**3GPP TSG-RAN WG4 Meeting # 101-bis-e R4-220xxxx**

**Electronic Meeting, January 17-25, 2022**

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| *CR-Form-v11.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.133** | **CR** |  | **rev** |  | **Current version:** | **17.4.0** |  |
|  | | | | | | | | |
| *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:*** | Draft CR to UE behaviour to group the frequency layers with NCSG | | | | | | | | | |
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| ***Source to WG:*** | OPPO | | | | | | | | | |
| ***Source to TSG:*** | RAN4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MG\_enh-Core | | | | |  | | ***Date:*** | | 2022-01-10 |
|  |  | | | |  | | |  | |  |
| ***Category:*** | **B** |  | | | | | | ***Release:*** | | Rel-17 |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | For capable NCSG UE, the UE behaviour for different network configurations is missed in the current spec. | | | | | | | | |
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| ***Summary of change:*** | | Add the conditions for UE to group a intra-frequency or inter-frequency SSB based measurement into measurement outside/within MG and within NCSG. | | | | | | | | |
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| ***Consequences if not approved:*** | | The core requirements for NCSG will be incompleted. | | | | | | | | |
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| ***Clauses affected:*** | | 9.2.1 9.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | |  | | | |
| ***Other specs*** | |  | **X** | Other core specifications | | |  | | | |
| ***affected:*** | | **X** |  | Test specifications | | |  | | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | |  | | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |

**< Start of change 1>**

9.2.1 Introduction

A measurement is defined as a SSB based intra-frequency measurement provided the centre frequency of the SSB of the serving cell indicated for measurement and the centre frequency of the SSB of the neighbour cell are the same, and the subcarrier spacing of the two SSBs are also the same.

The UE shall be able to identify new intra-frequency cells and perform SS-RSRP, SS-RSRQ, and SS-SINR measurements of identified intra-frequency cells if carrier frequency information is provided by PCell or the PSCell, even if no explicit neighbour list with physical layer cell identities is provided.

The UE can perform intra-frequency SSB based measurements without measurement gaps if

- the UE indicates ‘no-gap’ via *intraFreq-needForGap* for intra-frequency measurement, or

- the SSB is completely contained in the active BWP of the UE, or

- the active downlink BWP is initial BWP[3].

The UE supporting [NCSG] feature can perform intra-frequency SSB based measurements within NCSG if

- the UE indicates [‘no-gap-with-interruption’] via [TBD] for intra-frequency measurement, and the SMTC for the intra-frequency measurement is overlapped with the configured NCSG occasion, or

- the UE indicates [‘no-gap’] via *intraFreq-needForGap* for intra-frequency measurement, and the SMTC for the intra-frequency measurement is [fully] overlapped with the configured NCSG occasion.

Otherwise, the UE can only perform intra-frequency SSB based measurement within MG.

For intra-frequency SSB based measurements without measurement gaps, UE may cause scheduling restriction as specified in clause 9.2.5.3.

SSB based measurements are configured along with one or two measurement timing configuration(s) (SMTC(s)) which provides periodicity, duration and offset information on a window of up to 5ms where the measurements are to be performed. For intra-frequency connected mode measurements, up to two measurement window periodicities may be configured. A single measurement window offset and measurement duration are configured per intra-frequency measurement object.

When measurement gaps are needed, the UE is not expected to detect SSB which start earlier than the gap starting time + switching time, nor detect SSB which end later than the gap end – switching time. Switching time is 0.5ms for frequency range FR1 and 0.25ms for frequency range FR2.

The requirements in this clause shall also apply, when the UE is configured to perform SRS carrier based switching and using measurement gaps.

The measurement requirements defined for an activated SCell with a non-dormant active BWP defined in this clause shall also apply to an activated SCell with dormant BWP as active BWP.

**< End of change 1>**

**< End of change 2>**

9.3.1 Introduction

A measurement is defined as an SSB based inter-frequency measurement provided it is not defined as an intra-frequency measurement according to clause 9.2.

The UE shall be able to identify new inter-frequency cells and perform SS-RSRP, SS-RSRQ, and SS-SINR measurements of identified inter-frequency cells if carrier frequency information is provided by PCell or PSCell, even if no explicit neighbour list with physical layer cell identities is provided.

A measurement is defined as an inter-frequency SSB based measurements without measurement gaps for UE capable of *interFrequencyMeas-NoGap* provided

- the UE supports *interFrequencyMeas-Nogap-r16* [15], and

- the SSB is completely contained in the active BWP of the UE.

For a UE supporting [NCSG] feature, a measurement is defined as an inter-frequency SSB based measurements with NCSG provided

- the UE indicates [‘no-gap-with-interruption’] via [TBD] for inter-frequency measurement, and the SMTC for inter-frequency measurement is overlapped with configured NCSG occasion,

- the UE indicate [‘no-gap’] via *interFreq-NeedForGap* for inter-frequency measurement, and the SMTC for inter-frequency measurement is [fully] overlapped with configured NCSG occasion.

Otherwise, a measurement is defined as an inter-frequency SSB based measurements with MG.

For inter-frequency SSB based measurements without measurement gaps, UE may cause scheduling restriction as specified in clause 9.3.5.3.

SSB based measurements are configured along with a measurement timing configuration (SMTC) per carrier, which provides periodicity, duration and offset information on a window of up to 5ms where the measurements on the configured inter-frequency carrier are to be performed. For inter-frequency connected mode measurements, one measurement window periodicity may be configured per inter-frequency measurement object.

When measurement gaps are needed, the UE is not expected to detect SSB on an inter-frequency measurement object which start earlier than the gap starting time + switching time, nor detect SSB which ends later than the gap end – switching time. When the inter-frequency cells are in FR2 and the per-FR gap is configured to the UE in EN-DC, SA NR, NE-DC and NR-DC, or the serving cells are in FR2, the inter-frequency cells are in FR2 and the per-UE gap is configured to the UE in SA NR and NR-DC, the switching time is 0.25ms. Otherwise the switching time is 0.5ms.

The requirements in this clause shall also apply, when the UE is configured to perform SRS carrier based switching and using measurement gaps.

Longer measurement period would be expected during the period Tidentify\_CGI when the UE is requested to decode an NR CGI.

**< End of change 2>**