

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HANSHOW AMERICA INC. AND HANSHOW
TECHNOLOGY CO., LTD.,

Petitioner,

v.

SES-IMAGOTAG INC.,

Patent Owner.

Case No. IPR2024-00189

Patent No. 10,674,340

PATENT OWNER'S SUR-REPLY

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37 C.F.R. §42.64	5

Exhibit List

Exhibit	Reference
2001	Declaration of Rajeev Surati, Ph.D., in Support of Patent Owner's Response
2002	Curriculum Vitae of Rajeev Surati, Ph.D.
2003	U.S. Patent No. 8,049,621 (the "'621 patent")
2004	U.S. Patent No. 7,949,568 (the "'568 patent")
2005	U.S. Patent No. 7,957,998 (the "'998 patent")
2006	Kumar et al., Overview of RFID Technology and Its Applications in the Food Industry, 74 J. FOOD SCIENCE 8 (2009) ("Kumar")
2007	Rohde & Schwarz, Near Field Communication (NFC) Technology and Measurements, White Paper (2011) ("Rohde")
2008	ISO/IEC 14443-2 (2010)
2009	ISO/IEC 15693-2 (2006)
2010	Alva, A seminar report on Near Field Communication, S.D.M COLLEGE OF ENGINEERING AND TECHNOLOGY, DHARWAD (2010) ("Alva")
2011	ISO/IEC 18092 (2004)
2012	ECMA-340 (2004)
2013	U.S. Pat. No. 6,002,344 ("Bandy-344")
2014	Excerpt of Meriam-Webster's Collegiate Dictionary, 11 th ed. (2014)
2015	U.S. Patent No. 8,923,893 (the "'893 patent")
2016	Edwin Bergsma, Planogram Data Requirements, Global Retail Business Solutions (2011)
2017	"Planograms 101: What They Are and Why They're Important for Your Brand," ePac (2024) (available at https://epacflexibles.com/en-

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	gh/planograms-101-what-they-are-and-why-theyre-important-for-your-brand/) (last accessed Aug. 26, 2024)
2018	Erwin Bergsma, Analyzing your first planogram, Global Retail Business Solutions (Aug. 2015)
2019	Violino and Roberti, The History of RFID Technology, RFID J. (Jan. 16, 2005) (“Violino”) (2005)
2020	U.S. Patent Application Publication No. 2010/0190484 (the “484 publication”)
2021	U.S. Patent No. 7,809,402 (the “’402 patent”)
2022	U.S. Patent No. 7,546,948 (the “’948 patent”)
2023	Masao Ohta & Yoshiyuki Higuchi, Study on the Design of Supermarket Store Layouts: The Principle of “Sales Magnet,” 7 Int’l J. of Econ. Mgmt. Eng. 209 (2013)
2024	Deposition transcript of Dr. Emmanouil M. Tentzeris (“Tentzeris Dep. Tr.”)
2025	Opposition against European Patent 3 883 277
2026	Google translation of JP2014/222374
2027	Affidavit of Grant E. Kinsel
2028	Deposition transcript of Dr. Emmanouil M. Tentzeris (“Tentzeris Reply Dep. Tr.”) (Jan. 7, 2025)

LISTING OF CHALLENGED CLAIMS

Claim 1	
[1pre]	A method for communicating spatially localized information to a mobile terminal, the method being performed by a central server configured to access a planogram associating a plurality of unique identifiers of radio-frequency peripherals with a plurality of locations within a predetermined area, each of the plurality of locations being defined by a vertical and horizontal position within a plane perpendicular to a floor of the predetermined area, and each of the plurality of locations being associated one-to-one with a corresponding unique identifier, the method comprising:
[1a]	receiving a communication from a mobile terminal, the communication comprising a unique identifier received by the mobile terminal from a radio-frequency peripheral located in the predetermined area, the unique identifier being particular to the radio-frequency peripheral, wherein the radio-frequency peripheral includes an antenna and an electronic chip configured for near-field communication, and is configured to be activated by the mobile terminal when the radio-frequency communication peripheral is within a communication range of the mobile terminal, wherein the communication range is less than twenty centimeters;
[1b]	determining a location of the mobile terminal within the predetermined area based on the location associated with the unique identifier of the received communication in the planogram, the location of the mobile terminal comprising the vertical and horizontal position of said location; and
[1c]	transmitting to the mobile terminal spatially localized information associated with the location of the mobile terminal.
Claim 2	
[2]	The method according to claim 1, further comprising: when the mobile terminal is positioned relative to the radio-frequency communication peripheral within the communication range, energy of electromagnetic waves emitted by the mobile terminal activating the radio-frequency communication peripheral, thereby setting-up a radio-frequency communication between the mobile terminal and the radio-frequency peripheral, wherein the communication range

	is a range of the electromagnetic waves emitted by the mobile terminal.
Claim 3	
[3]	The method according to claim 1, wherein the central server receiving the communication from the mobile terminal is via the Internet.
Claim 4	
[4]	The method according to claim 1, wherein the spatially localized information is further associated with account data specific to the user of the mobile terminal previously stored in a database accessible to the central server via a communication network.
Claim 5	
[5pre]	A system for communicating spatially localized information to a mobile terminal, the system comprising:
[5a]	a central server configured to access a planogram associating a plurality of unique identifiers of radio-frequency peripherals with a plurality of locations within a predetermined area, each of the plurality of locations being defined by a vertical and horizontal position within a vertical plane of the predetermined area, and each of the plurality of locations being associated one-to-one with a corresponding unique identifier;
[5b]	a mobile terminal configured to communicate with the central server; and
[5c]	a plurality of radio-frequency peripherals distributed throughout the predetermined area, wherein each radio-frequency peripheral includes an antenna and an electronic chip configured for near-field communication, and is configured to be activated by the mobile terminal when the radio-frequency communication peripheral is within a communication range of the mobile terminal, wherein the communication range is less than twenty centimeters,
[5d]	wherein the central server is configured to:
[5e]	receive a communication from a mobile terminal, the communication comprising a unique identifier received by the mobile terminal from a radio-frequency peripheral located in the predetermined area, the unique identifier being particular to the radio-frequency peripheral;

[5f]	determine a location of the mobile terminal within the predetermined area based on the location associated with the unique identifier of the received communication in the planogram, the location of the mobile terminal comprising the vertical and horizontal position of said location; and
[5g]	transmit to the mobile terminal spatially localized information associated with the location of the mobile terminal.
Claim 6	
[6pre]	The system according to claim 5, wherein at least one radio-frequency peripheral is an electronic label which comprises:
[6a]	a radio-frequency communication module configured to receive data representing information relating to an item from a central server;
[6b]	a memory to store said data;
[6c]	a microcontroller to control the display of information relating to an item;
[6d]	a display screen to display said item-related information.
Claim 7	
[7]	The system according to claim 6, wherein the mobile terminal is adapted to transmit data to the electronic label via the radio-frequency communication module of said electronic label.
Claim 8	
[8]	The system according to claim 5, wherein the chip and the antenna are arranged at different points of the radio-frequency peripheral, and wherein the radio-frequency peripheral comprises connections configured to ensure a communications link between the antenna and the chip.
Claim 9	
[9]	The system according to claim 8, wherein the chip is connected to a microcontroller of the radio-frequency peripheral, and wherein the antenna is arranged on or within a case inside which the microcontroller is housed.

PETITIONER'S ASSERTED GROUNDS

Ground	Petitioner's Asserted Art
1	Claims 1-9: Fujiwara
2	Claims 1-9: Fujiwara, Arntzen
3	Claims 1-5, 8-9: Bandy, Fowler
4	Claims 1-5, 8-9: Bandy, Fowler, Arntzen

I. INTRODUCTION

Petitioners' analysis is conclusory and riddled with hindsight. Petitioners conflate technologies, cherry-pick teachings from the prior art, ignore the purposes of the primary references being modified, and throw it all together to selectively build up to the claims. Pulling Petitioners' analysis apart leaves several gaping holes in each Ground that the prior art simply cannot fill. Petitioners fail to satisfy their burden of demonstrating unpatentability of any challenged claim.

II. ARGUMENTS

A. Grounds 1-2

1. Fujiwara does not teach a “planogram” as properly construed (Claims 1, 5)

a. The '340 Patent did not redefine “planogram”

Rather than address the intrinsic and extrinsic evidence counseling *against* the broad construction of “planogram” applied by the Board at institution, (Paper 11 (“DI”), 27), Petitioners dismiss it because PO does not offer just *a single* conclusive definition, (Reply, 2-4).

Petitioners' reasoning is flawed because “[t]he Board is required to construe...terms...to the extent necessary to resolve the controversy.” *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019); *e.g.*, *Ford Motor Co. v. Neo Wireless LLC*, IPR2022-01537, Paper 61, 14 (Nov. 1, 2024) (construing terms only to determine whether features were “encompassed” by the claims); *Global Tel*Link*

Corp. v. Securus Techs., Inc., IPR2014-01283, Paper 30, 5-6 (Feb. 18, 2016) (same).

Petitioners' perceived issue with the *lack* of a single, definitive definition is nothing more than an objection to the "inherent limitations of language"; "the fit between the description and the concept is almost always inexact." *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 621 (Fed. Cir. 2000) (Linn J., concurring in part), *vacated on other grounds*, 535 U.S. 722 (2002).

PO not advancing just one definition is irrelevant. Resolving the parties' dispute requires answering one question: whether POSITAs would have understood "planogram" to encompass a database that merely provides shelf-label identifiers and their associated shelf number and products. As the evidence demonstrates, POSITAs would have understood this is insufficient. POR, 19-24 (citing support); Ex-1012, 86:7-89:9 (explaining planograms "generally share a few common features" and "serve a common purpose so that retailers can plan track and make provisions about the placement of products throughout a retail store in an effort to maximize sales"), 101:6-14, 132:6-8 (explaining why Fujiwara's Figure 4 *would not* meet POSITAs' understanding of "planogram").

Petitioners dismiss PO's claim-construction position as "inject[ing] ambiguity" and "leav[ing] unclear the precise scope of [the limitation]," but the cases Petitioners cite for support are inapposite. Reply, 4. *Amazon.com, Inc. v. Barnesandnoble.com, Inc.*, for instance, notes only that claims must be construed the same for

infringement and invalidity. 239 F.3d 1343, 1351-53 (Fed. Cir. 2001). *Home Semiconductor Corp. v. Samsung Elecs. Co.* criticized a construction that *replaced* the word “over” with “above” as “inject[ing] ambiguity.” 701 Fed. App’x 1006, 1011 (Fed. Cir. 2017). And *Toro Co. v. Deere & Co.* stated that “[t]he *lack of claim construction* leaves unclear the precise scope” of a limitation-at-issue. 355 F.3d 1313, 1319 (Fed. Cir. 2004).¹ None of these cases relate to the present dispute.

Petitioners instead hang their Petition on a perceived, expansive definition of the term purportedly set out in the specification and claims. Reply, 4-5; Ex-1032, ¶¶6-11. Specifically, the ’340 Patent states its planogram “associat[es] a plurality of unique identifiers of radio-frequency peripherals with a plurality of locations within a predetermined area,” (Ex-1001, cl. 1), and “lists the locations of all the electronic labels 3 *and of* the items on sale in a sales area,” (Ex-1001, 6:35-37). Not only do these passages fail to “clearly express an intent to redefine the term,” as required to depart from a term’s plain meaning, *Thorner v. Sony Comput. Ent. Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012), but Petitioners ignore surrounding language from these passages.

Specifically, the claims expressly require a “planogram” provide “locations...*defined by a vertical and horizontal position within a plane perpendicular to*

¹ All emphasis added unless otherwise noted.

a floor,” with each location “*being associated one-to-one with a corresponding unique identifier.*” Ex-1001, cl. 1. Petitioners do not address this recitation, which adds requirements to the “planogram” beyond the sentence in the specification Petitioners cherry pick.

Moreover, Egan does not support Petitioners’ position because what is required of “placement plans” is the placement or location of products for sale.² What is clear based on the totality of the evidence is that planograms are not simply a list of broadly defined “locations” of labels, but instead requires specific location information about products in a retail sales area.

b. Fujiwara does not disclose a “planogram”

If PO’s plain-meaning construction is adopted, Petitioners offer no persuasive argument that Fujiwara meets the claims. Petitioners’ reliance on Fujiwara *requires*

² Petitioners’ expert’s opinion that a “planogram” includes “product placement plans” consistent with Egan does not resolve the parties’ dispute. Ex-1032, ¶10. However, he admitted Egan’s disclosure that a “planogram indicates the assortment of products to be offered for sale at the facility [and] **the placement of those products within the facility’s sales floor**” was required of a planogram. Ex-2028, 36:14-37:16 (citing Egan, 1:17-20). He further agreed that a planogram included “the *location* of the items in the sales area.” *Id.*, 49:6-20.

the '340 Patent to be read as setting forth a broader, lexicographical definition of planogram, (Reply, 9-10), which is wrong (§II.A.1.a *supra*).

The *only* (new) argument Petitioners offer is that—despite Fujiwara tracking only shelf numbers of products (Ex-1003, [0044], [0062], [0086], [0090], [0092], Figs. 3, 10, 12; Ex-1009, ¶71, Ex-2001, ¶101)—Fujiwara also provides a light *on the real-life shelf label*, and thus indicates “that Fujiwara’s shelf labels *can operate as* precise locations.” Reply, 10 (emphasis in original). But turning on a light *on the real-life shelf label* sitting on a *real-life shelf* has nothing to do with the information stored in the database 301,³ which Petitioners rely on as teaching the claimed “planogram.” Pet., 20 (“*the electronic shelf label database is a planogram*”). Petitioners offer no evidence that POSITAs would consider a real-life light as part of a database-based planogram.

Petitioners also take issue with PO’s citation to another foreign-patent application submitted by “Dai Nippon Printing Co. Ltd.” (Ex-2026, 1)—the same applicant as Fujiwara (Ex-1003, 2)—that used the term “planogram” (unlike Fujiwara) inconsistent with Petitioners’ position here and consistent with PO’s. Reply, 10. Petitioners do not address the substance of PO’s argument. Regardless, Petitioners’ objections to this exhibit on reply are untimely and waived. 37 C.F.R. §42.64(b)(1);

³ The POR mislabels the database as “310.”

Cardiovascular Sys. Inc., v. Shockwave Med., Inc., IPR2019-00405, Paper 99, 83 (Feb. 2, 2023) (“The failure to raise an objection at the appropriate time, results in a waiver of the objection”).

At base, the term planogram should be construed consistent with its plain meaning that *does not* encompass databases that provide only a shelf number location of a tag and product. If so construed, Fujiwara indisputably does not teach this limitation. But even if Petitioners’ broader read is adopted, Fujiwara still fails to teach a “planogram” as claimed because it does not provide “locations within a pre-determined area”—just disembodied shelf numbers (POR 28-31; Ex-2001, ¶102)—or define the locations with the recited level of specificity, as discussed in further detail below (*see* §II.A.4).

2. Fujiwara does not teach “activated”/“activating” as properly construed (Claims 1, 5)

a. “activated”/“activating” requires powering a label

Petitioners accuse PO of limiting the claims to the preferred embodiments, but Petitioners seek to broaden the claims beyond what is described in the specification. *Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1480 (Fed. Cir. 1998) (“claims may be no broader than the supporting disclosure, and therefore,...a narrow disclosure will limit claim breadth.”).

Petitioners’ arguments conflate different communication technology *types* with different operation *modes* for those technologies. Reply, 6. Petitioners contend,

for instance, that the '340 Patent discloses “the RF peripheral could be NFC-type or RFID-type, without limiting it to be passive.” Reply, 6. But the type (NFC and RFID) of communication technology the peripheral can use says nothing about its mode (active or passive). Ex-1001, 4:50-53.

When it comes to discussing the *mode* of operation, the '340 Patent only ever envisions passive systems. The industry specifications the '340 Patent cites refer only to passive systems. Ex-1001, 4:57-67 (citing ISO 14443 and 15693); Ex-2008, 5 (ISO 14443 stating “[t]he interface includes both power and bidirectional communication.”); Ex-2009, 5 (ISO 15693 same); Ex-2001, ¶¶81-82. And *every time* the '340 Patent discusses activating the radio-frequency peripheral, it does so by saying it is *powered* by the radio waves themselves (e.g., a passive system). Ex-1001, 2:51-56 (“said radio-frequency peripheral is *activated* by the energy of the electromagnetic waves emitted by the mobile terminal”), 6:6-9 (same), cl. 1 (same), 2 (same); Ex-2001, ¶81. Petitioners identify *nothing* in the specification suggesting active tags were ever contemplated.

Petitioners' reliance on the prosecution history is misplaced. Specifically, Petitioners point to the examiner's reliance on “Rasband” as teaching the “activated” limitation by disclosing active tags. Reply, 7. But Rasband taught **both** passive and active tags, and the examiner never clarified which was being relied upon. Ex-1002, 42 (citing Ex-1011 (Rasband), ¶31, which states “tag 14 may be an active, passive,

semi-active tag, among other types of tags....A passive tag may rely entirely on the scanner's or reader's interrogation signal to power its circuitry, e.g., relies on the signal transmitted by NFC transceiver 26 to power its respective circuitry."). Petitioners' argument that the patentee "did not refute" the examiner's characterization of Rasband, (Reply, 7), is a red herring because the examiner never asserted Rasband's active-tag disclosure was being relied upon.

Petitioners also assert that if "activated" meant "powering," PO's construction would render claim 2 superfluous. Reply, 7. Not so. Claim 2 specifies that "energy of [the] electromagnetic waves" not only "activat[e] the radio-frequency communication peripheral," but *also* "set[]-up a radio-frequency communication between the mobile terminal and the radio-frequency peripheral." Ex-1001, cl. 2. In other words, claim 2 specifies that the same waves must both *power* and *set up a communication channel*; claim 1 requires only activation (i.e., by *powering*). Petitioners' reliance on *Cephalon, Inc. v. Abraxis Bioscience, LLC* is inapposite because, there, the Federal Circuit rejected a construction of "nanoparticles" and "microparticles" that gave them the same meaning. 618 F. App'x 663, 666 (Fed. Cir. 2015).

Finally, Petitioners attempt to reconcile the positions taken by their own expert and foreign affiliate that undermine their position here. Reply, 8-9. For their expert, Petitioners merely call PO's arguments a "mischaracteriza[tion]," without explaining how. Reply, 8. For their foreign affiliate, despite the affiliate addressing

a European counterpart to the '340 Patent, Petitioners contend the positions their affiliate took are irrelevant, or at least do not rise to the level of estoppel. *Id.* But PO never argued for estoppel (POR, 25-26); the European proceedings only demonstrate Petitioners' made-for-litigation positions have no merit. Moreover, Petitioners themselves rely on European-counterpart proceedings in a related IPR. *See* IPR2024-00208, Paper 31, 4-5 n.2 (Dec. 2, 2024).

Petitioners' construction of "activated" as "to put into action" (Reply, 9)—based on nothing more than the word of their expert—is both conclusory and devoid of supporting evidence. *See* Ex-1032, ¶12 (citing no evidence); Ex-2028, 50:6-16 (further proposing "getting ready for communication" with no evidence).

b. Fujiwara does not "activate[]" its labels

Petitioners first rehash their Petition arguments that Fujiwara's "resonant call-up signal" discloses "activated"/"activating" based on their unsupported (and incorrect) construction. Reply, 14. Petitioners do not address the deficiencies in the Petition identified in PO's Response. POR, 42 (call-up merely "resonate[s] the antenna of the tag to tell the tag that it is being addressed, and not a means of activating the label to respond.").

Petitioners then address PO's (proper) construction of "activat[ed/ing]," and now contend not only that Arntzen discloses *passive* NFC tags, but that it would

have been obvious to incorporate a *passive* NFC tag into Fujiwara's system. Reply, 14 n.4. This is unsupported attorney argument.

Petitioners' contention that Arntzen discloses passive NFC tags is disingenuous at best. Petitioners contend Arntzen provides *active* power only to an "electronic display"—suggesting the "display" refers to the device's screen. *Id.* But Arntzen repeatedly refers to the entire *label* as the "electronic display." Ex-1005, Abstract ("electronic display (12) *comprises* equipment for remote, contactless, near field communication"), 8:20-26 (same), 8:31-35 ("Said electronic display may *comprise* Bluetooth option for external communication with the handheld units."), 9:6-15 ("The electronic display may *comprise* a memory"), 9:17-23 ("The electronic display can be a battery free unit and be connected to a current conducting fastening rail."). Petitioners also suggest Arntzen's (active) display can be connected to an NFC-communication unit. Reply, 14 n.4. But Arntzen describes these as *the reading devices*, not external components for the labels themselves, and does not list the associated specifications. *Id.* (citing Ex-1005, 12:15-20, 6:6-8). And contrary to Petitioners' new arguments, Arntzen discloses the labels are "compatible with other known wireless technologies such as Bluetooth or Wi-Fi" and Zigbee (Ex-1005, 6:3-6, 11:16-26), which are "targeted at battery-powered devices," (*id.*, 13:4-14; Ex-2001, ¶93), not passive devices.

Petitioners' new argument that, based on Arntzen and a POSITA's general knowledge,⁴ Fujiwara could be modified to incorporate a *passive* NFC communication module finds no support in the record. Not only was this theory not presented in the Petition, (Pet., 27-29, 54-56), but Petitioners fail to address the reasons why POSITAs would *not* have modified Fujiwara to implement NFC in the first instance, (*see* POR, §VI.A.1.e, 42). Nor do Petitioners offer any expert testimony for such a modification. These unsupported (and conclusory) arguments are insufficient to satisfy Petitioners' burden. *See, e.g., VSR Indus., Inc. v. Cole Kepron Int'l, LLC*, IPR2015-00182, Paper 33, 22 (Apr. 28, 2016); *In re Geisler*, 116 F.3d 1465, 1471 (Fed. Cir. 1997).

3. Fujiwara does not teach the required communication range (Claims 1, 5).

Petitioners' focus on the presumption of obviousness for the recited communication range based on Fujiwara is misplaced. (Reply, 15). A presumption of obviousness based on overlapping ranges applies "when the only difference from the prior art is a difference in the range or value of a particular variable." *In re Kumar*, 418 F.3d 1361, 1366 (Fed. Cir. 2005). But there are numerous differences between Fujiwara's disclosure and the claims—one being the use of different wireless

⁴ *See* §II.C, explaining this "knowledge" is not properly before the Board.

technologies—besides just the communication range. The presumption is therefore inapplicable.

Regardless, Petitioners' attempts to discredit the criticality of the claimed range fall flat. Petitioners contend that 20cm is an arbitrary "cutoff point" for criticality, and the benefits of shorter distances were known, relying on *In re Geisler*, 116 F.3d at 1470. Reply, 15. But *Geisler* concerned claims to a coating with a particular thickness range (50-100 Angstroms), a prior-art combination taught the same coating with an adjacent thickness range (100-600 Angstroms), and the patentee's own testing confirmed the claimed thicknesses was not critical to the invention. 116 F.3d at 1468, 1470.

Here, the issue is one of completely different wireless technologies in the first instance—microwave (Fujiwara) and NFC ('340 Patent)—that happen to have some overlap in their operating range. And it is the use of NFC over, e.g., microwave that provided critical benefits other technologies could not provide. Ex-1001, 7:45-47 (noting the "ability to locate via electronic labels 3 allows fine-granularity to an extent never reached in locating systems of GPS type."), 7:47-59 (locating exact product positions), POR, 44; Ex-2001, ¶¶42-47, 138. Although Petitioners separately argue replacing Fujiwara's microwave RFIDs with NFC *would* provide a range of less than 20 cm (and presumably its associated benefits), (*see* Petition, 27), that modification would not be made for the reasons discussed below. *See* §II.A.5.

4. Fujiwara does not teach “locations” with a horizontal position or one-to-one correspondence (Claims 1, 5)

Petitioners seek to discard their burden of proof, providing *post hoc* reasoning to try to justify their originally deficient and still-unsupported Petition theories.

Petitioners originally argued Fujiwara *discloses*—and not that it would have been obvious—“locations...defined by a vertical position...and horizontal position” because Fujiwara “discloses that shelf label location information includes shelf label ID 311, [and] shelf number 313...together with FIG. 4.” Pet., 21. Petitioners further argued POSITAs would have found it *obvious only* that “each of the plurality of shelf label location[s] is associated one-to-one with an electronic shelf label.” Pet., 20-21. For support, Petitioners cited the declaration of their expert, who largely regurgitated the Petition’s arguments. Ex-1009, ¶¶74-75.

When instituting trial, the Board preliminarily appeared to agree, stating “[w]e are persuaded that an ordinarily skilled artisan would have understood that, because defining a location in a two-dimensional plane requires specifying at least two coordinates...listing the horizontal and vertical position of each of Fujiwara’s uniquely numbered tags in a database would define the location of each such tag.” DI, 27-28. The problem is that Fujiwara does not track the “location [of the shelf label] in a two-dimensional plane” *in the database* as the Board suggested. POR, 34-36. Fujiwara instead discloses tracking *the shelf number* in a database (Ex-1003, [0009], [0066]; Ex-2001, ¶¶110, 112)—which is not a one-to-one correspondence between

a label identifier and location (Ex-2001, ¶¶112-13)—and using lights on the shelf labels themselves to guide a user to the horizontal position of a product, (Ex-1003, [0006], Ex-2001, ¶114). The burden was on Petitioners to explain why Fujiwara would have been *modified* to track horizontal positions *in the database* as part of the “location information,” and create a one-to-one correspondence between the label identifier and location *that included horizontal position information*.

The Board is not entitled to find claims unpatentable based on theories that are not raised in the Petition. *Netflix, Inc. v. DivX, LLC*, 84 F.4th 1371, 1377 (Fed. Cir. 2023) (collecting cases). Nor are Petitioners entitled to backfill a deficient Petition on reply. *Bright Data Ltd. v. Oxylabs, UAB*, IPR2023-00186, 20 (July 15, 2024); *Am. Honda Motor Co., Inc. v. Neo Wireless LLC*, IPR2022-01567, Paper 59, 35-36 (Nov. 1, 2024); 37 C.F.R. §42.23; CTPG, 73 (Nov. 2019).

On reply, Petitioners first try to justify their flawed view of Fujiwara based on unsupported attorney argument. Petitioners take the unsupported position that, even though Figure 4 merely depicts *a real shelf as a patent drawing* (Ex-2001, ¶110), it can somehow constitute the recited “planogram” because PO “argues that a planogram can be represented by a diagram.” Reply, 11. Fujiwara nowhere suggests the shelf of Figure 4 is a planogram-representation of the shelves. Ex-1003, ¶66 (“FIG. 4 is a diagram depicting *the appearance configuration* of the electronic shelf label 103 and IC tag reader 104.”). Petitioners provide no evidence that it would have been

obvious to capture *every detail* depicted in Figure 4—including the horizontal positions of the shelf labels—as part of Fujiwara's alleged planogram (e.g., database 301). POR, 35-36 (explaining Fujiwara does not suggest Figure 4 represents the contents of the database 301).

Petitioners then accuse PO of taking “an overly restrictive view of Fujiwara” because Fujiwara discloses “location information” as including “shelf number 313, *and the like*,” (Ex-1003, ¶62), which does not “negat[e] any disclosure of horizontal position.” Reply, 11. This reverses the burdens. Because Fujiwara does not disclose the phrase “and the like” as *encompassing* “horizontal positions,” the burden was on *Petitioners* to bridge the gap and explain “the differences between the prior art and the asserted claims.” *Motorola Mobility, LLC v. Int’l Trade Comm’n*, 737 F.3d 1345, 1350 (Fed. Cir. 2013) (refusing to “divin[e] an invalidity defense from the record” based on an insufficiently-explained obviousness theory). Merely pointing to Figure 4, as Petitioners did, fails to bridge that gap because, once again, Figure 4 is not directed to the information stored in Fujiwara's database. Ex-2001, ¶110.

Petitioners also recognize a *specific* position on a shelf can be represented in ways other than by its horizontal and vertical positions (such as polar coordinates or region bins), undermining that they have met their burden. Reply, 12. But Petitioners contend these other representations still meet the claims because they can be

converted into horizontal and vertical positions,⁵ and the claims should be read to cover “any association of peripherals with two-dimensional locations.” *Id.* This argument fails.

First, Fujiwara does not disclose tracking “two-dimensional locations” in the first instance. Ex-2001, ¶¶109-16. Second, Petitioners only present unsupported attorney argument in Reply. *See VSR*, IPR2015-00182, Paper 33 at 22; *Geisler*, 116 F.3d at 1471. And third, just as “[c]ourts do not rewrite the claims to narrow them for the patentee to cover only the valid portion,” *Alcon Rsch., Ltd. v. Apotex Inc.*, 687 F.3d 1362, 1368 (Fed. Cir. 2012), they also cannot rewrite claims to broaden them for the patent challenger to read on prior art. The claims require “a planogram...associating a plurality of unique identifiers...with a plurality of locations...being defined by a vertical and horizontal position within a plane perpendicular to a floor...and...associated one-to-one with a corresponding unique identifier.” They do not, as Petitioners contend, broadly encompass “any association of peripherals with two-dimensional locations.”

⁵ Petitioners also claim ignorance of the distinction between a horizontal position (e.g., coordinate), as claimed, and a horizontal region, (Reply, 12), which PO's expert identified as being different than a “position,” (Ex-2001, ¶111).

Apparently recognizing their flawed reasoning, Petitioners now shift their original argument to include “Fujiwara’s shelf label ID [as] part of ‘shelf label location,’” arguing that it somehow “works together with shelf number 313 to define the shelf label location,” thus supplying the horizontal position. Reply, 11-12. Not only is this argument new and unsupported, but it also contradicts the Petition. The Petition maps shelf label ID 311 to the claimed “plurality of identifiers,” shelf number 313 to the “vertical position,” and Figure 4 for the “horizontal position.” Pet., 20-22. The Petition never contended shelf label ID 311 shows the horizontal position. *Netflix*, 84 F.4th at 1377.

Finally, Petitioners fall back on their alternative theory that multiple shelf segments can be stacked side-by-side, and thus each shelf segment can constitute a horizontal position. Reply, 13. Petitioners do not address the substantive arguments PO made in its Response, (POR, 37-40), and instead summarily classify them as being predicated “upon the assumption that a ‘position’ is a mathematical point,” which not only lacks support, but is “physically impossible,” (Reply, 13). This is a mischaracterization. In response to Petitioners’ alternative theory, PO argued: (1) because Fujiwara shows multiple labels on each shelf *segment*, using shelf number as a “horizontal position” would still apply to multiple labels (e.g., not be one-to-one as recited) regardless of whether a single shelf or multiple shelf segments were provided side-by-side; and (2) Petitioners’ arguments lack evidentiary support. POR, 37-40.

Neither argument presents a “physical[] impossib[ility],” and Petitioners ignore PO’s expert support. Ex-2001, ¶¶119-20.

At base, Petitioners’ theories in the Petition were largely unexplained because Fujiwara *never* discloses or suggests tracking horizontal positions in a database, and Petitioners offer no rationale to *modify* Fujiwara to do so. The Board cannot now fill in the missing gaps that Petitioners never advanced.

5. Fujiwara would not have been modified to use NFC (Claims 1, 5)

In the Response, PO presented evidence that Fujiwara’s system is incompatible with NFC, and that Petitioners provided no persuasive motivation to modify Fujiwara to incorporate what was at the time a nascent technology. POR, 46-51. Petitioners overlook most of these arguments in reply, and instead boil PO’s position down to a purported false premise that Fujiwara requires reading more than one label at a time. Reply, 17.⁶ Even this oversimplification of PO’s arguments is wrong.

Although Fujiwara *may* in some circumstances read only one label at a time, Fujiwara’s *ability* to read multiple tags together is a fundamental benefit of Fujiwara’s invention. Ex-1003, [0066], [0090]-[0091], [0104]; Figs. 4, 11. Only Fujiwara’s existing microwave technology affords that functionality; NFC did not. *See* Ex-2001, ¶¶150-53. Petitioners’ conclusory attorney argument that Fujiwara would

⁶ PO’s original citation to Dr. Tentzeris’ deposition testimony should be 15:5-8.

have been modified anyway—without addressing this deficiency—is pure hindsight and does not withstand scrutiny. *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1327 (Fed. Cir. 2012) (finding “a conclusory statement that a [POSITA] would have known, based on the ‘modular’ nature of the claimed components, how to combine any of a number of references...is not sufficient and is fraught with hindsight bias.”).

Petitioners' contortion of Dr. Surati's deposition testimony to prove up reasonable expectation of success is also mistaken. Reply, 17. Showing POSITAs *could* substitute NFC for microwave (in the abstract) says nothing about whether POSITAs *would* have modified Fujiwara that way. See *InTouch Techs., Inc. v. VGO Commc'ns., Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (looking to whether POSITAs “*would* have been motivated,” not whether they “*could* combine these references”) (original emphases); *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367-68 (Fed. Cir. 2016) (“The reasonable expectation of success requirement refers to the likelihood of success in combining references to meet the limitations of the claimed invention.”).

6. Fujiwara does not teach claims 6 or 7

In a single paragraph, Petitioners dismiss the deficiencies in their analysis of claims 6 and 7 by rephrasing their theory: “the proposed modification was to replace infrared with RF communication (which includes more than NFC or Zigbee) in both

grounds.” Reply, 18. This new catch-all theory—encompassing *any* of a disparate class of radio-frequency communication structures and protocols, some completely incompatible with each other (Ex-2001, ¶¶58, 60)—should not be considered, because Petitioners no longer specify the modification they are proposing. *See ActiveVideo*, 694 F.3d at 1327 (rejecting invalidity theory that failed to explain “how any specific combination would operate or read on the asserted claims”).

Petitioners appear to now disavow their original motivation of “harmonizing” Fujiwara’s communication circuitry to use a single type. Pet., 45-46; POR, 56. Petitioners cannot have it both ways; either all communication methods are “harmonized” to use NFC (as claim 5 requires), or they are “harmonized” using some other radio-frequency standard. Either way, Petitioners proposed modification fails to teach claims 6 and 7. POR, 53-56.

B. Grounds 3-4

1. Bandy and Fowler do not teach “locations” with a horizontal position or one-to-one correspondence (Claims 1, 5)

On reply, Petitioners do not dispute the deficiencies of Fowler’s teachings PO identifies. POR, 58-64. Instead, Petitioners shift their position, arguing Fowler is being relied upon only to show “that products and tags can be located on different shelves, counters, and heights.” Reply, 19. Why Petitioners resort to Fowler to teach something evident to any shopper is unclear. But Petitioners have no answer as to why Fowler—which *does not* teach tracking the vertical location of products in its

planogram—would be used to modify Bandy to *track* the vertical location of products. POR, 57-64. Petitioners' combination is predicated on hindsight.

2. Bandy would not have been modified to use NFC

In reply to the deficiencies PO identified in the prior art as to NFC, Petitioners again only mischaracterize and misdirect.

Petitioners first characterize the Response as arguing Bandy “teach[es] away” because Bandy does not teach NFC. Reply, 19. PO never made this argument and instead argued Bandy's examples would have been understood as being directed to a particular type of RFID—UHF RFID—selected specifically to accomplish Bandy's purposes. POR, 65-66; Ex-2001, ¶186. Petitioners' conclusory assertion that POSITAs would have simply swapped Bandy's RFID for NFC is insufficient to meet Petitioners' burden. *Virtek Vision Int'l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 886 (Fed. Cir. 2024).

Next, Petitioners argue Bandy's antenna is compatible with NFC, and accuse PO of “importing limitations from the specification” by noting that NFC requires a “coil” antenna. Reply, 20-22.⁷ Although Petitioners couch this issue as claim

⁷ Petitioners' assertion that “NFC tags can be used in the vicinity of metal or liquid” is a direct contradiction of Petitioners' expert's previous testimony. Reply, 22; *compare* Ex-2024, 16:18-22, *with* Ex-2028, 65:20-66:17.

construction, this is an issue of technology; NFC requires coils, as even Petitioners' expert conceded. POR, 66; Ex-1001, Fig. 4, 5:38-44; Ex-2001, ¶187; Ex-2024, 11:12-12:14 (“a coiled antenna and IC...are the *fundamental elements* of” NFC that uses magnetic induction); *see also id.*, 10:23-11:11 (NFC works using magnetic coupling), 14:12-19 (same). Contrary to Petitioners' arguments, (Reply, 20), an omnidirectional antenna is not a different *type* of antenna, but merely characterizes the direction of the signal. Ex-2001, ¶¶58, 60. Petitioners fail to show otherwise.

Petitioners contend PO's view of Bandy-344 is too restrictive, Bandy-344 was incorporated only for its protocols, and neither Bandy nor Bandy-344 are limited to the depicted antenna configurations. Reply, 19-21. First, Bandy-344 was incorporated “in [its] entirety,” not just for its protocols. Ex-1006, ¶77. But even if incorporated just for its protocols, they are related to UHF. POR, 65-66; Ex-2001, ¶186. That Bandy's “invention is directed to all types of RFID *tag devices*”—not protocols—on which Petitioners rely, (Reply, 20; Ex-1006, ¶74), does not suggest otherwise.

As for Petitioners' expansive reading of Bandy and Bandy-344 as encompassing nearly any antenna configuration, that reading is new and unsupported. Reply, 20. Petitioners' expert merely opines antennas “could be utilized interchangeably,” (Ex-1032, ¶21), which is wrong, (Ex-2001, ¶¶59-60, 186 (explaining differences and incompatibility of NFC's magnetic coupling and UHF radiative coupling); Ex-2006,

R102-103). Nor did Petitioners' expert offer an opinion on the operation of the myriad antennas he discusses; he simply opines that other antennas are "similar" to Bandy's. Ex-1032, ¶¶22-24. Petitioners fail to show antenna designs operate based on what looks "similar."

Petitioners' comparison of the antennas in Ex-1022-1027 (Ex-1032, ¶¶22-29) further fails because all of the antennas are coils, and not open-ended as in Bandy-344. Ex-1023, 101 (explaining all the shapes are coils); Ex-1027, ¶3 (Figs. 1 and 2 are "coils...with two...[or] three contacts"). As PO's expert explained, NFC works by inducing a current in the antenna (Ex-2001, ¶58), and to do so the coil must have two contacts to allow the current to flow. *Accord* Ex-1022, 7:1-6 (explaining conductive line 70 connects point 72 to a positive terminal 66 and terminal 68 is grounded); Ex-1025, 4 (Fig. 1 uses a pair of electrodes 122); Ex-1027, ¶2. Although Petitioners' "similar" antennas have such coils, Bandy-344 does not.⁸ POR, 67-68; Ex-2001, ¶188"); Ex-2028, 58:24-60:12 (stating that it is only *possible* that Bandy's antenna is connected to ground). Considering Dr. Tentzeris' incorrect analysis

⁸ Dr. Tentzeris' opines Bandy-344's Figure 9 shows spiral antennas (Ex-1032, ¶29), but as previously explained, one antenna is an incomplete loop and the other is serpentine, i.e., it has a winding back and forth path that does not make a loop.

regarding inductive and radiative antennas, the Board should give his testimony no weight.⁹

Finally, for Ground 4, Petitioners' argument that its cross-referencing for Arntzen is no different than its internal cross-referencing in Grounds 1 and 3 is disingenuous. Reply, 23. In Grounds 1 and 3, Petitioners refer back *within* the same Ground to discussion of an earlier claim (e.g., from claim 5 to claim 1). In contrast, in Ground 4—a combination of Bandy/Fowler/Arntzen—Petitioners wholesale cite to the completely different combination of Fujiwara/Arntzen. Pet., 91-92 (citing §III.F). This was precisely the problem in *In re Magnum Oil Tools Int'l, Ltd.* 829 F.3d 1364, 1379 (Fed. Cir. 2016); POR, 69-70. Moreover, Petitioners obfuscate any reasons for combining Bandy/Fowler/Arntzen in Ground 4 by citing to and combining purported motivations of Ground 2 (Fujiwara/Arntzen) and Ground 3 (Bandy/Fowler) obscuring their specific arguments for motivation. *Uber Techs., Inc. v. Surgetech LLC*, IPR2023-00738, Paper 8, 22-23 (Oct. 23, 2023).

⁹ Petitioners do not rely on Fowler for modifying Bandy to use NFC. Pet., 90; POR, 65. Thus, Petitioners arguments regarding Fowler are irrelevant, unsupported, and untimely attorney argument. Reply, 22-23.

C. Petitioners' combinations are driven by hindsight

Petitioners attempt to justify their hindsight analysis, stating “Petitioner[s] relied upon *other* references cited by its expert for certain NFC advantages, which the ’340 Patent acknowledges.” Reply, 25 (original emphasis). But none of those references were properly submitted as exhibits in this proceeding. POR, 10 n.1. Petitioners have since filed these references as exhibits (more than a year after filing the Petition) but have not once cited to them in any paper. *See* Ex-1013-1021 (filed December 2, 2024). And two are in Japanese with no translation filed prior to PO’s Response. The Board should disregard these references.¹⁰ 37 C.F.R. §42.63(a).

Petitioners claim that instead of relying on hindsight to modify the prior art to use NFC, they pointed to alleged motivations to modify Fujiwara, or combine it with Arntzen, and to combine Bandy with Fowler. Reply, 26. This rings hollow. First, Petitioners point to their conclusory discussion of possible modifications to Fujiwara to arrive at [1a]. *Id.* (citing Pet., 28-29). Not only do Petitioners apparently combine Fujiwara with the NFC specification (which is not included in any unpatentability ground), but Petitioners have not shown why or how POSITAs would have overhauled Fujiwara’s microwave tags to achieve the same communication range as

¹⁰ Petitioners’ expert admits these references are irrelevant. Ex-2028, 73:3-74:8, 77:23-25, 79:15-21.

NFC. POR, 47; Pet., 19, 28. Next, Petitioners point to its discussion of Arntzen's alleged disclosures (Reply, 26 (citing Pet., 54-55)) but provide no explanation of how or why any of Arntzen's teachings would have been combined with Fujiwara (POR, 52). Finally, Petitioners point to its motivations to combine Bandy with Fowler (*id.* (Pet., 86-91)), but neither Bandy nor Fowler disclose NFC (POR, 65-69). Instead, Petitioners state (without support) there is an NFC standard, and POSITAs would have modified both Bandy and Fowler to use it. Pet. 90. Mere familiarity with NFC is not a motivation to modify any reference to use it. *Virtek*, 97 F.4th at 886.

III. CONCLUSION

Patent Owner respectfully requests the Board find all challenged claims not unpatentable.

January 17, 2024

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), I, Jessica C. Kaiser, certify that PATENT OWNER'S SUR-REPLY contains 5,597 words, excluding those portions identified in 37 C.F.R. § 42.24(c), as measured by the word-processing system used to prepare this paper.

January 17, 2025

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on January 17, 2025, a copy of **PATENT OWNER'S SUR-REPLY** was served upon the below-listed counsel by electronic mail:

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