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Technical Specification

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Evolved Universal Terrestrial Radio Access (E-UTRA);
User Equipment (UE) radio access capabilities
(3GPP TS 36.306 version 10.4.0 Release 10)**



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1 Scope

The present document defines the E-UTRA UE Radio Access Capability Parameters.

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.
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- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 36.323: "Evolved Universal Terrestrial Radio Access (E-UTRA) Packet Data Convergence Protocol (PDCP) specification".
- [3] 3GPP TS 36.322: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Link Control (RLC) specification".
- [4] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA) Medium Access Control (MAC) specification".
- [5] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Resource Control (RRC) specification".
- [6] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA) radio transmission and reception".
- [7] IETF RFC 4995: "The RObust Header Compression (ROHC) Framework".
- [8] IETF RFC 4996: "RObust Header Compression (ROHC): A Profile for TCP/IP (ROHC-TCP)".
- [9] IETF RFC 3095: "RObust Header Compression (RoHC): Framework and four profiles: RTP, UDP, ESP and uncompressed".
- [10] IETF RFC 3843: "RObust Header Compression (RoHC): A Compression Profile for IP".
- [11] IETF RFC 4815: "RObust Header Compression (ROHC): Corrections and Clarifications to RFC 3095".
- [12] IETF RFC 5225: "RObust Header Compression (ROHC) Version 2: Profiles for RTP, UDP, IP, ESP and UDP Lite".
- [13] 3GPP TS 36.355: "Evolved Universal Terrestrial Radio Access (E-UTRA) LTE Positioning Protocol (LPP)".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 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 TR 21.905 [1].

<defined term>: *<definition>*.

3.2 Symbols

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

<symbol> <Explanation>

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 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 TR 21.905 [1].

| | |
|---------|--|
| 1xRTT | CDMA2000 1x Radio Transmission Technology |
| BCCH | Broadcast Control Channel |
| CSG | Closed Subscriber Group |
| DL-SCH | Downlink Shared Channel |
| E-UTRA | Evolved Universal Terrestrial Radio Access |
| E-UTRAN | Evolved Universal Terrestrial Radio Access Network |
| FDD | Frequency Division Duplex |
| GERAN | GSM/EDGE Radio Access Network |
| HARQ | Hybrid Automatic Repeat Request |
| HRPD | High Rate Packet Data |
| MAC | Medium Access Control |
| PDCP | Packet Data Convergence Protocol |
| PHR | Power Headroom Reporting |
| RACH | Random Access CHannel |
| RAT | Radio Access Technology |
| RLC | Radio Link Control |
| ROHC | RObust Header Compression |
| RRC | Radio Resource Control |
| SI | System Information |
| SON | Self Organizing Networks |
| SSAC | Service Specific Access Control |
| TDD | Time Division Duplex |
| TTI | Transmission Time Interval |
| UE | User Equipment |
| UL-SCH | Uplink Shared Channel |
| UMTS | Universal Mobile Telecommunications System |
| UTRA | UMTS Terrestrial Radio Access |

4 UE radio access capability parameters

The following subclauses define the UE radio access capability parameters and minimum capabilities for MBMS capable UE. Only parameters for which there is the possibility for UEs to signal different values are considered as UE radio access capability parameters. Therefore, mandatory capabilities that are the same for all UEs are not listed here. Also capabilities which are optional or conditionally mandatory for UEs to implement but do not have UE radio access capability parameter are listed in this specification.

E-UTRAN needs to respect the signalled UE radio access capability parameters when configuring the UE and when scheduling the UE.

All parameters shown in *italics* are signalled and correspond to a field defined in TS 36.331 [5].

4.1 ue-Category

The field *ue-Category* defines a combined uplink and downlink capability. The parameters set by the UE Category are defined in subclause 4.2. Tables 4.1-1 and 4.1-2 define the downlink and, respectively, uplink physical layer parameter values for each UE Category. A UE indicating category 6 or 7 shall also indicate category 4. A UE indicating category 8 shall also indicate category 5. Table 4.1-4 defines the minimum capability for the maximum number of bits of a MCH transport block received within a TTI for an MBMS capable UE.

Table 4.1-1: Downlink physical layer parameter values set by the field *ue-Category*

| UE Category | Maximum number of DL-SCH transport block bits received within a TTI | Maximum number of bits of a DL-SCH transport block received within a TTI | Total number of soft channel bits | Maximum number of supported layers for spatial multiplexing in DL |
|-------------|---|--|-----------------------------------|---|
| Category 1 | 10296 | 10296 | 250368 | 1 |
| Category 2 | 51024 | 51024 | 1237248 | 2 |
| Category 3 | 102048 | 75376 | 1237248 | 2 |
| Category 4 | 150752 | 75376 | 1827072 | 2 |
| Category 5 | 299552 | 149776 | 3667200 | 4 |
| Category 6 | 301504 | 149776 (4 layers) 75376 (2 layers) | 3654144 | 2 or 4 |
| Category 7 | 301504 | 149776 (4 layers) 75376 (2 layers) | 3654144 | 2 or 4 |
| Category 8 | 2998560 | 299856 | 35982720 | 8 |

Table 4.1-2: Uplink physical layer parameter values set by the field *ue-Category*

| UE Category | Maximum number of UL-SCH transport block bits transmitted within a TTI | Maximum number of bits of an UL-SCH transport block transmitted within a TTI | Support for 64QAM in UL |
|-------------|--|--|-------------------------|
| Category 1 | 5160 | 5160 | No |
| Category 2 | 25456 | 25456 | No |
| Category 3 | 51024 | 51024 | No |
| Category 4 | 51024 | 51024 | No |
| Category 5 | 75376 | 75376 | Yes |
| Category 6 | 51024 | 51024 | No |
| Category 7 | 102048 | 51024 | No |
| Category 8 | 1497760 | 149776 | Yes |

Table 4.1-3: Total layer 2 buffer sizes set by the field *ue-Category*

| UE Category | Total layer 2 buffer size [bytes] |
|-------------|-----------------------------------|
| Category 1 | 150 000 |
| Category 2 | 700 000 |
| Category 3 | 1 400 000 |
| Category 4 | 1 900 000 |
| Category 5 | 3 500 000 |
| Category 6 | 3 300 000 |
| Category 7 | 3 800 000 |
| Category 8 | 42 200 000 |

Table 4.1-4: Maximum number of bits of a MCH transport block received within a TTI set by the field *ue-Category* for an MBMS capable UE

| UE Category | Maximum number of bits of a MCH transport block received within a TTI |
|-------------|---|
| Category 1 | 10296 |
| Category 2 | 51024 |
| Category 3 | 75376 |
| Category 4 | 75376 |
| Category 5 | 75376 |
| Category 6 | (75376 TBD) |
| Category 7 | (75376 TBD) |
| Category 8 | (75376 TBD) |

4.2 Parameters set by the field *ue-Category*

4.2.1 Transport channel parameters in downlink

4.2.1.1 Maximum number of DL-SCH transport block bits received within a TTI

Defines the maximum number of DL-SCH transport blocks bits that the UE is capable of receiving within a DL-SCH TTI.

This number does not include the bits of a DL-SCH transport block carrying BCCH in the same subframe.

4.2.1.2 Maximum number of bits of a DL-SCH transport block received within a TTI

Defines the maximum number of DL-SCH transport block bits that the UE is capable of receiving in a single transport block within a DL-SCH TTI.

4.2.1.3 Total number of DL-SCH soft channel bits

Defines the total number of soft channel bits available for HARQ processing.

This number does not include the soft channel bits required by the dedicated broadcast HARQ process for the decoding of system information.

4.2.1.4 Maximum number of bits of a MCH transport block received within a TTI

Defines the maximum number of MCH transport block bits that the UE is capable of receiving within a MCH TTI.

4.2.2 Transport channel parameters in uplink

4.2.2.1 Maximum number of bits of an UL-SCH transport block transmitted within a TTI

Defines the maximum number of UL-SCH transport block bits that the UE is capable of transmitting in a single transport block within an UL-SCH TTI.

4.2.2.2 Maximum number of UL-SCH transport block bits transmitted within a TTI

Defines the maximum number of UL-SCH transport blocks bits that the UE is capable of transmitting within an UL-SCH TTI.

4.2.3 Physical channel parameters in downlink (DL)

4.2.3.1 Maximum number of supported layers for spatial multiplexing in DL

This field defines the maximum number of supported layers for spatial multiplexing per UE. The UE shall support the number of layers according to its Rel-8/9 category (Cat. 1-5) in all non-CA band combinations. Further requirements on the number of supported layers for spatial multiplexing are provided in section 4.3.5.2.

For each band and band combination specified in *supportedBandCombination*, the UE provides the corresponding MIMO capability.

4.2.4 Physical channel parameters in uplink (UL)

4.2.4.1 Support for 64QAM in UL

Defines if 64QAM is supported in UL.

4.2.5 Total layer 2 buffer size

This parameter defines the total layer 2 buffer size. The total layer 2 buffer size is defined as the sum of the number of bytes that the UE is capable of storing in the RLC transmission windows and RLC reception and reordering windows for all radio bearers.

4.3 Parameters independent of the field *ue-Category*

4.3.1 PDCP Parameters

4.3.1.1 supportedROHC-Profiles

This field defines which ROHC profiles from the list below are supported by the UE.

- 0x0000 ROHC uncompressed (RFC 4995)
- 0x0001 ROHC RTP (RFC 3095, RFC 4815)
- 0x0002 ROHC UDP (RFC 3095, RFC 4815)
- 0x0003 ROHC ESP (RFC 3095, RFC 4815)
- 0x0004 ROHC IP (RFC 3843, RFC 4815)
- 0x0006 ROHC TCP (RFC 4996)
- 0x0101 ROHCv2 RTP (RFC 5225)
- 0x0102 ROHCv2 UDP (RFC 5225)
- 0x0103 ROHCv2 ESP (RFC 5225)
- 0x0104 ROHCv2 IP (RFC 5225)

A UE that supports one or more of the listed ROHC profiles shall support ROHC profile 0x0000 ROHC uncompressed (RFC 4995).

'IMS capable UEs supporting voice' shall support ROHC profiles 0x0000, 0x0001, 0x0002 and be able to compress and decompress headers of PDCP SDUs at a PDCP SDU rate corresponding to supported IMS voice codecs.

4.3.1.2 maxNumberROHC-ContextSessions

This field defines the maximum number of header compression context sessions supported by the UE, excluding context sessions that leave all headers uncompressed.

4.3.2 RLC parameters

4.3.2.1 Void

4.3.3 Void

4.3.4 Physical layer parameters

4.3.4.1 ue-TxAntennaSelectionSupported

This field defines whether the UE supports transmit antenna selection.

4.3.4.2 ue-SpecificRefSigsSupported

This field defines whether the UE supports PDSCH transmission mode 7 for FDD.

4.3.4.3 Void

4.3.4.4 enhancedDualLayerFDD

This field defines whether the UE supports enhanced dual layer (PDSCH transmission mode 8) for FDD.

4.3.4.5 enhancedDualLayerTDD

This field defines whether the UE supports enhanced dual layer (PDSCH transmission mode 8) for TDD. Enhanced dual layer shall be supported by UEs of this version of the specification supporting TDD.

4.3.4.6 supportedMIMO-CapabilityUL-r10

This field defines the number of spatial multiplexing layers in the uplink direction in a certain supportedBandCombination supported by the UE.

4.3.4.7 supportedMIMO-CapabilityDL-r10

This field defines the number of spatial multiplexing layers in the downlink direction in a certain supportedBandCombination supported by the UE.

The support for more layers in *supportedMIMO-CapabilityDL* than given by the 'maximum number of supported layers for spatial multiplexing in DL' derived from the *ue-Category* in the *UE-EUTRA-Capability* IE is only applicable to transmission mode 9.

4.3.4.8 two-AntennaPortsForPUCCH-r10

This field defines whether the UE supports transmit diversity for PUCCH formats 1/1a/1b/2/2a/2b, and if the UE supports PUCCH format 3, transmit diversity for PUCCH format 3.

4.3.4.9 tm9-With-8Tx-FDD-r10

This field defines whether the UE supports PDSCH transmission mode 9 with 8 CSI reference signal ports for FDD.

4.3.4.10 pmi-Disabling-r10

This field defines whether the UE supports PMI disabling.

4.3.4.11 crossCarrierScheduling-r10

This field defines whether the UE supports cross carrier scheduling operation for carrier aggregation, including (if the UE supports carrier aggregation in UL) the use of PCell as the pathloss reference for a SCell when *pathlossReference-r10* within *UplinkPowerControlDedicatedSCell-r10* is configured as 'pCell'.

NOTE: Regardless of whether the UE supports cross carrier scheduling operation or not, it is mandatory for a UE supporting carrier aggregation in UL to support the configuration where *pathlossReference-r10* within *UplinkPowerControlDedicatedSCell-r10* is set to 'sCell'.

4.3.4.12 simultaneousPUCCH-PUSCH-r10

This field defines whether the UE baseband supports simultaneous transmission of PUCCH and PUSCH, and is band agnostic. If the UE indicates support of baseband capability for simultaneous transmission of PUCCH and PUSCH using this field, and if the UE indicates support of RF capability for non-contiguous UL resource allocation within a component carrier for a particular E-UTRA radio frequency band, then the UE supports simultaneous transmission of PUCCH and PUSCH within each component carrier of the band. If the UE indicates support of baseband capability for simultaneous transmission of PUCCH and PUSCH using this field, and if the UE indicates support of carrier aggregation in UL, then the UE supports simultaneous transmission of PUCCH and PUSCH across any UL component carriers which the UE can aggregate.

4.3.4.13 multiClusterPUSCH-WithinCC-r10

This field defines whether the UE baseband supports multi-cluster PUSCH transmission within a component carrier (i.e. PUSCH resource allocation type 1), and is band agnostic. If the UE indicates support of baseband capability for multi-cluster PUSCH transmission within a component carrier using this field, and if the UE indicates support of RF capability for non-contiguous UL resource allocation within a component carrier for a particular E-UTRA radio frequency band, then the UE supports multi-cluster PUSCH transmission within each component carrier of the band.

NOTE: If the UE indicates support of carrier aggregation in UL, then the UE supports PUSCH transmissions over non-contiguous resource blocks across any UL component carriers which the UE can aggregate, regardless of whether or not the UE indicates support of baseband capability for multi-cluster PUSCH transmission within a component carrier using this field..

4.3.4.14 nonContiguousUL-RA-WithinCC-Info-r10

This field defines whether the UE RF supports non-contiguous UL resource allocations within a component carrier, and is signalled per E-UTRA radio frequency band which the UE supports.

4.3.5 RF parameters

4.3.5.1 supportedBandListEUTRA

This field defines which E-UTRA radio frequency bands [6] are supported by the UE. For each band, support for either only half duplex operation, or full duplex operation is indicated. For TDD, the half duplex indication is not applicable.

4.3.5.2 supportedBandCombination

This field defines the carrier aggregation and MIMO capabilities supported by the UE for configurations with inter-band, intra-band non-contiguous, intra-band contiguous carrier aggregation and without carrier aggregation. For each band in a band combination the UE provides for uplink and downlink the supported CA bandwidth classes and the corresponding MIMO capabilities. A MIMO capability applies to all carriers of a band in a band combination.

In all non-CA band combinations the UE shall indicate a bandwidth class supporting the maximum channel bandwidth defined for the band.

In all non-CA band combinations the UE shall indicate at least the number of layers for spatial multiplexing according to the UE's Rel-8/9 category (Cat. 1-5). If the UE provides a Rel-10 category (Cat. 6-8) it shall indicate at least the number of layers according to that category for at least one band combination. In all other band combinations a UE indicating a category between 2 and 8 shall indicate support for at least 2 layers for spatial multiplexing for all bands. The indicated number of layers for spatial multiplexing may exceed the number of layers required according to the category indicated by the UE. The carrier aggregation and MIMO capabilities indicated for at least one band combination shall meet the processing requirements defined by the physical layer parameter values in the UE category (i.e., maximum number of DL-SCH/UL-SCH transport block bits received/transmitted within a TTI, maximum number of bits of a DL-SCH/UL-SCH transport block received/transmitted within a TTI, and total number of soft channel bits for downlink).

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 measurements on each other supported E-UTRA radio frequency band and 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 measurements on each supported E-UTRA radio frequency band and on each supported RAT/band combination.

4.3.7 Inter-RAT parameters

4.3.7.1 Support of UTRA FDD

This parameter defines whether the UE supports UTRA FDD.

A UE that supports UTRAN FDD shall support inter-RAT PS handover to UTRAN.

4.3.7.2 supportedBandListUTRA-FDD

Only applicable if the UE supports UTRA FDD. This field defines which UTRA FDD radio frequency bands are supported by the UE.

4.3.7.3 Support of UTRA TDD 1.28 Mcps

This parameter defines whether the UE supports UTRA TDD 1.28 Mcps.

A UE that supports UTRAN TDD 1.28 Mcps shall support inter-RAT PS handover to UTRAN.

4.3.7.4 supportedBandListUTRA-TDD128

Only applicable if the UE supports UTRA TDD 1.28 Mcps. This field defines which UTRA TDD 1.28 Mcps radio frequency bands are supported by the UE.

4.3.7.5 Support of UTRA TDD 3.84 Mcps

This parameter defines whether the UE supports UTRA TDD 3.84 Mcps.

A UE that supports UTRAN TDD 3.84 Mcps shall support inter-RAT PS handover to UTRAN.

4.3.7.6 supportedBandListUTRA-TDD384

Only applicable if the UE supports UTRA TDD 3.84 Mcps. This field defines which UTRA TDD 3.84 Mcps radio frequency bands are supported by the UE.

4.3.7.7 Support of UTRA TDD 7.68 Mcps

This parameter defines whether the UE supports UTRA TDD 7.68 Mcps.

A UE that supports UTRAN TDD 7.68 Mcps shall support inter-RAT PS handover to UTRAN.

4.3.7.8 supportedBandListUTRA-TDD768

Only applicable if the UE supports UTRA TDD 7.68 Mcps. This field defines which UTRA TDD 7.68 Mcps radio frequency bands are supported by the UE.

4.3.7.9 Support of GERAN

This parameter defines whether the UE supports GERAN.

4.3.7.10 supportedBandListGERAN

Only applicable if the UE supports GERAN. This field defines which GERAN radio frequency bands are supported by the UE.

4.3.7.11 interRAT-PS-HO-ToGERAN

Only applicable if the UE supports GERAN. This field defines whether the UE supports inter-RAT PS handover to GERAN.

4.3.7.12 Support of HRPD

This parameter defines whether the UE supports HRPD.

4.3.7.13 supportedBandListHRPD

Only applicable if the UE supports HRPD. This field defines which HRPD radio frequency bands are supported by the UE.

4.3.7.14 tx-ConfigHRPD

Only applicable if the UE supports HRPD. This field defines whether the UE supports single or dual transmitter. With dual transmitter, UE can transmit simultaneously on both E-UTRAN and HRPD.

4.3.7.15 rx-ConfigHRPD

Only applicable if the UE supports HRPD. This field defines whether the UE supports single or dual receiver. With dual receiver, UE can receive simultaneously on both E-UTRAN and HRPD.

4.3.7.16 Support of 1xRTT

This parameter defines whether the UE supports 1xRTT.

4.3.7.17 supportedBandList1XRTT

Only applicable if the UE supports 1xRTT. This field defines which 1xRTT radio frequency bands are supported by the UE.

4.3.7.18 tx-Config1XRTT

Only applicable if the UE supports 1xRTT. This field defines whether the UE supports single or dual transmitter. With dual transmitter, UE can transmit simultaneously on both E-UTRAN and 1xRTT.

4.3.7.19 rx-Config1XRTT

Only applicable if the UE supports 1xRTT. This field defines whether the UE supports single or dual receiver. With dual receiver, UE can receive simultaneously on both E-UTRAN and 1xRTT.

4.3.7.20 e-CSFB-1XRTT

Only applicable if the UE supports CDMA2000 1xRTT. This field defines whether the UE supports enhanced 1xRTT CS fallback.

4.3.7.21 e-CSFB-ConcPS-Mob1XRTT

Only applicable if the UE supports CDMA2000 1xRTT and CDMA2000 HRPD simultaneously. This field defines whether the UE supports concurrent enhanced CS fallback to CDMA2000 1xRTT and handover/redirection to CDMA2000 HRPD.

4.3.7.22 e-RedirectionUTRA

This parameter defines whether the UE supports use of UTRA system information provided by *RRCConnectionRelease* upon redirection.

4.3.7.23 e-RedirectionGERAN

This parameter defines whether the UE supports use of GERAN system information provided by *RRCConnectionRelease* upon redirection.

A UE that supports CS fallback to GERAN shall support e-Redirection to GERAN.

4.3.7.24 *dtm*

This parameter defines whether the UE supports Dual Transfer Mode (DTM) in GERAN.

4.3.7.25 e-CSFB-dual-1XRTT

Only applicable if the UE supports CDMA2000 1xRTT, dual transmitter (i.e. UE can transmit simultaneously on both E-UTRAN and 1xRTT) and dual receiver (i.e. UE can receive simultaneously on both E-UTRAN and 1xRTT). This field defines whether the UE supports dual receiver/transmitter enhanced 1xRTT CS fallback (dual Rx/Tx e1xCSFB).

4.3.7.26 e-RedirectionUTRA-TDD

This parameter defines whether the UE supports redirection by using UTRA TDD system information for cells on multiple carrier frequencies provided by *RRCConnectionRelease*.

4.3.8 General parameters

4.3.8.1 accessStratumRelease

This field defines the release of the E-UTRA layer 1, 2, and 3 specifications supported by the UE e.g. Rel-8, Rel-9, etc.

4.3.8.2 deviceType

This field defines whether the device does not benefit from NW-based battery consumption optimisation.

4.3.9 Void

4.3.10 CSG Proximity Indication parameters

4.3.10.1 intraFreqProximityIndication

This parameter defines whether the UE supports proximity indication for intra-frequency E-UTRAN cells whose CSG Identities are in the UE's CSG Whitelist.

4.3.10.2 interFreqProximityIndication

This parameter defines whether the UE supports proximity indication for inter-frequency E-UTRAN cells whose CSG Identities are in the UE's CSG Whitelist.

4.3.10.3 utran-ProximityIndication

This parameter defines whether the UE supports proximity indication for UTRAN cells whose CSG IDs are in the UE's CSG Whitelist.

4.3.11 Neighbour cell SI acquisition parameters

4.3.11.1 intraFreqSI-AcquisitionForHO

This parameter defines whether the UE supports, upon configuration of *si-RequestForHO* by the network, acquisition of relevant information from a neighbouring intra-frequency cell by reading the SI of the neighbouring cell using autonomous gaps and reporting the acquired information to the network as specified in [5].

4.3.11.2 interFreqSI-AcquisitionForHO

This parameter defines whether the UE supports, upon configuration of *si-RequestForHO* by the network, acquisition of relevant information from a neighbouring inter-frequency cell by reading the SI of the neighbouring cell using autonomous gaps and reporting the acquired information to the network as specified in [5].

4.3.11.3 utran-SI-AcquisitionForHO

This parameter defines whether the UE supports, upon configuration of *si-RequestForHO* by the network, acquisition of relevant information from a neighbouring UMTS cell by reading the SI of the neighbouring cell using autonomous gaps and reporting the acquired information to the network as specified in [5].

4.3.12 SON parameters

4.3.12.1 rach-Report

This parameter defines whether the UE supports delivery of *rachReport* upon request from the network.

4.3.13 UE-based network performance measurement parameters

4.3.13.1 loggedMeasurementsIdle

This parameter defines whether the UE supports logged measurements in RRC_IDLE upon request from the network. A UE that supports logged measurements in RRC_IDLE shall also support a minimum of 64kB memory for log storage.

4.3.13.2 standaloneGNSS-Location

This parameter defines whether the UE is equipped with a standalone GNSS receiver that may be used to provide detailed location information in RRC measurement report and logged measurements in RRC_IDLE.

5 Void

6 Optional features without UE radio access capability parameters

The following subclauses list the optional UE features not having UE radio access capability.

NOTE: This chapter does not yet contain complete analysis of all features of this release of specification.

6.1 CSG features

It is optional for UE to support some parts of CSG cell and hybrid cell reselection features as specified in [5, B.2].

6.2 PWS features

6.2.1 ETWS

It is optional for UE to support ETWS reception as specified in [5].

6.2.2 CMAS

It is optional for UE to support CMAS reception as specified in [5].

6.3 MBMS features

It is optional for UE to support MBMS procedures as specified in [5].

6.4 Void

6.5 Positioning features

6.5.0 UE Rx – Tx time difference

It is optional for UE to support *ue-RxTxTimeDiffResult* as specified in [5][13].

6.5.1 OTDOA inter-freq RSTD measurement indication

It is optional for UE to support delivery of *InterFreqRSTDMeasurementIndication* as specified in [5, 5.5.7].

7 Conditionally Mandatory features

7.1 Access control features

7.1.1 SSAC

It is mandatory to support Service Specific Access Control as specified in [5, 5.3.3.10] for UEs which are IMS voice capable in LTE.

7.1.2 CSFB Access Barring Control

It is mandatory to support CSFB Access Barring Control as specified in [5, 5.3.3.2] for UEs which are supporting CSFB to UTRA or GERAN.

7.2 Emergency call features

7.2.1 IMS emergency call

It is mandatory to support IMS emergency call for UEs which are IMS voice capable in LTE.

7.3 MAC features

7.3.1 SR mask

It is mandatory to support configuration indicated by *logicalChannelSR-Mask* for UE which have set bit number 29 of *featureGroupIndicators* to '1' as specified in [5].

7.3.2 Power Management Indicator in PHR

Power management indicator in PHR is mandatory to support for UE applying additional power backoff due to power management (as allowed by P-MPR [6]).

7.4 Inter-RAT Mobility features

7.4.1 High Priority CSFB redirection

It is mandatory to support the *RRConnectionRelease* indicating '*cs-FallbackHighPriority*' for UEs which are supporting CSFB to UTRA as specified in [5].

7.5 Delay Tolerant Access Features

7.5.1 extendedWaitTime

It is mandatory to support the *RRConnectionRelease* with *extendedWaitTime* or *RRConnectionReject* with *extendedWaitTime* for UEs which do support Delay Tolerant Access as specified in [5].

7.6 RRC Connection

7.6.1 Additional Spectrum Emission

It is mandatory to support handling of *additionalSpectrumEmissionPCell* for UEs which are carrier aggregation capable.

Annex A (informative): Guideline on maximum number of DL PDCP SDUs per TTI

In order to help the dimensioning of the UE design, values for the maximum number of DL PDCP SDUs per TTI from Table A-1 may be used.

Note: Due to the need for the network buffer data for efficient scheduling, values for Category 1 and 2 are same. It is not expected that category 1 UE has to sustain the same rate of PDCP SDUs per TTI as category 2 for prolonged period of time.

Table A-1: Maximum values for DL PDCP SDUs per TTI

| UE Category | Maximum number of PDCP SDUs per TTI |
|--------------------|--|
| Category 1 | 10 |
| Category 2 | 10 |
| Category 3 | 20 |
| Category 4 | 30 |
| Category 5 | 50 |

Annex B (informative): Change history

| Change history | | | | | | | |
|----------------|-------|-----------|------|-----|--|--------|--------|
| Date | TSG # | TSG Doc. | CR | Rev | Subject/Comment | Old | New |
| 11/2007 | RP-38 | RP-070916 | | | Presented for approval at TSG RAN-38 | 0.2.0 | 1.0.0 |
| 12/2007 | | - | | | Approved at TSG RAN-38 and placed under change control | 1.0.0 | 8.0.0 |
| 03/2008 | RP-39 | RP-080194 | 0001 | 1 | CR to 36.306 with Update to E-UTRA UE capabilities | 8.0.0 | 8.1.0 |
| 05/2008 | RP-40 | RP-080409 | 0002 | 1 | Update to E-UTRA UE capabilities: CR 0002r1 to 36.306 with status after RAN2 #62 | 8.1.0 | 8.2.0 |
| 03/2009 | RP-43 | RP-090126 | 0007 | - | CR to remove the sections on MBMS | 8.2.0 | 8.3.0 |
| | RP-43 | RP-090126 | 0008 | - | Final values for L2 buffer sizes | 8.2.0 | 8.3.0 |
| | RP-43 | RP-090126 | 0009 | - | Various Corrections | 8.2.0 | 8.3.0 |
| | RP-43 | RP-090126 | 0010 | - | CR to update uplink transmit diversity (UE transmit antenna selection) | 8.2.0 | 8.3.0 |
| | RP-43 | RP-090126 | 0011 | - | Downlink PDCP SDU limitation | 8.2.0 | 8.3.0 |
| | RP-43 | RP-090126 | 0014 | - | Thoughts on UE capability for RoHC | 8.2.0 | 8.3.0 |
| | RP-43 | RP-090126 | 0015 | 1 | Capturing USIMless UE to stage 3 | 8.2.0 | 8.3.0 |
| 06/2009 | RP-44 | RP-090511 | 0016 | 2 | Support of inter-RAT PS handover to GERAN Editor Note Removal | 8.3.0 | 8.4.0 |
| | RP-44 | RP-090511 | 0017 | 1 | Clarification of Half Duplex in TDD | 8.3.0 | 8.4.0 |
| | RP-44 | RP-090511 | 0018 | - | Correcting the maximum number of bits received during one TTI | 8.3.0 | 8.4.0 |
| | RP-44 | RP-090511 | 0019 | - | Clarification of field names used in TS 36.331 | 8.3.0 | 8.4.0 |
| | RP-44 | RP-090511 | 0021 | - | Clarification on disabling E-UTRA capabilities with a USIM | 8.3.0 | 8.4.0 |
| 09/2009 | RP-45 | RP-090906 | 0023 | - | Unit for "Total layer 2 buffer size" | 8.4.0 | 8.5.0 |
| 12/2009 | RP-46 | - | - | - | Upgrade to the Release 9 - no technical change | 8.5.0 | 9.0.0 |
| 03/2010 | RP-47 | RP-100308 | 0024 | 1 | CR to 36.306 on Optionality of Rel-9 UE features | 9.0.0 | 9.1.0 |
| | RP-47 | RP-100308 | 0025 | - | Introduction of power-limited device indication in UE capability. | 9.0.0 | 9.1.0 |
| | RP-47 | RP-100308 | 0026 | - | UE capability for enhanced 1xRTT CS fallback | 9.0.0 | 9.1.0 |
| | RP-47 | RP-100285 | 0028 | 1 | Bounds to RoHC requirements for IMS capable UEs supporting voice | 9.0.0 | 9.1.0 |
| | RP-47 | RP-100309 | 0029 | 1 | CR to 36.306 on Redirection enhancements to UTRAN | 9.0.0 | 9.1.0 |
| | RP-47 | RP-100188 | 0030 | 1 | Redirection enhancements to GERAN | 9.0.0 | 9.1.0 |
| 06/2010 | RP-48 | RP-100556 | 0031 | 1 | Clarification regarding / alignment of REL-9 UE capabilities | 9.1.0 | 9.2.0 |
| | RP-48 | RP-100531 | 0033 | - | Correction on the definition of ue-SpecificRefSigsSupported | 9.1.0 | 9.2.0 |
| 09/2010 | RP-49 | RP-100853 | 0035 | - | Clarification of MBMS UE capability | 9.2.0 | 9.3.0 |
| 12/2010 | RP-50 | RP-101268 | 0037 | - | Inclusion of new UE categories in Rel-10 | 9.3.0 | 10.0.0 |
| 03/2011 | RP-51 | RP-110290 | 0038 | - | Description of carrier aggregation and MIMO capabilities | 10.0.0 | 10.1.0 |
| | RP-51 | RP-110290 | 0039 | - | L2 buffer sizes for Rel-10 categories | 10.0.0 | 10.1.0 |
| | RP-51 | RP-110280 | 0041 | - | CR to 36.306 adding UE capability indicator for dual Rx/Tx e1xCsFB | 10.0.0 | 10.1.0 |
| | RP-51 | RP-110288 | 0042 | 1 | UE UL&DL MIMO Capabilities | 10.0.0 | 10.1.0 |
| | RP-51 | RP-110282 | 0043 | - | Counter proposal to R2-110795 on UE capabilities for MDT | 10.0.0 | 10.1.0 |
| 06/2011 | RP-52 | RP-110828 | 0048 | - | Clarification of optionality of UE features without capability | 10.1.0 | 10.2.0 |
| | RP-52 | RP-110830 | 0051 | - | Options for CSFB to GSM | 10.1.0 | 10.2.0 |
| | RP-52 | RP-110840 | 0056 | 1 | CR to 36.306 on UE capabilities for Rel-10 LTE features | 10.1.0 | 10.2.0 |
| | RP-52 | RP-110701 | 0058 | 2 | CA and MIMO Capabilities in LTE Rel-10 | 10.1.0 | 10.2.0 |
| | RP-52 | RP-110839 | 0062 | - | Introduction of UE capability for enhanced redirection to UTRA TDD | 10.1.0 | 10.2.0 |
| | RP-52 | RP-110834 | 0063 | 2 | Clarification of "supportedMIMO-CapabilityDL" | 10.1.0 | 10.2.0 |
| | RP-52 | RP-110627 | 0064 | - | Correction of "total number of soft channel bits" for category 6 and 7 | 10.1.0 | 10.2.0 |
| 09/2011 | RP-53 | RP-111291 | 0065 | - | The SON feature in optional features without UE radio access capability parameters | 10.2.0 | 10.3.0 |
| | RP-53 | RP-111283 | 0067 | - | AdditionalSpectrumEmissions in CA | 10.2.0 | 10.3.0 |
| | RP-53 | RP-111278 | 0069 | - | Correction to UE capability parameters for handover to CSG cell | 10.2.0 | 10.3.0 |
| 12/2011 | RP-54 | RP-111716 | 0070 | 1 | Corrections to enhancedDualLayerTDD | 10.3.0 | 10.4.0 |
| | RP-54 | RP-111710 | 0072 | - | Optionality of SR Masking | 10.3.0 | 10.4.0 |
| | RP-54 | RP-111709 | 0074 | 1 | Optionality of UE Rx-Tx time difference report | 10.3.0 | 10.4.0 |
| | RP-54 | RP-111714 | 0077 | - | Correction to the number of soft channel bits | 10.3.0 | 10.4.0 |

History

| Document history | | |
|-------------------------|---------------|-------------|
| V10.0.0 | January 2011 | Publication |
| V10.1.0 | April 2011 | Publication |
| V10.2.0 | June 2011 | Publication |
| V10.3.0 | November 2011 | Publication |
| V10.4.0 | January 2012 | Publication |