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# Integrated Services Digital Network (ISDN);
# Multiple Subscriber Number (MSN) supplementary service;
# Digital Subscriber Signalling System No. one (DSS1) protocol;
# Part 1: Protocol specification

## ETSI

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# 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).

This ETS is part 1 of a multi-part standard covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) Multiple Subscriber Number (MSN) supplementary service, as described below:

**Part 1:**     **"Protocol specification";**

Part 2:     "Protocol Implementation Conformance Statement (PICS) proforma specification";

Part 3:     "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";

Part 4:     "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";

Part 5:     "TSS&TP specification for the network";

Part 6:     "ATS and partial PIXIT proforma specification for the network".

In accordance with CCITT Recommendation I.130, the following three level structure is used to describe the supplementary telecommunications services as provided by European public telecommunications operators under the pan-European Integrated Services Digital Network (ISDN):

-     Stage 1: is an overall service description, from the user's standpoint;

-     Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and

-     Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

This ETS details the stage 3 aspects (signalling system protocols and switching functions) needed to support the Multiple Subscriber Number (MSN) supplementary service. The stage 1 and stage 2 aspects are detailed in ETS 300 050 (1991) and ETS 300 051 (1991), respectively.

This reprint includes all previous Corrigenda as shown in the History box at the last page.

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# 1	Scope

This first part of ETS 300 052 specifies the stage three of the Multiple Subscriber Number (MSN) supplementary service for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators at the T reference point or coincident S and T reference point (as defined in CCITT recommendation I.411 [1]) by means of the Digital Subscriber Signalling System No. one (DSS1). Stage three identifies the protocol procedures and switching functions needed to support a telecommunications service (see CCITT Recommendation I.130 [2]).

In addition, this standard specifies the protocol requirements at the T reference point where the service is provided to the user via a private ISDN.

This standard does not specify the additional protocol requirements where the service is provided to the user via a telecommunications network that is not an ISDN.

The MSN supplementary service provides the possibility for assigning multiple numbers to a single public or private access.

> NOTE:	This allows e.g.:
>
> 1)	a calling user to select, via the public network, one or multiple distinct terminals out of a multiple choice;
>
> 2)	to identify the terminal to the network for the application of other supplementary services.

It is considered:

-	that in the case of a basic access some service providers may not have knowledge or control over what is connected, e.g. a private ISDN or a terminal configuration;

-	that service providers have differing numbering methods.

The MSN supplementary service is applicable to all telecommunication services.

Further parts of this standard specify the method of testing required to identify conformance to this standard.

This standard is applicable to equipment, supporting the MSN supplementary service, to be attached at either side of a T reference point or coincident S and T reference point when used as an access to the public ISDN.

# 2	Normative references

This ETS incorporates by dated or 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]	CCITT Recommendation I.411 (1988): "ISDN user-network interfaces - Reference configurations".

[2]	CCITT Recommendation I.130 (1988): "Method for the characterisation of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[3]	ETS 300 102-1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control".

[4]                           ETS 300 195-1: "Integrated Services Digital Network (ISDN); Supplementary service interactions; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[5]                           ETS 300 102-2 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control; Specification Description Language (SDL) diagrams".

[6]                           CCITT Recommendation I.112 (1988): "Vocabulary of terms for ISDNs".

[7]                           CCITT Recommendation E.164 (1988): "Numbering plan for the ISDN era".

[8]                           CCITT Recommendation I.210 (1988): "Principles of telecommunication services supported by an ISDN and the means to describe them".

[9]                           ETS 300 092-1 (1992): "Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

## 3        Definitions

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

**Integrated Services Digital Network (ISDN):** see CCITT Recommendation I.112 [6], § 2.3, definition 308.

**Network:** the DSS1 protocol entity at the network side of the user-network interface.

**User:** the DSS1 protocol entity at the user side of the user-network interface.

**Service; telecommunications service:** see CCITT Recommendation I.112 [6], § 2.2, definition 201.

**Special arrangement:** see ETS 300 092-1 [9], Clause 3.

**Supplementary service:** see CCITT Recommendation I.210 [8], § 2.4.

**ISDN number:** A number conforming to the numbering plan and structure specified in CCITT Recommendation E.164 [7].

**International number:** an ISDN number structured as specified in § 3.2 (in the paragraphs relating to international number) of CCITT Recommendation E.164 [7].

**National number; National significant number:** an ISDN number structured as specified in § 3.2 (in the paragraphs relating to national significant number) of CCITT Recommendation E.164 [7].

**Subscriber number:** an ISDN number structured as specified in § 3.2 (in the paragraphs relating to subscriber number) of CCITT Recommendation E.164 [7].

**Multiple subscriber number:** an ISDN number as part of a set of ISDN numbers assigned to a user which shall be either:

-        the whole ISDN number; or

-        a part of the ISDN number (the least significant "n" digit(s) where "n" may be a number up to the full length of the ISDN number and shall be a number large enough to allow all terminals on an access to be assigned an individual number).

        NOTE:        National or international prefixes cannot form part of the multiple subscriber number

# 4    Symbols and abbreviations

DDI                  Direct Dialling In

DSS1                 Digital Subscriber Signalling System No. one

ISDN                 Integrated Services Digital Network

MSN                  Multiple Subscriber Number

PSTN                 Public Switched Telephone Network

# 5    Description

The MSN supplementary service shall enable each individual terminal on one access to have one or more identities, by which one individual terminal or a group of terminals (e.g. at a passive bus configuration) can be discriminated from the others.

> NOTE:    CCITT Recommendation E.164 [7] provides the flexibility to administrations to use national numbering plans of fixed or variable length. This flexibility also applies to multiple subscriber numbers.

# 6    Operational requirements

## 6.1    Provision and withdrawal

The service shall be provided after prior arrangement with the service provider and shall be withdrawn on the subscriber's request or for administrative reasons. The service provider shall allocate a proper set of ISDN numbers which shall meet the overall needs of the access concerned.

## 6.2    Requirements on the originating network side

The basic call control procedures according to ETS 300 102-1 [3] subclause 5.1 shall apply.

If the access has the MSN supplementary service, the network may use (as a network option) the information in the Calling party number information element to identify the calling terminal, and, if necessary, the appropriate basic or supplementary services.

## 6.3    Requirements on the destination network side

When the multiple subscriber number is provided to the called user, the network shall send at least the significant part of the called party's ISDN number to the user en-bloc in the SETUP message according to ETS 300 102-1 [3] subclause 5.2.

# 7    Coding requirements

The multiple subscriber number of the called user shall be inserted in the Called party number information element as specified in ETS 300 102-1 [3] subclause 4.5.8.

The multiple subscriber number of the calling user shall be inserted in the Calling party number information element as specified in ETS 300 102-1 [3] subclause 4.5.10.

# 8 State definitions

The states associated with basic call control according to ETS 300 102-1 [3] shall apply.

# 9 Signalling procedures at the coincident S and T reference point

## 9.1 Activation, deactivation and registration

Not applicable.

## 9.2 Delivery of multiple subscriber number

### 9.2.1 Normal operation

The multiple subscriber number shall be delivered from the network to the user according to the procedures of ETS 300 102-1 [3] subclause 5.2. The type of number indicated in the Called party number information element sent to the user shall be coded as:

- "unknown", where the number sent is not a full ISDN number (including at least the multiple subscriber number). National and international prefixes shall not be included;

- "subscriber number", "national number" or "international number", where the full appropriate ISDN number is sent.

The "numbering plan identification" field of the Called party number information element shall be coded either "unknown" or "ISDN/telephony numbering plan (CCITT Recommendation E.164/E.163)".

The network's selection from the choices in this Clause shall be a network option. The network shall supply sufficient digits uniquely to identify one ISDN number from the set of ISDN numbers at that access. Users with the MSN supplementary service shall use the least significant "n" digits up to the total number of digits supplied as part of the terminal selection process. If a user receives more digits than it is programmed to require for terminal selection, then the most significant surplus digits shall be discarded for MSN purposes.

If a user with the MSN supplementary service receives fewer digits than it is programmed to require for terminal selection, then that user shall use the available information in the Called party number information element for its terminal selection procedure.

### 9.2.2 Exceptional procedures

The normal basic call control procedures according to ETS 300 102-1 [3] subclause 5.2 shall apply.

If a terminal which has the MSN supplementary service receives a SETUP message without multiple subscriber number digits, the terminal shall handle the call according to ETS 300 102-1 [3], subclause 5.2.

NOTE: If a terminal which does not support the MSN supplementary service receives a SETUP message with multiple subscriber number digits, the terminal will handle the call according to ETS 300 102-1 [3] subclause 5.2 (see also subclause B.3.1b of ETS 300 102-1, Annex B).

### 9.3        Receipt of multiple subscriber number

#### 9.3.1        Normal operation

The multiple subscriber number, if provided by the calling user, shall be delivered from the user to the network according to the procedures of ETS 300 102-1 [3] subclause 5.1. The type of number indicated in the Calling party number information element sent to the network shall be coded as:

-        "unknown", where the number sent is not a full ISDN number (including at least the multiple subscriber number). National and international prefixes shall not be included;

-        "subscriber number", "national number" or "international number", where the full appropriate ISDN number is sent.

The "numbering plan identification" field of the Calling party number information element shall be coded either "unknown" or "ISDN/telephony numbering plan (CCITT Recommendation E.164/E.163)".

The user's selection from the choices in this Clause shall be a user option. If no special arrangement has been made with the calling subscriber, then the network shall check the user provided calling party number information for validity on the corresponding access.

If the user sends a multiple subscriber number, then the user shall supply sufficient digits uniquely to identify one ISDN number from the set of ISDN numbers at that access.

> NOTE:        For an interim period of time, some networks may not implement all the coding options provided above and therefore will not accept a Calling party number information element if it does not conform to a coding supported by the service provider.

#### 9.3.2        Exceptional procedures

The normal basic call control procedures according to ETS 300 102-1 [3] subclause 5.1 shall apply.

If a network receives fewer digits than is required uniquely to identify one ISDN number from the set of ISDN numbers at that access, then the network shall discard the information in the Calling party number information element and shall behave as though the Calling party number information element had not been received.

## 10        Procedures for interworking with private ISDNs

When the network knows that a private ISDN is attached to the access, the procedures of subclauses 9.2 and 9.3 shall not apply. Otherwise, those procedures may be applied by the network.

> NOTE:        MSN number digits forming part of an MSN supplementary service of the private ISDN can be included in the Direct Dialling IN (DDI) number digits passed across the interworking boundary.

## 11        Interactions with other networks

No special requirements for interaction with other networks are necessary.

> NOTE:        The MSN supplementary service may be used to enable successful terminal selection when some compatibility information is absent when a call originates in a PSTN.

## 12 Interactions with other supplementary services

The interactions of the MSN supplementary service with other supplementary services shall be as specified in ETS 300 195-1 [4].

## 13 Parameter values (timers)

The timers associated with basic call control according to ETS 300 102-1 [3] shall apply.

## 14 Dynamic description (SDLs)

ETS 300 102-2 [5] shall apply.

## Annex A (informative):     Signalling flows

No MSN supplementary service specific signalling flow is necessary in addition to normal basic call control according to ETS 300 102-1 [3].

## Annex B (informative): Terminal interchangeability between public and private ISDNs

Terminals conforming to ETS 300 052-1 are also compatible with private ISDNs offering interfaces conforming to the multiple subscriber number supplementary service aspects of ETS 300 189 and ETS 300 192, provided the terminal is able to accept the Called party number information element with the numbering plan identifier coded as "private numbering plan" and is able to generate the Calling party number information element with the numbering plan identifier coded as "private numbering plan".

Terminals conforming to the multiple subscriber number aspects of ETS 300 189 and ETS 300 192 are also compatible with public ISDNs offering interfaces conforming to ETS 300 052-1, provided they are configured not to generate a Calling party number information element with the numbering plan identifier coded as "private numbering plan".

## Annex C (informative): Bibliography

ETS 300 189:          "Private Telecommunication Network (PTN); Addressing".

ETS 300 192:          "Private Telecommunications Network (PTN); Signalling protocol at the S-reference point; Circuit mode basic services".

## History

| Document history | |
|---|---|
| October 1991 | First Edition |
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