UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.
Petitioner

v.

SCRAMOGE TECHNOLOGY LTD.
Patent Owner

U.S. Patent No. 9,461,364

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 9,461,364

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I. INTRODUCTION

Samsung Electronics Co., Ltd. ("Petitioner") requests *inter partes* review ("IPR") of Claims 1-3, 6, and 7 ("challenged claims") of U.S. Patent No. 9,461,364 ("the '364 patent," Ex. 1001). According to PTO records, the '364 patent is assigned to Scramoge Technology Ltd. ("PO"). For the reasons set forth below, the challenged claims should be found unpatentable and canceled.

II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

A. Real Party-in-Interest

Petitioner identifies the following as the real parties-in-interest: Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.

B. Related Matters

The '364 patent is at issue in the following district court proceeding:

- *Scramoge Technology Ltd. v. Samsung Electronics Co. Ltd. et al.*, Case No. 2:22-cv-00015-JRG-RSP (E.D. Tex.)

C. Counsel and Service Information

Lead Counsel: Naveen Modi (Reg. No. 46,224). Backup Counsel: Joseph E. Palys (Reg. No. 46,508), Phillip Citroën (Reg. No. 66,541), Paul M. Anderson (Reg. No. 39,896), David Valente (Reg. No. 76,287), and Kevin Stewart (Reg. No. 78,581). Service Information: Paul Hastings LLP, 2050 M Street, N.W., Washington, DC 20036. Tel: (202) 551-1700. Fax: (202) 551-1705. E-mail: PH-

Samsung-Scramoge-IPR@paulhastings.com. Petitioner consents to electronic service.

III. PAYMENT OF FEES

The PTO is authorized to charge any fees due during this proceeding to Deposit Account No. 50-2613.

IV. GROUNDS FOR STANDING

Petitioner certifies that the '364 patent is available for IPR, and that Petitioner is not barred or estopped from requesting IPR on the grounds identified below.

V. PRECISE RELIEF REQUESTED

Claims 1-3, 6, and 7 of the '364 patent should be canceled as unpatentable based on the following grounds:

Ground 1: Claims 1-3 and 6 are each anticipated under pre-AIA 35 U.S.C. § 102 by Korean Patent Application Publication No. 10-2008-0074640 ("Kim") (Ex. 1005);

Ground 2: Claims 1-3 and 6 are each obvious under pre-AIA 35 U.S.C. § 103 over Kim in view of U.S. Patent No. 7,202,825 ("Leizerovich") (Ex. 1014);

Ground 3: Claim 3 is obvious under pre-AIA 35 U.S.C. § 103 over Kim in view of U.S. Patent Application Publication No. 2012/0068301 ("Sin") (Ex. 1006);

Ground 4: Claim 3 is obvious under pre-AIA 35 U.S.C. § 103 over Kim in view of Sin and Leizerovich;

Ground 5: Claim 7 is obvious under pre-AIA 35 U.S.C. § 103 over Kim in view of U.S. Patent Application Publication No. 2011/0025265 ("Mochida");

Ground 6: Claim 7 is obvious under pre-AIA 35 U.S.C. § 103 over Kim in view of Mochida and Leizerovich;

Ground 7: Claims 1-3 are each obvious under pre-AIA 35 U.S.C. § 103 over U.S. Patent Application Publication No. 2013/0308256 ("Lehr") (Ex. 1007) in view of U.S. Patent No. 8,401,469 ("Chatterjee") (Ex. 1013);

Ground 8: Claim 3 is obvious under pre-AIA 35 U.S.C. § 103 over Lehr in view of Chatterjee and Sin;

Ground 9: Claim 6 is obvious under pre-AIA 35 U.S.C. § 103 over Lehr in view of Chatterjee and Leizerovich; and

Ground 10: Claim 7 is obvious under pre-AIA 35 U.S.C. § 103 over Lehr in view of Chatterjee and Mochida.

The '364 patent issued from U.S. Patent Application No. 13/658,116 (Ex. 1004), filed on October 23, 2012, and claims priority to KR 10-2011-0114721, filed on November 4, 2011.[1]

Kim was published on August 13, 2008. Leizerovich was published on April

[1] Petitioner does not concede that the '364 patent is entitled to its claimed priority date.

10, 2007. Therefore, Kim and Leizerovich are prior art at least under pre-AIA 35 U.S.C. § 102(b). Mochida was published on February 3, 2011. Therefore, Mochida is prior art at least under pre-AIA 35 U.S.C. § 102(a). Sin was filed on August 23, 2011, and a related provisional application was filed on August 23, 2010. Lehr has an international filing date of March 9, 2011. Chatterjee was filed on June 4, 2009, and a related provisional application was filed on January 1, 2009. Therefore, Sin, Lehr, and Chatterjee are prior art at least under pre-AIA 35 U.S.C. § 102(e).

VI. LEVEL OF ORDINARY SKILL IN THE ART

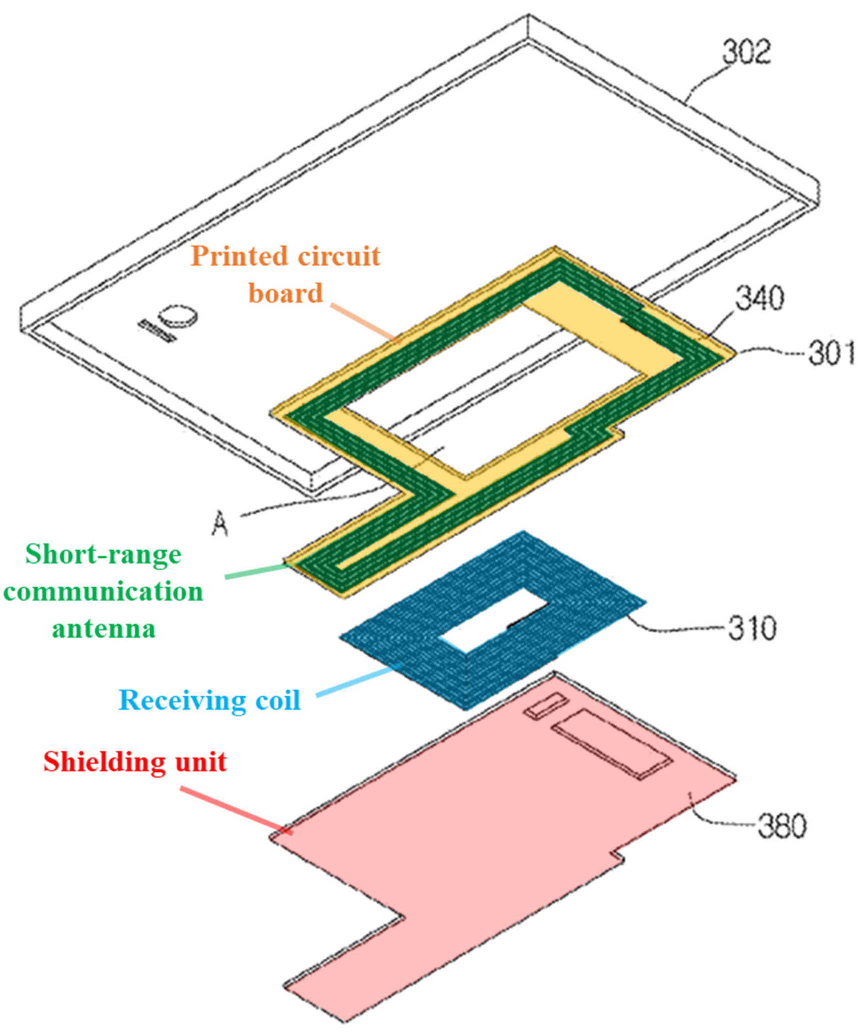
A person of ordinary skill in the art as of the claimed priority date of the '364 patent ("POSITA") would have had a bachelor's degree in electrical engineering, computer engineering, applied physics, or a related field, and at least one year of experience in the research, design, development, and/or testing of wireless charging systems, or the equivalent. (Ex. 1002, ¶20.)[2] More education can supplement practical experience and vice versa. (*Id.*)

VII. OVERVIEW OF THE '364 PATENT

The '364 patent generally concerns a "wireless power receiver" that "wirelessly receives power from a wireless power transmitter." (Ex. 1001, Abstract;

[2] Petitioner submits the testimony of Dr. R. Jacob Baker (Ex. 1002, ¶¶1-168), an expert in the field of the '364 patent. (*Id.*, ¶¶5-15; Ex. 1003.)

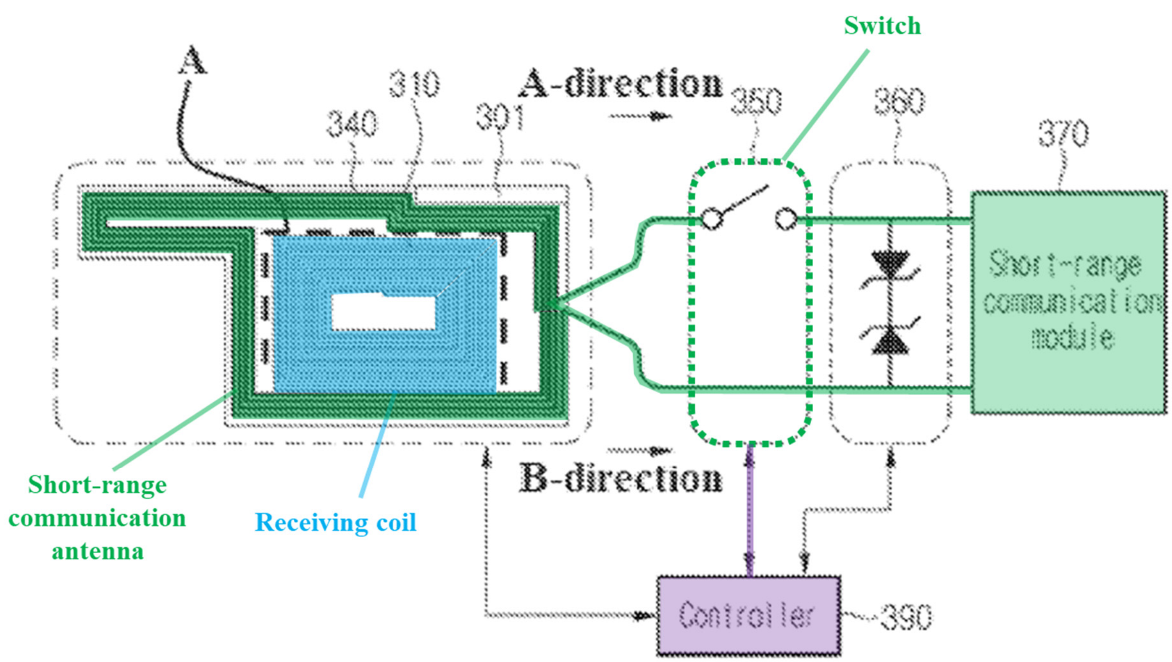
Ex. 1002, ¶¶27-28.) "Referring to the exploded perspective view of the wireless power receiver 300 shown in FIG. 6(a), the wireless power receiver 300 may include a case 302, the printed circuit board 301, the receiving coil 310, the short-range communication antenna 340 and the shielding unit 380." (*Id.*, 4:48-52, FIG. 6(a); *see also id.*, 2:10-19.)



(a)

(*Id.*, FIG. 6(a) (annotated).)

The wireless power receiver can also include "a switch for changing a conducting state of the short-range communication antenna according to a reception of the power, wherein the wireless power receiver opens or shorts the switch according to the reception of the power." (*Id.*, 2:10-19.) For instance, "switch 350 may receive the open signal from the controller 390 such that the switch 350 may break the current from flowing through the short-range communication antenna 340" when "power is received from the transmitting coil 320." (*Id.*, 7:11-16.)



(*Id.*, FIG. 5 (annotated).)

VIII. CLAIM CONSTRUCTION

For IPR proceedings, the Board applies the claim construction standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See*

83 Fed. Reg. 51,340-59 (Oct. 11, 2018). Under *Phillips*, claim terms are typically given their ordinary and customary meanings, as would have been understood by a POSITA, at the time of the invention. *Phillips*, 415 F.3d at 1313; *see also id.*, 1312-16. The Board, however, only construes the claims when necessary to resolve the underlying controversy. *Toyota Motor Corp. v. Cellport Systems, Inc.*, IPR2015-00633, Paper No. 11 at 16 (Aug. 14, 2015) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

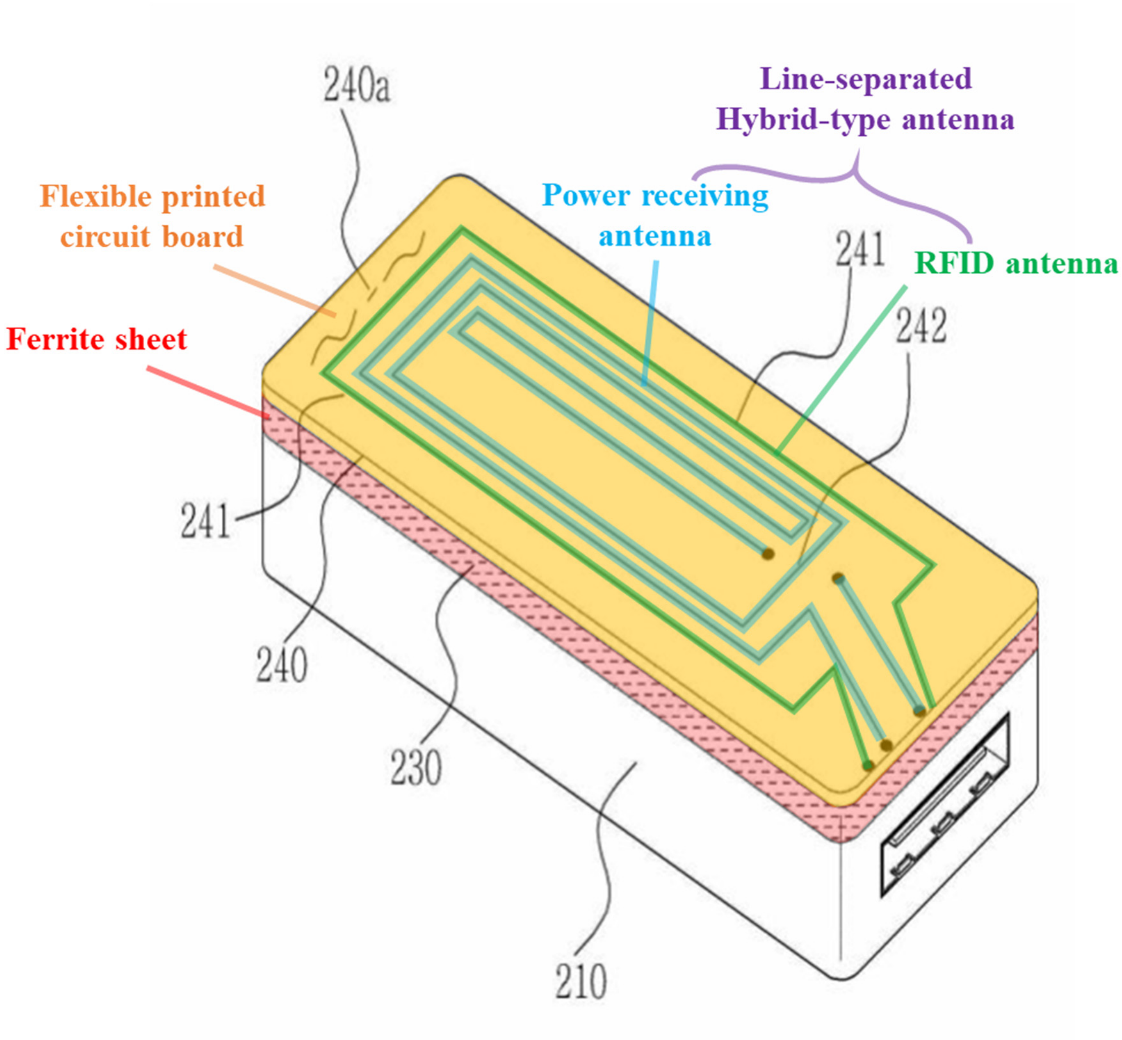
IX. DETAILED EXPLANATION OF UNPATENTABILITY

A. Ground 1: Claims 1-3 and 6 Are Anticipated by Kim

1. Claim 1

a) A wireless power receiver configured to wirelessly receive power from a wireless power transmitter, the wireless power receiver comprising:

To the extent the preamble is limiting, Kim discloses this feature. (Ex. 1002, ¶¶58-60.) For example, Kim discloses a battery pack 200, which is a "wireless power receiver," as claimed. (Ex. 1005, ¶¶18, 36-38, FIGs. 3-5, 12.) The battery pack 200 is the entire device illustrated in Figure 3, which includes battery cell 210, ferrite sheet 230, flexible printed circuit board 240, and line-separated hybrid-type antenna 240a on the upper portion of the ferrite sheet 230, which itself includes an RFID antenna 241 wired along the perimeter of the flexible printed circuit board 240 and an RF power receiving antenna 242 wired in a spiral shape in the central portion of the RFID antenna 241. (*Id.*, ¶38; *see also id.*, FIGs. 3, 4, 12, 14; Ex. 1002, ¶58.)

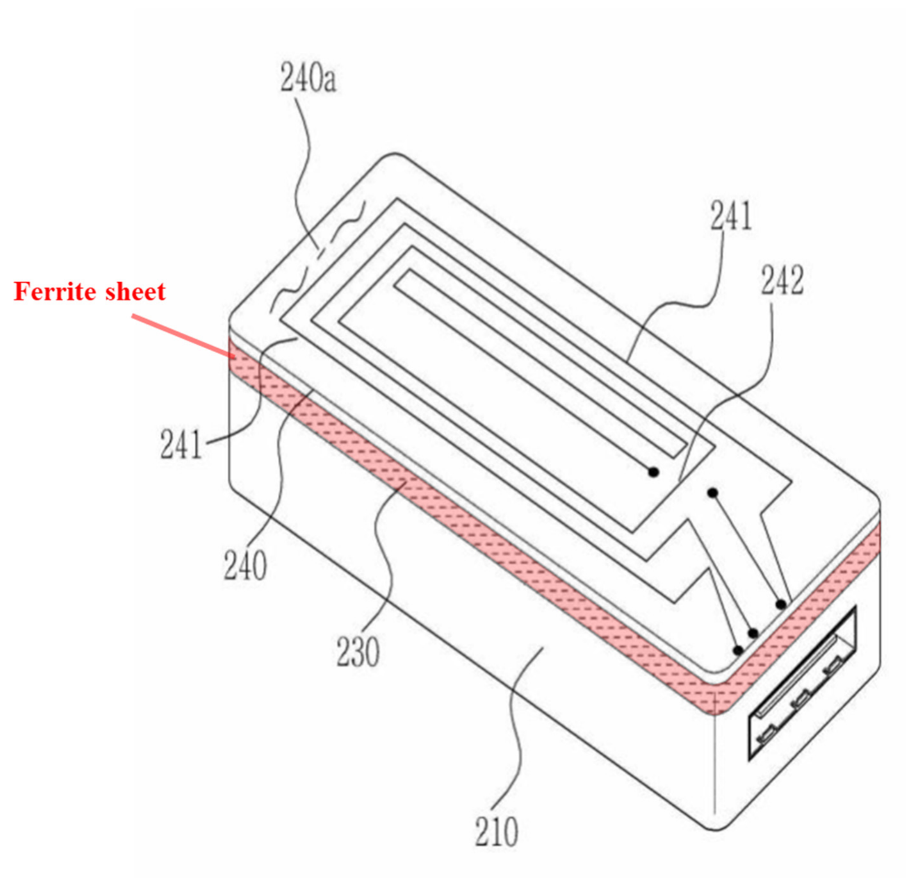


(*Id.*, FIG. 3 (annotated); Ex. 1002, ¶58.)

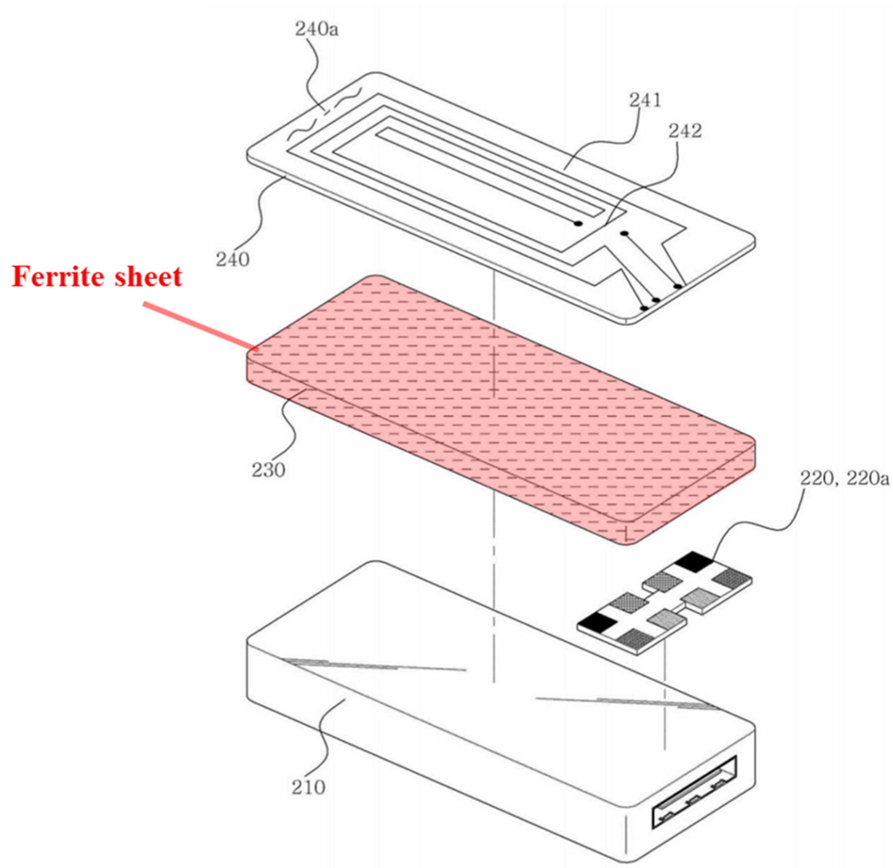
RFID antenna 241 is for "transmitting and receiving information," and RF power receiving antenna 242 is for "wireless charging." (*Id.*, ¶38; Ex. 1002, ¶59.) Kim further discloses that battery pack 200 is "configured to wirelessly receive power from a wireless power transmitter." For instance, Kim describes an "[R]FID reader" 300 ("wireless power transmitter") that outputs radio waves that induce a battery-charging signal in the battery pack 200. (Ex. 1005, ¶¶72, 75, 80-83.)

b) a shielding unit;

Kim discloses this feature. (Ex. 1002, ¶¶61-62.) For example, Kim discloses ferrite sheet 230 ("shielding unit") shown in Figures 3 and 4 below. (Ex. 1005, ¶¶38, 77, FIG. 3.)



(*Id.*, FIG. 3 (annotated); Ex. 1002, ¶61.)



(Ex. 1005, FIG. 4 (annotated); Ex. 1002, ¶61.)

As Kim explains, the "ferrite sheet (230) is configured to be formed between the battery cell and the flexible printed circuit board (FPCB) in an unfolded shape and disposed at the upper end of the battery cell to **remove radio waves and noise of several tens of MHz to several GHz**." (Ex. 1005, ¶77 (emphasis added); *see also id.*, ¶78.) And "[b]y configuring the ferrite sheet on one side at the lower end of the induction coil, **high-frequency noise can be removed**, which can prevent the loss of power consumption, thereby providing the effect of increasing the efficiency of the induced current." (*Id.*, ¶100 (emphasis added).)[3] Thus, Kim discloses ferrite sheet 230 that performs a shielding function by shielding the battery pack 200 from unwanted radio waves and noise. (Ex. 1002, ¶62.) Kim's disclosure is consistent with the '364 patent, which explains that a shielding unit similarly includes ferrite material, and may change the direction of or absorb (i.e., remove) a magnetic field. (Ex. 1001, 8:3-13; Ex. 1002, ¶62.)

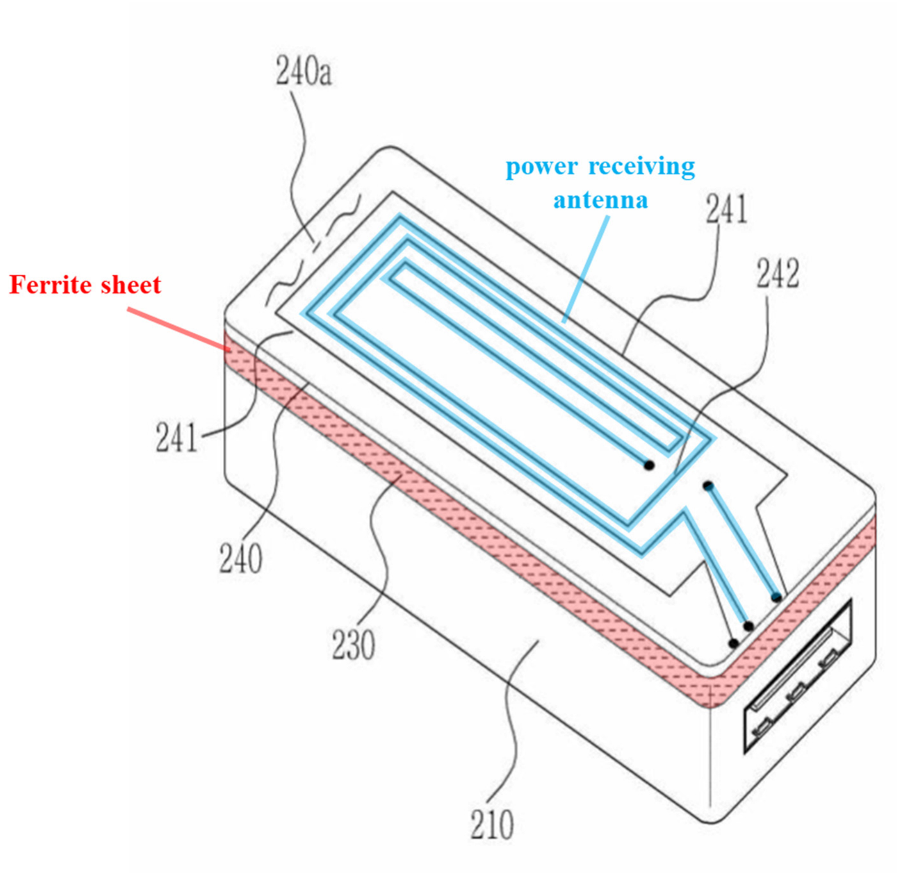
c) a receiving coil disposed on the shielding unit; and

Kim discloses this feature. (Ex. 1002, ¶¶63-68.) For example, Kim discloses "RF power receiving antenna (242)" ("receiving coil") that is disposed on ferrite sheet 230 ("shielding unit"). (Ex. 1005, ¶¶77, 85, FIGs. 3, 4.)

Like the receiving coil of the '364 patent, which is "for wirelessly receiving power" (Ex. 1001, 2:14), Kim discloses that RF power receiving antenna 242 ("receiving coil") receives wireless power from RFID device 300 for charging the battery pack, (Ex. 1005, ¶¶77, 85.) The **RF power receiving antenna 242** "is wired

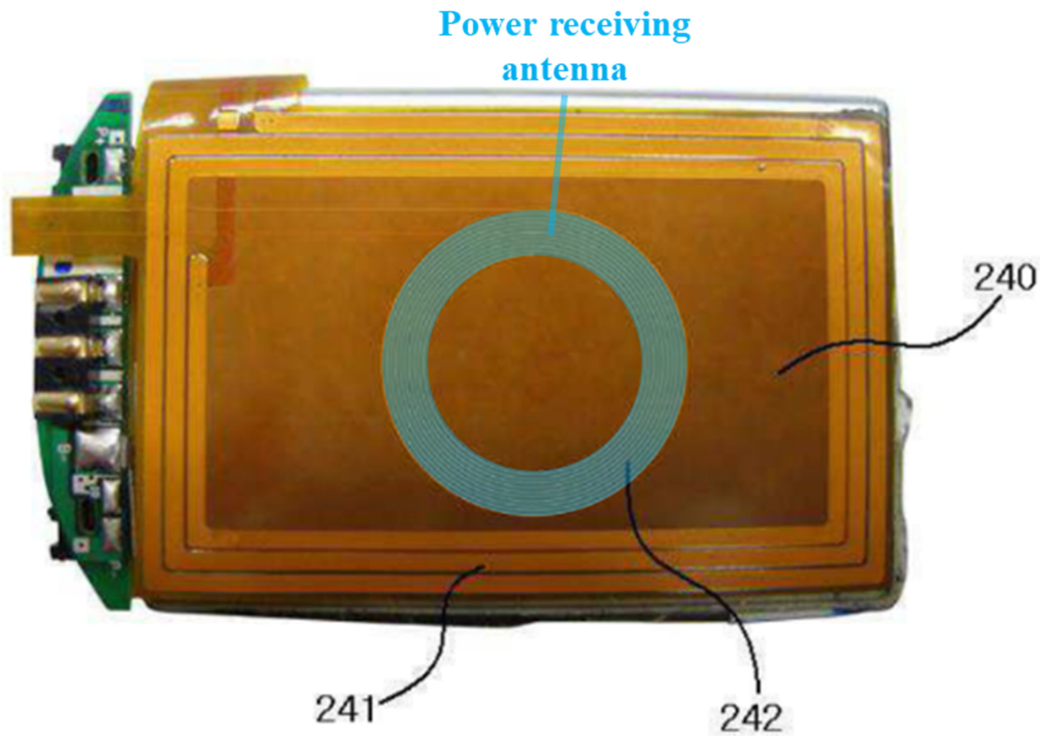
[3] As shown in Figures 3 and 4, above, by the term "upper end of the battery cell," Kim means the top of the battery cell 210 in the orientation shown. (Ex. 1002, ¶62; Ex. 1005, ¶¶34, 38, 70, FIGs. 3, 4.) Likewise, by the term "lower end of the induction coil," Kim means the bottom of RF power receiving antenna 242 in the orientation shown. (Ex. 1002, ¶62; Ex. 1005, ¶¶86, 87, 100, FIGs. 3, 4.)

in a spiral shape to **form an induction coil**." (Ex. 1005, ¶86 (emphasis added).) Figures 3 and 4 illustrate RF power receiving antenna 242 disposed on shielding sheet 230. (*Id.*, ¶3, FIGs. 3, 4; Ex. 1002, ¶64.)



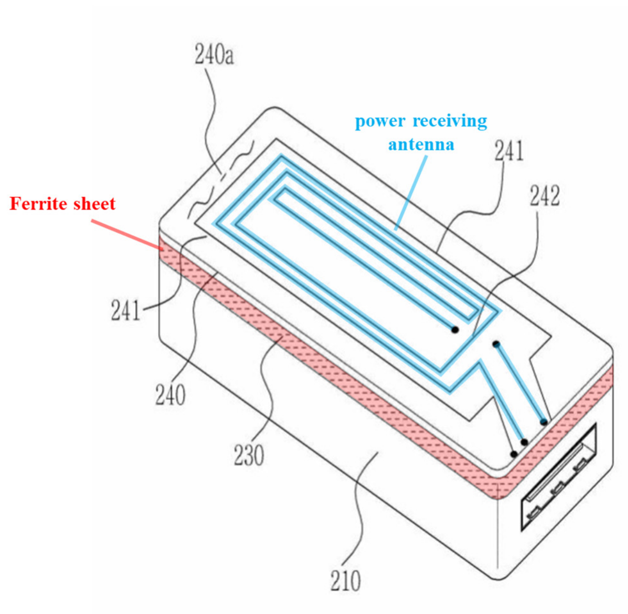
(Ex. 1005, FIG. 3 (annotated); Ex. 1002, ¶64.)

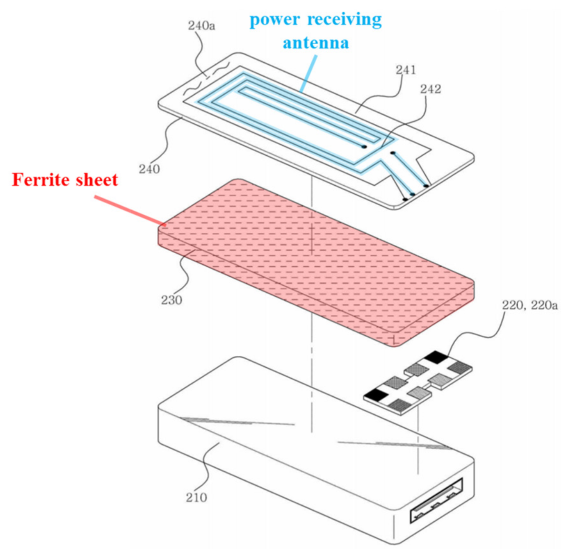
Figure 14 depicts an image of the same line-separated hybrid-type antenna shown in Figures 3 and 4, including RF power receiving antenna 242. (Ex. 1005, ¶¶41, 77, FIG. 14; Ex. 1002, ¶65.)



(Ex. 1005, FIG. 14 (RF power receiving antenna 242) (annotated); Ex. 1002, ¶65.)

Kim discloses that the RF power receiving antenna 242 ("receiving coil") is "disposed on" ferrite sheet 230 ("shielding unit") for at least three reasons. (Ex. 1002, ¶66.) First, Kim discloses that the ferrite sheet may be configured "***on* one side at the lower end of the induction coil**" (Ex. 1005, ¶100 (emphasis added)), which Kim explains is the RF power receiving antenna 242 (*id.*, ¶86). Second, Kim discloses that RF power receiving antenna 242 is installed in the center of flexible printed circuit board 240. (*Id.*, ¶¶41, 77.) The flexible printed circuit board 240 is, in turn, installed on the upper portion of ferrite sheet 230. (*Id.*, ¶38, FIGs. 3, 4.) Because both the RF power receiving antenna 242 and the flexible printed circuit board 240 are "installed on" the ferrite sheet 230, Kim discloses that the receiving antenna 242 is disposed on ferrite sheet 230. (Ex. 1002, ¶66; Ex. 1005, ¶38, FIGs. 3-4, 14.) Third, it is readily apparent in Figures 3 and 4 that RF power receiving antenna 242 is disposed on ferrite sheet 230. (Ex. 1005, FIGs. 3, 4, ¶¶4, 44.)





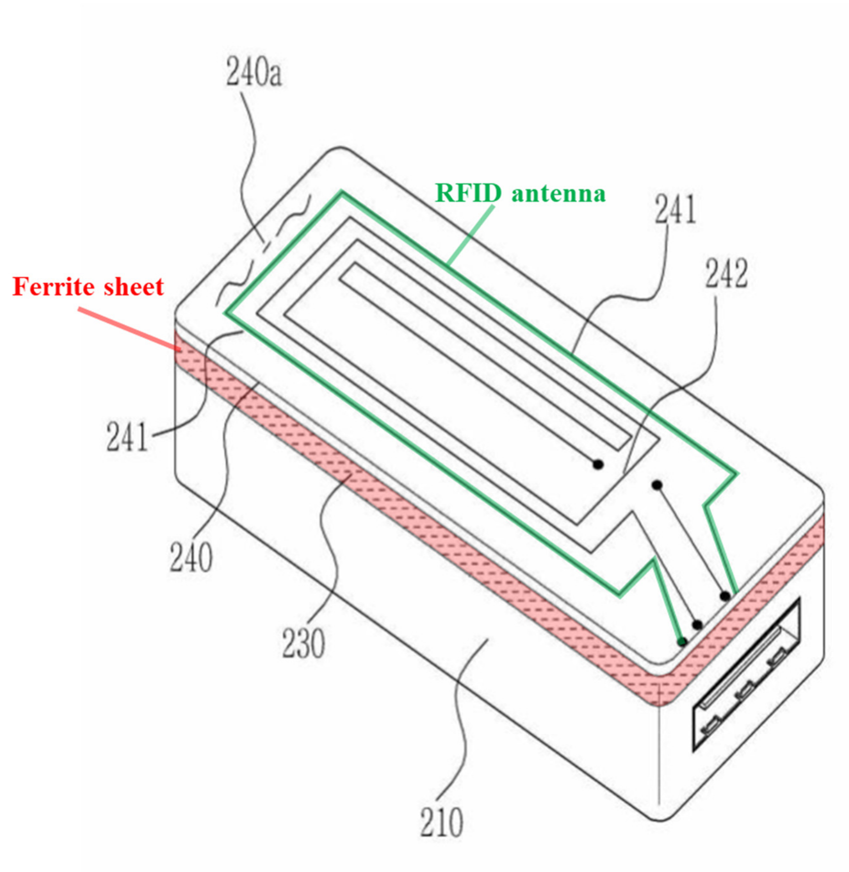
(*Id.*, FIGs. 3 (left; annotated) 4 (right; annotated); Ex. 1002, ¶66.)

The understanding that the Kim receiving antenna 242 is "disposed on" the shielding unit is consistent with the plain claim language. (Ex. 1002, ¶67.) Claim element 1[d] recites a short-range communication antenna "disposed on" the shielding unit, but dependent claim 2 recites the same coil "on" a printed circuit board, which itself is "on" the shielding unit (i.e., intervening between the coil and shielding unit). Because the short-range communication antenna of dependent claim 2 is disposed on, but not in contact with the shielding unit, the scope of claim 1 necessarily includes that same structure.

d) a short-range communication antenna disposed on the shielding unit,

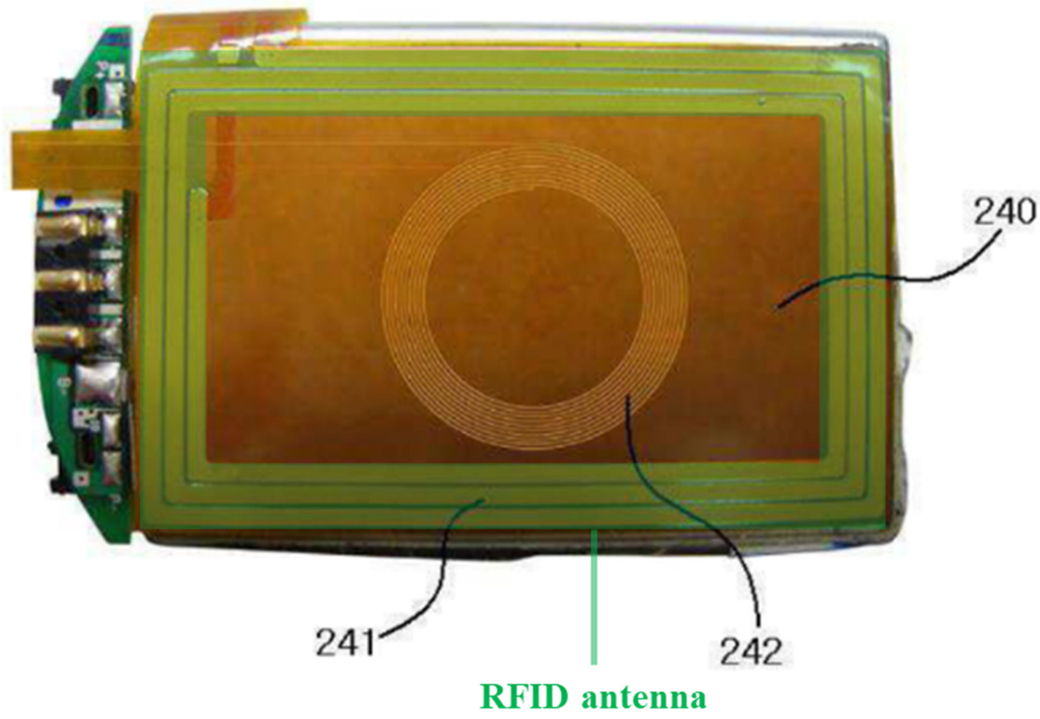
Kim discloses this feature. (Ex. 1002, ¶¶69-74.) For example, Kim discloses an “RFID antenna (241)” (“a short-range communication antenna”) that is disposed on the ferrite sheet 230 (“shielding unit”). (Ex. 1005, ¶¶76-77, 85, FIGs. 3-4.)

Kim explains that the battery pack 200 uses RFID antenna 241 (“short-range communication antenna”) to receive an RFID communication signal from an RFID reader 300. (*Id.*, ¶¶80, 38.) Communication with the antenna 241 occurs over the 13.56 MHz band for applications including exchanging information for “mobile banking and subway/bus fare payment.” (*Id.*, ¶¶26, 27, 40.)



(*Id.*, FIG. 3 (annotated); Ex. 1002, ¶70.)

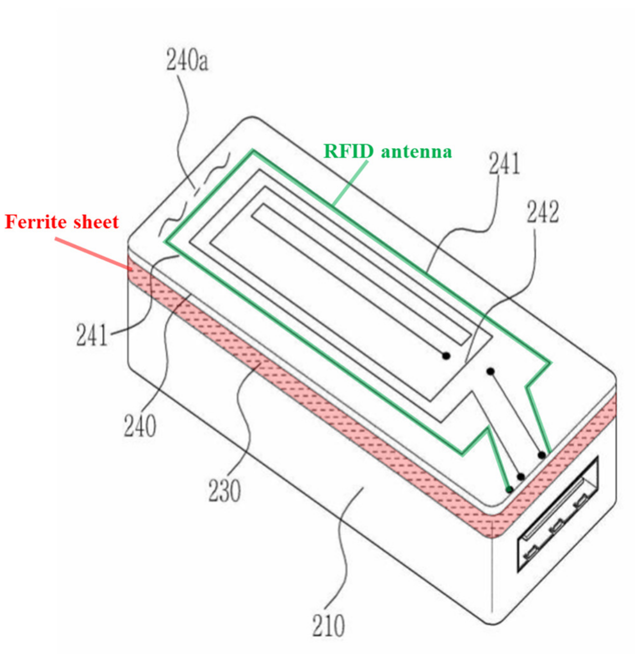
Figure 14 similarly depicts an image of an antenna that includes RFID antenna 241. (*Id.*, ¶14, FIG. 14; *see also id.*, ¶77.)

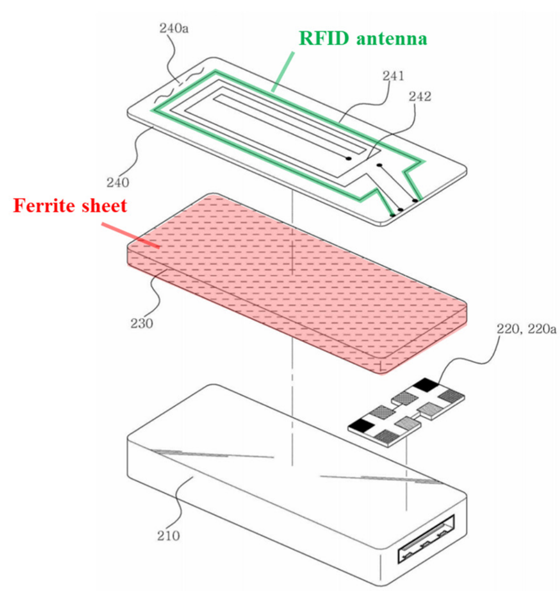


(Ex. 1005, FIG. 14, RFID antenna 241 (annotated); Ex. 1002, ¶71.)

A POSITA would have understood that Kim's RFID/communication antenna 241 is a "short-range" communication antenna. (Ex. 1002, ¶72.) For instance, Kim explains that its disclosure relates to "communicating with an external RFID reader ... when [a device] comes ***in contact with an RFID reader***," such as would be used for "***subway/bus fare payment***." (Ex. 1005, ¶27.) The '364 patent does not provide any objective standard to determine what communication distance is "short-range," but paying for subway or bus fare at a distance where the devices communicating are "in contact" is short-range communication by any reasonable metric. (Ex. 1002, ¶72.)

Kim also discloses that RFID antenna 241 ("short-range communication coil") is "disposed on" ferrite sheet 230 ("shielding unit"). (Ex. 1002, ¶73.) Kim discloses that the RFID antenna 241 is "integrally configured in" the same printed circuit board as the RF power receiving antenna 242. (Ex. 1005, ¶87.) Therefore, for the same reasons presented above demonstrating that the power receiving antenna is "on" the shielding unit, the RFID antenna 241 is "on" the shielding unit. (*Supra* Section IX.A.1(c), Ex. 1005, ¶¶38, 72, 100, FIGs 3, 4, 14.) Figures 3 and 4, also show RFID antenna 241 disposed on ferrite sheet 230. (Ex. 1005, FIGs 3, 4, ¶¶4, 44.)





(*Id.*, FIGs. 3 (left; annotated), 4 (right, annotated); Ex. 1002, ¶73.)

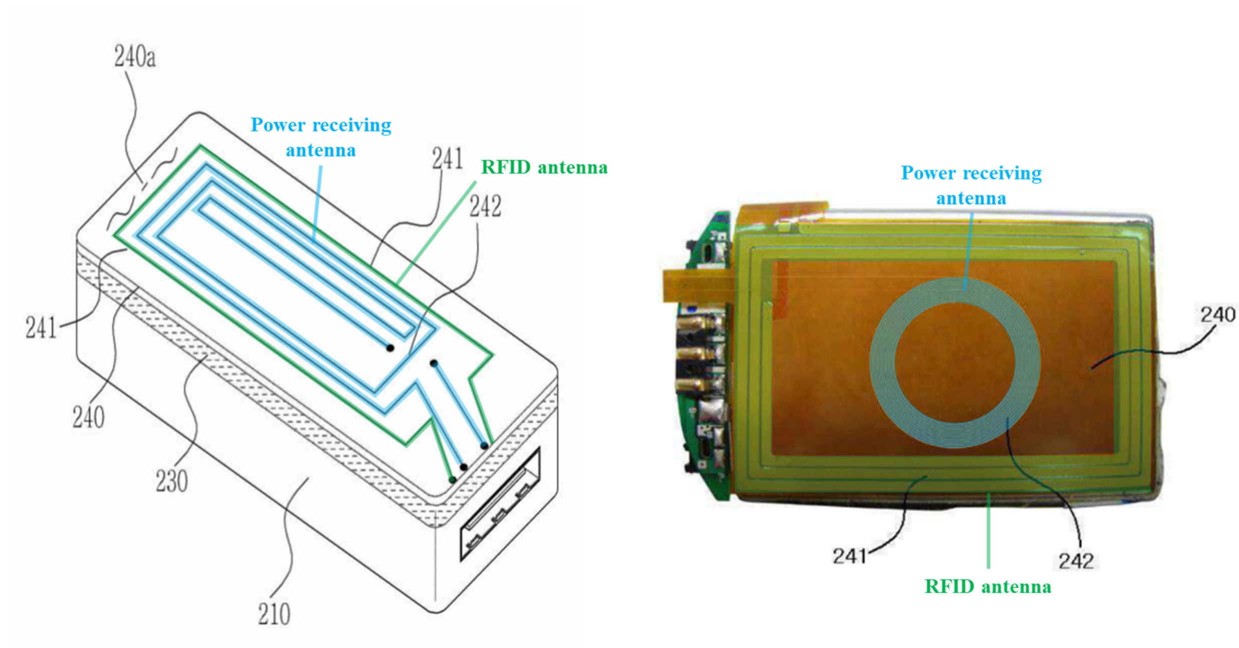
e) wherein the shielding unit shields a magnetic field generated from the receiving coil,

Kim discloses this feature. (Ex. 1002, ¶75.) For instance, the ferrite sheet 230 ("shielding unit") is configured to remove radio waves and noise of several tens of MHz to several GHz. (Ex. 1005, ¶70; *see also id.*, ¶100; *supra* Section IX.A.1.b; Ex. 1002, ¶75.) The current induced in the RF power receiving antenna 242 in response to electromagnetic waves from RFID Reader 300 generates a magnetic field that is shielded from Kim's battery pack 200 by the ferrite sheet 230 ("shielding unit"). (Section IX.A.1.b; Ex. 1005, ¶¶79, 81; Ex. 1002, ¶75.) A POSITA would have understood, as matter of basic physics, that the alternating current induced into the coil generates a corresponding magnetic field. (Ex. 1002, ¶75; Ex. 1005, ¶¶81-82.) By design, ferrite sheet 230 ("shielding unit") prevents this magnetic field from interfering with electronic components of the portable battery device. (Ex. 1005, ¶¶70, 100.)

f) wherein the short-range communication antenna surrounds the receiving coil, and

Kim discloses this feature. (Ex. 1002, ¶¶76-77.) For example, Kim discloses RFID antenna 241 (the "short-range communication antenna") wired along the edge perimeter of the flexible printed circuit board 240, surrounding RF power receiving antenna 242 (the "receiving coil"), which is "wired in a spiral shape along the central portion of the RFID antenna" 241. (Ex. 1005, ¶¶38, 77, FIGs. 3, 4, 14.)

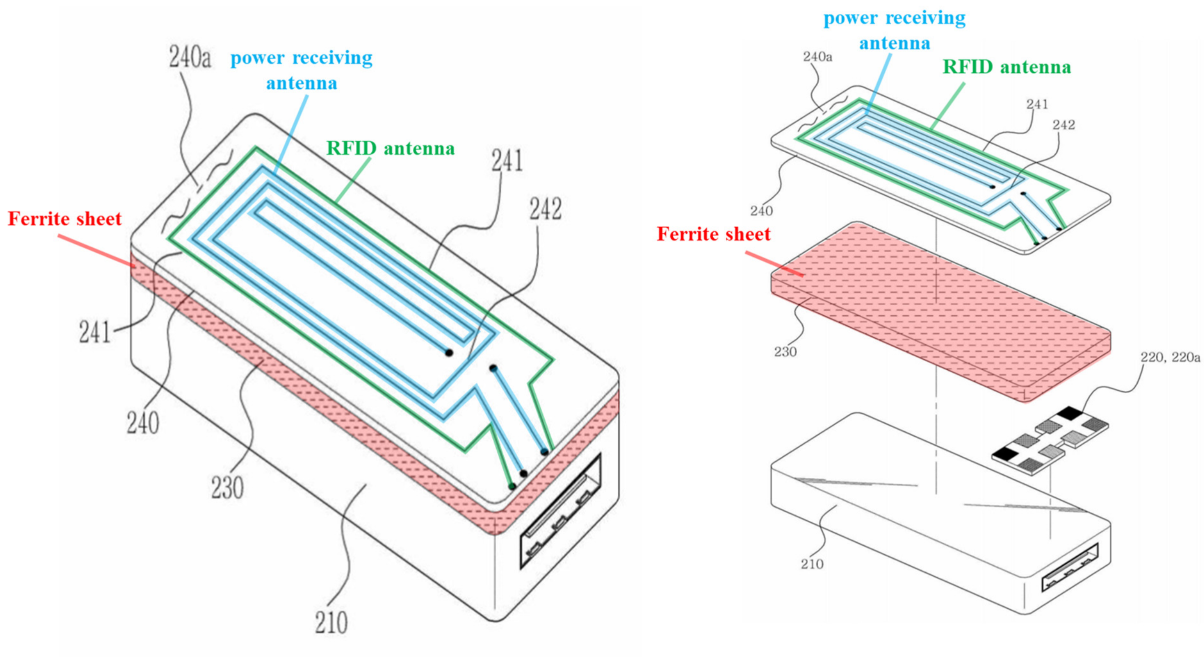
For instance, Kim's Figures 3, 4, and 14 illustrate "wiring a 13.56 MHz RFID antenna along the edge perimeter of the flexible printed circuit board (FPCB) and additionally wiring an RF power receiving antenna in a spiral shape along the central portion of the RFID antenna." (*Id.*, ¶41, FIGs. 3, 4, 14; *see also id.*, ¶¶14, 34, 38, 41, 77; Ex. 1002, ¶77.)



(Ex. 1005, FIGs. 3 (left; annotated), 14 (right; annotated); Ex. 1002, ¶77.)

g) wherein the shielding unit covers the receiving coil and the short-range communication antenna.

Kim discloses this feature. (Ex. 1002, ¶¶78-79.) As shown in Figures 3 and 4 below, Kim discloses that the ferrite sheet 230 (the "shielding unit") covers the entire bottom of flexible printed circuit board 240 on which the RF power receiving antenna 242 ("receiving coil") and RFID antenna 241 ("short-range communication antenna") are disposed. (Ex. 1005, ¶¶38, 78, FIGs. 3, 4; *supra* Sections IX.A.1(b)-(d).)



(Ex. 1005, FIGs. 3 (left; annotated), 4 (right; annotated); Ex. 1002, ¶78.)

For example, as Kim explains, ferrite sheet 230 is "configured to be formed between the battery cell [210] and the flexible printed circuit board (FPCB) [240] in an unfolded shape and disposed at the upper end of the battery cell [210]." (*Id.*, ¶70; *see also id.*, ¶38 ("an RFID antenna (241) is wired along the edge perimeter of the flexible printed circuit board (FPCB) (240) and an RF power receiving antenna (242) is additionally wired in a spiral shape along the central portion of the RFID antenna (241) to be installed on the upper portion of the ferrite sheet (230)"); ¶¶77-78.) Additionally, Kim explains that RF power receiving antenna 242 ("receiving coil") and "RFID antenna 241" ("a short-range communication antenna") are formed along the flexible printed circuit board 240. (*Id.*, FIG. 14, ¶38 ("an RFID antenna (241) is wired along the edge perimeter of the flexible printed circuit board (FPCB) (240) and an RF power receiving antenna (242) is additionally wired in a spiral shape along the central portion of the RFID antenna (241) to be installed on the upper portion of the ferrite sheet (230)"), ¶¶77-78.) Because Kim discloses that flexible printed circuit board 240 includes RF power receiving antenna 242 ("receiving coil") and "RFID antenna 241" ("short-range communication antenna"), and that the ferrite sheet 230 covers board 240, ferrite sheet 230 also covers antennas 241 and 242. (Ex. 1002, ¶79.) Indeed, it was well known at the time of the alleged invention to configure a shielding unit to cover both a receiving coil and short-range communication antenna and that such a configuration provided benefits. (*Id.*; Ex. 1013, FIG. 4A; *infra* Sections IX.G.1(c)-(e); *see also* Ex. 1022, 3:45-55, 4:16-24, FIG. 3 (describing multiple antenna coils on a shielding sheet).)

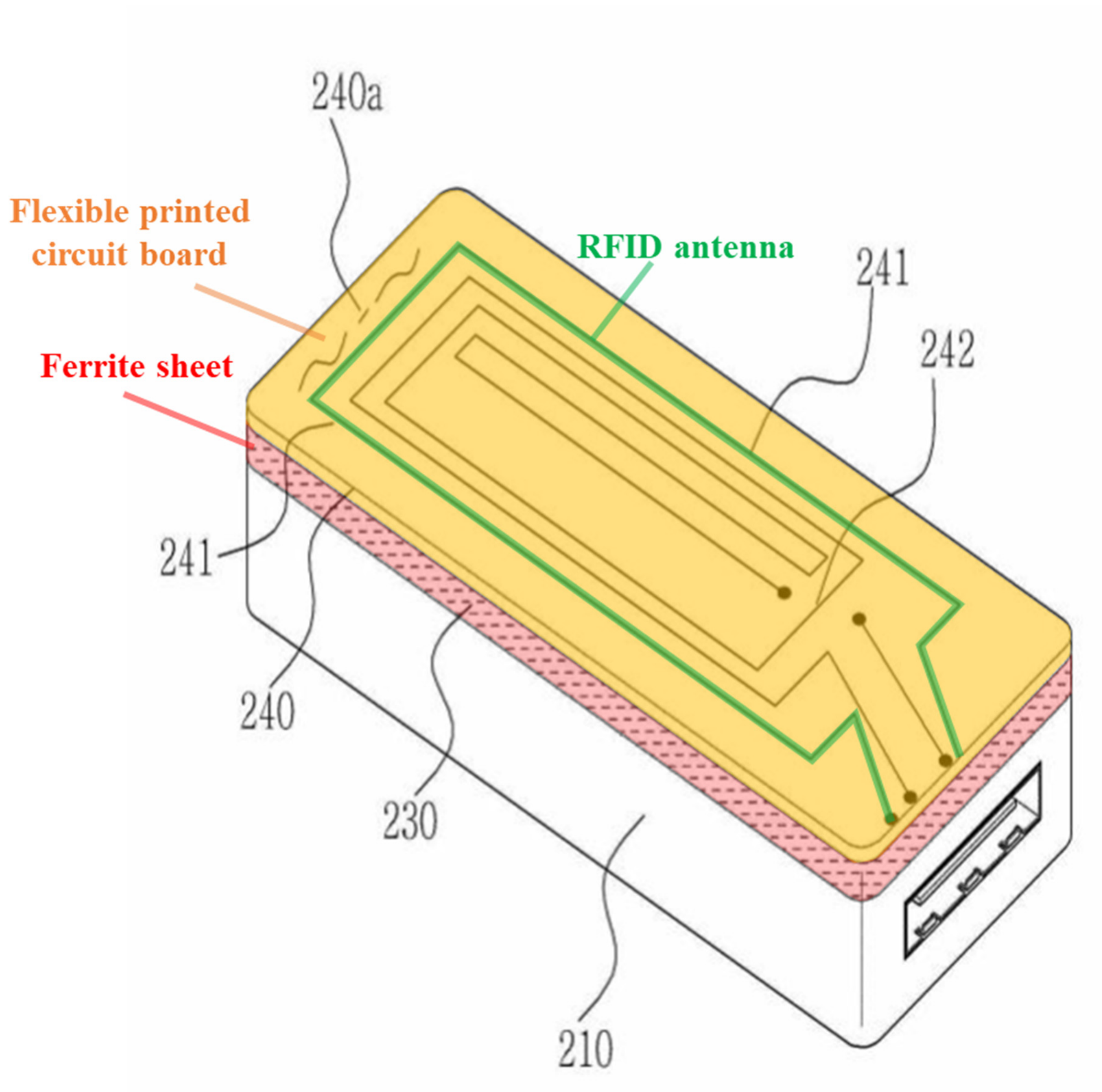
2. Claim 2

a) The wireless power receiver of claim 1, further comprising a printed circuit board on the shielding unit, wherein the short-range communication antenna is on the printed circuit board.

Kim discloses this feature. (Ex. 1002, ¶¶80-82.) For example, as discussed above, Kim discloses flexible printed circuit board 240 on ferrite sheet 230 (the "shielding unit") of battery pack 200, wherein RFID antenna 241 (the "short-range communication antenna") is disposed on the flexible printed circuit board 240. (Ex.

1005, ¶¶36-38, 77, 78, FIGs. 3, 4, 14; *supra* Sections IX.A.1(b)-(d), (g); *see generally* Ex. 1020, 1:6-20 ("Virtually every electronic device includes one or more varieties of printed circuit boards."); Ex. 1021, ¶¶[0041]-[0043] (describing antennas on printed circuit boards).)

For instance, Kim discloses that flexible printed circuit board (FPCB) (240) is "installed on the upper portion of the ferrite sheet (230)." (Ex. 1005, ¶38; *see also id.*, ¶¶36-37, 77, 78, FIGs. 3, 4.) Kim also discloses that the ferrite sheet 230 is formed "between the battery cell and the flexible printed circuit board." (Ex. 1005, ¶70; *see also id*. ¶78.) Figure 3 illustrates this configuration, i.e., how the flexible printed circuit board 240 is on the ferrite sheet 230. (*Id.*, FIG. 3; Ex. 1002, ¶81; *see also* Ex. 1005, FIGs. 4, 14.)



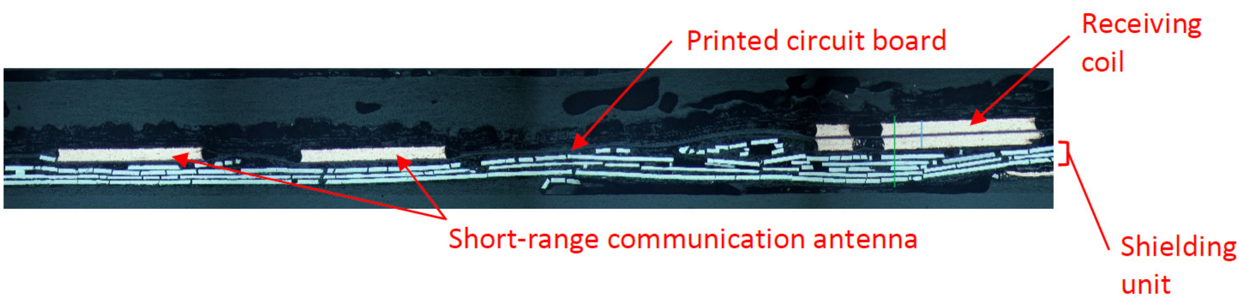
(*Id.*, FIG. 3 (annotated); Ex. 1002, ¶81.)

Kim also discloses that "the short-range communication antenna is on the printed circuit board," as shown above. (Ex. 1002, ¶¶82; Ex. 1005, FIGs. 3, 4; *supra* Section IX.A.1(d).) For instance, Kim discloses that "RFID antenna (241)" ("short-range communication antenna") "is wired along the edge perimeter of the flexible printed circuit board (FPCB) (240) according to the present invention," as shown above in Figure 3. (Ex. 1005, ¶77; *see also id.*, ¶¶36-38, 78, 85, 87, FIGs. 3, 4, 14.)

3. Claim 3

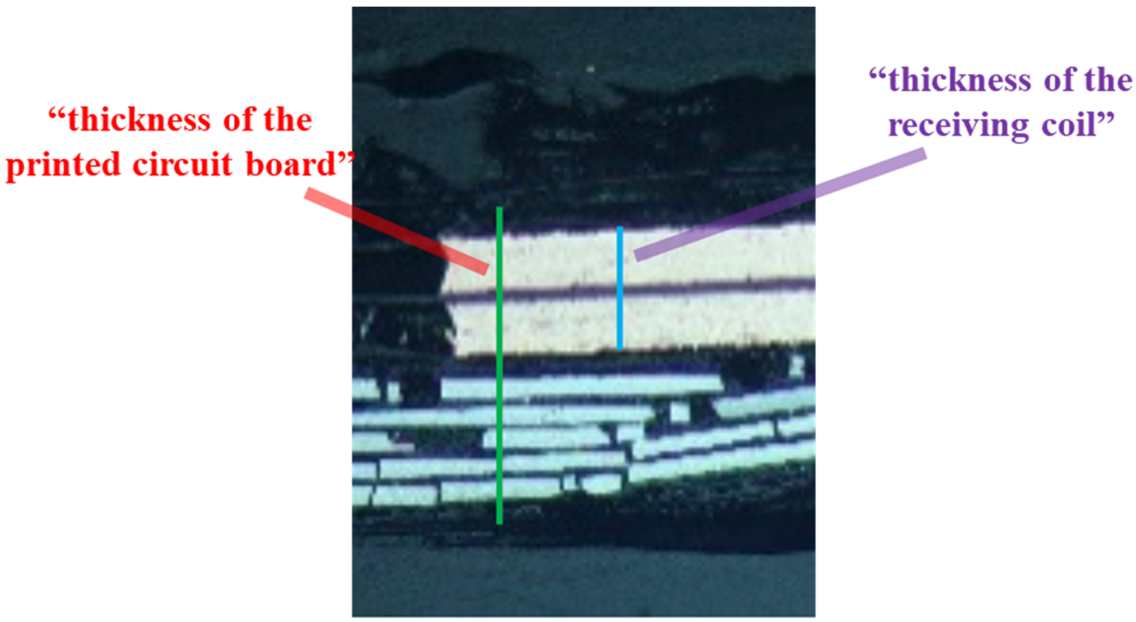
a) The wireless power receiver of claim 2, wherein the receiving coil has a thickness equal to or less than a thickness of the printed circuit board.

Without waiving any positions Petitioner may present in district court, under PO's broad interpretation of claim 3, Kim discloses this feature. (Ex. 1002, ¶¶83-84.) *See 10X Genomics, Inc.*, IPR2020-00086, Paper 8 at 21-22 (permitting petitioner to base its challenge "on claim constructions implied by Patent Owner's district court infringement contentions"); *W. Digital Corp.*, IPR2018-00084, Paper 14 at 11. In its infringement contentions, PO contends that this claim is met by comparing the thickness of the alleged "receiving coil" to the ***total height*** of the "receiving coil" ***plus*** the thickness of various other components disposed under and/or above the coil, including the alleged "printed circuit board" and "shielding unit." (Ex. 1012, 11.)



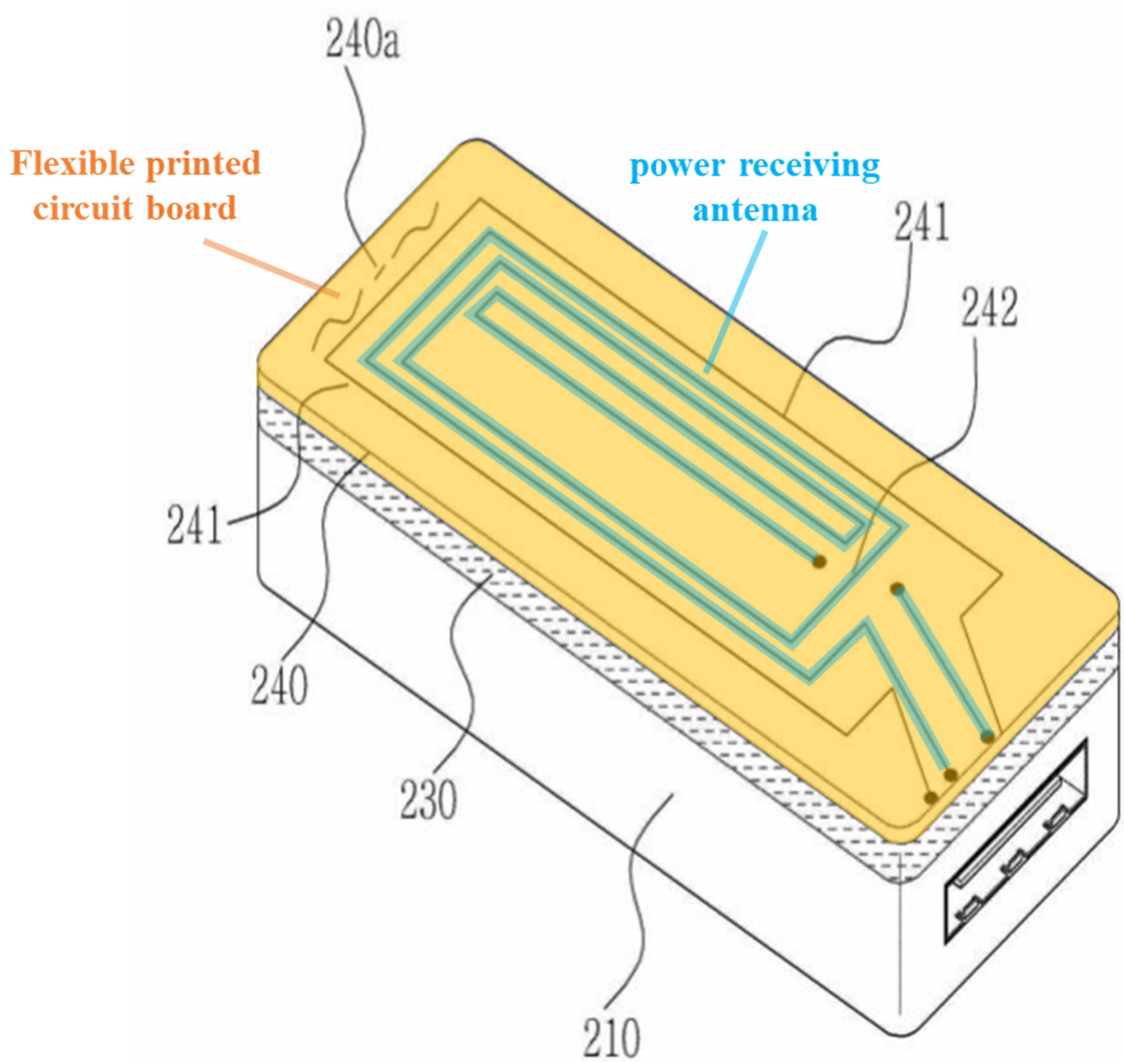
Optical cross section image of the wireless power receiver from the exemplary Samsung Galaxy S21 showing the thickness of the receiving coil (blue) is less than the thickness of the printed circuit board (green).

(*Id.*)



(*Id.* (excerpt showing the alleged "thickness of the receiving coil (blue)" and "thickness of the printed circuit board (green)"; red and purple annotations added).)

Kim similarly discloses that RF power receiving antenna 242 ("receiving coil") is installed on flexible printed circuit board 240. (Ex. 1005, ¶¶38, 41, 77, FIGs. 3, 4, 14.)



(Ex. 1005, FIG. 3 (annotated); Ex. 1002, ¶83.)

Based on PO's interpretation in which the thickness of the printed circuit board includes the thickness of the receiving coil, Kim discloses this feature, as the RF power receiving antenna 242 is on the printed circuit board. In other words, the thickness of the antenna 242 ("receiving coil") is equal to or less than a thickness of the antenna 242 plus the thickness of the printed circuit board 240. (Ex. 1002, ¶84.)

Thus, under PO's broad interpretation of claim 3, Kim discloses the receiving coil has a thickness equal to or less than a thickness of the printed circuit board. (*Id.*)

4. Claim 6

a) The wireless power receiver of claim 1, wherein the short-range communication antenna includes an NFC (Near Field Communication) antenna.

Kim discloses this feature. (Ex. 1002, ¶85.) For instance, as discussed above for claim element 1[d], Kim discloses RFID antenna 241 ("short-range communication antenna"). (*Supra* Section IX.A.1(d).) Although Kim does not use the words "near field communication" or "NFC," a POSITA would have understood that Kim's RFID antenna 241 is an NFC antenna. (Ex. 1002, ¶85.) For instance, Kim discloses that antenna 241 communicates with RFID devices at 13.56 MHz. (Ex. 1005, ¶¶26, 40.) NFC was a known RFID standard for communicating at 13.56 MHz. (Ex. 1008, ¶[0009] ("As an RFID standard, near field communication (NFC) developed by Sony and Philips is known. ... NFC uses a radio wave with a frequency of 13.56 MHz, and is capable of bidirectional communication with a very short communication range of approximately 10 cm."); Ex. 1010, ¶[0006] ("Near Field Communication (NFC) is a type of Radio Frequency IDentification (RFID) which is a short distance communication scheme . . . [with] a maximum distance of 20 cm via a frequency of 13.56 MHz.").) Thus, Kim discloses that RFID antenna 241 includes an NFC antenna.

B. Ground 2: Claims 1-3, and 6 are Obvious over Kim in view of Leizerovich

As discussed above for claim element 1[d] and claim 6, Kim discloses RFID antenna 241 ("short-range communication antenna"). (*Supra* Sections IX.A.1(d), IX.A.4.) To the extent that PO argues that Kim does not disclose a short-range communication antenna (claim element 1[d]) or an NFC antenna (claim 6), Leizerovich discloses an NFC antenna, and in view of Leizerovich, a POSITA would have found it obvious to implement Kim's RFID antenna 241 as an NFC antenna for short-range communications. (Ex. 1002, ¶¶86-95.)

Leizerovich is in the same field as Kim and the '364 patent, generally relating to implementing a communication antenna (e.g., in the form of a loop antenna) in a battery-powered mobile device. (Ex. 1014, Title ("Wireless Communication Device with Integrated Battery/Antenna System"), Abstract ("wireless communication device that uses the battery (300) and the loop antenna (100)"), 1:17-19 ("The present invention generally relates to the field of radio frequency antennas and more particularly to integrated near-field antennas."), 3:6-36 (describing loop antennas), 4:14-48 ("a small loop antenna is well suited for what is referred to as 'near field communication' (NFC)"); Ex. 1002, ¶87.)

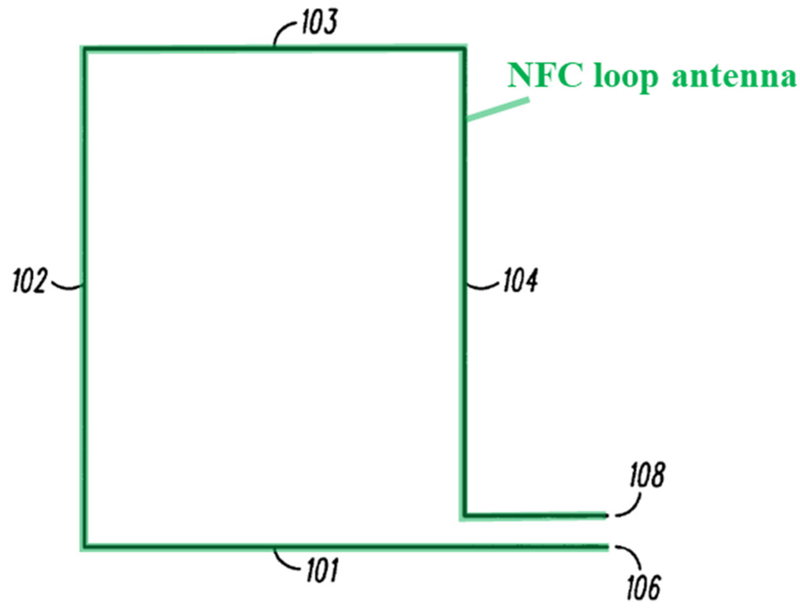


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FIG. 1

(*Id.*, FIG. 1 (annotated); Ex. 1002, ¶87)

Leizerovich discloses, for example, "NFC antenna 522" that is "a loop antenna in structure" integrated into a mobile device. (Ex. 1014, 6:5-12 ("Also shown in the schematic of FIG. 5 is an NFC antenna 522. Advantageously, the NFC antenna 522 is implemented on the existing battery circuit without the need for any additional separate terminals."), FIG. 5; *see also id.*, 4:9-16 ("a small loop antenna is well suited for what is referred to as 'near field communication' (NFC)"), 7:21-23 ("As has been described, the present invention includes a loop antenna that adds NFC functionality to a wireless communication device ....").)

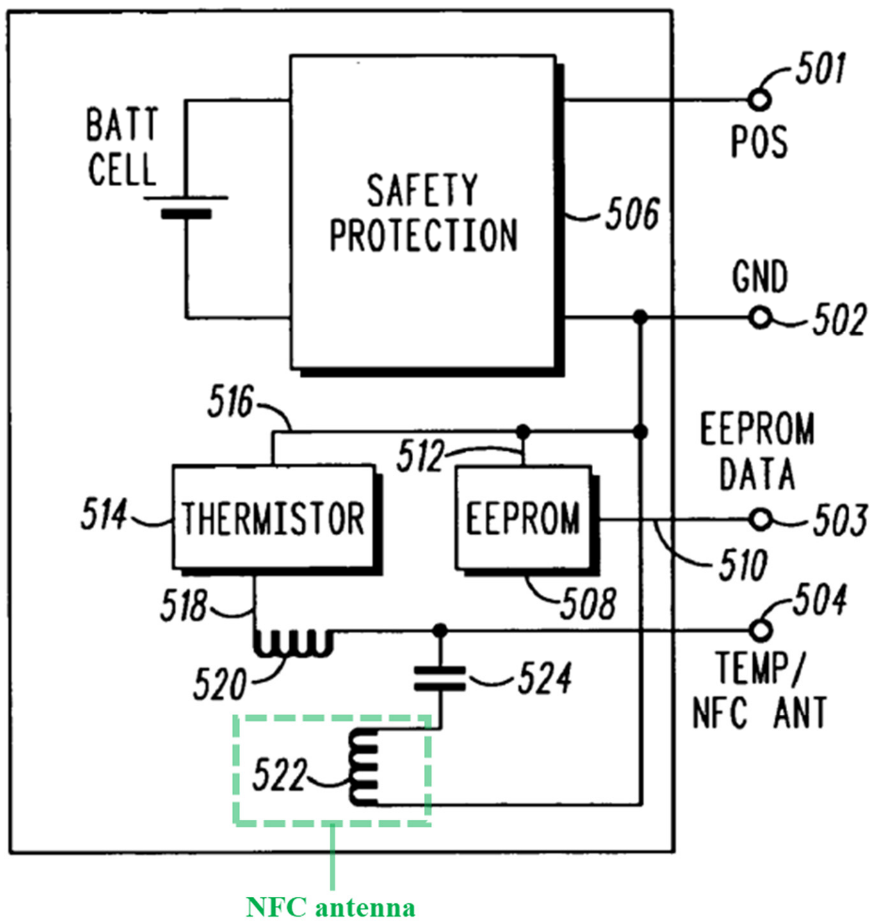


FIG. 5

(Ex. 1014, FIG. 5 (annotated); Ex. 1002, ¶88.)

Like Kim, Leizerovich discloses communicating at "about 13.5 MHz" using its loop antenna. (*Id.*, 4:25-27; Ex. 1002, ¶89.) Leizerovich explains that its loop antenna can use the "near field communication, or NFC," standard "for short range communication, such as, and without limitation, for effecting financial card transactions and the like." (*Id.*, 4:16-33.)

A POSITA implementing Kim's communication antenna would have looked to Leizerovich, because Leizerovich is in the same field as Kim, as discussed above, similarly concerning implementing a communication antenna in a battery-powered mobile device. (Ex. 1002, ¶90.) Furthermore, Leizerovich concerns loop antennas for communicating on the NFC standard, which was a well-known standard for RFID antennas like Kim's antenna that can operate at 13.56 MHz. (Ex. 1008, ¶[0009] ("As an RFID standard, near field communication (NFC) developed by Sony and Philips is known. ... NFC uses a radio wave with a frequency of 13.56 MHz, and is capable of bidirectional communication with a very short communication range of approximately 10 cm."); Ex. 1010, ¶[0006]; Ex. 1009, 1:26-34, 7:53-55.)

In view of Leizerovich, a POSITA would have found it obvious to implement Kim's communication antenna 241 such that it supports NFC communication. (Ex. 1002, ¶91.) Kim's communication antenna 241 already supported RFID communications, of which NFC is a particular type, and operated at the same 13.56 MHz used for communications on the NFC standard. (Ex. 1005, ¶¶26, 40.) As such, a POSITA would have understood that Kim's antenna was capable of communications at 13.56 MHz, such as on the NFC standard, and would therefore have had a reasonable expectation of success in operating it on the NFC standard (e.g., by connecting it to appropriate NFC circuitry). (Ex. 1002, ¶91.) A POSITA would have had good reason to do so, at least because NFC was an industry standard and operating on the industry standard would have facilitated interoperability with other devices operating on the standard, such as cellular telephones, which Kim's battery pack is designed to charge. (*Id.*; Ex. 1005, ¶[0029] ("the object of the present invention is to provide an apparatus for charging a battery of a mobile communication terminal"); Ex. 1002, ¶91.) It would have been beneficial to enable two-way communications on the NFC standard between the battery pack and a mobile telephone or another mobile device to, for example, exchange data including battery health and charge status with the mobile device. (Ex. 1002, ¶91.)

Kim also contemplates exchanging data including "mobile banking and subway/bus fare payment" (Ex. 1005, ¶[0027]), similar to Leizerovich, which discloses "effecting financial card transactions and the like" using its NFC antenna (Ex. 1014, 4:19-24). Implementing Kim's antenna such that it used the NFC industry standard would have facilitated storing mobile banking and subway/bus fare payment information on the battery pack (e.g., transmitted to it by a mobile phone or laptop over the NFC standard), and using the battery pack to communicate with banking and transit terminals also operating on the NFC standard. (Ex. 1002, ¶92; *see, e.g.*, Ex. 1011, 5 ("From buying a simple mass transit ticket with a mobile phone to accompanying the traveler all along his trip, NFC mobile phone technology will (r)evolutionize mass transit and make it more attractive."); Ex. 1008, ¶[0010] ("At present, the NFC is widely used for personal identification, electronic money payment, and so on.”).) Thus, a POSITA would have found it obvious to implement Kim’s RFID antenna 241 such that it is capable of communicating on the NFC standard, or found it obvious to make RFID antenna 241 an NFC antenna. (Ex. 1002, ¶92.)

Leizerovich further discloses that its NFC antenna can be used for short-range communications, “typically less than one foot.” (Ex. 1014, 4:43.) Indeed, NFC antennas were well-known as short-range communication antennas. (Ex. 1008, ¶[0009] (“NFC ... [has] a very short communication range of approximately 10 cm.”); Ex. 1010, ¶[0006] (“Near Field Communication (NFC) is ... a short distance communication scheme.”).) Thus, the Kim antenna, as modified to implement the NFC standard in view of Leizerovich, is a “short-range communication antenna,” as recited in claim element 1[d]. (Ex. 1002, ¶93.)

Making Kim’s communication antenna 241 an antenna for NFC communication as disclosed by Leizerovich would have been straightforward for a POSITA to implement, at least because Leizerovich discloses how to implement such an antenna connected to a battery in a mobile device. (Ex. 1002, ¶94.) In addition, Leizerovich is directed to a loop antenna for wireless communication with a mobile device like Kim. (*See, e.g.*, *id.*, 7:21-23 (“As has been described, the present invention includes a loop antenna that adds NFC functionality to a wireless communication device ....").) And like Kim's communication antenna 241, Leizerovich's NFC antenna is "advantageously placed on or near the outer surface of the device's battery, thereby utilizing very little space in the device." (*Id.*, 7:24-27.) The combination would have been no more than a predictable combination of known elements (implementing Leizerovich's teachings regarding NFC functionality for Kim's communication antenna 241) and would have produced the predictable result of an NFC-standard-compatible portable device, with the numerous advantages described above. (Ex. 1002, ¶94.) *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 ("*KSR*") ("The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.").

Therefore, the Kim-Leizerovich combination discloses or suggests "a short-range communication antenna disposed on the shielding unit" (claim element 1[d]), "wherein the short-range communication antenna includes an NFC (Near Field Communication) antenna" (claim 6). (Ex. 1002, ¶95.) The remaining features of claims 1-3 and 6 are disclosed or suggested by Kim for the reasons presented above in Section IX.A. (*Supra* Section IX.A; Ex. 1002, ¶95.)

C. Ground 3: Claim 3 Is Obvious over Kim in View of Sin

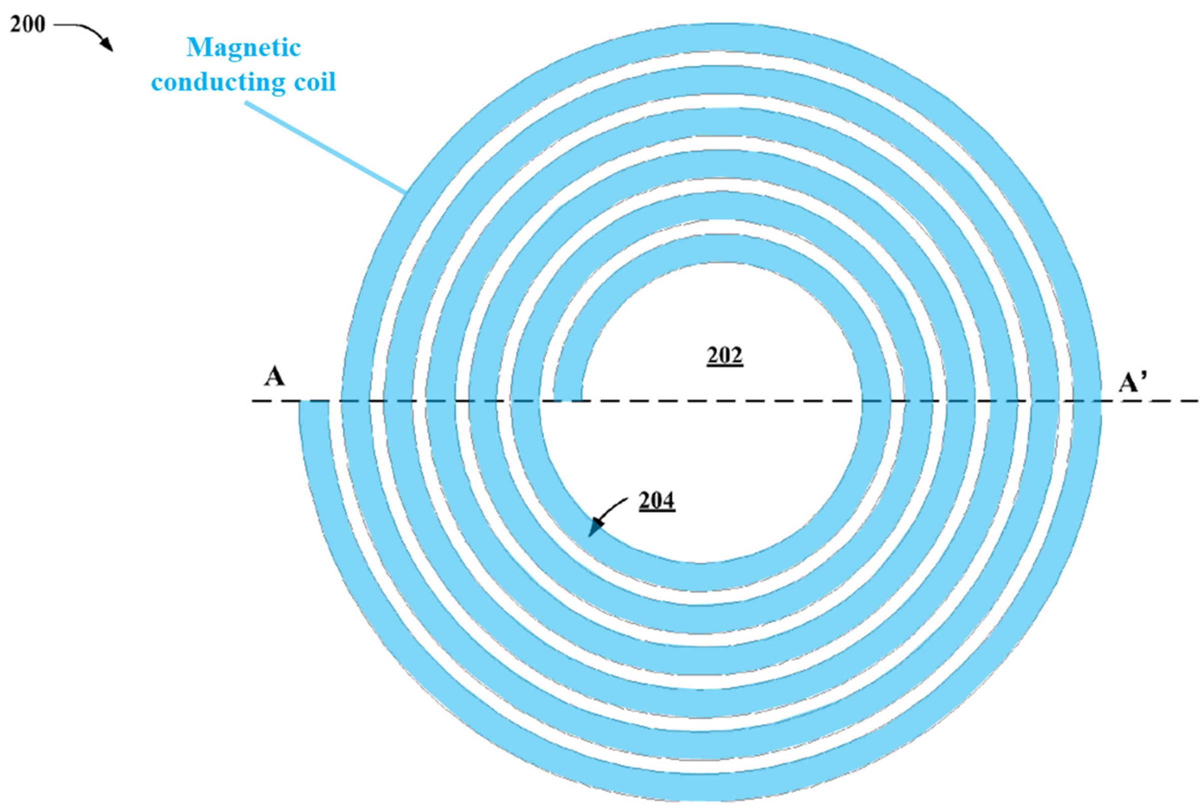
1. Claim 3

a) The wireless power receiver of claim 2, wherein the receiving coil has a thickness equal to or less than a thickness of the printed circuit board.

Even if the Board does not apply PO's broad reading of claim 3, Kim in combination with Sin discloses or suggests the features of claim 3. (Ex. 1002, ¶¶96-105.) As discussed above, Kim discloses the wireless power receiver of claim 2. (*See supra* Section IX.A.2.) Kim also discloses that the RF power receiving antenna 242 ("receiving coil") is "integrally configured in the flexible printed circuit board" 240. (Ex. 1005, ¶87.)

Kim does not explicitly discuss the relative thicknesses of RF power receiving antenna 242 and printed circuit board 240. (Ex. 1002, ¶97.) Nevertheless, it would have been obvious to a POSITA to modify Kim such that "the receiving coil has a thickness equal to or less than a thickness of the printed circuit board," based on the teachings of Sin. (*Id.*) As described below, Sin discloses techniques for, and benefits of, embedding a coil inductor into a substrate such that the coil has a thickness equal to or less than a thickness of the substrate. (*Id.*)

Sin's Figure 2 illustrates a top-down view of magnetic conduction coil 200, and Figure 1 illustrates a cross sectional view of magnetic conduction coil 200 along the A-A' line shown in Figure 2. (Ex. 1006, ¶[0038] ("FIG. 1 illustrates a cross-sectional view of a monolithic inductor 100”); ¶[0049] (“FIG. 2 illustrates a top view of the magnetic conducting coil 200 of monolithic inductor 100, of FIG. 1.”), FIGs. 1, 2.)



(*Id.*, FIG. 2 (annotated); Ex. 1002, ¶98.)

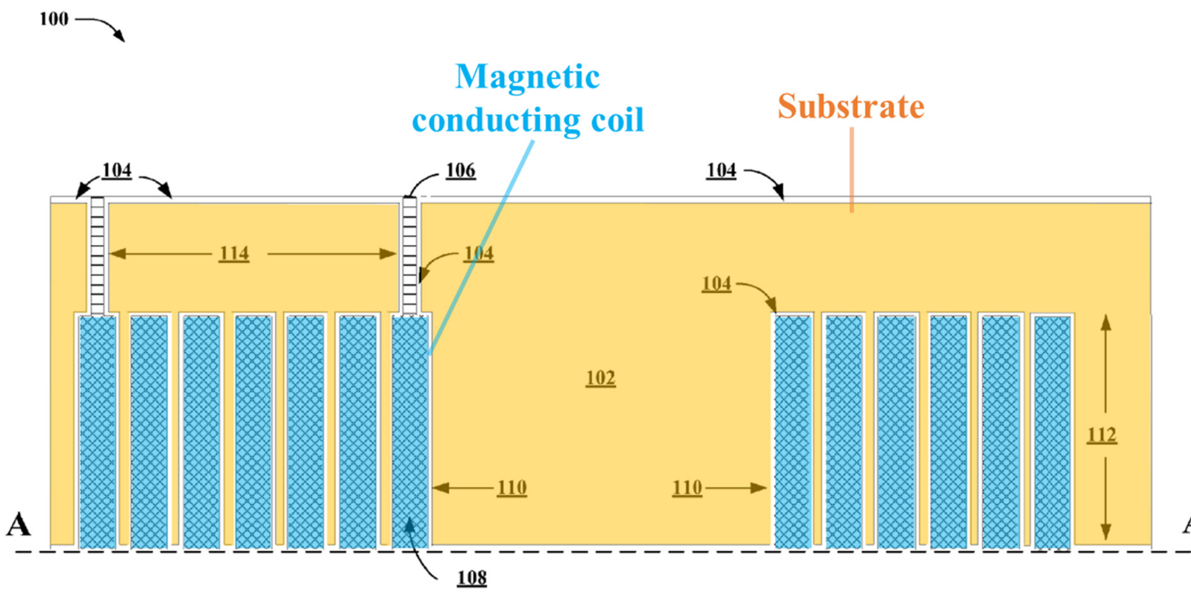


FIG. 1

(*Id.*, FIG. 1 (annotated); Ex. 1002, ¶98.)

As shown in Figures 1 and 2, Sin discloses embedding coil 200 in substrate 102 such that the coil has "a thickness equal to or less than a thickness" of a circuit substrate 102. (Ex. 1002, ¶99.) For instance, Sin discloses trenches 110 etched in substrate 102 to accommodate the coil windings. (Ex. 1006, ¶¶[0035], [0039].) Sin further discloses conductive coils 108 (i.e., the windings of Figure 2's coil 200) inside of the trenches 110. (*Id.*, ¶[0036] ("[F]abrication of a monolithic magnetic semiconductor device can comprise forming deep trenches in a substrate upward from a bottom surface of the substrate. The trenches can be formed according to a contour of a magnetic induction coil to be embedded in the trenches.").)

Moreover, Sin provides quantitative disclosure of a coil 108 having a thickness less than the thickness of the substrate. (*Id.*, ¶[0039]; FIG. 1; *see also, e.g.*, *id.*, ¶[0013] ("For instance, the substrate can have a thickness of more than about 100 micrometers (μm), in some aspects. In other aspects, the trenches and coil can have a thickness of greater than about 50 μm."); ¶[0034] ("embedding of the magnetic induction coils in the substrate saves space").) Sin discloses these relative thicknesses of induction coil 108 and substrate 102 in Figure 1, annotated below. (*Id.*, FIG. 1; Ex. 1002, ¶100.)

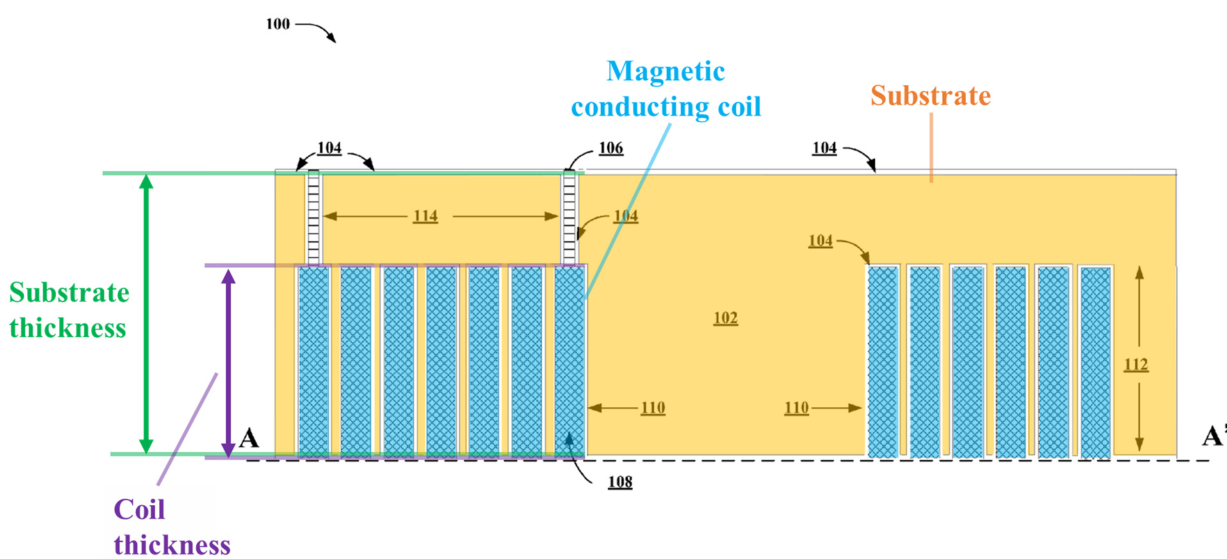


FIG. 1

(Ex. 1006, FIG. 1 (annotated); Ex. 1002, ¶100.)

A POSITA would have understood from Sin's disclosures that it was possible to minimize the combined thickness of an inductor and substrate by making the coil thinner than the substrate and embedding the coil into the substrate. (Ex. 1002, ¶101.)

Sin is in the same field as Kim and the '364 patent. (Ex. 1002, ¶102.) For example, Sin generally relates to magnetic induction devices ("including inductors, transformers, and related devices" (Ex. 1006, ¶[0003])), and to methods for creating magnetic induction devices having "low DC resistance and low surface area" compared to conventional magnetic induction devices (*id.*, ¶[0007]; *see also id.*, ¶¶[0002], [0030]-[0034], [0049], FIGs. 1, 2). Sin describes methods for reducing the thickness of a magnetic induction device with reference to "magnetic conducting coil 200 of monolithic inductor 100," as discussed above. (Ex. 1006, ¶[0049], FIGs. 1, 2.) Sin teaches that the target devices for its inductor coils includes "applications such as mobile phones, digital cameras, and so forth [that] have size, weight, and component density requirements that must be met," and where "reduced size can also lead to reduced cost, higher component reliability, or a simplified an flexible design." (*Id.*, ¶[0004]; *see also id.*, ¶[0003].) Although Sin's disclosures largely concerns embedding inductors in a semiconductor substrate, a POSITA would have recognized that Sin's teachings could have been applied to any inductor-substrate combination, such as Kim's wireless charging coil on a PCB substrate, to achieve the same or similar benefits, including reduced component thickness by embedding the inductor in the substrate. (Ex. 1002, ¶102.) Thus, Sin's teachings are from the same field (magnetic induction devices) as Kim and the ’364 patent, and concern the same problem (device thickness) faced by the applicant for the ’364 patent. (*Id.*)

To embed a coil in a substrate, as taught by Sin, a POSITA would have understood that the coil would have been equal to or less than the thickness of the substrate. (*Id.*, ¶103.) Thus, a POSITA would have found it obvious to implement Kim’s RF power receiving antenna 242 (“receiving coil”) such that its thickness is equal to or less than the thickness of the flexible printed circuit board 240 (“printed circuit board”), in view of Sin’s teachings. (*Id.*) A POSITA would have had good reason to do so (e.g., to reduce the thickness of Kim’s antenna). (*Id.*) Embedding Kim’s power receiving antenna 242 (“receiving coil”) (and, if necessary to achieve Sin’s benefits, RFID antenna 241) in flexible printed circuit board 240, as taught by Sin, would have similarly reduced the thickness of Kim’s antenna. (*Id.*) Indeed, before the time of the alleged invention, the industry felt market pressure from consumers who desired slimmer and thus more portable mobile devices, such as Kim’s battery, and it was well understood that implementing techniques for reducing the thickness of wireless charging antennas was one way to reduce the thickness of such devices and increase their portability. (Ex. 1015, ¶[0006] (“Japanese Unexamined Patent Application Publication No. 2006-42519 ... discloses a planar coil as a noncontact power-transmission coil mounted on a portable terminal desired to be thin, such as a mobile phone unit.”), ¶[0009] (“Recently, furthermore, mobile phone units and so on which are thinner than ever may have been demanded in the art. Therefore, a reduction in thickness of the noncontact power-transmission coil constructed of the above spiral planer coil has also been requested in addition to attain a reduction in thickness of any of various electronic parts arranged in the housing of such unit."), ¶[0011] ("It is desirable to provide a noncontact power-transmission coil formed of a spiral planar coil capable of further being thin in shape."); Ex. 1002, ¶103.)

A POSITA would have had a reasonable expectation of success in selecting an appropriate thickness for Kim's power receiving antenna 242 (i.e., no greater than that of the printed circuit board 240) and embedding it in printed circuit board 240, as taught or suggested by Sin. (Ex. 1002, ¶104.) Sin discloses that coil trenches can be formed in a substrate using various known processes. (Ex. 1006, ¶¶[0054], [0065].) Kim's printed circuit board is a substrate. (*See, e.g.*, Ex. 1007, ¶[0017] ("The coil assembly comprises a coil that is provided on a substrate, such as a printed circuit board.").) Thus a POSITA would have appreciated that known processes could have been used to embed Kim's power receiving antenna 242 in the substrate—instead of positioned on top—to reduce overall thickness. (Ex. 1002, ¶104.)

As such, the claimed configuration would have involved no more than a combination of known techniques (e.g., known coil and substrate manufacturing techniques) according to known methods (e.g., embedding a coil into a substrate) to yield a predictable result of a receiving coil that has a thickness equal to or less than a thickness of a printed circuit board. *See KSR,* 550 U.S. at 416.

D. Ground 4: Claim 3 Is Obvious over Kim in View of Sin and Leizerovich

1. Claim 3

a) The wireless power receiver of claim 2, wherein the receiving coil has a thickness equal to or less than a thickness of the printed circuit board.

Kim in combination with Sin and Leizerovich discloses or suggests the features of claim 3 for the same reasons discussed above in Grounds 2 and 3. (Ex. 1002, ¶106; Sections IX.B, IX.C.1(a).) For example, a POSITA would have found it obvious to modify the Kim-Sin combination discussed above in Section IX.C based on the disclosure of Leizerovich in the same manner as discussed above in Section IX.B. The modifications to Kim in view Sin, discussed in Section IX.C.1(a), do not impact the analysis of Kim in view of Leizerovich discussed in Section IX.B. (Ex. 1002, ¶106.)

E. Ground 5: Claim 7 Is Obvious over Kim in View of Mochida

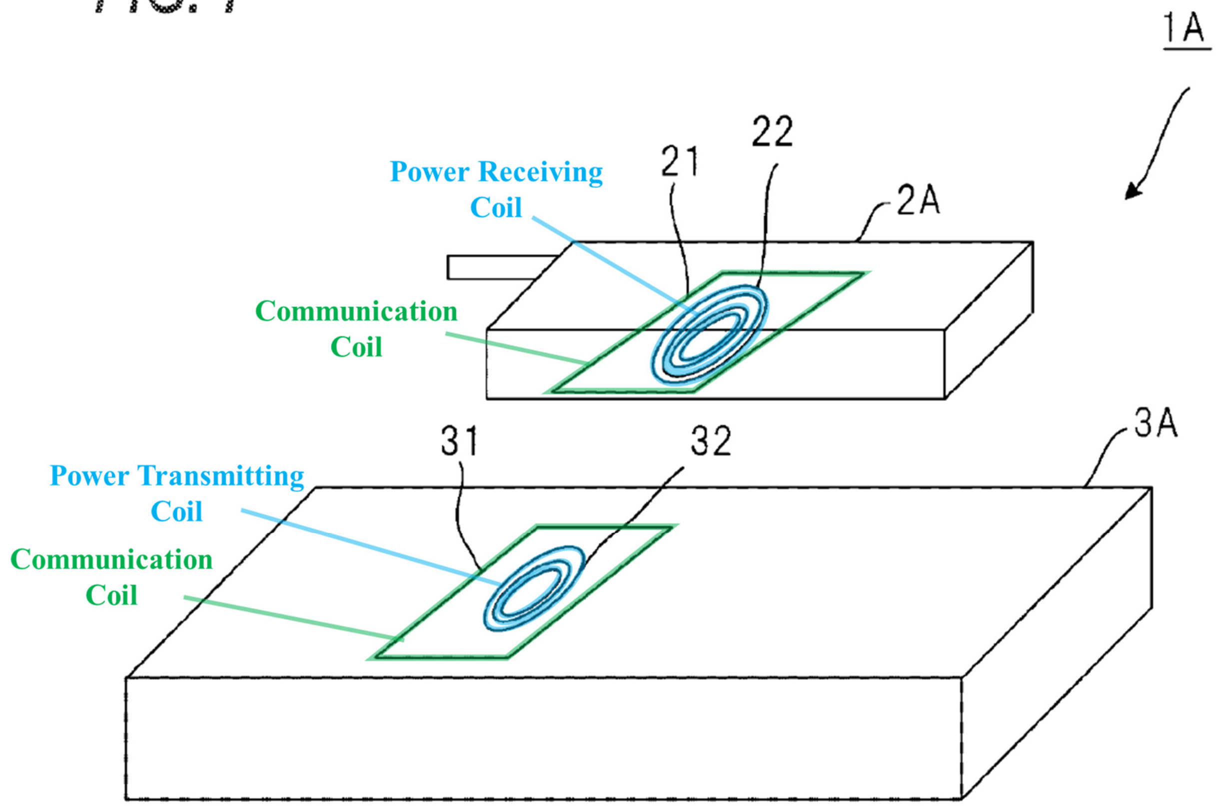
1. Claim 7

a) The wireless power receiver of claim 1, further comprising a switch for changing a conducting state of the short-range communication antenna according to reception of the power wherein the wireless power receiver opens or shorts the switch according to the reception of the power, and wherein the wireless power receiver opens the switch when the power is received and shorts the switch when the power is not received.

Kim in combination with Mochida discloses or suggests these features. (Ex. 1002, ¶¶107-118.) As discussed above, Kim discloses or suggests the wireless power receiver of claim 1. (*See supra* Section IX.A.1.) Kim does not explicitly disclose the remaining features of claim 7, but Mochida does, and a POSITA would have found it obvious to implement such features in Kim in view of Mochida. (Ex. 1002, ¶107.)

Mochida, in the same field as Kim and the '364 patent, generally relates to wireless charging and communication for mobile devices, and more specifically concerns an apparatus 2A for receiving wireless power (via "noncontact power-receiving secondary coil 22") and for short-range wireless communications (via a separate "proximity noncontact communication antenna 21"), as discussed below. (Ex. 1016, ¶¶[0001]-[0003], [0009]-[0010], [0080]-[0089], FIGs. 7, 8; Ex. 1002, ¶108.) For instance, as shown in annotated figure 7 below, Mochida discloses a charger 3A that provides power to electronic device 2A (e.g., a mobile device), by wirelessly transmitting power from noncontact feeding primary coil 32 to noncontact power-receiving secondary coil 22. (*Id.*, ¶¶[0080], [0084], FIG. 7.) Charger 3A and electronic device 2A also each include a communication coil 31 and 21, respectively, that are separate from the wireless power coils, for communication between the charger 3A and electronic device 2A. (*Id.*)

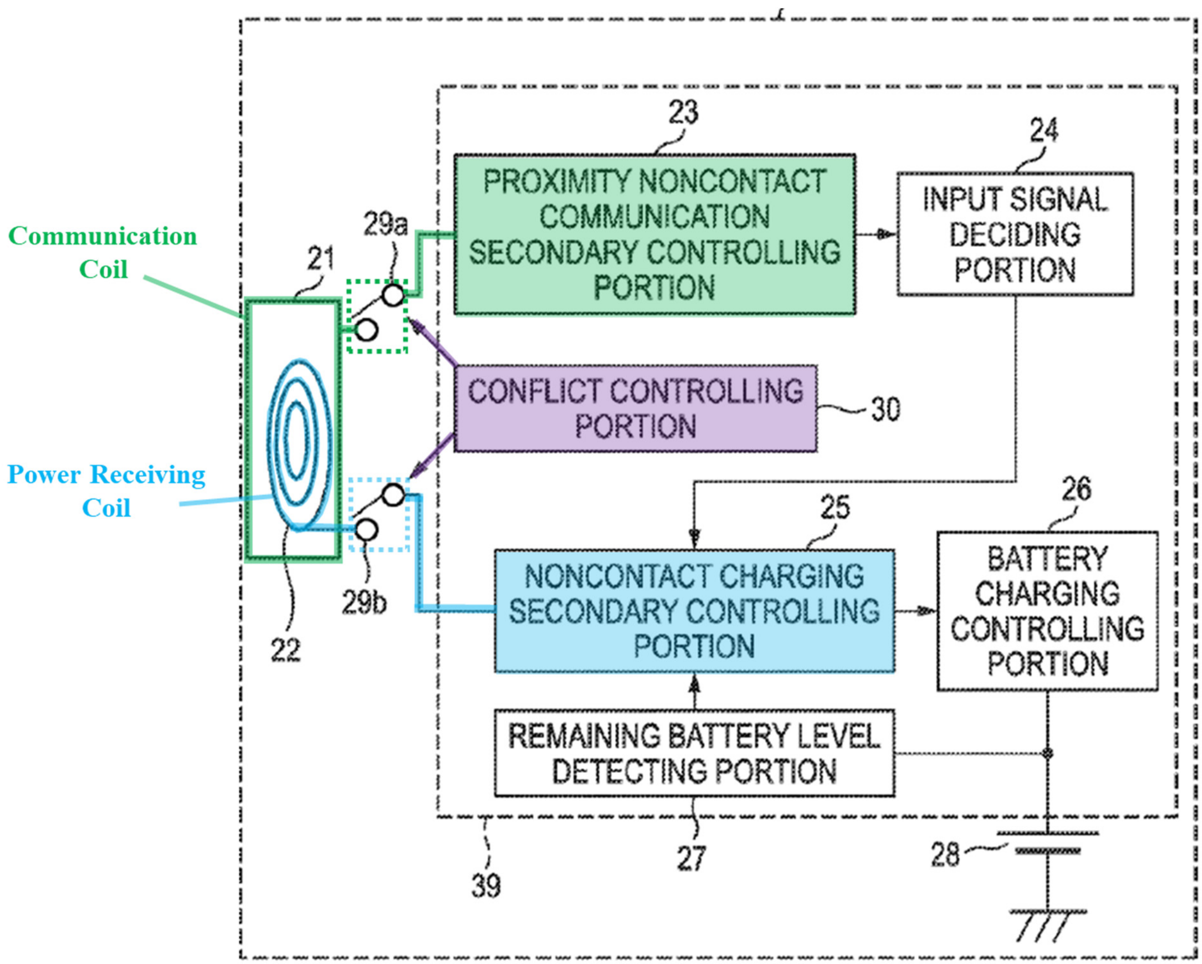
FIG. 7



(Ex. 1016, FIG. 7 (annotated); Ex. 1002, ¶108.)

With reference to figure 8 (annotated excerpt below), which is a block diagram showing a schematic configuration of an electronic device 2A from figure 7, Mochida describes the operation of electronic device 2A. (Ex. 1016, ¶[0080], Ex.

1002, ¶109.) The communication coil 21 disposed around power receiving coil 22 of electronic device 2A are shown on the left side of the below annotated figure. (Ex. 1016, ¶[0080]; Ex. 1002, ¶109.)



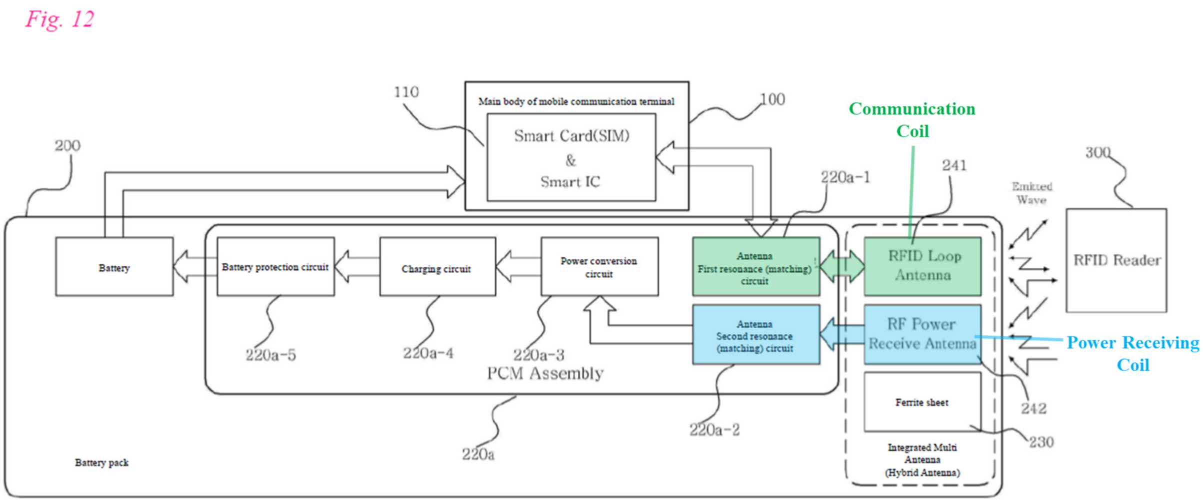
(Ex. 1016, FIG. 8 (excerpt, annotated); Ex. 1002, ¶109)

Mochida recognizes a problem where—as in this configuration—a wireless communication antenna can malfunction when in proximity to a wireless charging antenna, because of the "adverse influence of harmonic noise generated." (Ex. 1016, ¶[0003] ("[W]hen a power receiving coil for noncontact charging and a loop antenna for proximity noncontact communication (Felica®, or the like) are arranged in close vicinity to each other, it is probable that a malfunction is induced in the proximity noncontact communication due to an adverse influence of a harmonic noise generated in the power receiving coil."); *see also id.*, ¶¶[0083]-[0084] (where the communication coil surrounds the wireless charging antenna, "interference is caused between them" which "may act as the factor that causes a malfunction in the proximity noncontact communicating function").)

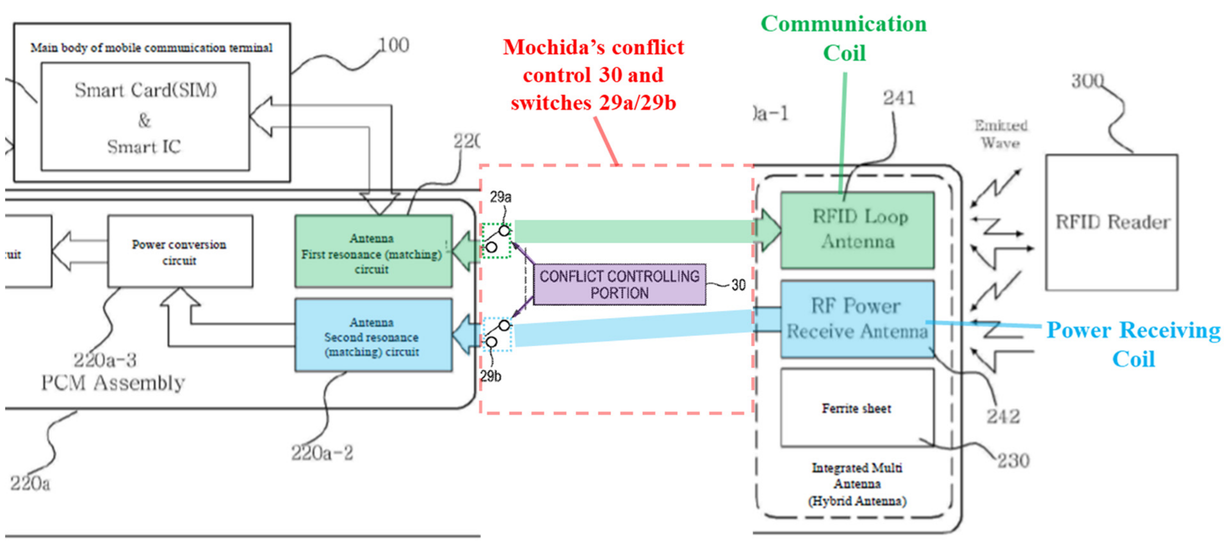
Thus, Mochida teaches that while receiving power, it is ideal to disconnect the communication coil from the electronic device, and vice-versa. (Ex. 1016, ¶¶[0083], [0084] ("[T]he electric power of the harmonic wave produced by the noncontact power-receiving secondary coil 22 is relatively high. As a result, the influence on the proximity noncontact communication cannot be neglected, which may act as the factor that causes a malfunction in the proximity noncontact communicating function."), [0085]; Ex. 1002, ¶111.) As such, Mochida discloses a conflict controller 30 that controls "changeover switches" 29a and 29b to ensure that when power is being received by the receiver, the switch 29a is off (in an open state). (*Id.*, ¶[0083] ("[W]hen the charger 3A gives a charge of electricity to the electronic device 2A ... the conflict controlling portion 30 of the electronic device 2A turns OFF the changeover switch 29a (open state, cutoff state) and also turns ON the changeover switch 29b (closed state, conduction state)."; "Thus, while one component is used, the other component is cut off in operation from the circuit. In order to cut off the unused component from the circuit, the electronic device 2A is equipped with changeover switches 29a, 29b, and a conflict controlling portion 30 for controlling the switching of the changeover switches 29a, 29b.").) Opening switch 29a during power reception ensures that "an electronic current never flows" between the communication antenna 21 and associated circuitry (i.e., the "proximity noncontact communication secondary controlling portion 23"). (*Id.*, ¶[0085].) "As a result, a malfunction never occurs" when communicating. (*Id.*; *see also id.*, ¶¶[0086]-[0087].)

A POSITA would have found it obvious to implement a switch, as disclosed by Mochida, in Kim's device, which operated in the same way, to achieve the same result. (Ex. 1002, ¶112.) In addition to Mochida's disclosure (discussed above), the problem of wireless charging antennas causing malfunctions and other problems for wireless communication antennas was well recognized at the time of the alleged invention. (*See, e.g.*, Ex. 1017, 2:1-4 (recognizing as a problem "the interference between the wireless charging function and the contactless IC card function," particularly where both use the same frequency (e.g., 13.56 MHz)); Ex. 1018, 1:46-55 (discussing a need for a way to protect devices such as NFC antennas or RFID cards from damage caused by excess power from a wireless power transmitter); Ex. 1019, 6:34-60 (recognizing that "vulnerable devices" such as "NFC devices and RFID cards" can be damaged by wireless power transmitters).)

This same problem—and thus Mochida's solution—would also have applied to Kim's device, because its communication antenna surrounds its wireless charging antenna, as discussed for claim element 1[f] (*supra* Section IX.A.1(f)), just like Mochida's antennas. (Ex. 1002, ¶113.) Specifically, a POSITA would have had good reason to implement a switch like Mochida's switch 29a between Kim's RIFD communication antenna 241 and the associated communication circuitry, along with a controller for that switch like Mochida's conflict controlling portion 30, to determine if wireless charging is occurring and disconnect the communication antenna 241 from the circuitry while power is being received through Kim's RF power receiving antenna 242, and reconnect the coil 241 when power is not being received so that communication can occur. (*Id.*) This modification is shown below, where Kim's annotated figure 12 is shown, first as disclosed by Kim, then as modified in view of Mochida, with a conflict controller and associated switches that can be controlled to connect/disconnect the respective antennas based on whether power is being received. (*Id.*)



(Ex. 1005, FIG. 12 (annotated); Ex. 1002, ¶113.)



(Ex. 1005, FIG. 12 (demonstrative illustrating Kim in combination with Mochida); Ex. 1002, ¶113.)

To the extent PO contends that Kim discloses that it is desirable to receive power wirelessly while communicating, that does not undermine the demonstration that a POSITA would have found it obvious to combine Kim and Mochida as discussed above. (Ex. 1002, ¶114.) A POSITA would have understood that while it may be desirable to perform both functions at the same time, such simultaneous operation can have disadvantages, like those described by Mochida and recognized in the art, as discussed above. (*Id.*) Moreover, communicating while charging can result in inefficient information transfer where communication errors occur, because an error would necessitate repetitive transmission of the data, thereby wasting power, the user's time, and other resources on both the transmit and receive side. Mochida's solution avoids such errors and wasted resources. (Ex. 1016, ¶¶[0085] ("As a result [of Mochida's solution], a malfunction never occurs in the proximity noncontact communicating function."), [0086] ("As a result, the user can carry out the proximity noncontact communication more firmly."); Ex. 1002, ¶114.) Indeed, Kim recognizes that it can be non-optimal to simultaneously perform wireless charging and communication. (*See, e.g.*, Ex. 1005, ¶[0113] ("Since unwanted communication between the RFID reader and the mobile communication occurs when charging continuously with the RFID reader, the function for communicating with the RFID reader can be temporarily suspended in the mobile communication terminal program or used separately.")

Therefore, even if the combination no longer supports simultaneous charging and communication, a POSITA would still have found it obvious implement

Mochida's switch and related functionality in Kim's device. (Ex. 1002, ¶115.) *See Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) ("a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine").

A POSITA would have had a reasonable expectation of success in the combination. (Ex. 1002, ¶116.) For instance, Kim already discloses the necessary antenna structure, and Mochida discloses how to implement a switch for changing a conducting state of the short-range communication antenna (that could be applied to Kim's RFID antenna 241) according to reception of the power, wherein the wireless power receiver opens or shorts the switch according to the reception of the power, and wherein the wireless power receiver opens the switch when the power is received and shorts the switch when the power is not received. (*Id.*) And there is nothing particularly complicated about using a switch to perform a switching function. (*Id.*) Thus, it would have been well within a POSITA's skill to combine these known elements and configure them to operate according to their known functions. (*Id.*) *See KSR*, 550 U.S. at 416.

Thus, for the reasons discussed above, the Kim-Mochida combination discloses "a switch for changing a conducting state of the short-range communication antenna according to reception of the power." (Ex. 1002, ¶117.) For instance, the switch used in such a combination is configured to open, disconnecting the communication circuitry from its respective ("changing a conducting state of the short-range communication antenna") while power is being wirelessly received ("according to the reception of power"), and closed while power is not being wirelessly received so that communication can occur. (Ex. 1002, ¶117; Ex. 1016, ¶¶[0083], [0085], FIG. 8; *see also id.*, ¶¶[0080]-[0082], [0084], [0086]-[0089], FIGs. 7, 8.)

Kim in view of Mochida further discloses "wherein the wireless power receiver opens or shorts the switch according to the reception of the power, and wherein the wireless power receiver opens the switch when the power is received and shorts the switch when the power is not received" for the same reasons discussed above (i.e., the switch is opened when power is received, and closed ("short[ed]") for communication when power is not received). (Ex. 1002, ¶118; Ex. 1016, ¶¶[0083], [0085], FIG. 8; *see also id.*, ¶¶[0080]-[0082], [0084], [0086]-[0089], FIGs. 7, 8.)

F. Ground 6: Claim 7 Is Obvious over Kim in View of Mochida and Leizerovich

1. Claim 7

a) The wireless power receiver of claim 1, further comprising a switch for changing a conducting state of the short-range communication antenna according to reception of the power, wherein the wireless power receiver opens or shorts the switch according to the reception of the power, and wherein the wireless power receiver opens the switch when the power is received and shorts the switch when the power is not received.

Kim in combination with Mochida and Leizerovich discloses or suggests the features of claim 7 for the same reasons discussed above in Grounds 2 and 5. (Ex. 1002, ¶119; Sections IX.B, IX.E.1(a).) For example, a POSITA would have found it obvious to modify the Kim-Mochida combination discussed above in Section IX.E based on the disclosure of Leizerovich in the same manner as discussed above in Section IX.B. The modifications to Kim in view of Mochida discussed in Section IX.E.1(a) do not impact the analysis of Kim in view of Leizerovich discussed in Section IX.B. (Ex. 1002, ¶119.)

G. Ground 7: Claims 1-3 Are Obvious over Lehr in View of Chatterjee

1. Claim 1

a) A wireless power receiver configured to wirelessly receive power from a wireless power transmitter, the wireless power receiver comprising:

To the extent the preamble is limiting, Lehr discloses this feature. (Ex. 1002, ¶¶120-122.) For instance, Lehr describes a "mobile computing device 100 that includes an enhanced coil assembly for use in transfer of power and/or data," which discloses a "wireless power receiver," as claimed. (Ex. 1007, ¶[0025].)

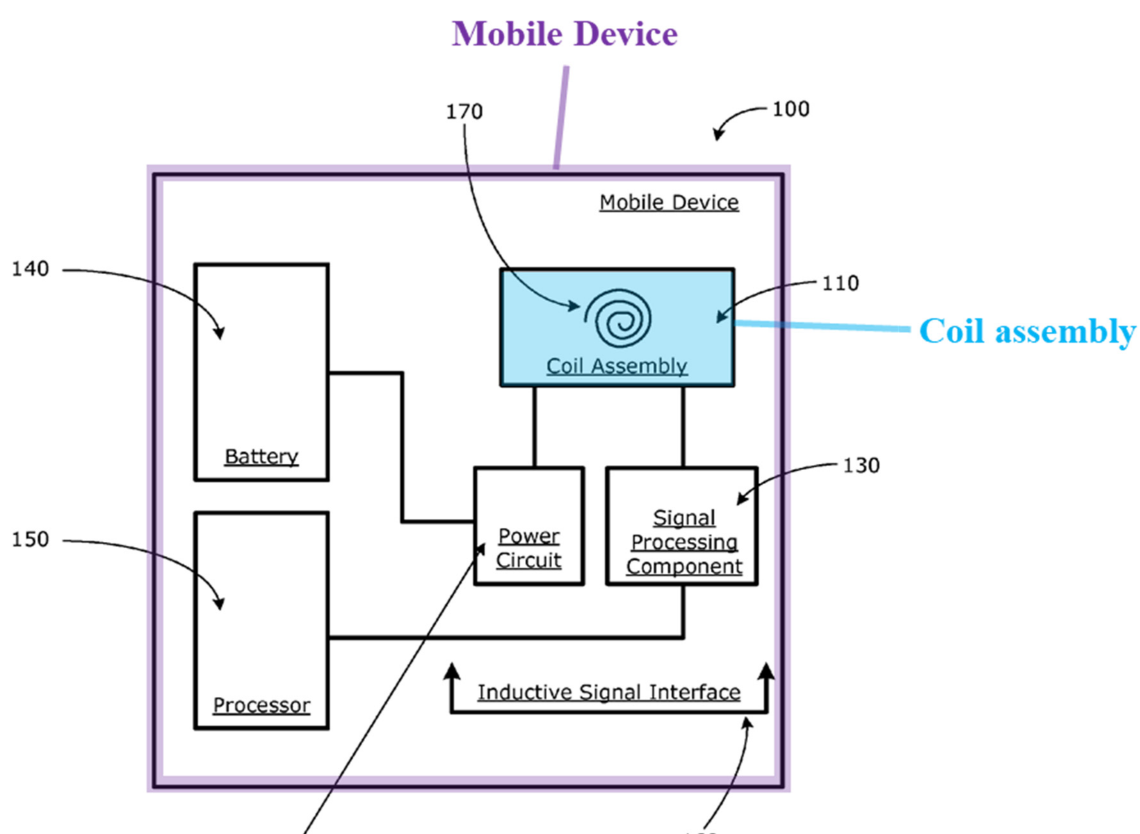


FIG. 1

(*Id.*, FIG. 1 (annotated); Ex. 1002, ¶120.)

Lehr discloses that the mobile computing device 100 is "configured to wirelessly receive power from a wireless power transmitter." (Ex. 1002, ¶121.) For instance, Lehr discloses that "the mobile computing device can be brought into contact or close proximity with a second device" ("wireless power transmitter") "to enable the transfer of power and/or data signals between the two devices." (Ex. 1007, ¶[0029].) "The second device can be a docking station, an accessory device (e.g., a speaker set, a printer, or a display device, for example), or another computing device that has inductive resources to transmit and/or receive power and/or data to and from the mobile computing device." (*Id.*)

The wireless power circuitry of the Lehr mobile computing device 100 includes a coil assembly 110. (*See, e.g.*, Ex. 1007, ¶[0025], FIG. 1.) Coil assembly 110 includes two coils—a "first coil 170" for wireless power transmission and a "second coil" for wireless data communication:

> In some embodiments, the inductive signal interface 160 can use the **first coil 170 in the coil assembly 110 to transmit and/or receive power signals**. For example, in an inductive charging system, the mobile computing device 100 can be brought into contact or close proximity with another device, such as a charging dock, to enable the charging dock to inductively charge the mobile computing device 100. The coil assembly 110 can also include a second coil that is provided on the substrate. The **second**

> **coil can be used to transmit or receive data signals** from another device.

(*Id.*, ¶[0035] (emphasis added).)

b) a shielding unit;

Lehr in combination with Chatterjee discloses or suggests this feature. (Ex. 1002, ¶¶123-130.) Lehr does not explicitly recite that the mobile computing device 100 ("wireless power receiver") comprises "a shielding unit," as claimed. It would have been obvious, however, to include such a feature in device 100 based on the teachings of Chatterjee. (*Id.*, ¶123.)

Lehr and Chatterjee are assigned to same assignee and have two inventors in common (Lehr and Chatterjee). (Ex. 1007, Cover; Ex. 1013, Cover.) Lehr, the later-filed reference, specifically refers to Chatterjee as a related reference and states that Chatterjee is "hereby incorporated by reference."[4] (Ex. 1007, ¶[0001].)

Chatterjee is titled "**Shield** for Use with a Computing Device That Receives an Inductive Signal Transmission." (Ex. 1013, Title (emphasis added).) Like Lehr, Chatterjee discloses a computing device that includes coils that "may transmit or

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[4] Petitioner does not rely on Chatterjee being properly incorporated by reference in Lehr, and merely refers to Lehr's statements regarding incorporation by reference to demonstrate that Lehr and Chatterjee are related and ripe for combination.

receive inductive signals from another device" such as "power and/or data signals." (*Id.*, 5:5-11, 3:42-46.) Chatterjee describes an "inductive shield" "positioned to underlie the coils." (*Id.*, 6:21-29, 5:1-35, 4:53-60.)

Chatterjee discloses that the inductive shield "protects external devices and/or components of the device from magnetically induced unwanted electrical effects." (*Id.*, 2:35-42.) Chatterjee also discloses that the shield is effective in protecting circuitry in a computing device like, that disclosed by Lehr. (*Id.*, 2:42-48; Ex. 1002, ¶126.)

As shown in annotated figure 4A below, Chatterjee discloses that the inductive shield 410, which includes two layers 414 and 416, is positioned between the coils 420 and the electrical circuits/components 411 and 413. (Ex. 1013, 6:25-29, FIG. 4A; Ex. 1002, ¶127)

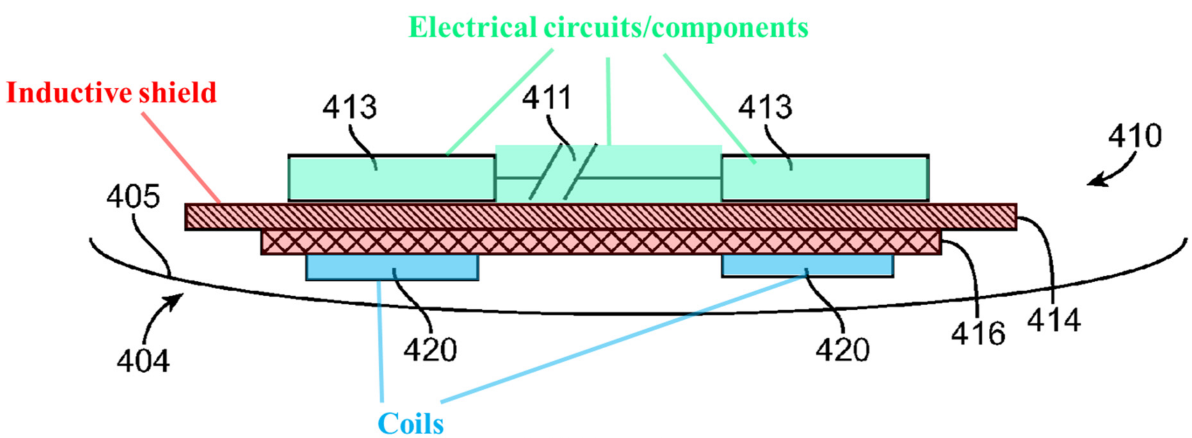


FIG. 4A

(Ex. 10113, FIG. 4A (annotated); Ex. 1002, ¶127.)

Based on the teachings of Chatterjee, it would have been obvious to a POSITA to include an inductive shield ("shielding unit") as disclosed by Chatterjee in a computing device as disclosed by Lehr. (Ex. 1002, ¶128.) Lehr and Chatterjee have common inventors, Lehr explicitly identifies the application that issued as Chatterjee as related, and Lehr states that Chatterjee is "incorporated by reference." (Ex. 1007, ¶[0001].) *See, e.g.*, *Bayer Healthcare Pharms., Inc. v. Watson Pharms., Inc.*, 713 F.3d. 1369, 1374-75 (Fed. Cir. 2013) (finding obviousness when one reference "refer[red] expressly" to the other); *Norian Corp. v. Stryker Corp.*, 363 F.3d 1321, 1328 (Fed. Cir. 2004) (finding obviousness when one reference explicitly cited the other).

The Lehr and Chatterjee references are plainly intended to go hand-in-hand, as Lehr relates to charging and communication coils for mobile devices, and Chatterjee relates to shielding units for coils in mobile devices. (Ex. 1002, ¶129.) For instance, a POSITA would have recognized that including such a shield would "protect[] external devices and/or components" of the Lehr device from "magnetically induced unwanted electrical effects" caused by the coils, as Chatterjee discloses. (Ex. 1013, 2:35-42; Ex. 1002, ¶129.) Moreover, Chatterjee further discloses an additional benefit of the inductive shield, noting that "the inductive shield improves efficiency of an inductive energy transfer system." (Ex. 1013, 5:23-24.) Therefore, in order to realize such benefits as disclosed by Chatterjee, a

POSITA would have found it obvious to combine Chatterjee's teachings regarding an inductive shield with Lehr such that the computing device of the Lehr-Chatterjee combination includes the claimed "shielding unit." (Ex. 1002, ¶129.)

A POSITA would have had a reasonable expectation of success implementing the configuration, at least because Chatterjee provides a detailed explanation of how to implement an inductive shield in a device with one or more magnetic coils. (Ex. 1002, ¶130; *see generally* Ex. 1013.) The resulting wireless power receiver would have been a predictable combination of known components according to known methods (e.g., applying the teachings of Chatterjee regarding an inductive shield to the multi-coil wireless power receiver as disclosed by Lehr), and would have produced the predictable result of a wireless power receiver that includes protection for related circuitry from magnetic fields. (Ex. 1002, ¶130.) *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416.

c) a receiving coil disposed on the shielding unit; and

Lehr in view of Chatterjee discloses or suggests this feature. (Ex. 1002, ¶¶131-132.) As discussed above in Section IX.G.1(a), Lehr discloses a coil assembly 110 that includes a "first coil . . . to transmit and/or receive power signals." (Ex. 1007, ¶[0035].) And, as discussed above in Section IX.G.1(b), in the Lehr-Chatterjee combination an inductive shield is layered on the coil assembly. (Ex. 1013, 6:21-32; *supra* Section IX.G.1(b).)

Lehr discloses that the "first coil 170" of coil assembly 110 is configured to "receive power signals." (Ex. 1007, ¶[0035]; *see also id.*, ¶¶[0034], [0040] ("the first coil 170 can be used to inductively transmit and/or receive power signals"), [0043]-[0069] (describing details of the coil assembly).) Therefore, the Lehr-Chatterjee combination discloses or suggests the first coil 170 of the coil assembly 110, which corresponds to the recited "receiving coil," where, consistent with the positioning described and disclosed by Chatterjee, the receiving coil is disposed on the shielding unit. (Ex. 1002, ¶132.)

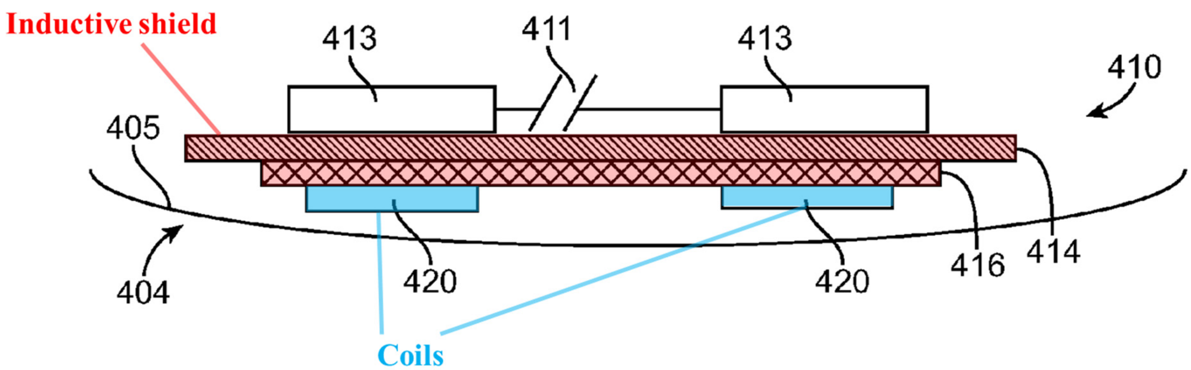


FIG. 4A

(Ex. 1013, FIG. 4A (annotated); Ex. 1002, ¶132.)

d) a short-range communication antenna disposed on the shielding unit,

Lehr in view of Chatterjee discloses or suggests this feature. (Ex. 1002, ¶¶133-134.) As discussed above in Section IX.G.1(a), Lehr discloses a coil assembly 110 that includes a "second coil . . . to transmit and/or receive data signals."

(Ex. 1007, ¶[0035].) And, as discussed above in Section IX.G.1(b), in the Lehr-Chatterjee combination an inductive shield is layered on the coil assembly. (Ex. 1013, 6:21-32; *supra* Section IX.F(1).) Therefore, like the first coil ("receiving coil") discussed above in Section IX.G.1(c), the second coil, which is used for data communication, is disposed on the inductive shield ("shielding unit") of the Lehr-Chatterjee combination. (Ex. 1002, ¶133.)

A POSITA would have understood that the second coil of the coil unit in the Lehr-Chatterjee combination is a "short-range communication antenna" because Lehr discloses that the device including such a coil performs data transfer with another device in "close proximity." (Ex. 1002, ¶134; *see also* Ex. 1007, ¶[0029] ("In some embodiments, the mobile computing device can be brought into contact or **close proximity** with a second device to enable the **transfer of** power and/or **data signals** between the two devices." (emphases added).) Furthermore, Lehr discloses that the "inductive" data communication can occur when "a secondary coil is close enough to the primary coil" so that "the electromagnetic field created by the primary coil induces the secondary coil (in the mobile computing device, for example) to generate a current." (Ex. 1007, ¶[0032].)

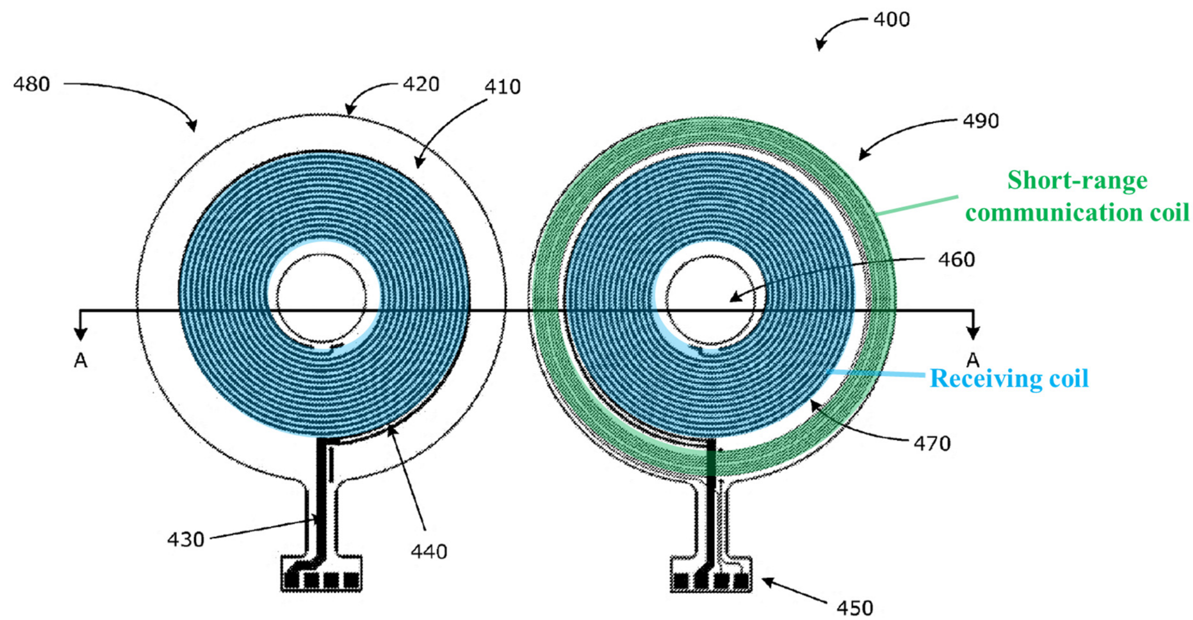
e) wherein the shielding unit shields a magnetic field generated from the receiving coil,

Lehr in view of Chatterjee discloses or suggests this feature. (Ex. 1002, ¶135.) As discussed above for claim element 1[b], the inductive shield ("shielding unit") in the Lehr-Chatterjee combination "shields" the electrical circuitry and components of the device from magnetic fields associated with the coils of the device. (*Supra* Section IX.G.1(b); Ex. 1013, 5:12-24.) A POSITA would have understood that in the receiving coils, exposure to a changing magnetic field induces current in the coils. (Ex. 1002, ¶135; Ex. 1013, 5:7-9 ("The magnetic coils 220 operate under a magnetic field that induces currents on the coils.") That induced current in the receiving coil, in turn, generates a corresponding magnetic field. (Ex. 1002, ¶135.) Therefore the inductive shield ("shielding unit") of the Lehr-Chatterjee combination shields the electronic components and circuitry from magnetic fields that include those generated by, for example, the "receiving coil" as well as other coils external to the wireless power receiver. (*Id.*; Ex. 1013, 2:35-42, 5:12-24.) Indeed, the purpose of Chatterjee's inductive shield is to protect against the electromagnetic fields from unshielded coils that "can damage the circuits or electrical elements, reduce their lifespan, or interfere with other operations of the device." (Ex. 1013, 5:12-24.)

f) wherein the short-range communication antenna surrounds the receiving coil, and

Lehr discloses or suggests this feature. (Ex. 1002, ¶¶136-141.) For instance, Lehr discloses "the first coil 170 can be provided on the printed circuit board with the second coil circumscribing" (i.e., surrounding) "at least a portion of the first coil 170," where the second coil corresponds to the short-range communication antenna, and the first coil 170 corresponds to the receiving coil, as discussed above. (Ex. 1007, ¶[0039]; Ex. 1002, ¶136; *supra* Section IX.G.1(c)-(d); *see also* Ex. 1007, ¶¶[0034]-[0035], [0040] ("[T]he second coil is provided on either one side or on both sides of the printed circuit board by circumscribing at least a portion of the first coil 170."), [0054], FIGs. 4, 5.)

Lehr does not illustrate the embodiments discussed in paragraph [0039], where both the communication and receiving coil are disposed on the same side of the printed circuit board. (Ex. 1002, ¶137; *see generally* Ex. 1001.) However, Figure 4 (annotated below) and Figure 5 illustrate an alternative embodiment where a receiving coil 410/510 (equivalent to first coil 170 discussed above) is disposed on both sides of a printed circuit board 420/520, surrounded on one side of the printed circuit board by a short-range communication coil 470/550 (equivalent to Lehr's "second coil" discussed above). (Ex. 1007, ¶¶[0053]-[0058], FIGs. 4, 5.)



(Ex. 1007, FIG. 4[5] (annotated); Ex. 1002, ¶137.)

[5] Figure 4 has an arrow incorrectly drawn from 470 to the inner (receiving) coil instead of to the outer (communication) coil. The specification makes clear that the second coil 470 circumscribes coil 410. (Ex. 1007, ¶[0054] ("[I]n FIG. 4, the second coil 470 is provided on side 490 so that it circumscribes at least a portion of the coil 410.").)

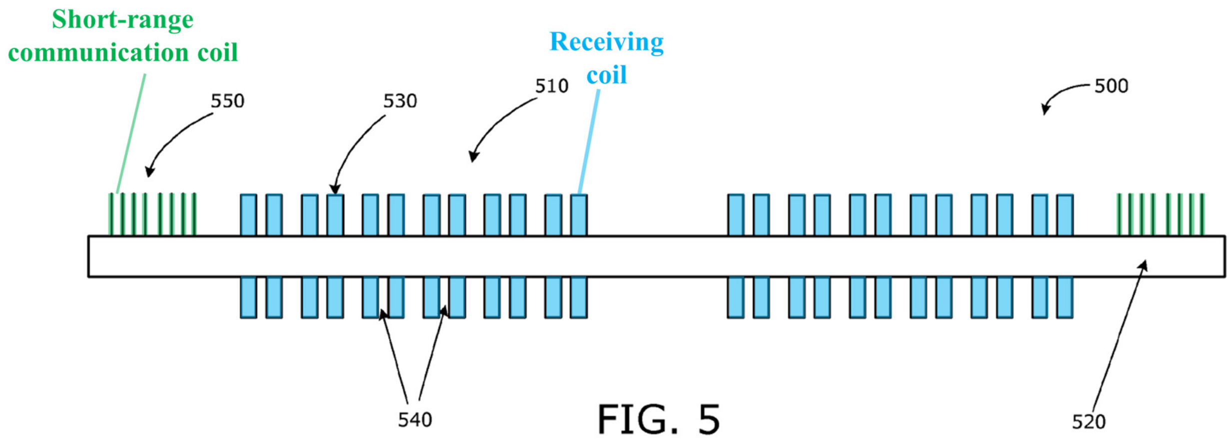
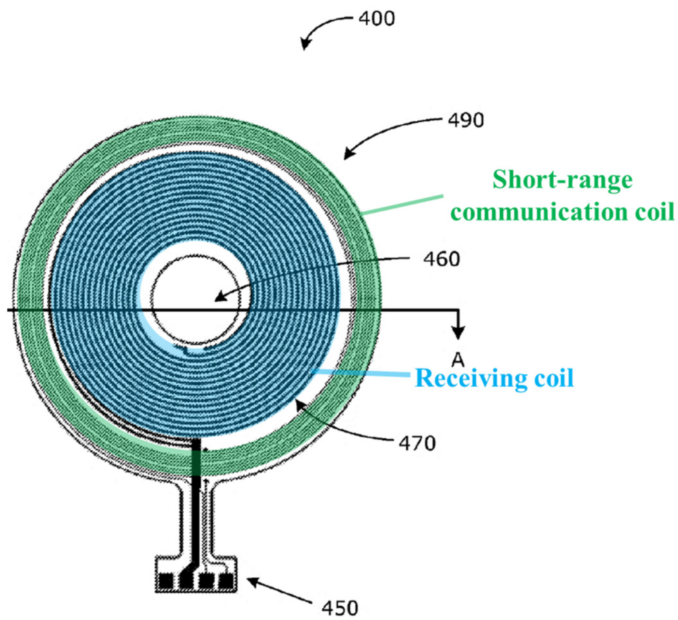


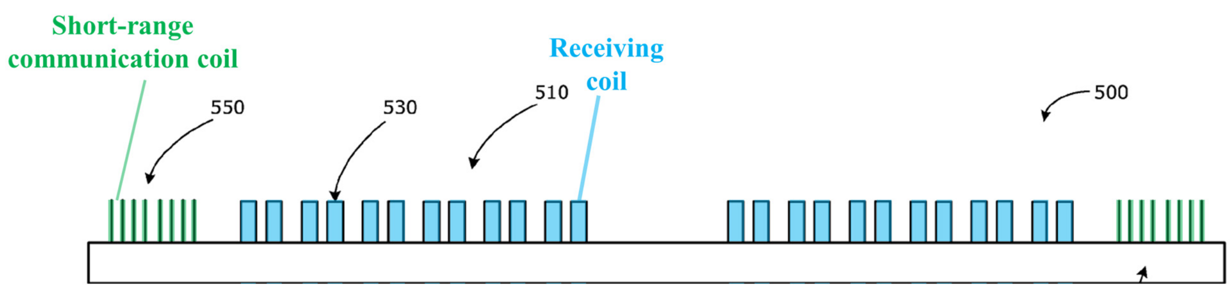
FIG. 5

(Ex. 1007, FIG. 5 (annotated); Ex. 1002, ¶137.)

A POSITA would have understood that modified figures 4 and 5 of Lehr below are consistent with the single-layer embodiment not pictured in Lehr, with coils on only one side of the printed circuit board, where the short-range communication coil surrounds the receiving coil. (Ex. 1002, ¶138; *see also* Ex. 1007, ¶¶[0039] ("[O]n a single-sided printed circuit board, the first coil 170 can be provided on the printed circuit board with the second coil circumscribing at least a portion of the first coil 170."), [0054] ("The second coil 470 [of Figure 4] can be provided on either one side or on both sides of the printed circuit board 420.").)



(Ex. 1007, FIG. 4 (annotated excerpt); Ex. 1002, ¶138.)



(Ex. 1007, FIG. 5 (annotated excerpt); Ex. 1002, ¶138.)

g) wherein the shielding unit covers the receiving coil and the short-range communication antenna.

Lehr in view of Chatterjee discloses or suggests this feature. (Ex. 1002, ¶¶139-141.) As discussed above, the Lehr-Chatterjee combination discloses or suggests including a shielding unit on the coil assembly, which includes the first coil ("receiving coil") and the second coil ("short-range communication coil"). (*See* *supra* Sections IX.G.1(b)-(e); Ex. 1013, 6:21-29, 5:1-35, 4:53-60; Ex. 1007, ¶[0035].)

For instance, Chatterjee discloses "the inductive shield 410 is positioned to underlie the coils 420, so as to separate or provide spacing between the coils and the electrical circuits/components 411, 413." (Ex. 1013, 4:26-29.) Chatterjee's Figure 4A illustrates how the inductive shield 410 (layers 414 and 416) is positioned relative to the coils in the Lehr-Chatterjee combination. (*Id.*, 4:21-32, 7:64-8:3, FIG. 4A; Ex. 1002, ¶140.)

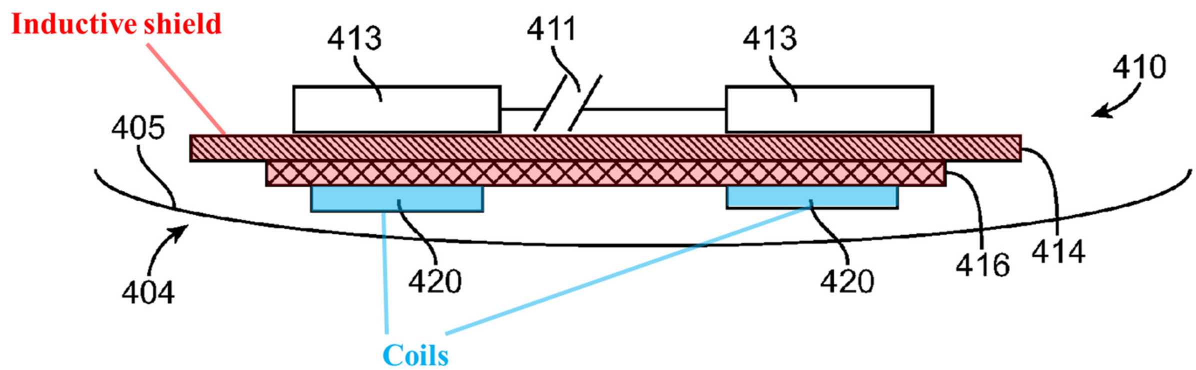


FIG. 4A

(Ex. 1013, FIG. 4A (annotated); Ex. 1002, ¶140.)

Indeed, it was well known at the time of the alleged invention to configure a shielding unit to cover both a receiving coil and short-range communication antenna and that such a configuration provided benefits. (Ex. 1002, ¶140; Ex. 1005, ¶77, FIGs. 3-4; *supra* Sections IX.A.1(c)-(e).)

Furthermore, Chatterjee only discloses embodiments where the entire coil is covered by the shielding unit. (*See generally* Ex. 1013; *id.*, FIGs. 3A, 4A, 4B, 7A, 7B, 9A-10C; Ex. 1002, ¶141)

2. Claim 2

a) The wireless power receiver of claim 1, further comprising a printed circuit board on the shielding unit, wherein the short-range communication antenna is on the printed circuit board.

Lehr in view of Chatterjee discloses or suggests the features of claim 2. (Ex. 1002, ¶¶142-145.) As discussed above for claim limitations 1[d], it would have been obvious to dispose Lehr's "second coil," which corresponds to the claimed "short-range communication antenna," on a shielding unit. (*Supra* Section IX.G.1(d).) Lehr also discloses that "coil assembly 110," which includes the "second coil" ("short-range communication antenna") is "provided on" a "printed circuit board." (Ex. 1007, ¶[0036]; *see also id.*, ¶¶[0017]; [0035] ("The coil assembly 110 can also include a second coil that is provided on the substrate."), [0037]-[0040], [0053]-[0068], FIGs. 4-7, 9, 10.)

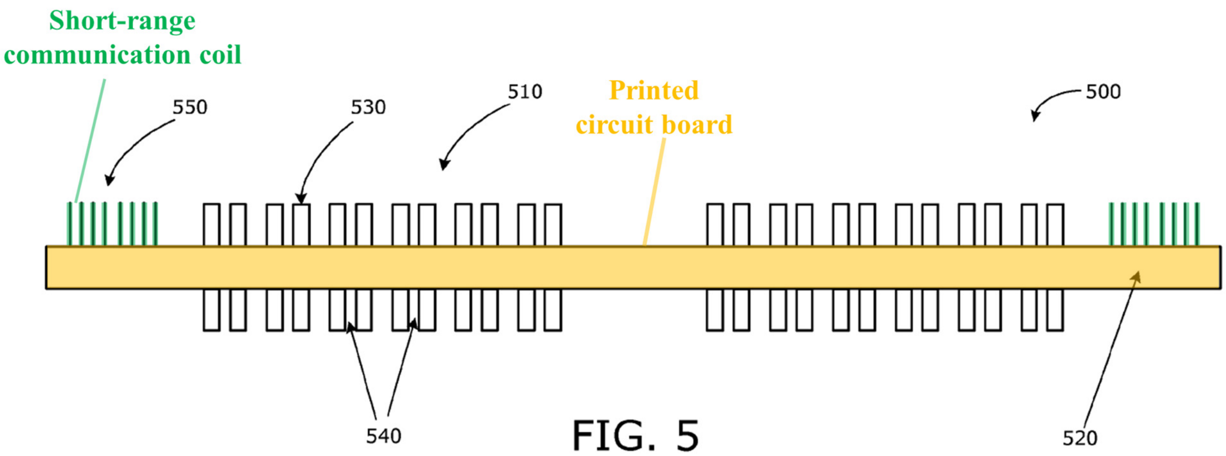
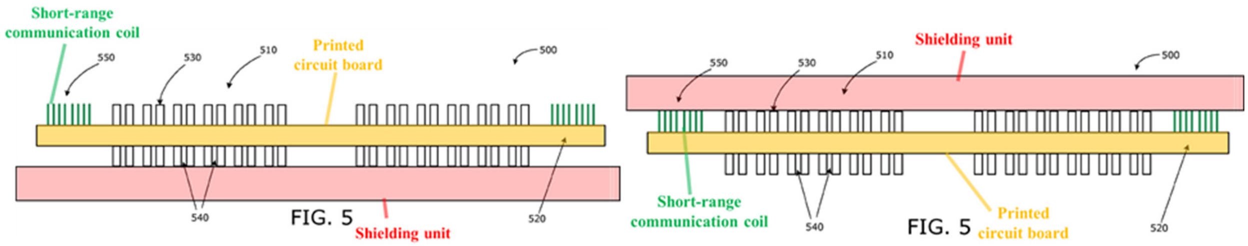


FIG. 5

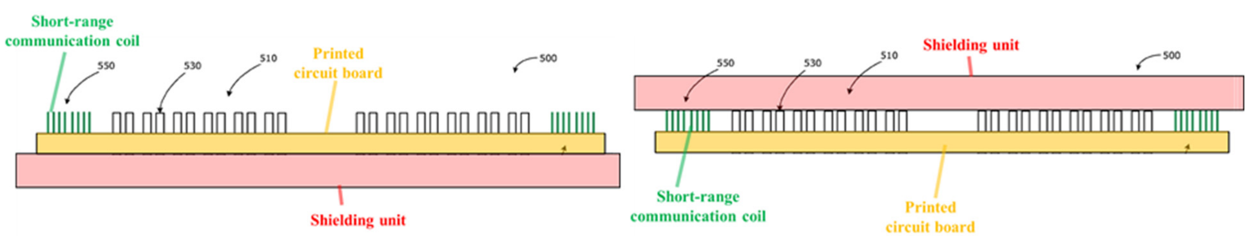
(*Id*., FIG. 5 (annotated); Ex. 1002, ¶142.)

As modified in view of Chatterjee's shielding unit disclosure, Lehr's antenna unit described above (disposed on a printed circuit board) would have been further disposed on the shielding unit, such that the printed circuit board was also disposed on the shielding unit as claimed. (*Supra* Section IX.G.1(d); Ex. 1002, ¶143.) Using Lehr's Figure 5 as an example again because Lehr does not include an illustration of the single-layer PCB embodiments (*supra* Section IX.G.1(f)), the Lehr-Chatterjee combination would include a printed circuit board on (either above or below) a shielding unit, with the communication coil also on the printed circuit board. (Ex. 1002, ¶143.) The two possible configurations are shown below, both of which disclose the features of this claim. (*Id.*)



(Ex. 1007, FIG. 5 (annotated); Ex. 1002, ¶143.)

The single-layer embodiments not illustrated in Lehr would similarly disclose the features of this claim. (Ex. 1002, ¶144.) A modified version of Lehr's Figure 5 is shown below to illustrate the single-layer embodiments as modified in view of Chatterjee. (*Id.*)



(Ex. 1007, FIG. 5 (annotated and modified); Ex. 1002, ¶144.)

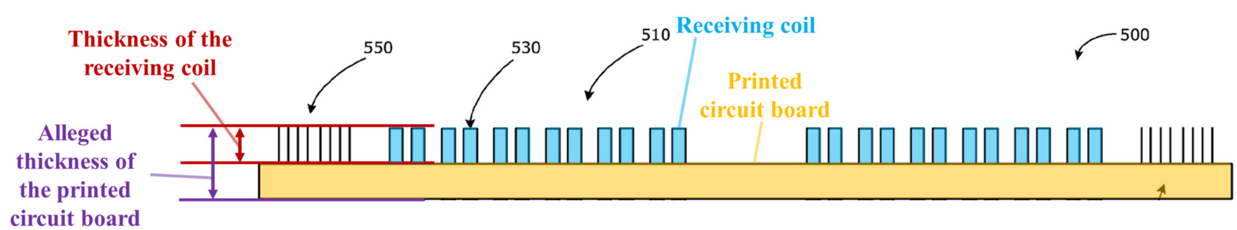
3. Claim 3

a) The wireless power receiver of claim 2, wherein the receiving coil has a thickness equal to or less than a thickness of the printed circuit board.

Without waiving any positions Petitioner may present in district court, under PO's broad interpretation of claim 3, the Lehr-Chatterjee combination discloses or suggests this feature. (Ex. 1002, ¶¶146-150.) *See 10X Genomics*, IPR2020-00086, Paper 8 at 21-22 (permitting petitioner to base its challenge "on claim constructions implied by Patent Owner's district court infringement contentions"); *W. Digital*

Corp., IPR2018-00084, Paper 14 at 11. As discussed above in Section IX.A.3, PO contends that this claim is met by comparing the thickness of the alleged "receiving coil" to the ***total height*** of the "receiving coil" ***plus*** the thickness of various other components disposed under and/or above the coil, including the alleged "printed circuit board" and "shielding unit." (Ex. 1012, 11.)

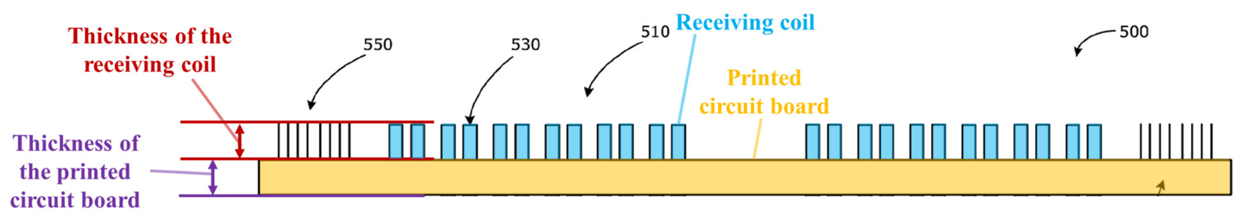
Lehr similarly discloses the first coil ("receiving coil") on a printed circuit board. (Ex. 1007, ¶¶[0017] ("The coil assembly comprises a coil that is provided on a substrate, such as a printed circuit board."), [0034], [0039], [0053]-[0058], FIGs. 4, 5.)



(Ex. 1007, FIG. 5 (annotated and modified to show the single-layer PCB design of ¶[0039]); Ex. 1002, ¶147.)

Based on PO's interpretation in which the thickness of the printed circuit board includes the thickness of the receiving coil, Lehr discloses this feature, as the first coil 170 is on the printed circuit board. In other words, the thickness of the first coil 170 ("receiving coil") is equal to or less than a thickness of the first coil 170 plus the thickness of the printed circuit board 520. (Ex. 1002, ¶148.)

Furthermore, even when considering only the thickness of Lehr's printed circuit board 520 as the thickness of the claimed "printed circuit board" (contrary to PO's reading of the claim where the thickness includes the coil), Lehr discloses or suggests that the thickness of the receiving coil is equal to the thickness of the printed circuit board in Figure 5. (Ex. 1007, FIG. 5; Ex. 1002, ¶¶149-150.)



(Ex. 1007, FIG. 5 (annotated and modified to show the single-layer PCB design of ¶[0039]); Ex. 1002, ¶149.)

H. Ground 8: Claim 3 Is Obvious over Lehr in View of Chatterjee and Sin

1. Claim 3

a) The wireless power receiver of claim 2, wherein the receiving coil has a thickness equal to or less than a thickness of the printed circuit board.

Even if the Board does not apply PO's broad reading of claim 3, Lehr in combination with Chatterjee and Sin discloses or suggests the features of claim 3. (Ex. 1002, ¶¶151-157.) Lehr discloses that first coil 170 can be "etched in the substrate," as opposed to being printed on the substrate as previously discussed. (Ex. 1007, ¶[0034]; *see also id.*, ¶[0042] ("because the trace of the coil 170 can be ... etched into the printed circuit board, the coil assembly 110 can be very thin");

¶¶[0044]-[0045], [0050], [0053], ¶[0056].) However, Lehr does not discuss the relative thickness of the first coil 170 (or its equivalents in other embodiments) as compared the thickness of the printed circuit board. (*See generally* Ex. 1007; Ex. 1002, ¶151.) Nevertheless, it would have been obvious to a POSITA to modify Lehr's coil assembly such that "the receiving coil has a thickness equal to or less than a thickness of the printed circuit board," based on the teachings of Sin, for substantially the same reasons discussed above in Section IX.C. (*See supra* Section IX.C; Ex. 1002, ¶¶96-105, 151-157.) In addition, Lehr already discloses etching coils into a printed circuit board, but it does not provide specific details regarding that configuration. (*See, e.g.*, Ex. 1007, ¶¶[0034], [0036].) Sin provides additional details that a POSITA would have had good reason to consider, such as how to embed coils in a substrate using known processes. (*See supra* Section IX.C; Ex. 1002, ¶¶96-105, 151-157.)

I. Ground 9: Claim 6 Is Obvious over Lehr in View of Chatterjee and Leizerovich

1. Claim 6

a) The wireless power receiver of claim 1, wherein the short-range communication antenna includes an NFC (Near Field Communication) antenna.

Lehr in combination with Chatterjee and Leizerovich discloses or suggests this feature. (Ex. 1002, ¶¶158-162.) As discussed above, the Lehr-Chatterjee combination discloses the wireless power receiver of claim 1, including a short-range communication antenna. (*See supra* Section IX.G.1(d), (f).) Lehr does not disclose specific details about the operation of its second coil ("short-range communication antenna"), including the operating frequency, communication protocols used, or circuitry connecting the antenna to a mobile device, beyond a generic "signal processing component 130" enabling inductive transmission and receipt of data. (Ex. 1007, ¶¶[0031], [0033], [0041].) Given Lehr's limited disclosure regarding implementing its short-range communication antenna in a mobile device, a POSITA would have had good reason to look to Leizerovich for such details. (Ex. 1002, ¶¶158-62.) Leizerovich discloses an NFC communication antenna (*supra* Section IX.B), and in view of Leizerovich, it would have been obvious to implement the short-range communication antenna in the Lehr-Chatterjee wireless power receiver as an NFC antenna for substantially the same reasons discussed above in Section IX.B. (*See supra* Section IX.B; Ex. 1002, ¶¶86-95, 158-62.)

In addition to the reasons discussed above, operating on the NFC industry standard would have expanded the utility of Lehr's short-range communication antenna by allowing it to communicate with other devices operating on the same NFC industry standard. (*See, e.g.*, Ex. 1014, 4:27-32 ("[T]he near field communication, or NFC, mode of the present invention complies with all types of short range communication standards, such as either ECMA-340 or ECMA-352

Near Field Communication Interface and Protocol standards."); Ex. 1008, ¶[0010] ("At present, the NFC is widely used for personal identification, electronic money payment, and so on."); Ex. 1011, 5); Ex. 1002, ¶161.) Indeed, Leizerovich discloses implementing its NFC antenna "for effecting financial card transactions and the like." (Ex. 1014, 4:16-33.) Thus, a POSITA would have found it obvious to implement Lehr's second coil ("short-range communication antenna") such that it is capable of communicating on the NFC standard ("includes an NFC (Near Field Communication) antenna"). (Ex. 1002, ¶¶161-162.)

J. Ground 10: Claim 7 Is Obvious over Lehr in View of Chatterjee and Mochida

1. Claim 7

a) The wireless power receiver of claim 1, further comprising a switch for changing a conducting state of the short-range communication antenna according to reception of the power, wherein the wireless power receiver opens or shorts the switch according to the reception of the power, and wherein the wireless power receiver opens the switch when the power is received and shorts the switch when the power is not received.

Lehr in combination with Chatterjee and Mochida discloses or suggests these features. (Ex. 1002, ¶¶163-166.) As discussed for claim 1 (Section IX.G.1), Lehr discloses a second coil ("short-range communication antenna"), and further discloses receiving power wirelessly. Lehr does not provide particular details regarding how to operate its wireless charging and communication antennas. (Ex.

1002, *see generally* Ex. 1007.) But Mochida provides a solution to the well-understood problems with wireless charging and communication coils being located in close proximity to each other, like Lehr's coils. (*Supra* Sections IX.E.1(a), G.1.) A POSITA would therefore have had good reason, and found it obvious, to implement a switch between Lehr's communication antenna and the circuitry of the mobile device in which that antenna is installed and a controller (e.g., Mochida's conflict controller 30) that controls the switch to ensure that the communication antenna is disconnected from and reconnected to the communication circuitry in the Lehr-Chatterjee device based on whether power is being received for substantially the same reasons discussed above in Section IX.E. (*See supra* Section IX.E; Ex. 1002, ¶¶107-18, 163-66.)

X. DISCRETIONARY DENIAL IS NOT APPROPRIATE

As explained below, the Board should not exercise its discretion to deny the present Petition.

A. § 314(a)

As explained below, the six factors set out in *Fintiv* do not justify denying institution. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential).

The **first factor** (stay) is at best neutral because Petitioner has not yet moved to stay the parallel district court case and the PTAB does not infer how the district court would rule should a stay be requested. *See, e.g., Hulu LLC v. SITO Mobile R&D IP, LLC et al.*, IPR2021-00298, Paper 11 at 10-11 (PTAB May 19, 2021).

The **second factor** (proximity of trial dates) is neutral. While jury selection is currently set for June 26, 2023, "an early trial date" is "non-dispositive" and simply means that "the decision whether to institute will likely implicate other factors," which, as explained, favor institution. *Fintiv*, IPR2020-00019, Paper 11 at 5, 9; *see also Intuitive Surgical, Inc. v. Ethicon LLC*, IPR2018-01703, Paper 7 at 12 (Feb. 19, 2019) (recognizing that, even if a trial will come before a final decision, institution is appropriate to "give[] the district court the opportunity, at its discretion, to conserve judicial resources by staying the litigation until the review is complete," which helps "satisfy[] the AIA's objective"); *cf. Unilioc USA, Inc. v. RingCentral, Inc.*, No. 2-17-cv-00354-JRG (E.D. Tex. Feb. 12, 2018), at *1 (observing that staying the case pending IPR will "streamline the scope of th[e] case to an appreciable extent").

The **third factor** (investment in parallel proceedings) weighs strongly in favor of institution. The district court case is in its infancy and the Parties' have made little investment to date. PO filed its complaint in the Eastern District of Texas on January 10, 2022, Petitioner filed its answer just over a month ago on April 14, 2022, and PO served its infringement contentions on May 4, 2022. Petitioner's diligence in pursuing this petition only four months after PO's Complaint and shortly after receiving the infringement contentions weighs in favor of institution. *Facebook, Inc. v. USC IP P'ship*, *L.P.*, IPR2021-00033, Paper 13 at 13 (PTAB April 30, 2021) (Finding it was reasonable for Petitioner to wait to file the Petition until shortly after receiving infringement contentions.).

Moreover, the most cost-intensive period in the case will occur after the Board's institution decision, including the January 25, 2023, *Markman* hearing, close of fact and expert discovery, and dispositive motions. *See Precision Planting, LLC. v. Deere & Co.*, IPR2019-01044, Paper 17 at 14-15 (Dec. 2, 2019) (where the district court has not issued a claim construction ruling, fact discovery and expert discovery are not closed, and dispositive motion briefing has not yet occurred, that weighs against finding that case is at "an advanced stage"); *Abbott Vascular, Inc. v. FlexStent, LLC*, IPR2019-00882, Paper 11 at 30 (Oct. 7, 2019) (same).

Because the investment in the trial has been minimal and Petitioner acted diligently, this factor favors institution. *See, e.g., Hulu*, Paper 11 at 13.

The **fourth factor** (overlap) also weighs in favor of institution, because Petitioner has not yet served its invalidity contentions in the parallel district court proceeding, and thus there is currently no overlap.

Regarding the **fifth factor**, the Board should give no weight to the fact that Petitioner and PO are the same parties as in district court. *See Weatherford U.S., L.P., v. Enventure Global Tech., Inc.*, Paper 16 at 11-13 (April 14, 2021).

The **sixth factor** (other circumstances) weighs heavily in favor of institution given the undeniable similarity between Petitioner's references and the '160 patent. *See Align Technology, Inc. v. 3Shape A/S*, IPR2020-01087, Paper 15 at 42-43 (PTAB Jan 20, 2021); *see also* Section IX. There is also a significant public interest against "leaving bad patents enforceable," and institution will further that interest. *Thryv, Inc v. Click-To-Call Techs., LP*, 140 S. Ct. 1367, 1374 (2020).

B. § 325(d)

Neither Chatterjee, Leizerovich, Lehr, nor Sin were considered during prosecution of the '364 patent. Eight of the ten grounds presented in this Petition rely on one or more of these references, which alone should be sufficient for the Board to find, under the first part of the *Advanced Bionics* framework, that discretionary denial is not appropriate. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential).

Moreover, even though Kim was cited to the Office on an IDS and the Examiner rejected pending claims over Mochida, the Examiner did not rely on any of the *combinations* of the prior art presented in this Petition (Grounds 2-10). *See, e.g.*, *Halliburton Energy Services, Inc. v. US Well Services, LLC*, IPR2021-01036, Paper 12 at 20 (PTAB Jan. 19, 2022) (granting institution when the Examiner cited a reference in a rejection during prosecution but the Petition set forth "obviousness grounds based on combinations of [the reference] with other prior art not considered by the Examiner").

Kim, while cited by PO in one of eight IDS's, was in Korean and the Examiner was never provided a full English translation. (Ex. 1004, 549-64 (partial Kim reference submitted), 567 (IDS).) Indeed, the copy of Kim presented to the Office included only the abstract, three of the seven claims, and the Korean figures. (*Id.*, 549-64.) Given the close alignment between Kim's disclosures and the '364 patent's claims discussed above (*supra* Section IX.A), the Examiner overlooked Kim or plainly erred by not rejecting the pending claims over Kim. Thus, with respect to Kim, the Office erred in a manner material to the patentability of challenged claims. *Advanced Bionics*, Paper 6 at 8. The Board has also declined to exercise its discretion under § 325(d) based solely on a reference being cited in an IDS. *See, e.g.*, *PEAG d/b/a JLab Audio v. VARTA Microbattery GmbH*, IPR2020-01213, Paper 9 at 7-11 (PTAB January 6, 2021).

Mochida was never combined with Kim, Leizerovich, Lehr, or Chatterjee during prosecution, as presented in this Petition. (*See generally* Ex. 1004.) *See Cont'l Auto. Sys.*, IPR2021-00322, Paper 7 at 19. Mochida was cited as a primary reference during prosecution of the '364 patent, but is only cited in this Petition as a secondary reference to address a single dependent claim, claim 7. *See Teradata Corp. v. SAP SE*, IPR2020-00943, Paper 12 at 20-24 (PTAB Nov. 25, 2020) (granting institution when a secondary reference was used as a primary reference during prosecution, but the examiner never considered the combination of references in the petition). Mochida discloses the features of claim 7, *supra* Sections IX.E.1(a), IX.J.1(a), a fact which the Applicant never disputed during prosecution (claim 7 was claim 10 in the application). (*See generally* Ex. 1004.) Instead, to secure allowance, the applicant amended independent claim 1 to add a "shielding unit" feature that is unrelated to Mochida's features cited in this Petition. (*See* Ex. 1004, 82-83, 86-87.) *See Cont'l Auto. Sys.*, IPR2021-00322, Paper 7 at 19 (declining to deny institution where an Applicant did not argue that a reference failed to teach a limitation and the instead amended a claim to advance prosecution).) Thus, Petitioner is not asking the Office to reconsider any arguments, but merely to make determinations consistent with the Examiner's previous and uncontested finding that Mochida discloses the features of dependent claim 7.

Petitioner also relies on evidence and arguments in the petition that were not the same or substantially the same those previously presented to the Office. *See Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (Feb. 13, 2020) (precedential). But even if the Board finds otherwise, for the reasons discussed above, the Office erred in a manner material to the patentability of the challenged claims. *Id.*

Under these circumstances, Petitioner respectfully submits that denial of institution under § 325(d) would not be appropriate.

XI. CONCLUSION

For the foregoing reasons, Petitioner requests IPR and cancellation of Claims 1-3, 6, and 7 of the ’364 patent.

Respectfully submitted,

Dated: May 24, 2022

By: /Naveen Modi/
Naveen Modi (Reg. No. 46,224)
Counsel for Petitioner

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 9,461,364 contains, as measured by the word-processing system used to prepare this paper, 13,664 words. This word count does not include the items excluded by 37 C.F.R. § 42.24(a).

Respectfully submitted,

Dated: May 24, 2022

By: /Naveen Modi/
Naveen Modi (Reg. No. 46,224)
Counsel for Petitioner

CERTIFICATE OF SERVICE

I hereby certify that on May 24, 2022, I caused a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 9,461,364 and supporting exhibits to be served via express mail on the Patent Owner at the following correspondence address of record as listed on PAIR:

Vorys, Sater, Seymour and Pease LLP
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The Petition and supporting exhibits were also served upon counsel of record for Patent Owner in the litigation pending before the U.S. District Court for the Eastern District of Texas entitled *Scramoge Technology Ltd. v. Samsung Electronics Co. Ltd. et al.*, Case No. 2:22-cv-00015-JRG-RSP (E.D. Tex.) by electronic mail at the following addresses:

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