**3GPP TSG-RAN WG4 Meeting #110bis R4-2406050**

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

**Title:** WF on UE demodulation performance for NR SL evolution

**Agenda Item:** 6.20.5

**Source:** LG Electronics

**Document for:** Approval

# 0 Introduction

This WF includes the agreements and open issues discussed in topic summary for [110bis][329] NR\_SL\_enh2\_demod.

According to session chair’s guidance, first section is for agreements issues and second section is for way forward.

# 1. Section#1 – For agreements

## Sub-topic 1-1 NR sidelink CA scenario

PSSCH performance requirements

**Issue 1-1-1: NR sidelink CA Bandwidth combination for PSSCH performance tests**

* CA bandwidth combination can be defined as rule in “applicability of requirement” section.
  + Additional section: 11.1.1.3 Applicability of CA requirements
  + Detail contents of additional section can be discussed.

**Issue 1-1-2: Number of sub-channels configuration for NR sidelink CA PSSCH test**

* Each CC is configured with 2 sub-channels (20RBs), existing requirements. e,g. Test 2 in Table 11.1.2.1.1-1 can be applied without simulation work

**Issue 1-1-3: Applicability rule for NR sidelink CA PSSCH test**

* Follow the precedence of CA applicability rule in 5.1.1.7.2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tests | CA capability where the tests apply | CA configuration from the selected CA capability where the tests apply | CA Bandwidth combination to be tested in priority order | PCell CC configuration |
| Test 1 in Clause 5.2A.2.1 and 5.2A.3.1 | CA\_C, CA\_N, CA\_AX | Table 5.1.1.7.2-2 | Largest aggregated CA bandwidth combination | Any of CCs |

PSCCH decoding capability test

**Issue 1-1-4: Bandwidth combination for PSCCH decoding capability test**

* Follow the precedence of CA applicability rule in 5.1.1.7.2

PSCCH decoding capability test

**Issue 1-1-6: Bandwidth combination for PSFCH decoding capability test**

* Follow the precedence of CA applicability rule in 5.1.1.7.2

## Sub-topic 1-2 NR sidelink unlicensed band scenario

**Issue 1-2-1: DMRS pattern for PSSCH test in SL-U**

* Support DMRS pattern {2,2}.

**Issue 1-2-2: Starting point of LBT model**

* If NR-U LBT model in 38.101-4 B.5 is assumed to be not suitable for SL-U, RAN4 could consider the LBT model of LAA.

**Issue 1-2-3: Starting point for LBT model**

* If the LBT model of LAA is used, the value for p\_LBT shall be defined. For alignment with 36.133, the value of 0.75 can be considered.

**Issue 1-2-4: TE emulation and DUT UE PSFCH transmission related**

* No further discussion on this issue

**Issue 1-2-5: Number of slots for transmission burst and muting method**

* Use following LBT model.

|  |
| --- |
| **1) Select the number of slots randomly from a given set of the number of slots with equal probability as the total length of burst transmission format.**  **2) uniform random variable from [0, 1] is generated.**   * **If the random variable is less than p which is given per test case,**   **- Start burst transmission with length selected in 1) at the end of last slot of previous burst.**   * **Otherwise, the burst transmission is muted and the muting duration is the same as the number of slots for determined burst format.**   **Note: Each slot is fully occupied. (Start from symbol 0, end at symbol 13)** |

**Issue 1-2-6: CPE in Gap**

* Do not consider COT sharing. So, For Gap1, Type1 LBT can be applied.

**Issue 1-2-7: Resource pool configuration**

* **Table 2-3: Proposed additional resource pool configuration**

|  |  |  |
| --- | --- | --- |
| Resource pool configuration | **Parameter** | **Value** |
| Number of interlaces per sub-channel within a resource pool (*sl-NumInterlacePerSubchannel-r18*) | 1 |
| Reference number of PRBs of one interlace within 1 RB set for TBS determination (*sl-NumReferencePRBs-OfInterlac*e) | 11 |
| Reference number of symbols for TBS determination. *(sl-NumRefSymbolLength)* | 14 |
| CPE starting position within the GP symbol before PSFCH transmission(*sl-CPE-StartingPositionPSFCH*  ) | 16 us after starting of the gap symbol before PSFCH transmisson |
| PSFCH transmission structure *(sl-TransmissionStructureForPSFCH-r18)* | CommonInterlace |
| Number of dedicated PRBs for PSFCH  *(sl-NumDedicatedPRBs-ForPSFCH-r18)* | 1 |
| The common interlace index for PSFCH  (*sl-PSFCH-CommonInterlaceIndex-r18*) | 0 |
| Number of PSFCH occasiopns corresponding to one PSSCH/PSCCH transmission. (*sl-NumPSFCH-Occasions-r18*) | 1 |

* Follow the legacy SL test
* Regarding the CPE before PSFCH transmission, it is not necessary because of Type 1 LBT operation for PSFCH transmission.

## Sub-topic 1-3 CR works

**Issue 1-3-1: Spec structure for SL-CA demodulation performance requirements**

* Additional section lists

11.1.1.1.3 Applicability of requirements for CA 🡪 LGE

11.1.1.1.4 Applicability of requirements for PSSCH with shared spectrum access 🡪 Huawei

11.1.2.1.2 Minimum requirements for PSSCH with shared spectrum access 🡪 Huawei

11.1.2A PSSCH demodulation requirements for CA 🡪 LGE

11.1.8A PSCCH decoding capability test for CA 🡪 Qualcomm

11.1.9A PSFCH decoding capability test for CA 🡪 Nokia

B.5.2 Sidelink Transmission Model for bands with shared spectrum access 🡪 Huawei

* Affected section lists

11.1.1.1.2 Applicability of requirements for mandatory UE V2X features with capability signalling 🡪 Huawei

A.6.2.2 Reference measurement channels for SCS 30 kHz FR1 🡪 Huawei

B.5 Transmission Model for requirements on bands with shared spectrum access 🡪 Huawei

# 2. Section#2 – For way forward

## Sub-topic 2-1 NR sidelink CA scenario

**Issue 1-1-5: Test setup for PSCCH decoding capability test**

* Option 1:
  + If PSFCH Rx/Tx capability is per UE as the total number of PSFCH Tx/Rx, we should have x­\_i as the number of PSFCH Tx/Rx on carrier i, and TE should evenly distribute the total capability on x\_i across all carriers (for high priority CCH and PSFCH transmission)
  + Else If PSFCH Rx/Tx capability is per CC, all the existing procedure description should apply.
* Option 2:
  + Same as option 1 except when PSFCH Rx/Tx capability is per UE the method of distribution of the total capability of PSFCH. How to distribute need to find.

**Issue 1-1-7: Test setup for PSFCH decoding capability test**

* Option 1:
  + If PSFCH Rx/Tx capability is per UE as the total number of PSFCH Tx/Rx, we should have x­\_i as the number of PSFCH Tx/Rx on carrier i, and TE should evenly distribute the total capability on x\_i across all carriers (for high priority CCH and PSFCH transmission)
  + Else If PSFCH Rx/Tx capability is per CC, all the existing procedure description should apply.
* Option 2:
  + Same as option 1 except when PSFCH Rx/Tx capability is per UE the method of distribution of the total capability of PSFCH. How to distribute need to find.

## Sub-topic 2-2 CR works

According to the work split, the formal CR should be submitted by next meeting.

Table 1: Work split on demodulation performance requirements for R18 Sidelink evolution

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Requirements for** | **Detail** | **New or impacted section in TS38.101-4** | **Volunteer Company** |
| 1 | PSSCH demodulation requirements for SL-CA | PSSCH demodulation requirements for SL-CA based on single carrier performance. | 11.1.1.1.3, 11.1.2A | LGE |
| 2 | PSCCH decoding capability test for SL-CA | PSCCH decoding capability test for SL-CA at maximum bandwidth combination. | 11.1.8A | Qualcomm |
| 3 | PSFCH decoding capability test for SL-CA | PSFCH decoding capability test for SL-CA at maximum bandwidth combination. | 11.1.9A | Nokia |
| 4 | PSSCH demodulation requirements for SL-U | PSSCH demodulation requirements for SL-U.  The discussed LBT model can be defined in B.5  Also, the reference measurement channel for SL-U PSSCH should be defined in A.6.2 | 11.1.1.1.2, 11.1.1.1.4, 11.1.2.1.2, B.5, A.6.2.2 | Huawei |