INTERNATIONAL STANDARD

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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Short message service

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseaux privés avec intégration de services — Protocole de signalisation entre commutateurs — Service de message court

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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 3.

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 International Standard 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 21990 was prepared by ECMA (as ECMA-325) 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.

Annexes A and E form a normative part of this International Standard. Annexes B, C and D are for information only.

Introduction

This International Standard is one of a series of Standards defining services and signalling protocols applicable to Private Integrated Services Digital Networks (PISNs). The series uses ISDN concepts as developed by ITU-T and conforms to the framework of International Standards on 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 Short Message Service. The protocol defined in this 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 — Short message service

1 Scope

This International Standard specifies the signalling protocol for the support of the Short Message Service (SMS) at the Q reference point between Private Integrated services Network eXchanges (PINXs) connected together within a Private Integrated Services Network (PISN).

This service is based on GSM 03.40. The Service Centre functionality described in this International Standard is equal to the functionality of a Service Centre in GSM 03.40. Thus, for interoperability with a GSM network, it is only necessary to implement a QSIG interface.

NOTE 1 - The interworking with other air interfaces is not precluded, but is outside the scope of this International Standard.

NOTE 2 - The Short Message Service is a special type of basic service but is described in the present document as a supplementary service.

The Short Message Service is a service which permits a served user to send a message of limited size to another user in the same PISN or another network.

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

Service specifications are produced in three stages and according to the method specified in ETS 300 387. 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 21989.

The signalling protocol for SMS operates on top of the signalling protocol for the connection oriented call independent APDU transport mechanism and uses certain further 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 SMS and supplementary services and ANFs.

This International Standard is applicable to PINXs which can be interconnected 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 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 8601:2000, *Data elements and interchange formats - Information interchange - Representation of dates and times*

ISO/IEC 10646-1:2000, *Information technology - Universal Multiple-Octet Coded Character Set (UCS) - Part 1: Architecture and Basic Multilingual Plane*

ISO/IEC 11572:2000, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode bearer services - Inter-exchange signalling procedures and protocol*

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 11582:1995, *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 13868:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Name identification supplementary services*

ISO/IEC 15506:2000, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network (PISN) - Inter-Exchange Signalling Protocol - Message Waiting Indication Supplementary Service*

ISO/IEC 21989:2002, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Short message service*

ETSI GTS GSM 03.38, *Digital cellular telecommunications systems (Phase 2+) (GSM); Alphabets and language-specific information*

ETSI TS 100 901, *Digital cellular telecommunications systems (Phase 2+); Technical realization of the Short Message Service (SMS) (GSM 03.40)*

ETSI TS 100 942, *Digital cellular telecommunications systems (Phase 2+) (GSM); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface* (GSM 04.11)

ETSI TS 101 032, *Digital cellular telecommunications systems (Phase 2+) (GSM); Compression algorithm for text messaging services* (GSM 03.42)

ETSI ETS 300 387, *Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services*

ETSI ETS 300 599, *Digital cellular telecommunications systems (Phase 2) (GSM); Mobile Application Part (MAP) specification* (GSM 09.02)

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

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

ITU-T Rec. Z.100:1999, *Specification and description language (SDL)*

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:

- Application Protocol Data Unit (APDU) (ISO/IEC 11582)
- Call, Basic Call (ISO/IEC 11582)
- Call Independent Signalling Connection (ISO/IEC 11582)
- Command (ISO/IEC 21989)
- End PINX (ISO/IEC 11582)
- Message Centre (ISO/IEC 21989)
- Message Centre Case (ISO/IEC 21989)
- Private Integrated services Network eXchange (PINX) (ISO/IEC 11579-1)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
- Receiving User (ISO/IEC 21989)
- Sending User (ISO/IEC 21989)
- Service Centre (ISO/IEC 21989)
- Short Message (ISO/IEC 21989)
- Short Message Waiting Data (ISO/IEC 21989)
- Status Report (ISO/IEC 21989)

- Signalling (ITU-T Rec. I.112)
- Supplementary Service (ITU-T Rec. I.210)
- Terminal Case (ISO/IEC 21989)

4.2 Other definitions

4.2.1 Receiving User Case

The configuration when the Terminal Case is provided for the Receiving User, i.e. no Receiving User Message Centre is involved in the SMS procedures.

4.2.2 Receiving User PINX

The Receiving User PINX is the PINX serving the Receiving User.

4.2.3 Sending User PINX

The Sending User PINX is the PINX serving the Sending User.

4.2.4 Sending User Message Centre

The Message Centre serving the Sending User.

4.2.5 Short Message Entity

A generic term for an entity that is capable of handling one or more SMS specific procedures. This can be either the Sending Users terminal, the Sending User PINX, the Sending User Message Centre, the Service Centre, the Receiving User Message Centre, the Receiving User PINX or the Receiving Users terminal.

4.2.6 Receiving User Message Centre

The Message Centre serving the Receiving User.

5 Acronyms

APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation One
GSM	Global System for Mobile communication
ISDN	Integrated Services Digital Network
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated services Network eXchange
PISN	Private Integrated Services Network
SDL	Specification and Description Language
SIM	Subscriber Identity Module
SM	Short Message
SMS	Short Message Service
SMSC	Short Message Service Centre
SMWD	Short Message Waiting Data
SS	Supplementary Service
TE	Terminal Equipment
UDH	User Data Header

6 Signalling Protocol for the support of SMS

6.1 SMS description

Short Message Service is a service which is offered to a user in a PISN and which enables the user to send and receive Short Messages to and from another user in a PISN or in another (e.g. GSM) network.

The PISN transfers the Short Message from the Sending User to an SC and from the SC to the Receiving User.

6.2 SMS operational requirements

6.2.1 Provision/Withdrawal

Provision and withdrawal shall be in accordance with 6.2.1 of ISO/IEC 21989.

6.2.2 Requirements on a Sending User PINX

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

6.2.3 Requirements on a Sending User Message Centre

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

6.2.4 Requirements on a Service Centre

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

6.2.5 Requirements on a Receiving User PINX

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

6.2.6 Requirements on a Receiving User Message Centre

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

6.3 SMS coding requirements

6.3.1 Operations

The following operations defined in Abstract Syntax Notation One (ASN.1) in table 1 shall apply.

Table 1 - Operations in Support of SMS

```
Short-Message-Service-Operations-asn1-97
{iso(1) identified-organization(3) icd-ecma(12) standard(0) qsig-short-message-service(325) short-message-service-
operations-asn1-97(1)}

DEFINITIONS::=
BEGIN
IMPORTS
        OPERATION,
        ERROR
FROM Remote-Operations-Information-Objects
{joint-iso-itu-t (2) remote-operations(4) informationObjects(5) version1(0)}
        EXTENSION, Extension{}
FROM Manufacturer-specific-service-extension-class-asn1-97
{iso(1) standard(0) pss1-generic-procedures(11582) msi-class-asn1-97(11)}
        Name
FROM Name-Operations-asn1-97
{iso(1) standard(0) pss1-name(13868) name-operations-asn1-97(1)}
        supplementaryServiceInteractionNotAllowed
FROM General-Error-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)};

--TYPE DEFINITIONS FOR SMS OPERATIONS FOLLOW

Sms-Operations OPERATION ::={

                smsSubmit | smsDeliver | smsStatusReport | smsCommand | scAlert}

smsSubmit       OPERATION ::= {
                -- sent from the Sending User PINX/ Sending User Message Centre to the Service Centre
                        ARGUMENT        SmsSubmitArg
                        RESULT          SmsSubmitRes
                        ERRORS          {smsSubmitError |
                                        unspecified}
                        CODE            local:107}

smsDeliver      OPERATION ::= {
                -- sent from the Service Centre to the Receiving User PINX or to the Receiving User Message Centre
                        ARGUMENT        SmsDeliverArg
                        RESULT          SmsDeliverRes
                        ERRORS          {smsDeliverError |
                                        unspecified}
                        CODE            local:108}
```

Table 1 - Operations in Support of SMS (continued)

```
smsStatusReport OPERATION ::= {
        -- sent from the Service Centre to the Sending User PINX or to the Sending User Message Centre
                ARGUMENT        SmsStatusReportArg
                RESULT          SmsStatusReportRes
                ERRORS          {smsStatusReportError |
                                unspecified}
                CODE            local:109}

smsCommandOPERATION ::= {
        -- sent from the Sending User PINX or the Sending User Message Centre to the Service Centre
                ARGUMENT        SmsCommandArg
                RESULT          SmsCommandRes
                ERRORS          {smsCommandError |
                                unspecified}
                CODE            local:110}

scAlert         OPERATION ::= {
        -- sent from the Receiving User PINX or the Receiving User Message Centre to the Service Centre
                ARGUMENT        ScAlertArg
                RESULT          DummyRes
                ERRORS          {unspecified}
                CODE            local:111}

--TYPE DEFINITIONS FOR SMS DATA TYPES FOLLOW

SmsSubmitArg ::=    SEQUENCE    {
        destinationAddress      PartyNumber,
        originatingAddress      PartyNumber,
        messageReference        MessageReference,
        smSubmitParameter       SmSubmitParameter,
        userData                UserData,
        smsExtension            SmsExtension                    OPTIONAL}

SmsSubmitRes ::=    SEQUENCE    {
        serviceCentreTimeStamp  ServiceCentreTimeStamp,
        protocolIdentifier      [3] IMPLICIT ProtocolIdentifier OPTIONAL,
        userData                [4] IMPLICIT UserData           OPTIONAL,
        smsExtension            SmsExtension                    OPTIONAL}

SmsDeliverArg ::=   SEQUENCE    {
        originatingAddress      PartyNumber,
        destinationAddress      PartyNumber,
        originatingName         Name                            OPTIONAL,
        smDeliverParameter      SmDeliverParameter,
        userData                UserData,
        smsExtension            SmsExtension                    OPTIONAL}

SmsDeliverRes ::=   SEQUENCE    {
        smsDeliverResponseChoice    SmsDeliverResChoice,
        smsExtension                SmsExtension                OPTIONAL}
```

Table 1 - Operations in Support of SMS (continued)

```
SmsStatusReportArg ::=          SEQUENCE        {
        messageReference        MessageReference,
        serviceCentreTimeStamp  ServiceCentreTimeStamp,
        dischargeTime           DischargeTime,
        recipientAddress        PartyNumber,
        recipientName           [10] Name                                   OPTIONAL,
        destinationAddress      PartyNumber,
        status                  Status,
        priority                [11] IMPLICIT BOOLEAN DEFAULT FALSE,
        moreMessagesToSend      [12] IMPLICIT BOOLEAN DEFAULT FALSE,
        statusReportQualifier   [13] IMPLICIT BOOLEAN DEFAULT FALSE,
        protocolIdentifier      ProtocolIdentifier                          OPTIONAL,
        userData                UserData                                    OPTIONAL,
        smsExtension            SmsExtension                                OPTIONAL}

SmsStatusReportRes ::= SEQUENCE     {
        smsStatusReportResponseChoice   SmsStatusReportResponseChoice,
        smsExtension                    SmsExtension                        OPTIONAL}

SmsCommandArg ::= SEQUENCE      {
        destinationAddress              PartyNumber,
        messageReference                MessageReference,
        messageNumber                   MessageReference,
        protocolIdentifier              ProtocolIdentifier,
        commandType                     CommandType,
        commandData                     CommandData                         OPTIONAL,
        statusReportRequest             BOOLEAN                             OPTIONAL,
        smsExtension                    SmsExtension                        OPTIONAL}

SmsCommandRes ::= SEQUENCE      {
        serviceCentreTimeStamp          ServiceCentreTimeStamp,
        protocolIdentifier              ProtocolIdentifier                  OPTIONAL,
        userData                        UserData                            OPTIONAL,
        smsExtension                    SmsExtension                        OPTIONAL}

ScAlertArg ::=          SEQUENCE        {
        originatingAddress              PartyNumber,
        smsExtension                    SmsExtension                        OPTIONAL}

DummyRes ::=            CHOICE{
        null                    NULL,
        smsExtension            SmsExtension}

SmSubmitParameter ::= SEQUENCE      {
        protocolIdentifier      ProtocolIdentifier,
        validityPeriod          ValidityPeriod                              OPTIONAL,
        statusReportRequest     [11] IMPLICIT BOOLEAN DEFAULT FALSE,
        replyPath               [12] IMPLICIT BOOLEAN DEFAULT FALSE,
        rejectDuplicates        [13] IMPLICIT BOOLEAN DEFAULT FALSE}
```

Table 1 - Operations in Support of SMS (continued)

```
SmDeliverParameter ::= SEQUENCE     {
        protocolIdentifier          ProtocolIdentifier,
        serviceCentreTimeStamp      ServiceCentreTimeStamp,
        priority                    [11] IMPLICIT BOOLEAN DEFAULT FALSE,
        moreMessagesToSend          [12] IMPLICIT BOOLEAN DEFAULT FALSE,
        statusReportIndication      [13] IMPLICIT BOOLEAN DEFAULT FALSE,
        replyPath                   [14] IMPLICIT BOOLEAN DEFAULT FALSE}

SmsDeliverResChoice ::= CHOICE      {
        null                        NULL,
        protocolIdentifier          ProtocolIdentifier,
        userData                    [0] IMPLICIT UserData,
        resChoiceSeq                [1] IMPLICIT ResChoiceSeq}

ResChoiceSeq ::= SEQUENCE {
        protocolIdentifier          ProtocolIdentifier,
        userData                    UserData}

SmsStatusReportResponseChoice ::= CHOICE    {
        null                        NULL,
        protocolIdentifier          ProtocolIdentifier,
        userData                    [0] IMPLICIT UserData,
        resChoiceSeq                [1] IMPLICIT ResChoiceSeq}

MessageReference ::=  INTEGER(0..255)

SmsExtension ::=      CHOICE{
        single                      [1]IMPLICIT Extension{{SmsExtSet}},
        multiple                    [2]IMPLICIT     SEQUENCE OF
                                                    Extension{{SmsExtSet}}
                                    }

SmsExtSet EXTENSION ::= {...}

ProtocolIdentifier ::=  INTEGER (0..127)
                        -- definition of the ProtocolIdentifier values and default value can be found in annex E section
                        -- E.1.2.1

ServiceCentreTimeStamp          ::=     GeneralizedTime(SIZE(12..19))
                                -- this date and time representation follows ISO 8601

DischargeTime                   ::=     GeneralizedTime(SIZE(12..19))
                                -- this date and time representation follows ISO 8601

ValidityPeriod          ::=     CHOICE{
        validityPeriodRel       [0] IMPLICIT ValidityPeriodRel,
        validityPeriodAbs       [1] IMPLICIT ValidityPeriodAbs,
        validityPeriodEnh       [2] IMPLICIT ValidityPeriodEnh}

ValidityPeriodAbs       ::=     GeneralizedTime(SIZE(12..19))
                        -- this date and time representation follows ISO 8601

ValidityPeriodRel ::=   INTEGER(0..255)
                        -- the rules for the encoding of ValidityPeriodRel are shown in annex E section E.1.2.2
```

Table 1 - Operations in Support of SMS (continued)

```
ValidityPeriodEnh ::=  SEQUENCE{
        singleShotSM            BOOLEAN DEFAULT FALSE,
        enhancedVP              EnhancedVP                          OPTIONAL}

EnhancedVP ::=          CHOICE{
        validityPeriodRel       [0] IMPLICIT ValidityPeriodRel,
        validityPeriodSec       [1] IMPLICIT INTEGER(0..255),
        validityPeriodSemi      [2] IMPLICIT ValidityPeriodSemi}

ValidityPeriodSemi ::=OCTET STRING (SIZE(3))
                -- Validity Period is relative in semi-octet representation, see ETSI TS 100 901, section 9.1.2.3
                -- and section 9.2.3.12.3

UserData ::=  SEQUENCE{
    userDataHeader              [0] IMPLICIT UserDataHeader         OPTIONAL,
    class                       [1] IMPLICIT INTEGER (0..3)         OPTIONAL,
    compressed                  [2] IMPLICIT BOOLEAN DEFAULT FALSE,
    shortMessageText            ShortMessageText}

ShortMessageText ::=        SEQUENCE{
    shortMessageTextType    ShortMessageTextType,
    shortMessageTextData    ShortMessageTextData}

ShortMessageTextType ::=    INTEGER{
                            iA5Coded        (0), -- ShortMessageTextData shall contain data according to
                            octetCoded      (1), -- the type given in ShortMessageTextType, for further
                            uniCoded        (2), -- details see annex E. 1.3.4.
                            compressedCoded (3)} (0..8)

ShortMessageTextData ::= OCTET STRING (SIZE(0..140))

Status ::=              INTEGER (0..255)
                        -- definition of status values can be found in section E.7.6 in annex E

CommandType ::=     INTEGER{
            enquiry                                     (0),
            cancelSRR                                   (1),
            deletePreviouslySubmittedSM                 (2),
            enableSRRrelatingToPreviouslySubmittedSM    (3)} (0..255)

CommandData ::= OCTET STRING (SIZE(0..157))

FailureCause ::=        INTEGER (0..255)
            -- definition for failureCause values can be found in section E.3.1 in annex E

UserDataHeader ::=      SEQUENCE OF UserDataHeaderChoice
```