UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TCT MOBILE (US), INC.; TCT MOBILE (US) HOLDINGS, INC.; HUIZHOU TCL MOBILE COMMUNICATION CO. LTD.; AND TCL COMMUNICATION, INC.,
Petitioners

v.

FUNDAMENTAL INNOVATION SYSTEMS INTERNATIONAL LLC,
Patent Owner

U.S. Patent No. 8,169,187
Issue Date: May 1, 2012
Title: MULTIFUNCTIONAL CHARGER SYSTEM AND METHOD

Case No. IPR2021-_____

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT 8,169,187 CHALLENGING CLAIMS 1-18 UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104

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1002	U.S. Patent File History of the '187 Patent Excerpts (the "'187 Patent File History")
1003	Declaration of Dr. Jacob Baker regarding U.S. Patent No. 8,169,187 ("Baker")
1004	*Curriculum Vitae* of Dr. Jacob Baker
1005	Amended Complaint, *Fundamental Innovation Systems Int'l LLC v. TCT Mobile (US) Inc. et al.*, No. 1:20-cv-00552-CFC (D. Del. Sep. 11, 2020) ("Complaint")
1006	U.S. Provisional Application No. 60/273,021 (the "'021 Application")
1007	U.S. Provisional Application No. 60/330,486 (the "'486 Application")
1008	Japanese Patent Application No. 2000-165513A ("Morita")
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1017	U.S. Patent No. 5,859,522 ("Theobald")
1018	U.S. Patent No. 7,360,004 ("Dougherty")

I. INTRODUCTION

TCT Mobile (US), Inc.; TCT Mobile (US) Holdings, Inc.; Huizhou TCL Mobile Communication Co. Ltd.; and TCL Communication, Inc. ("Petitioners") petition for *inter partes* review of claims 1-18 (the "Challenged Claims") of U.S. Patent No. 8,169,187 (the "'187 Patent") on the grounds that they are unpatentable under 35 U.S.C. §103.

The Challenged Claims relate to a "mobile communications device" that uses an industry standard Universal Serial Bus ("USB") port to draw current for charging. Charging through USB ports was well understood and routine by the priority date of the '187 Patent, but the Challenged Claims purport to "invent" a device that draws current from a USB port "without regard" to the current limits in the USB specification(s). In other words, the Challenged Claims cover little more than a mobile device that uses a USB interface but does not follow one or more of the requirements of the USB specification. Independent claims (1 & 10), for example, require a device that draws current "without regard" to an associated "condition" or "limit" imposed by the USB Specification. Certain dependent claims (2, 9, 11, 18) clarify that the disregarded "condition" or "limit" is the USB Specification's requirement that no more than 500mA of current be supplied to any single device.

As of the priority date of the '187 Patent, however, it was well known to charge mobile devices using over 500 mA of current (typically 600mA-1000mA).

As numerous references make clear, this allowed for "fast" charging. Indeed, the USB Specification itself indicates that certain USB devices will supply and draw current in excess of 500mA in certain circumstances. The specification states, for example, that "high powered" ports will provide a *minimum* of 500 mA of current to downstream devices. Accordingly, a skilled artisan would have understood that charging devices may draw more than 500 mA of current when they are the only downstream device connected to a high-powered port (e.g., when a phone is connected to a USB charging device connected to an outlet). Indeed, the provisional application to which the '187 Patent claims priority admits that such high powered ports existed at the time and supplied approximately 700mA-800mA of current. Ex. 1006 ('021 Application) (discussing prior art "high powered" hubs configured to supply around 700mA-800mA of current). The patentee removed this admission from the applications that led to the '187 Patent and related patents, and then claimed chargers and devices that supply and draw this amount of current as an "invention."

Certain dependent claims also require that the mobile communications device draw current in response to an "abnormal data condition" on the USB data line (Claims 4-6, 13-15) which may be logic high signal on each of the data lines (high/high) (Claims 7-8, 16-17). As of the priority date of the '187 Patent, however, it was well-known that this high/high signal—known commonly as an "SE1" signal—could be used to identify a charging state because it was the only signal state not already used by the USB standard (the standard specifically assigns the low/low, low/high, and high/low signals for other uses). Various prior art references discuss using the SE1 signal to, for example, identify a full power state, identify the presence of a PS/2 adapter, and identify a wake-up condition. Indeed, use of the SE1 signal was so prevalent that it was added to version 2.0 of the USB Specification, which was published before the priority date of the ’187 Patent. Accordingly, this aspect of the “invention” also would have been obvious.

The prior art cited in this petition has not been fully considered by the patent office. The Morita patent has not been considered by the examiner or the PTAB in any proceedings and it renders all 18 claims obvious. Specifically, Morita discloses a “mobile videophone” and an associated charger. The charger plugs directly into a power outlet, contains a high-powered port, and charges a single device (the videophone) in a charging state that does not involve typical communication over the USB data lines. In that state, a POSITA would have found it obvious to draw more than 500mA of current (i.e., without regard to the corresponding USB limit) and to have done so in response to an SE1 signal (because none of the other assigned signal states apply).

Moreover, the Dougherty reference, which is not asserted against the claims requiring the SE1 signal, discloses a laptop that draws 2,500 mA through a USB port, far exceeding the corresponding 500 mA limit. Dougherty was cited during the prosecution of the ’187 Patent, but the examiner did not provide any explanation or analysis of the reference.

Because there is a reasonable likelihood that Petitioners will prevail with respect to these claims, Petitioners respectfully request that the Board institute *inter partes* review.

II. SUMMARY OF CHALLENGE 37 C.F.R. §42.104(B)

Petitioners request that the Board review and cancel claims 1-18 of the ’187 Patent based on the following grounds.

Ground	Claims	Basis	References
1	1-18	Pre-AIA 35 U.S.C. § 103(a)	Morita in view of the knowledge of a POSITA.
2	1-2, 9-11, 18	Pre-AIA 35 U.S.C. § 103(a)	Dougherty in view of the knowledge of a POSITA.

III. INSTITUTION SHOULD BE GRANTED; DISCRETIONARY DENIAL IS NOT APPROPRIATE

The Board should not exercise its discretion to deny institution under 35 U.S.C. §§ 314(a) or 325(d). If the Board considers exercising its discretion to deny institution, Petitioner respectfully requests leave to file a reply to address any discretionary denial arguments Patent Owner makes in its preliminary response.

No prior petitions for *inter partes* review of the ’187 Patent have been filed.

There is a parallel district court proceeding involving the ’187 Patent in the District of Delaware. Ex. 1005 (Amended Complaint). The complaint was filed on April 23, 2020. However, the *Apple/Fintiv* factors support institution despite the existence of the Delaware litigation. *Apple Inc. v. Fintiv, Inc.,* IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020).

First, potential for a district court stay, is neutral or weighs in favor of institution. Neither party has requested a stay,[1] so at worst this factor is neutral because the Board “will not attempt to predict” how the district court will proceed. *Sand Revolution II, LLC v. Continental Intermodal Group5 Trucking LLC,* IPR2019-01393, Paper 24 at 7 (PTAB June 16, 2020) (informative). Congress, however, intended for district courts to be liberal in granting stays pending PTAB proceedings, especially in cases where petitioners moved quickly after service of a complaint. 157 Cong. Rec. S1363 (Mar. 8, 2011) (Sen. Schumer) (Congress placed “a very heavy thumb on the scale in favor of a stay being granted”). Given that Petitioners have moved expeditiously (*see* factor 2 discussion below), this factor favors institution. Furthermore, Judge Connolly has consistently granted stays in similar patent litigation cases, especially those where the petitions are instituted. *See, e.g., Allergen USA, INC. v. Prollenium US Inc.,* 1-20-cv-00104, Dkt. No. 34 (July 16, 2020); *Uniloc 2017 LLC v. Vudu, Inc.,* 1-19-cv-00183, Dkt. No. 72 (March 26, 2020).

[1] Petitioner does intend to move for a stay of the Delaware case.

Second, the proximity of the trial date to the final written decision, weighs in favor of institution. In the unlikely case that Judge Connolly does not grant a stay, the trial date is scheduled for October 17, 2022. This is after the PTAB's expected final written decision based on this Petition's filing in February 2021, which would tentatively calendar an institution date in August, 2021 and final written decision date of approximately August, 2022 (depending on the accorded filing date).

Third, investment in the parallel proceeding, weighs in favor of institution. Discovery will still be in the early stages, with the deadline not until December 17, 2021. It is unlikely that any fact depositions will have taken place before the institution decision. Further, as stated above, it is unlikely that the district court will have issued a *Markman* ruling by the time of the institution decision, and little to no Court resources will have been devoted to analyzing prior art invalidity issues. Again, the parallel district court litigation is likely to be stayed once the present Petition is instituted.

Furthermore, as part of a holistic analysis, the Board considers the speed with which the petitioner acted. *Apple Inc. v. Seven Networks, LLC,* IPR2020-00156, Paper 10 at 11–12 (PTAB June 15, 2020). In cases where the petitioner acted diligently and without meaningful delay, as here, any investment of the parties in the parallel district court litigation is mitigated. *HP Inc. v. Neodron LTD,* IPR2020-00459, Paper 17 at 40 (PTAB Sept. 14, 2020). Here, the plaintiff asserted a number of patents in the litigations and Petitioners filed its first petition within about five months of the Answer date, and roughly three months after Patent Owner served preliminary infringement contentions. It has subsequently worked diligently to get this and other petitions on file in a timely manner shortly thereafter. Such diligence favors institution.

Fourth, overlap of issues, weighs in favor of institution. The Petition challenges claims that are not asserted in the district court action. And while the petition also challenges the same claims as the parallel district court proceeding, there is a high likelihood that Judge Connolly grants a stay upon institution. In the unlikely instance where a stay is not granted, a final written decision will still issue before the beginning of trial. The final written decision, once issued, will trigger estoppel for in the district court litigation for grounds that were raised or reasonably could have been raised. *See* 35 U.S.C. §315(e)(2).

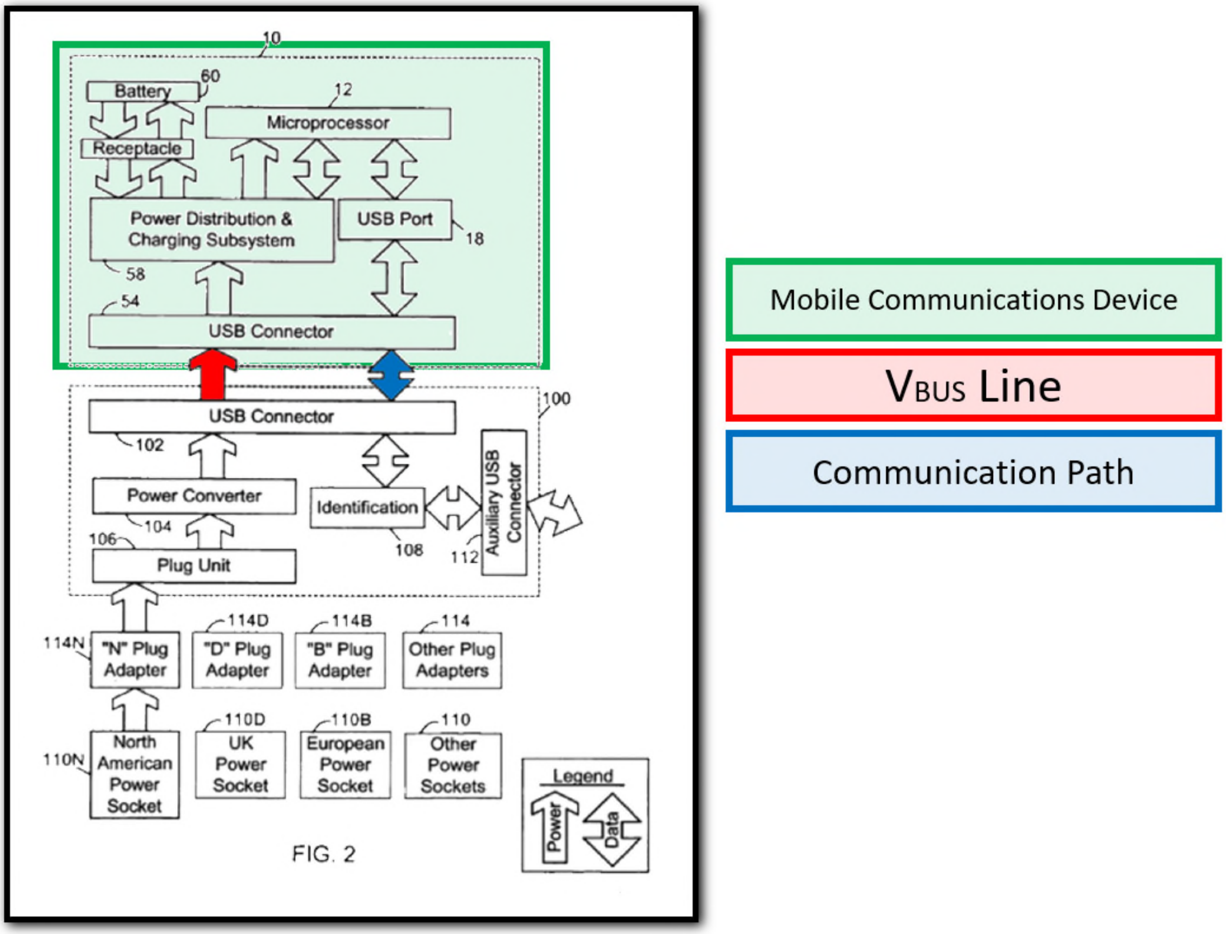
Fifth, whether the parties are the same, weighs in favor of institution. The parties with respect to this Petition are the same as those engaged in the parallel district court case.

Finally, other circumstances strongly favor institution. Petitioners advance a targeted Petition with one of the grounds centered on a prior art reference that has never been submitted to the Board previously. The strength of the present Petition strongly weighs in favor of institution. Moreover, Patent Owners assert that USB adapters, which are ubiquitous, and the mobile devices they charge, infringe the ’187 Patent and related patents. Given the substantial impact that the ’187 Patent and related patents could have on the mobile device industry, it is in the public interest to address invalidity, especially under new prior art never before submitted to the Board. And as the Supreme Court recently explained, there is a significant public interest against “leaving bad patents enforceable.” *Thryv, Inc. v. Click-To-Call Techs., LP*, 140 S. Ct. 1367, 1374 (2020).

IV. OVERVIEW OF THE ’187 PATENT

A. Disclosure of the ’187 Patent

The ’187 Patent discloses “a powering system for a mobile device having a USB connector.” Ex. 1001 (’187 Patent) at 3:6-7. “The powering system comprises a power distribution subsystem in the mobile device that is operable to receive energy through the USB connector and distribute the energy to at least one component in the mobile device.” *Id.* at 3:7-11. The mobile device comprises a “USB V_{BUS} line” and a “USB Communication Path.” *Id.* at Claims 1 and 10. Figure 2, reproduced below, is a schematic diagram of the disclosed mobile device and an adapter that can be used to charge the device.



Both the "V$_{BUS}$ line" and the "communication path" were well known and understood components of USB devices. They are expressly accounted for in USB specifications which a POSITA would have been familiar with:

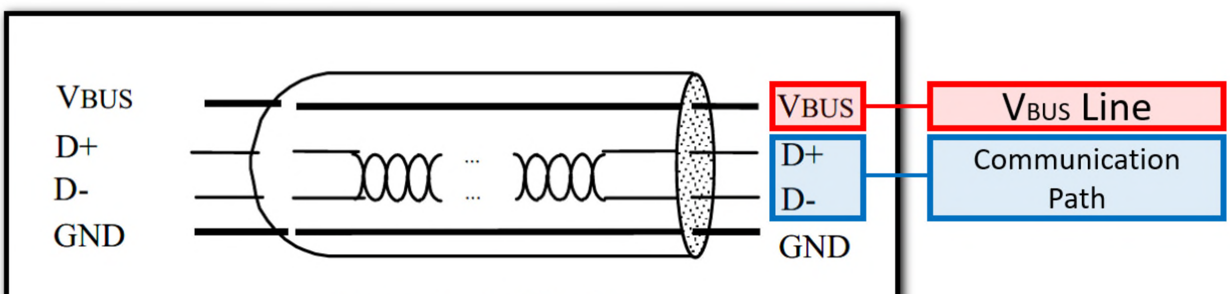


Figure 4-2. USB Cable

See e.g., Ex. 1009 (USB 1.1) at 17 and Figure 4-2 (annotated). A POSITA would have understood that the VBUS line is typically used to supply/draw current and the D+/D- lines are used for typical USB communication. Baker, ¶ 73; *See e.g.*, USB. 1.1 at 17 ("The cable also carries VBUS and GND wires on each segment to deliver power to devices.").

The challenged claims also require that the mobile device be "configured to" draw current from the V_{BUS} line "without regard" to a "condition" or "limit" stated in a USB Specification. Ex. 1001 ('187 Patent) at Claims 1, 10. As discussed in more detail herein, this may involve, for example, being configured to draw current in excess of an amount specified by a USB specification (e.g., the 500mA that may be supplied to a particular device) (Claims 2, 9, 11, 18).

Certain of the challenged claims also require that the device be configured to draw current "without USB enumeration" (Claims 3 and 12) or in response to an "abnormal data condition" (Claims 4 and 13) such as a logic high signal on the D+ and D- lines of the communication path (Claims 6-7 and 15-16). As discussed in more detail herein, USB "enumeration" is the communication engaged in by USB devices when connected in order to configure them. *See* USB 1.1 at 179; Baker, ¶ 92. The '187 Patent discloses that a mobile device can draw current without engaging in the enumeration process by detecting "an abnormal data line condition at the USB port 18." *Id.* at 9:13-24. Specifically, the '187 patent discloses that a device that detects "voltages on both the D+ and D- lines of the USB connector [that] are greater than 2 Volts (step 220), [will] determine[] that the device connected to the USB connector 54 is not a typical USB host or hub and that a USB adapter 100 has been detected." *Id.*, 9:39-44. In such a scenario, the mobile device can charge the battery or otherwise use the power from the USB connector, without waiting for enumeration. *Id.* at 9:44-47.

B. Priority Applications of the '187 Patent

The '187 patent claims priority through a series of continuations to two provisional applications: (1) U.S. Provisional Application 60/273,021 (the "'021 Application") (Ex. 1006), filed March 1, 2001; and (2) U.S. Provisional Application No. 60/330,486 (the "'486 Application") (Ex. 1007), filed October 23, 2001.

The '021 Application was filed on March 1, 2001. Ex. 1006. The application discloses "a charging circuit" that is part of a mobile device and that can use current received from the mobile device's USB connection to charge the device's battery. *Id.* at 18-20. The '021 Application notes that such a circuit could draw more than 500 mA of current from a high power USB port because, at the time (and as noted in the USB Specifications), there existed USB hubs with high-powered ports that were configured to supply more than 500 mA of current. Indeed, the specification notes that the patentee tested existing USB hubs to see how much current they would supply. *Id.* at 22-33 ("It was determined experimentally that current can be drawn from several USB ports at a high rate”). The patentee further noted that the tested “high powered” hubs were configured to provide up to 700mA-800mA of current before automatically shutting off the power. *Id.* at 22 (“Furthermore, it seems that certain high-power USB ports, such as a self-powered hub, appear to implement only an over-current protection, i.e., they turn off the voltage on the VBUS line for current valued exceeding 700mA-800mA.”).

The ’021 Application noticeably omits any discussion of using an “abnormal data condition” on the USB communication path (claims 4 and 13), that comprises a “logic high signal on each of said D+ and D- lines” (claims 7 and 16), wherein “each said logic high signal is greater than 2V” (claims 8 and 17). *Id.* at 20-30 (discussing various embodiments).

The ’486 Application was filed on October 23, 2001. Ex. 1007 (’486 Application). The application discusses, for the first time, the use of “abnormal data line conditions” including a signal in which D+ and D- are held high. *Id.* at 24-25. Accordingly, the claims requiring the use of such a signal (i.e., claims 4-9, 13-18) are entitled to the October 23, 2001 priority date at the earliest.

C. Prosecution History of the ’187 Patent

There was no substantive prosecution on the merits in the file history of the ’187 Patent. There was only a terminal disclaimer rejection, a filed disclaimer, and allowance with no statement as to the reason for allowance. Ex. 1002.

V. PERSON OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art ("POSITA") of the subject matter of the '187 Patent would have either a bachelor's degree in electrical engineering, computer science, or a related field, plus 3-5 years of experience in design of systems with Universal Serial Bus ("USB") or equivalent buses that follow the USB 2.0 and earlier specifications, or a master's degree in electrical engineering, computer science, or a related field, plus 1-2 years of experience in design of systems with USB or equivalent buses that follow the USB 2.0 and earlier specifications at the time of the '187 patent's priority date. Along with this petition, Petitioner submits the declaration of Dr. Jacob Baker, who has been a POSITA since at least the '187 Patent's claimed priority date. Baker, ¶ 68.

VI. SUMMARY OF THE PRIOR ART AND KNOWLEDGE OF POSITA

A. USB Specification

The Universal Serial Bus Specification, Revision 1.1, ("USB 1.1") was published by the USB Implementers Forum, Inc. on September 23, 1998. Ex. 1009. It is prior art to the '187 Patent under at least 35 U.S.C. § 102(a) and (b). Moreover, the USB 1.1 Specification would have been part of the knowledge of a POSITA as of the priority date of the '187 Patent. Baker, ¶ 69.

Figure 4-1, below, shows the bus topology for a USB system. Generally, each such system requires a "host" with a "root hub" for purposes of communication.

USB 1.1 at 16; Baker, ¶ 70. Without such a hub, there will be no communication among the devices. For example, connecting, Hub 1 to a node (a node is a connected device, also called a "function") or Hub 2 without connecting Hub 1 to the "Host" via the "Root Hub" will not result in a functioning/communicating, USB system. *Id.*

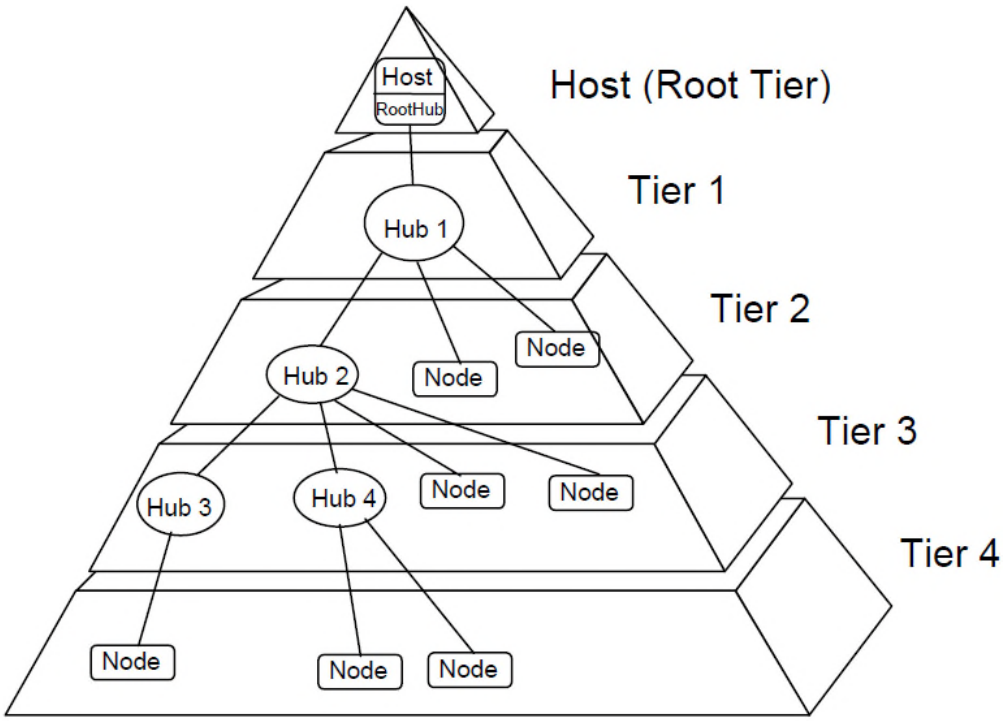


Figure 4-1. Bus Topology

USB 1.1 at 16 (annotated).

Generally, USB 1.1 instructs that a USB device (*i.e.*, node or function) is plugged into a port on a hub using a cable. USB 1.1 at 23. The cable is connected between a USB connector on a USB device and a USB connector on a host or hub. Baker, ¶ 71.

Figure 4-4 illustrates how hubs provide connectivity in a typical computer environment.

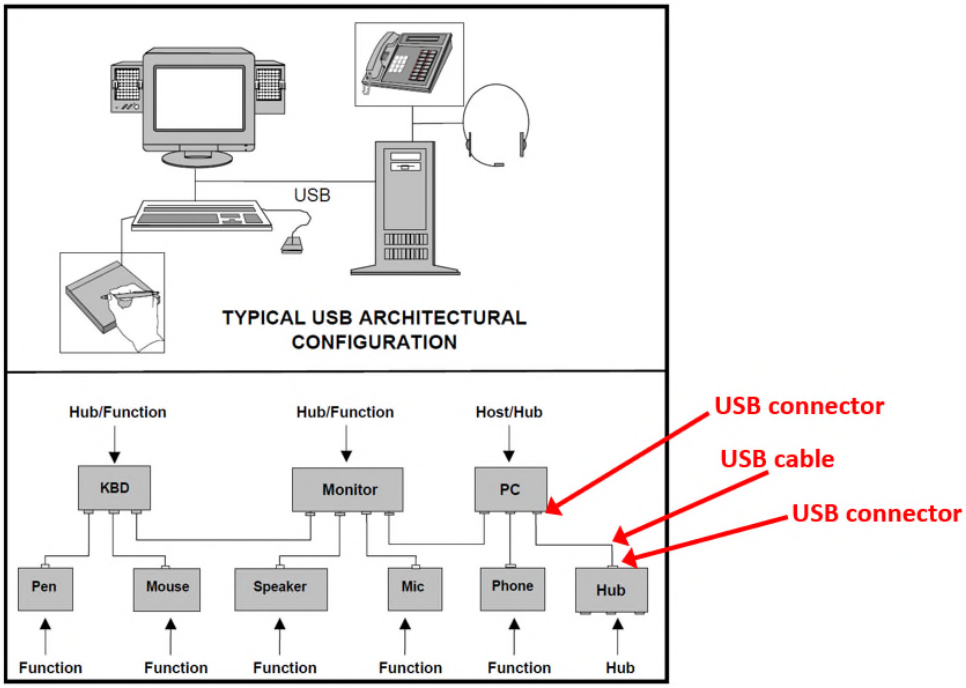


Figure 4-4. Hubs in a Desktop Computer Environment

USB 1.1 at 23 (annotated).

USB 1.1 teaches a POSITA how to implement a USB plug and that a USB connector includes four contacts: V_{BUS}, D+, D-, and GND:

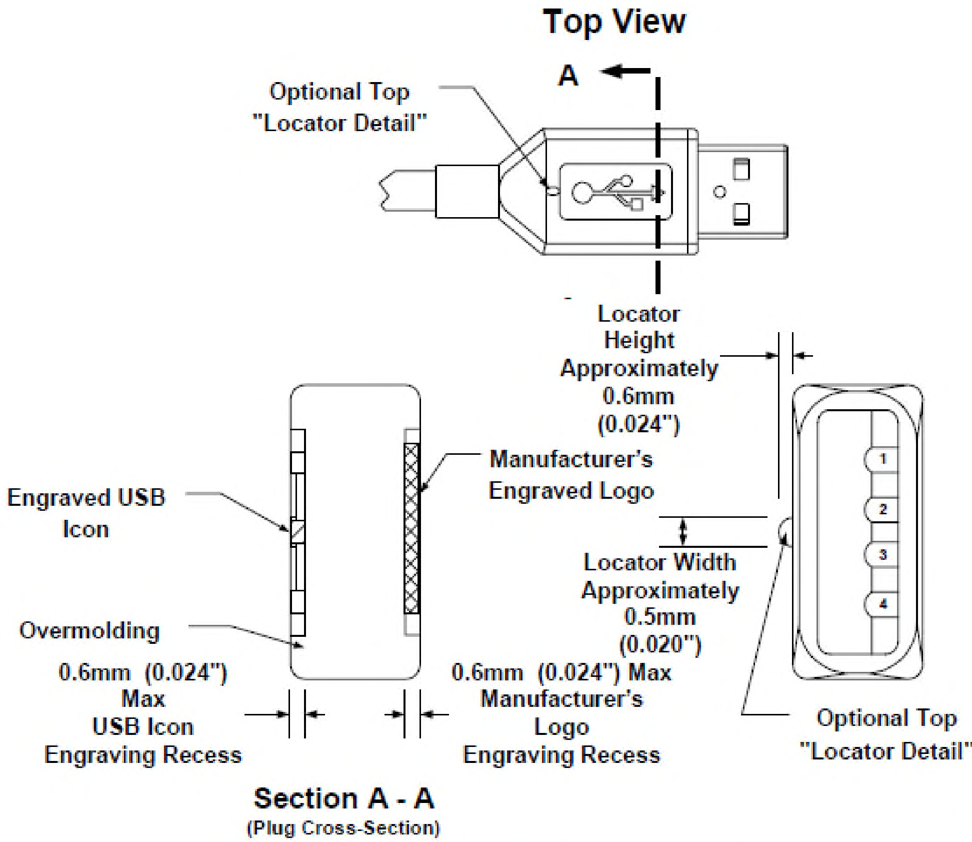


Figure 6-6. Typical USB Plug Orientation

Table 6-1. USB Connector Termination Assignment

Contact Number	Signal Name	Typical Wiring Assignment
1	VBUS	Red
2	D-	White
3	D+	Green
4	GND	Black
Shell	Shield	Drain Wire

USB 1.1 at 81 and 82; Baker, ¶¶ 72-73.

The USB 1.1 Specification indicates that that the host is responsible for providing power to an attached USB device. USB 1.1 at 24 ("The host is responsible for . . . [p]roviding power to the attached USB devices.") The USB Specification also sets forth conditions and limits for providing and drawing power on the V_{BUS} line. Baker, ¶¶ 73-74. The Specification does so in terms of milliamps (mA) of current and in terms of "unit loads." USB 1.1 at 134. "A unit load is defined to be 100mA" of current. *Id.* Notably, the USB Specification includes the following current conditions/limitations:

- A "high-power" hub port supplies a minimum of 500mA
- A "low-power" device is supplied with a maximum of 100mA of current
- A "high-power" device is supplied with a maximum of 500 mA of current

These conditions/limitations, as well as others, are listed in table 7-5 of the USB 1.1 Specification:

Table 7-5. DC Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Max.	Units
Supply Voltage:					
High-power Port	VBUS	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	VBUS	Note 2, Section 7.2.1	4.40	5.25	V
Supply Current:					
High-power Hub Port (out)	ICCPRT	Section 7.2.1	500		mA
Low-power Hub Port (out)	ICCUPT	Section 7.2.1	100		mA
High-power Function (in)	ICCHPF	Section 7.2.1		500	mA
Low-power Function (in)	ICCLPF	Section 7.2.1		100	mA
Unconfigured Function/Hub (in)	ICCINIT	Section 7.2.1.4		100	mA
Suspended High-power Device	ICCSH	Section 7.2.3 ; Note 15		2.5	mA
Suspended Low-power Device	ICCSL	Section 7.2.3		500	μA

USB 1.1 at 142 (annotated); Baker ¶ 73.

The USB Specification defines a "high power" port as one that obtains its power externally (e.g., from an outlet). *Id.* at 134 ("Systems that obtain operating power externally, either AC or DC must supply at least five unit loads to each port. Such ports are called high-power ports.") In other words, the USB specification, on its own, acknowledges that certain USB ports (high-powered ports) will supply current in excess of the 500mA limit to a particular USB device (e.g., when the high-power hub port is (1) connected to its own external power sources and (2) connected to a single USB device). *Id.*; Baker, ¶ 74.

USB 1.1 discloses that an attached device can operate at "full-speed" or "low-speed." USB 1.1 discloses "The speed of an attached device is determined by the placement of a pull-up resistor on the device (see Section 7.1.5)." USB 1.1 at 251.

The specific nature of how D+ and D- are connected is discussed in detail below and in USB 1.1. *See* Baker, ¶¶ 77-83. "Hubs, and the devices to which they connect, use a combination of pull-up and pull-down resistors to control D+ and D- in the absence of their being actively driven. These resistors establish voltage levels used to signal connect and disconnect and maintain the data lines at their idle values when not being actively driven." USB 1.1 at 256.

USB 1.1 discloses "Full-speed devices are terminated as shown in Figure 7-10 with the pull-up resistor on the D+ line." and "Low-speed devices are terminated as shown in Figure 7-11 with the pull-up resistor on the D- line." USB 1.1 at 113. These figures are annotated below to show that a pull-up resistor, labeled R_{pu}, on the D+ line indicates a "full-speed device" while a pull-up resistor, also labeled R_{pu}, on the D- line indicates a "low-speed device." Baker, ¶ 78.

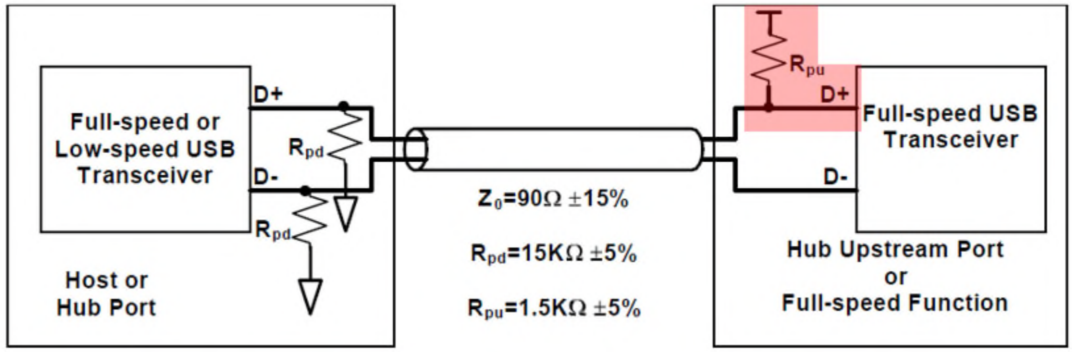


Figure 7-10. Full-speed Device Cable and Resistor Connections

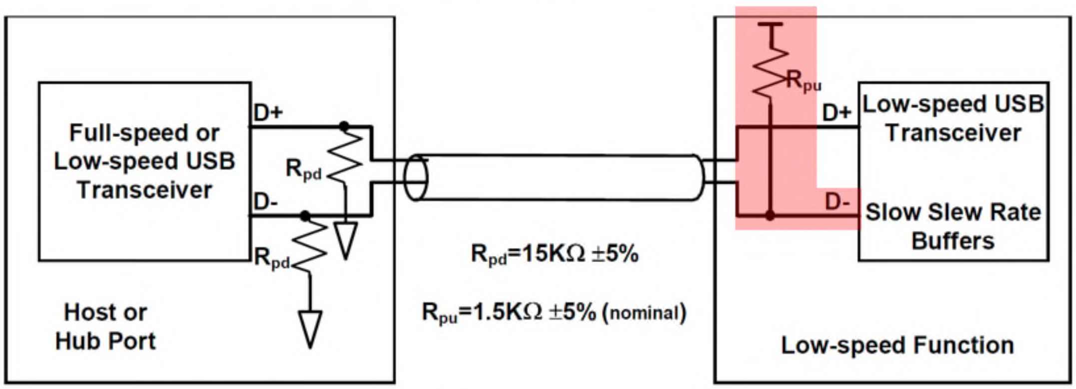


Figure 7-11. Low-speed Device Cable and Resistor Connections

USB 1.1 at 113 and 114 (annotated).

USB 1.1 also discloses that in the host or hub port "The pull-down terminators on downstream ports are resistors of 15kΩ+/-5% connected to ground." USB 1.1 at 113. These resistors are annotated below and labeled R_{pd}.

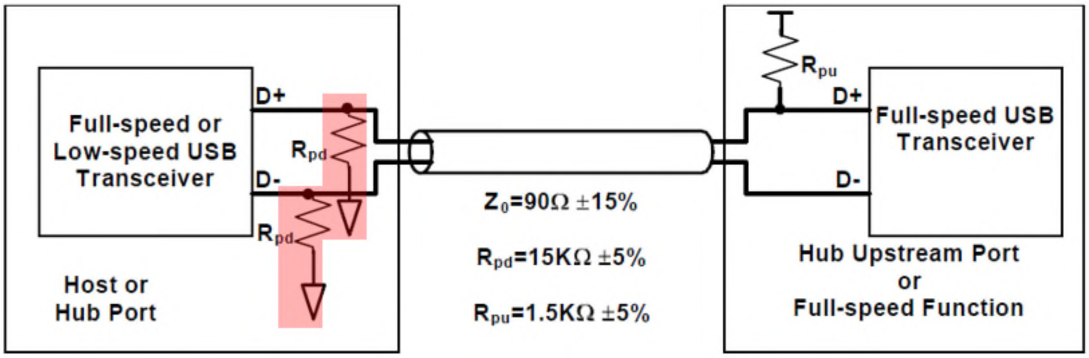


Figure 7-10. Full-speed Device Cable and Resistor Connections

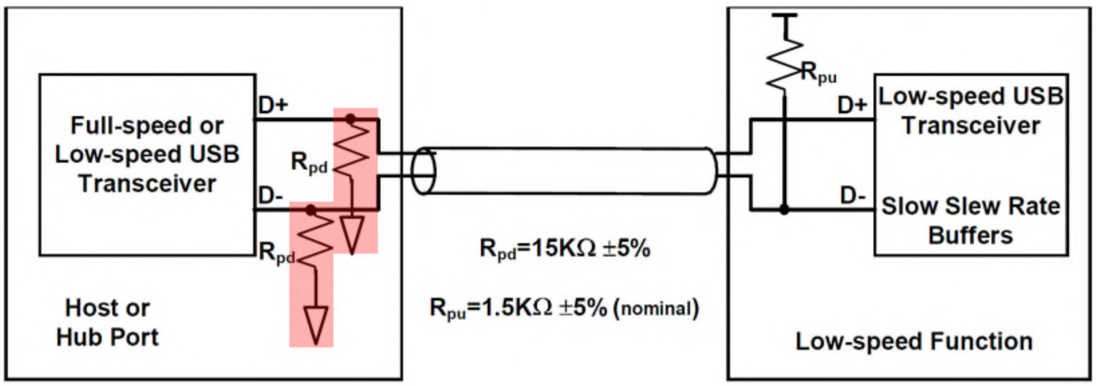


Figure 7-11. Low-speed Device Cable and Resistor Connections

USB 1.1 at 113 and 114 (annotated); Baker, ¶ 79.

When no pull-up resistor, R_{pu}, is present on D+ and/or D- the corresponding line is pulled to ground through R_{pd}. Baker, ¶ 80. If both D+ and D- are at ground then no device is connected to the USB host or hub port. If D+ is pulled high and D- is at ground the connected device operates in full-speed. *Id.* If D+ is at ground and D- is pulled high the connected device operates in low-speed. If D+ and D- are to be used for communications by either full- or low-speed devices then their voltages should never intentionally be pulled high (above 0.8V) at the same time. *Id.* A summary of the relationship between the D+ and D- levels on a USB connector and the port configurations discussed in this section is shown below:

D+	D-	Port configuration
Low	Low	No device connected
High	Low	Full-speed
Low	High	Low-speed
High	High	Abnormal condition

Baker, ¶ 83. As discussed in more detail below, the High/High signal on the data lines is also referred to in the art as an "SE1" signal. *See* Section VI.B; Baker, ¶ 80. A POSITA would have been aware of the effects of the SE1 signal on the data lines as disclosed by the USB 1.1 Specification. Baker, ¶¶ 80-84. Specifically, a POSITA would have understood that a device receiving this signal would terminate data communications and standby while receiving power across the V_{BUS} line. *Id.*

For example, USB 1.1 states "Note: if both D+ and D- are high at this time, the hub may stay in the Disabled state and set the C_PORT_ENABLE bit to indicate that the hub could not determine the speed of the device." USB 1.1 at 252. Accordingly, a POSITA would have understood that this signal indicates that the speed of a connected device cannot be determined and thus communications between the host or hub and the connected device are not possible. Baker, ¶ 81.

Moreover, The USB 1.1 further states "After the device has been powered, it must not respond to any bus transactions until it has received a reset from the bus. After receiving a reset, the device is then addressable at the default address." USB

1.1 at 178. In other words, the connected device, after being powered-up through the connection to the USB port though a USB cable, won't process commands until it receives a reset. Baker, ¶ 82. However, if the connected device can't communicate (e.g., because communication has been disable by a High/High signal on the data lines) then the connected device can't receive a reset command and thus can't receive or process commands (to, for example, clear the set C_PORT_ENABLE bit which indicates the port speed can't be determined or to power-down). *Id.* Accordingly, the device simply continues to receive power via V_{BUS} and GND and wait for the reset command (which will not occur with both D+ and D- pulled high). *Id*.

B. Use of SE1 State in Various Contexts

Persons of ordinary skill in art quickly realized that USB devices could use a High/High signal (SE1) on the D+ and D- lines for a number of purposes. *See e.g.*, Baker, ¶¶ 80-90. This is particularly the case because the signal is an "abnormal" condition that is outside the normal condition signals used by the USB Specification and thus will not be misread as being used for a specified purpose in the specification. Baker, ¶ 84. Indeed, of the four states available on a D+ and D- line (low/low, high/low, low/high, and high/high), the SE1 signal was the only state not already accounted for in the specification. Baker, ¶ 83. Accordingly, as noted below, a number of prior art references disclose using the signal for other purposes.

1. US Patent 6,531,845 (“Kerai”) (Ex. 1011)

U.S. Patent 6,531,845 was filed as Application No. 09/864,273 on May 25, 2001, claimed a priority date of May 26, 2000, and issued on March 11, 2003. Thus, Kerai is prior art under at least pre-AIA §102(e).

Kerai used a High/High state on the data lines for the purpose of charging a system while disabling communications. Kerai, Fig 3, 5:43-51. Specifically, Kerai disclosed “A battery charging circuit . . . in which power is derived from a communications port such as a USB interface (22) and is supplied to a rechargeable battery of a communications device.” *Id.*, Abstract. In its disclosure, Kerai notes that it was “well known” to pull both D+ and D- high when communications were inactive and that this was helpful for purposes of charging a device. *Id.* at 5:45-48 (“*As is well known*, the data lines of a serial connection (D+ and D- in the USB interface) are held high when the connection is inactive and will vary between a high and low state whilst communication over the ports takes place.”) (emphasis added); Baker, ¶ 85.

2. US Patent 6,625,738 (“Shiga”) (Ex. 1012)

U.S. Patent 6,625,738 was filed as Application No. 09/454,621 on December 6, 1999, claimed a priority date of December 15, 1998, and issued on September 23, 2003. Thus, Shiga is prior art to the ’187 patent under at least pre-AIA §102(e).

Shiga recognizes that, the existing USB standards accounted for three (D+, D-) signal line states representing three modes: (1) low-speed mode (D+ signal line is set to a low level ("L") and D- line is set to a high level ("H")); (2) full-speed mode (D+ is high and D- is low); and (3) unconnected mode (both D+ and D- are low). These three states are shown in Shiga's Table 1 seen below. Shiga, 5:38-60; Baker, ¶¶ 86-87.

TABLE 1

	Low Speed	Full Speed	Unconnected
D+	L (Hi-Z)	H	L (Hi-Z)
D−	H (Hi-Z)	L (Hi-Z)	L (Hi-Z)

In contrast to these three USB standard modes, Shiga also explains that the "fourth mode" signal, which is when both D+ and D- are in the H level state (an SE1 condition), is "not a USB standard state" and can therefore "be easily distinguished from USB standard data signals." Shiga, 5:60-62, 6:48-58; Baker, ¶ 87. Shiga discloses transmitting this fourth mode signal from a USB apparatus (*e.g.*, keyboard) to a host computer to wake up the computer. Shiga, Abstract, 6:35-47; Baker, ¶ 87. Accordingly, in 1999, using a signal state that is not a USB standard mode (*i.e.*, in which both D+ and D- are in the H state) was well-known. Shiga, 5:60-62; 6:48-50; Baker, ¶ 87.

3. US Patent Application Publication US20030135766 ("Zyskowski") (Ex. 1013)

U.S. Patent App. Publication No. 2003/0135766 was filed as Application No. 09/453,656 on December 3, 1999 and issued on July 17, 2003. Thus, Zyskowski is prior art to the '187 patent under at least pre-AIA §102(e).

Zyskowski is another example of prior art that discloses an SE1 condition (with D+ and D- being set at 5 V) being used by a host device (*e.g.*, computer) to signal its full power state to a connected device (*e.g.*, mass storage device, consumer electronic device). Ex. 1013, ¶ 19; Baker, ¶ 88.

4. US Patent 6,625,790 ("Casebolt") (Ex. 1014)

U.S. Patent 6,625,790 was filed as Application No. 09/409,683 on October 1, 1999, claimed a priority date of July 8, 1998, and issued on September 23, 2003 to Mark W. Casebolt and Lord Nigel Featherston. Thus, Casebolt is prior art to the '187 patent under at least pre-AIA §102(e).

Casebolt discloses that an SE1 condition could be used as a special signaling mode in which the D+ and D- data lines would be connected to Vcc (+5V) to signal the presence of a PS/2 adapter (a 6-pin connector used in older computer keyboards and mice). Ex. 1014 (Casebolt) at 7:40-54; Baker, ¶ 89. Indeed, the SE1 state for USB is shown in Casebolt's Table 1 below. *Id.*

TABLE 1

I/O State	D+/CLK	D−/DAT	USB	PS/2
0	L	L	SEO (Single Ended O) or Reset	Host Inhibit
1	L	H	J, Idle	Host Inhibit
2	H	L	K, Xmit Resume	Host Xmit
3	H	H	SE1 (Single Ended 1)	Idle, Confirm Connect

Ex. 1014, Table 1, *see also* 6:55-7:8.

5. Cypress Semiconductor enCoReUSB Datasheet (Ex. 1015)

Knowledge regarding the use of a state in which D+ and D- are both high was so common that Cypress Semiconductor integrated it into its enCoReUSB product in 2000. Ex. 1015 (Cypress enCoReUSB), 24-25; Baker, ¶ 90.

6. USB 2.0 Specification

The USB 2.0 Specification (USB 2.0) was published on April 27, 2000. Ex. 1010 (USB 2.0). It is prior art to the ’187 Patent under at least 35 U.S.C. § 102(a). Moreover, the USB 2.0 Specification would have been part of the knowledge of a POSITA as of the priority date of the ’187 Patent. Baker, ¶ 76.

As the USB 2.0 Specification notes, it is fully backwards compatible with devices built with previous versions of the specification, such as USB 1.1. USB 2.0

at 11. The majority of the disclosures of USB 1.1 are also contained in the USB 2.0 Specification. Baker, ¶ 76.

Given the prevalence of the use of the SE1 signal discussed above, the USB 2.0 Specification specifically addresses the SE1 signal. *See e.g.*, USB 2.0 at 123 ("SE1 is a state in which both the D+ and D- lines are at a voltage above V_{OSE1} (min), which is 0.8 V."); Baker, ¶ 130. Among other things, the USB 2.0 Specification discloses that the signal should not be used for devices seeking to utilize data communications over the USB connection (either low-speed or full-speed). *Id.* ("Low-speed and full-speed USB drivers must never "intentionally" generate an SE1 on the bus."). As noted above, however, persons of ordinary skill in the art understood that the signal could be used for various purposes, including to disable communications for purposes of charging. Baker, ¶¶ 80-84.

C. Fast Charging

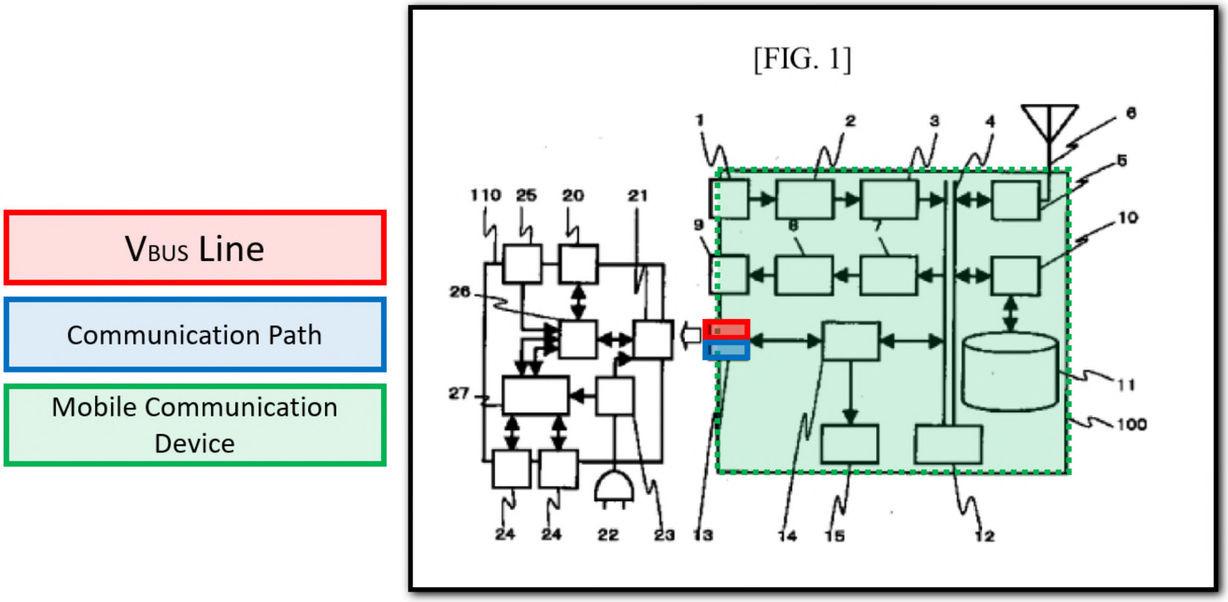
Persons of ordinary skill in art as of the priority date of the '187 Patent knew that charging a device like a mobile phone at currents greater than 500 mA allowed for faster charging. *See e.g.*, Baker, ¶ 120. Indeed, it was generally known at the time that drawing more than more than 600 mA of current results in faster charging for such devices. *See e.g., id.*; Ex. 1016 (U.S. Pat. No 5,923,146, "Martensson"), 1:5-8 (invention relates to charging "cellular radio telephone"), 1:30-34 ("fast-charged" technique using "600-1000 mA"); Ex. 1017 (U.S. Patent No. 5,859,522

“Theobald”) at 4:29-39 (a “mid-rate charger” supplies current at around 340 mA; a “fast rate charger” supplies approximately 850 mA of current).

D. Overview of Morita

Japanese Patent Application No. 2000-165513A (“Morita”), titled “Charger,” was filed on November 30, 1998. Morita is prior art under at least §102(b). A certified translation of Morita is attached here to as Exhibit 1008. Morita was not considered during prosecution of the ’187 Patent.

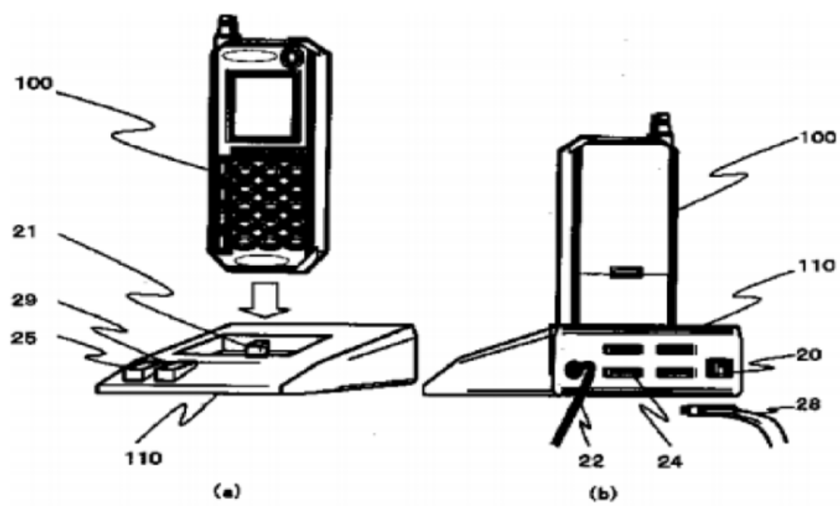
Morita discloses a mobile videophone and a charger. The charger has the ability charge the mobile videophone and/or connect the phone to a computer. Specifically, the charger comprises a “first coupling means for coupling to a mobile phone” and a “second coupling means for coupling to an external device.” Ex. 1008 (Morita) at Abstract. Morita discloses that the provided “coupling means” comprises USB connections. *Id.* at [Claim 2]. Figure 1 of Morita discloses the charger, the mobile videophone, and several key components:



Morita at Figure 1 (annotated); Baker, ¶¶ 102-105. As evidenced in Figure 1, the charger of Morita draws power from an outlet (22) to provide to the mobile device through the USB connection (21). *Id.* at column 3 (Embodiment of Invention) (disclosing a "power supply connection unit such as an outlet"); *id.* at [0014] ("A power supply voltage supplied from a power supply source is supplied from the charging control unit 23 to the USB hub control unit 27 and the second USB port 21"). Accordingly, as a POSITA would have understood from the USB Specifications, the "first coupling" (21) provided by Morita is a "high powered" USB port that provides a *minimum* of 500mA to the mobile device. Baker, ¶¶ 118-119. Moreover, unlike the existing high-power hubs discussed by the patentee in the '021 Application, Morita does not disclose automatically terminating charging when the current supplied to the mobile device exceeds "700mA-800mA." Ex. 1006 ('021 Application) at 22; Baker, ¶ 119.

A POSITA would have understood that, although the charger of Morita can be simultaneously connected to an external computer, there will be situations in which no such active device is connected. In such situations the device acts merely as a charger for the phone. Baker, ¶ 125.

[FIG. 2]



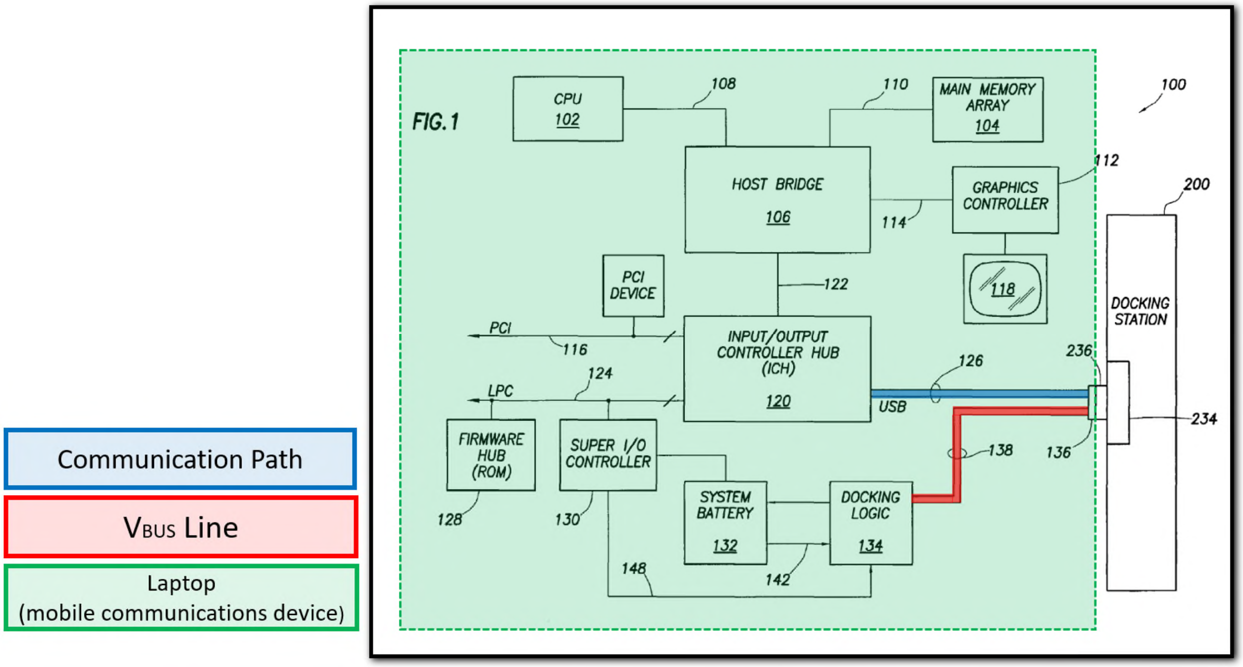
Morita at Figure 2.

E. Overview of Dougherty

U.S. Patent No. 7,360,004 ("Dougherty") is titled "Powering a Notebook Across a USB interface." Dougherty's effective filing date is June 30, 2000, which predates even the '187 Patent's earliest claimed priority date of March 1, 2001.

Accordingly, Dougherty constitutes prior art to each of the challenged claims under at least pre-AIA 35 U.S.C. § 102(e).

Dougherty discloses a docking station that powers a laptop using a USB connection. Ex. 1018 (Dougherty) at 2:55-58 (disclosing "a laptop computer and related docking station adapted to supply power from the docking station to the laptop computer across the USB connection."); *see id.* at Figure 2. Dougherty refers to the lines in the connection as "USB power rails" and "serial communication conductors." *See e.g.*, *id.* at Abstract ("A laptop computer and mating docking station where the docking station provides power to the laptop computer over the power rails of the Universal Serial Bus (USB) interface.") and 5:26-37; Baker, ¶¶ 107-108. Dougherty discloses—and a POSITA would have understood—that the "power rails" of the laptop of Dougherty include a USB V_{BUS} line and that the "serial communication conductors" of the laptop constitute a USB communication path. Baker, ¶¶ 107-108.



Ex. 1018 (Dougherty) at Figure 1 (annotated).

In order to power the laptop, the system of Dougherty disregards a number of the conditions associated with the USB Specification. *See e.g.*, *id.* at 2:55-3:10; *id.* at 6:1 (disclosing that the system "breaks with standard USB protocol"); Baker, ¶¶ 109-110. Among other things, the 5V typically supplied by the output USB connection of the laptop is disengaged and, instead, the port *receives* power at 18.5 volts from the docking station on that connection. *Id.* at 2:58-64 ("To accomplish this, the laptop computer is modified to have circuitry which is capable of being detected across USB power rails by the docking station and also capable of turning off the five volts typical supplied by the laptop onto the USB port, and instead, receiving power at 18.5 volts, from the docking station across the USB connections."). Baker, ¶¶ 109-110. As a result of this connection, the laptop draws current over the USB connection that exceeds the maximum amounts permitted by the USB Specification. Baker, ¶ 110. Specifically, Dougherty discloses that laptop may draw 2.5 amps of current from the docking station. *Id.* at 7:47-51 ("When the dock station 200 provides power for full operation of the laptop computer 100, as many as 2.5 amps of current may flow from the dock station 200 to the laptop computer 100 across the USB connectors 136, 236."). As noted above, this is more than five times the maximum amount that a device is to consume/draw under the USB Specification. *See e.g.*, USB 1.1 at 134-134; Baker, ¶ 110.

Because the dock supplies all the power required by the laptop, no other power adapter is required. Dougherty at 3:4-6 ("Thus, a laptop user need only plug the laptop into the docking station via the USB port, even if the battery for the laptop computer is drained."); Baker, ¶ 110.

VII. CLAIM CONSTRUCTION

The Board construes claims in an IPR in accordance with *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). 83 Fed. Reg. 51340, 51340-44 (Oct. 11, 2018). Under the *Phillips* standard, "words of a claim are generally given their ordinary and customary meaning." *Phillips*, 415 F.3d at 1312-13 (internal quotations omitted).

Claim construction is only necessary to the extent it is required to resolve disputes presented in the Petition. *Nidec Motor Corp. v. Zhongshan Broad Ocean*

Motor Co. Ltd., 868 F.3d 1013, 1017 (Fed. Cir. 2017). Petitioners submit that, other than the terms addressed below, no terms need to be construed to resolve the issues presented by this Petition and the claims should be afforded their plain and ordinary meaning in view of the '187 Patent's specification and prosecution history, as would have been understood by a POSITA. If Patent Owner attempts to create a claim construction dispute in its preliminary response, Petitioners reserve the right to address the issue in a reply to that preliminary response. If the Patent Owner attempts to create a claim construction issue in its post-institution response, Petitioners will address such issues in their reply.

A. "at least one associated condition specified in a USB specification" (claim 1) and "at least one USB Specification imposed limit" (claim10)

The PTAB construed these phrases in the context of a related patent, U.S. Patent No. 8,624,550. *See ZTE (USA) Inc. et al. v. Fundamental Innovation System International LLC*, IPR2018-00111 at Paper 62 (Final Written Decision) at 7-13. Specifically, the PTAB held that the "at least one associated condition specified in a USB specification" (Claim1) and the "at least one USB Specification imposed limit" must be conditions/limits that affect the supply of current on the V_{BUS} line. *Id.*

Accordingly, for purposes of this IPR Proceeding, Petitioner adopts the Board's prior construction which encompasses conditions/limitations related to supplying and drawing current, including at least: the amount of current supplied, the amount of current supplied prior to enumeration, and the direction in which current is supplied.

VIII. ANALYSIS

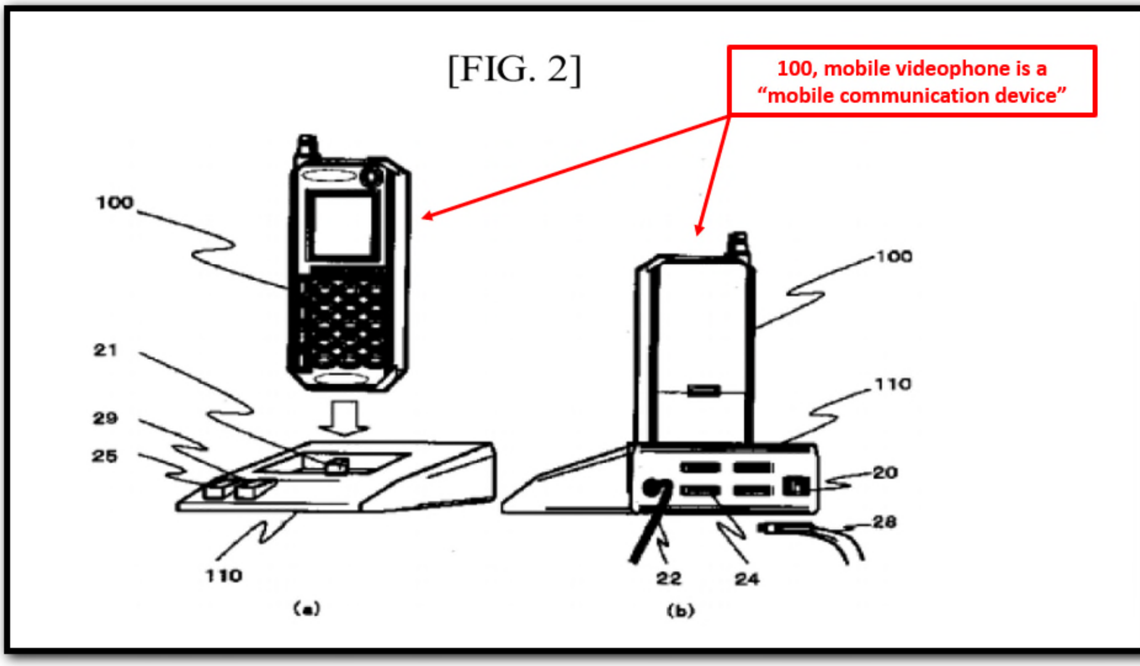
A. Morita in View of the Knowledge of a POSITA Renders The Subject Matter Of Claims 1-18 Obvious.

As noted above and herein, Morita expressly discloses a mobile videophone and charging device that charges the videophone via USB port. *See e.g.*, Ex. 1008 (Morita) at [Claim 1], [Claim 2], [0010]-[0011], and [0016]. As also discussed above, a POSITA would have been aware of the USB Specifications that existed as of the priority date of the ’187 Patent. This includes the USB 1.1 and USB 2.0 Specifications. *See* Section VI; Baker, ¶ 68.

1. Claim 1

a. 1[a]. A mobile communication device, comprising

To the extent the preamble of claim 1 is limiting, it is disclosed by Morita. Baker, ¶¶ 111-112. Morita discloses a mobile videophone:



Morita, Figure 2 (annotated); *see also*, *e.g.*, Morita at [0016] ("In FIG. 2, the mobile videophone device 100 is connected to the USB port 21 of the charger 110. . ."); *see also id*.at [0010]-[0011]. A POSITA would have understood the mobile videophone of Morita to be a "mobile communication device." Baker, ¶¶ 111-112; Morita at [0003].

b. 1[b] a USB V_{BUS} line and a USB communication path

Morita discloses that the mobile videophone comprises "a USB V_{BUS} line and a USB communication path." Baker, ¶¶ 113-115.

Specifically, Morita discloses that the mobile videophone connects to the charger through a "USB" connection. *See e.g.*, Morita at Claim 1 ("A charger capable of charging a mobile phone . . . comprising: first coupling means for coupling to a mobile phone") and Claim 2 ("The charger according to claim 1, wherein the first coupling means . . . are configured from a USB format."); *id.* at [0016] ("In FIG. 2, the mobile videophone device 100 is connected to the USB port 21 of the charger 110 . . . . "); *see also id.* at [0010]-[0011].

A POSITA would have understood that the "USB" "coupling means" of the videophone comprises a USB V_{BUS} line and a USB communication path. Indeed, the USB Specifications—which would have been known to a POSITA—expressly disclose that USB ports and connections include these components. Baker, ¶ 113. Specifically, the USB Specifications disclose that such connections have four wires or contacts: V_{BUS} and GND (ground) lines that provide power and D+ and D- lines that carry signals for communication. *See e.g.*, Ex. 1009 (USB 1.1) at 15-18, 80-82; Ex. 1010 (USB 2.0) at 15-18, 93-94, and 173-175; Baker, ¶¶ 113-114.

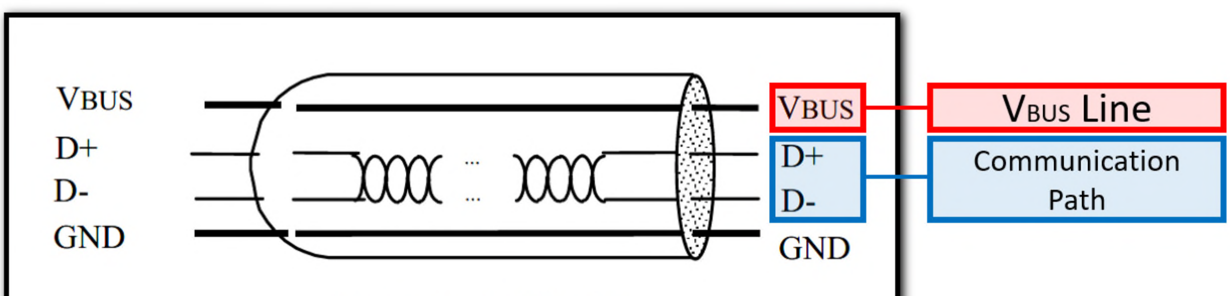


Figure 4-2. USB Cable

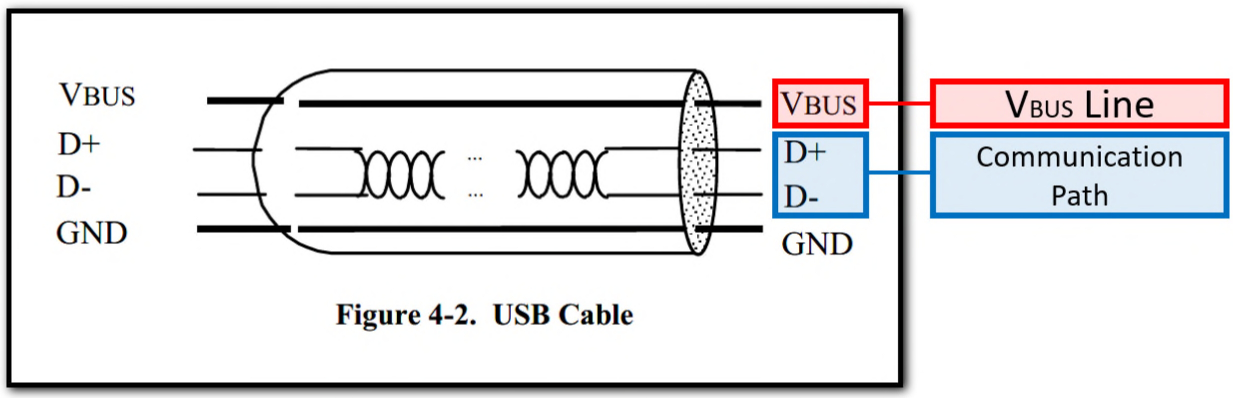
USB 1.1 at Figure 4-2.

Table 6-1. USB Connector Termination Assignment

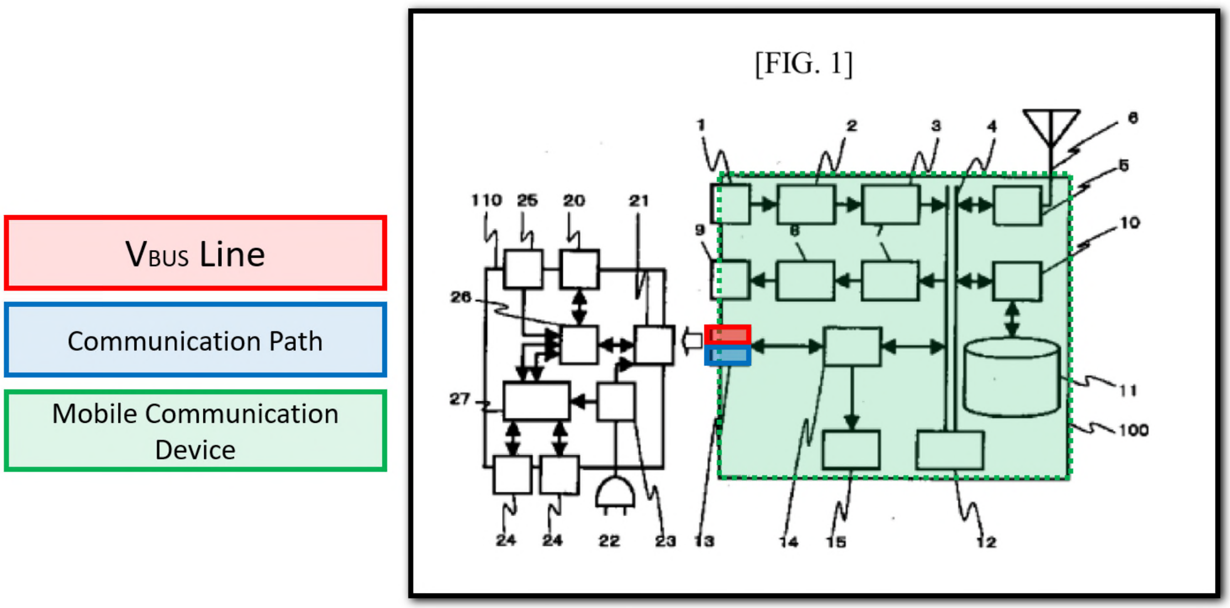
Contact Number	Signal Name	Typical Wiring Assignment
1	VBUS	Red
2	D-	White
3	D+	Green
4	GND	Black
Shell	Shield	Drain Wire

USB 1.1 at Table 6-1.

The "V_{BUS}" line disclosed in the specification constitutes the claimed V_{BUS} line of Claim 1. Baker, ¶ 113. Moreover, a POSITA would have understood that the data connections, including the data lines (D+ and D-), provide a "USB communication path" as required by Claim 1. *See e.g.* USB 1.1 at 25 ("The USB provides communication services between a host and attached USB devices."); Baker, ¶ 108. Indeed, dependent claims of the '187 Patent identify the D+ and D- lines as the primary example of the claimed "USB communication path." *See e.g.*, Ex. 1001 ('187 Patent) at claim 5 ("The device of claim 4, wherein said USB communication path includes a D+ and D- line.").



USB 1.1 at Figure 4-2 (annotated).



Morita at Figure 1 (Annotated).

Accordingly, a POSITA would have understood that the mobile phone of Morita includes "a USB V_{BUS} line and a USB communication path" as required by Claim 1 of the '187 Patent.

c. 1[c] said device configured to draw current from the VBUS line without regard to at least one associated condition specified in a USB specification.

Morita renders obvious that "said device configured to draw current from the V_{BUS} line without regard to at least one associated condition specified in a USB specification." Baker, ¶¶ 116-122.

Preliminarily, a POSITA would have understood that the mobile videophone of Morita draws current from the V_{BUS} line as this line is used for supplying power to, and drawing power from, a USB port. *See e.g.*, USB. 1.1 at 17 ("The cable also carries VBUS and GND wires on each segment to deliver power to devices."); Baker, ¶¶ 113-115. Moreover, a POSITA would have understood or found obvious that the mobile videophone of Morita (1) receives more than 500 mA of current and (2) receives more than 100 mA of current without performing USB enumeration which, as explained below, are conditions specified in a USB Specification. *Id.*, ¶¶ 116-122.

(1) Supplying More than 500mA of Current.

Although Morita does not expressly state the amount of current that the mobile phone of Morita draws from the V_{BUS} line, a POSITA would have understood that it is capable of drawing more than 500mA of current, which is sufficient to satisfy this limitation. *See ParkerVision, Inc. v. Qualcomm Inc.*, 903 F.3d 1354, 1361 (Fed. Cir. 2018); Baker, ¶¶ 116-122. At a minimum, a POSITA would have found it obvious to configure the videophone with this capability. This would have been understood or obvious to a POSITA for several reasons.

First, a POSITA would have understood that the charger of Morita *supplies* more than 500mA to the mobile videophone. Baker, ¶¶ 118-119. As noted above, Morita discloses that the charger draws power directly from an outlet. *See e.g.*, Morita at Figure 2 (component 22, outlet connection) and [0014] ("A power supply voltage supplied from a power supply source is supplied from the charging control unit 23 to the USB hub control unit 27 and the second USB port 21"). Accordingly, a POSITA would have understood that the "first coupling" provided by Morita is a "high powered" port, and would thus configure the charger to provide a ***minimum*** of five "unit loads" of current (500mA) through that port to the charging mobile device. USB 2.0 at 171 ("Systems that obtain operating power externally, either AC or DC, <u>must supply at least five unit loads [500mA] to each port</u>. Such ports are called high-power ports.") (emphasis added); *see also* USB 1.1 at 134 (same); Baker, ¶ 118.

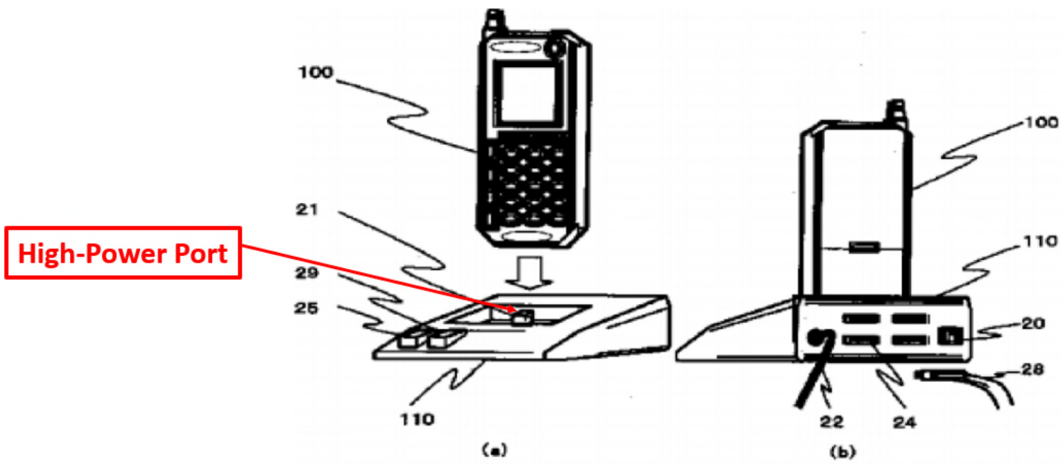
Table 7-7. DC Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Max.	Units
Supply Voltage:					
High-power Port	VBUS	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	VBUS	Note 2, Section 7.2.1	4.40	5.25	V
Supply Current:					
High-power Hub Port (out)	ICCPRT	Section 7.2.1	500		mA
Low-power Hub Port (out)	ICCUPT	Section 7.2.1	100		mA
High-power Function (in)	ICCHPF	Section 7.2.1		500	mA
Low-power Function (in)	ICCLPF	Section 7.2.1		100	mA
Unconfigured Function/Hub (in)	ICCINIT	Section 7.2.1.4		100	mA
Suspended High-power Device	ICCSH	Section 7.2.3; Note 15		2.5	mA
Suspended Low-power Device	ICCSL	Section 7.2.3		500	A

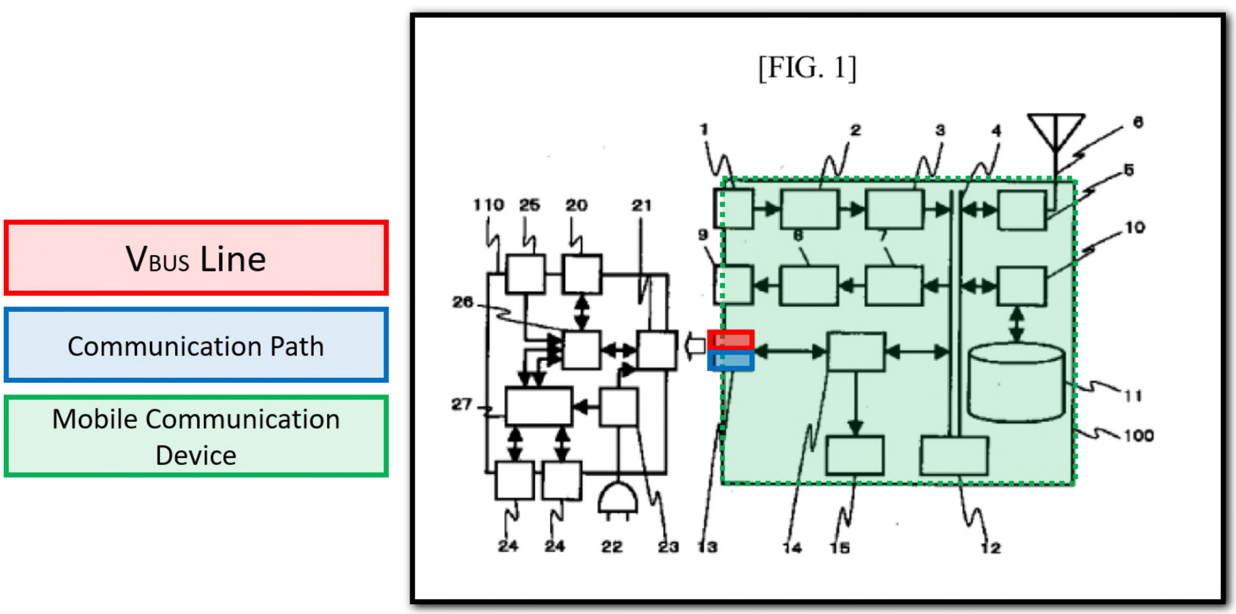
USB 2.0 at 178 (Table 7-7) (annotated); *see also* USB 1.1 at 142 (Table 7-5) (same). Because 500mA is only the ***minimum*** amount the charger is to supply at the high powered port, a POSITA would have understood that it is actually capable of supplying much more than 500mA. Indeed, the ’021 Application discloses that such high-powered ports existed prior to the priority date of the ’187 Patent and generally supplied between “700mA-800mA” before automatically terminating the power supply. Ex. 1006 (’021 Application) at 23.

Second, a POSITA would have understood that the videophone of Morita can draw the entire amount of current supplied by the high power port (which, as noted above, is more than 500mA) for charging because it is the only device connected to that port. Baker, ¶ 119. Indeed, a POSITA would have understood that the high-power port of the charger of Morita is designed to charge the mobile videophone only. *Id.* There would never be any additional downstream devices connected to the mobile videophone. *Id.*

[FIG. 2]



Morita at Figure 2 (annotated).



Morita at Figure 1 (annotated).

Third, although the high-power port of the Morita charger supplies a ***minimum*** of 500 mA, a POSITA would have been motivated to supply and draw more than 500mA (likely 600-1000 mA) in order to charge the phone more quickly. Baker, ¶ 120. It was well known at the time that drawing more than 500mA of current (when such current is available, as it is here) results in faster charging. *See* Section VI.C; Ex. 1016 (U.S. Pat. No 5,923,146, "Martensson"), 1:5-8 (invention relates to charging "cellular radio telephone"), 1:30-34 ("fast-charged" technique using "600-1000 mA"); Ex. 1017 (U.S. Patent No. 5,859,522 "Theobald") at 4:29-39 (a "mid-rate charger" supplies current at around 340 mA; a "fast rate charger" supplies approximately 850 mA of current); Baker, ¶ 120.

Because the phone is capable of drawing more than 500mA of current, it is "configured to draw current on the V_{BUS} line without regard to at least one associated condition specified in a USB specification" as required by claim element 1[c]. Baker, ¶ 117. Indeed, the USB Specification discloses as a condition/limit that a USB device should not be supplied with more than 100mA to a "low-power" power or 500 mA to a "high-power" device:

Table 7-7. DC Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Max.	Units
Supply Voltage:					
High-power Port	VBUS	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	VBUS	Note 2, Section 7.2.1	4.40	5.25	V
Supply Current:					
High-power Hub Port (out)	ICCPRT	Section 7.2.1	500		mA
Low-power Hub Port (out)	ICCUPT	Section 7.2.1	100		mA
High-power Function (in)	ICCHPF	Section 7.2.1		500	mA
Low-power Function (in)	ICCLPF	Section 7.2.1		100	mA
Unconfigured Function/Hub (in)	ICCINIT	Section 7.2.1.4		100	mA
Suspended High-power Device	ICCSH	Section 7.2.3; Note 15		2.5	mA
Suspended Low-power Device	ICCSL	Section 7.2.3		500	A

USB 2.0 at 178 (Table 7-7) (annotated); *see also* USB 1.1 at 142 (Table 7-5) (same).

A POSITA would have been motivated to configure the mobile phone of Morita in this manner even though it is inconsistent with the 500mA current limit in the USB Specification. Baker, ¶¶ 121-122. Notably, and as discussed in more detail with respect to Claims 3 and 4, Morita discloses that the USB charger is connected to an outlet and can be used for the sole purpose of charging the mobile videophone (i.e., without also being connected to a hub or host). *See* Section VIII.A.3. In this charging state, there are no typical USB communications to disrupt and no other downstream devices that need to be powered. *Id.*; Baker, ¶¶ 121-122. The USB Specification itself implies that, under such circumstances, the 500 mA limit may be disregarded. Specifically, as noted above, the USB Specification indicates that the port of the charger is a "high-power port" that will supply a *minimum* of 500 mA. USB 2.0 at 178 (Table 7-7); USB 1.1 at 142 (Table 7-5); Baker, ¶ 121. In other words, given the charging configuration of Morita, a POSITA (1) would have been motivated to draw more than 500 mA of current for purposes of efficiently and quickly charging the mobile videophone, (2) would have understood that doing so would not disrupt the charger from communicating with the mobile videophone (because it is not communicating with the videophone in the charging state), and (3) would have understood that doing so would not disrupt powering any other downstream devices (because there are no such other devices).

(2) Supplying More than 100mA of Current without Enumeration.

Moreover, a POSITA would have understood or found obvious that the mobile videophone of Morita is configured to draw more than 100 mA of current without performing enumeration. Baker, ¶ 122.

Specifically, as discussed in more detail with respect to Claim 3, a POSITA would have understood that, in some circumstances, the charger of Morita would not be connected to a computer and thus, would act only as a charging device. *See e.g.*, Morita at Figure 2; Baker, ¶¶ 122, 124. In those situations, the two devices have no reason or ability to communicate over the data lines (D+ and D-) and thus enumeration is not possible. *Id.* Accordingly, as noted above, the charging device would provide a *minimum* of 500 mA of current on the V_{BUS} to the mobile videophone without enumeration. This disregards the USB Specification's condition/limit on the amount of current that may be supplied without enumeration, which is one unit load (100 mA). USB 2.0 at 171 ("Devices must also ensure that the maximum operating current drawn by a device is one unit load, until configured."); Baker, ¶ 117.

Accordingly, for each of these reasons, a POSITA would have understood or found obvious that the mobile videophone of Morita would draw current without regard to at least one condition of the USB Specification.

2. Claim 2: The device of claim 1, where in the associated condition is a current limit.

As explained above, Morita discloses or renders obvious the device of claim 1. A POSITA would have understood that Morita also renders obvious that "said associated condition is a current limit." Indeed, as explained above with respect to claim element 1[c], Morita renders obvious a mobile phone that draws more than 500mA of current and more than 100 mA without enumeration. *See* Section VIII.A.1.c; Baker, ¶ 123. As such, the device disregards two conditions that are current limits.

3. Claim 3: The device of claim 1, wherein said current is drawn without USB enumeration.

As explained above, Morita discloses the device of claim 1. Morita also renders obvious that "said current is drawn without USB enumeration." Baker, ¶¶ 124-126.

Morita discloses a mobile videophone and associated charging device. Morita, Abstract. Although Morita's charger was capable of handling a "plurality of external devices," a POSITA would have understood that, in at least some cases, the charger would act as a charger only. Baker, ¶ 125. That is, the charger would be plugged into the power socket (e.g., wall outlet) and connected to the videophone for charging purposes, but not connected to any other external devices (*e.g.*, a personal computer or any other USB host or hub). In other words, although Morita discloses that a USB host or hub (e.g., personal computer) is ***optionally*** connectable to the adapter via USB port 20, it also discloses using the charger just that (a charger). Morita, [0014-0015].

A POSITA would have understood that in this "charging" state/configuration, (1) normal USB communications between the charger and the videophone are not possible (USB communications require a USB host and root hub as discussed above in Section VI.A) and (2) powering the USB charger from the absent, and unconnected, USB host or hub is not possible. Baker, ¶ 126. Morita embraces this scenario, because it discloses that the adapter can provide power to the phone via USB connector 21 using the power from a wall outlet. Morita, at [0016].

Because normal USB communications are not possible, a POSITA would have further understood that enumeration cannot occur and, thus, that videophone of Morita draws current without enumeration. Baker, ¶ 126. As discussed in more detail with respect to Claim 4, for example, it would have been obvious to use an SE1 signal to identify the charger as a high-power port from which current may be drawn. *See* Section VIII.A.4.

Accordingly, a POSITA would have found obvious that the mobile videophone of Morita is configured to draw current without enumeration when the charger of Morita is not connected to a host or hub.

4. Claim 4: The device of claim 1 wherein said current is drawn in response to an abnormal data condition on said USB communication path

As explained above, Morita discloses the device of claim 1. Morita further renders obvious that "said current is drawn in response to an abnormal data condition on said USB communication path." Baker, ¶¶ 127-134. Specifically, a POSITA would have been motivated to configure the mobile videophone of Morita to draw more than 500 mA of current in response to an SE1 signal, which is "an abnormal data condition on said USB communication path."

As discussed in more detail with respect to Claim 3, the charger of Morita will, in some cases, be used in a pure charging configuration in which it is connected to the videophone but no other devices. *See* Section VIII.A.3. In such cases, a POSITA would have understood that the charger must identify the charging state so that the mobile videophone does not default to charging at the "low-power" 100mA level. USB 1.1.; Baker, ¶ 128. A POSITA would have further understood that the devices cannot engage in typical USB communication or enumeration and, accordingly, the charger must identify the charging state in some other way. *Id.* Using an SE1 signal on the data lines to identify this state was the most obvious choice for several reasons.

First, the USB data lines were already used to signal connection states and, as noted above, they are not needed for typical USB communication or enumeration in this situation. *See* Section VI.A-B. Moreover, the VBUS line is being used to provide power. Accordingly, data lines are the obvious choice for signaling the charging state. Baker, ¶ 128.

Second, there are only four available signals that could be used (both high, both low, high/low, and low/high) to signal a state, and the SE1 signal (both high) is the only legitimate option. Baker, ¶ 128. The low/high (D+ low and D- high) and high/low (D+ high and D- low) signals cannot be used because the USB Specifications requires that such signals be used to indicate low-speed or full-speed communications across the USB port. *See* Section VI.A-B; Baker, ¶ 128. As noted above, the charging state of Morita does not allow for low-speed or full-speed communications (or any typical USB communications). *Id.* The low/low signal also cannot be used because it indicates that no device is connected and, in the charging state of Morita, the device is connected. *Id.*; Baker, ¶ 128. Accordingly, a POSITA would have logically looked to ***the only other possible state of the data lines***, that is, both D+ and D- being high, to identify the charging state. Baker, ¶ 128. In other words, a POSITA would have looked for an identification signal that is not utilized in normal USB communications so that it would not impact other USB operations, and there is only such signal available (SE1). Baker, ¶¶ 128-129.

Third, that the SE1 signal is the obvious choice for an identification signal was known in the art and, thus, is described throughout relevant prior art references. As those references indicate, a POSITA would have understood that the SE1 signal is the obvious choice because it us not utilized by the USB Specification and, thus, can "be easily distinguished from USB standard data signals." Shiga, 5:60-62, 6:48-58. Indeed, holding D+ and D- high in this situation (for charging a battery with no communications) was well-known before the priority date of the '766 Patent. *See* Section VI.B; Baker, ¶¶ 84-90, 130-131. For example, Kerai discloses "A battery charging circuit is described in which power is derived from a communications port such as a USB interface (22) and is supplied to a rechargeable battery of a communications device." Kerai, Abstract. "***As is well known***, the data lines of a serial connection (D+ and D- in the USB interface) are held high when the connection is inactive and will vary between a high and low state whilst communication over the ports takes place." *Id*., 5:45-48 (emphasis added).

Other references similarly disclose using the SE1 signal as an identification signal for other purposes. It was known, for example, to use the SE1 signal to identify a power state (analogous to high-power port charging being available). As noted above, Zyskowski employs the SE1 signal to identify its full power state to a different device (*e.g.*, mass storage device, consumer electronic device). Zyskowski, ¶ 19; Baker, ¶ 131. In particular, Zyskowski discloses that "[w]hen the host 104 is in a full power state, data lines D1 and D2 may be raised to a predefined DC voltage level, for example, 5 volts (systems operating at lower voltages might raise the data paths to 3 volts, 2 volts, or even less." *Id.*; *see also* Shiga, Abstract, 6:35-47 (wake up signal), Casebolt, 7:40-54 (signaling presence of PS/2 adapter).

Moreover, although it is not used in typical USB communications, the SE1 signal is also taught in the USB 2.0 Specification, which refers to this state as "single ended one" or "SE1." Indeed, while the SE1 signal was not disclosed or referenced in the USB 1.1 specification (1998), it had become so widely used by 2000 that it was added to the USB 2.0 specification in April 2000 (six months prior to the '486 Application in which the patentee first disclosed using this signal). *See e.g.,* USB

2.0 at 123 ("SE1 is a state in which both the D+ and D- lines are at a voltage above V_{OSE1} (min), which is 0.8 V."); Baker, ¶ 130.

Table 7-2. Low-/full-speed Signaling Levels

Bus State	Signaling Levels		
	At originating source connector (at end of bit time)	At final target connector	
		Required	Acceptable
Differential "1"	D+ > V_{OH} (min) and D- < V_{OL} (max)	(D+) - (D-) 200 mV and D+ V_{IH} (min)	(D+) - (D-) 200 mV
Differential "0"	D- > V_{OH} (min) and D+ < V_{OL} (max)	(D-) - (D+) > 200 mV and D- V_{IH} (min)	(D-) - (D+) > 200 mV
Single-ended 0 (SE0)	D+ and D- < V_{OL} (max)	D+ and D- < V_{IL} (max)	D+ and D- < V_{IH} (min)
Single-ended 1 (SE1)	D+ and D- > V_{OSE1}(min)	D+ and D- > V_{IL} (max)	

USB 2.0 at 145 (excerpted and annotated).

Table 11-8. Upstream Facing Port Receiver Signal/Event Definitions

Signal/Event Name	Event/Signal Source	Description
HS	Internal	Port is operating in high-speed
Tx_active	Transmitter	Transmitter in the Active state
J	Internal	Receiving a 'J' (IDLE) or an 'SE1' on the upstream facing port
HJ	Internal	Receiving an HJ on the upstream facing port
EOI	Internal	End of timed interval
EOITR	Internal	Generated 24 full-speed bit times after the K->SE0 transition at the end of resume
HK, K	Internal	Receiving an HK, 'K' on the upstream facing port
Tx_resume	Transmitter	Transmitter is in the Sresume state
HS_Idle	Internal	Receiving an Idle state on the high-speed upstream facing port
SE0	Internal	Receiving an SE0 on the full-speed upstream facing port
EOR	Internal	End of Reset signaling from upstream
POR	Implementation-dependent	Power_On_Reset

USB 2.0 at 320 (annotated).

Fourth, because the SE1 signal can "be easily distinguished from USB standard data signals," a POSITA would have found it routine to use the SE1 signal as an identification signal with a high expectation of success. *See* Shiga, 5:60-62, 6:48-58. Indeed, as noted above, the prior art is replete with disclosures of receiving and detecting SE1 signals. *E.g.*, Kerai, 5:49-53 (disclosing two instances of a "logic detector 50," and each instance "detects the state of" a data line (i.e., D+ or D-) to detect the SE1 signal); Shiga, 6:59-7:15 (disclosing comparing means and an AND gate to detect the SE1 signal); Zyskowski, ¶ 19 (detecting high voltage on D lines to recognize SE1 state); Casebolt, 6:6-16, 7:30-45 (disclosing "controller 144" to detect the SE1 condition); Baker, ¶ 131. Similarly, it was well within the knowledge and skill of a POSITA to detect the SE1 signal at the mobile videophone. Baker, ¶ 157.

Fifth, although the USB 2.0 Specification states that "Low-speed and full-speed USB drivers must never "intentionally" generate an SE1 on the bus," that would not discourage a POSITA from using the signal here. *See* USB 2.0 at 123; Baker, ¶ 130. As noted above, the charger is not acting as a low-speed or high-speed driver; indeed, it is not engaging in typical USB communication at all. Baker, ¶ 130. Accordingly, the USB specification does not teach away from using the SE1 signal for this purpose. To the contrary, by indicating that the signal should not be used during typical USB communications, the USB 2.0 specification itself implicitly suggests that the SE1 signal can be used to signal a charging-only state in which communication and enumeration is not occurring. As noted above, by providing the SE1 signal, the charger would confirm and indicate that communication will not occur, while still allowing the mobile device to continue receiving power over the power lines so that it can charge. *See* Section VI.A. Because this was the known result of the SE1 signal, and this is the exact purpose that Morita's adapter would seek to achieve without a host USB connection (i.e., charge without any USB communications), it would be obvious to select this known SE1 signal as the identification signal (and again, it is a selection from among a finite number of known choices). Baker, ¶ 129.

Sixth, although it is not necessary for purposes of the claims of the '187 Patent, a POSITA would have found it obvious to generate the SE1 signal at the charger of Morita. Baker, ¶¶ 132-134. The claims require only that the mobile device draw current in response to the abnormal signal (e.g., SE1); they do not contain any limitations about the manner in which the adapter generates the signal. Nonetheless, to the extent that Patent Owner argues that it would not have been obvious or predictable to generate the SE1 signal using Morita's adapter, Patent Owner's argument fails for two reasons. First, the claims do not recite any component that generates the SE1 signal. Second, the above prior art illustrates that it was routine to generate the SE1 signal as an identifying signal. Indeed, a POSITA would have understood how to pull D+ and D- high to provide the SE1 identifying signal. Baker, ¶¶ 132-134. As stated in USB 1.1, "Hubs, and the devices to which they connect, use a combination of pull-up and pull-down resistors to control D+ and D- in the absence of their being actively driven. These resistors establish voltage levels used to signal connect and disconnect and maintain the data lines at their idle values when not being actively driven." USB 1.1, 256. This would have informed a POSITA that pulling D+ and D- high is a simple matter of connecting the R_{pd} resistors high, as the R_{pu} is resistor is connected in the mobile device in the annotated Figure 7-10 from USB 1.1 seen below, instead of to ground. The claimed identification subsystem configured to generate an identification signal, both D+ and D- pulled high, are the resistors, R_{pd}, connected high instead of to ground as indicated in the annotated figure seen below.

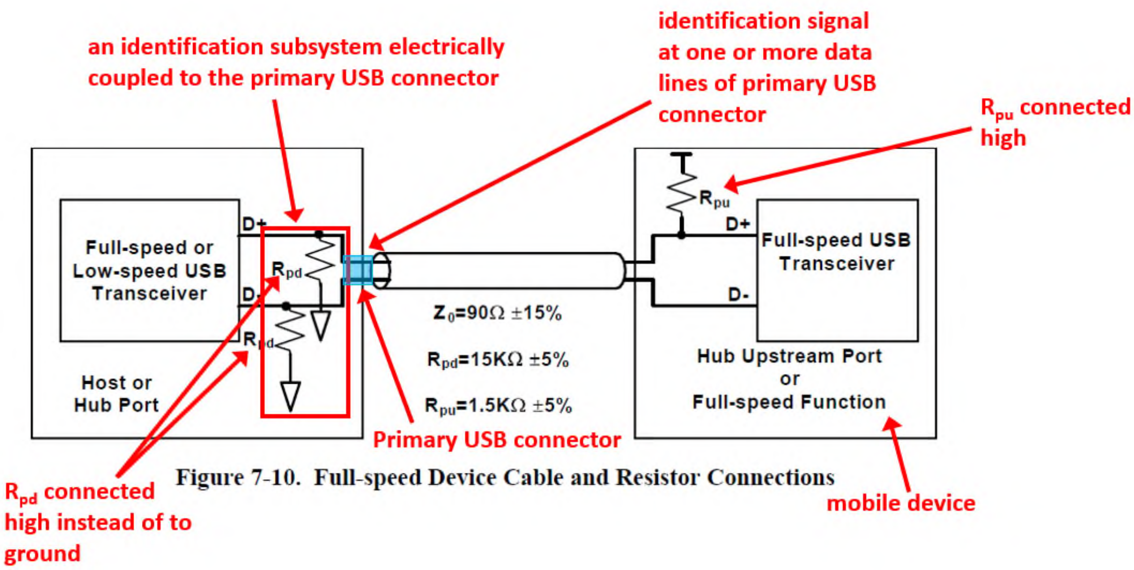
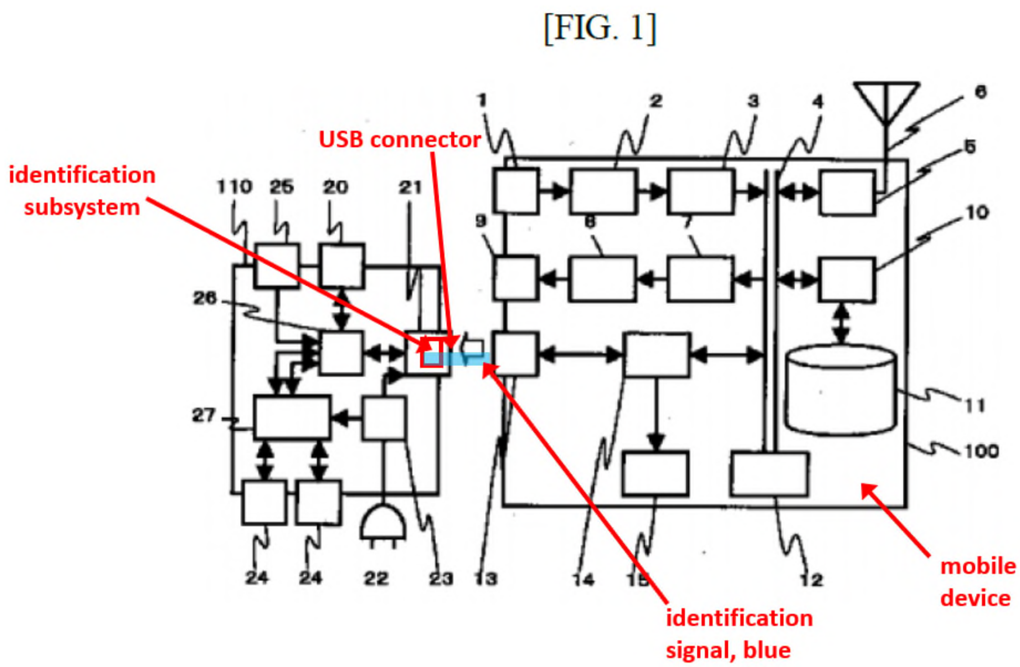


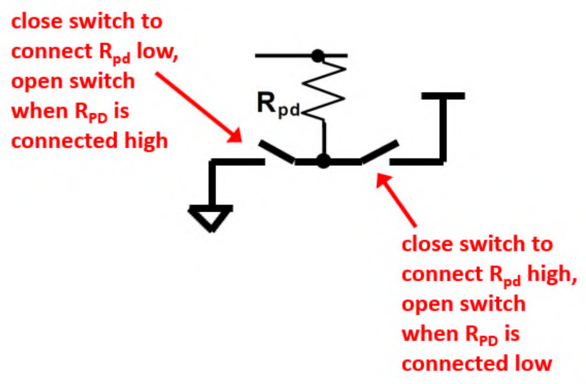
Figure 7-10. Full-speed Device Cable and Resistor Connections

USB 1.1, 113 (annotated).



Morita FIG. 1 (annotated).

In order to ensure that the USB port could continue to operate as a normal USB port, and not just a "High-power Port Hub," a POSITA would have known that R_{pd} resistors in a USB host or hub port must also connect low (to ground) as seen above in Figure 7-10 from USB 1.1. The addition of two simple switches to each R_{PD} resistor, *see* annotated image below, would have allowed the port to operate as either a normal USB port with normal communications or an abnormal port (SE1 where D+ and D- are both high) where communications are not possible. Baker, ¶¶ 132-134



USB 1.1, 113 (annotated portion of Figure 7-10).

In short, a POSITA would have understood, found obvious, and would have had a high expectation of success that this simple modification would have allowed Morita to maintain all of its stated functionality and operation, while adding the desired benefit of identifying and allowing charging in the common situation when no other USB host or hub was connected.

For all of the reasons discussed above, a POSITA would have found it obvious for the videophone of Morita to draw current in response to an SE1 signal. Moreover, a POSITA would have understood that signal to be an “abnormal data condition.” Baker, ¶ 129. Indeed, subsequent dependent claims of the ’187 Patent identify the High/High signal (SE1) as the exemplary “abnormal data condition.” ’187 Patent at Claim 7. Accordingly, Morita’s system, in view of the knowledge of a POSITA, renders this limitation obvious. Baker, ¶¶ 127-134.

5. Claim 5: The device of claim 4 wherein said USB communication path includes a D+ line and a D− line.

As explained above, Morita renders the device of claim 4 obvious. A POSITA would have understood that "said USB communication path includes a D+ line and a D− line." Indeed, as explained above with respect to claim element 1, Morita discloses a mobile videophone that is connected to a charger via a "USB" coupling, which a POSITA would have understood comprises a D+ and a D- line. *See* Section VIII.A.1.

6. Claim 6: The device of claim 5 wherein said abnormal data condition is an abnormal data line condition on said D+ line and said D− line.

As explained above, Morita renders the device of claim 5 obvious. Morita further renders obvious that "said abnormal data condition is an abnormal data line condition on said D+ line and said D− line." Baker, ¶¶ 127-134, 136. Indeed, as explained above with respect to claim 4, a POSITA would have been motivated to use an SE1 signal as the "abnormal data condition" by pulling the D+ and D- lines high. *See* Section VIII.A.4.

7. Claim 7: The device of claim 6 wherein said abnormal data line condition is a logic high signals [sic] on each of said D+ and D− lines.

As explained above, Morita renders the device of claim 6 obvious. Morita further renders obvious that "said abnormal data line condition is a logic high signal on each of said D+ and D− lines." Baker, ¶¶ 127-134, 137. Indeed, as noted above, with respect to claim 4, the "abnormal data condition" is an SE1 signal provided by the D+ and D- lines. *See* Section VIII.A.4. As explained by the USB 2.0 specification, and as would be known to persons of skill in the art, this signal is a logic high on each of said D+ and D- lines (at least 0.8V). *See e.g.*, USB 2.0 ("SE1 is a state in which both the D+ and D- lines are at a voltage above V_{OSE1} (min), which is 0.8V.").

Table 7-2. Low-/full-speed Signaling Levels

Bus State	Signaling Levels		
	At originating source connector (at end of bit time)	At final target connector	
		Required	Acceptable
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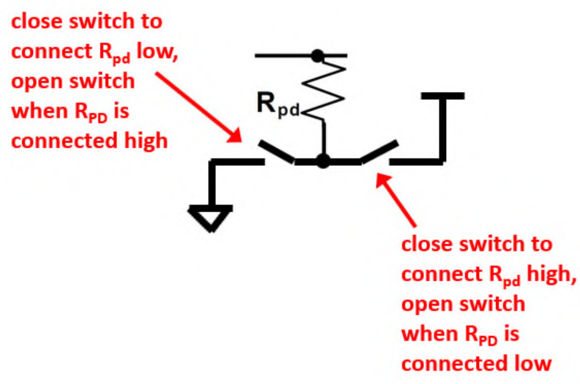
Differential "0"	D- > V_{OH} (min) and D+ < V_{OL} (max)	(D-) - (D+) > 200 mV and D- V_{IH} (min)	(D-) - (D+) > 200 mV
Single-ended 0 (SE0)	D+ and D- < V_{OL} (max)	D+ and D- < V_{IL} (max)	D+ and D- < V_{IH} (min)
Single-ended 1 (SE1)	D+ and D- > V_{OSE1}(min)	D+ and D- > V_{IL} (max)	

USB 2.0 at 145 (excerpted and annotated).

8. Claim 8: The device of claim 7, wherein each said logic high signal is greater than 2V.

As explained above, Morita renders the device of claim 7 obvious. Morita further renders obvious that "each said logic high signal is greater than 2V." Baker, ¶¶ 132-134, 138. Specifically, the USB Specifications—which were within the knowledge of a POSITA—teach that implementing a logic high signal on the D+ and D- lines would be accomplished by connecting the lines through a pull-up resistor to V_{TERM}. Baker, ¶ 127-134, 138.



USB 1.1 at 113 (annotated portion of Figure 7-10). Moreover, a person of ordinary skill in the art would have understood that V_{TERM} is typically 3.0 to 3.6 V, which is greater than 2.0V. Baker, ¶ 138.

9. Claim 9: The device of claim 2 wherein said current limit is 500 mA.

As explained above, Morita discloses the device of claim 2. A POSITA would have understood that Morita also discloses that "said current limit is 500 mA." Baker, ¶¶ 116-122, 139. Indeed, as explained above with respect to claim element 1[c], Morita renders obvious a mobile videophone that is capable of drawing more than 500mA of current. *See* Section VIII.A.1. As such, the device draws current without regard to the condition of the USB Specification that no more than 500 mA of current be supplied to a single device. *Id.*

10. Claim 10:

a. 10[a]. A mobile device, comprising

As explained above with respect to claim element 1[a], Morita discloses a mobile device. *See* Section VIII.A.1.a.

b. 10[b]. a USB V_{BUS} line and a USB communication path

As explained above with respect to claim element 1[b], Morita discloses a mobile device comprising a USB V_{BUS} line and a USB communication path. *See* Section VIII.A.1.b.

c. 10[c]. said device configured to draw current from the V_{BUS} line without regard to at least one USB Specification imposed limit.

Morita discloses or renders obvious a device "configured to draw current on the V_{BUS} line without regard to at least one USB Specification imposed limit." Indeed, as explained above with respect to claim element 1[c], Morita discloses a mobile device that draws more than 500mA from a high-powered port without enumeration. *See* Section VIII.A.1.c. As such, the videophone device disregards the "Specification imposed limit[s]" that (1) no more than 500 mA of current be supplied to/drawn by a single device and (2) no more than 100mA of current be supplied to/drawn by a single device without enumeration. *Id.*

11. Claim 11: The device of claim 10, wherein said USB Specification imposed limit is a current limit.

As explained above with respect to claim 10, Morita discloses the device of claim 10. Moreover, as explained above with respect to claim 2, Morita discloses or renders this additional limitation. *See* Section VIII.A.2.

12. Claim 12: The device of claim 10, wherein said current is drawn without USB enumeration.

As explained above with respect to claim 10, Morita discloses the device of claim 10. Moreover, as explained above with respect to claim 3, Morita discloses or renders obvious this additional limitation. *See* Section VIII.A.3.

13. Claim 13: The device of claim 10, wherein said current is drawn in response to an abnormal data condition on said USB communication path.

As explained above with respect to claim 10, Morita discloses the device of claim 10. Moreover, as explained above with respect to claim 4, Morita renders this additional limitation obvious. *See* Section VIII.A.4.

14. Claim 14: The device of claim 13, wherein said USB communication path includes a D+ line and a D− line.

As explained above with respect to claim 13, Morita renders the device of claim 13 obvious. Moreover, as explained above with respect to claim 5, Morita discloses this additional limitation. *See* Section VIII.A.5.

15. Claim 15: The device of claim 14, wherein said abnormal data condition is an abnormal data line condition on said D+ line and said D− line.

As explained above with respect to claim 14, Morita renders the device of claim 14 obvious. Moreover, as explained above with respect to claim 6, Morita renders this additional limitation obvious. *See* Section VIII.A.6.

16. Claim 16: The device of claim 15, wherein said abnormal data line condition is a logic high signal on each of said D+ and D- lines.

As explained above with respect to claim 15, Morita renders the device of claim 15 obvious. Moreover, as explained above with respect to claim 7, Morita renders this additional limitation obvious. *See* Section VIII.A.7.

17. Claim 17: The device of claim 6, wherein each said logic high signal is greater than 2V.

To the extent this claim is interpreted to be referring to claim 6, it is indefinite. To the extent this claim is interpreted to be referring to claim 16, it is rendered obvious by Morita. As explained above with respect to claim 16, Morita renders the device of claim 16 obvious. Moreover, as explained above with respect to claim 8, Morita renders this additional limitation obvious. *See* Section VIII.A.8.

18. Claim 18: The device of claim 11, wherein said current limit is 500 mA.

As explained above with respect to claim 11, Morita i discloses the device of claim 11. Moreover, as explained above with respect to claim 9, Morita discloses or renders obvious this additional limitation. *See* Section VIII.A.9.

B. Dougherty In View Of the Knowledge of POSITA Renders The Subject Matter Of Claims 1-2, 9, 10-11, And 18 Obvious.

As noted above and herein, Dougherty discloses a laptop with a USB port for drawing current and docking station for supplying said current. *See e.g.*, Ex. 1018 (Dougherty) at Abstract, Figure 2, 2:55-58, 5:26-37. A POSITA would have been aware of the USB Specifications, which disclose the internal components of the USB connections of the docking station and the laptop. Baker, ¶ 151.

1. Claim 1

a. 1[a]. A mobile communication device, comprising:

Dougherty discloses a mobile communication device. Baker, ¶152. Specifically, Dougherty discloses "a laptop computer and related docking station adapted to supply power from the docking station to the laptop computer across the USB connection." Dougherty at 2:52-55 (emphasis added).

A POSITA would have understood that the laptop computer is a "mobile communications device." The '187 Patent states that an "exemplary mobile communication device 10 . . . is preferably a two-way communication device having at least voice or data communication capabilities." Ex. 1001 ('187 Patent) at 3:42-47. The specification also refers to the "exemplary mobile communications device 10" as the "exemplary mobile device 10" and, thus, appears to equate the terms "mobile communications device" and "mobile device." *Id.* at 3:56-61.

As disclosed in Dougherty—and as a POSITA would have understood—laptop computers are mobile devices because they "are characterized in that the entire computing functionality is incorporated into a single package" and they "have a battery that allows for remote operation of the laptop even in locations where alternating current (AC) wall socket power is not available." Dougherty at 1:34-44; Baker, ¶ 152.

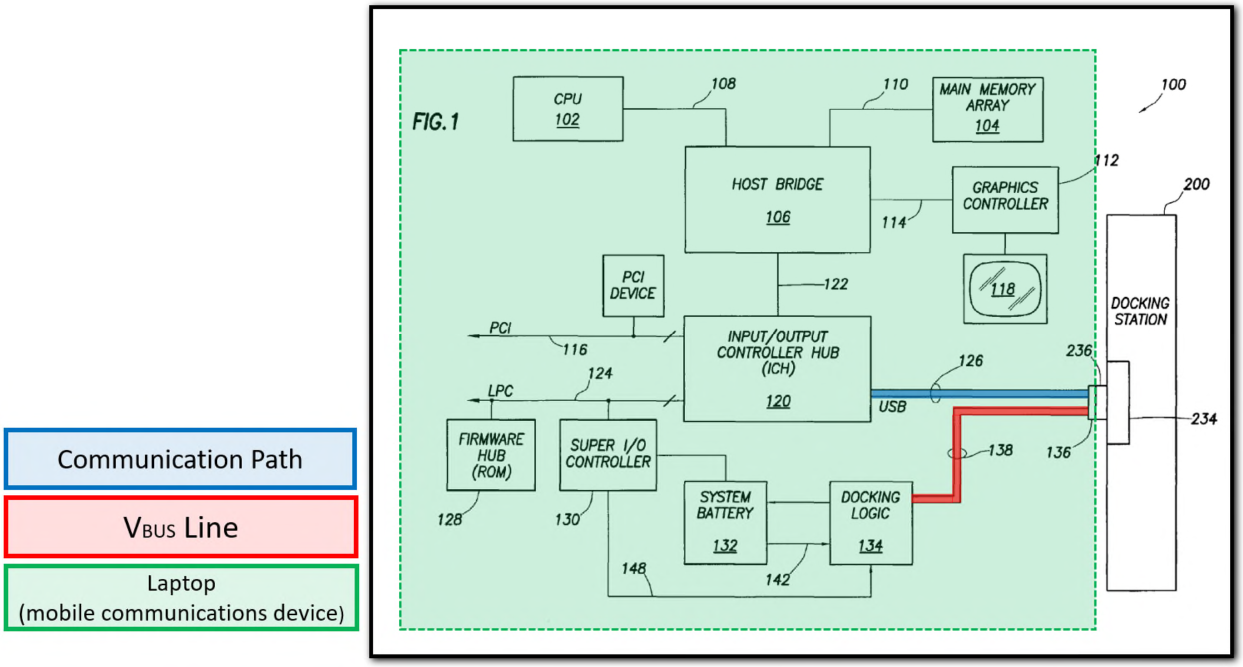
Moreover, a POSITA would have understood that a laptop is a "communications" device. The specification of the '187 Patent indicates that a "communications" device is a device that has "the ability to communicate wirelessly with external devices such as other mobile devices and other computers." '187 Patent at 3:61-64 ("The communication subsystem 14 provides the mobile device 10 with the ability to communicate wireless with external devices such as other mobile devices and other computers.") This includes, for example, "a wireless Internet appliance" and "a data communication device (with or without telephony capabilities)." *Id.* at 3:49-55. A POSITA would have understood that, as of the earliest priority date of the '187 Patent (March 1, 2011), laptops like those discussed in Dougherty routinely included wireless communications capabilities, e.g., through wireless modems. Baker, ¶ 152. Accordingly, at a minimum, it would have been obvious to a POSITA as of that date to implement the relevant teachings of Dougherty using a laptop with such capabilities. *Id.*

b. 1[b]. a USB V_{BUS} line and a USB communication path

Dougherty discloses a mobile communications device with a USB V_{BUS} line and a USB Communication path. Baker, ¶¶ 153-155. Specifically, Dougherty discloses that the laptop comprises "USB connector 136." Dougherty at 5:11-14

(“Docking of these two logic circuits is preferably through USB connector of the laptop computer 100 and mating USB connector 236 of the docking station.”); *see also id.* at 5:26-38 (“Further assume that the user docks the laptop 100 with a docking station 200 of the preferred embodiment. In so doing, the user either physically plugs in a USB cable to the connector 136 or slides the laptop computer 100 into a docking station 200.”)

Dougherty further discloses that the USB connector is comprised of “USB Power rails” and “serial communication conductors” in the laptop. *Id.* at *See e.g.*, *id.* at 4:63:-67 (“Two of these conductors are <u>serial communication conductors **126**</u> which allow communication between devices using USB protocol. The other two conductors carry power between the USB devices. Under the USB protocol, the <u>power conductors **138**</u> carry five volts.”); *see also id.* at 7:13-17 (“Thus the voltage on positive power rail 144 [VBUS] with respect to the negative power rail 146 [GND] in the laptop computer begins to rise toward 18 volts.”)



Dougherty at Figure 1 (annotated). A POSITA would have understood that the "serial communication conductors" are the data lines (D+ and D-) of the USB Specification and constitute a "USB communication path" as recited by Claim 1. Baker, ¶¶ 153-155. A POSITA would further have understood that the "power conductors" or "power rails" (138) constitute the V_{BUS} and Ground lines of the USB Specification, including the "USB V_{BUS} line" recited by Claim 1. Baker, ¶ 155.

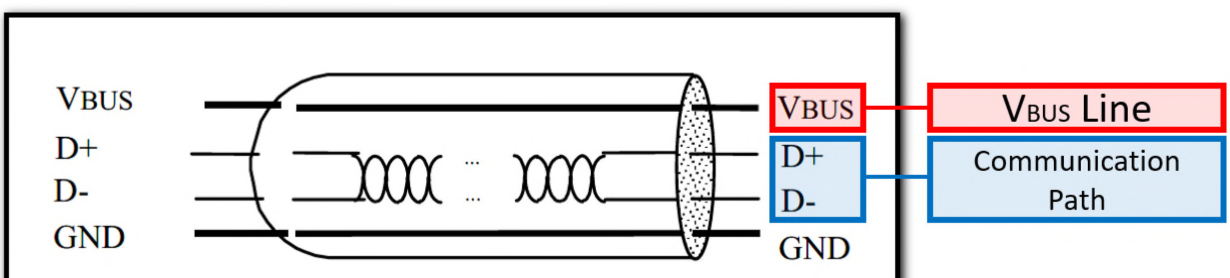


Figure 4-2. USB Cable

See e.g., Ex. 1009 (USB 1.1) at 17 and Figure 4-2.

Accordingly, a POSITA would have understood that the laptop device of Dougherty comprises "a USB V_{BUS} line and a USB communication path" as required by Claim 1.

c. 1[c]. said device configured to draw current from the VBUS line without regard to at least one associated condition specified in a USB specification

Dougherty discloses that the laptop "is configured to supply current on the V_{BUS} line without regard to at least one associated condition specified in a USB specification." Baker, ¶¶ 156-158. Indeed, Dougherty expressly discloses that the system "breaks the standard USB protocol." Dougherty at 6:1. It does so by, for example, drawing more than 500 mA of current from the V_{BUS} line.

As noted above, drawing a maximum of 500 mA of current is a "condition" specified in the USB 1.1. Specification:

Table 7-5. DC Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Max.	Units
Supply Voltage:					
High-power Port	VBUS	Note 2, Section 7.2.1	4.75	5.25	V
Low-power Port	VBUS	Note 2, Section 7.2.1	4.40	5.25	V
Supply Current:					
High-power Hub Port (out)	ICCPRT	Section 7.2.1	500		mA
Low-power Hub Port (out)	ICCUPT	Section 7.2.1	100		mA
High-power Function (in)	ICCHPF	Section 7.2.1		500	mA
Low-power Function (in)	ICCLPF	Section 7.2.1		100	mA
Unconfigured Function/Hub (in)	ICCINIT	Section 7.2.1.4		100	mA
Suspended High-power Device	ICCSH	Section 7.2.3 ; Note 15		2.5	mA
Suspended Low-power Device	ICCSL	Section 7.2.3		500	µA

See e.g. USB 1.1 Table 7-5 (annotated) and 34 (noting that "[a] unit load is defined to be 100mA" and that "[a] device may be either low-power at one unit load or high-power, consuming up to five unit loads."); Baker, ¶ 158. Indeed, the '187 Patent specifically discloses in dependent claims that "a current limit" can be a "condition" and that a "current limit of 500 mA" is one such limit in the USB Specification. Ex. 1001 ('187 Patent) at Claim 2 ("The device of claim 1, where in the associated condition is a current limit"); *id.* at Claim 9 ("The device of claim 2 wherein said current limit is 500 mA.").

Dougherty discloses that the laptop draws current without regard to this 500 mA current limit. Specifically, Dougherty discloses that the laptop draws as much as 2.5 amps (five times the current limit). Dougherty at 7:15-18 ("Laptop computer 100 preferably operates using the 18 volt power supplied by the docking station 200 across the USB interface. Also, the laptop computer may charge its battery, if needed, with this same supply."); *id.* at 7:47 ("When the dock station 200 provides full power for full operation of the laptop computer 100, as many as 2.5 amps of current may flow from the dock station 200 to the laptop computer 100 across the USB connectors 136, 236."); Baker, ¶ 157.

Because the laptop of Dougherty draws current in excess of the 500 mA limit, a POSITA would have understood that it discloses "said device configured to draw current from the VBUS line without regard to at least one associated condition specified in a USB specification." Baker, ¶ 158.

2. Claim 2: The device of claim 1, where in the associated condition is a current limit

As explained above, Dougherty discloses the device of Claim 1. Dougherty further discloses this limitation. Baker, ¶¶ 156-159. Indeed, as explained above with respect to claim element 1[c], Dougherty discloses a laptop that is configured to draw 2.5 amps of current, which is five times the amount of current that may be drawn by such a device under the USB Specification. *Id.* Accordingly, Dougherty discloses that the "associated condition" of Claim 1 is a current limit.

3. Claim 9: The device of claim 2 wherein said current limit is 500 mA.

As explained above, Dougherty discloses the device of Claim 2. Dougherty also renders obvious that "said current limit is 500 mA." Baker, ¶¶ 156-160. Indeed, as explained above with respect to claim element 1[c], Dougherty discloses a laptop configured to draws 2.5 amps of current, which is five times the amount of current that may be drawn by such a device USB Specification. *See* Claim 1[c]. Accordingly, Dougherty discloses that the "associated condition" of Claim 2 is a current limit of 500 mA as required by Claim 9.

4. Claim 10:

a. 10[a]. A mobile device, comprising

As explained with respect to claim element 1[a], Dougherty discloses a laptop which a POSITA would have understood is a "mobile device." *See* Section VIII.B.1.a.

b. 10[b]. a USB V_{BUS} line and a USB communication path

As explained with respect to claim element 1[b], Dougherty discloses a laptop that comprises "a V_{BUS} line and a USB communication path." *See* Section VIII.B.1.b.

c. 10[c]. said device configured to draw current from the V_{BUS} line without regard to at least one USB Specification imposed limit.

Dougherty discloses a laptop that is "configured to draw current from the V_{BUS} line without regard to at least one USB Specification imposed limit." As explained with respect to claim element 1[c], Dougherty discloses a laptop configured draw 2.5 amps of current on the V_{BUS} line, which is in excess of the specific limit for such current in the USB Specification. *See* Section VIII.B.1.c. Accordingly, a POSITA would have understood that the laptop of Dougherty is "configured to draw current from the V_{BUS} line without regard to at least one USB Specification imposed limit."

5. Claim 11: The device of claim 10, wherein said USB Specification imposed limit is a current limit.

As explained above, Dougherty discloses the device of claim 10. Moreover, As explained with respect to claim element 1[c] and claim 2, Dougherty discloses a device that draws 2.5 amps of current on the V_{BUS} line, which is in excess of the amount of current that may be supplied to or drawn by such device under the USB Specification (500 mA). *See* Sections VIII.B.1-2. Accordingly, a POSITA would have understood that the "USB Specification imposed limit" of Claim 10 is a current limit.

6. Claim 18: The device of claim 11, wherein said current limit is 500 mA.

As explained above, Dougherty discloses the device of claim 11. Moreover, as explained with respect to claim element 1[c] and claim 9, Dougherty discloses a laptop configured to draw 2.5 amps of current on the V_{BUS} line, which is in excess of the amount of current that may be supplied to or drawn by such device under the USB Specification (500 mA). *See* Sections VIII.B.1-3. Accordingly, a POSITA would have understood that the "USB Specification Imposed Limit" of Claim 10 is a current limit of 500 mA.

IX. CONCLUSION

For the foregoing reasons, there is a reasonable likelihood that Petitioners will prevail as to the Challenged Claims of the '187 Patent. Accordingly, *inter partes* review of claims 1-18 is requested.

Dated: February 26, 2021

Respectfully submitted,

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X. MANDATORY NOTICES – 37 C.F.R. §42.8

A. Real Party-in-Interest (37 C.F.R. §42.8(b)(1))

The real parties-in-interest in this Petition are TCT Mobile (US), Inc.; TCT Mobile (US) Holdings, Inc.; Huizhou TCL Mobile Communication Co. Ltd.; and TCL Communication, Inc. Petitioners certify that no other party exercised control or could exercise control over Petitioners' participation in this proceeding, the filing of this Petition, or the conduct of any ensuing trial.

B. Related Matters (37 C.F.R. §42.8(b)(2))

To the best knowledge of the Petitioner, the '187 Patent is involved in the following litigation as of the filing date of this Petition:

- *Fundamental Innovation Systems International LLC v. TCT Mobile (US) Inc. et al,* Case No. 1-20-cv-00552, District of Delaware. Petitioner is the named Defendant in this pending case. Petitioners were served with the complaint in this action on April 23, 2020, and thus this Petition is timely under 35 U.S.C. §315(b).

C. Lead/Back-up Counsel (37 C.F.R. §42.8(b)(3))

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Petitioners consent to service by electronic mail at the following addresses: 3J6PTABDocket@orrick.com, R75PTABDocket@orrick.com, PTABDocketJJL2@orrick.com and TCL-FISI_OHS@orrick.com. Petitioners' Power of Attorney is attached.

The USPTO is authorized to charge the filing fee and any other fees incurred by Petitioners to the deposit account of Orrick, Herrington & Sutcliffe LLP: 15-0665.

D. Service Information (37 C.F.R. §42.8(b)(4))

Please direct all correspondence to lead and backup counsel at the above address. Petitioners consent to electronic service at the email addresses above.

XI. GROUNDS FOR STANDING – 37 C.F.R. §42.104(A)

Petitioner certifies that: (i) the ’187 Patent is available for IPR and (ii) Petitioner is not barred or estopped from requesting an IPR challenging the ’187 patent’s claims. Specifically, Petitioner certifies that: (1) no Petitioner entity or real party-in-interest has filed a civil action challenging the validity of any claim of the ’187 patent; (2) Petitioner filed this petition within one year of the date they were served with a complaint asserting infringement of the ’187 patent; and (3) the estoppel provisions of 35 U.S.C. § 315(e)(1) do not prohibit this IPR.

XII. FEES – 37 C.F.R. §42.15(A)

The Office is authorized to charge the filing fee and any other necessary fees that might be due in connection with this Petition to Deposit Account No. 15-0665 for the fees set forth in 37 C.F.R. §42.15(a).

CERTIFICATE OF COMPLIANCE – 37 CFR § 42.24

Pursuant to 37 C.F.R. §42.24 *et seq*., the undersigned certifies that this document complies with the type-volume limitations. The substance of this document (*i.e.,* excluding table of contents, table of authorities, mandatory notices, listing of exhibits, and certificates of service and word count) contains 13,824 words as calculated by the "Word Count" feature of Microsoft Word Office 365, the word processing program used to create it.

Dated: February 26, 2021

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CERTIFICATION OF SERVICE ON PATENT OWNER

Pursuant to 37 C.F.R. §§42.6(e), 42.8(b)(4) and 42.105, the undersigned certifies that on February 26, 2021 a complete and entire copy of this Petition for *Inter Partes* Review of U.S. Patent 8,169,187 and all supporting documents and exhibits were served via Federal Express, postage prepaid, on the Patent Owner by serving the correspondence address of record for the ’187 Patent:

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A courtesy copy was provided on February 26, 2021 to Patent Owner’s litigation counsel in the action *Fundamental Innovation Systems International LLC v. TCT Mobile (US), Inc.; TCT Mobile (US) Holdings, Inc.; Huizhou TCL Mobile Communication Co. Ltd.; and TCL Communication, Inc.*, District of Delaware Case No. 1:20-cv-00552, pending between Petitioners and Patent Owner and involving the ’187 Patent:

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