Report No.:SZ11030003E01

47 CFR PART 24E

TEST REPORT

Issued to

Qingdao Haier Telecom Co.,ltd.
No.1 Haier Road Hi-tech Zone Qingdao P.R.CHINA

For

CDMA 1x mobile phone

Model Name:	HC-C53
Brand Name:	Haier
FCC ID:	SG70121HC-C53
Test Rule:	47 CFR Part 2
	47 CFR Part 24 Subpart E
Test date:	February 27, 2011 – March 9, 2011

by

Shenzhen Morlab Communications Technology Co., Ltd.

Tested by Tian Junjie	*Approved by* Shu Luan	*Review by* Huang Pulong
Date 2011.3.10	*Date* 2011.3.10	*Date* 2011.3.10

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Change History		
Issue	Date	Reason for change
1.0	March 10, 2011	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type ..... :	CDMA 1x mobile phone
Serial No. ..... :	(n.a, marked #1 by test site)
Hardware Version ..... :	P0V0
Software Version ..... :	C5310-HSP-S001.0-MOVILNET
Applicant ..... :	Qingdao Haier Telecom Co.,ltd No.1 Haier Road Hi-tech Zone Qingdao P.R.CHINA
Manufacturer ..... :	Qingdao Haier Telecom Co.,ltd No.1 Haier Road Hi-tech Zone Qingdao P.R.CHINA
Frequency Range ..... :	Tx: 1851.25 MHz -1908.75 MHz; Rx: 1931.25 MHz-1988.75 MHz
Modulation Type..... :	CDMA 1X
Emission Designators ..... :	1M25F9W
Power Supply ..... :	Battery Model Name: 423450A Brand name: BAK Capacitance: 800mAh Rated voltage: 3.7V Manufacturer: ShenZhen BAK Battery CO.,LTD Manufacturer Address: BAK Industrial Park,Kuichong Street,Longgang District,Shenzhen
Ancillary Equipments ..... :	AC Adapter (Charger for Battery) Model Name: H21115 Brand Name: 利顺达 Serial No.: (n.a. marked #1 by test site) Rated Input: ～ 100-240V, 50- 60Hz, 150mA Rated Output: ⎓ 5.0V, 550mA Manufacturer: Ningbo Lishunda Electronics Co.,Ltd Manufacturer Address: No.13 Lishan Guangming Rd.Yuyao City, Ningbo, Zhejiang, China

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<=n<=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: The GPRS was tested under 2 uplink time slots mode.

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.2 Test Standards and Results

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

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-09 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
3	47 CFR Part 24 (10-1-09 Edition)	Personal Communications Services

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

No.	Section	Description	Result
1	2.1046	Conducted RF Output Power	PASS
2	2.1049	20dB Occupied Bandwidth	PASS
3	2.1055 22.355 24.235	Frequency Stability	PASS
4	2.1051 2.1057 22.917 24.238	Conducted Out of Band Emissions	PASS
5	2.1051 2.1057 22.917 24.238	Band Edge	PASS
6	22.913 24.232	Transmitter Radiated Power (EIPR/ERP)	PASS
7	2.1053 2.1057 22.917 24.238	Radiated Out of Band Emissions	PASS

NOTE：Measurement method according to TIA/EIA-603.

1.3 Facilities and Accreditations

1.3.1 Facilities

Shenzhen Morlab Communications Technology Co., Ltd. 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 L3572.

All measurement facilities used to collect the measurement data are located at 3/F, Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055 P. R. 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.

1.3.1 Test Equipments

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2010.09	1year
Spectrum Analyzer	Agilent	E7405A	US44210471	2010.09	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.)
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2010.09	2year
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2010.09	1year
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2010.09	1year
DC Power Supply	Good Will	GPS-3030DD	EF920938	2010.09	2year
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2010.09	1year

1.3.2 Test Environment Conditions

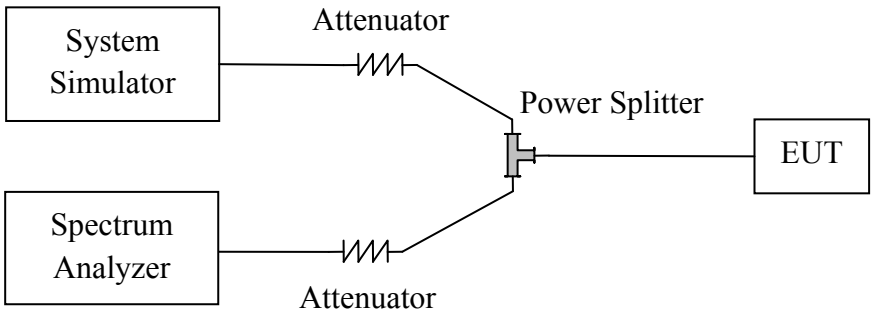
During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

2. 47 CFR PART 2, PART 22H, PART 24E REQUIREMENTS

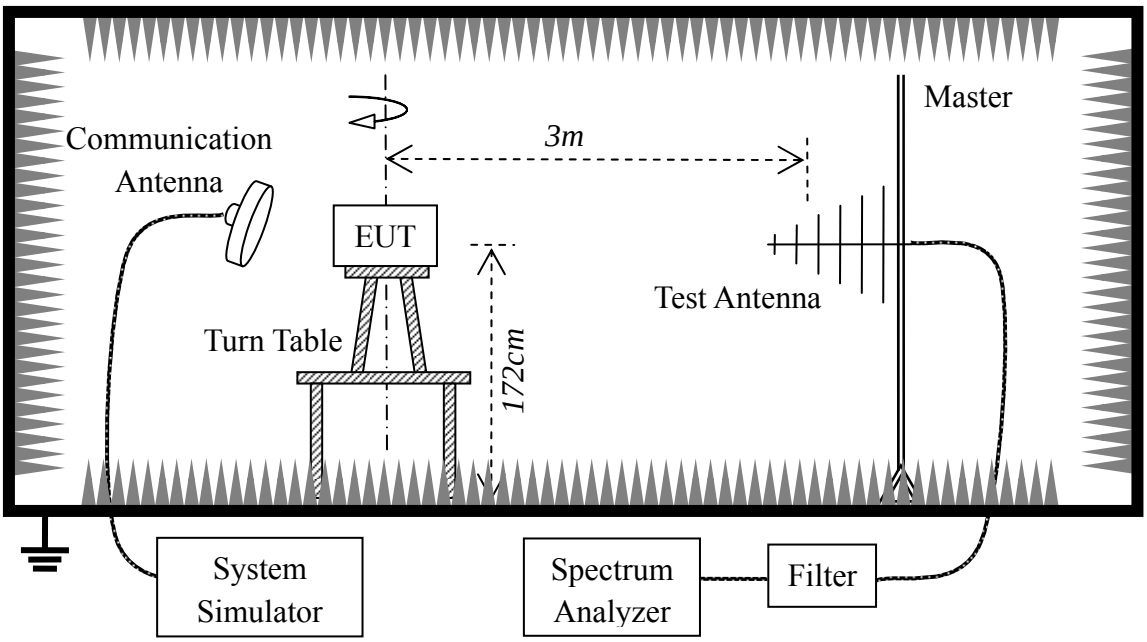
2.1 General Information

2.1.1 Conducted Related Tests



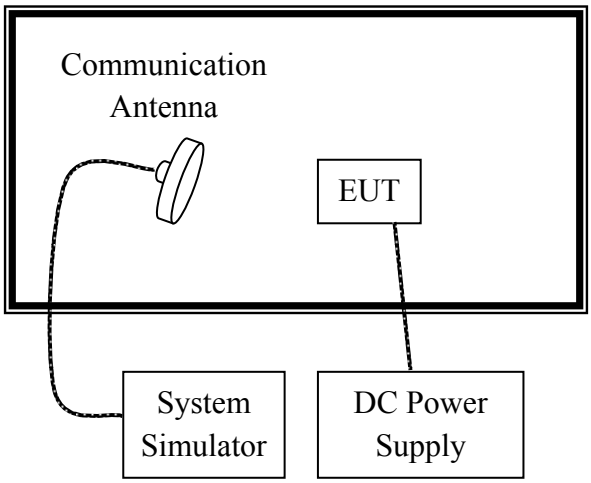
1. The EUT is coupled to the Spectrum Analyzer and the System Simulator with the suitable Attenuators through the Power Splitter; the path loss is calibrated to correct the reading.
2. The EUT is configured here as MS + Battery.
3. The EUT is commanded via the System Simulator (SS) to operate at the maximum output power .A communication link is established between the EUT and the SS.
4. The Spectrum Analyzer is set to max-peak detector function and maximum hold mode.

2.1.2 Radiated Power and Spurious Emission Tests



1. The test is performed in a full-Anechoic Chamber; the air loss of the site and the factors of the test system are pre-calibrated using the substitution method.
2. The EUT is configured as MS + Battery.
3. The EUT is placed on the vertical axis of a Turn Table 1.72 meters above the ground.
4. The Test Antenna is a bi-log one or a horn one, and the Test Antenna is at the same height as the EUT.
5. 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.
6. The Spectrum Analyzer is set to max-peak detector function and maximum hold mode.

2.1.3 Frequency Stability Test



1. The test is performed in a Temperature Chamber.
2. The EUT is configured as MS + Battery.

2.2 Frequencies

2.2.1 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

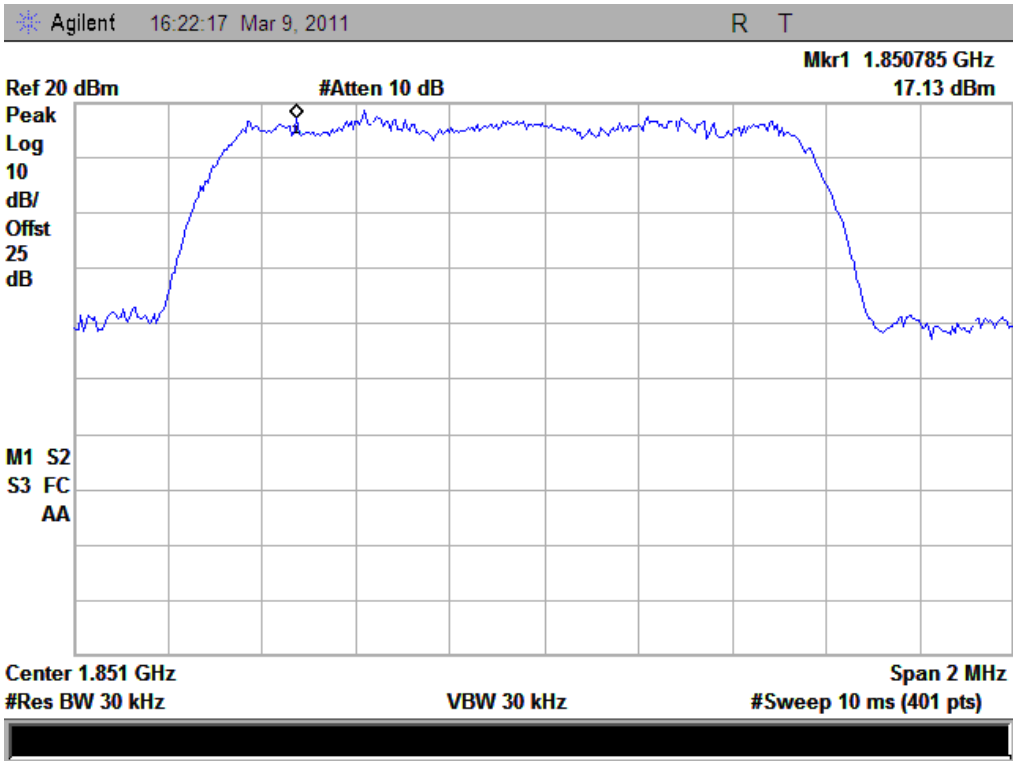
(b) The following frequency blocks are available for assignment on a BTA basis:
Block C: 1895 - 1910 MHz paired with 1975 - 1990MHz;
Block D: 1865 - 1870 MHz paired with 1945 - 1950MHz;
Block E: 1885 - 1890 MHz paired with 1965 - 1970MHz;
Block F: 1890 - 1895 MHz paired with 1970 - 1975MHz.

2.2.2 Test Procedure

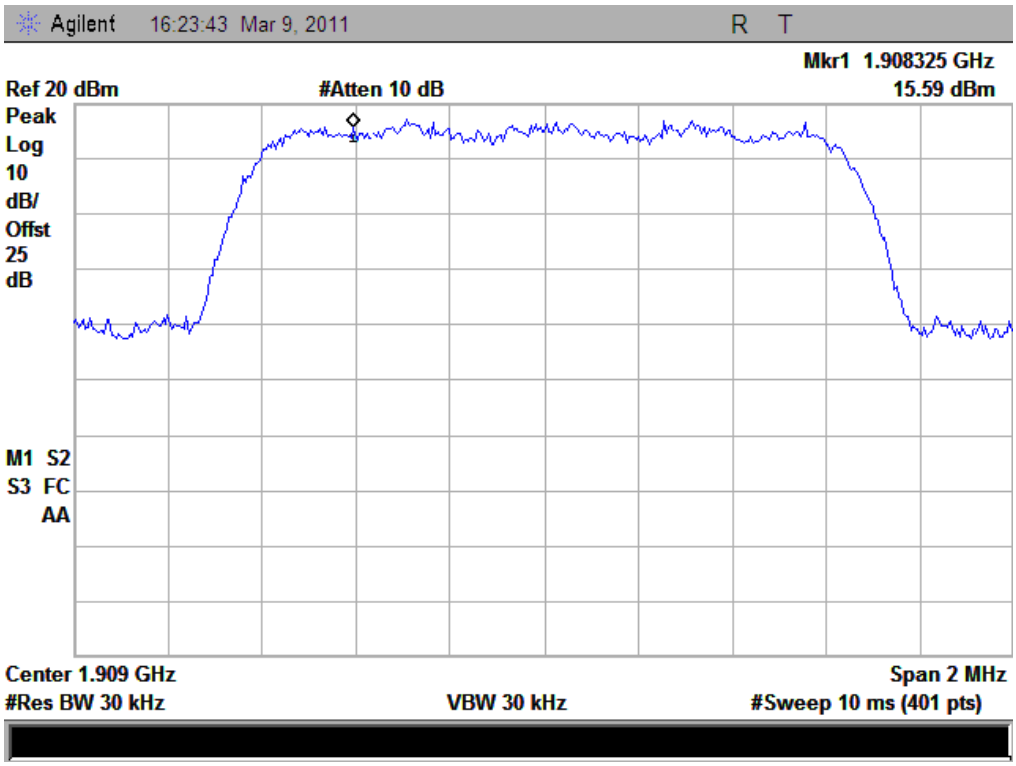
1. Perform test system setup as section 2.1.1.
2. The resolution bandwidth (RBW) of the Spectrum Analyzer was set to at lease 1% of the emission bandwidth of the fundamental emission of the transmitter, e.g. for GSM modulated signal (here used): RBW=VBW=3kHz, for CDMA modulated signal: RBW=VBW=30kHz.
3. The lowest and the highest channel were selected to perform tests respectively. Channel No.25 (lowest) and 1175(highest) for CDMA1900 MHz 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.

2.2.3 Test Result

The frequencies of the lowest channel and the highest channel are as the following figures.



(Plot A: CDMA 1900MHz Channel = 25)



(Plot B: CDMA 1900MHz Channel = 1175)

2.3 Conducted RF Output Power

2.3.1 Requirement

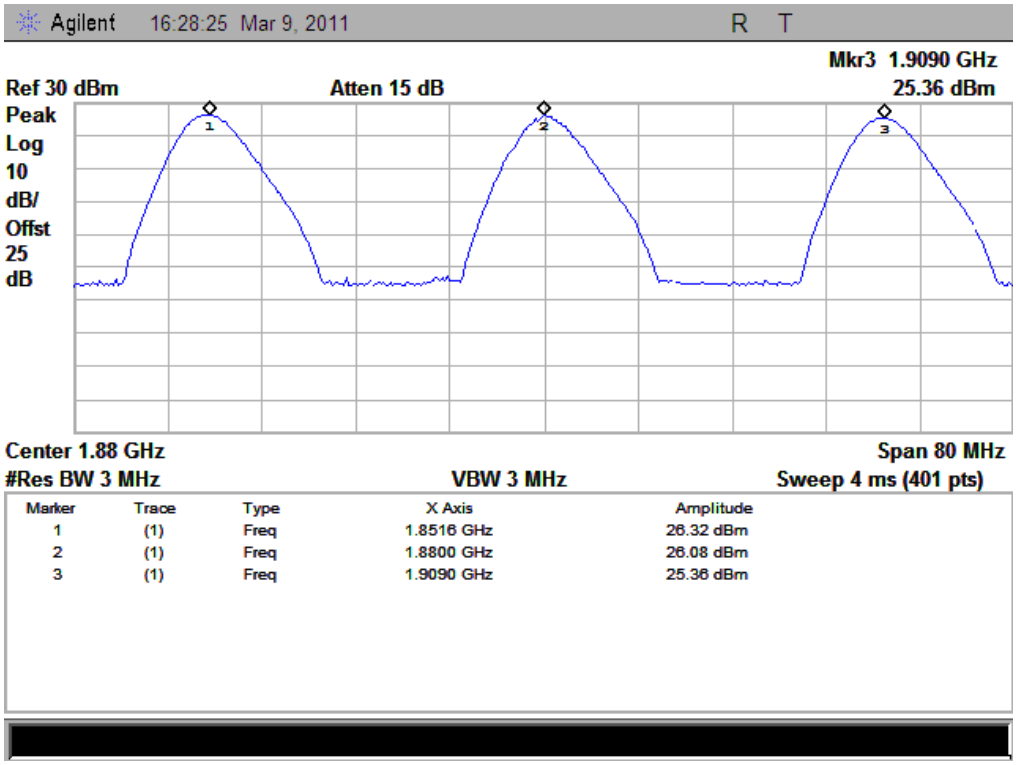
According to FCC §2.1046 (a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and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

2.3.2 Test Procedure

1. Perform test system setup as section 2.1.1 (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: RBW=VBW=1MHz, for CDMA modulated signal(here used): RBW=VBW=3MHz.
3. The low, middle and the high channels are selected to perform tests respectively.
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.

2.3.3 Test Result

No.	Channel Number	Frequency (MHz)	Measured Power		Rated Power	
			dBm	W	dBm	W
CDMA 1900MHz	25	1851.25	26.32	0.43	38.5	7
	600	1880.0	26.08	0.41		
	1175	1908.75	25.36	0.34		



(Plot A: CDMA 1900MHz Channel = 25, 600, 1175)

2.4 Occupied Bandwidth

2.4.1 Occupied Bandwidth Definition

According to FCC §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.

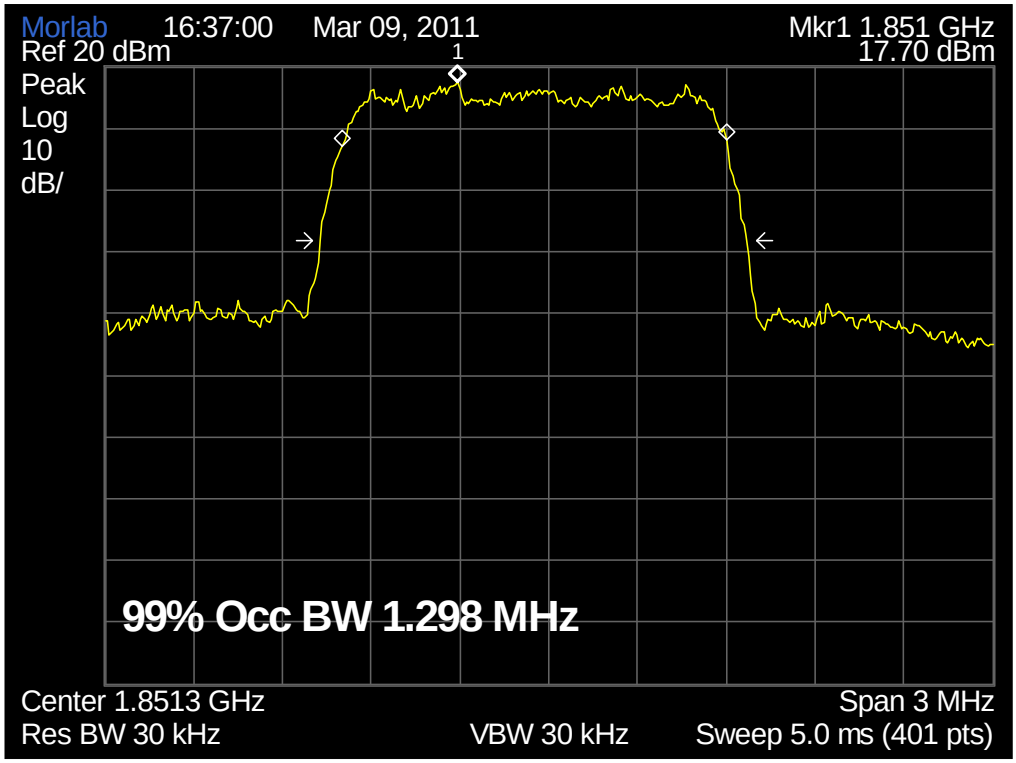
Occupied bandwidth is also known as the 99% emission bandwidth. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

2.4.2 Test Procedure

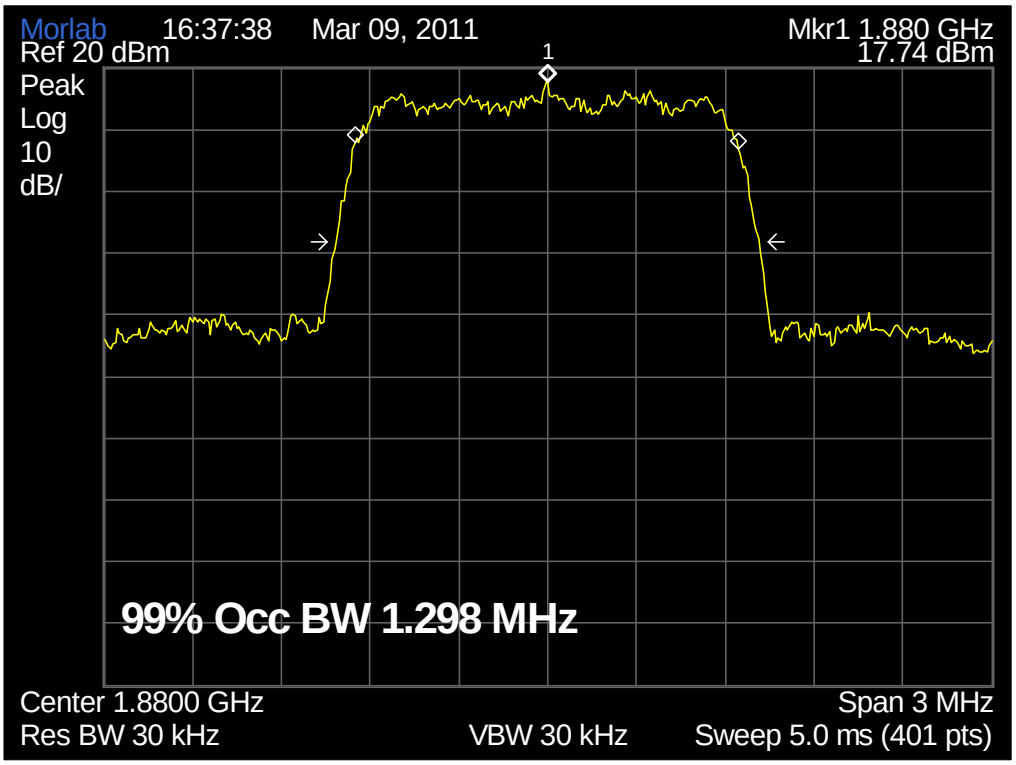
1. Perform test system setup as section 2.1.1.
2. The resolution bandwidth of the Spectrum Analyzer is set to at least one percent of the emission bandwidth, e.g. for GSM modulated signal: RBW=VBW=3kHz, for CDMA modulated signal(here used): RBW=VBW=30kHz.
3. The low, middle and the high channels are selected to perform tests respectively.
4. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak; make a line whose value is 20dB lower than the peak; mark two points which the line intersected the waveform at; finally record the delta of the two points as the occupied bandwidth and the plot.

2.4.3 Test Result

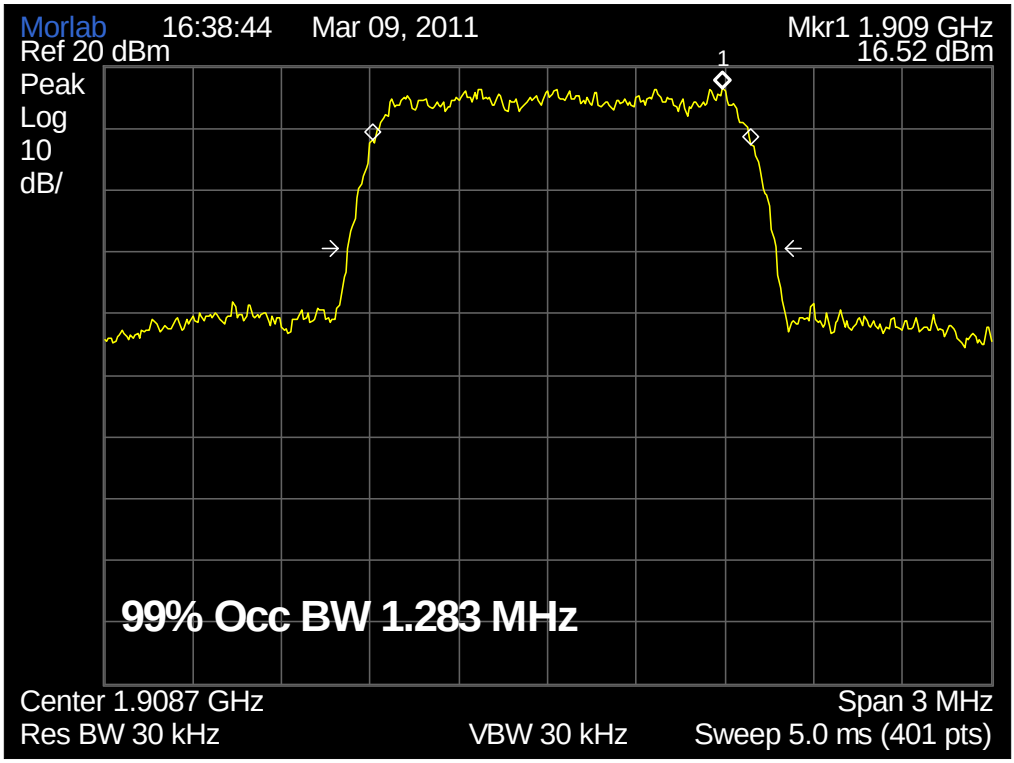
Band	Channel	Frequency (MHz)	Measured 20dB Occupied Bandwidth (MHz)	Refer to Plot
CDMA 1900MHz	25	1851.25	1.298	Plot A
	600	1880.0	1.298	Plot B
	1175	1908.75	1.283	Plot C



(Plot A: CDMA 1900MHz Channel = 25)



(Plot B: CDMA 1900MHz Channel = 600)



(Plot C: CDMA 1900MHz Channel = 1175)

2.5 Conducted Spurious Emission

2.5.1 Requirement

According to FCC §22.917(a) and 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.

2.5.2 Test Procedure

1. Perform test system setup as section 2.1.1.
2. Make a limit line whose value is -13dBm on the Spectrum Analyzer.
3. The lowest, middle and the highest channels are selected to perform tests respectively.
4. Set the RBW of the Spectrum Analyzer to 1MHz, and the measuring frequency range from 9kHz to 10^{th} harmonic of the fundamental frequency (here used 10GHz); 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.
5. 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: RBW=3kHz, for CDMA modulated signal(here used): RBW=30kHz.

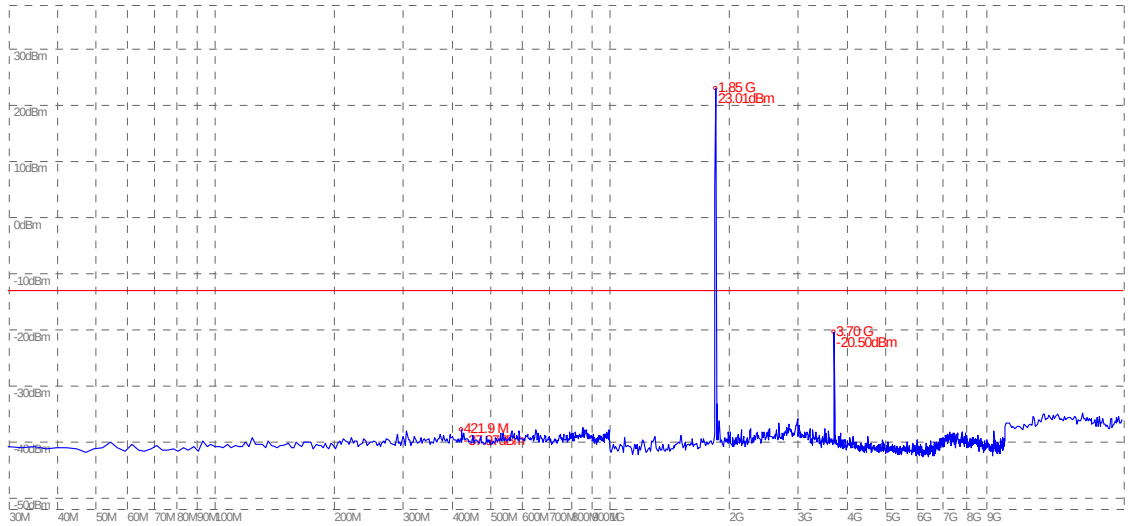
2.5.3 Test Result

2.5.3.1 Table for the Harmonics and Plots for the Spurious Emission

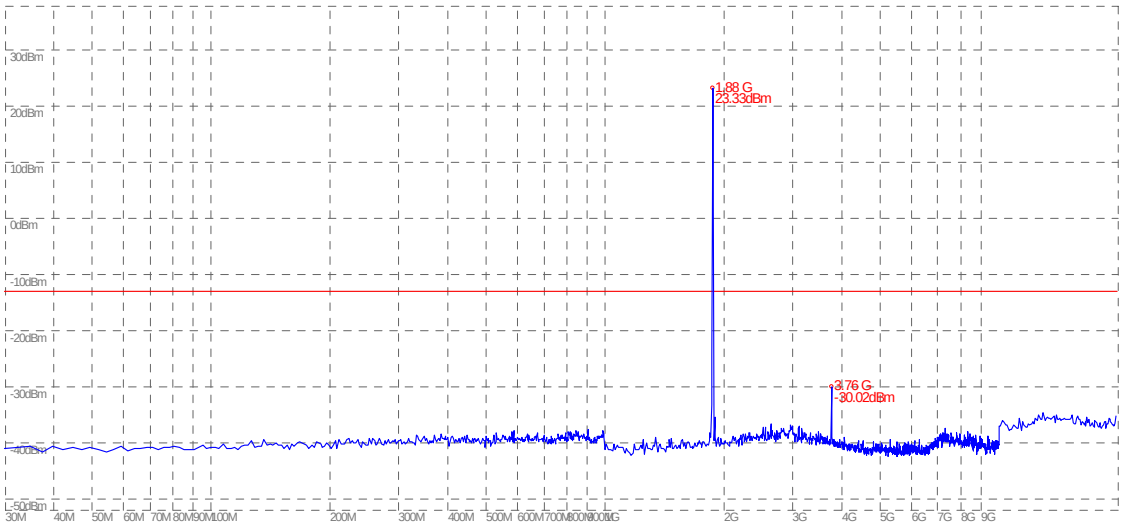
1. Table for the Harmonics:

No.	Channel	Frequency(MHz)	Measured Max Spurious Emission(dBm)	Limit(dBm)
CDMA 1900MHz	25	1851.25	-20.50	-13
	600	1880.0	-30.02	-13
	1175	1908.75	-20.74	-13

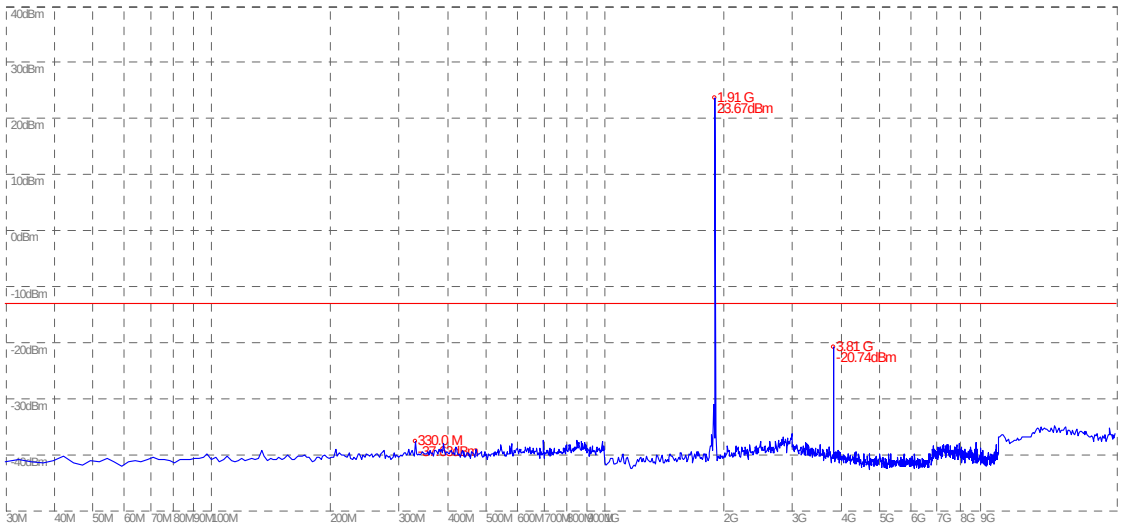
2. Plot for Spurious Emission:



(Plot A: CDMA 1900MHz Channel = 25, 30MHz to 20GHz)



(Plot B: CDMA 1900MHz Channel = 600, 30MHz to 20GHz)



(Plot C: CDMA 1900MHz Channel = 1175, 30MHz to 20GHz)

2.6 Band Edge

2.6.1 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.

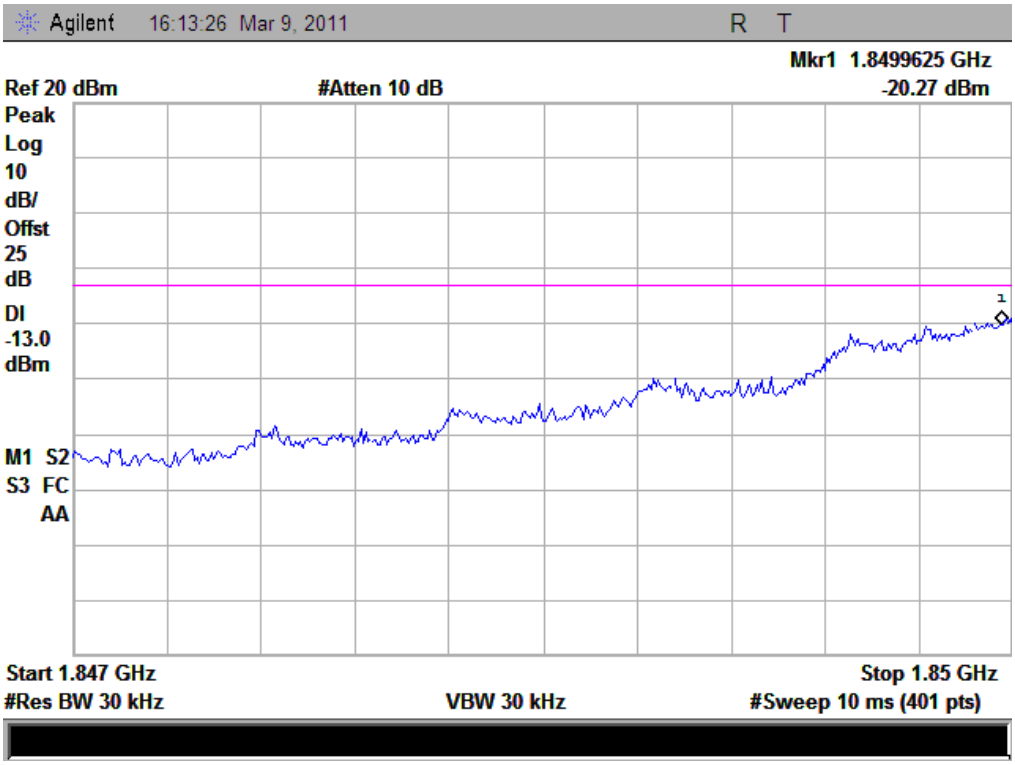
2.6.2 Test Result

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

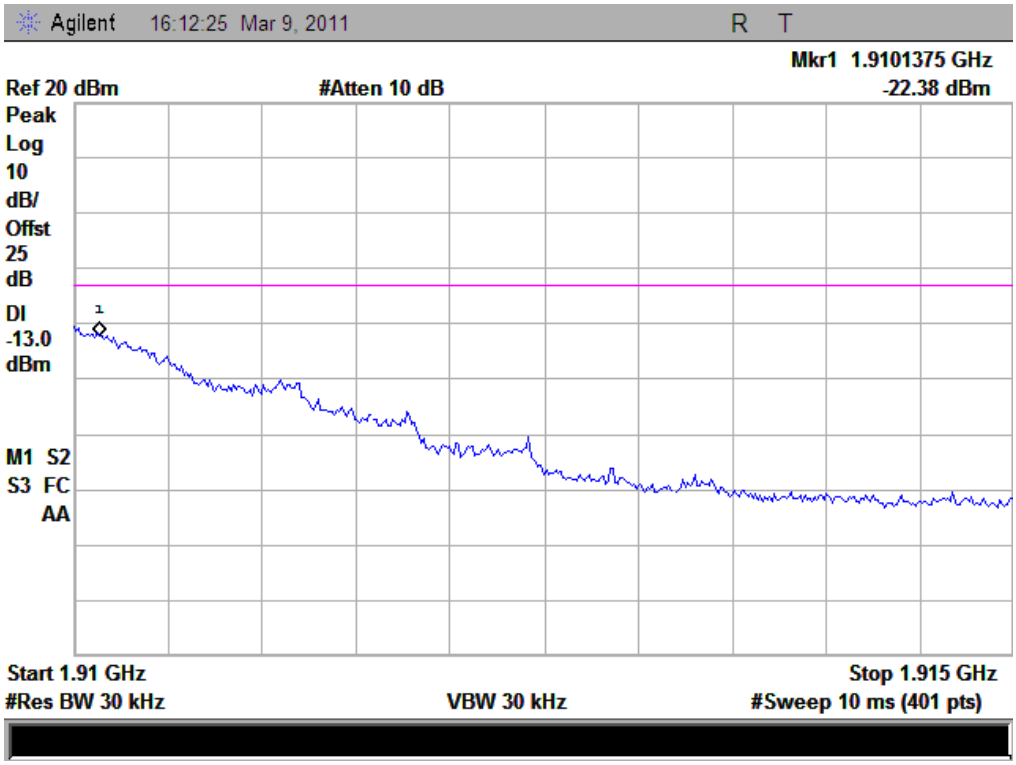
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
CDMA 1900MHz	25	1851.25	-20.27	Plat A	-13	PASS
	1175	1908.75	-22.38	Plot B		PASS

2. Plot



(Plot A: CDMA 1900MHz Channel = 25)



(Plot B: CDMA 1900MHz Channel = 1175)

2.7 Transmitter Radiated Power (EIRP/ERP)

2.7.1 Requirement

According to FCC §22.913 and section 24.232, the ERP of Cellular mobile transmitters must not exceed 2Watts.

2.7.2 Test Procedure

1. Perform test system setup as section 2.1.2.
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: RBW=VBW=1MHz, for CDMA modulated signal(here used): RBW=VBW=3MHz.
3. The low, middle and the high channels are selected to perform tests respectively.
4. 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.
5. 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.

2.7.3 Test Result

The substitution corrections are obtained as described below:

SCF_{Offset} = Pg(dBm) – cable loss (dB) + antenna gain (dB) – Pr(dBm)

Where Pg is the generator output power into the substitution antenna

Cable loss is the reduction in power between the generator and the substitution antenna

Antenna gain is the gain of the substitution antenna relative to an ideal half wave dipole antenna (for ERP) or isotropic radiator (for EIRP)

Pr is the spectrum analyzer reading

SCF_{Offset} is substitution correction factor.

Calculation example:

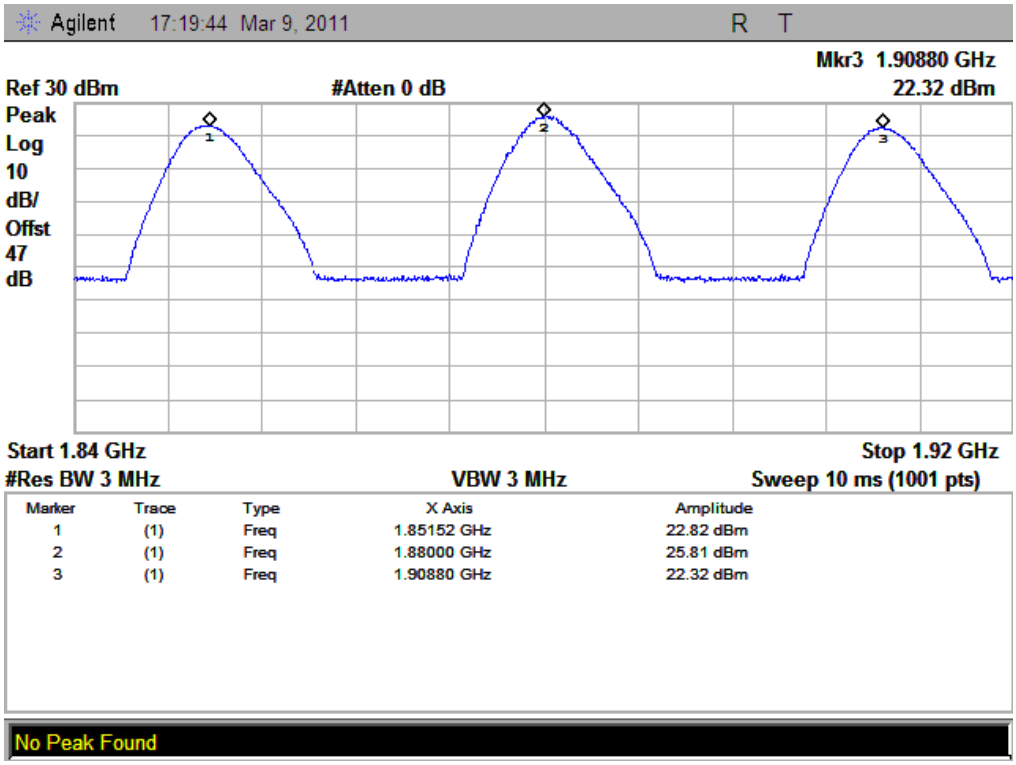
Band	SCF_{Offset}	Pg(dBm)	cable loss (dB)	antenna gain	Pr(dBm)
1880M	47 dB	0 dBm	1.3 dB	12.57 dBi	-35.73 dBm

During the test, the data of SCF_{Offset} was added in the Test Spectrum Analyze, so Spectrum Analyze reading is the final values which contain the data of SCF_{Offset}.

1. Test Verdict:

No.	Channel	Frequency (MHz)	Measured ERP/EIRP		Limit ERP/EIRP	
			dBm	W	dBm	W
CDMA 1900M Hz	25	1851.25	22.82	0.19	33	2
	600	1880.0	25.81	0.38		
	1175	1908.75	22.32	0.17		

2. The plots:



(Plot A: CDMA 1900MHz Channel = 25, 600, 1175)

2.8 Radiated Spurious Emission

2.8.1 Requirement

According to FCC §22.917(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.

2.8.2 Test Procedure

1. Perform test system setup as section 2.1.2.
2. Make a limit line whose value is -13dBm on the Spectrum Analyzer, and set the RBW of the Spectrum Analyzer to 1MHz.
3. The low, middle and the high channels are selected to perform tests respectively.
4. Employ the bi-log Test Antenna as the test system receiving antenna and set the frequency range of the Spectrum Analyzer from 30MHz to 3GHz.
5. The measurement is performed with the Test Antenna at both horizontal and vertical polarization respectively. Set the polarization of the Test Antenna to be horizontal.
6. Actuate the Turn Table to turn from 0 degrees to 360 degrees to find the maximum reading via the Spectrum Analyzer, mark the fundamental frequency and the harmonics thereof, after then record the harmonics and the plot.
7. Set the polarization of the Test Antenna to be vertical, then repeat step 6.
8. Employ the horn Test Antenna as the test system receiving antenna and set the frequency range of the Spectrum Analyzer from 3GHz to 10^{th} harmonic of the fundamental frequency (here used 20GHz for CDMA1900MHz).

2.8.3 Test Result

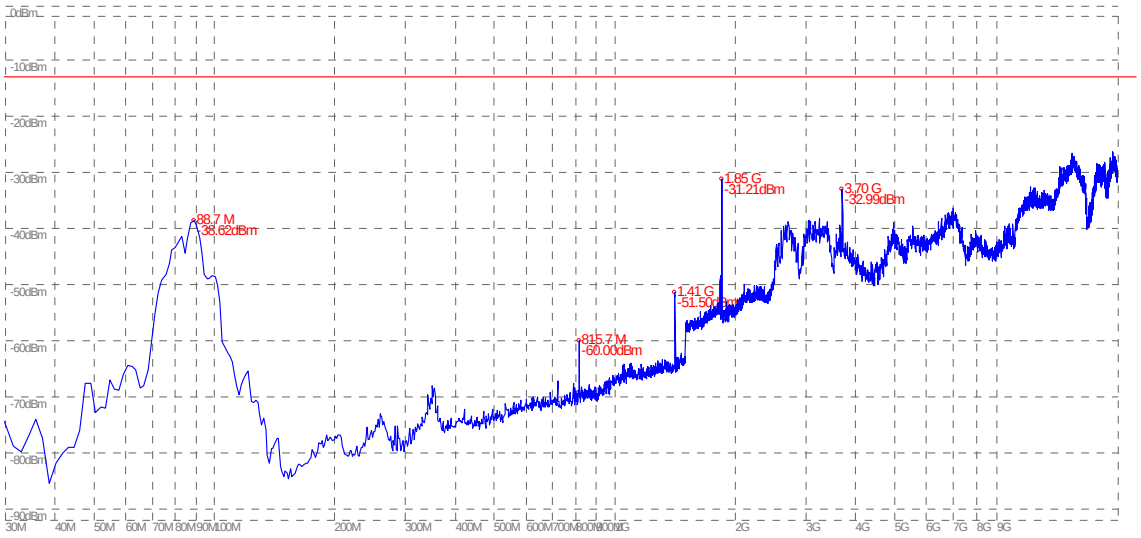
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels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

1. Test Verdict:

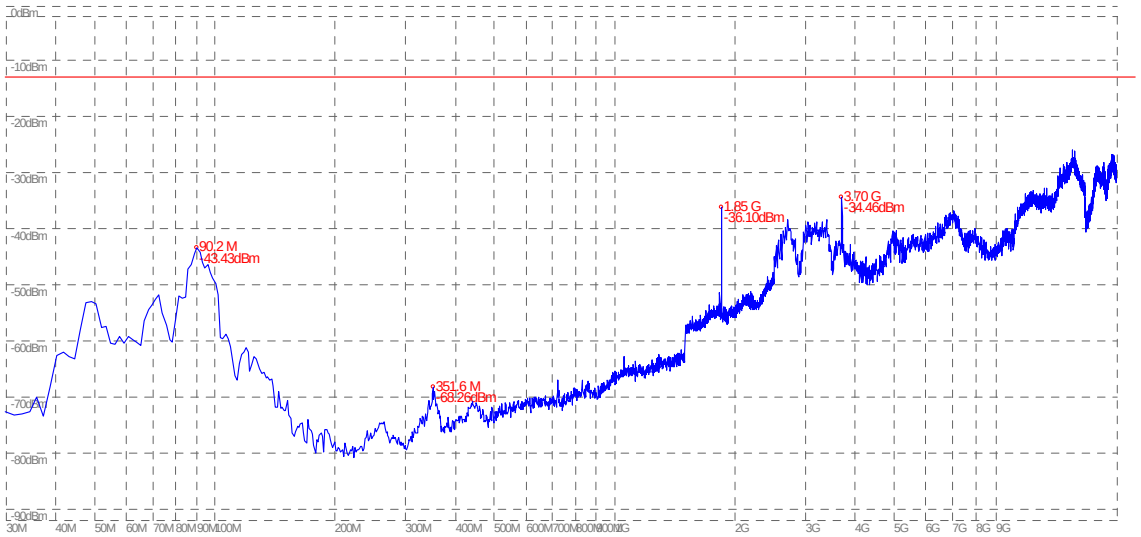
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)		Refer to Plot	Limit (dBm)	Verdict
			Test Antenna Horizontal	Test Antenna Vertical			
CDMA 1900MHz	25	1851.25	-32.99	-34.46	Plot A.1/A.2	-13	PASS
	600	1880.0	-39.45	-38.91	Plot B.1/B.2		PASS
	1175	1908.75	-36.64	-25.74	Plot C.1/C.2		PASS

2. Test Plot for the Whole Measurement Frequency Range:

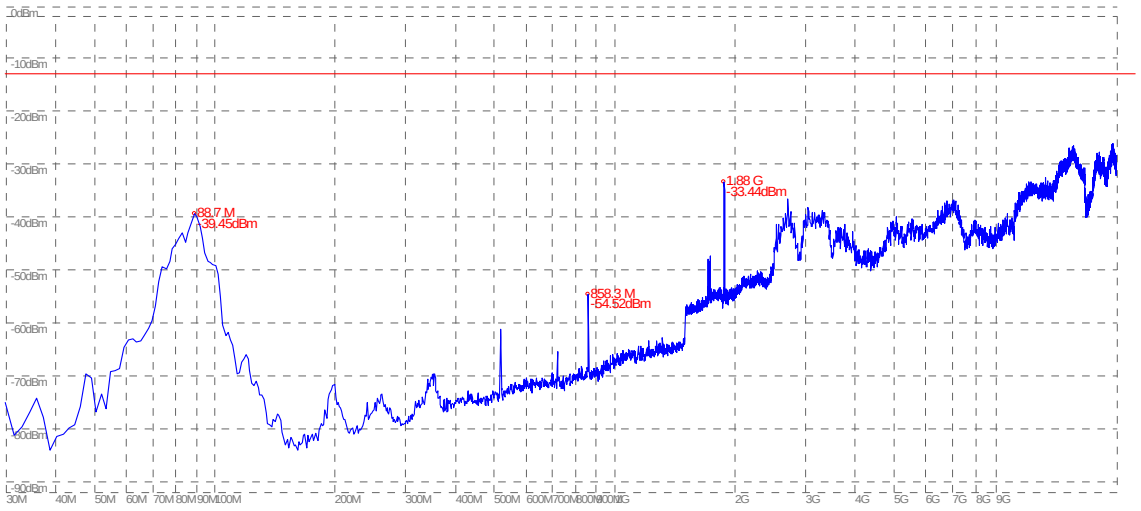
Note: the power of the EUT transmitting frequency should be ignored.



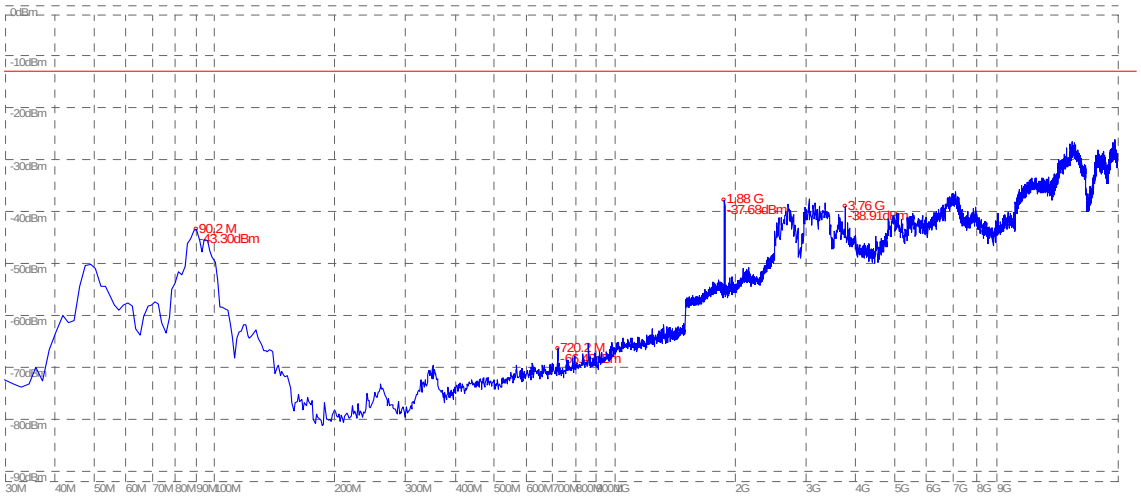
(Plot A.1: CDMA 1900MHz Channel = 25, Test Antenna Horizontal)



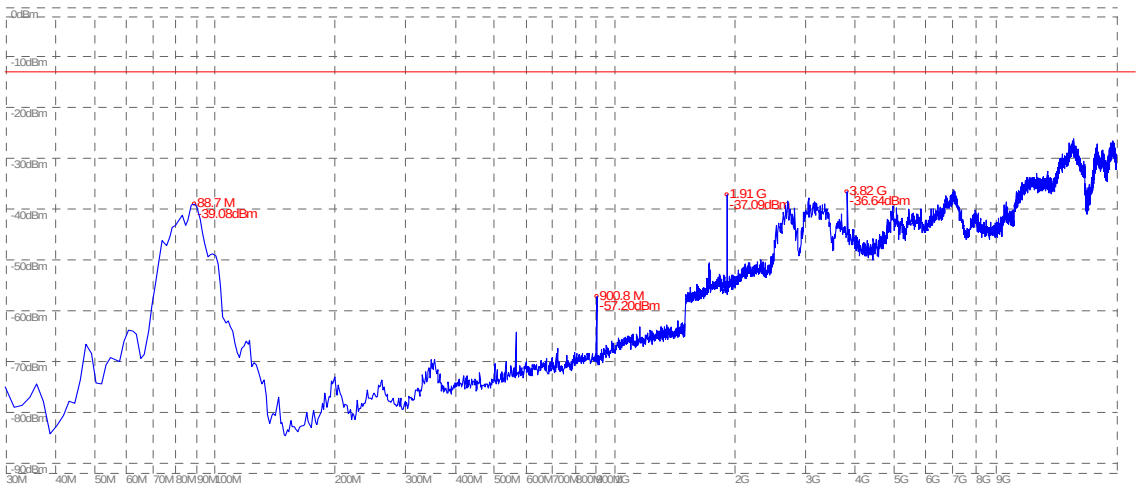
(Plot A.2: CDMA 1900MHz Channel = 25, Test Antenna Vertical)



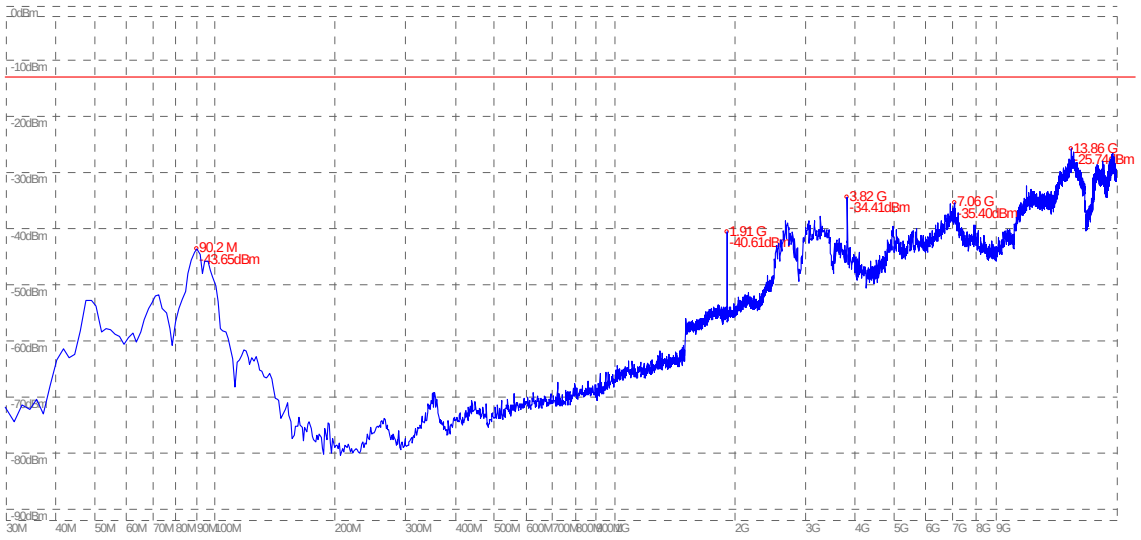
(Plot B.1: CDMA 1900MHz Channel = 600, Test Antenna Horizontal)



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



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



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

2.9 Frequency Stability

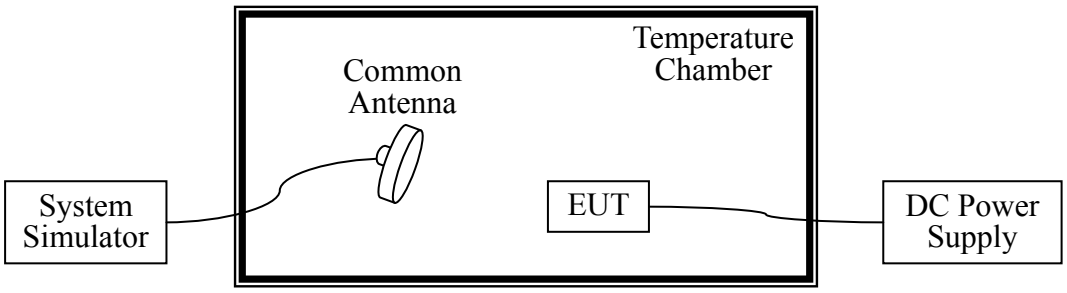
2.9.1 Requirement

According to FCC section 22.355 and 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°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.

2.9.2 Test Description

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.

Equipments List please refer to section 1.3.1.

2.9.3 Test Procedure

1. Perform test system setup as section 2.1.3.
2. 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°C at intervals of 10°C.
3. 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.

4. The low, middle and the high channels are selected to perform tests respectively.
5. The frequency deviation is measured (directly read from the SS, which can report the parameter) within three minutes.
6. 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 3 to 8.
7. 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 3 to 8.

2.9.4 Test Result

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	22.50	±1ppm	20.18	±1ppm	22.05	±1ppm	PASS
		-20	-13.59		-6.87		-11.42		
		-10	19.31		15.23		25.29		
		0	22.04		20.45		-3.59		
		+10	-2.77		-9.42		19.95		
		+20	18.53		27.02		4.50		
		+30	-15.32		5.67		-16.08		
		+40	29.07		-10.56		25.98		
		+50	30.15		18.97		31.05		
	4.2	+25	-3.97		-9.05		16.37		
	3.6	+25	17.89		13.09		-9.44		

** END OF REPORT **