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

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| --- |
|  |
| ***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 canbe 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

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| **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)

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| **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 | 11111111111111111111 | 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>> -----**