**3GPP TSG-RAN WG4 Meeting #102-e *R4-2207129***

**Electronic meeting, February 21 – March 3, 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **36.133** | **CR** | **7144** | **rev** | **-** | **Current version:** | **14.20.0** |  |
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| *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:*** | Big CR to TS 36.133: LTE RRM maintenance (Rel-14) | | | | | | | | | |
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| ***Source to WG:*** | MCC, Huawei | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_feMTC-Core, LTE\_V2X-Core, LTE\_V2X-Perf | | | | |  | ***Date:*** | | | 2022-03-07 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-14 |
|  | *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:*** | | This big CR merge the endorsed draft CR. The reason for change in each endorsed draft CR is copied below.  - R4-2206833, CR to eMTC inter-frequency measurement requirements in Idle mode R14   * The margin is defined as 8dB for newly detectable cell but 6dB for already detected cell. In addition, for connected mode, the relative RSRP accuracy requirements in section 9.1.21 for mode B is 8dB.   - R4-2203725, CR: Correction on SyncRef UE Frequency Offset in Synchronization Reference Selection/Reselection Test   * SyncRef UE1 and SyncRef UE2 should have the same frequency offset in this test, because they are with the same synchronization source, GNSS, directly or indirectly to GNSS: * SyncRef UE1 has SSID=168, according to 36.331, it synchronizes indirectly to GNSS * SyncRef UE2 has SSID=0, according to 36.331, it synchronizes directly to GNSS * During T3, when UE synchronizes to SyncRef UE1 and search for SyncRef UE2, the assumption is SyncRef UE1 and 2 are synchronized. If they have synchornized timing, frequency should be synchronized, too.   - R4-2206832, CR: Correction on Synchronization Reference Selection/Reselection SyncRefUE Frequency Offset Side Condition for LTE-V2X   * In 36.101, SL transmission frequency error requirement only applies to SL UEs synchronized to a reference source, but not to SL UEs without a reference source * *The UE modulated carrier frequency for V2X sidelink transmissions shall be accurate to within ±0.1 PPM observed over a period of one time slot (0.5 ms) compared to the absolute frequency in case of using GNSS synchronization source. The same requirements applied over a period of one time slot (0.5 ms) compared to the relative frequency in case of using the E-UTRA Node B or V2X UE sidelink synchronization signals.* * Therefore, the frequency error from a SyncRef UE can be unbounded if it doesn’t synchronize to any source, and an SL UE can not search for SLSS in a unbounded frequency range. Therefore, adding a side condition on frequency error range for SLSS search requirement is necessary. We propose to apply the frequency error configuration in Synchronization Reference Selection/Reselection Test in clause 12.3 as a side condition for Selection/Reselection to Intra-frequency SyncRef UE requirement. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The summary of change in each each endorsed draft CR is copied below.  - R4-2206833, CR to eMTC inter-frequency measurement requirements in Idle mode R14   * Change the margin in clause 4.7.2.2.3 from 6dB to 8dB. * Remove [] around margin values in clause 4.7.2.1.3.   - R4-2203725, CR: Correction on SyncRef UE Frequency Offset in Synchronization Reference Selection/Reselection Test   * Align frequency offsets of SyncRef UE1 and SyncRef UE2   - R4-2206832, CR: Correction on Synchronization Reference Selection/Reselection SyncRefUE Frequency Offset Side Condition for LTE-V2X   * Amend the necessary side condition for Selection/Reselection to Intra-frequency SyncRef UE requirement | | | | | | | | |
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| ***Consequences if not approved:*** | | The consequences if not approved for each endorsed draft CR are coppied below.  - R4-2206833, CR to eMTC inter-frequency measurement requirements in Idle mode R14   * eMTC inter-frequency measurement requirements in idle mode are incorrect.   - R4-2203725, CR: Correction on SyncRef UE Frequency Offset in Synchronization Reference Selection/Reselection Test   * Frequency offset setting is inconsistent with test configuration   - R4-2206832, CR: Correction on Synchronization Reference Selection/Reselection SyncRefUE Frequency Offset Side Condition for LTE-V2X   * Side conditions for Selection/Reselection to Intra-frequency SyncRef UE requirement are incomplete | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | - R4-2206833, CR to eMTC inter-frequency measurement requirements in Idle mode R14   * 4.7.2.1.3, 4.7.2.2.3   - R4-2203725, CR: Correction on SyncRef UE Frequency Offset in Synchronization Reference Selection/Reselection Test   * A.12.3.1   - R4-2206832, CR: Correction on Synchronization Reference Selection/Reselection SyncRefUE Frequency Offset Side Condition for LTE-V2X   * B.6.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 36.521-3 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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4.7.2.1.3 Measurements of inter-frequency cells for UE category M1 in normal coverage

The requirements in this subclause apply if UE is in the normal coverage area of the serving cell. The UE is considered to be in normal coverage area of serving cell according to RSRP, RSRP Ês/Iot, SCH\_RP and SCH Ês/Iot of the serving cell defined in Annex B.1.3 for a corresponding Band.

The UE shall be able to identify new inter-frequency cells and perform RSRP or RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided. The UE shall not cause any interruption to the paging reception and acquisition of SI while performing measurement on serving or any neighbor cells.

If Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ then the UE shall search for inter-frequency layers of higher priority at least every Thigher\_priority\_search where Thigher\_priority\_search is described in clause 4.2.2.

If Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell meets the reselection criteria defined in TS36.304 within Kcarrier\*Tdetect,EUTRAN\_Inter\_NC, if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when Treselection = 0 provided that the reselection criteria is met by a margin of at least 8 dB for reselections based on ranking or 8 dB for RSRP reselections based on absolute priorities or 5.5 dB for RSRQ reselections based on absolute priorities. Kcarrier is the number of inter-frequency carriers in the neighbour cell list. An inter frequency cell is considered to be detectable according to RSRP, RSRP Ês/Iot, SCH\_RP and SCH Ês/Iot defined in Annex B.1.8 for a corresponding Band.

When higher priority cells are found by the higher priority search, they shall be measured at least every Tmeasure,E-UTRAN\_Inter\_NC . If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this clause shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure RSRP or RSRQ at least every Kcarrier\*Tmeasure,EUTRAN\_Inter\_NC for identified lower or equal priority inter-frequency cells. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRP or RSRQ measurements of each measured higher, lower and equal priority inter-frequency cell using at least 2 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least Tmeasure,EUTRAN\_Inter\_NC/2.

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met reselection criterion defined TS 36.304 within Kcarrier\*Tevaluate,E-UTRAN\_Inter\_NC, when Treselection = 0 provided that the reselection criteria is met by a margin of at least 7dB for reselections based on ranking or 7dB for RSRP reselections based on absolute priorities or 5dB for RSRQ reselections based on absolute priorities.

If Treselection timer has a non zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

For UE not configured with eDRX\_IDLE cycle, Tdetect,EUTRAN\_Inter\_NC, Tmeasure,EUTRAN\_Inter\_NC and Tevaluate, E-UTRAN\_Inter\_NC are specified in Table 4.7.2.1.3-1. For UE configured with eDRX\_IDLE cycle, Tdetect,EUTRAN\_Inter\_NC, Tmeasure,EUTRAN\_Inter\_NC and Tevaluate, E-UTRAN\_Inter\_NC are specified in Table 4.7.2.1.3-2. Additionally, the requirements in Table 4.7.2.1.3-2 apply provided that the serving cell is configured with eDRX\_IDLE and is the same in all PTWs during any of Tdetect,EUTRAN\_Inter\_NC, Tmeasure,EUTRAN\_Inter\_NC and Tevaluate, E-UTRAN\_Inter\_NC when multiple PTWs are used.

**Table 4.7.2.1.3-1 : Tdetect,EUTRAN\_Inter\_NC, Tmeasure,EUTRAN\_Inter\_NC and Tevaluate,E-UTRAN\_Inter\_NC**

|  |  |  |  |
| --- | --- | --- | --- |
| **DRX cycle length [s]** | **Tdetect,EUTRAN\_Inter\_NC [s] (number of DRX cycles)** | **Tmeasure,EUTRAN\_Inter\_NC [s] (number of DRX cycles)** | **Tevaluate,E-UTRAN\_Inter\_NC**  **[s] (number of DRX cycles)** |
| 0.32 | 11.52 (36) | 1.28 (4) | 5.12 (16) |
| 0.64 | 17.92 (28) | 1.28 (2) | 5.12 (8) |
| 1.28 | 32(25) | 1.28 (1) | 6.4 (5) |
| 2.56 | 58.88 (23) | 2.56 (1) | 7.68 (3) |

**Table 4.7.2.1.3-2: Tdetect,EUTRAN\_Inter\_NC, Tmeasure,EUTRAN\_Inter\_NC and Tevaluate, E-UTRAN\_inter\_NC for UE configured with eDRX\_IDLE cycle**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **eDRX\_IDLE cycle length [s]** | **DRX cycle length [s]** | **PTW length [s] (number of 1.28s periods)** | **Tdetect,EUTRAN\_Inter\_NC [s] (number of DRX or eDRX cycles Note 3)** | **Tmeasure,EUTRAN\_Inter\_NC [s] (number of DRX or eDRX cycles Note 3)** | **Tevaluate,E-UTRAN\_inter\_NC**  **[s] (number of DRX or eDRX cycles Note 3)** |
| 5.12 | N/A | N/A | 117.76 (23) | 5.12 (1) | 10.24 (2) |
| 10.24 ≤ eDRX\_IDLE cycle length ≤ 2621.44 | 0.32 | ≥1.28 (1) | (23) | 0.32 (1) | (2) |
| 0.64 | ≥1.28 (1) | 0.64 (1) | (2) |
| 1.28 | ≥1.28 (1) | 1.28 (1) | (2) |
| 2.56 | ≥2.56 (2) | 2.56 (1) | (2) |
| NOTE 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs.  NOTE 2: The eDRX\_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34].  NOTE 3: Number of eDRX cycles when eDRX\_IDLE cycle length equals 5.12s, number of DRX cycles otherwise | | | | | |

For higher priority cells, a UE may optionally use a shorter value forTmeasure,EUTRAN\_Inter\_NC,which shall not be less than Max(0.64 s, one DRX cycle).

For any requirement in this section, when the UE transitions between any two states when being configured with eDRX\_IDLE, being configured with eDRX\_IDLE cycle, changing eDRX\_IDLE cycle length, or changing PTW configuration, the UE shall meet the transition requirement, which is the less stringent requirement of the two requirements corresponding to the first state and the second state, during the transition time interval which is the time corresponding to the transition requirement. After the transition time interval, the UE has to meet the requirement corresponding to the second state.

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4.7.2.2.3 Measurements of inter-frequency cells for UE category M1 in enhanced coverage

The requirements in this subclause apply if UE is in the enhanced coverage area of the serving cell. The UE is considered to be in enhanced coverage area of serving cell according to RSRP, RSRP Ês/Iot, SCH\_RP and SCH Ês/Iot of the serving cell defined in Annex B.1.3 for a corresponding Band.

The UE shall be able to identify new inter-frequency cells and perform RSRP or RSRQ measurements of identified inter-frequency cells if carrier frequency information is provided by the serving cell, even if no explicit neighbour list with physical layer cell identities is provided. The UE shall not cause any interruption to the paging reception and acquisition of SI while performing measurement on serving or any neighbor cells.

If Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ then the UE shall search for inter-frequency layers of higher priority at least every Thigher\_priority\_search where Thigher\_priority\_search is described in clause 4.2.2.

If Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ then the UE shall search for and measure inter-frequency layers of higher, equal or lower priority in preparation for possible reselection. In this scenario, the minimum rate at which the UE is required to search for and measure higher priority layers shall be the same as that defined below.

The UE shall be able to evaluate whether a newly detectable inter-frequency cell meets the reselection criteria defined in TS36.304 within Kcarrier\*Tdetect,EUTRAN\_Inter\_EC, if at least carrier frequency information is provided for inter-frequency neighbour cells by the serving cells when Treselection = 0 provided that the reselection criteria is met by a margin of at least 8 dB for reselections based on ranking. Kcarrier is the number of inter-frequency carriers in the neighbour cell list. An inter frequency cell is considered to be detectable according to RSRP, RSRP Ês/Iot, SCH\_RP and SCH Ês/Iot defined in Annex B.1.8 for a corresponding Band.

When higher priority cells are found by the higher priority search, they shall be measured at least every Tmeasure,E-UTRAN\_Inter\_EC . If, after detecting a cell in a higher priority search, it is determined that reselection has not occurred then the UE is not required to continuously measure the detected cell to evaluate the ongoing possibility of reselection. However, the minimum measurement filtering requirements specified later in this clause shall still be met by the UE before it makes any determination that it may stop measuring the cell. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall measure RSRP or RSRQ at least every Kcarrier\*Tmeasure,EUTRAN\_Inter\_EC for identified lower or equal priority inter-frequency cells. If the UE detects on a E-UTRA carrier a cell whose physical identity is indicated as not allowed for that carrier in the measurement control system information of the serving cell, the UE is not required to perform measurements on that cell.

The UE shall filter RSRP or RSRQ measurements of each measured higher, lower and equal priority inter-frequency cell using at least 4 measurements. Within the set of measurements used for the filtering, at least two measurements shall be spaced by at least Tmeasure,EUTRAN\_Inter\_EC/2.

The UE shall not consider a E-UTRA neighbour cell in cell reselection, if it is indicated as not allowed in the measurement control system information of the serving cell.

For an inter-frequency cell that has been already detected, but that has not been reselected to, the filtering shall be such that the UE shall be capable of evaluating that the inter-frequency cell has met reselection criterion defined TS 36.304 within Kcarrier\*Tevaluate,E-UTRAN\_Inter\_EC, when Treselection = 0 provided that the reselection criteria is met by a margin of at least 8 dB for reselections based on ranking.

If Treselection timer has a non zero value and the inter-frequency cell is better ranked than the serving cell, the UE shall evaluate this inter-frequency cell for the Treselection time. If this cell remains better ranked within this duration, then the UE shall reselect that cell.

For UE not configured with eDRX\_IDLE cycle, Tdetect,EUTRAN\_Inter\_EC, Tmeasure,EUTRAN\_Inter\_EC and Tevaluate, E-UTRAN\_inter\_EC are specified in Table 4.7.2.2.3-1. For UE configured with eDRX\_IDLE cycle, Tdetect,EUTRAN\_Inter\_EC, Tmeasure,EUTRAN\_Inter\_EC and Tevaluate, E-UTRAN\_inter\_EC are specified in Table 4.7.2.2.3-3. Additionally, the requirements in Table 4.7.2.2.3-3 apply provided that the serving cell is configured with eDRX\_IDLE and is the same in all PTWs during any of Tdetect,EUTRAN\_Inter\_EC, Tmeasure,EUTRAN\_Inter\_EC and Tevaluate, E-UTRAN\_inter\_EC when multiple PTWs are used.

**Table 4.7.2.2.3-1: Tdetect,EUTRAN\_Inter\_EC, Tmeasure,EUTRAN\_Inter\_EC and Tevaluate,E-UTRAN\_Inter\_EC**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SCH Ês/Iot of neighboring cell: Q2 [dB]** | **DRX cycle length [s]** | **Tdetect,EUTRAN\_Inter\_EC [s] (number of DRX cycles)** | **Tmeasure,EUTRAN\_Inter\_EC [s] (number of DRX cycles)** | **Tevaluate,E-UTRAN\_inter\_EC**  **[s] (number of DRX cycles)** |
| **-15≤ Q2 < -6** | 0.32 | 330.24 (1032) | 1.28 (4) | 10.24 (32) |
| 0.64 | 330.24 (516) | 1.28 (2) | 10.24 (16) |
| 1.28 | 524.8 (410) | 1.28 (1) | 12.8 (10) |
| 2.56 | 1039.36 (406) | 2.56 (1) | 15.36 (6) |
| **Q2≥-6** | 0.32 | 16.64 (52) | 1.28 (4) | 10.24 (32) |
| 0.64 | 23.04 (36) | 1.28 (2) | 10.24 (16) |
| 1.28 | 38.4 (30) | 1.28 (1) | 12.8 (10) |
| 2.56 | 66.56 (26) | 2.56 (1) | 15.36 (6) |

**Table 4.7.2.2.3-2: Void**

**Table 4.7.2.2.3-3: Tdetect,EUTRAN\_Inter\_EC, Tmeasure,EUTRAN\_Inter\_EC and Tevaluate, E-UTRAN\_inter\_EC for UE configured with eDRX\_IDLE cycle**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **eDRX\_IDLE cycle length [s]** | **DRX cycle length [s]** | **PTW length [s] (number of 1.28s periods)** | **Tdetect,EUTRAN\_Inter\_EC [s] (number of DRX or eDRX cycles Note 4) for neighboring cell with SCH Es/IoT:**  **-15≤ Q2 < -6 [dB]** | **Tdetect,EUTRAN\_Inter\_EC [s] (number of DRX or eDRX cycles Note 4) for neighboring cell with SCH Es/IoT:**  **Q2≥-6 [dB]** | **Tmeasure,EUTRAN\_Inter\_EC [s] (number of DRX or eDRX cycles Note 4)** | **Tevaluate,E-UTRAN\_inter\_EC**  **[s] (number of DRX or eDRX cycles Note 4)** |
| 5.12 | N/A | N/A | 2078.72 (406) | 133.12 (26) | 5.12 (1) | 30.72 (6) |
| 10.24 ≤ eDRX\_IDLE cycle length ≤ 2621.44 | 0.32 | ≥1.28 (1) | Note 3 (406) | Note 3 (26) | 0.32 (1) | Note 3 (6) |
| 0.64 | ≥1.28 (1) | 0.64 (1) | Note 3 (6) |
| 1.28 | ≥1.28 (1) | 1.28 (1) | Note 3 (6) |
| 2.56 | ≥2.56 (2) | 2.56 (1) | Note 3 (6) |
| NOTE 1: The number of DRX cycles in this table is given for the DRX cycles within PTWs.  NOTE 2: The eDRX\_IDLE cycle lengths are as specified in Section 10.5.5.32 of TS 24.008 [34].  NOTE 3: The detection period and the evaluation period depend on the number *N* of DRX cycles and are calculated according to the formula below:  .  NOTE 4: Number of eDRX cycles when eDRX\_IDLE cycle length equals 5.12s, number of DRX cycles otherwise. | | | | | | |

For higher priority cells, a UE may optionally use a shorter value forTmeasure,EUTRAN\_Inter\_EC,which shall not be less than Max(0.64 s, one DRX cycle).

For any requirement in this section, when the UE transitions between any two states when being configured with eDRX\_IDLE, being configured with eDRX\_IDLE cycle, changing eDRX\_IDLE cycle length, or changing PTW configuration, the UE shall meet the transition requirement, which is the less stringent requirement of the two requirements corresponding to the first state and the second state, during the transition time interval which is the time corresponding to the transition requirement. After the transition time interval, the UE has to meet the requirement corresponding to the second state.

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A.12.3 V2X Synchronization Reference Selection/Reselection Tests

A.12.3.1 V2X Synchronization Reference Selection/Reselection Tests for GNSS configured as the highest priority

A.12.3.1.1 Test Purpose and Environment

The purpose of this test is to verify the requirements related to SyncRef UE selection / reselection defined in clause 13.4, when GNSS is configured as the highest priority. For this test, the UE is triggered by the test loop function or the upper layers to transmit for V2X Sidelink Communication.

The test parameters are given in Table A.12.3.1.1-1and A.12.3.1.1-2 below. There are no GNSS signals in this test. There are one active cell (PCell) and two active SyncRef UEs (SyncRef UE 1 and SyncRef UE 2) in this test. The test system shall emulate SyncRef UE 1 and SyncRef UE 2 to transmit SLSS and MIB-SL every SLSS period.

The test system can verify the selection / reselection of SyncRef UE by monitoring the SLSS ID used by the V2X UE for its SLSS+MIB-SL transmissions. When the V2X UE is not synchronized to any SyncRef UE, then the V2X UE shall use the SLSS ID pre-configured in the V2X UE. When the V2X UE is synchronized to a SyncRef UE, the V2X UE shall derive its SLSS ID from the SLSS ID of the SyncRef UE as per clause 5.10.7.3 of TS 36.331.

The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. During T1, both SyncRef UE 1 and SyncRef UE 2 are powered off and the V2X UE will select PCell as synchronization source. During T2, SyncRef UE 1 is powered ON and the V2X UE will select SyncRef UE 1 as the synchronization source. During T3, a higher priority SyncRef UE 2 is additionally powered ON and the V2X UE will reselect to the higher priority SyncRef UE 2 as the synchronization source.

**Table A.12.3.1.1-1: Test Parameters for V2X Synchronization Reference Selection/Reselection Tests for GNSS configured as the highest priority**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| Initial condition | Active synchronization source |  | Cell 1 | UE transmits for V2X Sidelink Communication and SLSS+MIB-SL with SLSS ID = 30 and in-coverage set as TRUE in MIB-SL. |
| T2 end condition | Active synchronization source |  | Sync Ref UE 1 | UE transmits for V2X Sidelink Communication and SLSS+MIB-SL with SLSS ID = 168 and in-coverage set as FALSE in MIB-SL. |
| Final condition | Active synchronization source |  | Sync Ref UE 2 | UE transmits for V2X Sidelink Communication and SLSS+MIB-SL with SLSS ID = 0 and in-coverage set as FALSE in MIB-SL. |
| Active SyncRef UEs | |  | SyncRef UE 1  SyncRef UE 2 | Transmitting SLSS+MIB-SL on RF channel number 1 (TDD carrier in Band 47) |
| Active cell | |  | Cell 1 | E-UTRA FDD Cell 1 on RF channel number 2 |
| Timing offset between SyncRef UE 1 and SyncRef UE 2 | | μs | 3 | Synchronous |
| Frequency offset of SyncRef UE 1 | | ppm | 0 |  |
| Frequency offset of SyncRef UE 2 | | ppm | 0 |  |
| V2X sidelink Communication configuration | |  | As specified in Table A.3.24.2-2  (Configuration #2) | IE values unless specified otherwise in this test. |
| typeTxSync | |  | *gnss* |  |
| slssid | |  | *30* |  |
| syncTxThreshIC | |  | +infinity |  |
| T1 | | s | 24 |  |
| T2 | | s | 16 |  |
| T3 | | s | 3.2 |  |

**Table A.12.3.1.1-2: SyncRef UE Specific Test Parameters for V2X Synchronization Reference Selection/Reselection Tests for GNSS configured as the highest priority**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **SyncRef UE 1** | | | **SyncRef UE 2** | | |
| **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| E-UTRA RF Channel Number |  | 1 | | | | | |
| BWchannel Note 4 | MHz | 5 or 10 | | | | | |
| V2X Sidelink Communication resource pool configuration |  | As specified in Table A.3.24.2-1  (Configuration #1) | | | As specified in Table A.3.24.2-2  (Configuration #2) | | |
| networkControlledSyncTx |  | N/A | | | ON | | |
| syncTxThreshOoC | dBm/15 kHz | +infinity | | | N/A | | |
| slssid |  | 0 | | | 0 | | |
| inCoverage (in MIB-SL) |  | FALSE | | | TRUE | | |
| syncOffsetIndicator |  | syncOffsetIndicator2 | | | syncOffsetIndicator1 | | |
| Note1 | dBm/15 kHz | -95 | | | | | |
|  | dB | -infinity | 0 | 0 | -infinity | -infinity | 3 |
|  | dB | -infinity | 0 | -4.76 | -infinity | -infinity | 0 |
| S-RSRP Note2, Note 3 | dBm/15 kHz | -infinity | -95 | -95 | -infinity | -infinity | -92 |
| Propagation Condition |  | AWGN | | | | | |
| Note 1: 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 2: S-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: SSSS Es/Iot is set the same as PSSS/PSBCH Es/Iot. | | | | | | | |

**Table A.12.3.1.1-3: Cell Test Parameters for V2X Synchronization Reference Selection/Reselection Tests for GNSS configured as the highest priority**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | | |
| **T1** | **T2** | **T3** |
| E-UTRA RF Channel Number |  | 2 | | |
| BWchannel | MHz | 10 | | |
| PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1 |  | R.6 FDD | | |
| OCNG Patterns defined in A.3.2.1.2 |  | OP.2 FDD | | |
| PBCH\_RA | dB | 0 | | |
| PBCH\_RB |
| PSS\_RA |
| SSS\_RA |
| PCFICH\_RB |
| PHICH\_RA |
| PHICH\_RB |
| PDCCH\_RA |
| PDCCH\_RB |
| PDSCH\_RA |
| PDSCH\_RB |
| OCNG\_RANote 1 |
| OCNG\_RBNote 1 |
| Note2 | dBm/15 kHz | -95 | | |
|  | dB | 4.5 | 4.5 | 4.5 |
| RSRP Note3 | dBm/15 kHz | -90.5 | -90.5 | -90.5 |
| SCH\_RP Note 3 | dBm/15 kHz | -90.5 | -90.5 | -90.5 |
| 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: RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | |

A.12.3.1.2 Test Requirements

1) During T2, SyncRef UE selection delay is defined as the time from the beginning of T2 to the time UE is synchronized to SyncRef UE 1 and changes its SLSS transmissions timing and SLSS ID to follow SyncRef UE 1 as the synchronization source. For the test configuration, the SLSS ID will be changed to 168 (with in-coverage IE in MIB-SL set to FALSE) after SyncRef UE selection delay from start of T2.

The SyncRef UE selection delay shall be less than 8.8sec. The SyncRef UE selection/reselection delay can be expressed as:

SyncRef UE selection/reselection delay = Tdetect,SyncRef UE + Tevaluate,SLSS + SLSS period

Where

- Tdetect,SyncRef UE = 8sec (as specified in sub-clause 13.4)

- Tevaluate,SLSS = 0.64 (as specified in sub-clause 13.3.1.3)

- SLSS period = 160ms

This gives a total of 8.8seconds.

2) During T3, SyncRef UE reselection delay is defined as the time from the beginning of T3 to the time UE changes its synchronization source from SyncRef UE 1 to SyncRef UE 2, and changes its SLSS transmissions timing and SLSS ID to follow SyncRef UE 2 as the synchronization source. For the test configuration, the SLSS ID will still be 0 (with in-coverage IE in MIB-SL set to FALSE) after SyncRef UE selection delay from start of T3.

The SyncRef UE reselection delay shall be less than 2.4sec. The SyncRef UE selection/reselection delay can be expressed as:

SyncRef UE selection/reselection delay = Tdetect,SyncRef UE + Tevaluate,SLSS + SLSS period

Where

- Tdetect,SyncRef UE = 1.6sec (as specified in sub-clause 13.4)

- Tevaluate,SLSS = 0.64 (as specified in sub-clause 13.3.1.3)

- SLSS period = 160ms

This gives a total of 2.4seconds.

The test system will verify that the V2X UE does not drop or delay more than 6% of its V2X data and SLSS transmissions during the duration of T2, and does not drop or delay more than 30% of its SLSS transmissions during the duration of T3.

The rate of correct SyncRef UE selection / reselection observed during repeated tests shall be at least 90%.

<Unchanged Text Skipped>

B.6.4 Conditions for Selection/Reselection to Intra-frequency SyncRef UE

This clause defines the V2X SCH\_RP and SCH Ês/Iot applicable for a corresponding operating band.

The conditions for selection/reselection to intra-frequency SyncRef UE are defined in Table B.6.4-1.

**Table B.6.4-1: V2X synchronization measurements**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **E-UTRA V2X operating band groups Note 2** | **Minimum V2X SCH\_RP Note 1** | **V2X SCH Ês/Iot Note 3** |
|  | **dBm/15kHz** | **dB** |
| TDD\_G | -120 | ≥ 0 |
| NOTE 1: This condition level is increased by ∆>0, when applicable, as described in Sections B.4.2 and B.4.3.  NOTE 2: E-UTRA V2X operating band groups are as defined in Section 3.5 for the corresponding E-UTRA operating bands.  NOTE 3: V2X SCH Ês/Iot for a SyncRef UE is the minimum of the Ês/Iot of PSSS/PSBCH and the Ês/Iot of SSSS  NOTE 4: The SyncRef UE transmission frequency shall be accurate to within ±5 PPM compared to the absolute frequency. | | | |

<Unchanged Text Skipped>