

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROCHIP TECHNOLOGY INC.,
Petitioner,

v.

APTIV TECHNOLOGIES AG,
Patent Owner.

IPR2024-00495
Patent 9,619,420 B2

Before JEAN R. HOMERE, TERRENCE W. McMILLIN, and KEVIN C.
TROCK, *Administrative Patent Judges*.

McMILLIN, *Administrative Patent Judge*.

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

Microchip Technology Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 13, 14, and 18–20 (“the challenged claims”) of U.S. Patent No. 9,619,420 B2 (Ex. 1003, “the ’420 patent”). Aptiv Technologies AG (“Patent Owner”) filed a Preliminary Response (Paper 10, “Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. *See* 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2023). Under 35 U.S.C. § 314(a), we may not authorize an *inter partes* review unless the information in the Petition and the Preliminary 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.” For the reasons that follow, we institute an *inter partes* review as to claims 13, 14, and 18–20 of the ’420 patent on the single ground of unpatentability presented.

I. BACKGROUND

A. *Real Parties-in-Interest*

Petitioner identifies itself and its subsidiaries as the real parties-in-interest. Pet. 93. Patent Owner identifies itself and Aptiv Services US, LLC as the real parties-in-interest. Paper 6, 2.

B. *Related Matters*

The parties identify the following proceedings related to the ’420 patent or patents in the same family (Pet. 93; Paper 6, 2–3):

Aptiv Technologies AG v. Microchip Technology Inc., Case No. 1:23-cv-00307-JDW (D. Del. March 20, 2023);

Microchip Technology Inc. v. Aptiv Technologies AG, IPR2024-00228 (PTAB filed December 27, 2023);¹

Microchip Technology Inc. v. Aptiv Technologies AG, IPR2024-00229 (PTAB filed December 27, 2023);

Microchip Technology Inc. v. Aptiv Technologies AG, IPR2024-00230 (PTAB filed December 27, 2023);

Microchip Technology Inc. v. Aptiv Technologies AG, PGR2024-00011 (PTAB filed December 27, 2023);

Microchip Technology Inc. v. Aptiv Technologies AG and Aptiv Technologies Limited, IPR2024-00494 (PTAB filed February 27, 2024);

Microchip Technology Inc. v. Aptiv Technologies AG and Aptiv Technologies Limited, IPR2024-00496 (PTAB filed February 27, 2024); and

Microchip Technology Inc. v. Aptiv Technologies AG and Aptiv Technologies Limited, IPR2024-00558 (PTAB filed February 27, 2024).

C. *The '420 Patent (Ex. 1003)*

The '420 patent relates to a system to enable a vehicle's embedded USB (Universal Serial Bus) host system to connect to multiple mobile devices through a USB hub, regardless of whether the mobile devices are configured to act as USB hosts or USB devices, without USB On the Go (OTG) controllers or additional vehicle wiring or inhibiting the functionality of any consumer devices. Ex. 1003, code (57).

The '420 patent explains that “USB protocols require a point-to-point connection in which one end is the USB Host or master, and the other end is

¹ In IPR2024-00228, Petitioner challenges claims 1–12 and 15–17 of the '420 patent. See Paper 4 (“Petitioner’s Explanation for and Ranking of Two Petitions Challenging U.S. Patent No. 9,619,420”). Trial was instituted in IPR2024-00228 on July 15, 2024. IPR2024-00228, Paper 13.

a USB Device or slave. In this way, the flow of messages between the two devices is managed and controlled, whereby the USB Device responds to messages initiated by the USB Host.” *Id.* at 1:33–39. The patent further describes that in vehicle systems that employ USB connections, the vehicle is typically the USB host and the USB host function is often embedded into a component of the vehicle infotainment system, such as into the radio or other control module. *Id.* at 1:45–57.

As described in the patent, leading mobile device manufacturers and system designers began designing their mobile device products (such as smartphones) to support both USB host and USB device roles. *Id.* at 2:56–65. In other words, a phone may configure itself such that it can function as a USB device when it needs to be, or as a USB host when it needs to be. *Id.*

If a phone acts as a USB host, then the vehicle system will not function because, by USB convention, two USB hosts cannot directly connect with each other. *Id.* at 3:4–17. The patent states that existing solutions to this problem such as On the Go (OTG) technology and dynamic swapping of ports have disadvantages. *Id.* at 3:18–67.

The patent summarizes the invention as follows:

An embodiment of the present invention provides a system which can be employed between a vehicle's embedded USB Host and at least one, but preferably multiple, consumer facing USB ports provided in the vehicle for connection to consumer devices. The system is configured to recognize and control whether the consumer device is required to be connected to each USB port as a USB Host or as a USB Device. Further, the system is able to dynamically switch the device connection between USB Device mode and USB Host mode when desired. In the case where the consumer device is acting as a USB Device, signals are routed normally through a USB Hub to the Head Unit. In the case where the consumer device is acting as a

USB Host, signals between the consumer device and the vehicle's embedded USB Host are routed and processed through a USB Host to Host Bridge which is connected to the USB Hub, thereby rendering the consumer device compatible with the vehicle's embedded USB Host.

Id. at 4:12–30.

Figure 4, reproduced below, illustrates an embodiment wherein a USB hub, a USB bridge, and a switching device are provided as discrete components. *Id.* at 5:21–24.

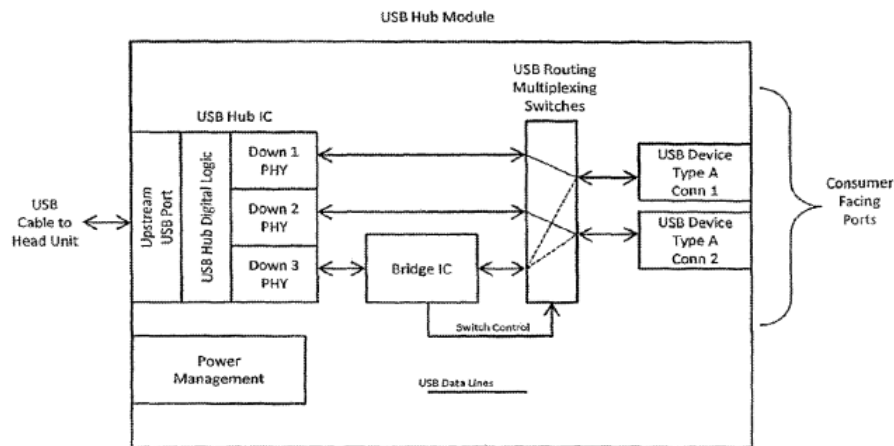


Figure 4 depicts a system configured to render a vehicle's embedded USB host compatible with consumer devices configured to act as a USB host or as a USB device. *Id.* at 5:46–6:18. The system is in the form of a USB hub module having a USB hub IC (integrated circuit), a USB bridge IC, and a switching device having switches. *Id.* The USB hub IC is configured to be connected (via an upstream USB port) to a vehicle's embedded USB host (such as a USB host in a head unit) via vehicle internal wiring. *Id.*

The USB hub IC also includes three downstream USB ports, one of which is connected to the USB bridge IC. *Id.* Two downstream USB ports of the USB hub IC are connected to the switches, such as multiplexing switches. *Id.* The switches are connected to two USB ports in the vehicle,

for connection to a consumer device. *Id.* The USB bridge effectively controls the switches. *Id.* The USB hub module is configured such that signals received from a USB port are received by the switching device, and the switching device routes the signals to the USB bridge or the USB hub. *Id.*

In the case where the consumer device is acting as a USB host, the USB bridge IC processes the USB packets from the consumer port and provides them to the USB hub IC, thereby rendering the consumer device compatible with the vehicle's embedded USB host. *Id.* The bridge may be bidirectional and pass USB traffic between two USB hosts. *Id.* at 7:54–66. In the case where the consumer device is acting as a USB device, the USB bridge IC controls the switching device such that the switching device provides the USB signaling directly to the USB hub, bypassing the bridge. *Id.* at 6:10–13.

“The architecture illustrated is capable of handling both the operation and data paths associated with the Bridge and the Hub at the same time, thus allowing concurrent operation of consumer devices operating in USB Device mode with consumer devices operating in USB Host mode.” *Id.* at 8:59–63.

D. Challenged Claims

As noted previously, claims 13, 14, and 18–20 of the '420 patent are challenged. Claim 13 is an independent method claim and claim 14 depends from claim 13. Claims 13 and 14 recite:

13. A method of operating a USB hub module having a USB hub configured to be interconnected to a first USB port connected to a USB host and a second USB port connected to a consumer device, a USB bridge interconnected to the USB hub, and a USB routing switch interconnected to the USB bridge, the

USB hub, and the second USB port, said method comprising the steps of:

- determining when the consumer device is operating in a USB host mode and in a USB device mode;
- connecting the consumer device via the second USB port to the USB **hub[host]**² via the first USB port through the USB routing switch and the USB bridge, thereby providing bidirectional initiation of communication between the USB host and the consumer device when the consumer device is determined to be in the USB host mode; and
- connecting the consumer device via the second USB port to the USB **hub[host]** via the first USB port through the USB routing switch and the USB hub thereby bypassing the USB bridge to only respond to communication initiated by the USB host when the consumer device is determined to be in the USB device mode.

14. The method according to claim 13, wherein the step of determining if when the consumer device is operating in the USB host mode or in the USB device mode is performed by the USB routing switch.

Ex. 1003, 10:41–65.

E. Cited Art

Petitioner relies on the following references:

² Claim 13 as issued recites “hub” in both bolded instances. Ex. 1003, 10:51, 10:57. The shown changes to challenged claim 13 are corrections to claim 13 proposed by the Patent Owner in the district court litigation between the parties. *See* Pet. 23–28. Petitioner argues that, if these changes are adopted in the district court litigation, we should adopt these changes and Petitioner presents its unpatentability arguments against the rewritten claim 13. *Id.* The shown changes to claim 13 were adopted by the District Court. Paper 11, 1; Ex. 1080, 7–9. As explained *infra*, we adopt the shown changes to claim 13. *See* Section II.C. (Claim Construction).

U.S. Patent Application Publication No. 2006/0206650
A1, filed August 16, 2005, published September 14, 2006
(Ex. 1014, “Chang”); and

U.S. Patent Application Publication No. 2009/0268743
A1, filed May 22, 2008, published October 29, 2009 (Ex. 1015,
“Chang II”).

F. Asserted Ground

Petitioner challenges claims 13, 14, and 18–20 of the ’420 patent
based on the following ground (Pet. 4):

Claims Challenged	35 U.S.C. §	References
13, 14, 18–20	103 ³	Chang, Chang II

Petitioner filed a Declaration of Eric Welch (Ex. 1013) in support of its
Petition. Patent Owner filed a Declaration of Henry Houh (Ex. 2001) in
support of its Preliminary Response.

II. ANALYSIS

A. Multiple Petitions

As noted above, this is the second Petition filed by the Petitioner
challenging claims of the ’420 patent. *See* Paper 4 (“Petitioner’s
Explanation for and Ranking of Two Petitions Challenging U.S. Patent No.
9,619,420”) (hereinafter “Petitioner’s Explanation” or “PET’s Expl.”).
Petitioner’s Explanation states:

[Petitioner] presents two petitions, each of which applies
the same ground based on two prior art references: U.S. Pat.
Pub. 2006/0206650 (EX1014, “Chang”); and U.S. Pat. Pub.

³ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125
Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102 and 103. Because the
’420 patent is based on a provisional application filed after March 16, 2013
(the effective date of the relevant amendments), the AIA versions of §§ 102
and 103 apply.

2009/0268743 (EX1015, “Chang II”). The petitions differ in respect to the particular claims challenged in each, and only a single ground is presented in each petition. The multiple petitions are justified by the number of claims Patent Owner has asserted in the related district court litigation (*i.e.*, all 20 claims of the ’420 patent), the depth of analysis presented in the petitions, Patent Owner’s belated disclosure to rewrite/correct certain claims, and the petition word limit.

PET’s Expl. 1.

Patent Owner contends that “[b]ecause Petitioner has failed to justify the need for this second . . . Petition, the Board should decline to expend its finite resources considering it.” Prelim. Resp. 1. Patent Owner argues that “[n]either the substance nor the timing of [Patent Owner]’s claim interpretations justifies this second Petition.” *Id.* at 6. We disagree and determine that two petitions challenging claims of the ’420 patent are justified under the circumstances presented here.

With regard to substance of the claim interpretations and merits of the challenge, the claim interpretations offered in the instant proceeding have no relation to the claims or the merits of the challenges that are the subject of the first Petition. As stated by Petitioner, “[t]he petition in IPR2024-00228 challenges claims 1-12 and 15-17” and “[t]here are no overlapping claims in these petitions.” PET’s Expl. 1. Petitioner argues, “[t]herefore, the petitions present materially different challenges, each to a unique subset of ’420 patent claims.” *Id.* We agree that, because of the uniqueness of the claim interpretations asserted in this proceeding that are not at all related to any of the claims challenged in the prior Petition or to any of the challenges asserted in the prior Petition, the instant, second Petition is justified.

In addition, the timing supports the need for a second Petition. At the time the first Petition was filed on December 27, 2023, the District Court had not yet scheduled its claim construction hearing and the Petitioner could not have known when claim construction would be taken up in the district court litigation. *See* PET's Expl. 5 (referencing February 20, 2024, order in the district court litigation setting claim construction hearing for June 21, 2024). The second, instant Petition in which the challenges to the claims are contingent upon claim construction in the district court litigation (*see* Pet. 23–28) was filed on February 27, 2024, one week after the claim construction hearing was set in the district court litigation. Because of the three month statutory deadline for institution decisions (35 U.S.C. § 314 (b)), the institution decision on the first Petition was due on July 18, 2024.⁴ IPR2024-00228, Paper 6, 1. If all the challenges to the claims of the '420 patent that are presented in the first and second petitions had been asserted in the first Petition, we would not have had adequate time to consider the District Court's claim construction Order and Memorandum (Ex. 1080) that was entered on July 12, 2024, and would not have had the benefit of the District Court's consideration and adoption of the corrections to claim 13 (*see* Section II.C. (Claim Construction) *infra*) before having to make our institution decision on the claims challenged here in the instant, second Petition.

For these reasons, we determine that the instant, second Petition challenging claims of the '420 patent was justified.

⁴ Trial was instituted in IPR2024-00228 on July 15, 2024. IPR2024-00228, Paper 13.

B. Discretionary Denial

Petitioner argues that discretionary denial is unwarranted. *See* Pet. 89–92. With regard to discretionary denial pursuant to Section 314(a), Petitioner states that it “hereby stipulates that, if the PTAB institutes this *inter partes* review, Petitioner will not pursue invalidity of the Challenged Claims in a parallel district court proceeding on the same grounds or any grounds that could have reasonably been raised before the PTAB in this Petition.” *Id.* at 90. Our analysis under Section 314(a) is guided by the USPTO Director’s Memorandum issued on June 21, 2022, titled “Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation” (“Director’s Memo”).⁵ Pursuant to the Director’s Memo, we “will not discretionarily deny institution . . . where a petitioner presents a [*Sotera*] stipulation.” Director’s Memo 3 (citing *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential as to § II.A)). Although Patent Owner cites the Director’s Memo and argues for discretionary denial under Section 314(a), Patent Owner fails to provide any reasoning or explanation as to why we should not follow the guidance of the Director. *See* Prelim. Resp. 4. Because Petitioner has offered a stipulation like that in *Sotera*, we do not discretionarily deny institution under Section 314(a).

C. Claim Construction

In an *inter partes* review, our claim construction standard is the same as that of a district court. 37 C.F.R. § 42.100(b). Under the standard applied

⁵ Available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

by district courts, claim terms are generally given their plain and ordinary meaning, as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc).

Petitioner proposes that, for purposes of this proceeding, we adopt Patent Owner’s proposed claim constructions for claims 13, 18, and 19 but, only if, Patent Owner’s proposed constructions are adopted in the district court litigation. Pet. 23 (“[I]f the district court sides with [Patent Owner], Petitioner requests institution of this IPR based on the district court construction.”); 26–27 (“[I]f [Patent Owner]’s position is adopted by the district court, Petitioner requests institution of this IPR based on the district court’s claim construction.”); 27 (“If the district court adopts [Patent Owner]’s constructions, and the Board agrees with them, the Board should institute IPR.”). The challenges to the claims in the Petition are based on Patent Owner’s proposed constructions in the district court litigation. *Id.* at 27–28 (“Petitioner does not contend the Ground herein renders the Challenged Claims unpatentable under the plain and ordinary meaning.”).

Patent Owner does not oppose the use of its claim constructions from the district court litigation in this proceeding. *See* Prelim. Resp. 28. Neither party suggests that any construction beyond that argued and adopted in the district court litigation is necessary. *See* Pet. 21–28; Prelim. Resp. 28.

In the district court litigation, Patent Owner proposed rewriting independent claim 13 by twice replacing “hub” with –host— as shown in claim 13 as reproduced above. *See* Section I.D. (Challenged Claims) *supra*. In the district court litigation, Patent Owner proposed rewriting claim 13 as

shown as a “judicial correction” (*see* Pet. 23 (citing Ex. 1076 (Patent Owner’s Opening Claim Construction Brief), 1–4)) and argued that “[e]ach error would have been obvious to a person of ordinary skill in the art (‘POSITA’) and should be judicially corrected” (Ex. 1076, 1). “Petitioner opposes [Patent Owner]’s attempt to re-write the claims in the district court.” Pet. 23 (citing Ex. 1077 (Petitioner’s Responsive Claim Construction Brief), 7-10). The shown changes to claim 13 were adopted by the District Court. Paper 11 (Notice of District Court *Markman* Order), 1; Ex. 1080 (District Court’s claim construction Order and Memorandum), 1–2, 10–12. The District Court reasoned:

[Patent Owner] says that the claim language contains an obvious error in need of revision because the patent should recite a connection from the consumer device to the "USB host," not the "USB hub." I may correct an error in a patent claim only when it is "evident from the face of the patent." *H-W Tech., LC v. Overstock.com, Inc.*, 758 F.3d 1329, 1333 (Fed. Cir. 2014). I can only order such a correction when it is "(1) ... not subject to reasonable debate based on consideration of the claim language and the specification and (2) the prosecution history does not suggest a different interpretation of the claims." *Novo Indus., LP. v. Micro Molds Corp.*, 350 F.3d 1348, 1357 (Fed. Cir. 2003).

The language of the claim and specification make clear that there’s a scrivener’s error in the claim. Claim 13 is a method claim for determining when the consumer device is operating as a host (and therefore controlling the infotainment unit) or a device (and therefore under the infotainment unit’s control). The invention requires communication between the USB host and the consumer device, which happens across a bridge when both are in host mode. As written, Claim 13 does not allow for that connection between the consumer device and the vehicle’s infotainment system (the USB *host*). Instead, the claim language connects the consumer device to the USB hub via the first USB port. The written connection does not allow

for “bidirectional initiation of communication between the USB *host* and the consumer device” because the connection stops short of the host (ending at the hub). (‘420 Patent at 10:53-54.)

[Patent Owner]’s proposal fixes this issue and is consistent with the invention that the patent discloses. The remainder of the claims provide for communication between the consumer device and the host via the first USB port. The specification summarizes the invention as “provid[ing]^[6] a system which is configured to enable a vehicle’s embedded USB Host system to connect to mobile devices through a USB Hub, regardless of whether the mobile devices are configured to act as USB Hosts or USB Devices” (‘420 Patent at 4:3-7.) Without this correction, the patent’s entire purpose is frustrated.

The need for correction isn’t subject to reasonable debate. [Petitioner] proffers a configuration, but it’s inconsistent with the claim language. The claim requires that the “first USB port” be “connected to [a]^[6] USB host.” (‘420 Patent at 10:42-43.) In [Petitioner]’s diagram, the first USB port is within the routing switch, not connected to it. There’s some indirect link between the first USB port and the USB host, but that’s not consistent with what the claim language requires. The question is not simply whether [Petitioner]’s configuration is operable. What matters is whether a configuration faithful to the claim language is operable. [Petitioner] hasn’t conceived of such a configuration, nor can I. As a result, the claim language and specification make clear on the face of the patent that I should revise the claim language.

Ex. 1080, 10–12.

Our rule relating to claim construction provides that “[a]ny prior claim construction determination concerning a term of the claim in a civil action . . . that is timely made of record in the *inter partes* review proceeding will be considered.” 37 C.F.R. 42.100(b). We have considered the District Court’s claim construction Order and Memorandum (Ex. 1080) that was

⁶ These alterations in original.

timely made of record by Petitioner in this proceeding (Paper 11). Based on our independent review of the '420 claims and specification, we agree with and adopt the reasoning and conclusion of the District Court that claim 13 should be corrected and rewritten as proposed by the Patent Owner and ordered by the District Court. Therefore, we construe claim 13 by twice replacing “hub” with –host— as shown in claim 13 as reproduced above. *See* Section I.D. (Challenged Claims) *supra*.

Claims 18–20 have been dismissed by stipulation and order from the district court litigation. Paper 8, 1 (citing Ex. 1079 (“Stipulation and Order of Partial Dismissal of Claims and Counterclaims”)). And, in accordance with the dismissal of claims 18–20 from the district court litigation, the parties withdrew their requests and contentions relating to construction of independent claim 18 and dependent claim 19 in the district court. *See* Corrected Joint Claim Construction Brief (*Aptiv Technologies AG v. Microchip Technology Inc.*, Case No. 1:23-cv-00307-JDW, Dkt. 198, 1 n.1 (D. Del. June 18, 2024)). The District Court did not construe claims 18 and 19. *See generally* Paper 11. The challenges to claims 18–20⁷ were based upon changes to claims 18 and 19 being adopted in the district court litigation. Pet. 26, 73, 85. As this contingency has not been met, we do not adopt the constructions of claims 18 and 19 proposed in the Petition.

We determine that no additional claim terms require express construction. *See, e.g., 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

⁷ Claim 20 depends indirectly from claim 18 and directly from claim 19. Ex. 1003, 12:42.

controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Legal Standards

A claim is unpatentable under 35 U.S.C. § 103 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 to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness 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) where in evidence, so-called secondary considerations.⁸ *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We also recognize that prior art references must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)).

E. Level of Ordinary Skill in the Art

Citing testimony from Mr. Welch, Petitioner contends:

⁸ Petitioner addresses arguments regarding secondary considerations that Patent Owner raised in related district court litigation. *See* Pet. 86–89. Patent Owner makes arguments regarding failure by others and commercial success. Prelim. Resp. 13–23. However, Patent Owner does not map the challenged claims to any product, or otherwise show the required nexus. *See id.* We have considered the parties’ arguments. We determine that, at this stage of this proceeding, the record and the evidence as to secondary considerations is not sufficiently articulated and developed. We will reconsider the secondary considerations arguments and evidence as part of the fully-developed and complete record, if necessary and appropriate, prior to making any decision on obviousness.

A POSITA at the time of the alleged invention would have been well-versed in USB standards (including the USB 2.0 and 3.0 Specifications and the OTG Supplement) and the design/deployment of USB hosts, USB devices, and USB hubs, including suitable environments for USB systems. A POSITA would also have had a working understanding of network/communication architectures (*e.g.*, master/slave) and components (*e.g.*, host-to-host bridges), computer hardware and peripherals, computer programming, and the design/implementation of communication software/firmware/drivers in standard operating systems (*e.g.*, Windows and Linux) and embedded systems.

A POSITA would have had at least a four-year degree in electrical engineering, computer engineering, computer science, or a related field and substantial experience (*e.g.*, several years) designing USB systems, including USB hosts, USB hubs, and USB devices. A relevant advanced degree may substitute for some work experience. Similarly, relevant work experience may substitute for formal education.

Pet. 22–23 (citations omitted).

Patent Owner argues Petitioner’s definition should be rejected because Petitioner’s definition is heightened from its proposed definition of a POSITA in co-pending district court litigation. Prelim. Resp. 23.

Specifically, Patent Owner argues that “Petitioner’s POSITA definition in these proceedings “requires familiarity with a litany of specific documents and standards absent from Petitioner’s POSITA definition in parallel district court litigation.” *Id.* n.11 (citing Ex. 2016 ¶¶ 32–33). Patent Owner proposes “a POSITA would have had a bachelor’s degree in computer science, electrical engineering, or an equivalent, and two years of professional experience working with computer network protocols such as USB and states that “[l]ack of work experience can be remedied by additional education, and vice versa.” *Id.* at 23 (citing Ex. 2001 ¶ 26).

The parties agree that a POSITA would have a four year or bachelor's degree in electrical engineering or computer science and professional experience related to USB. *Compare* Pet. 22–23 *with* Prelim. Resp. 23. And, the parties also agree that a relevant advanced degree or additional education may take the place of at least some work experience and work experience may take the place of some formal education. *Id.* Petitioner contends that a POSITA would have more familiarity with USB related documents and system than contended by Patent Owner. We need not, and do not, resolve this dispute between the parties at this preliminary stage in this proceeding. We invite the parties to further address this issue, if they deem it necessary and appropriate.

For purposes of this Decision, we adopt Patent Owner's definition of the level of ordinary skill in the art. It appears consistent with what is reflected by the content of the applied prior art references. *Cf. Okajima v. Bourdeau*, 261 F.3d 1350, 1354–55 (Fed. Cir. 2001) (the applied prior art may reflect an appropriate level of skill). Accordingly, at this point, we consider the arguments and the evidence from the standpoint of such a skilled artisan. If a POSITA was considered to have the additional work experience with USB systems and familiarity with USB standards as proposed by Petitioner and the level of skill was enhanced, our Decision to institute trial would be further supported. However, our Decision to go forward with trial is supported by either of the definitions offered by the parties.

F. Obviousness Based on Chang and Chang II

Petitioner contends that claims 13, 14, and 18–20 would have been obvious over Chang in view of Chang II and POSITA knowledge. Pet. 4, 36–87. Patent Owner opposes institution. See Prelim. Resp. 29–48.

We provide summaries of Chang and Chang II and then analyze the arguments and evidence of the parties relating to the merits of the presented challenges to the claims.

1. Chang (Ex. 1014)

Chang relates to “a hub and more particularly to a hub with a host-to-host transmission function.” Ex. 1014 ¶ 1. An object of the Chang invention is to provide a host-to-host transmission function. *Id.* ¶ 4.

Figure 2 illustrates a conventional USB hub and is reproduced below. *Id.* ¶ 13.

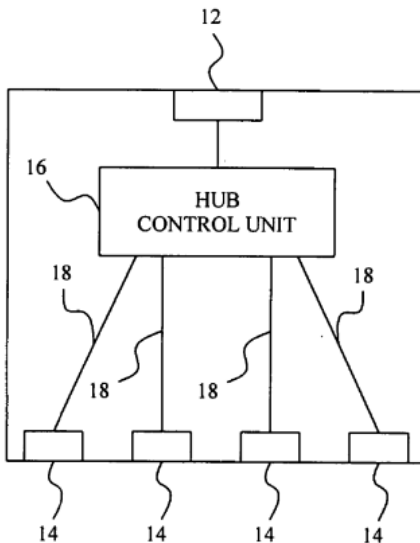


Figure 2 depicts a USB hub including uplink port 12 for being linked to a host, downlink ports 14 for being linked to other devices, and hub control unit 16. *Id.* ¶ 18. In the USB hub, several transmission paths 18 may be established such that uplink port 12 can communicate with each downlink

port 14 such that uplink port 12 can communicate with devices linked to each downlink port 14 via hub control unit 16. *Id.*

Chang summarizes the invention as:

a hub with a host-to-host transmission function comprises a hub control unit, an uplink port connected to the hub control unit for being linked to a first host, a host port for being linked to a second host, and a bridge connected between the host port and hub control unit for the first and second hosts to communicate with each other.

Id. ¶ 5.

Figure 3 illustrates a hub according to the Chang invention and is reproduced below. *Id.* ¶ 19.

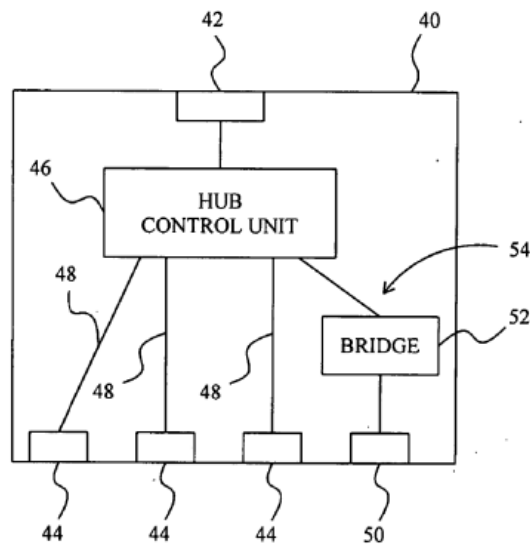


Figure 3 depicts hub 40, uplink port 42 for being linked to a host, several downlink ports 44 for being linked to devices, and hub control unit 46 for establishing several transmission paths 48 between uplink port 42 and downlink ports 44 such that the host linked to uplink port 42 can communicate with the devices linked to downlink ports 44. *Id.* Hub 40 further comprises host port 50 for being linked to a host, and bridge 52 connected between hub control unit 46 and host port 50. *Id.* ¶ 20. Bridge 52

provides a function for host-to-host communications, and may be implemented with a bridge chip, for example, OTi2108 of Ours Technology Inc. or other host-to-host transmission chip. *Id.* ¶¶ 20, 22, 24.

2. *Chang II (Ex. 1015)*

Chang II relates to “a bridge device for transmitting data; and more particular to a data transmission bridge device and control chip thereof for transmitting data that adopts USB specification, and can utilize switching to bridge between two host devices for transmitting data.” Ex. 1015 ¶ 2.

Chang II states that the invention:

solve[s] the technical limitation of the prior art, by designing a data transmission bridge device and control chip thereof for transmitting data between two nearby hosts; wherein the device would automatically detect the connecting device type and accordingly switch between different transmission paths, which would not only allow for support of data transfer between a host device and a slave device, but also can directly support data transfer between two host devices.

Id. ¶¶ 11, 12.

Figure 1 is a schematic diagram for a data transmission bridge device and control chip thereof for transmitting data according to the Chang II invention and is reproduced below. *Id.* ¶ 15.

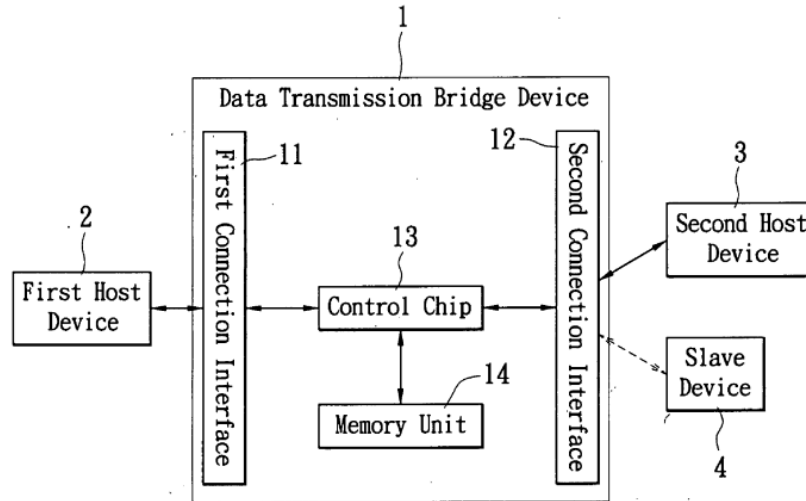


Figure 1 depicts data transmission bridge device 1 including first connection interface 11 for connecting to first host device 2, second connection interface 12 for connecting to second host device 3 or slave device 4, control chip 13 enabling connection to a detected host/slave device, and memory unit 14 for storing control data. *Id.* ¶¶ 22, 23.

Figure 5 is a schematic diagram for a control chip 13 within data transmission bridge device 1 for transmitting data according to the Chang II invention and is reproduced below. *Id.* ¶¶ 19, 34.

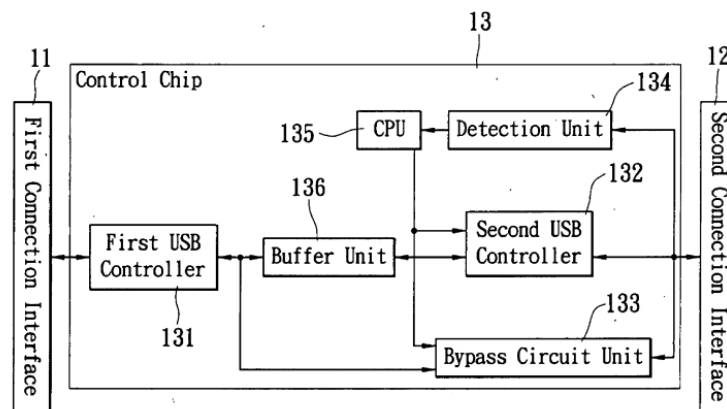


FIG. 5

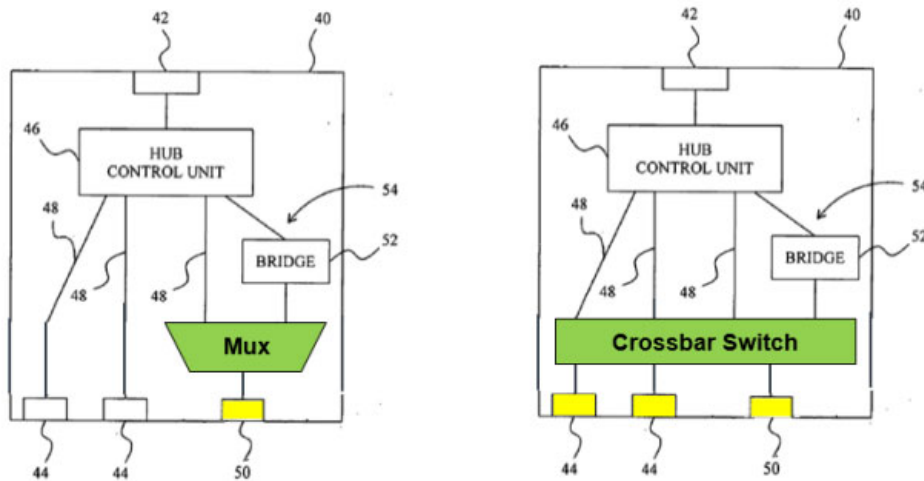
Figure 5 depicts control chip 13 for data transmission bridge device 1. *Id.* ¶ 34. Chip 13 includes first USB controller 131, second USB controller 132,

bypass circuit unit 133, detection unit 134, central processing unit (CPU) 135, and buffer unit 136. *Id.* The data transmission bridge device “by automatically detecting the type of connected device to switch between the proper transmission path, can not only support data transmission between a host device and a slave device, but can also directly support data transmission between two host devices.” *Id.* ¶ 46.

3. Claim 13

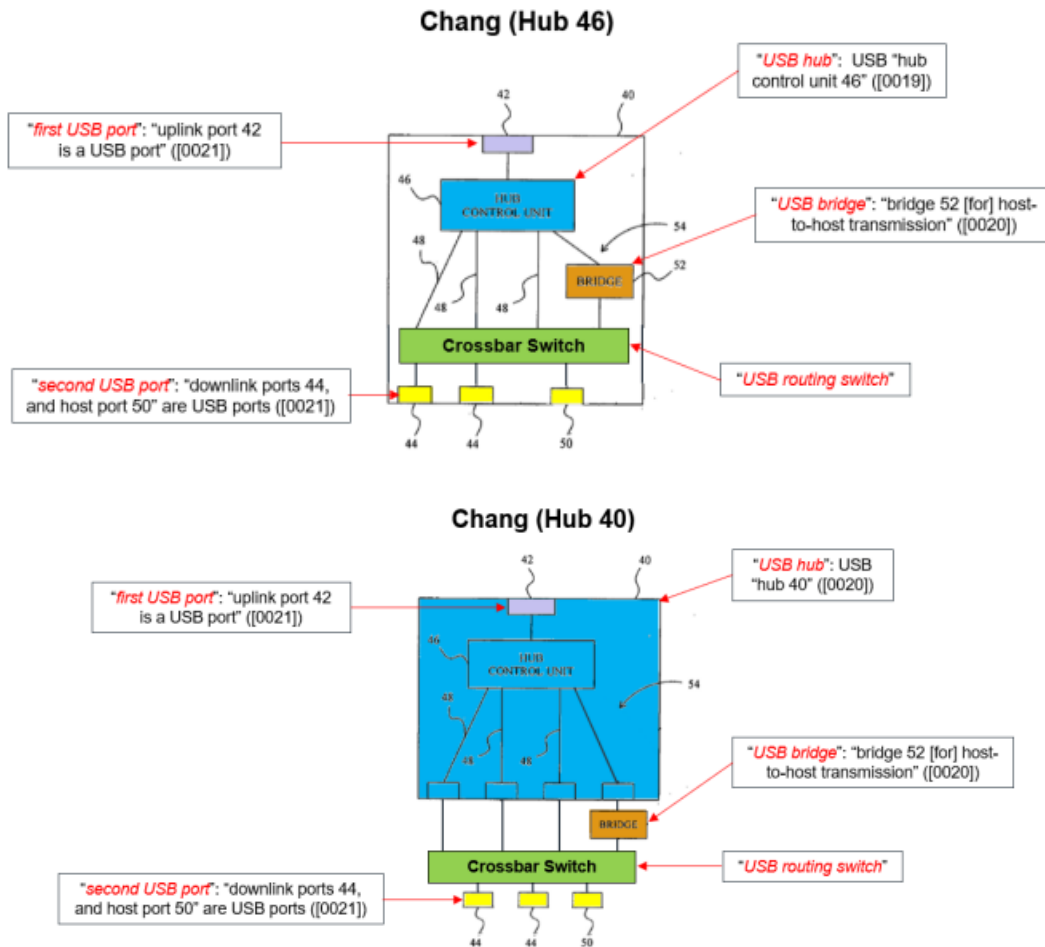
a. Overview of Petitioner’s Showing

Petitioner contends that there are two obvious implementation options for modifying Chang’s Figure 3 that are shown in the figures reproduced below. Pet. 42–45.



As depicted in the figure on the left, above, an added 2:1 multiplexer (Mux) serves as a switch (directing signals to bridge 52 or bypassing bridge 52) and port 50 serves as a dual-role port 50. *Id.* As depicted in the figure on the right, above, an added crossbar switch serves as a switch (directing signals to bridge 52 or bypassing bridge 52) and each of ports 44 and 50 serves as a dual-role port. *Id.*

Petitioner argues the right-hand crossbar implementation comes in two variations. Pet. 45–47. In one version (Chang (Hub 46)) the crossbar is inside hub 40 and in another version (Chang (Hub 40)) the crossbar is outside hub 40. *Id.* The Chang (Hub 46) implementation and the Chang (Hub 40) implementation are reproduced below.



The Chang (Hub 46) implementation and the Chang (Hub 40) implementation are shown above along with Petitioner’s mapping of claim 13 to each implementation. Pet. 48–49.

b. Limitation-by-Limitation Analysis⁹

A method of operating a USB hub module having a USB hub configured to be interconnected to a first USB port connected to a USB host and a second USB port connected to a consumer device, a USB bridge interconnected to the USB hub, and a USB routing switch interconnected to the USB bridge, the USB hub, and the second USB port, said method comprising the steps of:

Petitioner does not take a position as to whether the preamble of claim 13 is limiting. Pet. 49 (“If limiting, Ground 1 satisfies the preamble.”). The Petition provides a showing that all the components recited in the preamble of claim 13 are taught by the cited art. *See* Pet. 49–58 (citing Ex. 1013 (Welch Decl.) ¶¶ 191–200, 224–244; Ex. 1014 (Chang) ¶¶ 16, 19–22, Figs. 1, 3, 5; Ex. 1015 (Chang II) ¶¶ 21, 24, 34, 37, 38, 40, Figs. 1, 5).

Patent Owner does not address whether the preamble of claim 13 is limiting and does not dispute the showing in the Petition as to the preamble. *See generally* Prelim. Resp.

On the current record, we need not determine if the preamble is limiting. Even if the preamble is limiting, the showing in the Petition establishes that the cited art teaches all the elements recited in the preamble of claim 13.

determining when the consumer device is operating in a USB host mode and in a USB device mode;

Petitioner relies on Chang II (Ex. 1015) as disclosing this step. Pet. 58–59 (citing Ex. 1013 (Welch Decl.) ¶¶ 245–249; Ex. 1015 (Chang II) ¶¶ 13, 25–27, 38–40, 42–46, Figs. 5, 6). Petitioner points to the detection

⁹ In our analysis of claim 13, we incorporate into claim 13 the corrections discussed above (*see* Section II.C. (Claim Construction)) as does the showing in the Petition for claim 13 (*see* Pet. 60, 65).

unit 134 depicted in Figure 5 of Chang II as making the recited determination. (*id.* at 59) and paragraphs 38–40 of Chang II as “describ[ing] operational details of detection unit 134.” Paragraph 13 of Chang II provides:

[T]he detection unit will automatically operate to switch between a virtual host state and a virtual slave state, wherein the states are used to determine the type of device connected with the second connection interface, and a detection signal is produced accordingly, and the detection signal will be received by the CPU, and the CPU will accordingly control the second USB controller (host to host data transfer) or the bypass circuit unit (host to slave data transfer) for the appropriate operation.

Ex. 1015 ¶ 13. Paragraph 38 of Chang II provides:

The Detection unit 134 is also connected to the second connection interface 12, and the detection unit 134 will automatically operate to switch between a virtual host state and a virtual slave state, wherein the states are used to determine the type of device currently connected with the second connection interface 12, and a detection signal (bridging detection signal or slave detection signal) is produced accordingly. On the other hand, the CPU 135 is for receiving the detection signal, and then according to the detection signal controls the operation of either the second USB controller 132 or the bypass circuit unit 133.

Id. at ¶ 38; *see also id.* at ¶¶ 26–27, 46.

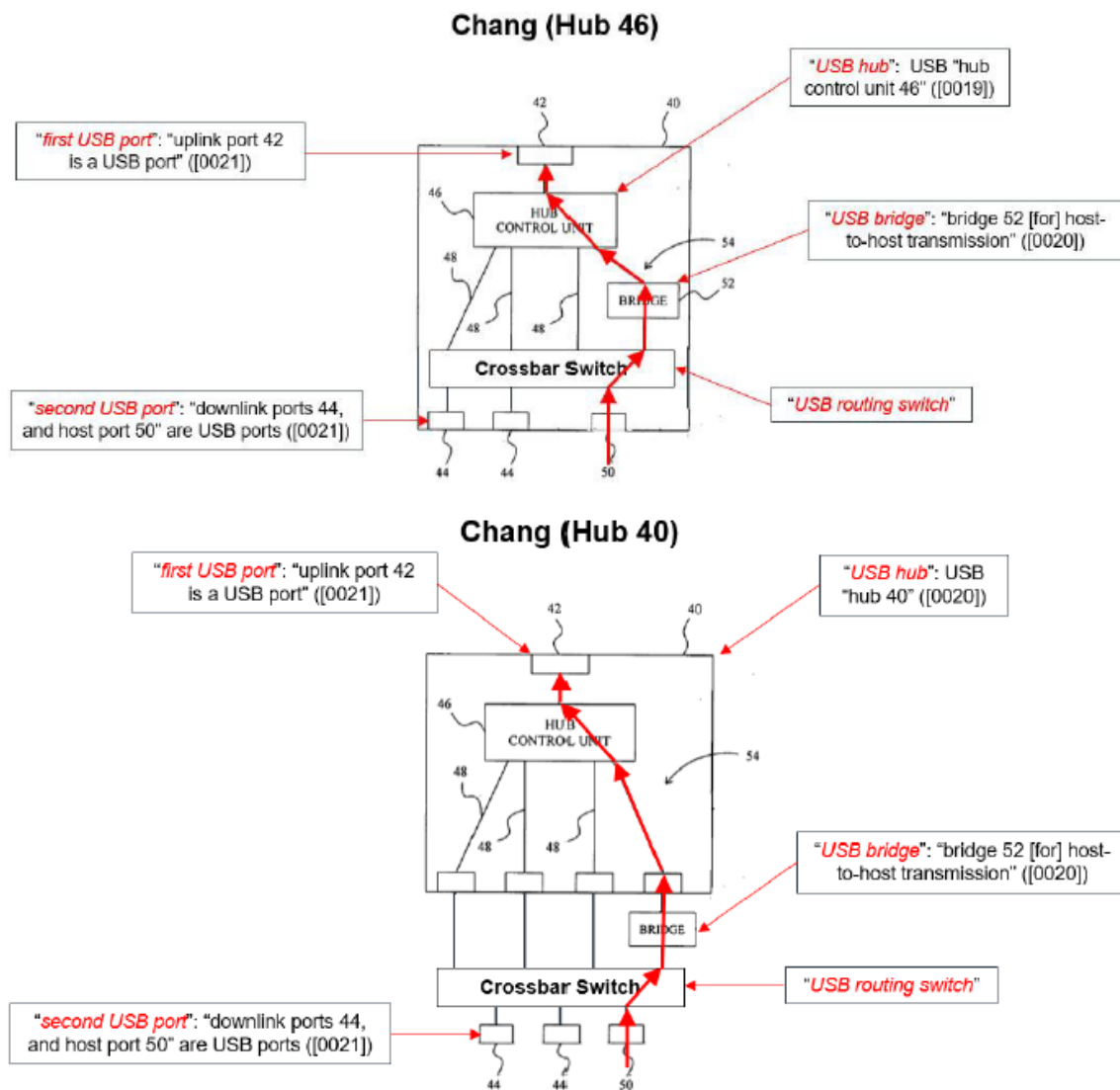
Patent Owner does not dispute Petitioner’s showing for this step. *See generally* Prelim Resp.

We determine that the cited art teaches this step.

connecting the consumer device via the second USB port to the USB host via the first USB port through the USB routing switch and the USB bridge, thereby providing bidirectional initiation of communication between the USB host and the

consumer device when the consumer device is determined to be in the USB host mode; and

Petitioner contends that the recited language, “*when the consumer device is determined to be in the USB host mode,*” “refers to a USB product in host mode.” Pet. 60. Accordingly, Petitioner interprets this step as reciting making a host-to-host connection between a USB host connected to the first USB port and a consumer device connected to the second USB port also acting as a USB host. *See, e.g., id.* at 62 (providing modified and annotated versions of Ex. 1014 (Chang), Fig. 3 (reproduced below).



These figures from the Petition depict “red arrows show[ing] host-to-host communication paths . . . ‘connecting the consumer device via the second USB port [e.g., port 50] to the USB [host] via the first USB port [port 42] through USB routing switch [crossbar] and the USB bridge [bridge] . . . when the consumer device is determined to be in the USB host mode.’” *Id.* at 62–63 (first two alterations added; remaining alterations in original).

With regard to “thereby providing bidirectional initiation of communication between the USB host and the consumer device when the consumer device is determined to be in the USB host mode,” the Petition states that “the ‘routing switch’ accomplishes this by connecting the hosts through the ‘bridge’” (Pet. 63) and the “host-to-host communication is bi-directional communication because each host is a standard USB host that may initiate host communications (*id.* at 64 (citing Ex. 1013 (Welch Decl.) ¶¶ 256–257; Ex. 1014 (Chang) ¶ 20; Ex. 1015 (Chang II) ¶ 26)). Cited paragraph 20 of Chang provides:

[T]he hub 40 further comprises a host port 50 for being linked to a host, and a bridge 52 connected between the hub control unit 46 and host port 50. The bridge 52 **provides a function for host-to-host communications**, and may be implemented with a bridge chip for example OTi2108 of Ours Technology Inc. or other **host-to-host transmission chip**. With the hub control unit 46 and bridge 52, **a host-to-host transmission path 54 may be established** such that the uplink port 42 may communicate with the host port 50. As such, the host linked to the uplink port 42 can communicate with the host linked to the host port 50. The **host-to-host transmission mechanism** is a prior art, and is not described in detail hereof.

Ex. 1014 ¶ 20 (emphasis added). Cited paragraph 26 of Chang II provides:

Similarly, when a current user is connecting the second host device 3 with the second connection interface 12, and the

control chip 13 is switched to the virtual slave device state for the second connection interface 12, there will also be an inquire signal produced by the control chip 13 to the second host device 3, then once the second host device 3 responds, by the response confirmation can be made that the device connected to the second connection interface 12 is also a host, so that the control chip 13 will switch the transmission path to the bridge transmission path, in order to successfully complete the bridging between the first host device 2 and the second host device 3, so that **data transfer can proceed between the two host devices.**

Ex. 1015 ¶ 26 (emphasis added). These passages establish that both Chang and Chang II teach bi-directional host-to-host communication.

Patent Owner disputes the showing for this limitation. See Prelim. Resp. 42–48. Specifically, Patent Owner contends that “Petitioner fails to produce evidence that Chang, modified as proposed, would include a bridge that enables ‘bidirectional initiation of communication’ as claimed.” *Id.* at 48. This argument lacks merit. As shown above, the Petition contains a showing supported by evidence, including both Chang (Ex. 1014) and Chang II (Ex. 1015), that this limitation is taught by the cited art. *See* Pet. 63–65.

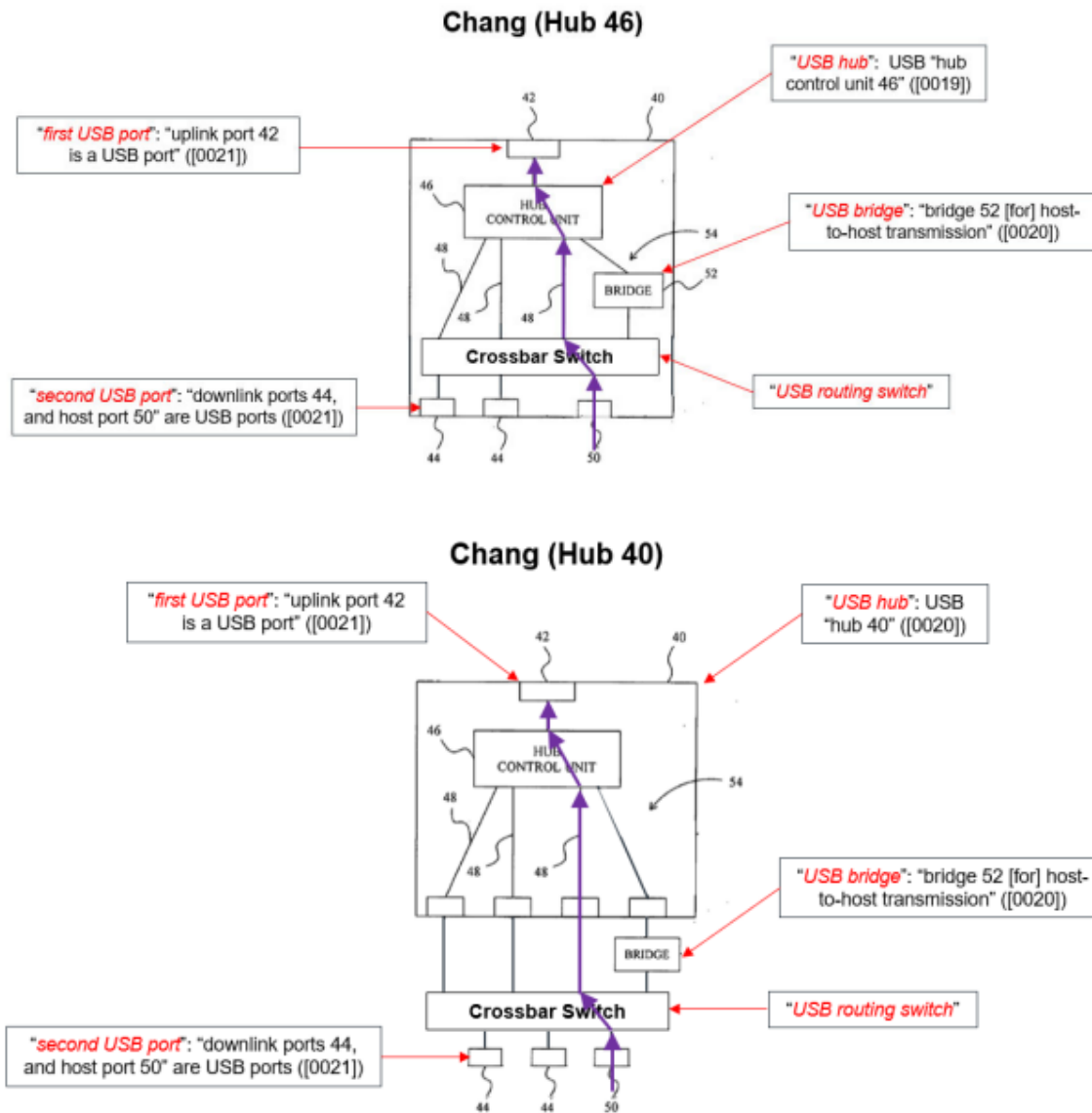
Moreover, in its Preliminary Response, Patent Owner also cites to paragraph 20 of Chang and acknowledges that “Chang’s dedicated host port and bridge allow for **host-to-host transmission** between a first host device (such as a computer) connected to an uplink port and a second host device (such as another computer) connected to the dedicated host port.” Prelim. Resp. 26 (citing Ex. 1014 ¶ 20) (emphasis added); *see also id.* at 24 (“Chang’s bridge . . . provides simple host-to-host data transmission.”), 41

(“Chang already provides a way to accomplish . . . host-to-host . . . communication.”).

We determine that the cited art teaches this step.

connecting the consumer device via the second USB port to the USB host via the first USB port through the USB routing switch and the USB hub thereby bypassing the USB bridge to only respond to communication initiated by the USB host when the consumer device is determined to be in the USB device mode.

Petitioner contends that this step “pertains to system operation when the consumer product is in the device mode.” Pet. 65–66. Accordingly, Petitioner interprets this step as “requir[ing] a host-to-device connection between upstream host and downstream consumer product (in device mode), where the signal/connection path traverses the ‘second USB port,’ ‘routing switch,’ ‘hub,’ and ‘first USB port,’ but ‘bypass[es] the USB bridge.’” *Id.* at 66 (second alteration in original). The Petition includes a showing that all the elements of this step are taught by the cited art. *Id.* at 65–69 (citing Ex. 1013 (Welsh Decl.) ¶¶ 261–266; Ex. 1014 (Chang) ¶¶ 19, 20, 23, Fig. 3; Ex. 1015 (Chang II) ¶ 30, Fig. 1). The Petition also provides modified and annotated versions of Ex. 1014 (Chang), Fig. 3 (reproduced below). *Id.* at 68.



These figures from the Petition depict “a host-device connection (purple arrows) between the first/upstream and second/downstream ports which ‘bypass[es] the USB bridge.’” *Id.* (alteration in original).

With regard to “*only respond[ing] to communication initiated by the USB host,*” the Petition states that “[t]his is traditional USB host/device operation and it was well-known USB devices only respond to host communication.” *Id.* at 69 (citations omitted).

Patent Owner does not dispute Petitioner’s showing for this step. *See generally* Prelim Resp. Moreover, the “Background” section of the ’420 patent in describing how USB systems historically operate states:

USB protocols require a point-to-point connection in which one end is the USB Host or master, and the other end is a USB Device or slave. In this way, the flow of messages between the two devices is managed and controlled, whereby the USB Device responds to messages initiated by the USB Host.

Ex. 1003, 1:33–38. And, Patent Owner acknowledges that “[t]he Chang hub also comprises a number of downlink ports for linking devices connected to the downlink ports to Chang’s uplink port” and “[t]he downlink ports allow for host-to-device transmission between devices connected to the downlink ports and a host device connected to the uplink port.” Prelim Resp. 26 (citing Ex. 1014 (Chang) ¶ 19).

We determine that the cited art teaches this step.

c. Motivation to Combine

With regard to combining the teachings of Chang and Chang II, Petitioner argues:

Chang discloses a hub with dedicated downstream device ports (for host-device connections) and a dedicated downstream host port (for a host-host connection through a bridge). It would have been obvious to modify Chang in view of Chang II and a POSITA’s knowledge to include dual-role port(s)^[10] and a switch to route the ports to the appropriate transmission path.

¹⁰ Petitioner describes a dual-role port as “a port supporting products that could operate in either a host or device mode.” Pet. 2. Patent Owner describes dual-role ports as “ports designed to accommodate a device regardless of whether it was operating in device or host mode.” Prelim. Resp. 33 (citing Ex. 2001 ¶ 46).

Pet. 36–37 (citing Ex. 1013 ¶¶ 175–202). Patent Owner challenges Petitioner’s showing on motivation to combine. *See* Prelim. Resp. 29–42.

With regard to motivation to modify Chang to include dual-role ports, Petitioner contends that “[a]s the ’420 patent admits, consumer products (*e.g.*, smartphones and other mobile device[s]) with dual-role capabilities were gaining popularity before the 2013 priority date” and “it would be impractical, and inconvenient at best, to require consumers to understand when to switch connections between host- and device-ports when using a dual-role product.” Pet. 37. Thus, according to Petitioner, “a POSITA would have been motivated to combine Chang’s dedicated device- and host-ports to create one or more dual-role ports.” *Id.* at 37 (citing Ex. 1013 (Welch Decl.) ¶ 177). The Specification of the ’420 patent provides support for this argument in this passage:

[L]eading mobile device manufacturers and system designers have begun designing their mobile device products (*i.e.* smart phones, tablets, etc.) to support both USB Host and USB Device roles. In other words, the phone may configure itself such that it can function as a USB Device when it needs to be, or as a USB Host when it needs to be.

Ex. 1003, 2:56–62. We determine that this contention seems reasonable in view of the market demands acknowledged in the Specification. *KSR*, 550 U.S. at 418 (“Often it will be necessary for a court to look to . . . the effects of demands known to the design community or present in the marketplace . . . to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.”).

Petitioner also contends that “modifying Chang to include dual-role ports would further its express goal of ‘easily establishing a connection between a computer and another computer.’” Pet. 38 (citing Ex. 1014 ¶ 3).

And, Petitioner relies on the acknowledgement in the '420 patent that prior art smartphones dynamically operated as either device or host, with host operation resulting from the fact that smartphones had effectively become personal computers.” *Id.* (citing Ex. 1003, 2:40–46). The Petition states:

[A] POSITA would have been motivated to include dual-role port(s) to further Chang’s goal of connecting the upstream computer to the downstream phone acting as a computer. Welch, ¶178. Specifically, dual-role ports would allow consumer products, such as smartphones, that operate as computers (in host mode) to “easily establish[] a connection” (EX1014, [0005]) to the upstream host; the smartphone would plug into the dual-role port and automatically connect to the upstream host (through the bridge) when the smart phone switches to host mode . . . without requiring the user to switch between dedicated host- and device-ports. Welch, ¶¶178-179.

Id. According to Petitioner with supporting testimony of its declarant, “[t]his avoids the inconvenience, hassle, and confusion of consumers having to keep track of (1) what mode their phone is operating in and (2) what mode(s) are supported by individual hub ports.” *Id.* (citing Ex. 1013 (Welch Decl.) ¶ 179). Here again, we determine that this reasoning provides rational underpinning, supported by evidence, that a skilled artisan would have been motivated to modify the USB hub module of Chang to include dual-role ports as described in Chang II.

And, Petitioner still further contends that “[o]ne common-sense reason it was desirable and obvious to a POSITA to make all downstream ports dual-role is user convenience (*viz.*, users need not know or recall which port to use for host-mode operation or keep track of whether their product is in device- or host-mode)” (Pet. 43 (citing Ex. 1013 ¶ 179)) and “[m]oreover, it was well-known and obvious to include multiple dual-role hub ports” (*id.*

(citing Ex. 1013 ¶¶ 195–197)). In support of the contention that including dual-role hub ports was well-known and obvious, Petitioner cites two references. *Id.* at 43–44 (citing Ex. 1016 ¶¶ 5, 24, 27 (products on ports may act as device or host), Fig. 2 (depicting five ports); Ex. 1017 ¶¶ 55–56 (ports support host and device modes), Fig. 6)).¹¹ We determine that this reasoning also supports with evidence modifying Chang to include dual-role ports as taught by Chang II.

Petitioner contends that “[a] POSITA would have had a high expectation of success in modifying Chang to include dual-role ports.” Pet.

39. In support of this contention, Petitioner argues:

[D]ual-role ports (*viz.*, interfaces for connecting dual-role products) and host/device detection were already well-known, and merely involved using commercially available components and well-understood signaling. *See also* EX1025, 3:10-32, 3:40-4:8, 7:34-40; EX1052, 3:21-50. Again, the ’420 patent admits several solutions for supporting dual-role ports in USB systems were readily available. EX1005, 3:21-59; *see also* Welch, ¶183.

Id. And, Petitioner also argues:

A POSITA would have been motivated to implement each of Chang’s downstream consumer ports as dual-role ports with a high expectation of success. Indeed, the typical consumer product was often a dual-role product, the implementation was well-known and routine, and doing so reduced the cost and footprint of the hub and was more convenient to the user.

¹¹ Exhibit 1016 also discloses a “port switching device” attached to its multiple ports (*see* Pet. 43) and Exhibit 1017 also discloses a “Port Router” attached to its multiple ports (*see* Pet. 44 (Exhibit 1017 “discloses that ‘Port Router’ may be a ‘crossbar switch for assigning each physical port to the respective port handler.’”))).

Pet. 45 (citing Ex. 1013, ¶¶ 69–73, 194–199). Patent Owner does not dispute that Petitioner has shown a reasonable expectation of success in modifying Chang to include dual-role ports. *See generally* Prelim. Resp.

With regard the motivation to modify Chang to include a switch to route the transmissions to and from a device attached to a downstream port through an appropriate transmission path to and from the upstream port with an attached host device, Petitioner relies on similar arguments and reasoning. The Petition states that “[w]hen multiple ports are dual-mode, it was well-known and obvious to a POSITA to include basic switching functionality to route each port to the appropriate transmission path.” Pet. 44.

Petitioner contends that “[a] POSITA would have recognized that Chang effectively provides a roadmap to implement switching to support dual-role ports.” Pet. 39. In support of this contention, Petitioner points to Chang’s teachings of “separate transmission paths for host-to-host (‘host-to-host transmission path 54’) and host-to-device connections (‘transmission paths 48’)” (*id.* at 39–40 (citing Ex. 1014 ¶¶ 19–20, Fig. 3) and Chang II’s teachings of “switching functionality to select the appropriate transmission path depending on the consumer product operating mode, *e.g.*, ‘host-to-host transmission path 54’ or ‘transmission paths 48’” (*see id.* at 40; Ex. 1015 ¶¶ 2, 11, 21, 24). Petitioner also contends that “switching transmission paths was highly predictable, being well-known and routine to implement using readily available off-the-shelf components.” Pet. 57 (citing Ex. 1013 ¶¶ 237–238; Ex. 1059, Ex. 1060, Ex. 1063, 7–8; Ex. 1068 (2); *see also* Ex. 1017 ¶ 57, Fig. 1; Ex. 1040, 4:39–5:29; Ex. 1041, 1:20–36; Ex. 1052, 3:7–

20, Fig. 1; Ex. 1053 ¶¶ 31–34, Fig. 1; Ex. 1055, 284–288). Based on this reasoning and evidence, Petitioner argues that:

Accordingly, in the context of Chang, a POSITA would have been motivated to implement dual-role ports by including a switch (*e.g.*, multiplexer or crossbar) that connects the dual-role port(s) directly to the hub’s upstream port (when the consumer product is configured as a device, *i.e.*, path 48) or to the hub through the bridge (when the consumer product is configured as host, *i.e.*, path 54).

Id. at 40–41 (citing Ex. 1013 ¶¶ 182–187). Petitioner’s argument that a skilled artisan would have been motivated to modify Chang to include switching functionality as taught by Chang II and supported by other substantial evidence appears well-reasoned and well-supported.

Petitioner argues that “[a] POSITA would have been further motivated to improve Chang in view of Chang II, because Chang II expressly states its relevance to USB hubs.” Pet. 41 (citing Ex. 1013 ¶ 181; Ex. 1015 ¶¶ 27, 40). And, Petitioner argues that “while Chang discloses little regarding its bridge (EX1014, [0020]), Chang II details various aspects of its bridge (EX1015, Title, Figs. 1-2 and 5).” *Id.* In support of this argument, the Petition provides:

Importantly, Chang II further details exemplary switching for either a host- or device-product: “the main feature is the provision of two different transmission paths, so that by automatically detecting the type of device connected (host or slave) the present invention can switch to the proper transmission path.” EX1015, [0021]. In other words, Chang II describes “switch[ing]” to connect a “bridge” transmission path (when the product is host) or “bypass” path (when the product is device). *Id.*, Figs. 1, 5, [0013]. And Chang II further discloses “detection unit 134” for detecting whether the consumer product is host or device. *Id.*, [0038].

Id. (bracketed material in original, footnote omitted). Petitioner contends that “[a]ccordingly, a POSITA would have been motivated, with a high expectation of success, to route the dual-role ports (and products attached thereto) to the appropriate path using a switch.” *Id.* at 41–42. We determine that this contention is well-reasoned and well-supported.

Patent Owner challenges on several grounds the showing regarding the motivation to combine the relevant teachings of Chang and Chang II. Prelim. Resp. 29–42. Generally, Patent Owner argues that “[i]nstead of establishing a motivation to combine Chang and Chang II, however, Petitioner relies on the general existence of dual-role devices and its expert’s say-so as the foundation for its hindsight-based combination.” *Id.* at 29. This criticism is not valid. As shown above, Petitioner relies on much more than the “general existence of dual-role devices and its expert’s say-so.” Petitioner (and its declarant, Mr. Welch) provide several well-articulated reasons that are well-supported by cited evidence to establish that a skilled artisan would have been motivated to make the combination of teachings alleged in the Petition.

Patent Owner argues that “Petitioner presents no evidence that a POSITA would be motivated to ‘modify Chang in view of Chang II and a POSITA’s knowledge to include dual-role port(s)’ for use with dual-role devices.” Prelim. Resp. 30. This criticism is also not valid. As shown above, Petitioner presents sufficient evidence to support modifying Chang in view of Chang II to include dual-role ports. Additionally, Patent Owner’s argument is based on the mistaken premise that the claims of the ’420 patent require a dual-role device. *See* Prelim. Resp. 33. Patent Owner relies on Dr. Houh’s testimony to establish this mistaken premise. *See id.* (citing Ex.

2001 ¶ 46). However, in paragraph 46 of his declaration, Dr. Houh never discusses or analyzes the claims of the '420 patent and does not state that the claims require a dual-role device. *See* Ex. 2001 ¶ 46.¹² There is no merit to this argument as it is directed to a combination not asserted in the Petition and is not commensurate in scope with the challenged claims of the '420 patent.

Patent Owner contends that “[a] POSITA would not have considered using Chang II to modify Chang because adding steps and components to Chang as Petitioner proposes would only have complicated Chang’s design and frustrated Chang’s ‘express goal’ of ‘easily establishing a connection between a computer and another computer.’” Prelim. Resp 35 (citing Ex. 2001 ¶ 67). Modifying Chang to include dual-role ports and a USB router switch would have added steps and components, but also would have increased the usefulness and provided benefits to the Chang system. As discussed above, Petitioner, and its expert declarant, articulate well-supported reasoning as to why the proposed modifications to Chang, based on teachings in Chang II, would increase usefulness and provide benefits. *See* Pet. 36–48. Even if modifying Chang as proposed would have somewhat complicated Chang’s design, “precedent . . . does not require that the motivation be the *best* option, only that it be a *suitable* option from which the prior art did not teach away.” *PAR Pharm., Inc. v. TWI Pharmas.,*

¹² In cited paragraph 46, Dr. Houh testifies, based on the Specification of the '420 patent, that “*the ports are ‘dual-role’* such that the device can be connected regardless of its USB mode, or even handle the same device changing modes.” Ex. 2001 ¶ 46 (citing Ex. 1003, 4:20–22 (“[T]he system is able to dynamically switch the device connection between USB Device mode and USB Host mode when desired.”)).

Inc., 773 F.3d 1186, 1197–1198 (Fed. Cir. 2014) (emphasis in original). And, Petitioner’s proposed modifications to Chang (dual-role ports and a USB routing switch) would not prevent the apparatus disclosed in Chang from “easily establishing a connection between a computer and another computer.” Patent Owner’s contention is contrary to Petitioner’s contention, and its declarant’s testimony, that its proposed modifications to Chang “would further its express goal of ‘easily establishing a connection between a computer and another computer.’” Pet. 38 (citing Ex. 1013 ¶¶ 178–179; Ex. 1014 ¶ 3). We have considered these arguments and, at least at this stage, we determine that Petitioner’s modifications would not frustrate Chang’s “express goal.”

Patent Owner argues that “Petitioner’s first three motivation-to-combine arguments fail to mention Chang II’s teachings at all and therefore fail as a matter of law.” Prelim. Resp. 37. This argument is contrary to the Supreme Court’s decision in *KSR* that the motivation to combine the teachings of the references need not come from the references themselves. *KSR*, 550 U.S. at 418–419 (rejecting a rigidly applied teaching, suggestion, or motivation (TSM) test). Thus, this argument lacks merit.

Patent Owner argues that “[t]he Petition overstates Chang II’s passing mentions of a USB hub as a suggestion that Chang II’s bridge would be considered for improving Chang’s solution, which involved a hub and a bridge” and that Petitioner’s argument for incorporating Chang II’s teachings of a bridge with a dual-role port and a USB routing switch are “lacking in evidentiary support.” Prelim. Resp. 41. As previously noted, we determine that Petitioner’s showing on motivation to combine has good evidentiary support and this includes the argument that the teachings of

Chang II would improve the usefulness of Chang's hub and bridge. *See* Pet. 36–48.

We have considered the arguments and the evidence presented by Petitioner relating to motivation to combine and the contrary arguments and evidence of the Patent Owner. Considering all these arguments and evidence, we determine that Petitioner has articulated sufficient reasoning with good evidentiary support to combine the relevant teachings of Chang and Chang II as proposed in the Petition.

d. Summary as to Claim 13

Petitioner has sufficiently shown for purposes of institution that the combination of Chang and Chang II teaches all the limitations of claim 13 and has sufficiently articulated well-supported reasoning as to why a skilled artisan would have been motivated to combine the relied-upon teachings of Chang and Chang II as set forth in claim 13. We determine that there is a reasonable likelihood that Petitioner will prevail in establishing the unpatentability of challenged claim 13 of the '420 patent.

4. Claim 14

Dependent claim 14 recites:

The method according to claim 13, wherein the step of determining if when the consumer device is operating in the USB host mode or in the USB device mode is performed by the USB routing switch.

Ex. 1003, 10:62–65. The Petition states:

[B]oth Crossbar Implementations render obvious a USB routing switch and determining a downstream product's host/device mode (e.g., via signal detection circuitry). It would further have been obvious to include this functionality on one IC. Welch, ¶¶267-274. First, Chang expressly teaches integrating multiple

components onto one IC. EX1014, [0022]. Second, Chang II discloses switching functionality and detection circuitry on one control chip. EX1015, Fig. 2 (showing “control chip 13” implemented on single chip), Fig. 5 (“Detection Unit 134” and “Bypass Circuit Unit 133”). Third, including these elements on a common IC was well-known. See, e.g., EX1071 (mux chip with detection circuitry); EX1017 (“crossbar switch” on same SoC (System-on-Chip) as detection circuitry (OTG controller for hostdevice negotiation), [0046] (OTG controller), [0057] (crossbar switch), [0063] (SoC), [0070] (SoC).

A POSITA would have been motivated to include these components on the same device or chip because it was well-known that doing so reduced size/footprint and lowered manufacturing and assembly costs. Welch, ¶273. Indeed, because the detection circuitry typically receives the signals from the downstream USB port for detection, co-locating the detection circuitry with the switching circuitry is common sense. *Id.*

Pet. 70–71 (bracketed material in original).

Patent Owner does not challenge the showing as to the additional limitation recited in claim 14. *See generally* Prelim. Resp.

Based on this record, we determine that Petitioner has shown a reasonable likelihood of establishing that claim 14 is unpatentable.

5. *Claims 18–20*

Petitioner’s showing as to independent claim 18 and dependent claims 19 and 20 is based on the District Court adopting Patent Owner’s proposed corrections to claims 18 and 19. The Petition states:

The Ground herein demonstrates how the prior art renders the challenged Claims unpatentable under [Patent Owner]’s constructions. . . . If the district court adopts [Patent Owner]’s constructions, and the Board agrees with them, the Board should institute IPR. . . . Petitioner does not contend the

Ground herein renders the Challenged Claims unpatentable under the plain and ordinary meaning.

Pet. 27–28. Petitioner’s mapping of the cited art to independent claim 18 incorporates Patent Owner’s proposed changes to claim 18. *See id.* at 73. Claim 19 depends from claim 18. Ex. 1003, 12:33. Petitioner’s mapping of the cited art to dependent claim 19 incorporates Patent Owner’s proposed changes to claim 19. *See* Pet. 85. Claim 20 depends directly from claim 19 and indirectly from claim 18. Ex. 1003, 12:42.

We determine that Petitioner has not shown a reasonable likelihood of establishing the unpatentability of claim 18–20 based on the presentation in the Petition.

III. CONCLUSION

After considering the evidence and arguments presented in the current record, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail with respect to at least one of the claims challenged in the Petition. Accordingly, we institute an *inter partes* review on all of the challenged claims and all grounds presented in the Petition. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348 (2018) (holding that the Board may not institute review on fewer than all claims challenged in the petition); 37 C.F.R. § 42.108(a) (2023) (“When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”). At this stage of the proceeding, we have not made a final determination as to the patentability of any challenged claim.¹³

¹³ No matter how designated in this Decision, any determination (except our decision to institute trial) is preliminary and non-binding. We wish to have

IV. ORDER

Accordingly, it is

ORDERED that pursuant to 35 U.S.C. § 314, *inter partes* review is instituted as to claims 13, 14, and 18–20 of the '420 patent with respect to the ground of unpatentability presented in the Petition; and

FURTHER ORDERED that *inter partes* review is commenced on the entry date of this Order, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial.

the full record as developed during trial before rendering any binding determination, finding, or conclusion.

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