|  |
| --- |
| 3GPP TR 38.822 V0.0.2 (2019-05) |
| Technical Report |
| 3rd Generation Partnership Project;Technical Specification Group Radio Access Network;NR;User Equipment (UE) feature list(Release 15) |
|   |
| *5G-logo_175px* | 3GPP-logo_web |
|  |
| The present document has been developed within the 3rd Generation Partnership Project (3GPP TM) and may be further elaborated for the purposes of 3GPP.The present document has not been subject to any approval process by the 3GPPOrganizational Partners and shall not be implemented.This Specification is provided for future development work within 3GPPonly. The Organizational Partners accept no liability for any use of this Specification.Specifications and Reports for implementation of the 3GPP TM system should be obtained via the 3GPP Organizational Partners' Publications Offices. |

|  |
| --- |
|  |
| ***3GPP***Postal address3GPP support office address650 Route des Lucioles - Sophia AntipolisValbonne - FRANCETel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16Internethttp://www.3gpp.org |
| ***Copyright Notification***No part may be reproduced except as authorized by written permission.The copyright and the foregoing restriction extend to reproduction in all media.© 2019, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).All rights reserved.UMTS™ is a Trade Mark of ETSI registered for the benefit of its members3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational PartnersLTE™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational PartnersGSM® and the GSM logo are registered and owned by the GSM Association |

Contents

Foreword 4

1 Scope 6

2 References 6

3 Definitions of terms, symbols and abbreviations 6

3.1 Terms 6

3.2 Symbols 6

3.3 Abbreviations 7

4 Release 15 UE feature list 8

4.1 Layer-1 UE features 8

4.2 Layer-2 and Layer-3 features 8

4.3 RF and RRM features 8

Annex A (informative): Change history 9

For definitive guidance on drafting 3GPP TSs and TRs, see [3GPP TS 21.801](http://www.3gpp.org/DynaReport/21801.htm) supplemented by the 3GPP web page <http://www.3gpp.org/specifications-groups/delegates-corner/writing-a-new-spec>.

Ensure all blue guidance text is removed before submitting the TS/TR to the TSG for approval.

# Foreword

This clause is mandatory; do not alter the text in any way.

In drafting the TS/TR pay particular attention to the use of modal auxiliary verbs!

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, certain modal verbs have the following meanings:

**shall** indicates a mandatory requirement to do something

**shall not** indicates an interdiction (prohibition) to do something

NOTE 1: The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

NOTE 2: The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

**should** indicates a recommendation to do something

**should not** indicates a recommendation not to do something

**may** indicates permission to do something

**need not** indicates permission not to do something

NOTE 3: The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

**can** indicates that something is possible

**cannot** indicates that something is impossible

NOTE 4: The constructions "can" and "cannot" shall not to be used as substitutes for "may" and "need not".

**will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

**might not** indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

**is** (or any other verb in the indicative mood) indicates a statement of fact

**is not** (or any other negative verb in the indicative mood) indicates a statement of fact

NOTE 5: The constructions "is" and "is not" do not indicate requirements.

# 1 Scope

The present document provides the list of UE features for NR. For each NR UE feature, the corresponding field name of UE capability, as specified in TS 38.331 [2] is also captured in this document.

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[3] 3GPP R1-19xxxxx: "RAN1 NR UE features", contribution to TSG-RAN WG1 meeting #XX.

[4] 3GPP R2-1904464: "Update of L2/3 feature lists", contribution to TSG-RAN WG2 meeting #105bis.

[5] 3GPP R4-19xxxxx: "RAN4 NR UE features", contribution to TSG-RAN WG4 meeting #XX.

# 3 Definitions of terms, symbols and abbreviations

This clause and its three subclauses are mandatory. The contents shall be shown as "void" if the TS/TR does not define any terms, symbols, or abbreviations.

## 3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

Definition format (Normal)

**<defined term>:** <definition>.

**example:** text used to clarify abstract rules by applying them literally.

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

Symbol format (EW)

<symbol> <Explanation>

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

Abbreviation format (EW)

<ACRONYM> <Explanation>

# 4 Release 15 UE feature list

## 4.1 Layer-1 UE features

Table 4.1-1 provides the list of Layer-1 features, as shown in [3] and the corresponding UE capability field name, as specified in TS 38.331 [2].

Table 4.1-1: Layer-1 feature list

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

## 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

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 PDCP2) SCG DRB with NR PDCP3) SN addition, modification, and release via RRC connection reconfiguration4) Joint processing on the combined RRC messages5) 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 path2) SRB3 |  | 1) *splitSRB-WithOneUL-Path*2) *srb3* | *GeneralParametersMRDC-XDD-Diff* | Yes | No | 2) Not applied to NE-DC. | 1) Optional with capability signalling2) Mandatory with capability signalling |
| 0-3 | DRB | 1) Maximum number of DRBs2) Split DRB with one UL path 3) Split DRB with both UL MCG and SCG paths |  | 1), 2) n/a3) *splitDRB-withUL-Both-MCG-SCG* | 1), 2) n/a3) *GeneralParametersMRDC-XDD-Diff* | Yes | No | 2) 8 DRBs are supported regardless of bearer types | 1, 2) Mandatory without UE capability signalling3) 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 NR2) Fallback HO to LTE for IMS voice3) 5GC VoLTE4) 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) No4) TBD | 1) Yes3) No4) TBD | 1), 2), 3) SA only4): 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 signalling4) TBD |
| 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/SRB2) Integrity protection on SRB3) Timer based SDU discard4) Re-ordering and in-order delivery5) Status reporting6) Duplicate discarding7) 18bits SN |  | n/a | n/a | n/a | n/a |  | Mandatory without capability signalling |
| 1-1 | ROHC context | 1) Maximum number of ROHC context sessions2) 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 SRB1/22) PDCP duplication for SRB1/2 and/or SRB33) PDCP duplication for MCG or SCG DRB4) 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 DL2) 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 TM2) 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 SSB5) Preamble grouping6) UL single TA maintenance7) HARQ operation for DL and UL8) LCH prioritization9) Prioritized bit rate10) Multiplexing11) SR with single SR configuration12) BSR13) PHR14) 8bits and 16bits L field |  | n/a | n/a | n/a | n/a |  | Mandatory without capability signallling |
| 3-1 | LCP restriction | 1) LCP restriction2) 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 cycle2) 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 grant2) Skipping UL transmission for configured UL grant |  | 1) *skipUplinkTxDynamic* | *MAC-ParametersXDD-Diff* | 1) Yes2) No | No |  | 1) Optional with capability signalling. Mandatory with capability signalling from Rel-162) Conditional mandatory if the UE supports configured grant |
| 3-7 | Codec adaptation | 1) Bit rate recommendation message1) 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 reports2) 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 connected2) 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 PSCell2) 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 configured2) CGI reporting of NR cell when EN-DC is not configured3) 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 only3) EN-DC onlyAutonomous 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 QoS2) Multiple flows to 1 DRB mapping3) AS reflective QoS |  | 3) *as-ReflectiveQoS* | *SDAP-Parameters* | No | No | SA only | 1), 2) Mandatory without capability signalling3) Optional with capability signalling |
| 5-2 | HD format | 1) DL SDAP HD2) UL SDAP HD3) 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 HO2) Inter-frequency HO3) HO between TDD and FDD4) HO from NR to LTE5) HO from NR to LTE with 5GC6) HO between FR1 and FR2 |  | 2) *handoverInterF*3) *handoverFDD-TDD*4) *handoverLTE*5) *handover-eLTE*6) *handoverFR1-FR2* | 3), 6) *MeasAndMobParametersCommon*2), 4), 5) *MeasAndMobParametersXDD-Diff* and *MeasAndMobParametersFRX-Diff* | 1), 3), 6) No2), 4), 5) Yes | 1), 3), 6) No2), 4), 5) Yes | SA only | 1) Mandatory without capability signalling2) Mandatory with capability signalling3) 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 provisioning2) 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 establishment2) RRC connection resume without SCell addition/release and SCG establishment/modification/release3) RRC connection reconfiguration without SCell addition/release and SCG establishment/modification/release4) RRC connection re-establishment.5) RRC connection reconfiguration with sync procedure6) RRC connection reconfiguration with SCell addition/release or SCG establishment/modification/release7) RRC connection resume8) Initial security activation9) Counter check10) UE capability transfer |  | n/a | n/a | n/a | n/a |  | 1) to 3) 10ms4) 10ms5): 10ms + additional delay (cell search time and synchronization) defined in TS 38.1336) and 7) 16ms7) 10 or 6ms(See details in 12, TS 38.331)8) and 9) 5ms10) 80ms |
| 10. Architecture options | 10-1 | NE-DC | Support of NE-DC |  | *ne-DC* | *EUTRA-Parameters* | No | No | Only applied to NE-DC. Note for EN-DC, it is included in EUTRA side. | Optional with capability signalling |
| 10-2 | NR-DC | Support of NR-DC |  | *dc-BC* | *BandCombination-v1560* | No | No |  | Optional with capability signalling |

## 4.3 RF and RRM features

Table 4.3-1 provides the list of RF and RRM features, as shown in [5] and the corresponding UE capability field name, as specified in TS 38.331 [2].

Table 4.3-1: RF and RRM feature list

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

Annex A (informative):
Change history

|  |
| --- |
| **Change history** |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2019-04 | RAN2 #105bis | R2-1904720 |  |  |  | Endorsed skeleton TR | 0.0.1 |