Global Handset Requirements for CDMA — CDMA2000 Voice, SMS, and Data

CDG Document 90

Version 2.7

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Revision History

Date	Version	Description
22 May 2004	0.91	Preliminary draft.
11 June 2004	0.92	Redrafted as requirements from v0.91, Global Feature Set.
08 July 2004	Rev. A	Initial Release. Incorporated review comments from QUALCOMM, Nokia and Motorola.
04 August 2004	Rev. B	1. Changed revision from A to B and date. 2. Changed references from TRAC Nominal feature set to 3GPP2 documents. 3. In Section 1.6.1, changed TRAC to CCF test process. 4. Version 1.1 scope augmented to indicate that nominal feature set is defined in this document. 5. Removed Appendix B. 6. Added CDG & CCF website reference. 7. Removed TRAC and added CCF to revision history.
27 August, 2004	1.02	Updated document with change requests from GHRC meeting, Hong Kong.
9 September, 2004	1.03	Updated document with change requests from GHRC conference call.
18 September 2004	1.04	Updated document with change requests from GHRC conference call.
1 November 2004	1.05	Reformatted document.
20 December 2004	1.06	Updated document based on discussions in GHRC Sydney meeting
14 January 2005	1.07	Continued document updates reflecting discussions in Sydney GHRC meeting
14 January 2005	1.08	Formatting changes

Date	Version	Description
24 January 2005	1.09	Final revisions and formatting adjustments
24 January 2005	2.0	Approved version
21 March 2007	2.1	Updated per CRs approved in February 2007 GHRC San Diego meeting
28 September 2007	2.2	Updated per CRs approved in September 2007 GHRC Toronto meeting (Long SMS requirements)
19 December 2008	2.3	Updated per CRs approved in September 2008 GHRC Toronto meeting (EVRC-B, Mandatory SMS Broadcast – Warren Act)
31 August 2009	2.4	Made modifications to be in sync with CDG 176
20 July 2010	2.5	Support for Expanded UIMID and CSIM Updated per CRs approved in July 2010 GHRC San Diego meeting: • MEID, etc. CRs from David Crowe. • 1X Advanced CRs from Jack Shauh. • Similar organization to CDG 148 which covered EV-DO R, 0,A, B. • 1X Advanced will be new section of document. • Plus Code Dialing CR to CDG 90, to reference CDG 198. Manual System Avoidance CR to CDG 90, to reference CDG 199.
5 May 2011	2.6	Added 1xAdvanced requirements
10 May 2012	2.7	Added External Memory Management Requirements

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1. Introduction

1.1 Scope of Document

The objective of this document is to provide detailed functional requirements for a basic CDMA handset that provides CDMA2000® 1x voice services and SMS. Also included are the requirements for CDMA2000® 1x packet and circuit data, if the terminal supports data function. This document specifies a nominal set of features that define a commercially viable and usable terminal, which correctly and optimally interoperates in all global markets, and which provides a nominal set of services and features to the user.

Additional functionality such as support for a mobile browser, application platform, multimedia messaging, camera, location based service; etc is described in separate documentation.

1.2 Organization

This document is organized in sections relating to major functional elements:

- Introduction
- Carrier/Network Specific Software options
- General Base CDMA Requirements
- Hardware-Related Requirements
- Provisioning Requirements
- Base Services Requirements
- Short Message Service Requirements
- Data Services
- Technical Documentation
- Appendix A – PRI guidelines and example

In addition, UIM toolkit requirements and over-the-air SMS management of the PRL are referenced in Appendices B and C.

1.3 Reference Documents

3GPP2 reference documents can be found at

http://www.3gpp2.org/Public_html/specs/index.cfm.

CDG reference documents can be found at http://www.cdg.org.

CCF reference documents can be found at http://www.globalccf.org.

Standard	Description
3GPP TS 11.11 V8.5.0	Specification of the Subscriber Identity Module – Mobile Equipment (SIM – ME) interface
C.R1001-G v1.0 (TSB-58-I)	Administration of Parameter Value Assignments for cdma2000 Spread Spectrum Standards
C.S0001-0-2 v1.0 (IS-2000.1-2)	Introduction to cdma2000® Standards for Spread Spectrum Systems - Addendum 2 (Release 0)
C.S0002-0-2 (IS-2000.2-2)	Physical Layer Standard for cdma2000® Spread Spectrum Systems - Addendum 2 (Release 0)
C.S0002-E v1.0	Physical Layer Standard for cdma2000® Spread Spectrum Systems – Revision E (Version 1.0)
C.S0003-0 v3.0 (IS-2000.3-2)	Medium Access Control (MAC) Standard for cdma2000® Spread Spectrum Systems - Addendum 2 (Release 0)
C.S0004-0-2 (IS-2000.4-2)	Signaling Link Access Control (LAC) Standard for cdma2000® Spread Spectrum Systems - Addendum 2 (Release 0)
C.S0005-0-2 (IS-2000.5-2)	Upper Layer (Layer 3) Signaling Standard for cdma2000® Spread Spectrum Systems - Addendum 2 (Release 0)
C.S0005-E v1.0	Upper Layer (Layer 3) Signaling Standard for cdma2000® Spread Spectrum Systems – Revision E (Version 1.0)
C.S0011-B	Recommended Minimum Performance Standards for cdma2000® Spread Spectrum Mobile Stations
C.S0014-A	Enhanced Variable Rate Codec, Speech Service Option 3 for Wideband Spread Spectrum Digital Systems - Addendum 3
C.S0014-D v1.0	Enhanced Variable Rate Codec, Speech Service Option 3, 68, 70, and 73 for Wideband Spread Spectrum Digital Systems (Version 1.0)
C.S0014-C v1.0 (TIA-127-C)	Enhanced Variable Rate Codec, Speech Service Options 3, 68, and 70 for Wideband Spread Spectrum Digital Systems
C.S0015-A	Short Message Services for Wideband Spread Spectrum Systems

Standard	Description
C.S0016-D	Over-the-Air Service Provisioning of Mobile Stations in Spread Spectrum Systems
C.S0017-0-2	Data Service Options for Spread Spectrum Systems - Addendum 2
C.S0017-03	Data Service Options for Spread Spectrum Systems Addendum 3 - cdma2000® High Speed Packet Data Service Option 33
C.S0020-A	High Rate Speech Service Option 17 for Wideband Spread Spectrum Communication Systems - Addendum 2
C.S0023-C v1.0 (TIA-820-D)	Removable User Identity Module for Spread Spectrum Systems
C.S0037-0 v1.0 (TIA-918)	Signaling Conformance Tests for cdma2000® Spread Spectrum Systems
C.S0065-B v1.0	cdma2000 Application on UICC for Spread Spectrum Systems
C.S0066-0 v2.0	Over-the-Air Service Provisioning for MEID-Equipped Mobile Stations in Spread Spectrum Systems
C.S0072-0	MEID for CDMA2000
CDG Document143	Recommended System Selection Requirements for 1X and 1xEV-DO - Capable Terminals
ETSI TS 102 221 v9.1.0	Smart Cards; UICC-Terminal interface; Physical and logical characteristics
GSMA DG.06 v4.0	IMEI Allocation and Approval Guidelines.
RFC2396	Uniform Resource Identifiers (URI): Generic Syntax http://www.ietf.org/rfc/.
X.S0008-0 v3.0	MAP Support for the Mobile Equipment Identity (MEID)
C.S0099-0 v1.0	Guidelines for using cdma2000 1x Revision E Features on Earlier Revisions

1.4 Acronyms and Abbreviations

Table 1-1: Acronyms and Abbreviations

Acronym / Abbreviation	Description
AMPS	Advanced Mobile Phone System (Analogue Cellular)
AT	Attention Commands
CAVE	Cellular Authentication and Voice Encryption
CCF	CDMA Certification Forum
CDG	CDMA Development Group
CDMA	Code Division Multiple Access
CDMA Card	Either an R-UIM card or a card with a CSIM application
Cdma2000®	TIA/EIA/IS-2000, with a 1.2288 MHz spreading rate
CFB	Call Forwarding Busy
CFNA	Call Forwarding No Answer
CFU	Call Forwarding Unconditional
CHAP	Challenge Handshake Authentication Protocol
CLIP	Calling Line Identification Presentation
CM Service Req	Connection Management Service Request
CS	Circuit Switched
CSIM	CDMA2000 Application on UICC
CVT	Compliance Verification Test
CW	Call Waiting
DAK	Delivery ACK
DLL	Dynamic-Link Library
DTMF	Dual Tone Multiple Frequency
EHDM	Extended Handoff Direction Message
ESCAM	Extended Supplemental Channel Assignment Message
ESN	Electronic Serial Number
EUIMID	Expanded UIM Identifier

Acronym / Abbreviation	Description
EVRC	Enhanced Variable Rate Vocoder
F-SCH	Forward Supplemental Channel
FTP	File Transfer Protocol
GEM	General Extension Message
GHDM	General Handoff Direction Message
GSM	Global System for Mobile communication
HTTP	Hypertext Transfer Protocol
IM	Instant Messaging
IMSI	International Mobile Subscriber Identity
IOTA	IP-based Over the Air
IPCP	PPP Internet Protocol Control Protocol (see RFC 1332)
IRDA	Infrared Data Association
LBS	Location Based Services
LCP	Link Control Protocol (see RFC 1661)
MAC	Medium Access Control
MCC	Mobile Country Code
MDN	Mobile Directory Number
MECAM	MEID Extended Channel Assignment Message
MEID	Mobile Equipment Identifier
MIN	Mobile Identifier Number
MMS	Multimedia Messaging Service
MNC	Mobile Network Code
MUHDM	MEID Universal Handoff Direction Message
MWI	Message Waiting Indication
NAM	Number Assignment Module
NID	Network Identification
OEM	Original Equipment Manufacturer

Acronym / Abbreviation	Description
OOA	Original Originating Address
OSMS	Over-the-Air Short Message Service
OTA	(Push) Over The Air
OTAPA	Over-the-Air Parameter Administration
OTASP	Over-the-Air Service Provisioning
OTKSL	One Time Key Subsidy Lock
PAP	Password Authentication Protocol
PCF	Packet Control Function
PDSN	Packet Data Serving Node
PI	Presentation Indicator
PPP	Point-to-Point Protocol
PRI	Product Release Instruction
PRL	Preferred Roaming List
PSMM	Pilot Strength Measurement Message
PST	Programming Service Tool
QCELP	Qualcomm Code Excited Linear Predictive
RC	Radio Configuration
RF	Radio Frequency
RLP	Radio Link Protocol
R-SCH	Reverse Supplemental Channel
R-UIM	Removable Universal Identity Module
SAR	Specific Absorption Rate
SID	System Identification
SIR	Service Initiation Request
SDMPI	Standard Diagnostic Monitor Programming Interface
SEA	South East Asia
SL	Service Loading

Acronym / Abbreviation	Description
SMS	Short Message Service
SPC	Service Programming Code (see TIA/EIA/IS-683A)
SSD	Shared Secret Data
TCP	Transmission Control Protocol
TLS	Transport Layer Security
UAPROF	User Agent Profile
UDP	User Datagram Protocol
UHDM	Universal Handoff Direction Message
UIM	Universal Identity Module
UIM_ID	UIM Identifier
UTK	UIM Tool Kit
VM	Voice Mail
WAP	Wireless Application Protocol

1.5 Terms and Definitions

Four categories of requirements are established:

(M) Mandatory	The handset **must** support that characteristic in order to achieve approval.
(HD) Highly Desirable	It is highly desirable and recommended that the handset supports this characteristic. This feature may become Mandatory in subsequent versions of the document. Supporting this characteristic will be valued in the commercial promotion of the terminal.
(O) Optional	It is left up to the manufacturer whether or not the terminal supports this characteristic. The handset **may** support this characteristic.
(D) Discard	The manufacturer **should not** support this feature or function.

1.6 Carrier Acceptance

The documentation and equipment that shall be delivered to the CDMA2000® 1x Operator for technical evaluation is detailed below.

1.6.1 Documentation

Req. #	Requirement	Category	Remarks	References	PRI Configurable
1.6.1.1	GHRC compliance report detailing compliance or non-compliance to each of the relevant performance specifications	M			
1.6.1.2	CCF Test Process documentation	M	Alternative to CDG test process documentation		
1.6.1.3	CDG Test Process	M	Alternative to CCF test process documentation		
1.6.1.4	Report for SAR (Specific Absorption Rate) tests	M			
1.6.1.5	SAR evaluation certificate	M			
1.6.1.6	Encrypted data base with the A-keys in electronic format, corresponding to the devices delivered (ESNs)	M			
1.6.1.7	Encrypted data base with Service Programming Codes (SPC 1,2,3) and OTKSL	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
1.6.1.8	Terminal information for type approval: necessary documentation to prove that the relevant regulatory compliance has been achieved	M			
1.6.1.9	Software and Hardware version codes and a detailed description of how to verify them	M			
1.6.1.10	Color pictures of the handset in JPEG, GIF or BMP format with at least 300 dpi resolution	M			
1.6.1.11	Electronic version of the device User's Manual, in English, including information about installation, configuration, and troubleshooting	M			
1.6.1.12	Local regulatory body approval requirement for software/hardware	M	Examples of local regulatory bodies include FCC or IC		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
1.6.1.13	Change notes if submitted product is different to the certified software/hardware version	M			
1.6.1.14	Description of how low battery alert is implemented in terminal (i.e., logic by which alert is triggered)	M			
1.6.1.15	Description of available memory for user data including address book	M			
1.6.1.16	Description of available memory space for downloadable content (if applicable) and application downloads (if applicable).	M			
1.6.1.17	Description of memory allocation – static or dynamic	M			

1.6.2 Programming, Configuration and Maintenance Tools

Supplier must provide: software tools and cables for programming, configuration, software download, parameter changes and remote maintenance purposes, considering the following items:

Req. #	Requirement	Category	Remarks	References	PRI Configurable
1.6.2.1	Tools and procedures for terminal configuration and programming via keypad	M			
1.6.2.2	Tools and procedures for software version upgrade through serial cables	M			
1.6.2.3	Software support for either Serial cable or USB	M			
1.6.2.4	PRL editor	M			
1.6.2.5	GUI PST compatible with WIN2K & XP (i.e., UPST)	M			
1.6.2.6	Tools, procedures, cables and peripherals (if any) to support logging of a data call – i.e., separation of diagnostic and logging streams from the data stream	M			

1.6.3 Basic Software Tools

Req. #	Requirement	Category	Remarks	References	PRI Configurable

Req. #	Requirement	Category	Remarks	References	PRI Configurable
1.6.3.1	The basic software tool shall support Windows XP and Windows2000.	M			
1.6.3.2	The tool shall allow Configuration of basic terminal parameters like MIN, SID, NID, RF channels, vocoder type and other basic parameters.	M			
1.6.3.3	The tool shall allow the operator to download new terminal operational software version and new parameter configuration files.	M			
1.6.3.4	Progressive PSTs for various models should be incorporated into a single Windows based GUI.	M			
1.6.3.5	Any DLLs for new models should have an installation application.	M			

1.6.4 Advanced Software Tools

Req. #	Requirement	Category	Remarks	References	PRI Configurable
1.6.4.1	The advanced tool shall allow the execution of the same procedures described in the previous item 1.6.2.1.	M			
1.6.4.2	Perform simultaneous Layer 3 data and radio logging.	M			
1.6.4.3	Visualize and save, for further analysis, IS-2000 messages exchanged between the terminal and BTS.	M			
1.6.4.4	As a minimum, advanced software tools should meet the requirements outlined in CDG document #45 including the SDMPI document. Advanced software tools should include a windows based viewer tool.	M			

1.6.5 Hardware

Req. #	Requirement	Category	Remarks	References	PRI Configurable
1.6.5.1	RF cables to allow testing to be done in laboratory environment.	M			
1.6.5.2	The terminal shall have a RF test port for RF testing and the RF connector shall not inject a loss of more than 0.5dB.	M			
1.6.5.3	Data cable (USB or Y cable if RS-232). T	M	There should be a minimum of one Y cable per device.		
1.6.5.4	Terminal for testing	M			

1.6.6 End User Software

End user software provided should include the following:

Req. #	Requirement	Category	Remarks	References	PRI Configurable
1.6.6.1	For CDMA2000® 1X data support, any necessary connectivity software (to be supplied in a CD-ROM) for CDMA2000® 1X data transmission shall be included.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
1.6.6.2	Address book transfer and down load from CSV or XLS file formats.	M			
1.6.6.3	PC-Sync software.	M			

2. Carrier/Network Specific Software Options

The CDMA2000® 1X Operator will provide a document specifying the software features that are applicable for the target network. This document shall also specify which of the highly desirable and optional requirements the operator requires.

2.1 PRI: Product Release Instruction

The CDMA2000® 1x Operator will provide the PRI in a document. An example is provided in Appendix A. This document contains the parameter values that shall be programmed into the device prior to shipment to the CDMA2000® 1x Operator.

PRI format shall be in Excel.

PRI format should be in XML (highly desirable).

3. General Base CDMA Requirements

The convention for the CDMA requirements is:

The feature set defined herein is the nominal set of features that a cdma2000® Release-0 mobile is required to support in order to offer acceptable voice and data services in both the home and foreign networks.

MOB_P_REV values are:

3 – IS-95A

4 – IS-95B

5 – IS-95B

6 – cdma2000® Release-0

The statement "≤" following a given MOB_P_REV value means that all features listed under that MOB_P_REV are supported, as well as all features listed under all mobile protocol revisions less than or equal to the stated value.

The feature set identified by this document is the nominal set of features that a cdma2000® Release-0 mobile is required to support in order to offer basic voice and data services while roaming. Such mobile can roam into a visited 1x system or IS-95 system.

3.1 Versions of CDMA

The following requirements apply to devices supporting IS-2000 (CDMA2000® 1xRTT).

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.1.1	The handset shall support IS-2000 Release 0.	M		C.S0001-0-2 C.S0002-0-2 C.S0003-0-2 C.S0004-0-2 C.S0005-0-2	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.1.2	The handset shall support the IS-2000 Release 0 Addendum 2.	M		C.S0001-0-2 C.S0002-0-2 C.S0003-0-2 C.S0004-0-2 C.S0005-0-2	
3.1.3	The handset shall support IS-95B (P_Rev = 5)	M	Exceptions to this requirement are support for PUF and PACA This requirement shall be optional beginning June 30, 2006.	C.S0001-0-2 C.S0002-0-2 C.S0003-0-2 C.S0004-0-2 C.S0005-0-2	

3.2 Frequency Bands/Modes

The frequency band support shall be as described below. Also refer to 3GPP2 doc C.S0011-B.

Technology	Frequency (MHz)	Category
CDMA IS-2000/IS-95A, Band Class 0	800MHz (A and B bands)	
CDMA IS-2000/IS-95A, Band Class 0	800MHz Korean Cellular (channel support 1011 - 779)	
CDMA IS-2000/IS-95A, Band Class 1	1900MHz	
CDMA IS-2000/IS-95A Band Class 5/11	450MHz	
CDMA IS-2000/IS-95A Band Class 6	2100MHz	
AMPS	800MHz (A and B bands)	

3.3 Mobile Station Class

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.3.1	All mobiles including band class 0, 1, 5, 6, and 11 shall support mobile station class III operation.	M			

3.4 Physical Channel Support Requirements

This section defines the minimum requirements for the CDMA2000® 1x RTT physical channels.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.4.1	The MS shall minimally support **MOB_P_REV = 6**.	M			
3.4.2	The MS shall minimally support up to 3 standard common Quick Paging channels (**F-QPCH**), at both 9.6 kbps and 4.8 kbps for a **MOB_P_REV = 6**.	M	QPCH is a key factor for standby time improvements.	C.S0002-0-2, §3.1.3.6 C.S0005-0-2 §2.6.2.1.2	
3.4.3	The MS shall minimally support Slot Cycle Index (SCI) 0 – 7.	M			Yes

3.5 Radio Configuration Requirements

This section defines the minimum requirements for the CDMA2000® 1x RTT radio configurations.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.5.1	The MS shall minimally support the Radio configuration **RC1** for the FORWARD LINK.	M		C.S0002-0-2, §3.1.3.1	
3.5.2	The MS shall minimally support the Radio configuration **RC1** for the REVERSE LINK.	M		C.S0002-0-2, §2.1.3.1	
3.5.3	The MS shall minimally support the Radio configuration **RC3** for the FORWARD LINK.	M		C.S0002-0-2, §3.1.3.1	
3.5.4	The MS shall minimally support the Radio configuration **RC3** for the REVERSE LINK.	M		C.S0002-0-2, §2.1.3.1	
3.5.5	The MS shall minimally support the Radio configuration **RC4** for the FORWARD LINK.	M		C.S0002-0-2, §3.1.3.1	

3.6 Data Rate Requirements

This section defines the minimum requirements for the CDMA2000® 1x RTT data rates.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.6.1	The MS shall minimally support the Rate Set 1 at a maximum data rate of 9.6 kbps for Radio configuration RC1 for the Forward and Reverse Fundamental Channels (F/R-FCH).	M		C.S0002-0-2, §2.1.3.1, §3.1.3.1	
3.6.2	The MS shall minimally support the Rate Set 1 at a maximum data rate of 9.6 kbps for Radio configurations RC3 and RC4 for the Forward Fundamental Channel (F-FCH).	M		C.S0002-0-2, §3.1.3.1	
3.6.3	The MS shall minimally support the Rate Set 1 at a maximum data rate of 9.6 kbps for Radio configuration RC3 for the Reverse Fundamental Channel (R-FCH).	M		C.S0002-0-2, §2.1.3.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.6.4	The MS shall minimally support the **Rate Set 2** at a maximum data rate of **14.4 kbps** for Radio configuration **RC2** for the Forward and Reverse Fundamental Channels (**F/R-FCH**).	M		C.S0002-0-2, §2.1.3.1, §3.1.3.1	
3.6.5	The MS shall minimally support the **Rate Set 2** at a maximum data rate of **14.4 kbps** for Radio configuration **RC5** for the Forward Fundamental Channels (**F-FCH**).	M		C.S0002-0-2, §2.1.3.1, §3.1.3.1	
3.6.6	The MS shall minimally support the **Rate Set 2** at a maximum data rate of **14.4 kbps** for Radio configuration **RC4** for the Reverse Fundamental Channels (**R-FCH**).	HD		C.S0002-0-2, §2.1.3.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.6.7	The MS shall minimally support the **Rate Set 1** at a maximum data rate of **153.6 kbps** for radio configurations **RC3** and **RC4** for the Forward Supplemental Channel (**F-SCH**).	M	153.6 is the maximum permitted data rate for Release-0 (not including FCH) at the physical layer.	C.S0002-0-2, §3.1.3.1	
3.6.8	The MS shall minimally support **Rate Set 1 up to a data rate of 153.6 kbps** for radio configuration **RC3** for the Reverse Supplemental Channel (**R-SCH**).	M	153.6 is the maximum permitted data rate for Release-0 (not including RCH) at the physical layer.	C.S0002-0-2, §2.1.3.1,	
3.6.9	The MS shall minimally support, for **Rate Set 1** in radio configuration **RC3,** the following set of maximum simultaneous data rates of 153.6 kbps F-SCH and 153.6 kbps R-SCH.	M	Numbers are for SCH only – does not include FCH (9.6kbps).	C.S0002-0-2, §2.1.3.1, §3.1.3.1	

3.7 Power Control Requirements

This section defines the minimum requirements for the CDMA2000® 1x RTT power

control.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.7.1	The MS shall support reverse link power control with **step size = 0.5 dB**.	M		C.S0002-0-2, §2.1.2.3.2	
3.7.2	The MS shall support reverse link power control with **step size = 0.25 dB**.	HD		C.S0002-0-2, §2.1.2.3.2	
3.7.3	The MS shall support **mode 000** (800Hz) Forward Power Control for the Fundamental Channel (**F-FCH)**.	M		C.S0002-0-2, §2.1.3.1.10.1	
3.7.4	The MS shall support **mode 001** (400/400 Hz Forward Power Control for the Fundamental Channel (**F-FCH)** and Supplemental channel (**F-SCH)**.	M		C.S0002-0-2, §2.1.3.1.10.1	
3.7.5	The MS shall support **mode 010** (200/600 Hz) Forward Power Control for the Fundamental Channel (**F-FCH)** and Supplemental channel (**F-SCH)**.	O		C.S0002-0-2, §2.1.3.1.10.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.7.6	The MS shall support **mode 011** (50 Hz) Forward Power Control for the Fundamental Channel (**F-FCH)**.	O		C.S0002-0-2, §2.1.3.1.10.1	

3.8 Other Physical Layer Requirements

This section defines other physical layer minimum requirements.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.8.1	The device shall support turbo coding for MOB_P_REV=6.	M	Convolutional coding is minimum required.	C.S0002-0-2, §2.1.3.1.4.2	
3.8.2	The device shall support Quasi-Orthogonal Functions.	M		C.S0002-0-2, §3.1.3.1.12	
3.8.3	The device shall support Multi-LTU Convolutional Coding.	M		C.S0003-0-2, §2.2.2.2.1.3.4	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.8.4	The device shall support, for MOB_P_REV=6, 1/8th rate TCH gating including all allowed RPC delays with this feature (1 to 4 pcgs).	M	Send traffic and pilot channels using a 50 % duty cycle (2PCG on, 2 off, etc) for each 1/8 rate R-FCH frame. Used only in RC 3 or 4, when no other channels other than the R-FCH and pilot are transmitted. Results in talk time savings, but reduces PC rate to 400 Hz during 1/8 rate frames.	C.S0002-0-2, §2.1.3.7.8	
3.8.5	The device shall support Slotted Mode Timer.	M	Slotted mode timer forces the MS to stay in non-slotted mode for a configurable time period before going back to slotted mode. This improves performance, especially for data services.	C.S0005-0-2, §2.6.2 "§3.7.3.3.2.7, §2.7.4.25, §3.7.4	

3.9 Handoff Requirements

This section defines other physical layer minimum requirements.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.9.1	The device shall support P_REV=6 to P_REV=6 voice soft, softer handoff.	M		C.S0005-0-2, §3.7.3.3.2.36	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.9.2	The device shall support P_REV=6 to P_REV=6 hard handoff.	M	TC Preamble in units of 1.25 ms or 20 ms depending on RC Class shall both be supported. This requirement is for both voice-only and voice and data devices.	C.S0005-0-2, §3.7.3.3.2.36	
3.9.3	The device shall support P_REV=6 to/from P_REV=3 voice hard handoff.	M		C.S0005-0-2, §3.7.3.3.2.36	
3.9.4	The device shall support P_REV=5 to P_REV=6 handoff (In-traffic and Idle).	M		C.S0005-0-2, §3.7.3.3.2.36	
3.9.5	The device shall support P_REV=6 to P_REV=5 handoff (In-traffic and Idle).	M		C.S0005-0-2, §3.7.3.3.2.36	
3.9.6	The device shall support EVRC 8k P_REV=6 to/from EVRC P_REV=3.	M		C.S0005-0-2, §3.7.3.3.2.36	
3.9.7	The device shall support 13k P_REV=6 to/from 13k P_REV=3.	HD		C.S0005-0-2, §3.7.3.3.2.36	
3.9.8	The device shall support Packet data FCH soft, softer handoff.	M		C.S0005-0-2, §3.7.3.3.2.36	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.9.9	The device shall support Packet data FCH hard handoff.	M		C.S0005-0-2, §3.7.3.3.2.36	
3.9.10	The device shall support Packet data SCH soft, softer handoff.	M	Mandatory when SCH is supported.	C.S0005-0-2, §3.7.3.3.2.36	
3.9.11	The device shall support Packet data DCCH soft and softer handoff.	O	Mandatory when DCCH is supported.	C.S0005-0-2, §3.7.3.3.2.36	
3.9.12	The device shall support Packet data DCCH hard handoff.	O	Mandatory when DCCH is supported.	C.S0005-0-2, §3.7.3.3.2.36	
3.9.13	The device shall support SCH Reduced Active Set.	M		C.S0005-0-2, §3.7.3.3.2.36	
3.9.14	The device shall support Mobile Assisted Hard Handoff (MAHHO).	M	Includes Candidate Frequency Searching with and without Return on Failure. This requirement shall become mandatory beginning Q3, 2005.	C.S0005-0-2, §2.6.6.2.5.1, §2.6.6.2.8, §2.7.2.3.2.19, §2.7.2.3.2.20, §3.7.3.3.2.27, §3.7.3.3.2.28	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.9.15	The device shall support Hard Hand-off Improvement.	M	Changes to MAHHO, including addition of thresholds based on E_c/I_o or E_c, ability to report the number of visits in CF Search Report Message, and using fixed length search periods. This requirement shall become mandatory beginning Q3, 2005.	C.S0005-0-2, §2.6.6.2.5.1, §2.6.6.2.8, §2.7.2.3.2.19, §2.7.2.3.2.20, §3.7.3.3.2.27, §3.7.3.3.2.28	
3.9.16	The device shall support Access Entry Handoff.	M	Enhances performance but does not limit basic services.	C.S0005-0-2, §2.6.2.3	
3.9.17	The device shall support Access Handoff.	M	Enhances performance but does not limit basic services.	C.S0005-0-2, §2.6.3.1.3.2	
3.9.18	The device shall support Access Probe Handoff.	M	Enhances performance but does not limit basic services.	C.S0005-0-2, §2.6.3.1.3.3	
3.9.19	The device shall support Channel Assignment into Soft Handoff.	M	Enhances performance but does not limit basic services.	C.S0005-0-2, §3.7.2.3.2.21	
3.9.20	The device shall support the Network Directed System Selection (NDSS)	O		C.S0005-0-2, §2.6.1.1	
3.9.21	The device shall support handoff to/from QPCH and Non-QPCH enabled sectors.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.9.22	The terminal shall support Optional Reconnect After Hard Handoff.	HD			
3.9.23	The terminal shall support Optional Packet Data Dormant Timer Control.	M		C.S0017-012-A §2.2.4	
3.9.24	The terminal shall support Optional Packet Zone Reconnection Control.	M		C.S0017-012-A §2.2.5	
3.9.25	The terminal shall support Optional Strongest Pilot Monitoring and Reporting.	M		C.S0017-012-A §2.2.6	
3.9.26	The terminal shall support SID/NID Hysteresis.	M	Reduce the number of times the terminal detects a change in packet zone and correspondingly reduces the number of terminal reconnection attempts due to a change in packet zone.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.9.27	If the terminal supports EVRC-B codec, it shall support handoff from EVRC-0 and EVRC-B and vice-versa.	M			

3.10 Layer 2 and Layer 3 Minimum Requirements

This section defines Layer 2 and Layer 3 minimum requirements.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
Layer 3 / Signaling Features					
3.10.1	The device shall support Service Negotiation and Capability Reporting. It should be supported in both idle mode and traffic mode.	M	Service negotiation as per IS-95B/ IS-2000. Capability Reporting using the capability-related info records (e.g., MS Capability Information and Channel Configuration).	C.S0005-0-2, §2.6.4.1.2 §2.7.4.25 §2.7.4.27	
3.10.2	The device shall support the Retry Order.	M	Allows BS to make MS cease trying to originate a call for a packet service option for a certain time period or indefinitely. Retry order can be used also to stop the MS from asking for an R-SCH assignment or to go to Active from Control Hold.	C.S0005-0-2, §3.7.4.7	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.10.3	The device shall support the Extended GSRM.	M	EGSRM provides service provider flexibility in separating MS by capability beyond GSRM.	C.S0005-0-2, §3.7.2.3.2.27	
3.10.4	The device shall support the Broadcast Messages/ Pages on PCH.	M		C.S0005-0-2, §3.6.2.4 §2.6.2.1.1.1.2	
3.10.5	The device shall support Preferred Roaming Lists.	M		C.S0016-0-2, §3.5.5	
Layer 2 / LAC Features					
3.10.6	The device shall support the Protocol Discriminator (PD) on Access Channel.	M		C.S0004-0-2, §2.1.1.4.1.1.1	
3.10.7	The device shall support Origination Continuation Message	M	Support longer dialing digits than that currently supported in Origination Message. Facilitate implementation international longer digits dialing for potential new service.		

3.11 Service Option Support Minimum Requirements

This section defines Layer 2 and Layer 3minimum requirements.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.11.1	The device shall support SO2: Rate Set 1 Mobile Loopback	M		C.R1001-0 §3.1	
3.11.2	The device shall support SO3: Enhanced Variable Rate Voice Service (8kbps).	M	EVRC	C.R1001-0 §3.1	
3.11.3	The device shall support SO4: Asynchronous Data Service.	O		C.R1001-0 §3.1	
3.11.4	The device shall support SO4100: Asynchronous Data Service.	O		C.R1001-0 §3.1	
3.11.5	The device shall support SO5: Group 3 Facsimile.	O		C.R1001-0 §3.1	
3.11.6	The device shall support SO4101: Group 3 Facsimile.	O		C.R1001-0 §3.1	
3.11.7	The device shall support SO6: Short Message Services.	M	Per IS-637, Rate Set 1 SMS, both MS terminated and Originated.	C.R1001-0 §3.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.11.8	The device shall support SO7: Packet Data Service: Internet Protocol Stack only.	M		C.R1001-0 §3.1	
3.11.9	The device shall support SO9: Rate Set 2 Mobile Loopback	O		C.R1001-0 §3.1	
3.11.10	The device shall support SO4103: Packet Data Service: Internet Protocol Stack only.	O		C.R1001-0 §3.1	
3.11.11	The device shall support SO12: Asynchronous Data Service.	O	Async Data	C.R1001-0 §3.1	
3.11.12	The device shall support SO13: Group 3 Facsimile.	O		C.R1001-0 §3.1	
3.11.13	The device shall support SO14: Short Message Services.	O	Per IS-637, Rate Set2 SMS, both MS terminated and Originated.	C.R1001-0 §3.1	
3.11.14	The device shall support SO15: Packet Data Service: Internet Protocol Stack only.	O		C.R1001-0 §3.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.11.15	The device shall support SO17: High Rate Voice Service (13 kbps).	HD	13k voice	C.R1001-0 §3.1	
3.11.16	The device shall support SO32768: High Rate Voice Service (13 kbps).	M	13k voice	C.R1001-0 §3.2	
3.11.17	The device shall support SO18: Over-the-Air Service Administration – OTAPA.	M	Per IS-683-A	C.R1001-0 §3.1	
3.11.18	The device shall support SO19: Over-the-Air Service Administration – OTAPA.	O	Per IS-683-A	C.R1001-0 §3.1	
3.11.19	The device shall support SO33: 1x High Speed Packet Data Service (RC>2).	M	Release 0 (P_REV 6) uses IS-707-A-1.	C.R1001-0 §3.1	
3.11.20	The device shall support SO35: Location Services (Rate Set1).	O	M if position location desired.	C.R1001-0 §3.1	
3.11.21	The device shall support SO36: Location Services (Rate Set2).	O	M if position location desired.	C.R1001-0 §3.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.11.22	The device shall support SO54: Markov Service Option (MSO).	M		C.R1001-0 §3.1	
3.11.23	The device shall support SO32798: Markov Calls (Rate Set1).	HD		C.R1001-0 §3.2	
3.11.24	The device shall support SO32799: Markov Calls (Rate Set2).	HD		C.R1001-0 §3.2	
3.11.25	The device shall support SO68: EVRC-B.	M		TSB-58-H	

3.12 MEID Terminals

This section defines requirements for terminals that use MEID as hardware identifier.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.12.1	If the terminal is MEID based it shall support C.S0072-0, “MEID for CDMA2000”.	M		C.S0072-0	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
3.12.2	If the terminal is MEID based it SHALL include EITHER a label with the MEID printed as 15 digits (including check digit) in human readable and bar code format OR a label with the MEID printed as 19 digits (decimal format, including check digit) in human readable and bar code format OR both.	M		X.S0008, GSMA DG.06	
3.12.3	If the MEID is displayed in the 15 digit format the check digit shall be calculated with base 16 if the first MEID digit is 'A'-'F', with base 10 otherwise.	M		X.S0008	

4. Hardware-Related Requirements

4.1 SPEECH CODEC

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.1.1	The handset shall use 8K-EVRC as the initial pre-set option for voice.	M		TIA/EIA/IS-127	Yes
4.1.2	The handset shall support 13K-QCELP.	HD		TIA/EIA/IS-733	Yes
4.1.3	The handset shall support EVRC-B codec.	M		C.S0014-C v1.0 (TIA-127-C)	Yes
4.1.4	The handset may support AMR.	O	Support for this vocoder is useful for VAS such as MMS or Video services.		

4.2 AUDIO CODEC

This section covers audio codecs that may be useful for value added services.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.2.1	The handset shall use 13K-QCELP.	HD		TIA/EIA/IS-733	
4.2.2	The handset may support AMR.	O	Support for this vocoder is useful for VAS such as MMS or Video services.		

4.3 CDMA Card

The CDMA2000® 1x Operator may or may not have plans for CDMA Card usage. Devices that support a CDMA Card must meet the following requirements. Terminal must be compliant with C.S0023 (R-UIM) and C.S0065 (CSIM).

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.3.1	The terminal shall support R-UIM enable/disable specified by the CDMA2000® 1x Operator.	HD	This option may be controlled by any means not directly accessible to the user, including separate device software.		
4.3.2	If the R-UIM option is enabled only the CDMA Card shall be used for provisioning and authentication.	M			
4.3.3	If the R-UIM option is enabled, only the CDMA Card shall be used for voice privacy mask.	O			
4.3.4	Any parameters cached in the handset when a CDMA Card is inserted shall be cleared when a different CDMA Card is inserted.	M			
4.3.5	The driver for the CDMA Card shall include support for direct mode convention.	M		ISO/IEC 7816-3, section 6.4.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.3.6	The driver for the CDMA Card shall include support for inverse mode convention.	M		ISO/IEC 7816-3, section 6.4.1	
4.3.7	The terminal's CDMA Card shall conform to 3GPP2 C.S0023 and C.S0065.	M	Includes support for OTASP and OTAPA PRL updates to R-UIM.	C.S0023, C.S0065	
4.3.8	The physical CDMA Card socket of the terminal shall follow the definitions specified in ETSI TS 102 221.	M		Section 4 of ETSI TS 102 221	
4.3.9	The terminal shall supply the operating voltage for the CDMA Card according to ETSI TS 102 221.	M		Section 5 of ETSI TS 102 221	
4.3.10	The terminal shall support the CDMA Card clock frequency: 4MHz (3V).	M			
4.3.11	The terminal shall support the CDMA Card with the capacities of 32 Kbytes, 64 Kbytes, or higher.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.3.12	The terminal shall support the selection of optional languages and character sets in the CDMA Card via Terminal keypad.	HD	The information on the CDMA Card must be presented in the language selected on the handset by the user.		
4.3.13	The security access to applications (Authentication of user to applications) of the CDMA Card shall support CHV1 defined in 3GPP 11.11.	M			
4.3.14	The security access to applications (Authentication of user to applications) of the CDMA Card shall support CHV2 defined in 3GPP 11.11.	O			
4.3.15	The terminal shall support the storage and editing of the phonebook and SMS both in the Terminal itself and in the R-UIM (default).	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.3.16	The device shall support for OSMS.	M	The terminal shall support the OSMS functionality is detailed in Appendix C.		
4.3.17	The terminal shall fully comply with and support UIM toolkit functionality/ feature as described in Appendix B.	M			
4.3.18	The terminal shall fully comply with and support CCAT.	O		C.S0035-0	
4.3.19	The PRL require-ments stated in Section 6.1 shall apply to the PRL contained in the CDMA Card.	M			
4.3.20	The terminal shall have the ability to check and accept only “Operator” CDMA Cards.	M	The terminal shall have a software mechanism that can detect and check Mobile Country Code (MCC) and Mobile Network Code (MNC) in in the CDMA Card EF-IMSI_M against the MCC and MNC of the device or a range of MINs. The MCC and MNC are the first five digits of the IMSI_M.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.3.21	If a non-“Operator” CDMA Card is detected; the device shall display the popup error message “Please insert Operator CDMA Card” (or equivalent in local language).	M	The device shall still be able to make emergency calls even if non-Operator CDMA Card is detected.		
4.3.22	If a terminal supports CDMA Cards with SF_EUIMID it shall support C.S0023 and C.S0065.	M			
4.3.23	If a terminal supports CDMA Cards with SF_EUIMID it shall support UsgInd bit 2 and allow the SF_EUIMID to override the MEID.	M			

4.4 External Interfaces

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.4.1	External interfaces shall be standardized for models of the same manu-facturer.	HD	The interfaces for all models of the same manufacturer are preferred to be the same, particularly the data cables and battery charger.		
4.4.2	If the device supports data functions, it shall support a data interface.	HD			
4.4.3	The device shall support SD™ (secure digital), SD-MMC™, and T-FLASH™.	O	Removable media		
4.4.4	The device shall support MMC™ memory card.	O	Multimedia Card, removable media		
4.4.5	The device shall provide Hands free Operation.	M	Standard 2.5mm headset jack or other non-standard headset jack is typically used for this requirement.		
4.4.6	The device shall support Bluetooth®.	HD			
4.4.7	The device shall provide an external RF port for Hands free Kit.	HD			
4.4.8	The device shall support far-field speaker output.	HD	Speaker phone		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.4.9	The device shall support IrDA™.	O			
4.4.10	The device shall support a built-in camera.	HD			

4.5 External Memory Management

The following requirements apply if the terminal supports an external memory card.

4.5.1 General Memory Card Support

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.5.1.1	External Memory Card support **SHALL** be compliant to SD Specification V2.0 or higher	M		http://www.sdcard.org	N/A
4.5.1.2	The terminal **SHALL** support SDHC family of cards	M	SDHC are the High Capacity family of cards supporting up to 32 GB of memory	http://www.sdcard.org	N/A
4.5.1.3	The terminal **SHOULD** support SDXC family of cards	HD	SDXC are the Extended Capacity family of cards supporting up to 2TB of memory	http://www.sdcard.org	N/A

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.5.1.4	The terminal **SHALL** support one of the following formats: - SD - MiniSD - MicroSD	M			N/A

4.5.2 Card Security

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.5.2.1	The terminal **SHALL** support complying to the write protection notch on the physical card	M		http://www.sdcard.org	N/A
4.5.2.2	The terminal **SHALL** support complying to the card password	M	Card password prevents the terminal from reading and writing data to the card without the supplied password by the user	http://www.sdcard.org	N/A
4.5.2.3	The terminal **SHALL** allow for the user to format the card for re-use should a password not be supplied to unlock the card	M		http://www.sdcard.org	N/A

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.5.2.4	The terminal **SHOULD** support the Content Right Protection Management (CPRM) DRM Schema	HD		http://www.sdcard.org	N/A
4.5.2.5	The terminal **SHALL** support OMA DRM Forward Lock	M		http://www.openmobilealliance.org	N/A

4.5.3 I/O Functionality

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.5.3.1	The terminal **SHALL** support at minimum SD cards with Speed Class 2 (2 Mbps)	M		http://www.sdcard.org	N/A
4.5.3.2	The terminal **SHALL** support read and write functions to/from the card	M		http://www.sdcard.org	N/A
4.5.3.3	The terminal **SHALL** allow creation of folders within the card file system	M			N/A

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.5.3.4	The terminal **SHOULD** support creation of Operator defined folders on the SD card	HD			Yes. Value: Name of folder to be generated
4.5.3.5	The terminal **SHALL** support copying files to and from the card	M			N/A
4.5.3.6	The terminal **SHALL** support moving files to and from the card	M			N/A
4.5.3.7	The terminal **SHALL** support saving content directly to the memory card	M			N/A
4.5.3.8	The terminal **SHALL** support deleting files and folders, directly on the card	M			N/A
4.5.3.9	The terminal **SHALL** allow access to the card from the following terminal applications: Camera Media Gallery	M			N/A

4.5.4 File system

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.5.4.1	The terminal **SHALL** support cards using FAT32 File system partition	M		http://www.sdcard.org	N/A
4.5.4.2	The terminal **SHALL** allow execution of files directly from the memory card	M	Note: Execution of files are dependent on the terminal supporting the proper application for file handling		N/A
4.5.4.3	The terminal **SHALL** present a suitable error message when executing a non-supported file	M	This is for the case the application required to handle file execution is not present on the terminal		N/A
4.5.4.4	The terminal **SHALL** allow the user to view the used and available memory on the card	M			N/A
4.5.4.5	The terminal **SHALL** support formatting the memory card	M	There should be an option from the terminal UI to format the card		N/A

Req. #	Requirement	Category	Remarks	References	PRI Configurable
4.5.4.6	The terminal **SHALL** support the ability to rename files and folders directly on the card	M			N/A
4.5.4.7	The terminal **SHALL** support the ability to view information of the files and folders directly on the card	M			N/A
4.5.4.8	The terminal **SHALL** allow the ability to access the files directly on the card for sharing via the following terminal applications: Bluetooth Email MMS	M			N/A

4.6 Application Memory Requirements

Please refer to Application specification documents for requirements.

5. Provisioning Requirements

5.1 OTA Provisioning Functions (OTASP, OTAPA)

Req. #	Requirement	Category	Remarks	References	PRI Configurable
5.1.1	The device shall support OTA provisioning as defined in C.S0016-0 (OTASP, OTAPA).	M		C.S0016-0	
5.1.2	The device shall support OTA provisioning as defined in C.S0016-A (OTASP, OTAPA).	HD		C.S0016-A	
5.1.3	The device shall support OTA provisioning as defined in C.S0016-B (OTASP, OTAPA).	M	The manufacturer shall indicate what is the implemented standard version and protocols.	C.S0016-B	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
5.1.4	If the terminal is MEID based it shall support C.S0066-0 “Over-the-Air Service Provisioning for MEID-Equipped Mobile Stations in Spread Spectrum Systems”.	M		C.S0066	

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5.2 NAM Requirements

5.2.1 NAM Programming Access

The IMSI is defined as the 15 digits code, composed by [MCC] + [MNC] + [MIN]. The device's NAM programming access shall be made in two distinct ways: SPC1 / OTSL and SPC2.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
5.2.1.1	NAM parameter access with SPC1: -MIN -MDN -MNC -SID CDMA -SID AMPS	M	With the SPC1, only some parameters of the NAM may be changed: MIN, MDN, MNC and SIDs (AMPS and CDMA). The SPC1 is the code to be used at retail stores, to activate end users. It shall provide access only to the basic parameters needed for activation, to make sure that there will be no impact in handset programming time.		Yes
5.2.1.2	Access to NAM programming with One Time Key Subsidy Lock (OTKSL)	HD	With the OTKSL, only some parameters of the NAM may be changed: MIN, MDN, MNC and SIDs (AMPS and CDMA). The Operator will indicate in the PRI which method will be preferred for the NAM access. Both methods shall be available for usage.		Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
5.2.1.3	NUM_VECES_SPC1	M	Indicates the number of times SPC1 may be used (number of wrong tries). Ranges from 0 to infinite.		Yes
5.2.1.4	TYPE_SPC1	M	Indicates if the SPC1 is RANDOM per ESN (different value per ESN) or fixed per ESN (same for all ESNs).		Yes
5.2.1.5	NAM parameter access with SPC2	M	With SPC2, all parameters of the NAM may be changed, e.g.: primary channels, secondary channels, slot mode, slot cycle index, MNC, MCC, NID, Vocoder, MIN, SID, WAP gateway address, BREW server address, etc.		Yes
5.2.1.6	NUM_VECES_SPC2	M	Indicates the number of times the SPC2 may be used (number of wrong tries). Ranges from 0 to infinite.		Yes
5.2.1.7	TYPE_SPC2	M	Indicates if the SPC2 is RANDOM per ESN (different value per ESN) or fixed per ESN (same for all ESNs).		Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
5.2.1.8	Master SPC & OTKSL Enable/Disable by SPC3	M	The PRI shall have an entry for master enable/disable for all SPCs and OTKSL. Modification of this entry shall be restricted by SPC3 and only via a PST, not through the device keypad.		Yes
5.2.1.9	The device's SPC1 and SPC2 shall not be reset or reinitialized after usage.	M			
5.2.1.10	Computer based SW tools shall be required to use the valid SPC to access or modify NAM parameters.	M	This requirement only applies if a Computer based software tool is provided.		

5.2.2 NAM and Software Update

Req. #	Requirement	Category	Remarks	References	PRI Configurable
5.2.2.1	The device shall provide a data interface that allows the device software upgrade and NAM programming. Interface for SW upgrade and NAM programming through a PC and OTA.	M	The device shall provide a data interface that allows the device software upgrade and NAM programming. The NAM programming shall be possible with OTA.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
5.2.2.2	The NAM programming shall be possible with OTA.	M	OTA could include OTASP, OSMS, SMS "bootstrapping", etc. This requirement does not apply to devices with a CDMA Card.		
5.2.2.3	The NAM programming shall be possible through the keypad with access restricted by SPCs.	M	This requirement does not apply to devices with a CDMA Card.		Yes

5.2.3 NAM Management in the Devices

Req. #	Requirement	Category	Remarks	References	PRI Configurable
5.2.3.1	The minimum number of NAMs in the mobile device shall be: 2.	HD	This requirement does not apply to devices with a CDMA Card.		Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
5.2.3.2	Switching active NAM through User Menu; the active NAM switching shall be possible through the user's menu, without any code restriction.	HD	In the PRI, the Operator may enable or disable this user option. i.e., if disabled, the user cannot switch between NAMs. If the user has enabled a personal lock code (PIN), the lock code prompt shall appear when switching to the alternate NAM. This requirement does not apply to devices with a CDMA Card.		Yes
5.2.3.3	NAM programming access with SPC - Access to all NAMs shall be restricted by the SPC.	M			Yes
5.2.3.4	NAM programming access with OTKSL; Access to all NAMs shall be restricted by the OTKSL.	HD			Yes
5.2.3.5	SPC shall control access to all service provision-ing in the device.	M			Yes

6. Base Services Requirements

6.1 System Selection Requirements

This section defines the requirements for the Preferred Roaming List, which describes the systems to be acquired and the relative preferences. A Preferred Roaming List supplied by the CDMA2000® 1x Operator as part of the PRI.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.1.1	The device shall comply with the System Selection requirements in CDG Document 143	M		CDG Document 143	
6.1.2	The device shall support PRL modification using PST with SPC.	M	This requirement does not apply to devices with a CDMA Card.		
6.1.3	The device shall support OTA modification of the PRL.	M	Via OTASP/OTAPA	C-S0016-B § 3.5.5	
6.1.4	The device shall support OTA modification of the PRL via OSMS.	HD	Via OSMS		
6.1.5	The device shall support OTA modification of the PRL via IOTA-DM.	HD	For Data		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.1.6	The user shall be able to verify the PRL version while in idle or active (during a call) mode.	M	The PRI shall allow the Operator to choose if a PRL version is displayed in this menu or it is presented as blank.		Yes
6.1.7	The device user interface shall include a system selection menu that allows the user to set system selection preferences.	M	System selection choices should minimally include: -Automatic -Home Only -Analog Note: The user must be able to disable Analog if supported by the terminal		Yes

6.2 Basic Functions

The Mobile device should have the following functions.

6.2.1 Input Device / Control

The Mobile device shall support the following input and control functions.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.1.1	The mobile device shall support directional inputs – Up, down, right, and left.	HD	May implement this requirement as separate keys, wheels, or a joystick. Four-way navigation key preferred.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.1.2	The mobile device shall provide a standard 12 key matrix (0 to 9, *, #) with alphanumeric indications for text input.	M			
6.2.1.3	The device shall have a display that can accommodate up to 31 digits.	M	This is to support extended dialing strings for voicemail or telephone banking, etc.		
6.2.1.4	The mobile device shall provide a call origination/ termination key.	M	This is typically a “SEND” key.		
6.2.1.5	The mobile device shall provide a call release key.	M			
6.2.1.6	The mobile device shall have a keypad backlight.	M			
6.2.1.7	The mobile device shall have some type of backlight for the display.	M	This user must be able to read the display in low light or dark conditions.		
6.2.1.8	The length of time that the backlight will remain on shall be settable via the user interface.	HD			Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.1.9	The mobile device shall support a clear key function.	M	This allows the user to clear the last digit/ character of an input string.		
6.2.1.10	Any handset with an exposed keypad shall have a keypad lock capability.	M	Function which pre-vents accidental key press. However, user may dial emergency numbers defined in PRI even when key lock is engaged.		
6.2.1.11	The device shall support auto lock on power down.	O	This function should be under user control. The choices should include: -Immediate -On power down		Yes
6.2.1.12	The device shall support adjustable earpiece volume.	M	This may be via the directional input, or dedicated control.		
6.2.1.13	The device shall support long and short DTMF tone lengths.	M	The vendor should identify the respective duration limits that apply to Short and Long tones.		
6.2.1.14	The device shall support the ability for the user to select long or short tone lengths.	M			Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.1.15	The device shall support DTMF mute, i.e., the option to not send DTMF tones during a call.	HD			
6.2.1.16	The device shall support power on/off function.	M	Can be combined/ multifunction key or dedicated key.		
6.2.1.17	The device shall be able to generate a “+” for international dialing.	HD	This requirement becomes mandatory at the start of Q3, 2005.		

6.2.2 Dialing / Call Initiation

The Mobile device shall support the following dialing and call initiation capabilities.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.2.1	The device shall support memory speed dialing for a minimum of 10 different numbers; one long key-press dials an entry from the phonebook.	HD	Some of these speed dials may already be pre-populated by operator. Hence, less than 10 may be available to the user.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.2.2	The handset shall provide an auto redial capability.	M	Automatically redial on call initiation failure. This feature should be automatic, and not visible to the user. The number of retries will be limited to three. Note: This feature applies to various scenarios where the handset may be connected to a hands-free kit or accessory. This feature should be “toggable” in the PRI and in the device UI. This allows the Operator and the user to turn this feature on or off.		Yes
6.2.2.3	The handset shall provide a link dialing capability (calling cards, remote services, etc.).	M	Linking provided for Calling card digits or for password used by multiple phone book entries. This could be implemented as a phone book feature.		
6.2.2.4	The handset shall support 48-digit dialing.	HD	Ability to dial 48-digit numbers. This implies that the screen can display a 48 digit number.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.2.5	The device must be able to originate calls (voice, SMS, or data) to numbers with 2 or more digits.	M	This feature is limited by network capability. The shortest dialing sequence supported by most networks is 2 digits (for emergency numbers, directory service, connection to customer service, etc.).		
6.2.2.6	The mobile device shall support “+” code dialing for international calls.	HD	This requirement will become mandatory at the start of Q3, 2005.	N.S0027-0 v1.0	
6.2.2.7	The mobile device shall support pseudo “+” code dialing in networks that do not yet support + code dialing.	HD	The user, through the device UI, is able to program the "+" key to equal the international dialing prefix of the country he is in. Thus if the user is in a network that does not support + code dialing, the user is able to enable this feature so that the device prepends the correct international dialing prefix. This allows the phone book entries to keep the + code in either scenario. This requirement will be discarded by Q1, 2007.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.2.8	The user shall be able to dial emergency numbers (defined in PRI) on any available system, even if it's "negative."	M	For devices that support a CDMA Card emergency numbers may be dialed even if no card is in the device.		

6.2.3 Incoming Call Management

The Mobile device shall support the following incoming call management capabilities.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.3.1	The device shall support any key answer.	HD	When alerting, any key answers the call. This feature must be user selectable. Note that the END key is excluded.		Yes
6.2.3.2	For non-clamshell handsets, the END key shall Silence Incoming Call Alert.	M	The incoming call alert shall be silenced however; the call shall not be released.		
6.2.3.3	The device shall support Auto answer as a user-selectable option.	HD	Note: This feature applies to various scenarios where the handset may be connected to a hands-free kit or accessory.		Yes
6.2.3.4	The device shall support answer holding.	HD		N.S0022 v1.0 IS-837	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.3.5	The device shall support user selective call holding.	HD		N.S0022 v1.0 IS-837	

6.2.4 General User Interface Requirements

The Mobile device shall support the following general functions.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.4.1	The mobile device shall support a User Profile defining the user selectable options.	HD	The User Profile may include: -Ring tones (or mute) -Auto answer choices -Etc…		Yes
6.2.4.2	The device shall support at least 2 User Profiles: Normal and Meeting.	HD	These profiles are configurable by the user to customize the handset depending on the user's current availability.		
6.2.4.3	The mobile device shall support the ability to set "call forwarding."	HD	This feature has a network dependency and is also dependant on ability to connect to the network.		
6.2.4.4	It shall be possible to view the SW version from the users' menu when in idle mode or during a call.	M	Some Operators may desire that their users not be able view the SW version on the handset. This feature should be PRI configurable.		Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.4.5	The handset shall maintain an internal clock that is not dependant on CDMA system time (i.e., works even when system time is unavailable).	M	The internal clock should be synchronized with CDMA system time when available.		
6.2.4.6	The alarm clock should function even if the handset is powered down. If the alarm is triggered while the handset is powered down, the handset should "wake up", sound the alarm, and present the user with the option of either powering down or turning on the radio and acquiring service.	HD			
6.2.4.7	The user shall be able to copy phonebook entries from the terminal to a CDMA Card and from the card to the terminal.	M			
6.2.4.8	The device shall include Personal Information Manager functionality.	HD	At a minimum, the PIM should be able to synchronize with Outlook via a cable.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.4.9	The device shall allow any pre-loaded downloadable applications and games to be deleted.	HD	The Operator can disable the delete function via the PRI.		Yes
6.2.4.10	It shall be possible to play games in “off-line” mode.	O			
6.2.4.11	The device shall support basic calculator functionality.	HD			
6.2.4.12	The terminal shall support “Airplane mode.” The device shall support the disabling of the RF transmitter by the user. The device shall clearly reflect the RF off status.	HD			
6.2.4.13	The device shall allow any pre-loaded files (ie. Ringtones) to be deleted.	HD			

6.2.5 Phonebook/Address Book

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.2.5.1	The terminal shall support the storage of a minimum of 99 contacts	M	A contact is, at a minimum, a name and contact number.		
6.2.5.2	The handset shall support the ability to edit/delete contacts.	M			
6.2.5.3	The handset shall support the ability to assign an available Speed Dial location to any number entry within the phonebook.	M			
6.2.5.4	The handset shall be able to store up to a minimum of 7 parameters for each phone book entry.	HD	The recommended fields to be supported are: Number1 Number2 Number3 Number4 Email1 Email2 URL		

6.3 Languages / Information Encoding

The default language will be indicated in the PRI. Some requirements in this section are intentionally blank since they will be mandatory depending on the language required by the Operator (i.e., Unicode for Chinese or ISO-Latin for Portuguese).

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.3.1.1	The device shall support English and local language.	M	Grammatically correct English for all items including PRI, User Interface, pop up/ dialog boxes.		
6.3.1.2	The device shall support multiple languages.	O	Specific languages as requested by Operator. (i.e., For SEA region, Thai, Bhasa, Vietnamese).		
6.3.1.3	The mobile device shall support Unicode.		The terminal must support Unicode for double byte languages. This is mandatory for some languages (i.e., Chinese, Hebrew, Thai, etc).		
6.3.1.4	The mobile device shall support UTF-8.				
6.3.1.5	The mobile device shall support 7-bit ASCII.	M	Mandatory for English support.		
6.3.1.6	The mobile device shall support ISO-Latin.		Mandatory for language support of Portuguese and Spanish.		

6.4 Features and Functions

6.4.1 Call Waiting and Three-Way Calling

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.1.1	While in a voice call, the device shall be able to receive a call waiting notification.	M			
6.4.1.2	When call waiting notification is re-ceived, the device shall display the caller information.	M			
6.4.1.3	The device shall send a “Flash Request” to answer an incoming call waiting alert when the SEND key is pressed.	M			
6.4.1.4	While in a voice call, the device shall be able to add another conversation sending a Flash Request, by pressing the “SEND” key.	M	Three Way call		
6.4.1.5	A second call can be placed on hold.	M	The terminal calling party calls a second party; the other party answers the call. The calling party can place the second party on hold.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.1.6	Device shall support ability to release an incoming call while in idle or in a call waiting scenario.				

6.4.2 Call Forwarding and Other Network Resident Features

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.2.1	Terminal shall allow user to dial any feature code per IS-52A to Activate/Deactivate network Resident features. A minimum of 3 digits after the feature code shall be supported.	M	Feature codes may be Operator dependent.		

6.4.3 Caller ID

As a function of the PI field of the CPN (Calling Party Number), the device shall display the following:

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.3.1	The device shall display the Calling Party Number (CPN) value.	M	The CPN value may be either numeric or alpha-numeric.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.3.2	The CPN shall be displayed when PI = 00.	M	The CPN value may be either numeric or alpha-numeric.		
6.4.3.3	When PI = 10 – “Number not Available,” the mobile device shall display a “number not available” text message.	M			
6.4.3.4	When PI = 01 – “Restricted Number,” the mobile device shall display a “restricted number” text message.	M			
6.4.3.5	The mobile device shall, as a configurable option, present the name in the phonebook that corresponds to the CPN.	M			
6.4.3.6	If the phonebook has picture capability, the mobile device shall, as a configurable option, present the picture corresponding to the CPN.	HD			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.3.7	The device shall support a PRI configurable digit length when matching CPN to a phone book entry.	M			

6.4.4 Call History

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.4.1	The mobile device shall keep a list of CPN for recent calls received (answered).	M	This list includes all calls that accepted, including call waiting calls.		
6.4.4.2	The mobile device shall keep a list of CPN for recent calls that were missed (not answered).	M	This list includes calls forwarded to voice mail, calls forwarded to an alternate number, and call waiting calls not answered.		
6.4.4.3	The mobile device shall keep a list of DN for recent dialed calls.	M	This list includes all dialed calls, whether connected or not.		

6.4.5 Voice Mail Call

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.5.1	The device shall support a direct call to the Voice Mail number, defined in the PRI (not hard coded), via a message key.	HD	The message key may be a soft key.		Yes
6.4.5.2	The device shall support, as a user selectable option, a direct call to Voice Mail via long key press.	M	The Operator must be able to enable/disable this feature via PRI. If enabled by Operator, user may toggle this feature to “On” or “Off”.		Yes
6.4.5.3	The device shall support auto-population of Voice mail number after the device is provisioned.	M			Yes

6.4.6 Phone Lock

6.4.6.1 MIN Lock

The requirements in this section only apply to devices without a CDMA Card.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.6.1.1	MIN Lock – feature that only allows the programming of MINs that match some predefined criteria, for all NAMs.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.6.1.2	MIN lock unlocking through keypad – the NAM programming option, accessible with SPC2 shall provide an option to unlock the MIN lock. To use that option, the user will have to type the correct SPC3 (6 digit number). OR MIN lock unlocking through manufacturer software – there shall be a manufacturer software program available to the operator that will be able to unlock the MIN lock, or to program an invalid MIN. The accessories needed for that software to interact with the handset should be available to the operator as well.	M			Yes
6.4.6.1.3	Distinct SPC3 per ESN – each device unit shall have its own SPC3.	M			Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.6.1.4	SPC3 delivery – the manufacturer will deliver the list of SPC3 corres-ponding to each ESN, using a channel indepen-dent from the one used to deliver the products. The operator will ask for those codes anytime they need.	M			
6.4.6.1.5	Valid MINs – only MINs whose 4 first (most significant) digits match with the ones listed in the PRI table for MIN lock, shall be accepted for NAM programming.	M			Yes
6.4.6.1.6	Maximum number of entries in the MIN lock table: 25.	M			Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.6.1.7	Validity rule for MIN programming – the device shall not allow the set-up of a MIN whose 4 first digits do not match any line in the MIN Lock table listed in the PRI. The device shall present a message like “Invalid MIN” in this case.	M			Yes

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Table 6-1: Example MIN Lock Table (Allowed MINs)

MIN first digit	MIN second digit	MIN third digit	MIN fourth digit
1	1	1	*
1	0	5	*
2	*	*	*
0	7	*	*
0	5	*	*
0	8	*	*
0	2	*	*
5	*	*	*
7	*	*	*
3	0	5	*
9	1	7	*
Other positions	Other positions	Other positions	Other positions

Where * = any number

Example: **1111** 234567 = allowed - according to first line of the table.

1191 234567 = not allowed (Handset will show the message “Invalid MIN”)

6.4.6.2 NAM Lock

The requirements in this section only apply to devices that support a CDMA Card.

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.6.2.1	The terminal shall have the ability to check and accept only “Operator” CDMA Cards.	M	The terminal shall have a software mechanism that can detect and check Mobile Country Code (MCC) and Mobile Network Code (MNC) in R-UIM or CSIM EF_{IMSI_M} against the MCC and MNC of the device or a range of MINs. The MCC and MNC are the first five digits of the IMSI_M.		Yes
6.4.6.2.2	If a non-“Operator” CDMA card is detected; the device shall display the popup error message “Please insert Operator CDMA card” (or equivalent in local language).	M	Emergency numbers may be dialed even if no CDMA card is in the device.		Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.6.2.3	MIN Lock for devices with CDMA Card - if a CDMA card is in use, the device shall use the MIN from the EF_{IMSIM} file of the card, and check if that MIN is allowed by the MIN Lock rules.	M			Yes

6.4.7 Indicators

6.4.7.1 Visual Indicators – Power

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.1.1	The mobile device shall have a visual Battery level meter.	M	3 or more levels		
6.4.7.1.2	The mobile device shall have a visual Low battery indicator.	M			

6.4.7.2 Visual Indicators – CDMA Service

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.2.1	The mobile device shall have a visual Signal strength meter.	M	4 or more levels		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.2.2	The mobile device shall have a visual Service / No service indicator.	M			
6.4.7.2.3	The mobile device shall support the Feature Notification Message (FNM).	M	This can be turned on/off in PRI.		Yes
6.4.7.2.4	The mobile device shall have a visual Mode indicator.	M	Indicate operation is CDMA2000® 1x or IS-95. The operator can choose icon to be displayed in PRI.		Yes
6.4.7.2.5	The mobile device shall support a visual Service warning for dropped calls.	HD			
6.4.7.2.6	The mobile device shall have a visual Roaming indicator.	M	Must support flashing Roaming indicator as per TSB 50.		
6.4.7.2.7	The mobile device shall have a visual Call timer display.	M	Hours, minutes, seconds of time in call		
6.4.7.2.8	The mobile device shall have a visual “In Use” indicator.	M	“Off-hook” icon		

6.4.7.3 Visual Indicators – Alerting

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.3.1	The mobile device shall support a visual Incoming Call Alert notification.	M			
6.4.7.3.2	The mobile device shall support a visual Lost Call Alert Indicator.	M			
6.4.7.3.3	The device shall support a text/ graphic indication for incoming calls.	M			
6.4.7.3.4	The device shall provide a visual indicator that ring tone is off when audible alerting is off.	M			

6.4.7.4 Visual Indicators – Banner

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.4.1	The device shall display the Service Provider's logo upon power-up.	M	Logo to be supplied as part of PRI.		Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.4.2	The device shall display User programmable power up message if one has been programmed.	M			Yes

6.4.7.5 Visual Indicators – Time and Date

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.5.1	The device shall display the time when the phone is idle.	M	The time displayed must be synchronized with CDMA system time when available. The time format shall be selectable via PRI.		Yes
6.4.7.5.2	The device shall display the date when the phone is idle.	M	The date displayed must be synchronized with CDMA system time when available. The date format shall be selectable via PRI.		Yes

6.4.7.6 Visual Indicators – CDMA Card

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.6.1	If a CDMA Card slot is enabled and no CDMA card is present the device shall display a "No Card" indicator.	M			

6.4.7.7 Visual Indicators – Voice Service

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.7.1	The device shall provide a visual indicator when Auto answer is on.	M			
6.4.7.7.2	The device shall provide a visual indication when Voice Privacy is active.	HD			
6.4.7.7.3	Dialed digits shall be displayed.	M			
6.4.7.7.4	User can toggle voice privacy if supported	M			

6.4.7.8 Visual Indicators – Data Service

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.8.1	The device shall provide different visual indicators to distinguish between circuit and packet data connections (bearer mode) for all data application (e.g., WAP, MMS, and IM) connections and for data connections via relay mode.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.8.2	The device shall provide a visual PPP link active indicator to indicate an active data call (in modem/relay mode).	M			
6.4.7.8.3	Data TX/Rx indicator.	M	For “relay mode”, display data bearer in use.		
6.4.7.8.4	The device shall provide a visual indicator to indicate when the data session is in dormant mode.	M			

6.4.7.9 Visual Indicators – Voice Mail

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.9.1	The device shall provide a visual Message arrival notification for voicemail messages.	M			

6.4.7.10 Visual Indicators – SMS

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.10.1	The device shall provide a visual Message arrival notification for SMS messages.	M			
6.4.7.10.2	The device shall provide a flashing visual indicator for Urgent/Emergency SMS arrival notification.	HD			
6.4.7.10.3	The device shall provide a visual reminder of SMS if there are unread SMS messages available.	M			
6.4.7.10.4	The device shall display SMS stored in a CDMA Card.	M	If an inserted CDMA Card is enabled		
6.4.7.10.5	The device shall display the SMS originating address.	M	This is the SMS originating address (not callback number)		
6.4.7.10.6	The device shall display the SMS call back number if it is available.	M	The Operator may disable this feature via the PRI so that no call back number is displayed.		Yes

6.4.7.11 Audible Indicators – Power

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.11.1	The mobile device shall provide an audible low battery warning.	M			

6.4.7.12 Audible Indicators – CDMA Service

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.12.1	The mobile device shall provide an audible “No service alert” when CDMA service is not available.	M	This alert should be configurable by the user (i.e., user can turn on/off).		Yes

6.4.7.13 Audible Indicators – Alerting / Call Progress

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.13.1	The mobile device shall provide an audible Incoming Call Alert.	M			
6.4.7.13.2	The user shall be able to mute audible call alerts.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.13.3	The mobile device shall support distinctive group ring tones that may be assigned to a CPN or group of CPNs.	HD			
6.4.7.13.4	The mobile device shall provide an audible signal at each elapsed minute of call connect time.	HD	The default setting shall be configurable by the PRI and may be turned on/off by the user.		Yes
6.4.7.13.5	The mobile device shall provide an audible notification of Call failure for failed originations.	HD	The default setting shall be configurable by the PRI and may be turned on/off by the user.		Yes
6.4.7.13.6	The mobile device shall provide an audible “Call drop alert” tone for dropped calls.	M	The default setting shall be configurable by the PRI and may be turned on/off by the user.		Yes

6.4.7.14 Audible Indicators – Voice Services

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.14.1	The mobile device shall provide an audible indication when voice privacy status changes.	O	This requirement only applies if voice privacy is active. The default setting shall be configurable by the PRI and may be turned on/off by the user.		Yes

6.4.7.15 Audible Indicators – SMS Services

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.15.1	The device shall provide an audible incoming message alert for all types of incoming messages.	M	This audible alert applies to SMS, MMS, IM, etc. The audible alert should be soft enough not to cause any discomfort to the user.		
6.4.7.15.2	The mobile device shall provide an audible Unread message reminder alert.	M	Should occur at regular intervals. The default setting shall be configurable by the PRI and may be turned on/off by the user.		Yes

6.4.7.16 Audible Indicators – General

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.16.1	The mobile device shall provide audible keypad feedback tones.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.16.2	The mobile device shall provide an audible Camera Shutter Sound.	M			
6.4.7.16.3	If terminal has a camera, the camera shutter sound shall not be disabled even when phone is in silent mode.	M	Operator can choose to enable or disable this feature.		Yes
6.4.7.16.4	The device shall be able to provide different audible indicators depending on different types of incoming messages.	M			
6.4.7.16.5	The terminal shall allow a user to set and adjust the audible indicators for all types of supported incoming messages.	M			

6.4.7.17 Physical Indicators – General

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.4.7.17.1	The terminal shall include a vibrating element. The vibrating element shall be used as a supplement to all ring and alert tones.	HD			
6.4.7.17.2	The vibrating element shall support different vibrating pulses (i.e. one long, two short) to differentiate between different alerts and rings.	HD			

6.4.8 Location Technology

If device supports location technology, see the LBS document for requirements.

6.5 Security and Privacy

6.5.1 Authentication and Voice Privacy

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.5.1.1	The mobile device shall support the CAVE algorithm.	M			Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.5.1.2	CDMA Card authentication for devices supporting one.	M	Devices supporting a CDMA Card shall use/execute the authentication algorithm (CAVE) in the CDMA Card as specified in C.S0023, and not in the device.		
6.5.1.3	Devices supporting a CDMA Card shall select the ESN or UIM_ID as directed by the CDMA Card usage indicator.	M		C.S0023-A § 3.4.32	
6.5.1.4	The SSD shall be initialized with zero anytime the A-key is modified.	M			
6.5.1.5	The mobile device shall support authentication.	M			
6.5.1.6	The mobile device shall support Voice Privacy.	HD			
6.5.1.7	The device shall offer the ability to view and modify the A-KEY via means other than through the keypad.	M	This requirement is not applicable to terminals supporting a CDMA Card.	TSB 50	Yes
6.5.1.8	The A-KEY shall not be readable from the device.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.5.1.9	The A-key shall remain the same for all NAMs supported on the device.	M			

6.5.2 ESN/MEID Security

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.5.2.1	The ESN/MEID shall be protected from modification.	M			

6.6 Debug Menu

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.6.1.1	The device shall be capable of entering a test mode screen either via a hidden menu or specific key sequence. When entering test mode, user shall be prompted for a password.	M	The Debug screen shall minimally display the following information: - SID - NID - Channel - P_REV - Transmit power - Ec/Io - RC - SO - FER - Active Sets		Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
6.6.1.2	If the device supports MEID, it shall be possible to view the MEID from debug menu in decimal format	M	X.S0008		
6.6.1.3	If the device supports ESN, it shall be possible to view the ESN from the debug menu in decimal format	M	X.S0008		

6.7 Mobile Execution Environments

Refer to relevant associated documents for detailed requirements.

7. Short Message Service Requirements

This section describes the technical requirements related to Short Message Service.

7.1 General Requirements

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.1.1	The device shall support sending SMS messages (MO) and receiving SMS messages (MT).	M		C.S0015-0	
7.1.2	The device shall support sending SMS messages (MO) and receiving SMS messages (MT).	M		C.S0015-A	

7.2 Mobile Terminated SMS Related Functions (MT-SMS)

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.2.1	The device shall display the SMS originating address.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.2.2	The device shall display the name associated with the sender phone number if it is in the handset phonebook.	M	The presentation of the SMS originating address shall be configurable in the PRI.		Yes
7.2.3	The device shall display the mes-sage timestamp.	M	The message time-stamp is assigned by the serving SMSC.	C.S0015-0	
7.2.4	The device shall implement a High Water Mark (HWM) for SMS storage when the memory capacity for SMS reaches a predefined upper limit. At this limit, the device UI shall notify the user and prompt them to manage the SMS memory to make space for new SMS.	M	The vendor may select this limit; it is recommended at 80% capacity of available SMS storage.		
7.2.5	The device UI shall allow the user to select automatic deletion of the oldest SMS to make space for new SMS in the event that the SMS inbox is full.	M	This default setting for this feature must be PRI configurable.		Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.2.6	The device shall send the correct L3 messaging back to the SMSC to indicate that the memory is full.	M	SMSC may store undelivered SMS for a specified period after which if the memory is still full on handset, the SMSC will discard the stored SMS.		
7.2.7	The handset shall support the reception of 140 character messages.	M	The actual character count will vary depending on the encoding scheme used (Unicode, UTF, ASCII). However, the handset must support a SMS payload of 140 bytes.		
7.2.8	The handset must be able to receive messages with 0 characters. (Blank message allowed.)	M		Teleservice ID 4098	
7.2.9	The handset shall display the Call back number if it is available.	M			
7.2.10	If the handset supports a CDMA Card, it shall allow the user to selectively store SMS on either the CDMA Card or the terminal NVRAM/EFS.	M	By default the messages shall be stored on the terminal, but the user should have an option to save the messages on the CDMA Card.		Yes

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.2.11	If the terminal supports a CDMA Card, the UI shall allow the user to store all of the contents of the SMS mailbox onto the card or vice versa.	M	This requirement applies to all contents that are supported by either the card or terminal.		
7.2.12	The device user interface shall allow the user to select and dial or respond to num-bers included in body of received SMS.	M	The implementation can recognize numbers with brackets and hyphens. i.e., 4166848135 (416)684-8135 416-684 8135		
7.2.13	The user interface shall allow the user to select and save numbers included in body of received SMS.	HD			
7.2.14	The user interface shall allow the user to select, store and connect (via browser) to URL embedded in the body of SMS (if terminal supports the browser function).	HD	The user interface must support URL formats as specified by RFC2396.	RFC2396	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.2.15	The user interface shall allow the user to select, save and reply to an email address received in body of SMS.	HD			
7.2.16	The device shall support alphanumeric addressing in SMS. The minimum string size to be supported is 32 characters/digits.	M			
7.2.17	SMS addressing functionality shall include “+” code dialing support.	M			
7.2.18	The device shall detect receipt of duplicate SMS.	M	Duplicate detection shall be based on SMS message ID (assigned by SMSC).		
7.2.19	The device shall be able to receive SMS during a call.	M	SMS notification shall be consistent with notification setting for idle mode.	C.S0015	
7.2.20	The UI SMS text display shall wrap based on words (not characters).	M			
7.2.21	The device shall support Point to Point Messaging Service.	HD		C.S0015-0	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.2.22	The device shall support Broadcast SMS.	M		C.S0015-0	
7.2.23	The device UI, while viewing an SMS, shall interpret the pressing of the SEND key to call the message callback number or any number “selected” in the body of the SMS.	M	The terminal shall originate a call to the number populated in the call back field. Any call back number must be a digit string and not alphanumeric.		
7.2.24	The device shall support segmentation and concatenation of EMS messages.	HD		C.S0015-A (3GPP TS23.040 Teleservice ID 4101)	
7.2.25	The device shall support segmentation and concatenation of long SMS messages.	HD		Appendix D	
7.2.26	The device shall be able to receive SMS during a data session (browser, network aware applications).	M	This assumes the device is in SO33 and that the SMS is delivered via data burst message.		
7.2.27	The user shall be notified when the SMS mailbox is full.	M			

7.3 Mobile Originated SMS (MO-SMS)

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.3.1	The handset shall support alphanumeric addressing.	M	The Operator must be able to disable alphanumeric addressing via the PRI		
7.3.2	The terminal shall support up to a 32 digit number for SMS addressing.	M			
7.3.3	The handset shall be able to send SMS to short numbers (with at least 3 digits).	M			
7.3.4	The handset shall be able to send SMS to numbers containing the special characters “*” and “#”.	HD	The handset must be able to send messages to numbers containing the following special characters: i.e., * y #.		
7.3.5	The handset shall be able to send SMS simultaneously to multiple numbers (destinations).	HD	Up to 10 distinct numbers.		
7.3.6	The handset shall allow the user to search and select phone book entries to send SMS messages to.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.3.7	The handset shall allow the user to send a reply message to OOA (Original Originating Address) of a received message from a mobile number.	M	Any format including International format (must populate number type and number plan fields).		
7.3.8	The handset shall allow the user to forward SMS messages to another user.	M			
7.3.9	The terminal shall support user data of 140 characters per single data burst message.	M	Limited to 140 characters to facilitate inter-operability between CDMA and GSM characters		
7.3.10	The handset shall be able to send messages with 0 characters. (Blank message allowed.)	M			
7.3.11	The handset shall be able to use the 7-bit ASCII format for SMS text to send messages if that format is supported on the handset.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.3.12	The handset shall be able to use the UTF-8 format for SMS text to send messages if that format is supported on the handset.	M			
7.3.13	The handset shall be able to use the Unicode format to send messages if that format is supported on the handset.	M			
7.3.14	The handset shall be able to use the ISO-Latin format to send messages if that format is supported on the handset.	M			
7.3.15	The handset shall allow the user to select the priority level of the sent message.	HD	Note that not all SMSC support this feature.		
7.3.16	The handset shall notify the user that SMS was delivered successfully to SMSC.	M	L3 acknowledgment in the form of a data burst message.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.3.17	The handset shall support user notification of successful message delivery to the terminating party.	M	This is SMS Delivery Acknowledgement.	C.S0015 (Section 4.5.11)	
7.3.18	The handset shall allow the user to define a valid time frame to deliver the message.	O	The handset should allow the user to define a validity time frame to deliver the message.		
7.3.19	The handset shall support deferred delivery of SMS	HD			
7.3.20	The device shall allow the user to compose and send SMS during a voice call.	M		C.S0015	
7.3.21	The handset shall support local language input as required by the Operator.	M	i.e., Thai or Vietnamese		
7.3.22	The handset shall support predefined messages in English and local language.	M	i.e., Local language = Thai, Chinese, etc.		
7.3.23	The message shall include the SMS originating address.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.3.24	The SMS text display for sent messages shall wrap based on words (not characters).	M			
7.3.25	The handset shall support Point to Point Messaging Service.	HD		C.S0015	
7.3.26	The device shall support segmentation and concatenation of EMS messages.	O		3GPP TS23.040 Teleservice ID 4101	
7.3.27	The device shall support segmentation and concatenation of long SMS messages	O		Appendix D	
7.3.28	The device shall support decoding HEADER_IND field and processing User Data Header as specified in EIA/TIA 637-B or higher.	HD		EIA/TIA 637-B	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.3.29	If the device does not support User Data Header, at a minimum it must ignore the User Data Header so that it is not being displayed as part of the message to the user.	M			
7.3.30	All the optional fields (priority, deferred delivery, delivery ack) for an outbound message shall be set to off by default (if they are supported).	M			

7.4 SMS UI

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.4.1	If long SMS is supported, user shall be able to edit multiple long SMS segments as one continuous message.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.4.2	If long SMS is supported, the device shall display a message segment count while editing a long SMS message	M			
7.4.3	If long SMS is supported, the device shall show only notification of an incoming a long SMS message for the initially received segment, as long as there is at least one segment stored in the device's memory.	M			
7.4.4	If long SMS is supported, the device shall store multiple long SMS segments as one message in message inbox.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
7.4.5	If long SMS is supported, the device must be able to show partially received long SMS messages and indicate where the missing segments are located within the message.	M			
7.4.6	If long SMS is supported, the device must dynamically update partially received long SMS messages upon receiving missing segments.	M			
7.4.7	If long SMS is supported, the device must support up to 7 segments per one long SMS.	M			

8. Data Services

The requirements detailed in this section only apply to terminals that support data service. If a terminal does not support data service, these requirements do not apply.

8.1 Summary Requirements

Req. #	Requirement	Category	Remarks	References	PRI Configurable
8.1.1	The terminal shall support C.S0017-0-2.	M			
8.1.2	The device shall support Mobile IP.	M			
8.1.3	The device shall support Simple IP.	M			
8.1.4	When the mobile device is connected to a computer via serial port, the minimum data rate at the RS232C data port shall be 115kbps.	M			
8.1.5	When the device is connected to a computer via a USB port, the minimum data rate at the USB data port shall be 12 Mbps.	M		USB 2.0	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
8.1.6	The terminal shall support relay mode packet data services as specified in the reference.	M		3GPP2 C.S0017-0-2.3 Data Service Options for Spread Spectrum System: **AT command Processing & Rm interface.**	
8.1.7	The terminal shall support switching bearing services (packet switching data services).	M	The fallback bearer shall be configurable by the PRI.		Yes
8.1.8	The device shall disable Quick Net Connect (QNC).	M			
8.1.9	The terminal shall support PAP authentication.	M	PDSN authentication		
8.1.10	The terminal shall support CHAP authentication.	M	PDSN authentication	RFC 1994	
8.1.11	If the handset is IS95B compatible and under IS95B coverage, it must use service option 25 by default.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
8.1.12	If the handset is 1x compatible and under 1x coverage, it must use service option 33 by default.	M			
8.1.13	The string to designate Service Option 12 shall be PRI configurable.	M			
8.1.14	The string to designate Service Option 15 shall be PRI configurable.	M			
8.1.15	The string to designate Service Option 33 shall be PRI configurable.	M			

8.2 General Requirements IS-95A (C.S0017-0-3)

Req. #	Requirement	Category	Remarks	References	PRI Configurable
8.2.1	The handset must support circuit switched data service, as described in C.S0017-0-3, when the wireless modem functionality is allowed (to support connections with PCs/PDA).	M	This requirement is only applicable when IS-95A is available.		

8.3 IS2000 Packet Data Service

8.3.1 Dormant Parameters

Req. #	Requirement	Category	Remarks	References	PRI Configurable
8.3.1.1	Dormant mode shall come acti-vated from the factory.	M	The timer setting (duration) must be defined in PRI.	C.S0017-0-3	
8.3.1.2	The dormant mode timer shall be configurable via AT commands.	M	via IS-707A AT commands (C.S0017-0-3)	C.S0017-0-3	
8.3.1.3	The handset shall support the switch from Dormant to Active initiated by network or handset.	M			

Req. #	Requirement	Category	Remarks	References	PRI Configurable
8.3.1.4	If the user finishes communication when the handset is in Dormant mode in a packet communication session (IS-95B or CDMA2000® 1xRTT), the handset shall send the session disconnection command to the network, and shall transition from Dormant to Active to send this command.	M			
8.3.1.5	If the user ends a client application session that is the last application using the connection, the handset shall send the PPP session finalization command.	M			

8.4 AT Commands Requirements

Req. #	Requirement	Category	Remarks	References	PRI Configurable
8.4.1	The handset shall support all AT commands specified by 3GPP2 document number C.S0017-0-2.3 “Data Service Options for Spread Spectrum Systems: AT Command Processing and the Rm Interface”, version 2.0.	M	The handset shall support all mandatory commands in the (referenced) specification.	C.S0017-0-2.3 is contained in C.S0017-0-2.	

9. Technical Documentation

Req. #	Requirement	Category	Remarks	References	PRI Configurable
Service Manuals					
9.1	Vendor shall provide an English-version and local language version of the service manual that provides information to allow Operator's service engineer to test, diagnose and repair the terminal.	M			
User Manual					
9.2	Vendor shall provide the user manual in English and local language version, to allow the user to operate the terminal effectively.	M			
9.3	The user manual shall be made in hard copy (hard copy).	M	This is the documentation that comes in the packaging with the device.		

Req. #	Requirement	Category	Remarks	References	PRI Configurable
Quick Guide					
9.4	Vendor shall provide a quick guide in English and local languages, containing compact version of user manual.	M			

1

10. Appendix A – Example PRI Document

The manufacturers may add their device own functionalities, at the end of the table in the section “Other, special features.”

10.1 NAM 1 Programming

Feature / Function	Customer Setting	Default Setting/Possible Values
NAM1 Name		
IMSI_M 11_12		
IMSI_MCC		
True IMSI		
Primary CDMA Channel, A Band		
Secondary CDMA Channel, A Band		
Primary CDMA Channel, B Band		
Secondary CDMA Channel, B Band		
SID/NID Lists		
Home SID/NID		
Preferred SID/NID		
Network Code		
Country Code		
Access Overload Class		
NAM Status		
A key		
Other Settings		

Feature / Function	Customer Setting	Default Setting/Possible Values
Customer PRL File Name		
PRL Version Number		
PRL Format		
Slot Cycle Index (Pag. Chan. Decoding Time Parameter)		
SPC		
NUM_VECES_SPC1		0~infinito
TYPE_SPC1		Fixed/Random
SPC1 in case of TYPE= fixed		
MDN		
Security		
Phone Lock Code		4 digits
Emergency Numbers		
Emergency Number – 1		
Emergency Number – 2		
Emergency Number – 3		
Emergency Number – 4		
Emergency Number – 5		

10.2 Features and Functions

Feature / Function	Customer Setting	Default Setting/Possible Values
Messages		
Service Option to be used for SMS		SO6 or SO14
Character number for SMS sending		up to160
Visual unread message reminder alert		Yes-No
Audible unread message reminder alert		Yes-No

Feature / Function	Customer Setting	Default Setting/Possible Values
Voice Messages		
Voice Mail Box Number		
Supplementary services		
Call waiting activation code		
Call waiting de-activation code		
Call divert Unconditional code		
Call divert if no answer code		
Call divert if occupied code		
Call divert to voice mail Unconditional code		
Call divert to voice mail if no answer code		
Call divert to voice mail if occupied code		
CLIP		
CLIP identify. with agenda (num. of digits)		
Phone Settings		
Touch Tones		
Manual Touch Tones		Continuous/Fixed/Off
Touch Tone Length		Short/Long
Language (default setting)		English
Banner		
Power-up/Wake-up Bitmap		
OTASP		
OTASP Activation Code: *228 (No) or *2 (Yes)		
OTAPA		
SPASM Security for OTAPA		
VOCODER		
Vocoder Home Page		

Feature / Function	Customer Setting	Default Setting/Possible Values
Vocoder Home Origination		
Vocoder Roam Origination		
DATA/FAX		
QNC Dial String		
OTHER, SPECIAL FEATURES		

11. Appendix B – UTK Specification

China Unicom Technical Requirements for UIM

Enhanced Version Volume 2

Contact China Unicom for Document.

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12. Appendix C – OSMS

GX World XL OSMS Release v1.0.pdf

13. Appendix D – Long SMS

13.1 Introduction

This appendix specifies how to support Long SMS for CDMA terminals. Current SMS in CDMA supports up to 160 characters when it is using 7-bit ASCII encoding, which can be shorter depending on the language and type of encoding used.

Long SMS is a feature that allows the user to send and receive text messages that are longer than standard SMS messages. The feature uses the SMS protocol as the bearer. Long messages are created by concatenating two or more SMS messages. The maximum message size is carrier specific, but cannot exceed 255 segments due to the size of the third octet of IED as described in Section 13.3.1.

A similar feature has been standardized for GSM/UMTS in 3GPP TS 23.040 [2] as “concatenated SMS”.

The intent of this document is not to create a new standard, but to illustrate how to support long SMS by using existing fields already defined in the TIA/EIA 637 [1] and TS 23.040 [2].

13.2 SMS Teleservice Layer

13.2.1 Message Identifier Subparameter

Following is the message structure of Message Identifier subparameter defined in section 4.5.1 of [1].

Field	Length (bits)
SUBPARAMETER_ID	8
SUBPARAM_LEN	8
MESSAGE_TYPE	4
MESSAGE_ID	16
HEADER_IND	1
RESERVED	3

Section 4.5.1 of [1] describes about HEADER_IND field such as below.

> *If this field is set to '1', the CHARi field in the User Data Subparameter contains a User Data Header as defined in 9.2.3.4 of [21], beginning with the first octet.*

This field has been introduced in TIA/EIA 637-B and stays in TIA/EIA 637-C. Referenced spec [21] is TS 23.040.

For Mobile Terminated SMS messages, if the HEADER _IND in Message Identifier sub-parameter is set to 1, a phone's CDMA SMS protocol stack should get the segment information from the User Data Subparameter which includes the User Data Header and use the information to put the SMS segments together.

If the phone does not support long SMS feature and if the HEADER_IND is set to 1, it should discard User Data Header, and display only User Data. And the user data in different segment will be displayed in individual SMS message.

For Mobile Originated SMS messages, if the text message is longer than maximum length, the phone's CDMA SMS protocol stack should create multiple text SMS message, set the HEADER_IND bit to 1, and add the User Data Header according to Section 13.3.1 at the beginning of User Data Subparameter.

13.2.2 User Data Subparameter

Following is the message structure of User Data subparameter defined in section 4.5.2 of [1].

Field	Length (bits)
SUBPARAMETER_ID	8
SUBPARAM_LEN	8
MESSAGE_ENCODING	5
MESSAGE_TYPE	0 or 8
NUM_FIELDS	8
NUM_FIELDS occurrences of the following field:	
CHARi	Variable
The subparameter ends with the following field:	
RESERVED	0-7

CHARi field should start with the User Data Header if the HEADER_IND bit was set to 1.

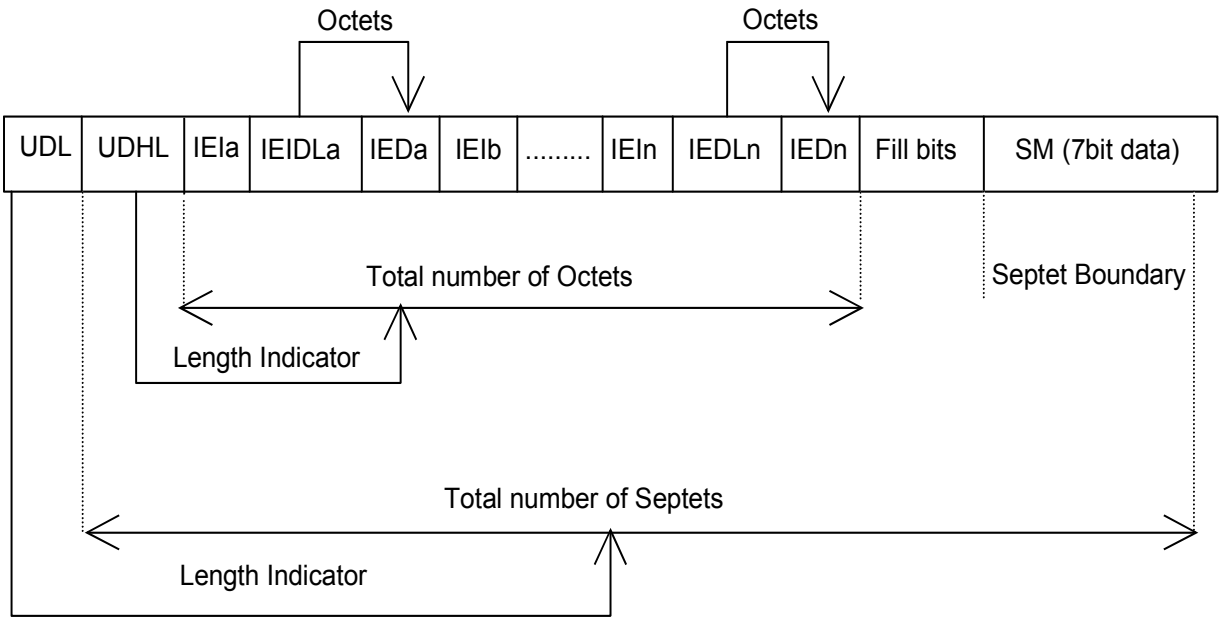
NUM_FIELDS must count User Data Header as well.

13.3 Usage of user data header

13.3.1 Message Structure

The 7-octet header information in the user data area must follow the TS 23.040 specification.

3GPP defines the field structure of User Data such as below.



IEI, IEIDL and IED can exists as many as needed according to this specification, and the usage of these fields is defined in detail in [2]. This section only extracted relevant information and adapted for CDMA.

Following table is the User Data Header data structure which shall be the first octet of CHARi.

Field	Description	Length / Octets	Value
UDHL	Length of UDH	1	0x06
IEI	Information Element Identifier of Long SMS	1	0x08
IEIDL	Length of Information Element	1	0x04
IED	Information Element “Long SMS” segmentation Data	4	Described below

- UDHL : Length of User Data Header. It is static value of 6.
- IEI : Concatenated short message. The value of IEI for CDMA long SMS is a

static value of 8, which means Information-Element-Data will use 16-bit reference number. Different values and description of each value of IEI field is defined in section 9.2.3.24 of [2].

- IEIDL : length of Information Element Data. With 16-bit reference number, length of IED is 4 octets.
- IED : The Information-Element-Data field contains information set by the application so that the receiving entity is able to re-assemble the short messages in the correct order.

  The Information-Element-Data octets shall be coded as follows:

  Octet 1-2 *Concatenated short messages, 16-bit reference number.*

  This octet shall contain a reference number of a concatenated short message. This reference number shall remain constant for every semented message which makes up a particular enhanced concatenated short message.

  Octet 3 *Total number of segments in the long SMS message.*

  This octet shall contain a value in the range 0 to 255 indicating the total number of short messages within the concatenated short message. The value shall start at 1 and remain constant for every short message which makes up the enhanced concatenated short message. If the value is zero then the receiving entity shall ignore the whole Information Element.

  Octet 4 *Sequence number of the current segmented message.*

  This octet shall contain a value in the range 0 to 255 indicating the sequence number of a particular short message within the concatenated short message. The value shall start at 1 and increment by one for every short message sent within the concatenated short message. If the value is zero or the value is greater than the value in octet 3 then the receiving entity shall ignore the whole Information Element.

  The IEI and associated IEI length and IEI data shall be present in every segment of the long SMS.

13.4 Specification references

[1] 3GPP2 C.S0015-A

[2] 3GPP TS 23.040

14. Appendix E – CDMA 1xAdvanced Requirements

In addition to the General Base CDMA requirements specified in chapter 3, the 1xAdvanced capable mobile station shall support the requirements specified in this chapter.

14.1 Physical Channel Support Requirements

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.1.1	The MS shall minimally support 1 Reverse Acknowledgement Channel, which provides feedback for the Forward Fundamental Channel (F-FCH) of Radio Configuration RC11.	M	Reverse ACK channel is required for Early Frame Termination for the F-FCH of RC11.	C.S0002-E §2.1.3.10	
14.1.2	The MS shall minimally support 1 Forward Acknowledgment Channel, which provides feedback for the Reverse Fundamental Channel (R-FCH) of Radio Configuration RC8.	M	Forward ACK channel is required for Early Frame Termination for the R-FCH of RC8.	C.S0002-E §3.1.3.1.13	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.1.3	The MS may support 1 Reverse Acknowledgment Channel, which provides feedback for the Forward Supplemental Channel (F-SCH) of Radio Configuration RC11.	O	Reverse ACK channel is required for Early Frame Termination for the F-SCH of RC11.	C.S0002-E §2.1.3.10	
14.1.4	The MS may support 1 Forward Common Acknowledgment Channel, which provides feedback for at least 1 Reverse Supplemental Channel (R-SCH) of Radio Configuration RC8.	O	Forward Common ACK channel is required for Early Frame Termination for the R-SCH of RC8.	C.S0002-E §3.1.3.7	

14.2 Radio Configuration Requirements

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.2.1	The MS shall minimally support the Radio configuration RC8 for the REVERSE LINK.	M		C.S0002-E, §2.1.3.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.2.2	The MS shall minimally support the Radio configuration RC11 for the FORWARD LINK.	M		C.S0002-E, §3.1.3.1	
14.2.3	When operating in Radio Configuration 8, the MS shall support Reverse Pilot Channel gating as specified in C.S0002-E when the Reverse Fundamental Channel is transmitted at 0 bps.	M	Reverse link Pilot Channel (R-PICH) gating for the new radio configuration RC8 applies only to the null-rate frames (which can be used only when smart blanking is enabled for the reverse link).	C.S0002-E, §2.1.3.2.3	

14.3 Data Rate Requirements

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.3.1	The MS shall minimally support the Rate Set 1 at a maximum data rate of 9.6 kbps for Radio config-urations RC8 for the Reverse Fundamental Channel (R-FCH) and RC11 for the Forward Funda-mental Channel (F-FCH).	M		C.S0002-E, §2.1.3.1, §3.1.3.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.3.2	The MS shall minimally support the Rate Set 1 at a minimum data rate of 0 kbps for Radio config-urations RC8 for the Reverse Fundamental Channel (R-FCH) and RC11 for the Forward Funda-mental Channel (F-FCH).	M		C.S0002-E, §2.1.3.1, §3.1.3.1	
14.3.3	The MS may support Rate Set 1 at a maximum data rate of 307.2 kbps for radio configuration RC8 for the Reverse Supplemental Channel (R-SCH).	O		C.S0002-E, §2.1.3.1	
14.3.4	The MS may support Rate Set 1 at a maximum data rate of 307.2 kbps for radio configuration RC11 for the Forward Supplemental Channel (F-SCH).	O		C.S0002-E, §3.1.3.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.3.5	The MS may support, for Rate Set 1 in radio configurations RC11 and RC8, the following set of maximum simultaneous data rates of 307.2 kbps F-SCH and 307.2 kbps R-SCH.	O	Numbers are for SCH only – does not include FCH (9.6kbps).	C.S0002-E, §2.1.3.1, §3.1.3.1	

14.4 Power Control Requirements

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.4.1	The MS shall support RPC_MODE 00 (400 Hz) and 01 (200 Hz) Reverse Power Control for the Reverse Fundamental Channel (R-FCH) of RC8.	M	The BS transmits power control bits in PCG 1, 3, 5, 7, 9, 11, 13, and 15. When the MS transmits a non-null-rate frame, all power control bits received by the MS are considered valid. When smart blanking is enabled for the reverse link and the MS transmits a null-rate frame, only power control bits received by the MS in PCG 1, 5, 9, and 13 are considered valid.	C.S0002-E, §2.1.2.3.2	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.4.2	The MS shall support FPC_MODE 000 (400Hz), 011 (200 Hz) and 010 (400 Hz) Forward Power Control for the Forward Fundamental Channel (F-FCH**)** of RC11.	M	When smart blanking is disabled for the reverse link, the MS transmits power control bits (for forward link power control) in PCG 1, 3, 5, 7, 9, 11, 13 and 15. When smart blanking is enabled for the reverse link, the MS transmits power control bits in PCG 3, 7, 11 and 15.	C.S0002-E, §2.1.3.1,15.1	
14.4.3	For Reverse Link Radio Configuration RC8, the MS shall support two additional power control step sizes 1.5 dB and 2.0 dB**.**	M	The use of larger power control step sizes for null-rate frames allow reverse link closed loop power control to maintain a similar slew rate for null-rate frames and non-null-rate frames.	C.S0002-E, §2.1.2.3.2	

14.5 Other Physical Layer Requirements

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.5.1	The 20 ms frames in Radio Configuration 11 and Radio Configuration 12 with 192, 100, 60, 36 total bits shall use the frame quality indicator as specified in C.S0002-E.	M	All F-FCH frames of RC11/12 contain a 12-bit CRC to reduce probability of false detection at lower data rates.	C.S0002-E, §3.1.3.15.2.1	
14.5.2	The 20 ms frames in Radio Configuration 8 with 192, 100, 60, and 36 total bits shall use the frame quality indicator as specified in C.S0002-E.	M	All R-FCH frames of RC8 contain a 12-bit CRC to reduce probability of false detection at lower data rates	C.S0002-E, §2.1.3.12.1.1	

14.6 Layer 3 Requirements

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.6.1	The device shall support the following information records: ESN_ME, UIM_ID, MEID_ME, EXT_UIM_ID.	M		C.S0005-E, §2.7.4	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.6.2	The device shall support Radio Configuration Parameters Message (RCPM)	M		C.S0005-E, §3.7.3.3.2.5.1	
14.6.3	The device shall support General Extension Message (GEM)	M	Base station may use the Redio Configuration Parameters Record of GEM to extend CAM/ECAM/ESCAM/MECAM or UHDM/GHDM/EHDM/MUHDM messages instead of sending a RCPM message separately to the mobile station.	C.S0005-E, §3.7.2.3.2.44	
14.6.4	If RC11 or RC12 is used on forwrad link and blanking is enabled (i.e. FOR_FCH_BLANKING_DUTYCYCLE is set to value other than ‘000’), then the device shall detect ‘good forward link’ trigger based on C.S0005-E.	M		C.S0005-E, §2.6.4.1.8.1.1	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.6.5	If RC11 or RC12 is used on Forward Link and blanking is enabled (i.e. FOR_FCH_BLANKING_DUTYCYCLE is set to value other than '000'), then the device shall detect 'forward link error' trigger based on C.S0005-E.	M		C.S0005-E, §2.6.4.1.8.1.1	

14.7 Service Option Support Requirements

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.7.1	The device shall support all the narrowband capacity operating points of SO73 as specified in C.S0014-D.	M		C.R1001-G §3.2; C.S0014-D §2.6.1.2	
14.7.2	The device shall support the wideband capacity operating point (COP0) of SO73 as specified in C.S0014-D.	HD		C.R1001-G §3.2; C.S0014-D §2.6.1.2	
14.7.3	The device shall support SO74: Flexible MSO.	M		C.R1001-G §3.2	

Req. #	Requirement	Category	Remarks	References	PRI Configurable
14.7.4	The device shall support SO75: Enhanced Loopback Service Option.	M		C.R1001-G §3.2	
14.7.5	If the device supports RL RC8 or FL RC11 or FL RC12 then the device shall support SO73 NB mode (i.e., COP1 through 7 of SO73) and shall indicate support for SO73 to the base station.	M	Support of SO73 is mandatory for device supporting RC8/11/12.	C.S0005-E §2.6.20; §2.7.4.25	