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JUDGMENT OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT (SEPTEMBER 19, 2019)

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

CHRIMAR SYSTEMS, INC.,

Appellant,

v.

JUNIPER NETWORKS, INC.,
RUCKUS WIRELESS, INC., NETGEAR, INC.,

Appellees.

2018-1499, 2018-1500, 2018-1503, 2018-1984

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2016-01389, IPR2016-01391, IPR2016-01397, IPR2016-01399, IPR2017-00719

Before: TARANTO, CLEVENGER, and HUGHES, Circuit Judges.

THIS CAUSE having been heard and considered, it is

ORDERED and ADJUDGED:

PER CURIAM (TARANTO, CLEVENGER, and HUGHES, Circuit Judges).

AFFIRMED. *See* Fed. Cir. R. 36.

ENTERED BY ORDER OF THE COURT

/s/ Peter R. Marksteiner
Clerk of Court

Date: September 19, 2019

FINAL WRITTEN DECISION OF UNITED STATES PATENT TRIAL AND APPEAL BOARD ON ’760 PATENT–35 U.S.C. § 318(A) AND 37 C.F.R. § 42.73 (APRIL 26, 2018)

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC., RUCKUS WIRELESS, INC., BROCADE COMMUNICATION SYSTEMS, INC., and NETGEAR, INC.,

Petitioner,

v.

CHRIMAR SYSTEMS, INC.,

Patent Owner.

Case IPR2016-01399[1]
Patent 8,902,760 B2

Before: Karl D. EASTHOM, Gregg I. ANDERSON, and Robert J. WEINSCHENK, Administrative Patent Judges.

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[1] Ruckus Wireless, Inc., Brocade Communication Systems, Inc., and Netgear, Inc. filed a petition in IPR2017-00719 (now terminated), and were joined to this proceeding.

WEINSCHENK, Administrative Patent Judge.

I. Introduction

Juniper Networks, Inc. filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1, 31, 37, 59, 69, 72, 73, 106, 112, 134, 142, and 145 of U.S. Patent No. 8,902,760 B2 (Ex. 1001, "the '760 patent"). Chrimar Systems, Inc. ("Patent Owner") filed a Preliminary Response (Paper 6, "Prelim. Resp.") to the Petition. On January 4, 2017, we instituted an *inter partes* review of claims 1, 31, 37, 59, 69, 72, 73, 106, 112, 134, 142, and 145 ("the challenged claims") of the '760 patent on the following grounds:

Claims	Statutory Basis	Applied References
1, 31, 37, 59, 69, 72, 73, 106, 112, 134, 142, and 145	35 U.S.C. § 103(a)[2]	Hunter et al., PCT Publication No. WO 96/23377 (published Aug. 1, 1996) (Ex. 1003, "Hunter"); and Bulan et al., U.S. Patent No. 5,089,927 (issued Feb. 18, 1992) (Ex. 1004, "Bulan")
1, 31, 37, 59, 69, 72, 73, 106, 112,	35 U.S.C. § 103(a)	Bloch et al., U.S. Patent No. 4,173,714 (issued Nov. 6, 1979) (Ex. 1005, "Bloch"); The Institute of Electrical and

[2] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, which was enacted on September 16, 2011, made amendments to 35 U.S.C. §§ 102, 103. AIA § 3(b), (c). Those amendments became effective eighteen months later on March 16, 2013. *Id.* at § 3(n). Because the application from which the '760 patent issued was filed before March 16, 2013, any citations herein to 35 U.S.C. §§ 102, 103 are to their pre-AIA versions.

134, 142, and 145		Electronics Engineers, Inc., IEEE Standard 802.3-1993 (1993) (Ex. 1006, "IEEE 802.3-1993"); and The Institute of Electrical and Electronics Engineers, Inc., IEEE Standard 802.3u-1995 (1995) (Exs. 1007-1008, "IEEE 802.3-1995")
1, 31, 37, 59, 69, 72, 73, 106, 112, 134, 142, and 145	35 U.S.C. § 103(a)	Bloch; IEEE 802.3-1993; IEEE 802.3-1995; and Huizinga et al., U.S. Patent No. 4,046,972 (issued Sept. 6, 1977) (Ex. 1009, "Huizinga")

Paper 8 ("Dec. on Inst."), 20-21.

After institution, Ruckus Wireless, Inc., Brocade Communication Systems, Inc., and Netgear, Inc. filed a petition in IPR2017-00719 requesting an *inter partes* review of the challenged claims of the '760 patent and filed a motion requesting joinder to this case. Paper 25, 2. On March 16, 2017, we joined Ruckus Wireless, Inc., Brocade Communication Systems, Inc., and Netgear, Inc. to this case and terminated IPR2017-00719. *Id.* at 5-6. In this Decision, we refer to Juniper Networks, Inc., Ruckus Wireless, Inc., Brocade Communication Systems, Inc., and Netgear, Inc. collectively as Petitioner. Also, after institution, Patent Owner filed a Response (Paper 26, "PO Resp.") to the Petition, and Petitioner filed a Reply (Paper 33, "Pet. Reply") to the Response. An oral hearing was held on August 31, 2017, and a transcript of the hearing is included in the record. Paper 63 ("Tr.").

On September 18, 2017, an *ex parte* reexamination certificate issued for the '760 patent. Ex. 2056. The *ex parte* reexamination certificate amends independent claim 73 and dependent claim 145. *Id.* at 1:18-19, 1:23-2:9. The *ex parte* reexamination certificate also amends dependent claims 106, 112, 134, and 142, by virtue of their dependency from amended claim 73. *Id.* at 1:20-22. We instituted an *inter partes* review of claims 73, 106, 112, 134, 142, and 145, as originally issued, and, thus, we address the patentability of original claims 73, 106, 112, 134, 142, and 145 in this Decision.[3] *See infra* Sections II.C, II.D; 35 U.S.C. § 318(a) ("the Patent Trial and Appeal Board shall issue a final written decision with respect to the patentability of any patent claim challenged by the petitioner"). Petitioner, however, does not challenge the patentability of claims 73, 106, 112, 134, 142, and 145, as amended by the *ex parte* reexamination certificate, in the Petition. *See* Pet. 7. Therefore, we did not institute an *inter partes* review of amended claims 73, 106, 112, 134, 142, and 145, and we do not address the patentability of amended claims 73, 106, 112, 134, 142, and 145 in this Decision. *See infra* Section II.E; 35 U.S.C. § 318(a).

We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the

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[3] Patent Owner's amendment of original claims 73, 106, 112, 134, 142, and 145 in the *ex parte* reexamination also may be considered a concession of unpatentability, and, thus, a request for adverse judgment as to original claims 73, 106, 112, 134, 142, and 145. *See* 37 C.F.R. § 42.73(b)(3); *Bloom Eng'g Co. v. N. Am. Mfg. Co.*, 129 F.3d 1247, 1249 (Fed. Cir. 1997) ("the making of substantive changes in the claims is treated as an irrebuttable presumption that the original claims were materially flawed").

reasons set forth below, Petitioner has shown by a preponderance of the evidence that claims 1, 31, 37, 59, 69, and 72, and original claims 73, 106, 112, 134, 142, and 145 of the ’760 patent are unpatentable.

A. Related Proceedings

The parties indicate that the ’760 patent is the subject of several cases in the United States District Court for the Eastern District of Michigan, the United States District Court for the Eastern District of Texas, and the United States District Court for the Northern District of California. Pet. 1; Paper 5, 2-3; Ex. 1012. The parties also indicate that the following petitions for *inter partes* review are related to this case:

Case No.	**Involved U.S. Patent No.**
IPR2016-00569	U.S. Patent No. 8,942,107
IPR2016-00573	U.S. Patent No. 9,019,838
IPR2016-00574	U.S. Patent No. 8,902,760
IPR2016-00983	U.S. Patent No. 8,155,012
IPR2016-01151	U.S. Patent No. 9,019,838
IPR2016-01389	U.S. Patent No. 8,155,012
IPR2016-01391	U.S. Patent No. 8,942,107
IPR2016-01397	U.S. Patent No. 9,019,838
IPR2016-01425	U.S. Patent No. 8,155,012
IPR2016-01426	U.S. Patent No. 9,019,838

Pet. 1; Paper 5, 3.

B. The ’760 Patent

The ’760 patent relates to a system for managing, tracking, and identifying remotely located electronic equipment. Ex. 1001, 1:27-30. According to the ’760 patent, one of the difficulties in managing a computerized office environment is keeping track of a company’s electronic assets. *Id.* at 1:32-57. Previous systems for tracking electronic assets suffered from several deficiencies. *Id.* at 1:62-65. For example, previous systems could not determine the connection status or physical location of an asset and could only track assets that were powered-up. *Id.* at 1:65-2:2.

To address these deficiencies, the ’760 patent describes a system for tracking an electronic asset. *Id.* at 2:3-6, 3:23-27. In one embodiment described in the ’760 patent, the system includes a central module and a remote module. *Id.* at 3:27-30. The remote module attaches to the electronic asset and transmits a low frequency signal. *Id.* A receiver in the central module monitors the signal transmitted by the remote module and determines if the status or location of the electronic asset changes. *Id.* at 3:30-32, 3:34-40.

C. Illustrative Claim

Claims 1 and 73 are independent. Claim 1 is reproduced below.

> 1. A BaseT Ethernet system comprising:
>
> a piece of central BaseT Ethernet equipment;
>
> a piece of BaseT Ethernet terminal equipment;
>
> data signaling pairs of conductors comprising first and second pairs used to carry BaseT

> Ethernet communication signals between the piece of central BaseT Ethernet equipment and the piece of BaseT Ethernet terminal equipment, the first and second pairs physically connect between the piece of BaseT Ethernet terminal equipment and the piece of central BaseT Ethernet equipment, the piece of central BaseT Ethernet equipment having at least one DC supply, the piece of BaseT Ethernet terminal equipment having at least one path to draw different magnitudes of current flow from the at least one DC supply through a loop formed over at least one of the conductors of the first pair and at least one of the conductors of the second pair, the piece of central BaseT Ethernet equipment to detect at least two different magnitudes of the current flow through the loop and to control the application of at least one electrical condition to at least two of the conductors.

Ex. 1001, 17:16-36.

II. Analysis

A. Level of Ordinary Skill in the Art

Petitioner argues that a person of ordinary skill in the art would have had "at least a B.S. degree in electrical engineering or computer science, or the equivalent, and at least three years of experience in the design of network communication products." Pet. 5. Petitioner also argues that a person of ordinary skill in the art would have been "familiar with, *inter alia*, data communications protocols, data communications standards (and standards under development at the time), and the behavior and use of common data communications products available on the market." *Id.* (citing Ex. 1002 ¶¶ 49-51). Patent Owner argues that a person of ordinary skill in the art would have had "a B.S. degree (or equivalent) in electrical engineering or computer science, and three years of experience in the design of network communications products." PO Resp. 14 (citing Ex. 2038 ¶ 26). Patent Owner also argues that a person of ordinary skill in the art would have been "familiar with data communications protocols, data communications standards (and standards under development at the time, including the 802.3 standard), and the behavior of data communications products available on the market." PO Resp. 14 (citing Ex. 2038 ¶ 26).

Patent Owner indicates that the only difference between the parties' respective definitions of the level of ordinary skill in the art is that Petitioner uses the phrase "at least." PO Resp. 14. According to Patent Owner, the phrase "at least" is "too open ended" and "would result in an expert, who has a Ph.D. and 15 years of experience, being considered an ordinary artisan." *Id.* at 14-15. Patent Owner, however, does not identify any specific instance in which the difference between the parties' respective definitions of the level of ordinary skill in the art impacts the analysis or conclusions of either party, or either party's declarant, in this case. *See id.*

Our findings and conclusions in this case would be the same under either party's definition of the level of ordinary skill in the art. To the extent necessary, though, we adopt Patent Owner's definition, which is supported by the declaration of Dr. Vijay K.

Madisetti. *Id.*; Ex. 2038 ¶ 26. As such, we determine that a person of ordinary skill in the art would have had a B.S. degree (or equivalent) in electrical engineering or computer science and three years of experience in the design of network communications products, and would have been familiar with data communications protocols, data communications standards (and standards under development at the time, including the 802.3 standard), and the behavior of data communications products available on the market.

B. Claim Construction

The claims of an unexpired patent are interpreted using the broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144-45 (2016). In applying that standard, claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the specification. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An applicant may provide a different definition of the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read into the claims from the specification. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

1. BaseT

The challenged claims include the term "BaseT." *See, e.g.*, Ex. 1001, 17:16-36, 21:37-52. In a decision on institution in IPR2016-01391, which involves the same parties, we construed the term "BaseT" in a related patent to mean "twisted pair Ethernet in accordance with the 10BASE-T or 100BASE-T standards." *Juniper Networks, Inc. v. Chrimar Systems, Inc.*, Case IPR2016-01391, slip op. at 11-12 (PTAB Dec. 22, 2016) (Paper 9). Our construction is consistent with Petitioner's proposal that the term "BaseT" be construed to mean "10BASE-T and 100BASE-T." Pet. 6. Our construction also is consistent with the construction adopted by the United States District Court for the Eastern District of Texas ("District Court") in a related case. Ex. 2021, 18. Further, Patent Owner "does not contest" our construction. PO Resp. 19. We note that our findings and conclusions in this case are not dependent on a particular construction of the term "BaseT." Nonetheless, because neither party disputes our prior construction of that term, we adopt it in this case. Specifically, we construe the term "BaseT" in the challenged claims to mean "twisted pair Ethernet in accordance with the 10Base-T or 100Base-T standards."

2. Protocol

Claim 59 and original claim 134 recite "wherein at least one of the different magnitudes of current flow through the loop is part of a detection protocol." Ex. 1001, 20:61-63, 25:13-15. Patent Owner proposes construing the term "protocol" to mean "a mutually agreed upon method of communication." PO Resp. 18. Patent Owner argues that its proposed construction is supported by a document entitled "FYI on 'What is the Internet?'" produced by the User Services Working Group of the Internet Engineering Task Force. *Id.* (citing Ex. 2038 ¶ 104; Ex. 2047, 1). Petitioner responds that Patent Owner's proposed construction improperly "reads in a requirement that two devices use an agreed upon communication method," which is not supported by the claim language or the specification. Pet. Reply 21-22.

We agree with Petitioner that Patent Owner's proposed construction is not the broadest reasonable interpretation. First, Patent Owner does not direct us to any intrinsic evidence to support its proposed construction, but instead relies on a single piece of extrinsic evidence. PO Resp. 18. Specifically, Patent Owner cites to a document that discusses the term "protocol" in the context of explaining how "networks that make up the Internet" communicate with one another. Ex. 2047, 1. That, however, is not the context in which the term "protocol" is used in the '760 patent. For example, the '760 patent relates to tracking electronic equipment in an Ethernet network. Ex. 1001, 1:27-30, 17:16-36. As a result, we are not persuaded that the extrinsic evidence cited by Patent Owner establishes the meaning of the term "protocol" in the context of the '760 patent.

Second, Patent Owner's proposed construction addresses the term "protocol" in isolation from the remainder of the claim language. By limiting the term "protocol" to a mutually agreed upon method of communication, Patent Owner's proposed construction appears to require a communication protocol. Claims 59 and 134, though, recite a <u>detection</u> protocol, not a <u>communication</u> protocol. *Id.* at 20:61-63, 25:13-15. Claims 59 and 134 further specify that the detection protocol is based on at least one magnitude of current flow detected by the central Base-T Ethernet equipment. *Id.* Patent owner does not explain specifically why the central Base-T Ethernet equipment must mutually agree upon a method of communication with other network equipment to detect a magnitude of current flow. *See* PO Resp. 18; Pet. Reply 21-22.

Third, the specification of the '760 patent indicates that the detection protocol does not require a mutually agreed upon method of communication. For example, the '760 patent describes one embodiment as follows:

> The existence of a connection between hub 1 and central module 15a is monitored by test voltage source 64 and test voltage monitor 66 through a pair of receive data lines. Current from test voltage source 64 flows through a data line to an isolation transformer within hub 1. The current flows through the primary winding of the isolation transformer and returns on the other receive data line to the test voltage monitor 66. An interruption in the flow of current is detected by the test voltage monitor 66. . . . Similarly, current sourced onto a transmit line from signal modulator 7 and isolation power supply 8 through remote module 16a to the isolation transformer of PC 3A which returns on the other transmit line is monitored by test voltage monitor 84 to verify that both remote module 16a and PC 3A are connected to central module 15a.

Ex. 1001, 8:6-24 (emphases added). In other words, central module 15a (*i.e.*, the central piece of network equipment) monitors the existence of connections with hub 1, remote module 16a, and PC 3A simply by detecting interruptions in the DC current flow between central module 15a and those other pieces of network equipment. *Id.* Thus, the detection protocol described in at least this embodiment of the '760 patent does not require a mutually agreed upon method of communication.

For the foregoing reasons, we do not adopt Patent Owner's proposed construction of the term "protocol." Specifically, we determine that the term "protocol" in claims 59 and 134 is not limited to a mutually agreed upon method of communication.[4] We also determine that further construction of

the term "protocol" is not necessary to resolve the parties' dispute regarding claims 59 and 134 in this case. *See infra* Section II.C.5; *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

3. Powered-Off

Claim 72 and original claim 145 recite "wherein the piece of BaseT Ethernet terminal equipment is a powered-off piece of BaseT Ethernet equipment." Ex. 1001, 21:33-36, 25:46-49. In a decision on institution in IPR2016-01391, which involves the same parties, we construed the term "powered-off" in a related patent to mean "without operating power." *Juniper Networks*, Case IPR2016-01391, slip op. at 9-10 (Paper 9). Our construction is consistent with Petitioner's proposal

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[4] Our determination that the term "protocol" does not require a mutually agreed upon method of communication is consistent with the opinion of Patent Owner's expert in a related district court case that "[i]n the context of these claims, 'detection protocol' means that the equipment is configured or designed so that the magnitude of the current (flow) or the impedance in the path allow it to detect or determine some information about the equipment at the other end of the path." Ex. 2020, 9.

that the term "powered-off" be construed to mean "without operating power." Pet. 6. Our construction also is consistent with the construction adopted by the District Court in a related case. Ex. 2021, 20.

The parties do not dispute our previous construction, but the parties' arguments indicate that our interpretation of "without operating power" requires further clarification. Pet. 6; PO Resp. 16-18; Pet. Reply 24-28. Specifically, Petitioner argues that "without operating power" allows for power to be applied to the Base-T Ethernet terminal equipment (Pet. 6), such as power for a component of the Base-T Ethernet terminal equipment (Pet. Reply 24-28). Patent Owner contends that the phrase "without operating power" does not allow for operating power to be applied to the Base-T Ethernet terminal equipment. PO Resp. 17-18. We find that both parties' requested clarifications are supported by the intrinsic evidence. Specifically, the '760 patent indicates that power can be applied to a component of the Base-T Ethernet terminal equipment (as Petitioner contends), even though operating power is not applied to the Base-T Ethernet terminal equipment (as Patent Owner contends).

The '760 patent explains that one of the problems with previous tracking systems is that they could only track assets that were powered-up. Ex. 1001, 1:62-2:2. To address that problem, the '760 patent describes a tracking system that can "identify[] the location of network assets without applying power to the assets." *Id.* at 12:57-59 (emphasis added); *see also id.* at 5:4-6 ("identifying the existence and location of network assets without power being applied to the assets"). Specifically, the '760 patent describes a remote module that attaches to an electronic asset, such as a piece of Base-T Ethernet terminal equipment. *Id.* at 3:27-30. A central module then supplies a DC current for powering the remote module so that the central module can track the connection status of the remote module and the attached Base-T Ethernet terminal equipment. *Id.* at 5:39-43, 5:64-67, 8:6-24. Thus, the specification of the '760 patent describes applying power to the remote module even when the attached Base-T Ethernet terminal equipment is powered-off.

Some of the aforementioned features of the '760 patent are included in claims 1 and 73, which recite that the piece of central Base-T Ethernet equipment has a "DC supply," and the piece of Base-T Ethernet terminal equipment has "at least one path to draw different magnitudes of current flow from the at least one DC supply." *Id.* at 17:26-30, 21:43-47. Notably, claims 1 and 73 do not recite a remote module separate from the Base-T Ethernet terminal equipment, thereby supporting Petitioner's position that the remote module is a component of the Base-T Ethernet terminal equipment. *Id.* Thus, we determine that the intrinsic evidence indicates that "without operating power" allows for power to be applied to a component of the Base-T Ethernet terminal equipment, but does not allow for operating power to be applied to the Base-T Ethernet terminal equipment.

For the foregoing reasons, we maintain our previous construction that the term "powered-off" in claims 72 and 145 means "without operating power." We clarify, though, that "without operating power" includes applying power to a component of the Base-T Ethernet terminal equipment, but does not include applying operating power to the Base-T Ethernet terminal equipment.

C. Obviousness of Claims 1, 31, 37, 59, 69, 72, 73, 106, 112, 134, 142, and 145 over Hunter and Bulan

Petitioner argues that claims 1, 31, 37, 59, 69, 72, 73, 106, 112, 134, 142, and 145 would have been obvious over Hunter and Bulan. Pet. 7. A claim is unpatentable as obvious under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) any objective indicia of non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

We have considered the parties' arguments and supporting evidence, and we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 31, 37, 59, 69, and 72, and original claims 73, 106, 112, 134, 142, and 145 would have been obvious over Hunter and Bulan.

1. Overview of Hunter and Bulan

Hunter relates to a system for providing power to terminal equipment in a computer network. Ex. 1003, Abstract, 16:26.[5] Hunter explains that power can be provided to terminal equipment in one of three ways. *Id.* at 16:26. First, a local power supply (*e.g.*, in the office) can provide power to the terminal equipment. *Id.* at 16:27-17:1. This is known as "local" power. *Id.* at 17:1-2. Second, power may be delivered to the terminal equipment using the same cable that carries data through the network. *Id.* at 17:2-3. This is known as "phantom" power. *Id.* at 17:3-5. Third, power may be delivered to the terminal equipment using a separate, dedicated power cable. *Id.* at 17:5-6. This is known as "third pair" power. *Id.* at 17:6-8.

Hunter explains that there are advantages and disadvantages to each type of power. *Id.* at 17:9-26. For example, the advantage of phantom power is that it does not require a dedicated power cable, but the disadvantage is that it must be implemented carefully to avoid potential interactions between the power and the data. *Id.* at 17:13-19. The advantage of third pair power is that it separates the power from the data, thereby avoiding potential interactions between them, but the disadvantage is that it requires a dedicated power cable, which can be expensive to install. *Id.* at 17:20-26.

Hunter describes a preferred embodiment in which phantom power is provided to terminal equipment using a 10Base-T Ethernet bus. *Id.* at 19:18-19, 21:17-18,

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[5] Petitioner cites to the original page numbers of Hunter, whereas Patent Owner cites to the page numbers that Petitioner added when Hunter was filed as Exhibit 1003 in this case. To avoid confusion, we cite to the original page numbers of Hunter.

37:19-20. 10Base-T is an IEEE Ethernet standard.[6] Ex. 1002 ¶ 100 n.5; Ex. 2038 ¶ 32. Hunter explains that the 10Base-T Ethernet bus comprises two twisted pair conductors, with one pair used for transmitting data from the terminal equipment and the other pair used for receiving data into the terminal equipment. Ex. 1003, 21:22-27, 37:20-26. In order to implement phantom power, Hunter teaches that the same two twisted pair conductors of the 10Base-T Ethernet bus that transmit data are used to deliver DC power to the terminal equipment. *Id.* at 21:27-29, 37:26-28. Hunter explains that its phantom power embodiment is not limited to networks that use the 10Base-T Ethernet standard and indicates that it "is also compatible with Ethernet® . . . , Token Ring® . . . , ATM, and isoEthernet® . . . standards." *Id.* at 21:17-21, 26:3-11.

Hunter further describes the preferred embodiment as including a current protection circuit. *Id.* at 22:27-23:7, 38:12-20. The current protection circuit can be a resettable device, such as a thermistor or polyfuse, which protects both the power supply and the bus from a potentially damaging overcurrent. *Id.* at 23:3-6, 38:15-19.

Bulan relates to an improved current protection circuit. Ex. 1004, 2:9-14. Bulan explains that a typical current protection circuit with just a single threshold value, such as the one described in Hunter, is inadequate because it cannot distinguish between a normal power up event for a DC-to-DC converter and an operational fault. *Id.* at 1:26-31, 1:52-2:8. As a result,

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[6] Thus, contrary to Patent Owner's argument that the asserted prior art relates to telephone technology (PO Resp. 4), Hunter relates to Ethernet technology.

a typical current protection circuit may stop current from flowing during a normal power up event and prevent the terminal equipment from starting properly, or may allow current to flow during an operational fault and jeopardize the terminal equipment. *Id.* at 1:65-2:8.

Bulan describes an improved current protection circuit that addresses the aforementioned problem. *Id.* at 2:9-14. Specifically, Bulan teaches a current control apparatus that detects whether DC current flow in a path exceeds static and dynamic current limits, and, if so, switches a high impedance into the path. *Id.* at 3:5-21, 4:35-40, 6:34-43. If the high impedance reduces the DC current flow to a trickle and then zero, the current control apparatus detects a normal start up event for a DC-to-DC converter and switches the high impedance out of the path to allow the terminal equipment to start up properly. *Id.* at 3:22-25, 4:62-5:1, 6:43-58. On the other hand, if the high impedance only reduces the DC current flow to a trickle, the current control apparatus detects an operational fault and keeps the high impedance in the path to protect the terminal equipment. *Id.*

2. Claims 1 and 73

Claim 1 recites "[a] BaseT Ethernet system" comprising "a piece of central BaseT Ethernet equipment" and "a piece of BaseT Ethernet terminal equipment." Ex. 1001, 17:16-18. Hunter teaches a 10Base-T Ethernet system with a piece of central 10Base-T Ethernet equipment, such as a hub, and a piece of 10Base-T Ethernet terminal equipment, such as an Integrated Services Terminal Equipment ("ISTE") device. Pet. 25-

29; Ex. 1003, 23:18-20, 32:7-9, 34:18-19, 37:19-28, 39:14-15, Figs. 1, 2.

Patent Owner responds that Petitioner does not show sufficiently that Hunter teaches a Base-T Ethernet system. PO Resp. 34-35, 45-47. Specifically, Patent Owner argues that Hunter repeatedly refers to "Ethernet® . . . ," but does not explain what the term "Ethernet® . . . " means. *Id.* at 34 (citing Ex. 1003, 12, 14, 21, 23, 28, 35, 36). Patent Owner contends that the term "Ethernet® . . . " in Hunter refers to the original trademarked version of Ethernet owned by Xerox Corporation, not the subsequent non-trademarked versions of Ethernet, such as 10Base-T and 100Base-T. PO Resp. 34 (citing Pet. 26; Ex. 1002 ¶ 101 n.6). In addition, Patent Owner alleges that "[w]hile Hunter mentions the terms '10Base-T' and '100Base-T,' he is referring to twisted pair wiring, not Ethernet." PO Resp. 46-47 (citing Ex. 1003, 21:22-24, 26:5-8, 51 (claim 3); Ex. 2038 ¶¶ 197-198).

Patent Owner's argument is not persuasive. Patent Owner does not dispute that the term "BaseT Ethernet" in claim 1 includes 10Base-T Ethernet. PO Resp. 18-19. As discussed above, Hunter teaches a 10Base-T Ethernet bus comprising two twisted pair conductors for the transmission of data. Pet. 25-30; Pet. Reply 11-12; Ex. 1003, 26:3-6, 37:19-28. For example, Hunter teaches the following:

> <u>In the illustrated embodiment, the bus comprises a 10Base-T bus. A 10Base-T bus conventionally comprises two twisted-pair conductors 240, 250, each used for uni-directional transmission of data</u>. Thus, in this embodiment, one of the twisted pairs (say, 250) is employed for transmitting data

> from the equipment 260, while the other of the twisted-pairs (say, 240) is used for receiving data into the equipment 260. The present invention preferably employs each of the twisted-pair conductors as a rail by which to deliver DC power to the equipment 260.

Ex. 1003, 37:19-28 (emphasis added). Thus, regardless of whether Hunter's use of the term "Ethernet®" includes 10Base-T Ethernet, Hunter independently teaches 10Base-T Ethernet. *Id.* Further, we are not persuaded that Hunter's use of the term "10Base-T" only refers to twisted pair wiring, not Ethernet, because Patent Owner and Patent Owner's declarant, Dr. Madisetti, acknowledge that 10Base-T is an IEEE <u>Ethernet</u> standard. PO Resp. 6; Ex. 1002 ¶ 100 n.5; Ex. 2038 ¶ 32.

Patent Owner also responds that Petitioner does not show sufficiently that Hunter teaches providing phantom power to Base-T Ethernet terminal equipment. PO Resp. 35-39. Patent Owner contends that the ISTE device in Figure 2 of Hunter (which Petitioner identifies as the Base-T Ethernet terminal equipment (Pet. 28)) is just an intermediate hub. PO Resp. 35-39. Patent Owner alleges that the only terminal equipment in Figure 2 of Hunter is voice instrument 299. *Id.* at 35 (citing Ex. 2038 ¶ 69). According to Patent Owner, when Figures 1 and 2 of Hunter are considered together, those figures "show phantom-power being delivered from a multimedia Hub ('120' in Hunter's Figure 1) through multiple connectors (each labelled '297' in Hunter's Figure 2) to an intermediate Hub ('150' in Hunter's Figure 1)." PO Resp. 37 (citing Ex. 2038 ¶ 71). Patent Owner concludes that "Hunter's phantom-power circuit does not connect to the phones ('end devices'), which are connected to the intermediate Hub through separate connectors (each labelled '298' in Hunter's Figure 2)." PO Resp. 37 (citing Ex. 2038 ¶ 71).

Patent Owner's argument is not persuasive. Patent Owner's argument focuses on the specific configuration shown in Figure 2 of Hunter. PO Resp. 35-39. But, as Petitioner explains in the Petition, Hunter is not limited to the configuration shown in Figure 2. Pet. 28-29. Hunter teaches generally supplying phantom power to network equipment. Ex. 1003, 19:2-7 ("[I]t is a primary object of the present invention to provide power subsystems for providing either phantom or third pair power to equipment coupled to a local area network."). For example, Hunter teaches that phantom power and data are delivered to network equipment using the two twisted pair conductors of the 10Base-T Ethernet bus (*id.* at 21:22-29), and that "[i]n an overall LAN, <u>many pieces of equipment</u>, each with its own third and fourth transformers, can take power as well as data from the bus" (*id.* at 21:11-13 (emphasis added)). Thus, regardless of the specific configuration shown in Figure 2, Hunter teaches providing phantom power to Base-T Ethernet terminal equipment.

In addition, even if Hunter is limited to the configuration shown in Figure 2, Hunter still teaches providing phantom power to Base-T Ethernet terminal equipment. Specifically, as discussed above, Hunter teaches that equipment 260 in Figure 2 of Hunter is an Integrated Services Terminal Equipment ("ISTE") device. Ex. 1003, 23:18-20, 39:14-15, Fig. 2. The fact that the "TE" in ISTE device stands for "Terminal Equipment" indicates by itself that equipment 260 is terminal equipment. *Id.* Further, Patent Owner proposed in the Preliminary Response that the term "Ethernet terminal equipment" be construed to mean a "device at which data transmission can originate or terminate and that is capable of Ethernet communication."[7] Prelim. Resp. 14. Consistent with that construction, the evidence of record indicates that Ethernet data transmissions can originate and terminate at the ISTE device in Hunter.[8] Pet. 28; Ex. 1002 ¶ 104; Ex. 1003, 37:19-28, 39:14-15. Further, Hunter teaches delivering phantom power to equipment 260 in Figure 2 over the same two twisted pair conductors 240, 250 of the 10Base-T Ethernet bus used to transmit data to equipment 260. *Id.* at 37:19-28, Fig. 2.

Moreover, even if Patent Owner were correct that voice instrument 299 is the only terminal equipment in Figure 2 of Hunter, Patent Owner's argument is not persuasive. Hunter teaches that the phantom power and data transmitted over the 10Base-T Ethernet bus are supplied to <u>both</u> equipment 260 <u>and</u> voice instrument 299. Pet. Reply 15; Ex. 1003, 38:25-27 ("A voice instrument 299 is therefore couplable to the

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7 Patent Owner does not propose a specific construction of the term "Ethernet terminal equipment" in the Response. *See* PO Resp. 16-19, 35-39. Nonetheless, Patent Owner's proposed construction in the Preliminary Response is consistent with Petitioner's proposed construction in the Petition (Pet. 28 ("because (10Base-T) Ethernet data transmissions can originate and terminate there")) and the District Court's construction (Ex. 2018, 13).

8 Hunter indicates that the ISTE device is compatible with ISDN standards, but Hunter does not indicate that the ISTE device is limited to ISDN standards. Ex. 1003, 23:18-24.

equipment 260 and receives both data and power therefrom.").

Claim 1 recites "data signaling pairs of conductors comprising first and second pairs used to carry BaseT Ethernet communication signals between the piece of central BaseT Ethernet equipment and the piece of BaseT Ethernet terminal equipment, the first and second pairs physically connect between the piece of BaseT Ethernet terminal equipment and the piece of central BaseT Ethernet equipment." Ex. 1001, 17:19-25. Hunter teaches that the piece of central 10Base-T Ethernet equipment and the piece of 10Base-T Ethernet terminal equipment are physically connected to a 10Base-T Ethernet bus with two twisted pair conductors for carrying power and data between the piece of central 10Base-T Ethernet equipment and the piece of 10Base-T Ethernet terminal equipment. Pet. 29-30; Ex. 1003, 36:6-12, 37:19-28, Fig. 2.

Patent Owner responds that Petitioner does not show sufficiently that the two twisted pair conductors of the 10Base-T bus in Hunter carry Base-T Ethernet communication signals, as required by claim 1. PO Resp. 40-41. Specifically, Patent Owner argues that hubs 140, 150, 160, 180 in Figure 1 of Hunter are connected to multimedia hub 120 through isoEthernet interfaces. *Id.* at 40 (citing Ex. 1003, 34:19-21, 35:14-16, 35:27-28, 36:13-17, 36:28-37:2). According to Patent Owner, isoEthernet interfaces only carry Integrated Services Digital Network ("ISDN") signals, not Ethernet signals. PO Resp. 40 (citing Ex. 1003, 17:15-18; Ex. 2038 ¶ 76). Patent Owner also argues that hub 170 in Figure 1 of Hunter is connected to multimedia hub 120 through a 10Base-F interface. PO Resp. 40-41 (citing Ex. 1003, 36:20). According to Patent Owner, a 10Base-F interface requires a fiber connection, and "fiber cannot carry electrical current." PO Resp. 41 (citing Ex. 2038 ¶ 78).

Patent Owner's argument is not persuasive. Patent Owner focuses on the embodiment shown in Figure 1 of Hunter. PO Resp. 40-41. Hunter, though, is not limited to that embodiment. Hunter teaches that preferably "the bus comprises a 10Base-T bus," but notes that "[t]hose of skill in the art will recognize . . . that the present invention is also compatible with Ethernet®, Token Ring®, ATM and isoEthernet® standards." Ex. 1003, 21:17-21, 26:3-11 (emphases added). Similarly, claim 3 of Hunter states that the "bus comprises a two-pair twisted-pair bus selected from the group consisting of: 10Base-T, Ethernet®, Token Ring®, ATM, 100Base-T, and isoEthernet®." Ex. 1003, 51 (emphases added). These portions of Hunter teach a network that preferably uses a 10Base-T Ethernet bus for connecting network equipment, but alternatively may use an isoEthernet bus. Therefore, contrary to Patent Owner's argument, Hunter is not limited to an embodiment in which network equipment is connected by isoEthernet interfaces.

Moreover, even if Hunter is limited to an embodiment in which network equipment is connected by isoEthernet interfaces, Patent Owner's argument still is not persuasive. As discussed above, Patent Owner alleges that isoEthernet interfaces only carry ISDN signals, not Ethernet signals. PO Resp. 40 (citing Ex. 1003, 17:15-18; Ex. 2038 ¶ 76). The evidence cited by Patent Owner, however, does not support that argument. The portion of Hunter cited by Patent Owner indicates that isoEthernet interfaces can carry ISDN signals, but does not establish that isoEthernet interfaces only carry ISDN signals. Ex. 1003, 15:15-18. Further, the portion of Dr. Madisetti's declaration cited by Patent Owner states that "isoEthernet used ISDN signals, not Ethernet signals," but Dr. Madisetti provides no support for that statement other than citing the same portion of Hunter discussed above. Ex. 2038 ¶ 76. In contrast, the documentary evidence that Petitioner submitted with the Petition (Pet. iii (exhibit list); Pet. Reply 12) indicates that isoEthernet includes a 10Base-T mode in which the "IsoEthernet layer functions as a 10Base-T transceiver" (Ex. 1010, 165).[9] As a result, even if we accept Patent Owner's premise that hub 120 in Figure 1 of Hunter communicates with hubs 140, 150, 160, 180 using isoEthernet interfaces, the evidence of record indicates that isoEthernet interfaces carry 10Base-T Ethernet signals at least when used in the 10Base-T mode of isoEthernet.

Patent Owner's argument regarding 10Base-T hub 170 in Figure 1 of Hunter also is not persuasive for an additional reason. As discussed above, Patent Owner alleges that 10Base-T hub 170 is connected to multimedia hub 120 only through a 10Base-F interface. PO Resp. 40-41 (citing Ex. 1003, 36:20). The evidence cited by Patent Owner, however, does not support that argument. The cited portion of Hunter states that "[t]he 10Base-T hub 170 further provides an Ethernet® AU interface and a single 10Base-F network interface." Ex. 1003, 34:18-20 (emphasis added). The phrase "further provides" in this portion of Hunter indicates that 10Base-T hub 170 includes an AU interface and a 10Base-F interface, but does not establish that

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[9] We cite to the page numbers that Petitioner added to Exhibit 1010. Also, like Hunter, Exhibit 1010 refers to the IEEE 802.9a standard for isoEthernet. Ex. 1003, 15:15-18; Ex. 1010, 160.

10Base-T hub 170 only includes an AU interface and a 10Base-F interface. *Id.* Further, Hunter teaches that multimedia hub 120 includes a 10Base-T repeater, and Figure 1 of Hunter shows that the 10Base-T repeater in multimedia hub 120 is connected to 10Base-T hub 170 over the 10Base-T Ethernet bus. Pet. Reply 11-12; Ex. 1003, 26:3-8, 32:16-27, 34:18-20, 37:19-28, Fig. 1. This indicates that the 10Base-T Ethernet bus in Hunter carries 10Base-T Ethernet signals from the 10Base-T repeater in multimedia hub 120 to 10Base-T hub 170.

At the oral hearing, Patent Owner further argued that, although Hunter teaches a 10Base-T Ethernet bus, Hunter does not teach that the 10Base-T Ethernet bus carries both 10Base-T Ethernet signals and DC power. Tr. 126:9-127:11. According to Patent Owner, when the 10Base-T Ethernet bus carries DC power, it only carries ISDN signals. *Id.* at 128:22-129:3. Patent Owner reads Hunter too narrowly. For example, Hunter teaches the following:

> In the illustrated embodiment, the bus comprises a 10Base-T bus. A 10Base-T bus conventionally comprises two twisted-pair conductors 240, 250, each used for unidirectional transmission of data. Thus, in this embodiment, one of the twisted pairs (say, 250) is employed for transmitting data from the equipment 260, while the other of the twisted-pairs (say, 240) is used for receiving data into the equipment 260. The present invention preferably employs each of the twisted-pair conductors as a rail by which to deliver DC power to the equipment 260.

Ex. 1003, 37:19-28 (emphases added). In other words, Hunter teaches generally that the 10Base-T Ethernet bus can deliver DC power over the same two twisted pair conductors used to transmit data. *Id.* at 21:22-29, 37:19-28. We, therefore, do not read Hunter as teaching that the 10Base-T Ethernet bus can only carry DC power with ISDN signals. Rather, as discussed above, Hunter indicates that isoEthernet and ISDN are just alternatives to a preferred embodiment that uses 10Base-T Ethernet. *Id.* at 21:17-21 ("also compatible with . . . isoEthernet®"); *id.* at 26:3-11 ("also compatible with . . . isoEthernet®"); *id.* at 39:15-16 ("compatible with ISDN standards").

Claim 1 recites "the piece of central BaseT Ethernet equipment having at least one DC supply, the piece of BaseT Ethernet terminal equipment having at least one path to draw different magnitudes of current flow from the at least one DC supply through a loop formed over at least one of the conductors of the first pair and at least one of the conductors of the second pair." Ex. 1001, 17:26-32. Hunter teaches that the piece of central 10Base-T Ethernet equipment includes a DC supply. Pet. 30; Ex. 1003, 35:27-36:1, 37:26-28, 52 (claim 5). Hunter also teaches that the piece of 10Base-T Ethernet terminal equipment includes a DC-to-DC converter and draws current flow from the DC supply through a loop formed over the two twisted pair conductors of the 10Base-T Ethernet bus. Pet. 13, 30-34; Ex. 1002 ¶¶ 109-111; Ex. 1003, 35:27-38:25, 39:5-8. Bulan teaches that a typical piece of terminal equipment includes a DC-to-DC converter that draws different magnitudes of current flow from a DC supply. Pet. 11-13; Ex. 1002 ¶¶ 70, 74; Ex. 1004, 1:52-65.

Patent Owner responds that Petitioner does not show sufficiently that Hunter teaches a path by which a piece of Base-T Ethernet terminal equipment draws different magnitudes of current flow from a DC supply. PO Resp. 47-49. Specifically, Patent Owner refers back to its previous argument, discussed above, that Hunter does not teach providing phantom power to Ethernet terminal equipment. *Id.* at 47. Patent Owner also argues that, even if voice instrument 299 in Figure 2 of Hunter is a piece of Base-T Ethernet terminal equipment, "Hunter's phantom power path does not connect to it." *Id.* at 47-49 (citing Ex. 2038 ¶ 201; Ex. 2039, 84:22-85:21).

Patent Owner's argument is not persuasive. As discussed above, Hunter teaches generally providing phantom power to Ethernet terminal equipment, and is not limited to the configuration shown in Figure 2. Ex. 1003, 19:2-7, 21:11-13, 21:22-29. Further, as also discussed above, Hunter indicates that equipment 260 in Figure 2 is terminal equipment (*id.* at 23:18-20, 39:14-15, Fig. 2), and there is no dispute that Hunter teaches a path for delivering phantom power to equipment 260 (*id.* at 37:19-28, Fig. 2). Moreover, Hunter also teaches that the path for delivering phantom power connects to voice instrument 299. Pet. Reply 15; Ex. 1003, 38:25-27 ("A voice instrument 299 is therefore couplable to the equipment 260 and receives both data and power therefrom.").

Claim 1 recites "the piece of central BaseT Ethernet equipment to detect at least two different magnitudes of the current flow through the loop and to control the application of at least one electrical condition to at least two of the conductors." Ex. 1001, 17:32-36. Bulan teaches a current control apparatus that detects whether DC current flow in a path exceeds static and dynamic current limits, and, if so, applies an electrical condition by switching a high impedance into the path. Pet. 12, 22-23, 32-33, 35; Ex. 1004, 3:5-21, 4:35-40, 6:34-43. Bulan teaches that, if the high impedance reduces the DC current flow to a trickle and then zero, the current control apparatus detects a normal start up event for a DC-to-DC-converter and applies an electrical condition by switching the high impedance out of the path. Pet. 12-13, 23, 33-35; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58. In contrast, Bulan teaches that, if the high impedance only reduces the DC current flow to a trickle, the current control apparatus detects an operational fault and keeps the high impedance in the path. Pet. 12, 23, 33, 35; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58. By combining the current control apparatus of Bulan with the central piece of network equipment of Hunter, as Petitioner proposes (*see infra* Section II.C.8), the current control apparatus of Bulan detects the aforementioned different magnitudes of DC current flow and applies the aforementioned electrical conditions via at least one of the contacts of the first and second pairs of the 10Base-T Ethernet bus of Hunter. Pet. 15, 31-32; Ex. 1002 ¶¶ 78-79, 109-111. Other than the arguments discussed above, Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 1.

Original claim 73 recites limitations similar to those discussed above for claim 1. Ex. 1001, 21:37-52. Petitioner identifies evidence showing that the combination of Hunter and Bulan teaches the limitations of original claim 73. Pet. 42. Our analysis of the limitations of claim 1 applies to the similar limitations of original claim 73. Patent Owner raises the same arguments for original claim 73 that we discussed above for claim 1. For the same reasons discussed above, Patent Owner's arguments are not persuasive.

3. Claims 31 and 106

Claim 31 depends from claim 1, and recites "wherein the BaseT Ethernet terminal equipment comprises a controller coupled to the at least one path." Ex. 1001, 19:34-36. Original claim 106 depends from original claim 73, and recites a similar limitation. *Id.* at 23:53-55. The evidence of record demonstrates that it would have been obvious to a person of ordinary skill in the art that the piece of 10Base-T Ethernet terminal equipment in Hunter includes a controller coupled to the path. Pet. 35-36; Ex. 1002 ¶ 120; Ex. 1003, 10:12-14. Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 31 and original claim 106.

4. Claims 37 and 112

Claim 37 depends from claim 1, and recites "wherein one or more magnitudes of the current flow through the loop represent information about the piece of BaseT Ethernet terminal equipment." Ex. 1001, 19:52-55. Original claim 112 depends from original claim 73, and recites a similar limitation. *Id.* at 24:3-6. Hunter teaches that the piece of 10Base-T

Ethernet terminal equipment includes a DC-to-DC converter and draws current flow from the DC supply through a loop formed over the two twisted pair conductors of the 10Base-T Ethernet bus. Pet. 13, 30-34; Ex. 1002 ¶¶ 109-111; Ex. 1003, 35:27-38:25, 39:5-8. Bulan teaches that the current control apparatus detects information about the Ethernet terminal equipment based on the magnitudes of current flow through the loop, such as whether the Ethernet terminal equipment is experiencing an overcurrent condition, and, if so, whether the overcurrent condition is due to a normal start up event or an operational fault. Pet. 12-13, 22-23, 32-37; Ex. 1004, 3:5-25, 4:35-40, 4:62-5:1, 6:34-58.

Patent Owner repeats its previous argument that the ISTE device in Hunter is not a piece of Base-T Ethernet terminal equipment. PO Resp. 50 (citing Ex. 2038 ¶ 207). Patent Owner's argument is not persuasive because, as discussed above, the ISTE device in Hunter is a piece of Base-T Ethernet terminal equipment. *See supra* Section II.C.2. Further, Patent Owner acknowledges that current flow through the loop "provides information about the ISTE Card." PO Resp. 51.

Patent Owner repeats its previous argument that, even if voice instrument 299 in Hunter is a piece of Base-T Ethernet terminal equipment, Hunter does not teach that the loop of current flow includes voice instrument 299. PO Resp. 50-51 (citing Ex. 2038 ¶ 207). Patent Owner's argument is not persuasive because, as discussed above, Hunter teaches that the path for delivering phantom power connects to voice instrument 299. *See supra* Section II.C.2.

Patent Owner also argues that an event that causes an overcurrent condition "could occur anywhere in the extended circuit leading from the Bulan hub to the ISTE card and back to the Bulan hub," and, thus, "Bulan cannot distinguish a short in the wiring from short in a device, such as the ISTE Card." PO Resp. 51 (citing Ex. 1004, 1:26-31; Ex. 2038 ¶ 209; Ex.

2039, 160:17-161:14). Patent Owner's argument is not persuasive. As discussed above, Bulan teaches that the current flow through the loop indicates whether the Ethernet terminal equipment is experiencing an overcurrent condition, and, if so, whether the overcurrent condition is due to a normal start up event for a DC-to-DC converter or an operational fault. Pet. 12-13, 22-23, 32-37; Ex. 1004, 3:5-25, 4:35-40, 4:62-5:1, 6:34-58. Regardless of whether the overcurrent condition arose in the ISTE device or somewhere else in the circuit, the fact that the ISTE card (or another piece of terminal equipment) is experiencing an overcurrent condition is information about the Base-T Ethernet terminal equipment, as required by claim 37 and original claim 112. Pet. Reply 21; Ex. 1046 ¶ 88.

5. Claims 59 and 134

Claim 59 depends from claim 1, and recites "wherein at least one of the different magnitudes of current flow through the loop is part of a detection protocol." Ex. 1001, 20:61-63. Original claim 134 depends from original claim 73, and recites a similar limitation. *Id.* at 25:13-15. Bulan teaches that the current control apparatus detects whether DC current flow in a path exceeds static and dynamic current limits, and, if so, switches a high impedance into the path. Pet. 12, 22-23, 32-33, 35, 38; Ex. 1004, 3:5-21, 4:35-40, 6:34-43. Bulan also teaches that, if the high impedance reduces the DC current flow to a trickle and then zero, the current control apparatus detects a normal start up event, whereas, if the high impedance only reduces the DC current flow to a trickle, the current control apparatus detects an operational fault.

Pet. 12-13, 23, 33-35, 38; Ex. 1002 ¶ 127; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58.

Patent Owner responds that Petitioner "do[es] not identify any mutually agreed upon protocol, and do[es] not explain how Bulan and the TE are communicating using such a protocol." PO Resp. 52 (Ex. 2038 ¶ 212). Patent Owner's argument is not persuasive. Patent Owner's argument is premised on its proposed construction of the term "protocol," which we do not adopt. *See supra* Section II.B.2. Specifically, as discussed above, we determine that the term "protocol" is not limited to a mutually agreed upon method of communication. *See id.* Patent Owner does not provide any other specific reason why the aforementioned teachings of Bulan would not have been considered a detection protocol. *See* PO Resp. 52.

6. Claims 69 and 142

Claim 69 depends from claim 1, and recites "wherein the piece of central BaseT Ethernet equipment to distinguish the piece of BaseT Ethernet terminal equipment from at least one other piece of BaseT Ethernet terminal equipment." Ex. 1001, 21:22-25. Original claim 142 depends from original claim 73, and recites a similar limitation. *Id.* at 25:36-39. Bulan teaches that the current control apparatus determines whether DC current flow exceeds static and dynamic current limits, and, thus, distinguishes one piece of terminal equipment that is experiencing an overcurrent condition from other pieces of terminal equipment that are not experiencing an overcurrent condition. Pet. 12, 22-23, 32-33, 35, 39; Ex. 1002 ¶ 128; Ex. 1004, 3:5-21, 4:35-40, 6:34-43. Bulan also teaches that the current control apparatus detects whether a piece of terminal equipment is experiencing a normal start up event or an operational fault, thereby distinguishing different pieces of terminal equipment that are experiencing different types of overcurrent conditions. Pet. 12-13, 23, 33-35, 39; Ex. 1002 ¶ 128; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58. Further, Bulan teaches that the current control apparatus observes an iterative pattern that is unique to a particular piece of terminal equipment, and, thus, distinguishes that piece of terminal equipment from other pieces of terminal equipment. Pet. 39; Ex. 1002 ¶ 128; Ex. 1004, 7:7-13.

Patent Owner responds that the current control apparatus in Bulan does not distinguish one piece of Base-T Ethernet terminal equipment from another because "the Bulan circuit does not have any information on where the current surges are coming from in the network." PO Resp. 53 (citing Ex. 2038 ¶¶ 214-215). Patent Owner's argument is not persuasive. Hunter teaches that the central piece of network equipment can include a separate current protection circuit for each piece of Base-T Ethernet terminal equipment. Pet. Reply 20-21; Ex. 1003, 42:21-23; Ex. 1046 ¶ 87. Further, as discussed above, Bulan teaches that the current control apparatus observes an iterative pattern that is "peculiar to the particular terminal equipment being connected to the line." Ex. 1004, 7:7-13 (emphasis added). Thus, in the proposed combination of Hunter and Bulan, the central piece of network equipment includes a separate current control apparatus that detects an overcurrent condition for each piece of Base-T Ethernet terminal equipment, thereby allowing the central piece of network equipment to distinguish one piece of Base-T Ethernet terminal equipment from another. Ex. 1046 ¶ 87. Further, regardless of whether the overcurrent condition arose in a piece of

Base-T Ethernet terminal equipment or somewhere else in the circuit, the fact that the piece of Base-T Ethernet terminal equipment is experiencing an overcurrent condition distinguishes it from others that are not. Pet. Reply 21; Ex. 1046 ¶ 88.

7. Claims 72 and 145

Claim 72 depends from claim 1, and recites "wherein the piece of BaseT Ethernet terminal equipment is a powered-off piece of BaseT Ethernet equipment." Ex. 1001, 21:33-36. Original claim 145 depends from original claim 73, and recites a similar limitation. *Id.* at 25:46-49. As discussed above, we construe the term "powered-off" in claim 72 and original claim 145 to mean "without operating power." *See supra* Section II.B.3. We also clarify that "without operating power" includes applying power to a component of the Base-T Ethernet terminal equipment, but does not include applying operating power to the Base-T Ethernet terminal equipment. *See id.*

Hunter teaches that the piece of 10Base-T Ethernet terminal equipment includes a DC-to-DC converter that draws current from the DC supply through a loop formed over the two twisted pair conductors of the 10Base-T Ethernet bus. Pet. 13, 30-34, 40-42; Ex. 1002 ¶¶ 109-111; Ex. 1003, 35:27-38:25, 39:5-8. Bulan teaches that a piece of terminal equipment with a DC-to-DC converter, such as the one in Hunter, is not supplied with operating power until the DC-to-

DC converter completes its startup.[10] Pet. 40-42; Ex. 1002 ¶¶ 132-133; Ex. 1003, 38:28-39:8, Ex. 1004, 1:52-62, 6:65-7:14. Bulan also teaches that the detection of the different magnitudes of DC current flow and the application of the electrical conditions discussed above (*see supra* Section II.C.2) occur before the DC-to-DC converter completes its startup, and, thus, before the terminal equipment is supplied with operating power. Pet. 40-42; Ex. 1002 ¶¶ 132-133; Ex. 1004, 1:52-62, 6:65-7:14.

Patent Owner responds that "[b]ecause Bulan supplies operating power to the converter <u>inside</u> the purported end device, Bulan is applying operating power to the 'piece of BaseT Ethernet terminal equipment,' and therefore, the 'piece of BaseT Ethernet terminal equipment' is not 'powered off.'" PO Resp. 54 (citing Ex. 2038 ¶ 217). According to Patent Owner, "[w]hether the device and the circuit beyond the DC-DC converter are actually operating is irrelevant to the claim requirements" because "[t]hat device—at least via its DC-DC converter—is drawing operating power." PO Resp. 57 (citing Ex. 2038 ¶ 222).

Patent Owner's argument is not persuasive. As discussed above, we clarify that "without operating power" includes applying some power to the Base-T Ethernet terminal equipment, such as applying power to a component of the Base-T Ethernet terminal equipment. *See supra* Section II.B.3. Patent Owner

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10 For example, Hunter explains that a DC-to-DC converter "convert[s] 48V to transistor-to-transistor logic ('TTL') voltage levels (*i.e.* 3V or 5V)." Ex. 1003, 39:5-8. Thus, the power applied to the DC-to-DC converter is not the same as the operating power applied to the Base-T Ethernet terminal equipment.

does not dispute that the DC-to-DC converter is just a component of the Base-T Ethernet terminal equipment, or that the Base-T Ethernet terminal equipment is not operational until the DC-to-DC converter completes its startup. *See* PO Resp. 57 ("[w]hether the device and the circuit beyond the DC-DC converter are actually operating is irrelevant"). Patent Owner also does not dispute that, when the current control apparatus detects the different magnitudes of DC current flow and applies the electrical conditions (*see supra* Section II.C.2), the DC-to-DC converter has not completed its startup. *See* PO Resp. 54-57. Thus, we determine that the combination of Hunter and Bulan teaches that the current control apparatus detects the different magnitudes of DC current flow and applies the electrical conditions when the Base-T Ethernet terminal equipment is without operating power. Our determination is consistent with Patent Owner's position in a related district court case that "[a] television, for example, is a 'powered-off end device' when it is turned off, even though it remains connected to AC power and current still flows through some of its components to allow the remote control to turn it on." Ex. 2021, 18-19.

Moreover, as discussed above, Bulan teaches that the current control apparatus switches a high impedance into the path when DC current flow exceeds static and dynamic current limits. Pet. 12, 22-23, 32-33, 35; Ex. 1004, 3:5-21, 4:35-40, 6:34-43. If the high impedance only reduces the DC current flow to a trickle, the current control apparatus keeps the high impedance in the path, thereby maintaining the current flow to a trickle. Pet. 12, 23, 33, 35; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58. If the DC current flow eventually reduces to zero, the current control apparatus switches the high impedance out of the path, thereby allowing current to flow again. Pet. 12-13, 23, 33-35; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58. In this example taught by Bulan, the current control apparatus detects two different magnitudes of current flow (*i.e.*, a trickle and then zero) and applies an electrical condition to the path (*i.e.*, switching the high impedance out of path) during a time period when there is at most a trickle of current applied to any component of the Base-T Ethernet terminal equipment.

8. Reasons for Combining Hunter and Bulan

Petitioner argues that a person of ordinary skill in the art would have had a reason to combine the cited teachings of Hunter and Bulan. Pet. 10-15. We agree with and adopt Petitioner's reasoning. Specifically, a person of ordinary skill in the art would have substituted the typical current protection circuit in Hunter with the improved current protection circuit in Bulan. *Id.* at 14-15. Hunter and Bulan relate to the same field of endeavor, which is powering network terminal equipment. *Id.* at 10; Ex. 1002 ¶ 68; Ex. 1003, Abstract; Ex. 1004, Abstract. Further, Bulan teaches that typical current protection circuits are inadequate because they cannot distinguish between a normal power up event for a DC-to-DC converter and an operational fault. Pet. 11; Ex. 1002 ¶ 70; Ex. 1004, 1:26-31, 1:52-2:8. As a result, a typical current protection circuit may stop current from flowing during a normal power up event and prevent network equipment from starting properly, or may allow current to flow during an operational fault and jeopardize network equipment. Pet. 11-12; Ex. 1002 ¶ 71; Ex. 1004, 1:65-2:8.

Hunter includes a typical current protection circuit that is a simple thermistor or polyfuse, and, thus, would have suffered from the deficiency identified in Bulan. Pet. 12; Ex. 1002 ¶ 72; Ex. 1003, 38:12-19. A person of ordinary skill in the art would have substituted the current protection circuit in Hunter with the current protection circuit in Bulan because a person of ordinary skill in the art would have recognized that "the Bulan current control apparatus would be a superior alternative to Hunter's existing protective device." Pet. 13; Ex. 1002 ¶¶ 74-75. Further, this substitution would have been a straightforward task with a reasonable expectation of success. Pet. 14-15; Ex. 1002 ¶¶ 76-79.

Patent Owner responds that a person of ordinary skill in the art would not have had a reason to combine the cited teachings of Hunter and Bulan. PO Resp. 19. The crux of Patent Owner's argument is that a person of ordinary skill in the art would not have had a reason to use phantom power for Ethernet terminal equipment. *Id.* at 19-32. However, as Patent Owner acknowledged at the oral hearing, the basis for Petitioner's proposed combination of Hunter and Bulan does not relate to using phantom power for Ethernet terminal equipment. Tr. 157:19-158:12. We explain in detail above that Hunter alone teaches using phantom power for Ethernet terminal equipment. *See supra* Section II.C.2. The proposed combination of Hunter and Bulan instead relates to substituting the current protection circuit in Hunter with the improved current protection circuit in Bulan. Pet. 10-15. Thus, any alleged issues with using phantom power for

Ethernet terminal equipment are not pertinent to the question of whether a person of ordinary skill in the art would have had a reason to combine the cited teachings of Hunter and Bulan in the manner proposed by Petitioner. As such, Patent Owner's argument is not persuasive. Nonetheless, we address each of Patent Owner's specific contentions in detail below, and we find that they also are not persuasive for additional reasons.

First, Patent Owner argues that the invention of the '760 patent is "directed to equipment networked over '<u>pre-existing</u> wiring or cables that connect pieces of networked computer equipment to a network.'" PO Resp. 19 (citing Pet. 3; Ex. 1002 ¶ 45) (emphasis added). According to Patent Owner, at the time of the '760 patent, a pre-existing Ethernet network would have contained millions of nodes that "commonly" included Bob Smith terminations and common mode chokes. PO Resp. 19-20 (citing Ex. 2038 ¶ 42; Ex. 2039, 43:20-44:2, 45:6-8, 193:6, 195:3-196:3). Patent Owner contends that supplying phantom power to Ethernet terminal equipment using a pre-existing Ethernet network, as proposed in Petitioner's combination of Hunter and Bulan, "would have burned out the existing Bob Smith terminations" and "would saturate the common mode chokes." PO Resp. 20-22 (citing Ex. 2038 ¶¶ 45, 47, 48).

Patent Owner's argument depends on the premise that the invention of the '760 patent is limited to equipment networked over pre-existing wiring or cables. PO Resp. 19-22. The specification and claims of the '760 patent, however, do not support that premise. The specification of the '760 patent states that "[t]his invention is <u>particularly adapted</u> to be used with an existing Ethernet communications link." Ex. 1001, 3:40-42. This portion of the '760 patent indicates that the system of the '760 patent, while particularly suited for use with an existing Ethernet network, is not limited to such a use. *Id.* Further, the challenged claims of the '760 patent do not require a pre-existing Ethernet network or pre-existing wiring or cables.[11] Tr. 107:18-111:6.

We also note that Patent Owner does not direct us to specific evidence indicating that the teachings of Hunter or Bulan are limited to Ethernet equipment networked over pre-existing wiring or cables. *See* PO Resp. 19-22. And Patent Owner acknowledged at the oral hearing that applying phantom power to "new" Ethernet terminal equipment would not have caused any problems with Bob Smith terminations or common mode chokes. Tr. 135:1-12. Thus, any alleged issues with Bob Smith terminations or common node chokes in a pre-existing Ethernet network are not pertinent to the question of whether a person of ordinary skill in the art would have had a reason to combine the cited teachings of Hunter and Bulan.

Moreover, even if we accepted Patent Owner's premise, Patent Owner's argument still is not persuasive. Patent Owner and Patent Owner's declarant, Dr. Madisetti, acknowledged that not all pre-existing Ethernet networks included Bob Smith terminations

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[11] At the oral hearing, Patent Owner argued that the '760 patent describes transmitting a low DC current, which, according to Patent Owner, would not have damaged Bob Smith terminations or common mode chokes. Tr. 111:7-22. Patent Owner, however, acknowledged that the challenged claims do not recite a limit on the magnitude of the DC current flow. *Id.* at 130:20-131:15.

or common mode chokes.[12] Tr. 115:19-116:3, 150:16-151:8; Ex. 1020, 55:19-56:2, 80:16-23. Further,

Petitioner's declarant, Mr. Ian Crayford, explains that, even for those preexisting Ethernet networks that did include Bob Smith terminations and/or common mode chokes, it would have been within the knowledge and capabilities of a person of ordinary skill in the art to implement phantom power without damaging the Bob Smith terminations or common mode chokes, such as by incorporating a blocking capacitor. Pet. Reply 4; Ex. 1046 ¶¶ 22-26.

Second, Patent Owner argues that a person of ordinary skill in the art seeking to supply operating power to Ethernet terminal equipment would have supplied that operating power over the unused lines in an Ethernet connection, rather than over the same lines used to transmit data. PO Resp. 22-26. Patent Owner alleges that a standard 10Base-T Ethernet network used eight lines, with four of the lines used to transmit data and the other four lines left unused. *Id.* at 24-26 (citing Pet. 50-51; Ex. 2038 ¶ 54; Ex. 2039, 70:23-71:3). According to Patent Owner, a person of ordinary skill would have provided operating power to Ethernet terminal equipment over the unused lines to avoid interference with the data signals. PO Resp. 23-24 (citing Ex. 1003, 19:20-22; Ex. 2038 ¶¶ 49-51; Ex. 2039, 138:16-139:11).

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[12] For example, as Petitioner explains (Pet. Reply 2-4), Bob Smith terminations and common mode chokes were used to satisfy electromagnetic emissions standards (Ex. 1046 ¶ 13), but those emissions standards also could have been satisfied <u>without</u> using Bob Smith terminations and common mode chokes (*id.* ¶¶ 18-21).

Patent Owner's argument is not persuasive. Hunter teaches a 10Base-T Ethernet bus that includes only two twisted pair conductors, both of which are used to transmit data. Ex. 1003, 37:19-28. Thus, contrary to Patent Owner's argument, the 10Base-T Ethernet bus in Hunter does not include any unused lines. *Id.* Further, Hunter teaches delivering DC power over the same lines of the 10Base-T Ethernet bus used to transmit data (*see supra* Section II.C.2) because it "has the advantage of not requiring the installation of a dedicated power cable" (Ex. 1003, 17: 13-26). Hunter even addresses Patent Owner's alleged concerns about interference by explaining that "a careful phantom power scheme must be implemented to avoid problems that may arise due to interactions between the power and the data." *Id.* Thus, although alternative ways of providing operating power to Ethernet terminal equipment may have existed (PO Resp. 23-26), that does not detract from the express teachings of Hunter. *See In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) ("[J]ust because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes."); *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004).

Third, Patent Owner argues that "[a]t the time of the invention, and for several years afterward, experts in the field were skeptical that operating power could be delivered to terminal equipment using the Ethernet data pairs . . . without disrupting the data propagation." PO Resp. 27 (citing Ex. 2038 ¶ 56). Specifically, Patent Owner relies on evidence relating to meetings of an IEEE committee. PO Resp. 27-31. In particular, Patent Owner explains that certain members of the committee identified the advantages of supplying power over unused lines (*id.* at 27-29 (citing Ex. 2040, 2-3; Ex. 2044, 3; Ex. 2048)), and identified the technical issues with supplying power over the data lines (PO Resp. 29 (citing Ex. 2044, 2)). Patent Owner also explains that at a meeting in March 2000, "no one brought a motion seeking to apply power to the data-carrying pairs," (PO Resp. 28 (citing Ex. 2041, 3) (emphasis omitted)), and that it was only in July 2000, after 250 hours of investigation, that the committee was "convinced that putting power on the data pairs was technically feasible without affecting the propagation of Ethernet data" (PO Resp. 30-31 (citing Ex. 2045, 1, 3; Ex. 2046, 2)).

Patent Owner's argument is not persuasive. The evidence cited by Patent Owner relates to whether certain IEEE committee members believed that phantom power should be adopted as an Ethernet standard, not whether phantom power would work in an Ethernet network. PO Resp. 27-31; Ex. 2041, 3 ("The standard for DTE power distribution"). Further, although Patent Owner's evidence indicates that some IEEE committee members were in favor of adopting an Ethernet standard in which operating power was delivered over unused lines, Petitioner identifies evidence indicating that other committee members were in favor of using phantom power as the Ethernet standard. Pet. Reply 7; Ex. 1037, 3 ("Current will be injected via the center taps using a Phantom Power method on the TX and RX pairs."); Ex. 1040, 3 ("Power over signal pairs allows easier integration of discovery & power control circuitry onto the PHY."); Ex. 1046 ¶¶ 38-44. In any event, the fact that an alternative way of providing operating power to Ethernet terminal equipment existed and was considered for an IEEE standard does not detract from the express teachings of Hunter. *See Mouttet*, 686 F.3d at 1334; *Fulton*, 391 F.3d at 1200. Moreover, we note that, even if Patent Owner's evidence indicates some amount of skepticism, we determine that it does not outweigh the strong evidence of obviousness presented by Petitioner and discussed in this Decision. *See In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litigation*, 676 F.3d 1063, 1079 (Fed. Cir. 2012).

Fourth, Patent Owner argues that Petitioner does not show sufficiently "that Hunter had the 'problem' that the complex Bulan circuit allegedly solves." PO Resp. 42. More specifically, Patent Owner contends that the central piece of network equipment in Hunter does not need to be able to determine whether an overcurrent condition is due to a normal power up event or an operational fault. *Id.* at 42-43. Further, according to Patent Owner, Hunter teaches using a simpler thermistor or polyfuse (*id.* at 43-44 (citing Ex. 1003, 40:19-20), and a person of ordinary skill in the art would have been able to select the correct thermistor for a given circuit in order to prevent the thermistor from blocking the necessary start up current (PO Resp. 44-45 (citing Ex. 2038 ¶¶ 84-85)).

Patent Owner's argument is not persuasive. Hunter itself does not have to identify the problem that would have motivated a person of ordinary skill in the art to combine the cited teachings of Hunter and Bulan. *See KSR*, 550 U.S. at 417. Rather, "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *Id.* As discussed above, Bulan explains that a typical current protection circuit with just a single threshold value, such as the one taught by Hunter, cannot distinguish between a normal power up event for a DC-to-DC converter and an operational fault. Pet. 11-12; Ex. 1002 ¶¶ 70-72; Ex. 1003, 38:12-19; Ex. 1004, 1:26-31, 1:52-2:8; Tr. 13:3-15. Because the Base-T Ethernet terminal equipment in Hunter includes a DC-to-DC converter, the current protection circuit in Hunter would have suffered from the same problem described in Bulan. Pet. 13; Ex. 1002 ¶ 74; Ex. 1003, 39:5-8. As a result, even if Hunter does not require the more advanced current protection circuit taught by Bulan, a person of ordinary skill in the art would have recognized it as an improvement. Pet. 13; Ex. 1002 ¶¶ 74-75. Further, even if Bulan's current protection circuit was more complex than Hunter's simple thermistor or polyfuse, that alone does not negate the identified reason for combining the teachings of Hunter and Bulan. *See KSR*, 550 U.S. at 417 ("[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill."); *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) ("The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another.").

9. Summary

For the reasons discussed above, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 31, 37, 59, 69, and 72, and original claims 73, 106, 112, 134, 142, and 145 would have been obvious over Hunter and Bulan.

D. Obviousness of Claims 1, 31, 37, 59, 69, 72, 73, 106, 112, 134, 142, and 145 over Bloch, IEEE 802.3-1993, and IEEE 802.3-1995, and over Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995

Petitioner argues that claims 1, 31, 37, 59, 69, 72, 73, 106, 112, 134, 142, and 145 would have been obvious over Bloch, Huizinga, IEEE 802.31993, and IEEE 802.3-1995. Pet. 7. In the Decision on Institution, we explained that Petitioner demonstrated a reasonable likelihood of prevailing in showing that claims 1, 31, 37, 59, 69, and 72, and original claims 73, 106, 112, 134, 142, and 145 would have been obvious over Bloch, IEEE 802.31993, and IEEE 802.3-1995, even without Huizinga. Dec. on Inst. 16. Therefore, we instituted an *inter partes* review on the grounds that claims 1, 31, 37, 59, 69, and 72, and original claims 73, 106, 112, 134, 142, and 145 would have been obvious over Bloch, IEEE 802.3-1993, and IEEE 802.3-1995, <u>and</u> over Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995. *Id.* at 20-21.

We have considered the parties' arguments and supporting evidence, and we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 31, 37, 59, 69, and 72, and original claims 73, 106, 112, 134, 142, and 145 would have been obvious over Bloch, IEEE 802.3-1993, and IEEE 802.3-1995, and over Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995.

1. Overview of Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995

Bloch describes a system that comprises a control unit and a terminal connected by two communication channels with each communication channel having two conductors. Ex. 1005, Abstract. According to Bloch, "[p]ower feed and bi-directional signaling are accomplished simultaneously over the same four conductors used for the two communication channels without interference." *Id.* Although Bloch describes this phantom power circuit in the context of a key telephone system, Bloch explains that it "can find application in many different control unit/terminal applications." *Id.* at 4:49-52.

Bloch explains that the control unit detects DC current pulses applied to the conductors when the terminal switches a resistor into and out of the path. *Id.* at 5:44-55. The DC current pulses detected by the control unit provide information regarding the status of different elements of the terminal. *Id.* at 5:56-6:2. In response to the detected DC current pulses, the control unit applies voltage pulses to the conductors to control indicators in the terminal. *Id.* at 10:34-40, 11:1-5.

Huizinga also describes a key telephone system. Ex. 1009, 1:6-9. Huizinga explains that, when a user presses a button to select a telephone line, the terminal sends status information to the control unit. *Id.* at 5:29-39. In response, the control unit sends data to the terminal causing a lamp associated with the selected telephone line to light up. *Id.*

IEEE 802.3-1993 and IEEE 802.3-1995 describe a 10Base-T Ethernet network. Ex. 1006, 243; Ex. 1007,

23. In particular, IEEE 802.3-1993 and IEEE 802.3-1995 describe central network equipment, such as a 10Base-T repeater, and terminal equipment. Ex. 1006, 243, 267; Ex. 1007, 27; Ex. 1008, 303-304. IEEE 802.3-1993 and IEEE 802.3-1995 further describe an Ethernet connector comprising one pair of contacts (TD+ and TD-) used to transmit 10Base-T Ethernet communication signals and a second pair of contacts (RD+ and RD-) used to receive 10Base-T Ethernet communication signals. Ex. 1006, 266-267; Ex. 1007, 147-148.

2. Claims 1 and 73

Claim 1 recites "[a] BaseT Ethernet system" comprising "a piece of central BaseT Ethernet equipment" and "a piece of BaseT Ethernet terminal equipment." Ex. 1001, 17:16-18. IEEE 802.3-1993 and IEEE 802.3-1995 teach a Base-T Ethernet system with a piece of central Base-T Ethernet equipment, such as a Base-T repeater, and a piece of Base-T Ethernet terminal equipment, such as a piece of Data Terminal Equipment ("DTE"). Pet. 55-56; Ex. 1006, 243, 267; Ex. 1007, 27; Ex. 1008, 303-304. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 1.

Claim 1 recites "data signaling pairs of conductors comprising first and second pairs used to carry BaseT Ethernet communication signals between the piece of central BaseT Ethernet equipment and the piece of BaseT Ethernet terminal equipment, the first and second pairs physically connect between the piece of BaseT Ethernet terminal equipment and the piece of central BaseT Ethernet equipment." Ex. 1001, 17:19-

25. IEEE 802.3-1993 and IEEE 802.3-1995 teach a connector that physically connects the piece of central Base-T Ethernet equipment and the piece of Base-T Ethernet terminal equipment. Pet. 56-57; Ex. 1006, 266-267; Ex. 1007, 147-148; Ex. 1008, 303-304. IEEE 802.3-1993 and IEEE 802.3-1995 teach that the Ethernet connector comprises one pair of contacts (TD+ and TD-) used to transmit 10Base-T Ethernet communication signals and a second pair of contacts (RD+ and RD-) used to receive Base-T Ethernet communication signals. Pet. 56-57; Ex. 1006, 266-267; Ex. 1007, 147-148. Patent Owner does not dispute that the combination of Bloch, IEEE 802.31993, and IEEE 802.3-1995 teaches the above limitation of claim 1.

Claim 1 recites "the piece of central BaseT Ethernet equipment having at least one DC supply, the piece of BaseT Ethernet terminal equipment having at least one path to draw different magnitudes of current flow from the at least one DC supply through a loop formed over at least one of the conductors of the first pair and at least one of the conductors of the second pair." Ex. 1001, 17:26-32. Bloch teaches a control unit with a DC power supply. Pet. 57-58; Ex. 1005, 4:14-17, 6:3-10, 6:28-40, Fig. 1. Bloch teaches a terminal that draws different magnitudes of current flow from the DC power supply over two pairs of conductors by switching a resistor into and out of a path between the control unit and the terminal. Pet. 58-59; Ex. 1005, 5:20-30, 5:44-55, 6:3-10, 6:28-40, 9:6-22. By combining the circuit of Bloch with the Base-T Ethernet system of IEEE 802.3-1993 and IEEE 802.3-1995, as Petitioner proposes (*see infra* Section II.D.8), the terminal of Bloch draws the aforementioned different magnitudes of current flow via at least one of the conductors of the first and second pairs of the connector of IEEE 802.3-1993 and IEEE 802.3-1995. Pet. 51-53; Ex. 1002 ¶¶ 156-158. Patent Owner does not dispute that the combination of Bloch, IEEE 802.31993, and IEEE 802.3-1995 teaches the above limitation of claim 1.

Claim 1 recites "the piece of central BaseT Ethernet equipment to detect at least two different magnitudes of the current flow through the loop and to control the application of at least one electrical condition to at least two of the conductors." Ex. 1001, 17:32-36. Bloch teaches that the control unit detects the DC current pulses applied to the path by the terminal. Pet. 59-60; Ex. 1005, 5:44-6:2, 9:6-15, 10:56-65. Bloch also teaches that, in response to the detected DC current pulses, the control unit applies voltage pulses to the path to control indicators in the terminal. Pet. 60-61; Ex. 1005, 10:34-55, 10:66-11:10. By combining the circuit of Bloch with the Base-T Ethernet system of IEEE 802.3-1993 and IEEE 802.3-1995, as Petitioner proposes (*see infra* Section II.D.8), the control unit of Bloch detects the aforementioned DC current pulses and applies the aforementioned voltage pulses through the connector of IEEE 802.3-1993 and IEEE 802.3-1995. Pet. 51-53; Ex. 1002 ¶¶ 156-158. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 1.[13]

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[13] Although not necessary to our ultimate determination, we note that Huizinga teaches that the indicators in the terminal can be lamps that illuminate for different telephone lines. Pet. 61; Ex. 1009, 4:26-30, 5:29-39. Patent Owner does not dispute that the combination of Bloch, Huizinga, IEEE 802.3-1993, and

Original claim 73 recites limitations similar to those discussed above for claim 1. Ex. 1001, 21:37-52. Petitioner identifies evidence showing that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the limitations of original claim 73. Pet. 66. Our analysis of the limitations of claim 1 applies to the similar limitations of original claim 73.

3. Claims 31 and 106

Claim 31 depends from claim 1, and recites "wherein the BaseT Ethernet terminal equipment comprises a controller coupled to the at least one path." Ex. 1001, 19:34-36. Original claim 106 depends from original claim 73, and recites a similar limitation. *Id.* at 23:53-55. Bloch teaches that the terminal includes a controller coupled to the path for switching the resistor into and out of the path. Pet. 61-62; Ex. 1002 ¶ 174; Ex. 1005, 9:6-22. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 31 and original claim 106.

4. Claims 37 and 112

Claim 37 depends from claim 1, and recites "wherein one or more magnitudes of the current flow through the loop represent information about the piece of BaseT Ethernet terminal equipment." Ex. 1001, 19:52-55. Original claim 112 depends from original claim 73, and recites a similar limitation. *Id.* at 24:3-6. Bloch teaches that the control unit detects the DC current pulses applied to the loop by the

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IEEE 802.3-1995 teaches the limitations of claim 1 and original claim 73.

terminal, which provide information regarding the status of different elements of the terminal. Pet. 59-60, 62-63; Ex. 1005, 5:44-6:2, 9:6-15, 10:56-65. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 37 and original claim 112.

5. Claims 59 and 134

Claim 59 depends from claim 1, and recites "wherein at least one of the different magnitudes of current flow through the loop is part of a detection protocol." Ex. 1001, 20:61-63. Original claim 134 depends from original claim 73, and recites a similar limitation. *Id.* at 25:13-15. Bloch teaches that the control unit detects the DC current pulses applied to the loop by the terminal, which provide information regarding the status of different elements of the terminal. Pet. 59-60, 63-64; Ex. 1005, 5:44-6:2, 9:6-15, 10:3-12, 10:34-40, 10:56-65,11:37-42. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 59 and original claim 134.

6. Claims 69 and 142

Claim 69 depends from claim 1, and recites "wherein the piece of central BaseT Ethernet equipment to distinguish the piece of BaseT Ethernet terminal equipment from at least one other piece of BaseT Ethernet terminal equipment." Ex. 1001, 21:22-25. Original claim 142 depends from original claim 73, and recites a similar limitation. *Id.* at 25:36-39. Bloch teaches that the control unit detects the DC current pulses applied to the loop by the terminal, which provide distinguishing information regarding the status of different elements of the terminal. Pet. 59-60, 64-65; Ex. 1005, 5:44-6:2, 9:6-15, 10:56-65. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 69 and original claim 142.[14]

7. Claims 72 and 145

Claim 72 depends from claim 1, and recites "wherein the piece of BaseT Ethernet terminal equipment is a powered-off piece of BaseT Ethernet equipment." Ex. 1001, 21:33-36. Original claim 145 depends from original claim 73, and recites a similar limitation. *Id.* at 25:46-49. As discussed above, we construe the term "powered-off" in claim 72 and original claim 145 to mean "without operating power." *See supra* Section II.B.3. We also clarify that "without operating power" includes applying power to a component of the Base-T Ethernet terminal equipment, but does not include applying operating power to the Base-T Ethernet terminal equipment. *See id.* Bloch teaches that the control unit detects the DC current pulses applied to the loop by the terminal, even when the terminal telephone station is "on hook" and the speakerphone is not operational. Pet. 65-66; Ex. 1002 ¶ 181; Ex. 1005, 11:17-22, 11:31-34.

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[14] Although not necessary to our ultimate determination, we note that Huizinga teaches that the status information from the terminal is used by the control unit to determine which telephone station is using a particular telephone line. Pet. 65; Ex. 1009, 5:29-39. Patent Owner does not dispute that the combination of Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 69 and original claim 142.

Patent Owner responds that "Bloch's Terminal device has operating power when the Bloch circuit is operating because the Voltage Regulator 500 <u>inside the terminal device</u> has operating power, regardless of whether the 'speakerphone' is operating." PO Resp. 58-59 (citing Ex. 1005, 3:17-23; Ex. 2038 ¶ 225; Ex. 2039, 211:24-212:21). Patent Owner's argument is not persuasive. As discussed above, we clarify that "without operating power" includes applying some power to the Base-T Ethernet terminal equipment, such as applying power to a component of the Base-T Ethernet terminal equipment. *See supra* Section II.B.3. Thus, the fact that power is applied to the voltage regulator component of the terminal in Bloch does not mean that operating power is applied to the terminal. Patent Owner does not dispute that, when the control unit detects the different magnitudes of DC current flow and applies the electrical conditions (*see supra* Section II.D.2), the terminal telephone station is "on hook" and the speakerphone is not operational (*see* PO Resp. 59 ("regardless of whether the 'speakerphone' is operating")). Thus, we determine that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches that the control unit detects the different magnitudes of DC current flow and applies the electrical conditions when the terminal equipment is without operating power. Our determination is consistent with Patent Owner's position in a related district court case that "[a] television, for example, is a 'powered-off end device' when it is turned off, even though it remains connected to AC power and current still flows through some of its components to allow the remote control to turn it on." Ex. 2021, 18-19.

8. Reasons for Combining Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995

Petitioner argues that a person of ordinary skill in the art would have had a reason to combine the cited teachings of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995. Pet. 53-55. We agree with and adopt Petitioner's reasoning. Specifically, Bloch describes a phantom power circuit in the context of a key telephone system, but explains that it "can find application in many different control unit/terminal applications." *Id.* at 43-44 (emphasis omitted); Ex. 1005, 4:49-52. A person of ordinary skill in the art would have combined the circuit of Bloch with the 10Base-T Ethernet network of IEEE 802.3-1993 and IEEE 802.3-1995 to achieve the "benefit of supplying power over the same wires used for the Ethernet communication channel." Pet. 54; Ex. 1002 ¶ 160. This combination would have "eliminate[d] the need to provide a local power supply or separate conductors and connectors for powering the DTE device," and would have allowed devices to "communicate and provide status and control information even when they are not operating normally and the communication channel is not in use." Pet. 54-55; Ex. 1002 ¶ 160.

Patent Owner responds that a person of ordinary skill in the art would not have had a reason to combine the cited teachings of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995. PO Resp. 19. Patent Owner relies on some of the same arguments discussed above with respect to the combination of Hunter and Bulan (*id.* at 19-32), but also presents some additional arguments that are specific to the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 (*id.* at

32-34). We address each of Patent Owner's specific contentions in detail below.

First, Patent Owner argues that providing phantom power over pre-existing Ethernet wiring and cables would have damaged Bob Smith terminations and common mode chokes. *Id.* at 19-22. Patent Owner's argument is not persuasive. As discussed above, Patent Owner's premise that the invention of the '760 patent is limited to a pre-existing Ethernet network is not supported by the specification or claims of the '760 patent. *See supra* Section II.C.8. In addition, we note that Patent Owner does not direct us to specific evidence indicating that the teachings of Bloch, IEEE 802.3-1993, or IEEE 802.3-1995 are limited to a pre-existing Ethernet network. *See* PO Resp. 19-22. And Patent Owner acknowledged at the oral hearing that applying phantom power to "new" Ethernet terminal equipment would not have caused any problems with Bob Smith terminations or common mode chokes. Tr. 135:1-12. Thus, any alleged issues with Bob Smith terminations or common node chokes in a pre-existing Ethernet network are not pertinent to the question of whether a person of ordinary skill in the art would have had a reason to combine the cited teachings of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995.

Moreover, even if we accepted Patent Owner's premise, Patent Owner's argument still is not persuasive because not all pre-existing Ethernet networks included Bob Smith terminations or common mode chokes. *See supra* Section II.C.8. And, even for those pre-existing Ethernet networks that did include Bob Smith terminations or common mode chokes, it would have been within the knowledge and capabilities of a person of ordinary skill in the art to implement phantom power without damaging the Bob Smith terminations or common mode chokes. *See id.*

Second, Patent Owner argues that a person of ordinary skill in the art would have provided operating power to Ethernet terminal equipment over the unused lines in an Ethernet connection to avoid interference with the data signals. PO Resp. 22-26. In particular, Patent Owner points out that the Ethernet connector taught by IEEE 802.3-1993 and IEEE 802.3-1995 includes two unused pairs of conductors. *Id.* at 24-25 (citing Ex. 1006, 266-267; Ex. 1007, 147).

Patent Owner's argument is not persuasive. Bloch teaches providing operating power to terminal equipment over the same lines used to transmit data. Pet. 43-44; Ex. 1005, 2:54-61, 5:20-30, Fig. 1. Although Bloch relates to a key telephone system, Bloch explains that its phantom power circuit "can find application in many different control unit/terminal applications." Ex. 1005, 4:49-52. Further, a person of ordinary skill in the art would have possessed the background knowledge that phantom power also would work in an Ethernet network. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362-63 (Fed. Cir. 2013). For example, as discussed above, Hunter teaches providing phantom power to Ethernet terminal equipment over a 10Base-T Ethernet bus. *See supra* Section II.C.2. In addition, at least two patents identified on the face of the '760 patent, namely U.S. Patent No. 5,994,998 ("Fisher '998") and U.S. Patent No. 6,140,911 ("Fisher '911") (collectively, "the Fisher patents"), teach providing phantom power to Ethernet terminal equipment.[15] Pet. Reply 5; Ex. 1025, 2:21-41, 3:49-67, 6:7-10; Ex. 1026, 2:32-52, 3:59-4:10, 6:17-20. Thus, although alternative ways of providing operating power to Ethernet terminal equipment may have existed (PO Resp. 23-26), that does not detract from the phantom power technique taught by Bloch (as well as Hunter and the Fisher patents). *See Mouttet*, 686 F.3d at 1334; *Fulton*, 391 F.3d at 1200.

Third, Patent Owner argues that members of an IEEE committee were skeptical that phantom power would work in an Ethernet network. PO Resp. 27-32. Patent Owner's argument is not persuasive. As discussed above, the evidence cited by Patent Owner relates to whether the IEEE committee members believed that phantom power should be adopted as an Ethernet standard, not whether phantom power would work in an Ethernet network. *See supra* Section II.C.8. Further, as also discussed above, at least some committee members were in favor of using phantom power as an Ethernet standard. *See id.* In any event, the fact that an alternative way of providing operating power to Ethernet terminal equipment existed and was considered for an IEEE standard does not detract from the phantom power technique taught by Bloch. *See Mouttet*, 686 F.3d at 1334; *Fulton*, 391 F.3d at 1200. Moreover, we note that, even if

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[15] Patent Owner argued at the oral hearing that the Fisher patents do not teach certain limitations of the challenged claims. Tr. 124:7-126:8. However, we do not rely on the Fisher patents to teach any limitations of the challenged claims. We rely on the Fisher patents as evidence that a person of ordinary skill in the art would have known that phantom power would work in an Ethernet network.

Patent Owner's evidence indicates some amount of skepticism, we determine that it does not outweigh the strong evidence of obviousness presented by Petitioner and discussed in this Decision. *See In re Cyclobenzaprine*, 676 F.3d at 1079.

Fourth, Patent Owner argues that Petitioner's proposed combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 would have degraded the Ethernet data signal. PO Resp. 32-34. Specifically, Patent Owner argues that switching a resistor into and out of the phantom power circuit, as taught in Bloch, would have created noise and degraded the Ethernet data signal. *Id.* at 32-33 (citing Ex. 2038 ¶ 86; Ex. 2039, 172:20-173:3). In addition, Patent Owner contends that applying operating power to just one side of the transformers in Bloch, as Petitioner proposes in Figure 6 of the Petition, would have saturated the coils and degraded the Ethernet data signal. PO Resp. 33 (citing Ex. 2038 ¶ 87; Ex. 2039, 168:6-14). Patent Owner also notes that, even if operating power was applied to both sides of the transformers in Bloch, "a saturation problem would still exist because the center taps are never perfectly centered and there can be imbalances in the wires." PO Resp. 33-34 (citing Ex. 2038 ¶ 88; Ex. 2039, 169:14-15).

Patent Owner's argument that switching a resistor into and out of the phantom power circuit would have degraded the Ethernet data signal is not persuasive. Patent Owner's declarant, Dr. Madisetti, states that "[s]witching the resistor would create noise that would degrade the Ethernet data propagation and reduce bandwidth," but does not otherwise explain or provide support for that statement. Ex. 2038 ¶ 86. In contrast, Petitioner's declarant, Mr. Crayford, explains that the resistor in Bloch would have produced low frequency signals, which would have been unlikely to interfere with the higher frequency data signals of an Ethernet network. Pet. Reply 8; Ex. 1046 ¶¶ 49-51. Mr. Crayford also explains that, even if the resistor in Bloch would have caused some interference with the Ethernet data signals, it would have been within the knowledge and capabilities of a person of ordinary skill in the art to separate the low frequency resistor signals from the high frequency Ethernet data signals, such as by using a filter. Pet. Reply 8; Ex. 1046 ¶ 49; Ex. 2039, 172:20-173:3.

Patent Owner's argument that applying operating power to the transformers in Bloch would saturate the coils also is not persuasive. Patent Owner's argument is premised on annotations that Petitioner added to Figure 1 of Bloch in the Petition. PO Resp. 33 (citing Pet. 45). Specifically, Petitioner added a red line to Figure 1 of Bloch to indicate the flow of DC current through the system, but, as Patent Owner points out, the red line only shows current flowing through one side of the transformer. Pet. 45; PO Resp. 33. Petitioner's declarant, Mr. Crayford, clarified during his deposition that the annotations to Figure 1 were intended to illustrate the direction of current flow, and that, even if not shown expressly by the annotations, the current clearly flows through both sides of the transformer. Ex. 2039, 167:14-169:22. Specifically, Mr. Crayford stated that he "did not choose to highlight both of the pairs of the twisted pair which is the current path, but clearly they're parallel connectors connected to the same transformers with the power and return path on the center tap," so "they probably should be highlighted." *Id.* at 167:23-168:4. Thus, contrary to Patent Owner's argument, Petitioner does not propose applying operating power to just one side of the transformers in Bloch.

Further, we are not persuaded by Patent Owner's argument that, even if operating power was applied to both sides of the transformer in Bloch, there would still be a saturation problem. Bloch teaches that the phantom power circuit "is connected to the two center taps of the transformers," thereby indicating that applying operating power to the center taps of the transformers would work. Ex. 1005, 3:9-23. Further, consistent with the teaching of Bloch, Mr. Crayford explained that the objective of balancing the coils on either side of the transformer is "very well known." Ex. 2039, 169:14-22.

In addition to combining the cited teachings of Bloch with IEEE 802.3-1993, and IEEE 802.3-1995, Petitioner also argues that a person of ordinary skill in the art would have had a reason to combine the cited teachings of Bloch and Huizinga. Pet. 53. Although the teachings of Huizinga are not necessary to our ultimate determination in this Decision, we nonetheless agree with and adopt Petitioner's reasoning. Specifically, Bloch teaches a control unit that detects the status of different elements of a terminal and controls indicators in the terminal. Pet. 53; Ex. 1005, 5:61-6:2, 10:66-11:10. Huizinga teaches that the indicators in Bloch can be lamps that illuminate for different telephone lines. Pet. 53; Ex. 1009, 4:19-30, 5:29-39. These interrelated teachings of Bloch and Huizinga would have provided a person of ordinary skill in the art with a reason to combine Bloch and Huizinga. *See KSR*, 550 U.S. at 418 (explaining that "interrelated teachings" of multiple prior art references may provide a reason to combine known elements). Patent Owner does not dispute that a person of ordinary skill in the art would have had a reason to combine the cited teachings of Bloch and Huizinga.

9. Summary

For the reasons discussed above, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 31, 37, 59, 69, and 72, and original claims 73, 106, 112, 134, 142, and 145 would have been obvious over Bloch, IEEE 802.3-1993, and IEEE 802.3-1995, and over Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995.

E. Amended Claims 73, 106, 112, 134, 142, and 145

A request for an *ex parte* reexamination of the '760 patent was filed on August 29, 2016. Ex. 2056. Both parties knew about the related *ex parte* reexamination, but did not update their mandatory notices under 37 C.F.R. §§ 42.8(a)(3), (b)(2) or otherwise notify us of the related *ex parte* reexamination until the oral hearing on August 31, 2017. Tr. 226:11-228:20; Paper 61, 8:2-12:21. By that time, the related *ex parte* reexamination already had concluded with a notice of intent to issue a reexamination certificate. Tr. 226:11-227:3; Ex. 3006. Neither party provided an explanation for its delay in notifying us of the related *ex parte* reexamination. Tr. 227:17-228:12; Paper 61, 8:2-12:21.

The *ex parte* reexamination certificate for the '760 patent amends independent claim 73 to further recite that "the piece of central network equipment is a BaseT Ethernet hub." Ex. 2056, 1:29-30 (emphasis omitted). In other words, amended independent claim 73 incorporates the limitation of original dependent claim 101. Ex. 1001, 23:40-41. The *ex parte* reexamination certificate also amends dependent claim 145, and amends dependent claims 106, 112, 134, and 142, by virtue of their dependency from amended independent claim 73. Ex. 2056, 1:20-22, 2:5-9.

Petitioner does not challenge the patentability of original claim 101 or amended claims 73, 106, 112, 134, 142, and 145 in the Petition. *See* Pet. 7. As a result, we did not institute an *inter partes* review in this proceeding with respect to original claim 101 or amended claims 73, 106, 112, 134, 142, and 145. *See* Dec. on Inst. 2, 20-21. We have considered the additional briefing we authorized regarding amended claim 73. *See* Papers 65-67, 69-72. However, because Petitioner does not challenge the patentability of original claim 101 or amended claims 73, 106, 112, 134, 142, and 145 in the Petition and we did not institute an *inter partes* review with respect to original claim 101 or amended claims 73, 106, 112, 134, 142, and 145, we do not address the patentability of original claim 101 or amended claims 73, 106, 112, 134, 142, and 145 in this Decision. *See* 35 U.S.C. 318(a) ("the Patent Trial and Appeal Board shall issue a final written decision with respect to the patentability of any patent claim challenged by the petitioner and any new claim added under section 316(d)").

F. Patent Owner's Motion to Strike

Patent Owner filed a Motion to Strike Petitioner's Reply (Paper 47, "PO Mot. Str."), to which

Petitioner filed an Opposition (Paper 54, "Pet. Opp. Str.").[16] Patent Owner argues that several portions of Petitioner's Reply should be stricken because they are beyond the scope of a proper reply.[17] PO Mot. Str. 1. Petitioner responds that the Reply is proper because it responds to arguments raised by Patent Owner in the Response. Pet. Opp. Str. 1. We have considered the parties' arguments, and, for the reasons discussed below, Patent Owner's Motion to Strike is denied. In addition, to the extent that this Decision does not rely on an argument that Patent Owner contends is improper, Patent Owner's Motion to Strike is moot as to that particular argument.

1. IsoEthernet

Patent Owner argues that Petitioner presented a new theory of unpatentability in the Reply based on Hunter's teaching of isoEthernet. PO Mot. Str. 2. Specifically, Patent Owner contends that "[t]he Reply newly asserts that 'Hunter's disclosure of isoEthernet also teaches Ethernet' and interjects new concepts: '[i]soEthernet . . . 10Base-T and ISDN modes' and 'isoEthernet interfaces.'" *Id.* (citing Pet. Reply 12:5-8, 15:21-16:4, 18:10-17; Ex. 1046 ¶¶ 48, 67-69, 74, 80-81).

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[16] We authorized Patent Owner to file a motion to strike and Petitioner to file an opposition. Paper 42, 3.

[17] Patent Owner also argues that Petitioner's Reply should be stricken in its entirety. PO Mot. Str. 1. Because we are not persuaded that any specific portions of the Reply should be stricken, we also are not persuaded that the entire Reply should be stricken.

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Petitioner explains in the Petition that Hunter preferably uses a 10Base-T Ethernet bus, but points out that Hunter is not limited to a 10Base-T Ethernet bus because Hunter also is compatible with 100Base-T, isoEthernet, and ISDN. Pet. 25 ("[T]he bus comprises a 10Base-T bus."); *id.* at 26 ("a system applying other BaseT Ethernet standards, such as 100Base-T"); *id.* at 26 ("[T]he present invention is also compatible with Ethernet®, Token Ring® . . . , ATM, and isoEthernet® standards."); *id.* at 28 ("compatible with ISDN standards"). Petitioner also argues in the Petition that "it would have been obvious to a PHOSITA to implement the teachings of Hunter in a system applying other BaseT Ethernet standards." *Id.* at 26. Thus, Petitioner's reliance on isoEthernet is not a new theory of unpatentability raised for the first time in the Reply. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080 (Fed. Cir. 2015).

Further, Patent Owner argues in the Response that Hunter does not teach a Base-T Ethernet system. PO Resp. 40-41. In particular, Patent Owner contends that the "isoEthernet® . . . interfaces [in Hunter] were part of an IEEE standard called 802.9a," which indicates that "isoEthernet used ISDN signals, not Ethernet signals, to transmit data." *Id.* at 40 (citing Ex. 1003, 17:15-18; Ex. 2038 ¶ 76). Petitioner responds in the Reply by explaining why Patent Owner's argument in the Response is incorrect. Pet. Reply 11-12. Specifically, in the Reply, Petitioner identifies evidence indicating that isoEthernet includes both an ISDN mode and a 10Base-T mode, and, as a result, is not limited to carrying just ISDN signals. *Id.* at 12 (citing Ex. 1003, 23:21-24, Ex. 1010, 165; Ex. 1032, 377; Ex. 1046 ¶ 68). Thus, Petitioner's argument regarding isoEthernet in the Reply properly responds to an argument raised by Patent Owner in the Response. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-79. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Section II.C.2; *Belden*, 805 F.3d at 1078-79.

We note that Patent Owner specifically objects to Petitioner's reliance on "a newly-cited IEEE standard for 802.9," which Petitioner submitted as Exhibit 1032 with the Reply. PO Mot. Str. 2 (citing Pet. Reply 12:5-8, 12:14-18, 18:16; Ex. 1032). Patent Owner contends that Hunter only teaches "the trademarked version 'isoEthernet®,'" and Petitioner does not link the trademarked version of isoEthernet in Hunter with the IEEE standard described in Exhibit 1032. PO Mot. Str. 2-3 (citing Pet. 26 n.8; Ex. 2055, 25:10-14, 31:9-21). Patent Owner also argues that Hunter refers to "IEEE draft standard 802.9a," but Exhibit 1032 is not a draft and only describes IEEE standard 802.9. PO Mot. Str. 3 (citing Ex. 1003, 16:7; Ex. 1032).

For the reasons discussed above, Petitioner's argument in the Reply regarding isoEthernet is a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. Thus, we *see* no problem with Petitioner's reliance on Exhibit 1032 to support its argument regarding isoEthernet in the Reply. Nonetheless, we do not rely on Exhibit 1032 in this Decision. Rather, as discussed above, we rely on Exhibit 1010 as showing that isoEthernet includes a 10Base-T mode.

See supra Section II.C.2. Petitioner submitted Exhibit 1010 with the Petition (Pet. iii), and cites Exhibit 1010 in the Reply (Pet. Reply 12). Also, like Hunter, Exhibit 1010 refers to the IEEE 802.9a standard for isoEthernet. Ex. 1003, 15:15-18; Ex. 1010, 160. Patent Owner does not raise any specific objections to Petitioner's reliance on Exhibit 1010 in the Motion to Strike. *See* PO Mot. Str. 1-3.

Patent Owner also argues that "had the <u>Petition</u> relied on isoEthernet (trademarked or otherwise) and/or Ex. 1032 as a basis for Ground 1, [Patent Owner] would have provided evidence with its Response that, as late as 1999, the IEEE isoEthernet committee prohibited combining phantom-power and Ethernet data signals ('10Base-T mode') to 'insure[] that 10Base-T services are unaffected.'"[18] PO Mot. Str. 3 (citing Ex. 2055, 38:23-39:18). Patent Owner also presented this argument at the oral hearing and referred to it as an offer of proof under Fed. R. Evid. 103(a)(2). Tr. 83:2-18, 218:8-21. In connection with this offer of proof, Patent Owner alleged that it would have

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[18] The evidence that Patent Owner allegedly would have presented to support this argument is a <u>draft</u> IEEE <u>802.9f</u> standard dated June 17, 1999. Tr. 83:2-18; Paper 44 ¶ 4; Ex. 2055, 35:15-39:18. We do not *see* how a draft IEEE standard dated after Hunter's publication date limits the express teachings of Hunter. Further, Patent Owner's attempt to rely on this draft IEEE 802.9f standard is inconsistent with Patent Owner's position that Petitioner cannot rely on evidence relating to an isoEthernet standard other than the IEEE 802.9a standard expressly mentioned in Hunter. Tr. 75:16-77:19. As discussed above, the evidence relating to an isoEthernet standard that we rely on in this Decision is Exhibit 1010, which refers to the IEEE 802.9a standard mentioned in Hunter. *See supra* Section II.C.2; Ex. 1003, 15:15-18; Ex. 1010, 160 ("IEEE 802.9a standard—IsoEthernet").

presented this evidence in a sur-reply, but was denied the opportunity to do so by the Board. *Id.*

Fed. R. Evid. 103(a)(2) provides that "[a] party may claim error in a ruling to . . . exclude evidence only if the error affects a substantial right of the party," and the party "informs the court of its substance by an offer of proof. . . . " We did not, however, exclude any evidence offered by Patent Owner or deny Patent Owner the opportunity to file a sur-reply in this proceeding. Patent Owner instead made a strategic decision to seek a motion to strike instead of a sur-reply. Specifically, Patent Owner requested "leave to file a motion to strike Petitioner's Reply Briefs in IPR Nos. 2016-01389, 2016-1391, 2016-1397, and 2016-1399 <u>or, in the alternative</u>, for leave to file a Sur-Reply." Ex. 3008, 1 (emphasis added). In other words, Patent Owner identified a motion to strike as the preferred method to respond to Petitioner's Reply, and identified a sur-reply as an alternative to the motion to strike. *Id.* Because we granted Patent Owner's request for leave to file a motion to strike, we did not grant the proposed alternative of a sur-reply. Paper 42, 2-3. Patent Owner did not at any time prior to the oral hearing request a clarification of our ruling or identify any error in our ruling. Further, Patent Owner's attempt at the oral hearing to re-characterize its request as being for <u>both</u> a motion to strike <u>and</u> a sur-reply (Tr. 222:11-223:17) is contradicted by the express language Patent Owner used in its request to the Board (Ex. 3008, 1).

Moreover, the disputed portions of Petitioner's Reply that address isoEthernet are not necessary to our ultimate determination in this proceeding. As discussed above, Hunter's teachings regarding 10Base-

T Ethernet alone satisfy the disputed limitations of the challenged claims. *See supra* Section II.C.2. Therefore, we determine that the challenged claims would have been obvious over Hunter and Bulan, even without relying on Hunter's teachings regarding isoEthernet.

2. Bob Smith Terminations and Common Mode Chokes

Patent Owner argues that Petitioner addresses Bob Smith terminations and common mode chokes for the first time in the Reply. PO Mot. Str. 4 (citing Pet. Reply 2:15-4:14, 6:7-10; Exs. 1021-1024, 1029; Ex. 1046 ¶¶ 12-21). Specifically, Patent Owner argues that Petitioner knew that the invention of the '760 patent is directed to equipment networked over pre-existing wiring and cables (PO Mot. Str. 4 (citing Pet. 3)), and that pre-existing Ethernet networks included Bob Smith terminations and common mode chokes (PO Mot. Str. 4 (citing Ex. 2039, 45:10-21; Ex. 2055, 65:13-67:11)), but did not address them in the Petition.

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Patent Owner raises the issue of Bob Smith terminations and common mode chokes in the Response (PO Resp. 19-22), and Petitioner responds in the Reply with an explanation and evidence showing why Patent Owner's argument in the Response is incorrect (Pet. Reply 2-4). Thus, the portions of Petitioner's Reply that address Bob Smith terminations and common mode chokes are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Sections II.C.8, II.D.8; *Belden*, 805 F.3d at 1078-79.

Moreover, the disputed portions of Petitioner's Reply that address Bob Smith terminations and common mode chokes are not necessary to our ultimate determination in this proceeding. As discussed above, the premise of Patent Owner's argument regarding Bob Smith terminations and common mode chokes—that the invention of the '760 patent is limited to equipment networked over pre-existing wiring or cables—is not supported by the specification or claims of the '760 patent. *See supra* Sections II.C.8, II.D.8. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

3. Fisher and De Nicolo Patents

Patent Owner argues that Petitioner submitted new exhibits with the Reply, specifically, the Fisher and De Nicolo patents, to show that using phantom power in an Ethernet network was known at the time of the '760 patent. PO Mot. Str. 5 (citing Pet. Reply 4:15-13, 9:18-10:4; Exs. 1025-1028; Ex. 1046 ¶¶ 27-35). Patent Owner acknowledges that Petitioner presents the same position in the Petition, but contends that Petitioner cannot cite new evidence in the Reply to support that position. PO Mot. Str. 5 (citing Pet. 4-5).

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Petitioner's position that using phantom power in an Ethernet network was known at the time of the '760 patent is presented in the Petition. Pet. 4-5. Patent Owner argues in the Response that "operating Power-over-Ethernet ('PoE') did not exist in 1997" (PO Resp. 8), and Petitioner responds in the Reply by citing to the Fisher and De Nicolo patents as evidence that Patent Owner's argument in the Response is incorrect (Pet. Reply 5 (citing Exs. 1025-1028)). Thus, the portions of Petitioner's Reply that cite to the Fisher and De Nicolo patents are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Sections II.C.8, II.D.8; *Belden*, 805 F.3d at 1078-79.

We note that Patent Owner specifically objects to Petitioner's reliance on the De Nicolo patents because Patent Owner alleges it could have demonstrated that the De Nicolo patents are not prior art to the '760 patent. PO Mot. Str. 5-6. We do not rely on the De Nicolo patents in this Decision. Rather, as discussed above, we rely on Hunter and the Fisher patents as showing that using phantom power in an Ethernet network was known at the time of the '760 patent. *See supra* Sections II.C.8, II.D.8.

Moreover, the disputed portions of Petitioner's Reply that rely on the Fisher and De Nicolo patents are not necessary to our ultimate determination in this proceeding. As discussed above, the teachings of Hunter alone demonstrate that using phantom power in an Ethernet network was known at the time of the '760 patent. *See supra* Sections II.C.2, II.C.8, II.D.8.

Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

4. Alleged Skepticism

Patent Owner argues that Petitioner addresses the objective indicia of non-obviousness, including skepticism of those skilled in the art, for the first time in the Reply. PO Mot. Str. 6 (citing Pet. Reply 6:14-7:15; Exs. 1035-1042; Ex. 1046 ¶¶ 36-44). Specifically, Patent Owner contends that Petitioner was "aware of the secondary considerations issues, but failed to address them in the Petition." PO Mot. Str. 6.

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Patent Owner raises the issue of skepticism by those skilled in the art in the Response (PO Resp. 27-32), and Petitioner responds in the Reply with an explanation and evidence showing why Patent Owner's argument in the Response is incorrect (Pet. Reply 6-7). Thus, the portions of Petitioner's Reply that address the alleged skepticism of those skilled in the art are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Sections II.C.8, II.D.8; *Belden*, 805 F.3d at 1078-79.

Moreover, the disputed portions of Petitioner's Reply that address the alleged skepticism of those skilled in the art are not necessary to our ultimate determination in this proceeding. As discussed above, even if we just consider the evidence submitted by Patent Owner, it does not establish that those of ordinary skill in the art were skeptical that phantom power would work in an Ethernet network. *See supra* Sections II.C.8, II.D.8. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

5. CAT-3 and CAT-5 Cabling

Patent Owner argues that Petitioner addresses the number of conductors in CAT-3 and CAT-5 cabling for the first time in the Reply. PO Mot. Str. 7 (citing Pet. Reply 10:5-16; Ex. 1031; Ex. 1046 ¶ 61). Specifically, Patent Owner contends that Petitioner knew that CAT-3 cabling was used for 10Base-T Ethernet and CAT-5 cabling was used for 100Base-T Ethernet, and, thus, "could have included" argument and evidence in the Petition regarding the number of conductors in that cabling. PO Mot. Str. 7.

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Patent Owner raises the issue of the number of conductors in CAT-3 and CAT-5 cabling in the Response (PO Resp. 25-26), and Petitioner responds in the Reply with an explanation and evidence showing why Patent Owner's argument in the Response is incorrect (Pet. Reply 10). Thus, the portions of Petitioner's Reply that address the number of conductors in CAT-3 and CAT-5 cabling are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80.

Patent Owner also argues that, if Petitioner had addressed the number of conductors in CAT-3 and CAT-5 cabling in the Petition, Patent Owner "would have included the cable specification for CAT-3/CAT-5 wiring, confirming that such cables comprise four wire pairs." PO Mot. Str. 7. (citing Ex. 2055, 171:23-176:13). Patent Owner also presented this argument at the oral hearing and referred to it as an offer of proof under Fed. R. Evid. 103(a)(2). Tr. 220:19-221:2. As discussed above, Fed. R. Evid. 103(a)(2) provides that "[a] party may claim error in a ruling to . . . exclude evidence only if the error affects a substantial right of the party," and the party "informs the court of its substance by an offer of proof. . . . " We did not, however, exclude any evidence offered by Patent Owner or deny Patent Owner the opportunity to file a sur-reply in this proceeding. *See supra* Section II.F.1. Patent Owner instead made a strategic decision to seek a motion to strike instead of a sur-reply. *See id.*

Moreover, the disputed portions of Petitioner's Reply that address the number of conductors in CAT-3 and CAT-5 cabling are not necessary to our ultimate determination in this proceeding. As discussed above, the portions of Hunter cited in the Petition independently demonstrate that a 10Base-T Ethernet bus may include only two twisted pair conductors, not four. *See supra* Sections II.C.2, II.C.8. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

G. Petitioner's Motion to Exclude

Petitioner filed a Motion to Exclude (Paper 46, "Pet. Mot. Excl."), to which Patent Owner filed an Opposition (Paper 50, "PO Opp. Excl."), and Petitioner filed a Reply (Paper 58, "Pet. Reply Excl."). We have considered the parties' arguments, and, for the reasons discussed below, Petitioner's Motion to Exclude is *denied*.[19]

1. Exhibit 2038

Exhibit 2038 is Dr. Madisetti's Declaration. Petitioner argues that Exhibit 2038 should be excluded under Fed. R. Evid. 401, 402, 403, 702, 703, as irrelevant, prejudicial, and unreliable. Pet. Mot. Excl. 1-11. Specifically, Petitioner argues that Dr. Madisetti: 1) relies on an incorrect date of invention for the challenged claims of the '760 patent (*id.* at 2-4); 2) fails to provide support for his opinion that a person of ordinary skill in the art would have provided operating power over the unused lines in an Ethernet connection (*id.* at 5-6); 3) misunderstands the iso-Ethernet standard (*id.* at 6-7); 4) fails to provide support for his opinion that the resistor in Bloch would interfere with Ethernet data signals (*id.* at 8); 5) provides inconsistent interpretations of what constitutes terminal equipment (*id.* at 8-10); 6) fails to read

[19] Patent Owner requested authorization to file Exhibits 2052-2054 with its Opposition to Petitioner's Motion to Exclude. Paper 60, 2. Patent Owner withdrew that request with respect to Exhibits 2052 and 2053, because Patent Owner did not cite those exhibits in its Opposition. *Id.*; Paper 59, 12:11-15:1. We note that Exhibits 2052 and 2053 would not change our ultimate determination because we deny Petitioner's Motion to Exclude even without considering Exhibits 2052 and 2053.

the teachings of Hunter as a whole (*id.* at 10); and 7) relies on an improper construction of the claim term "powered-off" (*id.* at 11). Petitioner's arguments raise a question of the weight that should be given to Dr. Madisetti's testimony, not admissibility. Therefore, Petitioner's Motion to Exclude is denied with respect to Exhibit 2038.

2. Exhibits 2040-2046 and 2048

Exhibits 2040-2046 and 2048 are documents relating to meetings of an IEEE committee. Petitioner argues that Exhibits 2040-2046 and 2048 should be excluded under Fed. R. Evid. 401, 402, 403, 801, 802, 804, 901, as irrelevant, prejudicial, hearsay, and lacking authentication. Pet. Mot. Excl. 11-13. Petitioner's arguments are not persuasive.

The proponent of an item of evidence must produce evidence sufficient to support a finding that the item is what the proponent claims it is. Fed. R. Evid. 901. Here, Patent Owner submits Mr. Clyde Camp's testimony that "[t]he 802.3af Committee maintained a record of its proceedings by posting documents pertaining to its work, including meeting minutes and presentations, on its public document server at http://www.ieee802.org/3/af/public/ ("the Website")," and that Exhibits 2040-2046 are such records. Ex. 2048 ¶¶ 4-11. Mr. Camp explains that his statements in Exhibit 2048 are based on personal knowledge. *Id.* ¶ 1. Petitioner, on the other hand, does not provide any specific reason for us to believe that Exhibits 2040-2046 are not what Petitioner and Mr. Camp claim them to be. *See* Pet. Mot. Excl. 11-13.

Hearsay is limited to a statement that a party offers in evidence to prove the truth of the matter asserted in the statement. Fed. R. Evid. 801. Patent Owner offers, and we consider, Exhibits 2040-2046 as evidence of the effect that the statements in Exhibits 2040-2046 would have had on a person of ordinary skill in the art considering the prior art combinations proposed by Petitioner in this case. *See supra* Sections II.C.8, II.D.8. Thus, the statements in Exhibits 2040-2046 are not hearsay because they are not offered as evidence of the truth of the matter asserted.

Petitioner's arguments regarding the relevance of Exhibits 2040-2046 and 2048 raise a question of sufficiency of proof, not admissibility. Further, as discussed above, we considered Exhibits 2040-2046 and 2048 in connection with Patent Owner's arguments in the Response, but we do not find Patent Owner's arguments that rely on Exhibits 2040-2046 and 2048 to be persuasive. *See supra* Sections II.C.8, II.D.8. As a result, Petitioner does not suffer any prejudice by our admission of Exhibits 2040-2046 and 2048. Therefore, Petitioner's Motion to Exclude is <u>denied</u> with respect to Exhibits 2040-2046 and 2048.

3. Exhibit 2047

Exhibit 2047 is a document entitled "FYI on 'What is the Internet?'" produced by the User Services Working Group of the Internet Engineering Task Force. Petitioner argues that Exhibit 2047 should be excluded under Fed. R. Evid. 401, 402, 403, 801, 802, 805, 901, as irrelevant, hearsay, and lacking authentication. Pet. Mot. Excl. 13-14. Petitioner's arguments are not persuasive.

The proponent of an item of evidence must produce evidence sufficient to support a finding that the item is what the proponent claims it is. Fed. R.

Evid. 901. Here, Patent Owner submits Dr. Madisetti's testimony that Exhibit 2047 is a document entitled "FYI on 'What is the Internet?'" produced by the Internet Engineering Task Force, and available at https://tools.ietf.org/html/rfc1462. Ex. 2038 ¶ 104. Petitioner, on the other hand, does not provide any specific reason for us to believe that Exhibit 2047 is not what Petitioner and Dr. Madisetti claim it to be. *See* Pet. Mot. Excl. 13-14.

Hearsay is limited to a statement that a party offers in evidence to prove the truth of the matter asserted in the statement. Fed. R. Evid. 801. Patent Owner offers Exhibit 2047 as evidence of the fact that the term "protocol" had been defined a certain way by the Internet Engineering Task Force, not necessarily for the truth of the definition asserted. PO Resp. 18. Thus, at least certain statements in Exhibit 2047 are not hearsay.

Petitioner's arguments regarding the relevance of Exhibit 2047 raise a question of sufficiency of proof, not admissibility. Further, as discussed above, we considered Exhibit 2047 in connection with Patent Owner's proposed construction of the term "protocol," but we do not find Patent Owner's arguments that rely on Exhibit 2047 to be persuasive. *See supra* Section II.B.2. As a result, Petitioner does not suffer any prejudice by our admission of Exhibit 2047. Therefore, Petitioner's Motion to Exclude is denied with respect to Exhibit 2047.

4. Exhibits 2049, 2050, 2054

Petitioner argues that Exhibits 2049, 2050, and 2054 should be excluded under Fed. R. Evid. 401, 402, 403, as irrelevant and prejudicial. Pet. Mot.

Excl. 14-15. Petitioner's arguments regarding the relevance of Exhibits 2049, 2050, and 2054 raise a question of sufficiency of proof, not admissibility. Further, we do not discern that Petitioner suffers any prejudice by our admission of Exhibits 2049, 2050, and 2054. Therefore, Petitioner's Motion to Exclude is denied with respect to Exhibits 2049, 2050, and 2054.

H. Patent Owner's Motion to Exclude

Patent Owner filed a Motion to Exclude (Paper 45, "PO Mot. Excl."), to which Petitioner filed an Opposition (Paper 52, "Pet. Opp. Excl."), and Patent Owner filed a Reply (Paper 57, "PO Reply Excl."). We have considered the parties' arguments, and, for the reasons discussed below, Patent Owner's Motion to Exclude is denied-in-part and dismissed-in-part.

1. Exhibits 1021-1024, 1029, and 1043

Exhibits 1021-1024 are product datasheets, catalogs, and specifications, Exhibit 1029 is U.S. Patent No. 5,321,372, and Exhibit 1043 is U.S. Patent No. 8,155,012, which is related to the '760 patent and also owned by Patent Owner. Patent Owner argues that Exhibits 1021-1024, 1029, and 1043 should be excluded as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 4-5; PO Mot. Str. 3-5. Patent Owner's arguments are not persuasive for the same reasons discussed above with respect to the Motion to Strike. *See supra* Section II.F.2.

Patent Owner also argues that Exhibits 1021-1024 and 1029 should be excluded as impermissible hearsay. PO Mot. Excl. 11. We rely on Exhibits 1021-

1024 and 1029 in this Decision only to the extent they provide a basis for certain portions of Mr. Crayford's declaration that are cited in this Decision. *See supra* Sections II.C.8, II.D.8 (citing Ex. 1046 ¶¶ 22-26). Patent Owner does not dispute that Exhibits 1021-1024 and 1029 present the kinds of facts and data that Mr. Crayford would reasonably rely upon in forming an opinion. *See* PO Mot. Excl. 11; PO Reply Excl. 2-3. As a result, Exhibits 1021-1024 and 1029 do not need to be independently admissible. *See* Fed. R. Evid. 703; *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 711 F.3d 1348, 1373 (Fed. Cir. 2013). Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibits 1021-1024, 1029, and 1043.

2. Exhibits 1025 and 1026

Exhibits 1025 and 1026 are the Fisher patents. Patent Owner argues that Exhibits 1025 and 1026 should be excluded as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 3-4; PO Mot. Str. 5-6. Patent Owner's arguments are not persuasive for the same reasons discussed above with respect to the Motion to Strike. *See supra* Section II.F.3.

Patent Owner also argues that Exhibits 1025 and 1026 should be excluded as impermissible hearsay. PO Mot. Excl. 10-11. Hearsay is limited to a statement that a party offers in evidence to prove the truth of the matter asserted in the statement. Fed. R. Evid. 801. Petitioner offers, and we rely on, the statements in Exhibits 1025 and 1026 as evidence of the effect those statements would have had on a person of ordinary skill in the art, not for the truth of the matter asserted. *See supra* Section II.D.8 (citing Pet. Reply 5; Ex. 1025, 2:21-41, 3:49-67, 6:7-10; Ex. 1026, 2:32-52, 3:59-4:10, 6:17-20). As a result, Exhibits 1025 and 1026 are not hearsay. However, even if the statements in Exhibits 1025 and 1026 are hearsay, Exhibits 1025 and 1026 are admissible at least under Fed. R. Evid. 803(8). Specifically, Exhibits 1025 and 1026 are records of the activities of the U.S. Patent and Trademark Office, and Patent Owner has not shown that the source of information or circumstances lack trustworthiness. *See* PO Mot. Excl. 10-11; PO Reply Excl. 3; Fed. R. Evid. 803(8); *Fresenius Med. Care Holdings, Inc. v. Baxter Int'l, Inc.*, No. C 03-1431, 2006 WL 1330003, at *2-4 (N.D. Cal. May 15, 2006). Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibits 1025 and 1026.

3. Exhibits 1036-1042

Exhibits 1036-1042 are documents relating to meetings of an IEEE committee. Patent Owner argues that Exhibits 1036-1042 should be excluded as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 5-6; PO Mot. Str. 6. Patent Owner's arguments are not persuasive for the same reasons discussed above with respect to the Motion to Strike. *See supra* Section II.F.4. Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibits 1036-1042.

4. Exhibit 1044

Exhibit 1044 is U.S. Patent No. 8,942,107, which is related to the '760 patent and also owned by Patent Owner. Other than pointing out that Exhibit 1044 was filed with Petitioner's Reply, Patent Owner does not provide any specific reason why Exhibit 1044 should be excluded. *See* PO Mot. Excl. 1-9. Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibit 1044.

5. Exhibits 1027, 1028, and 1030-1035

We do not rely on Exhibits 1027, 1028, and 1030-1035 in this Decision. Therefore, Patent Owner's Motion to Exclude is dismissed as moot with respect to Exhibits 1027, 1028, and 1030-1035.

I. Oral Hearing Objections

Each party objected to arguments presented by the other party during the oral hearing. Petitioner objected that Patent Owner improperly raised new arguments for the first time at the oral hearing regarding the IEEE 802.9f specification, the CAT-3 and CAT-5 cabling specifications, blind power, and power levels. Tr. 216:15-217:7. We considered Patent Owner's arguments in the Response in light of any additional arguments presented by Patent Owner at the oral hearing, but we ultimately do not find Patent Owner's arguments persuasive for the reasons discussed in this Decision. Thus, Petitioner does not suffer any prejudice by our admission of the arguments presented by Patent Owner at the oral hearing.

Patent Owner objected that Petitioner raised arguments at the oral hearing that were the subject of Patent Owner's Motion to Strike and/or Motion to Exclude. Tr. 66:20-67:20. For the reasons discussed above, we deny Patent Owner's Motion to Strike and deny-in-part and dismiss-in-part Patent Owner's Motion to Exclude. *See supra* Sections F, H. Thus, we *see* no problem with the arguments presented by Petitioner at the oral hearing.

J. Patent Owner's Observations on Cross Examination

Patent Owner filed a Motion for Observations on the cross examination of Mr. Ian Crayford (Paper 44), to which Petitioner filed a Response (Paper 55). We have considered Patent Owner's observations and

Petitioner's responses, and we determine that Patent Owner's observations do not demonstrate any issues with respect to the credibility of Mr. Crayford's testimony. We also have considered Patent Owner's observations in connection with the arguments and evidence discussed above, and we have given Mr. Crayford's testimony the appropriate weight in making our determination in this case.

III. Conclusion

Petitioner has shown by a preponderance of the evidence that claims 1, 31, 37, 59, 69, and 72, and original claims 73, 106, 112, 134, 142, and 145 of the '760 patent are unpatentable.

IV. Order

In consideration of the foregoing, it is hereby

ORDERED that claims 1, 31, 37, 59, 69, and 72, and original claims 73, 106, 112, 134, 142, and 145 of the '760 patent are shown unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Strike is denied;

FURTHER ORDERED that Petitioner's Motion to Exclude is denied; FURTHER ORDERED that Patent Owner's Motion to Exclude is denied-in-part and dismissed-in-part; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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FINAL WRITTEN DECISION OF UNITED STATES PATENT TRIAL AND APPEAL BOARD ON '012 PATENT—35 U.S.C. § 318(A) AND 37 C.F.R. § 42.73 (JANUARY 23, 2018)

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC., RUCKUS WIRELESS, INC., BROCADE COMMUNICATION SYSTEMS, INC., and NETGEAR, INC.,

Petitioner,[1]

v.

CHRIMAR SYSTEMS, INC.,

Patent Owner.

Case IPR2016-01389
Patent 8,155,012 B2

Before: Karl D. EASTHOM, Gregg I. ANDERSON, and Robert J. WEINSCHENK, Administrative Patent Judges.

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[1] The Board joined the latter three Petitioner parties to the instant proceeding after they collectively filed a petition in Case IPR2017-00790 (terminated).

EASTHOM, Administrative Patent Judge.

I. Introduction

Juniper Networks, Inc. filed a Petition (Paper 1, "Pet.") pursuant to 35 U.S.C. §§ 311-19 to institute an *inter partes* review of claims 31, 35, 36, 40, 43, 52, 55, 56, 59, 60, and 65 (the "challenged claims") of U.S. Patent No. 8,155,012 B2 (Ex. 1001 (the "'012 patent")). Pet. 1. After ChriMar Systems, Inc. ("Patent Owner") filed a Preliminary Response (Paper 10, "Prelim. Resp."), we instituted an *inter partes* review of the challenged claims (Paper 12, "Institution Decision" or "Inst. Dec."). We then joined the other three Petitioner parties listed in the heading and refer to the four Petitioner parties collectively as "Petitioner." *See* note 1; Paper 28.

After the Institution Decision, Patent Owner filed a Response. Paper 29 ("PO Resp."). Petitioner filed a Reply. Paper 36 ("Pet. Reply"). Patent Owner filed a Motion to Exclude Evidence (Paper 48) and a Motion to Strike Petitioner's Reply (Paper 50). Petitioner filed a Motion to Exclude Evidence. Paper 49.

Petitioner relies on, *inter alia*, three Declarations by Ian Crayford. Ex. 1002; Ex. 1046; Ex. 1048. Patent Owner relies on, *inter alia*, a Declaration by Dr. Vijay K. Madisetti. Ex. 2038. The Board filed a transcription of the Oral Hearing held on July 31, 2017. (Paper 66, "Tr.").[2]

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[2] Oral hearings in related Cases IPR2016-01391, IPR2016-01397, and IPR2016-01399 occurred on the same day, with similar issues presented and argued.

The Board has jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that the challenged claims are unpatentable.

A. Related Proceedings

Petitioner cites 56 civil actions based on the '012 patent filed in the Eastern District of Michigan, Eastern District of Texas, and Northern District of California.[3] Pet. 1 (citing Ex. 1012 ("a list identifying each of these civil actions")). Patent Owner identifies 20 civil actions as "related matters." Paper 9, 2-3. The parties also identify a number of related requests for *inter partes* review, including Case Nos. IPR2016-00569 (terminated/settled), IPR2016-00573 (terminated/settled), IPR2016-00574 (terminated/ settled), IPR2016-00983 (terminated/settled), IPR2016-01151 (terminated/settled), IPR2016-01391 (final written decision), IPR2016-01397 (final written decision), IPR2016-01399 (pending), IPR2016-01425 (terminated/ settled), and IPR2016-01426 (not instituted). *See* Pet. 1; Paper 9, 3.

During the Oral Hearing, Patent Owner informed the panel that a reexamination examiner finally rejected claims in the '012 patent. *See* Paper 67, Ex. 2058 (Examiner's Answer).[4] Patent Owner also

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[3] Patent Owner also cites a number of district court cases involving related claim construction issues. *See* Prelim. Resp. 16-18 & nn.19-22.

[4] The reexamination Examiner sustained a final rejection for obviousness of claims 1-3, 5, 6, 10, 11, 13, 16, 18, 19, 22, 24-33, 35, 36, 40-41, 43, 46, 48, 49, 52, 54-73, 76, 80-88, 91, 93-96, 98-104,

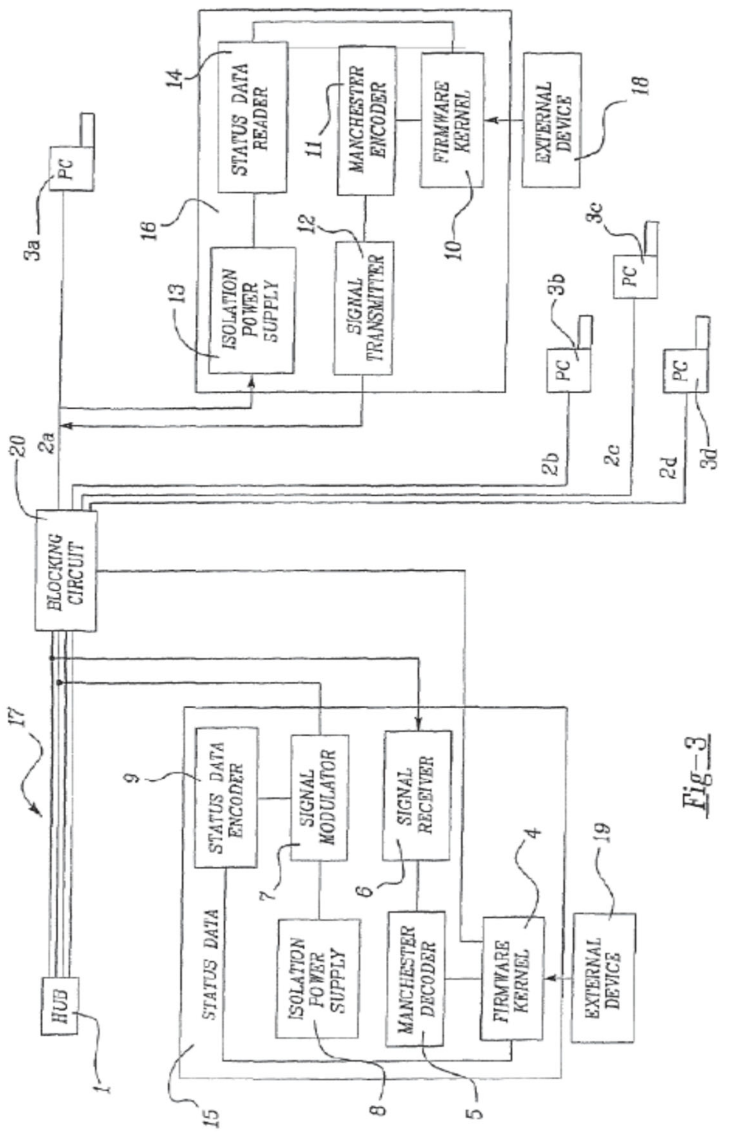
informed the panel during the Oral Hearing that another reexamination examiner considered claims of U.S. Patent No. 8,902,760, which are at issue in Case IPR2016-01399. *See* IPR2016-01399, Paper 69 (ordering briefing to address the claims amended during the reexamination proceeding).

B. The '012 Patent (Ex. 1001)

The '012 patent describes systems for monitoring assets connected to a communication system. Ex. 1001, Abstract. One aspect of the system "generat[es] and monitor[s] data over a pre-existing wiring or cables that connect pieces of networked computer equipment [assets] to a network." Ex. 1001, 3:19-22. To monitor the assets, central module 15 and remote module 16 identify electronic computer equipment attached to computer network 17. *Id.* at 4:44-47. For example, "central module 15 monitors remote module circuitry 16 that may be permanently attached to remotely located electronic workstations such as personal computers 3A through 3D." *Id.* at 4:53-56.

and 106 over prior art not involved in the instant case. *See* Ex. 2058, 3.

Figure 3 of the ’012 patent follows:



Fig–3

Ex. 1001, Fig. 3. Figure 3 portrays isolation power supply 8 in central module 15, which supplies direct current (DC) to current loops 2a-2d, personal computers (PCs) 3a-3d, and remote module 16a. *See id.* at 5:33-35, Figs. 3, 4.

Patent Owner argued during the Oral Hearing that the ’012 patent supports the last clause of challenged claim 31 (“wherein distinguishing information about the piece of Ethernet data terminal equipment is associated to impedance within the at least one path”), because it supports monitoring assets simply by monitoring a resistor attached to the asset. *See* Ex. 1001, Fig. 8, 8:22-31; Tr. 98:6-103:22.

Figure 8 of the '012 patent follows:

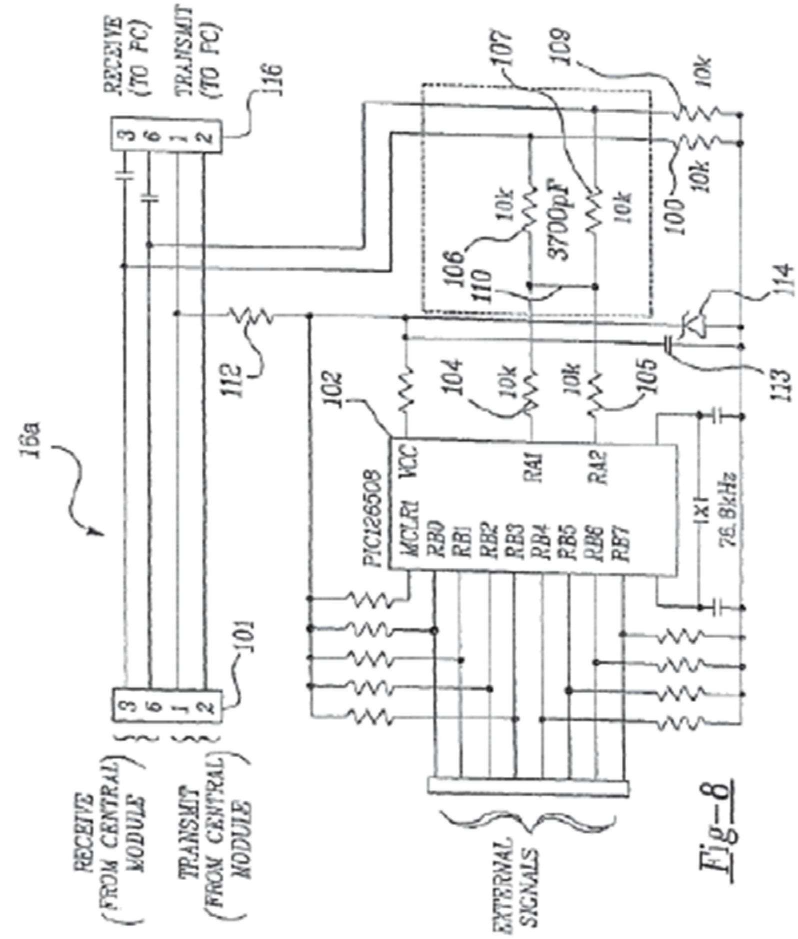


Figure 8 shows resistor 112 connected on a bus between the central module (not depicted) at connector 101 and a PC (not depicted) connected at connector 116. *See* Ex. 1001, 8:22-31, Fig. 4 (showing remote module 16a connected to PC 3a on one side and connected to central module 15a on another side via connectors and a bus). Although the Specification describes resistor circuitry 112 as part of a central module (Ex. 1001, 3:65-67), clearly that cannot be correct because Figure 8 describes "16a" (at top), shows "RECEIVE (FROM CENTRAL MODULE) (at left)," and the location of the circuitry that includes resistor 112 hangs off a bus between connectors 101 and 116, similar to the configuration of Figure 4, showing "REMOTE MODULE" 16a on a bus between connectors 101 and 116. *See infra* Section II.A.1 (reproducing Figure 4 of the "102 patent); Ex. 1001, 8:22-25 (describing "sourced power <u>from central module</u> 15a" through resistor 112 in reference to Figure 8 (emphasis added)). Therefore, central module 15 (Ex. 1001, Fig. 3) or 15a (*id.* at Fig. 4) monitors a personal computer (PC) asset connected to remote module 16a having resistor 112 attached to a bus connecting the PC and the central module. *See* Ex. 1001, Fig. 3, Fig. 4, Fig. 8, 8:22-31 (describing "sourced power from central module 15a" in reference to Figure 8). Even if resistor 112 does not constitute part of a remote module, Figure 8 shows it external to a PC, external to a central module, and attached on a bus (just like remote module 16a of Figure 4).

During the Oral Hearing, Patent Owner pointed to language in the '012 patent Specification at column 8, lines 27-31 (Tr. 99:18-22) as supporting the "wherein distinguishing" phrase in claim 31. *See* claim 31 below (reciting "wherein distinguishing information about the piece of Ethernet data terminal equipment is associated to impedance within the at least one path"). *See* Tr. 98:6-103:22 (citing Ex. 1008, Fig. 8, 8:27-31). Patent Owner generally explained that a central module determines the value of resistor 112 (*see* Figure 8) to determine information about terminal equipment. *See id.* at 99:12-13 ("[I]t has to be able to work with a . . . central module."); *see also* Ex. 1001, 8:5-23 (central module 15a monitors current through both PC 3a and remote module 16a) (discussed further below, Section II.A.2).

The '102 patent states the "remote module circuitry 16 [*e.g.*, including an impedance or a resistor] . . . may be permanently attached" (Ex. 1001, 4:54 (emphasis added)) or generally "attached" (*id.* at 3:22-24) to a monitored PC. *See* Tr. 98:6-100:2; Fig. 4 (showing mere electrical connections between module 16a and PC 3a). In other words, remote module 16a (as a simple resistor or with more circuitry) may or may not be permanently attached to a PC or other asset (terminal equipment) to be monitored. *See* Ex. 1001, 3:22-24, 4:54; *see also* Tr. 101:19-20 (Patent Owner arguing "I didn't intend to say that you have to have one piece" for the asset or terminal equipment); Tr. 103:10-22 (contending an adapted piece of terminal equipment includes an asset such as a PC with an attached module (resistor)).[5]

In operation, the resistance or impedance (or change thereof) of resistor, such as resistor 112, associated with an asset, such as a PC, may be determined by a DC voltage and current impressed

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[5] Patent Owner initially argued during the Oral Hearing that the claimed invention does not require a remote module (Tr. 99:6-10), but then explained its invention in terms of resistor 112 (which can be part of remote module at least with respect to Figures 4 and 8). *See* Ex. 1001, 8:27-31, Figs. 4, 8. Patent Owner argued the resistor must be "a bolt-on" or "permanently fixed to the equipment"-*i.e.*, "the piece of terminal equipment." *See id.* at 100:10-101:9. Later, Patent Owner stated "I didn't intend to say that you have one piece" for the terminal equipment. *See* Tr. 101:19-20.

on Ethernet bus lines, in order to identify whether or not the PC is still connected to the bus, or to identify other information about the asset, including specific circuitry of the PC asset. *See* Ex. 1001, 3:25-37, 4:48-67, 6:33-41, 8:27-31.

In addition to describing the return path from resistor 112 as being associated with remote module and/or PC as described above, the '012 patent refers to "a current loop through one of the personal computers 3A through 3D which is advantageously employed in accordance with the approach described herein" (*id.* at 5:29-32), and also states "[t]he return path for current from PC 3A is the pair of receive data lines" (*id.* at 7:34-35). These generic descriptions imply an identifying resistor or impedance alternatively may be located inside one of the PCs (because the current loop includes that impedance/ resistance).

The column 8 passage cited by Patent Owner during the Oral Hearing states "it is within the scope of the invention to receive the encoded data by monitoring various signals, <u>such as</u> the voltage amplitude of the data line relative to ground, the voltage across resistor 112, and the current through resistor 112." Ex. 1001, 8:27-31 (emphasis added); Tr. 99:18-22 (citing Ex. 1008, Fig. 8, 8:27-31). Other than resistor 112, this passage does not necessarily require any of the other circuitry of Figure 8. *See id.*; *see also* Tr. 103:19-22 (describing the resistor as "a key part of this"). Such a resistor may constitute part of the recited "terminal equipment" of claim 31. *See* Tr. 100:4-9 (Patent Owner arguing as follows: "[T]here's a resistance . . . within the scope of the invention . . . monitoring various signals such as the voltage amplitude and data line relative to the ground voltage across

[the] resistor and current through the resistor. Those are all pieces in the terminal equipment." (emphasis added)).

The column 8 passage also does not necessarily describe the current providing operating power to the PC (or other terminal equipment), nor does it specify the location, relative to any of the disclosed modules (*e.g.*, 15a, 16a) or PCs 3a-3d, of the monitored impedance/resistor that may be used for "monitoring various signals." *See* Ex. 1001, 8:27-31. In other words, the passage also refers to "the invention" without limiting the passage to a single embodiment (such as Figures 7 and 8). *See id.*

The disclosed invention may involve using DC voltage and current on the same data lines that include Ethernet signals. *See* Ex. 1001, 3:25-37 (power may be supplied via the central module); PO Resp. 9. The parties refer to a dual use of Ethernet lines that carry both data and sufficient DC operating power as power over Ethernet ("PoE") or "Ethernet phantom power." *See* PO Resp. 8 (asserting "Power over Ethernet ('PoE') did not exist in 1997. Rather, Ethernet terminal devices needed their own power supplies."); Pet. Reply 7 (asserting Patent Owner "did not enable Ethernet phantom power to function with [known Ethernet circuitry such as] BSTs [(Bob Smith Terminations)] and CMCs [(Common Mode Chokes)]").

With further respect to supplied power (*i.e.*, voltage and current), the Specification describes "isolation power supply 8 (see FIG. 3)" which provides "direct current . . . to each of current loops 2A through 2D." Ex. 1001, 5:33-35. This DC power from the central module provides "a low current preferably on the order of magnitude of about 1 mA." *Id.* at 5:36-37.

Regarding voltage, the Specification generally describes "providing other voltage levels such as 3V dc and 20 V dc." *Id.* 5:42-43. These disclosures relate generally to the "present embodiment" of providing "current for the immediate power needs of the remote module," but "it is also within the scope of the invention to supply current to charge a battery, capacitor bank, or other energy storage device that powers the remote module." *Id.* at 5:42-48. In addition, "powering the remote module from some other source such as a primary battery, rechargeable battery or capacitor bank that receives energy from a source other than the central module is within the scope of the invention." *Id.* at 5:48-52. Each remote module may associate with multiple external devices, including PCs. *See id.* at 5:33-52, 6:62-66 (describing "connect[ing] multiple external devices" or a "single [PC] device" to each module 15a).

Patent Owner initially asserted during the Oral Hearing that the challenged claims "absolutely do not" require PoE. *See* Tr. 86:10-12 (Q. "So your claims do not require power over Ethernet?" A. "They absolutely do not."). Patent Owner explained that the claims "do require some level of DC power." Tr. 91:15-15, 93:12-94:16 (Patent Owner confirming its claims require sending some amount of DC power to an impedance (*e.g.*, a resistor) to determine its impedance (resistance)). Patent Owner clarified "[i]t's the difference between power sufficient to power the actual device [PoE] versus power sufficient to inquire whether or not this particular piece of equipment can—is a piece of equipment that is part of our claims." *Id.* at 91:20-92:2. On the other hand, Patent Owner also argues its invention enables PoE-*i.e.*, it enables the network to provide "operating power"-after the Ethernet terminal device conveys distinguishing information (obtained by providing low DC power) about "how much [operating] power it can accept." *See* PO Resp. 9. Patent Owner, however, does not identify any specific portions of the '012 patent indicating that its invention enables PoE.

In summary, according to Patent Owner, its disclosed system initially provides some (low) DC power to identify terminal equipment (via an impedance/resistance), but not necessarily sufficient power to provide operating power to the terminal equipment. *See* Tr. 92:4-93:6 (Patent Owner explaining their patents disclose "a very, very low DC current and voltage applied. . . . so low that there's no possibility that the terminal equipment could actually run off that voltage, or in that—at that power"); PO Resp. 9 (initially providing low power). Nevertheless, after providing low power for identification purposes, as noted above, Patent Owner argues its disclosed invention can deliver PoE (*i.e.*, it enables "operating power" for terminal devices). *See* PO Resp. 9. As also noted above, Patent Owner does not provide a citation to the '012 patent showing it enables PoE.

C. Illustrative Challenged Claims

Of the challenged claims, claim 31 is the only independent claim. Claims 35, 36, 40, 43, 52, 55, 56, 59, 60 and 65 depend directly or indirectly from claim 31. Claims 31 and 36 follow:

31. An adapted piece of Ethernet data terminal equipment comprising:

an Ethernet connector comprising a plurality of contacts; and

at least one path coupled across selected contacts, the selected contacts comprising at least one of the plurality of contacts of the Ethernet connector and at least another one of the plurality of contacts of the Ethernet connector,

wherein distinguishing information about the piece of Ethernet data terminal equipment is associated to impedance within the at least one path.

Ex. 1001, 18:62-19:5.

36. The piece of Ethernet data terminal equipment according to claim 31 wherein the piece of Ethernet data terminal equipment is a piece of BaseT Ethernet data terminal equipment.

Id. at 19:23-26.

D. Trial Grounds of Unpatentability

We instituted trial for obviousness under 35 U.S.C. § 103(a) as follows:

References	Claims Challenged
Hunter (Ex. 1003)[6] and Bulan (Ex. 1004)[7]	31, 35, 36, 40, 43, 52, 55, 56, 59, 60 and 65
Bloch (Ex. 1005)[8], Huizinga (Ex. 1009)[9], and IEEE 802.3 (Exs. 1006-08)[10]	31, 35, 36, 40, 43, 52, 55, 56, 59, 60 and 65

Inst. Dec. 35; Pet. 6-59.

II. Analysis

A. Claim Construction

In an *inter partes* review, the Board construes claims by applying the broadest reasonable interpretation in light of the specification. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142 (2016) (affirming the Patent Office's authority to issue regulations governing *inter partes* review under 35 U.S.C. § 316(a)(4)). Under this standard, absent any special definitions, claim terms or phrases carry their ordinary and customary meaning, as would be understood by one of ordinary skill in the

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6 WO 96/23377, Richard K. Hunter et al., published August 1, 1996.

7 US 5,089,927, Sergiu Bulan et al., issued February 18, 1992.

8 US 4,173,714, Alan Bloch et al., issued November 6, 1979.

9 US 4,046,972, Donald D. Huizinga et al., issued September 6, 1977.

10 IEEE Standard 802.3-1993 ("IEEE-93," Ex. 1006) and IEEE Standard 802.3-1995, Parts 1 and 2 ("IEEE-95," Ex. 1007 (Part 1) and Ex. 1008 (Part 2)), collectively "IEEE 802.3."

art, in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

1. "Distinguishing Information About the Piece of Ethernet Data Terminal Equipment Is Associated to Impedance Within the At Least One Path"

The parties do not dispute the preliminary claim construction as set forth in the Institution Decision, wherein we determined the claim 31 phrase "distinguishing information about the piece of Ethernet data terminal equipment is associated to impedance within the at least one path" means "distinguishing information about the piece of Ethernet data terminal equipment, including information that differentiates it from another device, wherein the information is capable of being associated to impedance within the at least one path." *See* Inst. Dec. 10; PO Resp. 14.[11]

In interpreting the construction, during the Oral Hearing, Patent Owner agreed that distinguishing information includes information showing the resistance of a resistor (or impedance), as discussed above. *See* Tr. 94:1-96:10; Section I.B; Ex. 1001, 8:27-31 ("monitoring various signals, such as . . . the voltage across resistor 112, and the current through resistor 112"). In addition, the '012 patent shows that monitoring current includes monitoring whether a device becomes unattached (*i.e.*, removed) from the network. *See* Ex. 1001, 6:39-40 ("[I]f the potential thief later disconnects protected equipment from the network, this action is also detected and an alarm

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[11] Petitioner does not address the construction in its Reply.

can be generated."); PO Resp. 8 (arguing the claimed device "enhances network security because the device can convey information about itself to a network" (emphasis added)). In other words, in claim 31, "distinguishing information about the piece of Ethernet data terminal equipment is associated to impedance within the at least one path" includes the capability to convey a change in impedance as "distinguishing [impedance] information about" the device-*i.e.*, conveying that the device (and/or its attached module) has been disconnected from the bus or network.

Given that claim 31 recites a wherein clause and recites a device (not a method), any resistor (or other impedance) connected to, or within, an Ethernet device has the capability of distinguishing that device from another device, because neither party contends all Ethernet devices have the same input resistance. An artisan of ordinary skill would expect different devices, which draw different amounts of current and/or voltage, to have different input impedances. *See, e.g.*, Ex. 1004, 1:53-55 (noting even a "typical TE" (terminal equipment) draws "between about 40 to 60 milliamperes of current" at "the required voltage or voltages"—*i.e.*, even like TE devices have varying input impedances of V/I); Ex. 1003, 50:1-5 (providing varying power depending on equipment; PO Resp. 9 (arguing the disclosed invention can determine "how much power to accept" for a given "Ethernet terminal device," thereby implying different devices necessarily draw different power levels with different input impedances).

The analogous case of *In re Schreiber*, 128 F.3d 1473, 1475-77 (Fed. Cir. 1997) sheds light on the claim construction at issue here. As background, in

Schreiber, the court determined that the prior art Harz reference's funnel for "dispensing oil from an oil can," *id.* at 1475, anticipated a claim to a funnel for dispensing popcorn, even though Harz failed to disclose its funnel could dispense popcorn:

> Schreiber argues . . . that Harz does not disclose that such a[n oil funnel] structure can be used to dispense popcorn from an open-ended popcorn container.
>
> Although Schreiber is correct that Harz does not address the use of the disclosed structure to dispense popcorn, the absence of a disclosure relating to function does not defeat the Board's finding of anticipation. It is well settled that the recitation of a new intended use for an old product does not make a claim to that old product patentable. . . . <u>Accordingly, Schreiber's contention that his structure will be used to dispense popcorn does not have patentable weight if the structure is already known, regardless of whether it has ever been used in any way in connection with popcorn</u>.

Id. at 1477 (citations omitted) (emphasis added); *see also* Tr. 93:12-94:10 (Patent Owner agreeing that a resistor connected across Ethernet contacts satisfies the "wherein" clause; *i.e.*, agreeing the Ethernet device "has the ability to receive voltage and return current, and that information that's coming back is the resistance in the Ethernet device").

Under the logic and holding of *Schreiber*, the "wherein" clause of claim 31 specifies an intended use of an existing product-an intent to use the value of a resistor or other impedance as Ethernet device associating information. The '012 patent makes this clear, because, as discussed above, central module 15 (Fig. 3) or 15a (Fig. 4) associates device information by using voltage and current (to determine impedance), and claim 31 does not include a central module. *See supra* Section I.B. In other words, the disclosed invention, as a system, indicates an intended use of terminal equipment with a module or other circuitry, such as central module 15, but claim 31, drawn to Ethernet terminal equipment, does not claim such a system and corresponds to a disclosed PC and/or remote module 16 or 16a for support. *See id.*; Ex. 1001, Figs. 3, 7, 8.

Patent Owner's argument that "the improved Ethernet terminal device . . . can use its impedance to convey information" (PO Resp. 8 (emphasis added)) agrees with the logic and holding of *Schreiber,* because disclosed (but unclaimed) system components, including central module 15a, can use impedance or resistance information coupled across the path to convey information about remote module 16a and PC 3a. *See* Ex. 1001, Fig. 4; *supra* Section I.B.

Figure 4 of the '012 patent showing an embodiment of the disclosed system follows:

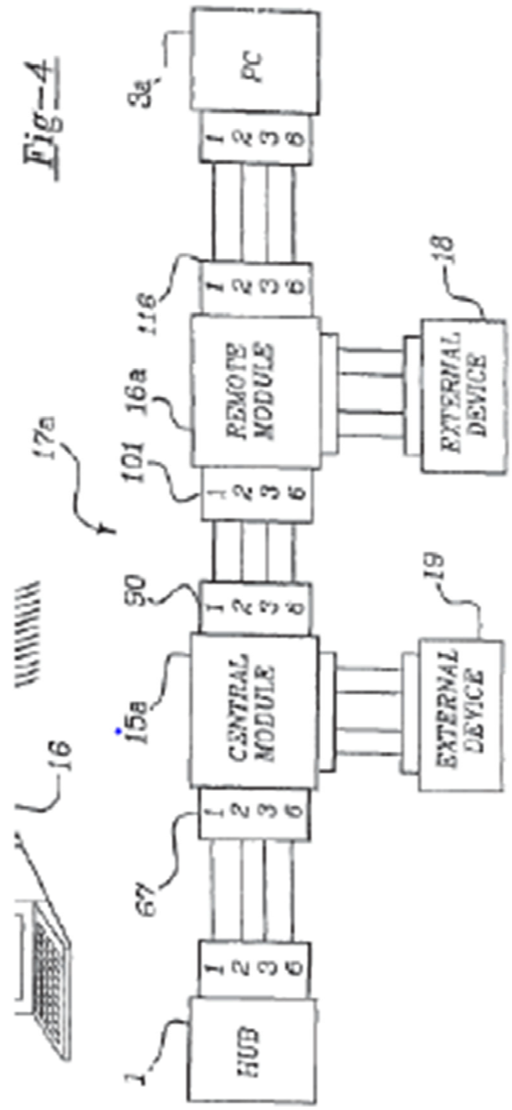

Figure 4 discloses remote module 16a and PC 3a electrically connected together. As noted above, Patent Owner argued during the Oral Hearing that the remote module may me be "a bolt-on" module or one "permanently fixed to the equipment"-the "piece of terminal equipment." *See supra* note 5; Tr. 100:10-101:22, 103:10-22 (arguing an adapted piece of terminal equipment includes a module (resistor)). But as discussed above, the Specification and challenged claims neither require nor preclude permanent attachment and do not specify the location of "impedance within the at least one path." *See* Tr. 101:19-20 (Patent Owner partially clarifying as follows: "I didn't intend to say that you have to have one piece" for the claimed terminal equipment). As also discussed above in connection with Figure 8, an impedance inside or outside remote module 16a on the bus (*i.e.*, path) may include circuitry or a single circuit device, including a single resistor, such as resistor 112. *Supra* Section I.B; Ex. 1001, 8:27-31 (generally describing, without specifying a location for the impedance or contacts, monitoring "various signals, <u>such as</u> the voltage amplitude of the data line relative to ground, the voltage across resistor 112, and the current through resistor 112" (emphasis added)).

Accordingly, based on the current record and the foregoing discussion, we maintain the construction set forth in the Institution Decision as quoted above. *See* Inst. Dec. 10.

2. "Detection Protocol"

Claim 35 depends from claim 31 and recites "wherein the impedance within the at least one path is part of a detection protocol." Patent Owner contends "[a] protocol, as defined in the computer networking field, is 'a mutually agreed upon method of communication.'" PO Resp. 13 (citing Ex. 2038 ¶ 104; Ex.

2047, 1). Patent Owner does not cite to intrinsic evidence in the '012 patent Specification to support its construction, and its cited extrinsic evidence relates to a communication protocol, not a detection protocol. *See* Ex. 2047, 1.

As Petitioner contends, neither claim 35 nor the Specification requires "a mutually agreed upon method of communication." Pet. Reply 25.

Petitioner argues as follows:

> Under BRI, neither "detect" nor "protocol" requires the concept that two devices agree to a method of communication. Crayford-2, ¶90. Instead, a POSITA understood that "detection" simply requires a discovery of something, and a "protocol" as rules. *Id.* <u>In other words, a detection protocol is merely rules for making a discovery</u>. *Id.;* Ex. 2039, 27:9-34:2.

Pet. Reply 25 (citing Ex. 1046 (Crayford-2)).

Claim 35 and the Specification support Petitioner's contentions. Claim 35, an apparatus claim, does not recite any other component that could provide the necessary mechanism for an agreed upon communication. As discussed above, the disclosed detection involves central module 15 or 15a. *Supra* Sections I.B, II.A.1; Ex. 1001, 6:33-37 ("central module 15 detects the absence of the proper identification code from the laptop"). Further regarding detection with a central module (which the challenged claims do not require), the Specification describes one embodiment that includes monitoring by the central module, but no actual two-way communication between two modules:

> [C]urrent sourced onto a transmit line <u>from signal modulator 7</u> and isolation power supply 8 [in central module 15a of Figures 4 and 5] through remote module 16a to the isolation transformer of PC 3A which returns on the other transmit line <u>is monitored by test voltage monitor 84 to verify that both remote module 16a and PC 3A are connected to central module 15a</u>.

Ex. 1001, 8:5-23 (emphasis added). In other words, central module 15a monitors the existence of connections with the claimed terminal equipment (both remote module 16a and PC 3A in this embodiment) simply by detecting interruptions in the DC current flow between central module 15a and that network equipment. *Id.* Thus, even with a central module (which claim 35 does not include), the detection protocol described in at least this embodiment of the '012 patent does not require a mutually agreed upon method of communication.

In any event, even if the central module includes an agreed upon detection protocol, dependent claim 35 and independent claim 31, each drawn to "Ethernet data terminal equipment," do not require a central module (such as disclosed central module 15 or 15a). *See supra* Sections I.B., II.A.1; Ex. 1001, 8:5-56, Fig. 4. Therefore, the limitation recited in apparatus claim 35 constitutes an intended use of the recited impedance as being part of a detection protocol, because apparatus claim 35 does not require another component, such as remote central module 15 or 15a, which the '012 patent discloses as part of any detection scheme.

Patent Owner does not argue that "Ethernet data terminal equipment" encompasses central module such as central module 15a (or even a remote module such as remote module 16a), and appears to argue to the opposite. *See* PO Resp. 40 ("such a device is at the end of an Ethernet network" and does not include an "intermediate device"). Under *Schreiber*, and in line with the discussion in the preceding section, the claimed device at most only needs to be capable of being part of a detection protocol. *See* *Schreiber*, 128 F.3d at 1477.

During the Oral Hearing, after the panel noted claim 35 recites "the piece of Ethernet data terminal equipment," *i.e.*, "just a device" (Tr. 95:14, 20), Patent Owner succinctly agreed with the *Schreiber* principles outlined above:

> Well, if you just had the device and it wasn't connected to the rest of the world, okay, and you read our claims on it, if the device, standing by itself, has the ability to respond to a detection request-if it were connected – that's what our claims are covering.

Tr. 95:21-96:3 (emphasis added).[12]

Accordingly, based on the respective positions of the parties and the foregoing discussion, "wherein the impedance within the at least one path includes

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[12] In similar fashion, Patent Owner's expert in a related district court case also agreed with these underlying principles, stating "[i]n the context of these claims, 'detection protocol' means that the equipment is configured or designed so that the magnitude of the current (flow) or the impedance in the path allow it to detect or determine some information about the equipment at the other end of the path." Ex. 2020, 9 (emphasis added).

a detection protocol" represents an intended use of the impedance such that it must be capable of being part of a scheme involving signals, current, and/or voltage, or similar inputs, for detecting the impedance or a change in impedance. *See supra* Section I.B; Ex. 1001, 8:27-31.

3. "Adapted Piece of Ethernet Data Terminal Equipment"

Claim 31 recites, in its preamble, an "adapted piece of Ethernet data terminal equipment comprising." The body of the claim includes "an Ethernet connector," having "contacts," which have "at least one path coupled across selected contacts" having an "impedance" per the "wherein" clause as discussed above. *Supra* Sections I.B, II.A.1. Therefore, the body of claim 31 sufficiently defines the "adapted piece of Ethernet data terminal equipment" as recited in the preamble.

The parties do not address the construction of "adapted" in the preamble. That term does not present a dispositive issue relative to the grounds at issue and arguments presented.[13] In challenged claim 31, "adapted Ethernet data terminal equipment" does not specify what part of "Ethernet data terminal equipment" to adapt. The '012 patent Specification indicates "Ethernet data terminal equipment" may include a resistor or impedance, as a module or otherwise. *Supra* Section I.B., II.A.1, II. A.2. Even if

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[13] As discussed below, Petitioner persuasively contends Hunter with or without Bulan, and Bloch with IEEE 802.3, teach or suggest modifying Ethernet terminal equipment. Patent Owner does not challenge the "adapted" aspect of Petitioner's showing.

the resistor or impedance were added to existing Ethernet data terminal equipment, the term "adapted" in that respect, at most, would represent a product-by-process limitation-*i.e.*, the old Ethernet terminal equipment would have been "adapted" to include an added resistor or impedance as a process step. Nevertheless, such adapted Ethernet terminal equipment creates no patentable distinction over Ethernet terminal equipment originally including the added resistor or impedance during manufacture.[14] *See Abbott Labs. v. Sandoz, Inc.*, 566 F.3d 1282, 1299 (Fed. Cir. 2009) (discussing product-by-process history, distinguishing infringement analysis from prosecution analysis). In both cases with respect to claim 31, an input resistor or impedance, in a "path," necessarily accomplishes the identical function of being "associated" with "distinguishing information" regardless of the time a process step "adapted" each Ethernet terminal equipment to include such a resistor or impedance in a path.

Setting aside the term "adapted," Petitioner contends the broadest reasonable construction of "data terminal equipment" includes its ordinary meaning of "[a] device that serves as a data source and/or data sink." Pet. Reply 16 (citing Ex. 1033, 10). This construction corresponds to the PCs disclosed in the '012 patent, because they necessarily source or sink data on a bus. *See, e.g.*, Ex. 1001, Fig. 4.

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14 Patent Owner argued during the Oral Hearing that "adapting, in the '012 case. . . . has to be something that modifies the terminal equipment." Tr. 103:15-18 (emphases added). The argument, even if timely, is not persuasive for the reasons noted. Patent Owner does not argue the term creates a patentable distinction, or otherwise overcome Petitioner's showing in the briefing.

Patent Owner does not propose a construction for the "data terminal equipment," but argues "such a device is at the end of an Ethernet network" and does not include an "intermediate device." PO Resp. 40. Contrary to Patent Owner's argument, however, the '012 patent clearly describes the terminal equipment as broad enough to include at least two devices or modules, including remote module 16 and/or PC 3a. *See supra* Sections I.B, II.A.1, 2 (discussing, *inter alia*, Ex. 1001, Fig. 4 (showing remote module 16a and PC 3a), Fig. 8 (showing resistor 112 attached to a bus), 4:63-64 (discussing Ethernet peripherals to a PC such as "telephones, fax machines, robots, and printers"), 8:27-31 (describing a resistor, such as resistor 112, attached to a bus without limitation); 8:5-23 (terminal equipment may include, *inter alia*, remote module 16a and PC 3A).

In addition, with respect to "Ethernet data terminal equipment" as claim 31 recites, the '012 patent broadly describes using "an existing Ethernet communication link or equivalents thereof" without pointing specifically to any particular device as being Ethernet equipment. *See* Ex. 1001, 3:35-37. Nevertheless, as noted, an implied Ethernet PC, or any Ethernet device, as terminal equipment, logically sources and sinks Ethernet data, which corresponds to Petitioner's reasonable construction. The Specification indicates such an Ethernet PC may be coupled to other devices (either upstream or downstream in terms of data or power). For example, the '012 patent broadly refers to "workstations such as personal computers" (Ex. 1001, 4:55-56), indicating other peripheral devices, including, for example, "telephones, fax machines, robots, and printers" (*id.* at 4:63-64), may be attached in such a work station to a monitored Ethernet PC (regardless of whether or not those devices represent separately monitored Ethernet devices).

As noted above, the body of claim 31 also makes clear that the recited terminal equipment includes "at least one path" with an impedance, with the '012 patent describing an impedance such as resistor 112 somewhere along the path, including within remote module 16 and/or PC 3a. *See supra* Sections I.B; II.A.1, A.2; Ex. 1001, Fig. 4, Fig. 8, 8:27-31. As also indicated above, Patent Owner described "bolt-on" modules or modules "permanently fixed to the equipment," as included in the terminal equipment, but the Specification describes generic attachment of simple resistors and other circuitry as discussed above. *Supra* note 5; Sections IB.1, II.A.1, A.2. Furthermore, during the Oral Hearing, Patent Owner verified that the "path" may be "a hundred meters long" and the claimed "contacts" could be "anywhere to the left of where [resistor] 112 connects" to the bus in Figure 8. *See* Tr. 106:106:15-107:7.

With further respect to "Ethernet," the parties agree that Ethernet at least includes standard 10Base-T Ethernet and 100Base-T Internet. *See* PO Resp. 7 ("At the time of ChriMar"s invention (1997)," "<u>Standard 10Base-T Ethernet</u> [was] still the most common type of network architecture in use."), 14 (agreeing with the Board"s construction of "BaseT" as "twisted pair Ethernet in accordance with the 10Base-T or 100Base-T standards" (citing related IPR 2016-01398, Paper 9)); Reply Br. 1, 13, 14 & n.7 (Patent Owner "agrees 10Base-T and 100Base-T teach 'Ethernet.'" (citing PO Resp. 14)).

No valid reason exists to construe or interpret an "adapted piece of Ethernet data terminal equipment" further. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

B. Obviousness Analysis and Level of Skill in the Art

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness involves resolving underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

The parties' positions on the level of ordinary skill in the art do not differ materially. Pet. 5: PO Resp. 11 ("The parties disagree slightly on the level of skill in the art."). A person of ordinary skill has an undergraduate degree in electrical engineering or computer science, or the equivalent, and three years of experience with network communication products and the relevant standards and protocols. *See* Inst.

Dec. 11 (similar finding).[15] The references of record reflect the level of ordinary skill.

C. Alleged Obviousness, Hunter and Bulan

Petitioner alleges claims 31, 35, 36, 40, 43, 52, 55, 56, 59, 60 and 65 would have been obvious to the person of ordinary skill in the art over Hunter and Bulan. Pet. 7-37. Petitioner cites the Crayford Declaration (Ex. 1002) in support of its positions. Patent Owner denies the challenged claims are obvious over Hunter and Bulan. *See, e.g.*, PO Resp. 14-16. Patent Owner cites the Madisetti Declaration (Ex. 2038) in support of its positions.

1. Hunter (Exhibit 1003)

Hunter discloses "[a] power subsystem and method for providing phantom power and third pair power via a computer network bus." Ex. 1003, Abstract. Hunter shows phantom power means that the same cable pair carries both data and power, as in PoE. *Id.* at 19:2-5.[16]

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[15] Patent Owner contends "<u>at least</u> a B.S. degree" is "too open ended," because "it would result in an <u>expert</u> . . . being considered an ordinary artisan." PO Resp. 11. Patent Owner's hypothetical distinction has no bearing on the outcome here, and Patent Owner does not argue it does.

[16] Citations throughout refer to the page numbers that Petitioner added to Exhibit 1003, instead of original page therein. (The Petition cites the original page numbers, but the Board transposed the citations to reflect the added Exhibit pages.)

Figure 2 of Hunter follows:

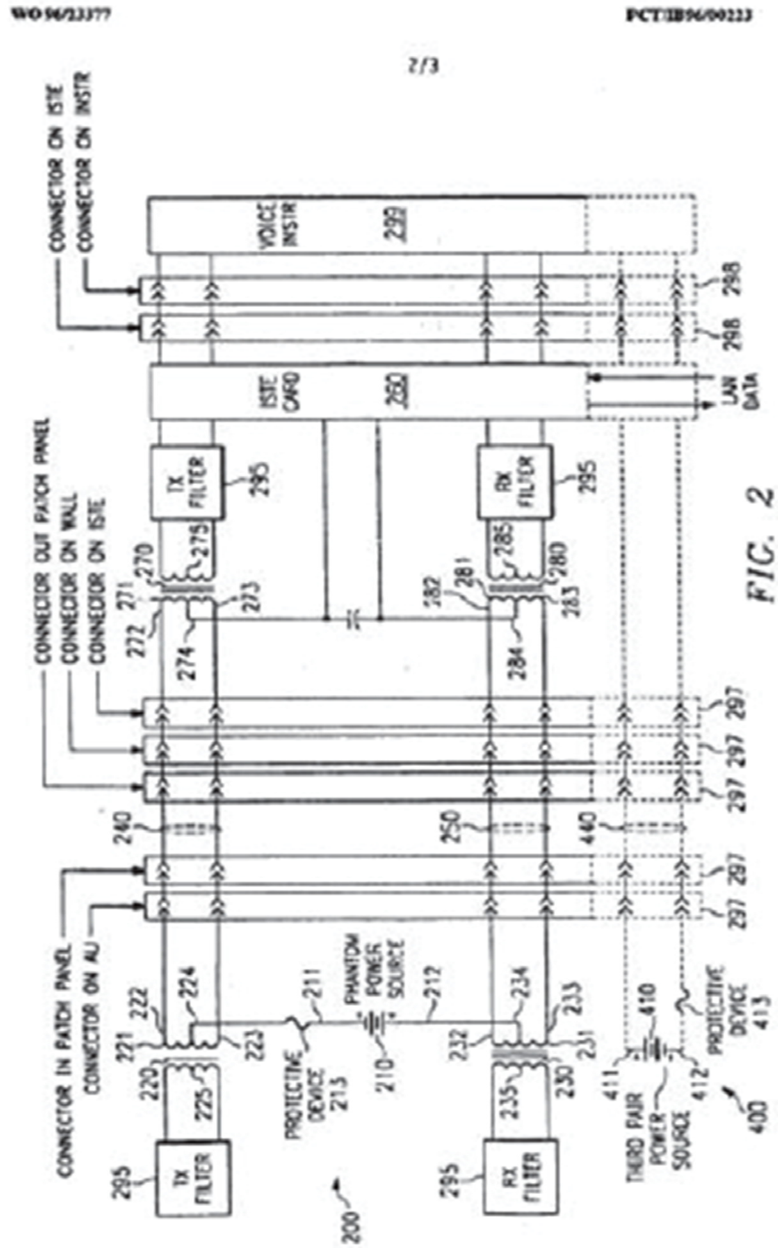

Figure 2 represents a schematic diagram of an example of a phantom powering subsystem 200. Ex. 1003, 35:21-23. "The phantom powering subsystem 200 comprises a power supply 210 having a positive output 211 and a negative output 212." *Id.* at 35:27-29. The subsystem also includes first and second transformers 220 and 230 with windings having end taps and center taps 224, 234. *Id.* at 36:1-6. First and second twisted-pair conductors 240 and 250 are connected to the respective end taps of the transformers "to allow data communication therebetween." *Id.* at 36:7-12.

"In a preferred embodiment of the first aspect of the present invention, the [twisted pair] bus comprises a 10Base-T bus." *Id.* at 23:17-18. "A 10base-T bus conventionally comprises two twisted-pair conductors, each used for unidirectional transmission of data. . . . <u>The present invention preferably employs each of the twisted-pair conductors as a rail by which to deliver DC power to the equipment</u>." *Id.* at 22-29 (emphasis added).

One of the twisted pairs transmits data from equipment 260 (Integrated Services Terminal Equipment, "ISTE") while the other twisted pair receives data into the equipment. *Id.* at 23:18-21, 37:22-26. "The subsystem further comprises a protective device 213 coupled to the power supply 210 to prevent power exceeding a desired amount from passing through the protective device 213." *Id.* at 38:12-15.

2. Bulan (Exhibit 1004)

Bulan discloses a current control apparatus for supplying direct current flow from a source of power via a transmission line to a telecommunications terminal apparatus "being continuously operable while drawing a load current which is exceeded by an inrush current being greater than the load current at a moment of power up." Ex. 1004, 2:17-23. Bulan is used in a network having terminal equipment ("TE") which includes a DC to DC converter ("DC-DC") in a well-known phantom power feed arrangement. *Id.* at 1:52-56, 3:53-56, 4:2-10.

"The current control apparatus is for connection in series between the power source and the transmission line." Ex. 1004, 2:23-25. A current path switch exists between the power source and the transmission line. *Id.* at 4:17-25, Fig. 2.

Figure 2 of Bulan is reproduced below.

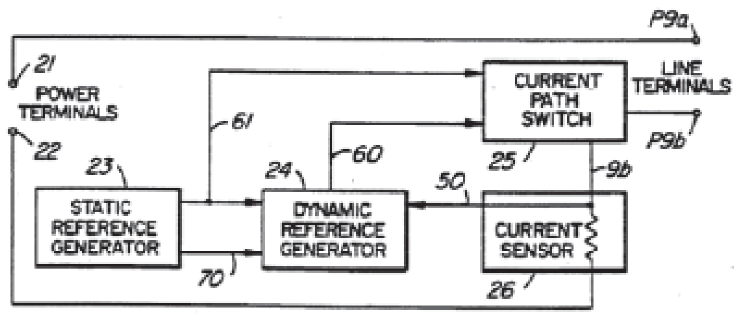

FIG. 2

Figure 2 represents a schematic diagram of a line interface circuit for coupling current from the power source. *Id.* at 4:17-22. As depicted in Figure 2, a static reference generator provides a stable voltage supply on a lead for use by a dynamic reference generator and the current path switch. *Id.* at 4:25-30. The dynamic reference generator generates a control signal for use by the current path switch. *Id.* at 4:33-36. The current path switch provides a current path that alternates between low and high impedance, in accordance with operation of the TE connected to the network. *Id.* at 4:35-40.

Current exceeding Bulan's static limit, set by the static reference generator, causes the current sensor to indicate a current inrush condition. Ex. 1004, 3:5-12, 4:23-24, 5:37-39. Bulan's system responds to this magnitude of current by setting a high limit on the inrush current. *Id.* at 2:31-36, 3:7-12, 5:42-46. After TE's DC-DC completes its startup, the TE draws normal operating power and current remains below Bulan's static limit (unless a fault later occurs). *See id.* at 2:1-14, 3:5-6, 4:60-67.

If "during start up there are several inrushes, the maximum permitted current will return to a high point of slightly more than the current which was permitted just before the envelope returned to the normal load current level." Ex. 1004, 7:7-13. "This may happen several times, as may be peculiar to the particular terminal equipment being connected to the line." *Id.*

3. Claim 31, Hunter and Bulan

Addressing the preamble of claim 31, an "adapted piece of Ethernet data terminal equipment," Petitioner contends that Hunter discloses an Integrated Services Terminal Equipment ("ISTE") device 260 that communicates with a central device ("Hub") over a 10Base-T bus. *See* Pet. 25-28 (citing Ex. 1003, Fig. 2, 25:19-21, 34:3-4, 36:18, 41:19-21). Petitioner argues that Hunter's method adapts Ethernet data terminal equipment by adding phantom power circuitry to it, and attaching it to the network bus via the center taps of transformers in a network interface. Pet. 27-28 (citing Ex.

1003, 23:10-13 ("The third and fourth transformers allow the [terminal] equipment to draw power from the conductors [supplying Hunter's phantom power]. In an overall LAN, many pieces of equipment, each with its own third and fourth transformers, can take power as well as data from the bus.")); Ex. 1002 ¶ 95); Fig. 2 (transformers attached to or on ISTE card 260).[17] Hunter's system includes "legacy" equipment to receive the phantom power. *See* Ex. 1003, 10:14-16 ("An interactive multimedia system must closely follow the availability requirements of the legacy voice system.").

Claim 31 also recites "an Ethernet connector comprising a plurality of contacts" and "at least one path coupled across selected contacts, the selected contacts comprising at least one of the plurality of contacts of the Ethernet connector and at least another one of the plurality of contacts of the Ethernet connector." For this limitation, Petitioner cites to Hunter's disclosure of an Ethernet connector with a first and second pair of contacts for connecting to each of the two twisted-pairs, asserting the pairs carry both phantom power and Ethernet communication signals. Pet. 28 (citing Ex. 1003, Fig. 2, 40:21-25, 39:19-26; Ex. 1002 ¶ 96). Petitioner contends that Hunter's phantom powering system permits the terminal equip-

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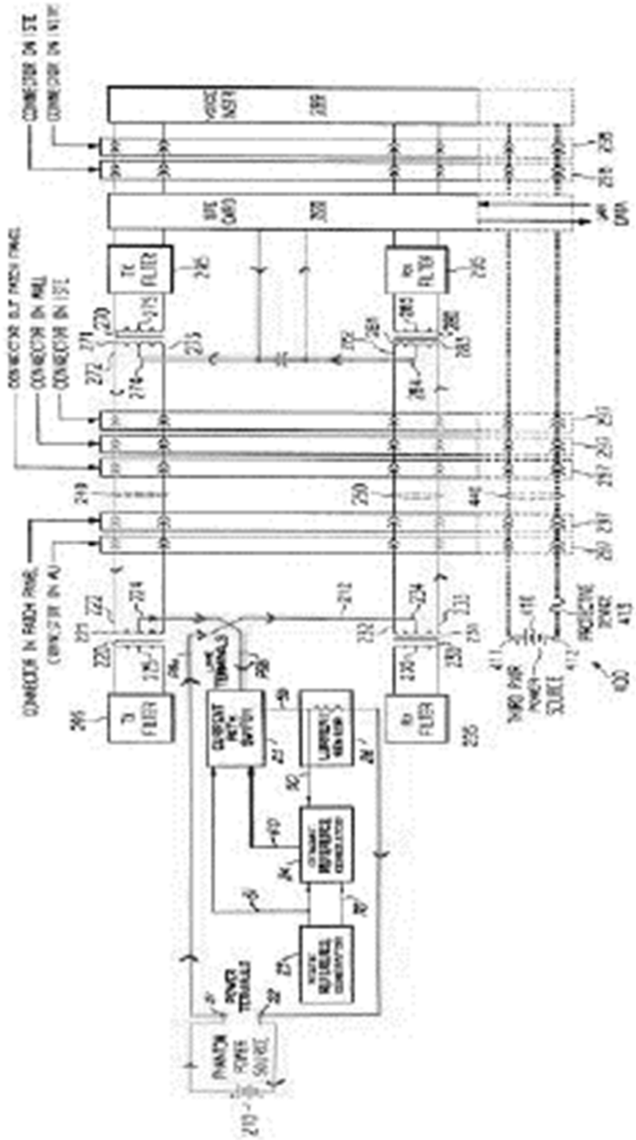
[17] Hunter refers to "the two connectors 298 shown in FIGURE 2 between the <u>equipment</u> 260 (an ISTE device) and the voice <u>instrument</u> 299." Ex. 1003, 43:24-44:1 (emphases added). Therefore, where Figure 2 specifies "CONNECTOR ON ISTE" with respect to contacts 297 (on the left) and contacts 298 (on the right), Hunter appears to indicate these ISTE connectors correspond to ISTE <u>equipment</u> 260, not necessarily just ISTE <u>card</u> 260.

ment (TE) to draw DC current from the same twisted-pairs that communicates Ethernet data to the TE. Pet. 29 (citing Ex. 1003, 23:27-29).

Petitioner explains that in the combined system of Hunter and Bulan, as shown in Petition Figure 3, DC current flows in a counterclockwise direction from the positive terminal of the Hub's power supply 201, through the TE device, and back to the negative terminal of the Hub's power supply. Pet. 29; Pet. Fig. 3.

Petition Figure 3 follows:

Petition Figure 3



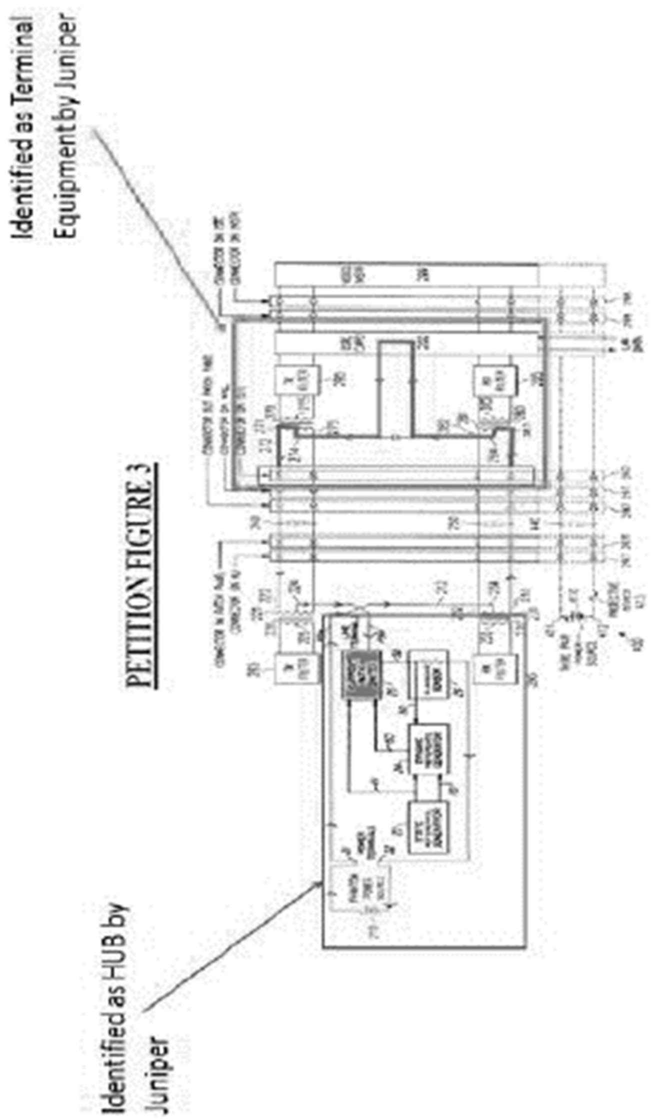
Pet. 16. Petitioner's Figure 3 represents the combined system of Hunter and Bulan in which Bulan's control apparatus replaces protective device 213 of Hunter. Pet. 15-16.

Petitioner explains that current flows from power supply 210 through the wire of twisted-pair conductor 250 through the TE device and returns through twisted-pair conductor 240. Pet. 29 (citing Ex. 1003, 37:27-38:25; Ex. 1002 ¶ 97). Accordingly, Petitioner contends that the path couples across at least one of the plurality of contacts of the terminal equipment's Ethernet connector. Petitioner also explains how based on Ohm's law, the TE equipment draws power through a resistor (generally impedance) to satisfy the distinguishing information "wherein" clause. *See* Pet. 30-33. As noted above, Petitioner contends allowing power to flow through the TE device and transformers via Hunter's circuit constitutes an adapted piece of terminal equipment.

As summarized above and in view of the record, by a preponderance of evidence, the record supports Petitioner's showing that Hunter and Bulan collectively teach or suggest the limitations of claim 31. We adopt Petitioner's persuasive showing as our own. *See* Pet. 7-32. In addition, as discussed further below, Petitioner shows by a preponderance of evidence that an artisan of ordinary skill would have been motivated to combine Bulan with Hunter in order to protect loads, including Ethernet terminal equipment, under varying load conditions. As discussed next, Patent Owner's arguments do not overcome Petitioner's persuasive showing.

a. Path, Impedance, Distinguishing Information

Patent Owner disputes that Petitioner's combination discloses the path and related distinguishing information limitation of claim 31. According to Patent Owner "[t]he 'path' required by the patent claims is identified by a green line below." PO Resp. 44.



Patent Owner's annotated version of Petition Figure 3 above identifies a (green) path inside an (orange) box that both includes Hunter's ISTE card 260 and Ethernet contacts. *See id.* According to Patent Owner,

> Petitioners only argue that the current magnitudes monitored by the Bulan current limiting circuit are associated to an impedance within the path because "they directly result from it per Ohm's Law (where the current magnitude equals the Hunter power supply voltage divided by the total impedance within the path)." (Pet. at 30.) But Petitioners' reliance on Ohm's Law misses the point: first you need something to apply impedance within the path of the Ethernet terminal equipment before Ohm's Law is even relevant, and there is no circuitry disclosed for applying an impedance to the relevant ISTE Card path.

PO Resp. 44-45.

Patent Owner relies on the same argument to allege the combination does not render obvious the "distinguishing information" clause. PO Resp. 45 ("For the same reasons, the examples of 'distinguishing information' . . . do not satisfy claim 31 because none of those examples are "associated to impedance within the at least one path. . . . To the contrary, the impedance identified in those examples is applied by the Bulan current limiting circuit in the hub outside of the claimed path of the adapted Ethernet data terminal equipment." (citing Ex. 2038 ¶ 177)). In a related argument, Patent Owner contends the claimed terminal equipment does not encompass "an intermediate device." *See* PO Resp. 40 (Ex. 2038 ¶¶ 69-74).

These related arguments are not persuasive and turn, in some aspects, on claim construction. Patent Owner appears to refer to Hunter's ISTE card/

equipment 260 (including the attached transformer circuitry with connectors 297) as an "intermediate device." *See* PO Resp. 40, 44; Ex. 1003, Fig. 2; *supra* note 17. Based on our claim construction above, the claimed Ethernet data terminal equipment encompasses an intermediate (or remote) module, attached peripheral devices, and a long path with Ethernet contacts somewhere along the path. *See* Sections B1, II.A1, A.3. Petitioner shows by a preponderance of evidence that the claimed terminal equipment reads on Hunter's ISTE card/equipment 260 (*see supra* note 17), as construed above, because it attaches to a 10Base-T bus according to Ethernet standards, and therefore, sources or sinks Ethernet data, even though that device also couples (in the embodiment of Figure 2) to voice instrument/card 299 in Hunter, as Petitioner contends (as discussed further below). *See* Pet. 27-31; Reply Br. 15-16 (citing Ex. 1046 ¶¶ 69-72); *supra* Section II.A.3.

Even if the recited "path" must be limited to the green path specified by Patent Owner so that the path ends at contacts 297 of Hunter's ISTE card /equipment (*see* PO Resp. 40, 44, Pet. 28), as Petitioner argues based on Ohms law and specific teachings in Hunter, Hunter's Ethernet ISTE 260 necessarily includes a resistor (*i.e.*, *inside* the green path identified by Patent Owner), or else that equipment could not draw power. The Petition persuasively shows "[t]he Ethernet data terminal equipment is . . . adapted to draw phantom power from the network bus." Pet. 27-28 (citing Ex. 1002 ¶¶ 94-95; Ex. 1003, 21:2-8, 23:10-13); Pet. 31 (describing driving "operating power to the TE" over the twisted-pair Ethernet cable."); Pet. 2931 (citing "Ohm's Law (where the current magnitude equals the Hunter power supply voltage divided by the total impedance within the path")).

Patent Owner's arguments reduce to the untenable assertion that Hunter's ISTE 260 equipment does not draw power, an impossible event as a matter of energy conservation. Of course, only a resistor R consumes power P (as heat in Watts (W)), where $P=I^2R$ or $(V)^2/R$, so if R, V, or I=0, then P=0). *See* Ex. 2055, 171:4-10 (Patent Owner's counsel asking "[i]f the resistance of a particular piece of equipment is a fixed value, then power becomes just a function of voltage; correct?" and Mr. Crayford agreeing "[m]athematically that would appear to be correct."); Ex. 1003, 45:2-4 ("For example, if the maximum short circuit is 500mA, then a 1/2W [balancing] resistor [in the terminal equipment's transformer circuit, Fig. 3, 310] is required (P=I*I*R=.5*.5*2=.5W)").

Accordingly, the record contradicts Patent Owner's argument that the orange box referenced by Patent Owner shows "no circuitry . . . for applying an impedance." *See* PO Resp. 45. As indicated, equipment within the orange box or connected as part of the card, including ISTE equipment/card 260, necessarily draws power by itself and necessarily has a resistance to draw that power. As Mr. Crayford testifies in his first Declaration "[i]n an overall LAN [in Hunter's system], many pieces of equipment, each with its own third and fourth transformers, <u>can take power as well as data from the bus</u>." Ex. 1002 ¶ 95 (emphasis added).

In addition, the Petition refers to "the total impedance within the path" as indicated by "Ohm's Law,"-asserting whatever Hunter's system includes in the path contributes to the impedance/resistance (as it must). *See* Pet. 30; *see also* Ex. 1003, 43 (calculating cable resistance and balance resistors in path equipment path); Ex. 1003, 45:2-4 (balance resistors). Petitioner's showing also indicates that when Hunter's LAN/Ethernet equipment also includes couplable ISDN voice instrument 299 at the end of the impedance path (with a resistor which also draws/consumes power) as the embodiment of Figure 2 shows, such voice equipment also contributes to impedance/resistance of the claimed path according to Ohms law. *See* Pet. 28-33. In either case, the total impedance/resistance can be associated to one or more couplable devices making up the terminal equipment-*i.e.*, ISTE card/equipment 260 and/or voice instrument 260.

Hunter supports Petitioner in several places, further disclosing that the terminal equipment 260 (itself) draws power (and LAN data, *see* Fig. 2 bottom of card) through a "10Base-T bus conventionally compris[ing] two twisted-pair conductors 240, 250, each used for unidirectional transmission of data":

> The third and fourth transformers 270, 280 allow <u>the equipment 260 to draw power</u> from the twisted-pair conductors 240, 250, thereby enabling phantom powering. In an overall LAN, many pieces of equipment, each with its own third and fourth transformers 270, 280, can take power as 15 well as data from the bus. Thus, <u>telephone instruments coupled to the equipment can remain powered</u> even when associated devices are not or in the event of a power failure.

Ex. 1003, 39 (emphasis added).

Hunter also teaches "[a] voice instrument 299 is therefore couplable to the equipment 260 and receives both data and power therefrom." Ex. 1003, 40 (emphases added); Pet. Reply 18 (asserting "the path delivering power to the ISTE continues to the Voice Instrument), quoting Ex. 1003, 40, citing Ex. 1002 ¶ 97; Ex. 1046 ¶ 72). As Petitioner's showing implies (though not necessary to the holding here), similar to the optional peripheral equipment (phones, printers etc.) at the '012 patent's disclosed workstations (Ex. 1001, 4:53-64), Hunter's "couplable" telephones/ instruments 299 certainly may be uncoupled by a simple disconnection, so that all the power would be drawn by the implicit resistance of the ISTE card /equipment 260, rendering that equipment no longer "intermediate" (assuming Patent Owner's narrow claim construction of terminal equipment applies). *See supra* Sections II.A.2, A.3; PO Resp. 40 (implying Hunter's ISTE equipment cannot be Ethernet data terminal equipment because it is "intermediate" equipment); Ex. 1002 ¶ 95 (citing Hunter's LAN equipment).

As Petitioner also alleges, Hunter's system delivers DC current "from the same twisted-pairs it uses to communicate Ethernet data." Pet. 29 (citing Ex. 1002 ¶ 98; Ex. 1003, 21:27-29). The Petition quotes Hunter: "The present invention preferably employs each of the twisted-pair [10Base-T] conductors as a rail by which to deliver DC power to the equipment." *Id.* (quoting Ex. 1003, 21:27-29 (emphasis added)). On the same page, Hunter also refers to "telephone instruments coupled to the equipment" that "receive power." Ex. 1003, 21:14-16.

Therefore, Patent Owner's arguments do not rebut Petitioner's showing that Hunter's circuit delivers power to ISTE equipment/card 260 and/or other devices (*e.g.*, voice instrument 299) connected thereto. *See* Ex. 1002, Fig. 2 (ISTE 260 and voice instrument 299 connected). As Petitioner shows, different resistor values necessarily draw different current (power), thereby necessarily having the capability to provide distinguishing information (different current magnitudes) from a resistor or resistors in the TE equipment about that equipment. *See* Pet. 30-32 (Bulan shows varying current magnitudes responsive to varying loads).

Patent Owner also argues the combination does not teach the distinguishing limitation because Bulan's circuit does not "differentiate the adapted Ethernet data terminal equipment from another device. Petitioners are silent as to how any of the current magnitudes <u>differentiate</u> the adapted Ethernet terminal equipment." PO Resp. 42. These arguments and related arguments ignore that the claimed Ethernet device and Hunter's Ethernet device need only, at most, be capable of being distinguished via impedance under the rationale of *Schreiber*. *See supra* Section I.B., II.A.1.[18]

In any event, even if claim 31 requires the limitation as interpreted by Patent Owner, at least some different Ethernet devices necessarily have different internal impedances/resistances than other

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[18] The claim phrase "wherein distinguishing information about the piece of Ethernet data terminal equipment is associated to impedance within the at least one path" does not require the <u>association</u> to occur within the path of the Ethernet data terminal equipment. Under *Schreiber*, as explained above in the claim construction section, claim 31 does not require any association actually to occur. *See supra* Sections II.A.1-3.

Ethernet devices, rendering any Ethernet device capable of being distinguished. *See supra* Section II.A.1 (citing support for the finding). Even if claim 31 somehow requires more, as Petitioner notes, Bulan specifically describes its circuit as providing different responsive information based on different load devices. *See* Pet. 30-32 (citations omitted), 21 (quoting Ex. 1004, 7:7-13); Ex. 1004, 7:7-13 ("If . . . the apparatus during start up requires several inrushes" this procedure "may happen several times, <u>as may be peculiar to the particular equipment being connected to the line</u>." (emphasis added)); Pet. Reply 24 (arguing Patent Owner "does not account for Bulan's statement that these detected magnitudes may provide information 'that is <u>peculiar to the particular terminal equipment</u> being connected to the line.'" (quoting Ex. 1007, 7:9-11 (emphasis by Petitioner), citing Pet., 21, 24, 33)).

b. Ethernet

Patent Owner also argues with respect to claim 31 that Hunter and Bulan do not disclose or suggest Ethernet. PO Resp. 6. For example, Patent Owner contends "10Base-T (1993) and 100Base-T (1995) did <u>not</u> employ phantom powering for <u>Ethernet</u> communications." *Id.* Patent Owner also argues installed Ethernet networks employed "common mode chokes" ("CMCs") and "Bob Smith" terminations ("BSTs") as terminations "to clean up [the] signal and minimize emissions." *Id.* at 6-7 (citing Ex. 2039, 43:11-18, 43:20-44:2, 45:6-8; Ex. 2038 ¶ 34). According to Patent Owner, "adding power to an Ethernet cable could saturate the common mode chokes, interfering with the Ethernet transmissions." *Id.* at 7 (citing Ex. 2038 ¶ 35). Patent Owner similarly contends power could damage the BSTs and impair the signal integrity. *Id.* (citing Ex.

2039, 45:10-21; Ex. 2038 ¶ 35). Patent Owner also argues that "as late as 1999-2000, the IEEE experts were skeptical about using PoE [(*i.e.*, sending operating power and data on the same lines, *supra* Section I.B)], because of potential damage to the equipment or degrading the Ethernet data signal." *Id.* at 7 (citing Ex. 2038 ¶ 36). Patent Owner also argues at the time of the invention (1997), "<u>Standard 10Base-T Ethernet</u> [was] still the most common type of network architecture in use." *Id.* at 7 (citing Ex.1010, 99, 157; Ex.2039, 24:18-25:15.). Patent Owner contends IEEE 802.3-the "[s]tandard [for] 10Base-T Ethernet"-required an RJ-45 "MDI connector" having eight contacts, with two unused pairs, thereby suggesting putting power over those unused pairs, instead of pairs used for the data. *Id.* (citing Ex.2039, 77:21-78:8).

Patent Owner also argued during the Oral Hearing that skilled artisans would have recognized that its <u>disclosed</u> low power would not destroy the BSTs or CMCs in "legacy devices," but high power (*i.e.*, PoE) would. *See* Tr. 111:7-22 (arguing "[b]ecause it can operate at low power, it doesn't saturate Bob Smith and it can communicate."); 134:21-135:12 (similar testimony); *supra* Section I.B. Patent Owner explains that pre-existing networks would have contained "billions of nodes" (*i.e.*, existing devices) each having BSTs and CMCs. PO Resp. 15 (citing Ex. 2039, 43:20-44:2, 45:6-8, 193:6, 195:3-196:3; Ex. 2038 ¶ 42). As noted above, Patent Owner similarly argues that its invention solves a PoE legacy problem because its system first checks for power requirements, <u>then</u> delivers PoE. *See* PO Resp. 9 ("[A] PoE network could not provide PoE power to an Ethernet terminal device unless it knew whether the device was a PoE terminal device."); *supra* Section I.B.

Based on these arguments, Patent Owner contends "an ordinary artisan never would have combined references and acted as Petitioner[']s propose." *Id.* at 14. Patent Owner refines the summarized arguments above on pages 16-27 of its Brief. Dr. Madisetti's testimony largely tracks Patent Owner's arguments. *See, e.g.*, Ex. 2038 ¶¶ 41-68.

These arguments are not persuasive. First, the arguments reveal that not all Ethernet terminal devices (legacy or otherwise) have BSTs and CMCs. Tr. 115:19-116:3, 150:16-151:8; Ex. 1020, 55:19-56:2, 80:16-23; *see also* PO Resp. 9 (alleging the disclosed invention enables PoE only after checking power and/or equipment requirements).[19] Second, because not all Ethernet terminal devices had BSTs and CMCs, Patent Owner's arguments implicitly recognize that providing PoE to those devices would have been obvious-and the claims cover those devices. Third, the claims do not limit the amount of power delivered to any Ethernet devices, regardless of whether such devices have BSTs and CMCs. Fourth, the challenged (apparatus) claims do not require checking for power requirements prior to sending PoE (*i.e.*, operating

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[19] In other words, Patent Owner alleges that after determining the Ethernet equipment could handle operating power (because, *inter alia*, it did not have BSTs or CMCs), the disclosed invention could supply operating power (PoE). *See* PO Resp. 9. Regardless of whether the record supports Patent Owner's arguments that its disclosed invention enables PoE, the record shows, and Patent Owner agrees, that not all legacy Ethernet equipment had BSTs or CMCs. Tr. 115:19-116:3, 150:16-151:8; Ex. 1020, 55:19-56:2, 80:16-23.

power). *See supra* Section I.B. Finally, Patent Owner admitted during the Oral Hearing that for "new devices, you can put whatever you want to in them. You can fix the problem." Tr. 135:6-7. This argument suggests a person of ordinary skill also could "fix the problem" with legacy Ethernet devices (assuming for the sake of argument the claims require legacy Ethernet devices). The latter suggestion coalesces with Mr. Crayford's credible testimony showing that skilled artisans knew how to provide PoE, even if they would have had to modify Ethernet circuitry that includes BSTs or CMCs. *See* Ex. 1046 ¶¶ 23-25 (including simple DC current blocking capacitors).

According to Patent Owner, an artisan of ordinary skill would have recognized that using Hunter's Ethernet with Hunter's phantom power would have degraded signal quality or damaged legacy equipment having BSTs or CMCs, and then abandoned Hunter's teaching/suggestion of providing Hunter's phantom power system with Hunter's Ethernet. *See* PO Resp. 17 (citing Ex. 2038 ¶ 48). But even if a legacy Ethernet terminal included a BST or CMC, the record shows an artisan of ordinary skill easily would have accommodated it in order to provide beneficial PoE. *See* Ex. 1046 ¶¶ 23-33.

For example, in addition to disclosing providing power and data to interactive multimedia systems via twisted pairs and Ethernet standards, Hunter teaches accommodating existing systems (Ex. 1001, 3:4-17, 21:3-12): "It is a further primary object of the present invention <u>to remain as compatible as possible with existing standards</u> for video, voice and data communications." *Id.* at 21:10-12 (emphasis added). Hunter also mentions "legacy voice systems," noting "[a]n interactive multimedia system must closely follow the availability requirements of the legacy voice system." Ex. 1003, 5:4-9, 10:14-16, 23:24-29. Hunter describes varying "the values of . . . balancing resistors . . . depend[e]nt on the current the load (the equipment 260 of FIGURE 2, for example) requires." *Id.* at 43:10-12 (emphasis added). Hunter describes preferably using a 48V source, but describes using sources with a "wide range of power levels" and using "DC-DC convertors" for other "voltage levels (*i.e.* 3V or 5V)." *Id.* at 41:5-8. Hunter describes providing balance circuits for signal quality, noting "[o]f course, those of skill in the art will recognize that the balance circuits 290 of the present invention may be deleted at the risk of impairing signal quality." *Id.* at 42:4-7 (emphasis added). Hunter further explains that "a careful phantom power scheme must be implemented to avoid problems that may arise due to interactions between the power and the data." Ex. 1003, 19:13-26 (emphasis added). Bulan's circuit prevents damage to circuit components under varying load conditions, further showing artisans of ordinary skill routinely designed protective circuits by considering load power and other system constraints. *See* Ex. 1004, Abstract ("providing effective overcurrent protection in spite of widely variable load current requirements"). These disclosures further support Mr. Crayford's credible testimony that accommodating CMCs and BSTs to provide PoE would have been routine. *See* Ex. 1046 ¶¶ 18-26.

Patent Owner's contention regarding the requirement for BSTs and CMCS to prevent noise for billions of existing terminal devices also is not commensurate in scope with the challenged claims, because the challenged claims only require a single Ethernet device. An artisan seeking to power a single isolated Ethernet device need not have considered in all cases embraced by the claims whether noise and emissions interfered with other Ethernet devices, because those isolated devices would be too far away for them to interfere with other devices. Even if FCC emissions were a concern, a skilled artisan could have implemented other designs. *See* Ex. 1046 ¶¶ 16-21 (showing CMCs and BSTs would have been optional and not required by the claims and other devices could have been used to solve their "purpose"-FCC regulations); Tr. 150:22-151:14 (Patent Owner arguing BSTs were "prevalent" but conceding "[w]e can't represent . . .they're in every single circuit ever made by man"); 115:19-116:4 (Patent Owner asserting with respect to the number of BSTs in Ethernet equipment "the record is that it's somewhere between some and all, and a lot closer to all").

In addition, the '012 patent does not discuss BSTs or CMCs in any of its disclosed networks. *See* Pet. Reply 2. Even if a skilled artisan desired to use BSTs and/or CMCs with billions of nodes, this relates to satisfying FCC regulations. *See* Ex. 1046 ¶¶ 13-14 (citing Ex. 1029 (patent for BSTs)). The claims do not require satisfying FCC regulations. *See id.* ¶¶ 14-15. Even if an artisan of ordinary skill would have contemplated satisfying FCC regulations, Mr. Crayford credibly and persuasively shows skilled artisans knew how to do reduce regulated emissions with or without using BSTs or CMCs. *Id.* ¶¶ 14-24.

Accordingly, Patent Owner's arguments that the challenged claims solve a problem with legacy devices are not commensurate in scope with the claims. *See*

PO Resp. 17. As noted, the claims read on devices that do not solve any alleged problems for several reasons: 1) not all legacy Ethernet devices included BSTs and CMCs; 2) even if some legacy Ethernet devices included BSTs and CMCs, the claims read on providing high power to them without checking any power requirements; and 3) skilled artisans already knew how to provide the correct PoE without burning out components, including legacy Ethernet components. *See Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1336 (Fed. Cir. 2010) ("Because the claims are broad enough to cover devices that either do or do not solve the 'short fill' problem, Abbott's objective evidence of non-obviousness fails because it is not 'commensurate in scope with the claims which the evidence is offered to support.'" (emphasis added) (quoting *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983)); *MeadWestVaco Corp. v. Rexam Beauty and Closures, Inc.*, 731 F.3d 1258, 1264 (Fed. Circ. 2013) (holding a district court erred because it credited "secondary considerations of nonobviousness [that] involved only fragrance-specific uses, but the claims now at issue are not fragrance-specific." (emphasis added)); *In re Tiffin*, 448 F.2d 791, 792 (CCPA 1971) (claims that are "too broad" fail to show that the claims are reasonably commensurate with the scope of the objective evidence of non-obviousness: "The solicitor's position is that the objective evidence of non-obviousness is not commensurate with the scope of claims 1-3 and 10-16, reciting 'containers' generally, but establishes non-obviousness only with respect to "cups" and processes of making them. We agree."); *In re Law*, 303 F.2d 951$_5$ 1162 (CCPA 1961) ("Thus, assuming the affidavits are a proper showing of commercial success, they do not show commercial success of dockboards covered by the appealed claims which are not limited to the bead of claim 13." (emphasis added)).[20]

In any event, setting aside the breadth of the claims, BSTs and CMCs pertain to, at most, design issues, as indicated above. The IEEE 10Base-T standard does not require them. *See* Ex. 1020, 141:19-144:10 (testifying the standard does not specify BSTs, but maintaining a skilled artisan would have understood "you require circuitry such as" BSTs "to maintain signal integrity and . . . [to] reduce other impairments"); Pet. Reply 2-4; Ex. 1046 ¶ 16 (BSTs and CMCs address FCC issues).

Regarding alleged skepticism, as discussed further below (*see infra* Section II.D.3) and as Petitioner argues, Patent Owner's evidence at most shows that some committee members did not favor using PoE as an IEEE standard, but other committee members did. *See* Pet. Rep. 8-9; PO Resp. 23-24 (arguing "the clear majority . . . rejected applying power to the data-carrying pins)). In addition, any skepticism about whether PoE would become a standard does not relate to whether or not it worked, and more importantly, does not relate to the obviousness of the challenged claims. Merely considering PoE as an IEEE standard shows the method was well-known.

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[20] The cited cases deal with secondary considerations, and Patent Owner's arguments relate to solving an alleged problem. Even if Patent Owner's arguments do not raise issues of secondary considerations directly, the cited cases reveal in principle that arguments asserting non-obviousness must be reasonably commensurate in scope with the claims.

Patent Owner's cited evidence shows that at least one member identified "[p]ossible" or "[p]otential" "[i]ssues" with PoE, but the same member listed "[a]ttributes," including that PoE "[u]ses less [sic: fewer] wires" and "would work on non-standard legacy two pair cabling." Ex. 2044, 2. PO Resp. 24 (citing Ex. 2044, 2). No reasonable dispute exists over the fact that PoE was used at the time of the invention. *See id.*; Tr. 84:13-92:6 (admitting the inventors of the '012 patent did not invent PoE, the challenged claims do not require PoE, and the challenged claims cover merely identifying equipment-*i.e.*, without providing PoE); PO Resp. 8 (one purpose of the claimed invention involves providing security-*i.e.*, not power).

Regarding Patent Owner's related arguments that some Ethernet cables and connectors included unused pairs (*see* PO Resp. 20-21, *inter alia* CAT-3, and CAT-5 cables and connectors), using data lines and power simultaneously over the same lines was so well-known that Hunter, Bloch, and skilled artisans referred to the practice as "phantom" power or PoE, as noted above and further below. *Supra* Section I.B; *infra* Section II.D.3. In addition to Hunter, Bloch explains phantom power circuits "can find application in many different control unit/terminal applications." Ex. 1005, 4:49-52. And as Petitioner argues, simply because some prior art connectors showed unused pins does not mean an existing circuit included wires for the connector pins or that other Ethernet TEs could not use existing wire pairs. *See* Reply Br. 13-14 (citing Ex. 1046 ¶¶ 61-62; Ex. 1008, 214; Ex. 1020, 345:21-346:7; 363:1-9; 364:21-365:5) (arguing "[e]ven the IEEE could not determine what percentage of installations had unused pairs"). As Patent Owner's evidence shows, and as Hunter suggests, using fewer wires to provide data and power constitutes a benefit of cost and the related benefit of communicating with more equipment. *See* Ex. 2044, 2; Ex. 1003, 23:23-29; Ex. 1040, 3 (decreases system cost and allows "easier integration of discovery & power control circuitry").

Challenged claim 31 requires Ethernet equipment to have the implicit capability of receiving sufficient power on a path coupled to Ethernet contacts so that its impedance can be detected. On this record, Petitioner shows by a preponderance of evidence that Hunter's Ethernet equipment necessarily does that, with or without the suggested features of Bulan that explicitly teach an impedance distinction in detected load equipment.

Patent Owner also contends that Hunter repeatedly refers to "Ethernet®," but does not explain what the term "Ethernet®" means. PO Resp. 29-30 (citing Ex. 1003, 12, 14, 21, 23, 28, 35, 36; Ex. 2038 ¶ 68). Patent Owner explains that the term "Ethernet®" in Hunter refers to the original trademarked version of Ethernet owned by Xerox Corp, not the subsequent non-trademarked versions of Ethernet, such as 10Base-T and 100Base-T. *Id.* at 29 (citing Pet. 27; Ex. 1002 ¶ 94 n.5).

These additional arguments regarding Ethernet are not persuasive. The '012 patent makes no distinction about Ethernet types, and broadly states "[t]his invention is particularly adapted to be used with an existing Ethernet communications link or equivalents thereof." Ex. 1001, 3:35-37. Hunter discloses a 10Base-T bus comprising two twisted pair conductors for the transmission of data. Pet. 27-28; Ex. 1003, 37:19-28.

Hunter also teaches connectors for connecting network equipment to the 10Base-T bus. Pet. 28; Ex. 1003, 38:21-25, Fig. 2.

Patent Owner does not dispute that the term "BaseT" (which unchallenged claim 14 recites as a type of Ethernet) refers to a "twisted pair Ethernet in accordance with the 10Base-T or 100Base-T standards." PO Resp. 14. Patent Owner does not dispute Petitioner's showing that Hunter teaches a "10Base-T" bus comprising two twisted pair conductors for the transmission of data. Pet. 27-28; Pet. Reply 19-20; Ex. 1003, 26:3-6, 37:19-28. For example, Hunter teaches a power "rail" on the 10Base-T bus:

> In the illustrated embodiment, the bus comprises a 10Base-T bus. A 10Base-T bus conventionally comprises two twisted-pair conductors 240, 250, each used for unidirectional transmission of data. Thus, in this embodiment, one of the twisted pairs (say, 250) is employed for transmitting data from the equipment 260, while the other of the twisted-pairs (say, 240) is used for receiving data into the equipment 260. The present invention preferably employs each of the twisted-pair conductors as a rail by which to deliver DC power to the equipment 260.

Ex. 1003, 37:19-28 (emphases added). Therefore, regardless of whether Hunter's "Ethernet®" nomenclature includes 10Base-T, Hunter independently teaches 10Base-T.[21] *Id.*

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[21] The parties agree that the IEEE published the 10Base-T standard prior to the invention. Ex. 1002 ¶ 92 n.5 (testifying

Patent Owner also contends that Petitioner does not show sufficiently that the two twisted pair conductors of the 10Base-T bus in Hunter carry Base-T Ethernet signals. *See* PO Resp. 35. Specifically, Patent Owner argues that hubs 140, 150, 160, and 180 in Figure 1 of Hunter connect to multimedia hub 120 through isoEthernet interfaces. *Id.* (citing Ex. 1003, 34:19-21, 35:14-16, 35:27-28, 36:13-17, 36:28-37:2). According to Patent Owner, isoEthernet interfaces only carry ISDN signals, not Ethernet signals. *Id.* (citing Ex. 1003, 15:15-18; Ex. 2038 ¶ 77). Patent Owner also argues that hub 170 in Figure 1 of Hunter connects to multimedia hub 120 through a 10Base-F interface. *Id.* at 35-36 (citing Ex. 1003, 36:20). According to Patent Owner, a 10Base-F interface requires a fiber connection, and "fiber cannot carry electrical current." *Id.* (citing Ex. 2038 ¶ 78).

Patent Owner's arguments regarding isoEthernet and 10Base-F arguments are not persuasive. Patent Owner's arguments rely on the unpersuasive premise that the phantom powering subsystem represented in Figure 2 of Hunter necessarily must be incorporated bodily into specific hubs represented in the system of Figure 1 of Hunter. *Id.* at 35-36. Figure 2 represents an "illustrated embodiment" (Ex. 1003, 39:19) and "a schematic diagram of a phantom powering subsystem" 200 (*id.* at 37:21-22). Figure 1 represents an "illustrated embodiment" of the system 100 (*id.* at 34:17) and also "illustrate[s] a system diagram of an interactive multimedia subsystem employing the power subsystem of the present invention" (*id.* at 34:4-5).

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both 10-Base-T and 100Base-T were well-known by 1997); Ex. 2038 ¶ 32 (testifying IEEE published the standard in 1993).

As Petitioner argues, Hunter does not limit its teachings about its phantom powering subsystem or its multimedia system to Figures 1 and 2, which merely represent embodiments. *See* Reply Br. 20-21. Hunter teaches generally that each hub in Figure 1 may represent "one of the cards" that otherwise may be in multimedia chassis 110 of the overall system 100. *See* Ex. 1003, 34:5-15, Figure 1. As noted, Figures 1 and 2 merely each represent an "illustrated embodiment." *Id.* at 34:17, 39:19. Hunter does not limit its system to each "illustrated embodiment," let alone, to a combined version of the embodiments according to Patent Owner's restricted view. As Petitioner also persuasively argues, Figure 2 does not require every connector depicted; Figure 1 does not require any specific hub or card arrangement; and Hunter generally discloses powering <u>equipment</u> by connecting phantom power to any hub along the 10Base-T bus, using 10Base-T as a standard. *See* Pet. Reply 20-22; Ex. 1003, 34:5-21, 39:19-20 (describing illustrated embodiments).

Hunter teaches that "in a <u>preferred embodiment</u> . . . the bus [to which cards or hubs attach] comprises a <u>10Base-T bus</u>," and notes that "[t]hose of skill in the art will recognize . . . that the present invention <u>is also compatible</u> with Ethernet®, Token Ring®, ATM and <u>isoEthernet® standards</u>." Ex. 1003, 26:3-11 (emphases added). Hunter refers to "[o]ne <u>standard</u> that employs" the "two twisted-pair conductors" bus as "10Base-T." *Id.* at 4-6. Similarly, claim 3 of Hunter states that the "bus comprises a two-pair twisted-pair bus selected from the group consisting of: <u>10Base-T</u>, Ethernet®, Token Ring®, ATM, 100Base-T, and <u>isoEthernet®</u>." *Id.* at 51 (emphases added). These portions of Hunter teach a network that preferably uses a 10Base-T bus for connecting network equipment, and alternatively may use an isoEthernet bus. Therefore, contrary to Patent Owner's argument, skilled artisans would have recognized that Hunter does not cabin its teachings to an isoEthernet ISDN embodiment or any other embodiment.

Patent Owner's remaining arguments regarding Hunter's Ethernet each impermissibly restrict Hunter's teachings by relying on specific card/hub bodily incorporations of the phantom powering subsystem 200 embodiment represented in Figure 2 into the system 100 embodiment represented in Figure 1 of Hunter. *See* PO Resp. 31-32 (citing Ex. 2038 ¶ 70). For example, Patent Owner's arguments assume that because Hunter shows voice instruments 155 connected to hub 150 in Figure 1, and because Figure 2 shows multiple connectors 297, 298, this shows that voice instruments 155 and hub 150 of Figure 1 respectively must represent voice instrument 299 and ISTE card 260 of Figure 2. *See* PO Resp. 32-34. In other words, Patent Owner reasons that ISTE 260 of Figure 2 must represent hub 150 of Figure 1, based on connectors 297, 298 respectively on each side of ISTE card 260 in Figure 2 (and implicit similar connections on hub 150 in Figure 1 with respect to ISDN phone 155 connections). *See* PO Resp. 33-34.

As another example, Patent Owner argues that hub 120 in Figure 1 of Hunter corresponds to the phantom power source on the left-hand side of Figure 2 of Hunter. *See* PO Resp. 32. Based on that and other indications noted above (*e.g.*, connections 297, 298), Patent Owner equates Figure 1's hub 150 with Figure 2's ISTE card 260, and contends hub 120 (allegedly with phantom power and data) communicates with hub 150/card 260 using isoEthernet interfaces. *See id.* at 32, 35. (With the exception of hub 170 discussed below, Patent Owner chooses hub 150 as a representative example of hubs 140, 150, 160, and 180 that each allegedly transmit only isoEthernet. *See id.*)

Hunter's Figure 1 depicts telephones 155 and 165 connected to hubs 150 and 160, and phone 127 (and video camera 126) connected to computer 125, which connects to multimedia Hub 120. Hunter simply does not confine any depicted telephones and connections of the embodiment of Figure 2 to any specific hub or connection depicted in the embodiment of Figure 1. *See id.* at 32:16-17, 41; Reply Br. 19-22; Ex. 1046 ¶¶ 77-78.

In addition, Figure 2 shows "ISTE Card 260," but Hunter refers to "two connectors 298 shown in FIGURE 2 between the <u>equipment</u> 260 (an ISTE device) and the voice instrument 299." Ex. 1003, 43:4-44:2. Connectors 297 exist on the other side of card 260 and include the transformer circuitry attached to card 260. *See id.* at Fig. 2. Patent Owner's showing relies on cards and respective connectors only. *See* PO Resp. 32 (Response Figure 1, citing Ex. 2038 ¶ 70). Hunter's teachings, including generic teachings regarding 10Base-T and phantom power, indicate that Hunter's ISTE equipment communicates using 10Base-T Ethernet standards, with the system "preferably" providing "DC power to the equipment" using "twisted-pair conductors as a rail." *See* Ex. 1003, 23:17-29.

As Petitioner argues, Hunter implies phantom power "can be located in any of the hubs or PCs."

Reply Br. 20 (citing Ex. 1046 ¶¶ 73-76). Petitioner describes the example of 10Base-T hub 170, which provides power over 10Base-T ports to 24 devices. *Id.* (citing Ex. 1003, 36:18-19). Petitioner persuasively contends that "[a] POSITA would understand a power source in Hub 120 would be unable to power all the connected Hubs and the dozens of devices connected to them." Pet. Reply 20 (citing Ex. 1046 ¶¶ 73-76); *see also* Pet. Reply 19-20 (arguing "ChriMar acknowledges there must be an ISTE Card in Hub 150" based on similar telephone connections in Figures 1 and 2 and listing hubs 150, 160, and 170 as candidates); Ex. 1046 ¶¶ 73-78.

As another example supporting Petitioner's showing, in reference to a generic application of the phantom powering subsystem represented schematically by Figure 2, Hunter states "[i]n an overall LAN, <u>many pieces of equipment, each with its own third and fourth transformers</u>, 270, 280, can take power as well as data from the bus." Ex. 1003, 39:13-15 (emphasis added). Hunter also generally describes providing "<u>various connectors</u> . . . <u>interposed</u> to allow the twisted-pair conductors 240, 250 <u>to be rerouted as necessary</u>." Ex. 1003, 40:21-23 (emphases added); Pet. Reply 21 (making same point, citing Ex. 1003, 40:21-23).

Accepting for the sake of argument Patent Owner's premise that combining Figures 1 and 2 limit Hunter's teachings to an isoEthernet configuration, Patent Owner unpersuasively also assumes isoEthernet interfaces <u>only</u> carry ISDN signals, <u>not</u> Ethernet signals. *See* PO Resp. 35 (citing Ex. 1003, 17:15—18; Ex. 2038 ¶ 77). Contrary to that added assumption, the portion of Hunter cited by Patent

Owner indicates that isoEthernet interfaces include ISDN signals, but Hunter does not indicate that isoEthernet interfaces do not include 10Base-T signals, and Petitioner shows they do. *See* Ex. 1003, 15:15—18; Ex. 1046 ¶ 69 ("an ISTE [of Hunter's Figure 2] splits isoEthernet data, a combined ISDN and 10Base-T signal into ISDN voice data for Voice Instrument 299 and 10Base-T LAN data for other equipment in the system").[22] Similarly, the portion of Dr. Madisetti's declaration cited by Patent Owner states that "isoEthernet used ISDN signals, not Ethernet," but Dr. Madisetti provides insufficient support for that statement (*i.e.*, it cites the same portion of Hunter discussed above). Ex. 2038 ¶ 77.

In addition to Mr. Crayford's testimony regarding 10Base-T (Ex. 1046 ¶ 69), to the extent ISTE card 260 represents isoEthernet as Patent Owner contends, Petitioner submits corroborating evidence with the Petition (Pet. iv,) and cites it in its Reply (Pet. Reply 15, 22) to show that the "IsoEthernet layer functions as a 10Base-T transceiver" (Pet. Reply 15 (citing Ex. 1010, 165)).[23] As a result, even accepting Patent Owner's premise that hub 120 in Figure 1 of Hunter communicates with hub 150 using isoEthernet inte-

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[22] Mr. Crayford explains that his reading of Hunter's ISTE coincides with IEEE 802.9a standards, which define an ISTE as "a device that serves as an information source and/or information sink for the provision of voice, facsimile, video, data, and other information." Ex. 1046 ¶ 69 (citing Ex. 1032, 20). Figure 2 supports the testimony and shows ISTE Card 260 splitting data by transferring LAN data (at the bottom of the card) and voice data (to the right to voice instrument 299).

[23] Like Hunter, Exhibit 1010 refers to the IEEE 802.9a standard for isoEthernet. Ex. 1003, 15:15-18; Ex. 1010, 160.

rfaces, and the premise that those hubs correspond to the above-noted components in Figure 2 (*see* PO Resp. 32), the evidence of record indicates that isoEthernet interfaces carry 10Base-T signals, at least when used in the 10Base-T mode of isoEthernet.

Patent Owner also alleges that 10Base-T hub 170 connects to multimedia hub 120 (again assumed by Patent Owner to be the phantom power source of Figure 2) only through a 10Base-F interface. *See* PO Resp. 35-36 (citing Ex. 1003, 36:20). The evidence cited by Patent Owner, however, does not support that argument. The cited portion of Hunter states that "[t]he 10Base-T hub 170 further provides an Ethernet®· AU interface and a single 10Base-F network interface." Ex. 1003, 34:18-20 (emphasis added). The phrase "further provides" does not establish that 10Base-T hub 170 only includes a 10Base-F interface to hub 120. *See id.*; Reply Br. 22. Hunter teaches that multimedia hub 120 includes a 10Base-T repeater, which, like the preferred embodiment of Hunter (discussed further next), indicates that multimedia hub 120 communicates with 10Base-T hub 170 over a 10Base-T bus, not just a 10Base-F interface. *See* Pet. Reply 15, 22; Ex. 1003, 26:3-8, 32:16-27, 34:18-20, 37:19-28, Fig. 1.

At the Oral Hearing, Patent Owner argued that although Hunter teaches a 10Base-T bus, Hunter does not teach that the 10Base-T bus carries both 10Base-T signals and DC power. Tr. 126:9-127:11. According to Patent Owner, when the 10Base-T bus carries DC power, it only carries ISDN signals. *Id.* at 128:22-129:3. Patent Owner reads Hunter too narrowly. As quoted above, Hunter teaches the following:

In the illustrated embodiment [of Figure 2],

> the bus comprises a 10Base-T bus. A 10Base-T bus conventionally comprises two twisted-pair conductors 240, 250, each used for unidirectional transmission of data. Thus, in this embodiment, one of the twisted pairs (say, 250) is employed for transmitting data from the equipment 260, while the other of the twisted-pairs (say, 240) is used for receiving data into the equipment 260. The present invention preferably employs each of the twisted-pair conductors as a rail by which to deliver DC power to the equipment 260.

Ex. 1003, 37:19-28 (emphases added).

In other words, Hunter teaches that the 10Base-T bus preferably delivers DC power over the same two twisted pair conductors used to transmit data, and it highlights the Figure 2 subsystem embodiment as a "10Base-T bus." *Id.* at 21:22-29, 37:19-28. Patent Owner's arguments that confine Hunter by attempting to bodily incorporate cards and power of the Figure 2 embodiment into certain hubs or cards of the Figure 1 embodiment do not account for Hunter's central teaching of delivering power and data over 10Base-T Ethernet twisted-pair bus.

Moreover, as Petitioner shows, "[t]he '012 patent acknowledges that at the time of the alleged invention, 'existing Ethernet communications' and equivalents thereof were known." Pet. 3 (quoting Ex. 1001, 3:36, citing 5:20-24). At the cited passage, the '012 patent states the invention "employs a conventional wiring approach of the type which may include twisted pair wiring such as Ethernet, Token Ring, or ATM. Wiring schemes similar to Ethernet are commonly employed to provide data communication links for electronic computer equipment." Ex. 1001, 5:16-20 (emphasis added). *See In re Baxter Travenol Labs*, 952 F.2d 388, 390 (Fed. Cir. 1991) (holding extrinsic evidence, including admissions, may be used to explain what a reference discloses in a reexamination proceeding).

As noted above, the Petition generally relies on Hunter's disclosure of "10Base-T hub" and other specific Ethernet disclosures that transmit power. *See, e.g.*, Pet. 26-27 (citing Ex. 1002 ¶ 96; Ex. 1003, 16:26-18:1). Petitioner alternatively alleges using Ethernet would have been obvious, as follows: "Moreover, it would have been obvious to a PHOSITA to implement the teachings of Hunter with terminal equipment other than the exemplary ISTE, and/or with a bus applying other Ethernet standards (such as 100Base-T). Hunter seeks to supply phantom power to equipment *generally*." *Id.* (citing Ex. 1003, 18:26-20:1, 21:2-8, 28:7-11).

In addition to noting that the '012 patent admits Ethernet conventionally was used to supply data, Petitioner provides the following citations to Hunter to support its showing of anticipation and/or obviousness with respect to the Ethernet limitation:

> *See* Hunter [18]:26-[20]:1 (*general* advantages of phantom powering), [21]:2-8 ("primary object" to provide "phantom" power "to equipment coupled to a local area network, including, but not limited to, Ethernet®, Token Ring®, ATM, and isoEthernet®."), 2[3]:11-13 ("In an overall LAN, many pieces of equipment . . . can take power as well as data from the bus."), 2[8]:7-11 ("[I]n a pre-

> ferred embodiment . . . the bus comprises a 10Base-T bus. Those of skill in the art will recognize, however, that the present invention is also compatible with Ethernet®, Token Ring®, ATM, and isoEthernet® standards."), 51 (claim 3: "bus comprises a two-pair twisted-pair bus selected from the group consisting of. "10Base-T, Ethernet®, Token Ring®, ATM, 100Base-T, and isoEthernet®"), 54 (claim 13: same), 58 (where dependent claim 29 confirms the TE need not be an ISTE by adding "wherein said equipment is an Integrated Services Terminal Equipment (ISTE) device"); Crayford ¶ 94.

Pet. 26-27.

Accordingly, even though Hunter discloses several types of communication standards, Petitioner shows that Hunter clearly discloses Ethernet as an option and suggests it as a preferred option. Patent Owner's argument that Hunter's disclosure of a 10Base-T Ethernet bus only refers to Ethernet wires is not persuasive. *See* PO Resp. 49 ("On page 26, [Hunter] . . . confirms that [it] is invoking '10Base-T' to describe the twisted pair wiring for his bus. . . . The claims also confirm that Hunter uses the terms '10Base-T' and '100Base-T' only to refer to the twisted-pair wiring.").

As Petitioner's Reply makes clear, "Hunter . . . discloses 10Base-T, 100Base-T, and isoEthernet standards, that all teach the 'Ethernet' limitation." Pet. Reply 14 (citing Pet. 25-28) (internal footnote omitted). Petitioner also notes the following Ethernet disclosures:

> Hunter also teaches 10Base-T equipment. For example, Hunter discloses a "10Base-T hub 170." *Id.*, 3[6]:18-20; Fig. 1. "Multimedia hub 120" is connected to "10Base-T hub 170" and handles "bridging among standards." *Id.*, Fig. 1, 3[4]:16-33:2. Multimedia hub 120 has a "10base-T hub repeater." *Id.* Hunter also teaches "a 10Base-T LAN system." *Id.*, 2[5]:16-17. One objective of Hunter is "compatibility . . . with existing standards," which included 10Base-T (1993) and 100Base-T (1995). *Id.*

Pet. Reply 15 (citing Exs. 1006-08).

No reasonable dispute exists that 10Base-T constitutes an Ethernet standard. By disclosing a desire to create "compatibility of the present invention with existing standards" (Ex. 1003, 25:21-24) and explicitly disclosing a "10base-T hub repeater" (*id.* at 32:19) and transformers "for a 10Base-T LAN system" (*id.* at 23:16-17), Hunter discloses, or at least renders obvious, Ethernet communication and equipment including terminal equipment for the purpose of sending and receiving data using a conventional standard.

4. Rationale to Combine Hunter and Bulan

Petitioner advances several persuasive reasons to combine Hunter and Bulan, primarily based on their interrelated teachings. Pet. 9-16. Petitioner argues both Hunter and Bulan direct their respective teachings to systems that provide phantom powering to network terminal equipment. *Id.* at 9 (citing Ex. 1003, Abstract, 38:12-15, Fig. 2; Ex. 1004, 4:7-10, Fig.

1). Petitioner argues "Hunter and Bulan disclose similar examples of terminal equipment that could be phantom powered, and even similar levels of DC voltage." *Id.* at 10 (citing Ex. 1003, 25:19-21, 23:9; Ex. 1004, Abstract, 1:49-50; Ex. 1002 ¶ 64).

Petitioner further persuasively argues "Bulan is intended to provide a superior replacement for the 'typical current limiting circuit' in such phantom powering systems, and Hunter employs just such a current limiting circuit: *i.e.*, its 'protective device 213.'" Pet. 10 (citing Ex. 1004, 1:65-2:14; Ex. 1003, 40:12-15). The current control circuit of Bulan would, according to Petitioner, replace Hunter's protective device 213. *Id.* (citing Ex. 1003, 40:15-19 (protective device protects from "overcurrents that may damage" the "power supply 210 and the bus"); Ex. 1002 ¶ 68).

Petitioner notes persuasively that "Bulan criticizes the 'typical current limiting circuit' as 'inappropriate for operation throughout the whole current load regime'," because it fails to distinguish between operational faults and a normal power up event in a TE that contains a DC-DC. Pet. 10 (citing Ex. 1004, Abstract, 1:26-31, 1:52-2:1; Ex. 1002 ¶ 67). This is, according to Petitioner, in part because the "typical current limiting circuit" either sets a current limit so low that startup cannot occur or so high that a fault will draw excessive current jeopardizing the operation of the power circuit. *Id.* at 11 (citing Ex. 1004, 1:66-2:8; Ex. 1002 ¶ 67). Petitioner argues "Hunter's protective device 213 suffers from [the] same deficiency" identified in Bulan. *Id.* at 11 (citing Ex. 1003, 40:12-19; Ex. 1002 ¶ 68).

Based on the preceding, Petitioner argues persuasively that replacement of the protective circuit of

Hunter with Bulan's current control circuit would be a "particularly straightforward task" for the person of ordinary skill in the art who would have had "a more than reasonable expectation of success, since the Bulan appar[a]tus is intended to simply replace prior art current limiting circuits without further modification." Pet. 13 (citing Ex. 1004, 2:23-26; Ex. 1003, Fig. 2 (showing protective device 213); Ex. 1002 ¶ 72). Petitioner also persuasively shows that both Hunter and Bulan "assume there is a separate protective device in the Hub to regulate the current to each separate TE, making the combination a simple one-for-one replacement." *Id.* at 13-14 (citing Ex. 1003, Fig. 2 (arguing "protective device 213 [is] in series to single remote 'ISTE'"); Ex. 1004, Fig. 1 (arguing "each 'NT1' in Hub [is] connected to a single remote TE device"), 4:17-25 ("'Each of the NT1s includes a line interface circuit' that includes the current control apparatus of the invention." (quoting Bulan)); Ex. 1002 ¶ 72 (discussing separate power in Hunter and Bulan)). Petitioner concludes that "[i]n the combined system, Bulan's current control apparatus simply replaces the existing 'protective device 213' of Hunter, and DC current and power continue to flow through the phantom power circuit unchanged." Pet. 15.

As summarized above and in view of the record, by a preponderance of evidence, the record supports Petitioner's showing that a person of ordinary skill would have been motivated to combine Bulan with Hunter in order to protect Ethernet loads under varying conditions. As discussed next, Patent Owner's arguments do not overcome Petitioner's showing.

Patent Owner argues Petitioner fails to show "Hunter had the 'problem' that the complex Bulan circuit allegedly solves." PO Resp. 37. Patent Owner explains Hunter does not teach that its central piece of network equipment must determine why an over-current condition exists-*i.e.*, whether due to a normal power up event or an operational fault. *Id.* at 37-38. According to Patent Owner, Hunter teaches using a simpler system, *i.e.*, a single thermistor or polyfuse (*id.* at 38 (citing Ex. 1003, 40:19-20)), and a person of ordinary skill in the art would have been able to select the correct thermistor for a given circuit in order to prevent the thermistor from blocking the necessary start up current (*id.* at 39 (citing Ex. 2038 ¶¶ 84-85)). Patent Owner also argues Hunter "steers an ordinary artisan away" from using Bulan's protection circuit, because Hunter states "protective device 213 is desirable, <u>but not necessary</u> to the present invention." *Id.* (quoting Ex. 1003, 40:19-20).

Patent Owner's arguments are not persuasive. Describing protection as desirable, but not necessary, does not steer away from protection. In addition, Hunter need not identify the same problem Bulan identifies. Rather, "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *See* KSR, 550 U.S. at 417.

Regarding protection by a thermistor, Bulan explains that a typical current protection circuit, such as the one taught by Hunter, cannot distinguish between a normal power up event and an operational fault, and, thus, may prevent terminal equipment from starting properly or may allow an operational fault to jeopardize terminal equipment. *See* Ex. 1004, Abstract, 1:62-2:14; Pet. 10; Ex. 1002 ¶¶ 67-68 ("'typical current limiting circuit' must blindly apply the same current limit to both conditions"); Ex. 1004, 1:65-2:8. Mr. Crayford maintains in his Reply Declaration that Patent Owner's argument that a skilled artisan could select a proper thermistor size "misses the point," because a thermistor cannot "distinguish a normal inrush current during start-up from a fault such as a short." Ex. 1046 ¶ 83.

Dr. Madisetti contends a thermistor can be selected to allow in-rush current and also contends "thermistors existed that would protect the device from damage." *See* Ex. 2038 ¶ 85 (citing Ex. 2049, 2:29-33). The thermistor cited by Dr. Madisetti appears in a protection circuit as disclosed in U.S. Patent No. 5,995,392 filed on December 5, 1997 (the "'392 patent"). *See id.* That date occurs after the effective filing date of the '012 patent. Assuming the relevancy of the '392 patent, its circuit includes resistor 50, thermistor 100, switch 70, and control circuitry for switch 70. *See* Ex. 2049, Fig. 3, Abstract. The '392 patent's circuit closes switch 70 to bypass thermistor 100 after sufficiently charging capacitor 20 to hold DC current from a rectifier circuit during normal start-up conditions. *See* 1:4:32-37, Abstract, Figs. 2-4.

Hence, the circuit control circuitry adds complexity relative to Hunter's thermistor, similar to complexity alleged by Patent Owner to be added by Bulan's circuit relative to Hunter's thermistor. Furthermore, although the '392 patent's circuit appears to handle in-rush conditions during start-up of a motor as Dr. Madisetti's testimony implies, and it also provides some fault protection during start-up when other conditions fail, Dr. Madisetti does not contend that the circuit also provides fault protection after normal start-up conditions subside, which Bulan's circuit provides-*i.e.*, providing fault protection even when the fault load current mimics the start-up current under varying load conditions. *See* Ex. 2038 ¶ 85 (citing Ex. 2049, 2:29-33).

Patent Owner's quotation of the '392 patent's protection during a "fault . . . in the components associated with the circuit" pertains to fault protection during and right after start-up. *See* PO Resp. 40 (quoting Ex. 2049, 2:29-33). In other words, the '392 patent states it preferably closes the switch "once the magnitude of the current surge has subsided," thereby providing "a short circuit for the current . . . preventing it from flowing through the resistors [including the PTC thermistor]. . . . The PTC thermistor acts to prevent overheating of the first resistor when the switch is open if there is a current surge."[24] Ex. 2049, 2:63-3:3. Therefore, the '392 patent supports Mr. Crayford's testimony the Dr. Madisetti and Patent Owner fail to show how a simple thermistor provides what Bulan's circuit provides.[25]

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24 Stated differently, the '392 patent's circuit controls switch 70 to by-pass PTC thermistor 100 after the start-up subsides (and capacitor 20 charges fully). It also provides current protection if the switch fails to close immediately after start-up-but the by-passed PTC thermistor necessarily cannot protect the circuit thereafter as Bulan's circuit does. *See* Ex. 2049, 4:23-64, Fig. 4.

25 Even without the understanding of the '392 patent's thermistor circuit, the record shows a simple thermistor cannot perform the dual functions of Bulan's circuit. *See* Ex. 1004, Abstract, 1:62-2:14; Pet. 10; Ex. 1002 ¶¶ 67-68.

Bulan's circuit operates over "widely variable load current requirements which occasionally may mimic a faulty over current condition." Ex. 1004, Abstract (emphasis added). Bulan specifically describes, in some circumstances, "the typical current limiting circuit" as "inappropriate" throughout the whole "load regime." *Id.* at 1:65-2:1. According to Bulan, merely setting a typical circuit device to trip at some multiple of the normal current level either cannot accommodate a start-up, or if it does, may allow the higher current level to "seriously jeopardize the operations." *See id.* at 2:1-7. Therefore, Bulan's circuitry provides a benefit relative to a simple thermistor of Hunter and relative to the more complicated start-up protection disclosed in the '392 patent relied upon by Dr. Madisetti, because as Mr. Crayford testifies, any thermistor has a "single threshold value" and "cannot distinguish a normal inrush current during start-up from a fault." *See* Ex. 1046 ¶ 83. In summary, Bulan's circuit provides a benefit to Hunter's circuit, and Bulan operates in the same environment as Hunter.

As a result, a person of ordinary skill in the art would have recognized Bulan as an improvement to similar circuits using DC to DC conversion to power equipment, such as that of Hunter. *See* Pet. 11-12; Ex. 1002 ¶¶ 69-72; Ex. 1046 ¶¶ 81-83; Ex. 1004, Fig. 1 (DC to DC convertor for powering telephones); Ex. 1003, Fig 2 (same). Accordingly, the simplicity of a thermistor or fuse does not negate the obviousness of using Bulan's beneficial current protection circuit in Hunter's circuit. *See* Pet. Reply 22-23; *cf. In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) ("[J]ust because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes.").

Patent Owner similarly contends that the combination would require "the use of 24 complex Bulan current limiting circuits for just one of Hunter's hubs." PO Resp. 39 (citing Ex.2039, 126:21-127:9). At the cited deposition testimony, Patent Owner asked Mr. Crayford "if we add Bulan as you suggest to Hunter, then we would have to have—if we have 28 ports on our 10BASE-T line card, we would have to have 28 Bulan circuits, one for each of the line card connectors; is that right?" Mr. Crayford responds "correct. The number was 24, but yes." *See* Ex. 2039, 126:21-127:9. Nevertheless, the challenged claims do not require more than one terminal device, so it only requires a single port suggested by the combination of Bulan and Hunter. And even if a skilled artisan would have preferred to connect up to 24 devices to 24 ports using 24 protection circuits, Bulan's system provides individual control during start-up and fault protection for one power phantom supply. *See* Ex. 2039, 127:8-9 ("It would be one power supply to the 24 ports.").

5. Dependent Claims 35, 36, 40, 43, 52, 55, 56, 59, and 60

Claim 35 depends from claim 31 and recites "wherein the impedance within the at least one path is part of a detection protocol." Patent Owner asserts Petitioner does "not identify any mutually agreed upon protocol." PO Resp. 48. Contrary to this argument, claim 35, an apparatus claim, neither recites nor requires a "mutually agreed upon protocol." *Supra* Section II.A.2 (claim construction).

As found above in connection with claim 31, Hunter necessarily discloses a resistor in the Ethernet terminal equipment (or it could not consume power). *See* Pet. 30-36; *supra* Section II.C.3. Such a resistor at least has the capability of being used in a detection protocol, and Bulan's circuit employs loads as part of its detection scheme. *See id.* at 33-34. (arguing Bulan's circuit distinguishes impedances as necessary to control and protect the circuit). In addition, Hunter's resistor or resistors necessarily have the same capabilities as resistor 212 as disclosed in the '012 patent. *See* Ex. 1001, 8:27-31; *supra* Sections I.B; II.A1-3.

As determined above in the claim construction section, under *Schreiber*, the claimed apparatus must only be capable of being part of a detection protocol as an intended use of the apparatus. *See Schreiber*, 128 F.3d at 1476; *supra* Section II.A.2. Petitioner shows that the Bulan-Hunter TE device (with a resistor) at least has such a capability, because "the total impedance within the path determines the current magnitudes, which represent information about the terminal equipment." *See* Pet. 33; *Schreiber* 128 F.3d at 1476 ("It is well settled that the recitation of a new intended use for an old product does not make a claim to that old product patentable.").

Claim 36 depends from claim 31 and recites "wherein the piece of Ethernet data terminal equipment is a piece of BaseT Ethernet data terminal equipment." Petitioner relies on its showing with respect to claim 31. *See* Pet. 34. Patent Owner argues "Hunter does not disclose the use of the 10Base-T or 100Base-T standards." PO Resp. 48. This argument fails to rebut Petitioner's showing that the Hunter at least discloses 10Base-T. *See, e.g.*, Ex. 1003, 51 (claim 3 reciting "said bus comprises a two-pair twisted-pair bus selected from the group consisting of . . . 10Base-T . . . [and] 100Base-T."); *supra* Section II.C.3-4.

Claim 40 depends from claim 31 and recites "the at least one path comprises at least one resistor." Patent Owner's arguments track the arguments asserted with respect to claim 31. *See* PO Resp. 46-47 (arguing "the ISTE card path . . . does not include a resistor"). As found above, Hunter necessarily discloses a resistor in the Ethernet terminal device else it could not consume power. *See* Pet. 30-36 (citing Ohm's law); Pet. Reply 26; *supra* Section II.C.3-4. Petitioner also cites to "various resistors [in Bulan] . . . which would comprise parts of the path, including *e.g.*, 'resistor 40' and 'resistor 48.'" Pet. 34. Regarding the latter alternative showing, as discussed further below in connection with claim 52, and above in connection with claim 31, the claim construction, and the disclosed invention, the claimed path need only be coupled to contacts and can extend past the contacts 297 of Hunter into Bulan's circuitry, where Patent Owner states the path "could be a hundred meters long" (Tr. 107:2-3). *See Supra* Sections I.B., II.A.1-3.

Claim 43 depends from claim 31 and recites "wherein the at least one path comprises a controller." Petitioner shows by a preponderance of evidence that Hunter suggests various protocols, providing evidence that circuit equipment of Hunter "very commonly included a network controller to execute various network protocol(s)" including Ethernet, in order to execute the known protocols. *See* Pet. 34 (citing Ex.

1002 ¶ 105). Patent Owner does not present an argument challenging Petitioner's showing regarding claim 43. Claim 43 further shows that the "path" may extend from the recited Ethernet data terminal equipment in order to include the network controller.

Claim 52 depends from claim 31 and recites "the impedance within the at least one path is a function of voltage across the selected contacts." Patent Owner contends the path relied upon by Petitioner cannot include "the hub where Bulan's circuit is located," and Petitioner relies on impedance "inside the hub, not the Ethernet data terminal equipment." PO Resp. 46-47. Patent Owner also argues "[t]here is no disclosure in Bulan or Hunter about taking or even having an ability to determine, voltage measurements across certain contacts." *Id.* (citing Ex. 2038 ¶ 182).

Contrary to Patent Owner's characterization, Petitioner relies on its showing with respect to claim 31, and refers to the whole path for which Bulan "detects an overcurrent condition." *See* Pet. 35 (citing its showing for "[c]laim 31(d)"). As noted above, the panel queried Patent Owner during the Oral Hearing about its disclosure for the claimed distinguishing information limitation in claim 31, and Patent Owner cited to column 8, lines 27-31 of the '012 patent. *See supra* Section I.B; Tr. 98:6-100:2 (citing Ex. 1008, Fig. 8, 8:27-31). That passage describes "monitoring various signals, such as . . . the voltage across resistor 112."

As Petitioner shows, and as discussed above in connection with claim 31, the Hunter-Bulan combination, if not Hunter alone, necessarily includes contacts having the capability of monitoring voltage to determine the resistance or other impedance in the path. *See* Pet. 30-31 (discussing, *inter alia*, Ohm's law); *supra* Sections II.C.3-4. In addition, as also discussed above (*supra* Sections I.B, II.A.1), neither the '012 patent, nor claim 31, defines how far the path extends, provided it is "coupled" across selected contacts-*i.e.*, "at least one path coupled across selected contacts" may include part of the bus that extends from ISTE 260 of Hunter into the Bulan hub. Stated differently, independent claim 31, from which claim 52 depends, defines the adapted Ethernet terminal equipment as including a path (*e.g.*, a bus) without limiting the extent of the path's length. Petitioner's showing persuasively recognizes the breadth of claims 31 and 52, because it relies on the impedance of the whole path, as discussed in connection with claim 31. *See* Pet. 30-31 (citing Ohm's law), Pet. 35-36 (open circuit detection); Pet. Reply 26-27 (arguing dependent claim 7 requires the path to be attached to the TE). The open circuit detection of Bulan cited by Petitioner also corresponds to the '012 patent's disclosure of detecting the removal of equipment (*i.e.*, an open circuit condition-no resistor to detect). *See supra* Sections I.B, II.A.1; Ex. 1001, 6:39-41 ("[I]f the potential thief later disconnects protected equipment from the network, this action is also detected and an alarm can be generated").

Claim 55 depends from claim 31 and recites "wherein the selected contacts are the same contacts used for normal network communication." Claim 56 depends from claim 55 and recites "wherein the normal network communication is BaseT Ethernet communication." Dependent claims 59 and 60 recite similar limitations. Petitioner persuasively identifies the same contacts as noted above with respect to claim 31, and also relies on its showing that Hunter discloses or suggests sending 10Base-T and 100Base-T Ethernet communications over those contacts as PoE. *See* Pet. 36-37.

As summarized above and in view of the record, by a preponderance of evidence, the record supports Petitioner's showing that Hunter and Bulan collectively teach or suggest the limitations of the challenged dependent claims. We adopt Petitioner's persuasive showing as our own. *See* Pet. 33-37.

6. Summary of Claims 31, 35, 36, 40, 43, 52, 55, 56, 59, and 60

Based on the record and the foregoing discussion, Petitioner shows by a preponderance of evidence that the challenged claims would have been obvious over the combination of Hunter and Bulan. Patent Owner presents a number of arguments regarding Hunter and Bulan that also apply to Bloch and IEEE 802.3. *See, e.g.*, PO Resp. 14-27 (directing arguments to both combinations). We address some of the arguments below in addressing the combination based on Bloch and IEEE 802.3, and incorporate that discussion hereinabove to the extent it applies to the combination based on Hunter and Bulan. Similarly, rather than repeating other discussion portions above, we incorporate them below to the extent they apply.

D. Alleged Obviousness, Bloch, Huizinga, and IEEE 802.3

Petitioner alleges claims 31, 35, 36, 40, 43, 52, 55, 56, 59, 60 and 65 would have been obvious to the person of ordinary skill in the art over Bloch, Huizinga, and IEEE 802.3. Pet. 38-59. Petitioner cites the

Crayford Declaration in support of its positions. *See* Ex. 1002 ¶¶ 112-155. After considering the parties' arguments and supporting evidence, we determine that Petitioner has shown by a preponderance of the evidence that claims 31, 35, 36, 40, 43, 52, 55, 56, 59, 60 and 65 would have been obvious over Bloch, IEEE 802.3-1993, and IEEE 802.3-1995, and alternatively, over Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995.

1. Overview of Bloch, Huizinga, and IEEE 802.3

Bloch's system allows a user to communicate via two audio channels, for example, an intercom system on one channel, and a typical outside call on another channel, while providing control and power signals over the four lines. Ex. 1005, 2:21-51, 6:11-21. Control unit 10 and terminal 20 connects the two audio communication channels with each channel having two conductors. *Id.* at 3:1-8; Fig. 1. "Power feed and bi-directional signaling are accomplished simultaneously over the same four conductors used for the two communication channels without interference." *Id.* at [57]. Although Bloch describes this phantom power circuit in the context of a key telephone system, Bloch explains that it "can find application in many different control unit/terminal applications." *Id.* at 4:49-52.[26]

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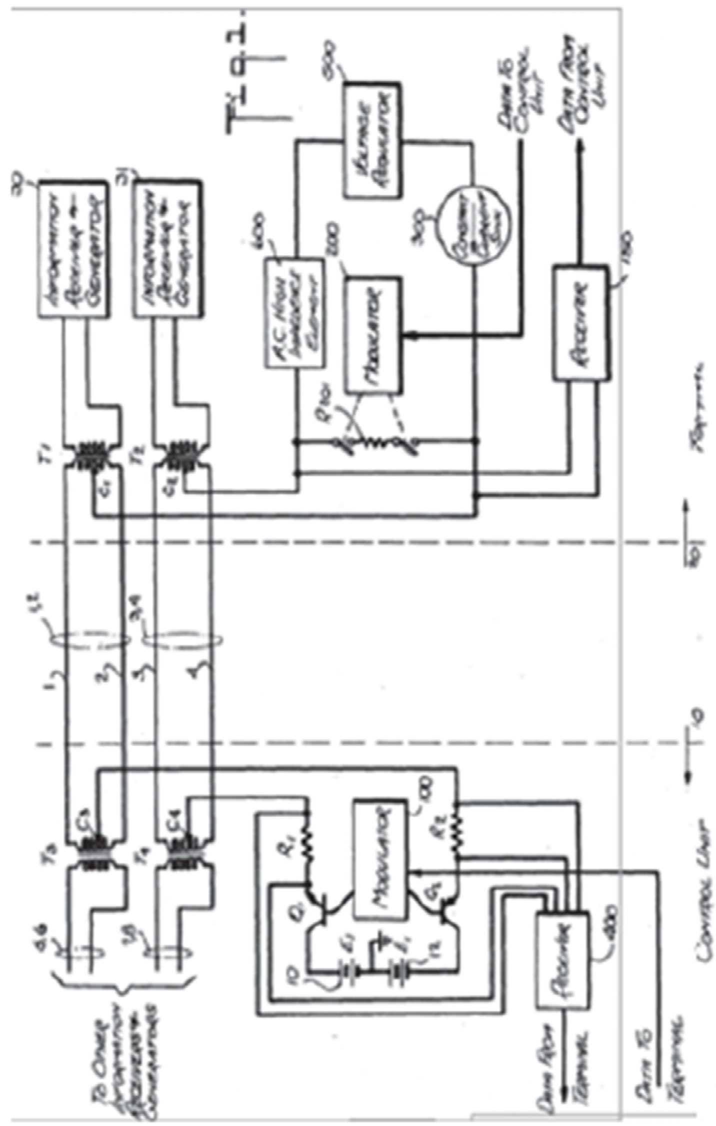
[26] Bloch explains its arrangement "is known as" a "phantom circuit" or "phantom pair" because DC current divides and then recombines: *i.e.*, "because in a closed circuit connected to taps C3 and C4 of T3 and T4 and to taps C1 and C2 of T1 and T2, the current supplied at a center tap point will divide at the

Figure 1 of Bloch follows:



center tap connection[,] flow over two conductors[,] and be received in recombined form at the other end." *Id.* at 4:61-5:2.

Figure 1 represents a block diagram of the circuit arrangement of Bloch and shows terminal unit 20 connected to control unit 10 via two conductor pairs, conductor pair 1 and 2 and conductor pair 3 and 4. *Id.* at 4:7-13, 4:46-52.

"Connected to both conductor pairs 1,2 and 3,4 at each end is circuitry necessary to create a complete communication channel." *Id.* at 5:3-5. This circuitry includes two transformers at each unit, connected to information receivers and generators for receiving and generating voice signals, such as microphones and speakers. *Id.* at 5:5-11.

Bloch explains that control unit 10 detects DC current pulses applied to the conductors when the terminal 20 switches resistor 210 into and out of its parallel connection with the phantom power path. *Id.* at 5:44-55. The DC current pulses detected by the control unit provide information regarding the status of different elements of the terminal. *Id.* at 5:56-6:2. In response to the detected DC current pulses, the control unit applies voltage pulses to the conductors to control indicators in the terminal. *Id.* at 10:34-40, 11:1-5.

Huizinga also describes a key telephone system. Ex. 1009, 1:6-9. Huizinga explains that, when a user presses a button to select a telephone line, the terminal sends status information to the control unit. *Id.* at 5:29-39. In response, the control unit sends data to the terminal causing a lamp associated with the selected telephone line to light up. *Id.* Petitioner employs Huizinga (cited by Bloch (Ex. 1005 [56]) only to clarify or explain the purpose of Bloch's telephone circuit.[27]

IEEE-93 and IEEE-95 (collectively IEEE 802.3) describe a 10Base-T Ethernet network. Ex. 1006, 243; Ex. 1007, 23. In particular, IEEE-93 and IEEE-95 describe central network equipment, such as a 10Base-T repeater, and data terminal equipment. Ex. 1006, 243, 267; Ex. 1007, 27, 303-304. IEEE-93 and IEEE-95 further describe an Ethernet connector comprising one pair of contacts (TD+ and TD-) used to transmit 10Base-T communication signals and a second pair of contacts (RD+ and RD-) used to receive 10Base-T communications signals. Ex. 1006, 266-267; Ex. 1007, 147-148.

2. Claim 31, Bloch, Huizinga, and IEEE 802.3

Addressing the preamble of claim 31, an "adapted piece of Ethernet data terminal equipment," Petitioner contends that IEEE 802.3 discloses a piece of BaseT Ethernet terminal equipment, namely a piece of Data Terminal Equipment ("DTE"). *See* Pet. 50 (citing Ex.

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[27] The parties agree Petitioner no longer relies upon Huizinga to teach a claim limitation at this juncture of the trial. *See* Tr. 198:14 (Petitioner stating they do not employ Huizinga "as part of our combination" to satisfy a claim limitation); PO Resp. 2 n.2 (arguing "Petitioners have dropped their reliance on Huizinga" (citing Ex. 2039, 173:24-175:20, 179:4-8)).

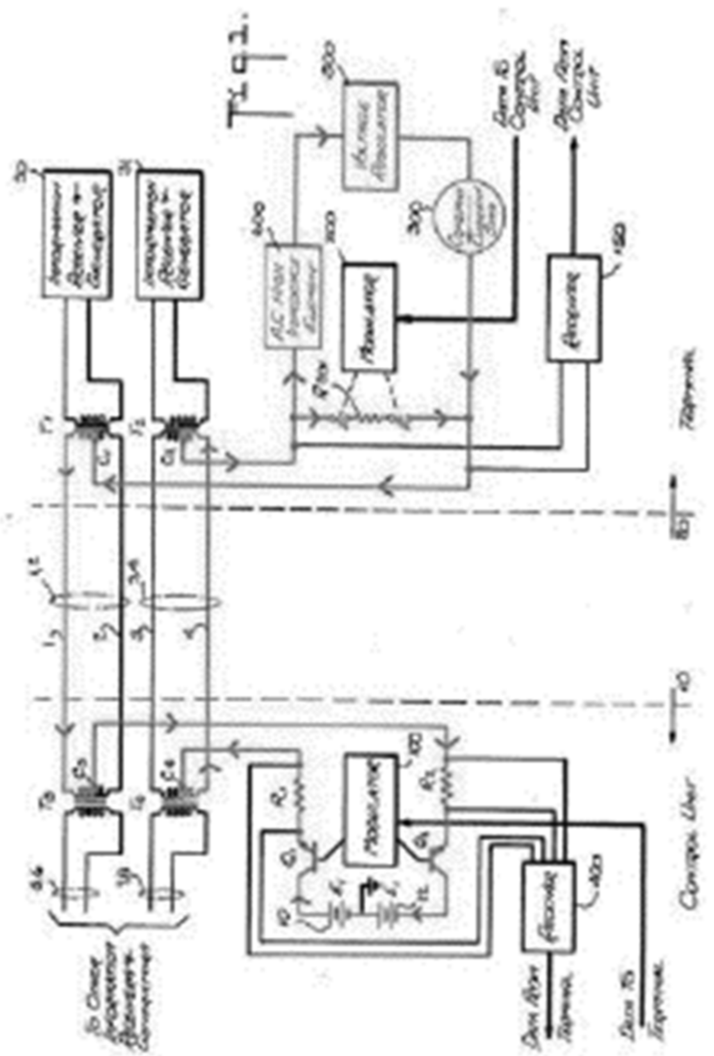
Petitioner explained during the Oral Hearing that Huizinga, "referenced by Bloch" (Tr. 197:1), merely "provide[s] more color to Bloch" (*id.* at 198:10) regarding, for example, the purpose of the control signals (*see id.* at 198:15-16), including for lighting "the LED" on telephones "so that everyone knows line 1 is in use" (*id.* at 198:22).

1007, 27; Ex. 1008, 303; Ex. 1006, 267; Ex. 1002 ¶ 136). Petitioner contends the DTEs of the combined system include the portion of the phantom circuitry in Bloch's terminal unit, including resistor 201, modulator 200, constant current sink 300, voltage regulator 500, A.C. high element 600, and receiver 150, thereby rendering the Ethernet DTEs "adapted" to receive normal network communication and remote power from the same conductors. Pet. 50-51 (citing Ex. 1005, Fig. 1; Ex. 1002 ¶ 137).

Claim 31 also recites "an Ethernet connector comprising a plurality of contacts" and "at least one path coupled across selected contacts, the selected contacts comprising at least one of the plurality of contacts of the Ethernet connector and at least another one of the plurality of contacts of the Ethernet connector." For this limitation, Petitioner cites to the disclosure in IEEE 802.3 that the DTE shall include an Ethernet connector (MDI connector) which accepts an Ethernet cable containing several twisted-pair conductors. *Id.* at 51 (citing Ex. 1006, Figs. 14-20, 14-21; Ex. 1007, 147; Ex. 1002 ¶ 139). Petitioner argues that IEEE 802.3 specifies that the MDI connector includes eight contacts, including one pair to transmit Ethernet communication signals and one pair to receive Ethernet communication signals. *Id.* (citing Ex. 1006, 268-69). Petitioner further alleges "[i]n the combined system, the DTE would include the Ethernet MDI connector and the conductors (1, 2, 3, and 4) would connect to the transformers T1 and T2 through the connector's receive pair and transmit pair of contacts." *Id.* at 55 (citing Ex. 1005, Fig. 1; Ex. 1006, 266-67; Ex. 1007, 147; Ex. 1002 ¶ 140).

Petitioner further argues that in the combined system of Bloch and IEEE 802.3, shown in Petition Figure 6, the DTE includes a path coupled across the four contacts. *Id.* at 52 (citing Ex. 1005, 6:27-40). Petition Figure 6 follows:

PETITION FIGURE 6



Pet. 40. Petition Figure 6, shown above, includes annotations in red to Bloch's Figure 1, annotated to indicate the phantom power path through transformers at control unit 10 and terminal 20. *Id.* at 40.[28] Petitioner explains "the DTE has a path coupled across the four contacts that connect the DTE to conductors 1, 2, 3, 4." *Id.* at 52 (citing Ex. 1005, 6:27-40 ("'Voltage sources 10 and 12' are 'connected in series so as to force current in the same direction, that is [in] from terminal center tap connection C3' through 'Q2 and then through voltage sources 12 and 10' to 'Q1' and then out 'the center tap connection C4"), 5:20-27). Petitioner contends the path provides DC current from the control unit to the DTE via the conductors 1-4. *Id.* at 56 (citing Ex. 1005, Fig. 1 (as annotated in Petition Fig. 6), 6:3-6; 9:6-22; Ex. 1002 ¶ 141). Accordingly, Petitioner shows that the path couples across at least one of the plurality of contacts of the terminal equipment's Ethernet connector.

Finally, claim 31 recites the distinguishing information limitation. As construed above, the limitation means "distinguishing information about the piece of Ethernet data terminal equipment, including information that differentiates it from another device, wherein the information is capable of being associated to impedance within the at least one path." *Supra* Section II.A.1. With respect to this limitation, Petitioner explains that in the combined (adapted) system, the Ethernet DTE includes the modulation circuitry

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[28] Similar to Petitioner's reliance on Hunter, the current would flow in both of the twisted wires of a pair (as it must, with the wires being in parallel), even though Petitioner only highlights one wire of each twisted pair in red. *See* Ex. 2039, 167:23-168:4 (discussed further below).

(in addition to the phantom power circuitry) taught by Bloch, which includes resistor 201 switched in and out of the current path to generate pulses that convey status information about the DTE. Pet. 53 (citing Ex. 1005, 5:44-6:2; Ex. 1002 ¶ 142). Petitioner contends the different current magnitudes "provide information with respect to the status of different elements of [the DTE]." *Id.* (quoting Ex. 1005, 5:44-6:2; Ex. 1002 ¶ 142).

Petitioner explains, and persuasively shows, that this information constitutes the claimed "distinguishing information" associated to impedance within at least one path, because switching of resistor R201 in and out of the current path generates information represented by current pulses. *Id.* In addition, as summarized above and in view of the record, by a preponderance of evidence, the record supports Petitioner's showing that Bloch and IEEE 802.3 collectively teach or suggest the limitations of claim 31. We adopt Petitioner's persuasive showing as our own. *See* Pet. 38-54. As discussed in the next section, Patent Owner's arguments do not overcome Petitioner's persuasive showing.

Additionally, Petitioner provides Huizinga as an example of information provided by Bloch's control unit. *See supra* note 27 (Huizinga provides insight, but is not necessary to meet claim 31.). For example, the control unit can use the status information about the line keys to determine which telephone station set uses a particular line, for example Line 1, and send a signal to that phone to light the L1 and I1 lamps on that phone. *See* Pet. 53 (citing Ex. 1009, 5:29-39). Petitioner further explains the control unit sends a different signal to phones not using Line 1 to light only the L1 key on those phones to indicate that Line 1 is in use. Pet. 53-54 (citing Ex. 1009, 3:30-35). Therefore, as an example in Petitioner's proposed combination involving Bloch's circuit, the status information about the line keys, generated by switching Bloch's resistor R201 in and out of the path, distinguishes a phone set using Line 1 from all other phone sets not using Line 1. *See* Pet. 54 (citing Ex. 1002 ¶ 143). This type of information at least tracks the '012 patent's disclosure of impedance providing information about whether terminal equipment became disconnected from a circuit. *See supra* Section II.A.1; Ex. 1001, 6:29-41.

3. Rationale to Combine Bloch, Huizinga, and IEEE 802.3

Petitioner advances several persuasive reasons to combine Bloch (as elucidated by Huizinga) and IEEE 802.3. For example, Bloch expressly references Huizinga and suggests its phantom circuit would provide DC power benefitting many different control unit/terminal applications, which a person of skill in the art would understand to include an Ethernet network. *See* Pet. 48-49 (citing Ex. 1005, 4:49-52; Ex. 1002 ¶¶ 134-135). Petitioner identifies evidence indicating that Bloch teaches a control unit that detects the status of different telephone lines in a terminal and controls indicators in the terminal, and Huizinga teaches that the indicators in Bloch can be lamps. *Id.* (citing Ex. 1005, 5:64-6:2, 1:1-10; Ex. 1009, 4:19-25, 5:29-34; Ex. 1002 ¶ 134). Petitioner also contends "[u]sing the phantom pair circuit taught by Bloch in an Ethernet network topology has the obvious benefit of supplying power over the same wires used for the Ethernet communication channel; this eliminates the need to provide a local power supply or separate conductors and connectors for powering the DTE device." *Id.* at 49 (citing Ex. 1002 ¶ 135).

The record supports Petitioner's reasoning as persuasive. Bloch describes a phantom power circuit in the context of a key telephone system, but explains that it "can find application in many different control unit/terminal applications." Ex. 1005, 4:49-52. As Petitioner reasons, a person of ordinary skill in the art would have combined the phantom power circuit of Bloch with the 10Base-T Ethernet network of IEEE-93 and IEEE-95 to achieve the benefit of supplying power over the same wires used for the Ethernet communication channel. *See id.*; Ex. 1002 ¶ 135. As Petitioner also reasons, the combination would have "eliminate[d] the need to provide a local power supply or separate conductors and connectors for powering the DTE device," and would have allowed devices to "communicate and provide status and control information even when they are not operating normally and the communication channel is not in use." Pet. 49-50; Ex. 1002 ¶ 135.

Patent Owner contends "Huizinga motivates using separate pairs to separate power from data." PO Resp. 22 (citing Ex. 2038, ¶55). According further to Patent Owner, "[u]nlike Huizinga and the Ethernet standard, Bloch had only two pairs available, so it is not a relevant reference (except using hindsight)." PO Resp. 22. This argument does not rebut Petitioner's persuasive showing. An artisan of ordinary skill would have recognized advantages of supplying power over data lines as Bloch teaches, including the benefit of providing data to multiple devices while also supplying power, instead of relying on dedicated power lines or local power.

Similar to its argument with respect to Hunter, Patent Owner argues that providing phantom power over pre-existing Ethernet wiring and cables would have damaged BSTs and CMCs. *Id.* at 15-17. Patent Owner's arguments are not persuasive for the same or similar reasons noted above in connection with Hunter, which we adopt here. *Supra* Sections II.C.3, 4. By way of summary, as discussed above in connection with Hunter, the challenged claims do not require the argued terminations, and even if the claims contemplate such terminations, an artisan of ordinary skill would have been able to accommodate the features. *Supra* Sections II.C.3, 4. Patent Owner also acknowledged at the Oral Hearing that applying phantom power to "new" Ethernet terminal equipment would not have caused any problems with BSTs or CMCs. Tr. 135:1-12. As also discussed above, this further indicates a person of ordinary skill in the art would have had good reasons to combine the cited teachings of Bloch and IEEE 802.3-*i.e.*, to provide phantom power to a maximum number of desired Ethernet TEs over available communication channels without requiring dedicated power lines or remote power. *See* Ex. 1005, 5:11-21; *supra* Sections II.C.3, 4.

Patent Owner also argues that a person of ordinary skill in the art would have provided operating power to Ethernet terminal equipment over the unused lines in an Ethernet connection to avoid interference with the data signals. PO Resp. 16-20. In particular, Patent Owner points out that the Ethernet connector taught by IEEE-93 and IEEE-95 includes two unused pairs of conductors. *Id.* at 18-22 (citing Ex. 1006, 266-267; Ex. 1007, 147).

These arguments also track arguments addressed above and are not persuasive for similar reasons. *See supra* Section II.C.3, C.4. As Patent Owner argues, Bloch's circuit does not include unused pairs. *See* PO Resp. 21. Block's system does this for a good reason-using the same lines for control, communications, and power maximizes the use of existing lines to communicate and power different equipment types. *See* Ex. 1005, 6:11-12 ("The invention allows simultaneous provision via only four conductors. . . . "), 2:54-61, 5:20-30, Fig. 1.

In addition, using data lines and power simultaneously over the same lines was so well-known that skilled artisans referred to the practice as "phantom" power or PoE, as noted above. *Supra* Section I.B, II.C.3, 4. Although Bloch relates to a key telephone system, Bloch explains that its phantom power circuit "can find application in many different control unit/ terminal applications." Ex. 1005, 4:49-52. And as Petitioner argues, simply because some prior art connectors showed unused pins does not mean an existing circuit included wires for the connector pins or that other Ethernet TEs could not use existing wire pairs. *See* Reply Br. 13-14 (citing Ex. 1046 ¶¶ 61-62; Ex. 1008, 214; Ex. 1020, 345:21-346:7; 363:1-9; 364:21-365:5) (arguing "[e]ven the IEEE could not determine what percentage of installations had unused pairs").

The record shows a person of ordinary skill in the art would have possessed the background knowledge sufficient to provide PoE. *Supra* Section II.C.3, 4; *see also Randall Mfg. v. Rea*, 733 F.3d 1355, 1362-63

(Fed. Cir. 2013) ("[T]he Board failed to account for critical background information that could easily explain why an ordinarily skilled artisan would have been motivated to combine or modify the cited references to arrive at the claimed inventions."). For example, as discussed above, Hunter at least suggests, if not discloses, providing PoE over a 10Base-T Ethernet bus. *See supra* Sections II.C.1, 3, 4. No reasonable dispute exists over the fact that PoE was well-known at the time of the invention-so well-known that skilled artisans considered it as a potential IEEE standard. *See supra* Section II.C.3, 4.

At least two patents identified on the face of the '012 patent, namely U.S. Patent No. 5,994,998 ("Fisher '998") and U.S. Patent No. 6,140,911 ("Fisher '911") (collectively, "the Fisher patents"), teach providing phantom power to Ethernet terminal equipment.[29] Pet. Reply 7; Ex. 1025, 2:21-41, 3:49-67, 6:7-10; Ex. 1026, 2:32-52, 3:59-4:10, 6:17-20. And as noted above, Hunter further shows skilled artisans could have handled interference by explaining that "a careful phantom power scheme must be implemented to avoid problems that may arise due to interactions between the power and the data." Ex. 1003, 19:13-26; *supra* Section II.C.3 (also noting Hunter discloses "[o]f course, those of skill in the art will recognize that the balance circuits 290 of the present invention <u>may be deleted at the risk of impairing signal quality</u>" (quoting Ex. 1003, 42:4-7) (emphasis added)).

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[29] Patent Owner argued at the Oral Hearing that the Fisher patents do not teach certain limitations of the challenged claims. *See* Tr. 124:7-126:8. The Fisher patents provide further evidence that a person of ordinary skill in the art would have known that phantom power would work in an Ethernet network.

Therefore, Patent Owner's arguments simply show alternative ways (*i.e.*, unused pairs) of providing operating power to Ethernet terminal equipment. This does not detract from the related PoE benefits of employing Ethernet data lines, including fewer wires, less cost, and the capability to add more terminal equipment on unused wire pairs as suggested by Bloch and taught by Hunter. Even if Patent Owner showed the well-known PoE would have been inferior in some respects, this would not overcome Petitioner's persuasive showing. *See In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) ("[J]ust because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes."); *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) ("A case on point is *In re Gurley*, 27 F.3d 551, 552-53 (Fed.Cir.1994), in which we upheld the Board's decision to reject, on obviousness grounds, the claims of a patent application directed to one of two alternative resins disclosed in a prior art reference, even though the reference described the resin claimed by Gurley as 'inferior.'").

Patent Owner also argues that members of an IEEE committee were skeptical about using PoE. PO Resp. 22-27. Similar to its arguments with respect to Hunter, Patent Owner's arguments are not persuasive. *See supra* Section II.C.3, C.4. The evidence cited by Patent Owner primarily relates to whether the IEEE committee members believed that phantom power should be adopted as an Ethernet standard, not whether they were skeptical as to whether phantom power would work in an Ethernet network. *See id.*; Ex. 2041, 3 ("Recount held due to closeness of vote"); Pet. Reply 8-9.

Although Patent Owner's evidence indicates that some IEEE committee members favored adopting an Ethernet standard employing the delivery of operating power over unused lines, Petitioner identifies evidence indicating that other committee members favored using phantom power as the Ethernet standard. Pet. Reply 8-9; Ex. 1046 ¶¶ 38-44; Ex. 1037, 3 ("Current will be injected via the center taps using a Phantom Power method on the TX and RX pairs."); Ex. 1040, 3 (Listing the following bullet points: "Power over signal pairs allows easier integration of discovery & power control circuitry onto the PHY"; "Decreases system cost by lowering parts count"; and "Short term may require extra complexity until integrated solutions become available, but the integrated solutions will come quickly").

As Petitioner argues, adopting one standard over another does not necessarily relate to obviousness, particularly where PoE was so well known it was considered as a potential standard, and members (and others of ordinary skill) recognized trade-offs. *See* Pet. Reply 8-9; Ex. 1040, 3. That some members considered an alternative way of providing operating power to Ethernet terminal equipment as an IEEE standard does not detract from the express teachings of Hunter and Bloch and the fact that skilled artisans knew how to implement PoE. *See Mouttet*, 686 F.3d at 1334; *Fulton*, 391 F.3d at 1200. Even if Patent Owner's evidence indicates some amount of skepticism for one reason or another, Petitioner shows that a skilled artisan would have employed PoE in a simple Ethernet circuit having one or two devices especially in situations involving only two available twisted pairs, as Bloch and Hunter teach. *See In re Cyclo-*

benzaprine Hydrochloride Extended-Release Capsule Patent Litigation, 676 F.3d 1063, 1079 (Fed. Cir. 2012) (weighing all evidence together).

Patent Owner also argues that Petitioner's proposed combination of Bloch, IEEE 802.3-93, and IEEE 802.3-95 would have degraded the Ethernet data signal. PO Resp. 27-29. Specifically, Patent Owner argues that switching a resistor into and out of the phantom power circuit, as taught in Bloch, would have created noise and degraded the Ethernet data signal. *Id.* at 27-28 (citing Ex. 2038 ¶ 86; Ex. 2039, 172:20-173:3). In addition, Patent Owner contends that applying operating power to just one side of the transformers in Bloch, as Petitioner proposes in Figure 6 of the Petition, would have saturated the coils and degraded the Ethernet data signal. *Id.* at 27 (citing Ex. 2038 ¶ 87; Ex. 2039, 168:6-14). Patent Owner also contends that even if Petitioner proposes applying operating power to both sides of the transformers in Bloch, "a saturation problem would still exist because the center taps are never perfectly centered and there can be imbalances in the wires." *Id.* at 28 (citing Ex. 2038 ¶ 88; Ex. 2039, 169:14-15).

Patent Owner's arguments are not persuasive. Regarding the switching argument, Dr. Madisetti testifies "[s]witching the resistor would create noise that would degrade the Ethernet data propagation and reduce bandwidth," but Dr. Madisetti fails to provide necessary context and support for that statement. Ex. 2038 ¶ 86. In contrast, Mr. Crayford, explains that switching the resistor in Bloch would have produced low frequency signals, which would have been unlikely to interfere with the higher frequency data signals of an Ethernet network. Pet. Reply 10-

11; Ex. 1046 ¶¶ 49-51. Mr. Crayford also explains that even if the resistor in Bloch would have caused some interference with the Ethernet data signals, it would have been within the knowledge and capabilities of a person of ordinary skill in the art to separate the low frequency resistor signals from the high frequency Ethernet data signals, such as by using a filter. Pet. Reply 11; Ex. 1046 ¶ 49; Ex. 2039, 172:20-173:3.

In addition, Petitioner points out Dr. Madisetti relies on a theory of "instantaneous switching illustrated in Bloch Figure 7B." *See* Reply Br. 11 (citing Ex. 1020, 204:14-205:10). In response, Mr. Crayford explains Bloch's mere pictorial representation of fast rise times does not imply a requirement for instantaneous switching, especially given the data rates involved; skilled artisans knew that instantaneous switching creates noise and would have been counterproductive; and, in any event, skilled artisans also knew that filters would have addressed any interference issues with Ethernet. *See* Ex. 1046 ¶¶ 51-53; Ex. 1020, 205:11-206:5 (Dr. Madisetti testifying filters suppress noise and a "basic signal process" shows square waves produce a noise spectrum predicted by a Fourier series).

Patent Owner's argument that applying operating power to the transformers in Bloch would saturate the coils also is not persuasive. Patent Owner premises its arguments on abbreviated annotations by Petitioner added to Figure 1 of Bloch in the Petition-a red line indicating current flows through one side of the transformer. *See* Pet. 44; PO Resp. 27; *supra* note 28. But Mr. Crayford clarified during his deposition that the current clearly flows through both sides of the transformer. Ex. 2039, 167:14-169:22; *see supra* note

28. Specifically, Mr. Crayford stated "I did not choose to highlight both of the pairs of the twisted pair which is the current path, but clearly they're parallel connectors connected to the same transformers with the power and return path on the center tap," so "they probably should be highlighted." *Id.* at 167:23-168:4 (emphasis added). Thus, contrary to Patent Owner's argument, Petitioner does not propose applying operating power to just one side of the transformers in Bloch.

Patent Owner's argument that applying operating power to both sides of the transformer in Bloch still creates a saturation problem also is not persuasive. Bloch teaches that the phantom power circuit "is connected to the two center taps of the transformers," thereby indicating that applying operating power to the center taps of the transformers would work. Ex. 1005, 3:9-23. Consistent with the teaching of Bloch, Mr. Crayford explains that the objective of balancing the coils on either side of the transformer is "very well known." Ex. 2039, 169:14-22. Finally, as noted above (Section I.B), Patent Owner argues its invention enables PoE, but similar to CMTs, and BSTs, the '102 patent does not describe overcoming power saturation problems, indicating either no significant problem existed, or if it did, indicating the '102 does not provide a saturation solution and the alleged saturation problem is not commensurate in scope with the claims.

4. Dependent Claims 35, 36, 40, 43, 52, 55, 56, 59, and 60

Claim 35 depends from claim 31 and "wherein the impedance within the at least one path is part of a detection protocol." Claim 40 depends from claim 31 and recites "the at least one path comprises at least one resistor." Petitioner persuasively relies on it showing regarding claim 31, noting resistor 201 switches into and out of the path in Bloch's circuit, with changes detected as current pulses in receiver 400. *See* Pet. 54 (citing Ex. 1005, 5:44-57, 9:6-22, 10:3-12, 10:34-37; Ex. 1002 ¶ 144), 55 (citing resistor 201 and referring to the claim 31 showing). Further regarding claim 35, Petitioner also cites Bloch's disclosure of identifying on hook conditions. *See id.* at 54 (citing Ex. 1005, 11:37-41); *Schreiber* 128 F.3d at 1476 ("It is well settled that the recitation of a new intended use for an old product does not make a claim to that old product patentable.").

Claim 36 depends from claim 31 and recites "wherein the piece of Ethernet data terminal equipment is a piece of BaseT Ethernet data terminal equipment." Petitioner persuasively relies on its showing with respect to claim 31. Pet. 55.

Claim 43 depends from claim 31 and recites "wherein the at least one path comprises a controller." Petitioner persuasively relies on Bloch's modulator 200 and also contends modulators were well-known and necessary to run software to operate using Ethernet. *See* Pet. 56 (citing Ex. 1005, Fig. 1; Ex. 1002 ¶ 148).

Claim 52 depends from claim 31 and recites "the impedance within the at least one path is a function of voltage across the selected contacts." Petitioner persuasively cites voltage pulses appearing across center taps C1 and C2 of Bloch. Pet. 56-57 (citing Ex. 1005, Fig. 1, 8:7-11, 10:41-55, Fig. 7A; Ex. 1002 ¶ 149).

Claim 55 depends from claim 31 and recites "wherein the selected contacts are the same contacts used for normal network communication." Claim 56 depends from claim 55 and recites "wherein the normal network communication is BaseT Ethernet communication." Dependent claims 59, 60, and 65 recite limitations similar to those of claims 55 and/or 56. Petitioner persuasively identifies the contacts relied upon with respect to claim 31, and also relies on its showing that IEEE 802.3 suggests sending Base-T Ethernet communications over those contacts as PoE. *See* Pet. 57-59 (citing Ex. 1005, 3:1-8, 5:19-29 (discussing superimposed audio and data with power); Ex. 1002 ¶ 152; Ex. 1006, 4; Ex. 1007, 23).

As summarized above and in view of the record, by a preponderance of evidence, the record supports Petitioner's showing that Bloch and IEEE 802.3 collectively teach or suggest the limitations of the challenged dependent claims. We adopt Petitioner's persuasive showing as our own. *See* Pet. 55-59. Patent Owner does not present arguments regarding Petitioner's showing with respect to the challenged dependent claims and the ground based on Bloch and IEEE 802.3.

5. Summary of Claims 31, 35, 36, 40, 43, 52, 55, 56, 59, and 60

Based on the record and the foregoing discussion, Petitioner shows by a preponderance of evidence that the challenged claims would have been obvious over the combination of Bloch and IEEE 802.3, and alternatively, over Bloch, Huizinga, and IEEE 802.3. As noted in Section II.C.6 above, Patent Owner presents a number of arguments regarding Hunter and Bulan that apply to Bloch and IEEE 802.3 and vice versa. *See, e.g.*, PO Resp. 14-27 (directing arguments to both combinations). Some overlap in our discussion exists, but we accordingly apply the discussion of each combination to the other to the extent it applies, rather repeating the whole of each discussion.

E. Patent Owner's Motion to Strike Petitioner's Reply

Patent Owner filed a Motion to Strike Petitioner's Reply. Paper 50 ("PO Mot. Str."). In response, Petitioner filed an Opposition. Paper 57 ("Pet. Opp. Str."). Patent Owner argues that several portions of Petitioner's Reply should be stricken because they are beyond the scope of a proper reply. PO Mot. Str. i, 1. Petitioner responds that its Reply properly responds to arguments raised by Patent Owner in the Response. Pet. Opp. Str. 1. For the reasons discussed below, we deny Patent Owner's Motion to Strike. In addition, to the extent that this Decision does not rely on an argument or evidence that Patent Owner contends is improper, Patent Owner's Motion to Strike is moot as to that particular argument or evidence.

1. IsoEthernet

Patent Owner argues that Petitioner presented a new theory of unpatentability in the Reply based on Hunter's teaching of isoEthernet. PO Mot. Str. 2. Specifically, Patent Owner contends that "[t]he Reply newly asserts that 'Hunter's disclosure of isoEthernet also teaches Ethernet' and interjects new concepts: '[i]soEthernet . . . 10Base-T and ISDN modes' and 'isoEthernet interfaces.'" *Id.* at 2-3 (citing Pet. Reply

15, 19, 22; Ex. 1032; Ex. 1046 ¶¶ 48, 67-68, 74, 80-81).

Patent Owner does not show the disputed portions of Petitioner's Reply are improper or constitute a new theory. The Petition states that Hunter preferably uses a "10Base-T bus," and asserts "10Base-T (and 100Base-T) were well-known Ethernet standards at the time of the alleged invention." Pet. 25-26 & n.7. Petitioner, in the Petition, points to other teachings in Hunter as not limited to a 10Base-T bus. *Id.* at 26 ("compatible with ISDN standards"); *id.* at 27 ("the bus comprises a 10Base-T bus"); *id.* at 26 ("a bus applying other Ethernet standards (such as 100Base-T" (emphasis deleted)); *id.* at 27 ("the present invention is also compatible with Ethernet®, Token Ring®, ATM, and isoEthernet® standards" (quoting Ex. 1003, 26:7-11)). Petitioner also argues in the Petition that "it would have been obvious to a PHOSITA to implement the teachings of Hunter terminal equipment other than the exemplary ISTE, and/or with a bus applying other Ethernet standards." *Id.* at 26. Therefore, Petitioner's reliance on isoEthernet does not constitute a new theory of unpatentability raised for the first time in the Reply. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080 (Fed. Cir. 2015).

Furthermore, Patent Owner argues in the Response that Hunter does not teach Ethernet terminal equipment. PO Resp. 35. For example, Patent Owner contends that the "isoEthernet® interfaces [in Hunter] were part of an IEEE standard called 802.9a," which indicates that "isoEthernet used ISDN signals, not Ethernet signals, to transmit data." *Id.* (citing Ex. 1003, 17:15-18; Ex. 2038 ¶ 76). Petitioner properly responds in the Reply to Patent Owner's Response argument. Pet. Reply 15, 22. Specifically, in the Reply, Petitioner identifies evidence indicating that isoEthernet includes both an ISDN mode and a 10Base-T mode, and, as a result, is not limited to carrying just ISDN signals. *Id.* at 15 (citing Ex. 1003, 23:21-24, Ex. 1010, 165; Ex. 1032, 377).

Therefore, Petitioner's argument regarding isoEthernet in the Reply not only occurs originally in the Petition, it properly responds to an argument raised by Patent Owner in the Response. *See* 37 C.F.R. § 42.23(b); *Belden,* 805 F.3d at 1078-79. These (and other) disputed portions of the Reply explain why the Response does not overcome the persuasive showing in the Petition. *See Belden*, 805 F.3d at 1078-79.

Patent Owner also objects to Petitioner's reliance on "a newly-cited IEEE standard for 802.9," which Petitioner submitted as Exhibit 1032 with the Reply. PO Mot. Str. 2 (citing Pet. Reply 15-16, 22; Ex. 1032). Patent Owner contends that Hunter only teaches "the trademarked version 'isoEthernet®,'" and Petitioner does not link the trademarked version of isoEthernet in Hunter with the IEEE standard described in Exhibit 1032. *Id.* at 2-3 (citing Pet. 27 n.8; Ex. 2055, 25:10-14, 31:9-21). Patent Owner also points out that Hunter refers to "IEEE draft standard 802.9a," but Exhibit 1032 is not a draft and only describes IEEE standard 802.9. *Id.* at 3 (citing Ex. 1003, 18:7; Ex. 1032).

For the reasons discussed above, Petitioner's argument in the Reply regarding isoEthernet properly responds to an argument raised by Patent Owner in the Response and does not constitute a new theory of unpatentability. Petitioner properly relies on Exhibit

1032 to support its argument regarding isoEthernet in the Reply. *See Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359 (Fed. Cir. 2015) (indicating the Board must consider prior art references cited as "evidence of the background understanding of skilled artisans," even when cited in a reply to a patent owner response.).

Patent Owner also argues that "had the Petition relied on isoEthernet (trademarked or otherwise) and/or Ex. 1032 as a basis for Ground 1, [Patent Owner] would have provided evidence with its Response that, as late as 1999, the IEEE isoEthernet committee prohibited combining phantom-power and Ethernet data signals ('10Base-T mode') to 'insure[] that 10Base-T services are unaffected.'" PO Mot. Str. 3 (citing Ex. 2055, 38:23-39:18) (emphasis deleted). Patent Owner also presented this argument at the Oral Hearing and referred to it as an offer of proof under Fed. R. Evid. 103(a)(2). Tr. 83:2-18, 218:8-21. In connection with this offer of proof, Patent Owner alleged that it would have presented this evidence in a sur-reply, but was denied the opportunity to do so by the Board. *Id.*

Under Fed. R. Evid. 103(a)(2), "[a] party may claim error in a ruling to . . . exclude evidence only if the error affects a substantial right of the party," and the party "informs the court of its substance by an offer of proof." We did not, however, exclude evidence offered by Patent Owner or deny Patent Owner the opportunity to file a sur-reply in this proceeding. Patent Owner instead made a strategic decision to seek a motion to strike instead of a sur-reply. Specifically, Patent Owner requested "leave to file a motion to strike Petitioner's Reply Briefs in IPR Nos.

2016-01389, 2016-1391, 2016-1397, and 2016-1399 or, *in the alternative*, for leave to file a Sur-Reply."' Ex. 3008, 1 (emphasis added). In other words, Patent Owner identified a motion to strike as the preferred method to respond to Petitioner's Reply, and identified a sur-reply as an alternative to the motion to strike. *Id.* Because we granted Patent Owner's request for leave to file a motion to strike, we did not grant the proposed alternative of a sur-reply. Paper 45, 2-3. Prior to the Oral Hearing, Patent Owner did not request a clarification or modification of our Order (Paper 45). Further, Patent Owner's re-characterization at the Oral Hearing of its request as being for both a motion to strike and a sur-reply (Tr. 222:11-223:17) contradicts the express language Patent Owner used in its request to the Board (Ex. 3008, 1).

For the foregoing reasons, we deny Patent Owner's Motion to Strike Petitioner's Reply sections that cite Hunter's isoEthernet teachings. Alternatively, we deem the Motion to Strike moot as to those sections, because we need not rely upon the disputed portions of Petitioner's Reply that address isoEthernet to support the ultimate determination in this proceeding. As discussed above, Hunter's teachings regarding 10Base-T alone, and the obviousness of employing Ethernet as a well-known standard, satisfy the disputed limitations of the challenged claims. *See supra* Sections II.C.3, C.4.

2. Bob Smith Terminations and Common Mode Chokes

Patent Owner argues that Petitioner addresses BSTs and CMCs for the first time in the Reply. PO Mot. Str. 4 (citing Pet. Reply 2, 5; Exs. 1021-24, 1029;

Ex. 1046 ¶¶ 12-21). Patent Owner explains that Petitioner "knew that pre-existing Ethernet equipment included terminations (*e.g.*, BSTs and CMCs) that were essential to the operation of an Ethernet network," but "the Petition did not address the effects of the blind-powering on pre-existing BSTs and CMCs." *Id.* at 4 (citing Ex. 2039, 45:10-21; Ex. 2055, 65:13-67:11).

Patent Owner does not show Petitioner's Reply improperly relies on BSTs and CMCs. Patent Owner raises BSTs and CMCs in the Response (PO Resp. 15-17), and Petitioner properly responds to those arguments in the Reply (Pet. Reply 2-5). *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. The disputed portions of Petitioner's Reply serve to explain, at least in part, why Patent Owner's arguments do not overcome Petitioner's persuasive showing in its Petition. *See Belden*, 805 F.3d at 1078-79.

For the foregoing reasons, we deny Patent Owner's Motion to Strike Petitioner's Reply sections that cite BSTs and CMCs and evidence related thereto. Alternatively, we deem the Motion to Strike moot as to those sections, because we need not rely upon the disputed portions of Petitioner's Reply that address BSTs and CMCs to support the ultimate determination in this proceeding. As discussed above, the challenged claims do not require BSTs or CMCs. *See supra* Sections II.C.3, C.4, D.2, D.3; Reply Br. 3 (arguing BSTs and CMCs are not relevant).

3. Fisher and De Nicolo Patents

Patent Owner argues that Petitioner improperly submits new exhibits with the Reply, specifically, the Fisher and De Nicolo patents, to show that using phantom power in an Ethernet network was known at the time of the invention. PO Mot. Str. 5 (citing Pet. Reply 7-8, 12-13; Exs. 1025-1028; Ex. 1046 ¶¶ 27-35). Patent Owner acknowledges that Petitioner's "basic argument that [Patent Owner] did not invent PoE is not new," but contends Petitioner cannot cite new evidence in the Reply to support that position. *Id.* (citing Pet. 4-5).

Patent Owner fails to show that Petitioner submitted an improper Reply regarding these patents. As noted, Patent Owner acknowledges that the Petition asserts Patent Owner did not invent PoE. Pet. 4-5; PO Mot. Str. 5. Patent Owner argues in the Response that "operating Power-over-Ethernet ('PoE') did not exist in 1997." PO Resp. 8. Petitioner responds properly in the Reply by citing to the Fisher and De Nicolo patents as evidence in response to Patent Owner's argument in the Response. Pet. Reply 6-7 (citing Exs. 1025-28). *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80.

Patent Owner specifically objects to Petitioner's reliance on the De Nicolo patents because Patent Owner alleges it could have demonstrated that the De Nicolo patents are not prior art to the '012 patent. PO Mot. Str. 5. We do not rely on the De Nicolo patents in this Decision. Moreover, Patent Owner acknowledged during the Oral Hearing that it did not invent PoE. Tr. 85:1-3 (Panel Question: "[B]ut you did not invent power over Ethernet? PO Answer: "We did not. We invented—what we invented was a way for power over Ethernet to work in the existing infrastructure."). As discussed above, Hunter's teachings, even without the admission during the Oral

Hearing, demonstrate that using PoE was known at the time of the invention. *See supra* Sections II.C.3-4.

For the foregoing reasons, we deny Patent Owner's Motion to Strike Petitioner's Reply sections that rely on the Fisher patents (Ex. 1025-26). We do not rely on the De Nicolo patents (Exhibits 1027-28), rendering that portion of the Motion to Strike moot.

4. Alleged Skepticism

Patent Owner argues that Petitioner addresses the objective indicia of non-obviousness, including skepticism of those skilled in the art, for the first time in the Reply. PO Mot. Str. 6 (citing Pet. Reply 6:6-7:5; Exs. 1035-42; Ex. 1046 ¶¶ 36-44).[30] Patent Owner contends that Petitioner was "aware of the secondary considerations issues, but failed to address them in the Petition." *Id.* at 6.

Patent Owner fails to show an improper Reply regarding alleged skepticism. Patent Owner raises the issue of skepticism by those skilled in the art in the Response (PO Resp. 21-26), and Petitioner responds properly to that argument in the Reply (Pet. Reply 9-10). *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. Petitioner's Reply serves to explain, at least in part, why Patent Owner's arguments in the Response do not overcome the persuasive showing in the Petition. *See supra* Section II.C.3; II.D.3; *Belden*, 805 F.3d at 1078-79.

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[30] The Reply does not address skepticism on pages 6-7. We assume Patent Owner intended to move to strike Section IV.C of the Reply Brief. *See* Reply Br. 8-9 (addressing Patent Owner's alleged skepticism).

For the foregoing reasons, we deny Patent Owner's Motion to Strike Petitioner's Reply sections and other evidence that address alleged skepticism raised by Patent Owner's Response.

5. CAT-3 and CAT-5 Cabling

Patent Owner argues that Petitioner addresses the number of conductors in CAT-3 and CAT-5 cabling for the first time in the Reply. PO Mot. Str. 7 (citing Pet. Reply 13:6-17; Ex. 1031; Ex. 1046 ¶ 61). Specifically, Patent Owner contends that Petitioner knew that CAT-3 cabling was used for 10Base-T Ethernet and CAT-5 cabling was used for 100Base-T Ethernet, and, thus, "could have included" argument and evidence in the Petition regarding the number of conductors in that cabling. *Id.* at 7.

Patent Owner does not show that the Petitioner's Reply constitutes an improper response. Patent Owner raises the issue of the number of conductors in CAT-3 and CAT-5 cabling in the Response (PO Resp. 19-20), and Petitioner properly addresses the argument in its Reply. Petitioner simply addresses Patent Owner's argument. Pet. Reply 13 (contending, *inter alia*, that some CAT-3 and CAT-5 cables consisted of only 2 pairs of data, both of which carried data). *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80.

Patent Owner also argues that, if Petitioner had addressed the number of conductors in CAT-3 and CAT-5 cabling in the Petition, Patent Owner "would have included the cable specification for CAT-3/CAT-5 wiring, confirming that such cables comprise four wire pairs." PO Mot. Str. 7. (citing Ex. 2055, 171:23-176:13). Patent Owner also presented this argument at the Oral Hearing and referred to it as an offer of proof under Fed. R. Evid. 103(a)(2). Tr. 220:19-221:2. As discussed above, Fed. R. Evid. 103(a)(2) provides that "[a] party may claim error in a ruling to . . . exclude evidence only if the error affects a substantial right of the party," and the party "informs the court of its substance by an offer of proof." We did not, however, exclude evidence offered by Patent Owner or deny Patent Owner the opportunity to file a sur-reply in this proceeding. *See supra* Section II.E.1. Patent Owner instead made a strategic decision to seek a motion to strike instead of a sur-reply. *See id.*; Ex. 3008.

Moreover, the disputed portions of Petitioner's Reply that address the number of conductors in CAT-3 and CAT-5 cabling are not necessary to our ultimate determination in this proceeding. As discussed above, the portions of Hunter cited in the Petition independently demonstrate that a 10Base-T bus may include only two twisted pair conductors, not four. *See supra* Sections II.C.1, II.C.3. Even if other types of Ethernet cables or connectors had more conductors, as explained above, this would not overcome Petitioner's persuasive showing in its Petition that relies on well-known PoE. *See supra* Sections I.B., II.C.3, II.C.4, II.D.2, II.D.3.

For the foregoing reasons, we deny Patent Owner's Motion to Strike Petitioner's Reply section (Pet. Reply 13:6-17) and evidence (Ex. 1031; Ex. 1046 ¶ 61) that address CAT-3 and CAT-5 wiring. Alternatively, we deem the Motion to Strike moot as to that section and evidence, because we need not rely upon the disputed portions of Petitioner's Reply to support the ultimate determination in this proceeding.

F. Petitioner's Motion to Exclude

Petitioner filed a Motion to Exclude (Paper 49, "Pet. Mot. Excl."), Patent Owner filed an Opposition (Paper 53, "PO Opp. Excl."), and Petitioner filed a Reply (Paper 61, "Pet. Reply Excl."). Petitioner's Motion to Exclude is moot, because we considered all of Patent Owner's evidence and it does not alter the outcome.

F. Petitioner's Motion to Exclude

Petitioner filed a Motion to Exclude (Paper 49, "Pet. Mot. Excl."), Patent Owner filed an Opposition (Paper 53, "PO Opp. Excl."), and Petitioner filed a Reply (Paper 61, "Pet. Reply Excl."). After considering the parties' arguments and for the reasons discussed below, we deny Petitioner's Motion to Exclude.

1. Exhibit 2038

Petitioner moves to exclude Exhibit 2038, the Madisetti Declaration, under Fed. R. Evid. 401, 402, 403, 702, 703, as irrelevant, prejudicial, and unreliable. Pet. Mot. Excl. 1-10. Specifically, Petitioner argues that Dr. Madisetti 1) relies on an incorrect date of invention for the challenged claims of the '012 patent (*id.* at 2-4); 2) fails to provide support for his opinion that a person of ordinary skill in the art would have provided operating power over the unused lines in an Ethernet connection (*id.* at 5-6); 3) misunderstands the isoEthernet standard (*id.* at 6-7); 4) fails to provide support for his opinion that Bloch's circuit would interfere with Ethernet data signals (*id.* at 8); 5) provides inconsistent interpretations of what constitutes terminal equipment (*id.* at 8-10); and 6) fails to read the teachings of Hunter as a whole (*id.*

at 10). Petitioner's arguments do not demonstrate that Exhibit 2038 lacks relevance. Rather, Petitioner's arguments, directed to the merits of the testimony in Exhibit 2038, raise a question of the weight, not admissibility. Therefore, Petitioner's Motion to Exclude is denied with respect to Exhibit 2038.

2. Exhibits 2040–46 and 2048

Petitioner moves to exclude Exhibits 2040-46 ("IEEE Exhibits"), and Exhibit 2048 (the "Camp Declaration") under Fed. R. Evid. 401, 402, 403, 801, 802, 804, 901, as irrelevant, prejudicial, hearsay, and lacking authentication. Pet. Mot. Excl. 11-12. Petitioner's arguments are not persuasive.

The proponent of an item of evidence must produce evidence sufficient to support a finding that the item is what the proponent claims it is. Fed. R. Evid. 901. Here, the Camp Declaration testimony avers "[t]he 802.3af Committee maintained a record of its proceedings by posting documents pertaining to its work, including meeting minutes and presentations, on its public document server at http://www.ieee802.org/3/af/public/ ("the Website")," and that Exhibits 2040-2046 are such records. Ex. 2048 ¶¶ 4-11. Mr. Camp explains that he bases his statements in Exhibit 2048 on personal knowledge, he served as a member of the "IEEE Standards Association . . . Board," was "personally aware" of work being done regarding the relevant standards, and was familiar with IEEE record-keeping policies. *Id.* ¶¶ 1-3. Petitioner, on the other hand, does not provide any specific reason showing that Exhibits 2040-2046 are not what Patent Owner and Mr. Camp claim them to be. *See* Pet. Mot. Excl. 11-12.

Petitioner also fails to show that Exhibits 2040-46 constitute hearsay. *See* Fed. R. Evid. 801. Patent Owner offers, and we consider, Exhibits 2040-2046 as evidence of the effect that the statements in Exhibits 2040-2046 would have had on a person of ordinary skill in the art considering the prior art combinations proposed by Petitioner in this case. *See supra* Sections II.C., II.D. Thus, the statements in Exhibits 2040-2046 are not hearsay, because they are not offered as evidence of the truth of the matter asserted. *See* Fed. R. Evid. 801.

Petitioner's arguments regarding the relevance of Exhibits 2040-2046 raise a question of sufficiency of proof, not admissibility. *See* Pet. Mot. Excl. 11-12 (arguing the evidence must be commensurate in scope with the claims). Therefore, Petitioner's Motion to Exclude is denied with respect to Exhibits 2040-2046 and 2048.

3. Exhibit 2047

Petitioner moves to exclude Exhibit 2047, a document entitled "FYI on 'What is the Internet?'" and produced by the User Services Working Group of the Internet Engineering Task Force, under Fed. R. Evid. 401, 402, 403, 801, 802, 805, 901, as irrelevant, hearsay, and lacking authentication. Pet. Mot. Excl. 12-13. Petitioner's arguments are not persuasive.

The proponent of an item of evidence must produce evidence sufficient to support a finding that the item is what the proponent claims it is. Fed. R. Evid. 901. Here, Patent Owner submits Dr. Madisetti's testimony that Exhibit 2047 is a document entitled "FYI on 'What is the Internet?'" produced by the Internet Engineering Task Force, and is available at https://tools.ietf.org/html/rfc1462. Ex. 2038 ¶ 104. Petitioner, on the other hand, does not provide persuasive argument showing that Exhibit 2047 is not what Patent Owner and Dr. Madisetti claim it to be. *See* Pet. Mot. Excl. 12-13.

With respect to Petitioner's argument regarding hearsay, *see* Fed. R. Evid. 801, Patent Owner offers Exhibit 2047 as extrinsic evidence of the definition of "protocol" to show how skilled artisans would have understood the term, but not for the truth of the definition asserted. *See* Pet. Mot. Excl. 12-13; PO Resp. 13-14. Accordingly, Petitioner fails to show the relied-upon statements in Exhibit 2047 are hearsay.

Petitioner's arguments regarding the relevance of Exhibit 2047 raise a question regarding the proper weight to afford to an alleged relationship between different protocol types and the proper weight to afford extrinsic evidence, not admissibility. *See* Pet. Mot. Excl. 11-12 (arguing "it is improper to consider extrinsic evidence that contradicts the intrinsic record or that is not from around the time of the invention"). Therefore, Petitioner's Motion to Exclude is denied with respect to Exhibit 2047.

4. Exhibits 2049, 2050, and 2054

Petitioner argues that Exhibits 2049, 2050, and 2054 should be excluded under Fed. R. Evid. 401, 402, 403, as irrelevant and prejudicial. Pet. Mot. Excl. 14-15. Petitioner's arguments regarding the relevance of Exhibits 2049, 2050, and 2054 raise a question of sufficiency of proof, not admissibility. *See id.* Further, Petitioner would not suffer any prejudice by our admission of Exhibits 2049, 2050, and 2054. Therefore, Petitioner's Motion to Exclude is denied with respect to Exhibits 2049, 2050, and 2054.

G Patent Owner's Motion to Exclude

Patent Owner filed a Motion to Exclude (Paper 48, "PO Mot. Excl."), Petitioner filed an Opposition (Paper 55, "Pet. Opp. Excl."), and Patent Owner filed a Reply (Paper 60, "PO Reply Excl."). After considering the parties' arguments and for the reasons discussed below, we deny-in-part and dismiss-in-part Patent Owner's Motion to Exclude.

1. Exhibit 1020

Other than pointing out that Petitioner filed, with its Reply, Exhibit 1020 (Dr. Madisetti's deposition testimony), Patent Owner does not provide any specific reason why Exhibit 1020 should be excluded. *See* PO Mot. Excl. 1-9. Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibit 1020.

2. Exhibits 1021–24, 1032, and 1033

Patent Owner moves to exclude Exhibits 1021-24 (product datasheets, catalogs, and specifications), Exhibit 1032 (IEEE 902.3 standard), and Exhibit 1033 (trade dictionary) as improper new evidence, based on the same or similar reasons as set forth in the Motion to Strike. *See* PO Mot. Excl. 4-5, 8; PO Mot. Str. 3-5. Patent Owner's arguments are not persuasive for the same reasons discussed above with respect to the Motion to Strike and Exhibits 1021-24 and 1032. *See supra* Sections II.E.1-2 (addressing Exs. 1021-24, 1032).

Patent Owner does not address Exhibit 1033 (dictionary providing a definition for "terminal equipment") in its Motion to Strike. In its Motion to Exclude, Patent Owner argues Petitioner cites Exhibit 1033 in its "Reply to assert a new claim construction argument for the phrase 'terminal equipment.'" PO Mot. Excl. 8. However, as Petitioner argues, a motion to exclude "is not a mechanism to argue that a reply contains new arguments or relies on evidence necessary to make out a prima facie case." Pet. Opp. Excl. 4 (quoting *Liberty Mutual Insurance Co. v. Progressive Casualty Insurance Co.*, Case CBM2012-00002 (PTAB Jan. 23, 2014) (Paper 66, 62)). Patent Owner should have presented this argument in its Motion to Strike; otherwise, as Petitioner also argues, Patent Owner would be circumventing the page requirements granted for that motion. *See* Pet. Opp. Excl. 4 (citing Paper 45). Accordingly, we deny the Motion to Exclude as to Exhibit 1033 as improper and without authorization.

Alternatively, even if we consider Patent Owner's Motion to Exclude to be proper and authorized as to Exhibit 1033, Petitioner properly provides it as extrinsic evidence to help to rebut Patent Owner's argument that terminal equipment cannot include Hunter's hub 150. *See* Pet. Reply 16 (citing PO Resp. 30 (arguing "the ISTE card is an intermediate hub . . . not an Ethernet terminal device")). Moreover, even without that extrinsic evidence, the intrinsic record shows that "terminal equipment" as recited in the challenged claims can include Hunter's hub 150 and other modules and peripheries. *See supra* Sections I.B, II.A.1, 3.

Patent Owner also argues that Exhibits 1021-24 should be excluded as impermissible hearsay. PO Mot. Excl. 11. Patent Owner fails to show these exhibits constitute impermissible hearsay. We rely on Exhibits 1021-1024 in this Decision only to the extent they provide a basis for certain portions of Mr. Crayford's declaration cited in this Decision. *See* Ex. 1046 ¶¶ 13, 18-26. Patent Owner does not dispute that Exhibits 1021-1024 present the kinds of facts and data that Mr. Crayford would reasonably rely upon in forming an opinion. *See* PO Mot. Excl. 11; PO Reply Excl. 2-3. As a result, Exhibits 1021-1024 do not need to be independently admissible. *See* Fed. R. Evid. 703; *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 711 F.3d 1348, 1373 (Fed. Cir. 2013). Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibits 1021-1024, 1032, and 1033.

3. Exhibits 1025, 1026, 1029, and 1031

Patent Owner moves to exclude Exhibits 1025 and 1026 (Fisher patents), Exhibit 1029 (Smith patent), and Exhibit 1031 (a Belden Technical Paper describing Belden wiring products), as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 4-6; PO Mot. Str. 4-5. Patent Owner's arguments are not persuasive for the same reasons discussed above with respect to the Motion to Strike. *See supra* Sections II.E.2-3.

Patent Owner also moves to exclude Exhibits 1025, 1026, 1029, and 1031 as impermissible hearsay. *See* PO Mot. Excl. 10-11; Fed. R. Evid. 801. That argument is not persuasive. Petitioner offers, and we rely on, the statements in Exhibits 1025, 1026, 1029, and 1031 as evidence of the effect those statements would have had on a person of ordinary skill in the art, not for the truth of the matter asserted. *See* Fed. R. Evid. 801.

As an example, Patent Owner contends Petitioner "reli[es] on Exhibit 1031 to assert that '[i]n April 1998, there were Cat-3 and Cat-5 cables with only 2 pairs, which were both used for data' and that a 'POSITA would not assume that an RJ-45 connector with 8 pins necessarily has 8 wires (4 pairs) connected.'" PO Mot. Excl. 11 (quoting Reply Br. 13). Patent Owner fails to identify what hearsay statement occurs in Exhibit 1031-Exhibit 1031 (describing Belden products) does not contain any of the statements Patent Owner quotes from the Reply. *See* Ex. 1031, 1. Exhibit 1031 provides circumstantial evidence (*i.e.*, not hearsay) that skilled artisans would have understood that at least one type of Cat-3 and Cat-5 cable consisted of two pairs ("2-pair") prior to 1998 (according to a 1997 web.archive.org date on the bottom of pages of Exhibit 1031, as further corroborated by "UPDATED 8/25/97" nomenclature under the title). *See* Ex. 1031, 2; Ex. 1046 ¶ 61 (citing Ex. 1031 to show Cat-3 and Cat-5 with two-pairs of twisted wires existed at the time of the invention); *Seabery North America Inc. v. Lincoln Global, Inc.*, Case IPR2016-00840, slip. op. at 5-6 (PTAB Oct. 2, 2017) (Paper 60, 5-6 & n.2) (reasoning dates do not constitute hearsay because they are not assertions). We adopt the reasoning of *Seabery*.[31]

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[31] Patent Owner does not specify whether evidence regarding the date of publication or two-pairs of twisted wires constitutes hearsay. In *Seabery*, the Board reasoned as follows:

> We agree with the view [of other PTAB panels] that the dates [of publications] are not hearsay because they are not assertions. . . . We are supported in this by cases such as *United States v. Snow*, 517 F.2d 441, 445 (9th Cir. 1975), where a red tape bearing the defendant's name affixed to a briefcase where a

In addition, under Fed. R. Evid. 703, this evidence constitutes the type of evidence an expert would rely upon to support an opinion, and does not constitute impermissible hearsay for that limited purpose. *See* Ex. 1046 ¶ 61.

Even if relied-upon statements in Exhibits 1025, 1026, and 1029 constitute hearsay, they also are admissible at least under Fed. R. Evid. 803(8). Specifically, Exhibits 1025, 1026, and 1029 constitute records of the activities of the U.S. Patent and Trademark Office, and Patent Owner has not shown that the source of information or circumstances lack trustworthiness. *See* PO Mot. Excl. 11-12; PO Reply Excl. 3; Fed. R. Evid. 803(8); *Fresenius Med. Care Holdings, Inc. v. Baxter Int'l, Inc.*, No. C 03-1431, 2006 WL 1330003, at *2-4 (N.D. Cal. May 15, 2006). Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibits 1025, 1026, 1029, and 1031.

> gun was found was admitted as circumstantial evidence that the defendant possessed the weapon. To the same effect are *United States v. Koch*, 625 F.3d 470, 480 (8th Cir. 2010) (computer flash drive with manufacturer's label "China" not inadmissible hearsay to prove place of manufacture); and *United States v. Bowling*, 32 F.3d 326$_5$ 328 (8th Cir. 1994) (manufacturer's name stamped on firearm not hearsay). We are persuaded by these cases that dates appearing in Exhibit 1003, like the examples in those cases, are circumstantial evidence of publication and not assertions that publication occurred on a date certain. We, therefore, overrule the objection and admit the dates for this purpose.

See IPR2016-00840, Paper 60, 5-6 & n.2 (alternatively relying on the residual exception to hearsay).

4. Exhibits 1036–1042

Patent Owner argues that Exhibits 1036-1042, documents relating to meetings of an IEEE committee, should be excluded as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 5-6; PO Mot. Str. 5-6. Patent Owner's arguments are not persuasive for the same reasons discussed above with respect to the Motion to Strike. *See supra* Section II.E.4. Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibits 1036-1042.

5. Exhibit 1043

Exhibit 1043, U.S. Patent No. 8,155,012, relates to the '012 patent. Other than pointing out that Petitioner filed Exhibit 1043 with Petitioner's Reply, Patent Owner does not provide any specific reason why Exhibit 1043 should be excluded. *See* PO Mot. Excl. 6. Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibit 1043.

6. Exhibits 1027, 1028, 1030, 1034, and 1035

We do not rely on Exhibits 1027, 1028, 1030, 1034, and 1035 in this Decision. Therefore, Patent Owner's Motion to Exclude is dismissed as moot with respect to Exhibits 1027, 1028, 1030, 1034, and 1035.

H. Oral Hearing Objections

Each party objected to arguments presented by the other party during the Oral Hearing. Petitioner objected that Patent Owner improperly raised new arguments for the first time at the oral hearing regarding the IEEE 802.9f specification, the CAT-3 and CAT-5 cabling specifications, blind power, and power levels. Tr. 216:15-217:7. We considered Patent Owner's arguments in the Response in light of any additional arguments presented by Patent Owner at the Oral Hearing, but we ultimately do not find Patent Owner's arguments persuasive for the reasons discussed in this Decision. Thus, Petitioner would not suffer any prejudice by our admission of the arguments presented by Patent Owner at the oral hearing.

Patent Owner objected that Petitioner raised arguments at the Oral Hearing that were the subject of Patent Owner's Motion to Strike and/or Motion to Exclude. Tr. 66:20-67:20. For the reasons discussed above, we deny Patent Owner's Motion to Strike and dismiss-in-part and deny-in-part Patent Owner's Motion to Exclude. *See supra* Sections E, G. We also do not rely on allegedly improper arguments presented by Petitioner at the Oral Hearing and rely instead on the briefing and record evidence.

I. Patent Owner's Observations on Cross Examination

Patent Owner filed a Motion for Observations on the cross examination of Mr. Ian Crayford (Paper 47) and Petitioner filed a Response (Paper 58). After considering Patent Owner's observations and Petitioner's responses, we determine that Patent Owner's observations do not undermine the credibility of Mr. Crayford's testimony. We also have considered Patent Owner's observations in connection with the arguments and evidence discussed above, and we have afforded Mr. Crayford's testimony the appropriate weight in making our determination in this case.

III. Conclusion

Petitioner has demonstrated, by a preponderance of the evidence, that claims 31, 35, 36, 40, 43, 52, 55, 56, 59, 60, and 65 of the ’012 patent are unpatentable.

IV. Order

For the reasons given, it is

ORDERED that claims 31, 35, 36, 40, 43, 52, 55, 56, 59, 60, and 65 of the ’012 patent are unpatentable;

FURTHER ORDERED that Patent Owner’s Motions to Strike and Exclude are dismissed as moot-in-part and denied-in-part;

FURTHER ORDERED that Petitioner’s Motion to Exclude is denied; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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FINAL WRITTEN DECISION OF UNITED STATES PATENT TRIAL AND APPEAL BOARD ON ’838 PATENT—35 U.S.C. § 318(A) AND 37 C.F.R. § 42.73 (DECEMBER 29, 2017)

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC., RUCKUS WIRELESS, INC., BROCADE COMMUNICATION SYSTEMS, INC., and NETGEAR, INC.,

Petitioner,

v.

CHRIMAR SYSTEMS, INC.,

Patent Owner.

Case IPR2016-01397[1]
Patent 9,019,838 B2

Before: Karl D. EASTHOM, Gregg I. ANDERSON, and Robert J. WEINSCHENK, Administrative Patent Judges.

[1] Ruckus Wireless, Inc., Brocade Communication Systems, Inc., and Netgear, Inc. filed a petition in IPR2017-00720 (now terminated), and were joined to this proceeding.

WEINSCHENK, Administrative Patent Judge.

I. Introduction

Juniper Networks, Inc. filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 of U.S. Patent No. 9,019,838 B2 (Ex. 1001, "the '838 patent"). Chrimar Systems, Inc. ("Patent Owner") filed a Preliminary Response (Paper 6, "Prelim. Resp.") to the Petition. On January 4, 2017, we instituted an *inter partes* review of claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 ("the challenged claims") of the '838 patent on the following grounds:

Claims	Statutory Basis	Applied References
1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69	35 U.S.C. § 103(a)[2]	Hunter et al., PCT Publication No. WO 96/23377 (published Aug. 1, 1996) (Ex. 1003, "Hunter"); and Bulan et al., U.S. Patent No. 5,089,927 (issued Feb. 18, 1992) (Ex. 1004, "Bulan")
1, 2, 7, 26, 29, 38, 39,	35 U.S.C. § 103(a)	Bloch et al., U.S. Patent No. 4,173,714 (issued Nov. 6, 1979) (Ex. 1005, "Bloch"); The

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2 The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, which was enacted on September 16, 2011, made amendments to 35 U.S.C. §§ 102, 103. AIA § 3(b), (c). Those amendments became effective eighteen months later on March 16, 2013. *Id.* at § 3(n). Because the application from which the '838 patent issued was filed before March 16, 2013, any citations herein to 35 U.S.C. §§ 102, 103 are to their pre-AIA versions.

40, 47, 55, and 69		Institute of Electrical and Electronics Engineers, Inc., IEEE Standard 802.3-1993 (1993) (Ex. 1006, "IEEE 802.3-1993"); and The Institute of Electrical and Electronics Engineers, Inc., IEEE Standard 802.3u-1995 (1995) (Exs. 1007-1008, "IEEE 802.3-1995")
1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69	35 U.S.C. § 103(a)	Bloch; IEEE 802.3-1993; IEEE 802.3-1995; and Huizinga et al., U.S. Patent No. 4,046,972 (issued Sept. 6, 1977) (Ex. 1009, "Huizinga")

Paper 8 ("Dec. on Inst."), 17-18.

After institution, Ruckus Wireless, Inc., Brocade Communication Systems, Inc., and Netgear, Inc. filed a petition in IPR2017-00720 requesting an *inter partes* review of the challenged claims of the '838 patent and filed a motion requesting joinder to this case. Paper 24, 2. On March 16, 2017, we joined Ruckus Wireless, Inc., Brocade Communication Systems, Inc., and Netgear, Inc. to this case and terminated IPR2017-00720. *Id.* at 5-6. In this Decision, we refer to Juniper Networks, Inc., Ruckus Wireless, Inc., Brocade Communication Systems, Inc., and Netgear, Inc. collectively as Petitioner.

Also, after institution, Patent Owner filed a Response (Paper 25, "PO Resp.") to the Petition, and Petitioner filed a Reply (Paper 32, "Pet. Reply") to the Response. An oral hearing was held on August

31, 2017, and a transcript of the hearing is included in the record. Paper 63 ("Tr."). We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons set forth below, Petitioner has shown by a preponderance of the evidence that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 of the '838 patent are unpatentable.

A. Related Proceedings

The parties indicate that the '838 patent is the subject of several cases in the United States District Court for the Eastern District of Michigan, the United States District Court for the Eastern District of Texas, and the United States District Court for the Northern District of California. Pet. 1; Paper 5, 2-3; Ex. 1012. The parties also indicate that the following petitions for *inter partes* review are related to this case:

Case No. Involved	U.S. Patent No.
IPR2016-00569	U.S. Patent No. 8,942,107
IPR2016-00573	U.S. Patent No. 9,019,838
IPR2016-00574	U.S. Patent No. 8,902,760
IPR2016-00983	U.S. Patent No. 8,155,012
IPR2016-01151	U.S. Patent No. 9,019,838
IPR2016-01389	U.S. Patent No. 8,155,012
IPR2016-01391	U.S. Patent No. 8,942,107
IPR2016-01399	U.S. Patent No. 8,902,760
IPR2016-01425	U.S. Patent No. 8,155,012
IPR2016-01426	U.S. Patent No. 9,019,838

Pet. 1; Paper 5, 3.

B. The ’838 Patent

The ’838 patent relates to a system for managing, tracking, and identifying remotely located electronic equipment. Ex. 1001, 1:27-30. According to the ’838 patent, one of the difficulties in managing a computerized office environment is keeping track of a company’s electronic assets. *Id.* at 1:32-57. Previous systems for tracking electronic assets suffered from several deficiencies. *Id.* at 1:62-65. For example, previous systems could not determine the connection status or physical location of an asset and could only track assets that were powered-up. *Id.* at 1:65-2:2.

To address these deficiencies, the ’838 patent describes a system for tracking an electronic asset. *Id.* at 2:3-6, 3:23-27. In one embodiment described in the ’838 patent, the system includes a central module and a remote module. *Id.* at 3:27-30. The remote module attaches to the electronic asset and transmits a low frequency signal. *Id.* A receiver in the central module monitors the signal transmitted by the remote module and determines if the status or location of the electronic asset changes. *Id.* at 3:30-32, 3:34-40.

C. Illustrative Claim

Claim 1 is independent and is reproduced below.

1. A central piece of network equipment comprising:

> at least one Ethernet connector comprising first and second pairs of contacts used to carry BaseT Ethernet communication signals; and

> the central piece of network equipment to detect different magnitudes of DC current flow via at least one of the contacts of the first and second pairs of contacts and to control application of at least one electrical condition to at least one of the contacts of the first and second pairs of contacts in response to at least one of the magnitudes of the DC current flow.

Ex. 1001, 17:13-23.

II. Analysis

A. Level of Ordinary Skill in the Art

Petitioner argues that a person of ordinary skill in the art would have had "at least a B.S. degree in electrical engineering or computer science, or the equivalent, and at least three years of experience in the design of network communication products." Pet. 5. Petitioner also argues that a person of ordinary skill in the art would have been "familiar with, *inter alia*, data communications protocols, data communications standards (and standards under development at the time), and the behavior and use of common data communications products available on the market." *Id.* (citing Ex. 1002 ¶¶ 49-50). Patent Owner argues that a person of ordinary skill in the art would have had "a B.S. degree (or equivalent) in electrical engineering or computer science, and three years of experience in the design of network communications products." PO Resp. 10 (citing Ex. 2038 ¶ 26). Patent Owner also argues that a person of ordinary skill in the art would have been "familiar with data communications protocols, data communications standards (and standards under development at the time, including the 802.3 standard), and the behavior of data communications products available on the market." PO Resp. 10 (citing Ex. 2038 ¶ 26).

Patent Owner indicates that the only difference between the parties' respective definitions of the level of ordinary skill in the art is that Petitioner uses the phrase "at least." PO Resp. 10. According to Patent Owner, the phrase "at least" is "too open ended" and "would result in an expert, who has a Ph.D. and 15 years of experience, being considered an ordinary artisan." *Id.* Patent Owner, however, does not identify any specific instance in which the difference between the parties' respective definitions of the level of ordinary skill in the art impacts the analysis or conclusions of either party, or either party's declarant, in this case. *See id.*

Our findings and conclusions in this case would be the same under either party's definition of the level of ordinary skill in the art. To the extent necessary, though, we adopt Patent Owner's definition, which is supported by the declaration of Dr. Vijay K. Madisetti. *Id.*; Ex. 2038 ¶ 26. As such, we determine that a person of ordinary skill in the art would have had a B.S. degree (or equivalent) in electrical engineering or computer science and three years of experience in the design of network communications products, and would have been familiar with data communications protocols, data communications standards (and standards under development at the time, including the 802.3 standard), and the behavior of data communications products available on the market.

B. Claim Construction

The claims of an unexpired patent are interpreted using the broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144-45 (2016). In applying that standard, claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the specification. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An applicant may provide a different definition of the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read into the claims from the specification. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

1. BaseT

Claim 1 recites "at least one Ethernet connector comprising first and second pairs of contacts used to carry BaseT Ethernet communication signals." Ex. 1001, 17:14-16. In a decision on institution in IPR2016-01391, we construed the term "BaseT" in a related patent to mean "twisted pair Ethernet in accordance with the 10BASE-T or 100BASE-T standards." *Juniper Networks, Inc. v. Chrimar Systems, Inc.*, Case IPR2016-01391, slip op. at 11-12 (PTAB Dec. 22, 2016) (Paper 9). Our construction is consistent with Petitioner's proposal that the term "BaseT" be construed to mean "10BASE-T and 100BASE-T." Pet. 5. Our construction also is consistent with the construction adopted by the United States District Court for the Eastern District of Texas in a related case. Ex. 2021, 18. Further, Patent Owner "does not contest" our construction. PO Resp. 12. We note that our findings and conclusions in this case are not dependent on a particular construction of the term "BaseT." Nonetheless, because neither party disputes our prior construction of that term, we adopt it in this case. Specifically, we construe the term "BaseT" in claim 1 to mean "twisted pair Ethernet in accordance with the 10Base-T or 100Base-T standards."

2. Protocol

Claim 2 recites "wherein the different magnitudes of DC current flow are part of a detection protocol." Ex. 1001, 17:24-26. Patent Owner proposes construing the term "protocol" to mean "a mutually agreed upon method of communication." PO Resp. 12. Patent Owner argues that its proposed construction is supported by a document entitled "FYI on 'What is the Internet?'" produced by the User Services Working Group of the Internet Engineering Task Force. *Id.* at 12-13 (citing Ex. 2038 ¶ 104; Ex. 2047, 1). Petitioner responds that Patent Owner's proposed construction improperly "reads in a requirement that two devices knowingly communicate with each other using an agreed upon method," which is not supported by the claim language or the specification. Pet. Reply 26-27.

We agree with Petitioner that Patent Owner's proposed construction is not the broadest reasonable interpretation. First, Patent Owner does not direct us to any intrinsic evidence to support its proposed construction, but instead relies on a single piece of extrinsic evidence. PO Resp. 12-13. Specifically, Patent

Owner cites to a document that discusses the term "protocol" in the context of explaining how "networks that make up the Internet" communicate with one another. Ex. 2047, 1. That, however, is not the context in which the term "protocol" is used in the '838 patent. For example, the '838 patent relates to tracking electronic equipment in an Ethernet network. Ex. 1001, 1:27-30, 17:13-23. As a result, we are not persuaded that the extrinsic evidence cited by Patent Owner establishes the meaning of the term "protocol" in the context of the '838 patent.

Second, Patent Owner's proposed construction addresses the term "protocol" in isolation from the remainder of the claim language. By limiting the term "protocol" to a mutually agreed upon method of communication, Patent Owner's proposed construction appears to require a communication protocol. Claim 2, though, recites a <u>detection</u> protocol, not a <u>communication</u> protocol. *Id.* at 17:24-26. Claim 2 further specifies that the detection protocol is based on different magnitudes of DC current flow detected by the central piece of network equipment via Ethernet contacts. *Id.* at 17:13-26. Patent Owner does not explain specifically why the central piece of network equipment must mutually agree upon a method of communication with other network equipment in order to detect different magnitudes of DC current flow. *See* PO Resp. 12-13; Pet. Reply 26-27.

Third, the specification of the '838 patent indicates that the detection protocol does not require a mutually agreed upon method of communication. For example, the '838 patent describes one embodiment as follows:

> The existence of a connection between hub 1 and central module 15a is monitored by test voltage source 64 and test voltage monitor 66 through a pair of receive data lines. Current from test voltage source 64 flows through a data line to an isolation transformer within hub 1. The current flows through the primary winding of the isolation transformer and returns on the other receive data line to the test voltage monitor 66. An interruption in the flow of current is detected by the test voltage monitor 66. . . . Similarly, current sourced onto a transmit line from signal modulator 7 and isolation power supply 8 through remote module 16a to the isolation transformer of PC 3A which returns on the other transmit line is monitored by test voltage monitor 84 to verify that both remote module 16a and PC 3A are connected to central module 15a.

Ex. 1001, 8:6-23 (emphases added). In other words, central module 15a (*i.e.*, the central piece of network equipment) monitors the existence of connections with hub 1, remote module 16a, and PC 3A simply by detecting interruptions in the DC current flow between central module 15a and those other pieces of network equipment. *Id.* Thus, the detection protocol described in at least this embodiment of the '838 patent does not require a mutually agreed upon method of communication.

For the foregoing reasons, we do not adopt Patent Owner's proposed construction of the term "protocol." Specifically, we determine that the term "protocol" in claim 2 is not limited to a mutually agreed upon method of communication.[3] We also determine that further construction of the term "protocol" is not necessary to resolve the parties' dispute regarding claim 2 in this case. *See infra* Section II.C.3; *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

C. Obviousness of Claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 Over Hunter and Bulan

Petitioner argues that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 would have been obvious over Hunter and Bulan. Pet. 6. A claim is unpatentable as obvious under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) any objective

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[3] Our determination that the term "protocol" does not require a mutually agreed upon method of communication is consistent with the opinion of Patent Owner's expert in a related district court case that "[i]n the context of these claims, 'detection protocol' means that the equipment is configured or designed so that the magnitude of the current (flow) or the impedance in the path allow it to detect or determine some information about the equipment at the other end of the path." Ex. 2020, 9.

indicia of non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

We have considered the parties' arguments and supporting evidence, and we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 would have been obvious over Hunter and Bulan.

1. Overview of Hunter and Bulan

Hunter relates to a system for providing power to terminal equipment in a computer network. Ex. 1003, Abstract, 16:26.[4] Hunter explains that power can be provided to terminal equipment in one of three ways. *Id.* at 16:26. First, a local power supply (*e.g.*, in the office) can provide power to the terminal equipment. *Id.* at 16:27-17:1. This is known as "local" power. *Id.* at 17:1-2. Second, power may be delivered to the terminal equipment using the same cable that carries data through the network. *Id.* at 17:2-3. This is known as "phantom" power. *Id.* at 17:3-5. Third, power may be delivered to the terminal equipment using a separate, dedicated power cable. *Id.* at 17:5-6. This is known as "third pair" power. *Id.* at 17:6-8.

Hunter explains that there are advantages and disadvantages to each type of power. *Id.* at 17:9-26. For example, the advantage of phantom power is that it does not require a dedicated power cable, but the disadvantage is that it must be implemented carefully to avoid potential interactions between the

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4 Petitioner cites to the original page numbers of Hunter, whereas Patent Owner cites to the page numbers that Petitioner added when Hunter was filed as Exhibit 1003 in this case. To avoid confusion, we cite to the original page numbers of Hunter.

power and the data. *Id.* at 17:13-19. The advantage of third pair power is that it separates the power from the data, thereby avoiding potential interactions between them, but the disadvantage is that it requires a dedicated power cable, which can be expensive to install. *Id.* at 17:20-26.

Hunter describes a preferred embodiment in which phantom power is provided to terminal equipment using a 10Base-T Ethernet bus. *Id.* at 19:18-19, 21:17-18, 37:19-20. 10Base-T is an IEEE Ethernet standard.[5] Ex. 1002 ¶ 92 n.5; Ex. 2038 ¶ 32. Hunter explains that the 10Base-T Ethernet bus comprises two twisted pair conductors, with one pair used for transmitting data from the terminal equipment and the other pair used for receiving data into the terminal equipment. Ex. 1003, 21:22-27, 37:20-26. In order to implement phantom power, Hunter teaches that the same two twisted pair conductors of the 10Base-T Ethernet bus that transmit data are used to deliver DC power to the terminal equipment. *Id.* at 21:27-29, 37:26-28. Hunter explains that its phantom power embodiment is not limited to networks that use the 10Base-T Ethernet standard and indicates that it "is also compatible with Ethernet® . . . , Token Ring® . . . , ATM, and isoEthernet® . . . standards." *Id.* at 21:17-21, 26:3-11.

Hunter further describes the preferred embodiment as including a current protection circuit. *Id.* at 22:27-23:7, 38:12-20. The current protection circuit can be a resettable device, such as a thermistor or

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[5] Thus, contrary to Patent Owner's argument that the asserted prior art relates to telephone technology (PO Resp. 4), Hunter relates to Ethernet technology.

polyfuse, which protects both the power supply and the bus from a potentially damaging overcurrent. *Id.* at 23:3-6, 38:15-19.

Bulan relates to an improved current protection circuit. Ex. 1004, 2:9-14. Bulan explains that a typical current protection circuit with just a single threshold value, such as the one described in Hunter, is inadequate because it cannot distinguish between a normal power up event for a DC-to-DC converter and an operational fault. *Id.* at 1:26-31, 1:52-2:8. As a result, a typical current protection circuit may stop current from flowing during a normal power up event and prevent the terminal equipment from starting properly, or may allow current to flow during an operational fault and jeopardize the terminal equipment. *Id.* at 1:65-2:8.

Bulan describes an improved current protection circuit that addresses the aforementioned problem. *Id.* at 2:9-14. Specifically, Bulan teaches a current control apparatus that detects whether DC current flow in a path exceeds static and dynamic current limits, and, if so, switches a high impedance into the path. *Id.* at 3:5-21, 4:35-40, 6:34-43. If the high impedance reduces the DC current flow to a trickle and then zero, the current control apparatus detects a normal start up event for a DC-to-DC converter and switches the high impedance out of the path to allow the terminal equipment to start up properly. *Id.* at 3:22-25, 4:62-5:1, 6:43-58. On the other hand, if the high impedance only reduces the DC current flow to a trickle, the current control apparatus detects an operational fault and keeps the high impedance in the path to protect the terminal equipment. *Id.*

2. Claim 1

Claim 1 recites "[a] central piece of network equipment." Ex. 1001, 17:13. Hunter teaches a network with a central piece of network equipment, such as a hub. Pet. 25-27; Ex. 1003, 32:3-9. Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 1.

Claim 1 recites "at least one Ethernet connector comprising first and second pairs of contacts used to carry BaseT Ethernet communication signals." Ex. 1001, 17:14-16. Hunter teaches a 10Base-T Ethernet bus comprising two twisted pair conductors for the transmission of data. Pet. 27-28; Ex. 1002 ¶ 94; Ex. 1003, 37:19-28. Hunter also teaches connectors for connecting network equipment to the 10Base-T Ethernet bus. Pet. 28; Ex. 1002 ¶ 95; Ex. 1003, 38:21-25, Fig. 2.

Patent Owner responds that Petitioner does not show sufficiently that Hunter teaches "'Base T Ethernet' as construed by the Board." PO Resp. 35. Specifically, Patent Owner argues that Hunter repeatedly refers to "Ethernet®," but does not explain what the term "Ethernet®" means. *Id.* (citing Ex. 1003, 12, 14, 21, 23, 28, 35, 36). Patent Owner also contends that the term "Ethernet®" in Hunter refers to the original trademarked version of Ethernet owned by Xerox Corporation, not the subsequent non-trademarked versions of Ethernet, such as 10Base-T and 100Base-T. PO Resp. 35 (citing Pet. 27; Ex. 1002 ¶ 93 n.8).

Patent Owner's argument is not persuasive. Patent Owner does not dispute that the term "BaseT Ethernet" in claim 1 includes 10Base-T Ethernet. PO Resp. 34-35. As discussed above, Hunter teaches a

10Base-T Ethernet bus comprising two twisted pair conductors for the transmission of data. Pet. 27-28; Pet. Reply 16; Ex. 1003, 26:3-6, 37:19-28. For example, Hunter teaches the following:

> In the illustrated embodiment, the bus comprises a 10Base-T bus. A 10Base-T bus conventionally comprises two twisted-pair conductors 240, 250, each used for uni-directional transmission of data. Thus, in this embodiment, one of the twisted pairs (say, 250) is employed for transmitting data from the equipment 260, while the other of the twisted-pairs (say, 240) is used for receiving data into the equipment 260. The present invention preferably employs each of the twisted-pair conductors as a rail by which to deliver DC power to the equipment 260.

Ex. 1003, 37:19-28 (emphasis added). Thus, regardless of whether Hunter's use of the term "Ethernet®" includes 10Base-T Ethernet, Hunter independently teaches 10Base-T Ethernet.[6] *Id.*

Patent Owner also responds that Petitioner does not show sufficiently that the two twisted pair conductors of the 10Base-T Ethernet bus in Hunter carry Base-T Ethernet communication signals, as required by claim 1. PO Resp. 40-42. Specifically, Patent Owner argues that hubs 140, 150, 160, 180 in Figure 1 of Hunter are connected to multimedia hub 120 through isoEthernet interfaces. *Id.* at 41 (citing Ex. 1003, 34:19-21, 35:14-16, 35:27-28, 36:13-17, 36:28-

6 There is no dispute that 10Base-T is an IEEE Ethernet standard. Ex. 1002 ¶ 92 n.5; Ex. 2038 ¶ 32.

37:2). According to Patent Owner, isoEthernet interfaces only carry Integrated Services Digital Network ("ISDN") signals, not Ethernet signals. PO Resp. 41 (citing Ex. 1003, 17:15-18; Ex. 2038 ¶ 250). Patent Owner also argues that hub 170 in Figure 1 of Hunter is connected to multimedia hub 120 through a 10Base-F interface. PO Resp. 41 (citing Ex. 1003, 36:20). According to Patent Owner, a 10Base-F interface requires a fiber connection, and "fiber cannot carry electrical current." PO Resp. 41-42 (citing Ex. 2038 ¶ 252).

Patent Owner's argument is not persuasive. Patent Owner focuses on the embodiment shown in Figure 1 of Hunter. PO Resp. 40-42. Hunter, though, is not limited to that embodiment. Hunter teaches that preferably "the bus comprises a <u>10Base-T bus</u>," but notes that "[t]hose of skill in the art will recognize . . . that the present invention <u>is also compatible</u> with Ethernet®, Token Ring®, ATM and <u>isoEthernet</u>® standards." Ex. 1003, 21:17-21, 26:3-11 (emphasis added). Similarly, claim 3 of Hunter states that the "bus comprises a two-pair twisted-pair bus selected from the group consisting of: <u>10Base-T</u>, Ethernet®, Token Ring®, ATM, 100Base-T, and <u>isoEthernet</u>®." Ex. 1003, 51 (emphases added). These portions of Hunter teach a network that <u>preferably</u> uses a 10Base-T Ethernet bus for connecting network equipment, but <u>alternatively</u> may use an isoEthernet bus. Therefore, contrary to Patent Owner's argument, Hunter is <u>not</u> limited to an embodiment in which network equipment is connected by isoEthernet interfaces.

Moreover, even if Hunter is limited to an embodiment in which network equipment is connected by isoEthernet interfaces, Patent Owner's argument still is not persuasive. As discussed above, Patent Owner alleges that isoEthernet interfaces only carry ISDN signals, not Ethernet signals. PO Resp. 41 (citing Ex. 1003, 17:15-18; Ex. 2038 ¶ 250). The evidence cited by Patent Owner, however, does not support that argument. The portion of Hunter cited by Patent Owner indicates that isoEthernet interfaces can carry ISDN signals, but does not establish that isoEthernet interfaces only carry ISDN signals. Ex. 1003, 15:15-18. Further, the portion of Dr. Madisetti's declaration cited by Patent Owner states that "isoEthernet used ISDN signals, not Ethernet," but Dr. Madisetti provides no support for that statement other than citing the same portion of Hunter discussed above. Ex. 2038 ¶ 250. In contrast, the documentary evidence that Petitioner submitted with the Petition (Pet. iv (exhibit list); Pet. Reply 16) indicates that isoEthernet includes a 10Base-T mode in which the "IsoEthernet layer functions as a 10Base-T transceiver" (Ex. 1010, 165).[7] As a result, even if we accept Patent Owner's premise that hub 120 in Figure 1 of Hunter communicates with hubs 140, 150, 160, 180 using isoEthernet interfaces, the evidence of record indicates that isoEthernet interfaces carry 10Base-T Ethernet signals at least when used in the 10Base-T mode of isoEthernet.

Patent Owner's argument regarding 10Base-T hub 170 in Figure 1 of Hunter also is not persuasive for an additional reason. As discussed above, Patent Owner alleges that 10Base-T hub 170 is connected to multimedia hub 120 only through a 10Base-F interface. PO Resp. 41 (citing Ex. 1003, 36:20). The evidence

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[7] We cite to the page numbers that Petitioner added to Exhibit 1010. Also, like Hunter, Exhibit 1010 refers to the IEEE 802.9a standard for isoEthernet. Ex. 1003, 15:15-18; Ex. 1010, 160.

cited by Patent Owner, however, does not support that argument. The cited portion of Hunter states that "[t]he 10Base-T hub 170 further provides an Ethernet® AU interface and a single 10Base-F network interface." Ex. 1003, 34:19-20 (emphasis added). The phrase "further provides" in this portion of Hunter indicates that 10Base-T hub 170 includes an AU interface and a 10Base-F interface, but does not establish that 10Base-T hub 170 only includes an AU interface and a 10Base-F interface. *Id.* Further, Hunter teaches that multimedia hub 120 includes a 10Base-T repeater, and Figure 1 of Hunter shows that the 10Base-T repeater in multimedia hub 120 is connected to 10Base-T hub 170 over the 10Base-T Ethernet bus. Pet. Reply 16; Ex. 1003, 26:3-8, 32:16-27, 34:18-20, 37:19-28, Fig. 1. This indicates that the 10Base-T Ethernet bus in Hunter carries 10Base-T Ethernet signals from the 10Base-T repeater in multimedia hub 120 to 10Base-T hub 170.

At the oral hearing, Patent Owner further argued that, although Hunter teaches a 10Base-T Ethernet bus, Hunter does not teach that the 10Base-T Ethernet bus carries both 10Base-T Ethernet signals and DC power. Tr. 126:9-127:11. According to Patent Owner, when the 10Base-T Ethernet bus carries DC power, it only carries ISDN signals. *Id.* at 128:22-129:3. Patent Owner reads Hunter too narrowly. For example, Hunter teaches the following:

> In the illustrated embodiment, the bus comprises a 10Base-T bus. A 10Base-T bus conventionally comprises two twisted-pair conductors 240, 250, each used for uni-directional transmission of data. Thus, in this embodiment, one of the twisted pairs

> (say, 250) is employed for transmitting data from the equipment 260, while the other of the twisted-pairs (say, 240) is used for receiving data into the equipment 260. <u>The present invention preferably employs each of the twisted-pair conductors as a rail by which to deliver DC power to the equipment 260</u>.

Ex. 1003, 37:19-28 (emphases added). In other words, Hunter teaches *generally* that the 10Base-T Ethernet bus can deliver DC power over the same two twisted pair conductors used to transmit data. *Id.* at 21:22-29, 37:19-28. We, therefore, do not read Hunter as teaching that the 10Base-T Ethernet bus can only carry DC power with ISDN signals. Rather, as discussed above, Hunter indicates that isoEthernet and ISDN are just <u>alternatives</u> to a preferred embodiment that uses 10Base-T Ethernet. Ex. 1003, 21:17-21 ("also compatible with . . . isoEthernet®"); *id.* at 26:3-11 ("also compatible with . . . isoEthernet®"); *id.* at 39:15-16 ("compatible with ISDN standards").

Patent Owner also responds that Petitioner does not show sufficiently that Hunter teaches providing phantom power to Ethernet terminal equipment. PO Resp. 35-40. Patent Owner contends that the Integrated Services Terminal Equipment ("ISTE") device in Figure 2 of Hunter (which Petitioner identifies as terminal equipment (Pet. 25)) is just an intermediate hub. PO Resp. 35-36. Patent Owner alleges that the only terminal equipment in Figure 2 of Hunter is voice instrument 299. *Id.* at 36. According to Patent Owner, when Figures 1 and 2 of Hunter are considered together, those figures "show phantom-power being delivered from a multimedia Hub ('120' in

Hunter's Figure 1) through multiple connectors (each labelled '297' in Hunter's Figure 2) to an intermediate Hub ('150' in Hunter's Figure 1)." *Id.* at 38 (citing Ex. 2038 ¶ 245). Patent Owner concludes that "Hunter's phantom-power circuit does not connect to the phones ('end devices'), which are connected to the intermediate Hub through separate connectors (each labelled '298' in Hunter's Figure 2)." PO Resp. 38.

Patent Owner's argument is not persuasive.[8] Patent Owner's argument focuses on the specific configuration shown in Figure 2 of Hunter. PO Resp. 35-40. But, as Petitioner explains in the Petition, Hunter is not limited to the configuration shown in Figure 2. Pet. 26-27, 36. Hunter teaches <u>generally</u> supplying phantom power to network equipment. Ex. 1003, 19:2-8 ("it is a primary object of the present invention to provide power subsystems for providing either phantom or third pair power to equipment coupled to a local area network"). For example, Hunter teaches that phantom power and data are delivered to network equipment using the two twisted pair conductors of the 10Base-T Ethernet bus (*id.* at 21:22-29), and that "[i]n an overall LAN, <u>many pieces of equipment</u>, each with its own third and fourth transformers, can take power as well as data from the bus" (*id.* at 21:11-13 (emphasis added)). Thus, regardless of the specific configuration shown in Figure 2, Hunter teaches providing phantom power to Ethernet terminal equipment. Ex. 1002 ¶ 111.

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[8] We note that claim 1 does not recite Ethernet terminal equipment. *See* Ex. 1001, 17:13-23. We address Patent Owner's argument anyway, though, to the extent it is applicable to the "end device" recited in claim 26. *Id.* at 18:66-19:2.

In addition, even if Hunter is limited to the configuration shown in Figure 2, Hunter still teaches providing phantom power to Ethernet terminal equipment. Specifically, as discussed above, Hunter teaches that equipment 260 in Figure 2 of Hunter is an Integrated Services Terminal Equipment ("ISTE") device. Ex. 1003, 23:18-20, 39:14-15, Fig. 2. The fact that the "TE" in ISTE device stands for "Terminal Equipment" indicates by itself that equipment 260 is terminal equipment. *Id.* In addition, Patent Owner proposed in the Preliminary Response that the term "Ethernet terminal equipment" be construed to mean a "device at which data transmission can originate or terminate and that is capable of Ethernet communication."[9] Prelim. Resp. 13. Consistent with that construction, the evidence of record indicates that Ethernet data transmissions can originate and terminate at the ISTE device in Hunter.[10] Pet. 36; Ex. 1002 ¶ 111; Ex. 1003, 37:19-28, 39:14-16. Further, Hunter teaches delivering phantom power to equipment 260 in Figure 2 over the same two twisted pair conductors 240, 250 of the 10Base-T Ethernet bus used to transmit data to equipment 260. Ex. 1003, 37:19-28, Fig. 2.

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[9] Patent Owner does not propose a specific construction of the term "Ethernet terminal equipment" in the Response. *See* PO Resp. 12-13, 35-40. Nonetheless, Patent Owner's proposed construction in the Preliminary Response is consistent with Petitioner's proposed construction in the Petition (Pet. 36 ("because it originates and terminates Ethernet data transmissions")) and the District Court's construction (Ex. 2018, 13).

[10] Hunter indicates that the ISTE device is compatible with ISDN standards, but Hunter does not indicate that the ISTE device is limited to ISDN standards. Ex. 1003, 23:18-24.

Moreover, even if Patent Owner were correct that voice instrument 299 is the only terminal equipment in Figure 2 of Hunter, Patent Owner's argument is not persuasive. Hunter teaches that the phantom power and data transmitted over the 10Base-T Ethernet bus is supplied to both equipment 260 *and* voice instrument 299. Pet. Reply 20; Ex. 1003, 38:25-27 ("A voice instrument 299 is therefore couplable to the equipment 260 and receives both data and power therefrom.").

Claim 1 recites "the central piece of network equipment to detect different magnitudes of DC current flow via at least one of the contacts of the first and second pairs of contacts." Ex. 1001, 17:17-19. Bulan teaches a current control apparatus that detects whether DC current flow in a path exceeds static and dynamic current limits, and, if so, switches a high impedance into the path. Pet. 11, 17-19, 29-31; Ex. 1004, 3:5-21, 4:35-40, 6:34-43. Bulan also teaches that, if the high impedance reduces the DC current flow to a trickle and then zero, the current control apparatus detects a normal start up event for a DC-to-DC converter, whereas, if the high impedance only reduces the DC current flow to a trickle, the current control apparatus detects an operational fault. Pet. 11-12, 20-21, 31-32; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58. By combining the current control apparatus of Bulan with the central piece of network equipment of Hunter, as Petitioner proposes (*see infra* Section II.C.12), the current control apparatus of Bulan detects the aforementioned different magnitudes of DC current flow via at least one of the contacts of the first and second pairs of the 10Base-T Ethernet bus of Hunter. Pet. 15-16, 29-30; Ex. 1002 ¶ 75. Other than the arguments discussed above, Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 1.

Claim 1 recites "the central piece of network equipment . . . to control application of at least one electrical condition to at least one of the contacts of the first and second pairs of contacts in response to at least one of the magnitudes of the DC current flow." Ex. 1001, 17:17-23. Bulan teaches that, in response to detecting DC current flow that exceeds static and dynamic current limits, the current control apparatus applies an electrical condition by switching a high impedance into the path. Pet. 11, 17-19, 32; Ex. 1004, 3:5-21, 4:35-40, 6:34-43. Bulan also teaches that, if the high impedance reduces the DC current flow to a trickle and then zero, the current control apparatus detects a normal start up event for a DC-to-DC converter and applies an electrical condition by switching the high impedance out of the path. Pet. 11-12, 20-21, 32-33; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58. By combining the current control apparatus of Bulan with the central piece of network equipment of Hunter, as Petitioner proposes (*see infra* Section II.C.12), the current control apparatus of Bulan applies the aforementioned electrical conditions to at least one of the contacts of the first and second pairs of the 10Base-T Ethernet bus of Hunter. Pet. 15-16, 29-30; Ex. 1002 ¶ 75. Other than the arguments discussed above, Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 1.

3. Claim 2

Claim 2 depends from claim 1, and recites "wherein the different magnitudes of DC current flow are part of a detection protocol." Ex. 1001, 17:24-26. Bulan teaches that the current control apparatus detects whether DC current flow in a path exceeds static and dynamic current limits, and, if so, switches a high impedance into the path. Pet. 11, 17-19, 29-31, 33; Ex. 1002 ¶ 104; Ex. 1004, 3:5-21, 4:35-40, 6:34-43. Bulan also teaches that, if the high impedance reduces the DC current flow to a trickle and then zero, the current control apparatus detects a normal start up event, whereas, if the high impedance only reduces the DC current flow to a trickle, the current control apparatus detects an operational fault. Pet. 11-12, 20-21, 31-33; Ex. 1002 ¶ 104; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58.

Patent Owner responds that Petitioner "do[es] not identify any mutually agreed upon protocol, and do[es] not explain how Bulan and the TE are communicating using such a protocol." PO Resp. 43 (citing Pet. 33; Ex. 2038 ¶¶ 255-256). Patent Owner's argument is not persuasive. Patent Owner's argument is premised on its proposed construction of the term "protocol," which we do not adopt. *See supra* Section II.B.2. Specifically, as discussed above, we determine that the term "protocol" is <u>not</u> limited to a mutually agreed upon method of communication. *See id.* Patent Owner does not provide any other specific reason why the aforementioned teachings of Bulan would not have been considered a detection protocol. *See* PO Resp. 43.

4. Claim 7

Claim 7 depends from claim 1, and recites "wherein the central piece of network equipment to provide at least one DC current via at least one of the contacts of the first and second pairs of contacts and to detect distinguishing information within the DC current via the at least one of the contacts of the first and second pairs of contacts." Ex. 1001, 17:45-50. Hunter teaches that the central piece of network equipment provides DC current via the two twisted pair conductors of the 10Base-T Ethernet bus. Pet. 34; Ex. 1003, 37:19-28, Fig. 2. Bulan teaches that the current control apparatus detects distinguishing information within the DC current, such as whether the terminal equipment is experiencing an overcurrent condition, and, if so, whether the overcurrent condition is due to a normal start up event or an operational fault. Pet. 11-12, 17-21, 29-32, 34-36; Ex. 1004, 3:5-25, 4:35-40, 4:62-5:1, 6:34-58. Other than the arguments discussed previously with respect to claim 1, Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 7.

5. Claims 26 and 29

Claim 26 depends from claim 1, and recites "wherein the central piece of network equipment to distinguish one end device from at least one other end device based on at least one of the magnitudes of the DC current flow." Ex. 1001, 18:66-19:2. Claim 29 depends from claim 1, and recites a similar limitation. *Id.* at 19:9-12. Bulan teaches that the current control apparatus determines whether DC current flow exceeds static and dynamic current limits, and, thus, distinguishes one end device that is experiencing an overcurrent condition from other end devices that are not experiencing an overcurrent condition. Pet. 11, 17-19, 29-31, 36-37; Ex. 1002 ¶ 113; Ex. 1004, 3:5-21, 4:35-40, 6:34-43. Bulan also teaches that the current control apparatus detects whether an end device is experiencing a normal start up event or an operational fault, thereby distinguishing different end devices that are experiencing different types of overcurrent conditions. Pet. 11-12, 20-21, 31-32, 37; Ex. 1002 ¶ 114; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58. Further, Bulan teaches that the current control apparatus observes an iterative pattern that is unique to a particular end device, and, thus, distinguishes that end device from other end devices. Pet. 37; Ex. 1002 ¶ 115; Ex. 1004, 7:7-13.

Patent Owner responds that, when the current control apparatus in Bulan detects an overcurrent condition, it does not know whether the condition occurred in an end device or any other network object. PO Resp. 44-45. According to Patent Owner, the current control apparatus in Bulan at most "can determine only that the 'overcurrent condition' arose from some fault . . . <u>somewhere in the extended circuit</u> leading from the Bulan hub to the ISTE card and back to the Bulan hub." *Id.* at 45 (citing Ex. 1004, Abstract, 3:13-21, 4:33-42, 6:36-47; Ex. 2038 ¶¶ 259-260).

Patent Owner's argument is not persuasive. Hunter teaches that the central piece of network equipment can include a separate current protection circuit for each piece of terminal equipment. Pet. Reply 25-26; Ex. 1003, 42:21-23; Ex. 1046 ¶ 87. Further, as discussed above, Bulan teaches that the current control apparatus observes an iterative pattern that is "peculiar to the particular terminal equipment being connected to the line." Ex. 1004, 7:7-13 (emphasis added). Thus, in the proposed combination of Hunter and Bulan, the central piece of network equipment includes a separate current control apparatus that detects an overcurrent condition for each piece of terminal equipment, thereby allowing the central piece of network equipment to distinguish one end device from other end devices. Ex. 1046 ¶ 87. Further, regardless of whether the overcurrent condition arose in an end device or somewhere else in the circuit, the fact that an end device is experiencing an overcurrent condition distinguishes it from other end devices that are not. Pet. Reply 26; Ex. 1046 ¶ 88.

6. Claim 38

Claim 38 depends from claim 1, and recites "wherein the central piece of network equipment comprises at least one DC supply." Ex. 1001, 19:42-44. Hunter teaches that the central piece of network equipment includes a DC supply. Pet. 38; Ex. 1003, 35:27-36:1, 52:1-2, Fig. 2. Other than the arguments discussed previously with respect to claim 1, Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 38.

7. Claim 39

Claim 39 depends from claim 38, and recites "wherein the at least one DC supply to provide at least one DC power signal." Ex. 1001, 19:45-47. Hunter teaches that the DC supply in the central piece of network equipment delivers a DC power signal. Pet. 38; Ex. 1003, 37:19-28. Other than the arguments discussed previously with respect to claim 1, Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 39.

8. Claim 40

Claim 40 depends from claim 39, and recites "wherein the central piece of network equipment to control the application of the at least one DC power signal." Ex. 1001, 19:48-50. Bulan teaches that the current control apparatus controls the application of the DC power signal by switching a high impedance into and out of the path. Pet. 11, 17-21, 29-33, 39; Ex. 1004, 3:5-25, 4:35-40, 4:62-5:1, 6:34-58. Other than the arguments discussed previously with respect to claim 1, Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 40.

9. Claim 47

Claim 47 depends from claim 1, and recites "wherein the at least one electrical condition comprises at least one voltage condition." Ex. 1001, 20:7-9. Bulan teaches that the current control apparatus applies a voltage condition by switching a high impedance into and out of the path. Pet. 11, 17-21, 29-33, 39-40; Ex. 1004, 3:5-25, 4:35-40, 4:62-5:1, 6:34-58. Other than the arguments discussed previously with respect to claim 1, Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 47.

10. Claim 55

Claim 55 depends from claim 1, and recites "wherein the different magnitudes of DC current flow comprise a first magnitude followed by a second magnitude." Ex. 1001, 20:31-33. Bulan teaches that the magnitude of DC current flow comprises a first magnitude when a device is plugged in and the DC current flow rises from zero to a static limit and then a dynamic limit. Pet. 11, 17-19, 29-31, 40; Ex. 1004, 3:5-21, 4:35-40, 6:34-43. Bulan also teaches that the first magnitude is followed by a second magnitude when a high impedance is switched into the path causing the DC current flow to drop to a trickle or zero. Pet. 11-12, 20-21, 29-32, 40; Ex. 1004, 3:22-25, 4:62-5:1, 6:43-58. Other than the arguments discussed previously with respect to claim 1, Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 55.

11. Claim 69

Claim 69 depends from claim 1, and recites "wherein the at least one magnitude of DC current flow is used by the central piece of network equipment to control application of at least one DC power signal." Ex. 1001, 21:15-18. Bulan teaches that, in response to the magnitude of DC current flow, the current control apparatus controls the application of the DC power signal by switching a high impedance into and out of the path. Pet. 11, 17-21, 29-33, 41; Ex. 1004, 3:5-25, 4:35-40, 4:62-5:1, 6:34-58. Other than the arguments discussed previously with respect to claim 1, Patent Owner does not dispute that the combination of Hunter and Bulan teaches the above limitation of claim 69.

12. Reasons for Combining Hunter and Bulan

Petitioner argues that a person of ordinary skill in the art would have had a reason to combine the cited teachings of Hunter and Bulan. Pet. 9-16. We agree with and adopt Petitioner's reasoning. Specifically, a person of ordinary skill in the art would have substituted the typical current protection circuit in Hunter with the improved current protection circuit in Bulan. *Id.* at 15-16. Hunter and Bulan relate to the same field of endeavor, which is powering network terminal equipment. *Id.* at 9; Ex. 1003, Abstract; Ex. 1004, Abstract. Further, Bulan teaches that typical current protection circuits are inadequate because they cannot distinguish between a normal power up event for a DC-to-DC converter and an operational fault. Pet. 10; Ex. 1004, 1:26-31, 1:52-2:8. As a result, a typical current protection circuit may stop current from flowing during a normal power up event and prevent network equipment from starting properly, or may allow current to flow during an operational fault and jeopardize network equipment. Pet. 10-11; Ex. 1002 ¶ 67; Ex. 1004, 1:65-2:8.

Hunter includes a typical current protection circuit that is a simple thermistor or polyfuse, and, thus, would have suffered from the deficiency identified in Bulan. Pet. 11; Ex. 1002 ¶ 68; Ex. 1003, 38:12-19. A person of ordinary skill in the art would have substituted the current protection circuit in Hunter with the current protection circuit in Bulan because a person of ordinary skill in the art would have recognized that "the Bulan current control apparatus would be a superior alternative to Hunter's existing protective device." Pet. 12; Ex. 1002 ¶¶ 70-

71. Further, this substitution would have been a straightforward task with a reasonable expectation of success. Pet. 13-15; Ex. 1002 ¶¶ 72-74.

Patent Owner responds that a person of ordinary skill in the art would not have had a reason to combine the cited teachings of Hunter and Bulan. PO Resp. 13. The crux of Patent Owner's argument is that a person of ordinary skill in the art would not have had a reason to use phantom power for Ethernet terminal equipment. *Id.* at 13-26. However, as Patent Owner acknowledged at the oral hearing, the basis for Petitioner's proposed combination of Hunter and Bulan does not relate to using phantom power for Ethernet terminal equipment. Tr. 157:19-158:12. We explain in detail above that Hunter alone teaches using phantom power for Ethernet terminal equipment. *See supra* Section II.C.2. The proposed combination of Hunter and Bulan instead relates to substituting the current protection circuit in Hunter with the improved current protection circuit in Bulan. Pet. 9-16. Thus, any alleged issues with using phantom power for Ethernet terminal equipment are not pertinent to the question of whether a person of ordinary skill in the art would have had a reason to combine the cited teachings of Hunter and Bulan in the manner proposed by Petitioner. As such, Patent Owner's argument is not persuasive. Nonetheless, we address each of Patent Owner's specific contentions in detail below, and we find that they also are not persuasive for additional reasons.

First, Patent Owner argues that the invention of the '838 patent is "directed to equipment networked over 'pre-existing wiring or cables that connect pieces of networked computer equipment to a network.'" PO

Resp. 13 (citing Pet. 3; Ex. 1002 ¶ 45) (emphasis added). According to Patent Owner, at the time of the ’838 patent, a pre-existing Ethernet network would have contained billions of nodes that “commonly” included Bob Smith terminations and common mode chokes. PO Resp. 13-14 (citing Ex. 2038 ¶ 42; Ex. 2039, 43:20-44:2, 45:6-8, 193:6, 195:3-196:3). Patent Owner contends that supplying phantom power to Ethernet terminal equipment in a pre-existing Ethernet network “would have burned out the existing Bob Smith terminations” and “would saturate the common mode chokes.” PO Resp. 14-16 (citing Ex. 2038 ¶¶ 45-47).

Patent Owner’s argument depends on the premise that the invention of the ’838 patent is limited to equipment networked over pre-existing wiring or cables. PO Resp. 13-16. The specification and claims of the ’838 patent, however, do not support that premise. The specification of the ’838 patent states that “[t]his invention is <u>particularly adapted</u> to be used with an <u>existing</u> Ethernet communications link.” Ex. 1001, 3:40-42 (emphases added). This portion of the ’838 patent indicates that the system of the ’838 patent, while particularly suited for use with an existing Ethernet network, is not limited to such a use. *Id.* Further, the challenged claims of the ’838 patent do not require a pre-existing Ethernet network or pre-existing wiring or cables.[11] Tr. 107:18-111:6.

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[11] At the oral hearing, Patent Owner argued that the ’838 patent describes transmitting a low DC current, which, according to Patent Owner, would not have damaged Bob Smith terminations or common mode chokes. Tr. 111:7-22. Patent Owner, however, acknowledged that the challenged claims do not recite a limit on the magnitude of the DC current flow. *Id.* at 130:20-131:15.

We also note that Patent Owner does not direct us to specific evidence indicating that the teachings of Hunter or Bulan are limited to Ethernet equipment networked over pre-existing wiring or cables. *See* PO Resp. 13-16. And Patent Owner acknowledged at the oral hearing that applying phantom power to "new" Ethernet terminal equipment would not have caused any problems with Bob Smith terminations or common mode chokes. Tr. 135:1-12. Thus, any alleged issues with Bob Smith terminations or common node chokes in a pre-existing Ethernet network are not pertinent to the question of whether a person of ordinary skill in the art would have had a reason to combine the cited teachings of Hunter and Bulan.

Moreover, even if we accepted Patent Owner's premise, Patent Owner's argument still is not persuasive. Patent Owner and Patent Owner's declarant, Dr. Madisetti, acknowledged that not all pre-existing Ethernet networks included Bob Smith terminations or common mode chokes.[12] Tr. 115:19-116:3, 150:16-151:8; Ex. 1020, 55:19-56:2, 80:16-23. Further, Petitioner's declarant, Mr. Ian Crayford, explains that, even for those pre-existing Ethernet networks that did include Bob Smith terminations and/or common mode chokes, it would have been within the knowledge and capabilities of a person of ordinary skill in the art to implement phantom power without damaging the Bob Smith terminations or common mode chokes,

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12 For example, as Petitioner explains (Pet. Reply 3-4), Bob Smith terminations and common mode chokes were used to satisfy electromagnetic emissions standards (Ex. 1046 ¶ 13), but those emissions standards also could have been satisfied without using Bob Smith terminations and common mode chokes (*id.* ¶¶ 18-21).

such as by incorporating a blocking capacitor. Pet. Reply 5; Ex. 1046 ¶¶ 22-26.

Second, Patent Owner argues that a person of ordinary skill in the art seeking to supply operating power to Ethernet terminal equipment would have supplied that operating power over the unused lines in an Ethernet connection, rather than over the same lines used to transmit data. PO Resp. 16-20. Patent Owner alleges that a standard 10Base-T Ethernet network used eight lines, with four of the lines used to transmit data and the other four lines left unused. *Id.* at 18-19 (citing Pet. 49-50; Ex. 2038 ¶ 53). According to Patent Owner, a person of ordinary skill would have provided operating power to Ethernet terminal equipment over the unused lines to avoid interference with the data signals. PO Resp. 17 (citing Ex. 1003, 19:20-22; Ex. 2038 ¶¶ 48-50; Ex. 2039, 138:16-139:11).

Patent Owner's argument is not persuasive. Hunter teaches a 10Base-T Ethernet bus that includes only two twisted pair conductors, both of which are used to transmit data. Ex. 1003, 37:19-28. Thus, contrary to Patent Owner's argument, the 10Base-T Ethernet bus in Hunter does not include any unused lines. *Id.* Further, Hunter teaches delivering DC power over the same lines of the 10Base-T Ethernet bus used to transmit data (*see supra* Section II.C.2) because it "has the advantage of not requiring the installation of a dedicated power cable" (Ex. 1003, 17:13-26). Hunter even addresses Patent Owner's alleged concerns about interference by explaining that "a careful phantom power scheme must be implemented to avoid problems that may arise due to interactions between the power and the data . . . ." *Id.* Thus, although alternative ways of providing operating power to Ethernet terminal equipment may have existed (PO Resp. 19-20), that does not detract from the express teachings of Hunter. *See In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) ("[J]ust because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes."); *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004).

Third, Patent Owner argues that "[a]t the time of the invention, and for several years afterward, experts in the field were skeptical that operating power could be delivered to terminal equipment using the Ethernet data pairs . . . without disrupting the data propagation." PO Resp. 21 (citing Ex. 2038 ¶ 56). Specifically, Patent Owner relies on evidence relating to meetings of an IEEE committee. PO Resp. 21-25. In particular, Patent Owner explains that certain members of the committee identified the advantages of supplying power over unused lines (*id.* at 21-23 (citing Ex. 2040, 2-3; Ex. 2044, 3; Ex. 2048)), and identified the technical issues with supplying power over the data lines (PO Resp. 23 (citing Ex. 2044, 2)). Patent Owner also explains that at a meeting in March 2000, "no one brought a motion seeking to apply power to the data-carrying pairs," (PO Resp. 22 (citing Ex. 2041, 3) (emphasis omitted)), and that it was only in July 2000, after 250 hours of investigation, that the committee "believed that putting power on the data pairs was technically feasible without affecting the propagation of Ethernet data" (PO Resp. 24-25 (citing Ex. 2045, 1, 3; Ex. 2046, 2)).

Patent Owner's argument is not persuasive. The evidence cited by Patent Owner relates to whether certain IEEE committee members believed that phantom power should be adopted as an Ethernet standard, not whether phantom power would work in an Ethernet network. PO Resp. 21-25; Ex. 2041, 3. Further, although Patent Owner's evidence indicates that some IEEE committee members were in favor of adopting an Ethernet standard in which operating power was delivered over unused lines, Petitioner identifies evidence indicating that other committee members were in favor of using phantom power as the Ethernet standard. Pet. Reply 9-10; Ex. 1037, 3 ("Current will be injected via the center taps using a Phantom Power method on the TX and RX pairs."); Ex. 1040, 3 ("Power over signal pairs allows easier integration of discovery & power control circuitry onto the PHY."); Ex. 1046 ¶¶ 38-44. In any event, the fact that an alternative way of providing operating power to Ethernet terminal equipment existed and was considered for an IEEE standard does not detract from the express teachings of Hunter. *See Mouttet*, 686 F.3d at 1334; *Fulton*, 391 F.3d at 1200. Moreover, we note that even if Patent Owner's evidence indicates some amount of skepticism, we determine that it does not outweigh the strong evidence of obviousness presented by Petitioner and discussed in this Decision. *See In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litigation*, 676 F.3d 1063, 1079 (Fed. Cir. 2012).

Fourth, Patent Owner argues that Petitioner does not show sufficiently "that Hunter had the 'problem' that the complex Bulan circuit allegedly solves." PO Resp. 29. More specifically, Patent Owner contends that the central piece of network equipment in Hunter does not need to be able to determine whether an overcurrent condition is due to a normal power up event or an operational fault. *Id.* Further, according to Patent Owner, Hunter teaches using a simpler thermistor or polyfuse (*id.* at 29-30 (citing Ex. 1003, 40:19-20)), and a person of ordinary skill in the art would have been able to select the correct thermistor for a given circuit in order to prevent the thermistor from blocking the necessary start up current (PO Resp. 30-31 (citing Ex. 2038 ¶¶ 84-85)).

Patent Owner's argument is not persuasive. Hunter itself does not have to identify the problem that would have motivated a person of ordinary skill in the art to combine the cited teachings of Hunter and Bulan. *See KSR*, 550 U.S. at 417. Rather, "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." *Id.* As discussed above, Bulan explains that a typical current protection circuit with just a single threshold value, such as the one taught by Hunter, cannot distinguish between a normal power up event for a DC-to-DC converter and an operational fault. Pet. 10; Ex. 1002 ¶¶ 67-68; Ex. 1004, 1:65-2:8; Tr. 13:3-15. Because the Ethernet terminal equipment in Hunter includes a DC-to-DC converter, the current protection circuit in Hunter would have suffered from the same problem described in Bulan. Pet. 12; Ex. 1002 ¶ 70; Ex. 1003, 39:5-8. As a result, even if Hunter does not require the more advanced current protection circuit taught by Bulan, a person of ordinary skill in the art would have recognized it as an improvement. Pet. 11-12; Ex. 1002 ¶¶ 70-71. Further, even if Bulan's current protection circuit was more complex than Hunter's simple thermistor or polyfuse, that alone does not negate the identified reason for combining the teachings of Hunter and Bulan. *See Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) ("The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another.").

13. Summary

For the reasons discussed above, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 would have been obvious over Hunter and Bulan.

D. Obviousness of Claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 Over Bloch, IEEE 802.3-1993, and IEEE 802.3-1995, and Over Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995

Petitioner argues that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 would have been obvious over Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995. Pet. 6. In the Decision on Institution, we explained that Petitioner demonstrated a reasonable likelihood of prevailing in showing that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 would have been obvious over Bloch, IEEE 802.3-1993, and IEEE 802.3-1995, even without Huizinga. Dec. on Inst. 13-14. Therefore, we instituted an *inter partes* review on the grounds that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 would have been obvious over Bloch, IEEE 802.3-1993, and IEEE 802.3-1995, *and* over Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995. *Id.* at 17-18.

We have considered the parties' arguments and supporting evidence, and we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 would have been obvious over Bloch, IEEE 802.3-1993, and IEEE 802.3-1995, and over Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995.

1. Overview of Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995

Bloch describes a system that comprises a control unit and a terminal connected by two communication channels with each communication channel having two conductors. Ex. 1005, Abstract. According to Bloch, "[p]ower feed and bi-directional signaling are accomplished simultaneously over the same four conductors used for the two communication channels without interference." *Id.* Although Bloch describes this phantom power circuit in the context of a key telephone system, Bloch explains that it "can find application in many different control unit/terminal applications." *Id.* at 4:49-52.

Bloch explains that the control unit detects DC current pulses applied to the conductors when the terminal switches a resistor into and out of the path. *Id.* at 5:44-55. The DC current pulses detected by the control unit provide information regarding the status of different elements of the terminal. *Id.* at 5:56-6:2. In response to the detected DC current pulses, the control unit applies voltage pulses to the conductors to control indicators in the terminal. *Id.* at 10:34-40, 11:1-5.

Huizinga also describes a key telephone system. Ex. 1009, 1:6-9. Huizinga explains that, when a user presses a button to select a telephone line, the terminal sends status information to the control unit. *Id.* at 5:29-39. In response, the control unit sends data to the terminal causing a lamp associated with the selected telephone line to light up. *Id.*

IEEE 802.3-1993 and IEEE 802.3-1995 describe a 10Base-T Ethernet network. Ex. 1006, 243; Ex. 1007, 23. In particular, IEEE 802.3-1993 and IEEE 802.3-1995 describe central network equipment, such as a 10Base-T repeater, and terminal equipment. Ex. 1006, 243, 267; Ex. 1007, 27; Ex. 1008, 303-304. IEEE 802.3-1993 and IEEE 802.3-1995 further describe an Ethernet connector comprising one pair of contacts (TD+ and TD-) used to transmit 10Base-T Ethernet communication signals and a second pair of contacts (RD+ and RD-) used to receive 10Base-T Ethernet communication signals. Ex. 1006, 266-267; Ex. 1007, 147-148.

2. Claim 1

Claim 1 recites "[a] central piece of network equipment." Ex. 1001, 17:13. IEEE 802.3-1993 and IEEE 802.3-1995 teach a central piece of Base-T Ethernet equipment. Pet. 54-55; Ex. 1006, 243, 267; Ex. 1007, 27; Ex. 1008, 303-304. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 1.

Claim 1 recites "at least one Ethernet connector comprising first and second pairs of contacts used to carry BaseT Ethernet communication signals." Ex. 1001, 17:14-16. IEEE 802.3-1993 and IEEE 802.3-1995 teach an Ethernet connector comprising one pair of contacts (TD+ and TD-) used to transmit 10Base-T Ethernet communication signals and a second pair of contacts (RD+ and RD-) used to receive 10Base-T Ethernet communication signals. Pet. 55-56; Ex. 1006, 266-267; Ex. 1007, 147-148. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 1.

Claim 1 recites "the central piece of network equipment to detect different magnitudes of DC current flow via at least one of the contacts of the first and second pairs of contacts." Ex. 1001, 17:17-19. Bloch teaches a control unit that detects DC current pulses applied to conductors by a terminal that switches a resistor into and out of the path. Pet. 56-57; Ex. 1005, 5:44-6:2, 9:6-15. By combining the circuit of Bloch with the central piece of network equipment of IEEE 802.3-1993 and IEEE 802.3-1995, as Petitioner proposes (*see infra* Section II.D.12), the control unit of Bloch detects the aforementioned DC current pulses via at least one of the contacts of the first and second pairs of the 10Base-T Ethernet connector of IEEE 802.3-1993 and IEEE 802.3-1995. Pet. 51-52; Ex. 1002 ¶¶ 144-146. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 1.

Claim 1 recites "the central piece of network equipment . . . to control application of at least one electrical condition to at least one of the contacts of the first and second pairs of contacts in response to at least one of the magnitudes of the DC current flow." Ex. 1001, 17:17-23. Bloch teaches that, in response to the detected DC current pulses, the control unit applies voltage pulses to the conductors to control indicators in the terminal. Pet. 57-58; Ex. 1005, 10:34-55, 10:66-11:10. By combining the circuit of Bloch with the central piece of network equipment of IEEE 802.3-1993 and IEEE 802.3-1995, as Petitioner proposes (*see infra* Section II.D.12), the control unit of Bloch applies the aforementioned voltage pulses to at least one of the contacts of the first and second pairs of the 10Base-T Ethernet connector of IEEE 802.3-1993 and IEEE 802.3-1995. Pet. 51-52; Ex. 1002 ¶¶ 144-146. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 1.[13]

3. Claim 2

Claim 2 depends from claim 1, and recites "wherein the different magnitudes of DC current flow are part of a detection protocol." Ex. 1001, 17:24-26. Bloch teaches that the DC current pulses detected by the control unit provide information regarding the status of different elements of the terminal. Pet. 59-60; Ex. 1005, 5:62-6:2, 10:3-12, 10:34-40. 11:37-42.

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[13] Although not necessary to our ultimate determination, we note that Huizinga teaches that the indicators in the terminal can be lamps that illuminate for different telephone lines. Pet. 59; Ex. 1009, 4:26-30, 5:29-39. Patent Owner does not dispute that the combination of Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the limitations of claim 1.

Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 2.

4. Claim 7

Claim 7 depends from claim 1, and recites "wherein the central piece of network equipment to provide at least one DC current via at least one of the contacts of the first and second pairs of contacts and to detect distinguishing information within the DC current via the at least one of the contacts of the first and second pairs of contacts." Ex. 1001, 17:45-50. Bloch teaches that the control unit supplies DC current to the terminal over the two pairs of conductors. Pet. 60; Ex. 1005, 4:14-18, 6:2-10, Fig. 1. Bloch also teaches that the control unit detects DC current pulses that provide distinguishing information regarding the status of different elements of the terminal. Pet. 60; Ex. 1005, 5:61-6:2. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 7.[14]

5. Claims 26 and 29

Claim 26 depends from claim 1, and recites "wherein the central piece of network equipment to distinguish one end device from at least one other

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[14] Although not necessary to our ultimate determination, we note that Huizinga teaches that the status information from the terminal is used by the control unit to determine which telephone station is using a particular telephone line. Pet. 61; Ex. 1009, 5:29-39. Patent Owner does not dispute that the combination of Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 7.

end device based on at least one of the magnitudes of the DC current flow." Ex. 1001, 18:66-19:2. Claim 29 depends from claim 1, and recites a similar limitation. *Id.* at 19:9-12. Bloch teaches that the control unit detects DC current pulses that provide distinguishing information regarding the status of different elements of the terminal. Pet. 60-61; Ex. 1005, 5:61-6:2. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claims 26 and 29.

6. Claim 38

Claim 38 depends from claim 1, and recites "wherein the central piece of network equipment comprises at least one DC supply." Ex. 1001, 19:42-44. Bloch teaches that the control unit includes a DC supply. Pet. 62; Ex. 1005, 4:14-18, 6:2-10, Fig. 1. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 38.

7. Claim 39

Claim 39 depends from claim 38, and recites "wherein the at least one DC supply to provide at least one DC power signal." Ex. 1001, 19:45-47. Bloch teaches that the DC supply provides a DC power signal. Pet. 62; Ex. 1005, 4:14-18, 6:2-10, Fig. 1. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 39.

8. Claim 40

Claim 40 depends from claim 39, and recites "wherein the central piece of network equipment to control the application of the at least one DC power signal." Ex. 1001, 19:48-50. Bloch teaches that the control unit controls the application of the DC power signal to the terminal. Pet. 62; Ex. 1005, 4:14-18, 6:2-10, Fig. 1. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 40.

9. Claim 47

Claim 47 depends from claim 1, and recites "wherein the at least one electrical condition comprises at least one voltage condition." Ex. 1001, 20:7-9. Bloch teaches that the control unit applies voltage pulses to the conductors to control indicators in the terminal. Pet. 62-63; Ex. 1005, 10:34-55, 10:66-11:10. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 47.[15]

10. Claim 55

Claim 55 depends from claim 1, and recites "wherein the different magnitudes of DC current flow comprise a first magnitude followed by a second magnitude." Ex. 1001, 20:31-33. Bloch teaches that the DC current pulses detected by the control unit can be a zero (*i.e.*, low) magnitude followed by a one (*i.e.*, high) magnitude. Pet. 63-64; Ex. 1002 ¶¶ 170-171; Ex. 1005, Fig. 7B. Patent Owner does not

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[15] Although not necessary to our ultimate determination, we note that Huizinga teaches that the indicators in the terminal can be lamps that illuminate for different telephone lines. Pet. 62-63; Ex. 1009, 4:26-30, 5:29-39. Patent Owner does not dispute that the combination of Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 47.

dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 55.

11. Claim 69

Claim 69 depends from claim 1, and recites "wherein the at least one magnitude of DC current flow is used by the central piece of network equipment to control application of at least one DC power signal." Ex. 1001, 21:15-18. Bloch teaches that, in response to the DC current pulses applied by the terminal, the control unit controls the application of the DC power signal to the conductors to control indicators in the terminal. Pet. 64; Ex. 1005, 6:62-7:2, 10:34-55. Patent Owner does not dispute that the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 69.[16]

12. Reasons for Combining Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995

Petitioner argues that a person of ordinary skill in the art would have had a reason to combine the cited teachings of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995. Pet. 53-54. We agree with and adopt Petitioner's reasoning. Bloch describes a phantom power circuit in the context of a key telephone system, but explains that it "can find application in

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[16] Although not necessary to our ultimate determination, we note that Huizinga teaches that the indicators in the terminal can be lamps that illuminate for different telephone lines. Pet. 64; Ex. 1009, 4:26-30, 5:29-39. Patent Owner does not dispute that the combination of Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995 teaches the above limitation of claim 69.

many different control unit/terminal applications." *Id.* at 43; Ex. 1005, 4:49-52. Specifically, a person of ordinary skill in the art would have combined the circuit of Bloch with the 10Base-T Ethernet network of IEEE 802.3-1993 and IEEE 802.3-1995 to achieve the "benefit of supplying power over the same wires used for the Ethernet communication channel." Pet. 53; Ex. 1002 ¶ 148. This combination would have "eliminate[d] the need to provide a local power supply or separate conductors and connectors for powering the DTE device," and would have allowed devices to "communicate and provide status and control information even when they are not operating normally and the communication channel is not in use." Pet. 53-54; Ex. 1002 ¶ 148.

Patent Owner responds that a person of ordinary skill in the art would not have had a reason to combine the cited teachings of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995. PO Resp. 13. Patent Owner relies on some of the same arguments discussed above with respect to the combination of Hunter and Bulan (*id.* at 13-26), but also presents some additional arguments that are specific to the combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 (*id.* at 26-28). We address each of Patent Owner's specific contentions in detail below.

First, Patent Owner argues that providing phantom power over pre-existing Ethernet wiring and cables would have damaged Bob Smith terminations and common mode chokes. *Id.* at 13-16. Patent Owner's argument is not persuasive. As discussed above, Patent Owner's premise that the invention of the '838 patent is limited to a pre-existing Ethernet network is not supported by the specification or claims of the ’838 patent. *See supra* Section II.C.12. In addition, we note that Patent Owner does not direct us to specific evidence indicating that the teachings of Bloch, IEEE 802.3-1993, or IEEE 802.3-1995 are limited to a pre-existing Ethernet network. *See* PO Resp. 13-16. And Patent Owner acknowledged at the oral hearing that applying phantom power to “new” Ethernet terminal equipment would not have caused any problems with Bob Smith terminations or common mode chokes. Tr. 135:1-12. Thus, any alleged issues with Bob Smith terminations or common node chokes in a pre-existing Ethernet network are not pertinent to the question of whether a person of ordinary skill in the art would have had a reason to combine the cited teachings of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995.

Moreover, even if we accepted Patent Owner’s premise, Patent Owner’s argument still is not persuasive because not all pre-existing Ethernet networks included Bob Smith terminations or common mode chokes. *See supra* Section II.C.12. And, even for those pre-existing Ethernet networks that did include Bob Smith terminations or common mode chokes, it would have been within the knowledge and capabilities of a person of ordinary skill in the art to implement phantom power without damaging the Bob Smith terminations or common mode chokes. *See id.*

Second, Patent Owner argues that a person of ordinary skill in the art would have provided operating power to Ethernet terminal equipment over the unused lines in an Ethernet connection to avoid interference with the data signals. PO Resp. 16-20. In particular, Patent Owner points out that the Ethernet connector taught by IEEE 802.3-1993 and

IEEE 802.3-1995 includes two unused pairs of conductors. *Id.* at 18-19 (citing Ex. 1006, 266-267; Ex. 1007, 147).

Patent Owner's argument is not persuasive. Bloch teaches providing operating power to terminal equipment over the same lines used to transmit data. Pet. 43-44; Ex. 1005, 2:54-61, 5:20-30, Fig. 1. Although Bloch relates to a key telephone system, Bloch explains that its phantom power circuit "can find application in many different control unit/terminal applications." Ex. 1005, 4:49-52. Further, a person of ordinary skill in the art would have possessed the background knowledge that phantom power would work in an Ethernet network. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362-63 (Fed. Cir. 2013). For example, as discussed above, Hunter teaches providing phantom power to Ethernet terminal equipment over a 10Base-T Ethernet bus. *See supra* Section II.C.2. In addition, at least two patents identified on the face of the '838 patent, namely U.S. Patent No. 5,994,998 ("Fisher '998") and U.S. Patent No. 6,140,911 ("Fisher '911") (collectively, "the Fisher patents"), teach providing phantom power to Ethernet terminal equipment.[17] Pet. Reply 7; Ex. 1025, 2:21-41, 3:49-67, 6:7-10; Ex. 1026, 2:32-52, 3:59-4:10, 6:17-20. Thus, although alternative ways of providing operating power to Ethernet terminal equipment may have existed (PO

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[17] Patent Owner argued at the oral hearing that the Fisher patents do not teach certain limitations of the challenged claims. Tr. 124:7-126:8. However, we do not rely on the Fisher patents to teach any limitations of the challenged claims. We rely on the Fisher patents as evidence that a person of ordinary skill in the art would have known that phantom power would work in an Ethernet network.

Resp. 19-20), that does not detract from the phantom power technique taught by Bloch (as well as Hunter and the Fisher patents). *See Mouttet*, 686 F.3d at 1334; *Fulton*, 391 F.3d at 1200.

Third, Patent Owner argues that members of an IEEE committee were skeptical that phantom power would work in an Ethernet network. PO Resp. 21-25. Patent Owner's argument is not persuasive. As discussed above, the evidence cited by Patent Owner relates to whether the IEEE committee members believed that phantom power should be adopted as an Ethernet standard, not whether phantom power would work in an Ethernet network. *See supra* Section II.C.12. Further, as also discussed above, at least some committee members were in favor of using phantom power as an Ethernet standard. *See id.* In any event, the fact that an alternative way of providing operating power to Ethernet terminal equipment existed and was considered for an IEEE standard does not detract from the phantom power technique taught by Bloch. *See Mouttet*, 686 F.3d at 1334; *Fulton*, 391 F.3d at 1200. Moreover, we note that even if Patent Owner's evidence indicates some amount of skepticism, we determine that it does not outweigh the strong evidence of obviousness presented by Petitioner and discussed in this Decision. *See In re Cyclobenzaprine*, 676 F.3d at 1079.

Fourth, Patent Owner argues that Petitioner's proposed combination of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 would have degraded the Ethernet data signal. PO Resp. 26-28. Specifically, Patent Owner argues that switching a resistor into and out of the phantom power circuit, as taught in Bloch, would have created noise and degraded the Ethernet data signal. *Id.* at 26-27 (citing Ex. 2038 ¶ 86; Ex. 2039, 172:20-173:3). In addition, Patent Owner contends that applying operating power to just one side of the transformers in Bloch, as Petitioner proposes in Figure 3 of the Petition, would have saturated the coils and degraded the Ethernet data signal. PO Resp. 27 (citing Ex. 2038 ¶ 87; Ex. 2039, 168:6-14). Patent Owner also notes that, even if operating power was applied to both sides of the transformers in Bloch, "a saturation problem would still exist because the center taps are never perfectly centered and there can be imbalances in the wires." PO Resp. 27 (citing Ex. 2038 ¶ 88; Ex. 2039, 169:14-15).

Patent Owner's argument that switching a resistor into and out of the phantom power circuit would have degraded the Ethernet data signal is not persuasive. Patent Owner's declarant, Dr. Madisetti, states that "[s]witching the resistor would create noise that would degrade the Ethernet data propagation and reduce bandwidth," but does not otherwise explain or provide support for that statement. Ex. 2038 ¶ 86. In contrast, Petitioner's declarant, Mr. Crayford, explains that the resistor in Bloch would have produced low frequency signals, which would have been unlikely to interfere with the higher frequency data signals of an Ethernet network. Pet. Reply 11; Ex. 1046 ¶¶ 49-51. Mr. Crayford also explains that even if the resistor in Bloch would have caused some interference with the Ethernet data signals, it would have been within the knowledge and capabilities of a person of ordinary skill in the art to separate the low frequency resistor signals from the high frequency Ethernet data signals, such as by using a filter. Pet. Reply 11; Ex. 1046 ¶ 49; Ex. 2039, 172:20-173:3.

Patent Owner's argument that applying operating power to the transformers in Bloch would saturate the coils also is not persuasive. Patent Owner's argument is premised on annotations that Petitioner added to Figure 1 of Bloch in the Petition. PO Resp. 27 (citing Pet. 44). Specifically, Petitioner added a red line to Figure 1 of Bloch to indicate the flow of DC current through the system, but, as Patent Owner points out, the red line only shows current flowing through one side of the transformer. Pet. 44; PO Resp. 27. Petitioner's declarant, Mr. Crayford, clarified during his deposition that the annotations to Figure 1 were intended to illustrate the direction of current flow, and that, even if not shown expressly by the annotations, the current clearly flows through both sides of the transformer. Ex. 2039, 167:14-169:22. Specifically, Mr. Crayford stated that "I did not choose to highlight both of the pairs of the twisted pair which is the current path, but clearly they're parallel connectors connected to the same transformers with the power and return path on the center tap," so "they probably should be highlighted." *Id.* at 167:23-168:4. Thus, contrary to Patent Owner's argument, Petitioner does not propose applying operating power to just one side of the transformers in Bloch.

Further, we are not persuaded by Patent Owner's argument that, even if operating power was applied to both sides of the transformer in Bloch, there would still be a saturation problem. Bloch teaches that the phantom power circuit "is connected to the two center taps of the transformers," thereby indicating that applying operating power to the center taps of the transfomers would work. Ex. 1005, 3:9-23. Further, consistent with the teaching of Bloch, Mr. Crayford explained that the objective of balancing the coils on either side of the transformer is "very well known." Ex. 2039, 169:14-22.

In addition to combining the cited teachings of Bloch with IEEE 802.3-1993, and IEEE 802.3-1995, Petitioner also argues that a person of ordinary skill in the art would have had a reason to combine the cited teachings of Bloch and Huizinga. Pet. 52-53. Although the teachings of Huizinga are not necessary to our ultimate determination in this Decision, we nonetheless agree with and adopt Petitioner's reasoning. Specifically, Bloch teaches a control unit that detects the status of different elements of a terminal and controls indicators in the terminal. Pet. 52-53; Ex. 1005, 5:61-6:2, 10:66-11:10. Huizinga teaches that the indicators in Bloch can be lamps that illuminate for different telephone lines. Pet. 52-53; Ex. 1009, 4:19-30, 5:29-39. These interrelated teachings of Bloch and Huizinga would have provided a person of ordinary skill in the art with a reason to combine Bloch and Huizinga. *See KSR*, 550 U.S. at 418 (explaining that "interrelated teachings" of multiple prior art references may provide a reason to combine known elements). Patent Owner does not dispute that a person of ordinary skill in the art would have had a reason to combine the cited teachings of Bloch and Huizinga.

13. Summary

For the reasons discussed above, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 would have been obvious over Bloch, IEEE

802.3-1993, and IEEE 802.3-1995, and over Bloch, Huizinga, IEEE 802.3-1993, and IEEE 802.3-1995.

E. Patent Owner's Motion to Strike

Patent Owner filed a Motion to Strike Petitioner's Reply (Paper 47, "PO Mot. Str."), to which Petitioner filed an Opposition (Paper 54, "Pet. Opp. Str.").[18] Patent Owner argues that several portions of Petitioner's Reply should be stricken because they are beyond the scope of a proper reply.[19] PO Mot. Str. 1. Petitioner responds that the Reply is proper because it responds to arguments raised by Patent Owner in the Response. Pet. Opp. Str. 1. We have considered the parties' arguments, and, for the reasons discussed below, Patent Owner's Motion to Strike is denied. In addition, to the extent that this Decision does not rely on an argument or evidence that Patent Owner contends is improper, Patent Owner's Motion to Strike is moot as to that particular argument or evidence.

1. IsoEthernet

Patent Owner argues that Petitioner presented a new theory of unpatentability in the Reply based on Hunter's teaching of isoEthernet. PO Mot. Str. 2. Specifically, Patent Owner contends that "[t]he Reply newly asserts that 'Hunter's disclosure of isoEthernet also teaches Ethernet' and interjects new concepts:

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[18] We authorized Patent Owner to file a motion to strike and Petitioner to file an opposition. Paper 42, 3.

[19] Patent Owner also argues that Petitioner's Reply should be stricken in its entirety. PO Mot. Str. 1. Because we are not persuaded that any specific portions of the Reply should be stricken, we also are not persuaded that the entire Reply should be stricken.

'[i]soEthernet . . . 10Base-T and ISDN modes' and 'isoEthernet interfaces.'" *Id.* (citing Pet. Reply 16:12-14, 20:21-21:4, 23:12-20; Ex. 1046 ¶¶ 48, 67-69, 74, 80-81).

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Petitioner explains in the Petition that Hunter preferably uses a 10Base-T Ethernet bus, but points out that Hunter is not limited to a 10Base-T Ethernet bus because Hunter also is compatible with 100Base-T, isoEthernet, and ISDN. Pet. 26 ("compatible with ISDN standards"); *id.* at 27 ("[T]he bus comprises a 10Base-T bus."); *id.* at 28 ("a bus applying other Ethernet standards, such as <u>100Base-T</u>"); *id.* at 28 ("the present invention is also compatible with <u>Ethernet®</u>, Token Ring®, ATM, and <u>isoEthernet</u>® standards."). Petitioner also argues in the Petition that "it would have been obvious to a PHOSITA to implement the teachings of Hunter with a bus applying other Ethernet standards." *Id.* at 28. Thus, Petitioner's reliance on isoEthernet is <u>not</u> a new theory of unpatentability raised for the first time in the Reply. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080 (Fed. Cir. 2015).

Further, Patent Owner argues in the Response that Hunter does not teach contacts used to carry Base-T Ethernet communications signals. PO Resp. 41. In particular, Patent Owner contends that the "isoEthernet® interfaces [in Hunter] were part of an IEEE standard called 802.9a," which indicates that "isoEthernet used ISDN signals, <u>not Ethernet signals</u>, to transmit data." *Id.* (citing Ex. 1003, 17:15-18; Ex. 2038 ¶ 250). Petitioner responds in the Reply by explaining why Patent Owner's argument in the Response is incorrect. Pet. Reply 16. Specifically, in the Reply, Petitioner identifies evidence indicating that isoEthernet includes both an ISDN mode and a 10Base-T mode, and, as a result, is not limited to carrying just ISDN signals. *Id.* (citing Ex. 1003, 23:21-24, Ex. 1010, 165; Ex. 1032, 377). Thus, Petitioner's argument regarding isoEthernet in the Reply properly responds to an argument raised by Patent Owner in the Response. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-79. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Section II.C.2; *Belden*, 805 F.3d at 1078-79.

We note that Patent Owner specifically objects to Petitioner's reliance on "a newly-cited IEEE standard for 802.9," which Petitioner submitted as Exhibit 1032 with the Reply. PO Mot. Str. 2 (citing Pet. Reply 16:12-14, 17:2-7, 23:18; Ex. 1032). Patent Owner contends that Hunter only teaches "the trademarked version 'isoEthernet®,'" and Petitioner does not link the trademarked version of isoEthernet in Hunter with the IEEE standard described in Exhibit 1032. PO Mot. Str. 2-3 (citing Pet. 27 n.8; Ex. 2055, 25:10-14, 31:9-21). Patent Owner also argues that Hunter refers to "IEEE draft standard 802.9a," but Exhibit 1032 is not a draft and only describes IEEE standard 802.9. PO Mot. Str. 3 (citing Ex. 1003, 16:7; Ex. 1032).

For the reasons discussed above, Petitioner's argument in the Reply regarding isoEthernet is a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. Thus, we see no problem with Petitioner's reliance on Exhibit 1032 to support its argument regarding isoEthernet in the Reply. Nonetheless, we do not rely on Exhibit 1032 in this Decision. Rather, as discussed above, we rely on Exhibit 1010 as showing that isoEthernet includes a 10Base-T mode. *See supra* Section II.C.2. Petitioner submitted Exhibit 1010 with the Petition (Pet. iv), and cites Exhibit 1010 in the Reply (Pet. Reply 16). Also, like Hunter, Exhibit 1010 refers to the IEEE 802.9a standard for isoEthernet. Ex. 1003, 15:15-18; Ex. 1010, 160. Patent Owner does not raise any specific objections to Exhibit 1010 in the Motion to Strike. *See* PO Mot. Str. 1-3.

Patent Owner also argues that "had the <u>Petition</u> relied on isoEthernet (trademarked or otherwise) and/or Ex. 1032 as a basis for Ground 1, [Patent Owner] would have provided evidence with its Response that, as late as 1999, the IEEE isoEthernet committee prohibited combining phantom-power and Ethernet data signals ('10Base-T mode') to 'insure[] that 10Base-T services are unaffected.'"[20] PO Mot. Str. 3 (citing Ex. 2055, 38:23-39:18). Patent Owner also presented this argument at the oral hearing and referred to it

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20 The evidence that Patent Owner allegedly would have presented to support this argument is a <u>draft</u> IEEE <u>802.9f</u> standard dated June 17, 1999. Tr. 83:2-18; Paper 44 ¶ 4; Ex. 2055, 35:15-39:18. We do not *see* how a draft IEEE standard dated after Hunter limits the express teachings of Hunter. Further, Patent Owner's attempt to rely on this draft IEEE 802.9f standard is inconsistent with Patent Owner's position that Petitioner cannot rely on evidence relating to an isoEthernet standard other than the IEEE 802.9a standard expressly mentioned in Hunter. Tr. 75:16-77:19. As discussed above, the evidence relating to an isoEthernet standard that we rely on in this Decision is Exhibit 1010, which refers to the IEEE 802.9a standard mentioned in Hunter. *See supra* Section II.C.2; Ex. 1003, 15:15-18; Ex. 1010, 160 ("IEEE 802.9a standard—IsoEthernet").

as an offer of proof under Fed. R. Evid. 103(a)(2). Tr. 83:2-18, 218:8-21. In connection with this offer of proof, Patent Owner alleged that it would have presented this evidence in a sur-reply, but was denied the opportunity to do so by the Board. *Id.*

Fed. R. Evid. 103(a)(2) provides that "[a] party may claim error in a ruling to . . . exclude evidence only if the error affects a substantial right of the party," and the party "informs the court of its substance by an offer of proof. . . . " We did not, however, exclude any evidence offered by Patent Owner or deny Patent Owner the opportunity to file a sur-reply in this proceeding. Patent Owner instead made a strategic decision to seek a motion to strike instead of a sur-reply. Specifically, Patent Owner requested "leave to file a motion to strike Petitioner's Reply Briefs in IPR Nos. 2016-01389, 2016-1391, 2016-1397, and 2016-1399 <u>or, in the alternative</u>, for leave to file a Sur-Reply." Ex. 3008, 1 (emphasis added). In other words, Patent Owner identified a motion to strike as the preferred method to respond to Petitioner's Reply, and identified a sur-reply as an alternative to the motion to strike. *Id.* Because we granted Patent Owner's request for leave to file a motion to strike, we did not grant the proposed alternative of a sur-reply. Paper 42, 2-3. Patent Owner did not at any time prior to the oral hearing request a clarification of our ruling or identify any error in our ruling. Further, Patent Owner's attempt at the oral hearing to re-characterize its request as being for <u>both</u> a motion to strike <u>and</u> a sur-reply (Tr. 222:11-223:17) is contradicted by the express language Patent Owner used in its request to the Board (Ex. 3008, 1).

Moreover, the disputed portions of Petitioner's Reply that address isoEthernet are not necessary to our ultimate determination in this proceeding. As discussed above, Hunter's teachings regarding 10Base-T Ethernet alone satisfy the disputed limitations of the challenged claims. *See supra* Section II.C.2. Therefore, we determine that the challenged claims would have been obvious over Hunter and Bulan, even without relying on Hunter's teachings regarding isoEthernet.

2. Bob Smith Terminations and Common Mode Chokes

Patent Owner argues that Petitioner addresses Bob Smith terminations and common mode chokes for the first time in the Reply. PO Mot. Str. 4 (citing Pet. Reply 3:1-5:17, 8:11-14; Exs. 1021-1024, 1029; Ex. 1046 ¶¶ 12-21). Specifically, Patent Owner argues that Petitioner knew that the invention of the '838 patent is directed to equipment networked over pre-existing wiring and cables (PO Mot. Str. 4 (citing Pet. 3)), and that pre-existing Ethernet networks included Bob Smith terminations and common mode chokes (PO Mot. Str. 4 (citing Ex. 2039, 45:10-21; Ex. 2055, 65:13-67:11)), but did not address them in the Petition.

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Patent Owner raises the issue of Bob Smith terminations and common mode chokes in the Response (PO Resp. 13-16), and Petitioner responds in the Reply with an explanation and evidence showing why Patent Owner's argument in the Response is incorrect (Pet. Reply 3-5). Thus, the portions of Petitioner's Reply that address Bob Smith terminations and common mode chokes are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Sections II.C.12, II.D.12; *Belden*, 805 F.3d at 1078-79.

Moreover, the disputed portions of Petitioner's Reply that address Bob Smith terminations and common mode chokes are not necessary to our ultimate determination in this proceeding. As discussed above, the premise of Patent Owner's argument regarding Bob Smith terminations and common mode chokes—that the invention of the '838 patent is limited to equipment networked over pre-existing wiring or cables—is not supported by the specification or claims of the '838 patent. *See supra* Sections II.C.12, II.D.12. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

3. Fisher and De Nicolo Patents

Patent Owner argues that Petitioner submitted new exhibits with the Reply, specifically, the Fisher and De Nicolo patents, to show that using phantom power in an Ethernet network was known at the time of the '838 patent. PO Mot. Str. 5 (citing Pet. Reply 5:18-8:17, 13:15-21; Exs. 1025-1028; Ex. 1046 ¶¶ 27-35). Patent Owner acknowledges that Petitioner presents the same position in the Petition, but contends that Petitioner cannot cite new evidence in the Reply to support that position. PO Mot. Str. 5 (citing Pet. 4-5).

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Petitioner's position that using phantom power in an Ethernet network was known at the time of the '838 patent is presented in the Petition. Pet. 4-5. Patent Owner argues in the Response that "operating Power-over-Ethernet ('PoE') did not exist in 1997" (PO Resp. 8), and Petitioner responds in the Reply by citing to the Fisher and De Nicolo patents as evidence that Patent Owner's argument in the Response is incorrect (Pet. Reply 7 (citing Exs. 1025-1028)). Thus, the portions of Petitioner's Reply that cite to the Fisher and De Nicolo patents are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Sections II.C.12, II.D.12; *Belden*, 805 F.3d at 1078-79.

We note that Patent Owner specifically objects to Petitioner's reliance on the De Nicolo patents because Patent Owner alleges it could have demonstrated that the De Nicolo patents are not prior art to the '838 patent. PO Mot. Str. 5. We do not rely on the De Nicolo patents in this Decision. Rather, as discussed above, we rely on Hunter and the Fisher patents as showing that using phantom power in an Ethernet network was known at the time of the '838 patent. *See supra* Sections II.C.12, II.D.12.

Moreover, the disputed portions of Petitioner's Reply that rely on the Fisher and De Nicolo patents are not necessary to our ultimate determination in this proceeding. As discussed above, the teachings of

Hunter alone demonstrate that using phantom power in an Ethernet network was known at the time of the '838 patent. *See supra* Sections II.C.2, II.C.12, II.D.12. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

4. Alleged Skepticism

Patent Owner argues that Petitioner addresses the objective indicia of non-obviousness, including skepticism of those skilled in the art, for the first time in the Reply. PO Mot. Str. 6 (citing Pet. Reply 9:1-10:11; Exs. 1035-1042; Ex. 1046 ¶¶ 36-44). Specifically, Patent Owner contends that Petitioner was "aware of the secondary considerations issues, but failed to address them in the Petition." PO Mot. Str. 6.

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Patent Owner raises the issue of skepticism by those skilled in the art in the Response (PO Resp. 21-26), and Petitioner responds in the Reply with an explanation and evidence showing why Patent Owner's argument in the Response is incorrect (Pet. Reply 9-10). Thus, the portions of Petitioner's Reply that address the alleged skepticism of those skilled in the art are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Sections II.C.12, II.D.12; *Belden*, 805 F.3d at 1078-79.

Moreover, the disputed portions of Petitioner's Reply that address the alleged skepticism of those skilled in the art are not necessary to our ultimate determination in this proceeding. As discussed above, even if we just consider the evidence submitted by Patent Owner, it does not establish that those skilled in the art were skeptical that phantom power would work in an Ethernet network. *See supra* Sections II.C.12, II.D.12. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

5. CAT-3 and CAT-5 Cabling

Patent Owner argues that Petitioner addresses the number of conductors in CAT-3 and CAT-5 cabling for the first time in the Reply. PO Mot. Str. 7 (citing Pet. Reply 14:12-15:5; Ex. 1031; Ex. 1046 ¶ 61). Specifically, Patent Owner contends that Petitioner knew that CAT-3 cabling was used for 10Base-T Ethernet and CAT-5 cabling was used for 100Base-T Ethernet, and, thus, "could have included" argument and evidence in the Petition regarding the number of conductors in that cabling. PO Mot. Str. 7.

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Patent Owner raises the issue of the number of conductors in CAT-3 and CAT-5 cabling in the Response (PO Resp. 19-20), and Petitioner responds in the Reply with an explanation and evidence showing why Patent Owner's argument in the Response is incorrect (Pet. Reply 14-15). Thus, the portions of Petitioner's Reply that address the number of conductors in CAT-3 and CAT-5 cabling are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80.

Patent Owner also argues that, if Petitioner had addressed the number of conductors in CAT-3 and CAT-5 cabling in the Petition, Patent Owner "would have included the cable specification for CAT-3/CAT-5 wiring, confirming that such cables comprise four wire pairs." PO Mot. Str. 7. (citing Ex. 2055, 171:23-176:13). Patent Owner also presented this argument at the oral hearing and referred to it as an offer of proof under Fed. R. Evid. 103(a)(2). Tr. 220:19-221:2. As discussed above, Fed. R. Evid. 103(a)(2) provides that "[a] party may claim error in a ruling to . . . exclude evidence only if the error affects a substantial right of the party," and the party "informs the court of its substance by an offer of proof. . . . " We did not, however, exclude any evidence offered by Patent Owner or deny Patent Owner the opportunity to file a sur-reply in this proceeding. *See supra* Section II.E.1. Patent Owner instead made a strategic decision to seek a motion to strike instead of a sur-reply. *See id.*

Moreover, the disputed portions of Petitioner's Reply that address the number of conductors in CAT-3 and CAT-5 cabling are not necessary to our ultimate determination in this proceeding. As discussed above, the portions of Hunter cited in the Petition independently demonstrate that a 10Base-T Ethernet bus may include only two twisted pair conductors, not four. *See supra* Sections II.C.2, II.C.12, II.D.12. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

F. Petitioner's Motion to Exclude

Petitioner filed a Motion to Exclude (Paper 46, "Pet. Mot. Excl."), to which Patent Owner filed an Opposition (Paper 50, "PO Opp. Excl."), and Petitioner filed a Reply (Paper 58, "Pet. Reply Excl."). We have considered the parties' arguments, and, for the reasons discussed below, Petitioner's Motion to Exclude is denied.[21]

1. Exhibit 2038

Exhibit 2038 is Dr. Madisetti's Declaration. Petitioner argues that Exhibit 2038 should be excluded under Fed. R. Evid. 401, 402, 403, 702, 703, as irrelevant, prejudicial, and unreliable. Pet. Mot. Excl. 1-10. Specifically, Petitioner argues that Dr. Madisetti: 1) relies on an incorrect date of invention for the challenged claims of the '838 patent (*id.* at 2-4); 2) fails to provide support for his opinion that a person of ordinary skill in the art would have provided operating power over the unused lines in an Ethernet connection (*id.* at 5-6); 3) misunderstands the isoEthernet standard (*id.* at 6-7); 4) fails to provide support for his opinion that the resistor in

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[21] Patent Owner requested authorization to file Exhibits 2052-2054 with its Opposition to Petitioner's Motion to Exclude. Paper 60, 2. Patent Owner withdrew that request with respect to Exhibits 2052 and 2053, because Patent Owner did not cite those exhibits in its Opposition. *Id.*; Paper 59, 12:11-15:1. We note that Exhibits 2052 and 2053 would not change our ultimate determination because we deny Petitioner's Motion to Exclude even without considering Exhibits 2052 and 2053.

Bloch would interfere with Ethernet data signals (*id.* at 8); 5) provides inconsistent interpretations of what constitutes terminal equipment (*id.* at 8-10); and 6) fails to read the teachings of Hunter as a whole (*id.* at 10). Petitioner's arguments raise a question of the weight that should be given to Dr. Madisetti's testimony, not admissibility. Therefore, Petitioner's Motion to Exclude is denied with respect to Exhibit 2038.

2. Exhibits 2040-2046, 2048

Exhibits 2040-2046 and 2048 are documents relating to meetings of an IEEE committee. Petitioner argues that Exhibits 2040-2046 and 2048 should be excluded under Fed. R. Evid. 401, 402, 403, 801, 802, 804, 901, as irrelevant, prejudicial, hearsay, and lacking authentication. Pet. Mot. Excl. 11-12. Petitioner's arguments are not persuasive.

The proponent of an item of evidence must produce evidence sufficient to support a finding that the item is what the proponent claims it is. Fed. R. Evid. 901. Here, Patent Owner submits Mr. Clyde Camp's testimony that "[t]he 802.3af Committee maintained a record of its proceedings by posting documents pertaining to its work, including meeting minutes and presentations, on its public document server at http://www.ieee802.org/3/af/public/ ("the Website")," and that Exhibits 2040-2046 are such records. Ex. 2048 ¶¶ 4-11. Mr. Camp explains that his statements in Exhibit 2048 are based on personal knowledge. *Id.* ¶ 1. Petitioner, on the other hand, does not provide any specific reason for us to believe that Exhibits 2040-2046 are not what Petitioner and Mr. Camp claim them to be. *See* Pet. Mot. Excl. 11-12.

Hearsay is limited to a statement that a party offers in evidence to prove the truth of the matter asserted in the statement. Fed. R. Evid. 801. Patent Owner offers, and we consider, Exhibits 2040-2046 as evidence of the effect that the statements in Exhibits 2040-2046 would have had on a person of ordinary skill in the art considering the prior art combinations proposed by Petitioner in this case. *See supra* Sections II.C.12, II.D.12. Thus, the statements in Exhibits 2040-2046 are not hearsay because they are not offered as evidence of the truth of the matter asserted.

Petitioner's arguments regarding the relevance of Exhibits 2040-2046 and 2048 raise a question of sufficiency of proof, not admissibility. Further, as discussed above, we considered Exhibits 2040-2046 and 2048 in connection with Patent Owner's arguments in the Response, but we do not find Patent Owner's arguments that rely on Exhibits 2040-2046 and 2048 to be persuasive. *See supra* Sections II.C.12, II.D.12. As a result, Petitioner does not suffer any prejudice by our admission of Exhibits 2040-2046 and 2048. Therefore, Petitioner's Motion to Exclude is <u>denied</u> with respect to Exhibits 2040-2046 and 2048.

3. Exhibit 2047

Exhibit 2047 is a document entitled "FYI on 'What is the Internet?'" produced by the User Services Working Group of the Internet Engineering Task Force. Petitioner argues that Exhibit 2047 should be excluded under Fed. R. Evid. 401, 402, 403, 801, 802, 805, 901, as irrelevant, hearsay, and lacking authentication. Pet. Mot. Excl. 12-13. Petitioner's arguments are not persuasive.

The proponent of an item of evidence must produce evidence sufficient to support a finding that the item is what the proponent claims it is. Fed. R. Evid. 901. Here, Patent Owner submits Dr. Madisetti's testimony that Exhibit 2047 is a document entitled "FYI on 'What is the Internet?'" produced by the Internet Engineering Task Force, and available at https://tools.ietf.org/html/rfc1462. Ex. 2038 ¶ 104. Petitioner, on the other hand, does not provide any specific reason for us to believe that Exhibit 2047 is not what Petitioner and Dr. Madisetti claim it to be. *See* Pet. Mot. Excl. 12-13.

Hearsay is limited to a statement that a party offers in evidence to prove the truth of the matter asserted in the statement. Fed. R. Evid. 801. Patent Owner offers Exhibit 2047 as evidence of the fact that the term "protocol" had been defined a certain way by the Internet Engineering Task Force, not necessarily for the truth of the definition asserted. PO Resp. 12-13. Thus, at least certain statements in Exhibit 2047 are not hearsay.

Petitioner's arguments regarding the relevance of Exhibit 2047 raise a question of sufficiency of proof, not admissibility. Further, as discussed above, we considered Exhibit 2047 in connection with Patent Owner's proposed construction of the term "protocol," but we do not find Patent Owner's arguments that rely on Exhibit 2047 to be persuasive. *See supra* Section II.B.2. As a result, Petitioner does not suffer any prejudice by our admission of Exhibit 2047. Therefore, Petitioner's Motion to Exclude is denied with respect to Exhibit 2047.

4. Exhibits 2049, 2050, 2054

Petitioner argues that Exhibits 2049, 2050, and 2054 should be excluded under Fed. R. Evid. 401, 402, 403, as irrelevant and prejudicial. Pet. Mot. Excl. 14-15. Petitioner's arguments regarding the relevance of Exhibits 2049, 2050, and 2054 raise a question of sufficiency of proof, not admissibility. Further, we do not discern that Petitioner suffers any prejudice by our admission of Exhibits 2049, 2050, and 2054. Therefore, Petitioner's Motion to Exclude is *denied* with respect to Exhibits 2049, 2050, and 2054.

G. Patent Owner's Motion to Exclude

Patent Owner filed a Motion to Exclude (Paper 45, "PO Mot. Excl."), to which Petitioner filed an Opposition (Paper 52, "Pet. Opp. Excl."), and Patent Owner filed a Reply (Paper 57, "PO Reply Excl."). We have considered the parties' arguments, and, for the reasons discussed below, Patent Owner's Motion to Exclude is <u>denied-in-part and dismissed-in-part</u>.

1. Exhibit 1020

Exhibits 1020 is the transcript of the deposition of Patent Owner's declarant, Dr. Madisetti. Other than pointing out that Exhibit 1020 was filed with Petitioner's Reply, Patent Owner does not provide any specific reason why Exhibit 1020 should be excluded. *See* PO Mot. Excl. 1-9. Therefore, Patent Owner's Motion to Exclude is *denied* with respect to Exhibit 1020.

2. Exhibits 1021-1024 and 1029

Exhibits 1021-1024 are product datasheets, catalogs, and specifications, and Exhibit 1029 is U.S.

Patent No. 5,321,372. Patent Owner argues that Exhibits 1021-1024 and 1029 should be excluded as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 4-5; PO Mot. Str. 3-5. Patent Owner's arguments are not persuasive for the same reasons discussed above with respect to the Motion to Strike. *See supra* Section II.E.2.

Patent Owner also argues that Exhibits 1021-1024 and 1029 should be excluded as impermissible hearsay. PO Mot. Excl. 11. We rely on Exhibits 1021-1024 and 1029 in this Decision only to the extent they provide a basis for certain portions of Mr. Crayford's declaration that are cited in this Decision. *See supra* Sections II.C.12, II.D.12 (citing Ex. 1046 ¶¶ 13, 18-26). Patent Owner does not dispute that Exhibits 1021-1024 and 1029 present the kinds of facts and data that Mr. Crayford would reasonably rely upon in forming an opinion. *See* PO Mot. Excl. 11; PO Reply Excl. 2-3. As a result, Exhibits 1021-1024 and 1029 do not need to be independently admissible. *See* Fed. R. Evid. 703; *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 711 F.3d 1348, 1373 (Fed. Cir. 2013). Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibits 1021-1024 and 1029.

3. Exhibits 1025 and 1026

Exhibits 1025 and 1026 are the Fisher patents. Patent Owner argues that Exhibits 1025 and 1026 should be excluded as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 4; PO Mot. Str. 5-6. Patent Owner's arguments are not persuasive for the same reasons discussed above with respect to the Motion to Strike. *See supra* Section II.E.3.

Patent Owner also argues that Exhibits 1025 and 1026 should be excluded as impermissible hearsay. PO Mot. Excl. 10. Hearsay is limited to a statement that a party offers in evidence to prove the truth of the matter asserted in the statement. Fed. R. Evid. 801. Petitioner offers, and we rely on, the statements in Exhibits 1025 and 1026 as evidence of the effect those statements would have had on a person of ordinary skill in the art, not for the truth of the matter asserted. *See supra* Section II.D.12. (citing Pet. Reply 7; Ex. 1025, 2:21-41, 3:49-67, 6:7-10; Ex. 1026, 2:32-52, 3:59-4:10, 6:17-20). As a result, Exhibits 1025 and 1026 are not hearsay. However, even if the statements in Exhibits 1025 and 1026 are hearsay, Exhibits 1025 and 1026 are admissible at least under Fed. R. Evid. 803(8). Specifically, Exhibits 1025 and 1026 are records of the activities of the U.S. Patent and Trademark Office, and Patent Owner has not shown that the source of information or circumstances lack trustworthiness. *See* PO Mot. Excl. 11-12; PO Reply Excl. 3; Fed. R. Evid. 803(8); *Fresenius Med. Care Holdings, Inc. v. Baxter Int'l, Inc.*, No. C 03-1431, 2006 WL 1330003, at *2-4 (N.D. Cal. May 15, 2006). Therefore, Patent Owner's Motion to Exclude is *denied* with respect to Exhibits 1025 and 1026.

4. Exhibits 1036-1042

Exhibits 1036-1042 are documents relating to meetings of an IEEE committee. Patent Owner argues that Exhibits 1036-1042 should be excluded as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 6; PO Mot.

Str. 6. Patent Owner's arguments are not persuasive for the same reasons discussed above with respect to the Motion to Strike. *See supra* Section II.E.4. Therefore, Patent Owner's Motion to Exclude is *denied* with respect to Exhibits 1036-1042.

5. Exhibit 1043

Exhibit 1043 is U.S. Patent No. 8,155,012, which is related to the '838 patent and also owned by Patent Owner. Other than pointing out that Exhibit 1043 was filed with Petitioner's Reply, Patent Owner does not provide any specific reason why Exhibit 1043 should be excluded. *See* PO Mot. Excl. 1-9. Therefore, Patent Owner's Motion to Exclude is <u>denied</u> with respect to Exhibit 1043.

6. Exhibits 1027, 1028, and 1030-1035

We do not rely on Exhibits 1027, 1028, and 1030-1035 in this Decision. Therefore, Patent Owner's Motion to Exclude is <u>dismissed as moot</u> with respect to Exhibits 1027, 1028, and 1030-1035.

H. Oral Hearing Objections

Each party objected to arguments presented by the other party during the oral hearing. Petitioner objected that Patent Owner improperly raised new arguments for the first time at the oral hearing regarding the IEEE 802.9f specification, the CAT-3 and CAT-5 cabling specifications, blind power, and power levels. Tr. 216:15-217:7. We considered Patent Owner's arguments in the Response in light of any additional arguments presented by Patent Owner at the oral hearing, but we ultimately do not find Patent Owner's arguments persuasive for the reasons discussed in this Decision. Thus, Petitioner does not suffer any prejudice by our admission of the arguments presented by Patent Owner at the oral hearing.

Patent Owner objected that Petitioner raised arguments at the oral hearing that were the subject of Patent Owner's Motion to Strike and/or Motion to Exclude. *Id.* at 66:20-67:20. For the reasons discussed above, we deny Patent Owner's Motion to Strike and deny-in-part and dismiss-in-part Patent Owner's Motion to Exclude. *See supra* Sections E, G. Thus, we *see* no problem with the arguments presented by Petitioner at the oral hearing.

I. Patent Owner's Observations on Cross Examination

Patent Owner filed a Motion for Observations on the cross examination of Mr. Ian Crayford (Paper 44), to which Petitioner filed a Response (Paper 55). We have considered Patent Owner's observations and Petitioner's responses, and we determine that Patent Owner's observations do not demonstrate any issues with respect to the credibility of Mr. Crayford's testimony. We also have considered Patent Owner's observations in connection with the arguments and evidence discussed above, and we have given Mr. Crayford's testimony the appropriate weight in making our determination in this case.

III. Conclusion

Petitioner has shown by a preponderance of the evidence that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 of the '838 patent are unpatentable.

IV. Order

In consideration of the foregoing, it is hereby

ORDERED that claims 1, 2, 7, 26, 29, 38, 39, 40, 47, 55, and 69 of the '838 patent are shown unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Strike is denied;

FURTHER ORDERED that Petitioner's Motion to Exclude is denied; FURTHER ORDERED that Patent Owner's Motion to Exclude is denied-in-part and dismissed-in-part; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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FINAL WRITTEN DECISION OF UNITED STATES PATENT TRIAL AND APPEAL BOARD ON ’107 PATENT—35 U.S.C. § 318(A) AND 37 C.F.R. § 42.73 (DECEMBER 20, 2017)

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JUNIPER NETWORKS, INC., RUCKUS WIRELESS, INC., BROCADE COMMUNICATION SYSTEMS, INC., and NETGEAR, INC.,

Petitioner,

v.

CHRIMAR SYSTEMS, INC.,

Patent Owner.

Case IPR2016-01391[1]
Patent 8,942,107 B2

Before: Karl D. EASTHOM, Gregg I. ANDERSON, and Robert J. WEINSCHENK, Administrative Patent Judges.

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[1] Ruckus Wireless, Inc., Brocade Communication Systems, Inc., and Netgear, Inc. filed a petition in (now terminated) IPR2017-00718, who have been joined to the instant proceeding. Paper 25.

ANDERSON, Administrative Patent Judge.

I. Introduction

Juniper Networks, Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") pursuant to 35 U.S.C. §§ 311-19 to institute an *inter partes* review of claims 1, 5, 31, 43, 70, 72, 74, 75, 83, 103, 104, 111, 123, and 125 ("the challenged claims") of U.S. Patent No. 8,942,107 B2 ("the '107 patent," Ex. 1001), filed February 10, 2012.[2] ChriMar Systems, Inc. ("Patent Owner") filed a Preliminary Response ("Prelim. Resp.," Paper 7). We instituted an *inter partes* review of the challenged claims (Paper 9, "Institution Decision" or "Inst. Dec."). We then joined the other three Petitioner parties listed above. *See* note 1; Paper 25. Patent Owner filed a Response ("PO Resp.," Paper 26) and Petitioner filed a Reply ("Pet. Reply," Paper 33). The Board filed a transcription of the Final Hearing held on August 31, 2017. (Paper 63, "Tr.").

Petitioner relies on, *inter alia*, First Declaration of Ian Crayford ("First Crayford Decl.," Ex. 1002) filed with the Petition and Second Declaration of Ian Crayford ("Second Crayford Decl.," Ex. 1046) filed with its Reply. A Third Declaration of Ian Crayford authenticates certain exhibits[3] (Ex. 1048). Patent

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[2] The cover page of the '107 patent alleges it is a "[C]ontinuation of application No. 12/239,001, filed on Sep. 26, 2008, now Pat. No. 8,155,012, which is a continuation of application No. 10/668,708, filed on Sep. 23, 2003, now Pat. No. 7,457,250, which is a continuation of application No. 09/370,430, filed on Aug. 9, 1999, now Pat. No. 6,650,622, which is a continuation-in-part of application No. PCT/US99/07846, filed on Apr. 8, 1999." Ex. 1001 (63). A provisional application was filed April 10, 1998. *Id.* (1).

[3] Exhibits 1021-1024, 1030, 1031, and 1035-1042.

Owner took a first deposition of Mr. Crayford ("First Crayford Deposition," "First Crayford Dep.," Ex. 2039) and a second deposition of Mr. Crayford ("Second Crayford Deposition," "Second Crayford Dep.," Ex. 2055) for which it filed Observations ("Obs.," Paper 44) and Petitioner filed an Opposition to Observations ("Opp. Obs.," Paper 55).

Patent Owner relies on, *inter alia*, a Declaration by Dr. Vijay K. Madisetti ("Madisetti Decl.," Ex. 2038) filed with its Response. Petitioner took the deposition of Dr. Madisetti ("Madisetti Deposition," "Madisetti Dep.," Ex. 1020).

Petitioner's Motion to Exclude (Paper 46) is denied. Patent Owner's Motion to Exclude (Paper 45) is denied-in-part and dismissed-in-part. Patent Owner's Motion to Strike Petitioner's Reply (Paper 47) is *denied*.

The Board has jurisdiction under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that the challenged claims are unpatentable.

A. Related Proceedings

Petitioner advises us that the '107 patent is the subject of fifty one (51) civil actions filed in the Eastern District of Michigan, Eastern District of Texas, and Northern District of California. Pet. 1 (citing *Docket Navigator* printout dated July 7, 2016, Ex. 1012). Petitioner is a defendant in *Chrimar Systems, Inc., et al. v. Juniper Networks, Inc.*, Case

No. 3:16-cv-558 (N.D. Cal.).[4] *Id.* The '107 patent was the subject of a now terminated *inter partes* review, *AMX, LLC, and Dell Inc. v. Chrimar Systems, Inc.*, IPR2016-00569 ("'569 IPR"). *Id.*[5]

Patent Owner identifies nineteen (19) related actions. Paper 6, 2-3. Patent Owner cites specifically to *Chrimar Systems, Inc., et al. v. ADTRAN, Inc., et al.*, Civil Action No. 6:15-cv-618-JRG-JDL (E.D. Tex.) (the '618 lawsuit"), *Chrimar Systems, Inc., et al. v. Alcatel-Lucent, et al.*, Civil Action No. 6:15-cv-163-JDL (E.D. Tex.) (the "'163 lawsuit"), and *Chrimar Systems, Inc., et al. v. AMX LLC.,* No. 6:13-cv-881-JDL (E.D. Tex.) (the "'881 lawsuit") (collectively the "District Court") as having construed several terms of the '107 patent and several of Patent Owner's related patents sharing a common specification. Prelim. Resp. 3 n4, 12-13. The Patent Owner indicates that the following petitions for *inter partes* review are related to this case:

Case No. Involved	U.S. Patent No.
IPR2016-00569 (*see* n.5)	U.S. Patent No. 8,942,107
IPR2016-00573	U.S. Patent No. 9,019,838
IPR2016-00574	U.S. Patent No. 8,902,760

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4 Patent Owner advises us that this lawsuit is stayed. Prelim. Resp. 3.

5 We instituted trial in the '569 IPR on August 10, 2016. '569 IPR, Paper 19. Trial was terminated as to Petitioner AMX LLC only on November 9, 2016. *Id.* at Paper 27. Petitioner Dell Inc. was terminated on January 20, 2017, terminating the proceeding. *Id.* at Paper 40.

IPR2016-00983	U.S. Patent No. 8,155,012
IPR2016-01151	U.S. Patent No. 9,019,838
IPR2016-01389	U.S. Patent No. 8,155,012
IPR2016-01397	U.S. Patent No. 9,019,838
IPR2016-01399	U.S. Patent No. 8,902,760
IPR2016-01425	U.S. Patent No. 8,155,012
IPR2016-01426	U.S. Patent No. 9,019,838

Paper 6, 3.

B. Technology and the '107 Patent

1. Technology

The '107 patent "relates generally to computer networks and, more particularly, to a network management and security system for managing, tracking, and identifying remotely located electronic equipment on a network." Ex. 1001, col. 1, ll. 27-30. The '107 patent is "adapted to be used with an existing Ethernet communications link or equivalents thereof." *Id.* at col. 3, ll. 41-43.

2. The '107 Patent (Ex. 1001)

The '107 patent describes a communication system that generates and monitors data relating to the electronic equipment, and can for example use the "pre-existing wiring or cables that connect pieces of networked computer equipment to a network." Ex. 1001, col. 3, ll. 24-27. In a first embodiment, the system includes a remote module attached to the electronic equipment being monitored. *Id.* at col. 3, ll. 27-30. The remote module transmits a low frequency signal containing equipment information to a central module over the cable. *Id.*

The communication or monitoring of the network equipment can be accomplished "over preexisting network wiring or cables without disturbing network communications." Ex. 1001, col. 12, ll. 1-7. This is accomplished "by coupling a signal that does not have substantial frequency components within the frequency band of network communications." *Id.* For example, a high frequency network such as an Ethernet network operates at higher frequencies of between 5 MHz to 10 MHz. *Id.* at col. 12, ll. 19-23. A lower frequency signal on the order of 150 kHz may use the same networking wires or cables as the higher frequency network communications with "no disruption of the high frequency network information." *Id.* at col. 12, ll. 19-28.

C. Illustrative Claims

Of the challenged claims, claims 1 and 104 are independent apparatus claims. Claims 5, 31, 43, 70, 72, 74, 75, 83, and 103 depend directly or indirectly from claim 1. Claims 111, 123, and 125 depend from claim 104. Claim 1 is reproduced below:

> 1. A piece of Ethernet terminal equipment comprising:
>
> an Ethernet connector comprising:
>
> first and second pairs of contacts used to carry Ethernet communication signals,
>
> at least one path for the purpose of drawing DC current, the at least one path coupled across at least one of the contacts of the first

> pair of contacts and at least one of the contacts of the second pair of contacts, the piece of Ethernet terminal equipment to draw different magnitudes of DC current flow via the at least one path,
>
> the different magnitudes of DC current flow to result from at least one condition applied to at least one of the contacts of the first and second pairs of contacts,
>
> wherein at least one of the magnitudes of the DC current flow to convey information about the piece of Ethernet terminal equipment.

Ex. 1001, col. 17, ll. 11-25.

D. Asserted Grounds of Unpatentability

Petitioner challenges claims 1, 5, 31, 43, 53, 58, 70, 72, 75, 83, 84, 103, 104, 111, 123, and 125 of the '107 patent as unpatentable on the following grounds. Pet. 7-66.

References	Basis	Claims Challenged
Hunter[6] and Bulan[7]	§ 103(a)[8]	1, 5, 31, 43, 70, 72, 74, 75, 83,

[6] WO 96/23377, Richard K. Hunter et al., published August 1, 1996, ("Hunter," Ex. 1003).

[7] US 5,089,927, Sergio Bulan et al., issued February 18, 1992, ("Bulan," Ex. 1004).

[8] The Leahy-Smith America Invents Act (AIA), Pub. L. No. 112-29, 125 Stat. 284, 287-88 (2011), revised 35 U.S.C. § 103, effective March 16, 2013. The '107 patent has an effective filing

		103, 104, 111, 123, and 125
Bloch,[9] Huizinga,[10] and IEEE 802.3[11]	§ 103(a)	1, 5, 31, 43, 70, 72, 74, 75, 83, 103, 104, 111, 123, and 125

II. Analysis

A. Claim Construction

In an *inter partes* review, claim terms are given their broadest reasonable interpretation in light of the Specification in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142 (2016). We presume that claim terms have their ordinary and customary meaning. *See Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1061-62 (Fed. Cir. 2016) ("Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history") (internal citation omitted); *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition

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date of at least April 10, 1998, prior to the effective date of the AIA. *See* Pet. Reply 2. Thus, the grounds asserted are under the pre-AIA version of § 103.

[9] US 4,173,714, Alan Bloch et al., issued November 6, 1979 ("Bloch," Ex. 1005).

[10] US 4,046,972, Donald D. Huizinga et al., issued September 6, 1977 ("Huizinga," Ex. 1009).

[11] IEEE Standard 802.3-1993 ("IEEE-93," Ex. 1006) and IEEE Standard 802.3-1995, Parts 1 and 2 ("IEEE-95," Ex. 1007 (Part 1) and Ex. 1008 (Part 2)), collectively "IEEE 802.3."

for a claim term must be set forth in the Specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a special definition or other consideration, "limitations are not to be read into the claims from the specification." *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). "[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy." *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner identifies "powered off" and "BaseT" as requiring construction. Pet. 5-6. Patent Owner identifies those same two terms plus "protocol." PO Resp. 15-18.

The parties have not disputed the meaning of either "Ethernet terminal equipment" or "end device." Patent Owner equates the two terms. *See, e.g.*, PO Resp. 45, Heading A. We apply the ordinary and customary meaning of the claim terms not specifically addressed.

1. "Path Coupled Across" (Claims 1 and 104)

Claims 1 and 104 recite, in part, "<u>at least one path coupled across</u> at least one of the contacts of the first pair of contacts and at least one of the contacts of the second pair of contacts." In the Institution Decision we construed the term "path coupled across" to mean "path permitting energy transfer." Inst. Dec. 8. The term is not disputed and we, upon consideration of the full record, maintain the construction from the Institution Decision.

2. "Pairs of Contacts" (Claims 1 and 104)

Claims 1 and 104 recite, in part, "an Ethernet connector comprising first and second <u>pairs of contacts</u> used to carry Ethernet communication signals, at least one path for the purpose of drawing DC current." In the Institution Decision we construed "pairs of contacts" to mean "at least two contacts which define a path for carrying electrical signals." Inst. Dec. 9. The term is not disputed and we maintain the construction from the Institution Decision.

3. "BaseT" (Claim 5)

Claim 5 depends from claim 1 and recites additionally "wherein the Ethernet communication signals are BaseT[12] Ethernet communication signals." In the Institution Decision we preliminarily determined that the broadest reasonable construction of "BASE-T," consistent with the specification and the knowledge of a person of ordinary skill in the art, is "twisted pair Ethernet in accordance with the 10BASE-T or 100BASE-T standards." Inst. Dec. 11-12. Patent Owner does not contest this construction. PO Resp. 18. Petitioner's proposed construction is the same as the Institution Decision except that it does not include "twisted pair Ethernet." Pet. 6.

In its Preliminary Response, Patent Owner cited to the District Court's construction in the '163 lawsuit.

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[12] "BaseT," "BASE-T," and "Base-T" are all used in various parts of the record, but we determine they all reference the same Ethernet standard. We use the terms interchangeably here.

Prelim. Resp. 14 (citing Ex. 2021, 16-18). The District Court construed the term as meaning "twisted pair Ethernet in accordance with the 10BASE-T or 100BASE-T standards." Ex. 2021, 18. We agree with the District Court that the specification lacks any special definition of Base-T. Ex. 2021, 17. The record before the District Court included evidence "that it was commonly known that 'Base' refers to baseband and 'T' designates twisted pair cabling, and that 'BASE-T' standards were known in the art at the time of invention." *Id.* Exhibit 1007, IEEE Standard 802.3-1995, does define "100BASE-T" and "10BASE-T." Ex. 1007 ¶¶ 1.4.2 and 1.4.14. The definition of "100BASE-T" does not include reference to a "twisted pair," while the definition of "10BASE-T" does. *Id.* We agree with the District Court's analysis that "Base-T" references a baseband and a twisted pair cable. Extrinsic dictionary evidence is that 10Base-T and 100Base-T are "an Ethernet standard for baseband LANs (local area networks) using twisted-pair cable."

MICROSOFT COMPUTER DICTIONARY, 2 (Microsoft Press 5th ed. 2002) (Ex. 3001).

The parties do not dispute the construction in the Institution Decision. *See* Pet. 6, PO Resp. 18. We maintain our construction from the Institution Decision.

4. "Powered Off" (Claims 103 and 104)

Claim 103 is a multiple dependent claim which, for purposes of this proceeding, depends on challenged claims 1 and 31, and recites "wherein the piece of Ethernet of terminal equipment is a piece of powered-off Ethernet terminal equipment." Claim 104 is an independent claim which recites, in pertinent part, "[a] powered-off end device" instead of "Ethernet terminal equipment."

In the Institution Decision we interpreted "powered off" to mean "without operating power." Inst. Dec. 10. Petitioner proposed this construction. Pet. 5-6. Patent Owner also agreed with the Institution Decision construction in its Preliminary Response, citing the District Court construction from the '163 lawsuit and our construction in the '569 IPR. Prelim. Resp. 14-15 (citing Ex. 2021, 18-20; '569 IPR, Paper 19, 10); *see also* PO Resp. 16 (citing the same authority).

Petitioner argues "'powered-off' does not mean entirely removed from the application of power." Pet. 6 (citing Ex. 1001, claims 103, 104, 111, 123, and 125; First Crayford Decl. ¶¶ 52-55). In its Response Patent Owner argues that the terminal device cannot be "powered-off" if "operating voltage is applied, but not used." PO Resp. 16. Patent Owner concludes that "[o]ne skilled in the art would understand 'without operating power' to exclude devices that have 'operating power' applied to the Ethernet terminal equipment/ end device." *Id.* at 17 (citing Madisetti Decl. ¶ 102). Petitioner argues that some power may be applied to the device and the device is "powered-off." Patent Owner disagrees.

That the "Ethernet terminal device" or "powered-off end device" receive some power is supported by the claims, which recite that the devices draw "different magnitudes of current flow." Ex. 1001, claims 1, 103, 104; *see* PO Resp. 16. The Specification describes the isolation power supply of the central module as providing "continuous direct current (DC) power supply" for the remote module. Ex. 1001, col. 5, ll. 39-

43 ("a low current preferably on the order of magnitude of about 1mA.")).

We maintain our construction of "powered-off" from the Institution Decision with the qualification that some power may be applied to the claimed "Ethernet terminal equipment" or "end device" and the devices may still be "powered-off."

5. "Protocol" (Claims 72 and 123)

Claims 72 and 123 depend from claims 1 and 104, each reciting "wherein at least one magnitude of the DC current is part of a detection protocol." Patent Owner contends "[a] protocol, as defined in the computer networking field, is 'a mutually agreed upon method of communication.'" PO Resp. 17 (citing Madisetti Decl. ¶ 104; Network Working Group, RFC 1462, "What is the Internet," May 1993, 1 (Ex. 2047)). Patent Owner does not cite to the Specification or the claim language to support its construction.

As Petitioner contends, neither "detect" nor "protocol" requires that two devices "agree to a method of communication." Pet. Reply 21-22 (citing Second Crayford Decl. ¶ 90). Petitioner argues as follows:

> Instead, a POSITA understood that "detection" simply requires a discovery of something, and a "protocol" as rules. . . . <u>In other words, a detection protocol is merely rules for making a discovery</u>.

The claim language and the Specification support Petitioner's contentions. Claim 72, a device claim, does not require communication with any other device. Any disclosed communication involves control module

15, but claim 72, drawn to "Ethernet terminal equipment," reads on remote module 16a and PC 3a, and does not necessarily encompass the central module. *See* Ex. 1001, col. 8, ll. 33-56, Figs. 4, 5. Further, the claimed device at most only needs to be capable of being part of a detection protocol. *See In re Schreiber,* 128 F.3d 1473, 75-77 (Fed. Cir. 1997).

Accordingly, "wherein at least one magnitude of the DC current is part of a detection protocol" means that the claimed magnitude of DC current must be capable of being part of a "detection protocol," which may involve, but is not limited to, rules for making a discovery or a mutually agreed upon method of communication.

B. Law of Obviousness

A patent claim is unpatentable as obvious if the differences between the claimed subject matter and the prior art are "such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103(a).

> The ultimate determination of obviousness is a question of law, but that determination is based on underlying factual findings. The underlying factual findings include (1) "the scope and content of the prior art," (2) "differences between the prior art and the claims at issue," (3) "the level of ordinary skill in the pertinent art," and (4) the presence of secondary considerations of nonobviousness such "as commercial success, long felt

> but unsolved needs, failure of others," and unexpected results.

In re Nuvasive, Inc., 842 F.3d 1376, 1381 (Fed. Cir. 2016) (internal citation omitted) (citing *inter alia Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)).

In assessing the prior art, the Board must consider whether a person of ordinary skill would have had a reason to combine the prior art to achieve the claimed invention. *Nuvasive*, 842 F.3d at 1381. As observed by our reviewing court in *Personal Web Technologies, LLC v. Apple, Inc.*, 848 F.3d 987, 991-92 (Fed. Cir. 2017):

> The Supreme Court in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 127 S.Ct. 1727, 167 L.Ed.2d 705 (2007), explained that, "because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known," "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does."

1. Level of Ordinary Skill

The Institution Decision substantially tracks Petitioner's proposal. Inst. Dec. 12-13; Pet. 5 (citing First Crayford Decl. ¶¶ 49-51). Patent Owner's only issue with Petitioner's proposal, and our prior determination, is that use of "at least" with respect to education and experience is too open ended because it would include persons having more than ordinary skill. PO Resp. 13-14 (citing Madisetti Decl. ¶ 26).

We agree with Patent Owner. Petitioner does not contest the change in its Reply.[13] We determine the level of ordinary skill at the time of the invention was a person having an undergraduate degree in electrical engineering or computer science, or the equivalent, and three years of experience. In addition, a person of ordinary skill would have had a familiarity with data communications protocols, data communications standards (and standards under development at the time, including the 802.3 standard), and the behavior of data communications products available on the market. Madisetti Decl. ¶ 26.

C. Obviousness over Hunter and Bulan

Petitioner alleges claims 1, 5, 31, 43, 70, 72, 74, 75, 83, 103, 104, 111, 123, and 125 would have been obvious to a person of ordinary skill in the art over Hunter and Bulan. Pet. 7-42. Petitioner cites the First Crayford Declaration in support of its positions. *See* First Crayford Decl. ¶¶ 63-142. Based on Petitioner's arguments and supporting evidence, we find Petitioner has made its case by a preponderance of the evidence and adopt the Petitioner's reasoning and factual assertions as our factual findings as summarized and discussed below.

1. Hunter (Exhibit 1003)

Hunter discloses "[a] power subsystem and method for providing phantom power and third pair power

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[13] At the Final Hearing Petitioner objected to a definition that did not include "at least." Tr. 14:13-19.

via a computer network bus." Ex. 1003, Abstract. Phantom power is power that may be routed through the same cable employed to carry data through the network. *Id.* at col. 17, ll. 2-5. "[P]hantom powering [] is employed in current telephone systems." *Id.* "In a preferred embodiment of the first aspect of the present invention, the bus comprises a 10Base-T bus." *Id.* at 21:17-18.

Figure 2 of Hunter is reproduced below.

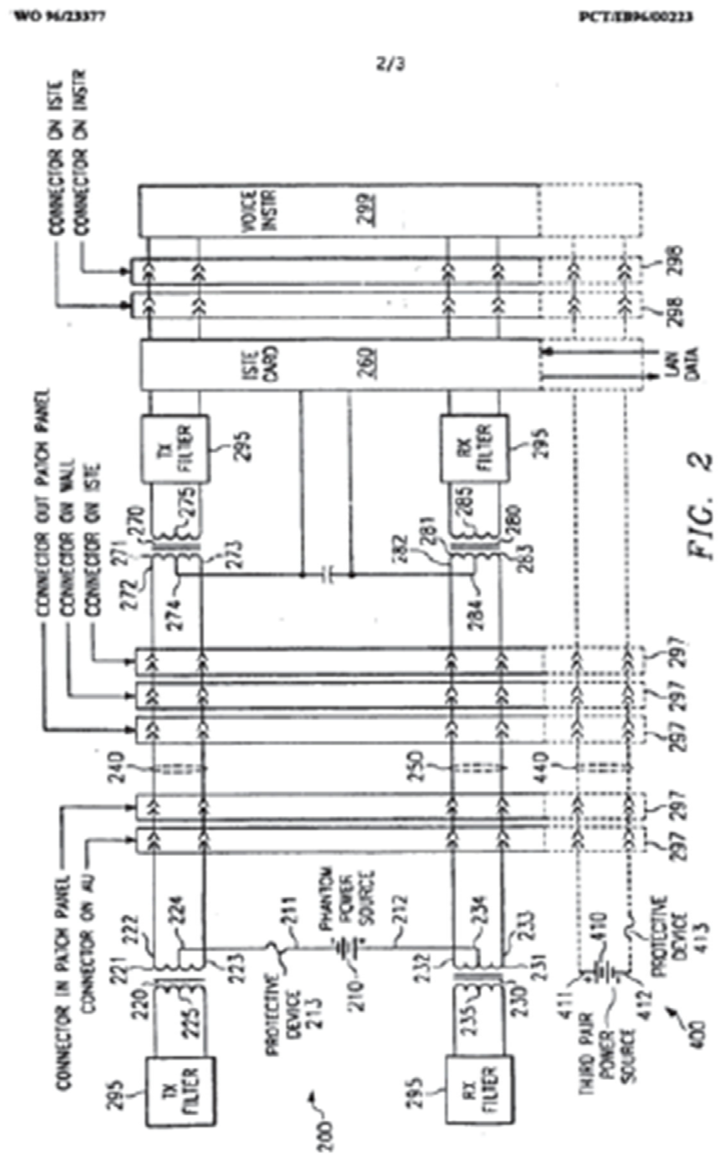

FIG. 2

Figure 2 is a schematic diagram of a phantom powering subsystem 200. Ex. 1003, 35:21-23. "The phantom powering subsystem 200 comprises a power supply 210 having a positive output 211 and a negative output 212." *Id.* at 35:27-29. The subsystem also includes first and second transformers 220 and 230 with windings having end taps and center taps 224, 234. *Id.* at 36:1-6. First and second twisted-pair conductors 240 and 250 are connected to the respective end taps of the transformers "to allow data communication there between." *Id.* at 36:7-12. The 10Base-T bus includes the "two twisted-pair conductors 240, 250, each used for unidirectional transmission of data." *Id.* at 37:20-23.

One of the twisted pairs is employed for transmitting data from equipment 260 (Integrated Services Terminal Equipment, "ISTE") "while the other of the twisted pairs (say, 240) is used for receiving data into the equipment 260." Ex. 1003, 23:18-21, 37:22-26. "The subsystem further comprises a protective device 213 coupled to the power supply 210 to prevent power exceeding a desired amount from passing through the protective device 213." *Id.* at 38:12-15.

2. Bulan (Exhibit 1004)

Bulan discloses a current control apparatus for supplying direct current flow from a source of power via a transmission line to a telecommunications terminal so that the telecommunications apparatus is "continuously operable while drawing a load current which is exceeded by an inrush current being greater than the load current at a moment of power up." Ex. 1004, col. 2, ll. 17-23. Bulan's system is used in a network having terminal equipment ("TE") which includes a DC to DC converter ("DC-DC") in a well-known phantom power feed arrangement. *Id.* at col. 1, ll. 52-56, col. 3, ll. 53-56, col. 4, ll. 2-10.

"The current control apparatus is for connection in series between the power source and the transmission line." Ex. 1004, col. 2, ll. 23-25. A current path switch is placed between the power source and the transmission line. *Id.* at col. 4, ll. 17-25.

Figure 2 of Bulan is reproduced below.

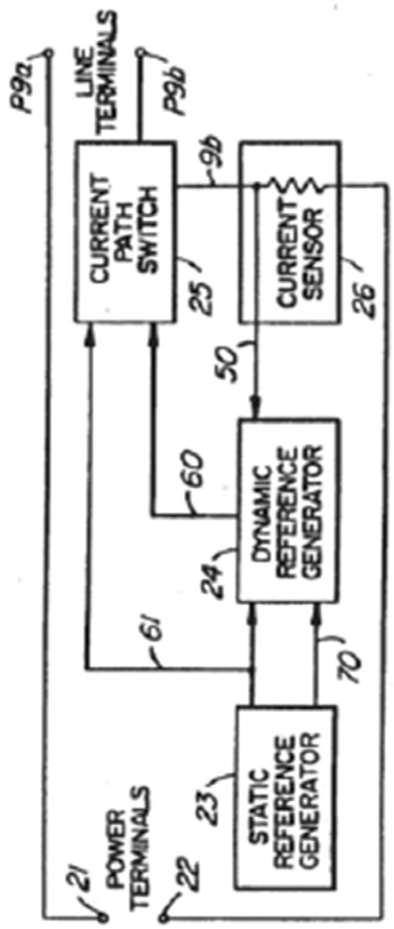

FIG. 2

Figure 2 is a schematic diagram of a line interface circuit for coupling current from the power source. Ex. 1004, col. 4, ll. 17-22. As shown in Figure 2, a static reference generator provides a stable voltage supply on a lead for use by a dynamic reference generator and the current path switch. *Id.* at col. 4, ll. 25-30. The dynamic reference generator generates a control signal for use by the current path switch. *Id.* at col. 4, ll. 33-36. The current path switch is required to provide a current path which at any one time is of a very low impedance, or alternately is of a much higher impedance, in accordance with operation of the TE connected to the network. *Id.* at col. 4, ll. 35-40.

Current exceeding Bulan's static limit, set by the static reference generator, is detected by the current sensor indicating a current inrush condition. Ex. 1004, col. 3, ll. 5-12, col. 4, ll. 23-24, col. 5, ll. 37-39. The dynamic reference generator responds to this magnitude of current by setting a maximum limit on the inrush current. *Id.* at col. 3, ll. 7-12, col. 5, ll. 6-15, ll. 42-46, Fig. 4 (see resistors 52 and 57 and capacitor 53). When the TE's DC-DC has finally completed its startup, the TE can draw operating power and proceed to draw a normal operating current that remains below Bulan's static limit. *Id.* at col. 2, ll. 1-8, col. 3, ll. 5-6.

If "during start up there are several inrushes, the maximum permitted current will return to a high point of slightly more than the current which was permitted just before the envelope returned to the normal load current level." Ex. 1004, col. 7, ll. 7-13. "This may happen several times, as may be peculiar to the particular terminal equipment being connected to the line." *Id.*

3. Claim 1

Addressing the preamble of claim 1, limitation [a],[14] "[a] piece of Ethernet terminal equipment," Petitioner alleges the ISTE of Hunter is "'Ethernet terminal equipment' because (10Base-T) Ethernet data transmissions can originate and terminate there." Pet. 24 (citing Ex. 1003, 37:19-28 ("[T]he bus [to the ISTE] comprises a 10Base-T bus.")). Petitioner also shows that the TE may include ISTE card 260 coupled to voice instrument 299 and drawing power from the circuit, as explained further below. Pet. 9 (showing TE on the right-hand side of connectors on cards 297 of Hunter's Figure 2), 25-26 (citing equipment in Hunter that draws power); First Crayford Decl. ¶ 102 (discussing "components along the path" of Hunter's Figure 2 (citing Exhibit 1003, 35:27-38:25, Fig. 2)). Petitioner concludes it would have been obvious to a person of ordinary skill in the art to "implement the teachings of Hunter with terminal equipment other than the exemplary ISTE, and/or with a bus applying other Ethernet standards (such as 100Base-T)." *Id.* at 25 (citing Ex. 1003, 16:26-18:1, 19:2-8 ("primary object" to provide "phantom" power "to equipment coupled to a local area network, including, but not limited to, Ethernet®, Token Ring®, ATM, and isoEthernet®."), 21:11-13, 26:7-11, claims 3 ("bus comprises a two-pair twisted-pair bus selected

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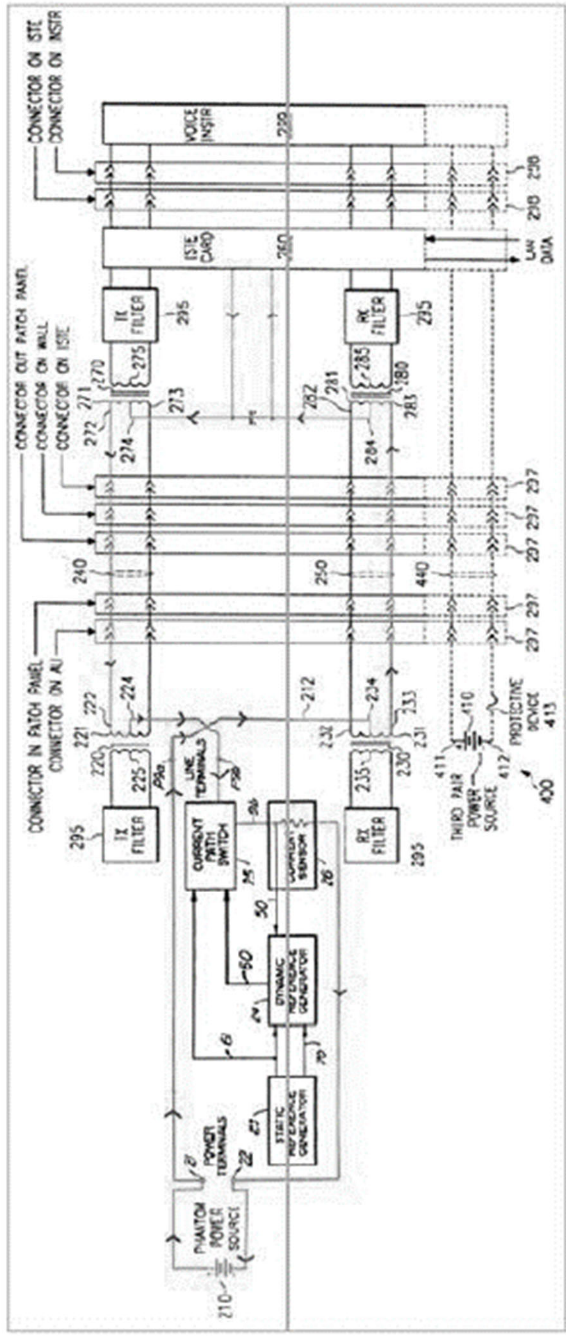
[14] Petitioner's convention for identifying the limitations of claim 1 is to bracket them in alphabetical order. Accordingly, the preamble, the first limitation of claim 1, is designated [a]. *See, e.g.,* Pet. 24. We follow the convention for purposes of this Decision.

from the group consisting of: "10Base-T, Ethernet®, Token Ring®, ATM, 100Base-T, and isoEthernet®"), claims 13, 29: First Crayford Decl. ¶ 100).

Claim 1 next recites as limitation [b] "an Ethernet connector comprising first and second pairs of contacts used to carry Ethernet communication signals." Hunter teaches that "one of the twisted-pairs (say, 250) is employed for transmitting data from the equipment 260, while the other of the twisted-pairs (say, 240) is used for receiving data into the equipment 260." Ex. 1003, 7:19-26. Petitioner cites the preceding from Hunter as well as Figure 2, reproduced in Section II.C.1 above, as showing "the TE includes an Ethernet connector with a first and second pair of contacts for connecting to each of the two twisted-pairs (which are used to carry both power and Ethernet communication signals)." Pet. 26-27 (citing Ex. 1003, 38:21-25, Fig. 2 ("connectors 297")).

Addressing limitation [c], "at least one path for the purpose of drawing DC current," Petitioner relies on the combined circuit of Hunter and Bulan annotated as "Petition Figure 3" from page 15 of the Petition, which is reproduced below.

PETITION FIGURE 3



Petition Figure 3 includes Figure 2 of Hunter (reproduced above in Section II.C.1) modified by substituting the current control apparatus from Figure 2 of Bulan (reproduced above in Section II.C.2) for the protective device 213 from Figure 2 of Hunter. Pet. 15 (citing First Crayford Decl. ¶ 77). Petitioner argues "[t]he purpose of Hunter's phantom-powering system is to permit the TE to draw DC current from the same twisted-pairs it uses to communicate Ethernet data." *Id.* at 27 (citing Ex. 1003, 21:27-29 ("each of the twisted-pair conductors as a rail by which to deliver DC power to the equipment"). Referencing Petition Figure 3, Petitioner traces the flow of DC current, shown in red with arrows indicating current direction, from phantom power source 210 to the TE (ISTE Card) and back. *Id.* at 27-28.

Claim 1 next recites as limitation [d], "the at least one path coupled across at least one of the contacts of the first pair of contacts and at least one of the contacts of the second pair of contacts." Petitioner relies on the showing made above for limitation [c], "at least one path for the purpose of drawing DC current." Pet. 28 (citing Ex. First Crayford Decl. ¶ 103). Petitioner cites to its showing regarding coupling of contacts. *Id.*; *see also id.* at 27 (describing the current path "through a contact in 'CONNECTOR ON ISTE' 297 . . . through the TE device . . . through the TE's 'center tap 274,' through a contact in 'CONNECTOR ON ISTE' 297 . . . ").

Addressing limitation [e] of claim 1, the "piece of Ethernet equipment to draw different magnitudes of DC current flow via the at least one path" recited in claim 1, Petitioner argues both Hunter and Bulan have a DC-to-DC-converter ("DC-DC"). Pet. 28 (citing

Ex. 1003, 39:5-6; Ex. 1004, col. 1, ll. 52-56). The First Crayford Declaration states that the DC-DC converters of the references are "to convert the phantom power supplied via the twisted-pair Ethernet cable into suitable operating power for the TE." First Crayford Decl. ¶ 104. Petitioner relies on the preceding to meet the recited limitation because both references include DC-DC and because the TE's "current draw is regulated by the Bulan current control apparatus in the Hub, the TE will draw <u>different magnitudes of DC current flow</u> via the at least one path." Pet. 28-29.

More specifically, Petitioner asserts that when power is first applied to Bulan's current control circuit the DC-DC will draw an inrush of current which rises to the static current limit and then to the dynamic current limit. Pet. 29 (citing Ex. 1004, col. 1, ll. 57-65 ("[t]he surge of current . . . required to initiate operation of the typical [DC-DC]"), col. 3, ll. 3-12 (static and dynamic current limits), col. 5, ll. 36-46, col. 6, ll. 36-38). Petitioner asserts that Bulan then switches to high impedance in the current path, forcing the current to a "trickle" level and then to zero. *Id.* at 29 (citing Ex. 1004, col. 3, ll. 13-21, col. 4,ll. 35-40, col. 6, ll. 36-51). In the next step of its showing, Petitioner argues Bulan determines that when the current in the circuit goes to zero it is indicative of the DC-DC startup and not an operational fault, like a short circuit, which would continue to draw a trickle current. *Id.* at 29-30 (citing Ex. 1004, col. 1, ll. 23-29, col. 1, ll. 57-65, col. 2, ll. 1-14, col. 3, ll. 22-25, col. 6, ll. 46-51). Petitioner concludes that Bulan draws different magnitudes of DC current by switching the high impedance out of the current path so the DC-DC may startup, reaching "the normal operating current level of the TE" if current stays within the static and dynamic limits." *Id.* at 30. Alternatively, Petitioner argues if the static and dynamic limits are exceeded, then further iterations are done until the DC-DC completes startup. *Id.* (citing Ex. 1004, col. 4, ll. 67-5:1, col. 6, ll. 52-58, col. 6, l. 65-col. 7, l. 14 "This may happen several times, as may be peculiar to the particular terminal equipment being connected to the line.").

The next limitation of claim 1, limitation [f], recites the "the different magnitudes of DC current flow to result from at least one condition applied to at least one of the contacts of the first and second pairs of contacts." Petitioner argues the different magnitudes of current flow discussed above in analyzing the "piece of Ethernet equipment to draw different magnitudes of DC current flow via the at least one path" limitation of claim 1 all result from "conditions applied to at least one of the contacts of the first and second pairs of contacts." Pet. 30 (citing First Crayford Decl. ¶¶ 109-113). For example, Petitioner points out that plugging the phantom-powered twisted-pair Ethernet cable into the TE "is a condition applied to the contacts: *e.g.*, current then begins to flow through them." *Id.* at 31.

The last limitation of claim 1 is limitation [g], "wherein at least one of the magnitudes of the DC current flow to convey information about the piece of Ethernet terminal equipment." Petitioner argues Bulan monitors the different magnitudes of DC current flow drawn by the TE. Pet. 31 (citing Ex. 1004, col. 4,ll. 23-24, col. 2, ll. 1-14; First Crayford Decl. ¶¶ 114-118). For example, at startup if the current drawn by the TE exceeds the static limit and then the dynamic limit"

> this conveys to Bulan that a potentially dangerous current "inrush" is occurring at the TE—though Bulan does not yet know whether the inrush is merely "the surge required to initiate operation of the typical [DC-DC]" in the TE (which should be permitted), or the presence of an "unintended operational fault[]" such as a "short circuit[]."

Id. at 32 (citing Ex. 1004, col. 1, ll. 60-62, col. 1, ll. 28-29, Abstract, col. 3, ll. 5-6, col. 3, ll. 7-12). As discussed above, Petitioner argues Bulan responds by switching a high impedance into the path. *Id.* (citing Ex. 1004, col. 3, ll. 13-21, col. 4, ll. 35-40, col. 6, ll. 36-44).

Patent Owner alleges Petitioner's citation to "Ethernet®" has not been explained as relevant to the claimed invention. PO Resp. 34 (citing Ex.1003 12, 14, 21, 23, 28, 35, 36). Patent Owner also contends that the term "Ethernet®" in Hunter refers to the original trademarked version of Ethernet owned by Xerox Corporation, not the subsequent non-trademarked versions of Ethernet, such as 10Base-T and 100Base-T. *Id.* (citing Pet. 26; First Crayford Decl. ¶100, n. 6.)

Patent Owner's argument is not persuasive. Hunter "discloses 10Base-T, 100Base-T4, and isoEthernet standards that all teach the 'Ethernet' limitation." Pet. Reply 11 (citing Pet. 24-26). For example, Hunter teaches the following:

> <u>In the illustrated embodiment, the bus comprises a 10Base-T bus. A 10Base-T bus</u>

> conventionally comprises two twisted-pair conductors 240, 250, each used for unidirectional transmission of data. Thus, in this embodiment, one of the twisted pairs (say, 250) is employed for transmitting data from the equipment 260, while the other of the twisted-pairs (say, 240) is used for receiving data into the equipment 260. The present invention preferably employs each of the twisted-pair conductors as a rail by which to deliver DC power to the equipment 260.

Ex. 1003, 37:19-28 (emphasis added). Patent Owner does not dispute that the term 10Base-T and 100Base-T teach "Ethernet." PO Resp. 18. Thus, regardless of whether Hunter's use of the term "Ethernet®" includes 10Base-T, Hunter independently teaches 10Base-T.[15] *Id.*

Patent Owner argues that the Integrated Services Terminal Equipment (ISTE) card of Hunter is an interconnecting "hub[]" and not claim 1's "Ethernet terminal equipment" and claim 104's "end device." PO Resp. 34-39; *see also id.* at 45-46 (making same argument). Patent Owner alleges that the only terminal equipment in Figure 2 of Hunter is voice instrument 299. *Id.* at 35. According to Patent Owner, when Figures 1 and 2 of Hunter are considered together, those figures "show phantom-power being delivered from a multimedia Hub ('120' in Hunter's Figure 1) through multiple connectors (each labelled '297' in Hunter's Figure 2) to an intermediate Hub ('150' in Hunter's Figure 1)." *Id.* at 37 (citing Ex. 2038 ¶ 71).

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15 There is no dispute that 10Base-T is an IEEE Ethernet standard. First Crayford Decl. ¶ 98 n.5; Madisetti Decl. ¶ 32.

Patent Owner concludes that "Hunter's phantom-power circuit does not connect to the phones ('end devices'), which are connected to the intermediate Hub through separate connectors (each labelled '298' in Hunter's Figure 2)." *Id.*

Patent Owner's argument is not persuasive. Patent Owner's argument focuses on the specific configuration shown in Figure 2 of Hunter. PO Resp. 34-39. Petitioner asserts Hunter is not limited to the configuration shown in Figure 2. *See, e.g.*, Pet. 25 (obvious to implement "Hunter with terminal equipment other than the exemplary ISTE"). Even were Hunter so limited, we agree with Petitioner and find that Hunter teaches both recited terms, "terminal equipment" and "end device," through its teaching of an Integrated Services Terminal Equipment (ISTE) card that "receives and transmits data over a 10Base-T bus." *See* Pet. Reply 11-12 (citing Pet. 24-26); *see also* Ex. 1003, 23:19-20 ("Integrated Services Terminal Equipment (ISTE)"); Petition Figure 3 above (showing the ISTE).

The ISTE of Hunter is "terminal equipment," as the name itself suggests. Hunter's Figure 2 depicts an "isoEthernet system where the ISTE splits iso-Ethernet data, a combined ISDN and 10Base-T signal, into ISDN data for Voice Instrument 299 and 10Base-T LAN data for other equipment." Pet. Reply 11-12 (citing Ex. 1003, Fig. 2; Second Crayford Declaration ¶ 68[16]); Pet. 24-26. A person of ordinary skill "would

[16] We have reviewed Patent Owner's Observations relating to the Second Crayford Deposition. None of the Observations concisely raise any issue about the credibility of Mr. Crayford's testimony. *See, e.g.*, Obs. 14. To the extent they are not directed to credibility, the Observations do not change our findings.

understand that both ISDN and 10Base-T Ethernet data terminate at the Hunter ISTE." *See* Pet. Reply 11-12 (citing Second Crayford Decl. ¶ 68). A drawing made by Dr. Madisetti's during his deposition, Ex. 1034, "shows 'Ethernet terminal equipment' can include a remote module, a PC or Phone device, and associated connectors." *See id.* at 13 (citing Ex. 1034). We specifically find that "the power supplied to the ISTE in Hunter powers the Voice Instrument." *Id.* at 14 (quoting Ex. 1003, 38:25-27) ("[V]oice instrument 299 is . . . couplable to the equipment 260 and receives both data and power therefrom."); *see also* Second Crayford Decl. ¶ 71 (noting Hunter explains the Voice Instrument "remain[s] powered even when associated devices are not or in the event of a power failure" (quoting Ex. 1003, 37:15-18)); First Crayford Decl. ¶ 102 (the path delivering power continues "at least" to the ISTE, which continues to the Voice Instrument); Pet Reply 13 (citing First Crayford Dep., 84:6-9 ("everything to the right of [connector 297 is] what we called the terminal equipment or data terminal equipment"); Pet. Fig. 1).

Patent Owner argues Hunter does not apply to Ethernet communications. PO Resp. 39-41. In support, Patent Owner cites to Hunter's disclosure that "[e]xcept for hub 170, all other hubs 140-180 (and the PC 125) are connected to the multimedia hub 120 through 'isoEthernet® network interfaces.'" *Id.* at 40 (citing Ex.1003, 34:28-35:2, *see also* 34:19-21, 35:14-16, 35:27-28, 36:13-17, Fig.1). According to Patent Owner, isoEthernet network interfaces only carry ISDN signals, not Ethernet signals. *Id.* (citing Ex. 1003, 15:15-18; Madisetti Decl. ¶ 76). Patent Owner also argues that hub 170 in Figure 1 of

Hunter is connected to multimedia hub 120 through a 10Base-F interface. *Id.* (citing Ex. 1003, 36:20). According to Patent Owner, a 10Base-F interface requires a fiber connection, and "fiber cannot carry electrical current." *Id.* at 40-41 (citing Madisetti Decl. ¶ 78).

Patent Owner's argument is not persuasive. Patent Owner focuses on the embodiment shown in Figure 1 of Hunter. PO Resp. 39-41. Hunter, though, is not limited to that embodiment. Hunter teaches that preferably "the bus comprises a <u>10Base-T bus</u>," but notes that "[t]hose of skill in the art will recognize . . . that the present invention <u>is also compatible</u> with Ethernet®, Token Ring®, ATM and *isoEthernet®* standards." Ex. 1003, 21:17-21, 26:3-11 (emphasis added). Therefore, contrary to Patent Owner's argument, Hunter is <u>not</u> limited to an embodiment in which network equipment is connected by isoEthernet interfaces.

Even if limited to network equipment connected by isoEthernet interfaces, we are not persuaded that isoEthernet interfaces <u>only</u> carry ISDN signals, <u>not</u> Ethernet signals. PO Resp. 41 (citing Ex. 1003, 15:15-18; Madisetti Decl. ¶ 76). The portion of Hunter cited by Patent Owner indicates that isoEthernet interfaces <u>can</u> carry ISDN signals, but does not establish that isoEthernet interfaces <u>only</u> carry ISDN signals. Ex. 1003, 15:15-18. Paragraph 76 of the Madisetti Declaration cited by Patent Owner states that "isoEthernet used ISDN signals, not Ethernet," but Dr. Madisetti provides no support for that statement other than citing the same portion of Hunter, "Transport Standards," discussed above. Madisetti Decl. ¶ 76. In contrast, the documentary evidence that Petitioner submitted with the Petition (Pet. iv (exhibit list); Pet. Reply 11) indicates that isoEthernet includes a 10Base-T mode in which the "IsoEthernet layer functions as a 10Base-T transceiver" (Ex. 1010, 165).[17] As a result, even if we accept Patent Owner's premise that hub 120 in Figure 1 of Hunter communicates with hubs 140, 150, 160, 180 using isoEthernet interfaces, the evidence of record indicates that isoEthernet interfaces carry 10Base-T signals at least when used in the 10Base-T mode of isoEthernet.

Patent Owner's argument regarding 10Base-T hub 170 in Figure 1 of Hunter also is not persuasive for an additional reason. As discussed above, Patent Owner alleges that 10Base-T hub 170 is connected to multimedia hub 120 only through a 10Base-F interface. PO Resp. 40 (citing Ex. 1003, 36:20). The evidence cited by Patent Owner, however, does not support that argument. The cited portion of Hunter states that "[t]he 10Base-T hub 170 further provides an Ethernet® AU interface and a single 10Base-F network interface." Ex. 1003, 34:18-20 (emphasis added). The phrase "further provides" in this portion of Hunter indicates that 10Base-T hub 170 also includes a 10Base-F interface, but does not establish that 10Base-T hub 170 only includes a 10Base-F interface. *Id.*

At the oral hearing, Patent Owner further argued that, although Hunter teaches a 10Base-T bus, Hunter does not teach that the 10Base-T bus carries both 10Base-T signals and DC power. Tr. 126:9-127:11. According to Patent Owner, when the 10Base-T bus

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[17] We cite to the page numbers that Petitioner added to Exhibit 1010. Also, like Hunter, Exhibit 1010 refers to the IEEE 802.9a standard for isoEthernet. Ex. 1003, 15:15-18; Ex. 1010, 160.

carries DC power, it only carries ISDN signals. *Id.* at 128:22-129:3. Patent Owner reads Hunter too narrowly. For example, Hunter teaches the following:

> In the illustrated embodiment, the bus comprises a 10Base-T bus. <u>A 10Base-T bus conventionally comprises two twisted-pair conductors 240, 250, each used for unidirectional transmission of data</u>*.* Thus, in this embodiment, one of the twisted pairs (say, 250) is employed for transmitting data from the equipment 260, while the other of the twisted-pairs (say, 240) is used for receiving data into the equipment 260. <u>The present invention preferably employs each of the twisted-pair conductors as a rail by which to deliver DC power to the equipment 260</u>.

Ex. 1003, 37:19-28 (emphasis added). In other words, Hunter teaches <u>generally</u> that the 10Base-T bus can deliver DC power over the same two twisted pair conductors used to transmit data. *Id.* at 21:22-29, 37:19-28. We, therefore, do not read Hunter as teaching that the 10Base-T bus can only carry DC power with ISDN signals. Rather, as discussed above, Hunter indicates that isoEthernet and ISDN are just <u>alternatives</u> to a preferred embodiment that uses 10Base-T. Ex. 1003, 21:17-21 ("also compatible with . . . isoEthernet®"); *id.* at 26:3-11 ("also compatible with . . . isoEthernet®"); *id.* at 39:15-16 ("compatible with ISDN standards").

Patent Owner contends Petitioner has not shown that the terminal equipment is configured "to draw different magnitudes of DC current flow via the at least one path . . . to convey information about" the recited equipment or device. PO Resp. 47-50. Patent

Owner argues that Bulan's current "information" cannot be about the terminal equipment (TE) because Bulan is separate from the TE and cannot convey information about itself. *Id.* at 48-49 (citing Madisetti Decl. ¶¶ 110, 112; *id.* at 48, Petition Figure 3 (illustrating the combined Bulan and Hunter circuit)). Patent Owner contends that "Bulan describes a circuit in the hub-not the terminal equipment-that manipulates the voltage applied to a generic, unknown, terminal device if it contains a DC-DC converter." *Id.* at 49 (citing Madisetti Decl. ¶ 113.)

We are not persuaded that the Hunter and Bulan combination does not convey information about a terminal device as recited in independent claims 1 and 104. The claims only require "at least one of the magnitudes of the DC current flow to convey information about" the "Ethernet terminal equipment" or the "end device." In one Bulan example, the current drawn by the TE may exceed the static limit and dynamic limit. *See* Pet. 32. Information about the TE is conveyed which may be a permitted current surge required to initiate operation of the TE or the presence of an "unintended operational fault[]" which is suppressed by adding a high impedance to the path. *Id.* (citing Ex. 1004, col. 1, ll. 60-62, col. 1, ll. 28-29, Abstract, col. 3, ll. 5-6). Bulan's iterative process "as a whole conveys information about the electrical design and state of the TE." *Id.* at 33 (citing Ex. 1004, col. 7. ll. 7-14, Fig. 7).

We are not persuaded that Hunter shows interconnecting "hubs" and not Ethernet terminal devices. As discussed above we find that the recited "terminal equipment" or "end device" includes Integrated Services Terminal Equipment (ISTE) card 260 and may also may include Voice Instrument 299 or other similar attached terminal devices envisioned by Hunter's system. We find that a person of ordinary skill would understand the hubs described in Hunter and the PC each connect to Multimedia Hub 120 (Ex. 1003, Fig. 1) "to a telephone and each have an ISTE Card to separate LAN data from voice data as shown in Figure 2." Pet. Reply 16 (citing Second Crayford Decl. ¶ 74). We find that a person of ordinary skill "would understand the hubs themselves could include power sources for phantom powering associated devices." *Id.* (citing Ex. 1003, 19:2-7).

4. Claim 104 and Dependent Claim 103

Petitioner contends that "[c]laims 1 and 104 recite identical language, except that claim 104 refers to a 'powered-off end device' instead of the 'piece of Ethernet terminal equipment' in claim 1." Pet. 41. Claim 103 depends from claim 1, among other claims, and recites the same "powered-off" limitation present in independent claim 104. *Id.* at 41-42. We address claims 103 and 104 immediately below.

Claim 103 depends from claim 1 and multiple other dependent claims, additionally reciting "wherein the piece of Ethernet of terminal equipment is a piece of powered-off Ethernet terminal equipment." Independent claim 104 is identical to claim 103, including claim 1 limitations, differing in that the device claimed is "a powered-off end device" instead of "powered-off Ethernet terminal equipment." We interpreted "powered off" to mean "without operating power." *See* Section II.A.4 above. Because of their similarity, Petitioner references its showing for claims

1 and 103 (discussed below) for its showing regarding claim 104. Pet. 41-42.

With respect to claim 103, Petitioner asserts Bulan regulates the initial inrush current needed to start the TE's DC-to-DC converter (DC-DC). Pet. 40 (citing Ex. 1004, col. 1, ll. 52-62, col. 7, l. 78, Fig. 7). Because the TE cannot draw operating power until the DC-DC has started, Petitioner asserts the TE is "powered-off," as we construed the term, throughout all of the iterations of the Bulan procedure previously described. *Id.*; *see also* First Crayford Decl. ¶¶ 134-138 (detailing Bulan's process). Petitioner further contends both Hunter and Bulan refer to the uses of DC-DC and it would have been obvious that the TE would require a DC-DC to "convert the phantom power supplied by the Hub into power suitable for operating the TE." Pet. 40 (citing Ex. 1003, 38:28-39:8; Ex. 1004, col. 1, ll. 52-56); *see also id.* at 41 (citing Ex. 1004, col. 1, ll. 57-62, col. 7, ll. 7-14, Fig. 7). Petitioner argues that only once the DC-DC has complete startup does the TE receive operating power and draw "normal operating current." *Id.* at 41 (citing Ex. 1004, col. 1, ll. 57-62, col. 2, l. 2, col. 6, l. 65-col. 7, l. 14, Fig. 7). Petitioner concludes "the TE is 'powered-off' throughout all of the iterations of the Bulan procedure." *Id.*

Patent Owner argues Petitioner has not shown that the claims meet the limitations that recite a "powered-off device," including claims 103 and 104. PO Resp. 56-57. According to Patent Owner, Petitioner's showing relies on Bulan for its teaching of "applying <u>operating power</u> to the DC-DC converter, <u>which is part of the end device</u>: 'A typical TE includes a direct current to direct current (DC to DC[)]

converter.'" *Id.* at 57 (citing Ex. 1004 col. 1, ll. 52-56). Patent Owner concludes that Bulan is continuously applying operating power to the DC-DC converter which is a piece of the "Ethernet terminal equipment," and is not "powered off." *Id.* (citing Madisetti Decl. ¶ 141).

Patent Owner cites to an annotation of Bulan's Figure 7 (Response Figure 3) as supporting its position that Bulan's "control current apparatus" activates only when more than the normal operating current is applied to the device. PO Resp. 58 (citing Madisetti Decl. ¶ 143). Patent Owner concludes that even the DC-DC converter is part of the TE and even if the TE is otherwise not operating the claim limitation of "powered-off" is met because "at least via its DC-DC converter-[it] is drawing operating power, and therefore is not "powered-off" under the Board's claim construction." *Id.* at 59-60 (citing Madisetti Decl. ¶ 146; *see also* First Crayford Decl. ¶ 136 (citing Ex.1004, col. 1, ll. 52-56 ("A typical TE includes a . . . DC to DC converter")).

We construed "powered-off" to mean without operating power but that some power may be applied to the "remote module" and it may still be "powered-off." The TE cannot draw sufficient power "to operate/perform its functions until the DC-DC component has completed its startup," at the end of the iterative Bulan procedure. Pet. Reply 24 (citing Pet. 39-42, 11-13, 16-24, 28-30). We are not persuaded that when a component of a TE receives power that the TE has "operating power." *See* Second Crayford Decl. ¶ 97 (for example, a VCR does not receive "operating power" when a display is on). This conclusion follows from the Specification, which explains that as between the central module and the remote module attached to the equipment to be monitored, the remote module is always powered. Ex. 1001, col. 3, ll. 27-30, col. 5, ll. 39-58.

We find that Petitioner has shown that the TE is "powered-off" when the "remote module" described in the Specification receives operating power while the TE (*i.e.*, PC) does not. *See* Pet. Reply 26-27. We are not persuaded by Patent Owner's argument that, when just the DC-DC converter receives power, the TE has operating power. We find that the "powered-off" limitation is shown by the combination of Hunter and Bulan and the TE may be "powered-off" even when the DC-DC converter has operating power.

5. Dependent Claims 5 and 31

Petitioner's showing on claims 5 and 31 is found at pages 33 through 35 of the Petition and paragraphs 119 through 123 of the First Crayford Declaration. Petitioner's stated reasons for modifying Hunter with respect to claim 1 also apply to all the dependent claims. *See* Pet. 10-15. Claims 5 and 31 both depend from claim 1. Each recites a further limitation on the "Ethernet terminal equipment" of claim 1.

Claim 5 requires "BaseT Ethernet communication signals." Petitioner relies on its showing for limitation [b] of claim 1 for "10Base-T" or "100Base-T" as its showing. Pet. 33; First Crayford Decl. ¶ 119 (referring to ¶ 101 on limitation 1 [b], "twisted-pair Ethernet (*e.g.*, 10Base-T or 100Base-T) . . . two twisted pairs []are used to carry both power and Ethernet communication signals[].").

Patent Owner argues that Petitioner's reliance on Ethernet in general does not disclose the 10Base-T or 100Base-T standards. PO Resp. 54 (citing Pet. 26. We are persuaded that Hunter discloses both Ethernet® and "BaseT Ethernet communication signals" as recited in claim 5. Pet. Reply 11 (citing Pet. 24-26); *see also* Section II.C.3 above (Hunter discloses 10Base-T, 100Base-T4, and isoEthernet standards). We credit the First Crayford Declaration that regardless of the type of twisted-pair Ethernet, 10Base-T or 100Base-T, Hunter discloses Ethernet communications. First Crayford Decl. ¶ 100 (citing Ex. 1001, claim 3). We find Hunter shows the 10Base-T and 100Base-T recitations in claim 5 because 10Base-T and 100Base-T are twisted pairs, as Dr. Madisetti testifies. Madisetti Decl. ¶ 134. We construed 10Base-T and 100Base-T to mean "twisted pair Ethernet in accordance with the 10BASE-T or 100BASE-T standards." *See* Section II.A.3 above. Patent Owner does not contest that construction. *See* PO Resp. 18.

Claim 31 requires that the "DC current" recited in claim 1 is within "a predetermined range of magnitudes." Petitioner cites to Bulan examples, including that current will rise from zero to the "static limit" or above or, in another example, fall to the static limit to trickle level and finally to zero. *Id.* at 33-34 (citing Ex. 1004, col. 1, ll. 57-65, col. 3, ll. 3-25, col. 6, ll. 36-58, col. 7, ll. 3-4 ("falls to less than the static threshold"), col. 7, ll. 11-13: First Crayford Decl. ¶ 120).

6. Dependent Claims 43 and 111

Petitioner's showing on claims 43 and 111 is found at pages 35 through 36 and 42 of the Petition and paragraphs 124 and 140 of the First Crayford Declaration. Claim 43 depends from claim 1 and recites "wherein the information to distinguish the piece of Ethernet terminal equipment from at least one other piece of Ethernet terminal equipment." Petitioner relies, in part, on its showing with respect to limitation [g] of claim 1, which is similar to claim 43.[18] *See* Pet. 35; Section II.C.3.a above. Claim 43 differs from limitation [g] of claim 1 in that the "information" must be capable of distinguishing between at least two different pieces of Ethernet terminal equipment. *See* n.19. Petitioner relies on Bulan's "procedure iterations as a whole distinguishes the TE from other TE's which would have a different pattern." Pet. 36 (citing Ex. 1004, col. 7, ll. 11-14 ("This may happen several times, as may be peculiar to the particular terminal equipment being connected to the line."); First Crayford Decl. ¶ 124). Claim 111 depends from claim 104 and recites the same subject matter as claim 43 for a "powered-off end device" instead of "Ethernet terminal equipment." Petitioner relies on its showing regarding claim 43 (see above). *Id.* at 42 (citing First Crayford Decl. ¶ 140).

Patent Owner argues that none of the Petitioners' arguments or supporting evidence show the "distinguish" limitation recited in claims 43, 111, and 103. PO Resp. 50-51 (citing Pet. 35-36). Patent Owner lists the four examples cited in the Petition: inrush current, trickle current, a decline in trickle current to

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[18] Limitation [g] of claim 1 recites "wherein at least one of the magnitudes of the DC current flow to convey information about <u>the piece</u> of Ethernet terminal equipment" instead of "<u>at least one other piece</u> of Ethernet terminal equipment" of claim 43. Emphasis added.

zero, and Bulan's iterative procedure as a whole. *Id.* Patent Owner repeats the argument we addressed above regarding distinguishing information in general. *See* Section II.C.3 above. Specifically to the instant issue, Patent Owner argues "none of Petitioners' four examples distinguishes one Ethernet terminal/end device from another Ethernet terminal/ end device." PO Resp. 51-52 (citing Madisetti Decl. ¶¶ 118, 119).

We find Petitioner has shown that, with respect to these apparatus claims, the Bulan circuit at least has the capability of distinguishing, and does distinguish, one piece of Ethernet equipment from another. *See Schreiber,* 128 F.3d at 1475-77. As discussed above in connection with claim 1, we are persuaded that Bulan's "procedure iterations as a whole distinguishes the TE from other TE's which would have a different pattern." Pet. 36 (quoting Ex. 1004, col. 7, ll. 11-14 ("This may happen several times, as <u>may be peculiar to the particular terminal equipment being connected to the line</u>.") (emphasis added); First Crayford Decl. ¶ 124). We find that "Hunter states that the Hub can include a protective device for each TE." Pet. Reply 20-21 (citing Ex. 1003, 42:21-23; Second Crayford Decl. ¶ 87). If an operational fault occurs, the Hub will cease providing power to the affected TE only. Pet. 21-24. We agree with Petitioner and find that "the Hub differentiates TEs from one another based on the detected magnitudes of current within the path for each TE." Pet. Reply 21 (citing Pet. 31-33, 35-36; 21-24; First Crayford Dep., 118:10-119:18, 126:21-127:9).

7. Dependent Claim 70

Petitioner's showing on claim 70 is found at pages 36 through 37 of the Petition and paragraphs 125 through 128 of the First Crayford Declaration. Claim 70 depends from claim 1 and recites "current for a first interval followed by a second magnitude of DC current for a second interval, wherein the second magnitude is greater than the first magnitude." Relying on the First Crayford Declaration, Petitioner shows that "[t]here are several intervals in which the DC current would comprise a second magnitude that is greater than the magnitude comprised in some previous interval." Pet. 36-37 (citing First Crayford Decl. ¶¶ 125-128); *see also id.* at 37 (citing Ex. 1004, col. 6, ll. 36-51, col. 6, ll. 53-58, col. 7, ll. 7-13) (switching a high impedance into a path and static and dynamic current limits).

8. Dependent Claims 72 and 123

Petitioner's showing on claims 72 and 123 is found at pages 38 and 42 of the Petition and paragraphs 129 and 141 of the First Crayford Declaration. Claim 72 depends from claim 1 and recites "wherein at least one magnitude of the DC current is part of a detection protocol." Petitioner argues "[t]he different magnitudes of DC current flow as relied on in Claim 1(e) and (g) are part of a detection protocol." Pet. 38 (First Crayford Decl. ¶ 129; *see* above regarding limitations [e] and [g] of claim 1). Relying on the cited First Crayford Declaration, Petitioner asserts the "detection protocol" of Bulan detects "whether the TE is experiencing an overcurrent condition, and to then further detect and distinguish between overcurrent conditions caused by a TE's DC-DC starting up and overcurrent conditions caused by unintended operational faults." *Id.* Petitioner concludes that Bulan removes the high impedance for startup but not for unintended faults and "this detection protocol is central to Bulan's purpose." *Id.*

Claim 123 depends from claim 104 and recites the same subject matter as claim 72 for a "powered-off end device" instead of "Ethernet terminal equipment." Petitioner relies on its showing regarding claim 72 (see above). *Id.* at 42 (citing First Crayford Decl. ¶ 141).

Patent Owner alleges the combination does not teach a "detection protocol" as required by claims 72 and 123. PO Resp. 56. Relying in part on its proposed construction of "protocol," the TE does not communicate with the circuit of Bulan but only "detects information" about the TE. *Id.*

In Section II.A.5 we construed "detection protocol" to mean that the claimed magnitude of DC current must be capable of being part of a detection protocol, which may involve, but is not limited to, rules for making a discovery or a mutually agreed upon method of communication. Patent Owner's arguments about "detection protocol" as required by claims 72 and 123 are based on its position that a communication back and forth must occur. *See* PO Resp. 56. We are persuaded that the different magnitudes of DC current flow detected by the Bulan circuit fall within the scope of "a detection protocol" because the circuit detects the state of the TE. *See* Pet. 38 (citing Pet. 27-29, 31-32; First Crayford Decl. ¶ 129). In addition, or alternatively, the TE components that create the different magnitudes have the capability of being part of a protocol as recited in these apparatus claims. *See In re Schreiber,* 128 F.3d at 1475-77. We determine, as noted above, it is not necessary that there be bi-directional communication as Patent Owner proposes in its claim construction.

9. Dependent Claims 74 and 75

Petitioner's showing on claims 74 and 75 is found at page 38 through 39 of the Petition and paragraphs 130 through 131 of the First Crayford Declaration. Claim 74 depends from claim 1 and recites "wherein the at least one path comprises an electrical component." Petitioner relies on the current path through the Bulan's current control apparatus, which includes "various electrical components," such as resistors 40 and 48 in Figure 3. Pet. 38 (citing Ex. 1004, col. 4, ll. 49-50, col. 4, ll. 60-65, Figs. 2, 3; First Crayford Decl. ¶ 130). This showing is also cited by Petitioner for claim 75, which depends from claim 74 and recites that the electrical component is a resistor. *Id.* at 39.

Patent Owner argues the "ISTE card" hub "Connector on ISTE" 297 of Hunter identified as the contacts for the path does not disclose a "resistor" in the path. PO Resp. 52, 53 (citing annotated Fig. 2 of Hunter; Pet. 26-27), 54 (citing Madisetti Decl. ¶¶ 131-132).

The claimed "at least one path" comprises an "electrical component" per claim 74 and the component is a resistor per claim 75. Patent Owner does not contest claim 74 but argues that the resistor of claim 75 is not in the recited path. Patent Owner argues the path is as shown in its Response. PO Resp. 53-54 (citing Madisetti Decl. ¶ 131). We find that the "at least one path" as proposed by Petitioner in the Hunter and Bulan combination is as shown in Petitioner Figure 3, which is shown and discussed at pages 14 through 15 of the Petition. *See* Pet. Reply 22 (reproducing Petition Figure 3). The path relied on by Petitioner shows a resistor 40 in the current sensor. *See* Pet. 38 (citing Bulan col. 4, ll. 49-50).

10. Dependent Claim 83

Petitioner's showing on claim 83 is found at page 39 of the Petition and paragraph 132 of the First Crayford Declaration. Claim 83 depends from claim 1 and recites "wherein the piece of Ethernet equipment comprises a controller." Petitioner argues that Ethernet terminal equipment commonly includes "a network controller to execute network protocol(s) needed by the device (*e.g.*, Ethernet, IP)." Pet. 39 (citing Ex. 1003, 10:12-14; First Crayford Decl. ¶ 132).

11. Dependent Claim 125

Petitioner's showing on claim 125 is found at page 42 of the Petition and paragraph 142 of the First Crayford Declaration. Claim 125 depends on claims 104 through 124 and recites "wherein the powered-off end device is a powered-off Ethernet end device." Petitioner challenges claim 125 to the extent it depends on claims 104, 111, and 123. Pet. 42 (heading n). Petitioner relies, among other things, its showing regarding claim 1's recitation of an "Ethernet terminal equipment." Pet. 42 (citing First Crayford Decl. ¶ 142).

12. Rationale for the Hunter and Bulan Combination

Petitioner advances several reasons to combine Hunter and Bulan, primarily based on their interrelated teaching. Pet. 10-14. Petitioner argues both Hunter and Bulan are directed to systems for phantom powering network terminal equipment. *Id.* at 10 (citing Ex. 1003, Abstract, 36:12-15, Fig. 2; Ex. 1004, col. 4:7-10, Fig. 1). Petitioner argues "Hunter and Bulan disclose similar terminal equipment that could be phantom powered, and similar levels of DC voltage." *Id.* at 10-11 (citing Ex. 1003, 23:19-21, 23:9; Ex. 1004, Abstract, col. 1, ll. 49-50; First Crayford Decl. ¶ 67).

Petitioner further argues "Bulan is intended to provide a superior replacement for the 'typical current limiting circuit' in such phantom powering systems, and Hunter employs just such a current limiting circuit: *i.e.*, its 'protective device 213.'" Pet. 11 (citing Ex. 1004, col. 1, l. 65-col. 2, l. 14; Ex. 1003, 38:12-15). The current control circuit of Bulan would, according to Petitioner, replace Hunter's protective device 213. *Id.* (citing Ex. 1003, 38:15-19 (protective device protects from "overcurrents that may damage" the "power supply 210 and the bus"); First Crayford Decl. ¶ 68).

Petitioner notes that "Bulan criticizes the 'typical current limiting circuit' as 'inappropriate for operation throughout the whole current load regime'" because it fails to distinguish between operational faults and a normal power up event in a TE that contains a DC-DC. Pet. 11 (citing Ex. 1004, Abstract, col. 1, ll. 26-31, col. 1, l. 52-col. 2, 1; First Crayford Decl. ¶ 69). According to Petitioner, this is in part because the "typical current limiting circuit" either sets a current limit so low that startup cannot occur or so high that a fault will draw excessive current jeopardizing the operation of the power circuit. *Id.* at 11-12 (citing Ex. 1004, col. 1, l. 66-2:8; First Crayford Decl. ¶ 71). Petitioner argues "Hunter's protective device 213 suffers from the deficiency identified in Bulan." *Id.* at 12 (citing Ex. 1003, 38:12-19; First Crayford Decl. ¶ 71).

Based on the preceding, Petitioner argues replacement of the protective circuit of Hunter with Bulan's current control circuit would be a "particularly straightforward task" for the person of ordinary skill in the art who would have had "a more than reasonable expectation of success, since the Bulan appartus is intended to simply replace prior art current limiting circuits without further modification." Pet. 13 (citing Ex. 1004, col. 2, ll. 23-26; Ex. 1003, Fig. 2 (showing protective device 213); First Crayford Decl. ¶ 74). Petitioner argues both Hunter and Bulan "assume there is a separate protective device in the Hub to regulate the current to each separate TE, making the combination a simple one-for-one replacement." *Id.* at 13-14 (citing Ex. 1003, Fig. 2 ("protective device 213 in series to single remote 'ISTE'"); Ex. 1004, Fig. 1 ("each 'NT1' in Hub connected to a single remote TE device"), col. 4, ll. 17-25 ("'Each of the NT1s includes a line interface circuit' that includes the current control apparatus of the invention.").

Petitioner concludes that "[i]n the combined system, Bulan's current control apparatus simply replaces the existing 'protective device 213' of Hunter, and DC current and power continue to flow through the phantom power circuit unchanged." Pet. 14. The combined system of Hunter and Bulan would be as shown in Petition Figure 3, reproduced above.

Patent Owner first contends that Petitioner does not show a sufficient rationale for a person of ordinary skill in the art to combine the references as Petitioner proposes. PO Resp. 18-31. Patent Owner's argument depends on the premise that the invention of the '107 patent is limited to equipment networked over pre-existing wiring or cables. *Id.* at 19 (citing Pet. 3; First Crayford Decl. ¶ 42 ("pre-existing wiring or cables that connect pieces of networked computer equipment to a network")). The specification and claims of the '107 patent, however, do not support that premise. The specification of the '107 patent states that "[t]his invention is <u>particularly adapted</u> to be used with an <u>existing</u> Ethernet communications link." Ex. 1001, 3:40-42. This portion of the '107 patent indicates that the system of the '107 patent, while particularly suited for use with an existing Ethernet network, is not limited to such a use. *Id.* We also note that Patent Owner does not direct us to specific evidence indicating that the system taught by the combination of Hunter and Bulan is limited to Ethernet equipment networked over pre-existing wiring or cables, let alone to billions of nodes. *See* PO Resp. 19-20.

Moreover, even if we accepted Patent Owner's premise, Patent Owner's argument still is not persuasive. Patent Owner first argues that, "at the time of the invention, an ordinary artisan would not have had a reason to apply telephone-based phantom operating power to Ethernet terminal equipment."[19] PO Resp. 19 (heading A), *id.* at 19-21. In Section II.C.3 above, we find Hunter discloses Ethernet terminal equipment and Ethernet communications. Thus, we find this argument unpersuasive and we give little weight to the unsupported testimony in the Madisetti Declaration that Hunter is "a phone system (not an Ethernet system)." *See* PO Resp. 19 (citing Madisetti Decl. ¶ 43); 37 C.F.R. § 42.65(a) (failure to disclose "underlying data or facts . . . entitled to little or no weight.").

Patent Owner contends that "Petitioners' proposed telephone-based phantom-power combinations-unaltered, as proposed-in an existing Ethernet network would have burned out the existing Bob Smith terminations"[20] resulting in impaired and degraded propagation of Ethernet data. PO Resp. 20 (citing Madisetti Decl. ¶ 45; First Crayford Dep. 45:10-21). We find that the '107 patent does not describe or discuss BSTs or CMCs in the described network or in the claims. *See* Pet. Reply 2; *supra* n.21. We are not persuaded of the relevance of these terminations, which are a design issue and are not a part of the 10BASE-T standard issued by IEEE. Madisetti Dep., 142:20-143:12; Pet. Reply 2. Finally, we credit the Second Crayford Declaration and find that a person

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[19] This argument and the next argument are asserted as to the combination of Hunter and Bulan and the combination of Bloch, Huizinga, and IEEE 802.3, which is discussed in section II.D below. *See* PO Resp. 19 (heading A).

[20] Network nodes have "Bob Smith terminations" (BST) in existing terminal equipment and common mode chokes (CMC). PO Resp. 19 (citing First Crayford Dep. 43:20-44:2, 45:6-8, 195:3-196:3; Madisetti Decl. ¶ 42).

of ordinary skill would know how to design a circuit considering BSTs and CMCs without damage to the circuitry as well as satisfying FCC emissions requirements without them. Second Crayford Decl. ¶¶ 22-26.

Patent Owner argues that "[w]hen an unused pair of contacts is available-as in Ethernet-an ordinary artisan would have supplied power over the unused pairs, not the data pairs as Petitioners assert." PO Resp. 22-31; *see* n.20 (argument applies to both grounds). Patent Owner argues that "[n]either Hunter nor Bloch teach how to supply phantom power and Ethernet data over the same wires to Ethernet terminal equipment without affecting the Ethernet data." PO Resp. 22 (citing Madisetti Decl. ¶ 49). Further, Hunter teaches a third wiring pair for power that does not carry data, making it easier to keep the two separate. *Id.* at 22 (citing Ex. 1003, col. 19, ll. 20-22; Madisetti Decl. ¶ 51; Pet. 47). Patent Owner argues a "motivating reason" to use wires other than data pairs is that using the data pairs will disrupt the data propagation. *Id.* at 23 (citing Crayford Dep. 138:16-139-11; Madisetti Decl. ¶ 50).

Patent Owner's argument is not persuasive. Hunter teaches a 10Base-T bus that includes only two twisted pairs of conductors, both of which are used to transmit data. Ex. 1003, 37:19-28. Thus, contrary to Patent Owner's argument, the 10Base-T bus in Hunter does not include any unused lines. *Id.* Further, Hunter teaches delivering DC power over the same lines of the 10Base-T bus used to transmit data (*see supra* Section II.C.1) because it "has the advantage of not requiring the installation of a dedicated power cable" (Ex. 1003, 17:13-26). Hunter even addresses Patent Owner's alleged concerns about interference by explaining that "a careful phantom power scheme must be implemented to avoid problems that may arise due to interactions between the power and the data." *Id.* Thus, although alternative ways of providing operating power to Ethernet terminal equipment may have existed (PO Resp. 22-23), that does not detract from the express teachings of Hunter. *See In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) ("[J]ust because better alternatives exist in the prior art does not mean that an inferior combination is unapt for obviousness purposes."); *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004).

Patent Owner then argues experts were skeptical that data pairs could be used to deliver operating power to terminal equipment "without disrupting the data propagation." PO Resp. 26 (citing Madisetti Decl. ¶ 56). Patent Owner cites to an IEEE 802.3 committee in January of 2000 which "concluded that the unused pairs should be used, not the data-carrying pairs." *Id.* at 26-27 (citing Madisetti Decl. ¶¶ 57-67; *see also* Exs. 2040-2046 (IEEE documents,[21] *e.g.*, Ex. 2040, 2-3 (reasons to use "idle pair" for power)). In July of 2000, a Power over Ethernet (PoE) committee meeting of IEEE resulted in considering applying power over data lines. *Id.* at 28-29 (citing Ex. 2045, 1). At this meeting, two Cisco engineers shared their finding, after "250 hrs of investigation," that sending common mode power on the signal pairs was found technically feasible. *Id.* (citing Ex. 2046, 2).

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[21] Authenticated by Ex. 2048, Declaration of Clyde Camp. PO Resp. 27.

That in 2000 the IEEE committee considered separating data and power as an Ethernet Standard does not address the converse that using the same wire for data and power would not work in an Ethernet network. PO Resp. 27 (citing Ex. 2041, 3). Further, although Patent Owner's evidence indicates that some IEEE committee members were in favor of adopting an Ethernet standard in which operating power was delivered over unused lines, Petitioner identifies evidence indicating that other committee members were in favor of using phantom power as the Ethernet standard. Pet. Reply 6-7 (citing Second Crayford Decl. ¶¶ 36-44; Ex. 1037, 3 ("Current will be injected via the center taps using a Phantom Power method on the TX and RX pairs.")); *see also* Ex. 1040, 3 ("Power over signal pairs allows easier integration of discovery & power control circuitry onto the PHY."). In any event, as noted above, the fact that an alternative way of providing operating power to Ethernet terminal equipment existed and was considered for an IEEE standard does not detract from the express teachings of Hunter. *See In re Mouttet*, 686 F.3d at 1334; *In re Fulton*, 391 F.3d at 1200. Moreover, we note that, even if Patent Owner's evidence indicates some amount of skepticism, we determine that it does not outweigh the strong evidence of obviousness presented by Petitioner and discussed in this Decision. *See In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litigation*, 676 F.3d 1063, 1079 (Fed. Cir. 2012).

Patent Owner further argues a person of ordinary skill would not have combined Hunter and Bulan because Hunter describes a "preferable" protection circuit and adding Bulan would raise undesirable issues of complexity. PO Resp. 41-45. Patent Owner argues the problem solved by the Bulan circuit was not a common problem. *Id.* at 42-43 (citing Ex. 2049,[22] col. 2, ll. 26-28; Madisetti Decl. ¶ 82). Hunter discloses a thermistor or polyfuse to protect both the power supply and the bus that includes conductors from overcurrents that may damage either one of them. Ex.1003, 38:15-19. Because it already had a "preferred" protection circuit, Patent Owner argues there is no "evidence that Hunter had the 'problem' that the complex Bulan circuit allegedly solves." PO Resp. 42 (citing Madisetti Decl. ¶ 82), *id.* at 43 (citing Crayford Dep., 126:21-127:9 (24 circuits of Bulan for every Hunter hub)).

We agree with Petitioner that "Bulan is intended to provide a superior replacement for the 'typical current limiting circuit' in such phantom powering systems, and Hunter employs just such a current limiting circuit: *i.e.*, its 'protective device 213.'" Pet. 11 (citing Ex. 1004, col. 1, l. 65-col. 2, l. 14; Ex. 1003, 38:12-15). Even assuming Bulan addresses a problem that was not common, a person of ordinary skill would have employed Bulan's current protection circuit in Hunter's circuit, replacing Hunter's simpler current limiting component, in order to provide similar protection while adding a beneficial mechanism to distinguish start-up currents from fault currents, as Bulan expressly teaches. Ex. 1004, Abstract, col. 2, ll. 1-14. Obviousness does not require using the simplest or best approach when a reference expressly teaches

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[22] Michael James Turner, U.S. Patent No. 5,995,392, issued November 30, 1999 ("Turner," Ex. 2049).

a reason why a person having ordinary skill would make the proposed combination.

13. Summary Hunter and Bulan

On this record and for the reasons stated in the Petition and summarized above, Petitioner's arguments and supporting evidence have shown by a preponderance of the evidence that claims 1, 5, 31, 43, 70, 72, 74, 75, 83, 103, 104, 111, 123, and 125 of the '107 patent would have been obvious over Hunter and Bulan.

D. Obviousness over Bloch, Huizinga,[23] and IEEE 802.3

Petitioner alleges claims 1, 5, 31, 43, 70, 72, 74, 75, 83, 103, 104, 111, 123, and 125 would have been obvious to the person of ordinary skill in the art over Bloch, Huizinga, and IEEE 802.3. Pet. 7, 42-66. Petitioner cites the Crayford Declaration in support of its positions. *See* Ex. 1002 ¶¶ 143-195. Based on Petitioner's arguments and supporting evidence, we find Petitioner has made its case by a preponderance of the evidence and adopt the Petitioner's reasoning and factual assertions as our factual findings as summarized and discussed below.

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23 Huizinga is not independently relied on in the challenge. *See* PO Resp. 31-32, n.8; *see also* Tr. 197:19-198:16 (Petitioner agrees, noting Bloch cites Huizinga, which further explains bi-directional communication). The Petition does rely on Huizinga in conjunction with claim 43. Pet. 60 ("Huizinga confirms this point"). Patent Owner does not argue the *de minimus* use of Huizinga as a basis for denial of the Petition and we decline to do so independently. Also, Petitioner may rely on the reference to support its view of the state of the art.

1. Bloch (Exhibit 1005)

Bloch is a communication system consisting of a control unit and a terminal unit connected by four conductors that form a communication channel between the two units. Ex. 1005, Abstract, col. 1, ll. 9-13, Fig. 1. A "phantom circuit arrangement" is disclosed which allows the control unit to supply power to the terminal unit "over the same four conductors" used for the communication channel. *Id.* Figure 1 of Bloch is reproduced below.

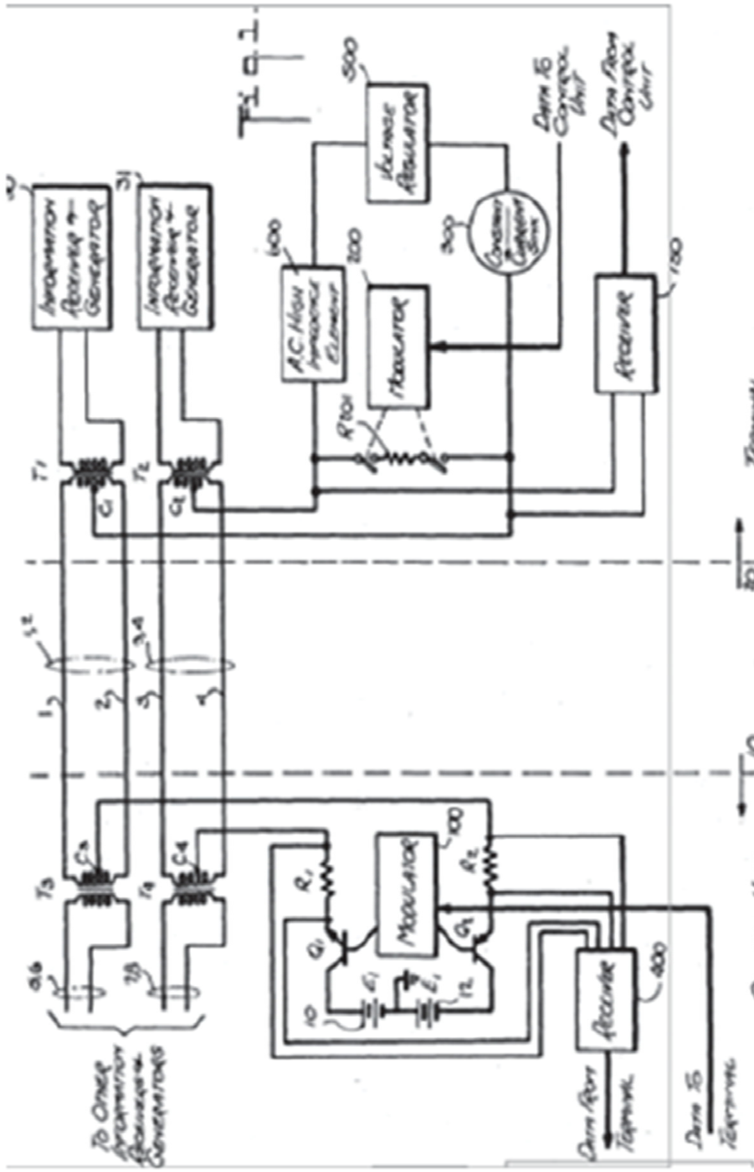
FIG. 1
INFORMATION RECEIVER + GENERATOR
INFORMATION RECEIVER + GENERATOR
A.C. HIGH IMPEDANCE ELEMENT
MODULATOR
VOLTAGE REGULATOR
CONSTANT CURRENT SINK
DATA TO CONTROL UNIT
DATA FROM CONTROL UNIT
RECEIVER
TERMINAL
MODULATOR
RECEIVER
CONTROL UNIT
TO OTHER INFORMATION RECEIVERS + GENERATORS
DATA FROM TERMINAL
DATA TO TERMINAL

Figure 1 is a block diagram of the circuit arrangement of Bloch. Ex. 1005, col. 4, ll.7-13, col. 4, ll. 46-52. A terminal unit 20 is connected to control unit 10 with two conductor pairs, conductor pair 1 and 2 and conductor pair 3 and 4. *Id.* at col. 4, ll. 46-48. "Connected to both conductor pairs 1,2 and 3, 4 at each end is circuitry necessary to create a complete communication channel." *Id.* at col. 5, ll. 3-5. This circuitry includes two transformers at each unit, which are connected to information receivers and generators for receiving and generating voice signals, such as microphones and speakers. *Id.* at col. 5, ll. 5-11.

The control unit and terminal unit include circuitry for supplying power from a DC voltage source in the control unit to the terminal, and for bi-directional data signaling between the units over the same two pairs of conductors that form the communication channel. Ex. 1005, Abstract, col. 2, ll. 53-61, col. 5, ll. 20-30. In the phantom pair circuit arrangement "[a] d.c. voltage source is connected at the control unit to the phantom pair circuit arrangement." *Id.* at col. 3, ll. 17-19. "Power is supplied from the control unit 10 to the terminal 20 by applying d.c. current from the d.c. sources 10, 12 via the phantom circuit to terminal 20." *Id.* at col. 6, ll. 3-5.

The terminal unit may send various types of status data by modulating its internal impedance to fluctuate the terminal unit's current draw and transmit different magnitude current pulses to the control unit over the phantom circuit. Ex. 1005, col. 3, ll. 28-33, col. 5, l. 44-col. 6, l. 2. The current pulses, which are detected by a receiver in the control unit, may provide the control unit "information with respect to the status of different elements of terminal 20." *Id.* at col. 3, ll. 33-36, col. 5, l. 56-col. 6, l. 2. In response to the current pulses, the control unit may send data (in the form of voltage pulses) to control the terminal unit. *Id.* at col. 6, ll. 25-49, col. 11, ll. 1-5. The terminal unit receives this control data and applies it "to logic circuits in the terminal for controlling various circuits and equipment within the terminal." *Id.* at col. 5, ll. 35-38, col. 10, ll. 34-40.

2. Huizinga (Exhibit 1009)

Huizinga is an electronic key telephone station set having line selection buttons. Ex. 1009, Abstract. Data is exchanged over leads between a station set and an interface controller. *Id.* at col. 3, ll. 14-17. A common control network effects the exchange of data via a path established by a cross-connection network. *Id.* at col. 3, ll. 17-20. In response to receiving signals indicating actions taken by a user with respect to buttons, the interface controller may send data to the station to set "LED lamp actuation." *Id.* at col. 4, ll. 27-29.

3. IEEE 802.3 (Exhibits 1006, 1007, 1008)

"Ethernet" is syntax for "IEEE Std 802.3." Ex. 1008, 350. IEEE 802.3 teaches 10BASE-T Ethernet, which is the physical layer specification for 10Mb/s "LAN [local area network] over two pairs of twisted telephone wire." Ex. 1007, 23; *see also* Ex. 1006, 243 ("[t]he medium for 10BASE-T is twisted pair wire.") (citations to exhibit pages). IEEE 802.3 discloses Ethernet "data terminal equipment (DTE)," which it describes as "[a]ny source or destination of data connected to the LAN (local area network)." Ex. 1008, 303 (Fig. 29-1, "information on building 100BASE-T networks."); Ex. 1006, 269 (describing 10BASE-T equipment); Ex. 1007, 7 (describing iterations of IEEE 802.3).

4. Claim 1

Petitioner alleges limitation [a][24] is taught by IEEE 802.3 which "discloses a piece of Ethernet terminal equipment, namely DTEs." Pet. 54 (citing Ex. 1007, 27 ("Data Terminal Equipment"), 303 (Figs. 29-1 and 29-2); Ex. 1006, 243 ("networks with . . . DTE"), 267 ("twisted-pair link connects a DTE to a repeater.").

Petitioner argues limitation [b] is met by the DTE of IEEE 802.3, which accepts twisted-pair conductors. Pet. 54-55 (citing Ex. 1006, 266, Figs. 14-20, 14-21; Ex. 1007, 147, Figs. 23-26, 23-27); *see also* Pet. 50 ("Petition Figure 7"). Petitioner further alleges "[i]n the combined system, the DTE would include the Ethernet MDI connector and the conductors (1, 2, 3, and 4) would connect to the transformers T1 and T2 through the connector's receive pair and transmit pair of contacts." *Id.* at 55 (citing Ex. 1005, Fig. 1; Ex. 1006, 266-67; Ex. 1007, 147; *see also* Ex. 1005, col. 2, ll. 30-47 ("audio communication channels over the four conductors"), col. 3, ll. 1-8) ("communication channels, typically audio channels"); First Crayford Decl. ¶ 170.

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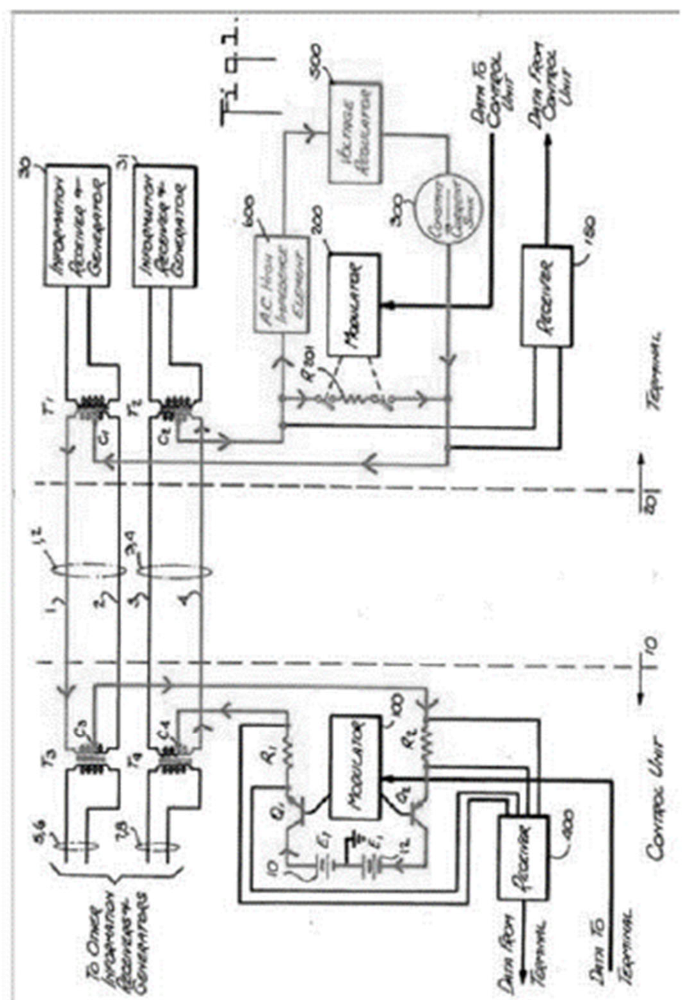
[24] As we did for the challenge based on Hunter and Bulan, we adopt Petitioner's convention of using [] in alphabetical order to represent the limitations of claim 1.

For limitation [c], Petitioner, at page 55 of the Petition, references an annotation of Figure 1 of Bloch as "Petition Fig. 6," which is reproduced below.

Petition Fig. 6



Petition Fig. 6 includes annotations in red added to Bloch Figure 1 reproduced above in Section II.D.1. Pet. 45. Petitioner argues "the DTE has a path coupled across the four contacts that connect the DTE to conductors 1, 2, 3, 4." *Id.* at 55-56 (citing Ex. 1005, col. 6, ll. 27-40 ("'Voltage sources 10 and 12' are 'connected in series so as to force current in the same direction, that is [in] from terminal center tap connection C3' through 'Q2 and then through voltage sources 12 and 10' to 'Q1' and then out 'the center tap connection C4'"); col. 5, ll. 20-27). Petitioner then alleges the path is for the purpose of drawing DC current from the control unit to the DTE via the conductors 1, 2, 3, 4. *Id.* at 56 (citing Ex. 1005, Fig. 1 (as annotated in Petition Fig. 6), col. 6, ll. 3-6; col. 9, ll. 6-22; First Crayford Decl. ¶ 171).

For limitation [d], Petitioner alleges that in Figure 1 of Bloch the center tap C1 of transformer T1 is coupled across the two contacts of one conductor pair (1, 2). Pet. 56. Then, according to Petitioner, the center tap C1 of transformer T2 is coupled across the two contacts of the other conductor pair (3, 4). *Id.*

For limitation [e] Petitioner cites to Bloch's DTE which "draws different magnitudes of current flow via the path by switching resistor [R]201 in and out of the current path." Pet. 57 (citing Ex. 1005, col. 5, ll. 44-55, col. 9, ll. 6-22). Specifically, Petitioner notes Bloch's teaching of changing current supplied to the phantom circuit, which equals the current through resistor R201 connected across center-taps C1 and C2 (*see* Petition Fig. 6 above) or drops if the resistor is not in the circuit. *Id.* (citing Ex. 1005, col. 9, ll. 12-15, First Crayford Decl. ¶ 173).

Petitioner alleges that limitation [f], is met by Bloch's resistor R201 "coupled across center taps C1 and C2 of transformers T1 and T2, which connect to the first and second pair of contacts and conductors (1, 2, 3, 4)." *Id.* at 57-58 (citing First Crayford Decl. ¶ 175). Petitioner references its showing made above in connection with limitation [e], "Ethernet terminal equipment to draw different magnitudes of DC current flow" limitation. *Id.*

For limitation [g], Petitioner again cites to Bloch's teaching that by "switching resistor R201 in and out of the path, the current through the path is modulated and generates different magnitudes of DC current flow that are received by a Receiver 400 inside the control unit." Pet. 58 (citing Ex. 1005, col. 5, ll. 44-59, col. 9, ll. 2-15, col. 9, ll. 37-40). Petitioner argues the different current magnitudes "provide information with respect to the status of different elements of terminal 20." *Id.* (citing Ex. 1005, col. 5, l. 60-col. 6, l. 2, col. 11, ll. 1-4; First Crayford Decl. ¶ 176). One example identified by Petitioner is the "status of line keys (*i.e.*, whether a line is in use)." *Id.* (citing Ex. 1005, col. 5, l. 64-col. 6, l. 2, col. 11, l. 1-4).

5. Claims 103 and 104

Following our construction of "powered-off," Petitioner cites Bloch's teaching that a DTE may be powered off when "the DTE sends hook switch current pulses when the DTE is hung up and not operational." Pet. 64-65 (citing Ex. 1005, col. 11, ll. 17-22 ("As illustrated in FIG. 7B, during each word, short width current pulses during time interval two, are transmitted from the telephone station set over the phantom circuit of conductors 1,2,3,4 to the key service unit, whenever the hook switch is open and the speaker phone is not operational."). Petitioner concludes that a person of ordinary skill in the art would have understood that "a device that is not operational does not draw the power it would draw when it is operational." *Id.* at 65 (citing First Crayford Decl. ¶ 191).

Patent Owner's sole argument regarding alleged limitations not disclosed in the Bloch, Huizinga, and IEEE 802.3 combination is that Petitioner has not shown sufficiently that the combination discloses the recited devices, "Ethernet terminal equipment" of claim 103 or "end device" of claims 104, 111, 123, and 125. Patent Owner argues "Petitioners rely on Bloch, exclusively, for these claim limitations." PO Resp. 60-61. Additionally, Patent Owner alleges "Bloch discloses a power arrangement that always supplies operating power to a connected terminal device." *Id.* (citing Ex. 1005, col. 3, ll. 17-23; Madisetti Decl. ¶ 144).

Regarding the power arrangement, Patent Owner notes that Petitioner's evidence is that Bloch Figure 7B shows short width current pulses are transmitted during a time interval over the phantom circuit of conductors to the "key service unit" whenever "<u>the hook switch is open and the speaker phone is not operational</u>." *Id.* at 62 (quoting from Pet. 64-65). Patent Owner argues the preceding does not show that the "end device is configured 'to draw different magnitudes of DC current flow via the at least one path . . . to convey information about' itself, without operating power." *Id.* According to Patent Owner, just because "the speakerphone portion of a phone may not be operating to amplify sound does not mean that the voltage source is not applying operating power to the end device." *Id.* (citing Madisetti Decl.

¶ 151). Patent Owner asks rhetorically how a phone (the terminal device) rings without power. *Id.* at 63 (citing Madisetti Decl. ¶ 152 (phone rings only when hook switch is on and speakerphone is off), *see also id.* ¶ 153 (concluding Bloch's device has operating power).

We find that Bloch "teaches that the DTE draws different magnitudes of DC current flow (hook switch current pulses) via the at least one path . . . even when the DTE is in an 'on hook' state (*i.e.* 'powered off')." Pet. Reply 28 (citing Pet. 64-65, 55-57, 44-45 (Petition Figure 6), 47-48). We find that only the voltage regulator 500 component shown in Petition Figure 6 receives power in the "on-hook" state. *See* PO Resp. 61 (stating voltage regulator of Petition Figure 6 always has operating power). The terminal 20 (Petition Figure 6) includes other equipment. *See* Pet. 45 (illustrating Petition Figure 6). Dr. Madisetti testifies that the voltage source applies power at all times, even when the speakerphone portion is not operational. Madisetti Decl. ¶¶ 151-153. Thus, the DTE, the phone, otherwise is without operating power. We find the combination and specifically Bloch discloses "powered off" terminal equipment. *Id.* at 28-29 (citing PO Resp. 60-62; Second Crayford Decl. ¶¶ 102-103).

Dependent Claims 5 and 31

Petitioner's showing on claims 5 and 31 is found at pages 59 through 60 of the Petition and paragraphs 177 through 178 of the First Crayford Declaration. Petitioner's stated reasons for combining Bloch, Huizinga, and IEEE 802.3 with respect to claim 1 also apply to the dependent claims. *See* Pet. 52-54, *see infra* Section II.D.13. Claims 5 and 31 both depend from claim 1. Each recites a further limitation on the "Ethernet terminal equipment" of claim 1.

Claim 5 requires "BaseT communication signals." Petitioner relies on its showing for limitation [b] of claim 1 for "10Base-T" or "100Base-T" as its showing Ethernet communication signals. Pet. 59; First Crayford Decl. ¶ 177. In addition, IEEE 802.3 is cited for its teaching of "Ethernet communication signals would be BaseT Ethernet communication signals." *Id.* (citing Ex. 1006, 4 ("Specification for MAU types. . . 10BASET")).

Claim 31 requires that the "DC current" recited in claim 1 is within "a predetermined range of magnitudes." Petitioner cites to its showing regarding limitation [e]. Pet. 59. In addition, the predetermined current magnitudes in Bloch change when resistor R201 in Figure 7B is switched on or off in the path. *Id.* at 59-60 (citing Ex. 1005, col. 9, ll. 12-15, col. 10, ll. 56-65, Fig. 7B).

6. Dependent Claims Dependent Claims 43 and 111

Petitioner's showing on claims 43 and 111 is found at pages 60 through 61 and 65 of the Petition and paragraphs 179 through 180 and 193 of the First Crayford Declaration. Claim 43 depends from claim 1 and recites "the information to distinguish the piece of Ethernet terminal equipment from at least one other piece of Ethernet terminal equipment." Petitioner relies, in part, on its showing with respect to limitation [g] of claim 1, which is similar to claim 43. *See* Pet. 60; Section II.D.4 above. Claim 43 differs from limitation [g] of claim 1 in that the "information" distinguishes between at least two different pieces of

Ethernet terminal equipment. Petitioner relies, in part, on Bloch's teaching that the "current pulses generated by the DTE 'provide information with respect to the status of different elements of terminal 20' including the status of different line keys." Ex. 1005, col. 5, ll. 61-68; First Crayford Decl. ¶ 179). Claim 111 depends from claim 104 and recites the same subject matter as claim 43 for a "powered-off end device" instead of "Ethernet terminal equipment." Petitioner relies on its showing regarding claim 43 (*see above*). *Id.* at 65 (citing First Crayford Decl. ¶ 193).

7. Dependent Claim 70

Petitioner's showing on claim 70 is found at pages 61 through 62 of the Petition and paragraphs 181 through 183 of the First Crayford Declaration. Claim 70 depends from claim 1 and recites "wherein the DC current to comprise first magnitude of DC current for a first interval followed by a second magnitude of DC current for a second interval, wherein the second magnitude is greater than the first magnitude." Petitioner cites its disclosure regarding limitation [e]. Pet. 61; *see* Section II.D.4. Petitioner argues Figure 7B of Bloch "illustrates an example in which the DTE draws a magnitude of current indicating a 'zero' pulse during the third interval (TI-3) of Word 1, and a 'one' pulse during the fourth interval (T1-4) of Word 1." *Id.* "[T]herefore, the second magnitude of DC current during interval TI-4 is greater than the magnitude in the preceding interval TI-3." *Id.* at 62 (citing First Crayford Decl. ¶ 182).

8. Dependent Claims 72 and 123

Petitioner's showing on claims 72 and 123 is found at pages 62 through 63 and 66 of the Petition and paragraphs 184 and 194 of the First Crayford Declaration. Claim 72 depends from claim 1 and recites "wherein at least one magnitude of the DC current is part of a detection protocol." Petitioner argues Bloch teaches the limitation by "switching the resistor R201 in and out of the path, the current through the path is modulated and generates current pulses that are received by a Receiver 400 inside the control unit." Pet. 62 (citing Ex. 1005, col. 5, ll. 44-57, col. 9, ll. 6-22; First Crayford Decl. ¶ 184). Claim 123 depends from claim 104 and recites the same subject matter as claim 72 for a "powered-off end device" instead of "Ethernet terminal equipment." Petitioner relies on its showing regarding claim 72 (see above). *Id.* at 66 (citing First Crayford Decl. ¶ 194).

9. Dependent Claims 74 and 75

Petitioner's showing on claims 74 and 75 is found at page 63 of the Petition and paragraphs 185 through 186 of the First Crayford Declaration. Claim 74 depends from claim 1 and recites "wherein the at least one path comprises an electrical component." Petitioner relies on its showing regarding limitation [e] of claim 1. Pet. 63 (citing Ex. 1005, Fig. 1; Petition Figure 6); First Crayford Decl. ¶ 185). This showing is also cited by Petitioner for claim 75, which depends from claim 74 and recites that the electrical component is a resistor. *Id.* (citing First Crayford Decl. ¶ 186).

10. Dependent Claim 83

Petitioner's showing on claim 83 is found at pages 63 through 64 of the Petition and paragraph 187 through 189 of the First Crayford Declaration. Claim 83 depends from claim 1 and recites "wherein the piece of Ethernet equipment comprises a controller." Petitioner argues that "IEEE-95 teaches that DTEs include hardware and software." Pet. 63 (citing Ex. 1007, 19). Furthermore, a person of ordinary skill "would understand that a controller, for example a processor, is necessary to run software and to operate over Ethernet." *Id.* at 63-64 (citing First Crayford Decl. ¶ 188).

11. Dependent Claim 125

Petitioner's showing on claim 125 is found at page 66 of the Petition and paragraph 195 of the First Crayford Declaration. Claim 125 depends on claims 104 through 124 and recites "wherein the powered-off end device is a powered-off Ethernet end device." Petitioner challenges claim 125 to the extent it depends on claims 104, 111, and 123. Pet. 66 (heading n.). Petitioner relies, among other things, on its showing regarding claim 1's recitation of an "Ethernet terminal equipment." Pet. 66 (citing Ex. 1007, 27 (DTE would be an Ethernet end device); First Crayford Decl. ¶ 195).

12. Rationale for Combining Bloch, Huizinga, and IEEE 802.3

We have reviewed Petitioner's argument and evidence that a person of ordinary skill in the art would have been motivated to combine Bloch and Huizinga and Bloch and IEEE 802.3. Pet. 52-54. We adopt Petitioner's arguments and rationale for the combination and are persuaded that Petitioner has shown a person of ordinary skill would have been motivated to combine the references.

Among other reasons, Petitioner points out that Bloch on its face references Huizinga. *Id.* at 52; *see* Ex. 1005 (56). Further, "[b]oth references are directed to key telephone systems and bi-directional signaling between station sets and controllers." Pet. 52 (citing Ex. 1005, Abstract; Ex. 1006, Abstract). Petitioner also argues that the benefit of combining Bloch with IEEE 802.3 was more than just providing bi-directional signaling of status and control information over Ethernet cables; the benefit was doing so <u>without</u> using any bandwidth from the Ethernet communication channel. *Id.* at 53 (citing First Crayford Decl. ¶ 167 ("At the time of the invention, conserving bandwidth was a known consideration and design motivation in the prior art.")).

Patent Owner first contends that Petitioner does not show a sufficient rationale for a person of ordinary skill in the art to combine Bloch, Huizinga, and IEEE 802.3 as Petitioner proposes. PO Resp. 18-31. To the extent the arguments were made for both combinations, we refer to Section II.C.12 above.

Further, as also discussed in Section II.C.12, we disagree with Patent Owner's premise that the invention of the '107 patent is limited to a pre-existing Ethernet network (*see* PO Resp. 20) which is not supported by the specification or claims of the '107 patent. Thus, we *see* no reason why a person of ordinary skill in the art would have been dissuaded from combining the cited teachings of Bloch, IEEE 802.3-1993, and IEEE 802.3-1995 based on potential issues with a pre-existing Ethernet network. Moreover, even if we accepted Patent Owner's premise, Patent Owner's argument still is not persuasive because not all pre-existing Ethernet networks included Bob Smith terminations or common mode chokes. *See* PO Resp. 20; Section II.C.12 above.

Specific to the Bloch, Huizinga, and IEEE 802.3 combination, Patent Owner first argues that Bloch's unaltered circuitry is used in telephone systems and the Petition fails to show why a person of ordinary skill would combine a telephone system to Ethernet, as disclosed in IEEE 802.3. PO Resp. 20 (citing Madisetti Decl. ¶ 44; *see also* First Crayford Dep. 173:10-19 (Bloch does not disclose Ethernet terminal equipment). That Bloch does not disclose Ethernet communications alone is insufficient to persuade us that a person of ordinary skill would not combine Bloch with IEEE 802.3, which does disclose 10BASE-T and 100BASE-T networks in the context of Ethernet communications. *See, e.g.*, Ex. 1008, 303 (Fig. 29-1, "information on building 100BASE-T networks."); Ex. 1006, 269 (describing 10BASE-T equipment); Ex. 1007, 7 (describing iterations of IEEE 802.3). We find that Bloch is not limited to a telephone system but also includes "many different control unit/terminal applications." Pet. 53 (citing Ex. 1005, col. 4, ll. 49-52).

Patent Owner argues that a person of ordinary skill in the art would have provided operating power to Ethernet terminal equipment over the unused lines in an Ethernet connection to avoid interference with the data signals. PO Resp. 22. In particular, Patent Owner points out that the Ethernet connector taught by IEEE 802.3-1993 and IEEE 802.3-1995 includes two unused pairs of conductors. *Id.* at 24 (citing Ex. 1006, 266-267; Ex. 1007, 147).

We are not persuaded by Patent Owner's argument. We credit the First Crayford Declaration testimony that a person of ordinary skill in the art "would understand that Bloch's phantom power circuit could be used in a 10BASE-T (or 100Base-T) Ethernet network with the Ethernet control and terminal units connected over [the] same twisted pairs of telephone wire used in the telephone system discussed by Bloch." First Crayford Decl. ¶ 167. Thus, a person of ordinary skill in the art would have possessed the background knowledge that phantom power also would work in an Ethernet network. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362-63 (Fed. Cir. 2013). In addition, at least two patents identified on the face of the '107 patent (Ex. 1001 (56)), namely U.S. Patent No. 5,994,998 ("Fisher '998," Ex. 1025) and U.S. Patent No. 6,140,911 ("Fisher '911," Ex. 1026) (collectively, "the Fisher patents"), teach providing phantom power to Ethernet terminal equipment. Pet. Reply 4-5.

Patent Owner argues that members of an IEEE committee were skeptical that phantom power would work in an Ethernet network. PO Resp. 26-31. This argument was made as to both challenges and is discussed above in connection with the Hunter and Bulan challenge. *See supra* Section II.C.12. No skepticism argument is made specifically to the Bloch, Huizinga, and IEEE 802.3 challenge.

Patent Owner also contends that Petitioner has not shown that Bloch could be modified to eliminate interference. PO Resp. 32 (citing First Crayford Dep. 173:10-13). Additionally, Patent Owner asserts that if operating power is applied to the center taps of TE terminal, as would occur with Bloch's design (*see* Pet. 45, Petition Figure 6), it "would saturate the coils and degrade the propagation of Ethernet data." *Id.* (citing First Crayford Dep. 168:6-14; *see also* Madisetti Decl. ¶ 87 (Ethernet device higher power requirements over telephone systems would make the problem greater). Patent Owner suggests a design change to Bloch, current flow on both sides of the center tap, would not resolve the problem due to "imbalances in the wires." *Id.* at 33 (citing Madisetti Decl. ¶ 88; First Crayford Dep. 169:14-15).

We are not persuaded that issues of noise, degradation of Ethernet data propagation, and reduced bandwidth interference would preclude one of ordinary skill from making the Bloch combination. Patent Owner argues that Petitioner has not shown that Bloch could be modified to eliminate interference. Petitioner responds with evidence that a person of ordinary skill would use filters to segregate higher Ethernet frequencies from lower Bloch frequencies. Pet. Reply 7-8 (citing Ex. 1043,[25] col. 8, ll. 39-42; col. 10, ll. 25-27; Madisetti Dep., 205:11-206:5 (filter would prevent noise from interfering with Ethernet communications); Second Crayford Decl. ¶ 49). Dr. Madisetti's cited testimony is that "the R201 creates a square wave in the context of Bloch that would interfere with Ethernet communications. If there's a filter, it won't." Madisetti Dep. 205:21-206:9. Further, contrary to Patent Owner's argument regarding saturation, Petitioner does not propose applying operating power to just one side of the transformers in Bloch.

[25] John F. Austermann, III et al., U.S. Patent No. 8,155,012, filed September 26, 2008, issued April 10, 2012 ("Austermann," Ex. 1043).'

First Crayford Dep., 167:14-169:22. Also, Mr. Crayford explained that the objective of balancing the coils on either side of the transformer to avoid saturation is "very well known." *Id.* at 169:14-22.

13. Summary

On this record and for the reasons stated in the Petition and summarized above, Petitioner's arguments and supporting evidence have shown by a preponderance of the evidence that claims 1, 5, 31, 43, 70, 72, 74, 75, 83, 103, 104, 111, 123, and 125 of the '107 patent would have been obvious over Bloch, Huizinga, and IEEE 802.3.

E. Petitioner's Motion to Exclude

Petitioner's move to exclude: (1) the Madisetti Declaration (Ex. 2038); (2) Exs. 2040-2046 ("IEEE Exhibits"); (3) the declaration of Clyde Camp ("Camp Decl.," Ex. 2048); (4) Exhibit 2047; (5) Exhibit 2049; and (6) Exhibits 2050 and 2054, and related testimony from the Second Crayford Deposition. Pet. Mot. Excl. 1. Patent Owner opposed the Petitioner's Motion to Exclude (Paper 50) and Petitioner filed a Reply (Paper 58).

1. Madisetti Declaration (Ex. 2038)

Petitioner argues the Madisetti Declaration should be excluded as unreliable "under F.R.E. 702, 703, 37 C.F.R. § 42.65 and the standards in *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993) and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999)." Pet. Mot. Excl. 1. Petitioner's basis for exclusion is that the Madisetti Declaration is based on a "1997" date of invention of the '107 patent when the earliest filing date on the face of the patent is April 10, 1998. *Id.* at 2. Petitioner alleges this is not inconsequential because, *inter alia*, "[b]ased on this error, he opines that 'Power over Ethernet ('PoE') did not exist in 1997.'" *Id.* at 3 (citing Madisetti Declaration ¶¶ 90, 155, 189, 232; *see also id.*, ¶¶ 37, 56, 67, 88, 93, 157, 191).

Patent Owner argues Petitioner's objection was untimely because it did not specifically mention the date of invention argument now asserted. Paper 50, 2 (citing Paper 27, 1-2). Patent Owner does not concede that 1997 is not the date of invention only that it did not need to prove the date because the references relied on all predated 1997.[26] *Id.* at 3. Petitioner argues in response that its factual assertions are unrebutted (Paper 58, 1-3) and the objection made gave sufficient notice (Paper 58, 3-5).

We agree with Patent Owner that the basis for the opinion of Dr. Madisetti goes to the weight afforded it. *See* Paper 50, 1 (citing *Liberty Mutual Ins. Co. v. Progressive Cas. Ins. Co.*, CBM2012-00002, Paper 66 at 60 (PTAB Jan. 23, 2014)). The testimony provided by Dr. Madisetti was weighed in the context of the unproven 1997 date of invention he testifies to. *See, e.g.*, Paper 50, 2-4. Petitioner's additional arguments regarding the Madisetti Declaration (Pet. Mot. Excl. 4-11) similarly go the weight to be afforded to it.

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[26] Patent Owner mistakenly references the prior art at issue as being "the De Nicolo patents." Opp. Pet. Mot. Excl. 3. Regardless, all the references relied on here predate 1997. *See* Section I.D. above.

Because we overrule the objections to the Madisetti Declaration, we deny Petitioner's Motion to Exclude it.

2. IEEE Exhibits (Exs. 2040-2046)

Petitioner move to exclude Exhibits 2040-2046 ("IEEE Exhibits") and related testimony in the Madisetti Declaration as "irrelevant, unauthenticated, hearsay, and prejudicial." Pet. Mot. Excl. 11-12 (citing Paper 27, 1-5; F.R.E. 901, 801, 802, 804, 401, 402, 403).

We overrule the relevance objection. According to Patent Owner's theory, the IEEE Exhibits evidence skepticism that PoE using data wires was questioned, continuing to a time well after the date of invention. Paper 50, 13; *see also* PO Resp. 26-31 (arguing skepticism regarding PoE on data lines). We disagree with Petitioner that the IEEE Exhibits are irrelevant because Patent Owner has not "met its burden to show a nexus between these exhibits and the claims of the '107 Patent." Paper 58, 5. Petitioner's argument that Patent Owner has not shown a nexus is an issue of sufficiency of proof, not relevance. Because we determine the IEEE Exhibits are relevant, we also deny the objection based on prejudice.

We overrule the authentication objection. We determine that the testimony of authentication is sufficient. Petitioner cites only to the Camp declaration (Ex. 2048) as the only authenticating evidence. Mr. Camp does testify to familiarity "with the record-keeping system and policies used by IEEE 802 LAN/MAN Standards Committee including 802.3af." Paper 50, 11 (citing Ex. 2048 ¶ 1). Patent Owner cites to additional authenticating evidence. The documents are linked at the IEEE website and the Johnson Declaration (Ex. 2054) is cited to establish that "the documents were indexed and captured by the Internet Archive about the time they were created." *Id.* at 11-12; *see also* Ex. 2054 ¶¶ 3-13, attached Exs. A-G (corresponding to Exs. 2040-2046).

We overrule the hearsay objection. We agree with Patent Owner that the IEEE Exhibits are not hearsay because they are not offered for the truth of the matter asserted. Paper 50, 12. Rather they are offered as proof of skepticism, the state of mind of a person of ordinary skill. *See* Fed. R. Evid. 803 (3) (a statement is excluded from hearsay if made regarding the declarant's "state of mind (such as motive, intent, or plan) . . . ").

Because we overrule the objections to the IEEE Exhibits, we deny Petitioner's Motion to Exclude them and Dr. Madisetti's testimony relating to them.

3. "What is the Internet?" (Ex. 2047)

Petitioner argues that a website printout, "What is the Internet?" (Ex. 2047) is unauthenticated, irrelevant, and hearsay. Pet. Mot. Excl. 13-14. We overrule the relevancy objection. The meaning of "protocol" is an issue in the case. *See* section II.A.5 above.

Dr. Madisetti testified that he found and relied on Ex. 2047 in giving his expert opinions. Paper 50, 14 (citing Madisetti Decl. ¶ 104). Petitioner has provided no evidence that Exhibit 2047 is not what it purports to be and Dr. Madisetti has testified as to what it is. The authentication objection is overruled.

We also agree that Exhibit 2047 is not hearsay because it is not offered for the truth of the matter asserted. Paper 50, 14; *see also* F.R.E. 801(c)(2) (not hearsay if not offered for truth of matter asserted). A definition is not an assertion of truth. Even if Exhibit 2047 were inadmissible, Dr. Madisetti's opinion based on it is admitted. *See* F.R.E. 703.

Because we overrule the objections to the Exhibit 2047, we deny Petitioner's Motion to Exclude it and Dr. Madisetti's testimony relating to it.

4. Turner Patent (Ex. 2049)

Petitioner argues that Turner (Ex. 2049) is irrelevant, prejudicial, and confuses the issues. Pet. Mot. Excl. 14-15. If evidence is relevant, it may be excluded if its relevance is outweighed by its prejudice or it confuses the issues. *See* F.R.E. 403.

The relevance test requires only that "(a) it has any tendency to make a fact more or less probable than it would be without the evidence; and (b) the fact is of consequence in determining the action." Fed. R. Evid. 401. We agree with Patent Owner that the evidence has a tendency to support its claim that a person of ordinary skill would not have reason to combine Hunter and Bulan because Turner is about "thermistors that could protect circuits without interfering with normal device power-up." Paper 50, 14-15. We also agree with Patent Owner that Turner's relevance is not outweighed by any prejudice or confusion of issues that we are not capable of weighing and deciding. Id. at 15.

Because we overrule the objections to the Exhibit 2049, we deny Petitioner's Motion to Exclude it and Dr. Madisetti's testimony relating to it.

5. IEEE Standards for Local & Metropolitan Area Networks/EIA/TIA Bulletin (Exs. 2050 and 2054)

Petitioner argues that *IEEE Standards for Local & Metropolitan Area Networks* (Ex. 2050) and *EIA/ TIA Bulletin* (Ex. 2054), referenced in the Second Crayford Deposition, are irrelevant and untimely. Pet. Mot. Excl. 15. Patent Owner filed Observations with respect to that deposition and Petitioner filed an Opposition. Papers 44, 55. Exhibits 2050 and 2054 were read into the record made at the Crayford Second deposition (Ex. 2055). *See* Opp. Obs., 3, 15.

We determine that Exhibits 2050 and 2054 are proper cross-examination as used in Second Crayford Deposition. However, neither exhibit was authenticated by Mr. Crayford nor did he have any familiarity with them. Second Crayford Dep., 35:18-36:5 (Ex. 2050); *id.* at 171:20-172:17 (Ex. 2054). The Exhibits are not otherwise admissible. Paper 50, 15. We therefore overrule the relevance objection.

Because Exhibits 2050 and 2054 are not offered as evidence separate from the cross-examination of Mr. Crayford and are otherwise inadmissible for reasons not alleged by Petitioner, we deny Petitioner's Motion to Exclude Exhibits 2050 and 2054 and decline to exclude any related testimony of Mr. Crayford.

F. Patent Owner's Motion to Exclude

Patent Owner moves to exclude what it alleges is new evidence presented in the Petitioner's Reply. PO Mot. Excl. 1-9. Patent Owner also moves to exclude Exhibits 1021-1029, 1031, and 1035 as inadmissible hearsay. *Id.* at 9-12. Petitioner opposed the Patent

Owner's Motion to Exclude (Paper 52) and Patent Owner filed a Reply (Paper 57).

1. Exhibit 1020 and Other Listed Exhibits

Exhibits 1020 is the transcript of the deposition of Patent Owner's declarant, Dr. Madisetti. Other than pointing out that Exhibit 1020 was filed with and cited in Petitioner's Reply, Patent Owner does not provide any specific reason why Exhibit 1020, or any other exhibit listed in the table but not otherwise objected to, should be excluded. PO Mot. Excl. 1-9. We find in Section II.G that these exhibits are properly raised in Petitioner's Reply. Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibit 1020 and any other exhibit listed in the table at page 3 but not specifically objected to or argued.

2. Exhibits 1023-1024 and 1043

Exhibits 1021-1024 are product datasheets, catalogs, and specifications, and Exhibit 1043 is Austermann, which is related to the '107 patent and also is owned by Patent Owner. Patent Owner argues that Exhibits 1021-1024 and 1043 should be excluded as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 4-5; PO Mot. Str. 3-5. We do not cite to Exhibits 1021 and 1022. In general, Patent Owner's arguments are not persuasive for the same reasons discussed below with respect to the Motion to Strike. *See infra* Section II.G.2.

Patent Owner argues specifically that Exhibits 1023-1024 should be excluded as impermissible hearsay. PO Mot. Excl. 9. We rely on Exhibits 1023-1024 and 1043 in this Decision only to the extent they provide a basis for certain portions of the Second

Crayford Declaration that are cited in this Decision. *See supra* Section II.C.12 (citing Second Crayford Decl. ¶¶ 22-26 (citing Exs. 1023-1024, 1043)). Patent Owner does not dispute that Exhibits 1023-1024 present the kinds of facts and data that Mr. Crayford would reasonably rely upon in forming an opinion. *See* PO Mot. Excl. 9-10; PO Reply Excl. 2-3. As a result, Exhibits 1023-1024 do not need to be independently admissible. *See* Fed. R. Evid. 703; *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 711 F.3d 1348, 1373 (Fed. Cir. 2013). Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibits 1023-1024 and 1043 and denied as moot with respect to Exhibits 1021 and 1022.

3. Exhibits 1025 and 1026

Exhibits 1025 and 1026 are the Fisher patents. Patent Owner argues that Exhibits 1025 and 1026 should be excluded as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 3; PO Mot. Str. 5. Patent Owner's arguments are not persuasive for the same reasons discussed below with respect to the Motion to Strike. *See infra* Section II.G.3.

Patent Owner also argues that Exhibits 1025 and 1026 should be excluded as impermissible hearsay. PO Mot. Excl. 9-12. Hearsay is limited to a statement that a party offers in evidence to prove the truth of the matter asserted in the statement. Fed. R. Evid. 801. Petitioner offers, and we rely on, the statements in Exhibits 1025 and 1026 as evidence of the effect those statements would have had on a person of ordinary skill in the art, not for the truth of the matter asserted. *See supra* Section II.D.13 (citing

Pet. Reply 4-5; Exs. 1025, 1026). As a result, Exhibits 1025 and 1026 are not hearsay. However, even if the statements in Exhibits 1025 and 1026 are hearsay, Exhibits 1025 and 1026 are admissible at least under Fed. R. Evid. 803(8). Specifically, Exhibits 1025 and 1026 are records of the activities of the U.S. Patent and Trademark Office, and Patent Owner has not shown that the source of information or circumstances lack trustworthiness. *See* PO Mot. Excl. 9-12; PO Reply Excl. 3; Fed. R. Evid. 803(8); *Fresenius Med. Care Holdings, Inc. v. Baxter Int'l, Inc.*, No. C 03-1431, 2006 WL 1330003, at *2-4 (N.D. Cal. May 15, 2006). Therefore, Patent Owner's Motion to Exclude is *denied* with respect to Exhibits 1025 and 1026.

4. Exhibit 1034

Exhibit 1034 is a drawing made by Dr. Madisetti at his deposition. Patent Owner argues the drawing was drawn "under duress" and is beyond the scope of cross-examination. PO Mot. Excl. 9. We overrule Patent Owner's objection to the extent it asserts "duress" because "duress" is not a proper objection. We also overrule the objection that the drawing is beyond the scope of cross-examination. Whether or not an "Ethernet terminal equipment" can include intermediate devices, like a remote module depicted in Exhibit 1034, which receives operating power, while the "Ethernet terminal equipment" does not, is an issue in this case. *See* Pet. Reply 25-27 (discussing Madisetti Deposition and Ex. 1034). Therefore, Patent Owner's Motion to Exclude is denied with respect to Exhibit 1034.

5. Exhibits 1036-1042

Exhibits 1036-1042 are documents relating to meetings of an IEEE committee. Patent Owner argues that Exhibits 1036-1042 should be excluded as improper new evidence for the same reasons set forth in the Motion to Strike. PO Mot. Excl. 5-6; PO Mot. Str. 5-6. Patent Owner's arguments are not persuasive for the same reasons discussed below with respect to the Motion to Strike. *See infra* Section II.G.4. Therefore, Patent Owner's Motion to Exclude is *denied* with respect to Exhibits 1036-1042.

6. Exhibits 1021-1022, 1027-1031, and 1035

We do not rely on Exhibits 1021-1022, 1027-1031, and 1035 in this Decision. Therefore, Patent Owner's Motion to Exclude is <u>dismissed as moot</u> with respect to Exhibits 1021-1022, 1027-1031, and 1035.

G. Patent Owner's Motion to Strike

Per our authorization (Paper 42) Patent Owner filed a Motion to Strike (Paper 47) Petitioner's Reply (Paper 33) alleging it "introduces significant new evidence and new arguments, which they could have and should have raised in their Petition." PO Mot. Str. 1. Petitioner opposes the Motion to Strike ("Pet. Opp. Mot. Str.," Paper 54). No reply was authorized. Patent Owner's Motion to Strike Petitioner's Reply (Paper 47) is denied.

Patent Owner argues that several portions of Petitioner's Reply should be stricken because they are beyond the scope of a proper reply.[27] PO Mot.

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[27] Patent Owner also argues that Petitioner's Reply should be stricken in its entirety. PO Mot. Str. 1. Because we are not

Str. 1. Petitioner responds that the Reply is proper because it responds to arguments raised by Patent Owner in the Response. Pet. Opp. Str. 1. We have considered the parties' arguments, and, for the reasons discussed below, Patent Owner's Motion to Strike is denied. In addition, to the extent that this Decision does not rely on an argument or evidence that Patent Owner contends is improper, Patent Owner's Motion to Strike is moot as to that particular argument or evidence.

1. IsoEthernet

Patent Owner argues that Petitioner presented a new theory of unpatentability in the Reply based on Hunter's teaching of isoEthernet. PO Mot. Str. 2. Specifically, Patent Owner contends that "[t]he Reply newly asserts that 'Hunter's disclosure of isoEthernet also teaches Ethernet' and interjects new concepts: '[i]soEthernet . . . 10Base-T and ISDN modes' and 'isoEthernet interfaces.'" *Id.* (citing Pet. Reply 11:14-14, 15:14-17, 18:3-10; Second Crayford Decl. ¶¶ 48, 67-68, 73, 79-80).

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Petitioner explains in the Petition that Hunter preferably uses a 10Base-T bus, but points out that Hunter is not limited to a 10Base-T bus because Hunter also is compatible with 100Base-T, isoEthernet, and ISDN. Pet. 24 ("[T]he bus [to the ISTE] comprises a 10Base-T bus."); *id.* at 25 ("compatible with ISDN standards"); *id.* at 25 ("a

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persuaded that any specific portions of the Reply should be stricken, we also are not persuaded that the entire Reply should be stricken.

bus applying other Ethernet standards, such as 100Base-T"); *id.* at 26 ("the present invention is also compatible with Ethernet®, Token Ring®, ATM, and isoEthernet® standards."). Thus, Petitioner's reliance on isoEthernet is not a new theory of unpatentability raised for the first time in the Reply. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080 (Fed. Cir. 2015).

Further, Patent Owner argues in the Response that Hunter does not teach contacts used to carry Base-T Ethernet communications signals. PO Resp. 41. In particular, Patent Owner contends that the "isoEthernet® interfaces [in Hunter] were part of an IEEE standard called 802.9a," which indicates that "isoEthernet used ISDN signals, not Ethernet signals, to transmit data." *Id.* (citing Ex. 1003, 15:15-18; Madisetti Decl. ¶ 76). Petitioner responds in the Reply by explaining why Patent Owner's argument in the Response is incorrect. Pet. Reply 10-11. Specifically, in the Reply, Petitioner identifies evidence indicating that isoEthernet includes both an ISDN mode and a 10Base-T mode, and, as a result, is not limited to carrying just ISDN signals. *Id.* at 11 (citing Ex. 1003, 23:21-24, Ex. 1010, 165; Ex. 1032, 377; First Crayford Decl. ¶ 67). Thus, Petitioner's argument regarding isoEthernet in the Reply properly responds to an argument raised by Patent Owner in the Response. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-79. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Section II.C.3; *Belden*, 805 F.3d at 1078-79.

We note that Patent Owner specifically objects to Petitioner's reliance on "a newly-cited IEEE standard for 802.9," which Petitioner submitted as Exhibit 1032 with the Reply. PO Mot. Str. 2 (citing Pet. Reply 11:12-14, 12:3-7, 18:9; Ex. 1032). Patent Owner contends that Hunter only teaches "the trademarked version 'isoEthernet®,'" and Petitioner does not link the trademarked version of isoEthernet in Hunter with the IEEE standard described in Exhibit 1032. *Id.* at 2-3 (citing Pet. 26 n.8; Ex. 2055, 25:10-14, 31:9-21). Patent Owner also points out that Hunter refers to "IEEE draft standard 802.9a," but Exhibit 1032 is not a draft and only describes IEEE standard 802.9. *Id.* at 3 (citing Ex. 1003, 16:7; Ex. 1032).

For the reasons discussed above, Petitioner's argument in the Reply regarding isoEthernet is a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. Thus, we *see* no problem with Petitioner's reliance on Exhibit 1032 to support its argument regarding isoEthernet in the Reply. Nonetheless, we do not rely on Exhibit 1032 in this Decision. Rather, as discussed above, we rely on Exhibit 1010 as showing that isoEthernet includes a 10Base-T mode. *See supra* Section II.C.3. Petitioner submitted Exhibit 1010 with the Petition (Pet. IV), and cites Exhibit 1010 in the Reply (Pet. Reply 11). Also, like Hunter, Exhibit 1010 refers to the IEEE 802.9a standard for isoEthernet. Ex. 1003, 15:15-18; Ex. 1010, 160. Patent Owner does not raise any specific objections to Exhibit 1010 in the Motion to Strike. *See* PO Mot. Str. 1-3.

Patent Owner also argues that "had the <u>Petition</u> relied on isoEthernet (trademarked or otherwise) and/or Ex. 1032 as a basis for Ground 1, [Patent Owner] would have provided evidence with its Response that, as late as 1999, the IEEE isoEthernet committee prohibited combining phantom-power and Ethernet data signals ('10Base-T mode') to 'insure[] that 10Base-T services are unaffected.'" PO Mot. Str. 3 (citing Second Crayford Dep., 38:23-39:18). Patent Owner also presented this argument at the oral hearing and referred to it as an offer of proof under Fed. R. Evid. 103(a)(2). Tr. 83:2-18, 218:8-21. In connection with this offer of proof, Patent Owner alleged that it would have presented this evidence in a sur-reply, but was denied the opportunity to do so by the Board. *Id.*

Fed. R. Evid. 103(a)(2) provides that "[a] party may claim error in a ruling to . . . exclude evidence only if the error affects a substantial right of the party," and the party "informs the court of its substance by an offer of proof." We did not, however, exclude any evidence offered by Patent Owner or deny Patent Owner the opportunity to file a sur-reply in this proceeding. Patent Owner instead made a strategic decision to seek a motion to strike instead of a sur-reply. Specifically, Patent Owner requested "leave to file a motion to strike Petitioner's Reply Briefs in IPR Nos. 201601389, 2016-1391, 2016-1397, and 2016-1399 <u>or, in the alternative</u>, for leave to file a Sur-Reply." Ex. 3008, 1. In other words, Patent Owner identified a motion to strike as the preferred method to respond to Petitioner's Reply, and identified a sur-reply as an alternative to the motion to strike. *Id.* Because we granted Patent Owner's request for leave to file a motion to strike, we did not grant the proposed alternative of a sur-reply. Paper 42, 2-3. Patent Owner did not at any time prior to the oral hearing request a clarification of our ruling or identify any error in our ruling. Further, Patent Owner's attempt at the oral hearing to re-characterize its request as being for both a motion to strike and a sur-reply (Tr. 222:11-223:17) is contradicted by the express language Patent Owner used in its request to the Board (Ex. 3008, 1).

Lastly, Petitioner's arguments and evidence regarding isoEthernet in the Reply are not necessary to our ultimate determination in this proceeding. As discussed above, Hunter's teachings regarding 10Base-T alone satisfy the disputed limitations of the challenged claims. *See supra* Section II.C.2. Therefore, we determine that the challenged claims would have been obvious over Hunter and Bulan, even without relying on Hunter's teachings regarding isoEthernet.

2. Bob Smith Terminations and Common Mode Chokes

Patent Owner argues that Petitioner addresses Bob Smith terminations and common mode chokes for the first time in the Reply. PO Mot. Str. 3-4 (citing Pet. Reply 2:13-4:8, 5:16-19; Exs. 1021-1024, 1029; Second Crayfor Decl. ¶¶ 12-21). Specifically, Patent Owner argues that Petitioner knew that the invention of the '107 patent is directed to equipment networked over pre-existing wiring and cables (PO Mot. Str. 4 (citing Pet. 3)), and that pre-existing Ethernet networks included Bob Smith terminations and common mode chokes (PO Mot. Str. 4 (citing Ex. 2039, 45:10-21; Ex. 2055, 65:13-67:11)), but did not address them in the Petition.

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Patent Owner raises the issue of Bob Smith terminations and common mode chokes in the Response (PO Resp. 19-21), and Petitioner responds in the Reply with an explanation and evidence showing why Patent Owner's argument in the Response is incorrect (Pet. Reply 2-3). Thus, the portions of Petitioner's Reply that address Bob Smith terminations and common mode chokes are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Sections II.C.12, II.D.13; *Belden*, 805 F.3d at 1078-79.

Moreover, the disputed portions of Petitioner's Reply that address Bob Smith terminations and common mode chokes are not necessary to our ultimate determination in this proceeding. As discussed above, the premise of Patent Owner's argument regarding Bob Smith terminations and common mode chokes—that the invention of the '107 patent is limited to equipment networked over pre-existing wiring or cables—is not supported by the specification or claims of the '107 patent. *See supra* Sections II.C.12, II.D.13. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

3. Fisher and De Nicolo Patents

Patent Owner argues that Petitioner submitted new exhibits with the Reply, specifically, the Fisher and De Nicolo patents, to show that using phantom power in an Ethernet network was known at the time of the '107 patent. PO Mot. Str. 5 (citing Pet. Reply 4:11-6:2, 9:11-18; Exs. 1025-1028; Second Crayford Decl. ¶¶ 27-35). Patent Owner acknowledges that Petitioner presents the same position in the Petition, but contends that Petitioner cannot cite new evidence in the Reply to support that position. *Id.* (citing Pet. 4-5).

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Petitioner's position that using phantom power in an Ethernet network was known at the time of the '107 patent is presented in the Petition. Pet. 3-5. Patent Owner argues in the Response that "operating Power-over-Ethernet ('PoE') did not exist in 1997" (PO Resp. 8), and Petitioner responds in the Reply by citing to the Fisher and De Nicolo patents as evidence that Patent Owner's argument in the Response is incorrect (Pet. Reply 5 (citing Exs. 1025-1028)). Thus, the portions of Petitioner's Reply that cite to the Fisher and De Nicolo patents are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* sections II.C.12, II.D.13; *Belden*, 805 F.3d at 1078-79.

We note that Patent Owner specifically objects to Petitioner's reliance on the De Nicolo patents because Patent Owner alleges it could have demonstrated that the De Nicolo patents are not prior art to the '107 patent. PO Mot. Str. 5. Rather, as discussed above, we specifically rely on Hunter and the Fisher patents as showing that using phantom power in an Ethernet network was known at the time of the ’107 patent. *See supra* sections II.C.12, II.D.13. We rely on the De Nicolo patents to the extent Petitioner’s Reply and the Second Crayford Declaration make use of them as additional evidence, and a basis for expert testimony, showing that using phantom power in an Ethernet network was known at the time of the ’107 patent.

Moreover, the disputed portions of Petitioner’s Reply that rely on the Fisher and De Nicolo patents are not necessary to our ultimate determination in this proceeding. As discussed above, the teachings of Hunter alone demonstrate that using phantom power in an Ethernet network was known at the time of the ’107 patent. *See supra* Sections II.C.3, II.C.12, II.D.13. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner’s Reply.

4. Alleged Skepticism

Patent Owner argues that Petitioner addresses the objective indicia of non-obviousness, including skepticism of those skilled in the art, for the first time in the Reply. PO Mot. Str. 5-6 (citing Pet. Reply 6:6-7:5; Exs. 1035-1042; Second Crayford Decl. ¶¶ 36-44). Specifically, Patent Owner contends that Petitioner was “aware of the secondary considerations issues, but failed to address them in the Petition.” PO Mot. Str. 6.

We are not persuaded that the disputed portions of Petitioner’s Reply are improper. Patent Owner raises the issue of skepticism by those skilled in the art in the Response (PO Resp. 26-31), and Petitioner responds in the Reply with an explanation and evidence showing why Patent Owner's argument in the Response is incorrect (Pet. Reply 6-7). Thus, the portions of Petitioner's Reply that address the alleged skepticism of those skilled in the art are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80. Further, we rely on the disputed portions of Petitioner's Reply only to explain, at least in part, why we are not persuaded by Patent Owner's argument in the Response. *See supra* Sections II.C.12, II.D.13; *Belden*, 805 F.3d at 1078-79.

Moreover, the disputed portions of Petitioner's Reply that address the alleged skepticism of those skilled in the art are not necessary to our ultimate determination in this proceeding. As discussed above, even if we just consider the evidence submitted by Patent Owner, it does not establish that those of skilled in the art were skeptical that phantom power would work in an Ethernet network. *See supra* Sections II.C.12, II.D.13. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

5. CAT-3 and CAT-5 Cabling

Patent Owner argues that Petitioner addresses the number of conductors in CAT-3 and CAT5 cabling for the first time in the Reply. PO Mot. Str. 6-7 (citing Pet. Reply 9:19-10:5; Ex. 1031; Second Crayford Decl. ¶ 60). Specifically, Patent Owner contends that

Petitioner knew that CAT-3 cabling was used for 10Base-T Ethernet and CAT-5 cabling was used for 100Base-T Ethernet, and, thus, "could have included" argument and evidence in the Petition regarding the number of conductors in that cabling. *Id.* at 7.

We are not persuaded that the disputed portions of Petitioner's Reply are improper. Patent Owner raises the issue of the number of conductors in CAT-3 and CAT5 cabling in the Response (PO Resp. 25-26), and Petitioner responds in the Reply with an explanation and evidence showing why Patent Owner's argument in the Response is incorrect (Pet. Reply 9-10). Thus, the portions of Petitioner's Reply that address the number of conductors in CAT-3 and CAT5 cabling are a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Belden*, 805 F.3d at 1078-80.

Patent Owner also argues that, if Petitioner had addressed the number of conductors in CAT-3 and CAT5 cabling in the Petition, Patent Owner "would have included the cable specification for CAT-3/CAT-5 wiring, confirming that such cables comprise four wire pairs." PO Mot. Str. 7. (citing Ex. 2055, 171:23-176:13). Patent Owner also presented this argument at the oral hearing and referred to it as an offer of proof under Fed. R. Evid. 103(a)(2). Tr. 220:19-221:2. As discussed above, Fed. R. Evid. 103(a)(2) provides that "[a] party may claim error in a ruling to . . . exclude evidence only if the error affects a substantial right of the party," and the party "informs the court of its substance by an offer of proof." We did not, however, exclude any evidence offered by Patent Owner or deny Patent Owner the opportunity to file a sur-reply in this proceeding. *See supra* Section II.G.1. Patent Owner instead made a strategic decision to seek a motion to strike instead of a sur-reply. *See id.*

Moreover, the disputed portions of Petitioner's Reply that address the number of conductors in CAT-3 and CAT5 cabling are not necessary to our ultimate determination in this proceeding. As discussed above, the portions of Hunter cited in the Petition independently demonstrate that a 10Base-T bus may include only two twisted pair conductors, not four. *See supra* Sections II.C.4, II.C.12, II.D.13. Therefore, we determine that the challenged claims would have been obvious over the asserted prior art combinations, even without relying on the disputed portions of Petitioner's Reply.

H. Oral Hearing Objections

Each party objected to arguments presented by the other party during the oral hearing. Petitioner objected that Patent Owner improperly raised new arguments for the first time at the oral hearing regarding the IEEE 802.9f specification, the CAT-3 and CAT-5 cabling specifications, blind power, and power levels. Tr. 216:15-217:7. We considered Patent Owner's arguments in the Response in light of any additional arguments presented by Patent Owner at the oral hearing, but we ultimately do not find Patent Owner's arguments persuasive for the reasons discussed in this Decision. Thus, Petitioner would not suffer any prejudice by our admission of the arguments presented by Patent Owner at the oral hearing.

Patent Owner objected that Petitioner raised arguments at the oral hearing that were the subject of Patent Owner's Motion to Strike and/or Motion to

Exclude. Tr. 66:20-67:20. For the reasons discussed above, we deny Patent Owner's Motion to Strike and dismiss-in-part and deny-in-part Patent Owner's Motion to Exclude. *See supra* Sections II.E, II.G. Thus, we *see* no problem with the arguments presented by Petitioner at the oral hearing.

III. Order

Accordingly, it is

ORDERED claims 1, 5, 31, 43, 70, 72, 74, 75, 83, 103, 104, 111, 123, and 125 of the '107 patent are held unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude is denied-in-part and dismissed-in-part;

FURTHER ORDERED that Petitioner's Motion to Exclude is denied;

FURTHER ORDERED that Patent Owner's Motion to Strike is denied;

FURTHER ORDERED that because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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PATENT TRIAL AND APPEAL BOARD CONSOLIDATED TRIAL PRACTICE GUIDE NOVEMBER 2019—RELEVANT EXCERPTS

INTRODUCTION

This consolidated Office Patent Trial Practice Guide ("Practice Guide") incorporates the updates from August 2018 and July 2019 into the original August 2012 Practice Guide.

In August 2012, the Office published the Practice Guide, concurrent with the promulgation of the AIA Trial Rules. *See* 77 Fed. Reg. 48,756 (Aug. 14, 2012). The Practice Guide apprised the public of standard practices before the Board during AIA trial proceedings, including *inter partes* reviews, post-grant reviews, covered business method reviews, and derivation proceedings. The Practice Guide also encouraged consistency of procedures among panels of the Board.

The Office has updated the Practice Guide to take into account stakeholder feedback, lessons learned during the years since the first AIA trial, and the natural evolution of the Board's practices. A first update to the Practice Guide was published on August 13, 2018, and a second update was published on July 16, 2019. This edition incorporates the updates from August 2018 and July 2019 into the original August 2012 Practice Guide so that the most recent versions of all sections of the Practice Guide are available in a single document. It also makes revisions to ensure consistency across the newly consolidated guide. Revisions to reconcile updates and to reflect the Board's current practices relate to institution of trial after *SAS Institute Inc. v. Iancu*, 138 S. Ct. 1348 (2018);

use of sur-replies in lieu of observations; how parties may contact the Board to request an initial conference call; use of word counts; updates to the sample scheduling order for derivation proceedings; and updates to the default protective order. The Office anticipates making further updates, if needed, on an annual

[. . .]

. . . *Luxembourg S.A.*, Case IPR2017-00948, slip op. at 5 (PTAB Jan. 18, 2019) (Paper 34) (precedential). Thus, petitioner may raise, and the Board may consider, other grounds of unpatentability, including 35 U.S.C. §§ 101 and 112, as to proposed substitute claims.

I. Reply to Patent Owner Response and Reply to Petitioner Opposition to a Motion to Amend; Sur-Replies

A petitioner may file a reply to a patent owner response, and a patent owner may file a reply to an opposition to a motion to amend. 37 C.F.R. § 42.23. Additionally, in response to issues arising from the Supreme Court's decision in SAS (138 S. Ct. at 1358), the Board will permit the petitioner, in its reply brief, to address issues discussed in the institution decision. The patent owner will similarly be allowed to address the institution decision in its sur-reply, if necessary to respond to petitioner's reply. Petitioner may not submit new evidence or argument in reply that it could have presented earlier, *e.g.* to make out a prima facie case of unpatentability. A party also may submit rebuttal evidence in support of its reply. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1077-78 (Fed. Cir. 2015). If a party submits a new expert declaration with its reply, the opposing party may cross-examine the expert, move to exclude the declaration, and comment on the declaration and cross-examination in any sur-reply. *Id.* at 1081-82.

Sur-replies to principal briefs (*i.e.*, to a reply to a patent owner response or to a reply to an opposition to a motion to amend) normally will be authorized by the scheduling order entered at institution. The sur-reply may not be accompanied by new evidence other than deposition transcripts of the cross-examination of any reply witness. Sur-replies should only respond to arguments made in reply briefs, comment on reply declaration testimony, or point to cross-examination testimony. As noted above, a sur-reply may address the institution decision if necessary to respond to the petitioner's reply. This sur-reply practice essentially replaces the previous practice of filing observations on cross-examination testimony.

Generally, a reply or sur-reply may only respond to arguments raised in the preceding brief. 37 C.F.R. § 42.23, except as noted above. "Respond," in the context of 37 C.F.R. § 42.23(b), does not mean proceed in a new direction with a new approach as compared to the positions taken in a prior filing. While replies and sur-replies can help crystalize issues for decision, a reply or sur-reply that raises a new issue or belatedly presents evidence may not be considered. The Board is not required to attempt to sort proper from improper portions of the reply or sur-reply.

Examples of indications that a new issue has been raised in a reply include new evidence necessary to make out a prima facie case for the patentability or unpatentability of an original or proposed substitute claim, such as newly raised rationale to combine the prior art references that was not expressed in the petition. *See Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369-70 (Fed. Cir. 2016) (holding that the Board did not err in refusing the reply brief as improper under 37 C.F.R. § 42.23(b) because petitioner relied on an entirely new rationale to explain why one of skill in the art would have combined the references at issue). It is also improper for a reply to present new evidence (including new expert testimony) that could have been presented in a prior filing, for example newly cited prior art references intended to "gap-fill" by teaching a claim element that was not present in