3GPP TSG-RAN WG2 Meeting #109bis-e draftR2-2004044

Online, 20th – 30th April 2020

**Agenda item: 7.2.5**

**Source: Huawei (offline email discussion rapporteur)**

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

**Document for: Report**

# 1 Introduction

This document is the report of the following e-mail discussion:

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

Scope: Discuss the open issues on UE capabilities

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

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

The discussion is based on the proposals in [2].

# 2 Discussion

## 2.1 GWUS

**Proposal S1-1:** For NB-IoT and eMTC, the existing capability *wakeUpSignalMinGap-eDRX-r15* also applies to Rel-16 WUS.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | This is rather a device feature. |
| Qualcomm | Yes | capability on the need of the gap is same for Rel-15 and Rel-16 WUS. |

Conclusion:

Proposal:

**Proposal S1-2:** For NB-IoT, Rel-16 GWUS is only applicable to FDD.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Same as the Rel-15. |
| Qualcomm | Yes |  |

Conclusion:

Proposal:

**Proposal S1-3:** For eMTC, separate capability indications are introduced for FDD and TDD.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Same as the Rel-15. |
| Qualcomm | Yes | Already clear from RAN1 feature list, see RAN1 LS R2-2002519. |

Conclusion:

Proposal:

**Proposal S1-4:** For NB-IoT and eMTC, Rel-16 GWUS is applicable to both EPC and 5GC, and there is no need for capability differentiation.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Probably better for simplicity if we can keep no difference as seen from the AS level. |
| Qualcomm | Yes |  |

Conclusion:

Proposal:

## 2.2 Multiple TB scheduling

**Proposal S2-1:** For NB-IoT, multiple TB scheduling in unicast and in multicast is only applicable to FDD.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Seems to align with RAN1 view. |
| Qualcomm | Yes | Already clear from RAN1 feature list, see RAN1 LS R2-2002519. |

Conclusion:

Proposal:

**Proposal S2-2:** For NB-IoT and eMTC, multiple TB scheduling in unicast is applicable to both EPC and 5GC without differentiation.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Probably better for simplicity if we can keep no difference as seen from the AS level. |
| Qualcomm | Yes | Same UE capability should work for eNB and ng-eNB. |

Conclusion:

Proposal:

**Proposal S2-3:** For NB-IoT and eMTC, multiple TB scheduling in multicast is only applicable to EPC

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | SC-PTM is not supported in 5GC. |
| Qualcomm | Yes | Agree, multicast is applicable to ONLY EPC. |

Conclusion:

Proposal:

**Proposal S2-4:** For NB-IoT and eMTC, support of multiple TB scheduling in multicast is optional without capability signalling.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| Qualcomm | Yes | In RAN1 feature list (1-21 and 1-22), RAN1 has left this decision to RAN2. |
|  |  |  |

Conclusion:

Proposal:

## 2.3 SON

**Proposal S3-1:** For NB-IoT, support of ANR, RACH report and RLF report are applicable to both FDD and TDD and there is no need for FDD/TDD differentiation.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | RRM measurements are defined for FDD and TDD. |
| Qualcomm | Yes |  |

Conclusion:

Proposal:

## 2.4 DL channel quality reporting in MSG3

**Proposal S4-1:** For NB-IoT, move the featureDL channel quality reporting in MSG3 for non-anchor carrier to section 6.17.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | This should go under 6.17 idle mode measurements (sorry my mistake).  Note that it is already moved there in the latest version of the running CR. |
| Qualcomm | Yes | Ok to move under the IDLE mode measurement section. |

Conclusion:

Proposal:

**Proposal S4-2:** For eMTC, introduce a separate capability for DL channel reporting in MSG3

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | The scope of the feature is different between eMTC and NB-IoT (cell versus carrier). |
| Qualcomm | No | The use of this capability is not clear. If UE does not support, it simply does not include the report in Msg3. |

Conclusion:

Proposal:

**Proposal S4-3:** For NB-IoT, update the description of the legacy featureDL channel quality reporting to avoid conflicting description with the Rel-16 capabilities.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Much better for clarity. |
| Qualcomm | Yes | We should update the legacy text as below  It is optional for UE to support DL channel quality reporting of the serving cell for anchor/non-anchor carrier for FDD in Msg3, as specified in TS 36.331 [5].  Therefore, we should remove the description from section 6.7.6. |

Conclusion:

Proposal:

**Proposal S4-4:** For NB-IoT, DL channel quality reporting in MSG3 for non-anchor carrier is only applicable to FDD.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Same as legacy. |
| Qualcomm | Yes | Already clear from RAN1 feature list, see RAN1 LS R2-2002519. |

Conclusion:

Proposal:

**Proposal S4-5:** For NB-IoT and eMTC, DL channel quality reporting in MSG3 is applicable to both EPC and 5GC without capability differentiation.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Better for simplicity if we can keep no difference as seen from the AS level. |
| Qualcomm | Yes |  |

Conclusion:

Proposal:

## 2.5 DL channel quality reporting in connected mode

**Proposal S5-1:** Keep a common capability for NB-IoT and eMTC for DL channel quality reporting in connected mdoe and clarify in the description that reporting of the serving cell applies to E-UTRAN and reporting of the configured carrier applies to NB-IoT.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry |  | No strong view, the scope of the feature is different (cell/carrier) but the reporting mechanism is the same. |
| Qualcomm | Yes |  |

Conclusion:

Proposal:

**Proposal S5-2:** For NB-IoT, DL channel quality reporting in MSG3 in connected mode is only applicable to FDD. For eMTC, it is applicable to both FDD and TDD.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Same as legacy. |
| Qualcomm | Yes | Already clear from RAN1 feature list, see RAN1 LS R2-2002519. |

Conclusion:

Proposal:

**Proposal S5-3:** For NB-IoT and eMTC, DL channel quality reporting in connected mode is applicable to both EPC and 5GC without capability differentiation.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Better for simplicity if we can keep no difference as seen from the AS level. |
| Qualcomm | Yes |  |

Conclusion:

Proposal:

## 2.6 NRS presence on non-anchor carrier

**Proposal S6-1:** For NB-IoT, Idle modeRRM measurementson non–anchor paging carrier is only applicable to FDD.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Seems to align with RAN1 view. |
| Qualcomm | Yes | Already clear from RAN1 feature list, see RAN1 LS R2-2002519. |

Conclusion:

Proposal:

**Proposal S6-2:** For NB-IoT, Idle modeRRM measurementon non–anchor carrier is applicable to EPC and 5GCwithout capability differentiation.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Better for simplicity if we can keep no difference as seen from the AS level. |
| Qualcomm | Yes |  |

Conclusion:

Proposal:

## 2.7 Inter-RAT cell selection

**Proposal S7-1:** For NB-IoT and eMTC, there is no need to define a optional feature for support of assistance information for inter-RAT cell selection to/from NB-IoT.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry |  | No strong view. May need to be re-discussed later if some optional UE behaviours are added in other specs. |
| Qualcomm | Yes | Not needed. |

Conclusion:

Proposal:

## 2.8 Co-existence with NR

**Proposal S8-1:** For NB-IoT and eMTC, UL andDL resource reservation for coexistence with NRare applicable to EPC and 5GCwithout capability differentiation.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Better for simplicity if we can keep no difference as seen from the AS level. |
| Qualcomm | Yes |  |

Conclusion:

Proposal:

## 2.9 Connection to 5GC

**Proposal S9-1**: For NB-IoT, introduce a new optional feature, NB-IoT/5GC, in section 6.18.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | eNB does not need to know, so no need to have a capability reporting (clause 4). |
| Qualcomm | Yes | If the question is whether network needs to know NB-IoT UE supports connectivity to 5GC, then yes. |

Conclusion:

Proposal:

**Proposal S9-2**: For NB-IoT and eMTC, remove the capabilities introduced in 6.18.1 (User Plane CIoT 5GS optimisations) and 6.18.2 (Control Plane CIoT 5GS optimisations).

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | We don’t want to replicate the NAS options in 306. |
| Qualcomm | Yes | We didn’t capture same for EPS. |

Conclusion:

Proposal:

**Proposal S9-3**: For NB-IoT and eMTC, introduce a new optional feature, MO-EDT for Control Plane CIoT 5GS Optimisation, in section 6.18 and remove the editor’s note in 6.8.4.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | We need the 5GS equivalent. |
| Qualcomm | Yes |  |

Conclusion:

Proposal:

**Proposal S9-4:** For NB-IoT, all pre-Rel15 capabilities not CIoT EPS optimisations related and other than *rai-Support-r14* are applicable to 5GC without capability differentiation.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes | Question: This will mean that when the EPC/5GC applicability is not stated, this applies to both by default (same as what is being done in Rel-16 NB-IoT/eMTC). Do the other parallel groups follow the same approach ? It would be useful to have a coherent use in 36.306. |
| Qualcomm | No | We need to check each individual capability. We do not need to duplicate the capabilities but just update the descriptions. |

Conclusion:

Proposal:

**Proposal S9-5**: For NB-IoT and eMTC connected to 5GC, support of AS RAI enhancement is optional at the UE, a new optional feature RAI Enhancement is introduced in section 6.18.

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry | Yes |  |
| Qualcomm | No | RAN2 already agreed it is mandatory to support. |

Conclusion:

Proposal:

**Proposal S9-6:** For eMTC, introduce the following capabilities for support of connection to 5GC:

* *ce-eutra-5GC*
* *ce-eutra-5GC-HO-ToNR-FDD-FR1*
* *ce-eutra-5GC-HO-ToNR-TDD-FR1*
* *ce-eutra-5GC-HO-ToNR-FDD-FR2*
* *ce-eutra-5GC-HO-ToNR-TDD-FR2*

**Company’s views**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree**  **(yes/no)** | **Comments** |
| BlackBerry |  | No strong view, normally we use FGI bits instead if the issue may come from testing. |
| Qualcomm | For non-BL UE, yes to all.  For BL UE, Only ce-eutra-5GC is applicable. | Interworking with NR is not applicable for Cat M UEs. Therefore, capabilities other than ce-eutra-5GC are not applicable for Cat M UEs. |

Conclusion:

Proposal:

# 3 Summary

**Conclusions:**

**Potential easy agreements**

To be completed

**For further discussion**

To be completed

# 4 List of referenced documents

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

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