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3RD GENERATION PARTNERSHIP PROJECT 2 "3GPP2"

# Recommended Minimum Performance Standards for Simultaneous cdma2000 and cdma2000-HRPD Access Terminal

# Revision History

| Revision | Description of Changes | Date |
|---|---|---|
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## FOREWORDS

**(This foreword is not part of this Standard)**

This Standard was prepared by Technical Specification Group C of the Third Generation Partnership Project 2 (3GPP2). This Standard contains recommended minimum performance standards for Simultaneous cdma2000® [1] and cdma2000-HRPD Access Terminal.

[1] cdma2000® is the trademark for the technical nomenclature for certain specifications and standards of the Organizational Partners (OPs) of 3GPP2. Geographically (and as of the date of publication), cdma2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA) in the United States

## FOREWORDS

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**NOTES**

1. "Mobile station" and "Access terminal" are used interchangeably in this document.
2. Throughput this document, cdma2000 1x is called CDMA, and cdma2000 HRPD is called HRPD.
3. An simultaneous cdma2000 and cdma2000 HRPD capable access terminal is one that is capable of supporting calls on a CDMA and one or more HRPD carriers at the same time. Such capability is denoted as CDMA-HRPD in this specification. A single-band CDMA-HRPD capable (SB-CDMA-HRPD) access terminal is one that can support simultaneous calls on a CDMA and one or more HRPD carriers when the CDMA and HRPD carriers belong to the same band class. A dual-band CDMA-HRPD capable (DB-CDMA-HRPD) access terminal is one that can support sumultaneous calls on a CDMA and one or more HRPD carriers when the carriers belong to two different band classes.
4. To ensure that the tests accurately represent CDMA-HRPD performance, the tester should start collecting minimum performance data for CDMA-HRPD only after both CDMA and HRPD calls have been established. This is true for all tests that require simultaneous CDMA and HRPD calls.
5. The term "Band Class Combination" is used in the context of dual-band CDMA_HRPD. A band class combination is a pair of band classes on which a mobile station can operate a CDMA carrier and one or more HRPD carriers simultaneously. The band class combination lists the CDMA band class first, followed by the HRPD band class. For example, for a mobile station supporting a CDMA carrier on Band Class A and a HRPD carrier on Band Class B, the band class combination would be designated as Band Class A, Band Class B.
6. "Base station" refers to the functions performed on the land side, which are typically distributed among a cell, a sector of a cell, and a mobile communications switching center.
7. "Access network" refers to the network equipment providing data connectivity between a packet switched data network (typically the Internet) and the access terminals. Connectivity is typically provided at the Link Layer (PPP).
8. "Sector" refers to the part of the access network that provides the land-side modem.
9. This standard uses the following verbal forms: "Shall" and "shall not" identify requirements to be followed strictly to conform to the standard and from which no deviation is permitted. "Should" and "should not" indicate that one of several possibilities is recommended as particularly suitable, without mentioning or excluding others; that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is discouraged but not prohibited. "May" and "need not" indicate a course of action permissible within the limits of the standard. "Can" and "cannot" are used for statements of possibility and capability, whether material, physical, or causal.
10. Unless indicated otherwise, this document presents numbers in decimal form. Binary numbers are distinguished in the text by the use of single quotation marks.

**NOTES**

11. Those wishing to deploy systems compliant with this standard should also be compliant with local radio regulations. For example, operation within the United States of America shall comply with Parts 2, 15, 22, 24, and 27 of [6] and with the applicable rules and regulations of local administrations.

12. The following operators define mathematical operations:

    × indicates multiplication.

    / indicates division.

    + indicates addition.

    - indicates subtraction.

    * indicates complex conjugation.

    ∈ indicates a member of the set.

    $\lfloor x \rfloor$ indicates the largest integer less than or equal to x: $\lfloor 1.1 \rfloor = 1$, $\lfloor 1.0 \rfloor = 1$.

    $|x|$ indicates the absolute value of x: $|-17|=17$, $|17|=17$.

13. All Radio Configuration 1 Eb/Nt requirements for Band Class 0 in this document are based on measured data. For all other band classes, the radio configuration Eb/Nt requirements in this document are based on simulated data with standard margins of 1.3 dB for static and 1.5 dB for fading channel cases. Additional Forward Fundamental Channel rate determination margins of 0.2, 0.3, and 0.4 dB are added for the 1/2, 1/4, and 1/8 rate cases, respectively.

14. Tests in this revision reference the *General Neighbor List Message*, *Universal Neighbor List Message* and the *Universal Handoff Direction Message* to maintain consistency with new tests that require the extended capability of these messages. Where needed to test a P_REV six or lower mobile station, the *Neighbor List Message*, *Extended Neighbor List Message*, *and Extended Handoff Direction Message* may be used as specified in [11].

15. Some tests may specify using the Paging Channel for general test setup requirements. If the mobile station does not support the Paging Channel, then the Broadcast Control Channel and Forward Common Control Channel shall be used in lieu of the Paging Channel.

16. The specification applies only to Band Classes 0 (Band Subclasses 0 and 1), 1, 2 (Band Subclasses 0, 1, and 2), 3, 4, 5 (Band Subclasses 0 through 7), 6, 7, 8, 9, 10 (Band Subclasses 0 through 4), 11 (Band Subclasses 0 through 5), and 12 (Band Subclasses 0 and 1) as defined in [7]. Operation with other band classes and band subclasses may not be supported by this specification.

# 1 INTRODUCTION

## 1.1 Scope

This Standard details definitions, methods of measurement, and minimum performance characteristics for CDMA-HRPD-capable access terminals. An CDMA-HRPD-capable access terminal shall satisfy the requirements of this document *in addition to* satisfying those in [4] and [17]. A single-band CDMA-HRPD (SB-CDMA-HRPD) access terminal shall pass all SB-CDMA-HRPD MPS tests in this document. A dual-band CDMA-HRPD (DB-CDMA-HRPD) access terminal that also supports SB-CDMA-HRPD shall pass the SB-CDMA-HRPD MPS tests in each individual band class in addition to passing the DB-CDMA-HRPD MPS tests in this document. The purpose of this standard is to ensure that an CDMA-HRPD-capable access terminal can obtain service in any system that meets the compatibility requirements of [1] and [8].

Compatibility, as used in connection with this Standard and [1] and [8], is understood to mean that any CDMA-HRPD-capable access terminal is able to simultaneously open data connections in any HRPD system and place and receive calls in any CDMA system. Conversely, all HRPD systems are able to open connections and all CDMA systems are able to place and receive calls simultaneously with any CDMA-HRPD-capable access terminal.

Test methods are recommended in this document; however, methods other than those recommended may suffice for the same purpose.

The performance metrics in this Standard require an access terminal to provide a single antenna connector for testing. Access terminals having multiple antenna, such as for receive diversity, shall provide a single antenna connector for testing. If an access terminal has more than one antenna connector, only one connector shall be used for testing. Additional requirements specifically for multiple antenna configurations, i.e. receive diversity, are for future study.

## 1.2 Terms and Definitions

Since CDMA-HRPD consists of simultaneous CDMA and HRPD calls, the terms and definitions used in this document are the same as those of the respective technologies. These terms and definitions are listed in Section 1.2 of the most recent revision and version of [4] (for CDMA) and [17] (for HRPD).

The test modes and the mapping to radio configurations for CDMA are described in Section 1.3 of [4].

## 1.3 CDMA and HRPD Equations

Sections 1.4 of [4] and 1.3 of [17] list the equations that describe the relationship between various test parameters under different conditions for CDMA and HRPD respectively.

## 1.4 Tolerances

### 1.4.1 CDMA and HRPD System Parameter Tolerances

CDMA parameters are specified in [8]. HRPD parameters are specified in [1]. All parameters indicated in all sections are exact unless an explicit tolerance is stated.

### 1.4.2 Measurement Tolerances

Unless otherwise specified, a measurement tolerance, including the tolerance of the measurement equipment, of ±10% is assumed.

Unless otherwise specified, the $\hat{I}_{or}/I_{oc}$ value shall be within ±0.1 dB of the value specified, and the $I_{oc}$ value shall be within ±5 dB of the value specified.

## 1.5 References

**NORMATIVE REFERENCES**

The following standards contain provisions that, through reference in this text, constitute provisions of this Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. ANSI and TIA maintain registers of currently valid national standards published by them.

[1] 3GPP2 C.S0024-B v3.0, cdma2000 High Rate Packet Data Air Interface Specification, September 2009.

[2] 3GPP2 C.S0032-C v1.0, Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Network. September 2010.

[3] 3GPP2 C.S0029-B v1.0, Test Application Specification for cdma2000 High Rate Packet Data Air Interface, March 2008.

[4] 3GPP2 C.S0011-C v2.0, Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Mobile Stations, March 2006.

[5] ANSI C63.4-2003, American National Standard for Methods of Measurement of Radi-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz, 2000.

[6] CFR Title 47, Code of Federal Regulations, October 2009.

[7] 3GPP2 C.S0057-E v1.0, Band Class Specification for cdma2000 Spread Spectrum Systems, October 2010.

[8] 3GPP2 C.S0002-E v2.0, Physical Layer Standard for cdma2000 Spread Spectrum Systems, June 2010.

[9] Reserved.

[10] 3GPP2 C.S0004-E v2.0, Signaling Link Access Control (LAC) Standard for cdma2000 Spread Spectrum Systems, June 2010.

[11] 3GPP2 C.S0005-E v2.0, Upper Layer (Layer 3) Signaling Standard for cdma2000 Spread Spectrum Systems, June 2010.

[12] 3GPP2 C.S0010-D v1.0, Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations, September 2010.

[13] 3GPP2 C.S0026-A v1.0, Test Data Service Option (TDSO) for cdma2000 Spread Spectrum Systems, Feburary 2005.

[14] 3GPP2 C.S0025-0 v2.0, Markov Service Option (MSO) for cdma2000 Spread Spectrum Systems, May 2006.

[15] 3GPP2 C.S0013-A, Loopback Service Options (LSO) for cdma2000 Spread Spectrum Systems, 2001.

[16] 3GPP2 C.S0003-E v2.0, Medium Access Control (MAC) Standard for cdma2000 Spread Spectrum Systems, June 2010.

[17] 3GPP2 C.S0033-B v1.0, Recommended Minimum Performance Standards for cdma2000 High Rate Packet Data Access Terminal, May 2008.

[18] 3GPP TS 45.004, 3rd Generation Partnership Project; Technical Specification Group GSM/EDGE Radio Access Network; Modulation.

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# 2 STANDARD RADIATED EMISSIONS MEASUREMENT PROCEDURE

The measurement and calibration procedures described are intended to provide an overview of radiated and conducted signal measurements. A detailed description of the required measurement procedures is given in [5].

## 2.1 Standard Radiation Test Site

The test site shall be on level ground that is of uniform electrical characteristics. The site shall be clear of overhead wires and other metallic objects and shall be as free as possible from undesired signals, such as ignition noise and other carriers. Reflecting objects, such as rain gutters and power cables shall lie outside an ellipse measuring 60 meters on the major axis by 52 meters on the minor axis for a 30-meter site, or an ellipse measuring 6 meters on the major axis by 5.2 meters on the minor axis for a 3-meter site. The equipment under test shall be located at one focus of the ellipse and the measuring antenna at the other focus. If desired, shelters may be provided at the test site to protect the equipment and personnel. All such construction shall be of wood, plastic, or other non-metallic material. All power, telephone, and control circuits to the site shall be buried at least 0.3 meter under ground.

A turntable, essentially flush with the ground, shall be provided that can be remotely controlled. A platform 1.2 meters high shall be provided on this turntable to hold the equipment under test. Any power and control cables that are used for this equipment should extend down to the turntable, and any excess cabling should be coiled on the turntable.

If the equipment to be tested is mounted in racks and is not easily removed for testing on the above platform, then the manufacturer may elect to test the equipment when it is mounted in its rack (or racks). In this case, the rack (or racks) may be placed directly on the turntable.

If a transmitter with an external antenna connection is being tested, then the RF output of this transmitter shall be terminated in a non-radiating load that is placed on the turntable. A non-radiating load is used in lieu of an antenna to avoid interference with other radio users. The RF cable to this load should be of minimum length. The transmitter shall be tuned and adjusted to its rated output value before starting the tests.

In order to conduct unintentional radiator tests as specified in Part 15, subpart B of [6], the radiation site must comply with 5.4.6 through 5.5 of [5] as required by Part 2.948 of [6].

## 2.2 Search Antenna

For narrow-band dipole adjustable search antennas, the dipole length shall be adjusted for each measurement frequency. This length may be determined from a calibration ruler that is normally supplied with the equipment.

The search antenna shall be mounted on a movable non-metallic horizontal boom that can be raised or lowered on a wooden or other non-metallic pole. The cable connected to the search antenna shall be at a right angle to the antenna. The cable shall be dressed at least 3 meters, either through or along the horizontal boom, in a direction away from the

equipment being measured. The search antenna cable may then be dropped from the end of the horizontal boom to ground level for connection to the field-strength measuring equipment.

The search antenna shall be capable of being rotated 90 degrees on the end of the horizontal boom to allow measurement of both vertically and horizontally polarized signals. When the antenna length of a vertically mounted antenna does not permit the horizontal boom to be lowered to its minimum specified search range, adjust the minimum height of the boom for 0.3 meter clearance between the end of the antenna and the ground.

## 2.3 Field-Strength Measurement

A field-strength meter shall be connected to a search antenna. The field-strength meter shall have sufficient sensitivity and selectivity to measure signals over the required frequency ranges at levels at least 10 dB below the levels specified in any document, standard, or specification that references this measurement procedure. The calibration of the measurement instruments (field-strength meter, antennas, etc.) shall be checked frequently to ensure that their accuracy is in accordance with the current standards. Such calibration checks shall be performed at least once per year.

## 2.4 Frequency Range of Measurements

When measuring radiated signals from transmitting equipment, the measurements shall be made from the lowest radio frequency (but no lower than 25 MHz) generated in the equipment to the tenth harmonic of the carrier, except for that region close to the carrier equal to ±250% of the authorized bandwidth.

When measuring radiated signals from receiving equipment, the measurements shall be made from 25 MHz to at least 6 GHz.

## 2.5 Test Ranges

### 2.5.1 30-Meter Test Range

Measurement of radiated signals shall be made at a point 30 meters from the center of the turntable. The search antenna shall be raised and lowered from 1 to 4 meters in both horizontally and vertically polarized orientations.

The field-strength measuring meter may be placed on a suitable table or tripod at the foot of the mast.

When measuring radiated emissions from receivers, equipment that contains its own receive antenna shall be tested with the antenna in place. Equipment that is connected to an external receive antenna via a cable shall be tested without the antenna, and the receive ports on the equipment under test shall be terminated in a 50Ω non-radiating resistive load.

### 2.5.2 3-Meter Test Range

Measurement of radiated signals may be made at a point 3 meters from the center of the turntable, provided the following three conditions can be met:

1. A ground screen that covers an elliptical area at least 6 meters on the major axis by 5.2 meters on the minor axis is used with the measuring antenna and turntable mounted 3 meters apart. The measuring antenna and turntable shall lie on the major axis and shall be equidistant from the minor axis of the elliptical area.
2. The maximum dimension of the equipment shall be 3 meters or less. When measuring radiated signals from receivers, the maximum dimension shall include the antenna if it is an integral part of the device.
3. The field-strength measuring equipment is either mounted below the ground level at the test site or is located a sufficient distance away from the equipment being tested and from the search antenna to prevent corruption of the measured data.

The search antenna shall be raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations. When the search antenna is vertically oriented, the minimum height of the center of the search antenna shall be defined by the length of the lower half of the search antenna.

When measuring radiated emissions from receivers, equipment that contains its own receive antenna shall be tested with the antenna in place. Equipment that is connected to an external receive antenna via a cable shall be tested without the antenna, and the receive ports on the equipment under test shall be terminated in a 50Ω non-radiating resistive load. The 3-meter test range may be used for determining compliance with limits specified at 30 meters (or other distances), provided that:

1. The ground reflection variations between the two distances have been calibrated for the frequencies of interest at the test range, or
2. A 5 dB correction factor is added to the specified radiation limit(s) to allow for average ground reflections.

Radiated field strength (volts/meter) varies inversely with distance, so that a measurement made on the 3-meter test range divided by 10 gives the equivalent value that would be measured on a 30-meter test range for the same EIRP (effective isotropic radiated power). The 30-meter field strength in volts/meter can be calculated from the EIRP by using the following formula:

$$\mu V/m@30\ \text{meters} = 5773.5 \times 10^{\text{EIRP(dBm)}/20}$$

## 2.6 Radiated Signal Measurement Procedures

Radiated signals having significant levels shall be measured on the 30-meter or the 3-meter range by using the following procedure:

1. For each observed radiated signal, raise and lower the search antenna to obtain a maximum reading on the field-strength meter with the antenna horizontally polarized. Then rotate the turntable to maximize the reading. Repeat this procedure of raising and lowering the antenna and rotating the turntable until the highest possible signal has been obtained. Record this maximum reading.
2. Repeat step 1 for each observed radiated signal with the antenna vertically polarized.

3. Remove the equipment being tested and replace it with a half-wave antenna. The center of the half-wave antenna should be at the same approximate location as the center of the equipment being tested.
4. Feed the half-wave antenna replacing the equipment under test with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to the observed radiated signal, raise and lower the search antenna to obtain a maximum reading on the field-strength measuring meter. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. Record the signal generator power output.
5. Repeat step 4 above with both antennas vertically polarized.
6. Calculate the power into a reference ideal isotropic antenna by:
    a. First reducing the readings obtained in steps 4 and 5 above by the power loss in the cable between the generator and the source antenna, and
    b. Then correcting for the gain of the source antenna used relative to an ideal isotropic antenna. The reading thus obtained is the equivalent effective isotropic radiated power (EIRP) level for the spurious signal being measured.
7. Repeat steps 1 through 6 above for all observed signals from the equipment being tested.

# 3 PHYSICAL LAYER RECEIVER MINIMUM STANDARDS

## 3.1 Demodulation Requirements for SB-CDMA-HRPD

### 3.1.1 Demodulation of Forward Traffic Channel in AWGN

On the CDMA carrier, this test shall be performed on the Forward Fundamental Channel, if the Forward Fundamental Channel is supported by the mobile station. Forward Traffic Channel closed loop power control in the CDMA base station shall be disabled during this test.

#### 3.1.1.1 Definition

The performance of the demodulation of Forward Traffic Channel in an AWGN (no fading or multipath) environment is determined by the frame error rate (FER) for the CDMA channel and packet error rate (PER) for the HRPD channel. The PER and FER are calculated for each individual data rate and on a per carrier basis.[2] For CDMA Radio Configuration 2 Fundamental Channel, the accuracy of the Erasure Indicator bits sent by the mobile station is verified in this test.

#### 3.1.1.2 Method of Measurement

1. Connect the sectors and the AWGN generator to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]).
2. For each band class that the access terminal supports, configure the access terminal to operate in that band class. Configure the access terminal to transmit on one CDMA and one HRPD channel at maximum separation supported by the device. The maximum carrier separation should be at least 2.46 MHz. Perform steps 3 through 14.
3. For each CDMA radio configuration supported on the Forward Fundamental Channel, set up a CDMA call using Fundamental Channel (see 1.3 of [4]) with frame activity equal to 100%.
4. For HRPD, perform steps 5 and 6. For Subtype 0 to 1 Physical Layer tests, perform steps 7 through 9. For Subtype 2 or 3 Physical Layer tests, perform steps 13 and 14.
5. Set the access network's forward HRPD packet activity to 100%. If the data rate under test is 1.536 Mbps or higher, an access network simulator meeting the waveform quality requirements in 8.4.3 of [17] shall be used. Set the access network’s Control Channel data rate to 38.4 kbps.

[2] To ensure that the tests accurately represent CDMA-HRPD performance, the tester should start collecting PER and FER data only after both CDMA and HRPD calls have been established.

6. Set the HRPD *SetManagementSameChannelParameters* attribute fields of the Default Route Update Protocol to the values specified below:

| Field | Value (Hex) |
|---|---|
| PilotDrop | 0x1c (-14 dB) |

7. Set up a HRPD Test Application session. Open a connection and configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) so that the HRPD Forward Traffic Channel rate corresponds to the rate of the test only.
8. Set the test parameters for each HRPD demodulation test specified in Table A.1.1.1-1.
9. From the number of HRPD packets transmitted and the number of bad packets received, calculate the PER for this test. Unless otherwise specified, the PER shall be measured at the end of the packet.
10. Set the test parameters for each CDMA demodulation test as specified in Table A.2.1.1-1 through Table A.2.1.1-5.
11. Count, at the base station, the number of CDMA frames transmitted and the number of good frames received at the mobile station.
12. For CDMA Radio Configuration 2, check the accuracy of the received Erasure Indicator bits at the base station against the corresponding frames received at the mobile station.
13. If the access terminal supports HRPD Subtype 2 or Subtype 3 Physical Layer, set up a HRPD Test Application session. Open a connection and configure the Test Application FETAP (for Subtype 2 or 3 Physical Layer) so that the HRPD Forward Traffic Channel rate corresponds to the rate of the test only.
14. Set the test parameters for each HRPD demodulation test specified in Table A.1.1.1-2 and repeat step 9.

3.1.1.3 Minimum Standard for HRPD

The actual $E_b/N_t$ used in each test shall be within ±0.2 dB of the value indicated in Table A.1.1.1-1 through Table A.1.1.1-2.

For access terminals that support HRPD Subtype 0 or Subtype 1 Physical Layer, the PER shall not exceed the piecewise linear PER curve specified by the points in Table A.1.1.2-1 with 95% confidence. The PER should not exceed the piecewise linear PER curve specified by the points in Table A.1.1.2-2 with 95% confidence.

For access terminals that support HRPD Subtype 2 or Subtype 3 Physical Layer, the PER shall not exceed the piecewise linear PER curve specified by the points in Table A.1.1.2-3 with 95% confidence. The PER should not exceed the piecewise linear PER curve specified by the points in Table A.1.1.2-4 with 95% confidence.

3.1.1.4 Minimum Standard for CDMA

The actual power measurement uncertainty shall be less than or equal to 0.2 dB. Test durations must be sufficient to meet confidence level requirements.

The actual $E_b/N_t$ used in each test shall be within ±0.2 dB of the value indicated in Table A.2.1.1-1 through Table A.2.1.1-5.

For Radio Configuration 2 Fundamental Channels, the mobile station shall set the Erasure Indicator Bit to '1' in the second transmitted frame following the reception of any bad frame on the Forward Fundamental Channel. The value of the Erasure Indicator bits corresponding to all other frames received at the mobile station shall be '0'.

The FER for each test shall not exceed the piecewise linear FER curve specified by the points in Table A.2.1.2-1 through Table A.2.1.2-5 with 95% confidence (see 6.6 of [4]).

## 3.2 Demodulation Requirements for DB-CDMA-HRPD

3.2.1 Demodulation of Forward Traffic Channel in AWGN

Forward Traffic Channel closed loop power control in the CDMA base station shall be disabled during this test.

3.2.1.1 Definition

The performance of the demodulation of the Forward Traffic Channel in an AWGN (no fading or multipath) environment is determined by the frame error rate (FER) for the CDMA channel and packet error rate (PER) for the HRPD channels. The PER and FER are calculated for each individual data rate and on a per carrier basis.

3.2.1.2 Method of Measurement

1. Connect the sector to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]).
2. For all band class combinations supported by the access terminal, configure the access terminal to operate with that band class combination, where B1 is the CDMA band class and B2 is the HRPD band class.
3. Perform steps 5 through 16 if the access terminal can simultaneously support a single CDMA carrier in B1 and one or more HRPD carriers in B2.
4. Perform steps 17 and 18 if the access terminal can simultaneously support a single CDMA carrier in B1 and two or more HRPD carriers in B2.
5. Configure the access terminal to transmit on a single CDMA carrier in B1, and on a single HRPD carrier in B2. Perform steps 6 through 16.
6. For CDMA radio configurations 3 and 4 supported on the Forward Fundamental Channel, set up a CDMA call on B1 using Fundamental Channel (see 1.3 of [4]) with frame activity equal to 100%.

7. For HRPD on B2, perform steps 8 and 9. For Subtype 0 to 1 Physical Layer tests, perform steps 10 through 12. For Subtype 2 or 3 Physical Layer tests, perform steps 13 and 14.
8. Set the access network's forward HRPD packet activity to 100%. If the data rate under test is 1.536 Mbps or higher, an access network simulator meeting the waveform quality requirements in 8.4.3 of [17] shall be used. Set the access network's Control Channel data rate to 38.4 kbps.
9. Set the HRPD *SetManagementSameChannelParameters* attribute fields of the Default Route Update Protocol to the values specified below:

| Field | Value (Hex) |
|---|---|
| PilotDrop | 0x1c (-14 dB) |

10. Set up a HRPD Test Application session for B2. Open a connection and configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) so that the HRPD Forward Traffic Channel rate corresponds to the rate of the test only.
11. Set the test parameters for each HRPD demodulation test specified in Table A.1.1.1-1.
12. From the number of HRPD packets transmitted and the number of bad packets received, calculate the PER for this test. Unless otherwise specified, the PER shall be measured at the end of the packet.
13. If the access terminal supports HRPD Subtype 2 or Subtype 3 Physical Layer, set up a HRPD Test Application session for B2. Open a connection and configure the Test Application FETAP (for Subtype 2 or 3 Physical Layer) so that the HRPD Forward Traffic Channel rate corresponds to the rate of the test only.
14. Set the test parameters for each HRPD demodulation test specified in Table A.1.1.1-2 and repeat step 12.
15. Set the test parameters for each CDMA demodulation test as specified in Table A.2.1.1-1 through Table A.2.1.1-5.
16. Count, at the base station, the number of CDMA frames transmitted and the number of good frames received at the mobile station.
17. Configure the access terminal to transmit on the maximum number of adjacent HRPD carriers supported by the access terminal on B2.
18. If the access terminal supports multiple HRPD carriers in B2, set up a HRPD Test Application session. Open a connection and configure the Test Application FMCTAP (for Subtype 3 Physical Layer) so that the Forward Traffic Channel rate corresponds to the rate of the test only. Set the test parameters for tests 5 and 6 as specified in Table A.1.1.1-3 and repeat step 12. The data rate and geometry parameters are on a per carrier basis.

3.2.1.3 Minimum Standard for HRPD

The actual $E_b/N_t$ used in each test shall be within ±0.2 dB of the value indicated in Table A.1.1.1-1 through Table A.1.1.1-3.

For access terminals that support HRPD Subtype 0 or Subtype 1 Physical Layer, the PER shall not exceed the piecewise linear PER curve specified by the points in Table A.1.1.3-1 with 95% confidence. The PER should not exceed the piecewise linear PER curve specified by the points in Table A.1.1.3-2 with 95% confidence.

For access terminals that support HRPD Subtype 2 or Subtype 3 Physical Layer, the PER shall not exceed the piecewise linear PER curve specified by the points in Table A.1.1.3-3 with 95% confidence. The PER should not exceed the piecewise linear PER curve specified by the points in Table A.1.1.3-4 with 95% confidence. For access terminals that support Subtype 3 Physical Layer, for each active carrier the PER shall not exceed the piecewise linear PER curve specified by the points in Table A.1.1.3-5 with 95% confidence. For access terminals that support Subtype 3 Physical Layer, for each active carrier the PER should not exceed the piecewise linear PER curve specified by the points in Table A.1.1.3-6 with 95% confidence.

3.2.1.4 Minimum Standard for CDMA

The actual power measurement uncertainty shall be less than or equal to 0.2 dB. Test durations must be sufficient to meet confidence level requirements.

The actual $E_b/N_t$ used in each test shall be within ±0.2 dB of the value indicated in Table A.2.1.1-3 through Table A.2.1.1-4.

The value of the Erasure Indicator bits corresponding to all frames received at the mobile station shall be '0'.

The FER for each test shall not exceed the piecewise linear FER curve specified by the points in Table A.2.1.2-3 through Table A.2.1.2-4 with 95% confidence (see 6.6 of [4]).

## 3.3 Receiver Performance for SB-CDMA-HRPD

3.3.1 Receiver Sensitivity and Dynamic Range

3.3.1.1 Definition

The RF sensitivity of the access terminal receiver is the minimum received power, measured at the access terminal antenna connector, at which the packet error rate (PER) for HRPD and the frame error rate (FER) for CDMA do not exceed a specified value. The receiver dynamic range is the input power range at the access terminal antenna connector over which the PER and FER do not exceed a specific value.

3.3.1.2 Method of Measurement

1. Connect the HRPD and CDMA sector(s) to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The AWGN generators and the CW generators are not applicable in this test.

2. For each band class that the mobile station supports, configure the base station to operate in that band class. Configure the access terminal to simultaneously perform a CDMA and one or more HRPD calls as indicated in Table 3.3.1.2-1. Use a power control step size of 0.5dB for CDMA as well as HRPD carriers. Perform steps 3 through 13.
3. If the mobile station supports demodulation of Radio Configuration 1, 2, 3, 4, or 5, set up a CDMA call using Fundamental Channel Test Mode 1 or 3 (see 1.3 of [4]) with 9600 bps data rate only, or Fundamental Channel Test Mode 2 or 5 (see 1.3 of [4]) with 14400 bps data rate only. Perform steps 5 through 13.
4. If the mobile station supports demodulation of Radio Configuration 6, 7, 8, or 9, set up a CDMA call using Fundamental Channel Test Mode 7 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 5 through 13.
5. For testing dynamic range (Test 1), perform steps 6 through 8. For testing sensitivity (Test 2), perform steps 9 through 13.
6. Set up a HRPD test Application session. Open a HRPD connection and configure the Test Application FTAP (for Subtype 0 OR 1 Physical Layer) or FETAP (for Subtype 2 Physical Layer) or FMCTAP (for Subtype 3 Physical Layer) so that the Forward Traffic Channel rate corresponds to the one specified in Table 3.3.1.2-1 for Test 1.
7. Set the test parameters for the CDMA and HRPD channels as specified in Table 3.3.1.2-1.
8. From the number of HRPD packets transmitted and the number of bad packets received, calculate the PER for HRPD. From the number of CDMA frames transmitted and the number of bad frames received, calculate the FER for CDMA.
9. For Test 2, open a HRPD connection and configure the Test Application FTAP (for Subtype 0 OR 1 Physical Layer) or FETAP (for Subtype 2 Physical Layer) or FMCTAP (for Subtype 3 Physical Layer) so that the Forward Traffic Channel rate corresponds to the one specified in Table 3.3.1.2-1 for Test 2.
10. Set the test parameters (all except $\hat{I}_{or}$) as specified in Table 3.3.1.2-1. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the CDMA channel.
11. Send continuously alternate '0' and '1' power control bits to the access terminal on the CDMA carrier, and send continuously '0' power control bits to the access terminal on each HRPD carrier and measure the total transmitted power at the access terminal until it becomes stable. For this test, denote this stable transmitted power value MaxAccessTerminalTxPower (in dBm).
12. Manually set the transmitted power on each CDMA and HRPD channel to MaxAccessTerminalTxPower – $10 \times \log_{10}(N)$ – Backoff, where N is the number of simultaneously active CDMA as well as HRPD carriers and Backoff is 3.3dB. Here, manual setting of the transmitted power implies using reverse power control commands to maintain the transmitted power close to a specified target. The

difference between the target transmitted power and the actual or measured transmitted power shall not exceed the power control step size.

13. Set the $\hat{I}_{or}$ for Test 2 for both CDMA and HRPD as specified in Table 3.3.1.2-1 and repeat step 8.

**Table 3.3.1.2-1. Test Parameters for Receiver Sensitivity (Test 2) and Dynamic Range (Test 1)**

| Parameter | | Units | Test 1 | Test 2 |
|---|---|---|---|---|
| HRPD | $\hat{I}_{or}$ | dBm/1.23 MHz | -25 | -105.5 |
| | Forward Traffic Channel Data Rate | kbps | 307.2 | |
| | | slots/packet | 2 | |
| CDMA | $\hat{I}_{or}$ | dBm/1.23 MHz | -25 | -104 |
| | $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 | |
| | $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -15.6 (RC 1 and 3)<br>-12.3 (RC 2 and 5)<br>-20.6 (RC 7) | |
| Number of carriers | | N/A | One CDMA channel and the maximum number of HRPD Forward Traffic channels that can be demodulated by the AT. The HRPD carriers are all adjacent to one another and adjacent to the single CDMA carrier with a spacing of 1.23 MHz (for Band Class 0) and 1.25 MHz (for all other Band Classes) between center frequencies. | One CDMA and one HRPD Forward Traffic channels at maximum allowable frequency separation supported by the device. The maximum separation should be at least 2.46MHz. |

3.3.1.3 Minimum Standard

The PER for HRPD as well as FER for CDMA in both Test 1 and Test 2 shall not exceed 0.5% with 95% confidence.

3.3.2 Single Tone Desensitization

3.3.2.1 Definition

For single carrier operation, the single tone desensitization is a measure of a receiver's ability to receive a CDMA or HRPD signal at its assigned channel frequency in the presence

of an interferer spaced at a given frequency offset from the center frequency of the assigned channel. For multi-carrier operation, the single tone desensitization is a measure of a receiver's ability to receive a multi-carrier HRPD or CDMA-HRPD signal at its assigned channel frequencies in the presence of a single jammer spaced at a given frequency offset from the center frequency of the outermost channels. The receiver desensitization performance is measured by the packet error rate (PER) for HRPD and the frame error rate (FER) for CDMA.

This test is applied to all band classes except Band Class 6, where no narrow-band interferers are currently known.

3.3.2.2 Method of Measurement

1. Connect the sector and an interfering tone to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The GMSK tone is modulated as defined in [18].
2. For each band class that the access terminal supports, except Band Class 6, configure the access terminal to operate in that band class. Use a power control step size of 0.5dB for CDMA as well as HRPD carriers. Configure the access terminal to simultaneously perform a CDMA and a HRPD call with the two carriers at the maximum carrier separation supported by the device and perform steps 3 through 13. The maximum carrier separation should be at least 2.46MHz.
3. If the mobile station supports demodulation of Radio Configuration 1, 2, 3, 4, or 5, set up a CDMA call using Fundamental Channel Test Mode 1 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 5 through 13.
4. If the mobile station supports demodulation of Radio Configuration 6, 7, 8, or 9, set up a CDMA call using Fundamental Channel Test Mode 7 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 5 through 13.
5. Set up a HRPD Test Application session. Open a connection and configure the HRPD Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 Physical Layer) so that the HRPD rate corresponds to the 2-slot version of 307.2 kbps.
6. Set the test parameters (excluding $\hat{I}_{or}$) for the CDMA channel as specified in Table 3.3.2.2-1.
7. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the HRPD channel. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the CDMA channel.
8. Send continuously alternate '0' and '1' power control bits to the access terminal on the CDMA carrier, and send continuously '0' power control bits to the access terminal on the HRPD carrier and measure the total transmitted power at the access terminal until it becomes stable. For this test, denote this stable transmitted power value MaxAccessTerminalTxPower (in dBm).
9. Manually set the transmitted power on each CDMA and HRPD channel to MaxAccessTerminalTxPower – 10 × $\log_{10}$(N), where N is the number of

simultaneously active CDMA as well as HRPD carriers. Here, manual setting of the transmitted power implies using reverse power control commands to maintain the transmitted power close to a specified target. The difference between the target transmitted power and the actual or measured transmitted power shall not exceed the power control step size.

10. Set the test parameters for Test 1 as specified in Table 3.3.2.2-1 and perform steps 12 and 13.
11. Repeat steps 6 through 9. Set the test parameters for Test 2 as specified in Table 3.3.2.2-1 and perform steps 12 and 13.
12. For Band Class 3, verify that the ERP is at a level higher than the minimum specified in Table 3.3.2.2-2 for the current test. Otherwise, repeat steps 10 and 11 until the EIRP or ERP reach desirable levels.
13. From the number of HRPD packets transmitted and the number of bad packets received calculate the PER for this test. From the number of CDMA frames transmitted and the number of bad frames received calculate the FER for this test.

**Table 3.3.2.2-1. Test Parameters for Single Tone Desensitization for CDMA-HRPD operation**

| Parameter | | Units | Test 1 | Test 2 |
|---|---|---|---|---|
| Jammer Offset from Carrier | | kHz | +1100 from highest frequency carrier (Band Groups 450 and 800, except BC 3)<br>+900 (BC 3)<br>+1250 from highest frequency carrier (BC 1, 4, 8, 14 and 15) | -1100 from lowest frequency carrier (Band Groups 450 and 800, except BC 3)<br>-900 (BC 3)<br>–1250 from lowest frequency carrier (BC 1, 4, 8, 14 and 15) |
| Number of active carriers | | N/A | 1 CDMA + 1 HRPD | |
| Jammer Power / Type | | dBm | -50 GMSK (Except BC 3)<br>-50 CW (BC 3) | |
| HRPD | $\hat{I}_{or}$ | dBm/ 1.23 MHz | -92.4 (Except BC 3)<br>-99.4 (BC 3) | |
| CDMA | $\hat{I}_{or}$ | dBm/ 1.23 MHz | -91 (Except BC 3)<br>-98 (BC 3) | |
| | $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 | |
| | $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -15.6 | |

**Table 3.3.2.2-2. Minimum Effective Radiated Power for Single Tone Desensitization Test for Band Class 3**

| Access terminal Class | Minimum Access terminal ERP |
|---|---|
| | Tests 1 and 2 |
| I | -7 dBW (200 mW) |
| II | -11 dBW (80 mW) |
| III | -15 dBW (32 mW) |

3.3.2.3 Minimum Standard

The FER for CDMA carriers and PER for HRPD carriers for each test shall not exceed 1.0% with 95% confidence (see 8.8 of [17] and 6.6 of [4]).

## 3.4 Receiver Performance for DB-CDMA-HRPD

3.4.1 Receiver Sensitivity and Dynamic Range

3.4.1.1 Definition

The RF sensitivity of the access terminal receiver is the minimum received power, measured at the access terminal antenna connector, at which the packet error rate (PER) for HRPD and the frame error rate (FER) for CDMA do not exceed a specified value. The receiver dynamic range is the input power range at the access terminal antenna connector over which the PER and FER do not exceed a specific value.

3.4.1.2 Method of measurement

1. Connect the HRPD access network(s) and the CDMA base station to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The AWGN generator and the CW generator are not applicable in this test.
2. For all band class combinations supported by the access terminal, configure the access terminal to operate with that band class combination, where B1 is the CDMA band class and B2 is the HRPD band class.
3. Perform steps 4 through 10, and 16 through 22 if the access terminal can support a single CDMA carrier in B1 and only one HRPD carrier in B2. Perform steps 11 through 15 and 23 through 29 if the access terminal can simultaneously support a single CDMA carrier in B1 and two or more HRPD carriers in B2. Use a power control step size of 0.5dB for CDMA as well as HRPD carriers.
4. Configure the access terminal to transmit on one CDMA carrier in B1 and on one HRPD carrier in B2.
5. If the mobile station supports demodulation of Radio Configuration 3, 4 or 5, set up a CDMA call in B1 using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with

9600 bps data rate only, or Fundamental Channel Test Mode 5 (see 1.3 of [4]) with 14400 bps data rate only.

6. Set up a HRPD Test Application session in B2. Open a HRPD connection and configure the Test Application FTAP (for Subtype 0 OR 1 Physical Layer) or FETAP (for Subtype 2 Physical Layer) so that the Forward Traffic Channel rate corresponds to the one specified in Table 3.4.1.2-1 for Test 1.

7. Set the test parameters for Test 1 as specified in Table 3.4.1.2-1.

8. From the number of HRPD packets transmitted and the number of bad packets received, calculate the PER for HRPD. From the number of CDMA frames transmitted and the number of bad frames received, calculate the FER for CDMA.

9. Open a HRPD connection in B2 and configure the Test Application FTAP (for Subtype 0 OR 1 Physical Layer) or FETAP (for Subtype 2 Physical Layer) so that the Forward Traffic Channel rate corresponds to the one specified in Table 3.4.1.2-1 for Test 2.

10. Set the test parameters for Test 2 as specified in Table 3.4.1.2-1 and repeat step 8.

11. Configure the access terminal to transmit on one CDMA carrier in B1 and on the maximum number of HRPD Forward Traffic channels that can be demodulated by the AT in B2 simultaneously.

12. If the mobile station supports demodulation of Radio Configuration 3, 4 or 5, set up a CDMA call on B1 using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only, or Fundamental Channel Test Mode 5 (see 1.3 of [4]) with 14400 bps data rate only.

13. Open a HRPD connection in B2 and configure the Test Application FMCTAP (for Subtype 3 Physical Layer) so that the Forward Traffic Channel rate corresponds to the one specified in Table 3.4.1.2-2 for Test 4.

14. Set the test parameters for Test 4 as specified in Table 3.4.1.2-2. The parameter $\hat{I}_{or}$ denotes received power per carrier. The forward traffic channel date rate is on a per carrier basis.

15. From the number of HRPD packets transmitted and the number of bad packets received, calculate the PER for each HRPD carrier. From the number of CDMA frames transmitted and the number of bad frames received, calculate the FER for CDMA. The PER and FER are computed on a per carrier basis.

16. Configure the access terminal to transmit on one CDMA carrier in B1 and on one HRPD carrier in B2.

17. If the mobile station supports demodulation of Radio Configuration 3, 4 or 5, set up a CDMA call in B1 using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only, or Fundamental Channel Test Mode 5 (see 1.3 of [4]) with 14400 bps data rate only.

18. Open a HRPD connection in B2 and configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 Physical Layer) so that the

Forward Traffic Channel rate corresponds to the one specified in Table 3.4.1.2-1 for Test 3.

19. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the CDMA channel.

20. Set the transmission power on the CDMA carrier in B1 to be L1 – 3dB, where L1 is the lower limit on maximum output power for the band class and mobile station class with appropriate backoff as specified in Table 4.3.4.3-1 of [17]. Maintain the CDMA channel output power at the current level for tests 3 and 5.

21. Send continuously '0' power control bits to the access terminal on each HRPD carrier. Measure the total transmitted power at the access terminal until it becomes stable.

22. Set the test parameters for Test 3 as specified in Table 3.4.1.2-1 and repeat step 8.

23. Configure the access terminal to transmit on one CDMA carrier in B1 and on two HRPD Forward Traffic channels at maximum allowable frequency separation (MaxForwardLinkBandwidthNoJammer)[3] in B2.

24. If the mobile station supports demodulation of Radio Configuration 3, 4 or 5, set up a CDMA call in B1 using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only, or Fundamental Channel Test Mode 5 (see 1.3 of [4]) with 14400 bps data rate only.

25. Open a HRPD connection and configure the Test Application FMCTAP (for Subtype 3 Physical Layer) so that two Forward Traffic Channels at the maximum channel separation (MaxForwardLinkBandwidthNoJammer)[4] are assigned to the AT and the rate corresponds to the 2-slot version of 307.2 kbps in each channel.

26. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the CDMA channel.

27. Set the transmission power on the CDMA carrier in B1 to be L1 – 3dB, where L1 is the lower limit on maximum output power for the band class and mobile station class with appropriate backoff as specified in Table 4.3.4.3-1 of [17]. Maintain the CDMA channel output power at the current level for tests 3 and 5.

28. Send continuously '0' power control bits to the access terminal on each HRPD carrier. Measure the total transmitted power at the access terminal until it becomes stable.

29. Set the test parameters for Test 5 as specified in Table 3.4.1.2-2 and repeat step 8.

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[3] See Section 8.9.7.1 in [1].

[4] See Section 8.9.7.1 in [1].

**Table 3.4.1.2-1. Test Parameters for Receiver Sensitivity (Test 3) and Dynamic Range (Tests 1, 2)**

| Parameter | | Units | Test 1 | Test 2 | Test 3 |
|---|---|---|---|---|---|
| HRPD | $\hat{I}_{or}$ | dBm/1.23 MHz | -25 | -25 | -105.5 |
| | Forward Traffic Channel Data Rate | kbps | 307.2 | 2,457.6 | 307.2 |
| | | slots/packet | 2 | 1 | 2 |
| CDMA | $\hat{I}_{or}$ | dBm/1.23 MHz | -25 | -25 | -104 |
| | $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 | | |
| | $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -15.6 (RC 1 and 3) | | |

**Table 3.4.1.2-2. Test Parameters for Receiver Sensitivity (Test 5) and Dynamic Range (Test 4)**

| Parameter | | Units | Test 4 | Test 5 |
|---|---|---|---|---|
| HRPD | $\hat{I}_{or}$ | dBm/1.23 MHz | -25 | -105.5 |
| | Forward Traffic Channel Data Rate | kbps | 307.2 | |
| | | slots/packet | 2 | |
| CDMA | $\hat{I}_{or}$ | dBm/1.23 MHz | -25 | -104 |
| | $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 | |
| | $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -15.6 (RC 1 and 3) | |
| Number of carriers | | N/A | One CDMA channel (in B1) and the maximum number of HRPD Forward Traffic channels (in B2) that can be demodulated by the AT. The HRPD carriers are all adjacent to one another with a spacing of 1.23 MHz (for Band Class 0) and 1.25 MHz (for all other Band Classes) between center frequencies. | One CDMA channel (in B1) and two HRPD Forward Traffic channels (in B2) at maximum allowable frequency separation supported by the device. The maximum separation should be at least 2.46MHz. |

3.4.1.3 Minimum Standard

The PER for HRPD as well as FER for CDMA in both Test 1 and Test 2 shall not exceed 0.5% with 95% confidence. The PER in Test 3 should not exceed 0.5% with 95% confidence. The PER in Test 4 and Test 5 shall not exceed 0.5% in each Forward Traffic Channel with 95% confidence.

3.4.2 Single Tone Desensitization

3.4.2.1 Definition

For single carrier operation, the single tone desensitization is a measure of a receiver's ability to receive a CDMA or HRPD signal at its assigned channel frequency in the presence of an interferer spaced at a given frequency offset from the center frequency of the assigned channel. For multi-carrier operation, the single tone desensitization is a measure of a

receiver's ability to receive a multi-carrier HRPD or CDMA-HRPD signal at its assigned channel frequencies in the presence of an interferer spaced at a given frequency offset from the center frequency of the outermost channels. The receiver desensitization performance is measured by the packet error rate (PER) for HRPD and the frame error rate (FER) for CDMA.

This test is applied to all band classes except Band Class 6, where no narrow-band interferers are currently known.

3.4.2.2 Method of Measurement

1. Connect the HRPD access network(s) and the CDMA base station and an interfering tone to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The GMSK tone is modulated as defined in [18].
2. For all band class combinations supported by the access terminal, configure the access terminal to operate with that band class combination, where B1 is the CDMA band class and B2 is the HRPD band class. Use a power control step size of 0.5dB for CDMA and HRPD carriers.
3. Perform steps 4 through 23 if the access terminal can support a single CDMA carrier in B1 and one or more HRPD carriers in B2.
4. Perform steps 24 through 29 if the access terminal can simultaneously support a single CDMA carrier in B1 and two or more HRPD carriers in B2.
5. Configure the access terminal to transmit on one CDMA carrier in B1 and on one HRPD carrier in B2.
6. If the mobile station supports demodulation of Radio Configuration 3 or 4, set up a CDMA call in B1 using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only.
7. Set up a HRPD Test Application session in B2. Open a connection and configure the HRPD Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 Physical Layer) or FMCTAP (for Subtype 3 Physical Layer) so that the HRPD rate corresponds to the 2-slot version of 307.2 kbps.
8. Set the test parameters for the CDMA channel as specified in Table 3.4.2.3-1.
9. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the CDMA channel.
10. Set the transmission power on the CDMA carrier in B1 to be L1 – 3dB, where L1 is the lower limit on maximum output power for the band class and mobile station class with appropriate backoff as specified in Table 4.3.4.3-1 of [17]. Maintain the CDMA channel output power at the current level.
11. Send continuously '0' power control bits to the access terminal on each HRPD carrier. Measure the total transmitted power at the access terminal until it becomes stable.

12. Set the test parameters for Test 1 on the CDMA carrier as specified in Table 3.4.2.3-1 and perform steps 16 and 17. Repeat for Test 5, Test 7 and Test 9 using the parameters as specified in Table 3.4.2.3-1 and perform steps 10 and 11.

13. Set the test parameters for Test 2 on the CDMA carrier as specified in Table 3.4.2.3-1 and perform steps 16 and 17. Repeat for Test 6, Test 8 and Test 10 using the parameters as specified in Table 3.4.2.3-1 and perform steps 10 and 11.

14. If B1 belongs to Band Class 3 with Radio Configuration 3, set the test parameters for Test 3 using the parameters as specified in Table 3.4.2.3-1 on the CDMA carrier and perform steps 16 and 17.

15. If B1 belongs to Band Class 3 with Radio Configuration 3, set the test parameters for Test 4 using the parameters as specified in Table 3.4.2.3-1 on the CDMA carrier and perform steps 16 and 17.

16. Use closed loop power control commands to adjust the CDMA transmit power, as measured at the mobile station antenna connector. If B1 is Band Class 3, set the ERP to a level higher than the minimum specified in Table 3.4.2.3-2 for the current test. If B1 is any other band class, use closed loop power control commands to adjust the access terminal transmit power, as measured at the access terminal antenna connector, to +20 dBm.

17. Count, at the base station, the number of CDMA frames transmitted and the number of good frames received at the mobile station.

18. Set the test parameters for Test 11 on the HRPD carrier as specified in Table 3.4.2.3-3 and perform steps 22 and 23. Repeat for Test 15, Test 17 and Test 19 using the parameters as specified in Table 3.4.2.3-3 and perform steps 22 and 23.

19. Set the test parameters for Test 12 on the HRPD carrier as specified in Table 3.4.2.3-3 and perform steps 22 and 23. Repeat for Test 16, Test 18 and Test 20 using the parameters as specified in Table 3.4.2.3-3 and perform steps 22 and 23.

20. If the access terminal is operating in Band Class 3, set the test parameters for Test 13 using the parameters as specified in Table 3.4.2.3-3 on the HRPD carrier and perform steps 22 and 23.

21. If the access terminal is operating in Band Class 3, set the test parameters for Test 14 using the parameters as specified in Table 3.4.2.3-3 on the HRPD carrier and perform steps 22 and 23.

22. Use closed loop power control commands to adjust the access terminal transmit power, as measured at the access terminal antenna connector. For Band Class 3, set the ERP to a level higher than the minimum specified in Table 3.4.2.3-2 for the current test. For all other band classes, use closed loop power control commands to adjust the access terminal transmit power, as measured at the access terminal antenna connector, to +20 dBm.

23. From the number of HRPD packets transmitted and the number of bad packets received calculate the PER for this test.

24. For an access terminal supporting HRPD Subtype 3 Physical Layer (multi-carrier capable) in B2 simultaneously with a CDMA carrier in B1, perform the additional steps 25 through 28. $\hat{I}_{or}$ refers to received power in each carrier in the following tests.

25. Set up a Test Application session. Open a connection and configure the Test Application FMCTAP (for Subtype 3 Physical Layer) so that two Forward Traffic Channels at the maximum channel separation (MaxForwardLinkBandwidthNoJammer)[5] are assigned to the AT on B2 and the rate corresponds to the 2-slot version of 307.2 kbps in each channel.

26. Set the test parameters for Test 21 as specified in Table 3.4.2.3-4 and perform steps 28 and 29.

27. Set the test parameters for Test 22 as specified in Table 3.4.2.3-4 and perform steps 28 and 29.

28. Use closed loop power control commands to adjust the access terminal transmit power, as measured at the access terminal antenna connector. When B2 is Band Class 3, set the ERP to a level higher than the minimum specified in Table 3.4.2.3-2 for the current test. When B2 is any other band class, use closed loop power control commands to adjust the access terminal transmit power, as measured at the access terminal antenna connector, to +20 dBm.

29. From the number of HRPD packets transmitted and the number of bad packets received calculate the PER for this test. The PER shall be calculated on a per carrier basis.

3.4.2.3 Minimum Standard

For CDMA: The FER in each test shall not exceed 1.0% with 95% confidence (see 6.6 of [4]).

For HRPD: The PER for each test shall not exceed 1.0% with 95% confidence (see 8.8 of [17]).

[5] See Section 8.9.7.1 in [1].

**Table 3.4.2.3-1. Test Parameters for CDMA carrier Single Tone Desensitization in B1**

| Parameter | | Units | Tests 1, 3, 5, 7, and 9 | Tests 2, 4, 6, 8, and 10 |
|---|---|---|---|---|
| Jammer Offset from Carrier | SR 1 | kHz | +1100 (Test 1, Band Groups 450 and 800, except BC 3)<br>+900 (Tests 1 and 3, BC 3)<br>+1250 (Test 1, BC 1, 4, 8, 14 and 15)<br>+5000 (Test 5)<br>+10000 (Test 7)<br>+900 (Test 9, BC 10) | -1100 (Test 2, Band Groups 450 and 800, except BC 3)<br>-900 (Tests 2 and 4, BC 3)<br>–1250 (Test 2, BC 1, 4, 8, 14 and 15)<br>-5000 (Test 5)<br>-10000 (Test 7)<br>-900 (Test 9, BC 10) |
| Jammer Power / Type | | dBm | -45 GMSK (Tests 1 and 2, except BC 3)<br>-30 CW (Tests 1 and 3, BC 3)<br>-40 CW (Tests 1 and 3, BC 3)<br>-38 GMSK (Tests 5 and 6)<br>-30 GMSK (Tests 7 and 8)<br>-50 GMSK (Tests 9 and 10) | |
| $\hat{I}_{or}$ | | dBm/ 1.23 MHz | -94 (Except BC 3)<br>-101 (BC 3) | |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | | dB | -7 | |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | | dB | -15.6 (SR 1) | |

**Table 3.4.2.3-2. Minimum Effective Radiated Power for CDMA carrier Single Tone Desensitization Test for B1 = Band Class 3 and for HRPD carrier Single Tone Desensitization Test for B2 = Band Class 3.**

| Mobile Station Class | Minimum Mobile Station ERP | |
|---|---|---|
| | **Tests 1 and 2**<br>**Tests 11 and 12**<br>**Tests 21 and 22** | **Tests 3 and 4**<br>**Tests 13 and 14** |
| I | -7 dBW (200 mW) | -2 dBW (630 mW) |
| II | -11 dBW (80 mW) | -6 dBW (250 mW) |
| III | -15 dBW (32 mW) | -10 dBW (100 mW) |

**Table 3.4.2.3-3. Test Parameters for HRPD carrier Single Tone Desensitization in B2**

| Parameter | Units | Tests 11, 13, 15, 17, and 19 | Tests 12, 14, 16, 18 and 20 |
|---|---|---|---|
| Jammer Offset from Carrier | kHz | +1100 (Test 11, Band Classes 0, 2, 5, 7, 9, 10, 11, and 12)<br>+900 (Tests 11 and 13, Band Class 3)<br>+1250 (Test 11, Band Classes 1, 4 and 8)<br>+5000 (Test 15)<br>+10000 (Test 17)<br>+900 (Test 19, Band Class 10) | -1100 (Test 12, Band Classes 0, 2, 5, 7, 9, 10, 11, and 12)<br>-900 (Tests 12 and 14, Band Class 3)<br>-1250 (Test 12, Band Classes 1, 4 and 8)<br>-5000 (Test 16)<br>-10000 (Test 18)<br>-900 (Test 20, Band Class 10) |
| Jammer Power / Type | dBm | -45 GMSK (Tests 1 and 2, except BC 3)<br>-30 CW (Tests 1 and 3, BC 3)<br>-40 CW (Tests 1 and 3, BC 3)<br>-38 GMSK (Tests 5 and 6)<br>-30 GMSK (Tests 7 and 8)<br>-50 GSMK (Tests 9 and 10) | |
| $\hat{I}_{or}$ | dBm/ 1.23 MHz | -95.4 (Except BC 3)<br>-102.4 (BC 3) | |

**Table 3.4.2.3-4. Test Parameters for HRPD carrier Single Tone Desensitization for Multi-carrier HRPD Operation (Subtype 3 Physical Layer)**

| Parameter | Units | Test 21 | Test 22 |
|---|---|---|---|
| Jammer Offset from Carrier | kHz | +1100 (Band Classes 0, 2, 5, 7, 9, 10, 11, and 12)<br>+900 (Band Class 3)<br>+1250 (Band Classes 1, 4 and 8) | -1100 (Band Classes 0, 2, 5, 7, 9, 10, 11, and 12)<br>-900 (Band Class 3)<br>-1250 (Band Classes 1, 4 and 8) |
| Jammer Power<br>(CW Tone for BC 3, GMSK for others) | dBm | -50 (Tests 21 and 22) | |
| $\hat{I}_{or}$ | dBm/ 1.23 MHz | -92.4 (Except Band Class 3)<br>-99.4 (Band Class 3) | |
| Number of active carriers | N/A | 2 | |
| Separation between the active carriers | MHz | MaxForwardLinkBandwidthNoJammer | |

# 4 PHYSICAL LAYER TRANSMITTER MINIMUM STANDARDS

## 4.1 Modulation Requirements for SB-CDMA-HRPD

### 4.1.1 Waveform Quality and Frequency Accuracy

#### 4.1.1.1 Definition

The waveform quality factor, $\rho_{Overall}$ (see 8.4.2.1 of [17] for HRPD) and correspondingly $\rho$ (see 6.4.2 of [4] for CDMA), are measured in this test. The measurement also returns values for $\Delta\hat{f}$ and $\hat{\tau}$, which are used to provide estimates of carrier frequency offset and transmit time offset, respectively. The waveform quality factor shall be measured on a per carrier basis.

#### 4.1.1.2 Method of Measurement

1. Connect the sector to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The AWGN generator and the CW generator are not applicable in this test.
2. For each band class that the access terminal supports, configure the access terminal to operate in that band class. Use a power control step size of 0.5dB for CDMA as well as HRPD carriers. Configure the access terminal to simultaneously perform a CDMA and a HRPD call with the two carriers at the closest possible frequency separation and perform steps 3 through 12.
3. Set up a HRPD Test Application session. Open a connection. For Subtype 0 or 1 Physical Layer, configure the Test Application RTAP so that the Reverse Data Channel rate corresponds to 9.6 kbps. For Subtype 2 Physical Layer, configure the Test Application RETAP so that the Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. For Subtype 3 Physical Layer, configure the Test Application RMCTAP so that the Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. Configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 Physical Layer) or FMCTAP (for Subtype 3 Physical Layer) so that the ACK Channel is transmitted at all the slots.
4. If the mobile station supports demodulation of Radio Configuration 1 or 2, set up a CDMA call using Fundamental Channel Test Mode 1 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 5 and 6.
5. Set the CDMA test parameters as specified below. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel.

| Parameter | Units | Value |
|---|---|---|
| $\hat{I}_{or}$ | dBm/1.23 MHz | -75 |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

6. Measure the CDMA waveform quality factor, ρ, frequency error, $\Delta\hat{f}$, and transmit time error, $\hat{\tau}$, at the mobile station antenna connector using the ρ-meter described in 6.4.2 of [4].
7. If the mobile station supports demodulation of Radio Configuration 3, 4, or 5, set up a CDMA call using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 9 through 12.
8. If the mobile station supports demodulation of Radio Configuration 6, 7, 8, or 9, set up a CDMA call using Fundamental Channel Test Mode 7 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 9 through 12.
9. Set the CDMA test parameters as specified below. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel.

| Parameter | Units | Value |
|---|---|---|
| $\hat{I}_{or}$ | dBm/1.23 MHz | -75 |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

10. Send a *Universal Handoff Direction Message* with a change to either the frame offset or the PN offset, using the rest of the following parameters, to the mobile station to force a hard handoff:

| Parameter | Value (Decimal) |
|---|---|
| USE_TIME | 1 (use action time) |
| EXTRA_PARMS | 1 |
| FRAME_OFFSET | may change |
| PILOT_PN | may change |
| NOM_PWR_EXT | 0 (0 dB correction) |
| NOM_PWR | 0 (0 dB correction) |
| NUM_PREAMBLE | 7 (20 ms preamble) |
| BAND_CLASS | same as current |
| CDMA_FREQ | same as current |

11. Measure the CDMA waveform quality factor, $\rho$, frequency error, $\Delta\hat{f}$, and transmit time error, $\hat{\tau}$, at the mobile station antenna connector using the $\rho$-meter described in 6.4.2 of [4] on the preamble following the explicit action time of the *Universal Handoff Direction Message*.
12. Measure the HRPD waveform quality factor, $\rho_{Overall}$, frequency error, $\Delta\hat{f}$, and transmit time error, $\hat{\tau}$, at the access terminal antenna connector using the $\rho$-meter described in 8.4.2 of [17].

4.1.1.3 Minimum Standard

The waveform quality factor, $\rho$ for each CDMA carrier and $\rho_{Overall}$ for each HRPD carrier, shall be greater than 0.933 (excess power is less than 0.30 dB). The frequency error, $\Delta\hat{f}$, shall be within ±300 Hz while transmitting in Band Groups 450 and 800. The frequency error, $\Delta\hat{f}$, shall be within ±150 Hz while transmitting in Band Group 1900. The transmit time error, $\hat{\tau}$, shall be within ±1 μs.

## 4.2 Modulation Requirements for DB-CDMA-HRPD

4.2.1 Waveform Quality and Frequency Accuracy

4.2.1.1 Definition

The waveform quality factor, $\rho_{Overall}$ (see 8.4.2.1 of [17] for HRPD) and correspondingly $\rho$ (see 6.4.2 of [4] for CDMA), are measured in this test. The measurement also returns values for $\Delta\hat{f}$ and $\hat{\tau}$, which are used to provide estimates of carrier frequency offset and transmit time offset, respectively. The waveform quality factor shall be measured on a per carrier basis.

4.2.1.2 Method of Measurement

1. Connect the sector to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The AWGN generator and the CW generator are not applicable in this test.

2. For all band class combinations supported by the access terminal, configure the access terminal to operate with that band class combination, where B1 is the CDMA band class and B2 is the HRPD band class.
3. Perform steps 4 through 12 if the access terminal can simultaneously support a single CDMA carrier in B1 and no more than one HRPD carrier in B2.
4. Perform steps 13 through 16 if the access terminal can simultaneously support a single CDMA carrier in B1 and two or more HRPD carriers in B2.
5. Configure the access terminal to transmit on a single CDMA carrier in B1, and on a single HRPD carrier in B2. Perform steps 6 through 12.
6. Set up a HRPD Test Application session in B2. Open a connection. For Subtype 0 or 1 Physical Layer, configure the Test Application RTAP so that the Reverse Data Channel rate corresponds to 9.6 kbps. For Subtype 2 Physical Layer, configure the Test Application RETAP so that the Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. For Subtype 3 Physical Layer, configure the Test Application RMCTAP so that the Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. Configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 Physical Layer) so that the ACK Channel is transmitted at all the slots.
7. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the HRPD carrier.
8. If the mobile station supports demodulation of Radio Configuration 3 or 4, set up a CDMA call in B1 using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 9 through 12.
9. Set the CDMA test parameters as specified below.

| **Parameter** | **Units** | **Value** |
|---|---|---|
| $\hat{I}_{or}$ | dBm/1.23 MHz | -75 |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

10. Send a *Universal Handoff Direction Message* with a change to either the frame offset or the PN offset, using the rest of the following parameters, to the mobile station to force a hard handoff:

| Parameter | Value (Decimal) |
|---|---|
| USE_TIME | 1 (use action time) |
| EXTRA_PARMS | 1 |
| FRAME_OFFSET | may change |
| PILOT_PN | may change |
| NOM_PWR_EXT | 0 (0 dB correction) |
| NOM_PWR | 0 (0 dB correction) |
| NUM_PREAMBLE | 7 (20 ms preamble) |
| BAND_CLASS | same as current |
| CDMA_FREQ | same as current |

11. Measure the CDMA waveform quality factor, $\rho$, frequency error, $\Delta\hat{f}$, and transmit time error, $\hat{\tau}$, at the mobile station antenna connector using the $\rho$-meter described in 6.4.2 of [4] on the preamble following the explicit action time of the *Universal Handoff Direction Message*.

12. Measure the HRPD waveform quality factor, $\rho_{Overall}$, frequency error, $\Delta\hat{f}$, and transmit time error, $\hat{\tau}$, at the access terminal antenna connector using the $\rho$-meter described in 8.4.2 of [17].

13. Configure the access terminal to transmit on a single CDMA carrier in B1, and on two HRPD carriers at the closest possible frequency separation between them in B2. Perform steps 14 through 16.

14. Set up a HRPD Test Application session for Subtype 3 Physical Layer in B2. Open a connection. Configure the Test Application RMCTAP so that the Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. Configure the Test Application FMCTAP (for Subtype 3 Physical Layer) so that the ACK Channel is transmitted at all the slots.

15. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for both HRPD carriers.

16. Repeat steps 8 through 12.

4.2.1.3 Minimum Standard

The waveform quality factor, $\rho$, for each CDMA carrier shall be greater than 0.944 (excess power is less than 0.25 dB). The waveform quality factor, $\rho_{Overall}$, for each HRPD carrier, shall be greater than 0.944 (excess power is less than 0.25 dB) if the test is performed with a single HRPD carrier in its band class (B2). The waveform quality factor, $\rho_{Overall}$, for each HRPD carrier, shall be greater than 0.933 (excess power is less than 0.30 dB) if the test is performed on two HRPD carriers at the closest possible frequency separation between them in the same band class (B2). The frequency error, $\Delta\hat{f}$, shall be within ±300 Hz while transmitting in Band Groups 450 and 800. The frequency error, $\Delta\hat{f}$, shall be within ±150 Hz while transmitting in Band Group 1900. The transmit time error, $\hat{\tau}$, shall be within ±1 μs.

## 4.3 RF Output Power Requirements for SB-CDMA-HRPD

### 4.3.1 Maximum RF Output Power

#### 4.3.1.1 Definition

The maximum radiated RF output power is determined by the measurement of the maximum power that the access terminal transmits as measured at the access terminal antenna connector plus the antenna gain recommended by the access terminal manufacturer. The antenna gain is determined by using the Radiated Signal Measurement Procedures (see 2.6) and calculating the antenna gain for EIRP or ERP as appropriate.

#### 4.3.1.2 Method of Measurement

1. Set the following parameters of the HRPD *AccessParameters Message* as specified below:

| Parameter | Value (Decimal) |
|---|---|
| OpenLoopAdjust | 81 (-81 dB) for BC 0, 2, 3, 5, 7, 9, 10, 11, and 12<br>84 (-84 dB) for BC 1, 4, 6, and 8 |
| ProbeInitialAdjust | 15 (15 dB) |
| PowerStep | 15 (7.5 dB/step) |

2. Connect the sector to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The AWGN generator and the CW generator are not applicable in this test. Connect a spectrum analyzer (or other suitable test equipment) to the access terminal antenna connector. Use a power control step size of 0.5dB for CDMA as well as HRPD carriers.
3. For each band class that the access terminal supports, configure the access terminal to operate in that band class. Configure the access terminal to simultaneously perform a CDMA call and the maximum number of HRPD calls supported by the device. For this test, the HRPD carriers are all adjacent to one another and adjacent to the single CDMA carrier with a spacing of 1.23 MHz (for Band Class 0) and 1.25 MHz (for all other Band Classes) between the center frequencies.
4. Perform step 5 using the HRPD Physical Layer Subtype (Subtype 0, 1, 2 or 3) supported by the access terminal.
5. Set up a Test Application session. Open each HRPD connection. For Subtype 0 or 1 Physical Layer, configure the Test Application RTAP so that the Reverse Data Channel rate corresponds to 153.6 kbps. For Subtype 2 or Subtype 3 Physical Layer, configure the Test Application RETAP so that the Reverse Data Channel payload size corresponds to 4096 bits with Termination Target of 4 sub-packets. Configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 or Subtype 3 Physical Layer) so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the ACK Channel is transmitted at all the

slots. Set RAB to '0' at all times. If there are multiple HRPD calls, set up a Test Application session for Subtype 3 Physical Layer. Configure the Test Application RMCTAP so that the Reverse Data Channel payload size corresponds to 4096 bits with Termination Target of 16 slots. Configure the Test Application FMCTAP (for Subtype 3 Physical Layer) so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the ACK Channel is transmitted at all the slots.

6. If the mobile station supports Reverse Traffic Channel Radio Configuration 1 and Forward Traffic Channel Radio Configuration 1 during an CDMA-HRPD call, then set up a CDMA call using Fundamental Channel Test Mode 1 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 12 through 16.

7. If the mobile station supports the Radio Configuration 3 Reverse Fundamental Channel and demodulation of Radio Configuration 3, 4, or 5 during an CDMA-HRPD call, then set up a CDMA call using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 12 through 16.

8. If the mobile station supports the Radio Configuration 3 Reverse Dedicated Control Channel and demodulation of Radio Configuration 3, 4, or 5 during an CDMA-HRPD call, then set up a CDMA call using Dedicated Control Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate and 100% frame activity and perform steps 12 through 16.

9. If the mobile station supports the Radio Configuration 5 Reverse Fundamental Channel and demodulation of Radio Configuration 6, 7, 8, or 9 during an CDMA-HRPD call, then set up a CDMA call using Fundamental Channel Test Mode 7 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 12 through 16.

10. If the mobile station supports the Radio Configuration 5 Reverse Dedicated Control Channel and demodulation of Radio Configuration 6, 7, 8, or 9 during an CDMA-HRPD call, then set up a CDMA call using Dedicated Control Channel Test Mode 7 (see 1.3 of [4]) with 9600 bps data rate and 100% frame activity and perform steps 12 through 16.

11. If the mobile station supports the Radio Configuration 5 Reverse Fundamental Channel, Radio Configuration 5 Reverse Dedicated Control Channel and demodulation of Radio Configuration 6, 7, 8, or 9 during an CDMA-HRPD call, then set up a CDMA call using Fundamental Channel Test Mode 7 (see 1.3 of [4]) with 1500 bps Fundamental Channel data rate only and 9600 bps Dedicated Control Channel with 100% frame activity, and perform steps 12 through 16.

12. Set the test parameters for the CDMA channel as specified in Table 4.3.1.3-1.

13. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for for the CDMA channel.

14. Send continuously alternate '0' and '1' power control bits to the access terminal on the CDMA carrier, and send continuously '0' power control bits to the access terminal on each HRPD carrier and measure the total transmitted power at the access

terminal until it becomes stable. For this test, denote this stable transmitted power value MaxAccessTerminalTxPower (in dBm).

15. Manually set the transmitted power on each CDMA and HRPD channel to MaxAccessTerminalTxPower – 10 × $\log_{10}$(N) – Backoff, where N is the number of simultaneously active CDMA as well as HRPD carriers. Here, manual setting of the transmitted power implies using reverse power control commands to maintain the transmitted power close to a specified target. The difference between the target transmitted power and the actual or measured transmitted power shall not exceed the power control step size.

16. Measure the mean access terminal output power at the access terminal antenna connector.

4.3.1.3 Minimum Standard

The maximum output power (of all active carriers) of each access terminal class shall be such that the maximum radiated power for the access terminal class using the antenna gain recommended by the access terminal manufacturer is within the limits specified in Table 4.3.1.3-2 less transmit power backoff of 3.3 dB. The antenna gain is determined using the Radiated Signal Measurement Procedures (see 2.6 of [17]) and calculating the antenna gain for EIRP or ERP as appropriate.

**Table 4.3.1.3-1. Test Parameters for Maximum RF Output Power with a Single Traffic Code Channel, Spreading Rate 1**

| **Parameter** | **Units** | **Value** |
|---|---|---|
| $\hat{I}_{or}$ | dBm/1.23 MHz | -104 |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

**Table 4.3.1.3-2. Effective Radiated Power at Maximum Output Power**

| Band Class | Access Terminal Class | Radiating Measurement | Lower Limit | Upper Limit |
|---|---|---|---|---|
| 0, 3, 9, and 12 | Class I | ERP | 1 dBW (1.25 W) | 8 dBW (6.3 W) |
| | Class II | ERP | -3 dBW (0.5 W) | 4 dBW (2.5 W) |
| | Class III | ERP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |
| 1, 4 and 8 | Class I | EIRP | -2 dBW (0.63 W) | 3 dBW (2.0 W) |
| | Class II | EIRP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |
| | Class III | EIRP | -12 dBW (63 mW) | -3 dBW (0.5 W) |
| | Class IV | EIRP | -17 dBW (20 mW) | -6 dBW (0.25 W) |
| | Class V | EIRP | -22 dBW (6.3 mW) | -9 dBW (0.13 W) |
| 6 (outside Japan) | Class I | EIRP | -2 dBW (0.63 W) | 3 dBW (2.0 W) |
| | Class II | EIRP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |
| | Class III | EIRP | -12 dBW (63 mW) | -3 dBW (0.5 W) |
| | Class IV | EIRP | -17 dBW (20 mW) | -6 dBW (0.25 W) |
| | Class V | EIRP | -22 dBW (6.3 mW) | -9 dBW (0.13 W) |
| 6 (in Japan) | Class I and II | EIRP | -10 dBW (0.1 W) | -6 dBW (0.25 W) |
| | Class III | EIRP | -12 dBW (63 mW) | -6 dBW (0.25 W) |
| | Class IV | EIRP | -17 dBW (20 mW) | -6 dBW (0.25 W) |
| | Class V | EIRP | -22 dBW (6.3 mW) | -9 dBW (0.13 W) |
| 2 | Class II | ERP | 1 dBW (1.25 W) | 8 dBW (6.3 W) |
| | Class III | ERP | -3 dBW (0.5 W) | 4 dBW (2.5 W) |
| | Class IV | ERP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |
| 5 and 11 | Class I | ERP | 3 dBW (2.0 W) | 10 dBW (10 W) |
| | Class II | ERP | -2 dBW (0.63 W) | 5 dBW (3.2 W) |
| | Class III | ERP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |
| | Class IV | ERP | -12 dBW (63 mW) | -5 dBW (320 mW) |
| 7 and 10 | Class I | ERP | -3 dBW (0.5 W) | 4 dBW (2.5 W) |
| | Class II | ERP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |

For Band Classes 0 and 3, the lower limit of the Effective Radiated Power at Maximum Output Power specified in Table 4.3.1.3-2 shall not apply to access terminals operated in Japan specifically used for fixed telemetry services. The mobile station should use country code information in the SectorParameter messages to determine correct ERP when it is used for fixed telemetry service.

For Band Class 6 operation, the access terminal should use country code information in the SectorParameters message to determine the correct maximum radiated power allowed.

## 4.4 RF Output Power Requirements for DB-CDMA-HRPD

### 4.4.1 Maximum RF Output Power

#### 4.4.1.1 Definition

The maximum radiated RF output power is determined by the measurement of the maximum power that the access terminal transmits as measured at the access terminal antenna connector plus the antenna gain recommended by the access terminal manufacturer. The antenna gain is determined by using the Radiated Signal Measurement Procedures (see 2.6 of [17]) and calculating the antenna gain for EIRP or ERP as appropriate. The power measurements are performed on a per-band class basis.

#### 4.4.1.2 Method of Measurement

1. Set the following parameters of the HRPD *AccessParameters Message* as specified below:

| Parameter | Value (Decimal) |
|---|---|
| OpenLoopAdjust | 81 (-81 dB) for BC 0, 2, 3, 5, 7, 9, 10, 11, and 12<br>84 (-84 dB) for BC 1, 4, 6, and 8 |
| ProbeInitialAdjust | 15 (15 dB) |
| PowerStep | 15 (7.5 dB/step) |

2. Connect the sector to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The AWGN generator and the CW generator are not applicable in this test.
3. For all band class combinations supported by the access terminal, configure the access terminal to operate with that band class combination, where B1 is the CDMA band class and B2 is the HRPD band class.
4. Perform steps 6 through 13 if the access terminal can support a single CDMA carrier in B1 and a single HRPD carrier in B2.
5. Perform steps 14 through 19 if the access terminal can simultaneously support a single CDMA carrier in B1 and two or more HRPD carriers in B2.
6. Configure the access terminal to transmit on a single CDMA carrier in B1, and on a single HRPD carrier in B2. Perform step 7 for the HRPD call. Perform step 8 for the CDMA call.
7. Set up a Test Application session. Open a HRPD connection. For Subtype 0 or 1 Physical Layer, configure the Test Application RTAP so that the Reverse Data Channel rate corresponds to 153.6 kbps. For Subtype 2 or Subtype 3 Physical

Layer, configure the Test Application RETAP so that the Reverse Data Channel payload size corresponds to 4096 bits with Termination Target of 4 sub-packets. Configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 or Subtype 3 Physical Layer) so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the ACK Channel is transmitted at all the slots. Set RAB to '0' at all times.

8. If the mobile station supports the Radio Configuration 3 Reverse Fundamental Channel and demodulation of Radio Configuration 3 or 4 during a CDMA-HRPD call, then set up a CDMA call using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 9 and 10.

9. Set the test parameters for the CDMA channel as specified in Table 4.4.1.2-1.

10. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the CDMA channel.

11. Set the transmitted power on the CDMA carrier to $L_{B1}$ - 3dB, where $L_{B1}$ is the lower limit on the maximum RF output power in B1 for the mobile station class in question (see Table 4.4.1.3-1).

12. Send continuously '0' power control bits to the access terminal on each HRPD carrier and measure the total transmitted power at the access terminal in each band class.

13. Measure the mean access terminal output power for each band class at the access terminal antenna connector. (Test 1).

14. Configure the access terminal to transmit on a single CDMA carrier in B1, and on the maximum number of adjacent reverse HRPD channels that the access terminal can support in B2, with the HRPD channels at a spacing of 1.23 MHz (for Band Class 0) and 1.25 MHz (for all other Band Classes) between the center frequencies. Perform step 15 for the HRPD calls.

15. Set up a Test Application session for Subtype 3 Physical Layer. Configure the Test Application RMCTAP so that the Reverse Data Channel payload size corresponds to 4096 bits with Termination Target of 4 sub-packets. Configure the Test Application FMCTAP (for Subtype 3 Physical Layer) so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the ACK Channel is transmitted at all the slots.

16. Perform step 8 for the CDMA call.

17. Set the transmitted power on the CDMA carrier to $L_{B1}$ - 3dB, where $L_{B1}$ is the lower limit on the maximum RF output power in B1 for the mobile station class in question, and $Backoff_{B1}$ is the recommended maximum RF power backoff for B1 (see Table 4.4.1.3-1).

18. Send continuously '0' power control bits to the access terminal on each HRPD carrier and measure the total transmitted power at the access terminal on each band class until it becomes stable.

19. Measure the mean access terminal output power for each band class at the access terminal antenna connector (Test 2).

**Table 4.4.1.2-1. Test Parameters for CDMA channel**

| Parameter | Units | Value |
|---|---|---|
| $\bar{I}_{or}$ | dBm/1.23 MHz | -75 |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

4.4.1.3 Minimum Standard

To describe the minimum standard, we define the following notation. Let the mean access terminal output power in band classes B1 and B2 be $P_{B1}$ and $P_{B2}$ respectively (in dBm). Also, let the lower and upper limits on the maximum RF output power for the access terminal class in question be $L_{B1}$ and $U_{B1}$ respectively (in dBm) for band class B1, and $L_{B2}$ and $U_{B2}$ respectively (in dBm) for band class B2. These lower and upper limits on maximum RF output power are specified in Table 4.4.1.3-1.

For Test 1, the maximum output power of each access terminal class shall satisfy the following condition (lower bound):

1. $10^{(0.1 \times (P_{B1} - L_{B1}))} + 10^{(0.1 \times (P_{B2} - L_{B2}))} > 1$,

and shall satisfy *all* of the following conditions (upper bound):

1. $P_{B1} \le U_{B1}$,
2. $P_{B2} \le U_{B2}$,

For Test 2, the maximum output power of each access terminal class shall satisfy *at least one* of the following conditions (lower bound):

1. $P_{B1} \ge L_{B1} - \text{Backoff}$,
2. $P_{B2} \ge L_{B2} - \text{Backoff}$,
3. $10^{(0.1 \times (P_{B1} - L_{B1} + \text{Backoff}))} + 10^{(0.1 \times (P_{B2} - L_{B2} + \text{Backoff}))} > 1$,

where Backoff = 3.3dB if there are multiple carriers in the band class in question and 0dB if there is only a single carrier in the band class, and shall satisfy *all* of the following conditions (upper bound):

1. $P_{B1} \le U_{B1}$,
2. $P_{B2} \le U_{B2}$.

The antenna gain is determined using the Radiated Signal Measurement Procedures (see 2.6 of [17]) and calculating the antenna gain for EIRP or ERP as appropriate.

**Table 4.4.1.3-1. Effective Radiated Power at Maximum Output Power**

| Band Class | Access Terminal Class | Radiating Measurement | Lower Limit | Upper Limit |
|---|---|---|---|---|
| 0, 3, 9, and 12 | Class I | ERP | 1 dBW (1.25 W) | 8 dBW (6.3 W) |
| | Class II | ERP | -3 dBW (0.5 W) | 4 dBW (2.5 W) |
| | Class III | ERP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |
| 1, 4 and 8 | Class I | EIRP | -2 dBW (0.63 W) | 3 dBW (2.0 W) |
| | Class II | EIRP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |
| | Class III | EIRP | -12 dBW (63 mW) | -3 dBW (0.5 W) |
| | Class IV | EIRP | -17 dBW (20 mW) | -6 dBW (0.25 W) |
| | Class V | EIRP | -22 dBW (6.3 mW) | -9 dBW (0.13 W) |
| 6 (outside Japan) | Class I | EIRP | -2 dBW (0.63 W) | 3 dBW (2.0 W) |
| | Class II | EIRP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |
| | Class III | EIRP | -12 dBW (63 mW) | -3 dBW (0.5 W) |
| | Class IV | EIRP | -17 dBW (20 mW) | -6 dBW (0.25 W) |
| | Class V | EIRP | -22 dBW (6.3 mW) | -9 dBW (0.13 W) |
| 6 (in Japan) | Class I and II | EIRP | -10 dBW (0.1 W) | -6 dBW (0.25 W) |
| | Class III | EIRP | -12 dBW (63 mW) | -6 dBW (0.25 W) |
| | Class IV | EIRP | -17 dBW (20 mW) | -6 dBW (0.25 W) |
| | Class V | EIRP | -22 dBW (6.3 mW) | -9 dBW (0.13 W) |
| 2 | Class II | ERP | 1 dBW (1.25 W) | 8 dBW (6.3 W) |
| | Class III | ERP | -3 dBW (0.5 W) | 4 dBW (2.5 W) |
| | Class IV | ERP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |
| 5 and 11 | Class I | ERP | 3 dBW (2.0 W) | 10 dBW (10 W) |
| | Class II | ERP | -2 dBW (0.63 W) | 5 dBW (3.2 W) |
| | Class III | ERP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |
| | Class IV | ERP | -12 dBW (63 mW) | -5 dBW (320 mW) |
| 7 and 10 | Class I | ERP | -3 dBW (0.5 W) | 4 dBW (2.5 W) |
| | Class II | ERP | -7 dBW (0.2 W) | 0 dBW (1.0 W) |

For Band Classes 0 and 3, the lower limit of the Effective Radiated Power at Maximum Output Power specified in Table 4.3.1.3-2 shall not apply to access terminals operated in Japan specifically used for fixed telemetry services. The mobile station should use country code information in the SectorParameter messages to determine correct ERP when it is used for fixed telemetry service.

For Band Class 6 operation, the access terminal should use country code information in the SectorParameters message to determine the correct maximum radiated power allowed.

## 4.5 Limitations on Emissions for SB-CDMA-HRPD

### 4.5.1 Conducted Spurious Emissions

#### 4.5.1.1 Definition

Conducted spurious emissions are emissions at frequencies that are outside the assigned CDMA and HRPD Channels, measured at the access terminal antenna connector. This test measures the spurious emissions during continuous transmission.

#### 4.5.1.2 Method of Measurement

1. Set the following parameters of the HRPD *AccessParameters Message* as specified below:

| Parameter | Value (Decimal) |
|---|---|
| OpenLoopAdjust | 81 (-81 dB) for BC 0, 2, 3, 5, 7, 9, 10, 11, and 12<br>84 (-84 dB) for BC 1, 4, 6, and 8 |
| ProbeInitialAdjust | 15 (15 dB) |
| PowerStep | 15 (7.5 dB/step) |

2. Connect the sector to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The AWGN generator and the CW generator are not applicable in this test. Connect a spectrum analyzer (or other suitable test equipment) to the access terminal antenna connector.
3. For each band class that the access terminal supports, configure the access terminal to operate in that band class. Use a power control step size of 0.5dB for CDMA as well as HRPD carriers. Configure the access terminal to simultaneously perform a CDMA and a HRPD call with the two carriers at the maximum carrier separation supported by the device. The maximum carrier separation should be at least 2.46MHz.
4. Perform step 5 using the HRPD Physical Layer Subtype (Subtype 0, 1, 2 or 3) supported by the access terminal.
5. Set up a Test Application session. Open an HRPD connection. For Subtype 0 or 1 Physical Layer, configure the Test Application RTAP so that the Reverse Data Channel rate corresponds to 153.6 kbps. For Subtype 2 or Subtype 3 Physical Layer, configure the Test Application RETAP so that the Reverse Data Channel payload size corresponds to 4096 bits with Termination Target of 4 sub-packets. Configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 or

Subtype 3 Physical Layer) so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the ACK Channel is transmitted at all the slots. Set RAB to '0' at all times.

6. If the mobile station supports Reverse Traffic Channel Radio Configuration 1 and Forward Traffic Channel Radio Configuration 1 during an CDMA-HRPD call, then set up a CDMA call using Fundamental Channel Test Mode 1 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 12 through 16.

7. If the mobile station supports the Radio Configuration 3 Reverse Fundamental Channel and demodulation of Radio Configuration 3, 4, or 5 during an CDMA-HRPD call, then set up a CDMA call using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 12 through 16.

8. If the mobile station supports the Radio Configuration 3 Reverse Dedicated Control Channel and demodulation of Radio Configuration 3, 4, or 5 during an CDMA-HRPD call, then set up a CDMA call using Dedicated Control Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate and 100% frame activity and perform steps 12 through 16.

9. If the mobile station supports the Radio Configuration 5 Reverse Fundamental Channel and demodulation of Radio Configuration 6, 7, 8, or 9 during an CDMA-HRPD call, then set up a CDMA call using Fundamental Channel Test Mode 7 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 12 through 16.

10. If the mobile station supports the Radio Configuration 5 Reverse Dedicated Control Channel and demodulation of Radio Configuration 6, 7, 8, or 9 during an CDMA-HRPD call, then set up a CDMA call using Dedicated Control Channel Test Mode 7 (see 1.3 of [4]) with 9600 bps data rate and 100% frame activity and perform steps 12 through 16.

11. If the mobile station supports the Radio Configuration 5 Reverse Fundamental Channel, Radio Configuration 5 Reverse Dedicated Control Channel and demodulation of Radio Configuration 6, 7, 8, or 9 during an CDMA-HRPD call, then set up a CDMA call using Fundamental Channel Test Mode 7 (see 1.3 of [4]) with 1500 bps Fundamental Channel data rate only and 9600 bps Dedicated Control Channel with 100% frame activity, and perform steps 12 through 16.

12. Set the test parameters for the CDMA channel as specified in Table 4.5.1.2-1.

13. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the CDMA channel.

14. Send continuously alternate '0' and '1' power control bits to the access terminal on the CDMA carrier, and send continuously '0' power control bits to the access terminal on each HRPD carrier and measure the total transmitted power at the access terminal until it becomes stable. For this test, denote this stable transmitted power value MaxAccessTerminalTxPower (in dBm).

15. Manually set the transmitted power on each CDMA and HRPD channel to MaxAccessTerminalTxPower – $10 \times \log_{10}(N)$, where N is the number of simultaneously active CDMA as well as HRPD carriers. Here, manual setting of the transmitted power

implies using reverse power control commands to maintain the transmitted power close to a specified target. The difference between the target transmitted power and the actual or measured transmitted power shall not exceed the power control step size.

16. Measure the spurious emission levels for all CDMA and HRPD carriers. (Test 1)

17. Configure the access terminal to simultaneously perform a CDMA call and the maximum number of HRPD calls supported by the device. For this test, the HRPD carriers are all adjacent to one another and adjacent to the single CDMA carrier with a spacing of 1.23 MHz (for Band Class 0) and 1.25 MHz (for all other Band Classes) between the center frequencies.

18. Repeat step 5 if there is a single HRPD carrier. If there are multiple HRPD carriers, set up a Test Application session for Subtype 3 Physical Layer. Configure the Test Application RMCTAP so that the Reverse Data Channel payload size corresponds to 4096 bits with Termination Target of 16 slots. Configure the Test Application FMCTAP (for Subtype 3 Physical Layer) so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the ACK Channel is transmitted at all the slots.

19. For the CDMA carrier, repeat steps 6 Through 11. (Test 2)

**Table 4.5.1.2-1. Test Parameters for Testing Spurious Emissions with a Single Traffic Code Channel at Maximum RF Output Power**

| Parameter | Units | Value |
|---|---|---|
| $\hat{I}_{or}$ | dBm/1.23 MHz | -75 |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

4.5.1.3 Minimum Standard

The spurious emissions in the mobile station's receive band shall be less than -76 dBm measured in a 1 MHz resolution bandwidth for band classes 0, 1, 2, 4, 5, 6, 7, 8, 9, 10, 11 and 12. For band class 3, the spurious emissions in the mobile station's receive band shall be less than -81 dBm measured in a 1 MHz resolution bandwidth. Throughout this section, 'reverse CDMA channel' refers to the reverse CDMA channel of both CDMA and HRPD technologies.

Test 1

When transmitting in Band Classes 0, 2, 3, 5, 7, 9, 10, 11 or 12, the spurious emissions with ten or more averages shall be less than the limits specified in Table 4.5.1.3-1.

**Table 4.5.1.3-1. Band Classes 0, 2, 3, 5, 7, 9, 10, 11, and 12 Transmitter Spurious Emission Limits for Test 1**

| For \|Δf\| Within the Range | Emission Limit |
|---|---|
| 885 kHz to 1.885 MHz | 6 dBm / 1 MHz |
| > 1.885 MHz | -13 dBm / 1 MHz |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on |Δf| where Δf is measured as the frequency offset from the center frequency of each reverse CDMA channel.

Emission Limits shall apply between the reverse CDMA channels when the maximum frequency separation (denoted MaxCarrierSeparation[6], measured from carrier to carrier, and specified in MHz for this test), MaxCarrierSeparation ≥ 4 × 1.23 MHz.

When transmitting in Band Classes 1, 4, 6, or 8, the spurious emissions with ten or more averages shall be less than the limits specified in Table 4.5.1.3-2.

**Table 4.5.1.3-2. Band Classes 1, 4, 6, and 8 Transmitter Spurious Emission Limits for Test 1**

| For \|Δf\| Within the Range | Emission Limit |
|---|---|
| 1.25 MHz to 2.25 MHz | 6 dBm / 1 MHz |
| 2.25 MHz to 3.5 × Ns MHz | -13 dBm / 1 MHz |
| > 3.5 × Ns MHz (ITU Category B) | -36 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-36 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-36 dBm / 100 KHz; 30 MHz < f < 1 GHz<br>-30 dBm / 1 MHz; 1 GHz < f < 12.75 GHz |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on |Δf| where Δf is measured as the frequency offset from the center frequency of each channel.

Except for ITU Category B, emission limits shall apply between the carriers when MaxCarrierSeparation ≥ 4 × 1.25 MHz.

Ns = MaxCarrierSeparation is the maximum separation between carriers in MHz.

ITU Category B limit is intended to apply only to Band Classes 6 and 8.

A single exception will be allowed for spurious emission frequencies between the two reverse CDMA channels (for both Table 4.5.1.3-1 and Table 4.5.1.3-2).

Test 2

[6] MaxCarrierSeparation is not an air interface parameter.

For adjacent reverse CDMA channels, the spurious emissions with ten or more averages shall be less than the limits specified in Table 4.5.1.3-3 and Table 4.5.1.3-4.

**Table 4.5.1.3-3. Adjacent Multi-carrier Transmitter Spurious Emission Limits for Number of adjacent reverse CDMA channels, N = 3**

| For $\|\Delta f\|$ Within the Range | Emission Limit |
|---|---|
| 2.5 MHz to 2.7 MHz | -14 dBm / 30 kHz |
| 2.7 MHz to 3.5 MHz | -[14 + 15 × ($\Delta f$ – 2.7 MHz)] dBm / 30 kHz |
| 3.08 MHz (Band Class 6 only) | -33 dBc / 3.84 MHz |
| 3.5 MHz to 7.5 MHz | -[13 + 1 × ($\Delta f$ – 3.5 MHz)] dBm / 1 MHz |
| 7.5 MHz to 8.5 MHz | -[17 + 10 × ($\Delta f$ – 7.5 MHz)] dBm / 1 MHz |
| 8.08 MHz (Band Class 6 only) | -43 dBc / 3.84 MHz |
| 8.5 MHz to 12.5 MHz | -27 dBm / 1 MHz |
| > 12.5 MHz (ITU Category A) | -13 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-13 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-13 dBm/100 kHz; 30 MHz < f < 1 GHz<br>-13 dBm / 1 MHz; 1 GHz < f < 5 GHz |
| > 12.5 MHz (ITU Category B) | -36 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-36 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-36 dBm/100 kHz; 30 MHz < f < 1 GHz<br>-30 dBm / 1 MHz; 1 GHz < f < 12.75 GHz |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on $|\Delta f|$ where $\Delta f$ = center frequency of the middle reverse CDMA channel- closer measurement edge frequency (f). The requirements at offsets of 3.08 and 8.08 MHz are equivalent to ACLR requirements of 33 and 43 dB from a Spreading Rate 3 mobile station transmitter into a Spreading Rate 3 or IMT-DS mobile station receiver offset by 5 and 10 MHz respectively. ITU Category B is intended to apply to only Band Class 6, 8, 9, 11 and 12.

**Table 4.5.1.3-4. Adjacent Multi-carrier Transmitter Spurious Emission Limits for Number of adjacent reverse CDMA channels, N≠ 3**

| For \|Δf\| Within the Range | Emission Limit |
|---|---|
| 2.5 + Δ MHz to 3.5 + Δ MHz | -13 dBm / (12.5 kHz × N) kHz |
| 3.5 + Δ MHz to 3.125 × (N + 1) MHz | -13 dBm / 1 MHz |
| > 3.125 × (N + 1) MHz (ITU Category A) | -13 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-13 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-13 dBm /100 kHz; 30 MHz < f < 1 GHz<br>-13 dBm / 1 MHz; 1 GHz < f < 5 GHz |
| > 3.125 × (N + 1) MHz (ITU Category B) | -36 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-36 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-36 dBm /100 kHz; 30 MHz < f < 1 GHz<br>-30 dBm / 1 MHz; 1 GHz < f < 12.75 GHz |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on |Δf| where Δf = center frequency - closer measurement edge frequency (f). ITU Category B is intended to apply to only Band Class 6, 8, 9, 11 and 12. Δ = (N – 3) × 625 kHz, where N is the number of carriers (N ≥ 2).

Current region-specific radio regulation rules shall also apply.

4.5.2 Occupied Bandwidth

This test is applicable to Band Class 0 Band Subclasses 2 and 3, Band Class 3 and Band Class 6 mobile stations only.

4.5.2.1 Definition

The occupied bandwidth is defined as the frequency range, whereby the power of emissions averaged over the frequency above and under the edge frequency are 0.5 % each of the total radiation power of a modulated carrier.

4.5.2.2 Method of Measurement

1. Connect the HRPD access network(s) and the CDMA base station to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The AWGN generator and the CW generator are not applicable in this test. Connect a spectrum analyzer to the access terminal antenna connector. Use a power control step size of 0.5dB for CDMA as well as HRPD carriers.
2. Configure the access terminal to transmit on one CDMA and one HRPD reverse carrier with the maximum possible frequency separation supported by the device between carriers. The maximum carrier separation should be at least 2.46MHz.

3. If the mobile station supports demodulation of Radio Configuration 1, 2, 3, 4, or 5, set up a CDMA call using Fundamental Channel Test Mode 1 or 3 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 5 through 10.

4. If the mobile station supports Band Class 6 and demodulation of Radio Configuration 6, 7, 8, or 9, set up a CDMA call using Fundamental Channel Test Mode 7 or Control Channel Test Mode 7 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 5 through 10.

5. Set up a HRPD Test Application session. Open a connection. For Subtype 0 or 1 Physical Layer, configure the Test Application RTAP so that the HRPD Reverse Data Channel rate corresponds to 9.6 kbps. For Subtype 2 or 3 Physical Layer, configure the Test Application RETAP so that the HRPD Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. Configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 or 3 Physical Layer) so that the HRPD Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the HRPD ACK Channel is transmitted at all the slots. Set RAB to '0' at all times.

6. Set the test parameters for the CDMA channel as specified in Table 4.5.2.3-1.

7. Set $\hat{I}_{or}$ to -75 dBm/1.23 MHz for each HRPD channel. Set $\hat{I}_{or}$ to -75 dBm/1.23 MHz for for the CDMA channel.

8. Send continuously alternate '0' and '1' power control bits to the access terminal on the CDMA carrier, and send continuously '0' power control bits to the access terminal on each HRPD carrier and measure the total transmitted power at the access terminal until it becomes stable. For this test, denote this stable transmitted power value MaxAccessTerminalTxPower (in dBm).

9. Manually set the transmitted power on each CDMA and HRPD channel to MaxAccessTerminalTxPower – $10 \times \log_{10}(N)$, where N is the number of simultaneously active CDMA as well as HRPD carriers. Here, manual setting of the transmitted power implies using reverse power control commands to maintain the transmitted power close to a specified target. The difference between the target transmitted power and the actual or measured transmitted power shall not exceed the power control step size.

10. Set the resolution bandwidth of the spectrum analyzer to a maximum of 30 kHz. The value of the occupied bandwidth is calculated by an external or internal computer by summing all samples stored as "total power" (Test 1). The occupied bandwidth shall be measured for each isolated carrier independently.

11. For an access terminal that supports Subtype 3 HRPD physical layer and two or more HRPD reverse link channels during CDMA-HRPD operation, configure the access terminal to transmit on one CDMA reverse channel and the maximum number of simultaneously supported HRPD channels with the CDMA channel adjacent to all the adjacent HRPD reverse channels at a spacing of 1.23 MHz (for Band Class 0) and 1.25 MHz (for all other Band Classes) between the center frequencies.

12. Repeat steps 3 and 4.

13. Using Subtype 3 Physical Layer, configure the Test Application RMCTAP so that the HRPD Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. Configure the Test Application FMCTAP so that the HRPD Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the HRPD ACK Channel is transmitted at all the slots.

14. Repeat steps 6 through 10 (Test 2).

15. For an access terminal that supports Subtype 3 HRPD physical layer and two or more HRPD reverse link channels during CDMA-HRPD operation, configure the access terminal to simultaneously transmit on one CDMA reverse channel and two HRPD channels, where any two of the aforementioned three carriers are at the maximum possible frequency separation, and the third carrier is adjacent to either the leftmost or the rightmost carrier. The channel spacing shall be a multiple of 1.23 MHz for BC 0 Subclass 2 and 3 or 1.25 MHz for BC 3 and 6. This test (Test 3) shall be performed only if the AT is able to support the transmission mode described above.

16. Repeat steps 3 and 4.

17. Repeat step 13.

18. Repeat steps 6 through 10 (Test 3). The occupied bandwidth shall be measured for the isolated carrier and two adjacent carriers independently.

19. For an access terminal that supports Subtype 3 HRPD physical layer and two or more HRPD reverse link channels during CDMA-HRPD operation, configure the access terminal to simultaneously transmit on one CDMA reverse channel and two HRPD channels, where any two of the aforementioned three carriers are at the maximum possible frequency separation, and the third carrier is not adjacent to either the leftmost or the rightmost carrier. The channel spacing shall be a multiple of 1.23 MHz for BC 0 Subclass 2 and 3 or 1.25 MHz for BC 3 and 6. This test (Test 4) shall be performed only if the AT is able to support the transmission mode described above.

20. Repeat steps 3 and 4.

21. Repeat step 13.

22. Repeat steps 6 through 10 (Test 4). The occupied bandwidth shall be measured for each isolated carrier independently.

#### 4.5.2.3 Minimum Standard

The occupied bandwidth shall be measured separately for each isolated carrier and each set of adjacent carriers.

The following conditions shall be met for Tests 1, 2, 3 and 4. Whenever there is an isolated carrier (CDMA or HRPD, with no carriers adjacent to it), the occupied bandwidth for the isolated carrier shall not exceed 1.48MHz. When there are two or more adjacent carriers, the occupied bandwidth for a set of N adjacent carriers shall not exceed (N-1) × M + 1.48

MHz where N is the total number of adjacent carriers (including both CDMA and HRPD) and M is the minimum carrier spacing between the center frequencies, which is 1.23 MHz (for Band Class 0) and 1.25 MHz (for all other Band Classes).

**Table 4.5.2.3-1. Test Parameters for Testing Occupied Bandwidth at Maximum RF Output Power**

| Parameter | Units | Value |
|---|---|---|
| $\hat{I}_{or}$ | dBm/1.23 MHz | -75 |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

## 4.6 Limitations on Emissions for DB-CDMA-HRPD

### 4.6.1 Conducted Spurious Emissions

#### 4.6.1.1 Definition

Conducted spurious emissions are emissions at frequencies that are outside the assigned CDMA and HRPD Channels, measured at the access terminal antenna connector. This test measures the spurious emissions during continuous transmission. Emissions are measured on a per-band class basis.

#### 4.6.1.2 Method of Measurement

1. Set the following parameters of the HRPD *AccessParameters Message* as specified below:

| Parameter | Value (Decimal) |
|---|---|
| OpenLoopAdjust | 81 (-81 dB) for BC 0, 2, 3, 5, 7, 9, 10, 11, and 12<br>84 (-84 dB) for BC 1, 4, 6, and 8 |
| ProbeInitialAdjust | 15 (15 dB) |
| PowerStep | 15 (7.5 dB/step) |

2. Connect the sector to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The AWGN generator and the CW generator are not applicable in this test. Connect a spectrum analyzer (or other suitable test equipment) to the access terminal antenna connector.

3. For all band class combinations supported by the access terminal, configure the access terminal to operate with that band class combination, where B1 is the CDMA band class and B2 is the HRPD band class.

4. Perform steps 6 through 13 if and only if the access terminal can simultaneously support only one CDMA carrier in B1 and only one HRPD carrier in B2.

5. Perform steps 14 through 24 if the access terminal can simultaneously support a single CDMA carrier in B1 and two or more HRPD carriers in B2.

6. Configure the access terminal to transmit on a single CDMA carrier in B1, and on a single HRPD carrier in B2. Perform step 7 for the HRPD call. Perform step 8 for the CDMA call.

7. Set up a Test Application session. Open a HRPD connection. For Subtype 0 or 1 Physical Layer, configure the Test Application RTAP so that the Reverse Data Channel rate corresponds to 153.6 kbps. For Subtype 2 or Subtype 3 Physical Layer, configure the Test Application RETAP so that the Reverse Data Channel payload size corresponds to 4096 bits with Termination Target of 4 sub-packets. Configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 or Subtype 3 Physical Layer) so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the ACK Channel is transmitted at all the slots. Set RAB to '0' at all times.

8. If the mobile station supports the Radio Configuration 3 Reverse Fundamental Channel and demodulation of Radio Configuration 3 or 4 during an CDMA-HRPD call, then set up a CDMA call using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 10 and 11.

9. Set the test parameters for the CDMA channel as specified in Table 4.6.1.2-1.

10. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the CDMA channel.

11. Set the transmitted power on the CDMA carrier to $L_{B1}$ - 3dB, where $L_{B1}$ is the lower limit on the maximum RF output power in B1 for the access terminal class in question (see Table 4.3.4.3-1 of [17]).

12. Send continuously '0' power control bits to the access terminal on each HRPD carrier and measure the total transmitted power at the access terminal on each band.

13. Measure the spurious emission levels for each band class (Test 1).

14. Configure the access terminal to transmit on a single CDMA carrier in B1, and on two HRPD carriers in B2 with the pair of carriers at the maximum possible frequency separation (MaxReverseLinkBandwidth[7]) between them. Perform step 16 for the HRPD calls.

[7] The maximum separation between the highest and lowest reverse link CDMA channels within a Band Class that can be assigned to the access terminal in units of 2.5 kHz. See Table 7.9.7.1-1 in [1] for more details

15. Set up a Test Application session for Subtype 3 Physical Layer. Configure the Test Application RMCTAP so that the Reverse Data Channel payload size corresponds to 4096 bits with Termination Target of 4 sub-packets. Configure the Test Application FMCTAP (for Subtype 3 Physical Layer) so that the Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the ACK Channel is transmitted at all the slots.

16. Perform step 8 for the CDMA call.

17. Set the transmitted power on the CDMA carrier to $L_{B1}$ - 3dB, where $L_{B1}$ is the lower limit on the maximum RF output power in B1 for the mobile station class in question, and $Backoff_{B1}$ is the recommended maximum RF power backoff for B1 (see Table 4.3.4.3-1 of [17]).

18. Send continuously '0' power control bits to the access terminal on each HRPD carrier and measure the total transmitted power at the access terminal in each band class.

19. Measure the spurious emission levels for each band class (Test 2).

20. Configure the access terminal to transmit on a single CDMA carrier in B1, and on the maximum number of adjacent reverse HRPD channels that the access terminal can support in B2, with the HRPD channels at a spacing of 1.23 MHz (for Band Class 0) and 1.25 MHz (for all other Band Classes) between the center frequencies. Perform step 16 for the HRPD calls. Perform step 8 for the CDMA call.

21. Set the transmitted power on the CDMA carrier to $L_{B1}$ - 3dB, where $L_{B1}$ is the lower limit on the maximum RF output power in B1 for the mobile station class in question, and $Backoff_{B1}$ is the recommended maximum RF power backoff for B1.

22. Send continuously '0' power control bits to the access terminal on each HRPD carrier and measure the total transmitted power at the access terminal in each band class.

23. Measure the spurious emission levels for each band class. (Test 3)

**Table 4.6.1.2-1. Test Parameters for CDMA channel**

| Parameter | Units | Value |
|---|---|---|
| $\hat{I}_{or}$ | dBm/1.23 MHz | -75 |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

4.6.1.3 Minimum Standard

The spurious emissions in the mobile station's receive band shall be less than -76 dBm measured in a 1 MHz resolution bandwidth for band classes 0, 1, 2, 4, 5, 6, 7, 8, 9, 10, 11 and 12. For band class 3, the spurious emissions in the mobile station's receive band shall be less than -81 dBm measured in a 1 MHz resolution bandwidth.

Limit for Test 1 (B1 and B2), Test 2 (B1 only) and Test 3 (B1 only)

When transmitting in Band Classes 0, 2, 5, 7, 9, 10, 11 or 12, the spurious emissions with ten or more averages shall be less than the limits specified in Table 4.6.1.3-1.

**Table 4.6.1.3-1. Band Classes 0, 2, 5, 7, 9, 10, 11, and 12 Transmitter Spurious Emission Limits**

| For \|Δf\| Within the Range | Emission Limit |
|---|---|
| 885 kHz to 1.98 MHz | Less stringent of<br>-42 dBc/30 kHz or -54 dBm/1.23 MHz |
| 1.25 to 4.00 MHz<br>(Band Class 10 only) | -13 dBm / 30 kHz |
| 1.98 MHz to 4.00 MHz | Less stringent of<br>-54 dBc/30 kHz or -54 dBm/1.23 MHz |
| | |
| 2.25 MHz to 4.00 MHz<br>(Band Class 7 only) | -35 dBm/6.25 kHz |
| > 4.00 MHz<br>(ITU Category A only) | -13 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-13 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-13 dBm/100 kHz; 30 MHz < f < 1 GHz<br>-13 dBm / 1 MHz; 1 GHz < f < 5 GHz |
| > 4.00 MHz<br>(ITU Category B only) | -36 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-36 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-36 dBm/100 kHz; 30 MHz < f < 1 GHz<br>-30 dBm / 1 MHz; 1 GHz < f < 12.75 GHz |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on |Δf| where Δf = center frequency - closer measurement edge frequency (f). Compliance with the -35 dBm / 6.25 kHz limit is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral power in a 6.25 kHz segment. ITU Category B is intended to apply to only Band Class 5, 9, 11 and 12. The -13 dBm/30 kHz requirement for Band Class 10 is based on CFR 47 Part 90.691(a)(2).

When transmitting in Band Classes 1, 4, 6, 8 or 13, the spurious emissions with ten or more averages shall be less than the limits specified in Table 4.6.1.3-2.

**Table 4.6.1.3-2. Band Classes 1, 4, 6, 8 and 13 Transmitter Spurious Emission Limits**

| For \|Δf\| Within the Range | Emission Limit |
|---|---|
| 1.25 MHz to 1.98 MHz | less stringent of<br>-42 dBc/30 kHz or -54 dBm/1.23 MHz |
| 1.98 MHz to 4.00 MHz | less stringent of<br>-50 dBc/30 kHz or -54 dBm/1.23 MHz |
| 2.25 MHz to 4.00 MHz<br>(Band Class 6, 8 and 13 only) | -[13 + 1 × (Δf – 2.25 MHz)] dBm / 1 MHz |
| > 4.00 MHz<br>(ITU Category A) | -13 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-13 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-13 dBm/100 kHz; 30 MHz < f < 1 GHz<br>-13 dBm / 1 MHz; 1 GHz < f < 10 GHz |
| > 4.00 MHz<br>(ITU Category B) | -36 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-36 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-36 dBm/100 kHz; 30 MHz < f < 1 GHz<br>-30 dBm / 1 MHz; 1 GHz < f < 12.75 GHz |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on |Δf| where Δf = center frequency - closer measurement edge frequency (f). ITU Category B is intended to apply to only Band Classes 6, 8 and 13.

When transmitting in Band Class 3, the spurious emissions with ten or more averages shall be less than the limits specified in Table 4.6.1.3-3.

**Table 4.6.1.3-3. Band Class 3 Transmitter Spurious Emission Limits**

| Measurement Frequency | For \|Δf\| Within the Range | Emission Limit |
|---|---|---|
| > 815 MHz and ≤ 850 MHz,<br>> 887 MHz and ≤ 889 MHz,<br>> 893 MHz and ≤ 901 MHz,<br>> 915 MHz and ≤ 925 MHz | ≥ 900 kHz and < 1.98 MHz | -42 dBc / 30 kHz |
| | ≥ 1.98 MHz | 25 μW (-16 dBm) / 100 kHz; Pout ≤ 30 dBm<br>-54 dBc / 100 kHz; Pout > 30 dBm |
| > 885 MHz and ≤ 958 MHz, except<br>> 887 MHz and ≤ 889 MHz<br>> 893 MHz and ≤ 901 MHz<br>> 915 MHz and ≤ 925 MHz | < 1.98 MHz | 25 μW (-16 dBm) / 30 kHz; Pout ≤ 30 dBm;<br>Less stringent of -60 dBc / 30 kHz<br>or 2.5 μW (-26 dBm) / 30 kHz; Pout > 30 dBm |
| | ≥ 1.98 MHz | 25 μW (-16 dBm) / 100 kHz; Pout ≤ 30 dBm;<br>Less stringent of -60 dBc / 100 kHz<br>or 2.5 μW (-26 dBm) / 100 kHz; Pout > 30 dBm |
| ≤ 885 MHz and > 958 MHz, except 815-850 MHz | < 1.98 MHz | 25 μW (-16 dBm) / 30 kHz; Pout ≤ 30 dBm;<br>Less stringent of -60 dBc / 30 kHz<br>or 2.5 μW (-26 dBm) / 30 kHz; Pout > 30 dBm |
| | ≥ 1.98 MHz | 25 μW (-16 dBm) / 1 MHz; Pout ≤ 44 dBm<br>More stringent of -60 dBc / 1 MHz<br>and 20 mW (13 dBm) / 1 MHz; Pout > 44 dBm |
| Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on \|Δf\| where Δf = center frequency – closer measurement edge frequency (f). The lower and upper limits of the frequency measurement are currently 10 MHz and 3 GHz in Japan radio measurement documents. | | |

When transmitting in Band Class 6, the spurious emissions with ten or more averages shall also be less than the requirements in Table 4.6.1.3-4.

**Table 4.6.1.3-4. Additional Band Class 6 Transmitter Spurious Emission Limits**

| Measurement Frequency | Emission Limit | Victim Band |
|---|---|---|
| 1884.5 to 1919.6 MHz | -41 dBm / 300 kHz | PHS |
| 925 to 935 MHz | -67 dBm / 100 kHz | GSM 900 |
| 935 to 960 MHz | -79 dBm / 100 kHz | GSM 900 |
| 1805 to 1880 MHz | -71 dBm / 100 kHz | DCS 1800 |

Note: Measurements apply only when the measurement frequency is at least 5.625 MHz from the CDMA center frequency. The non-PHS band measurements are made on frequencies which are integer multiples of 200 kHz. As exceptions, up to five measurements with a level up to the spurious emission limits in Table 4.4.1.3-1 are allowed.

When transmitting in Band Class 11 or 12, the spurious emissions with ten or more averages shall also be less than the requirements in Table 4.6.1.3-5.

**Table 4.6.1.3-5. Additional Band Class 11 and 12 Transmitter Spurious Emission Limits**

| For $\|\Delta f\|$ Within the Range | Emission Limit Band Class 11 Subclasses 4, 5; Band Class 12 Subclass 1 | Emission Limit Band Class 11 Subclasses 0, 1, 2, 3; Band Class 12 Subclass 0 |
|---|---|---|
| 885 kHz to 1.12 MHz | $-47 - 7 \times (\|\Delta f\| - 885) / 235$ dBc in 30 kHz | Not Specified |
| 1.12 MHz to 1.98 MHz | $-54 - 13 \times (\|\Delta f\| - 1120) / 860$ dBc in 30 kHz | Not Specified |
| 1.98 MHz to 4.00 MHz | $-67 - 15 \times (\|\Delta f\| - 1980) / 2020$ dBc in 30 kHz | Not Specified |
| 4.00 MHz to 10.0 MHz | -51 dBm in 100 kHz | Not Specified |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on $|\Delta f|$ where $\Delta f$ = center frequency - closer measurement edge frequency (f). $\Delta f$ is positive offset from the highest valid CDMA channel in the band subclass or negative offset from the lowest valid CDMA channel in the band subclass. The emission limits for Band Class 11 and 12 (European PAMR bands) are designed to allow co-existence with incumbent services in Europe and are tighter than ITU Category B requirements.

When transmitting in Band Class 7, the spurious emissions with ten or more averages shall also be less than the requirements in Table 4.6.1.3-6.

**Table 4.6.1.3-6. Additional Band Class 7 Transmitter Spurious Emission Limits[8]**

| Transmission Frequency (MHz) | Measurement Frequency (MHz) | Emission Limit | Victim Band |
|---|---|---|---|
| 776-788 | 763-775 | -35 dBm/6.25 kHz | Public Safety |
| 788-793 | 769-775 | -35 dBm/6.25 kHz | Public Safety |
| 776-788 | 793-805 | -35 dBm/6.25 kHz | Public Safety |
| 788-793 | 799-805 | -35 dBm/6.25 kHz | Public Safety |

Limit for Test 2 (B2 only)

When transmitting in Band Classes 0, 2, 3, 5, 7, 9, 10, 11 or 12, the spurious emissions with ten or more averages shall be less than the limits specified in Table 4.6.1.3-7.

**Table 4.6.1.3-7. Band Classes 0, 2, 3, 5, 7, 9, 10, 11, and 12 Transmitter Spurious Emission Limits**

| For $\|\Delta f\|$ Within the Range | Emission Limit |
|---|---|
| 885 kHz to 1.885 MHz | 6 dBm / 1 MHz |
| > 1.885 MHz | -13 dBm / 1 MHz |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on $|\Delta f|$ where $\Delta f$ is measured as the frequency offset from the center frequency of each reverse CDMA channel.

Emission Limits shall apply between the reverse CDMA channels when MaxReverseLinkBandwidth $\geq 4 \times 1.23$ MHz.

When transmitting in Band Classes 1, 4, 6, or 8, the spurious emissions with ten or more averages shall be less than the limits specified in Table 4.6.1.3-8.

[8] Based on FCC recommendations in FCC 07-132, 2nd Report and Order, August 10, 2007.

**Table 4.6.1.3-8. Band Classes 1, 4, 6, and 8 Transmitter Spurious Emission Limits**

| For \|Δf\| Within the Range | Emission Limit |
|---|---|
| 1.25 MHz to 2.25 MHz | 6 dBm / 1 MHz |
| 2.25 MHz to 3.5×Ns MHz | -13 dBm / 1 MHz |
| > 3.5×Ns MHz (ITU Category B) | -36 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-36 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-36 dBm / 100 KHz; 30 MHz < f < 1 GHz<br>-30 dBm / 1 MHz; 1 GHz < f < 12.75 GHz |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on |Δf| where Δf is measured as the frequency offset from the center frequency of each channel.

Except for ITU Category B, emission Limits shall apply between the carriers when MaxReverseLinkBandwidth ×0.0025 ≥ 4×1.25 MHz.

Ns = MaxReverseLinkBandwidth×0.0025

ITU Category B limit is intended to apply only to Band Classes 6 and 8.

A single exception will be allowed for spurious emission frequencies between the two reverse CDMA channels (for both Table 4.6.1.3-7 and Table 4.6.1.3-8).

Limit for Test 3 (B2 only)

For adjacent reverse CDMA channels, the spurious emissions with ten or more averages shall be less than the limits specified in Table 4.6.1.3-9 and Table 4.6.1.3-10.

**Table 4.6.1.3-9. Adjacent Multi-carrier Transmitter Spurious Emission Limits for Number of adjacent reverse CDMA channels, N = 3**

| For \|Δf\| Within the Range | Emission Limit |
|---|---|
| 2.5 MHz to 2.7 MHz | -14 dBm / 30 kHz |
| 2.7 MHz to 3.5 MHz | -[14 + 15 × (Δf – 2.7 MHz)] dBm / 30 kHz |
| 3.08 MHz (Band Class 6 only) | -33 dBc / 3.84 MHz |
| 3.5 MHz to 7.5 MHz | -[13 + 1 × (Δf – 3.5 MHz)] dBm / 1 MHz |
| 7.5 MHz to 8.5 MHz | -[17 + 10 × (Δf – 7.5 MHz)] dBm / 1 MHz |
| 8.08 MHz (Band Class 6 only) | -43 dBc / 3.84 MHz |
| 8.5 MHz to 12.5 MHz | -27 dBm / 1 MHz |
| > 12.5 MHz (ITU Category A) | -13 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-13 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-13 dBm/100 kHz; 30 MHz < f < 1 GHz<br>-13 dBm / 1 MHz; 1 GHz < f < 5 GHz |
| > 12.5 MHz (ITU Category B) | -36 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-36 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-36 dBm/100 kHz; 30 MHz < f < 1 GHz<br>-30 dBm / 1 MHz; 1 GHz < f < 12.75 GHz |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on |Δf| where Δf = center frequency of the middle reverse CDMA channel- closer measurement edge frequency (f). The requirements at offsets of 3.08 and 8.08 MHz are equivalent to ACLR requirements of 33 and 43 dB from a Spreading Rate 3 mobile station transmitter into a Spreading Rate 3 or IMT-DS mobile station receiver offset by 5 and 10 MHz respectively. ITU Category B is intended to apply to only Band Class 6, 8, 9, 11 and 12.

**Table 4.6.1.3-10. Adjacent Multi-carrier Transmitter Spurious Emission Limits for Number of adjacent reverse CDMA channels, N≠ 3**

| For \|Δf\| Within the Range | Emission Limit |
|---|---|
| 2.5 + Δ MHz to 3.5 + Δ MHz | -13 dBm / (12.5 kHz × N) kHz |
| 3.5 + Δ MHz to 3.125× (N+1) MHz | -13 dBm / 1 MHz |
| > 3.125× (N+1) MHz (ITU Category A) | -13 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-13 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-13 dBm/100 kHz; 30 MHz < f < 1 GHz<br>-13 dBm / 1 MHz; 1 GHz < f < 5 GHz |
| > 3.125× (N+1) MHz (ITU Category B) | -36 dBm / 1 kHz; 9 kHz < f < 150 kHz<br>-36 dBm / 10 kHz; 150 kHz < f < 30 MHz<br>-36 dBm/100 kHz; 30 MHz < f < 1 GHz<br>-30 dBm / 1 MHz; 1 GHz < f < 12.75 GHz |

Note: All frequencies in the measurement bandwidth shall satisfy the restrictions on |Δf| where Δf = center frequency - closer measurement edge frequency (f). ITU Category B is intended to apply to only Band Class 6, 8, 9, 11 and 12. Δ = (N-3) × 625 kHz, where N is the number of carriers (N ≥ 2). Operation outside North America is for future study.

Current region-specific radio regulation rules shall also apply.

4.6.2 Occupied Bandwidth

This test is applicable to Band Class 0 Band Subclasses 2 and 3, Band Class 3 and Band Class 6 mobile stations only.

4.6.2.1 Definition

The occupied bandwidth is defined in each band class as the frequency range, whereby the power of emissions averaged over the frequency above and under the edge frequency are 0.5% each of the total radiation power of all modulated carriers.

4.6.2.2 Method of Measurement

1. Connect the HRPD access network(s) and the CDMA base station to the access terminal antenna connector as shown in Figure 6.5.1-4 of [4] (Figure 8.5.1-4 of [17]). The AWGN generator and the CW generator are not applicable in this test. Connect a spectrum analyzer to the access terminal antenna connector. Use a power control step size of 0.5dB for CDMA and HRPD carriers.
2. For all band class combinations supported by the access terminal, configure the access terminal to operate with that band class combination, where B1 is the CDMA band class and B2 is the HRPD band class.

3. Perform steps 4 through 14 if the access terminal can support a single CDMA carrier in B1 and one or more HRPD carriers in B2.

4. Perform steps 15 through 22 if the access terminal can simultaneously support a single CDMA carrier in B1 and two or more HRPD carriers in B2.

5. Configure the access terminal to transmit on one CDMA reverse channel in B1 and on the maximum number of adjacent HRPD reverse channels that the access terminal can support simultaneously in B2 at a spacing of 1.23 MHz for BC 0 Subclass 2 and 3 or 1.25 MHz for BC 3 and 6 between the center frequencies.

6. If the mobile station supports demodulation of Radio Configuration 3 or 4, set up a CDMA call on B1 using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 7 through 14.

7. Set up a HRPD Test Application session in B2. Open a connection. If the access terminal can support only one HRPD channel in B2, then perform step 8. Otherwise, perform step 9.

8. If the access terminal can support only one HRPD channel in B2, then do the following. For Subtype 0 or 1 Physical Layer, configure the Test Application RTAP so that the HRPD Reverse Data Channel rate corresponds to 9.6 kbps. For Subtype 2 or 3 Physical Layer, configure the Test Application RETAP so that the HRPD Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. Configure the Test Application FTAP (for Subtype 0 or 1 Physical Layer) or FETAP (for Subtype 2 or 3 Physical Layer) so that the HRPD Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the HRPD ACK Channel is transmitted at all the slots. Set RAB to '0' at all times.

9. If the access terminal can support two or more HRPD channels in B2, then do the following. Using Subtype 3 Physical Layer, configure the Test Application RMCTAP to transmit on the maximum number of adjacent HRPD reverse channels so that the HRPD Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. Configure the Test Application FMCTAP so that the HRPD Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the HRPD ACK Channel is transmitted at all the slots.

10. Set the test parameters for the CDMA channel as specified in Table 4.6.2.3-1.

11. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for each HRPD channel. Set $\hat{I}_{or}$ to –75 dBm/1.23 MHz for the CDMA channel.

12. Set the transmission power on the CDMA carrier in B1 to be L1 – 3dB, where L1 is the lower limit on maximum output power for the band class and mobile station class with appropriate backoff as specified in Table 4.3.4.3-1 of [17].

13. Send continuously '0' power control bits to the access terminal on each HRPD carrier. Measure the total transmitted power.

14. Set the resolution bandwidth of the spectrum analyzer to a maximum of 30 kHz. The value of the occupied bandwidth is calculated for each band class by an

external or internal computer by summing all samples stored as “total power” (Test 1).

15. Configure the access terminal to transmit on one CDMA reverse channel in B1 and on two HRPD reverse channels at the maximum possible frequency separation (MaxReverseLinkBandwidth[9]) between them in B2.

16. If the mobile station supports demodulation of Radio Configuration 3 or 4, set up a CDMA call in B1 using Fundamental Channel Test Mode 3 (see 1.3 of [4]) with 9600 bps data rate only and perform steps 17 through 22.

17. Set up a HRPD Test Application session in B2. Open a connection. Using Subtype 3 Physical Layer, configure the Test Application RMCTAP to transmit on two HRPD reverse channels at the maximum possible frequency separation (MaxReverseLinkBandwidth[10]) between them so that the HRPD Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. Configure the Test Application FMCTAP so that the HRPD Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the HRPD ACK Channel is transmitted at all the slots.

18. Repeat steps 10 through 14 (Test 2).

19. Set up a HRPD Test Application session in B2. Open a connection. Using Subtype 3 Physical Layer, configure the Test Application RMCTAP to transmit on three HRPD reverse channels, of which two are at the maximum possible frequency separation (MaxReverseLinkBandwidth[11]) between them, and the third is adjacent to either the leftmost or the rightmost carrier. The HRPD Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. Configure the Test Application FMCTAP so that the HRPD Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the HRPD ACK Channel is transmitted at all the slots.

20. Repeat steps 10 through 14 (Test 3). The occupied bandwidth shall be measured for each isolated carrier and the set of two adjacent carriers independently.

21. Set up a HRPD Test Application session in B2. Open a connection. Using Subtype 3 Physical Layer, configure the Test Application RMCTAP to transmit on three HRPD

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[9] The maximum separation between the highest and lowest reverse link HRPD CDMA channels within a Band Class that can be assigned to the access terminal in units of 2.5 kHz. See Table 7.9.7.1-1 in **Error! Reference source not found.** for more details.

[10] The maximum separation between the highest and lowest reverse link HRPD CDMA channels within a Band Class that can be assigned to the access terminal in units of 2.5 kHz. See Table 7.9.7.1-1 in **Error! Reference source not found.** for more details.

[11] The maximum separation between the highest and lowest reverse link HRPD CDMA channels within a Band Class that can be assigned to the access terminal in units of 2.5 kHz. See Table 7.9.7.1-1 in **Error! Reference source not found.** for more details.

reverse channels, of which two are at the maximum possible frequency separation (MaxReverseLinkBandwidth[12]) between them, and the third is not adjacent to either the leftmost or the rightmost carrier. The HRPD Reverse Data Channel payload size corresponds to 256 bits with Termination Target of 4 sub-packets. Configure the Test Application FMCTAP so that the HRPD Forward Traffic Channel data rate corresponds to the 2-slot version of 307.2 kbps, and the HRPD ACK Channel is transmitted at all the slots.

22. Repeat steps 10 through 14 (Test 4). The occupied bandwidth shall be measured for each isolated carrier independently.

4.6.2.3 Minimum Standard

The occupied bandwidth shall be measured separately for each isolated carrier and each set of adjacent carriers in each band class.

The following conditions shall be met for Tests 1, 2, 3 and 4. Whenever there is an isolated carrier (CDMA or HRPD, with no carriers adjacent to it), the occupied bandwidth for the isolated carrier shall not exceed 1.48MHz. When there are two or more adjacent carriers, the occupied bandwidth for a set of N adjacent carriers shall not exceed (N-1) × M + 1.48 MHz where N is the total number of adjacent carriers (including both CDMA and HRPD) and M is the minimum carrier spacing between the center frequencies in that band class, which is 1.23 MHz (for Band Class 0) and 1.25 MHz (for all other Band Classes).

**Table 4.6.2.3-1. Test Parameters for Testing Occupied Bandwidth at Maximum RF Output Power**

| Parameter | Units | Value |
|---|---|---|
| $\hat{I}_{or}$ | dBm/1.23 MHz | -75 |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -7.4 |

[12] The maximum separation between the highest and lowest reverse link HRPD CDMA channels within a Band Class that can be assigned to the access terminal in units of 2.5 kHz. See Table 7.9.7.1-1 in **Error! Reference source not found.** for more details.

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# 5 ENVIRONMENTAL REQUIREMENTS

An CDMA-HRPD-capable access terminal shall satisfy the environmental requirements in Section 5 of [4] and Section 7 of [17] in addition to satisfying the requirements of this section.

## 5.1 Temperature and Power Supply Voltage

### 5.1.1 Definition

The temperature and voltage ranges denote the ranges of ambient temperature and power supply input voltages over which the access terminal will operate and meet the requirements of these standards. The ambient temperature is the average temperature of the air surrounding the access terminal. The power supply voltage is the voltage applied at the input terminals of the access terminal. The manufacturer shall specify the temperature range and the power supply voltage over which the equipment is to operate. In order to provide a convenient means for the manufacturer to express the temperature range under which the access terminal conforms to these recommended minimum standards, temperature ranges designated by letters are defined in Table 5.1.1-1.

**Table 5.1.1-1. Temperature Ranges**

| Designator | Range |
|---|---|
| A | -40°C to +70°C |
| B | -30°C to +60°C |
| C | -20°C to +50°C |
| D | 0°C to +45°C |

### 5.1.2 Method of Measurement

The access terminal shall be installed in its normal configuration (i.e., in its normal mounting arrangement fully assembled) and placed in a temperature chamber. The temperature chamber shall be stabilized at the manufacturer's highest specified operating temperature, and the access terminal shall be operated over the power supply input voltage range[13] specified by the manufacturer or ±10%, if the range is not specified. With the access terminal operating, the temperature shall be maintained at the specified test temperature without forced circulation of air from the

[13] In general, the voltage range will be the useful operating range of the battery used in the access terminal.

temperature chamber being directly applied to the access terminal. The measurements specified in 5.1.3 shall then be performed.

Turn the access terminal off, stabilize the access terminal in the chamber at room temperature, and repeat the measurements specified in 5.1.3.

Turn the access terminal off, stabilize the access terminal in the chamber at the coldest operating temperature specified by the manufacturer, and repeat the measurements specified in 5.1.3.

The overall temperature range may be reduced to a lesser range than -30°C to +60°C if the manufacturer uses circuitry that automatically inhibits RF transmission when the temperature falls outside the lesser range specified. Measurements shall be made at the specified extremes of the manufacturer's temperature range. The manufacturer shall verify that RF transmission is inhibited outside of the specified temperature range.

#### 5.1.3 Minimum Standard

The access terminal equipment shall meet all of the minimum standards specified in Sections 3 through 4 under the standard environmental test conditions specified in 8.2 of [17] and 6.2 of [4] for all supported band classes. Over the ambient temperature and power supply ranges specified by the manufacturer, the operation of the access terminal equipment shall meet the following minimum standards for all supported band classes unless noted otherwise:

(a) Receiver sensitivity and dynamic range as specified in 3.3.1 (also 3.4.1 if DB-CDMA-HRPD is supported). The received power, Îor, used to measure receiver sensitivity may be increased 2 dB at 60°C and higher.

(b) Waveform quality as specified in 4.1.1 (also 4.2.1 if DB-CDMA-HRPD is supported).

(c) Maximum RF output power as specified in 4.3.1 (also 4.4.1 if DB-CDMA-HRPD is supported). For Temperature Range Designators A and B, the ERP for a Band Classes 0, 2, 3, 5, 7, 9, 10, 11, and 12, access terminal may drop by 2 dB at 60°C and higher. For Temperature Range Designators A and B, the EIRP for Band Classes 1, 4, 6, and 8 Class II through V, access terminal may drop by 2 dB at 60°C and higher. These requirements do not apply other than for coldest, room and highest operating temperature test points.

(d) Conducted spurious emissions as specified in 4.5.1 (also 4.6.1 if DB-CDMA-HRPD is supported).

### 5.2 High Humidity

#### 5.2.1 Definition

The term "high humidity" denotes the relative humidity at which the access terminal will operate with the specified performance.

5.2.2 Method of Measurement

The access terminal, after having operated normally under standard test conditions, shall be placed, inoperative, in a humidity chamber with the humidity maintained at 0.024/gm $H_2O$/gm Dry Air at 50°C (40% Relative Humidity) for a period of not less than eight hours. The measurements specified in 3.3.1.3 (also 3.4.1.3 if DB-CDMA-HRPD is supported) and 4.1.1.3 (also 4.2.1.3 if DB-CDMA-HRPD is supported) shall then be performed. No readjustment of the access terminal shall be allowed during this test.

Turn the access terminal off, stabilize the access terminal in the chamber at standard conditions within six hours, and perform the measurements specified in Sections 3 through 4 of this standard.

5.2.3 Minimum Standard

The access terminal equipment shall meet the minimum standards specified in 3.3.1.3 (also 3.4.1.3 if DB-CDMA-HRPD is supported) and 4.1.1.3 (also 4.2.1.3 if DB-CDMA-HRPD is supported) under the high humidity conditions. Once stabilized in standard conditions, the access terminal shall meet all the minimum standards specified in Sections 3 through 4 of this standard.

## 5.3 Vibration Stability

5.3.1 Definition

The vibration stability is the ability of the access terminal to maintain specified mechanical and electrical performance after being vibrated.

5.3.2 Method of Measurement

Sinusoidal vibration at 1.5 g acceleration swept through the range of 5 to 500 Hz at the rate of 0.1 octave/second shall be applied to the access terminal in three mutually perpendicular directions (sequentially) for a single sweep rising in frequency followed by a single sweep falling in frequency.

5.3.3 Minimum Standard

The access terminal equipment shall meet all the minimum standards specified in Sections 3 through 4 after being subjected to the above vibration tests.

## 5.4 Shock Stability

5.4.1 Definition

The shock stability is the ability of the access terminal to maintain specified mechanical and electrical performance after being shocked.

5.4.2 Method of Measurement

The access terminal shall be subjected to three test table impacts, in three mutually perpendicular directions and their negatives, for a total of 18 impacts. In all cases,

the access terminal shall be secured to the test table by its normal mounting hardware. Each impact shall be a half sine wave, lasting from 7 to 11 ms, with at least 20 g peak acceleration.

### 5.4.3 Minimum Standard

The access terminal equipment shall meet all the minimum standards specified in Sections 3 through 4 of this standard and shall not suffer any mechanical damage after being subjected to the above shock tests.

# 6 STANDARD TEST CONDITIONS

The standard test conditions for CDMA and HRPD are as described in Section 6 of [4] and Section 8 of [17] respectively. The standard test conditions for CDMA-HRPD shall reflect those described in the latest revision and version of [4] and [17]. If the standard test conditions described in [4] and [17] are in disagreement, then the more restrictive test condition shall apply.

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# ANNEX A SELECTED PERFORMANCE REQUIREMENTS TABLES (NORMATIVE)

## A.1 Demodulation Requirements for HRPD

A.1.1 Demodulation of Forward Traffic Channel in AWGN

A.1.1.1 Method of Measurement

**Table A.1.1.1-1. Test Parameters for FTC Demodulation in AWGN (Part 1 of 3)**

| Parameter | Units | Test 1 | Test 2 |
|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | 15.4 | 13.4 |
| $I_{oc}$ | dBm/1.23 MHz | -70.4 | -68.4 |
| Data Rate | kbps | 2,457.6 | 2,457.6 |
| Slots per Physical Layer packet | Slots | 1 | 1 |
| $\frac{\text{Traffic } E_b}{N_t}$ | dB | 11.14 | 9.14 |
| $\frac{\text{Pilot } E_c}{I_o}$ | dB | -0.12 | -0.19 |

Note: The Traffic $E_b/N_t$ and Pilot $E_c/I_o$ values are calculated from the parameters set in the table. They are not settable parameter themselves.

**Table A.1.1.1-2. Test Parameters for FTC Demodulation in AWGN (Part 2 of 3)**

| Parameter | Units | Test 3 | Test 4 |
|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | 33.44 | 20.45 |
| $I_{oc}$ | dBm/1.23 MHz | -88.44 | -75.45 |
| Data Rate | kbps | 3,072.0 | 3,072.0 |
| Physical Layer Packet Size | Bits | 5,120 | 5,120 |
| Slots per Physical Layer packet | Slots | 1 | 1 |
| Preamble Length | Chips | 64 | 64 |
| $\frac{\text{Traffic } E_b}{N_t}$ | dB | 28.21 | 15.22 |
| $\frac{\text{Pilot } E_c}{I_o}$ | dB | -0.00 | -0.04 |

Note: The Traffic $E_b/N_t$ and Pilot $E_c/I_o$ values are calculated from the parameters set in the table. They are not settable parameter themselves.

**Table A.1.1.1-3 Test Parameters for FTC Demodulation in AWGN (Part 3 of 3)**

| Parameter | Units | Test 5[14] | Test 6 |
|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | 33.44 | 22.1 |
| $I_{oc}$ | dBm/1.23 MHz | -88.44 | -77.1 |
| Data Rate | Mbps | 3.1 | 3.1 |
| Physical Layer Packet Size | Bits | 5120 | 5120 |
| Slots per Physical Layer packet | Slots | 1 | 1 |
| Preamble Length | Chips | 64 | 64 |
| Number of active carriers | N/A | 3[15] | 3[12] |
| Carrier spacing | MHz | 1.25 or 1.23 | 1.25 or 1.23 |
| $\frac{\text{Traffic } E_b}{N_t}$ | dB | 28.21 | 16.87 |
| $\frac{\text{Pilot } E_c}{I_o}$ | dB | -0.00 | -0.026 |

Note: The Traffic $E_b/N_t$ and Pilot $E_c/I_o$ values are calculated from the parameters set in the table. They are not settable parameter themselves.

A.1.1.2 Minimum Standard for HRPD in SB-CDMA-HRPD

**Table A.1.1.2-1. Minimum Standards for Forward Traffic Channel Performance in AWGN (Part 1 of 4)**

| Test | Data Rate (kbps) | Slots | $E_b/N_t$ [dB] | PER |
|---|---|---|---|---|
| 1 | 2,457.6 | 1 | 10.94 | 0.03 |
| | | | 11.14 | 0.01 |
| | | | 11.34 | 0.005 |

[14] The specified $\hat{I}_{or}/I_{oc}$ applies to access terminals with improved RF noise-floor capable of supporting multi-carriers.

[15] For the case of number of forward link CDMA channels greater than 3 will be addressed in future revisions of **Error! Reference source not found.**.

**Table A.1.1.2-2. Minimum Standards for Forward Traffic Channel Performance in AWGN (Part 2 of 4)**

| Test | Data Rate (kbps) | Slots | $E_b/N_t$ [dB] | PER |
|---|---|---|---|---|
| 2 | 2,457.6 | 1 | 8.94 | 0.03 |
| | | | 9.14 | 0.01 |
| | | | 9.34 | 0.005 |

**Table A.1.1.2-3. Minimum Standards for Forward Traffic Channel Performance in AWGN (Part 3 of 4)**

| Test | Data Rate (kbps) | Slots | $E_b/N_t$ [dB] | PER |
|---|---|---|---|---|
| 3 | 3,072.0 | 1 | 21.41 | 0.03 |
| | | | 28.21 | 0.01 |
| | | | 44.28 | 0.008 |

**Table A.1.1.2-4. Minimum Standards for Forward Traffic Channel Performance in AWGN (Part 4 of 4)**

| Test | Data Rate (kbps) | Slots | $E_b/N_t$ [dB] | PER |
|---|---|---|---|---|
| 4 | 3,072.0 | 1 | 14.52 | 0.03 |
| | | | 15.22 | 0.01 |
| | | | 15.35 | 0.008 |

A.1.1.3 Minimum Standard for HRPD in DB-CDMA-HRPD

**Table A.1.1.3-1. Minimum Standards for Forward Traffic Channel Performance in AWGN (Part 1 of 6)**

| Test | Data Rate (kbps) | Slots | $E_b/N_t$ [dB] | PER |
|---|---|---|---|---|
| 1 | 2,457.6 | 1 | 10.94 | 0.03 |
| | | | 11.14 | 0.01 |
| | | | 11.34 | 0.005 |

**Table A.1.1.3-2. Minimum Standards for Forward Traffic Channel Performance in AWGN (Part 2 of 6)**

| Test | Data Rate (kbps) | Slots | $E_b/N_t$ [dB] | PER |
|---|---|---|---|---|
| 2 | 2,457.6 | 1 | 8.94 | 0.03 |
| | | | 9.14 | 0.01 |
| | | | 9.34 | 0.005 |

**Table A.1.1.3-3. Minimum Standards for Forward Traffic Channel Performance in AWGN (Part 3 of 6)**

| Test | Data Rate (kbps) | Slots | $E_b/N_t$ [dB] | PER |
|---|---|---|---|---|
| 3 | 3,072.0 | 1 | 21.41 | 0.03 |
| | | | 28.21 | 0.01 |
| | | | 44.28 | 0.008 |

**Table A.1.1.3-4. Minimum Standards for Forward Traffic Channel Performance in AWGN (Part 4 of 6)**

| Test | Data Rate (kbps) | Slots | $E_b/N_t$ [dB] | PER |
|---|---|---|---|---|
| 4 | 3,072.0 | 1 | 14.52 | 0.03 |
| | | | 15.22 | 0.01 |
| | | | 15.35 | 0.008 |

**Table A.1.1.3-5. Minimum Standards for Forward Traffic Channel Performance in AWGN (Part 5 of 6)**

| Test | Data Rate (Mbps) | Slots | $E_b/N_t$ [dB] | PER |
|---|---|---|---|---|
| 5 | 3.1 | 1 | 21.41 | 0.03 |
| | | | 28.21 | 0.01 |
| | | | 44.28 | 0.008 |

**Table A.1.1.3-6. Minimum Standards for Forward Traffic Channel Performance in AWGN(Part 6 of 6)**

| Test | Data Rate (Mbps) | Slots | $E_b/N_t$ [dB] | PER |
|---|---|---|---|---|
| 6 | 3.1 | 1 | 16.4 | 0.03 |
| | | | 16.87 | 0.01 |
| | | | 17.6 | 0.008 |

## A.2 CDMA Forward Traffic Channel Demodulation Performance Tables

A.2.1 Forward Traffic Channel Performance Requirements in AWGN

These requirements are referenced by 3.4.1.

A.2.1.1 Method of Measurement Test Parameters

**Table A.2.1.1-1. Test Parameters for Radio Configuration 1 Forward Fundamental Channel in AWGN**

| Parameter | Units | Test 5 | Test 6 | Test 7 |
|---|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | | |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 | | |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -16.3 | -15.8 | -15.6 |
| $I_{oc}$ | dBm/1.23 MHz | -54 | | |
| Data Rate | bps | 9600 | 9600 | 9600 |
| $\frac{\text{Traffic } E_b}{N_t}$ | dB | 3.8 | 4.3 | 4.5 |

Note: The Traffic $E_b/N_t$ value is calculated from the parameters in the table. It is not a directly settable parameter.

**Table A.2.1.1-2. Test Parameters for Radio Configuration 2 Forward Fundamental Channel in AWGN**

| Parameter | Units | Test 8 | Test 9 | Test 10 |
|---|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | | |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 | | |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | (1): -13.0<br>(2): -12.9 | (1): -12.7<br>(2): -12.5 | (1): -12.4<br>(2): -12.3 |
| $I_{oc}$ | dBm/ 1.23 MHz | -54 | | |
| Data Rate | bps | 14400 | 14400 | 14400 |
| $\frac{\text{Traffic } E_b}{N_t}$ | dB | (1): 5.3<br>(2): 5.4 | (1): 5.6<br>(2): 5.8 | (1): 5.9<br>(2): 6.0 |
| (1): Band Group 450 and 800; (2): BC 1, 4, 6, 8, 14 and 15. | | | | |

Note: The Traffic $E_b/N_t$ value is calculated from the parameters in the table. It is not a directly settable parameter.

**Table A.2.1.1-3. Test Parameters for Radio Configuration 3 Forward Fundamental Channel or Forward Dedicated Control Channel with 100% Frame Activity in AWGN**

| Parameter | Units | Test 11 | Test 12 | Test 13 | Test 14 | Test 15 | Test 16 |
|---|---|---|---|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | | | | | |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 | | | | | |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -17.5 | -16.9 | -16.7 | -16.6 | -16.2 | -15.9 |
| $I_{oc}$ | dBm/1.23 MHz | -54 | | | | | |
| Data Rate | bps | 9600 (5 ms) | | | 9600 | | |
| $\frac{\text{Traffic } E_b}{N_t}$ | dB | 2.6 | 3.2 | 3.4 | 3.5 | 3.9 | 4.2 |

Note: The Traffic $E_b/N_t$ value is calculated from the parameters in the table. It is not a directly settable parameter.

**Table A.2.1.1-4. Test Parameters for Radio Configuration 4 Forward Fundamental Channel or Forward Dedicated Control Channel with 100% Frame Activity in AWGN**

| Parameter | Units | Test 17 | Test 18 | Test 19 | Test 20 | Test 21 | Test 22 |
|---|---|---|---|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | | | | | |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 | | | | | |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -16.9 | -16.4 | -16.1 | -15.9 | -15.4 | -15.1 |
| $I_{oc}$ | dBm/1.23 MHz | -54 | | | | | |
| Data Rate | bps | 9600 (5 ms) | | | 9600 | | |
| $\frac{\text{Traffic } E_b}{N_t}$ | dB | 3.2 | 3.7 | 4.0 | 4.2 | 4.7 | 5.0 |

Note: The Traffic $E_b/N_t$ value is calculated from the parameters in the table. It is not a directly settable parameter.

**Table A.2.1.1-5. Test Parameters for Radio Configuration 5 Forward Fundamental Channel or Forward Dedicated Control Channel with 100% Frame Activity in AWGN**

| Parameter | Units | Test 23 | Test 24 | Test 25 | Test 26 | Test 27 | Test 28 |
|---|---|---|---|---|---|---|---|
| $\hat{I}_{or}/I_{oc}$ | dB | -1 | | | | | |
| $\frac{\text{Pilot } E_c}{I_{or}}$ | dB | -7 | | | | | |
| $\frac{\text{Traffic } E_c}{I_{or}}$ | dB | -17.5 | -17.0 | -16.7 | -14.2 | -13.8 | -13.6 |
| $I_{oc}$ | dBm/1.23 MHz | -54 | | | | | |
| Data Rate | bps | 9600 (5 ms) | | | 14400 | | |
| $\frac{\text{Traffic } E_b}{N_t}$ | dB | 2.6 | 3.1 | 3.4 | 4.1 | 4.5 | 4.7 |

Note: The Traffic $E_b/N_t$ value is calculated from the parameters in the table. It is not a directly settable parameter.

A.2.1.2 Minimum Standards Requirements

**Table A.2.1.2-1. Minimum Standards for Radio Configuration 1 Forward Fundamental Channel Performance in AWGN**

| Test(s) | Data Rate [bps] | Traffic $E_b/N_t$ [dB] | FER |
|---|---|---|---|
| **5, 6, 7** | 9600 | 3.6 | 0.05 |
| | | 3.8 | 0.03 |
| | | 4.3 | 0.01 |
| | | 4.5 | 0.005 |
| | | 4.7 | 0.003 |

**Table A.2.1.2-2. Minimum Standards for Radio Configuration 2 Forward Fundamental Channel Performance in AWGN**

| Test(s) | Data Rate [bps] | Traffic $E_b/N_t$ [dB] | FER |
|---|---|---|---|
| **8, 9, 10** | 14400 | 5.2 | 0.05 |
| | | 5.5 | 0.03 |
| | | 5.8 | 0.01 |
| | | 6.0 | 0.005 |
| | | 6.2 | 0.003 |

**Table A.2.1.2-3. Minimum Standards for Radio Configuration 3 Forward Fundamental Channel or Forward Dedicated Control Channel with 100% Frame Activity Performance in AWGN**

| Test(s) | Data Rate [bps] | Traffic $E_b/N_t$ [dB] | FER |
|---|---|---|---|
| **11, 12, 13** | 9600 (5 ms) | 2.3 | 0.05 |
| | | 2.6 | 0.03 |
| | | 3.2 | 0.01 |
| | | 3.4 | 0.005 |
| | | 3.6 | 0.003 |
| **14, 15, 16** | 9600 | 3.3 | 0.05 |
| | | 3.5 | 0.03 |
| | | 3.9 | 0.01 |
| | | 4.2 | 0.005 |
| | | 4.4 | 0.003 |

**Table A.2.1.2-4. Minimum Standards for Radio Configuration 4 Forward Fundamental Channel or Forward Dedicated Control Channel with 100% Frame Activity Performance in AWGN**

| Test(s) | Data Rate [bps] | Traffic $E_b/N_t$ [dB] | FER |
|---|---|---|---|
| **17, 18, 19** | 9600 (5 ms) | 2.9 | 0.05 |
| | | 3.2 | 0.03 |
| | | 3.7 | 0.01 |
| | | 4.0 | 0.005 |
| | | 4.2 | 0.003 |
| **20, 21, 22** | 9600 | 4.0 | 0.05 |
| | | 4.2 | 0.03 |
| | | 4.7 | 0.01 |
| | | 5.0 | 0.005 |
| | | 5.1 | 0.003 |

**Table A.2.1.2-5. Minimum Standards for Radio Configuration 5 Forward Fundamental Channel or Forward Dedicated Control Channel with 100% Frame Activity Performance in AWGN**

| Test(s) | Data Rate [bps] | Traffic $E_b/N_t$ [dB] | FER |
|---|---|---|---|
| **23, 24, 25** | 9600 (5 ms) | 2.3 | 0.05 |
| | | 2.6 | 0.03 |
| | | 3.1 | 0.01 |
| | | 3.4 | 0.005 |
| | | 3.6 | 0.003 |
| **26, 27, 28** | 14400 | 3.9 | 0.05 |
| | | 4.1 | 0.03 |
| | | 4.5 | 0.01 |
| | | 4.7 | 0.005 |
| | | 4.8 | 0.003 |