3GPP2 N.S0017-B

Version 1.0.0

Version Date: December 2002

International Implementation of Wireless Telecommunication Systems Compliant with TIA/EIA-41

Revision: B

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Contents

REVISION HISTORY

Revision	Publication	Description
N.S0017		Initial publication
N.S0017-A	Publication, April, 2001	First revision
N.S0017-B	Publication, January, 2003	Second revision.

1 INTRODUCTION

When the first edition of the Mobile Station – Land Station Compatibility Specification (*IS-3*, now *TIA/EIA-553-A*) was issued, it was envisioned that it would be adopted for use within North America. Provisions were included for international implementation; however, detailed guidelines to assist with such implementations were not included. TIA Subcommittee TR-45.2 recognized the need to provide such guidance and chartered a Working Group (Working Group VI) with this responsibility. The result of this Working Group's deliberations has been the production of TSB-29 as well as ongoing internationalization of other TIA standards, such as, *TIA/EIA-41-D (N.S0005), TIA-751 (N.S0009), TIA/EIA/IS-807 (N.S0016), TIA/EIA/IS-875 (N.S0027), TIA/EIA-124 (N.S0026), TIA/EIA-136, IS-95, IS-91*, and *TIA/EIA-2000 (C.S0001)*. TSG-N has taken TSB-29 and produced the specification N.S0017.

The principle aspects of international implementation addressed by this document are:

- The administration and assignment of System Identification Numbers (SIDs)
- The administration and assignment of Mobile Identification Numbers (MINs)
- Format of International Mobile Subscriber Identifiers (IMSIs)

The goal of this publication is to provide the international wireless telecommunications industry with the framework permitting the coordinated implementation of Wireless Radio Telecommunication Systems in compliance with the provisions of the AMPS family of air interface standards (e.g., *TIA/EIA-553, IS-54, IS-91, IS-95, TIA/EIA-2000,* and *TIA/EIA-136*).

1.1 ABBREVIATIONS AND ACRONYMS

ANSI	American National Standards Institute
AMPS	Advanced Mobile Phone Service
BID	Billing ID
CCITT	International Telegraph and Telephone Consultative Committee
CCS7	ITU-T Common Channel Signaling System 7
EIA	Electronics Industry Alliance
GTT	Global Title Translation
HLR	Home Location Register
IFAST	International Forum on ANSI-41 Standards Technology
IMSI	International Mobile Subscriber Identity
IRM	International Roaming MIN
ISDN	Integrated Services Digital Network
ITU-T	International Telecommunications Union – Telecommunications
MAP	Mobile Application Part
MC	Message Center
MCC	Mobile Country Code
MDN	Mobile Directory Number
MIN	Mobile Identification Number
MNC	Mobile Network Code
MS	Mobile Station
MSIN	Mobile Subscriber Identification Number
MTP	Message Transfer Point
NANP	North American Numbering Plan
NMSI	National Mobile Subscriber Identity
NPA	Number Plan Area
SCCP	Signaling Connection Control Part
SID	System Identification
SS7	ANSI Signaling System 7
STP	Signaling Transfer Point
TCAP	Transaction Capabilities Application Part
TIA	Telecommunications Industry Association
TSB	Telecommunication Systems Bulletin
VLR	Visitor Location Register

1.2 REFERENCES

The following standards and specifications contain provisions that, through reference in this text, constitute provisions of this TSB. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this TSB are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. ANSI and TIA maintain registers of currently valid national standards published by them. For further reference see the IFAST web site at http://www.ifast.org/.

American National Standards Institute (ANSI) T1 standards:

- ANSI T1.112, Signaling Connection Control Part Formats and Codes; 1988
- ANSI T1.114-1988, Signaling System Number 7 – Transaction Capabilities Application Part (TCAP); 1988.

American National Standards Institute (ANSI) Joint standards:

- ANSI J-STD-008-1996, Personal Station-Base Station Compatibility Requirements for 1.8 to 2.0 GHz Code Division Multiple Access (CDMA) Personal Communications Systems; 1996.

International Telecommunications Union – Telecommunications (ITU-T) standards:

- Series E: Overall Network Operation, Telephone Service, Service Operation and Human Factors; November 1998.
- Recommendation E.212, The International Identification Plan for Mobile Terminals and Mobile Users; ITU-T, November 1998.
- Recommendation E.164, Numbering Plan for the ISDN era; CCITT, 1991.
- Annex to ITU Operational Bulletin No. 615 (1.III.1996) List of Mobile Country or Geographical Area Codes; March 1996.
- Annex B of ITU Q.713 SCCP formats and codes; 1995.

Telecommunications Industry Association (TIA) – ANSI standards and Interim Standards:

- TIA/EIA-41-D, Cellular Radio-Telecommunications Intersystem Operations; 1997. (ANSI-41)
- TIA/EIA-553-A Mobile Station – Land Station Compatibility SpecificationNovember 1999.
- TIA/EIA Interim Standard IS-91-A, Mobile Station – Land Station Compatibility Standard; Telecommunications Industry AssociationNovember 1999.
- TIA/EIA Interim Standard IS-95-B, Mobile Station – Base Station Compatibility Standard for Dual-Mode Wideband Spread Spectrum Cellular System; Telecommunications Industry Association; March 1999.
- TIA/EIA-124-C, Cellular Radio Telecommunications Intersystem Non-Signaling Data Communications (DMH); Telecommunications Industry Association; August 2000.
- TIA/EIA 136, Cellular System Mobile Station — Land Station Compatibility Standard; Telecommunications Industry Association; Rev. D April 2002.

- TIA-751, TIA/EIA-41-D Modifications to Support IMSI; Telecommunications Industry Association; January, 2002.
- TIA/EIA Interim Standard IS-807, TIA/EIA-41-D Internationalization; Telecommunications Industry Association; 1999.

2 MOBILE IDENTIFICATION NUMBERS

A 10-digit mobile identification number, known as MIN, is used to identify MSs according to all air interface standards published before 1994. A transition is underway to the IMSI (see §3).

2.1 NORTH AMERICAN NUMBER PLAN (NANP) MOBILE STATIONS

The NANP MSs are those whose home system is within the NANP, as defined in ITU-T Recommendation *E.164* – The United States (its possessions and territories), Canada, Jamaica, Barbados, Antigua and Barbuda, Cayman Islands, British Virgin Islands, Bermuda, Bahamas, Dominican Republic, Grenada, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Turks and Caicos Islands, Puerto Rico and the US Virgin Islands. For such MSs the MIN is usually derived from the 10-digit national significant number, commonly referred to as the "directory number." The format of this number is NPA-NXX-XXXX, where:

- "**NPA**" represents the 3-digit Numbering Plan Area,
- "**NXX**" represents the 3-digit mobile exchange code, and
- "**XXXX**" represents the 4-digit telecommunication number within the exchange.

Phones that have not been assigned an NANP MDN are treated as non-NANP mobile stations.

2.2 NON-NANP MOBILE STATIONS

Non-NANP MSs are those MSs whose home system is external to the North American Numbering Plan (NANP).

It is recommended that the MINs be assigned from the set of the MINs that is allocated to the MS's home country (or home service provider) by the International Forum on ANSI-41 Standards Technology (IFAST). For such MSs the format of the 10-digit MIN is "0XXX+6 Digits" or "1XXX+6 Digits". The 0/1XXX portion will be assigned by IFAST to carriers that require international roaming. The MS's home service provider will assign the 6-digits of the MIN that follow the 0/1XXX portion.

The following tables describe what is known about MIN formatting outside those formatted as NANP directory numbers. Each row of the tables describes a distinct group of MINs, and identifies the country and, when known, the company using that group of MINs. The tables are formatted as follows:

MIN Prefix

The high order digits of the MIN. "X" indicates a MIN digit position that may assume a value between 0 and 9. The tables are sorted numerically.

MIN Prefixes with the high order digit value of 0 or 1 are frequently referred to as International Roaming MINs (IRMs).

Country or Geographic Area

The country or geographic area that uses the related MIN Prefix.

Company

The company (national ministry or service provider) within the associated country or geographic area using the related MIN Prefix.

2.2.1 0-XXX-XXXXXX MINs

See the IFAST Web Site for the most current assignment of 0-XXX-XXXXXX MINs. The URL for the site is: http://www.ifast.org.

2.2.2 1-XXX-XXXXXX MINs

See the IFAST Web Site for the most current assignment of 1-XXX-XXXXXX MINs. The URL for the site is: http://www.ifast.org.

2.2.3 XXX-0XX-XXXX MINs

MIN Prefix		Country or Geographical Area	Company
NPA	NXX		
530	0XX	New Zealand	Telecom New Zealand, Ltd.
549	0XX	Western Samoa	Telecom Samoa Cellular, Ltd.
722	0XX	Argentina	
972	0XX	Israel	Pele-Phone

2.2.4 XXX-1XX-XXXX MINs

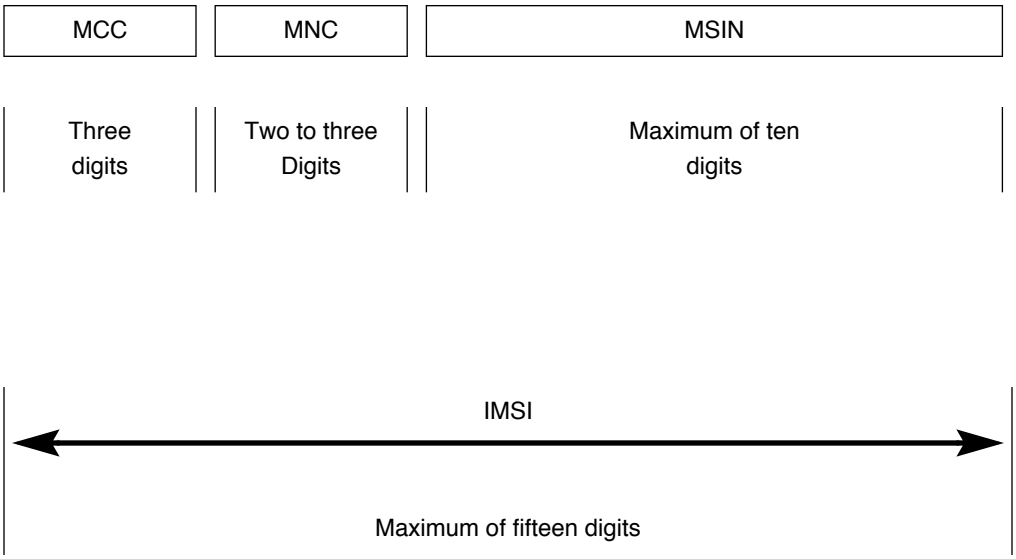
MIN Prefix		Country or Geographical Area	Company
NPA	NXX		
530	1XX	New Zealand	Telecom New Zealand, Ltd.
852	170	Hong Kong	Pacific Link Communications

2.2.5 NANP MINs Used Outside North America

MIN Prefix		Country or Geographical Area	Company
NPA	NXX		
460	XXX	China	unknown
668	XXX	Thailand	Several Carriers
732	XXX	Colombia	Several Carriers
734	XXX	Venezuela	Several Carriers
852	XXX	Hong Kong	Hutchison Telecom
972	XXX	Israel (State of)	Unknown

3 INTERNATIONAL MOBILE SUBSCRIBER IDENTITY

The ITU-T Recommendation *E.212* International Mobile Subscriber Identity (IMSI) is incorporated as an alternate MS identifier in newer MS air interface standards (e.g., *TIA/EIA IS-136* and *TIA/EIA IS-95* Revision A). The utilization of IMSIs should be such that not more than the first 6 digits of the IMSI have to be analyzed in a visited public network for querying the home network. This identifier has the following format:



Where:

MCC Mobile Country Code

MNC Mobile Network Code

MSIN Mobile Subscriber Identification Number

IMSI International Mobile Subscriber Identity

It is recommended that the IMSI format be used in accordance with the ITU-T *E.212* recommendation. The application of *E.212*, beyond this recommendation, is a national issue.

3.1 GUIDELINES FOR IMSI ASSIGNMENT

Use of the following guidelines minimizes international roaming problems:

a. Use the MCC assigned to the country that a wireless system serves.

b. The use of an MNC will allow optimal routing by signaling networks outside the home country.

c. The length of an MNC should be restricted to no more than 3-digits until international agreements adopt longer values.

d. CDMA MSs may need to be identified by a MIN based IMSI as defined by *TIA-751*.

4 SYSTEM IDENTIFICATION NUMBER

A 15-bit system identification (SID_p) must be stored in the mobile station and used to identify the mobile station's home system (see §2.6.1.1.2 of *EIA/TIA-553*). This Bulletin assumes that SIDs are globally unique regardless of band class (See *J-STD-008*).

4.1 SYSTEM IDENTIFICATION NUMBER DATA TABLES

This section identifies the organizations responsible for assigning subsets of the SID numbering space.

4.1.1 Reserved Blocks or Spare Codes

SIDs with values from 32768 through 65535 cannot be transmitted by a wireless system. However, these SIDs are available for use to identify groups of wireless systems within the wireless industry's accounting infrastructure.

4.1.2 SID Assignment Organizations

Table 1: SID Assignment Organizations

Low SID	High SID	Assignment Organization
0	2175	FCC/Cibernet Corporation
2176	2303	IFAST (www.ifast.org)
2304	7679	FCC/Cibernet Corporation (www.cibernet.com)
7680	26111	IFAST (www.ifast.org)
26112	31103	Cibernet Corporation (www.cibernet.com)
31104	32767	IFAST (www.ifast.org)
32768	65535	Non-transmissable SIDs assigned by Cibernet Corporation (www.cibernet.com)

5 Other TIA/EIA-41 Parameter Numbering Considerations

TIA/EIA-41 (N.S0005) supports several parameters that may require national network administration. Some of these parameters are:

a. BillingID (BILLID)
b. CarrierDigits (CARDGTS)
c. MobileSwitchingCenterIdentification (MSCID)
d. MSCIdentificationNumber (MSCIN)
e. PointCode_SubSystemNumber (PC_SSN)
f. SenderIdentificationNumber (SENDERIN)