3GPP TSG-RAN WG2 Meeting #113 electronic draftR2-2101957  
Online, Jan 25 – Feb 5, 2021

Agenda Item: 10.7

Source: Session Chair (Huawei)

Title: draft Report NB-IoT breakout session

Document for: Approval

## General

Please see the following TDocs for e-meeting guidance:

[R2-2100000](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100000.zip) Agenda for RAN2#113-e Chairman agenda

[R2-2100351](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100351.zip) 3GPP TSG RAN WG2 Handbook (01/2021) ETSI MCC discussion

[R2-2100352](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100352.zip) RAN2#113-e Meeting Guidelines ETSI MCC discussion

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

## List and Status of Offline Email Discussions

NOTE: The official kick off date for these email discussions is Monday, November 02, 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.

* [AT112-e][300][NBIOT] Organisational (Session Chair)

**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:** Feb 05 1100 UTC

* [AT113-e][301][NBIOT R15] Correction on NPRACH resources in SIB2-NB and SIB23-NB (Mediatek)

**Scope:**

Week 1: Determine whether there is sufficient support in principle, collect initial comments.

Week 2: Agree the CRs.

**Intended outcome:**

Week 1: Report in [R2-2102151](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102151.zip)

Week 2: Agreed CRs in [R2-2102157](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102157.zip) and [R2-2102158](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102158.zip).

**Deadline:**

Week 1: Jan 27 1100 UTC

Week 2: Feb 04 1100 UTC

* [AT113-e][302][eMTC R16] Paging narrowband selection in RRC\_INACTIVE for GWUS capable UEs (ZTE)

**Scope:**

Week 1: Try to converge on solution and agreeable proposals.

Week 2: Agree the CRs / potential LS.

**Intended outcome:**

Week 1: Report in [R2-2102152](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102152.zip)

Week 2: Agreed 36.331 CR in [R2-2102159](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102159.zip) (CR based on [R2-2101549](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101549.zip))

**Deadline:**

Week 1: Jan 27 1100 UTC

Week 2: Feb 04 1100 UTC

* [AT113-e][303][NBIOT/eMTC R16] PUR corrections (Huawei)

**Scope:**

Week 1:

1) Try to achieve agreeable proposals based on [R2-2101033](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101033.zip).

2) Check if there is sufficient support to pursue [R2-2101085](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101085.zip) and/or [R2-2101551](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101551.zip) and collect initial comments.

Week 2:

1. Agree the CRs.
2. NOTE that the Week 2 discussion may be branched in case CRs are needed based on [R2-2101085](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101085.zip) and [R2-2101551](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101551.zip).

**Intended outcome:**

Week 1: Report in [R2-2102153](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102153.zip)

Week 2: Agreed CRs in [R2-2102160](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102160.zip) and [R2-2102161](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102161.zip)

**Deadline:**

Week 1: Jan 27 1100 UTC

Week 2: Feb 04 1100 UTC

* [AT113-e][304][NBIOT/eMTC R17] Neighbour cell measurements before RLF (Ericsson)

**Scope:**

Week 1: 1) What to ask in RAN4 LS. 2) Options for how to do measurements and trigger condition.

Week 2: 2) Approved LS 2) TBD online Monday 1 Feb

**Intended outcome:**

Week 1: Report in [R2-2102154](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102154.zip), draft LS in [R2-2102156](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102156.zip)

Week 2: Approved LS in [R2-2102163](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102163.zip)

**Deadline:**

Week 1: Jan 29 1100 UTC

Week 2: Feb 02 1100 UTC

* [AT113-e][305][NBIOT/eMTC R17] Paging carrier selection improvements (Huawei)

**Scope:**

Week 1: Discuss the details of option 1 and 2 and try to select one

Week 2: TBD online Monday 1 Feb

**Intended outcome:**

Week 1: Report in [R2-2102155](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102155.zip)

Week 2: TBD

**Deadline:**

Week 1: Jan 29 1100 UTC

Week 2: TBD Feb 04 1100 UTC

* [AT113-e][306][NBIOT/eMTC R16] Correction on Drb-ContinueROHC for UP-PUR (Vivo)

Scope: Agree the CR.

Intended outcome: Agreed CR in [R2-2102162](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102162.zip)

Deadline: Feb 04 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

[R2-2101822](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101822.zip) Correction on NPRACH resources in SIB2-NB and SIB23-NB MediaTek Inc., ZTE CR Rel-15 36.331 15.12.0 4592 - F NB\_IOTenh2-Core

* Revised in [R2-2102157](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102157.zip)

[R2-2102157](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102157.zip) Correction on NPRACH resources in SIB2-NB and SIB23-NB MediaTek Inc., ZTE CR Rel-15 36.331 15.12.0 4592 1 F NB\_IOTenh2-Core

* Agreed

[R2-2101824](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101824.zip) Correction on NPRACH resources in SIB2-NB and SIB23-NB MediaTek Inc., ZTE CR Rel-16 36.331 16.3.0 4593 - A NB\_IOTenh2-Core

* Revised in [R2-2102158](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102158.zip)

[R2-2102158](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102158.zip) Correction on NPRACH resources in SIB2-NB and SIB23-NB MediaTek Inc., ZTE CR Rel-16 36.331 16.3.0 4593 1 A NB\_IOTenh2-Core

* Agreed
* [AT113-e][301][NBIOT R15] Correction on NPRACH resources in SIB2-NB and SIB23-NB (Mediatek)

**Scope:**

Week 1: Determine whether there is sufficient support in principle, collect initial comments.

Week 2: Agree the CRs.

**Intended outcome:**

Week 1: Report in [R2-2102151](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102151.zip)

Week 2: Agreed CRs in [R2-2102157](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102157.zip) and [R2-2102158](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102158.zip).

**Deadline:**

Week 1: Jan 27 1100 UTC

Week 2: Feb 04 1100 UTC

[R2-2102151](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102151.zip) offline\_[AT113-e][301][NBIOT R15] Correction on NPRACH resources Mediatek Inc.

Proposal 1: RAN2 to agree on having a CR for a correction on NPRACH resources.

Proposal 2: To revise the CR in the following phase of offline discussion.

Proposal 3: To discussion if there is any ambiguity for the ‘same order’ and ‘NPRACH repetition level’

- Huawei thinks there is not ambiguity. QC thinks it is not clear what NPRACH repetition level means. HW thinks it refers to the resource list per NPRACH repetition level in RRC. Ericsson agree with HW, maybe this can be discussed separately to the current CR if needed. ZTE agree with HW, the parameter refers to Rel-13 structure.

* No intention to include p3 in the CR revisions
* Can update the CRs in wk2

## 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.

### 7.3.1 General and Stage-2 Corrections

Including incoming LSs etc

### 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.

[R2-2100943](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100943.zip) Discussion for correction on paging narrowband selection ZTE Corporation, Sanechips discussion Rel-16 NB\_IOTenh3-Core

[R2-2100957](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100957.zip) Correction on paging narrowband selection-Option 1 ZTE Corporation, Sanechips CR Rel-16 36.304 16.3.0 0819 - F NB\_IOTenh3-Core

R2-2100959 Correction on paging narrowband selection-Option 1 ZTE Corporation, Sanechips CR Rel-16 36.304 16.3.0 0820 - F NB\_IOTenh3-Core Withdrawn

[R2-2100965](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100965.zip) Correction on paging narrowband selection-Option 1 ZTE Corporation, Sanechips CR Rel-16 36.331 16.3.0 4556 - F NB\_IOTenh3-Core

* Revised in [R2-2102159](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102159.zip)

[R2-2102159](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102159.zip) Correction on paging narrowband selection-Option 1 ZTE Corporation, Sanechips CR Rel-16 36.331 16.3.0 4556 1 F NB\_IOTenh3-Core

* Agreed

[R2-2100966](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100966.zip) Correction on paging narrowband selection-Option 2 ZTE Corporation, Sanechips CR Rel-16 36.304 16.3.0 0821 - F NB\_IOTenh3-Core

[R2-2100968](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100968.zip) Draft LS to RAN3 on UE radio capability provision ZTE Corporation, Sanechips LS out Rel-16 NB\_IOTenh3-Core To:RAN3

[R2-2101037](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101037.zip) Paging monitoring in RRC\_INACTIVE for GWUS capable Ues Huawei, HiSilicon discussion Rel-16 LTE\_eMTC5-Core

[R2-2101152](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101152.zip) Paging narrowband/carrier selection after RRC connection release Qualcomm Incorporated discussion Rel-16 LTE\_eMTC5-Core

[R2-2101153](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101153.zip) [draft] LS on parameters needed at paging RAN node to reliably page an eMTC UE in RRC-INACTIVE state Qualcomm Incorporated LS out Rel-16 LTE\_eMTC5-Core To:RAN3

[R2-2101154](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101154.zip) Paging narrowband selection in RRC-INACTIVE state Qualcomm Incorporated CR Rel-16 36.304 16.3.0 0823 - F LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2101548](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101548.zip) Paging narrowband selection in RRC\_INACTIVE for LTE-M Ericsson discussion Rel-16 LTE\_eMTC5-Core

[R2-2101549](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101549.zip) Correction to paging narrowband selection in RRC\_INACTIVE for LTE-M Ericsson CR Rel-16 36.331 16.3.0 4581 - F LTE\_eMTC5-Core

* [AT113-e][302][eMTC R16] Paging narrowband selection in RRC\_INACTIVE for GWUS capable UEs (ZTE)

**Scope:**

Week 1: Try to converge on solution and agreeable proposals.

Week 2: Agree the CRs / potential LS.

**Intended outcome:**

Week 1: Report in [R2-2102152](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102152.zip)

Week 2: Agreed 36.331 CR in [R2-2102159](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102159.zip) (CR based on [R2-2101549](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101549.zip))

**Deadline:**

Week 1: Jan 27 1100 UTC

Week 2: Feb 04 1100 UTC

[R2-2102152](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102152.zip) Report of [AT113-e][302][eMTC R16] Paging narrowband selection (ZTE) ZTE

Proposal 1: If eNB is connecting to 5GC and support of RRC\_INACTIVE, groupNarrowBandList would not be configured.

- QC thinks from RAN2 point of view this issue can be fixed, and RAN3 impact is expected in any case. The proposal removes the feature rather than correct it. Nokia agree, prefer solution 3. Ericsson wonder why RAN3 impact is expected in all cases. QC thinks there needs to be some updates to include eDRX paging parameters. Ericsson and Huawei think this is not the case.

- HW, Ericsson thinks solution 2 is not acceptable.

- HW thinks solution 3 should be simple, but there may be an issue that the last used cell information doesn’t work.

- QC thinks that for solutions 3 and 4 add constraints for 5GC compared to EPC. Ericsson think it is OK in order to fix this issue.

* If RRC\_INACTIVE and GWUS are supported then network ensures GWUS is configured on all paging narrowbands.

### 7.3.3 Transmission in preconfigured resources corrections

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

Including [Post112-e][351][NBIOT/eMTC R16] (N)RSRP reference for the TA validation for PUR (Huawei)

[R2-2101033](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101033.zip) Summary of email discussion [351] (N)RSRP reference for TA validation for PUR Huawei report Rel-16 NB\_IOTenh3-Core, LTE\_eMTC5-Core

[R2-2101034](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101034.zip) Clarification on the (N)RSRP reference for TA validation for PUR Huawei, HiSilicon CR Rel-16 36.331 16.3.0 4480 2 F NB\_IOTenh3-Core, LTE\_eMTC5-Core [R2-2009730](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_112-e/Docs/R2-2009730.zip)

* Revised in [R2-2102160](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102160.zip)

[R2-2102160](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102160.zip) Clarification on the (N)RSRP reference for TA validation for PUR Huawei, HiSilicon CR Rel-16 36.331 16.3.0 4480 3 F NB\_IOTenh3-Core, LTE\_eMTC5-Core [R2-2009730](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_112-e/Docs/R2-2009730.zip)

* Agreed

[R2-2101035](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101035.zip) Clarification on the (N)RSRP reference for TA validation for PUR Huawei, HiSilicon CR Rel-16 36.321 16.3.0 1518 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Revised in [R2-2102161](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102161.zip)

[R2-2102161](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102161.zip) Clarification on the (N)RSRP reference for TA validation for PUR Huawei, HiSilicon CR Rel-16 36.321 16.3.0 1518 1 F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Agreed

[R2-2101085](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101085.zip) Correction on Drb-ContinueROHC for UP-PUR vivo CR Rel-16 36.331 16.3.0 4567 - F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Revised in [R2-2102162](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102162.zip)

[R2-2102162](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102162.zip) Correction on Drb-ContinueROHC for UP-PUR vivo CR Rel-16 36.331 16.3.0 4567 1 F NB\_IOTenh3-Core, LTE\_eMTC5-Core

* Agreed
* [AT113-e][306][NBIOT/eMTC R16] Correction on Drb-ContinueROHC for UP-PUR (Vivo)

Scope: Agree the CR.

Intended outcome: Agreed CR in [R2-2102162](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102162.zip)

Deadline: Feb 04 1100 UTC

[R2-2101550](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101550.zip) Timing alignment validation for transmission using PUR Ericsson discussion Rel-16 LTE\_eMTC5-Core, NB\_IOTenh3-Core

[R2-2101551](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101551.zip) Correction to timing alignment validation for transmission using PUR Ericsson CR Rel-16 36.331 16.3.0 4582 - F LTE\_eMTC5-Core, NB\_IOTenh3-Core

* Take the text proposal from QC in Q4 of [R2-2102153](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102153.zip) into consideration in [R2-2102160](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102160.zip)
* [AT113-e][303][NBIOT/eMTC R16] PUR corrections (Huawei)

**Scope:**

Week 1:

1) Try to achieve agreeable proposals based on [R2-2101033](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101033.zip).

2) Check if there is sufficient support to pursue [R2-2101085](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101085.zip) and/or [R2-2101551](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101551.zip) and collect initial comments.

Week 2:

1. Agree the CRs.
2. NOTE that the Week 2 discussion may be branched in case CRs are needed based on [R2-2101085](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101085.zip) and [R2-2101551](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101551.zip).

**Intended outcome:**

Week 1: Report in [R2-2102153](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102153.zip)

Week 2: Agreed CRs in [R2-2102160](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102160.zip) and [R2-2102161](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102161.zip)

**Deadline:**

Week 1: Jan 27 1100 UTC

Week 2: Feb 04 1100 UTC

[R2-2102153](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102153.zip) Summary of [AT113-e][303][NBIOT/eMTC R16] PUR corrections (Huawei) Huawei

* ZTE thinks that in case of updating the reference (N)RSRP in case of reconfiguration introduces inconsistency.
* Vivo wonders whether the UE should immediately update the reference after reconfiguration or can do this sometime later.
* In case (N)RSRP based validation is configured, the (N)RSRP reference needs to be updated in the following cases:
  + - PUR TA timer is (re-)started
    - (N)RSRP threshold is configured or reconfigured
    - TA value is updated by TAC MAC CE or (N)PDCCH indicates timing advance adjustment

### 7.3.4 Other NB-IoT Specific corrections

NB-IoT specific topics

## 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: 4 tdocs

Email max expectation: 4 threads

### 9.1.1 Organizational

[R2-2101552](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101552.zip) Work plan of Rel-17 enhancements for NB-IoT and LTE-MTC Ericsson Work Plan Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

* Noted
* [Post113-e][xxx][NBIOT/eMTC R17] Capture the agreements (Ericsson)

Scope: Update the agreements document

Intended outcome: Endorsed Report in R2-2102164

Deadline: short.

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

Including Summary of AI 9.1.2 (Ericsson).

[R2-2101397](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101397.zip) Summary of NB-IoT AI 9.1.2 neighbor cell measurements before RLF Ericsson discussion Late

Proposal 1 Neighbour cells measurement (detection and measurements) are performed only on the anchor carrier.

Proposal 2 Inter-frequency measurement is supported for NB-IOT UEs in Connected mode for the purpose of reducing the reestablishment duration.

* QC thinks that we need to discuss the cases whereby the inter-frequency measurement is on a another carrier or an inter-frequency cell. ZTE also thinks we need further discussion. Huawei thinks this proposal is about inter-frequency carrier, not necessarily the cell. Ericsson think RAN4 may need to discuss. Nokia thinks this proposal is necessary but maybe RAN4 do need to be involved. ZTE thinks we need to discuss the definition in RAN2 in addition to asking RAN4, whether the idle mode definitions can apply in RRC\_CONNECTED. Huawei thinks that RAN4 already have intra-frequency measurement requirements for RRC\_CONNECTED power control. Thales are OK with p1 and 4 but also think p2 needs RAN4 discussion. Ericsson thinks for ANR we can do inter-frequency measurements.
* Formulate a question to RAN4 regarding the support of inter-frequency measurements.

Proposal 3 RAN2 to discuss whether selected system information parameters, e.g., SI needed for cell selection and SI needed for initial access, is provided to complete re-establishment faster.

* QC thinks this question depends on the solution we go with, it is not clear at the moment.

Proposal 4 RAN2 to agree that the solution should not be mandated to all devices and is thus optional

Proposal 5 RAN2 to discuss trigger conditions for neighour cell measurements and some options listed below

Option1: The neighbour cell measurement could be trigger when the serving cell channel quality is lower than a threshold.

Option2: the neighbour cell measurement could be trigger based on the RLM procedure. For example, after n number of consecutive "out-of-sync" indications for PCell is detected.

Option 3: combination of option1 and option2; multiple triggers (e.g., a configured threshold of RSRP/RSRQ, T310) are applied, the neighbour cell measurement would be triggered whichever the configured threshold of RSRP/RSRQ is met or T310 starts.

* Ericsson think option 2 would be better to avoid UE having to perform measurements e.g. periodically. Huawei thinks it could be up to the UE when to trigger. QC agrees with Huawei. Lenovo think these options are in line with the objective. Thales have a preference for option 1 for non-delay tolerant traffic or 3 for delay tolerant. QC agree with Thales, it is difficult to define and depends on the time. Nokia thinks NW can assist but prefer option 1, because option 2 may impact the in-sync measurements.

Proposal 6 RAN2 to discuss whether early RLF similar to LTE is supported for NB-IoT

Similar approach as LTE. T312 is configured with event A3 “Neighbour becomes amount of offset better than PCell/ PSCell” and started upon TTT expiry if T310 is already running. RLF is declared when T312 expires.

* ZTE are hesitant to include early RLF as it will reduce the chance of recovery. Thales agree.
* QC thinks a similar effect can be achieve by configuring shorter RLF timer. Huawei think this would cause the problem highlighted by ZTE.
* Nokia thinks we need to understand the benefit vs. impact to RLM.
* Lenovo thinks we should consider this only after the neighbour cell measurements are understood.
* Mediatek think this may be beneficial for reduction of the RLF recovery time, recovery is less of an issue in case of mobility as there wouldl be re-establishment on a new cell.
* Sequans thinks T312 would be better than shorter T310 but this is a secondary issue.

Proposal 7 RAN2 to discuss information needed from RAN4 to help arrive at a solution for connected mode neighbour cell measurements including measurement occasions.

* Attempt to send LS to RAN4 in this meeting.

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| Agreements:   * Neighbour cells measurement (detection and measurements) are performed only on the anchor carrier. * The solution is optional |

* [AT113-e][304][NBIOT/eMTC R17] Neighbour cell measurements before RLF (Ericsson)

**Scope:**

Week 1: 1) What to ask in RAN4 LS. 2) Options for how to do measurements and trigger condition.

Week 2: 2) Approved LS 2) TBD online Monday 1 Feb

**Intended outcome:**

Week 1: Report in [R2-2102154](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102154.zip), draft LS in [R2-2102156](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102156.zip)

Week 2: Approved LS in [R2-2102163](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102163.zip)

**Deadline:**

Week 1: Jan 29 1100 UTC

Week 2: Feb 02 1100 UTC

[R2-2102154](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102154.zip) Summary of Email Discussion [AT113-e][304][NBIOT/eMTC R17] Neighbour cell measurements before RLF Ericsson

Proposal 1 From RAN2 perspective, whether Intra or Inter-Frequency measurements assumptions (same as Idle mode) cannot be concluded.

* ZTE think we can provide some hints in the LS.

Proposal 2 From RAN2 perspective, whether a neighbor cell can be assumed as known cannot be concluded.

Proposal 3 From RAN2 perspective, measurement occasions cannot be concluded.

Proposal 4 From RAN2 perspective, the receiver retuning and gap analysis cannot be concluded.

Proposal 5 Measurement Trigger is based upon either "out-of-sync" indications or combination of "out-of-sync" indications and configured threshold of RSRP/RSRQ. Final decision is FFS.

* QC thinks it is too early to decide, we need RAN4 feedback. Ericsson thinks we may need to wait for a final decision but down-selection to these 2 options should be ok.
* HW thinks it is too early to decide, it may not be the only 2 possibilities. Nokia, Thales agree.
* Ericsson think these are the only 2 options with sufficient support.

Proposal 6 RAN2 to review and discuss the draft LS in [R2-2102156](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102156.zip).

* ZTE thinks we need to decide what aspects to include, we can’t leave everything to RAN4

[R2-2102156](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102156.zip) [Draft] LS on neighbour cell measurement in NB-IoT RRC\_CONNECTED state Ericsson

* Huawei thinks this assumes that we do measurements only after out of sync has been triggered but we didn’t agree this and think this would be too late. Nokia agrees it would be too late and if we used a threshold it could be earlier.
* Huawei thinks we should be clear that what we need to do is identify a cell, as opposed to e.g. cell reselection.
* Huawei thinks scenario 3 is only theoretical, but OK to keep it. ZTE thinks the table is complete and OK but wonders how RAN2 will use the answer to Q1. Scenarios A and B are intra-freq measurement, but B is not the same as legacy. ZTE think we can just point out the scenarios and let RAN4 decide what requirements are needed. Huawei agree with ZTE that Q1 can be removed.
* Thales wonder whether measurement with interruption would be outside of scope of the WI. Ericsson wonders whether the natural gaps e.g during DRX would be enough to do the measurements, so this is what we need to understand from RAN4 for each of the scenarios. Qualcomm agree.
* Huawei wonders why we need to ask about RSRQ, normally we don’t need that for cell reselection.
* Nokia thinks the duration itself may not be possible to determine in RAN4.
* Remove “and corresponding measurement triggering between reference points A and C” from the first paragraph
* Reword Q1 to ask in which of the above scenarios can UE perform measurements on neighbour anchor for RRC reestablishment, before RLF is declared, without measurement gaps and what would the conditions be.
* Remove RSRQ from Q4 and Q5
* Final polishing can be done offline

revised in [R2-2102163](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102163.zip)

[R2-2102163](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102163.zip) [Draft] LS on neighbour cell measurement in NB-IoT RRC\_CONNECTED state Ericsson

* Change source to “RAN2”
* Add question mark after Q1
* With the above changes the LS is approved in [R2-2102165](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102165.zip)

[R2-2100324](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100324.zip) Further considerations on measurement in connected mode ZTE Corporation, Sanechips discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core [R2-2009058](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_112-e/Docs/R2-2009058.zip)

[R2-2100325](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100325.zip) draft LS on measurement in connected mode for NB-IoT ZTE Corporation, Sanechips LS out Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core To:RAN4

[R2-2100513](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100513.zip) Analysis on Re-establishment time components and Solutions for Faster re-establishment Nokia, Nokia Shanghai Bell discussion Rel-17

[R2-2100670](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100670.zip) Further discussion on the corresponding measurement before RLF Spreadtrum Communications discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2101043](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101043.zip) Neighbour cell measurements in RRC\_CONNECTED Huawei, HiSilicon discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2101056](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101056.zip) Impact on Static Devices THALES discussion

[R2-2101113](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101113.zip) Neighbor cell measurements triggering before RLF Lenovo, Motorola Mobility discussion Rel-17

[R2-2101157](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101157.zip) Way forward for connected mode neighbour cell measurement in NB-IoT Qualcomm Incorporated discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core [R2-2009789](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_112-e/Docs/R2-2009789.zip)

[R2-2101329](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101329.zip) On the solution for reduction of RLF detection time Nokia Solutions & Networks (I) discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6

[R2-2101396](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101396.zip) Reducing time taken for reestablishment procedures in NB-IoT Ericsson discussion

[R2-2101399](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101399.zip) draft LS Measurements for Reducing time for RRC Reestablishment Ericsson LS out Rel-17 To:RAN4

[R2-2101836](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101836.zip) Measurement before radio link failure MediaTek Inc. discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

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

Including Summary of AI 9.1.3 (Huawei).

[R2-2101045](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101045.zip) Summary of contributions on Paging carrier selection improvements Huawei report Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core Late

Proposal 1: RAN level coverage information is used for paging carrier selection.

* Nokia and QC thinks the proposal may be unclear. Ericsson thinks this is what happens already.
* Huawei clarify this is just to exclude NAS level information.

Proposal 2: RAN2 to decide how to determine paging carrier based on coverage information from the following two options:

- Option 1: The paging carrier is determined by the UE and the eNB according to the same pre-defined rule according to the RAN level information

- Option 2: The paging carrier is configured by the eNB via dedicated signalling

- QC thinks it is better to identify the use-cases and this will help to decide on the solution(s). Huawei thnks the use-cases were already discussed so this is clear.

- ZTE thinks option 1 is the baseline. Fraunhofer thinks option 1 is the baseline but option 2 also has potential to improve power consumption.

Proposal 3: If Option 1 in Proposal 2 is agreed, NPDCCH repetitions for decoding NPDCCH is used for paging carrier selection.

Proposal 4: If Option 1 in Proposal 2 is agreed, the eNB can send the coverage information used for carrier selection to the UE during RRC connection release.

Proposal 5: If Option 2 in Proposal 2 is agreed, it is up to eNB implementation to take any RAN level coverage information into consideration when configuring the paging carrier.

Proposal 6: Upon moving to another cell, the UE does not monitor paging on the carrier selected/configured in the previous cell. FFS which carrier to use:

- The carrier selected as in legacy

- Another preconfigured carrier

Proposal 7: Avoid mechanism that requires UE to report the update of coverage when coverage changes.

Proposal 8: In case“coverage change” happens, the UE monitors paging on a “default” paging carrier. FFS how to determine the “default” carrier:

- Calculated/derived by pre-defined rule

- Determined based on legacy mechanism

- Preconfigured carrier

Proposal 9: RAN2 to decide how does the UE determine whether “coverage change” has happened from the following options:

- Option 1: A criterion is specified in the specification. Details are FFS.

- Option 2: Leave it to UE implementation.

Proposal 10: The information related to coverage based paging carrier selection is added to the UEPagingCoverageInformation-NB container, transmitted transparently from eNB to MME(AMF) and provided back to eNB in S1 (Ng) paging message. The details of the information depends on the outcome of Proposal 2:

- For Option 1, the coverage information used for carrier selection

- For Option 2, the configured carrier

Proposal 11: Send LS to RAN3 for the signalling after RAN2 decides which information to be added.

Proposal 12: Wait for the conclusion on Proposal 2 first before further discuss DRX based paging carrier selection.

Proposal 13: Service based paging carrier selection is down-prioritised in Rel-17.

Proposal 14: NPRACH carrier selection improvement is down-prioritised in Rel-17.

* [AT113-e][305][NBIOT/eMTC R17] Paging carrier selection improvements (Huawei)

**Scope:**

Week 1: Discuss the details of option 1 and 2 and try to select one

Week 2: TBD online Monday 1 Feb

**Intended outcome:**

Week 1: Report in [R2-2102155](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102155.zip)

Week 2: TBD

**Deadline:**

Week 1: Jan 29 1100 UTC

Week 2: TBD Feb 04 1100 UTC

[R2-2102155](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2102155.zip) Summary of [AT113-e][305][NBIOT R17] Paging carrier selection improvements Huawei

Proposal for Option 1:

Proposal 1 (option 1): For Option 1, NPDCCH repetitions for decoding NPDCCH is one candidate for the coverage information used for paging carrier selection. FFS whether and how to consider other information, e.g. carrier power level. (7/8)

Proposal for Option 2:

Proposal 1 (option 2): For Option 2, it is up to eNB implementation to take any RAN level coverage information into consideration when configuring the paging carrier. (5/7)

Proposals common for both options:

Proposals 2/3/5 (option 1) and Proposal 2/3/5 (option 2) in above summary are merged to proposals 2/3/5 below as very similar things are proposed for options 1 and 2:

Proposal 2: For both options, the eNB can send information related to coverage based paging carrier selection to the UE during RRC connection release. FFS other procedure, e.g. SIB. The details of the information depends on which option is chosen by RAN2 (5or6/8)

- For Option 1, the coverage information used for carrier selection

- For Option 2, the configured carrier

Proposal 3: For both options, if the UE moves to another cell, the carrier selected by legacy mechanism is the baseline for the UE to monitor paging in the new cell. (5or7/8)

Proposal 4: For both options, when coverage changes, mechanism that requires UE to report the update of coverage is not supported. (No objection)

Proposal 5: For both options, in case “coverage change” happens, the UE monitors paging on the carrier selected by legacy mechanism. (5or6/8)

Proposal 6: For both options, RAN2 to decide how the UE determines whether “coverage change” has happened from the following options:

- Option 1: A criterion is specified in the specification. Details are FFS.

- Option 2: Leave it to UE implementation.

Proposal 7: The information related to coverage based paging carrier selection is added to the UEPagingCoverageInformation-NB container, transmitted transparently from eNB to MME(AMF) and provided back to eNB in S1 (Ng) paging message. The details of the information depends on which option is chosen by RAN2: (No objection)

- For Option 1, the coverage information used for carrier selection

- For Option 2, the configured carrier

Proposal 8: RAN2 to down-select between Option 1 and Option 2 after discussing more details on both options.

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| Agreements:   * Select between one of the options:   + Option 1: UE selects a paging carrier based on a rule configured by the network   + Option 2: NW configures a specific paging carrier * Working assumption: For both options, when coverage changes, mechanism that requires UE to report the update of coverage is not introduced. |

* [Post113-e][xxx][NBIOT/eMTC R17] Paging carrier selection (Huawei)

Scope: Details and pros and cons of the 2 options.

Intended outcome: Report to the next meeting.

Deadline: long

[R2-2100326](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100326.zip) Paging carriers configuration and selection ZTE Corporation, Sanechips discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core [R2-2009059](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_112-e/Docs/R2-2009059.zip)

[R2-2100512](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100512.zip) Paging carrier selection procedure based on CEL Nokia, Nokia Shanghai Bell discussion Rel-17

[R2-2100671](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100671.zip) Further discussion on enhanced paging carrier selection and NPRACH carrier selection Spreadtrum Communications discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2101044](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101044.zip) Paging carrier selection improvements Huawei, HiSilicon discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2101156](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101156.zip) Support for NB-IoT carrier selection based on the coverage level Qualcomm Incorporated discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core [R2-2009790](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_112-e/Docs/R2-2009790.zip)

[R2-2101395](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101395.zip) NB-IoT carrier selection and configuration based on coverage level Ericsson discussion

[R2-2101839](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101839.zip) Carrier selection enhancement MediaTek Inc. discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

### 9.1.4 Other

Includes WI objectives led by other WGs.

[R2-2101046](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101046.zip) Discussion on 16-QAM for NB-IoT Huawei, HiSilicon discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2101047](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101047.zip) Support of 14 HARQ Processes in DL, for HD-FDD Cat M1 Ues Huawei, HiSilicon discussion Rel-17 NB\_IOTenh4\_LTE\_eMTC6-Core

[R2-2101398](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2101398.zip) Support of 16-QAM for unicast in UL and DL in NB-IoT Ericsson discussion