**3GPP TSG-RAN WG2** **Meeting #110 *R2-2004566***

**Electronic, 1 – 12 June 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.331** | **CR** | **1614** | **rev** | **-** | **Current version:** | **16.0.0** |  |
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| *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)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | Clarification on the presence of ssb-perRACH-Occasion for the CSI-RS based CFRA | | | | | | | | | |
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| ***Source to WG:*** | , Samsung | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core | | | | |  | ***Date:*** | | | 2020-05-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | According to the description in TS38.213, the indexing of the PRACH occasions indicated by *ra-OccasionList* is reset per PRACH association period.  Thus, UE should be provided with the association between SSB and RACH occasions to derive the PRACH association period so that it can understand the indexing of the PRACH occasions indicated by *ra-OccasionList* when CSI-RS based CFRA is configured in *RACH-ConfigDedicated*, which cannot be achieved by the current *RACH-ConfigDedicated* because the field *ssb-perRACH-Occasion* is absent when the field resources in CFRA is set to csirs due to the following presence condition for *ssb-perRACH-Occasion* in *RACH-ConfigDedicated*.   |  |  | | --- | --- | | Conditional Presence | Explanation | | SSB-CFRA | The field is mandatory present if the field resources in CFRA is set to ssb; otherwise it is absent. |   Thus, it is suggested to change the presence condition of *ssb-perRACH-Occasion* and this field should be mandatory present when the field resources in CFRA is set to ssb or csirs. | | | | | | | | |
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| ***Summary of change:*** | | The conditional presence for *ssb-perRACH-Occasion* is changed from“SSB-CFRA” into “Mandatory” to indicate that this field should be mandatory present when the field resources in CFRA is set to ssb or csirs.  **Impact Analysis**  Impacted 5G architecture options:  SA, NE-DC, NR-DC    Impacted functionality:  Random access    Inter-operability:  1. If the network is implemented according to the CR and the UE is not, no inter-operability issue is foreseen.  2. If the UE is implemented according to the CR and the network is not, the field *ssb-perRACH-Occasion* is absent when the field resources in CFRA is set to csirs. UE is not able to decide the association pattern period and thus cannot understand the index of the PRACH occasions indicated by *ra-OccasionList*. | | | | | | | | |
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| ***Consequences if not approved:*** | | The field *ssb-perRACH-Occasion* is absent when the field resources in CFRA is set to csirs. UE is not able to decide the association pattern period and thus cannot understand the index of the PRACH occasions indicated by *ra-OccasionList*. | | | | | | | | |
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| ***Clauses affected:*** | | 6.3.2 | | | | | | | | |
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|  | | **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:*** | |  | | | | | | | | |

Start of change

### 6.3.2 Radio resource control information elements

– *RACH-ConfigDedicated*

The IE *RACH-ConfigDedicated* is used to specify the dedicated random access parameters.

***RACH-ConfigDedicated* information element**

-- ASN1START

-- TAG-RACH-CONFIGDEDICATED-START

RACH-ConfigDedicated ::= SEQUENCE {

cfra CFRA OPTIONAL, -- Need S

ra-Prioritization RA-Prioritization OPTIONAL, -- Need N

...,

[[

rachConfigDedicatedIAB-r16 RACH-ConfigDedicated-IAB-v16xy OPTIONAL, -- Need S

ra-PrioritizationTwoStep-r16 RA-Prioritization OPTIONAL, -- Need N

cfra-TwoStep-r16 CFRA-TwoStep-r16 OPTIONAL -- Need N

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}

CFRA ::= SEQUENCE {

occasions SEQUENCE {

rach-ConfigGeneric RACH-ConfigGeneric,

ssb-perRACH-Occasion ENUMERATED {oneEighth, oneFourth, oneHalf, one, two, four, eight, sixteen}

OPTIONAL -- Cond Mandatory

} OPTIONAL, -- Need S

resources CHOICE {

ssb SEQUENCE {

ssb-ResourceList SEQUENCE (SIZE(1..maxRA-SSB-Resources)) OF CFRA-SSB-Resource,

ra-ssb-OccasionMaskIndex INTEGER (0..15)

},

csirs SEQUENCE {

csirs-ResourceList SEQUENCE (SIZE(1..maxRA-CSIRS-Resources)) OF CFRA-CSIRS-Resource,

rsrp-ThresholdCSI-RS RSRP-Range

}

},

...,

[[

totalNumberOfRA-Preambles INTEGER (1..63) OPTIONAL -- Cond Occasions

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}

CFRA-TwoStep-r16 ::= SEQUENCE {

occasionsTwoStepRA-r16 SEQUENCE {

rach-ConfigGenericTwoStepRA-r16 RACH-ConfigGeneric,

ssb-PerRACH-OccasionTwoStepRA-r16 ENUMERATED {oneEighth, oneFourth, oneHalf, one,

two, four, eight, sixteen} OPTIONAL -- Cond SSB-CFRA

} OPTIONAL, -- Need S

msgA-CFRA-PUSCH-r16 MsgA-PUSCH-Config-r16,

resourcesTwoStep-r16 CHOICE {

ssb SEQUENCE {

ssb-ResourceList SEQUENCE (SIZE(1..maxRA-SSB-Resources)) OF CFRA-SSB-Resource,

ra-ssb-OccasionMaskIndex INTEGER (0..15)

},

csirs SEQUENCE {

csirs-ResourceList SEQUENCE (SIZE(1..maxRA-CSIRS-Resources)) OF CFRA-CSIRS-Resource,

rsrp-ThresholdCSI-RS RSRP-Range

}

},

totalNumberOfTwoStepRA-Preambles-r16 INTEGER (1..62),

...

}

CFRA-SSB-Resource ::= SEQUENCE {

ssb SSB-Index,

ra-PreambleIndex INTEGER (0..63),

...

}

CFRA-CSIRS-Resource ::= SEQUENCE {

csi-RS CSI-RS-Index,

ra-OccasionList SEQUENCE (SIZE(1..maxRA-OccasionsPerCSIRS)) OF INTEGER (0..maxRA-Occasions-1),

ra-PreambleIndex INTEGER (0..63),

...

}

RACH-ConfigDedicated-IAB-v16xy ::= SEQUENCE {

prach-ConfigurationPeriodScaling-r16 ENUMERATED {scf1,scf2,scf4,scf16,scf32,scf64},

prach-ConfigurationFrameOffset-r16 INTEGER (0..63),

prach-ConfigurationSOffset-r16 INTEGER (0..39)

}

-- TAG-RACH-CONFIGDEDICATED-STOP

-- ASN1STOP

Editor's note: Details on signalling the PRU for 2-step CFRA msg PUSCH is still TBD.

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| ***CFRA-CSIRS-Resource* field descriptions** |
| ***csi-RS***  The ID of a CSI-RS resource defined in the measurement object associated with this serving cell. |
| ***ra-OccasionList***  RA occasions that the UE shall use when performing CF-RA upon selecting the candidate beam identified by this CSI-RS. The network ensures that the RA occasion indexes provided herein are also configured by prach-ConfigurationIndex and msg1-FDM. Each RACH occasion is sequentially numbered, first, in increasing order of frequency resource indexes for frequency multiplexed PRACH occasions; second, in increasing order of time resource indexes for time multiplexed PRACH occasions within a PRACH slot and Third, in increasing order of indexes for PRACH slots. |
| ***ra-PreambleIndex***  The RA preamble index to use in the RA occasions associated with this CSI-RS. |

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| ***CFRA* field descriptions** |
| ***occasions***  RA occasions for contention free random access. If the field is absent, the UE uses the RA occasions configured in *RACH-ConfigCommon* in the first active UL BWP. |
| ***ra-ssb-OccasionMaskIndex***  Explicitly signalled PRACH Mask Index for RA Resource selection in TS 38.321 [3]. The mask is valid for all SSB resources signalled in *ssb-ResourceList*. |
| ***rach-ConfigGeneric***  Configuration of contention free random access occasions for CFRA. The UE shall ignore *preambleReceivedTargetPower*, *preambleTransMax*, *powerRampingStep*, *ra-ResponseWindow* signaled within this field and use the corresponding values provided in *RACH-ConfigCommon*. |
| ***ssb-perRACH-Occasion***  Number of SSBs per RACH occasion. |
| ***totalNumberOfRA-Preambles***  Total number of preambles used for contention free random access in the RACH resources defined in CFRA, excluding preambles used for other purposes (e.g. for SI request). If the field is absent but the field *occasions* is present, the UE may assume all the 64 preambles are for RA. The setting should be consistent with the setting of *ssb-perRACH-Occasion*, if present, i.e. it should be a multiple of the number of SSBs per RACH occasion. |

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| ***CFRA-SSB-Resource* field descriptions** |
| ***ra-PreambleIndex***  The preamble index that the UE shall use when performing CF-RA upon selecting the candidate beams identified by this SSB. |
| ***ssb***  The ID of an SSB transmitted by this serving cell. |

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| ***CFRA-TwoStep* field descriptions** |
| ***msgA-CFRA-PUSCH***  PUSCH resource configuration(s) for msgA CFRA. |
| ***occasionsTwoStepRA***  RA occasions for contention free random access. If the field is absent, the UE uses the RA occasions configured in *RACH-ConfigCommonTwoStepRA* in the first active UL BWP. |
| ***ra-SSB-OccasionMaskIndex***  Explicitly signalled PRACH Mask Index for RA Resource selection in TS 38.321 [3]. The mask is valid for all SSB resources signalled in *ssb-ResourceList*. |
| ***rach-ConfigGenericTwoStepRA***  Configuration of contention free random access occasions for CFRA 2-step random access type. The UE shall ignore *msgA-preambleReceivedTargetPower*, *preambleTransMax*, *msgA-powerRampingStep*, *msgB-ResponseWindow, msgA-TransMax* signaled within this field and use the corresponding values provided in *RACH-ConfigCommonTwoStepRA*. |
| ***ssb-PerRACH-OccasionTwoStep***  Number of SSBs per RACH occasion for 2-step random access type. |
| ***totalNumberOfTwoStepRA-Preambles***  Total number of preambles used for contention free random access in the RACH resources defined in 2-step CFRA, excluding preambles used for other purposes (e.g. for SI request). If the field is absent but the field *occasions* is present, the UE may assume all the 64 preambles are for 2-step RA. The setting should be consistent with the setting of *ssb-perRACH-OccasionTwoStep*, if present, i.e. it should be a multiple of the number of SSBs per RACH occasion. |

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| ***RACH-ConfigDedicated* field descriptions** |
| ***cfra***  Parameters for contention free random access to a given target cell. If this field and *cfra-TwoStep* are absent, the UE performs contention based random access. |
| ***cfra-TwoStep***  Parameters for contention free 2-step random access type to a given target cell. Network ensures that *cfra* and *cfra-TwoStep* are not configured at the same time. |
| ***rachConfigDedicatedIAB***  Prach configuration for the IAB-MT. |
| ***ra-prioritization***  Parameters which apply for prioritized random access procedure to a given target cell (see TS 38.321 [3], clause 5.1.1). |
| ***ra-PrioritizationTwoStep***  Parameters which apply for prioritized 2-step random access type procedure to a given target cell (see TS 38.321 [3], clause 5.1.1). |

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| **Conditional Presence** | **Explanation** |
| *Mandatory* | The field is mandatory present. |
| *Occasions* | The field is optionally present, Need S, if the field *occasions* is present, otherwise it is absent. |

End of change