



Handset-based PCD Requirements

CDG Document 198

Version 1.0

July 2010

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Revision History

Date	Version	Description
July 2010	1.0	Initial release



1. *Introduction*

Plus Code Dialing (PCD) is a capability of high interest to operator members of the International Roaming Team (IRT) of the CDMA Development Group (CDG).

This document aims to state the technical requirements on the MS to realize handset-based PCD, which doesn't depend on the capability of the serving network.

Requirements are listed below as they apply to each element. They are further divided where appropriate as relating to Voice or SMS, and origination or termination.

1.1 Definition

Plus code dialing relieves the user of the need to dial an international access prefix, which may vary between countries and carriers. When addresses are entered by a user, the MS user interface can provide an input aid, such as a key marked with a "+" sign, to indicate that the address is international. For networks that don't support Network based PCD (see CDG Document 145), the handset uses a stored lookup table to retrieve the appropriate dialing prefixes for the serving country. Using this information, the handset translates plus-code number strings entered by the user (or retrieved from the phonebook, etc.) into direct-dialed numbers which are then sent to the network.

In this document, the features described above are referred to as "Handset-based PCD" to distinguish them from other approaches to achieve a similar end-user experience. This document only addresses handset-based PCD.

1.2 Standards Support

The requirements in this document are based primarily on the capabilities offered by IS-2000 Rel 0. Other standards referenced are IS-875 and IS-637.

CDG reference document #145 also defined the details of Network-based PCD requirements, which has certain requirements to the serving network. However, most of the CDMA networks in the world do not support the Network-based PCD. To make the PCD function universally available to CDMA users wherever they are, this document defines the Handset-based PCD requirements. Handset-based PCD is transparent to the network, i.e., it doesn't impose any requirement to the network.

From the MS standpoint, these requirements are intended to expand upon, and be consistent with CDG reference document #90: Global Handset Requirements for CDMA (GHRC) CDMA2000 Voice, SMS and Data

1.3 Minimum Requirements

Of the requirements shown below, those that are suggested to make up the minimum set are distinguished by the use of “shall” rather than “may” or “should” in the requirement wording.

1.4 Acronyms and Abbreviations

Term	Meaning
ANLYZD	AnalyzedInformation
BCD	Binary Coded Decimal
BSC	Base Station Controller
BTS	Base Transceiver/Transmitter Station
CDG	CDMA Development Group
CNIR	Calling Number Information Restriction
CONNRES	ConnectResource
CPNS	CallingPartyNumberString
CSIM	cdma2000 Subscriber Identity Module
GHRC	Global Handset Requirements for CDMA
HLR	Home Location Register
IAC+CC	International Access Code + Country Code
IAM	Initial Address Message
IP	International Prefix (aka International Access Code)
IRT	International Roaming Team
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
ITU-T	International Telecommunications Union-Telecommunications sector
MC	Message Center
MCC	Mobile Country Code
MDN	Mobile Directory Number
MO	Mobile-Originated
MMS	Multimedia Messaging Service
MS	Mobile Station
MSC	Mobile Switching Center
MSID	Mobile Station Identifier

Term	Meaning
MT	Mobile-Terminated
NAM	Number Assignment Module
NPI	Numbering Plan Identification
ODA	Original Destination Address
OMA	Open Mobile Alliance
ORREQ	OriginationRequest
PCD	Plus Code Dialing
R-UIM	Removable User Identity Module
SCP	Service Control Point
SMDPP	SMSDeliveryPointToPoint
SMPP	Short Message Peer-to-Peer
SMS	Short Message Service
SMSADDR	SMS_Address
SMSREQ	SMSRequest
SPC	Special Prefix Code
TON	Type of Number
Tranumreq	TransferToNumberRequest RETURN RESULT
VLR	Visitor Location Register
WAP	Wireless Application Protocol

1.5 Terms and Definitions

Three 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 device.
(O) Optional	It is left up to the manufacturer whether or not the device supports this characteristic. The handset may support this characteristic.



2. Mobile Station Requirements

2.1 Origination

2.1.1 Voice

Req. #	Requirement	Category	Remarks	References
2.1.1.1	The MS shall provide a plus key or equivalent user interface convention to allow PCD.	M	Individual operators may wish to specify the entry method in more detail, e.g., long-press of “*” or “0” key. The input method shall be applicable to all instances of digit entry, e.g., call origination, call back, phonebook entry, SMS destination, and SMS Call-Back Number.	N.S0027 (“TIA/EIA-664-701-A MODIFICATION S” chapter) §1.1

Req. #	Requirement	Category	Remarks	References
2.1.1.2	The MS shall support phonebook storage and subsequent retrieval of digits with an international indication, regardless of the source of the digits (e.g., user entry, caller display, and SMS Origination Address).	M		N.S0027 (“TIA/EIA-664-701-A MODIFICATION S” chapter) §1.18

Req. #	Requirement	Category	Remarks	References
2.1.1.3	The MS shall build in a lookup table, which enables the handset to uniquely identify the serving network (or serving country) and to determine the dialing rule information associated with the serving network/country.	M	Every record in the table should have the correlative information (e.g., MCC, MNC, SID, LTM_OFF, CC, IAC, NAC, support NPCD or not) .	

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Req. #	Requirement	Category	Remarks	References
2.1.1.4	The MS shall acquire the location information of the serving network to determine which network or country the MS is in.	M	The MS shall try to acquire MCC and MNC from the Extended System Parameter Message, SID from the System Parameter Message, and LTM_OFF from the Sync Channel Message. The MS uses such information to determine which record in the lookup table shall be used.	

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Req. #	Requirement	Category	Remarks	References
2.1.1.5	Based on the location information and lookup table, the MS shall determine whether NPCD or HPCD shall be used. In case that HPCD shall be used, the MS shall retrieve the dialing rule information from the lookup table.	M	<p>The MS shall use MCC and MNC, or SID (when MCC and MNC are invalid and there is no conflict for the SID), or SID together with LTM_OFF (when MCC and MNC are invalid and there is conflict for the SID) to determine the serving network.</p> <p>After determining the serving network/country and the corresponding record in the lookup table, the MS will know whether the serving network supports NPCD or not. If the network supports NPCD, the MS shall follow CDG Document 145 and use NPCD. Otherwise, the MS shall retrieve the dialing rule information (e.g., CC, IAC, NAC, SPC) of the serving network to use HPCD.</p>	

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Req. #	Requirement	Category	Remarks	References
2.1.1.6	When HPCD is needed, the MS shall translate the plus-code number string into appropriate direct-dialed pure number string and use the pure number string in the Origination message.	M	When the serving network does not support NPCD, MS shall use the CC, IAC, NAC and SPC information of the serving network retrieved from the lookup table to translate the plus-code format numbers into plain number string. The MS shall include the translated plain number string in the Origination message with the parameter DIGIT_MODE setting to '0'.	

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Req. #	Requirement	Category	Remarks	References
2.1.1.7	The MS should allow international dialing even when the dialed digit string includes overdecadic digits (i.e., * and/or #).	HD	A legitimate scenario is when a user attempts to set up call forwarding to a destination number in international format (even though in most CDMA networks today the use of the RedirectionRequest operation means forwarding can be performed without the use of the international format) .	

1 2.1.2 SMS

Req. #	Requirement	Category	Remarks	References
2.1.2.1	The MS shall support the conversion from plus-code format number string of the destination address to plain number string using the dialing rule of the home network for internationally-addressed text messages.	M	The plus code conversion for SMS is different from that for internationally-dialed voice calls. The MS shall use the home network information (i.e., MCC and MNC from the IMSI EF in the RUIM/CSIM card) to find out the appropriate record in the lookup table to determine the dialing rule. Other aspects of the conversion are same as for Voice.	

1 2.2 Termination

2 2.2.1 Voice

Req. #	Requirement	Category	Remarks	References
2.2.1.1	When the received Calling Party Number is not internationally-formatted (i.e., Number_Type="0"), the MS shall check whether the Calling Party Number starts with the IAC of the serving network. If it is, the MS shall replace the IAC portion with a "+" symbol and present the plus-code formatted number to the user.	M	This requirement applies both to voice calls received when idle and incoming call waiting calls.	

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Req. #	Requirement	Category	Remarks	References
2.2.1.2	When the received Calling Party Number is internationally-formatted (i.e., Number_Type="1"), the MS shall follow the procedure of NPCD (refer to CDG document #145 section 2.2.1) to present the Calling Party Number to the subscriber with a leading "+" symbol.	M	This requirement applies both to voice calls received when idle and incoming call waiting calls.	

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Req. #	Requirement	Category	Remarks	References
2.2.1.3	The MS should match a received Calling Party Number with the serving network's IAC prefixed (not internationally-formatted, i.e., Number_Type="0") to a corresponding phonebook entry after the conversion from IAC to plus code.	HD	For example, the Calling Party Number 011112345678 once converted to +112345678 should match to the +112345678 contacts entry stored in phonebook to display the stored name of the caller. If the MS allows a partial match, this may optionally be extended to include matching between international and non-international numbers. Partial matching may be especially desirable with plus code, e.g., matching a presented non-international calling party number with the equivalent international format phonebook entry.	

1 2.2.2 SMS

Req. #	Requirement	Category	Remarks	References
2.2.2.1	When the received Originating Address parameter is internationally-formatted (i.e., , Number_Type="1"), the MS shall follow the procedure of NPCD (refer to CDG document #145 section 2.2.2) to present the Originating Address parameter to the subscriber with a leading "+" symbol.	M		

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Req. #	Requirement	Category	Remarks	References
2.2.2.2	The MS should match a received internationally-formatted Originating Address parameter to a corresponding phonebook entry.	HD	Includes partial match as above.	

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Req. #	Requirement	Category	Remarks	References
2.2.2.3	The MS should recognize a "+" character as an international identifier when prefixed to digits in the body of the message for number extraction.	HD	If the MS supports "one-touch" dialing to a number contained in the body of the text message (e.g., "please call John +2125551234 to arrange meeting"), then a "+" prefix should be recognized as designating an international number, e.g., "please call John +12125551234 ...". This requirement applies to all character encoding methods that the MS supports.	

2 **2.3 Interface to the R-UIM/CSIM**

3 The following requirements apply only if the handset is implemented as Mobile
4 Equipment with an R-UIM or CSIM.

Req. #	Requirement	Category	Remarks	References
2.3.1	The ME shall have the capability to store and retrieve internationally formatted numbers to/from the R-UIM/CSIM.	M	The READ and UPDATE commands to various Elementary Files (e.g., EFADN, EFFDN, EFSDN, EFANR, EFICI, EFOCI shall allow for Type of number (TON) = "international number" and Numbering Plan Identification (NPI) = "ISDN/telephony".	C.S0065-0 v1.0 (various sections), and 3GPP 24.008 v6.13.0§10.5.4.7 .

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Req. #	Requirement	Category	Remarks	References
2.3.2	The ME should have the capability to store and retrieve the MDN to/from the R-UIM/CSIM in international format.	HD		C.S0065-0 v1.0 §5.2.35 & C.S0005-0 v3.0 §2.7.1.3.2.4

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Req. #	Requirement	Category	Remarks	References
2.3.3	The ME should have the capability to store and retrieve the default SMS Destination Address to/from the R-UIM/CSIM in international format.	HD	Default Destination Address is stored in EFSMSP.	C.S0065-0 v1.0 §5.2.29 & C.S0015-B v2.0 §3.4.3.3

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