**3GPP TSG-RAN WG4 Meeting # 98-bis-e R4-210XXXX**

**Electronic Meeting, 12th – 20th April, 2021**

**Agenda item:** 5.1.4.4

**Source:** Moderator (Huawei, HiSilicon)

**Title:** Email discussion summary for [98-bis-e][316] NR\_unlic\_Demod\_BS

**Document for:** Information

# Introduction

The email discussion is for Rel-16 NR-U BS demodulation performance in agenda 5.1.4.4. It mainly include the simulation alignment for PUSCH, PUCCH and PRACH, remaining open issues and draft CR review.

List of candidate target of email discussion for 1st round and 2nd round as follows:

* 1st round:
* Topic#1: PUSCH requirements
  + Sub-topic 1-1: Simulation results alignment
  + Sub-topic 1-2: Test applicability rules
  + Sub-topic 1-3: Simulation assumptions for CG-UCI requirements
* Topic#2: PUCCH requirements
  + Sub-topic 2-1: Simulation results alignment
  + Sub-topic 2-2:Test metric for PF3
  + Sub-topic 2-3: Bit pattern for information bits
* Topic#3: PRACH requirements
  + Sub-topic 3-1: Simulation results alignment
  + Sub-topic 3-2: BS declaration for extended PRACH
* 2nd round:
  + Further discuss the remaining issues for each topic
  + Continue to review the revised draft CR and try to endorse them

# Topic #1: PUSCH requirements

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2104548**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104548.zip) | Ericsson | **Proposal:** The information bit could be 7bits for RM coding and 18bits for Polar coding. If only one test case is preferred, the largest bit length18bits would be better.  **Observation:** Define a fixed information bits pattern in specification is more practical for real tests than just a statement as “random information bits pattern”.  **Observation:** The performance difference between different bit patterns are small.  **Proposal:** Use following simulation assumptions for CG-UCI multiplexing on PUSCH. |
| [**R4-2104549**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104549.zip) | Ericsson | Provide the simulation results for NR-U PUSCH and CG-UCI |
| [**R4-2104621**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104621.zip) | Nokia | **Observation 1:** The maximum payload size of the CG-UCI is 18 bits.  **Proposal 1:** Define payload of 18 bits for CG-UCI performance requirements.  **Observation 2**: Explicit HARQ feedback depends on correct demodulation of CG-UCI when using configured grants in unlicensed bands.  **Observation 3:** Large indexes increase overhead of CG-UCI while improving its robustness.  **Proposal 2:** Define that guarantees better performance of CG-UCI in comparison to CG-PUSCH data payload.  **Proposal 3:** Define with relatively low CG-UCI overhead.  **Proposal 4:** Define that fulfils the following criteria: SNR@1% CG-UCI BLER < SNR@10% PUSCH BLER -3 dB.  **Proposal 5:** Define =3 or 1 for the CG-UCI performance requirements.  **Proposal 6:** Consider the parameters in Table 2 for the CG-UCI performance requirements.  **Observation 4:** 20 MHz wide interlaces are not expected to be allocated in the center of 40 or 80 MHz carriers.  **Proposal 7:** RAN4 to adopt an applicability rule that reflects the possible allocations of 20 MHz interlaces within a wideband carrier.  **Proposal 8:** RAN4 to test all the possible 20 MHz subbands contained on the declared bandwidth.  **Proposal 9:** RAN4 to adopt the following note for the FRC definition of NR-U interlaced PUSCH requirements:  For 30 kHz SCS: For reference channel Ax-y, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N+B, N+B+5,N+B+10,..,N+B+45 where N={0} and B={0} for a 20 MHz carrier, B={0,55} for a 40 MHz carrier, B={0,55,110} for a 60 MHz carrier, and B={0,55,110,165} for a 80 MHz carrier.  For 15 kHz SCS: For reference channel Aw-z, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N+B, N+B+10,N+B+20,..,N+B+90 where N={0} and B={0} for a 20 MHz carrier, and B={0,110} for a 40 MHz carrier. |
| [**R4-2104622**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104622.zip) | Nokia | Provide the simulation results for NR-U PUSCH and CG-UCI |
| [**R4-2106508**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106508.zip) | Intel Corporation | Provide the simulation results for NR-U PUSCH |
| [**R4-2106787**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106787.zip) | Huawei, HiSilicon | Provide the simulation results for NR-U PUSCH |
| [**R4-2106788**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106788.zip) | Huawei, HiSilicon | **Proposal 1:** Use following test applicability for BS support different bandwidth.   * For each subcarrier spacing declared to be supported, the tests for a specific channel bandwidth shall apply only if the BS supports it (see D.xx in table 4.6-1).Unless otherwise stated, for each subcarrier spacing declared to be supported, the tests shall be done only for the widest supported channel bandwidth. If performance requirement is not specified for this widest supported channel bandwidth, the tests shall be done by using performance requirement defined for 20MHz channel bandwidth; * If bandwidth to be tested is 80MHz and subcarrier spacing to be tested is 30 kHz, the bandwidth is divided into four RB sets, each RB set contains 54RBs, 54RBs, 54RBs and 55 RBs respectively. The tested interlace shall be put on the intersection of the RBs of the first interlace and the second RB set. i.e. RB 55, RB 60, …, RB 105 * If bandwidth to be tested is 60MHz and subcarrier spacing to be tested is 30 kHz, the bandwidth is divided into three RB sets, each RB set contains 53RBs, 53RBs, and 56RBs respectively. The tested interlace shall be put on the intersection of the RBs of the first interlace and the second RB set. i.e. RB 55, RB 60, …, RB 105 * If bandwidth to be tested is 40MHz and subcarrier spacing to be tested is 15 kHz, the bandwidth is divided into two RB sets, each RB set contains 108 RBs. The tested interlace shall be put on the intersection of the RBs of the first interlace and the first RB set. i.e. RB 0, RB 10, …, RB 100. * If bandwidth to be tested is 40MHz and subcarrier spacing to be tested is 30 kHz, the bandwidth is divided into two RB sets, each RB set contains 53 RBs. The tested interlace shall be put on the intersection of the RBs of the first interlace and the first RB set. i.e. RB 0, RB 5, …, RB 50.   **Proposal 2:** Use Table 2.2-1 for CG-UCI simulation assumptions: |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 1-1 Test applicability rules for BS supporting different bandwidths

*Sub-topic description*

*Open issues and candidate options before e-meeting:*

**Issue 1-1-1: Test applicability rules for BS supporting different bandwidth**

* Proposals
* Option 1 (Huawei): For each subcarrier spacing declared to be supported, the tests for a specific channel bandwidth shall apply only if the BS supports it (see D.xx in table 4.6-1).Unless otherwise stated, for each subcarrier spacing declared to be supported, the tests shall be done only for the widest supported channel bandwidth. If performance requirement is not specified for this widest supported channel bandwidth, the tests shall be done by using performance requirement defined for 20MHz channel bandwidth;
* If bandwidth to be tested is 80MHz and subcarrier spacing to be tested is 30 kHz, the bandwidth is divided into four RB sets, each RB set contains 54RBs, 54RBs, 54RBs and 55 RBs respectively. The tested interlace shall be put on the intersection of the RBs of the first interlace and the second RB set. i.e. RB 55, RB 60, …, RB 105
* If bandwidth to be tested is 60MHz and subcarrier spacing to be tested is 30 kHz, the bandwidth is divided into three RB sets, each RB set contains 53RBs, 53RBs, and 56RBs respectively. The tested interlace shall be put on the intersection of the RBs of the first interlace and the second RB set. i.e. RB 55, RB 60, …, RB 105
* If bandwidth to be tested is 40MHz and subcarrier spacing to be tested is 15 kHz, the bandwidth is divided into two RB sets, each RB set contains 108 RBs. The tested interlace shall be put on the intersection of the RBs of the first interlace and the first RB set. i.e. RB 0, RB 10, …, RB 100.
* If bandwidth to be tested is 40MHz and subcarrier spacing to be tested is 30 kHz, the bandwidth is divided into two RB sets, each RB set contains 53 RBs. The tested interlace shall be put on the intersection of the RBs of the first interlace and the first RB set. i.e. RB 0, RB 5, …, RB 50.
* Option 2 (Nokia): Test all the possible 20 MHz subbands contained on the declared bandwidth.
* For 30 kHz SCS: For reference channel Ax-y, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N+B, N+B+5,N+B+10,..,N+B+45 where N={0} and B={0} for a 20 MHz carrier, B={0,55} for a 40 MHz carrier, B={0,55,110} for a 60 MHz carrier, and B={0,55,110,165} for a 80 MHz carrier.
* For 15 kHz SCS: For reference channel Aw-z, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N+B, N+B+10,N+B+20,..,N+B+90 where N={0} and B={0} for a 20 MHz carrier, and B={0,110} for a 40 MHz carrier.
* **[Moderator’s observation]**: The only difference the between two options is whether to test the performance with all RB sets(20 MHz subbands) for BS supporting widerband. For option 2, the tested interlace is 11RBs as per agreed simulation assumptions, but the number of allocated RBs within the widerband are only 10

* Recommended WF
  + TBA

### Sub-topic 1-2 Simulation assumptions for CG-UCI requirements

**Issue 1-2-1: *bettaOffsetCG-UCI-index***

* Proposals
  + Option 1: 3 (Nokia, Ericsson, Huawei (compromise))
  + Option 2: 8 (Huawei)
  + Option 3: 1 (Nokia)
* Recommended WF
  + Use *bettaOffsetCG-UCI-index* = 3

**Issue 1-2-2: Information bits**

* + Option 1: Only 18 bits (Nokia, Huawei(compromise), Ericsson)
  + Option 2: 8 and 18 bits (Huawei)
  + Option 3: 7 and 18 bits (Ericsson)
* Recommended WF
  + Only 18 bits

**Issue 1-2-3: Information bits pattern**

* + Option 1: Use fixed information pattern. i.e. [0 0 0 1 0 0 0] for 7bits (If necessary) and [0 0 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 0] for 18 bits (Ericsson)
  + Option 2: Random information bits pattern
* Recommended WF

**Issue 1-2-4: Detailed simulation assumptions**

* Recommended WF
  + Use following table as simulation assumptions

|  |  |  |
| --- | --- | --- |
| Parameter | | Value |
| Channel model | | TDLA30-10 |
| Bandwidth | | 20 MHz |
| Transform precoding | | Disabled |
| Default TDD UL-DL pattern | | 30 kHz SCS:  7D1S2U, S=6D:4G:4U  15 kHz SCS:  3D1S1U S=10D:2G:2U |
| MCS | | MCS 20 |
| HARQ | Maximum number of HARQ transmissions | 1 |
|  | RV sequence | 0 |
| DM-RS | DM-RS configuration type | 1 |
|  | DM-RS duration | Single-symbol DM-RS |
|  | Additional DM-RS position | pos1 |
|  | Number of DM-RS CDM group(s) without data | 2 |
|  | Ratio of PUSCH EPRE to DM-RS EPRE | -3 dB |
|  | DM-RS port(s) | {0} |
|  | DM-RS sequence generation | *NID0*=0, *nSCID*=0 |
| Time domain | PUSCH mapping type | A, B |
| resource | Start symbol | 0 |
| assignment | Allocation length | 14 |
| Frequency domain resource | RB assignment | 1 interlace |
| assignment | Frequency hopping | Disabled |
| Code block group based PUSCH transmission | | Disabled |
|  | Number GC-UCI information bit payload | 18 |
|  | *Scaling* | 1 |
| UCI | *betaOffsetGC-UCI index* | 3 |
|  | UCI partition for frequency hopping | Disabled |

### Sub-topic 1-3 Simulation results alignment

* Simulation results collected from companies are summarized as follows:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SCS | Mapping  type | Huawei | | Ericsson | | Intel | | Nokia | |
| Ideal | Impairment | Ideal | Impairment | Ideal | Impairment | Ideal | Impairment |
| 15kHz | Type A | 10.4 | 11.9 | 9.5 | 12 | 9.5 | 12 | 9.9 | 12.4 |
| Type B | 10.4 | 11.9 | 9.5 | 12 | 9.5 | 12 | 9.9 | 12.4 |
| 30kHz | Type A | 10.4 | 11.9 | 9.4 | 11.9 | 9.3 | 11.8 | 9.8 | 12.3 |
| Type B | 10.4 | 11.9 | 9.4 | 11.9 | 9.3 | 11.8 | 9.8 | 12.3 |

* **[Moderator’s observation]**:
  + Reuse the performance requirement derivation rules agreed for NR Rel-15 for the final performance requirements derivation?

## Companies views’ collection for 1st round

### Open issues

*One of the two formats, i.e. either example 1 or 2 can be used by moderators.*

**Example 1**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1:  Sub topic 1-2:  ….  Others: |

### CRs/TPs comments collection

*For close-to-finalize WIs and maintenance work, comments collections can be arranged for TPs and CRs. For ongoing WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| **R4-2104619** DraftCR on NR-U BS-demod applicability rules(38.141-1) | Company A |
| Company B |
|  |
| **R4-2104620** DraftCR on NR-U BS-demod applicability rules(38.141-2) | Company A |
| Company B |
|  |
| **R4-2106789** Draft CR for 38.104 Introduction of performance requirements for PUSCH with interlace allocation | Company A |
| Company B |
|  |
| **R4-2106790** Draft CR for 38.104 Introduction of FRC tables for PUSCH performance requirements with interlace allocation | Company A |
| Company B |
|  |
| **R4-2106791** Draft CR for 38.141-1 Introduction of conducted conformance performance testing for PUSCH with interlace allocation | Company A |
| Company B |
|  |
| **R4-2106792** Draft CR for 38.141-1 Introduction of FRC tables for conducted conformance performance testing for PUSCH with interlace allocation | Company A |
| Company B |
|  |
| **R4-2106793** Draft CR for 38.141-2 Introduction of FRC tables for radiated conformance performance testing for PUSCH with interlace allocation | Company A |
| Company B |
|  |
| **R4-2106794** Draft CR for 38.141-2 Introduction of radiated conformance performance testing for PUSCH with interlace allocation | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic #1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

# Topic #2: PUCCH requirements

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2104550**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104550.zip) | Ericsson | **Proposal:** Use fixed bit pattern for information bits for interlacing PUCCH requirements. Consider following bit pattern and content.   |  |  |  |  | | --- | --- | --- | --- | |  | Bit length | Bit pattern | Information content | | ePF0 | 1 | [0] | HARQ-ACK only | | ePF1 | 2 | [0 1] | HARQ-ACK only | | ePF2 | 22 | [0 1 0 1… 0 1] | HARQ-ACK and CSI part 1 | | ePF3 | 4 | [0 1 0 1] | HARQ-ACK only |   **Proposal:** Define enhanced PUCCH format 3 requirement test metric as SNR@ACK missed <= 10-2 with SNR@Prob(DTX->ACK)≤ 10-2 |
| [**R4-2104551**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104551.zip) | Ericsson | Provide the simulation results |
| [**R4-2104623**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104623.zip) | Nokia, Nokia Shanghai Bell | **Proposal 1:** Define performance requirements of interlaced PUCCH format 3 with ACK missed detection metric. |
| [**R4-2104624**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104624.zip) | Nokia, Nokia Shanghai Bell | Provide the simulation results |
| [**R4-2106795**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106795.zip) | Huawei, HiSilicon | **Proposal 1:** For PF3 test, UCI bits only contain HARQ-ACK information and use following test metric:   * Prob (DTX->ACK)≤1% * Prob (ACK miss)≤1%. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 2-1 Test metric for PF3

**Issue 2-1-1: Test metric for PF3**

* Proposals
  + Option 1: Prob(DTX->ACK)<=1% and Prob(ACK miss)<=1% (Huawei, Ericsson, Nokia)
* Recommended WF
  + Use Prob(DTX->ACK)<=1% and Prob(ACK miss)<=1% as test metric for PF3

### Sub-topic 2-2 Bit pattern for information bits

**Issue 2-2-1: Pattern for information bits**

* Proposals
  + Option 1: Use fixed pattern for information bits. For example: (Ericsson)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Bit length | Bit pattern | Information content |
| ePF0 | 1 | [0] | HARQ-ACK only |
| ePF1 | 2 | [0 1] | HARQ-ACK only |
| ePF2 | 22 | [0 1 0 1… 0 1] | HARQ-ACK and CSI part 1 |
| ePF3 | 4 | [0 1 0 1] | HARQ-ACK only |

* + Option 2: Random information bits pattern
* Recommended WF

### Sub-topic 2-3 Simulation results alignment

* Simulation results collected from companies are summarized as follows:
  + PF0/PF1:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Format | SCS | Test metric | Huawei | | Ericsson | | Nokia | |
| Ideal | Impairment | Ideal | Impairment | Ideal | Impairment |
| PF0 | 15kHz | 1% ACK miss | -4.6 | -3.1 | -5.2 | -2.7 | -4.7 | -2.2 |
| 30kHz | 1% ACK miss | -3.9 | -2.4 | -5.1 | -2.6 | -3.6 | -1.1 |
| PF1 | 15kHz | 1% ACK miss | -17.2 | -15.7 | -16.3 | -13.8 | -16.5 | -14 |
| 0.1% NACK to ACK | -16.7 | -15.2 | -16.1 | -13.6 | -15.5 | -13 |
| 30kHz | 1% ACK miss | -17.1 | -15.6 | -16.4 | -13.9 | -15.6 | -13.1 |
| 0.1% NACK to ACK | -16.3 | -14.8 | -16.1 | -13.6 | -14.6 | -12.1 |

* + PF2/PF3:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Format | SCS | Test metric | Huawei | | Ericsson | | Nokia | |
| Ideal | Impairment | Ideal | Impairment | Ideal | Impairment |
| PF2 | 15kHz | 1% UCI BLER | 1.3 | 2.8 | 1.3 | 2.8 | 1.5 | 4 |
| 30kHz | 1% UCI BLER | 1.9 | 3.4 | 1.2 | 2.7 | 2.2 | 4.7 |
| PF3 | 15kHz | 1% ACK miss | -0.11 | 1.39 | -9 | -10.2 | -5.3 | -2.8 |

* **[Moderator’s observation]**:
* The simulation results are not well aligned for PF3, further checking is needed
* Reuse the performance requirement derivation rules agreed for NR Rel-15 for the final performance requirements derivation?

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1:  Sub topic 1-2:  ….  Others: |

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| **R4-2104554** draft CR for TS38104 introduction of NR-U PUCCH PF0 PF1 demodulation requirements | Company A |
| Company B |
|  |
| **R4-2104555** draft CR for TS38141-1 introduction of NR-U PUCCH PF0 PF1demodulation requirements | Company A |
| Company B |
|  |
| **R4-2104556** draft CR for TS38141-2 introduction of NR-U PUCCH PF0 PF1 demodulation requirements | Company A |
| Company B |
|  |
| **R4-2105032**  Draft CR on interlaced PUCCH performance requirement for TS 38.104 | Company A |
| Company B |
|  |
| **R4-2105033**  Draft CR on interlaced PUCCH performance requirement for TS 38.141-1 | Company A |
| Company B |
|  |
| **R4-2105034**  Draft CR on interlaced PUCCH performance requirement for TS 38.141-2 | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Topic #3: PRACH requirements

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2104552](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104552.zip) | Ericsson | **Proposal:** Create new declaration field for extended PRACH sequences in 38.141-1 which includes format, SCS, and LRA.   |  |  |  | | --- | --- | --- | | [D.111] | PRACH format with LRA = 1151 for 15kHz SCS and LRA = 571 for 30kHz SCS | Declaration of the supported PRACH format(s) as specified in TS 38.211 [17], i.e., format: A2, B4, C2.    Declaration of the supported SCS(s) per supported PRACH format as specified in TS 38.211 [17], i.e., 15 kHz, 30 kHz or both. | |
| [R4-2104553](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104553.zip) | Ericsson | Provide the simulation results |
| [**R4-2104625**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104625.zip) | Nokia, Nokia Shanghai Bell | Proposal 1: RAN4 to adopt text of Option 1 as part of the manufacturer declaration for PRACH with LRA=1151 and LRA=571 as:  Declaration of the supported PRACH format(s) as specified in TS 38.211 [17], i.e., format: A2, B4, C2.  Declaration of the supported SCS(s) per supported PRACH format as specified in TS 38.211 [17], i.e., 15 kHz, 30 kHz or both. |
| [**R4-2104626**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2104626.zip) | Nokia, Nokia Shanghai Bell | Provide the simulation results |
| **[R4-2106509](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106509.zip)** | Intel Corporation | Provide the simulation results |
| [R4-2106796](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98bis_e/Docs/R4-2106796.zip) | Huawei, HiSilicon | Proposal 1:  Create new declaration field for extended PRACH sequences in 38.141-1 which includes format, SCS, and LRA.:   |  |  |  | | --- | --- | --- | | [D.111] | PRACH format with LRA = 1151 and LRA = 571 and SCS | Declaration of the supported PRACH format(s) as specified in TS 38.211 [17], i.e., format: A2, B4, C2.  Declaration of the supported SCS(s) per supported PRACH format as specified in TS 38.211 [17], i.e., 15 kHz, 30 kHz or both. |   Provide the simulation results |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 3-1 BS declaration for extended PRACH

**Issue 3-1-1: BS declaration for extended PRACH**

* Proposals
  + Create new declaration field for extended PRACH sequences in 38.141-1 which includes format, SCS, and LRA, with the following slightly different wording:
    - Option 1: (Huawei, Nokia)

|  |  |  |
| --- | --- | --- |
| [D.111] | PRACH format with LRA = 1151 and LRA = 571 and SCS | Declaration of the supported PRACH format(s) as specified in TS 38.211 [17], i.e., format: A2, B4, C2.  Declaration of the supported SCS(s) per supported PRACH format as specified in TS 38.211 [17], i.e., 15 kHz, 30 kHz or both. |

* + - Option 2: (Ericsson)

|  |  |  |
| --- | --- | --- |
| [D.111] | PRACH format with LRA = 1151 for 15kHz SCS and LRA = 571 for 30kHz SCS | Declaration of the supported PRACH format(s) as specified in TS 38.211 [17], i.e., format: A2, B4, C2.    Declaration of the supported SCS(s) per supported PRACH format as specified in TS 38.211 [17], i.e., 15 kHz, 30 kHz or both. |

* Recommended WF

### Sub-topic 3-2 Simulation results alignment

* Simulation results collected from companies are summarized as follows:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Format | LRA | Propagation  Conditions | Huawei | | Nokia | | Ericsson | | Intel | |
| Ideal | Impairment | Ideal | Impairment | Ideal | Impairment | Ideal | Impairment |
| A2 | 1151 | AWGN | -23.36 | -21.86 | -23.6 | -21.1 | -24.2 | -21.7 | -22.9 | -20.4 |
| TDLA30-10 | -18.3 | -16.8 | -17.5 | -15 | -17.1 | -14.6 | -16.4 | -13.9 |
| 571 | AWGN | -20.34 | -18.84 | -20.6 | -18.1 | -21.3 | -18.8 | -19.9 | -17.4 |
| TDLA30-10 | -14.7 | -13.2 | -13.7 | -11.2 | -14.6 | -12.1 | -13.2 | -10.7 |
| B4 | 1151 | AWGN | -27.02 | -25.52 | -27.3 | -24.8 | -26.8 | -24.3 | -26.5 | -24 |
| TDLA30-10 | -21.1 | -19.6 | -21.1 | -18.6 |  |  | -19.7 | -17.2 |
| 571 | AWGN | -24 | -22.5 | -24.5 | -22 | -25.5 | -23 | -23.4 | -20.9 |
| TDLA30-10 | -18.4 | -16.9 | -17.4 | -14.9 | -17.1 | -14.6 | -16.5 | -14 |
| C2 | 1151 | AWGN | -23.7 | -22.2 | -23.3 | -20.8 | -24.2 | -21.7 | -22.9 | -20.4 |
| TDLA30-10 | -18.35 | -16.85 | -17.4 | -14.9 | -17.1 | -14.6 | -16.4 | -13.9 |
| 571 | AWGN | -20.6 | -19.1 | -20.6 | -18.1 | -21.3 | -18.8 | -19.9 | -17.4 |
| TDLA30-10 | -14.83 | -13.33 | -13.6 | -11.1 | -14.6 | -12.1 | -13.2 | -10.7 |

* **[Moderator’s observation]**:
* Reuse the performance requirement derivation rules agreed for NR Rel-15 for the final performance requirements derivation?

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1:  Sub topic 1-2:  ….  Others: |

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| **R4-2104627** DraftCR NR-U BS demod PRACH performance requirements 38.104 | Company A |
| Company B |
|  |
| **R4-2104628**  DraftCR NR-U BS demod PRACH conducted performance requirements 38.141-1 | Company A |
| Company B |
|  |
| **R4-2104629**  DraftCR NR-U BS demod PRACH radiated performance requirements 38.141-2 | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Work split for CR drafting

Table 4-1: Work split for CR drafting

|  |  |  |
| --- | --- | --- |
| Spec | Topic | Company |
| 38.104 | Performance requirements for PUSCH with interlace allocation for both conducted and radiated | Huawei |
| Performance requirements for CG-UCI multiplexed on PUSCH with interlace allocation | Huawei |
| FRC tables for PUSCH with interlace allocation | Huawei |
| Performance requirements for PUCCH format 0 with interlace allocation for both conducted and radiated | Ericsson |
| Performance requirements for PUCCH format 1 with interlace allocation for both conducted and radiated | Ericsson |
| Performance requirements for PUCCH format 2 with interlace allocation for both conducted and radiated | Samsung |
| Performance requirements for PUCCH format 3 with interlace allocation for both conducted and radiated | Samsung |
| Performance requirements and Annex for PRACH with LRA=1151 and LRA=571 for both conducted and radiated | Nokia |
| 38.141-1 | Manufacture declarations and test applicability | Nokia |
| Conformance requirements for PUSCH with interlace allocation | Huawei |
| Performance requirements for CG-UCI multiplexed on PUSCH with interlace allocation | Ericsson |
| FRC for PUSCH with interlace allocation | Huawei |
| Performance requirements for PUCCH format 0 with interlace allocation | Ericsson |
| Performance requirements for PUCCH format 1 with interlace allocation | Ericsson |
| Performance requirements for PUCCH format 2 with interlace allocation | Samsung |
| Performance requirements for PUCCH format 3 with interlace allocation | Samsung |
| Performance requirements and Annex for PRACH with LRA=1151 and LRA=571 | Nokia |
| 38.141-2 | Manufacturer declarations and test applicability | Nokia |
| Performance requirements for PUSCH with interlace allocation | Huawei |
| Performance requirements for CG-UCI multiplexed on PUSCH with interlace allocation | Nokia |
| FRC for interlaced PUSCH with interlace allocation | Huawei |
| Performance requirements for PUCCH format 0 with interlace allocation | Ericsson |
| Performance requirements for PUCCH format 1 with interlace allocation | Ericsson |
| Performance requirements for PUCCH format 2 with interlace allocation | Samsung |
| Performance requirements for PUCCH format 3 with interlace allocation | Samsung |
| Performance requirements and Annex for PRACH with LRA=1151 and LRA=571 | Nokia |
| Simulation results | Simulation results summary sheet creation and maintaining | Huawei |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents