

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AT&T MOBILITY LLC, AT&T SERVICES INC., ERICSSON INC.,
NOKIA OF AMERICA CORPORATION, AND T-MOBILE USA, INC.,
PETITIONERS,

v.

DAINGEAN TECHNOLOGIES LTD.,
PATENT OWNER.

CASE IPR2024-00510
PATENT 10,484,976

PATENT OWNER'S PRELIMINARY RESPONSE
37 C.F.R. § 42.107

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CURRENT EXHIBIT LIST¹

No.	Brief Description
1001	U.S. Patent No. 10,484,976 (“’976 Patent”)
1002	File History for ’976 Patent
1003	Provisional Patent Application No. 62/443,464
1004	Expert Declaration of Dr. Mark Mahon
1005	Curriculum Vitae of Dr. Mark Mahon
1006	U.S. Patent No. 10,959,218 (“Babaei”)
1007	Provisional Patent Application No. 62/421,821 (“Babaei Provisional”)
1008	International Publication No. WO 2016/130175 A1 (“Fwu”)
1009	U.S. Patent Pub. No. 2018/0035332 (“Agiwal”)
1010	Provisional Patent Application No. 62/368,369 (“Agiwal Provisional”)
1011	U.S. Patent No. 10,869,331 (“Lee”)
1012	International Publication No. WO 2017/171526 A1 (“Lee PCT Publication”)
1013	Certified translation of Lee PCT Publication
1014	Provisional Patent Application No. 62/403,061 (“Lee Provisional”)
1015	Certified translation of Lee Provisional
2001	Declaration of Mr. Michael McBride in Support of Patent Owner’s Motion for Admission <i>Pro Hac Vice</i> of Michael McBride
2002	Expert Declaration of Dr. Karthikeyan Sundaresan
2003	PCT/US18/12039 Application (filed Jan. 2, 2018) (published July 12, 2018 as PCT Publication No. WO2018 128970A1), <i>available at</i> https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2018128970 (navigate to Documents then Application Body as Filed)
2004	U.S. Patent No. 11,778,633 to Liu <i>et al.</i> (claiming priority to CN 2017 10459498.1 Jun. 16, 2017)

¹ Relevant portions of exhibits may be highlighted to help the Panel find cited sections.

No.	Brief Description
2005	Excerpt from ETSI TS 136 212 V13.6.0 (2017-07), available at https://www.etsi.org/deliver/etsi_ts/136200_136299/136212/13.06.00_60/ts_136212v130600p.pdf
2006	U.S. Patent Publication No. 2022 0312395 A1 to Li <i>et al.</i> (claiming priority to provisional application no. 62/556,070 filed on Sept. 8, 2017)

CLAIM LISTING

	Limitation
[2pre]	2. A base station apparatus that communicates with a user equipment (UE), comprising:
[2a]	transmitting circuitry configured to transmit a radio resource control (RRC) message comprising first information used for configuring a periodicity,
[2b]	the transmitting circuitry configured to transmit a RRC message comprising second information used for configuring a numerology,
[2c]	the transmitting circuitry configured to transmit in a common search space of a physical downlink control channel, a downlink control information (DCI) format with cyclic redundancy check (CRC) scrambled by a first radio network identifier (RNTI), the first RNTI being different from a Cell-RNTI (C-RNTI) and a semi-persistent scheduling C-RNTI, the first RNTI being used for indicating an activation and a deactivation for an uplink data transmission on a physical uplink shared channel (PUSCH) based on the periodicity and the numerology; and
[2d]	receiving circuitry configured to receive confirmation information Medium Access Control (MAC) Control Element (CE) in a case that third information used for indicating the activation for the uplink data transmission on the PUSCH is comprised in the DCI format with the CRC scrambled by the first RNTI,
[2e]	the receiving circuitry configured to receive, based on a transmission of the DCI format comprising the third information, the uplink data transmission on the PUSCH based on the periodicity and the numerology, wherein
[2f]	the receiving circuitry is configured to receive confirmation information MAC CE in a case that fourth information used for indicating the deactivation for the uplink data transmission on the PUSCH is comprised in the DCI format with the CRC scrambled by the first RNTI, and
[2g]	the confirmation information MAC CE for the DCI format comprising the third information is identified by a MAC protocol data unit (MAC PDU) subheader with a logical channel identifier (LCID),
[2h]	the confirmation information MAC CE for the DCI format comprising the fourth information is identified by the MAC PDU subheader with the LCID, and

	Limitation
[2i]	the same index of the LCID is used for the confirmation information MAC CE for the DCI format comprising the third information and the confirmation information MAC CE for the DCI format comprising the fourth information.
[4pre]	4. A communication method of a base station apparatus that communicates with a user equipment (UE), comprising:
[4a]	transmitting a radio resource control (RRC) message comprising first information used for configuring a periodicity;
[4b]	transmitting a RRC message comprising second information used for configuring a numerology;
[4c]	transmitting in a common search space of a physical downlink control channel, a downlink control information (DCI) format with cyclic redundancy check (CRC) scrambled by a first radio network identifier (RNTI), the first RNTI being different from a Cell-RNTI (C-RNTI) and a semi-persistent scheduling C-RNTI, the first RNTI being used for indicating an activation and a deactivation for the uplink data transmission on a physical uplink shared channel (PUSCH) based on the periodicity and the numerology;
[4d]	receiving confirmation information Medium Access Control (MAC) Control Element (CE) in a case that third information used for indicating the activation for the uplink data transmission on the PUSCH is comprised in the DCI format with the CRC scrambled by the first RNTI;
[4e]	receiving, based on a transmission of the DCI format comprising the third information, the uplink data transmission on the PUSCH based on the periodicity and the numerology;
[4f]	receiving confirmation information MAC CE in a case that fourth information used for indicating the deactivation for the uplink data transmission on the PUSCH is comprised in the DCI format with the CRC scrambled by the first RNTI, wherein
[4g]	the confirmation information MAC CE for the DCI format comprising the third information is identified by a MAC protocol data unit (MAC PDU) subheader with a logical channel identifier (LCID),
[4h]	the confirmation information MAC CE for the DCI format comprising the fourth information is identified by the MAC PDU subheader with the LCID, and

	Limitation
[4i]	the same index of the LCID is used for the confirmation information MAC CE for the DCI format comprising the third information and the confirmation information MAC CE for the DCI format comprising the fourth information.

I. INTRODUCTION

Petitioners seek *inter partes* review of claims 2 and 4 (“Challenged Claims”) of U.S. Patent No. 10,484,976 (“’976 Patent”) in view of three different combinations of references consisting of Babaei, Fwu, Lee, and Agiwal. However, the Challenged Claims have a negative limitation, referred to herein as the “Different From” limitation, whereby a DCI format’s CRC bits must be scrambled with a first RNTI different from an SPS C-RNTI and C-RNTI, and Petitioners first two combinations simply identify a SPS first RNTI, against the claim requirements.

Additionally, all of Petitioner’s combinations are built upon the Babaei reference in combination with Fwu, where neither Babaei nor Fwu teaches another claim limitation, that the claimed DCI format a is transmitted/detected in a “common search space.” So, in an attempt to meet this limitation, Petitioners simply propose redesigning Babaei such that “different UEs could share [a] SPS RNTI” and use an “SPS-ConfigIndex . . . to determine to which UE the activation/deactivation DCI format should be applied.” There are many problems with this suggestion. First, no reference teaches or suggests the limitation to do this. Second, Petitioner’s *post hoc* claim that such a reengineering would save UE processing and power is incorrect, and would do the opposite, because the UEs sharing the RNTI would have to not only decode the DCI, but further decode the address index to determine if the DCI is for the UE, and do more resource intensive decoding in a common search space

rather than a more efficient user specific search space. Third, such sharing of a SPS RNTI vitiates the security the scrambling of the CRC bits was meant to produce. Fourth, Babaei already uses the SPS-ConfigIndex so that a single UE can be assigned multiple SPS configurations, and Petitioners' proposal to have the index act as a UE addressing mechanism would prevent Babaei's normal functioning.

Independently, Petitioners' motivation to modify Babaei with Lee and Agiwal are similarly flawed. For Lee, Petitioners have proposed a POSITA would combine Lee with Babaei due to the concern over "employing a large number of SPS RNTIs," but Babaei already addressed this issue in the same manner as Lee, and Petitioners have not explained why Lee provides any additional benefit.

For Agiwal, Petitioners have proposed redesigning Agiwal to have UEs send confirmations of base station skip commands, but this requires UEs to spend power and computer resources in contravention of Babaei's explicit goal to lower processing requirements and battery consumption. And Petitioners have not put forth any tangible benefit the confirmations would confer. Moreover, given Agiwal's teaching that the base station issued the skip command in the immediately preceding signaling frame, Petitioners have not explained how a base station would receive a confirmation in time to use the confirmation.

Finally, for the Babaei-Fwu-Agiwal combination, Petitioners map a single "skipping indication" to both an activation and deactivation of uplink data

transmission; however, the claims make clear that the base station is configured to receive two different “confirmations,” one for an activation event and a second for a deactivation event.

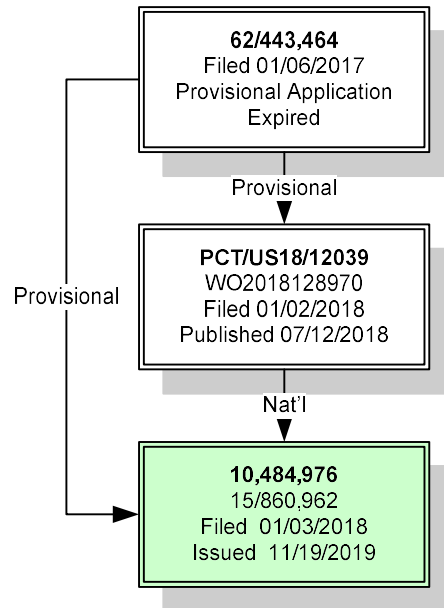
These and other issues are discussed in more detail herein, and show that Petitioners have not shown a reasonable likelihood that at least one of the claims challenged in the Petition is unpatentable.

II. OVERVIEW OF THE PATENT-AT-ISSUE

A. Family and Effective Filing Date

The '976 Patent is a national entry of PCT Application No. PCT/US18/12039 (filed Jan. 2, 2018) (published July 12, 2018, as WO 2018 128970) (“’039 PCT”), 35 U.S.C. § 120, that, in turn, claims priority to Provisional Patent Application No. 62/443,464 (filed Jan. 06, 2017) (“’464 Provisional”), 35 U.S.C. § 119(e); Ex. 2003 [001]. The '976 Patent also directly claims priority to the '464 Provisional. 35 U.S.C. § 119(e); *see also* Ex. 1001 1:8–14, (22), (60), (63), (65); Ex. 1002 at 242.²

² Patent Owner cites PDF page numbers for non-numbered paragraphs in Petitioners’ exhibits because it appears Petitioners did not number the exhibits per 37 C.F.R. § 42.63(c).



As such, the '976 Patent has an earliest possible effective priority date of January 6, 2017, and the Board should judge the '976 Patent under the AIA regime.

B. Brief Overview of the Patented Invention

The '976 Patent concerns “[f]ifth generation (5G) cellular communications.” Ex. 1001 7:8–10. 5G uses “time/frequency/space resources to allow for enhanced mobile broad band (eMBB) communication and ultra-reliable low latency communication (URLLC) services, as well as massive machine type communication (mMTC) like services.” *Id.* 7:10–14.

The '976 Patent describes one of the problems it seeks to address as follows:

[T]he timing between SR³ from the UE⁴ 102 and UL⁵ grant from an eNB,⁶ as well as the timing between UL grant and UL data transmission cannot guarantee the low latency. Thus, SR for URLLC UL may be possible but the latency requirement is difficult to satisfy. Therefore, there is a need for a more efficient method to meet the latency/reliability requirements of URLLC without wasting resources.

Id. 17:16–23.

To that end, the '976 Patent conceives of a gNB⁷ “configure[ing] a periodicity (e.g., a time resource) by using the RRC⁸ signal.” *See, e.g., id.* 10:54–61; *see also id.* Fig. 21 (step 2102). “[T]he granularity of the periodicity for SR resource (i.e., SR transmission) may be configured as sub frame level, slot level, mini-slot level, and/or symbol level.” *Id.* 16:67–17:2. Likewise, the base station may similarly configure “numerology (SCS,⁹ e.g. 15 kHz, 30 kHz and/or 60 kHz)” via RRC.

³ “SR” stands for “scheduling request.” *Id.* 8:16.

⁴ “UE” stands for “user equipment.” *Id.* 2:30.

⁵ “UL” stands for “uplink.” *Id.* 2:1.

⁶ “eNB” stands for “evolved Node B” and is a base station. *Id.* 6:29–30.

⁷ “A gNB may also be more generally referred to as a base station device.” *Id.* 7:20–21.

⁸ “RRC” stands for “Radio Resource Control.” *Id.* 10:44–45.

⁹ “SCS” stands for “Sub Carrier Spacing.” *Id.* 18:24–25.

Id. 18:37–41.

The '976 Patent further teaches that UE may issue a SR to “request[] UL-SCH (Uplink-Shared Channel) resources for new transmission and/or retransmission,” i.e., “UL resources for transmitting UL data.” *Id.* 8:22–26; *see also* 25:1–3 & Fig. 11 (step 1). In response, the base station may send the UE a Downlink Control Information (“DCI”) or URLLC-DCI format for scheduling and activation of transmission on a physical uplink shared channel (“PUSCH”) with numerology and periodicity the base station previously configured. *Id.* 8:30–35; 8:47–57.

The base station addresses a DCI format to a particular UE by scrambling the Cyclic Redundancy Check (“CRC”) parity bits of the DCI format with a Radio Network Temporary Identifier (“RNTI”) previously assigned to the UE. *See, e.g., id.* 8:35–41 (“For example, DCI format to which CRC (Cyclic Redundancy Check) parity bits scrambled by SPS C-RNTI (Cell-Radio Network Temporary Identifier) are attached may be used for activating and/or deactivating UL data transmission (e.g., activating and/or deactivating (releasing) PUSCH resource for UL data transmission).”). The '976 Patent contemplates that different RNTIs may be used, including C-RNTIs *id.* 11:8–10, semi-persistent scheduling (“SPS”) C-RNTIs, *id.* 8:35–41, and URLLC C-RNTIs, *id.* 8:41–46.

The base station can transmit the DCI with scrambled CRC bits on the Physical Downlink Control Channel (“PDCCH”) or URLLC-PDCCH; however, the

'976 Patent only describes the invention with respect to the PDCCH and the URLLC-PDCCH “is assumed to be included in the PDCCH for the sake of simple description.” *Id.* 8:47–52; 56–58.

“[T]he UE 102 may monitor (attempt to decode) PDCCH in a common search space and/or a UE-specific search space.” *Id.* 8:61–63. “[T]he UE 102 may transmit HARQ-ACK¹⁰ (also referred to as confirmation information) based on a detection of the PDCCH indicating activation and/or deactivation (release) of the . . . UL transmission.” *Id.* 14:52–55.

The confirmation information “HARQ-ACK . . . may be transmitted on PUCCH¹¹ and/or using MAC¹² control element (CE).” *Id.* 14:55–58. The base station identifies the confirmation information as “a MAC PDU¹³ subheader with [a] LCID (Logical Channel ID),” such as “10101.” *Id.* 15:2–4; 15:9–14. “[T]he same LCID . . . may be used for . . . indicating activation and/or deactivation” or “different LCID may be used for . . . indicating activation and/or deactivation.” *Id.* 15:5–9; 15:43–45.

¹⁰ “HARQ-ACK” stands for “Hybrid Automatic Repeat Request-acknowledgment.” *Id.* 8:12–16.

¹¹ “PUCCH” stands for “physical uplink control channel.” *Id.* 3:67.

¹² “MAC” stands for “Medium Access Control.” *Id.* 2:40.

¹³ “PDU” stands for “Protocol Data Unit.” *Id.* 8:4.

After the UL is configured and activated “the UE 102 may start UL transmission.” *Id.* 13:42–51.

C. Key Prosecution Events

In response to a March 5, 2019 Office Action Claims 1–4 rejecting the claims under 35 U.S.C. § 103, the patentee amended the claims significantly as shown by representative Claim 1:

1. (Currently Amended) A user equipment (UE) that communicates with a base station apparatus, comprising:
receiving circuitry configured to receive, ~~from a base station apparatus,~~ a radio resource control (RRC) message ~~including~~ comprising first information used for configuring a periodicity ~~for an uplink data transmission,~~
the receiving circuitry configured to receive a RRC message comprising second information used for configuring a numerology,
the receiving circuitry configured to ~~receive on~~ detect in a common search space, a physical downlink control channel for a downlink control information (DCI) format with cyclic redundancy check (CRC) scrambled by a first radio network identifier (RNTI), the first RNTI being different from a Cell-RNTI (C-RNTI) and a semi-persistent C-RNTI, the first RNTI being from the base station apparatus,
~~second information~~ used for indicating an activation and a deactivation for [[the]]
an uplink data transmission on a physical uplink shared channel (PUSCH) based on the periodicity and the numerology; and
transmitting circuitry configured to transmit, ~~to the base station apparatus,~~ confirmation information Medium Access Control (MAC) Control Element (CE) in a case that third information used for indicating the activation for the uplink data transmission on the PUSCH is comprised in the DCI format with the CRC scrambled by the first RNTI ~~for the second information,~~
the transmitting circuitry configured to perform, based on a detection of the DCI format comprising the third information ~~on a physical uplink shared channel, to the base station apparatus,~~ the uplink data transmission on the PUSCH based on the

periodicity and the numerology first information and the second information,
wherein
~~the receiving circuitry is configured to receive on the physical downlink control channel;~~
~~from the base station apparatus, third information used for indicating a~~
~~deactivation for the uplink data transmission;~~
the transmitting circuitry is configured to transmit, ~~to the base station apparatus;~~
confirmation information MAC CE in a case that fourth information used for
indicating the deactivation for the uplink data transmission on the PUSCH is
comprised in the DCI format with the CRC scrambled by the first RNTI for the
third information, and
the confirmation MAC CE for the DCI format comprising the third information is
identified by a MAC protocol data unit (MAC PDU) subheader with the same
index of a logical channel identifier (LCID),
the confirmation MAC CE for the DCI format comprising the fourth information is
identified by the MAC PDU subheader with the LCID, and
the same index of the LCID is used for identifying the confirmation information MAC
CE for the DCI format comprising the third information second information and
the confirmation information MAC CE for the DCI format comprising the fourth
information third information.

Ex. 1002 36–48.

As seen, and relevant to this proceeding, the patentee added the following negative limitation found in limitations 2c and 4c:

a downlink control information (DCI) format with
cyclic redundancy check (CRC) scrambled by a first
radio network identifier (RNTI),¹⁴ the first RNTI being

¹⁴ The specification notes that the acronym/initialism “RNTI” stands for “Radio Network *Temporary* Identifier,” *id.* 8:37–38 (emphasis added); however, the

different from a Cell-RNTI (C-RNTI) and a semi-persistent scheduling C-RNTI.

Id. 42–44. Patent Owner refers to this limitation throughout this Preliminary Response as the “Different From” limitation. The Different From limitation requires the first RNTI be different from a C-RNTI and semi-persistent scheduling, or “SPS,” C-RNTI.

The patentee also added the limitation that the receiver circuitry is not just “configured to receive” the claimed DCI format, but to “detect” it in a particular area: “in a common search space.” *Id.*

The patentee also added limitations that the invention handles two “cases”: one where the claimed DCI format has “third information used for indicating the activation for the uplink data” and one where different “fourth information [is] used for indicating the deactivation for the uplink data.” *Id.*

Patentee contextually defined RNTI in the claims, that take priority over the specification, as a “radio network identifier.” *See Tempo Lighting, Inc. v. Tivoli, LLC*, 742 F.3d 973, 977 (Fed. Cir. 2014) (“In claim construction, this court gives primacy to the language of the claims.”).

D. The '464 Provisional and '039 PCT¹⁵ (“Priority Documents”) Provide Section 112 Written Description Support for Limitations 2c and 4c

Petitioners assert that the '976 Patent is not entitled to the '464 Provisional priority date because Petitioners allege there is no § 112 written description support for two aspects of limitations 2c and 4c. Pet. 7. Patent Owner now discusses why Petitioners are incorrect on both counts, meeting Patent Owner's temporary burden of production to show the Priority Documents provide written description support. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1380 (Fed. Cir. 2015); *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1376 (Fed. Cir. 2016).

1. The Priority Documents Disclose “A Downlink Control Information (DCI) Format with Cyclic Redundancy Check (CRC) Scrambled by a First Radio Network Identifier (RNTI), the First RNTI Being Different from a Cell-RNTI (C-RNTI) and a Semi-Persistent Scheduling C-RNTI”

a. An Ultra-Reliable Low Latency Communications (“URLLC”) C-RNTI Is Different from a C-RNTI and SPS C-RNTI

Petitioners' first lack of written description allegation concerns the “Different From” limitation, Pet. 8, found in limitations 2c and 4c and again

¹⁵ While Patent Owner does not believe it is necessary to show the '039 PCT provides written description support, given the '976 Patent's reliance directly on the '464 Provisional for an earlier effective filing date, Patent Owner nonetheless provides parallel citations to the '039 PCT, Ex. 2003, out of an abundance of caution.

reproduced here:

a downlink control information (DCI) format with cyclic redundancy check (CRC) scrambled by a first radio network identifier (RNTI), the first RNTI being different from a Cell-RNTI (C-RNTI) and a semi-persistent scheduling C-RNTI.

Note that the claim uses the shorthand of “C-RNTI” for Cell-RNTI. And the ’976 Patent specification and ’464 Provisional refers to “semi-persistent scheduling” as “SPS” and a “semi-persistent scheduling C-RNTI” as a “SPS C-RNTI.” *See, e.g.*, Ex. 1001 10:42–43 (For semi-static resource allocation (also referred to as *semi-persistent scheduling (SPS)*) . . .”) (emphasis added); Ex. 1003 [0065] (same); Ex. 1001 8:35–38 (“DCI format to which CRC (Cyclic Redundancy Check) parity bits scrambled by *SPS C-RNTI* . . .”) (emphasis added); Ex. 1003 [0051] (same). Using this notation, the Different From limitation requires “the first RNTI” to be different from (1) a C-RNTI and (2) an SPS C-RNTI.

The Board can discern two things from the language of the Different From limitation. First, the limitation shows that an SPS C-RNTI is not the same as a “normal” or “plain” C-RNTI (i.e., without the SPS adjective), because the two terms are separately identified as items from which the “first RNTI” must be different. *Willis Elec. Co., Ltd. v. Polygroup Macau Ltd.*, 777 F. App’x 495, 498

(Fed. Cir. 2019) (“Where a claim lists elements separately, ‘the clear implication of the claim language’ is that those elements are ‘distinct component[s]’ of the patented invention.”) (quoting *Becton, Dickinson & Co. v. Tyco Healthcare Grp.*, 616 F.3d 1249, 1254 (Fed. Cir. 2010)) (one modification restored).

Second, the Different From limitation language teaches that the recited normal C-RNTI cannot be referring to *all* C-RNTIs, generally, and of different types. This is so because if “the first RNTI being different from a Cell-RNTI (C-RNTI)” included other network identifiers with C-RNTI in their name there would be no reason for the patentee to separately claim the “first RNTI” also needs to be different than an *SPS* C-RNTI. Such an interpretation would render “and a semi-persistent scheduling C-RNTI” surplusage, going against the “important principle” that “[a]n interpretation that renders language superfluous is strongly disfavored.” *VirnetX Inc. v. Apple Inc.*, 792 F. App’x 796, 811 (Fed. Cir. 2019). Further supporting this conclusion is the fact that the ’464 Provisional uses “RNTI”—sans “C-” — when discussing different varieties of identifiers. *See, e.g.*, Ex. 1003 [0069] (“[E].g., different *RNTI* may be used for allocation.”) (emphasis added).

Therefore, a DCI format with CRC scrambled with an ultra-reliable low latency communications (“URLLC”) C-RNTI, for example, meets the Different From limitation, because a URLLC C-RNTI is different from a C-RNTI and SPS C-RNTI. Indeed, the ’976 Patent and ’464 Provisional explicitly say the URLLC C-

RNTI is different from the SPS C-RNTI. Ex. 1001 8:41–46 (referring to a “URLLC C-RNTI (*i.e., different RNTI from SPS C-RNTI*)”) (emphasis added); Ex. 1003 [0051] (same). And the ’976 Patent and ’464 Provisional distinguish scrambling a DCI format CRC with a plain C-RNTI versus using an SPS or URLLC C-RNTI. *Compare* Ex. 1001 11:8–10 (“DS resource may be scheduled by using DCI format to which CRC parity bits [are] scrambled by **C-RNTI**.”) (emphasis added) *and* Ex. 1003 [0068] (same) *with* Ex. 1001 8:33–46 (disclosing scrambling a DCI format CRC parity with an **SPS** or **URLLC** C-RNTI) *and* Ex. 1003 [0051] (same).

Moreover, the ’976 Patent and ’464 Provisional refer to a C-RNTI, SPS C-RNTI, and URLLC C-RNTI separately in the same sentence, further evidencing that a URLLC radio network identifier is “different from” the prior two. Ex. 1001 8:63–65 (“[T]he UE-specific search space may be determined based on C-RNTI, SPS C-RNTI, and/or URLLC C-RNTI.”); Ex. 1003 [0053] (same).

b. The ’464 Provisional and ’039 PCT Provides § 112 Support for These Limitations by Disclosing a DCI Format with CRC Scrambled by a URLLC C-RNTI

The Priority Documents provide § 112 support for these limitations. For example, the Priority Documents explicitly teach a “DCI format to which CRC (Cyclic Redundancy Check) parity bits scrambled by URLLC C-RNTI (*i.e., different RNTI from SPS C-RNTI*) are attached.” Ex. 1003 [0051]; Ex. 2003 [0058]. So, the Priority Documents teach scrambling the DCI Format CRC with a first RNTI,

a URLLC C-RNTI, that is different from a C-RNTI and a SPS C-RNTI.

Petitioners concede the '464 Provisional describes “[i]n paragraph [0051] [of the '464 Provisional], scrambling using . . . a URLLC C-RNTI”; however, Petitioners’ position is that “neither . . . the SPS C-RNTI, nor the URLLC C-RNTIs . . . are ‘different from a C-RNTI.’” Pet. 8. Petitioners arrive at this incorrect conclusion by only quoting and considering the first part of the Different From limitation, saying “at least claim limitations [2c] and [4c] require . . . ‘a downlink control information (DCI) format with cyclic redundancy check (CRC) scrambled by a first radio network identifier (RNTI), the first RNTI being different from a Cell-RNTI (C-RNTI) [. . .]’” Pet. 7. That is, Petitioners left out, and did not analyze, the second half of the clause in: “the first RNTI being different from a Cell-RNTI (C-RNTI) *and a semi-persistent scheduling C-RNTI.*” Without truncating and ignoring the bolded claim language—which is a strange thing to do considering these words complete a thought and appear in a unified phrase bracketed by commas—Petitioners position that the first C-RNTI encompasses SPS C-RNTIs and URLLC C-RNTIs is untenable as set forth in Section II.D.1.a beginning on page 11.

Moreover, Petitioners later undercut their position when arguing that an SPS C-RNTI is different from a C-RNTI when considering the patentability of the Patent-at-Issue. Pet. 54 (“Lee’s SPS-C-RNTI . . . [is] different from the C-RNTI.”).

Considering the *complete* Different From limitation, a URLLC C-RNTI is

different from a SPS C-RNTI and C-RNTI. And the '464 Provisional and '039 PCT explicitly teach a DCI Format with CRC scrambled by a URLLC C-RNTI. Ex. 1003 [0051]; Ex. 2003 [0058]. Therefore, the Priority Documents disclosure more than “reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

2. The '464 Provisional and '039 PCT Disclose Using a Common Search Space to Send the Specified First RNTI Used for Indicating an Activation and a Deactivation for an Uplink Data Transmission on a Physical Uplink Shared Channel (“PUSCH”)

Petitioners also allege that the '464 Provisional fails to provide § 112 written description support for limitations 2c and 4c because the '484 Application “neither teaches nor suggests that the common search space be used to (1) send DCI formats with CRCs scrambled by an RNTI that is different from a C-RNTI or a semi-persistent scheduling C-RNTI or (2) send activation or deactivation messages.” Pet. 8. Petitioners are again incorrect.

The '464 Provisional and '039 PCT teach that “[t]he UE 102 and the gNB 160 may use one or more channels 119, 121 to communicate with each other. For example, a UE 102 may transmit information or data to the gNB 160 using one or more uplink channels 121.” Ex. 1003 [0046]; Ex. 2003 [0053]. Conversely, the “gNBs 160 may . . . transmit information or data to the one or more UEs 102 using one or more downlink channels.” Ex. 1003 [0050]; Ex. 2003 [0057]. These uplink

and downlink communication channels are illustrated below.

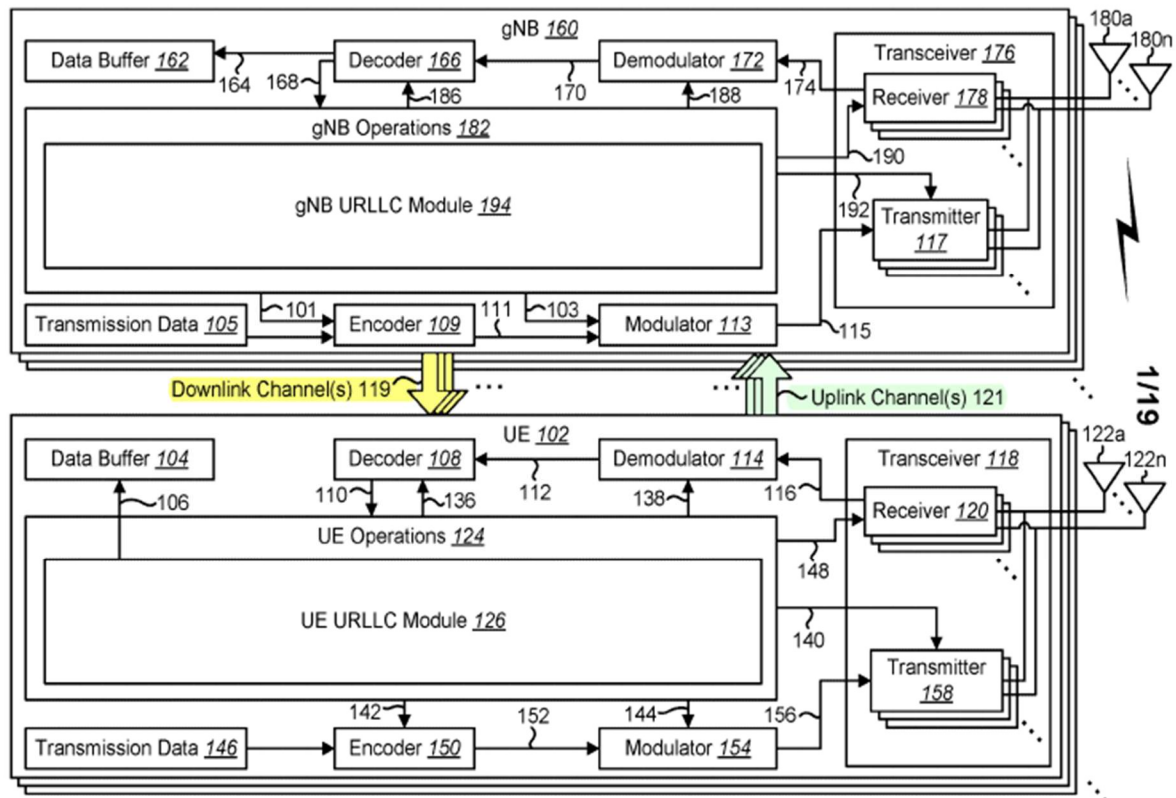


FIG. 1

Ex. 1003 Fig. 1 (highlighting added); *see also* Ex. 2003 Fig. 1 (same).

The Priority Documents disclose that “[e]xamples of downlink channels 119 include a ***PDCCH***, a PDSCH, etc., and] [o]ther kinds of channels may be used.”¹⁶ Ex. 1003 [0050] (emphasis added); Ex. 2003 [0057] (same).

The Priority Documents further explicitly disclose that “the UE 102 may monitor (attempt to decode) ***PDCCH in a common search space and/or*** a UE-

¹⁶ “PDCCH” stands for “physical downlink control channel” and “PDSCH” stands for “physical downlink shared channel.” Ex. 1003 [0040]

specific search space.” Ex. 1003 [0053] (emphasis added); Ex. 2003 [0060] (same).

The plain reading of “and/or” means the UE may be monitoring and attempting to decode the PDCCH information the gNBs are transmitting (1) *in a common search space only* or, (2) in UE-specific search space only, or (3) *in a common search space and* also a UE-specific search space. *Choice Escrow and Land Title v. BancorpSouth Bank*, 754 F.3d 611, 624 (8th Cir. 2014) (“‘[A]nd/or’ . . . usually means ‘one or the other or both.’”) (citing BRYAN A. GARNER, *Garner’s Modern American Usage* 45 (3d ed. 2009)). As such, the Priority Documents teach the UEs may be using the PDCCH information the gNBs are transmitting in a common search space.

The Priority Documents illustrate such uses, showing in one example the region (PRB¹⁷ set) that UEs may monitor as including all of the Downlink Control Channel and most of the Downlink Shared Channel below.

¹⁷ “PRB” stands for “physical resource block.” Ex. 1003 [0065].

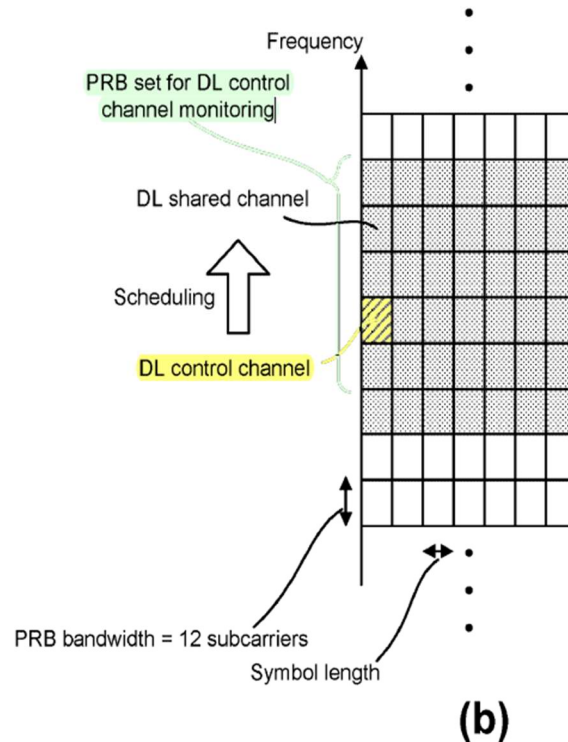


FIG. 8

Ex. 1003 Fig. 8(b) (highlighting added); Ex. 2003 Fig. 8(b) (same).

The Priority Documents also discloses part of the information or data that the gNB may transmit to the UEs is a “DCI format to which CRC (Cyclic Redundancy Check) parity bits scrambled by URLLC C-RNTI (i.e., different RNTI from SPS C-RNTI¹⁸) are attached [that] may be used for activating and/or deactivating UL data transmission (e.g., activating and/or deactivating (releasing) PUSCH¹⁹ resource for URLLC data transmission).” Ex. 1003 [0051]; Ex. 2003 [0058]. This disclosure

¹⁸ As explained above in Section II.D.1 beginning on page 11, the URLLC C-RNTI is also different from a C-RNTI.

¹⁹ “PUSCH” stands for “physical uplink shared channel.” Ex. 1003 [0024].

matches the claim language, “the first RNTI being used for indicating an activation and a deactivation for an uplink data transmission on a physical uplink shared channel (PUSCH),” and provides written support for this aspect of the claim.

Additionally, the Priority Documents note that “the gNB 160 may, *using the PDCCH (i.e., DCI format)*, activate and/or deactivate (release) the first UL transmission.” Ex. 1003 [0077] (emphasis added); [0078] (same for second UL transmission); Ex. 2003 [0084–85] (same). Likewise, the Priority Documents note that instead of using the PDCCH to transmit the DCI format, a “URLLC-PDCCH (i.e., different Physical Downlink Control Channel from PDCCH) may be defined *for transmitting DCI format* that may be used for activating and/or deactivating UL data transmission (e.g., activating and/or deactivating (releasing) PUSCH resource for URLLC data transmission).” Ex. 1003 [0052] (emphasis added); Ex. 2003 [0059] (same). But the Priority Documents say, “Here, the URLLC-PDCCH described herein *is assumed to be included in the PDCCH for the sake of simple description.*” *Id.* (emphasis added). And, as previously noted, “the UE 102 may monitor (attempt to decode) PDCCH *in a common search space.*” Ex. 1003 [0053] (emphasis added) ; Ex. 2003 [0060] (same).

Taken together, the ’464 Provisional teaches the gNB may send the DCI format *on the PDCCH*, Ex. 1003 [0052], [0077–78]; that the UE may *monitor the PDCCH in a common search space*, *id.* [0053]; and that the gNB may use the

URLLC C-RNTI—*a different RNTI than a C-RNTI or SPS-RNTI—to scramble the DCI format CRC parity bits* for activation and deactivation for an uplink data transmission on a PUSCH, *id.* [0051]. As such, the '464 Provisional contradicts Petitioners' assertion that "the '464 Application . . . does not indicate that the base station would transmit the claimed DCI format on the common search space." Pet. 9.

Petitioners also say that the '464 Provisional's "paragraph [0053] identifies separate, UE-specific search spaces to be determined based on C-RNTI, SPS C-RNTI, and/or URLLC C-RNTI," intimating this has some impact on the written description analysis. *Id.* It has none. First, the '464 Provisional uses permissive language saying, "the UE-specific search space *may* be determined based on C-RNTI, SPS C-RNTI, and/or URLLC C-RNTI," Ex. 1003 [0053] (emphasis added), indicating that the UE-specific spaces may *not* be so determined. Second, and more importantly, however the UE-specific search space is defined, such definition does not vitiate the '464 Provisional's unambiguous disclosure in the same paragraph—indeed in the sentence directly before the one Petitioners cite—that "the UE 102 may monitor (attempt to decode) *PDCCH in a common search space*," *id.*, and that the system may send the claimed DCI format via PDCCH, *id.* [0053], [0077–78].

Finally, while Petitioners do not appear to question the written description support for the "uplink data transmission on a physical uplink shared channel (PUSCH) [being] *based on the periodicity and the numerology*," Pet. 8–10, for sake

of completeness, the Priority Documents also provide support for the remainder of the limitation. For instance, the Priority Documents teaches that an “SPS resource may include (correspond to) . . . [a] PUSCH resource” and that “the gNB 160 may configure a *periodicity (e.g., a time resource)* by using the RRC signal, and indicate SPS resource (*e.g., a frequency resource*) by using DCI format.” Ex. 1003 [0066] (emphasis added); Ex. 2003 [0073] (same). The Priority Documents teach that the “frequency resource” refers to “numerology,” including the symbol length and subcarrier spacing that are inversely proportional as seen below.

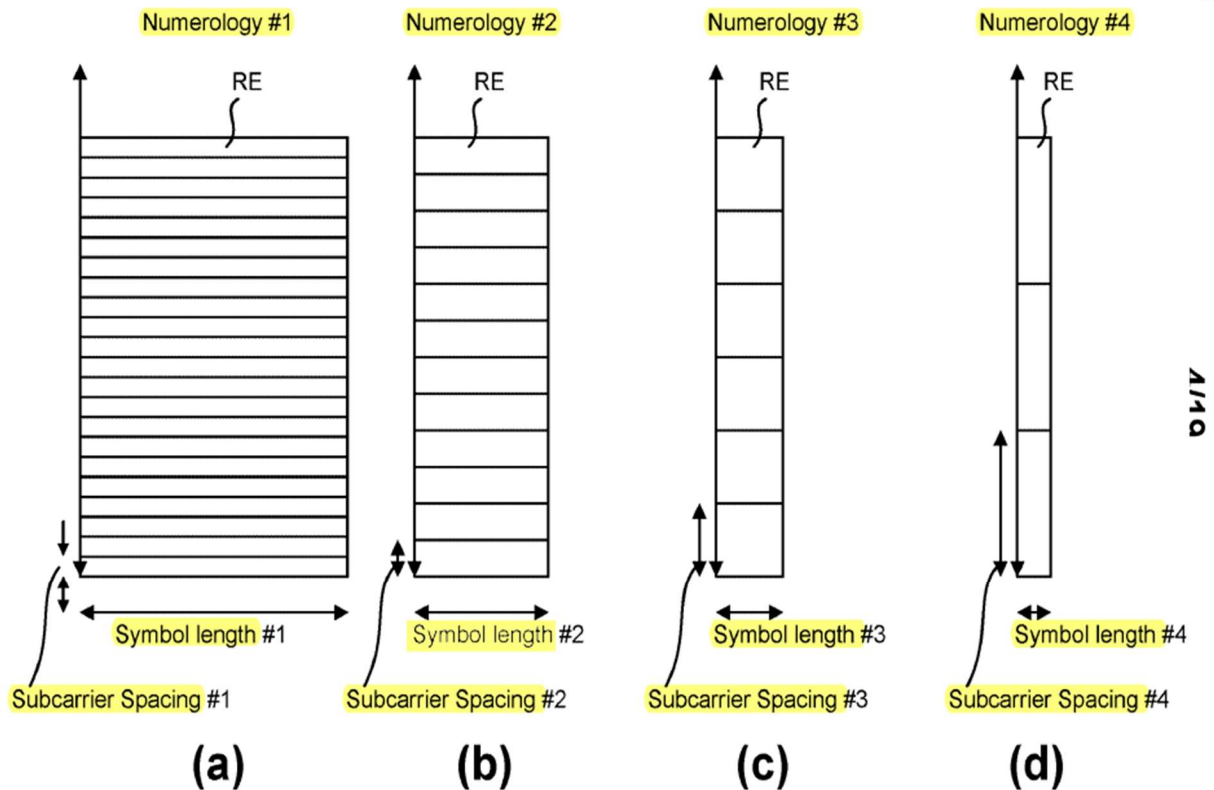


FIG. 4

Ex. 1003 Fig. 4 (highlighting added); *see also id.* [0128] (“Figure 4 shows

examples of several numerologies . . . [f]or example, a RE²⁰ of the basic numerology is defined with subcarrier spacing of 15 kHz in [the] frequency domain.”); *id.* [0096–97] (noting a “configuration may indicate . . . **numerology** (SCS, e.g. 15 kHz, 30 kHz and/or 60 kHz)” and that this “may be configured by RRC, MAC CE, DCI . . . or any combination.”) (emphasis added); Ex. 2003 [0104-105], [0135] & Fig. 4 (same).

* * * * *

Given that the Priority Documents provide written description support for the items Petitioners identify as missing, the ’976 Patent has an actual effective filing date of January 16, 2017.

III. OVERVIEW OF THE CITED REFERENCES

A. Overview of U.S. Patent No. 10,959,218 (“Babaei”)

Babaei is concerned with, among other things, the fact that “[t]he eNB may configure different SPS C-RNTIs for different SPS processes of the UE.” Ex. 1006 19:16–17. “For example, a first SPS C-RNTI may be configured for SPS configuration to transmit voice traffic, a second SPS C-RNTI may be configured for SPS configuration to transmit a V2X traffic.²¹” *Id.* 19:23–26. And “a UE may be configured with many SPS configurations (e.g. 4, or 8, etc[.]) for different types of

²⁰ “RE” stands for “resource element.” Ex. 1003 [0124].

²¹ “V2X” stands for “[v]ehicular communication services.” Ex. 1006 13:66–14:3.

V2X traffic.” *Id.* 21:8–10.

However, as Babaei explains, “[i]n the current LTE standard, a maximum of one downlink SPS and/or one uplink SPS may be configured for the PCell.” *Id.* 19:32–33. Therefore, for a base station to configure multiple SPS configurations requires a corresponding number of messages, and “[a] UE configured with multiple SPS RNTIs may need to monitor search space of PDCCH for multiple SPS RNTIs.” *Id.* 21:1–2. Babaei specifically notes that “[w]hen configuration of multiple SPSs are required, legacy mechanisms may be extended to support multiple SPSs,” *id.* 20:48–49, (i.e., using one standard SPS C-RNTI per configuration, *id.* 19:16–17), but the problem with the increased messaging is that “[w]hen the number of required SPS configurations increases, this mechanism may increase UE processing requirements and/or power consumption.” *id.* 21:3–5.

Therefore, Babaei proposes that “multiple SPSs may be activated in parallel.” *Id.* 21:21. Specifically, “the DCI activating or releasing an uplink SPS corresponding to a V2X SPS traffic may comprise an UL SPS configuration index field (e.g. 3 bits) identifying the SPS configuration[s] corresponding [to] the SPS configuration index.” *Id.* 21:52–56. That is multiple configurations may be activated at once with a single DCI. *Id.* 21:56–57 (“SPS configuration index may indicate the index of . . . one *or more* SL/UL SPS configurations.”) (emphasis added). While Babaei does not specifically layout where the index bits

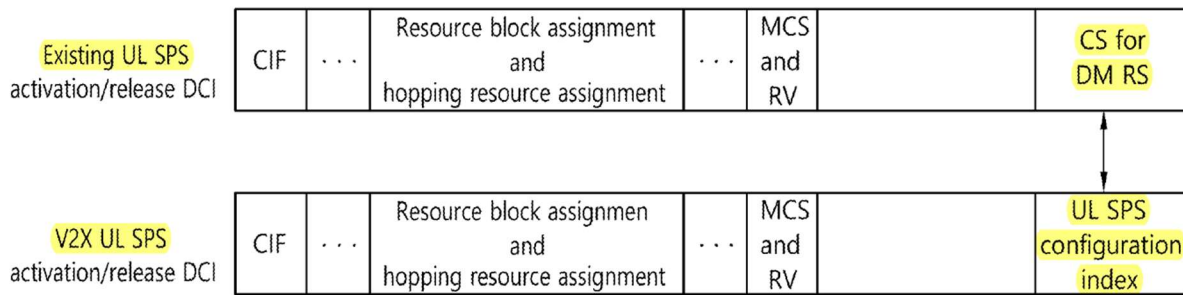
are, the Babaei Provisional that Petitioners rely upon for an earlier effective priority date under § 102(d)(2), explains that “the eNB may use the Cyclic shift DM RS field (3bits) in DCI 0 to indicate . . . the UL SPS configuration index to the UE.” Ex. 1007 p. 68.²²

B. Overview of U.S. Patent No. 10,869,331 (“Lee”)

Lee is very similar to Babaei, except that Lee uses different nomenclature. Specifically, what Babaei calls an SPS including an “index” or SPS with its “enhanced mechanism,” Ex. 1006 21:47–61, Lee calls a “V2X-SPS-RNTI,” because Lee envisions that it will only be used for vehicle communications, Ex. 1011 14:20–35.

Just like the Babaei Provisional, Lee explains, its V2X UL SPS is the conventional C-RNTI where the base station uses the cyclic shift for demodulation reference signal (“CS for DM RS,” Ex. 1011 Fig. 11, or “DM-RS CS,” *id.* 15:66–16:2) field as an SPS configuration index seen below:

²² Patent Owner cites to PDF Page of Ex. 1007, because Petitioners appear not to have numbered the exhibit’s pages per 37 C.F.R. § 42.63(d)(2)(i).



Ex. 1011 Fig. 11 (highlighting added).

C. Overview of WO 2016/130175 A1 (“Fwu”)

Fwu teaches that “5G systems may use a plurality of Radio Access Technologies (RATs)” and different RATs may be used “simultaneously by a single eNB for communications with different UEs.” Ex. 1008 [0033]. A RAT has “flexible subcarrier spacing and symbol duration.” *Id.* [0034].

Fwu concerns “a unified RAT with flexible air interface for the 5G system . . . referred to as a flexible Radio Access Technology (FRAT).” *Id.* [0035]. It is flexible and unified in that it has a “unified frame structure [and] may include, in some embodiments, a Transmission Time Interval (TTI) boundary alignment between multiple RATs . . . to allow seamless scheduling, fallback and support of different RATs.” *Id.*

Specifically, a FRAT has “configurable numerologies [that] may be used in the 5G system in which a base subcarrier spacing (Δf) and symbol duration (T).” *Id.* [0036]. “[T]o maintain the backward compatibility for existing LTE and LTE-

Advanced systems, a base subcarrier spacing and symbol duration can be specified as $\Delta f=15\text{KHz}$ and $T=66.7\mu\text{s}$.” *Id.* However, for different use cases, such as low latency, Machine-Type Communication, etc., different symbol duration and subcarrier spacing can be used. *Id.* [0037–38].

Fwu further teaches that a “UE may . . . determine that a change of operating conditions is warranted at operation . . . [and] transmit an indication to the eNB indicating the change of operating state of the UE.” *Id.* [0065-66]. The UE may “wait to change operating state until a new RAT is assigned to the UE.” *Id.* [0066]. In response, the base station may send a new configuration, with a “a different frame and/or symbol structure and use a different frequency spectrum and/or time range.” *Id.* [0067]. “The eNB may then continue to communicate with the UE” with the new configuration. *Id.*

D. Overview of U.S. Patent Pub. No. 2018/0035332 (“Agiwal”)

Agiwal concerns, among other things, handling collisions between URLLC UL allocation and other types of allocation. As Agiwal explains:

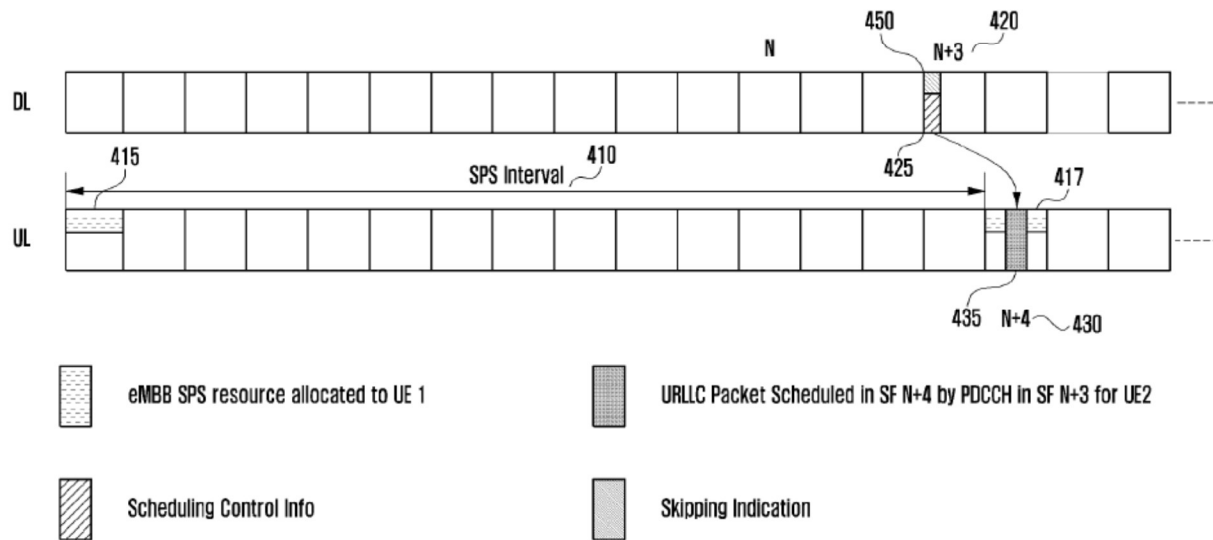
For uplink (UL) packet transmission (UE, terminal) (for example, UE1) is first allocated resources using scheduling control channel (e.g., a physical downlink common control channel (PDCCH)) in time slot (e.g., a subframe) N and the UE (UE1) transmits using the allocated resources in time slot N + P. The value of ‘P’ is different for different type[s] of services/packets. For

enhanced mobile broadband (eMBB) service/packet ‘P’ is larger than ultra-low latency (URLL)(e.g., ultra-reliable and low latency communication (URLLC)) service/packet. In order to support low latency ‘P’ is smaller for URLLC packet. This may result in collision between URLLC and eMBB packet transmissions from different UEs (for example, UE1 and UE3).

Ex. 1009 [0051]. Similarly, “a UE (for example, UE2) may be allocated semi-persistently scheduled (SPS) resource . . . periodically every SPS interval [and] URLLC packet resources allocated to another UE (for example, UE3) using dynamic scheduling may collide with SPS resource.” *Id.* [0052].

While there are subtleties that are not relevant, generally to avoid this collision, “if URLLC packet 135 scheduled in time slot (e.g., a subframe) ‘X’ (for example, N+4 subframe) . . . then, gNB/BS (base station) transmits (broadcast or dedicated manner) an indication (for example, skipping indication or pre-emption indication) 150 to . . . UE(s) . . . in time slot X-P ($P > 0$)(for example , N+3 subframe) 120 to skip UL transmission . . . in time slot ‘X’ 130 OR drop UL packet transmission.” *Id.* [0056]. “[I]n a case of broadcast signaling, the indication 150 can be addressed to a new RNTI (e.g., skip-RNTI) . . . [that] can be...[a] downlink control information (DCI) in PDCCH or group common DCI in PDCCH.” *Id.* [0060]. Agiwal illustrates a SPS collision and skipping indication as follows:

FIG. 4



Ex. 1009 Fig. 4. As seen above, the base station sends the skipping indication in the frame, N+3, immediately preceding the imminent collision in N+4.

IV. LEVEL OF ORDINARY SKILL IN THE ART

Petitioners propose a person of ordinary skill in the art (“POSITA”) “would have had a B.S. in Electrical Engineering or a related field with at least three years of experience designing, developing, and/or testing telecommunication systems. . . . [and] [a]dditional education may supplement practical experience or *vice versa*.” Pet. 5 (citations omitted). Patent Owner generally concurs with this description, though would propose that a POSITA only needs two years of experience, and believes that the appropriate field is what the ’976 Patent explicitly sets forth in the “TECHNICAL FIELD” section: “communication systems . . . specifically . . . new

signaling, procedures, user equipment (UE) and base stations for uplink ultra-reliable low latency communications (URLLC).” Ex. 1001 1:18–22.

Patent Owner does not believe any difference between Patent Owner’s view and Petitioners’ affects the unpatentability analysis.

V. CLAIM CONSTRUCTION

Patent Owner does not believe the Board needs to expressly construe any term for the purposes of deciding whether to institute, and should give all terms their plain and ordinary meaning to one of ordinary skill in the art at the effective priority date.

VI. PETITIONERS’ PRIOR ART REFERENCES FAIL TO RENDER OBVIOUS ANY CHALLENGED CLAIM

A. Ground 1: Babaei and Fwu

1. Petitioners Have Not Shown Babaei, or Babaei Combined with Fwu, Teaches, or Renders Obvious, Limitation 2c

[2c] the transmitting circuitry configured to transmit in a common search space of a physical downlink control channel, a downlink control information (DCI) format with cyclic redundancy check (CRC) scrambled by a first radio network identifier (RNTI), the first RNTI being different from a Cell-RNTI (C-RNTI) and a semi-persistent scheduling C-RNTI, the first RNTI being used for indicating an activation and a deactivation for an uplink data transmission on a physical uplink shared channel (PUSCH) based on the periodicity and the numerology; and

a. Petitioners Have Not Shown the Babaei-Fwu Combination Teaches or Renders Obvious Using a Claimed First RNTI that Is Different from an SPS C-RNTI

Babaei does not teach transmitting a DCI format with CRC bits scrambled with a “first RNTI being different from a Cell-RNTI (C-RNTI) and a semi-persistent

scheduling C-RNTI” (i.e., the “Different From” limitation discussed in Section II.D.1 beginning on page 11 where Patent Owner addressed the § 112 written description support for the ’976 Patent’s effective priority date).

Petitioners cite to only one example as allegedly teaching this limitation, Pet. 35 (citing Ex. 1006 16:64–17:8), where Babaei contemplates that “[a] base station may transmit to a UE at least one RRC message comprising SPS configuration parameters comprising a first ***SPS*** RNTI and a second ***SPS*** RNTI,” Ex. 1006 16:67–17:2 (emphasis added). Specifically, the “first ***SPS*** RNTI may be configured for a first SPS configuration (e.g. for VOIP), and a second ***SPS*** RNTI may be configured for a second SPS configuration (e.g. for V2X communications).” Ex. 1006 17:2–6. But contrary to Petitioners assertions, Babaei contemplates the use of two ***semi-persistent scheduling*** C-RNTIs, so neither is “different from . . . a semi-persistent scheduling C-RNTI.”

Petitioners’ cited “Corresponding Subject Matter” of the Babaei Provisional, *see* Pet. 12, makes clear that Babaei’s first SPS RNTI for VOIP and second SPS RNTI for V2X communications are SPS **C**-RNTIs. *See, e.g.*, Ex. 1007 p. 66 (“For example, a first SPS **C**-RNTI may be configured for SPS configuration to transmit voice traffic, [and] a second SPS **C**-RNTI may be configured for SPS configuration to transmit a V2X traffic.”) (emphasis added).; *see also* Ex. 1006 22:56–58 (noting that a “UE configured with SPS configurations” is done with a “DCI associated with

the **SPS RNTI** (e.g. *scrambled with SPS-RNTI*.)” (emphasis added).

Alternatively, Petitioners argue that Babaei’s use of two different SPS C-RNTIs meet the Different From limitation. Pet. 36 (“**SPS** RNTI for the first SPS configuration (voice) is . . . ‘different from’ the **SPS** RNTI for the second SPS configuration (V2X).”) (emphasis added). This is incorrect. The Different From limitation makes clear the identified “first RNTI” is different from a “plain” C-RNTI and **SPS** C-RNTI. Even if two SPS C-RNTIs are “different from” each other—and Petitioners have not made any showing that the first and second SPS C-RNTIs differ in anyway, other than different services are using the configurations—they are still SPS C-RNTIs, so not “different from” an SPS C-RNTI.

Assuming that the two SPS C-RNTIs are “different” for argument’s sake—a point Patent Owner in no way concedes—to accept Petitioners’ view requires the Board to impermissibly re-write this limitation as “the first semi-persistent scheduling RNTI being different from a Cell-RNTI (C-RNTI) and a second semi-persistent scheduling C-RNTI.” See *Becton Dickinson & Co. v. C.R. Bard, Inc.*, 922 F.2d 792, 799 n.6 (Fed. Cir. 1990) (“Nothing in any precedent permits judicial redrafting of claims.”).

Petitioners put forth an “illustrative” table for the Panel, Pet. 36; however, it should look as follows using Babaei’s disclosures against the actual limitation:

First RNTI	Use	“First RNTI different from a Cell-RNTI (C-RNTI) and a semi-persistent scheduling C-RNTI”
C-RNTI	Dynamic scheduling	No (this is a Cell-RNTI (C-RNTI))
SPS C-RNTI	Scheduling of periodic voice transmissions	No (this is a semi-persistent scheduling C-RNTI)
SPS C-RNTI	Scheduling of periodic V2X transmissions	No (this is a semi-persistent scheduling C-RNTI)

Petitioners merely point to a single Babaei semi-persistent scheduling C-RNTIs sent twice to configure channels for voice and vehicle traffic, neither “different from a . . . semi-persistent scheduling C-RNTI.”

Petitioners do not invoke Fwu for the Different From limitation, Pet. 34–35, but did note that Fwu teaches “a DCI format with a CRC scrambled by *the appropriate RNTI*,” *id.* 32 (citing Ex. 1008 [0023]) (emphasis added). In the cited paragraph, Fwu teaches that “the appropriate RNTI” is also a **SPS** C-RNTI. Ex. 1008 [0023] (“. . . a CRC scrambled by the **SPS** C-RNTI.”) (emphasis added), so also does not disclose a “first RNTI being different from . . . a semi-persistent scheduling C-RNTI.”

b. Petitioners Do Not Show Babaei, or Babaei in light of Fwu, Transmits the Relied-Upon DCI CRC Scrambled with an SPS C-RNTI in a Common Search Space

As Petitioners rely upon Babaei’s use of SPS C-RNTIs to meet the claim

limitation, Petitioners must also show a DCI with CRC scrambled with an SPS C-RNTI is “transmit[ed] in a common search space of a physical downlink control channel.” Petitioners have also not shown Babaei meets this additional limitation.

The only paragraphs of Fwu Petitioners cite for this limitation, Pet. 32–36 (citing Ex. 1008 [0022–23]), note that “A *UE-specific search space* may carry DCIs for UE specific allocations using . . . a semi-persistent scheduling (SPS C-RNTI),” Ex. 1008 [0023] (emphasis added). This is the opposite of a common search space.

And Babaei does not teach “transmit[ting] in a common search space of a physical downlink control channel[] a downlink control information (DCI)” at all, much less transmitting a DCI format with CRC scrambled by a SPS C-RNTI in a common search space.

Indeed, the best Petitioners can do is to cite to two of Babaei’s paragraphs as allegedly showing Babaei “at least suggests[] that the DCI format 0 used for scheduling could be sent in the common rather than UE-specific search space.” Pet. 33–34 (citing Ex. 1006 2:47; 14:50–15:31). But, the first cited line is merely giving the definition of “CSS.”²³ Ex. 1006 2:40–47 (“The following Acronyms are used throughout the present disclosure: . . . CSS[—]common search space.”). And

²³ Additionally, Petitioners allege there is a corresponding disclosure in page 62 of the Babaei Provisional, Pet. 12, but there is not. *See* Ex. 1007 p. 62 (showing no definition of “CSS”).

the other citation is to a paragraph that does not reference “CSS” or discuss a common search space. *Id.* 14:50–15:31.

In fact, the second paragraph merely says a DCI Format 0 may have a channel state information (“CSI”²⁴) request field. Ex. 1006 14:52–15:04 (“[T]he fields for DCI format 0 may comprise . . . [a] CSI request e.g. 1, 2 or 3 bits.”). A base station generally uses the CSI request field to trigger an aperiodic CSI report from a particular UE. Ex. 2002 ¶¶20–21; *see also* Ex. 2004 at Abstract (“The first request field indicates sending reference signal from the network device to a terminal device, and the first request field triggers the terminal device to report a measurement result of the reference signal to the network device.”). Babaei simply notes that, among other requirements, to use the “2-bit” or “3-bit” CSI request field the “DCI format [must be] mapped onto the *UE specific search space* given by the C-RNTI.” Ex. 1006 14:52–15:08 (emphasis added). These restrictions come from the relevant specification. Ex. 2002 ¶22 (citing Ex. 2005 at 2–3). Babaei, Petitioners, and Petitioners’ expert do not indicate or explain if a DCI format 0 with a “1-bit” CSI request field would have CRC scrambled with a SPS C-RNTI, or whether the DCI would or could be transmitted in a common search space.

Petitioners implicitly concede Babaei, in light of *Fwu*, does not show this

²⁴ See Ex. 1006 2:45.

feature by arguing a POSITA would modify Babaei to transmit in a common search space of a physical downlink control channel a DCI format applicable to multiple UEs. Pet. 34. However, to support this contention, Petitioners do not invoke Fwu, and simply redesign Babaei. *Id.*

Specifically, Petitioners propose a system inspired by Babaei whereby “different UEs could share [a] SPS RNTI” and use an “SPS-ConfigIndex . . . to determine to which UE” the base station is sending information. Pet. 34 (citing Ex. 1006 21:1–5; 22:32–40). But Babaei **does not** disclose multiple UEs sharing SPS C-RNTIs. Babaei teaches that a **single UE** may have multiple SPS C-RNTIs. *See, e.g.*, Ex. 1006 19:16–17 (instructing that “[t]he eNB may configure different SPS C-RNTIs for different SPS processes of **the** UE,” singular) (emphasis added).

Petitioners’ citations do not support a different conclusion. *See* Pet. 34 (citing Ex. 1006 21:1–5; 22:32–40). At column 21, Babaei says, “A [**singular**] UE configured with multiple SPS RNTIs may need to monitor search space of PDCCH for multiple SPS RNTIs.” Ex. 1006 21:1–5. At column 22, Babaei says one SPS C-RNTI may have multiple indexes. Ex. 1006 22:32–34. Babaei further says one base station may transmit the SPS C-RNTI with multiple parameters, including the indexes, to multiple cells, such as a primary and secondary cell. *Id.* 22:34–40. None of the cited portions contemplate different UEs sharing a single SPS C-RNTI.

In short, this is not a case where Petitioner is suggesting modifying one

reference in light of the teaching of another reference. Petitioners simply want Babaei to work differently to arrive at the claim limitation. *See Univ. of Strathclyde v. Clear-Vu Lighting LLC*, 17 F.4th 155, 160–61 (Fed. Cir. 2021) (reversing the Board’s obvious unpatentability determination because “[g]iven neither [reference] teaches or suggests [the limitation], we fail to see why a skilled artisan would opt to [include the limitation] when combining these references”); *see also In re Ratti*, 270 F.2d 810, 813 (CCPA 1959) (rejecting obviousness when modification required “substantial reconstruction and redesign of the elements shown in [a reference]”).

c. Petitioners’ Proffered Motivation to Combine Babaei and Fwu (1) Renders Babaei Inoperable for its Intended Purpose, (2) Does Not Provide Petitioners’ Alleged Benefit and (3) Is Deleterious in that It Introduces a Security Weakness

In any case, a POSITA would still not restructure Babaei so that “different UEs could share [a] SPS RNTI” as Petitioners suggest, given the proffered benefit is false and such a change would impose costs. *See Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) (explaining that when considering motivation to combine “the benefits, both lost and gained, should be weighed against one another”).

i. Petitioners Cannot Use Babaei Configuration Index for Addressing Purposes

Babaei’s main goal is to allow a base station to activate/deactivate multiple SPS configurations in parallel. *See supra* at Section III.A beginning on page 23. To

do this Babaei allocates the “SPS-ConfigIndex”—as the name implies—for configuration. *See, e.g.*, Ex. 1006 22:32–34 (“In an example, SPS-ConfigUL1 may be assigned SPS RNTI and SPS-Configindex1, and SPS-ConfigUL2 may be assigned SPS RNTI and SPS-Configindex2.”). The index may be 3-bits, *id.* 21:47–56, where the index identifies a particular configuration, *see, e.g., id.* 22:20–21. For example, “[d]ifferent SPS configurations (e.g. having different SPS periodicity) . . . may be identified by different SPS configuration indexes.” Ex. 1006 22:3–6.

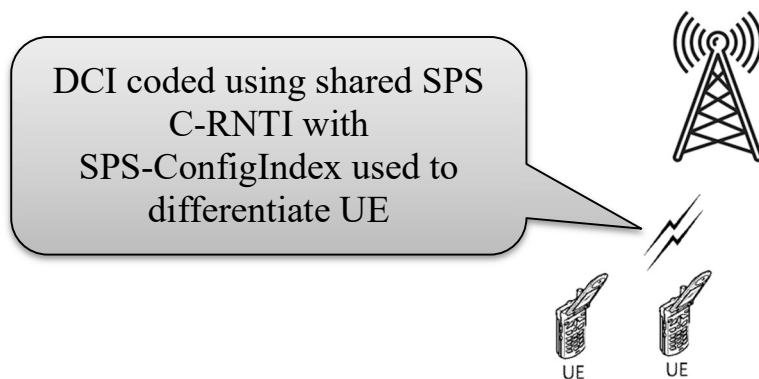
Yet Petitioners suggest that “each UE’s SPS-ConfigIndex could be used to determine to which UE the activation/deactivation DCI format should be applied.” Pet. 34. This would stop the UEs from finding *the configurations* with the index field. Indeed, Petitioners say elsewhere that “[b]its reserved for distinguishing between SPS configurations *would be lost for other purposes*,” Pet. 51–52 (emphasis added), such as Petitioner’s UE address identification, so Babaei teaches away from Petitioners’ design. *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (making clear that a modification that renders a reference “inoperable for its intended purpose” “teaches away from the . . . proposed modification”). Perhaps additional engineering is needed, but Petitioners cannot leave this as an exercise for the reader in showing a motivation to combine. *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1066 (Fed. Cir. 2016) (reminding the Board that “[a]lthough the *KSR* test is flexible,” the challenger must still provide an “explanation as to *how or why* the

references would be combined to produce the claimed invention.”) (citation and quotation omitted).

ii. Having Different UEs Share a SPS C-RNTI, Where an SPS-ConfigIndex Determines to which UE the SPS C-RNTI Is Addressed, Increases the Processing or Power Any UE Spends to Decode a Shared SPS C-RNTI

Petitioners assert that “a POSITA would have been motivated by Babaei’s concerns about UE processing requirements and power consumption to employ a common search space for Babaei’s enhanced SPS services.” Pet. 34 (citing Ex. 1004 ¶121). But Petitioners do not explain why their proposal of having multiple UEs independently receive a “shared” SPS C-RNTI would reduce the processing or power a UE spends to decode the configuration in any search space.

In fact, such a system would have the opposite effect, increasing UE processing. Petitioner’s suggestion whereby “different UEs could share [a] SPS RNTI” and use an “SPS-ConfigIndex . . . to determine to which UE the activation/deactivation DCI format should be applied,” Pet. 34, is depicted below.



As Patent Owner’s expert explains, that a second (or more) UEs are also

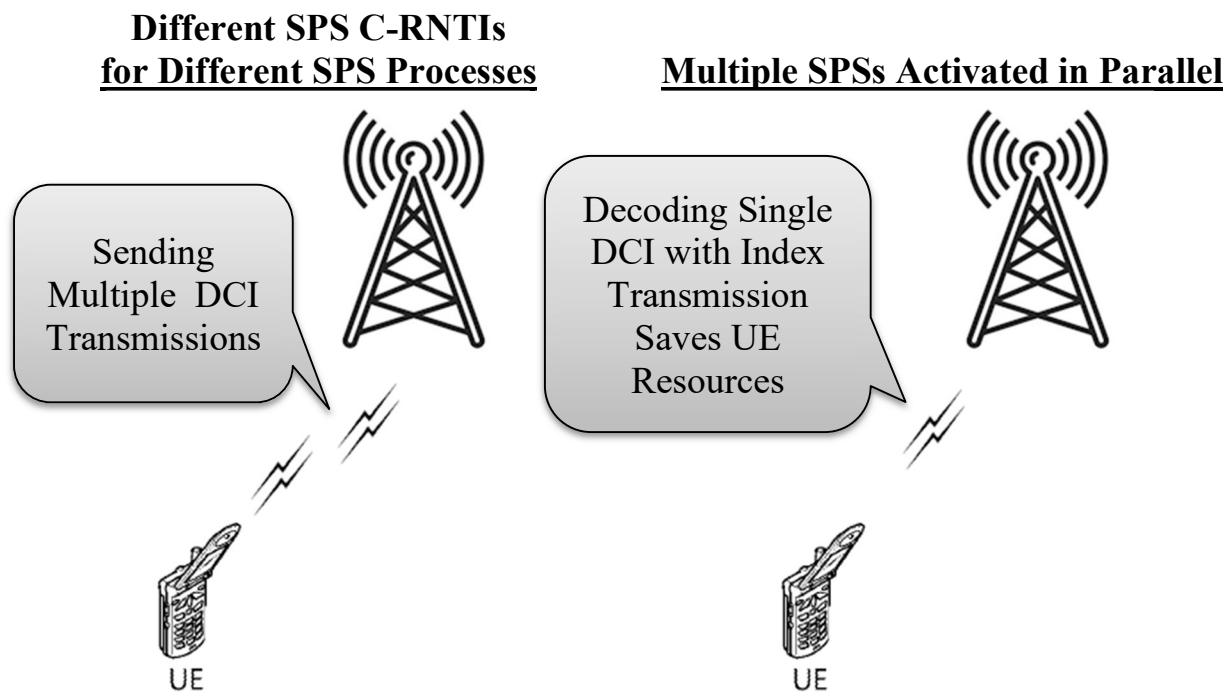
decoding a DCI does not lessen any burden on a first UE decoding the DCI. Ex. 2002 ¶23. That is because each UE independently must decode the DCI using the shared SPS C-RNTI . *Id.*

Moreover, Petitioners’ use of the configuration bits for UE addressing causes added UE processing/power expenditure. With UE-*specific* SPS C-RNTI scrambled DCI, each UE would *not* have the extra signaling overhead needed to compare the index to check the addressing. *Id.* ¶24. This is so because, with UE-specific SPS C-RNTIs, such as Babaei teaches, when the UE’s RNTI does not match the RNTI the base station used to scramble the DCI CRC, the UE does not “validate” the DCI and does no further DCI processing. *Id.* In contrast, under Petitioners’ shared SPS C-RNTI design, the UE will see the DCI as valid and then must decode and compare the SPS-ConfigIndex bits to figure out if the base station is directing the DCI to the UE. *Id.* This extra processing of the C-RNTI is wasteful and could have been avoided by using UE-specific SPS C-RNTIs where the UE would quickly decide the SPS C-RNTI was not valid or assigned to the UE.

In contrast, Babaei lays out why it is advantageous to configure multiple schedules *for one UE* using a single SPS C-RNTI with indexes rather than using multiple SPS C-RNTIs. Specifically, because a UE may have voice (“VoIP”) and vehicle (“V2X”) transmissions, Ex. 1006 17:2–6, it is efficient that “multiple SPSs may be activated in parallel” on the same UE, *see, e.g., id.* 21:21–42, rather than

having “[t]he eNB . . . configure different SPS C-RNTIs for different SPS processes of the UE,” *id.* 19:16–42, because “[w]hen the number of required SPS configurations increases, this mechanism may increase UE processing requirements and/or power consumption,” *id.* 21:3–5.

Babaei’s savings from using one SPS C-RNTI with a SPS-ConfigIndex rather than multiple DCIs is illustrated below.



Indeed, Petitioners expert does no more than to repeat Babaei’s sound reasoning for using one SPS C-RNTI with configuration indexes rather than multiple SPS C-RNTIs assigned to the same UE. Ex. 1004 ¶121 (“[M]ultiple SPS RNTIs result in increased processing/power resources, and Babaei discusses configuring some UEs to use the same SPS RNTI for two or more SPS configurations in order

to minimize this impact.”).

Lastly, while Petitioners’ expert is correct that Petitioners’ proposed system would require the UEs sharing the RNTIs to search a common space, see *id.* (“In this scenario, the SPS configurations share the SPS RNTI *and its search space.*”) (emphasis added), this would significantly increase the power expenditure of the UEs, which goes against Petitioner’s alleged motivation to combine, to reduce “UE processing requirements and power consumption.” Pet. 34. As Patent Owner’s expert explains, Petitioner’s system requires UEs to blindly decode over a larger resource block region because the UEs do not know if or where in the common search space a DCI for the UEs is located. Ex. 2002 ¶25. And such blind decoding is “expensive” compared to the “cheaper” process of putting a DCI in a UE specific search space. *Id.* So, Petitioners shared SPS C-RNTI design also increases UE power consumption and processing requirements because it requires the base station to transmits a DCI in a common search space.

In short, Petitioners’ alleged benefit does not result from Petitioners’ design—not taught by Babaei—so there is no incentive to make such a change.

iii. Having Different UEs Share a SPS C-RNTI Where an SPS-ConfigIndex Determines to which UE the SPS C-RNTI Is Addressed Introduces a Security Concern

Lastly, Petitioners and their expert’s suggestion of having “different UEs . . . share SPS RNTI,” Pet. 34, creates a security vulnerability. One reason that base

stations scramble the CRC for DCI formats with a UE-specific RNTIs is so that only the intended UE recipient that the system assigned the RNTIs can decode the DCI format and determine where and how to decode the corresponding message. Ex. 2002 ¶26; *see also* Ex. 1008 [0023] (“Use of the RNTI, which may be UE-specific, may limit decoding of the DCI information (and hence the corresponding PDSCH) to only the intended UE.”); Ex. 2006 [0002] (“The RNTI is implicitly encoded in the Cyclic Redundancy Check (CRC), so that only the UE with the RNTI may decode the DCI format, and hence use the corresponding PDSCH.”). The system created by Petitioners, and not taught by Babaei, whereby “different UEs could share [a] SPS RNTI,” Pet. 34, removes the security provided by UE-unique SPS C-RNTIs.

* * * * *

A POSITA would reject Petitioners’ ill-conceived redesign of Babaei after weighing the cost of vitiating the UE-specific RNTI CRC scrambling security and use of already claimed configuration index bits as a UE address field, especially given the required increase of UE resources Babaei warns against.

2. Petitioners Have Not Shown Babaei, or Babaei Combined with Fwu, Teaches, or Renders Obvious, Limitation 4c

[4c] transmitting in a common search space of a physical downlink control channel, a downlink control information (DCI) format with cyclic redundancy check (CRC) scrambled by a first radio network identifier (RNTI), the first RNTI being different from a Cell-RNTI (C-RNTI) and a semi-persistent scheduling C-RNTI, the first RNTI being used for indicating an activation and a deactivation for the uplink data transmission on a physical uplink shared channel (PUSCH) based on the periodicity and the numerology;

Petitioners solely rely upon their argument for limitation 2c for this limitation, 4c. Pet. 48. Therefore, Petitioners do not show limitation 4c is anticipated or obvious for the same reasons as previously given for limitation 2c. *See* Section VI.A.1 beginning on page 30.

B. Ground 2: Babaei and Fwu in further view of Lee

1. Petitioners Fail to Show a Motivation to further Combine Lee

a. Petitioners' Motivation to Combine Lee Does Not Ameliorate Petitioners' Deficient Motivation to Combine Babaei and Fwu

For Petitioners' proposed Babaei-Fwu-Lee combination, Petitioners solely rely upon their prior motivation to combine Babaei and Fwu argument, and then turn to why Petitioners believe a POSITA would further add Lee's teaching to use an SPS C-RNTI with a configuration index for V2X configurations. Pet. 50–52.

As set forth in Section VI.A.1.c beginning on page 37, the Board should reject Petitioners' offered reason to combine Babaei and Fwu because Petitioners base their argument upon insertion of a design in Babaei that, if implemented, would

make Babaei's concern for UE processing and power expenditure worse, while simultaneously creating security vulnerabilities and rendering Babaei's invention inoperable.

Given Petitioners are incorrect that "A POSITA would have been motivated to combine Babaei and Fwu," there is no Babaei and Fwu combination such that "[a] POSITA would have been further motivated to combine Babaei and Fwu with Lee." Pet. 50; *see also Intellectual Ventures I v. Motorola Mobility*, 870 F.3d 1320, 1331 n.5 & 1332 (Fed. Cir. 2017) (affirming no obviousness of one claim in light of three references, Nelson, Smith, and Ethridge, "because substantial evidence supports the finding that there was no motivation to combine [two references,] Nelson and Smith"); *Growlerwerks, Inc. v. Drink Tanks Corp.*, IPR2017-00262, Paper 7 at 31 (PTAB Feb. 22, 2017) (explaining Petitioner "lacks sufficient underpinning" to add an additional reference's teachings to a prior combination when the Board already determined Petitioner provided insufficient reasoning to combine the prior combination).

Indeed, Petitioners have not suggested their modifications to Babaei to have UE share SPS C-RNTIs as a motivation to transmit the claimed DCI format in a common search space in a Babaei-Fwu combination would be undone or altered in view of Lee. Pet. 50–52. Therefore, Lee does nothing to alleviate the Babaei-Fwu deficiencies.

b. Petitioners' Motivation to Combine Lee with Babaei and Fwu Makes No Sense

Petitioners' motivation to combine Lee is independently flawed. Petitioners again start their motivation to combine Lee on the “concern, identified in Babaei, that employing a large number of SPS RNTIs would increase UE processing requirements and power consumption,” Pet. 51 (citing Ex. 1006 21:1–5; Ex. 1004 ¶156), and arrive at the conclusion that a POSITA would use a SPS C-RNTI “for conventional VoIP UL traffic” and a V2X SPS C-RNTI, what Lee calls an SPS C-RNTI with configuration indexes, “for V2X UL SPS traffic.” Pet. 51–52. However, Babaei *already teaches* “a first SPS C-RNTI may be configured for SPS configuration to transmit voice traffic,” Ex. 1006, 19:23–26, and a second SPS C-RNTI for configuring multiple V2X SPS traffic configurations, *id.* 21:21–57. And Petitioners have not put forth any explanation why Lee would further reduce UE processing requirements and power consumption or reduce the number of SPS C-RNTIs more than the reduction already achieved with Babaei and Fwu. *Id.*

Indeed, neither Babaei nor Lee evinces a concern that the number of configuration index bits in a DCI is insufficient or inefficient, and Petitioners and Petitioners' expert have not said otherwise. Pet. 51–52. The best Petitioner can say is that “DCI Format messages are compact, and limited in how many SPS configurations could be signaled,” but Petitioners have not put forth any evidence concerning what Babaei's limit is, much less that it is insufficient. Pet. 51 (citing

Ex. 1004 ¶157). Conversely, Petitioners have not said that Lee’s DCI Format messages *are any less* “compact, and limited in how many SPS configurations could be signaled” than Babaei’s. *Id.* 51–52.

In fact, Babaei and Lee both contemplate the same number of index field bits. *Compare* Ex. 1011 16:4–8 (“[I]f the DCI is CRC-scrambled by the V2X-SPS-RNTI (second RNTI) . . . the . . . CS DM RS (**3 bits**) field) does not exist and . . . the uplink SPS configuration index field exists.”) (emphasis added) *with* Ex. 1006 21:52–56 (“[T]he DCI activating or releasing an uplink SPS corresponding to a V2X SPS traffic may comprise an UL SPS configuration index field (*e.g.* **3 bits**).”) (emphasis added).

Patent Owner respectfully submits that Petitioners have not proffered any valid motivation to further combine Lee.

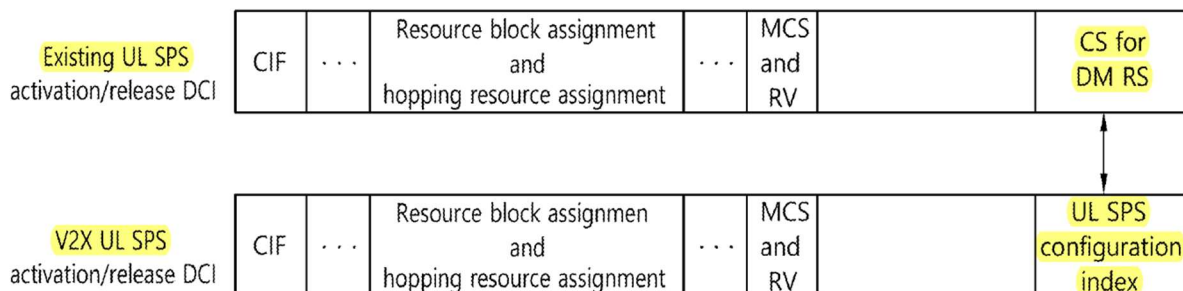
2. Petitioners Have Not Shown Babaei-Fwu Further Combined with Lee, Teaches, or Renders Obvious, Limitation 2c

[2c] the transmitting circuitry configured to transmit in a common search space of a physical downlink control channel, a downlink control information (DCI) format with cyclic redundancy check (CRC) scrambled by a first radio network identifier (RNTI), the first RNTI being different from a Cell-RNTI (C-RNTI) and a semi-persistent scheduling C-RNTI, the first RNTI being used for indicating an activation and a deactivation for an uplink data transmission on a physical uplink shared channel (PUSCH) based on the periodicity and the numerology; and

Even with Lee, Petitioners still do not show “a first radio network identifier (RNTI) . . . being different from a Cell-RNTI (C-RNTI) and a semi-persistent

scheduling C-RNTI” (i.e., the Different From limitation). The RNTI that Petitioners identify as the claimed “first RNTI” is what Lee calls a “V2X-SPS-RNTI.” Pet. 54 (citing Ex. 1011 14:12–35 & Fig. 9). However, the “SPS” in the name stands for “semi-persistent scheduling,” Ex. 1011 2:14–18, so this is not “different from a . . . semi-persistent scheduling C-RNTI.”

Indeed, while Lee’s nomenclature is slightly different, Lee’s V2X-SPS-RNTI corresponds to Babaei’s “SPS [that] may include the index of the SPS that is triggered.” Ex. 1006 21:49–51. As Lee explains, its V2X UL SPS is the conventional C-RNTI where the base station uses the cyclic shift for demodulation reference signal (“CS for DM RS,” Ex. 1011 Fig. 11, or “DM-RS CS,” *id.* 15:66–16:2) field as an SPS configuration index seen below:



Ex. 1011 Fig. 11 (highlighting added). Babaei Provisional teaches the same: “the eNB may use the Cyclic shift DM RS field (3bits) in DCI 0 to indicate to the UL SPS configuration index to the UE.” Ex. 1007 p. 68; *see also* Ex. 1006 21:49–56 (“[T]he DCI activating or releasing an uplink SPS corresponding to a

V2X SPS traffic may comprise an UL SPS configuration index field (e.g. 3 bits) identifying the SPS configuration corresponding [to] the SPS configuration index.”).

While Petitioners hope Lee’s labeling will confuse, Lee’s V2X-SPS-RNTI does not introduce a SPS RNTI different from Babaei’s SPS using a configuration index. Therefore, when Petitioners argue that Lee’s V2X-SPS-RNTI is “differentiated from” a SPS-C-RNTI, Pet. 54, Petitioners are just rehashing their argument that if two SPS C-RNTIs are different from each other this meets the claim language, Pet. 36 (arguing an “SPS RNTI for the first SPS configuration (voice) . . . ‘different from’ the SPS RNTI for the second SPS configuration (V2X)” meets the Different From limitation). The Panel should likewise reject this argument because, it is not enough that two SPS C-RNTIs are “different from” each other, per the limitation, the identified “first RNTI” must be “different from” an SPS C-RNTI.

3. Petitioners Have Not Shown Babaei, or Babaei Combined with Fwu and Lee, Teaches, or Renders Obvious, Limitation 4c

[4c] transmitting in a common search space of a physical downlink control channel, a downlink control information (DCI) format with cyclic redundancy check (CRC) scrambled by a first radio network identifier (RNTI), the first RNTI being different from a Cell-RNTI (C-RNTI) and a semi-persistent scheduling C-RNTI, the first RNTI being used for indicating an activation and a deactivation for the uplink data transmission on a physical uplink shared channel (PUSCH) based on the periodicity and the numerology;

Petitioners solely rely upon their argument for limitation 2c for this limitation,

4c. Pet. 56. Therefore, Petitioners do not show limitation 4c is anticipated or obvious for the same reasons as previously given for limitation 2c. *See* Section VI.B.2 beginning on page 47.

C. Ground 3: Babaei and Fwu in further view of Agiwal

1. Petitioners Fail to Show a Motivation to further Combine Agiwal

a. Petitioners' Motivation to Combine Agiwal Does Not Ameliorate Petitioners' Deficient Motivation to Combine Babaei and Fwu

For Petitioner's proposed Babaei-Fwu-Agiwal combination, Petitioners solely rely upon their prior motivation to combine Babaei and Fwu argument, and then turn to why Petitioners believe a POSITA would further add Agiwal's teaching to use a broadcast skip-RNTI to tell UEs to skip a URLLC UL transmission in a particular time slot. Pet. 57–58.

As set forth in Section VI.A.1.c beginning on page 37, the Board should reject Petitioners' offered reason to combine Babaei and Fwu because Petitioners base their argument upon insertion of a design in Babaei that, if implemented, would make Babaei's concern for UE processing and power expenditure worse, while simultaneously creating security vulnerabilities and rendering Babaei's invention inoperable.

Given Petitioners are incorrect that “[a] POSITA would have been motivated to combine Babaei and Fwu,” there is no Babaei and Fwu combination such that “[a] POSITA would have been motivated to combine Agiwal's skip-RNTI solution with

Babaei and Fwu’s SPS signaling and numerology configuration.” Pet. 58; *see also Intellectual Ventures*, 870 F.3d at 1331 n.5 & 1332 (affirming no obviousness in light of three references after the court found no motivation to combine two of the three references); *Growlerwerks*, IPR2017-00262, Paper 7 at 31 (rejecting motivation to combine an additional reference to a prior combination where the Board already determined no motivation to combine the prior combination).

Indeed, Petitioners have not suggested their modifications in view of Agiwal regarding a skip-RNTI has any effect on Petitioners conception of a modified Babaei-Fwu combination where UEs share SPS C-RNTIs. Pet. 57–58. Therefore, Agiwal does not help the Babaei-Fwu deficiencies.

b. Petitioners’ Have Insufficiently Provided a Benefit that Outweighs the Certain Cost for Petitioners Proposal to Modify Babaei and Fwu with Agiwal to Have UEs Send Skip Confirmations

Disregarding the lack of a “sufficient underpinning” to further combine Agiwal, Petitioners motivation to combine Agiwal is independently flawed.

Petitioners propose at least two modifications to Babaei-Fwu when further using Agiwal. The first alteration is the use of Agiwal’s “skip-RNTI” to meet the Different From limitation of limitation 2c. Pet. 56–61. The second redesign would have UEs send a confirmation to the base station to acknowledge the UE received the skip-RNTI in order to meet limitations 2d and 2f–i. *Id.* 60–61. For the second restructuring, Petitioners have not offered an explanation as to why this confirmation

outweighs the clear downside to such acknowledgements.

In Petitioners' imagined Babaei-Fwu-Agiwal system, UEs must expend processing resources and power to send skip confirmations. Ex. 2002 ¶27. This expenditure is antithetical to Babaei's explicit goal to save UE power and compute time. Ex. 1006 21:5–8 (explaining it put forth its system to avoid “increase[d] UE processing requirements and battery power consumption”). Petitioners do not provide an outweighing benefit to this concrete cost. Pet. 61.

Rather, Petitioners only say that a base station would get the intangible benefit of “know[ing] whether the conflicting SPS UE will allow the URLLC UE to transmit uncontested.” *Id.* If the answer is “yes,” Agiwal functions no differently. However, Petitioners do not discuss what will happen in the scenario where the conflicting SPS UE will not “allow the URLLC UE to transmit uncontested.” *Id.*

Presumably, Petitioners have an undisclosed plan for this situation Petitioners consider beneficial; however, Patent Owner and the Board must guess what this is and cannot assess such an unknown. Indeed, it is hard to even imagine what a base station would do if a UE will not allow uncontested transmission, given that Agiwal teaches the base station intentionally schedules conflicting URLLC allocations in the preceding URLLC signaling frame (“SF”) and has no provision for confirmation. *See, e.g.*, Ex. 1009 Fig. 4 (“URLLC Packet Scheduled in SF N+4 by PDCCH in SF N+3 for UE2”); *see also* Ex. 2002 ¶28 (explaining that because URLLC is scheduled

impromptu in the next immediate frame by design, a base station cannot wait for confirmation from conflicting UEs that must follow the skip command).

Further, Petitioner does not explain how it would even be possible for a UE to notify the base station of a skip-RNTI receipt before the timing conflict, given the skip-RNTI only goes out on the immediately preceding SF. Conversely, an *ultra-reliable* and *low latency* communication (“URLLC”) would not be so ultra-reliable or low latency if the base station rescinds and delays URLLC uplink grants if a lower priority SPS UE “will not allow the URLLC UE to transmit uncontested.”

Petitioners simply have not met their burden to explain “*how* or *why* the references would be combined to produce the claimed invention.” *Trivascular*, 812 F.3d at 1066 (citation and quotation omitted).

2. Petitioners Have Not Shown Babaei-Fwu Further Combined with Agiwal, Teaches, or Renders Obvious, Limitations 2d and 2f

[2d] *receiving circuitry configured to receive confirmation* information Medium Access Control (MAC) Control Element (CE) in a case that third information used for *indicating the activation* for the uplink data transmission on the PUSCH is comprised in the DCI format with the CRC scrambled by the first RNTI . . .

. . . .

[2f] *the receiving circuitry is configured to receive confirmation* information MAC CE in a case that fourth information used for *indicating the deactivation* for the uplink data transmission on the PUSCH is comprised in the DCI format with the CRC scrambled by the first RNTI, and

First, Agiwal does not teach that the UE sends confirmation information for

activation and deactivation in the case where the UE receives a skip indication, so the base station would not have “receiving circuitry configured to receive [such] confirmation[s],” as required by limitations 2d and 2f. And, as set forth in Section VI.C.1.b beginning on page 51, Petitioners have not provided an explanation how a UE could send a timely confirmation, much less a cogent reason why a UE would expend power and CPU cycles to send such a confirmation.

Second, Petitioners fail to show a different aspect of these limitations: that different information used for “indicating the activation” and “indicating the deactivation” in limitations 2d and 2f.

For Ground 1, limitation 2c, Petitioners identify “a first radio network identifier (RNTI)” as Babaei’s “SPS RNTI” for voice or vehicle communications. Pet. 35 (citing Ex. 1006 16:64–17:8); *accord id.* 60–61 (“In Ground 1, Petitioner relies upon the confirmation information MAC CEs described in Babaei for confirming DCI messages addressed to a UE’s assigned RNTIs for one or more different SPS configurations.”). For Ground 3, however, Petitioners switch their obviousness theory and identify a first RNTI as “Agiwal’s skip-RNTI.” *Id.* 59. Indeed, Petitioners are explicitly relying upon the position that “the skip-RNTI” for Ground 3 is “different from a . . . semi-persistent scheduling C-RNTI” used in Ground 1 for a different limitation. *Id.*

Of course, “*the* first RNTI” of limitations 2d and 2f is referring to the first

RNTI of limitation 2c. As such, for Ground 3, Petitioners must show the first RNTI they identify in 2c, Agiwal's skip-RNTI, meets the further limitations regarding the first RNTI in limitations 2d and 2f. *Wi-Lan, Inc. v. Apple, Inc.*, 811 F.3d 455, 462 (Fed. Cir. 2016) (reminding courts that a prior element identified for one limitation must be the same element for a subsequent limitation referring to the same "said limitation"); *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1306 (Fed. Cir. 2005) (agreeing that "the" referring to a previous limitation means the structure in the limitation must be the same as that in the previous limitation).

Specifically, among other things, Petitioners need to show their proffered combination has a base station that is configured to receive a "confirmation" in two specific "cases": one where the "DCI format with the CRC scrambled by [Agiwal's skip-RNTI]" has "**third information used for indicating the activation**" and a second one where the "DCI format with the CRC scrambled by [Agiwal's skip-RNTI]" has "**fourth information used for indicating the deactivation**." See limitations 2d and 2f. The ordinal numbering in the limitations makes clear that the third and fourth information are not the same. *Gillette Co. v. Energizer Holdings, Inc.*, 405 F.3d 1367, 1373 (Fed. Cir. 2005) ("The terms 'first, second, and third' are terms to distinguish different elements of the claim."). Petitioners have not done this.

Petitioners make no attempt to show the claimed "cases" exist with Babaei-

Fwu-Agiwal where there is a third information for activation, and a fourth information for deactivation, in a DCI format with CRC scrambled by a skip-RNTI. Indeed, Petitioners' theory rests on Petitioners' contention that "the [singular] skipping indication in Agiwal both activates and deactivates." Pet. 60. But, as explained above, the claims require *different* third and fourth information corresponding to the activation and deactivation, so assuming for argument's sake that Petitioners theory is correct, Petitioners have not explained how or why a UE would send different confirmations (so that the base station would be configured to receive the two confirmations) when under Petitioners' theory a single "skipping indication" both activates and deactivates.

3. Petitioners Have Not Shown Babaei-Fwu Further Combined with Agiwal, Teaches, or Renders Obvious, Limitations 4d and 4f

[4d] receiving confirmation information Medium Access Control (MAC) Control Element (CE) in a case that third information used for indicating the activation for the uplink data transmission on the PUSCH is comprised in the DCI format with the CRC scrambled by the first RNTI . . .

....

[4f] receiving confirmation information MAC CE in a case that fourth information used for indicating the deactivation for the uplink data transmission on the PUSCH is comprised in the DCI format with the CRC scrambled by the first RNTI

Petitioners solely rely upon their argument for limitations 2d and 2f for these limitations, 4d and 4f. Pet. 62–63. Therefore, Petitioners do not show limitations

4d and 4f are anticipated or obvious for the same reasons as previously given for limitations 2d and 2f. *See* Section VI.C.2 beginning on page 53.

VII. CONCLUSION

As set forth above, for the first two grounds, Petitioners simply identify SPS RNTIs as “first RNTIs” where the claims require the first RNTI be different from an SPS RNTI.

And Petitioners provided motivations to combine the references to meet the “common search space” and “confirmation” limitations that are variously counterproductive to the identified motivation to combine, introduce unaddressed problems, would render the prior art inoperable, appear impossible, and/or are incomplete and unexplained.

For Petitioners’ third ground, Petitioners contend that a single skipping indication “both activates and deactivates,” and have not attempted to show that a base station would be configured to receive separate confirmations for this single indication as required by the claims.

Therefore, Patent Owner submits that Petitioners have failed to meet their threshold showing that there is a reasonable likelihood that at least one of the claims challenged in the Petition is unpatentable, and that Board should deny Petitioners’ request for institution.

Dated: May 15, 2024

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

Per § 42.24(a)–(b) the undersigned certifies that the number of words in the paper, PATENT OWNER’S PRELIMINARY RESPONSE, is:

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Dated: May 15, 2024

/R. Allan Bullwinkel/
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CERTIFICATE OF SERVICE

The undersigned certifies that on the fifteenth day of May, 2024, a complete and entire copy of the foregoing “PATENT OWNER’S PRELIMINARY RESPONSE,” including exhibits, if any, was served on the following counsel of record via email per Petitioners’ consent to electronic service, see Paper 2 at 1:

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