**3GPP TSG-RAN WG2 Meeting #109bis-e *draft*** ***R2-2003921***

**Online, 20th - 30th April 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **36.306** | **CR** | **1752** | **rev** | **1** | **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:*** | Update of UE capabilities for eMTC | | | | | | | | | |
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| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_eMTC5-Core | | | | |  | ***Date:*** | | | 2020-04-10 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | C |  | | | | | ***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:*** | | Update of UE capabilities related to additional enhancements for eMTC in Rel-16 according to agreements in RAN2#109-e | | | | | | | | |
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| ***Summary of change:*** | | The following capabilities and agreements have been captured in this CR:  **WUS:**  Working assumption:  - Support of Release 16 WUS is independent to support of Release 15 WUS  **PUR:**  - Introduce separate UE capabilities pur-UP-5GC-r16 and pur-CP-5GC-r16.  **Multiple TB scheduling**  - For LTE-M and NB-IoT, multiple TBs scheduling in multicast is optional without capability reporting.  **NR coexistence**  - Working assumption: Introduce four UE capabilities for handling resources reservation on UL and DL, and for CE mode A and CE mode B separately, in PhyLayerParameters-v16xy.  - Working assumption: Introduce two UE capabilities for handling DL subcarrier puncturing for CE mode A and CE mode B separately, in PhyLayerParameters-v16xy.  - Working assumption: Six UE capabilities mentioned in Proposal 2-7 and Proposal 2-8 for handling resources reservation or DL subcarrier puncturing can be applied to both FDD and TDD, e.g., with separate values for FDD or TDD.  - Working assumption: Six UE capabilities for handling resources reservation or DL subcarrier puncturing can be introduced into TS 36.306.  Miscellaneous small corrections added. | | | | | | | | |
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| ***Consequences if not approved:*** | | WI cannot be completed. | | | | | | | | |
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| ***Clauses affected:*** | |  | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS 36.331 CR xxxx | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| FIRST CHANGE |

#### 4.3.4.181 *srs-DCI7-TriggeringFS2-r15*

This field indicates whether the UE supports SRS triggering via DCI format 7 for FS2.

#### 4.3.4.182 *multiTB-UL-r16*

This field indicates whether the UE supports multiple TB scheduling in the uplink as specified in TS 36.213 [22]. This feature is only applicable if the UE supports any *ue-Category-NB*.

#### 4.3.4.183 *multiTB-DL-r16*

This field indicates whether the UE supports multiple TB scheduling in the downlink as specified in TS 36.213 [22]. This feature is only applicable if the UE supports any *ue-Category-NB*.

#### 4.3.4.184 *ce-ModeA-PUSCH-MultiTB-r16*

This field indicates whether the UE supports multiple TB scheduling in the uplink when the UE is operating in coverage enhancement mode A as specified in TS 36.213 [22]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.185 *ce-ModeA-PDSCH-MultiTB-r16*

This field indicates whether the UE supports multiple TB scheduling in the downlink when the UE is operating in coverage enhancement mode A as specified in TS 36.213 [22]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.186 *ce-ModeB-PUSCH-MultiTB-r16*

This field indicates whether the UE supports multiple TB scheduling in the uplink when the UE is operating in coverage enhancement mode B as specified in TS 36.213 [22]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

#### 4.3.4.187 *ce-ModeB-PDSCH-MultiTB-r16*

This field indicates whether the UE supports multiple TB scheduling in the downlink when the UE is operating in coverage enhancement mode B as specified in TS 36.213 [22]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

4.3.4.188 *ce-ModeA-CSI-RS-Feedback-r16*

This field indicates whether the UE supports CSI-RS based feedback when the UE is operating in coverage enhancement mode A, as specified in TS 36.213 [22]. This feature is only applicable if the UE supports *ce-ModeA-r13* and a UE Category other than Category M1 and M2.

#### 4.3.4.189 *ce-RxInLTE-ControlRegion-r16*

This field indicates whether the UE supports PDSCH or MPDCCH reception in the LTE control channel region when the UE is operating in coverage enhancement mode A or B as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.190 *ce-CRS-ChannelEstMPDCCH-r16*

This field defines whether the UE supports CRS for improving MPDCCH channel estimation, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.191 *widebandPRG-Slot-r16, widebandPRG-Subslot-r16, widebandPRG-Subframe-r16*

This field indicates whether the UE supports wideband precoding resource block group size for slot/subslot/subframe PDSCH operation as specified in TS 36.213 [22].

#### 4.3.4.xa groupW*akeUpSignal-r16*

This field indicates whether the UE supports Group WUS for FDD as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.304 [14]. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

Editor’s note: FFS: Dependency on support of R15 WUS, currently RAN1 agreement and RAN2 working assumption are in conflict.

Editor’s note: FFS: For ce-ModeA-r13, FFS whether a separate capability is required for TDD or not.

#### 4.3.4.xb *ce-ModeA-NR-ResourceResvUL-r16*

This field defines whether the UE supports UL resource reservation for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xc *ce-ModeB-NR-ResourceResvUL-r16*

This field defines whether the UE supports UL resource reservation for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

#### 4.3.4.xd *ce-ModeA-NR-ResourceResvDL-r16*

This field defines whether the UE supports DL resource reservation for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xe *ce-ModeB-NR-ResourceResvDL-r16*

This field defines whether the UE supports DL resource reservation for coexistence with NR when the UE is operating in coverage enhancement mode B, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

#### 4.3.4.xf *ce-ModeA-NR-SubcarrierPuncturing-r16*

This field defines whether the UE supports DL subcarrier puncturing for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeA-r13*.

#### 4.3.4.xg *ce-ModeB-NR-SubcarrierPuncturing-r16*

This field defines whether the UE supports DL subcarrier puncturing for coexistence with NR when the UE is operating in coverage enhancement mode A, as specified in TS 36.211 [17]. This feature is only applicable if the UE supports *ce-ModeB-r13*.

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| NEXT CHANGE |

#### 4.3.8.7 *earlyData-UP-r15*

This field defines whether the UE supports MO-EDT for User Plane CIoT EPS optimizations, as defined in TS 24.301 [28]. This feature is only applicable if the UE supports *ce-ModeA-r13*, or for FDD if the UE supports any *ue-Category-NB*.

#### 4.3.8.8 void

#### 4.3.8.9 *extendedNumberOfDRBs-r15*

This field defines whether the UE supports up to 15 DRBs. The UE shall support any combination of RLC AM and RLC UM entities for the configured DRBs. A UE that supports *extendedNumberOfDRBs-r15* shall also support the extended LCID as specified in TS 36.321 [4].

#### 4.3.8.10 *reducedCP-Latency-r15*

This field defines whether the UE supports reduced control plane latency as defined in TS 36.213 [22] and TS 36.331 [5].

#### 4.3.8.11 *earlySecurityReactivation-r16*

This field defines whether the UE supports early security reactivation when resuming a suspended RRC connection as specified in TS 36.331 [5].

#### 4.3.8.12 *pur-CP-EPC-r16*

This field indicates whether the UE supports Transmission using PUR for Control Plane CIoT EPS optimisation, as defined in TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

#### 4.3.8.13 *pur-UP-EPC-r16*

This field indicates whether the UE supports Transmission using PUR for User Plane CIoT EPS optimisation, as defined in TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

#### 4.3.8.14 *dl-DedicatedMessageSegmentation-r16*

Indicates whether the UE supports reception of segmented DL RRC messages.

#### 4.3.8.xa *pur-CP-5GC-r16*

This field indicates whether the UE supports Transmission using PUR for Control Plane CIoT 5GS optimisation as specified TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

#### 4.3.8.xb *pur-UP-5GC-r16*

This field indicates whether the UE supports Transmission using PUR for User Plane CIoT 5GS EPS optimisation as specified TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

Editor’s note: In RRC the 4 PUR capabilities are part of MAC parameters for eMTC, but are part of general parameters for NB-IoT. Need to align one way or another.

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| NEXT CHANGE |

#### 4.3.19.20 *extendedLCID-Duplication-r15*

This field indicates whether the UE supports use of extended LCIDs 32-38 for PDCP duplication. A UE that supports *extendedLCID-Duplication-r15* shall also support the extended LCID as specified in TS 36.321 [4].

#### 4.3.19.21 *eLCID-Support-r15*

This field indicates whether the UE supports LCID "10000" and MAC PDU subheader containing the eLCID field as specified in TS 36.321 [4].

#### 4.3.19.22 *rai-SupportEnh-r16*

This field defines whether the UE supports AS Release Assistance Indication (AS RAI) MAC CE when connected to EPC as specified in TS 36.321 [4]. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

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| NEXT CHANGE |

#### 4.3.29.13 *ce-ModeA-ETWS-CMAS-RxInConn-r16*

This field indicates whether the UE supports ETWS/CMAS indication reception in RRC\_CONNECTED state when the UE is operating in coverage enhancement mode A as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ce-ModeA-r13* and a UE Category other than Category M1 and M2.

#### 4.3.29.14 *ce-ModeB-ETWS-CMAS-RxInConn-r16*

This field indicates whether the UE supporting CE Mode B supports ETWS/CMAS indication reception in RRC\_CONNECTED state when the UE is operating in coverage enhancement mode B as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ce-ModeB-r13* and a UE Category other than Category M1 and M2.

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| NEXT CHANGE |

## 6.16 SC-PTM features

### 6.16.1 SC-PTM in Idle mode

It is optional for UE to support the SC-PTM reception in RRC\_IDLE as specified in TS 36.331 [5]. This feature is only applicable if the UE supports UE category M1 or UE category M2 or if the UE supports coverage enhancements (*ce-ModeB-r13* and/or *ce-ModeA-r13*) or for FDD, if the UE supports any *ue-Category-NB*.

### 6.16.x Multiple TB scheduling for SC-PTM in Idle mode

It is optional for UE to support multiple TB scheduling for multicast as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

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| END OF CHANGES |