**3GPP TSG-RAN WG1 Meeting #119 *R1-241xxxx***

**Orlando, US, November 14 – 18, 2024**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **TS 38.211** | **CR** |  | **rev** | **-** | **Current version:** | **18.4.0** |  |
|  | | | | | | | | |
| *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:*** | Corrections to PRACH transmission for LTM in TS38.211 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon, Nokia, […] | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_Mob\_enh2-Core | | | | |  | ***Date:*** | | | 2024-11-20 |
|  |  | | | |  | |  | | |  |
| ***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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In TS38.331, the early RACH configuration for LTM is provided in *EarlyUL-SyncConfig* in which the field of *ltm-PRACH-SubcarrierSpacing-r18,* *bwp-GenericParameters-r18* and *prach-RootSequenceIndex-r18* indicate the subcarrier spacing, frequency location and root sequence of PRACH for candidate cell. However, these parameters have not been captured in TS38.211 for UE to generate RACH sequence and signal for a candidate cell. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add the description of *ltm-PRACH-SubcarrierSpacing-r18* and *bwp-GenericParameters-r18* in the clause of PRACH signal generation and add the description of *prach-RootSequenceIndex-r18* in the clause of PRACH sequence generation. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | UE cannot generate PRACH signals for candidate cell according to the LTM configuration. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.3.2, 6.3.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | Isolated Impact Analysis:  No inter-operatability issue is identified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

5.3.2 OFDM baseband signal generation for PRACH

The time-continuous signal  on antenna port for PRACH is defined by

where  and

-  is given by clause 6.3.3;

-  is the subcarrier spacing of the initial uplink bandwidth part during initial access. is provided by *ltm-PRACH-SubcarrierSpacing* in *EarlyUL-SyncConfig* if the PRACH transmission is for a candidate cell. Otherwise,  is the subcarrier spacing of the active uplink bandwidth part;

- is the largest value among the subcarrier spacing configurations by the higher-layer parameter *scs-SpecificCarrierList*;

-  is the lowest numbered resource block of the initial uplink bandwidth part and is derived by the higher-layer parameter *initialUplinkBWP* or *initialUplinkBWP-RedCap* during initial access. is derived by the higher-layer parameters *bwp-GenericParameters* in *EarlyUL-SyncConfig* if the PRACH transmission is for a candidate cell. Otherwise,  is the lowest numbered resource block of the active uplink bandwidth part and is derived by the higher-layer parameter *BWP-Uplink*;

- is the frequency offset of the lowest PRACH transmission occasion in frequency domain with respect to physical resource block 0 of the active uplink bandwidth part. The quantity is given by the higher-layer parameter *msgA-RO-FrequencyStart* if configured and a type-2 random-access procedure is initiated as described in clause 8.1 of [5, TS 38.213], otherwise by *msg1-FrequencyStart* as described in clause 8.1 of [5 TS 38.213];

-  is the PRACH transmission occasion index in frequency domain for a given PRACH transmission occasion in one time instance as given by clause 6.3.3.2;

< Unchanged parts are omitted >

6.3.3.1 Sequence generation

The set of random-access preambles  shall be generated according to



from which the frequency-domain representation shall be generated according to



where , , , or depending on the PRACH preamble format as given by Tables 6.3.3.1-1 and 6.3.3.1-2.

There are 64 preambles defined in each time-frequency PRACH occasion, enumerated in increasing order of first increasing cyclic shift  of a logical root sequence, and then in increasing order of the logical root sequence index, starting with the index obtained from the higher-layer parameter *prach-RootSequenceIndex* or *rootSequenceIndex-BFR* or by *msgA-PRACH-RootSequenceIndex* if configured and a type-2 random-access procedure is initiated as described in clause 8.1 of [5, TS 38.213] or by *prach-RootSequenceIndex-r18* in *EarlyUL-SyncConfig* if the PRACH transmission is for a candidate cell. Additional preamble sequences, in case 64 preambles cannot be generated from a single root Zadoff-Chu sequence, are obtained from the root sequences with the consecutive logical indexes until all the 64 sequences are found. The logical root sequence order is cyclic; the logical index 0 is consecutive to . The sequence number  is obtained from the logical root sequence index according to Tables 6.3.3.1-3 to 6.3.3.1-4B.

< Unchanged parts are omitted >