**3GPP TSG RAN WG1 #120 R1-250xxxx**

**Athens, Greece, February 17th – 21st, 2025**

|  |
| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **38.213** | **CR** | **-** | **rev** | **-** | **Current version:** | **18.5.0** |  |
|  |
| *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)*.* |
|  |

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

|  |
| --- |
|  |
| ***Title:***  | Draft CR on LTM PRACH and serving cell UL transmission in a same band |
|  |  |
| ***Source to WG:*** | Moderator(MediaTek) |
| ***Source to TSG:*** | R1 |
|  |  |
| ***Work item code:*** | NR\_mob\_enh2-Core |  | ***Date:*** | 2025-02-19 |
|  |  |  |  |  |
| ***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)* |
|  |  |
| ***Reason for change:*** | Background on legacy NR dropping rules:In legacy NR specification, for single cell operation in a same frequency band, the transmission dropping rules between PRACH and PUSCH/PUCCH/SRS transmissions in a same band are defined in Clause 8.1, TS38.213. According to Clause 8.1, if the UE is not provided with intraBandNC-PRACH-simulTx-r17, the following dropping rules apply for single cell operation in a same frequency band:* *UE does not transmit PRACH and PUSCH/PUCCH/SRS* ***in a same slot*** *with respect to the smallest SCS configuration between the SCS configuration for the UL BWP with the PRACH and the SCS configuration for the UL BWP with the PUSCH/PUCCH/SRS transmissions.*
* *UE does not transmit PRACH and PUSCH/PUCCH/SRS when a first or last symbol of a PRACH transmission in a first slot is separated by* ***less than N symbols*** *from the last or first symbol, respectively, of a PUSCH/PUCCH/SRS transmission in a second slot*

As can be seen, for single cell operation in a same frequency band, the dropping rule based on **“in a same slot”** condition still applies even if the gap between PRACH and PUSCH/PUCCH/SRS is not less than N symbols. LTM dropping rules for FG 45-5a:In LTM FG 45-5a, UE can report simultaneous transmission capability of PRACH to candidate cell and PUSCH/PUCCH/SRS to serving cell. If UE supports 45-5a, no dropping rules apply.On the other hand, if UE does not support FG 45-5a, the current specification defines the dropping rules based on “**transmissions that overlap in time**” and “**less than N symbols gap**” conditions. Although these LTM dropping conditions are aligned with the legacy NR specifications for different frequency bands, there is still a misalignment with the legacy NR dropping rules in a same frequency band. For a UE that does not support FG 45-5a, the dropping rule between PRACH and PUSCH/PUCCH/SRS in a same frequency band should be based on “**in a same slot**” condition, instead of “**transmissions that overlap in time**” condition.  |
|  |  |
| ***Summary of change:*** |  If a UE does not support LTM simultaneous uplink transmission capability (FG 45-5a), UE does not transmit PRACH and PUSCH/PUCCH/SRS in a same slot in a same frequency band based on the timing of the serving cell.  |
|  |  |
| ***Consequences if not approved:*** | The conditions for transmission dropping rule for a UE that does not support LTM simultaneous uplink transmission capability (FG 45-5a) for intra-band PRACH and PUSCH/PUCCH/SRS are NOT aligned with the default NR behavior of dropping rules for PRACH and PUSCH/PUCCH/SRS transmissions in a same frequency band. |
|  |  |
| ***Clauses affected:*** | 21 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | **Isolated Impact Analysis:**This CR has no isolated impact on network and UE behavior. |
|  |  |
| ***This CR's revision history:*** | This is the first version of this CR. |

\*\*\* Unchanged parts are omitted \*\*\*

21 L1/L2-triggered mobility procedures

A UE can be indicated, by *LTM-Config*, candidate cells and SS/PBCH blocks per candidate cell for the UE to obtain synchronization and measure corresponding L1-RSRPs [10, TS 38.133]. A Candidate Cell TCI States Activation/Deactivation MAC CE can activate TCI states, provided by *CandidateTCI-State* or/and *CandidateTCI-UL-State*, associated with SS/PBCH blocks or TRS of corresponding candidate cells [11, TS 38.321]. The RS index for obtaining the candidate cell downlink pathloss estimate is provided by *pathlossReferenceRS-Id* in the *CandidateTCI-State* or *CandidateTCI-UL-State.* If the Candidate Cell TCI States Activation/Deactivation MAC CE activates TCI states, an LTM Cell Switch Command MAC CE can indicate a TCI state from the activated TCI states; otherwise, the LTM Cell Switch Command MAC CE can activate and indicate a TCI state, provided by *CandidateTCI-State* or/and *CandidateTCI-UL-State*. After reception of the LTM Cell Switch Command MAC CE, activated TCI states that are not indicated by the MAC CE are deactivated. The UE is provided configurations by *ltm-CSI-ReportConfigToAddModList* for reporting L1-RSRP measurements [6, TS 38.214] that include a number of candidate cells and a number of SS/PBCH blocks per candidate cell from the number of candidate cells.

If *ltm-UE-MeasuredTA-ID* of a candidate cell and *ltm-ServingCellUE-MeasuredTA-ID* of the serving cell are provided to a UE and have same value, the UE estimates based on the UE implementation a timing advance to apply from a first transmission on the candidate cell that is after the reception of a cell switch command for the candidate cell when the condition defined in clause 5.18.35 of [11, TS 38.321] is satisfied.

A UE can be provided configurations, by *EarlyUL-SyncConfig*, for PRACH transmission parameters for each of the candidate cells. The UE can be triggered a PRACH transmission on a candidate cell by a PDCCH order that the UE receives on a serving cell and includes an indication of the candidate cell for the PRACH transmission [4, TS 38.212]. If the serving cell and the candidate cell operate in a same frequency range and the UE would have transmissions that overlap in time or that are in a same slot with respect to the smallest SCS configuration between the SCS configuration for the UL BWP with the PRACH and the SCS configuration for the UL BWP with the PUSCH/PUCCH/SRS transmissions when the serving cell and the candidate cell operate in a same frequency band, or when a gap between a first or last symbol of a PRACH transmission to the candidate cell is less than 𝑁 symbols from a last or first symbol, respectively, of an UL transmission to the serving cell, where $N$ is defined in Clause 8.1, the UE

- drops the transmissions on the serving cell when the UE does not support transmissions that overlap in time, or are in the same slot when the serving cell and the candidate cell operate in a same frequency band, or are separated by less than the gap on the serving cell and the candidate cell and the UL transmission to the serving cell is other than a RACH Msg 1, Msg A, or Msg 3 transmission.

- prioritizes power allocation to the PRACH transmission on the candidate cell in clause 7.5 when the UE supports transmissions that overlap in time or are separated by less than the gap, and a total UE transmit power in the frequency range would exceed $\hat{P}\_{CMAX}$.

The UE transmits the PRACH on the candidate cell as described in Clause 8.1 with a power determined as described in Clause 7.4.

\*\*\* Unchanged parts are omitted \*\*\*