

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent of: Alireza Babaei  
U.S. Patent No.: 11,139,944 Attorney Docket No.: 50095-0237IP1  
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Title: VALIDATION OF DOWNLINK CONTROL INFORMATION

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**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT  
NO. 11,139,944 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

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**LIST OF EXHIBITS**

|            |                                                                                                                     |
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| APPLE-1001 | U.S. Patent No. 11,139,944 to Babaei (“the ’944 patent”)                                                            |
| APPLE-1002 | Excerpts from the Prosecution History of the ’944 Patent (“the Prosecution History”)                                |
| APPLE-1003 | Declaration and Curriculum Vitae of Dr. Narayan Mandayam                                                            |
| APPLE-1004 | U.S. Patent No. 11,178,598 (“Zhang”)                                                                                |
| APPLE-1005 | 3GPP 38.213 TS 38.213 v15.7.0 (“3GPP-38.213”)                                                                       |
| APPLE-1006 | 3GPP 38.213 Draft Change Request v. 15.7.0 (“3GPP-38.213-CR”)                                                       |
| APPLE-1007 | 3GPP 38.212 Draft Change Request (“3GPP-38.212-CR”)                                                                 |
| APPLE-1008 | Declaration of Friedhelm Rodermund Regarding Public Availability of 3GPP-38.213, 3GPP-38.213-CR, and 3GPP-38.212-CR |
| APPLE-1009 | Email Circulated to 3GPP Working Group November 3, 2019 with APPLE-1006 attached                                    |
| APPLE-1010 | Email Circulated to 3GPP Working Group November 1, 2019 with APPLE-1007 attached                                    |
| APPLE-1011 | RESERVED                                                                                                            |
| APPLE-1012 | RESERVED                                                                                                            |
| APPLE-1013 | RESERVED                                                                                                            |
| APPLE-1014 | Original complaint filed in <i>Apex Beam Technologies LLC v. Apple Inc.</i> , Case No. 6-24-cv-00223 (WDTX).        |

- APPLE-1015 Amended Complaint filed in *Apex Beam Technologies LLC v. Apple Inc.*, Case No. 6-24-cv-00223-ADA-DIG (WDTX).
- APPLE-1016 Proof of Service of Amended Complaint in *Apex Beam Technologies LLC v. Apple Inc.*, Case No. 6-24-cv-00223-ADA-DIG (WDTX).

**LISTING OF CLAIMS**

| <b>Claim 1</b> |                                                                                                                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1.P]          | A method comprising:                                                                                                                                                                                                            |
| [1.1.1]        | receiving, by a wireless device, a downlink control information (DCI) comprising:                                                                                                                                               |
| [1.1.2]        | a hybrid automatic repeat request process number field comprising one or more first bits; and                                                                                                                                   |
| [1.1.3]        | a redundancy version field comprising one or more second bits;                                                                                                                                                                  |
| [1.2.1]        | validating the DCI, wherein the validating:                                                                                                                                                                                     |
| [1.2.2]        | is based on the one or more second bits;                                                                                                                                                                                        |
| [1.2.3]        | is based on comparing the one or more first bits with a first sequence of one or more bits, determined using a first configuration parameter, in response to:                                                                   |
| [1.2.3a]       | the one or more first bits not indicating a configuration index; and                                                                                                                                                            |
| [1.2.3b]       | the DCI having a first format;                                                                                                                                                                                                  |
| [1.2.4]        | is not based on comparing the one or more first bits with the first sequence in response to the DCI having a second format; and                                                                                                 |
| [1.2.5]        | is not based on the one or more first bits in response to the one or more first bits indicating a configuration index; and                                                                                                      |
| [1.3]          | activating or deactivating resources.                                                                                                                                                                                           |
| <b>Claim 2</b> |                                                                                                                                                                                                                                 |
| [2]            | The method of claim 1, further comprising receiving configured grant configuration parameters of an uplink configured grant configuration, wherein the resources are associated with the uplink configured grant configuration. |

|                |                                                                                                                                                                                                                          |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Claim 3</b> |                                                                                                                                                                                                                          |
| [3]            | The method of claim 1, further comprising receiving semi-persistent scheduling (SPS) configuration parameters of a downlink SPS configuration, wherein the resources are associated with the downlink SPS configuration. |
| <b>Claim 4</b> |                                                                                                                                                                                                                          |
| [4]            | The method of claim 1, wherein the DCI is associated with a configured scheduling radio network temporary identifier.                                                                                                    |
| <b>Claim 5</b> |                                                                                                                                                                                                                          |
| [5.1]          | The method of claim 4, wherein: the DCI further comprises a new data indicator field; and                                                                                                                                |
| [5.2]          | the validating the DCI is further based on the DCI being associated with the configured scheduling radio network temporary identifier and based on a value of the new data indicator field being zero.                   |
| <b>Claim 6</b> |                                                                                                                                                                                                                          |
| [6]            | The method of claim 1, wherein the first configuration parameter indicates a first number of bits in the first sequence of the one or more bits.                                                                         |
| <b>Claim 7</b> |                                                                                                                                                                                                                          |
| [7]            | The method of claim 6, wherein the first sequence of one or more bits are all zeros.                                                                                                                                     |
| <b>Claim 8</b> |                                                                                                                                                                                                                          |
| [8]            | The method of claim 1, the validating the DCI is further based on comparing the one or more second bits with a second sequence of one or more bits determined using a second configuration parameter.                    |

| Claim 9     |                                                                                                                                                               |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [9]         | The method of claim 8, wherein the second configuration parameter indicates a second number of bits in the second sequence of the one or more bits.           |
| Claim 10    |                                                                                                                                                               |
| [10]        | The method of claim 9, wherein the second sequence of one or more bits are all zeros.                                                                         |
| Claim 11    |                                                                                                                                                               |
| [11.P]      | A wireless device comprising:                                                                                                                                 |
| [11.1]      | one or more processors; and                                                                                                                                   |
| [11.2]      | memory storing instructions that, when executed by the one or more processors, cause the wireless device to:                                                  |
| [11.2.1]    | receive a downlink control information (DCI) comprising:                                                                                                      |
| [11.2.1a]   | a hybrid automatic repeat request process number field comprising one or more first bits; and                                                                 |
| [11.2.1b]   | a redundancy version field comprising one or more second bits;                                                                                                |
| [11.2.2]    | validate the DCI, wherein the validating:                                                                                                                     |
| [11.2.2a]   | is based on the one or more second bits;                                                                                                                      |
| [11.2.2b]   | is based on comparing the one or more first bits with a first sequence of one or more bits, determined using a first configuration parameter, in response to: |
| [11.2.2b.1] | the one or more first bits not indicating a configuration index; and                                                                                          |
| [11.2.2b.2] | the DCI having a first format;                                                                                                                                |
| [11.2.2c]   | is not based on comparing the one or more first bits with the first sequence in response to the DCI having a second format; and                               |

|                 |                                                                                                                                                                                                                                                                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [11.2.2d]       | is not based on the one or more first bits in response to the one or more first bits indicating a configuration index; and                                                                                                                                                                                                       |
| [11.3]          | activate or deactivate resources.                                                                                                                                                                                                                                                                                                |
| <b>Claim 12</b> |                                                                                                                                                                                                                                                                                                                                  |
| [12]            | The wireless device of claim 11, wherein the instructions, when executed by the one or more processors, further cause the wireless device to receive configured grant configuration parameters of an uplink configured grant configuration, wherein the resources are associated with the uplink configured grant configuration. |
| <b>Claim 13</b> |                                                                                                                                                                                                                                                                                                                                  |
| [13]            | The wireless device of claim 11, wherein the instructions, when executed by the one or more processors, further cause the wireless device to receive semi-persistent scheduling (SPS) configuration parameters of a downlink SPS configuration, wherein the resources are associated with the downlink SPS configuration.        |
| <b>Claim 14</b> |                                                                                                                                                                                                                                                                                                                                  |
| [14]            | The wireless device of claim 11, wherein the DCI is associated with a configured scheduling radio network temporary identifier.                                                                                                                                                                                                  |
| <b>Claim 15</b> |                                                                                                                                                                                                                                                                                                                                  |
| [15.1]          | The wireless device of claim 14, wherein: the DCI further comprises a new data indicator field; and                                                                                                                                                                                                                              |
| [15.2]          | the validating the DCI is further based on the DCI being associated with the configured scheduling radio network temporary identifier and based on a value of the new data indicator field being zero.                                                                                                                           |

|                 |                                                                                                                                                                                                                         |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Claim 16</b> |                                                                                                                                                                                                                         |
| [16]            | The wireless device of claim 11, wherein the first configuration parameter indicates a first number of bits in the first sequence of the one or more bits.                                                              |
| <b>Claim 17</b> |                                                                                                                                                                                                                         |
| [17]            | The wireless device of claim 16, wherein the first sequence of one or more bits are all zeros.                                                                                                                          |
| <b>Claim 18</b> |                                                                                                                                                                                                                         |
| [18]            | The wireless device of claim 11, wherein the validating the DCI is further based on comparing the one or more second bits with a second sequence of one or more bits determined using a second configuration parameter. |
| <b>Claim 19</b> |                                                                                                                                                                                                                         |
| [19]            | The wireless device of claim 18, wherein the second configuration parameter indicates a second number of bits in the second sequence of the one or more bits.                                                           |
| <b>Claim 20</b> |                                                                                                                                                                                                                         |
| [20]            | The wireless device of claim 19, wherein the second sequence of one or more bits are all zeros.                                                                                                                         |

Apple Inc. (“Apple” or “Petitioner”) petitions for Inter Partes Review (“IPR”) under 35 U.S.C. §§311–319 and 37 C.F.R. §42 of claims 1-20 (“the Challenged Claims”) of U.S. Patent No. 11,139,944 (“the ’944 patent”). As explained in this petition, there exists a reasonable likelihood that Apple will prevail with respect to at least one of the Challenged Claims.

The Challenged Claims are unpatentable based on teachings of at least the references presented in this petition. Apple respectfully submits that an IPR should be instituted, and that the Challenged Claims should be canceled as unpatentable.

**I. REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104**

**A. Grounds for Standing Under 37 C.F.R. § 42.104(a)**

Apple certifies that the ’944 Patent is available for IPR. The present petition is being filed within one year of service of a complaint against Apple. APPLE-1014; APPLE-1015; APPLE-1016. Apple is not barred or estopped from requesting this review challenging the Challenged Claims on the below-identified grounds.

**B. Challenge Under 37 C.F.R. § 42.104(b) and Relief Requested**

Apple requests an IPR of the Challenged Claims on the grounds identified in the table shown below, and requests that each of the Challenged Claims be found unpatentable. Additional explanation and support for each ground of rejection is

provided in APPLE-1003, the Declaration of Dr. Narayan Mandayam (“Expert Declaration”).

| Ground           | '944 Patent Claims | Basis for Rejection                                                                                                                                                       |
|------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ground 1</b>  | <b>1-20</b>        | Obvious (§103) based on 3GPP-38.213 (3GPP - 38.213) in view of 3GPP-38.213 Draft Change Request (“3GPP-38.213-CR”) and 3GPP-38.212 Draft Change Request (3GPP-38.212-CR). |
| <b>Ground 2A</b> | <b>1-20</b>        | Obvious (§103) based on Zhang.                                                                                                                                            |
| <b>Ground 2B</b> | <b>1-20</b>        | Obvious (§103) based on Zhang in view of 3GPP-38.213-CR.                                                                                                                  |

Each applied reference pre-dates the earliest priority date of the '944 Patent, which is November 5, 2019 (the “Critical Date” or “Earliest Effective Filing Date”).

| Ground         | Prior Art Date                                                                              | Exemplary Section   |
|----------------|---------------------------------------------------------------------------------------------|---------------------|
| 3GPP-38.213    | As early as September 28, 2019 and no later than September 30, 2019<br>(publicly available) | 35 U.S.C. 102(a)(1) |
| 3GPP-38.213-CR | As early as October 14, 2019 and no later than November 3, 2019<br>(publicly available)     | 35 U.S.C. 102(a)(1) |
| 3GPP-38.212-CR | As early as October 14, 2019 and no later than November 1, 2019<br>(publicly available)     | 35 U.S.C. 102(a)(1) |
| Zhang          | September 27, 2019 (effective filing date)                                                  | 35 U.S.C. 102(a)(2) |

**C. Public Availability of 3GPP-References**

The asserted 3GPP-References were publicly available.

**1. 3GPP-38-213 (“APPLE-1005”)**

APPLE-1005 offers, on its cover page, “2019-09,” indicating the year (2019) and month (September) during which it was released by 3GPP, a notoriously well-established publisher of standards documents. APPLE-1005, 1; APPLE-1008, [22]. APPLE-1005 is therefore presumed publicly available no later than September 30, 2019. *See VidStream LLC v. Twitter, Inc.*, 981 F.3d 1060, 1065-66 (Fed. Cir. 2020).

Petitioner has corroborated public availability of APPLE-1005 as of “2019-09”. APPLE-1008, [0083]. Specifically, Mr. Rodermund has accessed an archived version of APPLE-1005 via the Internet Archive and has established that this archived version on APPLE-1005 was published and freely available on 3GPP’s ftp server by September 28, 2019. APPLE-1008, [0023]-[0041], [0059]-[66], [0083]-[0091].

Accordingly, Petitioner asserts that APPLE-1005 was publicly available as early as September 28, 2019 and no later than September 30, 2019. APPLE-1008, [83]-[91].

**2. 3GPP-38-213-CR (“APPLE-1006”)**

APPLE-1006 is a document published and distributed by 3GPP that is a draft change request to a published standard, 3GPP-38.213 (APPLE-1005). APPLE-1006, 1; APPLE-1008, [67]; APPLE-1003, [54].

Consistent with 3GPP protocol, APPLE-1006 was made available – on November 3, 2019 and without restriction – to a working group including representatives of leading companies including, e.g., Huawei, Samsung, and Nokia, as indicated by the destination of an email (APPLE-1009) that attached the document, sent by an email address associated with Aris Papasakellariou directed to [3GPP\\_TSG\\_RAN\\_WG1@LIST.ETSI.ORG](mailto:3GPP_TSG_RAN_WG1@LIST.ETSI.ORG). APPLE-1009, 1; APPLE-1008, [70]-[78]. For example, the email shown in APPLE-1009 shows that Aris Papasakellariou from Samsung, Sigen Ye from Nokia, and Yamping Xing from CATT as participants of this email thread who received emails from the [3GPP\\_TSG\\_RAN\\_WG1@LIST.ETSI.ORG](mailto:3GPP_TSG_RAN_WG1@LIST.ETSI.ORG) email exploder. APPLE-1008, [71]. Emails directed to [3GPP\\_TSG\\_RAN\\_WG1@LIST.ETSI.ORG](mailto:3GPP_TSG_RAN_WG1@LIST.ETSI.ORG), an email exploder, with attachments such as APPLE-1006, were uploaded to that email exploder and made available without restriction by the email exploder to 3GPP working group delegates on November 3, 2019. APPLE-1008, [41]-[61], [70]-[78].

The transmission of email shown in APPLE-1009 not only made APPLE-1006 available to recipients of the [3GPP\\_TSG\\_RAN\\_WG1@LIST.ETSI.ORG](mailto:3GPP_TSG_RAN_WG1@LIST.ETSI.ORG) email exploder, but also made APPLE-1006 available to the general public without

restriction. APPLE-1008, [41]-[44] (“[s]ince their creation in December 1998, all of 3GPP’s email archives, including the dedicated email lists for TSG RAN WG1 and WG2, have been freely accessible to the general public...”), [45]-[61], [70]-[78]. Mr. Rodermund, who is well versed in 3GPP’s standard business practices, explains that an email addressed consistent with APPLE-1009 and its attachment (i.e., APPLE-1006) would have been both automatically uploaded via 3GPP’s email exploder to 3GPP working group delegates, and also automatically posted to the 3GPP email archive for restriction free access by the general public, with uploading and posting of the email (i.e., APPLE-1009) and its attachment (i.e., APPLE-1006) both occurring on the November 3, 2019 date of the APPLE-1009 email immediately after the APPLE-1009 was transmitted. APPLE-1008, [41]-[61], [70]-[78].

Further demonstrating that APPLE-1006 was attached to APPLE-1009 and transmitted to the 3GPP email exploder

[3GPP\\_TSG\\_RAN\\_WG1@LIST.ETSI.ORG](mailto:3GPP_TSG_RAN_WG1@LIST.ETSI.ORG) in the manner explained by Mr.

Rodermund are several corroborating facts. Consistent with the restriction free access described in his declaration, Mr. Rodermund was able to access APPLE-1009 via 3GPP’s listserv archive and downloaded the attachment to APPLE-1009 named “R1-19xxxxx\_CR\_38.213\_IIoT-Core\_v1.zip” from the following URL:

[https://list.etsi.org/scripts/wa.exe?A2=3GPP\\_TSG\\_RAN\\_WG1;f8c17069.1911A&](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_RAN_WG1;f8c17069.1911A&)

S. APPLE-1008, [72]. Mr. Rodermund unzipped the downloaded file named R1-19xxxxx\_CR\_38.213\_IIoT-Core\_v1.zip to access a file named “R1-19xxxxx\_CR\_38.213\_IIoT-Core\_v1.docx.” APPLE-1008, [73]. Based on his review, Mr. Rodermund confirmed that APPLE-1006 is an authentic copy of R1-19xxxxx\_CR\_38.213\_IIoT-Core\_v1.docx. *Id.*

More, metadata associated with the version of APPLE-1006 found by Mr. Rodermund at the 3GPP listserv establishes that APPLE-1006 was created November 2, 2019, and thus further corroborates that it was sent with an email and made publicly available just one day later, on November 3, 2019. APPLE-1008, [74]-[77].

Furthermore, the front page of APPLE-1006 includes text that recites “3GPP TSG-RAN WG1 Meeting #98bis” and “Chongqing, China, October 14-20, 2019.” APPLE-1006, 1. As explained by Mr. Rodermund, “3GPP TSG-RAN WG1 Meeting #98bis” identifies a 3GPP working group meeting that took place in “Chongqing, China” during the time period of “October 14-20, 2019,” which had 585 registered participants and was attended by 462 participants. APPLE-1006, 1; APPLE-1008, [68]-[70]. Mr. Rodermund further explains that, in his experience, this text on the front page of APPLE-1006 indicates that the contents of APPLE-1006 “was available either prior to or during or shortly after” the October 14-20, 2019 RAN WG1 meeting #98bis “to 3GPP members, and to the general public”

“prior to or during or shortly after” October 14-20, 2019. APPLE-1008, [67]-[70].

Accordingly, Petitioner asserts that APPLE-1006 was publicly available as early as October 14, 2019 and no later than November 3, 2019. APPLE-1008, [41]-[61], [70]-[78].

### **3. 3GPP-38-212-CR (“APPLE-1007”)**

APPLE-1007 was publicly available under the same reasoning set forth above with respect to APPLE-1006. APPLE-1007, 1; APPLE-1008, [21], [41]-[61], [79]-[91].

The only substantial differences between the publicly availability of APPLE-1007 and APPLE-1006 is that APPLE-1007 was attached to an email shown in APPLE-1010 that was accessible by a different URL (i.e., [https://list.etsi.org/scripts/wa.exe?A2=3GPP\\_TSG\\_RAN\\_WG1;21230e19.1911A&S=](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_RAN_WG1;21230e19.1911A&S=)), the email shown in APPLE-1010 was dated November 1, 2019, and the attachment APPLE-1007 to the email shown in APPLE-1010 has a different file name than the attachment APPLE-1006, but it also to email APPLE-1010, and the email APPLE-1010 was sent to the [3GPP\\_TSG\\_RAN\\_WG1@LIST.ETSI.ORG](mailto:3GPP_TSG_RAN_WG1@LIST.ETSI.ORG) email exploder, albeit by a different person. APPLE-1008, [41]-[61], [79]-[91] . Because email shown in APPLE-1010 was sent to the same [3GPP\\_TSG\\_RAN\\_WG1@LIST.ETSI.ORG](mailto:3GPP_TSG_RAN_WG1@LIST.ETSI.ORG) email exploder as the email shown in APPLE-1009, the same recipients of the email shown in APPLE-1009 listed above

also received the email shown in APPLE-1010. APPLE-1008, [83]. For these reasons, Petitioner asserts that APPLE-1007 was publicly available as early as October 14, 2019 and no later than November 1, 2019. APPLE-1008, [41]-[61], [79]-[91].

**D. Claim Construction under 37 C.F.R. §§ 42.104(b)(3)**

All claim terms should be construed according to the *Phillips* standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. §42.100. Petitioner submits that no claim terms need be construed to resolve issues of controversy in the present Petition. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011); APPLE-1003, [38].

**II. TECHNOLOGY OVERVIEW AND SUMMARY OF THE '944 PATENT**

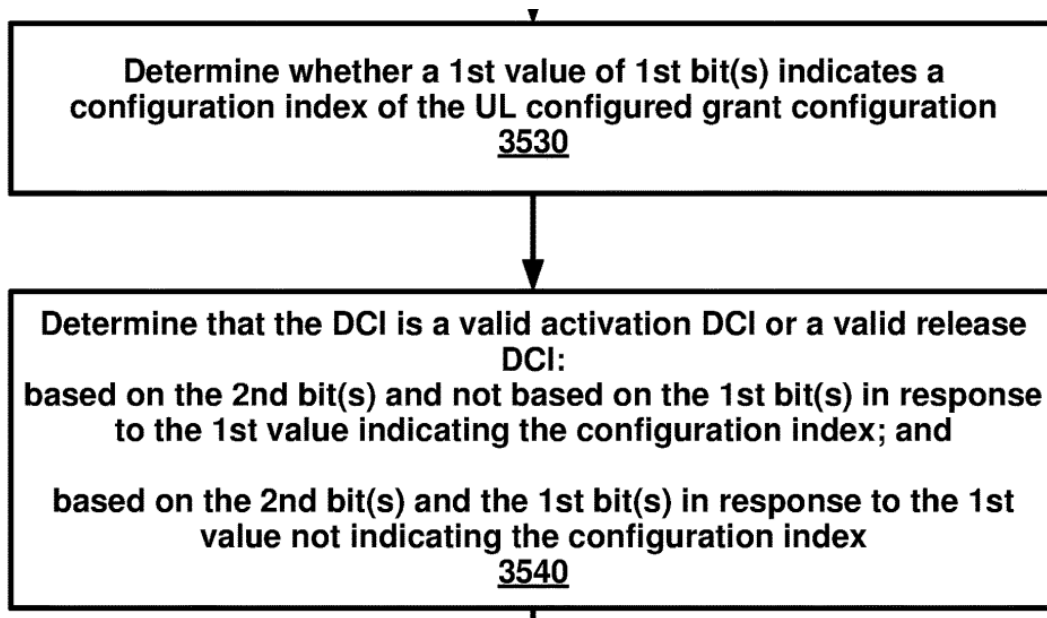
**A. Technology Overview**

Wireless networks comprise, among other things, a base station, e.g., gNB and a handset, e.g., a User Equipment (“UE”). APPLE-1003, [45]. The gNB can configure a UE such that the UE can transmit uplink (“UL”) transmissions and receive downlink (“DL”) transmissions. *Id.* Specifically, the gNB can configure the UE using configured grant parameters to allocate resources for UL transmission. *Id.* Likewise, the gNB can configure the UE using SPS parameters to allocate resources for DL transmission. *Id.*

## **B. Brief Description of the '944 Patent**

The '944 patent describes a method where a “wireless device ... receive[s] a DCI comprising a hybrid automatic repeat request” (HARQ) “process number field,” which it then uses to “[v]alidat[e] ... the DCI.” APPLE-1001, abstract; APPLE-1003, [48].

Elements 3530 and 3540 of FIG. 35 of the '944 patent (reproduced below) help to demonstrate aspects of the '944 patent process:



APPLE-1001, FIG. 35, 3530, 3540.

In some instances, if the HARQ Process Number of the DCI does not include a value indicating a configuration index of an UL grant or SPS configuration, then a UE will determine whether the “DCI is a valid activation DCI or a valid release” DCI based on an evaluation of the 2<sup>nd</sup> bit(s) (i.e., bit(s) of a

redundancy version field) **and** the 1<sup>st</sup> bit(s) (i.e., bit(s) of a HARQ Process Number field). APPLE-1001, FIG. 35, 3540; APPLE-1003, [49]-[50]. However, in other instances, where the HARQ Process Number field of the DCI includes a value that “indicates a configuration index of the UL configured grant configuration,” the UE will determine whether the “DCI is a valid activation DCI or a valid release” DCI based on the 2<sup>nd</sup> bit(s) (i.e., bit(s) of the redundancy version field) **and not** the 1<sup>st</sup> bit(s) (i.e., bit(s) of a HARQ Process Number field). *Id.*

### **C. The Effective Priority Date of the Claims of the '944 Patent**

Apple assumes for purposes of this Petition that the claims are entitled to the earliest claimed priority date – November 5, 2019.

## **III. LEVEL OF ORDINARY SKILL**

A person of ordinary skill in the art at the time of the '944 patent (a “POSITA”) would have included a bachelor’s degree in electrical engineering, computer engineering, computer science, or a similar field, along with two years of experience designing or developing wireless networks, including long-term evolution LTE/4G or 5G new radio (NR) cellular technology. APPLE-1003, [39]-[44]. Additional years of experience could substitute for an advanced-level degree (and vice versa). *Id.*

## **IV. DETAILED EXPLANATION OF GROUNDS**

### **A. GROUND 1 – Claims 1-20 are obvious over 3GPP-38.213 in view of 3GPP-38.213-CR and 3GPP-38.212-CR**

## 1. 3GPP-38.213

3GPP-38.213 is a standards document generated by the 3<sup>rd</sup> Generation Partnership Project related to 5G-NR communications networks. APPLE-1005, 1; APPLE-1003, [51]; APPLE-1008, [22], [83]-[91]. This document specifies “physical layer procedures for control” of signaling operations of a 5G-NR communications network. *Id.* This includes procedures for physical downlink control channel (PDCCH) signaling. APPLE-1005, 83; APPLE-1003, [51].

3GPP-38.213 discloses that a “UE validates, for scheduling activation or scheduling release, a DL SPS assignment PDCCH or configured UL grant Type 2 PDCCH...” APPLE-1005, 83, APPLE-1003, [52]. Further, 3GPP-38.213 specifies the fields of a DCI and their corresponding values that are considered for scheduling activation PDCCH validation in Table 10.2-1 and 10.2.2. APPLE-1005, 83, Table 10.2-1, Table 10.2-2; APPLE-1003, [52]. 3GPP-38.213, Table 10.2-1 is reproduced:

**Table 10.2-1: Special fields for DL SPS and UL grant Type 2 scheduling activation PDCCH validation**

|                     | DCI format 0_0/0_1 | DCI format 1_0  | DCI format 1_1                                  |
|---------------------|--------------------|-----------------|-------------------------------------------------|
| HARQ process number | set to all '0's    | set to all '0's | set to all '0's                                 |
| Redundancy version  | set to '00'        | set to '00'     | For the enabled transport block:<br>set to '00' |

APPLE-1005, 83, TABLE 10.2-1.

3GPP-38.213 also specifies, in Table 10.2-2, the fields of a DCI and their corresponding values for a single DL SPS and UL grant Type 2 scheduling release

PDCCH validation. APPLE-1005, 83, Table 10.2-2; APPLE-1003, [53]. 3GPP-38.213, Table 10.2-2 is reproduced below:

**Table 10.2-2: Special fields for DL SPS and UL grant Type 2 scheduling release PDCCH validation**

|                                      | DCI format 0_0  | DCI format 1_0  |
|--------------------------------------|-----------------|-----------------|
| HARQ process number                  | set to all '0's | set to all '0's |
| Redundancy version                   | set to '00'     | set to '00'     |
| Modulation and coding scheme         | set to all '1's | set to all '1's |
| Frequency domain resource assignment | set to all '1's | set to all '1's |

APPLE-1005, 83, TABLE 10.2-2.

## **2. 3GPP-38.213-CR**

3GPP-38.213-CR is a draft change request to 3GPP-38.213. APPLE-1006, 1; APPLE-1003, [54]; APPLE-1008, [20], [67]-[74]. 3GPP-38.213-CR suggests additions to 3GPP-38.213 that specify PDCCH validation for DL SPS and UL grant Type 2 configurations when a UE is provided more than one configuration for DL SPS or UL grant Type 2. APPLE-1006, 4-5; APPLE-1003, [54].

Regarding resource activation, 3GPP-38.213-CR specifies that “[i]f a UE is provided more than one configuration for UL grant Type 2 PUSCH or for SPS PDSCH, a value of the HARQ process number field in a DCI format indicates an activation for a corresponding UL grant Type 2 PUSCH or of a SPS PDSCH configuration with a same value as provided by *Configuredgrantconfig-index* or *SPSconfig-index*, respectively.” APPLE-1006, 4; APPLE-1003, [55]. In such instances and because a value in the HARQ process number field indicates an activation for a corresponding UL grant Type 2 PUSCH configuration or of a SPS

PDSCH configuration, 3GPP-213-CR specifies that “[v]alidation of the DCI format is achieved if the RV field for the DCI format is set as in Table 10.2-3” and the HARQ Process Number is not used for validation *Id.* Table 10-2.3 is reproduced below:

Table 10.2-3: Special fields for a single DL SPS or single UL grant Type 2 scheduling activation PDCCH validation when a UE is provided multiple DL SPS or UL grant Type 2 configurations

|                    | DCI format 0 0/0 1/0 2 | DCI format 1 0  | DCI format 1 1                                      |
|--------------------|------------------------|-----------------|-----------------------------------------------------|
| Redundancy version | set to all '0's        | set to all '0's | For the enabled transport block:<br>set to all '0's |

APPLE-1006, 5, TABLE 10.2-3.

Regarding resource release, 3GPP-38.213-CR also specifies that “[i]f a UE is provided more than one configuration for UL grant Type 2 PUSCH or for SPS PDSCH” and “if the UE is not provided Type2Configuredgrantconfig-ReleaseStateList or SPS-ReleaseStateList, a value of the HARQ process number field in a DCI format indicates a release for a corresponding value of an UL grant Type 2 PUSCH or of a SPS PDSCH configuration.” APPLE-1006, 4; APPLE-1003, [56]. In such instances, 3GPP-38-213-CR specifies that “[v]alidation of the DCI format is achieved if all the fields for the DCI format are set according to Table 10.2-4,” with validation again relying on the redundancy version field and note the HARQ Process Number field, as the HARQ Process Number field is used to indicate “a release for a corresponding value of an UL grant Type 2 PUSCH or

of a SPS PDSCH configuration.” *Id.* 3GPP-38.213-CR, Table 10.2-4 is reproduced below:

Table 10.2-43: Special fields for multiple DL SPS and UL grant Type 2 scheduling release PDCCH validation

|                                             | <u>DCI format 0 0/0 1/0 2</u> | <u>DCI format 1 0/1 1/1 2</u> |
|---------------------------------------------|-------------------------------|-------------------------------|
| <u>Redundancy version (if any)</u>          | <u>set to all '0's</u>        | <u>set to all '0's</u>        |
| <u>Modulation and coding scheme</u>         | <u>set to all '1's</u>        | <u>set to all '1's</u>        |
| <u>Frequency domain resource assignment</u> | <u>set to all '1's</u>        | <u>set to all '1's</u>        |

APPLE-1006, 5, TABLE 10.2-4.

3GPP-38.213-CR also adds additional DCI formats – i.e., DCI format 0\_2 and/or DCI format 1\_2 – to one or more of tables Table 10.2-1, 10.2-2, 10.2-3, and 10.2.4 that were not included in Tables 10.2-1 and 10.2.2 of 3GPP-38.213.

APPLE-1006, 4-5, Table 10.2.1 (adds DCI format 0\_2), Table 10.2-2 (adds DCI format 0\_2), Table 10.2-3 (adds DCI format 0\_2), Table 10.2-4 (adds DCI format 0\_2 and DCI format 1\_2); APPLE-1005, 84, Table 10.2-1, Table 10.2-2; APPLE-1003, [57]. However, though 3GPP-38.213-CR discloses the types of data that are used to validate activation or release of resources when multiple DL SPS or UL grant type 2 resources are provided to a UE, neither 3GPP-38.213 or 3GPP-38.213-CR definitively specify the fields of data received by a UE when the UE receives DCI format 0\_2 or DCI format 1\_2. *Id.*

### **3. 3GPP-38.212-CR**

3GPP-38.212-CR is a draft change request to 3GPP-38.212 that also informs 3GPP-38.213. APPLE-1007, 1; APPLE-1003, [58]; APPLE-1008, [21], [75]-[82].

For example, 3GPP-38.212-CR implements additions to these standards that specify the fields of data received by a UE when the UE receives DCI format 0\_2 or DCI format 1\_2. APPLE-1007, 7-8 (DCI format 0\_2), 9-11 (DCI format 1\_2); APPLE-1003, [58].

3GPP-38.212-CR specifies that DCI Format 0\_2 “is used for the scheduling of PUSCH in one cell.” APPLE-1007, 7; APPLE-1003, [59]. 3GPP-38.212-CR further specifies that the DCI Format 0\_2 includes a “redundancy version” field comprised of “x bits” and a “HARQ process number” comprised of “0, 1, 2, 3, or 4 bits determined by higher layer parameter *HARQProcessNumberSize-ForDCIFormat0\_2*.” APPLE-1007, 8; APPLE-1003, [59]. This indicates that the number of bits used to represent the HARQ process number is configurable using RRC parameter *HARQProcessNumberSize-ForDCIFormat0\_2*. *Id.* In addition, 3GPP-38.212-CR includes an explicit indication that the “redundancy version” field was comprised of “x bits,” which suggests to a POSITA that the numbers of bits to be used for the “redundancy version” field of DCI format 0\_2 was also intended to be configurable using higher-level RRC signaling. *Id.*

3GPP-38.212-CR also specifies that DCI Format 1\_2 “is used for scheduling of PDSCH in one cell.” APPLE-1007, 9; APPLE-1003, [60]. 3GPP-38.212-CR further specifies that DCI format 1\_2 includes a “redundancy version” field comprised of “0, 1, or 2 bits determined by higher layer parameter

*NumberofbitsforRV-ForDCIFormat1\_2.*” APPLE-1007, 9-10; APPLE-1003, [60].

This indicates that “redundancy version” field is configurable using the RRC parameter *NumberofbitsforRV-ForDCIFormat1\_2*. *Id.* 3GPP-38.212-CR also includes a “HARQ process number” field comprised of “0, 1, 2, 3, or 4 bits determined by higher layer parameters *HARQProcessNumberSize-ForDCIFormat1\_2*.” *Id.* This indicates that the HARQ process number is configurable using RRC parameter *HARQProcessNumberSize-ForDCIFormat1\_2*. *Id.*

#### **4. Analogous Art**

These 3GPP references are *analogous art* to the ’944 patent, as:

3GPP-38.213, 3GPP-38.213-CR and the ’944 patent each relate to receipt and validation of downlink control information (“DCI”) via the PDCCH. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1001, 32:1-20; 33:32-34:16; APPLE-1003, [61]; and

3GPP-38.212-CR and the ’944 patent both relate to the format of DCI in 5G NR wireless communication networks. APPLE-1007, 2-12; APPLE-1001, 33:5-30; APPLE-1003, [61].

#### **5. 3GPP-38.213/3GPP-38.213-CR/3GPP-38.212-CR Combination (“3GPP-Combination”)**

3GPP-38.213 generally specifies fields and corresponding values considered for scheduling activation PDCCH validation and scheduling release PDCCH validation of a single DL SPS or UL grant Type 2 configuration. APPLE-1005, 83, Table 10.2-1, Table 10.2-2; APPLE-1003, [62]. Then, 3GPP-38.213-CR – a change request to 3GPP-38.213 – specifies PDCCH validation for DL SPS or UL grant Type 2 configuration when a UE is provided more than one configuration for DL SPS or UL grant Type 2 configuration and also discloses that a UE can receive DCI Format 0\_2 and DCI Format 1\_2. APPLE-1006, 4-5; APPLE-1003, [62].

It would have been obvious to a POSITA to modify the standardized operation of 3GPP-38.213 with the operations of 3GPP-38.213-CR, since the author of 3GPP-38.213-CR proposed through that document to change the baseline implementation contemplated in 3GPP-38.213. Naturally, both publications are in the *same field of endeavor* related to “physical layer procedures for control” signaling operations of a 5G-NR communications network. APPLE-1005, 1; APPLE-1006, 1, 4-5; APPLE-1003, [63]. A POSITA *would have been motivated* to look to 3GPP-38.213-CR to modify 3GPP-38.213, as the first page of 3GPP-38.213-CR indicates that 3GPP-38.213-CR is a “Draft Change Request” to “38.213.” APPLE-1006, 1; APPLE-1003, [63]. In addition, a POSITA would have would have understood that the express purpose of a change request such as, e.g., 3GPP-38.213-CR is to modify the main standard to which it corresponds,

which in this case is 3GPP-38.213. *Id.* It would have been routine for a POSITA designing 5G communication networks to look to 3GPP documents for implementation configurations. APPLE-1003, [63]. Here, a POSITA would have had a ***reasonable expectation of success*** in modifying the 3G-38.213 standard to include functionality described by 3GPP-38.213-CR, as both documents describe features of the same technical standard and were shared amongst 3GPP participants in the same 3GPP working group APPLE-1003, [63]; APPLE-1008, [23]-[66], [67]-74], [83]-[91].

The title page of 3GPP-38.212-CR indicates that 3GPP-38.212-CR is intended to modify (i.e., ***affect***) 3GPP-38.213. APPLE-1007, 1; APPLE-1003, [64]. For example, 3GPP-38.212-CR specifies the fields of the DCI Format 0\_2 and DCI Format 1\_2 used by 3GPP-38.213, and specifies that parameters of a “redundancy version” field and a “HARQ Process Number” field can be configured using higher level RRC signaling. APPLE-1007, 7-8 (DCI format 0\_2), 9-11 (DCI format 1\_2); APPLE-1003, [64]. It would have been obvious to a POSITA to modify the standardized operation of the combination 3GPP-38.213 and 3GPP-38.213-CR to include and configure the DCI format fields in the manner described by 3GPP-38.212-CR as the disclosure of the 3GPP-38.213/3GPP-38.213-CR combination and 3GPP-38.212-CR are in the same field of endeavor related to features of the “physical layer” of a 5G-NR communications network.

APPLE-1007, 1; APPLE, 1005, 1, APPLE-1006, 1; APPLE-1003, [64]. A POSITA *would have been motivated* to look to 3GPP-38.212-CR to further modify the 3GPP-38.213/3GPP-38.213-CR combination to include and support “physical layer enhancements for NR URLLC.” APPLE-1007, 1; APPLE-1003, [64]. It would have been common for a POSITA designing 5G communication networks to look to 3GPP documents for implementation configurations. APPLE-1003, [64]. Here, a POSITA would have had a *reasonable expectation of success* in modifying the fields of DCI Format 0\_2 and DCI Format 1\_2 in 3GPP-38.213 to include the fields described for each of those respective DCI formats in 3GPP-38.212-CR, as the 3GPP-38.212-CR specify the fields of DCI Format 0\_2 and DCI Format 1\_2, which are referenced in the 3GPP-38.213 and 3GPP-38.213-CR specifications. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1007, 7-8 (DCI format 0\_2), 9-11 (DCI format 1\_2); APPLE-1003, [64].

## 6. Analysis

### *Limitation [1.P]:*

The 3GPP-Combination discloses and renders obvious [1.P]. APPLE-1005, 1, 73-83; APPLE-1006, 4-5; APPLE-1003, [79]. The 3GPP-Combination discloses “physical layer procedures for control” signaling operations of a UE in a 5G-NR network. *Id.*

***Limitation [1.1.1]:***

The 3GPP-Combination discloses and renders obvious [1.1.1]. APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8, 9-11; APPLE-1003, [80]. In the 3GPP-Combination, 3GPP-38.213-CR specifies a procedure for DCI “validation.” *Id.* 3GPP-38.213-CR specifies that “[v]alidation of the DCI format is achieved if all fields of the DCI format are set according” to Table 10.2-1, Table 10.2-2, Table 10.2-3, or Table 10.2-4. *Id.* A POSITA would have understood and found it obvious that for a UE to perform “validation of the DCI format” as described by 3GPP-213 and 3GPP-38.213-CR, the UE would have received the DCI format. APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8, 9-11; APPLE-1003, [80].

***Limitation [1.1.2]:***

The 3GPP-Combination discloses and renders obvious [1.1.2]. APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8 (“HARQ process number”), 9-11 (“HARQ process number”); APPLE-1003, [81].

3GPP-38.213-CR discloses that a UE can perform DCI “validation” based on fields of at least first DCI Format 0\_2 or a second DCI format 1\_2. APPLE-1006, 4; APPLE-1003, [82]. 3GPP-38.212-CR also discloses the contents of each of these different DCI formats. APPLE-1007, 7-8 (“HARQ process number”), 9-11 (“HARQ process number”); APPLE-1003, [82]. For example, in the case of a

UE receiving a first DCI Format 0\_2, 3GPP-38.212-CR of the 3GPP-Combination specifies that the first DCI Format 0\_2 includes a “**HARQ Process Number**” field that is comprised of “**0, 1, 2, 3, or 4 bits determined by higher layer parameter *HARQProcessNumberSize-ForDCIFormat0\_2.***” APPLE-1007, 8 (emphasis added); *see also* APPLE-1007, 10 (showing the HARQ Process Number field and corresponding higher layer parameter for DCI Format 1\_2); APPLE-1003, [82]. Thus, DCI format 0\_2 and DCI format 1\_2 disclosed by the 3GPP-combination includes a *hybrid automatic repeat request process number field* (i.e., the HARQ Process Number field) *comprising one or more first bits* (i.e., 0, 1, 2, 3, or 4 bits). APPLE-1007, 7-8, 9-11; APPLE-1003, [82].

***Limitation [1.1.3]:***

The 3GPP-Combination discloses and renders obvious [1.1.3]. APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8 (“Redundancy Version”), 9-11 (“Redundancy Version”); APPLE-1003, [83].

3GPP-38.213-CR discloses that a UE performs DCI “validation” based on fields of at least DCI Format 0\_2 or DCI format 1\_2. APPLE-1006, 4; APPLE-1003, [84]. 3GPP-38.212-CR discloses the contents of each of these different DCI formats. APPLE-1007, 7-8 (“Redundancy Version”), 9-11 (“Redundancy Version”); APPLE-1003, [84]. For example, in the case of a UE receiving a DCI

Format 0\_2, 3GPP-38.212-CR of the 3GPP-Combination specifies that DCI Format 0\_2 includes a **“Redundancy Version” field** that is comprised of **“x bits.”** APPLE-1007, 8 (emphasis added); *see also* APPLE-1007, 9 (showing the Redundancy Version field and corresponding higher layer parameter for DCI Format 1\_2); APPLE-1003, 84]. A POSITA would have understood from the comments in the document that “x bits” was a “placeholder” that refers to a variable number of one or more bits. APPLE-1007, 8; APPLE-1003, [84]. This becomes particularly clear on, e.g., pg. 9 of 3GPP-38.212-CR, where the Redundancy Version field of DCI format 1\_2 is described as having a variable number of 0, 1, or 2 bits. APPLE-1007, 9; APPLE-1003, [84].

***Limitation [1.2.1]:***

The 3GPP-Combination discloses and renders obvious [1.2.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [85]. For example, 3GPP-38.213-CR discloses DCI “validation” for scheduling of activation or release of resources in a first scenario where a “UE is provided with a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH.” APPLE-1006, 4; APPLE-1003, [85]. In this scenario, 3GPP-38.213-CR specifies that “[v]alidation of the DCI format is achieved if all fields of the DCI format are set according to Table 10.2-1 or Table 10.2-2.” APPLE-1006, 4-5; APPLE-1003, [85]. In this first scenario, 3GPP-

38.213-CR specifies that validation of a DCI will be performed using *one or more bits* in the *HARQ Process Number* Field and one or more bits in the *Redundancy Version* Field of the DCI, as shown in Table 10.2-1 or Table 10.2-2 (reproduced below). *Id.*

Table 10.2-1: Special fields for single DL SPS ~~and/or single~~ UL grant Type 2 scheduling activation  
PDCCH validation

|                     | DCI format 0_0/0_1/0_2                        | DCI format 1_0                                | DCI format 1_1                                                                    |
|---------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------|
| HARQ process number | set to all '0's                               | set to all '0's                               | set to all '0's                                                                   |
| Redundancy version  | <u>set to all '0's</u> <del>set to '00'</del> | <u>set to all '0's</u> <del>set to '00'</del> | For the enabled transport block:<br><u>set to all '0's</u> <del>set to '00'</del> |

Table 10.2-2: Special fields for single DL SPS ~~and/or single~~ UL grant Type 2 scheduling release  
PDCCH validation

|                                      | DCI format 0_0/0_1/0_2                        | DCI format 1_0                                |
|--------------------------------------|-----------------------------------------------|-----------------------------------------------|
| HARQ process number                  | set to all '0's                               | set to all '0's                               |
| Redundancy version                   | <u>set to all '0's</u> <del>set to '00'</del> | <u>set to all '0's</u> <del>set to '00'</del> |
| Modulation and coding scheme         | set to all '1's                               | set to all '1's                               |
| Frequency domain resource assignment | set to all '1's                               | set to all '1's                               |

APPLE-1006, 5, Table 10.2-1 (annotated), Table 10.2-2 (annotated).

3GPP-38.213-CR also discloses an alternative scenario for DCI “validation” for scheduling of activation or release of resources where a “UE is provided more than one configurations [*sic*] for UL grant Type 2 PUSCH or for SPS PDSCH.” APPLE-1006, 4; APPLE-1003, [86]. In this alternative scenario, 3GPP-38.213-CR specifies that “a value of the HARQ process number field in a DCI format indicates an activation for corresponding UL grant Type 2 PUSCH or of a SPS PDSCH configuration with a same value as provided by *Configuredgrantconfig-index* or by *SPSconfig-index*, respectively.” *Id.* In this scenario, 3GPP-38.213-CR

further specifies that “[v]alidation of the DCI format is achieved if the RV field for the DCI format is set as in TABLE 10.2-3.” APPLE-1006, 4-5; APPLE-1003, [86]. Thus, in this alternative scenario, 3GPP-38.213-CR specifies that validation of a DCI will be performed using one or more bits of the Redundancy Version Field of the DCI ***and not*** using one or more bits of the HARQ Process Number Field, as shown in Table 10.2-3. (reproduced below). APPLE-1006, 4-5; APPLE-1003, [86].

| Table 10.2-3: Special fields for a single DL SPS or single UL grant Type 2 scheduling activation PDCCH validation when a UE is provided multiple DL SPS or UL grant Type 2 configurations |                        |                 |                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-----------------|-----------------------------------------------------|
|                                                                                                                                                                                           | DCI format 0 0/0 1/0 2 | DCI format 1 0  | DCI format 1 1                                      |
| Redundancy version                                                                                                                                                                        | set to all '0's        | set to all '0's | For the enabled transport block:<br>set to all '0's |

APPLE-1006, 5, Table 10.2-3.

3GPP-38.213-CR also discloses another alternative scenario for DCI “validation” for scheduling of release of resources where a “UE is provided more than one configurations *[sic]* for UL grant Type 2 PUSCH or for SPS PDSCH.” APPLE-1006, 4; APPLE-1003, [87]. In this other alternative scenario, 3GPP-38.213-CR specifies that “[v]alidation of the DCI format is achieved if all fields for the DCI format are set according to table 10.2-4.” APPLE-1006, 4-5, Table 10.2-4; APPLE-1003, [87]. In this other alternative scenario, 3GPP-38.213-CR specifies that validation of a DCI will be performed using one or more bits one of

the Redundancy Version Field of the DCI **and not** using one or more bits of the HARQ Process Number Field, as shown in Table 10.2-4. (reproduced below). *Id.*

**Table 10.2-43: Special fields for multiple DL SPS and UL grant Type 2 scheduling release PDCCH validation**

|                                      | DCI format 0 0/0 1/0 2 | DCI format 1 0/1 1/1 2 |
|--------------------------------------|------------------------|------------------------|
| Redundancy version (if any)          | set to all '0's        | set to all '0's        |
| Modulation and coding scheme         | set to all '1's        | set to all '1's        |
| Frequency domain resource assignment | set to all '1's        | set to all '1's        |

APPLE-1006, 5, Table 10.2-4 (annotated).

***Limitation [1.2.2]:***

The 3GPP-Combination discloses and renders obvious [1.2.2]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [88]. As discussed in [1.2.1], the 3GPP-Combination discloses multiple scenarios where validation of a DCI received by a UE is validated **based on one or more second bits** (i.e., one or more bits of a Redundancy Version field). APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [88]; *see* [1.2.1]. Specifically, in a first scenario, when a “UE is provided with a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH” and a DCI Format 0\_2 is received, 3GPP-38.213-CR specifies that “[v]alidation of the DCI format is achieved if all fields of the DCI format are set according to Table 10.2-1 or Table 10.2-2.” APPLE-1006, 4-5; APPLE-1003, [88]. Table 10.2-1 of 3GPP-38.213-CR, reproduced in [1.2.1], requires that one or more (i.e., all) bits of the Redundancy Version Field of the DCI Format 0\_2 be set to “0”

in order for PDCCH validation of a resource activation or release. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [88]; *see* [1.2.1].

In an alternative scenario, when “UE is provided more than one configurations *[sic]* for UL grant Type 2 PUSCH or for SPS PDSCH” and a DCI Format 1\_2 is received by a UE, 3GPP-38.213-CR specifies that “[v]alidation of the DCI format is achieved if the RV field for the DCI format is set as in TABLE 10.2-3.” APPLE-1006, 4-5; APPLE-1003, [89]. Table 10.2-3 of 3GPP-38.213-CR, reproduced in [1.2.1], requires that one or more (i.e., all) bits of the Redundancy Version Field of the DCI Format 0\_2 be set to “0” in order for PDCCH validation of a resource activation. APPLE-1006, 4-5; APPLE-1003, [89]; *see* [1.2.1].

In another alternative scenario, for at least DCI Format 1\_2, when a “UE is provided more than one configurations *[sic]* for UL grant Type 2 PUSCH or for SPS PDSCH” and a DCI Format 1\_2 is received by a UE, 3GPP-38.213-CR specifies that “[v]alidation of the DCI format is achieved if all fields for the DCI format are set according to table 10.2-4.” APPLE-1006, 4-5, Table 10.2-4; APPLE-1003, [90]. Table 10.2-4 of 3GPP-38.213-CR, reproduced in [1.2.1], requires that one or more (i.e., all) bits of the Redundancy Version Field of the DCI Format 1\_2 be set to “0” in order for PDCCH validation of a resource release. *Id.*

***Limitation [1.2.3]<sup>1</sup>:***

The 3GPP-Combination discloses and renders obvious [1.2.3]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [91]. As discussed in [1.2.1], the 3GPP-Combination discloses multiple scenarios where validation of DCI received by a UE is validated ***based on one or more second bits*** (i.e., one or more bits of a Redundancy Version field). APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [91]; *see* [1.2.1]. However, in addition to requiring that one or more bits (i.e., all) of a Redundancy Version Field of the DCI Format 0\_2 be set to “0” in order for PDCCH validation of resource activation or release in this scenario, Table 10.2-1 and 10.2-2 of 3GPP-38.213-CR, reproduced in [1.2.1], ***each also require*** that ***one or more*** (i.e., all) ***first bits*** of the HARQ Process Number Field of the DCI Format 0\_2 be set to “0” in order for PDCCH validation of a resource activation or release. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [91]; *see* [1.2.1]. A POSITA would have understood and found it obvious in view of the teachings of 3GPP-38.213-CR for a UE to determine that one or more bits of a HARQ Process Number Field of the DCI Format 0\_2 are set to “0” by ***comparing the one or more bits of the HARQ Process Number Field with another sequence of one or more***

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<sup>1</sup> The “in response to” element is addressed in [1.2.3a] and [1.2.4b].

*bits* (e.g., a string or mask of all zeros corresponding to the bit length of the *configured HARQ Process Number Field*) in order to determine if the HARQ Process Number Field is set to all zeros, as required by Table 10.2.1 (i.e., PDCCH validation of single resource activation) or Table 10.2-2 (i.e., PDCCH validation of single resource release). APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [91]; *see* [1.2.1]. A POSITA would have found the aforementioned features of [1.2.3] obvious as it is common in the art to determine whether a first value equals a second value by performing a comparison between a first value and the second value to determine whether the respective values match. APPLE-1003, [91]; *cf.* APPLE-1004, FIG. 6, 610, 620, 29:66-30:10. Such a comparison is a basic operation in the art that does not require any engineering and a POSITA would have had a reasonable expectation of success in implementing such a comparison. *Id.*

In the 3GPP-Combination, the HARQ Process Number Field is comprised of one or more bits *determined using a first configuration parameter*, because the HARQ Process Number of DCI Format 0\_2 is configured using the “*higher layer parameter HARQProcessNumberSize-ForDCIFormat0\_2*” as explained in [1.1.2]. APPLE-1007, 8 (emphasis added); APPLE-1003, [92].

A POSITA would have understood and found it obvious to use the “*higher layer parameter HARQProcessNumberSize-ForDCIFormat0\_2*” in the 3GPP-

Combination to determine the first sequence of one or more bits that are compared to the configurable HARQ Process. APPLE-1007, 8 (emphasis added); APPLE-1003, [93]. This is because the *HARQProcessNumberSize-ForDCIFormat0\_2* specifies a number of bits – i.e., 0, 1, 2, 3, or 4 – bits of the HARQ Process Number, and using this same number of bits for the number of bits in the sequence of one or more bits for the comparison would have allowed a bit-by-bit comparison of the HARQ process number field to the sequence to determine if “*all*” bits of the HARQ process number are set to “0” as specified by Tables of 3GPP-38.213-CR. *Id.* For example, a POSITA would have found it obvious that, in the 3GPP-Combination, if the *HARQProcessNumberSize-ForDCIFormat0\_2* configures the HARQ Process Number to 1 bit, then the same or similar higher layer parameter could also be used to configure the *first sequence of one or more bits* to one bit so that a comparison of the one bit of the HARQ Process Number and the *first sequence of one bit* can validate that the HARQ Process Number is set to “all ‘0’s.” APPLE-1007, 8; APPLE-1003, [93].

***Limitation [1.2.3a]:***

The 3GPP-Combination discloses and renders obvious [1.2.3a]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [94]. Claim 1 requires that [1.2.3] be performed *in response to* [1.2.3a]. As discussed above, [1.2.3] calls for validating

the DCI based on comparing bits of a HARQ Process Number (i.e., *the one or more first bits*) to *a first sequence of one or more bits determined* using higher layer parameter *HARQProcessNumberSize-ForDCIFormat0\_2* (i.e., *a first configuration parameter*). APPLE-1003, [94]; *see* [1.2.3]. In the 3GPP-Combination, validation operations of the type specified by [1.2.3] are performed when (i.e., *in response to*) a UE is provided a *single configuration for UL grant Type 2 PUSCH or for SPS PDSCH*, as 3GPP-23.213-CR specifies that “[i]f a UE is provided a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH, ... [v]alidation of the DCI format is achieved if all fields of the DCI format are set according to Table 10.2-1 or Table 10.2-2.” APPLE-1006, 4-5; APPLE-1003, [94]. Thus, and for the reasons discussed above with respect to [1.2.3], validation of the DCI format if all fields of the DCI format are set according to Table 10.2-1 or Table 10.2-2 discloses and renders obvious [1.2.3]. APPLE-1006, 4-5; APPLE-1003, [94]; *see* [1.2.3]. These validations occur with the HARQ Process Number being configured to all “0”s, which is required by Table 10.2-1 or Table 10.2-2.

*Id.*

A POSITA would have understood and found it obvious in view of the teachings of 3GPP-38.213-CR that, that when the UE is provided with *Configuredgrantconfig-index or SPSconfig-index*, the *one or more bits* of the HARQ Process Number *do not indicat[e] a configuration index*. APPLE-1006, 4;

APPLE-1003, [95]. A POSITA would have had this understanding because 3GPP-38.213-CR further explains that a configuration index is provided to the UE “[i]f the UE is provided more than one configurations *[sic]* for UL grant Type 2 PUSCH or for SPS PDSCH” and, in such scenarios, the “HARQ process number field in ... DCI format indicates an activation for a corresponding UL grant Type 2 PUSCH or of SPS PDSCH configuration with the same value as provided by *Configuredgrantconfig-index* or by *SPSconfig-index*.” *Id.* In such instances, 3GPP-38.213-CR specifies that “validation of the DCI format is achieved if all fields of the DCI format are set according to Table 10.2-4,” which does not consider the HARQ Process Number for validation when “more than one configurations *[sic]* for UL grant Type 2 PUSCH or for SPS PDSCH” are provided to a UE, as the HARQ Process Number has been set to the “same value as provided by *Configuredgrantconfig-index* or by *SPSconfig-index*...” APPLE-1006, 4-5; APPLE-1003, [95].

***Limitation [1.2.3b]:***

The 3GPP-Combination discloses and renders obvious [1.2.3b]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [96]. In the 3GPP-Combination, the validation operations of [1.2.3] discussed in [1.2.3] are performed when (i.e., *in response to*) a UE is provided a *single configuration for UL grant Type 2 PUSCH*

*or for SPS PDSCH* using *DCI having DCI format 0\_2* (i.e., *a first format*), as 3GPP-23.213-CR specifies that “[i]f a UE is provided a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH, ... [v]alidation of the DCI format is achieved if all fields of the DCI format are set according to Table 10.2-1 or Table 10.2-2. APPLE-1006, 4-5; APPLE-1003, [96].

***Limitation [1.2.4]:***

The 3GPP-Combination discloses and renders obvious [1.2.4]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [97]. As discussed above with respect to [1.2.3]-[1.2.3b], 3GPP-38.213-CR discloses validation of a DCI that is performed *in response to* a DCI having a *first format* (i.e., DCI format 0\_2). See [1.2.3]-[1.2.3b]. However, 3GPP-38.213-CR also discloses that “[v]alidation of the DCI format is achieved if all fields for the DCI format are set according to Table 10.2-4” in response to a DCI having a *second DCI format* (i.e., DCI format 1\_2). APPLE-1006, 4-5; APPLE-1003, [97]. This validation of the release of resources as specified by Table 10.2-4 of 3GPP-38.213-CR that is performed *in response to* a DCI having a *second DCI format* (i.e., DCI format 1\_2) *is not based on comparing the one or more first bits with the first sequence of bits* (i.e., not based on one or more bits of the HARQ Process Number), as the validation of the release of one or more resources “is achieved if all fields for the DCI format are set

according to Table 10-2-4,” which does not include the HARQ Process Number. APPLE-1006, 4-5, Table 10-2-4 (requiring Redundancy Version (if any), Modulation and coding scheme, and frequency domain resources assignment for validation); APPLE-1003, [97].

Elements [1.2.3]-[1.2.3b] and [1.2.4] represent mutually exclusive conditional statements of a method claim. Accordingly, either the first branch of [1.2.3]-[1.2.3b] or the second branch of [1.2.4] must execute – but it cannot be both. *Ex Parte Schulhauser*, No. 2013-007847, 2016 WL 6277792 (P.T.A.B. Apr. 28, 2016). Though *Schulhauser* was decided under the broadest reasonable interpretation (BRI) standard, there is seemingly no other reasonable way to interpret the prongs of [1.2.3]-[1.2.3b] and [1.2.4] such that, in a method claim, both prongs can be performed in a single method. It seems that PO itself acknowledges this by including distinct flowcharts in FIGs. 36 and 37, respectively, of the '944 patent for each of these mutually exclusive conditions after an initial introduction of a flowchart in FIG. 35 showing both mutually exclusive conditions. APPLE-1001, FIG. 35, 3540, FIG. 36, 3630, FIG. 37, 3730. Thus, the portions of 3GPP-38.213-CR of the 3GPP-Combination relied upon by Petitioner to show [1.2.3]-[1.2.3b] obviate the need to show [1.2.4]. Alternatively, the Petitioner has also shown that the portions of 3GPP-38.213-CR of the 3GPP-Combination also teach the alternative branch of the method claimed in [1.2.4].

Further, DCI Validation that is not performed based on the comparison noted in [1.2.4] renders [1.2.4] obvious. The 3GPP-Combination discloses [1.2.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [99]. As an initial matter, Petitioner submits that the same reasoning set forth for [1.2.1]-[1.2.3b] also render [1.2.4] obvious, because the reasoning set forth to show the DCI validation operations in [1.2.1]-[1.2.3b] is ***not based on*** “comparing the one or more first bits with the first sequence in response to the DCI having a second format.” *Id.* This is because, for example, “comparing the one or more first bits with the first sequence ... in response to ... the DCI having a first format” is a DCI validation method that ***“is not based on*** comparing the one or more first bits with the first sequence in response to the DCI having a second format” (emphasis added). *Id.*

Specifically, the claim does not specify ***how DCI validation*** is performed in [1.2.4]. APPLE-1003, [100]. Instead, the claim indicates how DCI validation is ***not performed***. *Id.* Thus, ***any*** method for validating DCI that is ***not*** what is recited by [1.2.4] discloses and renders obvious [1.2.4], including the process for DCI validation that Petitioner has mapped to limitations [1.2.1]-[1.2.3b]. *Id.*

***Limitation [1.2.5]:***

The 3GPP-Combination discloses and renders obvious [1.2.5]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [100]. For example, 3GPP-38.213-CR

discloses when a “UE is provided more than one configurations *[sic]* for UL grant Type 2 PUSCH or for SPS PDSCH,” then “a value of the HARQ process number field in a DCI format indicates an activation for corresponding UL grant Type 2 PUSCH or of a SPS PDSCH configuration with a same value as provided by *Configuredgrantconfig-index* or by *SPSconfig-index*, respectively.” APPLE-1006, 4-5; APPLE-1003, [100]. In this scenario, one or more bits of the HARQ process number *indicate a configuration index* and a POSITA would have understood that the HARQ process number cannot be used for validation of the DCI because the HARQ Process Number is, instead, indicating which configuration or configurations provided to the UE are to be activated or released. *Id.*

In this aforementioned scenario, 3GPP-38.213-CR further specifies that “[v]alidation of the DCI format is achieved if the RV field for the DCI format is set as in TABLE 10.2-3.” APPLE-1006, 4-5, Table 10.2-3; APPLE-1003, [102]. Here, Table 10.2-3 identifies using the Redundancy Version Field for validation of a scheduling activation DCI **and not** the HARQ Process Number Field. *Id.* Thus, in this scenario, *validation is not based on the one or more first bits* of the HARQ Process Number and is instead based on the one or more bits Redundancy Version field. *Id.*

Elements [1.2.3]-[1.2.3b] and [1.2.5] represent mutually exclusive conditional statements of a method claim. Accordingly, either the first branch of

[1.2.3]-[1.2.3b] or the second branch of [1.2.5] must execute – but it cannot be both. *Ex Parte Schulhauser*, No. 2013-007847, 2016 WL 6277792 (P.T.A.B. Apr. 28, 2016). Though *Schulhauser* was decided under the BRI standard, there is seemingly not any other reasonable way to interpret the prongs of [1.2.3]-[1.2.3b] and [1.2.5] such that, in a method claim, both prongs can be performed in a single method. It seems that PO itself acknowledges this by including distinct flowcharts in FIGs. 36 and 37, respectively, of the '944 patent for each of these mutually exclusive conditions after an initial introduction of a flowchart in FIG. 35 showing both mutually exclusive conditions. APPLE-1001, FIG. 35, 3540, FIG. 36, 3630, FIG. 37, 3730. Thus, the portions of 3GPP-38.213-CR of the 3GPP-Combination relied upon by Petitioner to show [1.2.3]-[1.2.3b] obviate the need to show [1.2.5]. APPLE-1003, [103]. Alternatively, the Petitioner has also shown that the portions of 3GPP-38.213-CR of the 3GPP-Combination also teach the alternative branch of the method claimed in [1.2.5] as outlined above. *Id.*

Further, any DCI Validation that is not [1.2.5] renders [1.2.5] obvious. APPLE-1003, [104]. As an initial matter, Petitioner submits that the same reasoning set forth for [1.2.1]-[1.2.3b] also render [1.2.5] obvious, because the reasoning set forth to show DCI validation operations in [1.2.1]-[1.2.3b] **is not** “based on the one or more first bits in response to the one or more first bits indicating a configuration index.” *Id.* This is because, for example, “comparing

the one or more first bits with the first sequence ... in response to ... the one or more first bits not indicating a configuration index” is a DCI validation method that “***is not based on*** the one or more first bits in response to the one or more first bits indicating a configuration index” (emphasis added). *Id.*

The claim does not specify ***how DCI validation*** is performed in [1.2.5]. APPLE-1005, [105]. Instead, the claim tells the public how DCI validation is ***not performed***. *Id.* Thus, ***any*** method for validating DCI that is ***not*** what is recited by [1.2.5] discloses and renders obvious [1.2.5], including the process for DCI validation that Petitioner has mapped to limitations [1.2.1]-[1.2.3b]. *Id.* Inasmuch as validating DCI based on individual ones of [1.2.2], [1.2.3], [1.2.4] and [1.2.5] has been shown above to have been obvious to a POSITA, validating DCI based on the complement of all four also would have been deemed obvious to a POSITA. *Id.*

***Limitation [1.3]:***

The 3GPP-Combination discloses and renders obvious [1.3]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [106]. For example, 3GPP-38.213 discloses ***activating resources*** (e.g., UE “validates... for scheduling activation...”) when “a UE is provided a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH” and when “a UE is provided more than one configurations *[sic]* for UL

grant Type 2 PUSCH or for SPS PDSCH.” APPLE-1006, 4, Table 10.2-1 (fields validated for “single DL SPS or single UL grant Type 2 scheduling **activation** PDCCH validation”), 10.2-3 (fields validated for “single DL SPS or single UL grant Type 2 scheduling activation PDCCH validation when a UE is provided multiple DL SPS or UL grant Type 2 configurations”); APPLE-1003, [106].

3GPP-38.213 also discloses **deactivating resources** (e.g., “UE validates ... for scheduling release”) when “a UE is provided a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH” and when “a UE is provided more than one configurations [*sic*] for UL grant Type 2 PUSCH or for SPS PDSCH.” APPLE-1006, 4, Table 10.2-2 (fields validated for “single DL SPS or single UL grant Type 2 scheduling **release** PDCCH validation”), 10.2-4 (fields validated for “multiple DL SPS and UL grant Type 2 scheduling release PDCCH validation”); APPLE-1003, [107].

***Limitation [2]:***

The 3GPP-Combination discloses and renders obvious [2]. APPLE-1006, 4-5; APPLE-1003, [108]. For example, 3GPP-38.213-CR discloses that a UE **receiv[es]** more than one **configured grant configuration parameters of an uplink configured grant configuration** (i.e., “UE is provided with more than one configurations [*sic*] for UL grant Type 2 PUSCH...”). *Id.* When a UE is provided

with more than one configurations for UL grant Type 2, “a value of the HARQ Process Number field in a DCI format indicates an activation for a corresponding UL grant Type 2 PUSCH ... with a same value as provided by *Configuredgrantconfig-index*.” APPLE-1006, 4-5; APPLE-1003, [108]. Thus, the higher level *Configuredgrantconfig-index* signaling provides the ***configuration parameters*** to the UE. *Id.* In such implementations, the “more than one configurations for UL grant Type 2 PUSCH” provided to the UE are the ***received configured grant configuration parameters of an uplink grant configuration***. *Id.* Furthermore, in such implementations, the resources provided for the “more than one configuration for UL grant Type 2 PUSCH” are ***associated with the uplink configured grant configuration*** as the resources are provided to the UE “for UL grant Type 2”. *Id.*

***Limitation [3]:***

The 3GPP-Combination discloses and renders obvious [3]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [109]. For example, 3GPP-38.213-CR discloses that a UE *receiv[es]* more than one ***semipersistent scheduling (SPS) configuration parameters of a downlink SPS configuration*** (i.e., “UE is provided with more than one configurations [*sic*] for ... SPS PDSCH”). *Id.* When a UE is provided with more than one configurations for SPS PDSCH, “a value of the

HARQ Process Number field in a DCI format indicates an activation for a corresponding ... SPS PDSCH configuration ... with a same value as provided by *SPSconfig-index*.” APPLE-1006, 4-5; APPLE-1003, [109]. Thus, the higher level *SPSconfig-index* signaling provides the ***configuration parameters*** to the UE. *Id.*

In such implementations, the “more than one configurations for ... SPS PDSCH configuration” provided to the UE are the ***received semipersistent scheduling (SPS) configuration parameters of downlink SPS configuration***. *Id.*

Furthermore, in such implementations, the resources provided for the “more than one configurations for ... SPS PDSCH” are ***associated with the downlink SPS configuration*** as the resources are provided to the UE “for SPS PDSCH”. *Id.*

***Limitation [4]:***

The 3GPP-Combination discloses and renders obvious [4]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [110]. For example, 3GPP-38.213-CR discloses that “[i]f a UE is provided a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH the UE validates, for scheduling activation or release, a DL SPS assignment PDCCH or configured UL grant Type 2 PDCCH if ... the CRC of a corresponding DCI format is scrambled with a CS-RNTI provided by *cs-RNTI*.” *Id.* Thus, 3GPP-38.213-CR discloses that when a single configuration for UL grant Type 2 PUSCH or SPS PDSCH is provided to a UE, the first DCI format

(ie., DCI Format 0\_2) of [1.2.3b] is *associated* (i.e., scrambled) with a CS-RNTI.

*Id.* The CS-RNTI is the *configured scheduling radio network temporary identifier.*” *Id.*

***Limitation [5.1]:***

The 3GPP-Combination discloses and renders obvious [5.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [111]. For example, 3GPP-38.213-CR discloses a “new data indicator field in the DCI format...” *Id.*

***Limitation [5.2]:***

The 3GPP-Combination discloses and renders obvious [4]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [112]. For example, 3GPP-38.213-CR discloses that “[i]f a UE is provided a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH the UE validates, for scheduling activation or release, a DL SPS assignment PDCCH or configured UL grant Type 2 PDCCH if ... the CRC of a corresponding DCI format is scrambled with a CS-RNTI provided by *cs-RNTI* **and** the new data indicator field in the DCI format for the enabled transport block is set to ‘0’.” *Id.* The CS-RNTI is the “*configured scheduling radio network temporary identifier.*” *Id.*

***Limitation [6]:***

The 3GPP-Combination discloses and renders obvious [6] for at least the reasons set forth in [1.2.3]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1007, 7-11; APPLE-1003, [113].

***Limitation [7]:***

The 3GPP-Combination discloses and renders obvious [7] for at least the reasons set forth in [1.2.3]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1007, 7-11; APPLE-1003, [114].

***Limitation [8]:***

The 3GPP-Combination discloses and renders obvious [8]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [115]. As discussed in [1.2.1], the 3GPP-Combination discloses multiple scenarios where validation of DCI received by a UE is validated ***based on one or more second bits*** (i.e., one or more bits of a Redundancy Version field). APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [115]; *see* [1.2.1]. For at least one DCI Format, 3GPP-38.212-CR specifies that the “redundancy version” field of DCI Format 0\_2 is comprised of “x bits,” which suggests to a POSITA that the numbers of bits to be used for the “redundancy version” field in the DCI Format 0\_2 was intended to be configurable. *Id.*

3GPP-38.212-CR also specifies that, with respect to a different DCI Format, the “redundancy version” field is comprised of “0, 1, or 2 bits determined by higher layer parameter *NumberofbitsforRV-ForDCIFormat1\_2*.” APPLE-1007, 9-10; APPLE-1003, [116]. Thus, as described in the 3GPP-Combination above in §IV(A)(5), *supra*, a POSITA would have understood and found it obvious to configure the “redundancy version” field using a higher level RRC parameter such as *NumberofbitsforRV-ForDCIFormat1\_2*. *Id.* A POSITA would have understood that the number of bits of the second sequence of one or more bits to which the Redundancy Version is compared could also be determined by using the value of *NumberofbitsforRV-ForDCIFormat1\_2*. APPLE-1007, 9-10; APPLE-1006, 4-5; APPLE-1003, [116]; *see* [1.1.3]-[1.2.1].

With the number of *x* bits of the Redundancy Version and the corresponding ***second sequence of one or bits*** also configured based on the ***second configuration parameter*** (e.g., a higher layer parameter such as *NumberofbitsforRV-ForDCIFormat1\_2*), a POSITA would have understood and found it obvious to determine that one or more bits of a Redundancy Version field of the DCI Format 0\_2 are set to “0” by ***comparing the one or more second bits*** (i.e., one or more bits of a redundancy version field) ***with another second sequence of one or more bits*** (e.g., a string or mask of all zeros corresponding to the bit length of the ***configured Redundancy Version Field***) ***determined using a second configuration parameter***

(e.g., a higher layer parameter such as *NumberofbitsforRV-ForDCIFormat1\_2*) in order to determine if the Redundancy Version Field is set to all zeros, as required by Table 10.2.1 (i.e., PDCCH validation of single resource activation) or Table 10.2-2 (i.e., PDCCH validation of single resource release). APPLE-1003, [117]; *cf.* APPLE-1004, FIG. 6, 610, 620, 29:66-30:10. A POSITA would have found the aforementioned features of [8] obvious as it is common in the art to determine whether a first value equals a second value by performing a comparison between a first value and the second value to determine whether the respective values match. *Id.* Such a comparison is a basic operation in the art that does not require any engineering and a POSITA would have had a reasonable expectation of success in implementing such a comparison. *Id.*

***Limitation [9]:***

The 3GPP-Combination discloses and renders obvious [9] for at least the reasons set forth in [1.2.3]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1007, 7-11; APPLE-1003, [118].

***Limitation [10]:***

The 3GPP-Combination discloses and renders obvious [10] for at least the reasons set forth in [1.2.3]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1007, 7-

11; APPLE-1003, [119].

***Limitation [11.P]:***

The 3GPP-Combination discloses and renders obvious [11.P] for at least the reasons set forth in [1.P] of §IV(A)(6). APPLE-1005, 1, 73-83; APPLE-1006, 4-5; APPLE-1003, [120]. For example, the 3GPP-Combination discloses “physical layer procedures for control” signaling operations of a UE (user device) in a 5G-NR communications network. *Id.*

***Limitation [11.1]:***

The 3GPP-Combination discloses and renders obvious [11.1] for at least the reasons set forth in [11.P] of §IV(A)(6). APPLE-1005, 1, 73-83; APPLE-1006, 4-5; APPLE-1003, [121]. In the 3GPP-Combination, a POSITA would have understood that a UE has one or processors. APPLE-1005, 1, 73-83; APPLE-1006, 4-5; APPLE-1003, [121]; *see also* APPLE-1004, FIG. 6, 610, 620, 28:30-40, 29:11-24.

***Limitation [11.2]:***

The 3GPP-Combination discloses and renders obvious [11.1] for at least the reasons set forth in [11.P] and [1.1.1]-[1.3] of §IV(A)(6). APPLE-1005, 1, 73-83;

APPLE-1006, 4-5; APPLE-1003, [122]. In the 3GPP-Combination, a POSITA would have understood that a UE has a memory storing instructions for executing the processes of [11.2.1]-[11.3]. APPLE-1005, 1, 73-83; APPLE-1006, 4-5; APPLE-1003, [122]; *see also* APPLE-1004, FIG. 6, 610, 630, 30:11-25.

***Limitation [11.2.1]:***

The 3GPP-Combination discloses and renders obvious [11.2.1] for at least the reasons set forth in [1.1.1] of §IV(A)(6). APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8, 9-11; APPLE-1003, [123].

***Limitation [11.2.1a]:***

The 3GPP-Combination discloses and renders obvious [11.2.1a] for at least the reasons set forth in [1.1.2] of §IV(A)(6). APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8 (“HARQ process number”), 9-11 (“HARQ process number”); APPLE-1003, [124].

***Limitation [11.2.1b]:***

The 3GPP-Combination discloses and renders obvious [11.2.1b] for at least the reasons set forth in [1.1.3] of §IV(A)(6). APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8 (“Redundancy Version”), 9-11 (“Redundancy Version”); APPLE-1003, [125].

***Limitation [11.2.2]:***

The 3GPP-Combination discloses and renders obvious [11.2.2] for at least the reasons set forth in [1.2.1] of §IV(A)(6). APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [126].

***Limitation [11.2.2a]:***

The 3GPP-Combination discloses and renders obvious [11.2.2a] for at least the reasons set forth in [1.2.2] of §IV(A)(6). APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [1275].

***Limitation [11.2.2b]:***

The 3GPP-Combination discloses and renders obvious [11.2.2b] for at least the reasons set forth in [1.2.3] of §IV(A)(6). APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1007, 7-11; APPLE-1003, [128].

***Limitation [11.2.2b.1]:***

The 3GPP-Combination discloses and renders obvious [11.2.2b.1] for at least the reasons set forth in [1.2.3a] of §IV(A)(6). APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [129].

***Limitation [11.2.2b.2]:***

The 3GPP-Combination discloses and renders obvious [11.2.2b.2] for at least the reasons set forth in [1.2.3b] of §IV(A)(6). APPLE-1005, 83; APPLE-1006, 4-5 (DCI format 0\_1); APPLE-1003, [130].

***Limitation [11.2.2c]:***

The 3GPP-Combination discloses and renders obvious [11.2.2c] for at least the reasons set forth in [1.2.4] of §IV(A)(6). APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [131].

While it is noted that [11.2.2]-[11.2.2b.2] and [11.2.2c] represent mutually exclusive conditional statements of an operation performed by a device, the law is not as clear regarding whether the *Schulhauser* reasoning discussed in [1.2.4] applies to device claims. If the *Schulhauser* reasoning is found to apply to device claims, the 3GPP-Combination discloses and renders obvious [11.2.2c] for at least the same reasons set forth in [1.2.4] of §IV(A)(6). However, to the extent the *Schulhauser* reasoning is found not to apply to device claims, the 3GPP-Combination still discloses and renders obvious [11.2.2c] as a POSITA would have understood that a UE configured to comply with the 3GPP standards of the 3GPP-Combination would have included instructions stored in a memory that, when executed by one or more of the processors of the UE, would cause the UE to

perform the operations of claim 11, as discussed herein in [11.2.1]-[11.3]. APPLE-1003, [132].

***Limitation [11.2.2d]:***

The 3GPP-Combination discloses and renders obvious [11.2.2d] for at least the reasons set forth in [1.2.5] of §IV(A)(6). APPLE-1005, 83; APPLE-1006, 4-5, Table 10.2-3; APPLE-1003, [133].

While it is noted that [11.2.2]-[11.2.2b.2] and [11.2.2d] represent mutually exclusive conditional statements of an operation performed by a device, the law is not as clear regarding whether the *Shulhauser* reasoning discussed in [1.2.5] applies to device claims. If the *Schulhauser* reasoning discussed in [1.2.5] is found to apply to device claims, the 3GPP-Combination discloses and renders obvious [11.2.2d] for at least the same reasons set forth in [1.2.5] of §IV(A)(6). However, to the extent the *Schulhauser* reasoning is found not to apply to device claims, the 3GPP-Combination still discloses and renders obvious [11.2.2d] as a POSITA would have understood that a UE configured to comply with the 3GPP standards of the 3GPP-Combination would have included instructions stored in a memory that, when executed by one or more of the processors of the UE, would cause the UE to perform the operations of claim 11, as discussed herein in [11.2.1]-[11.3]. APPLE-1003, [133]-[134]. Inasmuch as validating DCI based on individual ones of

[11.2.2a], [11.2.2b], [11.2.2c] and [11.2.2d] has been shown above to have been obvious to a POSITA, validating DCI based on the complement of all four also would have been deemed obvious to a POSITA. *Id.*

***Limitation [11.3]:***

*See* [1.3] of §IV(A)(6).

***Limitation [12]:***

*See* [2] of §IV(A)(6).

***Limitation [13]:***

*See* [3] of §IV(A)(6).

***Limitation [14]:***

*See* [4] of §IV(A)(6).

***Limitation [15.1]:***

*See* [5.1] of §IV(A)(6).

***Limitation [15.2]:***

*See* [5.2] of §IV(A)(6).

***Limitation [16]:***

*See* [6] of §IV(A)(6).

***Limitation [17]:***

*See* [7] of §IV(A)(6).

***Limitation [18]:***

*See* [8] of §IV(A)(6).

***Limitation [19]:***

*See* [18] of §IV(A)(6).

***Limitation [20]:***

*See* [18] of §IV(A)(6).

**B. GROUND 2A – Claims 1-20 are rendered obvious by Zhang**

**1. Overview of Zhang**

Zhang discloses a method for “[v]alidation of [a]ctivation and [d]eactivation” of resources. APPLE-1004, 9:46-47. For example, Zhang discloses “PDCCH validation for DL SPS and UL grant Type 2 ... validates, for scheduling activation or scheduling release, a DL SPS assignment PDCCH or

configured UL grant Type 2 PDCCH...” APPLE-1004, 9:49-52. Zhang also explains that such validation occurs “if the CRC of a corresponding DCI format is scrambled with a CS-RNTI provided by higher layer parameter cs-RNTI, and the new data indicator field for enabled transport block is set to ‘0’.” APPLE-1004, 9:50-58. Zhang discloses that “[v]alidation of the DCI format is achieved if all fields for DCI format are set according to Table 10-2.1 or Table 10-2.2.” APPLE-1004, 9:59-61. Zhang’s Table 10.2-1 specifies “[s]pecial fields for DL SPS and UL grant Type 2 scheduling activation PDCCH validation[.]” APPLE-1004, Table 10.2-1 (reproduced below); APPLE-1003, [65].

| TABLE 10.2-1                                                                            |                       |                 |                                                    |
|-----------------------------------------------------------------------------------------|-----------------------|-----------------|----------------------------------------------------|
| Special fields for DL SPS and UL grant Type 2 scheduling activation<br>PDCCH validation |                       |                 |                                                    |
|                                                                                         | DCI format<br>0_0/0_1 | DCI format 1_0  | DCI format 1_1                                     |
| HARQ process<br>number                                                                  | set to all ‘0’s       | set to all ‘0’s | set to all ‘0’s                                    |
| Redundancy<br>version                                                                   | set to ‘00’           | set to ‘00’     | For the enabled<br>transport block: set<br>to ‘00’ |

APPLE-1004, Table 10.2-1.

Zhang’s Table 10-2.2 specifies “[s]pecial fields for DL SPS and UL grant Type 2 scheduling release PDCCH validation[.]” APPLE-1004, Table 10.2-2 (reproduced below); APPLE-1003, [66].

TABLE 10.2-2

| Special fields for DL SPS and UL grant Type 2 scheduling release<br>PDCCH validation |                 |                 |
|--------------------------------------------------------------------------------------|-----------------|-----------------|
|                                                                                      | DCI format 0_0  | DCI format 1_0  |
| HARQ process number                                                                  | set to all '0's | set to all '0's |
| Redundancy version                                                                   | set to '00'     | set to '00'     |
| Modulation and coding<br>scheme                                                      | set to all '1's | set to all '1's |
| Resource block<br>assignment                                                         | set to all '1's | set to all '1's |

APPLE-1004, Table 10.2-2.

Zhang specifies that when a UE is provided with a configuration for “DL SPS” or “UL grant Type 2 scheduling activation PDCCH validation” via a first DCI format (i.e., DCI format 1\_0), validation of the first DCI format is achieved if *the one or more first bits* of the “HARQ Process Number [are] set to all ‘0’s” and *the one or more second bits* of the “Redundancy version [are] set to ‘00.’”

APPLE-1004, 9:46-10:66, Table 10.2-1; APPLE-1003, [67].

Insofar as “validating the DCI ... *is based on comparing* the one or more first bits with a first sequence of one or more bits, determined using a first configuration parameter” is nevertheless rendered obvious. APPLE-1003, [69].

Zhang discloses a UE having “[p]rocessing circuitry 620 configured to perform ... operations ... [that] may include ... comparing the obtained information ... to information stored by WD 610...” APPLE-1004, FIG. 6, 610, 620, 29:66-30:10; APPLE-1003, [69] (UE configured to perform comparing operations.). One way

that a POSITA would have determined whether the *one or more first bits* of the “HARQ Process Number” are set to all “0s” was to *compare the one or more first bits of the HARQ Process Number* to a string or mask of another *sequence of one or more bits* corresponding to the same number of bits as the HARQ Process number. APPLE-1004, FIG. 6, 610, 620, 29:66-30:10; APPLE-1003, [69] (UE configured to perform comparing operations.). To a POSITA, such a design choice merely involves a determination as to whether a first value (i.e., one or more first bits of the HARQ Process Number) equals a second value (i.e., the sequence of one or more bits) in order to determine, based on a comparison between the two respective values, whether the two respective values match. *Id.* There are only a limited number of options to compare the first bits with the sequence of bits and setting the number of bits more facilitates comparison. *Id.* As another alternative, for example, a POSITA could have sequentially compared the HARQ Process number bit-by-bit in successive comparisons to confirm whether the values match. *Id.* A POSITA considering different options would have compared a string or mask to reduce the number of sequential comparisons. *Id.*

Zhang also describes *a first configuration parameter* (e.g., in the ConfiguredGrantConfig IE). APPLE-1004, 11:11-33, 17:3-18:67, APPLE-1003, [70]. Zhang also discloses a process for “set[ting] the HARQ Process ID to the HARQ Process ID associated with this PUSCH duration.” *Id.* Here, a HARQ

Process ID is set or, in other words, ***configured***. APPLE-1004, 11:11-33, 17:3-18:67, APPLE-1003, [70]. This set, or configured, HARQ Process ID would have had a number of one or more bits that were set, or configured, by this setting operation. APPLE-1003, [70]. The number of bits in the ***sequence of one or more bits*** is set to the same number of bits for the bits specified in the HARQ Process Number. *Id.* A POSITA would have considered this a design choice during implementation of a comparison between the ***one or more first bits of the HARQ Process Number*** and the ***sequence of one or more bits***. APPLE-1004, 11:11-33, APPLE-1003, [70]. As noted earlier, there are only a limited number of options to compare the first bits with the sequence of bits and setting the number of bits more facilitates comparison. APPLE-1003, [70]. As another alternative, for example, a POSITA could have sequentially compared the HARQ Process number bit-by-bit in successive comparisons to confirm whether the values match. *Id.* A POSITA considering different options would have set the number of bits to facilitate a comparison in a more efficient number of computing operations. *Id.* Zhang would have configured the number of bits in the ***sequence of one or more bits*** to facilitate an accurate comparison of the ***one or more first bits of the HARQ Process Number and the sequence of one or more bits***. *Id.*

Zhang's UE ***compares the one or more bits of the HARQ process number with another sequence of one or more bits*** (e.g., a string or mask of all zeros

corresponding to the bit length of **HARQ Process Number**) to determine whether the HARQ Process Number is set to all '0's, as required by Table 10.2-1. APPLE-1004, 9:46-10:66, Table 10.2-1; APPLE-1003, [71]. These comparison operations are so well known as it is common in the art to determine whether a first value equals a second value by performing a comparison between a first value and the second value to determine whether the respective values match. APPLE-1003, [71]. And given the basic, routine, nature of such a comparison, a POSITA would have had a *reasonable expectation of success* in implementing such a comparison. *Id.*

Zhang also describes *a first configuration parameter* (e.g., a length of bits in the HARQ field of the ConfiguredGrantConfig IE). APPLE-1004, 11:11-33, 17:3-18:67; APPLE-1003, [72]. Zhang further describes a process for “set[ting] the HARQ Process ID to the HARQ Process ID associated with this PUSCH duration.” *Id.* Here, a HARQ Process ID is set or, in other words, *configured*. *Id.* The HARQ Process ID is the same parameter as a HARQ Process Number. APPLE-1003, [72]. In addition, Zhang describes (and renders obvious) that the UE would *configure the first sequence of one or more bits* based on the field length of the HARQ field of the ConfiguredGrantConfig IE that sets the HARQ Process Number, as the set HARQ Process Number indicates a number of bits used for the HARQ Process Number. APPLE-1003, [72]. This, in turn, would convey a

number of one or more bits of the *first sequence of one or more bits* necessary to facilitate a comparison between to *one or more bits of the HARQ Process Number* and the *first sequence of one or more bits* when performing validation of a first DCI format to determine whether all bits of the HARQ Process Number are set to “0”s, as required by Table 10.2-1 or Table 10.2-2 of Zhang. APPLE-1004, 9:46-10:66, Table 10.2-1; APPLE-1003, [72].

## 2. Analogous Art

Zhang is *analogous art* to the '944 patent, as Zhang and the '944 patent each relate to receipt and validation of downlink control information (“DCI”) via the PDCCH. APPLE-1004, 20:23-25, 9:46-10:66, Table 10.2-1; APPLE-1001, 32:1-20; 33:32-34:16; APPLE-1003, [74].

## 3. Analysis

### a) Claim 1

#### ***Limitation [1.P]:***

Zhang renders obvious *a method* (e.g., process 100) for “performing DCI (PDCCH) reception ... for activation.” APPLE-1004, 20:20-25, FIG. 1; APPLE-1003, [145].

#### ***Limitation [1.1.1]:***

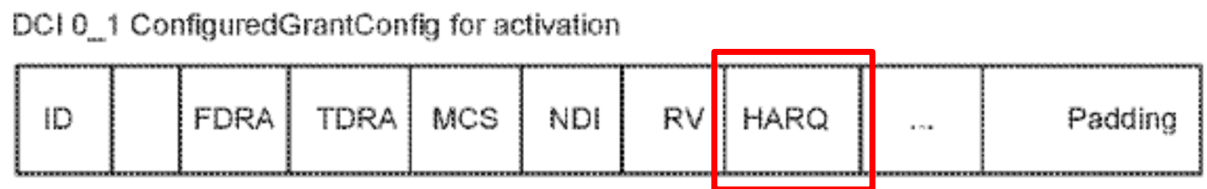
Zhang renders obvious [1.1.1]. APPLE-1004, 10:10-16, Table 10.2-1, FIG. 1, 20:23-30; APPLE-1003, [146]. For example, Zhang discloses that a “UE

perform[s] DCI (PDCCH) reception.” Apple-1004, 20:23-25; APPLE-1003, [146].

It would have been readily apparent and obvious to a POSITA that “performing DCI (PDCCH) receptions” indicates that a UE, or *wireless device, received downlink control information (DCI)* that was carried by the PDCCH. *Id.*

***Limitation [1.1.2]:***

Zhang renders obvious [1.1.2]. APPLE-1004, 13:46-51, 14:1-3, 49:56-63; FIG. 17; APPLE-1003, [147]. For example, Zhang discloses that DCI received via the PDCCH can include a *HARQ process number field* (shown below). APPLE-1004, 49:56-63, FIG. 17; APPLE-1003, [147].



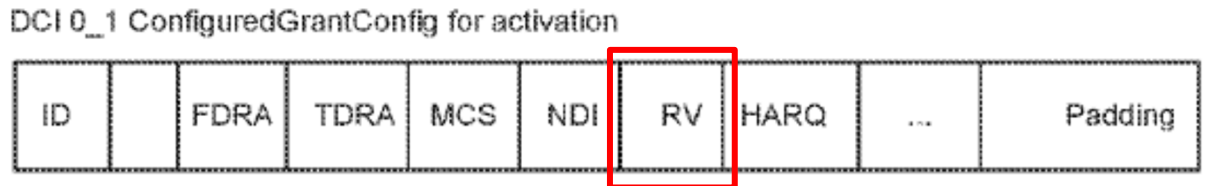
APPLE-1004, FIG. 17.

Zhang explains that “[v]alidation of the DCI format is achieved if all fields for the DCI format are set according to Table 10.2-1 or Table 10.2-2.” APPLE-1004, 9:59-61, Table 10.2-1, Table 10.2-2; APPLE-1003, [148]. Tables 10.2-1 and 10.2.2 of Zhang indicate that, for a DCI format to be validated, that the HARQ Process Number must be “set to all ‘0’s.” *Id.* Thus, the *HARQ process number* of the HARQ process number field of DCI format 0\_1 shown in FIG. 17 and as

disclosed by Zhang comprises *one or more bits* (e.g., one or more “0’s”). *Id.*

***Limitation [1.1.3]:***

Zhang renders obvious [1.1.3]. APPLE-1004, 13:46-51, 14:1-3, 49:56-63; FIG. 17; APPLE-1003, [149]. For example, Zhang discloses that DCI received via the PDCCH can include a *redundancy version field* (shown below). APPLE-1004, 49:56-63, FIG. 17; APPLE-1003, [149].



APPLE-1004, FIG. 17.

Zhang explains that “[v]alidation of the DCI format is achieved if all fields for the DCI format are set according to Table 10.2-1 or Table 10.2-2.” APPLE-1004, 9:59-61, Table 10.2-1, Table 10.2-2; APPLE-1003, [150]. Tables 10.2-1 and 10.2.2 of Zhang indicate that, for a DCI format to be validated, the Redundancy Version must be “set to all ‘00.’” *Id.* Thus, the *redundancy version field* of the RV field of DCI format 0\_1 shown in FIG. 17 and as disclosed by Zhang comprises *one or more bits* (e.g., “00”). *Id.*

***Limitation [1.2.1]:***

Zhang renders obvious [1.2.1]. APPLE-1004, 9:46-10:66; 20:25-67; Table

10.2-1, Table 10.2-2; APPLE-1003, [151]. Zhang discloses that “[v]alidation of the DCI format is achieved if all fields for the DCI format are set according to Table 10.2-1 or Table 10.2-2.” *Id.* Table 10.2-1 of Zhang specifies that when a UE is provided with a configuration for “DL SPS” or “UL grant Type 2 scheduling activation PDCCH validation” via a first DCI format (i.e., DCI format 1\_0), validation of the first DCI format is achieved if *the one or more first bits* of the “HARQ Process Number [are] set to all ‘0’s” and *the one or more second bits* of the “Redundancy version [are] set to ‘00.’” APPLE-1004, 9:46-10:66, Table 10.2-1; APPLE-1003, [151]. In addition, Table 10.2-2 of Zhang specifies that when a UE is provided with a configuration for “DL SPS” or “UL grant Type 2 scheduling release PDCCH validation” via a first DCI format (i.e., DCI format 1\_0), validation of the first DCI format is achieved if *the one or more first bits* of the “HARQ Process Number [are] set to all ‘0’s” and *the one or more second bits* of the “Redundancy version [are] set to ‘00.’” APPLE-1004, 9:46-10:66, Table 10.2-2; APPLE-1003, [151].

***Limitation [1.2.2]:***

Zhang renders obvious [1.2.2]. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003, [152]. As explained in [1.2.1], Zhang discloses wherein validation of a first DCI format (i.e., DCI format 1\_0) is based

on *one or more second bits* of a Redundancy version field. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003, [152]; *see also* [1.2.1].

***Limitation [1.2.3]:***

Zhang renders obvious [1.2.3]. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003, [153]. As discussed in [1.2.1], Table 10.2-1 of Zhang specifies that when a UE is provided with a configuration for “DL SPS” or “UL grant Type 2 scheduling activation PDCCH validation” via a *first DCI format* (i.e., DCI format 1\_0), validation of the first DCI format is achieved if *the one or more first bits* of the “HARQ Process Number [are] set to all ‘0’s” and *the one or more second bits* of the “Redundancy version [are] set to ‘00.’” APPLE-1004, 9:46-10:66, Table 10.2-1; APPLE-1003, [153].

Zhang renders obvious *comparing the one or more bits of the HARQ process number with another sequence of one or more bits* (e.g., a string or mask of all zeros corresponding to the bit length of *HARQ Process Number*) in order to determine whether the HARQ Process Number is set to all ‘0’s, as required by Table 10.2-1. APPLE-1004, 9:46-10:66, Table 10.2-1, FIG. 6, 610, 620, 29:66-30:10; APPLE-1003, [154]. Insofar as these elements are not disclosed, a POSITA would have found the aforementioned features of [1.2.3] obvious as a design choice as it is common in the art to determine whether a first value equals a second

value by performing a comparison between a first value and the second value to determine whether the respective values match. *Id.* Such a comparison is a basic operation in the art that does not require any engineering and a POSITA would have had a reasonable expectation of success in implementing such a comparison. *Id.*

Zhang also describes and renders obvious using the recited ***first configuration parameter*** (i.e., a length of bits in the HARQ field of the ConfiguredGrantConfig IE) to validate the DCI. APPLE-1004, 11:11-33, APPLE-1003, [155]. Zhang discloses a process for “set[ting] the HARQ Process ID to the HARQ Process ID associated with this PUSCH duration.” *Id.* Here, a HARQ Process ID is set or, in other words, ***configured***. *Id.* The HARQ Process ID is the same parameter as a HARQ Process Number. APPLE-1003, [155]. In addition, Zhang describes ***configuring the first sequence of one or more bits*** based on the field length of the HARQ field of the ConfiguredGrantConfig IE that sets the HARQ Process Number, as the set HARQ Process Number indicate a number of bits used for the HARQ Process Number. APPLE-1003, [155]. This would convey to a POSITA a number of one or more bits of the ***first sequence of one or more bits*** necessary to facilitate a comparison between to ***one or more bits of the HARQ Process Number*** and the ***first sequence of one or more bits*** when performing validation of a first DCI format to determine whether all bits of the

HARQ Process Number are set to “0”s, as required by Table 10.2-1 or Table 10.2-2 of Zhang. APPLE-1004, 9:46-10:66, Table 10.2-1; APPLE-1003, [155].

***Limitation [1.2.3a]:***

Zhang renders obvious [1.2.3a]. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003, [156]. In view of the teachings of Zhang, the HARQ Process Number disclosed by Zhang ***includes one or more first bits that do not indicat[e] a configuration index. Id.*** A UE can receive a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH. APPLE-1003, [156].

Accordingly, in such instances, Zhang’s HARQ Process Number functions as an identifier for a HARQ Process that is to be performed by the UE and does not indicate a configuration index. APPLE-1003, [156].

***Limitation [1.2.3b]:***

Zhang discloses and renders obvious [1.2.3b]. APPLE-1004, 9:46-10:66, Table 10.2-1; APPLE-1003, [157]. Table 10.2-1 of Zhang specifies that ***when*** a UE is provided with a configuration for “DL SPS” or “UL grant Type 2 scheduling activation PDCCH validation” via ***a first DCI format*** (i.e., DCI format 1\_0), ***validation of the first DCI format*** is achieved if ***the one or more first bits*** of the “HARQ Process Number [are] set to all ‘0’ s” and ***the one or more second bits*** of

the “Redundancy version [are] set to ‘00.’” APPLE-1004, 9:46-10:66, Table 10.2-1; APPLE-1003, [157].

***Limitation [1.2.4]:***

Zhang renders obvious [1.2.4]. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003, [158]. Zhang renders obvious ***a DCI validation method that discloses the DCI validation methods*** of [1.2.1]-[1.2.3b]. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003, [158]. *See also* [1.2.1]-[1.2.3b]. The DCI validation methods disclosed and rendered obvious by Zhang and relevant to [1.2.1]-[1.2.3b] are ***validation of DCI ... that is not based on comparing the one or more first bits with the first sequence in response to the DCI having a second format.*** *Id.* Therefore, the DCI validation method disclosed by Zhang with respect to [1.2.1]-[1.2.3b] renders obvious [1.2.4]. *Id.*

***Limitation [1.2.5]:***

Zhang renders obvious [1.2.5]. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003, [159]. Zhang renders obvious ***a DCI validation method that discloses the DCI validation methods*** of [1.2.1]-[1.2.3b]. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003,

[159]. *See also* [1.2.1]-[1.2.3b]. The DCI validation methods rendered obvious by Zhang and relevant to [1.2.1]-[1.2.3b] are a ***validation of DCI ... that is not based on the one or more first bits in response to the one or more first bits indicating a configuration index.*** *Id.* Therefore, the DCI validation method disclosed and rendered obvious by Zhang with respect to [1.2.1]-[1.2.3b] renders obvious [1.2.5]. *Id.* Inasmuch as validating DCI based on individual ones of [1.2.2], [1.2.3], [1.2.4] and [1.2.5] has been shown above to have been obvious to a POSITA, validating DCI based on the complement of all four also would have been deemed obvious to a POSITA.

***Limitation [1.3]:***

Zhang discloses and renders obvious [1.3]. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003, [163]. For example, Zhang discloses ***activation or deactivation*** of resources if a DCI format is validated to have DCI format fields set according to Table 10.2-1 (e.g., for ***activation***) or Table 10.2-2 (e.g., for ***release***). *Id.*

***Limitation [2]:***

Zhang renders obvious [2]. APPLE-1004, 11:11-33, 17:3-18:67; APPLE-1003, [162]. For example, Zhang discloses ***receiving resources that include***

receipt of a *ConfiguredGrantConfig IE* that includes ***configuration parameters of an uplink configured grant configuration***. *Id.* The ***received resources*** that include ***configuration parameters of an uplink configured grant configuration*** are ***associated with the uplink configured grant configuration*** because they set, or configure, parameters of an uplink configured grant configuration. *Id.*

***Limitation [3]:***

Zhang renders obvious [3]. APPLE-1004, 49:57-59, 9:46-52; 9:61-66, 10:58-66; APPLE-1003, [162]. For example, Zhang discloses ***receiving resources that include*** receipt of a *ConfiguredGrantConfig IE* that includes ***configuration parameters of an uplink configured grant configuration***. *Id.* Though the *ConfiguredGrantConfig IE* includes configuration parameters of an uplink configured grant configuration and not configuration for a downlink SPS assignment, a POSITA would have understood and found it obvious to use a similar information element to *ConfiguredGrantConfig IE* for configuration of parameters of an uplink configured grant configuration would have been used to ***configure parameters for a downlink SPS configuration***. APPLE-1003, [162]; *cf* APPLE-1006, 4. This is because, as illustrated by APPLE-1006, 4 (i.e., “Configuredgrantconfig-index” and “SPSconfig-index”), it is common for a POSITA to configure UEs for uplink and downlink in a similar manner using

similar information elements for respective configuration of uplink and downlink parameters. APPLE-1003, [162].

***Limitation [4]:***

Zhang renders obvious [4]. APPLE-1004, 9:46-58; APPLE-1003, [163]. For example, Zhang disclose that a “UE validates ... a DL SPS assignment PDCCH or configured UL grant Type 2 PDCCH if the CRC of a corresponding DCI is *scrambled with a CS-RNTI* ....” *Id* (emphasis added). A CS-RNTI is a *radio network temporary identifier*. APPLE-1003, [163]. Because the DCI is *scrambled using the CS-RNTI*, a POSITA would have understood that the *DCI is associated with a configured scheduling radio network temporary identifier*. *Id*.

***Limitation [5.1]:***

Zhang renders obvious [5.1]. APPLE-1004, 9:46-58, FIG. 17; APPLE-1003, [164]. For example, Zhang discloses that a “UE validates ... a DL SPS assignment PDCCH or configured UL grant Type 2 PDCCH if .... the new data indicator field for the enabled transport block is set to ‘0’.” *Id*. In addition, FIG. 17 of Zhang discloses a DCI that includes a *new data indicator* (i.e., NDI) field. *Id*.

***Limitation [5.2]:***

Zhang renders obvious [5.2]. APPLE-1004, 9:46-58, FIG. 17; APPLE-1003, [165]; *see also* [4] and [5.1]. For example, Zhang discloses that a “UE validates ... a DL SPS assignment PDCCH or configured UL grant Type 2 PDCCH if the CRC of a corresponding DCI is *scrambled with a CS-RNTI .... and the new data indicator field for the enabled transport block is set to ‘0’.*” *Id* (emphasis added).

***Limitation [6]:***

*See* [1.2.3] of §IV(B)(3).

***Limitation [7]:***

*See* [1.2.3] of §IV(B)(3).

***Limitation [8]:***

Zhang renders obvious [8]. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003, [168]. As explained in [1.2.2], Zhang discloses validation of a first DCI format (i.e., DCI format 1\_0) is based on *one or more second bits* of a Redundancy Version field. APPLE-1004, 9:46-10:66; 20:25-67; Table 10.2-1, Table 10.2-2; APPLE-1003, [168]; *see also* [1.2.1]. Table 10.2-1 of Zhang specifies that when a UE is provided with a configuration for “DL

SPS” or “UL grant Type 2 scheduling activation PDCCH validation” via a first DCI format (i.e., DCI format 1\_0), validation of the first DCI format is achieved if *the one or more first bits* of the “HARQ Process Number [are] set to all ‘0’s” and *the one or more second bits* of the “Redundancy version [are] set to ‘00.’ APPLE-1004, 9:46-10:66, Table 10.2-1; APPLE-1003, [168].

A POSITA would have understood and found it obvious in view of the teachings of Zhang that Zhang suggests *comparing the one or more second bits of the Redundancy version field with another sequence of one or more bits* (e.g., a length of bits in the RV field of the ConfiguredGrantConfig IE) in order to determine whether the Redundancy version is set to “00”, as required by Table 10.2-1. APPLE-1004, 9:46-10:66, Table 10.2-1, FIG. 6, 610, 620, 29:66-30:10; FIG. 17, 17:3-18:65; *see* §IV(B)(1) (describing different options for comparison of bits, e.g., mask or sequential); APPLE-1003, [169]. A POSITA would have found the aforementioned features of [8] obvious as it is common in the art to determine whether a first value equals a second value by performing a comparison between a first value and the second value to determine whether the respective values match. APPLE-1003, [169]. Such a comparison is a basic operation in the art that does not require any engineering and a POSITA would have had a reasonable expectation of success in implementing such a comparison. APPLE-1003, [169].

A POSITA would have also understood and found it obvious based on the

teachings of Zhang that Zhang also suggests *a second configuration parameter* (i.e., a length of bits in the RV field of the ConfiguredGrantConfig IE). APPLE-1004, 11:11-33, APPLE-1003, [170]. A POSITA would have also understood and found it obvious to *configure the second sequence of one or more bits* based on the length, or number, of bits in the RV field of the ConfiguredGrantConfig IE, as the number of bits of the RV field indicate a number of bits used for the Redundancy version. APPLE-1003, [170]. This, in turn, would convey to a POSITA a number of one or more bits of the *second sequence of one or more bits* necessary to facilitate a comparison between to *one or more bits of the Redundancy version* and the *second sequence of one or more bits* when performing validation of a first DCI format to determine whether all bits of the Redundancy version are set to “0”s, as required by Table 10.2-1 or Table 10.2-2 of Zhang. APPLE-1004, 9:46-10:66, Table 10.2-1; APPLE-1003, [170].

***Limitation [9]:***

*See [8] of §IV(B)(3).*

***Limitation [10]:***

*See [8] of §IV(B)(3).*

***Limitation [11.P]:***

Zhang renders obvious *a wireless device* (e.g., UE or WD). APPLE-1004, 20:20-25, 23:4-21, 27:45-47, 28:30-40, FIGs. 1, 6; APPLE-1003, [173].

***Limitation [11.1]:***

See [11.P] of §IV(B)(3). For example, Zhang discloses a UE or wireless device having “processing circuitry 620” (i.e., *one or more processors*). APPLE-1004, 28, 30-40, FIG. 6; APPLE-1003, [174].

***Limitation [11.2]:***

See [11.P] of §IV(B)(3). For example, Zhang discloses a UE or wireless device having a “device readable medium 630.” APPLE-1004, 28:30-40, 30:11-25, 23:4-21, 27:45-47, FIG. 6; APPLE-1003, [175].

***Limitation [11.2.1]:***

See [1.1.1] of §IV(B)(3).

***Limitation [11.2.1a]:***

See [1.1.2] of §IV(B)(3).

***Limitation [11.2.1b]:***

See [1.1.3] of §IV(B)(3).

***Limitation [11.2.2]:***

*See* [1.2.1] of §IV(B)(3).

***Limitation [11.2.2a]:***

*See* [1.2.2] of §IV(B)(3).

***Limitation [11.2.2b]:***

*See* [1.2.3] of §IV(B)(3).

***Limitation [11.2.2b.1]:***

*See* [1.2.3a] of §IV(B)(3).

***Limitation [11.2.2b.2]:***

*See* [1.2.3b] of §IV(B)(3).

***Limitation [11.2.2c]:***

*See* [1.2.4] of §IV(B)(3).

***Limitation [11.2.2d]:***

*See* [1.2.5] of §IV(B)(3).

***Limitation [11.3]:***

*See* [1.3] of §IV(B)(3).

***Limitation [12]:***

*See* [2] of §IV(B)(3).

***Limitation [13]:***

*See* [3] of §IV(B)(3).

***Limitation [14]:***

*See* [4] of §IV(B)(3).

***Limitation [15.1]:***

*See* [5.1] of §IV(B)(3).

***Limitation [15.2]:***

*See* [5.2] of §IV(B)(3).

***Limitation [16]:***

*See* [6] of §IV(B)(3).

***Limitation [17]***

*See* [7] of §IV(B)(3).

***Limitation [18]:***

*See* [8] of §IV(B)(3).

***Limitation [19]:***

*See* [18] of §IV(B)(3).

***Limitation [20]:***

*See* [18] of §IV(B)(3).

**C. GROUND 2B – Claims 1-20 are rendered obvious over Zhang in view of 3GPP-38.213-CR**

**1. Overview of the Zhang/3GPP-38.213-CR Combination**

As noted in Ground 2A, Zhang renders obvious claims 1-20. More, for reasons noted below, a POSITA would have been *motivated* and have had a *reasonable expectation of success* in combining Zhang with 3GPP-38.213-CR, and this combination would also and differently address the features recited by [1.2.4] and [1.2.5] of claim 1 and [11.2.2c] and [11.2.2d] of claim 11, and thus, otherwise render obvious claims 1-20. APPLE-1003, [74], [197]. As described with respect to [1.2.4] and [1.2.5] and [11.2.2c] and [11.2.2d] of §IV(A)(6), 3GPP-38.213-CR discloses “validating the DCI, wherein the validating ... is not based on comparing the one or more first bits with the first sequence in response to the DCI

having a second format” and “is not based on the one or more first bits in response to the one or more first bits indicating a configuration index,” and as described below, its integration into Zhang would therefore yield a combination with this feature, rendering obvious each of these claims, as again described in [1.2.4] and [1.2.5] and [11.2.2c] and [11.2.2d] of §IV(A)(6). APPLE-1003, [197].

It would have been obvious to a POSITA to modify Zhang with the operations of 3GPP-38.213-CR, since 3GPP-38.213-CR proposed to change the baseline implementation contemplated in 3GPP-38.213. Zhang describes the PDCCH validation for DL SPS and UL grant Type 2 functionality envisioned by 3GPP-38.213. APPLE-1004, 9:46-10:67; APPLE-1006, 1; APPLE-1003, [198]. Zhang explicitly incorporates aspects of 3GPP-38.213 into Zhang. APPLE-1004, 9:46-10:67; APPLE-1003, [198].

Both Zhang and 3GPP-38.213-CR are in the same *field of endeavor*, with each relating to “physical layer procedures for control” operations of a 5G-NR network that perform PDCCH validation for DL SPS and UL grant Type 2. APPLE-1004, 9:46-53; APPLE-1006, 1, 4-5; APPLE-1003, [199]. A POSITA would have been motivated to look to 3GPP-38.213-CR to modify Zhang, as the first page of 3GPP-38.213-CR indicates that 3GPP-38.213-CR is a “Draft Change Request” to “38.213,” aspects of which are incorporated into Zhang. APPLE-1006, 1; APPLE-1004, 9:46-10:67; APPLE-1003, [199]. Moreover, it would have

been routine for a POSITA designing 5G networks to look to 3GPP documents for implementation configurations. APPLE-1003, [199]. Here, a POSITA would have had a reasonable expectation of success in modifying Zhang, which incorporates aspects of the 3G-38.213 standard to include functionality described by 3GPP-38.213-CR, as both documents describe features of the same technical standard. APPLE-1003, [199].

## **V. DISCRETIONARY DENIAL IS NOT WARRANTED**

Petitioner believes that discretionary denial is unwarranted, and yet, Petitioner intends to utilize the bifurcated briefing process contemplated by the March 26, 2025, Stewart Memorandum to rebut contentions if offered by Patent Owner to the contrary. See, e.g. Learn about the new interim processes relating to institution in AIA proceedings (available at <https://www.uspto.gov/about-us/events/learn-about-new-interim-processes-relating-institution-aia-proceedings>, April 24, 2025); <https://uspto.cosocloud.com/p9xpz6s4jn75/> (Video).

## **VI. PAYMENT OF FEES – 37 C.F.R. § 42.103**

Petitioner authorizes the Patent and Trademark Office to charge Deposit Account No. 06-1050.

## **VII. CONCLUSION**

For the reasons outlined above, Petitioner respectfully requests institution of an IPR for those claims of the '944 patent for the grounds presented herein.

**VIII. MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1)**

**A. Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1)**

Petitioner, Apple Inc. is the real party-in-interest.

**B. Related Matters Under 37 C.F.R. § 42.8(b)(2)**

Petitioner is not aware of any disclaimers, reexamination certificates or petitions for inter partes review for the '944 Patent. The '944 patent is the subject of a number of civil actions including: *Apex Beam Technologies LLC v. Apple Inc*, 6-24-cv-00223 (WDTX), filed April 29, 2024; *Apex Beam Technologies LLC v. Samsung Electronics Co., Ltd. et al*, 2-24-cv-00203 (EDTX), filed March 20, 2024.

**C. Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)**

Petitioner provides the following designation of counsel.

| Lead Counsel                                                                                                                                                                                                                                       | Backup counsel                                                                                                                                                                                                                                                                      |
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**D. Service Information**

Please address all correspondence and service to the address listed above.

Petitioner consents to electronic service by email at [IPR50095-0237IP1@fr.com](mailto:IPR50095-0237IP1@fr.com).

Respectfully submitted,

Dated: April 29, 2025

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**CERTIFICATION UNDER 37 CFR § 42.24**

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter partes* Review totals 13,998 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated: April 29, 2025

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**CERTIFICATE OF SERVICE**

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on April 29, 2025, a complete and entire copy of this Petition for *Inter partes* Review, Power of Attorney, and all supporting exhibits were provided via Federal Express, to the record as follows:

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