**3GPP TSG RAN WG1#102-e R1-20xxxxxx**

**e-Meeting, August 17th – 28th, 2020**

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| *CR-Form-v11.2* |
| **CHANGE REQUEST** |
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|  | **38.213** | **CR** | **DRAFT** | **rev** | **-** | **Current version:** | **16.2.0** |  |
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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:***  | PRACH power ramping suspension |
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| ***Source to WG:*** | Samsung |
| ***Source to TSG:*** |  |
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| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2020-08-04 |
|  |  |  |  |  |
| ***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 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-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:*** | In section 7.4 of TS 38.213, two cases are listed as the trigger events for UE doesn’t transmit PRACH then UE notifies the power ramping suspension to higher layer, the two cases are:1. “If due to power allocation to PUSCH/PUCCH/PRACH/SRS transmissions as described in Clause 7.5,”
2. “due to power allocation in EN-DC or NE-DC or NR-DC operation”

However, based on the other part of the spec, there is someother case that UE doesn’t transmit PRACH then UE should also notify the power ramping suspension to higher layer, which are:1. In section 11.1, UE may need to determine the slot format based on DCI format 2\_0, in the case that UE finds “a set of symbols” of the RO is indicated as flexible, or being scheduled by DCI to receive DL, or not provided *EnableConfiguredUL-r16,* UE may not transmit the PRACH or other UL in the set of symbols;
2. In section 8.1, it descrbes for single cell operation or for operation with carrier aggregation in a same frequency band, a UE does not transmit PRACH and PUSCH/PUCCH/SRS in a same slot or when a gap is less than a value; the intention is that UE doesn’t transmit them at the same time, so there is also a chance that UE chooses to not transmit PRACH;

Thus, according the same rules, these case 3 and case 4 are rel-15 existing cases these may cause UE not transmiting PRACH, which also requires sending the power ramping suspension to higher layer.  |
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| ***Summary of change:*** | Adding case 3 (summary as “due to slot format determination in Clause 11.1”) and case 4 (summary as “due to the PUSCH/PUCCH/PRACH/SRS transmission occasions are in the same slot or the gap is small as describled in Clause 8.1 ”) to the trigger events of UE not transmitting PRACH, then UE notifies the power ramping suspension to higher layer in section 7.4. |
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| ***Consequences if not approved:*** | This is a missing of the other trigger events which causes UE not transmit the PRACH. If these events are not caputured together, it breaks the fairness during the RACH procedure.  |
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| ***Clauses affected:*** |  7.4. |
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|  | **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 ...  |
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| ***Other comments:*** | **Note: This CR was submitted to Rel-15, but not discussed yet.****Isolated Impact Analysis:**No impact to gNB behavior is expected from this CR.UE needs to add two more cases to trigger sending the power ramping suspension. |

7.4 Physical random access channel

A UE determines a transmission power for a physical random access channel (PRACH), , on active UL BWP  of carrier  of serving cell  based on DL RS for serving cell  in transmission occasion  as

  [dBm],

where  is the UE configured maximum output power defined in [8-1, TS 38.101-1], [8-2, TS 38.101-2] and [8-3, TS 38.101-3] for carrier  of serving cell  within transmission occasion ,  is the PRACH target reception power *PREAMBLE\_RECEIVED\_TARGET\_POWER* provided by higher layers [11, TS 38.321] for the active UL BWP  of carrier  of serving cell , and  is a pathloss for the active UL BWP  of carrier  based on the DL RS associated with the PRACH transmission on the active DL BWP of serving cell  and calculated by the UE in dB as *referenceSignalPower* – higher layer filtered RSRP in dBm, where RSRP is defined in [7, TS 38.215] and the higher layer filter configuration is defined in [12, TS 38.331]. If the active DL BWP is the initial DL BWP and for SS/PBCH block and CORESET multiplexing pattern 2 or 3, as described in Clause 13, the UE determines  based on the SS/PBCH block associated with the PRACH transmission.

If a PRACH transmission from a UE is not in response to a detection of a PDCCH order by the UE, or is in response to a detection of a PDCCH order by the UE that triggers a contention based random access procedure, or is associated with a link recovery procedure where a corresponding index  is associated with a SS/PBCH block, as described in Clause 6, *referenceSignalPower* is provided by *ss-PBCH-BlockPower*.

If a PRACH transmission from a UE is in response to a detection of a PDCCH order by the UE that triggers a contention-free random access procedure and depending on the DL RS that the DM-RS of the PDCCH order is quasi-collocated with as described in Clause 10.1, *referenceSignalPower* is provided by *ss-PBCH-BlockPower* or, if the UE is configured resources for a periodic CSI-RS reception or the PRACH transmission is associated with a link recovery procedure where a corresponding index  is associated with a periodic CSI-RS configuration as described in Clause 6, *referenceSignalPower* is obtained by *ss-PBCH-BlockPower* and *powerControlOffsetSS* where *powerControlOffsetSS* provides an offset of CSI-RS transmission power relative to SS/PBCH block transmission power [6, TS 38.214]. If *powerControlOffsetSS* is not provided to the UE, the UE assumes an offset of 0 dB. If the active TCI state for the PDCCH that provides the PDCCH order includes two RS, the UE expects that one RS has QCL-TypeD properties and the UE uses the one RS when applying a value provided by *powerControlOffsetSS*.

If within a random access response window, as described in Clause 8.2, the UE does not receive a random access response that contains a preamble identifier corresponding to the preamble sequence transmitted by the UE, the UE determines a transmission power for a subsequent PRACH transmission, if any, as described in [11, TS 38.321].

If prior to a PRACH retransmission, a UE changes the spatial domain transmission filter, Layer 1 notifies higher layers to suspend the power ramping counter as described in [11, TS 38.321].

If due to power allocation to PUSCH/PUCCH/PRACH/SRS transmissions as described in Clause 7.5, or due to power allocation in EN-DC or NE-DC or NR-DC operation, or due to slot format determination as described in Clause 11.1, or due to the PUSCH/PUCCH/PRACH/SRS transmission occasions are in the same slot or the gap between a PRACH transmission and PUSCH/PUCCH/SRS transmission is small as describled in Clause 8.1, the UE does not transmit a PRACH in a transmission occasion, Layer 1 notifies higher layers to suspend the corresponding power ramping counter. If due to power allocation to PUSCH/PUCCH/PRACH/SRS transmissions as described in Clause 7.5, or due to power allocation in EN-DC or NE-DC or NR-DC operation, the UE transmits a PRACH with reduced power in a transmission occasion, Layer 1 may notify higher layers to suspend the corresponding power ramping counter.