**3GPP TSG-RAN WG2 Meeting #110e *R2-200xxxx***

**E-meeting, 1st – 12th June 2020**

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| *CR-Form-v11.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.331** | **CR** | **1604** | **rev** | **1** | **Current version:** | **16.0.0** |  |
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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 | **x** | Core Network |  |

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| ***Title:***  | CR to 38.331 on introduction of mandatory gap patterns in Rel-16 |
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| ***Source to WG:*** | ZTE Corporation, Sanechips, Ericsson, MediaTek Inc, OPPO, CATT, Intel Corporation, Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, Vivo |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_RRM\_Enh\_Core |  | ***Date:*** | 2020-05-22 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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)* |
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| ***Reason for change:*** | Based on RAN4’s LS in R2-2004378(R4-2005846), in order to mandate gap patterns in FR1 in Rel-16, RAN4 asks RAN2 to introduce new UE capability for NR only measurement scenario.

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| *extract from RAN4’s LS*For NR SA and NR DC* To mandate additional gap patterns in FR1, the UE capability for NR only measurement needs to be introduced as follows:
	+ NR-only measurement means the target measurement objects to be measured within the measurement gap are all NR carriers.
	+ The UE capability is to indicate if the gap patterns from GP#2 to GP#11 can only be used to do NR only measurement and to indicate the gap patterns are supported by the UE.
	+ UE capability shall be indicated for each gap pattern and shall be mandatory with capability signalling.
* RAN4 is still discussing what gap patterns shall be made mandatory in Rel-16 and will inform RAN2 once the decision is made.

For LTE SA, EN-DC, NE-DC* Introduce a new 1 bit UE capability to signal the support of the full set of measurement gap patterns which RAN4 makes mandatory for NR only measurement in NR SA and NR-DC mode.
* This new UE capability is an optional capability.
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For NR SA and NR-DC, a new gap pattern capability should be introduced in NR RRC for NR only measurement, and for NE-DC, 1 bit UE capability should be introduced in NR RRC. This CR is provide to introduce the new measurement gap pattern capabilities.In addition, based on RAN4’s LS (R4-2009269), the additional mandatory gap pattern in Rel-16 are:* GP#17, GP#18 and GP#19 shall be additional mandatory
* GP#2, GP#3 and GP#11 shall be additional mandatory for NR only measurement
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| ***Summary of change:*** | 1. Add UE capability supportedGapPattern-NRonly-r16 within MeasAndMobParametersCommon, corresponding to gap pattern #2 ~#11. The field applies to both NR SA and NR-DC in case of NR only measurement (i.e. the measurement objects to be measured within gap are all NR carriers).
2. Add UE capability supportedGapPattern-NRonly-NEDC-r16 within MeasAndMobParametersCommon. The field applies to NR only measurement in NE-DC.

**Impact analysis**Impacted 5G architecture options:NR SA, NR-DC, NE-DCImpacted functionality:UE measurement capabilityInter-operability: 1. If UE implements according to the CR and the network does not, the network will determine the supported gap pattern based on legacy *supportedGapPattern* capability, there is no inter-operability issue;
2. If the network implements according to the CR and the UE does not, the UE is unable to signal the capability value, and network will assume the UE does not support the additional gap patterns for NR only measurement, and then use legacy *supportedGapPattern* capability to determine the supported gap patterns, there is no inter-operability issue.
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| ***Consequences if not approved:*** | The UE is unable to signal the support of additional gap patterns for NR only measurement in case of NR SA, NR-DC and NE-DC. |
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| ***Clauses affected:*** | 6.3.3 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** | **x** |  |  Other core specifications  | TS 38.306 CR0307, TS 36.331 CR4294, TS 36.306 CR1759  |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |

Start of change

### 6.3.3 UE capability information elements

#### – *MeasAndMobParameters*

The IE *MeasAndMobParameters* is used to convey UE capabilities related to measurements for radio resource management (RRM), radio link monitoring (RLM) and mobility (e.g. handover).

*MeasAndMobParameters* information element

-- ASN1START

-- TAG-MEASANDMOBPARAMETERS-START

MeasAndMobParameters ::= SEQUENCE {

 measAndMobParametersCommon MeasAndMobParametersCommon OPTIONAL,

 measAndMobParametersXDD-Diff MeasAndMobParametersXDD-Diff OPTIONAL,

 measAndMobParametersFRX-Diff MeasAndMobParametersFRX-Diff OPTIONAL

}

MeasAndMobParametersCommon ::= SEQUENCE {

 supportedGapPattern BIT STRING (SIZE (22)) OPTIONAL,

 ssb-RLM ENUMERATED {supported} OPTIONAL,

 ssb-AndCSI-RS-RLM ENUMERATED {supported} OPTIONAL,

 ...,

 [[

 eventB-MeasAndReport ENUMERATED {supported} OPTIONAL,

 handoverFDD-TDD ENUMERATED {supported} OPTIONAL,

 eutra-CGI-Reporting ENUMERATED {supported} OPTIONAL,

 nr-CGI-Reporting ENUMERATED {supported} OPTIONAL

 ]],

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 independentGapConfig ENUMERATED {supported} OPTIONAL,

 periodicEUTRA-MeasAndReport ENUMERATED {supported} OPTIONAL,

 handoverFR1-FR2 ENUMERATED {supported} OPTIONAL,

 maxNumberCSI-RS-RRM-RS-SINR ENUMERATED {n4, n8, n16, n32, n64, n96} OPTIONAL

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 [[

 nr-CGI-Reporting-ENDC ENUMERATED {supported} OPTIONAL

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 [[

 supportedGapPattern-NRonly-r16 BIT STRING (SIZE (10)) OPTIONAL,

 supportedGapPattern-NRonly-NEDC-r16 ENUMERATED {supported} OPTIONAL

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}

MeasAndMobParametersXDD-Diff ::= SEQUENCE {

 intraAndInterF-MeasAndReport ENUMERATED {supported} OPTIONAL,

 eventA-MeasAndReport ENUMERATED {supported} OPTIONAL,

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 handoverInterF ENUMERATED {supported} OPTIONAL,

 handoverLTE-EPC ENUMERATED {supported} OPTIONAL,

 handoverLTE-5GC ENUMERATED {supported} OPTIONAL

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 sftd-MeasNR-Neigh ENUMERATED {supported} OPTIONAL,

 sftd-MeasNR-Neigh-DRX ENUMERATED {supported} OPTIONAL

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 eutra-AutonomousGaps-r16 ENUMERATED {supported} OPTIONAL,

 nr-AutonomousGaps-r16 ENUMERATED {supported} OPTIONAL,

 nr-AutonomousGaps-ENDC-r16 ENUMERATED {supported} OPTIONAL,

 handoverUTRA-FDD-r16 ENUMERATED {supported} OPTIONAL

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}

MeasAndMobParametersFRX-Diff ::= SEQUENCE {

 ss-SINR-Meas ENUMERATED {supported} OPTIONAL,

 csi-RSRP-AndRSRQ-MeasWithSSB ENUMERATED {supported} OPTIONAL,

 csi-RSRP-AndRSRQ-MeasWithoutSSB ENUMERATED {supported} OPTIONAL,

 csi-SINR-Meas ENUMERATED {supported} OPTIONAL,

 csi-RS-RLM ENUMERATED {supported} OPTIONAL,

 ...,

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 handoverInterF ENUMERATED {supported} OPTIONAL,

 handoverLTE-EPC ENUMERATED {supported} OPTIONAL,

 handoverLTE-5GC ENUMERATED {supported} OPTIONAL

 ]],

 [[

 maxNumberResource-CSI-RS-RLM ENUMERATED {n2, n4, n6, n8} OPTIONAL

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 [[

 simultaneousRxDataSSB-DiffNumerology ENUMERATED {supported} OPTIONAL

 ]],

 [[

 nr-AutonomousGaps-r16 ENUMERATED {supported} OPTIONAL,

 nr-AutonomousGaps-ENDC-r16 ENUMERATED {supported} OPTIONAL,

 handoverUTRA-FDD-r16 ENUMERATED {supported} OPTIONAL

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-- TAG-MEASANDMOBPARAMETERS-STOP

-- ASN1STOP

End of change