**3GPP TSG RAN WG1 Meeting #107 R1-21xxxxx**

**e-Meeting, November 11th – 19th, 2021**

**Agenda Item: 8.9**

**Source: Moderator (Huawei)**

**Title: Feature lead summary on 107-e-R17-RRC-NB-IoT-eMTC**

**Document for: Discussion and Decision**

# Introduction

In email discussion of RAN1#106bis-e, there were discussion on RRC parameters for the WI [1]. And the list of stable rows was endorsed in [2].

This documents provides the proposals and summary of discussions of the corresponding email discussion on RRC parameters.

[106bis-e-R17-RRC-NB-IoT-eMTC] Email discussion on Rel-17 RRC parameters for Rel-17 NB-IoT and eMTC – Yubo (Huawei)

The RRC parameter list is also attached: [RAN1#107-e\_Rel-17\_RRC\_NB-IoT\_eMTC\_v1.xlsx](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_107-e/Inbox/drafts/8.9/RRC/RAN1%23107-e_Rel-17_RRC_NB-IoT_eMTC_v1.xlsx).

# Discussion

## Support of 16-QAM for unicast in UL and DL for NB-IoT

**Issue 1-1: Configuration of PUR**

For the configuration of NPUSCH for PUR, the two rows below are marked as stable.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NB\_IOTenh4\_LTE\_eMTC6 | 16QAM for NB-IoT | 36.211, 36.213 |  |  |  | enable16QAM-ul in PUR-config-NB | New | enable 16QAM for NPUSCH in PUR procedure | Enable/disable the use of 16QAM for NPUSCH in PUR procedure | Enable | disable | Per UE | UE specific | 36.331 | According to the following agreement, the configurations are up to RAN2, including the MCS indices, RU indices and UL power control parameter:  Agreement To support 16-QAM for NPDSCH and NPUSCH in PUR procedure, • 16-QAM can be enabled/disabled by UE specific RRC signaling for NPDSCH and NPUSCH separately • The corresponding configurations and signaling details are up to RAN2 |
| NB\_IOTenh4\_LTE\_eMTC6 | 16QAM for NB-IoT | 36.211, 36.213 |  |  |  | enable16QAM-dl in PUR-config-NB | New | enable 16QAM for NPDSCH in PUR procedure | Enable/disable the use of 16QAM for NPDSCH in PUR procedure | Enable | disable | Per UE | UE specific | 36.331 | According to the following agreement, the configurations are up to RAN2, including the configuration of power allocation:  Agreement To support 16-QAM for NPDSCH and NPUSCH in PUR procedure, • 16-QAM can be enabled/disabled by UE specific RRC signaling for NPDSCH and NPUSCH separately • The corresponding configurations and signaling details are up to RAN2 |

Please input your comments for the above proposal:

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| --- | --- |
| Companies | Comments |
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**Issue 1-2: Configuration for downlink power allocation**

For the following rows for configuration of power allocation:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NB\_IOTenh4\_LTE\_eMTC6 | 16QAM for NB-IoT | 36.213 |  |  |  | NPDSCH-NRS-PowerRatio | New | Power ratio of NPDSCH EPRE to NRS EPRE in symbols without NRS | the Power ratio of NPDSCH EPRE to NRS EPRE in symbols without NRS for standalone and guard-band deployments, or in symbols without NRS nor CRS for in-band deployments | FFS |  | Per UE | UE specific | 36.331 | Confirm working assumption: Working Assumption For downlink power allocation to support 16QAM: • For standalone and guard-band deployments: o One power ratio is signaled optionally § NPDSCH EPRE to NRS EPRE in symbols without NRS o The same transmit power is assumed across different symbols. o If the signalling is not indicated, the legacy power allocation is used. § i.e., the ratio of NPDSCH EPRE to NRS EPRE is 0dB for one NRS antenna port, and -3dB for two NRS antenna ports • UE specific signalling is used |
| NB\_IOTenh4\_LTE\_eMTC6 | 16QAM for NB-IoT | 36.213 |  |  |  | NPDSCH-NRS-PowerRatio-withCRS | New | Power ratio of NPDSCH EPRE to NRS EPRE in symbols with CRS | the Power ratio of NPDSCH EPRE to NRS EPRE in symbols with CRS for inband deployments | FFS |  | Per UE | UE specific | 36.331 | Agreement Confirm the following working assumption: For downlink power allocation to support 16QAM: • For inband deployments, a power ratio is signaled in addition to the signalling for standalone and guard-band deployments which in this case applies to “symbols with NRS” and “symbols without NRS nor CRS”.  o the power ratio between NPDSCH EPRE and NRS EPRE in symbols with CRS is signalled o the signalling is UE specific Note: “symbols with NRS” and “symbols without NRS nor CRS” have the same power. |

There is following proposal

|  |  |
| --- | --- |
| Sourcing | Proposals |
| [3] | **Proposal 6: The value range for RRC parameter power ratio of NPDSCH EPRE to NRS EPRE in symbols without NRS should be {-6, -4.77, -3, -1.77, 0, 1, 2, 3} dB.** |

Please input your comments on the value range of the higher layer parameters for power allocation:

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| Companies | Comments |
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**Issue 1-3: Configuration for uplink power control**

This will be discussed once there’s new agreement.

**Issue 1-4: Others**

Please input your comments on issues other than the above ones:

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| --- | --- |
| Companies | Comments |
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## Support additional PDSCH scheduling delay for introduction of 14-HARQ processes in DL for eMTC

Please input your comments in below table:

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| --- | --- |
| Companies | Comments |
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## Support a maximum DL TBS of 1736 bits as a Rel-17 optional UE capability

Please input your comments in below table:

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| --- | --- |
| Companies | Comments |
|  |  |
|  |  |
|  |  |

# Summary

# References

1. R1-2110650 Feature lead summary on 106bis-e-R17-RRC-NB-IoT-eMTC, Moderator (Huawei), RAN1#106bis-e, Oct., 11th-19th, 2021.
2. R1-2110572 Consolidated higher layers parameter list for Rel-17 LTE, Moderator (Ericsson), RAN1#106bis-e, Oct., 11th-19th, 2021.
3. R1-2110857 Support of 16QAM for unicast in UL and DL in NB-IoT Huawei, HiSilicon
4. R1-2111070 Discussion on 16QAM for NB-IoT ZTE, Sanechips
5. R1-2111133 Support of 16-QAM for NB-IoT Nokia, Nokia Shanghai Bell
6. R1-2111449 Support of 16-QAM for NB-IoT Qualcomm Incorporated
7. R1-2112001 Support 16QAM for NBIoT Lenovo, Motorola Mobility
8. R1-2112300 Discussion on CQI table and NPUSCH power control parameter for 16QAM MediaTek Inc.
9. R1-2112361 Support of 16-QAM for unicast in UL and DL in NB-IoT Ericsson
10. R1-2110858 Support of 14-HARQ processes in DL for HD-FDD MTC UEs Huawei, HiSilicon
11. R1-2111071 Remaining issues on 14-HARQ processes in DL for eMTC ZTE, Sanechips
12. R1-2111134 Support of 14-HARQ processes in DL for eMTC Nokia, Nokia Shanghai Bell
13. R1-2111450 Support of 14 HARQ processes and scheduling delay Qualcomm Incorporated
14. R1-2112362 Support of 14 HARQ processes in DL in LTE-MTC Ericsson
15. R1-2111939 Further considerations on Rel-17 NB-IoT and eMTC enhancements Huawei, HiSilicon
16. R1-2112363 On the support of 16-QAM for unicast in UL and DL in TDD NB-IoT Ericsson