ATIS STANDARD

ATIS-1000112.2005(S2020)

Signaling System Number 7 (SS7) – Signaling Connecting Control Part (SCCP)

AMERICAN NATIONAL STANDARD FOR TELECOMMUNICATIONS

As a leading technology and solutions development organization, the Alliance for Telecommunications Industry Solutions (ATIS) brings together the top global ICT companies to advance the industry's most pressing business priorities. ATIS' nearly 200 member companies are currently working to address the All-IP transition, 5G, network functions virtualization, big data analytics, cloud services, device solutions, emergency services, M2M, cyber security, network evolution, quality of service, billing support, operations, and much more. These priorities follow a fast-track development lifecycle — from design and innovation through standards, specifications, requirements, business use cases, software toolkits, open source solutions, and interoperability testing.

ATIS is accredited by the American National Standards Institute (ANSI). The organization is the North American Organizational Partner for the 3rd Generation Partnership Project (3GPP), a founding Partner of the oneM2M global initiative, a member of the International Telecommunication Union (ITU), as well as a member of the Inter-American Telecommunication Commission (CITEL). For more information, visit www.atis.org.

AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires review by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made towards their resolution. The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Notice of Disclaimer & Limitation of Liability

The information provided in this document is directed solely to professionals who have the appropriate degree of experience to understand and interpret its contents in accordance with generally accepted engineering or other professional standards and applicable regulations. No recommendation as to products or vendors is made or should be implied.

NO REPRESENTATION OR WARRANTY IS MADE THAT THE INFORMATION IS TECHNICALLY ACCURATE OR SUFFICIENT OR CONFORMS TO ANY STATUTE, GOVERNMENTAL RULE OR REGULATION, AND FURTHER, NO REPRESENTATION OR WARRANTY IS MADE OFMERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. ATIS SHALL NOT BE LIABLE, BEYOND THE AMOUNT OF ANY SUM RECEIVED IN PAYMENT BY ATIS FOR THIS DOCUMENT, AND IN NO EVENT SHALL ATIS BE LIABLE FOR LOST PROFITS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. ATIS EXPRESSLY ADVISES THAT ANY AND ALL USE OF OR RELIANCE UPON THE INFORMATION PROVIDED IN THIS DOCUMENT IS AT THE RISK OF THE USER.

> NOTE - The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, no position is taken with respect to whether use of an invention covered by patent rights will be required, and if any such use is required no position is taken regarding the validity of this claim or any patent rights in connection therewith. Please refer to [http://www.atis.org/legal/patentinfo.asp] to determine if any statement has been filed by a patent holder indicating a willingness to grant a license either without compensation or on reasonable and non-discriminatory terms and conditions to applicants desiring to obtain a license.

ATIS-1000112.2005(S2020), *Signaling System Number 7 (SS7) – Signaling Connection Control Part (SCCP)*

Is an American National Standard developed by the **Interoperability (IOP)** Subcommittee under the **ATIS Packet Technologies and Systems Committee (PTSC)**.

Published by

Alliance for Telecommunications Industry Solutions
1200 G Street, NW, Suite 500
Washington, DC 20005

ATIS-1000112.2005(S2020)

(Revision of T1.112-2001)

American National Standard for Telecommunications

Signaling System Number 7 (SS7) -- Signaling Connection Control Part (SCCP)

Secretariat

Alliance for Telecommunications Industry Solutions

Approved July 15, 2005

American National Standards Institute, Inc.

Abstract

This recommendation contains a general description of the services provided from the Message Transfer Part (MTP) of Signaling System Number 7 (SS7), the functions within the Signaling Connection Control Part (SCCP), and the resultant services provided for the users of the SCCP.

Foreword

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the standard.

This document is entitled "American National Standard for Telecommunications - Signaling System Number 7 (SS7) - Signaling Connection Control Part." It was originally based on the 1988 Blue Book specification of Signaling System No. 7 (SS#7) for international use, issued by the CCITT Study Group XI (Vol. VI, Fascicles VI.7 and VI.8) and is intended to be generally compatible with that standard and its successors. It has been appropriately modified for use within and between U.S. networks to meet the anticipated needs and applications of such entities. These modifications are the result of extensive work by the members of the PTSC-IOP (formerly T1S1.3) Working Group on U.S. Standards for Common Channel Signaling. In general, these modifications fall into two categories:

1) The specification of options designated by the ITU-T (formerly CCITT) for national use,

2) Extensions to the 1996 protocol to provide for new applications of the SS7 protocol. This is in accordance with current and projected ITU-T activity.

A vertical bar (|) in the right-hand margin indicates a change from the previous issue of this standard.

Note that the standard numbering has changed in this version of ATIS-1000111, ATIS-1000112, and ATIS-1000113. These standards were formerly numbered as T1.111, T1.112, and T1.113 respectively. The associated chapter numbering has not been modified.

This standard contains the following six chapters:

Changes and additions incorporated into these specifications consist of the following:

- Addition of new Translation Type Code "18" for ECS Call Routing.

The overall and detailed organization of these specifications parallels that used in the equivalent ITU-T Recommendations. Thus ATIS-1000112.1 through ATIS-1000112.5 of this standard correspond to Recommendations Q.711 through Q.714 and Q.716 of the ITU-T specification. ATIS-1000112.6 corresponds to Q.715.

This standard is intended for use in conjunction with T1.110-1999 (R2005), *Signaling System Number 7 (SS7) - General information*, which includes an overview of SS7, a glossary, and a chapter on abbreviations.

Information contained in a normative annex in these specifications is considered part of this standard.

Information contained in an informative annex in these specifications is not considered part of this standard but is rather auxiliary to the standard. Similarly, footnotes are not part of this official standard.

Caution should be exercised in using the Specification and Description Language (SDL) diagrams to interpret the standard; please note that the text always takes precedence over the SDL.

Future control of this document will reside with Accredited Standards Committee on Telecommunications, Alliance for Telecommunications Industry Solutions. This control of additions to the specification, such as ongoing protocol evolution, new applications, and operational requirements, will permit compatibility among U. S. networks. Such additions will be

incorporated in an orderly manner with due consideration to the ITU-T layered model principles, conventions, and functional boundaries.

Suggestions for improvement of this standard will be welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, 1200 G Street, NW, Suite 500, Washington, DC 20005.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee Packet Technologies and Systems Committee (PTSC). Committee approval of this standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the PTSC had the following members:

B. Hall, PTSC Chair
J. Zebarth, PTSC Vice-Chair
S. Carioti, ATIS Disciplines
S. Barclay, ATIS Secretariat
C. Underkoffler, ATIS Chief Editor
C. Brownmiller, ATIS Technical Editor
R. Singh, PTSC Technical Editor

Organization Represented	Name of Representative
AcmePacket	Kevin Klett
Alcatel USA Inc.	Ken Biholar
AT&T	Martin Dolly George Stanek (Alt)
BellSouth	Rick McNealy
BellSouth Telecommunications	David M. Brady
C.S.I Telecommunications	Michael S. Newman Thomas G Croda (Alt)
Cingular Wireless LLC	Don Zelmer Marc Grant (Alt)
Cisco Systems	Rajiv Kapoor Chip Sharp (Alt)
Defense Info. Systems Agency	Chris Fitzgerald Ryan Kuseki (Alt)
Ericsson Incorporated	Susana Sabater-Maroto Stephen Hayes (Alt)
FBI ESTS	Gregory Milonovich Eric Mason (Alt)
Harris Corporation	Marlis Humphrey
Hewlett-Packard	Steve Mills
Intelsat	Mark T. Neibert
Lucent Technologies	Stuart O. Goldman
MCI	J. Martin Carroll Robert Schafer (Alt)
National Communications Systems	Nicholas Andre Jean Trakinat (Alt)
Nokia Telecommunications Inc.	Joyabrata Mukherjee Ed Ehrlich (Alt)
Nortel	Joseph A. Zebarth
Qwest	Steve Showell Michael Fargano (Alt)
SBC Communications, Inc.	B.S. Sambasivan Bob Hall (Alt)
Siemens Communications, Inc.	Ron Franks David E. Francisco
Sprint Corporation	Mark L. Jones
Telcordia Technologies	Wesley Downum Cliff Halevi (Alt)
Tellabs Operations, Inc.	William A. Walker
Tridea Works	Greg Ratta
Verizon Communications	Dave Morris Wendy Pugh (Alt)

The Interoperability (IOP) Subcommittee was responsible for the development of this document.

TABLE OF CONTENTS

American National Standard for Telecommunications –

Signaling System Number 7 (SS7) -- Signaling Connection Control Part (SCCP)

ACRONYMS & ABBREVIATIONS

AC	Authentication Center
AI	Address Indicator
AIN	Advanced Intelligent Network
AK	Data Acknowledgment
ANSI	American National Standards Institute
AP	Application Process
ATIS	Alliance for Telecommunications Industry Solutions
BCD	Binary-Coded-Decimal
B-ISDN	Broadband Integrated Services Digital Network
CC	Connection Confirm or Country Code
CCITT	International Telegraph and Telephone Consultative Committee
CCS	Common Channel Signaling
CdPA	Called Party Address
CIID	Call Issuer ID
CNAM	Calling Name Delivery
CR	Connection Request
CREF	Connection Refused
CSC	Coordinated State Change
DPC	Destination Point Code
DT1	Data Form 1
DT2	Data Form 2
EA	Expedited Data Acknowledgment
ED	Expedited Data
EIA	Electronic Industries Association
EIR	Equipment Identification Register
EOP	End of Optional Parameters
ERR	Protocol Data Unit Error
ES	Encoding Scheme
GMSC	Gateway Mobile Switching Center
GPRS	General Packet Radio Service
GSM	Global System for Mobile
GTA	Global Title Address
GTAI	Global Title Address Information
GTT	Global Title Translation
HLR	Home Location Register
ICN	Interconnecting CCS Networks
IEC	International Electrotechnical Commission
IIF	Interworking and Interoperability Function
IIN	Issuer Identification Number
IMSI	International Mobile Station Identity
IN	Intelligent Network
INS	Intermediate Network Selection
IRI	ISNI Routing Indicator
ISDN	Integrated Services Digital Network
ISNI	Intermediate Signaling Network Identification
ISO	International Organization for Standardization
ISTP	International Signaling Transfer Point
ISUP	ISDN User Part
IT	Inactivity Test
ITU-T	International Telecommunication Union – Telecommunication Standardization Sector
LRN	Location Routing Number
LSB	Least Significant Bit
LUDT	Long Unitdata
LUDTS	Long Unitdata Service
MAN	Mandatory Field
MAP	Mobile Application Part

MC	Message Center
MCC	Mobile Country Code
MDN	Mobile Directory Number
MI	Mark for Identification Indicator
MII	Major Industry Identifier
MIN	Mobile Identification Number
MNC	Mobile Network Code
MSC	Mobile Switching Center
MSIN	Mobile Station Identification Number
MSISDN	Mobile Station International ISDN Number
MSS	Message Storage System
MSU	Message Signal Unit
MTI	Message Type Interworking
MTP	Message Transfer Part
MTP-3	Message Transfer Part level 3
NANP	North American Numbering Plan
NDC	National Destination Code
NE	Network Entity
NID	Network Identifiers
NP	Number Portability or Numbering Plan
NPA	Numbering Plan Area
NPCI	Network Protocol Control Information
NPDU	Network Protocol Data Unit
NSDU	Network Service Data Units
NSL	Network Service Layer
NSP	Network Service Part or Network Service Provider
NSU	Network Service User
O&M	Operations & Maintenance
OMAP	Operations, Maintenance and Administration Part
OPC	Originating Point Code
OPT	Optional Field
OSI	Open Systems Interconnection
OSI-RM	OSI Reference Model
P(R)	Receive Sequence Number
P(S)	Send Sequence Number
PC	Point Code
PCI	Protocol Control Information
PCS	Personal Communications Service
PDU	Protocol Data Unit
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
POTS	Plain Old Telephone Service
PSTN	Public Switched Telephone Network
QoS	Quality of Service
RAO	Regional Accounting Office
RIDB	Record Information Database
RLC	Release Complete
RLSD	Released
RSC	Reset Confirmation
RSR	Reset Request
SAAL	Signaling ATM Adaptation Layer
SBR	Subsystem-Backup-Routing
SC	Service Center
SCCP	Signaling Connection Control Part
SCLC	SCCP Connectionless Control
SCMG	SCCP Management
SCOC	SCCP Connection-Oriented Control
SCP	Service Control Point
SCRC	SCCP Routing Control
SDL	Specification and Description Language
SDU	Service Data Unit
SEP	Signaling End Point
SGSN	Serving GPRS Service Node
SIF	Signaling Information Field
SIO	Service Information Octet
SLS	Signaling Link Selection
SLS	Signaling Link Selection
SMDPP	Short Message Delivery Point To Point
SME	Short Message Entities
SMI	Subsystem Multiplicity Indicator
SMS	Short Message Services
SMS-PP	Short Message Service/Point-to-Point
SNR	Subsystem-Normal-Routing
SOG	Subsystem-Out-of-Service-Grant
SOR	Subsystem-Out-of-Service-Request
SPC	Signaling Point Code
SRT	Subsystem-Routing-Status-Test
SS7	Signaling System No. 7
SSA	Subsystem-Allowed
SSN	Subsystem Number
SSP	Subsystem-Prohibited
SSPN	Serving System Packet Node

SST	Subsystem-Status-Test
STP	Signaling Transfer Point
TC	Transaction Capabilities
TCAP	Transaction Capabilities Application Part
TI	Type Indicator
TIA	Telecommunications Industry Association
TLDN	Temporary Local Directory Number
TMSI	Temporary Mobile Station Identity

TT	Translation Type
UDT	Unitdata
UDTS	Unitdata Service
VLR	Visited Location Register
XUDT	Extended Unitdata
XUDTS	Extended Unitdata Service

NORMATIVE REFERENCES

The following standards contain provisions that, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

T1.110-1999 (R2005), *Signaling System No. 7 (SS7) - General Information*.[1]

ATIS-1000111.2005, *Signaling System No. 7 (SS7), Message Transfer Part*.[1]

ATIS-1000113.2005, *Signaling System No. 7 (SS7) - Integrated Services Digital Network (ISDN) User Part*.[1]

ATIS-1000003, October 2004, *Number Portability Database and Global Title Translation*.[1]

ITU-T Recommendation E.164 (05/97), *The international public telecommunication numbering plan*.[2]

ITU-T Recommendation E.210 (11/88), *Ship station identification for VHF/UHF and maritime mobile-satellite services*.[2]

ITU-T Recommendation E.211, *Selection procedures for VHF/UHF maritime mobile services*.[2]

ITU-T Recommendation E.212 (05/04), *The international identification plan for mobile terminals and mobile users*.[2]

ITU-T Recommendation E.214 (02/05), *Structure of the land mobile global title for the signaling connection control part (SCCP)*.[2]

ITU-T Recommendation F.69 (06/94), *The international telex service - Service and operational provisions of telex destination codes and telex network identification codes*.[2]

ITU-T Recommendation X.121 (10/00), *International numbering plan for public data networks*.[2]

ITU-T Recommendation X.213 (10/01), *Information technology – Open Systems Interconnection – Network service definition*.[2]

[1] This document is available from the Alliance for Telecommunications Industry Solutions, 1200 G Street N.W., Suite 500, Washington, DC 20005. <http://www.atis.org>

[2] This document is available from the International Telecommunications Union. < http://www.itu.int/ITU-T/ >

ATIS-1000112.1.2005(S2020)

[Revision of T1.112.1-2001]

Chapter 1
Functional Description of the Signaling Connection Control Part

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

American National Standard for Telecommunications –

Functional Description of the Signaling Connection Control Part

1 SCOPE, PURPOSE, AND APPLICATION

1.1 General

The Signaling Connection Control Part (SCCP) provides additional functions to the Message Transfer Part (MTP) to provide both connectionless as well as connection-oriented network services to transfer circuit-related and non circuit-related signaling information and other types of information between exchanges and specialized centers in telecommunication networks (e.g., for management and maintenance purposes) via a Signaling System No. 7 (SS7) network.

A functional block situated above the MTP, (see T1.110-1999 (R2005)), performs the functions and procedures of the SCCP. The SCCP is capable of using the services of the MTP as described in ATIS-1000111, chapters ATIS-1000111.1 to ATIS-1000111.8. The combination of the MTP and the SCCP is called the Network Service Part (NSP).

1.2 Objectives

The overall objectives of the SCCP are to provide the means for:

1. Logical signaling connections within the Common Channel Signaling Network; and
2. A transfer capability for signaling data units with or without the use of logical signaling connections.

Functions of the SCCP are used for the transfer of circuit related and non circuit-related signaling information of the ISDN User Part with or without setup of end-to-end signaling connections. These functions are described in ATIS-1000112.4 and ATIS-1000113.4. Figure 1/ATIS-1000112.1 illustrates the embedding of the SCCP within the common-channel signaling system.

1.3 General Characteristic

1.3.1 Technique of Description

The SCCP is described in terms of:

1. Services provided by the SCCP.
2. Services assumed from the MTP.
3. Functions of the SCCP.

The functions of the SCCP are performed by means of the SCCP protocol between two systems which provide the SCCP service to the user located above the SCCP layer. The service interfaces to the upper