3GPP TSG-RAN WG4 Meeting # 98-bis-e R4-2106968

Electronic Meeting, Apr. 12-20, 2021

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **Draft** | **rev** |  | **Current version:** | **16.7.0** |  |
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| *For* [***HELP***](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 on measurement requirements for NR-U |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_unlic-Core |  | ***Date:*** | 2021-03-01 |
|  |  |  |  |  |
| ***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)* |
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| ***Reason for change:*** | The requirements for intra-frequency RSSI and CO measurement are defined for measurement with gap and measurement withou gap. Howerver, the conditions when meaurement gap is needed is not defined in the spec. |
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| ***Summary of change:*** | Add the conditions under which UE shall perform RSSI and CO measurement without gap.Some typos are fixed. |
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| ***Consequences if not approved:*** | The requirements are incomplete. |
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| ***Clauses affected:*** | 9.2A.7 |
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|  | **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>

### 9.2A.7 Intra-frequency RSSI and Channel occupancy measurements

#### 9.2A.7.1 Intra-frequency RSSI measurements

An RSSI measurement is defined as an intra-frequency measurement provided that the RSSI measurement bandwidth is fully contained within the current carrier bandwidth of the UE.

The UE physical layer shall be capable of performing the RSSI measurements, defined in TS 38.215 [4] on one or more serving carriers operating with CCA, TS 37.213 [33], if the carrier(s) are indicated by higher layers [2], and report the RSSI measurements to higher layers. The UE physical layer shall provide to higher layers a single RSSI sample for each OFDM symbol within each configured RSSI measurement duration [2] occurring with a configured RSSI measurement timing configuration periodicity [2], *rmtc-Periodicity*.

The UE can perform RSSI measurements without measurement gaps if RSSI measurement bandwidth is fully within the active DL BWP of the UE.

The measurement period for intra-frequency RSSI measurements without measurement gaps is as shown in Table 9.2A.7.1-1 and Table 9.2A.7.1-2. The measurement period for intra-frequency RSSI measurements with measurement gaps is as shown in Table 9.2A.7.1-3.

Table 9.2A.7.1-1: Measurement period for intra-frequency RSSI measurements without measurement gaps when SMTC and RMTC are overlapping

|  |  |
| --- | --- |
| Condition NOTE1,2 | T RSSI\_measurement\_period\_intra\_cca |
| No DRX | max(*reportInterval*, *rmtc-Periodicity*\*CSSFoutside\_gap,i) |
| DRX | max(*reportInterval*, max(*rmtc-Periodicity*, DRX cycle) \*CSSFoutside\_gap,i) |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: CSSFoutside\_gap, i is a carrier specific scaling factor and is determined according to CSSF outside\_gap,i in clause 9.1.5.1 for measurement conducted outside measurement gap. |

Table 9.2A.7.1-2: Measurement period for intra-frequency RSSI measurements without measurement gaps when SMTC and RMTC are not overlapping

|  |  |
| --- | --- |
| Condition NOTE1,2 | T RSSI\_measurement\_period\_intra\_cca |
| No DRX | max(*reportInt*erval, Nintra-MO\**rmtc-Periodicity*) |
| DRX | max(*reportInt*erval, Nintra-MO\*max(*rmtc-Periodicity*, DRXcycle length)) |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: Nintra-MO is defined as the number of measurement objects that can be measured without gaps |

Table 9.2A.7.1-3: Measurement period for intra-frequency RSSI measurements with measurement gaps

|  |  |
| --- | --- |
| Condition NOTE1,2 | T RSSI\_measurement\_period\_intra\_cca |
| No DRX | max(*reportInterval*, max(*rmtc-Periodicity, MGRP*) x CSSFintra) |
| DRX | max(*reportInterval*, max(*rmtc-Periodicity*, MGRP,DRX cycle length) x CSSFintra) |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: CSSFintra is a carrier specific scaling factor and is determined according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps. |

If the UE requires measurement gaps to perform intra-frequency measurements, a single measurement gap pattern is used for all concurrent intra-frequency measurements, including intra-frequency RSSI measurements. The RSSI measurement duration and the measurement gap should be aligned, and the following additional condition should be fulfilled:

- Entire RSSI measurement duration should be contained in the measurement gap.

The RSSI measurement performed and reported according to this clause shall meet the RSSI measurement accuracy requirement in Clause 10.1.34.1. The reported RSSI measurement values contained in measurement reports shall be based on the measurement report mapping requirements specified in Clause 10.1.34.3.

#### 9.2A.7.2 Intra-frequency Channel occupancy measurements

The UE shall be capable of estimating the channel occupancy on one or more serving carrier frequencies indicated by higher layers [2], based on RSSI samples provided by the physical layer.

The UE can perform channel occupancy measurements without measurement gaps if RSSI measurement bandwidth is fully within the active DL BWP of the UE.

The measurement period for intra-frequency channel occupancy measurements without measurement gap is as shown in Table 9.2A.7.2-1 and Table 9.2A.7.1-2. The measurement period for intra-frequency RSSI measurements with measurement gaps is as shown in Table 9.2A.7.2-3.

Table 9.2A.7.2-1: Measurement period for intra-frequency Channel Occupancy measurements without measurement gaps when SMTC and RMTC are overlapping

|  |  |
| --- | --- |
| Condition NOTE1,2 | T RSSI\_measurement\_period\_intra\_cca |
| No DRX | max(*reportInterval*, *rmtc-Periodicity*\*CSSFoutside\_gap,i) |
| DRX | max(*reportInterval*, max(*rmtc-Periodicity*, DRX cycle) \*CSSFoutside\_gap,i) |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: CSSFoutside\_gap, iis a carrier specific scaling factor and is determined according to CSSFwithin\_gap,i in clause 9.1.5.1 for measurement conducted outside measurement gap. |

Table 9.2A.7.2-2: Measurement period for intra-frequency Channel Occupancy measurements without measurement gaps when SMTC and RMTC are not overlapping

|  |  |
| --- | --- |
| Condition NOTE1,2 | T RSSI\_measurement\_period\_intra\_cca |
| No DRX | max(*reportInt*erval, Nintra-MO\**rmtc-Periodicity*) |
| DRX | max(*reportInt*erval, Nintra-MO\*max(*rmtc-Periodicity*, DRXcycle length)) |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: Nintra-MO is defined as the number of measurement objects that can be measured without gaps |

Table 9.2A.7.2-3: Measurement period for intra-frequency Channel Occupancy measurements with measurement gaps

|  |  |
| --- | --- |
| Condition NOTE1,2 | T RSSI\_measurement\_period\_intra\_cca |
| No DRX | max(*reportInterval*, max(*rmtc-Periodicity, MGRP*) x CSSFintra) |
| DRX | max(*reportInterval*, max(*rmtc-Periodicity*, MGRP,DRX cycle length) x CSSFintra) |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1NOTE 2: CSSFintra is a carrier specific scaling factor and is determined according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps. |

If the UE requires measurement gaps to perform intra-frequency measurements, a single measurement gap pattern is used for all concurrent intra-frequency measurements, including intra-frequency RSSI measurements. The RSSI measurement duration and the measurement gap should be aligned, and the following additional condition should be fulfilled:

- Entire RSSI measurement duration should be contained in the measurement gap.

The channel occupancy measurement performed and reported according to this clause shall meet the channel occupancy measurement accuracy requirements in Clause 10.1.35.1. The reported channel occupancy measurement values

### <End of Change 1>