Translated English of Chinese Standard: YDC024-2006
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YD

Telecommunication Industry Standard Of the People's Republic of China

YDC 024-2006 (Replaced by: YD/T 1576.21-2013)

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

Issued on: September 19, 2006 Implemented on: September 19, 2006

Issued by: Ministry of Industry Information Technology, the People's Republic of China

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Preface

This Standard is one of the series of specifications for 800MHz CDMA 1X digital cellular mobile communication network MS. The structure and names of the serial specifications are 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

Each chapter of this specification references 3GPP2 C.S0031-0 v2.0 Signaling Conformance Tests for cdma2000 Spread Spectrum Systems with partial modification.

The document replaces YDC 024-2003 Test Specification of Mobile Station for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network: Part 2: Protocol Conformance Test Part

Major changes in this specification compared to YDC 024-2003 are as follows:

Section 1: update the Applied Scope

Section 3: update the Acronyms;

Section 4: add statement for terminals not support UIM card in the Overview part.

Section 5: add the content for non-UIM Card terminals.

Section 6: add the content for non-UIM Card terminals.

Section 8: add the content for non-UIM Card terminals.

Section 9: add the content for non-UIM Card terminals.

Appendix A and B of this Standard are the normative appendixes.

The specification is printed and distributed as a reference for science and research, design, production, usage and management activities in order to comply with the construction and operation requirements of 800MHz CDMA 1X commercial trail network. Any suggestions and comments during the using, please report to this Standard development unit or the telecommunication standard technology review department.

The specification is proposed and managed by China Communications Standards Association (CCSA).

This Standard is drafted by the Telecommunications Research Institute of the Ministry of Information Industry (MII).

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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

1 Scope

This Standard is one of the series of specifications for 800MHz CDMA 1X digital cellular mobile communication network MS.

The document is applicable for 800MHz CDMA 1X MS that supports UIM card (with device and card separated) and does not support UIM card (integrated device).

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.

YDC 015	Technical Specification of Mobile Station (MS) for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network
YDC 018	Technical Specification of Physical Layer over Air Interface for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network Interface
YDC 019	Technical Specification of MAC Layer over Air Interface for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network Interface
YDC 020	Technical Specification of LAC Layer over Air Interface for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network Interface
YDC 021	Technical Specification of L3 Signaling over Air Interface for 800MHz CDMA 1X Digital Cellular Mobile Telecommunication Network Interface
3GPP2 C.S0011-B	Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations Release B, Version1.0
3GPP2 C.S0031-0	Signaling Conformance Tests for cdma2000 Spread Spectrum Systems v2.0

3 Acronyms

The following acronyms apply to this specification.

AC	Authentication Center	鉴权中心
AT	Attention (condition in modem control)	AT指令（调制解调器控制指令）
AWGN	Additive White Gaussian Noise	加性高斯白噪声
BPS	Bits per Second	比特/秒
BS	Base Station	基站

5.1.3 Technical Requirement

The mobile station shall correctly detect the base station Pilot PN offset and acquire the new base station. All calls shall be established successfully.

5.2 Hashing CDMA Channels, Paging Channels, and Paging Slot

5.2.1 Definition

This test verifies that the mobile station hashes to the correct CDMA Channel, CDMA Paging Channel, and CDMA Paging Slot. The effect of IMSI on hashed CDMA channel, paging channel, and slot is also verified.

5.2.2 Test Method

5.2.2.1 CDMA Channel Number Hashing

a) Connect the base station and the mobile station as shown in Figure 1, and configure the base station for multiple CDMA channel assignment capability.
b) Send a *Registration Request Order* from the base station and verify the mobile station responds with a *Registration Message*. Note that some equivalent method may be employed to verify that the mobile station has hashed to the correct CDMA channel.
c) Change the IMSI (phone number) in the mobile station so that the hashing operation selects a different CDMA channel number assignment, and repeat steps a and b.

5.2.2.2 Paging Channel Number Hashing

a) Connect the base station and the mobile station as shown in Figure 1, and configure the base station for multiple paging channel assignment capability.
b) Send a *Registration Request Order* from the base station and verify the mobile station responds with a *Registration Message*. Note that some equivalent method may be employed to verify that the mobile station has hashed to the correct paging channel.
c) Change the IMSI (phone number) in the mobile station so that the hashing operation selects a different paging channel number assignment, and repeat steps a and b.

5.2.2.3 Paging Slot Number Hashing

a) Connect the base station and mobile station as shown in Figure 1, configure the base station system with slotted mode capability, and verify the mobile station goes into slotted mode.
b) Send a *Registration Request Order* from the base station and verify the mobile station responds with a *Registration Message*. Note that some equivalent method may be employed to verify that the mobile station has hashed to the correct Paging Channel Slot and receives messages in that slot.
c) Change the IMSI (phone number) in the mobile station so that the hashing operation selects a different paging channel Slot number assignment, and repeat steps a and b.

5.2.3 Technical Requirement

For all tests, the mobile station shall hash to the correct CDMA Channel, CDMA Paging Channel, and CDMA Paging Channel Slot.

5.6 Mobile Station Processing of MIN_P_REV

5.6.1 Definition

This test verifies the mobile station shall not access the CDMA system if the mobile station's protocol revision (MOB_P_REVp) is less than the minimum protocol revision permitted to access the CDMA system (MIN_P_REV). This test should be performed only if the base station supports a protocol revision greater than that supported by the mobile station, or if the base station can be configured to send arbitrary protocol revision numbers in the *Sync Channel Message*.

5.6.2 Test Method

a) Connect the mobile station to the base station as shown in Figure 1.
b) Configure the base station to send values for P_REV and MIN_P_REV in the *Sync Channel Message* greater than the value of MOB_P_REV in the mobile station.
c) MS powers on;
d) Verify the mobile station does not indicate CDMA service is available.
e) MS initiates a call. The mobile station shall not send any messages on the CDMA Access Channel.

5.6.3 Technical Requirement

When the mobile station's protocol revision is less than the minimum protocol revision permitted by the base station, the mobile station shall not indicate CDMA service is available and shall not originate a call on this system

5.7 Status Request Message

5.7.1 Definition

This test verifies that that mobile station responds to the *Status Request Message* with an *Extended Status Response Message* or *Status Response Message* with the correct information record(s).

5.7.2 Test Method

a) Connect the mobile station to the base station as shown in Figure 1.
b) MS originates a call.
c) Instruct the system simulator to send an *Origination Message* on the f-csch to request one or more of the information records listed in Annex B.
d) Verify the mobile station responds with an *Extended Status Response Message* if P_REV_IN_USE is greater than or *Status Response Message* if P_REV_IN_USE is less than or equal to on the r-csch with the correct record type and correct information
e) Instruct the system simulator to assign the dedicated channels to the mobile station and Verify the call completes and that user traffic is present.
f) Steps c through e may be repeated for one or more of the Mobile Station Information Records supported.
g) System simulator calls the MS.
h) Instruct the system simulator to send an *Origination Message* on the f-dsch to request one or more of the information records listed in Annex B.

6.23.1.2 True IMSI addressing supported by the system simulator with MIN-based addressing supported by the mobile station.

6.23.1.2.1 Definition

This test verifies that the system simulator pages the mobile station with True IMSI addressing supported by the system simulator and MIN-based addressing supported by the mobile station when the MCC and IMSI_11_12 of the mobile station match those sent by the system simulator in the *Extended System Parameter Message*.

6.23.1.2.2 Test Method

a) Connect the mobile station and the system simulator as shown in Figure 1.

b) Ensure the mobile station is programmed with the same values of MCC and IMSI_11_12 used in the system simulator.

c) Configure the system simulator to send the *Extended System Parameters Message* with the value IMSI_T_SUPPORTED=1

d) Enable power on registration.

e) Enable authentication. Configure the system simulator to disallow mobile station terminated calls if authentication fails.

f) Power on the mobile station and wait for power on registration to occur.

g) Initiate a land party to mobile station call.

h) Verify that the voice call is normal in both directions and end call at the mobile station.

6.23.1.2.3 Technical Requirement

The call shall be successfully established using the IMSI_M address form.

6.23.1.3 True IMSI_T addressing not supported by the system simulator or mobile station.

6.23.1.3.1 Definition

This test will verify the system simulator pages the mobile station when True IMSI addressing is not supported by the system simulator, when the MCC and IMSI_11_12 of the mobile station match those sent by the system simulator in the *Extended System Parameters Message*.

6.23.1.3.2 Test Method

a) Connect the mobile station and the system simulator as shown in Figure 1.

b) Ensure the mobile station is programmed with the same values of MCC and IMSI_11_12 used in the system simulator. Do not use MCC (wild card) value in the base station or mobile station Escape Code.

c) Configure the system simulator to send the *Extended System Parameters Message* with the value IMSI_T_SUPPORTED=1

d) Enable power on registration.

e) Enable authentication. Configure the system simulator to disallow mobile station terminated calls if authentication fails.

f) Power on the mobile station and wait for power on registration to occur.

g) Initiate a land party to mobile station call.

system simulator and mobile station use the same A-KEY value configured in UIM card.

d) At the system simulator, initiate a Shared Secret Data update on the Paging/Access Channels.

e) Verify the SSD Update was successful.

f) Enable timer-based registration (REG_PRD=29).

g) Wait for the mobile station to send the *Timer-Based Registration Message*.

h) Verify the mobile station sends a *Timer-Based Registration Message*, which includes AUTHR, RANDC and COUNT.

i) At the system simulator, verify authentication of registration is successful.

j) Setup a mobile station originated call.

k) Verify the call is successfully set up.

l) At the system simulator, initiate a Unique Challenge-Response Procedure on the Traffic Channel.

m) Verify the Unique Challenge-Response Procedure was successful.

n) End the call.

o) At the system simulator, initiate a Unique Challenge-Response Procedure on the Paging Channel.

p) Verify the Unique Challenge-Response Procedure was successful.

q) Power down the mobile station

9.2.3 Technical Requirement

The mobile station and system simulator shall successfully perform an SSD Update on the Paging/Access Channels.

SSD_A_NEW and SSD_B_NEW shall be stored at the mobile station and system simulator. Authentication of mobile station registrations, originations, and terminations should be successful.

9.3 Shared Secret Data Update on the Forward/Reverse Traffic Channels

9.3.1 Definition

This test verifies the mobile station and system simulator can perform a shared secret data update on the forward/reverse traffic channels.

9.3.2 Test Method

a) Connect the mobile station and the system simulator as shown in Figure 1.

b) Power on the mobile station.

c) For mobile station not supporting UIM card, the system simulator and mobile station are set with same A-KEY value. For mobile station supporting UIM card, the system simulator and mobile station use the same A-KEY value configured in UIM card.

f) Call the mobile station.

e) Verify that the voice call is normal in both directions;

f) At the system simulator, initiate a Shared Secret Data update on the Forward/Reverse traffic Channels.

g) Verify the SSD Update was successful.

h) End the call at the mobile station.

i) Enable timer-based registration (REG_PRD=29).

j) The mobile station sends the *Timer-Based Registration Message*.

k) Verify the mobile station sends a *Timer-Based Registration Message*, which includes AUTHR, RANDC and COUNT.

l) Verify that the authentication is successful;

m) MS originates a call.

h) Verify that the voice call is normal in both directions;

o) End the call at the mobile station.

p) Call the mobile station.

q) Verify that the voice call is normal in both directions;

r) At the system simulator, initiate a Unique Challenge-Response Procedure on the Traffic Channel.

s) Verify the Unique Challenge-Response Procedure was successful.

t) End the call.

u) At the system simulator, initiate a Unique Challenge-Response Procedure on the Paging Channel.

v) Verify the Unique Challenge-Response Procedure was successful.

w) Power down the mobile station

9.3.3 Technical Requirement

The mobile station and system simulator shall successfully perform an SSD Update on the Forward/Reverse Traffic Channels.

SSD_A_NEW and SSD_B_NEW shall be stored at the mobile station and system simulator. The mobile can successfully perform authentication upon registration, origination and termination.

9.4 Mismatched A-Keys

9.4.1 Definition

This test verifies that when there is an A_KEY (stored in the mobile station for mobile station not supporting UIM card, stored in UIM card for mobile station supporting UIM card) mismatch, authentication of registrations, originations, terminations, and Unique Challenge-Response procedures will fail.

9.4.2 Test Method

a) Connect the mobile station and the system simulator as shown in Figure 1.

b) Power on the mobile station.

c) For mobile station not supporting UIM card, the system simulator and mobile station are set with same A-KEY value. For mobile station supporting UIM card, the system simulator and mobile station use the same A-KEY value configured in UIM card.

d) At the system simulator, initiate a Shared Secret Data update on the Paging/Access Channels.

e) MS originates a call.

f) Verify that the voice call is normal in both directions;

g) End the call at the mobile station.

11.3.2 Caller ID from Conversation State

11.3.2.1 Definition

This test will verify the mobile station in conversation state (with call waiting enabled) properly displays the Calling Party Number (CPN).

11.3.2.2 Test Method

a) Connect the mobile station and the system simulator as shown in Figure 1.The System simulators simulate two fixed phones (fixed phone 1 and fixed phone 2).

b) MS powers on and enters into the idle state;

c) Setup a call from fixed phone 1 to the mobile station using a 10-digit CPN and set the Presentation Indicator (PI) field of the CPN information record to '00' (Presentation Allowed).

d) Verify the CPN (a fixed number) is displayed on the mobile station during the alerting state.

e) Verify that the voice call is normal on both directions.

f) Maintain the call and setup another call from fixed phone 2 to the mobile station using a different 10-digit CPN .Set the Presentation Indicator (PI) field of the calling party (fixed phone #2) to '00' (Presentation Allowed).

g) Verify the CPN is displayed on the mobile station during the alerting state.(Fixed number 2).

h) End the call.

i) Repeat steps b through i, except in step c and f, set the PI field 1 of the calling parties to '01' (Presentation Restricted). Verify that in step d and g, the mobile station does not display the CPN and that it indicates the CPN is restricted.

j) Repeat steps b through h, except in step c and f, set the PI field 1 of the calling parties to '10' (Number Not Available). Verify that in step d and g, the mobile station does not display the CPN and that it indicates Number Not Available.

11.3.2.3 Technical Requirement

The mobile station in Conversation Substate with call waiting enabled shall: perform the following when there is incoming call:

——Display the CPN when the PI field of the CPN information record is set to '00'

——Not display the CPN but shall indicate the CPN is restricted when the PI field of the CPN information record is set to '01'

——Not display the CPN but shall indicate the CPN is not available when the PI field of the CPN information record is set to '10'.

11.4 Call wait

11.4.1 Definition

This test verifies that a mobile station in a two-way conversation with call waiting enabled, will receive notification of waiting calls. This test will verify that the mobile station will send a flash request to connect to the waiting call.

11.4.2 Test Method

a) Connect the mobile station and the system simulator as shown in Figure 1.The System simulators simulate two fixed phones (fixed phone 1 and fixed phone 2).

a Message Waiting information record type.

f) Verify the user interface displays the correct number of messages based on the number of messages indicated in the received messages, i.e. the value set in step d.

g) Repeat steps d through f, setting the number of messages to a different value from that set in step d.

h) Power down the mobile station.

11.5.1.3 Technical Requirement

The mobile station shall accurately report the number of voice mail messages waiting to be processed in its Voice Mail System following an autonomous registration.

11.5.2 MWI when the mobile station is in Conversation State

11.5.2.1 Definition

MWI notifies the subscriber of voice mail messages when the mobile station is in *Conversation State*. Notification can be a tone, light or display and is manufacturer dependent. While in the conversation state, MWI notifies the subscriber when the number of new and retrieved voice mail messages change.

11.5.2.2 Test Method

a) Connect the mobile station and the system simulator as shown in Figure 1.

b) Enable MWI at the System simulator side.

c) Power on the mobile station.

d) Establish an MS-originated voice call;

e) Verify that the voice call is normal on both directions.

f) Instruct the system simulator to send a *Flash With Information Message* to the mobile station to instruct message waiting, setting the number of messages to a value between 0 and 31.

g) Verify the user interface displays the correct number of messages based on the number of messages indicated in the received messages, i.e. the value set in step f. If the mobile station does not support the number of messages indicated, it should display the maximum number of messages it supports.

h) Repeat steps d through f, setting the number of messages to a value larger than 100.

i) Power down the mobile station.

11.5.2.3 Technical Requirement

The mobile station should accurately report the number of voice mail messages waiting to be processed in its voice mail system when the mobile station is in *Conversation Substate*, and the system simulator sends *Flash With Information Message.*

11.6 Land Party to Mobile Station Calling Name Presentation

11.6.1 Calling Name Presentation (CNAP) from *Mobile Station Idle State*

11.6.1.1 Definition

This test will verify that a mobile station in the *Mobile Station Idle State* properly displays the Calling Name Information (CNA).

f) Verify the mobile station receives and displays the CNA and Calling Number Identification (CNI) (fixed number 1).

g) Verify that the voice call is normal on both directions.

h) Maintain the call, and Set up a voice call from the fixed line 2 to the MS;

i) Verify the mobile station receives and displays the CNA and Calling Number Identification (CNI)(fixed number 2) with delivery of the call waiting indication.

j) End both calls, then power down the mobile station.

k) Power down the mobile station.

l) Set the Presentation Indicator (PI) field of the two fixed phones to '01' (Presentation Restricted).

m) Repeat steps d through k, in step f and i, verify the mobile station does not display the CPN and that it indicates the CPN is restricted.

n) Set the Presentation Indicator (PI) field of the two fixed phones to '10' (CAN not available).

o) Repeat steps d through k, in step f and i, verify the mobile station does not display the CPN and that it indicates the CPN not available

11.6.2.3 Technical Requirement

The mobile station in Conversation Substate with call waiting enabled shall: perform the following when there is incoming call:

——Display the CPN and CNI when the PI field of the CPN information record is set to '00'

——Not Display the CPN and CNI when the PI field of the CPN information record is set to '01', and indicates Presentation Restricted.

——Not Display the CPN and CNI when the PI field of the CPN information record is set to '10', and indicates CAN not available.

11.6.3 Calling Name Presentation (CNAP) with Forwarding

11.6.3.1 Definition

This test verifies the mobile station receiving a forwarded call properly displays redirection information of party 1 (originating party) and party 2.

11.6.3.2 Test Method

a) Connect the mobile station and the system simulator as shown in Figure 1.The System simulators simulate two fixed phones (fixed phone 1 and fixed phone 2), which have different 10-digit calling number.

b) Ensure the mobile station has been assigned CNAP Class-of -Service and that the mobile station has not been pre-programmed (phone book) with any calling party name/number information.

c) Ensure fixed party 2 has been assigned Call Forwarding Unconditional, programmed to forward calls to the mobile station directory number, and that this service is invoked.

d) Set the Presentation Indicator (PI) field of fixed phone 1 and 2 to '00' (Presentation Allowed).

e) MS powers on and enters into the idle state;

f) Set up a voice call from the fixed line 1 to fixed line 2.

g) Verify the call is forwarded to the mobile station and that the mobile station properly receives and displays the CNA and CNI of both the original calling party 1 and the redirected party 2.

information records are sent to the mobile station in the same message, the mobile station shall properly perform all information record instructions. If display records are not supported in the mobile station, there shall be no negative impact on information records supported by the mobile station. There shall be no negative impact on any supported feature or on call processing when display records are sent to the mobile station in the same message as other information records. If supported by the mobile station, the most current display record shall be displayed on the mobile station.

11.7.2 Display Records Sent in the *Flash With Information Message*

11.7.2.1 Definition

This test verifies that the mobile station displays Traffic Channel Display Information Records or Extended Display Information Records. This test also verifies that Display Information Records and Extended Display Information Records do not interfere with any other information records or features.

11.7.2.2 Test Method

a) Connect the mobile station and the system simulator as shown in Figure 1.

b) Establish an MS-originated voice call;

c) Instruct the base station to send a display record of at least 15 characters in a *Flash With Information Message*.

d) Upon receiving the *Flash With Information Message,* verify the mobile station displays characters as instructed in the display record or extended display information record contained in the *Flash with Information Message*.

e) Perform Test 7.2, Hard Handoff Between Frequencies in the Same Band.

f) Immediately after the first hard handoff is completed, send from the base station a new display record of at least 15 characters contained in the *Flash with Information Message*.

g) Upon receiving the *Feature Notification Message,* verify the mobile station displays the new characters as instructed in the display record or extended display record contained in the *Flash with Information Message* without user interaction with the mobile station.

h) Cause the base station to initiate another hard handoff, and send from the base station a new display record or extended display record of at least 15 characters contained in the *Flash with Information Message*.

i) Upon receiving the *Feature Notification Message,* verify the mobile station displays the new characters as instructed in the display record or extended display record contained in the *Flash with Information Message* without user interaction with the mobile station.

j) Verify that multiple handoffs can be performed without dropping the call.

11.7.2.3 Technical Requirement

All information records contained in the *Flash with Information Message*, if supported by the mobile station, shall be performed properly without user interaction with the mobile station. When various information records are sent to the mobile station in the same message, the mobile station shall properly perform all information record instructions. If display records are not supported in the mobile station, there shall be no negative impact on information records supported by the mobile station. There shall be no negative impact on any supported feature or on call processing when display records are sent to the mobile station in the same message as other information records. If supported

Appendix B
(Normative Appendix)
Information Record

The following table lists the Information Records that may be requested in a Status Request Message.

Table B.1

Information Record requested	Record type(binary)	QUAL_INFO_TYPE
Call Mode	00000111	00000000
Terminal Information	00001000	00000010
Roaming Information	00001001	00000010
Security Status	00001010	00000000
IMSI	00001100	00000000
ESN	00001101	00000000
Band Class Information	00001110	00000000
Power Class Information	00001111	00000010
Operating Mode Information	00010000	00000001
Service Option Information	00010001	00000010
Multiplex Option Information	00010010	00000010
Service Configuration	00010011	00000000
Power Control Information	00010111	00000000
IMSI_M	00011000	00000000
IMSI_T	00011001	00000000
Capability Information	00011010	00000000
Channel Configuration Capability Information	00011100	00000000
Extended Multiplex Option	00011101	00000000