**3GPP TSG-RAN2#110-e R2-20xx**

**Electronic, 1-12 June 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **38.300** | **CR** | **0229** | **rev** | **1** | **Current version:** | **16.1.0** |  |
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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 |  | Radio Access Network |  | Core Network |  |

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| ***Title:***  | Miscellaneous corrections for NR operation with shared spectrum |
|  |  |
| ***Source to WG:*** | Qualcomm Incorporated, Nokia |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_unlic-Core |  | ***Date:*** | 2020-06-06 |
|  |  |  |  |  |
| ***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:*** | There is an Editor’s Note in the current specification regarding the deployment scenarios for NR operation with shared spectrum channel access. This CR resolves the considered Note.The CAPC selection is missing the case of dynamic grants which do not include CAPC.Per RAN4 agreement and LS (R2-2004370), an SCell can be a timing reference for PTAG. |
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| ***Summary of change:*** | The supported deployment scenarios for NR operation with shared spectrum channel access are captured in Annex B. In 5.6.2, CAPC selection is expanded to include dynamic grants which do not have a CAPC indication by the gNB.In 9.2.9, it is added an SCell can be used as a timing reference for PTAG in NR operation with shared spectrum channel access. |
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| ***Consequences if not approved:*** | The specification for NR operation with shared spectrum channel access will contain errors. |
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| ***Clauses affected:*** | 5.6.1, 5.6.2, Annex B.X (new), 9.2.9 |
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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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Rev0: Introduction of deployment scenariosRev1: Correction of CAPC selection and PTAG timing reference |

*Start of changes*

### 5.6.1 Overview

NR Radio Access operating with shared spectrum channel access can operate in different modes where either PCell, PSCell, or SCells can be in shared spectrum and an SCell may or may not be configured with uplink. The applicable deployment scenarios are described in Annex B.X.

The gNB operates in either dynamic or semi-static channel access mode as described in TS 37.213 [37]. In both channel access modes, the gNB and UE may apply Listen-Before-Talk (LBT) before performing a transmission on a cell configured with shared spectrum channel access. When LBT is applied, the transmitter listens to/senses the channel to determine whether the channel is free or busy and performs transmission only if the channel is sensed free.

When the UE detects consistent uplink LBT failures, it takes actions as specified in TS 38.321 [6]. The detection is per Bandwidth Part (BWP) and based on all uplink transmissions within this BWP. When consistent uplink LBT failures are detected on SCell(s), the UE reports this to the corresponding gNB (MN for MCG, SN for SCG) via MAC CE on a different serving cell than the SCell(s) where the failures were detected. If no resources are available to transmit the MAC CE, a Scheduling Request (SR) can be transmitted by the UE. When consistent uplink LBT failures are detected on SpCell, the UE switches to another UL BWP with configured RACH resources on that cell, initiates RACH, and reports the failure via MAC CE. When multiple UL BWPs are available for switching, it is up to the UE implementation which one to select. For PSCell, if consistent uplink LBT failures are detected on all the UL BWPs with configured RACH resources, the UE declares SCG RLF and reports the failure to the MN via *SCGFailureInformation.* For PCell, if the uplink LBT failures are detected on all the UL BWP(s) with configured RACH resources, the UE declares RLF.

### 5.6.2 Channel Access Priority Classes

Table 5.6.2-1 shows which CAPC should be used by traffic belonging to the different standardized 5QIs. A non-standardized 5QI (i.e. operator specific 5QI) should use suitable CAPC based on the below table, i.e. CAPC used for a non-standardized 5QI should be the CAPC of the standardized 5QIs which best matches the traffic class of the non-standardized 5QI.

For DRBs, the gNB selects the CAPC by taking into account the 5QIs of all the QoS flows multiplexed in this DRB while considering fairness between different traffic types and transmissions. For SRB0, SRB1, and SRB3, the CAPC is always the highest priority (i.e. the lowest number in Table 5.6.2-1). The padding BSR and recommended bit rate MAC CEs use the lowest priority CAPC (i.e. highest number in Table 5.6.2-1) while other MAC CEs use the highest priority CAPC. For uplink transmissions on configured grants, Msg3 and MsgA, and other uplink transmissions where the UE performs Type 1 LBT (see TS 37.213 [37], clause 4.2.1.1) and CAPC is not indicated in the DCI, the gNB configures the UE for the CAPC to be used for SRB2 and DRBs and the UE shall select the CAPC as follows:

- highest priority CAPC of MAC CE(s) if only MAC CE(s) are included;

- highest priority CAPC of DCCH(s) if DCCH SDU (s) are included;

- lowest priority CAPC of the logical channel(s) with MAC SDU multiplexed in this MAC PDU otherwise.

Table 5.6.2-1: Mapping between Channel Access Priority Classes and 5QI

|  |  |
| --- | --- |
| Channel Access Priority Class () | 5QI |
| 1 | 1, 3, 5, 65, 66, 67, 69, 70, 79, 80, 82, 83, 84, 85 |
| 2 | 2, 7, 71 |
| 3 | 4, 6, 8, 9, 72, 73, 74, 76 |
| 4 | - |

*Next Change*

### 9.2.9 Timing Advance

In RRC\_CONNECTED, the gNB is responsible for maintaining the timing advance to keep the L1 synchronised. Serving cells having UL to which the same timing advance applies and using the same timing reference cell are grouped in a TAG. Each TAG contains at least one serving cell with configured uplink, and the mapping of each serving cell to a TAG is configured by RRC.

For the primary TAG the UE uses the PCell as timing reference, except with shared spectrum channel access where an SCell can also be used in certain cases (see clause 7.1, TS 38.133 [13]). In a secondary TAG, the UE may use any of the activated SCells of this TAG as a timing reference cell, but should not change it unless necessary.

Timing advance updates are signalled by the gNB to the UE via MAC CE commands. Such commands restart a TAG-specific timer which indicates whether the L1 can be synchronised or not: when the timer is running, the L1 is considered synchronised, otherwise, the L1 is considered non-synchronised (in which case uplink transmission can only take place on PRACH).

*Next Change*

Annex B (informative):
Deployment Scenarios

>>Skipped unchanged parts

# B.X NR Operation with Shared Spectrum

NR Radio Access operating with shared spectrum channel access can support the following deployment scenarios:

- Scenario A: Carrier aggregation between NR in licensed spectrum (PCell) and NR in shared spectrum (SCell);

- Scenario B: Dual connectivity between LTE in licensed spectrum and NR in shared spectrum (PSCell);

- Scenario C: NR in shared spectrum;

- Scenario D: NR cell in shared spectrum and uplink in licensed spectrum;

- Scenario E: Dual connectivity between NR in licensed spectrum and NR in shared spectrum.

Carrier aggregation of cells in shared spectrum is applicable to all deployment scenarios.

*End of changes*