**3GPP TSG-RAN WG2 Meeting #117-e** ***R2-22xxxx***

**Electronic Meeting, February 21 - March 3, 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.321** | **CR** | **1190** | **rev** | **1** | **Current version:** | **16.7.0** |  |
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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:*** | Introduction of RAN Slicing | | | | | | | | | |
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| ***Source to WG:*** | OPPO | | | | | | | | | |
| ***Source to TSG:*** | RAN2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_slice-Core | | | | |  | ***Date:*** | | | 2022-03-10 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | MAC specification should capture agreements of NR RAN Slicing WI, including  RA prioritization  - scalingFactorBI and powerRampingStepHighPriority can be configured at least in SIB (FFS for dedicated RRC signalling).  - Network based solution is introduced to resolve the issue of prioritization parameter collision with MPS/MCS, i.e., Network indicates whether slice override MPS or MPS override slice .  - If no network indication is sent in case of slice prioritization parameter collision with MPS/MCS, it will be left to UE implementation.  - For slice based RACH prioritization, RAN2 will stick to the current baseline parameters, i.e., scalingFactorBI and powerRampingStepHighPriority, and no additional parameters for this release  - RACH prioritization parameters can be configured per slice group.  Trigger on Slicing-specific RACH  - Slice specific RACH is only applicable if there is slice information (e.g., slice group or slice related operator defined access category) available for AS layer when access. FFS on details of slice group.  RA fallback  - Legacy 2-step RA fallback mechanism is supported.  - The following fallback case is supported: Fallback case 2: Fallback from 2-step slice specific RACH to 4-step common RACH, if 4-step slice specific RACH is not configured.(This fallback case is ruled out based on the common session agreements achieved in RAN2#117-e). | | | | | | | | |
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| ***Summary of change:*** | | Agreements up to RAN2#117-e were captured:  - In 5.1.1a, RA prioritization handling. | | | | | | | | |
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| ***Consequences if not approved:*** | | RAN slicing is not supported in NR. | | | | | | | | |
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| ***Clauses affected:*** | | 5.1.1a | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 38.300 CR0413r1  TS 38.331 CR2921r1  TS 38.304 CR0235r1 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

Start of changes

### 5.1.1a Initialization of variables specific to Random Access type

The MAC entity shall:

1> if *RA\_TYPE* is set to *2-stepRA*:

2> set *PREAMBLE\_POWER\_RAMPING\_STEP* to *msgA-PreamblePowerRampingStep*;

2> set *SCALING\_FACTOR\_BI* to 1;

2> apply *preambleTransMax* included in the *RACH-ConfigGenericTwoStepRA*;

2> if the Random Access procedure was initiated for handover; and

2> if *cfra-TwoStep* is configured for the selected carrier:

3> if *msgA-TransMax* is configured in the *cfra-TwoStep*:

4> apply *msgA-TransMax* configured in the *cfra-TwoStep*.

2> else if *msgA-TransMax* is included in the *RACH-ConfigCommonTwoStepRA*:

3> apply *msgA-TransMax* included in the *RACH-ConfigCommonTwoStepRA*.

2> if the Random Access procedure was initiated for SpCell beam failure recovery (as specified in clause 5.17); and

2> if *beamFailureRecoveryConfig* is configured for the active UL BWP of the selected carrier; and

2> if *ra-PrioritizationTwoStep* is configured in the *beamFailureRecoveryConfig*:

3> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority* included in the *ra-PrioritizationTwoStep* in *beamFailureRecoveryConfig*;

3> if *scalingFactorBI* is configured in the *ra-PrioritizationTwoStep* in *beamFailureRecoveryConfig*:

4> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

2> else if the Random Access procedure was initiated for handover; and

2> if *rach-ConfigDedicated* is configured for the selected carrier; and

2> if *ra-PrioritizationTwoStep* is configured in the *rach-ConfigDedicated*:

3> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority* included in the *ra-PrioritizationTwoStep* in *rach-ConfigDedicated*;

3> if *scalingFactorBI* is configured in *ra-PrioritizationTwoStep* in the *rach-ConfigDedicated*:

4> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

2> else if both *ra-PrioritizationForSlicingTwoStep* for a slice group identity and *ra-PrioritizationForAccessIdentityTwoStep* are configured for the selected carrier; and

2> if the MAC entity is provided by upper layers with both this slice group identity and Access Identity 1 or 2; and

2> if for at least one of these Access Identities the corresponding bit in the *ra-PrioritizationForAI* is set to *one*:

3> if *enableRA-PrioritizationForSlicing* in *BWP-UplinkCommon* is set to *true*:

4> if *powerRampingStepHighPriority* is configured in the *ra-PrioritizationForSlicingTwoStep* for this slice group identity:

5> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority*.

4> if *scalingFactorBI* is configured in the *ra-PrioritizationForSlicingTwoStep* for this slice group identity:

5> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

3> else:

4> if *powerRampingStepHighPriority* is configured in the *ra-PrioritizationForAccessIdentityTwoStep*:

5> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority*.

4> if *scalingFactorBI* is configured in the *ra-PrioritizationForAccessIdentityTwoStep*:

5> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

2> else if *ra-PrioritizationForSlicingTwoStep* for a slice group identity is configured for the selected carrier; and

2> if the MAC entity is provided by upper layers with this slice group identity:

3> if *powerRampingStepHighPriority* is configured in the *ra-PrioritizationForSlicingTwoStep* for this slice group identity:

4> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority*.

3> if *scalingFactorBI* is configured in the *ra-PrioritizationForSlicingTwoStep* for this slice group identity:

4> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

2> else if *ra-PrioritizationForAccessIdentityTwoStep* is configured for the selected carrier; and

2> if the MAC entity is provided by upper layers with Access Identity 1 or 2; and

2> if for at least one of these Access Identities the corresponding bit in the *ra-PrioritizationForAI* is set to *one*:

3> if *powerRampingStepHighPriority* is configured in the *ra-PrioritizationForAccessIdentityTwoStep*:

4> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority*.

3> if *scalingFactorBI* is configured in the *ra-PrioritizationForAccessIdentityTwoStep*:

4> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

2> set *MSGA\_PREAMBLE\_POWER\_RAMPING\_STEP* to *PREAMBLE\_POWER\_RAMPING\_STEP*.

1> else (i.e. *RA\_TYPE* is set to *4-stepRA*):

2> set *PREAMBLE\_POWER\_RAMPING\_STEP* to *powerRampingStep*;

2> set *SCALING\_FACTOR\_BI* to 1;

2> set *preambleTransMax* to *preambleTransMax* included in the *RACH-ConfigGeneric*;

2> if the Random Access procedure was initiated for SpCell beam failure recovery (as specified in clause 5.17); and

2> if *beamFailureRecoveryConfig* is configured for the active UL BWP of the selected carrier:

3> start the *beamFailureRecoveryTimer*, if configured;

3> apply the parameters *powerRampingStep*, *preambleReceivedTargetPower*, and *preambleTransMax* configured in the *beamFailureRecoveryConfig*.

2> if the Random Access procedure was initiated for beam failure recovery (as specified in clause 5.17); and

2> if *beamFailureRecoveryConfig* is configured for the active UL BWP of the selected carrier; and

2> if *ra-Prioritization* is configured in the *beamFailureRecoveryConfig*:

3> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority* included in the *ra-Prioritization* in *beamFailureRecoveryConfig*;

3> if *scalingFactorBI* is configured in *ra-Prioritization* in the *beamFailureRecoveryConfig*:

4> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

2> else if the Random Access procedure was initiated for handover; and

2> if *rach-ConfigDedicated* is configured for the selected carrier; and

2> if *ra-Prioritization* is configured in the *rach-ConfigDedicated*:

3> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority* included in the *ra-Prioritization* in *rach-ConfigDedicated*;

3> if *scalingFactorBI* is configured in *ra-Prioritization* in the *rach-ConfigDedicated*:

4> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

2> else if both *ra-PrioritizationForSlicing* for a slice group identity and *ra-PrioritizationForAccessIdentity* are configured for the selected carrier; and

2> if the MAC entity is provided by upper layers with both this slice group identity and Access Identity 1 or 2; and

2> if for at least one of these Access Identities the corresponding bit in the *ra-PrioritizationForAI* is set to *one*:

3> if *enableRA-PrioritizationForSlicing* in *BWP-UplinkCommon* is set to *true*:

4> if *powerRampingStepHighPriority* is configured in the *ra-PrioritizationForSlicing* for this slice group identity:

5> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority*.

4> if *scalingFactorBI* is configured in the *ra-PrioritizationForSlicing* for this slice group identity:

5> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

3> else:

4> if *powerRampingStepHighPriority* is configured in the *ra-PrioritizationForAccessIdentity*:

5> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority*.

4> if *scalingFactorBI* is configured in the *ra-PrioritizationForAccessIdentity*:

5> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

2> else if *ra-PrioritizationForSlicing* for a slice group identity is configured for the selected carrier; and

2> if the MAC entity is provided by upper layers with this slice group identity:

3> if *powerRampingStepHighPriority* is configured in the *ra-PrioritizationForSlicing* for this slice group identity:

4> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority*.

3> if *scalingFactorBI* is configured in the *ra-PrioritizationForSlicing* for this slice group identity:

4> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

2> else if *ra-PrioritizationForAccessIdentity* is configured for the selected carrier; and

2> if the MAC entity is provided by upper layers with Access Identity 1 or 2; and

2> if for at least one of these Access Identities the corresponding bit in the *ra-PrioritizationForAI* is set to *one*:

3> if *powerRampingStepHighPriority* is configured in the *ra-PrioritizationForAccessIdentity*:

4> set *PREAMBLE\_POWER\_RAMPING\_STEP* to the *powerRampingStepHighPriority*.

3> if *scalingFactorBI* is configured in the *ra-PrioritizationForAccessIdentity*:

4> set *SCALING\_FACTOR\_BI* to the *scalingFactorBI*.

2> if *RA\_TYPE* is switched from *2-stepRA* to *4-stepRA* during this Random Access procedure:

3> set *POWER\_OFFSET\_2STEP\_RA* to (*PREAMBLE\_POWER\_RAMPING\_COUNTER* – 1) × (*MSGA\_PREAMBLE\_POWER\_RAMPING\_STEP* – *PREAMBLE\_POWER\_RAMPING\_STEP*).

NOTE: If *enableRA-PrioritizationForSlicing* is not configured in *BWP-UplinkCommon* and if both the provided slice group identity and the provided Access Identity whose corresponding bit in the *ra-PrioritizationForAI* is set to *one* are configured with *ra-Prioritization* either in *RACH-ConfigCommon* or *RACH-ConfigCommonTwoStepRA*, it is up to UE implementation how to determine the values of *PREAMBLE\_POWER\_RAMPING\_STEP* and *SCALING\_FACTOR\_BI*.

Editor’s Note (RAN Slicing): At least for 5.1.1 and 5.1.1a, leave RACH partitioning for Slicing to general MAC CR and capture RA prioritization for Slicing in Slicing MAC CR. Note that all these changes in Slicing MAC CR are subject to the final decisions in the common RACH session, which will reflect in the combined MAC CR.

End of changes