**3GPP TSG-RAN WG4 Meeting #112 R4-24xxxxx**

**Maastricht, Netherlands, 19 - 23 Aug, 2024**

**Agenda item:** 5.23.9

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

**Title:** Topic summary for [112][321] NR\_NTN\_enh\_SAN\_UE\_demod

**Document for:** Information

# Introduction

This contribution summarises the open issues for NR\_NTN\_enh\_SAN\_UE\_demod under AI 5.23.8 at RAN4#112.

This topic is introduced in RAN4 demodulation at RAN4#108b with a completion by RAN#104 in June 2024.

Three topics are captured:

* Topic #1: SAN demodulation performance requirements
* Topic #2: CR list
* Topic #3: Documents and suggested status

1. Topic #1: SAN demodulaton requirements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2411037**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411037.zip) | Nokia |  |
| [**R4-2412304**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412304.zip) | Ericsson | [**Proposal 1** **Take following manufactory declaration for SAN PUSCH DM-RS bundling requirements.**](#_Toc173488320)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | D.xxx | Supported FDD PUSCH DM-RS bundling | Declaration of supporting FDD PUSCH DM-RS  bundling | c | x | n/a |   [**Proposal 2** **Take following applicability rule for SAN PUSCH DM-RS bundling requirements.**](#_Toc173488321)  8.1.2.5 Applicability of performance requirements for PUSCH with DM-RS bundling  8.1.2.5.1 Applicability of requirements for different subcarrier spacings  Unless otherwise stated, PUSCH with DM-RS bundling requirement tests shall apply only for each subcarrier spacings declared to be supported (see D.xxx in table 4.6-1).  8.1.2.5.2 Applicability of requirements for different receiver antenna connectors  Unless otherwise stated, for a SAN supporting different numbers of TAB connectors (for SAN type 1-H) (see D.37 in table 4.6-1), the PUSCH with DM-RS bundling performance tests with low MIMO correlation level shall apply only for the highest numbers of supported connectors, and the specific connectors used for testing are based on manufacturer declaration. |
| [**R4-2413438**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413438.zip) | Samsung | Proposal 1: Discussion the rule for how to derive the requirement for those cases with ideal simulation results span large than 2dB, in case there is no enough input with well aligned. The rule agreed in the R4-2220161 can be considered as a starting point, FFS on additional margin could be added.  Proposal 2: Additional margin could be considered for PUSCH requirement with DMRS bundling, in case the simulation results cannot be aligned well, where the span is large than 2dB. FFS to refine the test parameters |

## Open issues summary

**Issue 1: Manufactory declaration and applicability rule for SAN PUSCH DM-RS bundling requirements**

* Proposals
  + Option 1 (Ericsson):
    - Take following manufactory declaration for SAN PUSCH DM-RS bundling requirements.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| D.xxx | Supported FDD PUSCH DM-RS bundling | Declaration of supporting FDD PUSCH DM-RS  bundling | c | x | n/a |

* + - Take following applicability rule for SAN PUSCH DM-RS bundling requirements.

8.1.2.5 Applicability of performance requirements for PUSCH with DM-RS bundling

8.1.2.5.1 Applicability of requirements for different subcarrier spacings

Unless otherwise stated, PUSCH with DM-RS bundling requirement tests shall apply only for each subcarrier spacings declared to be supported (see D.xxx in table 4.6-1).

8.1.2.5.2 Applicability of requirements for different receiver antenna connectors

Unless otherwise stated, for a SAN supporting different numbers of TAB connectors (for SAN type 1-H) (see D.37 in table 4.6-1), the PUSCH with DM-RS bundling performance tests with low MIMO correlation level shall apply only for the highest numbers of supported connectors, and the specific connectors used for testing are based on manufacturer declaration.

* Recommended WF
  + Further discuss is needed.

**Issue 2: Requirement derivation**

* Proposals
  + Option 1 (Samsung): Discussion the rule for how to derive the requirement for those cases with ideal simulation results span large than 2dB, in case there is no enough input with well aligned. The rule agreed in the R4-2220161 can be considered as a starting point, FFS on additional margin could be added.
* Recommended WF
  + Further discuss is needed.

**Issue 3: Additional margin for PUSCH requirement with DMRS bundling**

* Proposals
  + Option 1 (Samsung): Additional margin could be considered for PUSCH requirement with DMRS bundling, in case the simulation results cannot be aligned well, where the span is large than 2dB. FFS to refine the test parameters
* Recommended WF
  + Further discuss is needed.

1. Topic #3: CR list

## CRs list for UE demodulation requirements

|  |  |  |
| --- | --- | --- |
| **TDoc** | **Title** | **Source** |
| [**R4-2411040**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411040.zip) | (NR\_NTN\_enh-Perf) CR on performance requirements for 38.101-5 | Nokia |
| [**R4-2411383**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411383.zip) | CR to 38.101-5 on eNTN demod requirements for PDCCH | Apple |
| [**R4-2412151**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412151.zip) | CR to 38.101-5: Correction on UE demodulation requirement for NTN FR2 | Ericsson |
| [**R4-2412772**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412772.zip) | CR on NTN PDSCH demodulation requirements | Huawei,HiSilicon |

## CRs list for SAN demodulation requirements

|  |  |  |
| --- | --- | --- |
| **TDoc** | **Title** | **Source** |
| [**R4-2411038**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411038.zip) | (NR\_NTN\_enh-Perf) CR on PUCCH performance requirements for 38.108 | Nokia |
| [**R4-2411039**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411039.zip) | (NR\_NTN\_enh-Perf) CR on PUSCH demodulation requirements for 38.181 | Nokia |
| [**R4-2412305**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412305.zip) | (NR\_NTN\_enh-Perf) CR to 38.181 correction on FRC and naming alignment | Ericsson |
| [**R4-2412773**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412773.zip) | CR on NTN radiated performance requirements for PUSCH | Huawei, HiSilicon |
| [**R4-2412774**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412774.zip) | CR on NTN OTA performance requirements for PUCCH | Huawei, HiSilicon |
| [**R4-2413439**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413439.zip) | CR on performance requirements for PUSCH with DM-RS bundling | Samsung |
| [**R4-2413440**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413440.zip) | CR on performance requirements for PUSCH in TS 38181 | Samsung |

1. Topic #4: Documents and suggested status

## Documents lists for discussion and simulation results

|  |  |  |
| --- | --- | --- |
| **TDoc** | **Suggest status** | **Comments** |
| [**R4-2411037**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411037.zip) | Noted |  |
| [**R4-2412304**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412304.zip) | Noted |  |
| [**R4-2413438**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413438.zip) | Noted |  |

## Documents lists for CRs

|  |  |  |
| --- | --- | --- |
| **TDoc** | **Suggest status** | **Comments** |
| [**R4-2411040**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411040.zip) | Revised | Moderator: Other specs affected should be 38.521-5 |
| [**R4-2411383**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411383.zip) | Agreeable | Moderator: No comments |
| [**R4-2412151**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412151.zip) | Agreeable | Moderator: No comments |
| [**R4-2412772**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412772.zip) | Agreeable | Moderator: No comments |
| [**R4-2411038**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411038.zip) | Revised | Moderator: The requirements may be updated based on the discussion progress. |
| [**R4-2411039**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2411039.zip) | Revised | Moderator: The requirements may be updated based on the discussion progress. |
| [**R4-2412305**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412305.zip) | Revised | Moderator: The changes may be updated based on the discussion progress. |
| [**R4-2412773**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412773.zip) | Revised | Moderator: The requirements may be updated based on the discussion progress. |
| [**R4-2412774**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2412774.zip) | Revised | Moderator: The requirements may be updated based on the discussion progress. |
| [**R4-2413439**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_112/Docs/R4-2413439.zip) | Revised | Moderator: The requirements may be updated based on the discussion progress. |