**3GPP TSG-RAN WG2 Meeting #109 electronic *draft R2-200xxxx***

**24 Feb – 6 Mar 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **36.302** | **CR** | **CRnum** | **rev** |  | **Current version:** | **15.2.0** |  |
|  |
| *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:***  | Running 36.302 CR for R16 eMTC |
|  |  |
| ***Source to WG:*** | ZTE Corporation, Sanechips  |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** |  LTE\_eMTC5-Core |  | ***Date:*** | 2020-02-xx |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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)* |
|  |  |
| ***Reason for change:*** | Introduction of additional enhancements for R16 eMTC in TS 36.302. |
|  |  |
| ***Summary of change:*** | Introduction of additional enhancements for R16 eMTC in TS 36.302:* The reception types for SI-RNTI for receiving ETWS/CMAS notification in RRC\_CONNECTED.
 |
|  |  |
| ***Consequences if not approved:*** | Reception type for SI-RNTI and MPDCCH is missing from the specifications, the feature will not function properly.  |
|  |  |
| ***Clauses affected:*** | 8.2 |
|  |  |
|  | **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

## 8.2 Downlink

The tables describe the possible combinations of physical channels that can be received in parallel in the downlink in the same subframe by one UE. In one subframe, the UE shall be able to receive all TBs according to the indication on PDCCH. Tables 8.2-1, 8.2-1a, 8.2-2 and 8.2-2a are applicable to LTE; Tables 8.2-1b and 8.2-2b are applicable to NB-IoT.

Table 8.2-1: Downlink "Reception Types" except for NB-IoT UEs, BL UEs and UEs in enhanced coverage

|  |  |  |  |
| --- | --- | --- | --- |
| "Reception Type" | Physical Channel(s) | MonitoredRNTI | AssociatedTransport Channel |
| A | PBCH | N/A | BCH |
| B | PDCCH+PDSCH | SI-RNTI | DL-SCH |
| B1 | PDCCH+PDSCH | SI-RNTI (Note 11) | DL-SCH |
| C | PDCCH+PDSCH | P-RNTI | PCH |
| D | PDCCH+PDSCH | RA-RNTI (Note 3) | DL-SCH |
| Temporary C-RNTI (Note 3) (Note 4) | DL-SCH |
| ((PDCCH+SPDCCH)/EPDCCH) +(PDSCH/slot/subslot PDSCH) | C-RNTI and Semi-Persistent Scheduling C-RNTI | DL-SCH  |
| ((PDCCH+SPDCCH)/EPDCCH) +(PDSCH+subslot/slot PDSCH)(Note 14) | C-RNTI and Semi-Persistent Scheduling C-RNTI | DL-SCH  |
| D1 | ((PDCCH+SPDCCH)/EPDCCH) +(PDSCH/subslot/slot PDSCH)(Note 9) | C-RNTI | DL-SCH  |
| ((PDCCH+SPDCCH)/EPDCCH) +(PDSCH+subslot/slot PDSCH)(Note 9, Note 14) | C-RNTI | DL-SCH  |
| D2 | PDCCH+PDSCH | SC-RNTI | DL-SCH |
| G-RNTI | DL-SCH |
| D3 | ((PDCCH+SPDCCH) /EPDCCH) +(PDSCH/subslot/slot PDSCH) | C-RNTI and Semi-Persistent Scheduling C-RNTI | DL-SCH  |
| ((PDCCH+SPDCCH)/EPDCCH) +(PDSCH+subslot/slot PDSCH)(Note 14) | C-RNTI and Semi-Persistent Scheduling C-RNTI | DL-SCH  |
| PDCCH+PDSCH | SC-RNTI | DL-SCH |
| G-RNTI | DL-SCH |
| E | PDCCH/EPDCCH(Note 1) | C-RNTI | N/A |
| F | PDCCH | Temporary C-RNTI (Note 5) | UL-SCH |
| (PDCCH+SPDCCH)/EPDCCH | C-RNTI and Semi-Persistent Scheduling C-RNTI | UL-SCH |
| F1 | (PDCCH+SPDCCH)/EPDCCH(Note 9) | C-RNTI | UL-SCH |
| G | PDCCH | TPC-PUCCH-RNTI | N/A |
| H | PDCCH | TPC-PUSCH-RNTI | N/A |
| I | (PDCCH+SPDCCH)/EPDCCH | Semi-Persistent Scheduling C-RNTI (Note 6) | N/A |
| J | (PDCCH+SPDCCH)/EPDCCH | Semi-Persistent Scheduling C-RNTI (Note 7) | N/A |
| K | PDCCH | M-RNTI (Note 8) | N/A |
| K1 | PDCCH | SC-N-RNTI | N/A |
| K2 | PDCCH | M-RNTI  | N/A |
| L | PMCH | N/A (Note 8) | MCH |
| M | PDCCH | eIMTA-RNTI | N/A |
| N | PDCCH/EPDCCH | SL-RNTI | SL-SCH |
| N1 | PDCCH/EPDCCH | SL-V-RNTI | SL-SCH |
| N2 | PDCCH/EPDCCH | SL Semi-Persistent Scheduling V-RNTI | SL-SCH |
| O | PDCCH | CC-RNTI | N/A |
| P | PDCCH | SRS-TPC-RNTI (Note 10) | N/A |
| Q | PDCCH/EPDCCH | UL Semi-Persistent Scheduling V-RNTI | UL-SCH |
| Q1 | PDCCH/EPDCCH | UL Semi-Persistent Scheduling V-RNTI (Note 12) | N/A |
| R | PDCCH/EPDCCH | SL Semi-Persistent Scheduling V-RNTI (Note 13) | N/A |
| Note 1: PDCCH or EPDCCH is used to convey PDCCH order for Random Access.Note 2: Void.Note 3: RA-RNTI and Temporary C-RNTI are mutually exclusive and only applicable during Random Access procedure.Note 4: Temporary C-RNTI is only applicable when no valid C-RNTI is available.Note 5: Temporary C-RNTI is only applicable during contention-based Random Access procedure.Note 6: Semi-Persistent Scheduling C-RNTI is used for DL Semi-Persistent Scheduling release.Note 7: Semi-Persistent Scheduling C-RNTI is used for UL Semi-Persistent Scheduling release.Note 8: In MBSFN subframes onlyNote 9: DL-SCH reception corresponding to D1, and UL-SCH transmission corresponding to F1, are only applicable to SCells.Note 10: SRS-TPC-RNTI is used to trigger group SRS and TPC for SRS-only SCells. Up to 2 SRS-TPC-RNTI can be concurrently configured.Note 11: For MBMS-dedicated carrier, SI-RNTI may be assigned with two values which may be used in same subframe.Note 12: Used for release of an UL Semi-Persistent Scheduling associated with UL Semi-Persistent Scheduling V-RNTI.Note 13: Used for release of an SL Semi-Persistent Scheduling associated with SL Semi-Persistent Scheduling V-RNTI.Note 14: For a UE indicating the capability of decoding PDSCH and subslot/slot PDSCH assigned with C-RNTI/SPS C-RNTI in the same subframe for a given carrier. |

Table 8.2-1a: Downlink "Reception Types" for BL UEs and UEs in enhanced coverage

|  |  |  |  |
| --- | --- | --- | --- |
| "Reception Type" | Physical Channel(s) | MonitoredRNTI | AssociatedTransport Channel |
| A | PBCH | N/A | BCH |
| B | MPDCCH (Note 1) | C-RNTI | N/A |
| C | MPDCCH | TPC-PUCCH-RNTI | N/A |
| D | MPDCCH | TPC-PUSCH-RNTI | N/A |
| D1 | MPDCCH (Note 7) | SC-RNTI | DL-SCH |
| G-RNTI | DL-SCH |
| E | MPDCCH | Semi-Persistent Scheduling C-RNTI (Note 2) | N/A |
| F | MPDCCH | Semi-Persistent Scheduling C-RNTI (Note 3) | N/A |
| G | MPDCCH (Note 4) | RA-RNTI | DL-SCH |
| Temporary C-RNTI  | UL-SCH |
| Temporary C-RNTI  | DL-SCH |
| P-RNTI | PCH |
| H | PDSCH (Note 5) | SI-RNTI | DL-SCH |
| P-RNTI | PCH  |
| Temporary C-RNTI  | DL-SCH |
| RA-RNTI | DL-SCH |
| H1 | PDSCH (Note 7) | SC-RNTI | DL-SCH |
| G-RNTI | DL-SCH |
| I | MPDCCH | Temporary C-RNTI (Note 6) | UL-SCH |
| C-RNTI and Semi-Persistent Scheduling C-RNTI | UL-SCH |
| J | MPDCCH | C-RNTI and Semi-Persistent Scheduling C-RNTI | DL-SCH |
| K | PDSCH (Note 5) | C-RNTI and Semi-Persistent Scheduling C-RNTI | DL-SCH |
| L | MWUS | N/A | N/A |
| M | MPDCCH (Note 8) | SI-RNTI | N/A |
| Note 1: MPDCCH is used to convey PDCCH order for Random Access.Note 2: Semi-Persistent Scheduling C-RNTI is used for DL Semi-Persistent Scheduling release.Note 3: Semi-Persistent Scheduling C-RNTI is used for UL Semi-Persistent Scheduling release.Note 4: RA-RNTI, P-RNTI, and Temporary C-RNTI are not required to be simultaneously monitored.Note 5: All RNTIs listed in the reception type are mutually exclusive.Note 6: Temporary C-RNTI is only applicable during contention-based Random Access procedure.Note 7: SC-RNTI and G-RNTI are not required to be simultaneously monitored.Note 8: MPDCCH with SI-RNTI is used for ETWS/CMAS notification indication for non-BL UEs in CE in RRC\_CONNECTED. |

Editor’s note: It’s FFS whether PUR related new "Reception Types" would be needed in Table 8.2-1a.

Table 8.2-1b: Downlink "Reception Types" for NB-IoT UEs

|  |  |  |  |
| --- | --- | --- | --- |
| "Reception Type" | Physical Channel(s) | MonitoredRNTI | AssociatedTransport Channel |
| A | NPBCH | N/A | BCH |
| B | NPDCCH (Note 2) | C-RNTI | N/A |
| C | NPDCCH | P-RNTI | PCH |
| D | NPDCCH | RA-RNTI (Note 1) | DL-SCH |
| Temporary C-RNTI (Note 1) |
| D1 | NPDCCH (Note 3) | SC-RNTI | DL-SCH |
| G-RNTI | DL-SCH |
| E | NPDSCH | N/A | DL-SCH |
| F | NPDCCH | C-RNTI | DL-SCH |
| G | NPDCCH | C-RNTI | UL-SCH |
| H | NWUS | N/A | N/A |
| I | NPDCCH | Semi-Persistent Scheduling C-RNTI (Note 4) | N/A |
| J | NPDCCH | Semi-Persistent Scheduling C-RNTI | UL-SCH |
| Note 1: RA-RNTI and Temporary C-RNTI are mutually exclusive and only applicable during Random Access procedure.Note 2: NPDCCH is used to convey PDCCH order for Random Access.Note 3: SC-RNTI and G-RNTI are not required to be simultaneously monitored.Note 4: Semi-Persistent Scheduling C-RNTI is used for releasing SR with SPS BSR. |

Table 8.2-2: Downlink "Reception Type" Combinations except for NB-IoT UEs, BL UEs and UEs in enhanced coverage

The "Reception Type" used in this table refers to the "Reception Type" in Table 8.2-1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | PCell | PSCell | SCell | Non-serving cell |
| 1. RRC\_IDLE |
| 1.1 All UEs | A + B + C + D |  |  |  |
| Remarks: The combination for Random Access procedure is only required, related to D. |
| 1.2 UEs supporting MBMS | K + L |  |  |  |
| 1.3 UEs supporting SC-PTM | K1 + D2 |  |  |  |
| 2. RRC\_CONNECTED |
| 2.1 All UEs | A + B + (D or E or G or I) + (F or H or J) + M | A + (D or E or G or I) + (F or H or J) + M | (E or D1) + F1 |  |
| 2.2 UEs supporting FS2 | A + B + (D or E or G or I) + (F or H or J) + F + M + P | A + (D or E or G or I) + (F or H or J) + F + M | (E or D1) + F1 |  |
| Remarks: For TDD UL/DL configuration 6 with special subframe configuration 10 and TDD UL/DL configuration 0, two PDCCHs or EPDCCHs can be received in the same subframe for UL-SCH in two different uplink subframes. |
| 2.2a UEs supporting FS3 |  |  | D1 + F1 + O |  |
| Remarks: For FS3, up to four PDCCHs or EPDCCHs can be received in the same subframe for LAA UL-SCH in different FS3 uplink subframes. |
| 2.3 UEs supporting MBMS | ((E or G or I) + L + K) or (A + B + D) + (F or H or J) + M | ((E or G or I) + L + K) or (A + B + D) + (F or H or J) + M | (E + L + K) or (D1 + B) + F1 | (A + B) or (L + K) |
| Remarks: The combination is the requirement when MBMS reception is on PCell and/or any other cell. *r* is the number of DL CCs on which the UE supports MBMS reception according to the MBMSInterestIndication. The number of L and the number of K ≤ *r*.Remarks: It is not required to simultaneously receive EPDCCH and PMCH on the same cell. |
| 2.3a UEs supporting FeMBMS |  |  | (D1 + B + K2) or (L + K2) + F1 | (A + B1 + K2) or (L + K2) |
| Remarks: The combination is the requirement when MBMS reception is on PCell and/or any other cell. *r* is the number of DL CCs on which the UE supports MBMS reception according to the MBMSInterestIndication. The number of L and the number of K2 ≤ *r*.Remarks: It is not required to simultaneously receive EPDCCH and PMCH on the same cell. |
| 2.4 MBMS UEs supporting FS2 | ((E or G or I) + L + K) or (A + B + D) + 1x(F or H or J) + F + M + P | ((E or G or I) + L + K) or (A + B + D) + 1x(F or H or J) + F + M | (E + L + K) or (D1 + B) + F1 | (A + B) or (L + K) |
| Remarks: For TDD UL/DL configuration 6 with special subframe configuration 10 and TDD UL/DL configuration 0, two PDCCHs or EPDCCHs can be received in the same subframe for UL-SCH in two different uplink subframes.Remarks: The combination is the requirement when MBMS reception is on PCell and/or any other cell. *r* is the number of DL CCs on which the UE supports MBMS reception according to the MBMSInterestIndication. The number of L and the number of K ≤ *r*.Remarks: It is not required to simultaneously receive EPDCCH and PMCH on the same cell. |
| 2.5 UEs supporting ETWS and CMAS | A + B + C + (D or E or G or I) + (F or H or J) + M | A + (D or E or G or I) + (F or H or J) + M | (E or D1) + F1 |  |
| 2.6 ETWS and CMAS UEs supporting FS2 | A + B + C + (D or E or G or I) + (F or H or J) + F + M + P | A + (D or E or G or I) + (F or H or J) + F + M | (E or D1) + F1 |  |
| Remarks: For TDD UL/DL configuration 6 with special subframe configuration 10 and TDD UL/DL configuration 0, two PDCCHs or EPDCCHs can be received in the same subframe for UL-SCH in two different uplink subframes. |
| 2.7 UEs supporting sidelink communication | A + B + (D or E or G or I) + (F or H or J) + M + N |  |  |  |
| 2.7a UEs supporting V2X sidelink communication | A + B + (D or E or G or I) + (F or H or J or Q or Q1) + M + N1 + (N2 or R) |  |  |  |
| 2.7b UEs supporting V2X sidelink communication | A + B + (D or E or G or I) + (F or H or J or Q or Q1) +M |  |  |  |
|  | Remarks: The 2.7 and 2.7a combination is the requirement when the UE is configured in scheduled resource allocation mode, and the 2.7b combination is the requirement when the UE is configured in autonomous resource selection mode. |
| 2.8 UEs supporting SC-PTM | A + B + (D or (K1 + D2) or (K1 + D3) or E or G or I) + (F or H or J) + M | A + B + (D or (K1 + D2) or (K1 + D3) or E or G or I) + (F or H or J) + M | B + (D1 or (K1 + D2) or (K1 + D3) or E) + F1 | A + B + K1+ D2 |
| Remarks: The combination is the requirement when SC-PTM reception is on PCell and/or any other cell. *r* is the number of DL CCs on which the UE supports SC-PTM reception according to the MBMSInterestIndication. The number of K1 and the number of D2 ≤ *r*. |
| 2.9 SC-PTM UEs supporting FS2 | A + B + (D or (K1 + D2) or (K1 + D3) or E or G or I) + (F or H or J) + F + M + P | A + B + (D or (K1 + D2) or (K1 + D3) or E or G or I) + (F or H or J) + F + M | B + (D1 or (K1 + D2) or (K1 + D3) or E) + F1 | A + B + K1+ D2 |
| Remarks: For TDD UL/DL configuration 6 with special subframe configuration 10 and TDD UL/DL configuration 0, two PDCCHs or EPDCCHs can be received in the same subframe for UL-SCH in two different uplink subframes.Remarks: The combination is the requirement when SC-PTM reception is on PCell and/or any other cell. *r* is the number of DL CCs on which the UE supports SC-PTM reception according to the MBMSInterestIndication. The number of K1 and the number of D2 ≤ *r*. |
| NOTE 1: *p* is the number of DL CCs supported by the UE. The number of D1 is ≤ (*p*-1). *q* is the number of UL CCs supported by the UE. For UE not supporting FS2, the number of F1 is ≤ (*q*-1). For UE supporting FS2, the number of F1 is ≤ 2x(*q*-1). *q* = *p* = 1 implies non-CA capable UE. Only 1xE is possible at any subframe over all serving cells. 1xM is included if UE supports eIMTA.NOTE 2: The UE is only required to receive one PDSCH, pertaining to D or D1 or D2 (if the UE supports SC-PTM) or D3 (if the UE supports the parallel reception of unicast and SC-PTM), per DL CC.NOTE 3: If a UE indicating category 0 is scheduled with PDSCH transmissions exceeding its processing capability as specified in TS 36.306 [13], the prioritization between these PDSCH transmissions is up to the UE implementation.NOTE 4: Combination involving EPDCCH is optional and required only for UE supporting EPDCCH.NOTE 5: Combination involving SPDCCH and/or subslot/slot PDSCH is optional and required only for UE supporting SPDCCH and/or subslot/slot PDSCH.NOTE 6: For UEs supporting FS2, for TDD UL/DL configuration 0 not configured with special subframe configuration 10 and TDD UL/DL configuration 6 not configured with special subframe configuration 10, two PDCCHs or SPDCCHs can be received in a slot for UL-SCH with a slot duration in two different uplink slots.NOTE 7: For UEs supporting FS2, for TDD UL/DL configuration 0 with special subframe configuration 10 and TDD UL/DL configuration 6 with special subframe configuration 10, three PDCCHs can be received in a slot for UL-SCH with a slot duration in three different uplink slots or two SPDCCHs can be received in a slot for UL-SCH with a slot duration in two different uplink slots. |

Table 8.2-2a: Downlink "Reception Type" Combinations for BL UEs and UEs in enhanced coverage

The "Reception Type" used in this table refers to the "Reception Type" in Table 8.2-1a.

|  |  |
| --- | --- |
|  | PCell |
| 1. RRC\_IDLE |
| 1.1 All UEs  | A or G or H |
| 1.2 UEs supporting SC-PTM | A or G or H or (D1 + H1) |
| 1.3 UEs supporting MWUS | A or G or H or L |
| 2. RRC\_CONNECTED |
| 2.1 All UEs | A or ((J or C or E or B) + (I or D or F) + K) or G or H |
| Remarks: The combination for Random Access procedure is only required, related to G and H. |
| 2.2 UEs supporting FS2 |  A or ((J or C or E or B) + (I or D or F) + I + K) or G or H |
| Remarks: For TDD UL/DL configuration 0, two MPDCCHs can be received in the same subframe for UL-SCH in two different uplink subframes, which is only applicable for UEs configured with CE mode A with no repetitions.Remarks: The combination for Random Access procedure is only required, related to G and H. |
| 2.3 UEs supporting ETWS and CMAS | A or ((J or C or E or B or M) + (I or D or F) + K) or G or H |
| Remarks: The combination for Random Access procedure is only required, related to G and H.Remarks: The combination only applies for non-BL UE in CE. |
| 2.4 ETWS and CMAS UEs supporting FS2 | A or ((J or C or E or B or M) + (I or D or F) + I + K) or G or H |
| Remarks: For TDD UL/DL configuration 0, two MPDCCHs can be received in the same subframe for UL-SCH in two different uplink subframes, which is only applicable for UEs configured with CE mode A with no repetitions.Remarks: The combination for Random Access procedure is only required, related to G and H.Remarks: The combination only applies for non-BL UE in CE. |

Editor’s note: Further checks are needed to see whether the above new-added "Reception Type" Combinations in 2.3 and 2.4 are aligned with RAN1 specification, e.g., the description related to Type0-MPDCCH common search space and MPDCCH UE-specific search space.

Editor’s note: It’s FFS whether a formal Note, e.g., “Note 1: the remark applies to all UEs also applies to UEs with specific capabilities”, can be introduced at the bottom of this table in order to avoid repeating some common Remarks.

NOTE: Any subset of the combinations specified in table 8.2-2 and 8.2-2a are also supported.

The "reception type" names in Table 8.2-2b refer to the "reception types" from Table 8.2-1b.

Table 8.2-2b: Downlink "Reception Type" Combinations for NB-IoT UEs

|  |  |
| --- | --- |
|  | PCell |
| 1. RRC\_IDLE |
| 1.1 All UEs | A or C or D or E |
| Remarks: The combination for Random Access procedure is only required, related to D. |
| 1.2 UEs supporting SC-PTM | A or C or D or E or D1 |
| 1.3 UEs supporting NWUS | A or C or D or E or H |
| 2. RRC\_CONNECTED |
| 2.1 All UEs | A or B or D or F or G or E |
| 2.2 UEs supporting SR with SPS BSR | A or B or D or F or G or E or I or J |

End of changes