ETSI TS 134 229-5 V16.2.0 (2022-05)

5G;
Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP);
User Equipment (UE) conformance specification;
Part 5: Protocol conformance specification using 5G System (5GS)
(3GPP TS 34.229-5 version 16.2.0 Release 16)

Reference
RTS/TSGR-0534229-5vg20

Keywords
5G

ETSI

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Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Contents

Foreword

This Technical Specification 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

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

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

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

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

The constructions "is" and "is not" do not indicate requirements.

Introduction

The present document is the fifth part of a multi-part conformance specification valid for 3GPP Release 15 and later releases:

3GPP TS 34.229-1 [2]: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification".

3GPP TS 34.229-2 [3]: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) proforma specification".

3GPP TS 34.229-3 [4]: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 3: Abstract Test Suites (ATS)".

3GPP TS 34.229-4 [5]: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 4: Enabler for IP multimedia applications testing".

3GPP TS 34.229-5 (the present document): "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 5: Protocol conformance specification using 5G System (5GS)".

NOTE 1: The ATS is written in a standard testing language, TTCN-3, as defined in ETSI ES 201 873, Parts 1 to 3 [8], [9] and [10].

NOTE 2: Further information on testing can be found in ETSI ETS 300 406 [11] and ISO/IEC 9646-1 [12].

For at least a minimum set of services, the prose descriptions of test cases will have a matching detailed test case implemented in TTCN-3 (and provided in 3GPP TS 34.229-3 [4]).

1 Scope

The present document specifies the protocol conformance testing for the User Equipment (UE) supporting the Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP) when using the 5G System (5GS).

This is the fifth part of a multi-part test specification. The following information can be found in this part:

- the overall test structure;
- the test configurations;
- the conformance requirement and reference to the core specifications;
- the test purposes; and
- the test procedure.

The following information relevant to testing can be found in accompanying specifications:

- Implementation Conformance Statement (ICS) pro-forma and the applicability of each test case [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.
- 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 34.229-1: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 1: Protocol conformance specification".

[3] 3GPP TS 34.229-2: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 2: Implementation Conformance Statement (ICS) proforma specification".

[4] 3GPP TS 34.229-3: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 3: Abstract Test Suites (ATS)".

[5] 3GPP TS 34.229-4: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); User Equipment (UE) conformance specification; Part 4: Enabler for IP multimedia applications testing".

[6] IETF RFC 3261: "SIP: Session Initiation Protocol".

[7] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[8] ETSI ES 201 873-1: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 1: TTCN-3 Core Language".

[9] ETSI ES 201 873-2: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 2: TTCN-3 Tabular Presentation Format (TFT)".

[10] ETSI TR 201 873-3: "Methods for Testing and Specification (MTS); The Testing and Test Control Notation version 3; Part 3: TTCN-3 Graphical Presentation Format (GFT)".

[11] ETSI ETS 300 406: "Methods for testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[12] ISO/IEC 9646-1: "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[13] ISO/IEC 9646-7: "Information technology - Open systems interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[14] 3GPP TS 24.341: "Support of SMS over IP networks; Stage 3".

[15] IETF RFC 3310: "Hypertext Transfer Protocol (HTTP) Digest Authentication Using Authentication and Key Agreement (AKA)".

[16] 3GPP TS 33.203: "3G security;Access security for IP-based services".

[17] IETF RFC 3329: "Security Mechanism Agreement for the Session Initiation Protocol (SIP)".

[18] IETF RFC 3680: "A Session Initiation Protocol (SIP) Event Package for Registrations".

[19] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[20] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[21] 3GPP TS 38.508-1: "5GS; User Equipment (UE) conformance specification; Part 1: Common test environment".

[22] 3GPP TS 27.007: "AT command set for User Equipment (UE)".

[23] IETF RFC 2617: "HTTP Authentication: Basic and Digest Access Authentication".

[24] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[25] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[26] 3GPP TS 24.237: "IP Multimedia (IM) Core Network (CN) subsystem IP Multimedia Subsystem (IMS) Service Continuity".

[27] 3GPP TS 23.003: "Numbering, addressing and identification".

[28] IETF RFC 6665: “SIP-Specific Event Notification”.

[29] IETF RFC 3312: “Integration of Resource Management and SIP”.

[30] IETF RFC 3262: “Reliability of Provisional Responses in the Session Initiation Protocol (SIP)”.

[31] GSMA PRD NG.114: "IMS Profile for Voice, Video and Messaging over 5GS".

[32] 3GPP TS 24.610: "Communication HOLD (HOLD) using IP Multimedia (IM) Core Network (CN) subsystem".

[33] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction".

[34] 3GPP TS 24.606: "Message Waiting Indication (MWI) using IP Multimedia (IM) Core Network (CN) subsystem".

[35] 3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem".

[36] 3GPP TS 24.629: "Explicit Communication Transfer (ECT) using IP Multimedia (IM) Core Network (CN) subsystem".

[37] IETF RFC 4028: "Session Timers in the Session Initiation Protocol (SIP)".

[38] IETF RFC 4566: "SDP: Session Description Protocol".

[39] IETF RFC 7462: "URNs for the Alert-Info Header Field of the Session Initiation Protocol (SIP) ".

[40] IETF RFC 3891: "The Session Initiation Protocol (SIP) "Replaces" Header".

[41] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

[42] IETF RFC 3326: "The Reason Header Field for the Session Initiation Protocol (SIP)".

[43] 3GPP TS 24.109: "Bootstrapping interface (Ub) and network application function interface (Ua); Protocol details".

[44] 3GPP TS 33.220: "Generic Authentication Architecture (GAA); Generic Bootstrapping Architecture".

[45] IETF RFC 4825: "The Extensible Markup Language (XML) Configuration Access Protocol (XCAP)".

[46] IETF RFC 2616: "Hypertext Transfer Protocol -- HTTP/1.1".

[47] IETF RFC 3310: "Hypertext Transfer Protocol (HTTP) Digest Authentication Using Authentication and Key Agreement (AKA)".

[48] 3GPP TS 38.509: "5GS; Special conformance testing functions for User Equipment (UE)".

[49] IETF RFC 6228: "Session Initiation Protocol (SIP) Response Code for Indication of Terminated Dialog".

[50] IETF RFC 3323: "A Privacy Mechanism for the Session Initiation Protocol (SIP)".

[51] IETF RFC 3325: "Private Extensions to the Session Initiation Protocol (SIP) for Asserted Identity within Trusted Networks".

[52] 3GPP TS 38.508-2: "5GS; User Equipment (UE) conformance specification; Part 2: Common Implementation Conformance Statement (ICS) proforma".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

Void

3.2 Symbols

Void

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 3GPP TR 21.905 [1].

SS System Simulator

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 (Implementation Conformance Statement (ICS)) is used to determine whether an optional function/procedure has been implemented (see ISO/IEC 9646-7 [13] for general information about ICS).

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.

4.3 Conformance Requirements

The Conformance Requirements clauses in the present document are copy/paste from the relevant core specification where skipped text has been replaced with "...". References to clauses in the Conformance Requirements clause of the test body refers to clauses in the referred specification, not clauses in the present document.

5 Reference Conditions

5.1 General

The test cases are expected to be executed through the 3GPP radio interface. Details of the radio interfaces are outside the scope of this specification. The reference environments used by tests are specified in the test.

5.2 Generic setup procedures

A set of basic generic procedures for different IMS usage scenarios are described in Annex A of this specification. These procedures are used in numerous test cases throughout the present document. Default Messages are used from and maintained in Annex A of TS 34.229-1 [2].

5.3 Transport protocols applied

For simplicity, UDP (*User Datagram Protocol*) is applied to IMS testing as default DL transport protocol, except for the test cases in clause 6 where TCP (*Transmission Control Protocol*) is applied as DL transport protocol.

NOTE: Which UL transport protocol is used in the test is decided by the UE.

6 Registration

6.1 Initial Registration / 5GS

6.1.1 Test Purpose (TP)

(1)

```
with { UE has an ISIM or USIM inserted, is registered for 5GS, and has acquired P-CSCF address(es) }
ensure that {
  when { UE is made to register for IMS }
   then { UE sends a correctly composed initial REGISTER request to the P-CSCF }
            }
```

(2)

```
with { UE having sent unprotected REGISTER request }
ensure that {
  when { UE receiving a valid 401 (Unauthorized) response for the initial REGISTER request sent }
   then { UE correctly authenticates itself by sending another REGISTER request with a correctly
composed Authorization header using the AKAv1-MD5 algorithm }
            }
```

(3)

```
with { UE having sent unprotected and then protected REGISTER request }
ensure that {
  when { UE receiving a valid 200 OK response from S-CSCF for the REGISTER sent for authentication }
   then { UE subscribes to the reg event package for the public user identity registered, using the
stored service route for routing the SUBSCRIBE request }
            }
```


(4)

```
with { UE having subscribed to reg event }
ensure that {
  when { UE receives NOTIFY request for reg event }
   then { UE responds with a valid 200 OK response }
            }
```


6.1.2 Conformance Requirements

The conformance requirements covered in the present test case are, unless otherwise stated, Rel-15 requirements.

[TS 24.229, clause C.2]:

In case the UE is loaded with a UICC that contains a USIM but does not contain an ISIM, the UE shall:

- generate a private user identity;
- generate a temporary public user identity; and
- generate a home network domain name to address the SIP REGISTER request to.

All these three parameters are derived from the IMSI parameter in the USIM, according to the procedures described in TS 23.003 [3]. Also in this case, the UE shall derive new values every time the UICC is changed, and shall discard existing values if the UICC is removed.

NOTE: If there is an ISIM and a USIM on a UICC, the ISIM is used for authentication to the IM CN subsystem, as described in TS 33.203 [19]. See also clause 5.1.1.1A.

[TS 24.229, clause 5.1.1.1A]:

The ISIM shall always be used for authentication to the IM CN subsystem, if it is present, as described in 3GPP TS 33.203 [19].