**3GPP TSG-RAN WG1 Meeting #101-eR1-200xxxx**

**e-Meeting, May 25th – June 5th, 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.212** | **CR** | **0045** | **rev** | **1** | **Current version:** | **16.1.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | Corrections for Rel-16 NR-U | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | R1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_unlic-Core | | | | |  | ***Date:*** | | | 2020-06-06 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. Clarification on the 2 bit LSB of SFN in DCI 1\_0 2. Correction of interaction between Type-3 HARQ-ACK codebook triggering DCI fields and SCell dormancy indication DCI fields. 3. The mapping of the 2 bits of the New feedback indicator DCI field to the PDSCH group g or (g+1)mod2 (TS38.213 clause 9.1.3.3) is undefined. 4. Capture the RAN1 agreement that DCI 0\_0 in a UE-specific search space include Y bits to indicate the RB set allocation. 5. Alignment of RRC parameters between 38.331 and RAN1 specs 6. For multiplexing of coded UCI bits to interlaced PUCCH Format 3, the number of UCI symbols does not take into account the newly introduced spreading factor (OCC) for interlaced PUCCH format 3 with SF 7. Reflect the agreement “The presence of the SFI field can be configured in DCI 2\_0” 8. Correct that the bitfields ChanneAccess-CPext-CAPC and ChanneAccess-CPext should be present in DCI formats 0\_1 and 1\_1, respectively, also in the case of semi-static channel access. 9. Reflect the agreement “For a given shared COT, UE should provide consistent COT sharing information in multiple consecutive PUSCHs in the same UE-initiated COT”. 10. Align terminology of Search space set group switching flag with 38.213 and 38.331. 11. Referred subclause number in subclause 7.3.1.1.2 is still open and definition of Y in subclaus 7.3.1.1.1 is missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. [100b-e-NR-unlic-NRU-InitAccessProc-05] TP2 in Section 2.2 of R1-2002996: Clarification on the 2 bit LSB of SFN in DCI 1\_0. 2. [100b-e-NR-unlic-NRU-HARQ-01] TP#1 in R1-2003028: Clarification that SCell dormancy is indicated only if one-shot HARQ-ACK request is not present or set to ‘0’ in DCI format 1\_1. 3. [100b-e-NR-unlic-NRU-HARQ-02] TP#1 in R1-2003030: Specify how the 2 bits of the New feedback indicator DCI field are mapped to PDSCH group g or (g+1)mod2 defined in TS38.213 clause 9.1.3.3. 4. [100b-e-NR-unlic-NRU-ULSignalsChannels-01] TP#2 in R1-2003055: Modify description of FDRA field in DCI 0\_0 in 38.212 to capture RAN1 agreements 5. [100b-e-NR-unlic-NRU-ULSignalsChannels-03] TP#5 in R1-2002914:Former four parameters have been replaced by the two parameters; *useInterlacePUCCH-PUSCH* within the BWP-UplinkCommon IE (for configuring interlacing for both PUCCH and PUSCH prior to dedicated configuration on a PCell) and *useInterlacePUCCH-PUSCH* within the BWP-UplinkDedicated IE (for configuring interlacing for both PUCCH and PUSCH after dedicated configuration for SCell addition) 6. [100b-e-NR-unlic-NRU-ULSignalsChannels-03] TP#2 in R1-2002914: the number of UCI symbols takes into account the newly introduced spreading factor (OCC) for interlaced PUCCH format 3 with SF 7. Add the condition of *slotFormatCombToAddModList* being configured for the presence of slot format indicators 1 to N. 8. Remove the limitation that ChanneAccess-CPext-CAPC and ChanneAccess-CPext are not present with semi-static channel access 9. Add the clarification to configure consistent COT sharing information in multiple consecutive PUSCHs in table 6.3.2.1.3-1 10. Change monitor group flag to Search space set group switching flag 11. Add the referred subclause number in subclause 7.3.1.1.2 and the definition of Y in subclaus 7.3.1.1.1. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | 1. Not clear when the 2 bits of LSB of SFN is included 2. Unclear UE behavior if the gNB indicates field values in DCI that are relevant for both Type-3 HARQ-ACK codebook request and SCell dormancy indication. 3. The UE cannot determine the NFI for PDSCH group g and (g+1)mod2 4. PUSCH cannot be scheduled by DCI 0\_0 5. Misalignment between RAN2 and RAN1 specs for Type 2 FDRA 6. Incorrect caluculation of the number of UCI symbols for interlaced PUCCH format 3 with SF 7. Incorrect specification of slot format indicator presence in DCI Format 2\_0. 8. CP extension and LBT type cannot be indicated for the UE with DCI 0\_1 and 1\_1 in semi-static channel access. 9. UE can indicate different COT sharing information targeting at diffferent DL start points 10. Inconsistent terminology across specifications | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.3.1.6, 6.3.2.1.3, 7.3.1.1.1, 7.3.1.1.2, 7.3.1.2.1, 7.3.1.2.2, 7.3.1.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

6.3.1.6 Multiplexing of coded UCI bits to PUCCH

\*\*\* Unchanged text omitted \*\*\*

Denote  as UCI OFDM symbol index. Denote  as the number of elements in UCI symbol indices set  for , where  and  are given by Table 6.3.1.6-1 according to the PUCCH duration and the PUCCH DMRS configuration. Denote  as the number of OFDM symbols carrying UCI in the PUCCH. Denote  as the modulation order of the PUCCH.

For PUCCH format 3, set , where  is the number of PRBs that is determined by the UE for PUCCH format 3 transmission according to Clause 9.2 of [5, TS 38.213], and is the spreading factor for PUCCH format 3 [4, TS 38.211].

For PUCCH format 4, set , where  is the spreading factor for PUCCH format 4.

\*\*\* Unchanged text omitted \*\*\*

##### 6.3.2.1.3 CG-UCI

For CG-UCI bits transmitted on a CG PUSCH, the CG-UCI bit sequence is determined as follows:

- set for and , where the CG-UCI bit sequence is given by Table 6.3.2.1.3-1, mapped in the order from upper part to lower part.

Table 6.3.2.1.3-1: Mapping order of CG-UCI fields

|  |  |
| --- | --- |
| **Field** | **Bitwidth** |
| HARQ process number | 4 |
| Redundancy version | 2 |
| New data indicator | 1 |
| Channel Occupancy Time (COT) sharing information | if both higher layer parameter *ULtoDL-CO-SharingED-Threshold-r16* and higher layer parameter *cg-COT-SharingList-r16* are configured, where *C* is the number of combinations configured in *cg-COT-SharingList-r16;*  1 if higher layer parameter *ULtoDL-CO-SharingED-Threshold-r16* is not configured and higher layer parameter *cg-COT-SharingOffset-r16* is configured;  0 otherwise;  If a UE indicates COT sharing other than “no sharing” in a CG PUSCH within the UE's initiated COT, the UE should provide consistent COT sharing information in all the subsequent CG PUSCHs, if any, occurring within the same UE’s initiated COT such that the same DL starting point and duration are maintained. |

7.3.1.1.1 Format 0\_0

DCI format 0\_0 is used for the scheduling of PUSCH in one cell.

The following information is transmitted by means of the DCI format 0\_0 with CRC scrambled by C-RNTI or CS-RNTI or MCS-C-RNTI:

- Identifier for DCI formats – 1 bit

- The value of this bit field is always set to 0, indicating an UL DCI format

- Frequency domain resource assignment –  bits if neither of the higher layer parameters *~~useInterlacePUSCH-Common~~* ~~and~~ *~~userInterlacePUSCH-Dedicated~~* *useInterlacePUCCH-PUSCH* in *BWP-UplinkCommon* and *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated* is configured, where  is defined in clause 7.3.1.0

- For PUSCH hopping with resource allocation type 1:

-  MSB bits are used to indicate the frequency offset according to Clause 6.3 of [6, TS 38.214], where  if the higher layer parameter *frequencyHoppingOffsetLists* contains two offset values and  if the higher layer parameter *frequencyHoppingOffsetLists* contains four offset values

-  bits provides the frequency domain resource allocation according to Clause 6.1.2.2.2 of [6, TS 38.214]

- For non-PUSCH hopping with resource allocation type 1:

-  bits provides the frequency domain resource allocation according to Clause 6.1.2.2.2 of [6, TS 38.214]

- if any of the higher layer parameters *~~useInterlacePUSCH-Common~~* ~~and~~ *~~userInterlacePUSCH-Dedicated~~* *useInterlacePUCCH-PUSCH* in *BWP-UplinkCommon* and *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated* is configured

- ~~[5 or~~ 5+Y~~]~~ bits provide the frequency domain resource allocation according to Clause 6.1.2.2.3 of [6, TS 38.214] if the subcarrier spacing for the active UL bandwidth part is 30 kHz and the DCI format 0\_0 is monitored in a UE-specific search space. If the DCI 0\_0 is monitored in a common search space Y = 0.

- ~~[6 or~~ 6+Y~~]~~ bits provide the frequency domain resource allocation according to Clause 6.1.2.2.3 of [6, TS 38.214] if the subcarrier spacing for the active UL bandwidth part is 15 kHz and the DCI format 0\_0 is monitored in a UE-specific search space. If the DCI 0\_0 is monitored in a common search space Y = 0.

The value of Y is determined by where is the number of RB sets contained in the UL BWP as defined in clause 7 of [6, TS38.214].

\*\*\* Unchanged text omitted \*\*\*

The following information is transmitted by means of the DCI format 0\_0 with CRC scrambled by TC-RNTI:

- Identifier for DCI formats – 1 bit

- The value of this bit field is always set to 0, indicating an UL DCI format

- Frequency domain resource assignment – number of bits determined by the following:

- bits if the higher layer parameter *~~useInterlacePUSCH-Common-r16~~* *useInterlacePUCCH-PUSCH* in *BWP-UplinkCommon* is not configured, where

-  is the size of the initial UL bandwidth part.

- For PUSCH hopping with resource allocation type 1:

-  MSB bits are used to indicate the frequency offset according to Table 8.3-1 in Clause 8.3 of [5, TS 38.213], where  if  and  otherwise

-  bits provides the frequency domain resource allocation according to Clause 6.1.2.2.2 of [6, TS 38.214]

- For non-PUSCH hopping with resource allocation type 1:

-  bits provides the frequency domain resource allocation according to Clause 6.1.2.2.2 of [6, TS 38.214]

- if the higher layer parameter *~~useInterlacePUSCH-Common-r16~~ useInterlacePUCCH-PUSCH* in *BWP-UplinkCommon* is configured

- 5 bits provide the frequency domain resource allocation according to Clause 6.1.2.2.3 of [6, TS 38.214] if the subcarrier spacing for the active UL bandwidth part is 30 kHz

- 6 bits provide the frequency domain resource allocation according to Clause 6.1.2.2.3 of [6, TS 38.214] if the subcarrier spacing for the active UL bandwidth part is 15 kHz

\*\*\* Unchanged text omitted \*\*\*

7.3.1.1.2 Format 0\_1

\*\*\* Unchanged text omitted \*\*\*

- Frequency domain resource assignment – number of bits determined by the following, where  is the size of the active UL bandwidth part:

- If higher layer parameter *~~useInterlacePUSCH-Dedicated-r16~~ useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated* is not configured

-  bits if only resource allocation type 0 is configured, where  is defined in Clause 6.1.2.2.1 of [6, TS 38.214],

- bits if only resource allocation type 1 is configured, or  bits if both resource allocation type 0 and 1 are configured.

- If both resource allocation type 0 and 1 are configured, the MSB bit is used to indicate resource allocation type 0 or resource allocation type 1, where the bit value of 0 indicates resource allocation type 0 and the bit value of 1 indicates resource allocation type 1.

- For resource allocation type 0, the  LSBs provide the resource allocation as defined in Clause 6.1.2.2.1 of [6, TS 38.214].

- For resource allocation type 1, the  LSBs provide the resource allocation as follows:

- For PUSCH hopping with resource allocation type 1:

-  MSB bits are used to indicate the frequency offset according to Clause 6.3 of [6, TS 38.214], where  if the higher layer parameter *frequencyHoppingOffsetLists* contains two offset values and  if the higher layer parameter *frequencyHoppingOffsetLists* contains four offset values

-  bits provides the frequency domain resource allocation according to Clause 6.1.2.2.2 of [6, TS 38.214]

- For non-PUSCH hopping with resource allocation type 1:

-  bits provides the frequency domain resource allocation according to Clause 6.1.2.2.2 of [6, TS 38.214]

- If the higher layer parameter *~~useInterlacePUSCH-Dedicated-r16~~ useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated* is configured

- 5 + Y bits provide the frequency domain resource allocation according to Clause 6.1.2.2.3 of [6, TS 38.214] if the subcarrier spacing for the active UL bandwidth part is 30 kHz. The 5 MSBs provide the interlace allocation and the Y LSBs provide the RB set allocation.

- 6 + Y bits provide the frequency domain resource allocation according to Clause 6.1.2.2.3 of [6, TS 38.214] if the subcarrier spacing for the active UL bandwidth part is 15 kHz. The 6 MSBs provide the interlace allocation and the Y LSBs provide the RB set allocation.

The value of Y is determined by where is the number of RB sets contained in the UL BWP as defined in clause 7 of [6, TS38.214].

If "Bandwidth part indicator" field indicates a bandwidth part other than the active bandwidth part and if both resource allocation type 0 and 1 are configured for the indicated bandwidth part, the UE assumes resource allocation type 0 for the indicated bandwidth part if the bitwidth of the "Frequency domain resource assignment" field of the active bandwidth part is smaller than the bitwidth of the "Frequency domain resource assignment" field of the indicated bandwidth part.

\*\*\* Unchanged text omitted \*\*\*

- ChannelAccess-CPext-CAPC – 0, 1, 2, 3, 4, 5 or 6 bits. The bitwidth for this field is determined as bits, where *I* is the number of entries in the higher layer parameter *ul-dci-triggered-UL-ChannelAccess-CPext-CAPC-r16* for operation in a cell with shared spectrum channel access; otherwise 0 bit. One or more entries from Table 7.3.1.1.2-35 are configured by the higher layer parameter *ul-dci-triggered-UL-ChannelAccess-CPext-CAPC-r16.*

\*\*\* Unchanged text omitted \*\*\*

7.3.1.2.1 Format 1\_0

\*\*\* Unchanged text omitted \*\*\*

The following information is transmitted by means of the DCI format 1\_0 with CRC scrambled by RA-RNTI or ~~m~~MsgB-RNTI:

- Frequency domain resource assignment – bits

-  is the size of CORESET 0 if CORESET 0 is configured for the cell and  is the size of initial DL bandwidth part if CORESET 0 is not configured for the cell

- Time domain resource assignment – 4 bits as defined in Clause 5.1.2.1 of [6, TS38.214]

- VRB-to-PRB mapping – 1 bit according to Table 7.3.1.2.2-5

- Modulation and coding scheme – 5 bits as defined in Clause 5.1.3 of [6, TS38.214], using Table 5.1.3.1-1

- TB scaling – 2 bits as defined in Clause 5.1.3.2 of [6, TS38.214]

- LSBs of SFN – 2 bits for the DCI format 1\_0 with CRC scrambled by ~~m~~MsgB-RNTI as defined in Clause 8.2A of [5, TS 38.213]; or 2 bits for the DCI format 1\_0 with CRC scrambled by RA-RNTI as defined in Clause 8.2 of [5, TS 38.213] for operation in a cell with shared spectrum channel access; 0 bit otherwise

- Reserved bits – 14 bits for the DCI format 1\_0 with CRC scrambled by ~~m~~MsgB-RNTI; or 14 bits for the DCI format 1\_0 with CRC scrambled by RA-RNTI for operation in a cell with shared spectrum channel access; otherwise 16 bits

\*\*\* Unchanged text omitted \*\*\*

7.3.1.2.2 Format 1\_1

DCI format 1\_1 is used for the scheduling of PDSCH in one cell.

\*\*\* Unchanged text omitted \*\*\*

- New feedback indicator – 0, 1 or 2 bits.

- 1 bit if the higher layer parameter *pdsch-HARQ-ACK-Codebook = enhancedDynamic-r16* and the higher layer parameter *NFI-TotalDAI-Included-r16* is not configured;

- 2 bits if the higher layer parameter *pdsch-HARQ-ACK-Codebook = enhancedDynamic-r16* and the higher layer parameter *NFI-TotalDAI-Included-r16 = enable*; the MSB corresponds to the scheduled PDSCH group, and the LSB corresponds to the non-scheduled PDSCH group, as defined in [TS38.213] clause 9.1.3.3;

- 0 bit otherwise.

\*\*\* Unchanged text omitted \*\*\*

- SCell dormancy indication – 0 bit if higher layer parameter *Scell-groups-for-dormancy-within-active-time* is not configured; otherwise 1, 2, 3, 4 or 5 bits bitmap determined according to higher layer parameter *Scell-groups-for-dormancy-within-active-time,* where each bit corresponds to one of the Scell group(s) configured by higher layers parameter *Scell-groups-for-dormancy-within-active-time,* with MSB to LSB of the bitmap corresponding to the first to last configured Scell group. The field is only present when this format is carried by PDCCH on the primary cell within DRX Active Time and the UE is configured with at least two DL BWPs for an Scell.

If one-shot HARQ-ACK request is not present or set to ‘0’, and all bits of frequency domain resource assignment are set to 0 for resource allocation type 0 or set to 1 for resource allocation type 1, this field is reserved and the following fields among the fields above are used for Scell dormany indication, where each bit corresponds to one of the configured Scell(s), with MSB to LSB of the following fields concatenated in the order below corresponding to the Scell with lowest to highest Scell index

- Modulation and coding scheme of transport block 1

- New data indicator of transport block 1

- Redundancy version of transport block 1

- HARQ process number

- Antenna port(s)

[- DMRS sequence initialization]

\*\*\* Unchanged text omitted \*\*\*

- ChannelAccess-CPext – 0, 1, 2, 3 or 4 bits. The bitwidth for this field is determined as bits, where *I* is the number of entries in the higher layer parameter *dl-DCI-triggered-UL-ChannelAccess-CPext-r16* for operation in a cell with shared spectrum channel access; otherwise 0 bit. One or more entries from Table 7.3.1.2.2-6 are configured by the higher layer parameter *dl-DCI-triggered-UL-ChannelAccess-CPext-r16.*

\*\*\* Unchanged text omitted \*\*\*

##### 7.3.1.3.1 Format 2\_0

DCI format 2\_0 is used for notifying the slot format, COT duration, available RB set, and search space set group switching.

The following information is transmitted by means of the DCI format 2\_0 with CRC scrambled by SFI-RNTI:

- If the higher layer parameter *slotFormatCombToAddModList* is configured,

- Slot format indicator 1, Slot format indicator 2, …, Slot format indicator *N*,

- If the higher layer parameter *availableRB-SetPerCell-r16* is configured,

- Available RB set Indicator 1, Available RB set Indicator 2, …, Available RB set Indicator *N1*,

- If the higher layer parameter *CO-DurationPerCell-r16* is configured

- COT duration indicator 1, COT duration indicator 2, …, COT duration indicator *N2.*

- If the higher layer parameter *searchSpaceSwitchTrigger-r16* is configured

- Search space set group switching flag 1, Search space set group switching flag 2, …, Search space set group switching flag *M.*

The size of DCI format 2\_0 is configurable by higher layers up to 128 bits, according to Clause 11.1.1 of [5, TS 38.213].