**3GPP TSG RAN meeting #88e RP-201227**

**Electronic Meeting, June 29 - July 3, 2020**

## Status Report to TSG

**Agenda item:** 10.3.1

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| **WI / SI Name** | Additional MTC enhancements for LTE |
| included in this status report | Study Item: No | Core part: Yes | Performance part:Yes | Testing part:No |
| **Acronym** | LTE\_eMTC5 |
| **Unique ID** | 800083 |
| **TSG Tdoc of latest approved WI/SI description (if any)** | [RP-192875](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_86/Docs/RP-192875.zip) |
| **Target Completion Date****(indicate if changed)** | Study Item:  | Core part: 06/2020 | Performance part: 12/2020 | Testing part:  |
| **Overall Completion level** | Study Item:  | Core part: 100% | Performance Part: 40% | Testing part:  |

**Source:**

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| **Leading WG** | RAN1 |
| **Rapporteur** | **Name** | Johan BERGMAN |
| **Company** | Ericsson |
| **Email** | johan.bergman@ericsson.com |

## 1 Work plan related evaluation

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| **Do you want to modify the time budget for this WI/SI compared to what was endorsed at the last RAN meeting?** | No |

## 2. Detailed progress in RAN WGs since last TSG meeting

## 2.1 RAN1

#### 2.1.1 Agreements

**RAN1#100bis-e**

52 maintenance contributions were submitted (for details see agenda item 6.2.1 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/TDoc_List_Meeting_RAN1%23100-bis-e.xlsx)).

RAN1 discussed **UE-group wake-up signal**, with the following agreements:

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| [R1-2002705](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002705.zip) FL Summary of Maintenance for group MWUS Moderator (Qualcomm Incorporated)[R1-2001576](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2001576.zip) Corrections on UE-group wake-up signal Huawei, HiSiliconThe issue in [R1-2001576](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2001576.zip) has lower priority than other MTC issues. Wait for RAN2 discussion on whether need to clarify the misalignment between ‘legacyWUS’ and ‘non-group WUS’ first. |

RAN1 discussed **transmission in preconfigured UL resources**, with the following agreements:

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| [R1-2002357](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002357.zip) Preconfigured UL resources feature lead summary RAN1 #100bis-e Moderator (Sierra Wireless)[R1-2002740](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002740.zip) Preconfigured UL resources feature lead summary#2 RAN1 #100bis-e Moderator (Sierra Wireless)[100b-e-LTE-eMTC5-PUR-01] – Gus (Sierra Wireless)eMTC alignment to NB-IOT –includes NB-IOT alignment issues raised in sections 4.3, 4.4, 4.6, and 4.9 of [R1-2002740](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002740.zip) by 4/24 and corresponding TP (if any) by 4/30[R1-2002801](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002801.zip) Outcome summary of [100b-e-LTE-eMTC5-PUR-01] on eMTC Alignment to NB-IOT Moderator (Sierra Wireless)[R1-2002962](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002962.zip) Text Proposals for email [100b-e-LTE-eMTC5-PUR-01] on eMTC Alignment to NB-IOT Moderator (Sierra Wireless)**Agreement** (as per email decision posted on Apr.29th)The TPs in [R1-2002962](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002962.zip) are endorsed for the editor’s CRs on TS36.213.[100b-e-LTE-eMTC5-PUR-02] – Gus (Sierra Wireless)Power control correction – includes power control issues in section 4.2 of [R1-2002740](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002740.zip) by 4/24 and corresponding TP (if any) by 4/30 – Gus (Sierra Wireless)[R1-2002800](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002800.zip) Outcome summary of [100b-e-LTE-eMTC5-PUR-02] on PUR Power Control Moderator (Sierra Wireless)[R1-2002971](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002971.zip) Text Proposals for email [100b-e-LTE-eMTC5-PUR-02] on PUR Power Control Moderator (Sierra Wireless)**Agreement** (as per email decision posted on Apr.30th)The TPs in [R1-2002971](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002971.zip) are endorsed for the editors’ CRs on TS36.213.[100b-e-LTE-NB\_IoTenh3-PUR-01] – Xiang (Huawei)Collision handling between PUR transmission/ PUR SS monitoring and Paging CSS/ WUS by 4/24 and corresponding TP (if any) by 4/30* Issue#2 in [R1-2002714](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002714.zip)

[R1-2002942](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002942.zip) Feature lead summary #1 on [100b-e-LTE-NB\_IoTenh3-PUR-01] Moderator (Huawei)Decision: As per email decision posted on Apr.28th,**Working Assumption*** When PUR transmission overlaps with WUS, PUR transmission is prioritized
	+ For eMTC, this applies only to HD-FDD UEs
* When PUR SS monitoring overlaps with Paging CSS, PUR SS monitoring is prioritized
* When PUR SS monitoring overlaps with WUS, PUR SS monitoring is prioritized

If it is concluded by RAN2 that the working assumption is feasible, the working assumption will be automatically confirmed.[R1-2002944](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002944.zip) LS on PUR working assumption for NB-IoT and eMTC RAN1, Huawei**Agreement**The LS to RAN2 on PUR working assumption for NB-IoT and eMTC is approved.[100b-e-LTE-NB\_IoTenh3-PUR-03] – Johan (Ericsson)Email approval of the reply LS for [R1-2001517](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2001517.zip) for both eMTC and NB-IoT under 6.2.2.2 by 4/23* Refer to Issue#1 and Issue#4 in [R1-2002714](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002714.zip)

[R1-2002896](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002896.zip) Email discussion [100b-e-LTE-NB\_IoTenh3-PUR-03] on reply LS on open PUR issues for NB-IoT/eMTC Moderator (Ericsson)Decision: As per email decision posted on Apr.25th,[R1-2002846](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002846.zip) Reply LS on open PUR issues for NB-IoT/eMTC RAN1, Ericsson**Agreement**The LS to RAN2 in [R1-2002846](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002846.zip) is approved. |

RAN1 discussed **scheduling of multiple DL/UL transport blocks**, with the following agreements:

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| [R1-2002512](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002512.zip) Feature lead summary for Multi-TB scheduling for LTE-MTC Ericsson[R1-2002796](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002796.zip) Feature lead summary#2 for Multi-TB scheduling for LTE-MTC Moderator (Ericsson)[100b-e-LTE-eMTC5-Multi-TB-01] – Johan (Ericsson)TBS/MCS/RV determination (described in [R1-2002512](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002512.zip)) by 4/30The due date of the email discussion was postponed from 4/24 to 4/30[R1-2003112](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003112.zip) TP for 36.213 on determination of MCS, RV and HARQ ID for LTE-MTC multi-TB scheduling Moderator (Ericsson)**Agreement** (as per email decision posted on Apr.30th)The TP in [R1-2003112](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003112.zip) is endorsed for the editor’s CR on TS36.213.[100b-e-LTE-eMTC5-Multi-TB-02] – Johan (Ericsson)RV cycling, TB interleaving and frequency hopping (described in [R1-2002512](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002512.zip)) by 4/24 and corresponding TP (if any) by 4/30Decision: As per email decision posted on Apr.27th,**Agreement*** i\_0 is initialized at the beginning of each TB, and the corresponding includes all the subframes belonging to the TB and excludes those associated with other TBs.

**Agreement**For the sub-PRB interleaving case, the granularity can be similar with NB-IOT which is based on the TB repetition.Discussion on TP until 4/30[R1-2003113](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003113.zip) TP for 36.213 on RV cycling and interleaving granularity for LTE-MTC multi-TB scheduling Moderator (Ericsson)**Agreement** (as per email decision posted on Apr.30th)The TP in [R1-2003113](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003113.zip) is endorsed for the editor’s CR on TS36.213.[100b-e-LTE-eMTC5-Multi-TB-03] – Johan (Ericsson)HARQ-ACK bundling including (described in [R1-2002512](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002512.zip)) by 4/24 and corresponding TP (if any) by 4/30* HARQ-ACK bundling size
* TDD HARQ-ACK bundling mechanism

Decision: As per email decision posted on Apr.30th,**Agreement*** HARQ-ACK bundling size: Updated bundling patterns and DCI field mapping:

**Agreement** (as per email decision posted on Apr.30th)[R1-2003114](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003114.zip) TP for 36.213 on HARQ-ACK bundling size for LTE-MTC multi-TB scheduling Moderator (Ericsson)The TP in [R1-2003114](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003114.zip) is endorsed for editor’s CR on TS36.213. |

RAN1 discussed **coexistence of LTE-MTC with NR**, with the following agreements:

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| [R1-2002513](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002513.zip) Feature lead summary for NR coexistence performance improvements for LTE-MTC Ericsson[R1-2002797](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002797.zip) Feature lead summary#2 for NR coexistence performance improvements for LTE-MTC Moderator (Ericsson)[100b-e-LTE-eMTC5-Coex-NR-01] – Johan (Ericsson)Email discussion on the following issues in [R1-2002513](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002513.zip) by 4/24 and corresponding TP (if any) by 4/30 – Johan (Ericsson)* Issue #2: Special subframes
* Issue #3: DL DMRS
* Issue #4: UL DMRS
* Issue #5: SRS
* Issue #6: SPS

Decision: As per email decision posted on Apr.27th,**Agreement*** Symbol-level granularity resource reservation is not applied in special subframes.

**Agreement** (as per email decision posted on Apr.29th)The following TPs are endorsed for the editor’s CRs.[R1-2003116](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003116.zip) TP for 36.211 on UL DMRS handling for LTE-MTC resource reservation Moderator (Ericsson)[R1-2003117](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003117.zip) TP for 36.213 on SRS handling for LTE-MTC resource reservation Moderator (Ericsson)[R1-2003118](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003118.zip) TP for 36.211 on SPS handling for LTE-MTC resource reservation Moderator (Ericsson)[R1-2003119](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003119.zip) TP for 36.213 on SPS handling for LTE-MTC resource reservation Moderator (Ericsson)**Agreement** (as per email decision posted on Apr.30th)[R1-2003115](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003115.zip) TP for 36.211 on TDD special subframe handling for LTE-MTC resource reservation Moderator (Ericsson)[100b-e-LTE-NB\_IoTenh3-Coex-NR-04] – Alberto (Qualcomm)Email approval of the reply LS for [R1-2001518](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2001518.zip) for both eMTC and NB-IoT by 4/23 [R1-2002856](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002856.zip) Outcomes of email discussion [100b-e-LTE-NB\_IoTenh3-Coex-NR-04] Moderator (Qualcomm Incorporated)Decision: As per email decision posted on Apr.27th,[R1-2002897](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002897.zip) Draft LS response on NR coexistence QualcommDecision: The draft LS to RAN2 on NR coexistence is endorsed. Final LS is approved in [R1-2002899](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002899.zip). |

RAN1 discussed **MPDCCH performance improvements**, with the following agreements:

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| [R1-2002699](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002699.zip) Feature lead summary #1 on MPDCCH performance improvement Moderator (Huawei) |

RAN1 discussed **CSI-RS-based feedback for non-BL UEs**, with the following agreements:

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| [R1-2001930](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2001930.zip) FL summary of CE mode A and B improvements for non-BL UEs Moderator (LG Electronics)[R1-2002735](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002735.zip) FL summary#2 of CE mode A and B improvements for non-BL UEs Moderator (LG Electronics)[R1-2002772](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002772.zip) FL summary#3 of CE mode A and B improvements for non-BL UEs Moderator (LG Electronics) [100b-e-LTE-eMTC5-non-BL-UEs-01] – Jay (LG Electronics)Corrections on the CSI-RS based CSI feedback for non-BL UEs in CE mode A by 4/24* Issue #1: Part of the endorsed TP not captured in the draft CR (part of the TP agreed through [100e-LTE-eMTC5-non-BL-UEs-03] missed in clause 7.2.2.)
* Issue #2: Corrections on the CSI-RS based CSI feedback for non-BL UEs in CE mode A

Decision: As per email decision posted on Apr.25th, the TP#1 and TP#2 in Appendix of [R1-2002772](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002772.zip) are endorsed.[R1-2002969](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002969.zip) Text proposals endorsed through email discussion [100b-e-LTE-eMTC5-non-BL-UEs-01] Moderator (LG Electronics)**Agreement*** The text proposals in [R1-2002969](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002969.zip) are endorsed for the editor’s CRs on TS36.211 and TS36.213.
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RAN1 discussed **use of LTE control channel region for DL transmission**, with the following agreements:

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| [R1-2002644](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002644.zip) Feature lead summary on use of LTE control channel region Moderator (Nokia)[100b-e-LTE-eMTC5-Use-of-LTE-control-channel-region-01] – Rapeepat (Nokia)Email discussion on the following issues by 4/24 and corresponding TP (if any) by 4/30* Issue 3 (in [R1-2002644](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002644.zip)): Clarification of “for other purposes” wording
* Whether “Use of LTE control channel region” can be combined with PUR
* Whether “MPDCCH improvement” can be combined with PUR

[R1-2002993](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002993.zip) Feature lead summary for [100b-e-LTE-eMTC5-Use-of-LTE-control-channel-region-01] Moderator (Nokia)Decision: As per email decision posted on Apr.27th,**Agreement*** Distributed MPDCCH transmission is used for UE-specific search space configured by PUR C-RNTI

Conclusion: As per email decision posted on Apr.29th, on whether “Use of LTE control channel region” can be combined with PUR* Use of LTE control region for PUR is enabled by parameter *ce-dl-lte-control-region-config* in SIB. No specification change is needed.

On whether “MPDCCH improvement” can be combined with PUR* MPDCCH improvement for PUR is enabled by parameter *mpdcch-crs-idle-config* in SIB. No specification change is needed.

[R1-2002994](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002994.zip) Text Proposals for [100b-e-LTE-eMTC5-Use-of-LTE-control-channel-region-01] Moderator (Nokia)**Agreement*** The text proposals in [R1-2002994](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2002994.zip) are endorsed for the editor’s CR on TS36.211 and TS36.213.
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RAN1 endorsed the following CRs:

* + 36.211: [R1-2003152](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003152.zip)
	+ 36.213: [R1-2003157](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003157.zip)

There were no RAN1 agreements with RRC impact, but RAN1 provided a cleaned-up version in [R1-2003189](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003189.zip) of the RRC parameter list provided earlier in [R1-2001477](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100_e/Docs/R1-2001477.zip). An updated RAN1 UE feature list was provided in [R1-2003196](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/R1-2003196.zip).

**RAN1#101-e**

36 maintenance contributions were submitted (for details see agenda item 6.2.1 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/TDoc_List_Meeting_RAN1%23101-e.xlsx)).

RAN1 discussed **UE-group wake-up signal**, with the following agreements:

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| [R1-2004684](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004684.zip) Feature Lead Summary of Maintenance for group MWUS Moderator (Qualcomm Incorporated)[R1-2004888](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004888.zip) FL summary of email discussion [101-e-LTE-eMTC5-WUS-01]       Moderator (Qualcomm Incorporated)[101-e-LTE-eMTC5-WUS-01] Email discussion on the alignment of WUS resource locations between RAN1 agreement and RAN2 specification by 5/29 – Le (Qualcomm) * Discus whether to send LS to RAN2, clarifying the intention behind the agreement for frequency allocation below and above center frequency and asking RAN2 to implement the intended functionality as suggested in TP2.2 in [R1-2004684](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004684.zip).

**Agreement**Send an LS to RAN2, clarifying the intention behind the agreement for frequency allocation below and above center frequency. Ask RAN2 to implement the intended functionality as suggested in the following TP. * LS is endorsed in [R1-2004952](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004952.zip).

<BEGIN TP for Table 7.5.x-1 of TS 36.304>**Table 7.5.x-1: WUS Resource frequency location**

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| ***WUS Resource******(N\_ID^resource)*** | ***Frequency location of WUS Resource ID 0*** |
| ***n0*** | ***n2 (Note 3)*** | ***n4 (Note 1)*** |
| ***NB below centre frequency*** | ***NB above centre frequency*** |
| WUS Resource 1 | n2 | n4 | n0 | n2 |
| WUS Resource 2 | n0 | n2 | n2 | n4 |
| WUS Resource 2(Note 2) | n4 | n0 | n4 | n0 |
| WUS Resource 3 | n2 | n4 | n0 | n2 |
| Note 1: This column is applicable if wus-Config is present.Note 2: This row is applicable for the resource pattern ID 7Note 3: ‘NB below centre frequency’ implies that NB is located in lower frequency relative to the centre frequency and vice versa. The rationale for this differentiation is to avoid allocating WUS resources on the outermost PRBs in a carrier. The frequency relation of resources is n4>n2>n0.Editor Note : It is FFS whether further updates needed for WUS Resource ID 0 =n2. |

<END TP for Table 7.5.x-1 of TS 36.304>[R1-2004694](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004694.zip) Feature lead summary #1 of Group WUS for NB-IoT Moderator (Ericsson)[R1-2004832](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004832.zip) Feature lead summary #2 of Group WUS for NB-IoT Moderator (Ericsson)[101-e-LTE-NB\_IoTenh3-WUS-01] Alignment of non-group WUS between RAN1 and RAN2 specifications for both NB-IoT and LTE-MTC by 5/29 – Magnus (Ericsson)* Alt 1: Endorse presented TP for Sect. 10.2.6B.1 (6.11B.1 for LTE-MTC) of TS 36.211.
* Alt 2: Maintain current spec in Sect. 10.2.6B.1 (6.11B.1 for LTE-MTC) of TS 36.211.

**Agreement**The text proposal in [R1-2004902](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004902.zip) is endorsed for the editor’s CR on TS36.211. |

RAN1 discussed **transmission in preconfigured UL resources**, with the following agreements:

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| [R1-2004690](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004690.zip) LTE-M Preconfigured UL resources feature lead summary #1 RAN1 #101-e Moderator (Sierra Wireless)[R1-2004691](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004691.zip) LTE-M Preconfigured UL resources feature lead summary #2 RAN1 #101-e Moderator (Sierra Wireless)[101-e-LTE-eMTC5-PUR-01] Issue#1in [R1-2004691](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004691.zip) (Sub-PUR allocation for retransmissions) by 5/29 – Gus (Sierra Wireless)**Agreement**The text proposal #2 in section 2.2.2 in [R1-2004800](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004800.zip) is endorsed for editor’s CR on TS36.212.[101-e-LTE-eMTC5-PUR-02] PUR power control issues by 5/29 – Gus (Sierra Wireless)* Issue #2 in [R1-2004691](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004691.zip): PUCCH power control
* Issue #3 in [R1-2004691](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004691.zip): Power control Accumulation mechanism)

**Agreement**The following text proposals in [R1-2004801](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004801.zip) are endorsed for the editor’s CR on TS36.213* TP#2 in section 2.3.2
* TP#2 in section 3.2.2
* TP#2 in section 4.3.2

[101-e-LTE-eMTC5-PUR-03] Editorial changes needing some discussion by 5/29 – Gus (Sierra Wireless)* Issue #4 in [R1-2004691](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004691.zip): Timing advance adjustment via DCI
* Issue #7 in [R1-2004691](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004691.zip): Clarification for “UE-specific search space configured by PUR C-RNTI”

**Agreement**The following text proposals in [R1-2004802](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004802.zip) are endorsed for editor’s CR on TS36.213.* TP#2 in section 2.2.2
* TP#2 in section 3.2.2
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RAN1 discussed **scheduling of multiple DL/UL transport blocks**, with the following agreements:

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| [R1-2004696](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004696.zip) Feature lead summary #1 for Multi-TB scheduling for LTE-MTC Moderator (Ericsson)[R1-2004729](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004729.zip) Feature lead summary #2 for Multi-TB scheduling for LTE-MTC Qualcomm Inc.[101-e-LTE-eMTC5-Multi-TB-01] TDD HARQ-ACK bundling mechanism and possible conclusion on CSI reporting by 5/29 – Johan (Ericsson)* Consider TPs in Proposal 1 (on TDD HARQ-ACK bundling) in [R1-2004696](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004696.zip)
* Possible RAN1 conclusion: For multi-TB PUSCH transmission with aperiodic CSI reporting, the CSI is transmitted with the first TB. No TP is needed.

**Agreement**The text proposals in [R1-2004876](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004876.zip) is endorsed for the editor’s CR on TS36.212 and TS36.213.**Conclusion**For multi-TB PUSCH transmission with aperiodic CSI reporting, the CSI is transmitted with the first TB. No TP is needed.[101-e-LTE-eMTC5-Multi-TB-02] Minor corrections – Johan (Ericsson)* Consider TP in Proposal 3 (on sub-PRB symbol counter reset) in [R1-2004696](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004696.zip)
* Consider TP in Proposal 4 (on SPS handling) in [R1-2004696](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004696.zip)
* Consider TP in Proposal 5 (on removal of scheduling gap after last SC-MTCH TB) in [R1-2004696](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004696.zip)

**Agreement**The following text proposals are endorsed for editor’s CR* [R1-2004844](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004844.zip): 36.211 text proposals on sub-PRB symbol counter reset
* [R1-2004877](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004877.zip): 36.212 text proposals on SPS handling
* [R1-2004782](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004782.zip): 36.213 text proposals on removal of scheduling gap

[101-e-LTE-eMTC5-Multi-TB-03] Potential corrections on the following issues by by 5/29 and corresponding TP (if any) by 6/5 – Johan (Ericsson)* Discuss Proposal 6 (on DCI size alignment in TDD) in [R1-2004696](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004696.zip) and produce a TP if necessary
* Discuss Issue #7 (on UL early termination) in [R1-2004696](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004696.zip) and produce a TP if necessary
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RAN1 discussed **coexistence of LTE-MTC with NR**, with the following agreements:

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| [R1- 2004697](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004697.zip) Feature lead summary #1 for NR coexistence performance improvements for LTE-MTC Moderator (Ericsson)[R1-2004730](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004730.zip) Feature lead summary #2 for NR coexistence performance improvements for LTE-MTC Moderator (Ericsson)[101-e-LTE-eMTC5-Coex-NR-01] Email discussion on resource reservation by 5/29 – Johan (Ericsson) including* Resource reservation in special subframes: Consider the 36.213 TP in Proposal 1 for Issue #1 in [R1-2004697](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004697.zip)
* Resource reservation for DL DMRS: Consider the 36.211 TP in Proposal 3 for Issue #3 in [R1-2004697](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004697.zip)

**Agreement**The text proposal in [R1-2004783](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004783.zip) is endorsed for the editor’s CR on TS36.213. |

RAN1 discussed **CE mode improvements for** **non-BL UEs**, with the following agreements:

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| [R1-2004020](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004020.zip) FL summary of CE mode A and B improvements for non-BL UEs Moderator (LG Electronics)[R1-2003794](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2003794.zip) Clarification of DCI Format 6-1B for direct indication ZTE**For the 36.212 editor:**There is general consensus among interested companies on the corrections in [R1-2003794](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2003794.zip). Editors are recommended to review the tdoc and make changes if deemed necessary. |

RAN1 discussed **parameter name corrections**, with the following agreements:

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| **For the editors:**There is general consensus among interested companies on the corrections in Table 1 of [R1-2004291](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004291.zip). Editors are recommended to review the tdoc and make changes if deemed necessary. |

RAN1 endorsed the following CRs:

* + 36.211: [R1-2005170](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2005170.zip)
	+ 36.212: [R1-2005187](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2005187.zip)
	+ 36.213: [R1-2005180](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2005180.zip)

There were no RAN1 agreements with RRC. An updated RAN1 UE feature list was provided in [R1-2004967](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/R1-2004967.zip), where an effort was made to align the descriptions between LTE-MTC and NB-IoT.

#### 2.1.2 Remaining Open issues

There are no remaining open issues in RAN1.

## 2.2 RAN2

#### 2.2.1 Agreements

To RAN2#109bis-e, 79 contributions were submitted (for details see agenda items 7.1, 7.2.2 and 7.2.3 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/TDoc_List_Meeting_RAN2%23109-bis-e.xlsx))

To RAN2#110-e, 58 contributions were submitted (for details see agenda items 7.1, 7.2.2 and 7.2.3 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/TDoc_List_Meeting_RAN2%23110-e.xlsx))

RAN2 discussed **UE-group wake-up signal** jointly with NB-IoT, with the following agreements:

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| **RAN2#109bis-e agreements:*** R2-2003329 can be used as a baseline for further discussion during review of NB-IoT 36.304 CR.
* The following codepoints are used to indicate a paging probability threshold value: {p20,p30,p40,p50,p60,p70,p80,p90}.
* The paging probability threshold values, i.e., {p20,p30,p40,p50,p60,p70,p80,p90}, are used to map the paging probabilities configured by the core network to WUS group sets..
* Confirm the working assumption: Maximum number probability thresholds is 3 giving a total of 4 groups.
* Confirm the working assumption: “Support of Release 16 WUS is independent to support of Release 15 WUS”.
* For NB-IoT and eMTC, the existing capability *wakeUpSignalMinGap-eDRX-r15* also applies to Rel-16 WUS.
* For eMTC, separate capability indications are introduced for FDD and TDD.
* For NB-IoT and eMTC, Rel-16 GWUS is applicable to both EPC and 5GC, and there is no need for capability differentiation.

**RAN2#110-e agreements:*** Use the SA2 defined solution (i.e. re-use the R15 solution) with group WUS with no additional changes for minimising false wake-up.
* Each configured probability threshold shall have at least 1 WUS group.
* Use [R2-2005278](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005278.zip) as a baseline to discuss resource location signalling for eMTC as part of the CR updates.
* *frequencyLocation-r16* is not necessarily the same for all gap types.
* Merge rows for WUS Resource 1 and WUS resource 3 in Table 7.5.x-1 in TS 36.304 endorsed CR.
* Wait for input from RAN1 to correct the table in 36.304 endorsed CR to implement the meaning of ‘NB is below centre frequency’.
* Delete “*Any WUS group from the list numGroupsList that is not assigned to a probability group is assigned to the WUS group list used for UE ID based grouping.*” from TS 36.331.
* For eMTC UEs, it is captured in a Rel-16 CR that early implementation of relaxed serving cell measurements is allowed from Release 15.

UE capabilities:* For NB-IoT and eMTC, for FDD, clarify in TS 36.331 and TS 36.306 that the capability *groupWakeUpSignal-r16* corresponds to GWUS without group alternation.
* For NB-IoT and eMTC, for FDD, introduce a new capability *groupWakeUpSignalAlternation-r16* corresponding to GWUS with group alternation, conditional to support of *groupWakeUpSignal-r16*.
* For eMTC, for TDD, clarify in TS 36.331 and TS 36.306 that the capability *groupWakeUpSignalTDD-r16* corresponds to GWUS without group alternation.
* For eMTC, for TDD, introduce a new capability *groupWakeUpSignalAlternationTDD-r16* corresponding to GWUS with group alternation, conditional to support of *groupWakeUpSignalTDD-r16*.
* For NB-IoT and eMTC, update TS 36.304 to specify that if the UE does not support GWUS with group alternation and the eNB enables group alternation, then the UE does not use GWUS.
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RAN2 discussed **transmission in preconfigured uplink resources (PUR)** jointly with NB-IoT, with the following agreements:

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| **RAN2#109bis-e agreements:**RRC:* For both NB-IoT and eMTC, the value range of pur-TimeAlignmentTimer-r16 is INTEGER (1..8), i.e. 1~8 \* PUR periodicity.
* All PUR parameters are stored in the eNB. RAN2 has not identified any parameters that must be stored in the MME.
* Revert the previous working assumption, PUR grant is maintained in RRC.
* The handling of ‘m’ counter is moved from MAC to RRC.
* For pur-Periodicity-r16 and requestedPeriodicity-r16, confirm that the value range is {hsf8, hsf16, hsf32, hsf64, hsf128, hsf256, hsf512, hsf1024, hsf2048, hsf4096, hsf8192, spare5, spare4, spare3, spare2, spare1} for both NB-IoT and eMTC.
* For both NB-IoT and eMTC, PUR request indicates requested start time/offset of PUR in H-SF level.
* FFS: 2-level offset need and details for pur-StartTime-r16.
* Requested PUR TBS values:
	+ - For the requested PUR TBS in eMTC and NB-IoT, the minimum value is b328.
		- FFS: other details.
* FFS: It is up to eNB implementation how to link CP-PUR configuration to each UE in RRC\_IDLE according to PUR resource.

MAC aspects:* Remove the Editor’s Note “FFS whether restarting the window is indended” from 36.321.
* Remove the Editor’s Note “FFS what is the impact of PUR in this section” from 36.321.

RRC-MAC interactions:* No further MAC-RRC interaction on TA validation is needed. Remove the Editor’s Note “How RRC indicates to MAC that TA is valid or instructs MAC to use PUR” from 36.321.
* Remove the references to PUR TA timer validation in section 5.4.7.1 from 36.321.
* PUR release due to RACH initiation on a new cell is captured in RRC.
* PUR configuration is released when the UE initiates RA procedure on a new cell for all purposes.
* RRC configures the lower layers to use PUR grant upon initiation of transmission using PUR.
* FFS: implicitReleaseAfter handling and other RRC-MAC interaction details.

Other:* Confirm that transmission using PUR cannot be used for signalling, i.e. mt-Access and mo-Signalling cannot be used for transmission using PUR.
* From RAN2 point of view PUR (re-)configuration can be provided to the UE for the CP solution without AS security enabled.
	+ - No consensus to send an LS to SA3.
* PUR-RNTI is used as the name of RNTI used for PUR.

**RAN2#110-e agreements:**TB sizes:* Maximum value for requestedTBS for eMTC is b2984 and for NB-IoT b2536.
* For requestedTBS, use 64 values for eMTC and 32 values for NB-IoT.

RAN1 LSs:* Confirm the feasibility of RAN1 working assumption on search space priority, send a reply LS to RAN1.
* Update RRC with DCI adjustment on repetitions.
* When repetition adjustment DCI is detected, MAC layer expects the 3-bit index from PHY layer and further provides it to RRC layer. RRC layer updates the PUR configuration with the provided information.
* Ask RAN1 to provide indications on the 3-bit repetition adjustment, L1 ACK/fallback indication to upper layers in their specifications.

PUR offset working assumption and the H-SFN configuration:* Confirm the working assumption "Maximum PUR time offset should be the same as maximum PUR periodicity".
	+ - It is up to UE implementation to ensure synchronisation for the case of (>1024 H-SFNs) PUR periodicity/offset.
* Confirm that PUR starting time H-SFN configuration in pur-StartTime is an offset relative to a reference H-SFN, while SFN and subframe configurations are absolute within the H-SFN.
* pur-StartTime reference is the H-SFN corresponding to the last subframe of the first transmission of RRC release message containing pur-Config.
* Introduce 1 bit in the PUR (re)configuration to indicate LSB of H-SFN to resolve misalignment.

*pur-StartTime* structure and requested offset:* Start H-SFN range and requested offset range is 0-8191.
* Start SFN range is 0-1023.
* Start subframe range is 0-9.

CP configuration:* It is up to eNB implementation how UE and PUR configuration are linked according to the configured PUR resources.
* Introduce an optional 20-bit identifier for CP-PUR to identify the PUR configuration in eNB.
	+ - If identifier is configured by the NW, then it is included by the UE when moving to connected.

Corrections/clarifications on MAC/RRC:* RRC layer calculates the exact PUR timing and provides the information to MAC in the form of UL grant. Details of the timing of providing this information to MAC layer is up to UE implementation.
* pur-ResponseWindowSize is provided to MAC when lower layers are configured to use PUR.
* If pur-Config is not present in RRC release, pur-TimeAlignmentTimer is kept running.
* When configuration of pur-TimeAlignmentTimer is not present in pur-Config, the timer is released and not applicable.
* Clarify that PUR configuration is excluded in clause 5.3.12 in TS 36.331 when releasing the radio resource configuration.
* PUR-RNTI does not need to be explicitly mentioned when configuring lower layers for transmission using PUR.
* Clarify that pur-TimeAlignmentTimer is not provided to lower layers when configuring lower layers for transmission using PUR as it is provided already earlier in pur-Config.

UE Capabilities:* For eMTC introduce a new capability pur-RSRP-Validation-r16, conditional to support of at least one of the following capabilities:  pur-CP-EPC-CE-ModeA-r16, pur-CP-5GC-CE-ModeA-r16, pur-UP-EPC-CE-ModeA-r16 or pur-UP-5GC-CE-ModeA-r16..
* For NB-IoT FDD and eMTC, introduce a new capability pur-CP-L1Ack-r16. For NB-IoT, conditional to support of at least one of the following capabilities: pur-CP-EPC -r16, pur-CP-5GC-r16. For eMTC, conditional to support of at least one of the following capabilities:  pur-CP-EPC-CE-ModeA-r16, pur-CP-5GC-CE-ModeA-r16.
* For eMTC and NB-IoT, move the four PUR capabilities to a new capability group “PUR-Parameters” and create a new subclause in 36.306 4.3.x.
* Change the group Wake Up Signal capabilities names in the eMTC correction CR so the names align with NB-IoT and Rel-15 capabilities names.
* For eMTC, introduce PUR capabilities for CE Mode A and CE Mode B separately.
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RAN2 discussed **scheduling of multiple DL/UL transport blocks** jointly with NB-IoT, with the following agreements:

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| **RAN2#109bis-e agreements:*** For NB-IoT and eMTC, multiple TB scheduling in unicast is applicable to both EPC and 5GC without differentiation.
* For NB-IoT and eMTC, multiple TB scheduling in multicast is only applicable to EPC.

**RAN2#110-e agreements:**UE Capabilities:* For eMTC, introduce a new physical layer capability multiTB-Interleaving-r16, conditional to support of pusch-MultiTB-CE-ModeA-r16 and/or pusch-MultiTB-CE-ModeB-r16 and/or pdsch-MultiTB-CE-ModeA-r16 and/or pdsch-MultiTB-CE-ModeB-r16.
* For eMTC, introduce a new physical layer capability multiTB-HARQ-Bundling-r16, conditional to support of pdsch-MultiTB-CE-ModeA-r16.
* For eMTC, introduce a new physical layer capability multiTB-Sub-PRB-r16, conditional to support of (pusch-MultiTB-CE-ModeA-r16 and/or pusch-MultiTB-CE-ModeB-r16 ) and ce-PUSCH-SubPRB-Allocation-r15.
* For eMTC, introduce a new physical layer capability multiTB-EarlyTermination-r16, conditional to support of pusch-MultiTB-CE-ModeA-r16 and/or pusch-MultiTB-CE-ModeB-r16.
* For eMTC, introduce a new physical layer capability multiTB-64QAM-r16, conditional to support of epdsch-MultiTB-CE-ModeA-r16 and pdsch-64QAM-r15.
* For eMTC, introduce a new physical layer capability multiTB-FrequencyHopping-r16, conditional to support of pusch-MultiTB-CE-ModeA-r16 and/or pusch-MultiTB-CE-ModeB-r16 and/or pdsch-MultiTB-CE-ModeA-r16 and/or pdsch-MultiTB-CE-ModeB-r16.
* For eMTC, introduce a new capability without radio access capability signaling for Multi-TB SC-MTCH in CE-modeB.
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RAN2 discussed **coexistence of LTE-MTC with NR** jointly with NB-IoT, with the following agreements:

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| **RAN2#109bis-e agreements:**For eMTC:* Full configuration can be provided via dedicated or broadcast signaling to configure a UE for coexistence with NR.
* A new SIB is introduced for the broadcast signaling.

For NB-IoT and eMTC, UL and DL resource reservation for coexistence with NRare applicable to EPC and 5GCwithout capability differentiation.**RAN2#110-e agreements:**UE Capabilities:* For eMTC, rename the four already defined capabilities to subframeResourceResvUL-CE-ModeA-r16, subframeResourceResvU L-CE-ModeA-r16, subframeResourceResvDL-CE-ModeA-r16, subframeResourceResvDL-CE-ModeB-r16.
* For eMTC, introduce four new physical layer capabilities slotSymbolResourceResvUL-CE-ModeA-r16, slotSymbolResourceResvUL-CE-ModeB-r16, slotSymbolResourceResvDL-CE-ModeA-r16, slotSymbolResourceResvDL-CE-ModeB-r16 to support of slot/symbol level granularity.
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RAN2 discussed **quality report in Msg3 and connected mode** jointly with NB-IoT, with the following agreements:

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| **RAN2#109bis-e agreements:*** For non-EDT support 2-bit CQI using R and F2 bits only in a MAC header with uplink LCID equal to any CCCH.
* The text proposal in R2-2003183 is used as a baseline for the eMTC MAC CR. The intention is not to introduce a new MAC CE.

UE Capabilities:DL channel quality reporting in MSG3:* DL channel quality reporting in Msg3 for NB-IoT anchor carrier and DL channel quality reporting in Msg3 for eMTC are two separate optional features.
* For NB-IoT and eMTC, DL channel quality reporting in MSG3 is applicable to both EPC and 5GC without capability differentiation.

DL channel quality reporting in connected mode:* Keep a common capability for NB-IoT and eMTC for DL channel quality reporting in connected mode and clarify in the description that reporting of the serving cell applies to E-UTRAN and reporting of the configured carrier applies to NB-IoT.
* For NB-IoT, DL channel quality reporting in connected mode is only applicable to FDD. For eMTC, it is applicable to both FDD and TDD.
* For NB-IoT and eMTC, DL channel quality reporting in connected mode is applicable to both EPC and 5GC without capability differentiation.
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RAN2 discussed **MPDCCH performance** **improvements**, with the following agreements:

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| **RAN2#110-e agreements:**UE Capabilities:* Rename existing capability to crs-ChEstMPDCCH-CE-ModeA-r16.
* Introduce a new physical layer capability crs-ChEstMPDCCH-CE-ModeB-r16.
* Introduce a new physical layer capability crs-ChEstMPDCCH-CSI-r16 conditional to support of crs-ChEstMPDCCH-CE-ModeA-r16.
* Introduce a new physical layer capability crs-ChEstMPDCCH-reciprocity-TDD-r16 conditional to support of crs-ChEstMPDCCH-CE-ModeA-r16.
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RAN2 discussed **use of LTE control channel region for DL transmission**, with the following agreements:

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| **RAN2#109bis-e agreements:*** RAN2 intends to address the case for a non-BL UE to be able to select non-standalone cell to camp over standalone cell on the same frequency even when the coverage is better for the latter.

**RAN2#110-e agreements:*** Remove the square brackets around “may” in TS 36.304.

UE capabilities for LTE Control Channel use:* Rename existing capability to mpdcch-InLTE-ControlRegion-CE-ModeA-r16.
* Introduce 3 new capabilities mpdcch-InLTE-ControlRegion-CE-ModeB-r16, pdsch-InLTE-ControlRegion-CE-ModeA-r16, pdsch-InLTE-ControlRegion-CE-ModeB-r16.
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RAN2 discussed **mobility enhancements**, with the following agreements:

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| **RAN2#109bis-e agreements:*** The changes captured in [R2-2003138](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003138.zip) is agreed as a baseline and will be merged with the WI-specific CR.
* Early implementation of relaxed serving cell measurement by Rel-15 UEs when configured with WUS is permitted. FFS whether to agree in TEI15.
* UE assumes that the RSS power bias is the same as the one used for the serving cell or for the cell camped on for all neighbour cells that are not in the Neighbour Cell List.
* If a neighbour cell is in the Neighbour Cell List (NCL) but RSS power bias is not in the NCL, UE assumes RSS-based measurement is not used for that neighbour cell.
* Remove rss-MeasPowerBias-r16 from SIB2 (common configuration for SIB) from the text proposal.
* RAN2 waits for RAN4 progress to capture UE capability signalling to use RSS in RRC\_IDLE and RRC\_CONNECTED.
* RAN2 waits for RAN4 progress on the use of RSS in RRC\_CONNECTED before specifying RSS signalling configuration in RRC\_CONNECTED.

**RAN2#110-e agreements:*** The text proposed in [R2-2005306](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005306.zip) is endorsed and will be merged to the TS 36.300 CR for eMTC.
* The text proposed in [R2-2005831](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005831.zip) is endorsed and will be merged to the TS 36.331 CR for eMTC.
* Introduce RSS configuration for neighbour cells in dedicated signalling, i.e., for a UE in RRC\_CONNECTED. If absent, UE assumes no RRS configuration in connected mode, i.e., RRS based measurement is not applicable in connected mode.
* Introduce a UE capability bit to indicate support for RRS configuration for neighbour cells in dedicated signalling.
* Introduce RSS parameters in *MeasObjectEUTRA* to provide RSS measurement configuration for UEs in RRC\_CONNECTED.
 |

RAN2 discussed **connection to 5GC** jointly with NB-IoT, with the following agreements:

|  |
| --- |
| **RAN2#109bis-e agreements:*** If RRCConnectionResume message received in response to MO-EDT includes fullConfig, the UE considers the data were successfully transmitted.
* Upon fallback to RRC connection setup procedure during RRC connection resumption when connected to 5GC, eMTC UEs use default NR-PDCP configuration for all subsequent messages via SRB1.
* In TS 36.306 a separate table is introduced for BL UEs and the existing Cat M categories are removed.
* For eMTC UE connected to 5GC is not required to acquire SIB25-BR in the target cell after handover until the connection is released.
* SIB25-BR is not provided to the UE during HO signalling procedure, i.e. it is up to the ng-eNB to release the UE.
* Introduce enhancements for early eMTC UE capability retrieval (i.e., after Msg3 reception) by (ng-)eNB from AMF/MME if feasibility is confirmed.
* Send a LS to SA2, RAN3 CC: CT1, SA3 to inform the agreement above, describe the motivation, and ask for feasibility.
* For non-EDT/non-PUR cases, when Rel-16 AS RAI triggered by upper layers is not included in order to avoid data segmentation, Rel-16 AS RAI is allowed not to be cancelled.
* UE in RRC\_CONNECTED is allowed to send Rel-16 AS RAI without any UL data.
* It is up to the UE to use Rel-16 or Rel-14 AS RAI if Rel-14 is configured for the UE connected to 5GC.
* It is up to the UE to use Rel-16 or Rel-14 AS RAI if both Rel-14 and Rel-16 AS RAI are configured for the UE connected to EPC.
* For eMTC connected to 5GC, when UE enters RRC\_INACTIVE state, RRC layer indicates suspend indication to upper layers [as it for eLTE in Rel-15]. When UE enters RRC\_IDLE in suspended state, i.e., 5GC UE optimization, RRC indicates idle suspend indication to upper layers.
* Send a reply LS to CT1 to inform about the agreement above.
* For NB-IoT and eMTC, remove the capabilities introduced in 6.18.1 (User Plane CIoT 5GS optimisations) and 6.18.2 (Control Plane CIoT 5GS optimisations).
* For NB-IoT and eMTC, introduce a new optional feature, MO-EDT for Control Plane CIoT 5GS Optimisation, in section 6.18 and remove the editor’s note in 6.8.4.
* For eMTC, introduce a new capability, *ce-eutra-5GC,* for support of connection to 5GC.
* For eMTC non-BL UEs, introduce new capabilities, *ce-eutra-5GC-HO-ToNR-FDD-FR1, ce-eutra-5GC-HO-ToNR-TDD-FR1, ce-eutra-5GC-HO-ToNR-FDD-FR2* and *ce-eutra-5GC-HO-ToNR-TDD-FR2* for support of connection to 5GC.

**RAN2#110-e agreements:*** For NB-IoT and eMTC, *rai-Support-r14* applies to both EPC and 5GC without EPC/5GC differentiation.
* For NB-IoT and eMTC, introduce an optional feature for support of AS RAI enhancement for UE connected to 5GC in TS 36.306.
 |

RAN2 discussed **other topics**, with the following agreements:

|  |
| --- |
| **RAN2#109bis-e agreements:*** Interworking between Cat M1/M2 device and NR is not supported.
* Capture which NR related capabilities are not applicable to Cat M UE in TS 36.306.
* Capture that interworking between Cat M and NR is not supported in this version of the specification in TS 36.300.
* Send a reply LS to SA2.

**RAN2#110-e agreements:*** For eMTC, introduce UE-EUTRA-CapabilityAddXDD-Mode container for all of the newly introduced Release-16 physical layer capabilities.
 |

The following RAN2 CRs were endorsed:

* 36.300: [R2-2005824](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005824.zip) & [R2-2005922](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005922.zip)
* 36.304: [R2-2005880](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005880.zip) & [R2-2005950](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005950.zip)
* 36.306: [R2-2005828](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005828.zip)
* 36.321: [R2-2005826](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005826.zip) & [R2-2005924](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005924.zip)
* 36.331: [R2-2005827](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005827.zip) & [R2-2005921](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005921.zip)

#### 2.2.2 Remaining Open issues

There are no remaining open issues in RAN2.

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| **RAN2#110-e agreements:*** From RAN2 point of view, the eMTC WI is considered complete (including UE capabilities).
 |

## 2.3 RAN3

#### 2.3.1 Agreements

**RAN3#107bis-e**

79 contributions were submitted (for details see agenda item 14 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/TDoc_List_Meeting_RAN3%23107-bis-e.xlsx))

RAN3 discussed **mobile-terminated (MT) early data transmission (EDT)** jointly with NB-IoT, with the following agreements:

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| RAN3#107bis-e agreements:* Discussion on stage 3 clean-up for MT-EDT finalization. TP in [R3-201799](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201799.zip) agreed (Qualcomm Incorporated)
 |

RAN3 discussed **eMTC** **connection to 5GC**, with the following agreements:

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| RAN3#107bis-e agreements:* Reuse existing UE Context ID IE to support that I-RNTI is used as the UE identifier for UP CIoT 5GS Optimization for both eMTC and NB-IoT
* Extend XnAP Paging DRX IE used in RAN Paging, with new values 512rf and 1024rfKeep the UE CONTEXT SUSPEND FAILURE procedure
* Add the Suspend Request and Suspend Response indicators in UE Context Resume procedure with an editor’s note “The above IEs and text align with TS 23.502 v16.4.0, and may be subject to change”

The following TPs are agreed:* [R3-202597](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-202597.zip)
* [R3-202573](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-202573.zip)
* [R3-202656](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-202656.zip)
* [R3-201683](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201683.zip)
* [R3-202565](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-202565.zip)
* [R3-201684](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201684.zip)
 |

RAN3 discussed **GWUS**, with the following agreements:

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| RAN3#107bis-e agreements:* [R3-202580](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-202580.zip) Support of WUS Group endorsed as BL CR
 |

The following CRs were endorsed:

* [R3-201541](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201541.zip)
* [R3-201620](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201620.zip)
* [R3-201538](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201538.zip)
* [R3-201539](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201539.zip)
* [R3-201582](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201582.zip)
* [R3-201583](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201583.zip)
* [R3-201536](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201536.zip)
* [R3-201550](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201550.zip)
* [R3-201685](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/R3-201685.zip)

**RAN3#108-e**

87 contributions were submitted (for details see agenda item 14 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/TDoc_List_Meeting_RAN3%23108-e.xlsx))

RAN3 discussed **eMTC** **connection to 5GC**, with the following agreements:

|  |
| --- |
| RAN3#108-e agreements:* A number of clean-ups of stage 2 and stage 3 BL CRs.
* Removal of various “FFS” and “Editor’s notes” marks
* Correction of ASN.1
* Agreed to add the *UE differentiation information* IE to NGAP

The following TPs are agreed:* [R3-203910](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203910.zip)
* [R3-203446](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203446.zip)
* [R3-203727](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203727.zip)
* [R3-203449](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203449.zip)
* [R3-204121](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-204121.zip)
* [R3-203267](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203267.zip)
* [R3-204102](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-204102.zip)
* [R3-203542](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203542.zip)
* [R3-203226](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203226.zip)

The following LS to SA2 is agreed: [R3-204152](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-204152.zip) |

RAN3 discussed **GWUS**, with the following agreements:

|  |
| --- |
| RAN3#108-e agreements:* Remove FFS for Paging Probability Information value range. The value range of Paging Probability Information in PAGING message is {p00, p05, p10, p15, p20, p25, p30, p35, p40, p45, p50, p55, p60, p65, p70, p75, p80, p85, p90, p95, p100}.
* Do not send LS to CT1 and RAN2 about the value range of Paging Probability Information in PAGING message.
* Do not move the WUS Assistance Information IE into the Assistance Data for Paging IE.
* Introduce WUS Assistance Information IE in NGAP: PAGING Message.

The following TPs are agreed in [R3-203181](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203181.zip) and [R3-203214](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203214.zip) |

The following CRs were endorsed:

* [R3-203007](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203007.zip)
* [R3-203012](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203012.zip)
* [R3-203030](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203030.zip)
* [R3-203050](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203050.zip)
* [R3-203051](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203051.zip)
* [R3-203052](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203052.zip)
* [R3-203053](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203053.zip)
* [R3-203054](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203054.zip)
* [R3-203055](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203055.zip)
* [R3-203148](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/R3-203148.zip)

#### 2.3.2 Remaining Open issues

There are no remaining open issues in RAN3.

|  |
| --- |
| RAN3#108-e agreements:* Chair to report to RAN that these WIs are completed in RAN3
 |

## 2.4 RAN4

#### 2.4.1 Agreements

**RAN4#94-e-Bis**

37 contributions were submitted (for details see agenda items 5.10 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_94_eBis/Docs/TDoc_List_Meeting_RAN4%2394-bis-e.xlsx))

RAN4 discussed CRs for **transmission in preconfigured UL resources**, with the following agreements:

|  |
| --- |
| * In current agreements Tsearch is FFS when the UE is not configured with eDRX [[R4-1907733](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_91/Docs/R4-1907733.zip)]. Tsearch is the time required for performing tracking loop.
* Proposals for Tsearch in normal DRX
	+ Option 1: Tsearch = 5 SF in normal coverage and enhanced coverage
	+ Other options are not precluded.
 |

RAN4 discussed **RSS-based measurements**, with the following agreements:

|  |
| --- |
| * Conditions for RSS based RSRP measurement in **IDLE mode serving cell measurements**:
	+ if the RSS of serving cell share the same NB as that of paging occasion MPDCCH for $N$ successive DRX cycles, and
	+ at least two RSS subframes exists immediately before the first subframe of paging occasion MPDCCH, for $N$ successive DRX cycles
		- FFS on at least two subframes exists immediately after the last subframe of paging occasion
		- (FFS: min/max distance of start/end of RSS occasion w.r.t end/start of MPDCCH), and
	+ RSS power offset with respect to CRS is equal to or greater than 0 dB, and
	+ RSS-based measurement period is not longer than CRS-based measurement period, definition of measurement period in IDLE mode will be discussed further in 2nd round.
* Conditions for RSS based RSRP measurement in **IDLE mode neighbor cell measurements**:
	+ RSS power offset with respect to CRS is equal to or greater than 0 dB, and
	+ at least two RSS subframes exists immediately before the first subframe of paging occasion MPDCCH, for $N$ successive DRX cycles
		- FFS on at least two subframes exists immediately after the last subframe of paging occasion
		- (FFS: min/max distance of start/end of RSS occasion w.r.t end/start of MPDCCH), and
	+ FFS on whether the UE is expected perform concurrent measurements on CRS and RSS.
	+ FFS on RSS from neighbour cell is within same 2-RB layer as serving cell RSS
* Measurement delays in IDLE:
	+ RSS-based measurement period is not longer than CRS-based measurement period
	+ Nserv as measurement period for serving cell
	+ Whether to use Tmeasure or Tevalute is FFS for neighbour cells.
* Measurements in CONNECTED mode
	+ RSS power offset with respect to CRS is equal to or greater than 0 dB
	+ RSS can colllide with measurement gap, but UE is not expected do any RSS measurement within the gap. Instead the UE can measure in the subframes before and after the gap.
 |

RAN4 discussed **MPDCCH performance improvements**, with the following agreements:

|  |
| --- |
| * Enhanced MPDCCH is used:
	+ When enhanced RLM E1 event is triggered
	+ When in normal RLM OOS is triggered
* Other interested companies are encouraged to provide simulation results for this scenario for RAN4#95-e meeting based on agreed simulation assumptions (ref. [R4-1914343](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_93/Docs/R4-1914343.zip)).
 |

RAN4 discussed **support of quality report in Msg3 and connected mode**, with the following agreements:

|  |
| --- |
| * RAN4 shall wait for RAN2 conclusion regarding reporting table for 2-bit and 3-bit reporting.
* If RAN2 agrees to introduce 2-bit and 3-bit reporting, options for reporting tables to be considered include following (see next slide).
* Option for reporting table for 2-bit reporting

* Option for reporting table for 3-bit reporting

 |

RAN4 discussed **RRM performance requirements,** with the following agreements:

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| --- |
| * RSS measurement accuracy requirements are to be specified by averaging the simulation results (excluding RF margin) and a fixed RF margin is added on top.
* For the RF margins, following options are under consideration:
	+ Non-BL UE
		- 2.5 dB
	+ BL UE
		- Option 1: 3 dB
		- Option 2: 4 dB
 |

RAN4 discussed **UE demodulation performance requirements** and made the following agreements:

|  |
| --- |
| * FFS whether to define demodulation requirements of PDSCH with multi-TB scheduling
* Agreed with the simulation assumption for MDPCCH performance improvement ([R4-2005513](http://3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_94_eBis/Docs/R4-2005513.zip))
* Agreed with the simulation assumption for CSI-RS based CSI reporting ([R4-2005513](http://3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_94_eBis/Docs/R4-2005513.zip))
 |

RAN4 discussed **BS demodulation performance requirements** and made the following agreement:

|  |
| --- |
| * FFS whether to define demodulation requirements of PUSCH with multi-TB scheduling
 |

**RAN4#95-e**

50 contributions were submitted (for details see agenda items 5.10 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_95_e/Docs/TDoc_List_Meeting_RAN4%2395-e.xlsx))

RAN4 discussed CRs for **transmission in preconfigured UL resources**, with the following agreements:

|  |
| --- |
| * Do not specify the exact time duration for synchronization and Tserach times for normal DRX and eDRX, instead it is stated that the UE shall be synchronized towards the serving cell prior to the transmission, and otherwise UE shall drop PUR transmission.
 |

RAN4 discussed **RSS-based measurements**, with the following agreements:

|  |
| --- |
| * IDLE mode neighbour cell measurement conditions
	+ Introduce capability signaling to indicate whether the UE is able to measure on neighbor cell RSS that is in the same NB that UE monitors.
* Minimum/maximum distance:
	+ Minimum distance: 0 ms
	+ Maximum distance: 4 ms
* Neighbour cell measurements is done before the paging occasion
* Indicate in LTE feature list about capability indicating whether the UE is able to measure on neighbour cell RSS that is in the same NB that UE monitors.
* CONNECTED mode serving measurement conditions
	+ serving cell RSS share the same NB as that of paging MPDCCH for successive N DRX cycles,
	+ RSS power offset with respect to CRS is equal to or greater than 0 dB,
	+ RSS time location of the cell being measured does not coincide with UE’s measurement gap (if configured)
* Minimum/maximum distance:
	+ Minimum distance: 0 ms
	+ Maximum distance: 4 ms
* RSS-based measurement period is not longer than CRS-based measurement period.
* CONNECTED mode serving measurement conditions
	+ serving cell RSS share the same NB as that of paging MPDCCH for successive N DRX cycles,
	+ RSS power offset with respect to CRS is equal to or greater than 0 dB,
	+ RSS time location of the cell being measured does not coincide with UE’s measurement gap (if configured)
* Minimum/maximum distance:
	+ Minimum distance: 0 ms
	+ Maximum distance: 4 ms
* RSS-based measurement period is not longer than CRS-based measurement period.
* CONNECTED mode neighbour cell measurement conditions
	+ RSS frequency location of the cell being measured occurs in the NB(s) that UE monitors for MPDDCH for the *N* number of samples
	+ RSS time location of the cell being measured does not coincide with UE’s measurement gap (if configured)
* RSS power offset of the cell being measured is not sRSS location in frequency with respect to measured neighbor cell:
	+ Follow the similar agreement from IDLE mode
* Minimum/maximum distance:
	+ Follow the similar agreement from IDLE mode
* Measurement delays in IDLE mode
	+ RSS-based measurement period is not longer than CRS-based measurement period.
	+ Delay is expressed in terms of Tmeasure and Tevaluate
* Measurement delays in CONNECTED mode
	+ TRSS=160 ms, L1 measurement period is 480 ms and 800 ms in normal and enhanced coverage respectively for BL and non-BL UEs in non-DRX.
	+ If TRSS=320 ms, L1 measurement period is 960 ms and 1600 ms in normal and enhanced coverage respectively for BL and non-BL UEs in non-DRX.
	+ L1 measurement period is defined as max (DRX cycle length, TRSS) x 3 in normal coverage in DRX.
	+ L1 measurement period is defined as max (DRX cycle length, TRSS) x 5 in enhanced coverage in DRX.
* Measurement delays in IDLE mode
	+ RSS-based measurement period is not longer than CRS-based measurement period.
	+ Delay is expressed in terms of Tmeasure and Tevaluate
* Measurement delays in CONNECTED mode
	+ TRSS=160 ms, L1 measurement period is 480 ms and 800 ms in normal and enhanced coverage respectively for BL and non-BL UEs in non-DRX.
	+ If TRSS=320 ms, L1 measurement period is 960 ms and 1600 ms in normal and enhanced coverage respectively for BL and non-BL UEs in non-DRX.
	+ L1 measurement period is defined as max (DRX cycle length, TRSS) x 3 in normal coverage in DRX.
	+ L1 measurement period is defined as max (DRX cycle length, TRSS) x 5 in enhanced coverage in DRX.
* Concurrent CRS and RSS measurements
	+ The UE is not expected to measure on both RSS and CRS for RSRP measurements.
	+ In idle mode, UE is not required to concurrently measure based on RSS and CRS.
	+ UE is required to meet the current CRS based requirements for cells which cannot be measured based on RSS.
	+ UE is not required to measure both CRS and RSS for the same serving or neighbour cell.
 |

RAN4 discussed **support of quality report in Msg3 and connected mode**, with the following agreements:

|  |
| --- |
| * Use the same 2-bit report mapping from Rel-14 NB-IoT for eMTC.
* RAN4 reuse the downlink channel quality measurement report mapping of CQI-NPDCCH-Short-NB for eMTC short downlink channel quality report in MAC CE.
 |

RAN4 discussed **UE demodulation performance requirements** and made the following agreements:

|  |
| --- |
| * MPDCCH demodulation requirements with DMRS+CRS
* Interested companies bring TDD simulation results in RAN4#96-e
	+ Refer to [R4-2007374](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_95_e/Docs/R4-2007374.zip) for simulation assumption
* CSI reporting requirements due to the introduction of CSI-RS based feedback
* Set γ=1.2 (Throughput ratio of follow PMI over random PMI) for CSI-RS based PMI reporting test for non-BL UE at the SNR where 70% of the maximum throughput is achieved with the follow PMI.
* Interested companies bring simulation results in RAN4#96-e to decide the SNR test points for both FDD and TDD.
	+ Refer to [R4-2007375](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_95_e/Docs/R4-2007375.zip) for simulation assumption
* Not to define demodulation requirements of PDSCH with multi-TB scheduling
 |

RAN4 discussed **BS demodulation performance requirements** and made the following agreement:

|  |
| --- |
| * Not to define demodulation requirements of PUSCH with multi-TB scheduling
 |

RAN4 discussed **RF aspects of** **NR coexistence** and made the following agreements:

|  |
| --- |
| * Agreed TP for TR 37.823 on power boosting for LTE-MTC in [R4-2008423](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_95_e/Docs/R4-2008423.zip)
* Agreed TP for TR 37.823 on conclusion in [R4-2008424](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_95_e/Docs/R4-2008424.zip)
* Agreed TR 37.923 v1.0.0 in [R4-2009295](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_95_e/Docs/R4-2009295.zip)
 |

#### 2.4.2 Remaining Open issues

For the core part, there are no remaining open issues in RAN4.

For the UE demodulation performance part, there are the following open issues in RAN4:

* Endorse draft CRs for test cases with final test requirements TBD
* Agree on final test requirements
* Agree 36.101 CR for test cases corresponding to final test requirements

For the RRM performance part, there are the following open issues in RAN4:

* Agree on the scope of RRM tests
* Agree 36.133 CR for test cases corresponding to the test scope

## 4. References

**RAN1#100bis-e**

52 contributions (for details see agenda item 6.2.1 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_100b_e/Docs/TDoc_List_Meeting_RAN1%23100-bis-e.xlsx))

**RAN1#101-e**

36 contributions (for details see agenda item 6.2.1 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_101-e/Docs/TDoc_List_Meeting_RAN1%23101-e.xlsx))

**RAN2#109bis-e**

79 contributions (for details see agenda items 7.1, 7.2.2 and 7.2.3 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/TDoc_List_Meeting_RAN2%23109-bis-e.xlsx))

**RAN2#110-e**

58 contributions (for details see agenda items 7.1, 7.2.2 and 7.2.3 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/TDoc_List_Meeting_RAN2%23110-e.xlsx))

**RAN3#107bis-e**

79 contributions (for details see agenda item 14 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_107bis_e/Docs/TDoc_List_Meeting_RAN3%23107-bis-e.xlsx))

**RAN3#108-e**

87 contributions (for details see agenda item 14 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_108-e/Docs/TDoc_List_Meeting_RAN3%23108-e.xlsx))

**RAN4#94bis-e**

37 contributions (for details see agenda items 5.10 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_94_eBis/Docs/TDoc_List_Meeting_RAN4%2394-bis-e.xlsx))

**RAN4#95-e**

50 contributions (for details see agenda items 5.10 in [Tdoc list](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_95_e/Docs/TDoc_List_Meeting_RAN4%2395-e.xlsx))

**RAN contributions**

RAN1 CR packs: [RP-192647](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_86/Docs/RP-192647.zip) & [RP-192648](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_86/Docs/RP-192648.zip) & [RP-200196](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_87e/Docs/RP-200196.zip) & [RP-200698](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_88e/Docs/RP-200698.zip)

RAN2 CR packs: [RP-200360](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_87e/Docs/RP-200360.zip) & [RP-201192](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_88e/Docs/RP-201192.zip) & [RP-201193](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_88e/Docs/RP-201193.zip)

RAN3 CR packs: [RP-201086](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_88e/Docs/RP-201086.zip) & [RP-201087](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_88e/Docs/RP-201087.zip)

RAN4 CR packs: [RP-193023](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_86/Docs/RP-193023.zip) & [RP-200418](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_87e/Docs/RP-200418.zip) & [RP-200962](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_88e/Docs/RP-200962.zip)

WI summary: [RP-201228](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_88e/Docs/RP-201228.zip)