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

**E-meeting, 1st – 12th June 2020**

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| *CR-Form-v11.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **36.306** | **CR** | **1759** | **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 36.306 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 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:*** | | 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 capabilities for NR only measurement scenario.   |  | | --- | | *extract from RAN4’s LS*  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. |   For LTE SA and EN-DC respectively, 1 bit capability should be introduced in LTE RRC to indicate whether the UE supports gap pattern 2 , 3 and 11 for NR only measurement based on RAN4 LS (R4-2009269). | | | | | | | | |
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| ***Summary of change:*** | | 1. Add section 4.3.6.x measGapPatterns-NRonly-r16 capability and corresponding explanation, this capability applies to NR only measurement in LTE SA. 2. Add section 4.3.6.y measGapPatterns-NRonly-ENDC-r16 capability and corresponding explanation, this capability applies to NR only measurement in (NG)EN-DC.   **Impact analysis**  Impacted 5G architecture options:  LTE SA, (NG)EN-DC  Impacted functionality:  UE measurement capability  Inter-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 measGapPatterns-r15 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 measGapPatterns 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 LTE SA, (NG)EN-DC. | | | | | | | | |
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| ***Clauses affected:*** | | 4.3.6.x, 4.3.6.y | | | | | | | | |
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|  | | **Y** | **N** |  | | |  | | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | TS 36.331 CR4294, TS 38.331 CR1604, TS 38.306 CR0307 | | | |
| ***affected:*** | |  | **x** | Test specifications | | | TS/TR ... CR ... | | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | TS/TR ... CR ... | | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |

Start of change

4.3.6 Measurement parameters

4.3.6.1 *interFreqNeedForGaps* and *interRAT-NeedForGaps*

These fields define for each supported E-UTRA band whether measurement gaps are required to perform inter-frequency measurements on each supported E-UTRA radio frequency band and inter-RAT measurements on each supported RAT/band combination. A UE also indicates for each band combination as in the supportedBandCombination whether measurement gaps are required to perform inter-frequency measurements on each supported E-UTRA radio frequency band and inter-RAT measurements on each supported RAT/band combination.

4.3.6.2 *rsrqMeasWideband*

This field defines whether the UE can perform RSRQ measurements in RRC\_IDLE and RRC\_CONNECTED with wider bandwidth as specified in TS 36.133 [16].

4.3.6.3 *timerT312-r12*

This field defines whether the UE supports T312 as specified in TS 36.331 [5].

4.3.6.4 *alternativeTimeToTrigger-r12*

This field defines whether the UE supports alternativeTimeToTrigger as specified in TS 36.331 [5].

4.3.6.5 *benefitsFromInterruption-r11*

This field indicates whether the UE power consumption could benefit from being allowed to cause interruptions to serving cells when performing measurements of deactivated SCell carriers for *measCycleSCell* of less than 640ms, as specified in TS 36.133 [16].

4.3.6.6 *incMonEUTRA-r12*

This field defines whether the UE supports increased number of E-UTRA carrier monitoring in RRC\_IDLE and RRC\_CONNECTED as specified in TS 36.133 [16], and whether the UE supports extended number of cell re-selection priorities for EUTRA frequencies in *RRCConnectionRelease*, as specified in TS 36.331 [5]. It is mandatory for UEs of this release of the specification, except for Category 0 and 1bis UEs.

A UE that supports increased number of E-UTRA carrier monitoring shall also support extended number of measurement identities.

4.3.6.7 *incMonUTRA-r12*

This field defines whether the UE supports increased number of UTRA carrier monitoring in RRC\_IDLE and RRC\_CONNECTED as specified in TS 36.133 [16].

A UE that supports increased number of UTRA carrier monitoring shall also support extended number of measurement identities.

4.3.6.8 *extendedMaxMeasId-r12*

This field defines whether the UE supports extended number of measurement identities as defined by *maxMeasId-r12* in TS 36.331 [5].

It is mandatory for UEs of this release of the specification if *incMonEUTRA-r12* or *incMonUTRA-r12* or *dc-Support-r12* or *extendedMaxObjectId-r13* is supported.

4.3.6.9 *crs-DiscoverySignalsMeas-r12*

This field defines whether the UE supports CRS based discovery signals measurement as specified in TS 36.331 [5], and PDSCH/EPDCCH RE mapping with zero power CSI-RS configured for discovery signals.

4.3.6.10 *csi-RS-DiscoverySignalsMeas-r12*

This field defines whether the UE supports CSI-RS based discovery signals measurement as specified in TS 36.331 [5]. A UE that supports this feature shall also support *crs-DiscoverySignalsMeas-r12*.

4.3.6.11 *extendedRSRQ-LowerRange-r12*

This field defines whether the UE supports the extended RSRQ lower value range from -34dB to -19.5dB in measurement configuration and reporting as specified in TS 36.133 [16].

4.3.6.12 *rsrq-OnAllSymbols-r12*

This field defines whether the UE supports the RSRQ measurement on all OFDM symbols as specified in TS 36.214 [23] and also the extended RSRQ upper value range from -3dB to 2.5dB in measurement configuration and reporting as specified in TS 36.133 [16]. If the UE supports *rsrq-OnAllSymbols-r12* and *rsrqMeasWideband* it shall also support the RSRQ measurement on all OFDM symbols with wider bandwidth.

4.3.6.13 *rs-SINR-Meas-r13*

This field defines whether the UE can perform RS-SINR measurements in RRC\_CONNECTED as specified in TS 36.214 [23].

4.3.6.14 *whiteCellList-r13*

This field defines whether the UE supports configuration and use of white-listed cells as specified in TS 36.331 [5].

4.3.6.15 *extendedFreqPriorities-r13*

This field defines whether the UE supports extended E-UTRA frequency priorities as specified in TS 36.331 [5] and indicated by *cellReselectionSubPriority* field.

A UE supporting NR SA operation shall support extended E-UTRA frequency priorities and NR frequency priorities as specified in TS 36.331 [9] and indicated by *CellReselectionSubPriority* field.

4.3.6.16 *extendedMaxObjectId-r13*

This field defines whether the UE supports extended number of measurement object identities as defined by *maxObjectId-r13* in TS 36.331 [5]. The field is mandatory present for the UE supporting the configuration of *sCellToAddModListExt*. A UE indicating support of *extendedMaxObjectId-r13* shall also indicate the support of *extendedMaxMeasId-r12*.

4.3.6.17 *ul-PDCP-Delay-r13*

This field defines whether the UE supports UL PDCP Packet Delay per QCI measurement as specified in TS 36.314 [25]. A UE that supports the UL PDCP Delay measurement shall also support the measurement configuration and reporting as specified in TS 36.331 [5].

4.3.6.18 Void

4.3.6.19 *rssi-AndChannelOccupancyReporting-r13*

This field defines whether the UE supports measurement and reporting for RSSI and channel occupancy. This field is only applicable if the UE supports downlink LAA operation.

4.3.6.20 *multiBandInfoReport-r13*

This field defines whether the UE supports the acquisition and reporting of multi band information for *reportCGI* as specified in TS 36.331 [5].

4.3.6.21 Void

4.3.6.22 Void

4.3.6.23 *ceMeasurements-r14*

This field defines whether the UE supports intra-frequency RSRQ measurements and inter-frequency RSRP and RSRQ measurements in RRC\_CONNECTED, as specified in TS 36.133 [16], TS 36.304 [14] and TS 36.331 [5]. In this release of specification, it is mandatory for UEs of Category M1 and M2 and UEs that support coverage enhancements to support *ceMeasurements-r14*. A UE indicating support of *ceMeasurements-r14* shall also indicate support of *ce-ModeA-r13*.

4.3.6.24 *ncsg-r14*

This field defines whether the UE supports NCSG gap as specified in TS 36.133 [16]. If the UE supports *ncsg-r14* and asynchronous DC, the UE shall support NCSG Pattern Id 0, 1, 2 and 3. If the UE supports ncsg-r14 but the UE does not support asynchronous DC, only NCSG Pattern Id 0 and 1 shall be supported.

4.3.6.25 *perServingCellMeasurementGap-r14*

This field defines whether the UE supports per CC measurement gap as specified in TS 36.331 [5].

4.3.6.26 *shortMeasurementGap-r14*

This field defines whether the UE supports shorter measurement gap length (i.e. *gp2* and *gp3*) in LTE standalone as specified in TS 36.133 [16], and for independent measurement gap configuration on FR1 and per-UE gap in (NG)EN-DC as specified in TS38.133 [37].

4.3.6.27 *nonUniformGap-r14*

This field defines whether the UE supports measurement non uniform Pattern Id 1, 2, 3 and 4 in LTE standalone as specified in TS 36.133 [16].

4.3.6.28 *rlm-ReportSupport-r14*

This field defines whether the UE supports RLM event and information reporting as specified in TS 36.133 [16].

4.3.6.29 Void

4.3.6.30 *qoe-MeasReport-r15*

This field defines whether the UE supports QoE Measurement Collection for streaming services.

4.3.6.31 *ca-IdleModeMeasurements-r15*

This field defines whether the UE supports performing eNB-configured CRS-based RRM measurements for configured carrier(s) in RRC\_IDLE mode, including reporting them when requested by eNB while in RRC\_CONNECTED, as specified in TS 36.331 [5].

4.3.6.32 *ca-IdleModeValidityArea-r15*

This field defines whether the UE supports configuration of validity area for performing eNB-configured CRS-based RRM measurements for configured carrier(s) in RRC\_IDLE mode, as specified in TS 36.331 [5]. A UE that supports this feature shall also support *ca-IdleModeMeasurements-r15*.

4.3.6.33 *qoe-MTSI-MeasReport-r15*

This field defines whether the UE supports QoE Measurement Collection for MTSI services.

4.3.6.34 *multipleCellsMeasExtension-r15*

This field defines whether the UE supports measurement reporting triggered based on a number of cells.It is mandatory to support this feature for UEs which have Aerial UE subscription as defined in TS 23.401 [18].

4.3.6.35 *heightMeas-r15*

This field defines whether the UE supports height-based measurement reporting as specified in TS 36.331 [5]. It is mandatory to support this feature for UEs which have Aerial UE subscription as defined in TS 23.401 [18].

4.3.6.36 *measGapPatterns-r15*

This field defines whether the UE that supports NR supports gap patterns 4 to 11 in LTE standalone as specified in TS 36.133 [16], and for independent measurement gap configuration on FR1 and per-UE gap in (NG)EN-DC as specified in TS38.133 [37].

4.3.6.37 *dl-ChannelQualityReporting-r16*

This field defines whether the UE supports DL channel quality reporting of the serving cell or configured carrier for FDD in RRC\_CONNECTED as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

Editor's note: Whether to have a common or separate capability with MTC, and how to name it if common.

4.3.6.x *measGapPatterns-NRonly-r16*

This field indicates whether the UE supports gap patterns 2, 3 and 11 in LTE standalone when the frequencies to be measured within this measurement gap are all NR frequencies.

4.3.6.y *measGapPatterns-NRonly-ENDC-r16*

This field indicates whether the UE supports gap patterns 2, 3 and 11 in (NG)EN-DC when the frequencies to be measured within this measurement gap are all NR frequencies.

End of change