**3GPP TSG-RAN4 Meeting #98-bis-e *R4-2106928***

**Electronic Meeting, Apr. 12-20, 2021**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** |  | **rev** | **-** | **Current version:** | **16.7.0** |  |
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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:***  | CR on intra-frequency measurements |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_CSIRS\_L3meas-Core |  | ***Date:*** | 2021-4-16 |
|  |  |  |  |  |
| ***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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | 1. In cluase 9.10.2.5, only associatedSSB detection time duration refers to TPSS/SSS\_sync\_intra in Clause 9.2.5.1. If the associatedSSB is detected, the TPSS/SSS\_sync\_intra equals 0. However there is no description on the time validity of detected associatedSSB. The associatedSSB is detected if it has been meeting the relevant cell identification requirement during the last 5 seconds.
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| ***Summary of change:*** | 1. Add a clarification on time validitiy of detected associatedSSB.

The associatedSSB is detected if it has been meeting the relevant cell identification requirement during the last 5 seconds. |
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| ***Consequences if not approved:*** | The CSI-RS based mobility measurements are incomplete. |
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| ***Clauses affected:*** | 9.10.2.5 |
|  |  |
|  | **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>

### 9.10.2 CSI-RS based intra-frequency measurements

#### 9.10.2.1 Introduction

A measurement is defined as a CSI-RS based intra-frequency measurement provided that:

- the SCS of the CSI-RS resource of the neighbour cell configured for measurement is the same as the SCS of the CSI-RS resource on the serving cell indicated for measurement, and

- the CP type of the CSI-RS resource of neighbour cell configured for measurement is the same as the CP type of the CSI-RS resource of the serving cell indicated for measurement, and

- It is applied for SCS = 60KHzs

- the centre frequency of the CSI-RS resource of the neighbour cell configured for measurement is the same as the centre frequency of the CSI-RS resource of the serving cell indicated for measurement

The UE shall be able to identify new intra-frequency cells and perform CSI-RSRP, CSI-RSRQ and CSI-SINR measurements of identified intra-frequency cells if carrier frequency information is provided by PCell or the PSCell.

Intra-frequency CSI-RS resources are completely contained within the active BWP bandwidth.

No measurement gap is needed for intra-frequency CSI-RS resources measurements.

For intra-frequency CSI-RS based measurements, UE may cause scheduling restriction as specified in clause 9.10.2.5.

Note: Extended CP for CSI-RS based measurement is not supported in this release.

#### 9.10.2.2 Requirements applicability

The associated SSB layer of the CSI-RS follows the same requirements as SSB based measurements defined in 9.2

The requirements in clause 9.10.2 apply, provided:

- The associated SSB of the cell being identified or measured is detectable, and

- Only one intra-frequency CSI-RS layer per serving cell is configured, and

- The BW of the CSI-RS on the intra-frequency neighbor cell is within the active BWP of the UE, and

- The CSI-RS resources and the associated SSB of the cell being identified or measured are detectable, and

- The bandwidth of CSI-RS resources of intra-MO is the same as that of the CSI-RS resources configured for the serving cell, and

- Numerology for intra-frequency CSI-RS and data of serving cell are the same.

An intra-frequency cell shall be considered detectable when for each relevant CSI-RS and associated SSB:

- CSI-RSRP related side conditions given in clauses 10.1.x and 10.1.x for FR1 and FR2, respectively, for a corresponding Band,

- CSI-RSRQ related side conditions given in clauses 10.1.x and 10.1.x for FR1 and FR2, respectively, for a corresponding Band,

- CSI-SINR related side conditions given in clauses 10.1.x and 10.1.x for FR1 and FR2, respectively, for a corresponding Band,

- CSI\_RP and CSI-RS Ês/Iot according to Annex B.2.x for a corresponding Band.

- SS-RSRP related side conditions given in clauses 10.1.2 and 10.1.3 for FR1 and FR2, respectively, for a corresponding Band,

- SS-RSRQ related side conditions given in clauses 10.1.7 and 10.1.8 for FR1 and FR2, respectively, for a corresponding Band,

- SS-SINR related side conditions given in clauses 10.1.12 and 10.1.13 for FR1 and FR2, respectively, for a corresponding Band,

- SSB\_RP and SSB Ês/Iot according to Annex B.2.2 for a corresponding Band.

<End of Change 1>

<End of Change 2>

#### 9.10.2.5 Intra-frequency measurements without measurement gaps

If a UE is configured with the higher layer parameters *CSI-RS-Resource-Mobility* and *associatedSSB*, the CSI-RS based measurement shall include PSS/SSS detection time of associatedSSB, the time period used to acquire the SFN information and CSI-RS based measurement period without gap.

PSS/SSS detection time of associatedSSB is the intra-frequency TPSS/SSS\_sync\_intra in Clause 9.2.5.1. If the associatedSSB is already detected, the time period is equal to 0. If the associatedSSB which has been detectable at least for the time period TPSS/SSS\_sync\_intra defined in clause 9.2.5.1 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again, the time period is equal to 0.

The time period used to acquire the SFN information is intra-frequency TSSB\_time\_index\_intra in Clause 9.2.5.1 or in clause 9.2.6.2 or inter-frequency TSSB\_time\_index\_inter in clause 9.3.4. If the UE is indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled), the time period is equal to 0. It is assumed that deriveSSB-IndexFromCell is always enabled for FR1 TDD and FR2.

The measurement period for intrafrequency measurements without gaps is as shown in table 9.10.2.5-1, Table 9.10.2.5-2.

Additionally, for a given CSI-RS resource, if the associated SS/PBCH block is configured but not detected by the UE, or if CSI-RS configured with associated SSB but not QCL-ed to the associated SSB, the UE is not required to monitor the corresponding CSI-RS resource.

Table 9.10.2.5-1: Measurement period for intrafrequency CSI-RS based measurements without gaps(Frequency FR1)

|  |  |
| --- | --- |
| DRX cycle | T CSI-RS\_measurement\_period\_intra  |
| No DRX | max(200ms, ceil( [5] x Kp) x CSI-RS period) x CSSFintra |
| DRX cycle≤ 320ms | max(200ms, ceil(1.5x [5] x Kp) x max(CSI-RS period, DRX cycle)) x CSSFintra |
| DRX cycle>320ms | ceil( [5] x Kp ) x DRX cycle x CSSFintra |
| NOTE 1: The requirements apply assuming CSI-RS configuration with {D=3 with PRBs ≥ 48}. D is frequency domain density for the 1-port CSI-RS for L3 mobility defined in clause 7.4.1 of TS38.211 [6]. |

Table 9.10.2.5-2: Measurement period for intrafrequency CSI-RS based measurements without gaps(Frequency FR2)

|  |  |
| --- | --- |
| DRX cycle | T CSI-RS\_measurement\_period\_intra  |
| No DRX | max(400ms, ceil(Mmeas\_period\_w/o\_gaps x Kp) x CSI-RS period) x CSSFintra |
| DRX cycle≤ 320ms | max(400ms, ceil(1.5x Mmeas\_period\_w/o\_gaps x Kp) x max(CSI-RS period,DRX cycle)) x CSSFintra |
| DRX cycle>320ms | Mmeas\_period\_w/o\_gaps x DRX cycle x CSSFintra |
| NOTE 1: The requirements apply assuming CSI-RS configuration with {D=3 with PRBs ≥ 48}. D is frequency domain density for the 1-port CSI-RS for L3 mobility defined in clause 7.4.1 of TS38.211 [6]. |

Mmeas\_period\_w/o\_gaps : For a UE supporting power class 1, Mmeas\_period\_w/o\_gaps =[40]. For a UE supporting FR2 power class 2, Mmeas\_period\_w/o\_gaps =[24]. For a UE supporting power class 3, Mmeas\_period\_w/o\_gaps =[24]. For a UE supporting power class 4, Mmeas\_period\_w/o\_gaps =[24].

CSSFintra: it is a carrier specific scaling factor and is determined according to CSSFoutside\_gap,i in clause 9.1.5.

 If any CSI-RS resource in the CSI-RS MO is fully overlapping with gap, then the CSI-RS MO shall be measured within gap, otherwise,

- if intra-frequency CSI-RS resource is fully non overlapping with measurement gaps, Kp=1;

- if intra-frequency CSI-RS resource is partially overlapping with measurement gaps, Kp = 1/(1- (CSI-RS resource period /MGRP)).

<End of Change 2>