**3GPP TSG-RAN WG4 Meeting # 98-bis-e *R4-21***

**Electronic Meeting, 12 - 20 April, 2021**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-4** | **CR** | **-** | **rev** | **-** | **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:*** | | | 2021-04-02 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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:*** | | Table format for test parameters, RMC, and resoruce pool configuration was discussed in the last RAN4 meeting and e-mail discussion. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 2nd stage CSI parameters have been moved to RMC table.  Resource pool configuration has been updated. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The performance requirements will be incompleted. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 11, A.6, A.7 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 | | | | |
| PSSCH DMRS pattern (Note 1) | |  | {3,4} | | {2,3} | | {2,2} |
| Timing offset (Note 2) | |  | CP/2-12\*64\*Tc | | | | |
| Frequency offset (Note 3) | | Hz | +600 | | | | |
| Synchronization | |  | GNSS or GNSS-equivalent | | | | |
| Antenna configuration | |  | 1x2 | | | | |
| PSFCH resource period | | | Slot | 4 | 4 | | 4 | |
| MinTimeGapPSFCH | | | Slot | 3 | 3 | | 3 | |
| Note 1: {x, y}: x and y means the number of DMRS symbols for slot with PSFCH transmission and without PSFCH transmission, respectively.  Note 2: Time offset of sidelink UE receive signal with respect to GNSS referring timing.  Note 3: 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 | TDLA30-1400 | TBD |
| 3 | R.PSSCH.2-1.3 | 20 / 30 | 64QAM, 0.43 | TDLA30-180 | 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 |  |
| Modulation order | |  | QPSK | 16QAM | 64QAM |  |
| MCS index | |  | 4 | 11 | 17 |  |
| Number of MIMO layers | |  | 1 | 1 | 1 |  |
| Number of DMRS REs | |  | 21 | 15 | 12 |  |
| Number of REs for SCI format 1-A | |  | 240 | 240 | 240 |  |
| 2nd stage SCI format 2-A configuraion | payloads | Bits | 35 | 35 | 35 |  |
| *α* |  | 1 | 1 | 1 |  |
| *βoffset* |  | 3.5 | 5 | 5 |  |
| Overhaed for TBS determination | |  | 0 | 0 | 0 |  |
| Transport Block Size for slot with PSFCH | | Bits | 704 | 1800 | 984 |  |
| Transport Block Size for slot without PSFCH | | Bits | 1128 | 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 | 4848 | 2232 |  |
| Binary Channel Bits for slots without PSFCH | | Bits | 3744 | 7728 | 4392 |  |
| Note 1: OFDM symbols is for PSCCH/PSSCH transmission not including first symbol (AGC), PSFCH symbols, and guard 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/Remark** | **Comment** |
| SL-BWP-ConfigCommon-r16 ::= SEQUENCE { |  |  |
| sl-BWP-Generic-r16 SEQUENCE { |  |  |
| sl-LengthSymbols-r16 | sym14 |  |
| sl-StartSymbol-r16 | sym0 |  |
| } |  |  |
| sl-BWP-PoolConfigCommon-r16 SEQUENCE { |  |  |
| sl-RxPool-r16 SEQUENCE (SIZE (1..maxNrofRXPool-r16)) OF SEQUENCE | 1 entry | SL-ResourcePool-r16 |
| sl-TxPoolSelectedNormal-r16 SEQUENCE { |  |  |
| sl-PoolToReleaseList-r16 |  |  |
| sl-PoolToAddModList-r16 SEQUENCE (SIZE (1..maxNrofTXPool-r16)) OF SEQUENCE { | 1 entry | SL-ResourcePoolConfig-r16 |
| sl-ResourcePoolID-r16 |  |  |
| sl-ResourcePool-r16 { |  |  |
| sl-PSCCH-Config-r16 { |  |  |
| sl-TimeResourcePSCCH-r16 | n2 |  |
| sl-FreqResourcePSCCH-r16 | n10 |  |
| } |  |  |
| sl-PSFCH-Config-r16 { |  |  |
| sl-NumMuxCS-Pair-r16 | n1 |  |
| sl-PSFCH-HopID-r16 | 0 |  |
| sl-PSFCH-CandidateResourceType-r16 | startSubCh |  |
| } |  |  |
| sl-SyncAllowed-r16 | gnss | ENUMERATED {gnss, gnbEnb, ue } |
| sl-SubchannelSize-r16 | n10 |  |
| sl-TimeResource | 11111111  11111111  1111 | Indicates the time resource of resource pool within sl-Period. |
| sl-StartRB-Subchannel-r16 | 0 |  |
| sl-Additional-MCS-Table-r16 | Not presented |  |
| sl-PTRS-Config-r16 | Not presented |  |
| sl-X-Overhead-r16 | n0 |  |
| } |  |  |
| } |  |  |
| } |  |  |
| sl-TxPoolSelectedNormal-r16 |  |  |
| sl-TxPoolExceptional-r16 |  |  |
| } |  |  |
| } |  |  |
| SL-ThresPSSCH-RSRP | 66 | Threshold to allow PSSCH transmission for PSFCH reception is infinity dBm. |

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