3GPP TSG-RAN WG2 Meeting #109bis-e draft R2-2004049

Online, 20 – 30 March 2020

**Agenda item: 7.2.4**

**Source: Huawei (rapporteur)**

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

**WID: NB\_IOTenh3-Core, LTE\_eMTC5-Core**

**Document for: Discussion and Decision**

# 1 Introduction

An offline discussion has been set up to progress the ASN.1 review for WI specific issues:

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

Status: Starts Monday April 20th at 7:00 UTC

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

All RIL class 3 and 4 issues with rapporteur status equal to PropAgree, PropReject, and PropNoAct are listed in section 2 and will be agreed in block unless they are flagged via email, in which case they will move to the discussion section.

The document discusses RIL class 3 and 4 issues that have not been concluded by the rapporteur, i.e. status different from PropAgree, PropReject, and PropNoAct.

The document is organised by topic as follows

* PUR related issues
* GWUS related issues
* NB-IoT specific issues

It is assumed that the following topics are handled in the corresponding email discussion for eMTC [AT109bis-e][416][eMTC] ASN.1 review for eMTC (Qualcomm):

* MT-EDT
* Coexistence with NR
* Connection to 5GC
* eMTC specific

Note that it is recommended to refer to the ASN review file [2] for the details of the proposed changes, as RIL extraction does not reflect the text formatting (e.g. strike out, underline…).

# 2 RIL issues not for discussion unless flagged

Extract of the RIL:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H084 | 3 | None | PropAgree | v11: As suggested | 5GS optimisations are missing. | v05: Change to for the Control Plane CIoT EPS/5GS optimisation. |  | 5.3.7.2 Initiation |
| H089 | 3 | None | PropAgree | v11: As suggested, and also the addition from ZTE | RLF report also applies to NB-IoT but he variable has a different name | v05: Change 1:2> store the following radio link failure information in the VarRLF-Report (VarRLF-Report-NB in NB-IoT) by setting its fields as follows:3> clear the information included in VarRLF-Report (VarRLF-Report-NB in NB-IoT), if any;  Change 2: (last sentence in this section) The UE may discard the radio link failure information, i.e. release the UE variable VarRLF-Report (VarRLF-Report-NB in NB-IoT) 48 hours after the radio link failure is detected, upon power off or upon detach. | ZTE (LuTing): We agree with this change. Moreover, we think the similar issue exists in the section “5.6.5.3 Reception of the UEInformationRequest message” and needs to be changed accordingly. E.g., “if rlf-ReportReq is set to true and the UE has radio link failure information or handover failure information available in VarRLF-Report (VarRLF-Report-NB in NB-IoT) and if the RPLMN is included in plmn-IdentityList stored in VarRLF-Report: | 5.3.11.3 Detection of radio link failure |
| H091 | 3 | None | PropAgree | v11: As suggested | UE information Request procedure does not apply to UE only supporting the Control Plane optimisation. | v05: Add "(NOTE)" here and put the following NOTE after the table: NOTE: Not applicable for a UE that only supports the Control Plane CIoT EPS optimisation (see TS 24.301 [35]). | [QC FLAG]  This note should also be applicable to 5GC | 5.6.0 General |
| N014 | 4 | None | PropNoAct | v22: Class changed | Since this procedure is only used in CONNECTED mode, how can this ever happen? If the UE is in CONNECTED, it must have gone through at least one successful (normal) RACH procedure, so this flag is never sent. Presumably, the intent is to indicate that prior to becoming CONNECTED, UE did EDT, but if that’s the case, it should be captured properly. | Clarify how this field is supposed to be used. | Qualcomm v17: “initiated with EDT PRACH resource and succeded after receving EDT fallback indication” should already be clear. The whole procedure consists of one successfully completed random access: starting from EDT but fallback to legacy. Rap: Understood that after clarification from QC, there seems no need for further action | – UEInformationResponse |
| H116 | 3 | None | PropAgree | v22: As suggested | There were no comment on the 'Editor’s Note' for several meetings. It is porposed to remove | v07: remove the editor's note | Qualcomm v19: ok with proposed change. | – Multiplicity and type constraint definitions |
| H127 | 3 | None | PropAgree | v22: As suggested | It has been agreed that the procedure can only be triggered after security is activated, thus SRB1bis cannot be used | v07: remove SRB1bis | Qualcomm v17: Agree to proposed change. | – UEInformationRequest-NB |
| H130 | 3 | None | PropAgree | v22: As suggested | It has been agreed that the procedure can only be triggered after security is activated, thus SRB1bis cannot be used | v07: Remove SRB1bis | Qualcomm v17: Agree to proposed change. | – UEInformationResponse-NB |
| H134 | 3 | None | PropAgree | v11: as suggested | PUR same as EDT only applies to FDD | v07: Add 'For FDD:' at the beginning of the field description | Qualcomm v17: While we agree with the comment (to add FDD), we further think “respectively” here is confusing as EPS/5GS is used. So, it is better to align the field description to that of cp-EDT-5GC (and that in eMTC), to “For FDD: This field indicates whether the UE is allowed to initiate CP-EDT when connected to EPC/5GC, see 5.3.3.1c.”  [QC Flag] see above | – SystemInformationBlockType2-NB |
| H133 | 3 | None | PropAgree | v11: as suggested | Needs alignment with eMTC, see proposed change | v07 'Rename rai-SupportEnh-r16 to rai-ActivationEnh-r16 to align with eMTC  Refer to the MAC CE name in the field description, i.e. add "to report the AS release assistance indication (AS AS RAI) via the MAC DCQR and AS RAI CE" | Qualcomm v17: Agree with intent but wording should be “to report the AS release assistance indication via the DCQR and AS RAI MAC CE”. Similar to H103  [QC Flag] see above | – SystemInformationBlockType2-NB |
| H136b | 3 | None | PropAgree | v11: As suggested | wus-ConfigPerCarrier and gwus-Config are separate & independent parameters, so we should have separate field descriptions  Also as the condition indicates' this field is optionally present, Need OR' there is no need to add a statement in case of absence in the field description. | v08 remove the last two sentences in the description of wus-ConfigPerCarrier and add a row for gwus-Config as below gwus-Config For FDD: Carrier specific GWUS Configuration.  E-UTRAN only configures value explicit if wus-Config is not present for the carrier. | Rap: There may be ways to simplify the actual signalling, but that seems an independent issue | – SystemInformationBlockType22-NB |
| H141 | 3 | None | PropAgree | v11: as suggested | According to RAN1 parameters list, the CHOICE is netween single tone/ multitone | v08 1) change the enumerated values npusch-MCS-r16 CHOICE {  singleTone INTEGER (0..10),  multiTone INTEGER (0..13)  }, 2) update the description npsch-MCS This field contains an index to tables specified in TS 36.213 [23], Table 16.5.1.2-1 and Table 16.5.1.2-2 for subcarrier spacing 3.75 kHz and 15 kHz single tone and multi tone respectively, that defines modulation and TBS index for NPUSCH for PUR. |  | – PUR-Config-NB-r16 |
| H144 | 3 | None | PropAgree | v11: As suggested with minor to change i.e. to ENUMERATED { n0, n6 } | the parameter definition is not aligned with RAN1, value should be 0 or 6 | v08 1) Change parameter to : npusch-CyclicShift-r16 ENUMERATED { ncs0, ncs6 }, 2) Add at the end of the field description: Value ncs0 corresponds to value 0 and value ncs6 corresponds to value 6. | ZTE (LuTing): We agree with the intention but why not just a simple change like the following? npusch-CyclicShift -r16 INTEGER (0..6)ENUMERATED {0, 6}, Moreover, similar change should be applied to pusch-CyclicShift -r16 in eMTC | – PUR-Config-NB-r16 |
| H143 | 3 | None | PropAgree |  | the field description is not aligned with RAN1 | v08 alpha Parameter: αc( 13) . See TS 36.213 [23], clause 16.2.1.1.1. |  | – PUR-Config-NB-r16 |
| H150 | 3 | None | PropAgree | v22 | There were no comment on the 'Editor’s Note' for several meetings. It is proposed to remove | Remove the editor's note | Qualcomm v19: ok with proposed change (i.e., remove Ed note) | – Multiplicity and type constraint definitions |

Conclusion:

No flagging, all proposals are confirmed.

**Proposal 1**: H084, H089, H091, H116, H127, H130, H134, H133, H136b, H141, H144, H143, H150: Status set to ConcAgree.

**Proposal 2**: N014: Status set to ConcNoAct.

# 3 Discussion

## 3.1 PUR related issues

### RIL Z603

Extract of the RIL:

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| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| Z603 | 4 | [R2-2003278](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003278.zip) | TDoc | v21: Class changed | In RAN2#107 meeting, RAN2 has agreed “The UE may use the D-PUR resource to send RRCConnectionRequest or RRCConnectionResumeRequest to establish or resume RRC connection.” However, the transmission of RRCConnectionRequest message using PUR to establish RRC connection hasn’t been captured in 36.331. | 1> the establishment or resumption request is for mobile originating calls and the establishment cause is mo-Data or mo-ExceptionData or delayTolerantAccess or mt-Access or mo-Signalling; |  | 5.3.3.1c Conditions for initiating transmission using PUR |

**Rapporteur’s comment:**

This looks more like an open issue and should be handled in [AT109bis-e][311][NBIOT] PUR open issues (Huawei)

Conclusion will be captured in this document.

Conclusion:

**Proposal 3**: Z603 – FFS pending on [AT109bis-e][311][NBIOT] PUR open issues.

### RIL N001/ H098

Extract of the RIL:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| N001 | 4 | None | DiscMail | v22: Class changed | This name is very difficult to comprehend, especially if H098 is agreed. Since this is about whether UE preference for the PUR scheduling, name could be e.g. “noL1-ACK-Needed-r16” to better indicate UE indicates it doesn’t require DL L1 ACK for the UL using PUR. | Use “noL1-ACK-Needed-r16” for the field name. | Qualcomm v17: Do not agree to have “no” in the name. Because what the field is saying is L1 ack is sufficient, not the other way around. Can be discussed along with H098. Rap: Agree this is best concluded with H098. Name seems somewhat matter of taste i.e. could reflect if RRC acknowledgment is needed, or be general with 2 values indicating the ACK options (rrc, l1) | PURConfigurationRequest |
| H098 | 4 | None | DiscMail | v21: Class changed | Application layer has no understanding of L1 Ack, propose to remove the last sentence in the description. | v07: remove "i.e. …" | Rap: Seems to require some discussion. May be appropriate to instead refer to MAC. May be better to defer | PURConfigurationRequest |

**Companies’ view:**

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| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes with some changes | The information in PURConfigurationRequest is coming from the application layer, so we do not think that talking about L1 ACK is appropriate.  in section 5.6.23.3, we refer to RRC acknowledgment  1> if UE preference is that no RRC response message is needed for acknowledging the reception of a transmission using PUR, ~~set~~ *l1-ACK* to TRUE;  We also think that, in general, it is better to specify in a ‘positive’ way and we would be fine to change the name (and the description) to rrc-ACK.  Also, as the parameter is defined as Enumerated {true}, the current wording is not correct.  Proposed change: (both NB-IoT and eMTC)  section 5.6.23.3:  1> if UE preference is that ~~no~~a RRC response message is needed for acknowledging the reception of a transmission using PUR, ~~set~~ include ~~l1~~*rrc-ACK* ~~to TRUE~~;  PURConfigurationRequest-r16-IEs ::= SEQUENCE {  pur-ConfigRequest-r16 CHOICE {  pur-ReleaseRequest NULL,  pur-SetupRequest SEQUENCE {  requestedNumOccasions-r16 ENUMERATED {one, infinite},  requestedPeriodicity-r16 ENUMERATED {n8, n16, n32, n64, n128, n256, n512,  n1024, n2048, n4096, n8192, spare5},  requestedTBS-r16 ENUMERATED {b328, b408, b504, b600, b712, b808,  b936, b1000, b1352, b1544, b1736, b1992,  b2152, b2344, b2792, b2984},  ~~l1~~rrc-ACK-r16 ENUMERATED {true} OPTIONAL,  requestedTimeOffset-r16 TypeFFS OPTIONAL,  ...  }  } OPTIONAL,  nonCriticalExtension SEQUENCE {} OPTIONAL  }  ***~~l1~~rrc-Ack***  *Presence of t*~~T~~his field indicates that ~~if~~ a RRC response message for transmission using PUR is ~~not~~ needed~~, i.e. using L1 ACK to conclude the uplink transmisison using PUR and move the UE to RRC\_IDLE is sufficient~~. |
| Ericsson |  | Agree with the motivation as described by HW and support change as suggested by HW. Further, suggest to update procedural text to  1> if UE preference is that RRC response message is sent for acknowledging the reception of a transmission using PUR, include rrc-ACK;  "needed" here sounds strange as there are situations when it should be used  Otherwise, if the original name is kept, the field description should be clear it is UE preference to only receive L1 ACK if possible – "is sufficient" depends on the case and L1 is not always sufficient. |
| Qualcomm |  | It should be ok to rename the field as long as it is clear what it means. But disagree with Ericsson suggestions. When written from UE perspective, the word “is sent” is confusing. It should be clear it is request. Also, we do not think field description and procedural text should be exactly same.  So ok with Huawei’s suggested text above with change of “needed” -> “requested” and also clarifying that it is from the eNB. |

Conclusion:

**Proposal 4**: N001: Status changed to ConcAgree with the following changes:

* parameter is renamed to *rrc-ACK*

**Proposal 5**: H208: Status changed to ConcAgree with the following changes:

* section 5.6.23.3: text is changed as below:

|  |
| --- |
| 1> if UE preference is that ~~no~~ RRC response message is ~~needed~~sent for acknowledging the reception of a transmission using PUR, include *rrc-ACK* ~~set~~ *~~l1-ACK~~* ~~to TRUE~~; |

* PURConfigurationRequest/ PURConfigurationRequest-NB :

parameter is renamed to rrc-ACK-16 in the ASN.1 with the following field description:

***rrc-Ack***

Presence of this field indicates that UE preference is that a RRC response message for transmission using PUR is sent.

### RIL H122/ H125

Extract of the RIL:

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| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H122 | 4 | None | DiscMail | v18 | There is no need for a condition, this is dedicated signalling and the field is not conditional to any other one. We normally rely on correct network behaviour. | v07: Remove the Editors'note | Rap: Seems that eMTC decided otherwise i.e. introduced a condition. Conclude together with H125 Rap2: Class 4 used for issues for common session on eMTC and NB-IoT (same for H125) | – RRCConnectionResume-NB |
| H125 | 4 | None | DiscMail | v15 | There is no need for a condition for newUE-Identity-r16 , this is dedicated signalling and the field is not conditional to any other one. We normally rely on correct network behaviour. | v07: Remove the Editors'note. A condition on dedicatedInfoNAS-r16 could be useful to avoid that this becomes implicitly applicable to MO-EDT, which was not agreed in Rel-15 | Rap: Conclude together with H122 | – RRCConnectionSetup-NB |

**Rapporteur’s comment:**

Only handle the need for a condition for ‘newUE-Identity-r16 here.

The need for a condition for dedicatedInfoNAS-r16 can be handled with N009 in [AT109bis-e][416][eMTC] ASN.1 review for eMTC (Qualcomm)

**Companies’ view:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes | ‘*newUE-Identity-r16’* is the same as any other configuration parameter provided in *RadioResourceConfigDedicated* and almost none of them has a condition associated to them (both eMTC and NB-IoT), so we do not see why this would be different.  We actually think that the parameter has been introduced at the wrong place (message level) and should be introduced in *RadioResourceConfigDedicated* instead (both eMTC and NB-IoT) |
| Ericsson | Yes | Agree in principle on the need of conditions.  The new UE id would be used in RRC\_CONNECTED and it would make sense to move this to dedicated radio configuration so would be OK with this change. |
| Qualcomm | No | From purely ASN.1 modelling point of view, sure it could probably be appropriate be in RadioResourceConfigDedicated. But, there will be ~2 Bytes overhead to include this in the extension in RadioResourceConfigDedicated (using ellipsis). In the current messages, it is regular non critical extension and no additional overhead just to include this for PUR. See discussion in RIL N010. |

Conclusion:

**Proposal 6**: H122/H125: Status changed to ConcAgree with the following changes:

* *newUE-Identity-r16* is moved from *RRCConnectionSetup(-NB)*/ *RRCRonnectionResume(-NB)* to *RadioResourceConfigDedicated(-NB)*
* no condition is defined for inclusion of the parameter

## 3.2 GWUS related issues

### RIL H108/ H109

Extract of the RIL:

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H108 | 4 | [R2-2003250](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003250.zip) | TDoc | v11 | Same issue applies to gwus-Config-NB in 6.7.3.2 'timeOffset-eDRX-Short is always present in wus-Config-r15 / GWUS-TimeParameters-r16 then a WUS resource shall always be configured for the gap. Thus OPTIONAL Need OR is not correct There are two options. 1) parameter is defined as MP and the fallback configuration is described in ta CHOICE structure 2) parameter is defined as need OP, there is NO CHOICE structure, and the fallback configuration is described in the fleld decription | v07: See Tdoc |  | – GWUS-Config |
| H109 | 4 | [R2-2003250](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003250.zip) | TDoc | v22: Class changed | This issue also applies to gwus-Config-NB in 6.7.3.2 1. timeOffset-eDRX-Long is present , then a WUS resource for the gap should be configured.  2. parameter is defined as OPTIONAL Need OR but default configuration in absence is defined in the field descriotion 3. two different ways of implementing default configuration iare used for the same parameter, the CHOICE structure and | v07 1) change Need OR to Cond TimeOffset 2. for default configuration there are the same two options as for gwus-ResourceConfig-eDRX-Short. 1) parameter is defined as MP if timeoffset is present and the fallback configuration is described in the CHOICE structure 2) parameter is defined as need OP if timeoffset is present ,there is NO CHOICE structure, and the fallback configuration is described in the fleld decription Tdoc will be submitted to the meeting |  | – GWUS-Config |

**Companies’ view:**

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| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes | We support alternative 2 in R2-2003250. This aligns better with the way we specify fallback rules in the spec. This also the way it is done e.g. for *gwus-NumGroupsList* |
| Ericsson | Yes | No strong preference between the alternatives. |
| Qualcomm | Partially | It’s true timeOffset-eDRX-Short is present both in wus-Config-r15 and gwus-Config-r16 but with gWUS, WUS resource for timeOffset-DRX and timeOffset-eDRX-Short must not overlap. Furthermore, RAN1 parameter list implied WUS resource configuration for timeOffset-eDRX-Short is optional. For these reasons gWUS resource configuration for timeOffset-eDRX-Short was made optional.  For this issue, we prefer to add the following to the ***gwus-ResourceConfig*** field description: If *gwus-ResourceConfig-eDRX-short* is not present then no gWUS resources configured for timeOffset-eDRX-Short. In this case which WUS resources UE shall use can be clarified in TS36.304.  Agree with the proposal in R2-2003250 for timeOffset-eDRX-Long. |

Conclusion:

**Proposal 7**: H108/H109: Status changed to ConcAgree with the changes corresponding to Alternative 2.

### RIL H105/ H106

Extract of the RIL:

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| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H105 | 3 | None | DiscMail | v11 | We don't use 'group WUS' in RAAN2 spec for the resource. This is the RAN1 language to distinguish the rel-15 and rel-16 feature | v07: remove all occurrences of the word 'group' in the description | Rap: Should be concluded together with H106 | – GWUS-Config |
| H106 | 4 | None | DiscMail | v21: Class changed | GWUS-Config-NB:gwus-CommonSequence Parameter is defined as ENUMERATED {legacyWUS, groupWUS} but is unclear what legacyWUs and groupWUS mean. In my understanding: legacyWUS is Rel-15 WUS and groupWUS is rel-16 GWUS so we think it may be better to align with RAN2 terminology {wus, gwus} | v07: 1) Change enumerated value to "wus" and "gwus".  2) gwus-CommonSequence Presence of the field indicates common WUS sequence is configured. Value legacyWUSwus indicates the common WUS sequence for the shared WUS resource is the legacy WUS sequence, value groupWUSgwus indicates the common WUS sequence for the shared WUS resource is the group WUS sequence, see TS 36.211[21]. 3) Same changes in 6.7.3.2 gwus-Config-NB | Rap: seems desirable to agree and consistently use some clear terminology (should be consistent with H105) | – GWUS-Config |

**Companies’ view:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes with changes | RAN1 uses group WUS and non-group WUS to distinguish between rel-15 and rel-6 feature. However, in RAN2 we use ‘wus’ and ‘gwus’. we think we should align in RAN2 spec with RAN2 terminology.  In addition, as RAN2 has the concept of WUS group, using both ‘group WUS’ and ‘WUS group’ in the same specification makes the spec very difficult to understand.  for gwus-CommonSequence, in order to avoid referring to legacy wus, non-group wus or group wus, we propose to signal the signal actual sequence:  Proposed change H105: (both NB-IoT and eMTC)  gwus-CommonSequence-r16 ENUMERATED {~~legacyWUS~~g0, ~~groupWUS~~g126} OPTIONAL, -- Need OR  ***gwus-CommonSequence***  Presence of the field indicates common WUS sequence is configured. Value *~~legacyWUS~~* *g0* indicates common WUS sequence for the shared WUS resource is g=0 ~~the legacy WUS sequence~~. Value *~~groupWUS~~* *g126* indicates common WUS sequence for the shared WUS resource is g=126 ~~the group WUS sequence~~ , see TS 36.211 [21].  Proposed change H106: (eMTC only)  ***gwus-FreqLocation***  Frequency location of ~~group~~ WUS resource 0 within paging narrowband ~~for BL UEs and UEs in CE~~. Value *n0* corresponds to WUS resource 0 in the 1st and 2nd PRB and value *n2* represents the 3rd and 4th PRB  ***gwus-ResourcePattern***  Identifies the ~~group~~ WUS resource mapping to time/frequency as defined in TS 36.304 [4]. If *wus-Config-r15* is present in *SystemInformationBlockType2*, the field is set to value *gwus-ResourcePatternWithLegacy*; otherwise the field is set to value *gwus-ResourcePatternWithoutLegacy*. If the field is set to *gwus-ResourcePatternWithLegacy*, frequency location of ~~group~~ WUS resource 0 is defined by *freqLocation-r15* (in *WUS-Config*). If the field is set to *gwus-ResourcePatternWithoutLegacy*, frequency location of ~~group~~ WUS resource 0 is defined by *gwus-FreqLocation-r16*. |
| Ericsson | Yes | Agree with the proposed changes |
| Qualcomm | Yes | Changes look ok. |

Conclusion:

**Proposal 8**: H105: Status changed to ConcAgree with the following changes for both eMTC and NB-IoT:

* gwus-CommonSequence-r16 definition is changed to ENUMERATED {g0, g126} with the following field description

***gwus-CommonSequence***

Presence of the field indicates common WUS sequence is configured. Value *g0* indicates common WUS sequence for the shared WUS resource is g=0. Value *g126* indicates common WUS sequence for the shared WUS resource is g=126, see TS 36.211 [21].

**Proposal 9**: H106: Status changed to ConcAgree with the following changes (eMTC):

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| --- |
| ***gwus-FreqLocation***  Frequency location of ~~group~~ WUS resource 0 within paging narrowband ~~for BL UEs and UEs in CE~~. Value *n0* corresponds to WUS resource 0 in the 1st and 2nd PRB and value *n2* represents the 3rd and 4th PRB  ***gwus-ResourcePattern***  Identifies the ~~group~~ WUS resource mapping to time/frequency as defined in TS 36.304 [4]. If *wus-Config-r15* is present in *SystemInformationBlockType2*, the field is set to value *gwus-ResourcePatternWithLegacy*; otherwise the field is set to value *gwus-ResourcePatternWithoutLegacy*. If the field is set to *gwus-ResourcePatternWithLegacy*, frequency location of ~~group~~ WUS resource 0 is defined by *freqLocation-r15* (in *WUS-Config*). If the field is set to *gwus-ResourcePatternWithoutLegacy*, frequency location of ~~group~~ WUS resource 0 is defined by *gwus-FreqLocation-r16*. |

### RIL H107

Extract of the RIL:

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| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H107 | 4 | None | DiscMail | v21: Class changed | gwus-GroupAlternation is Enumerated {True}, This is the presence that enables hopping. Also Hopping is not defined, better use 'alternation' | v07 Presence of the field eEnables hoppingWUS group alternation between thetwo or more WUS resources for the gap type, see TS 36.304 [4]. Same chang in 6.7.3.2 gwus-Config-NB. |  | – GWUS-Config |

**Companies’ view:**

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| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes |  |
| Ericsson | Yes |  |
| Qualcomm | Yes |  |

Conclusion:

**Proposal 10**: H107: Status changed to ConcAgree.

### RIL H110

Extract of the RIL:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H110 | 4 | None | DiscMail | v22: Class changed | gwus-ProbaThreshList-r16 and gwus-GroupsForServiceList-r16 are defined as OPTIONAL need OR. There is no need to specify the absence case. It is not clear what happens in only one of the two parameters is configured or if they don't have the same of entries. Same issue in 6.7.3.2 gwus-Config-NB. | v07 It is proposed 1) to define the parameters as OPTIONAL-- Cond probabilityBased and remove the sentence 'If this field is absent, paging probability based WUS group selection is not configured' 2) clarify in the field description of gwus-GroupsForServiceList that E-UTRAN includes the same number of entries and in the same order in gWUS-GroupsForServiceList and gwus-ProbThreshList. gWUS-GroupsForServiceList Number of WUS groups for each paging probability group, see TS 36.304 [4]. The first entry corresponds to the first probability group, second entry corresponds to the second paging probability group, and so on. E-UTRAN includes the same number of entries and in the same order in gWUS-GroupsForServiceList and gwus-ProbThreshList. Any WUS group from the list of WUS groups defined in the numWUS-GroupsPerResourceList that are not assigned to a probability group is considered to be part of the list used for UE ID based group only list. Total number of WUS groups in this list cannot be more than total number of WUS groups in gwus-NumGroupsList. If this field is absent, paging probability based WUS group selection is not configured. gwus-ProbThreshList Paging probability thresholds corresponding to the paging probability groups, see TS 36.304 [4]. If this field is absent, then paging probability based WUS group selection is not configured. Cond probabilityBased: The field is mandatory present if paging probability based WUS group selection is configured; otherwise the field is not present, and the UE shall delete any existing value for this field. | Rap: Somewhat related to R2-2003184, although that addresses parameter gwus-NumGroupsList while this comment concerns parameter gwus-GroupsForServiceList Qualcomm v19: The issue stems from the fact that number of paging probability thresholds (1, 2 or 3) are common for all WUS configurations while gwus-GroupsForServiceList can be configured on per GAP type. Basically the concern is how to handle the case where the number of enteries in gwus-GroupsForServiceList are different from the number of entries in gwus-ProbThreshList. Seems this would be clear from 36.304 TP where the mapping of group WUS to paging probability set is defined and we don’t see the need to make this any clearer in 36.331. Basically, it boils down to this: - If gwus-ProbThreshList has more enteries than in gwus-GroupsForServiceList then all extra entries in gwus-ProbThreshList are not assigned any group WUS. - If gwus-GroupsForServiceList has more enteries than in gwus-ProbThreshList then all extra entries in gwus-GroupsForServiceList are ignored. | – GWUS-Config |

**Companies’ view:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes | The eNB should provide consistent signalling and the UE should just follow it without checking.  Having a condition when a parameter depends on the other and specifying parallel list is the usual way in RRC specification.  We do not agree with QC comments that it is valid to have a different number of entries in the two lists |
| Ericsson | Yes |  |
| Qualcomm | Partially | It may not always be possible to configure the same number of WUS groups for each gap type e.g. due to overlap of WUS resources for DRX and eDRX-short gaps. Therefore, it could mean some probability thresholds don’t have any WUS groups and this should be permitted. But yes, presence of gwus-GroupsForServiceList-r16 can be made conditional (i.e. COND PThresh, Need OR) on gwus-ProbaThreshList-r16. |

Conclusion:

**Proposal 11**: H110: Status changed to ConcAgree.

## 3.3 NB-IoT specific issues

### RIL H081, H086

Extract of the RIL:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H081 | 3 | None | DiscMail | v11 | earlyContentionResolution is only included in RRCConnectionResume for EPC | v05: Change to "2> if the UE is connected to EPC. Set earlyContentionResolution to TRUE;" | Rap: seems that issue requires discussion Qualcomm v17: agree that this indication is only for EPC, but need to also clafiry that for 5GC, the suppor tis mandatory without indication. | 5.3.3.3a Actions related to transmission of RRCConnectionResumeRequest message |
| H086 | 3 | None | DiscMail | v11 | earlyContentionResolution is only included in RRCConnectionReestablishment for EPC | v05 2> if the UE is connected to EPC, set earlyContentionResolution to TRUE; | Rap: Resolve together with H081 | 5.3.7.4 Actions related to transmission of RRCConnectionReestablishmentRequest message |

**Companies’ view:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes | to reply to QC comment, it is clear in stage 2 that contention resolution is mandatory in Rel-15 and nothing else needs to be specified.  TS 36.300 section 10.1.5:  -- For NB-IoT, for initial access, RRC connection resume procedure and RRC Connection Re-establishment procedure, eNB may transmit MAC PDU containing the UE contention resolution identity MAC control element without RRC response message;  Note that also in Rel-15, we have not included the IE in RRCEarlyDataRequest but did not specify anything additional. |
| Ericsson | FFS | We think this requires further discussion |
| Qualcomm | Yes | The confusion arises from the fact that spec says ‘eNB’. But the following overriding statement in 36.300 section 24.1 implies early contention resolution feature is mandatory for NB-IoT UE connected to 5GC:  “However, in this specification. the term "eNB" is used for both cases unless there is a specific need to disambiguate between eNB and ng-eNB” |

Conclusion:

**Proposal 12:** H081/H086: Status changed to ConcAgree.

**Proposal 13:** H081/H086: FFS whether and where to clarify that support for early contention resolution is mandatory for UE connected to 5GC.

### RIL H094

Extract of the RIL:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H094 | 3 | None | DiscMail | v11 | ANR is not applicable to UE using the CP optimisation but when UE is in RRC\_IDLE, it is difficult to decide using or not the CP CIOT optimisation. | v05: We propose to remove the sentence as it clear in TS 36.300. | Rap: understand this may require some further checking, also of what’s is/ would be captured in stage 2 | 5.6.24.0 General |

**Companies’ view:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes | It is clear in TS 36.300 section 22.3.4b  ‘ANR measurement reporting is not supported when the UE uses the Control Plane CIoT EPS Optimisation.’ |
| Ericsson | Yes |  |
| Qualcomm | yes |  |

Conclusion:

**Proposal 14:** H094**:** Status changed to ConcAgree.

### RIL H095 / Z607 / H146

Extract of the RIL:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H095 | 3 | None | DiscMail | v11 | If the carriers for ANR measurements are not signalled explicitly, the UE selects two carriers from SIB5 to perform the measurements. | v05 3> for each of the two carrier frequenciesy signalled in selected from SystemInformationBlockType5-NB: | Qualcomm v19: proposal intent is ok but what if SIB5 only has 1 carrier. So it should be for each of up to two … | 5.6.24.1 Initiation |
| Z607 | 3 | None | DiscMail | v22 | According to field description of carrierFreqIndex, such value of INTEGER (1..2) means only the first two carriers in interFreqCarrierFreqList can be assigned. But we understand any two carriers of interFreqCarrierFreqList can be assigned. So we assume the value range of such index should be 1~8, e.g., (1.. maxFreq). | carrierFreqIndex-r16 INTEGER (1.. maxFreqANR-NB-r16maxFreq), | Relates to H095; conclude togethe | – ANR-MeasConfig-NB |
| H146 | 3 | None | DiscMail | v22 | RAN2 has agreed max two carriers to be measured | v08: Change the field description anrCarrierList List of NB-IoT carriers to be measured for ANR. If the field is absent, the UE selects two of the carriers in interFreqCarrierFreqList in SystemInformationBlockType5-NB are to be measured. | ZTE (LuTing): We may have no specific discussion on the scenario that anr-CarrierList is absent. Is it really needed to measure two carriers in SIB5? Per our previous understanding, in this case, UE only needs to measure the serving frequency and no need to measure other frequencies. Similar comments to H095. Relates to H095; conclude togethe | – ANR-MeasConfig-NB |

**Companies’ view:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | H095/H146: yes with changes  Z607: yes | H096/ H146  On H146, we disagree with ZTE that in that case, the UE does not perform measurements. Not providing the list was a signalling optimisation for the cases all carriers was requested to measure.  Now, that we have agreed to a maximum of two carriers to be measured/ reported, we think the optimisation is not useful anymore and it is better that the eNB indicates to the UE which frequencies shall be measured (maximum 3bits \* 2 frequencies). We propose to make the parameters mandatory.  Proposed change:  section 5.6.24.1  1> while the serving cell global cell identity is the same as stored in *servCellIdentity* in *VarANR-MeasReport-NB*:  2> perform the measurements once in accordance with the following:  3> for each carrier frequency indicated by an entry in *anr-CarrierList,* if present, within *VarANR-MeasConfig*:~~; or~~  ~~3> for each carrier frequency signalled in~~ *~~interFreqCarrierFreqList~~* ~~in~~ *~~SystemInformationBlockType5-NB~~*~~:~~  4> add a new entry in *measResultList* in *VarANR-MeasReport-NB*;  4> set the *carrierFreq* to the carrier frequency;  4> perform measurements on the corresponding carrier frequency and determines the strongest cell, if any, on the carrier frequency;  section 6.7.3.5 ANR-MeasConfig-NB  ANR-MeasConfig-NB-r16 ::= SEQUENCE {  anr-QualityThreshold-r16 NRSRP-Range-NB-r14,  anr-CarrierList-r16 ANR-CarrierList-NB-r16 ~~OPTIONAL~~, ~~-- Need OP~~  ...  }  ***anr-CarrierList***  List of NB-IoT carriers to be measured for ANR.  *~~If the field is absent, the carriers in interFreqCarrierFreqList in SystemInformationBlockType5-NB are to be measured~~*  section 7.1a VarANR-MeasConfig-NB  VarANR-MeasConfig-NB-r16::= SEQUENCE {  anr-QualityThreshold-r16 NRSRP-Range-NB-r14,  anr-CarrierList-r16 ANR-CarrierList-NB-r16 ~~OPTIONAL~~  } |
| Ericsson | Yes, | We agree with Huawei’s suggestion above to make anr-CarrierList-r16 mandatory; one question though what if SIB5-NB is not being provided. Then the index will not work. Should there be provision to provide full carrier EARFCN value? |
| Qualcomm | Yes | Same view as E///. Unclear when SIB5-NB is not broadcasted. |

Conclusion:

Based on the discussions above, *anr-CarrierList-r16* is made mandatory.

**Proposal 15:** H095: Status changed to ConcAgree with *anr-CarrierList-r16* being mandatory.

**Proposal 16:** Z607: Status changed to ConcAgree.

**Proposal 17:** H146: Status changed to ConcAgree with *anr-CarrierList-r16* being mandatory in *ANR-MeasConfig-NB-r16* and *VarANR-MeasConfig-NB-r16.*

**Proposal 18:** Whether to introduce provision to introduce full carrier EARFCN value should be discussed based on contribution,

### RIL H096

Extract of the RIL:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H096 | 3 | None | DiscMail | v11 | the NOTE is confusing as it seems that the relaxation rules do not apply to any frequency while they do not apply only for the frequency configured for ANR. It is proposed to align with stage 2 | v07:NOTE: How the UE performs ANR measurement in RRC\_IDLE is up to UE implementation as long as the measurement requirements (see TS 36.133 [16], subclause 4.6) are met. While performing an ANR measurement, the UE performs inter-frequency measurements on the configured frequency regardless of the measurement rules for cell re-selection and the relaxed monitoring measurement rules as specified in TS 36.304 [11]. | Qualcomm v19: proposal intent is ok but what if SIB5 only has 1 carrier. So it should be for each of up to two … | 5.6.24.1 Initiation |

**Companies’ view:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes |  |
| Qualcomm | Yes |  |

Conclusion:

**Proposal 19:** H096: Status changed to ConcAgree.

### RIL H228/ H229

Extract of the RIL:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H229 | 3 | [R2-2003251](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003251.zip) | TDoc | v14 | multiTBConfig configuration implies configuration of two harq Processes. This is not specified . | v08: See Tdoc |  | – PhysicalConfigDedicated-NB |
| H228 | 3 | [R2-2003251](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003251.zip) | TDoc | v14 | multiTBConfig contains configuration for both UL and DL, which are independent of each other. It would have been better to separate . | v08: see Tdoc |  | – PhysicalConfigDedicated-NB |

**Companies’ view:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes |  |
| Ericsson | Yes | Looks OK to us |
| Qualcomm | No but | We had this discussion in ASN.1 general session as well.  But if this TP is to be used,  - interleaving should be interleaved, and non-interleaving should be nonInterleaved.  - Cond twoHARQ could be in the top level IEs itself. |

Conclusion:

**Proposal 20:** H228/H229: Status changed to ConcAgree.

### RIL H118

Extract of the RIL:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H118 | 3 | None | ToDo |  | The same message is used for 5GS | Change "CIoT EPS" to "CIoT EPS/5GS" |  | – RRCConnectionReestablishment-NB |

**Companies’ view:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | Yes |  |
| Ericsson | Yes |  |
| Qualcomm | Yes |  |

Conclusion:

**Proposal 21:** H118: Status changed to ConcAgree.

### RIL H148 (flagged)

Extract of the RIL:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Class** | **Tdoc** | **Status** | **Proposed Conclusion** | **Description** | **Proposed Change** | **Comments** | **Section** |
| H148 | None |  | DiscMail | v11 | nrsrqResult should be removed as there is no measurements required defined for inter-frequency cell in TS 36.133 | remove nrsrqResult | Rap: It seems 36.133 section 9.1.22.7 covers Inter-frequency Absolute NRSRQ Accuracy for UE Category NB1 | – ANR-MeasReport-NB |

**Companies’ view:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Do you agree (yes/no)** | **Comments** |
| Huawei | yes | Nn NB-IoT, NRSRQ measurement is only used when checking the S Criterion.  In TS 36.133, in Nb-IoT, the Ue is onl;y require to perform NRSRP measurement 4.6.2.5 Measurements of inter-frequency NB cells for UE category NB1 in normal coverage The UE shall be able to identify new inter-frequency cells and perform NRSRP measurements of identified inter-frequency cells if carrier frequency information is provided by the serving NB-IoT cell, even if no explicit neighbour list with physical layer cell identities is provided.  which is different for example for eMTC 4.7.2.1.3 Measurements of inter-frequency cells for UE category M1 in normal coverage The requirements in this subclause apply if UE is in the normal coverage area of the serving cell. The UE is considered to be in normal coverage area of serving cell according to RSRP, RSRP Ês/Iot, SCH\_RP and SCH Ês/Iot of the serving cell defined in Annex B.1.3 for a corresponding Band.  The UE shall be able to identify new inter-frequency cells and perform RSRP or RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided. The UE shall not cause any interruption to the paging reception and acquisition of SI while performing measurement on serving or any neighbor cells. |
| Qualcomm | Yes |  |

Conclusion:

**Proposal 21:** H148: Status changed to ConcAgree.

# 4 Conclusion

**Potential Easy agreements**

**Proposal 1**: H084, H089, H091, H116, H127, H130, H134, H133, H136b, H141, H144, H143, H150: Status set to ConcAgree.

**Proposal 2**: N014: Status set to ConcNoAct.

**Proposal 4**: N001: Status changed to ConcAgree with the following changes:

* parameter is renamed to *rrc-ACK*

**Proposal 5**: H208: Status changed to ConcAgree with the following changes:

* section 5.6.23.3: text is changed as below:

|  |
| --- |
| 1> if UE preference is that ~~no~~ RRC response message is ~~needed~~sent for acknowledging the reception of a transmission using PUR, include *rrc-ACK* ~~set~~ *~~l1-ACK~~* ~~to TRUE~~; |

* PURConfigurationRequest/ PURConfigurationRequest-NB :

parameter is renamed to rrc-ACK-16 in the ASN.1 with the following field description:

***rrc-Ack***

Presence of this field indicates that UE preference is that a RRC response message for transmission using PUR is sent.

**Proposal 6**: H122/H125: Status changed to ConcAgree with the following changes:

* *newUE-Identity-r16* is moved from *RRCConnectionSetup(-NB)*/ *RRCRonnectionResume(-NB)* to *RadioResourceConfigDedicated(-NB)*
* no condition is defined for inclusion of the parameter

**Proposal 7**: H108/H109: Status changed to ConcAgree with the changes corresponding to Alternative 2.

**Proposal 8**: H105: Status changed to ConcAgree with the following changes for both eMTC and NB-IoT:

* gwus-CommonSequence-r16 definition is changed to ENUMERATED {g0, g126} with the following field description

***gwus-CommonSequence***

Presence of the field indicates common WUS sequence is configured. Value *g0* indicates common WUS sequence for the shared WUS resource is g=0. Value *g126* indicates common WUS sequence for the shared WUS resource is g=126, see TS 36.211 [21].

**Proposal 9**: H106: Status changed to ConcAgree with the following changes (eMTC):

|  |
| --- |
| ***gwus-FreqLocation***  Frequency location of ~~group~~ WUS resource 0 within paging narrowband ~~for BL UEs and UEs in CE~~. Value *n0* corresponds to WUS resource 0 in the 1st and 2nd PRB and value *n2* represents the 3rd and 4th PRB  ***gwus-ResourcePattern***  Identifies the ~~group~~ WUS resource mapping to time/frequency as defined in TS 36.304 [4]. If *wus-Config-r15* is present in *SystemInformationBlockType2*, the field is set to value *gwus-ResourcePatternWithLegacy*; otherwise the field is set to value *gwus-ResourcePatternWithoutLegacy*. If the field is set to *gwus-ResourcePatternWithLegacy*, frequency location of ~~group~~ WUS resource 0 is defined by *freqLocation-r15* (in *WUS-Config*). If the field is set to *gwus-ResourcePatternWithoutLegacy*, frequency location of ~~group~~ WUS resource 0 is defined by *gwus-FreqLocation-r16*. |

**Proposal 10**: H107: Status changed to ConcAgree.

**Proposal 11**: H110: Status changed to ConcAgree.

**Proposal 12:** H081/H086: Status changed to ConcAgree.

**Proposal 14:** H094**:** Status changed to ConcAgree.

**Proposal 15:** H095: Status changed to ConcAgree with *anr-CarrierList-r16* being mandatory.

**Proposal 16:** Z607: Status changed to ConcAgree.

**Proposal 17:** H146: Status changed to ConcAgree with *anr-CarrierList-r16* being mandatory in *ANR-MeasConfig-NB-r16* and *VarANR-MeasConfig-NB-r16.*

**Proposal 19:** H096: Status changed to ConcAgree.

**Proposal 20:** H228/H229: Status changed to ConcAgree.

**Proposal 21:** H118: Status changed to ConcAgree.

**Proposal 22:** H148: Status changed to ConcAgree.

**For further discussion**

**Proposal 3**: Z603 – FFS pending on [AT109bis-e][311][NBIOT] PUR open issues

**Proposal 13:** H081/H086- FFS whether and where to clarify that support for early contention resolution is mandatory for UE connected to 5GC.

**Proposal 18:** Whether to introduce provision to introduce full carrier EARFCN value should be discussed based on contribution,

# 5 List of referenced documents

1. R2-200xxxx, “RAN2 agreements for Rel-16 additional enhancements for NB-IoT and MTC”, Blackberry, Rel-16, LTE\_eMTC5-Core, NB\_IOTenh3-Core
2. R2-2003234 “ASN.1 Review file (LTE) , v22” Samsung Telecommunications draftCR Rel-16 36.331 16.0.0 F TEI16
3. [R2-2003827](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Inbox/R2-2003827.zip) “LTE RIL v22” Samsung Telecommunications draftCR Rel-16 36.331 16.0.0 F TEI16
4. [R2-2003278](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003278.zip), “Capture RRC setup using PUR”, ZTE Corporation, Sanechips
5. [R2-2003250](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003250.zip) [H108][H109] TP on WUS sugnalling for per gap configuration Huawei, HiSilicon
6. [R2-2003251](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2003251.zip) [H228][H229] TP on multipe TB schedullng in NB-IoT Huawei, HiSilicon