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Paper 10
Date: August 21, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

POLARIS POWERLED TECHNOLOGIES, LLC,
Patent Owner.

IPR2023-00479
Patent 8,740,456 B2

Before MICHELLE N. WORMMEESTER, JON M. JURGOVAN, and KARA L. SZPONDOWSKI, *Administrative Patent Judges.*

JURGOVAN, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively "Petitioner") filed a Petition (Paper 1, "Pet.") to institute an *inter partes* review of claims 1–13 of U.S. Patent 8,740,456 B2 (Ex. 1001, "the '456 patent"). Polaris PowerLED Technologies, LLC ("Patent Owner") filed a Preliminary Response (Paper 8, "Prelim. Resp.").

We have jurisdiction under 35 U.S.C. § 314. Institution of an *inter partes* review is authorized when "the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a). Based on the current record, and for the reasons explained below, we determine that Petitioner has not established a reasonable likelihood that it would prevail with respect to at least one challenged claim. Accordingly, we decline to institute *inter partes* review.

II. BACKGROUND

A. Real Parties in Interest

Petitioner identifies Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. as real parties in interest. Pet. 2. Patent Owner identifies itself as the real party in interest. Paper 4, 1.

B. Related Matters

Petitioner and Patent Owner identify *Polaris PowerLED Technologies, LLC v. Samsung Elecs. Co., Ltd., et al.*, No. 2:22-cv-00469 (E.D. Tex). Pet. 2; Paper 4, 1. Patent Owner also identifies IPR2023-00484, where Petitioner filed a petition for *inter partes* review of U.S. Patent No. 8,217,887. Paper 4, 1.

C. The '456 Patent (Ex. 1001)

The '456 patent is titled "Adjusting Delivery of Current in a Connection Based on Temperature." Ex. 1001, code (54). Figure 1A of the '456 patent is shown below.

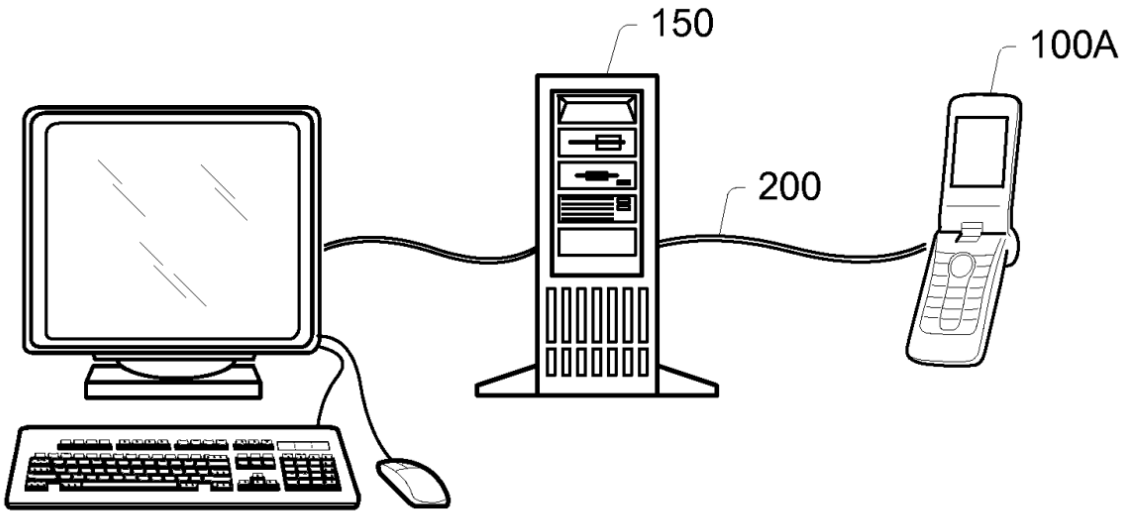


FIG. 1A

In Figure 1A, connection 200 connects first device 100 to second device 150. *Id.* at 3:45–48. The first device 100 may be a cell phone or personal music player, the second device 150 may be a computer system or hub, and the connection 200 may be a USB, fiber optic, Firewire, DVI, HDMI, VGA, or XLR connection, for example. *Id.* at 4:25–26, 4:36–37, 4:7–9. Connection 200 carries signals and power between the two devices. *Id.* at 3:57–61.

Figure 2A of the '456 patent is shown below.

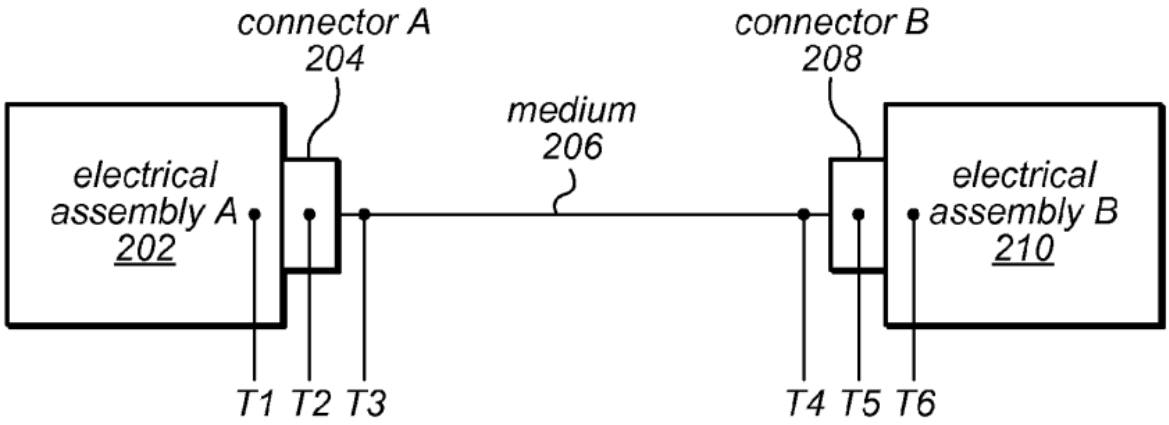


FIG. 2A

Figure 2A shows details of the connection 200, which includes physical medium 206 connected to connectors 204, 208 which are connected to respective electrical assembly A 202 and electrical assembly B 210. *Id.* at 5:18–24. According to the '456 patent, in one embodiment, "the electrical assemblies 202 and 210 may be ports (or connectors) of the first device 100 and the second device 150." *Id.* at 5:22–24. "[C]onnection 200 may be connected to both the first device 100 and the second device 150 via the corresponding connectors of the connection and the electrical assembly of the respective device." *Id.* at 5:24–27. Labels T1–T6 are "exemplary locations for temperature measurement." *Id.* at 5:43–45. Locations T1 and T6 appear to be at respective ports of the first device 100 and second device 150.

Figure 3 of the '456 patent is shown below.

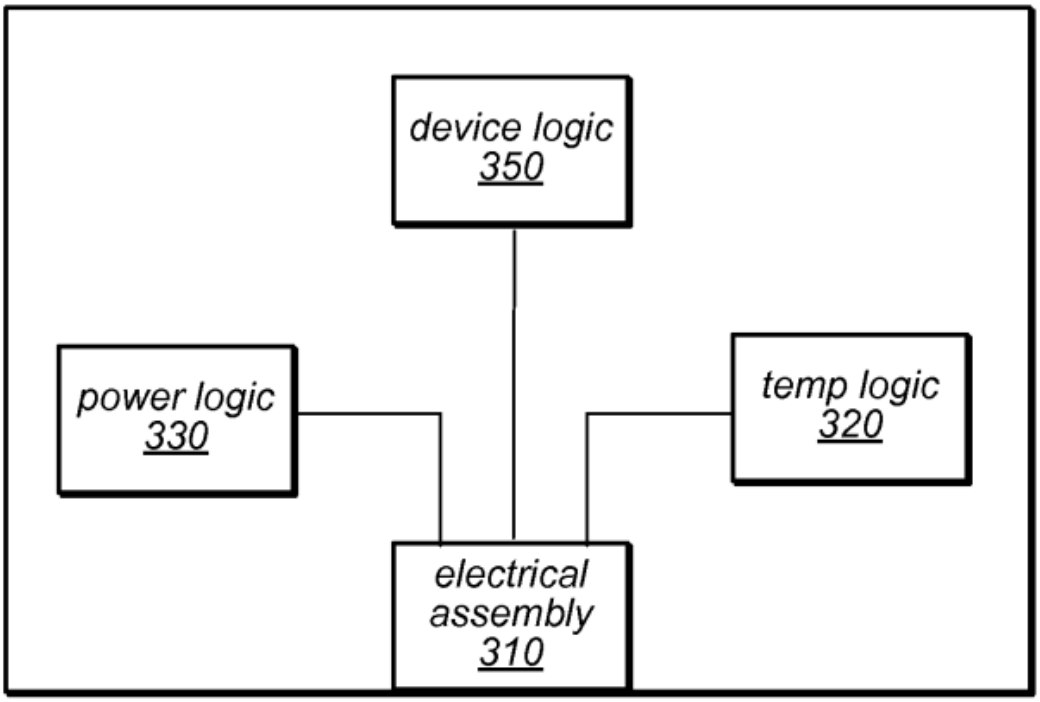


FIG. 3

"Figure 3 is a block diagram of an exemplary device (e.g., the first device 100 or the second device 150)" which includes an electrical assembly 310, temperature logic 320, power logic 330, and device logic 350. *Id.* at 5:49–50. "[T]he device may include an electrical assembly 310 (such as a port) for connecting to connection 200." *Id.* at 5:50–52. "[P]ower logic 330 may include circuitry or processor(s) necessary to provide or receive power over the connection 200." *Id.* at 5:65–6:1. "The power logic 330 may also be configured to monitor and/or change the power levels (e.g., the current) provided over the connection 200." *Id.* at 6:1–3. "[T]he power logic 330

may be configured to request a change in current to another device, e.g., over the connection 200." *Id.* at 6:3–5.

"The temperature logic 320 may include any circuitry or processor(s) to measure the temperature of the electrical assembly 310, a connector 200 connected to the electrical assembly 310, ambient temperature, e.g., outside of the device, etc." *Id.* at 6:5–10. Temperature logic 320 "may be configured to compare the measured temperature (or change in temperature) with a threshold temperature (or change in temperature) and initiate a change in current provided over the connection 200 when the threshold is exceeded. *Id.* at 6:11–16.

"[T]he temperature logic may indicate the threshold has been exceeded to power logic 330, which may in turn cause a reduction in current received or provided over the connection 200." *Id.* at 6:16–19. "The temperature logic 320 may include a temperature sensor used to measure the temperature at various places shown in FIGS. 2A and 2B, among other locations." *Id.* at 6:20–23. Change in temperature of a connection may be measured while current is provided from the first device to the second device. *Id.* at 7:3–5. The change in temperatures may be measured at an electrical assembly (e.g., the port of the device) relative to ambient temperature. *Id.* at 7:17–19. The change in temperature may be measured at both sides, and the largest of the two changes may be used for comparison with a threshold. *Id.* at 7:30–32. If the change in temperature is above a threshold, the current provided from the first device to the second device may be reduced to prevent overheating and failure. *Id.* at 8:11–19.

D. Illustrative Claims

Of the challenged claims, claims 1 and 9 of the '456 patent are independent. Claims 1 and 9 are shown below with Petitioner's identifiers in brackets.

> 1. [Pre] A method for adjusting current based on temperature, comprising:
>
> [A] determining a change temperature at a first device wherein said temperature is measured at a first port of the first device that is configured to receive a connection to a second device;
>
> [B] determining a change temperature at a second device wherein said temperature is measured at a second port of the second device that is configured to receive the connection to the first device;
>
> [C] determining the greater of the changes in temperature measured at the first device and the second device, wherein said determining is performed while the first device provides current to the second device over the connection; and
>
> [D] determining if the greater of the changes in temperature is above a threshold;
>
> [E] if the greater of the changes in temperature is above the threshold, reducing the current being provided from the first device to the second device.

Ex. 1001, 10:21–40.

9. [Pre] A device, comprising:

[A] a connection coupling a first device and a second device;

[B] a first port of the first device, wherein the first port is configured to receive a first connector of the connection;

[C] first logic of the first device coupled to the first port, wherein the first logic is configured to determine a temperature of the connection at the first connector;

[D] second logic of the first device, wherein the second logic is configured to provide current to the second device over the connection;

[E] a second port of the second device, wherein the second port is configured to receive a second connector of the connection;

[F] third logic of the second device coupled to the second port, wherein the third logic is configured to determine a temperature of the connection at the second connector;

[G] wherein, in response to the greater of the change in temperature determined by the first logic and the change in temperature determined by the third logic being above a threshold, the second logic is configured to reduce the current being provided from the first device to the second device.

Id. at 11:11–12:3.

E. Prior Art and Asserted Challenges to Patentability

Petitioner asserts that claims 1–17 are unpatentable on the following challenges (Pet. 3–4):

Claim(s) Challenged	35 U.S.C. §[1]	Basis/Reference(s)
1, 5–9, 12, 13	103(a)	Rabu[2], Katayama[3]
1, 5–9, 12, 13	103(a)	Rabu, Katayama, Shoji[4]
1–13	103(a)	Rabu, Katayama, Karam[5]

In support of its proposed challenges, Petitioner relies on the Declaration of Miltiadis Hatalis, Ph.D. *See* Ex. 1002.

III. ANALYSIS

A. Legal Standards

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

[1] Because the '456 patent issued from a patent application that was filed before March 16, 2013, patentability is governed by the version of 35 U.S.C. § 103 preceding the Leahy-Smith America Invents Act ("AIA"), Pub L. No. 112–29, 125 Stat. 284 (2011).
[2] Rabu et al., U.S. Patent Pub. 2010/0315752 A1, published Dec. 16, 2010 (Ex. 1005). Petitioner contends that Rabu is prior art under § 102(a) and § 102(e). Pet. 9.
[3] Katayama et al., Japanese Patent Pub. JP2011-15581A, published Jan. 20, 2011 (Ex. 1007). Petitioner contends that Katayama is prior art under § 102(a). Pet. 11.
[4] Shoji, U.K. Patent Pub. 2 276 783 A, published Oct. 5, 1994 (Ex. 1006). Petitioner contends that Shoji is prior art under § 102(b). Pet. 13.
[5] Karam et al., U.S. Patent 7,593,747 B1, issued Sep. 22, 2009 (Ex. 1008). Petitioner contends that Karam is prior art under § 102(b). Pet. 14.

invention was made to a person having ordinary skill in the art to which said 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 skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations.[6] *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

In conducting an obviousness analysis, one must determine whether the claimed elements are present in the prior art. *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1194–1198 (Fed. Cir. 2014). However, a patent claim "is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR*, 550 U.S. at 418. An obviousness determination requires finding "both 'that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.'" *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016) (citation omitted); *see KSR*, 550 U.S. at 418. Further, an assertion of obviousness "cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 550 U.S. at 418; *In re NuVasive, Inc.*, 842 F.3d 1376,

[6] Neither Petitioner nor Patent Owner have presented any objective evidence of obviousness or nonobviousness in the record.

1383 (Fed. Cir. 2016) (a finding of a motivation to combine "must be supported by a 'reasoned explanation'").

"In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3)); *see also Intelligent Bio-Sys.*, 821 F.3d at 1369. Therefore, to prevail in an *inter partes* review, Petitioner must explain how the proposed combinations of prior art would have rendered the challenged claims unpatentable. We determine whether the information presented in the Petition shows there is a reasonable likelihood that Petitioner would prevail in establishing that at least one of the challenged claims would have been obvious over the proposed combinations of prior art.

B. Level of Ordinary Skill in the Art

The person of ordinary skill in the art is a hypothetical person who is presumed to know the relevant prior art. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey–Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). In determining the skill level, the Board may consider various factors including "the type of problems encountered in the prior art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *Id.* In a given case, every factor may not be present, and one or more factors may predominate. *Id.*

Petitioner asserts that a person of ordinary skill in the art

> would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or a related field, and at least two years of experience in the research, design, development, and/or testing of computer circuitry, wired connections, temperature sensors, power charging, and related firmware and software, or the equivalent, with additional education substituting for experience and vice versa.

Pet. 8 (citing Ex. 1002 ¶¶ 40–54).

"Patent Owner applies Petitioner's definition of a [person of ordinary skill in the art] and level of ordinary skill for purposes of this Preliminary Response." Prelim. Resp. 5. However, Patent Owner does not concede that Petitioner's definition is correct. *Id.*

Neither Petitioner nor Patent Owner contends that the outcome of this proceeding is determined by the level of ordinary skill in the art. We apply Petitioner's definition of the level of ordinary skill in the art except that we delete the qualifier "at least" which renders the level of skill ambiguous and may encompass levels of skill beyond ordinary. We consider Petitioner's proposed level of skill to be consistent with the problems and solutions identified in the '456 patent and the prior art. *Okajima v. Bourdeau*, 261 F.3d 1350 (Fed. Cir. 2001). We also consider the proposed level of skill to be reflective of the education and experience a person of ordinary skill would have had.

C. Claim Construction

Petitioner contends that no terms require explicit construction, and "interprets the claims of the '833 Patent according to 37 C.F.R. § 42.100(b)." Pet. 9. Since this *inter partes* review concerns the '456 patent, we understand Petitioner's reference to the '833 Patent to be an error.

In any case, "Petitioner does not believe that any term requires explicit construction." *Id.* (citing Ex. 1002 ¶ 57).

Patent Owner "does not believe that any term requires explicit construction" and "construes the claims according to their plain and ordinary meaning in light of the specification, consistent with the standard established in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc)." Prelim. Resp. 5–6.

For purposes of this Decision, given that no claim terms are in controversy on the current record, we determine that no express claim construction is necessary. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Alleged Obviousness Over Rabu and Katayama

Petitioner contends claims 1, 5–9, 12, and 13 would have been obvious over the combination of Rabu and Katayama. Pet. 17–49.

1. Rabu (Ex. 1005)

Rabu is titled "Thermal Protection Circuits and Structures for Electronic Devices and Cables." Ex. 1005, code (54). Rabu's Figure 1 is shown below.

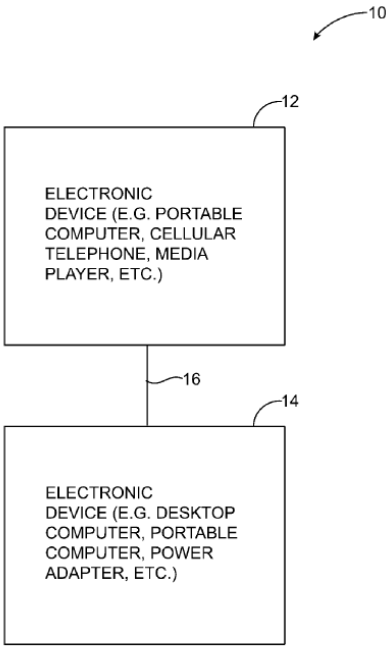


FIG. 1

Rabu's Figure 1 shows a first electronic device 12 and second electronic device 14 connected by path or cable 16, which conveys data and power signals. *Id.* ¶ 34.

Rabu's Figure 15 is shown below.

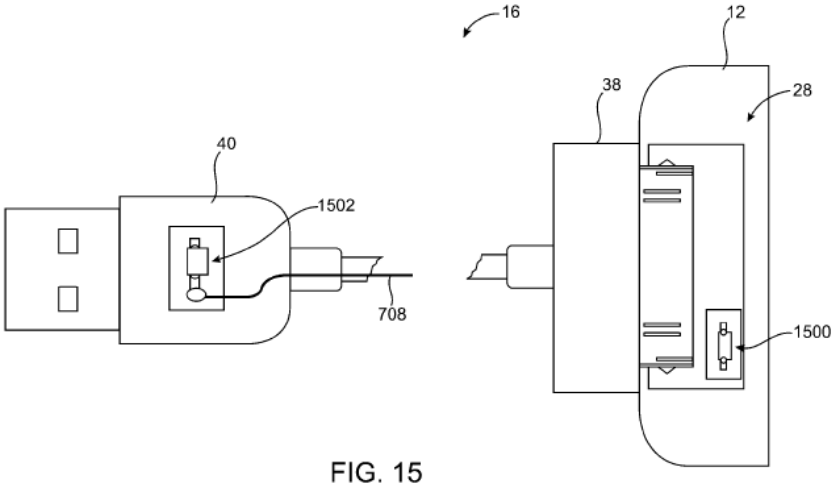


FIG. 15

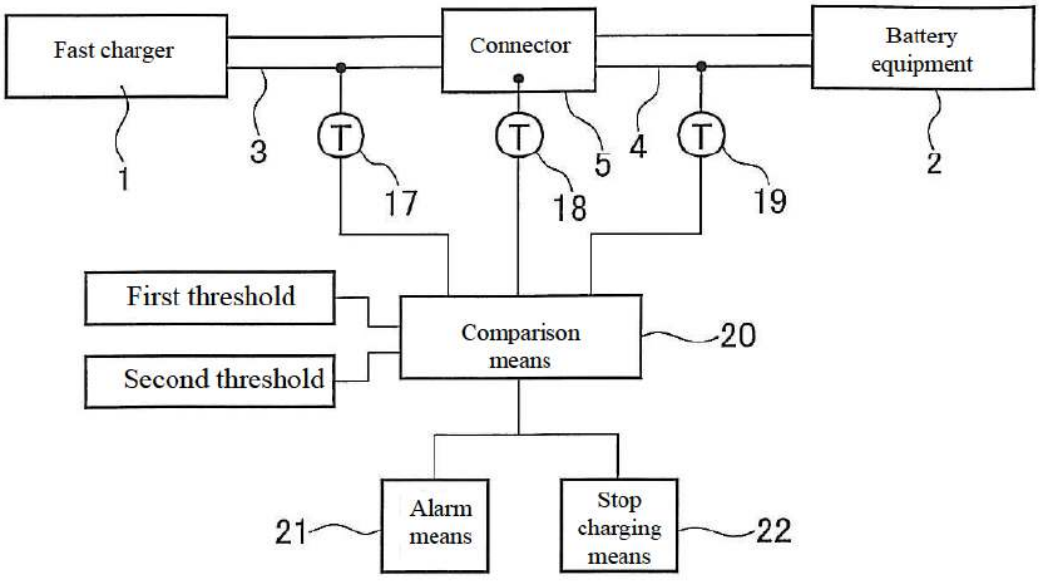
Rabu's Figure 15 shows a temperature sensor 1500 in electronic device 12, which senses the temperature of the connector 38 of cable 16 and conveys

signals to cutoff switch 1502 representative of the connector's temperature. *Id.* ¶ 77. The cutoff switch 1502 cuts off power when "the temperature of the first connector has exceeded a threshold temperature." *Id.* ¶ 8. Thermal protection circuitry may include a temperature sensor and a voltage (power) cutoff switch. *Id.* ¶ 46. In an alternative arrangement, thermal protection circuitry may be included in electronic devices 12 and 14. *Id.* ¶¶ 77–78.

2. Katayama (Ex. 1007)

Katayama is titled "Deterioration Detection Device for Electric Vehicle Fast Charger." Ex. 1007, code (54). Katayama's Figure 3 is shown below.

FIG. 3



In Katayama's Figure 3, fast charger 1 is connected to charging cable 3, connector 5, charging cable 4, and ultimately, battery equipment 2. *Id.* ¶ 18. Temperature sensor 17 is connected to cable 3, temperature sensor 18 is connected to connector 5, and temperature sensor 19 is connected to cable 4. *Id.* Comparison means 20 determines whether the measured temperature of

any one of temperature sensors 17, 18, and 19 is greater than the first threshold value. *Id.* If so, means 21 sounds a minor alarm while continuing to charge. *Id.* If the measured temperature of any of temperature sensors 17, 18, and 19 is above the second threshold, which is greater than the first threshold, then means 22 stops the charging of the battery equipment by the fast charger 1. *Id.* This prevents burnout of charging cables 3, 4. *Id.* ¶ 5.

3. Analysis of Independent Claim 1

We analyze Petitioner's and Patent Owner's contentions concerning claim 1 below using Petitioner's identifiers to indicate the limitations under discussion.

a) Preamble (1[Pre])

The preamble of claim 1 recites "[a] method for adjusting current based on temperature." Ex. 1001, 10:21–22. Petitioner contends that Rabu teaches "thermal protection circuitry that reduces or eliminate[s] power supply signals flowing to a connector in [a] cable." Pet. 22 (citing Ex. 1005 ¶ 32) (alteration in original). Petitioner further contends that power and current are directly related quantities: "[s]witch 900 may include a number of circuit components such as transistors, resistors, capacitors, etc. that allow switch 900 to block power delivery when desired (i.e., by interrupting the flow of current)." *Id.* (citing Ex. 1005 ¶ 55) (alteration in original). Petitioner contends that "block[ing] power delivery" and "interrupting the flow of current" similarly reduce or eliminate current in a circuit. *Id.* (citing Ex. 1002 ¶ 82) (alteration in original).

Patent Owner does not refute Petitioner's contentions concerning the preamble of claim 1.

We determine that Petitioner has adequately shown that the preamble of claim 1 is taught by Rabu.[7]

b) Limitation 1[A]

Limitation 1[A] recites "determining a change temperature at a first device wherein said temperature is measured at a first port of the first device that is configured to receive a connection to a second device." Ex. 1001, 10:23–26. Petitioner contends that Rabu teaches element [1A]. Pet. 22 (citing Ex. 1002 ¶¶ 83–95).

Specifically, Petitioner contends that Rabu teaches "a first device," "a second device," and "the first device that is configured to receive a connection to a second device." *Id.* at 22–23 (citing Ex. 1002 ¶¶ 12, 34, 84, Fig. 1). Petitioner contends that Rabu teaches that device 14 (the first device) may be a portable computer, for example, and may have connectors 28 and 29 (such as USB ports) that couple to one or more connectors in path (or cable) 16 (connection). *Id.* at 23–24 (citing Ex. 1005 ¶¶ 39, 40, 85, Fig. 4). Petitioner contends that the portable computer 14 charges the device 12 which may be a cell phone, for example. *Id.* (citing Ex. 1005 ¶¶ 38, 81, Fig. 3).

Petitioner contends that Rabu explains that temperature protection circuits may be included in either portable computer 14 (first device), the device 12 being charged (second device), or both. *Id.* at 24 (citing Ex. 1005 ¶ 78). This thermal protection circuitry "may include temperature sensor

[7] Since we determine that Petitioner adequately shows that claim 1's preamble is taught by Rabu, we need not and do not determine whether the preamble is limiting. *See, e.g., Catalina Mktg. Int'l v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002).

1500 in electronic device 12 (e.g., sensor 1500 in connector 28) and a cutoff switch 1600 in electronic device 14." *Id.* (citing Ex. 1005 ¶ 78).

Petitioner contends that Rabu teaches measuring temperature at various places in the system, including at connector 28 of the device 14 (first device). *Id.* at 25 (citing Ex. 1005 ¶¶ 46, 50, 77, 78, 86). Petitioner further contends that Rabu teaches measuring a change in temperature using a temperature sensor such as a rise in temperature over an ambient level. *Id.* at 26–27 (citing Ex. 1005 ¶¶ 46, 54, 57, 67; Ex. 1002 ¶¶ 95).

Patent Owner contends that Rabu does not disclose measuring temperature at the ports of the first and second devices. Prelim. Resp. 14–16. Patent Owner contends that the Office agreed in the prosecution history that measuring temperature changes at the ports at both ends of the electrical connection was absent from the prior art, and Patent Owner contends that this feature remains absent from the combinations of art in the Petition. *Id.* at 14–15.

Rabu is clear, however, that thermal protection circuitry includes a temperature sensor and cutoff switch, which may be provided both in electronic device 12 and electronic device 14. Ex. 1005 ¶¶ 77–78. Rabu also states that a temperature sensor 1500 may be included in connector 28 (first port) of electronic device 14 (first device). *Id.* ¶ 77. Thus, we do not agree with Patent Owner's argument.

Petitioner has shown sufficiently that Rabu teaches limitation 1[A] notwithstanding Patent Owner's arguments to the contrary.

c) Limitation 1[B]

Limitation 1[B] recites "determining a change temperature at a second device wherein said temperature is measured at a second port of the second

device that is configured to receive the connection to the first device." Ex. 1001, 10:27–30. Petitioner contends that Rabu teaches limitation [1B]. Pet. 27 (citing Ex. 1002 ¶¶ 96–100).

Specifically, Petitioner contends that Rabu teaches a temperature sensor 1500 in the port of device 12 (the second device) into which the cable connector connects. *Id.* (citing Ex. 1005 ¶ 77). Since Rabu teaches that temperature sensor 1500 can measure increasing temperature, Petitioner asserts that the temperature sensor 1500 measures a change in temperature as claimed. *Id.*

Patent Owner argues that Petitioner has created an inaccurate "mashup" of Rabu's Figures 2, 4, and 16. Prelim. Resp. 19. However, Petitioner shows that Rabu teaches that thermal protection circuitry can be provided in both electronic device 12 and electronic device 14, and that the thermal protection circuitry includes a temperature sensor and a cutoff switch. Ex. 1005 ¶¶ 77–78. Consequently, we do not agree that Petitioner's drawings are inaccurate in light of what Rabu teaches.

Dr. Hatalis stated

> [t]hough Rabu's teaching in regards to placing a thermal protection circuit that would include a temperature sensor in both the first and the second device is explicit as discussed in Ground 1, there is no explicit description of an embodiment that depicts the use of two temperature sensors for measuring the temperature in each of the two devices.

Ex. 1002 ¶ 168. Patent Owner argues that this statement means that Rabu does not teach two temperature sensors, much less one at a port of both the first and second device. Prelim. Resp. 22–29.

We do not agree with Patent Owner's contention. As explained, Rabu teaches that thermal protection circuitry includes a temperature sensor and a cutoff switch. Ex. 1005 ¶ 77. Rabu further teaches that the electronic device 12 and the electronic device 14 may each have thermal protection circuitry including a temperature sensor and cutoff switch. *Id.* ¶ 78. Thus, we do not consider Dr. Hatalis's testimony as an admission that Rabu does not disclose temperature sensors at both electronic device 12 and electronic device 14, contrary to Patent Owner's contention.

We determine that Petitioner shows sufficiently that limitation 1[B] is taught by Rabu.

d) Limitation 1[C]

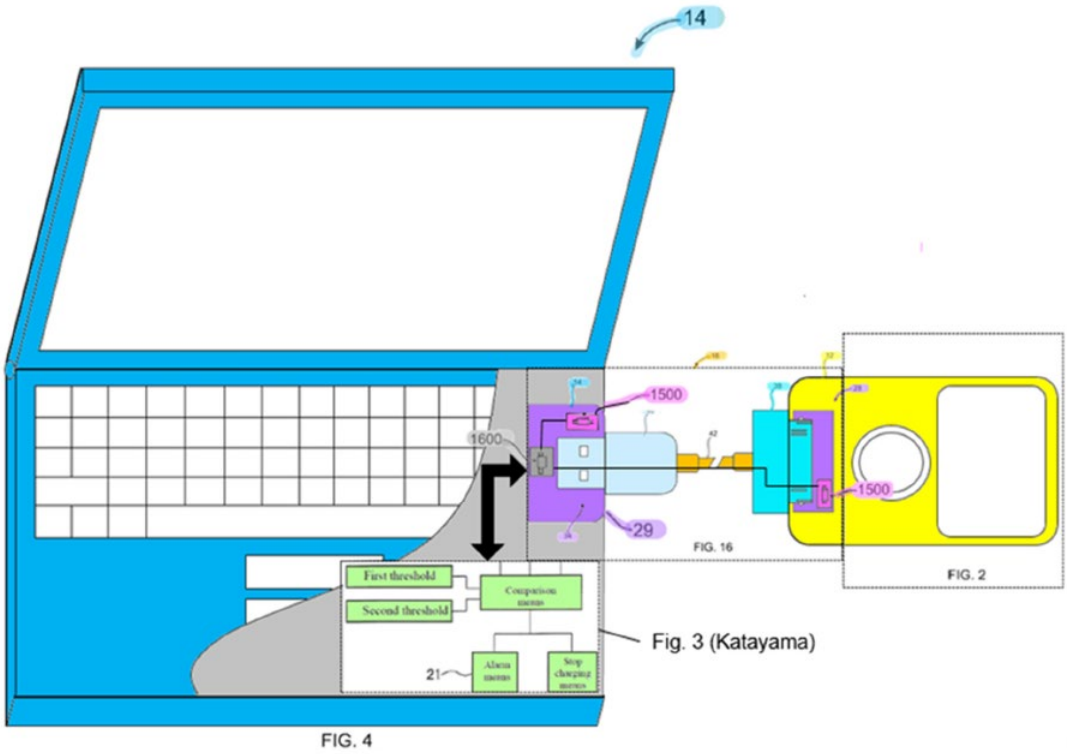
Limitation 1[C] of claim 1 recites "determining the greater of the changes in temperature measured at the first device and the second device, wherein said determining is performed while the first device provides current to the second device over the connection." Ex. 1001, 10:31–35. Petitioner contends that Rabu and Katayama teach limitation 1[C]. Pet. 29 (citing Ex. 1002 ¶¶ 101–113).

Specifically, Petitioner argues that the combined system of Rabu and Katayama "would have had temperature sensors at both ends of the connection for measuring temperature changes at both ends: both at the first device providing power (Rabu's device 14) and at the second device receiving power (Rabu's device 12)." *Id.* Petitioner contends that both Rabu and Katayama teach that a temperature change greater than a fixed value may cause damage to the system. *Id.* (citing Ex. 1005 ¶ 75; Ex. 1007, claim 3). Petitioner contends that it would have been obvious to a person of ordinary skill in the art to determine the worst-case temperature change in

the combined system because the greater change in temperature poses the greater risk of damage to the system. *Id.* at 29–30 (citing Ex. 1002 ¶ 102).

Petitioner contends that Katayama teaches measuring temperature changes in a charging system at multiple locations on the wires and connector of a fast charger for battery equipment. *Id.* at 30. Petitioner also contends that Katayama teaches comparison means 20 for comparing measured temperatures from temperature sensors 17, 18, and 19. *Id.* at 31. Petitioner contends that Katayama teaches to determine, using a comparison means 20, if any one of the temperature sensors 17, 18, 19 is at or above the temperature where burn-out damage may occur. *Id.* Petitioner contends that a person of ordinary skill in the art would have understood that the greatest risk of damage is at the sensor measuring the greatest temperature change as that would burn out before places experiencing a lesser temperature change. *Id.* (citing Ex. 1002 ¶ 105).

Petitioner contends that the combined teachings of Rabu and Katayama result in the system illustrated below:



Id. at 31–32. Petitioner contends that, in the combined thermal protection circuit shown above, "a temperature sensor measures temperature at second device 12, another sensor measures temperature at first device 14, and a power cutoff circuit at first device 14, which can shut off power to the second device 12." *Id.* at 32 (citing Ex. 1002 ¶ 107; Ex. 1005 ¶¶ 50, 77, 86, Figs. 9, 15; Ex. 1007 ¶ 18, Fig. 3). Petitioner contends a person of ordinary skill in the art would have been motivated to design the protection circuit with comparison means (taught by Katayama) for determining which of the two measured temperature changes (that is, the temperature rise measured at device 12 and the temperature rise measured at device 14) is greater, because the greater temperature change poses the greater danger of permanent damage to the system." *Id.* at 32–33 (citing Ex. 1002 ¶ 107; Ex. 1007 ¶ 18).

Petitioner further contends that Rabu teaches that the determination "is performed while the first device provides current to the second device

over the connection." *Id.* at 33. According to Petitioner, Rabu teaches that "if the difference between the power being delivered to cable 16 and the power being received through cable 16" is significant, then "a short has likely formed" because the system is "likely being heated from the short (e.g., because lost power may typically be transformed into heat)." *Id.* (citing Ex. 1005 ¶ 87) (emphasis omitted). Petitioner contends that, accordingly, the device "being heated" from a short, and the corresponding temperature rise being measured in the device, happens when current is being delivered and received over the connection, as claimed. *Id.* (citing Ex. 1002 ¶ 112).

Patent Owner argues that the proposed combination of Rabut and Katayama does not disclose or suggest limitation 1[C] of "determining the greater of the changes in temperature measured at the first device and the second device . . ." because the proposed combination does not teach measuring the temperature at the first device. Prelim. Resp. 29. Patent Owner contends that Petitioner merely alleges that "it would have been obvious to a [person of ordinary skill in the art] to determine the worst case temperature change," and that "it was well known in the prior art that the greater change in temperature poses the greater risk of damage to the system." *Id.* at 29–30. Patent Owner argues that "even a combination of Rabu and Katayama would not teach a temperature sensor at a first device or 'determining the greater of the changes . . .'" recited in limitation 1[C]. *Id.* at 30 (alteration in original).

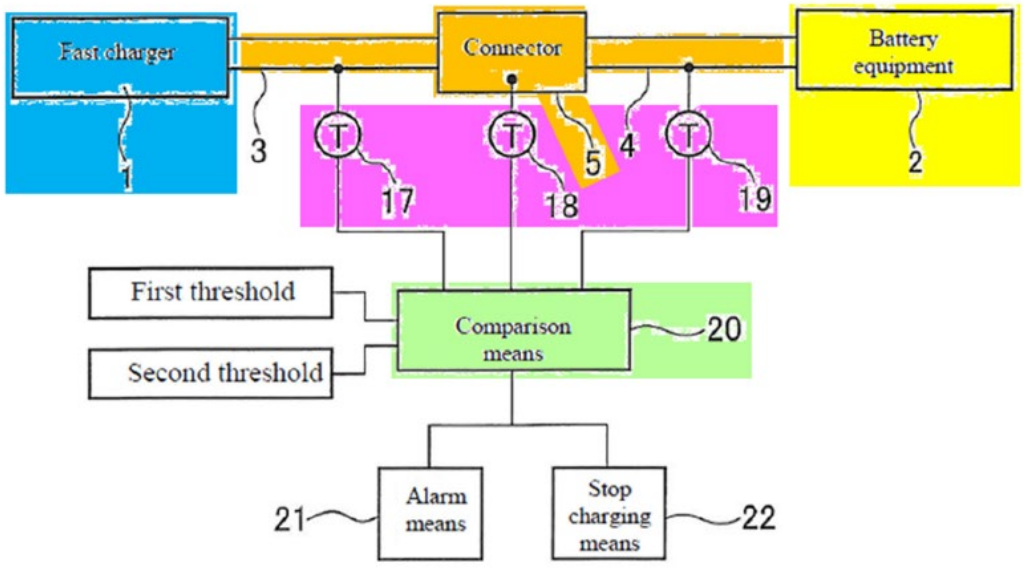
We agree with Patent Owner that the combination of Rabu and Katayama does not teach or suggest "determining the greater of the changes in temperature measured at the first device and second device" recited in

limitation 1[C]. Rabu discloses that thermal protection circuitry may be provided in both electronic device 12 and electronic device 14. Ex. 1005 ¶¶ 77–78. However, Rabu discloses no element that compares temperatures sensed in electronic device 12 and electronic device 14 since each is equipped with a cutoff switch to shut off power when the temperature in the device connectors exceeds a threshold level. *Id.* ¶ 48.

As Petitioner notes, Rabu also discloses measuring the amount of power lost in transmission between electronic devices 12 and 14 by measuring power input to and output from cable 16. *Id.* ¶¶ 86–87. Although this may involve a comparison of power at the input and output of the cable 16, there is no mention in Rabu of comparing temperature changes to determine the greater temperature change, as recited in limitation 1[C].

Petitioner also points to Katayama's Figure 3, shown below as colored by Petitioner.

FIG. 3



Pet. 12. Katayama discloses that comparison means 20 compares temperatures from temperature sensors 17, 18, 19, with a first threshold. If any one of the sensed temperatures is at or above the first threshold value but less than a second threshold value, means for sounding a minor alarm is activated while continuing to charge battery equipment 2 with fast charger 1. Ex. 1007 ¶ 18. If any of the measured temperatures is at or above the second threshold value, stop charging means 22 is activated to stop charging battery equipment 2. *Id.* Hence, there is no comparison of sensed temperatures in Katayama, let alone "determining the greater of the changes in temperature measured at the first device and the second device," as recited in claim 1.

Petitioner argues that it would have been obvious "to determine the worst case temperature change" because it poses the greatest danger (Pet. 29–30). But this is not what the combination of Rabu and Katayama teaches or suggests. Instead, the combination of Rabu and Katayama teaches to measure temperatures (or temperature changes) at both ends of the connection, independently compare them to thresholds, and cutoff power or current when the threshold is exceeded by either measured temperature. While Dr. Hatalis repeats the Petition in stating that "it would have been obvious to a [person of ordinary skill in the art] to determine the worst case temperature change" (Ex. 1002 ¶ 102, Pet. 29), Dr. Hatalis does not explain why this would be so given the teachings of the references to compare measured temperature, or temperature changes, with a threshold. Dr. Hatalis cites to Exhibits 1025, 1026 and 1027 as supporting his statement, but these references all teach that a measured temperature should be compared with a threshold, just like Rabu and Katayama. *See* Ex. 1002 ¶ 102 (citing Ex. 1025, code (57), 1:36–47; Ex. 1026 ¶ 4; Ex. 1027, code (57)). Neither

Petitioner nor its expert identify any teaching or suggestion in the prior art that temperature changes should be compared to determine the greater of them. "Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight." 37 C.F.R. § 42.65(a). In the Rabu-Katayama combination, the circuitry is adequately protected by a temperature sensor and cutoff switch in each of the electronic devices 12 and 14, and there is no need to determine the greater temperature change measured at the temperature sensors. Ex. 1005 ¶ 78. Consequently, Petitioner has not established a reasonable likelihood that limitation 1[C] is taught or suggested by the Rabu-Katayama combination.

e) Limitation 1[D]

For the reasons explained above for limitation 1[C], limitation 1[D] is also not taught or suggested by the combination of Rabu and Katayama since there is no teaching or suggestion of determining the greater change in temperature.

f) Limitation 1[E]

For the reasons stated for limitation 1[C], limitation 1[E] is not taught or suggested by the combination of Rabu and Katayama because there is no teaching or suggestion of determining the greater change in temperature.

g) Conclusion for Independent Claim 1

Based on our review and consideration of the record, Petitioner fails to meet the burden required to support institution of *inter partes* review of independent claim 1 based on obviousness over the combination of Rabu and Katayama. Specifically, in conducting an obviousness analysis, one must determine whether the claimed elements are present in the prior art. *PAR Pharm.*, 773 F.3d at 1194–1198. Petitioner has not adequately shown

that limitations 1[C], 1[D], or 1[E] are taught or suggested by the combination of Rabu and Katayama because neither determines the greater of changes in temperature measured at the ports or connectors of the first device and the second device. Nor has Petitioner demonstrated that this feature would have been obvious to a person of ordinary skill in the art. Accordingly, Petitioner has not demonstrated a reasonable likelihood of prevailing in its challenge to independent claim 1 of the '456 patent over the combination of Rabu and Katayama.

4. Analysis of Independent Claim 9

We now consider the combination of Rabu and Katayama in relation to independent claim 9 of the '456 patent.

a) Preamble (9[Pre])

The preamble of claim 9 recites "A device, comprising." Ex. 1001, 11:11. Petitioner contends that Rabu teaches the preamble of claim 9 for the same reasons set out in the Petition for element 1[A] (Section XII.A.2.b). Pet. 38 (citing Ex. 1002 ¶ 130). Patent Owner presents no arguments concerning the preamble. Petitioner has shown adequately that the preamble of claim 9 is taught by Rabu.[8]

b) Limitation 9[A]

Limitation 9[A] recites "a connection coupling a first device and a second device." Ex. 1001, 11:12. Petitioner contends that Rabu discloses limitation 9[A] for the same reasons discussed for limitations 1[A] and 1[B]. Pet. 38 (citing Sections XII.A.2.b–c; Ex. 1002 ¶¶ 131–133). Specifically, Petitioner contends that Rabu's

[8] Accordingly, we need not and do not reach the question of whether the preamble is a limitation. *See* footnote 6.

Figure 1 teaches electronic devices 12 and 14, and wired path 16 that may be used to convey data and power signals between the devices. *Id.* (citing Ex. 1005 ¶¶ 12, 34). Petitioner contends that "[w]ired path 16 is a connection coupling one device to another device." *Id.* (citing Ex. 1002 ¶ 132). Patent Owner does not dispute Petitioner's contentions concerning limitation 9[A].

We determine that Petitioner sufficiently shows that Rabu teaches limitation 9[A].

c) Limitation 9[B]

Limitation 9[B] recites "a first port of the first device, wherein the first port is configured to receive a first connector of the connection." Ex. 1001, 11:13–14. Petitioner contends that Rabu discloses the limitation 9[B] for the reasons set forth for limitation 1[A]. Pet. 40 (citing Section XII.A.2.b; Ex. 1002 ¶¶ 134–135).

Specifically, Petitioner contends that "Rabu teaches that the device 14 (the first device) may have connectors that couple to one or more connectors in path 16." *Id.* (citing Ex. 1005 ¶¶ 38–40, Figs. 3–4). Petitioner further contends that the device 14 may have "connectors such as connector 28 and connector 29," which "may be 30-pin connectors, Universal Serial Bus (USB) ports, connectors that couple to one or more connectors in path 16" and "may be used to convey power signals over path 16 from device 14 to device 12 (e.g., for powering device 12 and for charging a battery in device 12)." *Id.* at 40–41 (citing Ex. 1005 ¶¶ 38–40, Figs. 3–5). Patent Owner does not dispute Petitioner's contentions.

We agree with Petitioner that Rabu teaches limitation 9[B].

d) Limitation 9[C]

Limitation 9[C] recites "first logic of the first device coupled to the first port, wherein the first logic is configured to determine a temperature of the connection at the first connector." Ex. 1001, 11:15–17. Petitioner contends that Rabu teaches limitation 9[C]. Pet. 41 (citing Section XII.A.2.b; Ex. 1002 ¶¶ 136–140).

Specifically, Petitioner contends that Rabu's Figure 16 teaches that the thermal protection circuitry . . . may include temperature sensor 1500 in electronic device 12 (e.g., sensor 1500 in connector 28) and a cutoff switch 1600 in electronic device 14." *Id.* (citing Ex. 1005 ¶ 78) (alteration in original). According to Petitioner, Rabu explains that temperature protection circuit provided in portable computer 14 may include temperature sensors. *Id.* (citing Ex. 1005 ¶ 46 ("thermal protection circuitry may be provided in electronic device 12 and in electronic device 14"); Ex. 1002 ¶¶ 139–140 (explaining that it would have been obvious to implement temperature sensor in control logic circuitry or as an integrated circuit, including in view of Figures 10 and 11 and element 1100).

Patent Owner contends that Petitioner's proposed combination does not teach limitation 9[C]. Prelim. Resp. 31. Specifically, Patent Owner argues that Rabu does not disclose any logic in the first device (Rabu's device 14) related to determining a temperature of the connection. *Id.* According to Patent Owner, Petitioner does not explain how Rabu's first device 14 and its thermal protection circuitry 710 and temperature sensor 1500 constitute the "logic" recited in limitation 9[C]. *Id.* (citing Ex. 1002 ¶¶ 46, 78, Figs. 7, 16; Ex. 1005 ¶¶ 46, 78).

Petitioner's declarant, Dr. Hatalis, states that Rabu's temperature sensor 902 in Figure 11 "may include control circuitry and may be provided as an integrated circuit (element 1100) referred to as control and temperature sensing circuitry." Ex. 1002 ¶ 140 (citing Ex. 1005 ¶ 60, Fig. 11). Dr. Hatalis states that Rabu's integrated circuit (the control and temperature sensing circuitry 1100) placed in the port 28 or 29 of device 14 is the claimed "first logic." *Id.* Patent Owner does not acknowledge or address Petitioner's contention that Rabu's integrated circuit placed in the port 28 or 29 of device 14 is the claimed "first logic." We agree with Petitioner that Rabu teaches the "first logic."

Patent Owner further argues that in the embodiments of Rabu, the thermal protection circuitry and temperature sensor are on the connector to the second device, not the first device as recited in limitation 9[C] (which recites "first logic of the first device"). Prelim. Resp. 31–32 (citing Ex. 1002 ¶¶ 46, 78, Figs. 7, 16). Rabu teaches that electronic device 12 and electronic device 14 may each have thermal protection circuitry including a temperature sensor and cutoff switch. Ex. 1005 ¶¶ 77–78. We do not agree with Patent Owner's argument.

Patent Owner argues against Dr. Hatalis's statement that a person of ordinary skill in the art would have found it obvious to use a thermistor in device 14, because he does not cite anything from Rabu that supports his argument, but only cites Rabu's disclosures of thermistors generally. Prelim. Resp. 32 (citing Ex. 1002 ¶ 139). Patent Owner further argues that Rabu's Figure 11 shows only a circuit view of the connector of Figure 9, not any part of the first device 14. *Id.* Patent Owner contends that Rabu describes that "temperature sensor 902 may be provided as an integrated

circuit 1100 . . . for controlling switch 900." *Id.* (citing Ex. 1005 ¶ 60). Patent Owner contends that temperature sensor 902 is shown on the right side in Figure 9 . . . within connector 38, which is the side of the connector to device 12 (the first device), not anywhere near the ports 28 or 29 of device 14 (the second device). *Id.* (citing Ex. 1005, Fig. 4). Accordingly, Patent Owner argues that Petitioner has not shown any "first logic of the first device . . . configured to determine a temperature" because all evidence that Petitioner and Dr. Hatalis rely on only features the second device, not the first device. *Id.* at 33 (alteration in original).

We do not agree with Patent Owner's arguments. A person of ordinary skill in the art would have extended the concept of using a thermistor as a temperature sensor in the first device to use a thermistor in the second device because Rabu teaches that temperature sensors may be in both the first and second devices 12 and 14. *See* Pet. 41 (citing Ex. 1002 ¶¶ 136–140; Ex. 1005 ¶¶ 46, 78, Figs. 10, 11, 16).

Patent Owner argues that "Petitioner does not even explain how the identified features constitute logic." Prelim. Resp. 33. We do not understand Petitioner to contend that the identified Rabu features constitute logic. Rather, Petitioner contends that it would have been obvious to implement a temperature sensor in control logic circuitry or as an integrated circuit, including in view of Figures 10 and 11 and element 1100. *See* Pet. 41. Patent Owner's argument does not address Petitioner's contention.

Accordingly, Petitioner has shown adequately that limitation 9[C] is taught by Rabu.

e) Limitation 9[D]

Limitation 9[D] recites "second logic of the first device, wherein the second logic is configured to provide current to the second device over the connection." Ex. 1001, 11:18–20. Petitioner contends that Rabu teaches the limitation 9[D]. Pet. 42–43 (citing Ex. 1002 ¶¶ 141–144).

Petitioner contends that "Rabu discloses conductors to carry power and signals from the device providing power to the device receiving power." *Id.* at 42. Petitioner contends, for example, that Rabu discloses that "the positive power supply voltage may be conveyed to connector 38 over conductor 910 (e.g., one of a plurality of conductors in path 42)" within cable 16. *Id.* (citing Ex. 1005 ¶ 51, Fig. 9). Petitioner contends that a person of ordinary skill in the art would have understood that conductors are "configured to provide current to the second device over the connection." *Id.* (citing Ex. 1002 ¶ 144). Petitioner contends that a person of ordinary skill in the art "would have understood that Rabu's power cutoff switch is a logic circuit," as it "may include a number of circuit components such as transistors, resistors, capacitors, etc." that may block power delivery by interrupting the flow of current. *Id.* at 42–43 (citing Ex. 1002 ¶ 143; Ex. 1005 ¶¶ 55–56, 62, Figs. 9–11).

Patent Owner contends that Petitioner's proposed combination of Rabu and Katayama does not teach limitation 9[D], "second logic of the first device . . . configured to provide current to the second device . . . ." Prelim. Resp. 33–34 (alterations in original). Specifically, Patent Owner argues that "Petitioner identifies several components in Rabu for element 9[D] that are either not logic or do not provide current, and thus cannot satisfy second

logic configured to provide current to the second device." *Id.* at 34 (citing Pet. 42–43).

More particularly, Patent Owner contends that Petitioner identifies conductors in the cable (not the first device), which are not logic. *Id.* 34 (citing Ex. 1005 ¶ 51, Fig. 9; Ex. 1002 ¶¶ 141–144; Pet. 42–43). According to Patent Owner, Petitioner's highlighting in Figure 9 (Pet. 43) shows that the identified conductors are part of the cable, not "second logic of the first device." *Id.*

We do not agree with Patent Owner's argument, which does not adequately address Petitioner's contention that Rabu's "power cutoff switch" or "current cutoff switch" (not the conductor or cable) is the claimed "second logic." Ex. 1002 ¶ 144; Ex. 1005 ¶ 55. Although Rabu discloses that a cable may include thermal protection circuitry that reduces or eliminates power supply signals flowing to a connector in the cable when it is determined that the temperature of the connector has risen above a given threshold (Ex. 1005 ¶ 32), Rabu also teaches that thermal protection circuitry may include a temperature sensor and cutoff switch (*id.* ¶ 77) and that the thermal protection circuitry may be provided in both electronic device 12 and electronic device 14 (*id.* ¶ 78). Hence, the "power cutoff switch" or "current cutoff switch" provides current from the first device to the second device over the conductor or cable, and the current may be reduced or cutoff. *Id.* ¶¶ 32, 51, 55. The cutoff switch implements logic because it is "on" when the sensed temperature is below a threshold ("low") and is "off" when the sensed temperature is at or exceeds a threshold ("high"). *Id.* ¶ 76. The cutoff switch thus provides a logical function.

Thus, Petitioner has adequately shown that Rabu teaches limitation 9[D].

f) Limitation 9[E]

Limitation 9[E] recites "a second port of the second device, wherein the second port is configured to receive a second connector of the connection." Ex. 1001, 11:21–23. Petitioner contends that Rabu teaches limitation 9[E] for the same reasons discussed for element 1[B]. Pet. 43 (citing Section XII.A.2.c; Ex. 1002 ¶¶ 145–146).

Specifically, Petitioner contends that Rabu's Figure 2 shows item 28 (second port), and Rabu's Figure 5 shows item 38 (second connector). *Id.* (citing Ex. 1005, Figs. 2, 5).

Patent Owner does not dispute Petitioner's contentions concerning limitation 9[E].

Petitioner has shown sufficiently that Rabu teaches limitation 9[E].

g) Limitation 9[F]

Limitation 9[F] recites "third logic of the second device coupled to the second port, wherein the third logic is configured to determine a temperature of the connection at the second connector." Ex. 1001, 11:24–26. Petitioner contends that Rabu teaches limitation 9[F] for the same reasons stated for limitations 1[A] and 1[B]. Pet. 44–45 (citing Section XII.A.2.b–c; Ex. 1002 ¶¶ 147–149).

Specifically, Petitioner contends that Rabu's Figures 15 and 16 teach to include a temperature sensor in the port of device 12 (the claimed second device), into which the cable connector connects. *Id.* at 44. According to Petitioner, Rabu explains that "temperature sensor 1500 [is] in electronic device 12" and states that temperature sensor 1500 "may be able to sense the

temperature of connector 38 of cable 16." *Id.* (citing Ex. 1005 ¶¶ 77–78) (alteration in original). Petitioner contends that Rabu's Figure 15 shows that temperature sensor 1500 (the claimed third logic) sits in port 28 of device 12. *Id.* (citing Ex. 1002 ¶ 149).

Patent Owner does not dispute Petitioner's contentions for limitation 9[F].

Petitioner has shown sufficiently that Rabu teaches limitation 9[F].

h) Limitation 9[G]

Claim 9 recites limitation 9[G] as follows:

> wherein, in response to the greater of the change in temperature determined by the first logic and the change in temperature determined by the third logic being above a threshold, the second logic is configured to reduce the current being provided from the first device to the second device.

Ex. 1001, 11:27–12:3. Petitioner relies on similar teachings of Rabu and Katayama as addressed with respect to limitations 1[C], 1[D]. and 1[E] in an effort to show that claim 1 is taught by their combination. Pet. 45–46 (citing Sections XII.A.2.d–f; Ex. 1002 ¶ 150). For similar reasons as explained above for limitation 1[C], the combination of Rabu and Katayama fails to teach or suggest limitation 9[G].

Specifically, Petitioner contends that the "first logic" and the "third logic" correspond to Rabu's temperature sensing circuitry measuring temperature in first device 14 and in second device 12. *Id.* at 45. Petitioner contends the "second logic" corresponds to Rabu's power supply and "cutoff switch 1600" combined with Katayama's comparison means 20 and stop charging means, which may be located in portable computer 14. *Id.* at 45–46 (citing Ex. 1005 ¶ 78; Ex. 1007 ¶ 18, Figs. 2–4, 16).

For reasons explained with respect to limitation 1[C], we do not agree with Petitioner's contention that the combination of Rabu and Katayama teaches or suggests limitation 9[G]. Specifically, there is no teaching or suggestion in Rabu to determine the greater of changes of temperature at the opposing ports or connectors of a connection as claimed. Rabu does not compare temperatures sensed at different locations to determine which is the greater. Instead, Rabu determines at each location a temperature, or change of temperature, of a connector and compares it to a threshold to determine whether a cutoff switch should be activated to reduce or shut off current. Ex. 1005 ¶ 77. Rabu also teaches power measuring circuitry that senses power input and output from cable 16 to determine the amount of power lost. *Id.* ¶¶ 86–87. Rabu does not mention, however, comparing changes of temperature at the ports or connectors on opposite ends of the cable to determine which is the greater temperature change. Katayama's comparison means individually compares temperatures measured at different points of a charging cable connecting a fast charger and battery equipment with thresholds. Katayama does not teach or suggest comparing changes in temperature at different locations of the charging cable to determine which is the greater change in temperature. Ex. 1007 ¶ 18, Fig. 3.

Consequently, Petitioner does not show adequately that limitation 9[G] is taught or suggested by the combination of Rabu and Katayama.

i) Conclusion for Independent Claim 9

Based on our review and consideration of the current record, Petitioner fails to meet the burden required to support institution of *inter partes* review of independent claim 9 based on obviousness over the combination of Rabu and Katayama. Specifically, in conducting an

obviousness analysis, one must determine whether the claimed elements are present in the prior art. *PAR Pharm.*, 773 F.3d at 1194–1198. Petitioner has not adequately shown that limitation 9[G] is taught or suggested by the combination of Rabu and Katayama because neither determines the greater of the change in temperature determined by the first logic of the first device and the change in temperature determined by the third logic of the second device. Nor has Petitioner demonstrated that this feature would have been obvious to a person of ordinary skill in the art. Accordingly, Petitioner has not demonstrated a reasonable likelihood of prevailing in its challenge to independent claim 9 of the '456 patent over the combination of Rabu and Katayama.

5. Claims 5–8, 12, and 13

Claims 5–8, 12, and 13 depend from respective independent claims 1 and 9. Since the dependent claims incorporate all limitations of those from which they depend, we determine that the combination of Rabu and Katayama fails to teach or suggest these claims for the reasons stated for independent claims 1 and 9.

6. Summary

We determine that Petitioner has not demonstrated a reasonable likelihood that at least one claim is unpatentable under 35 U.S.C. § 103(a) over the combination of Rabu and Katayama.

E. Alleged Obviousness Over Rabu, Katayama, and Shoji

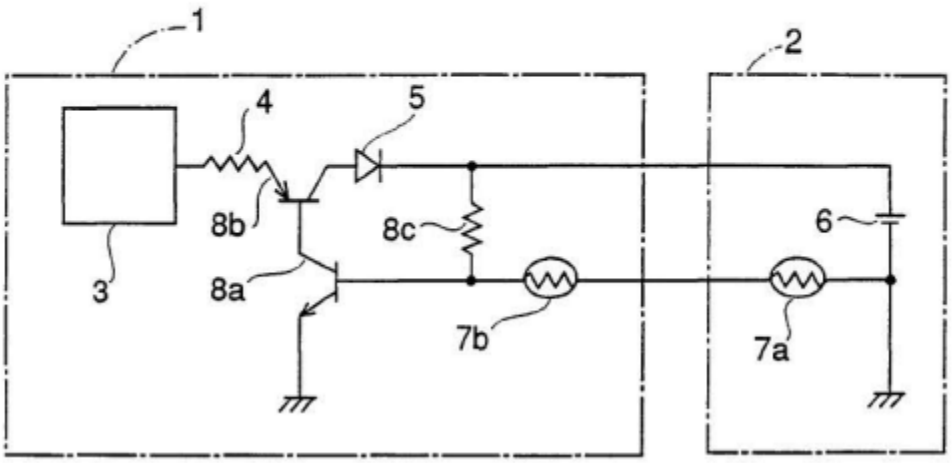
Petitioner contends that claims 1, 5–9, 12, and 13 would have been obvious over the combination of Rabu, Katayama, and Shoji. Pet. 50–59.

1. Shoji (Ex. 1006)

Shoji is titled "Battery Charging Apparatus" and discloses a charging

device to supply power to a battery of a separate portable device. Ex. 1006, codes (54, 57). Shoji's Figure 3 is shown below.

Fig.3



As shown in Figure 3, Shoji teaches that temperature sensors (thermistors) 7a, 7b should be located both in charger 1 and battery-operated device 2 which is being charged. *Id.* at 12–13. Charger 1 and device 2 are removably connected via a connector. *Id.* at 14–15. The charging current is terminated if either thermistor 7a, 7b senses the temperature is too high. *Id.* at code (57).

2. Analysis

In relation to limitations 1[C] and 9[G], Petitioner contends that Shoji teaches that a temperature change greater than a fixed value may cause damage to the system. Pet. 54 (citing Ex. 1006, 11), 58–59. As with Ground 1, Petitioner alleges that a person of ordinary skill in the art would have understood that the greatest risk of damage is at the sensor measuring the greatest temperature change where the circuit has the greater risk of

thermal failure and where the temperature needs to be reduced in order to lessen such risk. *Id.* (citing Ex. 1002 ¶ 172). But nothing in the references or documents identified by Dr. Hatalis supports this contention. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."). Shoji is much like Rabu and Katayama because it determines whether a sensed temperature at a location of a connector is at or above a threshold. Shoji does not determine the greater changes in temperature measured at ports or connectors as recited in limitations 1[C] and 9[G]. Consequently, the combination of Shoji with Rabu and Katayama does not cure the deficiencies noted in Ground 1 with respect to limitations 1[C] and 9[G]. This shortcoming extends to all challenged claims of this ground.

3. Summary

We determine that Petitioner has not demonstrated a reasonable likelihood that at least one claim is unpatentable under 35 U.S.C. § 103(a) over the combination of Rabu, Katayama, and Shoji.

F. Alleged Obviousness Over Rabu, Katayama, and Karam

Petitioner contends that claims 1–13 would have been obvious over the combination of Rabu, Katayama, and Karam. Pet. 59–74.

1. Karam (Ex. 1008)

Karam is titled "Techniques for Controlling Delivery of Power to a Remotely Powerable Device Based on Temperature." Ex. 1008, code (54). Karam discloses a method of delivering power to a remotely powerable device through a communications pathway. *Id.* at code (57). Karam's method involves generating a temperature change result based on initial resistance value and operating resistance value, and selectively enabling,

scaling back or disabling power to the remotely powerable device based on the temperature change result. *Id.*

Karam's Figure 1 is shown below.

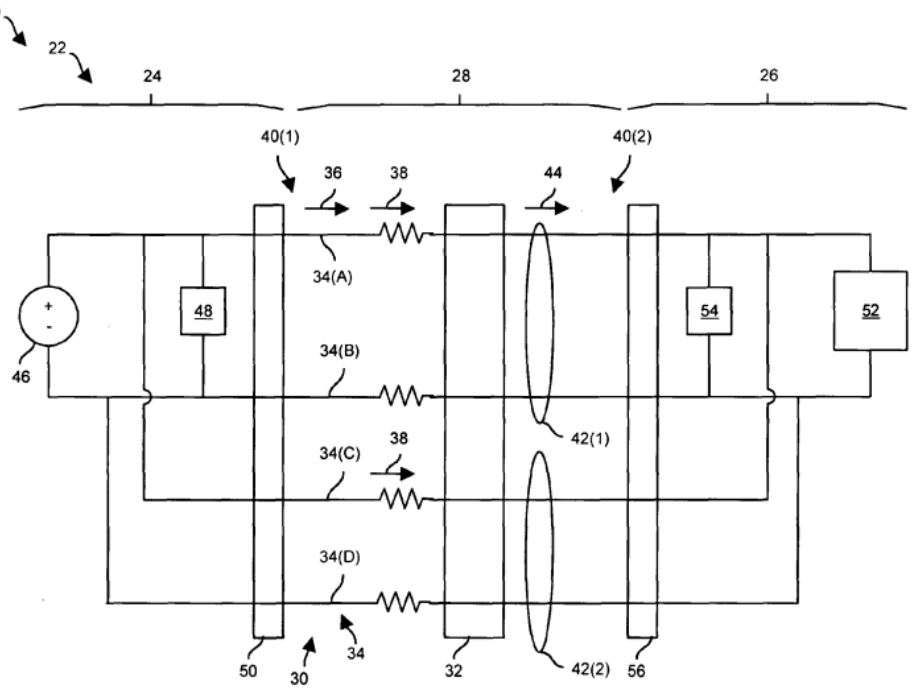


FIG. 1

In Figure 1, Karam discloses layout 20 for a Power-over-Ethernet (PoE) system 22 which includes power-sourcing equipment (PSE) 24, a remotely powerable device (PD) 26, and a communications pathway 28. *Id.* at 3:38–43.

Karam's Figure 3 is shown below.

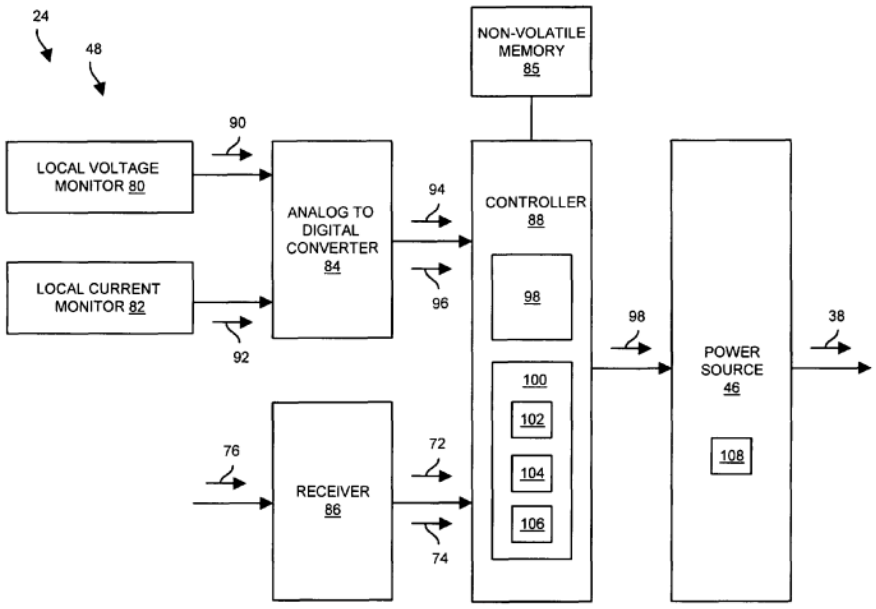


FIG. 3

In Figure 3, Karam shows that PSE 24 includes local voltage monitor 80, local current monitor 82, analog to digital converter (ADC) 84, receiver 86, controller 88, and non-volatile memory 85. *Id.* at 6:4–7. Controller 88 includes a processor 98 and memory 100 which stores a specialized application 102 which, when executed, causes processor 98 to calculate the resistance R through communications pathway 28. *Id.* at 7:23–27. The controller 88 computes the resistance R through communication pathway 28 at different times in order to determine a temperature change. *Id.* at 7:28–30. Karam discloses that the controller 888 periodically generates a temperature change result and compares this temperature change result to a predetermined threshold value. *Id.* at 8:22–25. Based on the temperature change result, processor 98 then either enables or disables power delivery to PD 26. *Id.* at 8:28–45.

2. Analysis

In relation to limitations 1[C] and 9[G], Petitioner contends that Karam discloses calculating a change in temperature. Pet. 63–64 (citing Ex. 1002 ¶¶ 197–199; Ex. 1008, 7:49–8:9). Karam generates a temperature change result based on initial resistance value and operating resistance value, and selectively enables, scales back, or disables power to the remotely powerable device based on the temperature change result. Ex. 1008, code (57). Thus, like Rabu, Katayama, and Shoji, Karam compares a sensed temperature with a threshold and does not teach determining the greater of changes in temperature as recited in limitations 1[C] and 9[G]. Consequently, the combination of Karam with Rabu and Katayama does not cure the deficiencies noted with respect to limitations 1[C] and 9[G].

3. Summary

We determine that Petitioner has not demonstrated a reasonable likelihood that at least one claim is unpatentable under 35 U.S.C. § 103(a) over the combination of Rabu, Katayama, and Karam.

IV. CONCLUSION

After considering the evidence and arguments presented in the Petition, we determine Petitioner has not established a reasonable likelihood of prevailing on its assertion that at least one claim of the '456 patent is unpatentable. Accordingly, we do not institute an *inter partes* review.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is denied as to all challenged claims of the '456 patent and no trial is instituted.

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