3GPP TSG-RAN WG2 Meeting #111 electronic draftR2-2008127

**Online, August 17th - 28th, 2020**

Agenda Item: 10.7

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 [AT111][000]

Please see the following Tdocs for e-meeting guidance:

R2-2006500 Agenda for RAN2#111-e Chairman agenda Late

**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_111-e/Inbox>

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**Organizational**

* All organizational emails and notes will be shared over the following email discussion throughout both meeting weeks:
* [AT111-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: August 28 1000 UTC

**List and Status of Offline Email Discussions**

NOTE: The official kick off date for these email discussions is Monday, June 1st 0700 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.

* [AT111-e][301][NBIOT/eMTC R15] NPRACH carrier selection (ZTE)

 Status: Started

 Scope: Discuss which changes, if any, are agreeable.

 Intended outcome: Report in R2-2008301 and Agreeable CRs (if needed)

 Deadline: Tuesday 25 1100 UTC.

* [AT111-e][302][NBIOT/eMTC R15] WUS last used cell (Huawei)

 Status: Started

 Scope: After SA2 reply, discuss what to do in RAN2.

 Intended outcome: Report in R2-2008302, and CRs (36.300, 36.304, and if needed 36.331)

 Deadline: Tuesday 25 1100 UTC.

* [AT111-e][303][NBIOT/eMTC R16] 36.331 miscellaneous corrections (Huawei)

 Status: Started

 Scope: Polish the CR.

 Intended outcome: Agreeable CR in R2-2008303

 Deadline: Tuesday 25 1100 UTC.

* [AT111-e][304][NBIOT/eMTC R16] 36.300 miscellaneous corrections (Huawei)

 Status: Started

 Scope: Polish the CR.

 Intended outcome: Agreeable CR in R2-2008304

 Deadline: Tuesday 25 1100 UTC.

* [AT111-e][305][NBIOT/eMTC R16] WUS related 36.304 corrections (Qualcomm)

 Status: Started

 Scope: Polish the CR.

 Intended outcome: Agreeable CR in R2-2008305

 Deadline: Tuesday 25 1100 UTC.

* [AT111-e][306][NBIOT R16] 36.304 miscellaneous corrections (Huawei)

 Status: Started

 Scope: Polish the CR.

 Intended outcome: Agreeable CR in R2-2008306

 Deadline: Tuesday 25 1100 UTC.

* [AT111-e][307][NBIOT/eMTC R16] 36.321 PUR corrections (ZTE )

 Status: Started

 Scope: To discuss MAC corrections for 36.321 based on the submitted CRs and discussion papers, include PUR-RNTI changes from rapporteur CR in common LTE session.

 Intended outcome: Report in R2-2008307 and merged MAC CR in R2-2008308

 Deadline: Tuesday 25 1100 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. No web conference is planned for this agenda item

[R2-2006838](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006838.zip) 36331\_R15\_Clarification for NPRACH carrier selection ZTE Corporation, Sanechips, MediaTek Inc CR Rel-15 36.331 15.10.0 4354 - F NB\_IOTenh2-Core

* QC wonder what happens when NW does not want mixed mode UE to use legacy list carriers, and thinks the UE would end up maintaining 2 lists for use with CFRA and CBRA. HW have the same understanding as QC on issue2, and also NW configuration can avoid most of the problems raised.
* Ericsson thinks MAC may also be impacted if we change this.
* [AT111-e][301][NBIOT/eMTC R15] NPRACH carrier selection (ZTE)

 Status:

 Scope: Discuss which changes, if any, are agreeable.

 Intended outcome: Report in R2-2008301 and Agreeable CRs (if needed)

 Deadline: Tuesday 25 1100 UTC.

[R2-2006840](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006840.zip) 36331\_R16\_Clarification for NPRACH carrier selection ZTE Corporation, Sanechips, MediaTek Inc CR Rel-16 36.331 16.1.1 4356 - A NB\_IOTenh2-Core

[R2-2007334](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007334.zip) Discussion of WUS last used cell Huawei, HiSilicon discussion Rel-15 NB\_IOTenh2-Core, LTE\_eMTC4-Core

Proposal 1: Signal in RRCConnectionRelease message that the connection has been rejected at the eNB.

Proposal 2: Introduce a new indication ‘ConnectionRejection’ as a non critical extension in RRCConnectionRelease message.

Proposal 3: Mandate WUS capable UEs to support the new indication ‘ConnectionRejection’.

[R2-2007566](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007566.zip) Way forward on WUS usage upon RRC connection release without S1 setup/release Qualcomm Incorporated discussion Rel-15 NB\_IOTenh2-Core

Proposal 1: Consider solution for issue 1 does not require any RAN2 specification changes.

Proposal 2: If issue 2 is a rare occurrence then RAN2 should consider solution 2 as the way forward.

Proposal 3: If issue 2 is a frequent occurrence then RAN2 should consider introducing RRC signaling to indicate WUS UE to continue the same behaviour regarding use of WUS as if the previous access had not taken place.

Discussion on above 2 papers:

* Huawei think there may be a long time before re-attempts if this problem occurs.
* QC thinks dedicated signalling may be needed if the problem is frequent.
* Ericsson wonders if UE will try again if it was not successful. HW thinks probably not.
* Ericsson thinks anyway this doesn’t happen frequently but in case it does the UE monitors the PO anyway so the consequence of not making any changes is acceptable.
* ZTE thinks SA2 have a potential solution from MME and we should make sure there are not 2 solutions. HW agree and think we may need to wait for SA2.
* Thales thinks we should correct this if the issue is relatively frequent, but should wait for SA2.
* QC thinks the question is how often the UE would end up being rejected in case UE thinks it should be using WUS while NW thinks otherwise.
* Nokia thinks if we do need a solution then RRC connection release is a clean solution.
* [AT111-e][302][NBIOT/eMTC R15] WUS last used cell (Huawei)

 Status:

 Scope: After SA2 reply, discuss what to do in RAN2.

 Intended outcome: Report in R2-2008302, and CRs (36.300, 36.304, and if needed 36.331)

 Deadline: Tuesday 25 1100 UTC.

[R2-2007330](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007330.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.300 15.10.0 1264 3 F NB\_IOTenh2-Core, LTE\_eMTC4-Core [R2-2005932](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005932.zip)

[R2-2007331](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007331.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-16 36.300 16.2.0 1265 2 F NB\_IOTenh2-Core, LTE\_eMTC4-Core [R2-2005933](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005933.zip)

[R2-2007332](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007332.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-15 36.304 15.6.0 0795 2 F NB\_IOTenh2-Core, LTE\_eMTC4-Core [R2-2005934](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005934.zip)

[R2-2007333](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007333.zip) System support for Wake Up Signal Huawei, HiSilicon CR Rel-16 36.304 16.1.0 0796 2 F NB\_IOTenh2-Core, LTE\_eMTC4-Core [R2-2005935](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_110-e/Docs/R2-2005935.zip)

## 7.3 Additional enhancements for NB-IoT

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

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

Some sub-items in 7.2 and 7.3 may be treated jointly.

Email max expectation: 5-6 email threads

### 7.3.1 General and Stage 2 Corrections

Including incoming LSs etc

[R2-2006506](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006506.zip) LS on RAN1 clarification on MWUS frequency allocation (R1-2004952; contact: Ericsson) RAN1

* Taken into account already in the agreed CR from last meeting.
* Noted

[R2-2006519](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006519.zip) Reply LS on assistance indication for WUS (R3-204175; contact: Qualcomm) RAN3 LS in Rel-15 NB\_IOTenh3-Core, LTE\_eMTC5-Core To:SA2, RAN2 Cc:CT1

* Noted

[R2-2007337](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007337.zip) Miscellaneous corrections for Rel-16 NB-IoT Huawei, HiSilicon CR Rel-16 36.331 16.1.1 4380 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* [AT111-e][303][NBIOT/eMTC R16] 36.331 miscellaneous corrections (Huawei)

 Status:

 Scope: Polish the CR.

 Intended outcome: Agreeable CR in R2-2008303

 Deadline: Tuesday 25 1100 UTC.

[R2-2007338](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007338.zip) Miscellaneous corrections to NB-IoT and eMTC Rel-16 enhancements Huawei, HiSilicon CR Rel-16 36.300 16.2.0 1300 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* [AT111-e][304][NBIOT/eMTC R16] 36.300 miscellaneous corrections (Huawei)

 Status:

 Scope: Polish the CR.

 Intended outcome: Agreeable CR in R2-2008304

 Deadline: Tuesday 25 1100 UTC.

### 7.3.2 UE-group wake-up signal (WUS) Corrections

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

[R2-2007336](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007336.zip) Corrections to GWUS Huawei, HiSilicon CR Rel-16 36.304 16.1.0 0809 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Merge with CR in #305

[R2-2007567](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007567.zip) Group WUS corrections Qualcomm Incorporated CR Rel-16 36.304 16.1.0 0810 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* [AT111-e][305][NBIOT/eMTC R16] WUS related 36.304 corrections (Qualcomm)

 Status:

 Scope: Polish the CR.

 Intended outcome: Agreeable CR in R2-2008305

 Deadline: Tuesday 25 1100 UTC.

[R2-2007568](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007568.zip) WUS corrections Qualcomm Incorporated CR Rel-16 36.300 16.2.0 1304 - F LTE\_eMTC5-Core

* Merge with CR in #304

### 7.3.3 Transmission in preconfigured resources corrections

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

HARQ feedback for PUR response

[R2-2006846](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006846.zip) HARQ feedback for PUR response ZTE Corporation, Sanechips discussion NB\_IOTenh3-Core

Proposal 1: If the timeAlignmentTimer is stopped or expired and the HARQ feedback except for PDSCH addressed with PUR-RNTI is to be transmitted, MAC doesn’t indicate the HARQ feedback to the physical layer.

* Ericsson think this wouldn’t apply in PUR case, so wonder if something needs to be fixed. QC agree with Ericsson but maybe we can discuss exactly how this should be captured in MAC.
* Huawei agrees with the intention but should discuss this along with other TA issues.
* LG agree with Ericsson and QC and think MAC needs to be corrected in line with the proposal.
* [AT111-e][307][NBIOT/eMTC R16] 36.321 PUR corrections (ZTE )

 Status:

 Scope: To discuss MAC corrections for 36.321 based on the submitted CRs and discussion papers, include PUR-RNTI changes from rapporteur CR in common LTE session.

 Intended outcome: Report in R2-2008307 and merged MAC CR in R2-2008308

 Deadline: Tuesday 25 1100 UTC.

[R2-2007398](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007398.zip) TA validation check for HARQ feeback to PUR response LG Electronics UK discussion Rel-16

[R2-2007739](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007739.zip) HARQ feedback in RRC\_IDLE ASUSTeK discussion Rel-16 36.321 NB\_IOTenh3-Core

Others

[R2-2006842](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006842.zip) Starting legacy TA timer for PUR fallback ZTE Corporation, Sanechips discussion NB\_IOTenh3-Core

* included in #307

[R2-2007339](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007339.zip) Discussion on carrier configuration for PUR Huawei, HiSilicon discussion Rel-16 NB\_IOTenh3-Core

* ZTE, QC prefer option 3 (NBC change).
* Will correct according to option 3
* Correct as part of #303

[R2-2007738](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007738.zip) Impact on D-PUR TA timer due to reconfiguration of PUR periodicity and offset ASUSTeK discussion Rel-16 NB\_IOTenh3-Core

* Included in #307

36.300

[R2-2007901](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007901.zip) CR for starting legacy TA timer for PUR fallback ZTE Corporation, Sanechips CR Rel-16 36.300 16.2.0 1310 - F NB\_IOTenh3-Core

* Can revisit if necessary based on offline #307

[R2-2006980](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006980.zip) Addition of PUR RNTI in E-UTRA related UE identities Qualcomm Inc CR Rel-16 36.300 16.2.0 1297 - F LTE\_eMTC5-Core, NB\_IOTenh3-Core

* Agreed

36.321

[R2-2006848](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006848.zip) Correction on discarding PUR-RNTI ZTE Corporation, Sanechips CR Rel-16 36.321 16.1.0 1489 - F NB\_IOTenh3-Core

* Included in #307

[R2-2007365](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007365.zip) Correction to discard of PUR-RNTI Ericsson CR Rel-16 36.321 16.1.0 1494 - F LTE\_eMTC5-Core, NB\_IOTenh3-Core

* Included in #307

[R2-2007987](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007987.zip) CR for HARQ feedback for PUR response ZTE Corporation, Sanechips CR Rel-16 36.321 16.1.0 1503 - F NB\_IOTenh3-Core

* Included in #307

[R2-2006849](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006849.zip) Other corrections on 36321 for PUR ZTE Corporation, Sanechips CR Rel-16 36.321 16.1.0 1490 - F NB\_IOTenh3-Core

* Included in #307

### 7.3.4 Other NB-IoT Specific corrections

NB-IoT specific topics

[R2-2006851](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006851.zip) Minor corrections on 36304 for NB-IoT ZTE Corporation, Sanechips CR Rel-16 36.304 16.1.0 0804 - F NB\_IOTenh3-Core

* Merge WUS related changes with #305, and other with #306

[R2-2007335](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007335.zip) Correction to NB-IoT supported functionality in idle mode Huawei, HiSilicon CR Rel-16 36.304 16.1.0 0808 - F NB\_IOTenh3-Core

* [AT111-e][306][NBIOT R16] 36.304 miscellaneous corrections (Huawei)

 Status:

 Scope: Polish the CR.

 Intended outcome: Agreeable CR in R2-2008306

 Deadline: Tuesday 25 1100 UTC.

### 7.3.5 NB-IoT UE capabilities corrections

## 9.1 NB-IoT and eMTC enhancements

(NB\_IOTenh4\_LTE\_eMTC6-Core; leading WG: RAN1; REL-17; WID: RP-201306)

Time budget: 1 TU

Tdoc Limitation: 2 tdocs

Email max expectation: 2 threads

Focus on two objectives only, initial discussions to understand the context, scope, potential solution proposals.

### 9.1.1 Organizational

[R2-2007696](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007696.zip) Work plan of Rel-17 enhancements for NB-IoT and LTE-MTC Ericsson, Huawei Work Plan NB\_IOTenh4\_LTE\_eMTC6-Core

### 9.1.2 NB-IoT neighbor cell measurements and corresponding measurement triggering before RLF

[R2-2006833](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006833.zip) Reducing time taken for reestablishment procedures in NB-IOT Ericsson discussion Rel-17

[R2-2006834](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006834.zip) Cell measurement in connected mode for NB-IoT ZTE Corporation, Sanechips discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2007342](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007342.zip) Discussion on RLF enhancements Huawei, HiSilicon discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2007472](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007472.zip) Neighbor cell measurements triggering before RLF Lenovo, Motorola Mobility discussion Rel-17

[R2-2007569](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007569.zip) Connected mode neighbor cell measurement in NB-IoT Qualcomm Incorporated discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2007619](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007619.zip) Clarification on Agenda Item – 9.1.2 THALES discussion Rel-17

[R2-2007951](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007951.zip) Measurement before radio link failure Shanghai Chen Si Electronics discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2008097](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2008097.zip) Analysis on Re-establishment time reduction Nokia, Nokia Shanghai Bell discussion NB\_IOTenh4\_LTE\_eMTC6-Core Late

### 9.1.3 NB-IoT carrier selection based on the coverage level, and associated carrier specific configuration

[R2-2006832](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006832.zip) NB-IoT carrier selection and configuration based on coverage level Ericsson discussion Rel-17

[R2-2006835](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006835.zip) Enhancements on multi carrier configuration and selection ZTE Corporation, Sanechips discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2007343](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007343.zip) Use cases and scenarios of carrier specific configuration Huawei, HiSilicon discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2007354](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007354.zip) Analysis on carrier selection options Nokia, Nokia Shanghai Bell discussion Rel-17

[R2-2007570](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007570.zip) Support for NB-IoT carrier selection based on the coverage level Qualcomm Incorporated discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2007957](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007957.zip) Carrier selection enhancement Shanghai Chen Si Electronics discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core