**3GPP TSG-RAN WG4 Meeting #94-e R4-20xxxxx**

**Electronic Meeting, Feb.24th – Mar.6th 2020**

**Agenda item:** 7.13.3 / 7.13.4

**Source:** NTT DOCOMO, INC.

**Title:** Email discussion summary for RAN4#94e\_#87\_LTE\_high\_speed\_enh2\_Demod

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion and provide some guidelines for email discussion if necessary.*

*List of candidate target of email discussion for 1st round and 2nd round*

* 1st round: TBA
* 2nd round: TBA

The scope of this email discussion are Rel-16 LTE HST BS and UE demodulation requirements, and related agenda items are listed below:

7.13.3 UE Demodulation and CSI requirements (36.101)

7.13.3.1 Extension of demodulation requirements to CA

7.13.3.2 HST-SFN PDSCH demodulation requirements

7.13.3.3 Single tap HST PDSCH demodulation requirements

7.13.4 BS Demodulation requirements (36.104)

7.13.4.1 PUSCH demodulation requirements

7.13.4.2 PRACH requirements

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

For UE demodulation:

* 1st round: Based on received comments, update related CRs
  + NOTE: If no further updates are needed, CR(s) may be agreed.
* 2nd round: Agree on CRs for TS 36.101

For BS demodulation:

* 1st round: Conclude the method of calculating SNR values for PUSCH and PRACH requirements
* 2nd round: Agree on CRs with final SNR values for TS 36.104 and TS 36.141

# Topic #1: UE Demodulation and CSI requirements (36.101) (7.13.3)

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-20xxxxx | Company A | Proposal 1:  Observation 1: |
| R4-2000872 | NTT DOCOMO, INC. | CRs to finalize PDSCH demodulation for HST-SFN with 500km/h velocity |
| R4-2001348 | Ericsson | CRs to finalize CA PDSCH demodulation for HST-SFN with 500km/h velocity |

## 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: CRs for UE demodulation

*Sub-topic description:*

This sub-topic deals with finalization of UE demodulation performance requirements with 500km/h velocity.

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

**Issue 1-1-1: Removal of square brackets**

* Proposals
  + Option 1: Remove all square brackets
  + Other options are not precluded
* Recommended WF
  + Remove all square brackets and agree on CRs.

## 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** |
| XXX | Company A |
| Company B |
|  |
| R4-2000872 |  |
|  |
|  |
| R4-2001348 |  |
|  |
|  |

## 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:* |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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”* |
| R4-2000872 |  |
| R4-2001348 |  |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **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: BS Demodulation requirements (36.104) (7.13.4)

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-20xxxxx | Company A | Proposal 1:  Observation 1: |
| R4-2000309 | Samsung | Simulation summary (To be uploaded) |
| R4-2000310 | Samsung | Observation 1: Due to the limited DMRS resource in small bandwidth, it is reasonable that there is performance loss with considering the inaccuracy frequency offset estimation.  Observation 2: The maximum Doppler value with 1944Hz is out of range of DMRS frequency offset tracking ability, even the DMRS in PUCCH. To some extent, with large Doppler value, there should be some performance loss.  Proposal 1: Encourage companies to provide the simulation results with ideal frequency offset for further alignment.  Proposal 2: Additional margin should be considered for deriving requirement, due to the diverse of two DMRS structure in PUSCH and PUCCH. |
| R4-2001452 | Huawei, HiSilicon | Ideal Simulation results for LTE PUSCH under HST single-tap |
| R4-2001720 | Nokia, Nokia Shanghai Bell | Observation 1: The choice of a Doppler compensation algorithm has an impact on PUSCH performance.  Observation 2: The SNR values for Scenario 1-LTE500b and Scenario 3-LTE500b are less than the corresponding SNR for Scenarios 1 and 3, respectively, which seems to be odd. A similar observation is made for Scenario 1-LTE500a and Scenario 3-LTE500a.  Proposal 1: SNR values for Scenario 1-LTE500b and Scenario 3-LTE500b that are smaller than the corresponding SNR for Scenario 1 and 3, respectively, should be excluded. |
| R4-2001718 | Nokia, Nokia Shanghai Bell | Observation 1: The SNR values for 1944 Hz for PRACH format 1, 2 and 3 are less than those for 1875 Hz, which seem to be odd.  Observation 2: As the frequency offset for 1944 Hz is slightly larger than 1875 Hz, the minimum SNR for achieving the target PRACH detection probability of 99% should be comparable to but not be less than the SNR values for 1875 Hz.  Observation 3: SNR values for the 1875 Hz frequency offset case can be used as a baseline for computing the final SNR based on simulation results of different companies.  Proposal 1: SNR values that are smaller or far greater than the corresponding SNR for 1875 Hz should be excluded from the averaging computation. |

## 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: PUSCH

*Sub-topic description:*

This sub-topic deals with open issues related to PUSCH performance requirements for enhanced HST with 500km/h velocity.

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

**Issue 2-1-1: Simulation alignment**

* Proposals
  + Option 1 (Samsung): Encourage companies to provide the simulation results with ideal frequency offset for further alignment.
  + Other options are not precluded
* Recommended WF
  + Further discussion is needed

**Issue 2-1-2: Additional margin**

* Proposals
  + Option 1 (Samsung): Additional margin should be considered for deriving requirement, due to the diverse of two DMRS structure in PUSCH and PUCCH.
  + Other options are not precluded.
* Recommended WF
  + Further discussion is needed

**Issue 2-1-3: Alignment of SNR values between existing and enhanced PUSCH HST tests**

* Proposals
  + Option 1 (Nokia): SNR values for Scenario 1-LTE500b and Scenario 3-LTE500b that are smaller than the corresponding SNR for Scenario 1 and 3, respectively, should be excluded.
  + Other options are not precluded.
* Recommended WF
  + Further discussion is needed

### Sub-topic 2-2: PRACH

*Sub-topic description*

This sub-topic deals with open issues related to PRACH performance requirements for enhanced HST with 500km/h velocity.

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

**Issue 2-2-1: Alignment of SNR values between existing and enhanced PRACH tests**

* Proposals
  + Option 1: SNR values that are smaller or far greater than the corresponding SNR for 1875 Hz should be excluded from the averaging computation.
  + Other options are not precluded
* Recommended WF
  + Further discussion is needed

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1:  Sub topic 2-2:  ….  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** |
| XXX | Company A |
| Company B |
|  |
| YYY | 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:* |

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### 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)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **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”* |