

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROCHIP TECHNOLOGY INC.,
Petitioner,

v.

APTIV TECHNOLOGIES AG,
Patent Owner.

Patent No. 11,681,643

Post Grant Review No. PGR2024-00011

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	BACKGROUND	4
A.	Traditional USB Topology	4
B.	Apple’s CarPlay Requirements	5
C.	Existing Technology Fell Short	6
D.	Manufacturers Demanded Better Solutions	7
E.	Leading Chip Makers—including Microchip—Failed to Solve the Problem	8
F.	Patent Owner Developed a Novel Solution That Provided Persistent USB.....	11
G.	As Patent Owner’s Invention Enjoyed Commercial Success, Microchip Failed to Replicate It.....	13
H.	Microchip Finally Released a Competing Product in 2017	14
III.	OVERVIEW OF THE ASSERTED PRIOR ART	14
IV.	OVERVIEW OF THE ’643 PATENT	17
A.	The ’643 Patent’s Prosecution History	18
V.	PERSON OF ORDINARY SKILL IN THE ART (“POSITA”).....	20
VI.	CLAIM CONSTRUCTION	21
A.	“The USB Routing Switch Includes the Signal Detection Circuit”	21
VII.	THE BOARD SHOULD DENY THE PETITION UNDER 35 U.S.C. § 325(d) BECAUSE THE EXAMINER CONSIDERED THE SAME PRIOR ART REFERENCES	22
VIII.	A POSITA WOULD NOT HAVE BEEN MOTIVATED TO COMBINE CHANG AND CHANG II.....	24
A.	A POSITA Would Have No Reason to Consider Using Chang II to Modify Chang	26
1.	A POSITA would not have recognized Chang II as intended for use with dual-role devices	26
2.	A POSITA would not have referenced Chang II to implement a dual-role port.....	29

Patent Owner’s Preliminary Response

3.	A POSITA would not have been motivated to modify Chang with Chang II because adding steps to Chang’s solution would only frustrate Chang’s express goal.....	30
B.	Petitioner’s Justifications for Combining Chang and Chang II Ignore and Mischaracterize Chang II’s Disclosures	32
1.	Petitioner cannot establish obviousness over Chang and Chang II based on arguments that do not mention any teaching in Chang II	33
2.	Petitioner cannot establish obviousness based on combinations that fail to include all claim elements	34
3.	“Common-sense” cannot fill the gaps in Petitioner’s motivation-to-combine arguments.....	35
4.	Petitioner cannot establish motivation to combine based on arguments that misapply the disclosures in Chang and Chang II.....	37
5.	Petitioner’s final argument lacks sufficient evidentiary support.....	37
C.	A POSITA Would Not Have Been Motivated to Add Chutorash to the Combination.....	38
IX.	THE CHALLENGED CLAIMS ARE NOT INDEFINITE UNDER 35 U.S.C. § 112.....	41
A.	“The USB Hub and USB Bridge Have Different Components and Functionality” (Ground 3).....	42
B.	“Routing Logic Circuit” (Ground 4)	45
C.	“Signal Detection Circuit” (Ground 5)	47
1.	35 U.S.C. § 112 ¶ 6 does not apply because “signal detection circuit” does not recite “means” or a similar nonce word	47
2.	Petitioner cannot overcome the presumption that “signal detection circuit” is not a means-plus-function term.....	49
3.	Petitioner’s failure to point to any structure warrants denying institution.....	52
D.	“Wherein the USB Routing Switch Includes the Signal Detection Circuit” (Ground 6).....	53
1.	“Includes” has a straightforward meaning.....	53
2.	Petitioner’s contention relates to implementation-level details, not definiteness	55

Patent Owner’s Preliminary Response

3.	Petitioner’s contention that its argument also extends to dependent Claim 15 is baseless.....	58
X.	THE CHALLENGED CLAIMS HAVE SUFFICIENT WRITTEN DESCRIPTION UNDER 35 U.S.C. § 112.....	59
XI.	CONCLUSION.....	63

TABLE OF AUTHORITIES**Page(s)****Cases**

<i>Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH,</i> IPR2019-01469, Paper 6, 10 (P.T.A.B. Feb. 13, 2020).....	24, 25, 26
<i>Arbor Glob. Strategies LLC v. Samsung Elecs. Co.,</i> No. 2:19-CV-00333-JRG, 2020 WL 7074877 (E.D. Tex. Dec. 3, 2020)	62
<i>Ariad Pharm., Inc. v. Eli Lilly & Co.,</i> 598 F.3d 1336 (Fed. Cir. 2010)	66
<i>BASF Corp. v. Johnson Matthey Inc.,</i> 875 F.3d 1360 (Fed. Cir. 2017)	47
<i>Biosig Instruments, Inc. v. Nautilus, Inc.,</i> 783 F.3d 1374, 1382-83 (Fed. Cir. 2015)	62
<i>Boston Sci. Corp. v. Johnson & Johnson,</i> 647 F.3d 1353 (Fed. Cir. 2011)	68
<i>Centrak, Inc. v. Sonitor Techs., Inc.,</i> 915 F.3d 1360 (Fed. Cir. 2019)	68
<i>Eibel Process Co. v. Minnesota & Ontario Paper Co.,</i> 261 U.S. 45 (1923).....	63
<i>In re Gardner,</i> 427 F.2d 786 (CCPA 1970)	47
<i>Husky Injection Molding Sys., Ltd. v. Plastipak Packaging, Inc.,</i> IPR2020-00438, Paper 23, 12 (P.T.A.B. July 29, 2020).....	25
<i>Innogenetics, N.V. v. Abbott Labs,</i> 512 F.3d 1363 (Fed. Cir. 2008)	37
<i>Intex Recreation Corp v. Team Worldwide Corp.,</i> IPR2019-00243, Paper 7, 19 (P.T.A.B. May 8, 2019)	59

<i>In re Kaslow</i> , 707 F.2d 1366 (Fed. Cir. 1983)	66
<i>Koninklijke Philips N.V. v. Google LLC</i> , 948 F.3d 1330 (Fed. Cir. 2020)	27
<i>Linear Tech. Corp. v. Impala Linear corp.</i> , 379 F.3d 1311 (Fed. Cir. 2004)	54, 57
<i>Microchip Tech. Inc. v. Aptiv Servs. US, LLC</i> , No. 17-cv-1194 (D. Del.).....	10
<i>MIT v. Abacus Software</i> , 462 F.3d 1344 (Fed. Cir. 2006)	51, 54, 56
<i>MTD Prods. Inc. v. Iancu</i> , 933 F.3d 1336 (Fed. Cir. 2019)	53
<i>Nalpropion Pharms., Inc. v. Actavis Lab'ys., FL, Inc.</i> , 934 F.3d 1344 (Fed Cir. 2019)	70
<i>Nature Simulation Sys. Inc. v. Autodesk, Inc.</i> , 50 F.4th 1358 (Fed. Cir. 2022)	48
<i>Nautilus, Inc. v. Biosig Instruments, Inc.</i> , 572 U.S. 898 (2014).....	46, 63
<i>In re Nuvasive, Inc.</i> , 842 F.3d 1376 (Fed. Cir. 2016)	39
<i>Orthokinetics, Inc. v. Safety Travel Chairs, Inc.</i> , 806 F.2d 1565 (Fed. Cir. 1986)	62
<i>In re Packard</i> , 751 F.3d 1307 (Fed. Cir. 2014)	46
<i>Phenix Longhorn, LLC v. Wistron Corp.</i> , No. 2:17-cv-00711-RWS, 2019 WL 2568476 (E.D. Tex. June 21, 2019)	56
<i>Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.</i> , 711 F.3d 1348 (Fed. Cir. 2013)	54, 55

<i>Realtime Data, LLC v. Iancu</i> , 912 F.3d 1368 (Fed. Cir. 2019)	23
<i>SmithKline Diagnostics, Inc. v. Helena Lab'ys Corp.</i> , 859 F.2d 878 (Fed. Cir. 1988)	28
<i>Sorensen v. Int'l Trade Comm'n</i> , 427 F.3d 1375 (Fed. Cir. 2005)	49, 61
<i>Supercell OY v. Gree, Inc.</i> , PGR2018-00055, Paper 36, 36-38 (P.T.A.B. Sept. 23, 2019).....	47
<i>Tandon Corp. v. U.S. Int'l Trade Comm'n</i> , 831 F.2d 1017 (Fed. Cir. 1987)	65
<i>Tinnus Enters., LLC v. Telebrands Corp.</i> , 733 F. App'x 1011 (Fed. Cir. 2018)	48, 51, 52
<i>TQ Delta, LLC v. CISCO Sys., Inc.</i> , 942 F.3d 1352 (Fed. Cir. 2019)	28, 31, 38, 45
<i>Ultimax Cement Mfg. Corp. v. CTS Cement Mfg. Corp.</i> , 587 F.3d 1339 (Fed. Cir. 2009)	47
<i>Univ. of Rochester v. G.D. Searle & Co., Inc.</i> , 358 F.3d 916 (Fed. Cir. 2004)	68
<i>Williamson v. Citrix Online, LLC</i> , 792 F.3d 1339 (Fed. Cir. 2015)	53, 54

Statutes

35 U.S.C. § 112	<i>passim</i>
35 U.S.C. § 325	1, 24, 27

Other Authorities

37 C.F.R. § 42.104	39
37 C.F.R. § 42.204	58, 59
Chisum on Patents § 7.03.....	67

Exhibit List for Post Grant Review of U.S. Patent No. 11,681,643

Exhibit #	Exhibit Description
2001	Declaration of Henry Houh ("Houh Decl.")
2002	Trial Transcript Excerpts, <i>Microchip Tech. Inc. v. Aptiv Servs. US, LLC</i> , No. 17-cv-1194 (D. Del. Apr. 6-13, 2022) – Testimony of Mitch Obolsky
2003	Trial Transcript Excerpts, <i>Microchip Tech. Inc. v. Aptiv Servs. US, LLC</i> , No. 17-cv-1194 (D. Del. Apr. 6-13, 2022) – Testimony of Robert Voto
2004	Complaint, <i>Aptiv Technologies Ltd. v. Microchip Technology, Inc.</i> , No. 23-cv-307-JDW (D. Del.)
2005	Trial Exhibit No. 58 Jun. 18, 2014 Mark Orlosky and Brigham Steele Email Chain re: CarPlay and forced DCP to external ports
2006	Trial Exhibit No. 62 - Oct. 1, 2014 Stefan Saenger, Chris Behal, and Ray Kamps Email Chain re: CarPlay - Fiat
2007	Trial Exhibit No. 66 - Nov. 26-Dec. 1, 2014 David Sroka, Eric Kawamoto, and Sal Canu Email Chain re: Media Hub Interim Update
2008	Trial Exhibit No. 246 - Jul. 20, 2014 Don Perkins Email re: UNG Detroit Sales Meeting and Training July 15 – 18
2009	Trial Exhibit No. 252 Aug. 11, 2014 David Sroka, Don Perkins, Sal Canu Email Chain re: CarPlay compliance Strategy
2010	Trial Exhibit No. 262 - Sal Canu Dec. 2, 2014 Email re: Microchip Position for the Thursday Chrysler Meeting
2011	Merriam Webster – https://www.merriam-webster.com/dictionary/includes
2012	U.S. Patent No. 7,282,965 ("Hatooka")
2013	U.S. Patent No. 5,838,875 ("Cho")
2014	U.S. Patent No. 6,441,627 ("Larson")

2015	Wiley Electrical and Electronics Engineering Dictionary (2004)
2016	Robert Dezmelyk Declaration in Support of Microchip's Responsive Claim Construction Brief, <i>Aptiv Technologies AG v. Microchip Technology Inc.</i> , No. 23-cv-307-JDW (DED)
2017	Trial Transcript Excerpts, <i>Microchip Tech. Inc. v. Aptiv Servs. US, LLC</i> , No. 17-cv-1194 (D. Del. Apr. 6-13, 2022) – Testimony of Michael Dreon
2018	Redacted Version of Jury Verdict Form, <i>Microchip Tech. Inc. v. Aptiv Servs. US, LLC</i> , No. 17-cv-1194 (D. Del.), D.I. 357

Aptiv Technologies AG (“Patent Owner” or “Aptiv”) submits this Patent Owner's Preliminary Response under 35 U.S.C. § 313 and 37 C.F.R. § 42.207 to Microchip Technology Inc. (“Petitioner” or “Microchip”)’s Petition for post grant review (“PGR”) of Claims 1-15 (the “Challenged Claims”) of U.S. Patent No. 11,681,643 (“the ’643 Patent,” EX-1011).

I. INTRODUCTION

The Board should deny the petition. Petitioner's prior art references are the same references that were previously presented to, and considered by, the Examiner during prosecution of the ’643 Patent, and Petitioner merely speculates the Examiner erred without identifying any material error attributable to the Examiner. Accordingly, the petition should be denied under § 325(d).

With respect to its prior art-based grounds, Petitioner provides no reason, other than attorney argument based on hindsight, why a person of ordinary skill in the art (“POSITA”) would be motivated to combine two of the references on which it relies: U.S. Pub 2006/0206650 (“Chang”) and U.S. Pub. 2009/0268743 (“Chang II”). Three of Petitioner's motivation to combine arguments fail to address the Chang II reference at all, rendering them legally insufficient. Petitioner's fourth argument fares no better and relies on a passing, tangential reference as its sole support. Moreover, Petitioner fails to explain why a POSITA would have been motivated to add a third reference, U.S. Pat. No. 8,447,598

("Chutorash") to the Chang-Chang II combination, and further, fails to establish that adding Chutorash to the combination would remedy the missing elements inherent in the Chang-Chang II combination.

Ultimately, Chang and Chang II, authored by different named inventors, are designed to address entirely different technical problems from one another and from the '643 Patent. It was, in fact, precisely the limitations of systems like Chang and Chang II that the '643 Patent was designed to resolve.

Petitioner's own struggle to create a working solution to the problem solved by the '643 Patent underscores precisely why such a solution was not obvious. The inventors of the '643 Patent created their patented design in response to the pressing need for a USB hub capable of integrating into existing infotainment systems and providing support for Apple CarPlay, including Apple's requirement that an iPhone act as the USB host. At the time of the invention, Petitioner was the market leader in vehicle USB hub chips and was highly motivated to develop a solution to the CarPlay problem in response to automakers' repeated requests. Yet even years after learning of CarPlay, and even after learning of Aptiv's solution, Petitioner's own engineers repeatedly acknowledged that they had no way of providing what it was that the automakers required.

With respect to its indefiniteness grounds, Petitioner's assertions are unfounded. Petitioner mistakes claim breadth for indefiniteness, discounts relevant

teachings in the specification, mischaracterizes the prosecution history of the '643 Patent, which provides clarity, ignores relevant Federal Circuit precedent, wrongly focuses on implementation-level details, and relies on circular assertions from its expert lacking support in its attempts to wrongly cast the claims as indefinite. In fact, a POSITA would be informed, with reasonable certainty, about the scope of the invention from reading the claims in light of the specification and prosecution history. The challenged terms, and claims, are thus not indefinite.

With respect to its written description ground, despite acknowledging that certain components recited in the claims are “well-known” components (Pet., 1), Petitioner asserts that these components require detailed description inclusive of basic routine implementation details, which is contrary to written description law. A POSITA reading the claims and specification would recognize that the inventors had possession of the claimed subject matter based on the description of the components (*e.g.*, the USB routing switch and signal detection circuit), their functions, and the interrelations between the recited components.

Because the Petition suffers from multiple glaring deficiencies, the Board should decline to institute post grant review of the '643 Patent.

II. BACKGROUND

A. Traditional USB Topology

Universal Serial Bus (“USB”) is a ubiquitous communication protocol that has been used in automobiles for some time. (EX-1011, 1:36-38; EX-2001, ¶ 30.) Among other things, it allows a car’s infotainment system to communicate with various devices in the vehicle, such as removable consumer devices (*e.g.*, smartphones) and/or non-removable embedded devices (*e.g.*, an SD card reader). (EX-1011, 1:55-59, 2:12-17.)

USB uses a strict top-down topology: a single upstream “host” manages and communicates with all downstream “devices.” (EX-1011, 1:38-43.) A USB network can have only one host, and the host must initiate all communication within the network—hosts are not configured to listen for or respond to incoming messages. (EX-2001, ¶ 33.) Downstream devices in a USB network merely respond to requests from a host. (*Id.*)

The downstream devices connect to the host via ports—physical connection interfaces. (*Id.*, ¶ 36.) USB networks may also include USB hubs—devices that increase the number of ports to which downstream devices may connect. (*Id.*) A standard USB hub routes multiple downstream ports to a single upstream port, allowing a host to have more downstream ports while reducing the amount of wiring required. (*Id.*)

B. Apple's CarPlay Requirements

In 2013, Apple announced its plans for “CarPlay,” a technology that would allow passengers to use iPhone applications via a vehicle’s infotainment system.

(*Id.*, ¶ 39.) As part of its announcement, Apple provided automakers with certain technical requirements to ensure that CarPlay would function properly. (*Id.*)

Apple described these requirements in an Accessory Interface Specification and mandated a certification process to ensure that only certified devices would be permitted to support CarPlay. (*Id.*)

Notably, CarPlay required that the iPhone act as the USB host at all times while CarPlay was in use. (*Id.*, ¶ 40.) This presented a quandary for automakers because most existing automobiles had USB networks designed to operate with a built-in USB host (*i.e.*, the “head unit”) contained in the infotainment system. (*Id.*) In those existing systems, consumer devices, such as smartphones, SD cards, etc., connected to the USB network through a hub and would appear to the head unit as USB devices. (*Id.*)

Apple’s requirement that the iPhone act as a USB host complicated this design because the iPhone and the head unit could not both be hosts under USB’s conventional top-down architecture. (EX-1011, 3:8-12; EX-2001, ¶ 40.) Existing infotainment system design would not allow the iPhone to act as a USB host for CarPlay while also allowing the head unit to control the other media devices in the

vehicle. (EX-2001, ¶ 40.) Nor would it allow the iPhone to communicate with the head unit while the iPhone acted as a host. (*Id.*) Even more challenging, certain non-CarPlay use cases expected the iPhone to function as a USB device. (EX-1011, 2:60-66.)

C. Existing Technology Fell Short

At the time of the patented invention, there were two methods for implementing host-to-host and host-to-device communication in an automotive USB system that would permit an iPhone to act as a host within a car's USB system. Both methods were flawed.

The first solution—a “dual lane” approach—supported host-to-host communications and host-to-device communications on separate lines. Consequently, the system required an additional communication path between the car's head unit and every host-to-host port, adding significant cost and complexity to the USB system. (EX-2001, ¶ 42.) Moreover, the dual-lane approach required consumers to attach a smartphone using different ports depending on whether the phone was operating in host or device mode. (EX-1011, 3:44-48.)

The second solution was role reversal: a method of inverting the USB system to swap the existing host and device roles. (EX-1011, 3:49-52.) For example, specialized “On-the-Go” or “OTG” ports permitted OTG-capable devices to act as a host while CarPlay was active. (EX-1011, 3:55-3:59; EX-2001, ¶ 43.)

Similarly, Microchip's proprietary "FlexConnect" feature dynamically changed a physical port from an upstream port to a downstream port, thereby allowing a device to swap from host to device and vice versa. (EX-2001, ¶ 43.)

But the role reversal approach suffered from a fundamental and unacceptable flaw. Though it allowed the smartphone to act as a host, it forced the infotainment system to act as a device. (EX-1011, 3:63-66.) That meant that the infotainment system could not support other downstream devices during CarPlay, potentially interrupting features like navigation and audio playback. (EX-1011, 3:59-67.) Role reversal could not simultaneously provide both host-to-host communication *and* persistent downstream USB connections throughout the vehicle. (EX-2001, ¶ 44.)

Even Microchip recognized that dual lane and role reversal solutions were simply not acceptable to its customers, conceding that, "[w]hen persistent USB is a requirement we definitely have run into a wall." (EX-2007, 1.)

D. Manufacturers Demanded Better Solutions

Automakers, also known as Original Equipment Manufacturers ("OEMs"), wanted infotainment systems capable of CarPlay and persistent downstream USB communications, and they voiced this request to Microchip and other suppliers of USB hub modules. For example, Chrysler expressed that it "does not want to lose data capability on the other ports not tied to the Apple device." (EX-2005, 2.) As

one of Microchip's employees noted, "[OEMs] want CarPlay AND they want additional connectivity to [*sic.*] head unit to other devices." (EX-2006, 2.)

E. Leading Chip Makers—including Microchip—Failed to Solve the Problem

At the time of the invention, Microchip was undisputedly an expert in chip design and manufacturing, including in the automotive USB sector. As of 2022, Microchip sold about eight billion chips per year and had at least 2,000 engineers working in its Networking and Data Center Business Unit, and many of those engineers specialized in research and development for new products. (EX-2002, 195:17-21, 199:5-9, 200:13-20, 203:22-204:3.) Between 2021 and 2022, Microchip provided 35 million USB hub chips per year to the automotive industry. (*Id.*, 211:8-14.)

In fact, prior to the invention, Microchip provided nearly 100% of all USB hub chips used in cars made by the "Big Three" automotive companies: Ford, Chrysler, and GM. (*Id.*, 211:23-212:6.) Microchip had also provided USB hub chips to Tesla, Audi, Volkswagen, BMW, Mercedes, Kia, Mazda, Toyota, Honda, and Nissan. (*Id.*, 215:1-23.)

If there were an obvious solution to manufacturers' demands, Microchip would have found it. Yet Microchip repeatedly acknowledged, both internally and to its customers, that it did not have a solution to the CarPlay problem even *years* after the 2013 priority date of the '643 Patent:

- On June 18, 2014, Microchip declared that the problem was not solvable:

Some items may be *physically outside the capabilities of ANY USB system*. . . . With USB, you are only allowed 1 Host and multiple devices on a bus. This message is critical, so we need to make sure [Chrysler] understands this fact *We need to emphasize that you cannot do CarPlay AND own the other ports with one USB data lane* No bus can serve two masters

(EX-2005, 1-2 (emphases added¹).)

- During an April 2022 trial,² Microchip admitted that it told customers that the problem was not solvable:

¹ All emphases added throughout unless otherwise specified.

² Once Microchip eventually developed a competing product (modeled after Aptiv's), it sued Aptiv in Delaware district court, alleging that Aptiv's product infringed several of Microchip's existing USB patents. (*See Microchip Tech. Inc. v. Aptiv Servs. US, LLC*, No. 17-cv-1194 (D. Del.).) At trial, the jury disagreed, finding conclusively that Aptiv's product did not infringe any of the patents that Microchip asserted against it. (EX-2018.)

Q: So at this point in time, Microchip was telling its customers this one lane persistent USB thing isn't going to work and you should go with the FlexConnect solution instead?

A: That's about right.

(EX-2002, 312:4-9.)

- On July 20, 2014, Microchip acknowledged that Aptiv had invented a solution to the problem that Microchip could not solve:

[Aptiv's] solution offers 'Flex' on every port and connectivity throughout the car. Both of these features are highly desirable by the car makers. . . . There is no way to defeat the competitive threat without accomplishing this.

(EX-2008, 1 (July 20, 2014).)

- Even after Aptiv invented a solution, Microchip continued to maintain that no viable solution was possible:

This is completely NON-STANDARD USB. . . . *This goes against the primary requirement of USB*; one bus / one Host. . . . These hosts will be acting independently of each other but will need to maintain USB specifications/ timing/time-outs/HID / adequate throughputs as if it was a single bus. Could be demo'd but *no way it can be guaranteed.*

(EX-2009, 1 (Aug. 11, 2014).)

- Even at the end of 2014, Microchip still had not been able to offer a system with persistent USB:

When persistent USB is a requirement *we definitely have run into a wall.*

(EX-2007, 1 (Dec. 1, 2014).)

F. Patent Owner Developed a Novel Solution That Provided Persistent USB

While Microchip, the market leader, considered this an impossible problem, Aptiv was able to create a single-upstream solution that supported CarPlay and allowed persistent downstream USB after launching a custom development program in late 2012.³ (EX-2003, 53:4-17, 54:16-55:1, 111:5-12.)

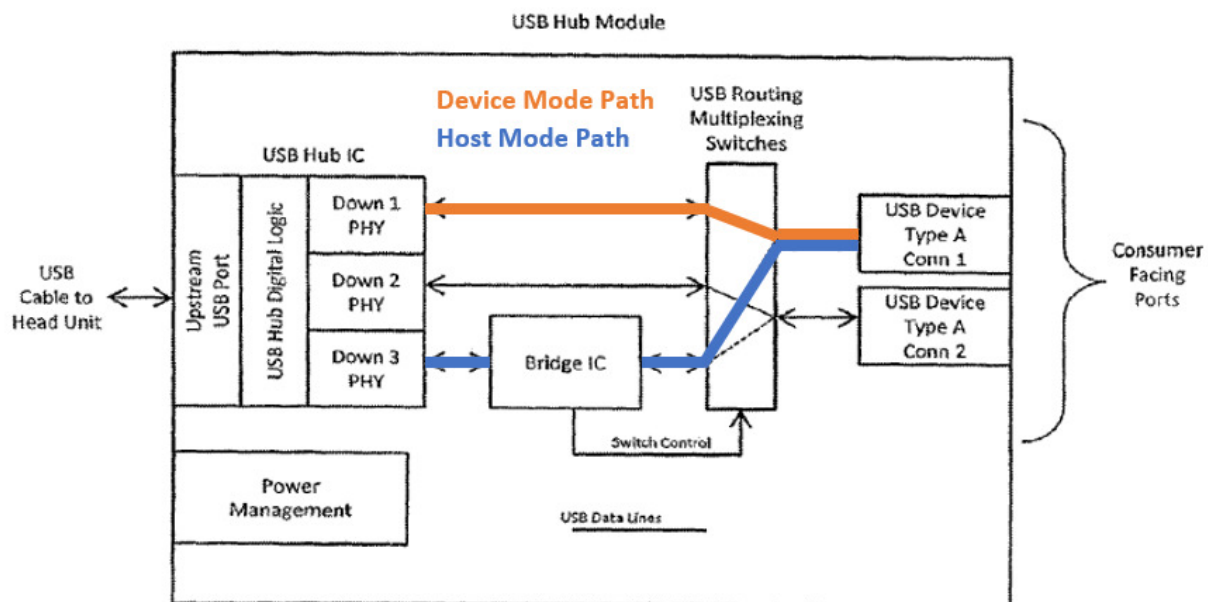
Aptiv's solution was creative and elegant, integrating a USB bridge into a traditional USB hub, allowing for host-to-host communication through the bridge without interrupting the traditional hub function for other downstream devices.

(EX-1011, 8:63-67.) Specifically, when the consumer device is in host mode, the

³ At the time of the invention of the Asserted Patents, the inventors were employees of Unwired Technology, which was acquired by Aptiv (named Delphi at the time) in 2014.

USB signal is routed to the hub through a USB bridge, rendering the two hosts compatible. (*Id.*, Claim 1, 9:24-29.) But when the consumer device is in device mode, the USB signal is routed directly to the hub, thereby bypassing the bridge. (*Id.*, Claim 1, 9:32-37.) The alternative paths are shown below in an annotated version of Figure 4.

Figure 4



(*Id.*, Figure 4 (annotated).)

In contrast to the dual lane approach, the patented invention can be implemented with a single upstream line and allows a CarPlay device to be connected on any port. This design also addresses the flaws in the role reversal approach. Because it allows the infotainment system to remain a host at all times,

even while supporting CarPlay, the design enables persistent communication with downstream devices. (*Id.*, 8:63-9:8.) And it accomplishes this without the need for OTG ports or adapters; it takes an entirely different approach to solving the problem. (*See id.*, 1:24-29.)

G. As Patent Owner's Invention Enjoyed Commercial Success, Microchip Failed to Replicate It

As a result of this innovative design, Aptiv's dual-role hub product, which embodies the invention, is able to provide the features that auto-makers found "highly desirable." (EX-2008, 1.) As Microchip conceded, Aptiv's solution "offers 'Flex'" (*i.e.*, host-to-host capability) "on every port and connectivity throughout the car" (*i.e.*, persistent downstream USB). (*Id.*) As a result of Aptiv's significant innovation, Aptiv unseated Microchip as the exclusive supplier of USB hub chips for the "big three" automotive companies. (EX-2002, 229:14-19, 237:22-238:8.)

If the invention were obvious over the prior art, as Microchip now contends, presumably, Microchip—an expert in the field—could have deduced how it works. This is especially true given Microchip's resources and incentives to provide a viable CarPlay solution that would satisfy the automakers' requirements. But even as Patent Owner's invention gained traction in the market, Microchip still could not replicate it. As Microchip's field-application engineer explained on December 2, 2014: "[w]e looked at developing a solution for 1 upstream lane,

persistent USB data and we don't have a solution. We wish we could provide a solution but we don't have it." (EX-2010, 1.) Thus, even with access to the prior art that Microchip now relies on, Microchip's team of POSITAs and its motivated business unit could not develop the claimed invention.

H. Microchip Finally Released a Competing Product in 2017

Microchip finally launched a competing product in 2017, named "Sandia," several years after the priority date and multiple years after Aptiv released its product employing the patented technology. (EX-2004, ¶ 24.)

III. OVERVIEW OF THE ASSERTED PRIOR ART

Petitioner relies on three prior art references, two of which name inventors that share the surname "Chang," however, these inventors are different individuals:

- **Chang** – U.S. Pub 2006/0206650 (EX-1014) – Chang discloses a hub for implementing host-to-host transmission through a dedicated host port connected to a bridge. (*Id.*, Abstract, [0020].) Chang's hub addresses the express goal of "easily establishing a connection between a computer and another computer." (*Id.*, [0003].) 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. (*Id.*, [0020].) The Chang hub also comprises a number of downlink ports

for linking devices connected to the downlink ports to Chang's uplink

port. (*Id.*, [0019].) The downlink ports allow for host-to-device

transmission between devices connected to the downlink ports and a host

device connected to the uplink port. (*Id.*, [0019].)

- **Chang II** – U.S. Pub. 2009/0268743 (EX-1015) – Chang II discloses a data transmission bridge device. (*Id.*, Abstract.) The Chang II bridge device has a first connection interface and a second connection interface connected by a control chip. (*Id.*, [0023].) Chang II's control chip comprises a bypass circuit unit, a detection unit, a CPU, and a pair of USB controllers. (*Id.*, [0013].) These components are arranged in a particular logical configuration to form two transmission paths between the pair of connection interfaces. (*Id.*, Figs. 1, 5, [0023].) The first connection interface is for connecting to a first host device, and the second connection interface is “for connecting to a second host device 3 or a slave device 4.” (*Id.*, [0022].) Chang II teaches that the second connection interface utilizes A-Type male connector design for connection to a host device, but that an adapter can be used to instead connect a slave device to the second connection interface. (*Id.*, [0029].) The control chip detects whether a host or slave device is connected to the second connection interface and selects one of the two transmission

paths to enable data transmission between the first and second connection interfaces. (*Id.*, [0023].) The first transmission path is the “bridge transmission path,” which “spans first connection interface 11, first USB controller 131, buffer unit 136, second USB controller 132, and second connection interface 12.” (*Id.*) The control chip enables the bridge transmission path when a second host device connects to the second connection interface and the control chip receives a response from the second host device that is responsive to an inquire signal produced by the control chip. (*Id.*, [0026].) The second path is the “bypass path,” which “spans first connection interface 11, first USB controller 131, bypass circuit 133, and second connection interface 12.” (*Id.*, [0023].) The bridge enables the bypass path when a user connects a slave device to the second connection interface and the control chip receives an inquire signal from the slave device. (*Id.*, [0027].)

- **Chutorash** – U.S. Pat. 8,447,598 (EX-1029) – Chutorash is directed to a system for connecting a vehicle control system to a device, such as a mobile phone, via USB. Chutorash identifies two problems with vehicle user interface systems. First, it notes that the human-machine interfaces of vehicles and portable devices are “typically separate, look very different, and are difficult to use together.” (*Id.*, 1:28-32.) Because

“[a]pplications provided on portable devices are typically not configured to interact with a vehicle,” Chutorash explains that there is a need for “improved user interface features and/or connectivity features.” (*Id.*, 1:32-33, 1:34-35.) Second, Chutorash states that “[t]here is a need for effective display reproduction and/or user interface reproduction from a remote source to an in-vehicle display or other in-vehicle interface.” (*Id.*, 1:36-39.)

IV. OVERVIEW OF THE '643 PATENT

The '643 Patent claims priority to a provisional application filed September 26, 2013, and is the sixth issued patent claiming priority to the same provisional application.

At a high level, the '643 Patent is generally directed to methods for facilitating host-to-host and host-to-device communications through a USB hub. (EX-1011, Abstract.) Claim 1 is representative and recites:

1. A method, comprising:
 - providing a first USB port for communication with a USB host;
 - providing a second USB port for communicating with a consumer USB device;
 - providing a signal detection circuit for receiving USB signals from the consumer USB device via the second USB port;

routing the USB signals emanating from the consumer USB device to the first USB port via a routing logic circuit connected directly to a USB bridge and a USB hub connected to the USB bridge **in accordance with a determination by the signal detection circuit that the consumer device is operating in a USB host mode**, wherein the USB bridge includes a bridge controller, buffers, and a plurality of ports; and

routing the USB signals emanating from the consumer USB device to the first USB port via the routing logic connected directly to the USB hub and **thereby bypassing the USB bridge in accordance with a determination by the signal detection circuit that the consumer device is operating in a USB device mode**, wherein the USB hub and USB bridge have different components and functionality.

(EX-1011, Claim 1.) Thus, Claim 1 implements routing logic to connect a pair of USB ports in a manner that bypasses the USB bridge when the consumer device is determined to be operating in a USB device mode.

A. The '643 Patent's Prosecution History

The '643 Patent issued from U.S. Patent Application No. 17/498,045 ("the '045 Application.")

The Examiner rejected the claims of the '045 Application during prosecution as anticipated by U.S. Patent No. 7,502,878 ("Wright"). (EX-1012, 66-68; EX-1047.) The Applicant traversed the rejection without amendment, arguing that the multiplexer of Wright does not disclose a USB hub, and thus Wright fails to disclose each element of the claimed invention. (EX-1012, 89-90.)

Thereafter, the Examiner issued a Notice of Allowance, which included a Notice Allowability citing the following attachments: a Notice of References Cited, which named Chang II, and an Interview Summary. (EX-1012, 197, 201, 208-209.) Along with this Notice of Allowance, the Examiner included an Examiner's Amendment, which added the following terms to the independent claims: (1) routing the signals emanating from the consumer USB device to the first USB port via a "routing logic circuit connected directly to a" USB bridge and a USB hub "connected to the USB bridge" when in USB host mode, (2) routing the USB signals to the first USB port via the "routing logic connected directly to the USB hub and thereby" bypassing the USB bridge when in USB device mode, and (3) clarifying that "the USB hub and USB bridge have different components and functionality." (EX-1012, 202-203.)

In addition to considering Chang II prior to allowance, the Examiner also considered both Chang and Chutorash. During prosecution, the Applicant submitted IDSs disclosing each of Chang, Chang II, and Chutorash, and these IDSs

were signed by the Examiner to indicate that the Examiner had considered each reference. (EX-1012, 77-80 (Chutorash), 78-80 (Chang), 193-194 (Chang II).)

V. PERSON OF ORDINARY SKILL IN THE ART (“POSITA”)

At the time of the invention, 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. (EX-2001, ¶ 26.) Lack of work experience can be remedied by additional education, and vice versa. (*Id.*)

Petitioner's definition, heightened from its proposed definition of a POSITA in the co-pending district court litigation,⁴ should be rejected.

⁴ 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. (*Compare* Pet., 28-29, *with* EX-2016, ¶¶ 32-33.) Notably, Petitioner's expert in district court—a co-author of the original USB Specification—did not require familiarity with the particular documents and standards Petitioner now identifies, despite his broad consideration of “the type of problems encountered by practitioners, the nature of prior art solutions, [and] the rapidity of innovations in the area of USB technology[.]” (EX-2016, ¶¶ 32-33.)

VI. CLAIM CONSTRUCTION

Only those terms in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019). Patent Owner sets forth its claim construction position below for purposes of this proceeding only.

A. “The USB Routing Switch Includes the Signal Detection Circuit”

The term “the USB routing switch includes the signal detection circuit” appears in dependent claims 4 and 9. Though Petitioner has not sought construction of this term, its invalidity arguments in Ground 6 fail to apply the plain and ordinary meaning of the word “includes.”

Here, the ordinary meaning of the common word “includes” “as understood by a person of skill in the art may be readily apparent even to lay judges,” and its construction “involves little more than the application of the widely accepted meaning of commonly understood words.” *Phillips*, 415 F.3d at 1314. “In such circumstances, general purpose dictionaries may be helpful.” *Id.* Merriam Webster defines “include” to mean “to take in or comprise as part of a whole or group.” (EX-2011.) As applied to the claims, the term “the USB routing switch includes the signal detection circuit” should be construed to mean that the USB routing switch comprises the signal detection circuit as part of a whole or group.

VII. THE BOARD SHOULD DENY THE PETITION UNDER 35 U.S.C. § 325(d) BECAUSE THE EXAMINER CONSIDERED THE SAME PRIOR ART REFERENCES

The Board may “reject the petition or request [where] the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. § 325(d). To assess whether a petition should be denied under § 325(d), the Board applies a two-part *Advanced Bionics* framework, considering: (1) whether “the same or substantially the same art or arguments were previously presented to the Office”; and if so, (2) whether “the petitioner has demonstrated material error by the Office.” *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6, 10 (P.T.A.B. Feb. 13, 2020) (precedential). Both prongs of this framework strongly favor discretionary denial here.

First, Chang, Chang II, and Chutorash are the same references that were previously presented to the Examiner during prosecution. This fact favors discretionary denial. *See Husky Injection Molding Sys., Ltd. v. Plastipak Packaging, Inc.*, IPR2020-00438, Paper 23, 12 (P.T.A.B. July 29, 2020) (finding the first prong of the *Advanced Bionics* framework satisfied where the reference in question “previously was presented to the Office during the prosecution”).

As Petitioner acknowledges, both Chang and Chang II were presented to the Office and before the Examiner during prosecution. (Pet., 107.) In fact, each of

Petitioner's references was cited by the Applicant in an IDS, which was signed by the Examiner to indicate that each reference had been considered. (EX-1012, 77-80 (Chutorash), 78-80 (Chang), 193-194 (Chang II).) Further, Chang II was cited by the Examiner in an attachment to the Notice of Allowability. (EX-1012, 201-209.) Accordingly, in allowing the application, the Examiner expressly considered Chang II.

Second, *Advanced Bionics* instructs that when “the record of the Office’s previous consideration of the art ***is not well developed or silent, then*** a petitioner may show the Office erred by overlooking something persuasive.” *Advanced Bionics*, Paper 6, 9-10. That is not the case here. The Examiner considered Chang II *immediately prior to allowance*. (See § III.A.) The Examiner amended the claims via an Examiner’s Amendment following an interview where Chang II was cited and presumably discussed. (*Id.*) The Office’s consideration of Chang II is thus well developed.

Petitioner speculates that there is “no indication the Examiner considered combining Chang and Chang II” and asserts that “the Examiner erred in not considering Chang in view of Chang II (or if there was any consideration, erred in not issuing a rejection.” (Pet., 107-108.) But Petitioner identifies no material error by the Examiner. (Pet., 107-110.) The Examiner considered Chang. (EX-1012, 78.) The Examiner considered Chang II. (*Id.*, 194, 201-209.) The Examiner

recognized the novelty of the invention and issued a notice of allowance after considering both references. Petitioner's argument ignores that the Board gives deference to the Examiner when a party asserts unpatentability based on prior art or arguments that were already before the Examiner during prosecution. *See Advanced Bionics*, IPR2019-01469, Paper 6, 8-9 ("If reasonable minds can disagree regarding the purported treatment of the art or arguments, it cannot be said that the Office erred in a manner material to patentability.") At most, Petitioner's argument is a disagreement with the Examiner's treatment of Chang and Chang II, which is insufficient to establish material error by the Office. For the reasons set forth above, the Board should deny institution under § 325(d) because the Petition sets forth identical art and fails to show any material error in the Office's decision to grant the '643 Patent.

VIII. A POSITA WOULD NOT HAVE BEEN MOTIVATED TO COMBINE CHANG AND CHANG II

Petitioner challenges the claims of the '643 Patent based on prior art on two grounds: (1) a combination of Chang, Chang II, and a POSITA's knowledge,⁵ and

⁵ To the extent Petitioner contends that Chang II is not essential to Ground 1, the Petition does not articulate any single-reference obviousness ground based on Chang alone. Accordingly, the Board should decline to consider any argument that

(2) a combination of Chang, Chang II, Chutorash, and a POSITA's knowledge.

(See Pet., 5.) As such, Petitioner bears the burden to prove motivation to combine Chang and Chang II in the manner proposed. Instead 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. Furthermore, Petitioner fails to demonstrate motivation to add Chutorash to the combination. This is insufficient to meet Petitioner's burden to demonstrate "motivation to combine particular references," *TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1360 (Fed. Cir. 2019), and to provide evidence "to support their use in the particular claimed combination," *SmithKline Diagnostics, Inc. v. Helena Lab'ys Corp.*, 859 F.2d 878, 886-87 (Fed. Cir. 1988). Furthermore, Petitioner fails to demonstrate that its proposed Chang-Chang II combination meets each element of the challenged claims. Because each and every ground Petitioner raises involves combining Chang with Chang II, these failures warrant denying institution.

the '643 Patent claims are invalid for obviousness based on Chang alone.

Koninklijke Philips N.V. v. Google LLC, 948 F.3d 1330, 1337 (Fed. Cir. 2020)

(concluding that the Board erred by instituting *inter partes* review based on an obviousness combination not advanced in the petition).

A. A POSITA Would Have No Reason to Consider Using Chang II to Modify Chang

Perhaps because there is none, 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 one or more dual-role port(s)” for use with dual-role devices. (Pet., 42.) Even assuming that a POSITA would have been motivated to modify Chang to include dual-role ports, a POSITA would not have looked to Chang II to accomplish that goal, and Petitioner presents no evidence to suggest otherwise. One need look no further than Chang II itself to confirm that a POSITA would have no reason to believe that Chang II would be compatible with Chang.

1. A POSITA would not have recognized Chang II as intended for use with dual-role devices

Nothing about Chang II suggests that it is intended for use with dual-role devices. (EX-2001, ¶ 56.) As an initial matter, Chang II does not mention dual-role devices. It instead consistently and exclusively refers to *either* a “host device 3” or a separate and distinct “slave device 4” as the possible downstream device connected to the second connection interface, as shown in Figure 1 below:

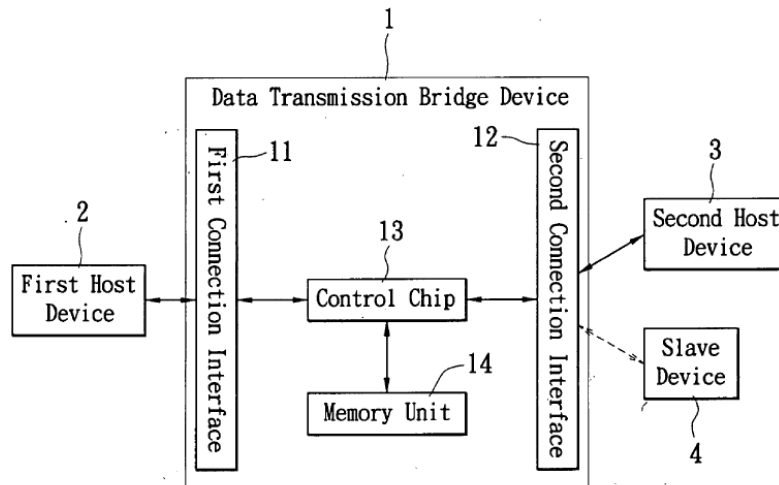


FIG. 1

(EX-1015, [0022], Fig. 1.) Chang II would therefore not have been a candidate for modifying Chang to add dual-role device connectivity. (EX-2001, ¶¶ 56-57.)

Petitioner's sole argument that Chang II contemplates dual-role devices is Chang II's disclosure that its second interface could use any of the connector types covered under the USB specification. (Pet., 33; EX-1015, [0030].) This disclosure that a POSITA could use any specification-compliant connector type does nothing to suggest that any particular device type would be compatible with Chang II's second connection interface—let alone suggest that Chang II would be useful for dual-role devices. (EX-2001, ¶ 58.) Petitioner's *ipse dixit* assertion that a POSITA would have understood that “connecting dual-role products to the second interface was within the scope of Chang II's disclosure,” (Pet., 33) is supported only by “[c]onclusory expert testimony [and] does not qualify as substantial evidence.” *TQ*

Delta, 942 F.3d at 1358 (collecting cases). Notably, Petitioner does not contend that this would be sufficient to demonstrate motivation to combine Chang and Chang II. (Pet., 33.)

Petitioner's suggestion that a POSITA would have read Chang II to disclose use of its bridge with dual-role devices based on the existence of Micro-AB connectors is hindsight-based revisionism. (Pet., 33.) Petitioner claims that a POSITA would have understood Chang II to concern dual-role devices because a Micro-AB connector was "a well-known connector type" covered under the USB specification. (*Id.*; EX-1013, ¶ 157.) Chang II does not mention the Micro-AB connector, and its use contradicts Chang II's actual descriptions regarding distinct host and slave devices and the need for an adapter to change device types. (EX-1015 [0029]; EX-2001, ¶ 58.) Furthermore, even if a POSITA would have considered Micro-AB connectors to be within the scope of Chang II's disclosure, it would have been apparent that Micro-AB connectors would limit the utility of a USB hub like Chang's by using an uncommon port that would have required an adapter to interface with most USB devices. (EX-2001, ¶ 59.) Notably, Petitioner does not propose using Micro-AB connectors in its combination of Chang and Chang II. Petitioner's tenuous and conclusory evidence of a connection between Chang II and dual-role devices fails to establish that a POSITA would have modified Chang specifically in view of Chang II.

2. A POSITA would not have referenced Chang II to implement a dual-role port

The ports in the claimed invention are “dual-role” ports designed to accommodate a device regardless of whether it was operating in device or host mode. (EX-2001, ¶ 46.) Importantly, because the system was designed specifically to address the requirement that an iPhone act as a host when CarPlay is in use and as a device in other non-CarPlay use cases, these ports were designed to handle *the same device* swapping from host mode to device mode and vice-versa. (*Id.*)

Chang II does not consider a single device capable of operating in both host and device mode and instead expressly teaches that “an adapter 121 can be further attached to transform the connector type of the second connection interface 12.” (EX-1015, [0029]; EX-2001, ¶¶ 56-57.) This confirms that a POSITA seeking to modify Chang to incorporate dual-role ports would not reference Chang II. (EX-2001, ¶ 59.) Indeed, rather than contemplating a dual-role port that could accommodate a device regardless of whether it was in device or host mode, Chang II expressly discloses that the use of an adapter is necessary to swap between the USB connection used for USB hosts (A-type male) and the USB connection used for USB devices (B-type female): “if the second connection interface 12 needs to connect to a slave device 4 (which normally has a B-Type female connector of USB specification), *then an adapter 121 can be further* attached to transform the

connector type of the second connection interface 12, so that the required B-Type male connector of USB specification can be available.” (EX-1015, [0029].)

Chang II's disclosure that its second interface could use any of the connector types covered under the USB specification does not obviate the need for an adapter to switch between different USB specification connector types at a given port. (EX-1015, [0030]; EX-2001, ¶ 59.) It is the adapter that permits the second connection interface to “acquire” a different USB specification connection type than the one it had “adopt[ed].” (*Id.*) Thus, Chang II does not contemplate the use of a port that would allow a single device to seamlessly swap between host and device modes, as taught in the '643 Patent. (EX-2001, ¶¶ 57-58.)

3. A POSITA would not have been motivated to modify Chang with Chang II because adding steps to Chang's solution would only frustrate Chang's express goal

Additionally, Chang already accommodated both USB hosts and USB devices through dedicated ports for host-to-host and host-to-device transmission. (EX-1014, [0019]-[0020], Fig. 3; EX-2001, ¶¶ 62-63.) The very references that Petitioner relies on therefore establish that a POSITA would have no motivation to look to Chang II (which does not mention dual-role devices, let alone dual-role ports) when searching for a disclosure pertinent to incorporating dual-role ports into Chang's invention (which already accommodated dual-role devices). (EX-2001, ¶¶ 55-63.)

A POSITA would not have considered using Chang II to modify Chang for the additional reason that 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." (*Id.*, ¶ 67; EX-1014, [0003].) Indeed, Chang II presents a specific method of connecting two devices using a bridge device that is substantially more complex than Chang's generic bridge. (EX-2001, ¶¶ 67-68.) Chang II's bridge includes a control chip with a CPU, a detection unit, multiple controllers, a bypass unit, and a buffer unit, as well as a memory unit and two connection interfaces, all arranged in a particular logical configuration. (*See* EX-1015, Figs. 1, 5; EX-2001, ¶ 67.) All of this would have been superfluous to Chang's bridge, which provides simple host-to-host data transmission. (*See* EX-1014, [0020]; EX-2001, ¶ 67.)

Ignoring the fundamental differences in bridge design between Chang and Chang II, and with the benefit of hindsight, Petitioner cherry-picks only a portion of Chang II's bridge (the detection unit) as the sole component from Chang II that Petitioner proposes should be added to Chang. (*See* Pet., 47-48.) According to Petitioner, Chang II's detection unit, *by itself*, would motivate a POSITA to route signals using a switch. (*See* Pet., 47-48.) Despite acknowledging that Chang II's bridge "includes 'control chip 13' (shown in Fig. 5) with 'detection unit' (134) and

CPU (135)” (*Id.*, 48 (citing EX-1015, [0022]-[0023], [0034])), Petitioner plucks just the detection unit out of Chang II’s bridge and uses it to modify Chang. (*See* Pet., 47-48.) Petitioner is forced to single out Chang II’s detection unit to modify Chang because using Chang II’s bridge in its entirety would result in a failure of Petitioner’s solution to meet each element of the challenged claims. That is because the challenged claims each require routing the USB signals received from the consumer USB device to the USB hub via the USB bridge when the consumer USB device is operating in a USB host mode or alternatively routing the signals such that they bypass the USB bridge when the consumer device is operating in a USB device mode (*e.g.*, to accommodate a device that “can change roles dynamically” and “act as either USB Host or USB Device.” (*See* EX-1011, Claims 1 and 5 (reciting “routing” USB signals); Claim 10 (reciting “establishing a first [and second] communication path” rather than “routing”); 3:25-27.) But Chang II lacks any disclosure suggesting that its detection unit would be extractable from the control chip of its bridge for use as a separate component. (*See, e.g.*, EX-1015, Fig. 5 & [0034]; EX-2001, ¶ 68.)

B. Petitioner’s Justifications for Combining Chang and Chang II Ignore and Mischaracterize Chang II’s Disclosures

Petitioner offers four alleged justifications for combining Chang and Chang II. (Pet., 42; *see also* EX-1013, ¶¶ 175-181 (Petitioner’s expert declaration enumerating the four reasons).) None is persuasive or carries Petitioner’s burden

to provide evidence of a motivation to combine at this stage. Petitioner's first three arguments fail to discuss Chang II's disclosures at all and therefore cannot provide a motivation to combine Chang II with any reference or disclosure. (Pet., 42-43.) Petitioner's fourth argument transforms Chang II's passing mention that its bridge *sometimes* functions similarly to a USB hub into an unfounded conclusion that "Chang II expressly states its relevance to USB hubs," such that a POSITA would use Chang II to modify Chang. (Pet., 46; EX-1015, [0027], [0040].) Notably, none of Petitioner's arguments address why a POSITA would have looked to Chang II's specific disclosures to modify Chang.

1. Petitioner cannot establish obviousness over Chang and Chang II based on arguments that do not mention any teaching in Chang II

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. *Innogenetics, N.V. v. Abbott Laby's*, 512 F.3d 1363, 1373 (Fed. Cir. 2008) ("[K]nowledge of a problem and motivation to solve it are entirely different from motivation to combine particular references.") First, Petitioner asserts that a POSITA would apply Chang II's invention to USB hubs because Petitioner argues that products "with dual-role USB capabilities were gaining popularity." (Pet., 42; EX-1013, ¶ 176.) Second, relying on its expert's say-so, Petitioner asserts that "common sense" would motivate a POSITA to modify Chang to include dual-role ports

because: (1) “it would be impractical, and inconvenient at best, to require consumers to understand when to switch connections between dedicated host- and device-ports when using a dual-role product”; and (2) including dual-role ports would save costs. (Pet., 42-43.) Third, Petitioner argues that adding dual-role ports to Chang would “further its express goal of ‘easily establishing a connection between a computer and another computer.’” (Pet., 43 (quoting EX-1014, [0003]).) None of these arguments refers to any teaching in Chang II (Pet., 42-43), let alone “explain[s] why a person of ordinary skill in the art would have combined elements from specific references *in the way the claimed invention does.*” *TQ Delta*, 942 F.3d at 1360 (quoting *Innogenetics*, 512 F.3d at 1373). As such, none of these arguments suffices to establish motivation to modify Chang in view of Chang II.

2. Petitioner cannot establish obviousness based on combinations that fail to include all claim elements

Petitioner's first argument further suffers from a failure of proof. Petitioner asserts that it would be obvious to modify Chang to not only incorporate dual-role ports, but also to “include a switching structure . . . to select the appropriate transmission path.” (Pet., 59; EX-1013, ¶ 175.) To be sure, a routing logic circuit is required by each claim of the '643 Patent. (EX-1011, Independent Claims 1, 5, and 10 each reciting a “routing logic circuit.”) Petitioner fails, however, to point to any disclosure in either Chang or Chang II as disclosing this element. Nor could it.

Chang, which Petitioner acknowledges uses dedicated ports, does not use, or contemplate using a routing logic circuit. (Pet., 42; EX-2001, ¶ 87; EX-1014, [0020].) Purely as a conceptual matter, Chang II contemplates switching between transmission paths, but does not actually disclose a discrete routing logic circuit that performs this switching. (EX-2001, ¶ 61.) A POSITA would understand that switching between transmission paths could be performed by an element other than a routing logic circuit. (EX-2001, ¶¶ 60-61.) Petitioner has thus failed to specify “where each element of the claim is found in the prior art.” *See* 37 C.F.R. 42.104.

3. “Common-sense” cannot fill the gaps in Petitioner’s motivation-to-combine arguments

Petitioner’s second argument, based on “common-sense,” fails for the additional reason that common-sense rationalization alone is legally insufficient to supply a motivation to combine Chang and Chang II. *See In re Nuvasive, Inc.*, 842 F.3d 1376, 1383 (Fed. Cir. 2016) (“[T]he PTAB cannot rely solely on common knowledge or common sense to support its findings” (citing *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1362 (Fed. Cir. 2016))).

Even if Petitioner’s “common-sense” arguments were legally cognizable, they suffer from a failure of proof. For example, Petitioner’s expert relies on the purportedly common-sense cost savings of dual-role ports, but provides no evidentiary support. Nor does Petitioner’s expert compare the costs associated with Chang’s solution to the costs associated with Petitioner’s allegedly obvious

modification of Chang. That failure is fatal to Petitioner's cost-savings argument because cost savings are relative and can only be evaluated based on a comparison of the two competing solutions. (EX-2001, ¶ 65.) Petitioner's failure is especially problematic here given that Petitioner's proposed modifications to Chang would only *add* components to Chang's existing USB hub, including components like the detection unit that Petitioner borrows from Chang II. (*See* Pet., 46-47; *see also* EX-2001, ¶ 65.)

Regardless, Petitioner's assertion of common-sense motivation to combine is rebutted by its own actions. In short, Petitioner's theory is premised on various shortcomings of then-existing USB systems, such as their reliance on designated host-to-host ports, costly additional components, and lack of persistent downstream USB. OEMs expressed similar concerns about existing solutions, including Petitioner's own products. (EX-2005; EX-2006; EX-2007.) If it was common sense to combine Chang and Chang II to address these issues, one might wonder why Petitioner did not do so. (EX-2010, 1 ("We looked at developing a solution for 1 upstream lane, persistent USB data and we don't have a solution. We wish we could provide a solution but we don't have it.").)

4. Petitioner cannot establish motivation to combine based on arguments that misapply the disclosures in Chang and Chang II

Petitioner's third argument—that a POSITA would have been motivated to add dual-role ports to Chang to further Chang's "express goal" of "easily establishing a connection between a computer and another computer"—also suffers from a failure of proof. (*See* Pet., 43.) As an initial matter, the argument makes little sense: Chang already provides a way to accomplish its "express goal," and it does so by using dedicated ports for host-to-host and host-to-device communication. (EX-1014, [0020]; EX-2001, ¶¶ 62-63.) Complicating Chang's solution by adding steps and components, as Petitioner proposes, would only have frustrated Chang's "express goal." (EX-2001, ¶ 67.) Nothing in Chang calls for Chang II's solution, and Petitioner presents no evidence suggesting otherwise. (*See* Pet., 43; EX-1013, ¶ 178.)

5. Petitioner's final argument lacks sufficient evidentiary support

Petitioner's fourth argument is lacking in evidentiary support. The 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. (Pet., 46.) But Chang II does not suggest that it could be used with a hub. (EX-2001, ¶¶ 70-71.) Instead, the cited paragraphs of Chang II note merely that when using its "bypass path," the "data transmission

bridge device” provides an “intermediate transmission function (similar to the commonly known USB HUB function),” *i.e.*, “host-slave operation.” (EX-1015, [0027]; *see also id.*, [0040] (same).) As a POSITA would have recognized, this has nothing to do with the primary function and defining characteristic of a USB hub—allowing an upstream port to connect to multiple downstream ports. (EX-2001, ¶ 72; *see also* Pet., 8-9 (defining USB hubs in this way).) Rather, it is intended to convey that the bypass path is a passive intermediary and does not interrupt or transform the connection between the USB device and host. (EX-2001, ¶ 72.)

A POSITA need not look beyond Chang and Chang II to recognize that Chang II’s disclosures could not readily be combined with Chang to solve the problem presented by CarPlay and similar functionality. Petitioner’s arguments to the contrary are insufficient as a matter of law, suffer from a failure of proof, and are belied by Petitioner’s own actions, and therefore fail to provide competent evidence of motivation to combine Chang and Chang II. Accordingly, the Petition fails to demonstrate that there is a reasonable likelihood that at least one of the challenged claims is unpatentable.

C. A POSITA Would Not Have Been Motivated to Add Chutorash to the Combination

Recognizing that the combination of Chang and Chang II is deficient, Petitioner proposes adding a third reference, Chutorash. (*See* Pet., 85.) Not only

does this third reference fail to remedy the missing elements of the challenged independent claims, it exacerbates Petitioner's failure to explain why a POSITA would have been motivated to combine the references in the first instance. Just as the Petition provides no motivation for combining Chang and Chang II (see *supra* Sec. VIII.A-VIII.B32), it provides no motivation to combine these two references with Chutorash.

Petitioner claims to rely on Chutorash only as an example of an embedded USB host within a vehicle. (*See* Pet., 85-86.) While Chutorash does disclose USB communications between a mobile device and a vehicle, it does so using a standard, top-down USB architecture in which a single host controls all of the connected components of the infotainment system. (*See* EX-2001, ¶ 75.) It does not contemplate a USB topology in which there are two hosts, each of which may send commands to the connected infotainment devices.

As a POSITA would have recognized, integrating two hosts into an infotainment system requires more than simply adding a hub with host-to-host connectivity. (*Id.*, ¶ 76.) The standard USB devices found in those systems cannot process conflicting commands, which could prove not only frustrating for the user, but also potentially dangerous. (*Id.*) It is easy to envision, for example, the chaos caused by two hosts sending conflicting GPS coordinates to the navigation system.

Chutorash also fails to contemplate that the embedded host it describes is even capable of connecting to another host, much less how it would allow for communication between the two, as would be required for a system capable of coordinating commands to downstream devices. (*Id.*, ¶ 75.) A POSITA would have needed to significantly alter the infotainment system and its embedded host in order to make any dual-role system useful in the vehicle context. Chutorash contains no teaching as to how this would be accomplished, nor any reason to believe that it could be. (*Id.*, ¶ 76.) A POSITA looking to place a dual-role hub into a vehicle would therefore not have looked to the standard system taught in Chutorash as an example of an embedded host or USB network capable of supporting such a device in a way that would provide a useful improvement. (*Id.*) For these same reasons, even if a POSITA did attempt to combine Chutorash's teaching with the alleged combination of Chang and Chang II, there would not have been any reason to believe that such a combination would succeed.

Petitioner's arguments amount to nothing more than hindsight. The mere contention that "Chutorash expressly discloses using a USB hub in a vehicle control/infotainment system" does not provide a reason why a POSITA would be motivated to place a dual-role hub in that environment. (Pet., 85.) And neither the Petition nor Petitioner's expert provide any non-conclusory justification for doing so other than to satisfy the challenged claim limitations. This is "impermissible *ex*

post reasoning and hindsight bias” and should not be credited. *See TQ Delta*, 942

F.3d at 1361 (cautioning that such arguments “risk[] allowing the challenger to use the challenged patent as a roadmap to reconstruct the claimed invention using disparate elements from the prior art—i.e., the impermissible *ex post* reasoning and hindsight bias that *KSR* warned against.”).

IX. THE CHALLENGED CLAIMS ARE NOT INDEFINITE UNDER 35 U.S.C. § 112

Petitioner argues that the following four phrases in the '643 Patent are indefinite:

- “the USB hub and USB bridge have different components and functionality,” which appears in independent claims 1, 5, and 10;
- “routing logic circuit,” which appears in independent claims 1, 5, and 10;
- “signal detection circuit,” which appears in independent claims 1 and 5; and
- “wherein the USB routing switch includes the signal detection circuit,” which appears in dependent claims 4 and 9.

A patent's claims are indefinite only if the “claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.”

Nautilus, Inc. v. Biosig Instruments, Inc., 572 U.S. 898, 901 (2014); *In re Packard*,

751 F.3d 1307, 1311 (Fed. Cir. 2014) (holding a claim indefinite when it contains words or phrases that are “unclear in describing and defining the claimed invention.”). Here, Petitioner fails to meet its burden to show that any of the challenged limitations are indefinite for the reasons explained below.

A. “The USB Hub and USB Bridge Have Different Components and Functionality” (Ground 3)

The term “the USB hub and USB bridge have different components and functionality” is not indefinite. This term is non-technical, providing general descriptive language that means simply what it says: that the claimed USB bridge and the claimed USB hub must have different components and different functionality from each other.

Petitioner’s argument is premised on the word “different” as used in the term, which Petitioner asserts renders the term indefinite because it is unclear *how* the USB hub and USB bridge are different. (Pet., 88-89.) But Petitioner’s argument that it does not understand what difference, *e.g.*, a structural difference or otherwise, the word “different” requires is a complaint about the breadth of the claim, not about what meaning the word “different” imparts. This complaint is legally insufficient, as a claim term is not indefinite merely because it is broad. *See, e.g., BASF Corp. v. Johnson Matthey Inc.*, 875 F.3d 1360, 1367 (Fed. Cir. 2017) (“But the inference of indefiniteness simply from the scope finding is legally incorrect: ‘breadth is not indefiniteness.’”); *Ultimax Cement Mfg. Corp. v. CTS*

Cement Mfg. Corp., 587 F.3d 1339, 1352 (Fed. Cir. 2009) (“Merely claiming broadly” does not “prevent the public from understanding the scope of the patent.”); *In re Gardner*, 427 F.2d 786, 788 (CCPA 1970) (“Breadth is not indefiniteness.”); *Supercell OY v. Gree, Inc.*, PGR2018-00055, Paper 36, 36-38 (P.T.A.B. Sept. 23, 2019) (finding that challenged claims are not indefinite and classifying Petitioner’s arguments as pertaining to “breadth rather than definiteness”).

Moreover, Petitioner mischaracterizes the circumstances under which this term was added by amendment during prosecution. Petitioner asserts that there “is no context that could provide clarity” because this limitation was added in response to an Examiner Interview. (Pet., 92.) Not so. In fact, this term was added *by the Examiner* in order to place the claims in position for allowance. (EX-1012, 107-108.) Accordingly, the language is presumed not indefinite. *See Nature Simulation Sys. Inc. v. Autodesk, Inc.*, 50 F.4th 1358, 1367-1368 (Fed. Cir. 2022) (criticizing the district court’s failure to give weight to the prosecution history and Examiner’s Amendment); *Tinnus Enters., LLC v. Telebrands Corp.*, 733 F. App’x 1011, 1020 (Fed. Cir. 2018) (“We presume that an [E]xaminer would not introduce an indefinite term into a claim when he/she chooses to amend the claim for the very purpose of putting the application in a condition for allowance.”).

Here, any difference in components and functionality would satisfy the claim language. In the context of the invention, USB signals emanating from the consumer device are routed through both the USB hub and USB bridge when the consumer device is determined to be in a USB host mode, whereas the USB signals are routed directly to the USB hub, thereby bypassing the USB bridge when the consumer device is determined to be in a USB device mode. (EX-1011, 4:25-33.) It is evident, then, that the bridge must perform some function that the hub does not to facilitate communication between a pair of USB hosts. Petitioner acknowledges this fact, as it must. (Pet., 90-91) (“Of course, drilling down on how the hub and bridge function to connect ports will result in some differences.”). The specification explains that the bridge performs a host of functions that the hub does not. (EX-1011, Figs. 6, 7; 4:44-53; 6:3-5, 14-17, 44-59; 7:22-8:42.)

None of the claims, the specification, or the prosecution history limits what difference is required beyond different “components” and different “functionality.” That is, there is no disavowal of claim scope that limits “different” beyond requiring different “components” and “functionality.” This straight-forward reading, that any difference in components and functionality would satisfy the claim language, is consistent with how the Federal Circuit has construed the term “different” under similar circumstances. *See, e.g., Sorensen v. Int’l Trade Comm’n*, 427 F.3d 1375, 1379 (Fed. Cir. 2005) (construing “different

characteristics” to mean “any difference in characteristics” where the term “different” in view of the entire claim connoted such meaning and there was “no disavowal of claim scope” in either the specification or prosecution history).

A POSITA reading this limitation in light of the specification and prosecution history would understand that as long as the USB bridge and the USB hub do not have the exact same components and do not have the exact same functionality, they meet the limitation that “the USB hub and USB bridge have different components and functionality.” (EX-2001, ¶ 97; *see also id.* at 98-99.) Accordingly, a POSITA, reading the claim in light of the specification and prosecution history, would be informed, with reasonable certainty, about the scope of the invention.

B. “Routing Logic Circuit” (Ground 4)

The term “routing logic circuit” is not indefinite. A POSITA would understand, based on the plain language of the term, the surrounding claim context, and the specification, that this term refers to a class of structures that directs signals from one input/output interface to another. (*Id.*, ¶ 100.)

The claims set forth the functions performed by the “routing logic circuit.” In Claim 1, which is representative, the “routing logic circuit” “rout[es] the USB signals emanating from the USB device” in accordance with a determination as to whether the consumer USB device is operating in host or device mode. (EX-1011,

Claims 1, 5, 10.) This claim language adds context to identify the class of structures to which the term applies, namely, circuits that route signals. *See MIT v. Abacus Software*, 462 F.3d 1344, 1355 (Fed. Cir. 2006) (noting that the qualifier “aesthetic correction” before “circuit” adds further structure by describing operation of the “circuit”). As Petitioner acknowledges (Pet., 101), the specification goes on to disclose multiple configurations in which routing logic circuitry may be implemented. (EX-2001, ¶ 103.) For example, routing logic circuitry may be a discrete device, it may be present inside a USB multiplexing switch, or it may include circuitry to implement “USB routing logic.” (EX-1011, 4:35-38, 4:40-43; Figs. 4-6; EX-2001, ¶ 103.)

Petitioner's assertions that this term is indefinite contradict the context provided by the claim language itself and the examples provided by the specification. Moreover, Petitioner again ignores that this term was added *by the Examiner* in order to place the claims in position for allowance, creating a presumption that it is not indefinite for the same reasons as the “different components and functionality” term discussed above. (EX-1012, 107-108); *see Tinnus Enters.*, 733 F. App'x at 1020.

The claims and disclosures in the specification would inform a POSITA with reasonable certainty of the scope of the term “routing logic circuit.” A POSITA reading the term within the context of the claim language and specification would

understand that the claims identify what is routed where (*i.e.*, signals emanating from the consumer device are routed to the USB bridge or directly to the USB hub), and that this routing could be implemented using various circuit techniques (*e.g.*, switches, logic gates, control lines, port identifiers, etc.). (EX-2001, ¶¶ 102-103.) The POSITA would not, therefore, be confused as to the scope of the term because the term itself recites the specific operation of the claimed routing logic circuit (*e.g.*, to route signals), and the specification provides examples that assist a POSITA in identifying exemplary structures that perform that operation. (*Id.*) Accordingly, a POSITA reading the claim in light of the specification and prosecution history would be informed, with reasonable certainty, about the scope of the invention.

C. “Signal Detection Circuit” (Ground 5)

Petitioner asserts that the term “signal detection circuit” is a “means-plus-function” term that lacks corresponding structure for performing its recited function as required under § 112 ¶ 6. (Pet., 94.) Therefore, according to Petitioner, “signal detection circuit” is indefinite. (*Id.*, 94.) Petitioner is incorrect.

1. 35 U.S.C. § 112 ¶ 6 does not apply because “signal detection circuit” does not recite “means” or a similar nonce word

Petitioner does not, and cannot, dispute that the claims do not recite the word “means.” (*Id.*, 94.) Because “signal detection circuit” does not recite the word “means,” it is presumed that § 112 ¶ 6 does not apply. *See Williamson v. Citrix*

Online, LLC, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (“the failure to use the word ‘means’ [] creates a rebuttable presumption that § 112 ¶ 6 does not apply”).

Though a claim term that does not recite the word “means” may nonetheless use “a similar nonce word that can operate as a substitute for ‘means,’” that is not the case here. *MTD Prods. Inc. v. Iancu*, 933 F.3d 1336, 1341 (Fed. Cir. 2019) (internal quotations omitted). A “critical question” to assess whether a particular word is a “nonce word” is “whether the claim term is used in common parlance or by persons of [ordinary] skill in the pertinent art to designate structure, including either a particular structure or a class of structures.” *Id.* Here, the term “circuit” is well-understood by a POSITA as conveying structure. (EX-2015 (*Wiley Electrical and Electronics Engineering Dictionary*), 112 (defining “circuit” as “[o]ne or more conducting paths which serve to interconnect electrical elements, in order to perform a desired function such as amplification or filtering.”) (2004).) Furthermore, courts have repeatedly held that “circuit” connotes structure. *See, e.g., Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, 711 F.3d 1348, 1364 (Fed. Cir. 2013) (“We have previously held on several occasions that the term ‘circuit’ connotes structure.”); *Abacus*, 462 F.3d at 1355 (“[D]ictionary definitions establish that the term ‘circuitry,’ **by itself**, connotes structure.”); *Linear Tech. Corp. v. Impala Linear corp.*, 379 F.3d 1311, 1320 (Fed. Cir. 2004) (“Technical dictionaries which are evidence of the understandings of person of

skill in the technical arts, plainly indicate that the term ‘circuit’ connotes structure . . . The *Dictionary of Computing* 75 (4th ed. 1996) defines ‘circuit’ as ‘the combination of a number of electrical devices and conductors that, when interconnected to form a conducting path, fulfill some desired function.’”).

Accordingly, because the claims do not recite the word “means” or a similar nonce term, it is presumed that § 112 ¶ 6 does not apply.

2. Petitioner cannot overcome the presumption that “signal detection circuit” is not a means-plus-function term

Petitioner has not met its burden to rebut the presumption that this term is not subject to § 112 ¶ 6. When a patent term lacks the word “means,” the presumption can be overcome if the challenger demonstrates that “the claim term fails to ‘recite sufficiently definite structure’ or else recites ‘function without reciting sufficient structure for performing that function.’” *Williamson*, 792 F.3d at 1349. Petitioner fails to overcome the presumption here because: (1) the term “signal detection circuit” connotes a class of structures to a POSITA, (2) the adjectival qualifier that the circuit operates to detect signals connotes further structure, and (3) the claims provide further description of the operation of the signal detection circuit identifying sufficient structure to a POSITA.

First, the term “signal detection circuit” is well understood by a POSITA as conveying sufficient structure. (*See* EX-2001, ¶¶ 104-105.) For instance, multiple patents filed before the ’643 Patent’s September 26, 2013 priority date use this

term to describe components within their respective inventions. (*See, e.g.*, EX-2012 (U.S. 7,282,965, claims directed to a “signal detection circuit” for detecting an input signal); EX-2013 (U.S. 5,838,875, describing a “signal detection circuit” for discriminating between analog and digital signals); EX-2014 (U.S. 6,441,627, describing a “signal detection circuit” for detecting a power characteristic of a signal).) As explained above, Federal Circuit case law similarly indicates that the term “circuit” by itself “connotes structure.” *See, e.g., Power Integrations*, 711 F.3d at 1364. Accordingly, a POSITA would understand that the term “signal detection circuit” refers to a class of circuits that perform the claimed signal reception and identification functions. (EX-2001, ¶ 107.)

Second, Claim 1, which is representative, includes the adjectival qualifier “signal detection” before “circuit.” (EX-1011, Claim 1.) This adjectival qualification indicates the circuit operates to detect signals and “adds further structure by describing the operation” of the “circuit.” *Abacus*, 462 F.3d at 1355-56 (holding the adjectival qualification “aesthetic correction” in the term “aesthetic correction circuitry” connotes sufficient structure to avoid means-plus function because the qualifier “adds further structure by describing the operation of the circuit,” which “is sufficient to avoid 112 ¶ 6.”); *see also, Phenix Longhorn, LLC v. Wistron Corp.*, No. 2:17-cv-00711-RWS, 2019 WL 2568476, at *15 (E.D.

Tex. June 21, 2019) (quoting *Power Integrations*, 711 F.3d at 1365) (“circuits for programming” conveys sufficient structure).

Third, the surrounding claim context further describes the signal detection circuit's operation, which provides sufficient detail to connote structure to a POSITA. The claims recite that the “signal detection circuit” receives USB signals from the consumer USB device and determines whether the consumer USB device is operating in a USB host mode or in a USB device mode. (EX-1011, Claims 1, 5.) This description provides sufficient detail to “suggest structure to persons of ordinary skill in the art” such that the term should not be deemed a means-plus-function limitation. *See Linear Technology*, 379 F.3d at 1320-1321 (“[W]hen the structure-connoting term ‘circuit’ is coupled with a description of the circuit’s operation, sufficient structural meaning generally will be conveyed to persons of ordinary skill in the art § 112 ¶ 6 presumptively will not apply.”)

Petitioner’s expert opined that “[i]t was well-known to POSITAs circa 2013 that detecting the presence/values of the resistors using, *e.g.*, a voltage divider, indicated whether a host or device was connected.” (EX-1013, ¶ 76.) Petitioner’s expert goes on to provide additional exemplary structures for signal reception and classification: a “pull up resistor” on a data line (Bohm ’759), a “sensing mechanism” for sensing impedance changes (Bohm ’885), passive monitoring of data lines (Castleberry). (*Id.*, ¶ 77.) Accordingly, by providing such Examples,

Petitioner's own expert acknowledges evidence that the term "signal detection circuit" and the surrounding claim context provide sufficient detail such that a person of skill in the art would understand the term refers to the class of structures that perform the claimed signal reception and detection functions. (See EX-2001, ¶ 111, *see also id.* at ¶¶ 107-110.)

Because the term "signal detection circuit" refers to sufficient structure, Petitioner cannot overcome the presumption that it is not a means-plus-function term, and therefore cannot demonstrate that "signal detection circuit" is indefinite.

3. Petitioner's failure to point to any structure warrants denying institution

Petitioner asserts that the term "the signal detection circuit" "require[s] construction" (Pet., 29) and that it is a means-plus-function term. (*Id.*, 94.)

However, Petitioner points to no structure and instead states that "if the Board finds the term is means-plus-function but there is a corresponding structure, this Petition assumes corresponding structure is merely a circuit that performs the functions of the claims, *because the specification discloses no structure.*" (*Id.*, 99.) Petitioner thus points to no corresponding structure in the specification.

Petitioner's failure to identify structure in the specification warrants denying institution. 37 C.F.R. § 42.204(b)(3) requires that the Petitioner identify how a challenged claim is to be construed, and, more specifically, that if the Petitioner asserts a challenged claim contains a means-plus-function limitation, the petitioner

“***must*** identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function.” “When a petitioner has not adequately identified a construction for a means-plus-function limitation, the Board ***typically denies institution***, or, if trial has been instituted, determines that the petitioner has failed to carry its burden as to the challenges involving the means-plus-function limitation.” *Intex Recreation Corp v. Team Worldwide Corp.*, IPR2019-00243, Paper 7, 19 (P.T.A.B. May 8, 2019). Because Petitioner has pointed to no corresponding structure, it has not adequately identified a construction for a term it asserts is means-plus-function, and this petition should be denied for failing to comply with 37 C.F.R. § 42.204(b)(3).

D. “Wherein the USB Routing Switch Includes the Signal Detection Circuit” (Ground 6)

The term, “wherein the USB routing switch includes the signal detection circuit” is not indefinite. Petitioner contends that it is unclear “what it means for the ‘routing switch’ to ***include*** ‘the signal detection circuit’” (Pet., 99), but this contention is unfounded.

1. “Includes” has a straightforward meaning

The word “includes” itself has a straightforward, plain meaning. Merriam-Webster defines “include” to mean “to take in or comprise as part of a whole or group.” (EX-2011 (*Include*, Merriam-Webster Online Dictionary (Apr. 3, 2024), <https://www.merriam-webster.com/dictionary/includes>).) Based on

its plain meaning, a POSITA would understand that this claim term requires simply that the USB routing switch comprises the signal detection circuit as part of a whole or group. (EX-2001, ¶ 114.)

The surrounding claim language confirms the straightforward meaning of “includes.” Claim 1 recites that the signal detection circuit receives USB signals from the consumer device and determines whether the consumer device is operating in a USB host or a USB device mode, and Claim 3 recites that a USB routing switch routes signals emanating from the consumer device to the USB hub such that the signals bypass the USB bridge based on the determination of the signal detection circuit. (EX-1011, Claims 1, 3.) Accordingly, the other claims describe that a signal is first received by the signal detection circuit before being routed by the USB routing switch based on the determination by the signal detection circuit.

This straightforward meaning of “includes” is also clear based on the prosecution history. Specifically, the Examiner understood during prosecution that “includes,” as used in the claim term, indicates membership within a group of components. For example, the Examiner cited a prior art reference’s “combination of hub logic 38, mux 72B and transceiver 34B,” and the connections between those elements (depicted in Figures 4 and 5) as disclosing a USB routing switch that performs the function of bypassing the USB bridge, wherein the USB routing

switch includes the signal detection circuit. (EX-1012, 68; EX-1047.) In other words, the Examiner understood that multiple devices *could be part of a group* to satisfy the language “includes” as used in the claims.

2. Petitioner's contention relates to implementation-level details, not definiteness

Petitioner contends that this term is indefinite because Petitioner fails to understand “how” the USB switch includes the signal detection circuit. (Pet., 102.) Generally, Petitioner's contention concerns how, from a structural standpoint, the USB routing switch includes the signal detection circuit. (Pet., 99-102.)

None of the claims, specification, or the prosecution history limits the scope of the claim to a particular structural arrangement beyond the USB routing switch including the signal detection circuit. Because there exists no such disclaimer or disavowal of claim scope, the word “includes” does not impart a narrow structural requirement. Much like in *Sorensen*, where the Court held that “different characteristics” meant “any difference in characteristics” where there was no disavowal of claim scope, here, “includes” indicates any structural limitation where the routing switch includes the signal detection circuit within a group. *See Sorensen*, 427 F.3d at 1379.

At base, Petitioner's contentions relate to implementation-level details, which do not give rise to indefiniteness. *See, e.g., Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1382-83 (Fed. Cir. 2015) (holding that despite the

patent's lack of a specific definition, a skilled artisan would understand "spaced relationship" to mean neither infinitesimally small nor greater than the width of a user's hands based on the claim language, specification, and figures because the claims require measurement at distinct points of a hand) (cert. denied);

Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1575-76 (Fed. Cir. 1986) (a chair leg portion "so dimensioned as to be insertable through the space between the doorframe of an automobile and one of the seats thereof," not indefinite because "[t]he patent law does not require that all possible lengths corresponding to the spaces in hundreds of different automobiles be listed in the patent, let alone that they be listed in the claims"); *Arbor Glob. Strategies LLC v. Samsung Elecs. Co.*, No. 2:19-CV-00333-JRG, 2020 WL 7074877, at *29 (E.D. Tex. Dec. 3, 2020) ("The word 'accelerated' does not give rise to indefiniteness because the relative speeds and the precise manner of acceleration are implementation-specific details.").

Here, the claims, read in light of the specification, provide sufficient description for those skilled in the art to understand the scope of the claims with reasonable certainty. *See Nautilus*, 572 U.S. at 909. This instance is similar to *Eibel Process Co.*, where the Court upheld a patent directed to an improvement for a paper-making machine that required a wire be placed at a "high" or "substantial elevation" as definite because "readers ... skilled in the art of paper making"

would have “no difficulty” determining the elevation needed” for the machine to operate as specified. *See Eibel Process Co. v. Minnesota & Ontario Paper Co.*, 261 U.S. 45, 58, 65-66 (1923) (cited with approval in *Nautilus*, 572 U.S. at n.5.). The same logic applies here in that a person of skill in the art would have “no difficulty” arranging the USB routing switch and the signal detection circuit such that the USB routing switch includes the signal detection circuit as part of a whole or group. (EX-2001, ¶ 116.) That is, the POSITA would understand that a method as claimed could be implemented using a system wherein the USB routing switch comprises the signal detection circuit as part of a group of devices that receive USB signals from a consumer device and route those signals based on a determination as to whether the consumer device is in a host or device mode as explained in the claims and specification. (*Id.*)

In fact, Petitioner's own exemplary implementations illustrate that a POSITA would understand the scope of the claim with reasonable certainty. According to Petitioner, the word “includes” in the claim term “indicates that the ‘signal detection circuit’ is inside the ‘switch’ or that the ‘switch’ uses the same circuitry as the ‘signal detection circuit.’” (Pet., 99-100.) Alternatively, Petitioner posits that the effect of “includes” may be that “the ‘routing switch’ and ‘signal detection circuit’ are simply on the same IC,” “that the transistors that comprise the ‘switch’ and ‘signal detection circuit’ [are] intermingled,” or further still, that “the

switch transistors themselves [] also function as a ‘signal detection circuit.’” (Pet., 100.) Each of Petitioner’s proposed structural implementations satisfies the claim because each implementation is configured such that the USB routing switch includes the signal detection circuit as part of a whole or group. Petitioner has in fact tacitly acknowledged the scope of the claim by providing this list of exemplary implementations, thereby illustrating that the scope, *i.e.*, the definiteness, of the claim is clear.

Accordingly, a POSITA would understand the scope of the invention with reasonable certainty and the claim term is therefore not indefinite.

3. Petitioner’s contention that its argument also extends to dependent Claim 15 is baseless

Petitioner relies exclusively on its expert’s declaration to assert that its arguments to this claim term also extend to dependent Claim 15. (Pet., 99.) But neither Claim 15 nor any of the claims from which Claim 15 depends *even recite a signal detection circuit*, let alone the entire phrase “wherein the USB routing switch includes the signal detection circuit.” (EX-1011, Claims 10-15.) Neither Petitioner nor its expert offer any explanation (let alone citation to the patent or its prosecution history), for their bald assertions that Claim 15 should be read to include limitations that the applicant chose to include in dependent Claims 4 and 9, but not in Claim 15. *See Tandon Corp. v. U.S. Int’l Trade Comm’n*, 831 F.2d 1017, 1023 (Fed. Cir. 1987) (“There is presumed to be a difference in meaning and

scope when different words or phrases are used in separate claims.”). Undeterred by the applicant’s decision not to add a “signal detection circuit” in Claim 15, Petitioner’s expert attempts to import a “signal detection circuit” into Claim 15 through Claim 15’s recitation of a “USB routing switch.” According to Petitioner’s expert, “[b]ecause claim 15 recites that the switch performs the detection functionality ... Claim 15 would be understood to require that the switch includes the signal detection circuit in some way, because the switch performs the signal detection functionality.” (Pet., 99; EX-1013, ¶ 341.) This circular, *ipse dixit* argument finds no support within the claims, the specification, or prosecution history.

X. THE CHALLENGED CLAIMS HAVE SUFFICIENT WRITTEN DESCRIPTION UNDER 35 U.S.C. § 112

To satisfy the written description requirement under 35 U.S.C. § 112, the specification must “reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010). Assessing sufficiency of written description support “requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art.” *Id.* The written description inquiry turns not on “the presence or absence of literal support in the specification for the claim language,” *In re Kaslow*, 707 F.2d 1366, 1375 (Fed. Cir. 1983) (citation omitted), but instead, upon

whether the specification conveys possession of the “complete and final invention with all its claimed limitations.” *Ariad*, 598 F.3d at 1353. Further, the “level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology.” *Id.* at 1351-52.

In Ground 7, Petitioner asserts that the term “wherein the USB routing switch includes the signal detection circuit,” which appears in dependent claims 4 and 9, is invalid for lack of written description. (Pet., 102-103.) Not so.

At the outset, Petitioner repeats its unfounded assertion that its argument for this term extends to dependent Claim 15, which does not recite the term at all and does not recite claim limitations that Petitioner seeks to read in. For the same reasons discussed *supra* Section IX.D.3, Petitioner's Ground 7 arguments apply only to dependent claims 4 and 9, and not to dependent Claim 15.

Petitioner's primary contention relates to its scope—Petitioner asserts that the term lacks written description support because the specification “provides no structural description” of how the USB routing switch might include the signal detection circuit. (Pet., 102.) Against the field of USB, which is *not* an unpredictable art, Petitioner's assertion rings hollow. ((EX-2001, ¶ 120); *see also* Chisum on Patents § 7.03(7) (classifying “predictable arts” “as mechanics or electronics” versus “‘unpredictable’ arts, such as chemistry or biotechnology”).)

First, it turns a blind eye to Petitioner's own characterization of a routing switch as a "well-known component[]" (Pet., 1), that would not require a detailed description in the specification to demonstrate possession. Second, it ignores that a POSITA relies on his or her knowledge and skill in the art when reviewing the disclosures in the specification. *See Boston Sci. Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1366 (Fed. Cir. 2011) ("Because the specification is viewed from the perspective of one of skill, in some circumstances, a patentee may rely on information that is 'well-known in the art' for purposes of meeting the written description requirement.").

Moreover, to satisfy written description, the specification need not disclose basic routine implementation details or exemplary implementations of the invention. *See, e.g., Centrak, Inc. v. Sonitor Techs., Inc.*, 915 F.3d 1360, 1366 (Fed. Cir. 2019) ("[W]ritten description is about whether the skilled reader of the patent disclosure can recognize that what was claimed corresponds to what was described; it is not about whether the patentee has proven to the skilled reader that the invention works, or how to make it work, which is an enablement issue."); *Univ. of Rochester v. G.D. Searle & Co., Inc.*, 358 F.3d 916, 923 (Fed. Cir. 2004) (written description involves a comparison of what is disclosed to what is claimed, not an analysis of whether the disclosure teaches a skilled artisan how to make the invention).

A POSITA would understand, based on the specification's disclosure and his or her general understanding of routing switches and signal detection circuits in the field of USB, that the specification sufficiently describes this term. (EX-2001, ¶¶ 118-122.) The claims and specification explain that the function of the USB routing switch is to route signals emanating from the consumer device to the USB hub such that the signals bypass the USB bridge upon a determination that the consumer device is in a USB host mode, and further that the signal detection circuit functions to receive USB signals from the consumer device and determine whether the consumer device is acting in a USB host mode or a USB device mode. (EX-1011, 4:45-57, Claims 1, 5, 10.) Based on this disclosure, a POSITA would understand that the claims identify what is routed where (*i.e.*, signals emanating from the consumer device are routed to the USB bridge or directly to the USB hub), that this routing is performed in accordance with a determination by a signal detection circuit, and that these routing and signal detection functions can be implemented using a group of devices. (EX-2001, ¶¶ 102, 118.)

Indeed, after reviewing the specification, Petitioner's own expert offered two implementations of "wherein the USB routing switch includes the signal detection circuit" (Pet., 99-100), thereby confirming that a POSITA would understand the inventor to be in possession of at least two implementations of this limitation. To the extent Petitioner argues that Claims 4 and 9 lack written description for failure

of the specification to contain the same literal language as that recited in the claims (*see Id.*, 102-03), that is irrelevant. *See, e.g., Nalpropion Pharms., Inc. v. Actavis Lab'ys., FL, Inc.*, 934 F.3d 1344, 1350 (Fed Cir. 2019) ("It is not necessary that the exact terms of a claim be used *in haec verba* in the specification, and equivalent language may be sufficient.")

Accordingly, for the reasons explained above, the specification reasonably conveys to a POSITA that the inventors had possession of the claimed subject matter.

XI. CONCLUSION

Petitioner has failed to establish any motivation to combine the references on which it relies. Three of its arguments for why Chang and Chang II should be combined fail to address Chang II in any way and are therefore legally insufficient. Petitioner's fourth argument lacks sufficient evidentiary support, relying instead on tangential mentions of "USB hubs" in the Chang II specification. Because the basis for each challenged claim relies on the combination of Chang and Chang II, the failure to show a motivation to combine those references is fatal to the petition.

Petitioner has also failed to explain why a POSITA would have been motivated to combine Chang and Chang II with Chutorash. Rather, its treatment of Chutorash reveals that Petitioner's arguments are the product of impermissible hindsight.

Patent Owner's Preliminary Response

Finally, Petitioner's assertions with respect to indefiniteness fail because a POSITA would be informed, with reasonable certainty, about the scope of the invention from reading the claims in light of the specification and prosecution history. Further, Petitioner's written description challenge fails because a POSITA reading the claims and specification would recognize that the inventors had possession of the claimed subject matter based on description of the components (*e.g.*, the USB routing switch and signal detection circuit), their functions, and the interrelations between the recited components.

Therefore, Patent Owner respectfully requests that the Board deny institution of the petition for post grant review of the '643 Patent.

Dated: April 18, 2024

Respectfully submitted,

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Certification of Word Count (37 C.F.R. § 42.24)

I hereby certify that this PATENT OWNER'S PRELIMINARY RESPONSE has 13,927 words (as counted by the "Word Count" feature of the Microsoft Word™ word-processing system), exclusive of "a table of contents, a table of authorities, mandatory notices under § 42.8, a certificate of service or word count, or appendix of exhibits or claim listing."

Dated: April 18, 2024

By /s/ Alex S. Yap

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CERTIFICATE OF SERVICE

I hereby certify that the attached PATENT OWNER'S PRELIMINARY RESPONSE was served as of the below date via email (by agreement) to the following counsel of record for the Petitioner:

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