

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VUSIONGROUP SA,
Petitioner

v.

HANSHOW TECHNOLOGY CO., LTD.,
Patent Owner.

IPR2024-00857

U.S. Patent No. 11,540,216

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 11,540,216**

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EXHIBIT LIST

Exhibit	Reference
1001	U.S. Patent No. 11,540,216 (“’216 patent” or “’216Pat”)
1002	File History of the ’216 patent (“’216Pat File History”)
1003	Declaration of Dr. Andrew Wolfe in Support of Petition
1004	Dr. Andrew Wolfe Curriculum Vitae
1005	Certified Translation of Japanese Published Unexamined Patent Application 2017-126872 (“Nagata”)
1006	Certified Translation of Japanese Published Unexamined Patent Application 2016-140368 (“Hashiguchi”)
1007	U.S. Patent Application Publication No. 2018/0123887 (“Thubert”)
1008	Complaint, <i>Hanshow Technology Co., Ltd. v. SES-imagotag SA et al.</i> , Case No. 2:23-cv-00174 (E.D. Tex.).
1009	Waiver of Service, <i>Hanshow Technology Co., Ltd. v. SES-imagotag SA et al.</i> , Case No. 2:23-cv-00174 (E.D. Tex.).
1010	Docket Control Order, <i>Hanshow Technology Co., Ltd. v. SES-imagotag SA et al.</i> , Case No. 2:23-cv-00174 (E.D. Tex.).
1011	Original Japanese Published Unexamined Patent Application 2017-126872 (“Nagata”)
1012	Original Japanese Published Unexamined Patent Application 2016-140368 (“Hashiguchi”)
1013	U.S. Patent No. 7,567,791 to Laroia, et al. (“Laroia”)
1014	U.S. Patent Application Publication No. 2017/0011238 to Röbl et al. (“Röbl”)
1015	Farhana Afroz et al., SINR, RSRP, RSSI and RSRQ Measurements in Long Term Evolution Networks, <i>International Journal of Wireless & Mobile Networks (IJWMN)</i> , Vol. 7, No. 4 (Aug. 2015) (“Afroz”)
1016	Bluetooth Core Specification v5.0, December 6, 2016 (“Bluetooth”)

Exhibit	Reference
1017	Liu Weiyang, et al., “A low power 2.4 GHz transceiver for ZigBee applications,” Journal of Semiconductors, Vol. 34, No. 8 (Aug, 2013) (“Weiyang”)
1018	Ben W. Cook, et al., “Low-Power 2.4-GHz Transceiver With Passive RX Front-End and 400-mV Supply,” IEEE Journal of Solid-State Circuits, Vol. 41, No. 12 (Dec. 2006) (“Cook”)
1019	Abdellah Chehri, et al., “Link-Quality Measurement and Reporting in Wireless Sensor Networks,” Sensors Journal (2013) (“Chehri”)
1020	Baidoo-Williams, Henry, et al., “PHY-layer link quality indicators for wireless networks using matched-filters,” (Aug. 2015) (“Baidoo-Williams”)
1021	U.S. Patent Application Publication No. 2017/0330064 (“Kim”)
1022	U.S. Patent Application Publication No. 2015/0278890 (“Yang”)
1023	U.S. Patent Application Publication No. 2003/0133468 (“Haulk”)

LISTING OF CHALLENGED CLAIMS

Reference	Claim Limitation
Claim 1	
1.0	An interactive electronic tag device communication system, comprising:
1.1	a background server, a base station, an electronic tag device and an external device;
1.2	wherein the electronic tag device comprises two communication paths: a first communication path and a second communication path;
1.2.1	the first communication path supports two monitoring modes: a normal monitoring mode and a fast monitoring mode;
1.2.2	and the base station comprises two wake-up modes: a normal wake-up mode and a fast wake-up mode;
1.3	the external device is configured to transmit first data to the electronic tag device through the second communication path;
1.4	the electronic tag device is configured to receive the first data, transmit the first data to the base station through the first communication path, and enter the fast monitoring mode;
1.5	the base station is configured to receive the first data and transmit the first data to the background server;
1.6	the background server is configured to generate a control instruction and second data according to the first data, and transmit the control instruction and the second data to the base station;
1.7	the base station is further configured to receive the control instruction and the second data, communicate with the electronic tag device in the fast wake-up mode, and transmit a fast wake-up instruction, the control instruction and the second data to the electronic tag device through the first communication path; and
1.8	the electronic tag device is further configured to receive the fast wake-up instruction, the control instruction and the second data,

Reference	Claim Limitation
	and switch to the normal monitoring mode after completing the communication.
Claim 2	
2	The interactive electronic tag device communication system according to claim 1, wherein the electronic tag device is configured to attach an ID of the electronic tag device to the first data when transmitting the first data to the base station.
Claim 3	
3.0	The interactive electronic tag device communication system according to claim 1, wherein when the first data is received by a plurality of base stations, the plurality of base stations are configured to attach respective energy value information of the plurality of base stations to the first data when transmitting the first data to the background server;
3.1	the background server is configured to determine an optimal base station among the plurality of base stations according to the respective energy value information of the plurality of base stations, and transmit the control instruction and the second data to the electronic tag device through the optimal base station.
Claim 4	
4	The interactive electronic tag device communication system according to claim 3, wherein the background server is further configured to perform deduplication processing on the first data uploaded by the plurality of base stations.
Claim 5	
5	The interactive electronic tag device communication system according to claim 1, wherein the electronic tag device is further configured to switch to the normal monitoring mode when the fast wake-up instruction transmitted by the base station is not received within a preset time range.
Claim 6	
6	The interactive electronic tag device communication system according to claim 1, wherein the electronic tag device is further

Reference	Claim Limitation
	configured to switch to the normal monitoring mode when the fast wake-up instruction is received but the control instruction and the second data are not received within a preset time range.
Claim 7	
7.0	An interactive electronic tag device communication method, comprising:
7.1	transmitting, by an external device, first data to an electronic tag device through a second communication path in the electronic tag device;
7.2	receiving, by the electronic tag device, the first data, transmitting the first data to a base station through a first communication path in the electronic tag device, and entering a fast monitoring mode;
7.3	receiving, by the base station, the first data and transmitting the first data to a background server;
7.4	generating, by the background server, a control instruction and second data according to the first data, and transmitting the control instruction and the second data to the base station;
7.5	receiving, by the base station, the control instruction and the second data, communicating with the electronic tag device in a fast wake-up mode, and transmitting a fast wake-up instruction, the control instruction and the second data to the electronic tag device through the first communication path; and
7.6	receiving, by the electronic tag device, the fast wake-up instruction, the control instruction and the second data, and switching to a normal monitoring mode after completing the communication;
7.7	wherein the electronic tag device comprises two communication paths: the first communication path and the second communication path, the first communication path supports two monitoring modes: the normal monitoring mode and the fast monitoring mode, and the base station comprises two wake-up modes: a normal wake-up mode and the fast wake-up mode.

Reference	Claim Limitation
Claim 8	
8.0	The interactive electronic tag device communication method according to claim 7, wherein transmitting, by the electronic tag device, the first data to the base station comprises:
8.1	attaching an ID of the electronic tag device to the first data, and transmitting the ID of the electronic tag device and the first data to the base station.
Claim 9	
9	The interactive electronic tag device communication method according to claim 7, wherein receiving, by the base station, the first data and transmitting the first data to a background server comprises: attaching, by a plurality of base stations, respective energy value information of the plurality of base stations to the first data when receiving the first data, and transmitting, by the plurality of base stations, the first data and the respective energy value information of the plurality of base stations to the background server.
Claim 10	
10	The interactive electronic tag device communication method according to claim 9, further comprising: performing, by the background server, deduplication processing on the first data uploaded by the plurality of base stations.
Claim 11	
11	The interactive electronic tag device communication method according to claim 7, further comprising: switching, by the electronic tag device, to a normal monitoring mode when the fast wake-up instruction transmitted by the base station is not received within a preset time range.
Claim 12	
12	The interactive electronic tag device communication method according to claim 7, further comprising: switching, by the electronic tag device, to the normal monitoring mode when the

Reference	Claim Limitation
	fast wake-up instruction is received but the control instruction and the second data are not received within a preset time range.
Claim 13	
13	A computer device comprising a memory, a processor and a computer program stored on the memory and executable by the processor, wherein the processor implements, when executing the computer program, the method according to claim 7.
Claim 14	
14.0	A non-transitory computer-readable storage medium storing therein a computer program for executing an interactive electronic tag device communication method comprising:
14.1	transmitting, by an external device, first data to an electronic tag device through a second communication path in the electronic tag device;
14.2	receiving, by the electronic tag device, the first data, transmitting the first data to a base station through a first communication path in the electronic tag device, and entering a fast monitoring mode;
14.3	receiving, by the base station, the first data and transmitting the first data to a background server;
14.4	generating, by the background server, a control instruction and second data according to the first data, and transmitting the control instruction and the second data to the base station;
14.5	receiving, by the base station, the control instruction and the second data, communicating with the electronic tag device in a fast wake-up mode, and transmitting a fast wake-up instruction, the control instruction and the second data to the electronic tag device through the first communication path; and
14.6	receiving, by the electronic tag device, the fast wake-up instruction, the control instruction and the second data, and switching to a normal monitoring mode after completing the communication;
14.7	wherein the electronic tag device comprises two communication paths: the first communication path and the second

Reference	Claim Limitation
	communication path, the first communication path supports two monitoring modes: the normal monitoring mode and the fast monitoring mode, and the base station comprises two wake-up modes: a normal wake-up mode and the fast wake-up mode.
Claim 15	
15.0	The non-transitory computer-readable storage medium according to claim 14, wherein transmitting, by the electronic tag device, the first data to the base station comprises:
15.1	attaching an ID of the electronic tag device to the first data, and transmitting the ID of the electronic tag device and the first data to the base station.
Claim 16	
16	The non-transitory computer-readable storage medium according to claim 14, wherein receiving, by the base station, the first data and transmitting the first data to a background server comprises: attaching, by a plurality of base stations, respective energy value information of the plurality of base stations to the first data when receiving the first data, and transmitting, by the plurality of base stations, the first data and the respective energy value information of the plurality of base stations to the background server.
Claim 17	
17	The non-transitory computer-readable storage medium according to claim 16, wherein the computer program further executes the act of: performing, by the background server, deduplication processing on the first data uploaded by the plurality of base stations.
Claim 18	
18	The non-transitory computer-readable storage medium according to claim 14, wherein the computer program further executes the act of: switching, by the electronic tag device, to a normal monitoring mode when the fast wake-up instruction transmitted by the base station is not received within a preset time range.

Reference	Claim Limitation
Claim 19	
19	The non-transitory computer-readable storage medium according to claim 14, wherein the computer program further executes the act of: switching, by the electronic tag device, to the normal monitoring mode when the fast wake-up instruction is received but the control instruction and the second data are not received within a preset time range.

I. INTRODUCTION

Petitioner requests *inter partes* review (“IPR”) of claims 1-19 (“Challenged Claims”) of U.S. Patent 11,540,216 (EX1001). Petitioner has shown a reasonable likelihood of prevailing as to each Challenged Claim and respectfully requests the Board institute trial.

II. GROUNDS FOR STANDING

Petitioner certifies the ’216 patent is available for IPR, and Petitioner is not barred or estopped from requesting IPR. PO sued Petitioner in district court. EX1008. The summons issued on May 4, 2023, and PO filed a waiver of service on May 24, 2023. EX1009. This Petition was filed within one year of PO filing the waiver of service, and is, therefore, timely. *Motorola Mobility LLC v. Arnouse*, IPR2013-00010, Paper 20 (Jan. 30, 2013) (informative) (“[I]n the situation where the petitioner waives service of a summons, the one-year time period begins on the date on which such a waiver is filed.”).

III. STATEMENT OF PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED

Petitioner respectfully requests review and cancellation of the Challenged Claims¹ in view of:

¹ Petitioner does not concede any Challenged Claim satisfies other requirements for patentability that cannot be raised in IPR, including 35 U.S.C. §§101, 112.

Prior Art ²
Japanese Published Unexamined Patent Application 2017-126872 (“Nagata”), filed January 13, 2016; published July 20, 2017; prior art under at least 35 U.S.C. §102(a)(1) ³ (EX1005, EX1011)
Japanese Published Unexamined Patent Application 2016-140368 (“Hashiguchi”), filed January 29, 2015; published August 8, 2016; prior art under at least 35 U.S.C. §102(a)(1) (EX1006, EX1012)
U.S. Patent Application Publication No. 2018/0123887 (“Thubert”), filed May 19, 2017; published May 3, 2018; prior art under at least 35 U.S.C. §102(a)(2) (EX1007)

Ground (35 U.S.C. §103)	Claims	References
1	1, 2, 5-8, 11-15, 18-19	Nagata
2	1, 2, 5-8, 11-15, 18-19	Nagata, Hashiguchi
3A	3-4, 9-10, 16-17	Nagata, Thubert
3B	3-4, 9-10, 16-17	Nagata, Hashiguchi, Thubert

IV. ’216 PATENT OVERVIEW

A. Specification

The ’216 patent is directed to an “Interactive Electronic Tag Device Communication System and Method.” *’216Pat*, Title; *Declaration of Dr. Andrew Wolfe* (EX1003) (“*Wolfe*”), ¶67. The patent describes problems in which large-scale,

² Petitioner includes original and translated copies with translator declarations of foreign prior art references where applicable. Cites herein are to the English translations.

³ All references to 35 U.S.C. §§102, 103 are to the AIA statutory framework.

battery-operated radio frequency communicating electronic tag devices (“tags”) consume too much battery power when they communicate, causing frequent battery replacements and increased labor costs. *'216Pat*, 1:51-2:3. The *'216* patent proposes switching tags between normal (less frequent) and fast (more frequent) communication monitoring modes and a base station between normal and fast wake-up modes to conserve power by reducing communication time, while preserving “customer experience requirements.” *Id.*, 6:35-42. Each tag has two “communication paths”: (1) communicating with a server through base stations, and (2) communicating with an external device. *Id.*, Fig. 3 (below).

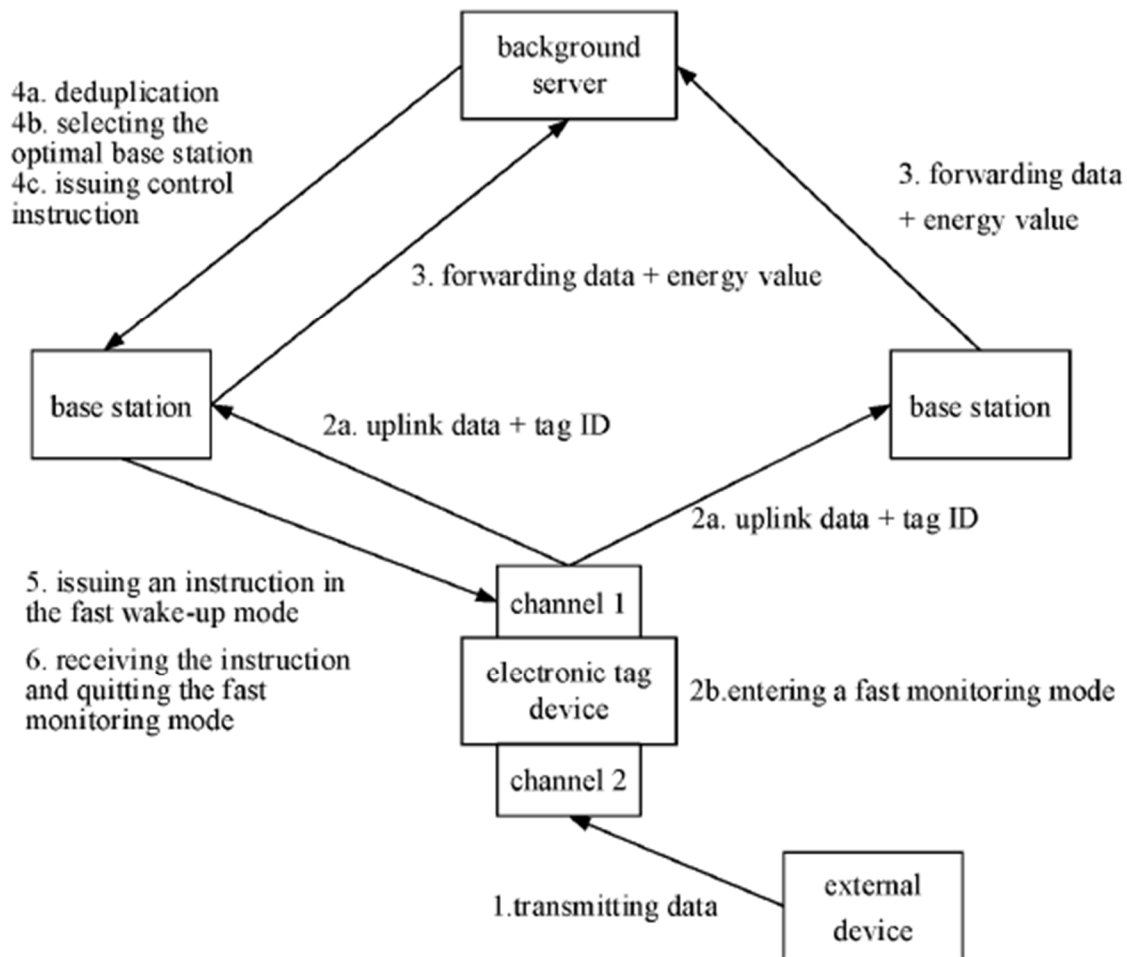


FIG. 3

Id., Fig. 3, 6:1-24, Fig. 2, 5:31-63.

B. Prosecution History

The '216 patent issued from U.S. Application 17/257,570, and claims priority to Patent Cooperation Treaty (PCT) application PCT/CN2019/070431, which claims foreign priority to China patent application 201810706496.2 ("China parent

application”), dated July 2, 2018.⁴ *’216Pat*, Cover. On March 22, 2019, while the PCT application was pending, the International Searching Authority (“ISA”) issued an International Search Report listing three Chinese prior art references and authored a Written Opinion applying one of the same (CN107343259). *’216Pat File History*, 214-19 (ISA-issued English translation). In an Information Disclosure Statement (“IDS”), the U.S. examiner (“Examiner”) received and considered the ISA search report and the three cited Chinese references. *Id.*, 264-65. The IDS contained one other Chinese reference unidentified by the ISA (CN110677898). *Id.*, 265; *Wolfe*, ¶¶67-68.

The Examiner issued a first Office Action without any prior-art-based rejections. *Id.*, 247-51. After receiving Applicant’s minor claim amendments to overcome a §101 rejection, the Examiner issued a Notice of Allowance stating only that the prior art previously identified failed to anticipate or render obvious “switching between normal and fast wake-up modes of an electronic tag device via two communication paths by a control instruction and a fast wake-up instruction.” *Id.*, 311 (internal quotes omitted). Applicant then submitted a Request for Continued Examination (“RCE”) to consider an IDS (*id.*, 415-16) listing an Extended European

⁴ The references are prior art even assuming July 2, 2018, is the earliest possible priority date. Petitioner reserves the right to further address priority in other forums.

Search Report for related European Patent Application EP19830815 including three US prior art references (*id.*, 374-82, 375 (listing Schleef, Merlin, Tseng)), a First Office Action for Chinese Patent Application 201810706496.2 (*id.*, 401-12), and two additional foreign prior art references including Cho (*id.*, 355-73) and Wang (*id.*, 383-400).

The Examiner indicated consideration of the same and maintained the Notice of Allowance. *Id.*, 424-26, 455-56 (“Upon filing of RCE along with IDS...Notice of Allowance is still valid”), 421-22. The ’216 patent issued on December 27, 2022. ’216*Pat*, Cover; *Wolfe*, ¶69.

Nagata, Hashiguchi, and Thubert were not cited in the ’216 file history. Nor was the cited art related to those references. *Wolfe*, ¶70.

V. LEVEL OF ORDINARY SKILL

Dr. Wolfe explains that a person of ordinary skill in the art (“POSITA”) in July 2018 would have had a Bachelor’s Degree in electrical or computer engineering, computer science, or a similar field with two or more years of work experience with low-power connected devices. *Wolfe*, ¶29. Additional education in a relevant field or relevant industry experience may compensate for a deficit in one of the other aspects of the requirements stated above. *Id.*

Dr. Wolfe is at least a POSITA in the field of technology of the ’216 patent and familiar with U.S. patent law, and therefore qualified to opine on what a POSITA

would have known and understood as of July 2018 to form the basis of his analysis and opinions. *Wolfe*, ¶¶1-66, 225.

VI. Claim Construction

Petitioner is unaware of any “prior claim construction determination” related to the ’216 patent. 37 C.F.R. §42.100(b). Petitioner believes that no express constructions are necessary to assess whether the prior art reads on the challenged claims. The claims should be given their plain and ordinary meaning.⁵ *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en banc); *Wolfe*, ¶85.

VII. DETAILED EXPLANATION OF GROUNDS

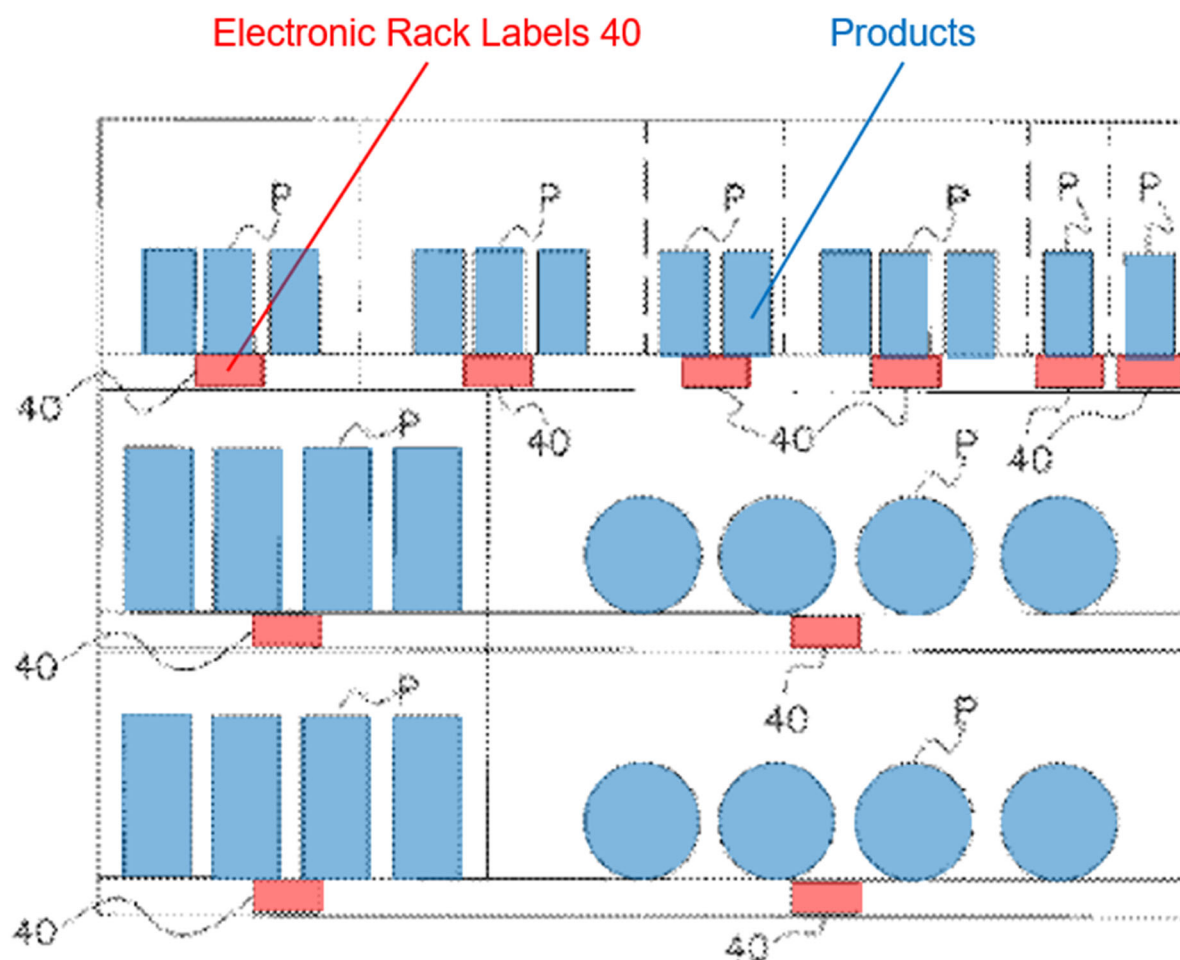
A. Ground 1: Nagata Renders Claims 1, 2, 5-8, 11-15, 18, 19 Obvious in View of the Knowledge of POSITAs

1. Nagata

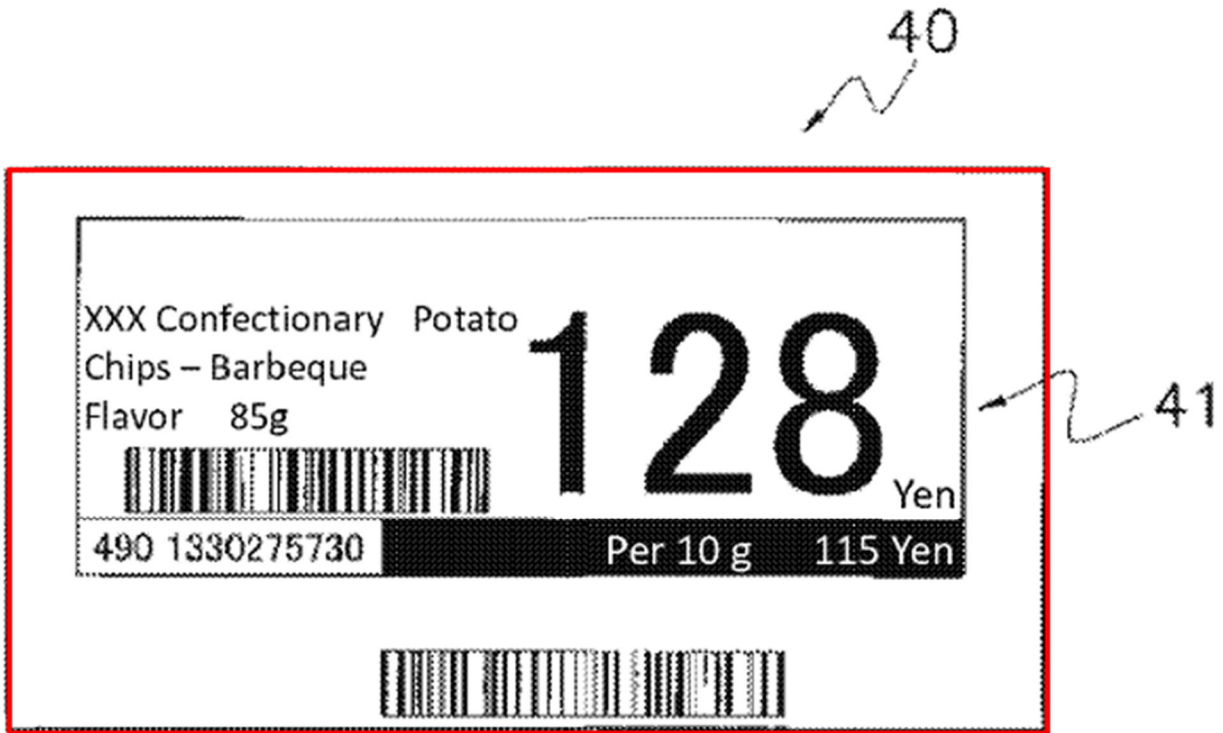
Nagata (EX1005) is analogous art to the ’216 patent. *Wolfe*, ¶75.

Nagata is directed to a wireless display system utilizing electronic rack labels (“labels”) to display updatable product information. *Nagata*, Abstract, [0026], [0114]; *Wolfe*, ¶¶71-72. Products (blue) are displayed above labels 40 (red) as shown in annotated Figure 2, below:

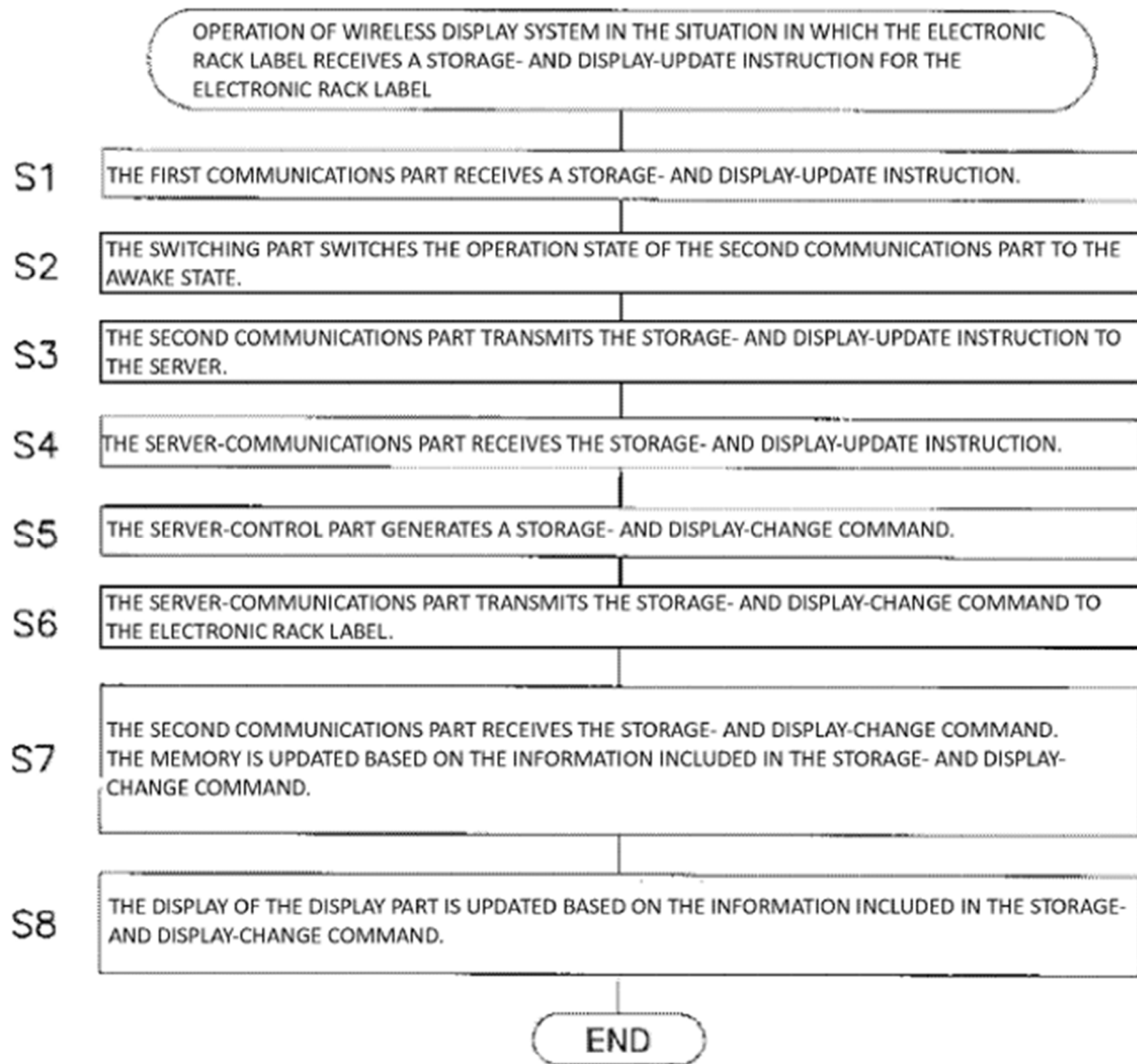
⁵ Petitioner reserves all rights to raise claim construction arguments in other forums or to address construction of any terms PO may argue in this proceeding.



Nagata, Fig. 2, [0048]; *Wolfe*, ¶72. Each label (red) displays product information such as the type of product, its price, and a barcode as shown in Figure 3 (below):



Nagata, Fig. 3, [0028]; *Wolfe*, ¶72. A worker may rapidly change the label's display by initiating an instruction from remote control 80 or smart phone 180. The instruction is relayed through an access point to a server, and the server generates a command including updated image data that is transmitted to the label through the access point. *Nagata*, [0114]-[0123] (describing a "Situation in Which a Storage-and/or Display-Update Instruction for an Electronic Rack Label Is Received"). This process is shown in Figure 8 (below):

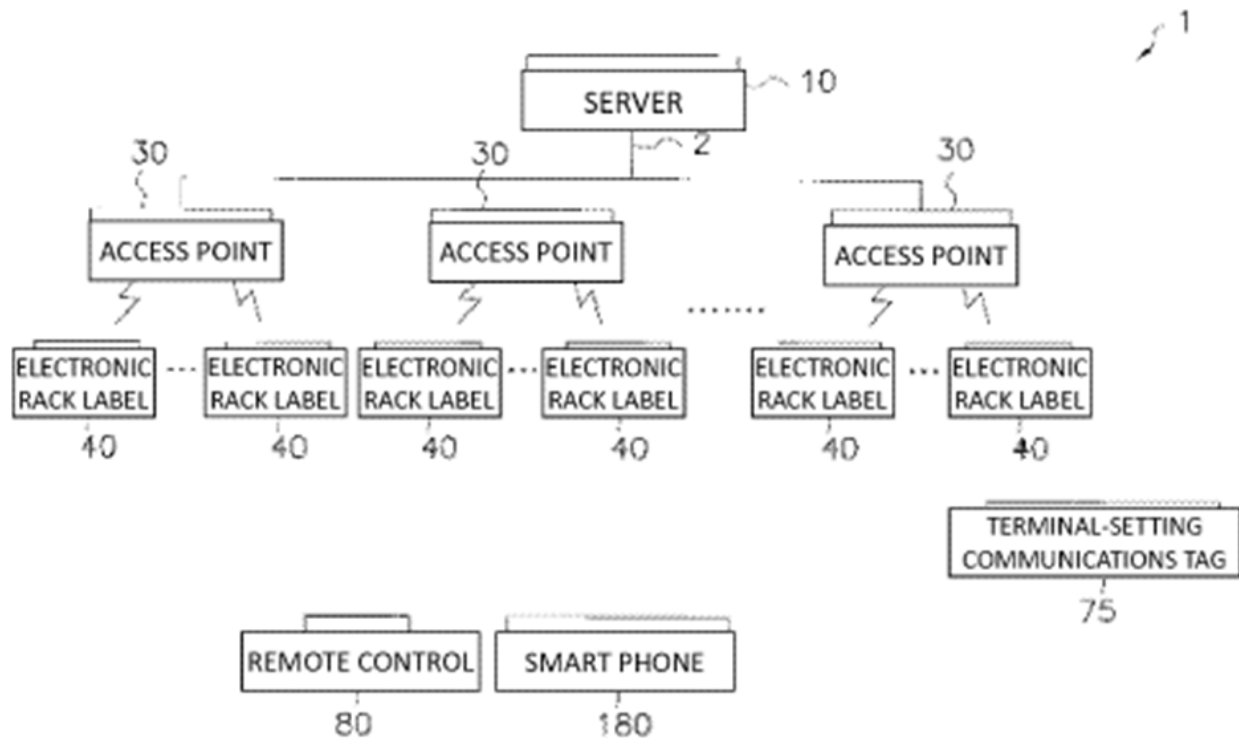


Id., Fig. 8; *Wolfe*, ¶73. To prevent excessive battery power drain, the labels transition between sleep and awake modes (according to known time intervals and durations) to communicate with the access point and server. *Nagata*, [0029], [0114], [0123]; *Wolfe*, ¶74. The access points use beacons to prepare the label to receive and implement a server-generated command (consuming battery power) or return to sleep (saving battery power). *Nagata*, [0033], [0083]; *Wolfe*, ¶74.

2. Independent Claim 1

a. Claim 1.0

If limiting, Nagata discloses or suggests 1.0. *Wolfe*, ¶186. Nagata discloses a “wireless display system” that “performs communication” between server 10, “portable terminal” such as remote control 80 or smart phone 180, labels 40, and access point 30. *Nagata*, Abstract, [0005], [0035]. Figure 1 (below) depicts Nagata’s wireless display system.



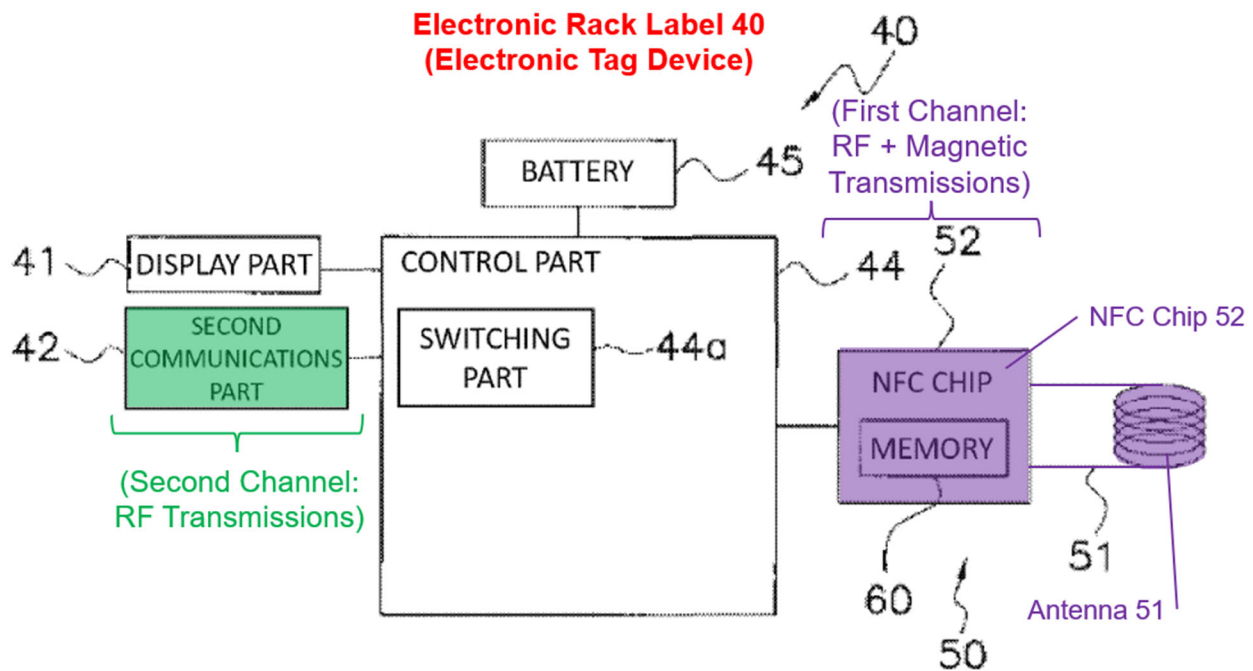
Id., Fig. 1, [0211]. Each label 40 displays at least product (“Potato Chips”) and price (“Yen”) information as shown in Figure 3 (below).



Id., Fig. 3, [0024].

POSITAs would have recognized Nagata's label as an electronic tag device because it displays electronic price information for an item, consistent with an "electronic price tag...tag device" as disclosed in the '216 patent's originally-filed specification. '216Pat, 1:23-25; *Wolfe*, ¶87. POSITAs would have also understood Nagata's label is "interactive" because it exchanges wireless information (e.g., "interact[s]") with remote control 80 or smart phone 180 using first communications part 50 employing near-field communications (NFC) to, e.g., transmit to label instructions from the smartphone or remote control or to receive at the remote control or smart phone information from the label. *Nagata*, [0051]-[0060]; *Wolfe*, ¶87. POSITAs would have also recognized Nagata's label exchanges wireless information (e.g., "interact[s]") through second communications part 42 with server

10 via access point 30 using radio wave transmissions to, e.g., change the display on the label. *Nagata*, [0061]-[0064]; *Wolfe*, ¶87. Annotated Figure 5 (below) identifies these elements:



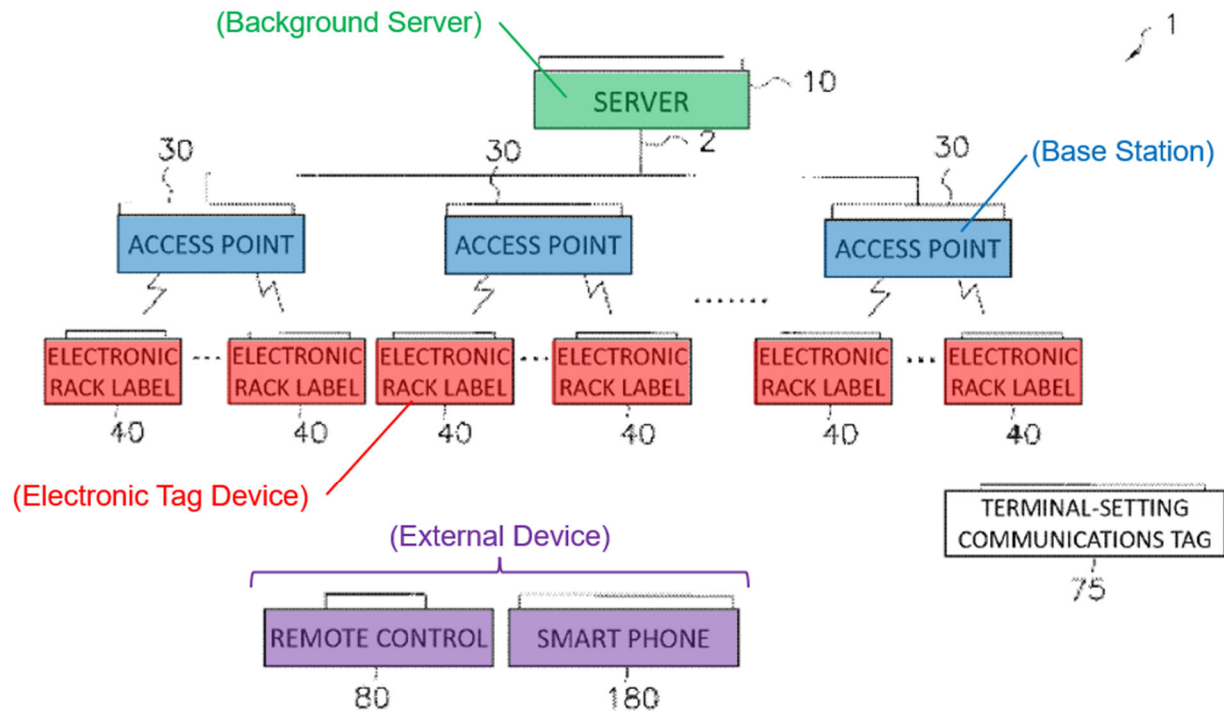
Nagata, Fig. 5, [0049]; *Wolfe*, ¶87.

Accordingly, *Nagata* discloses or suggests a wireless display system comprising a server, access points, smart phone, and electronic rack labels for communicating retail product information (“interactive electronic tag device communication system”). *Wolfe*, ¶88.

b. Claim 1.1

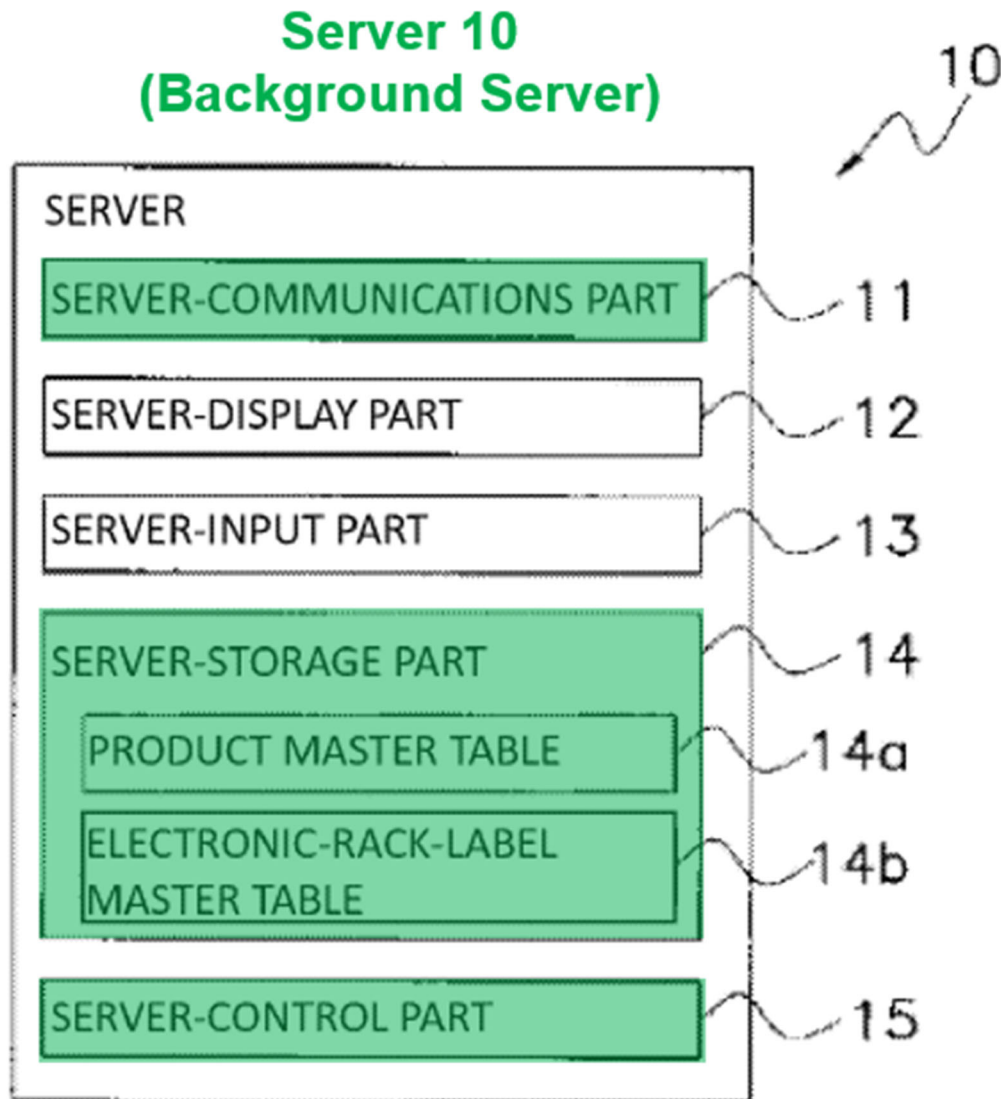
Nagata discloses or suggests 1.1. *Wolfe*, ¶89. As discussed in 1.0, *Nagata*’s wireless display system 1 (“interactive electronic tag device communication system”) performs communications between server 10 (“background server”),

portable terminal, i.e., remote control 80 or smart phone 180 (“external device”), electronic rack labels 40 (“electronic tag device[s]”), and access point 30 (“base station”). *Nagata*, Abstract, [0005], [0035]. Annotated Figure 1 (below) depicts these components:



Id., Fig. 1, [0027]; *Wolfe*, ¶89.

Server 10 includes server-communications part 11, server-storage part 14, and server-control part 15 to manage, store, and communicate tabularized product information to and from the labels as shown in annotated Figure 6:

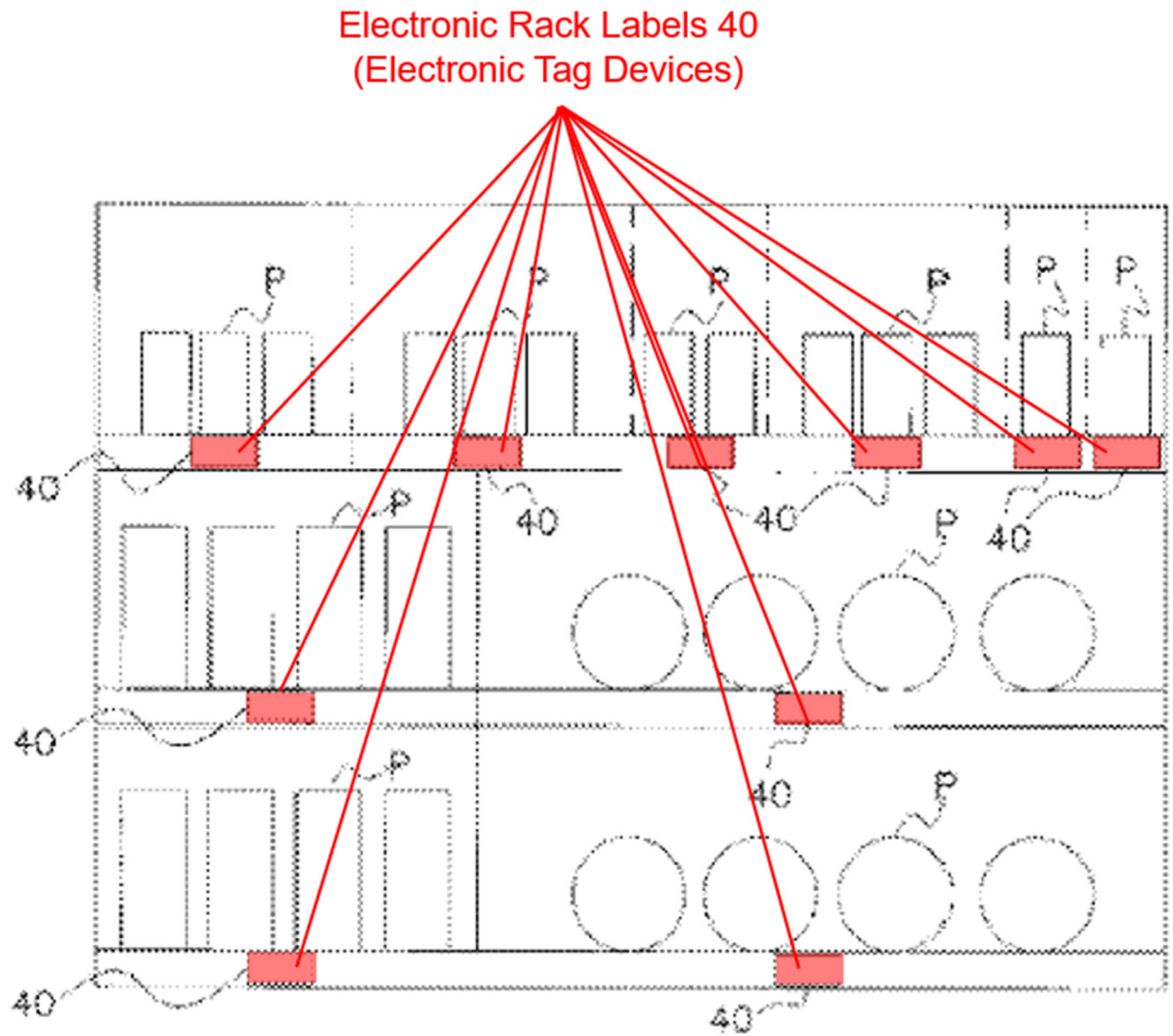


Nagata, Fig. 6, [0088]-[0091] (“Server-Communications Part”), [0094]-[0101] (“Server-storage part” with “Product Master Table” and “electronic-Rack-Label Master Table”). The server exchanges product information with the labels using a network with access points 30. *Id.*, [0030], [0087]; *Wolfe*, ¶90.

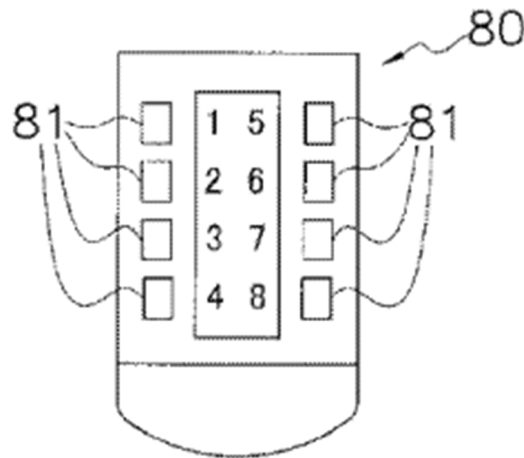
Each of access points 30 is a “communications apparatus” that transmits information between labels 40 and server 10 using “radio-wave-type wireless

communication.” *Nagata*, [0031]-[0032]. Labels communicate with access points mounted throughout a store. *Id.*, [0032]. POSITAs would have recognized Nagata’s access points as “base stations” because they receive and transmit information between the label and server in the same manner as the “base stations” transmit and receive information between the tag and background server in the ’216 patent. *Compare Nagata*, [0031] (disclosing each access point transmits and receives information via radio waves between electronic rack labels and the server), *with ’216Pat*, 2:33-34 (“the base station is configured to receive the first data and transmit [it]...to the background server”). Nagata’s labels communicate with the server through access points utilizing a radio frequency path just as tags in the ’216 patent communicate via radio frequency with the server through base stations. *Compare ’216Pat*, 4:31-41 (“The first communication path (channel 1) is a 2.4 G[Hz] RF (Radio Frequency) path”), *with Nagata*, [0031] (“Each of the access points 30 is a communications apparatus that performs radio-wave-type wireless communication”); *Wolfe*, ¶91.

Labels 40, like the labels of the ’216 patent, are battery-powered and are installed on store shelves. The labels display certain product-related information as shown in annotated Figure 2:



Nagata, Fig. 2, [0024], [0028]-[0029]; *Wolfe*, ¶92. The labels exchange information with (i) remote control 80 shown in Fig. 7 (below) or smartphone 180, directly, or (ii) with server 10 via access point 30. The labels communicate with the remote control or smartphone via NFC. *Nagata*, [0035]-[0037], [0044], [0046].



Customers can use the smart phone to query product information stored in the label for viewing on the smart phone. *Id.*, [0058], [0070]-[0073]; *Wolfe*, ¶¶93-95.

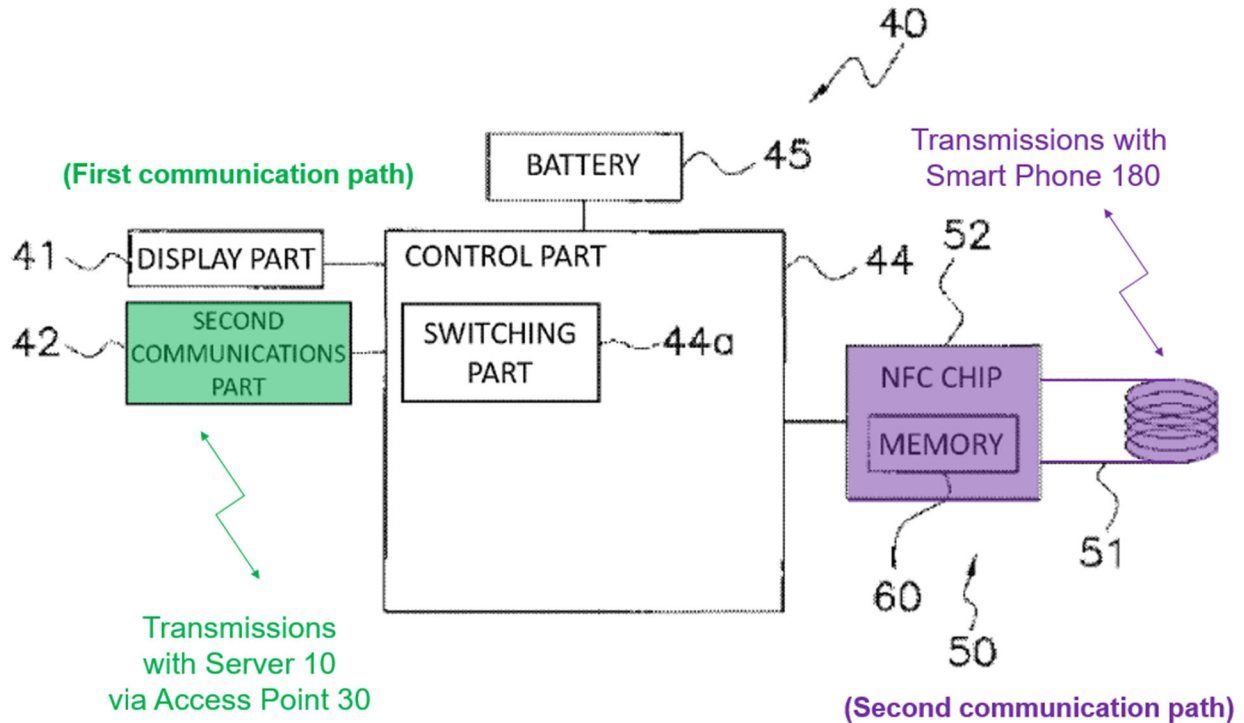
POSITAs would have understood Nagata's portable terminal, either remote control 80 or smart phone 180, as "external devices" because they operate in the same manner as the "external devices" in the '216 patent. *Wolfe*, ¶96. For example, Nagata's portable terminals can be used to initiate a change in the display of product inventory quantity, sales count, affiliated allergic information, turn communication on or off, or view information stored in the label about the product. *Nagata*, [0037]-[0039], [0044], [0058], [0125]. In the same way, "[t]he electronic tag device [of the '216 patent] performs a data interaction with external devices...to transmit data (including screen update, data update, device control, status change, etc.) to the electronic tag device and receive data (such as device status information query, read public area data, read private area data, etc.)." '216Pat, 4:44-50; *Wolfe*, ¶96.

Accordingly, Nagata discloses or suggests a wireless display system that exchanges wireless information in communications between server 10 (“a background server”), access points 30 (“base station[s]”), electronic rack labels 40 (“electronic tag device[s]”) and remote control 80 or smart phone 180 (“external device”). *Wolfe*, ¶97.

c. Claim 1.2

Nagata discloses or suggests 1.2. *Wolfe*, ¶98. As discussed above, Nagata’s labels include first communications part 50 and second communications part 42. First communications part 50 provides wireless communication between the label and remote control and/or smart phone using NFC chip 52. *Nagata*, [0051]-[0060]. First communications part 50 further receives instructions and power from remote control 80 and/or smart phone 180 to control the label and can transmit information stored in the label to the smart phone. *Id.*, [0051]-[0053]. Second communications part 42 wirelessly communicates with server 10 via access point 30 using “radio-wave-type wireless communication.” *Id.*, [0061]-[0066]. POSITAs would have recognized Nagata’s labels each contain two distinct communications paths corresponding to each of the label’s two separate communications parts. *Wolfe*, ¶99. Each label communicates specific information with respect to its source or destination; the label communicates *information* with the server only using wireless radio signals (green path), but both *information* and *power* are sent to the label from

a remote control or smart phone using NFC (purple path). *Id.* The two communication paths are shown in annotated Figure 5:



Nagata, Fig. 5; *Wolfe*, ¶¶99. POSITAs would have further recognized Nagata's two communication parts and respective channels as the two separate and distinct channels depicted in the '216 patent on either side of the electronic tag device that communicate with the server (green) and external device (purple) as shown in annotated Figure 3:

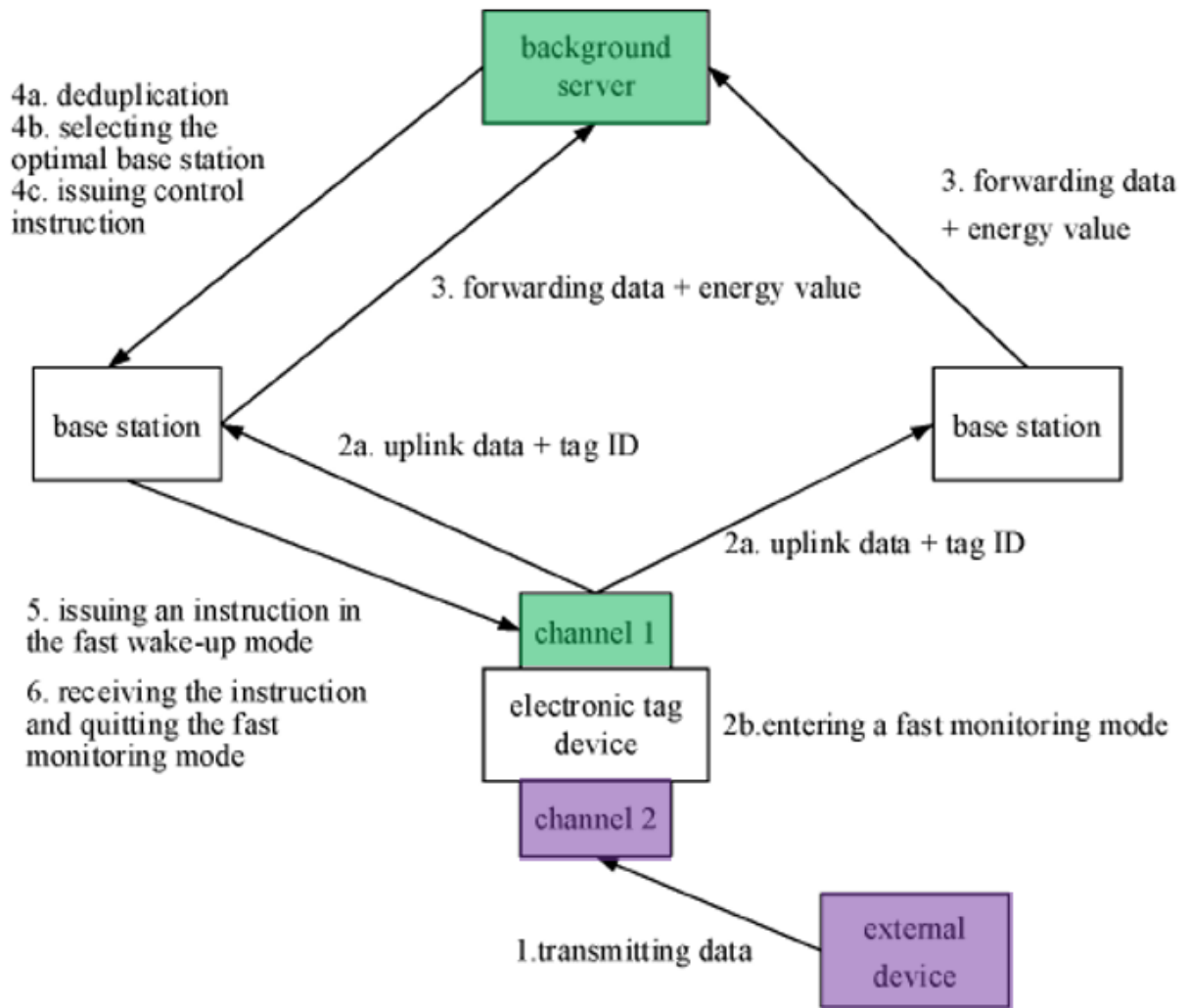


FIG. 3

'216Pat, Fig. 3; Wolfe, ¶100. “Channel 1” as shown above provides communication to a server (through a base station) using “a 2.4 G RF (Radio Frequency) path” ('216Pat, 4:31-34), and “channel 2” provides communication with an external device using “a magnetic switch, an NFC switch, an infrared switch,” or other means (*id.*, 4:41-44). POSITAs would have recognized Nagata’s second communications part 42 operates the same as the '216 patent’s “channel 1” (i.e., “first communication

path”), and that Nagata’s first communications part 50 operates the same as the ’216 patent’s “channel 2” (i.e., “second communication path”). *Wolfe*, ¶100.

Accordingly, Nagata discloses or suggests each electronic rack label (“electronic tag device”) includes a second communications part that wirelessly exchanges information over radio waves with a server (“first communications path”) and a first communications part using NFC (“second communications path”) for exchanging information with a remote control or smart phone (“external device”). *Wolfe*, ¶101.

d. Claim 1.2.1

Nagata discloses or suggests 1.2.1. *Wolfe*, ¶102. Nagata’s labels include a “switching part” that switches the operation of the second communications part from a “sleep state” to an “awake state” to communicate with an access point. *Nagata*, Abstract, [0005]. The time and duration of the awake state can be adjusted to conserve battery power of the label (low power) or communicate quickly with the access point (high power). *Id.*, [0029], [0081]-[0083], [0115]-[0116]; *Wolfe*, ¶102.

Nagata’s system configures two parameters: (i) an interval at which the label automatically switches between the sleep (low power mode) and awake (high power mode) state, and (ii) the duration the label will remain in the awake state (e.g., duration of high power mode). *Nagata*, [0082]-[0083]; *Wolfe*, ¶103. For example, Nagata discloses that the label’s second communications part may be *normally* set

to wake for one second once every minute. *Nagata*, [0083]. But *Nagata* also discloses that the second communications part may be set to be awake for 30 seconds following communication from the remote control or smart phone. *Id.*, [0115]-[0116]. Thus, the second communications part may be maintained in a prolonged active state after the label has received information from the remote control (or phone). *Id.*, [0113]-[0116]. Furthermore, the awake state may be prolonged (e.g., for an additional 30 seconds) when the second communications part receives a beacon from the access point during the awake state. *Id.*, [0033], [0083]; *Wolfe*, ¶103.

POSITAs would have recognized *Nagata*'s label has at least two monitoring modes through the second communications part 42 and its respective communications path: (i) a monitoring mode that operates in accordance with a relatively short prescribed duration at elongated intervals (e.g., once every minute for one second), with slower communications because the access point must wait to communicate with the electronic rack label until the next waking period; and (ii) a monitoring mode where the second communications part may enter and maintain the awake state to keep the path active for faster communications that avoid the delay of waiting for the next interval to start. *Nagata*, [0029], [0083]; *Wolfe*, ¶104.

POSITAs would have recognized *Nagata*'s monitoring modes teach the recited “normal monitoring mode” and “fast monitoring mode.” *Wolfe*, ¶105. Although the '216 patent does not expressly disclose what constitutes “normal” and

“fast” monitoring, it explains the electronic tag device may have a “monitoring period” and “wake up duration” that can be changed based on the speed of communication with the base station. *'216Pat*, 1:23-65; *Wolfe*, ¶105. POSITAs would have understood faster communication could be achieved by either shortening the monitoring period or lengthening the wake-up duration. *Wolfe*, ¶105.

POSITAs would have recognized Nagata’s monitoring mode with a longer prescribed time interval (i.e., period) and shorter awake time (i.e., wake-up duration) teaches the *'216* patent’s “normal monitoring mode” because battery power would be conserved in the label’s normal state. *Id.*, ¶106. POSITAs would have also recognized Nagata’s monitoring mode with an increased awake time teaches the *'216* patent’s “fast monitoring mode” because the label would communicate faster with the access point than in the monitoring mode with longer prescribed time interval, consuming more power. *Id.*

Accordingly, Nagata discloses or suggests the label’s second communications part (between access points and labels) operates in both a prescribed time-delay awake mode (“normal monitoring mode”) and persistent awake mode (“fast monitoring mode”). *Id.*, ¶107.

e. Claim 1.2.2

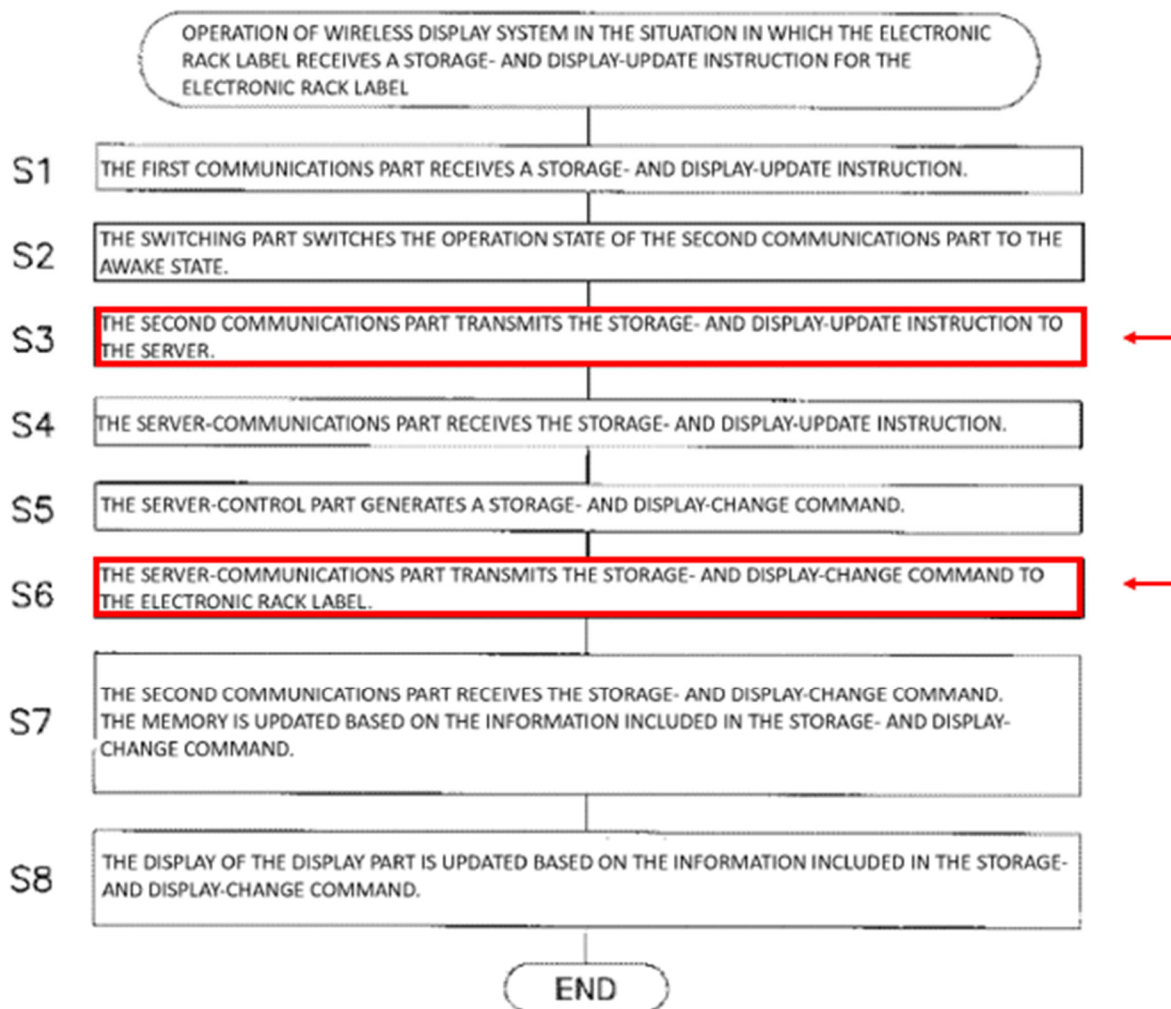
Nagata discloses or suggests 1.2.2. *Wolfe*, ¶108. Nagata’s labels have a second communications part that operates in at least a normal and fast monitoring mode as

discussed in 1.2.1. The access points communicate information to the labels from the server (and vice versa) while the labels are in those monitoring modes but cannot communicate with the labels unless the labels are in an awake state. *Nagata*, [0005], [0029], [0031]. POSITAs would have understood the access points necessarily operate in a coordinated mode with the labels because the access points can only communicate with the labels when the labels are awake in those modes. Indeed, Nagata's access points have modes corresponding to the labels' modes so they can exchange transmissions. *Id.*, [0033] ("each of the access points 30 transmits at a prescribed-time interval a signal called a beacon *timed to when the operation state of the second communications parts 42 of the electronic rack labels 40 becomes the awake state*");⁶ *Wolfe*, ¶108.

Nagata's access points receive instructions from a remote control or smart phone via the labels. *Nagata*, [0115]-[0117]. The access points transmit the instructions to a server, which generates and transmits a command back to the access points. *Id.*, [0117]-[0121]. The access points transmit beacons to the labels at coordinated, prescribed time intervals matching those of the label's mode to indicate the presence or absence of more information (e.g., the server command) for subsequent transmission to the label (i.e., via the "first communications path"). *Id.*,

⁶All emphasis is added unless otherwise noted.

[0033]. Annotated Figure 8 shows where the access points transmit (i) label-provided instructions to a server (S3), and (ii) beacons and/or server-provided commands back to labels (S6):



Nagata, Fig. 8, [0114]-[0124] (“Storage- and/or Display-Update Instruction” from smart phone or remote control), [0033] (describing access point beacon transmission from access point to label);⁷ *Wolfe*, ¶109.

When a remote control or smart phone sends a “storage- and/or display-updated instruction” or “display-switch instruction” to the label (e.g., a store employee wishing to change product information displayed by the label for a product) via the second communications path 42, the label switching part switches the second communications part into the longer duration awake state (“fast mode”). *Nagata*, [0113]-[0116], [0128]. That instruction is then sent to the access points. *Id.*, [0117], [0129]. *Wolfe*, ¶110.

Therefore, POSITAs would have recognized *Nagata*’s label-server communications through the access points require system-wide timing that causes the access points to switch into an active state (“wake up”) at different rates of communication (“normal” and “fast”) according to the rate of communications of the labels to avoid wasted power and transmissions. *Wolfe*, ¶111 (discussing *Nagata*, [0033], [0065] [0111]; *Laroia*, 2:33-50).

⁷ The Figure 8 and 9 embodiments are nearly identical. *Compare Nagata*, Fig. 8, [0114]-[0124]; *with id.*, Fig. 9, [0125]-[0135]. As discussed below, Petitioner relies on these embodiments independently, and does not combine them. *Wolfe*, ¶109.

Further, as discussed in 1.2.1, transmissions between Nagata's access points and labels are all exchanged via a "radio-wave-type wireless communication" channel ("first communication path") using each label's RF-type "second communications part 42." *Nagata*, [0031], [0033]. Although Nagata does not specifically describe the network standard for communication, POSITAs would have found it obvious to utilize widely used network standards that were well-known at the relevant time, such as IEEE 802.15.4 and/or ZigBee™, because those standards were specially and technically tuned to connect widely distributed, network-connected low-energy Bluetooth devices to a server using the unlicensed 2.4GHz Industrial, Scientific and Medical (ISM) radio frequency band. *Wolfe*, ¶¶112-13 (discussing *Bluetooth Specification*, *Weiyang*, *Cook* (EX1017-1018)).

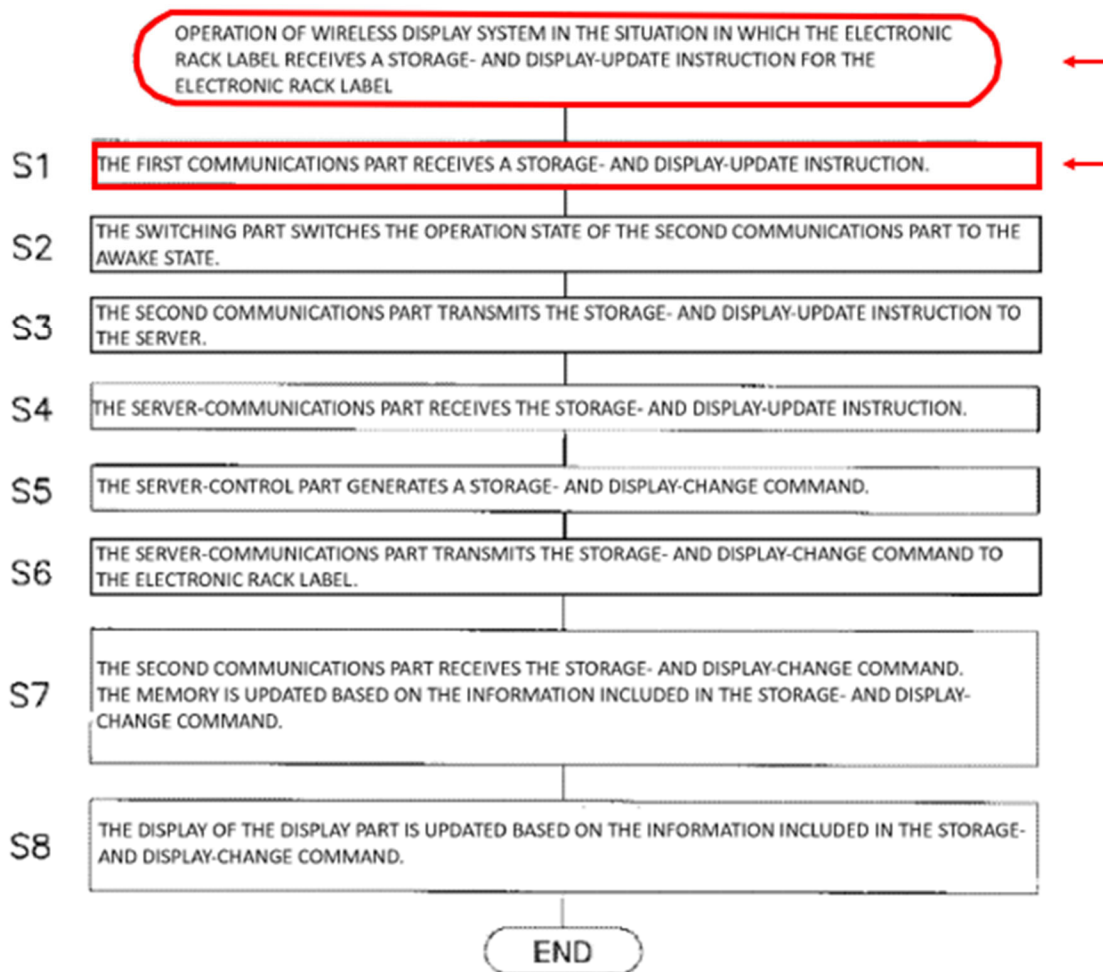
POSITAs would have further recognized this type of network offers dynamic, incremental power management to both conserve label battery power drain and improve connectivity and communicability between two devices, but only if *both* devices using the channel support that feature. *Id.*, ¶113. Therefore, POSITAs would have recognized Nagata's access points and labels likewise implement normal and fast wake-up modes to realize this known benefit. *Id.*

Accordingly, Nagata discloses or suggests each access point operates in both a short awake state at prescribed time-delay intervals ("normal wake-up mode") and

longer, awake state (“fast wake-up mode”) when communicating with the label. *Id.*, ¶114.

f. Claim 1.3

Nagata discloses or suggests 1.3. *Wolfe*, ¶115. As described in 1.1 and 1.2.2, a remote control or smart phone transmits an instruction using the first communications part of the label using NFC transmission. *Nagata*, Fig. 1 (40, 80, 180), [0038], [0044], [0052], [0114]-[0115]. This step is highlighted in annotated Figure 8, below:



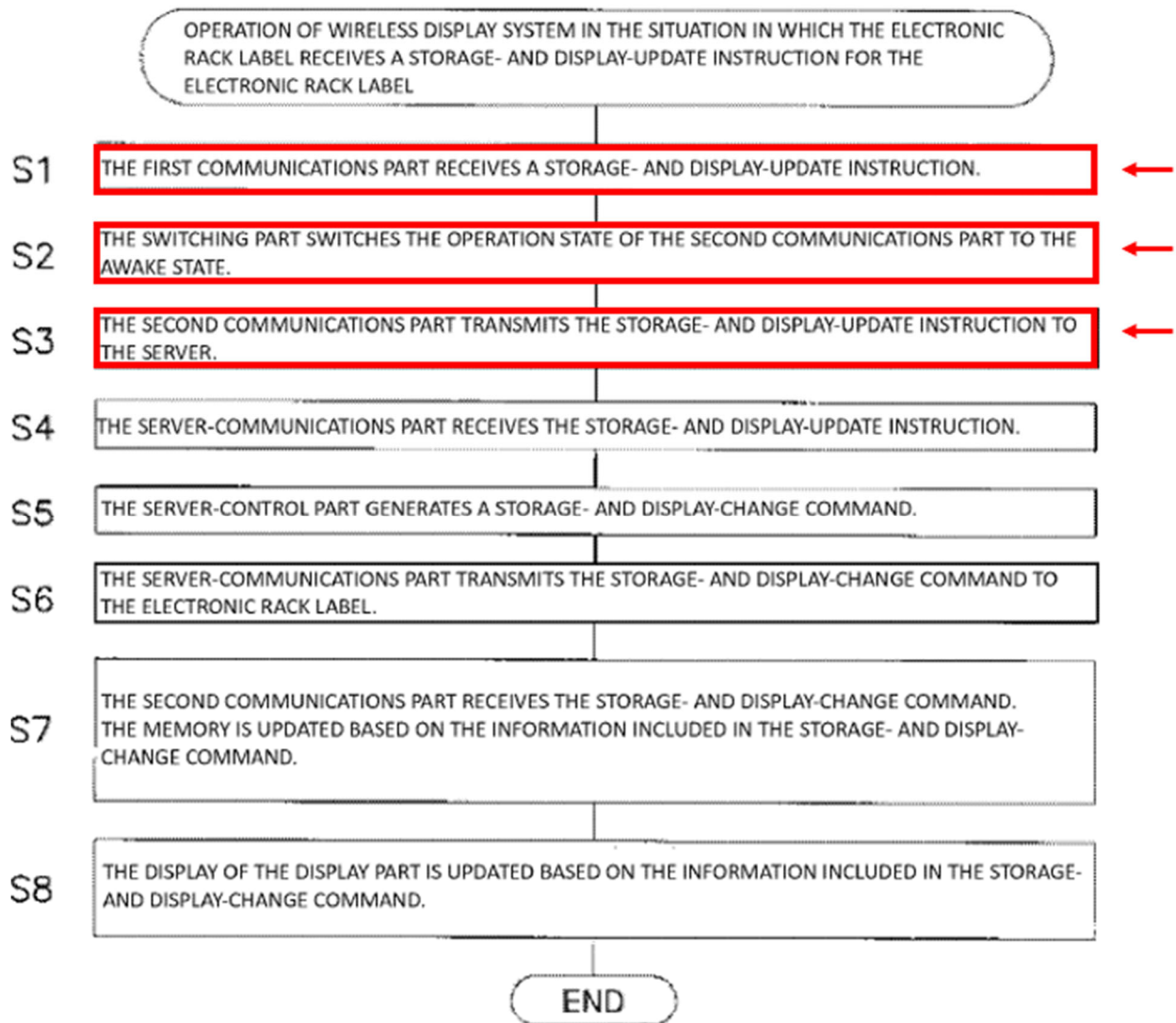
Id., Fig. 8 (S1), [0114-0115], Fig. 9 (S11), [0125]-[0127]. The instructions from the remote control or smart phone correspond to the claimed “first data.” *Wolfe*, ¶115.

Accordingly, Nagata discloses or suggests the remote control or smart phone (“external device”) transmits an instruction (“first data”) to the label (“electronic tag device”) through NFC transmissions to its first communications part (“second communication path”). *Id.*, ¶116.

g. Claim 1.4

Nagata discloses or suggests 1.4. *Wolfe*, ¶117. Nagata's label receives an instruction transmitted by the remote control or smart phone using NFC. *Nagata*, Abstract, [0051]-[0052], [0057], [0114]-[0115], [0125]. The label transmits the received instruction data to the server via an access point. *Id.*, [0064], [0066]. The label transmits that instruction to the server via the access point, and thereafter maintains the active state for the interval prescribed by the faster monitoring mode (i.e., awake for 30s) or until a command is received back from the server. *Id.*, [0057], [0079]-[0080], [0116]-[0117], [0128]-[0129].

These steps are highlighted in annotated Figure 8, below:



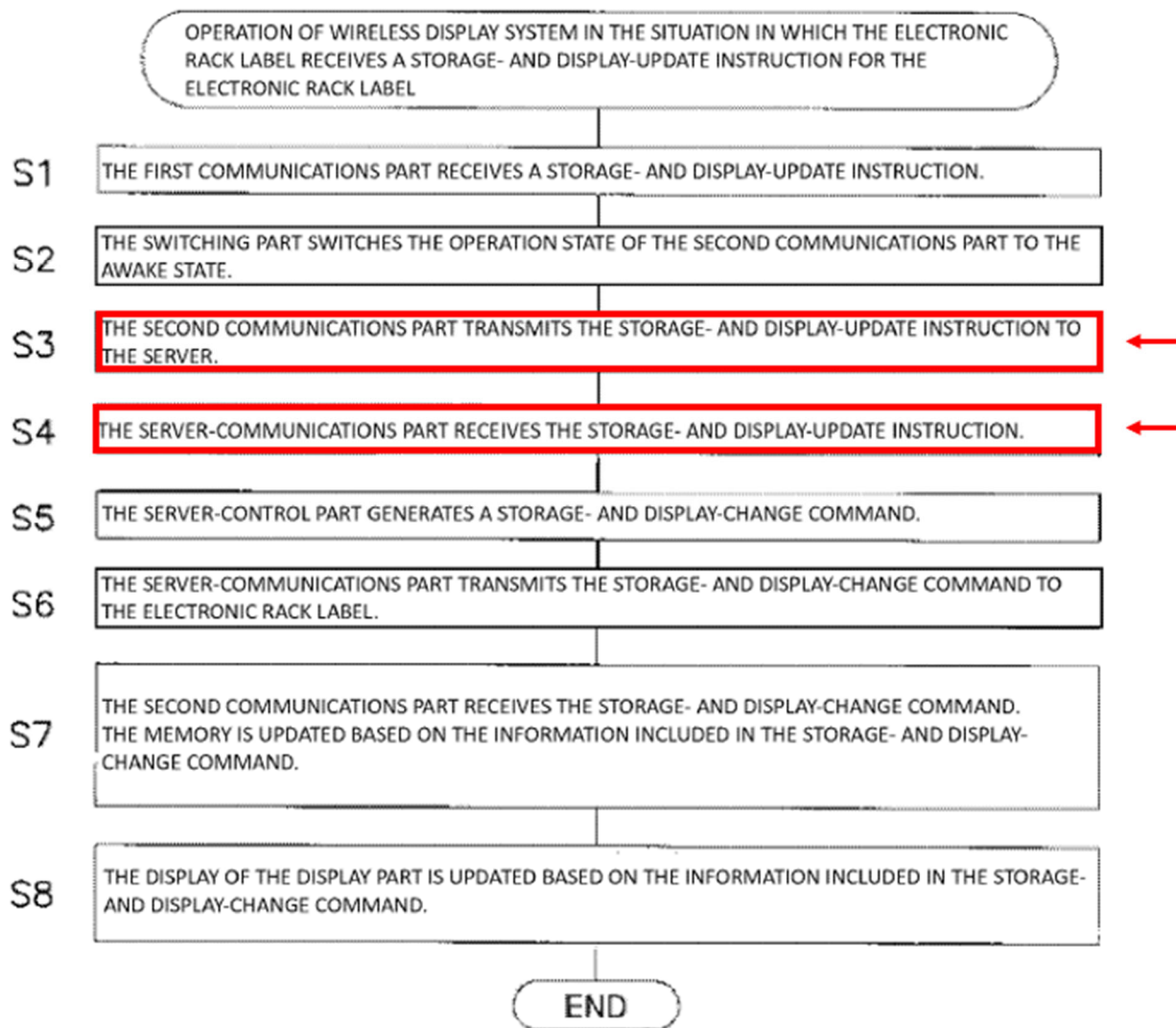
Id., [0115]-[0117], Fig. 8 (steps S1-S3); *see* [0125]-[0129], Fig. 9 (steps S11-S13), [0127]-[0129]; *Wolfe*, ¶117.

Accordingly, Nagata discloses or suggests label 40 (“electronic tag device”) receives a remote control or smart phone-initiated instruction (“configured to receive the first data”), then switches the second communication part into a longer awake

state (“enter the fast monitoring mode”) to communicate the instruction to the server via an access point (“transmit the first data to the base station”). *Wolfe*, ¶118.

h. Claim 1.5

Nagata discloses or suggests 1.5. *Wolfe*, ¶119. As discussed in 1.1 and 1.4, above, each label “exchanges information with the server via the access point.” *Nagata*, Abstract. Specifically, access point 30 receives an instruction transmitted by the label, and then relays that instruction to the server. *Id.*, [0117]-[0118], [0128]-[0129]. Server 10 only communicates directly with access points 30 and does not communicate directly with the labels. *Id.*, [0089]; *Wolfe*, ¶119. This is shown in annotated Figure 8:



Nagata, Fig. 8 (steps S3 (showing transmission via access point to server), S4), [0117] (“[I]n step S3, the control part 44 of the electronic rack label 40 controls the second communications part 42 so that the second communications part 42 transmits, to the server 10 *via the corresponding access point 30*, the storage- and display-update instruction stored in the memory 60.”), Fig. 9 (S13 and S14), [0129] (“[I]n step S13, the control part 44 of the electronic rack label 40 controls the second communications part 42 so that the second communications part 42 transmits, to the

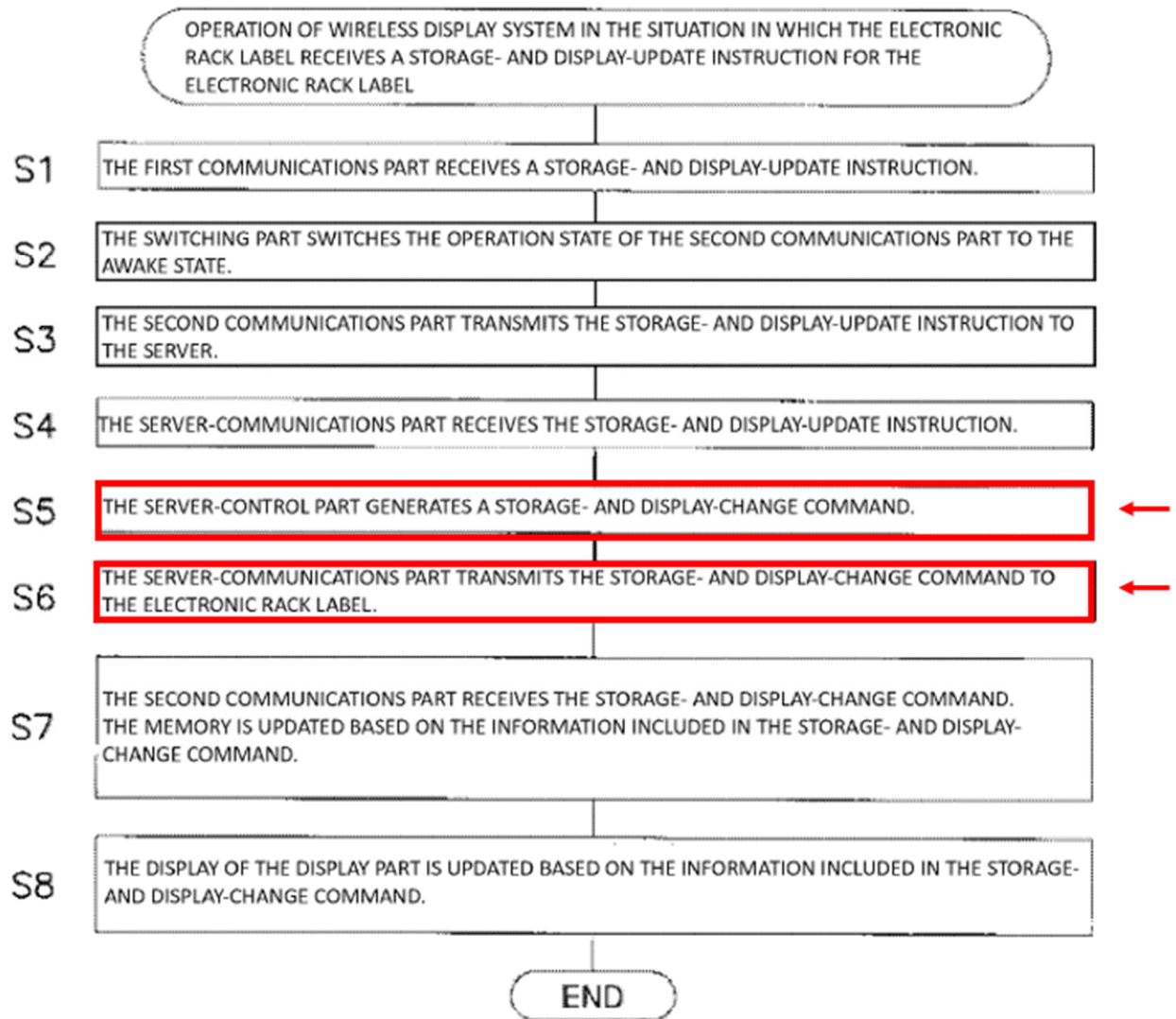
server 10 *via the corresponding access point 30*, the display-switch instruction stored in the memory 60.”); *Wolfe*, ¶119.

Accordingly, Nagata discloses or suggests transmitting the instruction (“first data”) from the remote control or smart phone to the server (“background server”) through an access point (“base station” that “receive[s]” to “transmit”). *Wolfe*, ¶120.

i. Claim 1.6

Nagata discloses or suggests 1.6. *Wolfe*, ¶121. Based on the information received from the label, the server “generates a storage- and display-change command,” which is created with data stored in the “electronic-rack-label master table” and “product master table” at the server. *Nagata*, [0119]-[0120], [0131]-[0132]. Specifically, the server generates image data including “product information related to the product P to be displayed on the display part” with respect to the label associated with an identified product P. *Id.*, [0120], [0132]. Subsequently, the server generates the command, which includes the image data, and transmits the command (with image data) back to the access point for transmission back to the respectively-identified electronic rack label. *Id.*, [0120]-[0121]. POSITAs would have understood Nagata’s server-generated command teaches the recited “control instruction” and its image data teaches the recited “second data” because the label uses the command and image data to update its display. *Compare* ’216Pat 4:38-41 (“the control instruction and data include

screen update, data update, device control, status change, and device status information query and the like”), *with Nagata*, [0123] (“the display part 41 is updated based on the information (image data...) included in the storage- and display-change command.”), [0134]. Annotated Figure 8 shows these steps:



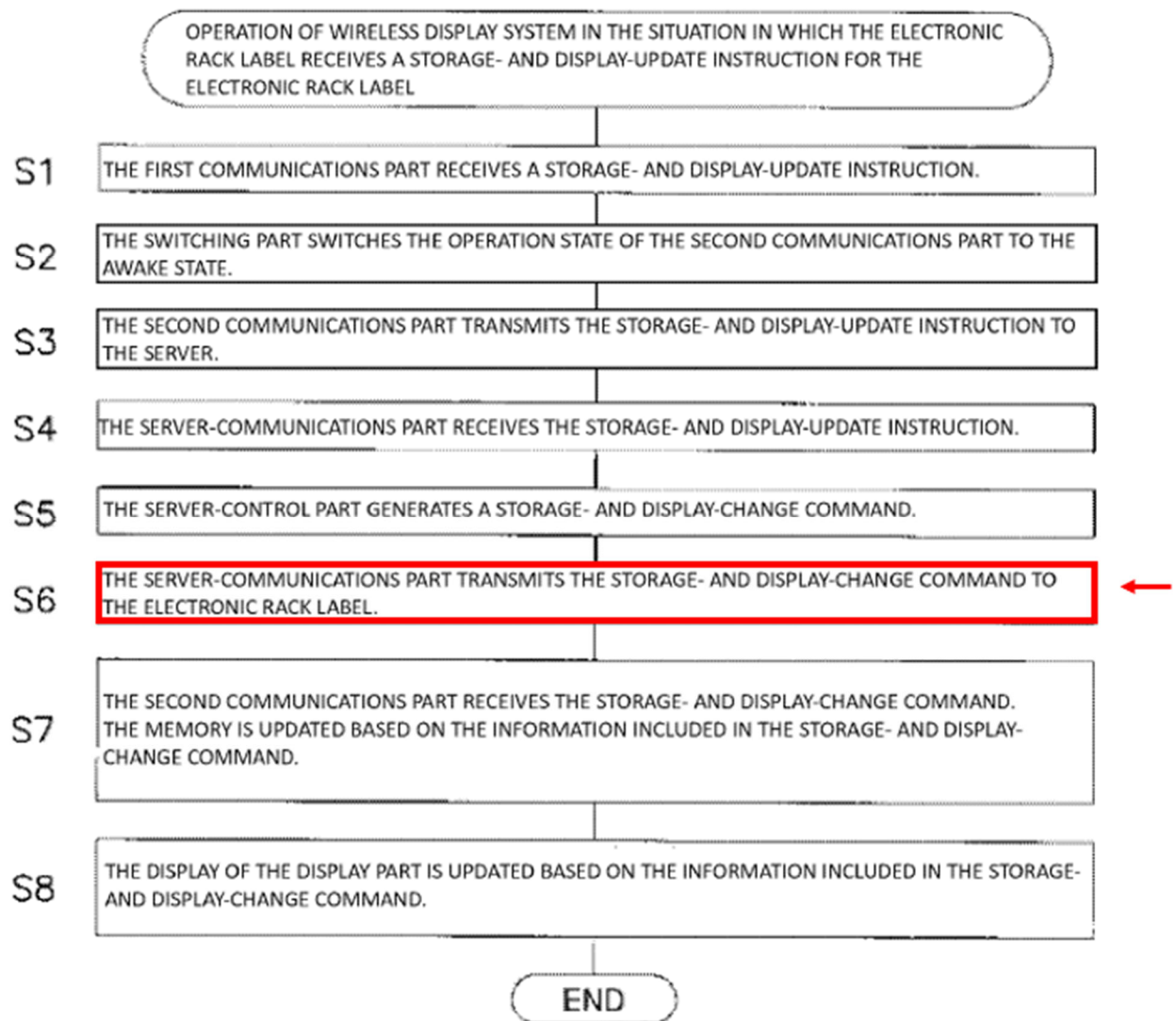
Id., Fig. 8 (steps S5, S6), [0121] (“[I]n step S6, the server-control part 15 of the server 10 controls the server-communications part 11 so that the storage- and

display-change command generated by the server-communications part 11 is transmitted to the electronic rack label 40 *via the corresponding access point 30.*”), Fig. 9 (steps S15, S16), [0133] (stating steps S16-S17 are the same as S6-S7); *Wolfe*, ¶121.

Accordingly, Nagata discloses or suggests a server (“background server”) generates a storage- and display-change command (“control instruction”) including image data (“second data”) that is transmitted back to the label through an access point (“base station”). *Wolfe*, ¶122.

j. Claim 1.7

Nagata discloses or suggests 1.7. *Wolfe*, ¶123. As discussed in 1.6, the server transmits the command with image data to the label via an access point. *Nagata*, [0121], [0133]. As described in 1.2.2 and 1.4, POSITAs would have recognized the label remains in a longer or persistent awake transmission state that is matched by access point 30 while the server processing occurs. The access point then transmits the server-generated command to the label. *Id.*, [0121] (“[I]n step S6, the server-control part 15 of the server 10 controls the server-communications part 11 so that the storage- and display-change command generated by the server-communications part 11 is transmitted to the electronic rack label 40 *via the corresponding access point 30*”). This is shown in annotated Figure 8:



Id., Fig. 8 (step S6), Fig. 9 (S16) [0133] (stating steps S16-S17 are the same as S6-S7); *Wolfe*, ¶123.

Furthermore, Nagata's access point precedes every information transmission to the electronic rack label with a timed beacon that indicates either the "presence or absence of information transmission" following the beacon. *Nagata*, [0033], [0083]. Regardless of whether the label initiated the command or the server itself initiated a

command, POSITAs would have understood the access point would have transmitted a beacon preceding the server-generated command including image data before transmitting the command to ensure the label remains in the active transmission state to ensure reception of the server command. *Wolfe*, ¶124. Because the beacon is sent to maintain the label in the fast-monitoring mode, POSITAs would have understood the beacon teaches a “fast wake-up instruction.” *Id.*

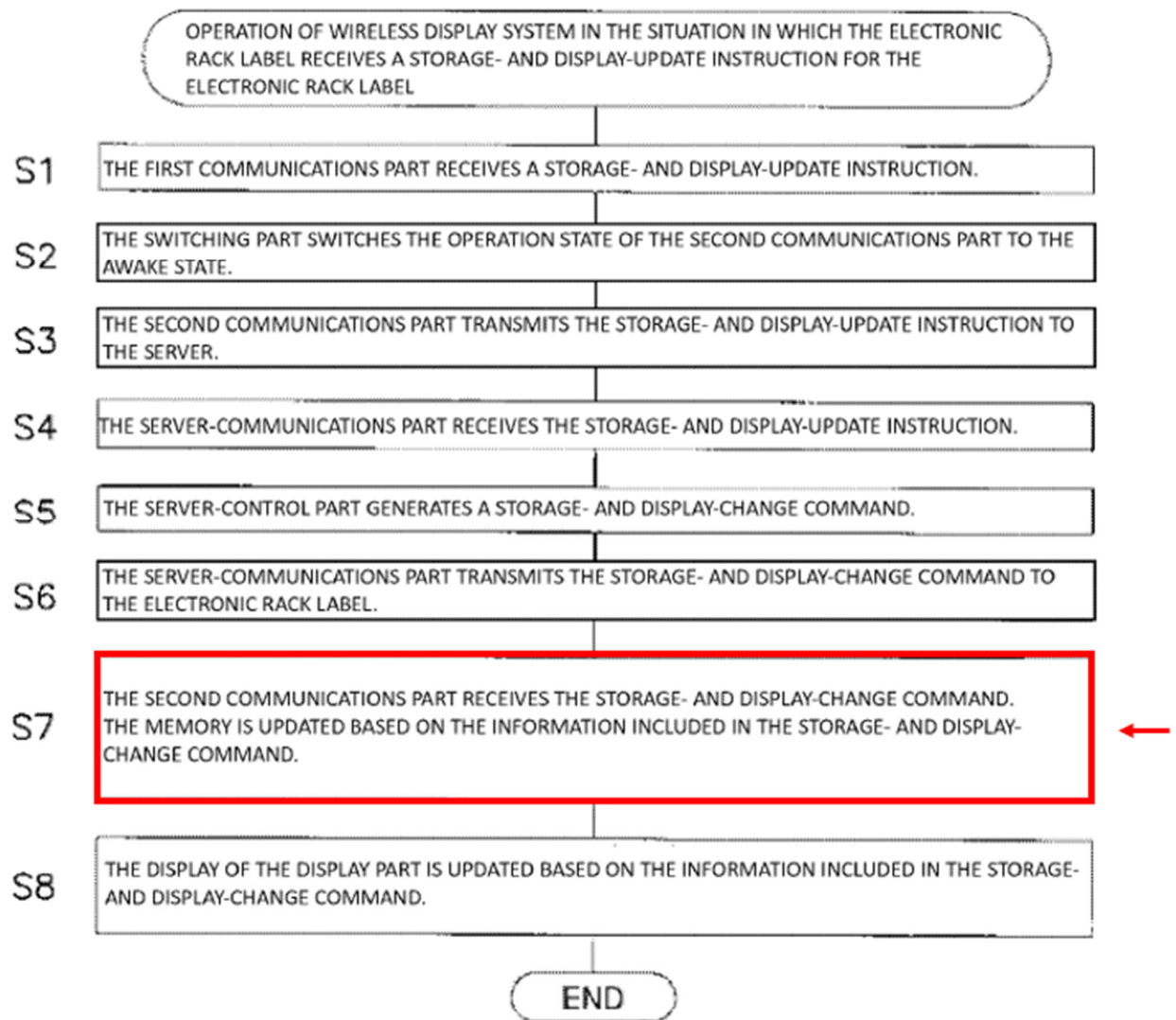
To the extent that PO argues that Nagata’s beacon indicating forthcoming data is not the claimed “fast wake-up instruction,” Nagata still discloses or suggests this limitation. *Id.*, ¶125. As discussed above, Nagata’s access point sends a beacon indicating the “absence of information” when no command from the server is sent. POSITAs would have recognized that receiving the “absence”-indicating beacon enables the label to exit the fast monitoring mode and return to its lower power monitoring mode to conserve battery power. *Nagata*, [0033]-[0034]; *Wolfe*, ¶125. Therefore, to the extent PO argues that the “fast wake-up instruction” must revert the label to the normal low-power mode, Nagata teaches it. *Wolfe*, ¶125.

Additionally, POSITAs would have understood Nagata discloses or suggests the access point (“base station”) receives the server-generated command with image data (“control instruction and the second data”) and transmits a beacon (“fast wake-up instruction”) to the label before the command to ensure the label remains in the

awake operation state (“communicate with the electronic tag device in the fast wake-up mode”). *Id.*, ¶126.

k. Claim 1.8

Nagata discloses or suggests 1.8. *Wolfe*, ¶127. As discussed in 1.2.2, above, the label receives the server-generated storage- and display-change command as highlighted in annotated of Figure 8:



Nagata, Fig. 8 (step S7), [0122], Fig. 9, [0133]. As discussed in 1.7, the label first receives a beacon preceding the server-generated command and remains in an awake operation state to receive that command before reverting back to a sleep state. *Wolfe*, ¶128. *Nagata* further explains that the label only remains in the mode with the longer prescribed interval (“fast monitoring mode”) for 30s or until it receives the command. *Nagata*, [0116], [0128]. Furthermore, when no additional data is received by the label from the server, no other beacons would be sent by the access points. *Wolfe*, ¶128. POSITAs would have understood the second communications part in *Nagata*’s label would revert back to its normal state, which is a one-second periodic awake state, after the command is received or after the awake time elapsed. *Nagata*, [0083]; *Wolfe*, ¶128.

Accordingly, POSITAs would have understood *Nagata* discloses or suggests the label (“electronic tag device”) receives a beacon (“fast wake-up instruction”) before receiving the server-generated command with image data (“control instruction and second data”) and reverts back to a normal state (“normal monitoring mode”) once the command has been implemented at the label (“after completing the communication”). *Wolfe*, ¶129.

3. Independent Claim 7

Nagata discloses or suggests claim 7 for substantially the same reasons as claim 1, as discussed in Section VII.A.2, because the claims are substantively

identical and Nagata further discloses steps of a method that “performs communication” using the same “wireless display system” described above. *Nagata*, Abstract. Compare claim limitations 1.0-1.8, with claim limitations 7.0-7.7. *Wolfe*, ¶130.

Claim limitation 7.0 is substantially similar to 1.0, except that it recites a “method” instead of a “system.” *Wolfe*, ¶131. As discussed in VII.A.2, Nagata describes the recited method because it discloses “step[s]” to perform the claimed wireless communication of claim 7. *Nagata*, [0115]-[0135].

The table below correlates the reasons why Nagata discloses or suggests the limitations of claim 1 with limitations 7.1-7.7. *Wolfe*, ¶132.

Claim 7		
Limitation	Substantially Similar Limitation(s)	Reference
7.1	1.3	§VII.A.2.f
7.2	1.4	§VII.A.2.g
7.3	1.5	§VII.A.2.h
7.4	1.6	§VII.A.2.i
7.5	1.7	§VII.A.2.j
7.6	1.8	§VII.A.2.k
7.7	1.2-1.2.2	§§VII.A.2.c-VII.A.2.e

4. Independent Claim 14

Nagata discloses or suggests claim 14 for substantially the same reasons as claim 1, as discussed above in Section VII.A.2, because the claims are substantively

identical and Nagata further discloses both the label and server components execute RAM- and ROM- stored programs with steps to “perform[] communication” in the same “wireless display system” described above. *Nagata*, Abstract, [0074]-[0076], [0094]. *Compare* 14.0-14.7, with 1.0-1.8. *Wolfe*, ¶133.

Claim limitation 14.0 is substantially similar to 1.0 and 7.0, except that it recites a “non-transitory computer-readable storage medium storing therein a computer program for executing” instead of a “system” or “method.” *Wolfe*, ¶134. 14.0 is disclosed for the reasons below and those already discussed above in §§VII.A.1, VII.A.3. *Id.*

The table below correlates the reasons why Nagata discloses or suggests the limitations of claim 1 with the limitations 14.1-14.7. *Wolfe*, ¶135.

Claim 14		
Limitation	Substantially Similar Limitation(s)	Reference
14.1	1.3	§VII.A.2.f
14.2	1.4	§VII.A.2.g
14.3	1.5	§VII.A.2.h
14.4	1.6	§VII.A.2.i
14.5	1.7	§VII.A.2.j.
14.6	1.8	§VII.A.2.k.
14.7	1.2-1.2.2	§§VII.A.2.c-VII.A.2.e

To the extent PO argues, or the Board finds, this claim requires the base station includes a non-transitory computer-readable storage medium storing therein a computer program for executing the method recited in 14, Nagata renders this element obvious. *Wolfe*, ¶136.

POSITAs would have been motivated to include a program or software for execution in Nagata's access point because the access point performs synchronized wireless communications with other devices implementing memory storing programs or software for executing similar steps. *Id.*, ¶137. Nagata teaches the access point "is a communications apparatus that performs radio-wave-type wireless communication" between the server and electronic rack label via network 2, e.g., "a LAN (local-area network)." *Nagata*, [0005], [0010], [0012], [0016], [0030]-[0031], [0033], [0083]. POSITAs would have been motivated to implement a memory (non-transitory computer-readable storage medium) storing the program or software for execution to perform the steps required for the access point to synchronize communication with the label and packetize information for transmission via a LAN. *Wolfe*, ¶138. Inclusion of a memory in communications components was known in the art to POSITAs, for example, as taught by Nagata. *Nagata*, [0030], [0037], [0045], [0074]-[0076], [0094], [0102], [0195]; *Wolfe*, ¶138.

POSITAs would have been motivated to implement a memory in Nagata's access points because it represents a known technique used to improve similar

devices (e.g., other wireless communication devices), which implement wireless communication, packet routing, and synchronization operations. *Nagata*, [0030], [0037], [0045], [0074]-[0076], [0094], [0102], [0195]; *Wolfe*, ¶139. POSITAs would have also found such techniques obvious to try as a known way of implementing wireless communication, packet routing, and synchronization between a label or other wireless device and a server. *Nagata*, [0030], [0037], [0045], [0074]-[0076], [0094], [0102], [0195]; *Wolfe*, ¶¶139-40 (citing *Laroia*, Figs. 2, 14, 6:30-42, 25:10-33, 31:10-34).⁸

POSITAs would have reasonably expected success in including a non-transitory computer-readable storage medium to store instructions for execution in Nagata's access point because each of Nagata's other devices that communicate with the access point includes a memory storing software or programs for execution, as

⁸ *Laroia*, *Röβl*, and *Afroz* are cited in this Petition to demonstrate POSITA's knowledge and/or as evidence to support motivation to combine in the manner discussed in this Petition. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007) ("[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed."). These exhibits are not part of the unpatentability grounds.

discussed above. *Nagata*, [0030], [0037], [0045], [0074]-[0076], [0094], [0102], [0195]; *Wolfe*, ¶141.

Storing software or programs in a memory would have been a straightforward application of known, conventional wireless communication operations (storing software or programs for execution in hardware devices, such as access points) used according to their known functions to yield predictable results (allowing the hardware device to perform wireless communications, packet routing, and synchronization). *Nagata*, [0030], [0037], [0045], [0074]-[0076], [0094], [0102], [0195]; *Wolfe*, ¶142; *KSR*, 550 U.S. at 416.

5. Claims 2, 8, 15

Claims 2, 8, and 15 depend from claims 1, 7, and 14, respectively, which as discussed above, *Nagata* discloses or suggests. *Wolfe*, ¶143. *Nagata* further discloses or suggests claim 2's additional limitation. *Id.*

Each label contains a memory that stores its respective apparatus ID. *Nagata*, [0075]. *Nagata* explains that when the label transmits the instruction received from the remote control or smart phone to the server, “[t]he apparatus ID...is affixed to the...instruction transmitted to the server 10” to identify that specific label. *Id.*, [0117], [0129]. Accordingly, *Nagata* discloses or suggests claim 2's additional limitation. *Wolfe*, ¶144.

Claims 8 and 15 are substantially similar to claim 2, except that they recite a “method” and a “non-transitory computer-readable storage medium storing therein a computer program for executing” instead of a “system.” *Id.*, ¶145. For the reasons discussed above for claim 2, Nagata discloses or suggests claims 8 and 15. *Id.*

6. Claims 5, 11, 18

Claims 5, 11, and 18 depend from claims 1, 7, and 14 respectively, which as discussed above, Nagata discloses or suggests. *Wolfe*, ¶146. Nagata further discloses or suggests claim 5’s additional limitation. *Id.*

As discussed above, access point 30 transmits beacons to the labels indicating the “presence or absence of information transmission” at a prescribed time interval corresponding to the label’s mode. *Nagata*, [0033]; *see* 1.2.1, 1.2.2. As described in 1.7, POSITAs would have recognized the beacon, indicating the presence of following information, discloses or suggests a “fast wake-up instruction.” *Wolfe*, ¶147. Nagata explains that if “information is not to be transmitted to one of the...labels 40, the access point 30 transmits a beacon that reports to the electronic rack label 40 that information will not be transmitted.” *Nagata*, [0033]. However, if the label receives a beacon indicating subsequent data, the label extends its awake state for an additional amount of time (e.g., 30 seconds), thereby maintaining the faster mode. *Id.*, [0083], [0116], [0128]. POSITAs would have thus understood that if the data is not to be received, e.g., a beacon indicating no data or the label awake

state times out, the label will not extend its awake time and will revert to the normal mode of one second on every one minute (“normal monitoring mode”) once the current prescribed-time interval elapses. *Wolfe*, ¶147; *Nagata*, [0083] (explaining that if the label does not receive a beacon indicating data, it is normally in a lower power mode, switching on for one second, once a minute), [0116] (the label stays “in the awake state for a prescribed interval (e.g., 30 s)”), [0128] (same).

Alternatively, to the extent that the beacon indicating that no subsequent data will be transmitted is the “fast wake-up instruction,” as discussed above in 1.7, POSITAs would have nevertheless understood that if no communication is received by the label, the label will not extend its awake time and will revert to the normal mode of one second on every one minute (“normal monitoring mode”) once the current prescribed-time interval elapses. *Wolfe*, ¶148; *Nagata*, [0033]-[0034], [0083], [0116], [0128]. This curtails the power consumption of the battery instead of keeping the label in the awake state if communication with the access point is lost. *Nagata*, [0029], [0034]; *Wolfe*, ¶148.

Claims 11 and 18 are substantially similar to claim 5, except that they recite a “method” and a “non-transitory computer-readable storage medium storing therein a computer program for executing” instead of a “system.” *Wolfe*, ¶149. For the reasons discussed for claim 5, *Nagata* discloses or suggests claims 11 and 18. *Id.*

7. Claims 6, 12, 19

Claims 6, 12, and 19 depend from claims 1, 7, and 14 respectively, which as discussed above, Nagata discloses or suggests. *Wolfe*, ¶150. Nagata further discloses or suggests claim 6’s additional limitation. *Id.*

As discussed for claim 5, in normal mode a label wakes up once every minute for one second to receive a beacon transmitted by the access point indicating the presence or absence of following information. *Id.*, ¶151. When a transmitted beacon indicates the presence of information (“fast wake-up instruction”), the label maintains an awake operation (“fast monitoring mode”) for a prescribed interval (“present time range”) rather than immediately returning the label to its normal state (“normal monitoring mode”). *Nagata*, [0033]. That time interval may be thirty seconds. *Id.*, [0083]. POSITAs would have understood the label would have switched back to its normal state once thirty seconds elapsed, even if no server command with image data is received, because this curtails the power consumption of the battery instead of keeping the label in the awake state until the information from the server (“control instruction and second data”) is received. *Id.*, [0029], [0034]; *Wolfe*, ¶151.

Indeed, Nagata expressly discloses the labels revert to sleep state after an elapsed period of time (e.g., 30 seconds), *unless* the labels switch into an awake state conditioned upon receipt of a server command. *Nagata*, [0116], (disclosing that a

label switches its communications part 42 into an awake state for 30 seconds, but may “instead” (alternatively) maintain that awake state “until the second communications part 42 receives a storage- and display-change command in step S7”), [0138] (disclosing same). POSITAs would have understood Nagata’s label reverts to a sleep state by default within a prescribed amount of time (e.g., 30s), unless the switching part is *expressly* programmed to maintain the awake state longer upon condition of a receipt of the server command. *Wolfe*, ¶152. By expressly teaching the alternative, Nagata teaches that labels revert to a sleep state, ending the fast monitoring mode when 30 seconds elapses (“within a present time range”) whether or not that label receives the server command (“control instruction and second data”) *unless* expressly programmed to do so. *Id.* POSITAs would have also understood that without the remote or smart phone communicating with the label to send another instruction, the label would reenter its normal mode of awaking for one second every minute. *Nagata*, [0083]; *Wolfe*, ¶152.

Alternatively, to the extent that the beacon indicating that no subsequent data will be transmitted is the “fast wake-up instruction,” as discussed above in 1.7, POSITAs would have understood that the label would not extend its awake time and revert to its normal mode of awaking for one second every minute because no further data is expected to be received. *Nagata*, [0083]; *Wolfe*, ¶153. This curtails the power

consumption of the battery instead of keeping the label in the awake state if communication with the access point is lost. *Wolfe*, ¶153.

Claims 12 and 19 are substantially similar to claim 6, except that they recite a “method” and a “non-transitory computer-readable storage medium storing therein a computer program for executing” instead of a “system.” *Id.*, ¶154. For the reasons discussed for claim 6, Nagata discloses or suggests claims 12 and 19. *Id.*

8. Claim 13

This claim is substantially similar to claims 1, 7, and 14, except that claim 13 also recites “executable by [a] processor.” *Wolfe*, ¶155. Nagata discloses or suggests three processor components used to execute the steps described in claim 7. First, each smart phone/remote control includes a CPU for executing memory-stored instructions. *Nagata*, [0037], [0045]; *Wolfe*, ¶155. Second, the labels each contain a “control part 44” with a CPU for executing a program that POSITAs would have recognized as a processor. *Nagata*, [0074]-[0076]; *Wolfe*, ¶155. Third, Nagata’s server is a “common computer” with “control part 15” that POSITAs would have recognized includes a processor for executing “[v]arious programs.” *Nagata*, [0087], [0094], [0102]; *Wolfe*, ¶155. These processing components in these devices execute stored instructions, i.e., programs, to carry out the claimed steps of claim 7 as discussed for claims 1, 7, and 14 in §§VII.A.2, VII.B.3. *Wolfe*, ¶155.

B. Ground 2: Nagata in view of Hashiguchi renders Claims 1, 2, 5-8, 11-15, 18, 19 obvious

As discussed above, Nagata alone renders obvious the claims challenged in Ground 1. Petitioner challenges those same claims in Ground 2, showing they would have also been obvious over the combination of Nagata and Hashiguchi. To the extent Patent Owner argues, or the Board finds, Nagata does not disclose or render obvious 1.2.1, 1.2.2, 1.4, 1.7, 1.8, 7.2, 7.5, 7.6, 7.7, 14.2, 14.5, 14.6, and 14.7, the combination of Nagata and Hashiguchi renders these limitations obvious.⁹ *Wolfe*, ¶156.

1. Hashiguchi

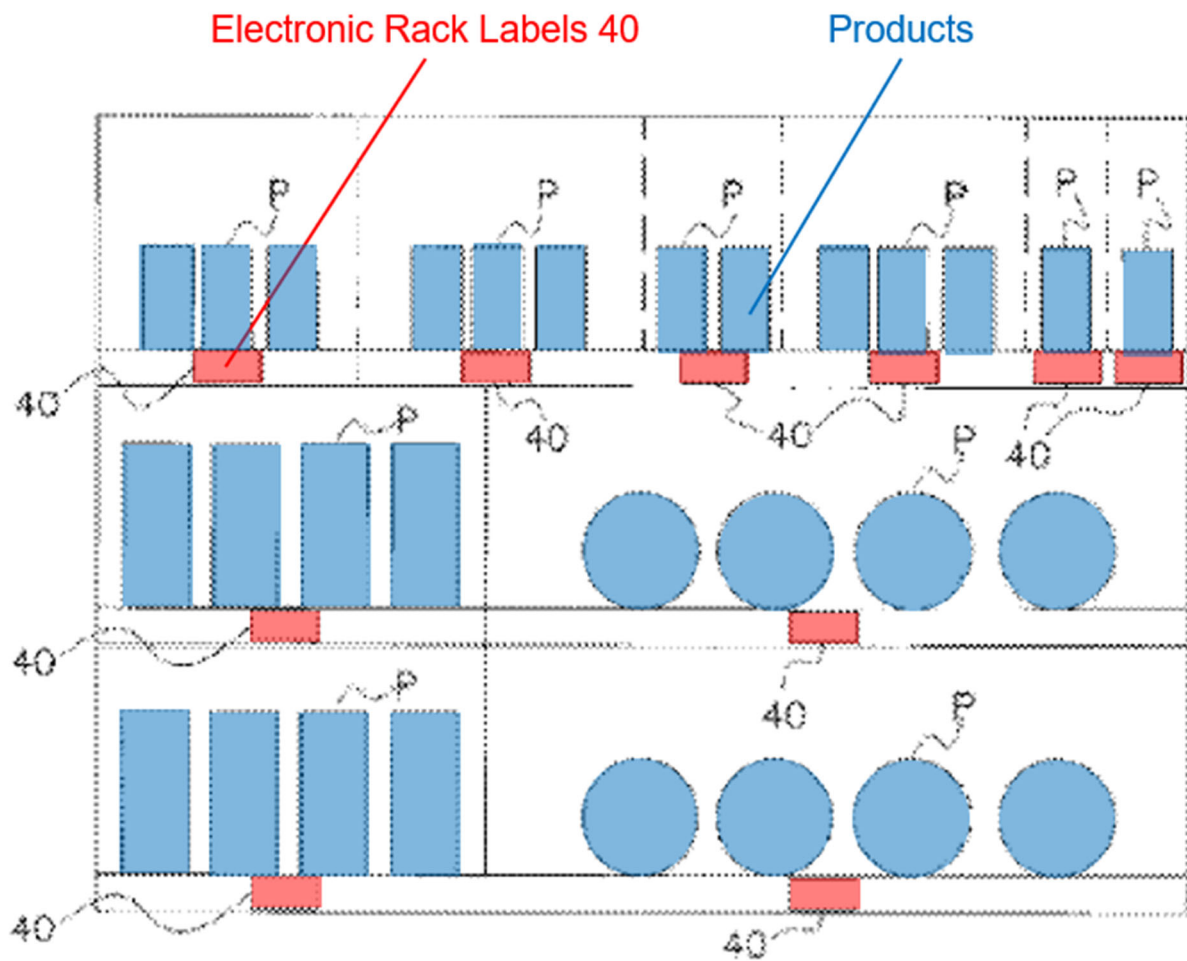
Hashiguchi (EX1006) is analogous art to the '216 patent. *Wolfe*, ¶81.

Hashiguchi shares an Applicant (Ishida Co., Ltd.) and inventorship (Nobuki Hashiguchi) with Nagata. *Compare Hashiguchi*, Cover with, *Nagata*, Cover; *Wolfe*, ¶76. Like Nagata, Hashiguchi¹⁰ is directed to an electronic rack label (“label”) and

⁹ Petitioner explains in Section VII.A Nagata discloses or suggests the remaining limitations.

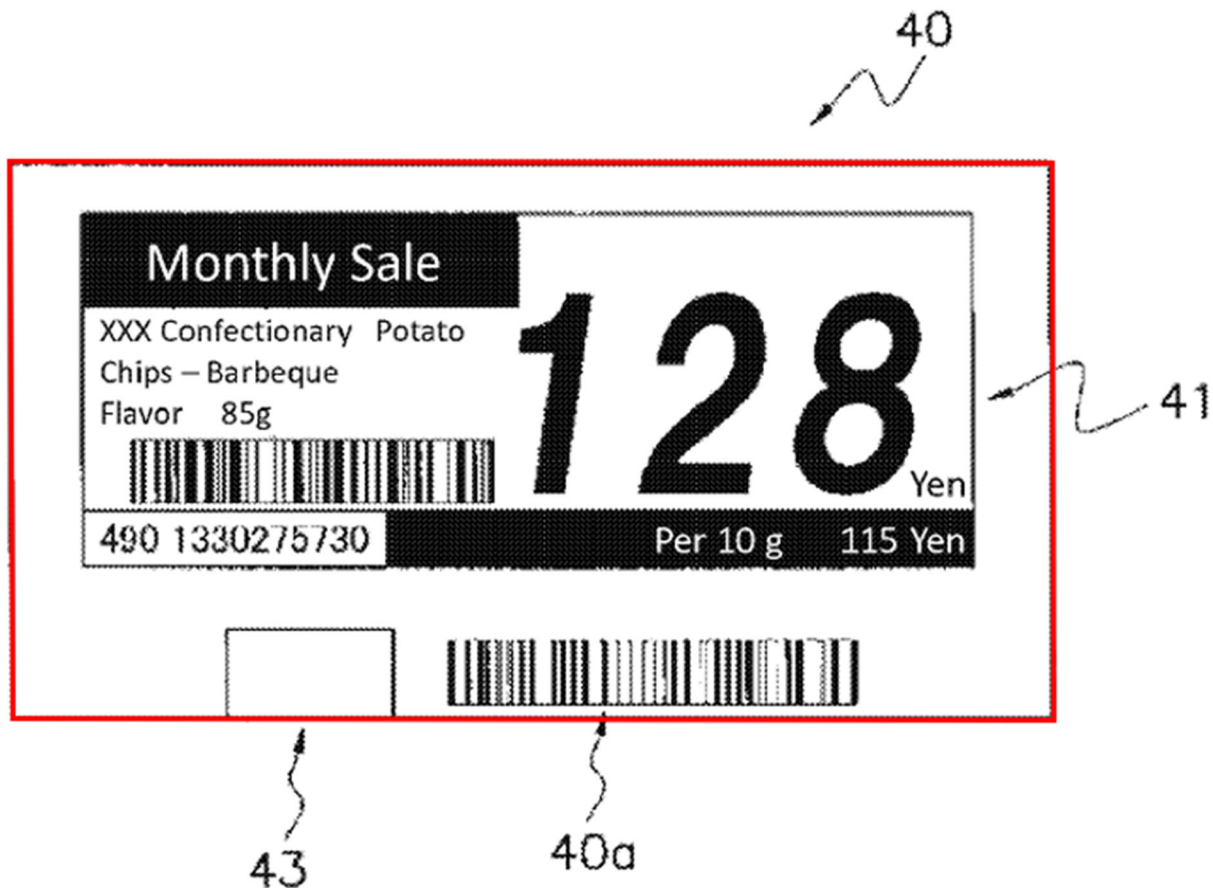
¹⁰ Hashiguchi discloses two embodiments, and most of the first is incorporated into the second. *Compare Hashiguchi*, Fig. 1, [0026]-[0028] with, *id.*, Fig. 9, [0109]-[0113]. Petitioner is not combining embodiments in this Ground, but rather cites the

wireless display system that utilizes labels to display updatable product information of products associated with those labels. *Hashiguchi*, Abstract, [0027], [0030]; *Wolfe*, ¶77. Products (blue) are displayed above the labels 40 (red) as shown in annotated Figure 2:



first embodiment where Hashiguchi expressly incorporates it into the second embodiment. *Wolfe*, ¶80.

Hashiguchi, Fig. 2, [0029]; *Wolfe*, ¶77. As in Nagata, each label (red) displays product information such as the type of product, its price, and a barcode affiliated with that product as shown in Figure 3:



Hashiguchi, Fig. 3, [0034]; *Wolfe*, ¶77. A worker may link a product to a label and instruct the label to display that product information in a linking operation. *Hashiguchi*, [0032], [0135] (describing handy terminal and electronic rack label operations), [0055]-[0059] (describing server and access point transmission operations); *Wolfe*, ¶78.

Because the labels are battery operated, their power consumption must be managed to prevent excessive battery power drain and replacement. *Hashiguchi*, [0045], [0067]-[0069]; *Wolfe*, ¶79. The labels thus transition between sleep and awake modes to communicate according to known time intervals and durations synchronized with the access point and server to carry out an instruction, for example, to change the label's display. *Hashiguchi*, [0068]-[0071]; *Wolfe*, ¶79. Like Nagata, the access points further use beacons to prepare the label to receive and implement a server-generated command (thereby consuming battery power) or return to sleep (to save battery power). *Hashiguchi*, [0127]-[0129]; *Wolfe*, ¶79.

2. Independent Claim 1

a. Claim 1.2.1

The Nagata-Hashiguchi combination teaches 1.2.1. *Wolfe*, ¶157. Like Nagata, Hashiguchi's label 240 communicates with access point 30 (via communications part 42). Also, like Nagata, label 240 has a "sleep state" where "electric power is not supplied" to "communications part 42" and it does not communicate with access point 30, and an "awake state" where "electric power is supplied" to "communications part 42" to communicate with access point 30. *Hashiguchi*, [0037], [0045], [0123]-[124]. Cycling between the sleep state and awake state is controlled by control part 244 of label 240, which sets "ratios of the sleep state time and the awake state time" to operate different "control modes." *Id.*, [0037], [0043],

[0115], [0123]. These “ratios” of sleep-state time and awake-state time describe how frequently the electronic rack label wakes up to check for information. *Id.*, [0042], [0067], [0068], [0070]-[0071], [0101], [0107], [0138]-[0139]; *Wolfe*, ¶157.

Hashiguchi discloses two label operation modes defined by an access point communication rate with a label for a duration state. In “energy-saving mode,” the label awakens at “comparatively long intervals of time” and communicates at a “normal” rate for a short duration. *Hashiguchi*, [0127] (describing access point “normal command transmission mode” communicating at a rate of 20-second intervals), [0138] (label awakens every 20 seconds in energy-saving mode for a duration of time, Δt , which is 150 milliseconds). In “active mode,” the communication duration remains the same, but the label awakens at “comparatively short intervals of time” and communicates at a “rapid interval.” *Id.*, [0070], [0128] (describing an access point “rapid command transmission mode” communicating at a rate of 4-second intervals), [0139] (label awakens every 4 seconds in the active mode for the same duration, Δt); *Wolfe*, ¶158.

Hashiguchi’s two modes are similar to Nagata’s because they follow a scheduled and “repetitively” performed rate of waking up an electronic rack label to check for information from an access point. *Nagata*, [0029], [0033], [0083]. But whereas Nagata varies the *duration* characteristic of the label’s modes and holds the duration state constant, Hashiguchi varies the *rate* characteristic of the label’s modes

(how often the label switches into awake mode) while holding the duration of that mode constant (how long awake mode lasts). *Compare Nagata*, [0083], with *Hashiguchi*, [0138]-[0139]; *Wolfe*, ¶159.

This enables Hashiguchi to increase the electronic rack label's communicative responsiveness while decreasing its battery power drain. *Wolfe*, ¶160. Specifically, Hashiguchi's disclosed 20- and 4-second wake time intervals occur more frequently than Nagata's 1-minute (60-second) wake times, which enables Hashiguchi's label to "listen" for signals more often per period of time. *Compare Hashiguchi*, [0138]-[0139] with, *Nagata*, [0083]; *Wolfe*, ¶160 (explaining that Hashiguchi's label wakes up 3 or 15 times a minute according to the 20- or 4-second wake up frequency, while Nagata's label awakens only once a minute). In linear correlation, POSITAs would have recognized Hashiguchi's label is therefore also available to receive instructions and commands 3 to 15 times a minute. *Wolfe*, ¶160.

POSITAs would have also understood that Nagata's label remains awake for longer durations of time (e.g., 30 seconds) once awakened, which requires more battery power to be supplied for a longer duration than Hashiguchi's shorter duration of time (e.g., 150 milliseconds (ms)). *Nagata*, [0083], *Hashiguchi*, [0138]-[0139]. POSITAs would have therefore understood that Hashiguchi's label communication components are able to communicate more often using less battery power because they are awakened more frequently for less time than Nagata's. *Wolfe*, ¶161

(explaining the product of Hashiguchi's 15 wakes of the communications components for 150 milliseconds per minute (2,250ms) requires less powered "on" time than the product of Nagata's single wake for 30 seconds (30,000ms)).

Thus, POSITAs would have been motivated to use Hashiguchi's awake time ratios so that the amount of time spent in the "awake state is less" and, therefore, "power consumption of the battery is less." *Hashiguchi*, [0008], [0138]-[0139]; *Wolfe*, ¶162. In tandem, POSITAs would have been motivated to implement Hashiguchi's increasingly frequent awake times into Nagata's label switching processes at shorter durations to, e.g., rewrite the product information on label within a shorter time. *Hashiguchi*, [0009]-[0010], [0083]-[0084], [0147]; *Wolfe*, ¶162.

As noted above, Hashiguchi and Nagata share inventors, Applicants, content, and explanation for their similar disclosures. *Wolfe*, ¶163. Thus, POSITAs would have understood that Nagata and Hashiguchi were combinable. *Id.* POSITAs would have also been motivated to combine them because this implementation would have required nothing more than the application of known, conventional techniques (switching the label communications component into an awake state at timed intervals and durations using label CPU-executed processes) to yield predictable results (switching into the awake state more often for less time) as described in Nagata and Hashiguchi. *Hashiguchi*, [0127]-[0129], [0138]-[0139], [0147], [0157]; *Nagata*, [0033], [0083]; *Wolfe*, ¶163; *KSR*, 550 U.S. at 416; *see also ZUP, LLC v.*

Nash Mfg, Inc., 896 F.3d 1365, 1371-73 (Fed. Cir. 2018) (internal citations omitted) (quoting *KSR*, 550 U.S. at 418-21) (upholding invalidity for obviousness over combination of two patents to the same inventor directed to solving the same problem because the “motivation to combine may be found explicitly or implicitly in...‘interrelated teachings of multiple patents’”).

b. Claim 1.2.2

The Nagata-Hashiguchi combination teaches 1.2.2. *Wolfe*, ¶164. As discussed in 1.2.1, Hashiguchi teaches that the access point communicates with the label using a “normal command transmission mode” and a “rapid command transmission mode.” *Hashiguchi*, [0127]-[0129], [0138], [0143]. The access point’s transmission mode is “synchronized” with “the awake operation timing of the electronic rack label 240” such that the access point transmits “beacon signals” synchronized with the label’s awake time ratio. *Id.*, [0068], [0071], [0127], [0138]. The access point’s normal and rapid command transmission modes communicate with the label in the label’s 20-second and 4-second time interval cadences. *Id.*, [0127]-[0129], [0139]; *Wolfe*, ¶164.

Specifically, in the access point’s normal command transmission mode, the server may “instruct[] the access point 30” to “transmit a command, following one of the beacons” at “a 20 s interval.” *Hashiguchi*, [0127]. Conversely, in the access point’s rapid command transmission mode, the server may instruct the access point

to transmit information following the beacons “at 4 s intervals,” thereby permitting the access point to increase the frequency (i.e., quicken the rate) for transmitting data to the label in the label’s active (i.e., awake) mode. *Id.*, [0127]-[0129], [0143]. The access point’s rapid command transmission mode thus “synchronize[s]” with the label’s active mode, making it “possible to shorten the average time it takes until the completion of command [information] transmission” when the label needs to be “updated in a short time,” for example, following a user’s NFC interaction. *Id.*, [0128]-[0129], [138], [0143], [0147]; *Wolfe*, ¶165.

Further, the access point and label communicate using a shared, bidirectional communication channel; the access point transmits beacons and server commands to the label as appropriate, and the label transmits a response signal acknowledging receipt of a server command following that beacon. *Hashiguchi*, [0031], [0037]. Although Hashiguchi does not specifically describe the network standard for that bidirectional channel, POSITAs would have found it obvious to follow well-known standards of the time, such as the IEEE 802.15.4/ZigBeeTM network type channel, as described in §VII.A.2.e. *Wolfe*, ¶166.

Therefore, POSITAs would have recognized Hashiguchi’s access points transition between modes (“wake up”) at the same times and for the same durations as the labels (“normal” and “fast”) according to the label awake ratios (e.g., wake every 20 seconds for 150 milliseconds in the normal, energy-saving mode and every

4 seconds for 150 milliseconds in the rapid transmission mode) to successfully (i) communicate with the labels at (ii) a shared rate of communication supported by a common, standardized network before each label reverts to a non-communicative sleep state to conserve power. *Hashiguchi*, [0068], [0071], [0138]-[0139], [0142]-[0144]; *Wolfe*, ¶167.

POSITAs would have found it obvious to implement Hashiguchi's rapid command transmission mode in the access points in Nagata's system to "synchronize" the communications cycles between the label and the access point to provide a system where the label can be "updated in a short time" with "high responsiveness" using the higher awake time ratio while also "curtailing the electric power consumption." *Hashiguchi*, [0082]-[0084], [0087]-[0089], [0093], [0147], [0157]-[0158]; *Wolfe*, ¶168. Moreover, POSITAs would have recognized implementing Hashiguchi's rapid command transmission mode in the access points of Nagata's system would allow them to be "synchronized" with or be "timed to" the label's "awake state[s]" in the "active mode" to synchronize the access point's information transmission with the label's monitoring timing when the label expects information. *Hashiguchi*, [0068], [0071], [0138], [0143]; *Nagata*, [0033]; *Wolfe*, ¶168.

POSITAs would have been motivated to combine Nagata and Hashiguchi in this way to improve the label's communication responsiveness and curtail its battery

power consumption, as discussed above. § VII.B.2.a; *Hashiguchi*, [0068], [0071], [0127]-[0129], [0138]-[0139], [0143], [0157]-[0158]; *Nagata*, [0033], [0083]; *Wolfe*, ¶169. POSITAs would have been further motivated by Hashiguchi's teaching that, in the rapid command transmission mode, the access point can transmit information more frequently (e.g., at 4 second intervals or less) to "synchronize" with the active mode of the label to be "updated in a short time." *Hashiguchi*, [0128]-[0129], [138], [0143], [0147]; *Wolfe*, ¶169.

This implementation represents a known technique used to improve similar devices (e.g., systems for updating electronic tag devices) by prescribing faster communication cycles to both improve responsiveness and reduce power consumption in the same way as described in the prior art and discussed above. § VII.B.2.a; *Hashiguchi*, [0068], [0071], [0138]-[0139], [0146]-[0147], [0157]-[0158]; *Nagata*, [0002], [0004], [0006], [0034], [0086], [0114], [0124], [0135], [0166]; *Wolfe*, ¶170 (citing *Laroia*, 1:35-57, 3:37-45). Moreover, such implementation would have been obvious to try as a known way of improving battery management while also improving responsiveness of an electronic tag device, which the state of the art sought to improve. *Hashiguchi*, [0006]-[0007], [0009], [0011], [0017], [0021], [0069], [0071], [0138]-[0139], [0146]-[0147], [0157]-[0158]; *Nagata*, [0004], [0006], [0029], [0034], [0114], [0124], [0135], [0166]; *Wolfe*, ¶171 (citing *Rößl*, [0005], [0037]; *Laroia*, 1:35-57, 3:37-45).

POSITAs would have reasonably expected success in implementing Hashiguchi's rapid command transmission mode into Nagata's access points because the combination represents nothing more than the combination of known elements used according to their ordinary and expected operations. *Wolfe*, ¶172. This combination was well within the skill of POSITAs and would have required nothing more than the application of known, conventional techniques. *Id.*

POSITAs would have reasonably expected to succeed because Nagata teaches synchronizing the access point's transmissions "timed to" match the label's awake state in the normal mode, as discussed in Ground 1. *Nagata*, [0033]; *Wolfe*, ¶173. Nagata also teaches a faster data transmission, which POSITAs would have recognized would be implemented using Hashiguchi's rapid command transmission mode to account for the shorter information transmission intervals. *Wolfe*, ¶173. This implementation would have only needed to apply Hashiguchi's shorter transmission time intervals to Nagata's access points, as disclosed in Hashiguchi, to achieve success. *Hashiguchi*, [0068], [0071], [0127]-[0129], [0138], [0139], [0143]; *Nagata*, [0033], [0083]; *Wolfe*, ¶173.

Implementing the shorter periodic intervals at the access point synchronized with the label's active mode (e.g., one, two, or a few seconds) would have been a straightforward application of known, conventional components executing common communication sequence and timing operations used according to their known

functions to yield predictable responsiveness and power-saving results as discussed in 1.2.1 and the paragraphs above in this Section. *Wolfe*, ¶174; *KSR*, 550 U.S. at 416; *ZUP*, 896 F.3d at 1371-73.

c. Claim 1.4

To the extent Patent Owner argues, or the Board finds, Nagata does not disclose or render obvious a “fast monitoring mode,” the Nagata-Hashiguchi combination renders it obvious for the reasons discussed above. §VII.B.2.a; *Wolfe*, ¶175. The remainder of 1.4 is taught in Nagata as discussed in §VII.A.2.g, and POSITAs would have been motivated to combine Nagata and Hashiguchi for the reasons discussed in §§VII.B.2.a, VII.B.2.b. *Id.*

d. Claim 1.7

To the extent Patent Owner argues, or the Board finds, Nagata does not disclose or render obvious the “fast wake-up mode” or “fast wake-up instruction” of 1.7, the Nagata-Hashiguchi combination renders them obvious. *Wolfe*, ¶176. The remainder of 1.7 is also taught in Nagata as discussed in Section VII.A.2.j. *Id.*

POSITAs would have found it obvious to implement Hashiguchi’s fast wake-up mode in Nagata’s system, as discussed in 1.2.2. §VII.B.2.b; *Wolfe*, ¶177. POSITAs also would have found it obvious to implement a beacon transmission, such as including an indicator to indicate whether information is to be transferred (“fast wake-up instruction”), as part of the access point’s fast wake-up mode (either

as taught by Nagata or by Hashiguchi) to facilitate communications with the label in its active mode. *Wolfe*, ¶177.

Hashiguchi explains that this is done by a beacon signal “for informing the electronic rack labels 40 of the presence/absence of a command transmission” during an expressly termed “rapid command transmission mode” (fast wake-up mode) providing an instruction for the label whether it should remain awake to receive the requested information, similar to Nagata. *Hashiguchi*, [0031], [128]. Specifically, Hashiguchi explains, in the rapid command transmission mode (fast wake-up mode), access point 30 transmits “beacons” “at 4 s[econd] intervals” *synchronized* with the label’s active mode to facilitate communications when there is a “high probability” of information being transmitted to the label. *Hashiguchi*, [0068], [0071], [0128]-[0129], [0147]; *Wolfe*, ¶178.

POSITAs would have been motivated to implement Hashiguchi’s rapid command transmission mode beacon signal instructions (“fast wake-up instruction”) as part of the fast wake-up mode implemented in Nagata’s access point because POSITAs would have recognized that Nagata and Hashiguchi disclose similar system and beacon transmission techniques. *Wolfe*, ¶179. Thus, transmitting Hashiguchi’s beacon instructions in Nagata with Hashiguchi’s expressly “rapid” 4-second intervals would have improved response time of the label while also advancing Nagata’s and Hashiguchi’s goals to extend battery life of the label by

reducing time spent in the awake state. *Nagata*, [0033], [0083]; *Hashiguchi*, [0068], [0071], [0127]-[0129], [0138]; *Wolfe*, ¶179.

POSITAs would have been motivated to further transmit Hashiguchi's beacon signal instructions during the rapid command transmission mode that is synchronized to the label's active mode cycle to indicate the "presence or absence" of information for the active-mode label to prevent it from "immediately returning to the sleep state" when there is data to be sent during the period where "there is a high probability that product information will be transmitted" after an NFC trigger. *Nagata*, [0033]; *Hashiguchi*, [0147]; *Wolfe*, ¶180. POSITAs would have been motivated to implement this functionality to indicate to a label whether the expected information is ready for transmission and the label should either stay awake or may return to the sleep state, and to achieve Nagata's and Hashiguchi's goals of reducing time spent in the awake state when there is no information to receive. *Nagata*, [0029], [0033], [0034], [0083]; *Hashiguchi*, [0031], [0068], [0071], [0127]-[0129], [0138], [0147], [0157]; *Wolfe*, ¶180.

Further motivation is provided because implementing Hashiguchi's beacon signal instructions in the rapid command transmission mode represents a known technique used to improve similar devices (e.g., other electronic tag devices) in the same way to reduce overall power consumption and improve battery life and energy maintenance at the electronic tag device. *Hashiguchi*, Abstract, [0031], [0068],

[0071], [0127]-[0129], [0143]; *Nagata*, [0033], [0083]; *Wolfe*, ¶181. Such techniques would have been obvious to try as known ways of improving battery management and energy consumption for electronic tag devices and because the state of the art sought to use these improved techniques. *Hashiguchi*, Abstract, [0031], [0068], [0071], [0127]-[0129], [0143]; *Nagata*, [0033], [0083]; *Wolfe*, ¶181.

POSITAs would have reasonably expected success in implementing Hashiguchi's beacon signal instructions in the rapid command transmission mode in Nagata's access point during the non-normal operation in response to an NFC trigger because the combination represents nothing more than the combination of known elements used according to their ordinary and expected operations, as discussed in §VII.B.2.b. *Wolfe*, ¶182. This combination was well within the skill of POSITAs and would have required nothing more than the application of known, conventional techniques (the access point transmitting the beacon signal instruction to the label) to yield predictable results (informing a label of the presence or absence of information to either remain awake or return to the sleep state). *Nagata*, [0033], [0083]; *Hashiguchi*, [0031], [0068], [0071], [0127]-[0129], [0143]; *Wolfe*, ¶182.

Transmitting a beacon signal instruction from the access point to the label also would have been a straightforward application of known, conventional electronic label operations (transmitting a beacon signal from an access point to an electronic rack label) used according to their known functions to yield predictable results

(informing the label of the presence or absence of data to be received from the access point). *Nagata*, [0033], [0083]; *Hashiguchi*, [0031], [0068], [0071], [0127]-[0129], [0143]; *Wolfe*, ¶183; *KSR*, 550 U.S. at 416; *ZUP*, 896 F.3d at 1371-73.

e. Claim 1.8

To the extent Patent Owner argues, or the Board finds, *Nagata* does not disclose or suggest receiving the fast wake-up instruction, the *Nagata*-*Hashiguchi* combination renders it obvious for the reasons discussed in §VII.B.2.d. *Hashiguchi*, [0031], [0128]-[0129], [0143]; *Nagata*, [0029], [0033], [0083]; *Wolfe*, ¶184. The remainder of 1.8 is taught in *Nagata* as discussed in Section VII.A.2.k. *Wolfe*, ¶184.

3. Independent Claims 7 and 14¹¹

a. Claims 7.2, 14.2

These limitations are substantially similar to 1.4. *Wolfe*, ¶¶185-86. The *Nagata*-*Hashiguchi* combination renders obvious 7.2 and 14.2 for the reasons discussed in §VII.B.2.c. *Id.*

¹¹ The claims 7 and 14 limitations not discussed below are disclosed or suggested by *Nagata* as discussed in Sections VII.A.3 and VII.A.4.

b. Claims 7.5, 14.5

These limitations are substantially similar to 1.7. *Wolfe*, ¶187. The Nagata-Hashiguchi combination renders obvious 7.5 and 14.5 for the reasons discussed in §VII.B.2.d. *Id.*

c. Claims 7.6, 14.6

These limitations are substantially similar to 1.8. *Wolfe*, ¶188. The Nagata-Hashiguchi combination renders obvious 7.6 and 14.6 for the reasons discussed in §VII.B.2.e. *Id.*

d. Claims 7.7, 14.7

These limitations are substantially similar to 1.2.1 and 1.2.2. *Wolfe*, ¶189. The Nagata-Hashiguchi combination renders obvious 7.7 and 14.7 for the reasons discussed in §§VII.B.2.a-VII.B.2.b. *Id.*

4. Claims 2, 8, 15

Nagata renders obvious the additional limitation of claim 2, as discussed in §VII.A.5 of Ground 1. *Wolfe*, ¶190. To the extent Patent Owner argues, or the Board finds, Nagata does not disclose or render obvious claim 2, then the Nagata-Hashiguchi combination renders claim 2's additional limitation obvious. *Id.*

Hashiguchi discloses or suggests a “linking operation” that associates each label apparatus ID with particular product information to be associated with that ID before transmitting that information package to the server. *Hashiguchi*, [0032],

[0133], [0135]; *Wolfe*, ¶191. POSITAs would have reasonably expected success in implementing Hashiguchi’s linking operation in Nagata because the combination represents nothing more than the combination of known elements used according to their ordinary and expected operations, as discussed above in §VII.B.2. *Wolfe*, ¶¶182, 191.

Claims 8 and 15 are substantially similar to claim 2, except that they recite a “method” and a “non-transitory computer-readable storage medium storing therein a computer program for executing” instead of a “system.” *Id.*, ¶192. For the reasons discussed both here and in Ground 1 regarding claim 2, Nagata and the Nagata-Hashiguchi combination both render obvious claims 2, 8, and 15. *Id.*

5. Claims 5, 11, 18

Nagata renders obvious the additional limitation of claim 5, as discussed in §VII.A.6 of Ground 1. *Wolfe*, ¶193.

To the extent Patent Owner argues, or the Board finds, Nagata does not disclose or render obvious claim 5, then the Nagata-Hashiguchi combination renders claim 5’s additional limitation obvious. *Id.*, ¶194. Hashiguchi discloses the label may time out from the active mode because the active mode may be maintained for a “prescribed time (e.g. 1 min)” after the NFC trigger is received. *Hashiguchi*, [0079], [0085], [0143], [0145], Fig. 13 (step S203, S204). After “the prescribed time has

elapsed,” the label switches “from the active mode [fast monitoring mode] to the energy-saving mode [normal monitoring mode].” *Hashiguchi*, [0143]-[0144].

To the extent Nagata does not disclose or render obvious transmitting a beacon signal in the fast wake-up mode, Hashiguchi expressly discloses transmitting a beacon signal during the access point’s “rapid command transmission mode” (fast wake-up mode). *Hashiguchi*, [0128]. POSITAs would have recognized the access point may delay sending a beacon signal instruction beyond the specified beacon interval, for example, due to traffic. *Wolfe*, ¶195. For example, Hashiguchi teaches the label may not receive the “distribution data addressed to itself” and then the active mode may lapse. *Hashiguchi*, [0143]-[0144], Fig. 13 (step S203, S204). In situations where the access point delays transmitting the beacon signal instruction, the label would not receive the beacon signal instruction before elapsed time expires. *Id.*, [0143]-[0144]. The label would then timeout and return to the energy-saving mode. *Id.*, [0127]-[0129], [0138]-[0139], [0143]-[0144].

POSITAs would have been motivated to implement Hashiguchi’s timeout mechanism when the beacon signal instruction is not received within the prescribed time period to prevent the label from being in the active mode for an extended time period, thereby defaulting back to the energy-saving mode to preserve battery life. *Wolfe*, ¶196.

Claims 11 and 18 are substantially similar to claim 5, except that they recite a “method” and “non-transitory computer-readable storage medium storing therein a computer program for executing” instead of a “system.” *Id.*, ¶197. For the reasons discussed both here and above in Ground 1 regarding claim 5, Nagata and the Nagata-Hashiguchi combination render obvious claims 5, 11, and 18. *Id.*

6. Claims 6, 12, 19

Nagata renders obvious the additional limitation of claim 6, as discussed in §VII.A.7 of Ground 1. *Wolfe*, ¶198.

To the extent Patent Owner argues, or the Board finds, Nagata does not disclose or render obvious claim 6’s additional limitation, then the Nagata-Hashiguchi combination renders claim 6’s additional limitation obvious. *Id.* As described in §VII.B.5, Hashiguchi discloses a timeout for the active mode (fast monitoring mode) at the label. *Hashiguchi*, [0079], [0085], [0143], [0145], Fig. 6, Fig. 13; *Wolfe*, ¶199.

Hashiguchi discloses a beacon for “informing” the label of the “absence of a command transmission.” *Hashiguchi*, [0031]. In such situations where the access point transmits a beacon reporting that information will not be transmitted to the label, the active mode of label 40 would timeout after the exemplary one-minute interval and return to the active mode (normal monitoring mode) after receiving the beacon (fast wake-up instruction), but not receiving the command (control

instruction) or product information (second data). *Hashiguchi*, [0127]-[0129], [0138]-[0139], [0143]-[0144]; *Wolfe*, ¶200.

Claims 12 and 19 are substantially similar to claim 6, except that they recite a “method” and “non-transitory computer-readable storage medium storing therein a computer program for executing” instead of a “system.” *Wolfe*, ¶201. For the reasons discussed both here and above in Ground 1 regarding claim 6, Nagata and the Nagata-Hashiguchi combination render obvious claims 6, 12 and 19. *Id.*

7. Claim 13

This claim is substantially similar to claim 14. *Wolfe*, ¶202. For the reasons discussed for claims 1 and 14 in §§VII.B.2, VII.B.3, Nagata discloses this additional claim. *Id.*

To the extent Patent Owner argues, or the Board finds, Nagata does not disclose or render obvious the additional limitation of claim 13, then the Nagata-Hashiguchi combination renders claim 13’s additional limitation obvious. *Id.*, ¶203. Hashiguchi discloses CPU and processing components operating in an electronic rack label and server to execute instructions for operating the method steps described in claims 1, 7, and 14 in Ground 1, above. *Hashiguchi*, [0039], [0120], [0126]-[0129]; *Wolfe*, ¶203. Although Hashiguchi does not expressly describe a processing element in the handy terminal, POSITAs would have recognized that terminal contains a processor because Hashiguchi discloses the handy terminal executes well-

known types of decisions to transmit, receive, and process data with the remainder of Hashiguchi's system in a "linking operation" used to pull label and product data, associate it, and transmit it to the server. *Hashiguchi*, [0032], [0133], [0135]; *Wolfe*, ¶203.

C. Grounds 3A and 3B: Nagata in view of Thubert or Nagata in view of Hashiguchi and Thubert renders Claims 3, 4, 9, 10, 16, 17 Obvious

1. Thubert

Thubert (EX1007) is analogous art to the '216 patent. *Wolfe*, ¶84.

Thubert discloses a wireless communication network, including a supervisory device (e.g., server), plurality of access points (APs) 302, and nodes 306 (e.g., end-point devices). *Thubert*, [0047]. The plurality of APs 302 may be grouped into virtual access points (VAP) that receive a "broadcast network availability request 308" from node 306 and capture data regarding the request. *Id.*, [0054]. The captured data may include characteristics of the received request, such as "a link quality indicator (LQI), a signal to noise ratio (SNR), or received signal strength indicator (RSSI), or the like," which allows an AP to determine if the signal strength is "poor", "fair," "good," or "excellent." *Id.*, [0054]-[0055]. The APs report this data to supervisory device 304 that may "designate one of the selected APs 302 as the primary AP 302." *Id.*, [0057]. The primary AP may be the AP with "the best signal quality." *Id.*; *Wolfe*, ¶¶82-83.

2. Claims 3, 9, 16

a. Claim 3.0

Nagata discloses or suggests the interactive electronic tag device communication system of claim 1 includes a plurality of base stations as described in 1.0-1.1, 1.3, above. *Wolfe*, ¶204. The Nagata-Hashiguchi combination also renders obvious claim 1 as discussed in Ground 2 above. Nagata further explains that a label may communicate with any of the access points. *Nagata*, [0032]. Accordingly, Nagata discloses or suggests more than one access point receiving a communication from a label because the label can communicate with all of the access points. *Wolfe*, ¶204.

To the extent Nagata (or Nagata-Hashiguchi) does not expressly disclose or suggest attaching respective energy value information of the plurality of base stations to the first data when transmitting it to the background server, Thubert does. *Id.*, ¶205. Thubert renders obvious selecting an optimal base station for this transmission. Accordingly, Nagata in view of Thubert, or the combination of Nagata and Hashiguchi in further view of Thubert, renders obvious the additional limitations of claim 3. *Id.*

For example, Thubert teaches receiving first data at a plurality of base stations (APs), the plurality of base stations attaching respective energy value information of the plurality of base stations (signal strength, signal to noise ratio, signal quality) to

the first data when transmitting the first data to a “supervisory device” (server). *Thubert*, [0054]-[0055]. The server determines an optimal base station from the plurality of base stations (e.g., creating a VAP of one or more APs, or selecting a primary AP in the VAP) according to the respective energy value information (signal strength, signal to noise ratio, signal quality). *Id.*, [0057]. In light of Thubert’s teachings, POSITAs would have found it obvious to select an optimal base station from among a plurality of base stations in Nagata’s system based on the energy values of the base stations to transmit instructions and data to improve the reliability and throughput of the system, thereby ensuring better and more reliable communications for updating the label. *Wolfe*, ¶206. POSITAs would have found this obvious because, generally, information throughput can be considered proportional to signal interference, which is a function of signal strength. *Id.*, ¶¶207-08 (citing *Afroz*, 119; *Laroia*, 2:33-50).

To improve communications, Thubert teaches the APs receive and report “at least one metric of the quality of communication with the node (e.g., signal strength, signal to noise ratio, signal quality, etc.)” so that the best transmission can be selected as VAPs. *Thubert*, [0054]-[0055], [0057]. Implementing Thubert’s reporting of signal strength and selecting access points, as claim 3 recites, would have been obvious to POSITAs as a way to also reduce battery consumption of Nagata’s labels. Improved transmissions resulting from Thubert’s system would reduce the amount

of time the labels need to be in the fast monitoring mode. Moreover, the sooner the transmission is successfully completed, the sooner the label can return to the normal operating mode. More efficient return to normal operating mode results in the labels consuming less battery. *Wolfe*, ¶209.

POSITAs would have been motivated to implement Thubert's access point selection techniques in Nagata's system (or in the Nagata-Hashiguchi system) to improve communications for sending the information to the label, in particular by improving transmission quality to further reduce battery consumption by reducing the time that the electronic rack label spends in the fast monitoring mode. *Id.*, ¶210.

It was well known to POSITAs that base stations (e.g., access points) could determine signal strength of information received from an electronic tag device (e.g., node) and that a server could use that information to select the optimal base station for subsequent communications. *Thubert*, [0054]-[0055], [0057]; *Wolfe*, ¶211. POSITAs would have been motivated to apply this well-known technique to Nagata's electronic rack label system (either alone or in combination with Hashiguchi) to improve network throughput by optimizing signal quality. Specifically, higher quality signals reduce the total amount of time the label must operate in the fast monitoring mode because more information is transmitted with fewer signals and higher network throughput. This "ensure[s] high responsiveness" to "speedily change the display" of the electronic rack label while also limiting and

“curtail[ing]” battery power consumption and network interference. *Hashiguchi*, [0008], [0138]-[0139], [0147], [0158]; *Nagata*, [0029], [0033]-[0034], [0083], [0114]; *Wolfe*, ¶211 (citing *Röβl*, [0009]).

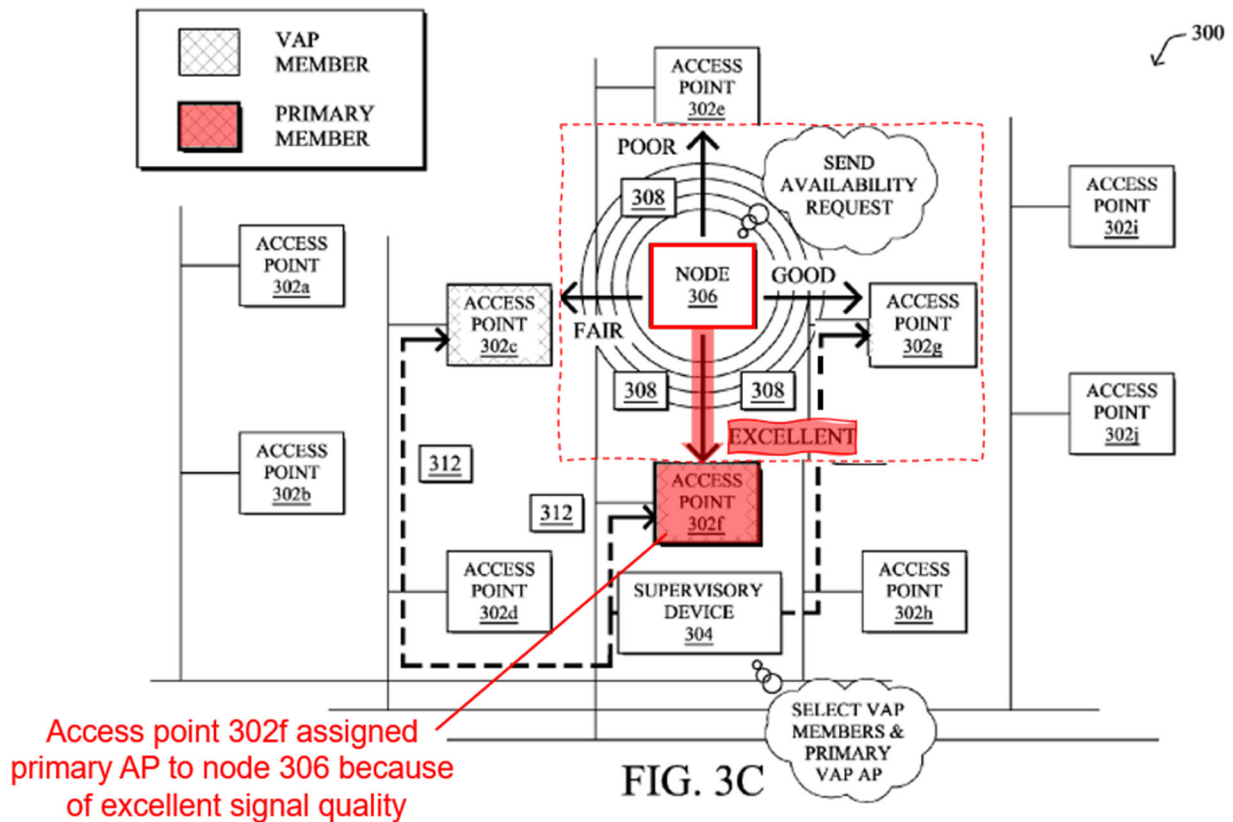
POSITAs would have also had a reasonable expectation of success in implementing the signal strength reporting and access point selection, as recited in claim 3 and taught by Thubert, in Nagata’s system (either alone or in combination with Hashiguchi) because it would have involved using only known techniques (known signal strength reporting and forming a VAP or selecting a primary AP) to improve similar devices (node-AP-server communications networks) in the same way as known in the prior art (selecting optimal AP to improve overall communications reliability). *Wolfe*, ¶212.

Reporting signal strength characteristics and using them to select an optimal base station for information transmission would have been a straightforward application of known, conventional information transmission network operations (monitoring signal strength and selecting the device with the best signal strength) used according to their known functions to yield predictable results (sending information to the node (e.g., rack label) through the selected optimal access point. *Id.*, ¶213; *KSR*, 550 U.S. at 416; *ZUP*, 896 F.3d at 1371-73.

b. Claim 3.1

To the extent that Nagata (or Nagata-Hashiguchi) does not expressly teach “the background server is configured to determine an optimal base station among the plurality of base stations according to the respective energy value information of the plurality of base stations, and transmit...through the optimal base station,” those references in combination with Thubert does. *Wolfe*, ¶214.

Thubert’s server assesses multiple access point transmission quality characteristics shared with a node as described in limitation 3.0, above. Thubert’s supervisory device (server) selects and maps—i.e., assigns—the best access points to a node as a function of the shared signal quality and dedicates the best as the “primary” AP. *Thubert*, [0056]-[0057]. For example, POSITAs would have recognized Thubert’s supervisory device may select access points 302c, 302f, and 302g to service node 306 on the basis of the “fair,” “excellent,” and “good” signal qualities between the node and those APs (with AP 302f as primary). *Wolfe*, ¶215. This is shown in the superimposed, annotated combination of Figures 3A, 3C:



Thubert, Figs. 3A, 3C. *Wolfe*, ¶215.

Accordingly, the Nagata-Thubert combination and Nagata-Hashiguchi-Thubert combination teach a supervisory device (“background server”) that receives and considers the signal quality characteristics between a node and several available access points (“respective energy value information of the plurality of base stations”) to select a best, primary access point (“optimal base station”) to map to a node. *Wolfe*, ¶216.

c. Claims 9, 16

Claims 9 and 16 depend from claims 7 and 14 respectively. *Wolfe*, ¶217. Claims 9 and 16 are substantially similar to claim 3.0,¹² except that they recite a “method” and “non-transitory computer-readable storage medium storing therein a computer program for executing” instead of a “system.” *Id.* Any other differences in wording do not affect the unpatentability analysis because each claim recites that a plurality of base stations receive the first data and attach an energy value to the received first data when forwarding it to the server. For the reasons discussed above for claim 3.0, the combination of Nagata’s system (either alone or in combination with Hashiguchi) and Thubert renders obvious claims 9 and 16. *Id.*

3. Claims 4, 10, 17

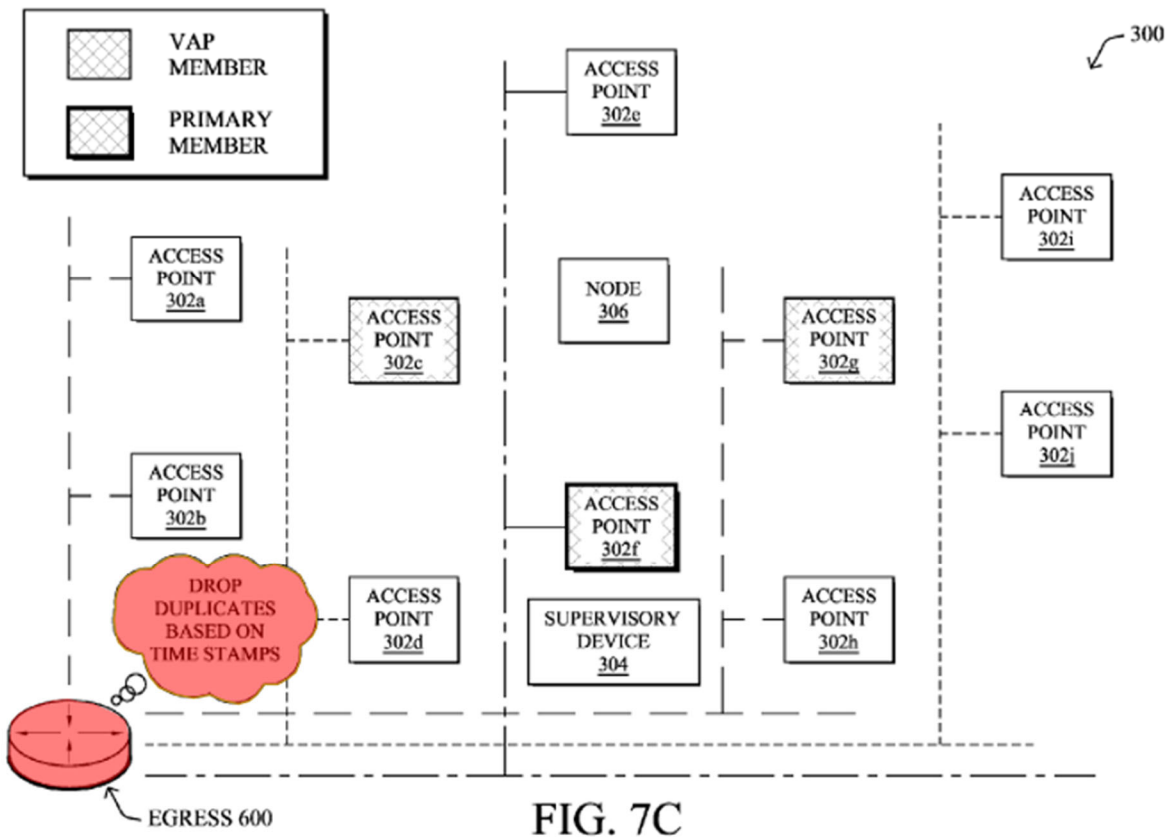
Claims 4, 10, and 17 depend from claims 3, 9, and 16 respectively. *Wolfe*, ¶218.

The Nagata-Thubert combination or Nagata-Hashiguchi-Thubert combination teaches the interactive electronic tag device communication system of claim 3 including a background server that receives first data as described in limitations 1.5, 3.0-3.1, above. *Id.*, ¶219.

¹² Claims 9 and 16 do not include a limitation similar to 3.1.

Additionally, the Nagata-Thubert combination or Nagata-Hashiguchi-Thubert combination teaches claim 4. *Id.*, ¶220. Specifically, POSITAs would have found it obvious to perform deduplication processing on data uploaded by a plurality of base stations, as in Thubert. This would reduce data redundancy at the server, which POSITAs would have recognized improves processing at the server by reducing data redundancy and increasing the reliability of network transmissions. *Id.*

Thubert's VAP-enabled network maps the highest-signal quality access points to a node to help transmit messages from that node to a supervisory device. *Thubert*, [0016], [0094]. Continuing the example from claim 3, this means multiple mapped APs 302f and 302g may receive duplicate copies of the same message 702 from mutually-mapped node 306. *Id.*, [0093]-[0094]. The supervisory device uses its knowledge of the network topology for AP groupings to ensure each AP maintains a different network path to "DetNet egress 600." *Id.*, [0084]. This server-controlled traffic engineering enables egress 600 to eliminate duplicate copies of the same message by comparing timestamps, tokens, MAC addresses, and other information attributes of that message as annotated in Figure 7C:



Id., Fig. 7C (600), [0084], [0094]; *Wolfe*, ¶221. POSITAs would have recognized the node message transmitted via access points to the supervisory device in Thubert’s network as a first data uploaded by a plurality of base stations to a supervisory device because any information sent first from a node to a supervisory device through an access point is a “first data.” *Wolfe*, ¶221.

Both Nagata and Hashiguchi disclose that each label can communicate with multiple access points. *Nagata*, [0032] (“the electronic rack labels 40 installed inside the store can communicate with any of the access points 30”); *Hashiguchi*, [0031] (“The installation location, the installation spacing, and the like of the access points

30 are determined such that the electronic rack labels 40 installed in the store are capable of communicating with any of the access points 30.”). POSITAs would have thus been motivated to implement Thubert’s teachings of deduplication in Nagata’s system (or the combination of Nagata and Hashiguchi) because it was well-known and conventional to perform deduplication processing on data uploaded by a plurality of base stations to facilitate network diversity to improve wireless communications reliability. *Thubert*, [0017], [0051], [0078]-[0079], [0089]-[0090], [0094]; *Wolfe*, ¶222. POSITAs would have been motivated to apply these well-known techniques to perform deduplication processing to reduce data redundancy, improve processing at the server, make better use of available storage at the server, and increase the reliability of wireless networks in Nagata (or Nagata-Hashiguchi). *Thubert*, [0074]; *Wolfe*, ¶222.

POSITAs would have had reasonable expectation of success in implementing deduplication processes, such as disclosed in Thubert in Nagata’s system (or the combination of Nagata and Hashiguchi) because the combination would have involved merely combining known prior art elements (Thubert’s deduplication of information at Nagata’s server (e.g., Thubert’s system egress)) according to known methods (deduplicating and eliminating redundant data based on known features such as time stamps or packet numbers) to yield predictable results (removing the duplicate data). *Thubert*, [0074]; *Wolfe*, ¶223.

Claims 10 and 17 are substantially similar to claim 4, except that they recite a “method” and “non-transitory computer-readable storage medium storing therein a computer program for executing” instead of a “system.” *Wolfe*, ¶224. For the reasons discussed above for claim 4, the Nagata-Thubert or Nagata-Hashiguchi-Thubert combination renders obvious claims 4, 10 and 17. *Id.*

VIII. DISCRETIONARY DENIAL WOULD BE INAPPROPRIATE

Petitioner stipulates that if the Board institutes *inter partes* review, Petitioner will not pursue in the District Court the specific grounds asserted in this petition for *inter partes* review, or on any other ground that was raised or could have been reasonably raised in this petition for IPR, under 35 U.S.C. §§102 or 103, on the basis of prior art patents or printed publications. *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 13-14 (Dec. 1, 2020) (precedential as to §II.A). Because this stipulation “mitigates concerns of potentially conflicting decisions and duplicative efforts between the district court and PTAB,” discretionary denial under *Apple, Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020) is improper. USPTO Mem., *Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litig.*, at 7 (June 21, 2022).¹³

¹³https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

IX. Conclusion

For the foregoing reasons, Petitioner respectfully requests that the Board institute *inter partes* review trial and cancel the challenged claims as unpatentable.

X. Mandatory Notices

A. Real Party in Interest

Petitioner identifies itself, VusionGroup, and its affiliates VusionGroup GmbH (f/k/a SES-Imagotag GmbH) as real parties in interest.

B. Related Matters

To the best of Petitioner's knowledge, the '216 patent has been involved in one district court litigation, *Hanshow Technology Co., Ltd. v. SES-imagotag SA, et al.*, Case No. 2:23-cv-00174 (E.D. Tex.). EX1008.

To the best of Petitioner's knowledge, the '216 patent has not been challenged in any *inter partes* review prior to this proceeding.

C. Notice of Counsel and Service Information

Pursuant to 37 C.F.R. §§42.8(b)(3), 42.8(b)(4) and 42.10(a), Petitioner appoints the following counsel in the table below:

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Petitioner consents to electronic service at the following email address: SES-
imagotag-IPRs@perkinscoie.com.

D. Power of Attorney

A power of attorney is filed herewith according to 37 C.F.R. §42.10(b).

Respectfully submitted,

/ Jessica Kaiser /

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Date: May 1, 2024

CERTIFICATE OF WORD COUNT UNDER 37 CFR §42.24(d)

Pursuant to 37 C.F.R. §42.24(a), Petitioner hereby certifies that portions of the above-captioned Petition for *Inter Partes* Review of U.S. Patent 11,540,216, in accordance with and reliance on the word count provided by the word-processing system used to prepare this Petition, that the number of words in this paper is 13,984. Pursuant to 37 C.F.R. §42.24(a), this word count is in compliance and excludes the table of contents, table of authorities, mandatory notices under §42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing. This word count was prepared using Microsoft Word.

Respectfully submitted,

/ *Jessica Kaiser* /

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that true copies of the Petition for *Inter Partes* Review of U.S. Patent No. 11,540,216 and supporting materials (Exhibits and Power of Attorney) were served via overnight delivery on the Patent Owner at the correspondence address of record as listed on Patent Center:

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A courtesy copy was also sent via electronic mail to Patent Owner's litigation counsel listed below:

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Date: May 1, 2024