

Keysight Technologies

Standards Comparison for Key Measurements on Mobile Stations for cdma2000[®] and IS-98-C

Technical Overview

This is an overview of the standards' differences between the IS-98-C standard and the cdma2000 standard. Key measurements for mobile stations are listed, along with a description of the differences between the standards. In a few cases, new measurements are presented. There are separate tables for transmitter and receiver measurements, and notes are appended at the end of each table.

Summary of differences for key receiver measurements

IS-98-C (ballot version March 1998)		cdma2000 (release A baseline version July 10, 2000)		
Standard number	Name	Standard number	Name	Comments about cdma2000 that are different from IS-98-C
3.1	Frequency requirements	3.1	Frequency requirements	cdma2000 has 7 band classes, IS-98-C has two. Channel assignments vary, and different spreading rates have different assignments.
3.3.3	Demodulation of forward traffic channel in additive white Gaussian noise	3.4.1	Demodulation of forward traffic channel in additive white Gaussian noise	All band classes should be tested. Tests are to be performed on forward fundamental channel (if supported, otherwise test on forward dedicated control channel). Also, test on forward supplemental and forward supplemental code channels (if they are supported).
3.3.4	Demodulation of forward traffic channel in multipath fading channel	3.4.2	Demodulation of forward traffic channel in multipath fading channel	The case 5 test is on band classes 0, 2, 3, 5, and 7 for cdma2000. IS-98-C is band class 0 only.
3.4.1	Receiver sensitivity and dynamic range	3.5.1	Receiver sensitivity and dynamic range	Test parameter traffic E_C/I_{OR} varies with radio configuration.
3.4.2	Single tone desensitization tests 1 and 2	3.5.2	Single tone desensitization tests 1 and 2	Tone offset from carrier and traffic E_C/I_{OR} parameters vary for spreading rate 3. Otherwise, all parameters are the same as in IS-98-C.
3.4.3	Intermodulation spurious response attenuation	3.5.3	Intermodulation spurious response attenuation	Tone 1 and tone 2 offsets from carrier and traffic E_C/I_{OR} parameters vary for spreading rate 3. Otherwise, all parameters are the same as in IS-98-C.
Not in IS-98-C	3.5.4		Adjacent channel selectivity	New test that measures the ability to receive a CDMA signal on the assigned channel frequency in the presence of an offset CDMA signal. For band class 6 mobiles only.

Detailed notes for key receiver tests

These notes are arranged by cdma2000 standard number.

3.1 Frequency requirements

Band class 0: CDMA channel numbers, frequency assignments and block designators vary. Multiple spreading rates impact channel numbering. Preferred frequency assignments for cdma2000 band class 0 and spreading rate 1 are the same as IS-98-C's preferred set for both systems A and B.

Band class 1: Spreading rate 1 is the same as IS-98-C's band class 1 channel numbers and frequencies. Preferred frequency assignments for cdma2000 band class 1 and spreading rate 1 are the same as IS-98-C's preferred set for all block designators.

Band class 2 through 7: all are added for cdma2000.

3.4.1 Demodulation of forward traffic channel in additive white Gaussian noise

All band classes and all radio configurations should be tested. Tests are to be performed on forward fundamental channel (if supported, otherwise test on forward dedicated control channel). Also, test on forward supplemental and forward supplemental code channels (if they are supported). Closed loop power control must be disabled.

3.5.1 Receiver sensitivity and dynamic range

Test parameters for cdma2000 receiver sensitivity and dynamic range			
Parameter	Units	Test 1	Test 2
I_{OR}	dBm/1.23 MHz	-104	-25
Pilot E_C/I_{OR}	dB	-7	-7
Traffic E_C/I_{OR}	dB	-15.6 (RC 1 and 3) -12.3 (RC 2) -20.6 (RC 7)	-15.6 (RC 1 and 3) -12.3 (RC 2) -20.6 (RC 7)

3.5.2 Single tone desensitization tests 1 and 2

Tone offset from carrier parameter: +2500 kHz for test 1 and -2500 kHz for test 2.
For a spreading rate 3 system, IOR is the received power on each carrier.

3.5.3 Intermodulation spurious response attenuation

Tone 1 offset from carrier parameter: +2.50 MHz for test 1, -2.50 MHz for test 2.
Tone 2 offset from carrier parameter: +3.30 MHz for test 1, -3.30 MHz for test 2.

3.5.4 Adjacent channel selectivity

Measures the ability to receive a CDMA signal on the assigned channel frequency, in the presence of another CDMA signal offset from the assigned channel's frequency by ± 2.5 MHz for spreading rate 1, or ± 5 MHz for spreading rate 3. For band class 6 mobiles only.

Summary of differences for key transmitter measurements

IS-98-C (ballot version March 1998)		cdma2000 (release A baseline version July 10, 2000)		
Standard number	Name	Standard number	Name	Comments about cdma2000 that are different from IS-98-C
4.1.1.1	Frequency accuracy	4.1	Frequency accuracy	Same, except that cdma2000 adds minimum standards for the additional band classes.
4.3.1	Time reference	4.3.1	Time reference	Same, except that cdma2000 adds minimum standards for the new radio configurations.
4.3.2	Waveform quality and frequency accuracy	4.3.4	Waveform quality and frequency accuracy	IS-98-C style waveform quality can only be measured during a handoff in cdma2000. See Keysight Technologies, Inc. product note 5988-1989EN, <i>Multi-Coded Waveform Quality and Code Domain Measurements for cdma2000</i> .
Not in IS-98-C		4.3.2	Reverse pilot channel to code channel time tolerance	New measurement for cdma2000. Measures the timing error between the reverse pilot channel and the other code channels. Measured only on radio configurations 3 through 9.
Not in IS-98-C		4.3.3	Reverse pilot channel to code channel phase tolerance	New measurement for cdma2000. Measures the phase error between the reverse pilot channel and the other code channels. Measured only on radio configurations 3 through 9.
Not in IS-98-C		4.3.5	Code domain power	Power in each code channel of a cdma2000 channel. Measured only on radio configurations 3 through 9.
4.4.1	Range of open loop power	4.4.1	Range of open loop power	Added estimates for transmitting on the enhanced access channel. Added test parameters for all band classes.
4.4.3	Access probe output power	4.4.3	Access probe output power	Access probe power for cdma2000 is performed on the access channel the spreading rate 1 enhanced access channel, and the spreading rate 3 enhanced access channel.
4.4.4	Range of closed loop power	4.4.4	Range of closed loop power	Test modes are defined for the radio configurations. Test is defined for power control step sizes of 1 dB, 0.5 dB and 0.25 dB.
4.4.5	Maximum RF output power	4.4.5	Maximum RF output power	Measured across all radio configurations. Test modes are defined for the radio configurations. Includes setting parameters with the enhanced access channel as well as the access channel. No spurious emissions defined.
4.4.6	Minimum controlled output power	4.4.6	Minimum controlled output power	Test modes are defined for the radio configurations. Includes minimum standard for spreading rate 3.
4.4.7	Standby output power and gated output power	4.4.7	Standby output power and gated output power	Test modes are defined for the radio configurations. Gating rates are controlled on the reverse channel. Data rate sent depends on test mode.
Not in IS-98-C		4.4.8	Power up function output power	New test. Verifies probe duration, initial power offset, power increment between consecutive probes, time interval between consecutive probes, total number of PUF probes in one PUF attempt, and maximum number of PUF probes.
Not in IS-98-C		4.4.9	Code channel to reverse pilot channel output power accuracy	New test. Measures the permissible error in the mobile station mean output power between each of the radiated code channels and the reverse pilot channel.
Not in IS-98-C		4.4.10	Reverse channel transmit phase discontinuity	Measures reverse pilot channel phase over the range of the mobile station output power levels.
4.5.1		4.5.1	Conducted spurious emission	Test modes are defined for the radio configurations. Data rates are dependent on radio configuration. Spreading rate 1, minimum standards change above 2.25 MHz. Spreading rate 3 standards added.
4.5.2		4.5.2	Radiated spurious emission	IS-98-C requirement that spurious emissions be less than the levels specified for the conducted spurious emissions is dropped. cdma2000 requirement is just to meet current region-specific radio regulation rules.
Not in IS-98-C		4.5.3	Occupied bandwidth	For band class 3 and 6 mobile stations only. Measures the bandwidth of the transmitted signal.

Detailed notes for key transmitter tests

4.3.2 and 4.3.3 Reverse pilot channel time and phase error measurements

Time error must be less than ± 10 ns between the reverse pilot channel and all other code channels.

Phase error should be less than 0.05 radians and must be less than 0.15 radians.

4.3.5 Code domain power

This measurement uses a time reference derived from the pilot channel. This time reference is also used for the demodulation of all other code channels. Measured with the waveform quality measurement.

4.4.1 Range of open loop power

This test measures the channel power of the mobile station when the base station power is set to low, medium and high values (depends on band class and mobile station class).

4.4.3 Access probe output power

This test verifies the same parameters verified in IS-98-C, but for the enhanced access channel as well as the access channel: nominal power offset, initial power offset, power increment between consecutive probes, number of access probes in one probe sequence, and the number of probe sequences in one access attempt.

4.4.9 Code channel to reverse pilot channel output power accuracy

Measures code channel output power for the enhanced access channel header, enhanced access channel data, and reverse common control channel data, as well as code channel output power for the reverse traffic channel.

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