3GPP TSG-RAN WG2 Meeting #109bis electronic draftR2-2003807

**20 – 30 April 2020**

Agenda Item: 8.7

Source: Session Chair (Huawei)

Title: draft Report NB-IoT breakout session

Document for: Approval

**General**

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 meeting organizational thread [AT109bis-e][000]

Please see the following Tdocs for e-meeting guidance:

R2-2002500 Agenda for RAN2#109bis-e Chairman agenda

[R2-2003824](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003824.zip) RAN2 109bis-e Methods and Guidance RAN2 chairman, RAN2 vice chairmen, session chairs discussion

**Time Schedule**Please refer to the latest schedule in the RAN2 inbox on the public 3GPP servers.

**Access Tools**

*HTTP Upload Tool:*

ETSI IT has created a facility in Inbox and Inbox/Drafts folders on the public 3GPP servers to allow delegates to upload their documents using a web browser (however Internet Explorer is not yet supported). Open your browser and navigate to your chosen folder – for example,

<https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Inbox>

Click the green button to log in using your EOL account. A panel will appear in the upper part of the screen and documents may be dragged and dropped onto this landing pad; this causes them to be uploaded to the folder.

*Secure FTP:*

Those e-delegates who prefer to use FTP-like access to our e-meeting Inbox & Draft folders but are concerned by their usernames and passwords being sent unencrypted over the internet, ETSI IT has fitted the server with FTPS (SSL) so delegates can connect from their favourite FTP client using the address: ftps.3gpp.org. Please enter your username and password when prompted.

**Organizational**

* Incoming LSs are noted by default. Contact companies should flag LSs that need to be replied from this meeting.
* Legacy topics will be treated by email only. Please see the list of offline email discussions below.
* Rel-16 (draft) CRs and text proposals will be handled as part of the email discussion on the corresponding CR(s) or the ASN.1 review email discussion if associated with a RIL#.
* All organizational emails and notes will be shared over the following email discussion throughout both meeting weeks:
* [AT109bis-e][300][NBIOT] Organisational (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: 30-04-2020, 10:00 UTC

**List and Status of Offline Email Discussions**

NOTE: The official kick off date for these email discussions are Monday April 20th at 7:00 UTC. The rapporteurs can share them on the reflector earlier, however companies are not required to participate before the official kick off date. The deadlines refer to the deadline for providing company comments unless stated otherwise.

* [AT109bis-e][301][NBIOT] Clarification on RLC UM SN size for NB-IoT (Huawei)

 Status: Started

 Scope: Check if there is support and update based on the comments if the CR is agreeable.

 Intended outcome: Report from the discussion and, if agreeable, in-principle agreed CR. The report can be provided in R2-2004036

 Deadline: 27-04-2020, 10:00 UTC

* [AT109bis-e][302][NBIOT] Optimisation on trigger for dedicated SR with HARQ-ACK (ZTE)

 Status: Started

 Scope: Check if there is support and update based on the comments if the CR is agreeable.

 Intended outcome: Report from the discussion and, if agreeable, in-principle agreed CR. The report can be provided in R2-2004037

 Deadline: 27-04-2020, 10:00 UTC

* [AT109bis-e][303][NBIOT] Cell selection on the dedicated frequency after RRC connection rejection for NB-IoT (Mediatek)

 Status: Started

 Scope: Check if there is support and update based on the comments if the CR is agreeable.

 Intended outcome: Report from the discussion and, if agreeable, in-principle agreed CR. The report can be provided in R2-2004038

 Deadline: 27-04-2020, 10:00 UTC

* [AT109bis-e][304][NBIOT] 36.300 CR (Huawei)

Status: Started

 Scope: Update the CR with agreements from this meeting.

 Intended outcome: baseline CR for updating 36.300 in R2-2004039

 Deadline: 29-04-2020, 10:00 UTC

* [AT109bis-e][305][NBIOT] 36.331 CR (Huawei)

 Status: Not started

 Scope: Update the CR with agreements from this meeting.

 Intended outcome: baseline CR for updating 36.331 in R2-2004040

 Deadline: 29-04-2020, 10:00 UTC

* [AT109bis-e][306][NBIOT] 36.302 CR (Huawei)

 Status: Not started

 Scope: Update the CR with agreements from this meeting.

 Intended outcome: baseline CR for updating 36.302 in R2-2004041

 Deadline: 29-04-2020, 10:00 UTC

* [AT109bis-e][307][NBIOT] 36.304 CR (Nokia)

 Status: Started

 Scope: Update the CR with agreements from this meeting, including WUS TP.

 Intended outcome: baseline CR for updating 36.304 in R2-2004042

 Deadline: 29-04-2020, 10:00 UTC

* [AT109bis-e][308][NBIOT] 36.321 CR (Ericsson)

 Status: Started

 Scope: Update the CR with agreements from this meeting.

 Intended outcome: baseline CR for updating 36.321 in R2-2004043

 Deadline: 29-04-2020, 10:00 UTC

* [AT109bis-e][309][NBIOT] 36.306 CR (Blackberry)

 Status: Started

 Scope: Update the CR with agreements from this meeting.

 Intended outcome: baseline CR for updating 36.306 in R2-2004044

 Deadline: 29-04-2020, 10:00 UTC

* [AT109bis-e][310][NBIOT] WUS open issues (Ericsson)

 Status: Started

 Scope: Remaining open issues on WUS

 Intended outcome: Finalise the open issues, report in [R2-2004045](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004045.zip)

 Deadline: 23-04-2020, 16:00 UTC

* [AT109bis-e][311][NBIOT] PUR open issues (Huawei)

 Status: Started

 Scope: Remaining open issues on PUR

 Intended outcome: Finalise the open issues, report in [R2-2004046](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004046.zip)

 Deadline: 22-04-2020, 16:00 UTC

* [AT109bis-e][312][NBIOT] SON open issues (Session Chair)

 Status: Started

 Scope: Remaining open issues on SON

 Intended outcome: Finalise the open issues, report in [R2-2004047](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004047.zip)

 Deadline: 22-04-2020, 16:00 UTC

* [AT109bis-e][313][NBIOT] UE capabilities, TDD/FDD differentiation and 5GC applicability for NB-IoT and eMTC (Huawei)

 Status: Started Scope: Discuss the open issues on UE capabilities

 Intended outcome: Finalise the issues, report in R2-2004048

 Deadline: 27-04-2020, 10:00 UTC

* [AT109bis-e][314][NBIOT] ASN.1 review of NB-IoT (Huawei)

 Status: Started Scope: ASN.1 WI specific issues discussion

 Intended outcome: progress the ASN.1 review and conclude as much as possible, report in R2-2004049

 Deadline: 27-04-2020, 10:00 UTC

* [AT109bis-e][315][NBIOT] UE specific DRX - FFSs (Huawei)

 Status: Not started

 Scope: Address the 2 FFS on UE specific DRX

 Intended outcome: Report in R2-2004052

 Deadline: 28-04-2020, 10:00 UTC

* [AT109bis-e][316][NBIOT] UE specific DRX – LSs (Huawei)

 Status: Closed

 Scope: Approve 2 LS on UE specific DRX. 1) to RAN4, 2) to CT1, RAN3.

 Intended outcome: 2 approved LS in [R2-2004050](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004050.zip) (to:RAN4), [R2-2004051](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004051.zip) (to:CT1, RAN3)

 Deadline: 22-04-2020, 10:00 UTC

## 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.

This agenda item may not be treated during the e-meeting. No web conference is planned for this agenda item

[R2-2003246](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003246.zip) Clarification on RLC UM SN size for NB-IoT Huawei, HiSilicon CR Rel-15 36.322 15.3.0 0145 - F NB\_IOTenh2-Core

* [AT109bis-e][301][NBIOT] Clarification on RLC UM SN size for NB-IoT (Huawei)

 Scope: Check if there is support and update based on the comments if the CR is agreeable.

 Intended outcome: Report from the discussion and, if agreeable, in-principle agreed CR. The report can be provided in R2-2004036

 Deadline: 27-04-2020, 10:00 UTC

[R2-2003245](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003245.zip) Optimisation on trigger for dedicated SR with HARQ-ACK ZTE Corporation, Sanechips, MediaTek Inc. discussion Rel-15 LTE\_eMTC4-Core

[R2-2003254](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003254.zip) Optimisation on trigger for dedicated SR with HARQ-ACK ZTE Corporation, Sanechips, MediaTek Inc. CR Rel-15 36.321 15.8.0 1469 - F LTE\_eMTC4-Core

[R2-2003256](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003256.zip) Optimisation on trigger for dedicated SR with HARQ-ACK ZTE Corporation, Sanechips, MediaTek Inc. CR Rel-15 36.331 15.9.0 4254 - F LTE\_eMTC4-Core

* [AT109bis-e][302][NBIOT] Optimisation on trigger for dedicated SR with HARQ-ACK (ZTE)

 Scope: Check if there is support and update based on the comments if the CR is agreeable.

 Intended outcome: Report from the discussion and, if agreeable, in-principle agreed CR. The report can be provided in R2-2004037

 Deadline: 27-04-2020, 10:00 UTC

[R2-2003619](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003619.zip) Discussion on dedicated frequency search after connection rejection MediaTek Inc. discussion Rel-15 NB\_IOTenh2-Core

[R2-2003621](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003621.zip) Cell selection on the dedicated frequency after RRC connection rejection for NB-IoT in 36.304 MediaTek Inc. CR Rel-15 36.304 15.5.0 0787 - F NB\_IOTenh2-Core

[R2-2003622](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003622.zip) Cell selection on the dedicated frequency after RRC connection rejection for NB-IoT in 36.331 MediaTek Inc. CR Rel-15 36.331 15.9.0 4280 - F NB\_IOTenh2-Core

* [AT109bis-e][303][NBIOT] Cell selection on the dedicated frequency after RRC connection rejection for NB-IoT (Mediatek)

 Scope: Check if there is support and update based on the comments if the CR is agreeable.

 Intended outcome: Report from the discussion and, if agreeable, in-principle agreed CR. The report can be provided in R2-2004038

 Deadline: 27-04-2020, 10:00 UTC

## 7.2 Additional enhancements for NB-IoT

(NB\_IOTenh3-Core; leading WG: RAN1; REL-16; started: Jun 18; target; June 20; WID: RP-200293; SR: RP-200440)

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

A web conference will be used for handling some of the discussions in this AI.

One CR per specification will be provided by the corresponding rapporteur. No individual company CRs are expected. Companies should provide TPs when needed.

[R2-2002587](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002587.zip) RAN2 agreements for Rel-16 additional enhancements for NB-IoT and MTC Document Rapporteur (BlackBerry) other Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2003249](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003249.zip) Miscellaneous corrections to TS 36.300 for Rel-16 NB-IoT Huawei, HiSilicon CR Rel-16 36.300 16.1.0 1277 - F NB\_IOTenh3-Core

* [AT109bis-e][304][NBIOT] 36.300 CR (Huawei)

 Scope: Update the CR with agreements from this meeting.

 Intended outcome: baseline CR for updating 36.300 in R2-2004039

 Deadline: 29-04-2020, 10:00 UTC

R2-2003744 Miscellaneous corrections to 36.331 for Rel-16 NB-IoT Huawei, HiSilicon CR Rel-16 36.331 16.0.0 4287 - F NB\_IOTenh3-Core Late

* [AT109bis-e][305][NBIOT] 36.331 CR (Huawei)

 Scope: Update the CR with agreements from this meeting.

 Intended outcome: baseline CR for updating 36.331 in R2-2004040

 Deadline: 29-04-2020, 10:00 UTC

R2-2003745 Miscellaneous corrections to 36.302 for Rel-16 NB-IoT Huawei, HiSilicon CR Rel-16 36.302 16.0.0 1209 - F NB\_IOTenh3-Core Late

* [AT109bis-e][306][NBIOT] 36.302 CR (Huawei)

 Scope: Update the CR with agreements from this meeting.

 Intended outcome: baseline CR for updating 36.302 in R2-2004041

 Deadline: 29-04-2020, 10:00 UTC

* [AT109bis-e][307][NBIOT] 36.304 CR (Nokia)

 Scope: Update the CR with agreements from this meeting, including WUS TP.

 Intended outcome: baseline CR for updating 36.304 in R2-2004042

 Deadline: 29-04-2020, 10:00 UTC

* [AT109bis-e][308][NBIOT] 36.321 CR (Ericsson)

 Scope: Update the CR with agreements from this meeting.

 Intended outcome: baseline CR for updating 36.321 in R2-2004043

 Deadline: 29-04-2020, 10:00 UTC

### 7.2.2 UE-group wake-up signal WUS

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

A web conference will be used for handling some of the discussions in this AI.

Includes [Post109e#32][NBIOT/EMTC] Finalise the 36.304 Text for WUS (Nokia)

Includes [Post109e#45][NBIOT/EMTC] WUS open issues (Ericsson)

All identified critical open issues should be provided to the rapporteur via email discussion Post109e#45 and new contributions on those topics are discouraged.

[R2-2003328](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003328.zip) E-mail-Discussion-Summary for Post109e-32 : Finalise TP for TS36.304 for WUS Nokia, Nokia Shanghai Bell discussion Rel-16

* Noted

[R2-2003329](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003329.zip) Draft TP for TS36.304 Nokia, Nokia Shanghai Bell discussion Rel-16

* Can be used as a baseline for further discussion under offline#307

[R2-2003431](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003431.zip) Report - Email discussion [Post109e#45][NB-IoT/eMTC] WUS open issues Ericsson discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core Late

Proposal 1 8 codepoints are used to indicate paging probability classes.

Proposal 2 The value range for paging probability classes is up to 0.9.

Proposal 3 The granularity for paging probability classes is 0.1.

Proposal 4 The value range for paging probability classes starts from 0.2.

Proposal 5 The following codepoints are used to indicate a paging probability class: {n20,n30,n40,n50,n60,n70,n80,n90}

Proposal 6 Discuss whether SA2/RAN3 should be informed with an LS if RAN2 were to decide on the value range and granularity.

Proposal 7 Discuss whether there is a need to support 4 WUS group sets considering that 1 WUS group set is assigned for UEs with no paging probability class.

Proposal 8 Discuss whether it would be beneficial for the eNB if the MME provides assistance information regarding a particular paging probability class.

Proposal 9 The mechanism proposed in SA2 for Release 15 to reduce false wake-up is used in Rel-16.

Proposal 10 Confirm the following working assumption: “Support of Release 16 WUS is independent to support of Release 15 WUS”.

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| Agreements:* The following codepoints are used to indicate a paging probability threshold value: {p20,p30,p40,p50,p60,p70,p80,p90}
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* [AT109bis-e][310][NBIOT] WUS open issues (Ericsson)

 Scope: Remaining open issues on WUS

 Intended outcome: Finalise the open issues, report in [R2-2004045](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004045.zip)

 Deadline: 22-04-2020, 16:00 UTC

[R2-2004045](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004045.zip) Report - Email discussion [AT109bis-e][310][NBIOT eMTC] WUS open issues Ericsson

Proposal 1 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.

Proposal 2 Confirm the working assumption: Maximum number probability thresholds is 3 giving 4 group.

Proposal 3 Discuss whether RAN2 should indicate to other WGs, e.g., SA2/RAN3, that it would be beneficial for the eNB if the MME provides assistance information regarding a particular paging probability class.

* QC thinks it could be raised in RAN3, we don’t need to send an LS. Huawei think it is not necessary, eNB can change the configuration, same as other paging related configs. Nokia agree with QC and HW.
* Lenovo think there is no RAN2 impact, but it can be beneficial. Ericsson think that RAN2 are the feature lead so that is why the issue was raised here.

Proposal 4 Discuss whether the mechanism proposed in SA2 for Release 15 to reduce false wake-up should be used in Rel-16.

* QC thinks SA2 already agreed this, Huawei agree and think the release is finishing so no time to make a new solution. Ericsson, Sony think there is a solution.
* Nokia think we should consider relaxing this as group can improve this. Zte think there should be a difference to Rel-15, Sony agree but think it is up to MME so not RAN2 issue.
* Huawei think there is no problem having the same solution in Rel-16 as Rel-15, and further other new solutions are not agreeable.

Proposal 5 Confirm the working assumption: “Support of Release 16 WUS is independent to support of Release 15 WUS”.

* QC thnk the capabilities could be linked, no need to have the flexibility – UE is anyway required to implement the Rel-15 functionality to support Rel-16..
* Sequans think this is useful for UE preference. HW agree with Sequans, Rel-15 is not as efficient.
* Nokia think from NW point of view this is an independent capability.
* ZTE thinks common WUS needs to be configured.

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| Agreements* 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”.
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[R2-2002671](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002671.zip) On supporting UE group WUS operation with mobility Sony discussion Rel-16 NB\_IOTenh3-Core

[R2-2003101](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003101.zip) Consideration on WUS paging probability parameter Lenovo, Motorola Mobility discussion Rel-16

[R2-2003102](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003102.zip) Group WUS for mobile UE Lenovo, Motorola Mobility discussion Rel-16

[R2-2003184](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003184.zip) Clarification of WUS resource configuration Qualcomm Incorporated draftCR Rel-16 36.331 16.0.0 LTE\_eMTC5-Core

[R2-2003485](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003485.zip) Formula for WUS group selection ZTE Corporation, Sanechips discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2003741](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003741.zip) Signalling changes for GWUS Resource mapping for eMTC Nokia Solutions & Networks (I) discussion Rel-16

### 7.2.3 Transmission in preconfigured resources

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

A web conference will be used for handling some of the discussions in this AI.

Includes [Post109e#46][NBIOT/EMTC] PUR open issues (Huawei)

All identified critical open issues should be provided to the rapporteur via email discussions Post109e#46 and new contributions on those topics are discouraged.

[R2-2003746](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003746.zip) Report of email discussion [Post109e#46][NBIOT/EMTC] PUR open issues Huawei report Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core Late

RRC aspects:

Proposal 1-1: For PUR TBS in eMTC, the current TBS values captured in eMTC RRC CR are supported, i.e. {b328, b408, b504, b600, b712, b808, b936, b1000, b1352, b1544, b1736, b1992, b2152, b2344, b2792, b2984}. (7/7)

Proposal 1-2: [FFS] For PUR TBS in eMTC, TBS values larger than b2984 can be supported, FFS exact values and how many code points. (4/7)

Proposal 1-3: For PUR TBS in NB-IoT, TBS values {b328, b408, b504, b584, b680, b808, b936, b1000, b1128, b1256, b1384, b1608, b1800, b2024, b2280, b2536} are supported. (5/7)

Proposal 1-4: [FFS] For pur-Periodicity-r16 and requestedPeriodicity-r16, FFS whether to support hsf16384, hsf32768 and hsf65536 for both NB-IoT and eMTC (4/8).

Proposal 1-5: [FFS] For both NB-IoT and eMTC, pur-StartTime-r16 is a 2-level start offset (5/8)

- Level 1: startHSF: {hsf128, hsf256, hsf512, hsf1024, hsf2048, hsf4096, hsf8192, spare} (7/8)

- Level 2: startSubframe: FFS value range (8/8)

Proposal 1-6: [FFS] For both NB-IoT and eMTC, the granularity of requestedTimeOffset-r16 is H-SF level, FFS exact values. (4/8)

Proposal 1-7: For both NB-IoT and eMTC, the value range of pur-TimeAlignmentTimer-r16 is INTEGER (1..8), i.e. 1~8 \* PUR periodicity. (8/8)

Proposal 1-8: PUR-RNTI is used as the name of RNTI used for PUR. (6/8)

Proposal 2-1: All PUR parameters are stored in the eNB (7/8).

Proposal 2-2: The eNB links CP-PUR configuration to each UE in RRC\_IDLE according to PUR resource by implementation. (5/7)

Proposal 2-3: [FFS] PUR (re-)configuration can be provided to the UE for the CP solution without AS security enabled (4/7).

MAC aspects:

Proposal 3: Remove the Editor’s Note “FFS whether restarting the window is indended” from 36.321. (8/8)

Proposal 4: Remove the Editor’s Note “FFS what is the impact of PUR in this section” from 36.321. (6/7)

Proposal 5: [FFS] No additional change on implicitReleaseAfter is needed in MAC specification. (4/7)

RRC-MAC interactions:

Proposal 6-0: RAN2 to discuss whether to confirm or revert the working assumption that MAC calculates the PUR grant for each PUR occasion.

The following proposals 6-1 to 8 are conditional. If RAN2 confirms the working assumption:

Proposal 6-1: RRC is aware of PUR grant. How RRC is aware is up to UE implementation. (5/7)

Proposal 6-2: RRC can decide not to use the PUR grant for NAS signalling and no MAC-RRC interaction is needed. (6/7)

Proposal 6-3: pur-NumOccasion is handed in MAC layer. (5/7)

Proposal 7: MAC is aware of RRC state. How MAC is aware is up to UE implementation. (4/6)

Proposal 8: MAC is aware of CP transmission using PUR. How MAC is aware is up to UE implementation. (7/7)

Proposal 9-1: 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. (5/6)

Proposal 9-2: Remove the references to PUR TA timer validation in section 5.4.7.1 from 36.321. (4/6)

Proposal 10-1: PUR release due to RACH initiation on a new cell is captured in RRC. (7/7)

Proposal 10-2: PUR configuration is released when the UE initiates RA procedure on a new cell for all purposes. (6/7)

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| 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.

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.
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* [AT109bis-e][311][NBIOT] PUR open issues (Huawei)

 Scope: Remaining open issues on PUR

 Intended outcome: Finalise the open issues, report in [R2-2004046](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004046.zip)

 Deadline: 22-04-2020, 16:00 UTC

 Extended deadline to make further agreements: 28-04-2020 1000 UTC

[R2-2004046](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004046.zip) Report of offline discussion [AT109bis-e][311] on PUR open issues Huawei

Proposal 1. For the requested PUR TBS in eMTC, the maximum value is b2984, with spare values in requestedTBS-r16 for future extension. (4?/5)

Proposal 2. For the requested PUR TBS in eMTC, the minimum value is b328. (4/5)

Proposal 3. For the requested PUR TBS in eMTC, FFS how many codepoints. (3/5)

Proposal 4. For the requested PUR TBS in NB-IoT, FFS TBS values {b328, b408, b504, b584, b680, b808, b936, b1000, b1128, b1256, b1384, b1608, b1800, b2024, b2280, b2536}. (2/5)

Proposal 5. 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 (5/5)

Proposal 6. For both NB-IoT and eMTC, pur-StartTime-r16 is a 2-level start offset (3/5)

Proposal 7. For both NB-IoT and eMTC, level-1 offset is H-SF level (5/5).

Proposal 8. Only some of HSFN need to be included in the level-1 offset. FFS exact values. (3/5)

Proposal 9. For both NB-IoT and eMTC, FFS details on level-2 offset.

Proposal 10. For both NB-IoT and eMTC, requestedTimeOffset-r16 in PUR request is in H-SF level (5/5).

Proposal 11. requestedTimeOffset-r16 in PUR request has the same value range as the level-1 offset for pur-StartTime-r16 in PUR configuration. (4/5)

Proposal 12. PUR-RNTI is used as the name of RNTI used for PUR. (4/5).

Proposal 13. The eNB links CP-PUR configuration to each UE in RRC\_IDLE according to PUR resource by implementation. (4/5)

Proposal 14. PUR (re-)configuration can be provided to the UE for the CP solution without AS security enabled. (4/5)

* QC, Nokia, Sequans think this needs to be checked with SA3.
* Huawei think this needs to be implemented in the spec and further action only if SA3 have an issue. QC agree.

Proposal 15. No additional change on implicitReleaseAfter is needed in MAC specification. (3/5)

Proposal 16. Revert the previous working assumption, PUR grant is maintained in RRC. (4/5)

* LG don’t want to revert, but can accept.
* ZTE think the proposal is acceptable as this is mainly UE implementation.

Proposal 17. RRC configures the lower layers to use PUR grant upon initiation of transmission using PUR. (4/5)

Proposal 18. The handling of ‘m’ counter is moved from MAC to RRC. (4/5)

Proposal 19. Confirm that transmission using PUR cannot be used for signalling, i.e. mt-Access and mo-Signalling cannot be used for transmission using PUR. (4/5)

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| Agreements:* Revert the previous working assumption, PUR grant is maintained in RRC.
* The handling of ‘m’ counter is moved from MAC to RRC
* From RAN2 point of view PUR (re-)configuration can be provided to the UE for the CP solution without AS security enabled.
	+ - Send LS to SA3 to confirm.
* PUR-RNTI is used as the name of RNTI used for PUR.
 |

* [AT109bis-e][317][NBIOT] LS to SA3 on CP PUR security (Huawei)

 Status:

 Scope: Draft and approve the LS

 Intended outcome: Approved LS in R2-2004055

 Deadline: 28-04-2020 1000 UTC

[R2-2003257](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003257.zip) Complete the HARQ process for PUR ZTE Corporation, Sanechips draftCR Rel-16 36.321 16.0.0 NB\_IOTenh3-Core, LTE\_eMTC5-Core

[R2-2003258](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003258.zip) Correction on successful PUR transmission indication ZTE Corporation, Sanechips draftCR Rel-16 36.321 16.0.0 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2003267](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003267.zip) Correction on TA timer maintenance ZTE Corporation, Sanechips draftCR Rel-16 36.321 16.0.0 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2003331](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003331.zip) Security Aspects of PUR Configuration for CP Nokia, Nokia Shanghai Bell discussion

[R2-2003355](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003355.zip) Moving UL grant handling from MAC to RRC for PUR Ericsson, Huawei, HiSilicon discussion NB\_IOTenh3-Core, LTE\_eMTC5-Core

[R2-2003415](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003415.zip) TA validation based on serving cell RSRP change (related to RAN4 LSes) Sierra Wireless, S.A. discussion Rel-16 R2-2000443

[R2-2003429](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003429.zip) Configuration and adjustment of repetition number Sierra Wireless, S.A. discussion Rel-16

[R2-2003652](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003652.zip) Remaining issues of D-PUR TA timer in MAC ASUSTeK discussion Rel-16 38.321 NB\_IOTenh3-Core

[R2-2003653](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003653.zip) PUR configuration maintenance during RRC state transition ASUSTeK discussion Rel-16 36.331 NB\_IOTenh3-Core

### 7.2.4 NB-IoT Specific

NB-IoT specific topics

This agenda item may utilize a summary document to facilitate treatment of topics during the e-meeting.

A web conference will be used for handling some of the discussions in this AI.

Includes [Post109e#15][NBIOT] UE specific DRX: DRX cycle values (Sequans)

[R2-2003131](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003131.zip) To Verify ANR Measurements Ericsson, Nokia, Nokia Shanghai Bell, ZTE Corporation discussion Rel-16

[R2-2003133](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003133.zip) Logging of CE Level for RLF and ANR measurements Ericsson discussion Rel-16

[R2-2003139](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003139.zip) Draft LS to RAN4 on ANR Measurements Ericsson [To be RAN2] LS out Rel-16 NB\_IOTenh3-Core To:RAN4

[R2-2003247](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003247.zip) SON remaining issues Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core

[R2-2003291](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003291.zip) Remaining FFSs for SON in NB-IoT ZTE Corporation, Sanechips discussion Rel-16 NB\_IOTenh3-Core

[R2-2003786](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003786.zip) Summary of SON/ANR open issues Session Chair (Huawei)

* [AT109bis-e][312][NBIOT] SON open issues (Session Chair)

 Scope: Remaining open issues on SON

 Intended outcome: Finalise the open issues, report in [R2-2004047](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004047.zip)

 Deadline: 22-04-2020, 16:00 UTC

[R2-2004047](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004047.zip) Summary of SON/ANR open issues Session Chair (Huawei)

Easy agreements:

Proposal S1-1: Confirm the Working assumption that the ANR report is discarded after 96 hours.

Proposal S1-2: ANR measurement report is discarded upon RAT change.

Proposal S1-3: Cell ID of the cell where e-establishment failed, if different to the current cell, is included in the RLF report when available.

Proposal S1-5: RLF report is discarded in the following cases:

Reporting rlf-InfoAvailable and returning to idle.

RAT change

Power off or detach.

(already agreed) after 48 hours if not fetched

Needs further discussion:

Proposal S2-2: UE stores the serving cell measurement at the time where the neighbour cell measurement is taken (in ANR-MeasResult-NB)

No consensus:

Proposal S1-4a: Include timeSpent information in ANR report to indicate the elapsed time since the generation of ANR record

Proposal S1-4b: timeSpent is defined as INTEGER (0..5760) with unit of minutes

Proposal S2-1: Send a LS to RAN4 to verify that the ANR measurements specified by RAN2 would work fine.

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| **Agreements:*** Confirm the Working assumption that the ANR report is discarded after 96 hours.
* ANR measurement report is discarded upon RAT change.
* Re-establishment Cell ID is included in the RLF report, only if different to the cell on which the report is sent.
* RLF report is discarded in the following cases:
	+ Reporting rlf-InfoAvailable and returning to idle.
	+ RAT change
	+ Power off or detach.
	+ (already agreed) after 48 hours if not fetched
* [CB]: FFS- In addition to the serving cell measurement stored when the configuration is received, UE stores the latest serving cell measurement when the neighbour cell measurement is stored (in ANR-MeasResult-NB)
 |

[R2-2003669](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003669.zip) Report of [Post109e#15][NBIOT] UE specific DRX DRX cycle values Sequans Communications discussion Rel-16 NB\_IOTenh3-Core

Proposal 1: Discuss further introduction of short UE specific cycles 320ms and 640ms

[R2-2003747](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003747.zip) Introduction of UE specific DRX for NB-IoT Huawei, HiSilicon, MediaTek, CMCC, China Unicom, Ericsson, Lenovo, Motorola Mobility discussion Rel-16 NB\_IOTenh3-Core

=> Revised in [R2-2003780](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003780.zip)

[R2-2003780](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003780.zip) Introduction of UE specific DRX for NB-IoT Huawei, HiSilicon, MediaTek, CMCC, China Unicom, Ericsson, Lenovo, Motorola Mobility, Vodafone discussion Rel-16 NB\_IOTenh3-Core

=> Revised in [R2-2003815](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003815.zip)

[R2-2003815](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003815.zip) Introduction of UE specific DRX for NB-IoT Huawei, HiSilicon, MediaTek, CMCC, China Unicom, Ericsson, Lenovo, Motorola Mobility, Vodafone, China Telecom discussion Rel-16 NB\_IOTenh3-Core

Proposal: 1: UE-specific DRX cycle values 320ms, 640ms, 1280ms, 2560ms, 5120ms and 10240ms are supported in NB-IoT for both EPS and 5GS.

Proposal: 2: Introduce an indication in SIB to enable/disable the use of UE specific DRX cycles in NB-IoT for 5GS (similar to EPS).

Proposal 3: Send a LS to CT1 and RAN3 to inform them about the UE specific DRX cycle values introduced for NB-IoT for both EPS and 5GS.

Proposal 4: Send a LS to RAN4 to inform them about the UE specific DRX cycle values introduced for NB-IoT for both EPS and 5GS and ask to update RRM requirements, if needed.

* Qualcomm is not sure how the NW configuration can address both use cases in the same cell.
* Sequans has the same concern as QC and are not sure why an indication would be needed.
* Vodafone thinks the same basestation can support multiple cells and split UEs according to the coverage. Vodafone thinks the SIB indication is different for 5GS but think it is still useful.
* Ericsson thinks worst case repetitions is not always needed for UE in good coverage even if this is configured so in practise it is possible to support both cases in the same cell.
* Huawei thinks some issues can be avoided by the correct configuration, and the SIB indication is useful for some deployments
* Huawei thinks the problems raised by Sequans and Qualcomm have been discussed several times in email discussions and the majority think these can be solved and in fact don’t exist in a typical deployment. China Telecom agree
* Sequans thinks we could capture in the minutes that the feature is not compatible with extreme coverage. Ericsson think UE can just continue until the maximum repetitions whether there is overlap with PO or not. Sequans would be fine to have clarification on UE behaviour. Nokia think some clarification would be needed but would be OK with that. QC wonders where the clarification would be specified. Ericsson thinks we can check.

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| Agreements:* UE-specific DRX cycle values 320ms, 640ms, 1280ms, 2560ms, 5120ms and 10240ms are supported in NB-IoT for both EPS and 5GS.
* Introduce an indication in SIB to enable/disable the use of UE specific DRX cycles in NB-IoT for 5GS (similar to EPS). FFS whether it is cell or PLMN specific.
* Will clarify UE behaviour in case of CSS overlap due to large repetitions needed to decode the NPDCCH for paging. FFS how.
* Send a LS to CT1 and RAN3 to inform them about the UE specific DRX cycle values introduced for NB-IoT for both EPS and 5GS.
* Send a LS to RAN4 to inform them about the UE specific DRX cycle values introduced for NB-IoT for both EPS and 5GS and ask to update RRM requirements, if needed.
 |

* [AT109bis-e][315][NBIOT] UE specific DRX - FFSs (Huawei)

 Status: Not started

 Scope: Address the 2 FFS on UE specific DRX

 Intended outcome: Report in R2-2004052

 Deadline: 28-04-2020, 10:00 UTC

[R2-2003748](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003748.zip) [Draft] Reply LS on Rel-16 NB-IoT enhancements Huawei LS out Rel-16 NB\_IOTenh3-Core To:CT1, RAN3 Cc:SA2

[R2-2003749](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003749.zip) [Draft] LS on UE specific DRX in NB-IoT Huawei LS out Rel-16 NB\_IOTenh3-Core To:RAN4

* [AT109bis-e][316][NBIOT] UE specific DRX – LSs (Huawei)

 Status: Not started

 Scope: Approve 2 LS on UE specific DRX. 1) to RAN4, 2) to CT1, RAN3.

 Intended outcome: 2 approved LS in [R2-2004050](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004050.zip) (to:RAN4), [R2-2004051](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004051.zip) (to:CT1, RAN3)

 Deadline: 22-04-2020, 10:00 UTC

[R2-2004051](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004051.zip) [Draft] Reply LS on Rel-16 NB-IoT enhancements Huawei LS out Rel-16 NB\_IOTenh3-Core To:CT1, RAN3

* LS approved in R2-2004053

[R2-2004050](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004050.zip) [Draft] LS on UE specific DRX in NB-IoT Huawei LS out Rel-16 NB\_IOTenh3-Core To:RAN4

* LS approved in R2-2004054

### 7.2.5 NB-IoT UE capabilities

This agenda item may utilize a summary document to facilitate treatment of topics during the e-meeting.

A web conference will be used for handling some of the discussions in this AI.

Includes [Post109e#14][NBIOT] 36.306 CR (Blackberry)

[R2-2002588](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002588.zip) Updates for Rel-16 additional enhancements NB-IoT BlackBerry UK Limited CR Rel-16 36.306 16.0.0 1746 - C NB\_IOTenh3-Core Late

* [AT109bis-e][309][NBIOT] 36.306 CR (Blackberry)

 Scope: Update the CR with agreements from this meeting.

 Intended outcome: baseline CR for updating 36.306 in R2-2004044

 Deadline: 29-04-2020, 10:00 UTC

[R2-2003248](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003248.zip) UE capabilities, TDD/FDD differentiation and 5GC applicability for NB-IoT and eMTC Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core

* [AT109bis-e][313][NBIOT] UE capabilities, TDD/FDD differentiation and 5GC applicability for NB-IoT and eMTC (Huawei)

 Scope: Discuss the open issues on UE capabilities

 Intended outcome: Finalise the issues, report in R2-2004048

 Deadline: 27-04-2020, 10:00 UTC

### 7.2.6 ASN.1 review of NB-IoT

*Including documents related to Class 2/3 ASN.1 review issues that require WI-specific discussion.*

A web conference will be used for handling some of the discussions in this AI.

[R2-2003250](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003250.zip%22%20%5Co%20%22https%3A//www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003250.zip) [H108][H109] TP on WUS sugnalling for per gap configuration Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core Late

[R2-2003251](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003251.zip) [H228][H229] TP on multipe TB schedullng in NB-IoT Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core Late

Moved from AI 7.2.3

Related to [Z603]

[R2-2003278](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003278.zip) Capture RRC setup using PUR ZTE Corporation, Sanechips draftCR Rel-16 36.331 16.0.0 LTE\_eMTC5-Core, NB\_IOTenh3-Core

* [AT109bis-e][314][NBIOT] ASN.1 review of NB-IoT (Huawei)

 Scope: ASN.1 WI specific issues discussion

 Intended outcome: progress the ASN.1 review and conclude as much as possible, report in R2-2004049

 Deadline: 27-04-2020, 10:00 UTC