**3GPP TSG-RAN WG2 Meeting #110 electronic R2-19xxxxx**

**Online, June 1 – June 12 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.822** | **CR** | **-** | **rev** | - | **Current version:** | **15.0.1** |  |
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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:*** | UE feature list introduction for NR SON/MDT WI | | | | | | | | | |
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| ***Source to WG:*** | CMCC | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_SON\_MDT-Core | | | | |  | ***Date:*** | | | 2020-05 |
|  |  | | | |  | |  | | |  |
| ***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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Due to NR SON/MDT WI finalization, UE features list agreed as part of NR SON/MDT WI needs to be specified. | | | | | | | | |
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| ***Summary of change:*** | | CR captures UE features list agreed as part of NR SON/MDT WI.  Updates after RAN2#109bis-e meeting:   * Add a new capability Cross RAT RLF reporting | | | | | | | | |
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| ***Consequences if not approved:*** | | UE features related to NR SON/MDT WI are unspecified. | | | | | | | | |
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| ***Clauses affected:*** | | 4.2 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

4.2 Layer-2 and Layer-3 features

Table 4.2-1 provides the list of Layer-2 and Layer-3 features, as shown in [4] and the corresponding UE capability field name, as specified in TS 38.331 [2].

Table 4.2-1: Layer-2 and Layer-3 feature list

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Features** | | **Index** | **Feature group** | | **Components** | | **Prerequisite feature groups** | | **Field name in TS 38.331 [2]** | | **Parent IE in TS 38.331 [2]** | | | **Need of FDD/TDD differentiation** | | **Need of FR1/FR2 differentiation** | **Note** | | | **Mandatory/Optional** |
| 0. General (including supported bearer types) | | 0-0 | Basic EN-DC procedures | | 1) MCG DRB with LTE/NR PDCP  2) SCG DRB with NR PDCP  3) SN addition, modification, and release via RRC connection reconfiguration  4) Joint processing on the combined RRC messages  5) Failure handling (including both MN and SN) | |  | | n/a | | n/a | | | n/a | | n/a |  | | | Mandatory without capability signalling |
| 0-1 | Access stratum release | | Access stratum release | |  | | *accessStratumRelease* | | *UE-NR-Capability* | | | No | | No |  | | | Optional with capability signalling and candidate value set is {Rel-15, spare7, … , spare1} |
| 0-2 | SRB | | 1) Split SRB with one UL path  2) SRB3 | |  | | 1) *splitSRB-WithOneUL-Path*  2) *srb3* | | *GeneralParametersMRDC-XDD-Diff* | | | No | | No | 2) Not applied to NE-DC. | | | 1) Optional with capability signalling  2) Mandatory with capability signalling |
| 0-3 | DRB | | 1) Maximum number of DRBs  2) Split DRB with one UL path  3) Split DRB with both UL MCG and SCG paths | |  | | 1), 2) n/a  3) *splitDRB-withUL-Both-MCG-SCG* | | 1), 2) n/a  3) *GeneralParametersMRDC-XDD-Diff* | | | No | | No | 2) 8 DRBs are supported regardless of bearer types | | | 1, 2) Mandatory without UE capability signalling  3) Mandatory with capability signalling |
| 0-4 | Direct SN addition in the first RRC connection reconfiguration after RRC connection establishment | | Direct SN addition in the first RRC connection reconfiguration after RRC connection establishment | |  | | n/a | | n/a | | | n/a | | n/a |  | | | Mandatory without capability signalling |
| 0-5 | IMS voice | | 1) IMS voice over NR  2) Fallback HO to LTE for IMS voice  3) 5GC VoLTE  4) IMS voice over SCG bearer of NE-DC | |  | | 1) *voiceOverNR*  3) *voiceOverEUTRA-5GC*  4) *voiceOverSCG-BearerEUTRA-5GC* | | 1) *IMS-ParametersFRX-Diff*  3), 4) *IMS-ParametersCommon* | | | 1), 3), 4) No | | 1) Yes  3), 4) No | 1), 2), 3) SA only  4): NE-DC only | | | 1) Mandatory with capability signalling if UE is IMS voice capable in NR SA. Otherwise optional with capability signalling.  2) No need for a separate capability signalling.  3) Optional with capability signalling  4) Optional with capability signalling |
| 0-6 | Delay budget reporting | | Delay budget reporting | |  | | *delayBudgetReporting* | | *UE-NR-Capability-v1530* | | | No | | No | SA only | | | Optional with capability signalling |
| 0-7 | PCell operation | | 1) PCell operation on FR2 | |  | | *pCell-FR2* | | *Phy-ParametersFR2* | | | No | | No | SA only | | | Mandatory with capability signalling |
| 0-8 | Overheating | | 1) Overheating assistance information | |  | | *overheatingInd* | | *UE-NR-Capability-v1540* | | | No | | No | SA only | | | Optional with capability signalling |
| 0-9 | V2X | | 1) Support of EUTRA V2X | |  | | *v2x-EUTRA* | | *GeneralParametersMRDC-XDD-Diff* | | | Yes | | No | Only applied to EN-DC | | | Optional with capability signalling |
| 1. PDCP | | 1-0 | Basic PDCP procedures | | 1) (de)Ciphering on DRB/SRB  2) Integrity protection on SRB  3) Timer based SDU discard  4) Re-ordering and in-order delivery  5) Status reporting  6) Duplicate discarding  7) 18bits SN | |  | | n/a | | n/a | | | n/a | | n/a |  | | | Mandatory without capability signalling |
| 1-1 | ROHC context | | 1) Maximum number of ROHC context sessions  2) Supported ROHC profiles | |  | | 1) *maxNumberROHC-ContextSessions*  2) *supportedROHC-Profiles* | | *PDCP-Parameters* | | | No | | No |  | | | Optional with capability signaling and candidate value set is:  1) {cs2, cs4, cs8, cs12, cs16, cs24, cs32, cs48, cs64, cs128, cs256, cs512, cs1024, cs16384, spare2, spare1}  2) {0x0000, 0x0001, 0x0002, 0x0003, 0x0004, 0x0006, 0x0101, 0x0102, 0x0103, 0x0104} |
| 1-2 | ROHC context continuation operation | | ROHC context continuation operation | |  | | *continueROHC-Context* | | *PDCP-Parameters* | | | No | | No |  | | | Optional with capability signalling |
| 1-3 | Uplink only ROHC profiles | | Uplink only ROHC profiles | |  | | *uplinkOnlyROHC-Profiles* | | *PDCP-Parameters* | | | No | | No |  | | | Optional with capability signalling |
| 1-4 | Out of order delivery | | Out of order delivery | |  | | *outOfOrderDelivery* | | *PDCP-Parameters* | | | No | | No |  | | | Optional with capability signalling |
| 1-5 | Short SN | | Short SN | |  | | *shortSN* | | *PDCP-Parameters* | | | No | | No |  | | | Mandatory with capability signalling |
| 1-6 | PDCP duplication | | 1) PDCP duplication for split SRB1/2  2) PDCP duplication for SRB1/2 and/or SRB3  3) PDCP duplication for MCG or SCG DRB  4) PDCP duplication for split DRB | |  | | 1) *pdcp-DuplicationSplitSRB*  2) *pdcp-DuplicationSRB*  3) *pdcp-DuplicationMCG-OrSCG-DRB*  4) *pdcp-DuplicationSplitDRB* | | 1), 4) *PDCP-ParametersMRDC*  2), 3) *PDCP-Parameters* | | | No | | No |  | | | Optional with capability signalling |
| 1-7 | DRB IP data rate | | 1) DRB IP data rate in DL  2) DRB IP data rate in UL | |  | | n/a | | n/a | | | n/a | | n/a |  | | | Optional capability is signalled by NAS signalling defined in 24.501 |
| 2. RLC | | 2-0 | Basic RLC procedures | | 1) RLC TM  2) RLC AM with 18bits SN\*  3) SDU discard | |  | | n/a | | n/a | | | n/a | | n/a | No separate feature is considered for t-PollRetransmit, t-Reassembly and t-StatusProhibit | | | Mandatory without capability signalling |
| 2-1 | RLC AM with short SN | | RLC AM with short SN | |  | | *am-WithShortSN* | | *RLC-Parameters* | | | No | | No |  | | | Mandatory with capability signalling |
| 2-2 | RLC UM with short SN | | RLC UM with short SN | |  | | *um-WithShortSN* | | *RLC-Parameters* | | | No | | No |  | | | Mandatory with capability signalling |
| 2-3 | RLC UM with long SN | | RLC UM with long SN | |  | | *um-WithLongSN* | | *RLC-Parameters* | | | No | | No |  | | | Mandatory with capability signalling |
| 2-4 | NR RLC SN size for SRB | | NR RLC SN size for SRB | |  | | n/a | | n/a | | | n/a | | n/a |  | | | RAN2 decided only short RLC SN is used for SRB. |
| 3. MAC | | 3-0 | Basic MAC procedures | | 1) RA procedure on PCell or PSCell (in case of EN-DC)  2) UE initiated RA procedure (including for beam recovery purpose)  3) NW initiated RA procedure (i.e. based on PDCCH)  4) Support of ssb-Threshold and association between preamble/PRACH occasion and SSB  5) Preamble grouping  6) UL single TA maintenance  7) HARQ operation for DL and UL  8) LCH prioritization  9) Prioritized bit rate  10) Multiplexing  11) SR with single SR configuration  12) BSR  13) PHR  14) 8bits and 16bits L field | |  | | n/a | | n/a | | | n/a | | n/a |  | | | Mandatory without capability signallling |
| 3-1 | LCP restriction | | 1) LCP restriction  2) LCP restriction to SCell(s) | |  | | 1) *lcp-Restriction*  2) *lch-ToSCellRestriction* | | *MAC-ParametersCommon* | | | No | | No |  | | | Optional with capability signalling |
| 3-2 | LCH SR delay timer | | LCH SR delay timer | |  | | *logicalChannelSR-DelayTimer* | | *MAC-ParametersXDD-Diff* | | | Yes | | No |  | | | Optional with capability signalling |
| 3-3 | DRX | | 1) DRX with long DRX cycle  2) DRX with short DRX cycle | |  | | 1) *longDRX-Cycle*  2) *shortDRX-Cycle* | | *MAC-ParametersXDD-Diff* | | | Yes | | No |  | | | Mandatory with capability signalling |
| 3-4 | Configured grants | | Maximum number of configured grant configurations per cell group | |  | | *multipleConfiguredGrants* | | *MAC-ParametersXDD-Diff* | | | Yes | | No |  | | | Optional with capability signalling |
| 3-5 | SR | | Multiple SR configurations | |  | | *multipleSR-Configurations* | | *MAC-ParametersXDD-Diff* | | | Yes | | No |  | | | Optional with capability signalling |
| 3-6 | Skipping UL transmission | | 1) Skipping UL transmission for dynamic UL grant  2) Skipping UL transmission for configured UL grant | |  | | 1) *skipUplinkTxDynamic* | | *MAC-ParametersXDD-Diff* | | | 1) Yes  2) No | | No |  | | | 1) Optional with capability signalling. Mandatory with capability signalling from Rel-16  2) Conditional mandatory if the UE supports configured grant |
| 3-7 | Codec adaptation | | 1) Bit rate recommendation message  1) Bit rate recommendation query message | |  | | 1) *recommendedBitRate*  2) *recommendedBitRateQuery* | | *MAC-ParametersCommon* | | | No | | No | SA only | | | Optional with capability signalling |
| 4. Measurements | | 4-1 | Intra-NR measurements and reports | | 1) Intra-frequency and inter-frequency measurements and reports  2) Event A-based measurement and measurement report | |  | | 1) *intraAndInterF-MeasAndReport*  2) *eventA-MeasAndReport* | | *MeasAndMobParametersXDD-Diff* | | | Yes | | No |  | | | Mandatory with capability signalling when EN-DC is configured. Mandatory without capability signalling for NR SA. |
| 4-2 | Inter-NR measurement and reports while in LTE connected | | 1) NR measurement and reports while in LTE connected  2) Event B1-based measurement and reports while in LTE connected | |  | | n/a | | n/a | | | n/a | | n/a |  | | | Mandatory without capability signalling |
| 4-3 | SFTD measurements | | 1) SFTD measurements between PCell and PSCell  2) SFTD measurements between PCell and NR Cell | |  | | 1) *sftd-MeasPSCell*  2) *sftd-MeasNR-Cell* | | *MeasAndMobParametersMRDC-XDD-Diff* | | | Yes | | No |  | | | Optional with capability signalling |
| 4-4 | Measurement gaps | | Additional measurement gap configurations | |  | | *supportedGapPattern* | | *MeasAndMobParametersCommon* | | | No | | No |  | | | Optional with capability signalling and candidate value set is:  BIT STRING (SIZE (22)) |
| 4-5 | ANR | | 1) CGI reporting of EUTRA cell when EN-DC is not configured  2) CGI reporting of NR cell when EN-DC is not configured  3) CGI reporting of NR cell when EN-DC is configured | |  | | 1) *eutra-CGI-Reporting*  2) *nr-CGI-Reporting*  3) *nr-CGI-Reporting-ENDC* | | *MeasAndMobParametersCommon* | | | No | | No | 1) and 2) SA only  3) EN-DC only  Autonomous gap is not supported when ANR (towards NR neighbour cells) configured by NR PCell in NR SA and when ANR (towards NR neighbouring cells) configured by NR PSCell in EN-DC. | | | Mandatory with capability signalling |
| 4-6 | LTE measurement and reporting while in NR connected | | 1) Periodic measurement and reporting while NR connected.  2) Event B#N-based measurement and reporting while NR connected | |  | | 1) *periodicEUTRA-MeasAndReport*  2) *eventB-MeasAndReport* | | *MeasAndMobParametersCommon* | | | No | | No |  | | | Mandatory with capability signalling if the UE supports LTE |
| 5. SDAP | | 5-1 | QoS | | 1) Flow-based QoS  2) Multiple flows to 1 DRB mapping  3) AS reflective QoS | |  | | 3) *as-ReflectiveQoS* | | *SDAP-Parameters* | | | No | | No | SA only | | | 1), 2) Mandatory without capability signalling  3) Optional with capability signalling |
| 5-2 | HD format | | 1) DL SDAP HD  2) UL SDAP HD  3) SDAP End-marker | |  | | n/a | | n/a | | | n/a | | n/a | SA only | | | 1) Conditional mandatory if either NAS reflective QoS or AS reflective QoS is supported. No capability signalling is needed.  2), 3) Mandatory without capability signalling |
| 6. Inactive | | 6-1 | RRC inactive | | RRC inactive | |  | | *inactiveState* | | *UE-NR-Capability-v1530* | | | No | | No | SA only | | | Mandatory with capability signalling |
| 7. Mobility | | 7-1 | Handover | | 1) Intra-frequency HO  2) Inter-frequency HO  3) HO between TDD and FDD  4) HO from NR to LTE  5) HO from NR to LTE with 5GC  6) HO between FR1 and FR2 | |  | | 2) *handoverInterF*  3) *handoverFDD-TDD*  4) *handoverLTE-EPC*  5) *handover-LTE-5GC*  6) *handoverFR1-FR2* | | 3), 6) *MeasAndMobParametersCommon*  2), 4), 5) *MeasAndMobParametersXDD-Diff* and *MeasAndMobParametersFRX-Diff* | | | 1), 3), 6) No  2), 4), 5) Yes | | 1), 3), 6) No  2), 4), 5) Yes | SA only | | | 1) Mandatory without capability signalling  2) Mandatory with capability signalling  3) Mandatory with capability signalling if the UE supports both TDD and FDD.  4) and 5) Mandatory with capability signalling if the UE supports the associated RAT.  6) Mandatory with capability signalling if the UE supports both FR1 and FR2. |
| 8. Idle/inactive UE procedures | | 8-1 | System information acquisition | | 1) Msg.1 based on-demand SI provisioning  2) Msg.3 based on-demand SI provisioning | |  | | n/a | | n/a | | | n/a | | n/a | SA only | | | Mandatory without capability signalling |
| 9. RRC | | 9-1 | RRC buffer size | | Maximum overall RRC configuration size | |  | | n/a | | n/a | | | n/a | | n/a |  | | | 45 Kbytes |
| 9-2 | RRC processing time | | 1) RRC connection establishment  2) RRC connection resume without SCell addition/release and SCG establishment/modification/release  3) RRC connection reconfiguration without SCell addition/release and SCG establishment/modification/release  4) RRC connection re-establishment.  5) RRC connection reconfiguration with sync procedure  6) RRC connection reconfiguration with SCell addition/release or SCG establishment/modification/release  7) RRC connection resume  8) Initial security activation  9) Counter check  10) UE capability transfer | |  | | n/a | | n/a | | | n/a | | n/a |  | | | 1) to 3) 10ms  4) 10ms  5): 10ms + additional delay (cell search time and synchronization) defined in TS 38.133  6) and 7) 16ms  7) 10 or 6ms  (See details in 12, TS 38.331)  8) and 9) 5ms  10) 80ms |
| 10. Architecture options | | 10-1 | NE-DC | | Support of NE-DC | |  | | *ne-DC* | | *EUTRA-ParametersCommon* | | | No | | No | Only applied to NE-DC. Note for EN-DC, it is included in EUTRA side. | | | Optional with capability signalling |
| *ne- DC-BC* | | *BandCombination-v1560* | | |
| 10-2 | NR-DC | | Support of NR-DC | |  | | *ca-ParametersNRDC* | | *BandCombination-v1560* | | | No | | No |  | | | Optional with capability signalling |
| x. Rel-16 SON/MDT support for NR | x-0 | | | Basic logged MDT | | Logged measurements in RRC\_IDLE and RRC\_INACTIVE | |  | | *loggedMeasurements* | | *UE-NR-Capability* | No | | No | | |  | Optional with capability signalling | |
| x-1 | | | Location reporting | | Location reporting while performing MDT | |  | | n/a | | n/a | n/a | | n/a | | |  | Mandatory without capability signalling.  Note: If location information is available, location information should be included while performing MDT. | |
| x-2 | | | GNSS | | Equipped with a standalone GNSS receiver | |  | | standaloneGNSS-Location | | *UE-NR-Capability* | No | | No | | |  | Optional with capability signalling | |
| x-3 | | | Bluetooth and WLAN measurement collection | | 1) Bluetooth measurements in RRC\_CONNECTED state  2) WLAN measurements in RRC\_CONNECTED state  3) Bluetooth measurements in RRC\_IDLE and RRC\_INACTIVE state  4) WLAN measurements in RRC\_IDLE and RRC\_INACTIVE state | |  | | 1) *immMeasBT*  2) *immMeasWLAN*  3) *loggedMeasBT*  4) *loggedMeasWLAN* | | *­UE-NR-Capability* | No | | No | | |  | Optional with capability signalling | |
| x-4 | | | Sensor data collection | | 1) Uncompensated barometeric pressure measurement reporting  2) orientation information reporting  3) speed information reporting | |  | | 1) *barometerMeasReport*  2) *orientationMeasReport*  3) *speedMeasReport* | | *UE-NR-Capability* | No | | No | | |  | Optional with capability signalling | |
| x-5 | | | Delay measurement | | UL PDCP Packet Delay measurement and reporting in RRC\_CONNECTED state | |  | | *ulPDCP-Delay* | | *UE-NR-Capability* | No | | No | | |  | Optional with capability signalling | |
| x-6 | | | Mobility history information storage | | Storage of mobility history information and the reporting in *UEInformationResponse* message | |  | | n/a | | n/a | n/a | | n/a | | |  | Optional without capability signalling | |
| x-7 | | | SON | | 1) CEF reporting  2) RLF reporting  3) RACH reporting  4) Cross RAT RLF reporting | |  | | 1),2),4) n/a  3) *rachReport* | | 1),2),4) n/a  3) *UE-NR-Capability* | 1),2),4) n/a  3) No | | 1),2),4) n/a  3) No | | |  | 1), 2) Mandatory without capability signalling  3) Optional with capability signalling  4) Optional without capability signalling | |

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| **Features** | **Index** | **Feature group** | **Components** | **Prerequisite feature groups** | **Field name in TS 38.331 [2]** | **Parent IE in TS 38.331 [2]** | **Need of FDD/TDD differentiation** | **Need of FR1/FR2 differentiation** | **Note** | **Mandatory/Optional** |