**3GPP TSG-RAN WG4 Meeting # 97-e draftR4-2017425**

**Electronic Meeting, 2 – 13 Nov., 2020**

**Agenda item:** 7.15.3.2

**Source:** Moderator (Nokia, Nokia Shanghai Bell)

**Title:** Email discussion summary for [97e][327] NR\_HST\_Demod\_BS

**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

## Background and scope

This T-doc will be used to guide and summarize the email discussion for the topic of Rel-16 NR HST BS demodulation requirements (AI 7.15.3.2), with the email thread identifier “[97e][327] NR\_HST\_Demod\_BS”.

The scope of this email discussion are Rel-16 NR HST BS demodulation requirements, and in particular the agenda items:

7.15.3.2 BS demodulation requirements

7.15.3.2.1 PUSCH requirements

7.15.3.2.2 PRACH requirements

7.15.3.2.3 UL timing adjustment requirements

Priority topics are marked directly in the open issues’ summaries.

# 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** |
| R4-2014397 | CATT | Tdoc Title: Summary of ideal and impairment results for NR HST demodulation requirements |
| R4-2015183 | ZTE Corporation | Tdoc Title: Rel-16 NR HST BS demodulation requirements**Proposal 1: Capture performance requirements for multipath fading with high Doppler values in the relevant HST section in order to avoid confusion.** |
| R4-2014398 | CATT | Tdoc Title: Simulation results for NR HST PUSCH demodulation requirement |
| R4-2014555 | Intel Corporation | Tdoc Title: Simulation results for NR HST PUSCH |
| R4-2015090 | Nokia, Nokia Shanghai Bell | Tdoc Title: On NR Rel-16 HST BS demodulation PUSCH requirements and simulation resultsSimulation results misalignmentObservation 1: One company’s impairment result is better than the corresponding ideal one for 30kHz/10MHz, 2334Hz, 1T8R, MCS16. This causes a -102 error (span too large).**Proposal 1: In case the identified cases in the simulation summary excel are not updated in this meeting, remove them from the requirement calculation and move ahead with replacing TBDs in the CRs.**Multi-path carrier frequency**Proposal 2: If required for simulation alignment, RAN4 to consider fc=2.1GHz for TDLC300-600 FO=0Hz (15kHz), and fc=3.6GHz for TDLC300-1200 FO=0Hz (30kHz).**Applicability rules not implemented in specObservation 2: The implicit test passing and 1T1R applicability rules from RAN4#95e have yet to be included in TS 38.141-1 and TS 38.141-2.**Proposal 3: The companies responsible for PUSCH HST CRs to TS 38.141-1 and TS 38.141-2, are requested to include the implicit test passing and 1T1R applicability rules in this meeting.** |
| R4-2015118 | Samsung | Tdoc Title: Simulation results for NR HST PUSCH |
| R4-2015609 | Huawei, HiSilicon | Tdoc Title: Simulation results on the NR HST PUSCH performance requirements |
| R4-2015850 | Ericsson | Tdoc Title: simulation results for HST PUSCH under fading channel |

## Open issues summary and views’ collection for 1st round

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

*Interested companies are expected to add their views directly under the respective issues in a dialogue-like form, i.e., identical to how the chair would record views during a f2f meeting.*

*Please add further table rows as required and do not change previous comments of your company or other companies. Answering to questions from other companies is encouraged.*

### Sub-topic 1-1 Simulation results (all channels)

*Sub-topic description:*

Many companies have provided updates simulation results for this meeting.
Please update the collection excel and check for misalignment

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

**Issue 1-1-1: Collection of simulation updates**

* Proposals
	+ Option 1: Each company to update the simulation summary excel file prepared by CATT [R4-2014397] with revision available in the draft folder.
* Recommended WF
	+ Finish option 1 during 1st week.

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| --- | --- |
| **Company** | **Comments** |
| Ericsson | Agree with recommended WF |
| CATT | Support the recommended WF. |
| XXXZTE | Fine with Moderator’s recommendation |
| Samsung | Ok with recommended WF |
| Huawei | Ok with recommended WF, our updated results are uploaded. |

**Issue 1-1-2: Resolve alignment issues**

* Proposals
	+ Option 1 (Nokia, Ericsson): In case the identified cases in the simulation summary excel are not updated in this meeting, remove them from the requirement calculation and move ahead with replacing TBDs in the CRs.
	+ Option 2 (Nokia): If required for simulation alignment, RAN4 to consider fc=2.1GHz for TDLC300-600 FO=0Hz (15kHz), and fc=3.6GHz for TDLC300-1200 FO=0Hz (30kHz).
* Recommended WF
	+ During 2nd week, check simulation results excel for alignment issues and resolve.

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| **Company** | **Comments** |
| Ericsson | We can accept Option 1. We don’t understand the relationship between Option 1 and 2. They seems not parallel options.  |
| ZTE | Fine with Option 1 |
| Samsung | Firstly, we need to clarify the different between option 1 and option 2。Secondly, for results with larger gap handling, RAN4 should be allow companies to further checking, Meanwhile, how to handle the results with large gap for requirement deriving, in Rel-15, the rule with 2dB gap for ideal results are agreed. If the gap is large than 2dB, then the results farthest from the average is taken out for average and span re-calculation until the ideal span is <=2Db. If no enough input for performance deriving, we prefer to allow larger ideal span than 2dB. Meanwhile, we suggest to the SNR with keep [] in this meeting. |
| CMCC | One thing to be noted is that Rel-16 HST WI targets to be finalized in this meeting (RP-201614). If we go with Option1, we are not sure whether the CRs with TBD will be implemented to the spec. To move forward, one possible way is to specify the requirements with [] for the case with larger gap. |
| Huawei | All results are aligned now as per the latest submitted results summary of revised R4-2014397, the issue does not exist any more. |
| Docomo | Fine with Option 1. |
| Nokia, Nokia Shanghai Bell | Thank you for updating the simulation results before (and during) the meeting.Currently, there are derivation error observed anymore. We propose to take revision of the 1st round revision of the summary excel as final and proceed to adapt the CRS. Though, we can agree to capture SNR with [] this meeting, if there are strong concerns by a contributor this meeting.Clarifying option2: Previously the carrier frequency was not explicitly discussed for the multi-path fading scenario. It seems that all companies have understood 15kHZ being paired with 2.1GHz and 30kHz being paired with 3.6GHz.So we are already aligned and option2 can be disregarded. |

### Sub-topic 1-2 Specification drafting of multi-path fading requirements

*Sub-topic description*

One proposal on specification drafting of multi-path fading requirements has been submitted.
The proposal seems to re-tread previous agreements form the last (Friday) GtW session of RAN4#96e.

|  |
| --- |
| * Specification drafting of multi-path fading requirements
	+ - * Introduce multi-path fading channel requirements with high Doppler value in a separate table under section “8.2.4 Requirements for PUSCH for high speed train”
			* This requirement only applicable for wide-area, medium-range BS which supporting HST
 |

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

**Issue 1-2-1: Specification drafting of multi-path fading requirements**

* Proposals
	+ Option 1 (ZTE): Capture performance requirements for multipath fading with high Doppler values in the relevant HST section in order to avoid confusion.
	+ Option 2 (RAN4#96e, Ericsson): Introduce multi-path fading channel requirements with high Doppler value in a separate table under section “8.2.4 Requirements for PUSCH for high speed train”.
* Recommended WF
	+ Do not reopen this discussion and continue with last meeting’s agreement.

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| **Company** | **Comments** |
| Ericsson | Agree with Option 2. |
| ZTE | To us Option 1 and 2 are the same, but Option 2 are more specific. |
| Samsung | Agree with option 2 following the agreement in the last meeting |
| Huawei | Agree with Option 2 that is more specific for the section and table. |
| Docomo | Agree with Option 2 that is already agreed in the last meeting. |
| Nokia | Option 2, for specificity. |

### Sub-topic 1-3: Other

*Sub-topic description:*

*In this sub-topic companies are invited to bring issues to the attention of the group, which have not been captured in the previous sub-topics.*

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |

### 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 | Title, Source |
| Company A |
| Company B |
|  |
| R4-2014822 | CR for TS 38.141-1: Updates of NR PUSCH performance requirements for Multi-path fading channel models under high Doppler values and applicability rules, NTT DOCOMO, INC. |
| Nokia: (a) There is a mismatch between the CRs for PUSCH on how many tables are used to capture the fading requirements. We understood the GtW agreement to put requirements in “a” table, to mean “one” table containing all. Could you check [R4-2015091] and tell us your preference?(b) Section 8.1.2.4.1 contains “D.1XX”. Should this be “D.109”?(c) Section 8.2.4.3 adds “and multipath fading propagation”, which we don’t think is necessary. Is this important to include in your opinion? |
|  |
|  |
| R4-2015091 | CR for 38.104: HST PUSCH demodulation requirements, Nokia, Nokia Shanghai Bell |
| Samsung: suggest to add [] for the SNR value in this meeting, and remove the [] in the last meeting if no more results updated or no technical issue identified Nokia: We would have preferred to directly update without [], but we can add them, if you think it’s necessary. |
| Docomo:”TDLC300-600” and “TDLC300-1200” in Table 8.2.4.2-9 should be corrected to “TDLC300-600 Low” and “TDLC300-1200 Low” to align with other PUSCH requirements.Nokia: The tables are preceded by the following sentence: “Unless stated otherwise, the MIMO correlation matrices for the gNB are defined in annex G for low correlation”. This was introduced and agreed a few meetings ago to avoid the repetitive nature and allow fitting of the tables.Is this enough to address the concerns? |
| Nokia: The G.2.2 channel model changes are missing, and TBD should be updated following the results delivered this meeting. |
| R4-2015846 | additional test cases for HST PUSCH in TS38.141-2, Ericsson |
| Samsung: suggest to add [] for the SNR value in this meeting, and remove the [] in the last meeting if no more results updated or no technical issue identified Ericsson: We also tend to no [ ] in spec, but we are also OK to add [ ].  |
| Docomo: “TDLC300-600” and “TDLC300-1200” in Table 8.2.4.5-9 and Table 8.2.4.5-10 should be corrected to “TDLC300-600 Low” and “TDLC300-1200 Low” to align with other PUSCH requirements.Nokia: The tables are preceded by the following sentence: “Unless stated otherwise, the MIMO correlation matrices for the gNB are defined in annex G for low correlation”. This was introduced and agreed a few meetings ago to avoid the repetitive nature and allow fitting of the tables.Is this enough to address the concerns?Ericsson: We share the same view with Nokia. |
| Nokia: - Same as R4-2014822 Nokia (a).Ericsson: We tend to use 2 tables for fading channel because the table format is aligned with other tables. - Concerning 8.1.2.4.1, we think it is sufficient to mention D.110. D.109 is not needed for the implicit test passing rule.Ericsson: OK, we’ll change it.  |
| The secretary commented that the CR number 0245 is missing on the coversheet. |

## 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:* |
| **Sub-topic 1-1** | **Sub-topic 1-1 Simulation results (all channels)**All issues resolved, without need for agreements to be captured.Current simulation result template contains only valid cells. |
| **Sub-topic 1-2** | **Sub-topic 1-2 Specification drafting of multi-path fading requirements**Issue 1-2-1: Specification drafting of multi-path fading requirements*Tentative agreements:*Do not reopen this discussion and continue with last meeting’s agreement.*Recommendations for 2nd round:*Tentative agreement is agreeable. |

*Recommendations on WF/LS assignment*

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| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
| # |  |  |
| #1 | WF on Rel-16 NR HST BS demodulation requirements | Nokia, Nokia Shanghai Bell |

### 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”* |
| R4-2014822 | to be revised |
| R4-2015091 | to be revised |
| R4-2015846 | 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”* |

# Topic #2: PRACH Requirements

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

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014399 | CATT | Tdoc Title: Simulation results for NR HST PRACH demodulation requirement |
| R4-2014554 | Intel Corporation | Tdoc Title: Simulation results for NR HST PRACH |
| R4-2015092 | Nokia, Nokia Shanghai Bell | Tdoc Title: On NR Rel-16 HST BS demodulation PRACH simulation resultsObservation 1: The simulation results collection template [3], erroneously captures the carrier frequency for set B as 2.1GHz (instead of 3.6GHz). This can be checked as a source of error in case of observed misalignment but is currently not expected to be a cause of concern. |
| R4-2015120 | Samsung | Tdoc Title: Simulation results for NR HST PRACH |
| R4-2015667 | Huawei, HiSilicon | Tdoc Title: Simulation results for NR HST PRACH format 0 with restricted set A and B under fading channel |
| R4-2015849 | Ericsson | Tdoc Title: simulation results for HST PRACH under fading channel |

## Open issues summary and views’ collection for 1st round

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

*Interested companies are expected to add their views directly under the respective issues in a dialogue-like form, i.e., identical to how the chair would record views during a f2f meeting.*

*Please add further table rows as required and do not change previous comments of your company or other companies. Answering to questions from other companies is encouraged.*

### Sub-topic 2-1 PRACH restricted set specification

*Sub-topic description:*

The moderator has observed that for PRACH with restricted sets specification writing, the applicability rule has been already captured in 8.1.2.3 (PRACH applicability rule), and not in a new section for HST applicability rules (which is proposed in the CRs for PUSCH this meeting).

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

**Issue 2-1-1: Capturing PRACH restricted set applicability rules in specifications**

* Proposals
	+ Option 1 (Moderator): Leave the applicability rules for PRACH tests with restricted set configurations in the section of PRACH applicability rules; the rule is only for restricted sets so there is an implicit distinction to only apply to HST scenarios.
	+ Option 2 (Moderator, Ericsson): Move the applicability rules for PRACH tests with restricted set configurations to a new section called “8.1.2.5 Applicability of PRACH for high speed train performance requirements”, to maintain a consistent specification structure.
* Recommended WF
	+ Please give your companies preference in the first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | **Issue 2-1-1: Capturing PRACH restricted set applicability rules in specifications**We have no strong opinion on this but tend to Option 2 which can keep consistent structure.  |
| CATT | **Issue 2-1-1: Capturing PRACH restricted set applicability rules in specifications**We prefer Option 1 to keep the current version. There is no need to create a section for applicability rules of high speed train. If to make a distinguish with non-HST, the current title “8.1.2.3.4 Applicability of requirements for different restricted set types of long PRACH format 0” can be changed to “8.1.2.3.4 Applicability of requirements for different restricted set types of long PRACH format 0 for high speed train”. |
| ZTE | No strong view, slightly Option 1.  |
| Samsung | **Issue 2-1-1: Capturing PRACH restricted set applicability rules in specifications**We slightly prefer option 1, considering both requirement for high speed mode and normal mode of PRACH are specified in the same section. Meanwhile, the restricted set has an implicit distinction to only apply HST scenarios |
| Huawei | Option 1 with further clarification of high speed train is preferred, such as the proposal from CATT to change the section title, or add clarification in the following contents |
| Docomo | **Issue 2-1-1: Capturing PRACH restricted set applicability rules in specifications**We have no strong opinion on this but slightly prefer Option 2. In CRs for PUSCH requirements for HST, applicability rules are reflected aligned with Option 2(create a new section 8.1.2.4). |
| Nokia, Nokia Shanghai Bell | In favour of option 2.In PUSCH we are about to introduce a new section for HST applicability rules, as there are quite a few that only apply to HST; i.e., those need to be separated.A similar spec structure should be kept for PRACH. |

### Sub-topic 2-2 Simulation summary template

*Sub-topic description:*

It is possible that the simulation summary template erroneously captures the carrier frequency for set B as 2.1GHz (instead of 3.6GHz). Even though this is currently not expected to be a cause of concern, it is of interest correct the template, if it is found to be misquoting previous agreements.

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

**Issue 2-2-1: Capturing PRACH restricted set applicability rules in specifications**

* Proposals
	+ Option 1 (Moderator): The carrier frequency for PRACH restricted set type B in the simulation summary template should read 2.1GHz.
	+ Option 2 (Moderator, Ericsson): The carrier frequency for PRACH restricted set type B in the simulation summary template should read 3.6GHz.
* Recommended WF
	+ Please give your companies understanding in the first round.

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| --- | --- |
| **Company** | **Comments** |
| Ericsson | We agree with Option 2.  |
| CATT | Support Option 2. The Doppler shift 2334Hz and velocity 350km/h should be corresponding to 3.6GHz carrier frequency. The simulation sheet will be updated if no company object Option 2. From the perspective of simulation result, the carrier frequency has no impact on the SNR level since the Doppler shift 2334Hz is correctly enforced in the simulation. |
| ZTE | We are fine with Option 2. |
| Samsung | We agree with option 2. As mentioned by CATT, the Doppler shift with 2334 Hz is calculated based on the 3.6GHz carrier frequency.Why this issue is related with “capturing PRACH restricted set applicability rules in the specification ” |
| CMCC | Option 2 |
| Huawei | We are OK with Option 2. |
| Docomo | We are OK with Option 2. |
| Nokia | Prefer option 2. It is only a small change to introduce in the next simulation summary revision of CATT. |

### Sub-topic 2-3: Other

*Sub-topic description:*

*In this sub-topic companies are invited to bring issues to the attention of the group, which have not been captured in the previous sub-topics.*

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |

### 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 | Title, Source |
| Company A |
| Company B |
|  |
| R4-2015664 | CR for 38.104 Introduction of performance requirements for NR HST PRACH under fading channel, Huawei, HiSilicon |
| Nokia: In the newly introduced rows for TDLC300 the painted borders are now no longer correct. Furthermore, some of the RX number of antennas seem to be bold now… |
|  |
| Samsung: the latest revision for CR coverpage should be v12.1 |
| R4-2015665 -> R4-2016596 | CR for 38.141-1 Introduction of conformance testing for NR HST PRACH under fading channel, Huawei, HiSilicon |
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|  |
| Samsung: the latest revision for CR coverpage should be v12.1 |
| R4-2015666 -> R4-2016597 | CR for 38.141-2 Introduction of conformance testing for NR HST PRACH under fading channel, Huawei, HiSilicon |
|  |
|  |
| Samsung: the latest revision for CR coverpage should be v12.1 |

## 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:* |
| **Sub-topic 2-1** | **Sub-topic 2-1** **PRACH restricted set specification**Issue 2-1-1: Capturing PRACH restricted set applicability rules in specifications*Tentative agreements:** None

*Candidate options:** Option 1: Leave the applicability rules for PRACH tests with restricted set configurations in the section of PRACH applicability rules; the rule is only for restricted sets so there is an implicit distinction to only apply to HST scenarios.
* Option 2: Move the applicability rules for PRACH tests with restricted set configurations to a new section called “8.1.2.5 Applicability of PRACH for high speed train performance requirements”, to maintain a consistent specification structure.
* Option 3: The current title “8.1.2.3.4 Applicability of requirements for different restricted set types of long PRACH format 0” can be changed to “8.1.2.3.4 Applicability of requirements for different restricted set types of long PRACH format 0 for high speed train”

*Recommendations for 2nd round:** Discuss in GtW, if possible.
* Few companies have a strong opinion. Option 3 has some support and should be considered in 2nd round.
 |
| **Sub-topic 2-2** | **Sub-topic 2-2 Simulation summary template**Issue 2-2-1: Capturing PRACH restricted set applicability rules in specifications*Tentative agreements:*Change the carrier frequency for PRACH restricted set type B in the simulation summary template to be 3.6GHz.*Recommendations for 2nd round:*Tentative agreement is agreeable. |

*Recommendations on WF/LS assignment*

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

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

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| --- | --- |
| **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”* |
| R4-2015664 | to be revised |
| R4-2015665 | New Tdoc for CR revision already allocated. |
| R4-2015666 | New Tdoc for CR revision already allocated. |
| R4-2014397 | to be revised(Simulation result collection template. New results have been contributed since the start of the meeting and will be used for CRs.) |

## 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 #3: UL TA Requirements

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015183 | ZTE Corporation | Tdoc Title: Rel-16 NR HST BS demodulation requirements**Proposal 2: Have requirements for 15kHz: 10MHz/5MHz; 30kHz: 40MHz/10MHz in order to cover the minimum channel bandwidth for all operating bands.****Proposal 3: Re-use non-HST PUSCH applicability for UL TA performance requirements for Scenario X.** |
| R4-2014400 | CATT | Tdoc Title: Simulation results for NR PUSCH UL timing adjustment demodulation requirement |
| R4-2014426 | CATT | Tdoc Title: Discussion on remaining issues of PUSCH UL TASCS/CBW combinations for scenario X**Proposal 1: To have requirements with 15kHz/5MHz, 15kHz/10MHz, 30kHz/10MHz and 30kHz/40MHz for UL TA scenario X (Option 1).**Applicability rules concerning SCS/CBW**Proposal 2: To reuse HST PUSCH applicability rules for UL TA scenario X (Option 1 or 2).** |
| R4-2014702 | CMCC | Tdoc Title: Discussion on remaining issues for NR HST BS demodulation**Proposal 1: for UL timing adjustment with scenario X, it is proposed to specify requirements for:  • 15kHz: 10MHz and 5MHz; • 30kHz: 40MHz and 10MHz.** |
| R4-2014823 | NTT DOCOMO, INC. | Tdoc Title: Views on NR PUSCH for UL timing adjustmentObservation 1: The requirements of PUSCH UL timing adjustment and PUSCH HST are considered with following SCS/CBW combinations: - 15kHz: 10MHz/5MHz; 30kHz: 40MHz/10MHz.**Proposal 1: Introduce requirements of 5/10MHz for 15kHz SCS and requirements of 10/40MHz for 30kHz SCS (Option 1).****Proposal 2: RAN4 reuses HST PUSCH applicability rules (Option 2).** |
| R4-2015093 | Nokia, Nokia Shanghai Bell | Tdoc Title: On NR Rel-16 HST BS demodulation UL timing adjustment requirements and simulation resultsSCS/CBW combinationsObservation 1: Introducing new mandatory tests with scenario X for all SCS/CBW combinations introduced in Rel-15 NR\_newRAT adds a non-negligible testing load. For scenarios Y and Z, we used the combinations 15/5, 15/10, 30/10, 30/40. Implicit passing for scenario X was also agreed.**Proposal 1: RAN4 to consider having scenario X requirements for 15kHz: 10MHz/5MHz; 30kHz: 40MHz/10MHz.**Applicability rules for SCS/CBW combinations and implicit test passing.**Proposal 2: RAN4 to apply the non-HST PUSCH applicability rules to SCS/CBW combinations, i.e., not to modify the current specification text in this regard.****Proposal 3: RAN4 to capture the implicit test passing agreement for scenario X, as follows:“Unless otherwise stated, a BS that declares to support PUSCH HST (see D.1XX in table 4.6-1) and passes the tests for scenario Y or scenario Z, can also consider the tests for scenario X as passed.”** |
| R4-2015119 | Samsung | Tdoc Title: Discussion and simulation results for NR HST UL timing adjustmenta) SCS/CBW combinations**Proposal 1: Only introduce the requirement of UL timing adjustment for scenario X with SCS/BW combination as 15 KHz/5MHz and 30 KHz/10MHz.**b) Applicability rules for SCS/BW**Proposal 2: Re-use non-HST PUSCH applicability rule for SCS/BW with requirement of UL timing adjustment scenario X**  |
| R4-2015610 | Huawei, HiSilicon | Tdoc Title: Discussion and simulation results on the UL timing adjustment2.1 SCS/CBW combinations for Scenario X**Proposal 1: For SCS/CBW combinations for Scenario X, define requirements only for 15kHz: 5MHz; 30kHz: 10MHz.** |
| R4-2015847 | Ericsson | Tdoc Title: discussion on HST UL TA remain issuesSCS/CBW combinations**Proposal 1: Modify parameter table for scenario X as follows:**

|  |  |
| --- | --- |
| **Parameter** | **Scenario X** |
| **Channel model** | Stationary UE: AWGNMoving UE: TDLC300-400 for 15kHz SCSTDLC300-800 for 30kHz SCS |
| **UE speed** | 120 km/h |
| **CP length** | Normal |
| **A** | 15 kHz: 10 us30 kHz: 5 us |
| **Δω** | 15 kHz: 0.04 s-130 kHz: 0.08 s-1 |

**Proposal 2: Agree with Option 2 to have requirements for 15kHz SCS 5MHz BW and 30kHz SCS 10MHz BW.**Applicability rules concerning SCS/CBW**Proposal 3: Re-use current applicability rules for scenario X requirements.** |
| R4-2015848 | Ericsson | Tdoc Title: additional simulation results for UL TA |
| R4-2016468 | Intel Corporation | Tdoc Title: Simulation results for NR HST UL TA |

## Open issues summary and views’ collection for 1st round

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

*Interested companies are expected to add their views directly under the respective issues in a dialogue-like form, i.e., identical to how the chair would record views during a f2f meeting.*

*Please add further table rows as required and do not change previous comments of your company or other companies. Answering to questions from other companies is encouraged.*

### Sub-topic 3-1 Scenario X - SCS/CBW combinations

*Sub-topic description:*

In the last meeting the following issue was left open

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| --- |
| UL TA - Additional scenario “X”* SCS/CBW combinations
	+ Option 1: Have requirements for
		- 15kHz: 10MHz/5MHz; 30kHz: 40MHz/10MHz.
	+ Option 2: Have requirements for
		- 15kHz: 5MHz; 30kHz: 10MHz.
	+ Option 3: Have requirements for all Rel-15 non-HST PUSCH bandwidths.
	+ Other options not precluded.
 |

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

**Issue 3-1-1: Scenario X requirements w.r.t. SCS/CBW combinations**

* Proposals
	+ Option 1 (ZTE, CATT, CMCC, DoCoMo, Nokia): Have requirements for
		- 15kHz: 10MHz/5MHz; 30kHz: 40MHz/10MHz
	+ Option 2 (Samsung, Huawei, Ericsson): Have requirements for
		- 15kHz: 5MHz; 30kHz: 10MHz
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | **Issue 3-1-1: Scenario X requirements w.r.t. SCS/CBW combinations**We tend to Option 2 to reduce test effort. |
| CATT | **Issue 3-1-1: Scenario X requirements w.r.t. SCS/CBW combinations**Prefer Option 1 to align with UL TA scenario Y and scenario Z. |
| ZTE | Option 1. |
| Samsung | **Issue 3-1-1: Scenario X requirements w.r.t. SCS/CBW combinations**We prefer option 2According the requirement of scenarios Y and Z, the performance different is very minor. Since the requirement of scenario X was agreed to be added into non-HST section, we can apply the same test applicability rule from non-HST section to define the requirement with mini CBW for each SCS. To reduce the test effort, we prefer to only introduce the requirement of UL timing adjustment for scenario X with SCS/BW combination as 15 KHz/5MHz and 30 KHz/10MHz.  |
| CMCC | **Option 1.**  |
| Huawei | We prefer Option 2, i.e. 15kHz: 5MHz; 30kHz: 10MHz.Firstly, the purpose for testing UL TA is to verify whether proper BS implementation can be performed for TO estimation and TA command transmission. For different bandwidth, the TA procedure is same and higher accuracy of TO estimation can be achieved with higher bandwidth. If a BS support higher bandwidth, it is sure that the performance can be ensured comparing with the worst case with the smallest bandwidth. Also, with MCS 16, the working SNR is high enough to achieve rather good TO estimation performance even with the smallest bandwidth. Moreover, only requirements for 5MHz for 15 kHz SCS, 10MHz for 30 kHz SCS are defined in HST PUSCH for fading channel. |
| Docomo | We prefer Option 1. Taking in account of implicit test passing for scenario X, we would like to align the combination of SCS/CBW with scenario Y and Z. |
| Nokia, Nokia Shanghai Bell | Prefer option 1.We already have an applicability rule for SCS/CBW combinations in PUSCH, that allows to only test a single SCS/CWB combination per SCS.Hence there is no testing effort difference between option 1 and option 2, and option 1 allows for better requirement coverage of deployments, while being aligned with scenario Y and Z. |

### Sub-topic 3-2 Scenario X - Parameters

*Sub-topic description:*

It was argued that the channel model Doppler spread for scenario X moving UE should be scaled with the SCS.

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

**Issue 3-2-1: Scaling Doppler spread with SCS**

* Proposals
	+ Option 1 (Ericsson): Modify parameter table for scenario X as follows

|  |  |
| --- | --- |
| **Parameter** | **Scenario X** |
| **Channel model** | Stationary UE: AWGNMoving UE: TDLC300-400 for 15kHz SCSTDLC300-800 for 30kHz SCS |
| **UE speed** | 120 km/h |
| **CP length** | Normal |
| **A** | 15 kHz: 10 us30 kHz: 5 us |
| **Δω** | 15 kHz: 0.04 s-130 kHz: 0.08 s-1 |

* + Option 2: Other options not precluded
* Recommended WF
	+ Companies to contribute their analysis of this proposed change in the first round.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | **Issue 3-2-1: Scaling Doppler spread with SCS**It was a misunderstanding. We suggest to remove this issue and keep the parameters table in WF as agreed in RAN4#96-e.  |
| ZTE | How could the Doppler spread in a channel modelling associated with an arbitrary SCS? |
| Samsung | **Issue 3-2-1: Scaling Doppler spread with SCS**The Doppler shift 400Hz is related with UE velocity 120km/h under carrier frequency 3.6GHz. There is no necessary to scale with SCS |
| Nokia | Prefer to not scale the fading channel with SCS, as it is hard to justify technically. |

### Sub-topic 3-3 Scenario X - Applicability rules

*Sub-topic description*

Several issues concerning applicability rule details remained open in the last meeting:

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| --- |
| UL TA - Additional scenario “X”* SCS/CBW combinations
	+ Option 1: Have requirements for
		- 15kHz: 10MHz/5MHz; 30kHz: 40MHz/10MHz.
	+ Option 2: Have requirements for
		- 15kHz: 5MHz; 30kHz: 10MHz.
	+ Option 3: Have requirements for all Rel-15 non-HST PUSCH bandwidths.
	+ Other options not precluded.
* Addition of scenario “X”
	+ RAN4 agree to introduce scenario X requirements under rel-16 HST WI, adding it in non-HST sections/tables to avoid misleading.
		- A BS, which declares to support HST and passes scenario Y or scenario Z, can assume implicit test passing of scenario X.
 |

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

**Issue 3-3-1: Applicability rules for SCS/CBW combinations**

* Proposals
	+ Option 1 (ZTE, CATT, Nokia, Samsung, Ericsson): Re-use non-HST PUSCH applicability rules.
	+ Option 2 (CATT, DCM): Re-use HST PUSCH applicability rules
	+ Option 3 (Ericsson): Re-use current applicability rules for scenario X requirements.
* Recommended WF
	+ Option 1 seems like a potential compromise.
	Please supply further input during first round, especially if the recommended WF does not seem acceptable.

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| --- | --- |
| **Company** | **Comments** |
| Ericsson | We agree with Option 1.  |
| CATT | Prefer Option 1 to reuse non-HST PUSCH applicability rules. There is no need to update the current specifications.  |
| ZTE | Option 1. |
| Samsung | OK with option 1 |
| CMCC | Option 1 |
| Huawei | We are OK with Option 1. |
| Docomo | If the SCS/CBW combination to be tested is the same between option 1 and option 2, we are OK with option 1. |
| Nokia | Prefer option 1. |

**Issue 3-3-2: Applicability rule text for implicit test passing**

* Proposals
	+ Option 1 (Nokia, Ericsson): “Unless otherwise stated, a BS that declares to support PUSCH HST (see D.1XX in table 4.6-1) and passes the tests for scenario Y or scenario Z, can also consider the tests for scenario X as passed.”
	+ Option 2: Other options not precluded.
* Recommended WF
	+ TBD

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| --- | --- |
| **Company** | **Comments** |
| Ericsson | We agree with Option1.  |
| CATT | Option 1. Support to capture the applicability rule text for implicit test passing in the specs. |
| ZTE | We are fine with Option 1, implicit passing rule may apply to reduce the test efforts. |
| Samsung | We are fine with option 1 with minor updated to align our CR“Unless otherwise stated, the tests for UL timing adjustment for scenario Y and scenario Z shall be carried out according to the declaration (see D.109 in table4.6-1). If the BS declares to support high speed train and can pass the test of scenario Y or scenario Z, the BS can be considered the test of scenaio X passed implicity.” |
| CMCC | Option 1. A little confusing on issue 3-3-2, it seems that Option 1 is the agreement in the last meeting. |
| Huawei | Generally we are OK with Option, to better align with other applicability rules description in the specification, our proposal is: “Unless otherwise stated, the tests for UL timing adjustment for scenario Y and scenario Z shall apply only if high speed train is declared to be be supported (see D.109 in table4.6-1). A BS that passes the tests for scenario Y or scenario Z, can also consider the tests for scenaio X passed.” |
| Docomo | We are fine with Option 1 and think that the proposal from Samsung or Huawei might be better in that it mentions the test applicability of scenario Y and Z.  |
| Nokia | Answering to CMCC: Yes, the text is supposed to capture the agreement in the last meeting. The wording is non-trivial (as evidenced by the different solutions chosen in the CRs), hence we brought it up in our discussion.We prefer Huawei’s wording. But can also accept Samsung’s proposal. |

### Sub-topic 3-4: Other

*Sub-topic description:*

*In this sub-topic companies are invited to bring issues to the attention of the group, which have not been captured in the previous sub-topics.*

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| --- | --- |
| **Company** | **Comments** |
| XXX |  |

### 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 | Title, Source |
| Company A |
| Company B |
|  |
| R4-2014427 | CR for TS 38.141-2, Introduction of NR PUSCH UL TA performance requirement, CATT |
| Samsung: the latest version of CR coverpage should be v12.1. Base on agreement in the last meeting, the requirement of scenario X should be captured in non-HST section, we suggestion to differentiate the requirement scenario X with different section.CATT: To Samsung, the agreement in the last meeting is shown as below:* + RAN4 agree to introduce scenario X requirements under rel-16 HST WI, adding it in non-HST sections/tables to avoid misleading.

Our intention of adding it in non-HST tables is to bring less alteration in the current specs. We suggest collecting comments from other companies to achieve consensus. |
| Huawei: We have the same understanding as Samsung about the previous agreement that the Scenario X should be captured in non-HST section. |
| Nokia: - We agree with Samsung’s and Huawei’s understanding that “non-HST sections/tables” means both, i.e., new tables in new section.We also think that Samsung’s example for 141-1 looks very clean and should be followed (taking our comments on 141-1 into account).- Some border of newly created cell/tables are missing (not painted).- It seems that some rows of the base text have been “re-merged“, which makes the table cell structure extremely inconsistent.It would be much cleaner for the future to keep following MCCs efforts, of having tables without merged rows. |
| R4-2015121 | CR on UL timing adjustment conducted performance requirement for TS 38.141-1, Samsung |
| Huawei: Our comment on the applicability rule wording is shared in Issue 3-3-2. |
| Nokia: The base version tables have unmerged rows, while the newly added ones have merged rows. It would be much cleaner for the future to keep following MCCs efforts, of having tables without merged rows. |
|  |
| R4-xxxxxx | [Moderator: CR for 38.104 might allocated during meeting, to capture scenario Z and outcome of SCS/BW discussion] |
| 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:* |
| **Sub-topic 3-1** | **Sub-topic 3-1**Issue 3-1-1: Scenario X requirements w.r.t. SCS/CBW combinations*Tentative agreements:*None*Candidate options:** Option 1: Have requirements for
	+ 15kHz: 10MHz/5MHz; 30kHz: 40MHz/10MHz
* Option 2: Have requirements for
	+ 15kHz: 5MHz; 30kHz: 10MHz

*Recommendations for 2nd round:** Discuss in GtW, if possible.
* Continue discussion in 2nd round.
 |
| **Sub-topic 3-2** | **Sub-topic 3-2 Scenario X - Parameters**Issue 3-2-1: Scaling Doppler spread with SCS*Tentative agreements:*Do not change the current Doppler spread parameters of scenario X.*Recommendations for 2nd round:*Tentative agreement is agreeable. |
| **Sub-topic 3-3** | **Sub-topic 3-3 Scenario X - Applicability rules**Issue 3-3-1: Applicability rules for SCS/CBW combinations*Tentative agreements:*Re-use non-HST PUSCH applicability rules*Recommendations for 2nd round:*Tentative agreement is agreeable.Issue 3-3-1: Applicability rule text for implicit test passing*Tentative agreements:*None*Candidate options:*Option 1: “Unless otherwise stated, a BS that declares to support PUSCH HST (see D.109 in table 4.6-1) and passes the tests for scenario Y or scenario Z, can also consider the tests for scenario X as passed.”Option 2: “Unless otherwise stated, the tests for UL timing adjustment for scenario Y and scenario Z shall be carried out according to the declaration (see D.109 in table 4.6-1). If the BS declares to support high speed train and can pass the test of scenario Y or scenario Z, the BS can be considered the test of scenario X passed implicitly.Option 3: “Unless otherwise stated, the tests for UL timing adjustment for scenario Y and scenario Z shall apply only if high speed train is declared to be supported (see D.109 in table 4.6-1). A BS that passes the tests for scenario Y or scenario Z, can also consider the tests for scenario X passed.”*Recommendations for 2nd round:*Companies to check, if option 3 is acceptable as compromise. |

*Recommendations on WF/LS assignment*

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| --- | --- | --- |
|  | **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*

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| --- | --- |
| **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”* |
| R4-2014427 | to be revised |
| R4-2015121 | 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”* |