**3GPP TSG-RAN WG4 Meeting #97-e R4-2017605**

**Electronic Meeting, November 2nd – 13th 2020**

**Agenda item:** 4.9, 7.19.6

**Source:** Moderator (Intel Corporation)

**Title:** Email discussion summary for [97e][314] NR\_Demod\_Maintenance

**Document for:** Information

# Introduction

The scope of this email thread is:

* Rel-15 NR maintenance – UE demodulation and CSI requirements (AI 4.9.1 and 4.9.2)
* Rel-15 NR maintenance – BS demodulation requirements (AI 4.9.3)
* Note: There are no tdocs submitted in this meeting for:
	+ Rel-16 NR maintenance (AI 7.19.6)

Email discussion targets for the 1st round and 2nd round

* 1st round:
	+ Collect comments for NR CRs.
* 2nd round:
	+ Collect comments for revised NR CRs from the 1st round.

# Topic #1: Rel-15 NR maintenance - UE demodulation and CSI requirements

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014015 | ANRITSU LTD | Rel-15 CR with the following changes for TS 38.101-4:* Update formulae and Table notes to use per-band relaxation factors ∆MBP,n (as demodulation and CSI requirements are specified in Rx Beam peak direction, ∆MBS,n is not relevant).
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| R4-2014016 | ANRITSU LTD | Rel-16 Cat A CR of R4-2014015 |
| R4-2015824 | Ericsson | Rel-15 CR with the following changes for TS 38.101-4:* Set the information bit payload in slots where TRS is transmitted as follows:
	+ FDD: 39936bits, according to channel bits of 78624 and MCS19
	+ TDD: 79896bits, according to channel bits of 160272 and MCS19
* Maximum throughput revised accordingly.
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| R4-2015825 | Ericsson | Rel-16 Cat A CR of R4-2015824 |
| R4-2016424 | Huawei Technologies Sweden AB | Rel-15 CR with the following changes for TS 38.101-4:* Specified the OCNG pattern to be applied for the “Symbols for all unused REs” in the test parameters
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| R4-2016425 | Huawei Technologies Sweden AB | Rel-16 Cat A CR of R4-2016424 |
| R4-2016448 | Qualcomm, Inc. | Rel-15 CR with the following changes for TS 38.101-4:* Clarify that OCNG pattern is not applied to PDSCH DMRS symbols.
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| R4-2016449 | Qualcomm, Inc. | Rel-16 Cat A CR of R4-2016448 |
| R4-2014050 | ANRITSU LTD | Rel-15 CR with the following changes for TS 38.101-4:* Corrected Aperiodic Report Slot Offset value: 9 -> 8
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| R4-2014051 | ANRITSU LTD | Rel-16 Cat A CR of R4-2014050 |
| R4-2014052 | ANRITSU LTD | Rel-15 CR with the following changes for TS 38.101-4:* Corrected Aperiodic Report Slot Offset values for Test 1 and Test 2: Test 1: 7 -> 6, Test 2: 9 -> 8
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| R4-2014053 | ANRITSU LTD | Rel-16 Cat A CR of R4-2014052 |

## Open issues summary

N/A

## Companies views’ collection for 1st round

### Open issues

N/A

### CRs comments collection

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| **CR number** | **Comments collection** |
| R4-2014015 |  |
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| R4-2015824 | Intel: Based on our understanding, TBS determination procedure does not take into account whether TRS is transmitted or not in slot for which TBS is calculated. TBS can be changed only if MCS is changed. Same time, same MCS is used for all slots in test. Therefore, we think that original version of 64QAM FRC is correct. |
| Apple: We see the intention of the change to make coding rate closer to the target rate. But as Intel commented out, since MCS is not changing, TBS cannot change in slots with TRS. Is the intention to change MCS in slots with TRS? |
| Huawei: As per formula  in section 5.1.3.2 of TS 38.214, no overhead for TRS is taken into account for TBS calculation.Ericsson: For Intel and Apple, we agree N’RE does not consider TRS symbols, so the current TBS is valid since Noh is set to 0. On the other hand, since the binary channel bits in FRC are different between the slots where TRS is transmitted and TRS is not transmitted. We are wondering if we would add note to avoid confusion in the future. One option is to add a note saying ‘Note 3: Information Bit Payload is derived with $N\_{oh}^{PRB}=0$.’ |
| Intel (04-11-20): We already have information about $N\_{oh}^{PRB}$ configuration in all FRC tables (“Overhead for TBS determination”). Therefore, it is not clear whether such note will bring any additional information/clarification. |
| R4-2016424 | Intel: We prefer to keep information about OCNG pattern configuration in general section to avoid cope/paste of same information in all tables with test configuration. Also, it is not clear what is confusing in the existing version. Therefore, more clarification is needed.Cover page typo: Current CR version is 15.7.0, not 15.07.0.  |
| Apple: We think the existing format is fine. It captured the OCNG in the common tst parameters section. Also, in case a change is needed, we need to duplicate the change in all test parameter tables under FDD and TDD, for all sub-sections, 2RX and 4RX and it seems reductant. |
| Huawei: Some clarifications from our side, ‘OCNG’ and ‘OCNG pattern’ have different meaning, OCNG means uncorrelated pseudo random data with QPSK modulated; OCNG pattern means a complete pattern with certain structure like defined in A.5 including both PDCCH and PDSCH. Based on the common understanding about the test parameters of “Symbols for all unused REs”, it should be OCNG pattern instead of OCNG. Without such clear definition, some confusion is causing, like clarified in R4-2016448.Keeping the OCNG pattern configuration in the general section for both FDD and TDD or separate sub-section is fine for us.  |
| R4-2016448 | Intel: We’ve realized that the current version of this note is rather confusing: “Unused available REs refer to REs in PRBs not allocated for any physical channels, CORESETs, synchronization signals or reference signals in channel bandwidth”. Based on our understanding, it is not clear whether condition “not allocated…” is related to term “REs” or “PRBs”. If it is related to term “PRBs” then OCNG will not be mapped in most of empty REs and there will be no issue with empty REs on DMRS symbols because CORESET usually have wideband allocation in test and there will be no PRBs not allocated for CORESETs. If it is related to term “REs” then it is not clear what is the purpose of sentence “in PRBs” in this note and we understand the intention of proposal from QC. Same time, if we say that OCNG is mapped on REs are not on PDSCH DMRS symbols then it means that OCNG will not mapped in all PRBs on symbols with PDSCH DMRS.Therefore, we would like to check the understanding of this note from other companies.As for possible modification of this note, we suggest the following:Unused available REs refer to REs belonging to PRBs not allocated for PDSCH and REs not allocated for any other physical channels (except PDSCH), CORESETs, synchronization signals or reference signals in channel bandwidth |
| Apple: In our understanding, it is REs of the PRBs not allocated to any physical channels where OCNG needs to be mapped. |
| Huawei: As per our clarification about OCNG and OCNG pattern, it is not possible to map **OCNG** **pattern** on those empty REs in the PDSCH DM-RS symbols and other possible very limited REs. The update is fine for us. |
| Keysight: We agree that a clarification is needed. However, we would like to propose a new wording: ***“excluding REs in all the available PDSCH DMRS CDM groups***”. |
| QC: As TE vendor (Keysight) pointed out, this clarification is needed, otherwise the current wording on the spec can be understood as OCNG can be mapped to empty REs in the PDSCH DMRS symbols. We agree with Keysight’s wording suggestion, and will update CR accordingly for next round. |
| R4-2014050 | Huawei: as per the current test configuration for CSI request: “1 in slots i, where mod(i, 10) = 1, otherwise it is equal to 0”, when CSI request in slot 1, the aperiodic report offset should be 8, but for CSI request in slot 0, the original slot 9 is feasible. |
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| R4-2014052 | Huawei: CSI request in Slot 1, the updates are ok, but for CSI request in slot other than 1, i.e. Slot 0, the original 7 or 9 is feasible. |
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## Summary for 1st round

### Open issues

N/A

### CRs

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| **CR number** | **CRs/TPs Status update recommendation**  |
| R4-2014015 | To be agreed |
| R4-2014016 | To be agreed (Rel-16 Cat A CR of R4-2014015) |
| R4-2015824 | To be revised |
| R4-2016424 | To be revised |
| R4-2016448 | To be revised |
| R4-2016449 | To be revised (Rel-16 Cat A CR of R4-2016448 which was uploaded) |
| R4-2014050 | To be further discussed |
| R4-2014052 | To be further discussed |

## Discussion on 2nd round (if applicable)

### Open issues

N/A

### CRs comments collection

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| **CR number** | **Comments collection** |
| R4-2017447 (revision of R4-2015824) | Ericsson: We are fine to keep the existing FRC. So we would like to set this revision (R4-2017447) to be withdrawn.  |
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| R4-2017448 (revision of R4-2016424) | Huawei: Based on the comments, we moved the updates in the general section for each part to avoid unnecessary duplication, revised version is uploaded for further review.OP.1 FDD as defined in Annex A.5.1.1OP.1 TDD as defined in Annex A.5.2.1 |
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| R4-2017449 (revision of R4-2016448) | Intel: Based on our understanding, the current clarification tries to avoid the mapping of OCNG in the white REs showed in the figure below.Same time, as we commented in the first round, current wording (i.e. “REs in PRBs not allocated”) looks rather confusing for us. What do you think if we remove sentence “in PRBs” from this note? |
| Qualcomm: **To Intel**, we need to look into further details for the wording change you suggested, however, this CR as stated in the "reason for change" is only for DMRS symbols, your wording change suggestion will make this CR goes beyond the reason for change stated. Therefore, we suggest to have another CR covering this suggested change. And your understanding and figure are correct. |
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| R4-2014050 | Intel: Based on our understanding, corrections in this CR are fine. |
| Anritsu: We did not receive clarification from Huawei of any specific issue with the change proposed. We believe it to be a valid solution, and request that the CR is agreed.  |
| Huawei: After double checking, the correction is fine for us, sorry for the confusion. |
| R4-2014052 | Intel: Based on our understanding, corrections in this CR are fine. |
| Anritsu: We did not receive clarification from Huawei of any specific issue with the change proposed. We believe it to be a valid solution, and request that the CR is agreed.  |
| Huawei: After double checking, the correction is fine for us, sorry for the confusion. |

## Summary on 2nd round (if applicable)

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: Rel-15 NR maintenance - BS demodulation requirements

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014494 | Nokia, Nokia Shanghai Bell | Rel-15 CR with the following changes for TS 38.141-2:* Added note in PUSCH minimum perfromance requirement OTA test setup, following the text agreed in TR 37.941 (section 15.3) on HARQ feedback, to allow HARQ feedback on an error-free feedback link in OTA testing.Note adapted from TS 38.141-1.
 |
| R4-2014509 | Nokia, Nokia Shanghai Bell | Rel-16 Cat A CR of R4-2014494 |
| R4-2015843 | Ericsson | Rel-15 CR with the following changes for TS 38.104:* Adding MCS12 requirements for 2-O PUSCH performance
* Adding 30% throughput requirements for 2-O PUSCH performance
* Adding corresponding FRC tables for 2-O PUSCH performance
* Adjust table format
 |
| R4-2015844 | Ericsson | Rel-15 CR with the following changes for TS 38.141-2:* Adding applicability rule for 30% throughput requirement
* Adding MCS12 requirements for 2-O PUSCH performance
* Adding 30% throughput requirements for 2-O PUSCH performance
* Adding corresponding FRC tables for 2-O PUSCH performance
* Adjust table format
 |

## Open issues summary

N/A

## Companies views’ collection for 1st round

### Open issues

N/A

### CRs comments collection

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| **CR number** | **Comments collection** |
| R4-2014494 | Huawei: Fine to add the note. |
| ZTE: Ok with the note. “The HARQ Feedback should be error free.” 🡪 “The HARQ feedback shall be error free”? |
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| R4-2015843 | China Telecom: For PUSCH FR2 2T2R with MCS 12, we raised this issue in the last year, and the agreement at RAN4 #92bis is copied as below (captured in ad-hoc minutes in R4-1912722):The PUSCH FR2 2T2R with MCS 12 requirements are applicable from Rel-16.But we are fully ok to re-open this issue to see if the proposal from E/// can be agreeable. |
| Nokia: In the interest of not re-opening the already finished type approval for Rel-15 products, we are very much not in favour of back-porting Rel-16 requirements to Rel-15 specification at this point in time.As pointed out by CTC, the agreement on MCS12 was quite clear in [R4-1912722] and should not be reopened after closure of Rel-15.The handling of >20dB tests in rel-15, is also technically solved in [R4-1907239] and the corresponding applicability rule in 38.141-2 8.1.2.0.Discussion on this topic would need to be explicitly brought to the attention of the companies involved in the Rel-15 discussions. |
| Huawei: We are also not in favor of reversing the previous agreement. The previous agreement is very clear and no any necessity to open it for re-discussion.Ericsson: We got feedback from readers that they are confused about the difference between Rel-15 and Rel-16. They would think all untestable cases would be solved in next release of Rel-15 since these cases have been replaced by MCS12 cases in Rel-16. We think it might be good to add some notes in Rel-16 spec to inform readers that these MCS12 cases are only applicable from Rel-16, even we don’t want to modify Rel-15.  |
| ZTE: With the current workload in RAN4, we are hesitating to re-open a discussion which has been concluded, and for the moment we don’t see the need or benefit to put Rel-16 requirements back to Rel-15. |
| R4-2015844 | China Telecom: Same comment as to the 38.104 CR. |
| Nokia: Same as above. |
| Huawei: Same as above |
| ZTE: Same comment as R4-2015843. |

## Summary for 1st round

### Open issues

N/A

### CRs

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| **CR number** | **CRs/TPs Status update recommendation**  |
| R4-2014494 | To be agreed |
| R4-2014509 | To be agreed |
| R4-2015843 | To be noted |
| R4-2015844 | To be noted |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |