

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.
Petitioner,

v.

WIPQTUS, INC.
Patent Owner.

Case IPR2024-00023
Patent No. 10,038,339

**PETITIONER'S OPPOSITION TO PATENT OWNER'S
MOTION TO AMEND**

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LIST OF EXHIBITS

Exhibit	Description
Ex. 1001	U.S. Patent No. 10,038,339 to Sankar et al. (“the ’339 patent”)
Ex. 1002	Declaration of Dr. Joshua Phinney (“Phinney”)
Ex. 1003	U.S. Patent Publication No. US2011/0018356 (“Chatterjee”)
Ex. 1004	U.S. Patent Publication No. US2010/0083012 (“Corbridge”)
Ex. 1005	CV of Dr. Joshua Phinney
Ex. 1006	Prosecution History of the ’339 patent
Ex. 1007	Prosecution History of U.S. Patent No. 9,343,929
Ex. 1008	System Description, Wireless Power Transfer, Volume I: Low Power, Part 1: Interface Definition, Version 1.0.3, September 2011 (“WPT”)
Ex. 1009	<i>Hulu LLC v. SITO Mobile R&D IP, LLC et al.</i> , IPR2021-00298, Paper 11 (P.T.A.B. May 19, 2021)
Ex. 1010	<i>WiPQTUS Inc. v. Samsung Elec. Co., Ltd. et al.</i> , Case No. 2:23-cv-00054, Dkt. 28 (Docket Control Order) (E.D. Tex.)
Ex. 1011	<i>Verizon Business Network Services, Inc. v. Huawei Techs. Co.</i> , IPR2020-01141, Paper 12 (Jan. 14, 2021)
Ex. 1012	<i>Sand Revolution II, LLC v. Continental Intermodal Group-Trucking LLC</i> , IPR2019-01393, Paper 24 (P.T.A.B. June 16, 2020)
Ex. 1013	<i>Samsung Elecs. Co. Ltd. v. Dynamics Inc.</i> , IPR2020-00505, Paper 11 (P.T.A.B. Aug. 12, 2020)
Ex. 1014	LinkedIn Profile of Dr. Randal Direen
Ex. 1015	Supplemental Declaration of Dr. Joshua Phinney (“Phinney-Supp”)
Ex. 1016	Exhibit 2 of WiPQTUS’ Infringement Contentions
Ex. 1017	U.S. Patent Publication No. 2009/0243397 (“Cook”)

Ex. 1018	U.S. Patent Publication No. 2013/0062959 (“Lee”)
Ex. 1019	Deposition Transcript of Dr. Randal Direen (“Direen-Depo”)

WiPQTUS' contingent Motion to Amend ("Motion") should be denied because each of proposed substitute claims 21-32 lacks written description support and is indefinite under 35 U.S.C. §112. In addition, substitute claims 21, 22, 23, 25, 27, and 29 are obvious under 35 U.S.C. §103 in view of the prior art.

I. SUBSTITUTE CLAIMS 21-32 LACK WRITTEN DESCRIPTION

Substitute claims must be supported by the written description of the original disclosure and may not introduce new subject matter. *See* 35 U.S.C. § 316(d); 37 C.F.R. § 42.121(a)(2)(ii). Patent Owner must identify written description support for its amended claims in the patent and in the document to which Patent Owner claims priority, the '321 Provisional. 37 C.F.R. § 42.121(a)(2)(ii).

A. [21.e] "said first circuitry, based on an input from said control logic circuit, configured to change, while configured to receive said power, the impedance of said impedance network and topology of said switch network to obtain a modified form of said received power, and apply said modified form of said power to said load device "

In its Motion to Amend, Patent Owner attempts to identify written description support from the '339 patent and the '321 Provisional for amended limitation [21.e].

Patent Owner identifies one paragraph from the '339 patent, reproduced below:

... The dual mode wireless power receiver can operate in a charging mode and a communication mode. In the charging mode, dual mode wireless power receiver configures the first circuitry to receive the power from an external wireless power transmitter. **The first [1.e] circuitry, based on an input from the control logic circuit is configured to change the impedance of the impedance network and topology of the switch network** to obtain a modified form of the

received power, and apply the modified form of the power to the load device . . .

Motion, 6 (citing EX1001, 2:37-46). Nowhere does the proposed language “while configured to receive said power” appear in the cited paragraph above, or anywhere else in the ’339 patent or the ’321 Provisional. Nor does any language that would lead a POSA to conclude the alleged inventors were in possession of what they are now trying to claim. Indeed, the amended claim is nearly identical to the original claim [1.e], which does not require the first circuitry to be configured to change the impedance and topology “while configured to receive said power,” but merely to change the impedance and topography “*to obtain a modified form of the received power.*” Reply, 9-11.

A POSA would have understood the paragraph reproduced above to describe changing the impedance of the impedance network and topology of the switch network when transitioning **between** the modes. Patent Owner fails to identify any disclosure in the ’339 patent specification that describes what the receiver does **during** the power receive mode. For example, the ’339 patent is directed to a receiver that that selectively “operate[s] in a charging [power receive] mode and a communication [power transmit] mode.” EX1001, 2:24, 2:37-39. The ’339 patent’s “impedance network” can change impedance “prior to transmitting power to a secondary wireless power receiver.” EX1001, 9:11-14. A POSA would thus have

understood that the receiver changes impedance between charging mode and communication mode, not dynamically changing impedance **while** it is transmitting or receiving power. EX1001, 9:4-14; Phinney-Supp(EX1015), ¶21.

Similarly, the '339 patent describes that the switched network “is configured as an inverter or a rectifier depending upon the mode of operation.” EX1001, 2:60-62. Thus, a POSA would have understood that the switch network changes its topology (i.e., from a rectifier to an inverter, or the reverse) between the two modes. EX1001, 2:39-67; Phinney-Supp(EX1015), ¶22.

Patent Owner also cites substantially the same language from the '321 Provisional as support for its proposed amendment, Motion, 6 (citing '321 Provisional, ¶¶4, 7, 32), but none of this disclosure describes changing impedance or topology “*while configured to receive power.*” Accordingly, Patent Owner fails to meet its burden to establish written description support for substitute claims 21-32.

B. [23] “at least one of said one or more passive components of the impedance network of said first circuitry is (1) chosen a priori with a fixed value and (2) tuned during operation over a range of values”

As an initial matter, claim 23 is indefinite because, as explained in further detail below in Section II.A, the requirements of the proposed substitute claim limitation are ambiguous. For example, if the proposed claim amendment requires a “*passive component*” “*with a fixed value,*” it is unclear how such a fixed value

passive component could be “*tuned during operation*” as the proposed amended claims require. As Dr. Direen testified, “**you can’t tune fixed passive elements.**” Direen-Depo(EX1019), 105:3-4.

If claim 23 refers to a variable electrical component of the impedance network that has a “chosen” initial value and can further be “tuned during operation,” such a variable component is not disclosed in the ’339 patent. The only written description Patent Owner identifies for this limitation reads: “Capacitor[’s] capacitance value is chosen a priori (fixed) **or** tuned during operation (variable).” Motion, 6 (citing EX1001, 2:11-12, 24:7-8, 24:46, 25:18, 25:55 (emphasis added).) As the Board correctly determined in its Institution Decision, this disclosure “describes ‘chosen a priori (fixed)’ and ‘tuned during operation (variable)’ as **alternatives.**” Institution Decision (Paper 7, “Dec.”), 29. The specification does not describe choosing the initial capacitance value of a variable capacitor. *Id.*; Phinney-Supp(EX1015), ¶29. Indeed, it’s unclear why such a choice would be made if the capacitance is to be varied anyway.

II. SUBSTITUTE CLAIMS 21-32 ARE INVALID UNDER 35 U.S.C. 112 FOR INDEFINITENESS

Patent Owner’s proposed Motion to Amend should not be granted because Patent Owner’s proposed claims are indefinite, ambiguous, and open to multiple interpretations, some of which contradict Patent Owner’s expert.

A. [23] “at least one of said one or more passive components of the impedance network of said first circuitry is (1) chosen a priori with a fixed value and (2) tuned during operation over a range of values”

Claim 23 is indefinite because the requirement of the claim is unclear and illogical. In *Synchronoss Techs., Inc. v. Dropbox, Inc.*, the Federal Circuit affirmed the judgment that claims were invalid as indefinite when the claims “contain an impossibility.” 987 F.3d 1358, 1367 (Fed. Cir. 2021); *see also Trustees of Columbia Univ. in City of New York v. Symantec Corp.*, 811 F.3d 1359, 1367 (Fed. Cir. 2016) (“The claims are nonsensical in the way a claim to extracting orange juice from apples would be, and are thus indefinite.”). It is not possible to have a “fixed value” “passive component” that can be “tuned over a range of values,” thus requiring a component to be both fixed and variable at the same time. Patent Owner’s own expert testified that a “passive component” cannot be “tuned ... over a range of values.” Direen(EX104), ¶104 (“it doesn’t make sense for a particular passive element itself to be tuned”); ¶105 (“you can’t tune fixed passive elements”). As confirmed by Patent Owner’s expert, Patent Owner’s proposed amendment would result in an impossibility; thus, the claim is indefinite.

B. [21.b-i] “an impedance network comprised of two or more electrical components from the list (i) one or more passive components, (ii) one or more active components, or (iii) one or more switches;”

Claim [21.b-i] is indefinite because its meaning is not reasonably certain.

Patent Owner’s expert adopts a view of “impedance network” in claim [1.b]

that contradicts the plain language of claim [21.b-i], even though Patent Owner argues that claim [1.b] is “substantially identical to” claim [21.b]. Motion, 7. The plain language of [21.b-i] requires two components from three categories (i), (ii), or (iii), without specifying whether any category is optional or mandatory. However, Dr. Direen opines that “impedance network” must cover category (i), and it must also cover one of category (ii) and category (iii). Direen(EX2003), ¶¶100 (“the ‘impedance network’ is an entity consisting of two or more components, *one or more of which must be passive components*, and additional components used for the purpose of varying impedance). Dr. Direen’s view of the impedance network is inconsistent with the plain language of claim [21b-i].

Further, it is unclear what Patent Owner means by “passive components” as its expert gave conflicting testimony on this. Dr. Direen testified that passive components are devices that add impedance to a circuit whereas active components are not relied upon to add impedance to a circuit. Direen-Depo(EX1019), 71:9-17. Under that logic, variable capacitors should be passive components. Phinney-Supp(EX1015), ¶34. However, Patent Owner’s expert Dr. Direen also opined that a passive component cannot be “tuned,” and thus cannot cover variable capacitors. Direen(EX2003), ¶104:15-16 (“it doesn’t make sense for a particular passive element itself to be tuned”). It is thus unclear what is meant by each category.

It is also unclear what Patent Owner means by “active components” and

“switches” because the ’339 patent describes switches such as MOSFETS and transistors as being part of category (ii) active components. EX1001, 9:7-11. It is unclear which categories Patent Owner intends to cover MOSFETS and transistors.

C. [21.e] “while configured to receive said power”

Claim [21.e] is indefinite because it is unclear what it means for the first circuitry to be “configured to change, while configured to receive said power, ... topology of said switch network to obtain a modified form of said received power, and apply said modified form of said power to said load device.” For example, it is unclear whether “change topology ... of said switch network” means (1) changing from an inverter to a rectifier (or the opposite), or (2) merely changing the connected/disconnected states of the switches. Patent Owner does not provide a construction as to the “change ... topology” term.

A POSA may adopt the first interpretation because that is consistent with the written description support that Patent Owner identifies in its Motion (Motion, 6 (citing EX1001, 2:37-46)), as well as the general written description of the ’339 patent. As explained above in Section I.A, the dual mode wireless power receiver transitions between the charging mode and the communication mode by changing the topology of the switch network, such that the switch network is configured as an inverter in the communication mode and a rectifier in the charging mode. *E.g.*, EX1001, 2:42-46, 2:51-57, 2:60-67, 4:16-20. But a POSA would have recognized

that this interpretation renders claim [21.e] inoperable. Specifically, while a first circuitry is “configured to receive power,” it cannot “change topology of [its] switch network” from a rectifier to an inverter to “obtain a modified form of said received power, and apply said modified form of said power to said load device,” because the inverter could only convert the stored power to AC for charging another device, and is incapable of converting the received AC power to DC for charging the load device. Phinney-Supp(EX1015), ¶39.

Patent Owner appears to adopt the second interpretation in its infringement contentions. For example, it argues that “the switch network is constantly changing its topology while operating in ... rectification mode” because “the MOSFET *switches* of the “switch network” ... *change their configuration* at a rapid rate” such that “in one instance *two of the MOSFETS are on while the other two are off* and at another instant the MOSFETs that were on turn off and the ones that were off turn on.” Contentions(EX1016), 34-35, 37. However, Patent Owner does not identify any written description from the ’339 patent to support this interpretation. The only paragraph that Patent Owner cites merely recites “change ... topology of the switch network” without explaining how turning a switch on or off changes the switch network’s topology.

Given the multiple possible interpretations of claim [21.e] and the failure for Patent Owner to present any claim construction on the “change . . . topology”

limitation, claim [21.e] is indefinite. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 911 (2014) (a claim may be indefinite if “it might mean several different things and no informed and confident choice is available among the contending definitions”); *Trustees of Columbia Univ. in City of New York v. Symantec Corp.*, 811 F.3d 1359, 1367 (Fed. Cir. 2016) (“The claims are nonsensical in the way a claim to extracting orange juice from apples would be, and are thus indefinite.”).

III. SUBSTITUTE CLAIMS 21, 22, 23, 25, 27 and 29 ARE INVALID UNDER 35 U.S.C. 103

Substitute claims 21, 22, 23, 25, 27 and 29 are obvious.

Ground No.	Obviousness Grounds
1	Substitute claims 21, 22, 23, 25, 27, and 29 are obvious based Chatterjee in view of Corbridge, Cook, and the knowledge of a POSA.
2	Substitute claims 21, 22, 23, 25, 27, and 29 are obvious based on Chatterjee in view of Corbridge, Lee, and the knowledge of a POSA.

A. GROUND 1: Chatterjee in view of Corbridge, Cook, and the Knowledge of a POSA

Chatterjee and Corbridge are both prior art as explained in the Petition. Pet., 12, 14. Cook was filed on March 4, 2009 and published on October 1, 2009 and thus qualifies as prior art under at least pre-AIA 35 U.S.C. §§102(a), and 102(b) and post-AIA 35 U.S.C. §§102(a)(1) or 102(a)(2). Patent Owner’s Motion to Amend focuses on the limitations provided in the amendments to original claims. Accordingly,

Petitioner's Ground 1 below focuses on these amended limitations. Petitioner's Ground 1 here builds upon Ground 1 from the Petition, and the unchanged limitations from the original claims are unpatentable for the reasons set forth in Ground 1 of the Petition, which Petitioner relies upon herein as noted below.

1. Motivation to Combine

Chatterjee teaches an inductive signal interface that selectively operates in a power transmit mode and a power receive mode. Pet., 12-14. Corbridge similarly teaches an inductive signal transfer system, and in particular, teaches establishing a communication protocol for wireless power transmission. Pet., 14-15. A POSA would have found it obvious to improve Chatterjee's inductive signal interface such that, in the power transmit mode, it implements the sequence of signaling disclosed in Corbridge. Pet., §V.C.8.c. However, neither Chatterjee nor Corbridge expressly disclose changing impedance of the impedance network while the inductive signal interface is configured to receive power.

Cook teaches "[a] wireless power system includ[ing] a power source, power receiver, and components thereof." Cook(EX1017), Abstract. In particular, Cook teaches a wireless antenna that "can have both a variable capacitor and a variable inductor, and both of those can be changed in order to change characteristic of the matching," thus "improv[ing] the coupling." Cook(EX1017), Abstract. Cook is analogous art to the '339 patent. Phinney-Supp., ¶51.

A POSA would have been motivated to improve Chatterjee’s inductive signal interface such that, in power receive mode, its impedance network—i.e., the capacitors connected to the coil—can be tuned while receiving power to improve performance, as taught by Cook. Specifically, a POSA would have understood in view of Cook that in wireless power transmission, the “transmit and receiving antennas are preferably resonant antennas, which are substantially resonant, e.g., within 10% of resonance” Cook(EX1017), ¶16. During operation, various factors may cause “detuning effects,” i.e., mismatch of antenna frequencies, such as “extraneous objects,” “detuned power receivers in close proximity,” “variation of load impedance.” Cook(EX1017), ¶¶96-99; Phinney-Supp(EX1015), ¶56. Tuning may compensate for such detuning effects, as well as component tolerances, aging, etc. Cook(EX1017), ¶¶96-100; Phinney-Supp(EX1015), ¶56. A POSA would have understood that Cook’s wireless receiver with “antenna tuning control” provides the benefit of improving antenna resonance matching and “maximiz[ing] receiver efficiency.” Cook(EX1017), ¶¶119-124, 133. Such a combination would have involved “the mere application of a known technique”—Cook’s capacitive tuning using a capacitor bank and switches—“to a piece of prior art”—Chatterjee’s inductive signal interface 410—that is “ready for the improvement.” Cook(EX1017), ¶¶104-107; Phinney-Supp(EX1015), ¶¶54-56.

A POSA would have had a reasonable expectation of success in applying

Cook's capacitive tuning technique in Chatterjee's inductive signal interface. Phinney-Supp(EX1015), ¶57. A POSA would have understood that such a combination could be implemented as adding Cook's capacitor bank to be connected in series with Chatterjee's capacitor C6. Cook(EX1017), ¶240 ("a tuning capacitor bank 1600 . . . in series to the principal capacitor 1610"), Fig. 16; Phinney-Supp(EX1015), ¶57. Chatterjee's inductive signal interface already includes a processor 413 that can control the operation of switches of its power bridge circuit. Chatterjee(EX1003), ¶¶55, 73. A POSA would have been familiar with how to use that processor 413 to also control the switches for capacitive tuning pursuant to Cook's teaching, e.g., using "fractional tuning . . . in the order of +/- 10%." Cook(EX1017), ¶¶101-103, 107, Fig. 16; Phinney-Supp(EX1015), ¶57.

2. Claim 21

Claim 21 is a proposed substitute claim of original claim 1.

a. Claim [21.p]

As the limitations for claim [21.p] are unchanged from the original, Petitioner relies upon the challenge as set forth in Ground 1 of the Petition. *See* Pet., §V.C.1.

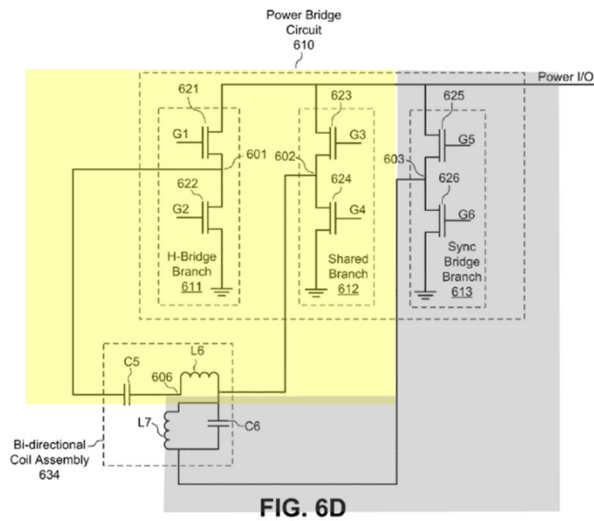
b. Claim [21.a] one of coil and capacitor electrodes

As the limitations for claim [21.a] are unchanged from the original, Petitioner relies upon the challenge as set forth in Ground 1 of the Petition. *See* Pet., §V.C.2.

c. Claim [21.b] a first circuitry comprising:

- i. Claim [21.b-i] an impedance network comprised of two or more electrical components from the list (i) one or more passive components, (ii) one or more active components, or (iii) one or more switches**

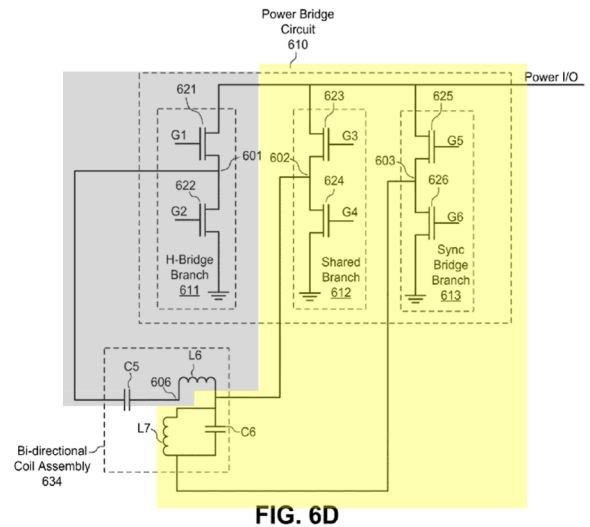
Chatterjee in view of Corbridge, Cook, and the knowledge of a POSA render obvious this claim limitation. Chatterjee discloses, as shown in Figure 6D, the coil assembly 635 comprises capacitors C5 and C6 that are connected between the coil inductor L6 and L7 and the switch network (Power Bridge Circuit 610). EX1003, Fig. 6D, 7E, 7F; Phinney-Supp(EX1015), ¶64. “In the power transmit mode, the sync bridge branch 613 is turned off and the current path through the bi-directional coil assembly 634 is the series combination of the capacitor C5 and the inductive coil L6. In the power receive mode, the H-bridge branch 611 is turned off and the current path through the bi-directional coil assembly 634 is parallel combination of the inductive coil L7 and the capacitor C6.” Chatterjee(EX1003), ¶73. The annotated Figures below showing the active part of the circuitry of Figure 6D in yellow highlighting (and the inactive part in gray) under different modes. *Id.* Fig. 6D; Phinney-Supp(EX1015), ¶65.



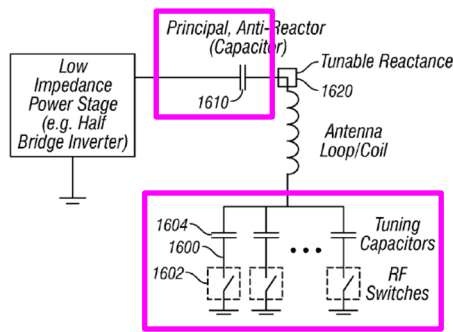
Power Transmit Mode

Cook teaches a wireless receiver that comprises “a resonant antenna 210, tuning 220, matching 240, rectifier 250, load 260, **control system** 270.” Cook(EX1017), ¶91, Fig. 2. Cook’s resonant antenna comprises a “multi-turn loop of wire,” i.e., a coil, Cook(EX1017), ¶¶92, 130; and a **capacitor**. Cook(EX1017), ¶103 (“The resonant antenna can be changed by varying by anti-reactance (**capacitance**), or reactance of the inductive part of the antenna system.”), ¶130, Figs. 13, 15; *see also* Phinney-Supp(EX1015), ¶67.

Cook further discloses that the **capacitor** comprises “[c]apacitor bank (library) and electronic or mechanical switches (RF relays),” an example of which is shown in Fig. 16 below. Cook(EX1017), ¶¶104-107, 239, Fig. 16. The **capacitor bank and switches** teach the “impedance network” of claim [21.b-i] because it comprises “two or more electrical components from the list of (i) one or more passive components; ... and (iii) switches.”



Power Receive Mode



Cook(EX1017), Fig. 16.

Cook further teaches “tuning the antenna’s resonance frequency” to compensate for “variation of load impedance,” Cook(EX1017), ¶¶96, 99, such as by capacitive tuning. Cook explains that “[c]apacitive tuning can use a set of capacitors, e.g., *a capacitor bank, in a series or parallel arrangement with RF switches* that may be opened or closed to adjust the effective capacitance.” Cook further teaches that the wireless receiver further comprises a **control system** 160 that “handles . . . antenna tuning control” and “power and efficiency control.” Cook(EX1017), ¶¶76-78. A POSA would have understood that the controlling of capacitive turning takes place “*while configured to receive power*” because Cook teaches that tuning is “automatically executed by the receiver’s control system” including using, for example, a “fractional tuning range in the order of +/- 10%.” EX-Cook, ¶¶101, 102; Phinney-Supp(EX1015), ¶82. A POSA would have understood that fractional tuning takes places while the receiver is in operation, i.e., receiving power, so as to compensate for detuning effects during operation that cause the antenna to shift out of resonance. Phinney-Supp(EX1015), ¶82. Therefore, Cook disclose “*based on an*

*input from said **control logic circuit**, configured to change, while configured to receive said power, the impedance of said **impedance network**.”*

A POSA would have found it obvious to modify Chatterjee to add Cook’s “capacitor bank ... with switches” to be connected in series with capacitor C6 as to be able to change impedance of the wireless power receiver in the charging mode, as explained above in § III.A.1.

ii. Claim [21.b-ii], [21.b-iii], [21.c], and [21.d]

As the limitations for claim [21.b-ii], [21.b-iii] [21.c], and [21.d] are unchanged from the original claim, Petitioner relies upon the challenge as set forth in Ground 1 of the Petition as follows: [21.b-ii] (*see* §V.C.3.b); [21.b-iii] (*see* §V.C.3.c); [21.c] (*see* §V.C.4); [21.d] (*see* §V.C.5).

d. Claim [21.e] said first circuitry, based on an input from said **control logic circuit, configured to change, while configured to receive said power, the impedance of said **impedance network** and topology of said **switch network** to obtain a modified form of said received power, and apply said modified form of said power to said **load device****

Although this limitation is indefinite for reasons set forth in Section II.B, Petitioner will assume, for purposes of its obviousness argument that “changing . . . topology of the switch network” covers changing the connect/disconnect state of switches of the switch network. Figure 6D of Chatterjee teaches a first circuitry comprising at least the “impedance network” (**C5 and C6**) and the “switch network”

(**power bridge circuit** 610). EX1001, Fig. 6D, ¶72. The **processor** 413 provides control signals G1-G6 to control the operation of the **power bridge circuit**. EX1001, Fig. 6D, ¶63. In particular, in the power receive mode, **processor** 413 sends signals G3-G6 to operate the shared branch 612 and sync bridge branch 613 so that the **switches 623-626** operate synchronously as a rectifier—i.e., each switch alternates between the connected and disconnected states to change the topology of the **power bridge circuit**. EX1001, ¶65, 4, Fig. 2; Phinney-Supp(EX1015), ¶75. Chatterjee therefore discloses “*said first circuitry, based on an input from said **control logic circuit**, configured to change . . . topology of said **switch network**.*” A POSA would also have understood that changing topology takes place “*while [the first circuitry is] configured to receive said power*” because **switches 623-626** continually to switch on and off while in the power receive mode. EX1001, ¶4, Fig. 2; Phinney-Supp(EX1015), ¶76. A POSA would further have understood that Chatterjee’s first circuitry is configured to change topology of said **switch network** “*to obtain a modified form of said received power, and apply said modified form of said power to said load device*” because **switches 623-626 operating as a rectifier** turns the received AC power into DC power, thus obtaining a “*modified form*” of the received power, and provides that modified form of said power to a load device such as a rechargeable battery. EX1001, ¶37; Phinney-Supp(EX1015), ¶77.

However, Chatterjee does not explicitly disclose “said first circuitry, based on

an input from said **control logic circuit**, configured to change, **while configured to receive said power**, the impedance of said **impedance network**.” Cook teaches this limitation. *Supra* §III.A.2.c.i.

e. Claim [21.f] –[21.i]:

As the limitations for claim [21.f] –[21.i] are unchanged from the original claim, Petitioner relies upon the challenge as set forth in Ground 1 of the Petition as follows: [21.f] (*see* Pet., §V.C.7); [21.g] (*see* §V.C.8); [21.h] (*see* §V.C.9); [21.i] (*see* §V.C.10).

3. Claim [23]

Cook’s capacitor band and switches (Cook(EX1017), Fig. 16) teaches this limitation because Dr. Direen testified that this limitation can be met by “a capacitor and a switch.” Direen-Depo(EX1019), 105:5-12; Phinney-Supp(EX1015), ¶49.

4. Claims [22], [25], [27], and [29]

As the limitations for claims [22], [25], [27], and [29] are unchanged from the original claims, Petitioner relies upon the challenge as set forth in Ground 1 of the Petition as follows: [22] (*see* Pet., §V.D); [25] (*see* Pet., §V.F); [27] (*see* Pet., §V.G); [29] (*see* Pet., §V.H).

B. GROUND 2: Chatterjee in view of Corbridge, Lee, and the Knowledge of a POSA

Lee was filed on May 4, 2012 and published on Mar. 14, 2012 and qualifies as prior art under at least pre-AIA § 102(e) and post-AIA 35 U.S.C. § 102(a)(2).

Similar to Ground 1 above, Petitioner's Ground 2 below focuses on the amended limitations. Petitioner's Ground 2 here builds upon Ground 1 from the Petition, and the unchanged limitations from the original claims are unpatentable for the reasons set forth in Ground 1 of the Petition, which Petitioner relies upon as noted below.

1. Motivation to Combine

As described in §III.A.1, neither Chatterjee nor Corbridge expressly disclose changing impedance of the impedance network while the inductive signal interface is configured to receive power. However, Lee discloses a wireless power receiver that includes a receive coil 618 that “may be tuned to resonate at the same frequency, or within a specified range of frequencies, as transmit coil.” Lee(EX1018), ¶54. Lee further teaches that the receiver includes an RX impedance adjustment and switching circuitry 612 to “provide an impedance adjustment of the effective impedance of receiver based on an impedance of the receive coil.” Lee(EX1018), ¶¶55, 57. Lee is analogous art to the '339 patent. Phinney-Supp(EX1015), ¶98.

A POSA would have been motivated to improve Chatterjee's inductive signal interface to implement its coil assembly as a tunable one and include an impedance adjustment circuitry. Specifically, a POSA would have understood that a tunable coil assembly improves power transmission efficiency by matching resonant frequencies. Lee(EX1018), ¶¶28, 34-36; Phinney-Supp(EX1015), ¶101. A POSA would have further understood that adjusting the “effective impedance of the

receiver” provides the additional benefit of minimizing signal reflection and maximizing the amount of power delivered to the receiver. Lee(EX1018), ¶¶55, 57; Phinney-Supp(EX1015), ¶101. Such a modification would have required applying Lee’s known tuning and impedance adjustment techniques in Chatterjee’s inductive signal interface in the same way as it functions in Lee. *Id.*, ¶¶102-103.

A POSA would have had a reasonable expectation of success in applying Lee’s resonance tuning and impedance adjustment technique in Chatterjee’s inductive signal interface. Phinney-Supp(EX1015), ¶104. A POSA would have understood that such a combination could be implemented by first, implementing Chatterjee’s coil assembly as a tunable one, such as by including a tunable capacitor. Lee(EX1018), ¶¶46, 54 (“using capacitors to define the resonance frequency”); and second, adding Lee’s impedance adjustment circuitry between Chatterjee’s coil assembly and power bridge circuitry to be able to adjust the impedance of the inductive signal interface based on the coil assembly’s impedance so as to “improve efficiency during power transfer.” Lee(EX1018), ¶¶55, 57, Fig. 6; Phinney-Supp(EX1015), ¶104. Chatterjee’s inductive signal interface included a processor 413 that can control the operation of switches of its power bridge circuit. Chatterjee(EX1003), ¶¶55, 73. A POSA would have understood that processor 413 could control capacitive tuning and impedance adjustment while in charging mode, according to Lee. Lee(EX1018), ¶¶101-103, 107, Fig. 6; Phinney-Supp(EX1015),

¶104.

2. Claim 21

a. Claim [21.p]

As the limitations for claim [21.p], are unchanged from the original claim, Petitioner relies upon the challenge as set forth in Ground 1 of the Petition. *See* Pet., §V.C.1.

b. Claim [21.a]

As the limitations for claim [21.a], are unchanged from the original claim, Petitioner relies upon the challenge as set forth in Ground 1 of the Petition. *See* Pet., §V.C.2

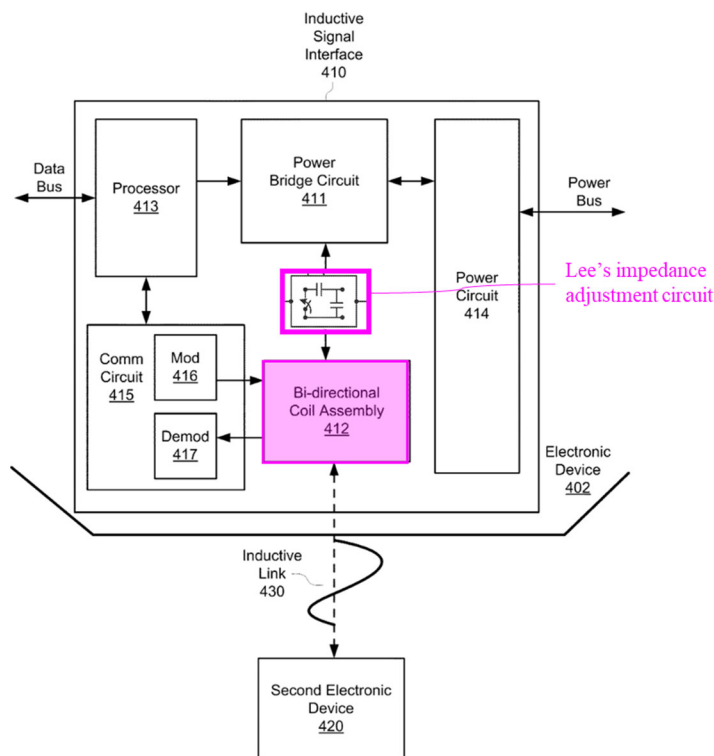
c. Claim [21.b]

i. Claim [21.b-i]

Chatterjee in view of Corbridge, Lee, and the knowledge of a POSA renders this limitation obvious. As shown in Chatterjee's Figure 6D, the coil assembly 635 comprises **capacitors C5 and C6** that are connected between the coil inductor L6 and L7 and the switch network (Power Bridge Circuit 610). EX1003, Fig. 6D, 7E, 7F; Phinney-Supp(EX1015), ¶111.

Furthermore, as explained in Section III.B.1, a POSA would have been motivated to revise Chatterjee to further include Lee's impedance adjustment circuitry. Lee discloses a wireless receiver 608 comprising a receiver coil 618, **RX**

impedance adjustment circuit 612, RF-DC converter 620, processing signaling controller 616, and a charging device 650. Lee(EX1018), ¶¶53-64, Fig. 6. Lee teaches that the receiver's RX impedance adjustment circuitry 612 may be configured to adjust an impedance of the receive circuitry 610 based on an impedance of the receive coil 618 to improve efficiency during power transfer. Lee(EX1018), ¶57. As shown in Figure 6, Lee's RX impedance adjustment circuitry 612 comprises at least a switch and two capacitors, and thus teaches the “impedance network” of claim [21.b-i]. Lee(EX1018), Fig. 6.



Lee further teaches that the processor 616 “coordinat[es] the processes of receiver 608 . . . including the control of the RX impedance adjustment and switching

circuitry 512[sic].” Lee(EX1018), ¶ 64. Thus, a POSA would have understood that the Lee’s processor 616 can control the RX impedance adjustment and switching circuitry to change its impedance. A POSA would further have understood that such impedance changing happens **while the receiver is configured to receive power**. Phinney-Supp(EX1015), ¶127. Specifically, Lee first teaches that the transmit coil and receive coil both may tuned to “resonate at the same frequency or within a specified range of frequencies” to improve the power transmission efficiency, such as, “tuned . . . by using capacitors to define the resonant frequency.” Lee(EX1018), ¶¶34-36, 46, 54. A POSA would have recognized that this refers to the capacitive tuning technique which is described in more detail in Lee. Phinney-Supp(EX1015), ¶127. Lee further teaches the receiver’s RX impedance adjustment and switching circuitry may be configured to adjust an impedance of the receive circuitry 610 “based on an impedance of the receive coil 618.” Lee(EX1018), ¶55. A POSA would have understood that the purpose of this impedance adjustment is to adjust the impedance of the receiver as viewed from the transmitter and can be used to adjust the amount of power drawn out of the transmitter and minimize signal reflection when the load impedance matches the source impedance. Phinney-Supp(EX1015), ¶127. A POSA would thus have understood that the impedance adjustment takes place **during power transmission** because it is “based on an impedance of the receive coil,” which is in turned during power transmission so as to match the receive

coil's resonance frequency to the transmit coil's resonance frequency. Lee(EX1018), ¶¶35; Phinney-Supp(EX1015), ¶127. Therefore, Lee discloses “*based on an input from said **control logic circuit**, configured to change, while configured to receive said power, the impedance of said **impedance network**.*”

A POSA would have found it obvious to modify Chatterjee to implement Chatterjee's coil assembly as one that can be tuned and add Lee's **RX impedance adjustment and switching circuitry** between the Chatterjee's coil assembly and the power bridge circuit as to be able to improve wireless power transmission efficiency, as explained above in Section III.B.1.

ii. Claim [21.b-ii], [21.b-iii], [21.c], and [21.d]

As the limitations for claim [21.b-ii], [21.b-iii], [21.c], and [21.d] are unchanged from the original claim, Petitioner relies upon the challenge as set forth in Ground 1 of the Petition as follows: [21.b-ii] (*see* Pet., §V.C.3.b); [21.b-iii] (*see* Pet., §V.C.3.c); [21.c] (*see* Pet., §V.C.4); [21.d] (*see* Pet., §V.C.5).

d. Claim [21.e]

As explained above in Section III.A.2.d, Chatterjee discloses “said first circuitry, based on an input from said control logic circuit, configured to change, while configured to receive said power, . . . topology of said switch network to obtain a modified form of said received power, and apply said modified form of said power to said load device”; as well as “said first circuitry, based on an input from said

control logic circuit, configured to change . . . impedance of said impedance network” But Chatterjee does not explicitly disclose “said first circuitry, based on an input from said control logic circuit, configured to change, while configured to receive said power, the impedance of said impedance network.” Lee teaches this limitation. *Supra* Section III.B.2.c.i.

e. Claim [21.f] –[21.i]

As the limitations for claim [21.f] –[21.i] are unchanged from the original claim, Petitioner relies upon the challenge as set forth in Ground 1 of the Petition as follows: [21.f] (*see* Pet., §V.C.7); [21.g] (*see* §V.C.8); [21.h] (*see* §V.C.9); [21.i] (*see* §V.C.10).

3. Claim [23]

Lee’s impedance adjustment circuitry comprising two capacitors and a switch (Lee(EX1018), Fig. 6) teaches this limitation because Dr. Direen testified that this limitation can be met by “a capacitor and a switch.” Direen-Depo(EX1019), 105:5-12; Phinney-Supp(EX1015), ¶49.

4. Claims [22], [25], [27], and [29]

As the limitations for claim [22], [25], [27], and [29] are unchanged from the original claims, Petitioner relies upon the challenge as set forth in Ground 1 of the Petition as follows: [22] (*see* Pet., §V.D); [25] (*see* Pet., §V.F); [27] (*see* Pet., §V.G); [29] (*see* Pet., §V.H). .

Date: August 28, 2024

Respectfully Submitted,

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Lead Counsel

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing **Petitioner's Opposition to Patent Owner's Motion to Amend** was served electronically on August 28, 2024, on counsel of record for the Patent Owner as follows:

Brian A. Carpenter, bcarpenter@coleschotz.com

Gary Sorden, gsorden@coleschotz.com

Date: August 28, 2024

/s/ Trenton A. Ward