YD

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Test Specification of Mobile Station (including Non UIM Mobile Station) for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network: Part 1: Minimum Standard, Function and Performance

Test Specification of Mobile Station (including Non UIM Mobile Station) for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network: Part 1: Minimum Standard, Function and Performance

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Preface

This Standard is one of the serial standards of 800MHz CDMA 1X digital cellular mobile telecommunication network base station. The structure and names of the serial standards are listed as follows:

1. Technical Specification of Mobile Station (MS) for CDMA 1X Digital Cellular Mobile Telecommunication Network

2. Test Specification of Mobile Station for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network: Part 1--Minimum Standard, Function and Performance

3. Test Specification of Mobile Station (including Non UIM Mobile Station) for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network: Part 2: Protocol Conformance Test Part

4. Test Specification of Mobile Station Part Volume 3 Network Compatibility Test for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network

The modifications in this document refer to 3GPP2 C.S0011-B Version1.0 Recommended Minimum Performance Standards for CDMA2000 Spread Spectrum Mobile Stations Release B. The RF indicators are basically consistent with 3GPP2 C.S0011-B Version1.0 with partial content modified.

This specification only lists frequency band type 0 of the 12 frequency band types recommended in 3GPP2. MS may choose to use all or part of frequency band type 0 according to the frequency administration regulations. The environmental test method in the original document is not used based on the situation in China.

This specification will replace YDC 023-2003 Test Specification of Mobile Station for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network: Part 1--Minimum Standard, Function and Performance.

Major changes in this specification compared to YDC 023-2003 are as follows:

Non-UIM MS part is added;

Chapter 4: Test items for partial basic functions are added;

Chapter 5: It is updated based on 3GPP2 C.S0011-B;

Chapter 6: It is updated based on 3GPP2 C.S0011-B;

Chapter 7: Acoustics performance test is added;

Chapter 8: The original environmental adaptability requirement and test method are deleted, referring to YD/T XXXX Technical Requirements and Testing Methods for Reliability of Mobile Telecommunication Handset directly.

Chapter 9: Standby time test and connection time test are added;

Chapter 10: Card interface test is added;

Chapter 11: EMC test is added;

Chapter 12: SAR test is added.

Appendix A of this Standard is a normative appendix.

This Standard is printed and distributed in response to the deployment and operation demands for 800MHz CDMA 1X commercial trial network, and is used as the reference for scientific research, design, manufacturing, use and management of relevant equipment. Suggestion and opinion in use shall be reflected to the organization that develops this Standard or Telecommunication Standard Technology Review Department.

This Standard is proposed and managed by China Communications Standards Association (CCSA).

This Standard is developed by MIIT Telecommunication Institute, and ZTE.

This Standard is written by: Ma Xin, Ma Zhiguo, Liu Dongming, Zhangxiang, Zhang Yufeng and Peng Hongli

This is the first revision of the original standard which was released in May, 2003.

Test Specification of Mobile Station for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network: Part 1--Minimum Standard, Function and Performance

1 Scope

This document defines the methods to test the function, RF parameters, acoustics performance, environment adaptation of mobile station for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network.

This document is applicable for 800MHz CDMA 1X MS supporting UIM card (UIM MS) and those not supporting UIM card (Non-UIM MS); all items in this specification are applicable for the 800MHz CDMA 1X MS supporting UIM card; the items involving UIM card and UIM card interface in this specification are not applicable for the 800MHz CDMA 1X MS not supporting UIM card.

2 Quoted Standards

The following standards contribute to the stipulation of this specification after being quoted. All the revision versions (excluding correction version) of the quoted standards specified with date are not applicable for this document. However, parties that have come to agreements based on this document are encouraged to explore the possibility to use the latest versions of the following standards. The latest version of the quoted documents without date specified is applicable for this specification.

GB 2312	Chinese Coded Character Set for Information Exchange: Basic Set
GB 13000.1	Information Technology – Universal Multiple-Octet Coded Character Set (UCS) – Part 1: Architecture and Basic Multilingual Plane
GB/T 18287	General Specification of Li-Ion Battery for Cellular Phone
GB/T 18288	General Specification of Nickel-metal Hydride Battery for Cellular Phone
GB/T 18289	General Specification of Nickel-cadmium Battery for Cellular Phone
GB 19484.1	Requirement and Measurement Methods of Electromagnetic Compatibility for 800MHz CDMA Digital Cellular Telecommunication Systems - Part 1: Mobile Station and Ancillary Equipment

YD 1268	The Safety Specification and Test Method for Lithium Batteries and Charger for Mobile Phone
YD/T 965	The Safety Requirement and Test Method for Telecommunication Terminal Equipment
YD/T 1538	Technical Requirements and Testing Methods for Acoustics Performance of Digital Mobile Terminal
YD/T 1539	Technical Requirements and Testing Methods for Reliability of Mobile Telecommunication Handset
3GPP2 C.S0011-B	"Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations Release B, Version1.0"

3 Acronyms

The following acronyms apply to this specification.

BER	Bit Error Rate
CDMA	Code Division Multi Access
DTMF	Dual Tone Multi Frequency
ERP	Effective Radiated Power
FER	Frame Error Rate
MER	Message Error Rate
RMS	Root Mean Square
UIM	User Identity Module, also called R-UIM

4 Requirements and Test Methods for Service and Function of MS

4.1 Overview

Unless otherwise specified, the test items in this section are tested by performing test over real CDMA network or simulated network.

4.2 Display Function

4.2.1 UIM card prompt

4.2.1.1 Test method

Power on and view the screen information of the MS without inserting the UIM card.

4.2.1.2 Expected test result

The MS under test shall display the UIM card information prompt on the screen, which shall be identical with the description on the product specification.

4.15 Other Functions

4.15.1 Switch of MS

4.15.1.1 Test method

Insert UIM card into a UIM MS, and turn on the power supply with the switch key indicated on the keypad. Use the switch key as identified on the keypad to power off the MS that has turned on the power supply.

4.15.1.2 Expected test result

The MS under test can correctly switch on/switch off.

4.15.2 Photo or camera function

4.15.2.1 Test method

Use the Photo or Camera functions of the MS as described in the MS specification. Check the level of the audio of the MS for its Photo function, and check the camera prompt information of the MS for its Camera function.

4.15.2.2 Expected test result

If the MS supports Photo function, the audio level generated when the MS uses this function shall be more than or equal to 65dB (A).

If the MS supports Camera function, there shall be audible or other prompt information when the MS uses this function.

4.15.3 Other functions described in the MS specification

4.15.3.1 Test method

Test the specific functions individually according to the operation method explicitly described in the product specification.

4.15.3.2 Expected test result

The number of Audit Orders that were correctly received on Channel 2 during a test is given by ΔPAG_3, where ΔPAG_3 is the increment of the parameter PAG_3 during the test.

Test 1: Since the change of pilot power level occurs when the MS is operating in slotted mode, it is possible that the MS will miss messages sent in the first slot after the transition. However, the MS shall receive messages in the second slot after the transition. The number of idle handoffs shall be equal to the number of pilot Ec/Io transitions.

The number of Audit Orders that were correctly received shall at least one half the number of pilot Ec/Io transitions. If the transition occurs sufficiently before the first slot, then the number of Audit Orders that an MS not operating in the slotted mode should have correctly received is equal to the number of pilot Ec/Io transitions.

Test 2: since the levels are sufficient to correctly receive messages on both Channel 1 and Channel 2, the MS shall receive messages in all assigned slots. The MS shall perform idle handoff to the frequency with the stronger pilot.

The number of idle handoffs shall be equal to the number of pilot Ec/Io transitions.

The number of Audit Orders that were correctly received shall be equal to four times the number of pilot Ec/Io transitions.

5.2.2 Soft handoff tests

5.2.2.1 Neighbor Set pilot detection and incorrect detection in soft handoff

5.2.2.1.1 Definition

This test measures the detection time for a pilot in the Neighbor Set at three values of pilot Ec/Io, for the static add threshold configuration. The detection time of a pilot Ec/Io is defined as the time elapsed from the time when the pilot increases to a given Ec/Io until the MS sends a Pilot Strength Measurement Message containing this pilot. The accuracy of the Candidate Set pilot PN phase reported in the corresponding Pilot Strength Measurement Message is also examined.

The correct detection of a pilot in the Neighbor Set is defined as the acquisition of a pilot with Ec/Io above the value defined by T_ADD (pilot signal detection threshold). The value of T_ADD is set to 28 (-14 dB) as specified in section 6.5.2 of 3GPP2 C.S0011-C. An incorrect detection of a pilot in the Neighbor Set is defined as the acquisition of a pilot with Ec/Io below the value defined by T_ADD.

5.2.2.1.2 Method of measurement

1) Connect two base stations and an AWGN generator to the MS antenna connector, as shown in Figure 21. The forward channel from BS 1 has an arbitrary pilot PN offset index P1, and is called Channel 1. The forward channel from BS 2 has an arbitrary pilot PN offset index P2, and is called Channel 2.
2) Set up a call using Fundamental Channel Test Mode 1 or 3 with 9600 bps data rate only

range shall exceed-24dB (including-24dB);

b) The interval from the end of the first "1" power control bit after the 100 consecutive "0" valid power control bits to the MS output power starting to decrease shall not be longer than 2.5ms;

c) The average change rate of the average output power for 9600bps data rate shall be greater than 12.8dB/20ms and less than 19.2dB/20ms;

d) When receiving any valid power control bit after 2.5ms from the receiving of 100 consecutive "0" valid power control bits, the average output power of the MS shall reach range within 0.3dB of the final value in less than500μs;

Test 2:

a) The interval from the end of the first "1" power control bit after the 100 consecutive "0" valid power control bits to the MS output power starting to decrease shall not be longer than 2.5ms; Test 3:

Test 3:

a) Closed-loop power control range shall be at least ±24dB of the open-loop estimation; with 100 consecutive "0" power control bits, the power adjustment range shall exceed 24dB (including 24dB); with 100 consecutive "1" power control bits, the power adjustment range shall exceed -24dB (including -24dB);

b) The interval from the end of the first "1" power control bit after the 100 consecutive "0" valid power control bits to the MS output power starting to decrease shall not be longer than 5ms;

c) The average change rate of the average output power for 4800bps data rate shall be greater than 6.4dB/20ms and less than 9.6dB/20ms;

Test 4:

a) Closed-loop power control range shall be at least ±24dB of the open-loop estimation; with 100 consecutive "0" power control bits, the power adjustment range shall exceed 24dB (including 24dB); with 100 consecutive "1" power control bits, the power adjustment range shall exceed -24dB (including -24dB);

b) The interval from the end of the first "1" power control bit after the 100 consecutive "0" valid power control bits to the MS output power starting to decrease shall not be longer than 10ms;

c) The average change rate of the average output power for 2400bps data rate shall be greater than 3.2dB/20ms and less than 4.8dB/20ms;

Test 5:

a) Closed-loop power control range shall be at least ±24dB of the open-loop estimation; with 100 consecutive "0" power control bits, the power adjustment range shall exceed 24dB (including 24dB); with 100 consecutive "1" power control bits, the power adjustment range shall exceed -24dB (including -24dB);

b) The interval from the end of the first "1" power control bit after the 100 consecutive "0" valid power control bits to the MS output power starting to decrease shall not be longer

5) Set attenuation in the forward CDMA channel until the output power level of the MS reverse CDMA channel measured at the MS antenna connector is -50dBm. Perform step 10 to 12;

6) Set attenuation in the forward CDMA channel until the output power level of the MS reverse CDMA channel measured at the MS antenna connector is -35dBm. Perform step 10 to 12;

7) Set attenuation in the forward CDMA channel until the output power level of the MS reverse CDMA channel measured at the MS antenna connector is -20dBm. Perform step 10 to 12;

8) Set attenuation in the forward CDMA channel until the output power level of the MS reverse CDMA channel measured at the MS antenna connector is -5dBm. Perform step 10 to 12;

9) Set attenuation in the forward CDMA channel until the output power level of the MS reverse CDMA channel measured at the MS antenna connector is +10dBm. Perform step 10 to 12;

10) Measure the reverse pilot channel phase at the MS antenna connector, and send any number of alternative “0” and “1” valid power control bits(the last bit is “1”) , then send ten continuous sequences of “00011000110001110101010101010101” valid power control bits, and again ten continuous sequences of “11100111001110000101010101010101” valid power control bits. Ensure that for each closed-loop power control command sent to the MS, the MS output power level shall change within the range defined by this Standard.

11) Measure the reverse pilot channel phase at the MS antenna connector, and send any number of alternative “0” and “1” valid power control bits(the last bit is “1”) , then send ten continuous sequences of “00000000011111110101010101010101” valid power control bits, and again ten continuous sequences of “11111111000000001010101010101” valid power control bits. Ensure that for each closed-loop power control command sent to the MS, the MS output power level shall change within the range defined by this Standard.

12) Measure the reverse pilot channel phase at the MS antenna connector, and send any number of alternative “0” and “1” valid power control bits(the last bit is “1”) , then send sixteen continuous “0” valid power control bits, and again sixteen continuous “1” valid power control bits. Ensure that for each closed-loop power control command sent to the MS, the MS output power level shall change within the range defined by this Standard.

6.4.10.3 Indicator

For all tests of this section, the MS pilot channel phase shall meet the following requirements:

a) Within whole MS output power range, no more than one “Type 1” phase is discontinuous for any 5ms; and

b) Within whole MS output power range, no more than one “Type 2” phase is discontinuous for any20ms.

Where, discontinuous “Type 1” phase refers that the phase change is more than 56 degree for less than 0.5ms, and discontinuous “Type 2” phase refers that the phase change is more than 90

standard configuration fully again.

c) Assemble the fully-charged battery of standard configuration onto the battery tester and discharge it with 200mA constant current until it reaches the shutoff voltage V_{off}, and record the discharging time $T_{200mA.}$

7) Calculate the talk time: $T_{Idle}=(200mA/I_{average})*T_{200mA}$;

8) Set the BS simulator to radio configuration 3(RC3), and repeat step 4-7.

9.2.3 Expected Test Result

The MS continuous talk time shall meet the nominal talk time provided by vendor.

10 MS Card Interface Requirements and Test Methods

Card interface of the MS under test shall meet the related national standards.

11 Partial Requirements for Access Device with Card and Device Integrated and the One with Card and Device Separated

The contents of UIM card shall be stored in native access terminal with card and device integrated. For the test requirements, see Appendix D in YDC 021 and the applicable part in UIM card specifications.

12 Electromagnetic Compatibility (EMC)

Electromagnetic compatibility shall comply with GB 19484.1 requirements

13 Requirements of Specific Absorption Rate (SAR)

Specific absorption rate of the MS under test shall meet the related national standards.

14 MS Power Supply and Charger Requirements and Measurement Methods

14.1 Battery Performance

1) The performance requirements and test methods of various Li battery shall meet GB/T18287 requirements.

2) The performance requirements and test methods of various nickel metal hydride battery shall meet GB/T18288 requirements.

3) The performance requirements and test methods of various nickel-cadmium battery shall meet GB/T18289 requirements.

4) The security requirements and test methods of various Li battery shall meet YD 1268 requirements.

14.2 Charger Safety

The charger safety shall comply with the requirement of YD/T965 and YD 1268.

15 Exterior Packaging and Assembly Requirements and Measurement Methods

The ex-factory MS outlook, packaging and assembly shall be inspected according to the requirements in Table 68.

Table 92 Outlook, Packaging and Assembly Requirements

Basic Channel Gating

Parameter	Unit	Value
Îor	dBm / 1.23 MHz	-55
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4
$\frac{\text{Power Control } E_c}{I_{or}}$	dB	-17.8

Notes: Pilot Ec/Io value is calculated from the parameters in the table, it is not directly configurable.

A.2.13.2 Performance Index

NONE.

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