**3GPP TSG-RAN WG4 Meeting #110bis** **R4-2406024**

**Changsha, China, April 15th – 19th, 2024**

**Agenda item:** 6.16.9

**Source:** Huawei, HiSilicon

**Title:** WF on NR\_NTN\_enh\_SAN\_UE\_demod

**Document for:** Approval

1. Introduction

This contribution is the way forward for NR NTN enhancement demod for both SAN and UE. The following topics are captured:

* Topic #1: General
* Topic #2: UE demodulation performance requirements
* Topic #3: SAN demodulation performance requirements

# Channel model

**Issue 1-1: Doppler Spread for both UL and DL**

* Agreement
  + 1200Hz

# UE demodulation performance requirements

**Issue 2-1: PDSCH demodulation requirements for above 10 GHz bands**

* Agreement:

|  |  |  |
| --- | --- | --- |
| **Prop. Channel** | **MCS** | **HARQ Config** |
| NTN-TDLC5-1200 | MCS4 | Disabled HARQ （4/16） |
| MCS4 | 16 HARQ Proc |
| NTN-TDLC5-1200 | MCS4 | 32 HARQ Proc |
| MCS13 | 16 HARQ Proc |

**Issue 2-2: How to define requirements for GSO and NGSO for above 10 GHz bands**

* Agreement
  + Define one set of performance requirements for both NGSO and GSO
    - Only consider K\_offset = [8] that corresponding to 64 slots for 120kHz SCS

**Issue 2-3: PDCCH demodulation requirements for above 10 GHz bands**

* Agreement
* AL8 and AL16, with the following test configurations

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Case** | **Bandwidth (MHz)** | **SCS (kHz)** | **CORESET RB** | **CORESET duration** | **Aggregation level** | **CCE to REG mapping type** | **REG bundle size** | **Interleaver size** | **Shift index** | **DCI format** | **Payload (without CRC)** |
| 1 | 200 | 120 | 60 | 1 | 8 | Interleaved | 2 | 3 | 0 | [1-0] | [40] |
| 2 | 200 | 120 | 60 | 2 | 16 | Interleaved | 2 | 3 | 0 | [1-1] | [56] |

**Issue 2-4: Antenna configuration**

* Agreement
  + 1Tx1Rx

**Issue 2-5: Applicability rule**

* Agreement
  + All the performance requirements are applicable for Type 1 fixed and Type 2 mobile VSAT UEs

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| --- | --- | --- | --- | --- |
| **UE feature/capability [TBD]** | **Test type** | | **Test list** | **Applicability notes** |
| NR NTN access (nonTerrestrialNetwork-r17) | FR2-NTN | PDSCH | Clause x (Testxx ) |  |
| PDCCH | Clause y (Test 1, Test 2) |
| Increasing the number of HARQ processes (max-HARQ-ProcessNumber-r17) | FR2-NTN | PDSCH | Clause x (Testxx ) |  |
|  |  |
| Disabled HARQ feedback for downlink transmission (harq-FeedbackDisabled-r17) | FR2-NTN | PDSCH | Clause x (Testxx ) |  |
|  |  |

1. SAN demodulaton requirements

## Test setup for normal PUSCH with CP-OFDM for above 10 GHz bands

**Issue 3-1-1: MCS**

* Agreement
  + MCS 2 and [MCS 12]

**Issue 3-1-2: PTRS configuration**

* Agreement
  + Not configure PTRS for test with MCS 2 and [MCS12]

## Test setup for PUCCH for above 10 GHz bands

**Issue 3-2-1: UCI info**

* Agreement
  + The UCI information can include both ACK/NACK and CSI part 1 for specifying PUCCH UCI BLER performance requirement.

**Issue 3-2-2: Additional DMRS configuration for PUCCH format 3/4**

* Agreement
  + Define PUCCH format 3/4 requirements with additional DMRS configuration both enabled and disabled.
  + Reuse the applicability of requirements for different configurations in section 8.1.2.3.4 of TS 38.181

## Test setup for PUSCH with DM-RS bundling for FR1 UL coverage enhancement

**Issue 3-3-1: RB assignment**

* Agreement
  + 6RBs for both 15KHz and 30KHz

**Issue 3-3-2: PUSCH aggregation factor**

* Agreement
  + n4 for 15kHz SCS
  + n8 for 30kHz SCS

**Issue 3-3-3: pusch-TimeDomainWindowLength**

* Agreement
  + 4 for 15kHz SCS
  + 8 for 30kHz SCS

1. CR splits

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| --- | --- | --- |
| 38.101-5 | Big CR | Huawei |
| 11 | Radiated performance requirements | Nokia |
| 11.1 | General |
| 11.2 | Demodulation performance requirements |
| 11.2.1 | General |
| 11.2.2 | PDSCH demodulation requirements | Huawei |
| 11.2.2.1 | 1RX requirements |
| 11.2.3 | PDCCH demodulation requirements | Apple |
| 11.2.3.1 | 1RX requirements |
| Annex A | Measurement channels | Ericsson |
| A.3.2.1.4 | Reference measurement channels for PDSCH performance requirements |
| A.3.3 | Reference measurement channels for PDCCH performance requirements | Qualcomm |
| Annex B | Propagation conditions |

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| 38.108 | Big CR | Nokia |
| 8.2.5 | Performance requirements for PUSCH with DM-RS bundling | Samsung |
| 11 | Radiated performance requirements | Huawei |
| 11.1 | General |
| 11.2 | Performance requirements for PUSCH |
| 11.3 | Performance requirements for PUCCH | Nokia |
| 11.4 | Performance requirements for PRACH | CATT |
| Annex A | Reference measurement channels | Nokia |
| Annex D | Propagation conditions |

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| 38.181 | Big CR | Ericsson |
| 8.2.5 | Performance requirements for PUSCH with DM-RS bundling | Nokia |
| 11.2.5 | Performance requirements for PUSCH with DM-RS bundling |
| 4.1.2.4 | Measurement of performance requirements | Huawei |
| 4.6 | Manufacturer declarations |
| 11 | Radiated performance requirements |
| 11.1 | General |
| 11.2 | OTA performance requirements for PUSCH | Samsung |
| 11.3 | OTA performance requirements for PUCCH | Huawei |
| 11.4 | OTA performance requirements for PRACH | CATT |
| Annex A | Reference measurement channels | Ericsson |
| Annex C | Test tolerances and derivation of test requirements |
| Annex D | Measurement system set-up |
| Annex G | Propagation conditions |

1. Reference
2. R4-2402865, WF on NR\_NTN\_enh\_SAN\_UE\_demod, RAN4#110, Huawei, HiSilicon