**3GPP TSG-RAN WG4 Meeting # 98-e *R4-2103815***

**Electronic Meeting, 25 Jan. - 5 Feb., 2021**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-4** | **CR** | **-** | **rev** | **1** | **Current version:** | **16.3.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Draft CR for PSSCH demodulation requirements for NR V2X | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | LG Electronics | | | | | | | | | |
| ***Source to TSG:*** | RAN4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_V2X\_NRSL-Perf | | | | |  | ***Date:*** | | | 2021-01-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | According to Big draft CR approach, draft CR for PSSCH demodulation requirements were submitted based on RAN4#97-e meeting agreements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The PSSCH demodulation requirements have been added. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The performance requirements will be incompleted. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS38.521-4 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**----- << Start of Change 1>> -----**

# 11 V2X Requirements

## 11.1 Demodulation performance requirements (conducted requirements)

### 11.1.1 General

### 11.1.2 PSSCH demodulation requirements

#### 11.1.2.1 2Rx requirements

##### 11.1.2.1.1 Minimum requirements

The purpose of the requirements in this subclause is to verify the PSSCH for V2X demodulation performance with a single active PSSCH link.

The minimum requirements are specified in Table 11.1.2.1.1-2 with the test parameters specified in Table 11.1.2.1.1-1. In this test scenario, GNSS or GNSS-equivalent synchronization source is used and sidelink UE 1 transmits PSCCH and PSSCH.

Table 11.1.2.1.1-1: Test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Value** | | |
| **Test 1** | **[Test 2]** | **Test 3** |
| Resource pool configuration | | |  | As specified in Table A.7-1 (Configuration #1-V2X) | | |
| Active cell(s) | | |  | None | | |
| Sidelink UE 1 | Sidelink transmissions | |  | PSCCH + PSSCH | | |
| 2nd stage SCI format 2-A configuration | Payloads | Bits | 35 | 35 | 35 |
| *α* |  | 1 | 1 | 1 |
| *βoffset* |  | 3.5 | 5 | 5 |
| *γ* | Bits | 4 | 8 | 3 |
| Timing offset (Note 1) | |  | CP/2-12\*64\*Tc | | |
| Frequency offset (Note 2) | | Hz | +600 | | |
| Synchronization | |  | GNSS or GNSS-equivalent | | |
| Antenna configuration | |  | 1x2 | | |
| PSFCH resource period | | | Slot | 4 | 4 | [4] |
| MinTimeGapPSFCH | | | Slot | 3 | 3 | [3] |
| Note 1: Time offset of sidelink UE receive signal with respect to GNSS referring timing.  Note 2: Frequency offset of sidelink UE with respect to GNSS reference frequency. | | | | | | |

Table 11.1.2.1.1‑2: Minimum performance

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test num.** | **Reference channel** | **Bandwidth (MHz)/ Subcarrier spacing(kHz)** | **Modulation format and code rate** | **Propagation condition** | **Reference value** | |
| **PSSCH BLER (%)** | **SNR(dB) of PSSCH** |
| 1 | R.PSSCH.2-1.1 | 20 / 30 | QPSK, 0.30 | TDLA30-2700 | 10% | TBD |
| [2] | R.PSSCH.2-1.2 | 20 / 30 | 16QAM, 0.37 | TDLA-1400 | TBD |
| 3 | R.PSSCH.2-1.3 | 20 / 30 | 64QAM, 0.43 | TDLA-180 | TBD |

**----- << End of Change 1>> -----**

**----- << Start of Change 2>> -----**

# A.6 SL reference measurement channels

## A.6.1 General

The transport block size (TBS) determination procedure is described in clause 8.1.3 of TS 38.214 [12].

## A.6.2 Reference measurement channels for PSSCH performance requirements

A.6.2.1 Reference measurement channels for SCS 15 kHz FR1

A.6.2.2 Reference measurement channels for SCS 30 kHz FR1

Table A.6.2.2-1: PSSCH Reference Channel for V2X

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | | |
| Reference channel |  | R.PSSCH.2-1.1 | [R.PSSCH.2-1.2] | R.PSSCH.2-1.3 |  |
| Channel bandwidth | MHz | 20 | 20 | 20 |  |
| Subcarrier spacing | kHz | 30 | 30 | 30 |  |
| Allocated resource blocks | RB | 20 | 20 | [10] |  |
| CP-OFDM symbols for slot with PSFCH(Note 1) |  | 9 | 9 | [9] |  |
| CP-OFDM symbols for slot without PSFCH |  | 12 | 12 | [12] |  |
| DMRS symbols for slot with PSFCH |  | 3 | 2 | 2 |  |
| DMRS symbols for slot without PSFCH |  | 4 | 3 | 2 |  |
| Modulation order |  | QPSK | 16QAM | 64QAM |  |
| MCS index |  | 4 | 11 | 17 |  |
| Number of MIMO layers |  | 1 | 1 | 1 |  |
| Number of DMRS REs |  |  |  |  |  |
| Transport Block Size for slot with PSFCH | Bits | 704 | 1928 | [984] |  |
| Transport Block Size for slot without PSFCH | Bits | 1064 | 2856 | [1928] |  |
| Transport block CRC | Bits | 24 | 24 | 24 |  |
| Maximum number of HARQ transmissions |  | 1 | 1 | 1 |  |
| Binary Channel Bits for slots with PSFCH |  | 2304 | 5088 | [2232] |  |
| Binary Channel Bits for slots without PSFCH | Bits | 3504 | 7728 | [4392] |  |
| Note 1: OFDM symbols is for PSCCH/PSSCH transmission not including first symbol (AGC) and PSFCH symbols. | | | | | |

**----- << End of Change 2>> -----**

**----- << Start of Change 3>> -----**

# A.7 SL reference resource pool configurations

Table A.7-1 V2X sidelink communication resource pool for PSSCH/PSCCH tests (Configuration #1-V2X)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Information Element** | | | **Value** | **Comment** |
| SL-ResourcePool-r16 | sl-PSCCH-Config-r16 | sl-TimeResourcePSCCH-r16 | n2 |  |
|  |  | sl-FreqResourcePSCCH-r16 | n10 |  |
|  | sl-SyncAllowed-r16 |  | gnss-Sync-r16 |  |
|  | sl-SubchannelSize-r16 |  | n10 |  |
|  | sl-TimeResource-r16 |  | 160 |  |
|  | sl-StartRB-Subchannel-r16 |  | 0 |  |
|  | sl-NumSubchannel-r16 |  |  | Depending on allocated resource blocks in A.6 |
|  | sl-Additional-MCS-Table-r16 |  | Not presented |  |
|  | sl-RB-Number-r16 |  | 51 |  |
|  | sl-X-Overhead-r16 |  | n0 |  |

**----- << End of Change 3>> -----**