Final draft ETSI ES 283 027 V2.4.0 (2008-01)

ETSI Standard

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Endorsement of the SIP-ISUP Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks

[3GPP TS 29.163 (Release 7), modified]

Reference
RES/TISPAN-03119-NGN-R2

Keywords
endorsement, interworking, ISUP, SIP

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Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN), and is now submitted for the ETSI standards Membership Approval Procedure.

1 Scope

The present document provides the ETSI endorsement of the 3GPP TS 29.163 [1].

Clauses 7.2.3 and 7.4 of 3GPP TS 29.163 [1] specify the signalling interworking between ISDN User Part (ISUP) protocols and SIP in order to support services that can be commonly supported by ISUP and SIP-based network domains.

Clause 9.2.3.3.5 specifies how ringing tone is applied at the gateway when interworking ISUP and SIP.

The present document specifies the principles of interworking between the ETSI TISPAN IMS and ISUP based legacy CS networks, in order to support IM basic voice calls, therefore all the references to interworking between IMS and BICC are out of scope of the present document.

The present document is a protocol interworking specification; therefore all references to the user plane interworking are out of scope of the present document.

The present document specifies the interworking between ETSI SIP profile (as specified within ES 283 003 [3]) and ISUP, as specified in EN 300 356-1 [2] respectively.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

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

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

[1] 3GPP TS 29.163: "3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks (Release 7)".

[2] ETSI EN 300 356-1 (V4.2.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 1: Basic services [ITU-T Recommendations Q.761 to Q.764 (1999) modified]".

[3] ETSI ES 283 003: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Call Control Protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP) Stage 3 [3GPP TS 24.229 (Release 7), modified]".

[4] ETSI ES 282 007: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Subsystem (IMS); Functional architecture".

[5] ETSI EN 300 356-3 (V4.2.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 3: Calling Line Identification Presentation (CLIP) supplementary service [ITU-T Recommendation Q.731, clause 3 (1993) modified]".

[6] ETSI EN 300 356-4 (V4.2.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 4: Calling Line Identification Restriction (CLIR) supplementary service [ITU-T Recommendation Q.731, clause 4 (1993) modified]".

[7] ETSI EN 300 356-5 (V4.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 5: Connected Line Identification Presentation (COLP) supplementary service [ITU-T Recommendation Q.731, clause 5 (1993) modified]".

[8] ETSI EN 300 356-6 (V4.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 6: Connected Line Identification Restriction (COLR) supplementary service [ITU-T Recommendation Q.731, clause 6 (1993) modified]".

[9] ETSI EN 300 356-7 (V4.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 7: Terminal Portability (TP) supplementary service [ITU-T Recommendation Q.733, clause 4 (1993) modified]".

[10] ETSI EN 300 356-8 (V4.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 8: User-to-User Signalling (UUS) supplementary service [ITU-T Recommendation Q.737, clause 1 (1997) modified]".

[11] ETSI EN 300 356-9 (V4.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 9: Closed User Group (CUG) supplementary service [ITU-T Recommendation Q.735, clause 1 (1993) modified]".

[12] ETSI EN 300 356-10 (V4.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 10: Subaddressing (SUB) supplementary service [ITU-T Recommendation Q.731, clause 8 (1992) modified]".

[13] ETSI EN 300 356-11 (V4.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 11: Malicious Call Identification (MCID) supplementary service [ITU-T Recommendation Q.731, clause 7 (1997) modified]".

[14] ETSI EN 300 356-12 (V4.2.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 12: Conference call, add-on (CONF) supplementary service [ITU-T Recommendation Q.734, clause 1 (1993) and implementors guide (1998) modified]".

[15] ETSI EN 300 356-14 (V4.2.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 14: Explicit Call Transfer (ECT) supplementary service [ITU-T Recommendation Q.732, clause 7 (1996) and implementors guide (1998) modified]".

[16] ETSI EN 300 356-15 (V4.2.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 15: Diversion supplementary service [ITU-T Recommendation Q.732, clauses 2 to 5 (1999) modified]".

[17] ETSI EN 300 356-16 (V4.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 16: Call Hold (HOLD) supplementary service [ITU-T Recommendation Q.733, clause 2 (1993) modified]".

[18] ETSI EN 300 356-17 (V4.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 17: Call Waiting (CW) supplementary service [ITU-T Recommendation Q.733, clause 1 (1992) modified]".

[19] ETSI EN 300 356-18 (V4.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 18: Completion of Calls to Busy Subscriber (CCBS) supplementary service [ITU-T Recommendation Q.733, clause 3 (1997) modified]".

[20] ETSI EN 300 356-19 (V4.2.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 19: Three-Party (3PTY) supplementary service [ITU-T Recommendation Q.734, clause 2 (1996) and implementors guide (1998) modified]".

[21] ETSI EN 300 356-20 (V4.3.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 20: Completion of Calls on No Reply (CCNR) supplementary service [ITU-T Recommendation Q.733, clause 5 (1999) modified]".

[22] ETSI EN 300 356-21: "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 21: Anonymous Call Rejection (ACR) supplementary service [ITU-T Recommendation Q.731, clause 4 (1993)]".

[23] ETSI EN 300 485 (V1.2.3): "Integrated Services Digital Network (ISDN); Definition and usage of cause and location in Digital Subscriber Signalling System No. one (DSS1) and Signalling System No. 7 (SS7) ISDN User Part (ISUP) [ITU-T Recommendation Q.850 (1998) with addendum modified]".

[24] ETSI EN 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".

[25] IETF RFC 3966 (December 2004): "The tel URI for Telephone Numbers".

3 Definitions and abbreviations

For the purposes of the present document, the terms, definitions and abbreviations given in 3GPP TS 29.163 [1], clauses 7.2.3 and 7.4 apply.

Endorsement notice

The present document endorses 3GPP TS 29.163: "3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks (Release 7)" [1], the contents of which apply together with the following modifications:

Clauses 6.3, 7.3, 8, 9.2.2.1, 9.2.2.2, 9.2.3.1, 9.2.3.2, 9.2.4.1, 9.2.5.1, 9.2.6.1, 9.2.7.1, 9.2.8.1, 9.2.8.3 and annex B do not apply to this recommendation.

NOTE: Underlining and/or strike-out are used to highlight detailed modifications where necessary.

Global modifications to 3GPP TS 29.163 Release 7

Throughout the text of the 3GPP TS 29.163 Release 7

Replace references as shown in table 1.

Table 1

References in 3GPP TS 29.163 [1]	Replaced references
ITU-T Recommendation Q.761	EN 300 356-1 [2]
ITU-T Recommendation Q.762	EN 300 356-1 [2]
ITU-T Recommendation Q.763	EN 300 356-1 [2]
ITU-T Recommendation Q.764	EN 300 356-1 [2]
3GPP TS 24.229	ES 283 003 [3]
3GPP TS 23.228	ES 282 007 [4]
ITU-T Recommendation Q.850 (1998)	EN 300 485 [23]
ITU-T Recommendation Q.731.3	EN 300 356-3 [5]
ITU-T Recommendation Q.731.4	EN 300 356-4 [6]
ITU-T Recommendation Q.731.5	EN 300 356-5 [7]
ITU-T Recommendation Q.731.6	EN 300 356-6 [8]
ITU-T Recommendation Q.731.7	EN 300 356-11 [13]
ITU-T Recommendation Q.731.8	EN 300 356-10 [12]
ITU-T Recommendation Q.732.2	EN 300 356-15 [16]
ITU-T Recommendation Q.732.3	EN 300 356-15 [16]
ITU-T Recommendation Q.732.4	EN 300 356-15 [16]
ITU-T Recommendation Q.732.5	EN 300 356-15 [16]
ITU-T Recommendation Q.732.7	EN 300 356-14 [15]
ITU-T Recommendation Q.733.1	EN 300 356-17 [18]
ITU-T Recommendation Q.733.2	EN 300 356-16 [17]
ITU-T Recommendation Q.733.3	EN 300 356-18 [19]
ITU-T Recommendation Q.733.4	EN 300 356-7 [9]
ITU-T Recommendation Q.733.5	EN 300 356-20 [21]
ITU-T Recommendation Q.734.1	EN 300 356-12 [14]
ITU-T Recommendation Q.734.2	EN 300 356-19 [20]
ITU-T Recommendation Q.735.1	EN 300 356-9 [11]
ITU-T Recommendation Q.737.1	EN 300 356-8 [10]

Clause 2

Modify as follows:

~~[77] IETF draft-ietf-sip-acr-code-03 "Rejecting Anonymous Requests in the Session Initiation Protocol (SIP)"~~

[77] IETF RFC 5079: "Rejecting Anonymous Requests in the Session Initiation Protocol (SIP)".

~~[89] draft-ejzak-sipping-p-em-auth-03.txt (January 2007): "Private Header (P-Header) Extension to the Session Initiation Protocol (SIP) for Authorization of Early Media".~~

[89] IETF RFC 5009: "Private Header (P-Header) Extension to the Session Initiation Protocol (SIP) for Authorization of Early Media".

[91] ETSI EN 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".

[92] IETF RFC 3966: "The tel URI for Telephone Numbers".

[93] ISO/IEC 8348: "Information technology Open Systems Interconnection Network service definition".

Clause 7.2.3.1.2.5 Transmission medium requirement

Modify as follows:

The I-MGCF may either transcode the selected codec(s) to the codec on the PSTN side or it may attempt to interwork the media without transcoding. If the I-MGCF transcodes, it shall select the TMR parameter to "3,1 kHz audio". If the I-MGCF does not transcode, it should map the TMR, USI and Access Transport parameters from the selected codec according to table 2a. The support of any of the media listed in table 2a is optional. The SDP for the data transfer with 64 kbit/s clearmode shall be mapped to the TMR "64 kbit/s unrestricted".

If the XML BearerCapability element is received in the INVITE the mapping of the USI shall be taken from the BearerCapability XML, else the USI shall be derived from the SDP attributes as shown in table2a.

Add clause 7.2.3.1.2.1.5a

7.2.3.1.2.5a Transmission medium requirement prime and USI prime (optional)

The Fallback mechanism shall only apply if a XML Bearer Capability element appears within the INVITE Request.

When the INVITE request includes multiple audio codecs with codec appearing in table 2a then the I-MGCF shall:

- If the first stated codec in the INVITE is a codec appearing in table 2a and is the equivalent as stated within the second Bearer Capability in the XML Bearer Capability element then the I-MGCF shall map the XML Bearer Capability element into the TMR and USI prime.
- If the second stated codec in the INVITE is a codec appearing in table 2a and is the equivalent as stated within the first Bearer Capability in the XML Bearer Capability element then the I-MGCF shall map the XML Bearer Capability element into the TMR prime and USI.
- If the compared codec stated within the INVITE is not equivalent as stated within XML Bearer Capability element then the XML Bearer Capability element shall be discarded.

If the Fallback mechanism is not supported by the terminating network the procedures as described within clause 7.2.3.1.2.5 shall apply.

In cases where the fallback appears within the terminating entity and sends back a codec to which is fallen back then the I-MGCF shall only apply the cut-though to the chosen codec.

In cases where the fallback appears within the terminating entity and sends back a SDP Answer that is equivalent with the TMR prime codec (fallback codec) then the I-MGCF shall only apply the cut-though to the fallback codec.

In cases where preconditions are used the I-MGCF has to wait for the SDP answer where the preconditions are met and fallback codec is sent back.

Add clause 7.2.3.1.2.10

7.2.3.1.2.10 Access Transport Parameter and User Tele Service

When an INVITE was received containing a PSTN XML body as defined in ES 283 003 [3], an available "ProgressIndicator" element can be as a network option mapped into a Progress Indicator in the Access Transport Parameter of the sent IAM

Table 7a0.1: Mapping of PSTN XML elements with ISUP Parameters

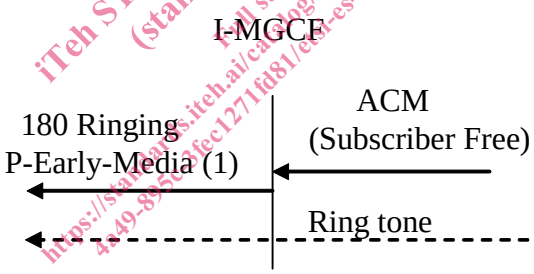
INVITE →	**IAM →**	
PSTN XML	**ISUP Parameter**	**Content**
ProgressIndicator	Access Transport Parameter	Progress indicator
HighLayerCompatibility		High layer compatibility (Note)
LowLayerCompatibility		Low layer compatibility
BearerCapability	User Service Information	
HighLayerCompatibility	User Tele Service	High layer compatibility (Note)
NOTE: If two high layer compatibility information elements are received, they are transferred in the same order as received in the INVITE message in the access transport parameter of the initial address message.		

Clause 7.2.3.1.4 Sending of 180 ringing

Modify as follows:

The I-MGCF shall send the SIP 180 Ringing when receiving any of the following messages:

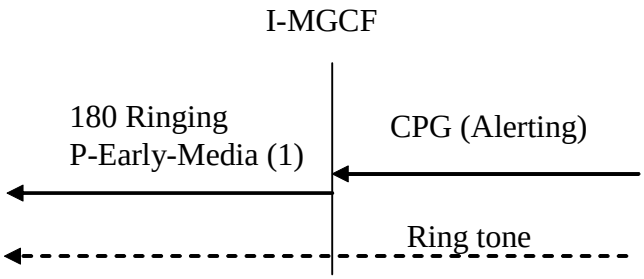
- ACM with Called party's status indicator set to subscriber free.



NOTE: Including the P-Early-Media Header is a network option for a speech call.

Figure 6: The receipt of ACM

- CPG with Event indicator set to alerting



NOTE: Including the P-Early-Media Header is a network option for a speech call.

Figure 7: Receipt of CPG (Alerting)