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Human Factors (HF); Minimum Man-Machine Interface (MMI) to public network based supplementary services

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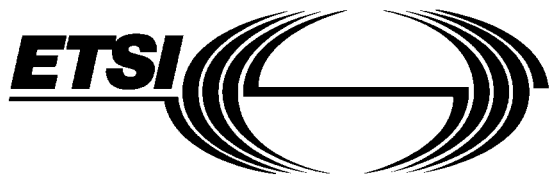
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## Foreword

This European Telecommunication Standard (ETS) on a minimum Man-Machine Interface for access and control of supplementary services has been produced by the Human Factors (HF) Technical Committee of the European Telecommunications Standards Institute (ETSI).

Transposition dates	
Date of adoption:	23 May 1997
Date of latest announcement of this ETS (doa):	30 September 1997
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 March 1998
Date of withdrawal of any conflicting National Standard (dow):	31 March 1998

NOTE: This ETS is intended to replace CEPT T/CAC 02 (formerly CEPT T/SF 2).

## Introduction

This ETS has been developed in response to the rapid growth of telecommunications networks and services, and the increasing mobility of the human user, both within and between networks.

The initial stimulus for the work was the recognition that two complementary networks were developing the same, or a very similar, set of supplementary services with significantly different Man-Machine Interfaces (MMIs). At least two different MMIs, based on the 12 keys (0 - 9, \* and #) have been defined for supplementary services provided within European public networks (CEPT Recommendation T/CAC 0 2 [12] and ETS 300 511 [13]), and yet a third non-standard MMI was in common use by a number of European public network operators (ETR 261 [14]). See annex B for a Bibliography which gives these references in full. In addition, a European service provider has introduced a new code scheme, based on an all numeric syntax, for some of its services. At the same time there was increasing recognition that the existing minimum Man-Machine Interface for the access and control of these services did not offer an adequate level of usability.

To address these concerns, this ETS describes a minimum MMI for the access and control of supplementary services within the public telecommunications networks, fixed and mobile, analogue and digital.

Its purpose is to provide a consistent set of user control procedures that will ensure that the access and control of public network based supplementary services can be harmonized, such that a user can access and control the same service in the same way irrespective of the public network providing the service, or of the terminal providing access to it (ITU-T Recommendation E.330 [15]). Its purpose is also to ensure that the user is consistently provided with the necessary information both before and during access and control of a service to establish a minimum acceptable level of usability.

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## 1 Scope

This European Telecommunication Standard (ETS) defines the minimum MMI for use to gain access to and control of supplementary services within public telecommunications networks. It describes the requirements to be met jointly by the service provider, the network operator and the terminal manufacturer necessary to ensure provision of the minimum MMI.

This ETS applies to network based supplementary services provided within:

- the Public Switched Telephone Network (PSTN);
- the Integrated Services Digital Network (ISDN);
- the analogue Public Land Mobile Networks (PLMN), including: Total Access Communication Systems (TACS), Extended Total Access Communication Systems (ETACS) and Nordic Mobile Telephone System (NMT);
- the Global System for Mobile Communications Public Land Mobile Network (GSM - PLMN), including the Digital Cellular System (DCS) 1800;
- the Trans-European Trunked Radio system (TETRA);
- Satellite Personal Communications Service (S-PCS);
- Universal Mobile Telecommunications System (UMTS);
- Universal Personal Telecommunications (UPT).

This ETS does not apply to supplementary services provided within private telecommunications networks, but will apply to public network based services accessed from a private network.

This ETS does not apply to supplementary services that are provided by private networks (or servers) which are attached to the public network and can be accessed from it.

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This ETS applies to all telecommunications terminals that are intended to access the supplementary services provided within the public networks.

## 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] | ETR 095 (1993): "Human Factors (HF); Guide for usability evaluation of telecommunications systems and services".   |
| [2] | ETR 096 (1993): "Human Factors (HF); Phone based interfaces (PBI) Human factors guidelines for the design of minimum phone based user interface to computer services". |
| [3] | ETR 116 (1994): "Human Factors (HF); Human factors guidelines for ISDN terminal equipment design".   |
| [4] | ETR 329 (1996): "Human Factors (HF); Guidelines for procedures and announcements in Stored Voice Services (SVS) and Universal Personal Telecommunication (UPT)".       |
| [5] | ITU-T Recommendation E.161: "Arrangement of figures, letters and symbols on telephones and other devices that can be used for gaining access to a telephone network".  |

- [6] ITU-T Recommendation E.182: "Application of tones and recorded announcements in telephone services".
- [7] ITU-T Recommendation E.183: "Guiding principles for telephone announcements".
- [8] ITU-T Recommendation F.902: "Interactive services design guidelines".
- [9] ITU-T Recommendation G.115: "Mean active speech level for announcements and speech synthesis systems".
- [10] ITU-T Recommendation I.210: "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [11] ITU-T Recommendation Q.932: "Generic procedures for the control of ISDN supplementary services".
- [12] CEPT Recommendation T/CAC 0 2 (formerly T/SF 2): "Subscriber control procedures for supplementary services in modern telecommunication systems".
- [13] ETS 300 511: "European digital cellular telecommunications system (phase 2): Man-Machine Interface (MMI) of the Mobile Station (MS) (GSM 02.30)".
- [14] ETR 261: "Human Factors (HF); Assessment and definition of a harmonized minimum ManMachine Interface (MMi) for accessing and controlling public network based telecommunication services - Final Report"; 7 parts.
- [15] ITU-T Recommendation E.330: "User control of ISDN - Supported Services".

### 3 Definitions, Abbreviations and Symbols

#### 3.1 Definitions

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

**activation:** An action taken by a user or by a service provider to change the state of a service from inactive to active. For example, to activate (switch on) call waiting enables the call waiting indication and service to be invoked by the service provider whenever a call is presented to a busy terminal.

**command dialogue:** A dialogue format which enables user commands to control a supplementary service by entering the complete string of information necessary to execute the required service function. The service's response will either confirm the execution of the service function, or confirm an error condition. The service's response does not include a prompt for further information. See Interactive Dialogue.

**control action:** A user input to a telecommunication terminal, network or service that is intended to change the state of the terminal, network or service as part of a man-machine interface to gain access to and control of a telecommunication service.

**data check:** The interrogation function that compares data input by a user during an interrogation procedure with the data stored with respect to a service. For example, to confirm a Personal Identity Number (PIN) or other secure data item.

**data request:** The interrogation function that enables a user to obtain information on the existing data stored with respect to a service.

**deactivation:** An action taken by a user or by a service provider to change the status of a service from active to inactive. For example, to deactivate (switch off) call waiting means the call waiting indication and service will not be invoked by the service provider whenever a call is presented to a busy terminal.

**descriptive information:** Information provided for the subscriber and user which describes aspects of a supplementary service that are necessary for, or supportive to, the usage of the service; but which excludes the control procedures required to operate the service. See Procedural Information.

**disabling:** An action taken by a user on a per call basis to prevent (i.e. temporarily suspend) the action of a supplementary service. For example, to switch off CLIR and allow the sending of Calling Line Identification information for the current call, although Calling Line Identification Restriction (CLIR) is normally active.

**en-bloc dialling:** From a user's perspective, the form of dialling where a user inputs an address or supplementary service command before going off-hook or "sending" it to the network. The address or command may or may not be available to the user for editing before the user goes off-hook or "sends" the information to the network.

**erasure:** An action taken by a user or by a service provider to delete data stored against a particular service by a previous registration.

**feedback:** Information, with respect to the state of the system (terminal, network, or service), that is provided to a user in response to their previous control action. Feedback includes confirmation indications, error indications, and status information, as well as implicit or explicit guidance information that further control action may, or may not, be required. See also Prompts and ITU-T Recommendation F.902 [8].

**functional protocol:** A generic form of protocol for sending information from the user's equipment (i.e. a terminal) to a network or service provider, which implies in this case, that the user's equipment has knowledge of the supplementary service. In effect the terminal translates the users commands into specific supplementary service function related signals that the network or service provider can interpret. (See also ITU-T Recommendation Q.932 [11]).

**interactive dialogue:** A dialogue format which enables user commands to control a supplementary service by entering a sequence of information strings in response to prompts, from the terminal, network or supplementary service, to compile the full information necessary to execute a service function. The service's response will either confirm the execution of the service function, or confirm an error condition and may include a prompt for further information or offer help facilities.

**interrogation:** An action taken by a user to request information from a service provider relating to a particular service. For the purposes of this ETS, the interrogation function shall include Status Check, Data Request and enable Data Check.

**invocation:** An action taken by a user or by a service provider to execute a specific service function within real time. For example, by a service provider forwarding an incoming call for a user who has activated the call forwarding service and registered a forwarding-to number; by a user invoking an active call transfer service when the two current calls are in the relevant states (see table 6 in subclause 7.1.2.5); or by a user, on a per call basis, to invoke (i.e. temporarily activate) a supplementary service, e.g. to switch on CLIR and allow the restriction of Calling Line Identification information for the current call, although Calling Line Identification Restriction is NOT normally active.

**man-machine interface:** The interface through which a user communicates with a telecommunications terminal or via a telecommunications terminal to a telecommunications service provider. The communication is bi-directional and includes the information presented to the user before a control action, the control actions initiated by the user and the information presented to the user after a control action.

**network operator:** The entity which provides the telecommunications network offering connection to the service provider. For the purposes of this ETS the network operator may be one or many, between a user and a "supplementary service" service provider, and should also include any telecommunications infrastructure providers.

**overlap dialling:** From a user's perspective, the form of dialling where a user goes off-hook and then inputs the address or supplementary service command digit by digit.

**procedural information:** Information provided for the subscriber and user which describes the user control procedures required to operate a supplementary service correctly, including control procedures required to recover from user errors. See Descriptive Information.

**prompts:** Information presented to a user that a specific service state is current and that a control action is expected in order for the service state to be changed.

**provision:** An action taken by a service provider to make a service available to a subscriber. Provision may be general (where the service is made available to all subscribers without prior arrangement with the service provider) or pre-arranged (where the service is made available to specific subscribers only after prior arrangements are made with the service provider).

**register recall:** A control defined by ITU-T Recommendation E.161 [5] to enable a user to signal to the local exchange within a fixed network during a call.

**registration:** An action taken by a user or by a service provider to store specific data necessary to enable subsequent operation of a service. For example, the "forwarding-to number" in the Call Forwarding Unconditional service.

**separator:** A one character string, the star (\*) symbol, used within a command dialogue control action to separate two digit strings. The digit strings may be a service code or a supplementary information string.

**service code:** A two or three digit string used within a command dialogue control action to identify a supplementary service.

**service prefix:** A one or two character string composed entirely of the star (\*) or square (#) symbols and used to define which of a set of functions should be applied to a service, within a command dialogue control action.

**service provider:** The entity which provides one or more supplementary services to a user. The network operator may be the service provider.

**service suffix:** A one character string, the square (#) symbol, used within a command dialogue control action to define the end of the command string.

**status check:** The interrogation function that enables a user to request information on the existing status of a designated service.

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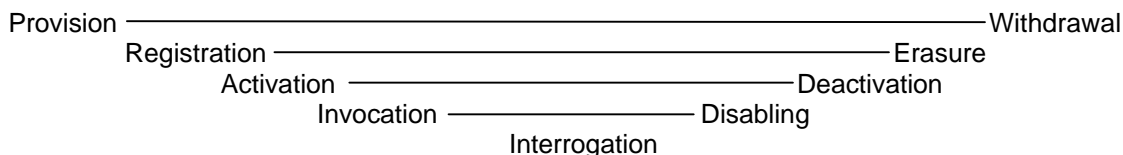
**stimulus protocol:** A generic form of protocol for sending information from the user's equipment (i.e. a terminal) to a network or service provider, which implies in this case, that the user's equipment does not require any knowledge of the supplementary service. In effect the terminal is transparent to the user's commands. (See also ITU-T Recommendation Q.932 [11]).

**subscriber:** The person or organisational body who has made arrangements with a network operator to have connection with a telecommunications network and who may make arrangements for the provision of telecommunications services via that network with a service provider.

**supplementary information:** A digit, symbol and/or letter string of undefined length used within a control command sequence to transfer data to the supplementary service provider.

**supplementary service:** A supplementary service modifies or supplements a basic telecommunication service. Consequently, it cannot be offered to a customer as a stand-alone service. It must be offered together with or in association with a basic telecommunication service. The same supplementary service may be common to a number of telecommunication services. See ITU-T Recommendation I.210 [10].

**supplementary service functions:** The collection of functions that are commonly applied in supplementary services including: Activation, Deactivation, Disabling, Erasure, Interrogation, Invocation, Provision, Registration and Withdrawal. Two of these, Provision and Withdrawal, are usually handled at subscription and do not usually require a user interface. These nine functions can be viewed hierarchically and reciprocally as shown in figure 1.



**Figure 1: Supplementary service functions, hierarchical and reciprocal view**

**switching order:** A one or two digit string used within a command dialogue control action to identify a telecommunications order.

**syntax:** The particular sequence of service prefix, service code, switching order, separator, supplementary information, service suffix, etc. specified for a command dialogue information string.

**third party user:** The person who interacts with or may be affected by a supplementary service which has been activated, invoked, disabled, or deactivated, by another person. For example, the third party user may be calling a person who has activated a call forwarding service, or he may be one of the non-controlling parties involved in a multi-party call (e.g. Call Waiting, Hold, Explicit Call Transfer, 3-Party Conference, etc.).

**usability:** The effectiveness, efficiency and satisfaction with which specified users can achieve specified goals (tasks) in a particular environment, see ETR 116 [3]. In telecommunications usability should also include the concepts of learnability and flexibility; and reference to the interaction of more than one user (the A and B parties) with each other and with the telecommunications system, see ETR 095 [1].

**user:** The person who uses a telecommunications terminal to gain access to and control of a telecommunications service, in this case a supplementary service. The user may or may not be the person who has subscribed to the provision of the service. Also, the user may or may not be a person with an impairment, e.g. an elderly or disabled person.

**withdrawal:** An action taken by a service provider to make a service unavailable to a subscriber. Withdrawal may be general (where the service is removed from all subscribers previously provided with the service) or specific (where the service is removed from individual subscribers previously provided with the service).

### 3.2 Abbreviations

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

3PTY	Three Party Conference
AN	Abbreviated Number
AOC-D	Advice of Charge - During a Call
AOC-E	Advice of Charge - at End of Call
AOC-S	Advice of Charge - at Start of Call
AS	Alphanumeric String
CCBS	Completion of Call to Busy Subscriber
CCNR	Completion of Call on No Reply
CD	Call Deflection
CFB	Call Forwarding on Busy
CFNR	Call Forwarding on No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CONF	Conference Call, Add-on
CW	Call Waiting
DCS 1800	Digital Cellular System 1800
DTMF	Dual Tone Multi-frequency
ECT	Explicit Call Transfer

ETNO	European public Telecommunications Network Operators' Association
FLMPTS	Future Land Mobile Public Telecommunications System
GSM	Global System for Mobile Communications
GUI	Graphical User Interface
HF	Human Factors
HOLD	Hold
IMT 2000	International Mobile Telecommunications 2000 (formerly FLMPTS)
ISDN	Integrated Services Digital Network
MCID	Malicious Call Identification
MMC	Meet Me Conference
MMI	Man-Machine Interface
NMT	Nordic Mobile Telephone System
NRA	National Regulatory Authority
TACS	Total Access Communication Systems
ETACS	Extended Total Access Communication Systems
N	Number (a one digit number)
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PRI	Priority
PSTN	Public Switched Telephone Network
PUI	Personal User Identity
PX	Service Prefix
S-PCS	Satellite Personal Communications Service
SC	Service Code
SCT	Single Step Call Transfer
SI	Supplementary Information
SO	Switching Order
SR	Separator
SX	Service Suffix
TETRA	Trans-European Trunked Radio
TP	Terminal Portability
UMTS	Universal Mobile Telecommunications System
UPT	Universal Personal Telecommunications
UUS	User to User Signalling

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### 3.3 Symbols

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

- \* The Star on the standard telephone keypad arrays, see ITU-T Recommendation E.161 [5]. Also known as the asterisk.
- # The Square on the standard telephone keypad arrays, see ITU-T Recommendation E.161 [5]. Also known as the hash, number or sharp sign ("pound" in the USA).
- R Register Recall, see ITU-T Recommendation E.161 [5].

## 4 The Minimum Man-Machine Interface

A MMI is the bi-directional communication interface provided to enable communication between a system and its human users. The MMI for public network based supplementary services is the communication interface between the system (the terminal, the network/s and the supplementary service) and the user. The interface is defined here to include: informative and instructional material that allow a user to select and use an appropriate service, the software and physical items of hardware that facilitate control and command actions that effect a service and static or dynamic elements that provide information (prompts and feedback) about a service.

The minimum MMI which shall be used to gain access to and control of public network based supplementary services shall comprise the following elements:

- a) the information provided to a user before a control action is performed;

- b) the control actions a user performs to, gain access to and control of, a service;
- c) the information provided to a user after a control action has been performed.

The minimum MMI is intended to be facilitated by all telecommunications terminals that can access the services provided. This is irrespective of the type of signalling protocols used between the terminal and the network or service provider, (stimulus or functional); and of the method of signalling, (dualtone multi-frequency (DTMF), or digital). It is also independent of the media used for presenting information back from the service provider (auditory - tones or verbal messages; or visual - text based messages, symbols, signalling lights, etc.). In this respect there are no predefined assumptions of how the MMI is implemented.

For the detailed requirements to be included in each element of the minimum MMI, see clauses 5, 6 and 7.

## 5 Information before a control action

The information provided to a user before a control action is performed, as part of the minimum MMI for gaining access to and control of public network based supplementary services, shall include:

- a) information provided before a service can be used, see subclause 5.1;
- b) information provided before a service is activated, de-activated or invoked, see subclause 5.2.

### 5.1 Information before a service can be used

The information that is provided to the subscriber and other users before a service can be used shall be:

- a) descriptive, see subclause 5.1.1;
- b) procedural, see subclause 5.1.2.

The descriptive and procedural information shall be presented to the subscriber in a form appropriate to the subscriber and the other user's capabilities. Provision shall also be made to accommodate the requirements of users with special needs.

The supplementary service provider shall ensure that the descriptive and procedural information relevant to the services it provides is made available to the service subscribers. The service subscribers are assumed to be responsible for ensuring the information is available to other users.

This requirement applies equally to all formats and media used for the presentation of this descriptive and procedural information. For example, it may be incorporated into:

- promotional material, advertisements, brochures, etc.;
- training material, handbooks, prompt cards, user guides, etc.;
- terminal-presented material, keyboard labels / symbols / pictograms, display-based help messages / tutorials, etc.

These materials may be published as printed material or in electronic formats, e.g. as recorded messages, broadcast advertisements, etc. Whatever the format or medium used, the service provider should take all practicable measures to ensure that the information is accurate, consistent and relevant. Whenever transient information media are used, e.g. auditory or audio-visual broadcast messages, the user should always be provided with supporting information in a more permanent form, e.g. printed text.

The format and presentation of the descriptive and procedural information should conform with the recommendations included within the relevant guidelines in ETR 116 [3].