

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Alireza Babaei
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**PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES PATENT
NO. 10,965,434 PURSUANT TO 35 U.S.C. §§ 311–319, 37 C.F.R. § 42**

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LIST OF EXHIBITS

APPLE-1001	U.S. Patent No. 10,965,434 to Babaei (“the ’434 patent”)
APPLE-1002	Excerpts from the Prosecution History of the ’434 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 (2019-09) (“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	3GPP R2-1913143 Titled “Confirmation MAC CE for multiple CG configurations” (“R2-1913143”)
APPLE-1012	3GPP 38.331 Draft Change Request v. 15.7.0 (“3GPP-38.331-CR”)
APPLE-1013	Email Circulated to 3GPP Working Group November 1, 2019 with APPLE-1012 attached

- APPLE-1014 Original complaint filed in *Apex Beam Technologies LLC v. Apple Inc.*, 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

Claim 1	
[1.P]	A method comprising:
[1.1]	receiving, by a wireless device: ¹
[1.1.1]	a first configuration parameter used in determination of a first sequence of one or more bits for downlink control information (DCI) validation;
[1.1.2]	a second configuration parameter used in determination of a second sequence of one or more bits for DCI validation; and
[1.1.3]	a third configuration parameter indicating a configuration index of an uplink configured grant configuration;
[1.2]	receiving a DCI comprising:
[1.2.1]	a hybrid automatic repeat request process number field comprising one or more first bits; and
[1.2.2]	a redundancy version field comprising one or more second bits;
[1.3]	validating the DCI:
[1.3.1]	based on comparing the one or more second bits with the second sequence and not based on the one or more first bits in response to the one or more first bits indicating the configuration index; and
[1.3.2]	based on comparing the one or more second bits with the second sequence and comparing the one or more first bits with the first sequence in response to the one or more first bits not indicating the configuration index; and

¹ In the text of the '434 patent, limitation [1.1] ends with a semi-colon. But, because element [1.1] references elements [1.1.1], [1.1.2] and [1.1.3], to avoid confusion, we have changed the semi-colon to a colon in this listing of claims.

[1.4]	activating or deactivating resources associated with the uplink configured grant configuration.
Claim 2	
[2]	The method of claim 1, further comprising receiving a fourth configuration parameter indicating one or more deactivation states, wherein a first value of the one or more first bits, indicates a first deactivation state corresponding to one or more uplink configured grant configurations comprising the uplink configured grant configuration.
Claim 3	
[3]	The method of claim 1, further comprising transmitting a confirmation control element comprising a field with a second value indicating that the DCI indicating activation or deactivation of the uplink configured grant configuration, in a plurality of uplink configured grant confirmations, is received.
Claim 4	
[4.1]	The method of claim 1, wherein: configured grant configuration parameters of the uplink configured grant configuration comprise a first radio network temporary identifier; and
[4.2]	the DCI is associated with the first radio network temporary identifier.
Claim 5	
[5.1]	The method of claim 4, wherein: the DCI further comprises a new data indicator field;
[5.2]	and validating the DCI is further based on the DCI being associated with the first radio network temporary identifier and based on a third value of the new data indicator field being zero.
Claim 6	
[6.1]	The method of claim 1, wherein: a first value, of the one or more first bits, indicates the configuration index of the uplink configured grant

	configuration in a plurality of uplink configured grant configurations; and
[6.2]	validating the DCI is based on the one or more second bits and not based on the one or more first bits.
Claim 7	
[7]	The method of claim 6, further comprising receiving bandwidth part configuration parameters of a bandwidth part of a cell, wherein the plurality of uplink configured grant configurations are for the bandwidth part.
Claim 8	
[8]	The method of claim 6, wherein the bandwidth part configuration parameters comprise uplink configured grant configuration parameters comprising the third configuration parameter indicating the configuration index.
Claim 9	
[9.1]	The method of claim 1, wherein: a first value, of the one or more first bits, indicates the configuration index; and
[9.2]	validating the DCI is based on comparing the one or more second bits with the second sequence.
Claim 10	
[10.1]	The method of claim 1, wherein: a first value, of the one or more first bits, does not indicate the configuration index; and
[10.2]	validating the DCI is based on comparing the one or more second bits with the second sequence and comparing the one or more first bits with the first sequence.
Claim 11	
[11.1]	The method of claim 1, wherein: the first sequence of one or more bits are all zeros; and

[11.2]	the second sequence of one or more bits are all zeros.
Claim 12	
[12.P]	A method comprising:
[12.1]	receiving, by a wireless device:
[12.1.1]	a first configuration parameter used in determination of a first sequence of one or more bits for downlink control information (DCI) validation;
[12.1.2]	a second configuration parameter used in determination of a second sequence of one or more bits for DCI validation; and
[12.1.3]	a third configuration parameter indicating a configuration index of a downlink semi-persistent scheduling (SPS) configuration;
[12.2]	receiving a DCI comprising:
[12.2.1]	a hybrid automatic repeat request process number field comprising one or more first bits; and
[12.2.2]	a redundancy version field comprising one or more second bits;
[12.3]	validating:
[12.3.1]	based on comparing the one or more second bits with the second sequence and not based on the one or more first bits in response to the one or more first bits indicating the configuration index; and
[12.3.2]	based on comparing the one or more second bits with the second sequence and comparing the one or more first bits with the first sequence in response to the one or more first bits not indicating the configuration index; and
[12.4]	activating or deactivating resources associated with the downlink SPS configuration.
Claim 13	
[13]	The method of claim 12, further comprising receiving a fourth configuration parameter indicating one or more deactivation states,

	wherein a first value, of the one or more first bits, indicates a first deactivation state corresponding to one or more downlink SPS configurations comprising the downlink SPS configuration.
Claim 14	
[14.1]	The method of claim 12, wherein: the DCI further comprises a new data indicator field; and
[14.2]	validating the DCI is further based on the DCI being associated with a first radio network temporary identifier and based on a second value of the new data indicator field being zero.
Claim 15	
[15.1]	The method of claim 12, wherein: a first value, of the one or more first bits, indicates the configuration index of the downlink SPS configuration in a plurality of downlink SPS configurations; and
[15.2]	validating the DCI is based on the one or more second bits and not based on the one or more first bits.
Claim 16	
[16]	The method of claim 15, further comprising receiving bandwidth part configuration parameters of a bandwidth part of a cell, wherein the plurality of downlink SPS configurations are for the bandwidth part.
Claim 17	
[17]	The method of claim 15, wherein the bandwidth part configuration parameters comprise downlink SPS configuration parameters comprising the third configuration parameter indicating the configuration index.
Claim 18	
[18.1]	The method of claim 12, wherein: a first value, of the one or more first bits, indicates the configuration index; and

[18.2]	validating the DCI is based on comparing the one or more second bits with the second sequence.
Claim 19	
[19.1]	The method of claim 12, wherein: a first value, of the one or more first bits, does not indicate the configuration index; and
[19.2]	validating the DCI is based on comparing the one or more second bits with the second sequence and comparing the one or more first bits with the first sequence.
Claim 20	
[20.1]	The method of claim 12, wherein: the first sequence of one or more bits are all zeros; and
[20.2]	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. 10,965,434 (“the ’434 patent”). Evidence presented in this petition demonstrates that Petitioner the Challenged Claims are unpatentable.

I. 37 C.F.R. § 42.104 Requirements

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

Apple certifies that the ’434 Patent is available for IPR. The present petition is being filed within one year of service of a complaint against Apple. APPLE-1016. Apple is not barred or estopped from requesting this review.

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

Apple requests institution of IPR and cancellation of the Challenged Claims based on the following grounds.

Ground	’434 Patent Claims	§ 103 Basis
1	1-2, 4-6, 9-15, and 18-20	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”)
2	3	Obvious (§103) based on

Ground	'434 Patent Claims	§ 103 Basis
		3GPP-38.213 in view of 3GPP-38.213-CR, 3GPP-38.212-CR, and 3GPP R2-1913143 ("R2-1913143")
3	7, 8, 16, and 17	Obvious (§103) based on 3GPP-38.213 in view of 3GPP-38.213-CR, 3GPP-38.212-CR, and 3GPP 38.331 Draft Change Request ("3GPP-38.331-CR")

Each applied reference pre-dates the earliest claimed priority date of the '434 Patent, which is November 5, 2019 (the "Critical Date" or "Earliest Effective Filing Date").

Reference	Prior Art Date	Section
3GPP-38.213	As early as September 28, 2019 and no later than September 30, 2019 (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 (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 (publicly available)	35 U.S.C. 102(a)(1)
R2-	No later than October	35 U.S.C. 102(a)(1)

Reference	Prior Art Date	Section
1913143	4, 2019 (publicly available)	
3GPP-38-311-CR	No later than November 1, 2019 (publicly available)	35 U.S.C. 102(a)(1)

C. Public Availability of the 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, [23]. 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, [104]. 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, [104]-[106].

Accordingly, Petitioner asserts that APPLE-1005 was publicly available as early as September 28, 2019 and no later than September 30, 2019. APPLE-1008, [23], [103]-[111].

2. 3GPP-38.213-CR (“APPLE-1006”)

APPLE-1006 is a document published and distributed by 3GPP as a draft change request to the following published standard: 3GPP-38.213 (APPLE-1005). APPLE-1006, 1; APPLE-1008, [20].

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. APPLE-1009, 1; APPLE-1008, [72]-[80]. For example, the email shown in APPLE-1009 shows that at least Aris Papasakellariou from Samsung, Sigen Ye from Nokia, and Yamping Xing from CATT received the email attaching APPLE-1006 from the 3GPP_TSG_RAN_WG1@LIST.ETSI.ORG email exploder. APPLE-1009, 1-4; APPLE-1008, [73]. Emails directed to 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, [43]-[63], [72]-[80].

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 email exploder, but also made APPLE-1006 available to the general public without restriction. APPLE-1008, [43]-[63] (“[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...”), [47]-[63], [72]-[80]. 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, [43]-[63], [72]-[80].

Further demonstrating that APPLE-1006 was attached to APPLE-1009 and transmitted to the 3GPP email exploder 3GPP_TSG_RAN_WG1@LIST.ETSI.ORG in the manner explained by Mr.

Rodermund are several pieces of corroborating evidence. First, and consistent with the restriction-free access described in the Rodermund declaration, APPLE-1009 was able to be identified in 3GPP's listserv archive, and the attachment to APPLE-1009 named "R1-19xxxxx_CR_38.213_IIoT-Core_v1.zip" was able to be downloaded from the following URL:

https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_RAN_WG1;f8c17069.1911A&S=. APPLE-1008, [74]. Indeed, Mr. Rodermund explains that he was able to unzip and download the file named R1-19xxxxx_CR_38.213_IIoT-Core_v1.zip and access a file named "R1-19xxxxx_CR_38.213_IIoT-Core_v1.docx." APPLE-1008, [75]. 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 accessed by Mr. Rodermund on the 3GPP listserv establishes that APPLE-1006 was created November 2, 2019, thus further corroborating that this document was sent with an email and made publicly available just one day later, on November 3, 2019. APPLE-1008, [76]-[79].

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, [70]-[72]. Mr. Rodermund further explains that, in his experience, text of the type found on the front page of APPLE-1006 was used to indicate 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, [69]-[72].

Accordingly, Petitioner asserts that APPLE-1006 was publicly available as early as October 14, 2019, and no later than November 3, 2019. APPLE-1008, [43]-[63], [72]-[80].

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], [43]-[61], [81]-[92].

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=), 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 was also sent to the 3GPP_TSG_RAN_WG1@LIST.ETSI.ORG email exploder, albeit by a different person. APPLE-1008, [43]-[63], [81]-[93]. Because email shown in APPLE-1010 was sent to the same 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, [85]. Thus, and accounting for the remainder of reasons presented in establishing public accessibility of APPLE-1006, Petitioner asserts that APPLE-1007 was publicly available as early as October 14, 2019 and no later than November 1, 2019. APPLE-1008, [43]-[61], [81]-[92].

4. R2-1913143 (“APPLE-1011”)

APPLE-1011 is a 3GPP document with the title “Confirmation MAC CE for multiple CG configuration” published by 3GPP as of at least “October 4, 2019”. APPLE-1008, [112], [114]-[120]. Specifically, using an archived version of APPLE-1011 that was accessible via the Internet Archive, Mr. Rodermund has established that APPLE-1005 was published and freely available on 3GPP’s ftp server by October 4, 2019. APPLE-1008, [114]-[117].

More, the front page of APPLE-1011 includes text that recites “3GPP TSG-RAN WG2 Meeting #107bis” and “Chongqing, China, 14th October – 18th October

2019.” APPLE-1011, 1; APPLE-1008, [113]. As explained by Mr. Rodermund, “3GPP TSG-RAN WG2 Meeting #107bis” identifies a 3GPP working group meeting that took place in “Chongqing, China” during the time period of “14th October – 18th October 2019,” which had 382 registered participants and was attended by 307 participants. APPLE-1011, 1; APPLE-1008, [113], [118]-[119]. Mr. Rodermund further explains that, in his experience, text of the type found on the front page of APPLE-1011 was used to indicate that the contents of APPLE-1011 “was available either prior to or during or shortly after” the October 14-20, 2019 RAN WG2 meeting #107bis “to 3GPP members, and to the general public” “prior to or during or shortly after” October 14-20, 2019. APPLE-1008, [113].

Accordingly, Petitioner asserts that APPLE-1005 was publicly available no later than October 4, 2019, and further disclosed “prior to or during or shortly after” October 14-20, 2019.

5. 3GPP-38.331-CR (“APPLE-1012”)

APPLE-1012 was publicly available under the same reasoning set forth above with respect to APPLE-1006. APPLE-1012, 1; APPLE-1008, [22], [43]-[63], [93]-[102].

The only substantial differences between the publicly availability of APPLE-1012 and APPLE-1006 is that APPLE-1012 was attached to an email shown in APPLE-1013 that was accessible by a different URL (i.e.,

[https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_RAN_WG2;5b1a1fd1.1911A&](https://list.etsi.org/scripts/wa.exe?A2=3GPP_TSG_RAN_WG2;5b1a1fd1.1911A&S=)

[S=](#)), the email shown in APPLE-1013 was dated November 1, 2019, and the attachment APPLE-1012 to the email shown in APPLE-1013 was named differently and was sent by a different person to a different 3GPP email exploder (i.e., 3GPP_TSG_RAN_WG2 email exploder). APPLE-1008, [43]-[63], [96]-[102]. However, despite being sent to a different email exploder, the email shown in APPLE-1013 would have been received by representatives of multiple, different interested parties including, e.g., representatives of Samsung, Huawei, Nokia, and others since “all companies active in 3GPP WGs are subscribed to the respective 3GPP email exploders.” APPLE-1008, [97]. For these reasons, Petitioner asserts that APPLE-1007 was publicly available no later than November 1, 2019. APPLE-1008, [43]-[63], [96]-[102].

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). This determination that no claim terms need to be construed to resolve this controversy is based on the Petition’s demonstration of obviousness of limitations found in (i) elements [1.3.1] and [1.3.2] and (ii)

elements [12.3.1] and [12.3.2], whether or not these respective sets of claim limitations are deemed to advance a mutually exclusive condition subject to interpretation under *Ex Parte Schulhauser*, No. 2013-007847, 2016 WL 6277792 (P.T.A.B. Apr. 28, 2016). *See*, e.g., [1.3.1] and [1.3.2] and also [12.3.1] and [12.3.2]. APPLE-1003, [101]-[105], [106]-[111], [141], [142].

II. TECHNOLOGY OVERVIEW AND’434 PATENT SUMMARY

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, [46]. 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.*

The resource allocation process begins with a base station configuring configured grant / SPS parameters via higher-level RRC signaling. APPLE-1003, [47]. RRC signaling is a network layer protocol used between the UE and base station to communicate via the air interface of a 5G network. *Id.* The UE receives RRC signaling and stores data corresponding to the configured parameters. *Id.* Once the base station has configured the UE, the base station generates DL control

information (DCI) and then transmits the DCI using the physical DL control channel (PDCCH). *Id.* The UE monitors the PDCCH for DCI, by, for example, monitoring for scheduling information used to indicate UL configured grant configurations or DL SPS configurations that are to be activated or deactivated. APPLE-1003, [47]. The fields of information contained within a DCI generated and transmitted to a UE can be in one of multiple different formats, with each format being defined by a corresponding section in a 3GPP standard. APPLE-1003, [47].

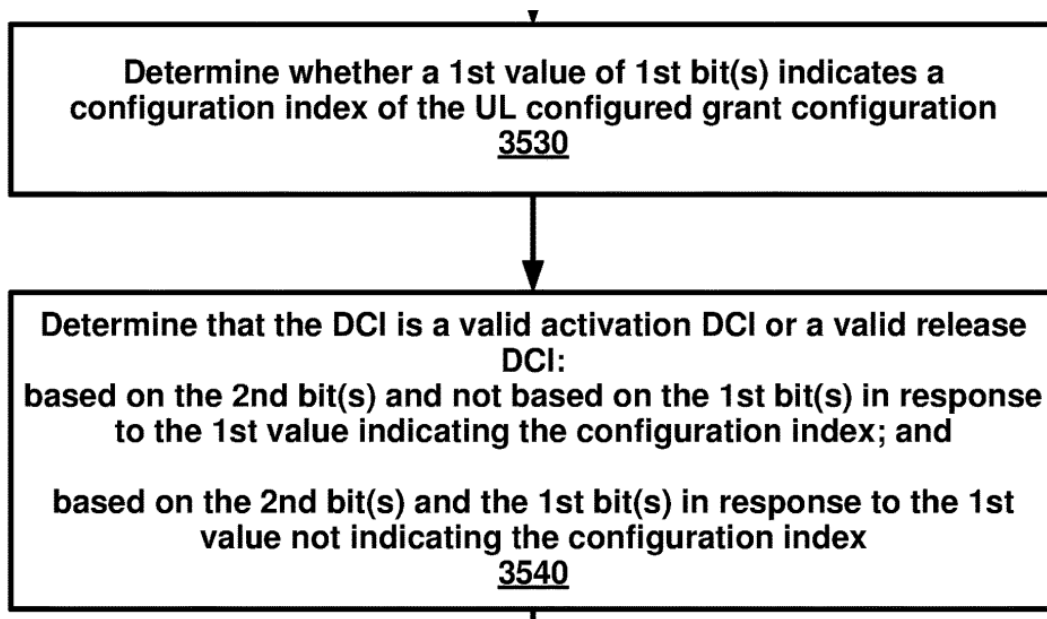
Upon detection of DCI received via the PDCCH, the UE performs validation of the received DCI. APPLE-1003, [48]. Validation of the received DCI is performed by the UE evaluating whether certain fields of the DCI include particular information specified by the 3GPP standard as necessary for a DCI to be validated. *Id.* If the DCI is validated, the UL configured grant configurations or DL SPS configurations indicated by the DCI for activation or deactivation may then be activated or deactivated. *Id.*

B. Brief Description of the '434 Patent

The '434 patent describes a method for determination as to whether a DCI is a valid activation DCI or a valid release DCI “based on the second bit(s) and not based on the first bit(s) *in response to* the first value *indicating* the configuration index; *and* based on the second bit(s) and the first bit(s) *in response to* the first

value ***not indicating*** the configuration index.” APPLE-1001, abstract. (emphasis added); APPLE-1003, [49]. Then, “a plurality of resources, associated with the uplink configured grant configuration, are activated or deactivated.” APPLE-1001, abstract. (emphasis added); APPLE-1003, [49].

Elements 3530 and 3540 of FIG. 35 of the '434 patent (reproduced below) help to demonstrate aspects of the '434 method:



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

In some instances, if the HARQ Process Number of the DCI does not include data that indicates a configuration index of an UL grant or SPS configuration, then a UE will determine that the “DCI is a valid activation DCI or a valid release” DCI based on the 2nd bit(s) (i.e., bit(s) of a redundancy version field) and the 1st bit(s) (i.e., bit(s) of a HARQ Process Number field). APPLE-1001,

FIG. 35, 3540; APPLE-1003, [51]. However, in other instances, where the HARQ Process Number field of the DCI “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 2nd bit(s) (i.e., bit(s) of the redundancy version field) **and not** the 1st bit(s) (i.e., bit(s) of a HARQ Process Number field). APPLE-1001, FIG. 35, 3540; APPLE-1003, [51].

C. The Effective Priority Date of the Claims of the ’434 Patent

Apple assumes for purposes of this petition that the claims are entitled to the earliest claim priority date - November 5, 2019

III. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art at the time of the ’434 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]-[42]. Additional years of experience could substitute for an advanced-level degree (and vice versa). *Id.*

IV. DETAILED EXPLANATION OF GROUNDS

A. GROUND 1 - Claims 1-2, 4-6, 9-15 and 18-20 are obvious over 3GPP-38.213 in view of 3GPP-38.213-CR and 3GPP-38.212-CR (“the 3GPP-Combination”)

1. Overview of 3GPP-38.213

3GPP-38.213 is a standards document generated by the 3rd Generation Partnership Project related to 5G-NR communications networks. APPLE-1005, 1; APPLE-1003, [52]; 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, [52].

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, [53]. 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, [53]. 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: 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, [54]. 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 10.2-2.3.

2. Overview of 3GPP-38.213-CR

3GPP-38.213-CR is a draft change request to 3GPP-38.213. APPLE-1006, 1; APPLE-1003, [55]; 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, [55].

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, [56]. 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 APPLE-1006, 4; APPLE-1003, [56]. 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

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

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, [57]. 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, [58]. 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. Overview of 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, [59]; 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, [59].

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, [60]. 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, [60]. 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, [61]. 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, [61].

This indicates that “redundancy version” field is configurable using the RRC parameter *NumberofbitsforRV-ForDCIFormat1_2*. APPLE-1007, 9-10; APPLE-1003, [61]. 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 ’434 patent, as:

3GPP-38.213, 3GPP-38.213-CR and the ’434 patent each relate to receipt and validation of downlink control information (“DCI”) via the PDCCH. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1001, 49:51-50:15; APPLE-1003, [62]-[63]; and

3GPP-38.212-CR and the ’434 patent both relate to the format of DCI in 5G NR wireless communication networks. APPLE-1007, 2-12; APPLE-1001, 31:42-32:12, 32:62-67; APPLE-1003, [62], [64].

5. 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, [65]. 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, [65].

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, [66]. 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, [66]. 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, [66]. 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, [66]; 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, [67]. 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, [67]. 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, [67]. 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, [67]. It would have been common for a POSITA designing 5G communication networks to look to 3GPP documents for implementation configurations. APPLE-1003, [67]. 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, [67].

6. Analysis

a) Claim 1

Limitation [1.P]:

The 3GPP-Combination renders obvious element [1.P]. APPLE-1005, 1, 73-83; APPLE-1006, 4-5; APPLE-1003, [81]. For example, the 3GPP-28.313 discloses “physical layer procedures for control” signaling operations of a UE (user device) in a 5G-NR communications network. *Id.* In 5G-NR communications networks, this *method* includes procedures physical downlink control channel (PDCCH) signaling. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [81].

Limitation [1.1]:²

The 3GPP-Combination renders obvious element [1.1]. APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8, 9-11; APPLE-1003, [82]. For example, in the 3GPP-Combination, 3GPP-38.213-CR specifies the procedure for “PDCCH validation for DL SPS and UL grant Type 2”. *Id.* In particular, 3GPP-38.213-CR specifies that a procedure for “[v]alidat[ing] ... [a] DCI format” that has been received using one of Table 10.2-1, Table 10.2-2, Table 10.2-3, or Table 10.2-4, with the specific table used based on whether the UE was provided with a single or multiple configurations for UL grant Type 2 PUSCH or SPS PDSCH. APPLE-1006, 4-5; APPLE-1003, [82].

The 3GPP-Combination renders obvious a wireless device that receives multiple parameters used for validating the received DCI. APPLE-1006, 4-5, APPLE-1007, [7-8], [9-11]; APPLE-1003, [0083]. These parameters include *a first configuration parameter* (described with references to element 1.1.1 below), *a second configuration* (described with reference to element 1.1.2 below), and a *third configuration parameter* (described with reference to element 1.1.3 below). APPLE-1006, 4-5, APPLE-1007, [7-8], [9-11]; APPLE-1003, [0083].

² See FN1.

Limitation [1.1.1]:

The 3GPP-Combination renders obvious [1.1.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1007, 7-8, 9-11; APPLE-1003, [84]. In the 3GPP-combination, 3GPP-38.213-CR discloses that a UE can receive a DCI format such as, e.g., DCI format 0_2 and describes a set of procedures that can be performed to validate the received DCI format. APPLE-1006, 4-5; APPLE-1003, [84]. Also in the 3GPP-combination, 3GPP-38.212-CR discloses the contents of the received DCI format including, e.g., DCI format 0_2. APPLE-1007, 7-8; APPLE-1003, [84]. For example, 3GPP-38.212-CR of the 3GPP-Combination specifies that the 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; APPLE-1003, [84]. This higher level parameter *HARQProcessNumberSize-ForDCIFormat0_2* is the ***first configuration parameter*** that is ***used in determination of a first sequence of one or more bits for downlink control information (DCI) validation.***³ APPLE-1007, 8; APPLE-1003, [84].

³ This mapping is consistent with Patent Owner’s second amended complaint in the corresponding litigation that a *harq-ProcessNumberSizeDCI-0-2* that is used to

The primary function of the higher layer parameter

*HARQProcessNumberSize-ForDCIFormat0_2*⁴ is to **configure** the number of bits in the HARQ Process Number. APPLE-1007, 8; APPLE-1003, [85]. However, as disclosed by 3GPP-38.213-CR of the 3GPP-Combination, when a UE is provided with “a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH,” validation of the DCI format 0_2 requires comparing the HARQ Process Number to a ***first sequence of one or more bits*** to determine whether the HARQ Process

“configure the number of bits for the field “HARQ process number” in DCI format 0_2 of TS 38.212, clause 7.3.1 is a ***first configuration parameter*** that is ***used in determination of a first sequence of one or more bits for downlink control information (DCI) validation***. Second Amended Complaint [Dkt. 32] ¶ 259.

⁴ A configuration parameter associated with a HARQ Process Number for DCI Format 0_2 is cited here. See §IV(A)(2) explaining that APPLE-1006 expands Tables 10.2-1 and 10.2-2 to support validation of DCI Format 0_2, which are cited in limitation [1.3] and [1.3.2] to address a UE being provided with a single configuration. In addition, see §IV(A)(2) explaining that APPLE-1006 adds Table 10.2-4 to support validation of DCI Format 1_2, which is cited in elements [1.3] and [1.3.1] for when a UE is provided with multiple configurations.

Number is “set to all ‘0’s.” APPLE-1006, 4-5, Table 10.2-1, Table 10.2-2; APPLE-1003, [85].

A POSITA would have understood and found it obvious to *use* the higher layer parameter *HARQProcessNumberSize-ForDCIFormat0_2*⁵ in the 3GPP-Combination to *determine the first sequence of one or more bits that are compared to the configurable HARQ Process Number*. APPLE-1007, 8; APPLE-1003, [86]. 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 first sequence of one or more bits to determine if “*all*” bits of the HARQ process number are set to “0” as specified by Tables of 3GPP-38.212-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 one bit, then the same or similar higher layer parameter could also be *used to determine 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*

⁵ See FN4.

one bit can validate that the HARQ Process Number is set to “all ‘0’s.” APPLE-1007, 8; APPLE-1003, [86].

Limitation [1.1.2]:

The 3GPP-Combination renders obvious [1.1.2]. APPLE-1006, 4-5; APPLE-1007, 7-8; APPLE-1003, [87]. In the 3GPP-combination, 3GPP-38.213-CR discloses that a UE can receive a DCI format such as, e.g., DCI format 0_2 and describes a set of procedures that can be performed to validate the received DCI format. APPLE-1006, 4-5; APPLE-1003, [87]. Also in the 3GPP-combination, 3GPP-38.212-CR discloses the contents of the received DCI format including, e.g., DCI format 0_2. APPLE-1007, 7-8; APPLE-1003, [87]. For example, 3GPP-38.212-CR of the 3GPP-Combination specifies that the DCI Format 0_2 includes a ***Redundancy Version*** field that is comprised of *x bits*.” APPLE-1007, 8 (emphasis added); APPLE-1003, [87]. 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, [87]. 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, [87]. For DCI Format 1_2, GPP-212-CR ***configures*** the number of bits of the Redundancy Version field using a higher layer parameter *NumberofbitsforRV-DCIFormat1_2* that is

transmitted to a UE. *Id.* This higher level parameter *NumberOfbitsforRV-DCIFormat1_2* is the ***second configuration parameter*** that is used in determination of a second sequence of one or more bits for DCI validation.⁶ *Id.*

A POSITA would have understood and found it obvious to ***use*** such a higher level parameter *NumberOfbitsforRV-DCIFormat1_2* from this example of as ***second configuration parameter*** to configure the “x bits” of the “Redundancy Version” field of DCI Format 0_2. APPLE-1007, 9; APPLE-1003, [88]. A POSITA would have had a ***reasonable expectation of success*** in using the higher level parameter *NumberOfbitsforRV-DCIFormat1_2* as a ***second configuration parameter*** to ***determine*** the “x bits” of the “Redundancy Version” field of DCI Format 0_2, as such a modification would include basic programming and network configuration skills and not require any significant levels of engineering. APPLE-1007, 9; APPLE-1003, [88].

⁶ Patent Owner has indicated in its second amended complaint in the corresponding litigation that a *numberOfBitsRV-DCI-0-2 parameter* that is used to “configure[] the number of bits for the “Redundancy version” in DCI format 0_2 of TS 38.212, clause 7.3.1 is a ***second configuration parameter*** that is ***used in determination of a second sequence of one or more bits for downlink control information (DCI) validation***. Second Amended Complaint [Dkt. 32] ¶ 260.

The primary function of the higher layer parameter such as *NumberofbitsforRV-DCIFormat1_2* is to configure the number of bits in the Redundancy Version field. APPLE-1007, 8 (“Redundancy version - x bits”), 9 (“Redundancy Version – 0, 1, 2 bits determined by higher layer parameter *NumberofbitsforRV-DCIFormat1_2*”); APPLE-1003, [89]. However, as disclosed by 3GPP-38.213-CR of the 3GPP-Combination, when a UE is provided with “a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH,” validation of the DCI format 0_2 requires comparing the Redundancy Version to a ***second sequence of one or more bits*** to determine whether the Redundancy Version is “set to all ‘0’s.” APPLE-1006, 4-5, Table 10.2-1, Table 10.2-2⁷; APPLE-1003, [89].

A POSITA would have understood and found it obvious to ***use*** a higher layer parameter such as *NumberofbitsforRV-DCIFormat1_2* in the 3GPP-Combination to ***determine the second sequence of one or more bits that are compared to the configurable Redundancy Version.*** APPLE-1007, 8 (“Redundancy version - x bits”), 9 (“Redundancy Version – 0, 1, 2 bits determined by higher layer parameter *NumberofbitsforRV-DCIFormat1_2*”); APPLE-1003, [90]. This is because a higher layer parameter such *NumberofbitsforRV-DCIFormat1_2* specifies a number of bits – e.g., 0, 1, or 2 – bits of the

⁷ See FN4.

Redundancy Version, 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 Redundancy Version field to the second sequence of one or more bits to determine if the bits of the Redundancy Version field is set to “all ‘0’s”.

APPLE-1003, [90]. For example, a POSITA would have found it obvious that, in the 3GPP-Combination, if a higher layer parameter such as a *NumberofbitsforRV-DCIFormat1_2* configures the Redundancy Version to one bit, then the same or similar higher layer parameter could also be *used to determine* the *second sequence of one or more bits* to one bit so that a comparison of the one bit of the Redundancy Version and the *second sequence of one bit* can validate that the Redundancy Version is set to “all ‘0’s.” *Id.*

Limitation [1.1.3]:

The 3GPP-Combination renders obvious element [1.1.3]. APPLE-1006, 4; APPLE-1003, [91]. For example, in the 3GPP-Combination, 3GPP-38.213-CR discloses that the “[i]f a UE is provided more than one configurations *[sic]*..., 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; APPLE-1003, [91]. Here, the higher layer parameter “*Configuredgrantconfig-index*” is the *third configuration parameter*.” *Id.*

The higher layer parameter *Configuredgrantconfig-index* ***indicat[es] a configuration index of a configured grant configuration.*** APPLE-1006, 4; APPLE-1003, [92]. For example, in the 3GPP-Combination, 3GPP-38.213-CR specifies that the higher layer parameter *Configuredgrantconfig-index* is used to set the value of HARQ Process Number to “indicat[e] an activation for a corresponding UL grant Type 2 PUSCH” if “a UE is provided more than one configurations *[sic]* for UL grant Type 2 PUSCH...” *Id.*

Limitation [1.2]:

The 3GPP-Combination renders obvious element [1.2]. APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8, 9-11; APPLE-1003, [93]. 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. APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8, 9-11; APPLE-1003, [93]. 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. *Id.*

Limitation [1.2.1]:

The 3GPP-Combination renders obvious element [1.2.1]. APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8 (“HARQ process number”), 9-11 (“HARQ process number”); APPLE-1003, [94].

In the 3GPP-Combination, 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_2.⁸ APPLE-1006, 4; APPLE-1003, [95]. 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, [95]. 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, [95]. 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)

⁸ See FN4.

comprising one or more first bits (i.e., 0, 1, 2, 3, or 4 bits). APPLE-1007, 7-8, 9-11; APPLE-1003, [95].

Limitation [1.2.2]:

The 3GPP-Combination renders obvious element [1.2.2]. APPLE-1005, 83; APPLE-1006, 4; APPLE-1007, 7-8 (“Redundancy Version”), 9-11 (“Redundancy Version”); APPLE-1003, [96].

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, [97]. 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, [97]. 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, [97]. 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, [97]. 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, [97].

Limitation [1.3]:

The 3GPP-Combination renders obvious element [1.3]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [98]. For example, in the 3GPP-Combination 3GPP-38.213-CR discloses “PDCCH validation for DL SPS and UL grant Type 2” 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, [98]. In such a 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.”⁹ APPLE-1006, 4-5; APPLE-1003, [98]. Thus, 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.*

⁹ See FN4.

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	set to all '0'sset to '00'	set to all '0'sset to '00'	For the enabled transport block: set to all '0'sset to '00'

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	set to all '0'sset to '00'	set to all '0'sset 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-1006, 5, Table 10.2-1 (annotated), Table 10.2-2 (annotated).

In addition, 3GPP-38.213-CR also discloses an alternative scenario for “PDCCH validation for DL SPS and UL grant Type 2” 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, [99]. 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 such a 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, [99]. 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, as shown in Table 10.2-3. (reproduced below). *Id.*

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: set to all '0's

APPLE-1006, 5, Table 10.2-3.

In addition, 3GPP-38.213-CR also discloses yet another alternative scenario for “PDCCH validation for DL SPS and UL grant Type 2” 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, [100]. 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, [100]. Thus, 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 [1.3.1]:

The 3GPP-Combination renders obvious at least [1.3.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [101]; *cf* APPLE-1004, APPLE-1004, FIG. 6, 610, 620, 29:66-30:10 (UE configured to perform comparing operations).

For example, in the 3GPP-Combination, 3GPP-38.213-CR discloses where ***validation is based on one or more second bits with a second sequence*** (i.e., determining whether all bits of the Redundancy Version are set to 0) ***and not one or more first bits*** (i.e., one or more bits of a HARQ Process Number) ***in response to the one or more first bits indicating a configuration index*** (i.e., HARQ Process Number indicating that more than one configuration for UL grant Type 2 PUSCH or for SPS PDSCH). APPLE-1006, 4-5, Table 10.2-3, Table 10.2-4; APPLE-1003, [102]; *cf* APPLE-1004, APPLE-1004, FIG. 6, 610, 620, 29:66-30:10 (UE configured to perform comparing operations); *see also* [1.3]. In general, the HARQ Process Number is associated with the simultaneous/concurrent transmissions of data. APPLE-1003, [102]; *cf*

https://www.sharetechnote.com/html/5G/5G_HARQ.html. Thus, the UE in the instances where a UE is provided with a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH as described by 3GPP-38.213-CR, the HARQ Process Number ***does not indicate a configuration index*** and instead is associated with and/or provides an indication of simultaneous/concurrent transmissions of data.

APPLE-1006, 4-5; APPLE-1003, [102]; *cf*

https://www.sharetechnote.com/html/5G/5G_HARQ.html. However, when the UE is provided with more than one configuration for UL grant Type 2 PUSCH or for SPS PDSCH as disclosed by 3GPP-38.213-CR and this is indicated to the UE using *Configuredgrantconfig-index* or by *SPSconfig—index*, then a value of the HARQ Process Number field indicates an activation for a corresponding UL grant Type 2 PUSCH configuration or for SPS PDSCH using the same value as provided by *Configuredgrantconfig-index* or by *SPSconfig-index*. *Id.* Thus, such instances, the HARQ Process Number field includes ***one or more first bits indicating a configuration index***. *Id.*

Although 3GPP-38.213-CR does not explicitly disclose the word “comparing” with reference to the validation operations using Tables 10.2-3 and 10.2-4, a POSITA would have understood that the validation process using Table 10.2-3 (i.e., set to all “0”s for activation validation) or Table 10.2-4 (set to all “0”s for release validation) requires a ***comparing*** operation based on the bits of the

Redundancy Version field. APPLE-1006, 4-5, Table 10.2-3, Table 10.2-4; APPLE-1003, [103]; *cf* APPLE-1004, APPLE-1004, FIG. 6, 610, 620, 29:66-30:10 (UE configured to perform comparing operations); *see also* [1.3]. Indeed, it was well known and understood by a POSITA at the time of the '434 patent that UE's have had "processing circuitry ... [that] may be configured to perform ... determining, calculating, or similar operations" such as, for example, "***comparing*** ... obtained information ... to information stored by the" UE to "mak[e] a determination." APPLE-1003, [103]; *cf*. FIG. 6, 610, 620, 29:66-30:10.

3GPP-38.213-CR also discloses the condition that triggers comparison as recited in [1.3.1]. For example, 3GPP-38.213-CR discloses at least one scenario for "PDCCH validation for DL SPS and UL grant Type 2" 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, [104]. 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*...." *Id.* In such a scenario, because the HARQ process number indicates an activation (or release) of one of multiple UL grant Type 2 PUSCH configurations or an activation (or release) of one of multiple SPS PDSCH configurations, the ***one***

or more second bits of the Redundancy Version field – and not the *one or first bits of the* HARQ Process Number - used for validation by determining whether the *one or more second bits* of the Redundancy Version field are set to all “0”s as specified by Table 10.2-3 (reproduced below). APPLE-1006, 4-5, Table 10.2-3; APPLE-1003, [104]; *see also* APPLE-1006, 4-5, Table 10.2-4 regarding validation of DCI configuration release when a UE is provided with multiple configurations.

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: set to all '0's

APPLE-1006, 5, Table 10.2-3.

Furthermore, in the 3GPP-Combination, 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 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 the 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* 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-1006, 4-

5, Table 10.2-3; APPLE-1003, [105]; *cf* APPLE-1004, APPLE-1004, FIG. 6, 610, 620, 29:66-30:10 (UE configured to perform comparing operations); *see also* [1.3]. This is because a higher layer parameter such *NumberofbitsforRV-DCIFormat1_2* specifies a number of bits – e.g., 0, 1, or 2 – bits of the Redundancy Version, 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 Redundancy Version field to the second sequence of one or more bits to determine if the bits of the Redundancy Version field is set to “all ‘0’s”. *Id.*

Limitation [1.3.2]:

Here, the 3GPP-Combination renders obvious at least [1.3.2]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [106]; *cf* APPLE-1004, APPLE-1004, FIG. 6, 610, 620, 29:66-30:10 (UE configured to perform comparing operations).

For example, in the 3GPP-Combination, 3GPP-38.213-CR discloses where ***validation is based on comparing one or more second bits with a second sequence*** (i.e., determining whether all bits of the Redundancy Version are set to 0) ***and comparing one or more bits with the first sequence*** (i.e., determining whether one or more bits of a HARQ Process Number are set to 0) ***in response to the one or more first bits not indicating a configuration index*** (i.e., HARQ Process Number not indicating that more than one configuration for UL grant Type 2 PUSCH or for SPS PDSCH). APPLE-1006, 4-5; APPLE-1003, [107]. In

general, the HARQ Process Number is associated with the simultaneous/concurrent transmissions of data. APPLE-1003, [107]; *cf* https://www.sharetechnote.com/html/5G/5G_HARQ.html. Thus, the UE in the instances where a UE is provided with a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH, the HARQ Process Number ***does not indicate a configuration index*** and instead is associated with and/or provides an indication of simultaneous/concurrent transmissions of data. *Id.*

Although 3GPP-38.213-CR does not explicitly disclose the word “comparing” with reference to the validation operations using Tables 10.2-3 and 10.2-4, a POSITA would have understood that the validation process using Table 10.2-3 (i.e., set to all “0”s for activation validation) or Table 10.2-4 (set to all “0”s for release validation) requires a ***comparing*** operation based on the bits of the Redundancy Version field. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [108]; *cf* APPLE-1004, APPLE-1004, FIG. 6, 610, 620, 29:66-30:10 (UE configured to perform comparing operations). Indeed, it was well known and understood by a POSITA at the time of the ’434 patent that UE’s have had “processing circuitry ... [that] may be configured to perform ... determining, calculating, or similar operations” such as, for example, “***comparing*** ... obtained information ... to information stored by the” UE to “mak[e] a determination.” APPLE-1003, [108]; *cf* FIG. 6, 610, 620, 29:66-30:10.

3GPP-38.213-CR also discloses the condition that triggers this alternative comparison as recited in [1.3.2]. For example, 3GPP-38.213-CR discloses an alternative scenario for “PDCCH validation for DL SPS and UL grant Type 2” scheduling of activation or release of resources where a “UE is provided a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH.” APPLE-1006, 4; APPLE-1003, [109]. In this alternative scenario), 3GPP-38.213-CR specifies that *one or more bits* of the HARQ process number and the *one or more bits* of the Redundancy Version field are used for validation because the HARQ process number field is not used as – i.e., is *not indicating – a configuration index*. APPLE-1006, 4-5, Table 10.2-1 (reproduced below), Table 10.2-2 (reproduced below); APPLE-1003, [109].

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	set to all '0'sset to '00'	set to all '0'sset to '00'	For the enabled transport block: set to all '0'sset to '00'

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	set to all '0'sset to '00'	set to all '0'sset 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-1006, 5, Table 10.2-1, Table 10.2-2.

Furthermore, in the 3GPP-Combination, 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 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 the 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* 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-1006, 4-5, Table 10.2-3; APPLE-1003, [110]; *cf* APPLE-1004, APPLE-1004, FIG. 6, 610, 620, 29:66-30:10 (UE configured to perform comparing operations); *see also* [1.3]. This is because a higher layer parameter such *NumberofbitsforRV-DCIFormat1_2* specifies a number of bits – e.g., 0, 1, or 2 – bits of the Redundancy Version, 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 Redundancy Version field to the second sequence of one or more bits to determine if the bits of the Redundancy Version field is set to “all ‘0’s”. *Id.*

Likewise, in the 3GPP-Combination, 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 first bits* (i.e., one or more bits of a HARQ Process Number field) *with the first sequence of one or more bits* (e.g., a string or mask of all zeros corresponding to the bit length of the configured HARQ Process Number field) *determined using a first configuration parameter* 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-1006, 4-5, Table 10.2-3; APPLE-1003, [111]; *cf* APPLE-1004, APPLE-1004, FIG. 6, 610, 620, 29:66-30:10 (UE configured to perform comparing operations); *see also* [1.3]. 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 first sequence of one or more bits to determine if “*all*” bits of the HARQ process number are set to “0” as specified by Tables of 3GPP-38.212-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 one bit, then the same or similar higher layer parameter could also be

used to determine 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.” *Id.*

Limitation [1.4]:

The 3GPP-Combination renders obvious element [1.4]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [112]. For example, 3GPP-38.213-CR 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, [112].

3GPP-38.213-CR 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, [113].

b) Claim 2

Limitation [2]:

The 3GPP-Combination renders obvious element [2]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [114]. For example, in the 3GPP-Combination, 3GPP-38.213-CR discloses *fourth configuration parameter Type2Configuredgrantconfig-ReleaseStateList* that *indicates one or more deactivation states* (i.e., an entry for scheduling release of one or more UL grant Type 2 PUSCH). APPLE-1006, 4; APPLE-1003, [114]. This *fourth configuration parameters* configures the *one or more first bits* (i.e., HARQ Process Number) to indicate the *first deactivation state corresponding to one or more uplink configured grants comprising the uplink configured grant configuration* (i.e., entry for scheduling release of one or more UL grant Type 2 PUSCH). *Id.*

c) Claim 4

Limitation [4.1]:

The 3GPP-Combination renders obvious element [4.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [115]. For example, in the 3GPP-Combination, 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, in the 3GPP-Combination, 3GPP-38.213-CR disclose that when a single configuration for UL grant Type 2 PUSCH or SPS PDSCH is provided to a UE, a DCI Format (e.g., DCI Format 0_2) is *associated* (i.e., scrambled) with a CS-RNTI. *Id.* The CS-RNTI is the *configured scheduling radio network temporary identifier*.” *Id.* This *temporary identifier* (i.e., CS-RNTI) is a *configured grant configuration parameter* of the *uplink configured grant* because, in configured grant Type 2 procedures, the CS-RNTI is used for activation, deactivation, and retransmission of configured grant resources using DCI. APPLE-1003, [115].

Limitation [4.2]:

The 3GPP-Combination renders obvious element [4.2]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [116]. For example, in the 3GPP-Combination, 3GPP-38.213-CR disclose that when a single configuration for UL grant Type 2 PUSCH or SPS PDSCH is provided to a UE, a DCI Format (e.g., DCI Format 0_2) is *associated* (i.e., scrambled) with a CS-RNTI. *Id.*

d) Claim 5

Limitation [5.1]:

The 3GPP-Combination renders obvious [5.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [117]. For example, 3GPP-38.213-CR discloses a “new data indicator field in the DCI format...” *Id.*

Limitation [5.2]:

The 3GPP-Combination renders obvious [5.2]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [118]. For example, in the 3GPP-Combination, 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 ***radio network temporary identifier*** and the new data indicator field of 3GPP-38.213-CR is the claimed ***new data indicator field***. *Id.*

Validation of the DCI is based on the DCI being ***associated with the first radio network temporary identifier and the third valid of the new data indicator field being zero***. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [119]. This is because in order for a DCI to be validated using the specifications of Table 10.2-1 or 10.2-2, the DCI must be scrambled using the C-RNTI (i.e., radio network

temporary identifier) and have a new data indicator field (i.e., new data indicator field) that is set to “0.” *Id.*

e) **Claim 6**

Limitation [6.1]:

The 3GPP-Combination renders obvious [6.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [120]. As further explained with respect to element [1.3.1], 3GPP-38.213-CR contemplates a scenario for “PDCCH validation for DL SPS and UL grant Type 2” 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 (emphasis added); APPLE-1003, [120]. In this scenario, 3GPP-38.213-CR specifies that ***first value of the one or more bits*** “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 ...*” *Id.*

Limitation [6.2]:

The 3GPP-Combination renders obvious [6.2]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [121]. In the scenario of element [6.1], (i.e., ***if the one or bits of the HARQ Process Number indicates a configuration index of the uplink grant configuration*** (i.e., same value as provided by *Configuredgrantconfig-index*))

in a plurality of uplink grant configurations (i.e., more than one configuration), Table 10.2-3 (reproduced below) is used to **validate the DCI**. APPLE-1006, 4-5, Table 10.2-3; APPLE-1003, [121]. in Table 10.2-3. (reproduced below). *Id.*

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: set to all '0's

APPLE-1006, 5, Table 10.2-3.

As shown in Table 10.2-3 above (and also explained in [1.3.1]), **one or more second bits** of the Redundancy Version field is/are relied upon for validation. APPLE-1006, 4-5; Table 10.2-3; APPLE-1003, [122]. Further, Table 10.2-3 indicates that **one or more first bits** of the HARQ Process Number is/are not used for DCI validation in the scenario of 6.1. Thus, in the scenario of [6.1], 3GPP-38.213-CR specifies that validation of a DCI will be performed using **one or more second bits** of the Redundancy Version Field of the DCI and **not** using **one or more bits** of the HARQ Process Number. *Id.*

f) Claim 9

Limitation [9.1]:

See [1.3.1] and [6.1].

Limitation [9.2]:

See element 6.2. For example, when the *a first value of the one or first more bits* of the HARQ Process Number indicate a configuration index as described in element [6.1], then the *one or more second bits* of the Redundancy Version field are compared to the *second sequence* as described in element [1.3.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [124]; cf APPLE-1004, APPLE-1004, FIG. 6, 610, 620, 29:66-30:10 (UE configured to perform comparing operations).

g) Claim 10

Limitation [10.1]:

The 3GPP-Combination renders obvious [10.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [125]. As discussed in elements [1.3], 3GPP-38.213-CR discloses where validation is based on *comparing one or more second bits with a second sequence* (i.e., determining whether all bits of the Redundancy Version are set to 0) *and comparing one or more bits with the first sequence* (i.e., determining whether one or more bits of a HARQ Process Number are set to 0) *in response to the one or more first bits not indicating a configuration index* (i.e., HARQ Process Number not indicating that more than one configuration for UL grant Type 2 PUSCH or for SPS PDSCH was received by the UE). APPLE-1006, 4-5; APPLE-1003, [125]. For example, 3GPP-38.213-CR discloses a scenario for

“PDCCH validation for DL SPS and UL grant Type 2” for scheduling of activation or release of resources where a “UE is provided a single configuration for UL grant Type 2 PUSCH or for SPS PDSCH.” APPLE-1006, 4; APPLE-1003, [125].

Limitation [10.2]:

The 3GPP-Combination renders obvious [10.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [126]. In response to the scenario described with reference to element [10.1] (i.e., ***if the one or more first bits of the HARQ Process Number do not indicate a configuration index or in response the one or more first bits of the HARQ Process Number not indicating a configuration index***), the HARQ process number is used for validation and the Redundancy Version field is relied upon for validation APPLE-1006, 4-5, Table 10.2-1, Table 10.2-2; APPLE-1003, [126]. For example, 3GPP-38.213-CR further specifies that “[v]alidation of the DCI format is achieved if all the fields for the DCI format are set according to Table 10.2-1 and 10.2-2.” APPLE-1006, 4-5, Table 10.2-1, Table 10.2-2; APPLE-1003, [126]. 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*** using one or more bits of the HARQ Process Number, as shown in Table 10.2-1 and 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	set to all '0'sset to '00'	set to all '0'sset to '00'	For the enabled transport block: set to all '0'sset to '00'

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	set to all '0'sset to '00'	set to all '0'sset 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-1006, 5, Table 10.2-1, Table 10.2-2.

Furthermore, in the 3GPP-Combination, 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 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) 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). Id. A POSITA would have found the aforementioned features of element [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, [127]. 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, [127]. The second sequence of one or more bits that the Redundancy Version is to be compared to is set as described with reference to limitation [1.1.2].

Likewise, in the 3GPP-Combination, 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 first bits (i.e., one or more bits of a HARQ Process Number field) with another first sequence of one or more 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). *Id.* A POSITA would have found the aforementioned features of element [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, [128]. 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, [128].

The first sequence of one or more bits that the HARQ Process Number is to be compared to is set as described with reference to limitation [1.1.1].

h) Claim 11

Limitation [11.1]:

See elements [1.1.1], [1.3], and [1.3.2].

Limitation [11.2]:

See elements [1.1.2], [1.3], and [1.3.2].

i) Claim 12:

Limitation [12.P]:

See [1.P].

Limitation [12.1]:

See [1.1].

Limitation [12.1.1]:

See [1.1.1].

Limitation [12.1.2]:

See [1.1.2].

Limitation [12.1.3]:

The 3GPP-Combination renders obvious element [12.1.3]. APPLE-1006, 4; APPLE-1003, [135]. For example, in the 3GPP-Combination, 3GPP-38.213-CR

discloses that the “[i]f a UE is provided more than one configurations *[sic]*..., 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 ... *SPSconfig-index*...” APPLE-1006, 4; APPLE-1003, [135]. Here, the higher layer parameter “*SPSconfig-index*” is the ***third configuration parameter***.” *Id.*

The higher layer parameter *SPSconfig-index* ***indicat[es] a downlink semi-persistent scheduling (SPS) configuration***. APPLE-1006, 4; APPLE-1003, [136]. For example, in the 3GPP-Combination, 3GPP-38.213-CR specifies that the higher layer parameter *SPSconfig-index* is used to set the value of HARQ Process Number to “indicat[e] an activation for a corresponding ... SPS PDSCH configuration” if “a UE is provided more than one configurations *[sic]* for ... SPS PDSCH...” *Id.*

Limitation [12.2]:

See [1.2].

Limitation [12.2.1]:

See [1.2.1].

Limitation [12.2.2]:

See [1.2.2].

Limitation [12.3]:

See [1.3].

Limitation [12.3.1]:

See [1.3.1].

Limitation [12.3.2]:

See [1.3.2].

Limitation [12.4]:

The 3GPP-Combination renders obvious element [12.4]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [143]. For example, 3GPP-38.213-CR discloses ***activating resources*** (e.g., UE “validates... for scheduling activation...”) when “a UE is provided a single configuration ... for SPS PDSCH” and when “a UE is provided more than one configurations [*sic*] ... for SPS PDSCH.” APPLE-1006, 4, Table 10.2-1 (fields validated for “single DL SPS ... scheduling ***activation*** PDCCH validation”), 10.2-3 (fields validated for “single DL SPS ... scheduling activation PDCCH validation when a UE is provided multiple DL SPS ... configurations”); APPLE-1003, [143]. 3GPP-38.213-CR also discloses deactivating resources (e.g., “UE validates ... for scheduling release”) when “a UE is provided a single configuration ...for SPS PDSCH” and when “a UE is provided more than one configurations [*sic*] ... for SPS PDSCH.” APPLE-1006, 4, Table 10.2-2 (fields validated for “single DL SPS ... scheduling release PDCCH validation”), 10.2-4 (fields validated for “multiple DL SPS ... scheduling release PDCCH validation”); APPLE-1003, [143].

j) Claim 13

Limitation [13]:

The 3GPP-Combination renders obvious element [13]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [144]. For example, in the 3GPP-Combination, 3GPP-38.213-CR discloses *fourth configuration parameter SPS-ReleaseStateList* that *indicates one or more deactivation states* (i.e., an entry for scheduling release of one or more SPS PDSCH configurations). APPLE-1006, 4; APPLE-1003, [144]. This *fourth configuration parameters* configures the *one or more first bits* (i.e., HARQ Process Number) to indicate the *first deactivation state corresponding to one or downlink SPS configurations comprising the downlink SPS configuration* (i.e., entry for scheduling release of one or more SPS PDSCH configurations). *Id.*

k) Claim 14

Limitation [14.1]:

See [5.1].

Limitation [14.2]:

See [5.2].

l) Claim 15

Limitation [15.1]: The method of claim 12, wherein: a first value, of the one or more first bits, indicates the configuration index of the downlink SPS configuration in a plurality of downlink SPS configurations; and

The 3GPP-Combination renders obvious element [15.1]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [147]. As further explained with respect to

element [1.3.1], 3GPP-38.213-CR contemplates a scenario for “PDCCH validation for DL SPS and UL grant Type 2” 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 (emphasis added); APPLE-1003, [147]. In this scenario, 3GPP-38.213-CR specifies that a *first value of the one or more first bits “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 ... SPSconfig-index*” *Id.* (emphasis added).

Limitation [15.2]: validating the DCI is based on the one or more second bits and not based on the one or more first bits.

The 3GPP-Combination renders obvious element [15.2]. APPLE-1005, 83; APPLE-1006, 4-5; APPLE-1003, [148]. In the scenario of element [15.1], (i.e., *if the one or bits of the HARQ Process Number indicates a configuration index of the downlink SPS configuration* (i.e., *same value as provided by SPSconfig-index*) *in a plurality of SPS configurations* (i.e., more than one configuration), Table 10.2-3 (reproduced below) is used to ***validate the DCI***. APPLE-1006, 4-5, Table 10.2-3; APPLE-1003, [148]. in Table 10.2-3. (reproduced below). *Id.*

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: set to all '0's

APPLE-1006, 5, Table 10.2-3.

As shown in Table 10.2-3 above, ***one or more second bits*** of the Redundancy Version field is/are relied upon for validation. APPLE-1006, 4-5; Table 10.2-3; APPLE-1003, [149]. Further, Table 10.2-3 indicates that ***one or more first bits*** of the HARQ Process Number is/are not used for DCI validation in the scenario of 15.1. Thus, in the scenario of [15.1], 3GPP-38.213-CR specifies that validation of a DCI will be performed using ***one or more second bits*** of the Redundancy Version Field of the DCI and ***not*** using ***one or more bits*** of the HARQ Process Number. *Id.*

m) Claim 18

Limitation [18.1]: The method of claim 12, wherein: a first value, of the one or more first bits, indicates the configuration index; and

See elements [9.1], [6.2], and [12.3.1].

Limitation [18.2]: validating the DCI is based on comparing the one or more second bits with the second sequence.

See elements [9.2], [6.2], and [12.3.1].

n) Claim 19

Limitation [19.1]: The method of claim 12, wherein: a first value, of the one or more first bits, does not indicate the configuration index; and

See elements [10.1], [12.1.4], and [12.3.3].

Limitation [19.2]: validating the DCI is based on comparing the one or more second bits with the second sequence and comparing the one or more first bits with the first sequence.

See elements [10.2], [12.1.4], and [12.3.3].

o) Claim 20

Limitation [20.1]: The method of claim 12, wherein: the first sequence of one or more bits are all zeros; and

See elements [12.1.2], [12.3.1], and [12.3.3].

Limitation [20.2]: the second sequence of one or more bits are all zeros.

See elements [12.1.3], [12.3.1], and [12.3.3].

B. GROUND 2 – Claim 3 is obvious over the 3GPP-Combination in view of R2-1913143 (“the 3GPP/R2-1913143-Combination”)

1. Overview of R2-1913143

R2-1913143 is a document titled “Confirmation MAC CE for multiple CG configurations” that was submitted for discussion during a 3GPP TSG-RAN WG2 Meeting on or before October 18th, 2019. APPLE-1011, 1; APPLE-1003, [68]; APPLE-1008, [68]. R2-1913143 discloses that given “previously agreed working assumption[s] of RAN2 ... that multiple CG configurations could be used for one TSN flow... the network is likely to send the activation or deactivation command(s) for multiple configurations at the same time, whether through a single DCI or multiple DCIs.” APPLE-1011, 1; APPLE-1003, [68]. R2-1913143 indicates that “[i]f the CG confirmation MAC CE can contain the status of multiple

CG configurations, e.g., in the form of bitmap, it could not only save lots of resources and but *[sic]* also reduce the UE processing for CG confirmation.”

APPLE-1011, 1-2; APPLE-1003, [68]. In addition, R2-1913143 discloses that the working group sought to consider “that there should be no misalignment between the UE and the network for activation/deactivation status of each CG configuration” in the scenario of “multiple active CG configurations.” APPLE-1011, 2; APPLE-1003, [68].

R2-1913143 discloses that “the main motivation for introducing the multiple active CG configuration is a reliable service of delay critical traffic, e.g., URLLC or TSN traffic...” APPLE-1011, 2; APPLE-1003, [69]. To this end, R2-1913143 explains that “it would be beneficial to report the activation/deactivation status of multiple CG configurations in a CG confirmation MAC CE to reliably support the TSN traffic.” *Id.* FIG. 1 of R2-1913143, which is reproduced below, shows an example of a new CG confirmation MAC CE format to support joint confirmation of multiple CG configurations...” *Id.*

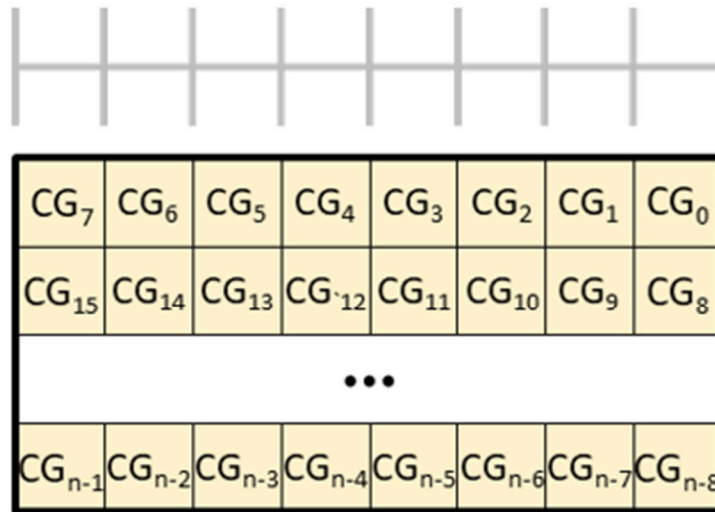


Figure 1. New CG confirmation MAC CE format

APPLE-1011, 2, FIG. 1.

R2-1913143 further discloses that “the confirmation MAC CE for the multiple CG configurations can be designed without introducing a group index by using a bitmap which indicates the activation/deactivation status of multiple CG configurations.” APPLE-1011, 2; APPLE-1003, [70].

2. Analogous Art

R2-1913143 and the '434 patent are *analogous art*, as each relate to 5G networks that activation or deactivation status for multiple Configured Grant (CG) configurations. APPLE-1011, 1-3, APPLE-1001, 36:32-43; APPLE-1003, [71].

3. The 3GPP/R2-1913143-Combination.

The 3GPP-Combination is described in Section IV(A)(5), *supra*. However,

the 3GPP-Combination does not explicitly disclose a description of a confirmation control element having a value indicating that the DCI activated or deactivated an uplink configured grant configuration. APPLE-1003, [72]. However, R2-1913143 is related to the 3GPP-Combination, as it describes a MAC CE for incorporation into 3GPP standards related to a wireless communications network that provides multiple configured grant Type 2 configurations to a UE. APPLE-1011, 1; APPLE-1003, [72]. R2-1913143 further disclose that it would be beneficial to *report* a CG confirmation MAC CE instead of generating and transmitting multiple configurations for each of multiple activations/deactivations. APPLE-1011, 1-3; APPLE-1003, [72].

A POSITA would have understood and found it obvious to incorporate R2-1913143's configuration MAC CE into the 3GPP-Combination. APPLE-1003, [73]. A POSITA *would have been motivated* to include the disclosure of R2-1913143 into the 3GPP-Combination for *multiple reasons*. APPLE-1011, 1-2; APPLE-1003, [73]. *First*, a POSITA would have been motivated to achieve the benefit of R2-1913143's "CG confirmation MAC CE," which as R2-1913143 explains "can contain the status of multiple CG configurations, e.g., in the form of a bitmap" in a manner that "saves lots of resources and [] also reduce[s] the UE processing for CG configuration." APPLE-1011, 1-2; APPLE-1003, [73]. *Second*, a POSITA would have been motivated to incorporate R2-1913143's "CG

confirmation MAC CE” into the 3GPP-Combination to prevent “misalignment between the UE and the network for the activation/deactivation status of each CG configuration.” APPLE-1011, 2; APPLE-1003, [73]. *Third*, a POSITA would have recognized that “it would be beneficial to report the activation/deactivation status of multiple CG configurations in a CG confirmation MAC CE to reliably support the TSN traffic.” *Id.*

A POSITA would have also known to look to R2-1913143, as it would have been common for a POSITA designing 5G communication networks to look to R2-1913143 for a description of an implementation raised for consideration by a 3GPP working group for incorporation into 3GPP standards related to the use of multiple CG configurations. APPLE-1011, 1; APPLE-1003, [74]. Here, a POSITA would have had a ***reasonable expectation of success*** in modifying the 3GPP-Combination to include the “CG confirmation MAC CE” of R2-1913143, as both the 3GPP-Combination and R2-1913143 related to the configuration of wireless communications networks related to the use of multiple CG configurations. APPLE-1006, 4-5; APPLE-1011, 1-2; APPLE-1003, [74]. Moreover, such success should be expected because the CG confirmation MAC CE of R2-1913143 is being proposed in order to avoid “misalignment between the UE and the network for the activation/deactivation status of each CG configuration” in the existing standard. APPLE-1011, 2; APPLE-1003, [74].

4. Analysis

a) Claim 3

Limitation [3]:

The 3GPP-R2-1913143-Cominbation renders obvious element [3]. APPLE-1011, 1-2; APPLE-1003, [155]. For example, R2-1913143 discloses a UE that is to *transmit* (i.e., report) a configured grant (CG) *confirmation* medium access control (MAC) *control element* (CE). *Id.* An example of the CG confirmation MAC CE transmitted by the UE of R2-1913143 is reproduced below:

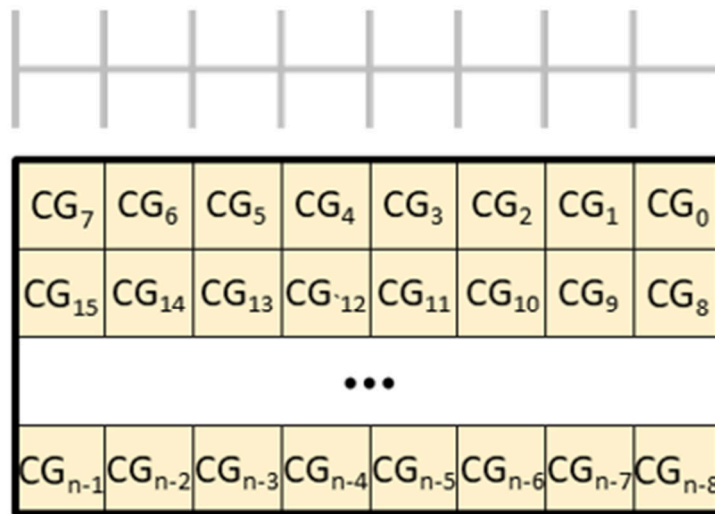


Figure 1. New CG confirmation MAC CE format

APPLE-1011, 2, FIG. 1.

R2-1913143's CG confirmation MAC CE includes a *field* for each of a *plurality of uplink configured grant confirmations*. APPLE-1011, 2, FIG. 1; APPLE-1003, [156]. The CG confirmation MAC CE is bitmap, with a *second*

value (e.g., bitmap field value) in each *field* corresponding to whether the configured grant corresponding to the *field* has been *activated or deactivated by the DCI previously received* and validated *by the UE* that generates and transmits the CG confirmation MAC CE. APPLE-1011, 1-3, FIG. 1; APPLE-1003, [156]. For example, a bitmap value in the *field* corresponding to configured grant 12 (CG₁₂) indicates whether the configured grant corresponding to configured grant 12 (CG₁₂) has been *activated or deactivated*. *Id.*

C. GROUND 3 – Claims 7, 8, 16, and 17 are obvious over the 3GPP-Combination in view of 3GPP-38.331-CR (“the 3GPP-38.331-CR Combination”)

1. Overview of 3GPP-38.331-CR

3GPP-38.331-CR is a draft change request to 3GPP-38.331 titled “RRC running CR for NR IIoT.” APPLE-1012, 1; APPLE-1003, [75]. The 3GPP-38.331-CR is a change request that implements additions to 3GPP 38.331 that, among other things, “[a]dd support for multiple DL SPS and UL CG in one BWP.” APPLE-1012, 2; APPLE-1003, [75].

For example, 3GPP-38.331-CR describes a *BWP-UplinkDedicated* information element (IE) that is a bandwidth part configuration for uplink transmissions. APPLE-1012, 7; APPLE-1003, [76]. 3GPP-38.331 explains that the *BWP-UplinkDedicated* is used “to configure the dedicated (UE specific) parameters of an uplink BWP.” *Id.* The *BWP-UplinkDedicated* IE includes a

plurality of parameters such as, e.g., *pucch-Config*, *pusch-Config*, *configuredGrantConfig*, *srs-Config*, *beamFailureRecoveryConfig*, and *configuredGrantConfigList-r16*. APPLE-1012, 7; APPLE-1003, [76]. In more detail, 3GPP-38.331 includes one or more *ConfiguredGrantConfig* parameters and a *configuredGrantConfigList* parameter. *Id.* The *configuredGrantConfig* parameter that indicates a Configured-Grant of type 1 or 2. *Id.* The *configuredGrantConfigList* parameter is a list, or plurality, of *ConfiguredGrantConfigs*. *Id.*

In more detail, 3GPP-38.331-CR discloses that the *ConfiguredGrantConfig* IE of the *BWP-UplinkDedicated* IE includes the *configuredGrantConfigIndex* IE. APPLE-1012, 7-13; APPLE-1003, [77]. 3GPP-38.331-CR further discloses that the *configuredGrantConfigIndex* IE is “used to indicate the index of one of multiple UL Configured Grant configurations.” APPLE-1012, 7-13; APPLE-1003, [77].

3GPP-38.331-CR also discloses a *BWP-DownlinkDedicated* IE. APPLE-1012, 6; APPLE-1003, [78]. *BWP-DownlinkDedicated* IE is the bandwidth part configuration for downlink transmissions and it also contains several parameters such as, e.g., *pdccch-Config*, *pdsch-Config*, *sps-Config*, *radioLinkMonitoringConfig*, and *sps-ConfigList-r16*. *Id.* The *sps-Config* information element includes an *SPS-ConfigIndex*. APPLE-1012, 22; APPLE-

1003, [78]. This SPS-ConfigIndex IE “is used to indicate the index of one of multiple DL SPS configurations.” APPLE-1012, 24; APPLE-1003, [78].

2. The 3GPP-38.331-CR Combination

The 3GPP-Combination is described in Section IV(A)(5), *supra*. The 3GPP-Combination does not explicitly disclose receipt of bandwidth part configuration parameters for configured grants or SPS configurations. APPLE-1003, [80].

However, 3GPP-38.331-CR is a change request that implements bandwidth part configuration information elements such as, e.g., *BWP-UplinkDedicated* or *BWP-DownlinkDedicated* that include bandwidth part configuration parameters listed in Section IV(C)(1). APPLE-1012, 1, 2, 6, 7-13, 22, 24; APPLE-1003, [80].

It would have been obvious to a person of ordinary skill in the art (POSITA) to modify the 3GPP-Combination with the operations of 3GPP-38.331-CR. APPLE-1003, [80]-[81]. Naturally, each of these publications are in the *same field of endeavor* related to configuration of parameters of wireless communication network. APPLE-1005, 1; APPLE-1006, 1, 4-5; APPLE_1007, 1, 7-18, 9-11; APPLE-1012, 1, 2, 6, 7-13, 22, 24; APPLE-1003, [80]-[81]. A POSITA *would have been motivated* to looked to 3GPP-38.331-CR in order to “enhance[] for NR ultra-reliable and low latency communication.” APPLE-1012, 1; APPLE-1003, [80]-[81]. Further, when designing a standards-compliant wireless communication network, it would have been common for a POSITA designing 3GPP wireless

communications networks to look to 3GPP documents such as 3GPP-38.331-CR for implementation configurations. APPLE-1012, 1; APPLE-1003, [80]-[81]. Here, a POSITA would have had a *reasonable expectation of success* in further modifying the 3GPP-Combination to include the aforementioned features of 3GPP-38.331-CR described in Section V(C)(1), as both documents describe features of the related technical standards and were shared amongst 3GPP participants in the same 3GPP working group as proposed changes to enhance functionality of 5G-NR networks. APPLE-1003, [80]-[81]; APPLE-1008, [22], [93]-[102]; APPLE-1012, 1.

3. Analysis

a) Claim 7

Limitation [7]:

The 3GPP-38.331-CR-combination discloses or renders obvious element [7]. APPLE-1012, 1, 2, 6, 7-13; APPLE-1003, [157]. For example, 38.331-CR discloses a *BWP-UplinkDedicated* IE. APPLE-1012, 7; APPLE-1003, [157]. The *BWP-UplinkDedicated* IE “is used to configure the dedicated (UE specific) parameters of uplink BWP.” *Id.* This *BWP-UplinkDedicated* IE is the bandwidth part configuration for uplink transmissions and includes a *plurality of parameters* (i.e., “bandwidth part configuration parameters of a bandwidth part of a cell”). *Id.*

Here, 3GPP-38.331’s disclosure of the configurations that are specific to the

UE corresponds to *the plurality of uplink configured grant configurations are for the bandwidth part*, as the *BWP-UplinkDedicated* IE element configures the UE using, e.g., one *or more* (i.e., a plurality of) *ConfiguredGrantConfig* information elements. APPLE-1012, 1, 2, 6, 7-13; APPLE-1003, [157]. The one *or more* *ConfiguredGrantConfig** information elements are the “plurality of configured grant configurations.” *Id.*

b) Claim 8

Limitation [8]:

The 3GPP-38.331-CR-combination discloses or renders obvious element [8]. APPLE-1012, 7-13; APPLE-1003, [159]. For example, 38.331-CR discloses a *BWP-UplinkDedicated IE*. APPLE-1012, 7, 8; APPLE-1003, [159]. The *BWP-UplinkDedicated IE* includes, among other things, *bandwidth part configuration parameters* that include a *ConfiguredGrantConfig* IE and this *ConfiguredGrantConfig* IE is further described in 3GPP-38.331-CR at pgs. 9-13. APPLE-1012, 7-13; APPLE-1003, [159]. This further disclosure of 3GPP-38.331-CR explains that the *ConfiguredGrantConfig* IE of the *BWP-UplinkDedicated IE* includes the *configuredGrantConfigIndex* IE. APPLE-1012, 7-13; APPLE-1003, [159]. The *configuredGrantConfigIndex* IE is *an uplink configured grant configuration parameter* that *comprises* data indicating *the third configuration parameter indicating the configuration index*, as 3GPP-38.331-CR is “used to

indicate the index of one of multiple UL Configured Grant configurations.” *Id.*

c) **Claim 16**

Limitation [16]:

The 3GPP-38.331-CR-combination discloses or renders obvious element [17]. APPLE-1012, 1, 2, 6, 22-24; APPLE-1003, [160]. For example, 3GPP-38.331-CR discloses a *BWP-DownlinkDedicated IE*. APPLE-1012, 6, 7; APPLE-1003, [160]. The *BWP-DownlinkDedicated IE* includes, among other things, ***bandwidth part configuration parameters*** that include a *sps-Config* information element. *Id.* 3GPP-38.331-CR further explains that the *sps-Config* IE of the *BWP-DownlinkDedicated IE* includes the *sps-ConfigIndex* IE. APPLE-1012, 6, 22-24; APPLE-1003, [160]. The *sps-ConfigIndex* IE includes ***SPS configuration parameters*** for the bandwidth part. *Id.*

Limitation [17]:

The 3GPP-38.331-CR-combination discloses or renders obvious element [17]. APPLE-1012, 1, 2, 6, 22, 24; APPLE-1003, [161]. For example, 38.311-CR discloses a *BWP-DownlinkDedicated IE*. APPLE-1012, 6, 7; APPLE-1003, [161]. The *BWP-DownlinkDedicated IE* includes, among other things, ***bandwidth part configuration parameters*** that include a *sps-Config* information element. APPLE-1012, 6, 22-24; APPLE-1003, [161]. 3GPP-38.331-CR further explains that the *sps-Config* IE of the *BWP-DownlinkDedicated IE* includes the *sps-ConfigIndex* IE.

APPLE-1012, 6, 22-24; APPLE-1003, [161]. The *sps-ConfigIndex* IE includes *SPS configuration parameters* that *comprise* data indicating *the third configuration parameter indicating the configuration index*, as 3GPP-38.331-CR is “used to indicate the index of one of multiple UL Configured Grant configurations.” *Id.*

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 '434 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 '434 Patent. The '434 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.

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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 IPR50095-0236IP1@fr.com.

Respectfully submitted,

Dated: May 5, 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 13,963 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated: May 5, 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 May 5, 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 Patent Owner by serving the correspondence address of record as follows:

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