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Foreword

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The present document is part 1 of a multi-part deliverable covering the 5G System (5GS) User Equipment (UE) protocol conformance specification, as identified below:

- **3GPP TS 38.523-1: "5GS; User Equipment (UE) conformance specification; Part 1: Protocol"** (the present document).
- 3GPP TS 38.523-2 [2]: "5GS; User Equipment (UE) conformance specification; Part 2: Applicability of protocol test cases".
- 3GPP TS 38.523-3 [3]: "5GS; User Equipment (UE) conformance specification; Part 3: Protocol Test Suites".

1 Scope

The present document specifies the protocol conformance testing for the 3GPP UE connecting to the 5G System (5GS) via its radio interface(s).

The following information can be found in the present document (first part of a multi-part test specification):

- the overall test structure;
- the test configurations;
- the conformance requirement and references to the core specifications;
- the test purposes; and
- a brief description of the test procedure, the specific test requirements and short message exchange table.

The applicability of the individual test cases is specified in the ICS proforma specification (3GPP TS 38.523-2 [2]). The Test Suites are specified in part 3 (3GPP TS 38.523-3 [3]).

The present document is valid for UE implemented according to 3GPP Releases starting from Release 15 up to the Release indicated on the cover page of the present 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.
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- 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 38.523-2: "5GS; UE conformance specification; Part 2: Implementation Conformance Statement (ICS) proforma specification".
- [3] 3GPP TS 38.523-3: "5GS; User Equipment (UE) conformance specification; Part 3: Protocol Test Suites".
- [4] 3GPP TS 38.508-1: "5GS; User Equipment (UE) conformance specification; Part 1: Common test environment".
- [5] 3GPP TS 38.508-2: "5GS; User Equipment (UE) conformance specification; Part 2: Common Implementation Conformance Statement (ICS) proforma".
- [6] 3GPP TS 38.509: "5GS; Special conformance testing functions for User Equipment (UE)".
- [7] 3GPP TS 36.508: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRAN); Common Test Environments for User Equipment (UE) Conformance Testing".
- [8] 3GPP TS 36.509: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Special conformance testing functions for User Equipment (UE)".
- [9] 3GPP TS 38.113: "New Radio (NR); Requirements for support of radio resource management".

- [10] 3GPP TS 36.133: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management".
- [11] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".
- [12] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".
- [13] 3GPP TS 36.523-1: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification".
- [14] 3GPP TS 38.212: "NR; Multiplexing and channel coding".
- [15] 3GPP TS 38.214: "NR; Physical layer procedures for data".
- [16] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".
- [17] 3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone".
- [18] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".
- [19] 3GPP TS 38.323: "NR; Packet Data Convergence Protocol (PDCP) specification".
- [20] 3GPP TS 33.501: "Security Architecture and Procedures for 5G System".
- [21] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".
- [22] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".
- [23] 3GPP TS 38.306: "NR; User Equipment (UE) radio access capabilities"[24] 3GPP TS 38.211: "NR; Physical channels and modulation".
- [25] 3GPP TS 36.523-3: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRAN); User Equipment (UE) conformance specification; Part 3: Abstract Test Suites (ATS)".
- [26] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".
- [27] 3GPP TS 38.322: "NR; Radio Link Control (RLC) protocol specification".
- [28] 3GPP TS 37.340: "NR; Multi-connectivity; Overall description; Stage-2".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1], specifications referred to in the tests' Conformance requirements subclauses and the following apply. A term defined in the present document takes precedence.

Floor: Floor(x) is the largest integer smaller than or equal to x.

Ceil: Ceil (x) is the smallest integer larger than or equal to x.

3.2 Symbols

For the purposes of the present document, symbols defined in specifications referred to in the tests' Conformance requirements subclauses and the following apply. A symbol defined in the present document takes precedence

None.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1]], specifications referred to in the tests' Conformance requirements subclauses and the following apply. An abbreviation defined in the present document takes precedence.

ICS	Implementation Conformance Statement
FFS	For Further Study

4 Overview

4.1 Test methodology

4.1.1 Testing of optional functions and procedures

Any function or procedure which is optional, as indicated in the present document may be subject to a conformance test if it is implemented in the UE.

A declaration by the apparatus supplier (ICS) is used to determine whether an optional function/procedure has been implemented.

4.1.2 Test interfaces and facilities

Detailed descriptions of the UE test interfaces and special facilities for testing are provided in 3GPP TS 38.509 [6].

4.2 Implicit testing

For some 3GPP signalling and protocol features conformance is not verified explicitly in the present document. This does not imply that correct functioning of these features is not essential, but that these are implicitly tested to a sufficient degree in other tests.

Implicit testing of 5GS requirements may be done also in tests specified in other 3GPP conformance test specifications. For clarity these are listed below:

- Indication for support of EN-DC: if the UE supports E-UTRA-NR dual connectivity, then the UE shall set the DCNR bit to "dual connectivity with NR supported" in the UE network capability IE of the ATTACH REQUEST/TRACKING AREA UPDATE REQUEST message; verified implicitly (the setting of the DCNR bit to 1) by tests specified in TS 36.523-1 [13].

NOTE 1: It is assumed that an UE supporting EN-DC will support EPS (legacy LTE) and therefore it will be tested against all relevant legacy LTE tests.

4.3 Repetition of tests

As a general rule, the test cases specified in the present document are highly reproducible and don't need to be repeated unless otherwise stated. However, the rate of correct UE behaviour such as cell re-selection, measurement and handover is specified statistically, e.g. "at least 90%" [8], [9]. Additionally, in some of the test cases, presented in TS 38.523-3

[3], HARQ retransmissions are not tolerated, because of characteristics of the test case. In such cases a repetition of test may be required. Details are FFS.

4.4 Handling of differences between conformance requirements in different releases of core specifications

The conformance requirements which determine the scope of each test case are explicitly copy-pasted from relevant core specifications in the especially dedicated for this section of each test with the title 'Conformance requirements'.

NOTE: When in the copy/pasted text there are references to other specifications the reference numbers will not match the reference numbers used in the present document. This approach has been taken in order to allow easy copy and then search for conformance requirements in those specifications.

When differences between conformance requirements in different releases of the cores specifications have impact on the Pre-test conditions, Test procedure sequence or/and the Specific message contents, the Conformance requirements related to different releases are specified separately with clear indication of the Release of the spec from which they were copied.

When there is no Release indicated for a conformance requirement text, this should be understood either as the Conformance requirements in the latest version of the spec with release = the TC Applicability release (which can be found in the column 'Release' for the relevant for the test case entry in the tables in TS 38.523-2 [2], subclause 4.1, or, as the Conformance requirements in the latest version of the spec of the release when the feature was introduced to the core specs.

5 Reference conditions and generic setup procedures

5.1 Reference conditions

The reference environments used by all signalling and protocol tests will be specified in TS 38.508-1 [4]. If a test requires an environment that is different, this will be specified in the test itself.

5.2 Generic setup procedures

A set of basic generic procedures for radio resource signalling, and generic setup procedures for layer 3 NAS signalling will be described in TS 38.508-1 [4]. These procedures will be used in numerous test cases throughout the present document.

6 Idle mode operations

6.1 NR idle mode operations

Editor's note: Intended to capture tests of Idle Mode behaviour defined in TS 38.304

FFS

7 Layer 2

7.1 NR Layer 2

7.1.0 Common test case specific values for Layer 2

For all layer 2 test cases, default values for periodicBSR-Timer, retxBSR-Timer and phr-Config shall be taken according to the table 7.1.0-1 unless test case specific values are given in the test case.