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

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Line Hunting (LH) supplementary service;
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Part 1: Protocol specification**

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document is part 1 of a multi-part EN covering the Integrated Services Digital Network (ISDN); Line Hunting (LH) supplementary service; Digital Subscriber Signalling System No. one (DSS1), as identified below:

Part 1: "Protocol specification";

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

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

Part 6: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network".

In accordance with CCITT Recommendation I.130 [7], 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 Line Hunting supplementary service. The stage 1 aspects are detailed in draft EN 301 479 [1]. The stage 2 aspects of the Line Hunting supplementary service have not been specified.

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1 Scope

The present document specifies the stage three of the Line Hunting (LH) supplementary service for the pan-European Integrated Services Digital Network (ISDN) as provided by the European public telecommunications operators at the T reference point or coincident S and T reference point (as defined in ITU-T Recommendation I.411 [13]) 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 [7]).

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 LH supplementary service enables calls to a single ISDN number to be offered to a free access in a group of accesses to which terminals are connected.

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 LH service is applicable to all circuit-switched telecommunication services with the exception of services requiring the use of more than one B-channel.

Further parts of EN 301 484 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.

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- [1] ETSI EN 301 479: "Integrated Services Digital Network (ISDN); Line Hunting (LH) supplementary service; Service Description".
- [2] 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".
- [3] 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".
- [4] 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]".
- [5] ITU-T Recommendation I.112: "Vocabulary of terms for ISDNs".
- [6] ITU-T Recommendation I.210: "Principles of telecommunication services supported by an ISDN and the means to describe them".
- [7] CCITT Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

- [8] ETSI EN 300 089: "Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service; Service description".
- [9] ITU-T Recommendation Z.100: "CCITT Specification and description language (SDL)".
- [10] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [11] ITU-T Recommendation X.680: "Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation".
- [12] ITU-T Recommendation X.880: "Information technology - Remote Operations: Concepts, model and notation".
- [13] ITU-T Recommendation I.411: "ISDN user-network interfaces - Reference configurations".
- [14] ITU-T Recommendation I.221: "Common specific characteristics of services".

3 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 as a network provider option, primary rate accesses

Basic access: see ITU-T Recommendation I.112 [5], 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

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, or a free access is found

Default number: defined for the CLIP service in EN 300 089 [8]

NOTE: In order to provide consistency from a customer perspective the same default number may be associated with all the accesses that go to a user installation. In this situation the default number is a Hunt Group Number and the Hunt Group it relates to contains all the accesses that go to a user installation.

Free access: access to which the call can be offered without exceeding the number of used B-channels specified for this access

Hunt group: number of accesses over which the LH supplementary service applies for the assigned ISDN number. A hunt group may consist of a single access

Hunt group number: ISDN number, to which the LH 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 an access of the hunt group in order to temporarily prevent this access from receiving calls to the hunt group (existing calls are not affected)

Individual number: (in the context of the present document) ISDN number which is not a hunt group number, but which can be associated with an access that belongs to a hunt group in order to identify one or more terminals connected to the access

Integrated Services Digital Network (ISDN): see ITU-T Recommendation I.112 [5], subclause 2.3, definition 308

ISDN number: number conforming to the numbering plan and structure specified in ITU-T Recommendation E.164 [10]

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

Network determined user busy: see ITU-T Recommendation I.221 [14], subclause 2.1.4

Primary rate access: see ITU-T Recommendation I.112 [5], 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 to whom the LH service is provided

Service; telecommunications service: see ITU-T Recommendation I.112 [5], subclause 2.2, definition 201

Supplementary service: see ITU-T Recommendation I.210 [6], subclause 2.4

User: DSS1 protocol entity at the user side of the user-network interface when a coincident S and T reference point applies

User determined user busy: see ITU-T Recommendation I.221 [14], subclause 2.1.4

4 Abbreviations

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

HG	Hunt Group
ISDN	Integrated Services Digital Network
LH	Line Hunting
LHG	Line Hunt Group

5 Description

The LH supplementary service is intended for use on accesses to which terminals are connected at the S/T reference point.

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The LH supplementary service enables calls to an ISDN number (i.e. 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 (as a network option), or a mixture of these types of accesses.

The LH supplementary service applies to accesses within a hunt group that are connected to the same exchange. As a network option the LH supplementary service can be used to create a multi-nodal service that allows line hunting across accesses on multiple exchanges. The specification of the multi-nodal service is outside the scope of the present document, however annex A of EN 301 479 [1] considers some of the implications of this service.

Calls made to an individual number (see note 1) may be offered on the corresponding access without being subject to hunting procedures (channel hunting may be performed within the access itself).

NOTE 1: The individual accesses that are members of the hunt group can also have individual numbers (e.g., with the multiple subscriber number supplementary service) allocated.

It is the user's responsibility to ensure compatibility of the equipment connected to an access in a hunt group.

The served user can determine at subscription for each access how many B-channels shall be available for the hunt group. A call to the hunt group can only be presented to an access, if the number of used B-channels specified for an access will not be exceeded (independent of the required telecommunications service).

NOTE 2: In order to minimize the user determined user busy condition after the call has been presented to an access, the user should only allocate as many B-channels for each access of the hunt group, as compatible terminals are connected to that access.

An access can only be a member of one hunt group.

The method of selecting an access shall be either sequential or cyclic hunting.

An access in a hunt group can activate "hunt group withdrawal" to be temporarily prevented from receiving calls to the hunt group, if this option is subscribed to.

As a subscription option the served user can receive an indication that the served user's access is currently withdrawn from its hunt group. This indication shall be provided when the served user originates a call on the access, which is withdrawn from the hunt group.

Services can be subscribed to on the hunt group identified by the hunt group number. Some supplementary services on the hunt group number which need special authorization can only be activated and deactivated from an access which is a member of the hunt group and on which the option "activation allowance" is subscribed to. These supplementary services are listed in clause 8 of EN 301 479 [1].

NOTE 3: Services can also be subscribed to on an individual access or on individual numbers (e.g., with the multiple subscriber number supplementary service).

6 Operational Requirements

6.1 Provision and Withdrawal

The LH supplementary service shall be provided after prior arrangement with the network provider. To establish the hunt group, the following data shall be provided:

- the list of the accesses;
- the hunt group number.

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

The network options having an impact on the protocol are summarized in table 1.

Table 1: Network options

Network option	Values
Primary rate access	- yes - no

As a network option, the LH supplementary service can be offered with a number of subscription options which are given in EN 301 479 [1] and summarized in tables 2 and 3.

Table 2: Subscription option applying for each individual hunt group

Subscription Option	Values
Selection Method	- sequential hunting - cyclic hunting

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

Table 3: Subscription options applying to each access in a hunt group

Subscription option	Values
Number of B-channels available for the hunt group	value 1 or 2 for BA and 1 to 30 for PRA
Activation allowance (for supplementary services related to the hunt group)	- yes - No
Temporary Hunt group withdrawal	- available - not available
User receives notification, that his access is currently withdrawn from its hunt group.	- yes - no

If the network does not offer the subscription option "number of B-channels available for the hunt group", then all B-channels of the access shall be available for the hunt group.