3GPP TSG-RAN WG1 Meeting #120 **R1-2501653**
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CR-Form-v12.3

CHANGE REQUEST

38.214	CR	0660	rev	-	Current version:	18.5.0

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Proposed change affects: UICC apps ☐ ME ☐ Radio Access Network ☐ Core Network ☐

Title:	Rel-17 editorial corrections for TS 38.214 (mirrored to Rel-18)		
Source to WG: ***Source to TSG:***	Nokia		
Work item code:	NR_FeMIMO-Core, NR_cov_enh-Core	***Date:***	2025-02-27
Category:	**A** *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.	***Release:***	Rel-18 *Use one of the following releases:* *Rel-8 (Release 8)* *Rel-9 (Release 9)* *Rel-10 (Release 10)* *Rel-11 (Release 11)* … *Rel-17 (Release 17)* *Rel-18 (Release 18)* *Rel-19 (Release 19)* *Rel-20 (Release 20)*

Reason for change:	In clause 5.2.1.5.1, in Rel-17, group-based beam reporting has been enhanced to be associated with two CSI resource sets as stated in TS38.214: "For aperiodic CSI, and for aperiodic CSI resource settings, each trigger state configured using the higher layer parameter *CSI-AperiodicTriggerState* is associated with one or multiple *CSI-ReportConfig* where the *CSI-ReportConfig* configured with *groupBasedBeamReporting-r17* is associated with *resourcesForChannel* and *resourcesForChannel2*, which correspond to first and second resource sets, respectively, for L1-RSRP measurement." It has been noted that *qcl-info2* which can be configured in *resourcesForChannel2* is missing from the specification. In clauses 6.3.1, the parameter *pusch-FrequencyHoppingInterval* related to DMRS bundling is incorrectly called *pusch-FrequencyHopping-Interval*.
Summary of change:	In clause 5.2.1.5.1, *qcl-info2* which can be configured in *resourcesForChannel2* is missing from the specification. Also updated the TCI-State naming which was misspelled. In clauses 6.3.1, the parameter name is corrected to *pusch-FrequencyHoppingInterval*.
Consequences if not approved:	Inconsistency with TS 38.331.

Clauses affected:	5.2.1.5.1, 6.3.1			
	Y	**N**		
Other specs affected: ***(show related CRs)***	☐	☐	Other core specifications	TS/TR ... CR ...
	☐	☐	Test specifications	TS/TR ... CR ...
	☐	☐	O&M Specifications	TS/TR ... CR ...

Other comments:
This CR's revision history:

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5.2.1.5.1 Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have the same numerology

For CSI-RS resource sets associated with Resource Settings configured with the higher layer parameter *resourceType* set to 'aperiodic', 'periodic', or 'semi-persistent', trigger states for Reporting Setting(s) (configured with the higher layer parameter *reportConfigType* set to 'aperiodic') and/or Resource Setting for channel and/or interference measurement on one or more component carriers are configured using the higher layer parameter *CSI-AperiodicTriggerStateList*. For a reporting setting for which the *CSI-ReportConfig* contains a list of sub-configurations provided by the higher layer parameter *csi-ReportSubConfigToAddModList*, one or more trigger states can be configured with each indicating one or more of the sub-configurations. For aperiodic CSI report triggering, a single set of CSI triggering states are higher layer configured, wherein the CSI triggering states can be associated with any candidate DL BWP. A UE is not expected to receive more than one DCI with non-zero *CSI request* field per slot per cell. A UE is not expected to receive DCI with non-zero *CSI request* field within a cell group in a slot overlapping with any slot receiving DCI with non-zero *CSI request* field in the same cell group. A UE is not expected to be configured with different *TCI-StateId*'s for the same aperiodic CSI-RS resource ID configured in multiple aperiodic CSI-RS resource sets with the same triggering offset in the same aperiodic trigger state. A UE is not expected to receive more than one aperiodic CSI report request for transmission in a given slot per cell. A UE is not expected to receive an aperiodic CSI report request for transmission in a slot overlapping with any slot having an aperiodic CSI report transmission in the same cell group. If a UE does not indicate its capability of *csi-TriggerStateNon-ActiveBWP* the UE is not expected to be triggered with a CSI report for a non-active DL BWP. Otherwise, when a UE is triggered with a CSI report for a DL BWP that is non-active when expecting to receive the most recent occasion, no later than the CSI reference resource, of the associated NZP CSI-RS, the UE is not expected to report the CSI for the non-active DL BWP and the CSI report associated with that BWP is omitted. When a UE is triggered with aperiodic NZP CSI-RS in a DL BWP that is non-active when expecting to receive the NZP CSI-RS, the UE is not expected to measure the aperiodic CSI-RS. In the carrier of the serving cell expecting to receive that associated NZP CSI-RS, if the active DL BWP when receiving the NZP CSI-RS is different from the active DL BWP when receiving the triggering DCI,

- the last symbol of the PDCCH span of the DCI carrying the BWP switching shall be no later than the last symbol of the PDCCH span of the DCI carrying the CSI trigger, irrespective of whether they are in the same carrier of a serving cell or not and irrespective of whether they are in the same SCS or not;
- the UE is not expected to have any other BWP switching in that carrier after the last symbol of the PDCCH span covering the DCI carrying the CSI trigger and before the first symbol of the triggered NZP CSI-RS or CSI-IM.
- when the PDCCH reception includes two PDCCH candidates from two respective search space sets, as described in clause 10.1 of [6, TS 38.213], the span that involves the PDCCH candidate that ends later in time is used.

A trigger state is initiated using the *CSI request* field in DCI.

- When all the bits of *CSI request* field in DCI are set to zero, no CSI is requested.
- When the number of configured CSI triggering states in *CSI-AperiodicTriggerStateList* is greater than $2^{N_{\text{TS}}}-1$, where N_{TS} is the number of bits in the DCI *CSI request* field, the UE receives a subselection indication, as described in clause 6.1.3.13 of [10, TS 38.321], used to map up to $2^{N_{\text{TS}}}-1$ trigger states to the codepoints of the *CSI request* field in DCI. N_{TS} is configured by the higher layer parameter *reportTriggerSize* where $N_{TS} \in \{0,1,2,3,4,5,6\}$. When the UE would transmit a PUCCH with HARQ-ACK information in slot n corresponding to the PDSCH carrying the subselection indication, the corresponding action in [10, TS 38.321] and UE assumption on the mapping of the selected CSI trigger state(s) to the codepoint(s) of DCI CSI request field shall be applied starting from the first slot that is after slot $n + 3N_{slot}^{subframe,\mu} + \frac{2^{\mu}}{2^{\mu_{K_{mac}}}} \cdot k_{\text{mac}}$ where μ is the SCS configuration for the PUCCH and $\mu_{K_{mac}}$ is the subcarrier spacing configuration for k_{mac} with a value of 0 for frequency range 1 and for FR2-NTN, and k_{mac} is provided by *K-Mac* or $k_{\text{mac}} = 0$ if *K-Mac* is not provided..
- When the number of CSI triggering states in *CSI-AperiodicTriggerStateList* is less than or equal to $2^{N_{\text{TS}}}-1$, the *CSI request* field in DCI directly indicates the triggering state.
- For each aperiodic CSI-RS resource in a CSI-RS resource set associated with each CSI triggering state, the UE is indicated the quasi co-location configuration of quasi co-location RS source(s) and quasi co-location type(s), as described in clause 5.1.5, through higher layer signaling of *qcl-info* or *qcl-info2* which contains a list of references to *TCI-State's* for the aperiodic CSI-RS resources associated with the CSI triggering state. If a *TCI-*

State referred to in the list is configured with a reference to an RS configured with *qcl-Type* set to 'typeD', that RS may be an SS/PBCH block located in the same or different CC/DL BWP or a CSI-RS resource configured as periodic or semi-persistent located in the same or different CC/DL BWP.

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6.3.1 Frequency hopping for PUSCH repetition Type A and for TB processing over multiple slots

For PUSCH repetition Type A other than the PUSCH scheduled by RAR UL grant or fallbackRAR UL grant or by DCI format 0_0 with CRC scrambled by TC-RNTI and for TB processing over multiple slots (as determined according to procedures defined in Clause 6.1.2.1 for scheduled PUSCH, or Clause 6.1.2.3 for configured PUSCH), a UE is configured for frequency hopping by the higher layer parameter *frequencyHoppingDCI-0-2* in *pusch-Config* for PUSCH transmission scheduled by DCI format 0_2, and by *frequencyHopping* provided in *pusch-Config* for PUSCH transmission scheduled by a DCI format other than 0_2, and by *frequencyHopping* provided in *configuredGrantConfig* for configured PUSCH transmission. For PUSCH repetition Type A scheduled by RAR UL grant or by DCI format 0_0 with CRC scrambled by TC-RNTI, a UE is configured for frequency hopping by the frequency hopping flag information field of the RAR UL grant, and by the frequency hopping flag information field of DCI format 0_0 with CRC scrambled by TC-RNTI, respectively. One of two frequency hopping modes can be configured:

- Intra-slot frequency hopping, applicable to single slot and multi-slot configured PUSCH transmission, multi-slot PUSCH transmission scheduled by DCI format 0_1, 0_2 or 0_3, each of multiple PUSCH transmissions on a serving cell scheduled by a DCI if the higher layer parameter *pusch-TimeDomainAllocationListForMultiPUSCH* is configured and each of multiple configured grant PUSCH transmissions in a configuration where the higher layer parameters *cg-nrofSlots* and *cg-nrofPUSCH-InSlot* are provided.

- Inter-slot frequency hopping, applicable to multi-slot PUSCH transmission.

For operation with shared spectrum channel access in FR1, the UE does not expect that two hops of a PUSCH transmission are in different RB sets.

In case of resource allocation type 2, the UE transmits PUSCH without frequency hopping.

In case of resource allocation type 1, whether or not transform precoding is enabled for PUSCH transmission, the UE may perform PUSCH frequency hopping, if the frequency hopping field in a corresponding detected DCI format or in a random access response UL grant is set to 1, or if for a Type 1 PUSCH transmission with a configured grant the higher layer parameter *frequencyHoppingOffset* is provided, otherwise no PUSCH frequency hopping is performed. When frequency hopping is enabled for PUSCH, the RE mapping is defined in clause 6.3.1.6 of [4, TS 38.211].

For a PUSCH scheduled by RAR UL grant, fallbackRAR UL grant, or by DCI format 0_0 with CRC scrambled by TC-RNTI, frequency offsets are obtained as described in clause 8.3 of [6, TS 38.213]. Otherwise, for a PUSCH scheduled by DCI format 0_0/0_1/0_3 or a PUSCH based on a Type2 configured UL grant activated by DCI format 0_0/0_1 and for resource allocation type 1, frequency offsets are configured by higher layer parameter *frequencyHoppingOffsetLists* in *pusch-Config*. For a PUSCH scheduled by DCI format 0_2 or a PUSCH based on a Type2 configured UL grant activated by DCI format 0_2 and for resource allocation type 1, frequency offsets are configured by higher layer parameter *frequencyHoppingOffsetListsDCI-0-2* in *pusch-Config*.

- When the size of the active BWP is less than 50 PRBs, one of two higher layer configured offsets is indicated in the UL grant.

- When the size of the active BWP is equal to or greater than 50 PRBs, one of four higher layer configured offsets is indicated in the UL grant.

For PUSCH based on a Type1 configured UL grant the frequency offset is provided by the higher layer parameter *frequencyHoppingOffset* in *rrc-ConfiguredUplinkGrant*.

For a MsgA PUSCH the frequency offset is provided by the higher layer parameter as described in [6, TS 38.213].

In case of intra-slot frequency hopping, the starting RB in each hop is given by:

$$RB_{start} = \begin{cases} RB_{start} & i = 0 \\ \left(RB_{start} + RB_{offset}\right) \bmod N_{BWP}^{size} & i = 1 \end{cases},$$

where i=0 and i=1 are the first hop and the second hop respectively, and $\mathrm{RB}_{\mathrm{start}}$ is the starting RB within the UL BWP, as calculated from the resource block assignment information of resource allocation type 1 (described in Clause 6.1.2.2.2) or as calculated from the resource assignment for MsgA PUSCH (described in [6, TS 38.213]) and $\mathrm{RB}_{\mathrm{offset}}$ is the frequency offset in RBs between the two frequency hops. The number of symbols in the first hop is given by $\lfloor N_{symb}^{PUSCH,s}/2 \rfloor$, the number of symbols in the second hop is given by $N_{symb}^{PUSCH,s} - \lfloor N_{symb}^{PUSCH,s}/2 \rfloor$, where $N_{symb}^{PUSCH,s}$ is the length of the PUSCH transmission in OFDM symbols in one slot.

In case of inter-slot frequency hopping and when *pusch-DMRS-Bundling* is not enabled, or for inter-slot frequency hopping for a PUSCH scheduled by RAR UL grant or DCI format 0_0 with CRC scrambled by TC-RNTI, the starting RB during slot n_s^μ is given by:

$$\mathrm{RB}_{\mathrm{start}}\left(n_s^\mu\right) = \begin{cases} \mathrm{RB}_{\mathrm{start}} & n_s^\mu \bmod 2 = 0 \\ \left(\mathrm{RB}_{\mathrm{start}} + \mathrm{RB}_{\mathrm{offset}}\right) \bmod N_{BWP}^{size} & n_s^\mu \bmod 2 = 1 \end{cases},$$

where n_s^μ is the current slot number within a system radio frame, where a multi-slot PUSCH transmission can take place, $\mathrm{RB}_{\mathrm{start}}$ is the starting RB within the UL BWP, as calculated from the resource block assignment information of resource allocation type 1 (described in Clause 6.1.2.2.2) and $\mathrm{RB}_{\mathrm{offset}}$ is the frequency offset in RBs between the two frequency hops.

In case of inter-slot frequency hopping and when *pusch-DMRS-Bundling* is enabled, and when a PUSCH is not scheduled by RAR UL grant or DCI format 0_0 with CRC scrambled by TC-RNTI, the starting RB during slot n_s^μ is given by:

$$\mathrm{RB}_{\mathrm{start}}\left(n_s^\mu\right) = \begin{cases} \mathrm{RB}_{\mathrm{start}} & \left\lfloor \frac{n_s^\mu}{N_{FH}} \right\rfloor \bmod 2=0 \\ \left(\mathrm{RB}_{\mathrm{start}} + \mathrm{RB}_{\mathrm{offset}}\right) \bmod N_{BWP}^{size} & \left\lfloor \frac{n_s^\mu}{N_{FH}} \right\rfloor \bmod 2=1 \end{cases}$$

where n_s^μ is the current slot number within a system radio frame, N_{FH} is the value of the higher layer parameter *pusch-FrequencyHoppingInterval* ~~*pusch-FrequencyHopping-Interval*~~, $\mathrm{RB}_{\mathrm{start}}$ is the starting RB within the UL BWP, as calculated from the resource block assignment information of resource allocation type 1 (described in Clause 6.1.2.2.2) and $\mathrm{RB}_{\mathrm{offset}}$ is the frequency offset in RBs between the two frequency hops.

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