**3GPP TSG- Meeting #9**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **3701** | **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:*** |  | | | | | | | | | |
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| ***Source to WG:*** | , OPPO | | | | | | | | | |
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| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
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| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Add endorsed draft CRs in RAN4#109 based on endorsed draft Big CR for RRM requirements for NR sidelink evolution (R4-2315535). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add the endorsed draft CRs in RAN4#108bis:   * R4-2321587 draftCR on interruptions to WAN due to sidelink carrier aggregation * R4-2321352 Draft CR for RRM requirements for NR sidelink unlicensed operation * R4-2321584 Draft CR for RRM requirements for NR SL CA * R4-2321473 DraftCR: RRM requirements for initiation/cease of SLSS Transmissions with CCA | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The RRM core requirements for SL Evoluation are missing in the specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 12.1, 12.2, new12.3A, new12.4A, 12.5, new12.7.x, new12.y, new12.z | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.533 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

## 12.1 Introduction

This clause contains the requirements for the UE capable of V2X sidelink communication when the UE is out of coverage on the carrier used for V2X sidelink operation, as defined in TS 38.304 [1]. The requirements apply when the UE is:

- in any cell selection state, or,

- configured for V2X SL operation on a V2X carrier which is dedicated to only V2X SL operation and configured with only a PCell on WAN carrier.

- configured for SL operation on a sidelink carrier with CCA and configured with only a PCell on WAN carrier.

- configured for inter-band con-current V2X operation.

- configured for intra-band con-current V2X operation with different carriers.

- configured in co-channel coexistence for LTE SL and NR SL operation with same carrier，

Note: Any cell selection state refers to a UE that is out of network coverage and is not associated with a serving cell on any carrier as defined in TS 38.304 [1].

Note: When a UE in RRC\_CONNECTED state is performing transmissions and/or reception for V2X sidelink communication, the UE shall meet all the requirements specified in Clause 9 assuming that UE has a dedicated RX/TX chain for V2X sidelink communication. Otherwise, the UE may interrup the V2X sidelink communication in order to meet the measurement requirements specified in Clause 9.

This clause also contains the requirements for the UE capable of V2X sidelink communication when the UE is in coverage on the carrier used for V2X sidelink operation, as defined in TS 38.304 [1]. The requirements apply when the UE is:

- configured for intra-band con-current NR V2X cooperation with same carrier.

- configured in co-channel coexistence for LTE SL and NR SL operation with same carrier，

For UE capable of Public Safety sidelink communication and/or other commercial sidelink commnunication, unless explicitly stated, V2X requirements apply.

For sidelink communication in unlicensed spectrum,

- the term SyncRef UE subject to CCA is not available at the UE refers to when all the candidate S-SSB positions monitored in every S-SSB period are not available during the last 1280 ms; otherwise the SyncRef UE subject to CCA is considered as available at the UE.

- the term S-SSB period subject to CCA is not available at the UE refers to the S-SSB period in which all the candidate S-SSB positions are not available; otherwise the S-SSB period subject to CCA is considered as available at the UE.

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

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

## 12.2 UE Transmit Timing

### 12.2.1 Introduction

This clause contains requirements of transmission timing for V2X sidelink communication when:

- GNSS is used as the synchronization reference source;

- NR Cell is used as the synchronization reference source;

- E-UTRAN Cell is used as the synchronization reference source;

- SyncRef UE is used as the synchronization reference source.

The requirements for 60kHz SCS of sidelink signal defined in this caluse do not apply to the sidelink communication in unlicensed spectrum.

### 12.2.2 GNSS as synchronization reference source

The requirements in this subclause are applicable when the reference timing used by the UE for V2X sidelink communication is derived from GNSS.

The sidelink transmissions takes place  before the subframe starting boundary as defined in TS 38.331 [2], where  = 0 and=0.

The transmission timing error for sidelink transmissions shall be less than or equal to ±Te where the timing error limit value Te is defined in Table 12.2.2-1.

Table 12.2.2-1: Te Timing Error Limit

|  |  |
| --- | --- |
| Frequency Range of sidelink | Te\_ |
| FR1 | 12\*64\*Tc |
| Note 1: Tc is the basic timing unit defined in TS 38.211 [6]. | |

### 12.2.3 NR Cell as synchronization reference source

The requirements in this subclause are applicable when the reference timing used for sidelink transmissions is a NR serving cell on a non-V2X sidelink carrier or a V2X sidelink carrier.

The sidelink transmissions takes place  before the reception of the first detected path (in time) of the corresponding downlink frame from the reference cell, where = 0. If uplink transmission and sidelink transmission are in the same band,  is defined in Table 7.1.2-2, otherwise  is 0.

The transmission timing error for sidelink transmissions shall be less than or equal to ±Te where the timing error limit value Te is defined in Table 12.2.3-1.

Table 12.2.3-1: Te Timing Error Limit

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency Range of sidelink | SCS of SSB signals ( kHz) | SCS of sidelink signals (kHz) | Te |
| FR1 | 15 | 15 | 14\*64\*Tc |
|  |  | 30 | 12\*64\*Tc |
|  |  | 60 | 12\*64\*Tc |
|  | 30 | 15 | 10\*64\*Tc |
|  |  | 30 | 10\*64\*Tc |
|  |  | 60 | 9\*64\*Tc |
| Note 1: Tc is the basic timing unit defined in TS 38.211 [6]. | | | |

### 12.2.4 E-URTAN Cell as synchronization reference source

The requirements in this subclause are applicable when the reference timing used for sidelink transmissions is an E-UTRAN serving cell on a non-V2X sidelink carrier.

The sidelink transmissions takes place  before the reception of the first detected path (in time) of the corresponding E-UTRAN downlink frame from the reference cell, where  = 0 and=0.

The transmission timing error for sidelink transmissions shall be less than or equal to ±Te where the timing error limit value Te is defined in Table 12.2.4-1.

Table 12.2.4-1: Te Timing Error Limit

|  |  |  |
| --- | --- | --- |
| Frequency Range of sidelink | E-UTRAN downlink bandwidth (MHz) | Te\_ |
| FR1 | ≥3 | 14\*64\*Tc |
| Note 1: Tc is the basic timing unit defined in TS 38.211 [6]. | | |

### 12.2.5 SyncRef UE as synchronization reference source

The requirements in this subclause are applicable when the reference timing used for deriving sidelink transmission is from SyncRef UE transmitting sidelink synchronization signals.

The sidelink transmissions takes place  before the reception of the first detected path (in time) of the corresponding timing reference frame from the SyncRef UE, where  = 0 and=0.

The transmission timing error for sidelink transmissions shall be less than or equal to ±Te where the timing error limit value Te is defined in Table 12.2.5-1.

Table 12.2.5-1: Te Timing Error Limit

|  |  |  |
| --- | --- | --- |
| Frequency Range of sidelink | SCS of sidelink signals (kHz) | Te |
| FR1 | 15 | 12\*64\*Tc |
|  | 30 | 8\*64\*Tc |
|  | 60 | 5\*64\*Tc |
| Note 1: Tc is the basic timing unit defined in TS 38.211 [6]. | | |

If the UE uses SyncRefUE on a carrier frequency subject to CCA for deriving the UE transmit timing, then the UE shall meet all the transmit timing requirements defined in clause 12.2.5 provided that the SyncRefUE is available at the UE. The transmission timing error for sidelink transmissions shall be less than or equal to ±Te where the timing error limit value Te is defined in Table 12.2.5-1 provided that at least one S-SSB is available at the UE durting the last 160ms.

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

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

## 12.3A Initiation/Cease of SLSS Transmissions with CCA

### 12.3A.1 Introduction

The requirements in this subclause are applicable to the UE capable of sidelink communication in unlicensed spectrum when:

- GNSS is used as the synchronization reference source;

- NR Cell is used as the synchronization reference source;

- EUTRAN Cell is used as the synchronization reference source;

- SyncRef UE is used as the synchronization reference source on a carrier frequency subject to CCA.

#### 12.3A.1.1 Initiation/Cease of SLSS transmissions with NR cell as synchronization reference source

The requirements defined in subclause 12.3.1.1 apply when the NR Cell is used as synchronization reference source and when the UE is

- out of coverage on the NR sidelink carrier and in-coverage with a serving cell on a NR non- sidelink carrier, or

- in coverage with a serving cell on a NR sidelink carrier.

#### 12.3A.1.2 Initiation/Cease of SLSS transmissions with EUTRAN cell as synchronization reference source

The requirements defined in subclause 12.3.1.2 apply when the EUTRAN Cell is used as synchronization reference source and when the UE is

- out of coverage on the NR sidelink carrier and in-coverage with a serving cell on a LTE non-sidelink carrier.

#### 12.3A.1.3 Initiation/Cease of SLSS transmissions with GNSS as synchronization reference source

The requirements defined in subclause 12.3.1.3 apply when GNSS is used as synchronization reference source and when the UE is

- out of coverage on the sidelink carrier and in-coverage with a serving cell on a non-sidelink carrier, or

- in coverage with a serving cell on a NR sidelink carrier.

#### 12.3A.1.4 Initiation/Cease of SLSS transmissions with SyncRef UE as synchronization reference source

The requirements apply when SyncRef UE is used as synchronization reference source and when the UE is

- in any cell selection state, or

- out of coverage on the sidelink carrier and is associated with a serving cell on a non-sidelink carrier, or

- in coverage with a serving cell on a NR sidelink carrier,

and when the conditions for SLSS transmissions specified in TS 38.331[2] are met and when SyncRef UE is used as synchronization reference source and if *syncTxThreshOoC* is included in the preconfigured sidelink parameters.

The UE shall be capable of measuring the PSBCH-RSRP of the selected SyncRef UE used as synchronization reference source and evaluate it to initiate/cease SLSS transmissions within Tevaluate,SLSS\_CCA, as shown in Table 12.3A.1.4-1 when the SyncRef UE is transmitting S-SSB on a carrier frequency subject to CCA.

Table 12.3A.1.4-1: Tevaluate,SLSS\_CCA when SyncRef UE is transmitting S-SSB on a carrier subject to CCA and is used as synchronization reference source

|  |  |
| --- | --- |
| SL-DRX cycleNote 1 [ms] | Tevaluate,SLSS\_CCA [ms] |
| No SL-DRX | (4 + LSLSS) x S-SSB periods |
| SL-DRX cycle ≤ 160ms | (4 + LSLSS) x S-SSB periods |
| SL-DRX cycle > 160ms | (4 + LSLSS) x SL-DRX cycle |
| Note 1: If multiple SL-DRX cycles are configured for SL UE, the SL-DRX cycle in the requirement is the shortest of all the configured SL-DRX cycles. When the shortest SL-DRX cycle UE used changes, the requirements do not apply to the time of transition.  Note 2: LSLSS is the number of unavailable S-SSB period during Tevaluate,SLSS\_CCA due to the CCA failures; where LSLSS ≤ LSLSS, max and LSLSS, max = 4. | |

The UE shall initiate the procedure for selection/reselection of different synchronization reference source as defined in TS38.331 [2] when the requirements cannot be met due to that LSLSS exceeding LSLSS, max during Tevaluate,SLSS\_CCA.

If higher layer filtering for PSBCH-RSRP measurements is pre-configured, an additional delay in evaluation to initiate/cease SLSS transmissions can be expected.

For the selected SyncRef UE as defined in TS 38.331 [2] used to derive transmission timing for sidelink communication:

- PSBCH-RSRP related side conditions given in Clause 12.4 for a corresponding Band are fulfilled,

- sidelink S-SSB\_RP and S-SSB Ês/Iot according to Annex B. 4 for a corresponding Band are fulfilled.

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

-------------- Start of Change <4> --------------

## 12.4A Selection / Reselection of Sidelink Synchronization Reference Source with CCA

The requirements defined in this clause do not apply to the UEs that do not support transmission and reception of SLSS.

A SyncRef UE is considered to be detectable when

- PSBCH-RSRP related side conditions given in Clause 10 are fulfilled for a corresponding Band,

- S-SSB\_RP and S-SSB Ês/Iot according to Annex B.4.3 for a corresponding Band are fulfilled.

When GNSS synchronization reference source is configured as the highest priority and

- UE is synchronized to GNSS directly,

- UE shall not drop any sidelink SLSS and data transmission for the purpose of selection/reselection to the SyncRef UE.

- UE is synchronized to a SyncRef UE that is synchronized to GNSS directly or in-directly,

- UE shall not drop any sidelink data transmission for the purpose of selection/reselection to the SyncRef UE. The UE shall be able to identify newly detectable intra-frequency SyncRef UE within Tdetect,SyncRef UE\_V2X\_CCA seconds if the SyncRef UE meets the selection / reselection criterion defined in TS 38.331[2] and all S-SSB periods selected for SyncRefUE identification are available during the Tdetect,SyncRef UE\_V2X\_CCA seconds. Tdetect,SyncRef UE\_V2X\_CCA is defined as 1.6 seconds at S-SSB Ês/Iot ≥ 0 dB, provided that the UE is allowed to drop a maximum of 30% of its SLSS transmissions during Tdetect,SyncRef UE\_V2X\_CCA for the purpose of selection / reselection to the SyncRef UE.

For other cases

- When UE is in non-SL-DRX

- The UE shall be able to identify newly detectable intra-frequency SyncRef UE within Tdetect,SyncRef UE\_V2X\_CCA seconds if the SyncRef UE meets the selection / reselection criterion defined in TS 38.331[2] and all S-SSB periods selected for SyncRefUE identification are available during the Tdetect,SyncRef UE\_V2X\_CCA seconds. Tdetect,SyncRef UE\_V2X\_CCA is defined as 8 seconds at S-SSB Ês/Iot ≥ 0 dB, provided that the UE is allowed to drop its sidelink data and SLSS transmissions at most in an aggregated window of 480ms during Tdetect,SyncRef UE\_V2X\_CCA for the purpose of selection / reselection to the SyncRef UE. [UE is allowed to additionally drop a maximum of 30% of its SLSS transmission. The UE shall be able to identify newly detectable intra-frequency SyncRef UE within T’detect,SyncRef UE\_V2X\_CCA seconds if the SyncRef UE [is in the UE’s S-SSB resource], and all S-SSB periods selected for SyncRefUE identification are available during the T’detect,SyncRef UE\_V2X\_CCA seconds, only when UE additionally drops a maximum of 30% of its SLSS transmission. T’detect,SyncRef UE\_V2X\_CCA is defined as 1.6 seconds at S-SSB Ês/Iot ≥ 0 dB.]

- UE is allowed to drop up to 2 slots of its sidelink data reception per PSBCH monitoring occasion and overall drop rate shall not exceed 0.3% of its sidelink data reception during Tdetect,SyncRef UE\_V2X\_CCA for the purpose of selection / reselection to the SyncRef UE.

- When UE is in SL-DRX

- UE shall be able to identify newly detectable intra-frequency SyncRef UE within Tdetect,SyncRef UE\_V2X\_CCA seconds if the SyncRef UE meets the selection / reselection criterion defined in TS 38.331[2] and all S-SSB periods selected for SyncRefUE identification are available during the Tdetect,SyncRef UE\_V2X\_CCA seconds. Tdetect,SyncRef UE\_V2X\_CCA is defined as 8 seconds at S-SSB Ês/Iot ot0 dB, provided that the sidelink UE is allowed to drop a maximum of 6 % of its sidelink data and SLSS transmissions for the purpose of selection / reselection to the SyncRef UE. [UE is allowed to additionally drop a maximum of 30% of its SLSS transmission. The UE shall be able to identify newly detectable intra-frequency SyncRef UE within T’detect,SyncRef UE\_V2X\_CCA seconds if the SyncRef UE [is in the UE’s S-SSB resource], and all S-SSB periods selected for SyncRefUE identification are available during the T’detect,SyncRef UE\_V2X\_CCA seconds, only when UE additionally drops a maximum of 30% of its SLSS transmission. T’detect,SyncRef UE\_V2X\_CCA is defined as 1.6 seconds at S-SSB Ês/Iot ≥ 0 dB.]

- UE is allowed to drop up to 2 slots of its sidelink data reception per PSBCH monitoring occasion and UE is allowed to drop at most an aggregated window of 24ms of its sidelink data reception during Tdetect,SyncRef UE\_V2X\_CCA for the purpose of selection / reselection to the SyncRef UE.

- The UE is allowed to extend Tdetect,SyncRef UE\_V2X\_CCA to max(4 x 50 SL-DRX cycle length, 8s) when the following conditions are satisfied over an evaluation period Tevaluate,SLSS in clause 12.3.1.1 if an NR cell is used as synchronization reference source, or Tevaluate,SLSS in clause 12.3.1.2 if an EUTRA cell is used as synchronization reference source, or Tevaluate,SLSS\_CCA in clause 12.3A.1.4 if an SLSS is used as synchronization reference source. If multiple SL-DRX cycles are configured, the SL-DRX cycle length is the longest one.

- SS-RSRP is larger than *syncTxThreshOoC*.

When serving cell/PCell synchronization reference source is configured as the highest priority,

- When UE is in non-SL-DRX

- UE shall be able to identify newly detectable intra-frequency SyncRef UE within Tdetect,SyncRef UE\_V2X\_CCA seconds if the SyncRef UE meets the selection / reselection criterion defined in TS 38.331[2] and all S-SSB periods selected for SyncRefUE identification are available during the Tdetect,SyncRef UE\_V2X\_CCA seconds. Tdetect,SyncRef UE\_V2X\_CCA is defined as 8 seconds at SCH Es/Iot ot0 dB, provided that the sidelink UE is allowed to drop a maximum of 6 % of its sidelink data and SLSS transmissions for the purpose of selection / reselection to the SyncRef UE. [When GNSS is not available, UE is allowed to additionally drop a maximum of 30% of its SLSS transmission. The UE shall be able to identify newly detectable intra-frequency SyncRef UE within T’detect,SyncRef UE\_V2X\_CCA seconds if the SyncRef UE [is in the UE’s S-SSB resource], and all S-SSB periods selected for SyncRefUE identification are available during the T’detect,SyncRef UE\_V2X\_CCA seconds, only when UE additionally drops a maximum of 30% of its SLSS transmission. T’detect,SyncRef UE\_V2X\_CCA is defined as 1.6 seconds at S-SSB Ês/Iot ot dB.]

- UE is allowed to drop up to 2 slots of its sidelink data reception per PSBCH monitoring occasion and overall drop rate shall not exceed 0.3% of its sidelink data reception during Tdetect,SyncRef UE\_V2X\_CCA for the purpose of selection / reselection to the SyncRef UE.

- When UE is in SL-DRX

- The UE shall be able to identify newly detectable intra-frequency SyncRef UE within Tdetect,SyncRef UE\_V2X\_CCA seconds if the SyncRef UE meets the selection / reselection criterion defined in TS 38.331[2] and all S-SSB periods selected for SyncRefUE identification are available during the Tdetect,SyncRef UE\_V2X\_CCA seconds. Tdetect,SyncRef UE\_V2X\_CCA is defined as 8 seconds at SCH Es/Iot ≥ 0 dB, provided that the UE is allowed to drop its sidelink data and SLSS transmissions at most in an aggregated window of 480ms during Tdetect,SyncRef UE\_V2X\_CCA for the purpose of selection / reselection to the SyncRef UE. [When GNSS is not available, UE is allowed additionally to drop a maximum of 30% of its SLSS transmission. The UE shall be able to identify newly detectable intra-frequency SyncRef UE within T’detect,SyncRef UE\_V2X\_CCA seconds if the SyncRef UE [is in the UE’s S-SSB resource], and all S-SSB periods selected for SyncRefUE identification are available during the T’detect,SyncRef UE\_V2X\_CCA seconds, only when UE additionally drops a maximum of 30% of its SLSS transmission. T’detect,SyncRef UE\_V2X\_CCA is defined as 1.6 seconds at S-SSB Ês/Iot ≥ 0 dB.]

- UE is allowed to drop up to 2 slots of its sidelink data reception per PSBCH monitoring occasion and UE is allowed to drop at most an aggregated window of 24ms of its sidelink data reception during Tdetect,SyncRef UE\_V2X\_CCA for the purpose of selection / reselection to the SyncRef UE.

- The UE is allowed to extend Tdetect,SyncRef UE\_V2X\_CCA to max(4 x 50 SL-DRX cycle length, 8s) when the following conditions are satisfied over an evaluation period Tevaluate,SLSS in clause 12.3.1.1 if an NR cell is used as synchronization reference source, or Tevaluate,SLSS in clause 12.3.1.2 if an EUTRA cell is used as synchronization reference source, or Tevaluate,SLSS\_CCA in clause 12.3A.1.4 if an SLSS is used as synchronization reference source. If multiple SL-DRX cycles are configured, the SL-DRX cycle length is the longest one.

- SS-RSRP is larger than *syncTxThreshOoC*.

UE shall be capable of performing PSBCH-RSRP measurements for 3 identified intra-frequency SyncRef UE with the measurement period of Tmeasure,PSBCH-RSRP\_CCA in Table 12.4A-1. It is assumed that the SyncRef UE do not drop or delay any SLSS transmission within the measurement period. Otherwise, the measurement period may be extended.

Table 12.4A-1: PSBCH-RSRP measurement period for intra-frequency SyncRef UE

|  |  |
| --- | --- |
| SL-DRX cycleNote 1 [ms] | Tmeasure,PSBCH-RSRP\_CCANote 3[ms] |
| No SL-DRX | (2 + LPSBCH)\*160 |
| SL-DRX cycle ≤ 160ms | (2 + LPSBCH)\*160 |
| SL-DRX cycle > 160ms | (2 + LPSBCH)\*SL-DRX cycle |
| Note 1: If multiple SL-DRX cycles are configured, the SL-DRX cycle is the shortest one.  Note 2: LPSBCH is the number of S-SSB periods in which the SLSS is not available due to CCA failures during Tmeasure,PSBCH-RSRP\_CCA, where LPSBCH ≤ LPSBCH,max and LPSBCH,max = 2.  Note 3: Upon LPSBCH exceeding LPSBCH,max, the UE shall not reselect to the measured candidate SyncRef UE based on the measurement result. | |

When UE is synchronized to GNSS directly, before selection / reselection of the new synchronization reference source UE shall evaluate the GNSS synchronization source reliability for at least 20 seconds before changing the synchronization reference from GNSS to another synchronization reference source. UE shall be always synchronized to GNSS directly during the evaluation of GNSS synchronization source reliability.

-------------- End of Change <4> --------------

-------------- Start of Change <5> --------------

## 12.5 L1 SL-RSRP measurements

### 12.5.1 Introduction

This clause contains the measurement requirements related to resource reselection and resource pre-emption of the UE capable of V2X sidelink communication.

### 12.5.2 SL-RSRP measurements

The UE physical layer shall be capable of performing the L1 SL-RSRP measurements on the carrier operating V2X sidelink communication for determining the subset of resources to be excluded in PSSCH resource selection in sidelink transmission mode 2 based on network configuration or pre-configuration. The L1 SL-RSRP measurement period corresponds to one slot and the measurement shall meet the L1 SL-RSRP measurement accuracy requirement in Clause 10. After resource (re-)selection procedure, re-evaluation is performed on the reserved resources by L1 SL-RSRP measurements before transmission of SCI with reservation when the conditions specified in TS 38.214[26] are satisfied.

When the pre-emption mechanism is enabled for the resource pool that UE is monitoring and selecting resource from, after UE selects from the resource not excluded based on L1 SL-RSRP measurement procedure, the UE shall be capable of triggering reselection of already signalled resource(s) as a resource reservation when the conditions specified in TS38.214[26] are satisfied.

When partial sensing mechanism is enabled for the resource pool that UE is monitoring and selecting resource from, the UE shall be capable of performing the L1 SL-RSRP measurements on the sensing periods specified in TS38.214[26]. When SL-DRX is enabled, the UE shall be capable of performing the L1 SL-RSRP measurements and select resource during SL-DRX active time as specified in TS38.214[26].

-------------- End of Change <5> --------------

-------------- Start of Change <6> --------------

## 12.7 Interruption

----- Omit unchanged parts -----

### 12.7.X Interruptions to WAN due to sidelink carrier addition/release

This sub-clause contains the requirements related to the interruptions on the PCell/serving cell due to sidelink component carrier addition/release. It is applicable for UE is in sidelink resource allocation mode 2.

A UE capable of V2X sidelink communication may indicate its interest (initiation or termination) in V2X sidelink communication to the connected gNodeB using IE *SidelinkUEInformationNR* in TS38.331[2].

The UE is allowed an interruption of up to the duration shown in table 12.7.X-1 on the PCell/serving cell when any number of sidelink component carriers is added or released. This interruption is for both uplink and downlink of the PCell/serving cell.

Table 12.7.X-1: Interruption length due to sidelink component carrier addition/release

|  |  |  |
| --- | --- | --- |
|  | NR Slot length (ms) | Interruption length  (number of slots) |
| 0 | 1 | 2 |
| 1 | 0.5 | 3 |
| 2 | 0.25 | 5 |
| 3 | 0.125 | 9 |

For sidelink component carrier addition/release, when the UE is in RRC\_IDLE/RRC\_INACTIVE mode, the interruptions in this clause shall not apply when one of the following conditions is met:

- While receiving paging,

- While receiving system information.

-------------- End of Change <6> --------------

-------------- Start of Change <7> --------------

## 12.y Component Carrier Addition and Release Delay for Sidelink Carrier Aggregation

Requirements in this clause are applicable to UE supporting NR sidelink carrier aggregation.

For UE configured in sidelink resource allocation mode 2, the delay within which the UE shall accomplish the NR sidelink component carrier addition/release is up to UE implementation.

-------------- End of Change <7> --------------

-------------- Start of Change <8> --------------

## 12.z Selection / Reselection of Synchronization Reference Source for NR SL Carrier Aggregation

Requirements in this clause are applicable to UE supporting NR sidelink carrier aggregation.

When the UE is synchronized to a SyncRef UE in a carrier and required only to search other SyncRef UEs in the synchronized carrier, the UE shall be able to identify a newly detectable NR SL SyncRef UE within Tdetect,SyncRef UE\_V2X if the SyncRef UE meets the selection/reselection criterion defined in TS 38.331 [2]. UE shall be capable of performing PSBCH-RSRP measurements for 3 identified NR SL SyncRef UE with the measurement period of Tmeasure,PSBCH-RSRP in Table 12.4-1.



When the synchronization reference source for NR sidelink carrier aggregation is lost and has to search SyncRef UE on the aggregated carriers which are configured as synchronization carrier, the UE shall be able to identify a newly detectable NR SL SyncRef UE within N×Tdetect,SyncRef UE\_V2X if the SyncRef UE meets the selection/reselection criterion defined in TS 38.331 [2]. UE shall be capable of performing PSBCH-RSRP measurements for 3 identified NR SL SyncRef UE per carrier with the measurement period of N×Tmeasure,PSBCH-RSRP. N is the number of aggregated carriers configured as synchronization carrier.

It is assumed that the identified NR SL SyncRef UE does not drop or delay any SLSS transmission within the measurement period. Otherwise, the measurement period may be extended.

When GNSS synchronization reference source is configured as the highest priority and

- UE is synchronized to a SyncRef UE that is synchronized to GNSS directly or in-directly,

- The value of Tdetect,SyncRef UE\_V2X is as 1.6 seconds at S-SSB Es/Iot ≥0 dB, provided that the UE is allowed to drop a maximum of 30% of its SLSS transmissions on each carrier operating NR SL sidelink communication during Tdetect,SyncRef UE\_V2X for the purpose of selection / reselection to the SyncRef UE.

- in other case

- When UE is in non-SL-DRX

- The value of Tdetect,SyncRef UE\_V2X is as 8 seconds at S-SSB Es/Iot ≥0 dB, provided that the UE is allowed to drop a maximum of 6% of its SLSS transmissions on each carrier operating SL sidelink communication during Tdetect,SyncRef UE\_V2X for the purpose of selection / reselection to the SyncRef UE.

- UE is allowed to drop up to 2 slots of its SL data reception on each carrier operating SL sidelink communication per PSBCH monitoring occasion and overall drop rate shall not exceed 0.3% of its SL data reception during Tdetect,SyncRef UE\_V2X for the purpose of selection / reselection to the SyncRef UE.

- When UE is in SL-DRX

- The value of Tdetect,SyncRef UE\_V2X is as 8 seconds at S-SSB Es/Iot ≥0 dB, provided that the UE is allowed to drop a maximum of 6% of its SLSS transmissions on each carrier operating SL sidelink communication during Tdetect,SyncRef UE\_V2X for the purpose of selection / reselection to the SyncRef UE.

- UE is allowed to drop up to 2 slots of its SL data reception on each carrier operating SL sidelink communication per PSBCH monitoring occasion and UE is allowed to drop at most an aggregated window of 24 ms of its SL data reception during Tdetect,SyncRef UE\_V2X for the purpose of selection / reselection to the SyncRef UE.

- The UE is allowed to extend Tdetect,SyncRef UE\_V2X to max(4×50 SL-DRX cycle length, 8s) when the following conditions are satisfied over an evaluation period Tevaluate,SLSS in clause 12.3.1.1 if an NR cell is used as synchronization reference source, or Tevaluate,SLSS in clause 12.3.1.2 if an EUTRA cell is used as synchronization reference source, or Tevaluate,SLSS in clause 12.3.1.4 if an SLSS is used as synchronization reference source. If multiple SL-DRX cycles are configured, the SL-DRX cycle length is the longest one.

- SS-RSRP is larger than *syncTxThreshOoC*.

When serving cell/PCell synchronization reference source is configured as the highest priority,

- When UE is in non-SL-DRX

- The value of Tdetect,SyncRef UE\_V2X is as 8 seconds at S-SSB Es/Iot ≥0 dB, provided that the UE is allowed to drop a maximum of 6% of its SLSS transmissions on each carrier operating NR sidelink communication during Tdetect,SyncRef UE\_V2X for the purpose of selection / reselection to the SyncRef UE.

- UE is allowed to drop up to 2 slots of its SL data reception on each carrier operating NR SL sidelink communication per PSBCH monitoring occasion and overall drop rate shall not exceed 0.3% of its SL data reception during Tdetect,SyncRef UE\_V2X for the purpose of selection / reselection to the SyncRef UE.

- When UE is in SL-DRX

- The value of Tdetect,SyncRef UE\_V2X is as 8 seconds at S-SSB Es/Iot ≥0 dB, provided that the UE is allowed to drop a maximum of 6% of its SLSS transmissions on each carrier operating NR SL sidelink communication during Tdetect,SyncRef UE\_V2X at most in an aggregated window of 480ms during Tdetect,SyncRef UE\_V2X for the purpose of selection / reselection to the SyncRef UE.

- UE is allowed to drop up to 2 slots of its SL data reception per PSBCH monitoring occasion and UE is allowed to drop at most an aggregated window of 24ms of its SL data reception during Tdetect,SyncRef UE\_V2X for the purpose of selection / reselection to the SyncRef UE.

- The UE is allowed to extend Tdetect,SyncRef UE\_V2X to max(4×50 SL-DRX cycle length, 8s) when the following conditions are satisfied over an evaluation period Tevaluate,SLSS in clause 12.3.1.1 if an NR cell is used as synchronization reference source, or Tevaluate,SLSS in clause 12.3.1.2 if an EUTRA cell is used as synchronization reference source, or Tevaluate,SLSS in clause 12.3.1.4 if an SLSS is used as synchronization reference source. If multiple SL-DRX cycles are configured, the SL-DRX cycle length is the longest one.

- SS-RSRP is larger than *syncTxThreshOoC*.

-------------- End of Change <8> --------------