



ETSI
TECHNICAL
REPORT

ETR 302

September 1996

Source: ETSI TC-NA

Reference: DTR/NA-010042

ICS: 33.080

Key words: ISDN, supplementary services, multimedia

**Integrated Service Digital Network (ISDN);
Supplementary services for multimedia services**

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

Copyright Notification: No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 1996. All rights reserved.

Contents

Foreword	5
1 Scope	7
2 References	7
3 Definitions and abbreviation	7
3.1 Definitions	7
3.2 Abbreviation	7
4 Introduction.....	8
5 Applicability of supplementary services to ISDN basic services	9
6 Applicability of supplementary services to new multimedia services	10
7 Market observations	11
8 Recommendations	11
Annex A: Protocol stack for ISDN teleservices (user plane)	12
Annex B: Applicability of supplementary services to basic services.....	14
Annex C: Applicability of supplementary services to new multimedia services	18
Annex D: Bibliography	19
History.....	20

Blank page

Foreword

This ETSI Technical Report (ETR) has been produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

ETRs are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim European Telecommunication Standard (I-ETS) status. An ETR may be used to publish material which is either of an informative nature, relating to the use or the application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or an I-ETS.

Blank page

4 Introduction

ISDN supplementary services provide additional capabilities to be used with basic services (bearer services or teleservices). ETSI supplementary services considered in this ETR are listed in table 1.

Section 1 of each supplementary service description contains some very general information on the applicability to basic services (e.g. applicable to all circuit-switched telecommunication services). However, for the applicability of the respective supplementary service to a particular basic service (e.g. carrying multimedia information like videotelephony) this general statement is no sufficient.

The invocation of certain supplementary services causes interruption of the end-to-end communication. This might cause conflicts with the end-to-end protocols of basic services. Supplementary services causing user channel interruption are indicated in the very right column of table 1.

Table 1: ETSI supplementary services

References	MoU supplementary services	User channel interruption
	Number identification services:	
ETS 300 089	Calling Line Identification Presentation (CLIP)	no
ETS 300 090	Calling Line Identification Restriction (CLIR)	no
ETS 300 094	Connected Line Identification Presentation (COLP)	no
ETS 300 095	Connected Line Identification Restriction (COLR)	no
ETS 300 128	Malicious Call Identification (MCID)	no
ETS 300 062	Direct-Dialling IN (DDI)	no
ETS 300 059	Sub-Addressing (SUB)	no
ETS 300 050	Multiple Subscriber Number (MSN)	no
	Call offering services:	
ETS 300 200	Call Forwarding Unconditional (CFU)	no
ETS 300 201	Call Forwarding No Reply (CFNR)	no
ETS 300 199	Call Forwarding Busy (CFB)	no
ETS 300 202	Call Deflection (CD)	no
ETS 300 367	Explicit Call Transfer (ECT)	yes
	Call completion services:	
ETS 300 056	Call Waiting (CW)	no
ETS 300 139	Hold (HOLD)	yes
ETS 300 357	Call Completion to Busy Subscriber (CCBS)	no
	Multiparty services:	
ETS 300 186	Three Party (3PTY)	yes
ETS 300 183	Add on Conference (CONF)	yes
ETS 300 164	Meet me Conference (MMC)	no

(continued)

Table 1 (concluded): ETSI supplementary services

References	MoU supplementary services	User channel interruption
	Charging services:	
ETS 300 178	Advice of Charge - at call set up (AOC-S)	no
ETS 300 179	Advice of Charge - during the call (AOC-D)	no
ETS 300 180	Advice of Charge - at the end of the call (AOC-E)	no
ETS 300 208	Freephone Service (FPH)	no
	Additional information transfer services:	
ETS 300 284	User to user signalling (UUS)	no
	Community of interest services:	
ETS 300 136	Closed User Group (CUG)	no
	Miscellaneous services:	
ETS 300 053	Terminal Portability (TP)	yes
	New supplementary services:	
DE/NA 010009	Remote Control (RC)	no
DE/NA 010006	Outgoing Call Barring - Fixed (OCB-F)	no
DE/NA 010022	Outgoing Call Barring - User Controlled (OCB-UC)	no
DE/NA 010028	Trunk Hunting (TH)	no
DE/NA 010003	Line Hunting (LH)	no
DE/NA 010027	Completion of Calls on No Reply (CCNR)	no
DE/NA 010018	Call Forwarding Unconditional to a Service Centre (CFU-S)	no
DE/NA 010002	Incall Modification (IM)	yes
DE/NA 010017	Unconditional Reverse Charging (REV(U))	no
DE/NA 010016	Reverse Charging at Call set up time (REV(S))	no
DE/NA 010026	Advice of Charge on User Request (AOC-R)	no
DE/NA 010012	Charge Card Calling (CCC)	no
DE/NA 010013	Virtual Card Calling (VCC)	no
DE/NA 010014	Premium Rate (PRM)	no
DE/NA 010008	Selective Call Forwarding (SCF)	no
DE/NA 010011	Universal Access Number (UAN)	no
DTR/NA 010010	Universal Personal Telecommunications (UPT)	n
DE/NA 010015	Televoting (VOT)	n
DE/NA 010004	Support of private numbering plans (SPNP)	n
DE/NA 010039	Cordless Terminal Mobility (CTM)	yes (note)
NOTE:	In case of hand over the user channel might be interrupted.	

5 Applicability of supplementary services to ISDN basic services

ISDN basic services provide the capability for a compatible end-to-end exchange of information. ETSI ISDN basic services considered in this ETR are listed in table 2.

Very general information on the relation of basic services to supplementary services (e.g. users are advised to hold the end-to-end inband communication prior to invocation of supplementary services interrupting the inband communication) is provided within some basic service descriptions. Further an informative annex to several basic services (e.g. 7 kHz telephony) provides information on the support of certain supplementary services.

It can be expected, that basic services using the same end-to-end inband protocol type have similar problems with the application of supplementary services. Therefore, in table 2 the type of the end-to-end inband protocol for each basic service has been indicated. The detailed protocol stack for each basic service is listed in annex A.

A terminal based B channel aggregation mechanism is used by basic services and applications requiring a transmission capability greater than 64 kbit/s. The ISDN network supports these services with independent 64 kbit/s connections. The applicability of supplementary services to these basic services requires special attention (e.g. correlation of independent network connections, coping with network determined busy). Basic services using more than one 64 kbit/s network connection are indicated in table 2. Further basic services of this category (e.g. for the transport of multimedia information) can be expected in future.

Table 2: ETSI ISDN basic services

References:	Basic service:	end-to-end protocol type	B channel aggregation
	MoU Teleservices:		
ETS 300 111	3.1 kHz Telephony	PCM speech	no
ETS 300 263	7 kHz Telephony	frame multiplex	no
ETS 300 120	Telefax G4	telematic based	no
ETS 300 264	Videotelephony	frame multiplex	yes
ETS 300 262	ISDN syntax based Videotex (circuit mode)	telematic based	no
ETS 300 262	ISDN syntax based Videotex (packet mode)	packet based	no
	New Teleservices:		
DE/NA 12240	Teleaction	system dependant	no
ETS 300 409	Eurofile transfer teleservice	telematic based	no
ETS 300 410	FTAM teleservice	telematic based	no
DE/TE-04031	Audiographic conference teleservice	frame multiplex	yes

An overview of the applicability of ETSI supplementary services to ETSI ISDN basic services is provided in annex B. Combinations marked with S (Support without any additional requirements) indicate that the respective supplementary service can be applied directly to the particular basic service.

6 Applicability of supplementary services to new multimedia services

New multimedia services considered in this section are based on the multimedia service concept described in the ETSI base document for multimedia services, ETR 197 [3].

This concept includes the end-to-end transport of service components such as audio, video, text and data. Therefore, appropriate end-to-end transport protocols and supporting terminal functions have to be taken into account. Above this a set of service control elements has been described in the base document for multimedia services, that allow the user co-ordination and control of the multimedia services. Especially, for the support of supplementary services (activation, registration, invocation) the service control element INVOKE has been introduced.

According to the base document of multimedia services the service level can be described with a set of attributes. One attribute at the service level is called "list of supplementary services provided". INVOKE of a supplementary service at the service level applies to the complete service, including all service tasks and service components, which might be used. The INVOKE of supplementary services for a specific service task or a specific service component is not foreseen in the ETSI base document on multimedia services, ETR 197 [3].

NOTE: From the users point of view the INVOKE of a supplementary service for a part of the multimedia communication (e.g. audio service component) seems not to be very meaningful.

The applicability of supplementary services to new multimedia services depends very much on the question, whether one or more network connections have to be considered. Three options may be distinguished (table 3).

Table 3: Network connections for the transport of new multimedia services

Option	Network connections supported	ISDN interfaces supported	similarities concerning support of supplementary services
1	1	BA,PRA	7 kHz telephony
2	up to 2	BA,PRA	video telephony
3	up to 30	PRA	

BA: Basic Access
 PRA: Primary Rate Access

In case that a multimedia service is supported by more than one network connection additional terminal functions may be required for the support of supplementary services. Similarities with application of supplementary services to the 7 kHz telephone service and the videotelephony teleservice are obvious. An overview of the applicability of ETSI supplementary services to new multimedia services is provided in annex C.

7 Market observations

The commercial success of the multimedia communication (similar to the GSM mobile communication) depends very much on the capability to fulfil the basic multimedia communication requirements in a cost effective way. Compatible multimedia end-to-end communication (conversational, retrieval and messaging) seems to be the key requirement from the market.

A limited set of supplementary services (similar to the GSM mobile communication) may improve the acceptance of the multimedia communication by the user. The decisive criteria will be the value to price relation.

8 Recommendations

- Harmonization of functional requirements

It is recommended to describe the necessary requirements for multimedia terminals capable to support supplementary services in a reusable way. The intention is to achieve harmonized functions (e.g. for all basic services based on two network connections).

- Support of terminal functions for supplementary services

Considering market observations it is recommended to classify the support of supplementary services to basic multimedia services based on more than one network connection as optional (terminal option). The intention is to keep the basic end-to-end multimedia communication as simple as the market needs it.

- High priority list of supplementary services applicable to multimedia services and applications

In order to progress standardization work meeting market needs it is recommended to list high priority supplementary services for the support of multimedia services and applications. These supplementary services should offer a good combination of great value for multimedia communication and limited technical complexity.

Candidates for the priority list could include:

- Calling Line Identification Presentation;
- Calling Line Identification Restriction;
- Connected Line Identification Presentation;
- Connected Line Identification Restriction;
- Direct Dialling In;
- Multiple Subscriber Number;
- Sub-Addressing;
- Advice of Charge.

Annex A: Protocol stack for ISDN teleservices (user plane)

Table A.1: Protocol stack for ISDN teleservices (telephony)

OSI Layer	3.1 kHz Telephony	7 kHz Telephony (note 1)	Videotelephony (note 2)	Audiographic conference (note 2)
7	not applicable	not applicable	not applicable	ITU-T T.120 series (Multipoint Communication Control)
6	CCITT G.7.11 (3.1 kHz audio)	CCITT G.711 (3.1 kHz audio) CCITT G.722 (7 kHz audio)	ETS 300 142 (video) CCITT G.711 (3.1 kHz audio) CCITT G.722 (7 kHz audio) CCITT G.728 (3.1 kHz compr. audio)	CCITT G.711 (3.1 kHz audio) CCITT G.722 (7 kHz audio)
5	not applicable	not applicable	not applicable	not applicable
4	not applicable	not applicable	not applicable	not applicable
3	not applicable	not applicable	not applicable	not applicable
2	not applicable	not applicable	not applicable	not applicable
1	ETS 300 011 (primary rate access) ETS 300 012 (basic rate access)	ETS 300 144 (frame multiplex) ETS 300 011 (primary rate access) ETS 300 012 (basic rate access)	ETS 300 144 (frame multiplex) ETS 300 011 (primary rate access) ETS 300 012 (basic rate access)	ETS 300 144 (frame multiplex) ETS 300 011 (primary rate access) ETS 300 012 (basic rate access)

Table A.2: Protocol stack for ISDN teleservices (data)

OSI Layer	Telefax G4	Eurofile transfer	FTAM file transfer	Syntax-based videotex (circuit mode)
7	ETS 300 112 (End-to-end protocols)	ETS 300 383 (Eurofile transfer profile)	ETS 300 388 (FTAM over ISDN based on simple file transfer profile)	ETS 300 079 (End-to-end protocols, circuit mode)
6				
5				
4	ETS 300 080 (Low layer protocols for telematic terminals)	ETS 300 080 (Low layer protocols for telematic terminals)	ETS 300 080 (Low layer protocols for telematic terminals)	ETS 300 080 (Low layer protocols for telematic terminals)
3				
2				
1	ETS 300 011 (primary rate access) ETS 300 012 (basic rate access)	ETS 300 011 (primary rate access) ETS 300 012 (basic rate access)	ETS 300 011 (primary rate access) ETS 300 012 (basic rate access)	ETS 300 011 (primary rate access) ETS 300 012 (basic rate access)

Table A.3: Protocol stack for ISDN teleservices (data)

OSI Layer	Syntax-based videotex (packet mode)	Teleaction
7	ETS 300 223 (end-to-end protocols)	system dependant
6	not applicable	system dependant
5	not applicable	system dependant
4	not applicable	system dependant
3	ETS 300 218 (videotex low layer protocols)	X.25, PVC
2	for ISDN packet mode (X.31)	CCITT I.440/441
1	ETS 300 011 (primary rate access) ETS 300 012 (basic rate access)	ETS 300 011 (primary rate access) ETS 300 012 (basic rate access)

NOTE 1: This service is based on one ISDN B - channel.

NOTE 2: This service is based on up to two ISDN B - channels.

Matrix 2 MoU supplementary services (see table 1 for abbreviations).

	CW	HOLD	CCBS	3PTY	CONF	MMC	AOC-S	AOC-D	AOC-E	FPH	UUS	CUG	TP
MoU teleservices:													
3.1 kHz Telephony	S	S	S	S	S	S	S	S	S	S	S	S	S
7 kHz Telephony	S		NA				S	S	S	S	S	S	
Telefax G4	S		S	NA	NA	NA	S	S	S	S	S	S	
Videotelephony	C	C, I		C, I	C, I	C	C	C	C		C	C	C, I
ISDN syntax based Videotex (CS)													
ISDN syntax based Videotex (PS)													
New teleservices:													
Teleaction	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Eurofile transfer teleservice				NA	NA	NA							
File transfer and access management (FTAM) teleservice				NA	NA	NA							
Audiographic conference teleservice	C	C, I		C, I	C, I	C	C	C	C		C	C	C, I

Matrix 3 New supplementary services (see table 1 for abbreviations).

	RC	OCB-F	OCB-UC	TH	LH	CCNR	CFU-S	IM	REV(U)	REV(S)	AOC-R
MoU teleservices:											
3.1 kHz Telephony	S	S	S	S	S	S	S	S	S	S	S
7 kHz Telephony	S	S	S	S	S	S	S	S	S	S	S
Telefax G4	S	S	S	S	S	NA	S	S	S	S	S
Videotelephony	C	C	C	C	C		C		C	C	C
ISDN syntax based Videotex (CS)								S			
ISDN syntax based Videotex (PS)											
New teleservices:											
Telection	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Eurofile transfer teleservice								S			
File transfer and access management (FTAM) teleservice								S			
Audiographic conference teleservice	C	C	C	C	C		C		C	C	C

Matrix 4 New supplementary services (see table 1 for abbreviations).

	CCC	VCC	PRM	SCF	UAN	UPT	VOT	SPNP	CTM
MoU teleservices:									
3.1 kHz Telephony	S	S	S	S	S	S	S	S	S
7 kHz Telephony									
Telefax G4									
Videotelephony									
ISDN syntax based Videotex (CS)									
ISDN syntax based Videotex (PS)									
New teleservices:									
Telection	NA	NA	NA	NA	NA	NA	NA	NA	NA
Eurofile transfer teleservice									
File transfer and access management (FTAM) teleservice									
Audiographic conference teleservice									

S Can be supported without additional requirements.

C Support would require additional co-ordination functions (e.g. for multiple B channels) from the terminal.

I Support would require intervention in the inband signalling from the terminal.

NA Not applicable (e.g. not meaningful).

Annex C: Applicability of supplementary services to new multimedia services

Matrix 1 MoU supplementary services (see table 1 for abbreviations).

Network connections supported	CLIP	CLIR	COLP	COLR	MCID	DDI	SUB	MSN	CFU	CFNR	CFB	CD	ECT
1	S	S	S	S	S	S	S	S	S	S	S	S	
up to 2	C	C	C	C	C	S	C	C	C	C	C	C	C, I
up to 30	C	C	C	C	C	S	C	C	C	C	C	C	C, I

Matrix 2 MoU supplementary services (see table 1 for abbreviations).

Network connections supported	CW	HOLD	CCBS	3PTY	CONF	MMC	AOC-S	AOC-D	AOC-E	FPH	UUS	CUG	TP
1	S		S				S	S	S	S	S	S	
up to 2	C	C, I		C, I	C, I	C	C	C	C		C	C	C, I
up to 30	C	C, I		C, I	C, I	C	C	C	C		C	C	C, I

Matrix 3 New supplementary services (see table 1 for abbreviations).

Network connections supported	RC	OCB-F	OCB-UC	TH	LH	CCNR	CFU-S	IM	REV(U)	REV(S)	AOC-R
1	S	S	S	S	S	S	S	S	S	S	S
up to 2	C	C	C	C	C		C		C	C	C
up to 30	C	C	C	C	C		C		C	C	C

Matrix 4 New supplementary services (see table 1 for abbreviations).

Network connections supported	CCC	VCC	PRM	SCF	UAN	UPT	VOT	SPNP	CTM
1									
up to 2									
up to 30									

S Can be supported without additional requirements.

C Support would require additional co-ordination functions (e.g. for multiple B channels) from the terminal.

I Support would require intervention in the inband signalling from the terminal.

NA Not applicable (e.g. not meaningful).

Annex D: Bibliography

- CCITT Recommendation I.230 (1988): "Definition of bearer service categories".
- CCITT Recommendation I.240 (1988): "Definition of teleservices".
- CCITT Recommendation I.250 (1988): "Definition of Supplementary Services".
- CCITT (1988): "Terms and Definitions, Abbreviations and Acronyms".
- ITU-T Recommendation F.700: "Framework recommendation for audiovisual and multimedia services".

History

Document history	
September 1996	First Edition