FCC TEST REPORT

Issued to

HOPERUN MMAX DIGITAL PTE. LTD

For

CDMA 1x Advanced Feature Phone

Model Name:	MXC-550
Trade Name:	UMX
Brand Name:	N/A
FCC ID :	2AB5L-MXC550
Standard:	47 CFR Part 22 Subpart H 47 CFR Part 24 Subpart E 47 CFR Part 90 Subpart S
Test date:	2014-5-9 to 2014-6-18
Issue date:	2014-6-19

By

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(Test Engineer)	*(Chief Engineer)*	*(Dept. Manager)*
Date 2014.6.19	**Date** 2014.6.19	**Date** 2014.6.19

TABLE OF CONTENTS

Change History		
Issue	Date	Reason for change
1.0	May 29, 2014	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type ..... :	CDMA 1x Advanced Feature Phone
Serial No. ..... :	(n.a, marked #1 by test site)
Hardware Version ..... :	N/A
Software Version..... :	N/A
Applicant ..... :	HOPERUN MMAX DIGITAL PTE. LTD 152 BEACH ROAD #13-06 GATEWAY EAST SINGAPORE 189721
Manufacturer..... :	HOPERUN MMAX DIGITAL PTE. LTD 152 BEACH ROAD #13-06 GATEWAY EAST SINGAPORE 189721
Frequency Range ..... :	CDMA 800MHz (BC 0) Tx: 824.7 – 848.31 MHz; Rx: 869.7-893.31MHz CDMA 1900MHz: (BC 1) Tx: 1851.25 MHz -1908.75 MHz; Rx: 1931.25 MHz-1988.75 MHz CDMA 800MHz (BC 10) Tx: 817.9 – 823.1 MHz; Rx: 903.8-914.2MHz
Modulation Type..... :	CDMA 1X
Antenna Type..... :	PIFA Antenna
Antenna Gain..... :	CDMA800(BC 0):1 dBi CDMA800(BC 10): 1 dBi CDMA1900(BC 1): -1 dBi
Emission Designators ..... :	CDMA800(BC 0):1M27F9W CDMA1900(BC 1):1M26F9W CDMA800(BC 10):1M26F9W

Note 1: The transmitter (Tx) frequency arrangement of the Cellular 800MHz band used by the EUT can be represented with the formula F(n)=824.2+0.2*(n-128), 128<=n<=251; the lowest, middle, highest channel numbers (ARFCHs) used and tested in this report are separately BC0 1013 (824.7MHz), 384 (836.52MHz) and 777 (848.31MHz), and BC10 476 (817.9MHz), 526 (819.1MHz) and 684 (823.1MHz)

Note 2: The transmitter (Tx) frequency arrangement of the CDMA 1900MHz band used by the EUT can be represented with the formula F(n)=1850.2+0.2*(n-512), 512<=n<=810; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 25 (1851.25MHz), 600 (1880.0MHz) and 1175 (1908.75MHz).

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 22 and Part 24 and Part 90 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-13 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10-1-13 Edition)	Public Mobile Services
3	47 CFR Part 24 (10-1-13 Edition)	Personal Communications Services
4	47 CFR Part 90 (10-1-13 Edition)	PRIVATE LAND MOBILE RADIO 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.	24.232(d)	Peak to average radio	PASS
3	2.1049,22.917 24.238,90.209	99% Occupied Bandwidth	PASS
4	90.691	Emission masks –In-band emissions	PASS
5	2.1055,22.355 24.235,90.213	Frequency Stability	PASS
6	2.1051,2.1057 22.917,24.238,90.691	Conducted Out of Band Emissions	PASS
7	2.1051,2.1057 22.917,24.238,90.691	Band Edge	PASS
8	22.913,24.232 90.635(b)	Transmitter Radiated Power (EIPR/ERP)	PASS
9	2.1053,2.1057 22.917,24.238,90.691	Radiated Out of Band Emissions	PASS

NOTE：Measurement method according to TIA/EIA 603.D-2010

1.3 Facilities and Accreditations

1.3.1 Facilities

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, No.8 LongChang Road,Block 67, BaoAn District, ShenZhen, GuangDong Province,P. R. China 518101. 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 695796.

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 & 24E & 90S REQUIREMENTS

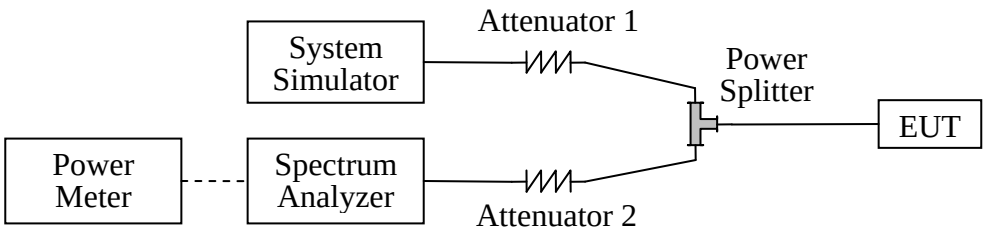
2.1 Conducted RF Output Power

2.1.1 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).

2.1.2 Test Description

1. Test Setup:



The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

The Power Meter was just used for the Conducted RF Output Power test of CDMA Model.

There are five band subclasses specified for Band Class 10. Mobile stations supporting

13 Band Class 10 shall support at least one band subclass belonging to Band Class 10.

Table 3.1.11-1. Band Class 10 System Frequency Correspondence

System Designator	Band Subclass	Transmit Frequency Band (MHz)	
		Mobile Station	Base Station
A	0	806.000–810.975	851.000–855.975
B	1	811.000–815.975	856.000–860.975
C	2	816.000–820.975	861.000–865.975
D	3	821.000–823.975	866.000–868.975
E	4	896.000–900.975	935.000–939.975

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2014.02.26	2015.02.25
Spectrum Analyzer	Agilent	E7405A	US44210471	2014.02.26	2015.02.25
Power Meter	Agilent	E4418B	GB43318055	2014.02.26	2015.02.25
Power Sensor	Agilent	8482A	MY41091706	2014.02.26	2015.02.25
Power Splitter	Weinschel	1506A	NW521	2014.02.26	2015.02.25
Attenuator 1	Resnet	20dB	(n.a.)	2014.02.26	2015.02.25
Attenuator 2	Resnet	3dB	(n.a.)	2014.02.26	2015.02.25

2.1.3 Test Results

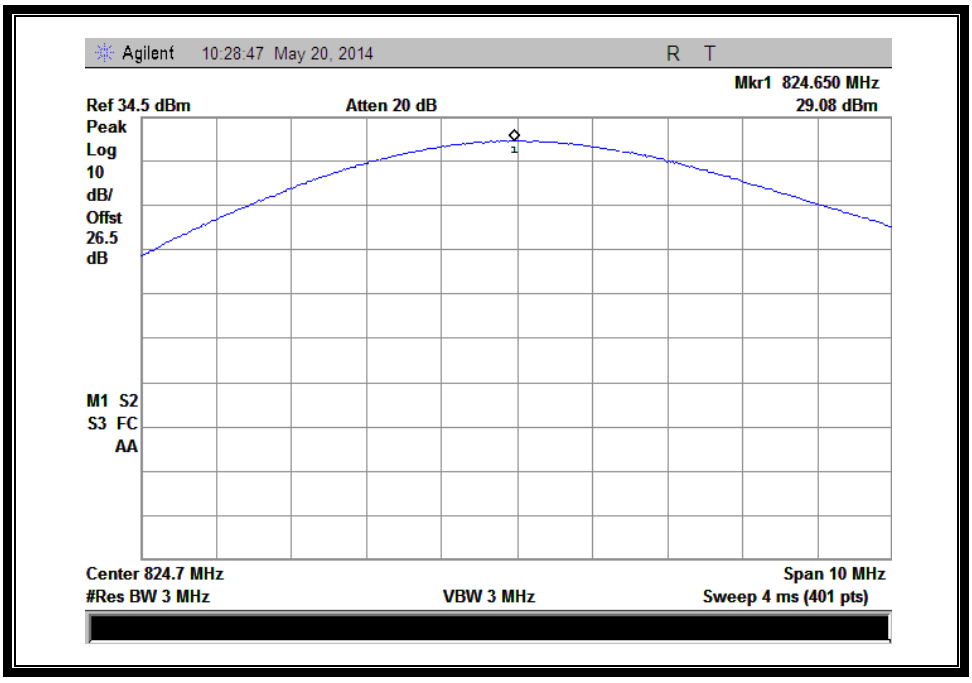
Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT..

1. Test Verdict:

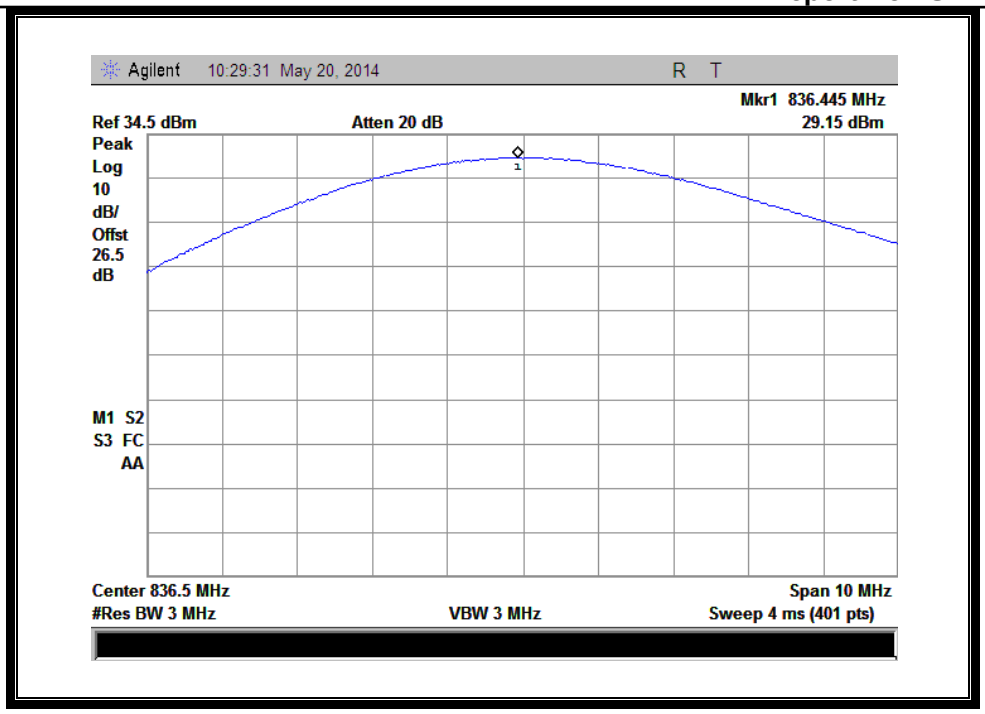
Band	Channel	Frequency (MHz)	SO55(dBm)
			RC3
BC 0	1013	824.70	29.08
	384	836.52	29.15
	777	848.31	28.63
BC 1	25	1851.25	27.60
	600	1880.00	28.01
	1175	1908.75	27.49
BC 10	476	817.90	28.30
	526	819.10	28.57
	684	823.10	28.90
Note:	For the S055 and S032 model, the entire Model was tested and just the worst data was record in this report.		

Band	Channel	Frequency (MHz)	SO55(dBm)	SO32 (dBm)
			RC1	RC3
BC 0	1013	824.70	29.01	29.05
	384	836.52	29.15	29.13
	777	848.31	28.58	28.60
BC 1	25	1851.25	27.58	27.55
	600	1880.00	28.00	28.01
	1175	1908.75	27.46	27.41
BC 10	476	817.90	28.28	28.26
	526	819.10	28.55	28.56
	684	823.10	28.90	28.86
Note: The RC1 and RC3 test result reference SAR report.				

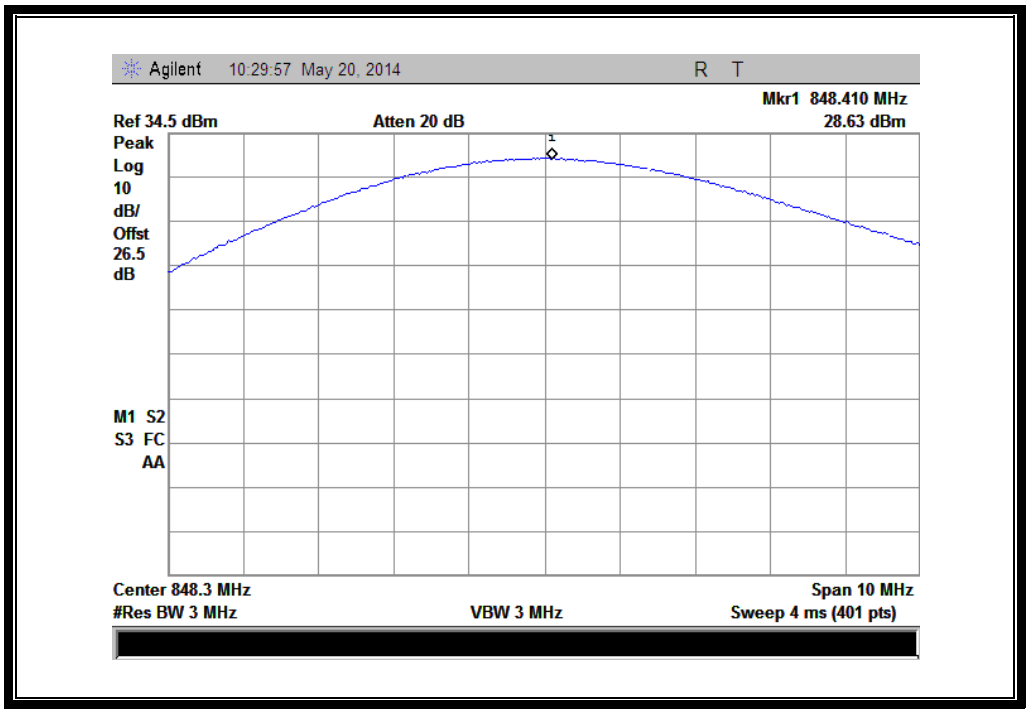
2. Test Plots:



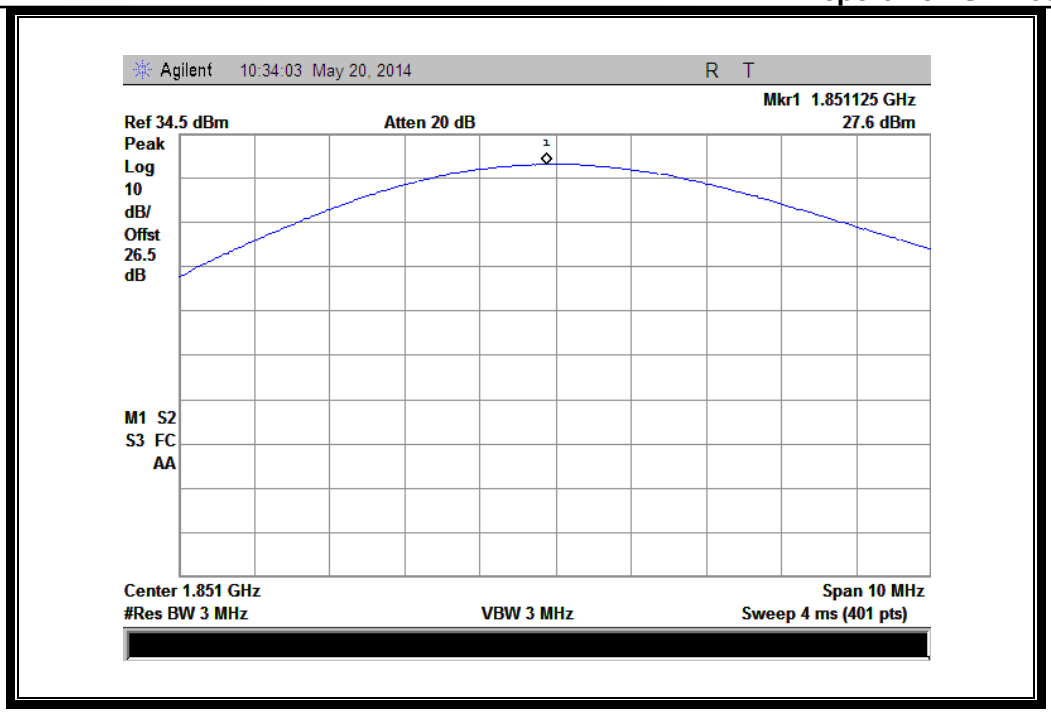
(CDMA 800MHz:BC 0 Channel = 1013)



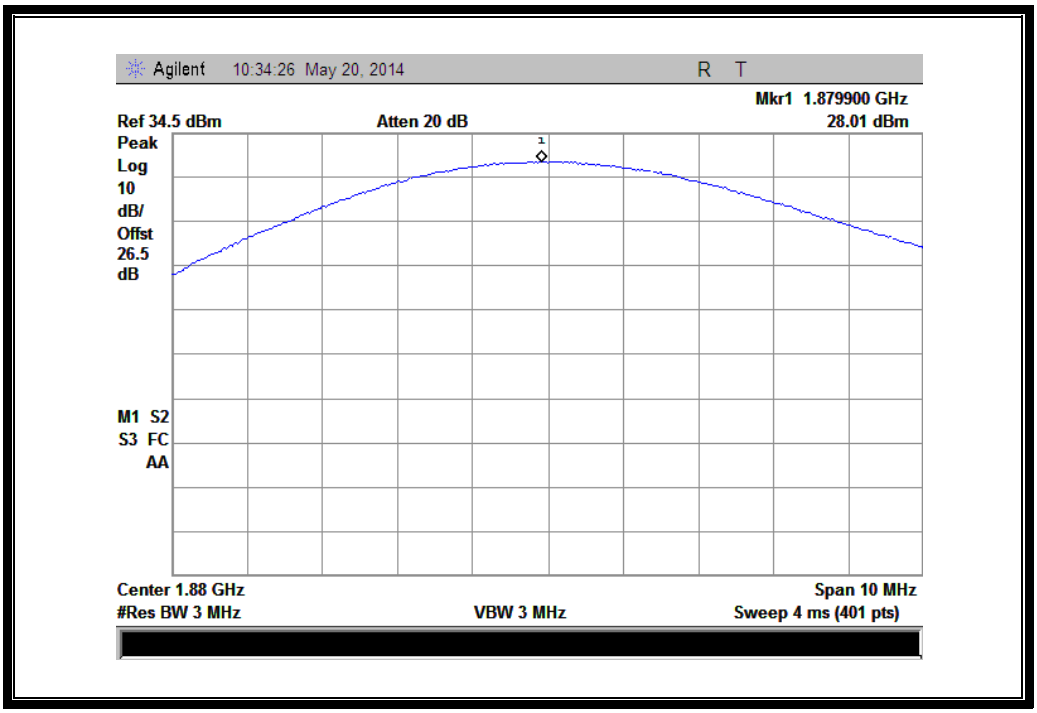
(CDMA 800MHz:BC 0 Channel = 384)



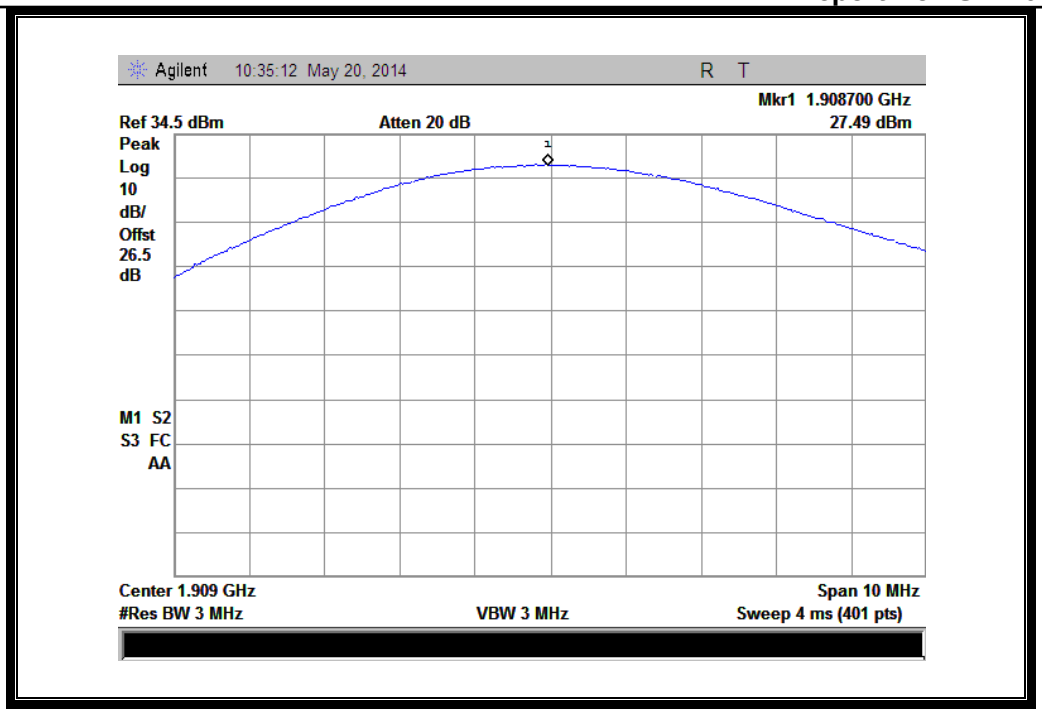
(CDMA 800MHz:BC 0 Channel = 777)



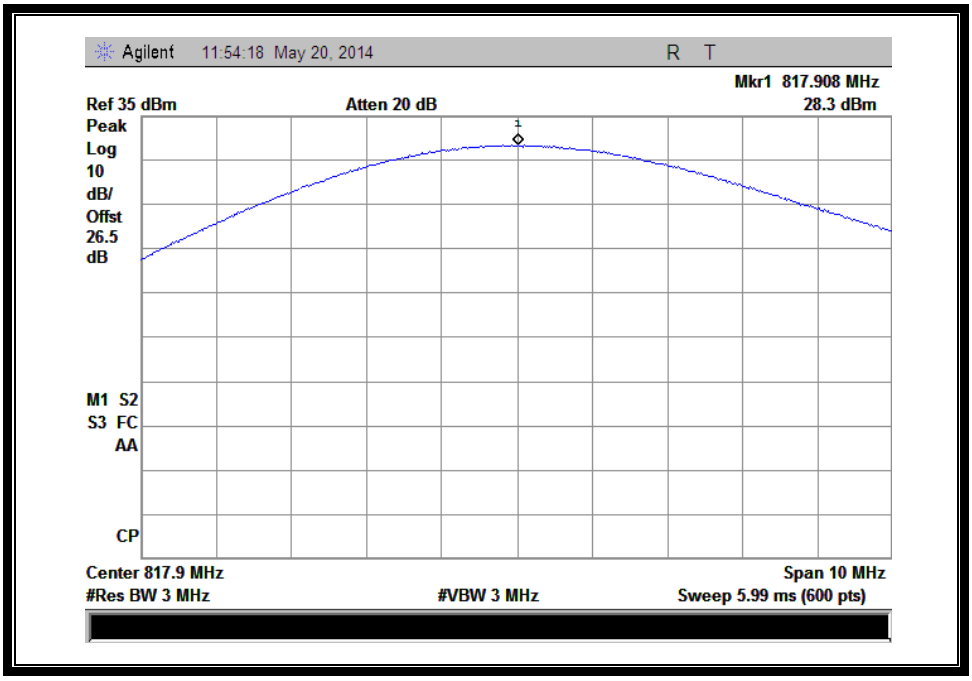
(CDMA 1900MHz:BC 1 Channel = 25)



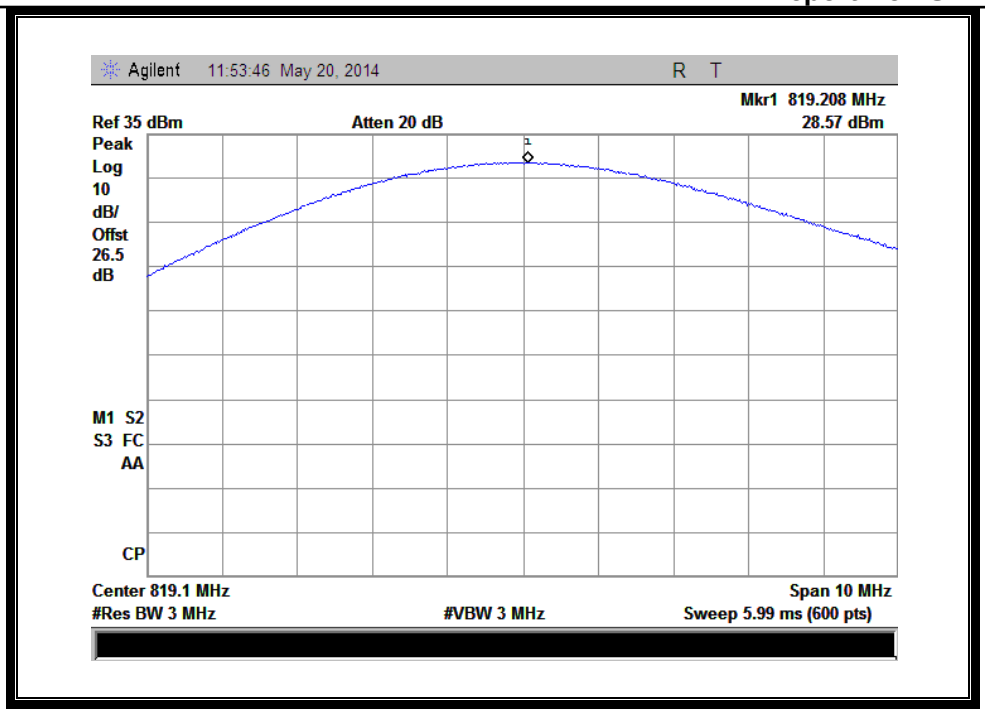
(CDMA 1900MHz:BC 1 Channel = 600)



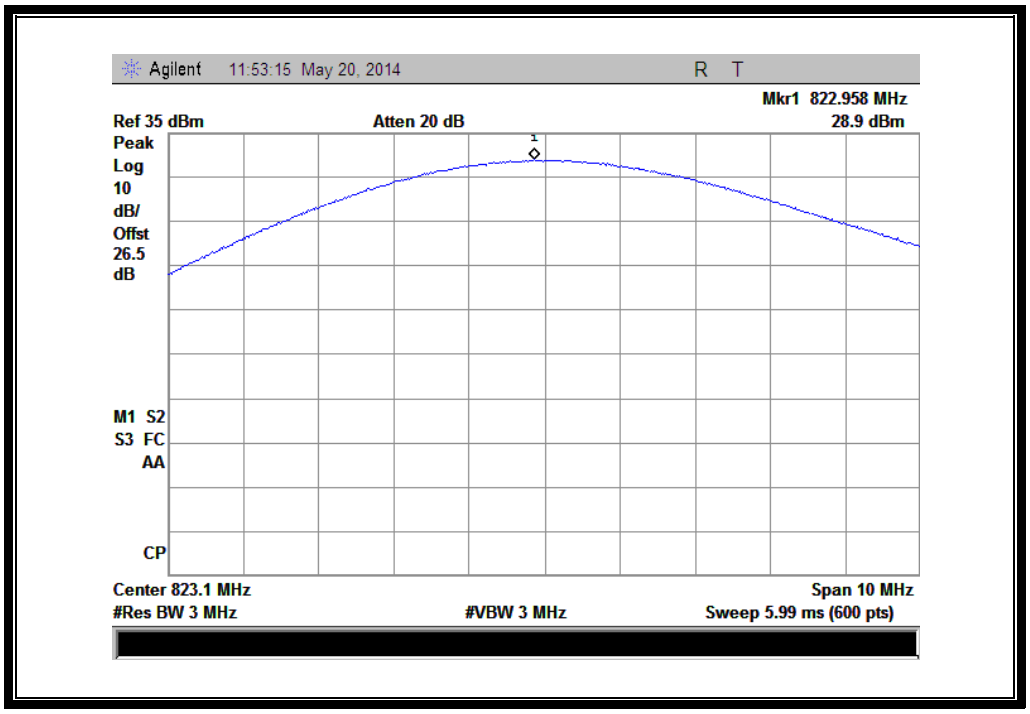
(CDMA 1900MHz:BC 1 Channel = 1175)



(CDMA 800MHz:BC 10 Channel = 476)



(CDMA 800MHz:BC 10 Channel = 526)



(CDMA 800MHz:BC 10 Channel = 684)

2.2 Peak to Average Radio

2.2.1 Definition

According to FCC section 2.1049 and FCC 24.232(d) the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.2.2 Test Description

See section 2.1.2 of this report.

2.2.3 Test Verdict

Here the lowest, middle and highest channels are selected to perform testing to verify the peak-to-average ratio.

Test procedures:

A .For GSM/EGPRS operating mode:

a. Set RBW=1MHz, VBW=1MHz, peak detector in spectrum analyzer.

b. Set EUT in maximum output power, and triggered the bust signal.

c. Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average radio.

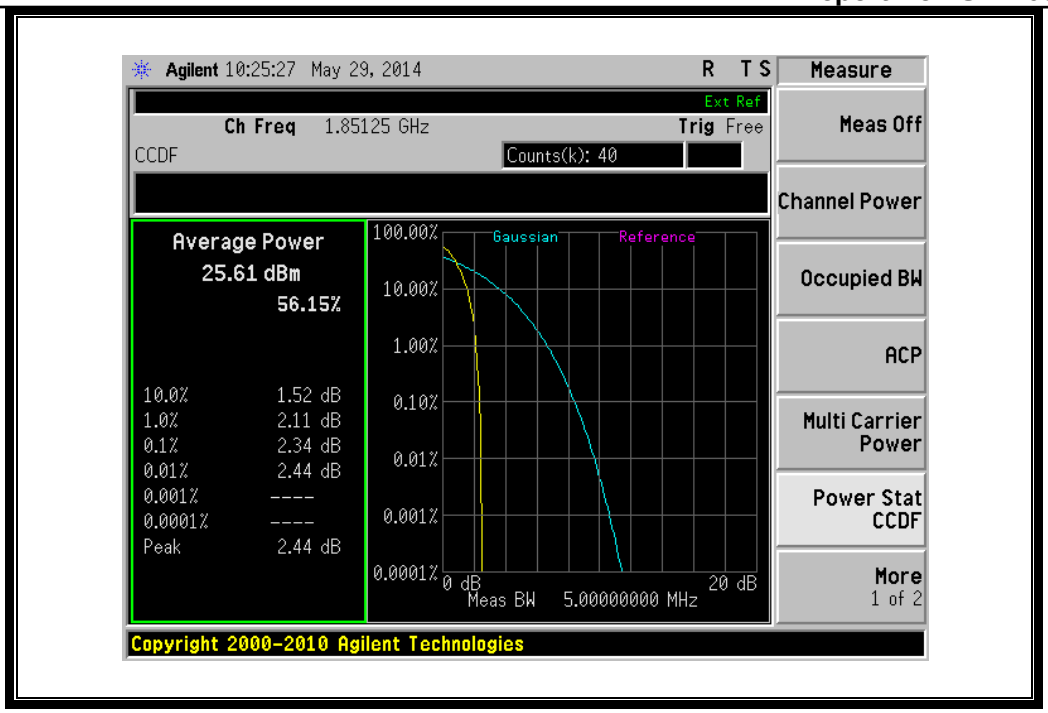
B. For UMTS operating mode:

a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.

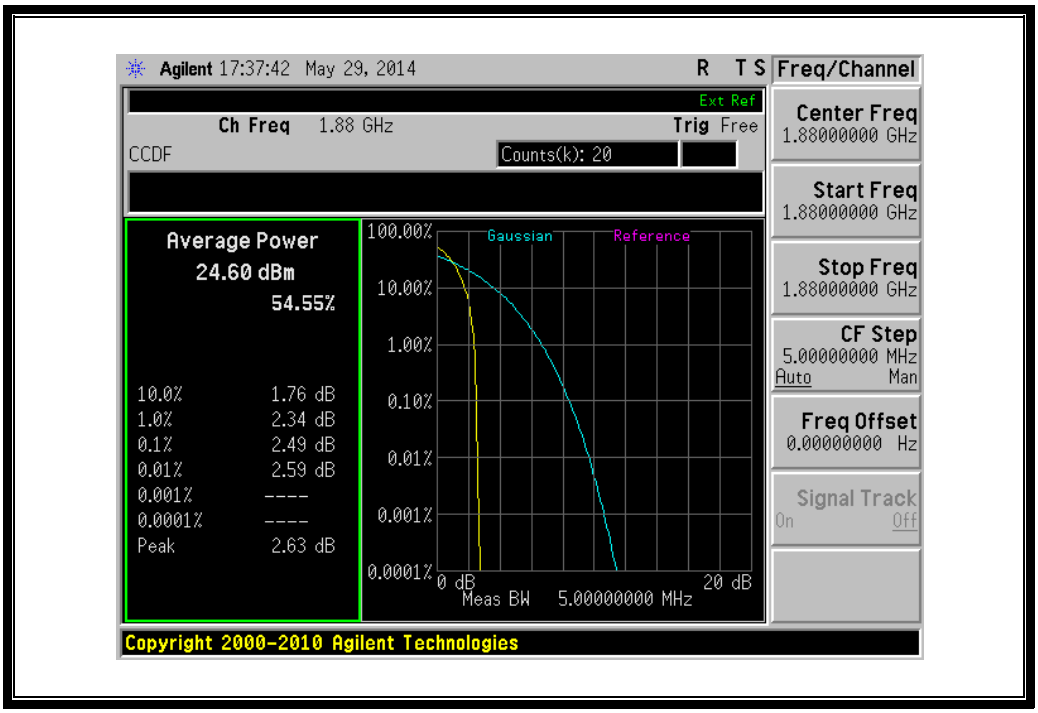
b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

3. Test Verdict:

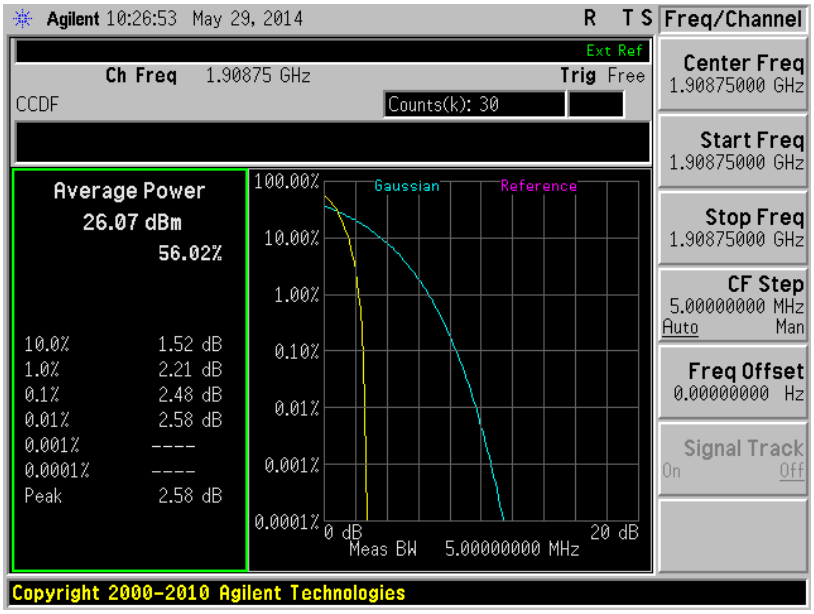
Band	Channel	Frequency (MHz)	Peak to Average radio		Limit	Verdict
			dBm	Refer to Plot	dBm	
CDMA 1900MHz(BC 1)	25	1851.25	2.34	Plot A1 to A3	13	PASS
	600	1880.0	2.49			PASS
	1175	1908.75	2.48			PASS



(Plot A1:CDMA 1900 MHz:BC 1 Channel =25)



(Plot A2:CDMA 1900 MHz:BC 1 Channel =600)



(Plot A3:CDMA 1900 MHz:BC 1 Channel =1175)

2.3 99% Occupied Bandwidth

2.3.1 Definition

According to FCC section 2.1049 and FCC § 22.917 &24.238 and section 90 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,

2.3.2 Test Description

See section 2.1.2 of this report.

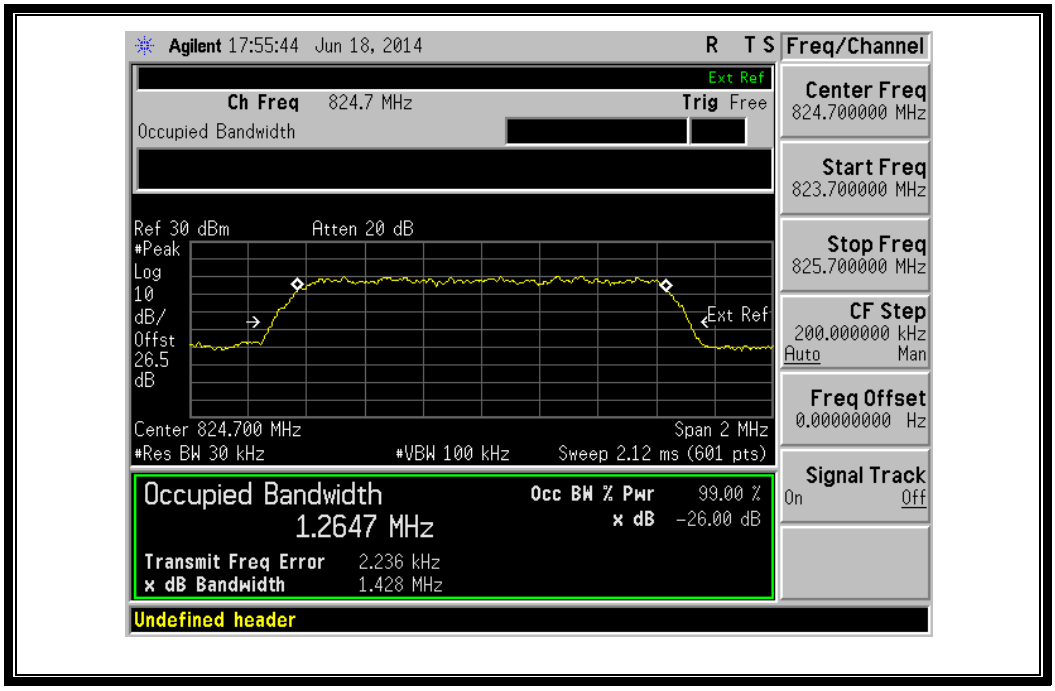
2.3.3 Test Verdict

Here the lowest, middle and highest channels are selected to perform testing to verify the 99% occupied bandwidth.

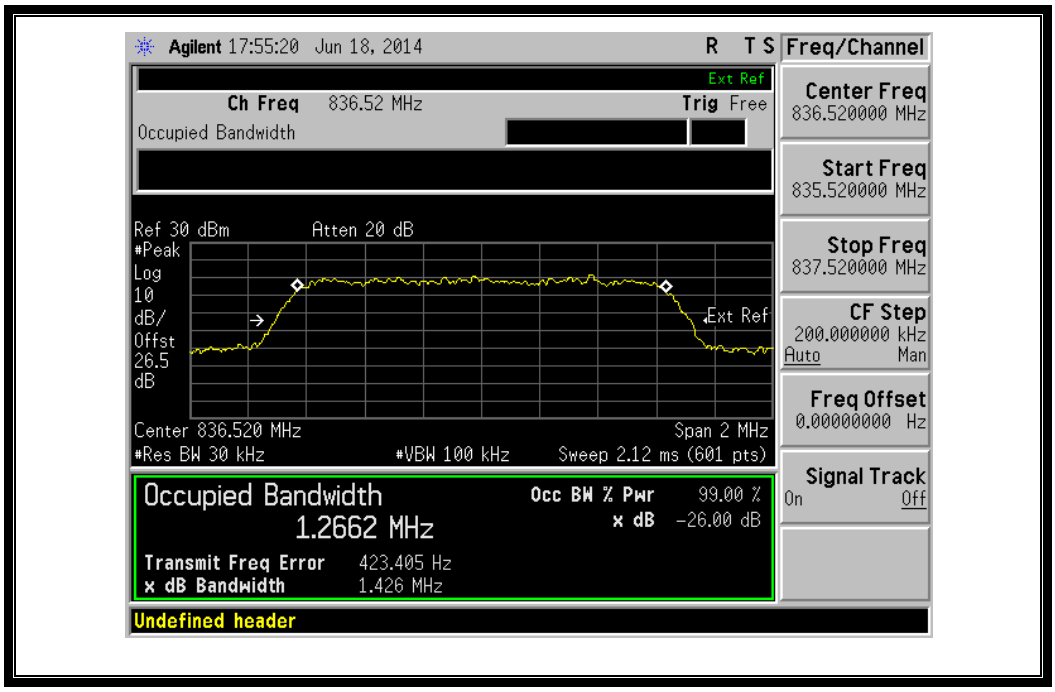
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured 99% Occupied Bandwidth (MHz)	Refer to Plot
CDMA 800MHz(BC 0)	1013	824.7	1.2647	Plot A
	384	836.52	1.2662	Plot B
	777	848.31	1.2587	Plot C
CDMA 1900MHz(BC 1)	25	1851.25	1.2588	Plot D
	600	1880.0	1.2644	Plot E
	1175	1908.75	1.2591	Plot F
CDMA 800MHz(BC 10)	476	817.9	1.2541	Plot G
	526	819.1	1.2574	Plot H
	684	823.1	1.2584	Plot I

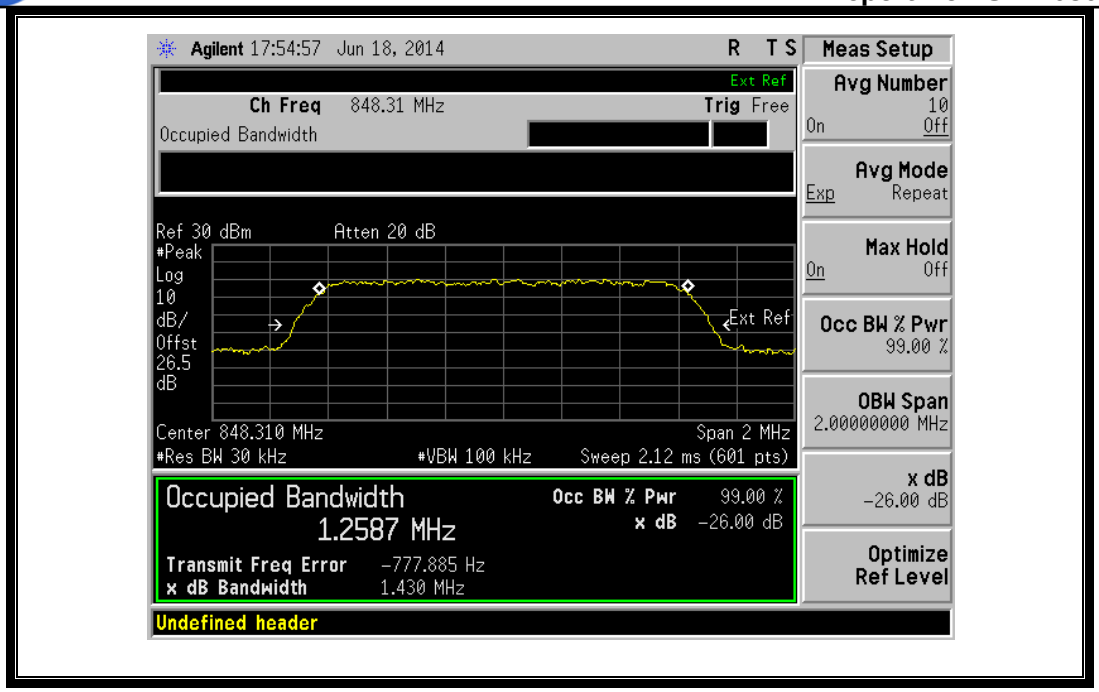
2. Test Plots:



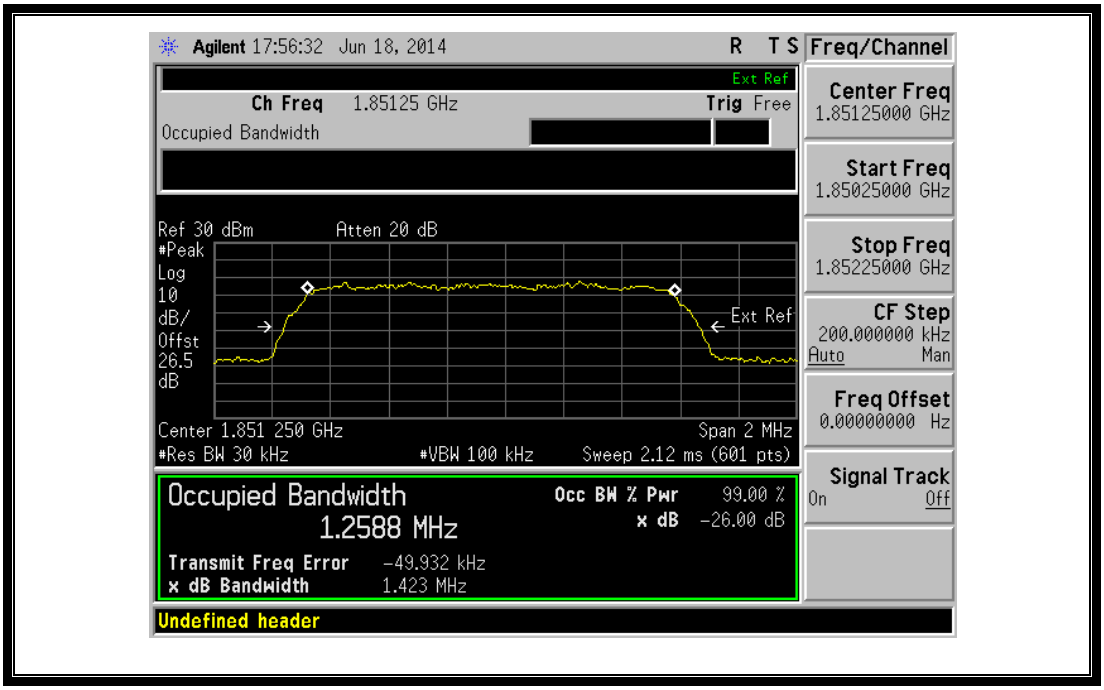
(Plot A: CDMA 800MHz:BC 0 Channel = 1013)



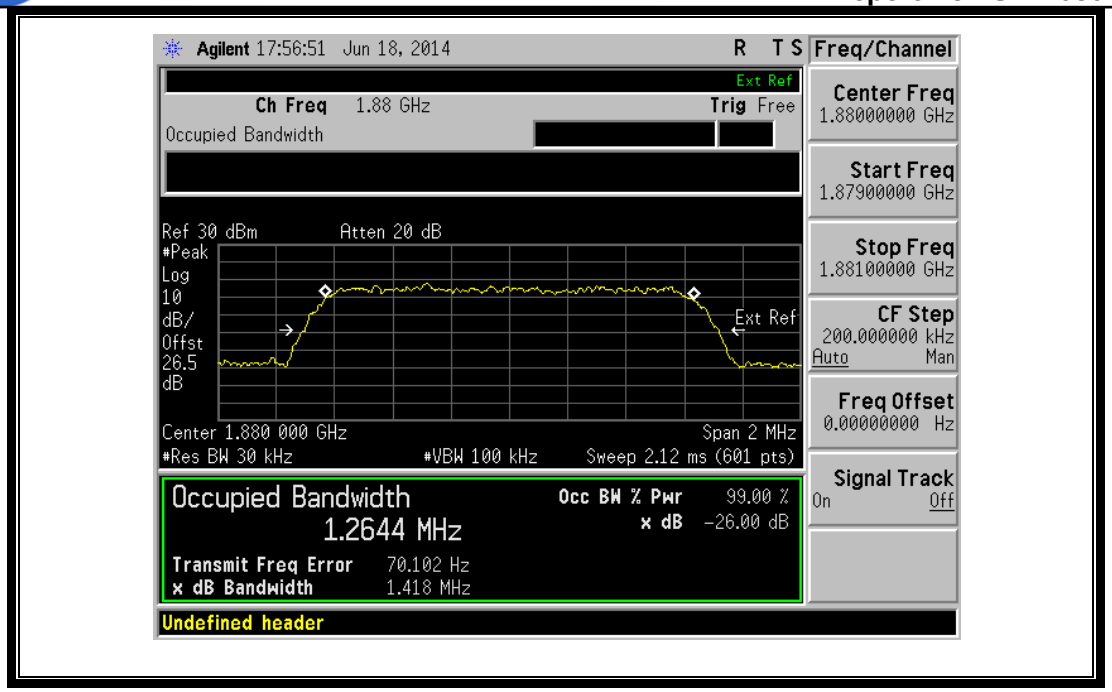
(Plot B: CDMA 800MHz:BC 0 Channel = 384)



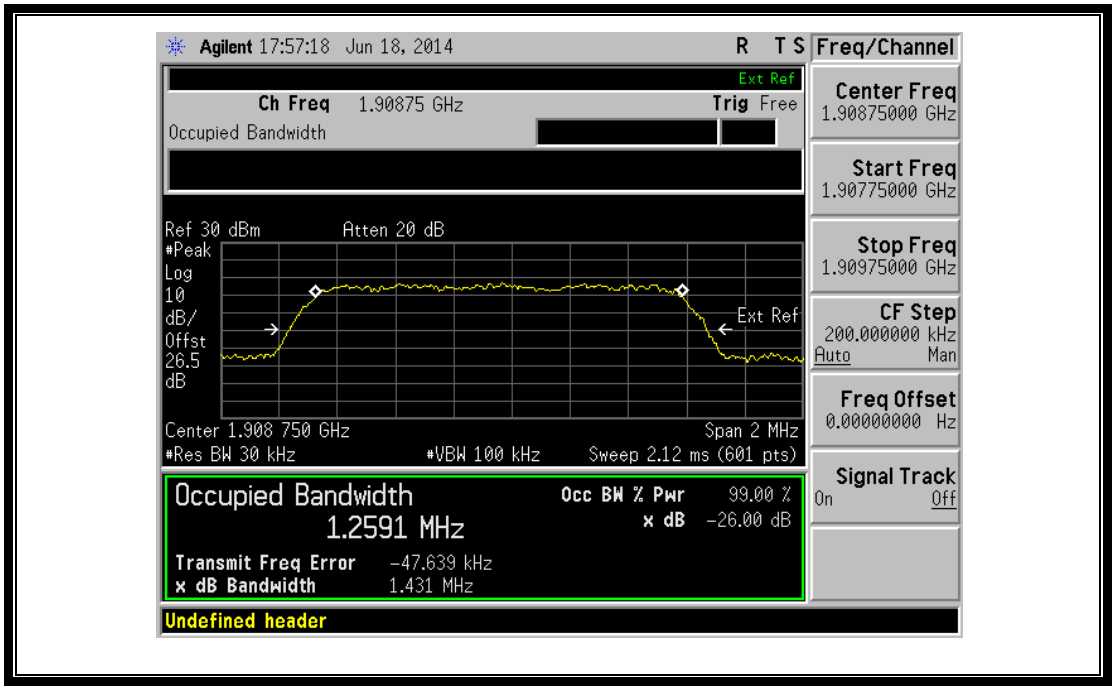
(Plot C: CDMA 800MHz:BC 0 Channel = 777)



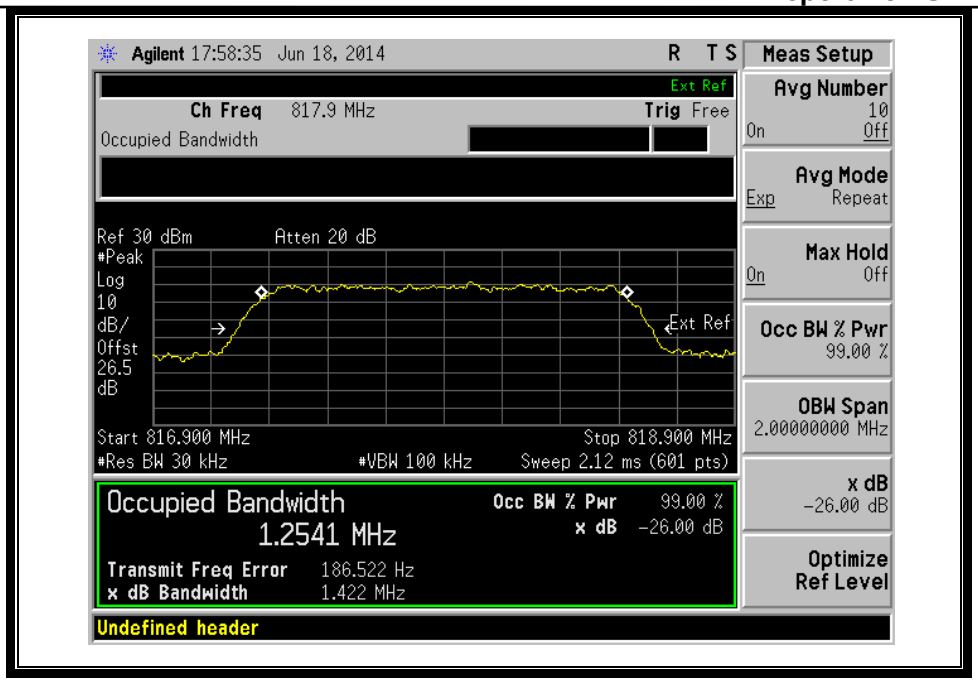
(Plot D: CDMA 1900MHz:BC 1 Channel = 25)



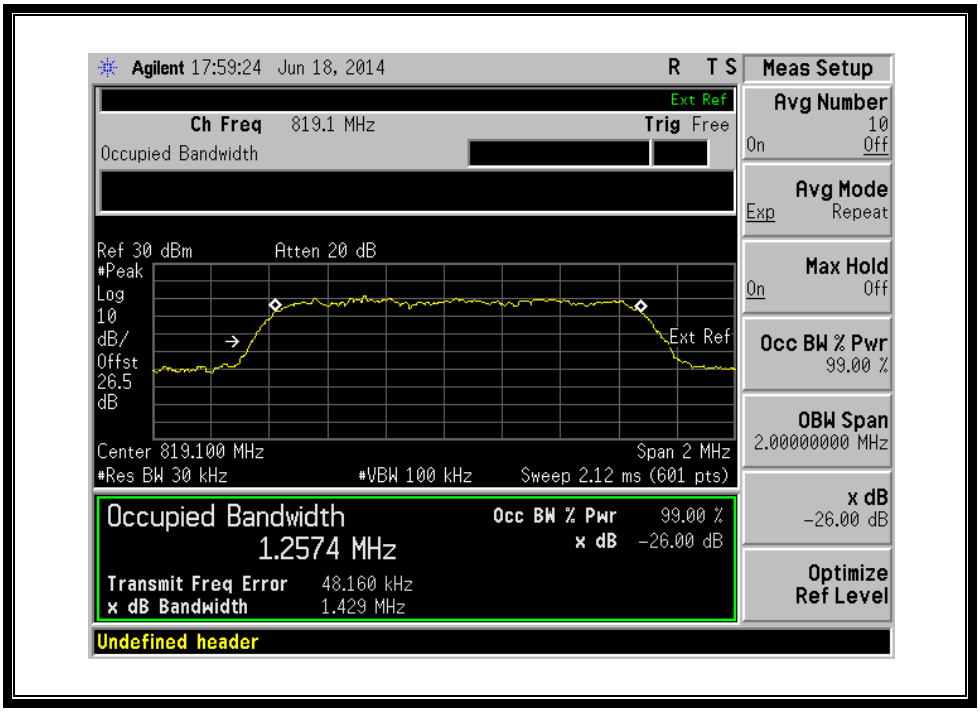
(Plot E: CDMA 1900MHz:BC 1 Channel = 600)



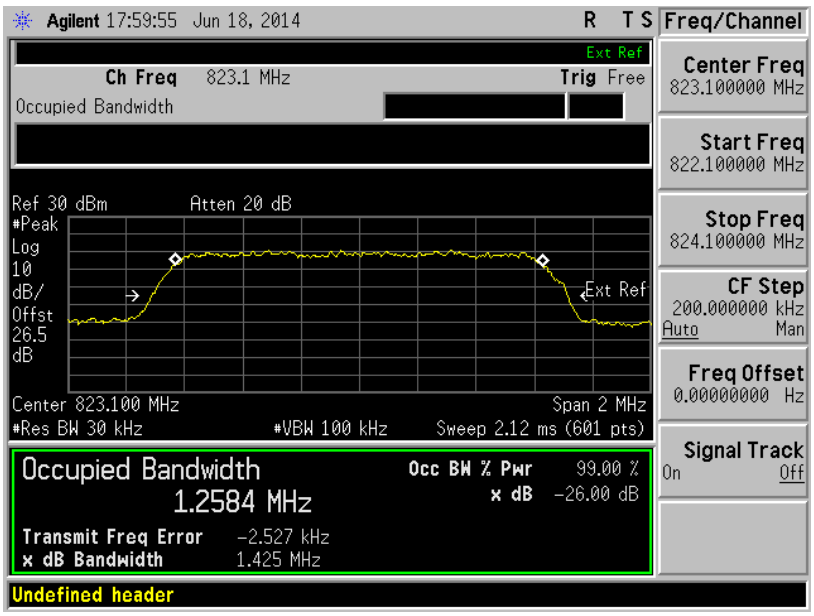
(Plot F: CDMA 1900MHz:BC 1 Channel = 1175)



(Plot G: CDMA 800MHz:BC 10 Channel = 476)



(Plot H: CDMA 800MHz:BC 10 Channel = 526)



(Plot I: CDMA 800MHz:BC 10 Channel = 684)

2.4 Emissions Mask Measurement

2.4.1 Description of Emissions Mask Measurement

According to FCC section 90 the Equipment used in this licensed to EA or non-EA systems shall comply with the emission mask provisions of FCC
Part 90.691.(a)(1)

(a). Out-of-band emission requirement shall apply only to the "outer" channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10(f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

2.4.2 Measuring Instruments

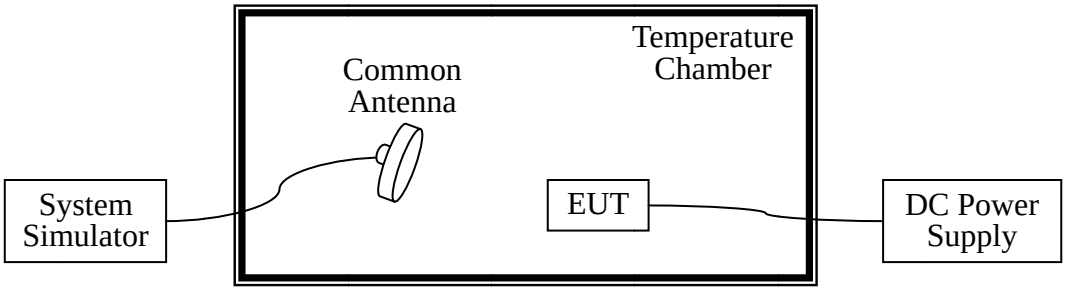
See list of measuring instruments of this test report.

2.4.3 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The emissions mask of low and high channels for the highest RF powers were measured.
3. The RBW was set 30 kHz, higher than 1% of bandwidth 1.27MHz, and VBW was set 3 times of RBW.
4. The final test results were shown below plots with a correction offset factor including cable loss, insertion loss of power divider.
5. The 1% of bandwidth 1.256MHz approximately was 13kHz. The test results need to follow below equation.

   Test Result(dBm) = PwrAbs(dBm) + 10*LOG(13kHz/30KHz)(dB) (~ -3.63dB)

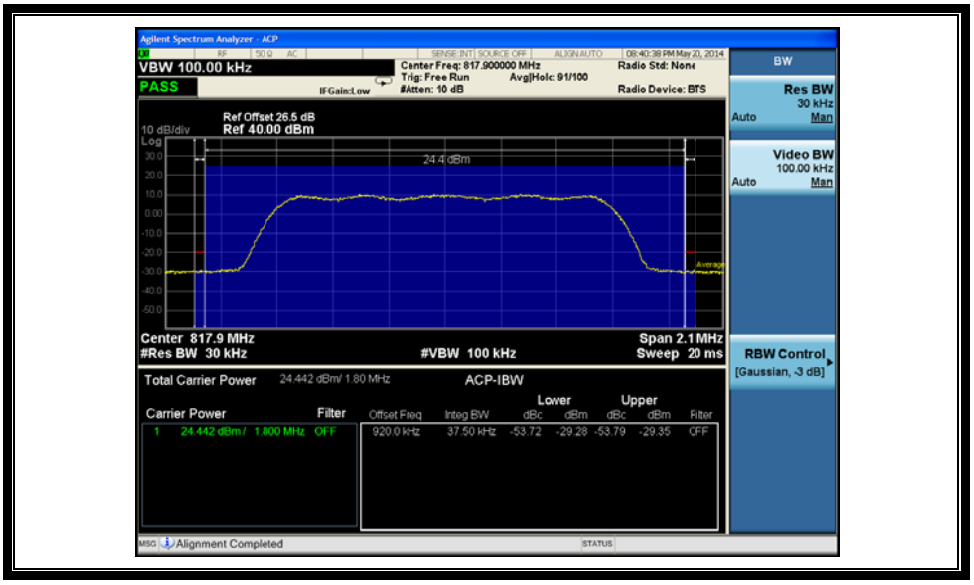
2.4.4 Test Setup



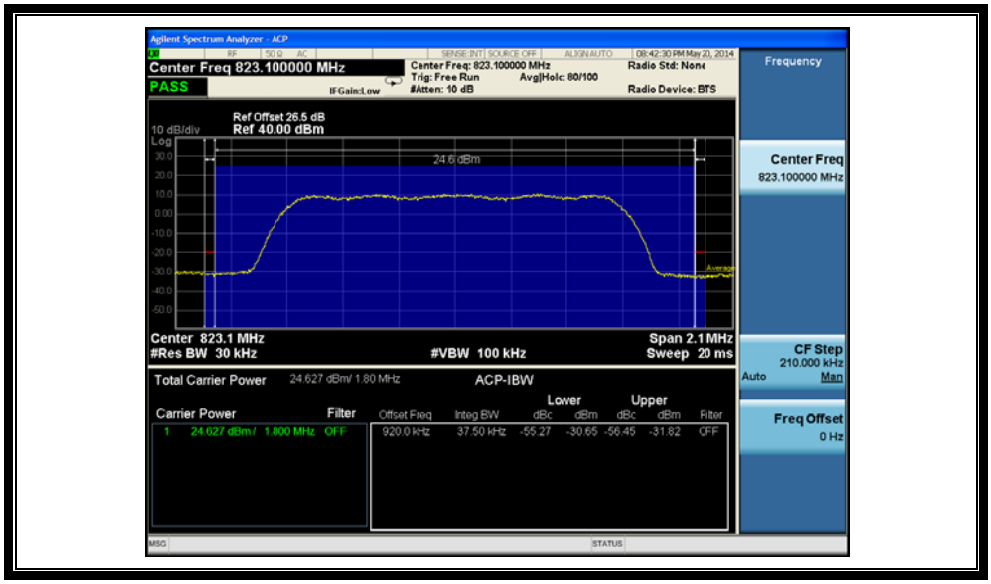
2.4.5 Test Result (Plots) of Conducted Emissions Mask

Band:	CDMA2000	BC10	TestMode:	1xRTT_RC1+SO55

Lower Band Edge Plot on Channel 476 (817.90MHz)



Higher Band Edge Plot on Channel 684 (823.10MHz)



2.5 Frequency Stability

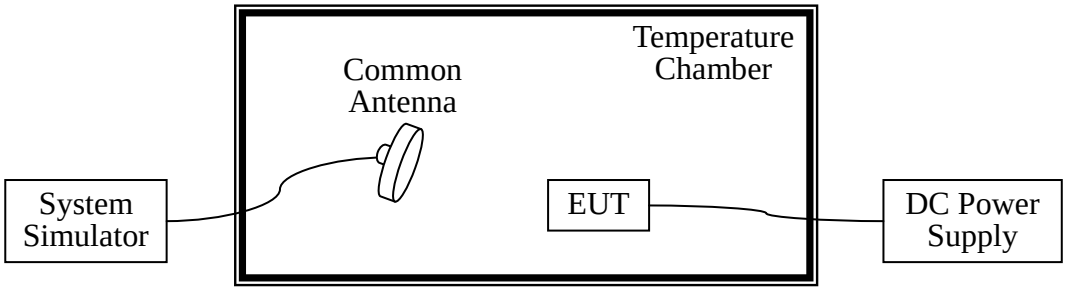
2.5.1 Requirement

According to FCC section 22.355 and FCC section 24.235 and section 90, 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.

2.5.2 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 i.e. Power Control Level (PCL) = 5 and Power Class = 4. 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	2014.02.26	2015.02.25
DC Power Supply	Good Will	GPS-3030DD	EF920938	2014.02.26	2015.02.25
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2014.02.26	2015.02.25

2.5.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.7VDC, 4.2VDC and 3.4VDC, which are specified by the applicant; the normal temperature here used is 25°C. The frequency deviation limit of CDMA 800MHz and CDMA 1900MHz is ±2.5ppm.

Band	Test Conditions		Frequency Deviation						Verdict
	Power (VDC)	Temperature (°C)	Channel = 1013 (824.7MHz)		Channel = 384 (836.52MHz)		Channel = 777 (848.31MHz)		
			Hz	Limits	Hz	Limits	Hz	Limits	
CDMA 800MHz (BC 0)	3.7	-30	7.06	±2061.75	26.75	±2091.30	-16.29	±2120.775	PASS
		-20	-21.13		-11.01		29.37		
		-10	17.01		11.54		-11.06		
		0	3.20		-4.85		35.04		
		+10	-5.17		13.32		-22.26		
		+20	14.51		5.09		35.09		
		+30	20.79		23.04		26.75		
		+40	-18.75		-10.26		-11.08		
		+50	17.43		21.09		21.44		
	4.2	+25	13.27		-17.85		-7.85		
	3.4	+25	14.34		15.32		25.32		

Band	Test Conditions		Frequency Deviation						Verdict
	Power (VDC)	Temperature (°C)	Channel = 25 (1851.25MHz)		Channel = 600 (1880.0MHz)		Channel = 1175 (1908.75MHz)		
			Hz	Limits	Hz	Limits	Hz	Limits	
CDMA 1900MHz (BC 1)	3.7	-30	-16.11	±1851.2	15.06	±1880.0	-9.54	±1908.8	PASS
		-20	9.35		-25.16		18.17		
		-10	-25.42		24.03		-24.09		
		0	-2.21		-23.21		23.41		
		+10	-19.01		9.85		-16.07		
		+20	26.52		27.01		29.16		
		+30	-18.49		26.09		-17.54		
		+40	17.92		-8.15		11.74		
		+50	-10.25		27.23		28.05		
	4.2	+25	26.98		24.37		-20.13		
	3.4	+25	7.39		24.26		33.70		

Band	Test Conditions		Frequency Deviation						Verdict
	Power (VDC)	Temperature (°C)	Channel = 476 (817.9MHz)		Channel = 526 (819.1MHz)		Channel = 684 (823.1MHz)		
			Hz	Limits	Hz	Limits	Hz	Limits	
CDMA 800MHz (BC 10)	3.7	-30	7.06	±2061.75	26.75	±2091.30	-16.29	±2120.775	PASS
		-20	-21.13		-11.01		29.37		
		-10	17.01		11.54		-11.06		
		0	3.20		-4.85		35.04		
		+10	-5.17		13.32		-22.26		
		+20	14.51		5.09		35.09		
		+30	20.79		23.04		26.75		
		+40	-18.75		-10.26		-11.08		
		+50	17.43		21.09		21.44		
	4.2	+25	13.27		-17.85		-7.85		
	3.4	+25	14.34		15.32		25.32		

2.6 Conducted Out of Band Emissions

2.6.1 Requirement

According to FCC section 22.917(a) and FCC section 24.238(a) and section 90 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.

2.6.2 Test Description

See section 2.1.2 of this report.

2.6.3 Test Result

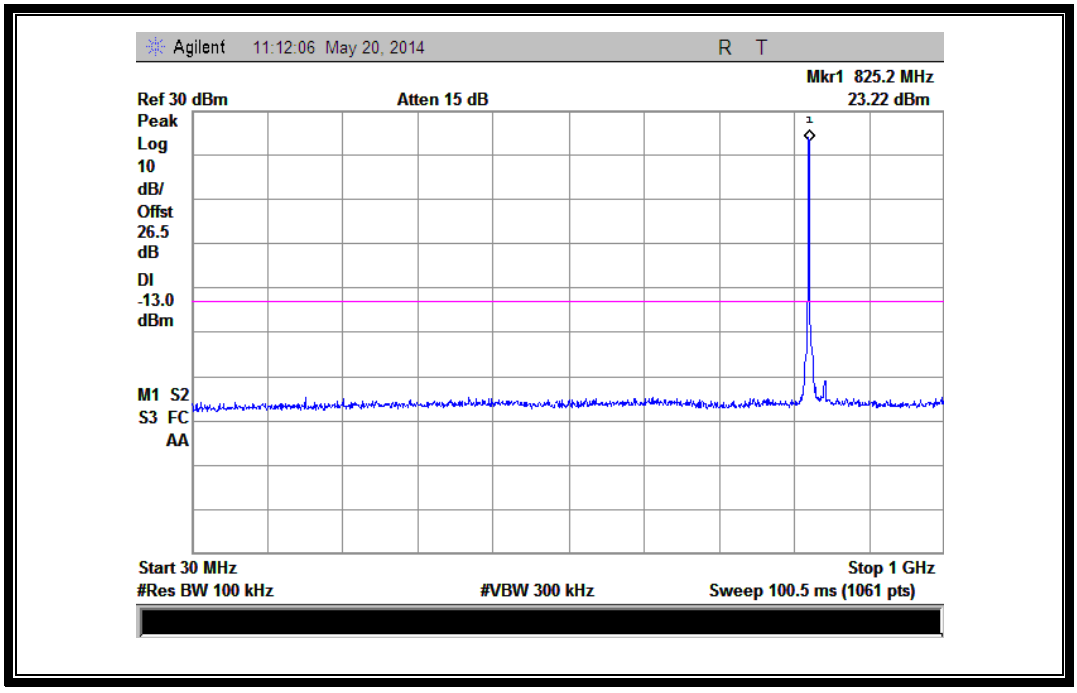
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

1. Test Verdict:

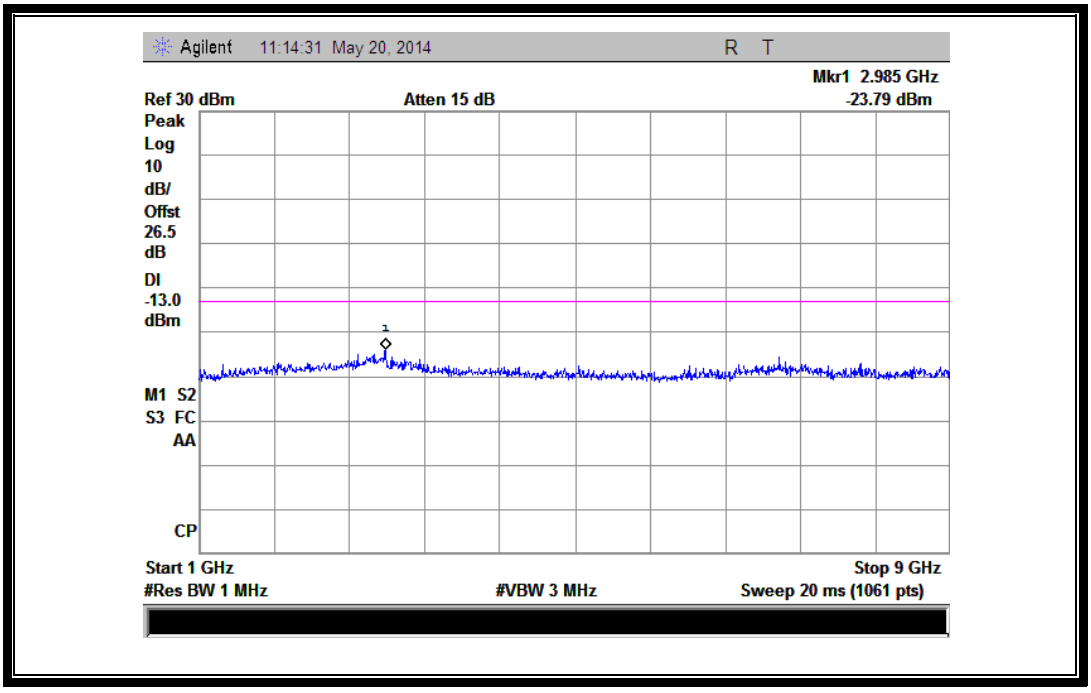
No.	Channel	Frequency(MHz)	Measured Max Spurious Emission(dBm)	Limit(dBm)
CDMA 800MHz(BC 0)	1013	824.7	-23.79	-13
	384	836.52	-22.86	-13
	777	848.31	-23.99	-13
CDMA 1900MHz(BC 1)	25	1851.25	-24.5	-13
	600	1880.0	-24.26	-13
	1175	1908.75	-23.34	-13
CDMA 800MHz(BC 10)	476	817.9	-19.56	-13
	526	819.1	-19.27	-13
	684	823.1	-19.68	-13

2. Test Plots for the Whole Measurement Frequency Range:

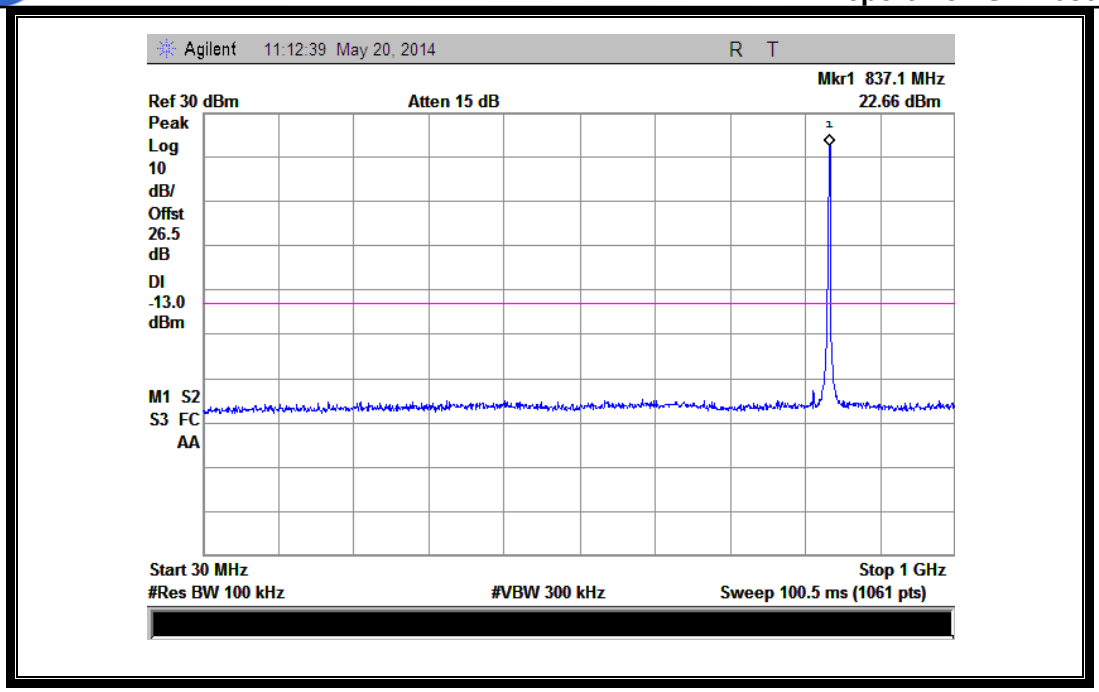
Note: the power of the EUT transmitting frequency should be ignored.



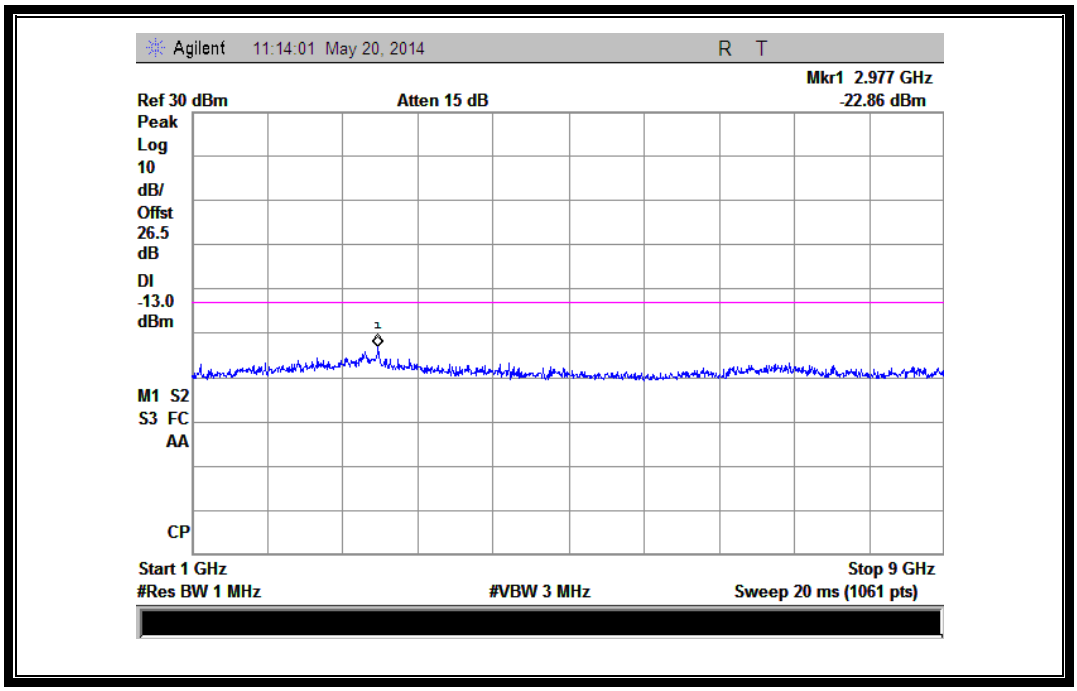
(Plot A: CDMA 800MHz:BC 0 Channel = 1013, 30MHz to 1GHz)



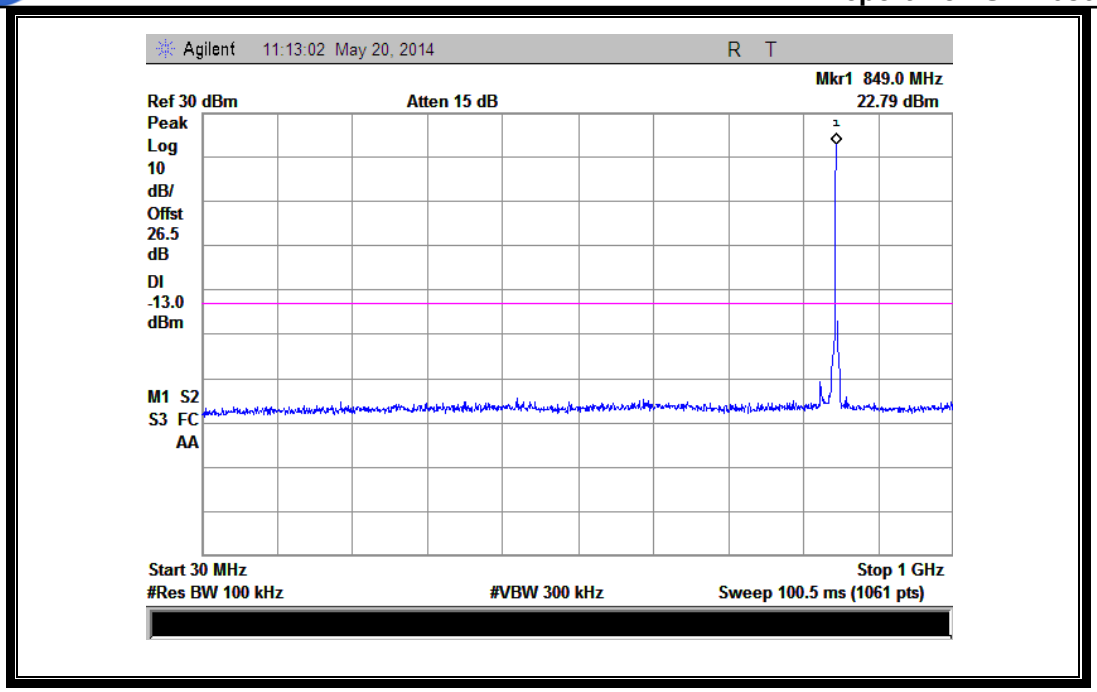
(Plot B: CDMA 800MHz:BC 0 Channel =1013, 1GHz to 9GHz)



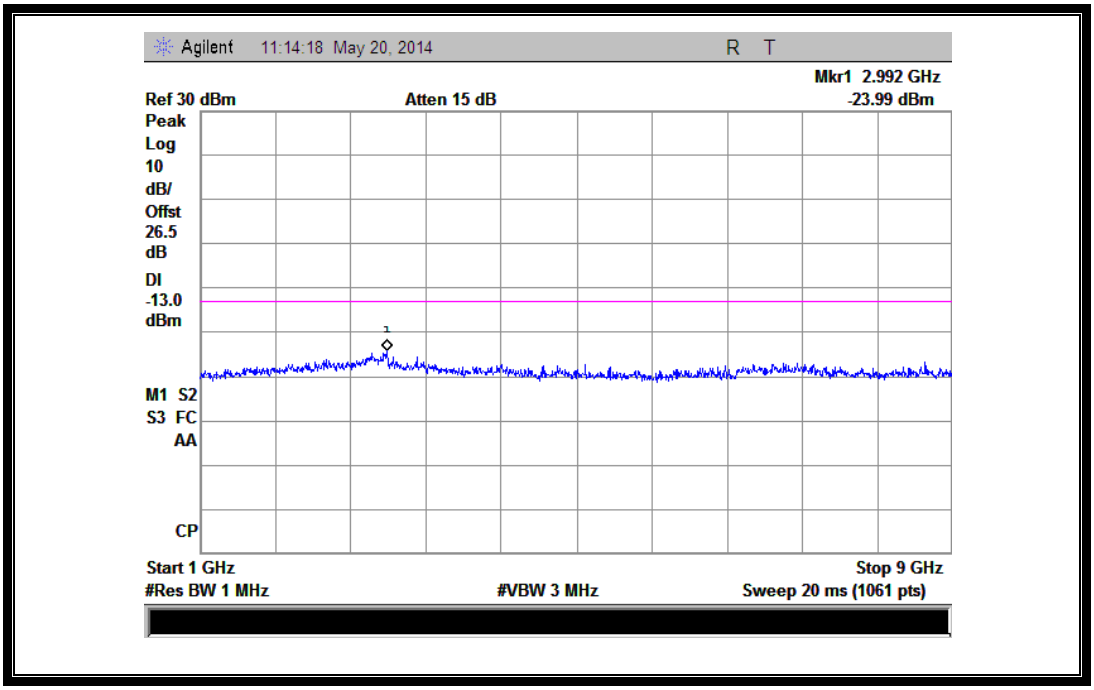
(Plot C: CDMA 800MHz:BC 0 Channel =384, 30MHz to 1GHz)



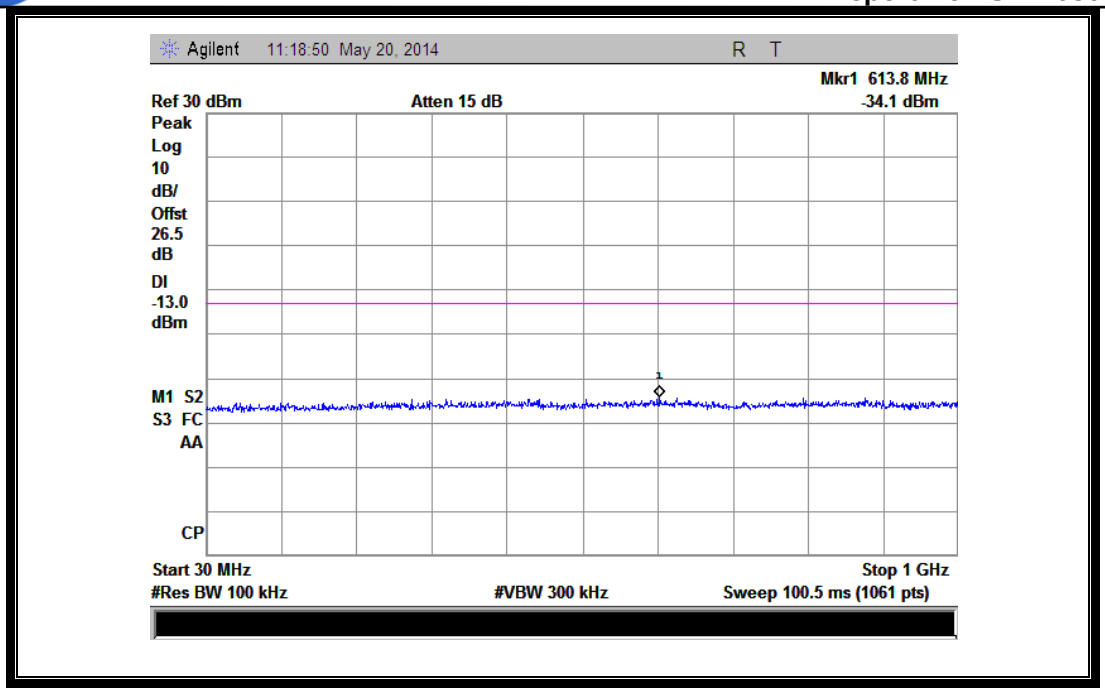
(Plot A: CDMA 800MHz:BC 0 Channel =384, 1GHz to 9GHz)



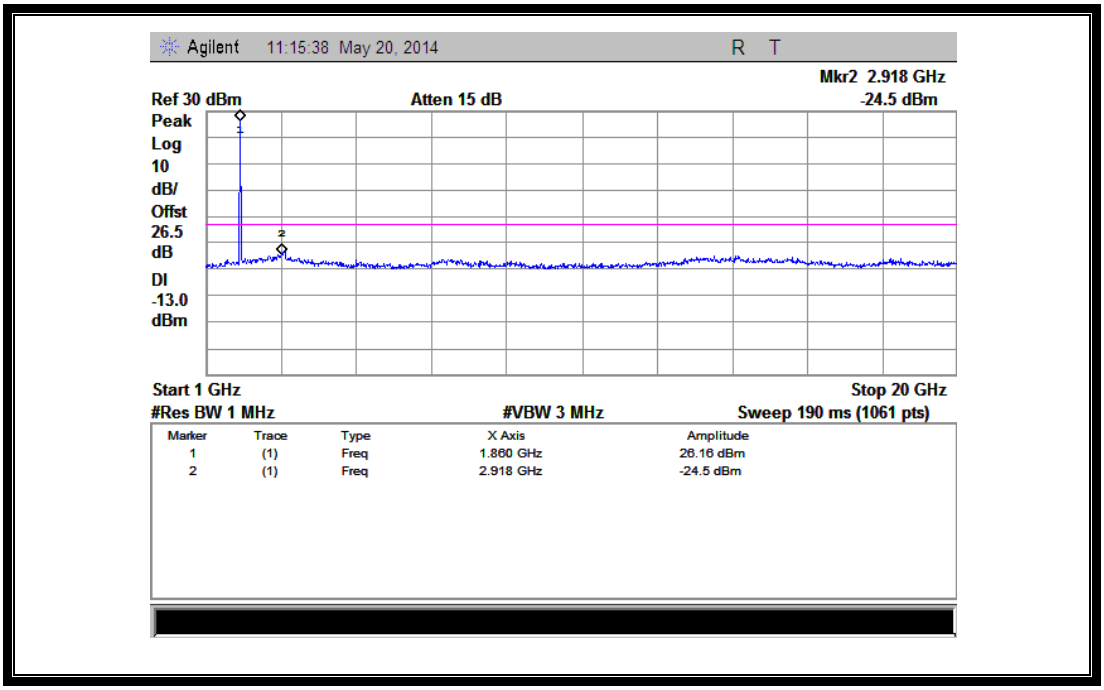
(Plot B: CDMA 800MHz:BC 0 Channel =777, 30MHz to 1GHz)



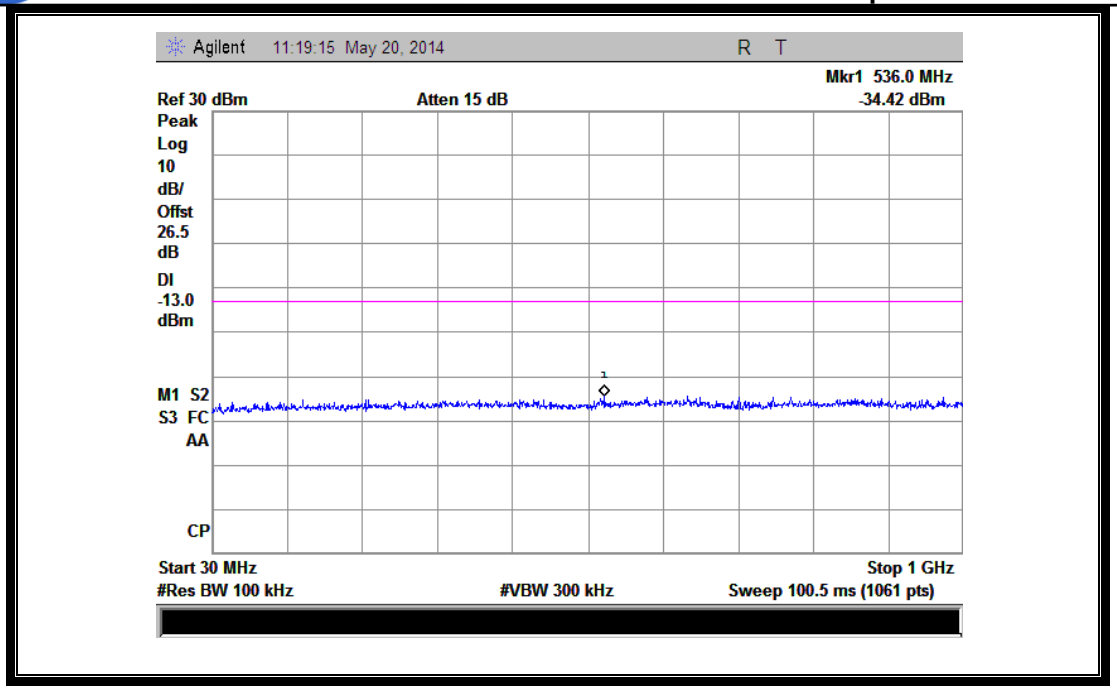
(Plot C: CDMA 800MHz:BC 0 Channel = 777, 1GHz to 9GHz)



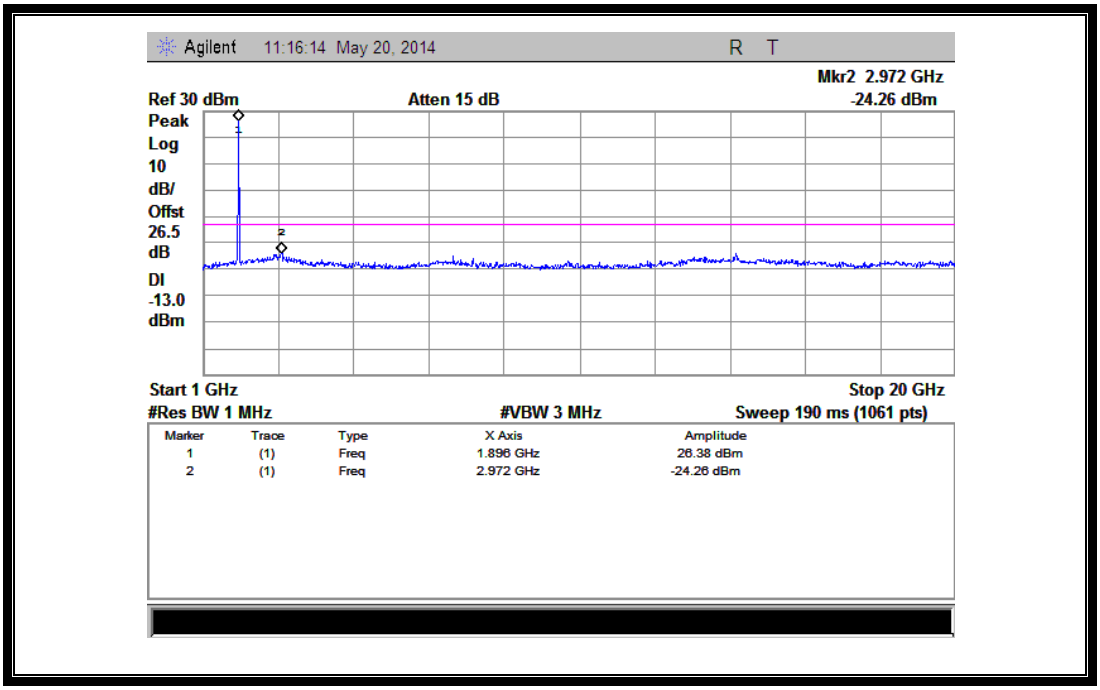
(Plot D: CDMA 1900MHz:BC 1 Channel = 25, 30MHz to 1GHz)



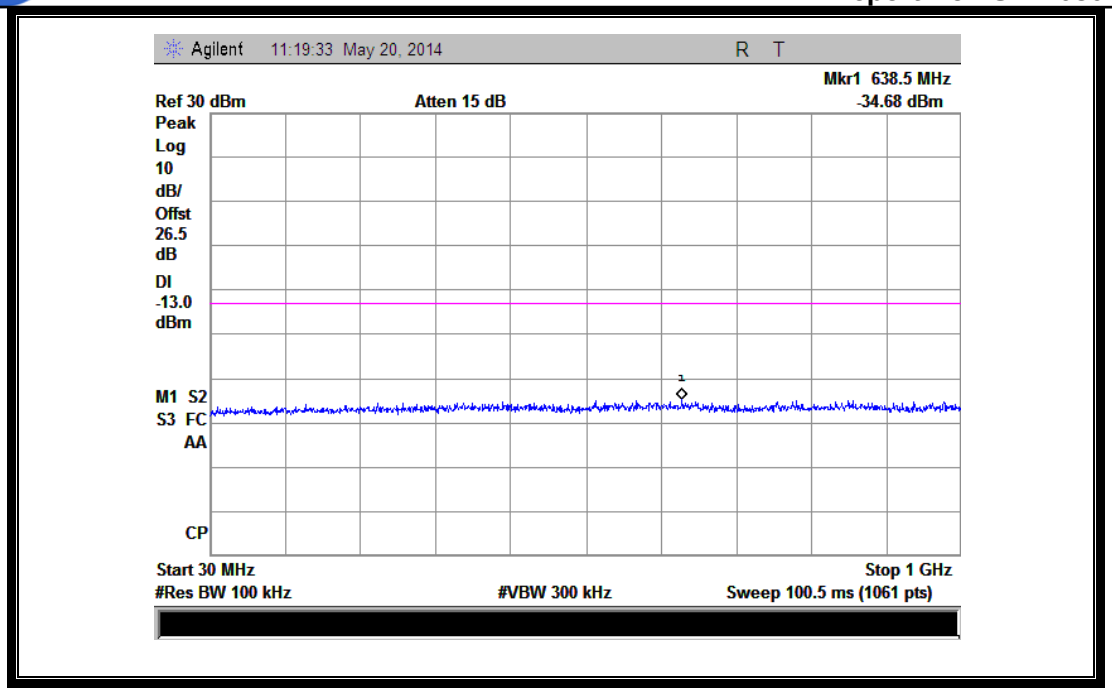
(Plot E: CDMA 1900MHz:BC 1 Channel =25, 1GHz to 20GHz)



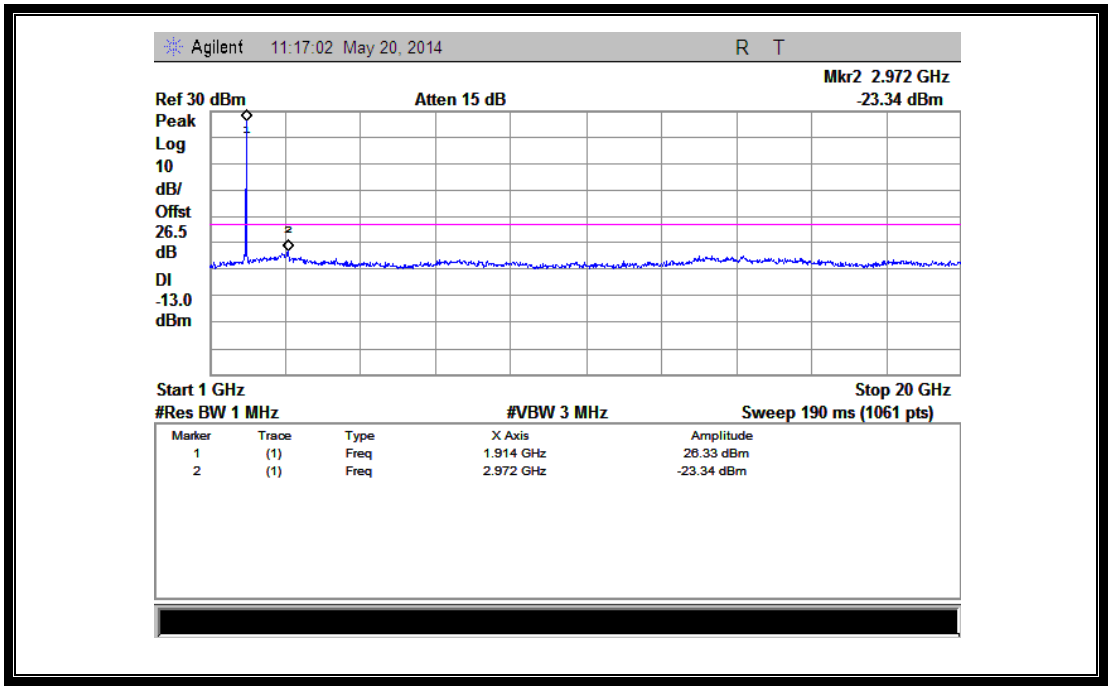
(Plot F: CDMA 1900MHz:BC 1 Channel = 600, 30MHz to 1GHz)



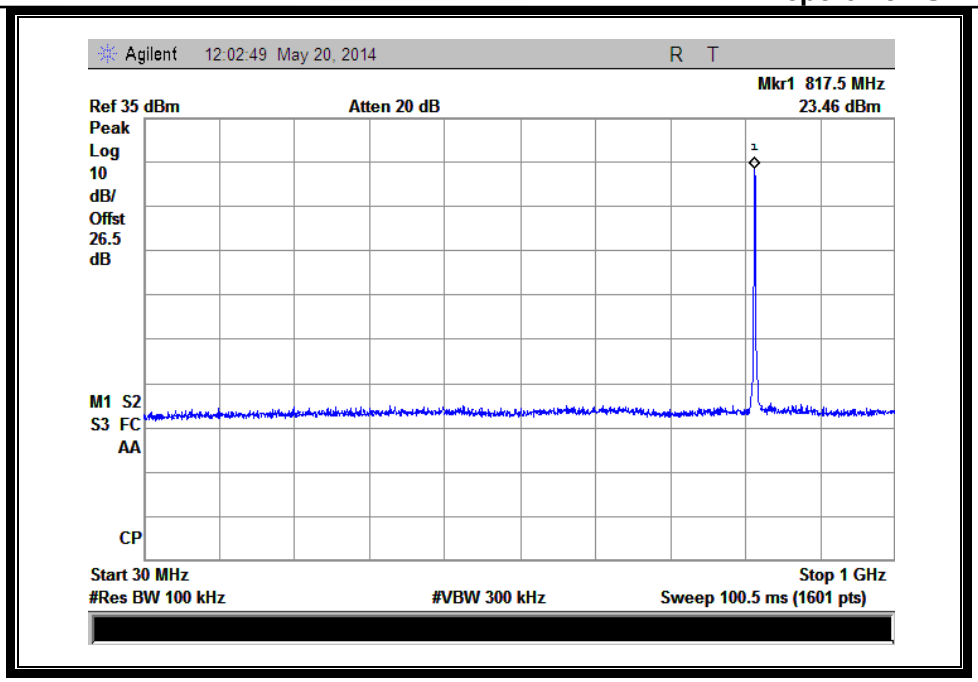
(Plot D: CDMA 1900MHz:BC 1 Channel =600, 1GHz to 20GHz)



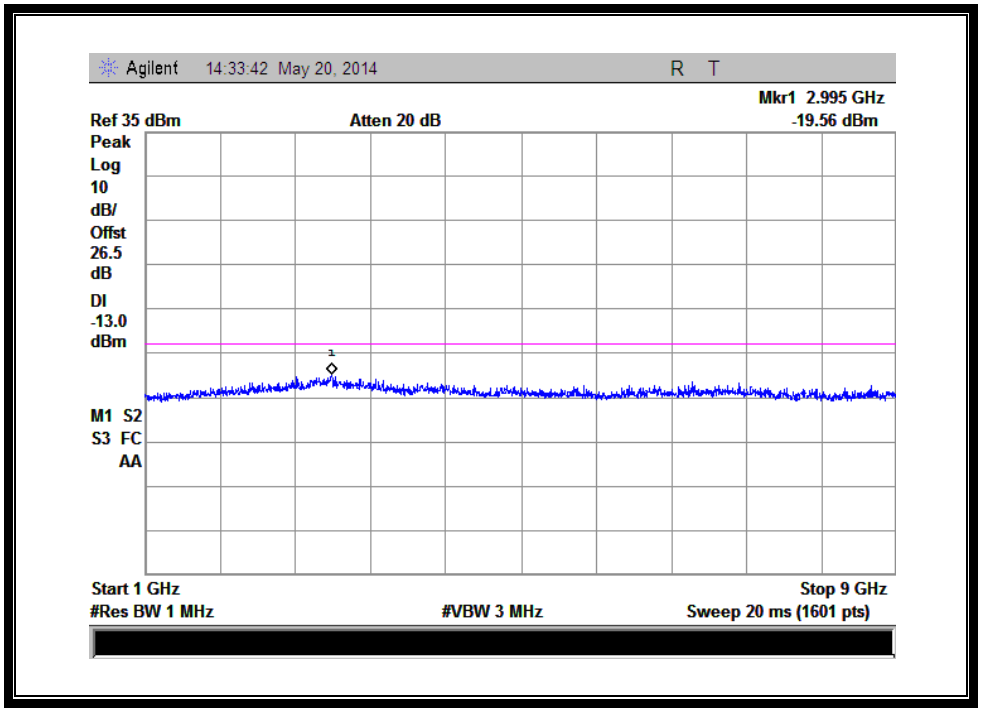
(Plot E: CDMA 1900MHz:BC 1 Channel =1175, 30MHz to 1GHz)



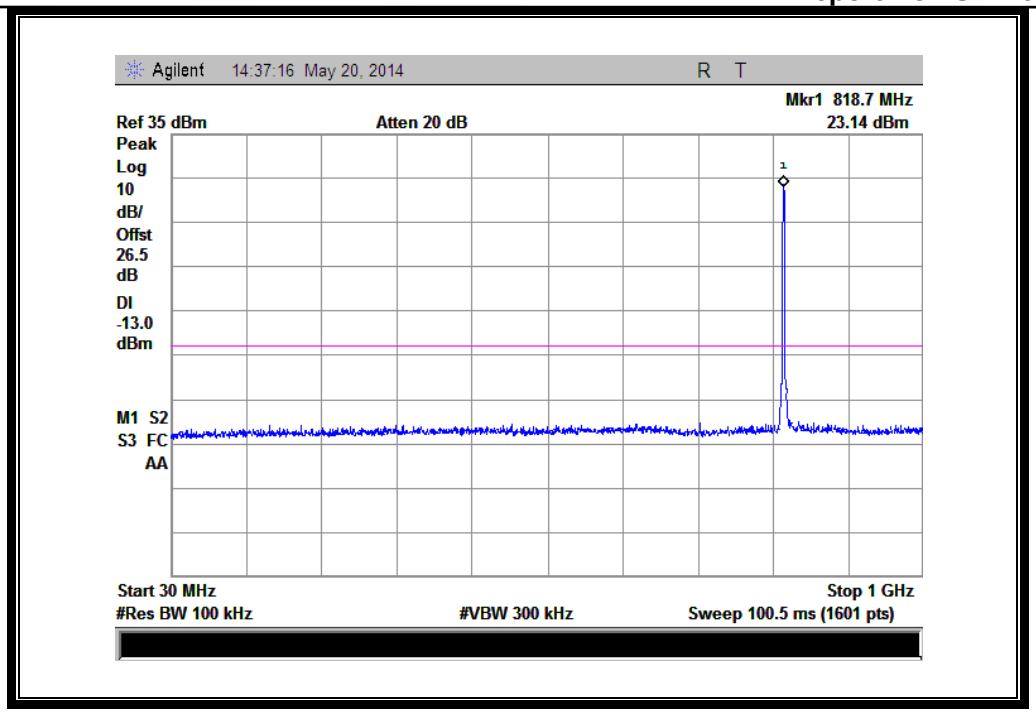
(Plot F: CDMA 1900MHz:BC 1 Channel = 1175, 1GHz to 20GHz)



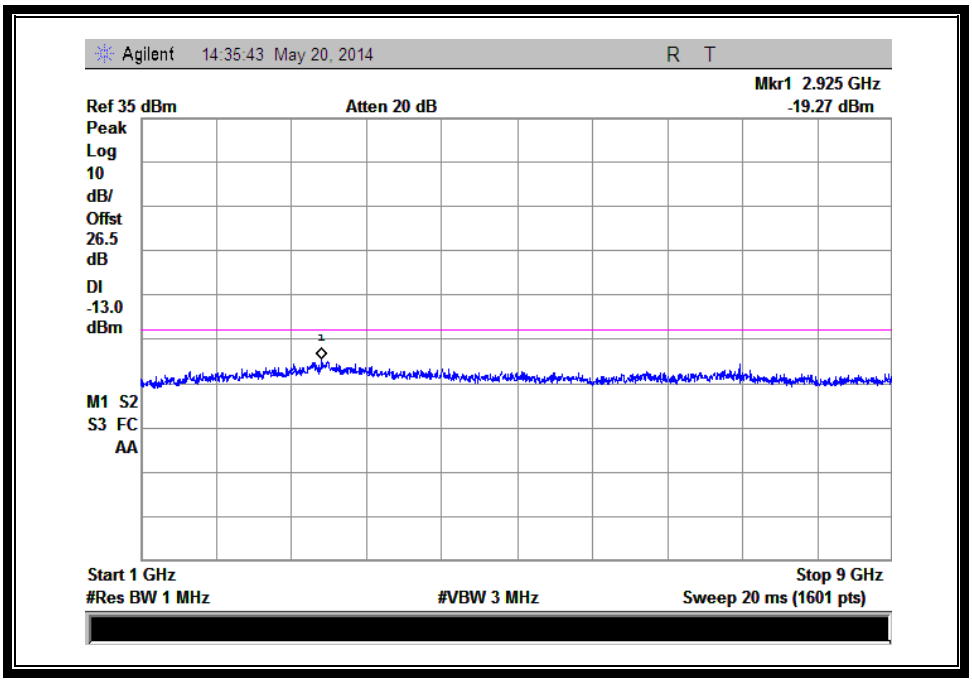
(Plot G: CDMA 800MHz:BC 10 Channel = 476, 30MHz to 1GHz)



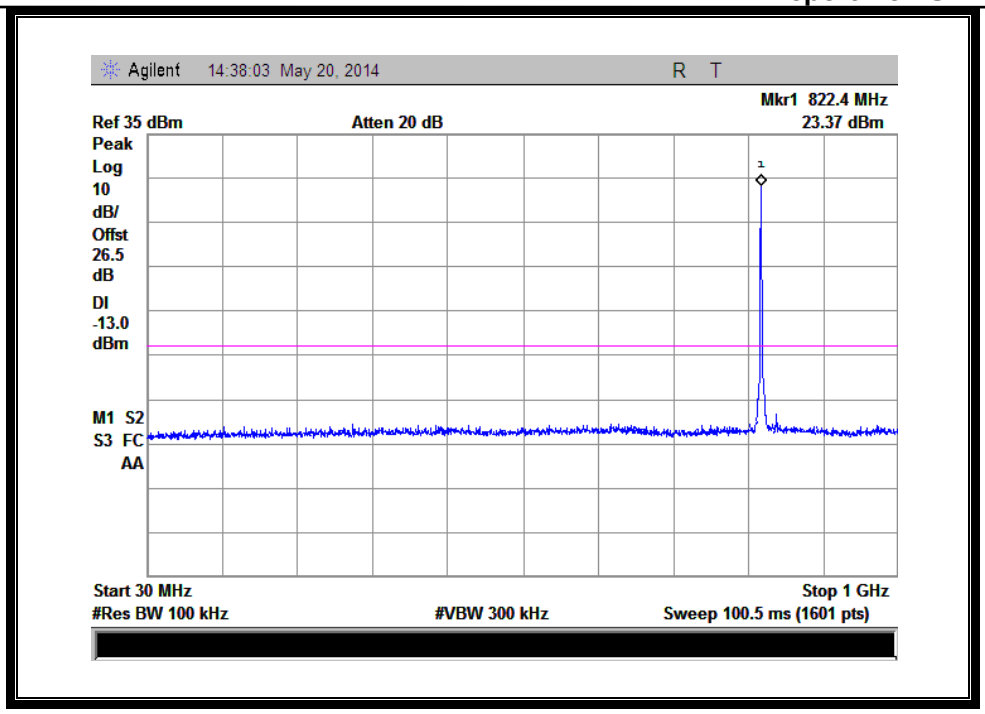
(Plot H: CDMA 800MHz:BC 10 Channel = 476, 1GHz to 9GHz)



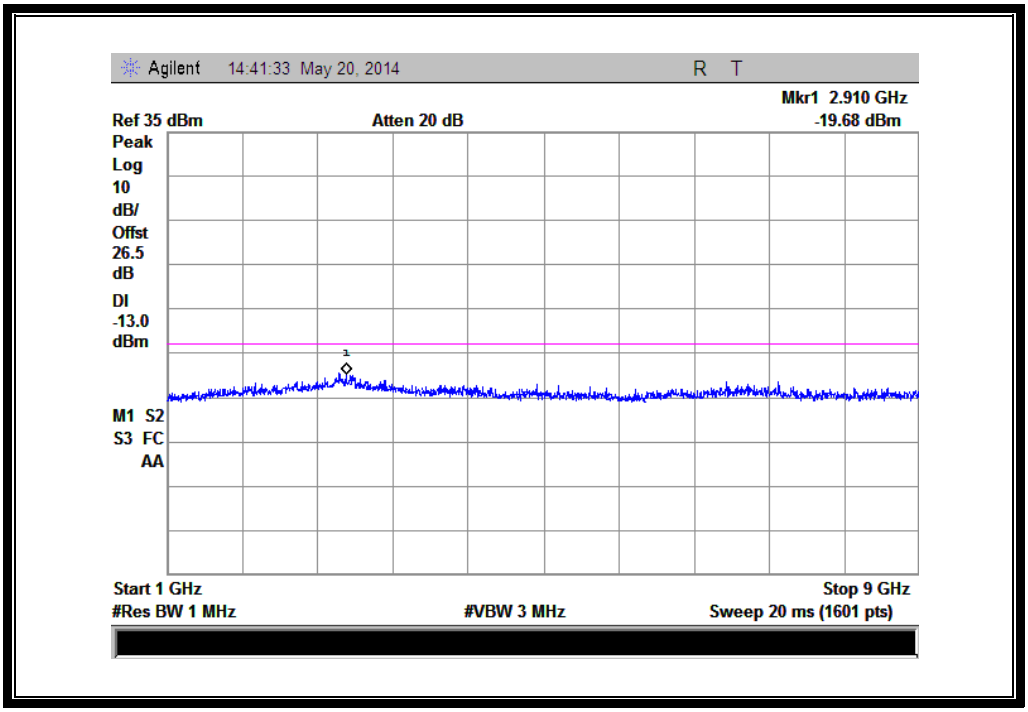
(Plot I: CDMA 800MHz:BC 10 Channel = 526, 30MHz to 1GHz)



(Plot G: CDMA 800MHz:BC 10 Channel =526, 1GHz to 9GHz)



(Plot H: CDMA 800MHz:BC 10 Channel = 684, 30MHz to 1GHz)



(Plot I: CDMA 800MHz:BC 10 Channel =684, 1GHz to 9GHz)

2.7 Band Edge

2.7.1 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.

2.7.2 Test Description

See section 2.1.2 of this report.

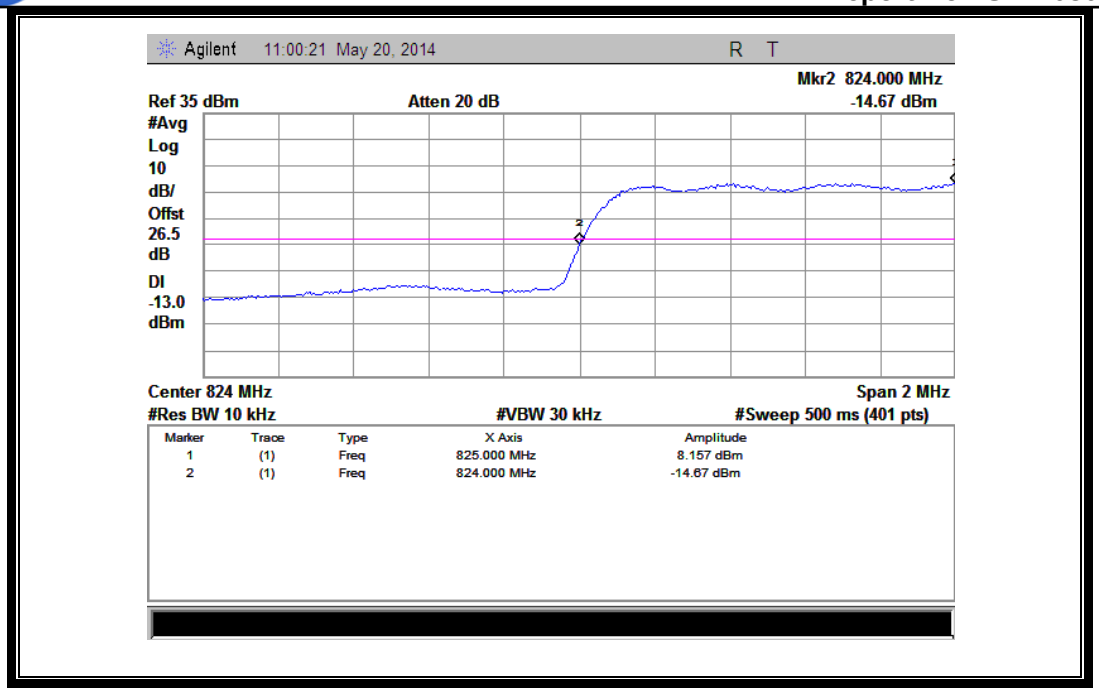
2.7.3 Test Result

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

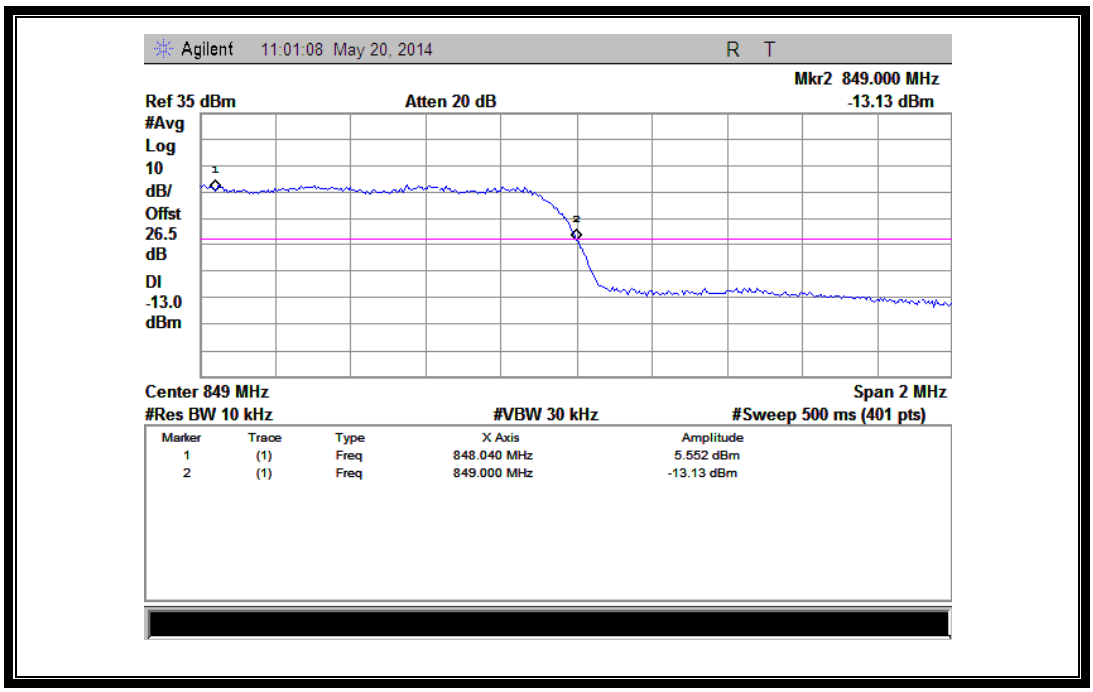
1. 1Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
CDMA 800MHz(BC 0)	1013	824.7	-14.67	Plat A	-13	PASS
	777	848.31	-13.13	Plot B		PASS
CDMA 1900MHz(BC 1)	25	1851.25	-30.53	Plat C	-13	PASS
	1175	1908.75	-32.21	Plot D		PASS

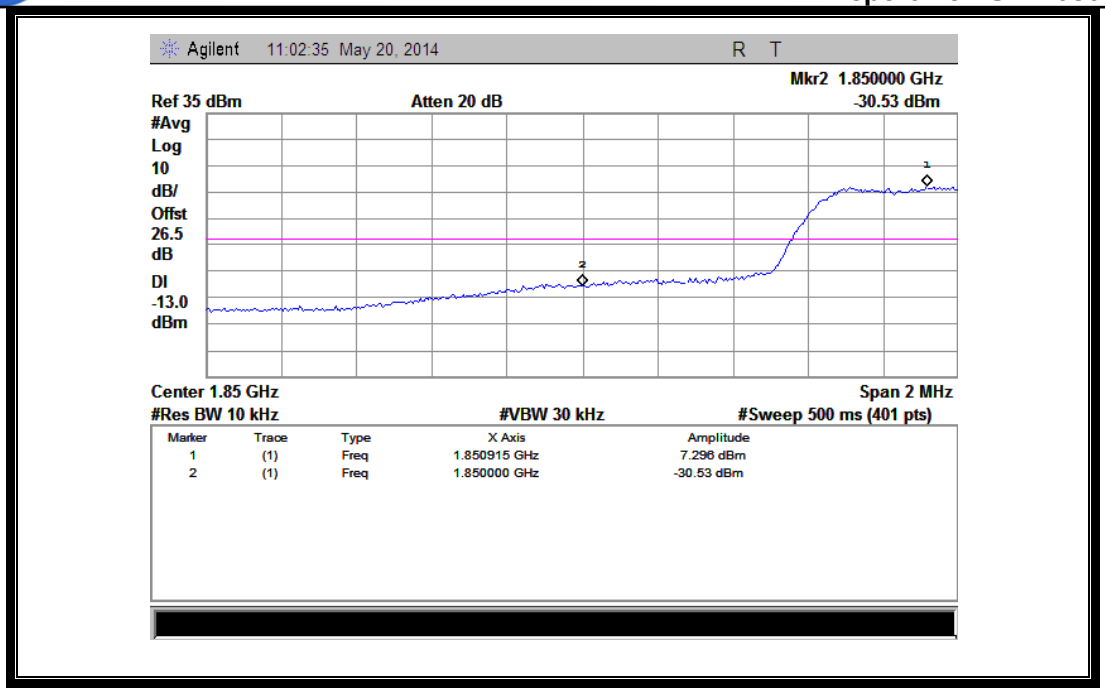
2. Test Plots:



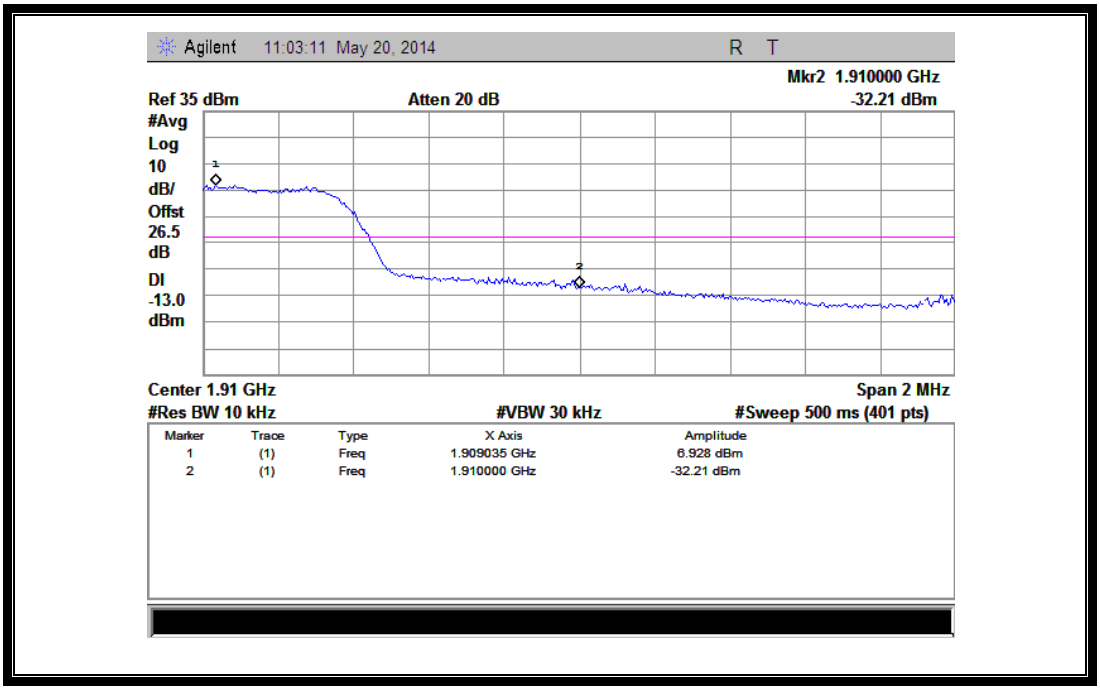
(Plot A: CDMA 800MHz:BC 0 Channel = 1013)



(Plot B: CDMA 800MHz:BC 0 Channel = 777)



(Plot C: CDMA 1900MHz:BC 1 Channel = 25)



(Plot D: CDMA 1900MHz:BC 0 Channel = 1175)

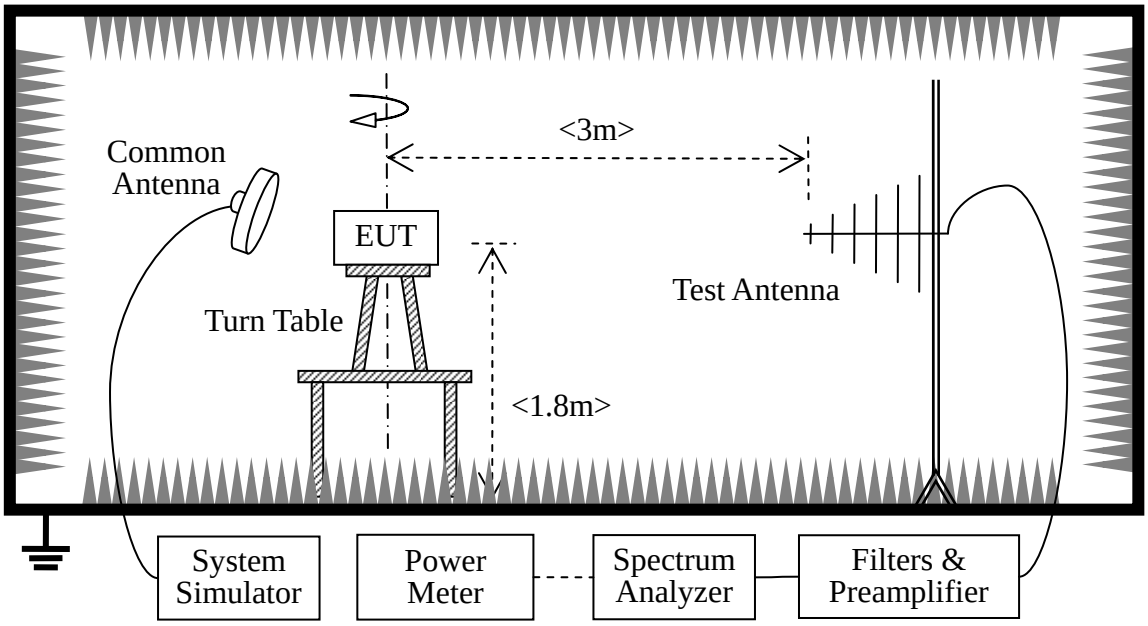
2.8 Transmitter Radiated Power (EIRP/ERP)

2.8.1 Requirement

According to FCC section 22.913 and section 90, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7Watts, and FCC section 24.232, the broadband PCS mobile station is limited to 2 Watts e.i.r.p. peak power

2.8.2 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.

A call is established between the EUT and the SS via a Common Antenna. The EUT is commanded by the SS to operate at the maximum and minimum output power (i.e. GSM850MHz band Power Control Level (PCL) = 5/19 and Power Class = 4, GSM1900MHz band Power Control Level (PCL) = 0/15 and Power Class = 1), and only the test result of the maximum output power was recorded.

- WCDMA Maximum RF output power: CDMA 800MHz(BC 0) 29.15dBm, CDMA 1900MHz(BC 1) 28.01dBm, CDMA 800MHz(BC 10) 28.9dBm, Please refer to section 2.1.3 of this report.

- Step size (dB): 3dB

The Test Antenna is a Bi-Log one (used for 30MHz to 1GHz) 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	2014.02.26	2015.02.25
Spectrum Analyzer	Agilent	E7405A	US44210471	2014.02.26	2015.02.25
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2014.02.26	2015.02.25
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2014.02.26	2015.02.25
Test Antenna - Horn	Schwarzbeck	UG -596A/U	A0902607	2014.02.26	2015.02.25
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2014.02.26	2015.02.25
Substitution Antenna	Schwarzbeck	BBHA 9120C	9120C-384	2014.02.26	2015.02.25
Pre-AMPs	lucix	S10M100L3802	S020180L3203	2014.02.26	2015.02.25
Notch Filter	COM-MW	ZBSF-C836.5-25-X	NA	2014.02.26	2015.02.25
Notch Filter	COM-MW	ZBSF-C1747.5-75-X2	NA	2014.02.26	2015.02.25
Notch Filter	COM-MW	ZBSF-C1880-60-X2	NA	2014.02.26	2015.02.25

2.8.3 Test Result

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.

The substitution corrections are obtained as described below:

$A_{SUBST} = P_{SUBST\_TX} - P_{SUBST\_RX} - L_{SUBST\_CABLES} + G_{SUBST\_TX\_ANT}$

$A_{TOT} = L_{CABLES} + A_{SUBST}$

Where A_{SUBST} is the final substitution correction including receive antenna gain.

P_{SUBST_TX} is signal generator level,

P_{SUBST_RX} is receiver level,

L_{SUBST_CABLES} is cable losses including TX cable,

$G_{SUBST\_TX\_ANT}$ is substitution antenna gain.

A_{TOT} is total correction factor including cable loss and substitution correction

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

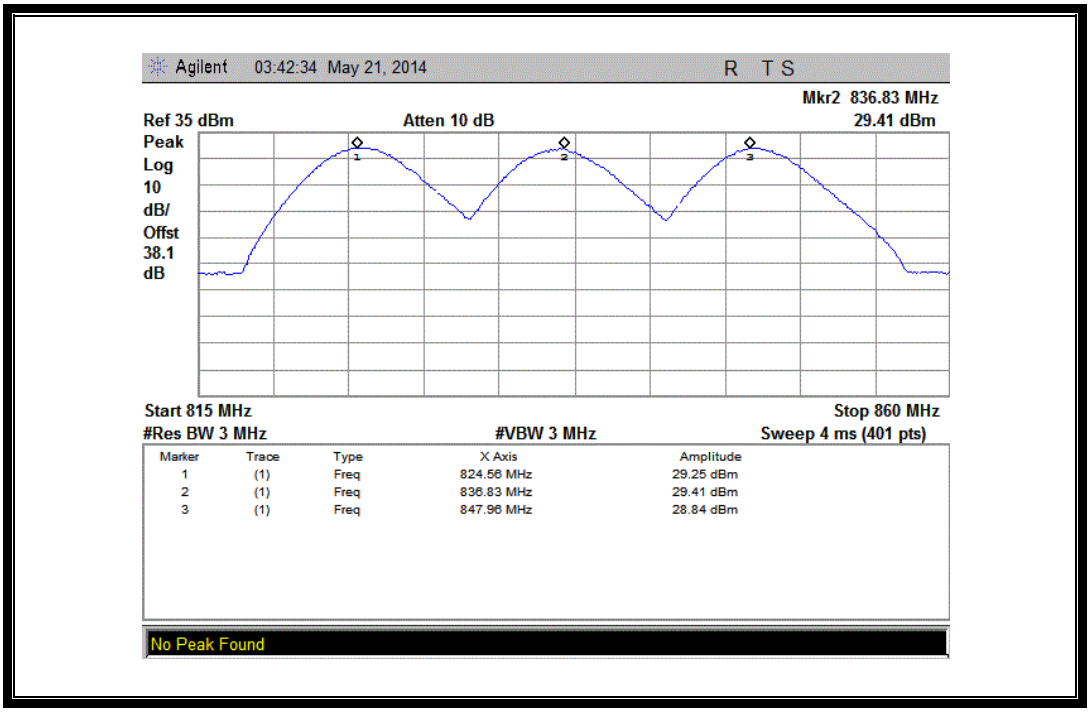
1. Test Verdict:

No.	Channel	Frequency (MHz)	Measured ERP		Limit	
			dBm	W	dBm	W
CDMA 800MHz(BC 0)	1013	824.7	29.25	0.841	35	7
	384	836.52	29.41	0.873		
	777	848.31	28.84	0.766		

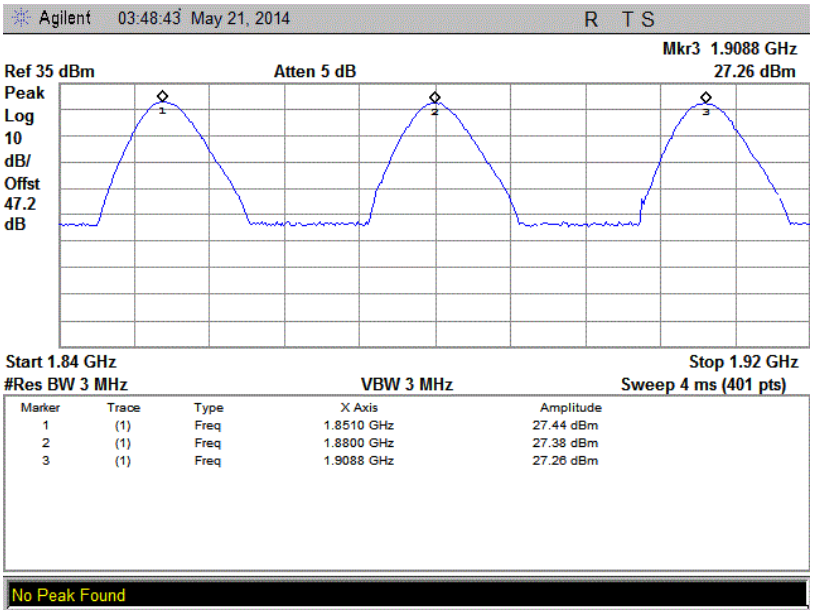
No.	Channel	Frequency (MHz)	Measured EIRP		Limit	
			dBm	W	dBm	W
CDMA 1900MHz(BC 1)	25	1851.25	27.44	0.555	33	2
	600	1880.0	27.38	0.547		
	1175	1908.75	27.26	0.532		

No.	Channel	Frequency (MHz)	Measured ERP		Limit	
			dBm	W	dBm	W
CDMA 800MHz(BC 10)	476	817.9	29.71	0.935	35	7
	526	819.1	29.82	0.959		
	684	823.1	29.81	0.957		

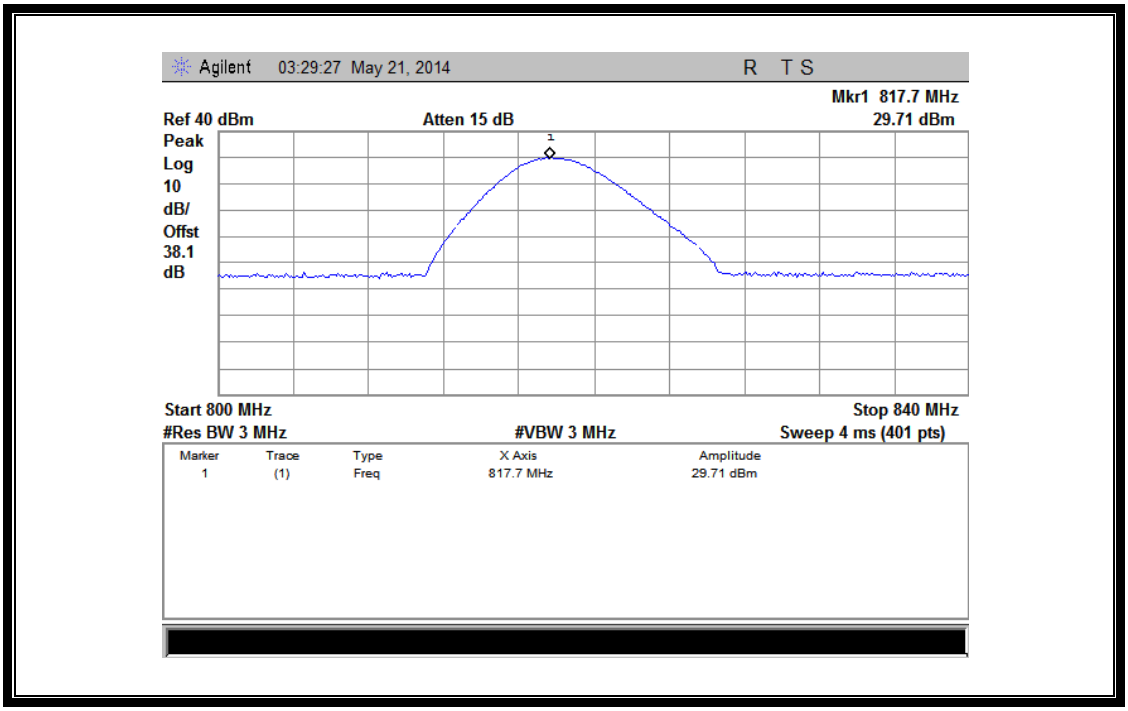
2. Test Plots:



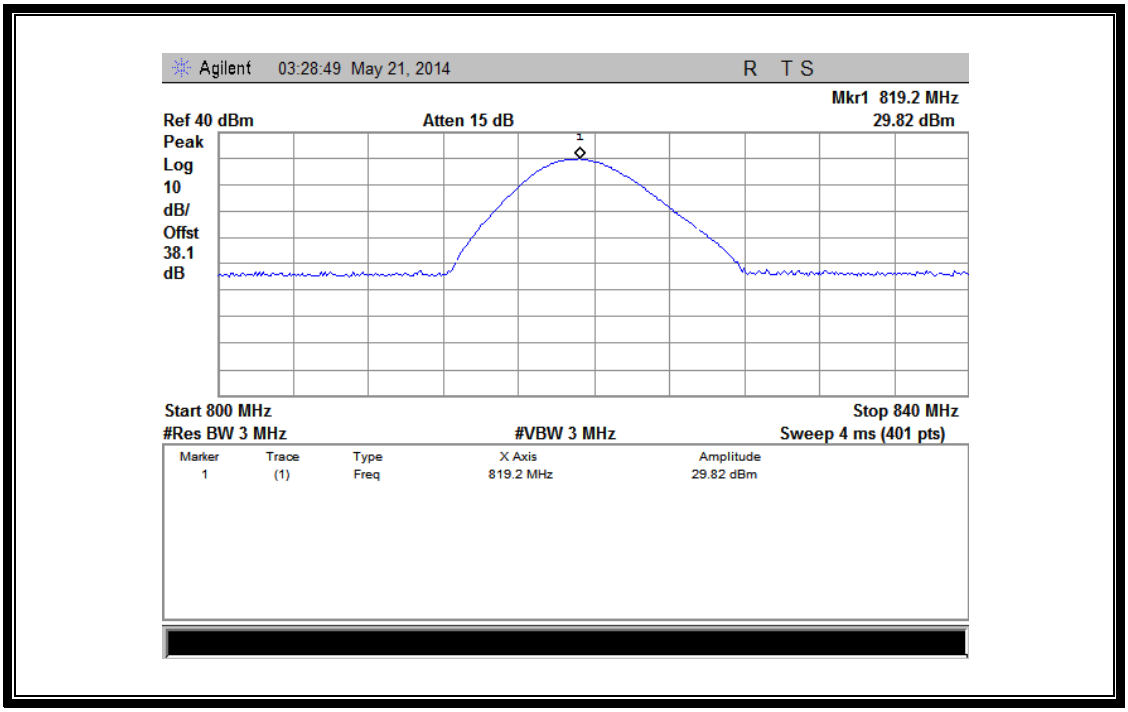
(CDMA 800MHz:BC 0 Channel = 1013,384, 777)



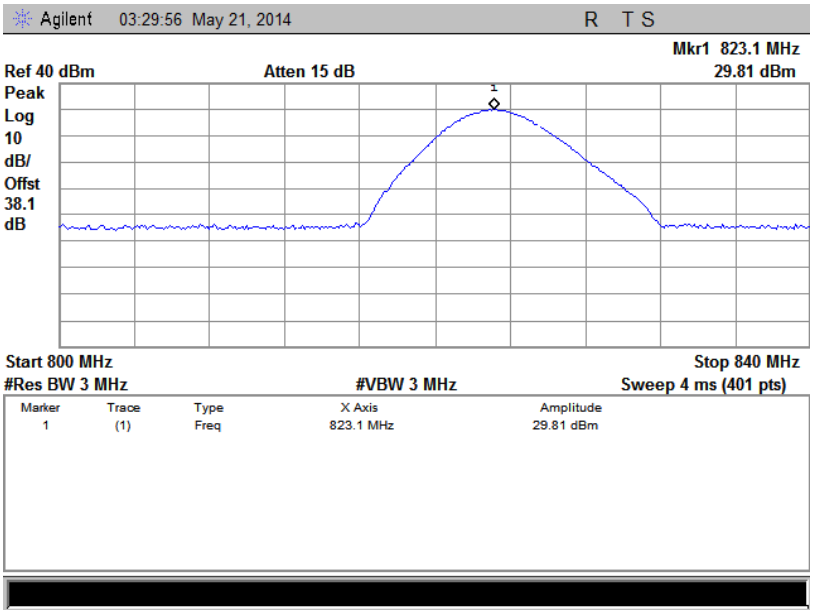
(CDMA 1900MHz:BC 1 Channel = 25, 600, 1175)



(CDMA 800MHz:BC 10 Channel = 476)



(CDMA 800MHz:BC 10 Channel = 526)



(CDMA 800MHz:BC 10 Channel = 684)

2.9 Radiated Out of Band Emissions

2.9.1 Requirement

According to FCC section 22.917(a) and section 24.238(a) and section 90 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.

The spurious emission with frequency band 1900 according to FCC section 2.1057.

2.9.2 Test Description

See section 2.8.2 of this report.

Equipment List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2014.02.26	2015.02.25
Spectrum Analyzer	Agilent	E7405A	US44210471	2014.02.26	2015.02.25
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2014.02.26	2015.02.25
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2014.02.26	2015.02.25
Test Antenna - Horn	Schwarzbeck	UG -596A/U	A0902607	2014.02.26	2015.02.25
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2014.02.26	2015.02.25
Substitution Antenna	Schwarzbeck	BBHA 9120C	9120C-384	2014.02.26	2015.02.25
Pre-AMPs	lucix	S10M100L3802	S020180L3203	2014.02.26	2015.02.25
Notch Filter	COM-MW	ZBSF-C836.5-25-X	NA	2014.02.26	2015.02.25
Notch Filter	COM-MW	ZBSF-C1747.5-75-X2	NA	2014.02.26	2015.02.25
Notch Filter	COM-MW	ZBSF-C1880-60-X2	NA	2014.02.26	2015.02.25

Note: when doing measurements above 1GHz, the EUT has been within the 3dB cone width of the horn antenna during horizontal antenna.

2.9.3 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.

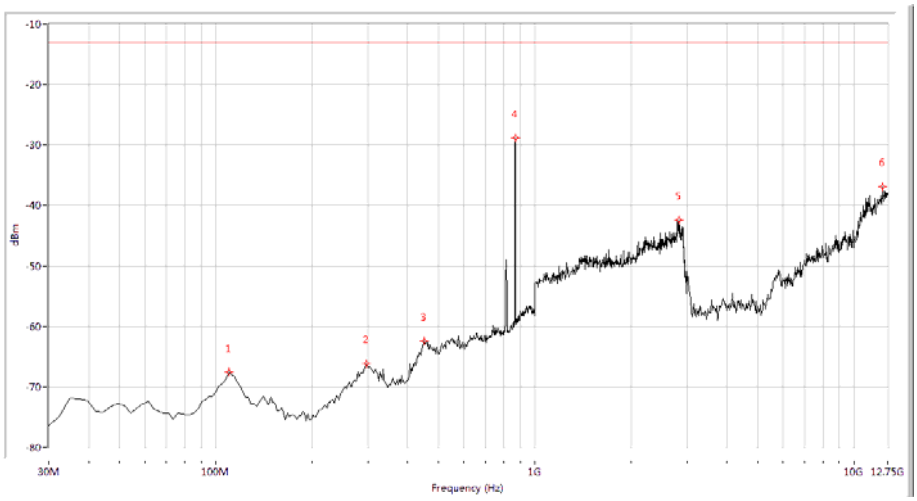
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)		Refer to Plot	Limit (dBm)	Verdict
			Test Antenna Horizontal	Test Antenna Vertical			
CDMA 800MHz(BC 0)	1013	824.7	< -25	< -25	Plot A.1/A.2	-13	PASS
	384	836.52	< -25	< -25	Plot B.1/B.2		PASS
	777	848.31	< -25	< -25	Plot C.1/C.2		PASS
CDMA 1900MHz(BC 1)	25	1851.25	-24.69	< -25	Plot D.1/D.2	-13	PASS
	600	1880.0	-24.32	< -25	Plot E.1/E.2		PASS
	1175	1908.75	< -25	-24.65	Plot F.1/F.2		PASS
CDMA 800MHz(BC 10)	476	817.9	< -25	< -25	Plot G.1/G.2	-13	PASS
	526	819.1	< -25	< -25	Plot H.1/H.2		PASS
	684	823.1	< -25	< -25	Plot I.1/I.2		PASS

2. Test Plots for the Whole Measurement Frequency Range:

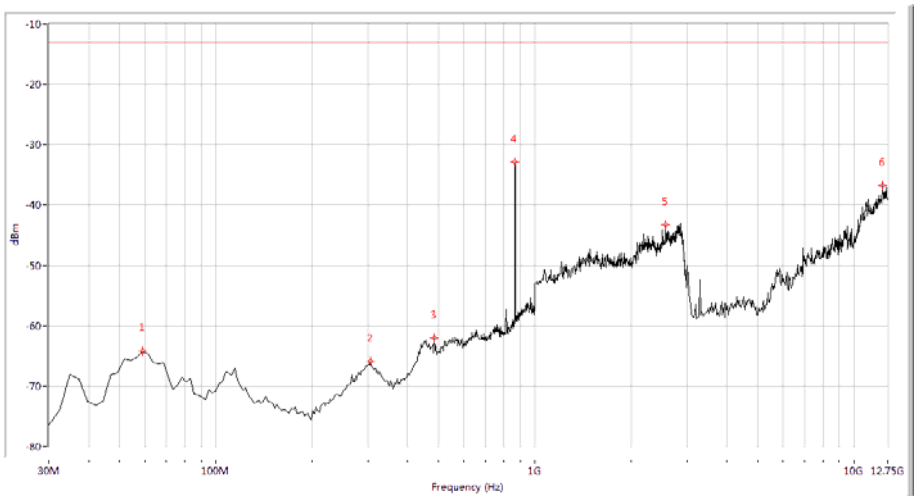
Note1: the power of the EUT transmitting frequency should be ignored.

Note2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.



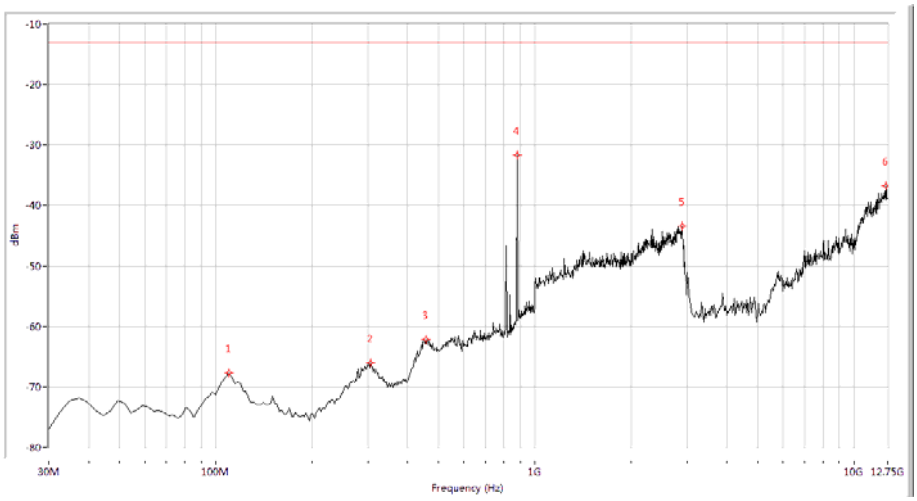
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-67.47	-13.0	54.5	57.7	Horizontal	PASS
296.085	-66.10	-13.0	53.1	260.0	Horizontal	PASS
450.898	-62.44	-13.0	49.4	56.0	Horizontal	PASS
869.377	-28.86	-13.0	15.9	329.4	Horizontal	PASS
2825.436	-42.43	-13.0	29.4	77.0	Horizontal	PASS
12288.030	-36.88	-13.0	23.9	33.2	Horizontal	PASS

(Plot A.1: CDMA 800MHz:BC 0 Channel = 1013, Test Antenna Horizontal)



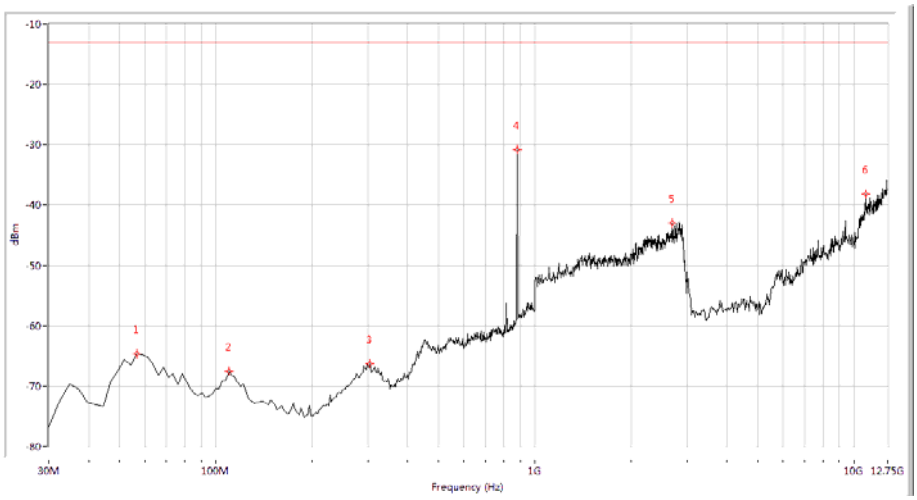
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
59.027	-64.16	-13.0	51.2	60.9	Vertical	PASS
305.761	-65.89	-13.0	52.9	62.2	Vertical	PASS
484.763	-62.03	-13.0	49.0	242.1	Vertical	PASS
866.958	-32.89	-13.0	19.9	352.6	Vertical	PASS
2576.060	-43.27	-13.0	30.3	35.6	Vertical	PASS
12312.344	-36.69	-13.0	23.7	355.6	Vertical	PASS

(Plot A.2: CDMA 800MHz:BC 0 Channel = 1013, Test Antenna Vertical)



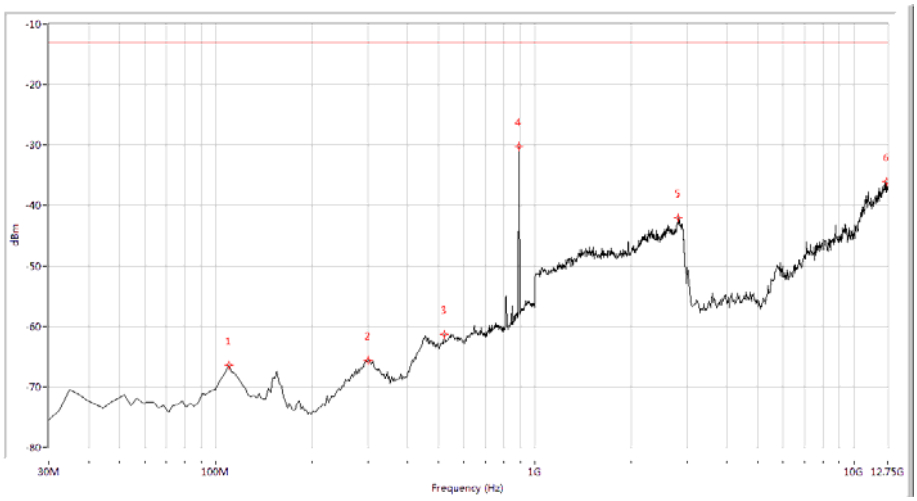
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-67.68	-13.0	54.7	172.1	Horizontal	PASS
305.761	-66.02	-13.0	53.0	323.9	Horizontal	PASS
455.736	-62.15	-13.0	49.2	17.0	Horizontal	PASS
879.052	-31.68	-13.0	18.7	335.4	Horizontal	PASS
2890.274	-43.39	-13.0	30.4	45.3	Horizontal	PASS
12628.429	-36.75	-13.0	23.7	145.2	Horizontal	PASS

(Plot B.1: CDMA 800MHz:BC 0 Channel = 384, Test Antenna Horizontal)



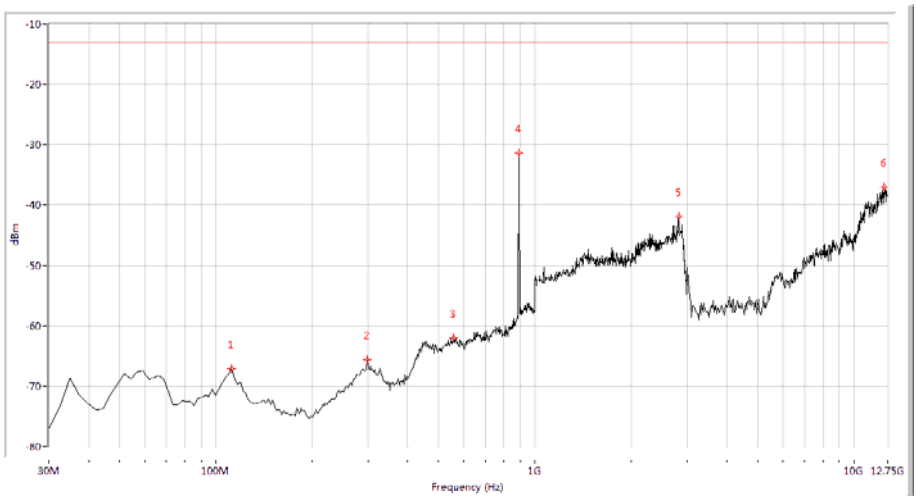
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
56.608	-64.56	-13.0	51.6	20.2	Vertical	PASS
109.825	-67.58	-13.0	54.6	15.3	Vertical	PASS
303.342	-66.29	-13.0	53.3	27.8	Vertical	PASS
879.052	-30.76	-13.0	17.8	324.9	Vertical	PASS
2700.748	-43.03	-13.0	30.0	134.2	Vertical	PASS
10877.805	-38.14	-13.0	25.1	61.4	Vertical	PASS

(Plot B.2: CDMA 800MHz:BC 0 Channel = 384, Test Antenna Vertical)



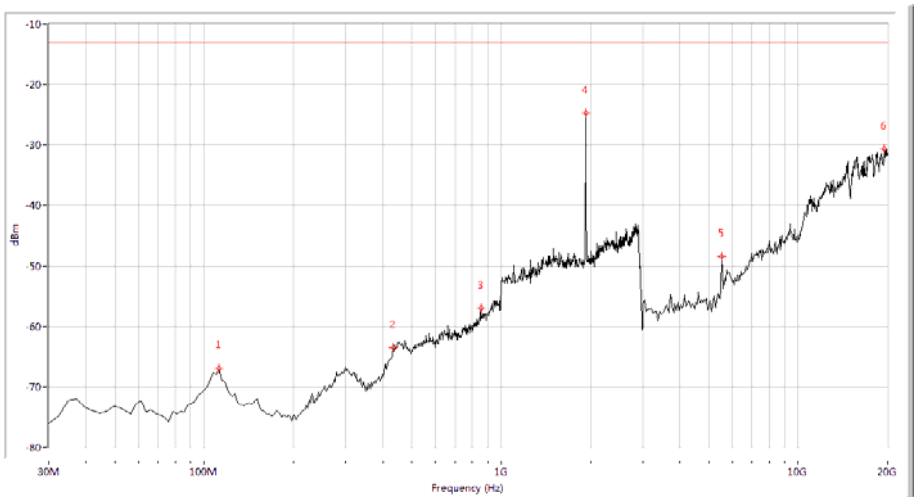
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-66.48	-13.0	53.5	166.3	Horizontal	PASS
300.923	-65.55	-13.0	52.5	46.9	Horizontal	PASS
521.047	-61.34	-13.0	48.3	121.0	Horizontal	PASS
891.147	-30.20	-13.0	17.2	211.3	Horizontal	PASS
2815.461	-41.97	-13.0	29.0	127.8	Horizontal	PASS
12701.372	-36.01	-13.0	23.0	3.4	Horizontal	PASS

(Plot C.1: CDMA 800MHz:BC 0 Channel = 777, Test Antenna Horizontal)



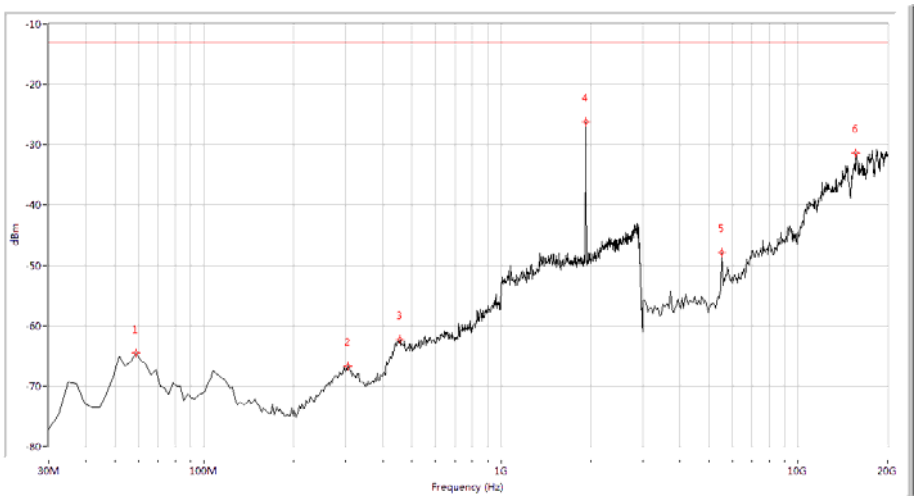
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
112.244	-67.14	-13.0	54.1	-0.0	Vertical	PASS
298.504	-65.56	-13.0	52.6	96.4	Vertical	PASS
557.332	-61.98	-13.0	49.0	33.3	Vertical	PASS
891.147	-31.37	-13.0	18.4	243.9	Vertical	PASS
2830.424	-41.88	-13.0	28.9	297.1	Vertical	PASS
12433.915	-36.96	-13.0	24.0	220.2	Vertical	PASS

(Plot C.2: CDMA 800MHz:BC 0 Channel = 777, Test Antenna Vertical)



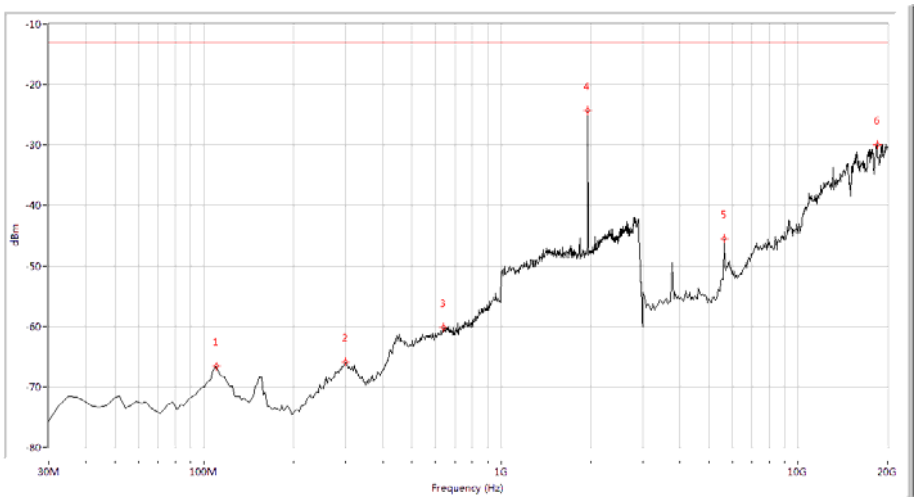
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
112.244	-66.94	-13.0	53.9	142.3	Horizontal	PASS
433.965	-63.55	-13.0	50.5	56.1	Horizontal	PASS
854.863	-57.02	-13.0	44.0	-0.0	Horizontal	PASS
1927.681	-24.69	-13.0	11.7	338.2	Horizontal	PASS
5543.641	-48.37	-13.0	35.4	287.6	Horizontal	PASS
19491.272	-30.62	-13.0	17.6	353.8	Horizontal	PASS

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



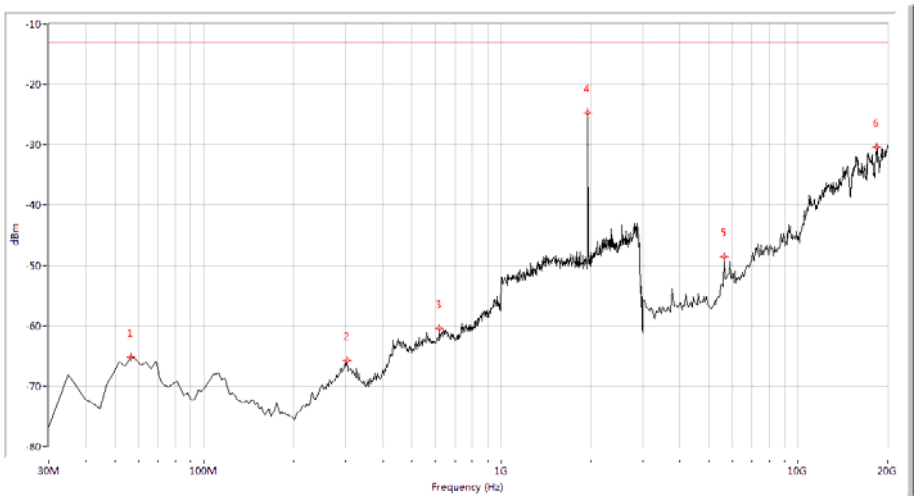
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
59.027	-64.41	-13.0	51.4	130.6	Vertical	PASS
305.761	-66.66	-13.0	53.7	48.4	Vertical	PASS
455.736	-62.23	-13.0	49.2	231.2	Vertical	PASS
1927.681	-26.18	-13.0	13.2	-0.0	Vertical	PASS
5543.641	-47.82	-13.0	34.8	149.0	Vertical	PASS
15675.810	-31.38	-13.0	18.4	114.8	Vertical	PASS

(Plot D.2: CDMA 1900MHz:BC 1 Channel = 25, Test Antenna Vertical)



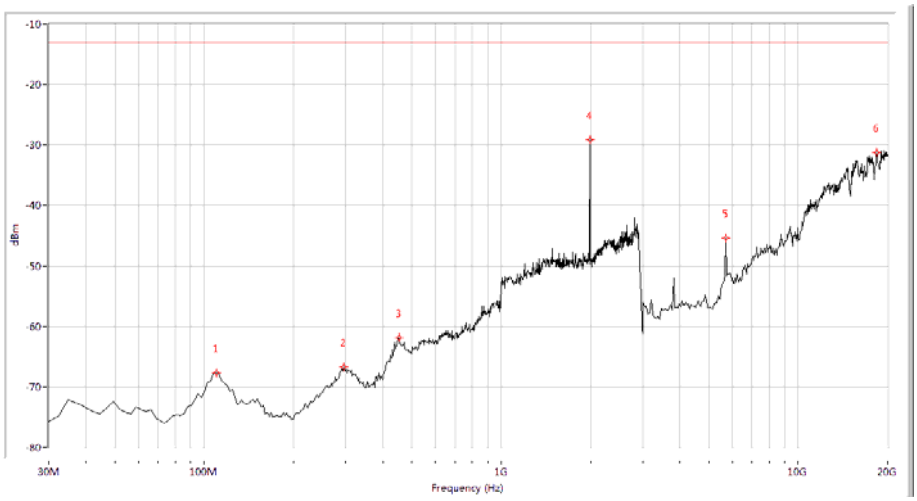
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-66.54	-13.0	53.5	257.3	Horizontal	PASS
298.504	-65.87	-13.0	52.9	172.8	Horizontal	PASS
639.576	-60.24	-13.0	47.2	89.5	Horizontal	PASS
1957.606	-24.32	-13.0	11.3	7.6	Horizontal	PASS
5628.429	-45.55	-13.0	32.5	247.6	Horizontal	PASS
18473.815	-29.91	-13.0	16.9	197.7	Horizontal	PASS

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



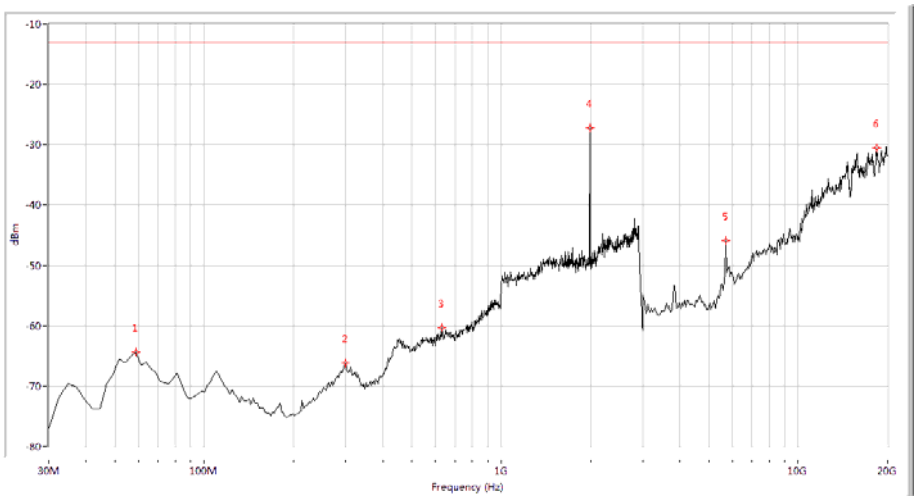
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
56.608	-65.12	-13.0	52.1	139.5	Vertical	PASS
303.342	-65.66	-13.0	52.7	176.7	Vertical	PASS
620.224	-60.46	-13.0	47.5	-0.0	Vertical	PASS
1957.606	-24.65	-13.0	11.7	300.0	Vertical	PASS
5628.429	-48.58	-13.0	35.6	291.1	Vertical	PASS
18346.633	-30.31	-13.0	17.3	300.0	Vertical	PASS

(Plot E.2: CDMA 1900MHz:BC 1 Channel = 600, Test Antenna Vertical)



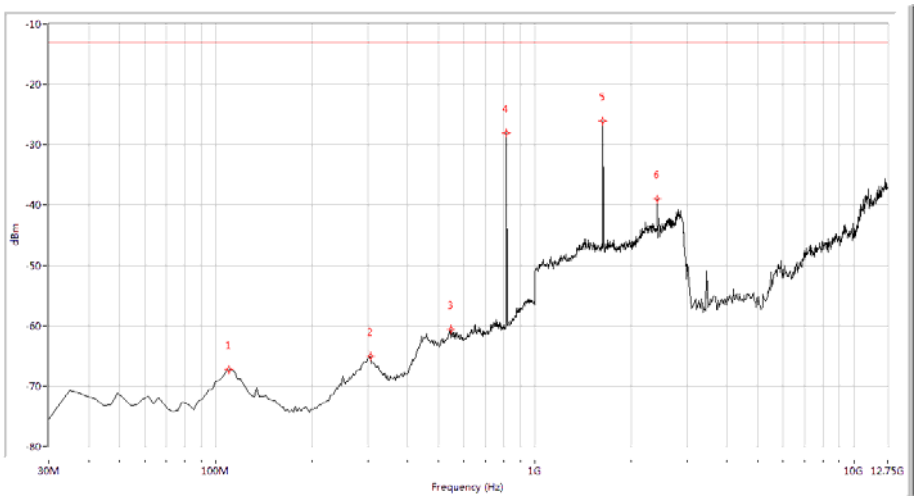
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-67.61	-13.0	54.6	360.0	Horizontal	PASS
296.085	-66.69	-13.0	53.7	137.0	Horizontal	PASS
453.317	-61.80	-13.0	48.8	299.8	Horizontal	PASS
1987.531	-29.10	-13.0	16.1	256.8	Horizontal	PASS
5713.217	-45.36	-13.0	32.4	356.1	Horizontal	PASS
18389.027	-31.24	-13.0	18.2	-0.0	Horizontal	PASS

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



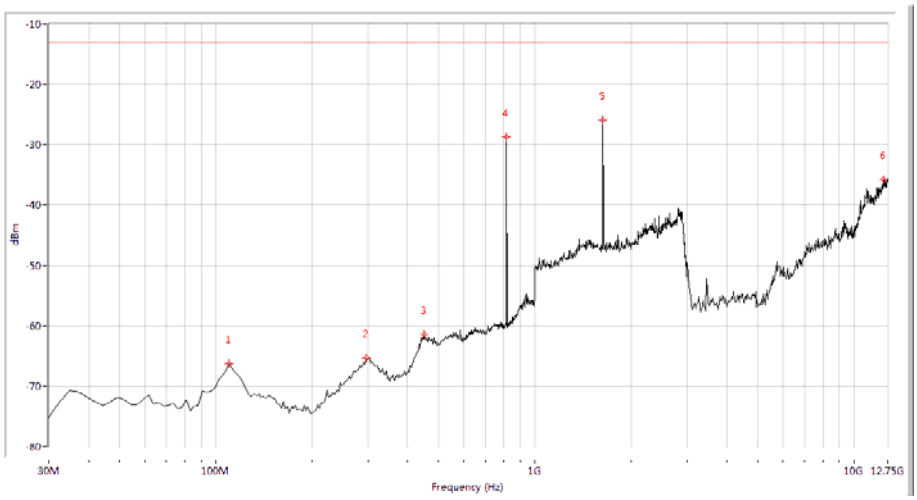
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
59.027	-64.38	-13.0	51.4	126.8	Vertical	PASS
298.504	-66.20	-13.0	53.2	135.0	Vertical	PASS
629.900	-60.38	-13.0	47.4	279.7	Vertical	PASS
1987.531	-27.18	-13.0	14.2	235.4	Vertical	PASS
5713.217	-45.94	-13.0	32.9	60.9	Vertical	PASS
18346.633	-30.57	-13.0	17.6	103.3	Vertical	PASS

(Plot F.2: CDMA 1900MHz:BC 1 Channel = 1175, Test Antenna Vertical)



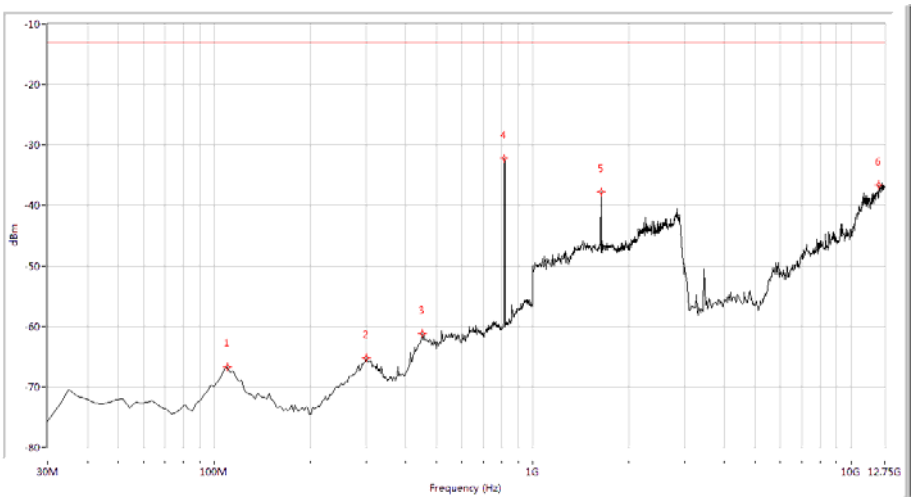
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-67.19	-13.0	54.2	50.8	Horizontal	PASS
305.761	-65.03	-13.0	52.0	295.2	Horizontal	PASS
547.656	-60.54	-13.0	47.5	8.4	Horizontal	PASS
816.160	-28.05	-13.0	15.0	358.1	Horizontal	PASS
1633.416	-26.04	-13.0	13.0	310.9	Horizontal	PASS
2416.459	-38.98	-13.0	26.0	111.2	Horizontal	PASS

(Plot G.1: CDMA 800MHz:BC 10 Channel = 476, Test Antenna Horizontal)



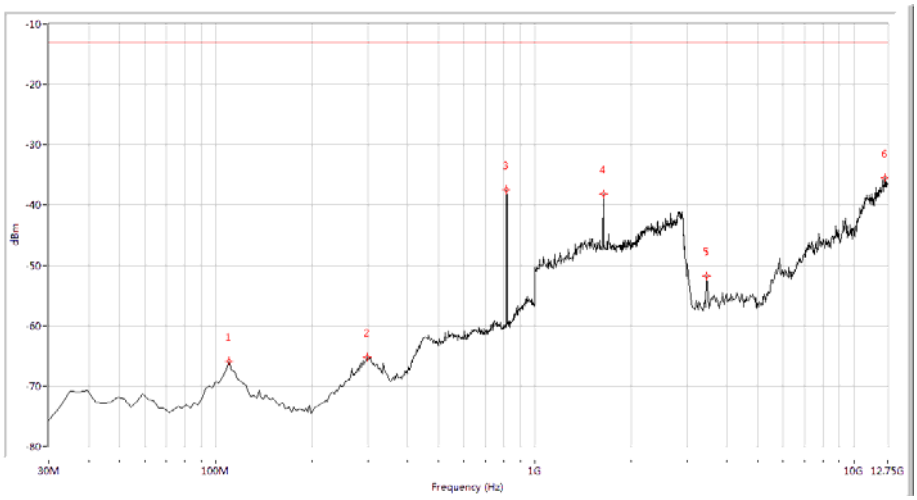
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-66.34	-13.0	53.3	14.1	Vertical	PASS
296.085	-65.30	-13.0	52.3	284.8	Vertical	PASS
450.898	-61.44	-13.0	48.4	110.4	Vertical	PASS
816.160	-28.73	-13.0	15.7	159.8	Vertical	PASS
1633.416	-25.89	-13.0	12.9	311.3	Vertical	PASS
12336.658	-35.84	-13.0	22.8	203.3	Vertical	PASS

(Plot G.2: CDMA 800MHz:BC 10 Channel = 476, Test Antenna Vertical)



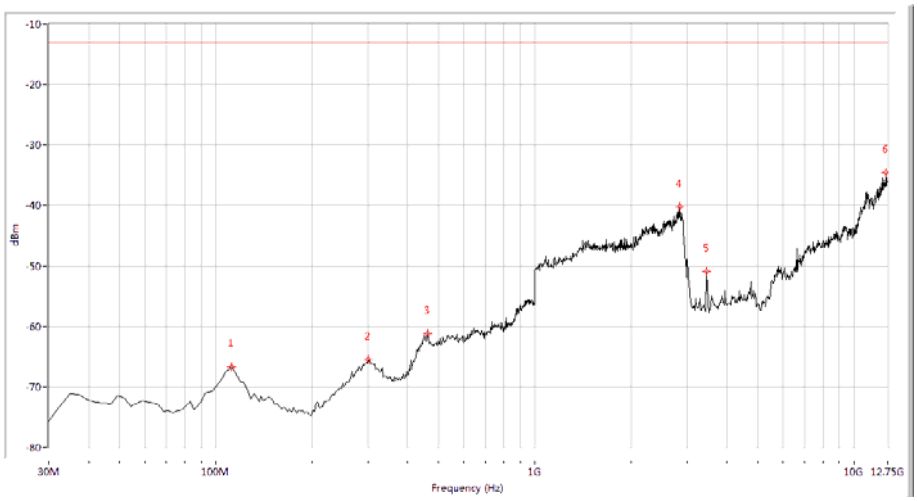
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-66.76	-13.0	53.8	360.0	Horizontal	PASS
300.923	-65.16	-13.0	52.2	213.2	Horizontal	PASS
450.898	-61.09	-13.0	48.1	360.0	Horizontal	PASS
816.160	-32.12	-13.0	19.1	360.0	Horizontal	PASS
1638.404	-37.70	-13.0	24.7	294.8	Horizontal	PASS
12239.401	-36.55	-13.0	23.6	212.0	Horizontal	PASS

(Plot H.1: CDMA 800MHz:BC 10 Channel = 526, Test Antenna Horizontal)



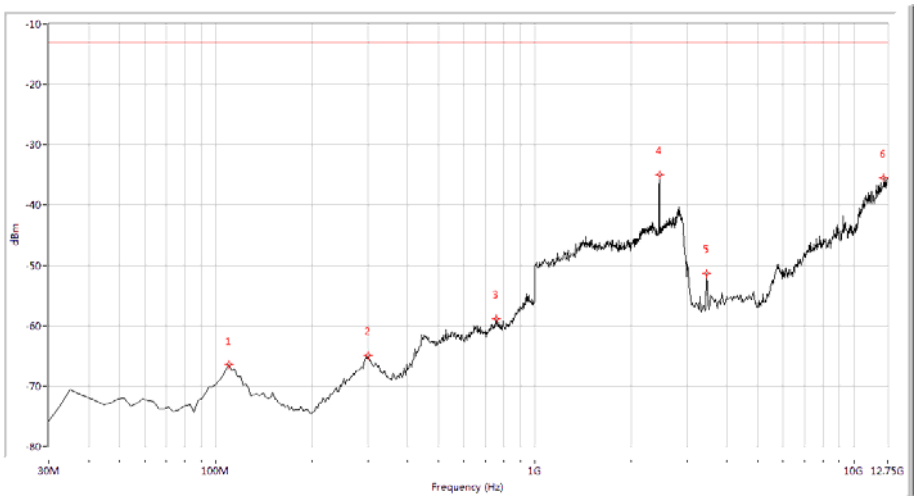
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-65.85	-13.0	52.8	1.8	Vertical	PASS
298.504	-65.17	-13.0	52.2	178.9	Vertical	PASS
816.160	-37.50	-13.0	24.5	147.7	Vertical	PASS
1638.404	-38.17	-13.0	25.2	289.6	Vertical	PASS
3461.970	-51.67	-13.0	38.7	310.6	Vertical	PASS
12555.486	-35.57	-13.0	22.6	125.4	Vertical	PASS

(Plot H.2: CDMA 800MHz:BC 10 Channel = 526, Test Antenna Vertical)



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
112.244	-66.72	-13.0	53.7	131.0	Horizontal	PASS
300.923	-65.51	-13.0	52.5	16.5	Horizontal	PASS
460.574	-61.21	-13.0	48.2	358.8	Horizontal	PASS
2840.399	-40.15	-13.0	27.2	199.2	Horizontal	PASS
3461.970	-50.88	-13.0	37.9	269.6	Horizontal	PASS
12628.429	-34.60	-13.0	21.6	86.3	Horizontal	PASS

(Plot I.1: CDMA 800MHz:BC 10 Channel = 684, Test Antenna Horizontal)



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-66.44	-13.0	53.4	135.6	Vertical	PASS
300.923	-64.87	-13.0	51.9	125.9	Vertical	PASS
755.686	-58.82	-13.0	45.8	51.6	Vertical	PASS
2456.359	-34.96	-13.0	22.0	122.8	Vertical	PASS
3461.970	-51.24	-13.0	38.2	314.1	Vertical	PASS
12385.287	-35.46	-13.0	22.5	261.7	Vertical	PASS

(Plot I.2: CDMA 800MHz:BC 10 Channel = 684, Test Antenna Vertical)

** END OF REPORT **