INTERNATIONAL STANDARD

ISO/IEC 15428

First edition
1999-11-01

Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Wireless Terminal Location Registration supplementary service and Wireless Terminal Information Exchange additional network feature

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseau privé à intégration de services — Spécification, modèle fonctionnel et flux d'information — Service supplémentaire d'enregistrement de localisation de terminal sans fil et caractéristiques de réseau additionnelles pour l'échange d'information de terminal sans fil

Reference number
ISO/IEC 15428:1999(E)

Contents

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 15428 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*.

Annex A of this International Standard is for information only.

Introduction

This International Standard is one of a series of International Standards defining services and signalling protocols applicable to Private Integrated Services Networks (PISNs). The series uses ISDN concepts as developed by ITU-T and conforms to the framework of International Standards for Open Systems Interconnection as defined by ISO/IEC.

This particular International Standard specifies the WTLR supplementary service.

Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Wireless Terminal Location Registration supplementary service and Wireless Terminal Information Exchange additional network feature

1 Scope

This International Standard specifies the Wireless Terminal Location Registration supplementary service (SS-WTLR) and the Wireless Terminal Information Exchange additional network feature (ANF-WTINFO), which are applicable to various basic services supported by Private Integrated Services Networks (PISN). Basic services are specified in ISO/IEC 11574.

The Wireless Terminal Location Registration Supplementary Service (SS-WTLR) enables a WTM user to register at, or de-register from, the current location within the PISN. The ability to register at different locations in the PISN at different times enables the WTM user to maintain the provided services (including the ability to make and receive calls) at different access points. De-registration is used to inform the PISN that the WTM user is temporarily unable to make use of the provided services (including the receipt of incoming calls).

The Information Exchange Additional Network Feature (ANF-WTINFO) allows to exchange information about a WTLR user between the Home Data Base and the Visitor Data Base.

Supplementary service and additional network feature specifications are produced in three stages, according to the method described in CCITT Recommendation I.130. This International Standard contains the stage 1 and stage 2 specifications of SS-WTLR and ANF-WTINFO. The stage 1 specification (clause 6 and 7) specifies the service/feature as seen by users of PISNs. The stage 2 specification (clause 8 and 9) identifies the functional entities involved in the service/feature and the information flows between them.

2 Conformance

In order to conform to this International Standard, a stage 3 International Standard shall specify signalling protocols and equipment behaviour that are capable of being used in a PISN which supports the supplementary service or additional network feature specified in this International Standard. This means that, to claim conformance, a stage 3 International Standard is required to be adequate for the support of those aspects of clause 6 and 7 (stage 1) and clause 0 and 9 (stage 2) which are relevant to the interface or equipment to which the stage 3 International Standard applies.

3 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 11571:1994, *Information technology - Telecommunications and information exchange between systems - Numbering and sub-addressing in private integrated services networks.*

ISO/IEC 11574:1994, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows.*

ISO/IEC 11579-1:1994, *Information technology - Telecommunications and information exchange between systems - Private integrated services network - Part 1: Reference configuration for PISN Exchanges (PINX).*

ISO/IEC 15432:1999, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network – Specification, functional model and information flows - Wireless Terminal Authentication supplementary services (WTAT and WTAN).*

ITU-T Rec. I.112:1993, *Vocabulary of terms for ISDNs.*

CCITT Rec. I.130:1988, *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN (Blue Book).*

ITU-T Rec. I.210:1993, *Principles of telecommunication services supported by an ISDN and the means to describe them.*

ITU-T Rec. Z.100:1993, *Specification and Description Language.*

4 Definitions

For the purposes of this International Standard, the following definitions apply.

4.1 External definitions

This International Standard uses the following terms defined in other documents:

– Authentication	(ISO/IEC 15432)
– Basic service	(ITU-T Rec. I.210)
– PISN number	(ISO/IEC 11571)
– Private Integrated Services Network (PISN)	(ISO/IEC 11579-1)
– Private Integrated Services Network Exchange (PINX)	(ISO/IEC 11579-1)
– Service	(ITU-T Rec. I.112)
– Signalling	(ITU-T Rec. I.112)
– Supplementary Service	(ITU-T Rec. I.210)
– User	(ISO/IEC 11574)

4.2 Other definitions

Additional Network Feature (ANF): A capability, over and above that of a basic service, provided by a PISN, but not directly to a PISN user.

Directory PINX: A PINX which provides a mapping function to a WTM user's PISN number or permanent identity from another type of identity indicating the same WTM user.

Fixed part (FP): A physical grouping of some or all of the fixed component parts of a mobile radio system. These would include one or more radio equipments attached to an antenna system. It could also include common control functions and interfaces to the PINX.

Home Data Base (HDB): The data base in which the current location and all associated parameters of a wireless terminal are stored.

Home PINX: The PINX which has direct access to the HDB entry for a particular WTM user.

Location Area (LA): The coverage area in which a wireless terminal may receive and make calls as a result of a single location registration.

Network Assigned Identity (NAI): A temporary identity assigned by the PISN to a WTM user. This identity comprises:

- a PISN number sufficient to identify the PINX assigning the NAI; and
- a local identity valid while the user is registered.

PISN authority: The body or its representative responsible for arranging the service with the service provider.

PISN user: The user of the network layer services provided by a PISN.

Service profile: The specific collection of PISN services and service options which a PISN user can utilize.

Visitor Area (VA): The area covered by a single VDB.

Visitor Data Base (VDB): The data base in which all relevant parameters concerning a wireless terminal are stored for as long as the terminal is located in an area controlled by that data base.

Visitor PINX: The PINX which is serving a WTM user in a visitor area.

Wireless Terminal Mobility (WTM): The ability of a wireless terminal to be in continuous motion whilst accessing and using the telecommunication services offered by the PISN, as well as the capability of the network to keep track of the location of the wireless terminal within the coverage area of the radio system used.

WTLR user: The user of Supplementary Service "Wireless Terminal Location Registration" (SS-WTLR).

WTM information: The information for a WTM user managed by a VDB.

WTM user: The user of a WTM supplementary service.

WTM user's identity: An identifier which is used to identify a WTM user.

5 List of acronyms

ANF	Additional Network Feature
CC	Call Control (functional entity)
CCA	Call Control Agent (functional entity)
FE	Functional Entity
FEA	Functional Entity Action
FP	Fixed Part
HDB	Home Data Base
ISDN	Integrated Services Digital Network
LA	Location Area
NAI	Network Assigned Identity
PINX	Private Integrated Services Network Exchange
PISN	Private Integrated Services Network
SDL	Specification and Description Language
SS	Supplementary Service
VA	Visitor Area
VDB	Visitor Data Base
WTM	Wireless Terminal Mobility

6 SS-WTLR stage 1 specification

6.1 Description

6.1.1 General description

SS-WTLR makes the location of a WTM user known to the PISN. By updating location information in the PISN, incoming calls can be routed to a WTM user, and the WTM user can access the PISN services from the current location area. WTLR also enables a WTM user to inform the PISN that the current location area is no longer to be used to make and receive calls.

The network may allow the WTM user to perform location registration using a permanent identifier. Alternatively, for security reasons, a procedure supporting the use of temporary identifiers may be used.

SS-WTLR may use an authentication procedure in order to validate the identity provided by the WTM user to the PISN before completing the location registration.

6.1.2 Qualifications on applicability to telecommunication services

This supplementary service is applicable to all basic services defined in ISO/IEC 11574.

6.2 Procedure

6.2.1 Provision/withdrawal

SS-WTLR shall be provided by arrangement with the PISN authority. SS-WTLR shall be withdrawn on user request or for service provider reasons.

6.2.2 Normal procedures

6.2.2.1 Activation/deactivation/registration/interrogation

SS-WTLR shall be activated on provision and deactivated on withdrawal.

Interrogation and registration are not applicable to this supplementary service.

6.2.2.2 Invocation and operation

The following procedures apply on the basis of individual basic services. On invocation, a unique identification and optionally an indication of the affected basic services shall be provided to the network.

SS-WTLR shall be invoked to register a WTM user's current location area either when the location area has changed or following a period of de-registration.

Location registration shall cause the PISN to register the WTM user at the current location area for the indicated basic services. The location information at the previously visited location area shall be deleted for these basic services, which are identical in the newly and the previously visited location. When the procedures are completed, the location registration is confirmed to the WTM user. As the result of a location registration, the PISN may assign a temporary identity to the WTM user. This identity may be stored by the WTM user and used for identification in a subsequent location registration. The identity is valid until a new location registration has successfully completed and shall be sufficient to access information specific to the WTM user at the previous visitor area from any location area within the PISN.

SS-WTLR may be invoked to de-register a WTM user when the WTM user decides not to use the service or is unable to make use of the services provided by the PISN.

NOTE: The decision to invoke de-registration can be either explicit (e.g. by switching off a wireless terminal) or implicit (e.g. by detecting that the wireless terminal is out of range).

Location de-registration shall cause the PISN to treat the WTM user as unavailable until the WTM user performs location registration again.

6.2.3 Exceptional procedures

6.2.3.1 Activation/deactivation/registration/interrogation

Not applicable.

6.2.3.2 Invocation and operation

Location registration shall be rejected under, at least, the following circumstances:

- user identity not known;
- WTM user not permitted to register in the current location area;
- WTM user failed authentication;
- location registration temporarily not possible.

An indication of the reason for rejection shall be sent to the WTM user.

The rejection cause "WTM user failed authentication" is only applicable if authentication is supported.

If the reason for rejection is "User identity not known" and the identity used was a temporary identifier, SS-WTLR may be invoked again using the WTM user's permanent identity.

Location de-registration shall be rejected if the WTM user was not registered at that location area.

6.3 Interaction with other supplementary services and ANFs

Interactions with other supplementary services and ANFs for which PISN International Standards were available at the time of publication of this International Standard are specified below.

6.3.1 Calling Line Identification Presentation (SS-CLIP)

No Interaction

6.3.2 Connected Line Identification Presentation (SS-COLP)

No interaction

6.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)

No interaction

6.3.4 Calling Name Identification Presentation (SS-CNIP)

No Interaction

6.3.5 Connected Name Identification Presentation (SS-CONP)

No interaction

6.3.6 Calling/Connected Name Identification Restriction (SS-CNIR)

No interaction

6.3.7 Completion of Calls to Busy Subscriber (SS-CCBS)

If the WTM user is either the served user or the called user in a call completion attempt, the following interactions shall apply.

Location registration may cause call completion to be cancelled.

If the WTM user de-registers, an existing call completion request shall be cancelled. Invocation of call completion on a de-registered WTM user shall be rejected.

6.3.8 Completion of Calls on No Reply (SS-CCNR)

If the WTM user is either the served user or the called user in a call completion attempt, the following interactions shall apply.

Location registration may cause call completion to be cancelled.

If the WTM user de-registers, an existing call completion request shall be cancelled. Invocation of call completion on a de-registered WTM user shall be rejected.

6.3.9 Call Transfer (SS-CT)

No interaction

6.3.10 Call Forwarding Unconditional (SS-CFU)

No interaction

6.3.11 Call Forwarding Busy (SS-CFB)

No interaction

6.3.12 Call Forwarding No Reply (SS-CFNR)

No interaction

6.3.13 Call Deflection (SS-CD)

No interaction

6.3.14 Path Replacement (ANF-PR)

No interaction

6.3.15 Call Offer (SS-CO)

No interaction

6.3.16 Call Intrusion (SS-CI)

No interaction

6.3.17 Do Not Disturb (SS-DND)

No interaction

6.3.18 Do Not Disturb Override (SS-DNDO)

No interaction

6.3.19 Advice of Charge (SS-AOC)

No interaction

6.3.20 Recall (SS-RE)

No interaction

6.3.21 Wireless terminal information exchange (ANF-WTINFO)

SS-WTLR may cause the invocation of ANF-WTINFO.

6.3.22 Wireless terminal incoming call (ANF-WTMI)

An incoming call may be rejected if it occurs between the invocation and completion of the SS-WTLR procedures or if the incoming call occurs during a period of de-registration.

6.3.23 Wireless terminal outgoing call (ANF-WTMO)

An outgoing call may be rejected if attempted between the invocation and completion of the SS-WTLR procedures or if the outgoing call occurs during a period of de-registration.

6.3.24 Authentication of wireless terminal (SS-WTAT)

SS-WTLR may cause the invocation of SS-WTAT.

6.3.25 Authentication of network (SS-WTAN)

No interaction

6.3.26 Message waiting indication (SS-MWI)

Message waiting indications may be forwarded to the new location.

6.4 Interworking considerations

Not applicable

6.5 Overall SDL

Figure 1 contains the dynamic description of SS-WTLR using the Specification and Description Language (SDL) defined in ITU-T Rec. Z.100. The SDL process represents the behaviour of the PISN in providing SS-WTLR.

Input signals from the right represent primitives from the served user. Output signals to the right represent primitives to the served user.

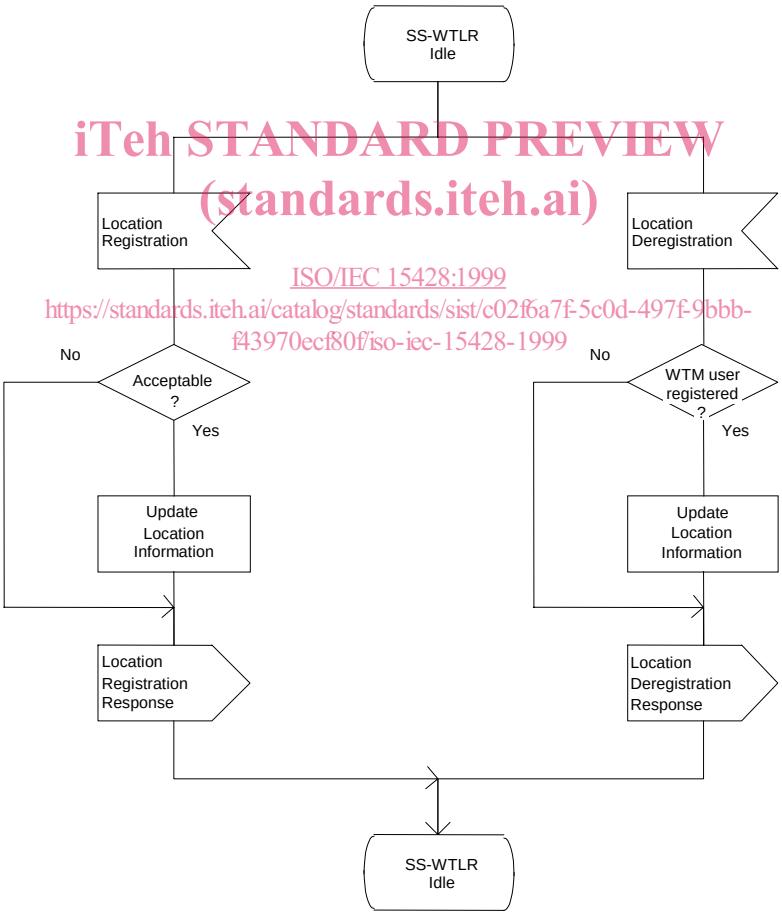

Figure 1: SS-WTLR, overall SDL diagram

7 ANF-WTINFO stage 1 specification

7.1 Description

7.1.1 General description

The ANF-WTINFO enables the exchange of information about a WTLR user between the Home Data Base and the Visitor

Data Base.

The information transfer may occur at any time.

7.1.2 Qualifications on applicability to telecommunication services

Not applicable.

7.2 Procedure

7.2.1 Provision/withdrawal

ANF-WTINFO shall be provided by arrangement with the PISN authority.

7.2.2 Normal procedures

7.2.2.1 Activation/deactivation/registration/interrogation

ANF-WTINFO shall be permanently activated. Interrogation and registration are not applicable.

7.2.2.2 Invocation and operation

ANF-WTINFO may be invoked at any time, e.g. to initiate a check of the current location information or to transfer information about a WTLR user from the HDB to the VDB.

7.2.3 Exceptional procedures

7.2.3.1 Activation/deactivation/registration/interrogation

Not applicable.

7.2.3.2 Invocation and operation

Not applicable.

7.3 Interaction with other supplementary services and ANFs

Interactions with other supplementary services and ANFs for which PISN International Standards were available at the time of publication of this International Standard are specified below.

7.3.1 Calling Line Identification Presentation (SS-CLIP)

No Interaction

7.3.2 Connected Line Identification Presentation (SS-COLP)

No interaction

7.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)

No interaction

7.3.4 Calling Name Identification Presentation (SS-CNIP)

No Interaction

7.3.5 Connected Name Identification Presentation (SS-CONP)

No interaction

7.3.6 Calling/Connected Name Identification Restriction (SS-CNIR)

No interaction

7.3.7 Completion of Calls to Busy Subscriber (SS-CCBS)

No interaction

7.3.8 Completion of Calls on No Reply (SS-CCNR)

No interaction

7.3.9 Call Transfer (SS-CT)

No interaction

7.3.10 Call Forwarding Unconditional (SS-CFU)

No interaction

7.3.11 Call Forwarding Busy (SS-CFB)

No interaction

7.3.12 Call Forwarding No Reply (SS-CFNR)

No interaction

7.3.13 Call Deflection (SS-CD)

No interaction

7.3.14 Path Replacement (ANF-PR)

No interaction

7.3.15 Call Offer (SS-CO)

No interaction

7.3.16 Call Intrusion (SS-CI)

No interaction

7.3.17 Do Not Disturb (SS-DND)

No interaction

7.3.18 Do Not Disturb Override (SS-DNDO)

No interaction

7.3.19 Advice of Charge (SS-AOC)

No interaction

7.3.20 Recall (SS-RE)

No interaction

7.3.21 Wireless Terminal Location Registration (SS-WTLR)

SS-WTLR may cause the invocation of ANF-WTINFO.

7.3.22 Incoming WTM Call Handling (ANF-WTMI)

No interaction

7.3.23 Outgoing WTM Call Handling (ANF-WTMO)

No interaction

7.3.24 Authentication of wireless terminal (SS-WTAT)

No interaction

7.3.25 Authentication of network (SS-WTAN)

No interaction

7.4 Interworking considerations

Not applicable

7.5 Overall SDL

Figure 2 contains the dynamic description of ANF-WTINFO using the Specification and Description Language (SDL) defined in ITU-T Rec. Z.100. The SDL process represents the behaviour of the PISN in providing SS-WTLR.

Input signals from the right represent primitives from the ANF-WTINFO user. Output signals to the right represent primitives to the ANF-WTINFO user.