EUROPEAN TELECOMMUNICATION STANDARD

ETS 300 482

January 1996

Source: ETSI TC-SPS

Reference: DE/SPS-01009

ICS: 33.080

Key words: ISDN, SS7, ISUP, GSM, mobile, radio, PLMN, interworking, testing

Integrated Services Digital Network (ISDN); ISDN - Global System for Mobile communications (GSM) Public Land Mobile Network (PLMN) signalling interface; Test specification

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

*

Contents

Blank page

Foreword

This European Telecommunication Standard (ETS) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

Transposition dates	
Date of adoption of this ETS:	29 December 1995
Date of latest announcement of this ETS (doa):	30 April 1996
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 October 1996
Date of withdrawal of any conflicting National Standard (dow):	31 October 1996

Blank page

1 Scope

This European Telecommunications Standard (ETS) specifies the ISDN User Part (ISUP) protocol test specification to be used for the verification of the Integrated Services Digital Network (ISDN) - Global System for Mobile communications (GSM) Public Land Mobile Network (PLMN) signalling interface defined in ETS 300 303 [2].

Both validation testing, i.e. to provide a level of confidence that a given implementation conforms to ETS 300 303 [2], and compatibility testing, i.e. to provide a level of confidence that two implementations of ETS 300 303 [2] are compatible, are specified.

This ETS is based on the ISUP version 1 test specification in ETS 300 335 [3]. The appropriate modifications to ETS 300 335 [3] contained in this ETS are based on CCITT Recommendations Q.784 [5] and Q.785 [6].

2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] ETS 300 121 (1992): "Integrated Services Digital Network (ISDN); Application of the ISDN User Part (ISUP) of CCITT Signalling System No.7 for international ISDN interconnections (ISUP version 1)".

[2] ETS 300 303 (1994): "Integrated Services Digital Network (ISDN); ISDN - Global System for Mobile communications (GSM) Public Land Mobile Network (PLMN) signalling interface".

[3] ETS 300 335 (1994): "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 1; Test specification".

[4] ETS 300 356-1 (1994): "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 2 for the international interface; Part 1: Basic services [ITU-T Recommendations Q.761 to Q.764 (1993), modified]".

[5] CCITT Recommendation Q.784 (1991): "ISUP basic call test specification".

[6] CCITT Recommendation Q.785 (1991): "ISUP protocol test specification for supplementary services".

3 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

ACM	Address Complete Message
ANM	Answer Message
CPG	Call Progress message
CUG	Closed User Group
GSM	Global System for Mobile communications
IAM	Initial Address Message
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
MSC	Mobile-service Switching Centre
MTP	Message Transfer Part
PLMN	Public Land Mobile Network

REL	Release message
RLC	Release Complete message
SP	Signalling Point
TTCN	Tree and Tabular Combined Notation

4 General

Testing of the PLMN/ISDN signalling interface shall proceed in several steps before normal traffic is accepted:

1) validation of the ETS 300 303 [2] protocol. This test is performed when the ETS 300 303 [2] protocol is initially established in a network. An extensive set of test cases is required. It is assumed that a substantial part of the validation test is performed with test instruments simulating one of the networks involved in the test;

2) testing of the Message Transfer Part (MTP) interconnection. The MTP test is outside the scope of this ETS;

3) compatibility test of the ETS 300 303 [2] ISUP protocol interconnection. A limited set of test cases is required. This test is performed on an actual interconnection to be established between a fixed network and a PLMN;

4) end-to-end testing. The testing shall be performed between "live" accesses of the two networks, and include the ETS 300 303 [2] interconnection. The end-to-end test is outside the scope of this ETS.

5 Validation test

The test specifications of CCITT Recommendations Q.784 [5] and Q.785 [6] shall apply according to ETS 300 335 [3] with the following exceptions and clarifications.

The tests of CCITT Recommendation Q.784 [5] subclauses 1.4.1 to 1.4.5 may be omitted if it has been decided by the network operator that continuity check shall never be used for the PLMN/ISDN interface.

Cause 20 shall be included in the set of causes for the test in CCITT Recommendation Q.784 [5] subclause 4.1.

For the purpose of the tests in CCITT Recommendation Q.784 [5] subclause 5.2, timers T1, T5, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22 and T23 with timer values either according to ETS 300 121 [1] or ETS 300 356-1 [4] shall both be considered to be compliant to ETS 300 303 [2].

The PLMN/ISDN early Address Complete Message (ACM) timer shall be tested in addition to the timers listed for the test in CCITT Recommendation Q.784 [5] subclause 5.2. See clause 7 of this ETS.

The tests in CCITT Recommendation Q.784 [5] subclauses 5.2.5, 6.1.1 to 6.1.5 and 6.2.4 may be omitted if it has been decided by the network operator that continuity check shall never be used for the PLMN/ISDN interface.

The tests in CCITT Recommendation Q.784 [5] subclauses 6.4.1 to 6.4.4 shall not apply.

For the tests in CCITT Recommendation Q.785 [6] subclauses 2.1.1 to 2.1.6, it shall be verified that only international interlock codes are used on the ISDN/PLMN interface.

The tests in CCITT Recommendation Q.785 [6] subclauses 2.1.7 to 2.1.8 and 3.6.1 to 3.6.4 shall not apply.

Call forwarding shall be tested as specified in clause 8 of this ETS.

6 Compatibility test

The test specifications of CCITT Recommendations Q.784 [5] and Q.785 [6] shall apply according to ETS 300 335 [3] with the following exceptions and clarifications.

If one or more of the supplementary services are not supported between the PLMN and the fixed network, the required test is to verify that the service is properly screened or rejected in the gateway exchanges.

NOTE: Support of the Closed User Group (CUG) supplementary service on the PLMN/ISDN interconnection requires bilateral agreement on administration of CUG interlock codes between the operators of the PLMN and the fixed ISDN network.

Tests listed without asterisks (*) in clause 6 of CCITT Recommendation Q.784 [5] and clause 5 of CCITT Recommendation Q.785 [6] shall not apply.

The tests in CCITT Recommendation Q.784 [5] subclauses 1.4.1 to 1.4.2 may be omitted if it has been agreed by the network operators that continuity check shall not be used for the PLMN/ISDN interface.

The test in CCITT Recommendation Q.784 [5] subclause 3.8 is not required in the compatibility test. It is assumed that this test has been performed separately for each network in the validation test prior to the compatibility test.

Cause 20 shall be included in the set of causes for the test in CCITT Recommendation Q.784 [5] subclause 4.1.

For the purpose of the tests in CCITT Recommendation Q.784 [5] subclause 5.2, timers T1, T5, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22 and T23 with timer values either according to ETS 300 121 [1] or ETS 300 356-1 [4] shall both be considered to be compliant to ETS 300 303 [2].

The PLMN/ISDN early ACM timer shall be tested in addition to the timers listed for the test in CCITT Recommendation Q.784 [5] subclause 5.2. See clause 7 of this ETS.

The tests in CCITT Recommendation Q.784 [5] subclauses 6.1.1 to 6.1.2 and 6.2.4 may be omitted if it has been agreed by the network operators that continuity check shall not be used for the PLMN/ISDN interface.

The tests in CCITT Recommendation Q.784 [5] subclauses 6.2.1, 6.3.1 and 7.1.3 are not required in the compatibility test. It is assumed that the tests have been performed separately for each network in the validation test prior to the compatibility test.

For the tests in CCITT Recommendation Q.785 [6] subclauses 2.1.1 to 2.1.6, it shall be verified that only international interlock codes are used on the ISDN/PLMN interface.

The tests in CCITT Recommendation Q.785 [6] subclauses 2.1.7 to 2.1.8 and 3.6.1 to 3.6.4 shall not apply.

The tests in CCITT Recommendation Q.785 [6] subclauses 3.7.1 and 3.7.2 shall apply for the compatibility test even if they are not marked with asterisks (*), to verify that also international numbers can be passed on the ISDN/PLMN interconnection.

Call forwarding shall be tested as specified in clause 8 of this ETS.

7 Test description for expiry of PLMN/ISDN early ACM timer

The principles of CCITT Recommendation Q.784 [5] apply.

Purpose: To verify that ACM with subsequent Call Progress message (CPG) can be sent from the Mobile-service Switching Centre (MSC) on expiry of the PLMN/ISDN early ACM timer (refer to subclause 4.2.2.2.2 of ETS 300 303 [2]).

Pre-test conditions: Arrange the stimulus such that ACM is delayed more than 20 seconds (e.g. 30 seconds) in the backwards direction within network A, so that it is received in Signalling Point (SP) A after expiry of the PLMN/ISDN early ACM timer (5 to 20 seconds).

Expected message sequence:

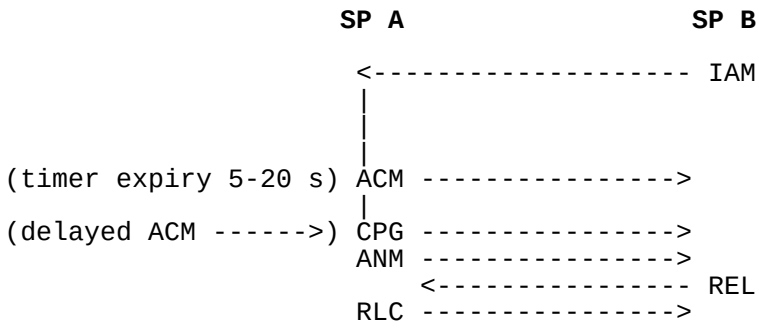

Figure 1

Test description:

1) Make a call from SP B (fixed network) to SP A (MSC).

2) Record the message sequence and parameters using a signal monitor.

3) CHECK A: Confirm that parameter values received in ACM were according to specification (refer to subclause 4.2.2.2.2 of ETS 300 303 [2]).

4) CHECK B: Was the message sequence and delays as above?

8 Test descriptions for call forwarding

The principles of clause 4 of CCITT Recommendation Q.785 [6] apply.

The tests shall be performed with both the gateway in the fixed network and the MSC as SP A.

8.1 Forwarded call

Purpose: To verify that call forwarding information can be correctly sent in the Initial Address Message (IAM) (refer to annex A of ETS 300 303 [2]).

Pre-test conditions: Arrange the stimulus such that the IAM generated from SP A contains the redirection information parameter.

Expected message sequence:

Figure 2

Test description:

1) Make a call from SP A to SP B.

2) Record the message sequence and parameters using a signal monitor.

3) CHECK A: Was the redirection information parameter included in the IAM by SP A?

4) CHECK B: Were the parameter fields of the redirection information parameter set correctly according to ITU-T Recommendation Q.763 subclause 3.29 in table B.2 of ETS 300 303 [2]?

5) CHECK C: Confirm that other parameters possibly generated by the call forwarding (e.g. redirecting number, original called number) are not included in the IAM from SP A.

6) CHECK D: Was the message sequence as above?

7) Repeat this test in the reverse direction.

8.2 Call to be forwarded

Purpose: To verify that call forwarding information can be correctly screened in the backwards messages (refer to annex A of ETS 300 303 [2]).

Pre-test conditions: Arrange the stimulus such that call forwarding information is generated in the backwards direction within network A and screened in SP A.

Expected message sequence:

Figure 3

Test description:

1) Make a call from SP B to SP A.

2) Record the message sequence and parameters using a signal monitor.

3) CHECK A: Confirm that parameters possibly generated by the call forwarding (e.g. redirection number, redirection number restriction, call diversion information) are not included in the ACM or CPG from SP A.

4) CHECK B: Was the message sequence as above?

5) Repeat this test in the reverse direction.

Annex A (informative): Tree and Tabular Combined Notation (TTCN) description

The TTCN description of ETS 300 335 [3] applies according to the corresponding test cases of this ETS. In addition, the following TTCN descriptions apply for the PLMN/ISDN early ACM timer expiry described in clause 7 and the Call forwarding test cases described in clause 8.

Timer Declarations

Timer Name	Duration	Units	Comments
TearlyACMmin	5	sec	waiting for ACM
TearlyACMmax	20	sec	waiting for ACM

ASP Constraints Declarations

Constraint Name	ASP Type	Comments
SETUP_RESP_call_forwd	USER_REQ	sent by user in the backward direction, e.g. in ACM, containing call forwarding information.
SETUP_RESP_acm	USER_REQ	
SETUP_RESP_anm	USER_REQ	
Progress_info	USER_REQ	

ASP Constraints Declarations

Constraint Name	ASP Type	Comments
IAM_Redir_ind_BA	TRANSFER_REQ	call setup asps
IAM_Redir_ind_AB	TRANSFER_IND	
ACM_early_AB	TRANSFER_IND	
ACM_no_call_forwd_AB	TRANSFER_IND	without call forward information
CPG_no_call_forwd_AB	TRANSFER_IND	without call forward information

Test Case Dynamic Behaviour

Test Case Name : ISUPB-PLMN07
Group : ISUPB/PLMN/
Purpose : To verify that ACM with subsequent CPG can be sent from MSC.
Default : AnyOtherEventUnexpected
Comments : SUBTITLE: Early ACM sent awaiting ACM
REFERENCE: ETS 300 303 [2] subclause 4.2.2.2
PRE-TEST CONDITIONS: Arrange the stimulus such that ACM is delayed more than 20 seconds in the backwards direction within network A, so that it is received in SP A after expiry of the PLMN/ISDN early ACM timer.

Behaviour Description	L	CREF	V	C
LAB! TRANSFER_REQ		IAM_BA		
# START TearlyACMmin, START TearlyACMmax	1			
?TIMEOUT TearlyACMmin	2			
UTA? USER_IND	3	SETUP_IND		
LAB? TRANSFER_IND, CANCEL TearlyACMmax	4	ACM_early_AB		Note
UTA! USER_REQ	5	SETUP_RESP_acm		
LAB? TRANSFER_IND	6	CPG_Alert_AB		
+Check_RINGING_TONE	7			
UTA! USER_REQ	8	SETUP_RESP_anm		
LAB? TRANSFER_IND	9	ANM_AB		
+Check_CONNECTIVITY	10			
LAB! TRANSFER_REQ	11	REL_BA		
+Receive_RLC_and_REL_IND	12	RLC_AB	P	
?TIMEOUT T20sec	13			
LAB! TRANSFER_REQ	14	REL_BA		
+Receive_RLC_and_REL_IND	15		F	

Detailed comments:
NOTE: ACM should be according to subclause 4.2.2.2.2 of ETS 300 303 [2].

Test Case Dynamic Behaviour				
Test Case Name	: ISUPSUP-PLMN0801			
Group	: ISUPB/PLMN/			
Purpose	: To verify that call forwarding information can be correctly sent in the IAM.			
Default	: AnyOtherEventUnexpected			
Comments	: SUBTITLE: IAM with redirection information REFERENCE: ETS 300 303 [2] annex A PRE-TEST CONDITIONS: Arrange the stimulus such that the IAM generated from SP A contains the redirection information parameter.			
Behaviour Description		**L**	**CREF**	**V** **C**
UTA! USER_REQ [SP_A=OR]		1	SETUP_REQ_any	
LAB? TRANSFER_IND		2	IAM_Redir_ind_AB	Note
LAB! TRANSFER_REQ		3	ACM_BA	
+Check_RINGING_TONE		4		
LAB! TRANSFER_REQ		5	ANM_BA	
+Check_CONNECTIVITY		6		
UTA! USER_REQ		7		
LAB? TRANSFER_IND		8	REL_AB	
LAB! TRANSFER_REQ		9	RLC_BA	P
LAB! TRANSFER_REQ [SP_A=TER]		10	IAM_Redir_ind_BA	Note
+Receive_ACM_and_SETUP_IND		11		
+Check_RINGING_TONE		12		
UTA! USER_REQ		13	SETUP_RESP_any	
LAB? TRANSFER_IND		14	ANM_AB	
+Check_CONNECTIVITY		15		
LAB! TRANSFER_REQ		16	REL_BA	
+Receive_RLC_and_REL_IND		17		P
Detailed comments: NOTE: IAM should include the redirection information parameter according to ITU-T Recommnedation Q.763 subclause 3.29 in table B.2 of ETS 300 303 [2]. Other parameters possibly generated by call forwarding (e.g. redirecting number, original called number) should not be included in the IAM.				

Test Case Dynamic Behaviour				
Test Case Name	: ISUPSUP-PLMN0802			
Group	: ISUPB/PLMN/			
Purpose	: To verify that call forwarding information is not sent in the backward direction.			
Default	: AnyOtherEventUnexpected			
Comments	: SUBTITLE : IAM with redirection information REFERENCE: ETS 300 303 [2] annex A PRE-TEST CONDITIONS: Arrange the stimulus such that call forwarding information is generated in the backwards direction within network A and screened in SP A.			
Behaviour Description		**L**	**CREF**	**V** **C**
LAB! TRANSFER_REQ		1	IAM	
UTA? USER_IND		2	SETUP_IND_any	
UTA! USER_REQ		3	SETUP_RESP_call_forwd	
LAB? TRANSFER_IND		4	ACM_no_call_forwd_AB	
UTA! USER_REQ		5	Progress_info	
LAB? TRANSFER_IND		6	CPG_no_call_forwd_AB	
+Check_RINGING_TONE		7		
UTA! USER_REQ		8	SETUP_RESP_any	
LAB? TRANSFER_IND		9	ANM_AB	
+Check_CONNECTIVITY		10		
LAB! TRANSFER_REQ		11	REL_BA	
+Receive_RLC_and_REL_IND		12		P
Detailed comments:				

History

Document history			
January 1995	Public Enquiry	PE 76:	1995-01-02 to 1995-04-28
October 1995	Vote	V 90:	1995-10-23 to 1995-12-15
January 1996	First Edition		

ISBN 2-7437-0452-7
Dépôt légal : Janvier 1996