**3GPP TSG-RAN WG2 Meeting #109bis-e *Draft R2-2003704***

**Electronic meeting, 20 - 30 April 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.306** | **CR** | **0293** | **rev** | **-** | **Current version:** | **16.0.0** |  |
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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 | **X** | Core Network |  |

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| ***Title:*** | Introduction of UE capabilities for eDCCA | | | | | | | | | |
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| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_NR\_DC\_CA\_enh-Core | | | | |  | ***Date:*** | | | 30/04/2020 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | Introduction of UE capabilities for eDCCA | | | | | | | | |
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| ***Summary of change:*** | | Addition of the following capabilities  General parameters:  - mcgRLF-RecoveryViaSCG-r16  - resumeWithStoredMCG-SCells-r16  - resumeWithStoredSCG-r16  - resumeWithSCG-Config-r16  MAC parameters:  - directSCellActivation-r16  - directSCellActivationResume-r16  MeasAndMobParameters:  - idleInactiveNR-MeasReport-r16  - idleInactiveEUTRA-MeasReport-r16  - idleInactive-ValidityArea-r16  To be added:  - SCell dormancy  - R1 features | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | UE capabilities for eDCCA are missing | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2.2, 4.2.6, 4.2.9 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 38.331 CRx, TS 38.321 CRy | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## 4.2 UE Capability Parameters

### 4.2.2 General parameters

| Definitions for parameters | Per | M | FDD-TDD DIFF | **FR1-FR2**  DIFF |
| --- | --- | --- | --- | --- |
| ***accessStratumRelease***  Indicates the access stratum release the UE supports as specified in TS 38.331 [9]. | UE | Yes | No | No |
| ***delayBudgetReporting***  Indicates whether the UE supports delay budget reporting as specified in TS 38.331 [9]. | UE | No | No | No |
| ***mcgRLF-RecoveryViaSCG-r16***  Indicates whether the UE supports recovery from MCG RLF via split SRB1 (if supported) and via SRB3 (if supported) as specified in TS 38.331[9]. | UE | No | No | No |
| ***dl-DedicatedMessageSegmentation-r16***  Indicates whether the UE supports reception of segmented DL RRC messages. | UE | No | No | No |
| ***inactiveState***  Indicates whether the UE supports RRC\_INACTIVE as specified in TS 38.331 [9]. | UE | Yes | No | No |
| ***inDeviceCoexInd-r16***  Indicates whether the UE supports IDC (In-Device Coexistence) assistance information as specified in TS 38.331 [9]. | UE | No | No | No |
| ***overheatingInd***  Indicates whether the UE supports overheating assistance information. | UE | No | No | No |
| ***reducedCP-Latency***  Indicates whether the UE supports reduced control plane latency as defined in TS 38.331 [9] | UE | No | No | No |
| ***resumeWithStoredMCG-SCells-r16***  Indicates whether the UE supports not deleting the stored MCG SCell configuration when initiating the resume procedure. | UE | No | No | No |
| ***resumeWithStoredSCG-r16***  Indicates whether the UE supports not deleting the stored SCG configuration when initiating resume. The UE which indicates supports for *resumeWithStoredSCG-r16* shall also indicate support for *resumeWithSCG-Config-r16*. | UE | No | No | No |
| ***resumeWithSCG-Config-r16***  Indicates whether the UE supports (re-)configuration of an SCG during the resume procedure. | UE | No | No | No |
| ***splitSRB-WithOneUL-Path***  Indicates whether the UE supports UL transmission via MCG path and DL reception via either MCG path or SCG path, as specified for the split SRB in TS 37.340 [7]. The UE shall not set the FDD/TDD specific fields for this capability (i.e. it shall not include this field in *UE-MRDC-CapabilityAddXDD-Mode*). | UE | No | No | No |
| ***splitDRB-withUL-Both-MCG-SCG***  Indicates whether the UE supports UL transmission via both MCG path and SCG path for the split DRB as specified in TS 37.340 [7]. The UE shall not set the FDD/TDD specific fields for this capability (i.e. it shall not include this field in *UE-MRDC-CapabilityAddXDD-Mode*). | UE | Yes | No | No |
| ***srb3***  Indicates whether the UE supports direct SRB between the SN and the UE as specified in TS 37.340 [7]. The UE shall not set the FDD/TDD specific fields for this capability (i.e. it shall not include this field in *UE-MRDC-CapabilityAddXDD-Mode*). This field is not applied to NE-DC. | UE | Yes | No | No |
| ***v2x-EUTRA***  Indicates whether the UE supports EUTRA V2X according to *UE-EUTRA-Capability* as defined in TS 36.331 [17], independent of the configured EN-DC band combination. This field is only applied to EN-DC. In UE-NR-Capability, this field is not used, and UE does not include the field. | UE | No | Yes | No |

### 4.2.6 MAC parameters

| Definitions for parameters | Per | M | FDD-TDD DIFF | FR1-FR2 DIFF |
| --- | --- | --- | --- | --- |
| ***directSCellActivation-r16***  Indicates whether the UE supports:  - direct NR MCG SCell activation, as specified in TS 38.321 [8], upon SCell addition, upon reconfiguration with sync of the MCG, as specified in TS 38.331 [9];  - direct NR SCG SCell activation, as specified in TS 38.321 [8], if the UE indicates support of *en-dc* as specified in TS 36.331 [17] or support of *nr-dc* as specified in TS 38.331 [9], upon SCell addition and upon reconfiguration with sync of the SCG, both performed via an *RRCReconfiguration* message received via SRB3 or contained in an *RRC(Connection)Reconfiguration* message received via SRB1, as specified in TS 38.331 [9] and TS 36.331 [17].  FFS: Split two capabilities, one for NR MCG SCell activation, one for NR SCG SCell activation. | UE | No | No | FFS |
| ***directSCellActivationResume-r16***  Indicates whether the UE supports direct NR MCG SCell activation, as specified in TS 38.321 [8], upon reception of an *RRCResume* message, as specified in TS 38.331 [9].  Also indicates whether the UE supports direct NR SCG SCell activation, as specified in TS 38.321 [8]:  - if the UE indicates support of *en-dc* and of *resumeWithSCG-Config-r16* as specified in TS 36.331 [17], upon reception of an *RRCReconfiguration* included in an *RRCConnectionResume* message, as specified in TS 38.331 [9] and TS 36.331 [17];  - if the UE indicates support of *nr-dc* and of *resumeWithSCG-Config-r16* as specified in TS 38.331 [9], upon reception of an *RRCReconfiguration* included in an *RRCResume* message, as specified in TS 38.331 [9].  FFS: Split two capabilities, one for NR MCG SCell activation, one for NR SCG SCell activation. | UE | No | No | FFS |
| ***lch-ToSCellRestriction***  Indicates whether the UE supports restricting data transmission from a given LCH to a configured (sub-) set of serving cells (see allowedServingCells in LogicalChannelConfig). A UE supporting pdcp-DuplicationMCG-OrSCG-DRB or pdcp-DuplicationSRB (see PDCP-Config) shall also support lch-ToSCellRestriction. | UE | No | No | No |
| ***lcp-Restriction***  Indicates whether UE supports the selection of logical channels for each UL grant based on RRC configured restriction. | UE | No | No | No |
| ***logicalChannelSR-DelayTimer***  Indicates whether the UE supports the logicalChannelSR-DelayTimer as specified in TS 38.321 [8]. | UE | No | Yes | No |
| ***longDRX-Cycle***  Indicates whether UE supports long DRX cycle as specified in TS 38.321 [8]. | UE | Yes | Yes | No |
| ***multipleConfiguredGrants***  Indicates whether UE supports more than one configured grant configurations (including both Type 1 and Type 2) in a cell group. For each cell, the UE supports at most one configured grant per BWP and the maximum number of configured grant configurations per cell group is 2. If absent, for each configured cell group, the UE only supports one configured grant configuration on one serving cell. | UE | No | Yes | No |
| ***multipleSR-Configurations***  Indicates whether the UE supports 8 SR configurations per PUCCH cell group as specified in TS 38.321 [8]. | UE | No | Yes | No |
| ***recommendedBitRate***  Indicates whether the UE supports the bit rate recommendation message from the gNB to the UE as specified in TS 38.321 [8]. | UE | No | No | No |
| ***recommendedBitRateMultiplier-r16***  Indicates whether the UE supports the bit rate multiplier for recommended bit rate MAC CE as specified in TS 38.321 [8], clause 6.1.3.20. This field is only applicable if the UE supports recommendedBitRate. | UE | No | No | No |
| ***recommendedBitRateQuery***  Indicates whether the UE supports the bit rate recommendation query message from the UE to the gNB as specified in TS 38.321 [8]. This field is only applicable if the UE supports recommendedBitRate. | UE | No | No | No |
| ***shortDRX-Cycle***  Indicates whether UE supports short DRX cycle as specified in TS 38.321 [8]. | UE | Yes | Yes | No |
| ***skipUplinkTxDynamic***  Indicates whether the UE supports skipping of UL transmission for an uplink grant indicated on PDCCH if no data is available for transmission as specified in TS 38.321 [8]. | UE | No | Yes | No |

### 4.2.9 *MeasAndMobParameters*

| Definitions for parameters | Per | M | FDD-TDD DIFF | FR1-FR2 DIFF |
| --- | --- | --- | --- | --- |
| ***cli-RSSI-Meas-r16***  Indicates whether the UE can perform CLI RSSI measurements as specified in TS 38.215 [13] and supports periodical reporting and measurement event triggering as specified in TS 38.331 [9]. | UE | No | TDD only | Yes |
| ***cli-SRS-RSRP-Meas-r16***  Indicates whether the UE can perform SRS RSRP measurements as specified in TS 38.215 [13] and supports periodical reporting and measurement event triggering based on SRS-RSRP as specified in TS 38.331 [9]. | UE | No | TDD only | Yes |
| ***csi-RS-RLM***  Indicates whether the UE can perform radio link monitoring procedure based on measurement of CSI-RS as specified in TS 38.213 [11] and TS 38.133 [5]. This parameter needs FR1 and FR2 differentiation. If the UE supports this feature, the UE needs to report *maxNumberResource-CSI-RS-RLM*. | UE | Yes | No | Yes |
| ***csi-RSRP-AndRSRQ-MeasWithSSB***  Indicates whether the UE can perform CSI-RSRP and CSI-RSRQ measurement as specified in TS 38.215 [13], where CSI-RS resource is configured with an associated SS/PBCH. If this parameter is indicated for FR1 and FR2 differently, each indication corresponds to the frequency range of measured target cell. If the UE supports this feature, the UE needs to report *maxNumberCSI-RS-RRM-RS-SINR*. | UE | No | No | Yes |
| ***csi-RSRP-AndRSRQ-MeasWithoutSSB***  Indicates whether the UE can perform CSI-RSRP and CSI-RSRQ measurement as specified in TS 38.215 [13], where CSI-RS resource is configured for a cell that transmits SS/PBCH block and without an associated SS/PBCH block. If this parameter is indicated for FR1 and FR2 differently, each indication corresponds to the frequency range of measured target cell. If the UE supports this feature, the UE needs to report *maxNumberCSI-RS-RRM-RS-SINR*. | UE | No | No | Yes |
| ***csi-SINR-Meas***  Indicates whether the UE can perform CSI-SINR measurements based on configured CSI-RS resources as specified in TS 38.215 [13]. If this parameter is indicated for FR1 and FR2 differently, each indication corresponding to the frequency range of measured target cell. If the UE supports this feature, the UE needs to report *maxNumberCSI-RS-RRM-RS-SINR*. | UE | No | No | Yes |
| ***eutra-AutonomousGaps-r16***  Defines whether the UE supports, upon configuration of *useAutonomousGaps* by the network, acquisition of relevant information from a neighbouring E-UTRA cell by reading the SI of the neighbouring cell using autonomous gap and reporting the acquired information to the network as specified in TS 38.331 [9] when MR-DC is not configured. | UE | No | Yes | No |
| ***eutra-CGI-Reporting***  Defines whether the UE supports acquisition of relevant information from a neighbouring E-UTRA cell by reading the SI of the neighbouring cell and reporting the acquired information to the network as specified in TS 38.331 [9] when the EN-DC is not configured. It is mandated if the UE supports EUTRA. | UE | CY | No | No |
| ***eventA-MeasAndReport***  Indicates whether the UE supports NR measurements and events A triggered reporting as specified in TS 38.331 [9]. This field only applies to SN configured measurement when EN-DC is configured. For NR SA, this feature is mandatory supported. | UE | Yes | Yes | No |
| ***eventB-MeasAndReport***  Indicates whether the UE supports EUTRA measurement and event B triggered reporting as specified in TS 38.331 [9]. It is mandated if the UE supports EUTRA. | UE | CY | No | No |
| ***handoverLTE-5GC***  Indicates whether the UE supports HO to EUTRA connected to 5GC. It is mandated if the UE supports EUTRA connected to 5GC. | UE | CY | Yes | Yes |
| ***handoverFDD-TDD***  Indicates whether the UE supports HO between FDD and TDD. It is mandated if the UE supports both FDD and TDD. This field only applies to NR SA (e.g. PCell handover). For PSCell change when EN-DC is configured, this feature is mandatory supported. | UE | Yes | No | No |
| ***handoverFR1-FR2***  Indicates whether the UE supports HO between FR1 and FR2. Support is mandatory for the UE supporting both FR1 and FR2. This field only applies to NR SA(e.g. PCell handover). For PSCell change when EN-DC is configured, this feature is mandatory supported. | UE | Yes | No | No |
| ***handoverInterF***  Indicates whether the UE supports inter-frequency HO. It indicates the support for inter-frequency HO from the corresponding duplex mode if this capability is included in *fdd-Add-UE-NR-Capabilities* or *tdd-Add-UE-NR-Capabilities*. It indicates the support for inter-frequency HO from the corresponding frequency range if this capability is included in *fr1-Add-UE-NR-Capabilities* or *fr2-Add-UE-NR-Capabilities*. This field only applies to NR SA (e.g. PCell handover). For PSCell change when EN-DC is configured, this feature is mandatory supported. | UE | Yes | Yes | Yes |
| ***handoverLTE-EPC***  Indicates whether the UE supports HO to EUTRA connected to EPC. It is mandated if the UE supports EUTRA connected to EPC. | UE | CY | Yes | Yes |
| ***handoverUTRA-FDD-r16***  Indicates whether the UE supports NR to UTRA-FDD CELL\_DCH CS handover. It is mandatory to support both UTRA-FDD measurement and event B triggered reporting, and periodic UTRA-FDD measurement and reporting if the UE supports HO to UTRA-FDD. If this field is included, then UE shall support IMS voice over NR. | UE | No | Yes | Yes |
| ***idleInactiveNR-MeasReport-r16***  Indicates whether the UE supports configuration of NR SSB measurements in RRC\_IDLE/RRC\_INACTIVE and reporting of the corresponding results upon network request as specified in TS 38.331 [9]. | UE | No | No | FFS |
| ***idleInactiveEUTRA-MeasReport-r16***  Indicates whether the UE supports configuration of E-UTRA measurements in RRC\_IDLE/RRC\_INACTIVE and reporting of the corresponding results upon network request as specified in TS 38.331 [9]. | UE | No | No | No |
| ***idleInactive-ValidityArea-r16***  Indicates whether the UE supports configuration of a validity area for NR measurements in RRC\_IDLE/RRC\_INACTIVE as specified in TS 38.331 [9]. | UE | No | No | No |
| ***independentGapConfig***  This field indicates whether the UE supports two independent measurement gap configurations for FR1 and FR2 specified in clause 9.1.2 of TS 38.133 [5]. The field also indicates whether the UE supports the FR2 inter-RAT measurement without gaps when EN-DC is not configured. | UE | No | No | No |
| ***intraAndInterF-MeasAndReport***  Indicates whether the UE supports NR intra-frequency and inter-frequency measurements and at least periodical reporting. This field only applies to SN configured measurement when EN-DC is configured. For NR SA, this feature is mandatory supported. | UE | Yes | Yes | No |
| ***periodicEUTRA-MeasAndReport***  Indicates whether the UE supports periodic EUTRA measurement and reporting. It is mandated if the UE supports EUTRA. | UE | CY | No | No |
| ***maxNumberCSI-RS-RRM-RS-SINR***  Defines the maximum number of CSI-RS resources for RRM and RS-SINR measurement across all measurement frequencies per slot. If UE supports any of *csi-RSRP-AndRSRQ-MeasWithSSB*, *csi-RSRP-AndRSRQ-MeasWithoutSSB*, and *csi-SINR-Meas*, UE shall report this capability. | UE | CY | No | No |
| ***maxNumberResource-CSI-RS-RLM***  Defines the maximum number of CSI-RS resources within a slot per spCell for CSI-RS based RLM. If UE supports any of *csi-RS-RLM* and *ssb-AndCSI-RS-RLM*, UE shall report this capability. | UE | CY | No | Yes |
| ***nr-AutonomousGaps-r16***  Defines whether the UE supports, upon configuration of *useAutonomousGaps* by the network, acquisition of relevant information from a neighbouring NR cell by reading the SI of the neighbouring cell using autonomous gap and reporting the acquired information to the network as specified in TS 38.331 [9] when MR-DC is not configured. | UE | No | Yes | Yes |
| ***nr-AutonomousGaps-ENDC-r16***  Defines whether the UE supports, upon configuration of *useAutonomousGaps* by the network, acquisition of relevant information from a neighbouring NR cell by reading the SI of the neighbouring cell using autonomous gap and reporting the acquired information to the network as specified in TS 38.331 [9] when (NG)EN-DC is configured. | UE | No | Yes | Yes |
| ***nr-CGI-Reporting***  Defines whether the UE supports acquisition of relevant information from a neighbouring intra-frequency or inter-frequency NR cell by reading the SI of the neighbouring cell and reporting the acquired information to the network as specified in TS 38.331 [9] when EN-DC is not configured. | UE | Yes | No | No |
| ***nr-CGI-Reporting-ENDC***  Defines whether the UE supports acquisition of relevant information from a neighbouring intra-frequency or inter-frequency NR cell by reading the SI of the neighbouring cell and reporting the acquired information to the network as specified in TS 38.331 [9] when the (NG)EN-DC is configured. | UE | Yes | No | No |
| ***simultaneousRxDataSSB-DiffNumerology***  Indicates whether the UE supports concurrent intra-frequency measurement on serving cell or neighbouring cell and PDCCH or PDSCH reception from the serving cell with a different numerology as defined in clause 8 and 9 of TS 38.133 [5]. | UE | No | No | Yes |
| ***sftd-MeasPSCell***  Indicates whether the UE supports SFTD measurements between the PCell and a configured PSCell. If this capability is included in UE-MRDC-Capability, it indicates that the UE supports SFTD measurement between PCell and PSCell in (NG)EN-DC. If this capability is included in UE-NR-Capability, it indicates that the UE supports SFTD measurement between PCell and PSCell in NR-DC. | UE | No | Yes | No |
| ***sftd-MeasPSCell-NEDC***  Indicates whether the UE supports SFTD measurement between the NR PCell and a configured E-UTRA PSCell in NE-DC. | UE | No | Yes | No |
| ***sftd-MeasNR-Cell***  Indicates whether the SFTD measurement with and without measurement gaps between the EUTRA PCell and the NR cells is supported by the UE which is capable of EN-DC/NGEN-DC when EN-DC/NGEN-DC is not configured. The SFTD measurement without gaps can be used when the UE supports at least one EN-DC band combination consisting of the set of the current E-UTRA serving frequencies and the NR frequency where SFTD measurement is configured. In UE-NR-Capability, this field is not used, and UE does not include the field. | UE | No | Yes | No |
| ***sftd-MeasNR-Neigh***  Indicates whether the inter-frequency SFTD measurement with and without measurement gaps between the NR PCell and inter-frequency NR neighbour cells is supported by the UE when MR-DC is not configured. The SFTD measurement without gaps can be used when the UE supports at least one DC or CA band combination consisting of the set of the current NR serving frequencies and the NR frequency where SFTD measurement is configured. | UE | No | Yes | No |
| ***sftd-MeasNR-Neigh-DRX***  Indicates whether the inter-frequency SFTD measurement using DRX off period between the NR PCell and the inter-frequency NR neighbour cells is supported by the UE when MR-DC is not configured. | UE | No | Yes | No |
| ***ssb-RLM***  Indicates whether the UE can perform radio link monitoring procedure based on measurement of SS/PBCH block as specified in TS 38.213 [11] and TS 38.133 [5]. This field shall be set to *supported*. | UE | Yes | No | No |
| ***ssb-AndCSI-RS-RLM***  Indicates whether the UE can perform radio link monitoring procedure based on measurement of SS/PBCH block and CSI-RS as specified in TS 38.213 [11] and TS 38.133 [5]. If the UE supports this feature, the UE needs to report *maxNumberResource-CSI-RS-RLM*. | UE | No | No | No |
| ***ss-SINR-Meas***  Indicates whether the UE can perform SS-SINR measurement as specified in TS 38.215 [13]. If this parameter is indicated for FR1 and FR2 differently, each indication corresponds to the frequency range of measured target cell. | UE | No | No | Yes |
| ***supportedGapPattern***  Indicates measurement gap pattern(s) optionally supported by the UE for NR SA, for NR-DC, for NE-DC and for independent measurement gap configuration on FR2 in (NG)EN-DC. The leading / leftmost bit (bit 0) corresponds to the gap pattern 2, the next bit corresponds to the gap pattern 3, as specified in TS 38.133 [5] and so on. The UE shall set the bits corresponding to the measurement gap pattern 13 and 14 to 1 if the UE is an NR standalone capable UE that supports a band in FR2 or if the UE is an (NG)EN-DC capable UE that supports *independentGapConfig* and supports a band in FR2. | UE | CY | No | No |