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SIST-TS ETSI/TS 101 818-1 V1.1.1:2005
01-januar-2005

8 [[]HJbc`ca fYy`n]bhY[f]fUb]a]ghcf]hj Ua]fG8 BŁĚ Dfclt_c`X[[]HJbY`bUfc b]j_Y
g][bU]nUWY`yH`r%f8 GG%ŁĚ`8 cdc`b]bUghcf]Hj .]g_Ub`Y`dfYbcgb]_Uj `g_i d]b]fH<ŁĚ
%`XY. `GdYWZ_UWY`Udfclt_c`U

Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1); Trunk Hunting (TH) supplementary service; Part 1: Protocol specification

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ICS:

33.080	Digitalno omrežje z integriranimi storitvami (ISDN)	Integrated Services Digital Network (ISDN)
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SIST-TS ETSI/TS 101 818-1 V1.1.1:2005 en

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ETSI TS 101 818-1 V1.1.1 (2000-07)

Technical Specification

**Integrated Services Digital Network (ISDN);
Digital Subscriber Signalling System No. one (DSS1);
Trunk Hunting (TH) supplementary service;
Part 1: Protocol specification**

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Reference

DTS/SPAN-05172-1

KeywordsISDN, DSS1, supplementary service, TH,
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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document 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) Trunk Hunting (TH) 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 [6], the following three level structure is used to describe the supplementary telecommunication services as provided by European public telecommunications operators under the pan-European 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.

The present document details the stage 3 aspects (signalling system protocols and switching functions) needed to support the Trunk Hunting supplementary service. The stage 2 aspects of the Trunk Hunting supplementary service have not been specified.

1 Scope

The present document specifies the stage three of the Trunk Hunting (TH) 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 [12]) by means of the Digital Subscriber System No. one (DSS1). Stage three identifies the protocol procedures and switching functions needed to support a telecommunications service (see CCITT Recommendation I.130 [6]).

In addition, the present document specifies the protocol requirements at the T reference point where the service is provided to the user via an intermediate private ISDN.

The present document 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 TH supplementary service enables calls to a single ISDN number to be offered to a free access in a group of accesses to which a private ISDN is connected (T reference point).

The principles for the selection of a free channel within an access are a network provider matter as part of the basic call procedures and so are outside the scope of the present document.

The TH service is applicable to all circuit-switched telecommunication services.

Further parts of EN 301 484 [13] specify the method of testing required to identify conformance to the present document.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ETSI EN 300 195-1: "Integrated Services Digital Network (ISDN); Supplementary service Interactions; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol Specification".
- [2] ETSI EN 300 196-1: "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".
- [3] 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]".
- [4] ITU-T Recommendation I.112: "Vocabulary of terms for ISDNs".
- [5] ITU-T Recommendation I.210: "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [6] CCITT Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [7] ITU-T Recommendation I.221 (1993): "Common specific characteristics of services".

- [8] CCITT Recommendation Z.100: "Specification and Description Language (SDL)".
- [9] ITU-T Recommendation E.164: "The International public telecommunications Numbering plan".
- [10] ITU-T Recommendation X.680: "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".
- [11] ITU-T Recommendation X.880: "Information technology – remote operations: concepts, model and notation".
- [12] CCITT Recommendation I.411: "ISDN user-network interfaces - Reference configurations".
- [13] ETSI EN 301 484: "Integrated Services Digital Network (ISDN); Line Hunting (LH) supplementary service; Digital Subscriber Signalling System No. one (DSS1)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

Access: General term, used in the present document, denoting basic accesses and/or primary rate accesses.

Basic access: See ITU-T Recommendation I.112 [4], subclause 2.4, definition 425.

Basic call procedures: Procedures by which a call (as an instance of a basic telecommunications service) is established and terminated.

Channels busy: See ITU-T Recommendation I.221 [7], subclause 2.1.3.

Cyclic hunting: Selection of a free access always starts at the next access after the one used last, and follows a fixed order. When the last access in the group is reached, the search continues from the beginning of the group until all accesses in the group have been searched.

Free access: Access for which the channels busy condition does not exist (i.e., one or more information channels are available).

Hunt group: Number of accesses over which the TH supplementary service applies for the assigned ISDN number.

Hunt group number: The ISDN number to which the TH supplementary service is allocated and to which ISDN basic services and supplementary services relating to the hunt group are allocated.

Hunt group withdrawal: Request by the private ISDN in order to temporarily prevent an access from receiving calls to the hunt group (existing calls are not affected).

Integrated Services Digital Network (ISDN): See ITU-T Recommendation I.112 [4], subclause 2.3, definition 308.

ISDN number: Number conforming to the numbering plan and structure specified in ITU-T Recommendation E.164 [9].

Primary rate access: See ITU-T Recommendation I.112 [4], subclause 2.4, definition 426.

Sequential hunting: Selection of a free access always starts with the same access and then follows a fixed order until all accesses in the hunt group have been searched or a free access is found.

Served user: User (i.e., a private ISDN) to whom the TH service is provided.

Service; telecommunications service: See ITU-T Recommendation I.112 [4], subclause 2.2, definition 201.

Supplementary service: See ITU-T Recommendation I.210 [5], subclause 2.4.

Uniform Hunting:

NOTE: Uniform hunting is not explicitly identified but not necessarily excluded for future enhancement.

3.2 Abbreviations

For the purpose of the present document, the following abbreviations apply:

HG	Hunt Group
ISDN	Integrated Services Digital Network
TH	Trunk Hunting

4 Description

The TH supplementary service is intended for use on accesses to which a private ISDN is connected to the public ISDN at the T reference point.

The TH supplementary service enables calls to an ISDN number assigned to the private ISDN (i.e. the hunt group number and any DDI number associated with the hunt group number) to be offered to a free access in a hunt group. The hunt group can comprise basic accesses, primary rate accesses, or a mixture of these types of accesses.

The TH supplementary service applies to accesses within a hunt group that are connected to the same exchange. As a network operator option the TH supplementary service can be used to create a multi-nodal service that allows Trunk Hunting across accesses on multiple exchanges. The specification of the multi-nodal service is outside the scope of the present document.

As a network option an access can be member of more than one hunt group. The maximum number of hunt groups of which an access can be a member, shall be a network option with an upper limit of 15.

The method of selecting the access shall be either sequential, uniform or cyclic hunting.

As a service provider option, the TH supplementary service can be offered with the possibility for hunt group withdrawal. If the option of "hunt group withdrawal" is supported by the service provider, the served user can request that an access can be temporarily prevented from receiving calls to the hunt group.

Services can be subscribed to on the hunt group identified by the hunt group number.

5 Operational Requirements

5.1 Provision and Withdrawal

The TH supplementary service shall be provided after prior arrangement with the network provider.

The TH supplementary service shall be withdrawn at the network provider or subscriber's request.

The network option having an impact on the protocol is described in Table 1.

Table 1: Network options

Network option	Values
Max number of HGs for which one access may be a member	1 to 15

As a network option, the TH supplementary service can be offered with subscription options which are provided on a hunt group basis. The subscription options are summarized in Table 2.

If the network supports the option "hunt group withdrawal" then the subscription option for "hunt group withdrawal" shall be available to all accesses of the hunt group.

Table 2: Subscription option applying for the whole hunt group

Subscription Option	Values
Selection Method	- sequential hunting - cyclic hunting - uniform hunting (see Note)
Hunt group withdrawal	- available - not available
NOTE: Uniform hunting is not explicitly identified as an option but is not necessarily excluded for future enhancement.	

If the TH supplementary service is provided without the subscription option "selection method", the network shall determine the selection method.

If the network does not offer the subscription option "hunt group withdrawal", then the accesses cannot be withdrawn from the hunt group by the user.

5.2 Requirements on the originating network side

The procedures at the T reference point in EN 300 403-1 [3], subclause 5.1 and the procedures of Clause 9 in the present document shall apply.

5.3 Requirements on the destination network side

The procedures at the T reference point in EN 300 403-1 [3], subclause 5.2 and the procedures of Clause 9 in the present document shall apply.

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6 Coding requirements

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6.1 Coding of the Facility information element components.

Table 3 shows the definitions of the operations and errors required for the TH supplementary service using ASN.1 as specified in ITU-T Recommendation X.680 [10] and ITU-T Recommendation X.880 [11].

The formal definition of the component types to encode these operations and errors is provided in Clause D.1 of EN 300 196-1 [2].

The inclusion of components in Facility information elements is defined in subclause 11.2.2.1 of EN 300 196-1 [2]. All components (invoke, return result, return error and reject) shall be included within a Facility information element. This Facility information element may be included in any appropriate message as specified in subclause 8.3.1.1 of EN 300 196-1 [2], unless a more restrictive specification is given in Clause 9 of the present document.

Table 3: Definitions of operations and errors

Trunk-Hunting-Operations { itu-t identified-organization etsi(0) 1xxx revised-operations-and-errors(2) }
DEFINITIONS EXPLICIT TAGS::=
BEGIN
EXPORTS withdrawTHG, cancelWithdrawTHG,
wrongHuntGroupNr, noHuntGroupNr,
withdrawalNotSupported,

```

        withdrawalNotSubscribed;

IMPORTS      OPERATION,
            ERROR
            FROM Remote-Operations-Information-Objects
                { joint-iso-itu-t remote-operations (4) informationObjects(5) version2 (1) }

                PartyNumber

            FROM Revised-Addressing-Data-Elements
                { itu-t identified-organization etsi (0) 196 revised-addressing-data-elements (14) }

            notSubscribed,
            notAvailable,
            supplementaryServiceInteractionNotAllowed
            FROM Revised-General-Errors
                { itu-t identified-organization etsi (0) 196 revised-general-errors (10) }

tHOID OBJECT IDENTIFIER ::= { itu-t identified-organization etsi (0) 1xxx operations-and-errors (1) }

withdrawTHG          OPERATION ::=
    {
        ARGUMENT SEQUENCE {
            huntGroupNr    HuntGroupNr OPTIONAL }

        ERRORS {
            notSubscribed|
            wrongHuntGroupNr|
            noHuntGroupNr|
            withdrawalNotSubscribed|
            notAvailable
            withdrawalNotSupported|
            supplementaryServiceInteractionNotAllowed }
        CODE global:{tHOID 1}
    }
-- End of WithdrawTHG operation definition.

cancelWithdrawTHG    OPERATION ::=
    {
        ARGUMENT SEQUENCE {
            huntGroupNr    HuntGroupNr OPTIONAL }

        ERRORS {
            wrongHuntGroupNr|
            noHuntGroupNr|
            withdrawalNotSubscribed|
            withdrawalNotSupported }
        CODE global:{tHOID 2}
    }
-- End of CancelWithdrawTHG operation definition.

ServedUserNr          ::= CHOICE {
    individualNumber    PartyNumber,
    allNumbers          NULL }

HuntGroupNr           ::= CHOICE{
    individualNumber    PartyNumber,
    allNumbers          NULL }

wrongHuntGroupNr      ERROR ::= {CODE global:{tHOID 10}}
noHuntGroupNr         ERROR ::= {CODE global:{tHOID 11}}
withdrawalNotSupported ERROR ::= {CODE global:{tHOID 12}}

```