**3GPP TSG-RAN WG4 Meeting #96-e R4-2012720**

**Electronic Meeting, August 17th – 28th 2020**

**Agenda item:** 4.9, 5.4, 6.5.4, 7.19.6

**Source:** Moderator (Intel Corporation)

**Title:** Email discussion summary for [96e][313] 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)
* LTE maintenance up to Rel-15 - UE demodulation and CSI requirements (AI 5.4.1)
* Note: There are no tdocs submitted in this meeting for:
  + Rel-15 NR maintenance – BS demodulation requirements (AI 4.9.3)
  + LTE maintenance up to Rel-15 - BS demodulation requirements (AI 5.4.2)
  + Rel-16 LTE maintenance (AI 6.5.4)
  + Rel-16 NR maintenance (AI 7.19.6)

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

* 1st round:
  + Collect comments for NR and LTE CRs.
* 2nd round:
  + Collect comments for revised NR and LTE 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** |
| R4-2009540 | ANRITSU LTD | Rel-15 CR with the following changes for TS 38.101-4:   * Changed Reference Channel from R.PDSCH.1-1.4 FDD to R.PDSCH.1-1.3 FDD in Table 5.2.2.1.3-3 and Table 5.2.3.1.3-3 |
| R4-2009541 | ANRITSU LTD | Rel-16 Cat A CR of R4-2009540 |
| R4-2010798 | Rohde & Schwarz | Rel-15 CR with the following changes for TS 38.101-4:   * Readded R.PDSCH.1-1.4 FDD to the specification |
| R4-2010799 | Rohde & Schwarz | Rel-16 Cat A CR of R4-2010798 |
| R4-2011401 | Qualcomm Incorporated | Rel-15 CR with the following changes for TS 38.101-4:   * PDCCH allocation for LTE-NR coexistence PDSCH tests is specified. PDCCH is allocated on symbol 2. * Number of HARQ processes for Test 2-1 in Section 5.2.3.1.1 is fixed. * PDSCH precoding configuration for FR2 SDR tests is fixed. * Editor’s notes are removed in Annex C.3.1 and C.5.1 |
| R4-2009538 | ANRITSU LTD | Rel-15 CR with the following changes for TS 38.101-4:   * Resource type of ZP CSI-RS is changed from “Aperiodic” to “Periodic” so that no DCI 1-1 (DL grant, i.e. with PDSCH) transmission is required on slot#1. * Periodicity of Periodic ZP CSI-RS is set to 8 slot with offset 1 so that it is sent on the same timing as Aperiodic NZP-CSI-RS * ZP CSI-RS trigger at ZP CSI-RS configuration is removed. |
| R4-2009539 | ANRITSU LTD | Rel-16 Cat A CR of R4-2009538 |

## 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** |
| R4-2009540 | R&S: This CR seems to address the same issue as R&S CR R4-2010798. From our perspective either the Anritsu or R&S CR should be agreed, Both seem to solve the issue, but in different ways (Anritsu changes the RMC, R&S adds the missing RMC). |
| Ericsson: Same comment as R&S. We support this CR (R4-2009540) because Rel-15 PDSCH Type-B test assumed to use 7 OFDM symbols if we understand correctly.  PDSCH with 9 OFDM symbols (proposed by R&S in R4-2010798) is used for LTE-NR co-existence case, and the relevant FRC is specified as R.PDSCH.1-7.1. |
| Intel: Support this CR, because it corrects typo for Type B PDSCH requirements. |
| QC: Support this CR. |
| Huawei: OK with proposed changes. |
| R4-2010798 | Ericsson: Same comments as R4-2009540. |
| Intel: R.PDSCH.1-1.4 FDD has been moved to the Table A.3.2.1.1-7 (R.PDSCH.1-7.1). R.PDSCH.1-1.4 FDD is used for PDSCH Mapping Type B requirements by mistake which is fixed by CR R4-2009540. |
| QC: Same comment as Intel |
| R4-2011401 | Ericsson: Is is ok, but Cat-A CR for rel-16 is missing. |
| Intel: Support this CR. Agree with Ericsson’s observation about Cat A CR.  *Moderator note: Cat A CR can be requested later as part of 1st round summary preparation.* |
| QC: If everyone is ok with this CR, we ask the moderator to request the tdoc for CAT-A CR as part of 1st round summary. |
| Huawei: The “Starting symbol” configured in Table 5.2.2.1.4-2 is L0=3, the left position for PDCCH is symbol#0, 1 and 2, considering CRS in symbol#0, i.e. symbols for PDCCH should be 1, 2, it is not clear if we just say 2 symbols for PDCCH. |
| Intel (24-08-20): LTE-NR coexistence requirements are defined under assumption of 4 CRS APs. CRS is allocated in symbol #0, #1 and PDCCH is allocated in the symbol #2 (please also check paper with simulation assumptions R4-1814239). Therefore, we think that modifications are correct. |
| QC: We have same comment as Intel. We think that there is no change needed to this CR. |
| Huawei: Thank Intel for clarification, we agree with you that only symbol#2 is available for NR PDCCH with 4 CRS ports. Another issue is that it should be the symbol index(es) of PDCCH not the number of symbols with PDCCH, so we should not put unit of symbols, the correct format can refer to PDCCH configuration in Table 7.5A.1-1 that gives the clear PDCCH index number as below: |
| Intel (25-0820): Based on our understanding, this CR is aligned with formatting in Table 5.2-1.    Same time, original version or modification, suggested by HW, are fine for us. |
| QC: We have made changes based on Huawei’s suggestion and uploaded the revised CR in drafts folder of 313 as [draft\_R4-2012593\_CR\_Corrections\_Rel15.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_96_e/Inbox/Drafts/%5B313%5D%20Demod_Maintenance/drafts/draft_R4-2012593_CR_Corrections_Rel15.docx)  Please let us know if this version is ok. Then, I can also prepare the CAT-A CR. |
| R4-2009538 | Ericsson: Agree with CR. If this CR is agreeable in the 1st round, maybe consider to fix other sections also in the 2nd round rather than the next meeting. |
| QC: This change violates the spec. As per Section 5.2.1.2 in 38.214, all CSI-RS resources linked to a CSI report setting need to have same time-domain behavior. So, all resources should either be aperiodic or periodic. We think that an easier solution to solve this problem will be to schedule these resources a few slots before where PDSCH is scheduled. Below is the excerpt from 38.214:  *The time domain behavior of the CSI-RS resources within a CSI Resource Setting are indicated by the higher layer parameter resourceType and can be set to aperiodic, periodic, or semi-persistent. For periodic and semi-persistent CSI Resource Settings, the number of CSI-RS Resource Sets configured is limited to S=1. For periodic and semi-persistent CSI Resource Settings, the configured periodicity and slot offset is given in the numerology of its associated DL BWP, as given by BWP-id. When a UE is configured with multiple CSI-ResourceConfigs consisting the same NZP CSI-RS resource ID, the same time domain behavior shall be configured for the CSI-ResourceConfigs. When a UE is configured with multiple CSI-ResourceConfigs consisting the same CSI-IM resource ID, the same time-domain behavior shall be configured for the CSI-ResourceConfigs. All CSI Resource Settings linked to a CSI Report Setting shall have the same time domain behavior.* |
| Huawei: prefer to have more time to check. |
| Anritsu:  In our understanding the limitation mentioned above from TS 38.214 clause 5.2.1.2 does not apply to ZP-CSI-RS. In 38.331 the *CSI-ResourceConfig* information element contains:  CSI-ResourceConfig ::=      SEQUENCE {      csi-ResourceConfigId        CSI-ResourceConfigId,      csi-RS-ResourceSetList      CHOICE {          nzp-CSI-RS-SSB              SEQUENCE {              nzp-CSI-RS-ResourceSetList  SEQUENCE (SIZE (1..maxNrofNZP-CSI-RS-ResourceSetsPerConfig)) OF NZP-CSI-RS-ResourceSetId                                                                                                                  OPTIONAL, -- Need R              csi-SSB-ResourceSetList     SEQUENCE (SIZE (1..maxNrofCSI-SSB-ResourceSetsPerConfig)) OF CSI-SSB-ResourceSetId                                                                                                                  OPTIONAL  -- Need R          },          csi-IM-ResourceSetList      SEQUENCE (SIZE (1..maxNrofCSI-IM-ResourceSetsPerConfig)) OF CSI-IM-ResourceSetId      },      bwp-Id                      BWP-Id,      resourceType                ENUMERATED { aperiodic, semiPersistent, periodic },      ...  }  We agree that we can configure ResourceType of each CSI Resource by CSI-ResourceConfig, but ZP-CSI-RS is not included in CSI-Resources, and in 38.331 is associated with *PDSCH-Config* information element.  PDSCH-Config ::=                        SEQUENCE {        zp-CSI-RS-ResourceToAddModList                  SEQUENCE (SIZE (1..maxNrofZP-CSI-RS-Resources)) OF ZP-CSI-RS-Resource                                                                                                                  OPTIONAL,   -- Need N  ZP-CSI-RS-ResourceSet ::=           SEQUENCE {      zp-CSI-RS-ResourceSetId             ZP-CSI-RS-ResourceSetId,      zp-CSI-RS-ResourceIdList            SEQUENCE (SIZE(1..maxNrofZP-CSI-RS-ResourcesPerSet)) OF ZP-CSI-RS-ResourceId,      ...  }  CSI Resource are associated with NZP-CSI-RS/SSB and/or CSI-IM and we can set Aperiodic/Periodic/SemiPersistent for those, and in the Anritsu CR R4-2009538, NZP-CSI-RS and CSI-IM are still kept as Aperiodic and don’t appear to violate 38.214.  Please say if we misinterpret 38.214 or 38.331 here. |
| QC: We are ok with Anritsu’s observation. So, ZP CSI-RS can be made periodic as long as it’s allocated on same REs as CSI-IM (which is the case here). As Ericsson mentioned, it will be good to also correct other sections where aperiodic ZP CSI-RS was configured. |
| Huawei: After double check, we are fine with updates to ZP CSI-RS configuration. Maybe it is better to just update the necessary test parameters instead of replacing the whole test parameters table for easy review and tracking. |
| Anritsu: Thanks for the comments. An updated version making the agreed change to all relevant 6.x and 8.x requirements is uploaded as “R4-20xxxxx\_09538\_38.101-4\_Rel-15\_CatF\_AperiodicZP-CSI-RS \_Scheduling\_r1\_OY” in the drafts folder under #313. As the change involves modification to tables, apologies but we weren’t able to change only necessary parameters, as there would be a risk of changes not being shown. All the changes are confined to the “ZP CSI-RS configuration” part of the tables.  We will request a new Tdoc# for this update. |
| QC: In the new CR, I noticed another mistake in existing spec. In **Table 6.3.2.1.1-1,** CSI-IM configuration is repeated twice. I think the second one is a remnant from old spec and should be removed. The rest of the revised CR looks ok. |
| Anritsu: Thanks for noticing. An updated version is uploaded as “Draft R4-2012594\_09538\_38.101-4\_Rel-15\_CatF\_Aperiodic ZP-CSI-RS\_Scheduling” in the drafts folder under #313. The redundant/duplicate rows are shown with yellow highlight in the original table, and removed in the new Table 6.3.2.1.1-1. |

## Summary for 1st round

### Open issues

N/A

### CRs

|  |  |
| --- | --- |
| **CR number** | **CRs/TPs Status update recommendation** |
| R4-2009540 | To be agreed |
| R4-2009541 | To be agreed (Rel-16 Cat A CR of R4-2009540) |
| R4-2010798 | To be noted |
| R4-2010799 | To be withdraw (Rel-16 Cat A CR of R4-2010798) |
| R4-2011401 | To be revised |
| R4-2009538 | To be revised |

New t-doc request:

* Cat A CR for R4-2011401

## Discussion on 2nd round

### Open issues

N/A

### CRs comments collection

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| **CR number** | **Comments collection** |
| R4-2012593 (revision of R4-2011401) | [Moderator]: 2nd round comments are included in section 1.3.2 |
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|  |
| R4-2012594 (revision of R4-2009538) | [Moderator]: 2nd round comments are included in section 1.3.2 |
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## Summary on 2nd round

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| R4-2012593 | To be agreed |
| R4-2012595 | To be agreed (Rel-16 Cat A CR of R4-2012593) |
| R4-2012594 | To be agreed |
| R4-2009539 | To be agreed (Rel-16 Cat A CR of R4-2012594) |

# Topic #2: LTE requirements maintenance (up to Rel-15) - UE demodulation and CSI requirements

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2010460 | Ericsson | Rel-14 CR with the following changes for TS 36.101:   * Set OP.1 FS3 as OCNG patter for LAA CC for SDR requirements |
| R4-2010461 | Ericsson | Rel-15 Cat A CR of R4-2010460 |
| R4-2010462 | Ericsson | Rel-16 Cat A CR of R4-2010460 |
| R4-2010463 | Ericsson | Rel-15 CR with the following changes for TS 36.101:   * Add note PDSCH demodulation requirements with 64QAM for MTC UE is applicable for MTC UE capable of ce-PDSCH-64QAM. |
| R4-2010464 | Ericsson | Rel-16 Cat A CR of R4-2010463 |

## 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** |
| R4-2010460 | Huawei: OK with the changes. |
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| R4-2010463 | Huawei: Not sure if the note is proper way. We are considering to include this information in the formal text or in applicability part. |
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## Summary for 1st round

### Open issues

N/A

### CRs

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| --- | --- |
| **CR number** | **CRs/TPs Status update recommendation** |
| R4-2010460 | To be agreed |
| R4-2010461 | To be agreed (Rel-15 Cat A CR of R4-2010460) |
| R4-2010462 | To be agreed (Rel-16 Cat A CR of R4-2010460) |
| R4-2010463 | To be revised |

## Discussion on 2nd round

### Open issues

N/A

### CRs comments collection

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| --- | --- |
| **CR number** | **Comments collection** |
| R4-2012596 (revision of R4-2010463) | Ericsson:  For Huawei’s 1st round comment, the reason we put this applicability text in the table is to keep the consistency with other features such as CE Mode B, ce-CRS-IntfMitig, in Table 8.11.1.1.3.1-1. If we put the applicability text outside the table like formal text or in applicability part, it is not consistent. Therefore we would like to keep R4-2010643 as is. |
| Huawei: Thanks for responses to our comments.  After double checking, it is true that test applicability are capturing in the tables for test parameters for eMTC, i.e. Table 8.11.1.1.3.1-1 and Table 8.11.1.2.3.1-1. Based on our understanding, we think the general way for test applicability rule definition is either a separate sub-section created or captured in the tables for minimum performance requirements like did for LAA and CA. If all other companies are ok with this way to capture test applicability rule, it is fine for us. |
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## Summary on 2nd round

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| R4-2010463 | To be agreed |
| R4-2012596 | To be withdraw (revision of R4-2010463) |
| R4-2010464 | To be agreed (Rel-16 Cat A CR of R4-2010463) |