INTERNATIONAL STANDARD

ISO/IEC 15429

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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — 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 — Protocole de signalement d'interéchange — Service supplémentaire d'enregistrement de localisation de terminal sans fil et caractéristiques de réseau additionnelles pour l'échange d'information de terminal sans fil

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 15429 was prepared by ECMA (as ECMA-302) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

This second edition cancels and replaces the first edition (ISO/IEC 15429:1999), which has been technically revised.

Introduction

This International Standard is one of a series of Standards defining Wireless Terminal Mobility (WTM) 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 International Standard specifies the signalling protocol for use at the Q reference point in support of the WTM Wireless Terminal Location Registration supplementary service and the Wireless Terminal Information Exchange additional network feature. The protocol defined in this International Standard forms part of the PSS1 protocol (informally known as QSIG).

This International Standard is based upon the practical experience of ECMA member companies and the results of their active and continuous participation in the work of ISO/IEC JTC 1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Wireless Terminal Location Registration supplementary service and Wireless Terminal Information exchange additional network feature

1 Scope

This International Standard specifies the signalling protocol for the support of the Wireless Terminal Location Registration supplementary service (SS-WTLR) and the Wireless Terminal Information exchange additional network feature (ANF-WTINFO) at the Q reference point between Private Integrated services Network eXchanges (PINXs) connected together within a Private Integrated Services Network (PISN).

SS-WTLR is a supplementary service which enables a WTM user to register at, or deregister 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. Deregistration is used to inform the PISN that the WTM user is temporarily unable to make use of the provided services (including the receipt of calls).

ANF-WTINFO is an additional network feature which enables transfer of restriction information between Home PINX and Visitor PINX. ANF-WTINFO also enables the Visitor PINX or Home PINX to initiate a check of the current location information.

The Q reference point is defined in ISO/IEC 11579-1.

Supplementary Service specifications and Additional Network Feature specifications are produced in three stages and according to the method specified in ITU-T Rec. I.130. This International Standard contains the stage 3 specification for the Q reference point and satisfies the requirements identified by the stage 1 and stage 2 specifications in ISO/IEC 15428.

The signalling protocol for SS-WTLR and ANF-WTINFO uses certain aspects of the generic procedures for the control of supplementary services specified in ISO/IEC 11582.

This International Standard also specifies additional signalling protocol requirements for the support of interactions at the Q reference point between SS-WTLR and other supplementary services and ANFs.

This International Standard is applicable to PINXs which can interconnect to form a PISN.

2 Conformance

In order to conform to this International Standard, a PINX shall satisfy the requirements identified in the Protocol Implementation Conformance Statement (PICS) proforma in annex A.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 11571:1998, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Networks - Addressing*

ISO/IEC 11574:2000, *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 11582:2002, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Generic functional protocol for the support of supplementary services - Inter-exchange signalling procedures and protocol*

ISO/IEC 13873:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call Diversion supplementary services*

ISO/IEC 15506:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Message Waiting Indication supplementary service*

ISO/IEC 15428:1999, *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*

ISO/IEC 15433:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Wireless Terminal Aauthentication supplementary services*

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

ITU-T 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. Q.950:2000, *Supplementary services protocols, structure and general principles*

ITU-T Rec. Z.100:2002, *Specification and description language (SDL)*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1 External definitions

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

– Application Protocol Data Unit (APDU) (ISO/IEC 11582)
– Basic Service (ITU-T Rec. I.210)
– Call, Basic Call (ISO/IEC 11582)
– Complete Number (ISO/IEC 11571)
– Co-ordination Function (ISO/IEC 11582)
– Directory PINX (ISO/IEC 15428)
– End PINX (ISO/IEC 11582)
– Home PINX (ISO/IEC 15428)
– Home data base (HDB) (ISO/IEC 15428)
– Interpretation APDU (ISO/IEC 11582)
– Location Area (LA) (ISO/IEC 15428)
– Network Facility Extension (NFE) (ISO/IEC 11582)
– Originating PINX (ISO/IEC 11582)
– PISN Number (ISO/IEC 11571)
– Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
– Private Integrated services Network eXchange (PINX) (ISO/IEC 11579-1)
– Signalling (ITU-T Rec. I.112)
– Supplementary Service (ITU-T Rec. I.210)
– Supplementary Services Control Entity (ISO/IEC 11582)
– Terminating PINX (ISO/IEC 11582)
– Transit PINX (ISO/IEC 11582)

– User (ISO/IEC 11574)
– Visitor area (ISO/IEC 15428)
– Visitor data base (VDB) (ISO/IEC 15428)
– Visitor PINX (ISO/IEC 15428)
– Wireless Terminal Mobility (WTM) (ISO/IEC 15428)
– WTM user's identity (ISO/IEC 15428)

4.2 Other definitions

4.2.1 WTM user

The user of SS-WTLR or other WTM services.

5 Symbols and abbreviated terms

ANF	Additional Network Feature
ANF-WTINFO	Wireless Terminal Information exchange
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation no. 1
HDB	Home Data Base
ISDN	Integrated Services Digital Network
NFE	Network Facility Extension
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated services Network eXchange
PISN	Private Integrated Services Network
SDL	Specification and Description Language
SS-MWI	Message Waiting Indication supplementary service
SS-WTLR	Wireless Terminal Location Registration supplementary service
VDB	Visitor Data Base
WTM	Wireless Terminal Mobility

6 Signalling protocol for the support of SS-WTLR

6.1 SS-WTLR description

SS-WTLR is a supplementary service which 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. SS-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.

6.2 SS-WTLR operational requirements

6.2.1 Requirements on the Visitor PINX

Generic procedures for the call independent control (connection oriented) of supplementary services, as specified in ISO/IEC 11582 for an Originating and Terminating PINX, shall apply.

6.2.2 Requirements on the Home PINX

Generic procedures for the call independent control (connection oriented) of supplementary services, as specified in ISO/IEC 11582 for a Terminating and an Originating PINX, shall apply.

6.2.3 Requirements on a Transit PINX

Generic procedures for the call independent control (connection oriented) of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply.

6.2.4 Requirements on the Directory PINX

Generic procedures for the call independent control (connection oriented) of supplementary services, as specified in ISO/IEC 11582 for a Terminating PINX, shall apply.

6.3 SS-WTLR coding requirements

6.3.1 Operations

The operations defined in Abstract Syntax Notation number 1 (ASN.1) in table 1 shall apply. The notation is in accordance with ITU-T Rec. X.680 and X.690. The ITU-T Rec. X.208 and X.209 superseded version is in annex E.

Table 1 - Operations in support of SS-WTLR and ANF-WTINFO

```
WTM-Location-Registration-Operations-asn1-97
                        {iso standard pss1-location-registration (15429) wtlr-operations-asn1-97 (1)}

DEFINITIONS EXPLICIT TAGS ::=

BEGIN
IMPORTS                 OPERATION, ERROR FROM Remote-Operations-Information-Objects
                              {joint-iso-itu-t remote-operations(4) informationObjects(5) version1(0)}
                        EXTENSION, Extension{} FROM Manufacturer-specific-service-extension-class-asn1-97
                              {iso standard
                              pss1-generic-procedures (11582) msi-class-asn1-97(11)}
                        notAvailable, invalidServedUserNr
                              FROM General-Errors-List
                              {ccitt recommendation q 950 general-error-list (1)}
                        PartyNumber FROM Addressing-Data-Elements-asn1-97
                              {iso(1) standard(0) pss1-generic-procedures(11582)
                              addressing-data-elements-asn1-97(20)}
                        BasicService FROM Call-Diversion-Operations-asn1-97
                              { iso (1) standard (0) pss1-call-diversion (13873)
                              call-diversion-operations-asn1-97 (1) };

WTMLR-Operations OPERATION ::= {locUpdate | locDelete | locDeReg | pisnEnquiry | getRRCInf | locInfoCheck}


locUpdate               OPERATION ::={
                        -- Sent from the Visitor PINX to the Home PINX.
                              ARGUMENT      LocUpdArg
                              RESULT        DummyRes
                              ERRORS        { invalidServedUserNr | notAuthorized | unspecified }
                              CODE          local: 50}
```

Table 1 - Operations in support of SS-WTLR and ANF-WTINFO (continued)

```
locDelete           OPERATION ::= {
                    -- Sent from the Home PINX to the previous Visitor PINX.
                          ARGUMENT      LocDelArg
                          RESULT        DummyRes
                          ERRORS        { temporarilyUnavailable | unspecified }
                          CODE          local: 51}

locDeReg            OPERATION ::= {
                    -- Sent from the Visitor PINX to the Home PINX.
                          ARGUMENT      LocDeRegArg
                          RESULT        DummyRes
                          ERRORS        { notAvailable | unspecified }
                          CODE          local: 52}

pisnEnquiry         OPERATION ::= {
                    -- Sent from the Visitor PINX to the previous Visitor PINX or a Directory PINX.
                          ARGUMENT      PisnEnqArg
                          RESULT        PisnEnqRes
                          ERRORS        { invalidServedUserNr | unspecified}
                          CODE          local: 53}

getRRCInf           OPERATION ::= {
                    -- Sent from the Visitor PINX to the Home PINX.
                          ARGUMENT      GetRRCInfArg
                          RESULT        GetRRCInfRes
                          ERRORS        { notAvailable | unspecified }
                          CODE          local: 97}

locInfoCheck        OPERATION ::= {
                    -- Sent from the Visitor PINX to the Home PINX or vice versa.
                          ARGUMENT      LocInfoCheckArg
                          RESULT        LocInfoCheckRes
                          ERRORS        { notAvailable | unspecified }
                          CODE          local: 98}

LocUpdArg ::=       SEQUENCE      { wtmUserId         WtmUserId,
                                  basicServiceBasicService DEFAULT allServices,
                                  visitPINX           PartyNumber,
                                  -- The pisnNumber of the Visitor PINX,
                                  -- always a Complete Number.
                                  argExtension        LrExtension OPTIONAL }

DummyRes ::=        CHOICE        { null        NULL,
                                  extension     [ 1 ] IMPLICIT Extension{{WTMLRExtSet}},
                                  sequOfExtn    [ 2 ] IMPLICIT SEQUENCE OF
                                                      Extension{{WTMLRExtSet}} }

LocDelArg ::=       SEQUENCE      { wtmUserId         WtmUserId,
                                  basicServiceBasicService DEFAULT allServices,
                                  argExtension        LrExtension OPTIONAL }

LocDeRegArg ::=     SEQUENCE      { wtmUserId         WtmUserId,
                                  basicServiceBasicService DEFAULT allServices,
                                  argExtension        LrExtension OPTIONAL }
```

Table 1 - Operations in support of SS-WTLR and ANF-WTINFO (concluded)

```
PisnEnqArg ::=          SEQUENCE    { alternativeId     AlternativeId,
                                      -- Can be a temporary identifier, e.g. Network Assigned
                                      -- Identity structure, or a fixed handset identifier.
                                      argExtension      LrExtension OPTIONAL }

PisnEnqRes ::=          SEQUENCE    { wtmUserId         WtmUserId,
                                      resExtension      LrExtension OPTIONAL }

GetRRCInfArg ::=        SEQUENCE    { wtmUserId         WtmUserId,
                                      basicServiceBasicService DEFAULT allServices,
                                      argExtension      LrExtension OPTIONAL }

GetRRCInfRes ::=        SEQUENCE    { alternativeId     AlternativeId OPTIONAL,
                                      rrClass           RRClass OPTIONAL,
                                      argExtension      LrExtension OPTIONAL }

LocInfoCheckArg ::=     SEQUENCE    { wtmUserId         WtmUserId,
                                      basicServiceBasicService DEFAULT allServices,
                                      visitPINX         PartyNumber,
                                      -- The PISN number of the Visitor PINX,
                                      -- always a Complete Number.
                                      argExtension      LrExtension OPTIONAL }

LocInfoCheckRes ::=     SEQUENCE    { checkResult       CheckResult,
                                      argExtension      LrExtension OPTIONAL }

WtmUserId ::=           CHOICE      { pisnNumber        PartyNumber,
                                      -- The PISN number of the WTM user,
                                      -- always a Complete Number.
                                      alternativeId     AlternativeId }

AlternativeId ::=       OCTET STRING(SIZE(1..20))

LrExtension ::=         CHOICE      { extension   [ 1 ] IMPLICIT Extension{{WTMLRExtSet}},
                                      sequOfExtn  [ 2 ] IMPLICIT SEQUENCE OF
                                                          Extension{{WTMLRExtSet}} }

RRClass ::=             INTEGER (0..99)

CheckResult ::=         ENUMERATED  { locInfChk-correct (0),
                                      locInfChk-incorrect (1) }

WTMLRExtSet EXTENSION ::= {...}

notAuthorized               ERROR     ::=   {CODE local: 1007}
temporarilyUnavailable      ERROR     ::=   {CODE local: 1000}

unspecified                 ERROR ::= {
                                      PARAMETER     Extension{{WTMLRExtSet}}
                                      CODE          local: 1008}

END                     -- of WTM-Location-Registration-Operations-asn1-97
```

NOTE
Element visitPINX in LocUpdArg can either be a roaming number for the individual WTLR user or a single number for all WTLR users currently registered in this PINX. In the latter case the individual WTLR users are distinguished by their own WtmUserId.