**3GPP TSG-RAN2 #109bis\_e R2-200xxxx**

**Electronic meeting, 20th April to 1st May 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **38.321** | **CR** | **0726** | **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:***  | Corrections of NR-U in 38.321 |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_unlic-Core |  | ***Date:*** | 2020-04-23 |
|  |  |  |  |  |
| ***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:*** | Corrections of NR-U in 38.321 after RAN2#109bis\_e. |
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| ***Summary of change:*** |  |
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| ***Consequences if not approved:*** |  |
|  |  |
| ***Clauses affected:*** | 5.8.2, 5.21.2 |
|  |  |
|  | **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:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

Start of changes

Next change

### 5.8.2 Uplink

There are two types of transmission without dynamic grant:

- configured grant Type 1 where an uplink grant is provided by RRC, and stored as configured uplink grant;

- configured grant Type 2 where an uplink grant is provided by PDCCH, and stored or cleared as configured uplink grant based on L1 signalling indicating configured uplink grant activation or deactivation.

Type 1 and Type 2 are configured by RRC per Serving Cell and per BWP. Multiple configurations can be active simultaneously in the same BWP. For Type 2, activation and deactivation are independent among the Serving Cells. For the same BWP, the MAC entity can be configured with both Type 1 and Type 2.

RRC configures the following parameters when the configured grant Type 1 is configured:

- *cs-RNTI*: CS-RNTI for retransmission;

- *periodicity*: periodicity of the configured grant Type 1;

- *timeDomainOffset*: Offset of a resource with respect to SFN = *timeReferenceSFN* in time domain;

- *timeDomainAllocation*: Allocation of configured uplink grant in time domain which contains *startSymbolAndLength* (i.e. *SLIV* in TS 38.214 [7]);

- *nrofHARQ-Processes*: the number of HARQ processes for configured grant;

- *harq-procID-offset*: offset of HARQ process for configured grant;

- *timeReferenceSFN*: SFN used for determination of the offset of a resource in time domain. The UE uses the closest SFN with the indicated number preceding the reception of the configured grant configuration.RRC configures the following parameters when the configured grant Type 2 is configured:

- *cs-RNTI*: CS-RNTI for activation, deactivation, and retransmission;

- *periodicity*: periodicity of the configured grant Type 2;

- *nrofHARQ-Processes*: the number of HARQ processes for configured grant;

- *harq-procID-offset*: offset of HARQ process for configured grant.

RRC configures the following parameters when retransmissions on configured uplink grant is configured:

- *cg-RetransmissionTimer*: the duration after a configured grant (re)transmission of a HARQ process when the UE shall not autonomously retransmit that HARQ process.

Upon configuration of a configured grant Type 1 for a Serving Cell by upper layers, the MAC entity shall:

1> store the uplink grant provided by upper layers as a configured uplink grant for the indicated Serving Cell;

1> initialise or re-initialise the configured uplink grant to start in the symbol according to *timeDomainOffset* and *S* (derived from *SLIV* as specified in TS 38.214 [7]), and to reoccur with *periodicity*.

After an uplink grant is configured for a configured grant Type 1, the MAC entity shall consider sequentially that the Nth uplink grant occurs in the symbol for which:

[(SFN × *numberOfSlotsPerFrame* × *numberOfSymbolsPerSlot*) + (slot number in the frame × *numberOfSymbolsPerSlot*) + symbol number in the slot] =
 *timeReferenceSFN* × *numberOfSlotsPerFrame* × *numberOfSymbolsPerSlot +* (*timeDomainOffset* × *numberOfSymbolsPerSlot* + *S* + N × *periodicity*) modulo (1024 × *numberOfSlotsPerFrame* × *numberOfSymbolsPerSlot*).

Editor’s Note: The step of determining the closest N needs to be added.

After an uplink grant is configured for a configured grant Type 2, the MAC entity shall consider sequentially that the Nth uplink grant occurs in the symbol for which:

[(SFN × *numberOfSlotsPerFrame* × *numberOfSymbolsPerSlot*) + (slot number in the frame × *numberOfSymbolsPerSlot*) + symbol number in the slot] =
[(SFNstart time × *numberOfSlotsPerFrame* × *numberOfSymbolsPerSlot* + slotstart time × *numberOfSymbolsPerSlot* + symbolstart time) + N × *periodicity*] modulo (1024 × *numberOfSlotsPerFrame* × *numberOfSymbolsPerSlot*).

where SFNstart time, slotstart time, and symbolstart time are the SFN, slot, and symbol, respectively, of the first transmission opportunity of PUSCH where the configured uplink grant was (re-)initialised.

NOTE: In case of unaligned SFN across carriers in a cell group, the SFN of the concerned serving cell is used to calculate the occurences of configured uplink grants.

When the configured uplink grant is released by upper layers, all the corresponding configurations shall be released and all corresponding uplink grants shall be cleared.

The MAC entity shall:

1> if at least one configured uplink grant confirmation has been triggered and not cancelled; and

1> if the MAC entity has UL resources allocated for new transmission:

2> if the MAC entity is configured with *configuredGrantConfigList*:

3> instruct the Multiplexing and Assembly procedure to generate a Multiple Entry Configured Grant Confirmation MAC CE as defined in clause 6.1.3.31.

2> else:

3> instruct the Multiplexing and Assembly procedure to generate a Configured Grant Confirmation MAC CE as defined in clause 6.1.3.7.

2> cancel the triggered configured uplink grant confirmation.

For a configured grant Type 2, the MAC entity shall clear the configured uplink grant(s) immediately after first transmission of Configured Grant Confirmation MAC CE or Multiple Entry Configured Grant Confirmation MAC CE which confirms the configured uplink grant deactivation.

Retransmissions use:

- repetition of configured uplink grants; or

- received uplink grants addressed to CS-RNTI; or

- configured uplink grants with *cg-RetransmissionTimer* configured.

Next change

## 5.21 LBT operation

### 5.21.1 General

The lower layer may perform an LBT procedure, see TS 37.213 [18], according to which a transmission is not performed if the channel is identified as being occupied. When lower layer performs an LBT procedure before a transmission and the transmission is not performed, an LBT failure indication is sent to the MAC entity from lower layers. Unless otherwise specified, when LBT procedure is performed, actions related to "is transmitted" and "transmission is performed" shall not be performed if an LBT failure indication is received from lower layers.

### 5.21.2 LBT failure detection and recovery procedure

The MAC entity may be configured by RRC with a consistent LBT failure recovery procedure. Consistent LBT failure is detected per UL BWP by counting LBT failure indications, for all UL transmissions, from the lower layers to the MAC entity.

RRC configures the following parameters in the *lbt-FailureRecoveryConfig*:

- *lbt-FailureInstanceMaxCount* for the consistent LBT failure detection;

- *lbt-FailureDetectionTimer* for the consistent LBT failure detection;

The following UE variable is used for the consistent LBT failure detection procedure:

- *LBT\_COUNTER*: counter for LBT failure indication which is initially set to 0.

For each activated Serving Cell configured with *lbt-FailureRecoveryConfig,* the MAC entity shall:

1> if LBT failure indication has been received from lower layers:

2> start or restart the *lbt-FailureDetectionTimer*;

2> increment *LBT\_COUNTER* by 1;

2> if *LBT\_COUNTER* >= *lbt-FailureInstanceMaxCount*:

3> trigger consistent LBT failure for the active UL BWP in this Serving Cell;

3> if this Serving Cell is the SpCell:

4> if consistent LBT failure has been triggered in all UL BWPs configured with PRACH occasions on same carrier in this Serving Cell:

5> indicate consistent LBT failure to upper layers.

4> else:

5> stop any ongoing Random Access procedure in this Serving Cell;

5> switch the active UL BWP to an UL BWP, on same carrier in this Serving Cell, configured with PRACH occasion and for which consistent LBT failure has not been triggered;

5> initiate a Random Access Procedure (as specified in clause 5.1.1).

1> if a triggered consistent LBT failure is cancelled; or

1> if the *lbt-FailureDetectionTimer* expires; or

1> if *lbt-FailureDetectionTimer* or *lbt-FailureInstanceMaxCount* is reconfigured by upper layers:

2> set *LBT\_COUNTER* to 0.

The MAC entity shall:

1> if consistent LBT failure has been triggered, and not cancelled, in the SpCell; and

1> if UL-SCH resources are available for a new transmission in the SpCell and these UL-SCH resources can accommodate the LBT failure MAC CE plus its subheader as a result of logical channel prioritization:

2> instruct the Multiplexing and Assembly procedure to generate the LBT failure MAC CE.

1> else if consistent LBT failure has been triggered, and not cancelled, in at least one SCell:

2> if UL-SCH resources are available for a new transmission in a Serving Cell for which consistent LBT failure has not been triggered and these UL-SCH resources can accommodate the LBT failure MAC CE plus its subheader as a result of logical channel prioritization:

3> instruct the Multiplexing and Assembly procedure to generate the LBT failure MAC CE.

2> else:

3> trigger a Scheduling Request for LBT failure MAC CE.

1> if a MAC PDU is transmitted and this PDU includes the LBT failure MAC CE:

2> cancel the triggered consistent LBT failure in SCell(s) indicating consistent LBT failure in the transmitted LBT failure MAC CE.

1> if consistent LBT failure is triggered and not cancelled in the SpCell; and

1> if the Random Access procedure is considered successfully completed (see clause 5.1) in the SpCell:

2> cancel the triggered consistent LBT failure(s) in the SpCell.

1> if *lbt-FailureRecoveryConfig* is reconfigured by upper layers for a Serving Cell:

2> cancel any triggered consistent LBT failure(s) in this Serving Cell.

End of changes