UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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MICROCHIP TECHNOLOGY INC.,
Petitioner,

v.

APTIV TECHNOLOGIES AG,
Patent Owner.

_____

Case No. IPR2024-00229
Patent No. 9,645,962

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PATENT OWNER'S PRELIMINARY RESPONSE

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Exhibit List for *Inter Partes* Review of U.S. Patent No. 9,645,962

Exhibit #	Exhibit Description
2001	Declaration of Henry Houh ("Houh Decl.")
2002	Trial Transcript Excerpts, *Microchip Tech. Inc. v. Aptiv Servs. US, LLC*, No. 17-cv-1194 (D. Del. Apr. 6-13, 2022) – Testimony of Mitch Obolsky
2003	Trial Transcript Excerpts, *Microchip Tech. Inc. v. Aptiv Servs. US, LLC*, No. 17-cv-1194 (D. Del. Apr. 6-13, 2022) – Testimony of Robert Voto
2004	Complaint, *Aptiv Technologies Ltd. v. Microchip Technology, Inc.*, No. 23-cv-307-JDW (DED)
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, and 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
2011-2015	*Intentionally Omitted*
2016	Declaration of Robert Dezmelyk in Support of Microchip's Responsive Claim Construction Brief, *Aptiv Technologies Ltd. v. Microchip Technology, Inc.*, No. 23-cv-307-JDW (DED)
2017	Trial Transcript Excerpts, *Microchip Tech. Inc. v. Aptiv Servs. US, LLC*, No. 17-cv-1194 (D. Del. Apr. 6-13, 2022) – Testimony of Michael Dreon

Exhibit #	Exhibit Description
2018	Redacted Version of Jury Verdict Form, *Microchip Tech. Inc. v. Aptiv Servs. US, LLC*, No. 17-cv-1194 (D. Del.), D.I. 357

Aptiv Technologies AG ("Aptiv" or "Patent Owner") submits this Patent Owner's Preliminary Response under 35 U.S.C. § 323 and 37 C.F.R. § 42.107 to Microchip Technology Inc. ("Microchip" or "Petitioner")'s Petition for *Inter Partes Review* of U.S. Patent No. 9,645,962 ("the '962 Patent").

I. INTRODUCTION

The Board should deny the Petition. Petitioner provides no reason, other than attorney argument based on hindsight, why a POSITA would be motivated to combine the two 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. Ultimately, Chang I and Chang II, authored by different named inventors, are designed to address entirely different technical problems from one another and from the '962 Patent. It was, in fact, precisely the limitations of systems like Chang and Chang II that the '962 Patent was designed to resolve.

Petitioner's addition of a third reference, Cypress Semiconductor AN96527 ("AN96527"), only exacerbates this issue. This third reference addresses power delivery only for standard USB systems and fails to provide any motivation besides hindsight for a POSITA to combine this reference with the dual-role and

host-to-host features of the claimed USB hub. Nor does AN96527 explain how such a combination could be achieved with a reasonable likelihood of success.

Petitioner's own struggle to create a working solution to the problem solved by the '962 Patent underscores precisely why such a solution was not obvious. The inventors of the '962 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 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.

Because Chang, Chang II, and AN96527 are directed to different problems, their combination also fails to address every limitation of the challenged claims. Most notably, none of the references teach a system in which two USB hosts are able to engage in "bidirectional communication," as required by every independent claim of the '962 Patent. Because the Petition suffers from multiple glaring deficiencies, the Board should decline to institute *inter partes* review of the '962 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-1005, 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-1005, 1:51-56, 2:12-17.)

USB uses a strict top-down topology: a single upstream "host" manages and communicates with all downstream "devices." (EX-1005, 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. (EX-2001, ¶ 33.)

The downstream devices connect to the host via ports—physical connection interfaces. (EX-2001, ¶ 36.) USB networks may also include USB hubs—devices that increase the number of ports to which downstream devices may connect. (EX-2001, ¶ 36.) 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. (EX-2001, ¶ 36.)

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. (EX-2001, ¶ 39.) As part of its announcement, Apple provided automakers with certain technical requirements to ensure that CarPlay would function properly. (EX-2001, ¶ 39.) 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. (EX-2001, ¶ 39.)

Notably, CarPlay required that the iPhone act as the USB host at all times while CarPlay was in use. (EX-2001, ¶ 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. (EX-2001, ¶ 40.) 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. (EX-2001, ¶ 40.)

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-1005, 3:9-12; 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. (EX-2001, ¶ 40.) Even more challenging, certain non-CarPlay use cases expected the iPhone to function as a USB device. (EX-1005, 2:56-60.)

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-2001, ¶ 42.)

The second solution was role reversal: a method of inverting the USB system to swap the existing host and device roles. (EX-1005, 3:21-23.) For example, specialized "On-the-Go" or "OTG" ports permitted OTG-capable devices to act as a host while CarPlay was active. (EX-1005, 3:24-27; EX-2001, ¶ 43.)

Similarly, solutions like 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-1005, 3:49-52; 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-1005, 3:59-63.) That meant that the infotainment system could not support other downstream devices during CarPlay, potentially interrupting features like navigation and audio playback. (EX-1005, 3:63-67.) 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 '962 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[1].)

- During an April 2022 trial[2], Microchip admitted that it told customers 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

> 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 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:

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disagreed, finding conclusively that Aptiv's product did not infringe any of the patents Microchip asserted against it. (EX-2018.)

> 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) (emphases added).)

- 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

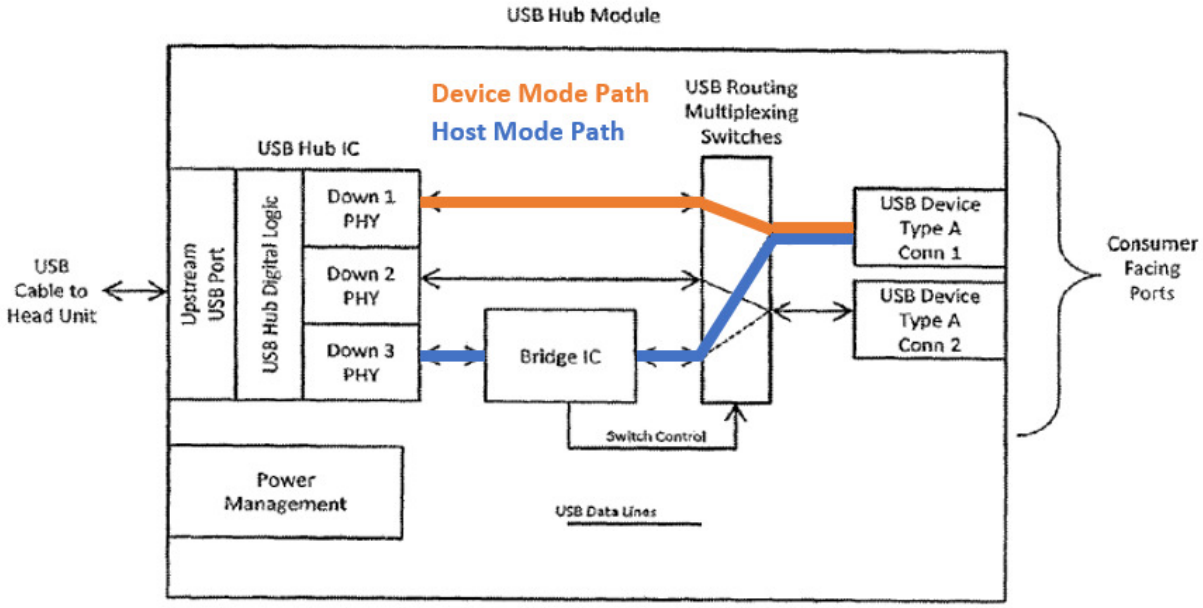
While Microchip, the market leader considered this to be a problem with no solution, Aptiv was able to create a single-upstream solution that supported

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-1005, Claim 1, 4:17-22.) Specifically, when the consumer device is in host mode, the USB signal is routed to the hub through a USB bridge, rendering the two hosts compatible. (*Id.*, Claim 1, 4:33-38.) But when the consumer device is in device mode, the USB signal is routed directly to the hub, thereby bypassing the bridge. (*Id.*, 4:39-45.) The alternative paths are shown below in an annotated version of Figure 4.

[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.

Figure 4



(*Id.*, Fig. 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.*, 10:17-26.) And it accomplishes this without the need for OTG ports or adapters; it takes an entirely different approach to solving the problem. (*See id.*, 1:20-26.)

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 automakers 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 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. 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. (EX-2001, ¶ 26.)

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., 23-24, *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

IV. THE '962 PATENT

At a high level, the '962 Patent is generally directed to devices for facilitating host-to-host and host-to-device communications through a USB hub. (EX-1005, Abstract.) The '962 Patent contains claims directed to a USB hub module (claims 1-13) and an integrated circuit (claims 14-19).

Claim 1 of the '962 Patent is generally representative, and recites:

1. A Universal Serial Bus (USB) hub module, comprising:

an upstream USB port;

a plurality of downstream USB ports;

a USB hub interconnected to the upstream USB port and the plurality of downstream USB ports, said USB hub configured to broadcast data from the upstream USB port to each downstream USB port and to transmit data from each downstream USB port to the upstream USB port;

a USB bridge interconnected to the USB hub and configured to connect the upstream USB port to a USB host; and

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solutions, [and] the rapidity of innovations in the area of USB technology[.]" (EX-2016 ¶¶ 32-33.)

a USB routing switch interconnected to the USB bridge, the USB hub, and the plurality of downstream USB ports, wherein the USB routing switch is configured to connect a first downstream USB port of the plurality of downstream USB ports to the upstream USB port through the USB bridge when a consumer device connected to the first downstream USB port is the USB host and is configured to initiate bidirectional communication with the upstream USB port, and wherein the USB routing switch is configured to connect the first downstream USB port directly to the USB hub when the consumer device connected to the first downstream USB port is configured to only respond to communication from the upstream USB port, thereby rendering the consumer device compatible with a device connected to the upstream USB port.

Thus, Claim 1 implements a USB routing switch to connect a pair of USB ports through a USB bridge when a consumer device is connected to one of the USB ports is in a USB host mode and to instead connect the pair of ports only through a USB hub when the consumer device is in a USB device mode, maintaining hub functionality and persistent downstream USB while supporting host-to-host communications on any port. Dependent claims further describe

implementing this functionality while also providing power to the connected device. (EX-1005, '962 Patent.)

V. OVERVIEW OF THE ASSERTED PRIOR ART

Petitioner relies on three prior art references. While two named inventors share the surname "Chang," they are, in fact, 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.*, [0023].) 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].)

- **AN96527** – Cypress AN96527 – Designing USB Type-C Products Using Cypress's CCG1 Controllers (EX-1064) – AN96527 is an application note that provides guidance on "Designing USB Type-C Products Using Cypress's CCG1 Controllers." (*Id.*, 1.) The document "only discusses the power delivery aspect of the reference designs; it does not discuss anything about the USB data delivery over the Type-C cable." (*Id.*, 4.) Nor does the document discuss dual-role ports or multi-host USB systems. Rather, it contemplates a standard, top-down USB topology.

VI. CLAIM CONSTRUCTION

Petitioner "submits that no terms need construction." (Pet., 24-25.) At this time, Patent Owner sees no need to construe any claim language because the Board need only construe terms that are in controversy. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368 (Fed. Cir. 2019). Patent Owner reserves the right to address any construction proposed hereafter by the Board or as relevant to arguments made in future submissions.

VII. A POSITA WOULD NOT HAVE BEEN MOTIVATED TO COMBINE THE REFERENCES

Petitioner's challenge relies on two grounds: (1) a combination of Chang, Chang II, and a POSITA's knowledge[5], and (2) a combination of Chang, Chang II, AN96527, and a POSITA's knowledge. (Pet., 5.) As such, Petitioner bears the burden to prove motivation to combine Chang and Chang II in the manner

[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 the '962 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).

proposed for each ground. 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 a Cypress application note to the combination. This is insufficient to meet Petitioner's burden to demonstrate "motivation to combine particular references," *TQ Delta, LLC v. CISCO Systems, 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). Because each and every ground Petitioner raises involves combining Chang with Chang II, these failures warrant denying institution.

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 dual-role port(s)" for use with dual-role devices. (Pet., 34.) 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 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:

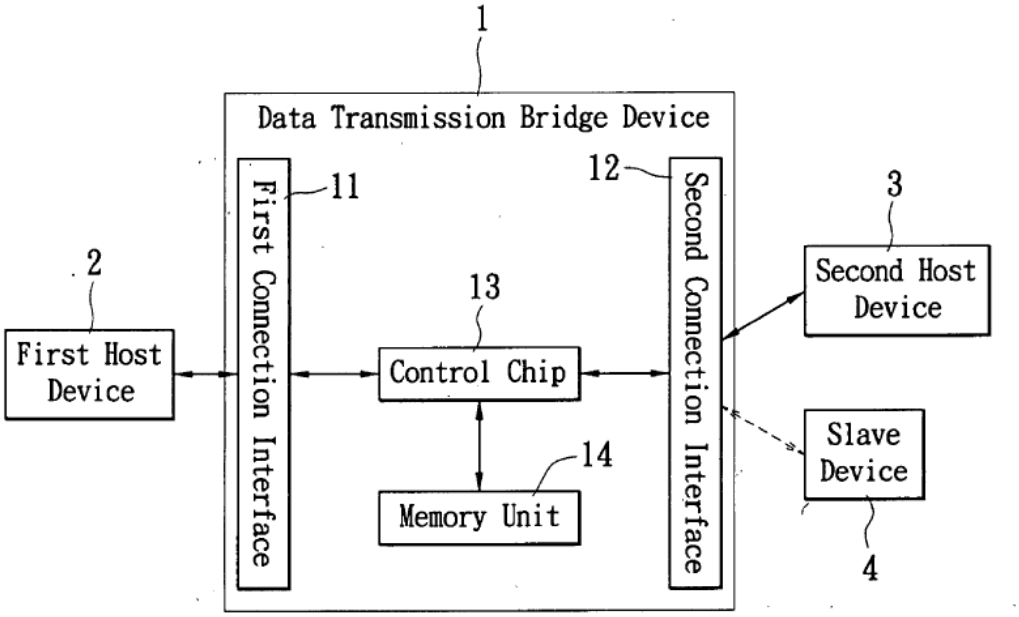


FIG. 1

(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. (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 was within Chang II's disclosure," (Pet., 27 n.12 (relying on EX-1013, ¶ 157)) is supported only by "[c]onclusory expert testimony [and] does not qualify as substantial evidence." *TQ Delta*, 942 F.3d at 1358-59 (collecting cases). Notably, Petitioner does not contend that this would be sufficient to demonstrate motivation to combine Chang and Chang II. (Petition, 27 n.12.)

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., 62.) Petitioner claims 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 operating in both host and device modes 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." (*Id.*) 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. (*Id.*, [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 mode, as taught in the '962 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 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." (EX-2001, ¶ 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., 38-39 & n.14.) According to Petitioner, Chang II's detection unit, *by itself*, would motivate a POSITA to route signals using a switch. (*See* Pet., 38-39.) Despite acknowledging that Chang II's bridge "includes 'control chip 13' (shown in Fig. 5) with 'detection unit' (134) and CPU (135)" (*Id.* at 39 n.14 (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., 38-39 & n.14). 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 at least challenged claims 13-20. 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., 34; *see also* EX-1013, ¶¶ 175-181 (Petitioner's expert declaration enumerating the four reasons).) None is persuasive or carry Petitioner's burden to provide evidence of a motivation to combine at this stage. Petitioner's first three arguments fail to mention Chang II at all and therefore cannot provide a motivation to combine Chang II with any reference or disclosure. (Pet., 34-35.) 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. (*Id*., 38; 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., 34; 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., 34-35). 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., 35 (quoting EX-1014, [0003]).) None of these arguments refers to any teaching in Chang II (Pet., 33-34), 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 1328). 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 switch to route each port to the appropriate

transmission path." (EX-1013, ¶ 175.) To be sure, a switch is required by each claim of the '962 Patent. (EX-1005, Independent Claims 1 and 14, each reciting a "USB routing switch.") 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 switch. (Pet., 34.) Purely as a conceptual matter, Chang II contemplates switching between transmission paths, but does not actually disclose a discrete switch 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 switch. (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(b)(4).

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., 38-39; *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., 35). As an initial matter, the argument makes little sense: Chang already provides a way to accomplish its "express goal," and it does so using dedicated ports for host-to-host and host-to-device communication. (EX-1014, [0020].) 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., 34; 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' solution, which involved a hub and a bridge. (Pet., 38.) But Chang II does not suggest that it could be used

with a hub. (EX-2201, ¶¶ 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., 6-7 (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 AN96527 to the Combination

Recognizing that the combination of Chang and Chang II is deficient, Petitioner proposes adding a third reference, AN96527. 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* Secs. VII.A-VII.B), it provides no motivation to combine these two references with AN96527.

AN96527 is an application note—a technical document published by Cypress to provide details on how to design USB Type-C products using one of its USB controller products. (EX-2001, ¶ 79.) Within this document is some discussion of the controllers' power delivery systems. Petitioner advances three theories for why a POSITA would allegedly be motivated to add AN96527 to the alleged combination of Chang and Chang II. None provide a realistic motivation to combine these three disparate references.

Each of Petitioner's alleged improvements taught by AN96527 relate to the improved power delivery introduced by the USB-PD standard. (EX-2001, ¶ 81.) This standard increased the amount of power deliverable via a Type-C cable to 100W and created a system for changing the amount of power provided to a connected device as the needs of that device change. (EX-2001, ¶ 81.) Petitioner

argues that these improvements would have motivated a POSITA to include these power delivery systems in the hub comprising the combination of Chang and Chang II. This argument is unconvincing for several reasons.

First and most glaringly, nothing in AN96527 or the USB-PD specification make any mention of dual-role devices or dual-role ports. (EX-2001, ¶ 82.) While the document mentions USB products capable of operating as either ***power*** provider or a ***power*** consumer using a "dual-role port," it makes clear that "this term has no relationship to the USB OTG ability to swap data host and data peripheral roles." (EX-1064, 8.) In fact, the document explains that "[t]his application note only discusses the power delivery aspect of the reference designs; it does not discuss anything about the USB data delivery over the Type-C cable." (EX-1064, 4.)

Second, AN96527 only addresses power delivery within a standard USB hub consistent with the typical top-down USB architecture with a single host. (EX-2001, ¶ 83.) Nothing in the document would indicate that such a system could be used with a hub connecting two hosts through a host-to-host bridge, much less motivate a POSITA to construct one. (EX-2001, ¶ 83.)

Finally, even if a POSITA were motivated to combine the Cypress port controller taught in AN96527 with Chang and Chang II, they would not have had a reasonable expectation of success. (EX-2001, ¶ 84.) The port controllers are not

designed to operate in a USB system with two hosts able to communicate with one another through a host-to-host bridge. (EX-2001, ¶ 84.) If it were even possible to provide power in such a system using the Cypress port controllers, it would require significant experimentation. (EX-2001, ¶ 84.) Furthermore, nothing in the document indicates that these controllers are capable of supporting dual-role devices or dynamic role-reversal. In fact, the document seems to indicate the opposite, expressly stating that it does not address data role-reversal. (EX-2001, ¶ 84.) A POSITA considering the combination proposed by the Petition would therefore have no reason to believe she could successfully do so. (EX-2001, ¶ 84.)

Petitioner's arguments amount to nothing more than hindsight. The mere contention that AN96527 discusses improved power delivery systems in single-host traditional USB networks does not provide a reason why a POSITA would be motivated to attempt incorporating such a system into the specific dual-role system claimed in the '962 patent. 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.").

VIII. PETITIONER FAILS TO PROVE THAT THE PROPOSED COMBINATION DISCLOSES EACH CLAIM ELEMENT

Each claim of the '962 patent requires a specific relationship between the USB bridge and the USB routing switch. When the routing switch is "configured to connect a first downstream USB port of the plurality of downstream USB ports to the upstream USB port through the USB bridge" (because "a consumer device connected to the first downstream USB port is the USB host"), the switch must be "configured to initiate bidirectional communication with the upstream USB port." (EX-1005, 4:37-38 (claim 1); *see also id.*, 5:37-38 (claim 14).)

Rather than engaging with this limitation, Petitioner merely waves its hands at it and identifies no evidence that it would have been part of the Chang-Chang II combination. The claim element is not trivial and stems from the need for a CarPlay-enabled iPhone and a vehicle's embedded USB host to ***both*** be able to send, receive, recognize, and respond to requests between one another in order to implement CarPlay. (EX-2001, ¶ 89.) This contrasts with the standard USB architecture in which there is only a single USB host and only that USB host is able to send requests. (EX-2001, ¶ 33.) In such a network, USB devices (and only USB devices) are able to receive and respond to commands from the USB host and cannot communicate independently. (*Id.*) In the claimed system, it is not enough

for a connected device to operate in host mode at the same time as the embedded host, it must be able to perform the functions of both a USB host (sending requests) and a USB device (receiving, recognizing, and responding to requests). (EX-2001, ¶ 87.)

The '962 patent's specification contains a detailed description of how the bridge allows two hosts to initiate communication while each remains in host mode. For example, Figure 7 of the patent shows an exemplary embodiment of the bridge:

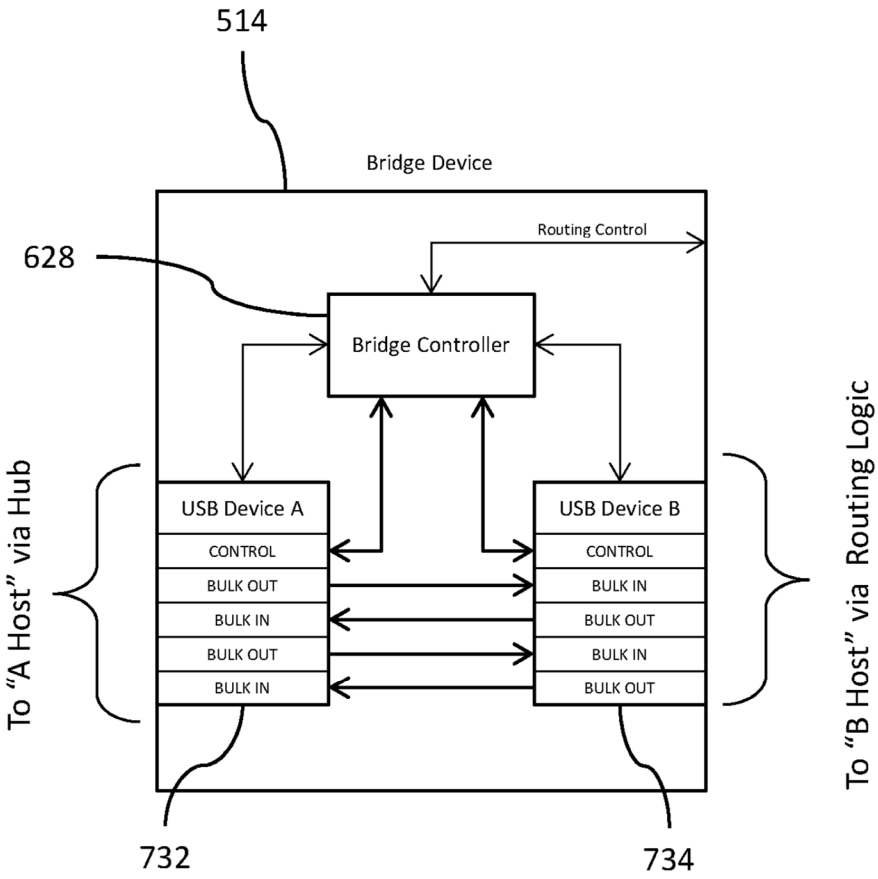


Figure 7

(EX-1005, Fig. 7.) As shown above, "the IN endpoints of Device A are connected to the OUT endpoints of Device B and the OUT endpoints of Device A 732 are connected to the IN endpoints of Device B 734."[6] (*Id.*, 8:51-54.) These

[6] To be clear, the "Device A" and "Device B" the patent describes here are not the host devices connected through the bridge, but rather components of the bridge itself that interface with those host devices. (EX-2001, ¶ 88.)

mappings of IN and OUT endpoints form "a bidirectional bridge that passes USB traffic between two USB Hosts." (*Id.*, 9:13-14.) In addition, both devices "provide a bidirectional Control endpoint connected to their respective USB Hosts" to support "USB defined control messages between the Host and Device." (*Id.*, 9:17-21.) The "Control endpoints are mapped to the Bridge Controller," which oversees and facilitates an enumeration process that allows "the two hosts . . . to use the IN and OUT endpoints to transfer application data and services." (*Id.*, 9:26-63.)

While not every aspect of this exemplary mechanism is claimed, it illustrates that "initiat[ion of] bidirectional communication" entails more than just an electrical connection provided by configuring a switch. (EX-2001, ¶¶ 88-89.) A POSITA would have understood from the patent's disclosures that bidirectional communication requires that both hosts send, receive, recognize, and respond to requests. (EX-2001, ¶ 89.) Notwithstanding this requirement, Petitioner equates a host's well-known ability to "initiate communication requests" with "bi-directional communication because each host may initiate communication." (*See* Pet., 63.) As explained above, initiating communication ***requests*** is only a part of the communication that the claims require be bidirectional. The Petition is therefore facially insufficient.

Petitioner is also incorrect with respect to initiating communication requests. It cites three pieces of evidence, but none of these suggests that each host can initiate requests, let alone communication (entailing not just sending of requests by one host, but also receipt, recognition, and responses by the other host). First, Petitioner cites to a background reference's statement that "one of the units operates as a USB Host which initiates communication requests . . . and the other operates as a USB Device which responds to those requests." (*See id.*, (quoting EX-1025, 1:17-20).) This statement plainly describes sending requests in only one direction. Next, Petitioner cites Chang's description of a "host-to-host transmission path." (*Id.* (citing EX-1014, [0020]).) But Petitioner fails to show why this would necessarily imply that *both* hosts are sending requests, when just one host sending commands to a second host, without the latter sending commands back, would still be "host-to-host transmission." (EX-2001, ¶ 91.) After all, Chang's USB hub is not a symmetric device, but rather one that privileges the host connected to the uplink port over a host connected to the host port, which is one of many downlink ports. (*See* EX-1014, [0019]-[0020], Figs. 3-4.) Lastly, Petitioner points to Chang II's description of how its bridge device connects two host devices. (Pet., 63 (citing EX-1015, [0026]).) The cited paragraph, however, states only that if the second host device responds to an inquire signal produced by the bridge's control chip, the chip will enable the bridge transmission path and thus

"complete the bridging" between the host devices. (EX-1015, [0026].) This has nothing to do with whether or how each of the devices could initiate communication. (EX-2001, ¶ 95.)

Confusingly, Petitioner appears to interpret "initiation of communication" in a second way that contradicts its assumption that initiation of communication is equivalent to initiating requests: Petitioner argues that enumeration ("the activity that identifies and assigns unique addresses to devices attached to a bus") is also initiation of communication. (*See* Pet., 63-64.) Petitioner then uses this interpretation to argue that Chang II's description of "complet[ing] the bridging" discloses "initiat[ing] bidirectional communication" because a POSITA would have read it to mean "enumerating a device interface in the bridge." (*Id.*, 64.) This argument is just as incorrect as the previous, and equally unsupported. As an initial matter, Petitioner offers only its expert's conclusory say-so to justify its claim that "comple[ting] the bridging" means enumeration. (*See id.* (citing EX-1013, ¶ 244).) There is no evidence that a POSITA would have read Chang II in this way. If anything, context shows that "complete the bridging" simply means that on recognizing that the second device is a host device, Chang II's bridge control chip will "switch the transmission path to the bridge transmission path," enabling an electrical pathway that would otherwise be incomplete. (EX-1015, [0026]; EX-2001, ¶ 92.) Chang II says nothing about identifying devices or

assigning addresses. At most, the control chip detects whether the attached device is a USB host or a USB device. (EX-2001, ¶ 95.) Moreover, the alleged enumeration in Chang II occurs in only one direction, with only one of the two hosts responding to the inquire signal. (*Id.*; EX-1015, [0026].) Petitioner therefore cannot rely on it to show "initiat[ion of] bidirectional communication."

In short, Petitioner fails to produce evidence that Chang, modified as proposed, would include a bridge that enables "bidirectional communication" as claimed.

IX. 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 these references is fatal to the Petition.

Petitioner has also failed to sufficiently address each element of the challenged claims of the '962 Patent. Each independent claim of the '962 Patent requires "bidirectional communication" between two hosts when the consumer

device is operating in USB host mode. Petitioner provides no evidence that this was contemplated, much less taught in any of its cited references.

Because Petitioner has provided no justification for why a POSITA would be motivated to combine the cited references and because Petitioner's proposed combination fails to meet each element of the challenged claims of the '962 Patent, Aptiv respectfully requests that the Board deny institution of the Petition for *inter partes* review of the '962 Patent.

Dated: April 18, 2024

Respectfully submitted,

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Dated: April 18, 2024

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