**3GPP TSG-RAN WG4 Meeting #111 R4-2407519**

**Fukuoka City, Fukuoka, Japan, 20th – 24th May, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
|  | | | | | | | | |
| *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:*** | (Set 1-4 & 10-2) Draft CR for SL PRS configuration and SL Rx-Tx measurement delay TC in FR1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_pos\_enh2-Perf | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The requirements for SL Rx-Tx measurement delay are defined and the corresponding test cases need to be introduced. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Introduce the SL PRS configuration and the test case for SL Rx-Tx measurement delay requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The test case for SL Rx-Tx measurement delay requirements is missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | New A.3.X, A.9A.1.1.X | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

# <Start of Change 1>

## A.3.X NR Sidelink Measurements for Positioning

### A.3.X.1 Introduction

This clause defines the principles and the reference configurations that are applicable to test cases verifying RRM requirements for NR sidelink measurements for positioning.

### A.3.X.2 NR SL-PRS configurations

### A.3.X.2.1 NR SL-PRS configurations for FR1

Table A.3.X.2.1-1: SL PRS.1 FR1: SL PRS configuration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SL PRS Parameters | Values | | | |
| Reference channel | SL PRS.1.1 FR1 | SL PRS.1.2 FR1 | SL PRS.1.3 FR1 | SL PRS.1.4 FR1 |
| SCS | 15kHz, 30kHz | | | |
| SL PRS comb size | 2 | | 4 | |
| Number of SL PRS symbol | 4 | | 4 | |
| SL PRS comb offset Note 1 | [1] | | [1] | |
| SL PRS Resource slot offset (slot) Note 1 | [0] | [4] | [0] | [4] |
| RB numbers containing SL PRS within channel BW Note 1 | [48] | | [96] | |
| SL PRS Starting PRB | [4] | | [4] | |
| [SL PRS reservation periodicity (ms)] | [40] | | [40] | |
| Note 1: Unless otherwise specified in the test case | | | | |

# <End of Change 1>

# <Start of Change 2>

# A.9A Tests for NR Sidelink Measurements for Positioning

## A.9A.1 Tests for NR Sidelink Measurements for Positioning in FR1

### A.9A.1.1 Measurement delay tests

#### A.9A.1.1.X SL Rx-Tx measurement delay tests

##### A.9A.1.1.X.1 Test Purpose and Environment

The purpose of this test is to verify that the V2X UE meets the SL Rx-Tx time difference measurement requirements defined in clause 12A.4 in AWGN propagation condition in FR1 when single frequency layer is configured. And the reference timing used for sidelink transmissions is a NR serving cell in FR1 on a non-V2X sidelink carrier.

Supported test configurations for FR1 NR cell are shown in Table A.9A.1.1.X.1-1.

**Table A.9A.1.1.X.1-1: Supported Test Configurations for FR1 NR cell**

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | NR Uu: 15 kHz SSB SCS, 20 MHz BW, FDD duplex mode |
| 2 | NR Uu: 15 kHz SSB SCS, 20 MHz BW, TDD duplex mode |
| 3 | NR Uu: SSB SCS 30 kHz, 40 MHz BW, TDD duplex mode |
| Note 1: The UE is only required to pass in one of the supported test configurations in FR1. | |

There is one NR active cell (Cell 1) and two active V2X UEs (Anchor UEs for SL positioning measurement) in this test. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Before T2 starts, the V2X UEs have been synchronized to the NR serving cell. And during T2, two V2X UEs transmit SL PRS for positioning measurements.

The *SL-TDOA-ProvideAssistanceData* and *SL-TDOA-RequestLocationInformation* as defined in TS 38.355 [37, clause 6.9], shall be provided to the target UE via Cell 1 during T1. The last TTI containing the two messages shall be provided to the target UE ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the *SL-TDOA assistance* data and location information request.

The test parameters are given in Table A.9A.1.1.X.1-2, A.9A.1.1.X.1-3 and Table A.9A.1.1.X.1-4 below.

Table A.9A.1.1.X.1-2: V2X sidelink general Test Parameters for SL Rx-Tx measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| SCS | kHz | 30 |  |
| Active cell |  | Cell 1 |  |
| Active V2X UE |  | V2X UE 1,  V2X UE 2 | Transmitting SL PRS on RF channel number 1 |
| V2X sidelink communication preconfiguration |  | As specified in Table A.3.21.2-2 | IE values unless specified otherwise in this test |
| PSCCH Reference Measurement Channel |  | CC.1A HD | As specified in Table A.3.21.3-1 |
| PSSCH Reference Measurement Channel |  | CD.1A HD | As specified in Table A.3.21.3-2 |
| networkControlledSyncTx |  | Not configured |  |
| syncTxThreshOoC | dBm/30kHz | -100 |  |
| T1 | s | 3 |  |
| T2 | s | 5.24 |  |

Table A.9A.1.1.X.1-3: Anchor V2X UE specific test parameters for SL Rx-Tx measurement

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | V2X UE 1 | | V2X UE 2 | | Comment |
| T1 | T2 | T1 | T2 |  |
| NR RF Channel Number |  | 1 | | 1 | |  |
| Channel Bandwidth (BWchannel) Note3 | MHz | 20(NRB,c = 50) or 40(NRB,c = 100) | | 20(NRB,c = 50) or 40(NRB,c = 100) | |  |
| SLSSID |  | 30 | | 30 | |  |
| inCoverage |  | TRUE | | TRUE | |  |
| networkControlledSyncTx |  | ON | | ON | |  |
| SL PRS configuration |  | - | SL PRS.1.1 FR1 | - | SL PRS.1.2 FR1 | As specified in Table A.3.X.2.1-1 |
| Note1 | dBm/30 kHz | -95 | | -95 | |  |
| SL PRS | dB | - | 3 | - | 3 |  |
| SL PRS | dB | - | 3 | - | 3 |  |
| SL PRS-RSRPNote2 | dBm/30 kHz | - | -92 | - | -92 |  |
| IoNote2 | dBm/36MHz | - | -59.2 | - | -59.2 |  |
| Propagation condition |  | AWGN | | | |  |
| Note 1: Interference from other UEs and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SL PRS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. Io level is based on the allocated RBs for SL PRS symbols.  Note 3: The UE is only required to be tested in one of the supported test configurations. | | | | | | |

Table A.9A.1.1.X.1-4: NR serving Cell Test Parameters for SL Rx-Tx measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 |
| RF Channel Number | |  | 2 |
| Duplex Mode | Config 1 |  | FDD |
| Config 2,3 |  | TDD |
| TDD configuration | Config 1 |  | Not Applicable |
| Config 2 |  | TDDConf.1.1 |
| Config 3 |  | TDDConf.2.1 |
| Channel Bandwidth (BWchannel) | Config 1,2 | MHz | 10: NRB,c = 52 |
| Config 3 | 40: NRB,c = 106 |
| Initial BWP Configuration | |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP Configuration | |  | DLBWP.1.1  ULBWP.1.1 |
| DRX Cycle | |  | N/A |
| PDSCH Reference measurement channel | Config 1 |  | SR.1.1 FDD |
| Config 2 |  | SR.1.1 TDD |
| Config 3 |  | SR.2.1 TDD |
| CORESET Reference Channel | Config 1 |  | CR.1.1 FDD |
| Config 2 |  | CR.1.1 TDD |
| Config 3 |  | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | Config 1 |  | CCR.1.1 FDD |
| Config 2 |  | CCR.1.1 TDD |
| Config 3 |  | CCR.2.1 TDD |
| SSB configuration | Config 1,2 |  | SSB.1 FR1 |
| Config 3 |  | SSB.2 FR1 |
| SMTC Configuration | |  | SMTC.2 |
| OCNG Patterns | |  | OP.1 |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |
| Note2 | Config 1,2,3 | dBm/15 kHz | -98 |
| Note2 | Config 1,2 | dBm/SCS | -98 |
| Config 3 | -95 |
|  | | dB | 3 |
| SS-RSRP Note3 | Config 1,2 | dBm/SCS | -95 |
| Config 3 | -92 |
| Io Note 3 | Config 1,2 | dBm/9.36 MHz | -65.2 |
| Config 3 | dBm/38.1 MHz | -59.2 |
| Propagation Condition | |  | AWGN |
| Note 1: OCNG shall be used such that cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | |

##### A.9A.1.1.X.2 Test Requirements

The SL Rx-Tx time difference measurement time fulfils the requirements specified in clause 12A.4.5.

The V2X UE shall perform and report the SL Rx-Tx time difference measurements for Anchor UE 1 within the specified SL Rx-Tx time difference measurement time starting from the beginning of time interval T2.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the time duration above because of TTI insertion uncertainty of the measurement report in DCCH.

The rate of the correct events for each Anchor UE observed during repeated tests shall be at least 90%, where the reported SL Rx-Tx measurement for each correct event shall be within the SL Rx-Tx reporting range specified in clause 10.4A.4.1.

# <End of Change 2>