



47 CFR PART 15B, 24E

TEST REPORT

of

HC-D2000

Model Name: HC-D2000
Brand Name: Haier
Report No.: SZ08080037E01
FCC ID: SG70808HC-D2000

prepared for

Qingdao Haier Telecom Co., Ltd.

No.1,Haier Road,Hi-tech Zone,Qingdao,266101,P.R.China



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TABLE OF CONTENTS

1.	TEST CERTIFICATION	4
2.	GENERAL INFORMATION	5
2.1	EUT Description	5
2.2	Test Standards and Results	6
2.3	Facilities and Accreditations	7
2.3.1	Facilities	7
2.3.2	Test Environment Conditions.....	7
3.	47 CFR PART 2, PART 22H REQUIREMENTS	8
3.1	Frequencies.....	8
3.1.1	Requirement	8
3.1.2	Test Description	8
3.1.3	Procedure.....	9
3.1.4	Test Result.....	9
3.2	Conducted RF Output Power	11
3.2.1	Requirement	11
3.2.2	Test Description	11
3.2.3	Test Procedure.....	11
3.2.4	Test Result.....	11
3.3	Occupied Bandwidth	14
3.3.1	Definition	14
3.3.2	Test Description	14
3.3.3	Test Procedure.....	14
3.3.4	Test Verdict.....	14
3.4	Frequency Stability	17
3.4.1	Requirement	17
3.4.2	Test Description	17
3.4.3	Test Procedure.....	17
3.4.4	Test Verdict.....	18
3.5	Conducted Out of Band Emissions	19
3.5.1	Requirement	19

3.5.2	Test Description	19
3.5.3	Test Procedure	19
3.5.4	Test Result	19
3.6	Band Edge	23
3.6.1	Requirement	23
3.6.2	Test Description	23
3.6.3	Test Result	23
3.7	Transmitter Radiated Power (EIRP)	25
3.7.1	Requirement	25
3.7.2	Test Description	25
3.7.3	Test Procedure	26
3.7.4	Test Result	26
3.8	Radiated Out of Band Emissions	29
3.8.1	Requirement	29
3.8.2	Test Description	29
3.8.3	Test Result	29

1. TEST CERTIFICATION

Equipment under Test: HC-D2000

Brand Name: Haier

Model Name: HC-D2000

FCC ID: SG70808HC-D2000

Applicant: Qingdao Haier Telecom Co., Ltd.

No.1, Haier Road, Hi-tech Zone, Qingdao, 260001, P.R.China

Manufacturer: Qingdao Haier Telecom Co., Ltd.

No.1, Haier Road, Hi-tech Zone, Qingdao, 260001, P.R.China

Emission Designator 1M25F9W

Test Standards: 47 CFR Part 2

47 CFR Part 15 Subpart B

47 CFR Part 24 Subpart E

Test Date(s): August 27, 2008 – August 29, 2008

Test Result: PASS

* We Hereby Certify That:

The equipment under test was tested by Shenzhen Electronic Product Quality Testing Center Morlab Laboratory. The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the requirement of related FCC rules.

The test results of this report only apply for the tested sample equipment identified above. The test report shall be invalid without all the signatures of the test engineer, the reviewer and the approver.

Tested by:

Luo Biao

Dated:

2008.9.08

Reviewed by:

Wei Yanquan

Dated:

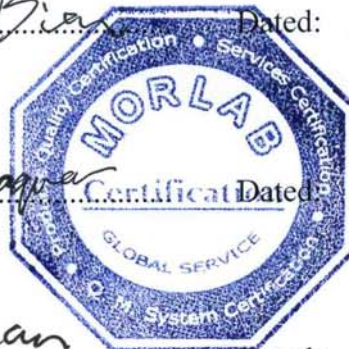
2008.09.08

Approved by:

Shu Luan

Dated:

2008.09.08



2. GENERAL INFORMATION

2.1 EUT Description

EUT Type.....: CDMA mobile phone
Model Name: HC-D2000
Serial No.....: (n.a, marked #1 by test site)
MSIN: 7028072470
Hardware Version: SP
Software Version: D2000-H01-S002-Nig
Frequency Range: Tx: 1851.25 MHz -1908.75 MHz
Rx: 1931.25 MHz -1988.75 MHz
Modulation Type.....: CDMA
Emission Designators: 1M25F9W
Power Supply.....: Battery
Model Name: H11124
Brand name: Haier
Capacitance: 800mAh
Rated voltage: 3.7V
Manufacturer: Shenzhen BYD BATTERY Co. Ltd
Ancillary Equipments.....: AC Adapter (Charger for Battery)
Model Name: H24142
Brand Name: Haier
Serial No.: (n.a. marked #1 by test site)
Rated Input: ~ 100-240V, 0.2A,50/60Hz
Rated Output: = 5V, 550mA
Manufacturer: ZHONG WEI FENG DA ELECTRONIC
CO.LTD
Manufacturer Address: Changyang Industry Area, Laixi Jiangshan
Town, Qingdao City.
Wire Length: 100cm

Note 1: The transmitter (Tx) frequency arrangement of the CDMA 1900MHz band used by the EUT can be represented with the formula $F(n)=1851.2+0.05*(n-25)$, $25 \leq n \leq 1175$; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 25 (1851.2MHz), 600 (1880.0MHz) and 1175 (1908.7MHz).

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

2.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2 and Part 24 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-05 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 24 (10-1-05 Edition)	Personal Communications Services

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result	Test date
1	2.106 24.229	Frequencies	PASS	2008-08-27
2	2.1046	Conducted RF Output Power	PASS	2008-08-27
3	2.1049	20dB Occupied Bandwidth	PASS	2008-08-27
4	2.1055 24.235	Frequency Stability	PASS	2008-08-27
5	2.1051 2.1057 24.238	Conducted Out of Band Emissions	PASS	2008-08-27
6	2.1051 2.1057 24.238	Band Edge	PASS	2008-08-27
7	24.232	Transmitter Radiated Power (EIPR/ERP)	PASS	2008-08-27
8	2.1053 2.1057 24.238	Radiated Out of Band Emissions	PASS	2008-08-27

2.3 Facilities and Accreditations

2.3.1 Facilities

Shenzhen Electronic Product Quality Testing Center Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

All measurement facilities used to collect the measurement data are located at Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen 518055 CHINA. The test site is constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22; the FCC registration number is 741109.

2.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	20 - 25
Relative Humidity (%):	40 - 60
Atmospheric Pressure (kPa):	96

3. 47 CFR PART 2, PART 22H REQUIREMENTS

3.1 Frequencies

3.1.1 Requirement

According to FCC section 24.229, the frequencies available in the Broadband PCS services are listed as below, in accordance with the frequency allocations table of FCC section 2.106.

(a) The following frequency blocks are available for assignment on an MTA basis:

Block A: 1850 - 1865MHz paired with 1930 - 1945MHz;

Block B: 1870 - 1885MHz paired with 1950 - 1965MHz

(b) The following frequency blocks are available for assignment on a BTA basis:

Block C: 1895 - 1910 MHz paired with 1975 - 1990MHz;

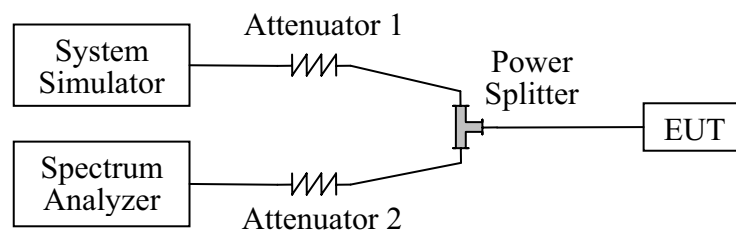
Block D: 1865 - 1870 MHz paired with 1945 - 1950MHz;

Block E: 1885 - 1890 MHz paired with 1965 - 1970MHz;

Block F: 1890 - 1895 MHz paired with 1970 - 1975MHz.

3.1.2 Test Description

1. Test Setup:



1.1 The EUT is coupled to the Spectrum Analyzer and the System Simulator with the suitable Attenuators through the Power Splitter; the path loss is calibrated to correct the reading.

1.2 The EUT is configured here as MS + Battery.

1.3 The EUT is commanded via the System Simulator (SS) to operate at the maximum output power. A communication link is established between the EUT and the SS.

1.4 The Spectrum Analyzer is set to max-peak detector function and maximum hold mode.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
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Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2008.06	1year
Spectrum Analyzer	Agilent	E7405A	US44210471	2008.07	1year
Power Splitter	Weinschel	1506A	NW521	(n.a.)	(n.a.)
Attenuator 1	Resnet	20dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 2	Resnet	3dB	(n.a.)	(n.a.)	(n.a.)

3.1.3 Procedure

1. Perform test system setup as section 3.1.2
2. The resolution bandwidth (RBW) of the Spectrum Analyzer was set to at least 1% of the emission bandwidth of the fundamental emission of the transmitter, e.g. for CDMA modulated signal (here used): $RBW=VBW=3$ kHz, for CDMA modulated signal: $RBW=VBW=30$ kHz.
3. The lowest and the highest channel were selected to perform tests respectively. Channel No.25 (lowest) and 1175(highest) for PCS band.
4. The MS operated at the maximum output power. Set the Spectrum Analyzer suitably to capture the waveform, search peak and mark, and then record the plot.

3.1.4 Test Result

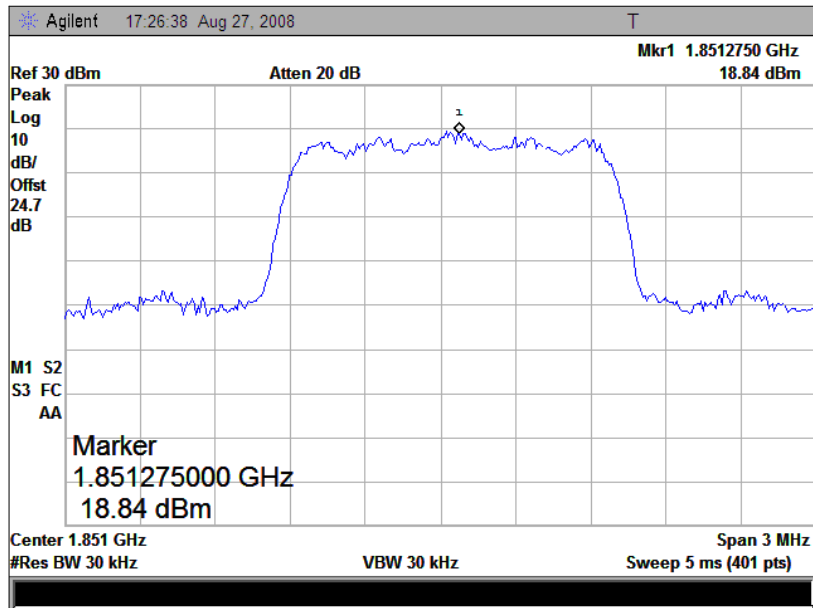
The Tx frequency arrangement of the PCS 1900MHz band employed by the EUT should be from 1850.2MHz to 1909.8MHz (the corresponding frequency block is from 1850MHz to 1910MHz). Here the lowest and highest channels are tested to verify the EUT's using the frequency block required.

1. Test Verdict:

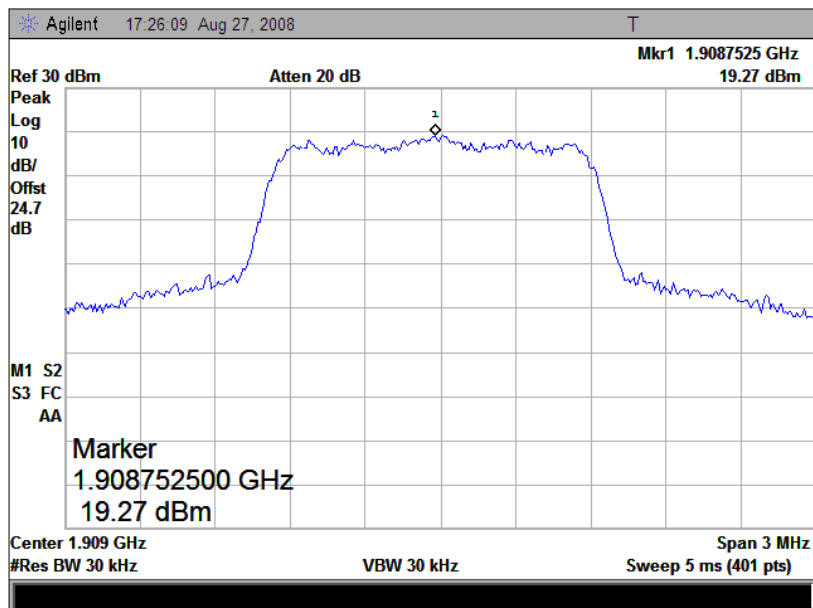
The required frequency block is employed legally, the verdict is PASS.

Band	Channel	Frequency (MHz)	Measured Carrier (dBm)	Refer to Plot
CDMA 1900MHz	25	1851.275	18.84	Plot C
	1175	1908.7525	19.27	Plot D

2. Test Plot:



(Plot C: CDMA 1900MHz Channel = 25)



(Plot D: CDMA 1900MHz Channel = 1175)

3.2 Conducted RF Output Power

3.2.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

3.2.2 Test Description

See section 0 of this report.

3.2.3 Test Procedure

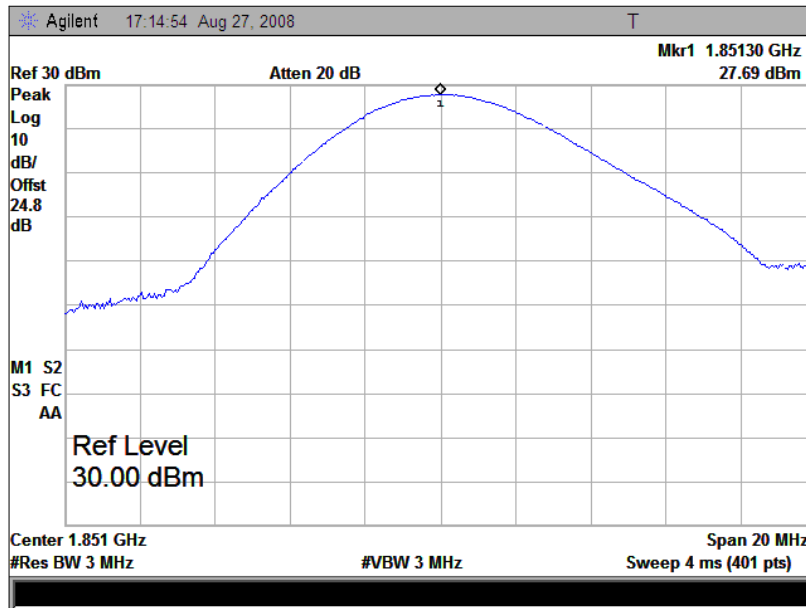
1. Perform test system setup as section 2.4.1 (the radio frequency load attached to the EUT antenna terminal is 50Ω).
2. The resolution bandwidth of the Spectrum Analyzer is set to be comparable to the emission bandwidth of the transmitter, e.g. for GSM modulated signal (here used): $RBW=VBW=1\text{MHz}$, for CDMA modulated signal: $RBW=VBW=3\text{MHz}$.
3. The lowest and the highest channel were selected to perform tests respectively. channel No.25 (lowest) 600(middle) and 1175(highest) for PCS band.
4. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak and mark it; finally record the peak and the plot.

3.2.4 Test Result

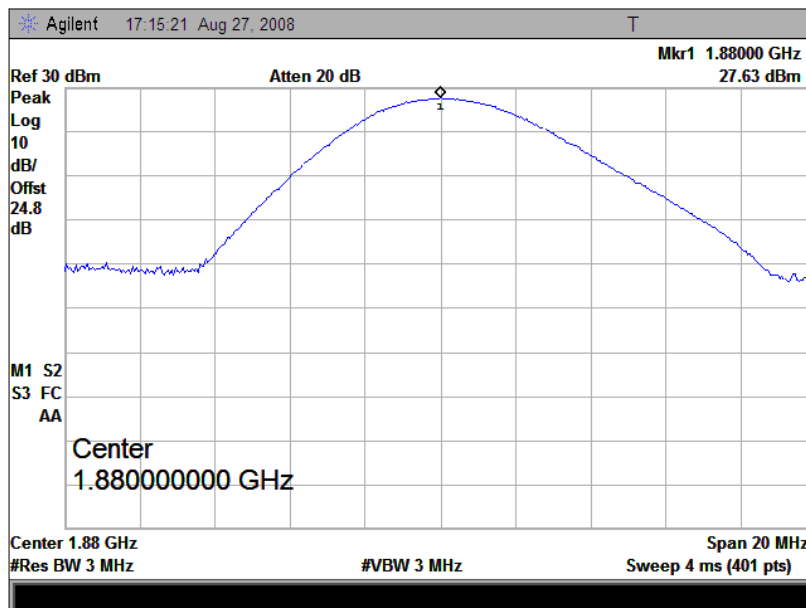
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Output Power		Rated Output Power		Verdict
			dBm	W	dBm	W	
CDMA 1900MHz	25	1851.30	27.69	0.587	33	7	PASS
	600	1880.0	27.63	0.579			PASS
	1175	1908.8	27.21	0.526			PASS

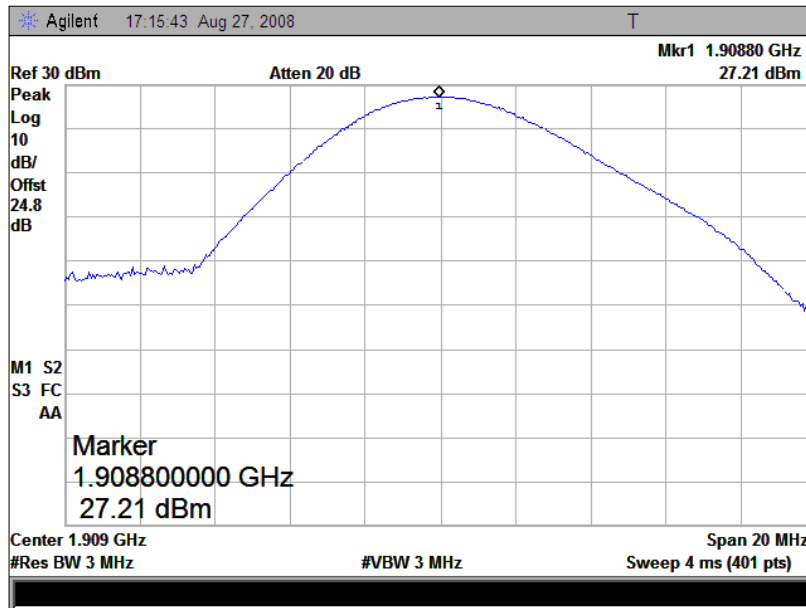
2. Test Plot:



(Plot D: CDMA 1900MHz Channel = 25)



(Plot E: CDMA 1900MHz Channel = 600)



(Plot F: CDMA 1900MHz Channel = 1175)

3.3 Occupied Bandwidth

3.3.1 Definition

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Occupied bandwidth is also known as the 99% emission bandwidth.

3.3.2 Test Description

See section 0 of this report.

3.3.3 Test Procedure

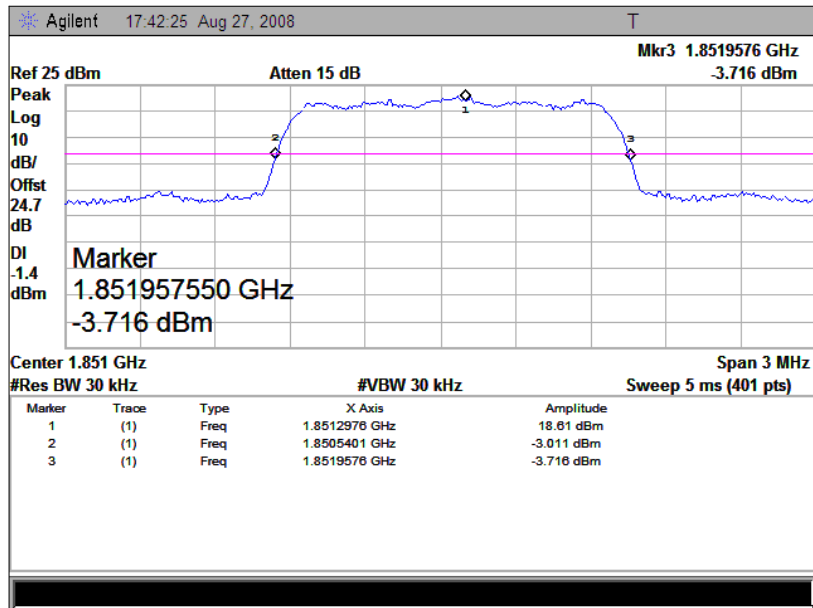
- 1 Perform test system setup as section 2.4.1 (the radio frequency load attached to the EUT antenna terminal is 50Ω).
- 2 The resolution bandwidth of the Spectrum Analyzer is set to be comparable to the emission bandwidth of the transmitter, e.g. for GSM modulated signal (here used): $RBW=VBW=1MHz$, for CDMA modulated signal: $RBW=VBW=3MHz$.
- 3 The lowest and the highest channel were selected to perform tests respectively. channel No.25 (lowest) 600(middle) and 1175(highest) for PCS band.
- 4 Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak and mark it; finally record the peak and the plot.

3.3.4 Test Verdict

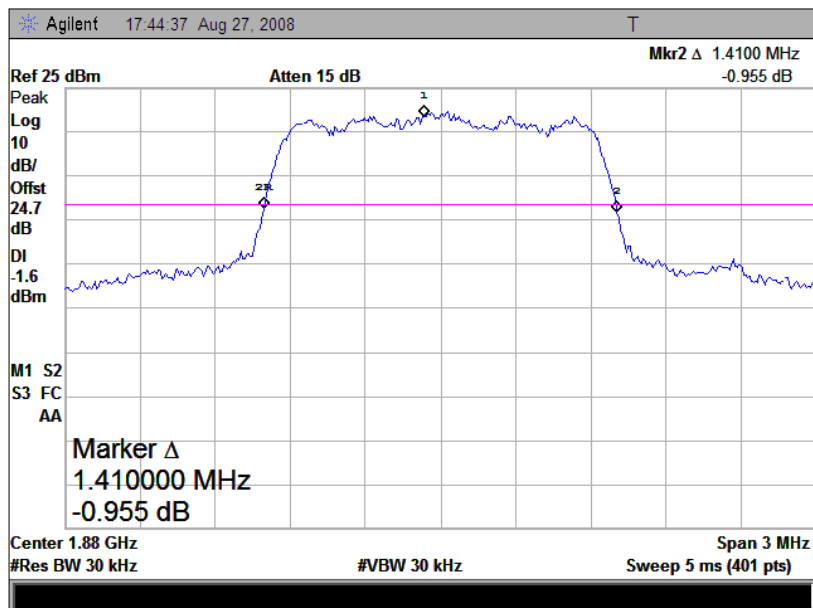
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured 20dB Occupied Bandwidth (MHz)	Refer to Plot
CDMA 1900MHz	25	1850.2	1.4175	Plot D
	600	1880.0	1.4100	Plot E
	1175	1909.8	1.4100	Plot F

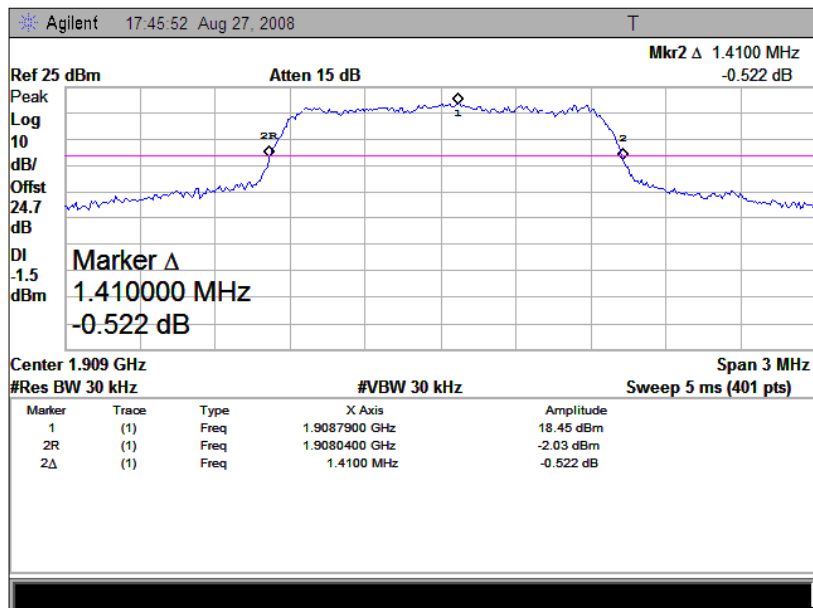
2. Test Plot:



(Plot D: CDMA 1900MHz Channel = 25)



(Plot E: CDMA 1900MHz Channel = 600)



(Plot F: CDMA 1900MHz Channel = 1175)

3.4 Frequency Stability

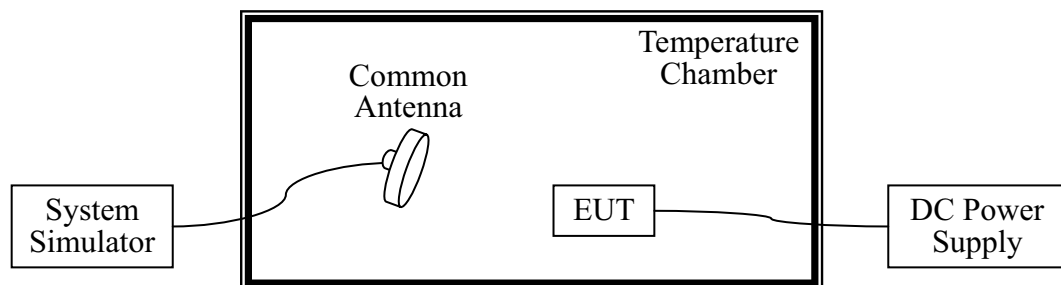
3.4.1 Requirement

According to FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from -30°C to $+50^{\circ}\text{C}$ at intervals of not more than 10°C .
- (b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

3.4.2 Test Description

1. Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power. A call is established between the EUT and the SS via a Common Antenna.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2007.06	1year
DC Power Supply	Good Will	GPS-3030DD	EF920938	2007.06	2year
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2007.03	1year

3.4.3 Test Procedure

1. Set the voltage of the DC Power Supply to normal supply voltage (here used 3.7V) and the temperature of the Temperature Chamber to vary from -30°C to $+50^{\circ}\text{C}$ at intervals of 10°C .

2. At each temperature level, the EUT is powered off and kept in the Temperature Chamber for two hours. After sufficient stabilization, turn on the EUT, command it via the System Simulator (SS) to operate at the maximum output power i.e. A communication link is established between the EUT and the SS.
3. The lowest and the highest channel were selected to perform tests respectively. channel No.25 (lowest) 600(middle) and 1175(highest) for PCS band..
4. The frequency deviation is measured (directly read from the SS, which can report the parameter) within three minutes.
5. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak and mark it; finally record the peak and the plot.
6. Adjust the temperature of the Temperature Chamber as specified in step 2, then repeat step 2 to 6.
7. Set the voltage of the DC Power Supply to high extreme supply voltage (here used 4.2V) and the temperature of the Temperature Chamber to normal (here used +22°C), then repeat step 2 to 7.
8. Set the voltage of the DC Power Supply to low extreme supply voltage (here used 3.6V) and the temperature of the Temperature Chamber to normal (here used +22°C), then repeat step 2 to 7.

3.4.4 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.7VDC, 4.2VDC and 3.6VDC, which are specified by the applicant; the normal temperature here used is 25°C. The frequency deviation limit of CDMA 1900MHz is ± 1 ppm

Band	Test Conditions		Frequency Deviation						Verdict
	Power (VDC)	Temperature (°C)	Channel = 25 (1851.2MHz)		Channel = 600 (1880.0MHz)		Channel = 1175 (1908.8MHz)		
			Hz	Limits	Hz	Limits	Hz	Limits	
CDMA 1900MHz	3.7	-30	26.05	± 1851.2	38.25	± 1880.0	22.16	± 1908.8	PASS
		-20	26.59		29.51		15.28		
		-10	31.05		-19.08		30.17		
		0	-29.51		-11.99		-25.04		
		+10	-26.30		24.81		-8.58		
		+20	21.05		30.08		10.05		
		+30	-20.58		26.81		15.24		
		+40	-30.15		26.17		31.28		
		+50	22.16		-9.05		-27.61		
	4.2	+25	24.51	-16.80	-28.52				
	3.6	+25	26.18	17.08	22.54				

3.5 Conducted Out of Band Emissions

3.5.1 Requirement

According to FCC section 24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43+10*\log(P)$ dB. This calculated to be -13dBm.

3.5.2 Test Description

See section 0 of this report.

3.5.3 Test Procedure

1. Make a limit line whose value is -13dBm on the Spectrum Analyzer.
2. The lowest and the highest channel were selected to perform tests respectively. Channel No.25 (lowest), 600 (middle) and 1175(highest) for PCS band.
3. Set the RBW of the Spectrum Analyzer to 1MHz, and the measuring frequency range from 9kHz to 10th harmonic of the fundamental frequency (here used 26.5GHz); mark the fundamental frequency and the harmonics thereof; finally record the harmonics and the plot. Note, the measuring frequency range can be divided into several parts to perform tests.
4. In the 1MHz bands immediately outside and adjacent to the frequency black, the RBW of the Spectrum Analyzer was set to at least one percent of the emission bandwidth of the fundamental emission of the transmitter, e.g. for GSM modulated signal (here used): RBW=3kHz, for CDMA modulated signal: RBW=30kHz.
5. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak and mark it; finally record the peak and the plot.

3.5.4 Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

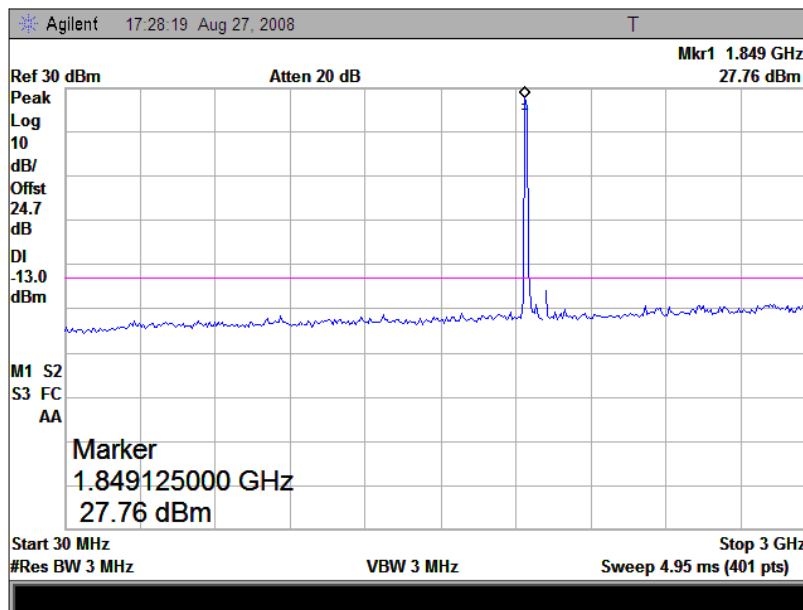
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
CDMA	25	1851.2	-21.04	Plot D.1/D.2	-13	PASS

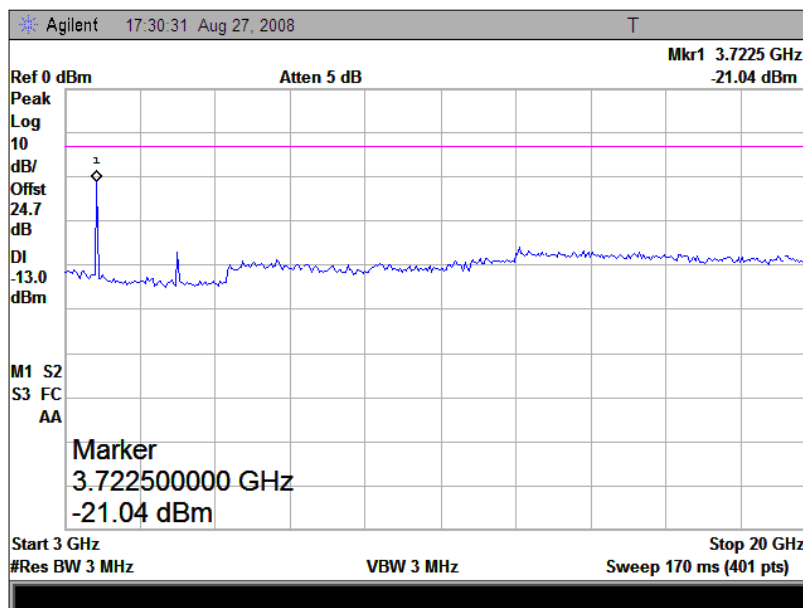
Band	Channe 1	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdic t
1900MHz	600	1880.0	-30.85	Plot E.1/E.2		PASS
	1175	1908.8	-27.37	Plot F.1/F.2		PASS

2. Test Plot for the Whole Measurement Frequency Range:

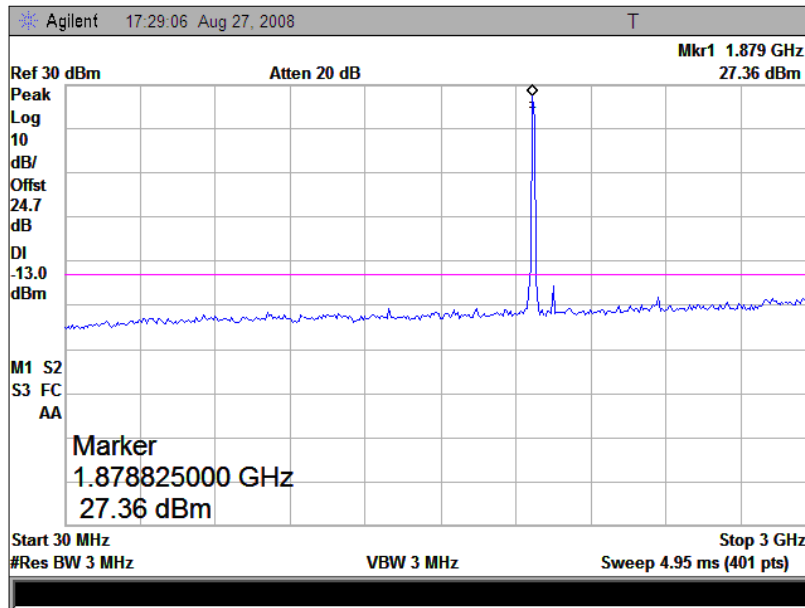
Note: the power of the EUT transmitting frequency should be ignored.



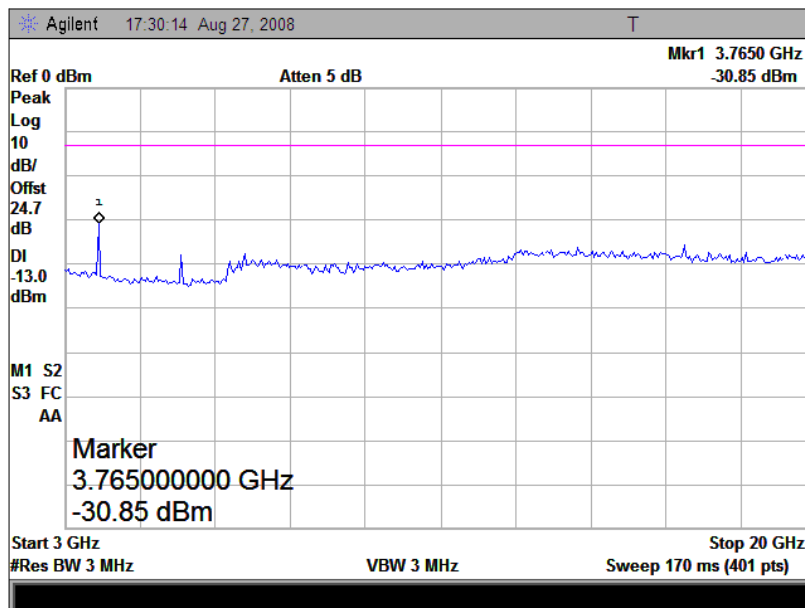
(Plot D.1: CDMA 1900MHz Channel = 25, 30MHz to 3GHz)



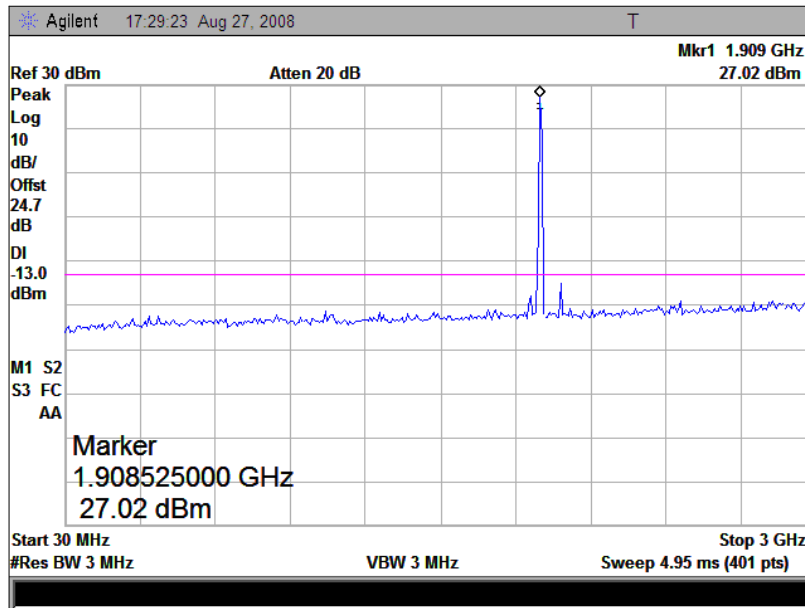
(Plot D.2: CDMA 1900MHz Channel = 25, 3GHz to 20GHz)



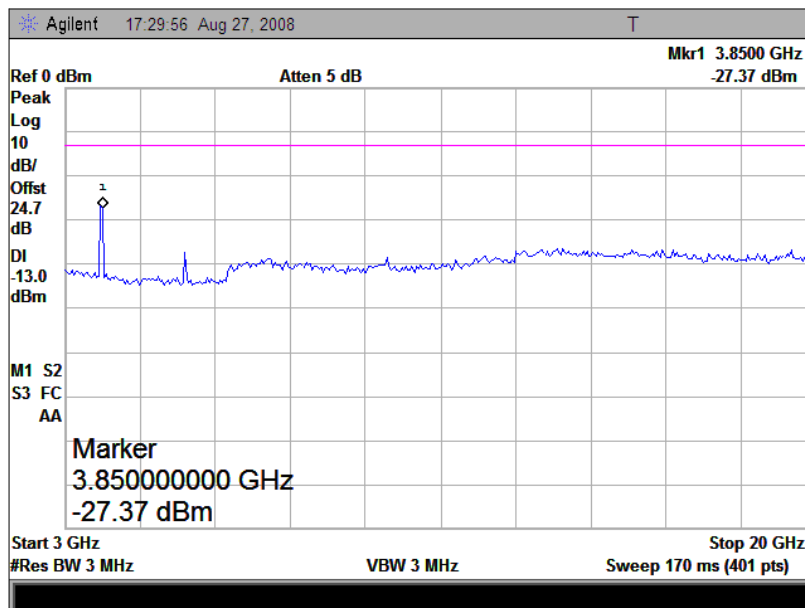
(Plot E.1: CDMA 1900MHz Channel = 600, 30MHz to 3GHz)



(Plot E.2: CDMA 1900MHz Channel = 600, 3GHz to 20GHz)



(Plot F.1: CDMA 1900MHz Channel = 1175, 30MHz to 3GHz)



(Plot F.2: CDMA 1900MHz Channel = 1175, 3GHz to 20GHz)

3.6 Band Edge

3.6.1 Requirement

According to FCC section 22.917(b) and FCC section 24.238(b), in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth (26dB emission bandwidth) of the fundamental emission of the transmitter may be employed.

3.6.2 Test Description

See section 0 of this report.

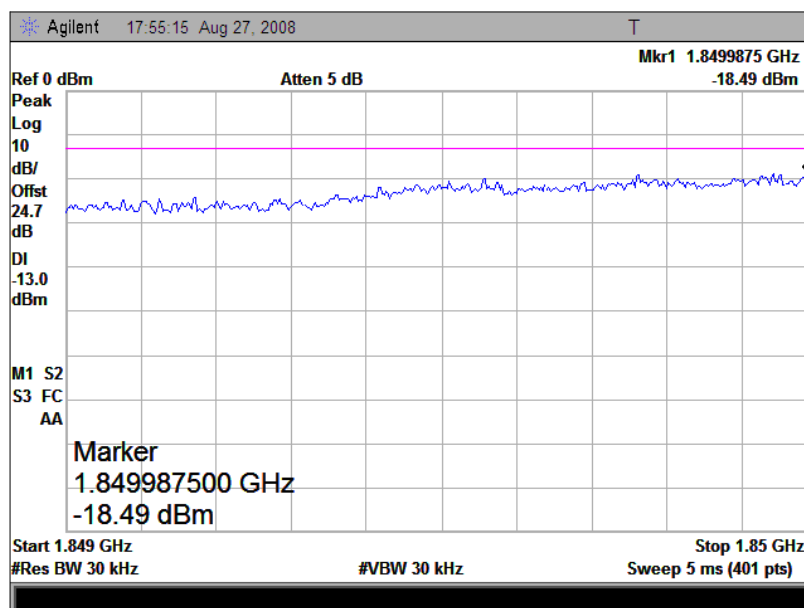
3.6.3 Test Result

The lowest and highest channels are tested to verify the band edge emissions.

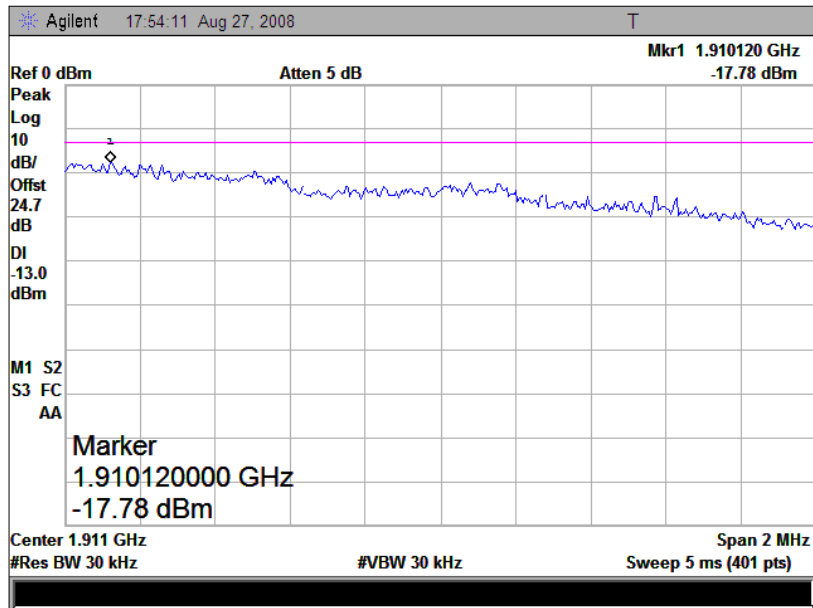
1. Test Verdict:

Band	Channe 1	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
CDMA	25	1851.2	-18.49	Plat C	-13	PASS
1900MHz	1175	1908.8	-17.78	Plot D		PASS

2. Test Plot:



(Plot C: Channel = 25)



(Plot D: Channel = 1175)

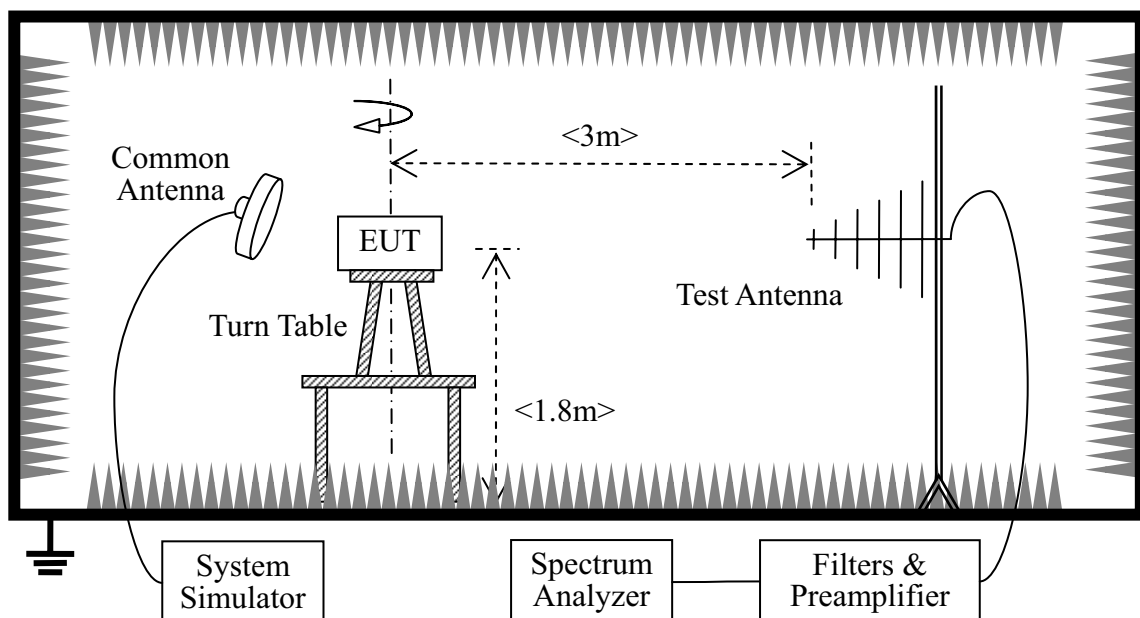
3.7 Transmitter Radiated Power (EIRP)

3.7.1 Requirement

According to FCC section 24.232, the broadband PCS mobile station is limited to 2Watts e.i.r.p. peak power.

3.7.2 Test Description

1. Test Setup:



The EUT, which is powered by the Battery charged with the AC Adapter, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS via a Common Antenna.

The Test Antenna is a Bi-Log one (used for 30MHz to 3GHz) or a Horn one (used for above 3GHz), and it's located at the same height as the EUT. The Filters consists of Notch Filters and High Pass Filter.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2008.06	1year
Spectrum Analyzer	Agilent	E7405A	US44210471	2008.07	1year
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2006.08	2year

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2008.07	1year
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2008.07	1year

3.7.3 Test Procedure

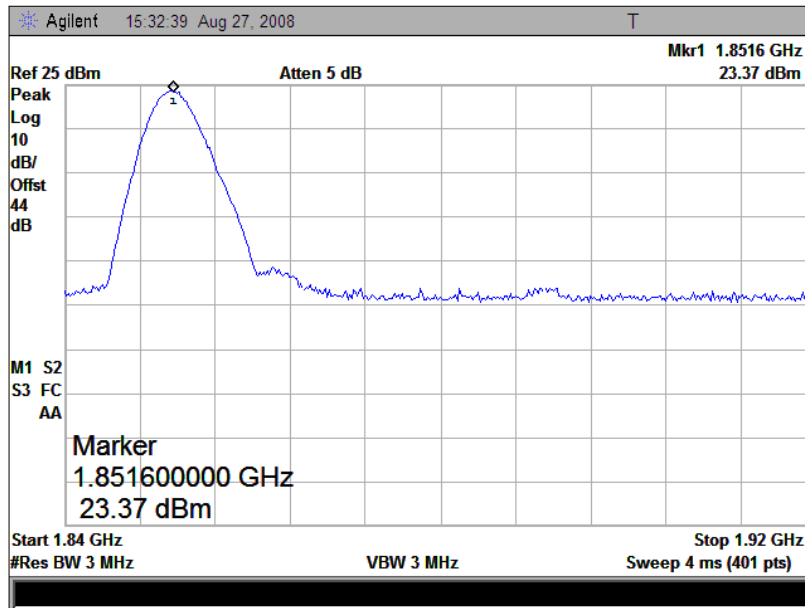
1. The resolution bandwidth of the Spectrum Analyzer is set to be comparable to the emission bandwidth of the transmitter, e.g. for GSM modulated signal (here used): RBW=VBW=1MHz, for CDMA modulated signal: RBW=VBW=3MHz.
2. The lowest and the highest channel were selected to perform tests respectively. channel No.25 (lowest) 600(middle) and 1175(highest) for PCS band..
3. Employ the bi-log Test Antenna as the test system receiving antenna; set the polarization of the Test Antenna to be the same as that of the EUT transmitting antenna.
4. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; actuate the Turn Table to turn from 0 degrees to 360 degrees to find the maximum reading via the Spectrum Analyzer, mark the peak; finally record the peak and the plot.
5. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak and mark it; finally record the peak and the plot.

3.7.4 Test Result

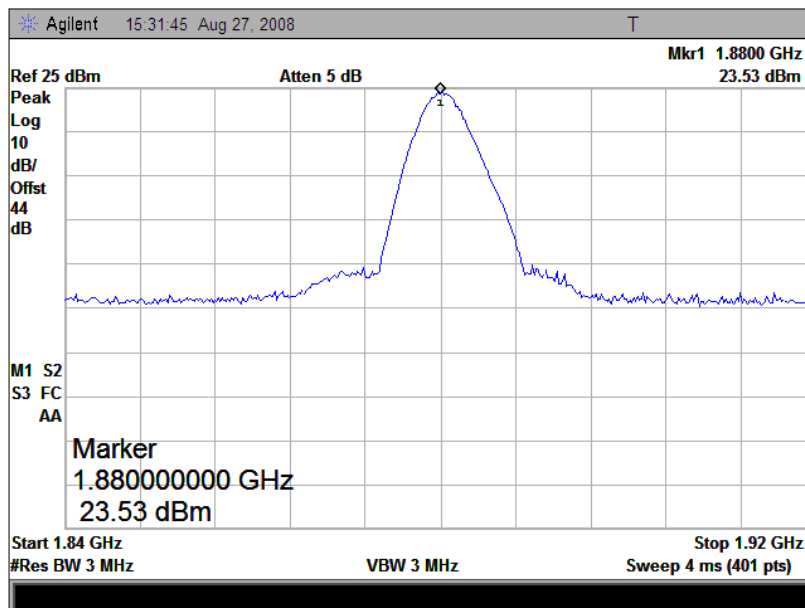
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured EIRP			Limit		Verdict
			dBm	W	Refer to Plot	dBm	W	
CDMA 1900MHz	25	1850.2	23.37	0.217	Plot D	33	2	PASS
	600	1880.0	23.53	0.225	Plot E			PASS
	1175	1909.8	22.8	0.191	Plot F			PASS

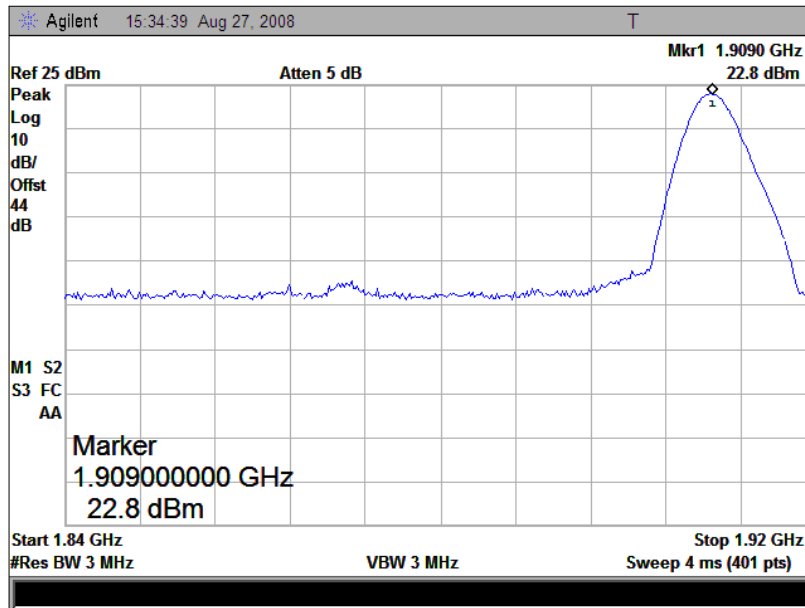
2. Test Plot:



(Plot D: CDMA 1900MHz Channel = 25)



(Plot E: CDMA 1900MHz Channel = 600)



(Plot F: CDMA 1900MHz Channel = 1175)

3.8 Radiated Out of Band Emissions

3.8.1 Requirement

According to FCC section 22.917(a) and section 24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43+10*\log(P)$ dB. This calculated to be -13dBm.

3.8.2 Test Description

See section 3.7.2 of this report.

3.8.3 Test Result

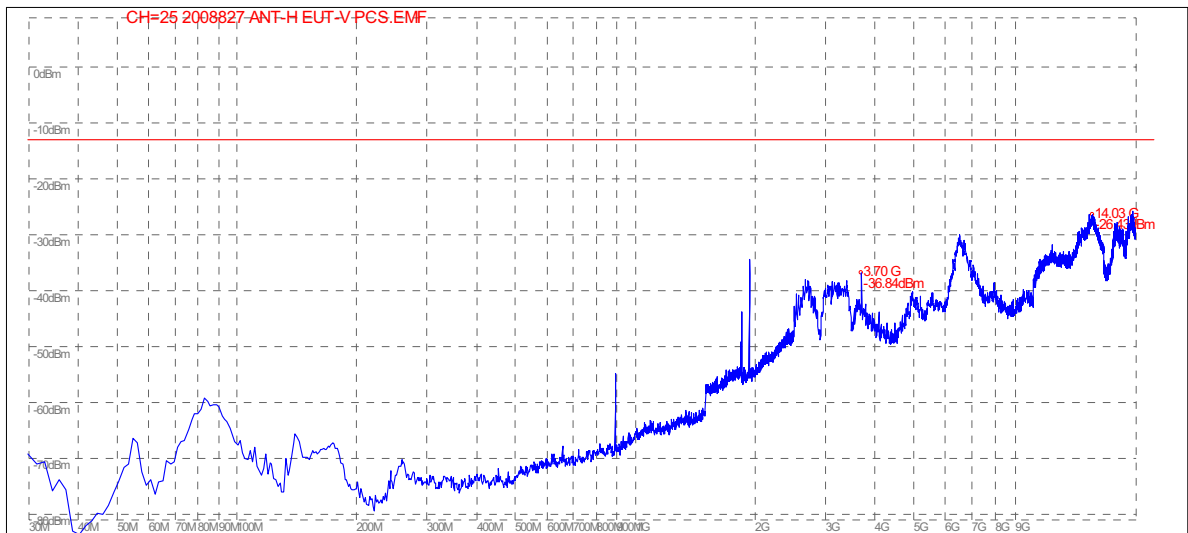
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested to verify the out of band emissions.

1. Test Verdict:

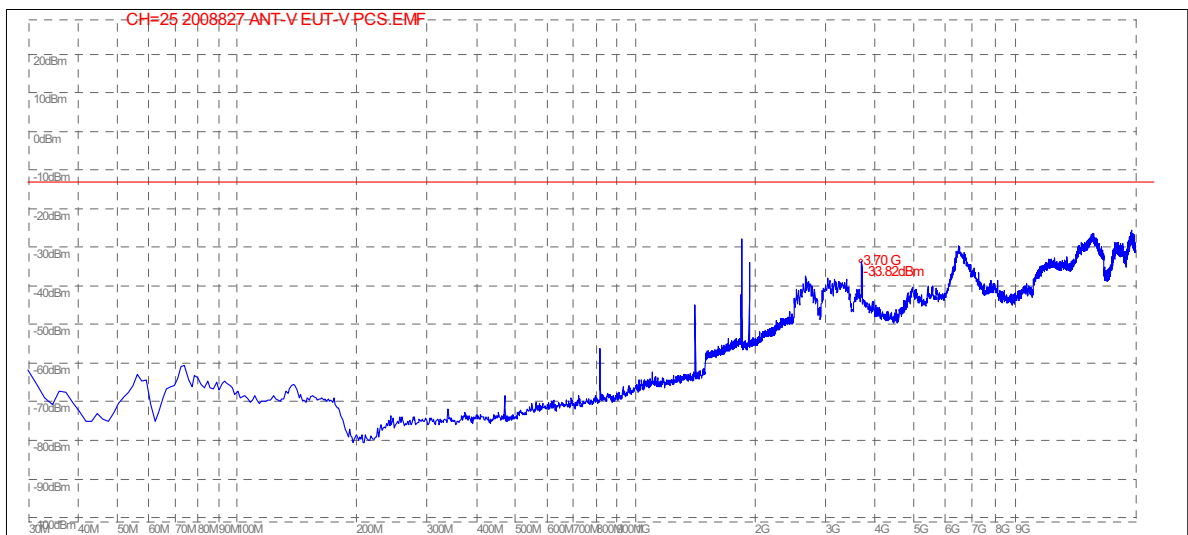
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)		Refer to Plot	Limit (dBm)	Verdict
			Test Antenna Horizontal	Test Antenna Vertical			
CDMA 1900MHz	25	3700	-36.84	-33.72	Plot D.1/D.2	-13	PASS
	600	3760	< -25	-36.83	Plot E.1/E.2		PASS
	1175	1909.8	< -25	< -25	Plot F.1/F.2		PASS

2. Test Plot for the Whole Measurement Frequency Range:

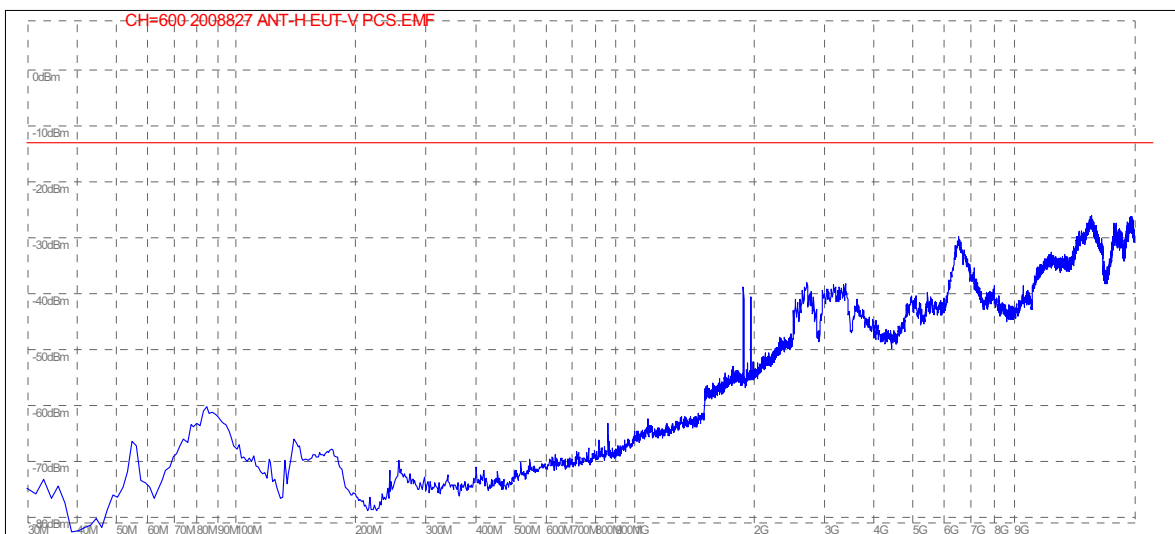
Note: the power of the EUT transmitting frequency should be ignored.



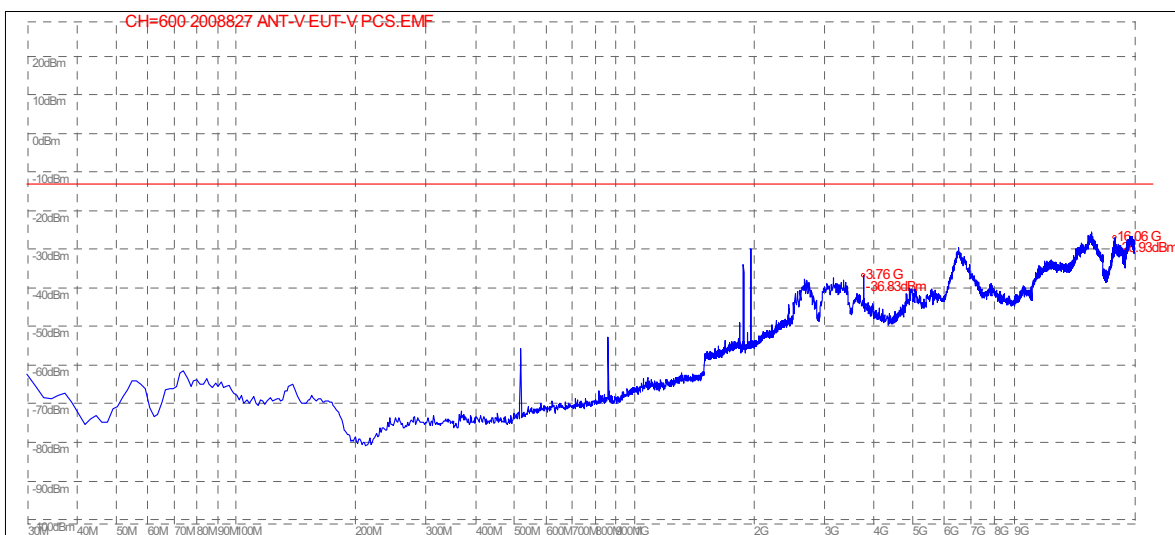
(Plot D.1: CDMA 1900MHz Channel = 25, Test Antenna Horizontal)



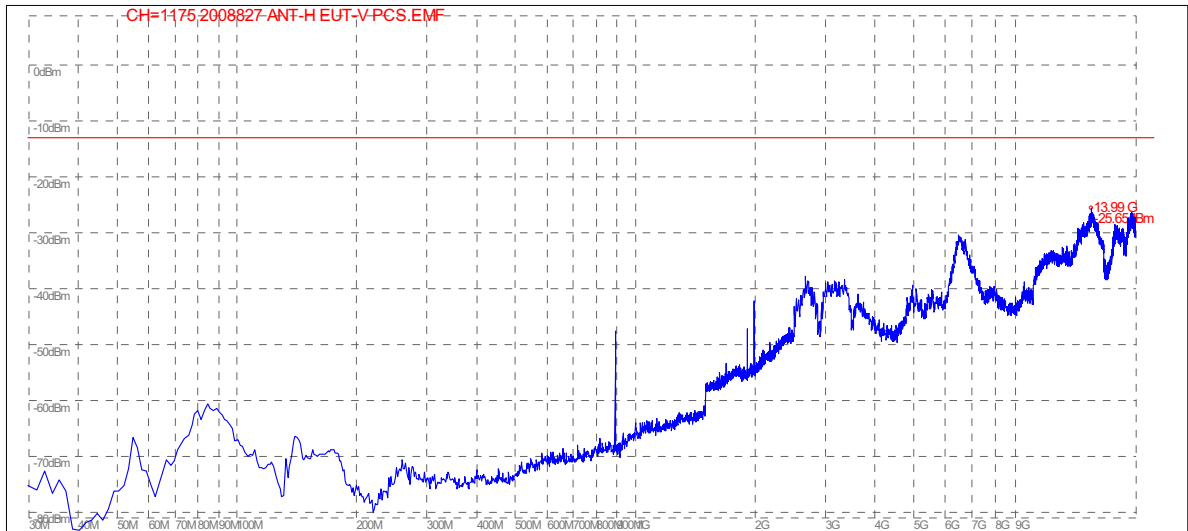
(Plot D.2: CDMA 1900MHz Channel = 25, Test Antenna Vertical)



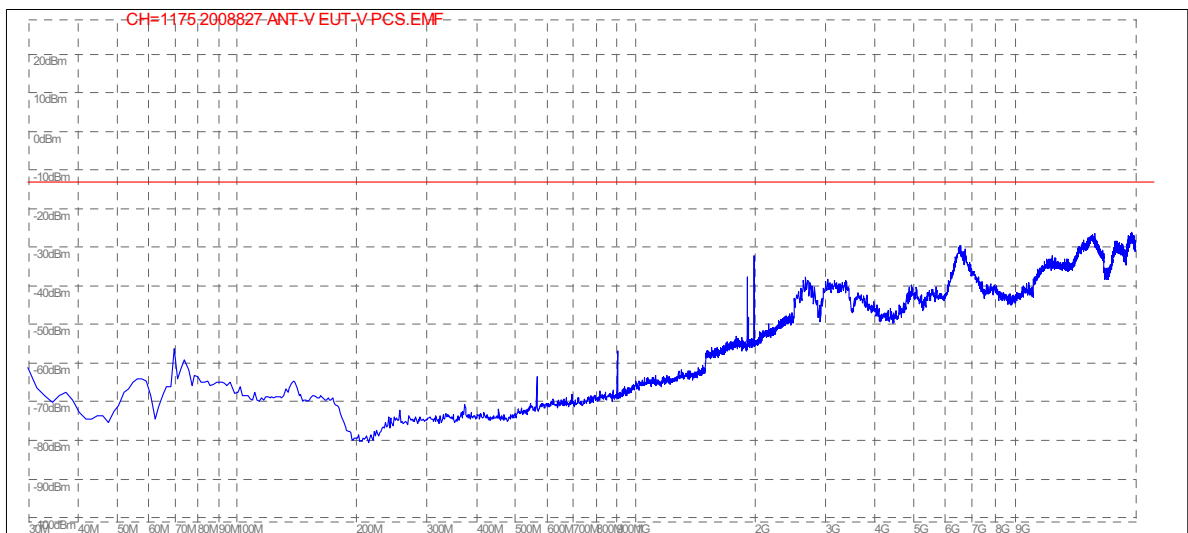
(Plot E.1: CDMA 1900MHz Channel = 600, Test Antenna Horizontal)



(Plot E.2: CDMA 1900MHz Channel = 600, Test Antenna Vertical)



(Plot F.1: CDMA 1900MHz Channel = 1175, Test Antenna Horizontal)



(Plot F.2: CDMA 1900MHz Channel = 1175, Test Antenna Vertical)

**** END OF REPORT ****