



CDMA Device Requirements – CDMA2000 1xEV-DO Revision 0, A, and B

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Revision History

Date	Version	Description
22 December 2007	1.5	Approved version by GHRC Steering Committee.
8 January 2010	1.6	Review version with DOrB content
27 January 2010	1.7	Released version with DOrB content

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1. Introduction

1.1 Purpose

The purpose of this document is to provide the detailed functionality requirements for 1xEV-DO capable devices. This document covers the main requirements for 1xEV-DO Release 0 and the incremental requirements for 1xEV-DO Revision A and B capable devices. The requirements described herein are in addition to the requirements detailed in the CDG Document 90 [16] and replace the obsolete requirements in CDG Document 93 [19].

1.2 Scope

This document covers the minimum device requirements for the design of 1xEV-DO Rev 0, 1xEV-DO Rev A, or 1xEV-DO Rev B devices. These requirements are written to support best effort packet data services on 1xEV-DO Rev 0, Rev A, or Rev B devices.

The requirements for 1xEV-DO Rev A or Rev B devices that allow support of services with quality of service will be covered in service specific documents.

1.3 Organization

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

- Introduction
- 1xEV-DO Rev 0 Device Requirements
- 1xEV-DO Rev A Additional Device Requirements
- 1xEV-DO Rev B Additional Device Requirements

1.4 Reference Documents

The compliance to the standard references is limited to the scope described in section 2 for 1xEV-DO Rev 0 devices and combined sections 2 and 3 for 1xEV-DO Rev A devices.

3GPP2 reference documents can be found at
http://www.3gpp2.org/Public_html/specs/index.cfm.

Ref #	Reference	Description
1.	C.S0024-A v3.0 (IS-856-A-2)	CDMA2000 High Rate Packet Data Air Interface Specification
2.	C.S0033-B v1.0 (TIA-866-B)	Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Terminal

Ref #	Reference	Description
3.	C.S0023-D v1.0 (TIA-820-D)	Removable User Identity Module for Spread Spectrum Systems
4.	C.S0016-Cv2.0 (TIA-683-D-1)	Over-the-Air Service Provisioning of Mobile Stations in Spread Spectrum Standards
5.	C.S0029-B v1.0 (IS-890-B)	Test Application Specification (TAS) for High Rate Packet Data Air Interface
6.	C.S0038-Bv1.0 (TIA-919-B)	Signaling Conformance Standard for High Rate Packet Data Air Interface
7.	C.S0039v2.0 (TIA-925-1)	Enhanced Subscriber Privacy for CDMA2000 High Rate Packet Data
8.	A.S0006-0	Interoperability Specification (IOS) for Hybrid MS/AT (HAT) Authentication
9.	A.S0008-B v1.0 (IS-878-B)	Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Access Network
10.	A.S0009-B v1.0 (IS-1878-B)	Interoperability Specification (IOS) for High Rate Packet Data (HRPD) Radio Access Network Interfaces with Session Control in the Packet Control Function.
11.	C.S0044-A v1.0 (TIA-1036-A)	Interoperability Specification for CDMA2000 Air Interface, July 27, 2007
12.	C.S0063-A v2.0(TIA-1054-A-1)	CDMA2000 High Rate Packet Data Supplemental Services, March 2007
13.	C.S0082-0 v1.0 (TIA-1110)	Circuit Services Notification Application Specification for cdma2000 High Rate Packet Data
14.	C.S0057-D v1.0. (TIA-1030-D)	Band Class Specification for cdma2000 Spread Spectrum Systems
15.	RFC 2486	The Network Access Identifier, January 1999
16.	CDG Document 90	Global Handset Requirements for CDMA — CDMA2000 Voice, SMS, and Data; Ver 2.1, March 21, 2007.
17.	CDG Document 142	Global Handset Requirements for CDMA R-UIM; Version 0.9; 20 April 2007.
18.	CDG Document 143	Recommended System Selection Requirements for 1X and 1xEV-DO-Capable Terminals; Version 1.0; 15 March 2007.
19.	CDG Document 93	CDMA Handset Requirements – CDMA2000 1xEV-DO; Version 1.3; 19 March 2007. (obsolete)
20.	CDG Document 155	Wireless IP Access CDG document is under development.
21.	C.S0024-0 v4.0 (IS-856-2)	cdma2000 High Rate Packet Data Air Interface Specification

Ref #	Reference	Description
22.	C.S0024-B v3.0 (TIA-856-B-2)	cdma2000 High Rate Packet Data Air Interface Specification

1.5 Acronyms and Abbreviations

Table 1: Acronyms and Abbreviations

Acronym / Abbreviation	Description
AN	Access Network, 1XEV-DO network equipment
AT	Access Terminal, a 1XEV-DO mobile station
CDMA	Code Division Multiple Access
CLID	Calling Line Identification
CSIM	CDMA SIM
CSL	Client Subsidy Lock
DRC	Data Rate Control used by the Access Terminal to request a Forward Traffic Channel data rate and selected serving sector from the Access Network
E _b	The combined received energy per bit for the Control Channel or Forward traffic Channel, measured at the antenna interface of the mobile station
E _c	Average energy per PN chip over its TDM interval for the Pilot Channel, Forward Medium Access Control (MAC) Channel, Control Channel or Forward Traffic Channel
EIRP	Effective Isotropic Radiated Power. The product of power supplied to the antenna and the antenna gain in a direction relative to an isotropic antenna
ERP	Effective Radiated Power. The product of power supplied to the antenna and the antenna gain relative to a half-wave dipole in a given direction
ESN	Electronic Serial Number
GEO	Geographical Area
GSRM	Global Service Redirect Message
I _o	The overall received power spectrum density, including signal and interference, measured at the antenna interface of the mobile station
I _{oc}	The power spectrum density of intra-band flat noise source, measured at the antenna interface of the mobile station

Acronym / Abbreviation	Description
I _{or}	The overall sending power spectrum density of the forward CDMA channel at the antenna interface of the base station
\hat{I}_{or}	The power spectrum density of the forward CDMA channel at the antenna interface of the mobile station.
MAC	Medium Access Control
MDN	Mobile Directory Number
MEID	Mobile Equipment Identifier
MIN	Mobile Identification Number
MIP	Mobile IP
MMS	Multimedia Messaging Service
MS	Mobile station
NAI	Network Access Identifier
NID	Network ID
N _t	Effective noise power spectral density, measured at the antenna interface of the mobile station
OTASP	Over the Air Service Provisioning
PHY	Physical Layer
PRI	Product Release Instruction
PRL	Preferred Roaming List
RUIM	Removable User Identification Module
SID	System ID
SIM	Subscriber Identity Module
SIP	Simple IP
SMS	Short Message Service
SPC	Service Programming Code
UATI	Unicast Access Terminal Identifier
UDM	Universal Diagnostic Mode
UI	User Interface

1.6 Terms and Definitions

- Four categories of requirements are established:

(M) Mandatory	The handset must support that characteristic in order to achieve approval.
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(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.

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The following table defines the terminology used in this document

Term	Definition
Idle State	When access terminal has acquired the 1xEV-DO system but the connection is closed, the access terminal is in idle state.
Connected State	When access terminal has acquired the 1xEV-DO system and the connection is open, the access terminal is in connected state.

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1.7 Carrier Acceptance

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The documentation and equipment to be delivered to the CDMA2000 1x Operator for technical evaluation is described below:

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1.7.1 Documentation

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- The vendor shall provide a compliance report detailing compliance or non-compliance to each of the relevant performance and functional specifications in this document.

2. 1xEV-DO Rev 0 Device Requirements

This chapter covers the minimum set of requirements for a device to be 1xEV-DO Rev 0 compliant.

2.1 Air Interface

2.1.1 Air Interface Standards

The 1xEV-DO Rev 0 terminals shall comply with the requirements listed in the latest revision of the following standards limited by the features defined in [21] and protocols listed in section 2.1.2 .

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.1.1.1	The 1xEV-DO Rev 0 terminal shall support High Rate Packet Data as specified in [1].	M	The compliance is limited to default protocols as listed in section 2.1.2 and the mandatory features of [21]. It is recommended that developers check the differences between [21] and [22] to comply with all relevant bug fixes in [22] that apply to the content of [21].	[1]	See section 2.1.2
2.1.1.2	The 1xEV-DO Rev 0 terminal shall support Signaling Conformance Standard for High Rate Packet Data Air Interface as specified in [6].	M	The compliance is limited to default protocols as listed in section 2.1.2 and the mandatory features of [21].	[6]	See section 2.1.2
2.1.1.3	The 1xEV-DO Rev 0 terminal shall comply with the minimum performance requirements in [2].	M	The compliance is limited to default protocols as listed in section 2.1.2	[2]	See section 2.1.2

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.1.1.4	The band class (es) supported in a 1xEV-DO Rev 0 terminal shall be compliant to Band Class Specification for cdma2000 Spread Spectrum Systems [14].	M	The specific band classes supported are market dependent.	[14]	
2.1.1.5	The 1xEV-DO terminal shall support Forward and Reverse Test application Protocol specification (FTAP and RTAP) for High data rate air interface, [5].	M	Only Forward Test Application Protocol (FTAP) and Reverse Test Application Protocol (RTAP) will be supported for 1xEV-DO Rev 0 terminals.	See sections 2 and 3 in [5].	
2.1.1.6	The 1xEV-DO terminal shall comply with Interoperability Specification for CDMA2000 Air Interface, [11].	M		[11]	

1 **2.1.2 Air Interface Protocol Requirements**

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Req. #	Requirement	Category	Remarks	References	Related Requirements
2.1.2.1	Default Signaling Application	M	Application Layer	Section 2 in [1].	
2.1.2.2	Default Packet Application	M	Application Layer	Section 3 in [1].	
2.1.2.3	Default Stream Protocol	M	Stream Layer	Section 6.2 in [1].	
2.1.2.4	Default Session Management Protocol	M	Session Layer	Section 7.2 in [1].	
2.1.2.5	Default Address Management Protocol	M	Session Layer	Section 7.3 in [1].	
2.1.2.6	Default Session Configuration Protocol	M	Session Layer	Section 7.4 in [1].	

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.1.2.7	Default Air Link Management Protocol	M	Connection Layer	Section 8.2 in [1].	
2.1.2.8	Default Idle State Protocol	M	Connection Layer	Section 8.4 in [1].	
2.1.2.9	Default Connected State Protocol	M	Connection Layer	Section 8.6 in [1].	
2.1.2.10	Default Route Update Protocol	M	Connection Layer	Section 8.7 in [1].	
2.1.2.11	Default Packet Consolidation Protocol	M	Connection Layer	Section 8.8 in [1].	
2.1.2.12	Overhead Messages Protocol	M	Connection Layer	Section 8.9 in [1].	
2.1.2.13	Default Initialization State Protocol	M	Connection Layer	Section 8.3 in [1].	
2.1.2.14	Default Security Protocol	M	Security Layer	Section 9.3 in [1].	
2.1.2.15	Default Key Exchange Protocol	M	Security Layer	Section 9.5 in [1].	
2.1.2.16	Default Authentication Protocol	M	Security Layer	Section 9.7 in [1].	
2.1.2.17	Default Encryption Protocol	M	Security Layer	Section 9.9 in [1].	
2.1.2.18	Default Control Channel MAC Protocol	M	MAC Layer	Section 10.2 in [1].	
2.1.2.19	Default Access Channel MAC Protocol	M	MAC Layer	Section 10.4 in [1].	
2.1.2.20	Default Forward Traffic Channel MAC Protocol	M	MAC Layer	Section 10.6 in [1].	
2.1.2.21	Default Reverse Traffic MAC Protocol	M	MAC Layer	Section 10.8 in [1].	
2.1.2.22	Default Physical Layer Protocol	M	Physical Layer	Section 11.1 in [1].	
2.1.2.23	DH Key Exchange Protocol	HD	Security Layer	Section 9.6 in [1].	
2.1.2.24	Generic Security	O	Security Layer	Section 9.4 in [1].	

Req. #	Requirement	Category	Remarks	References	Related Requirements
	Protocol			[1].	
2.1.2.25	SHA-1 Authentication Protocol	O	Security Layer	Section 9.8 in [1].	

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2.2 OTA Provisioning Requirements

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Req. #	Requirement	Category	Remarks	References	Related Requirements
2.2.1	The 1xEV-DO terminal shall support OTASP/OTAPA provisioning of the following parameters: HRPD Access Authentication Capability Parameters, HRPD Access Authentication User Profile Parameters and HRPD Access Authentication CHAP SS Parameters.	M		Sec. 3.5.8.12 Sec. 3.5.8.13 Sec. 3.5.8.14 In [4]	

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2.3 Access Authentication

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Req. #	Requirement	Category	Remarks	References	Related Requirements
2.3.1	NAI Format and Value: AT shall use IMSI@"PRIspecified name" or MDN@"PRIspecified name" or ESN@"PRIspecified name" or MEID@"PRIspecified name" as the NAI format during access authentication. (e.g., 123456789012345@cdg.org), and AT shall use this NAI value to CHAP Response message. The ESN and MEID may be in hex or decimal.	M		[15]	
2.3.2	Domain Length: The terminal shall support a domain length of no less than 50 characters.	M	Modification of Domain name allowed through the keypad but protected by SPC.		
2.3.3	Password Length: The terminal shall support a password length no less than 20 characters.	M	Modification of password allowed through the keypad but protected by SPC.		
2.3.4	The 1xEV-DO terminal shall support A12 (AN-AAA) Authentication procedures as specified in [9] .	M	The terminal follows the call flow presented in the reference for successful access authentication.	Section 3.1.1 in [9].	
2.3.5	The 1xEV-DO terminal shall support Unsuccessful A12 (AN-AAA)	M	The terminal follows the call flow presented in the reference for an unsuccessful	Section 3.1.2 in [9].	

Req. #	Requirement	Category	Remarks	References	Related Requirements
	Authentication procedures as specified in [9].		access authentication.		
2.3.6	If 1xEV-DO terminal fails 1xEV-DO AN Authentication, it shall still be able to access CDMA voice and data services if it has successfully authenticated on CDMA network.	M	The 1xEV-DO AN authentication failure does not impact 1xRTT services.		
2.3.7	Upon being removed from the EVDO system due to A12 (AN-AAA) authentication failure, the 1xEV-DO terminal shall be capable of searching for an alternative network as specified in [18]	M	Subject to the search requirements defined in [18].	[18]	
2.3.8	When a data call is originated on 1xEV-DO network and 1xEV-DO A12 (AN-AAA) authentication fails, if the 1xEV-DO terminal is set to "MIP Preferred" or "MIP Only" mode, the terminal shall attempt a MIP registration after falling back on 1x.	M			
2.3.9	The 1xEV-DO terminal shall support the access network requesting AN-AAA re-authentication at any time while in the dormant state.	M	The terminal follows the call flow presented in the reference for the re-authentication of a terminal in the dormant state.	Section 3.2.1 in [9].	
2.3.10	If AN-AAA re-authentication procedure fails while in dormant state, the	M		Section 3.1.2 in [9].	

Req. #	Requirement	Category	Remarks	References	Related Requirements
	terminal shall remove 1xEV-DO session when the network sends a SessionClose message.				
2.3.11	The terminal shall support the access network requesting AN-AAA re-authentication At any time while in the active state.	M	The terminal follows the call flow presented in reference for the re-authentication of a terminal in the active state.	Section 3.2.2 in [9].	
2.3.12	If AN-AAA re-authentication Fails while in active state, the terminal shall remove 1xEV-DO session when the network sends a SessionClose Message.	M		Section 3.1.2 in [9].	
2.3.13	Whenever the AN-AAA username or password are modified, either directly or indirectly (e.g. via an IMSI/MDN change), the terminal shall clear the EVDO session.	M	This should result in a new UATI being assigned to the terminal and forcing AN-AAA authentication to be conducted		

1 2.4 External Interfaces

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Req. #	Requirement	Category	Remarks	References	Related Requirements
2.4.1	The device shall support a data interface.	M	The data interface can be either wireless or cable (e.g.; Bluetooth, infrared, or USB).		

3 2.5 R-UIM/CSIM

4 The requirements in this section only apply to devices that support R-UIM/CSIM.

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.5.1	If the terminal supports RUIM/CSIM, the terminal shall be compliant with Removable User Identity Module for Spread Spectrum Systems, [3].	M		[3]	
2.5.2	The terminal shall be compliant with Global Handset Requirements for CDMA R-UIM, [17].	M		[17]	
2.5.3	The terminal shall support both CAVE and CHAP based authentication for 1xEV-DO.	M	If the RUIM/CSIM card supports CHAP based authentication per [3] (per CDMA service table EF6F32), then terminal shall proceed with CHAP based authentication. If the RUIM/CSIM card does not support CHAP, CAVE based authentication shall be used per [8].	[3], [8]	

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.5.4	<p>CHAP based EVDO Authentication with RUIM/CSIM: If the CDMA Service Table (EF 6F32) in RUIM/CSIM indicates HRPD authentication (service n5) is supported, the CHAP Response shall use the hashing algorithm defined by the Standard during access authentication. The Compute IP Authentication command with Option 4 (HRPD Access Authenticator) shall be used to compute the CHAP response.</p>	M	Note, this requirement only applies to devices that support RUIM/CSIM.	[3]	

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.5.5	CAVE-based HRPD Authentication in RUIM/CSIM: If the CDMA Service Table (EF 6F32) in RUIM/CSIM does not indicate HRPD authentication (service n5) is supported, the AT shall support CAVE-based HRPD Authentication. The Run Cave Command shall be used to compute the CHAP Response. The AT shall use the first 32 bits of the Random value in the Challenge field from CHAP Challenge Message as the input parameter RAND in the RUN CAVE process of R-UIM card. If Challenge field is less than 32 bits AT shall fill in "0" until there are 32bits	M	Note: this requirement only applies to devices that support RUIM/CSIM.	[3]	

1 **2.6 Power Rating**

2 This section puts the requirements on the maximum power out of 1xEV-DO handsets
3 per band class.

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.6.1	The terminal shall be compliant with [2] for maximum power output per band class.	M		See section 4.3.4 of [2]	

1 **2.7 Requirements for Hybrid Operation**

2 This section provides the minimum technical requirements for the performance of the
3 hybrid 1x and 1xEV-DO Rev 0 mobile stations.

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Req. #	Requirement	Category	Remarks	References	Related Requirements
2.7.1	The hybrid 1x and 1xEV-DO terminal shall support idle handoff on the 1x paging channel and 1xEV-DO control channel during hybrid operation.	M		[11]	
2.7.2	The hybrid 1x and 1xEV-DO terminal shall support cross channel idle handoff for 1x and DO systems independently.	M	CDMA 1x and 1xEV-DO support of idle handoff among different frequencies should be independent.		

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.7.3	When the hybrid 1x and 1xEV-DO access terminal is on 1xEV-DO connection and CDMA 1x system is lost, the hybrid access terminal shall periodically attempt to re-acquire a CDMA 1x system in such a way that a CDMA 1x system is acquired as soon as possible without seriously impacting 1xEV-DO Connection performance. When CDMA 1x coverage becomes unavailable while a terminal is idle on 1xEV-DO, the terminal shall continue to provide 1xEV-DO service. When a CDMA 1x system is re-acquired, the hybrid access terminal shall operate in hybrid mode (CDMA and EV-DO).	M	The acquisition time shall be dependant on CDMA 1x rescan and sleep mode timers		[18]

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.7.4	When 1xEV-DO coverage becomes unavailable while the hybrid 1x and 1xEV-DO terminal is in 1x idle state, the terminal shall continue to provide CDMA 1x service. While idling on CDMA 1x system and 1xEV-DO system is lost, the hybrid access terminal shall periodically attempt to acquire the 1xEV-DO System without impacting IS-2000 paging channel performance. When 1xEV-DO system is re-acquired, the hybrid access terminal shall operate in hybrid mode (CDMA and EV-DO).	M	The acquisition time depends on CDMA 1x rescan and sleep mode timers. When the access terminal is in idle state, there is no open data session.		[18]
2.7.5	The sensitivity and dynamic range of the hybrid 1x and 1xEV-DO terminal's receiver for CDMA 1xEV-DO shall meet the requirements specified in [2].	M	For tests 3.3.1, 3.3.2, and 3.3.3, set the Limit reverse link transit power to +15dBm.	See section 3.3 of [2].	
2.7.6	The hybrid 1x and 1xEV-DO terminal shall monitor both 1x and DO control channels to receive their corresponding pages.	M	The 1xEV-DO may use a long sleep cycle if there is no PPP session.		

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.7.7	The hybrid 1x and 1xEV-DO terminal shall give the highest priority to 1x access and traffic channel requests while on DO connection unless it is restricted by 1x access control requirements as described in section 3.7	M	The 1x access control capability is an optional feature for the hybrid 1x and 1xEV-DO Rev 0 terminals as the main services over 1xEV-DO Rev 0 are best effort and have lower priority than services over 1x network.		
2.7.8	The hybrid 1x and 1xEV-DO terminal with single receiver shall interrupt 1xEV-DO connection to receive IS-2000 paging when the access terminal has open 1xEV-DO connection. The AT shall transmit DRC null cover prior to tune-away to 1x channel to inhibit transmission of data from the access network.	M	There is a small impact to the performance of 1xEV-DO throughput. The impact depends on 1x slot cycle and whether or not QPCH is used. The duration of DRC null cover transmission depends on DRC value prior to tune-away and DRC length.		

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2.8 Key Functions

2.8.1 Features and Functions

2.8.1.1 Visual Indicators

The requirements within this section apply to handset.

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Req. #	Requirement	Category	Remarks	References	Related Requirements
2.8.1.1.1	The EV-DO terminal shall display signal level based on EV-DO signal quality.	HD	This indicates the coverage of the EV-DO signal similar to 1x RSSI indicator.		

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.8.1.1.2	The terminal shall have a visual indicator to indicate whether the terminal is operating in CDMA2000 1x or 1xEV-DO.	HD			
2.8.1.1.3	The terminal should display the time spent connected on the traffic channel.	O			
2.8.1.1.4	The terminal shall display the total data transferred during the data session.	HD			

1 **2.8.2 Test Mode**

- 2 The mobile station should provide an engineering test mode and menu that is only
3 available to professional technical staff for restricted access.

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.8.2.1	The test mode display shall display the band class and channel number when the mobile station is operating in 1xEV-DO mode.	M			
2.8.2.2	The test mode display shall display the UATI color code when the mobile station is operation in 1xEV-DO mode.	M			
2.8.2.3	The test mode display shall display transmit UATI when the mobile station is operating in 1xEV-DO mode.	M			

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.8.2.4	The test mode display shall display the serving Pilot PN when the mobile station is operating in 1xEV-DO mode.	M			
2.8.2.5	The test mode display shall display the receive signal strength of Chain 0 and Chain 1 (if applicable) expressed (dBm) when the mobile station is operating in 1xEV-DO mode.	M			
2.8.2.6	The test mode display shall display the total Transmit Power when the mobile station is operating in 1xEV-DO mode.	M			
2.8.2.7	The test mode display shall display the 1xEV-DO session state when the mobile station is operating in 1xEV-DO mode.	M	Session State should be coded as follows: 0 – Inactive 1 – AMP Setup 2 – AT Initiated Negotiation 3 – AN Initiated Negotiation 4 – Open		
2.8.2.8	The test mode display shall display the protocol state when the mobile station is operating in 1xEV-DO mode.	M	Protocol state should be coded as follows: 0 – Inactive (AT switched to 1X or is in Deep Sleep) 1 – Acquisition 2 – Sync 3 – Idle 4 – Access 5 – Connected		
2.8.2.9	The test mode display shall display the data session current IP address when the mobile station is operation in 1xEV-DO mode.	HD	This applies to socket application only.		

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.8.2.10	The test mode display should display 1xEV-DO Rev 0 search state and 1x-EVDO Rev 0 slot cycle.	O	The 1xEV-DO slot cycle depends on the negotiated idle state protocol. For 1xEV-DO Rev 0 handset, it shall be the constant NIDPSleep. The 1xEV-DO search state displays one of the following states: Traffic, Idle, Sleep, or Acquisition.		
2.8.2.11	The test mode display shall display SectorID and SubnetID.	M			

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2.9 Handoff Requirements

3 The 1xEV-DO Rev 0 hybrid terminal shall comply with mobility requirements between
4 HRPD network and IS-2000 network as specified in [20], Wireless IP Access. The
5 mobility requirements cover both dormant and active packet data session. The AT shall
6 comply with all mobility requirements for radio connection mobility as specified in [1]
7 limited to features in [21].

8

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.9.1	The 1xEV-DO Rev 0 hybrid terminal shall support handoff of an active data call from 1xEV-DO Rev 0 to 1x RTT packet call when 1xEV-DO Rev 0 terminal moves out of DO coverage.	M	This feature is supported for hybrid operation only.		

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.9.2	If 1xEV-DO Rev 0 hybrid terminal detects the edge of 1xEX-DO coverage during traffic channel operation, it shall force dormancy, and exit dormancy onto the available 1x system. If the data session is continuously active, this transition shall take less than 10 seconds.	M	Active hand-down from to 1xEV-DO traffic to 1x traffic. Note: "available 1x system" means good 1x coverage.	[11]	

1

2

3 **2.10 IP Access**

4 The 1xEV-DO Rev 0 terminal shall comply with requirements in [20], Wireless IP
5 Access.

6 **2.11 Receiver Requirements**

7 None.

8 **2.12 Other Air Interface Requirements**

9 None.

10 **2.13 System Selection Requirements**

Req. #	Requirement	Category	Remarks	References	Related Requirements
2.13.1	The 1xEV-DO terminal shall comply with [18] for system selection requirements.	M		[18]	

11

3. 1xEV-DO Rev A Device Requirements

The 1xEV-DO Rev A devices shall comply with the additional requirements in this chapter in addition to requirements in chapter 2.

3.1 Air Interface

3.1.1 Air Interface Standards

The 1xEV-DO Rev A terminals shall comply with the latest revision of the following standards limited to combined features of [21] and [1] and the protocols listed in sections 2.1.2 and 3.1.2 .

Req. #	Requirement	Category	Remarks	References	Related Requirements
3.1.1.1	The 1xEV-DO Rev A terminal shall support High Rate Packet Data as specified in [1].	M	The compliance is limited to protocols as listed in sections 2.1.2 and 3.1.2 . It is recommended that developers check the difference between [1] and [22] to comply with all relevant bug fixes in [22] that apply to the content of [1].	[1]	See sections 2.1.2 and 3.1.2 .
3.1.1.2	The 1xEV-DO Rev A terminal shall support Signaling Conformance Standard for High Rate Packet Data Air Interface as specified in [6].	M	The compliance is limited to protocols as listed in sections 2.1.2 and 3.1.2 and the mandatory features of [1].	[6]	See sections 2.1.2 and 3.1.2 .
3.1.1.3	The 1xEV-DO Rev A terminal shall comply with the minimum performance requirements in [2].	M		[2]	See sections 2.1.2 and 3.1.2 .

Req. #	Requirement	Category	Remarks	References	Related Requirements
3.1.1.4	The band class specification for 1xEV-DO Rev A terminal shall be compliant to Band Class Specification for cdma2000 Spread Spectrum Systems [14].	M		[14]	
3.1.1.5	The 1xEV-DO terminal shall support Test application specification (TAS) for High data rate air interface.	M		See sections 4 and 5 in [5].	
3.1.1.6	The 1xEV-DO terminal shall comply with Interoperability Specification for CDMA2000 Air Interface, [11].	M		[11]	

1

2 **3.1.2 Air Interface Main Protocol Requirements**

3 This section provides a list of the minimum requirements from [1] that 1xEV-DO Rev A
4 devices shall comply in addition to requirements in section 2.1.2 to support best effort
5 traffic with 1xEV-DO Rev A data rates.

6

Req. #	Requirement	Category	Remarks	References	Related Requirements
3.1.2.1	Multi-Flow Packet Application	M	Application Layer	Section 4 in [1].	
3.1.2.2	Enhanced Multi-Flow Packet Application	HD	Application Layer	[12]	
3.1.2.3	3G1X Circuit Services Notification Application	HD	Application Layer	[13]	
3.1.2.4	Generic Virtual Stream Protocol	O	Stream Layer; not required for Rev A devices.	Section 6.3 in [1].	
3.1.2.5	Generic Multimode	O	Session Layer	Section 7.5 in	

Req. #	Requirement	Category	Remarks	References	Related Requirements
	Capability Discovery Protocol			[1].	
3.1.2.6	Enhanced Idle State Protocol	M	Connection Layer This protocol is used to enable separation of 1xEV-DO Rev 0 terminals and 1xEV-DO Rev A terminals across Rev 0 channel (s) and Rev A Channel(s) by using AccessHashingChannelMask.	Section 8.5 in [1].	
3.1.2.7	Enhanced Control Channel MAC Protocol	HD	MAC Layer	Section 10.3 in [1].	
3.1.2.8	Enhanced Access Channel MAC Protocol	HD	MAC Layer	Section 10.5 in [1].	
3.1.2.9	Enhanced Forward Traffic Channel MAC Protocol	M	MAC Layer	Section 10.7 in [1].	
3.1.2.10	Subtype 1 Reverse Traffic Channel MAC Protocol	O	MAC Layer	Section 10.9 in [1].	
3.1.2.11	Subtype 2 Reverse Traffic Channel MAC Protocol	D	MAC Layer	Section 10.10 in [1].	
3.1.2.12	Subtype 3 Reverse Traffic Channel MAC Protocol	M	MAC Layer	Section 10.11 in [1].	
3.1.2.13	Subtype 1 Physical Layer Protocol	O	Physical Layer	Section 11.1 in [1].	
3.1.2.14	Subtype 2 Physical Layer Protocol	M	Physical Layer	Section 11.2 in [1].	
3.1.2.15	Generic Attribute Update Protocol	M		Section 14.10 in [1].	

1 **3.2 OTA Provisioning Requirements**

2 There are no new requirements for 1xEV-DO Rev A terminals.

3 **3.3 Access Authentication**

4 There are no new requirements for 1xEV-DO Rev A terminals.

5 **3.4 External Interfaces**

6 There are no new requirements for 1xEV-DO Rev A terminals.

7 **3.5 R-UIM/CSIM**

8 There are no new requirements for 1xEV-DO Rev A terminals.

9 **3.6 Power Rating**

10 There are no new requirements for 1xEV-DO Rev A terminals.

11 **3.7 Requirements for Hybrid Operation**

12

Req. #	Requirement	Category	Remarks	References	Related Requirements
3.7.1	The hybrid 1x and 1xEV-DO Rev A terminal shall be able to restrict 1x access as a function of the active data service on 1xEV-DO Rev A connection.	M	The application shall enable and disable 1x access control when it is activated or deactivated for providing service. Otherwise, the last configured access control will apply to all DO connections.		

Req. #	Requirement	Category	Remarks	References	Related Requirements
3.7.2	When there is an open DO connection, the hybrid 1x and 1xEV-DO Rev A terminal shall support a 1x access control mask that allows disabling 1x access for any of the following reasons: 1x registration, 1x layer 2 acknowledgments, 1x origination, or 1x page response per service option.	M	The 1x access control mask provides a capability to enable or disable any of listed access types independently.		
3.7.3	If the hybrid 1x and 1xEV-DO Rev A terminal supports two independently tunable receivers, the access terminal shall support simultaneous receive of traffic over 1xEV-DO (DO connection is open) on the primary RF chain and IS-2000 paging on the secondary RF chain.	M	The access terminal is defined to have independently tunable receivers if each receiver can be tuned to a separate CDMA channel.		

1 **3.8 Key Functions**

2 **3.8.1 Features and Functions**

3 **3.8.1.1 Visual Indicators**

4 The requirement(s) in this section applies to Handset.

Req. #	Requirement	Category	Remarks	References	Related Requirements
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Req. #	Requirement	Category	Remarks	References	Related Requirements
3.8.1.1.1	The 1xEV-DO Rev A terminal shall have a visual indicator to indicate whether the terminal is operating in CDMA2000 1x or 1xEV-DO Rev 0 or 1xEV-DO Rev A.	M	The indicator for 1xEV-DO Rev A is triggered if the Physical Subtype 2 is in use.		

1 3.8.2 Test Mode

Req. #	Requirement	Category	Remarks	References	Related Requirements
3.8.2.1	The test mode display should display 1xEV-DO REV A search state and 1xEV-DO REV A slot cycle.	O	The 1xEV-DO REV A slot cycle depends on the negotiated idle state protocol. For 1xEV-DO Rev A devices with Enhanced Idle State Protocol, it shall be based on configured SlotCycle _i corresponding to the current PagePeriod. The 1xEV-DO REV A search state displays one of the following states: Traffic, Idle, Sleep, or Acquisition.		
3.8.2.2	The test mode display shall display the InUse packet application bound to the service network.	M			
3.8.2.3	The test mode display shall display the number of configured RLP flows.	M			

Req. #	Requirement	Category	Remarks	References	Related Requirements
3.8.2.4	The test mode display shall display the QoS state.	HD	<p>QoS State: 1a,1b,1c = QOS_GRANTED, indicating that QOS is granted in response to mobile initiated operations such as QOS_REQUEST(a), QOS_MODIFY(b), or QOS_RESUME(c)</p> <p>2 = QOS_NW_MODIFIED, indicating that granted QOS is modified by network on its own.</p> <p>3 = QOS_DEACTIVATED, indicating that QOS is suspended.</p> <p>4= QOS_RELEASED, indicating that QOS is no longer available.</p> <p>QOS MASK (2 bit value): QOS is requested in Rx direction</p> <p>QOS is requested in Tx direction</p>		

1 **3.9 Handoff Requirements**

2 The 1xEV-DO Rev A devices shall comply with the following requirements in addition to
3 requirements in section 2.9 . The AT shall comply with all mobility requirements for radio
4 connection mobility as specified in [1].

5

6

Req. #	Requirement	Category	Remarks	References	Related Requirements
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Req. #	Requirement	Category	Remarks	References	Related Requirements
3.9.1	The 1xEV-DO Rev A terminal shall support change in personality for handoff from 1xEV-DO Rev A to 1xEV-DO Rev 0 in idle state.	M	Multiple personality support is required.		
3.9.2	The 1xEV-DO Rev A terminal shall support change in personality for handoff from 1xEV-DO Rev A to 1xEV-DO Rev 0 in connected state.	M	Multiple personality support is required.		
3.9.3	The 1xEV-DO Rev A terminal shall support change in personality for handoff from 1xEV-DO Rev 0 to 1xEV-DO Rev A in idle state.	M	Multiple personality support is required.		
3.9.4	The 1xEV-DO Rev A terminal shall support change in personality for handoff from 1xEV-DO Rev 0 to 1xEV-DO Rev A in connected state.	M	Multiple personality support is required.		
3.9.5	The 1xEV-DO Rev A hybrid terminal shall support handoff of an active data call from 1xEV-DO Rev A to 1x RTT packet call when 1xEV-DO Rev A terminal moves out of DO coverage.	M			

1 **3.10 IP Access**

- 2 The 1xEV-DO Rev A terminal shall comply with requirements in [20], Wireless IP
3 Access.

3.11 Receiver Requirements

Req. #	Requirement	Category	Remarks	References	Related Requirements
3.11.1	The 1xEV-DO Rev A terminal shall support mobile receive diversity.	HD			
3.11.2	The 1xEV-DO Rev A terminal should support two independently tunable receivers.	O	The access terminal is defined to have independently tunable receivers if each receiver can be tuned to a separate CDMA channel.		

3.12 Other Air Interface Requirements

Req. #	Requirement	Category	Remarks	References	Related Requirements
3.12.1	The 1xEV-DO Rev A terminal shall only accept Default Packet Application bound to the radio network for the purpose of access authentication.	M	The RAN shall only propose Default Packet Application bound to the radio network to the AT for performing access authentication.		

3.13 System Selection Requirements

There are no new requirements for 1xEV-DO Rev A terminals.

4. 1xEV-DO Rev B Device Requirements

The 1xEV-DO Rev B devices shall comply with the additional requirements in this chapter in addition to requirements in chapter 2. and 3.

4.1 Air Interface

4.1.1 Air Interface Standards

The 1xEV-DO Rev B terminals shall comply with the latest revision of the following standards limited to the protocols listed in sections 2.1.2 , 3.1.2 , and 4.1.2 .

Req. #	Requirement	Category	Remarks	References	Related Requirements
4.1.1.1	The 1xEV-DO Rev B terminal shall support High Rate Packet Data as specified in [22].	M	The compliance is limited to protocols as listed in sections 2.1.2 , 3.1.2 , and 4.1.2 .	[22]	See sections 2.1.2 , 3.1.2 , and 4.1.2 .
4.1.1.2	The 1xEV-DO Rev B terminal shall support Signaling Conformance Standard for High Rate Packet Data Air Interface as specified in [6].	M	The compliance is limited to protocols as listed in sections 2.1.2 , 3.1.2 , and 4.1.2 plus the mandatory features of [22].	[6]	See sections 2.1.2 , 3.1.2 , and 4.1.2 .
4.1.1.3	The 1xEV-DO Rev B terminal shall comply with the minimum performance requirements in [2].	M		[2]	See sections 2.1.2 , 3.1.2 , and 4.1.2 .
4.1.1.4	The band class specification for 1xEV-DO Rev B terminal shall be compliant to Band Class Specification for cdma2000 Spread Spectrum Systems [14].	M		[14]	

Req. #	Requirement	Category	Remarks	References	Related Requirements
4.1.1.5	The 1xEV-DO terminal shall support Test application specification (TAS) for High data rate air interface.	M		See section 6 and 7 of [5].	
4.1.1.6	The 1xEV-DO terminal shall comply with Interoperability Specification for CDMA2000 Air Interface, [11].	M		[11]	

1

2 **4.1.2 Air Interface Main Protocol Requirements**

3 This section provides a list of the minimum requirements from [22] that 1xEV-DO Rev B
4 devices shall comply in addition to requirements in section 2.1.2 and 3.1.2 to support
5 best effort traffic with 1xEV-DO Rev B data rates. The protocols listed in sections 2.1.2
6 and 3.1.2 must comply with the requirements in [22].

7

Req. #	Requirement	Category	Remarks	References	Related Requirements
4.1.2.1	Multi-link Multi-Flow Packet Application	M	Application Layer	Section 3 in [12]	
4.1.2.2	Quick Idle State Protocol	HD	Connection Layer	See section 7.6 in [22]	
4.1.2.3	Subtype 2 Forward Traffic Channel MAC Protocol	M	MAC Layer Operates with Physical Subtype 3	Section 9.8 in [22].	
4.1.2.4	Subtype 4 Reverse Traffic Channel MAC Protocol	M	MAC Layer Operates with Physical Subtype 3	Section 9.13 in [22].	
4.1.2.5	Subtype 3 Physical Layer Protocol	M	Physical Layer	Section 12.1 in [22].	

8

9 **4.2 OTA Provisioning Requirements**

10 There are no new requirements for 1xEV-DO Rev B terminals.

1 **4.3 Access Authentication**

2 There are no new requirements for 1xEV-DO Rev B terminals.

3 **4.4 External Interfaces**

4 There are no new requirements for 1xEV-DO Rev B terminals assuming that peak
5 enhanced data rates for DO Rev B could be supported over the chosen interface.

6 **4.5 R-UIM/CSIM**

7 There are no new requirements for 1xEV-DO Rev B terminals.

8 **4.6 Power Rating**

9 There are no new requirements for 1xEV-DO Rev B terminals.

10 **4.7 Requirements for Hybrid Operation**

11 There are no new requirements for 1xEV-DO Rev B terminals.

12 **4.8 Key Functions**

13 **4.8.1 Features and Functions**

14 **4.8.1.1 Visual Indicators**

15 The requirement(s) in this section applies to Handset.

Req. #	Requirement	Category	Remarks	References	Related Requirements
4.8.1.1.1	The 1xEV-DO Rev A terminal shall have a visual indicator to indicate whether the terminal is operating in CDMA2000 1x or 1xEV-DO Rev 0 or 1xEV-DO Rev A or 1xEV-DO Rev B.	M	The indicator for 1xEV-DO Rev B is triggered if the Multi-link Multi-Flow Packet Application is in InUse personality.		

16 **4.8.2 Test Mode**

17 There are no new requirements for 1xEV-DO Rev B terminals.

4.9 Handoff Requirements

The 1xEV-DO Rev B devices shall comply with the following requirements in addition to requirements in section 2.9 and 3.9 . The AT shall comply with all mobility requirements for radio connection mobility as specified in [22].

Req. #	Requirement	Category	Remarks	References	Related Requirements
4.9.1	The 1xEV-DO Rev B terminal shall support change in personality for handoff from 1xEV-DO Rev B to 1xEV-DO Rev 0 or Rev A in idle state.	M	Multiple personality support is required.		
4.9.2	The 1xEV-DO Rev B terminal shall support change in personality for handoff from 1xEV-DO Rev B to 1xEV-DO Rev 0 or Rev A in connected state.	M	Multiple personality support is required.		
4.9.3	The 1xEV-DO Rev B terminal shall support change in personality for handoff from 1xEV-DO Rev 0 or Rev A to 1xEV-DO Rev B in idle state.	M	Multiple personality support is required.		
4.9.4	The 1xEV-DO Rev B terminal shall support change in personality for handoff from 1xEV-DO Rev 0 or Rev A to 1xEV-DO Rev B in connected state.	M	Multiple personality support is required.		
4.9.5	The 1xEV-DO Rev B hybrid terminal shall support handoff of an active data call from 1xEV-DO Rev B to 1x RTT packet call when 1xEV-DO Rev B terminal moves out of DO coverage.	M			

1 **4.10 IP Access**

2 The 1xEV-DO Rev B terminal shall comply with requirements in [20], Wireless IP
3 Access.

4 **4.11 Receiver Requirements**

5

Req. #	Requirement	Category	Remarks	References	Related Requirements
4.11.1	The 1xEV-DO Rev B terminal shall support mobile receive diversity.	HD			
4.11.2	The 1xEV-DO Rev B terminal should support two independently tunable receivers.	O	The access terminal is defined to have independently tunable receivers if each receiver can be tuned to a separate CDMA channel.		

6 **4.12 Other Air Interface Requirements**

7

Req. #	Requirement	Category	Remarks	References	Related Requirements
4.12.1	The 1xEV-DO Rev B terminal shall only accept Default Packet Application bound to the radio network for the purpose of access authentication.	M	The RAN shall only propose Default Packet Application bound to the radio network to the AT for performing access authentication.		

Req. #	Requirement	Category	Remarks	References	Related Requirements
4.12.2	The 1xEV-DO Rev. B terminal shall support at least 3 carriers over the FL with maximum edge to edge bandwidth separation of 5x and at least 3 carriers over the RL with maximum edge to edge bandwidth separation of 5x for active data transfer in a multicarrier traffic channel operation.	M	x = channel bandwidth		
4.12.3	The 1xEV-DO Rev. B terminal should support at least 3 carriers over the FL with maximum edge to edge bandwidth separation of 7x and at least 3 carriers over the RL with maximum edge to edge bandwidth separation of 7x for active data transfer in a multicarrier traffic channel operation.	O	x = channel bandwidth		
4.12.4	The 1xEV-DO Rev. B terminal shall support symmetric FL and RL carrier assignments.	M			
4.12.5	The 1xEV-DO Rev. B terminal shall propose 1xEV-DO Rev 0/A/B capability during session negotiation. It is left up to the AN to configure the required personalities.	M			

Req. #	Requirement	Category	Remarks	References	Related Requirements
4.12.6	The AT shall support up to four personalities at any given point in time.	M			

1 **4.13 System Selection Requirements**

2 There are no new requirements for 1xEV-DO Rev B terminals.

3

1 **5. Appendix A – 1xEV-DO PRI Parameters**

2 Manufacturers can add their own device functionalities at the end of the table in the
3 section *Other, special features*.

4 **5.1 NAM 1 Programming**

Feature / Function	Customer Setting	Default Setting/Possible Values

5 **5.2 Features and Functions**

Feature / Function	Customer Setting	Default Setting/Possible Values

6