**3GPP TSG RAN WG1 #118** **R1-240xxxx**

Maastricht, Netherlands, August 19th – 23th, 2024

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **DRAFT CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.213** | **CR** |  | **rev** |  | **Current version:** | **18.3.0** |  |
|  | | | | | | | | |
| *For* [***HELP***](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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Rel-18 editorial corrections for TS 38.213 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Samsung | | | | | | | | | |
| ***Source to TSG:*** | R1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | , NR\_MC\_enh-Core, NR\_pos\_enh2-Core, BWP\_wor-Core | | | | |  | ***Date:*** | | | 2024-08-26 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. Misaligned parameter names for multi-panel transmission with TS 38.331 v18.2.0 in Clauses 7.1.1, 7.2.1, and 7.7.1. 2. Undefined higher-layer parameter for SRS transmission with frequency hopping in Clause 7.3.1. 3. Typo in using instead of , and typo in missing “second” for the configured maximum output power provided together with the second PHR in Clause 7.7.1. 4. Missing parentheses in indexes of the pseudo-code in Clause 9.1.3.1. 5. Redundant/ambiguous text in the pseudo-code in Clause 9.1.3.1. 6. Missing support for DCI format 1\_3 in Clause 9.1.5. 7. Misaligned parameter name for *apply-IndicatedTCIState* with TS 38.331 v18.2.0 in Clauses 9.2.1, 9.2.2, 9.2.6, and 10.1. 8. Incorrect/non-existing parameter *UCI-OnPUSCH-DCI-0-3* in Clause 9.3. 9. Missing parameter *SearchSpaceExt*-v1800 in the search space sets providing USS sets in Clause 10.1. 10. Unclear that the search space set dropping procedure is for search space sets with PDCCH candidates and non-overlapping CCEs counted on the primary cell in Clause 10.1. 11. Miscellaneous corrections or alignment of RRC parameter names in Clauses 5 and 7.4. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Align parameter names with TS 38.331 v18.2.0 in Clauses 7.1.1, 7.2.1, and 7.7.1. 2. Capture the higher-layer parameter for SRS transmission with frequency hopping in Clause 7.3.1. 3. Change to , and add “second” for the configured maximum output power provided together with the second PHR in Clause 7.7.1. 4. Add the missing parentheses in the indexes of the pseudo-code in Clause 9.1.3.1. 5. Remove redundant/ambiguous text in pseudo-code in Clause 9.1.3.1. 6. Clarify that the non-scheduled cells can be more than one in Clause 9.1.5. 7. Change *apply-IndicatedTCIState* to *applyIndicatedTCI-State* in Clauses 9.2.1, 9.2.2, 9.2.6, and 10.1. 8. Remove parameter *UCI-OnPUSCH-DCI-0-3* and clarify that *UCI-onPUSCH* determines UCI multiplexing for PUSCH scheduled by DCI format 0\_3 in Clause 9.3. 9. Add parameter *SearchSpaceExt*-v1800 in the search space sets providing USS sets in Clause 10.1. 10. Clarify that the search space set dropping procedure is for search space sets with PDCCH candidates and non-overlapping CCEs counted on the primary cell in Clause 10.1. 11. Correction/alignment of RRC parameter name in Clauses 5 and 7.4. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Ambiguous/incorrect/incomplete specifications. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5, 7.1.1, 7.2.1, 7.3.1, 7.4, 7.7.1, 9.1.3.1, 9.1.5, 9.2.1, 9.2.2, 9.2.6, 9.3, 10.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

# 5 Radio link monitoring

The downlink radio link quality of the primary cell is monitored by a UE for the purpose of indicating out-of-sync/in-sync status to higher layers. The UE is not required to monitor the downlink radio link quality in DL BWPs other than the active DL BWP, as described in clause 12, on the primary cell unless the UE indicates a capability *bwpOperationMeasWithoutInterrupt* [18, TS 38.306]. If the active DL BWP is the initial DL BWP and for SS/PBCH block and CORESET multiplexing pattern 2 or 3, as described in clause 13, the UE is expected to perform RLM using the associated SS/PBCH block when the associated SS/PBCH block index is provided by *RadioLinkMonitoringRS*.

If the UE is configured with a SCG, as described in [12, TS 38.331], and the parameter *rlf-TimersAndConstants* is provided by higher layers and is not set to release, the downlink radio link quality of the PSCell of the SCG is monitored by the UE for the purpose of indicating out-of-sync/in-sync status to higher layers. The UE is not required to monitor the downlink radio link quality in DL BWPs other than the active DL BWP on the PSCell unless the UE indicates a capability *bwpOperationMeasWithoutInterrupt* [18, TS 38.306].

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

### 7.1.1 UE behaviour

If a UE transmits a PUSCH on active UL BWP of carrier of serving cell using parameter set configuration with index and PUSCH power control adjustment state with index

- if the UE is indicated a first *TCI-State* or *TCI-UL-State* and a second *TCI-State* or *TCI-UL-State*, and is configured with *multipanelSchemeSDM* or *multipanelSchemeSFN* or *sTx-2Panel*, and the UE determines to apply both the first *TCI-State* or *TCI-UL-State* and the second *TCI-State* or *TCI-UL-S*tate in PUSCH transmission occasion , the UE determines the PUSCH transmission power for the k-th indicated *TCI-State* or *TCI-UL-State* as

[dBm]

- else, the UE determines the PUSCH transmission power in PUSCH transmission occasion as

[dBm]

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

### 7.2.1 UE behaviour

If a UE transmits a PUCCH on active UL BWP of carrier in the primary cell using PUCCH power control adjustment state with index

- if the UE is indicated a first *TCI-State* or *TCI-UL-State* and a second *TCI-State* or *TCI-UL-State*, and is configured with *multipanelSFN-Scheme*, and the UE determines to apply both the first *TCI-State* or *TCI-UL-State* and the second *TCI-State* or *TCI-UL-S*tate in PUCCH transmission occasion , the UE determines the PUCCH transmission power for the k-th indicated *TCI-State* or *TCI-UL-State* as

[dBm]

- else, the UE determines the PUCCH transmission power in PUCCH transmission occasion as

[dBm]

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

### 7.3.1 UE behaviour

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

If a UE transmits SRS based on a configuration by *SRS-PosResourceSet* in *SRS-PosRRC-InactiveValidityAreaConfig* in RRC\_INACTIVE state [12, TS 38.331], the active UL BWP *b* refers to the BWP provided by *bwp* in *SRS-PosRRC-InactiveValidityAreaConfig*. If the UE is not provided *pathlossReferenceRS-Pos* in *SRS-PosResourceSet*, or if the UE is provided *pathlossReferenceRS-Pos* in *SRS-PosResourceSet* and the UE cannot accurately measure the pathloss RS provided in *pathlossReferenceRS-Pos*, the UE calculates using an RS resource from an SS/PBCH block with same index as the one the UE used to obtain *MIB*; otherwise, the UE uses the RS indicated by *pathlossReferenceRS-Pos* to calculate .

If a RedCap UE transmits SRS with frequency hopping outside the active UL BWP of carrier of serving cell in RRC\_CONNECTED state based on a configuration by *SRS-PosResourceSet*, the active UL BWP refers to the BWP provided by *bwp* in *SRS-PosTx-Hopping*.

If a RedCap UE transmits SRS with frequency hopping outside the initial UL BWP of carrier of serving cell in RRC\_INACTIVE state based on a configuration by *SRS-PosResourceSet*, the active UL BWP refers to the BWP provided by *bwp* in *SRS-PosTx-Hopping*.

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

## 7.4 Physical random access channel

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

If a PRACH transmission from a UE is in response to a detection of a PDCCH order by the UE that triggers a contention-free random access procedure and depending on the DL RS that the DM-RS of the PDCCH order is quasi-collocated with as described in clause 10.1

- when the PRACH association indicator is not present in the PDCCH order, or

- when the cell indicator field in the PDCCH order is not present or has value 0, or

- when a value of a PRACH association indicator field in the PDCCH order is 0 if the UE is not provided *SSB-MTC-AdditionalPCI*, or

- when the PRACH association indicator field in the PDCCH order indicates a *physCellId* associated with the cell of the PDCCH order reception,

or depending on an indicated SS/PBCH block

- when the PRACH transmission is on a non-serving cell indicated by the cell indicator field in the PDCCH order, or

- when a value of a PRACH association indicator field in the PDCCH order is 1 if the UE is not provided *SSB-MTC-AdditionalPCI*, or

- when the PRACH association indicator field in the PDCCH order indicates a *physCellId* that is different than the *physCellId* associated with the cell of the PDCCH order reception,

*referenceSignalPower* is provided by a corresponding *ss-PBCH-BlockPower*.

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

### 7.7.1 Type 1 PH report

If a UE determines that a Type 1 power headroom report for an activated serving cell is based on an actual PUSCH transmission then, for PUSCH transmission occasion on active UL BWP of carrier of serving cell ,

- if for the active UL BWP of carrier of serving cell , the UE is provided

- *twoPHRMode*,

- two SRS resource sets in *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage set to 'codebook' or 'nonCodebook',

- *dl-OrJointTCI-StateList* or *TCI-UL-State* and is indicated a first TCI-State or TCI-UL-State and a second TCI-State or TCI-UL-State, and

- *multipanelSchemeSDM* or *multipanelSchemeSFN*

the UE computes the Type 1 power headroom report associated with the k-th TCI-State or TCI-UL-State as

[dB]

- else, the UE computes the Type 1 power headroom report as

[dB]

where , , , , , , and are defined in clause 7.1.1.

If a UE is configured with multiple cells for PUSCH transmissions, where a SCS configuration on active UL BWP of carrier of serving cell is smaller than a SCS configuration on active UL BWP of carrier of serving cell , and if the UE provides a Type 1 power headroom report in a PUSCH transmission in a slot on active UL BWP that overlaps with multiple slots on active UL BWP , the UE provides a Type 1 power headroom report for the first PUSCH, if any, on the first slot of the multiple slots on active UL BWP that fully overlaps with the slot on active UL BWP . If a UE is configured with multiple cells for PUSCH transmissions, where a same SCS configuration on active UL BWP of carrier of serving cell and active UL BWP of carrier of serving cell , and if the UE provides a Type 1 power headroom report in a PUSCH transmission in a slot on active UL BWP , the UE provides a Type 1 power headroom report for the first PUSCH, if any, on the slot on active UL BWP that overlaps with the slot on active UL BWP .

If a UE is configured with multiple cells for PUSCH transmissions and provides a Type 1 power headroom report in a PUSCH transmission with PUSCH repetition Type B having a nominal repetition that spans multiple slots on active UL BWP and overlaps with one or more slots on active UL BWP , the UE provides a Type 1 power headroom report for the first PUSCH, if any, on the first slot of the one or more slots on active UL BWP that overlaps with the multiple slots of the nominal repetition on active UL BWP .

For a UE configured with EN-DC/NE-DC and capable of dynamic power sharing, if E-UTRA Dual Connectivity PHR [14, TS 36.321] is triggered, the UE provides power headroom of the first PUSCH, if any, on the determined NR slot as described in clause 7.7.

If a UE is configured with multiple cells for PUSCH transmissions, the UE does not consider for computation of a Type 1 power headroom report in a first PUSCH transmission that includes an initial transmission of transport block on active UL BWP of carrier of serving cell , a second PUSCH transmission on active UL BWP of carrier of serving cell that overlaps with the first PUSCH transmission if

- the second PUSCH transmission is scheduled by a DCI format in a PDCCH received in a second PDCCH monitoring occasion, and

- the second PDCCH monitoring occasion is after a first PDCCH monitoring occasion where the UE detects the earliest DCI format scheduling an initial transmission of a transport block after a power headroom report was triggered

or

- the second PUSCH transmission is after the first uplink symbol of the first PUSCH transmission minus where is determined according to [6, TS 38.214] assuming , , and with corresponding to the subcarrier spacing of the active downlink BWP of the scheduling cell for a configured grant if the first PUSCH transmission is on a configured grant after a power headroom report was triggered.

If the UE determines that a Type 1 power headroom report for an activated serving cell is based on a reference PUSCH transmission then, for PUSCH transmission occasion on active UL BWP of carrier of serving cell ,

- if for the active UL BWP of carrier of serving cell , the UE is provided

- *twoPHRMode*,

- two SRS resource sets in *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage set to 'codebook' or 'nonCodebook',

- *dl-OrJointTCI-StateList* or *TCI-UL-State* and is indicated a first TCI-State or TCI-UL-State and a second TCI-State or TCI-UL-State, and

- *multipanelSchemeSDM* or *multipanelSchemeSFN*

the UE computes the Type 1 power headroom report associated with the k-th TCI-State or TCI-UL-State as

[dB]

- else, the UE computes the Type 1 power headroom report as

[dB]

where and are computed assuming MPR=0 dB, A-MPR=0 dB, P-MPR=0 dB. TC = 0 dB. MPR, A-MPR, P-MPR and TC are defined in [8-1, TS 38.101-1], [8-2, TS 38.101-2], [8-3, TS 38.101-3] and [8-5, TS 38.101-5]. The remaining parameters are defined in clause 7.1.1 and, if *ul-powerControl* is not provided, and are obtained using and *p0-PUSCH-AlphaSetId* *=* 0, is obtained using *pusch-PathlossReferenceRS-Id =* 0, and . If *ul-powerControl* is provided and the UE is indicated one TCI-State or TCI-UL-State, and are obtained by *p0AlphaSetforPUSCH* associated with the indicated *TCI-State* or *TCI-UL-State*, is obtained by PL-RS associated with the indicated *TCI-State* or *TCI-UL-State*. If *ul-powerControl* is provided and the UE is indicated a first TCI-State or TCI-UL-State and a second TCI-State or TCI-UL-State, and for are obtained by *p0AlphaSetforPUSCH* associated with the *k*-th indicated *TCI-State* or *TCI-UL-State*, is obtained by PL-RS associated with the *k*-th indicated *TCI-State* or *TCI-UL-State*.

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

If a UE is provided, for active UL BWP of carrier of serving cell ,

- *twoPHRMode*,

- two SRS resource sets in *srs-ResourceSetToAddModList* or *srs-ResourceSetToAddModListDCI-0-2* with usage set to 'codebook' or 'nonCodebook',

- *dl-OrJointTCI-StateList* or *TCI-UL-State* and is indicated a first TCI-State or TCI-UL-State and a second TCI-State or TCI-UL-State, and

- *multipanelSchemeSDM* or *multipanelSchemeSFN*

the UE provides

- a first Type 1 power headroom report and a first configured maximum output power associated with the first *TCI-State* or *TCI-UL-State* for an actual PUSCH transmission using a spatial domain filter corresponding only to the first *TCI-State* or *TCI-UL-State*, and a second Type 1 power headroom report and a second configured maximum output power associated with the second *TCI-State* or *TCI-UL-State* for a reference PUSCH transmission using the *p0AlphaSetforPUSCH* and *pathlossReferenceRS-Id-r17* values associated with the second *TCI-State* or *TCI-UL-State*

- a second Type 1 power headroom report and a second configured maximum output power associated with the second *TCI-State* or *TCI-UL-State* for an actual PUSCH transmission using a spatial domain filter corresponding only to the second *TCI-State* or *TCI-UL-State*, and a first Type 1 power headroom report and a first configured maximum output power associated with the first *TCI-State* or *TCI-UL-State* for a reference PUSCH transmission using the *p0AlphaSetforPUSCH* and *pathlossReferenceRS-Id-r17* values associated with the first *TCI-State* or *TCI-UL-State*

- a first Type 1 power headroom report and a first configured maximum output power associated with the first *TCI-State* or *TCI-UL-State*, and a second Type 1 power headroom report and a second configured maximum output power associated with the second *TCI-State* or *TCI-UL-State*, for an actual PUSCH transmission using a spatial domain filter corresponding to the first *TCI-State* or *TCI-UL-State* and using a spatial domain filter corresponding to the second *TCI-State* or *TCI-UL-State*.

- a first Type 1 power headroom report and a first configured maximum output power associated with the first *TCI-State* or *TCI-UL-State* for a reference PUSCH transmission using the *p0AlphaSetforPUSCH* and *pathlossReferenceRS-Id-r17* values associated with the first *TCI-State* or *TCI-UL-State*, and a second Type 1 power headroom report and a second configured maximum output power associated with the second *TCI-State* or *TCI-UL-State* for another reference PUSCH transmission using the *p0AlphaSetforPUSCH* and *pathlossReferenceRS-Id-r17* values associated with the second *TCI-State* or *TCI-UL-State*

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

#### 9.1.3.1 Type-2 HARQ-ACK codebook in physical uplink control channel

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

while

if *harq-ACK-SpatialBundlingPUCCH* is not provided,

while

if PDCCH monitoring occasion is before an active UL BWP change on the serving cell of PUCCH transmission if the UE is provided *pucch-sSCellDyn*, or an active UL BWP change on the PCell if the UE is not provided *pucch-sSCellDyn*

;

else

if there is a PDSCH reception on serving cell that is scheduled by a DCI format scheduling more than one PDSCHs that provide respective more than one transport blocks with enabled HARQ-ACK information on respective more than one serving cells, where the DCI format is associated with a PDCCH reception in PDCCH monitoring occasion and *c* is the smallest serving cell index among the more than one serving cells

if

;

end if

;

if

;

else

;

end if

;

;

while

if the UE is scheduled PDSCH reception on serving cell, if any, from the more than one serving cells

if *maxNrofCodeWordsScheduledByDCI* is 2 for serving cell

= HARQ-ACK information bit corresponding to the first transport block of this cell

= HARQ-ACK information bit corresponding to the second transport block of this cell

;

else

= HARQ-ACK information bit corresponding to the transport block of this cell

;

end if

end if

;

end while

while

= NACK;

;

end while

;

end if

;

end if

end while

else

while

if PDCCH monitoring occasion is before an active UL BWP change on the serving cell of PUCCH transmission if the UE is provided *pucch-sSCellDyn*, or an active UL BWP change on the PCell if the UE is not provided *pucch-sSCellDyn*

;

else

if there is a PDSCH reception on serving cell that is scheduled by a DCI format scheduling more than one PDSCHs that provide respective more than one transport blocks with enabled HARQ-ACK information on respective more than one serving cells, where the DCI format is associated with a PDCCH reception in PDCCH monitoring occasion and *c* is the smallest serving cell index among the more than one serving cells

if

;

end if

;

if

;

else

;

end if

;

;

while

if the UE is scheduled PDSCH reception for transport blocks with enabled HARQ-ACK information on serving cell , if any, from the more than one serving cells

if *maxNrofCodeWordsScheduledByDCI* is 2 for serving cell

if the PDSCH reception provides two transport blocks

= binary AND operation of the HARQ-ACK information bits corresponding to the first and second transport blocks of this cell

else

= HARQ-ACK information bit corresponding to the first transport block of this cell

end if

else

= HARQ-ACK information bit of this cell

end if

;

end if

;

end while

while

= NACK;

;

end while

;

end if

;

end if

end while

end if

;

end while

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

### 9.1.5 HARQ-ACK codebook retransmission

With reference to slots of PUCCH transmissions on the primary cell and for Type-1 or Type-2 HARQ-ACK codebooks, a UE that transmitted or would transmit a PUCCH or a PUSCH with a first HARQ-ACK codebook in slot can be indicated by a DCI format with CRC scrambled by a C-RNTI or a MCS-C-RNTI that does not schedule a PDSCH reception [4, TS 38.212] on one or more serving cells and is received in a PDCCH ending in slot , to transmit a PUCCH with the first HARQ-ACK codebook in slot , where slot is after slot . The UE determines and a resource for the PUCCH transmission as described in clauses 9.2.3 and 9.2.5. If the UE is provided a periodic cell switching pattern for PUCCH transmissions by *pucch-sSCellPattern*, the UE further determines a corresponding cell based on the periodic cell switching pattern as described in clause 9.A.

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

### 9.2.1 PUCCH Resource Sets

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

A PUCCH resource includes the following parameters:

- a PUCCH resource index provided by *pucch-ResourceId*

- an index of the first PRB prior to frequency hopping or for no frequency hopping by *startingPRB*, if a UE is not provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- an index of the first PRB after frequency hopping by *secondHopPRB*, if a UE is not provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- an indication for intra-slot frequency hopping by *intraSlotFrequencyHopping*, if a UE is not provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- an index of a first interlace by *interlace0*, if a UE is provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- if provided, an index of a second interlace by *interlace1*, if a UE is provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- an index of an RB set by *rb-SetIndex*, if a UE is provided *useInterlacePUCCH-PUSCH* in *BWP-UplinkDedicated*

- an indication for applying one or both of *TCI-State* or *TCI-UL-State* by *applyIndicatedTCI-State*, if provided

- a configuration for a PUCCH format provided by *format*

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

### 9.2.2 PUCCH Formats for UCI transmission

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

A spatial setting for a PUCCH transmission by a UE is provided by

- an indicated *TCI-State* or *TCI-UL-State*, if provided, as described in [6, TS 38.214];

- *PUCCH-SpatialRelationInfo* if the UE is configured with a single value for *pucch-SpatialRelationInfoId*;

- as described in [11, TS 38.321], if the UE is provided multiple values for *PUCCH-SpatialRelationInfo*. The UE applies corresponding actions in [11, TS 38.321] and a corresponding setting for a spatial domain filter to transmit PUCCH in the first slot that is after slot where is the slot where the UE would transmit a PUCCH with HARQ-ACK information with ACK value corresponding to a PDSCH reception providing the *PUCCH-SpatialRelationInfo*, each slot consists of symbols as defined in [4, TS 38.211],and is the SCS configuration for the PUCCH

- If *PUCCH-SpatialRelationInfo* or the indicated *TCI-UL-State* provides *ssb-Index*, the UE transmits the PUCCH using a same spatial domain filter as for a reception of a SS/PBCH block with index provided by *ssb-Index* for a same serving cell or, if *servingCellId* is provided, for a serving cell indicated by *servingCellId*

- else if *PUCCH-SpatialRelationInfo* or the indicated *TCI-UL-State* provides *csi-RS-Index*, or the indicated *TCI-State* provides *csi-rs* configured with *qcl-Type* set to 'typeD', the UE transmits the PUCCH using a same spatial domain filter as for a reception of a CSI-RS with resource index provided by *csi-RS-Index* or csi-rs for a same serving cell or, if *servingCellId* or *cell* is provided, for a serving cell indicated by *servingCellId* or *cell*

- else *PUCCH-SpatialRelationInfo* or the indicated *TCI-UL-State* provides *srs*, the UE transmits the PUCCH using a same spatial domain filter as for a transmission of an SRS with resource index provided by *resource* for a same serving cell and/or active UL BWP or, if *servingCellId* and/or *uplinkBWP* are provided, for a serving cell indicated by *servingCellId* and/or for an UL BWP indicated by *uplinkBWP*

- an indicated *applyIndicatedTCI-State*, if provided

- if *applyIndicatedTCI-State* = 'first', the UE transmits a PUCCH using a spatial domain filter corresponding to a first *TCI-State* or *TCI-UL-State*

- if *applyIndicatedTCI-State* = 'second', the UE transmits a PUCCH using a spatial domain filter corresponding to second *TCI-State* or *TCI-UL-State*

- if *applyIndicatedTCI-State* = 'both', the UE transmits a PUCCH using respective first and second spatial domain filters corresponding to the first and the second *TCI-State* or *TCI-UL-State*

If the UE

- is not provided *coresetPoolIndex* or is provided *coresetPoolIndex* with a value of 0 for first CORESETs on an active DL BWP of a serving cell, and

- is provided *coresetPoolIndex* with a value of 1 for second CORESETs on the active DL BWP of the serving cells,

the first and second *TCI-State* or *TCI-UL-State* are specific to the first and second CORESETs, respectively.

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

### 9.2.6 PUCCH repetition procedure

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

For ,

- the UE repeats the PUCCH transmission with the UCI over slots

- if the UE is provided *multipanelSFN-Scheme* and *applyIndicatedTCI-State* = 'both', a repetition of the PUCCH transmission simultaneously uses first and second spatial domain filters corresponding to first and second *TCI-State* or *TCI-UL-State*

- a repetition of the PUCCH transmission in each of the slots has a same number of consecutive symbols, as provided by *nrofSymbols*

- a repetition of the PUCCH transmission in each of the slots has a same first symbol, as provided by *startingSymbolIndex* if *subslotLengthForPUCCH* is not provided; otherwise mod(*startingSymbolIndex*, *subslotLengthForPUCCH*)

- the UE is configured by *interslotFrequencyHopping* whether or not to perform frequency hopping for repetitions of the PUCCH transmission in different slots

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

The UE repeats the above procedure until there is no PUCCH overlapping with any PUCCH with repetitions in the slot.

When a PUCCH resource used for repetitions of a PUCCH transmission by a UE includes

- first and second spatial settings, or first and second sets of power control parameters, as described in [11, TS 38.321] and in clauses 7 and 7.2.1, or

- first and second *TCI-State* or *TCI-UL-State* and *applyIndicatedTCI-State* = 'both', and the PUCCH resource does not include *multipanelSFN-Scheme*

the UE

- uses the first and second spatial settings or the first and second indicated *TCI-State* or *TCI-UL-State*, or the first and second sets of power control parameters, for first and second repetitions of the PUCCH transmission, respectively, when ,

- alternates between the first and second spatial settings or between the first and second indicated *TCI-State* or *TCI-UL-State*, or between the first and second sets of power control parameters, respectively, per repetitions of the PUCCH transmission, where if *mappingPattern* = 'cyclicMapping'; else, .

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

9.3 UCI reporting in physical uplink shared channel

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

If a DCI format that includes a beta\_offset indicator field with one bit or two bits, as configured by *UCI-OnPUSCH* for DCI format 0\_1/0\_3 or *UCI-OnPUSCH-DCI-0-2* for DCI format 0\_2, schedules the PUSCH transmission from the UE, the UE is provided by each of {*betaOffsetACK-Index1*, *betaOffsetACK-Index2*, *betaOffsetACK-Index3*}, the {first, second, third} values provided by *betaOffsetsCrossPri0*, or *betaOffsetsCrossPri0DCI-0-2,* and the {first, second, third} values provided by *betaOffsetsCrossPri1*, or *betaOffsetsCrossPri1DCI-0-2*, a set of two or four indexes from Table 9.3-1 for multiplexing HARQ-ACK information in the PUSCH transmission and by each of {*betaOffsetCSI-Part1-Index1*, *betaOffsetCSI-Part1-Index2*} a set of two or four indexes, and by each of {*betaOffsetCSI-Part2-Index1*, *betaOffsetCSI-Part2-Index2*} a set of two or four indexes from Table 9.3-2, respectively, for multiplexing Part 1 CSI reports and Part 2 CSI reports, respectively, in the PUSCH transmission. The beta\_offset indicator field indicates a value and/or a value, and/or a value, a value and a value from the respective sets of values, with the mapping defined in Table 9.3-3 and in Table 9.3-3A. If the PUSCH transmission has priority 0 or priority 1, and the UE is provided *uci-MuxWithDiffPrio*, and the UE multiplexes HARQ-ACK information of priority 1 or priority 0 in the PUSCH, the UE applies the {first, second, third} values provided by *betaOffsetsCrossPri1* *= 'dynamic'* for DCI format 0\_1/0\_3, *betaOffsetsCrossPri1DCI-0-2= 'dynamic'* for DCI format 0\_2, or applies the {first, second, third} values provided by *betaOffsetsCrossPri0 = 'dynamic'* for DCI format 0\_1/0\_3, *betaOffsetsCrossPri0DCI-0-2= 'dynamic'* for DCI format 0\_2.

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

## 10.1 UE procedure for determining physical downlink control channel assignment

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

A set of PDCCH candidates for a UE to monitor is defined in terms of PDCCH search space sets. A search space set can be a CSS set or a USS set. A UE monitors PDCCH candidates in one or more of the following search spaces sets

- a Type0-PDCCH CSS set on the primary cell of the MCG configured by

- *pdcch-ConfigSIB1* in MIB or by *searchSpaceSIB1* in *PDCCH-ConfigCommon* or by *searchSpaceZero* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a SI-RNTI, or

- *searchSpaceZero* by providing *searchSpaceID*=0 for *searchSpaceMCCH* or *searchSpaceMTCH* for a DCI format 4\_0 with CRC scrambled by a MCCH-RNTI or a G-RNTI for broadcast, or

- *searchSpaceZero* by providing *searchSpaceID*=0 for *searchspaceMulticastMCCH* for a DCI format 4\_0 with CRC scrambled by a Multicast MCCH-RNTI, or by *searchSpaceMulticastMTCH* for a DCI format 4\_1 with CRC scrambled by a G-RNTI for multicast in RRC\_INACTIVE state

- a Type0A-PDCCH CSS set configured by *searchSpaceOtherSystemInformation* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a SI-RNTI on the primary cell of the MCG

- a Type0B-PDCCH CSS set configured by

- *searchSpaceMCCH* and *searchSpaceMTCH* for a DCI format 4\_0 with CRC scrambled by a MCCH-RNTI or a G-RNTI for broadcast, on the primary cell of the MCG

- *searchspaceMulticastMCC*H for a DCI format 4\_0 with CRC scrambled by a Multicast MCCH-RNTI, or by *searchSpaceMulticastMTCH* for a DCI format 4\_1 with CRC scrambled by a G-RNTI for PDCCH receptions in RRC\_INACTIVE state

- a Type1-PDCCH CSS set configured by *ra-SearchSpace* in *PDCCH-ConfigCommon* for a DCI format with CRC scrambled by a RA-RNTI, a MsgB-RNTI, or a TC-RNTI on the primary cell

- a Type1A-PDCCH CSS set configured by *sdt-SearchSpace* in *PDCCH-ConfigCommon* for a DCI format with CRC scrambled by a C-RNTI or a CS-RNTI on the primary cell

- a Type2-PDCCH CSS set configured by *pagingSearchSpace* in *PDCCH-ConfigCommon* for a DCI format 1\_0 with CRC scrambled by a P-RNTI on the primary cell of the MCG

- a Type2A-PDCCH CSS set configured by *pei-SearchSpace* in *pei-ConfigBWP* for a DCI format 2\_7 with CRC scrambled by a PEI-RNTI on the primary cell of the MCG

- a Type3-PDCCH CSS set configured by

- *SearchSpace* in *PDCCH-Config* with *searchSpaceType* = *common* for DCI formats with CRC scrambled by INT-RNTI, SFI-RNTI, TPC-PUSCH-RNTI, TPC-PUCCH-RNTI, TPC-SRS-RNTI, CI-RNTI, or cellDTRX-RNTI and, only for the primary cell, C-RNTI, MCS-C-RNTI, CS-RNTI(s), or PS-RNTI, or

- *SearchSpace* in *pdcch-ConfigMulticast* for DCI formats with CRC scrambled by G-RNTI, or G-CS-RNTI, or

- *searchSpaceMCCH* and *searchSpaceMTCH* on a secondary cell for a DCI format 4\_0 with CRC scrambled by a MCCH-RNTI or a G-RNTI for broadcast, and

- a USS set configured by

- *SearchSpace* or by *SearchSpaceExt-v1800* in *PDCCH-Config* with *searchSpaceType* = *ue-Specific* for DCI formats with CRC scrambled by C-RNTI, MCS-C-RNTI, SP-CSI-RNTI, CS-RNTI(s), SL-RNTI, SL-CS-RNTI, SL Semi-Persistent Scheduling V-RNTI, or NCR-RNTI

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

For a CORESET with index 0,

- if the UE is provided *TCI-State* and *followUnifiedTCI-State* for the CORESET, the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET and a DM-RS antenna port for PDSCH receptions scheduled by DCI formats provided by PDCCH receptions in the CORESET are quasi co-located with the reference signals provided by the indicated *TCI-State* [6, TS 38.214]

- else if the UE is provided *dl-OrJointTCI-StateList* and is indicated a first *TCI-State* and a second *TCI-State*, and *applyIndicatedTCI-State* for the CORESET

- if the CORESET is associated with a Type 0/0A/2-PDCCH CSS set that has search space set index 0

- if *applyIndicatedTCI-State* = 'first', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the first *TCI-State*,

- if *applyIndicatedTCI-State* = 'second', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the second *TCI-State*,

- if *applyIndicatedTCI-State* = 'none', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the one or more DL RS configured by a TCI state, where the TCI state is indicated by a MAC CE activation command for the CORESET, if any

- else

- if *applyIndicatedTCI-State* = 'first', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the first *TCI-State*,

- if *applyIndicatedTCI-State* = 'second', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the second *TCI-State*,

- if *applyIndicatedTCI-State* = 'both', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the first and the second *TCI-State,*

- if *applyIndicatedTCI-State* = 'none', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the one or more DL RS configured by a TCI state, where the TCI state is indicated by a MAC CE activation command for the CORESET.

- else, the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with

- the one or more DL RS configured by a TCI state, where the TCI state is indicated by a MAC CE activation command for the CORESET, if any, or

- the one or more DL RS configured by a TCI state provided by *CandidateTCI-State*, where the TCI state is indicated by an LTM Cell Switch Command MAC CE that triggers a RACH-less or RACH-based LTM cell switch, if any, or

- a SS/PBCH block the UE identified during a most recent random access procedure not initiated by a PDCCH order that triggers a contention-free random access procedure, if no MAC CE activation command indicating a TCI state for the CORESET is received after the most recent random access procedure, or a SS/PBCH block the UE identified during a most recent configured grant PUSCH transmission as described in clause 19 or 22.1.

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

If a UE is provided *dl-OrJointTCI-StateList* and is indicated a first *TCI-State* and a second *TCI-State*, and is provided *applyIndicatedTCI-State* for a CORESET, other than a CORESET with index 0,

- if the CORESET is associated only with USS sets and/or Type3-PDCCH CSS sets

- if *applyIndicatedTCI-State* = 'first', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the first *TCI-State*

- if *applyIndicatedTCI-State* = 'second', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the second *TCI-State*

- if *applyIndicatedTCI-State* = 'both', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the first *TCI-State* and the second *TCI-State*

- if the CORESET is associated at least with CSS sets other than Type3-PDCCH CSS sets,

- if *applyIndicatedTCI-State* = 'first', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the first *TCI-State*

- if *applyIndicatedTCI-State* = 'second', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the second *TCI-State*

- if *applyIndicatedTCI-State* = 'both', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the reference signals provided by the first *TCI-State* and the second *TCI-State*

- if *applyIndicatedTCI-State* = 'none', the UE assumes that a DM-RS antenna port for PDCCH receptions in the CORESET is quasi co-located with the one or more DL RS configured by a TCI state indicated by a MAC CE activation command for the CORESET

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

In the following pseudocode, if the UE is provided *monitoringCapabilityConfig* = *r17monitoringcapability* for the primary cell,and are replaced by and respectively, and and are replaced by and respectively.

For all search space sets that a UE monitors PDCCH on the primary cell within a slot , or within a group of slots for a corresponding combination , or within a span in slot , denote by a set of CSS sets, except for CSS sets provided by *searchSpaceMCCH*, *searchSpaceMTCH*, *searchSpaceMulticastMCCH*, *searchSpaceMulticastMTCH* or by *SearchSpace* in *pdcch-ConfigMulticast* for DCI formats with CRC scrambled by G-RNTI or G-CS-RNTI, with cardinality of and by a set of USS sets and CSS sets provided by *searchSpaceMCCH*, *searchSpaceMTCH* or by *SearchSpace* in *pdcch-ConfigMulticast* for DCI formats with CRC scrambled by G-RNTI or G-CS-RNTI with cardinality of with PDCCH candidates and non-overlapping CCEs counted on the primary cell. The location of search space sets , , in is according to an ascending order of the search space set index.

Denote by , , the number of counted PDCCH candidates for monitoring for CSS set and by , , the number of counted PDCCH candidates for monitoring for search space set . If a UE indicates *numBD-twoPDCCH-r17* with value of 3 and is provided *searchSpaceLinkingId* with same value for search space sets and , with , set if and are CSS sets or set if and are USS sets.

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