MORLAB

FCC TEST REPORT

**TESTING
CNAS L3572**

Issued to

Qingdao Haier Telecom Co.,Ltd.

For

Smartphone

Model Name:	HW-W716
Trade Name:	Haier
Brand Name:	Haier
FCC ID :	SG70713HW-W716
Standard:	47 CFR Part 22 Subpart H
	47 CFR Part 24 Subpart E
Test date:	2013-8-12 to 2013-8-27
Issue date:	2013-8-28

By

Shenzhen Morlab Communications Technology Co., Ltd.

Tested by Nie Quan
  Nie Quan
  (Test Engineer)
Date 2013. 8. 28

Approved by Zeng Dexin
  Zeng Dexin
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Date 2013. 8. 28

Reviewed by Peng Huarui
  Peng Huarui
  (Project Manager)
Date 2013. 8. 28

CTIA Authorized Test Lab
LAB CODE 20081223-00
IEEE 1725 OTA

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電訊管理局

ilac-MRA

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Testing Laboratory
2000

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FCC
Reg. No.
695796

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Change History		
Issue	Date	Reason for change
1.0	Aug 28, 2013	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type ....:	Smartphone
Serial No.............................:	(n.a, marked #1 by test site)
Hardware Version ....:	W72_MB_A
Software Version ....:	HW-W716-H01-S002-AM
Applicant ....:	Qingdao Haier Telecom Co.,Ltd.
	No.1,Haier Road,Haier information Property Zone, Qingdao, P.R.China
Manufacturer ....:	Qingdao Haier Telecom Co.,Ltd.
	No.1,Haier Road,Haier information Property Zone, Qingdao, P.R.China
Frequency Range ....:	GSM 850MHz:
	Tx: 824.20 - 848.80MHz (at intervals of 200kHz);
	Rx: 869.20 - 893.80MHz (at intervals of 200kHz)
	GSM 1900MHz:
	Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz);
	Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz)
	WCDMA 850MHz
	Tx: 826.4 - 846.6MHz (at intervals of 200kHz);
	Rx: 871.4 - 891.6MHz (at intervals of 200kHz)
	WCDMA 1900MHz
	Tx: 1852.4 - 1907.6MHz (at intervals of 200kHz);
	Rx: 1932.4 - 1987.6MHz (at intervals of 200kHz)
Modulation Type...................:	GSM,GPRS Mode with GMSK Modulation
	HSDPA Mode with QPSK Modulation
Multislot Class......................:	GPRS: Multislot Class12
Antenna Type.......................:	PIFA Antenna
Emission Designators ....:	GSM 850:248KGXW,GSM 1900:250KGXW
	WCDMA 850:4M18F9W ,WCDMA1900:4M18F9W

Note 1: The transmitter (Tx) frequency arrangement of the Cellular 850MHz 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 128 (824.2MHz), 190 (836.6MHz) and 251 (848.8MHz).

Note 2: The transmitter (Tx) frequency arrangement of the PCS 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 512 (1850.2MHz), 661 (1880.0MHz) and 810 (1909.8MHz).

Note 3: The transmitter (Tx) frequency arrangement of the WCDMA 850MHz band used by the EUT

can be represented with the formula F(n)=826.4+0.2*(n-4132), 4132<=n<=4233; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 4132 (826.4MHz), 4175(835MHz) and 4233 (846.6MHz).

Note 4: The transmitter (Tx) frequency arrangement of the WCDMA 1900MHz band used by the EUT can be represented with the formula F(n)=1852.4+0.2*(n-9262), 9262<=n<=9538; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 9262 (1852.4MHz), 9400 (1880MHz) and 9538 (1907.6MHz).

Note 5: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 6: After pre-scan test，the SIM Card 1 was the worst case，so we did the testing and recorded the results according to SIM card 1.

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 for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-12 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10-1-12 Edition)	Public Mobile Services
3	47 CFR Part 24 (10-1-12 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.	24.232(d)	Peak to average radio	PASS
2	2.1049,22.917 24.238,	99% 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.D-2010

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 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 C63.7-2009, ANSI C63.4-2009 and CISPR Publication 22:2010; 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 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:
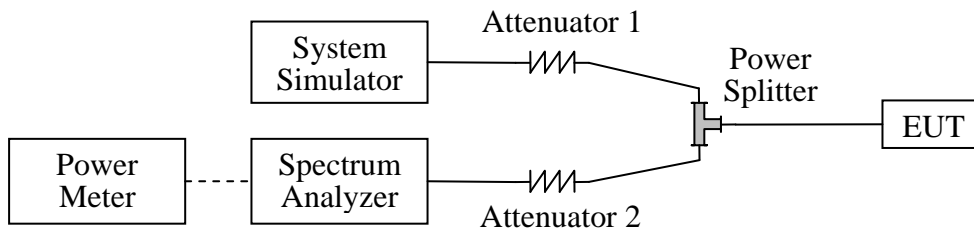
The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded 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 WCDMA Model.

2. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2013.05	2014.05
Spectrum Analyzer	Agilent	E7405A	US44210471	2013.05	2014.05
Power Meter	Agilent	E4418B	GB43318055	2013.05	2014.05
Power Sensor	Agilent	8482A	MY41091706	2013.05	2014.05
Power Splitter	Weinschel	1506A	NW521	2013.05	2014.05
Attenuator 1	Resnet	20dB	(n.a.)	2013.05	2014.05
Attenuator 2	Resnet	3dB	(n.a.)	2013.05	2014.05

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. GSM Model Test Verdict:

| Band	Channel	Frequency (MHz)	Measured Output Power		Limit dBm	Verdict
			dBm	Refer to Plot		
GSM 850MHz	128	824.2	33.30	Plot A1 to A3	35	PASS
	190	836.6	34.03			PASS
	251	848.8	34.28			PASS
GSM 1900MHz	512	1850.2	30.92	Plot B1 to B3	32	PASS
	661	1880.0	31.22			PASS
	810	1909.8	30.90			PASS
GPRS 850MHz	128	824.2	32.98	Plot C1 to C3[Note 1]	35	PASS
	190	836.6	33.81			PASS
	251	848.8	34.09			PASS
GPRS 1900MHz	512	1850.2	28.30	Plot D1 to D3[Note 1]	32	PASS
	661	1880.0	29.72			PASS
	810	1909.8	28.00			PASS

Note 1: For the GPRS model, all the slots were tested and just the worst data was record in this report.

2.   WCDMA Model Test Verdict:

| Item	band	WCDMA 850			WCDMA 1900		
	ARFCN	4132	4175	4233	9262	9400	9538
	subtest	dBm			dBm		
5.2(WCDMA)	non	24.83	24.86	24.55	24.53	24.56	23.59
HSDPA	1	24.76	24.79	24.61	24.47	24.52	23.57
	2	24.75	24.78	24.59	24.45	24.51	23.53
	3	24.27	24.29	24.13	23.98	24.04	23.07
	4	24.25	24.27	24.11	23.96	24.01	23.05
Note:	The Conducted RF Output Power test of WCDMA /HSDPA was tested by power meter.						

3.   GSM Model Test Plots:
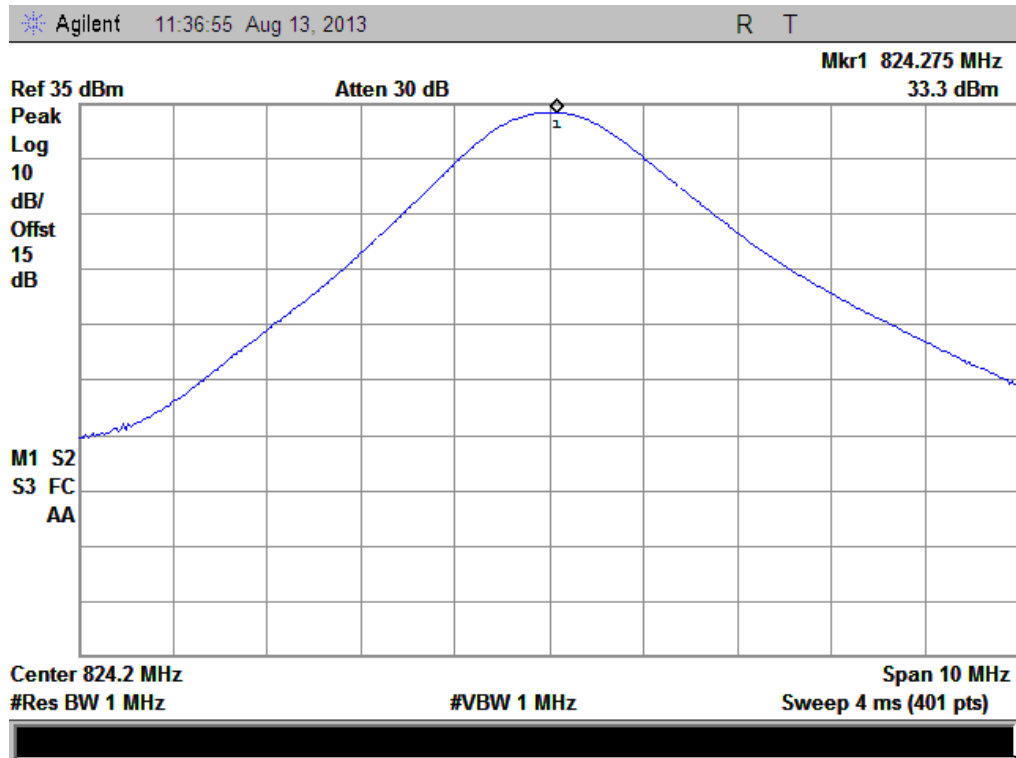
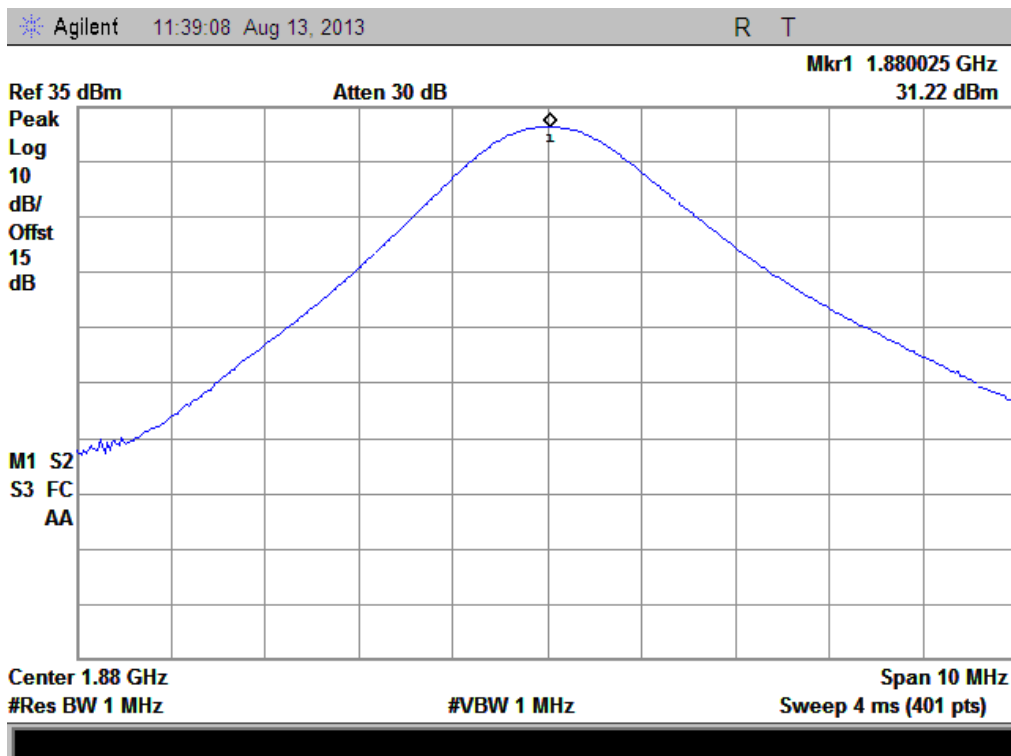(Plot A1:   GSM 850MHz Channel = 128)
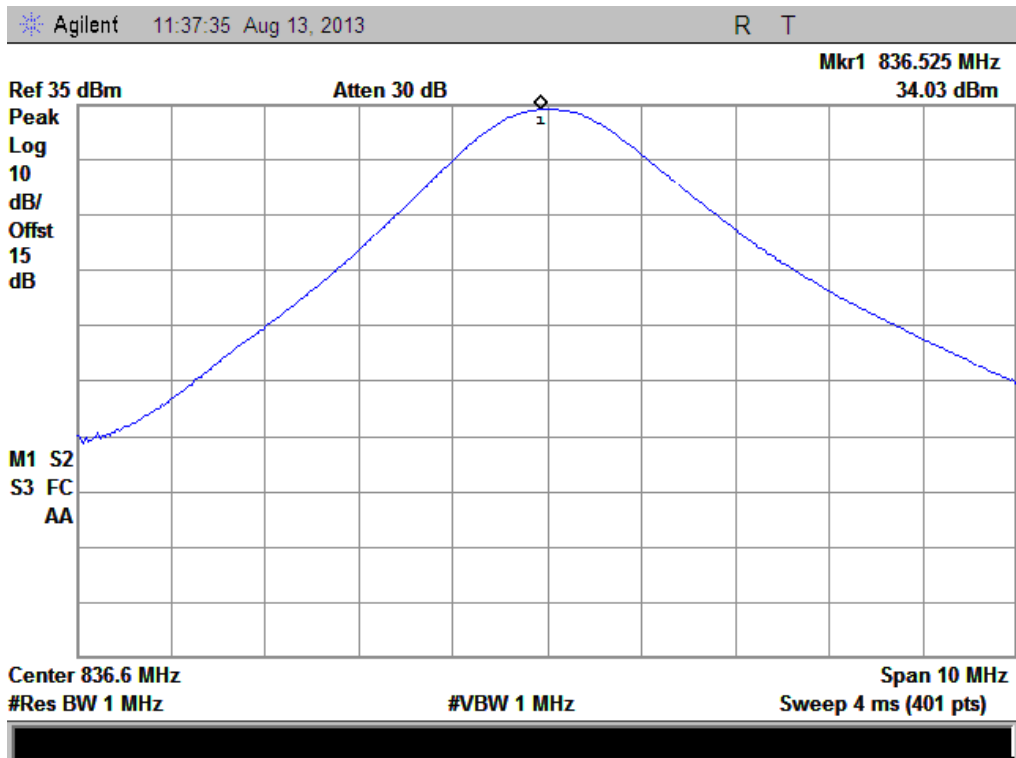
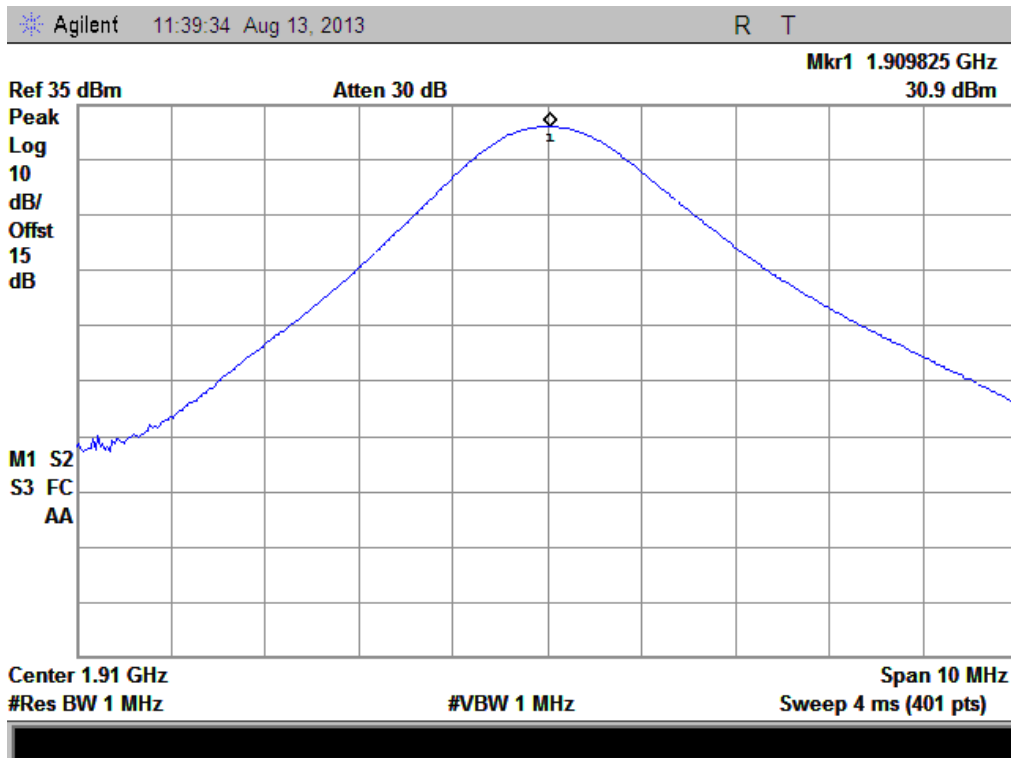(Plot A2:   GSM 850MHz Channel = 190)
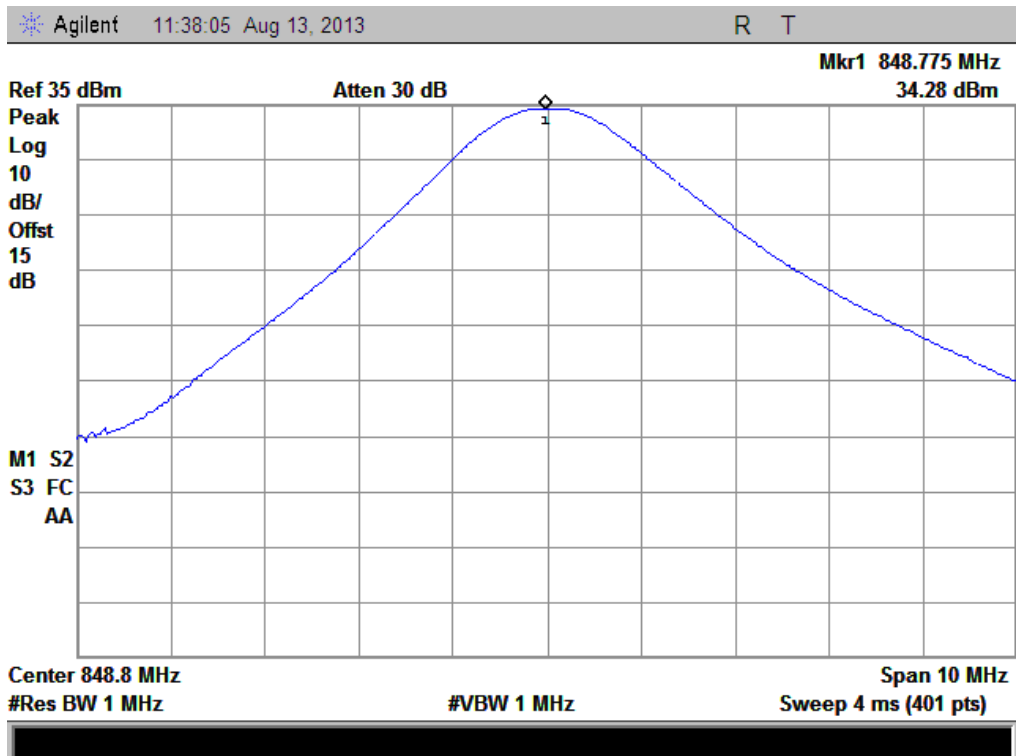
(Plot A3:   GSM 850MHz Channel = 251)
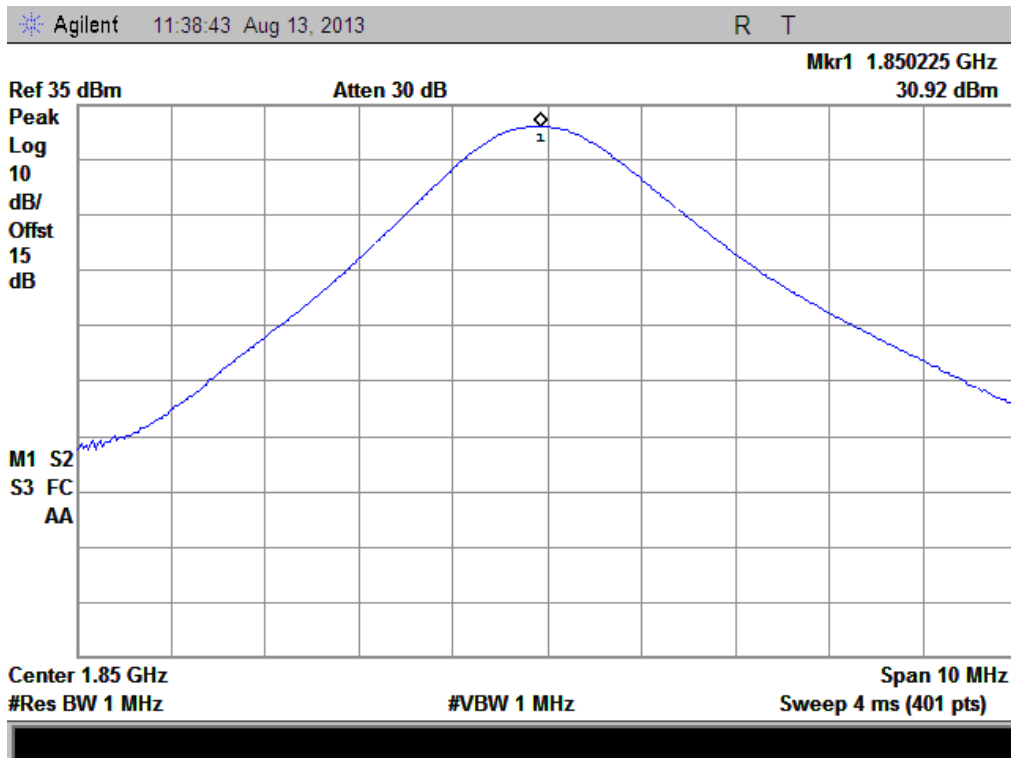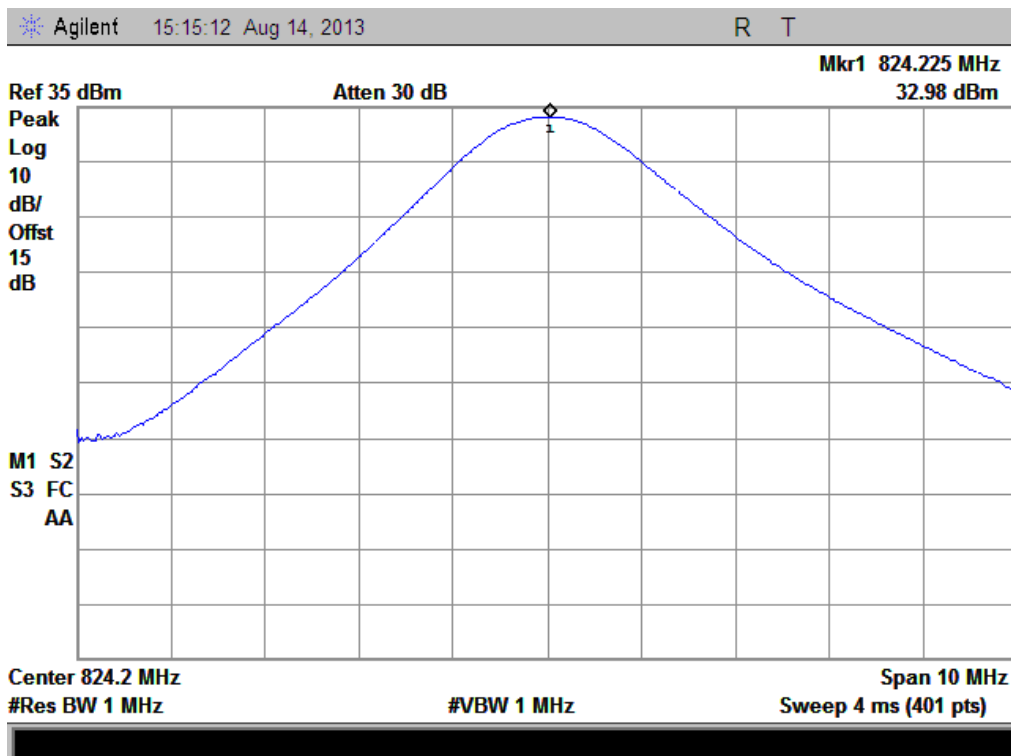
(Plot B1:   GSM 1900MHz Channel = 512)
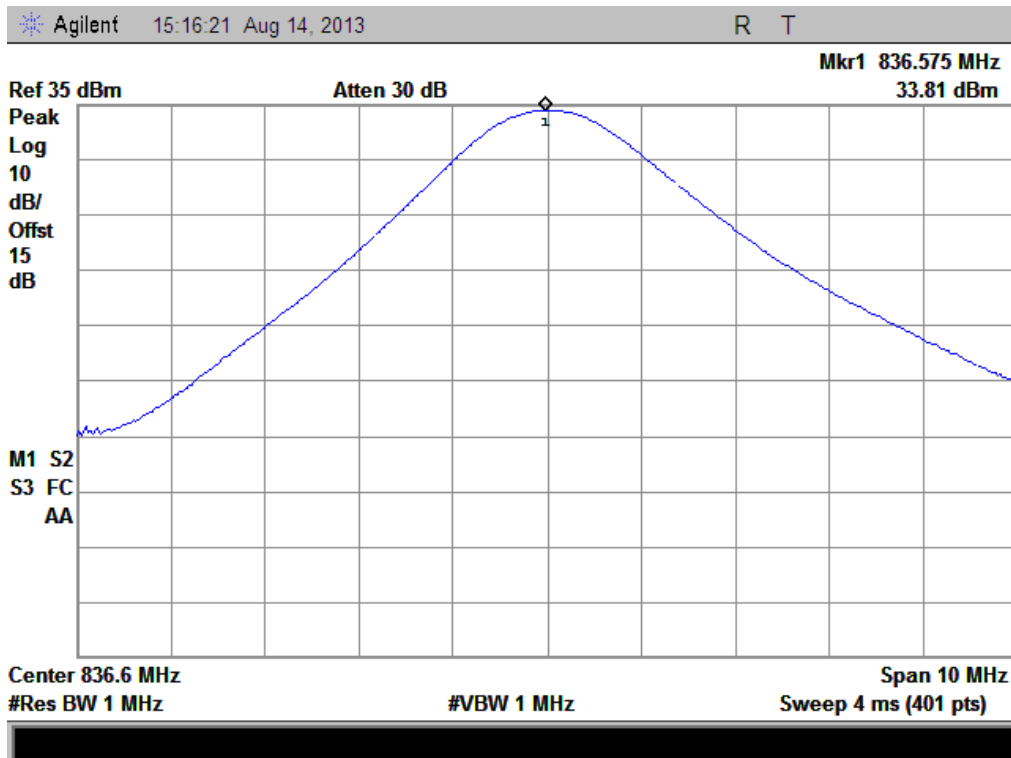

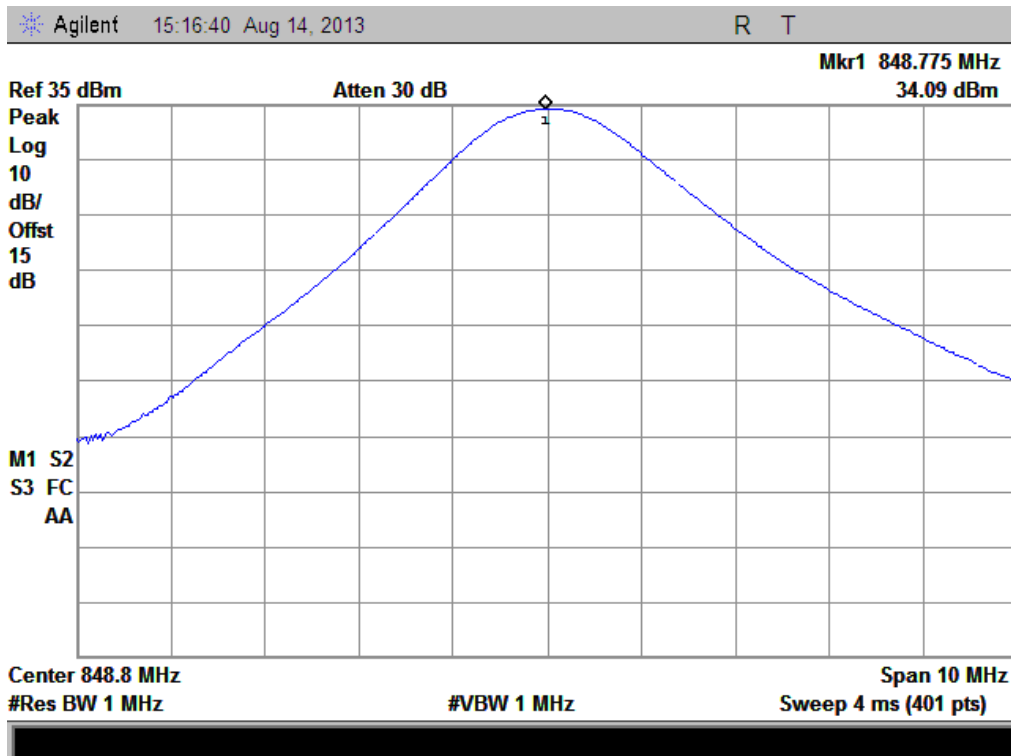(Plot B2:   GSM 1900MHz Channel = 661)

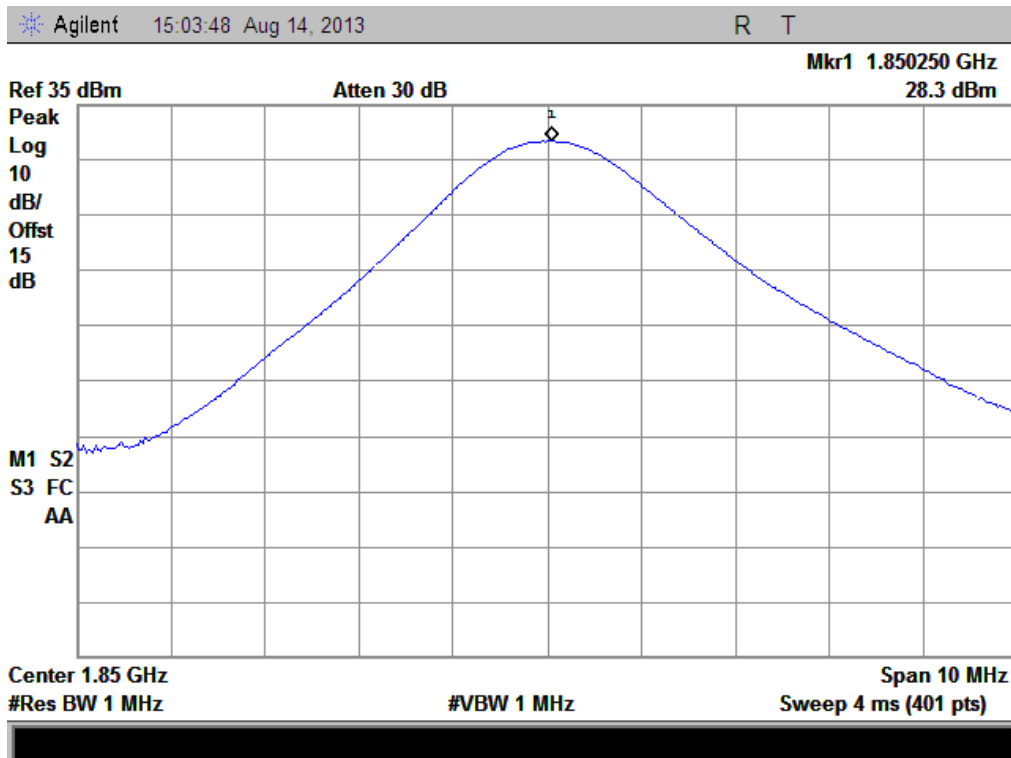(Plot B3:   GSM 1900Hz Channel = 810)

(Plot C 1:   GPRS 850MHz Channel = 128)
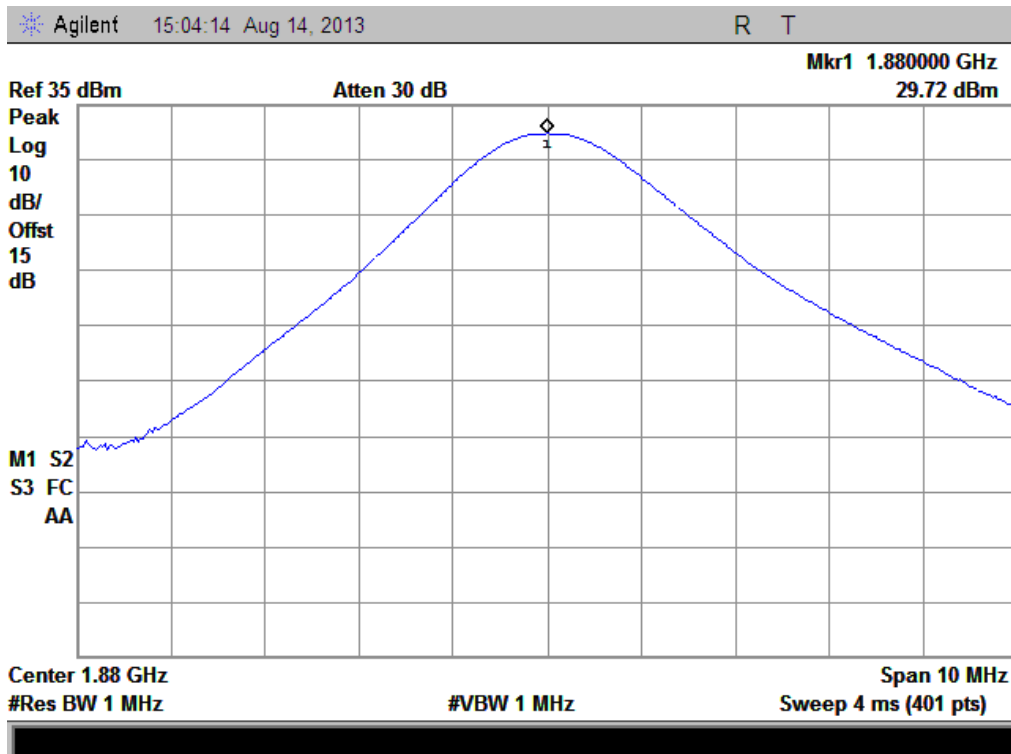
(Plot C 2:   GPRS 850MHz Channel = 190)

(Plot C 3:   GPRS 850MHz Channel = 251)

(Plot D 1:   GPRS 1900MHz Channel = 512)

(Plot D 2:   GPRS 1900MHz Channel = 661)

※ Agilent   15:04:31 Aug 14, 2013   R   T

Mkr1 1.909750 GHz

Ref 35 dBm   Atten 30 dB   28 dBm
Peak
Log
10
dB/
Offst
15
dB

M1 S2
S3 FC
AA

Center 1.91 GHz   Span 10 MHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 4 ms (401 pts)
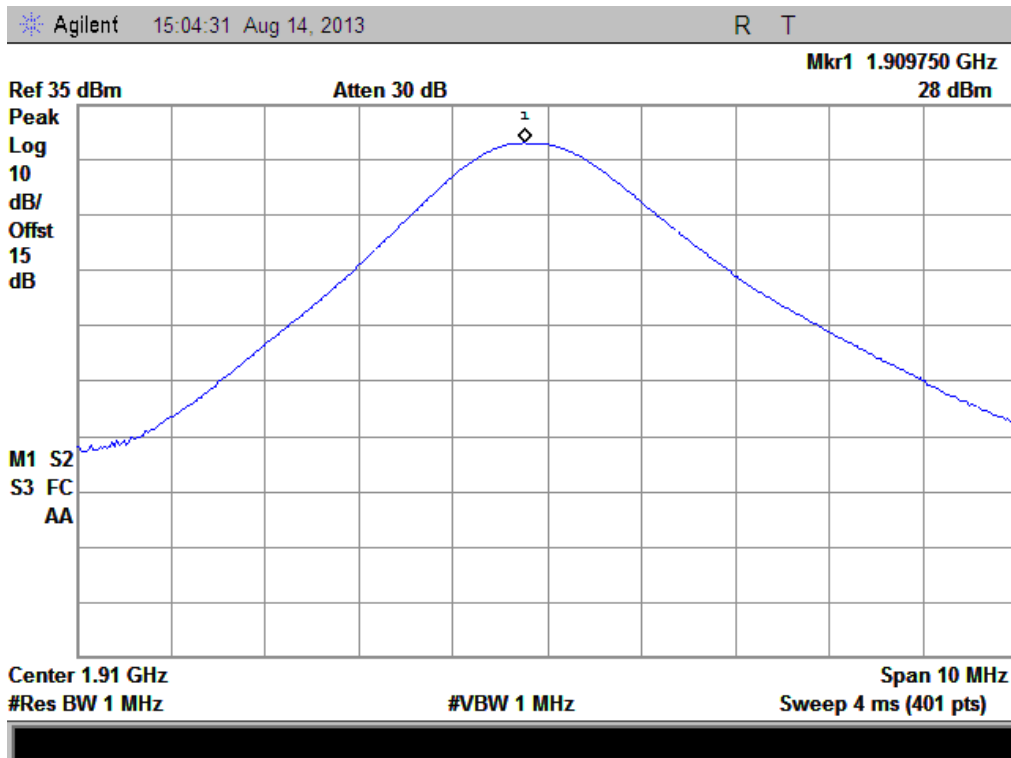
(Plot D 3:   GPRS 1900MHz Channel = 810)

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=3MHz, peak detector in spectrum analyzer.

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

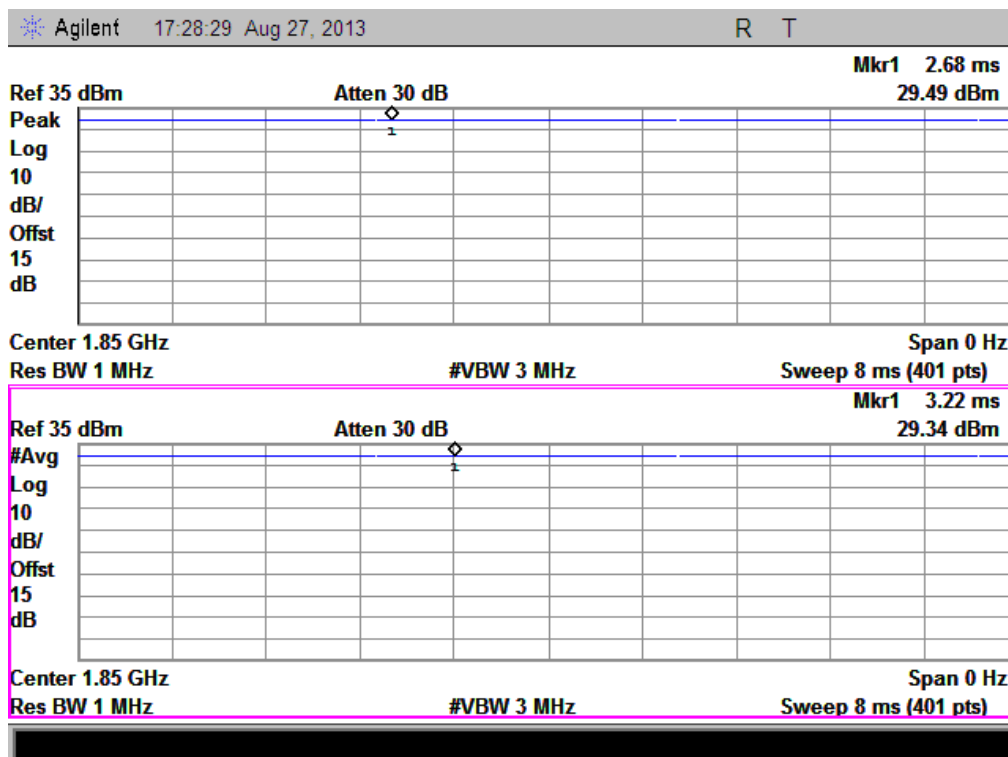c. Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average radio.

B. For UMTS operating mode:

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

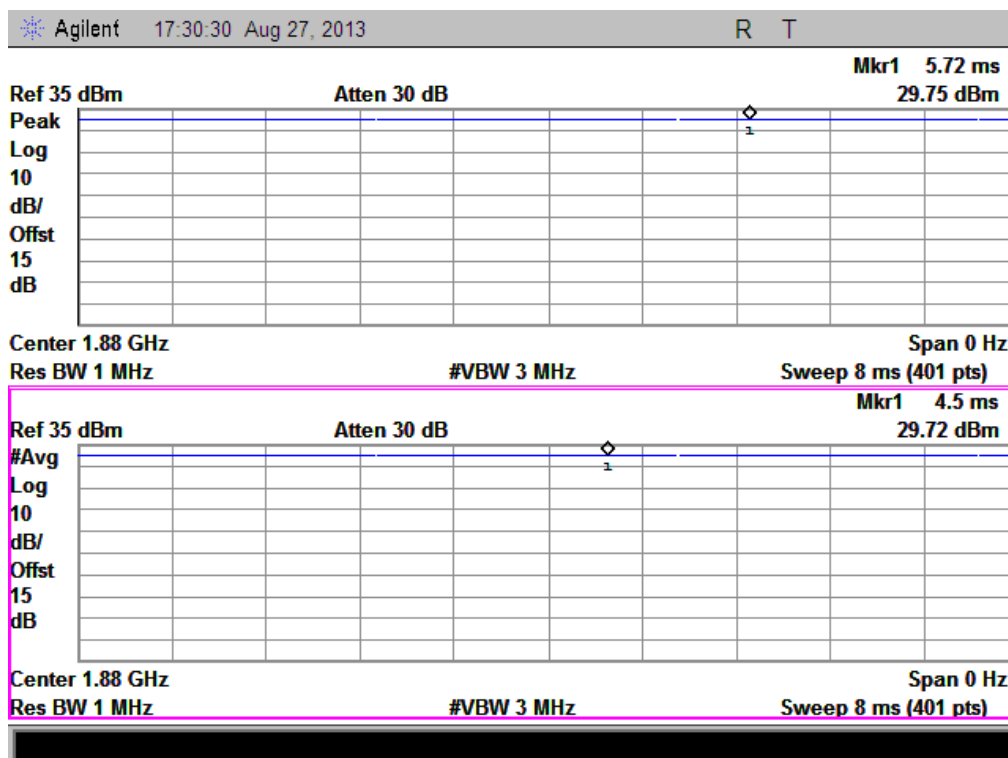b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

1. Test Verdict:

Band	Channel	Frequency (MHz)	Peak to Average radio		Limit dBm	Verdict
			dBm	Refer to Plot		
GSM 1900MHz	512	1850.2	0.15			PASS
	661	1880.0	0.03	Plot A1 to A3	13	PASS
	810	1909.8	0.03			PASS
WCDMA 1900MHz	9262	1852.4	2.48			PASS
	9400	1880	2.89	Plot B1 toB3	13	PASS
	9538	1907.6	2.91			PASS

(Plot A1:   GSM 1900 MHz Channel = 512)

(Plot A2:   GSM 1900 MHz Channel = 661)

Agilent   17:32:03 Aug 27, 2013   R   T

Mkr1   4.12 ms
Ref 35 dBm   Atten 30 dB   29.31 dBm
Peak
Log
10
dB/
Offst
15
dB

Center 1.91 GHz   Span 0 Hz
Res BW 1 MHz   #VBW 3 MHz   Sweep 8 ms (401 pts)

Mkr1   2.5 ms
Ref 35 dBm   Atten 30 dB   29.28 dBm
#Avg
Log
10
dB/
Offst
15
dB

Center 1.91 GHz   Span 0 Hz
Res BW 1 MHz   #VBW 3 MHz   Sweep 8 ms (401 pts)

(Plot A3:   GSM 1900MHz Channel = 810)

Agilent 17:08:17 Aug 27, 2013   R   T S | Freq/Channel

Overload   Ext Ref
        Ch Freq   1.8524 GHz   Trig Free   Center Freq
CCDF   Counts(k): 10   1.85240000 GHz

                                                      Start Freq
Average Power   100.00% Gaussian   Reference   1.85240000 GHz
   17.08 dBm
       46.48%   10.00%   Stop Freq
                                                      1.85240000 GHz
                      1.00%
 10.0%   1.47 dB   CF Step
 1.0%   2.21 dB   0.10%   5.00000000 MHz
 0.1%   2.48 dB   Auto   Man
 0.01%   2.60 dB
 0.001%   ----   0.01%   Freq Offset
 0.0001%   ----   0.00000000 Hz
 Peak   2.63 dB   0.001%

                      0.0001% 0 dB   20 dB   Signal Track
                            Meas BW 5.00000000 MHz On   Off

Copyright 2000-2010 Agilent Technologies
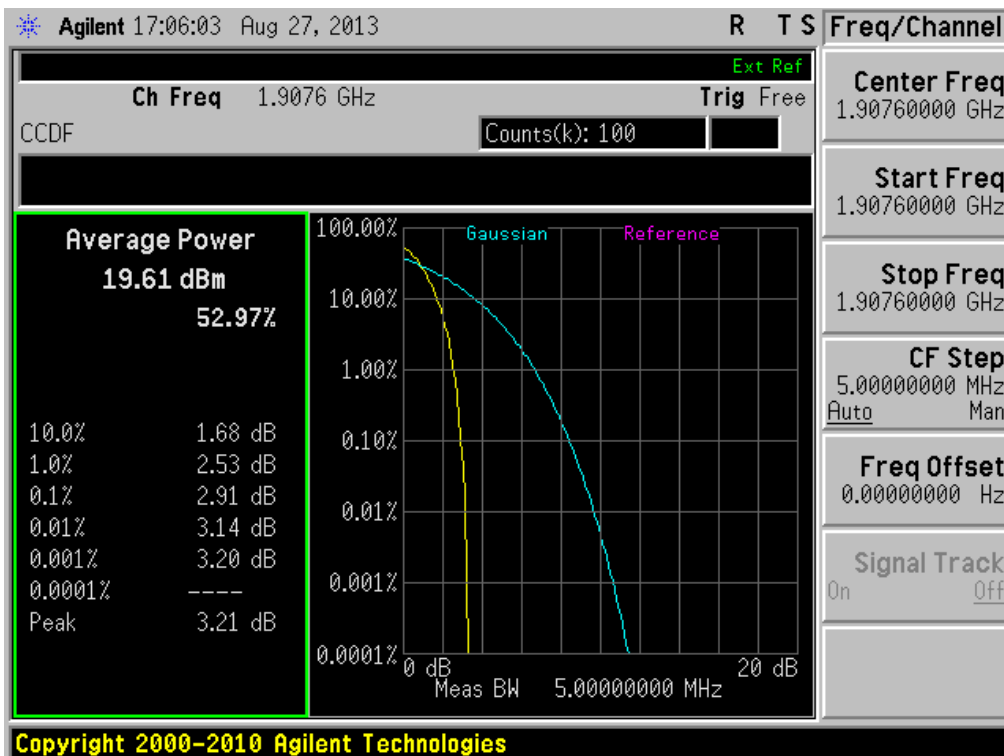
(Plot B1:   WCDMA 1900MHz Channel = 9262)

(Plot B2:   WCDMA 1900MHz Channel = 9400)

(Plot C3:   WCDMA 1900MHz Channel = 9538)

2.3   99% Occupied Bandwidth

2.3.1   Definition

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

2.   Test Verdict:

Band	Channel	Frequency (MHz)	26dB bandwidth	99% Occupied Bandwidth	Refer to Plot
GSM 850MHz	128	824.2	322.394 KHz	247.6561 KHz	Plot A
	190	836.6	323.488 KHz	245.7423 KHz	Plot B
	251	848.8	321.824 KHz	246.2004 KHz	Plot C
GSM 1900MHz	512	1850.2	320.422 KHz	250.3498 KHz	Plot D
	661	1880.0	316.908 KHz	247.6230 KHz	Plot E
	810	1909.8	318.329 KHz	247.8269 KHz	Plot F
WCDMA 850MHz	4132	826.4	4.695MHz	4.1723MHz	Plot G
	4175	835	4.696MHz	4.1585MHz	Plot H
	4233	846.6	4.702MHz	4.1741MHz	Plot I
WCDMA 1900MHz	9262	1852.4	4.716MHz	4.1700MHz	Plot J
	9400	1880	4.729MHz	4.1801MHz	Plot K
	9538	1907.6	4.747MHz	4.1743MHz	Plot L
HSDPA 850MHz	4132	826.4	4.718MHz	4.1694MHz	Plot M
	4175	835	4.708MHz	4.1781MHz	Plot N
	4233	846.6	4.714MHz	4.1680MHz	Plot O
HSDPA 1900MHz	9262	1852.4	4.717MHz	4.1602MHz	Plot P
	9400	1880	4.735MHz	4.1699MHz	Plot Q
	9538	1907.6	4.750MHz	4.1702MHz	Plot R
GPRS 850MHz	128	824.2	326.507 KHz	247.0180 KHz	Plot S
	190	836.6	313.232KHz	247.7420 KHz	Plot T
	251	848.8	325.957 KHz	244.7287 KHz	Plot U
GPRS 1900MHz	512	1850.2	324.607 KHz	246.3551 KHz	Plot V
	661	1880.0	315.339 KHz	243.2321 KHz	Plot W
	810	1909.8	322.149 KHz	247.3635 KHz	Plot X

3. Test Plots:

(Plot A: GSM 850MHz Channel = 128)

(Plot B: GSM 850MHz Channel = 190)

(Plot C: GSM 850MHz Channel = 251)

(Plot D: GSM1900MHz Channel = 512)

(Plot E: GSM1900MHz Channel = 661)

(Plot F: GSM 1900MHz Channel = 810)

Agilent 17:31:19 Aug 26, 2013   R   T
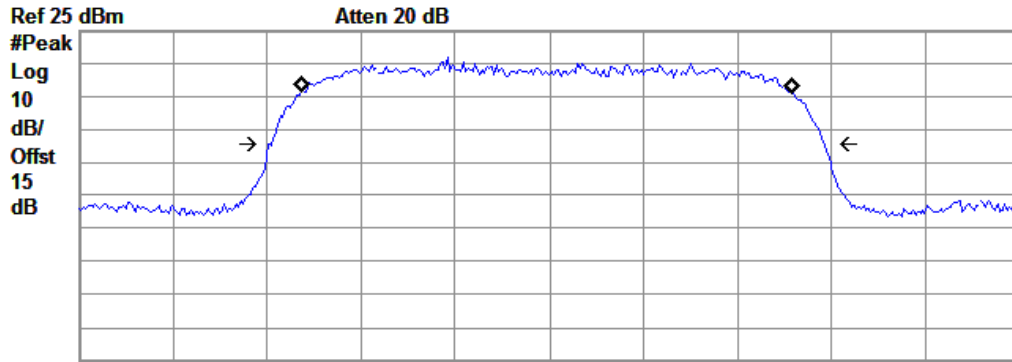
Ref 25 dBm   Atten 20 dB
#Peak
Log
10
dB/
Offst
15
dB

Center 826.4 MHz   Span 8 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 5 ms (401 pts)

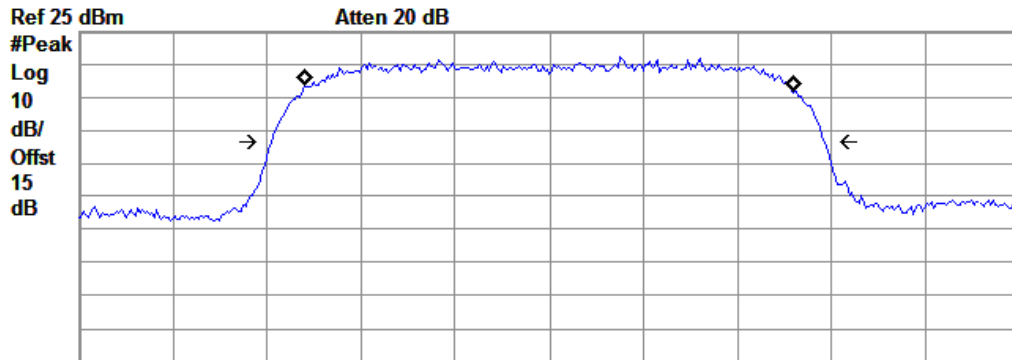Occupied Bandwidth   Occ BW % Pwr   99.00 %
        4.1723 MHz   x dB   -26.00 dB

Transmit Freq Error   -16.608 kHz
x dB Bandwidth   4.695 MHz

(Plot G: WCDMA 850MHz Channel = 4132)

Agilent 17:30:53 Aug 26, 2013   R   T

Ref 25 dBm   Atten 20 dB
#Peak
Log
10
dB/
Offst
15
dB

Center 835 MHz   Span 8 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 5 ms (401 pts)

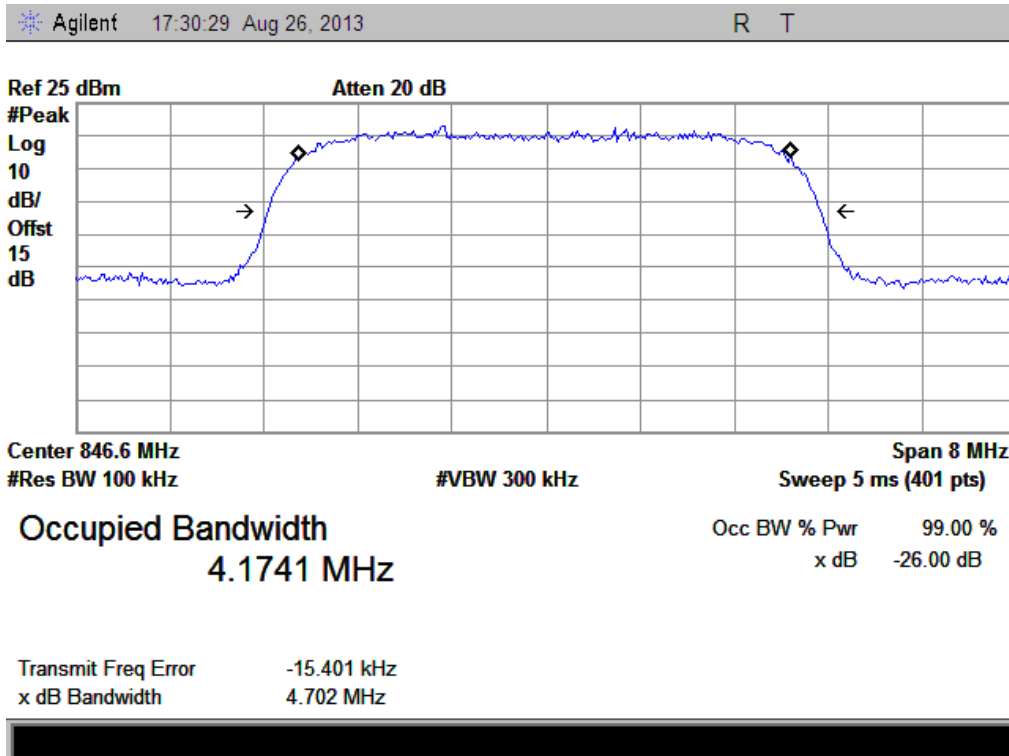Occupied Bandwidth   Occ BW % Pwr   99.00 %
        4.1585 MHz   x dB   -26.00 dB

Transmit Freq Error   -840.106 Hz
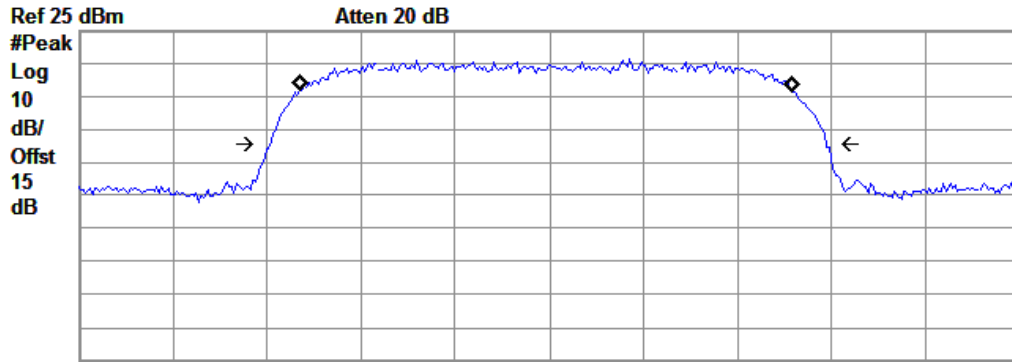x dB Bandwidth   4.696 MHz

(Plot H: WCDMA 850 MHz Channel = 4175)

※ Agilent   17:30:29 Aug 26, 2013   R   T

Ref 25 dBm   Atten 20 dB
#Peak
Log
10
dB/
Offst
15
dB

Center 846.6 MHz   Span 8 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 5 ms (401 pts)

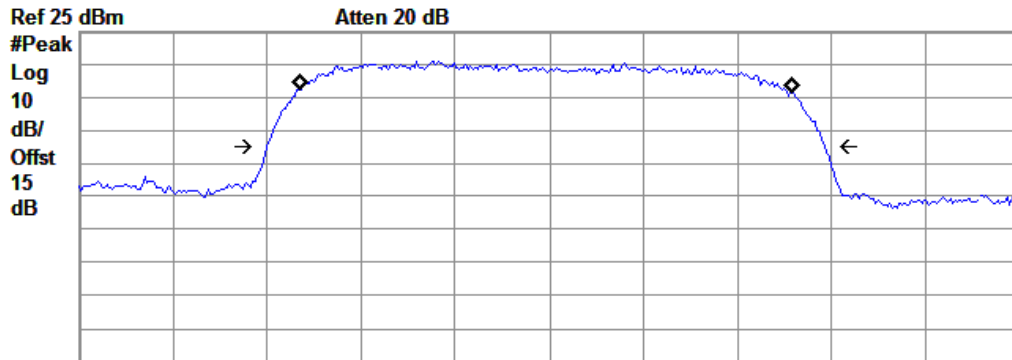Occupied Bandwidth   Occ BW % Pwr   99.00 %
        4.1741 MHz   x dB   -26.00 dB

Transmit Freq Error   -15.401 kHz
x dB Bandwidth   4.702 MHz

(Plot I: WCDMA 850MHz Channel = 4233)

※ Agilent   17:29:58 Aug 26, 2013   R   T

Ref 25 dBm   Atten 20 dB
#Peak
Log
10
dB/
Offst
15
dB

Center 1.852 GHz   Span 8 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 5 ms (401 pts)

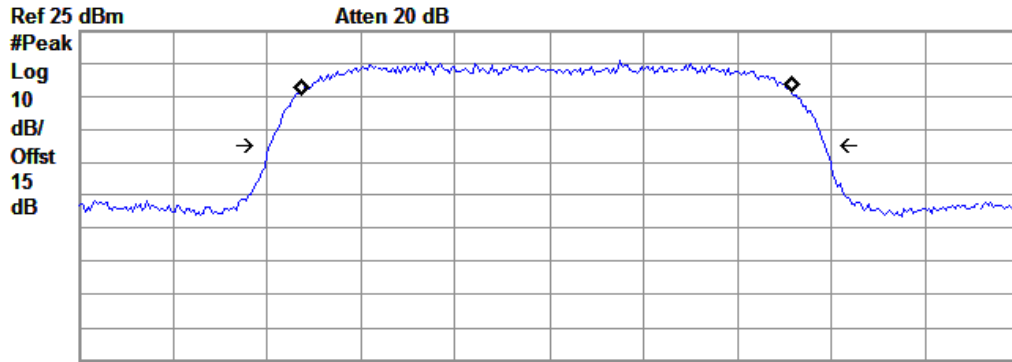Occupied Bandwidth   Occ BW % Pwr   99.00 %
        4.1700 MHz   x dB   -26.00 dB

Transmit Freq Error   3.024 kHz
x dB Bandwidth   4.716 MHz

(Plot J: WCDMA 1900MHz Channel = 9262)

(Plot K: WCDMA 1900 MHz Channel = 9400)

(Plot L: WCDMA1900MHz Channel = 9538)

Ref 25 dBm   Atten 20 dB

Center 826.4 MHz   Span 8 MHz
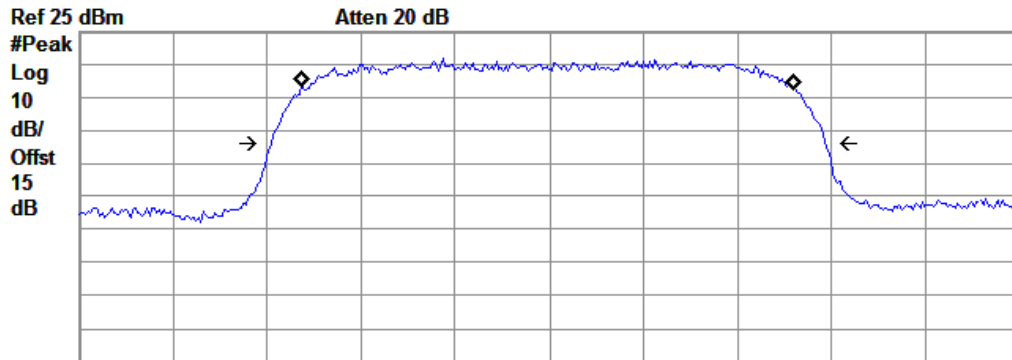#Res BW 100 kHz   #VBW 300 kHz   Sweep 5 ms (401 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
4.1694 MHz   x dB   -26.00 dB

Transmit Freq Error   -20.103 kHz
x dB Bandwidth   4.718 MHz

(Plot M: HSDPA 850MHz Channel = 4132)

Ref 25 dBm   Atten 20 dB

Center 835 MHz   Span 8 MHz
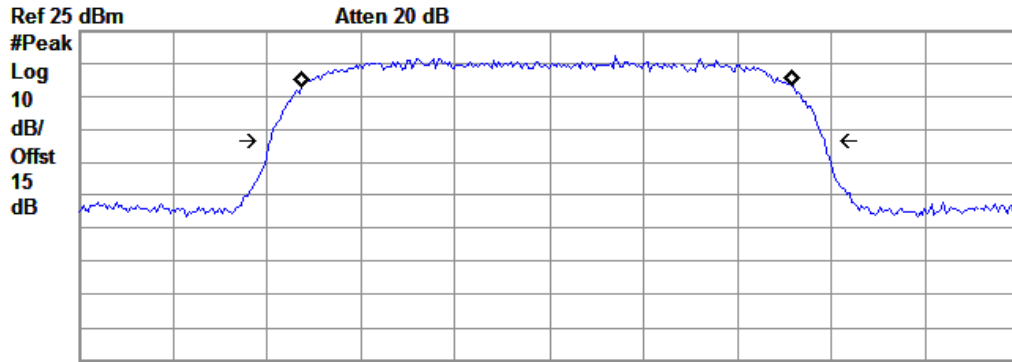#Res BW 100 kHz   #VBW 300 kHz   Sweep 5 ms (401 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
4.1781 MHz   x dB   -26.00 dB

Transmit Freq Error   -5.433 kHz
x dB Bandwidth   4.708 MHz

(Plot N: HSDPA850 MHz Channel = 4175)

Ref 25 dBm   Atten 20 dB

Center 846.6 MHz   Span 8 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 5 ms (401 pts)

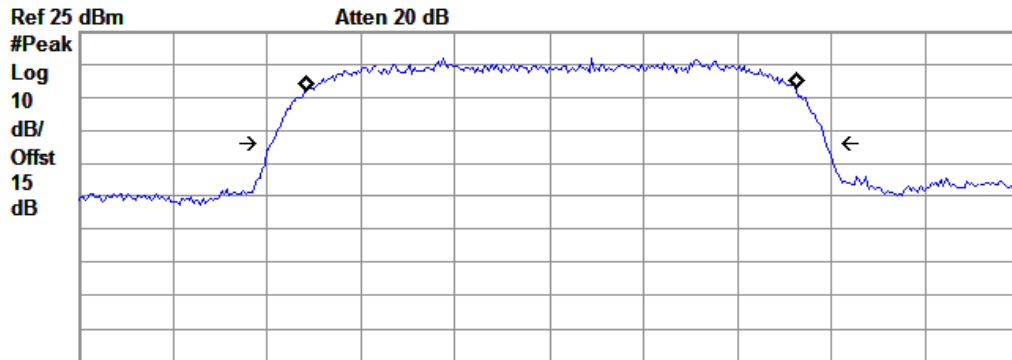Occupied Bandwidth   Occ BW % Pwr   99.00 %
        4.1680 MHz   x dB   -26.00 dB

Transmit Freq Error   -14.117 kHz
x dB Bandwidth   4.714 MHz

(Plot O: HSDPA 850 MHz Channel = 4233)

Ref 25 dBm   Atten 20 dB

Center 1.852 GHz   Span 8 MHz
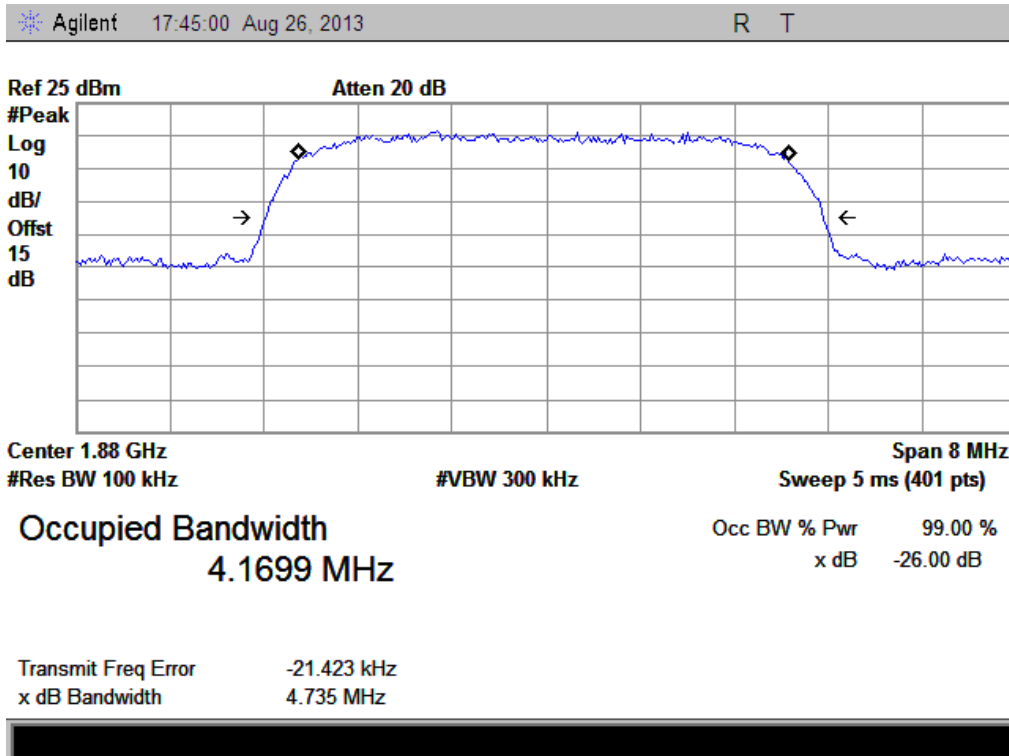#Res BW 100 kHz   #VBW 300 kHz   Sweep 5 ms (401 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
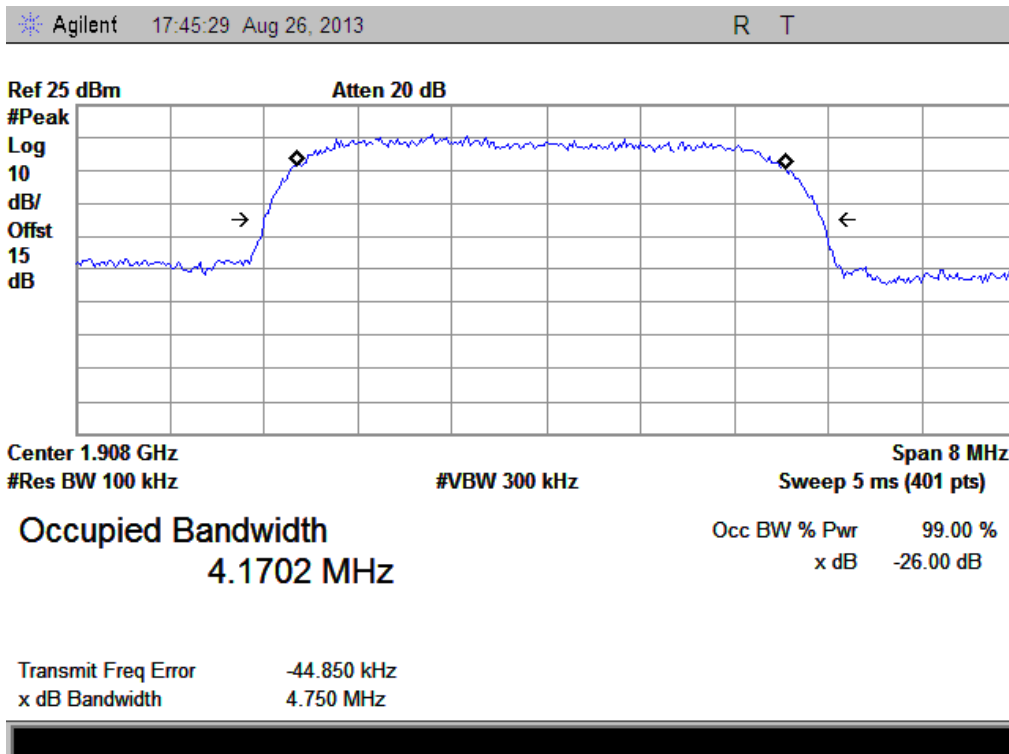   4.1602 MHz   x dB   -26.00 dB

Transmit Freq Error   10.847 kHz
x dB Bandwidth   4.717 MHz

(Plot P: HSDPA1900 MHz Channel = 9262)

※ Agilent   17:45:00 Aug 26, 2013   R   T

Ref 25 dBm   Atten 20 dB
#Peak
Log
10
dB/
Offst
15
dB

Center 1.88 GHz   Span 8 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 5 ms (401 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
          4.1699 MHz   x dB   -26.00 dB

Transmit Freq Error   -21.423 kHz
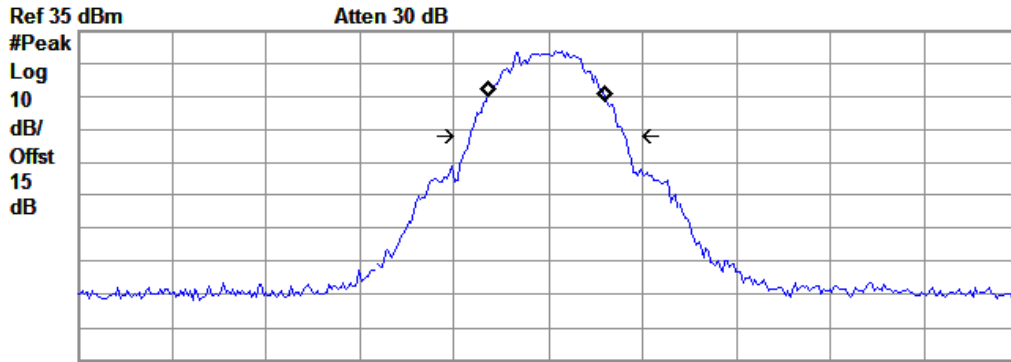x dB Bandwidth   4.735 MHz

(Plot Q: HSDPA1900 MHz Channel = 9400)

※ Agilent   17:45:29 Aug 26, 2013   R   T

Ref 25 dBm   Atten 20 dB
#Peak
Log
10
dB/
Offst
15
dB

Center 1.908 GHz   Span 8 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 5 ms (401 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
          4.1702 MHz   x dB   -26.00 dB

Transmit Freq Error   -44.850 kHz
x dB Bandwidth   4.750 MHz

(Plot R: HSDPA 1900 MHz Channel = 9538)

Ref 35 dBm   Atten 30 dB

Center 824.2 MHz   Span 2 MHz
#Res BW 10 kHz   #VBW 10 kHz   Sweep 25.77 ms (401 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
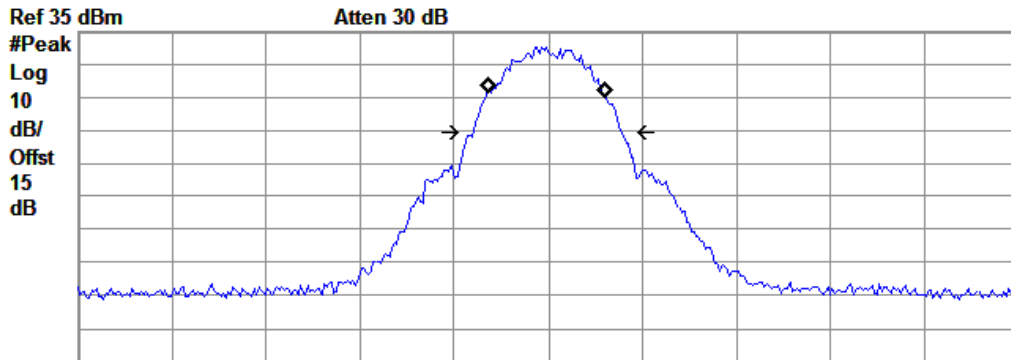   247.0180 kHz   x dB   -26.00 dB

Transmit Freq Error   -2.738 kHz
x dB Bandwidth   326.507 kHz

(Plot S: GPRS 850MHz Channel = 128)

Ref 35 dBm   Atten 30 dB

Center 836.6 MHz   Span 2 MHz
#Res BW 10 kHz   #VBW 10 kHz   Sweep 25.77 ms (401 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
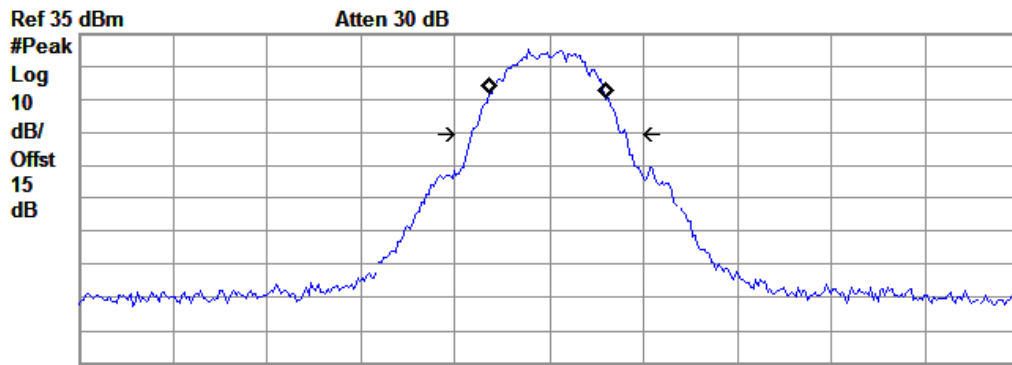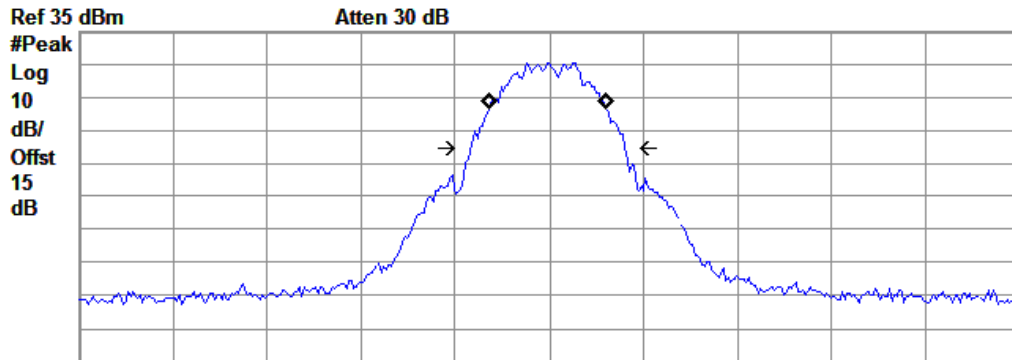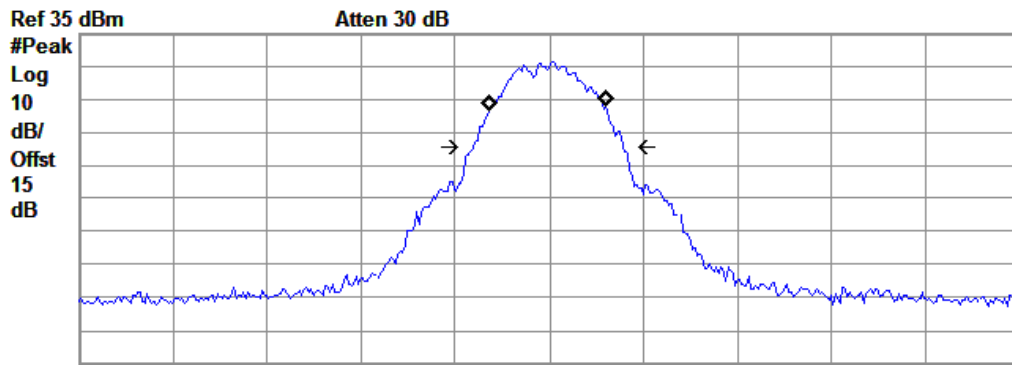   247.7420 kHz   x dB   -26.00 dB

Transmit Freq Error   -2.909 kHz
x dB Bandwidth   313.232 kHz

(Plot T: GPRS 850MHz Channel = 190)

Ref 35 dBm   Atten 30 dB

Agilent   15:20:10 Aug 14, 2013   R   T

#Peak
Log
10
dB/
Offst
15
dB

Center 848.8 MHz   Span 2 MHz
#Res BW 10 kHz   #VBW 10 kHz   Sweep 25.77 ms (401 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
      244.7287 kHz   x dB   -26.00 dB

Transmit Freq Error   -2.686 kHz
x dB Bandwidth   325.957 kHz

(Plot U: GPRS850MHz Channel = 251)

Ref 35 dBm   Atten 30 dB

Agilent   15:20:48 Aug 14, 2013   R   T

#Peak
Log
10
dB/
Offst
15
dB

Center 1.85 GHz   Span 2 MHz
#Res BW 10 kHz   #VBW 10 kHz   Sweep 25.77 ms (401 pts)

Occupied Bandwidth   Occ BW % Pwr   99.00 %
      246.3551 kHz   x dB   -26.00 dB

Transmit Freq Error   -1.339 kHz
x dB Bandwidth   324.607 kHz

(Plot V: GPRS 1900MHz Channel = 512)
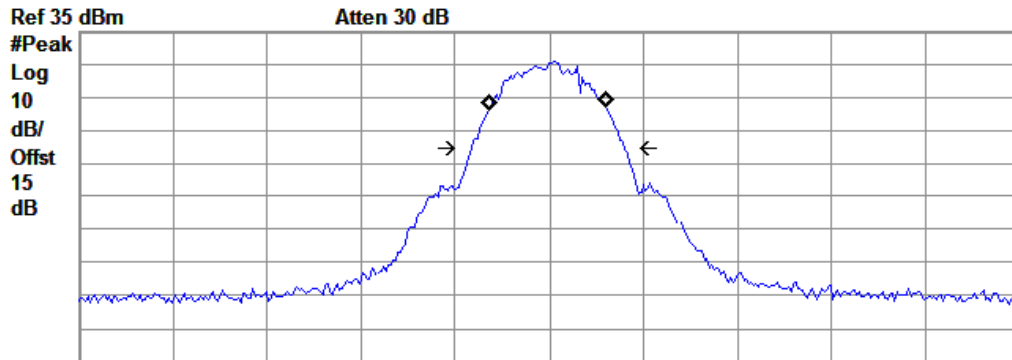
(Plot W: GPRS 1900MHz Channel = 661)

(Plot X: GPRS 1900MHz Channel = 810)

2.4   Frequency Stability

2.4.1   Requirement

According to FCC section 22.355 and 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°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.

2.4.2   Test Description

1.   Test Setup:
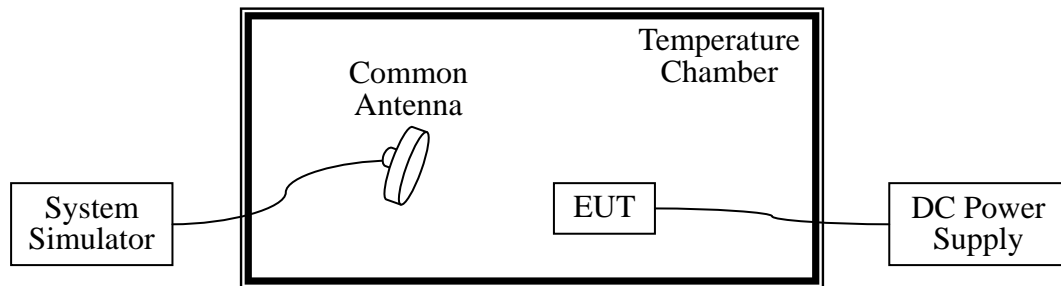
The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.

2.   Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2013.05	2014.05
DC Power Supply	Good Will	GPS-3030DD	EF920938	2013.05	2014.05
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2013.05	2014.05

2.4.3   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 850MHz band is ±2.5ppm, and 1900MHz is ±1ppm.

1. GSM 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 128 (824.2MHz)		Channel = 190 (836.6MHz)		Channel = 251 (848.8MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.7	-30	11.53	±2060.5	-15.02	±2091.5	18.59	±2122	PASS
	-20	2.47		38.15		-2.93		
	-10	-10.76		-22.06		12.33		
	0	-2.11		-16.11		15.22		
	+10	13.33		17.76		13.37		
	+20	5.33		15.64		10.76		
	+30	-2.56		3.67		-16.51		
	+40	10.61		13.95		-2.10		
	+55	12.51		-17.55		-12.99		
4.2	+25	11.53		13.95		-7.53		
3.6	+25	-17.77		16.22		16.07		

2. GSM 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 512 (1850.2MHz)		Channel = 661 (1880.0MHz)		Channel = 810 (1909.8MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.7	-30	10.61	±1850.2	27.71	±1880.0	-15.33	±1909.8	PASS
	-20	11.53		13.22		31.54		
	-10	2.47		25.22		12.94		
	0	-10.76		-11.21		49.12		
	+10	-2.11		10.82		64.85		
	+20	13.33		9.44		-1.71		
	+30	5.33		17.06		5.39		
	+40	5.33		11.26		3.05		
	+55	-2.56		13.82		3.11		
4.2	+25	17.60		27.11		11.35		
3.6	+25	-18.01		12.19		10.08		

3. WCDMA 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 4123 (826.4MHz)		Channel = 4175 (835MHz)		Channel = 4233 (846.6MHz)		Verdict
		Hz	Limit	Hz	Limit	Hz	Limit	
3.7	-30	-16.65	±2066	-12.32	±2087.5	11.22	±2116.5	PASS
	-20	-3.01		31.20		21.01		
	-10	21.71		-8.31		-15.33		
	0	20.12		-13.95		-13.96		
	+10	-15.09		-24.31		35.21		
	+20	22.71		12.85		-8.31		
	+30	16.32		-14.75		-13.92		
	+40	-11.27		23.37		14.41		
	+55	10.33		17.02		21.55		
4.2	+25	-3.01		35.23		-24.37		
3.6	+25	21.73		-18.07		11.02		

4. WCDMA 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 9262 (1852.4MHz)		Channel = 9400 (1880.0MHz)		Channel = 9538 (1907.6MHz)		Verdict
		Hz	Limits	Hz	Limits	Hz	Limits	
3.7	-30	-11.69	±1852.4	15.31	±1880	9.61	±1907.6	PASS
	-20	10.12		-11.21		-13.02		
	-10	-19.02		10.60		-8.51		
	0	21.71		-4.81		5.64		
	+10	23.12		34.31		-3.85		
	+20	-13.01		8.36		9.57		
	+30	21.71		-25.88		27.54		
	+40	16.32		29.43		-12.52		
	+55	-11.65		-12.27		-2.83		
4.2	+25	10.12		14.37		-13.02		
3.6	+25	-13.09		-11.21		-8.51		

5. HSDPA 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 4123 (826.4MHz)		Channel = 4175 (835MHz)		Channel = 4233 (846.6MHz)		Verdict
		Hz	Limit	Hz	Limit	Hz	Limit	
3.7	-30	-16.27	±2066	-11.79	±2087.5	27.42	±2116.5	PASS
	-20	-12.61		-0.44		37.01		
	-10	-13.09		0.09		-7.32		
	0	-0.38		-6.64		-4.91		
	+10	-11.85		24.25		21.35		
	+20	29.57		9.63		-5.94		
	+30	-11.79		23.76		13.78		
	+40	-0.44		-4.57		28.45		
	+55	1.71		-11.79		27.42		
4.2	+25	-16.20		-0.44		37.01		
3.6	+25	-15.61		0.01		-17.88		

6. HSDPA 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 9262 (1852.4MHz)		Channel = 9400 (1880.0MHz)		Channel = 9538 (1907.6MHz)		Verdict
		Hz	Limits	Hz	Limits	Hz	Limits	
3.7	-30	18.03	±1852.4	20.84	±1880	-6.57	±1907.6	PASS
	-20	15.01		13.53		32.02		
	-10	19.62		14.59		12.94		
	0	30.40		-6.88		19.11		
	+10	13.45		55.91		14.85		
	+20	11.31		59.30		-11.72		
	+30	-12.52		11.35		16.31		
	+40	16.10		21.93		3.94		
	+55	-6.18		23.84		3.99		
4.2	+25	18.85		53.59		15.36		
3.6	+25	5.05		14.51		11.03		

2.5 Conducted Out of Band Emissions

2.5.1 Requirement

According to FCC section 22.917(a) and 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.

2.5.2 Test Description

See section 2.1.2 of this report.

2.5.3 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:

Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GSM 850MHz	128	824.2	-20.79	Plot A1toA1.1	-13	PASS
	190	836.6	-21.43	Plot A2toA2.1		PASS
	251	848.8	-20.83	Plot A3toA3.1		PASS
GSM 1900MHz	512	1850.2	-21.02	Plot B1toB1.1	-13	PASS
	661	1880.0	-20.98	Plot B2toB2.1		PASS
	810	1909.8	-20.45	Plot B3toB3.1		PASS
WCDMA 850MHz	4132	826.4	-20.63	Plot C1toC1.1	-13	PASS
	4175	835	-20.02	Plot C2toC2.1		PASS
	4233	846.6	-21.48	Plot C3toC3.1		PASS
WCDMA 1900MHz	9262	1852.4	< -25	Plot D1toD1.1	-13	PASS
	9400	1880	< -25	Plot D2toD2.1		PASS
	9538	1907.6	< -25	Plot D3toD3.1		PASS
HSDPA 850MHz	4132	826.4	< -25	Plot E1toE1.1	-13	PASS
	4175	835	< -25	Plot E2toE2.1		PASS
	4233	846.6	< -25	Plot E3toE3.1		PASS
HSDPA 1900MHz	9262	1852.4	< -25	Plot F1toF1.1	-13	PASS
	9400	1880	< -25	Plot F2toF2.1		PASS
	9538	1907.6	< -25	Plot F3toF3.1		PASS

2.   Test Plots for the Whole Measurement Frequency Range:

Note: the power of the EUT transmitting frequency should be ignored.
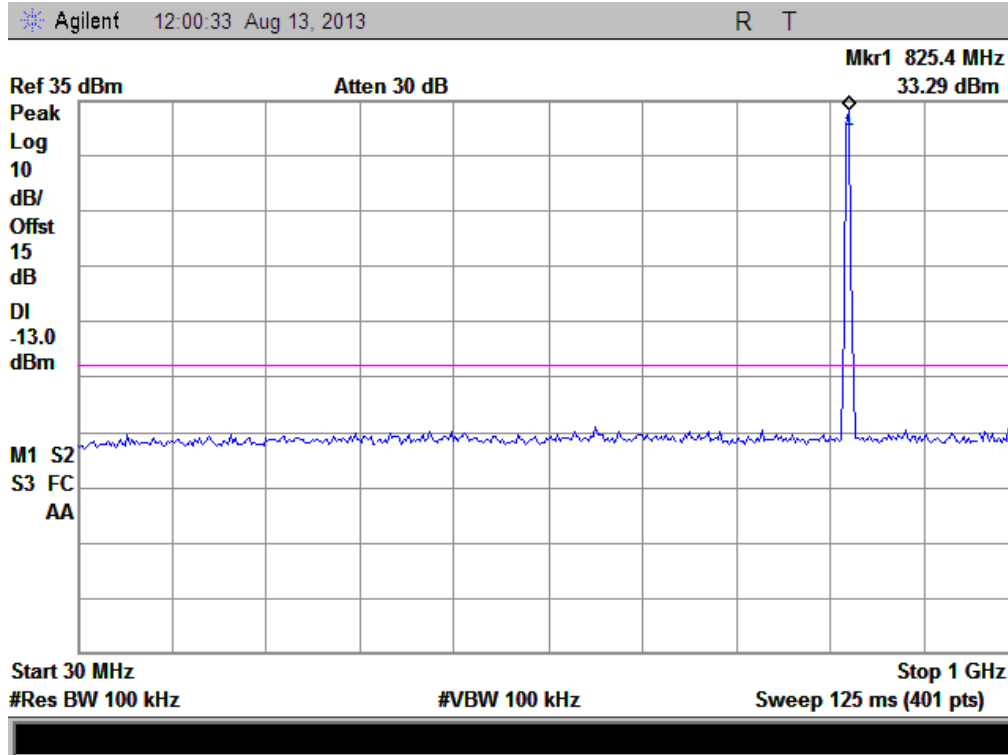
(Plot A1:   GSM 850MHz Channel = 128, 30MHz to 1GHz)
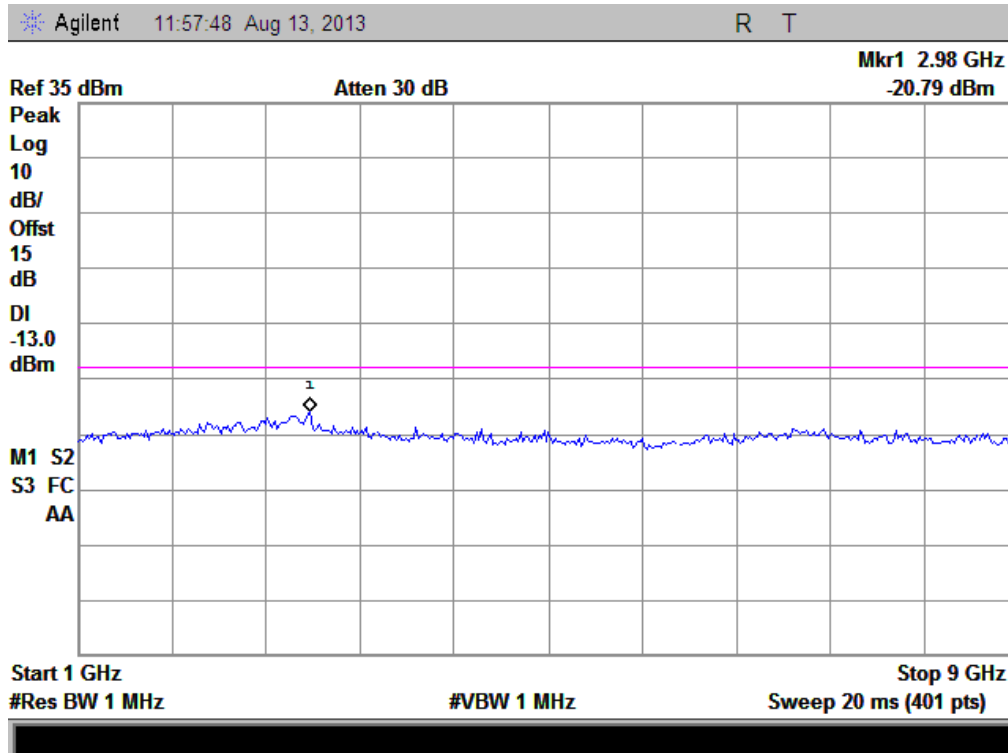
(Plot A1.1:   GSM 850MHz Channel = 128, 1GHz to 9GHz)
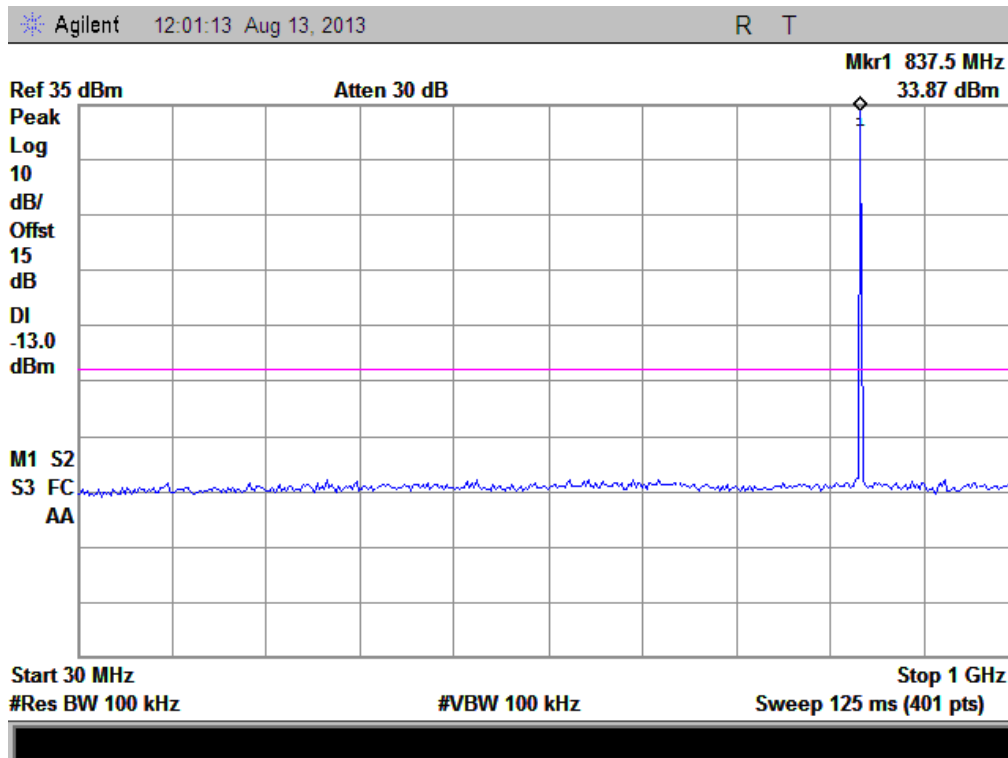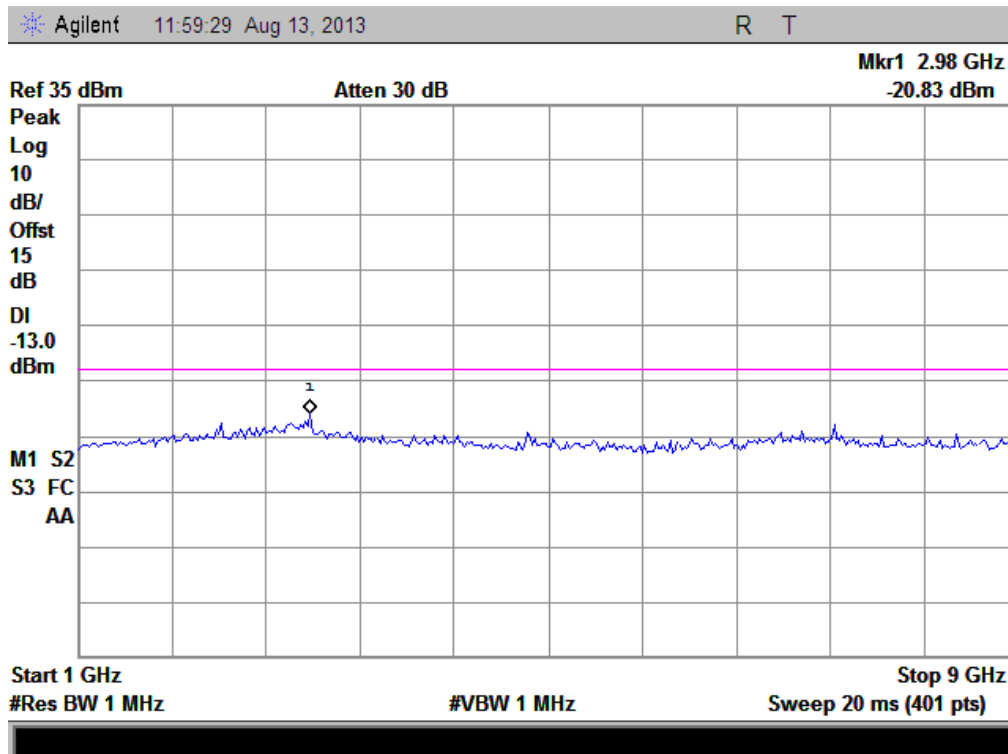
(Plot A2:   GSM 850MHz Channel = 190, 30MHz to 1GHz)
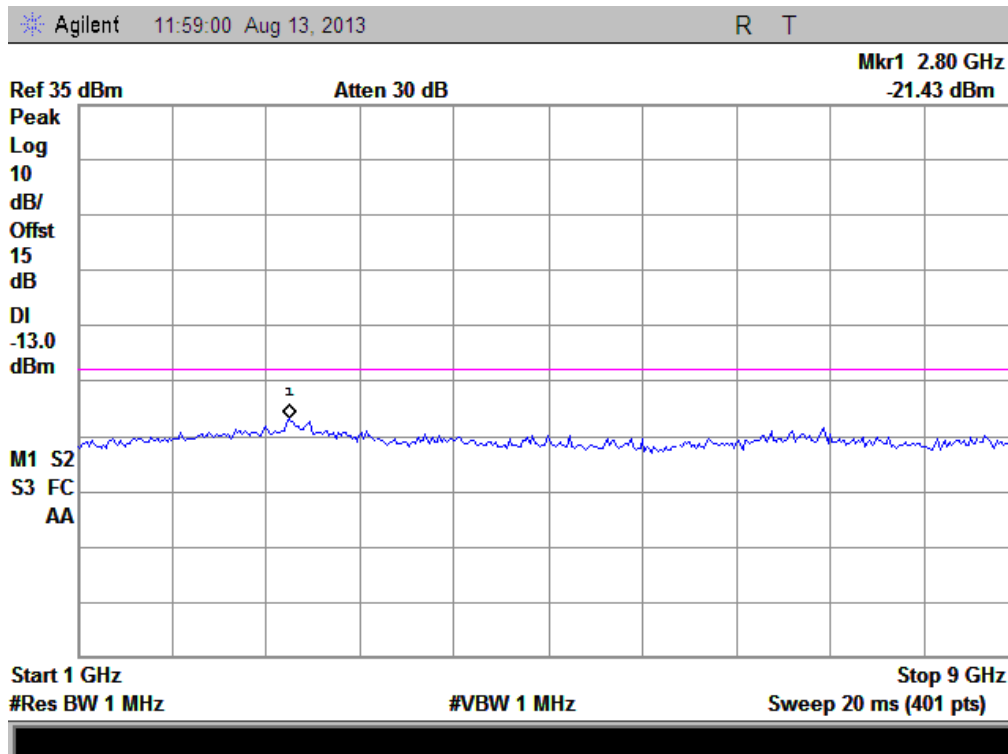
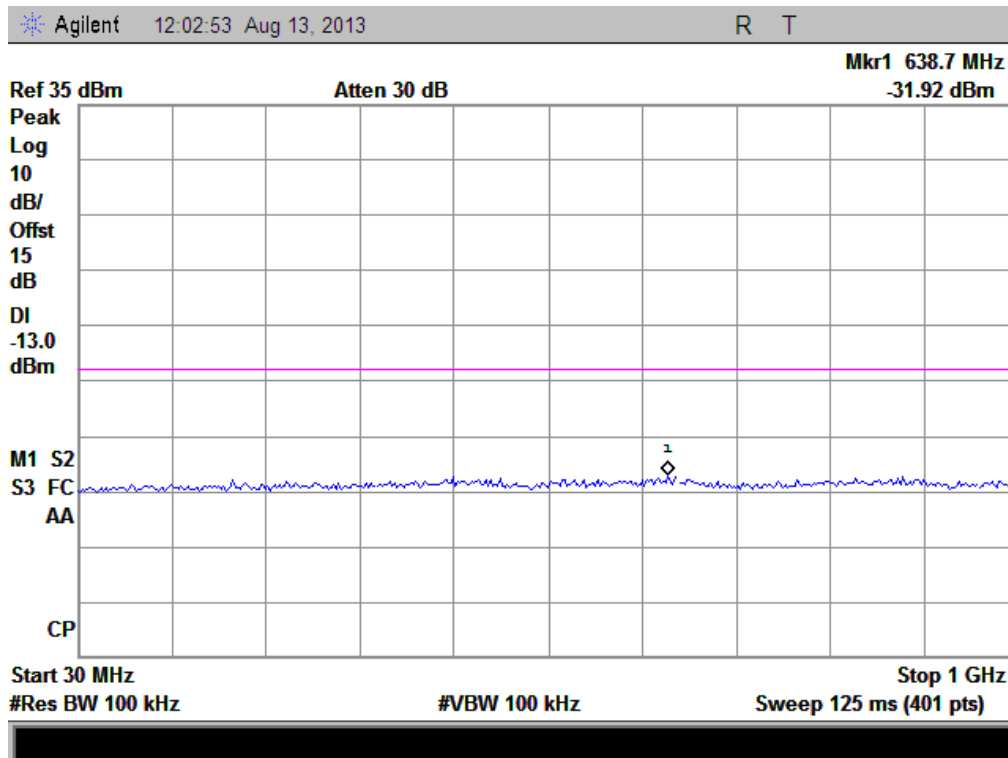(Plot A2.1:   GSM 850MHz Channel = 190, 1GHz to 9GHz)
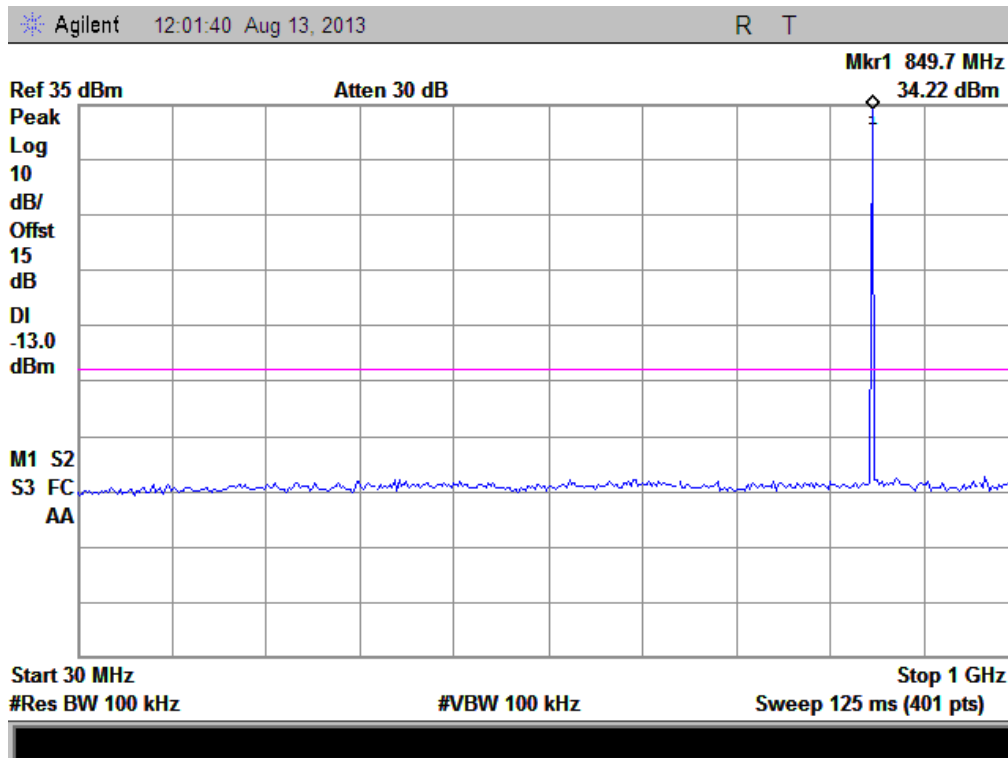
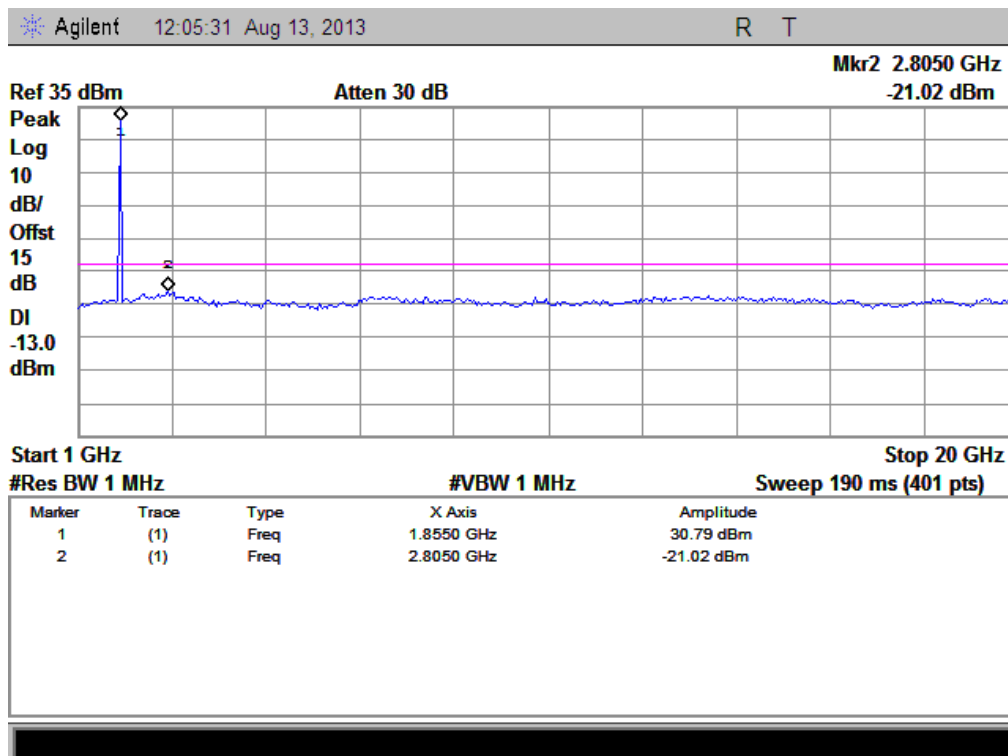(Plot A3:   GSM 850MHz Channel = 251, 30MHz to 1GHz)
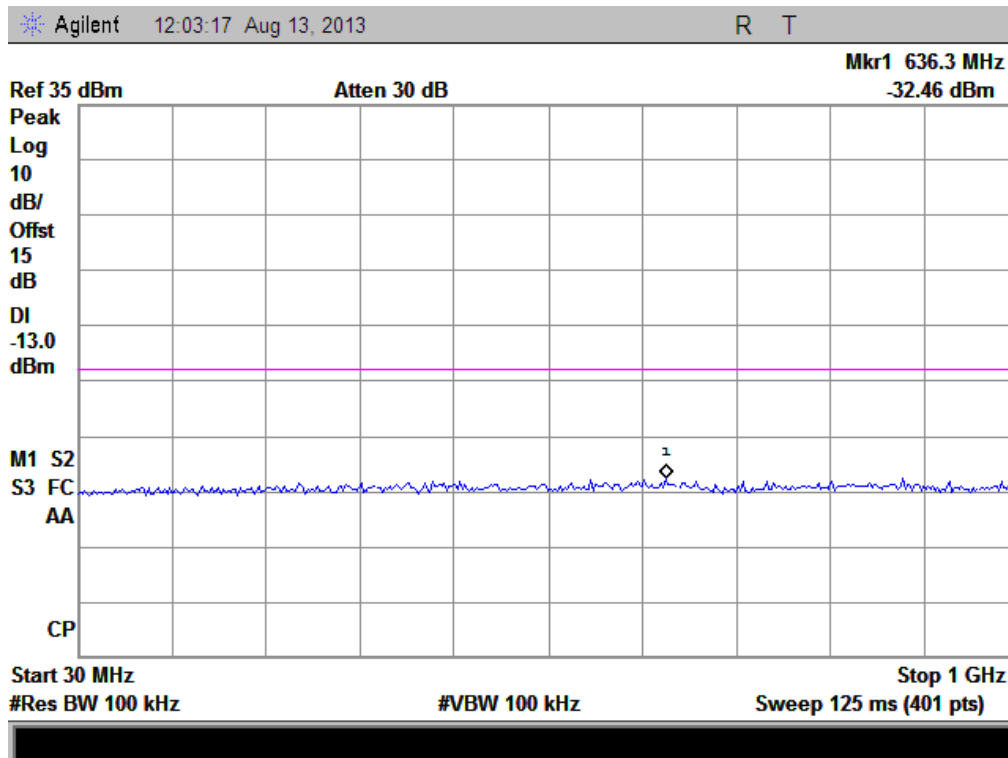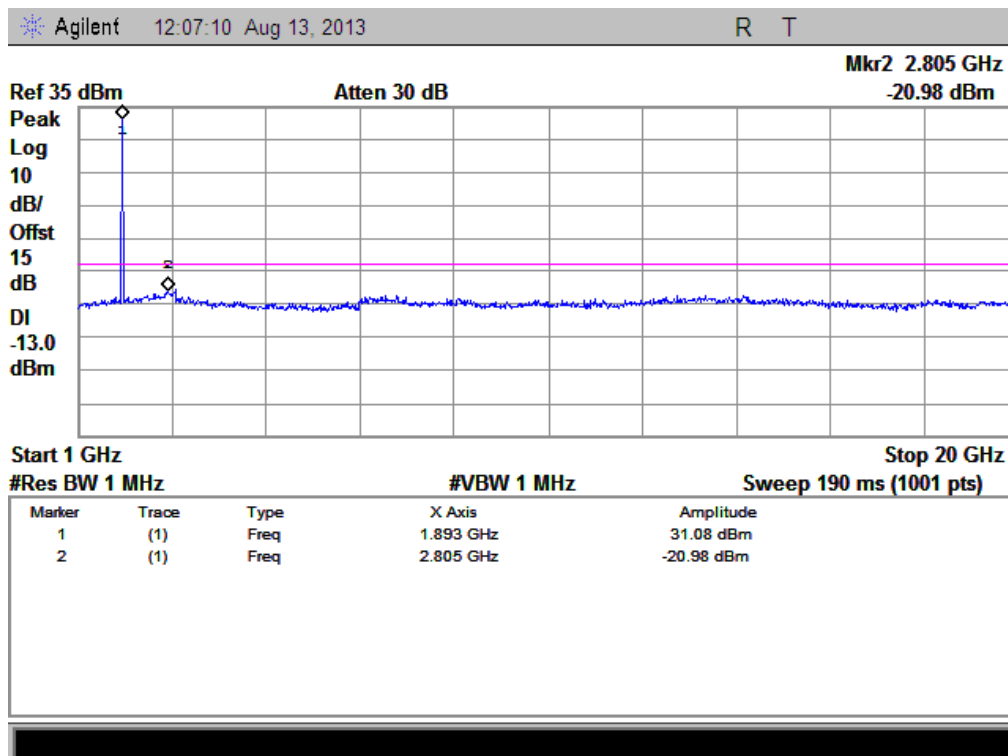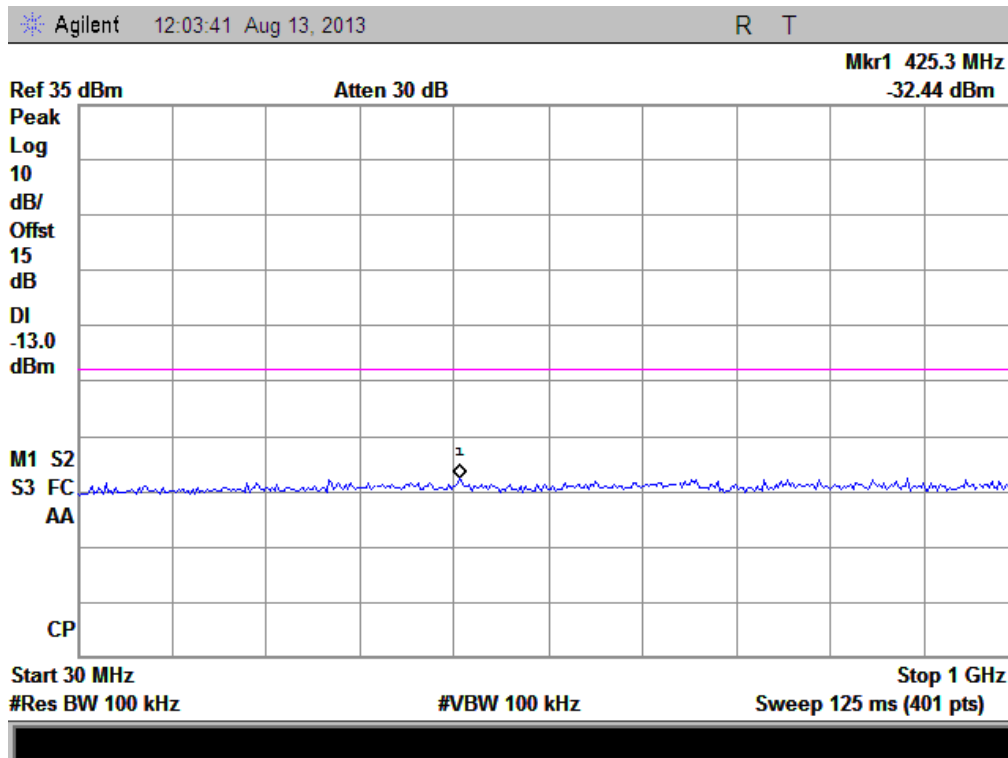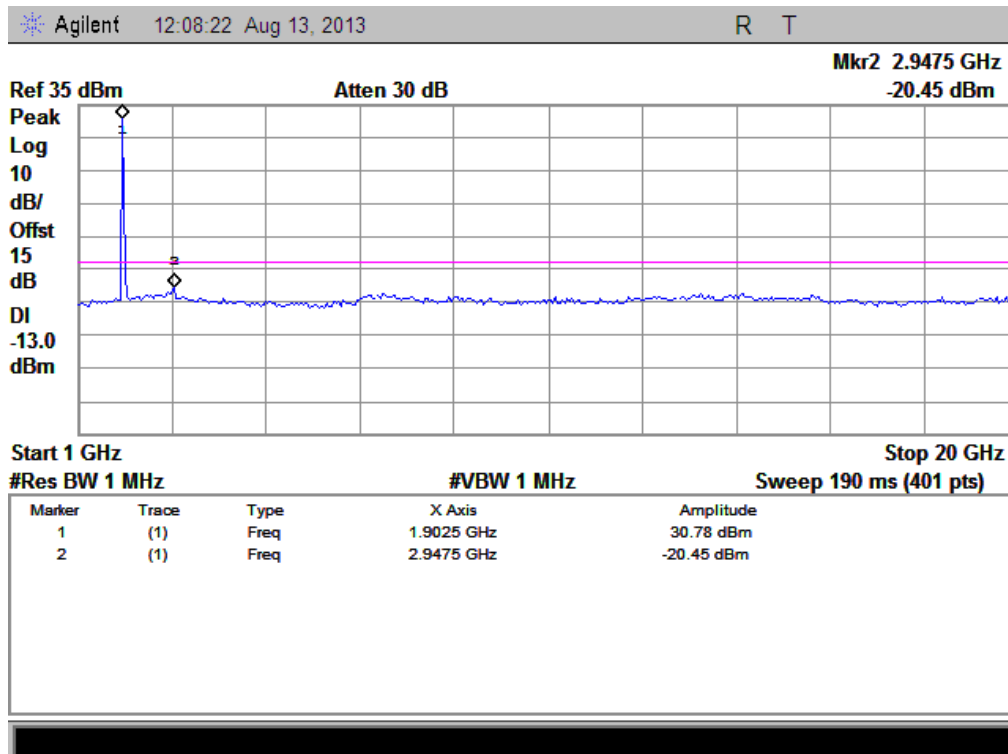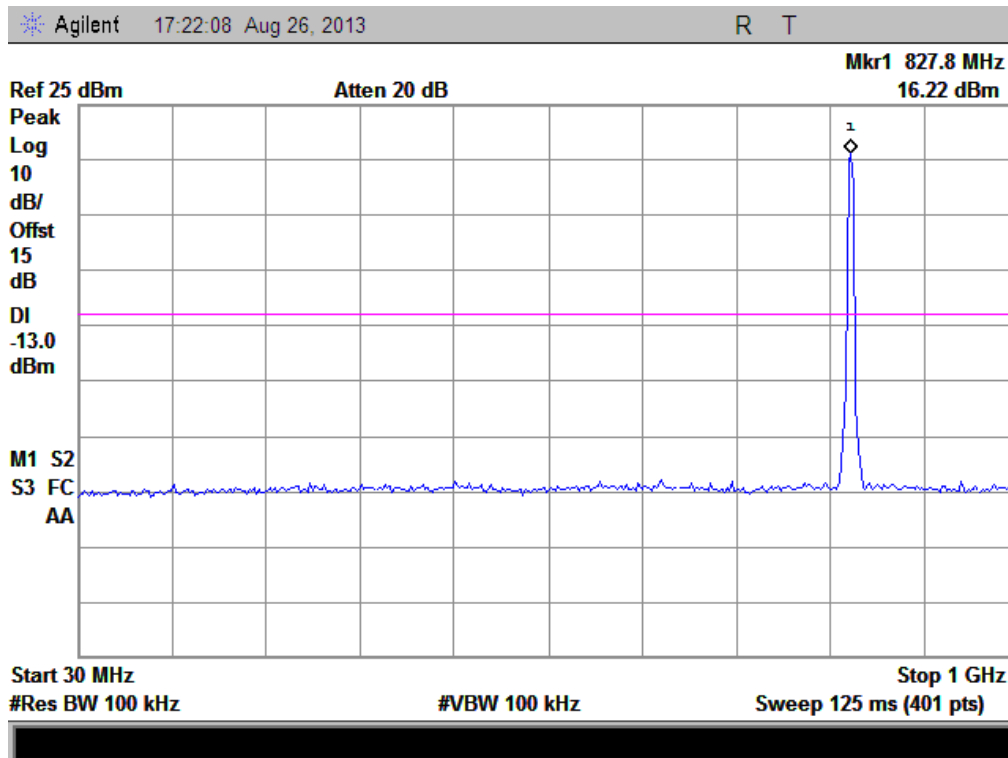

(Plot A3.1:   GSM 850MHz Channel = 251, 1GHz to 9GHz)

(Plot B1:   GSM 1900MHz Channel = 512, 30MHz to 1GHz)

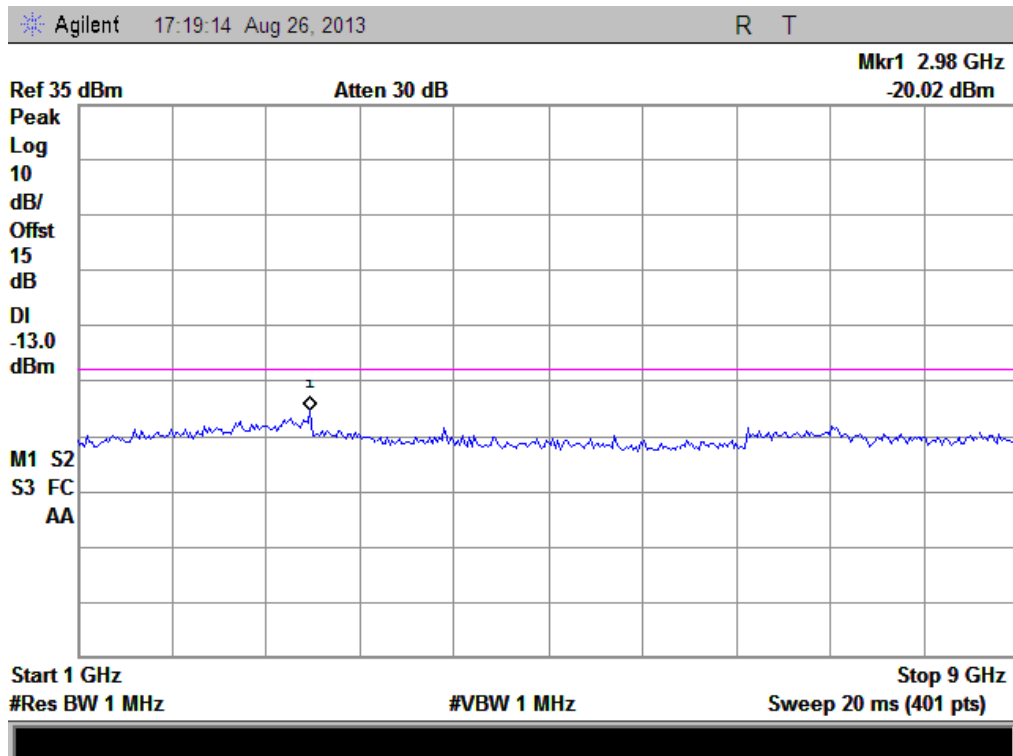

(Plot B1.1:   GSM 1900MHz Channel = 512, 1GHz to 20GHz)

(Plot B2:   GSM 1900MHz Channel = 661, 30MHz to 1GHz)

(Plot B2.1:   GSM 1900MHz Channel = 661, 1GHz to 20GHz)

(Plot B3:   GSM 1900MHz Channel = 810, 30MHz to 1GHz)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.9025 GHz	30.78 dBm
2	(1)	Freq	2.9475 GHz	-20.45 dBm

(Plot B3.1:   GSM 1900MHz Channel = 810, 1GHz to 20GHz)

(Plot C1: WCDMA850MHz Channel = 4132, 30MHz to 1GHz)
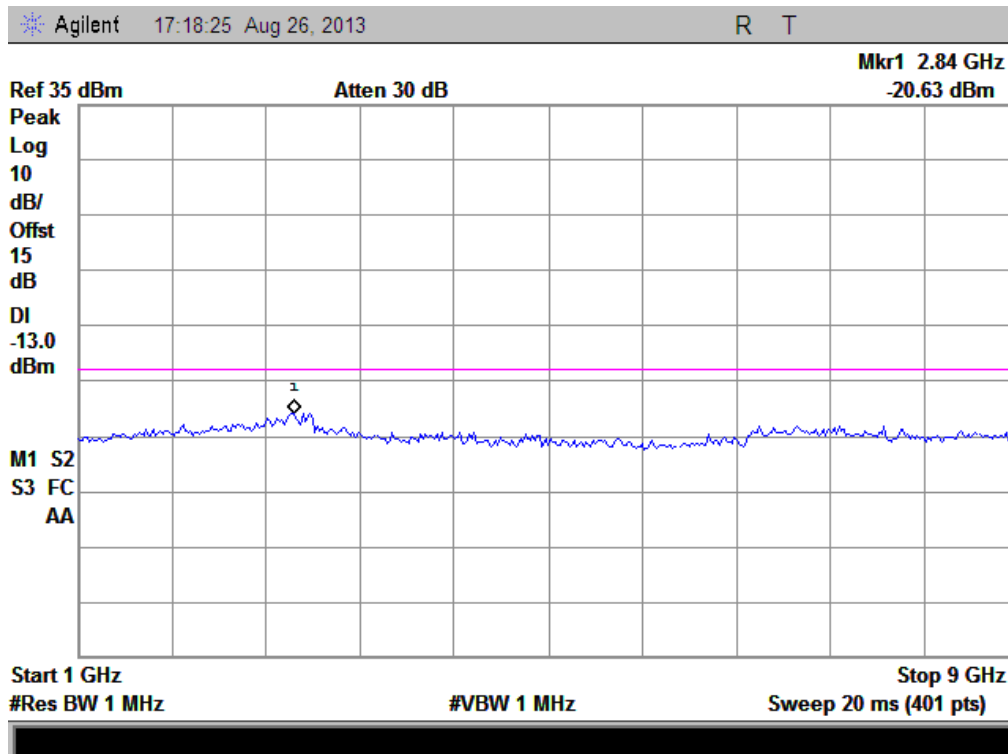
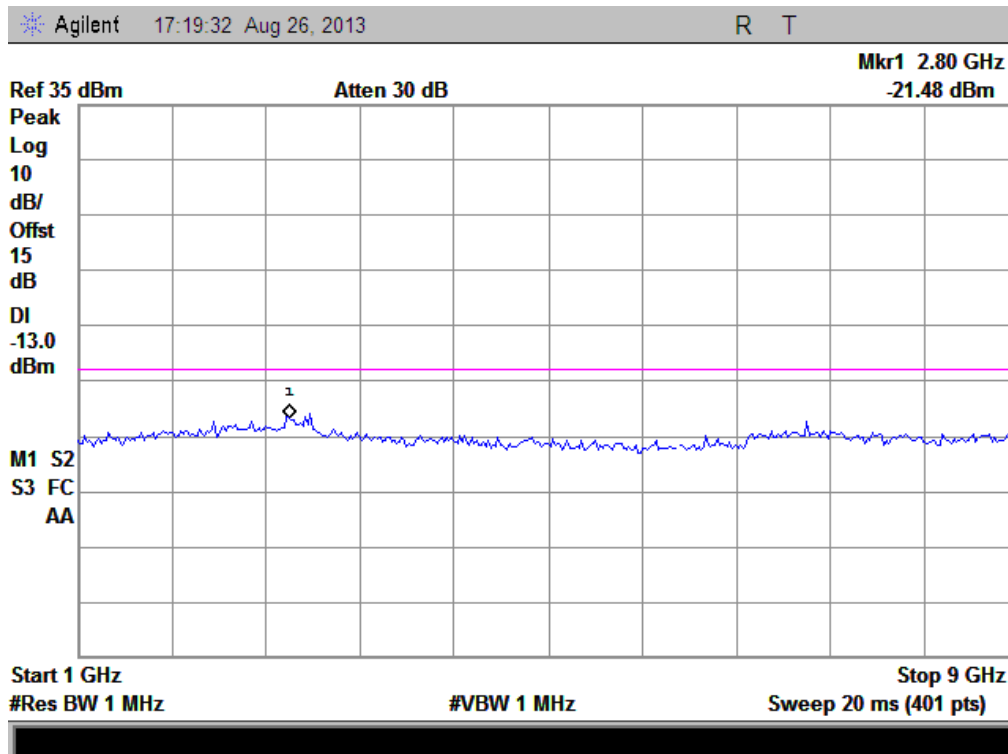(Plot C1.1: WCDMA850MHz Channel = 4132, 1GHz to 9GHz)
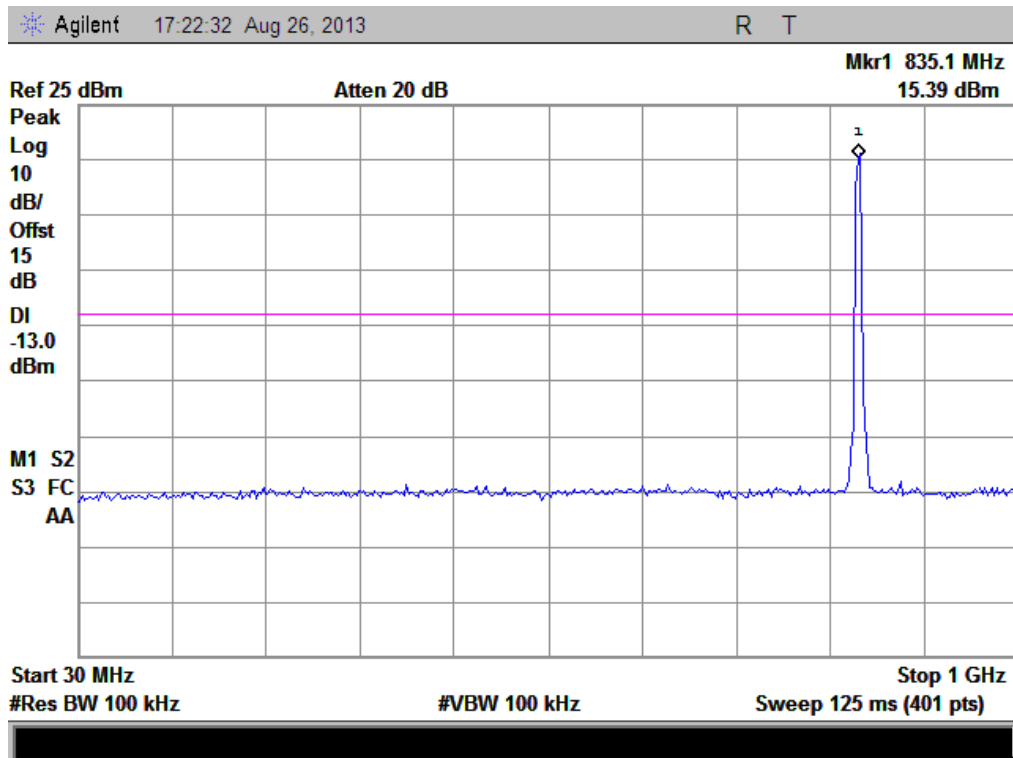
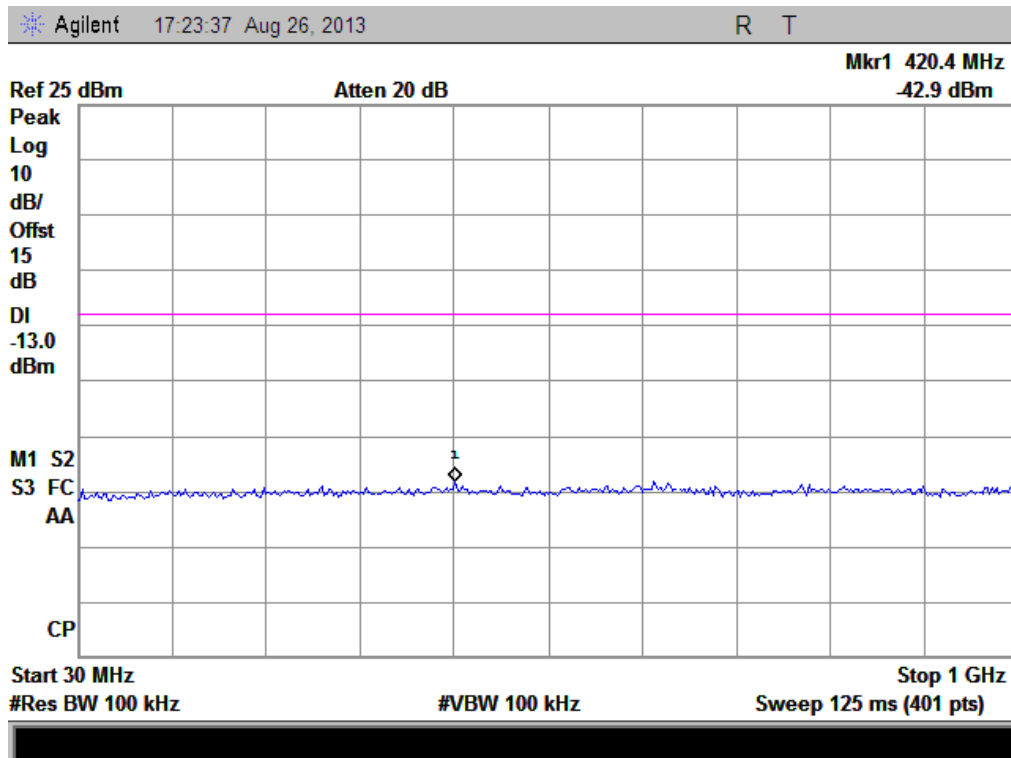(Plot C2:   WCDMA850MHz Channel = 4175, 30MHz to 1GHz)

(Plot C2.1:   WCDMA850MHz Channel = 4175, 1GHz to 9GHz)
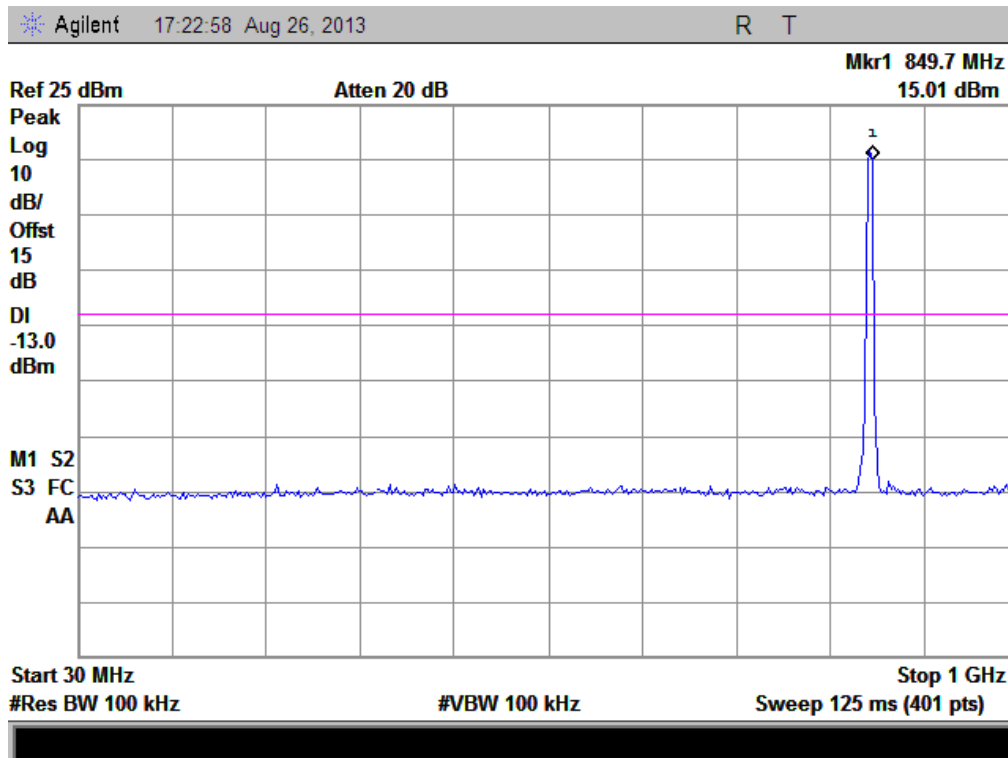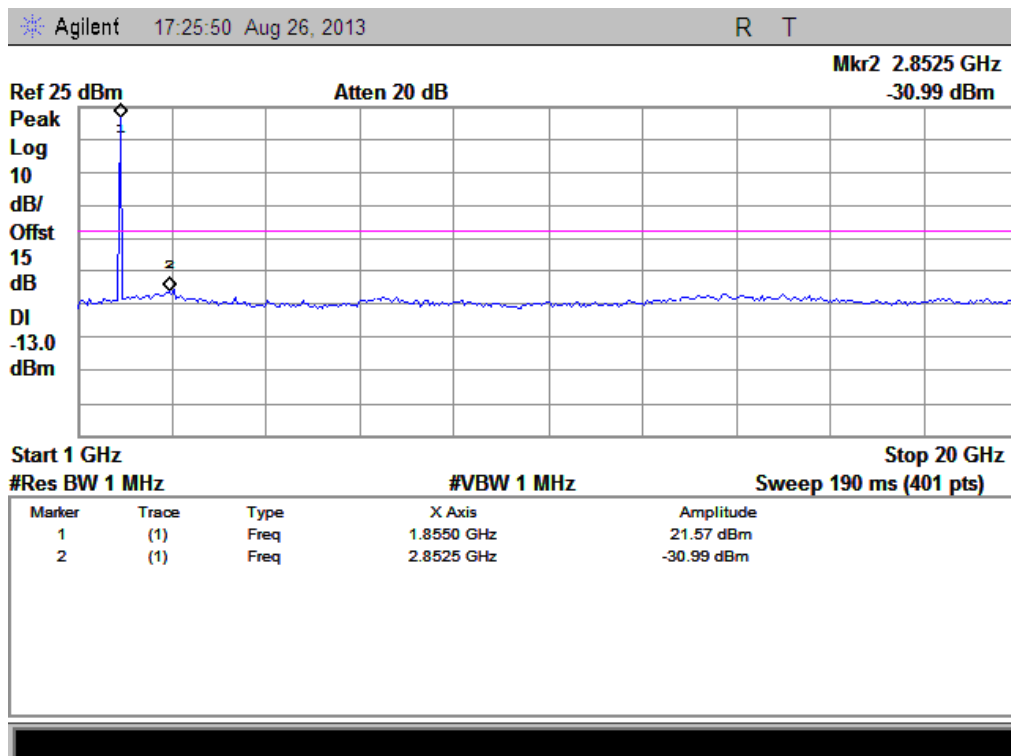
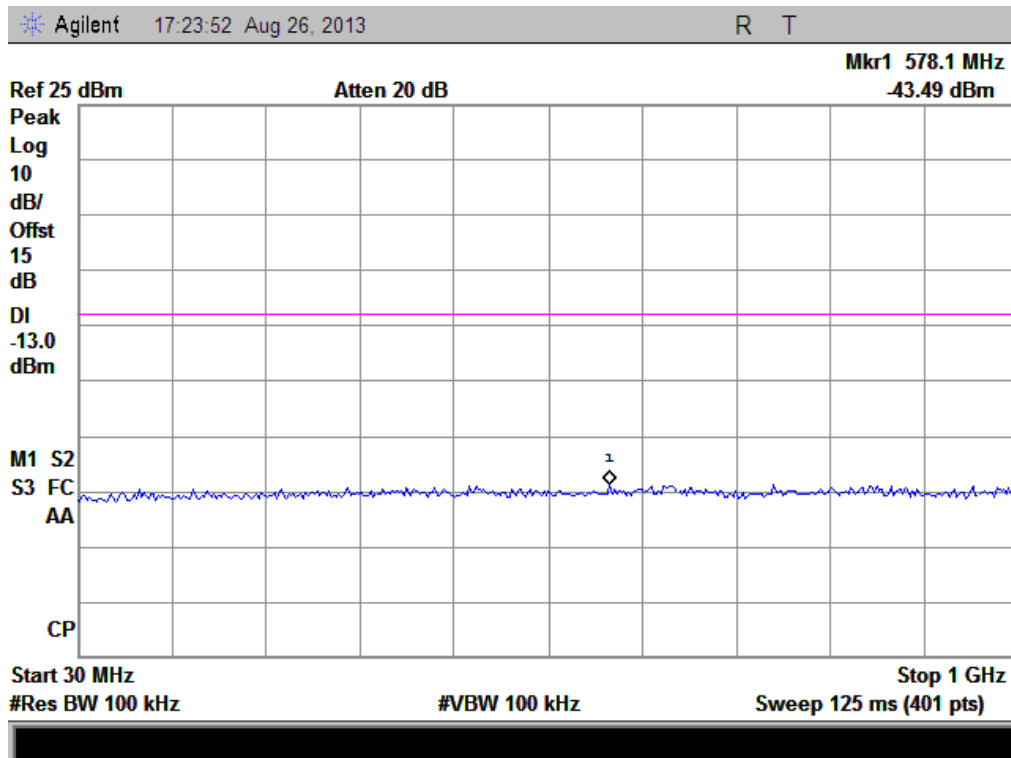(Plot C3:   WCDMA850MHz Channel = 4233, 30MHz to 1GHz)

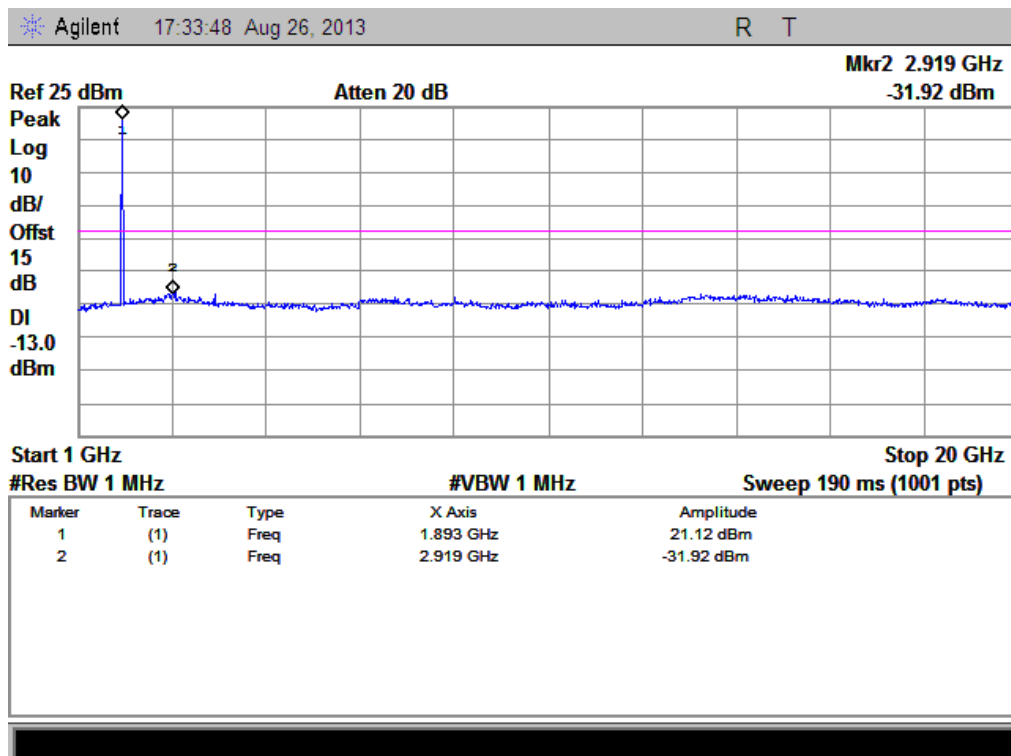(Plot C3.1:   WCDMA850MHz Channel = 4233, 1GHz to 9GHz)

(Plot D1:   WCDMA1900MHz Channel = 9262, 30MHz to 1GHz)

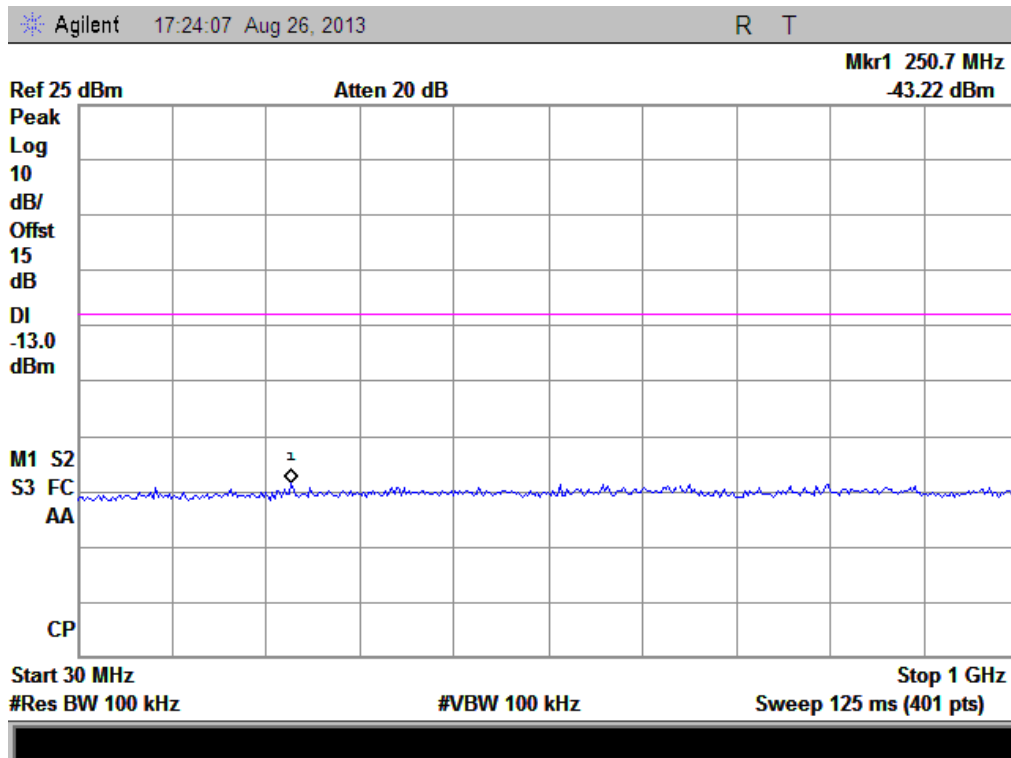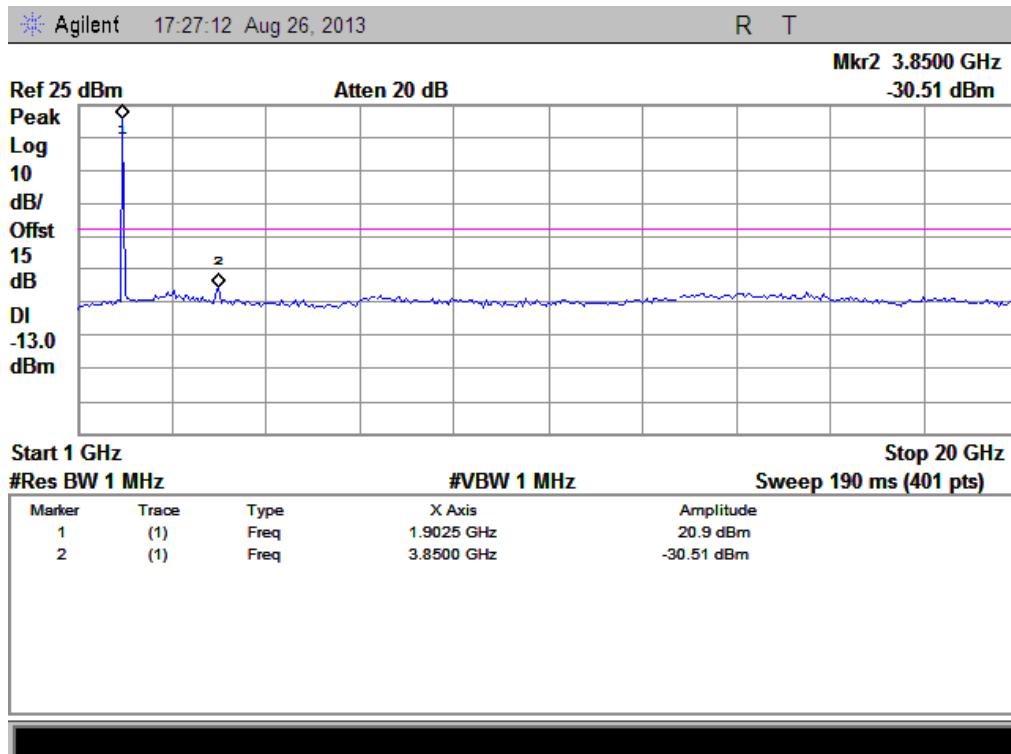| Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.8550 GHz	21.57 dBm
2	(1)	Freq	2.8525 GHz	-30.99 dBm

(Plot D1.1:   WCDMA1900MHz Channel = 9262, 1GHz to 20GHz)

(Plot D2:　　WCDMA1900MHz Channel = 9400, 30MHz to 1GHz)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.893 GHz	21.12 dBm
2	(1)	Freq	2.919 GHz	-31.92 dBm

(Plot D2.1:　WCDMA1900MHz Channel = 9400, 1GHz to 20GHz)

Agilent 17:24:07 Aug 26, 2013   R T

Mkr1 250.7 MHz
-43.22 dBm

Ref 25 dBm   Atten 20 dB
Peak
Log
10
dB/
Offst
15
dB
DI
-13.0
dBm

M1 S2
S3 FC
AA

CP

Start 30 MHz   Stop 1 GHz
#Res BW 100 kHz   #VBW 100 kHz   Sweep 125 ms (401 pts)

(Plot D3:   WCDMA1900MHz Channel = 9538, 30MHz to 1GHz)

Agilent 17:27:12 Aug 26, 2013   R T

Mkr2 3.8500 GHz
-30.51 dBm

Ref 25 dBm   Atten 20 dB
Peak
Log
10
dB/
Offst
15
dB
DI
-13.0
dBm

Start 1 GHz   Stop 20 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 190 ms (401 pts)

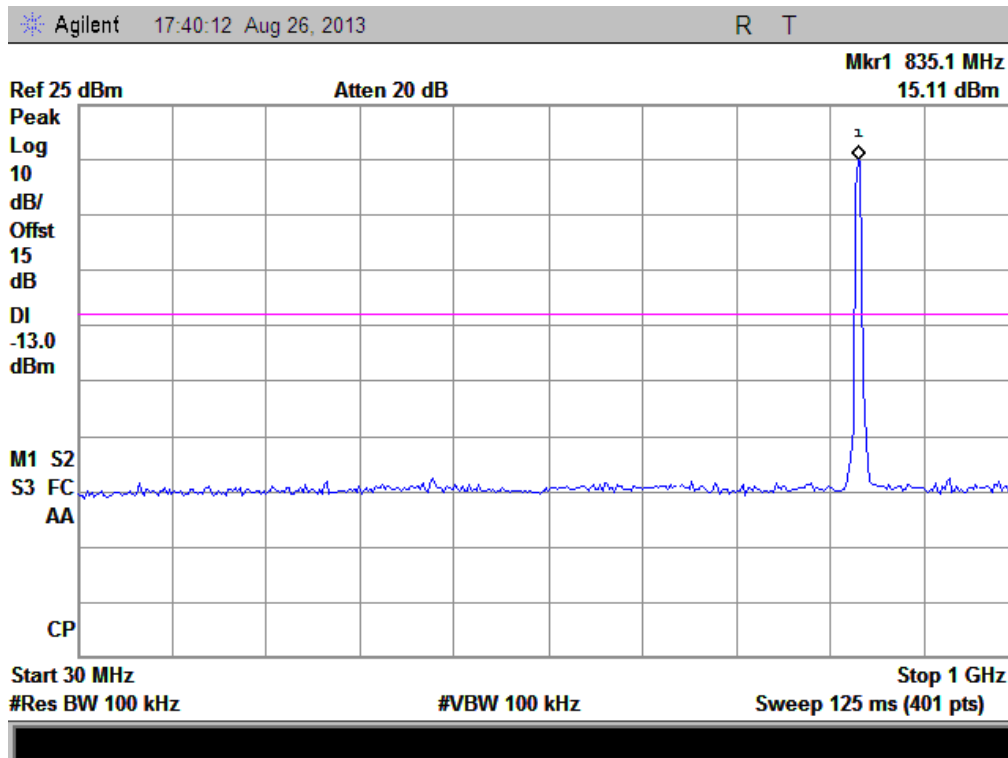| Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.9025 GHz	20.9 dBm
2	(1)	Freq	3.8500 GHz	-30.51 dBm

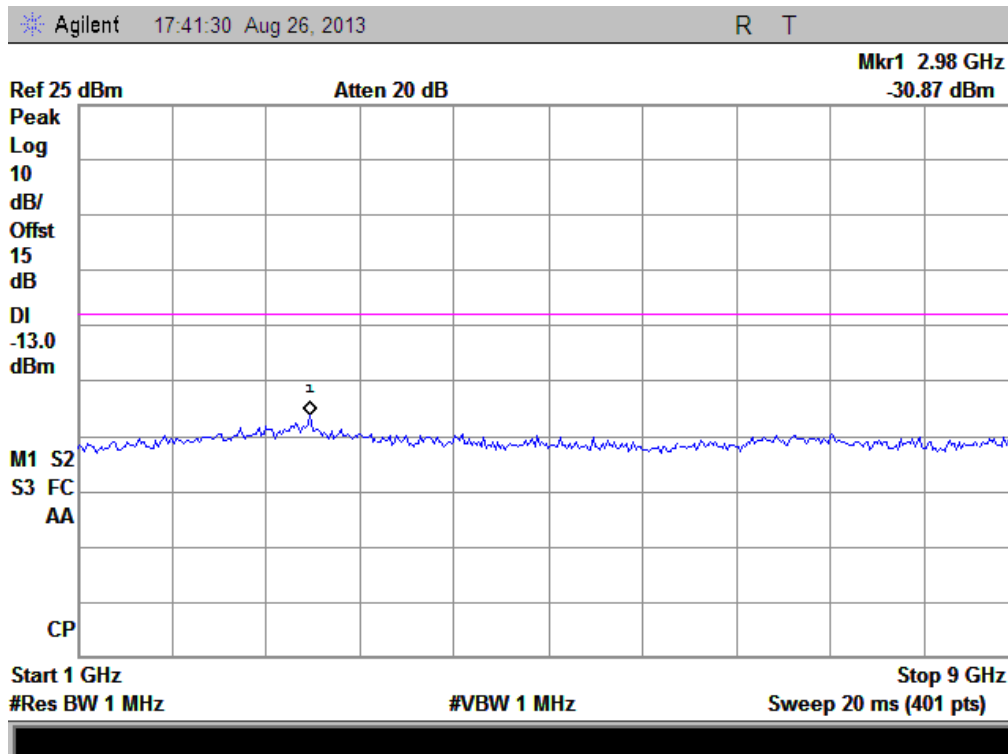(Plot D3.1:   WCDMA1900MHz Channel = 9538 1GHz to 20GHz)
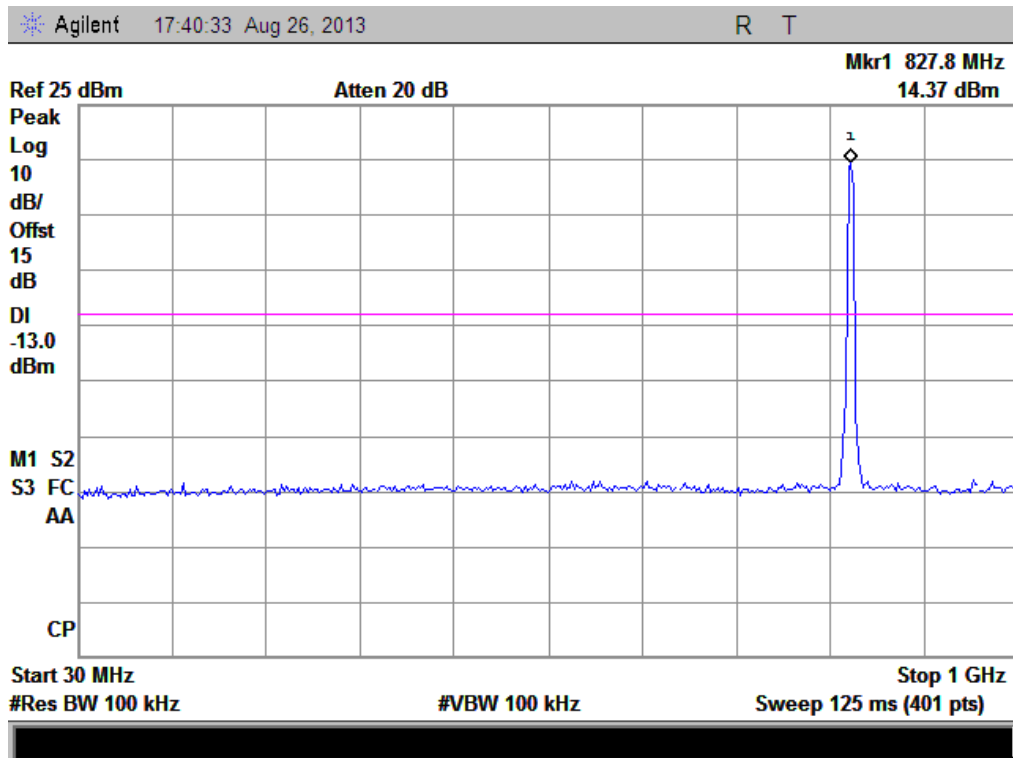
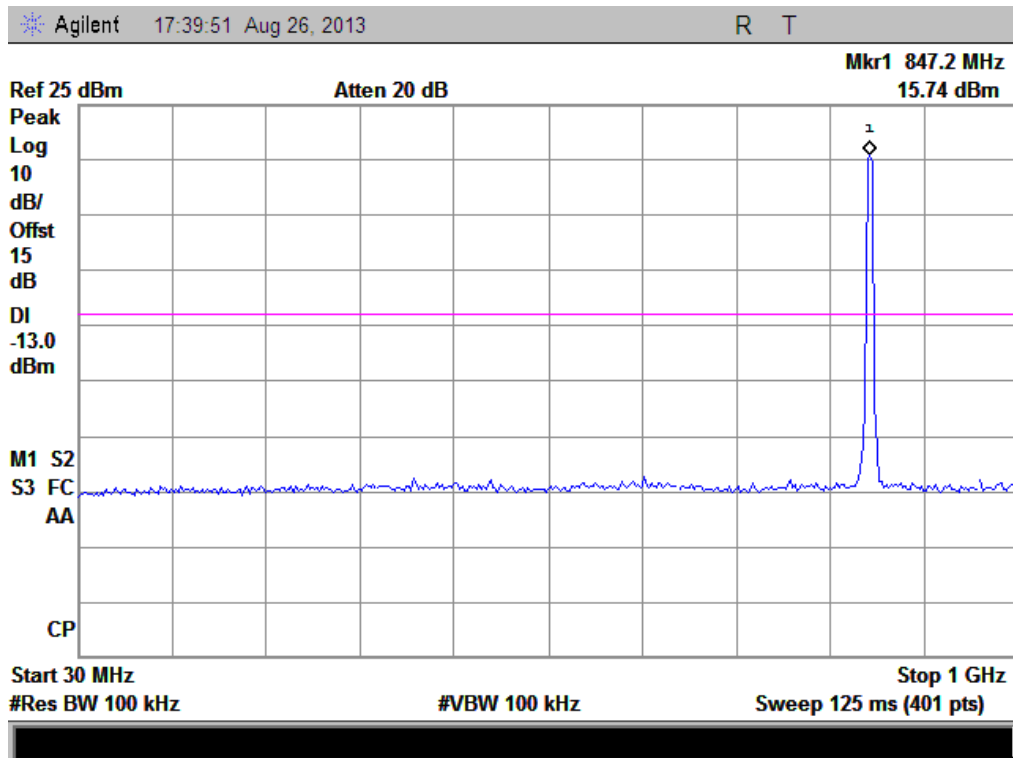(Plot E1:   HSDPA 850MHz Channel = 4132, 30MHz to 1GHz)
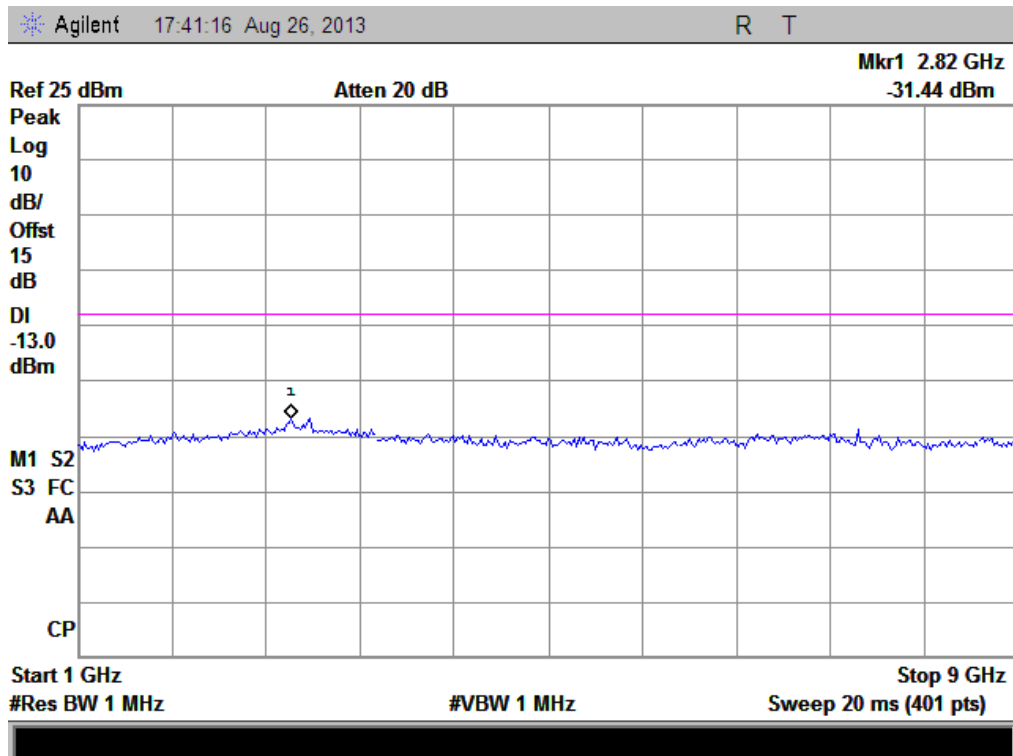
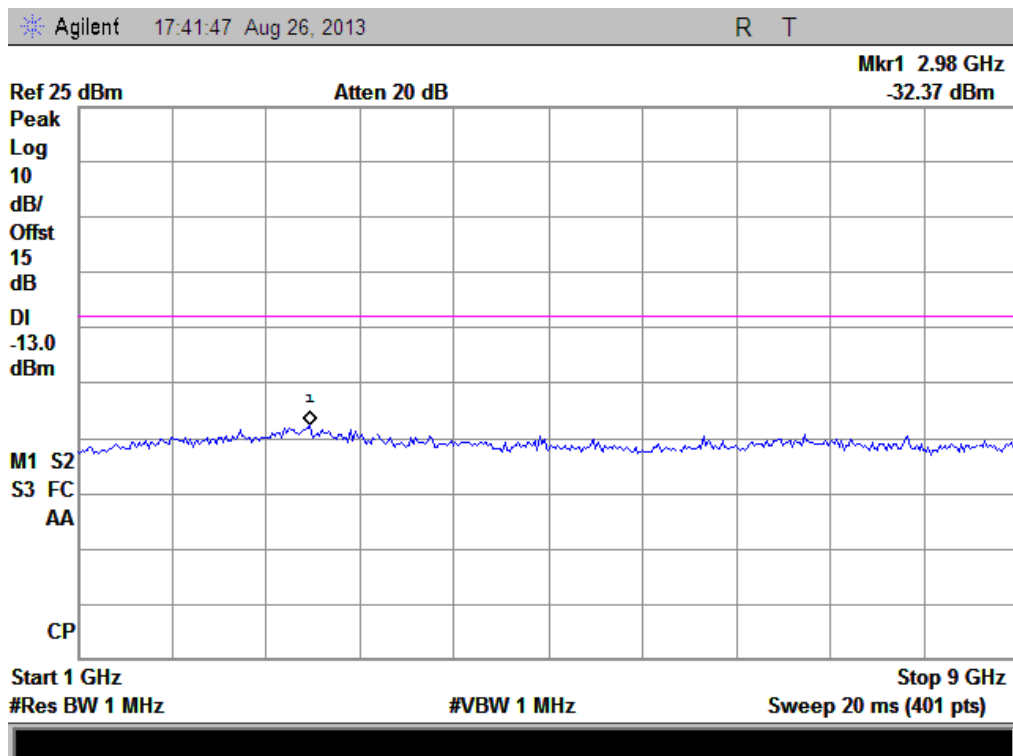(Plot E1.1:   HSDPA 850MHz Channel = 4132, 1GHz to 9GHz)

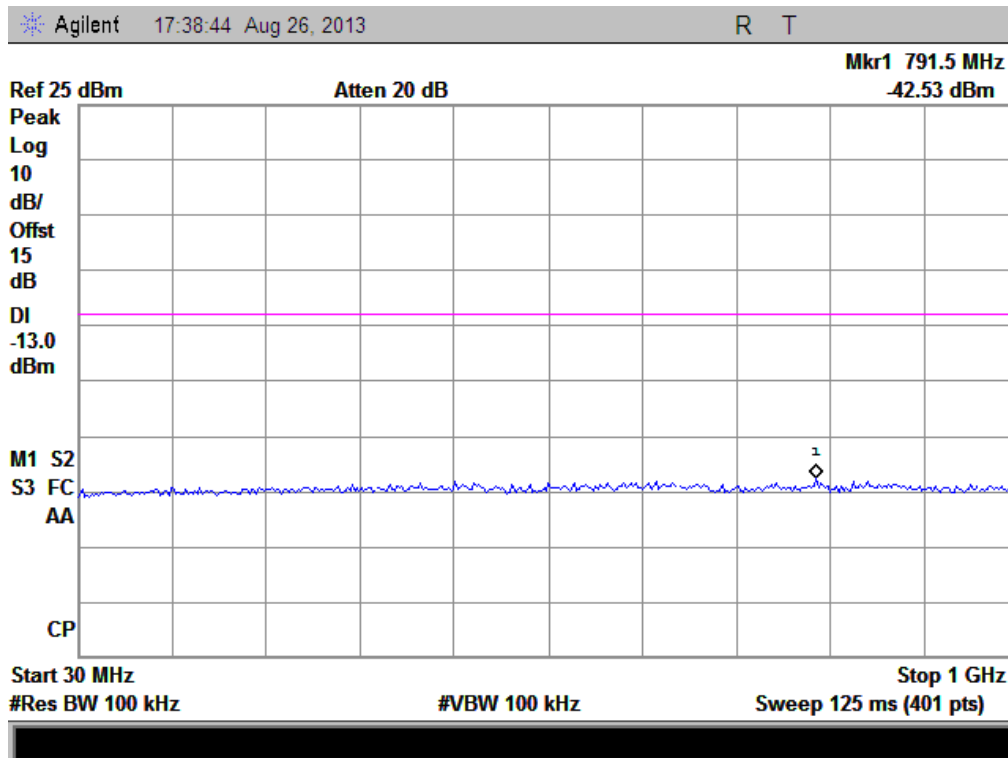(Plot E2:   HSDPA 850MHz Channel = 4175, 30MHz to 1GHz)

(Plot E2.1:   HSDPA 850MHz Channel = 4175, 1GHz to 9GHz)
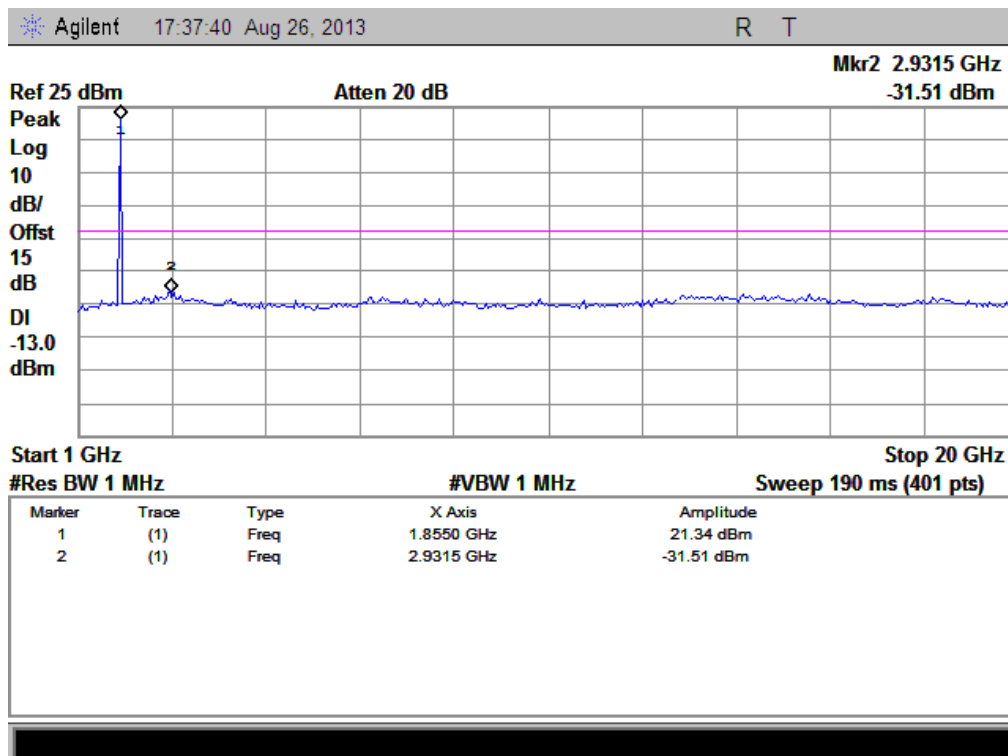
(Plot E3:   HSDPA850MHz Channel = 4233, 30MHz to 1GHz)

(Plot E3.1:   HSDPA850MHz Channel = 4233, 1GHz to 9GHz)

(Plot F1:   HSDPA1900MHz Channel = 9262, 30MHz to 1GHz)
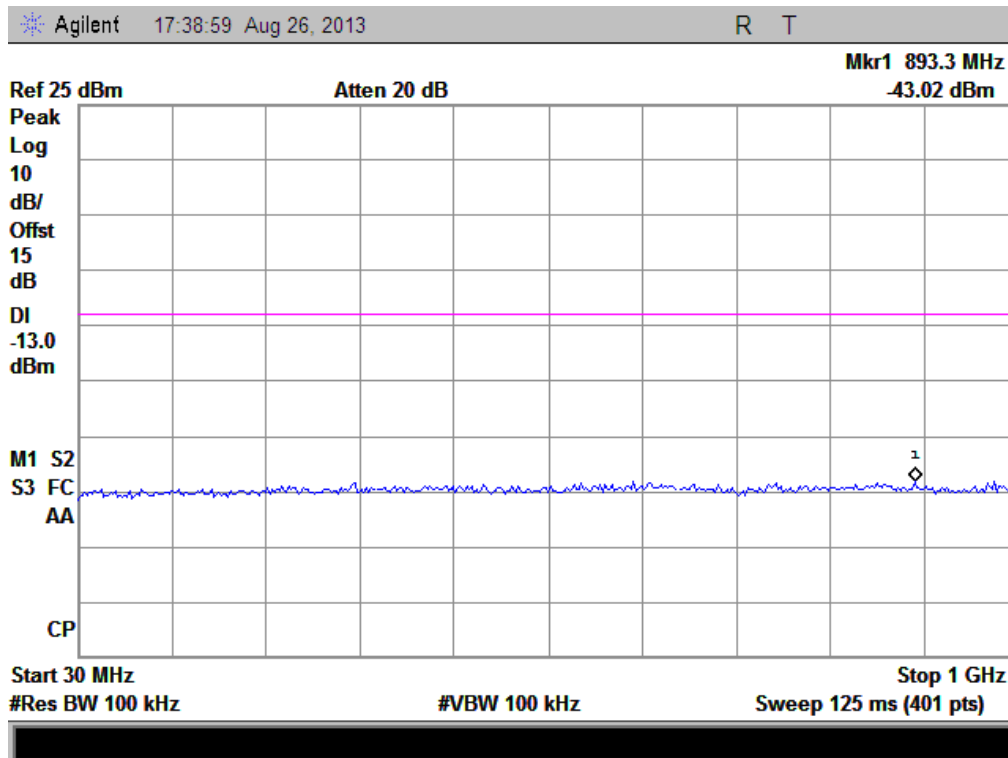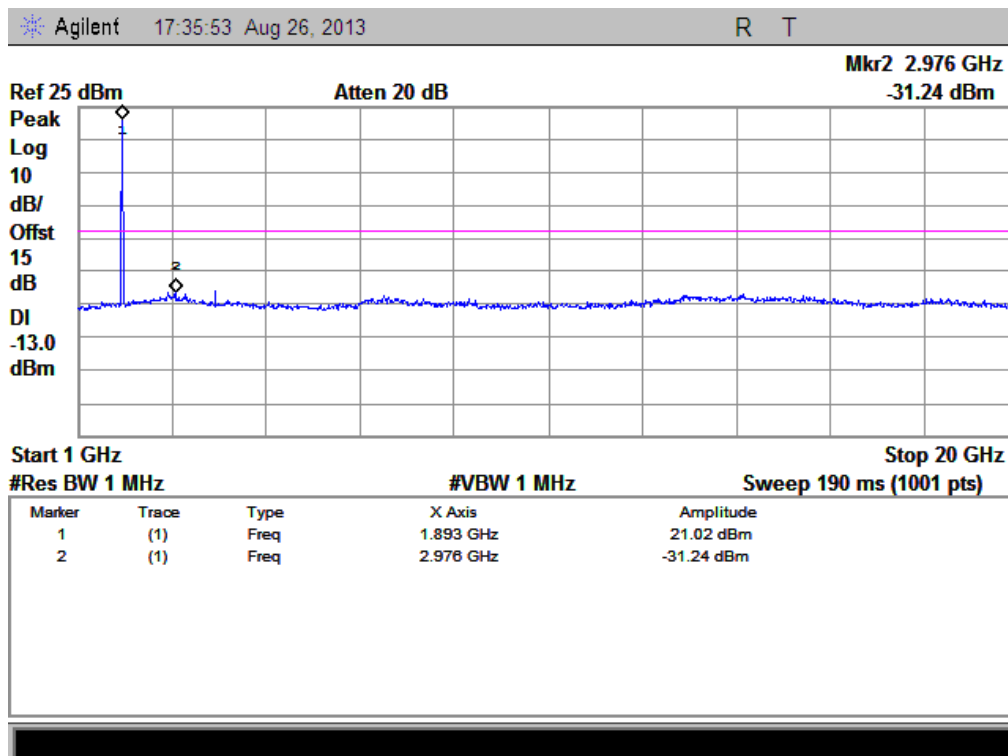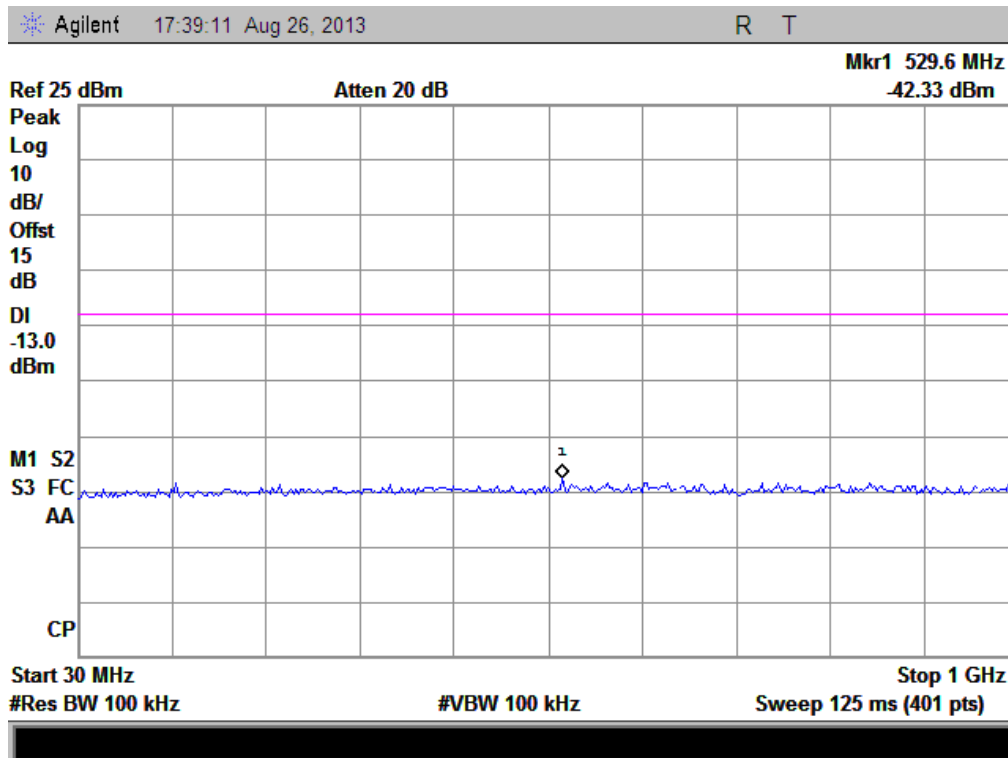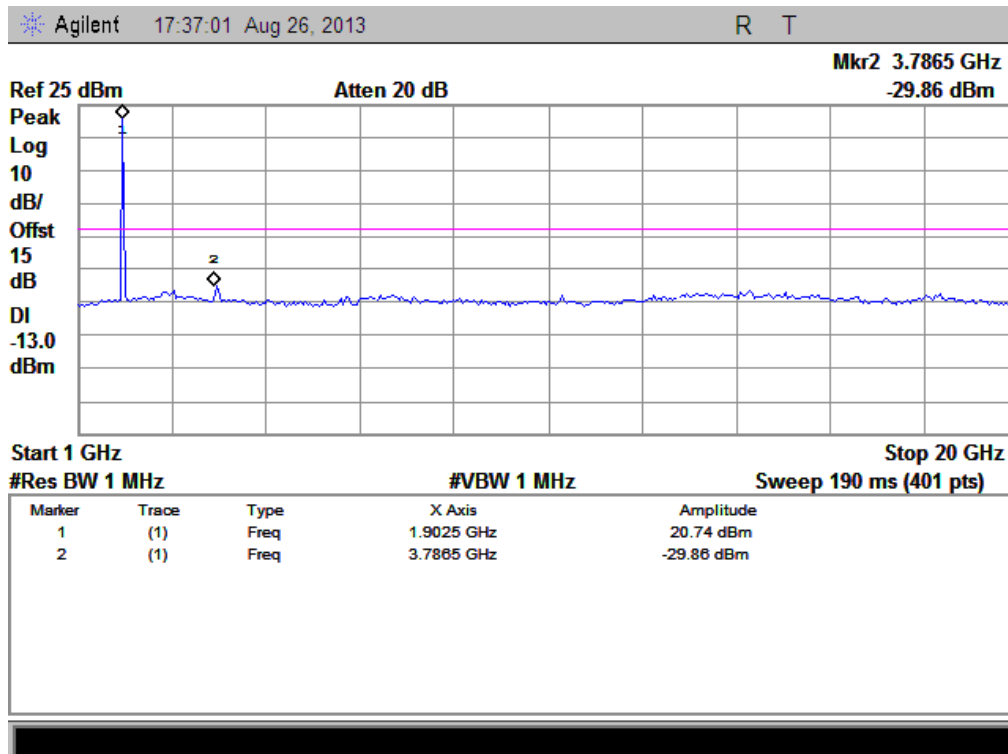

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.8550 GHz	21.34 dBm
2	(1)	Freq	2.9315 GHz	-31.51 dBm

(Plot F1.1:   HSDPA1900MHz Channel = 9262, 1GHz to 20GHz)

Agilent   17:38:59 Aug 26, 2013   R   T

Mkr1 893.3 MHz
Ref 25 dBm   Atten 20 dB   -43.02 dBm

Peak
Log
10
dB/
Offst
15
dB
DI
-13.0
dBm

M1 S2
S3 FC
AA

CP

Start 30 MHz   Stop 1 GHz
#Res BW 100 kHz   #VBW 100 kHz   Sweep 125 ms (401 pts)

(Plot F2:   HSDPA1900MHz Channel = 9400, 30MHz to 1GHz)

Agilent   17:35:53 Aug 26, 2013   R   T

Mkr2 2.976 GHz
Ref 25 dBm   Atten 20 dB   -31.24 dBm

Peak
Log
10
dB/
Offst
15
dB
DI
-13.0
dBm

Start 1 GHz   Stop 20 GHz
#Res BW 1 MHz   #VBW 1 MHz   Sweep 190 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.893 GHz	21.02 dBm
2	(1)	Freq	2.976 GHz	-31.24 dBm

(Plot F2.1:   HSDPA1900MHz Channel = 9400, 1GHz to 20GHz)

(Plot F3:   HSDPA1900MHz Channel = 9538, 30MHz to 1GHz)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.9025 GHz	20.74 dBm
2	(1)	Freq	3.7865 GHz	-29.86 dBm

(Plot F3.1:   HSDPA1900MHz Channel = 9538 1GHz 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 Description

See section 2.1.2 of this report.

2.6.3 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
GSM	128	824.2	-13.79	Plat A	-13	PASS
850MHz	251	848.8	-14.68	Plot B		PASS
GSM	512	1850.2	-15.37	Plat C	-13	PASS
1900MHz	810	1909.8	-13.77	Plot D		PASS
WCDMA	4132	826.4	-15.69	Plat E	-13	PASS
850MHz	4233	846.6	-14.62	Plot F		PASS
WCDMA	9262	1852.4	-14.47	Plat G	-13	PASS
1900MHz	9538	1907.6	-15.83	Plot H		PASS
HSDPA	4132	826.4	-16.10	Plat I	-13	PASS
850MHz	4233	846.6	-15.55	Plot J		PASS
HSDPA	9262	1852.4	-14.80	Plat K	-13	PASS
1900MHz	9538	1907.6	-16.51	Plot L		PASS

2.   Test Plots:
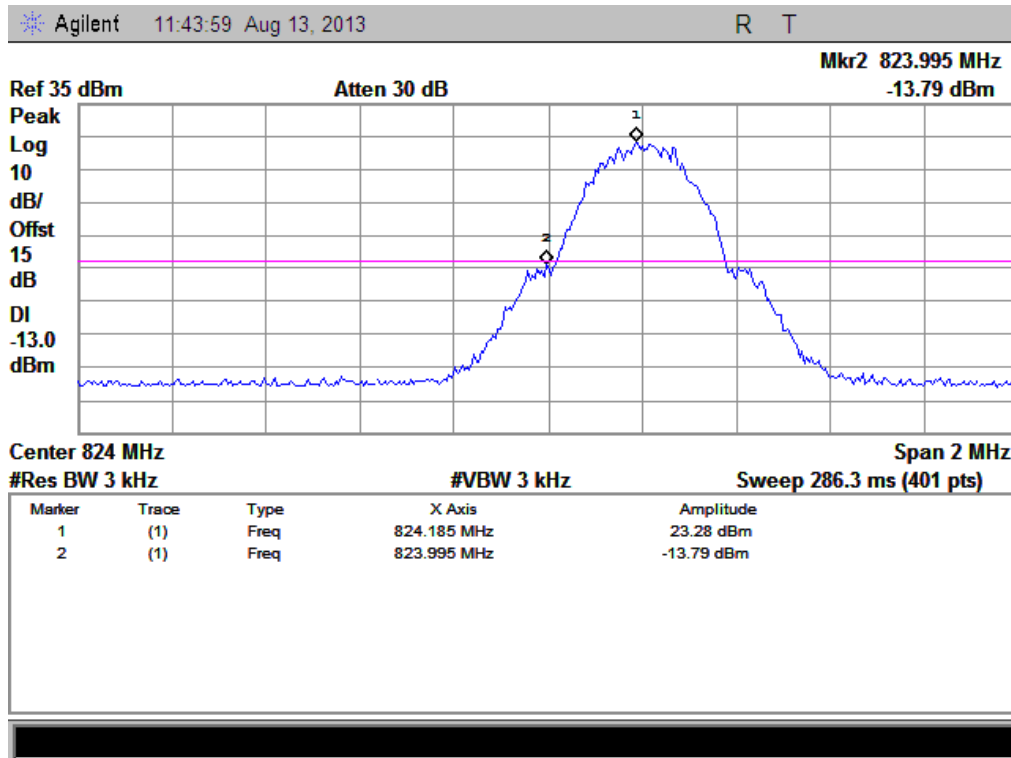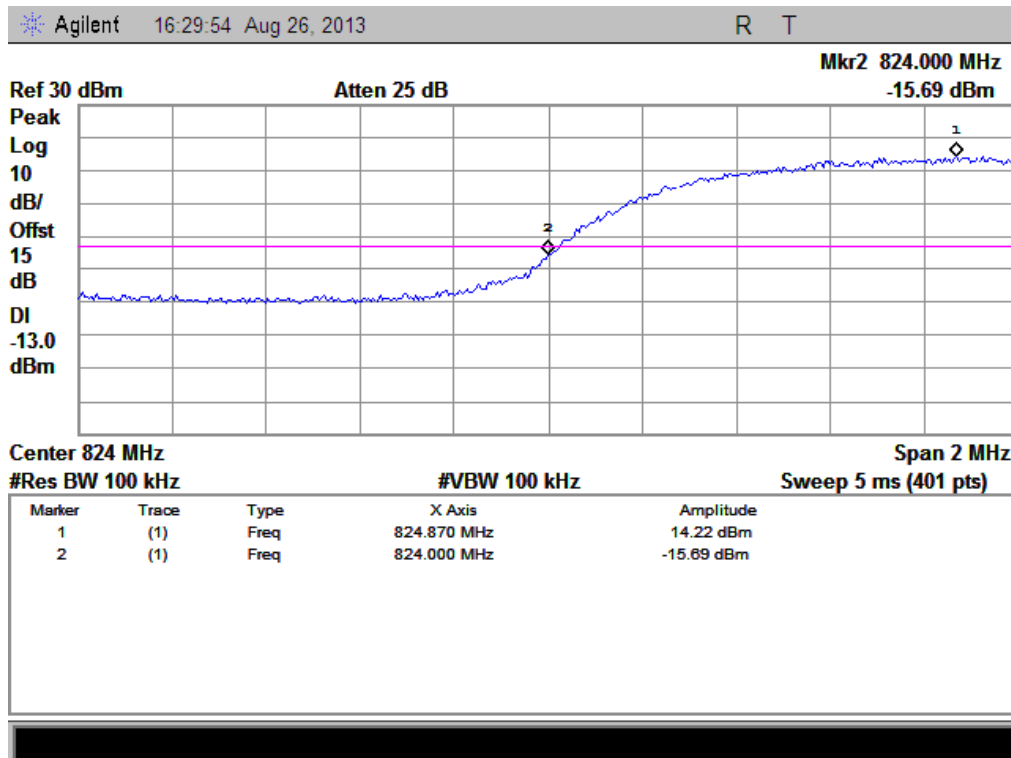

(Plot A: GSM 850 Channel = 128)
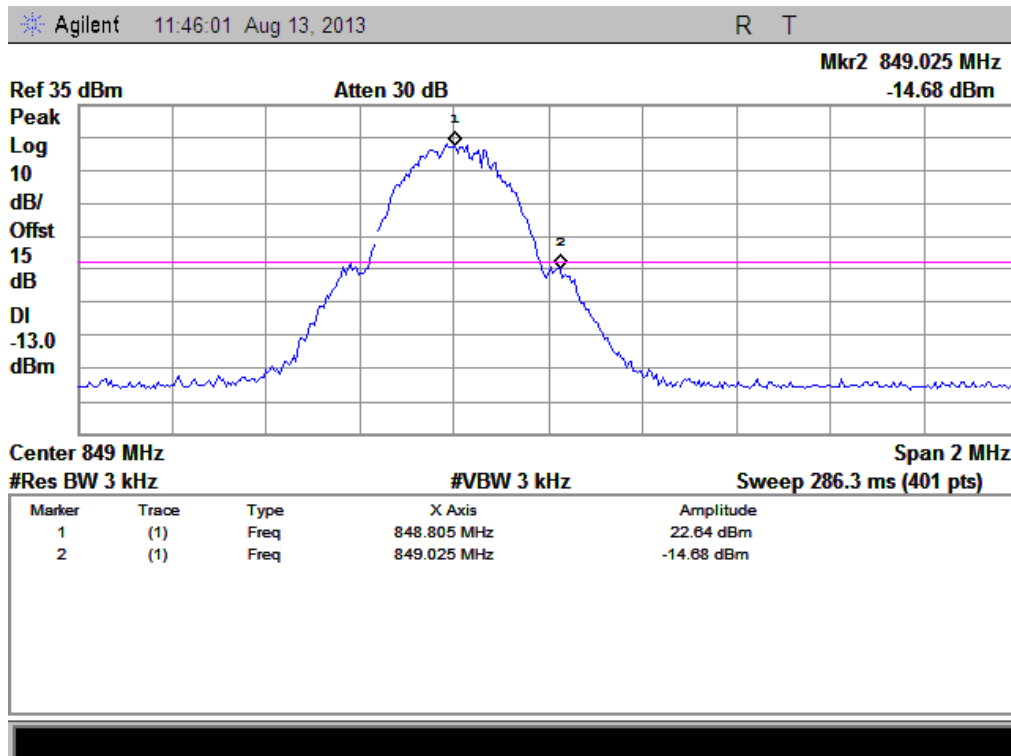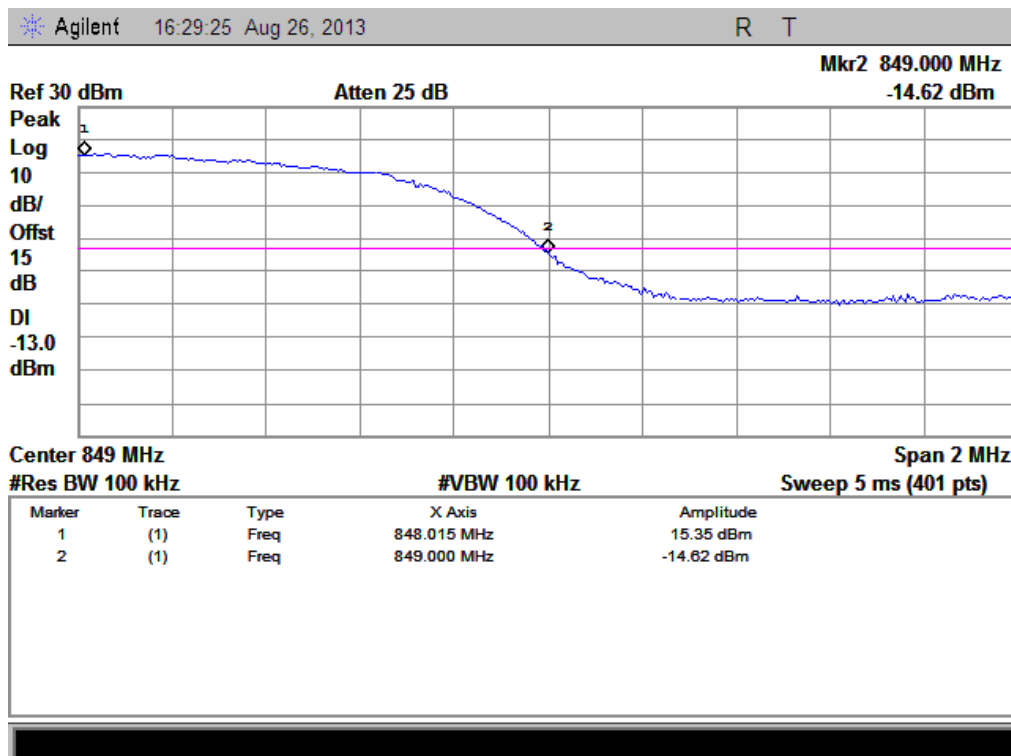

(Plot B: GSM 850 Channel = 251)
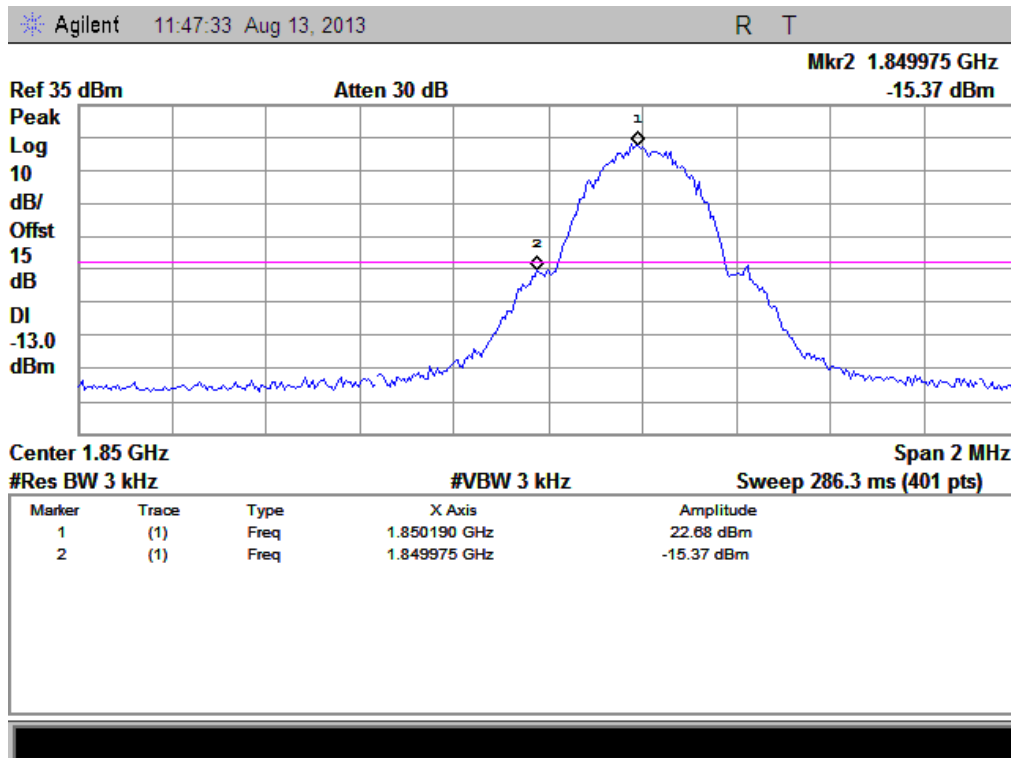
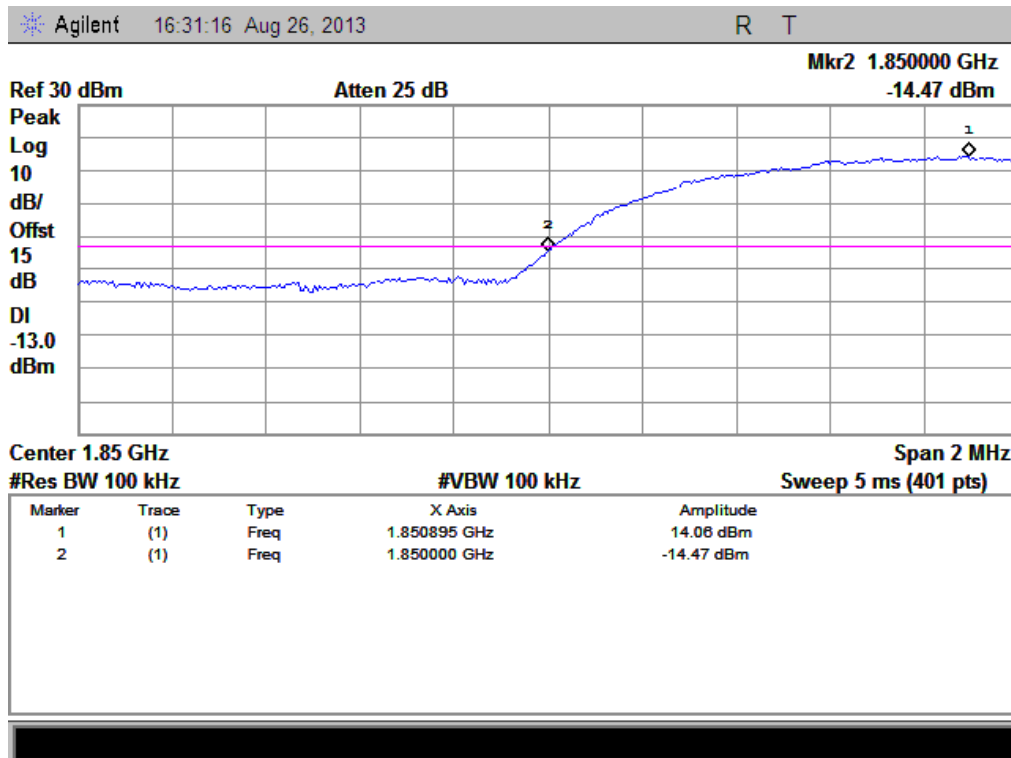(Plot C: GSM 1900 Channel = 512)
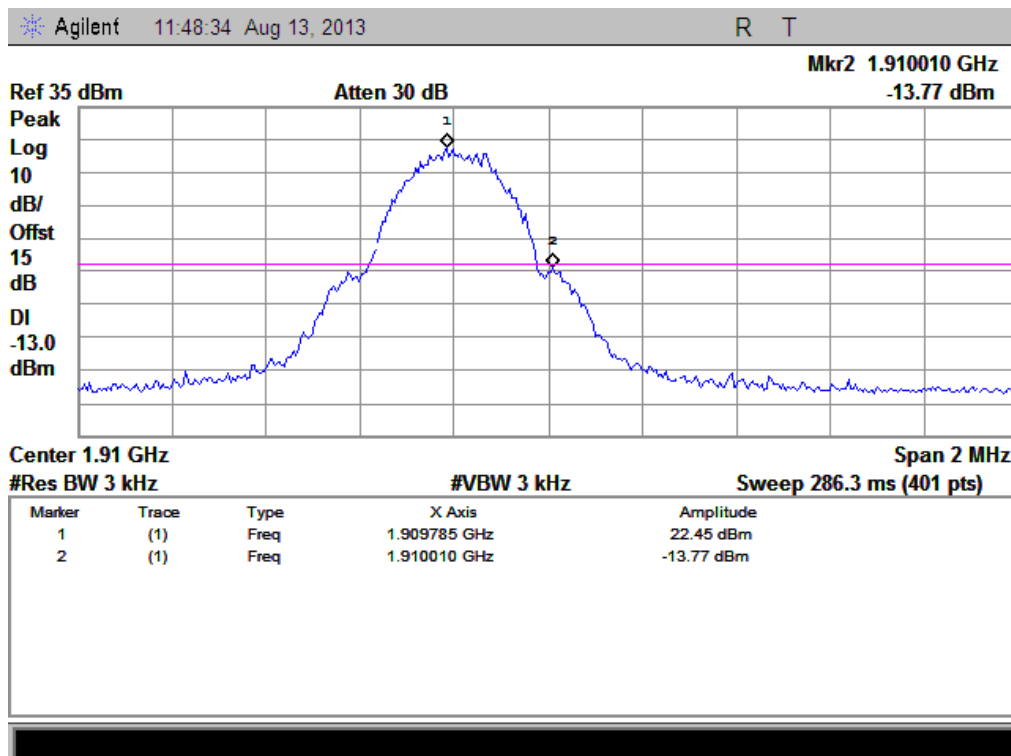
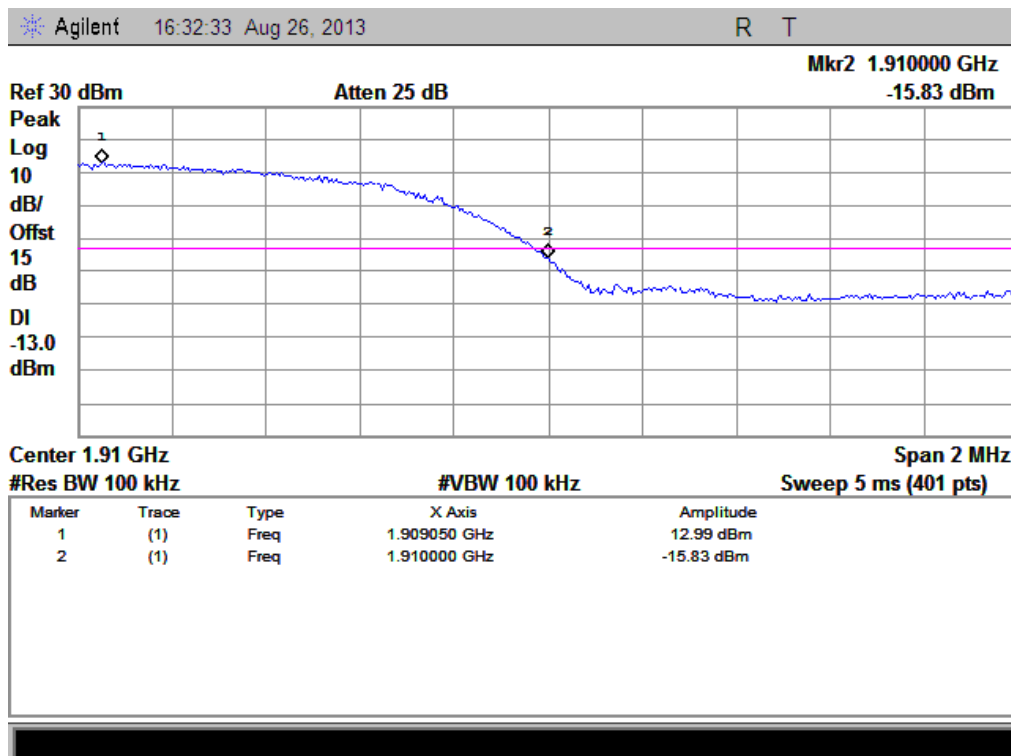(Plot D: GSM 1900 Channel = 810)
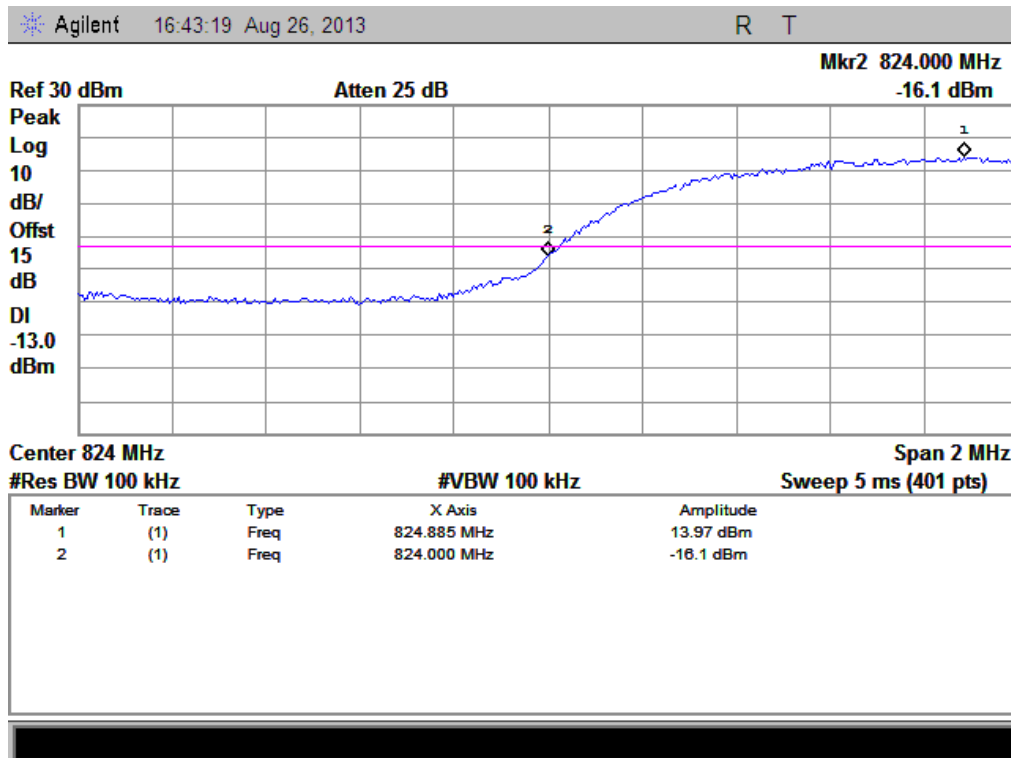
(Plot E: WCDMA 850 Channel = 4132)

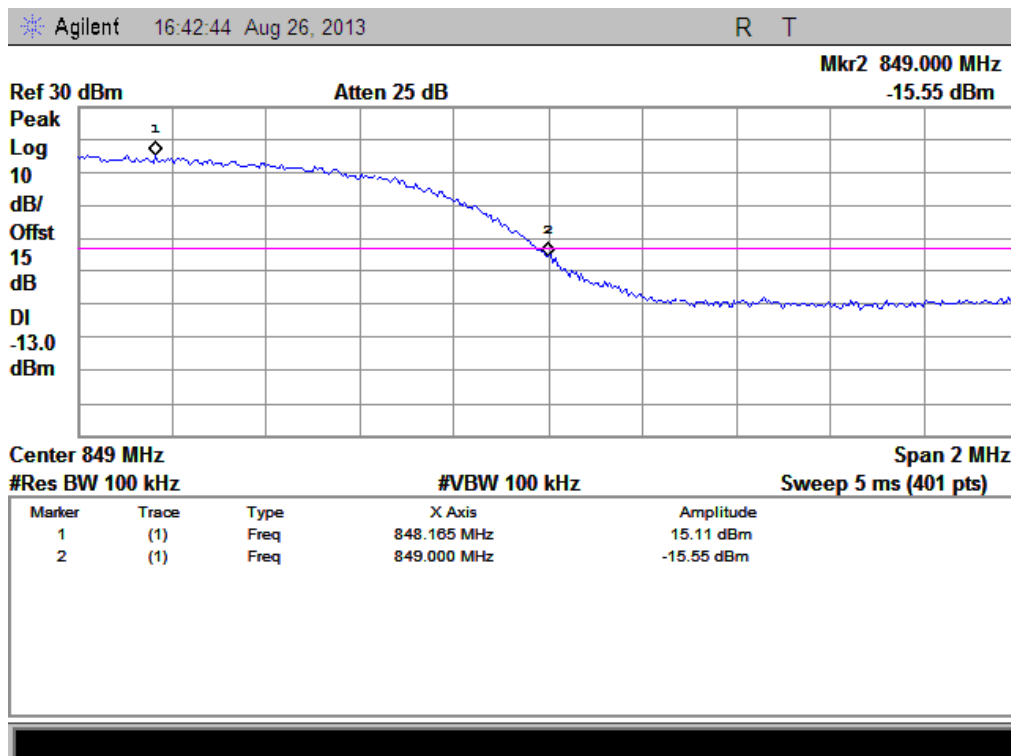(Plot F: WCDMA 850 Channel = 4233)

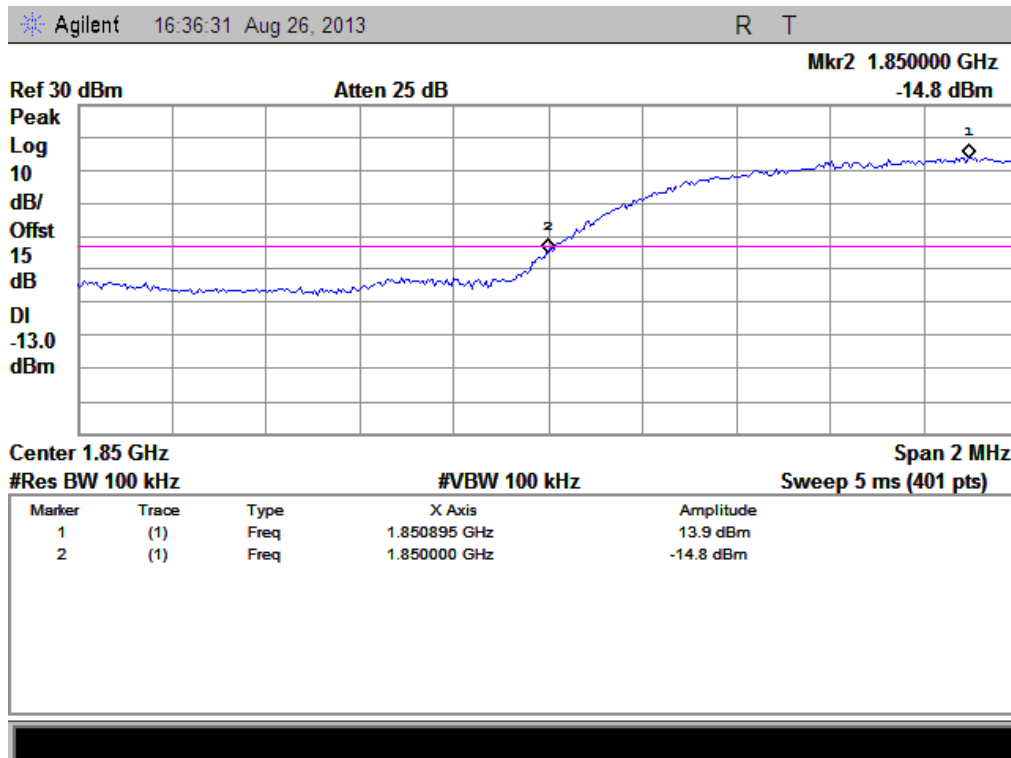(Plot G: WCDMA 1900 Channel = 9262)

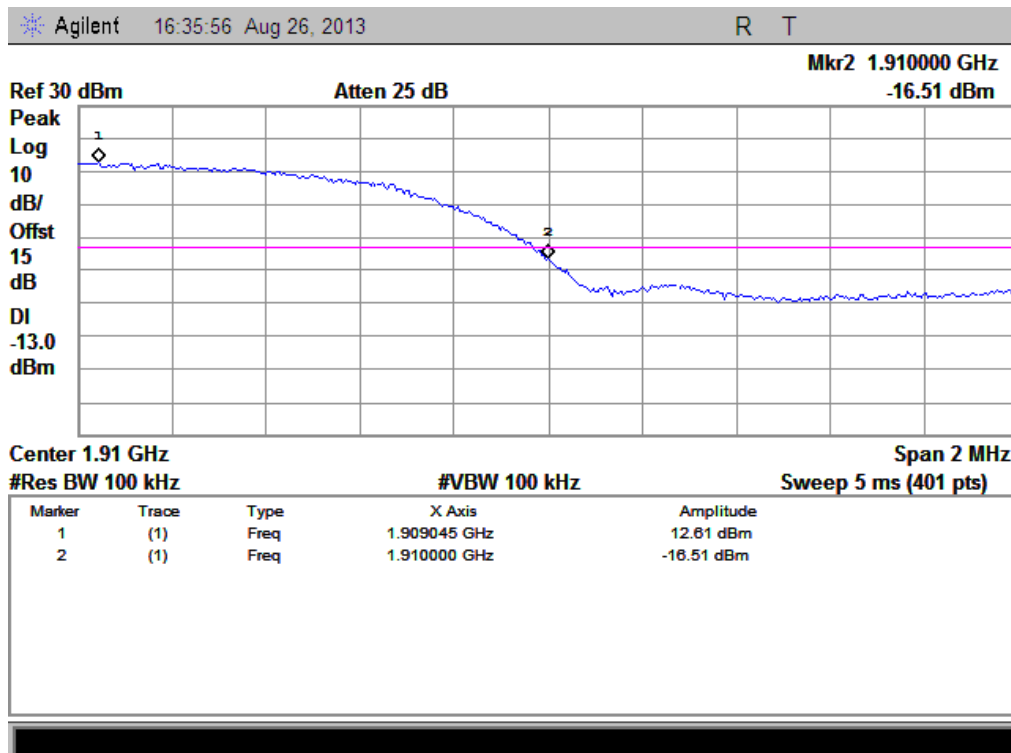(Plot H: WCDMA 1900 Channel = 9538)

(Plot I: HSDPA 850 Channel = 4132)

(Plot J: HSDPA850 Channel = 4233)

(Plot K: HSDPA 1900 Channel = 9262)

(Plot L: HSDPA 1900 Channel = 9538)

2.7 Transmitter Radiated Power (EIRP/ERP)

2.7.1 Requirement

According to FCC section 22.913, 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.

2.7.2 Test Description

1. Test Setup:
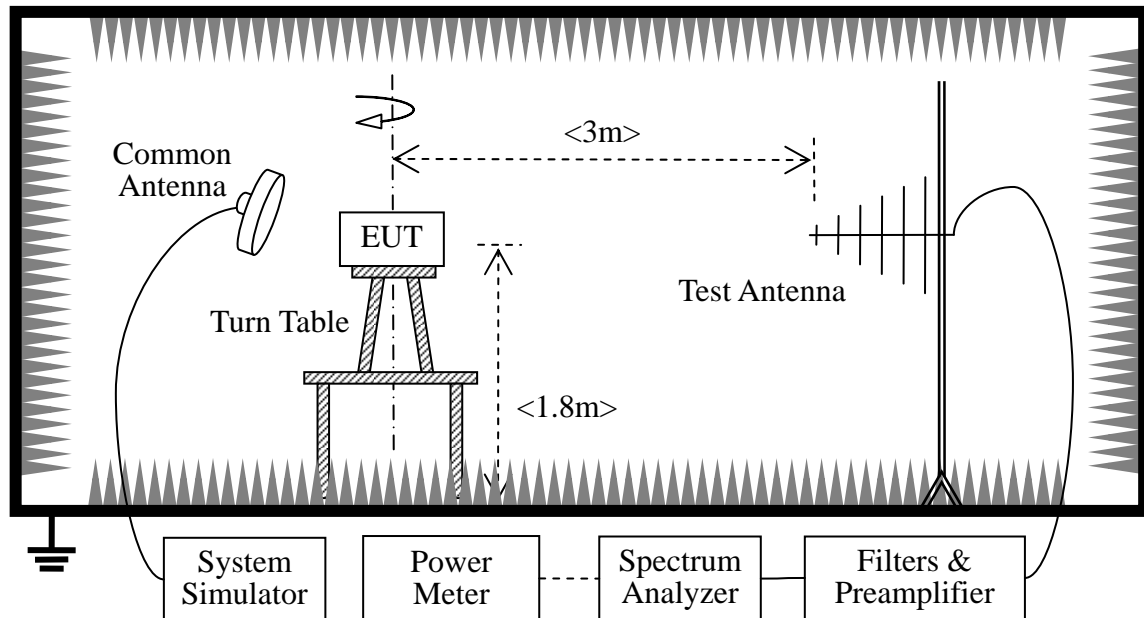
The EUT, which is powered by the Battery charged with the AC Adapter, is located in a 3m Full-Anechoic Chamber; the cable loss, air loss and so on of the site as factors are pre-calibrated using the "Substitution" method, and calculated to correct the reading.

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.

- GSM Maximum RF output power: GSM 850 34.28dBm, GSM 1900 31.22dBm.WCDMA 850 24.98 dBm, WCDMA 1900 23.96 dBm Please refer to section 2.1.3 of this report.

- Step size (dB): 3dB

- Minimum RF power: GSM 850 3.1dBm, GSM 1900 0.3dBm, WCDMA 850 0.39dBm, WCDMA 1900 0.5dBm.

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	2013.05	2014.05
Spectrum Analyzer	Agilent	E7405A	US44210471	2013.05	2014.05
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2013.05	2014.05
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2013.05	2014.05
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2013.05	2014.05
Substitution Antenna	Schwarzbeck	BBHA 9120C	9120C-384	2013.05	2014.05
Pre-AMPs	lucix	S10M100L3802	S020180L3203	2013.05	2014.05
Notch Filter	COM-MW	ZBSF-C836.5-25-X	NA	2013.05	2014.05
Notch Filter	COM-MW	ZBSF-C1747.5-75-X2	NA	2013.05	2014.05
Notch Filter	COM-MW	ZBSF-C1880-60-X2	NA	2013.05	2014.05

2.7.3   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. GSM Model Test Verdict:

Band	Channel	Frequency (MHz)	PCL	Measured ERP			Limit		Verdict
				dBm	W	Refer to Plot	dBm	W	
GSM 850MHz	128	824.20	5	32.85	1.928	Plot A	38.5	7	PASS
	190	836.60	5	32.08	1.614				PASS
	251	848.80	5	31.49	1.409				PASS
GPRS 850MHz	128	824.20	5	32.88	1.941	Plot B Note 1	38.5	7	PASS
	190	836.60	5	32.04	1.600				PASS
	251	848.80	5	31.47	1.403				PASS

| Band	Channel	Frequency (MHz)	PCL	Measured EIRP			Limit		Verdict
				dBm	W	Refer to Plot	dBm	W	
GSM 1900MHz	512	1850.2	0	28.06	0.640	Plot C	33	2	PASS
	661	1880.0	0	27.50	0.562				PASS
	810	1909.8	0	27.74	0.594				PASS
GPRS 1900MHz	512	1850.2	0	27.81	0.604	Plot D Note 1	33	2	PASS
	661	1880.0	0	27.54	0.568				PASS
	810	1909.8	0	27.58	0.573				PASS
Note 1:		For the GPRS model, all the slots were tested and just the worst data was record in this report.							

2. WCDMA Model Test Verdict:

Band	Channel	Frequency (MHz)	Measured ERP			Limit		Verdict
			dBm	W	Refer to Plot	dBm	W	
WCDMA 850MHz	4132	826.4	28.00	0.631	Plot E	38.5	7	PASS
	4175	835	26.87	0.486				PASS
	4233	846.6	27.26	0.532				PASS
HSDPA 850MHz	4132	826.4	27.90	0.617	Plot F	38.5	7	PASS
	4175	835	26.87	0.486				PASS
	4233	846.6	27.26	0.532				PASS

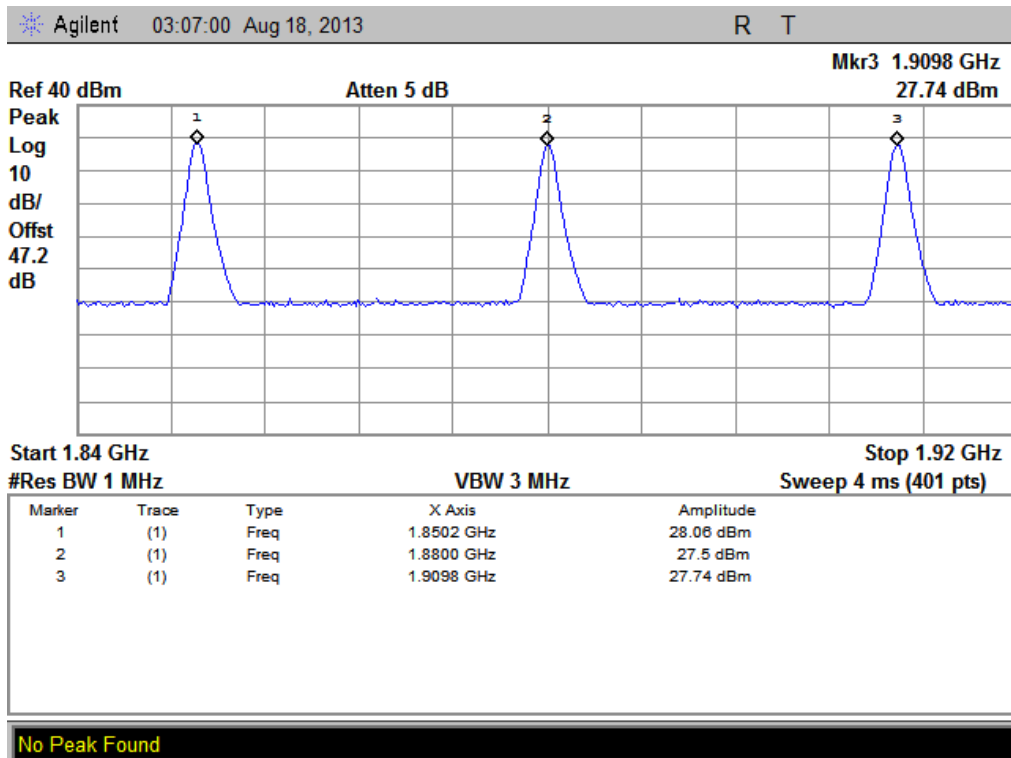| Band	Channel	Frequency (MHz)	Measured EIRP			Limit		Verdict
			DBm	W		dBm	W	
WCDMA 1900MHz	9262	1852.4	22.99	0.199	Plot G	33	2	PASS
	9400	1880	22.26	0.168				PASS
	9538	1907.6	20.86	0.122				PASS
HSDPA 1900MHz	9262	1852.4	23.33	0.215	Plot H	33	2	PASS
	9400	1880	22.15	0.164				PASS
	9538	1907.6	20.76	0.119				PASS

3. Test Plots:
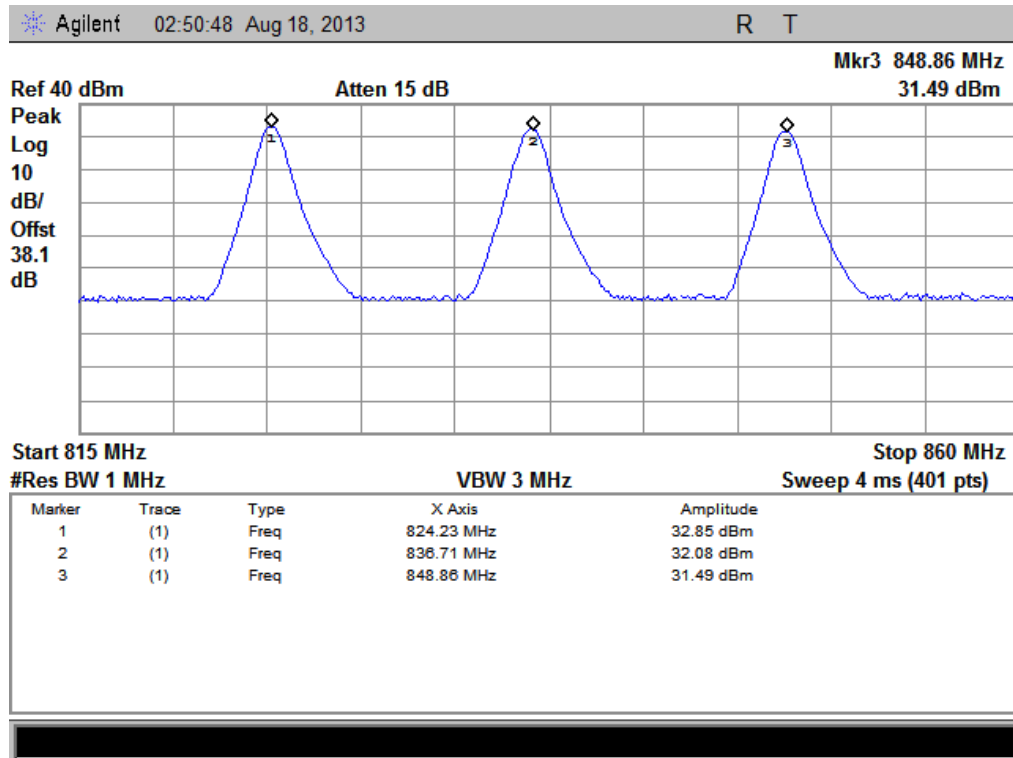
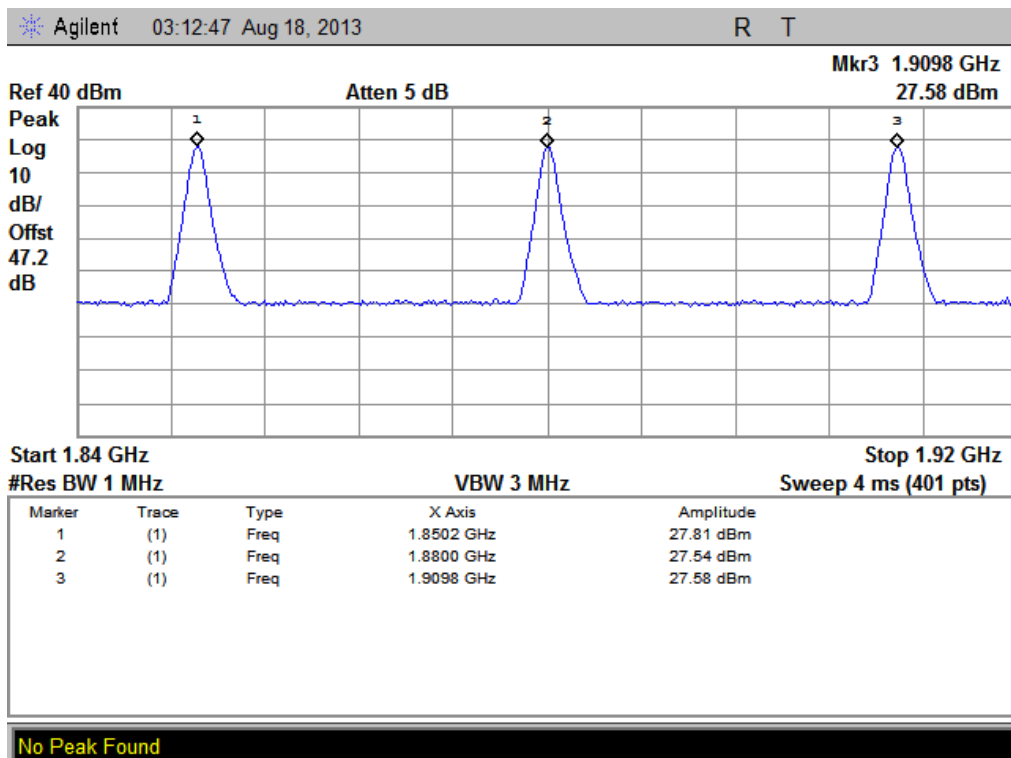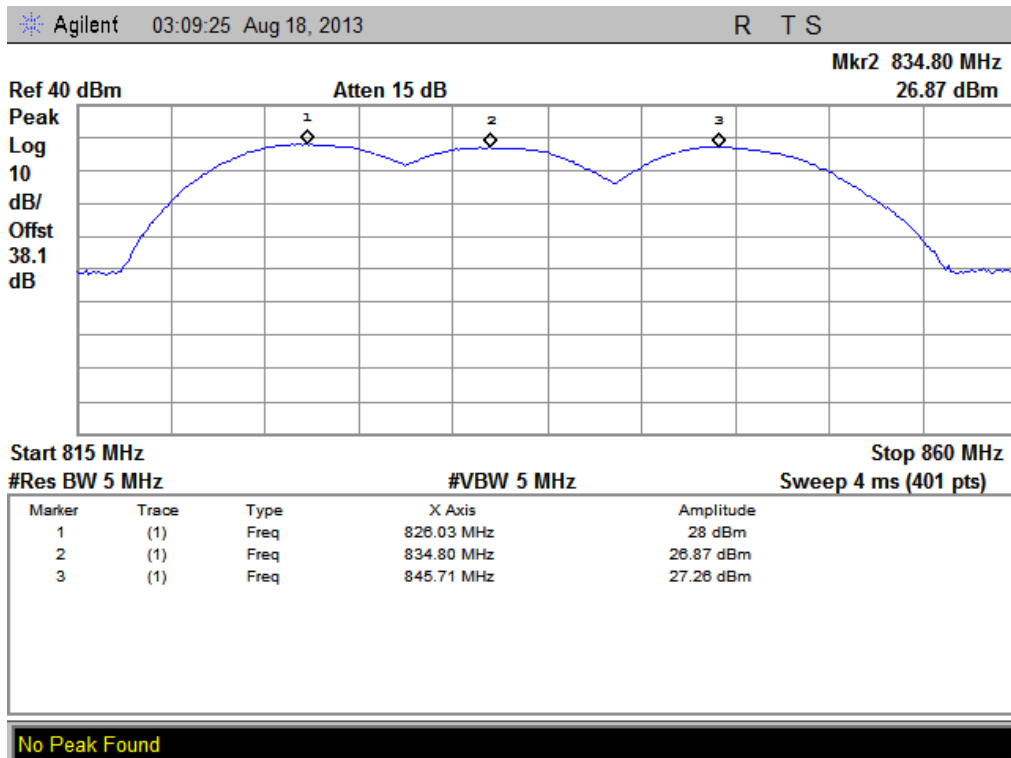(Plot A: GSM 850MHz Channel = 128, 190, 251)
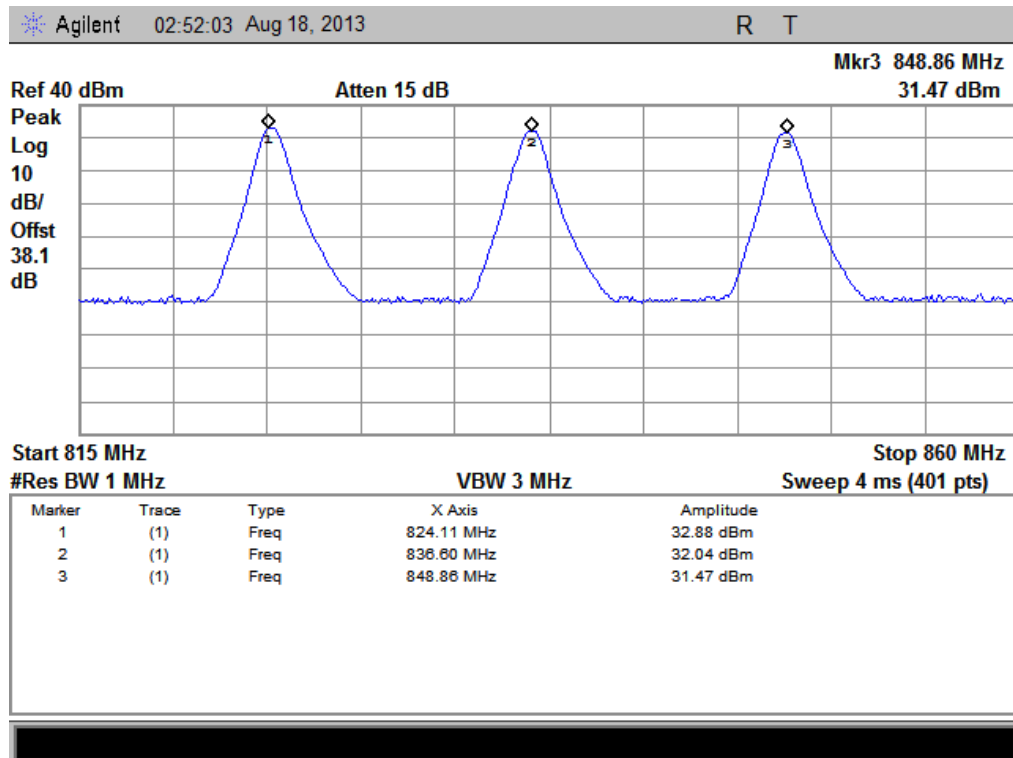
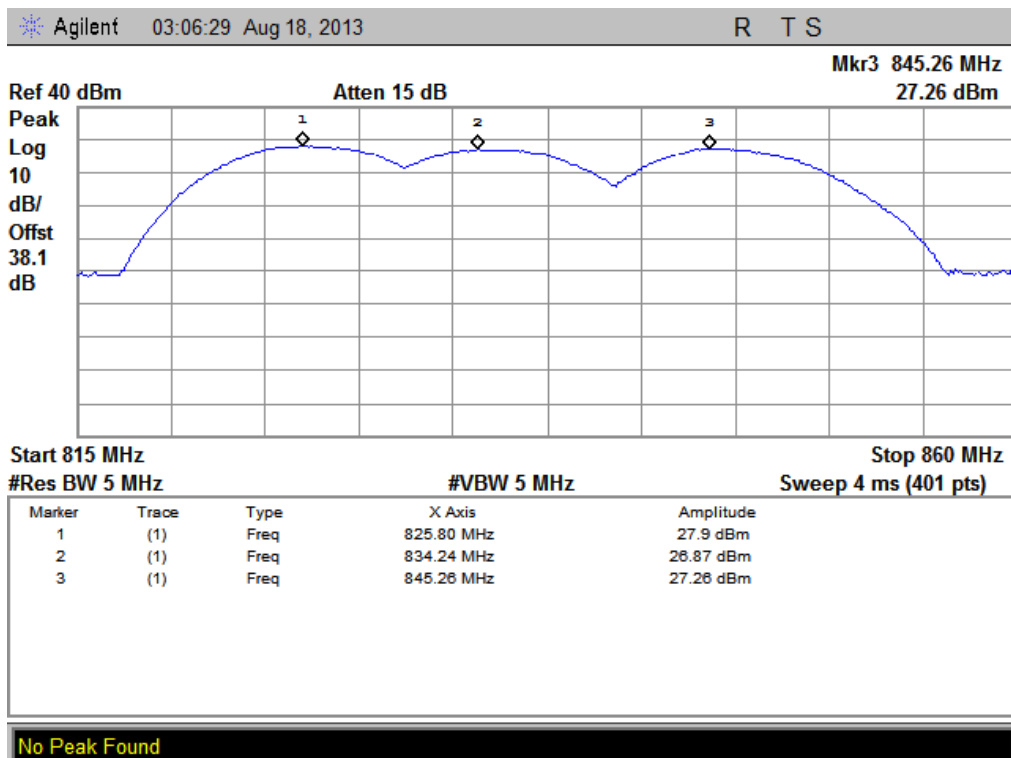(Plot B: GPRS 850MHz Channel = 128, 190, 251)

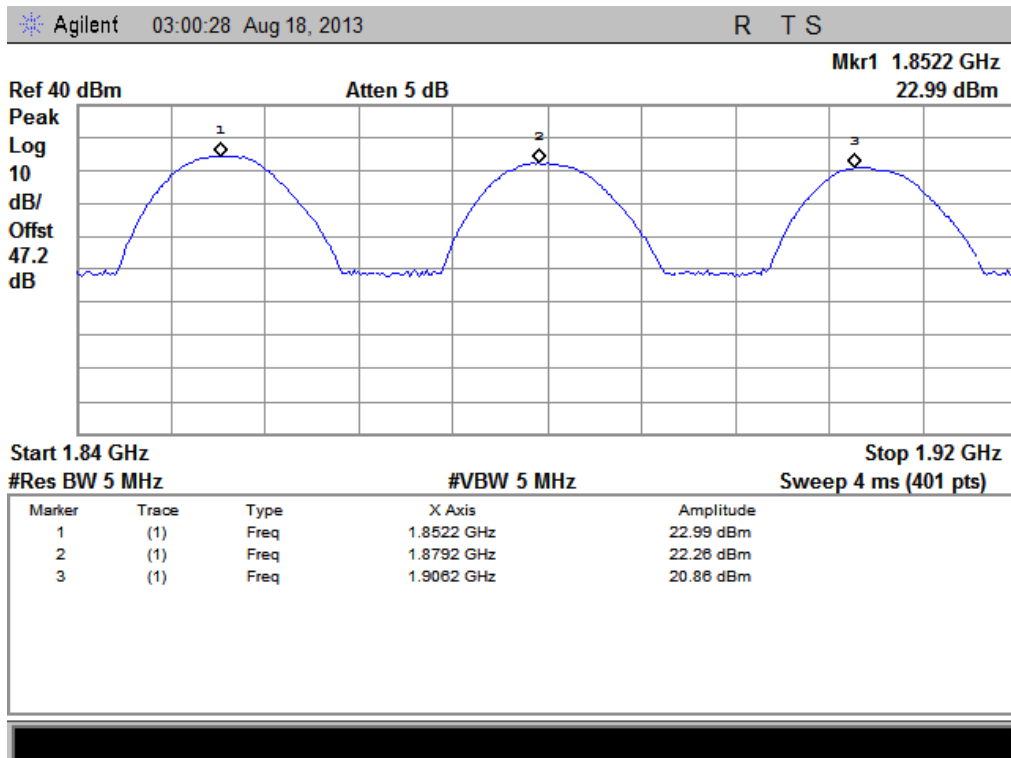(Plot C: GSM 1900MHz Channel = 512, 661, 810)

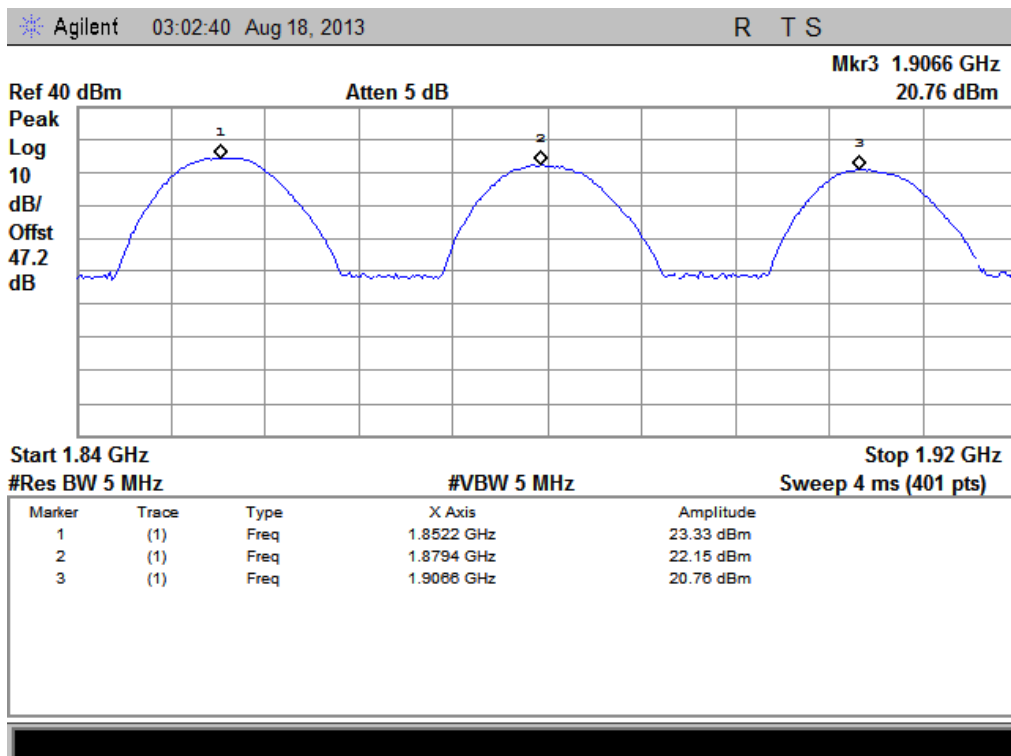(Plot D: GPRS 1900MHz Channel = 512, 661, 810)

(Plot E: WCDMA 850 MHz Channel = 4132, 4175, 4233)

(Plot F: HSDPA 850 MHz Channel = 4132, 4175, 4233)

(Plot G: WCDMA 1900 MHz Channel = 9262, 9400, 9538)

(Plot H: HSDPA1900 MHz Channel = 9262, 9400, 9538)

2.8 Radiated Out of Band Emissions

2.8.1 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.

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

2.8.2 Test Description

See section 2.7.2 of this report.

Equipment List：

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	Agilent	E5515C	GB43130131	2013.05	2014.05
Spectrum Analyzer	Agilent	E7405A	US44210471	2013.05	2014.05
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2013.05	2014.05
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2013.05	2014.05
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2013.05	2014.05
Substitution Antenna	Schwarzbeck	BBHA 9120C	9120C-384	2013.05	2014.05
Pre-AMPs	lucix	S10M100L3802	S020180L3203	2013.05	2014.05
Notch Filter	COM-MW	ZBSF-C836.5-25-X	NA	2013.05	2014.05
Notch Filter	COM-MW	ZBSF-C1747.5-75-X2	NA	2013.05	2014.05
Notch Filter	COM-MW	ZBSF-C1880-60-X2	NA	2013.05	2014.05

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

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			
GSM 850MHz	128	824.2	< -25	< -25	Plot A.1/A.2	-13	PASS
	190	836.6	< -25	< -25	Plot A.3/A.4		PASS
	251	848.8	< -25	< -25	Plot A.5/A.6		PASS
GSM 1900MHz	512	1850.2	< -25	< -25	Plot B.1/B.2	-13	PASS
	661	1880.0	< -25	< -25	Plot B.3/B.4		PASS
	810	1909.8	< -25	< -25	Plot B.5/B.6		PASS
WCDMA 850MHz	4132	826.4	< -25	< -25	Plot C.1/C.2	-13	PASS
	4175	835	< -25	< -25	Plot C.3/C.4		PASS
	4233	846.6	< -25	< -25	Plot C.5/C.6		PASS
WCDMA 1900MHz	9262	1852.4	< -25	< -25	Plot D.1/D.2	-13	PASS
	9400	1880	< -25	< -25	Plot D.3/D.4		PASS
	9538	1907.6	< -25	< -25	Plot D.5/D.6		PASS
HSDPA 850MHz	4132	826.4	< -25	< -25	Plot E.1/E.2	-13	PASS
	4175	835	< -25	< -25	Plot E.3/E.4		PASS
	4233	846.6	< -25	< -25	Plot E.5/E.6		PASS
HSDPA 1900MHz	9262	1852.4	< -25	< -25	Plot F.1/F.2	-13	PASS
	9400	1880	< -25	< -25	Plot F.3/F.4		PASS
	9538	1907.6	< -25	< -25	Plot F.5/F.6		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.
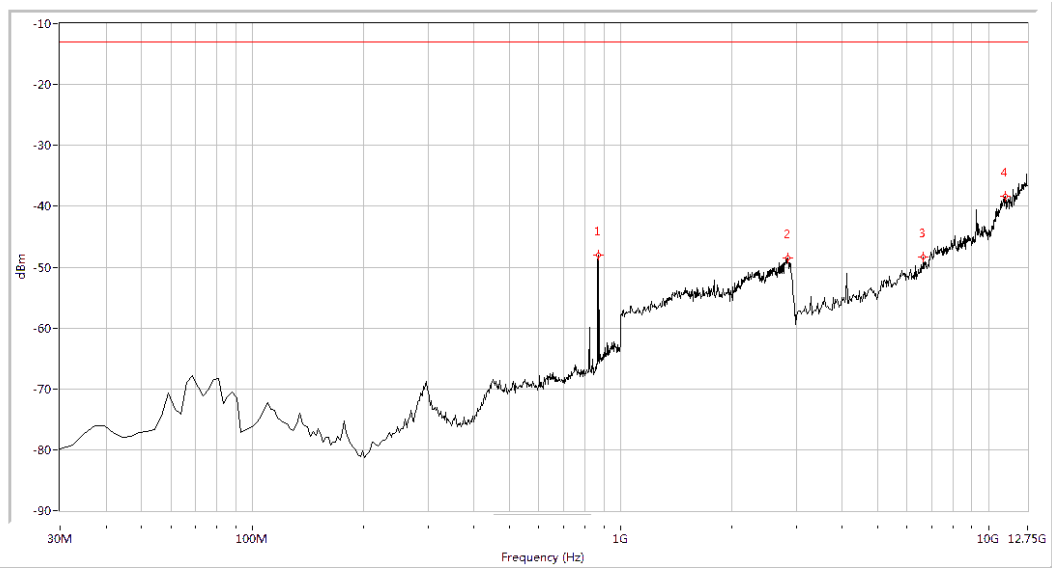
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
871.796	-48.00	-13.0	35.0	126.9	Horizontal	PASS
2850.374	-48.50	-13.0	35.5	306.0	Horizontal	PASS
6647.132	-48.27	-13.0	35.3	145.2	Horizontal	PASS
11096.633	-38.29	-13.0	25.3	260.9	Horizontal	PASS

(Plot A.1:   GSM 850MHz Channel = 128, Test Antenna Horizontal)
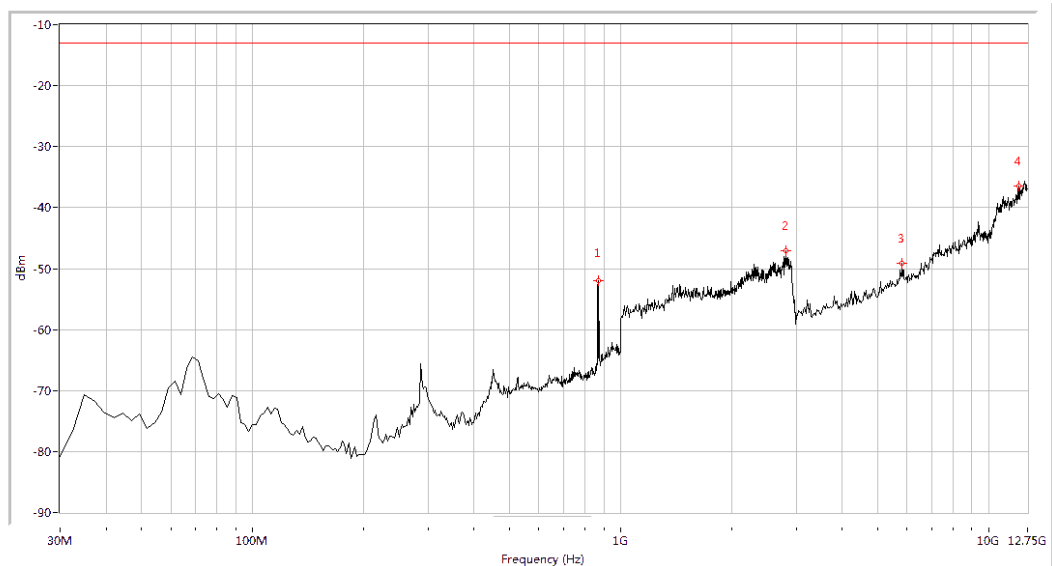
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
871.796	-52.04	-13.0	39.0	49.6	Vertical	PASS
2805.486	-47.04	-13.0	34.0	360.0	Vertical	PASS
5820.449	-49.19	-13.0	36.2	360.0	Vertical	PASS
12044.888	-36.39	-13.0	23.4	357.6	Vertical	PASS

(Plot A.2:   GSM 850MHz Channel = 128, Test Antenna Vertical)
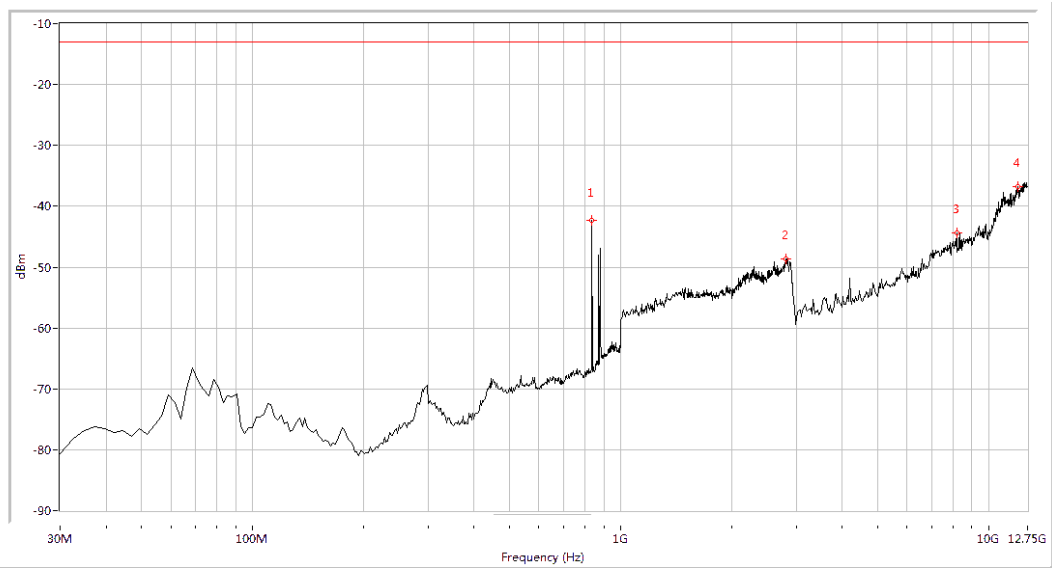
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
835.511	-42.32	-13.0	29.3	204.4	Horizontal	PASS
2810.474	-48.71	-13.0	35.7	39.1	Horizontal	PASS
8178.928	-44.41	-13.0	31.4	220.8	Horizontal	PASS
12020.574	-36.78	-13.0	23.8	109.5	Horizontal	PASS

(Plot A.3:   GSM850MHz Channel = 190, Test Antenna Horizontal)
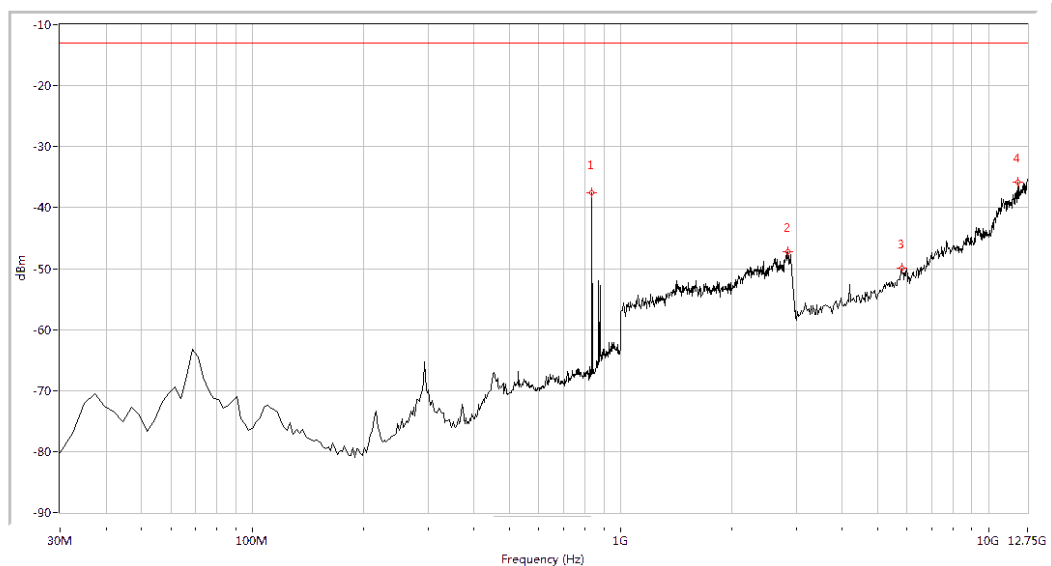
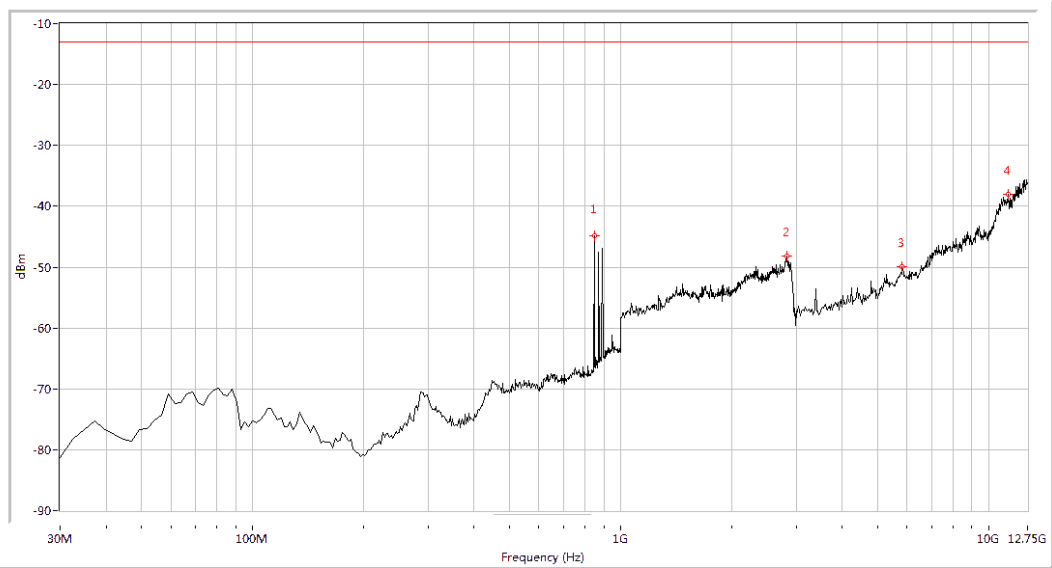| Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
835.511	-37.52	-13.0	24.5	142.6	Vertical	PASS
2850.374	-47.16	-13.0	34.2	274.4	Vertical	PASS
5796.135	-49.97	-13.0	37.0	5.1	Vertical	PASS
12020.574	-35.86	-13.0	22.9	153.1	Vertical	PASS

(Plot A.4:   GSM 850MHz Channel = 190, Test Antenna Vertical)

Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
847.606	-44.90	-13.0	31.9	208.6	Horizontal	PASS
2825.436	-48.25	-13.0	35.2	180.2	Horizontal	PASS
5820.449	-49.94	-13.0	36.9	80.5	Horizontal	PASS
11266.833	-38.00	-13.0	25.0	274.0	Horizontal	PASS

(Plot A.5:   GSM 850MHz Channel = 251, Test Antenna Horizontal)
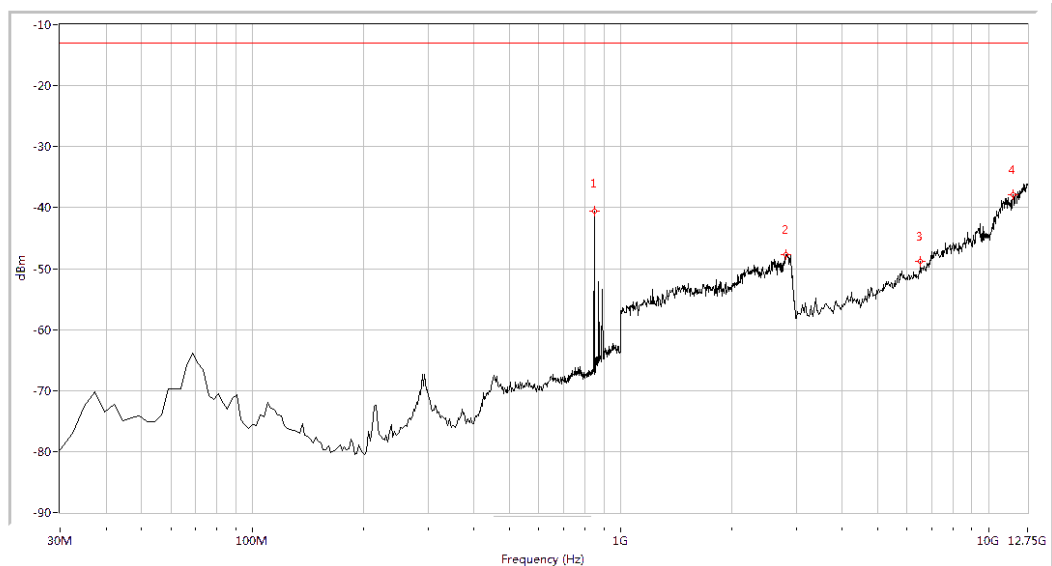
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
847.606	-40.62	-13.0	27.6	153.4	Vertical	PASS
2810.474	-47.75	-13.0	34.8	94.9	Vertical	PASS
6525.561	-48.74	-13.0	35.7	304.1	Vertical	PASS
11631.546	-37.85	-13.0	24.8	33.9	Vertical	PASS

(Plot A.6:   GSM 850MHz Channel = 251, Test Antenna Vertical)
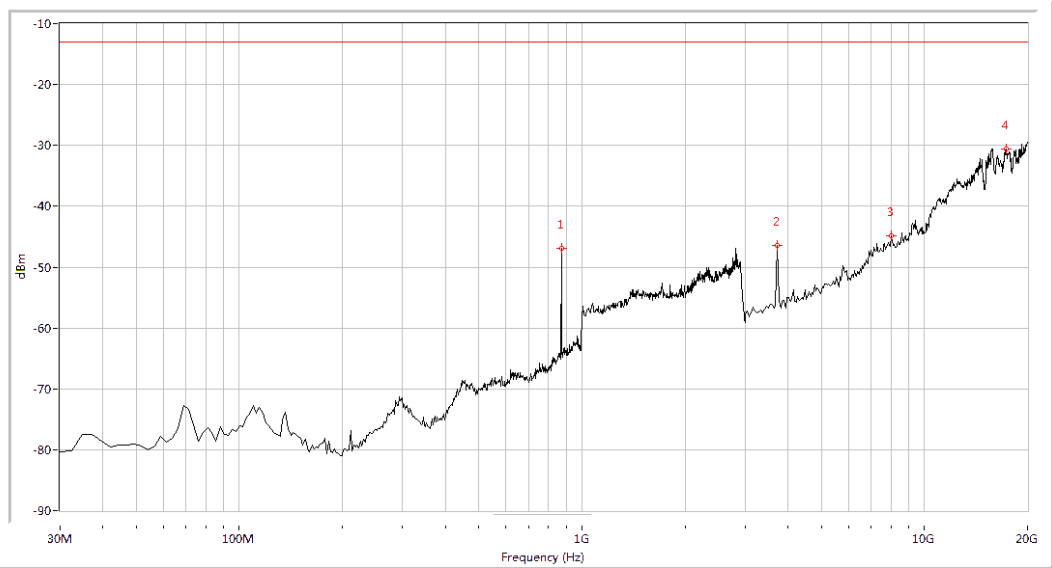
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
871.796	-46.96	-13.0	34.0	101.4	Horizontal	PASS
3720.698	-46.47	-13.0	33.5	-0.0	Horizontal	PASS
8002.494	-44.92	-13.0	31.9	47.8	Horizontal	PASS
17286.783	-30.58	-13.0	17.6	137.8	Horizontal	PASS

(Plot B.1: GSM 1900MHz Channel = 512, Test Antenna Horizontal)
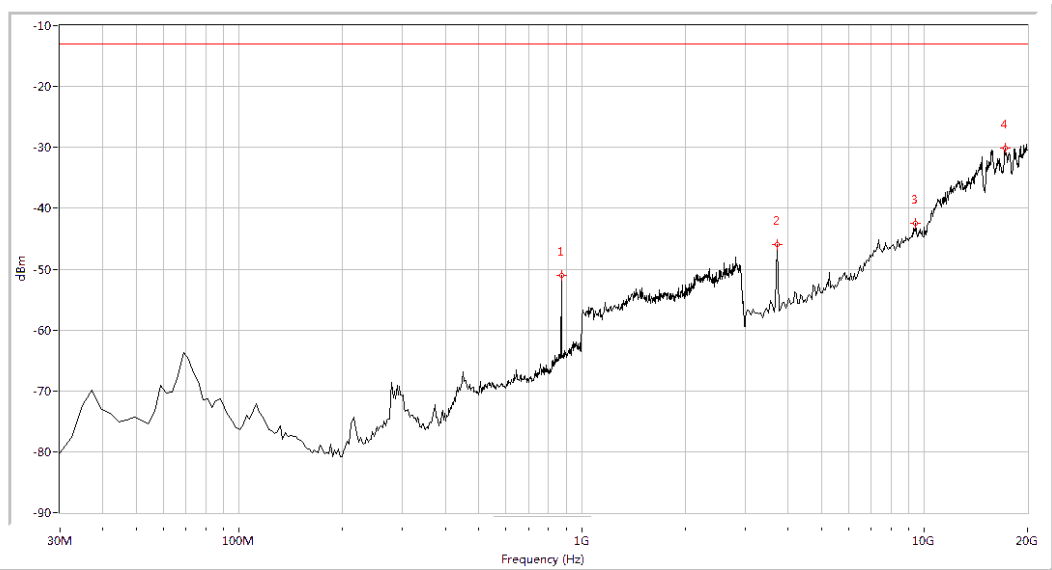
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
871.796	-50.96	-13.0	38.0	51.0	Vertical	PASS
3720.698	-45.95	-13.0	32.9	259.6	Vertical	PASS
9443.890	-42.53	-13.0	29.5	153.7	Vertical	PASS
17201.995	-30.07	-13.0	17.1	360.0	Vertical	PASS

(Plot B.2: GSM 1900MHz Channel = 512, Test Antenna Vertical)
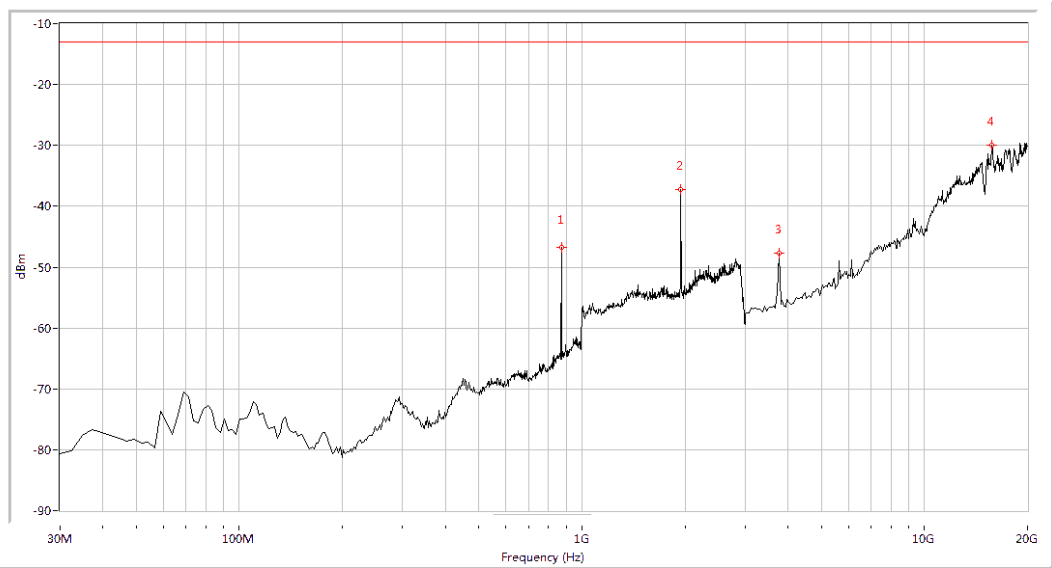
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
871.796	-46.70	-13.0	33.7	136.3	Horizontal	PASS
1947.631	-37.28	-13.0	24.3	223.8	Horizontal	PASS
3763.092	-47.72	-13.0	34.7	72.0	Horizontal	PASS
15760.599	-30.04	-13.0	17.0	320.1	Horizontal	PASS

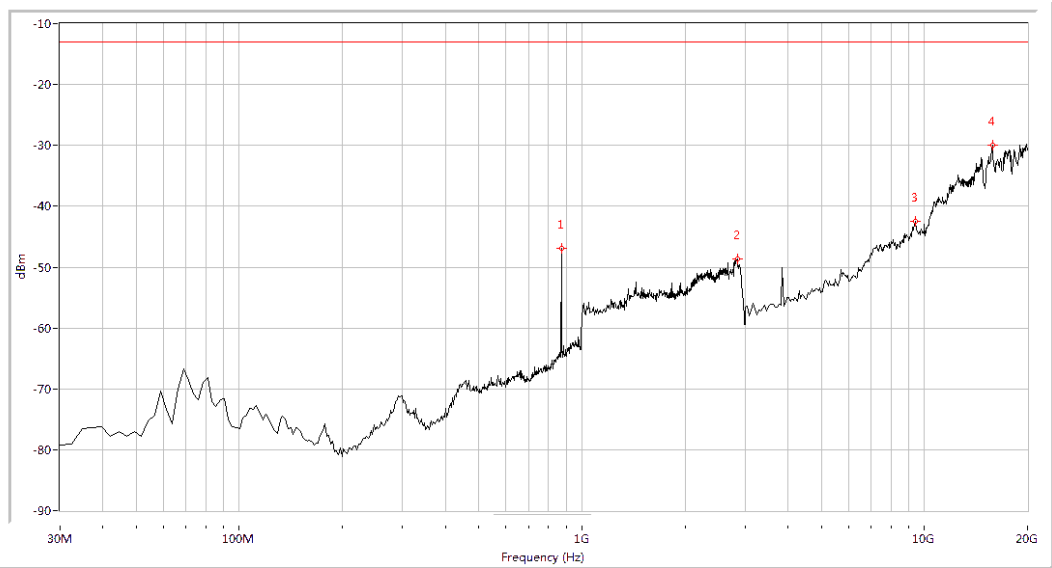(Plot B.3:   GSM 1900MHz Channel = 661, Test Antenna Horizontal)
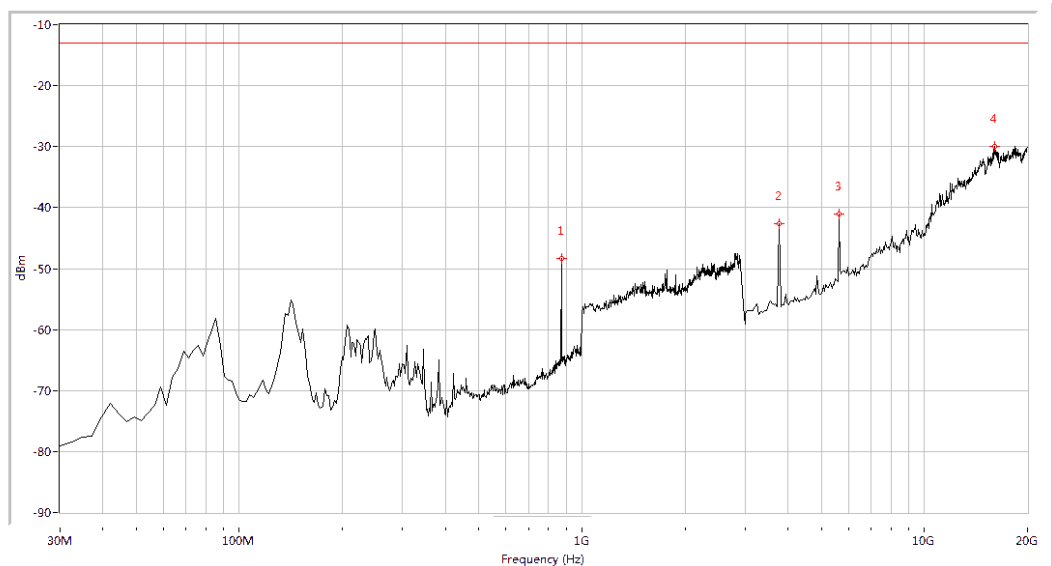
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
871.796	-48.34	-13.0	35.3	138.5	Vertical	PASS
3763.092	-42.68	-13.0	29.7	149.0	Vertical	PASS
5628.429	-41.04	-13.0	28.0	82.1	Vertical	PASS
16014.963	-30.00	-13.0	17.0	203.5	Vertical	PASS

(Plot B.4:   GSM 1900MHz Channel = 661, Test Antenna Vertical)

Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
871.796	-46.83	-13.0	33.8	149.6	Horizontal	PASS
2850.374	-48.60	-13.0	35.6	51.4	Horizontal	PASS
9443.890	-42.45	-13.0	29.4	235.9	Horizontal	PASS
15802.993	-29.96	-13.0	17.0	358.9	Horizontal	PASS

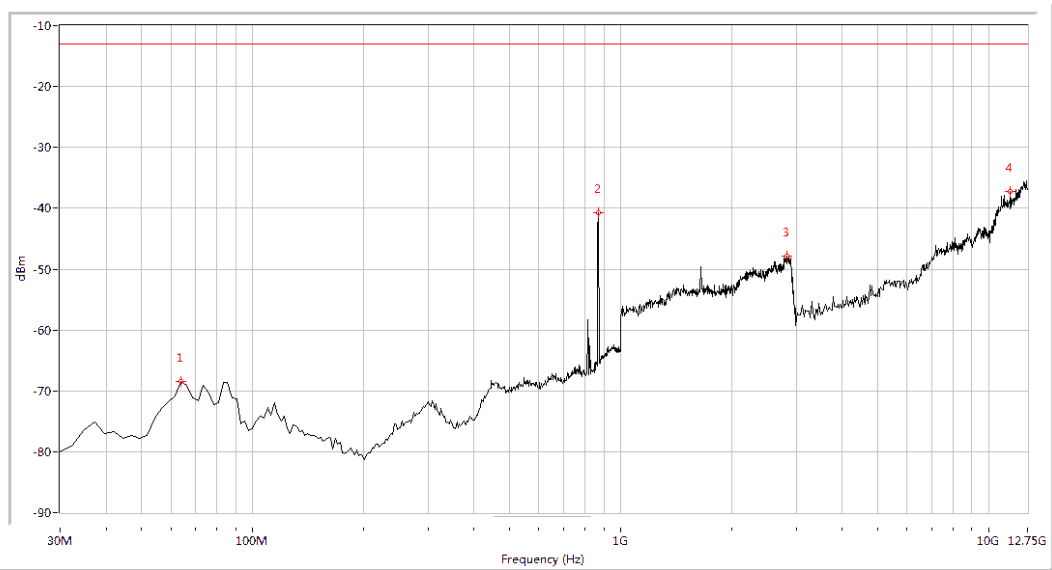(Plot B.5:   GSM 1900MHz Channel = 810, Test Antenna Horizontal)
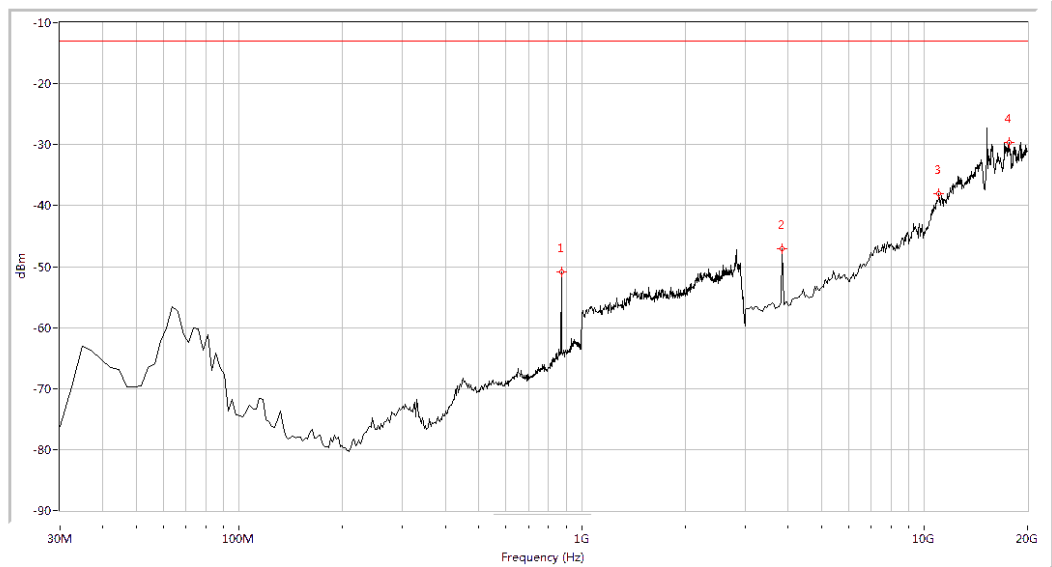
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
871.796	-50.90	-13.0	37.9	122.5	Vertical	PASS
3847.880	-47.02	-13.0	34.0	254.1	Vertical	PASS
11012.469	-38.01	-13.0	25.0	278.2	Vertical	PASS
17625.935	-29.72	-13.0	16.7	336.2	Vertical	PASS

(Plot B.6:   GSM 1900MHz Channel = 810, Test Antenna Vertical)

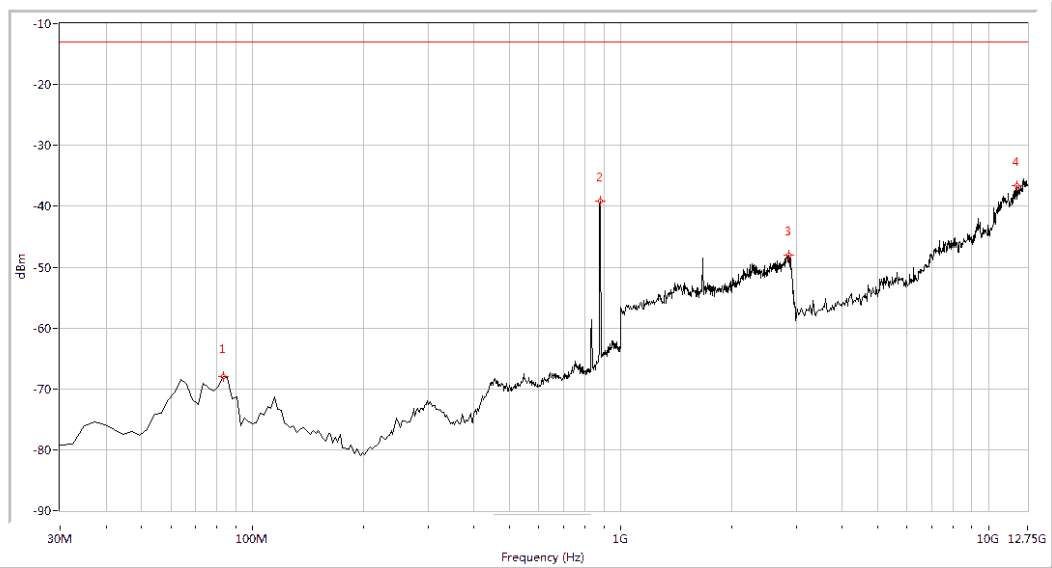| Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
63.865	-68.45	-13.0	55.4	76.7	Horizontal	PASS
869.377	-40.66	-13.0	27.7	154.5	Horizontal	PASS
2835.411	-47.85	-13.0	34.8	355.5	Horizontal	PASS
11461.347	-37.27	-13.0	24.3	360.0	Horizontal	PASS

(Plot C.1:   WCDMA 850MHz Channel = 4132, Test Antenna Horizontal)
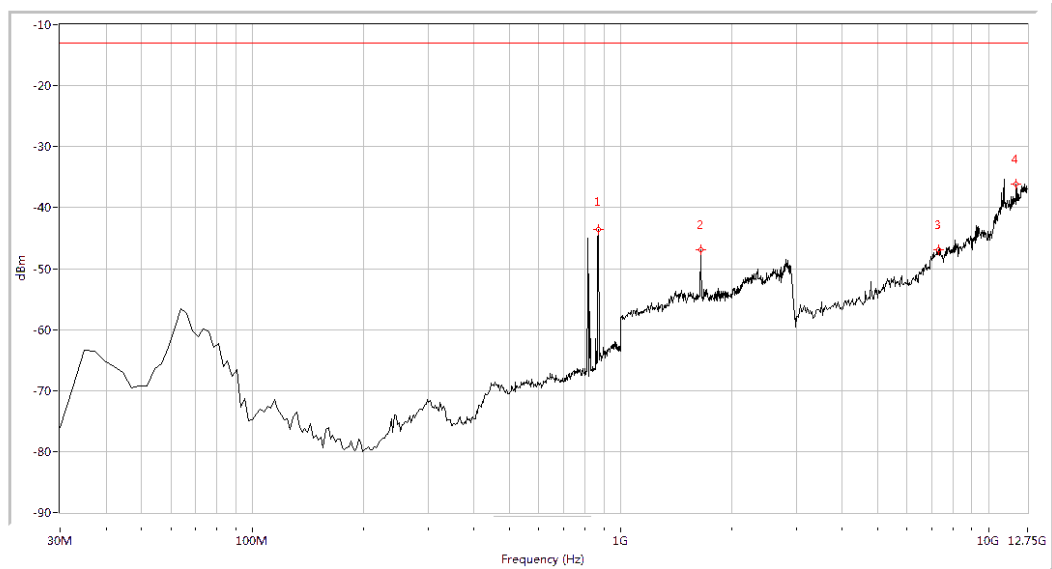
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
871.796	-43.56	-13.0	30.6	298.4	Vertical	PASS
1648.379	-46.95	-13.0	34.0	282.9	Vertical	PASS
7327.930	-46.97	-13.0	34.0	4.7	Vertical	PASS
11874.688	-36.19	-13.0	23.2	81.5	Vertical	PASS

(Plot C.2:   WCDMA 850MHz Channel = 4132, Test Antenna Vertical)

Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
83.217	-68.00	-13.0	55.0	152.0	Horizontal	PASS
879.052	-39.18	-13.0	26.2	103.6	Horizontal	PASS
2870.324	-48.00	-13.0	35.0	276.9	Horizontal	PASS
11899.002	-36.54	-13.0	23.5	55.2	Horizontal	PASS

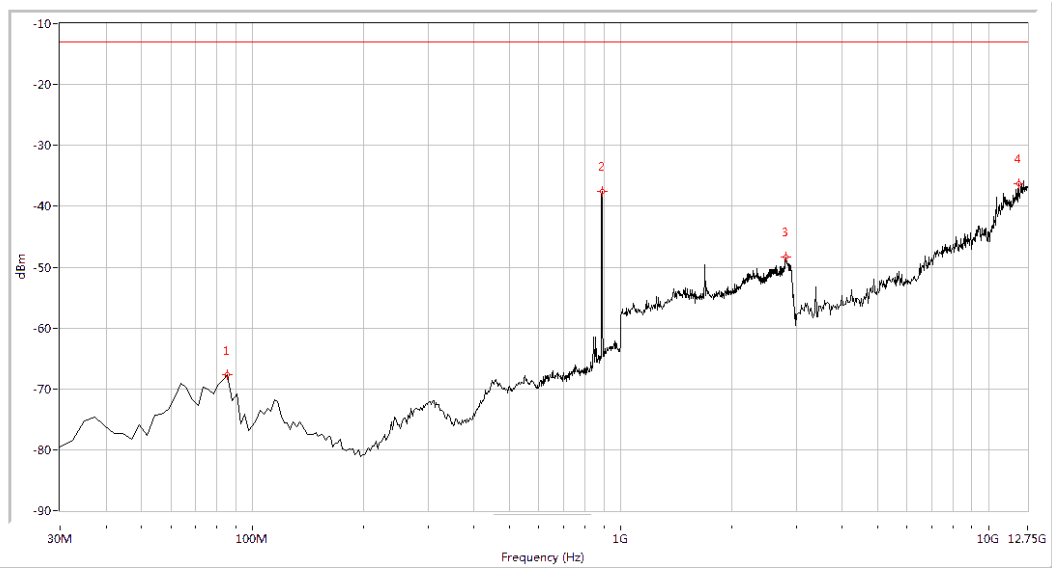(Plot C.3:　WCDMA 850MHz Channel = 4175, Test Antenna Horizontal)
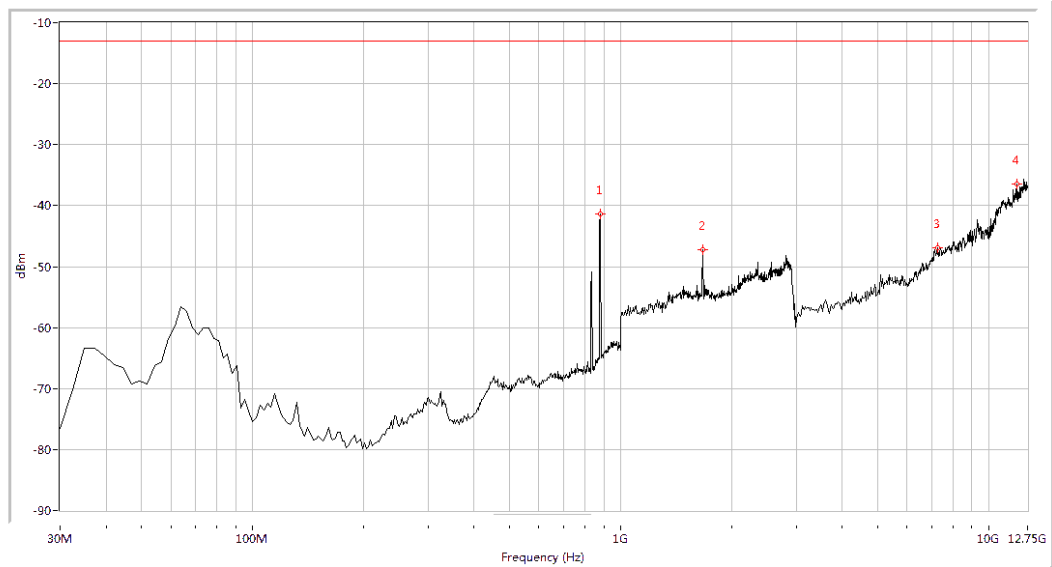
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
879.052	-41.38	-13.0	28.4	268.4	Vertical	PASS
1668.329	-47.29	-13.0	34.3	294.6	Vertical	PASS
7254.988	-46.86	-13.0	33.9	360.0	Vertical	PASS
11899.002	-36.44	-13.0	23.4	56.3	Vertical	PASS

(Plot C.4:　WCDMA 850MHz Channel = 4175, Test Antenna Vertical)

Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
85.636	-67.66	-13.0	54.7	169.5	Horizontal	PASS
891.147	-37.53	-13.0	24.5	309.7	Horizontal	PASS
2810.474	-48.31	-13.0	35.3	242.6	Horizontal	PASS
12044.888	-36.34	-13.0	23.3	138.2	Horizontal	PASS

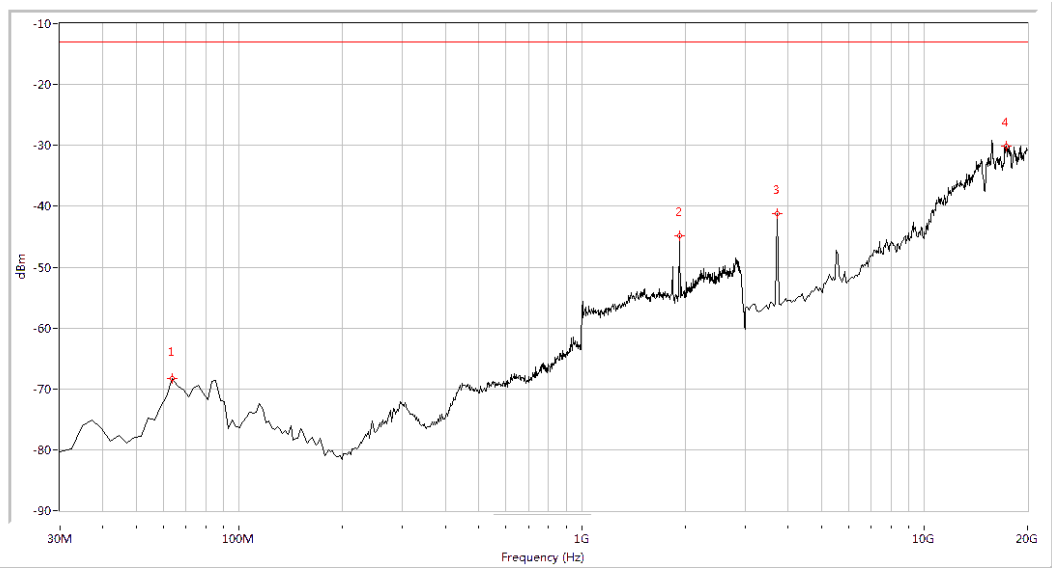(Plot C.5:   WCDMA 850MHz Channel = 4233, Test Antenna Horizontal)
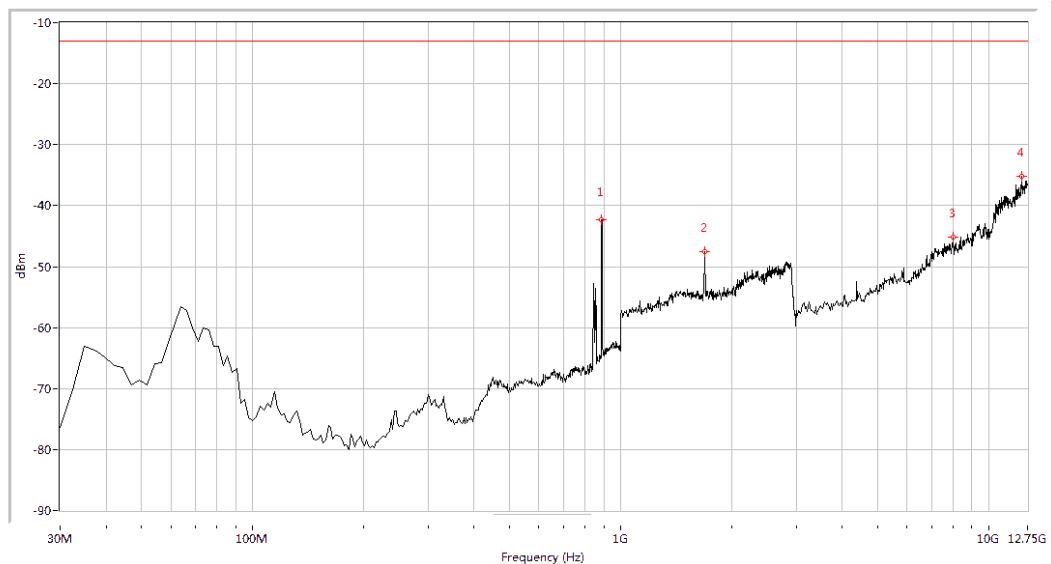
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
888.728	-42.25	-13.0	29.2	26.5	Vertical	PASS
1693.267	-47.54	-13.0	34.5	276.2	Vertical	PASS
7984.414	-45.15	-13.0	32.2	343.0	Vertical	PASS
12263.716	-35.11	-13.0	22.1	293.3	Vertical	PASS

(Plot C.6:   WCDMA 850MHz Channel = 4233, Test Antenna Vertical)

Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
63.865	-68.35	-13.0	55.3	63.0	Horizontal	PASS
1927.681	-44.85	-13.0	31.9	46.6	Horizontal	PASS
3720.698	-41.20	-13.0	28.2	63.3	Horizontal	PASS
17286.783	-30.17	-13.0	17.2	120.7	Horizontal	PASS

(Plot D.1:   WCDMA 1900MHz Channel = 9262, Test Antenna Horizontal)
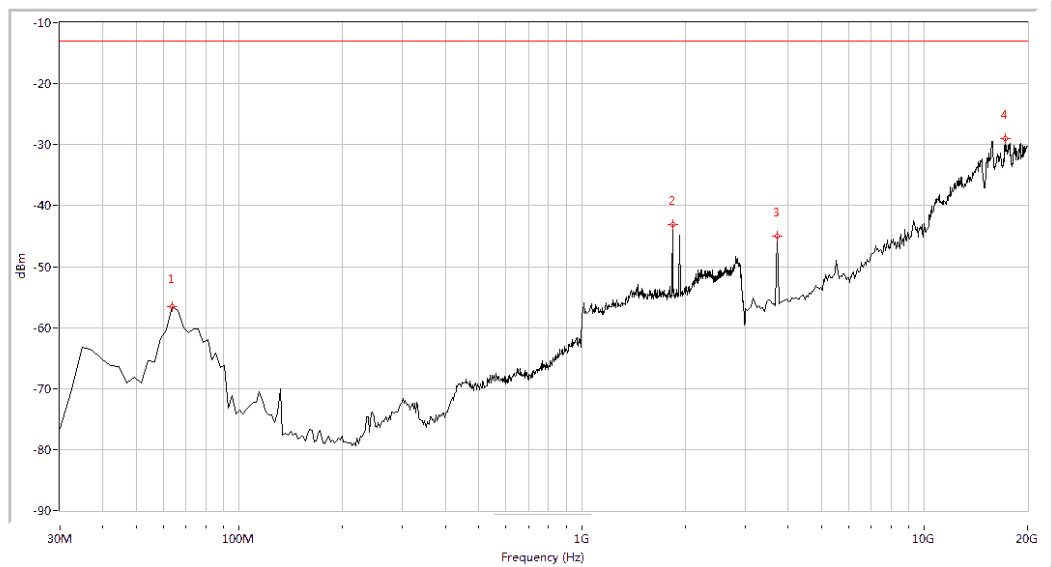
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
63.865	-56.56	-13.0	43.6	354.3	Vertical	PASS
1837.905	-43.09	-13.0	30.1	259.4	Vertical	PASS
3720.698	-45.06	-13.0	32.1	293.3	Vertical	PASS
17201.995	-28.94	-13.0	15.9	-0.0	Vertical	PASS

(Plot D.2:   WCDMA 1900MHz Channel = 9262, Test Antenna Vertical)
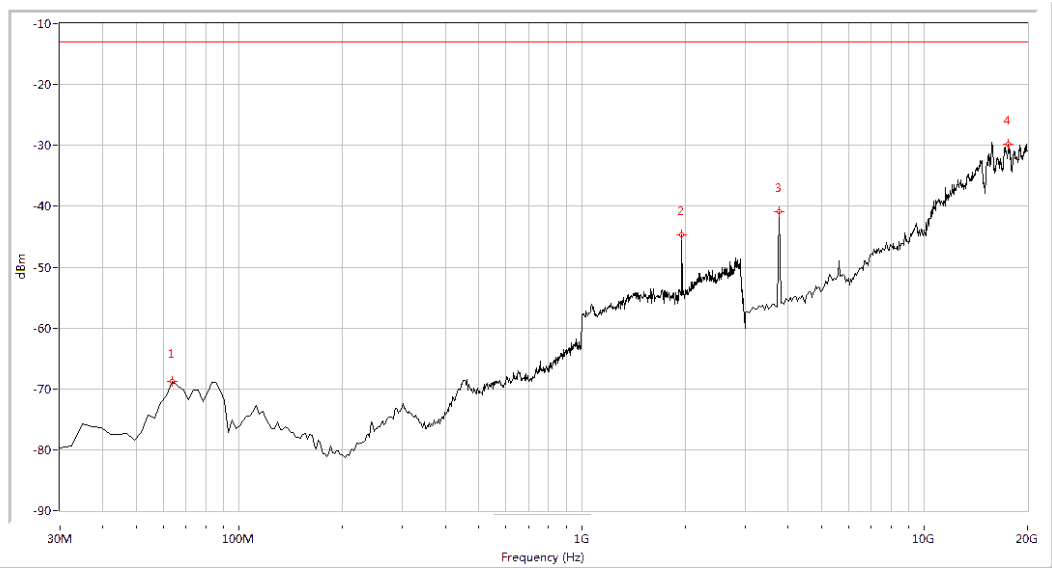
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
63.865	-68.83	-13.0	55.8	77.5	Horizontal	PASS
1957.606	-44.71	-13.0	31.7	52.9	Horizontal	PASS
3763.092	-40.83	-13.0	27.8	51.8	Horizontal	PASS
17583.541	-29.72	-13.0	16.7	360.0	Horizontal	PASS

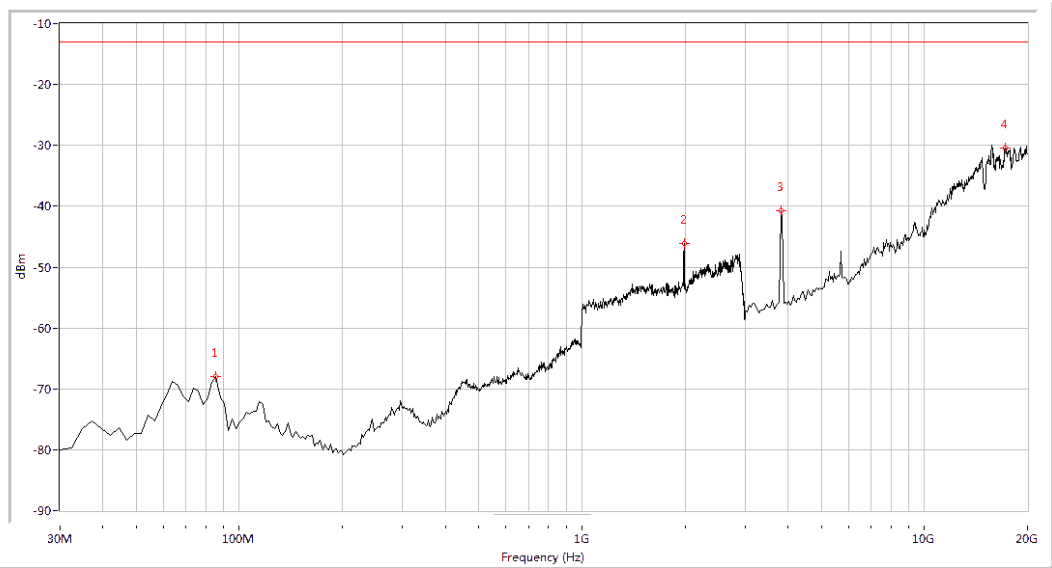(Plot D.3:   WCDMA 1900MHz Channel = 9400, Test Antenna Horizontal)
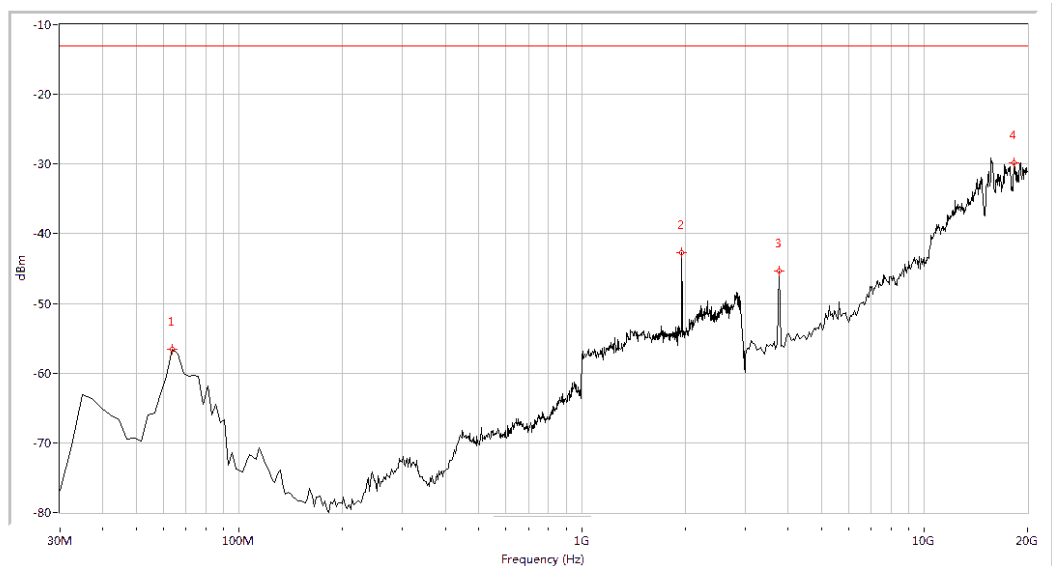
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
63.865	-56.60	-13.0	43.6	336.7	Vertical	PASS
1957.606	-42.66	-13.0	29.7	149.7	Vertical	PASS
3763.092	-45.38	-13.0	32.4	282.1	Vertical	PASS
18304.239	-29.84	-13.0	16.8	138.5	Vertical	PASS

(Plot D.4:   WCDMA 1900MHz Channel = 9400, Test Antenna Vertical)

Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
85.636	-67.93	-13.0	54.9	168.6	Horizontal	PASS
1987.531	-46.12	-13.0	33.1	235.7	Horizontal	PASS
3805.486	-40.68	-13.0	27.7	73.0	Horizontal	PASS
17201.995	-30.38	-13.0	17.4	122.5	Horizontal	PASS

(Plot D.5: WCDMA 1900MHz Channel = 9538, Test Antenna Horizontal)
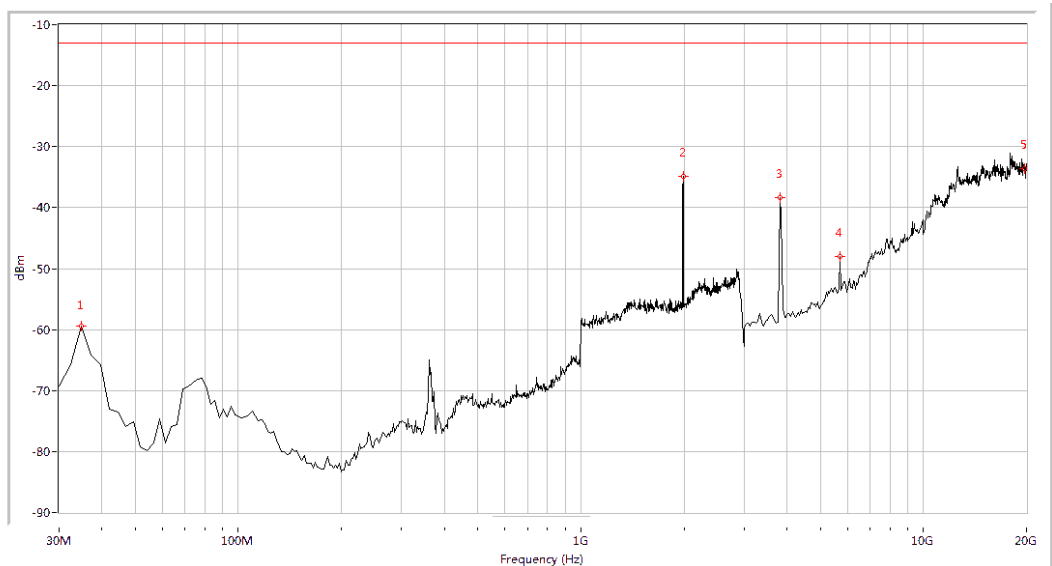
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
34.838	-59.41	-13.0	46.4	334.0	Vertical	PASS
1987.531	-34.85	-13.0	21.9	316.4	Vertical	PASS
3805.486	-38.40	-13.0	25.4	143.6	Vertical	PASS
5713.217	-47.99	-13.0	35.0	168.1	Vertical	PASS
19703.242	-33.61	-13.0	20.6	85.3	Vertical	PASS

(Plot D.6: WCDMA 1900MHz Channel = 9538, Test Antenna Vertical)
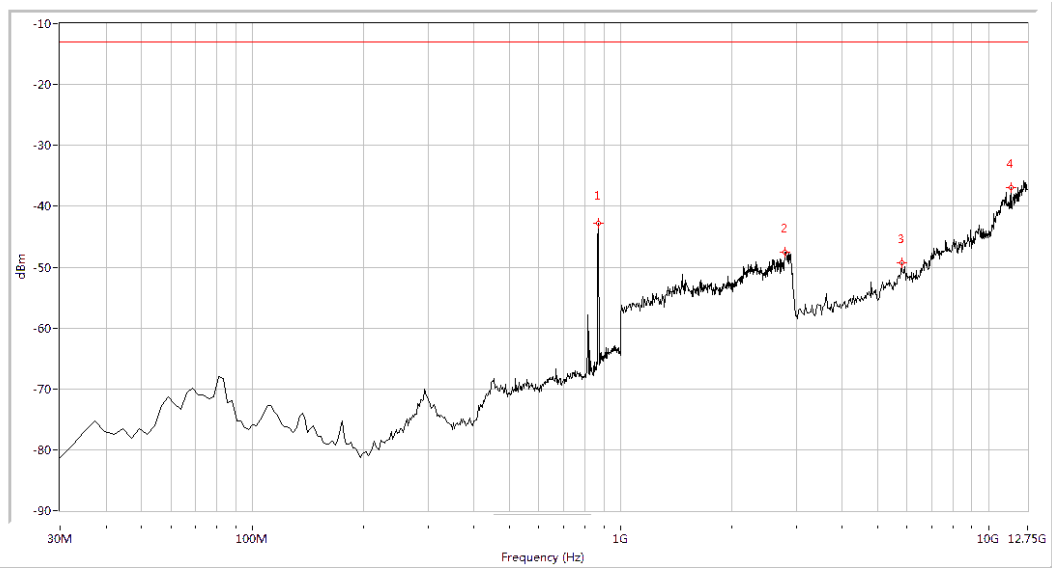
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
869.377	-42.73	-13.0	29.7	147.1	Horizontal	PASS
2795.511	-47.58	-13.0	34.6	228.9	Horizontal	PASS
5796.135	-49.36	-13.0	36.4	258.0	Horizontal	PASS
11485.661	-36.89	-13.0	23.9	331.3	Horizontal	PASS

(Plot E.1:   HSDPA 850MHz Channel = 4132, Test Antenna Horizontal)
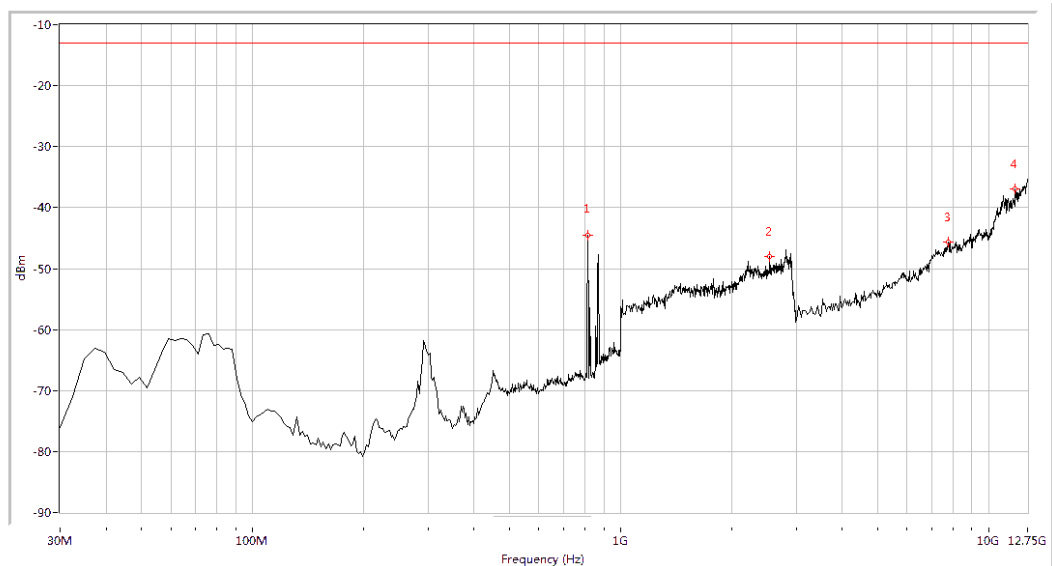
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
813.741	-44.55	-13.0	31.6	147.8	Vertical	PASS
2536.160	-47.95	-13.0	35.0	254.6	Vertical	PASS
7765.586	-45.69	-13.0	32.7	101.2	Vertical	PASS
11801.746	-36.97	-13.0	24.0	193.1	Vertical	PASS

(Plot E.2:   HSDPA 850MHz Channel = 4132, Test Antenna Vertical)
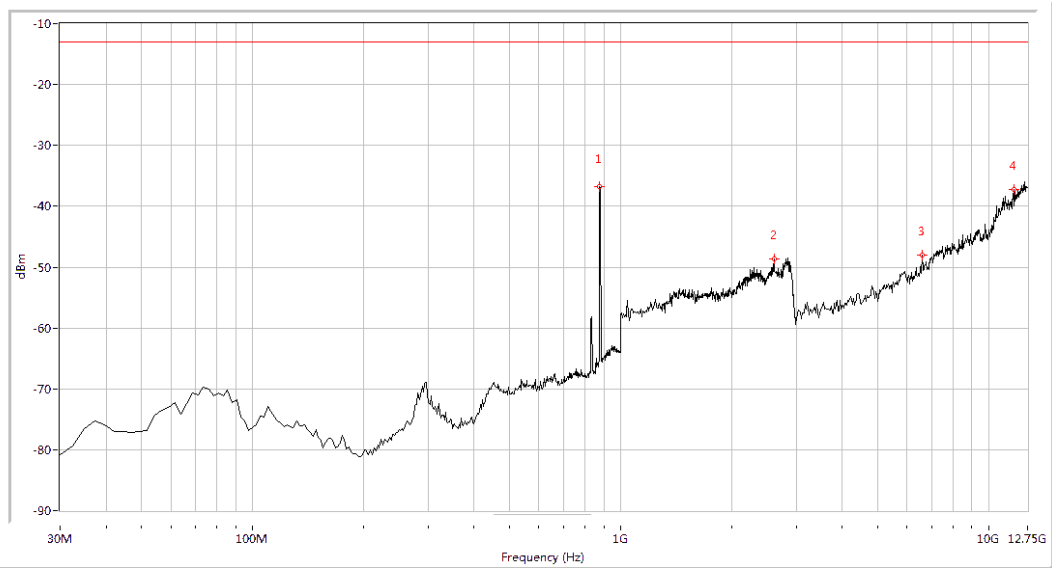
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
876.633	-36.84	-13.0	23.8	299.5	Horizontal	PASS
2610.973	-48.70	-13.0	35.7	132.2	Horizontal	PASS
6598.504	-48.08	-13.0	35.1	360.0	Horizontal	PASS
11680.175	-37.31	-13.0	24.3	172.7	Horizontal	PASS

(Plot E.3:   HSDPA 850MHz Channel = 4175, Test Antenna Horizontal)
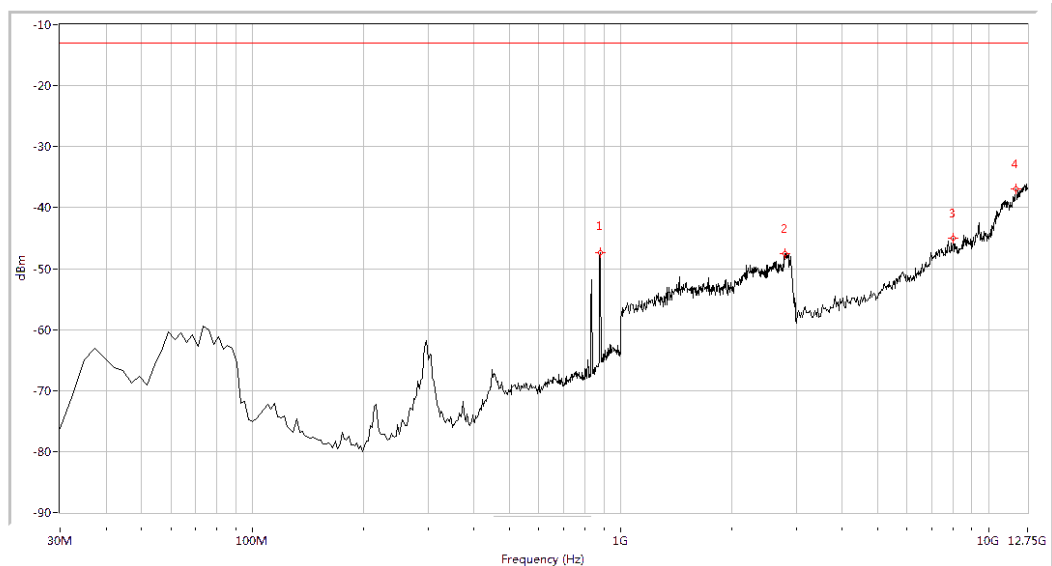
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
879.052	-47.36	-13.0	34.4	292.6	Vertical	PASS
2790.524	-47.52	-13.0	34.5	230.3	Vertical	PASS
8008.728	-44.93	-13.0	31.9	308.6	Vertical	PASS
11850.374	-36.93	-13.0	23.9	359.2	Vertical	PASS

(Plot E.4:   HSDPA 850MHz Channel = 4175, Test Antenna Vertical)
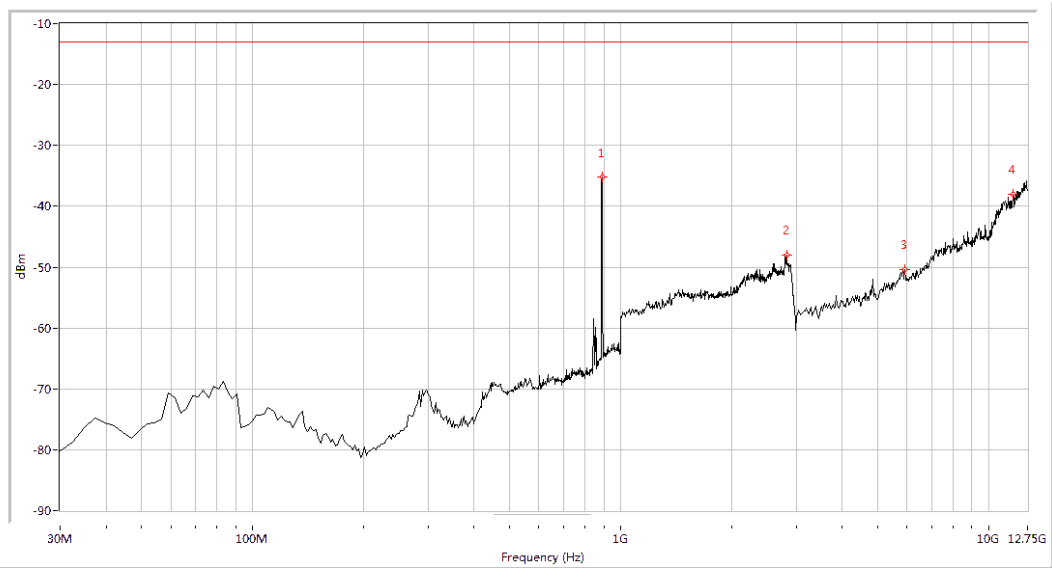
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
891.147	-35.27	-13.0	22.3	89.4	Horizontal	PASS
2825.436	-48.02	-13.0	35.0	3.4	Horizontal	PASS
5917.706	-50.36	-13.0	37.4	194.3	Horizontal	PASS
11655.860	-38.04	-13.0	25.0	104.3	Horizontal	PASS

(Plot E.5:   HSDPA 850MHz Channel = 4233, Test Antenna Horizontal)
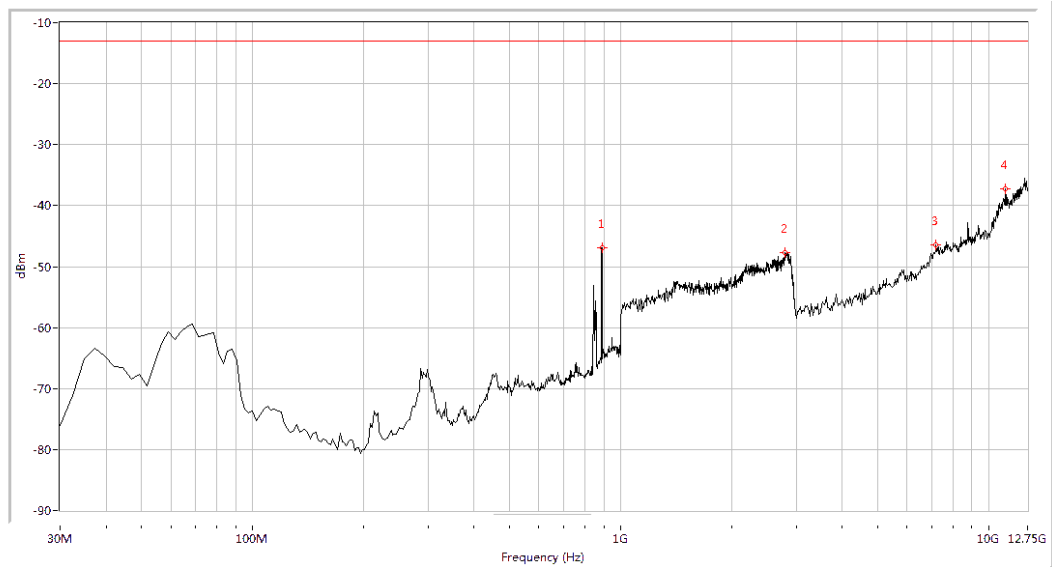
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
891.147	-46.98	-13.0	34.0	62.2	Vertical	PASS
2800.499	-47.68	-13.0	34.7	59.3	Vertical	PASS
7182.045	-46.45	-13.0	33.4	148.9	Vertical	PASS
11120.948	-37.29	-13.0	24.3	331.5	Vertical	PASS

(Plot E.6:   HSDPA 850MHz Channel = 4233, Test Antenna Vertical)
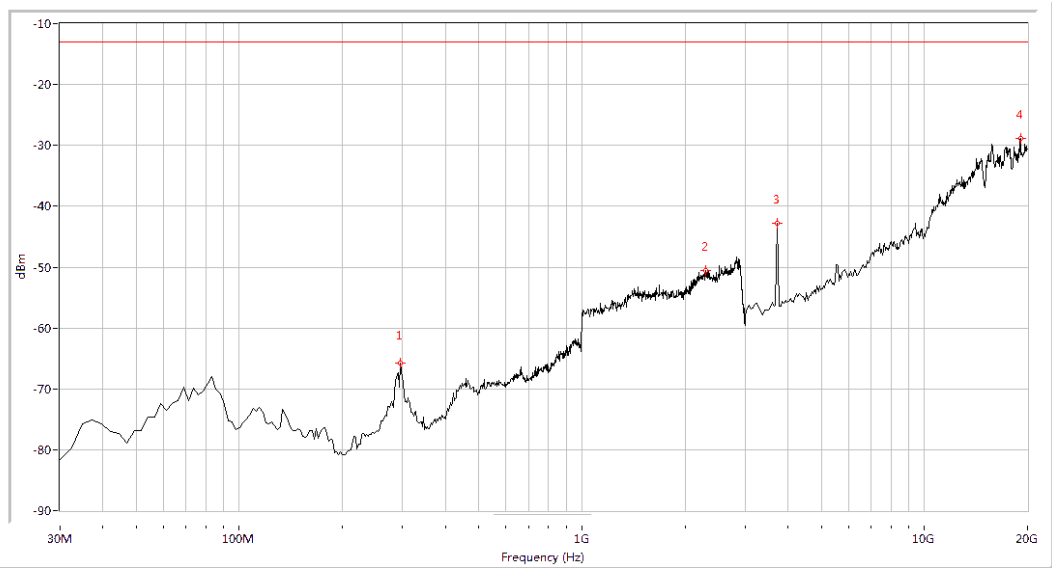
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
296.085	-65.84	-13.0	52.8	247.5	Horizontal	PASS
2301.746	-50.49	-13.0	37.5	18.7	Horizontal	PASS
3720.698	-42.82	-13.0	29.8	60.8	Horizontal	PASS
19067.332	-28.85	-13.0	15.9	194.8	Horizontal	PASS

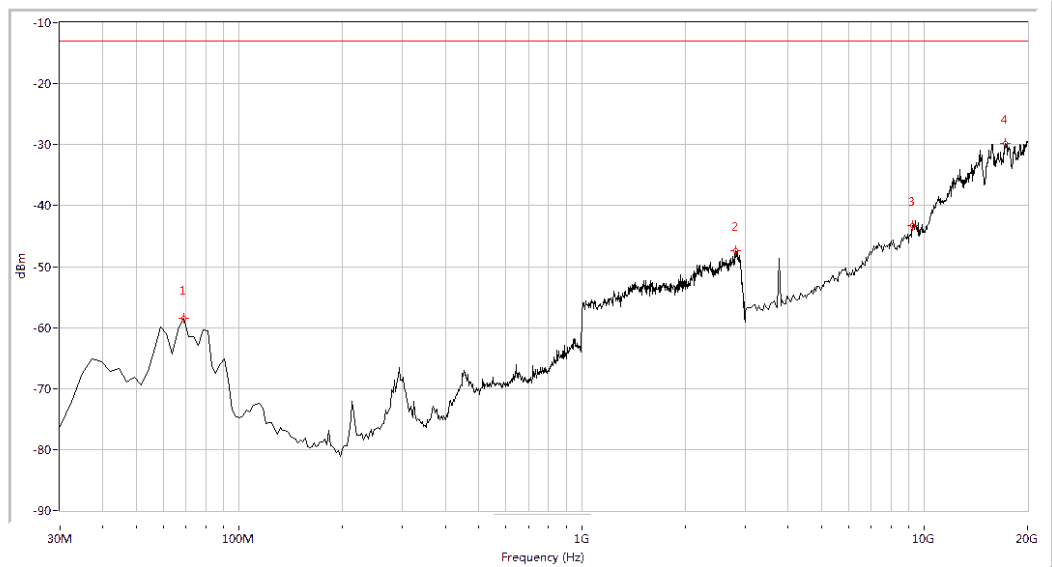(Plot F.1:   HSDPA 1900 MHz Channel = 9262, Test Antenna Horizontal)
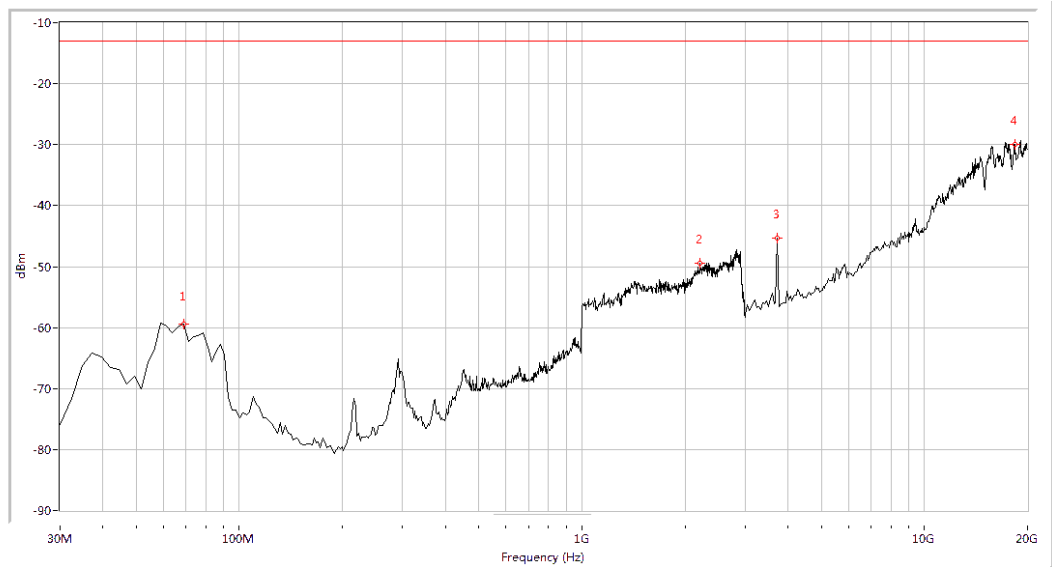
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
68.703	-59.49	-13.0	46.5	5.1	Vertical	PASS
2211.970	-49.49	-13.0	36.5	298.8	Vertical	PASS
3720.698	-45.38	-13.0	32.4	294.9	Vertical	PASS
18346.633	-29.98	-13.0	17.0	53.0	Vertical	PASS

(Plot F.2:   HSDPA 1900 MHz Channel = 9262, Test Antenna Vertical)
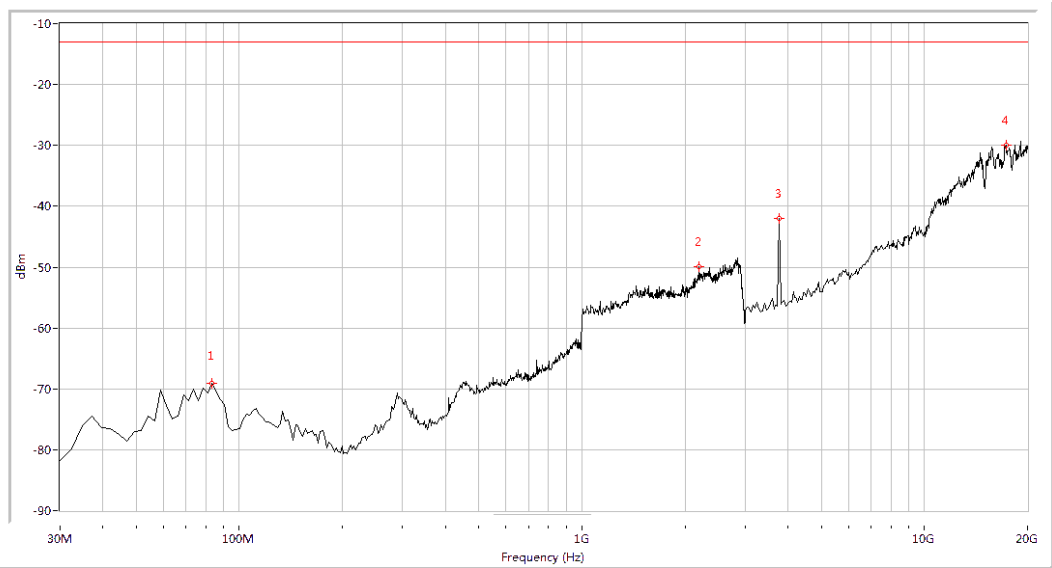
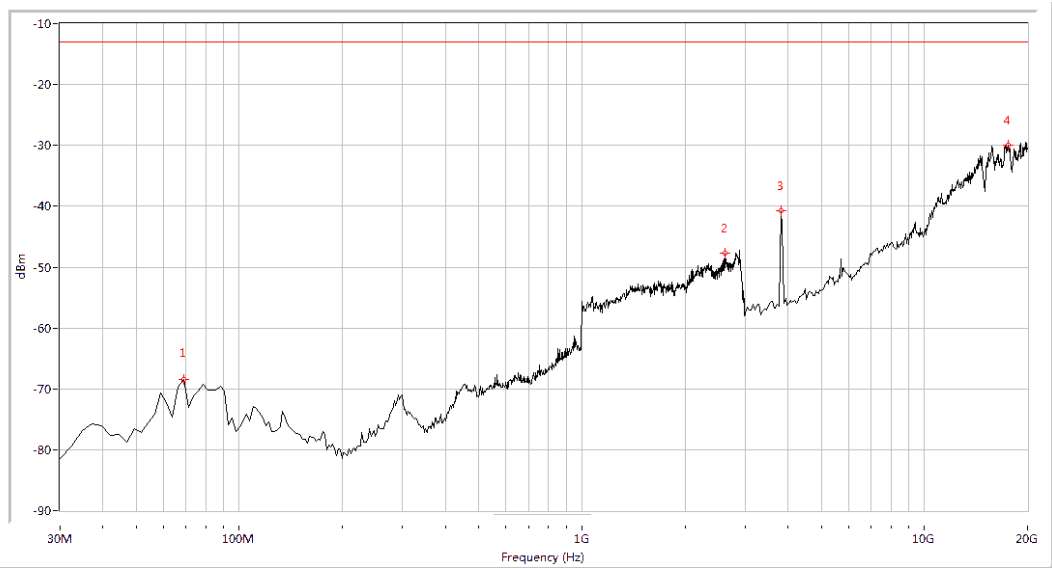| Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
83.217	-69.07	-13.0	56.1	207.7	Horizontal	PASS
2197.007	-49.96	-13.0	37.0	191.0	Horizontal	PASS
3763.092	-42.00	-13.0	29.0	70.8	Horizontal	PASS
17286.783	-29.91	-13.0	16.9	144.1	Horizontal	PASS

(Plot F.3:   HSDPA 1900 MHz Channel = 9400, Test Antenna Horizontal)

Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
68.703	-58.53	-13.0	45.5	-0.0	Vertical	PASS
2820.449	-47.44	-13.0	34.4	206.3	Vertical	PASS
9231.920	-43.24	-13.0	30.2	108.3	Vertical	PASS
17201.995	-29.75	-13.0	16.7	76.0	Vertical	PASS

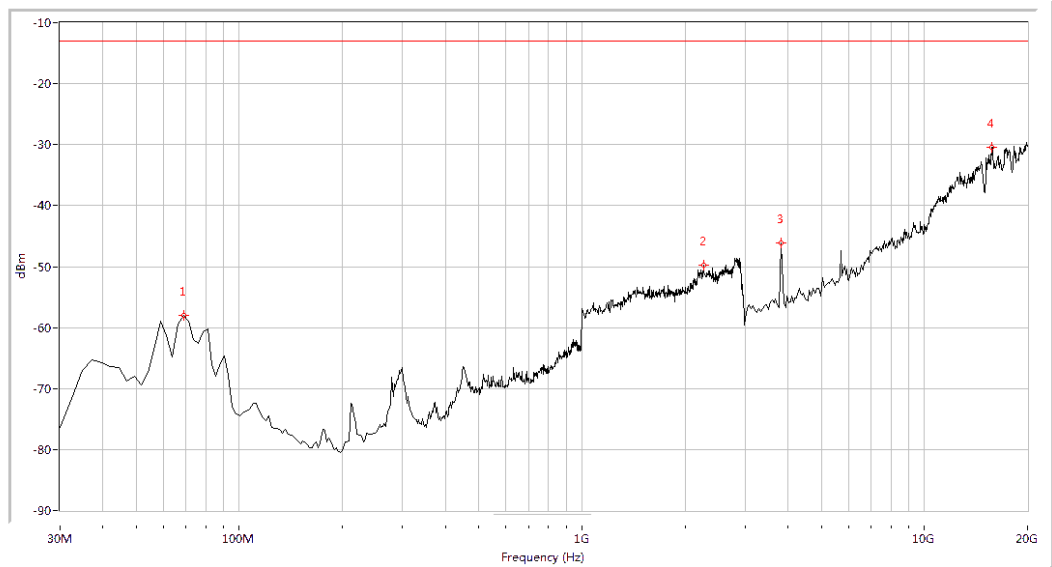(Plot F.4:   HSDPA 1900 MHz Channel = 9400, Test Antenna Vertical)

Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
68.703	-68.53	-13.0	55.5	99.4	Horizontal	PASS
2610.973	-47.75	-13.0	34.8	39.7	Horizontal	PASS
3805.486	-40.75	-13.0	27.8	59.2	Horizontal	PASS
17541.147	-29.92	-13.0	16.9	309.5	Horizontal	PASS

(Plot F.5:   HSDPA 1900 MHz Channel = 9538, Test Antenna Horizontal)

Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
68.703	-58.02	-13.0	45.0	36.2	Vertical	PASS
2271.820	-49.75	-13.0	36.8	-0.0	Vertical	PASS
3805.486	-46.18	-13.0	33.2	269.8	Vertical	PASS
15760.599	-30.38	-13.0	17.4	75.6	Vertical	PASS

(Plot F.6:   HSDPA 1900 MHz Channel = 9538, Test Antenna Vertical)

** END OF REPORT **