3GPP TSG-RAN WG2 #109bis-e DRAFT R2-2003931

Electronic Meeting, April 20th – 30th 2020

Agenda Item: 7.1.12

Source: Qualcomm

Title: [AT109bis-e][416][eMTC] ASN.1 review for eMTC

Document for: Discussion, Decision

# 1 Introduction

This document is the report of the following email discussion:

* [AT109bis-e][416][eMTC] ASN.1 review for eMTC (Qualcomm)

Scope: Resolve ASN.1 WI specific issues

Intended outcome: Report including the list of resolved issues with RIL#. The outcome can be provided in R2-2003931.

Deadline: Monday, Apr. 27th 10:00 UTC

This document summarizes the discussion on LTE ASN.1 issues specific to Rel-16 eMTC and belonging to class 3 (and also class 4 which is a “new” class defined by RRC rapporteur for issues common to both eMTC and NB-IoT) from RIL v22. (See R2-2003234 ASN.1 review file and/or R2-2003827 spreadsheet of RILs.)

# 2 Discussion

As a starting point, following table is populated with the RILs to be discussed. Companies are requested to add their comments in the “Comments” column.

NOTE 1: Keep in mind the “status” and “proposed conclusion (from RRC spec rapporteur)” column while providing your comment, i.e., comments should take the proposals from RRC spec rapporteur as baseline conclusion, where available.

NOTE 2: If you are unable to see the whole table, change the display to “draft” or “web layout” from “view” menu option.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **RIL ID** | **Delegate** | **WI** | **Class** | **Tdoc** | **Status**  **(from RRC spec rapporteur)** | **Proposed Conclusion**  **(from RRC spec rapporteur)** | **Description** | **Proposed Change** | **Comments**  **Companies are requested to input their views on this column** | **Proposed conclusion (from email discussion)**  **Column to be used by email rapporteur later.** |
| Z602 | ZTE (LuTing) | NBIOT/eMTC | 4 | R2-2003279 | TDoc | v21: class changed | When UE in RRC\_IDLE receives its own paging message indicating the MT-EDT, at the first step, RRC will forward the ue-Identity etc., but not mt-EDT, to the upper layer. And then, RRC will initiate EDT in accordance with conditions in 5.3.3.1b. Take into account that upon reception of those information in paging, the upper layer would also request RRC to establish or resume an RRC connection with the establishment cause of mt-Access, RRC will trigger EDT twice under the request of the upper layer and itself. Therefore, it’s suggested to remove the description that RRC triggers EDT by itself. | ~~Upon receiving the~~ *~~Paging~~* ~~message, the UE may:~~  ~~1> for each of the~~ *~~PagingRecord~~*~~, if any, included in the~~ *~~Paging~~* ~~message:~~  ~~2> if the~~ *~~ue-Identity~~* ~~included in the~~ *~~PagingRecord~~* ~~matches one of the UE identities allocated by upper layers and the~~ *~~mt-EDT~~* ~~is included:~~  ~~3> initiate EDT in accordance with conditions in 5.3.3.1b;~~ | Qualcomm v17: The condition in 5.3.3.1b requires “upper layers request establishment of an RRC connection” or “upper layers request resumption of an RRC connection”. So it is incorrect to say EDT is triggered twice. EDT is not triggered until 5.3.3.1b is fulfilled. This procedure here simply says UE “may” go to 5.3.3.1b as result of the indication in paging. But actual EDT does NOT trigger until upper layers request is processed. Suggest PropReject |  |
| Z603 | ZTE (LuTing) | NBIOT/eMTC | 4 | R2-2003278 | 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*; |  |  |
| Q501 | QC (Umesh) | LTE\_eMTC5-Core, NB\_IOTenh3-Core | 4 | R2-2002841 | TDoc | v22: Class changed | eMTC, NB-IoT and early security reactivation CRs merging has resulted in some mixup on resumption of SRB1. | TP is proposed in the Tdoc. | Rap: Suggest QC ultimately prepares TP also covering the other comments in this section (Z302, H083) to avoid further merging issues |  |
| H083 | Odile (Huawei) | eMTC | 3 | None | ToDo |  | Action upon ressumption in 5GC are different for RRC\_INACTIVE and RRC\_IDLE | v05: Change as follows:  2> else, except for NB-IoT, if resuming a suspended RRC connection in 5GC:  3> restore the physical layer configuration, the MAC configuration, the RLC configuration and the PDCP configuration from the stored UE AS context;  3> discard the stored UE AS context and resumeIdentity;  2> else (i.e., for resuming an RRC connection from RRC\_INACTIVE, ~~or except for NB-IoT for resuming a suspended RRC connection in 5GC~~): |  |  |
| H085 | Odile (Huawei) | NBIoT/eMTC | 4 | None | DiscMail | v21: Class changed | UP tranmsission using PUR and resumption a suspended RRC connection in 5G should be handled the same as UP-EDT | v05:  Change 1:  1> except for UP-EDT, UP transmission using PUR and resuming a suspended RRC connection in 5GC, , upon integrity check failure indication from lower layers concerning SRB1 or SRB2; or  1> upon an RRC connection reconfiguration failure, in accordance with 5.3.5.5; or  1> upon an RRC connection reconfiguration failure, in accordance with TS38.331 [82], clause 5.3.5.5.  Change 2:  NOTE: For UP-EDT, UP transmission using PUR, and resuming a suspended RRC connection in 5GC, integrity check failure indication from lower layers is handled in accordance with clause 5.3.3.16. | Rap: general intention seems fine but may require some discussion regarding wording/ details  Qualcomm v17: We think “except for UP-EDT” should be replaced by “except when resuming an RRC connection after early security reactivation in accordance with conditions in 5.3.3.18”. Similar for the NOTE. |  |
| H090 | Odile (Huawei) | eMTC | 3 | None | DiscMail | v11: | It was agreed that BL UE and EE in CE in RRC-CONNECTED used SIB25 acquired prior to enter connected mode similar to NB-IoT, this is not captured. | v05: Can be discussed together with handling after handover. | Rap: Proposal seems agreeable. Suggest Huawei to prepare actual TP |  |
| H092 | Odile (Huawei) | eMTC | 3 | None | PropAgree | v11: as suggested | The same behaviour applies to UE connected to 5GC. | v05  1> upon RRC connection establishment, if UE supports the Control Plane CIoT EPS/5GS optimisation and UE does not need UL gaps during continuous uplink transmission: |  |  |
| N001 | Nokia (Tero) | MTC(NB-IoT | 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) |  |
| H098 | Odile (Huawei) | NBIoT/eMTC | 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 |  |
| Q603 | QC (Umesh) | LTE\_eMTC5-Core | 3 | R2-2002849 | TDoc | v11 | The agreement was “When idle mode eDRX is not configured, eMTC UEs in RRC\_INACTIVE cannot be configured with values 5.12 sec and 10.24 sec”. However, the condition description implies the opposite. | Condition should be updated to delete the word “not” after “… eDRX is not configured..”. Condition name may be updated to reflect the intent. Will be included in WI CR. | Rap: Shouldn’t field names be updated also?  Qualcomm v17: field is ran-PagingCycle-v16xy mandatory in rrc-InactiveConfig-v16xy which is conditional. No need to update field name. |  |
| H100 | Odile (Huawei) | eMTC | 3 | None | PropAgree | v11: as suggested | The field (NCC) shall be mandatory present for 5GC | v07: change to mandatory present for UP CIoT 5GS optimisation. |  |  |
| N017 | Nokia (Tero) | MTC | 3 | None | PropNoAct | v22: Status updated | Why are the other establishment cause values missing? I.e. mt-Access, delayTolerantAccess? | Clarify of other cause values should be added | Qualcomm v17: MT EDT support for 5GC still not concluded, watiting for SA2. Other values not applicable.  Rap: Assume that issue will be covered by response LS from SA |  |
| N014 | Nokia (Tero) | NB-IoT/MTC | 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 |  |
| H103 | Odile (Huawei) | eMTC | 3 | None | PropAgree | v21: As suggested, but using revised wording suggested by Qualcomm | 2-bit RAI is not defined anywhere, better to refer the MAC CE name | v07: Change to 'to report the AS release assistance indication (AS AS RAI) via the MAC DCQR and AS RAI CE ' | Qualcomm v17: Suggestion makes sense but wording should be “to report the AS release assistance indication via the DCQR and AS RAI MAC CE” |  |
| H108 | Odile (Huawei) | NBIoT/eMTC | 4 | R2-2003250 | 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 |  |  |
| H104 | Odile (Huawei) | eMTC | 3 | None | DiscMail | v11 | Should probably add parameter powerBoost and numDRX-CyclesRelaxed to GWUS-TimeParameters-r16 | v07:See description | Qualcomm v19: numDRX-CyclesRelaxed is currently provided separately as it applies to both R15 and R16 therefore it does not need to be included in GWUS-TimeParameters-r16. Similar comment applies to powerBoost-r15 provided in wus-Config-v1560. |  |
| H110 | Odile (Huawei) | NBIoT/eMTC | 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. |  |
| H106 | Odile (Huawei) | NBIoT/eMTC | 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 ~~legacyWUS~~wus indicates the common WUS sequence for the shared WUS resource is the ~~legacy~~ WUS sequence, value ~~groupWUS~~gwus 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) |  |
| H107 | Odile (Huawei) | NBIoT/eMTC | 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 e~~E~~nables ~~hopping~~WUS group alternation between ~~the~~two or more WUS resources for the gap type, see TS 36.304 [4].  Same chang in 6.7.3.2 gwus-Config-NB. |  |  |
| H109 | Odile (Huawei) | NBIoT/eMTC | 4 | R2-2003250 | 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 |  |  |
| H105 | Odile (Huawei) | eMTC | 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 |  |
| N002 | Nokia (Tero) | eMTC | 3 | None | PropAgree | v22: As suggested | What does “is enabled” mean? Does the UE do it, or is it allowed to do it? Normally configuration makes UE behaviour clear, so I would assume UE shall do it. | Use “Indicates UE shall monitor” if this is a true UE requirements, or “may monitor” if it’s something that UE is allowed to do but is not mandated to. | Qualcomm v17: WI is eMTC. Should change to “Indicates UE shall monitor”. |  |
| H111 | Odile (Huawei) | eMTC | 3 | R2-2003478 | TDoc | v11 | The IE is defined but referenced nowhere. Note that RAN2 has agreed to support dedicated signalling. | v07: TBC | Rap: Assumed to be covered by TDoc prepared by ZTE, also covering H112 |  |
| H112 | Odile (Huawei) | eMTC | 3 | R2-2003478 | TDoc | v11 | In absence of agreed signalling optimisation, the three parameters periodicity, startPosition and slotConfig-r16 shall be mandatory present. The condition FDD-OR-TDD-DL is not correct, this applies to both UL and DL The field description is missing for all parameters | v07 TBC | Rap: See H112 |  |
| H113 | Odile (Huawei) | eMTC | 3 | None | PropAgree | v11: As suggested | pur-ImplicitReleaseAfter-r16 is only 2 bits. There is no benefit in introducing a CHOICE structure to allow delta configuration | v07: Define the parameter as ENUMERATED {e2, e4, e8, spare} OPTIONAL --Need OR |  |  |
| Z605 | ZTE (LuTing) | eMTC | 3 | None | PropAgree | v11: As suggested, but no need for ce- prefix in field name (clear from the context i.e. ce-ModeA). Propose to use pusch-NarrowBandMaxTBS-r16 | One of the RAN1 parameter ce-pusch-nb-maxTbs-config in R1-2001477 has been missed in PUR configuration for eMTC. The RAN1 description for this parameter is “When the UE supports the ‘2984 bits max UL TBS in 1.4 MHz in CE mode A’ feature, the PUR configuration includes whether the feature is enabled or disabled”. So an enable indication, e.g., ce-PUSCH-nb-MaxTBS would be introduced for ce-ModeA. | ce-ModeA SEQUENCE {  numRUs-r16 BIT STRING (SIZE(2)),  prb-AllocationInfo-r16 BIT STRING (SIZE(10)),  mcs-r16 BIT STRING (SIZE(4)),  numRepetitions-r16 BIT STRING (SIZE(3)),  ce-PUSCH-nb-MaxTBS-r16 ENUMERATED {on}  } |  |  |
| Z606 | ZTE (LuTing) | eMTC | 3 | None | DiscMail | v11 | The current subPRB-Allocation-r16 is defined in ce-ModeB, that is not aligned with description of the related RAN1 parameter ce-PUSCH-SubPRB-Config “When the UE supports the “PUSCH sub-PRB allocation in CE mode A/B” feature, the PUR configuration includes whether the feature is enabled or disabled”. So this parameter needs to be moved out of ce-ModeB. Moreover, there has no sub PRB configuration in PUR-Config, so we assume even this feature is enabled by subPRB-Allocation-r16, it cannot be used for PUR. R15 sub-PRB configuration is provided in dedicated signalling so it also cannot be used by UE in IDLE. Therefore, we suggest to provide sub-PRB configuration in PUR configuration and this can be used as implicit enable indication. | pur-GrantInfo-r16 CHOICE {  ce-ModeA SEQUENCE {  ...  },  ce-ModeB SEQUENCE {  ~~subPRB-Allocation -r16 BOOLEAN,~~  numRUs-r16 BOOLEAN,  prb-AllocationInfo-r16 BIT STRING (SIZE(8)),  mcs-r16 BIT STRING (SIZE(4)),  numRepetitions-r16 BIT STRING (SIZE(3))  }  } OPTIONAL, -- Need ON  ce-PUSCH-SubPRB-Config-r16 CHOICE {  release NULL,  setup SEQUENCE {  locationCE-ModeB-r16 INTEGER (0..5) OPTIONAL, -- Cond CE-ModeB  sixToneCyclicShift-r16 INTEGER (0..3),  threeToneCyclicShift-r16 INTEGER (0..2)  }  } OPTIONAL -- Need ON  pur-PUSCH -FreqHopping-r16 BOOLEAN,  … | Rap: It seems QC assumes that current signalling is sufficient: ModeA: codepoint 00 of num-Rus-r16 indicates full-PRB and other values indicated subPRB, and ModeB: 1 bit flag subPRB-Allocation-r16 in DCI indicates this. Hence the parameter is not common in the current ASN.1. Furhermore, whether the feature is enabled/disabled for CE Mode A or B is clear from the CHOICE value of pur-GrantInfo-r16 set to ce-ModeA or ce-ModeB. It does not make sense to include the GRANT for BOTH mode A and B at the same time. Then, there is no point of including subPRB info for Mode B if grant is actually for mode A (or vice versa) |  |
| H115 | Odile (Huawei) | eMTC | 3 | None | PropTDoc | v11 | Most parameters have no field description. Need to be added | v07: Add the missing descriptions | Rap: Suggest Huawei to prepare paper with TP |  |
| H161 | Brian (Huawei) | eMTC | 3 | None | PropNoAct | v11 | there are currently no containers for differentiation between TDD/FDD using fdd-Add-UE-EUTRA-Capabilities and tdd-Add-UE-EUTRA-Capabilities, this needs to be addressed in UE capabillities discussion | v08: update after discussion on TDD/FDD separation | Rap: There is a container for FDD/ TDD differentiation, but maybe assessment which fields to include still needs to be completed. Assumed this will be covered ongoing discussions on UE capabilities. If needed separate eMail may be started, but probably better after 109-bis |  |

# Conclusion

In the previous sections we made the following observations:

Based on the discussion in the previous sections following is proposed:

# References

[1] R2-2003234 ASN.1 review file, v22

[2] R2-2003827 Spreadsheet containing RILs v22