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Paper 34
Entered: August 23, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TCT MOBILE (US), INC., TCT MOBILE (US) HOLDINGS, INC., HUIZHOU TCL MOBILE COMMUNICATION CO. LTD., and TCL COMMUNICATION, INC.,
Petitioner,

v.

FUNDAMENTAL INNOVATION SYSTEMS INTERNATIONAL LLC,
Patent Owner.

IPR2021-00599
Patent 7,834,586 B2

Before JO-ANNE M. KOKOSKI, JON B. TORNQUIST, and ARTHUR M. PESLAK, *Administrative Patent Judges.*

PESLAK, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Dismissing Petitioner's Motion to Exclude
35 U.S.C. § 318(a)

I. INTRODUCTION

TCT Mobile (US), Inc., TCT Mobile (US) Holdings, Inc., Huizhou TCL Mobile Communication Co. Ltd., and TCL Communication, Inc. (collectively "Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1, 2, 8, and 9 (the "challenged claims") of U.S. Patent No. 7,834,586 B2 (Ex. 1001, "the '586 patent"). Petitioner filed a Declaration of R. Jacob Baker, Ph.D., P.E. in support of the Petition. Ex. 1003. We instituted this *inter partes* review as to the challenged claims and all grounds presented in the Petition. Paper 8 ("Dec.").

During the course of trial, Patent Owner filed a Response to the Petition. Paper 17 ("PO Resp."). Patent Owner filed a Declaration of Dr. Kenneth Fernald in support of the Patent Owner Response. Ex. 2023. Petitioner filed a Reply to the Patent Owner Response. Paper 19 ("Pet. Reply"). Petitioner filed a Reply Declaration of R. Jacob Baker, Ph.D., P.E. in support of the Petitioner Reply. Ex. 1026. Patent Owner filed a Sur-reply. Paper 24 ("Sur-reply"). Petitioner filed a Motion to Exclude Evidence. Paper 28. Patent Owner filed an opposition to the Motion to Exclude. Paper 29. Petitioner filed a Reply. Paper 30 ("Reply"). An oral hearing was held on June 7, 2022, and a transcript has been entered into the record. Paper 33 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the challenged claims of the '586 patent. For the reasons discussed below, we determine Petitioner establishes by a preponderance of the evidence that all of the challenged claims are unpatentable. We also dismiss Petitioner's Motion to Exclude as moot.

A. Related Matters

The parties state that the '586 patent is asserted in *Fundamental Innovation Systems International LLC v. Coolpad Group Limited, et al.*, No. 2:20-cv-00117 (E.D. Tex.); *Fundamental Innovation Systems International LLC v. Lenovo (United States) Inc., et al.*, No. 1:20-cv-00551 (D. Del.); and *Fundamental Innovation Systems International LLC v. TCT Mobile (US) Inc., et al.*, No. 1:20-cv-00552 (D. Del.). Petitioner's Mandatory Notices, 1[1]; Paper 5, 2. In addition, the parties state that the '586 patent was the subject of IPR2018-00276, IPR2018-00495, and IPR2018-00487. Petitioner's Mandatory Notices 1; Paper 5, 4.

B. Real Parties-in-Interest

Petitioner identifies TCT Mobile (US), Inc., TCT Mobile (US) Holdings, Inc., Huizhou TCL Mobile Communication Co. Ltd., and TCL Communication, Inc. as real parties-in-interest. Mandatory Notices, 1. Patent Owner identifies Fundamental Innovation Systems International LLC and Fundamental Innovation Systems International Holdings LLC as real parties-in-interest. Paper 5, 1.

C. Technology Background

An overview of USB[2] cables and the USB technology is helpful in understanding the technology involved in the '586 patent, which relates to charging a mobile device through a USB connector. *See* Ex. 1001, Fig. 3. Cables compliant with the USB standard have four conductors: VBUS, D+, D-, and GND. Ex. 1009, 17–18, 86[3]. The VBUS and GND conductors of

[1] Petitioner appended its Mandatory Notices to the Petition. Pet. iii.
[2] "USB" is an acronym for "Universal Serial Bus." Ex. 1010, 1.
[3] Exhibit 1009 is Revision 2.0 of the Universal Serial Bus Specification. We refer to the original printed page numbers in this Exhibit.

the USB cable are used to deliver power to devices, and the D+ and D- conductors carry communication signals between a USB host and a connected device. *Id.* at 17–18; Ex. 1001, 6:63–7:3. Figure 4–2 of the USB specification, reproduced below, depicts these four conductors within a USB cable:

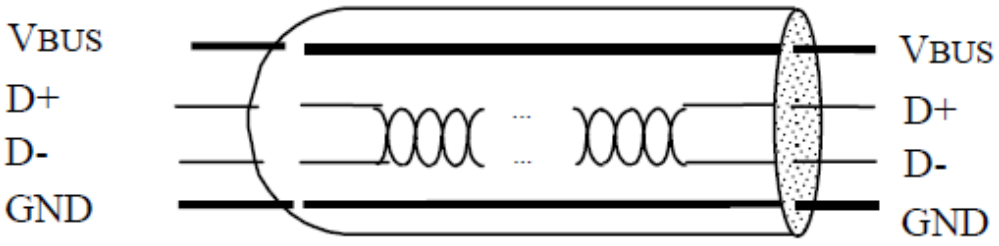

Figure 4-2. USB Cable

Ex. 1009, 17. Figure 4–2 illustrates the arrangement of conductors in a USB cable.

The USB 2.0 specification designates "SE1" as a state in which D+ and D− conductors are both high (i.e., at a voltage greater than 0.8 V). *See* Ex. 1009 at 123, 145. The USB 2.0 specification states that "[l]ow-speed and full-speed USB drivers must never 'intentionally' generate an SE1 on the bus." *Id.* at 123; *see also id.* at 148 n.4 ("A high-speed driver must never 'intentionally' generate a signal in which both D+ and D− are driven to a level above 200 mV. The current-steering design of a high-speed driver should naturally preclude this possibility.").

D. The '586 Patent

The '586 patent is titled "Multifunctional Charger System and Method." Ex. 1001, code (54). The '586 patent issued on November 16, 2010, from an application filed on February 26, 2010. *Id.* at codes (45), (22). The patent claims priority through a chain of related applications to

Provisional Application No. 60/273,021, filed on March 1, 2001, and to Provisional Application No. 60/330,486, filed on October 23, 2001. *Id.* at codes (63), (60); *see also id.* at 1:7–30.

The '586 patent "relates generally to power adapters. More particularly, the invention relates to power adapters for use with mobile devices." *Id.* at 1:34–36. The '586 patent explains that "[a]lthough the USB interface can be used as a power interface, the USB is typically not used for that purpose by mobile devices." *Id.* at 1:56–58. According to the '586 patent, the USB specification requires "that a USB device participate in a host-initiated process called enumeration in order to be compliant with the current USB specification in drawing power from the USB interface." *Id.* at 1:60–62. The '586 patent states that it would be preferable "to be able to utilize alternate power sources such as conventional AC outlets and DC car sockets that are not capable of participating in enumeration to supply power to the mobile device via a USB interface." *Id.* at 1:65–2:3.

Figure 2, reproduced below, shows a USB adapter coupled to an exemplary mobile device.

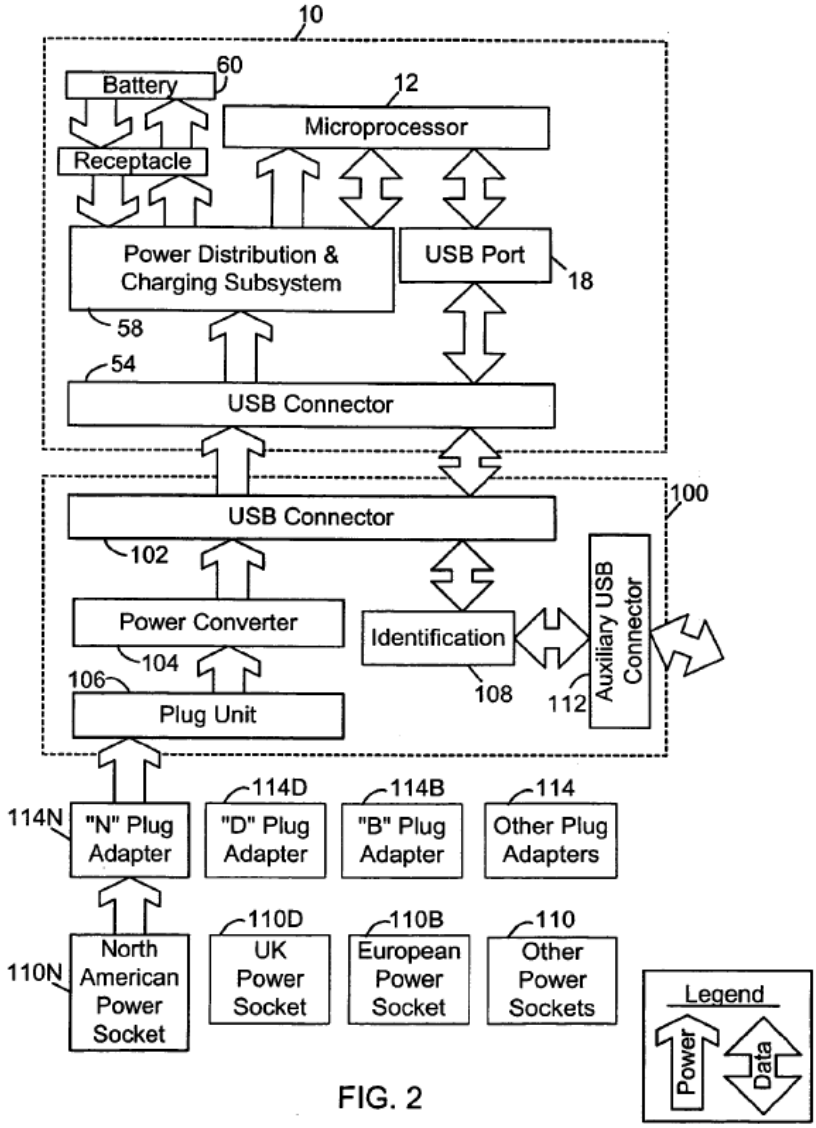

FIG. 2

Figure 2 depicts a USB adapter 100 that includes a primary USB connector 102, a power converter 104, a plug unit 106, and an identification subsystem 108. *Id.* at 6:50–53. The '586 patent discloses that "plug unit 106 can be a two prong or three prong plug of the type used in North America that can couple to a North American AC power socket 110N that provides 115 VAC." *Id.* at 7:6–9. Plug unit 106 can also accept one or more types of plug adapters 114N, 114B, 114D, and 114 that are configured to directly mate with one or more types of power sockets 110N, 110D, 110B, 110. *Id.* at 7:10–14, Fig. 2.

The '586 patent explains that "[t]ypically when a mobile device 10 receives power over the USB from a USB host, it is required to draw power in accordance with the USB specification," which requires the enumeration process and limits the electrical current that can flow across the USB. *Id.* at 8:3–8. However, the '586 patent discloses that "[t]he identification subsystem 108 provides an identification signal to the mobile device 10 that the power source is not a USB limited source" and mobile device 10 "can now draw power without regard to the USB specification and the USB specification imposed limits." *Id.* at 8:13–17.

The '586 patent describes a preferred embodiment in which the identification signal is "the application of voltage signals greater than 2 volts to both the D+ and D− lines of the USB connector." *Id.* at 9:13–15. The '586 patent provides a further example of applying "a logic high signal, such as +5V reference, to both the D+ and D- lines." *Id.* at 9:23–26. If mobile device 10 detects this identification signal, then mobile device 10 determines that the device connected to its USB connector 54 "is not a typical USB host or hub and that a USB adapter 100 has been detected." *Id.* at 9:26–31. The '586 patent explains that "the mobile device 10 can forego the enumeration process and charge negotiation process and immediately draw energy from the USB power adapter 100 at a desired rate" and "can then charge the battery or otherwise use power provided via the Vbus and Gnd lines in the USB connector 54." *Id.* at 9:31–34, 9:52–57. Otherwise, if mobile device 10 detects that both D+ and D− lines are not greater than 2 volts, mobile device 10 determines that it is connected to a USB host or hub, and signals the connected host or hub to initiate the enumeration process, and it can power or charge battery 60 according to the power limits imposed

by the USB specification. *Id.* at 9:35–47. "The enumeration process is typically initiated after mobile device 10 applies approximately zero volts to the D- line and approximately 5 volts to the D+ line to inform the host of the mobile device's 10 presence and communication speed." *Id.* at 9:47–51.

E. Illustrative Claim

Claims 1 and 8 are independent. Claim 1 is reproduced below, with Petitioner's annotations added for ease of reference:

> 1. A mobile device configurable for use in a wireless telecommunications network, comprising:
>
> [a] a Universal Serial Bus ("USB") interface configured to allow reception of a USB cable;
>
> [b] a charging subsystem, the charging subsystem operably connected to the USB interface V-bus power line;
>
> [c] the charging subsystem operably connected to a battery, and configured to charge a battery if a battery is operably connected;
>
> [d] the charging subsystem further configured to use power from the V-bus power line for the charging of a battery; and,
>
> [e] where the mobile device is configured to detect an identification signal at a D+ and D- data line of the USB interface, the identification signal being different than USB enumeration.

Ex. 1001, 11:49–64.

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1, 2, 8, and 9 would have been unpatentable on the following ground (Pet. 2–3):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 2, 8, 9	103(a)[4]	Morita[5] and the knowledge of a skilled artisan

II. ANALYSIS

A. Overview

Petitioner bears the burden of establishing the unpatentability of the challenged claims by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). This burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A claim is unpatentable under § 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 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

[4] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA") included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Because the '586 patent claims priority to a chain of U.S. Non-Provisional and Provisional Applications filed prior to March 16, 2013, we apply the pre-AIA version of 35 U.S.C. § 103.
[5] Japanese Unexamined Patent Application Publication No. 2000-165513 A, published June 16, 2000 (Ex. 1015, "Morita").

the art; and (4) when in evidence, objective indicia of non-obviousness (i.e., secondary considerations).[6] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is "a prism or lens" through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including the "type of problems encountered in the 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.* (internal quotation marks and citation omitted).

Petitioner contends:

> A person of ordinary skill in the art ("POSITA") of the subject matter of the '586 Patent would have had either a bachelor's degree in electrical engineering, computer science, or a related field, plus 3-5 years of experience in design of systems with Universal Serial Bus ("USB") or equivalent buses that follow the USB 2.0 and earlier specification, or a master's degree in electrical engineering, computer science, or a related field, plus 1-2 years of experience in design of systems with USB or equivalent buses that follow the USB 2.0 and earlier specification at the time of the '586 Patent's priority date.

Pet. 13.

Patent Owner states that "[f]or purposes of this trial only, Patent Owner applies the skill level proposed by Petitioner." PO Resp. 24.

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[6] No evidence of objective indicia has been presented by the parties.

We apply Petitioner's proffered level of skill in the art because it appears consistent with the problems addressed in the '586 patent and the prior art.

C. Claim Construction

We apply the same claim construction standard used by Article III federal courts and the International Trade Commission, both of which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. 37 C.F.R. § 42.100(b) (2019). Accordingly, we construe each challenged claim of the '586 patent to generally be "the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." *Id.*

Petitioner submits "that no terms need to be construed to resolve the issues presented by this Petition." Pet. 33.

Patent Owner submits that "Petitioner admits in the parallel district court case that a POSITA would interpret the recited 'identification signal' as 'signal that identifies a power source type.'" PO Resp. 24 (citing Ex. 2013, 5; Ex. 2010, 40–41; Ex. 2011, 34; Ex. 2012; Ex. 2013, 5) (emphasis omitted). Petitioner does not address this construction in the Petitioner Reply. *See generally* Pet. Reply.[7] As there is no dispute about this construction, we apply it as necessary in this Decision.

Patent Owner also submits "the preambles for claims 1 and 8 are limiting because they provide antecedent basis to 'the mobile device' in the rest of the claims and further limit the claimed 'mobile device' to one 'configurable for use in a wireless telecommunications network.'"

[7] Dr. Baker applies this construction in his Reply Declaration. *See, e.g.*, Ex. 1026 ¶¶ 11–12.

PO Resp. 24 (citing Ex. 1001, 8:49–50, 12:30–32). We need not reach the question of whether the preamble is limiting because, as explained below in our analysis of claim 1, there is no dispute that Morita discloses the subject matter of the preambles of claims 1 and 8. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1015 (Fed. Cir. 2017) (noting that "we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy'" (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Alleged Obviousness of Claims 1, 2, 8, and 9 over Morita and/or the Knowledge of One of Ordinary Skill in the Art

Petitioner contends claims 1, 2, 8, and 9 would have been obvious over Morita and/or the knowledge of one of ordinary skill in the art. Pet. 34–61. Patent Owner disputes Petitioner's contentions. PO Resp. 22–65. In particular, Patent Owner's arguments focus on claim limitation 1[e]. *See id.*

We begin with a brief summary of Morita and then address the parties' respective contentions.

1. Morita (Ex. 1015)

Morita is titled "Charger." Ex. 1015, code (54).[8] Morita relates to "a hub-controllable charger capable of accessing a plurality of external devices in a state wherein a mobile phone is coupled to the charger, and capable of

[8] Exhibit 1015 includes a Japanese original and a certified English translation, e.g., "Morita is a Japanese-language publication (Ex. 1015, 1–5) that was filed with an English-language translation (*id.* at 6–10) and an affidavit attesting to the accuracy of the translation, as required by 37 C.F.R. § 42.63(b) (*id.* at 11 (Certificate of Accuracy)). Patent Owner does not dispute the accuracy of the English translation in Exhibit 1015. Our citations to Morita are to the certified English translation.

managing transmission and branching of signals between each." *Id.* at code (57). More specifically, Morita is directed "to a charger capable of charging a mobile phone and coupling to an external device and more specifically relates to a USB format charger provided with a HUB function capable of connecting a plurality of external devices." *Id.* ¶ 1.

Morita discloses that the USB format "is often used for the interfaces of current personal computers." *Id.* ¶ 4. Further, providing the mobile phone with "a USB port enables easy use of personal computers . . . to read/write image data, audio data, phone directory data, and other internal program data stored in memory on the mobile videophone device." *Id.* In addition, "when the mobile videophone device operates as a personal computer, it is possible to easily access hard disk data by simply connecting to an external peripheral . . . such as a hard disk." *Id.* But, "it is not desirable to operate the mobile videophone device as the host end from the viewpoint of the battery." *Id.* ¶ 8.

Morita's Figure 1 is reproduced below, and depicts a charger.

【図１】

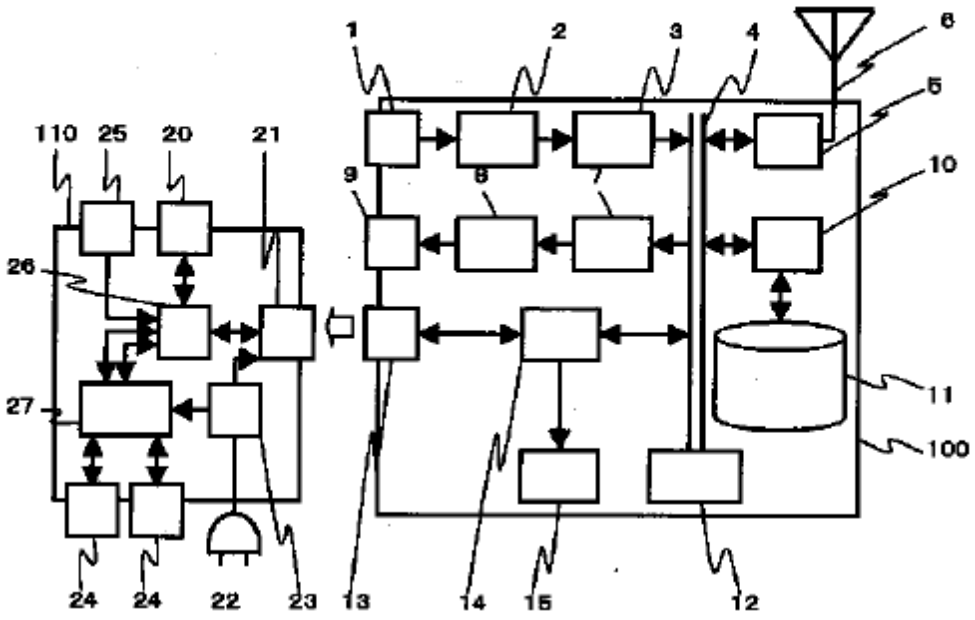


Figure 1 is a block diagram of an embodiment of Morita's charger. *Id.* ¶ 12.

Morita discloses mobile videophone device 100 and charger 110 for charging mobile videophone device 100. *Id.* Mobile videophone device 100 includes USB port 13 "for transmitting and receiving data to and from an external device and supplying power," USB controller 14 for controlling USB port 13, and battery 15. *Id.* Charger 110 includes first USB port 20 "for coupling a host-controllable external device such as a personal computer," second USB port 21 "for coupling the mobile videophone device 100," power supply connection unit 22 "such as an outlet," charging control unit 23, and third USB port 24 "for coupling devices such as a mouse, keyboard, and monitor." *Id.* Charger 110 further comprises connection switching port 26 "for performing connection switching of the first USB port and the second USB port," and USB hub control unit 27 "having functions

for branching and transmitting signals, attaching and removing external devices, determining low speed devices and high speed devices, and supplying and managing power." *Id.*

Morita explains that "[t]he power supply of the mobile videophone device 100 is supplied from the USB controller 14 to the battery 15 by coupling to a charger via a USB format capable of supplying data and power." *Id.* ¶ 13. For instance, Morita discloses that "[t]he power supply cable 22 is connected to an outlet or the like connected to a commercial power supply, and the supplied power supply voltage is supplied to the mobile videophone device 100 via the USB port 21 to charge an internal battery." *Id.* ¶ 16. According to Morita, "charger 110 thus performs, as one device, a charging operation of the mobile videophone device 100 and an operation as a USB hub to which the first USB port 20 and the second USB port 24 are connected." *Id.*

Morita further explains that the "personal computer is connected to the first USB port 20 via a USB cable, the connection switching unit 26 connects the connection destination of the first USB port 20 to the USB hub control unit 27" and "the mobile videophone device 100 connected to the second USB port 21 is connected to the USB hub control unit 27 as a device." *Id.* ¶ 15. Conversely, "when the mobile videophone device 100 is used as the host personal computer," the second USB port 21 is connected to the USB hub control unit 27 by the connection switching unit 26 "and the first USB port 20 is not connected to the USB hub control unit 27 and is in disconnected state." *Id.* Morita also discloses that "external peripherals (devices) connected to the third USB port 24 are connected as peripherals of the mobile videophone device 100." *Id.* Morita further discloses that "the

mobile phone always accesses the external device while receiving the supply of power from the charger, and thus the mobile phone can be used without worrying about battery consumption due to long-term and continuous use." *Id.* ¶ 22.

2. Claim 1

Preamble: A mobile device, the mobile device configurable for use in a wireless telecommunications network, comprising:

Petitioner contends that, to the extent the preamble is limiting, "Morita discloses a 'mobile videophone device 100 . . . that includes a 'wireless unit for transmitting and receiving data' (5) and 'antenna' (6)." Pet. 34 (citing Ex. 1015 ¶ 12). Therefore, according to Petitioner, "Morita discloses a mobile device that is 'configurable for use in a wireless telecommunications network." *Id.* at 34–35 (citing Ex. 1003 ¶ 99).

Patent Owner does not address Petitioner's contentions. *See generally* PO Resp.

Based on the evidence cited by Petitioner, Petitioner establishes Morita discloses the subject matter of the preamble.[9]

[1.a] a Universal Serial Bus ("USB") interface configured to allow reception of a USB cable;

Petitioner contends that "Morita discloses, and, at a minimum, renders obvious, this limitation." Pet. 35. Petitioner contends that Morita's "mobile videophone device 100 includes 'USB port [13] for transmitting and receiving data to and from an external device and

[9] Because we find Petitioner has shown Morita discloses the preamble, we do not address whether the preamble is limiting.

supplying power.'" *Id.* (citing Ex. 1015 ¶ 12, Figs. 1, 2). Petitioner further contends that "it would be understood that [the] USB port is 'configured to allow reception of a ***USB cable***.'" *Id.* at 36. Petitioner further contends that USB port 13 on mobile videophone 100 "couples to USB port 21" and that port 13 "refers to 'the point where the USB device is attached.'" *Id.* at 37 (citing Ex. 1008, 8). According to Petitioner, "Morita's USB port 13 is 'configured to allow reception of a USB cable' because a USB cable is attachable to it." *Id.* (citing Ex. 1003¶ 104). Petitioner further contends that "USB port 21 would include a cable of 4 wires that connects it to switching unit 26 of the Morita charger, and thus USB port 21 is the end-point connector of a USB cable." *Id.* (citing Ex. 1003 ¶¶ 105–106).

Patent Owner does not address Petitioner's contentions. *See generally* PO Resp.

Based on the evidence cited by Petitioner, Petitioner establishes Morita discloses this limitation.

[1.b] a charging subsystem, the charging subsystem operably connected to the USB interface V-bus power line;

Petitioner contends that "Morita discloses 'a charging subsystem,'[] namely, USB controller 14" and "that 'the power supply of the mobile videophone device 100 is supplied from the USB controller 14 to the battery 15 by coupling to a charger via a USB format capable of supplying data and power.'" Pet. 39 (citing Ex. 1003 ¶ 108; Ex. 1015 ¶¶ 12, 13). Petitioner further contends "that 'the charging subsystem [Morita's USB controller 14] [is] operably connected to the USB interface V-bus power line.'" *Id.* at 40 (citing Ex. 1003 ¶ 109; Ex. 1008, 17, Fig. 4-2). According to Petitioner,

power is received on "USB port 13's V_{BUS} connection from the adapter USB port 21 V_{BUS} line" and the power is used by USB controller 14 to charge the battery in Morita's mobile videophone. *Id.* at 41 (citing Ex. 1003 ¶ 110; Ex. 1015 ¶ 13).

Patent Owner does not address Petitioner's contentions. *See generally* PO Resp.

Based on the evidence cited by Petitioner, Petitioner establishes Morita discloses this limitation.

[1.c] the charging subsystem operably connectable to a battery, and configured to charge a battery if a battery is operably connected:

Petitioner contends that "Morita discloses that 'the power supply of the mobile videophone device 100 is supplied from the USB controller 14 to the battery 15 by coupling to a charger via a USB format capable of supplying data and power.'" Pet. 42 (citing Ex. 1003 ¶ 111; Ex. 1015 ¶¶ 12, 13).

Patent Owner does not address Petitioner's contentions. *See generally* PO Resp.

Based on the evidence cited by Petitioner, Petitioner establishes Morita discloses this limitation.

[1.d] the charging system further configured to use power from the V-bus power line for the charging of a battery; and

Petitioner contends that "Morita discloses that 'the power supply of the mobile videophone 100 is supplied from the USB controller 14 to the battery 15 by coupling to a charger via a USB format capable of supplying data and power." Pet. 43–44 (citing Ex. 103 ¶ 114; Ex. 1015 ¶¶ 12, 13).

Patent Owner does not address Petitioner's contentions. *See generally* PO Resp.

Based on the evidence cited by Petitioner, Petitioner establishes Morita discloses this limitation.

> *[1.e] where the mobile device is configured to detect an identification signal at a D+ and a D- data line of the USB interface, the identification signal being different than USB enumeration.*

a) The Parties' Contentions

Petitioner contends that Morita renders this limitation obvious in view of the knowledge of a skilled artisan. Pet. 45–55. Petitioner contends that although "Morita does not expressly disclose this limitation, it does disclose that a USB host or hub (e.g., a personal computer) is optionally connectable to the charger . . . and that the charger charges a mobile videophone." *Id.* (citing Ex. 1015 ¶¶ 14–15). Petitioner further contends that a skilled artisan "would have found it obvious that although Morita's charger was capable of handling a 'plurality of external devices,' one possibility would have been that the charger was merely plugged into the power socket (e.g., wall outlet) to charge the mobile device without any other external device (*e.g.*, USB host or hub)." *Id.* at 46. Petitioner further contends that "although Morita discloses that a USB host or hub (e.g., personal computer) is ***optionally*** connectable to the adapter via USB port 20, it also discloses its device merely acting as a charger." *Id.* at 47 (citing Ex. 1015 ¶¶ 14–15). According to Petitioner, "[w]ithout this optional connection: 1) normal USB communications through the USB adapter with a connected mobile device are not possible . . . and 2) powering the USB adapter from the absent, and unconnected, USB host or hub is not possible." *Id.* (citing Ex. 1003 ¶ 118). Petitioner contends that "Morita embraces this scenario, because it discloses that the adapter can provide power to the phone via USB connector 21 using the power from a wall outlet" and "the sole source of power to the connected

device through Morita's adapter would have to come from the power socket (outlet) via the plug unit." *Id.* (citing Ex. 1003 ¶ 115; Ex. 1015 ¶ 16). Based on the foregoing, Petitioner contends that an ordinarily skilled artisan "would have found it obvious to provide an identification signal via USB port 21 to indicate that the adapter is not . . . a USB host or hub, and for Morita's videophone to detect it so that it can draw current at a High-power level." *Id.* at 48.

Petitioner further contends that it would have been obvious to use the SE1 signal because "[t]he data lines were already used to signal connection states." Pet. 49. In addition, "because normal USB communications . . . are not possible when a USB host or hub is not connected to the USB adapter, and there is a mobile device connected to the USB adapter" an ordinarily skilled artisan "would have logically looked to ***the only other possible state of the data lines***, that is, both D+ and D- being high." *Id.* at 49–50. According to Petitioner, an ordinarily skilled artisan would know that the mobile device "cannot communicate via normal USB communications" and "it is connected to a 'High-power Hub Port.'" *Id.* at 50 (citing Ex. 1003 ¶ 120). Petitioner further contends that the SE1 signal had been used "as an identification signal to identify, and detect, various states" and "the prior art is replete with disclosures of detecting SE1 signals." *Id.* at 52 (citing Ex. 1003 ¶ 125; Ex. 1010, 5:49–53 ("Kerai"); Ex. 1011, 5:60–62, 6:35–48, Abstract ("Shiga"); Ex. 1012 ¶ 19 ("Zyskowski"); Ex. 1013, 6:6–16, 7:40–54 ("Casebolt")).

Petitioner further contends that claim 1 "require[s] only detecting the SE1 signal — not generating it." Pet. 53. Petitioner provides two reasons why any Patent Owner argument that it would not be obvious to generate the

SE1 signal with Morita's adapter would fail. *Id.* Petitioner first contends that "the claims do not recite any component that generates the SE1 signal." *Id.* Petitioner then contends "that it was routine to generate the SE1 as an identifying signal" and that an ordinarily skilled artisan "would have understood how to pull D+ and D- high to provide the SE1 identifying signal." *Id.* (citing Ex. 1003 ¶¶ 127–129). Petitioner then details a way that an ordinarily skilled artisan would modify Morita's charger to do so. *See id.* at 53–55.

Patent Owner first contends that a skilled artisan "would not have modified Morita's mobile videophone to detect a signal ***for identifying a power source*** . . . unless Morita's charger was first modified to generate and send the signal to the phone." PO Resp. 25. Patent Owner refers to the deposition testimony of Dr. Baker and the Declaration testimony of Dr. Fernald to support this contention. *Id.* at 25–26 (citing Ex. 2024, 85:25–86:8, 90:16–91:16, 105:12–22); Ex. 2009 ¶¶ 141–142). While conceding that the claims do not expressly recite generating an identification signal, Patent Owner contends Petitioner's "obviousness theory is founded on Morita's charger being modified to send an identification signal (SE1 in particular) to the mobile device for detection so Morita's mobile videophone could undergo fast charging." *Id.* at 27 (citing Pet. 45–49; Ex. 1003 ¶¶ 115–121, p. 63 n.3; Ex. 2024, 85:25–86:8, 90:16–91:16, 104:11–105:22).

Patent Owner next contends that a skilled artisan "would understand that the '586 patent relates to USB charging in a mobile device" and the recited "identification signal, *i.e.*, the signal that identifies a power source type, is discussed in this context." PO Resp. 28 (citing Ex. 1001, 8:9–16, 8:62–67, 9:3–51, Fig. 3; Ex. 2009 ¶¶ 158–159). Patent Owner further

contends Dr. Baker "agrees that the claimed identification signal in claim 1 is related to the charging system." *Id.* at 29 (citing Ex. 2024, 110:5–17; 112:8–21). Patent Owner also points to the preamble of method claim 8 that Patent Owner contends "restricts the scope of the claim and the recited steps to the context of 'charging a battery in a mobile device.'" *Id.* at 30. According to Patent Owner, "the claims must be interpreted in the proper context given the remaining claim language in light of the specification and in light of the agreed meaning of the term 'identification signal' (*i.e.*, 'the signal that identifies a power source type')." *Id.*

Petitioner counters that these contentions are "irrelevant because the claims require only a device that is configured to detect an identification signal (not send a SE1 signal)." Pet. Reply 5 (citing Dec. 21). Petitioner contends "there is no dispute that the claims do not require sending an identification signal" and "Dr. Fernald admitted that Morita's phone ***is already configured*** to detect a[n] SE1 signal." *Id.* (citing Ex. 1009, 145, 179: Ex. 1021, 8:18–9:8, 10:19–25, 118:13–23, 160:25–161:11, 188:16–189:2; Ex. 1026 ¶ 34; Ex. 2023 ¶¶ 49, 52).

Patent Owner next contends the prior art relied on by Petitioner does not disclose "[t]he claimed 'identification signal,'" namely a "signal that identifies a power source type." PO Resp. 61. Patent Owner further contends that "[i]t is insufficient to point to prior art where SE1 is used, e.g., for differentiating a PS/2 interface from a USB interface as in Casebolt or for detecting error signal as provided in the USB specification." *Id.* (footnotes omitted). According to Patent Owner, "Petitioner has not shown a single instance where SE1 was used for identifying a power source type,

let alone in a system like Morita with active USB communication." *Id.* at 62 (citing Ex. 1003 ¶¶ 124–125).

Patent Owner contends that "Kerai examines the voltage on each data line individually to determine whether power that would otherwise have gone wasted can be harvested and stored in the corresponding capacitor." PO Resp. 62 (citing Ex. 2009 ¶¶ 60–61). According to Patent Owner, "Kerai does not disclose, and Petitioner does not argue that Kerai discloses, using a non-USB power source to charge a USB device or providing an identification signal that indicates to the mobile device the type of power source from which power is derived." *Id.* (citing Pet. 43–45; Ex. 2013, 1, 5).

Patent Owner contends Zyskowski "determin[es] whether the PC is in a full power and normal operating state or in a reduced power or sleep state from which it needs to be woken up." PO Resp. 63 (citing Ex. 1003 ¶ 125; Ex. 1012 ¶¶ 19, 27; Ex. 2009 ¶¶ 55–57). According to Patent Owner, this determination is made "by observing whether one of the data lines is in a high state at a given time because in normal operation, one of the data lines will be pulled high at a given time" and consequently "Zyskowski . . . does not disclose the use of SE1." *Id.* (citing Ex. 2009 ¶¶ 56–57).

Patent Owner contends "Shiga concerns a wake-up signal sent to a USB host and not a power source type." PO Resp. 63 (citing Pet. 27–28; Ex. 1003 ¶ 125; Ex. 2009 ¶¶ 64–65).

Patent Owner contends "Casebolt and Cypress also have nothing to do with identifying power source types, and use[] SE1 for telling PS/2 and USB interfaces apart." PO Resp. 63 (citing Ex. 1003 ¶ 125; Ex. 1013, 7:40–46; Ex. 1014, 24–25; Ex. 2009 ¶¶ 66–67).

Petitioner, in turn, replies, "by conceding that Casebolt and Cypress use a SE1 signal to distinguish between 'PS/2 and USB interfaces,' [Patent Owner] concedes that Casebolt and Cypress use SE1 signal[s] to identify a power source type. On the one hand, PS/2 provides a power line that provides 275 mA of power." Pet. Reply 7 (citing Ex. 1021, 40:17–41:1; Ex. 1026 ¶ 16; Ex. 1027, 19). Petitioner contrasts PS/2 power with USB, which Petitioner contends "provides a power line that may supply either 100mA or up to 500mA." *Id.* (citing Ex. 1008, 142). According to Petitioner, "the identification of PS/2 or USB identifies the corresponding power source type, which provide different output current." *Id.* at 7–8 (citing Ex. 1026 ¶¶ 12–16; Ex. 1021, 41:16–23).

Patent Owner contends we should not consider Petitioner's argument in the Reply that the prior art usage of SE1 "involved identifying a power source type" because the arguments were not raised in the Petition and are untimely. Sur-Reply 4. Notwithstanding this argument, Patent Owner contends the new arguments fail. *Id.* at 4–5. Patent Owner contends "[b]ecause it is not inherent that Morita's phone had a circuitry that identified PS/2 versus USB, Petitioner must, but did not, show that a [skilled artisan] would have had a reason to modify Morita's phone to include a PS/2 detection circuit." *Id.* at 5–6.

Patent Owner next contends that "[i]f Morita receives an SE1signal, Morita's mobile device becomes inoperative for USB communication, which is essential to the mobile device's role as a USB host in the second configuration on which Petitioner focuses." PO Resp. 31–32. Patent Owner further contends Petitioner fails to identify "structure in Morita as modified that would be able to distinguish between an SE1 signal from a power source

and an SE1 signal that represents a system in an error state justifying the disabling of communication." *Id.* at 32. According to Patent Owner, this purported failure by Petitioner requires its theory of obviousness "to revolve around a charging-only mode that Morita neither discloses nor suggests." *Id.*

Patent Owner contends that "Morita's charging function is to address perceived problems of limited battery life when a mobile device serves as a host to operate other peripherals" and "[t]he charging function is included for replenishing the battery power consumed during the mobile device's operation as a host." PO Resp. 39–40 (citing Ex. 1015 ¶¶ 8, 19, 22). Patent Owner further contends "[t]he primary function of Morita is to allow the mobile device to easily access peripherals while also prolonging the battery life by recharging it." *Id.* at 40 (citing Ex. 1015 ¶¶ 18, 19, 22; Ex. 2009 ¶¶ 102, 103). According to Patent Owner, "Morita contains no disclosure of a hub-controllable charger that is used only to charge a mobile phone" but "expressly discloses that the mobile device is to operate as 'a device for host controlling a connected device' connected via the charger and to '***always*** access[] the external device while receiving the supply of power from the charger.'" *Id.* at 41 (citing Ex. 1015 ¶¶ 18, 19, 22, Fig. 4).

Petitioner, in turn, contends that "Morita discloses only charging the phone without connecting other devices to the charger." Pet. Reply 21. Petitioner further contends Morita discloses USB ports for coupling various devices and "these ports are . . . are not static connections." *Id.* (citing Ex. 1020 ¶¶ 12, 20). Petitioner further contends Morita "discloses that 'a plurality of external devices ***can be*** connected" and Morita's "figure 2 depicts the charging station with no devices connected except the phone"

which, according to Petitioner, means "these connections with peripheral devices are optional." *Id.* (citing Ex. 1020 ¶ 21, Fig. 2). Petitioner further contends "[u]sing a charger to merely charge an USB phone was so well known that PO's expert refers to it as 'a normal charger'" and "admits that the USB specification specifies a hub's operation (Morita's charger) without any peripheral connections." *Id.* (citing Ex. 1021, 106:12–20; Ex. 2023 ¶ 101). Based on the foregoing, Petitioner contends "Morita 'fairly suggests' a 'normal charger' function." *Id.* at 22 (citing Ex. 1026 ¶ 52).

b) Analysis

We start with several observations concerning the scope of claim 1. Claim 1 is an apparatus claim directed to a "mobile device configurable for use in a wireless telecommunications network." Ex. 1001, 11:49–50. Claim 1 does not recite a charger or adapter for the mobile device. *See id.* at 11:49–64. The Specification of the '586 patent provides that a USB "adapter preferably provides an identification signal to the mobile device." *Id.* at 8:63–63. Claim 1 does not recite providing or generating the identification signal. *See* PO Resp. 27. Further, claim 1 does not recite detection of the identification signal, only that the mobile phone is configured to detect the identification signal. *See* Ex. 1001, 11:49–64. Nor does claim 1 require the phone to perform or be configured to perform any function in connection with the identification signal other than being configured to detect the identification signal. *See id.*

Our view that claim 1 requires only a mobile device configured to detect the identification signal is confirmed by the relevant evidence from the '586 patent. The Specification of the '586 patent draws a distinction between the mobile device detecting an identification signal and other

functions that may be required of the mobile device. The Specification provides that "[t]he detection of the identification signal may be accomplished using a variety of methods. For example, the microprocessor 12 may detect the identification signal by detecting the presence of an abnormal data line condition at the USB port 18." Ex. 1001, 9:6–11. The Specification provides, "[p]referably, the mobile device 10 is *programmed* to recognize the identification signal" and "[i]f the voltages on both the D+ and D- lines of the USB connector are greater than 2 Volts (step 220), then the mobile device *determines* that the device connected to the USB connector 54 is not a typical USB host or hub." *Id.* at 8:67–9:2, 9:26–30 (emphases added).

Claim 5 of the '586 patent, which like claim 1 is directed to a mobile device, specifically recites a distinction between receiving a signal and taking further action. Claim 5 recites the "data lines D+ and D- at the USB interface are configured to receive signals" and "a microprocessor and memory usable to process the received signal, configured . . . [to] indicat[e] a charging connection is available is *recognized* by the device." *Id.* at 12:17–23 (emphasis added). Claim 1, however, only recites "the mobile device is configured to detect an identification signal at a D+ and a D- data line" with no other structure or functions recited in the claim, such as requiring the mobile device to be programmed to recognize the detected identification signal or to include a microprocessor and memory configured to recognize a charging connection.

We now turn to Patent Owner's contentions that the challenged claims are directed to charging a mobile device. PO Resp. 28–31. Patent Owner starts with the proposition that "claims are to be interpreted in light of the

specification and from the perspective of a POSITA who has read the specification as a whole." *Id.* at 28 (citing *Phillips*, 415 F.3d at 1313)). Patent Owner cites, *inter alia*, to Dr. Baker's deposition testimony and the preamble of claim 8 that recites "charging a battery in a mobile device." *Id.* at 29–31. Although Patent Owner contends that the preamble of claim 1 is limiting (PO Resp. 24), unlike the preamble of claim 8, the preamble of claim 1 makes no mention of battery charging.

Given that claim 1 does not recite a charger or an adapter or require the mobile device to be configured to do anything other than detect the identification signal, we determine that many of Patent Owner's contentions are unavailing at the outset because they are directed to either Morita's charger or functions of Morita's mobile video phone not related to detecting the recited identification signal or assume Morita's phone requires modification to detect the SE1 signal. *See* PO Resp. 25 (arguing a POSITA would not have modified Morita's video phone to detect the recited identification signal), 39 (arguing Morita does not provide a charger for the sake of charging alone), 44 (arguing Morita's mobile phone engages in USB communication when connected to the charger), 46 (arguing Morita's mobile phone needs to maintain communication with the USB hub charger), 49 (arguing Morita's charger would not know whether the mobile phone is connected for charging only or for accessing peripherals), 50 (arguing that if Morita's hub charger were used only as a charger, that would render the hub charger inoperable for its stated purpose); 51 (arguing Petitioner incorrectly assumes that Morita's hub charger would provide different amounts of current to the mobile device).

The factual matters in dispute for claim 1 revolve around the recited "identification signal." There is no dispute that Morita's USB enabled phone is "configured to detect" an SE1 signal. Ex. 1021, 188:16–23 (Dr. Fernald testifying Morita's phone would "basically go into reset" if both data lines are held high). The crux of the parties' dispute is whether Petitioner has shown that the prior art discloses or renders obvious detecting an SE1 signal to *identify a power source type*. In particular, Patent Owner contends that Petitioner must show that an SE1 signal was used for identifying a power source type (PO Resp. 62), and Petitioner contends "the only remaining question is whether the prior art renders obvious a SE1 signal that identifies a power source" (Pet. Reply 7). It is through this lens that we evaluate the parties' factual contentions.

Petitioner relies on various references, other than Morita, to support its contention that a skilled artisan "would have found it routine to use the SE1 signal as an identification signal—and detect it, with a high expectation of success, because the SE1 signal can 'be easily distinguished from USB standard data signals.'" Pet. 52 (citing Ex. 1011, 5:60–62, 6:48–58). Petitioner identifies Shiga as using SE1 to signal a wake-up condition, Zyskowski as using SE1 to identify a full power state, and Casebolt to identify the presence of a PS/2 adapter. *Id.* (citing Ex. 1003 ¶ 125; Ex. 1011, 6:35–47; Ex. 1012 ¶ 19; Ex. 1013, 7:40–54). Petitioner also relies on Kerai as disclosing the use of an SE1 signal to indicate "charging a battery and no communications." *Id.* at 51 (citing Ex. 1003 ¶ 125; Ex. 1010, 5:45–48). We focus on Casebolt because, as discussed below, we find Casebolt discloses using SE1 as an identification signal and supports Petitioner's contention that it was within the knowledge of a skilled artisan to detect an

SE1 signal to identify a power source type. *See Randall Mfg. v. Rea*, 733. F.3d 1355, 1362 (Fed. Cir. 2013) (explaining the Board should not "ignore[] the additional record evidence . . . cited to demonstrate the knowledge and perspective of one of ordinary skill in the art.").

We first address Patent Owner's argument that we should not consider Petitioner's Reply arguments concerning whether Casebolt discloses using SE1 to identify a power source type because "[t]he Petition never raised this theory." Sur-reply 4. Our rules require that "[a] reply may only respond to arguments raised in the corresponding opposition, patent owner preliminary response, or patent owner response." 37 C.F.R. § 42.23 (b) (2021); *see also Apple Inc. v. Andrea Elecs. Corp.*, 949 F.3d 697, 707 (Fed. Cir. 2020) (explaining "we must consider . . . whether the reply arguments are responsive to arguments raised in the patent owner's response brief."). Our trial practice guide provides that 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," but "[a] party may submit rebuttal evidence in support of its reply." Consol. TPG,[10] 73 (Nov. 2019) (citing *Belden Inc. v. Berk-Tek LLC*, 805 F. 3d 1064, 1077–78 (Fed. Cir. 2015)).

The Petition asserts that, in view of the potential to use Morita's phone in a charge-only mode, it would have been obvious to provide an identification signal "to indicate that the adapter is powered by a power socket." Pet. 47–48. The Petition asserts that SE1 would have been used for this identification signal because, *inter alia*, it meets the claim requirement of a signal "at a D+ and a D- data line of the USB interface . . . being

[10] Available at https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf.

different than USB enumeration." *Id.* at 49 (citing Ex. 1003 ¶ 123; Ex. 1008, 120, 179). In addition, Petitioner asserts that because normal USB communications "are not possible when a USB host or hub is not connected to the USB adapter, and there is a mobile device connected to the USB adapter . . . a POSITA would have looked to ***the only other possible state of the data lines"*** that could be used as an identification signal, i.e., SE1. *Id.* at 49–50 (citing Ex. 1003 ¶ 120). Petitioner further asserts that use of the SE1 signal was known by skilled artisans to "indicate that communication will not occur . . . but the mobile device continu[es] to receive power over the power lines so that it can charge" and consequently "it would have been obvious to select this known SE1 signal as the identification signal (again it is a selection from among a finite number of known choices)." *Id.* at 50–51 (citing Ex. 1003 ¶¶ 120, 122). The Petition expressly identifies Casebolt's use of an SE1 signal to detect the presence of a PS/2 adapter as an example of using an SE1 signal as an identification signal. *Id.* at 52 (citing Ex. 1013, 7:40–54).

Patent Owner asserts that the SE1 signal in Casebolt is not used to identify a power source type, but rather to tell PS/2 and USB interfaces apart. PO Resp. 63.

Our analysis, as discussed below, is predicated on the disclosure of Morita and the knowledge of a skilled artisan, as demonstrated by the disclosure of Casebolt, that the SE1 signal was known to be used for identification. Nevertheless, Petitioner's reply arguments directly respond to Patent Owner's argument that Casebolt does not use SE1 to identify a power source type. PO Resp. 63. In his Reply Declaration, Dr. Baker testifies that PS/2 and USB interfaces have different current limits, and explains why that

difference meets the claim limitation of using an SEI signal to identify a power source type. Ex. 1026 ¶ 16. Petitioner relies on Casebolt and on Dr. Baker's Reply Declaration testimony to explain why Casebolt uses SE1 to identify a power source type. Pet. Reply 7–8. We find that Petitioner's Reply argument is not beyond the proper scope of a Reply because it elaborates on the contentions in the Petition that "[i]t would have been obvious to use the SE1 signal state . . . to provide this identification" and "the prior art is replete with disclosures of detecting SE1 signals." Pet. 49, 52; *see Chamberlain Grp., Inc. v. One World Techs., Inc.*, 944 F. 3d, 919, 925 (Fed. Cir. 2019) ("Parties are not barred from elaborating on their arguments on issues previously raised.").

We make the following findings of fact regarding the disclosure of Casebolt. Casebolt discloses a peripheral device that is a capable of using either the USB or PS/2 protocol. Ex. 1013, 3:13–16; Ex. 2023 ¶ 67. Casebolt's controller 144 monitors the "state of signal lines 158 and 160" and "looks for I/O state 3 in Table 1 (or the SE1 condition) on signal lines 158 and 160." Ex. 1013, 7:30–34. Casebolt further discloses "if the SEI condition is maintained for the necessary time period, and the terminal count is reached, controller 144 determines that it has detected a PS2 interface and moves to state 180." *Id.* at 7:40–43. At that point, controller 144 "causes USB functions to be terminated, and PS2 communications controller 148 takes over communication between peripheral device 142 and computer 20." *Id.* at 7:43–46.

Casebolt explains that "[t]he PS2 interface uses two conductors which include a separate clock conductor and a separate data conductor." *Id.* at 1:62–63. Casebolt further explains that "[t]he USB interface also use two

conductors which include differential signal conductors D+ and D-." *Id.* at 2:13–14. Figure 3 of Casebolt is reproduced below:

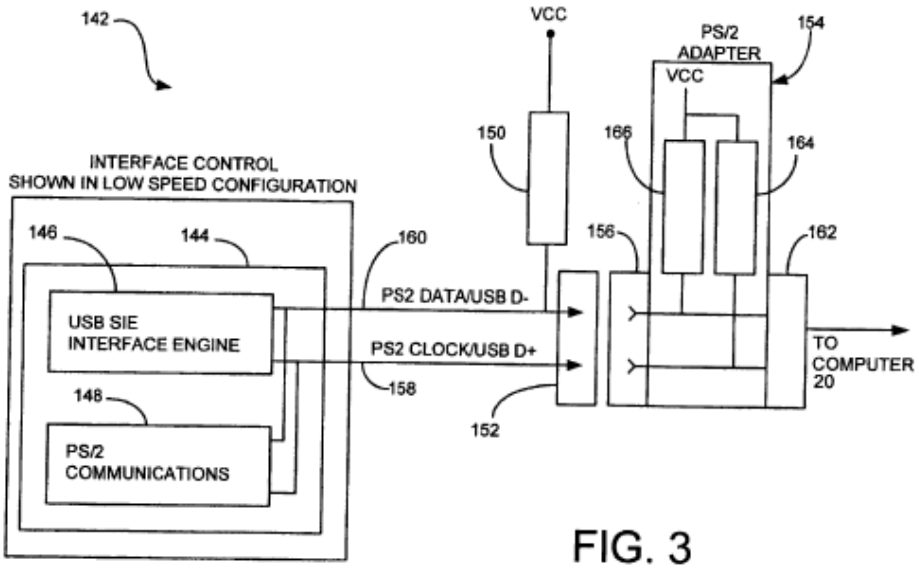


FIG. 3

Figure 3 of Casebolt "illustrates a peripheral device in accordance with one embodiment of the present invention." Ex. 1013, 3:1–2. Figure 3 shows that the PS2 Data and PS2 Clock conductors share the same conductors as the USB D+ and D- conductors. *Id.* at 6:17–23, Fig. 3. Based on the foregoing, we find that Casebolt discloses using an SE1 signal for identification.

Patent Owner does not dispute that a PS/2 power line and a USB power line have different current limits. Sur-reply 5–6; Ex. 1021, 40:17–41:23 (Dr. Fernald confirming PS/2 maximum current is 275 mA). Patent Owner contends that "[b]ecause it is not inherent or even likely that Morita's phone had circuitry that identified PS/2 versus USB, Petitioner . . . did not show that a POSITA would have had a reason to modify Morita's phone to include a PS/2 detection circuit" and "[t]his is unsurprising because Morita had nothing to do with a PS/2 connection." Sur-reply 5–6 (citing Ex. 2024,

125:7–10; Ex. 2025, 198:3–4, 150:22–151:3). This contention, however, is unavailing for several reasons. First, Petitioner does not propose modifying Morita to add circuitry to distinguish between a PS/2 and USB device. Second, Patent Owner's contention requires a bodily incorporation of Casebolt's circuitry into Morita. *Cf. In re Keller*, 642 F.2d 413, 425 (CCPA 1981) ("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference. . . . Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art."). Petitioner relies on Casebolt to support its contention that it was within the knowledge of a skilled artisan to use an SE1 signal as the recited "identification signal."

We now turn to the question of whether the current limits of a PS/2 power line or a USB power line are an indicia of "power source type." At the oral hearing, Petitioner argued that one example of identifying a power source type in the Specification of the '586 patent is "the identification signal indicates or identifies that the power source is not subject to the limits imposed [sic] by the USB. So a signal that would say the type of power source, that it's in line with the USB spec, that it's not in line with the USB spec." Tr. 6:5–13. Petitioner also argued a second example of identifying a power source type is "[c]laim 11 recites that the identification signal identifies that a power connection is available. So one subset of this term and the meaning of it is simply that a power source is available." *Id.* at 6:19–21.

Patent Owner argued if "[i]t is connected to a power source type that is not subject [to] the power limits imposed by the USB specification . . .

that information is not about whether it's connected or not but about a type of power that it's being connected to." Tr. 28:1–6. We take from this that Patent Owner agrees with Petitioner's first example of identifying a power source type but not the second. We note that the Specification of the '586 patent provides support for the first example when it describes "the identification subsystem 108 of the USB adapter 100 preferably provides an identification signal to the mobile device 10 to notify the mobile device 10 that the device 10 is connected to a power source that is not subject to the power limits imposed by the USB specification." Ex. 1001, 8:62–67.

We find that a PS/2 power line with a 275 mA current limit is not subject to the power limits imposed by the USB specification because the USB limitations are either 100 mA or 500 mA. Ex. 1008, 142. Casebolt clearly discloses using an SE1 signal to distinguish between a PS/2 device and a USB device. Ex. 1013, 7:40–46; *see also* Ex. 2023 ¶ 67 (Dr. Fernald testifying "SE1 in Casebolt helps differentiate a PS/2 interface from a USB interface."). Whether or not Morita's mobile video phone contains circuitry to detect a PS/2 device as argued by Patent Owner is of little import because the issue is what Casebolt shows as evidence of what was known to a person of ordinary skill in the art.

Dr. Baker testifies that "[b]ecause the SE1 signal differentiates between PS/2 and USB interfaces, the SE1 signal in Casebolt . . . identifies a power source type." Ex. 1026 ¶ 16. Dr. Baker relies on the undisputed facts that "the PS/2 interface provides a maximum current of 275 mA" and "according to the USB specification, a high-power function can draw up to 500 mA, while a low-power function may draw only up to 100mA." *Id.* As discussed above, although Dr. Fernald testifies that Casebolt uses SE1 to

distinguish between PS/2 and USB and that PS/2 and USB have different current limits, he offers no explanation for his conclusion that Casebolt does not suggest use of SE1 to identify a power source type. *See* Ex. 2023 ¶ 67. We credit Dr. Baker's testimony over that of Dr. Fernald on this point because it is consistent with the evidence that USB and PS/2 have different current limits. Consequently, we find that Casebolt shows using an SE1 signal to identify a power source type was known to a person of ordinary skill in the art at the time of the invention.

Notwithstanding the question of whether Casebolt suggests using an SE1 signal to identify a power source type, there is no question that Casebolt specifically discloses using SE1 as an identification signal. *See* PO Resp. 63 ("Casebolt . . . used SE1 for telling PS/2 and USB interfaces apart."). This supports Dr. Baker's testimony that a skilled artisan "would have looked to ***the only other possible state of the data lines***, that is, . . . SE1 to identify to the connected mobile device that the power socket is not a USB host or hub." Ex. 1003 ¶ 120 (underlining added). SE1 meets the claim requirements of the recited identification signal at a D+ and a D- data line that is different than enumeration. *See id.* ¶ 123 (Dr. Baker testifying that "the SE1 signal is not enumeration; enumeration is not possible during application of the SE1 signal.") As discussed above, Casebolt monitors the state of the D+ and D- conductors to detect an SE1 signal. Ex. 1013, 7:30–34, Fig. 3. Consequently, we find that Petitioner establishes it would have been obvious "to select this known SE1 signal as the identification signal (and again, it is a selection from among a finite number of known choices)." Pet. 51 (citing Ex. 1003 ¶¶ 120, 122).

For all the foregoing reasons, we determine that Morita renders this limitation obvious in view of the knowledge of a skilled artisan.

Patent Owner's Remaining Contentions

Patent Owner contends that a skilled artisan would have had no reason to employ SE1 for identifying the hub port as a high-powered port because the USB specification already provides a means to identify self-powered hubs to the host (PO Resp. 56), Petitioner has not addressed complications associated with using SE1 in Morita's system (*id.* at 64), and Dr. Baker incorrectly assumed that SE1 is the only option for charge-only mode (*id.* at 66). These contentions are all based on what Patent Owner submits are alternatives to using SE1 or alleged drawbacks in using SE1 as Petitioner proposes. However, merely because there may purportedly be better alternatives than SE1 does not mean that the use of SE1 would not have been obvious. *See In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) ("This court has further explained that just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes."); *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) ("a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine."). Therefore, the contentions are unavailing.

Patent Owner also contends that Petitioner used improper hindsight because "Petitioner rewrote Morita to conjure up a charge-only mode," and its selection of SE1 was infected with hindsight. PO Resp. 59–60. We take each contention in turn.

Patent Owner points to prior Board decisions involving patents relating to the '586 patent where the Board stated that "Petitioner's

contention that Morita would operate as a charger only, without USB communication with the peripherals, is unsupported by Morita" and "Morita does not provide a charger for the sake of charging alone." PO Resp. 3–4 (citing *TCT Mobile (US), Inc. v. Fundamental Innovation Systems Int'l LLC*, IPR2021-00598, Paper 8, 11 (PTAB Aug. 30, 2021); *TCT Mobile (US), Inc. v. Fundamental Innovation Systems Int'l LLC*, IPR2021-00597, Paper 8, 15–16 (PTAB Aug. 25, 2021)).

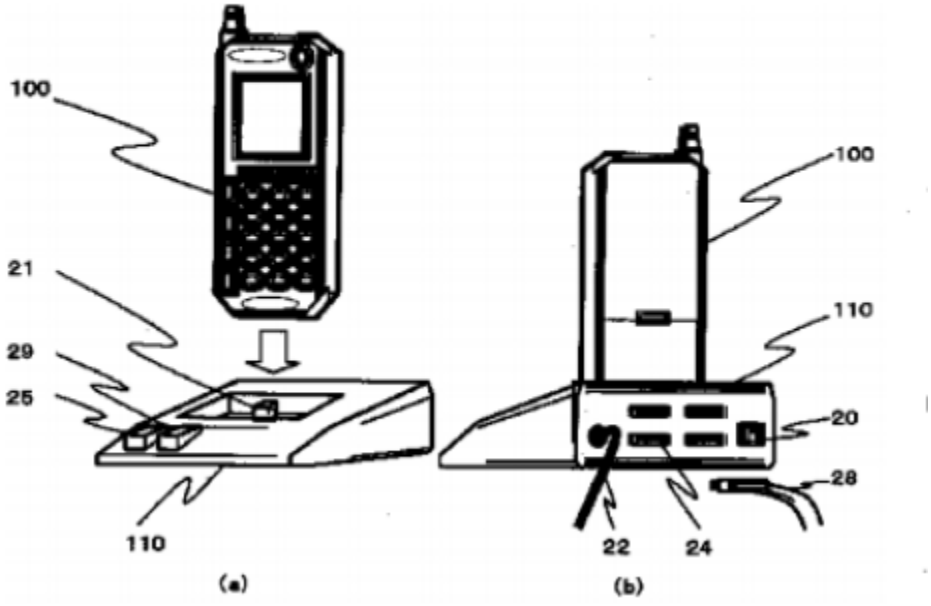
There is no dispute that Morita does not explicitly describe how its system functions if only the phone were connected to its adapter for charging. *See generally* Ex. 1015. In IPR2021-00597, the claims recited a mobile device "configured to draw current from the VBUS line without regard to at least one associated condition specified in a USB specification" and "wherein said current is drawn without USB enumeration." IPR2021-00597, Paper 8 at 5 (citing claims 1, 3). In IPR2021-00598, the claims recited a mobile device with "a charging system enabled to draw current unrestricted by at least one predetermined USB Specification limit." IPR2021-00598, Paper 8 at 5. The claims in the prior cases, thus, dealt with a mobile device where current is actually drawn (presumably from a charger) to charge the mobile phone battery. Because of this difference, the determinations in those cases are of limited applicability here.

Petitioner argues that a skilled artisan "would have found it obvious that although Morita's charger was capable of handling a 'plurality of external devices,' one possibility would have been that the charger was merely plugged into the power socket (e.g., wall outlet) to charge the mobile device without any other external device . . . It goes without saying that charging a mobile device is a critical function, and often users just need to

charge[] their mobile device." Pet. 46–47 (citing Ex. 1002 ¶ 116). In support of its contention, Petitioner directs us to Figure 2 of Morita which "depicts the charging station with no devices connected except the phone." Pet. Reply 21. Petitioner also directs us to Dr. Fernald's testimony that "[u]sing a charger to merely charge an USB phone was so well known that PO's expert refers to it as a 'normal charger.'" *Id.* (citing Ex. 2023 ¶ 101).

Figure 2 of Morita is reproduced below:

[FIG. 2]



Figures 2a and 2b are an embodiment of Morita's charger "illustrating coupling of a mobile phone and a charger." Ex. 1015, col. 6 (Brief Description of the Drawings).

Figure 2b shows mobile video phone 100 coupled with charger 110. Figure 2b also shows power supply cable 22 on the back of charger 110 which is "connected to an outlet or the like connected to a commercial power supply, and the supplied power supply voltage is supplied to the mobile videophone device 100 via USB port 21 to charge an internal battery

and supply power supply voltage from the USB port 24 to an external peripheral." *Id.* ¶ 16. There is no peripheral device shown connected to USB port 24 and cable 28 is not connected to any port on charger 110. *Id.* at Fig. 2b. Based on Figure 2b and the associated description, we find Figure 2 provides some support for Petitioner's contention that Morita suggests a mode where only the phone is connected to charger 110 for charging with no peripheral device connected.

Dr. Fernald testified that the USB specification contemplates the situation where no peripheral devices are connected to a USB hub such as Morita's charger. Ex. 1021, 106:12–20. From this testimony, we find that a skilled artisan would have had knowledge that the USB specification contemplates a situation wherein only Morita's phone is connected to its charger. Dr. Fernald also described a charger used solely for the sake of charging as "a normal charger." Ex. 2009 ¶ 101. Dr. Fernald's testimony accords with that of Dr. Baker that "Morita's device is a charger . . . and at least one of its express objectives is to charge a mobile device" and "one possibility would have been that the charger was merely plugged into the power socket . . . to charge the mobile device without any other external device." Ex. 1003 ¶ 116.

Based on the disclosure of Morita, and the testimony of Dr. Baker, and Dr. Fernald, we find Morita would, at a minimum, suggest to a skilled artisan that Morita's adapter could be used to charge Morita's phone without connection to other devices. Consequently, Petitioner's contentions are based on evidence, not improper hindsight.

In connection with the SE1 signal, as discussed above we find that Casebolt shows that using an SE1 signal to identify a power source type was

known to a person of ordinary skill in the art at the time of the invention. Consequently, Patent Owner's contention that Petitioner engaged in improper hindsight reconstruction is unavailing.

Summary of Claim 1

For the reasons discussed above, Petitioner establishes by a preponderance of the evidence that claim 1 would have been obvious over Morita and the knowledge of a skilled artisan.

3. Claim 2

Claim 2 depends from claim 1 and recites "wherein the identification signal comprises a voltage level that is applied to at least one data line in the USB connector." Ex. 1001, 11:65–57.

Petitioner contends "Morita renders this limitation obvious in view of the knowledge of a POSITA." Pet. 56. Petitioner contends the SE1 signal "is a high voltage level on each of the data lines of Morita's USB port 13." *Id.* (citing Ex. 1003 ¶¶ 122, 123; Ex. 1009, 123). Patent Owner does not provide separate arguments for the patentability of claim 2. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner for claim 2 and determine Petitioner establishes by a preponderance of the evidence that claim 2 would have been obvious over Morita and the knowledge of a skilled artisan.

4. *Claim 8*

Claim 8 is an independent claim directed to a method of charging a battery in a mobile device. Ex. 1001, 12:30–46. Claim 8 contains limitations substantially similar to claim 1 including the last limitation "detecting an identification signal at a D+ and D- data line of the USB

interface, the identification signal being different than USB enumeration." *Id.* at 12:44–46.

Petitioner provides a limitation by limitation analysis of claim 8 with reference to evidence in Morita and Dr. Baker's declaration testimony. Pet. 56–60. Petitioner relies on its contentions and evidence for claim limitations 1[b], 1[c], 1[d] and 1[e] for the limitations it annotates as 8[b], 8[c], 8[d], and 8[e]. *Id.* at 59–60.

Patent Owner does not provide separate arguments for the patentability of claim 8. *See generally* PO Resp. As discussed above, Patent Owner notes that the preamble of claim 8 recites a method of charging a battery in a mobile device. *Id.* at 30. Patent Owner then contends that "obviousness is not proven by merely arguing Morita's mobile device detects SE1 in the abstract: the claims must be interpreted in the proper context given the remaining claim language in light of the specification and in light of the agreed meaning of the term 'identification signal." *Id.* As discussed above in connection with limitation 1[e], we find that Casebolt shows using SE1 as an identification signal to identify a power source type was known to person of ordinary skill in the art at the time of the invention.

We reviewed the evidence cited by Petitioner for claim 8 and in light of the reasons discussed above in connection with claim 1, and determine Petitioner establishes by a preponderance of the evidence that claim 8 would have been obvious over Morita and the knowledge of a skilled artisan.

5. Claim 9

Claim 9 depends from claim 8 and recites "wherein the identification signal comprises a voltage level at least one date line in the USB connector." Ex. 1001, 12:47–59.

Petitioner relies on its contentions and evidence for claim 2. Pet. 61. Patent Owner does not provide separate arguments for the patentability of claim 9. *See generally* PO Resp.

We reviewed the evidence cited by Petitioner for claim 9 and determine Petitioner establishes by a preponderance of the evidence that claim 9 would have been obvious over Morita and the knowledge of a skilled artisan.

III. PETITIONER'S MOTION TO EXCLUDE

Petitioner moves to exclude Exhibit 2030. Paper 28, 1. Petitioner contends Patent Owner filed Exhibit 2030 with its Sur-reply in violation of 37 C.F.R. § 42.23(b), which prohibits the filing of new evidence other than deposition transcripts with the Sur-reply. *Id.* at 1–2.

We do not rely on Exhibit 2030 in this Decision. Consequently, we dismiss Petitioner's Motion to Exclude as moot.

IV. CONCLUSION[11]

Weighing the evidence and the competing testimony, we determine that Petitioner establishes by a preponderance that claims 1, 2, 8 and 9 of the '586 patent are unpatentable.

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 8, 9	103	Morita and the knowledge of a skilled artisan	1, 2, 8, 9	

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 2, 8, and 9 of the '586 patent have been shown to be unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude (Paper

[11] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

28) is dismissed as moot; and

FURTHER ORDERED that any party seeking judicial review must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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