**3GPP TSG-RAN WG1 Meeting #117 *R1-240xxxx***

**Fokuoka, Japan, May 20th – 24th, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  | **38.212** | **CR** | **xxxx** | **rev** | **-** | **Current version:** | **18.2.0** |  |
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| *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)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Corrections on PRACH association indicator in PDCCH order in 38.212 |
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| ***Source to WG:*** | Huawei, HiSilicon, Google, Ericsson, ZTE, Samsung |
| ***Source to TSG:*** |  |
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| ***Work item code:*** | NR\_MIMO\_evo\_DL\_UL-Core |  | ***Date:*** | 2024-05-10 |
|  |  |  |  |  |
| ***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 canbe 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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)Rel-20 (Release 20)* |
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| ***Reason for change:*** | According to 38.212, when UE is configured with both LTM and mTRP operation with two TAs, Cell indicator and PRACH association indicator both exist in PDCCH order. In this case, how can UE understand the intention of the PDCCH order?Basically, there are following four cases:* Case 1: Cell indicator = 0 and PRACH association indicator = 0;
* Case 2: Cell indicator = 0 and PRACH association indicator = non-zero;
* Case 3: Cell indicator = non-zero and PRACH association indicator = 0;
* Case 4: Cell indicator = non-zero and PRACH association indicator = non-zero;

In Case 1 and 2, the PDCCH order can be interpreted to trigger RACH for the serving cell. Details of the triggered RACH, i.e., PL RS (when the serving cell is configured with intra-cell mTRP) or PCI (when the serving cell is configured with inter-cell mTRP), can be determined according to PRACH association indicator. While, in Case 3 and 4, the intention of the PDCCH order is unclear. One reasonable interpretation is that the PDCCH order is used to trigger RACH for a candidate cell. UE can determine the candidate cell according to Cell indicator. The PRACH association indicator is not applied.This issue has been discussed for some meetings and up to now the only outcome is to preclude Case 4 which is not sufficient to avoid ambiguity of the spec. A simple way to capture above rule is to restrict that **the PRACH association indicator field is reserved if the cell indicated by Cell indicator field is a candidate cell (i.e., Cell indicator = non-zero).**

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| **Conclusion***When a UE is configured with both the inter-cell multi-DCI based Multi-TRP operation with two TAs and Rel-18 LTM features, the UE does not expect the cell indicator field and PCI indicator field to be non-zero simultaneously.* * *FFS: cell indicator field and PCI indicator field are not non-zero simultaneously*
	+ *Including potential specification impact*
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Another issue for the PRACH association field is that the parameter name of the second TAG, i.e., *tag-Id2*, is not aligned with the one in 38.331 which is *tag2-Id*.  |
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| ***Summary of change:*** | 1. Introduce a restriction that PRACH association indicator field is reserved if the cell indicated by Cell indicator field is a candidate cell.2. Aligned the parameter name of the second TAG with 38.331. |
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| ***Consequences if not approved:*** | The spec is unclear. |
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| ***Clauses affected:*** | 7.3.1.2.1 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
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| ***Other comments:*** |  |
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| ***This CR's revision history:*** |  |

##### 7.3.1.2.1 Format 1\_0

DCI format 1\_0 is used for the scheduling of PDSCH in one DL cell.

The following information is transmitted by means of the DCI format 1\_0 with CRC scrambled by C-RNTI or CS-RNTI or MCS-C-RNTI:

- Cell indicator -$ \left⌈log\_{2}\left(C+1\right)\right⌉$ bits indicating the cell for the corresponding PRACH transmission if the UE is configured with higher layer parameter *EarlyUlSyncConfig*, where *C* is the number of candidate cells configured with higher layer parameter *EarlyUlSyncConfig*; 0 bit otherwise. The bit field index 0 of the cell indicator field is mapped to the serving cell, and other bit field indexes are mapped to the candidate cells configured with higher layer parameter *EarlyUlSyncConfig* according to an ascending order of a candidate identity configured by *ltm-CandidateId*, with the bit field index 1 mapped to the candidate cell with the smallest candidate identity.

- PRACH association indicator - 0 or 1 bit

- 1bit if the UE is provided with *tag2-Id*, and the UE is not provided *coresetPoolIndex* or is provided *coresetPoolIndex* with value 0 for the first CORESETs, and is provided *coresetPoolIndex* with value 1 for the second CORESETs. This field is reserved if the cell indicated by Cell indicator field is a candidate cell.

- This field indicates the PCI associated with the PRACH transmission if the UE is provided *SSB-MTC-AddtionalPCI*. The bit field index 0 of this field is mapped to the PCI of the serving cell, and the bit field index 1 of this field is mapped to the additional PCI associated with active TCI states.

- This field indicates the PL-RS for the PRACH transmission if the UE is not provided *SSB-MTC-AddtionalPCI*. The bit field index 0 of this field is mapped to the DL RS that the DM-RS of the PDCCH order is quasi-collocated with, and the bit field index 1 of this field is mapped to the SS/PBCH indicated by the SS/PBCH index field in this DCI format.

- 0 bit otherwise.

- PRACH retransmission indicator - 0 or 1 bit

- 1bit if the UE is configured with higher layer parameter *EarlyUlSyncConfig*. This field indicates initial transmission or retransmission of PRACH according to Table 7.3.1.2.1-3 if the cell indicated by Cell indicator field is a candidate cell, and this field is reserved if the cell indicated by Cell indicator field is a serving cell but not a candidate cell.

- 0 bit otherwise.

**<Unchanged parts are omitted>**