3GPP TSG-RAN WG2 Meeting #109 electronic draftR2-2001667

**24 Feb – 6 Mar 2020**

Agenda Item: 8.7

Source: Session Chair (Huawei)

Title: draft Report NB-IoT breakout session

Document for: Approval

**Time Schedule**Please refer to the latest schedule in the RAN2 inbox.

Note
Recording of voice or video at meetings is not used in 3GPP. This applies also to this e-Meeting. At this e-Meeting, no specific actions are taken to prevent the recording of web conferences. Companies that have concerns related to recordings, if any, may express those by email in the main organisational thread [AT109e][000].

# NB-IoT Session e-mail list

Email discussions xyz range: [300]-[399].

* [AT109e][300] RAN2 109-e Organizational NB-IoT (Session Chair)

Status: Started

Scope: Comments to session notes. Kick-off and management of email discussions for NB-IoT session. Coordination issues. Other organisational issues and announcements.

 Intended outcome: Approval of Report from NB-IoT session.

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][301][NBIOT R14] Clarification on polling bit for RRCConnectionRelease (Huawei)

 Status: Started

 Scope: Discuss and review the CRs

 Intended outcome: Agreeable CRs, or decision to e.g. postpone/not agree.

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][302][NBIOT R13] Handling of UE Radio Capability for Paging in NB-IoT and eMTC (Huawei)

 Status: Started

 Scope: Discuss and review the CRs

 Intended outcome: Agreeable CRs, or decision to e.g. postpone/not agree.

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][303][NBIOT R15] System support for Wake Up Signal (Huawei)

 Status: Started

 Scope: Discuss and review the CRs

 Intended outcome: Agreeable CRs, or decision to e.g. postpone/not agree.

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][304][NBIOT R16] NRS presence on non-anchor paging carrier (Huawei)

 Status: Started

 Scope: Discuss and review the CRs

 Intended outcome: Endorsed TP for main CRs, or decision to e.g. postpone/not agree.

 Deadline: Wednesday 4th 0900 CET

* [AT109e][305][NBIOT/EMTC] WUS: Progress the FFS from Email Discussion 108#94 and Summary (QC)

 Status: complete

 Scope: try to progress proposals 2, 3, 4 from the email discussion as well as all proposals/open issues from the summary document [R2-2000308](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000308.zip)

 Intended outcome: report in [R2-2001789](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001789.zip)

 Deadline: Thursday 27th 0900 CET

* [AT109e][306][NBIOT/EMTC] WUS: Finalise the signalling (QC)

 Status: started

 Scope: Try to finalise the signalling, based on the agreements above and potential agreements from offline #305

 Intended outcome: Endorsed TP to be incorporated into the NB-IoT and eMTC CRs in R2-2001790.

 Deadline: Wednesday 4th 0900 CET

* [AT109e][307][NBIOT] PUR RRC-MAC-PHY interactions (QC)

 Status: complete

 Scope: Discuss and progress on the open issues and proposals in [R2-2002021](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002021.zip), excluding 4 and 9 (already agreed) and those marked as ASN.1/CR issues

 Intended outcome: report with categorisation of proposals – agreeable, needs further discussion, postpone in [R2-2001791](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001791.zip)

 Deadline: Thursday 27th 0900 CET

* [AT109e][308][NBIOT] PUR RRC in general and L1 signalling impact to RRC (Ericsson )

 Status: extended

 Scope: Progress the FFS not agreed above from [R2-2002028](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002028.zip)

 Intended outcome: Report in R2-2001792. Updated report in R2-2001796

 Deadline: Monday 2nd March 1200 CET

* [AT109e][309][NBIOT/EMTC] RAI whether AS RAI should be provided in case including AS RAI would lead to data segmentation (Ericsson)

 Status: Started

 Scope: Proposal 3 and 9 of [R2-2001474](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001474.zip)

 Intended outcome: report in [R2-2001793](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001793.zip)

 Deadline: Thursday 27th 0900 CET

* [AT109e][310][NBIOT] 5GC open issues in AI 7.2.10 (Huawei)

 Status: Started

 Scope: Progress the open issues and proposals listed in [R2-2002015](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002015.zip), not already agreed.

 Intended outcome: report in [R2-2001794](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001794.zip)

 Deadline: Thursday 27th 0900 CET

* [AT109e][311][NBIOT] R16 36.331 CR (Huawei)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001782.

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][312][NBIOT] R16 38.300 CR (Qualcomm)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001783.

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][313][NBIOT] R16 36.300 CR (Huawei)

 Status: Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001784

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][314][NBIOT] R16 36.302 CR (Huawei)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001785.

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][315][NBIOT] R16 36.306 CR (Blackberry)

 Status: Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001786.

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][316][NBIOT] R16 36.321 CR (Ericsson)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001787.

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][317][NBIOT] R16 36.304 CR (Nokia)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001788.

 Deadline: 06-03-2020, 12:00 CET

* [AT109e][318][NBIOT] Reply LS to Reply LS on Rel-16 NB-IoT enhancements (Huawei)

 Status: Not started

 Scope: Discuss the value range + Draft the reply LS based on the agreements.

 Intended outcome: Approved LS in R2-2001795

 Deadline: 04-03-2020, 12:00 CET – Value range

 Deadline: 06-03-2020, 12:00 CET – LS approved

## 4.1 NB-IoT corrections Rel-15 and earlier

Documents in this agenda item will be handled in a break out session. Common NB-IoT/eMTC parts treated jointly with 4.2.

[R2-2000617](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000617.zip) Clarification on polling bit for RRCConnectionRelease Huawei, HiSilicon CR Rel-14 36.322 14.1.0 0143 - F NB\_IOTenh-Core

[R2-2000618](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000618.zip) Clarification on polling bit for RRCConnectionRelease Huawei, HiSilicon CR Rel-15 36.322 15.3.0 0144 - A NB\_IOTenh-Core

* [AT109e][301][NBIOT R14] Clarification on polling bit for RRCConnectionRelease (Huawei)

 Status: Not Started

 Scope: Discuss and review the CRs

 Intended outcome: Agreeable CRs, or decision to e.g. postpone/not agree.

 Deadline: 06-03-2020, 12:00 CET

[R2-2000632](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000632.zip) Handling of UE Radio Capability for Paging in NB-IoT and eMTC Huawei, HiSilicon CR Rel-13 36.300 13.13.0 1260 - F NB\_IOT-Core, LTE\_MTCe2\_L1-Core

[R2-2000633](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000633.zip) Handling of UE Radio Capability for Paging in NB-IoT and eMTC Huawei, HiSilicon CR Rel-14 36.300 14.11.0 1261 - F NB\_IOT-Core, LTE\_MTCe2\_L1-Core, NB\_IOTenh-Core

[R2-2000634](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000634.zip) Handling of UE Radio Capability for Paging in NB-IoT and eMTC Huawei, HiSilicon CR Rel-15 36.300 15.8.0 1262 - A NB\_IOT-Core, LTE\_MTCe2\_L1-Core, NB\_IOTenh-Core

[R2-2000635](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000635.zip) Handling of UE Radio Capability for Paging in NB-IoT and eMTC Huawei, HiSilicon CR Rel-16 36.300 16.0.0 1263 - A NB\_IOT-Core, LTE\_MTCe2\_L1-Core, NB\_IOTenh-Core

* [AT109e][302][NBIOT R13] Handling of UE Radio Capability for Paging in NB-IoT and eMTC (Huawei)

 Status: Not Started

 Scope: Discuss and review the CRs

 Intended outcome: Agreeable CRs, or decision to e.g. postpone/not agree.

 Deadline: 06-03-2020, 12:00 CET

[R2-2000638](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000638.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.304 15.5.0 0779 - F NB\_IOTenh2-Core, LTE\_eMTC4-Core

[R2-2000809](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000809.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.300 15.8.0 1264 - F NB\_IOTenh2-Core, LTE\_eMTC4-Core

[R2-2000810](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000810.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-16 36.300 16.0.0 1265 - A NB\_IOTenh2-Core, LTE\_eMTC4-Core

* [AT109e][303][NBIOT R15] System support for Wake Up Signal (Huawei)

 Status: Not Started

 Scope: Discuss and review the CRs

 Intended outcome: Agreeable CRs, or decision to e.g. postpone/not agree.

 Deadline: 06-03-2020, 12:00 CET

Withdrawn

R2-2000637 System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.331 15.8.0 4193 - F NB\_IOTenh2-Core, LTE\_eMTC4-Core Withdrawn

## 7.2 Additional enhancements for NB-IoT

(NB\_IOTenh3-Core; leading WG: RAN1; REL-16; started: Jun 18; target; Mar 20; WID: RP-192313)

Time budget: 2.5 TU

Documents in this agenda item will be handled in a break out session

Some sub-items in 7.1 and 7.2 may be treated jointly.

### 7.2.1 Organisational

Including incoming LSs, draft TS, rapporteur inputs, etc

[R2-2000049](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000049.zip) Reply LS on UAC for NB-IOT (S1-193592; contact: Qualcomm) SA1 LS in Rel-16 SMARTER\_Ph2 To:RAN2 Cc:CT1, SA2, RAN3

* noted

[R2-2000058](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000058.zip) Reply LS on Rel-16 NB-IoT enhancements (S2-1912763; contact: Huawei) SA2 LS in Rel-16 NB\_IOTenh3 To:RAN, CT, RAN2, CT1, RAN3 Cc:SA

* noted

[R2-2000064](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000064.zip) Reply LS on 5G-S-TMSI Truncation Procedure (S2-2001248; contact: Qualcomm) SA2 LS in Rel-16 5G\_CIoT To:SA3, RAN2, CT1 Cc:CT4

* noted

[R2-2000068](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000068.zip) Reply LS on assistance indication for WUS (S2-2001578; contact: Huawei) SA2 LS in Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core To:CT1, RAN2, RAN3

* noted

[R2-2000072](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000072.zip) Reply LS to SA2 on 5G-S-TMSI Truncation Procedure (S3-194482; contact: Huawei) SA3 LS in Rel-16 5G\_CIoT To:SA2 Cc:RAN2, CT4, CT1, RAN3

* noted

[R2-2000088](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000088.zip) Reply LS on assistance indication for WUS (S2-2001732; contact: Huawei) SA2 LS in Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core To:CT1, RAN2, RAN3

* noted

[R2-2000092](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000092.zip) Reply LS on assistance indication for WUS (C1-199008; contact: Huawei) CT1 LS in Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core To:CT1 Cc:SA2, RAN2, RAN3

* noted

CRs

[R2-2000647](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000647.zip) Miscellaneous for NB-IoT and eMTC RRC CRs Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core

[R2-2000620](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000620.zip) Introduction of additional enhancements for NB-IoT in TS 36.331 Huawei CR Rel-16 36.331 15.8.0 4192 - B NB\_IOTenh3-Core

* [AT109e][311][NBIOT] R16 36.331 CR (Huawei)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR inR2-2001782.

 Deadline: 06-03-2020, 12:00 CET

[R2-2000304](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000304.zip) Introduction of additional enhancements for NB-IoT Qualcomm Incorporated CR Rel-16 38.300 16.0.0 0176 3 B NB\_IOTenh3-Core R2-1916570

* [AT109e][312][NBIOT] R16 38.300 CR (Qualcomm)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001783.

 Deadline: 06-03-2020, 12:00 CET

[R2-2000619](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000619.zip) Introduction of additional enhancements for NB-IoT in TS 36.300 Huawei CR Rel-16 36.300 16.0.0 1259 - B NB\_IOTenh3-Core

* [AT109e][313][NBIOT] R16 36.300 CR (Huawei)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001784

 Deadline: 06-03-2020, 12:00 CET

[R2-2000621](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000621.zip) Introduction of additional enhancements for NB-IoT in TS 36.302 Huawei CR Rel-16 36.302 15.2.0 1202 - B NB\_IOTenh3-Core

* [AT109e][314][NBIOT] R16 36.302 CR (Huawei)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001785.

 Deadline: 06-03-2020, 12:00 CET

[R2-2000622](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000622.zip) UE capabilities, TDD/FDD differentiation and 5GC applicability for NB-IoT Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core

[R2-2000930](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000930.zip) Introduction of Rel-16 additional enhancements NB-IoT in TS 36.306 BlackBerry UK Limited CR Rel-16 36.306 15.7.0 1731 - B LTE\_eMTC5-Core, NB\_IOTenh3-Core

* [AT109e][315][NBIOT] R16 36.306 CR (Blackberry)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001786.

 Deadline: 06-03-2020, 12:00 CET

[R2-2000983](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000983.zip) Running CR on 36.321 for NB-IoT Ericsson CR Rel-16 36.321 15.8.0 1466 - B NB\_IOTenh3-Core

* [AT109e][316][NBIOT] R16 36.321 CR (Ericsson)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001787.

 Deadline: 06-03-2020, 12:00 CET

[R2-2002090](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002090.zip) Introduction of additional enhancements for NB-IoT Nokia CR Rel-16 36.304 15.5.0 0783 B NB\_IOTenh3\_ Core Late

* [AT109e][317][NBIOT] R16 36.304 CR (Nokia)

 Status: Not Started

 Scope: Discuss and review the CR

 Intended outcome: Agreeable CR in R2-2001788.

 Deadline: 06-03-2020, 12:00 CET

Withdrawn

[R2-2000394](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000394.zip) Introduction of Rel-16 additional enhancements NB-IoT: running 36.306 CR BlackBerry UK Limited draftCR Rel-16 36.306 15.7.0 B LTE\_eMTC5-Core, NB\_IOTenh3-Core Withdrawn

[R2-2001161](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001161.zip) Introduction of additional enhancements for NB-IoT in Rel-16 in TS36.304 Nokia Solutions & Networks (I) draftCR Rel-16 36.304 15.5.0 B NB\_IOTenh4\_LTE\_eMTC6-Core Withdrawn

### 7.2.2 Mobile-terminated (MT) early data transmission (EDT)

Mobile-terminated Early Data transmission for NB-IoT is treated jointly with MTC under AI 7.1.2. Do not use this AI for any item that can be discussed jointly.

### 7.2.3 UE-group wake-up signal (WUS)

UE group wake Up signal for MTC and NB-IoT is treated jointly under this Agenda Item.

Including outcome of the email discussion [108#94][NB-IoT/eMTC R16] Finalise the WUS signalling (Qualcomm)

This agenda item will utilize a summary document to facilitate treatment of topics during the e-meeting. This may lead to postponing of some items to next meeting. A web conference will be used for handling some of the discussions in this AI.

Reports/Summaries

[R2-2000306](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000306.zip) Report of Email Discussion 108#94 Finalise the WUS signalling Qualcomm Incorporated report Rel-16 NB\_IOTenh3-Core

* QC thinks p1, 5, 6, 7, 8 have a reasonable level of consensus
* QC think p2, 3, 4 needs more discussion.
* ZTE thinks some of the proposals e.g. p1 needs a bit of work, but baseline is OK as long as there is no restriction in case further issues are found.

**Proposal 1: For NB-IoT, RAN2 agree signaling changes proposed in Table 5 as the baseline.**

**Proposal 2: For NB-IoT/eMTC, RAN2 discuss paging probability threshold configuration**

**Proposal 3: For NB-IoT/eMTC, RAN2 discuss how to handle overlapping WUS resources.**

**Proposal 4: For NB-IoT, RAN 2 discuss if Rel 15 WUS is not configured and only one R16 WUS is configured then should this always be in primary position.**

**Proposal 5: For NB-IoT, RAN2 assume the changes proposed in Table 7, 8 and 9 as the baseline for signalling group WUS information.**

**Proposal 6: For NB-IoT, RAN2 use the changes proposed in Table 10 as the baseline.**

**Proposal 7: For eMTC, RAN2 agree to use the changes proposed in Table 12 as the baseline.**

**Proposal 8: For eMTC, RAN2 assume the changes proposed in Table 15, 16 and 17 as the baseline for signalling group WUS information.**

**Proposal 9: The baseline signalling changes, including field description, be captured in the eMTC and NB-IoT ruining CRs.**

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| --- |
| Agreements:* For NB-IoT, RAN2 agree signaling changes proposed in Table 5 as the baseline.
* For NB-IoT, RAN2 assume the changes proposed in Table 7, 8 and 9 as the baseline for signalling group WUS information.
* For NB-IoT, RAN2 use the changes proposed in Table 10 as the baseline.
* For eMTC, RAN2 agree to use the changes proposed in Table 12 as the baseline.
* For eMTC, RAN2 assume the changes proposed in Table 15, 16 and 17 as the baseline for signalling group WUS information.
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* [AT109e][305][NBIOT/EMTC] WUS: Progress the FFS from Email Discussion 108#94 and Summary (QC)

 Scope: try to progress proposals 2, 3, 4 from the email discussion as well as all proposals/open issues from the summary document [R2-2000308](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000308.zip)

 Intended outcome: report in [R2-2001789](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001789.zip)

 Deadline: Thursday 27th 0900 CET

[R2-2001789](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001789.zip) [AT109e][305][NBIOT/EMTC] WUS: Progress the FFS from Email Discussion 108#94 and Summary Qualcomm Incorporated report

**Proposal 1: For eMTC and NB-IoT support the same paging probability range and granularity.**

**Proposal 2: RAN2 discuss number of code points for paging probability.**

**Proposal 4: No special handling of WUS resource overlap is specified and UE use the WUS resource corresponding to its gap capability.**

**Proposal 5: For NB-IoT, if only one R16 WUS resource is configured and no Release 15 WUS resource is configured then R16 WUS resource is always in primary location.**

**Proposal 7: Update stage 2 to explain group WUS in more detail and the text can be discussed via email using text proposed in [8] as starting point.**

**Proposal 8: RAN2 discuss if Release 15 mechanism to minimize false wake-up as baseline for Release 16.**

**Proposal 9: No other mechanism to minimize false wake-up be considered for Release 16.**

**Proposal 10: From RAN2 point of view paging escalation does not need to be mandated.**

**Proposal 11: RAN2 discuss from IOT point of view whether it is better to allow UE to support Release 16 WUS independently of Release 15 WUS.**

**Proposal 12: No other aspects from the proposals impact RAN2.**

**Proposal 13: Define WUS group selection based on the formula defined in [10].**

**Proposal 14: Email discussion on text proposal for 36.304 and use the text defined in [11] as the starting point.**

**Proposal 15: No other WUS group signalling optimisations identified.**

|  |
| --- |
| Agreements:* For eMTC and NB-IoT support the same paging probability range and granularity.
* No special handling of WUS resource overlap is specified and UE use the WUS resource corresponding to its gap capability
* Update stage 2 to explain group WUS in more detail using text proposed in [R2-2000639](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000639.zip) as starting point.
* From RAN2 point of view paging escalation does not need to be mandated

Working assumption: * For NB-IoT, if only one R16 WUS resource is configured and no Release 15 WUS resource is configured then R16 WUS resource is always in primary location
* Support of Release 16 WUS is independent to support of Release 15 WUS
* Define WUS group selection based on the formula defined in [R2-2001472](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001472.zip)

FFS:* Code points for paging probability thresholds.
* Mechanism to minimize false wake-up
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* [AT109e][306][NBIOT/EMTC] WUS: Finalise the signalling (QC)

 Scope: Try to finalise the signalling, based on the agreements above and potential agreements from offline #305

 Intended outcome: Endorsed TP to be incorporated into the NB-IoT and eMTC CRs in R2-2001790.

 Deadline: Wednesday 4th 0900 CET

R2-2001790 [AT109e][306][NBIOT/EMTC] WUS: Finalise the signalling Qualcomm Incorporated report

[R2-2000308](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000308.zip) Summary of WUS contributions to RAN2#109e. Qualcomm Incorporated report Late

* QC thinks the stage 2 should be updated by email (p1)
* Huawei thinking proposal 2 is not in line with SA2 agreements and should not be agreed. At least the release this proposal is for needs to be clarified. ZTE think SA2 have a solution for Rel-15 so we don’t need to agree anything on this proposal, but for Rel-16 we need to decide. Ericsson also wonders, because we had previously sent an LS including an issue on mobility as well as CN awareness.
* Ericsson thinks p4 was already agreed to be independent.
* Thales wonders what the “last connected cell” means. QC and Ericsson think we need to discuss these 2 issues separately.

**Summary Proposal 1: Update and agree stage 2 changes via email.**

**Summary Proposal 2: RAN2 agree [8]-P1 and companies can take contributions to RAN3**

**Summary Proposal 3: [FFS] How to minimise false wake-up with group WUS.**

**Summary Proposal 4: email discussion whether R16 WUS capability be dependent on support of R15 WUS.**

**Summary Proposal 5: RAN2 discuss the range of probability values to signal.**

**Summary Proposal 6: Companies can take contributions to RAN3 directly for S1-AP changes.**

**Summary Proposal 7: RAN2 discuss equation to select a WUS group from the list of WUS groups corresponding to its paging probability set (or non-paging probability set).**

**Summary Proposal 8: As there is no concrete proposal it is up to the sourcing company to provide details.**

**Summary Proposal 9: Use draft text proposal in [3] as the baseline, make changes and incorporate further agreements.**

* Will discuss the above proposals as part of offline #305.

Others

[R2-2000307](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000307.zip) Text proposal for WUS description in TS 36.304 Qualcomm Incorporated discussion

[R2-2000639](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000639.zip) Remaining issues for Rel-16 GWUS Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core

R2-2000828 UE-group wake-up signal for MTC/NB-IoT Sony discussion Rel-16 NB\_IOTenh3-Core R2-1915235 Withdrawn

[R2-2001024](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001024.zip) Paging probability based UE grouping Lenovo, Motorola Mobility discussion Rel-16

[R2-2001025](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001025.zip) WUS grouping for mobile UE Lenovo, Motorola Mobility discussion Rel-16

[R2-2001026](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001026.zip) Consideration on WUS configuration Lenovo, Motorola Mobility discussion Rel-16

[R2-2001203](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001203.zip) Consideration on mobility for WUS ZTE Corporation, Sanechips discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2001210](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001210.zip) Formula for mapping UE to WUS group ZTE Corporation, Sanechips discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core R2-1915638

[R2-2001472](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001472.zip) Group WUS Ericsson discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core R2-1915801

### 7.2.4 Transmission in preconfigured resources

Including support for transmission in preconfigured resources in idle and/or connected mode based on SC-FDMA waveform for UEs with a valid timing advance.

Transmission in preconfigured resources for MTC and NB-IoT is treated jointly under this Agenda Item.

This agenda item will utilize a summary document to facilitate treatment of topics during the e-meeting. This may lead to postponing of some items to next meeting. A web conference will be used for handling some of the discussions in this AI.

Reports/Summaries

[R2-2002021](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002021.zip) Summary of Other RRC-MAC-PHY interactions Qualcomm Incorporated discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

* QC thinks p4, 9 are agreeable now

**Proposal 1. [FFS] Which layer (RRC or MAC) maintains PUR grant (i.e., whether RRC provides PUR configuration to MAC once and MAC calculates the grant, or whether RRC calculates the grant before each PUR transmission), or whether to leave it up to UE implementation.**

**Proposal 2. Conditional on RRC providing PUR grant to MAC: “m” counter is maintained in RRC.**

**Proposal 3. Conditional on MAC receiving PUR configuration and calculating PUR grant: “m” counter is maintained in MAC. When the counter value reaches the configured max value, MAC sends indication to RRC to release PUR configuration.**

**Proposal 4. PUR TA timer configuration is provided to MAC when RRC receives PUR configuration from eNB.**

**Proposal 5. [FFS] MAC entity starts the PUR TA timer [when the MAC entity is configured with the PUR TA timer]/[when the UE moves to IDLE]/[upon first PUR transmission opportunity after the PUR configuration has been received].**

**Proposal 6. TA adjustment by DCI is captured in MAC specification 5.4.x.2 to include the condition “when a Timing Advance Command MAC control element is received or PDCCH indicates timing advance adjustment as specified in TS 36.212 subclauses 5.3.3.1.10 and 5.3.3.1.11”.**

**Proposal 7. [ASN.1/CR] It’s suggested to delete the “Editor's note: FFS what is the impact of PUR and the TA timer in this section” in the section “5.9 MAC Reset” in 36.321 running CR.**

**Proposal 8. [FFS] To confirm: TA validation procedure is captured in RRC spec.**

**Proposal 9. When TA validation fails due to other than expiration of TA timer, the PUR TA timer is not stopped (i.e. keeps running until expiry).**

**Proposal 10. When "PUR fallback indication" is received, MAC stops monitoring PDCCH in PUR response window.**

**Proposal 11. MAC forwards the L1 ACK or PUR fallback indication received from lower layers to the RRC.**

**Proposal 12. [ASN.1/CR] Adopt TP given in section 2.1 of [9] as baseline for MAC running CR in section 5.4.x.1.**

**Proposal 13. In RRC CR 5.3.3.3x, add “NOTE: UE actions upon reception of fallback indication from lower layers (see TS 36.213 subclause 9.1.5.3) is left up to implementation.” Remove Editor’s Notes.**

**Proposal 14. [FFS] Where to capture PUR release due to RACH initiation on a new cell.**

**Proposal 15. Upon reception of RRC message indicating successful PUR transmission, RRC indicates this to MAC layer.**

**Proposal 16. [ASN.1/CR] The PUR response window timer is restarted at the last subframe of a PUSCH transmission corresponding to the retransmission indicated by the UL grant.**

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| Agreements: * PUR TA timer configuration is provided to MAC when RRC receives PUR configuration from eNB.
* When TA validation fails due to other than expiration of TA timer, the PUR TA timer is not stopped (i.e. keeps running until expiry).
 |

* [AT109e][307][NBIOT] PUR RRC-MAC-PHY interactions (QC)

 Scope: Discuss and progress on the open issues and proposals in [R2-2002021](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002021.zip), excluding 4 and 9 (already agreed) and those marked as ASN.1/CR issues

 Intended outcome: report with categorisation of proposals – agreeable, needs further discussion, postpone in [R2-2001791](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001791.zip)

 Deadline: Thursday 27th 0900 CET

[R2-2001791](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001791.zip) [AT109e][307][NBIOT] PUR RRC-MAC-PHY interactions Qualcomm Incorporated report

**Potential agreements:**

Proposal 3. MAC entity starts the PUR TA timer when the MAC entity is configured with the PUR TA timer.

Proposal 4. TA adjustment by DCI is captured in MAC specification 5.4.x.2 to include the condition “when a Timing Advance Command MAC control element is received or PDCCH indicates timing advance adjustment as specified in TS 36.212 [5]”.

Proposal 5. RAN2 confirms TA validation procedure is captured/kept in RRC spec.

Proposal 6. When "PUR fallback indication" is received, MAC stops monitoring PDCCH in PUR response window.

Proposal 7. (Already captured in MAC CR) Upon L1 ACK indication received from lower layers, MAC indicated PUR success to the RRC.

Proposal 9. In RRC CR 5.3.3.3x, add “NOTE: UE actions upon reception of [FFS: fallback/failure] indication from lower layers (see TS 36.213 [23]) is left up to implementation.” Remove Editor’s Notes.

**Potential agreement with quick discussion:**

Proposal 1. RRC provides PUR configuration to MAC once and MAC calculates the PUR grant for each PUR occasion.

Proposal 2. “m” counter is maintained in MAC. When the counter value reaches the configured max value, MAC sends indication to RRC to release PUR configuration.

* Huawei have serious concerns about these 2 proposals and how they can work, HW and Ericsson think we need to see the CRs

Proposal 8. [FFS] Upon PUR fallback indication from lower layers, MAC indicates [PUR fallback]/[PUR failure] to the RRC.

Proposal 11. [FFS] Upon reception of RRC message indicating successful PUR transmission, RRC does not need to indicate this to MAC layer.

**Need further discussion:**

Proposal 10. [FFS] Where to capture PUR release due to RACH initiation on a new cell.

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| **Agreements:*** MAC entity starts the PUR TA timer when the MAC entity is configured with the PUR TA timer.
* TA adjustment by DCI is captured in MAC specification 5.4.x.2 to include the condition “when a Timing Advance Command MAC control element is received or PDCCH indicates timing advance adjustment as specified in TS 36.212 [5]”.
* RAN2 confirms TA validation procedure is captured/kept in RRC spec.
* When "PUR fallback indication" is received, MAC stops monitoring PDCCH in PUR response window.
* (Already captured in MAC CR) Upon L1 ACK indication received from lower layers, MAC indicated PUR success to the RRC.
* In RRC CR 5.3.3.3x, add “NOTE: UE actions upon reception of fallback/failure indication from lower layers (see TS 36.213 [23]) is left up to implementation.” Remove Editor’s Notes.
* Upon PUR fallback indication from lower layers, MAC indicates PUR fallback and PUR failure separately to the RRC.
* Upon reception of RRC message indicating successful PUR transmission, RRC does not need to indicate this to MAC layer.

**Working assumptions: (Can be used as baseline for CR and revisit if there is a problem):*** RRC provides PUR configuration to MAC once and MAC calculates the PUR grant for each PUR occasion.
* “m” counter is maintained in MAC. When the counter value reaches the configured max value, MAC sends indication to RRC to release PUR configuration.

**FFS:*** Where to capture PUR release due to RACH initiation on a new cell.
 |

[R2-2002028](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002028.zip) Summary of RRC in general and L1 signalling impact to RRC (including e.g. how/when to configure PHY) Ericsson discussion Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core

The following proposals are suggested for agreement without need for extensive discussion:

Proposal 1 Similar to EDT, upon transmission using PUR, RRC configures PHY to use PUR.

Proposal 7 EDT value for timer t300 applies when UL data is included in transmission using PUR.

Proposal 8 When UL data is not included in transmission using PUR, non-EDT value applies to t300.

* ZTE wonders about the case of DL data.

Proposal 16 PUR periodicity configuration granularity is based on counts of binary multiples of HSFN, i.e. full SFN cycles (= 10.24 s). FFS on exact count.

Proposal 17 PUR periodicity includes at least values of several minutes, tens of minutes, ~hour, several hours, ~one day. FFS exact minimum and maximum values and total number of values.

Proposal 18 TA timer range and values are discussed further and agreed once TA timer start location and PUR periodicity have been agreed.

Proposal 19 The PUR time offset has the same range as PUR periodicity.

* Thales wonders if this is requested or configured time offset.

Proposal 21 For NB-IoT: The value range for PUR response timer is same as in EDT (FDD): {pp1, pp2, pp3, pp4, pp8, pp16, pp32, pp64} with upper boundary 10.24s

Proposal 22 For eMTC: The value range for PUR response timer is same as in EDT: {sf240, sf480, sf960, sf1920, sf3840, sf5760, sf7680, sf10240}.

* QC thinks these values need discussion, maybe the larger values are not needed.

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| Agreements:* Similar to EDT, upon transmission using PUR, RRC configures PHY to use PUR.
* EDT value for timer t300 applies when UL data is included in transmission using PUR.
* When UL data is not included (i.e. only RRC message is included) in transmission using PUR, non-EDT value applies to t300.
* PUR periodicity includes at least values of several minutes, tens of minutes, ~hour, several hours, ~one day. FFS exact minimum and maximum values and total number of values.
 |

* [AT109e][308][NBIOT] PUR RRC in general and L1 signalling impact to RRC (Ericsson )

 Status: started

 Scope: Progress the FFS not agreed above from [R2-2002028](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002028.zip)

 Intended outcome: Report in R2-2001792. Updated report in R2-2001796

 Deadline: Monday 2nd March 1200 CET

R2-2001792 [AT109e][308][NBIOT] PUR RRC in general and L1 signalling impact to RRC Ericsson report

R2-2001796 [AT109e][308][NBIOT] updated PUR RRC in general and L1 signalling impact to RRC Ericsson report

Others

[R2-2000250](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000250.zip) Remaining clarifications on PUR configuration THALES discussion

[R2-2000435](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000435.zip) T300 applicability for PUR Qualcomm Incorporated discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2000443](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000443.zip) TA validation based on serving cell RSRP change (related to RAN4 LSes) Sierra Wireless, S.A. discussion Rel-16 R2-1916427

[R2-2000559](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000559.zip) Security Aspects of D-PUR for control plane solution Nokia, Nokia Shanghai Bell discussion Rel-16

[R2-2000640](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000640.zip) Handling of D-PUR configuration for CP solution Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core R2-1915312

[R2-2000641](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000641.zip) [Draft] LS on handling of D-PUR configuration for the CP solution Huawei LS out Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core To:RAN WG3

[R2-2000642](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000642.zip) RRC-MAC-PHY interactions for PUR Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core

[R2-2000643](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000643.zip) Signalling aspect of PUR configuration Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core

[R2-2000695](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000695.zip) Remaining FFSes on RRC-MAC interaction for PUR Qualcomm Incorporated discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2000984](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000984.zip) PUR periodicity and UE multiplexing Ericsson discussion NB\_IOTenh3-Core, LTE\_eMTC5-Core

[R2-2000985](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000985.zip) RRC-MAC interaction details and other FFSs for PUR in running MAC CR Ericsson discussion NB\_IOTenh3-Core, LTE\_eMTC5-Core

[R2-2001198](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001198.zip) D-PUR reconfiguration and release for CP solution ZTE Corporation, Sanechips discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core R2-1914717

[R2-2001200](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001200.zip) MAC-RRC coordination for TA validation and some FFS for D-PUR ZTE Corporation, Sanechips discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2001201](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001201.zip) Remaining FFSs for D-PUR in 36.331 ZTE Corporation, Sanechips discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2001202](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001202.zip) Remaining FFSs for D-PUR in 36.321 ZTE Corporation, Sanechips discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2001394](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001394.zip) Clarification for the condition of PUR configuration request procedure LG Electronics UK discussion Rel-16

[R2-2001395](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001395.zip) Handling application response for D-PUR transmission LG Electronics UK discussion Rel-16

[R2-2001397](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001397.zip) Discussion on delivery of D-PUR configuration request LG Electronics UK discussion Rel-16 R2-1915951

[R2-2001398](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001398.zip) Paging response usign D-PUR LG Electronics UK discussion Rel-16 R2-1915952

[R2-2001399](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001399.zip) Discussion on preconfigured shared uplink resource transmission LG Electronics UK discussion Rel-16 R2-1915053

[R2-2001516](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001516.zip) Further Pre-configured UL Resources Design Considerations Sierra Wireless, S.A. discussion Rel-16

[R2-2001601](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001601.zip) Handling D-PUR configuration in RRC\_CONNECTED state ASUSTeK discussion Rel-16 36.331 NB\_IOTenh3-Core

[R2-2001602](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001602.zip) Remaining issues of D-PUR TA timer ASUSTeK discussion Rel-16 NB\_IOTenh3-Core

### 7.2.5 Scheduling multiple DL/UL transport blocks

Including scheduling multiple DL/UL transport blocks with or without DCI for SC-PTM and unicast

Scheduling multiple DL/UL transport blocks for NB-IoT is treated jointly with MTC under AI 7.1.5. Do not use this AI for any item that can be discussed jointly.

### 7.2.6 Network management tool enhancement

Including SON support for ANR, Random access performance and RLF report

Including outcome of the email discussion [108#95][NB-IoT] Finalise SON ANR and RLF (Huawei)

This agenda item may utilize a summary document to facilitate treatment of topics during the e-meeting. This may lead to postponing of some items to next meeting. A web conference may be used for handling some of the discussions in this AI.

Reports/Summaries

[R2-2000623](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000623.zip) Summary of [108#95][NB-IoT] Finalise SON ANR and RLF Huawei report Rel-16 NB\_IOTenh3-Core

ANR

**Proposal 1**: The NOTE about the ANR measurement requirements is sufficient and the Editor’s Note can be removed.

**Proposal 2**: It is left to the UE implementation whether to follow DRX or eDRX requirements for ANR measurements. Nothing needs to be specified.

**Proposal 3**: No need to specify additional requirements for UE using PSM.

**Proposal 4**: The validity timer is fixed, FFS 48 hours same as LTE.

* Ericsson thinks we should be able to configure.

**Tentative Proposal 5**: A time indication of when the ANR measurements were performed is included in the report. RAN2 to discuss whether a time stamp or a simple indication “immediately after going to IDLE, immediately before going to CONNECTED, in between”.

**Proposal 6**: ANR measurements is not applicable to 5GC in Rel-16. Can be considered in Rel-17.

**Proposal 7**: The blackcell list size is 16 and *maxCellBlack* is used as the maximum.

**Proposal 8**: A maximum of two frequencies can be configured and reported for ANR measurements.

RACH/RLF

**Proposal 9**: The processing delay of the UE information procedure in Table 11-2-2 is set to 45 ms.

**Proposal 10**: The UE information procedure can only be used when AS security has been activated.

**Proposal 11**: RACH report is not applicable to 5GC.

**Proposal 12**: RLF report is not applicable to 5GC.

* ZTE thinks there is no reason to exclude 5GC.

**Tentative Proposal 13**: Support of RACH report is mandatory at the UE with IOT bit.

**Proposal 14**: Support of RLF report is optional at the UE without capability reporting

**Proposal 15**: The following applies to the RLF report:

1. RLF report is discarded after 48 hours if not fetched.
2. RLF report is kept during state transitions and RAT changes.
3. RLF report availability and RLF report is only provided if the current RPLMN is a PLMN that was present in the UE's EPLMN List or the RPLMN at the time of RLF detection

**Proposal 16**: The re-establishment cell id is also included in the RLF report.

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| Agreements:ANR* The NOTE about the ANR measurement requirements is sufficient and the Editor’s Note can be removed.
* Nothing additional needs to be specified on when UE follows DRX or eDRX requirements for ANR measurements.
* No need to specify additional requirements for UE using PSM.
* The validity timer is fixed. Working assumption: 96 hours
* ANR measurements is not applicable to 5GC in Rel-16. Can be considered in Rel-17.
* The blackcell list size is 16 and *maxCellBlack* is used as the maximum.
* A maximum of two frequencies can be configured and reported for ANR measurements.
* FFS: Whether a time indication of when the ANR measurements were performed is included in the report, and whether it is a time stamp or a simple indication “immediately after going to IDLE, immediately before going to CONNECTED, in between”.

RACH/RLF* The processing delay of the UE information procedure in Table 11-2-2 is set to 45 ms.
* The UE information procedure can only be used when AS security has been activated.
* RACH report is not applicable to 5GC.
* RLF report is not applicable to 5GC.
* Support of RACH report is optional with capability reporting.
* Support of RLF report is optional at the UE without capability reporting
* RLF report is discarded after 48 hours if not fetched.
* RLF report availability and RLF report is only provided if the current RPLMN is a PLMN that was present in the UE's EPLMN List or the RPLMN at the time of RLF detection
* FFS: The re-establishment cell id is also included in the RLF report.
* FFS: RLF report is kept during state transitions and RAT changes.
 |

Others

[R2-2001027](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001027.zip) Remaining issues on ANR reporting Lenovo, Motorola Mobility discussion Rel-16

### 7.2.7 Improved multi-carrier operation

Including support of Msg3 quality reporting for non-anchor access.

Including signalling to indicate on a non-anchor carrier for paging a set of subframes which will contain NRS even when no paging NPDCCH is transmitted.

This agenda item may utilize a summary document to facilitate treatment of topics during the e-meeting. This may lead to postponing of some items to next meeting. A web conference may be used for handling some of the discussions in this AI.

[R2-2000624](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000624.zip) NRS presence on non-anchor paging carrier Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core

* [AT109e][304][NBIOT R16] NRS presence on non-anchor paging carrier (Huawei)

 Status: Not Started

 Scope: Discuss and review the CRs

 Intended outcome: Endorsed TP for main CRs, or decision to e.g. postpone/not agree.

 Deadline: Wednesday 4th 0900 CET

### 7.2.8 Inter-RAT cell selection

Including power efficient NB-IoT mechanism which would assist idle mode inter-RAT cell selection for NB-IoT to and from LTE, LTE-MTC and GERAN

This agenda item may utilize a summary document to facilitate treatment of topics during the e-meeting. This may lead to postponing of some items to next meeting. A web conference may be used for handling some of the discussions in this AI.

### 7.2.9 Coexistence with NR

Study NR and LTE specifications to identify possible issues related to coexistence of NB-IoT with NR

This agenda item may utilize a summary document to facilitate treatment of topics during the e-meeting. This may lead to postponing of some items to next meeting. A web conference may be used for handling some of the discussions in this AI.

Coexistence with NR is treated jointly with MTC under AI 7.1.11 during the e-meeting.

[R2-2000625](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000625.zip) Coexistence with NR for NB-IoT Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core

[R2-2000986](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000986.zip) NB-IoT coexistence with NR Ericsson discussion NB\_IOTenh3-Core

=> Revised in [R2-2002063](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002063.zip)

[R2-2002063](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002063.zip) NB-IoT coexistence with NR Ericsson discussion NB\_IOTenh3-Core

[R2-2001215](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001215.zip) RAN2 impacts of coexistence between NB-IoT and NR ZTE Corporation, Sanechips discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core Late

### 7.2.10 Connection to 5GC (Other common aspects, NB-IoT specific aspects)

Common aspects for MTC and NB-IoT not listed in 7.1.12 are treated jointly under this AI.

Including outcome of the email discussion [108#96][NB-IoT/eMTC R16] Finalise details on RAI (Ericsson)

Including outcome of the email discussion [108#97][NB-IoT / eMTC] Consider how to minimize ping-pong between CN types in RRC\_IDLE/RRC\_INACTIVE. (Qualcomm)

This agenda item will utilize a summary document to facilitate treatment of topics during the e-meeting. This may lead to postponing of some items to next meeting. A web conference will be used for handling some of the discussions in this AI.

Reports/Summaries

[R2-2000540](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000540.zip) Email discussion report [108#97] for how to minimize ping-pong between CN types in RRC\_IDLE/RRC\_INACTIVE Qualcomm India Pvt Ltd discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

* Ericsson think there is no agreement to do something. Huawei thinks this is an optimisation with not enough support.
* Sony thinks there is a ping pong issue to solve. QC agree.
* postponed

[R2-2001474](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001474.zip) Report - Email discussion [108#96][NB-IoT/eMTC R16] Finalise details on RAI Ericsson discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

Proposal 1 AS RAI can be used when connected to EPC or 5GC, including when in RRC connected mode and using CP/UP optimisations, EDT, or PUR.

Proposal 2 AS RAI can be provided with any higher layer PDU transmission in the UL including the last one or with no higher layer PDU transmission in the UL.

Proposal 3 AS RAI, when triggered, should have higher priority than data.

Proposal 4 AS RAI is provided in the same MAC CE as the DL channel quality report.

Proposal 5 One of the codepoints for AS RAI implies “no indication”.

Proposal 6 AS RAI has higher priority than data when AS RAI and DL channel quality report are provided in the same MAC CE.

Proposal 7 No other MAC mechanisms are introduced to provide AS RAI.

* ZTE wonders if this also excludes RRC mechanisms. Ericsson think nothing else was proposed.

Proposal 8 Codepoints for AS RAI are allocated as follows:

 Code Point 00: No RAI information

 Code Point 01: no subsequent DL and UL data transmission is expected

 Code Point 10: a single subsequent DL transmission is expected

 Code Point 11: Reserved.

Proposal 9 RAN2 to discuss whether AS RAI should be provided in case including AS RAI would lead to data segmentation.

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| Agreements * AS RAI can be used when connected to EPC or 5GC, including when in RRC connected mode and using CP/UP optimisations, EDT, or PUR.
* AS RAI can be provided with any higher layer PDU transmission in the UL including the last one or with no higher layer PDU transmission in the UL.
* AS RAI is provided in the same MAC CE as the DL channel quality report.
* One of the codepoints for AS RAI implies “no indication”.
* AS RAI has higher priority than data when AS RAI and DL channel quality report are provided in the same MAC CE.
* No other mechanisms are introduced to provide R16 AS RAI.
* Codepoints for AS RAI are allocated as follows:
	+ - Code Point 00: No RAI information
		- Code Point 01: no subsequent DL and UL data transmission is expected
		- Code Point 10: a single subsequent DL transmission is expected
		- Code Point 11: Reserved.
 |

* [AT109e][309][NBIOT/EMTC] RAI whether AS RAI should be provided in case including AS RAI would lead to data segmentation (Ericsson)

 Scope: Proposal 3 and 9 of [R2-2001474](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001474.zip)

 Intended outcome: report in [R2-2001793](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001793.zip)

 Deadline: Thursday 27th 0900 CET

[R2-2001793](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001793.zip) [AT109e][309][NBIOT/EMTC] RAI whether AS RAI should be provided in case including AS RAI would lead to data segmentation Ericsson report

[R2-2002015](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002015.zip) Summary of contributions for connection to 5GC (AI 7.2.10) Huawei discussion Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core

**Agreements proposed to be agreed in this meeting (from all sub-topics):**

**Proposal S3-1:** Similar as UP CIoT EPS Optimization, rrc-SuspendIndication in RRCConnectionReject can be supported for UP CIoT 5GS Optimization. No change for specification is needed.

**Proposal S3-2**: DL channel quality report can be supported for both NB-IoT and eMTC connected to 5GC.

**Proposal S3-3**: Confirm the working assumption that cause delayTolerantAccess it not applicable to 5GC.

**Proposal S3-4**: Confirm the working assumption that there is no need for an indication of extended Idle mode DRX support in system information for NB-IoT.

**Proposal S3-5:** Confirm the working assumption that there is a new IE up-EDT-5GC-r16 in SIB2-BR/SIB2-NB to indicate ng-eNB connected to 5GC supports CP MO-EDT.

**Proposal S3-6**: Revert the working assumption that the values ‘n’ and ‘m’ for the truncation of the 5G-S-TMSI are signalled per PLMN in SystemInformationBlockType2-NB.

**Proposal S3-7:** Remove the IE cp-ReestablishmentPLMNList-5GC-r16 in SystemInformationBlockType2-NB.

**Proposal S3-8**: For 5GC, CP re-establishment is always enabled, there is no need for an indication in system information.

**Proposal S3-9**: The existing capability multipleDRB-r13 is also applicable to 5GC

**Proposal S3-10**: PUR is supported in EPC and 5GC.

**Proposal S3-11**: Introduce separate indications up-PUR-5GC-r16 and cp-PUR-5GC-r16 in SIB2-BR/SIB2-NB

**Proposal S3-12**: Introduce separate UE capabilities pur-UP-5GC-r16 and pur-CP-5GC-r16.

**Proposal S4-1:** Add ab-PerRSRP-r16 parameter (same definition as SIB14-BR) in SIB25-BR.

**Proposal S4-2:** BL UEs or UEs in CE in RRC\_CONNECTED mode performs access barring check based on the latest UAC parameters acquired prior to entering RRC\_CONNECTED.

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| Agreements* Similar as UP CIoT EPS Optimization, rrc-SuspendIndication in RRCConnectionReject can be supported for UP CIoT 5GS Optimization. No change for specification is needed.
* DL channel quality report can be supported for both NB-IoT and eMTC connected to 5GC.
* Confirm the working assumption that cause delayTolerantAccess it not applicable to 5GC.
* Confirm the working assumption that there is no need for an indication of extended Idle mode DRX support in system information for NB-IoT.
* Confirm the working assumption that there is a new IE cp-EDT-5GC-r16 in SIB2-BR/SIB2-NB to indicate ng-eNB connected to 5GC supports CP MO-EDT.
* Revert the working assumption that the values ‘n’ and ‘m’ for the truncation of the 5G-S-TMSI are signalled per PLMN in SystemInformationBlockType2-NB.
* Remove the IE cp-ReestablishmentPLMNList-5GC-r16 in SystemInformationBlockType2-NB.
* The existing capability multipleDRB-r13 is also applicable to 5GC
* PUR is supported in EPC and 5GC.
* Introduce separate indications up-PUR-5GC-r16 and cp-PUR-5GC-r16 in SIB2-BR/SIB2-NB
* Introduce separate UE capabilities pur-UP-5GC-r16 and pur-CP-5GC-r16.
* Add ab-PerRSRP-r16 parameter (same definition as SIB14-BR) in SIB25-BR.
* BL UEs or UEs in CE in RRC\_CONNECTED mode performs access barring check based on the latest UAC parameters acquired prior to entering RRC\_CONNECTED.
 |

* [AT109e][310][NBIOT] 5GC open issues in AI 7.2.10 (Huawei)

 Scope: Progress the open issues and proposals listed in [R2-2002015](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2002015.zip), not already agreed.

 Intended outcome: report in [R2-2001794](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001794.zip)

 Deadline: Thursday 27th 0900 CET

[R2-2001794](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001794.zip) [AT109e][310][NBIOT] 5GC open issues in AI 7.2.10 Huawei

Others

[R2-2000517](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000517.zip) Remaining FFSs for connection to 5GC ZTE Corporation, Sanechips discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2000539](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000539.zip) UAC information change indication for eMTC UE connected to 5GC Qualcomm Incorporated discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core R2-1914801

[R2-2000648](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000648.zip) Access barring for eMTC connected to 5GC Huawei, HiSilicon discussion Rel-16 LTE\_eMTC5-Core

R2-2000830 Mobility enhancements for Connectivity to 5GC for MTC and NB-IoT Sony discussion Rel-16 NB\_IOTenh3-Core R2-1915237 Withdrawn

[R2-2001014](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001014.zip) UE redirection to a specific CN type and ping-pong behavior Sony Europe B.V. discussion NB\_IOTenh3-Core

[R2-2001478](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001478.zip) AS RAI and optimization of release in EDT Ericsson discussion LTE\_eMTC5-Core, NB\_IOTenh3-Core Late

### 7.2.11 UE specific DRX

Specify support of UE specific DRX and consider expanding the current DRX range

Including outcome of the email discussion [108#98][NB-IoT] UE specific DRX (Huawei)

This agenda item will utilize a summary document to facilitate treatment of topics during the e-meeting. This may lead to postponing of some items to next meeting. A web conference will be used for handling some of the discussions in this AI.

Reports/Summaries

[R2-2000626](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000626.zip) Report of email discussion [108#98][NB-IoT] UE specific DRX Huawei report Rel-16 NB\_IOTenh3-Core Late

* Revised to [R2-2001781](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001781.zip)

[R2-2001781](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001781.zip) Report of email discussion [108#98][NB-IoT] UE specific DRX Huawei report Rel-16 NB\_IOTenh3-Core Late

SIB indication is introduced to enable/disable the use of UE specific DRX for EPC.

(A：No challenging on the need, only one company wants to broadcast the minimum DRX cycle)

* Sequans and QC thinks we can’t agree yet, as we have not settled the details
* QC thinks we should make the proposal conditional on whether we agree to introduce.
* China Unicom thinks we can agree and move forward
* Huawei thinks it is clear from the LS that this should be supported for EPC and 5GC and they are discussing options.
* Sequans thinks there are issues to discuss in RAN2. Huawei thinks these were discussed in the email discussion and most companies think they can be solved by eNB implementation.
* Ericsson thinks this should be supported and should be more straightforward than some claim. ZTE agree with Ericsson.
* Vodafone thinks we should standardise and would like to see issues resolved.
* Sony thinks we may need to clarify this is only for NB-IoT. Huawei thinks it is clear that this is only NB-IoT. Sony thinks it is clear that this discussion is about NB-IoT but it should be clear in any reply LS too.
* Ericsson think it is clear that we should introduce an indication as it is needed for both options provided by SA2 and is already part of the WI objectives
* Huawei think SA2 agreed to introduce for EPC and 5GS, they are just discussing the options.
* Vodafone also think SA2 instruction is clear and prefer option 2.

Indicate in the Reply LS to SA2 that both options are feasible from RAN2 point of view.

(A: Almost all companies think both options are feasible)

* Sequans thinks we can’t say these are feasible without discussing all the details
* China Unicom thinks we need to reply and option 2 is their preference
* Sequans thinks there is LTE impact from option 2. QC think the LS may contain an error regarding EPC. Ericsson thinks the LS just considers how things work in NB-IoT and eMTC today, and think the intention is not to change eMTC. Vodafone thinks there is a mistake in the LS.
* Huawei think both options have impact in multiple groups and the LS has gone to them. We should reply from RAN2 perspective, and in RAN2 the impact is the indication and paging probability, so no issue that makes either option not feasible from RAN2 perspective. The issue raised by Sequans is not a RAN2 issue.
* China Telecom agree with HW.

Indicate in the Reply LS to SA2 that RAN2 has a preference for Option 2 as it can support separate value ranges for NB-IoT and WB-EUTRAN.

RAN2 to discuss the value range of NB-IoT UE specific DRX cycle.

(B: 8 out of 11 companies prefer Option 2 as it can support separate value ranges.)

* Sequans think we should also point out issues.
* Ericsson thinks there should not be MME impact with option 1. QC thinks it depends on the MME implementation. QC thinks option 1 is too limited and option 2 also means a common solution between RATs.
* Sequans think we need to discuss MME awareness. Huawei thinks this is not in RAN2 scope.
* QC thinks the NB-Iot value range has to be re-used. Huawei thinks the main objective of the UE specific DRX is latency reduction so LTE range should be used. Sequans thinks the NB-IoT range should be used. Huawei think there is no range currently for NB-IoT in CT1, so the only one to re-use is the LTE one.
* QC thinks the value range needs to be concluded before the LS is sent. HW thinks the behavior is not impacted by the range.

It is up to eNB implementation to address timely paging issue for UE specific DRX in NB-IoT.

It is up to eNB implementation to address PO overlapping issue for UE specific DRX in NB-IoT.

It is up to eNB implementation to address fractional nB value issue UE specific DRX in NB-IoT.

(B: 7 out of 11 companies think above issues are up to NW implementation)

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| Agreements:* For both option 1 and option 2, a SIB indication is needed at least for enabling/disabling the use of UE specific DRX for NB-IoT accessing EPC.
* Indicate in the Reply LS to SA2 that both options are feasible from RAN2 point of view.
* Indicate in the Reply LS to SA2 that RAN2 has a preference for Option 2.
* FFS value range for NB-IoT.
 |

Others

[R2-2000627](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000627.zip) [Draft] Reply LS to Reply LS on Rel-16 NB-IoT enhancements Huawei LS out Rel-16 NB\_IOTenh3-Core To:TSG RAN, TSG CT, SA2 WG2, CT WG1, RAN WG3 Cc:TSG SA Late

* [AT109e][318][NBIOT] Reply LS to Reply LS on Rel-16 NB-IoT enhancements (Huawei)

 Status: Not started

 Scope: Discuss the value range + Draft the reply LS based on the agreements.

 Intended outcome: Approved LS in R2-2001795

 Deadline: 04-03-2020, 12:00 CET – Value range

 Deadline: 06-03-2020, 12:00 CET – LS approved

[R2-2000628](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000628.zip) TP for Introduction of UE specific DRX for NB-IoT in 36.300 Huawei discussion Rel-16 36.300 NB\_IOTenh3-Core Late

[R2-2000629](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000629.zip) TP Introduction of UE specific DRX for NB-IoT in 36.304 Huawei discussion Rel-16 36.304 NB\_IOTenh3-Core Late

R2-2000630 TP for Introduction of UE specific DRX for NB-IoT in 36.306 Huawei discussion Rel-16 36.306 NB\_IOTenh3-Core Late

[R2-2000631](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000631.zip) TP for Introduction of UE specific DRX for NB-IoT in 36.331 Huawei discussion Rel-16 36.331 NB\_IOTenh3-Core Late

[R2-2000836](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2000836.zip) Details on UE Specific DRX cycle Sony discussion Rel-16 NB\_IOTenh3-Core

[R2-2001629](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001629.zip) NB-IoT UE Specific DRX - NB-IoT UE specific DRX – Options 1/2 and Fast Paging Escalation Sequans Communications discussion Rel-16 NB\_IOTenh3-Core

[R2-2001630](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e%5CDocs%5CR2-2001630.zip) NB-IoT UE Specific DRX - Efficiency Issues Sequans Communications discussion Rel-16 NB\_IOTenh3-Core R2-1916236

### 7.2.12 Other

Others