

# FCC TEST REPORT



Issued to

**Group Sense Mobile-Tech Limited**

For

**Wireless POS Handheld Terminal**

Model Name: DT-07  
Trade Name: Xplore / Touch Dynamic  
Brand Name: Xplore / Touch Dynamic  
FCC ID : VRI-B195  
Standard: 47 CFR Part 22 Subpart H  
47 CFR Part 24 Subpart E  
Test date: 2013-10-15 to 2014-1-20  
Issue date: 2014-3-31

By

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Date 2014.3.31



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Date 2014.3.31

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Change History		
Issue	Date	Reason for change
1.0	Mar 31, 2014	First edition

## 1. GENERAL INFORMATION

### 1.1 EUT Description

EUT Type.....: Wireless POS Handheld Terminal  
Serial No.....: (n.a, marked #1 by test site)  
Hardware Version.....: QA1/PP1  
Software Version.....: D13  
Applicant.....: Group Sense Mobile-Tech Limited  
Address: 6th Floor, Enterprise Building, No.5 Science Park West Avenue, Hong Kong Science Park, Shatin, New Territories, Hong Kong  
Manufacturer.....: Group Sense Mobile-Tech Limited  
Address: 6th Floor, Enterprise Building, No.5 Science Park West Avenue, Hong Kong Science Park, Shatin, New Territories, Hong Kong  
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  
EDGE Mode with 8PSK Modulation  
WCDMA Mode with QPSK Modulation  
HSDPA Mode with QPSK Modulation  
HSUPA Mode with QPSK Modulation  
Multislot Class.....: GPRS: Multislot Class12,EGPRS: Multislot Class12  
Antenna Type.....: PIFA Antenna  
Emission Designators.....: GSM 850:251KGXW,GSM 1900:255KGXW  
EGPRS850:250KG7W, EGPRS1900:246KG7W,  
WCDMA 850:4M19F9W ,WCDMA1900:4M21F9W

**Note 1:** The transmitter (Tx) frequency arrangement of the Cellular 850MHz band used by the EUT can be represented with the formula  $F(n)=824.2+0.2*(n-128)$ ,  $128 \leq n \leq 251$ ; 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  $F(n)=1850.2+0.2*(n-512)$ ,  $512 \leq n \leq 810$ ; 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  $F(n)=826.4+0.2*(n-4132)$ ,  $4132 \leq n \leq 4233$ ; 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  $F(n)=1852.4+0.2*(n-9262)$ ,  $9262 \leq n \leq 9538$ ; 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.

## 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 (10-1-09 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10-1-09 Edition)	Public Mobile Services
3	47 CFR Part 24 (10-1-09 Edition)	Personal Communications Services

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

No.	Section	Description	Result
1	2.1046	Conducted RF Output Power	PASS
2.	24.232(d)	Peak to average ratio	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, 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 REQUIREMENTS

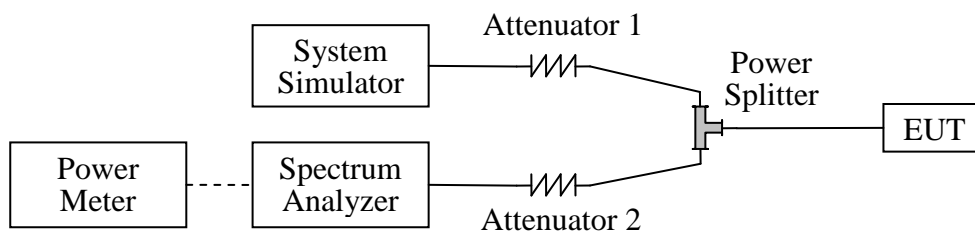
### 2.1 Conducted RF Output Power

#### 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	2013.05.13	2014.05.12
Spectrum Analyzer	Agilent	E7405A	US44210471	2013.05.13	2014.05.12
Power Meter	Agilent	E4418B	GB43318055	2013.05.13	2014.05.12
Power Sensor	Agilent	8482A	MY41091706	2013.05.13	2014.05.12
Power Splitter	Weinschel	1506A	NW521	2013.05.13	2014.05.12
Attenuator 1	Resnet	20dB	(n.a.)	2013.05.13	2014.05.12
Attenuator 2	Resnet	3dB	(n.a.)	2013.05.13	2014.05.12

### 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	31.60	Plot A1 to A3	35	<u>PASS</u>
	190	836.6	31.32			<u>PASS</u>
	251	848.8	31.27			<u>PASS</u>
GSM 1900MHz	512	1850.2	31.96	Plot B1 to B3	32	<u>PASS</u>
	661	1880.0	31.02			<u>PASS</u>
	810	1909.8	29.40			<u>PASS</u>
GPRS 850MHz	128	824.2	30.83	Plot C1 to C3 <sup>Note 1</sup>	35	<u>PASS</u>
	190	836.6	30.57			<u>PASS</u>
	251	848.8	30.51			<u>PASS</u>
GPRS 1900MHz	512	1850.2	30.89	Plot D1 to D3 <sup>Note 1</sup>	32	<u>PASS</u>
	661	1880.0	30.27			<u>PASS</u>
	810	1909.8	28.93			<u>PASS</u>
EGPRS 850MHz	128	824.2	30.61	Plot E1 to E3 <sup>Note 1</sup>	35	<u>PASS</u>
	190	836.6	31.26			<u>PASS</u>
	251	848.8	30.35			<u>PASS</u>
EGPRS 1900MHz	512	1850.2	29.45	Plot F1 to F3 <sup>Note 1</sup>	32	<u>PASS</u>
	661	1880.0	29.28			<u>PASS</u>
	810	1909.8	28.83			<u>PASS</u>

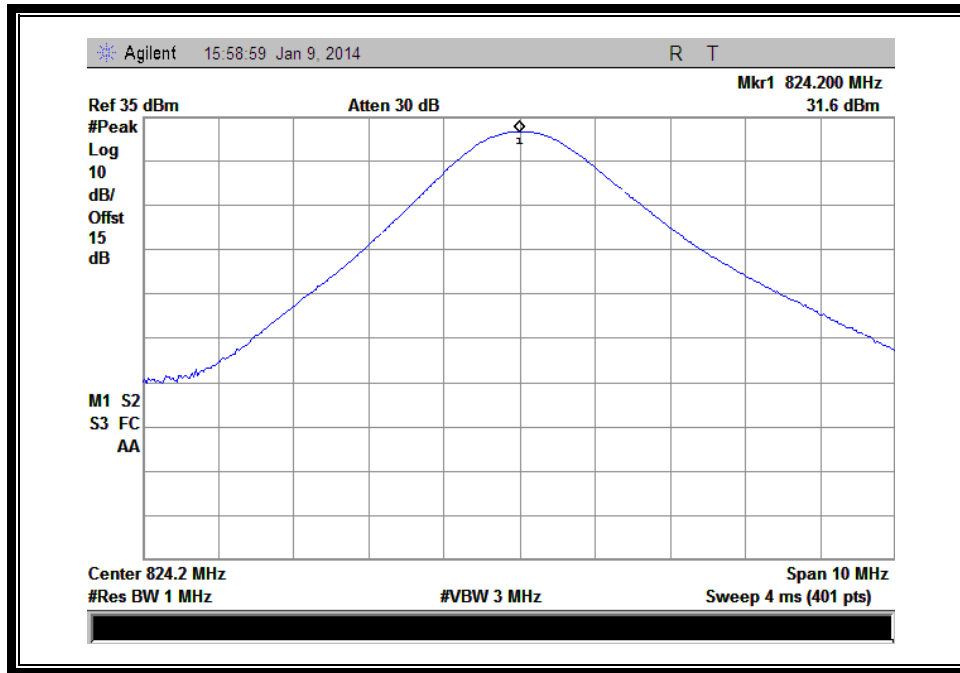
**Note 1:** For the GPRS and EGPRS model, all the slots were tested and just the worst data was record in this report.



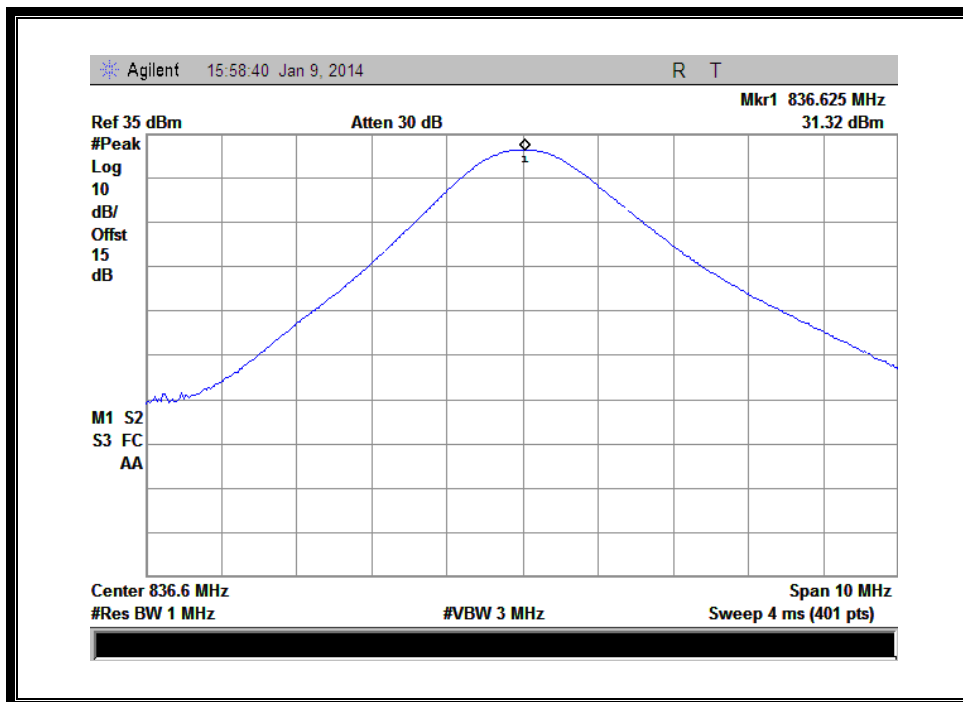
2. WCDMA Model Test Verdict:

Item	band	WCDMA 850			WCDMA 1900		
	ARFCN	4132	4175	4233	9262	9400	9538
	subtest	dBm			dBm		
5.2(WCDMA)	non	23.68	24.04	23.97	22.28	21.79	22.42
HSDPA	1	23.59	22.21	23.88	22.12	21.70	22.35
	2	23.57	22.20	23.86	22.09	21.41	22.30
	3	23.08	21.72	23.30	21.62	21.18	21.87
	4	29.98	21.71	23.29	21.60	20.95	21.77
HSUPA	1	22.95	21.80	23.53	21.49	21.20	21.77
	2	20.85	18.79	21.68	19.50	19.36	19.66
	3	21.87	19.97	22.62	20.55	20.10	20.93
	4	20.92	18.86	21.82	19.84	19.79	19.79
	5	22.99	20.54	23.78	21.56	20.90	21.62
Note:	The Conducted RF Output Power test of WCDMA /HSDPA /HSUPA /HSPA+ was tested by power meter.						

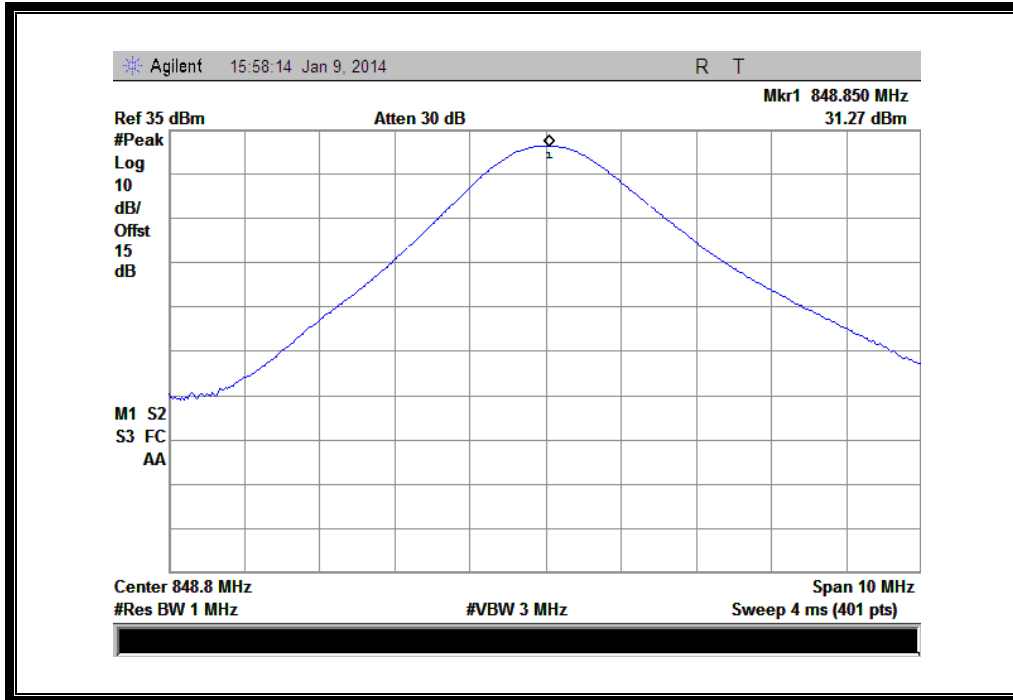
3. GSM Model Test Plots:



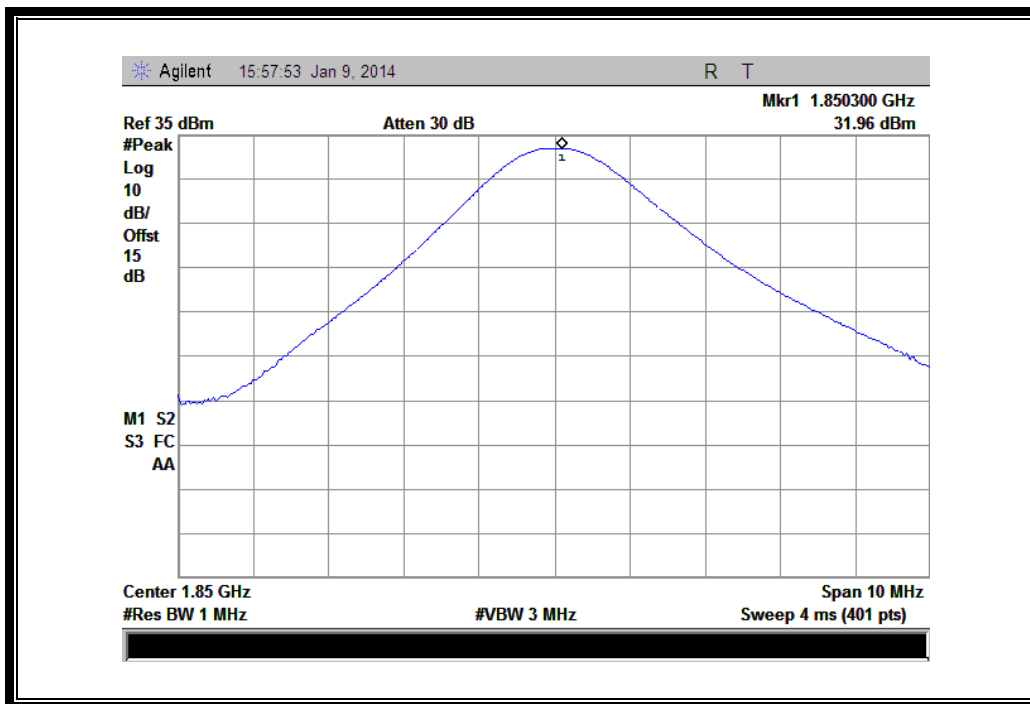
(Plot A1:GSM 850MHz Channel = 128)



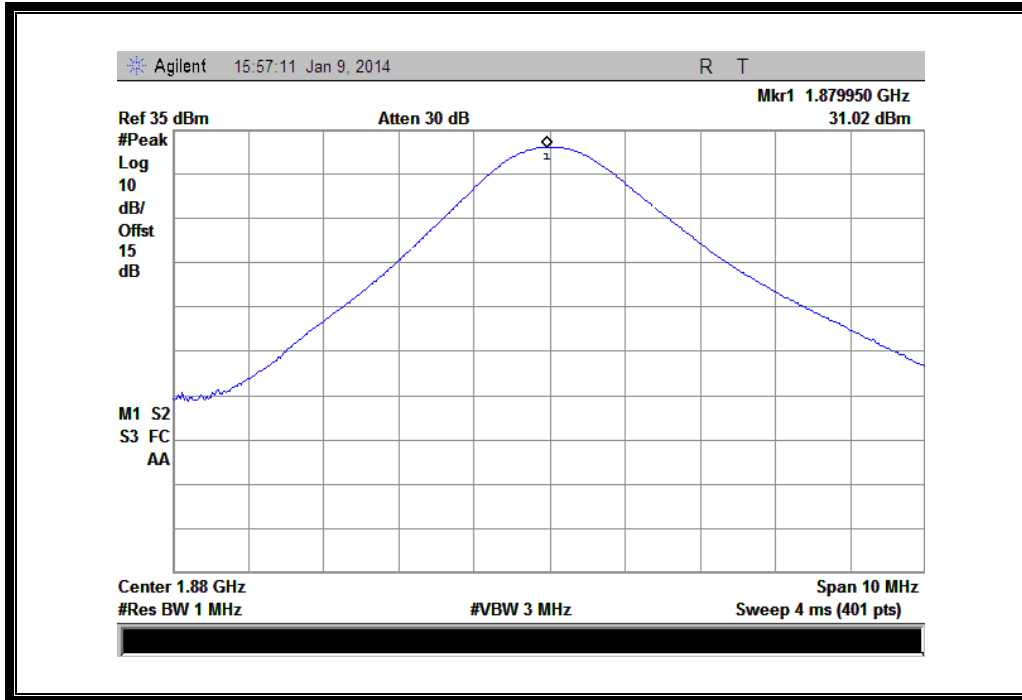
(Plot A2:GSM 850MHz Channel = 190)



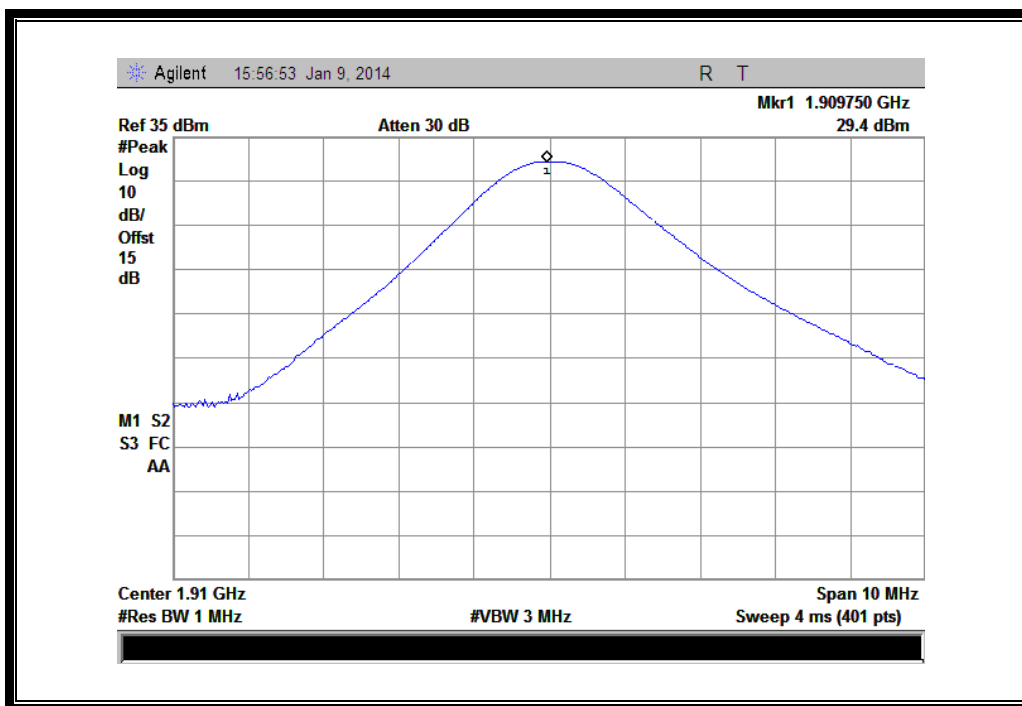
(Plot A3:GSM 850MHz Channel = 251)



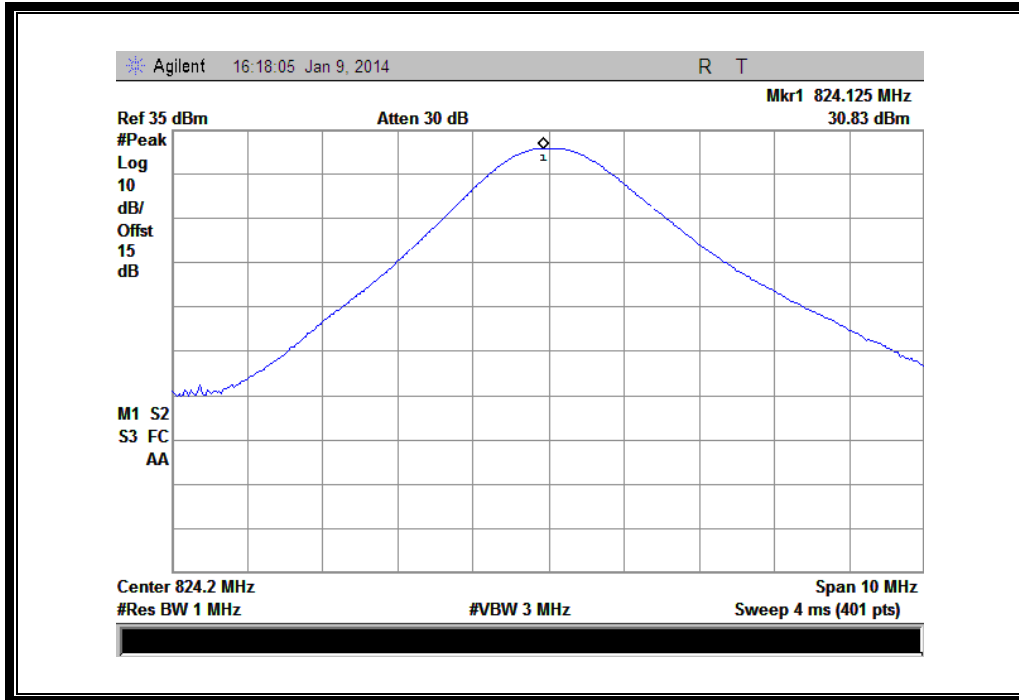
(Plot B1: GSM 1900MHz Channel = 512)



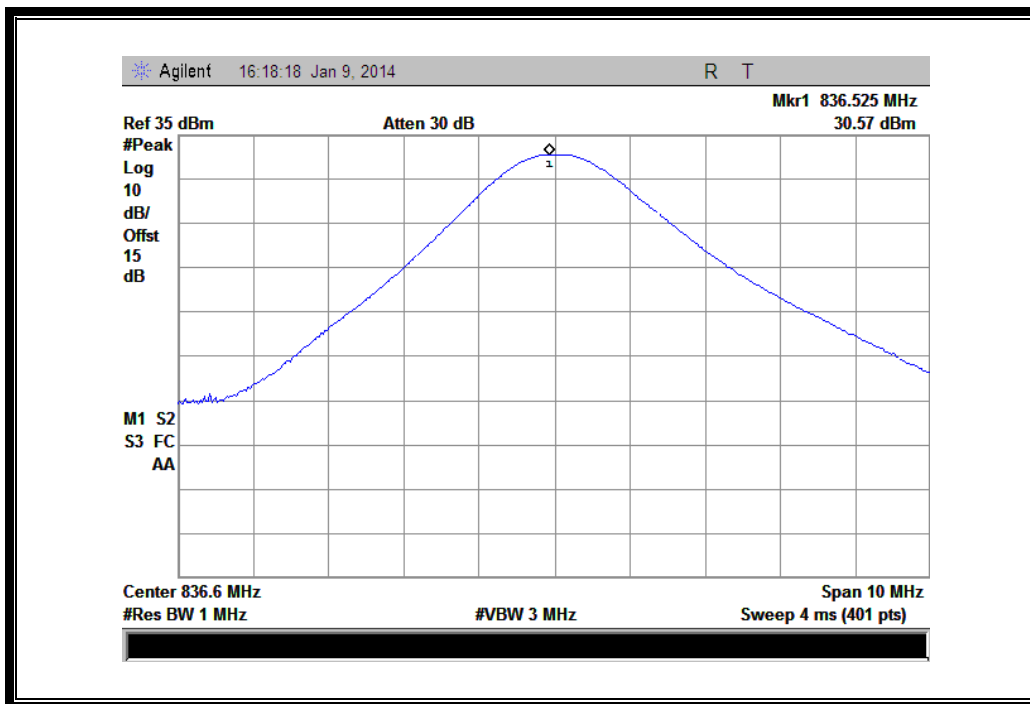
(Plot B2: GSM 1900MHz Channel = 661)



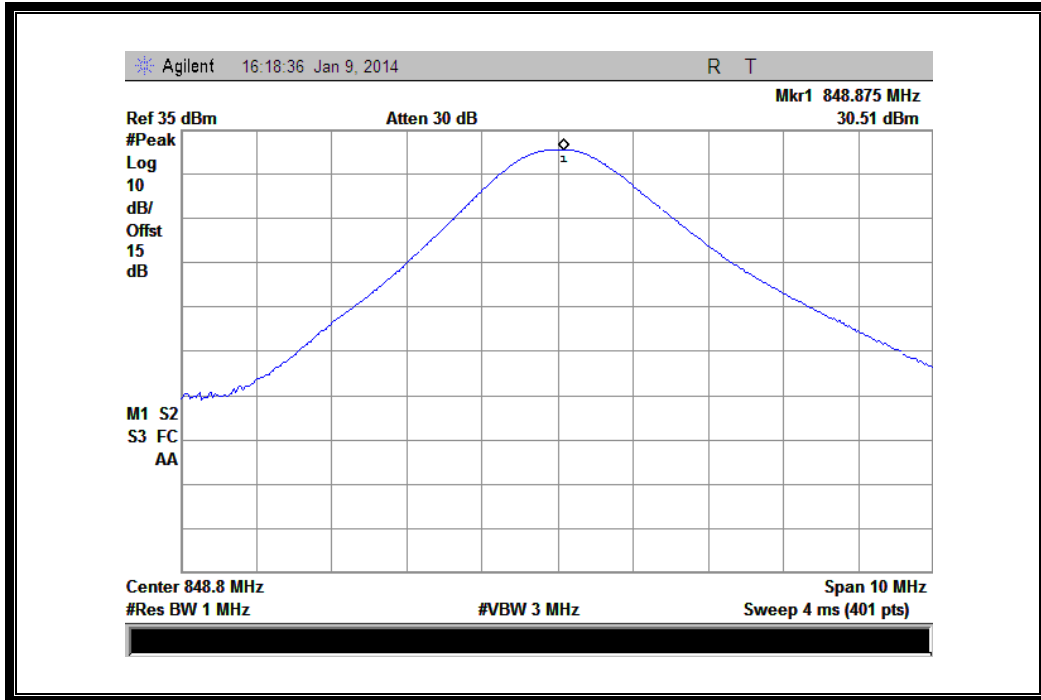
(Plot B3: GSM 1900Hz Channel = 810)



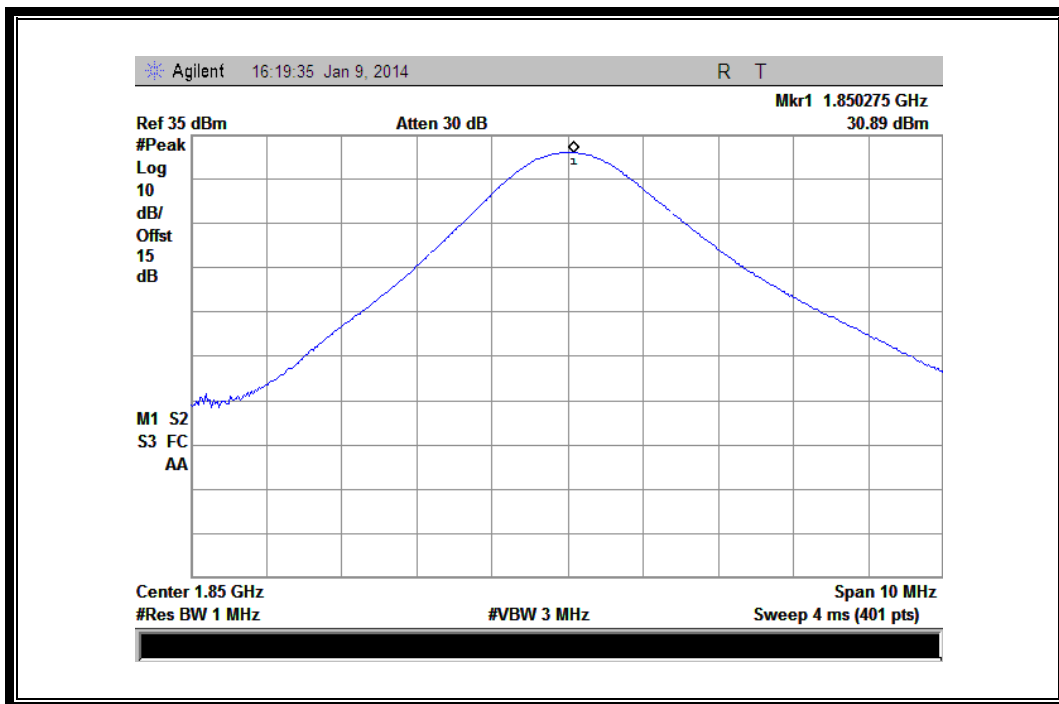
(Plot C 1: GPRS 850MHz Channel = 128)



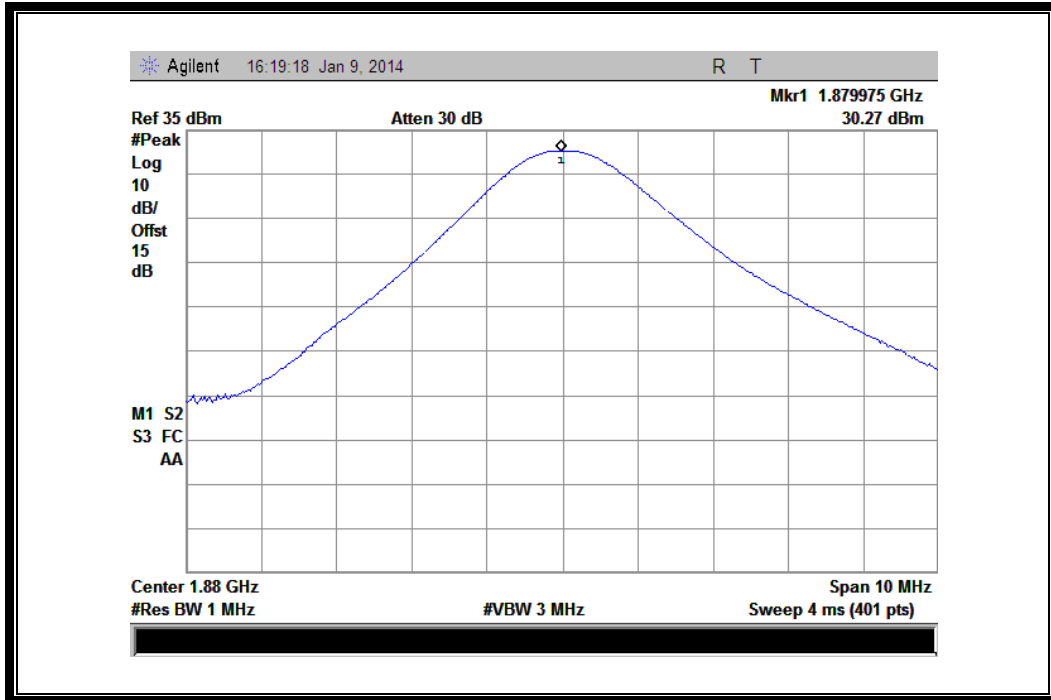
(Plot C 2: GPRS 850MHz Channel = 190)



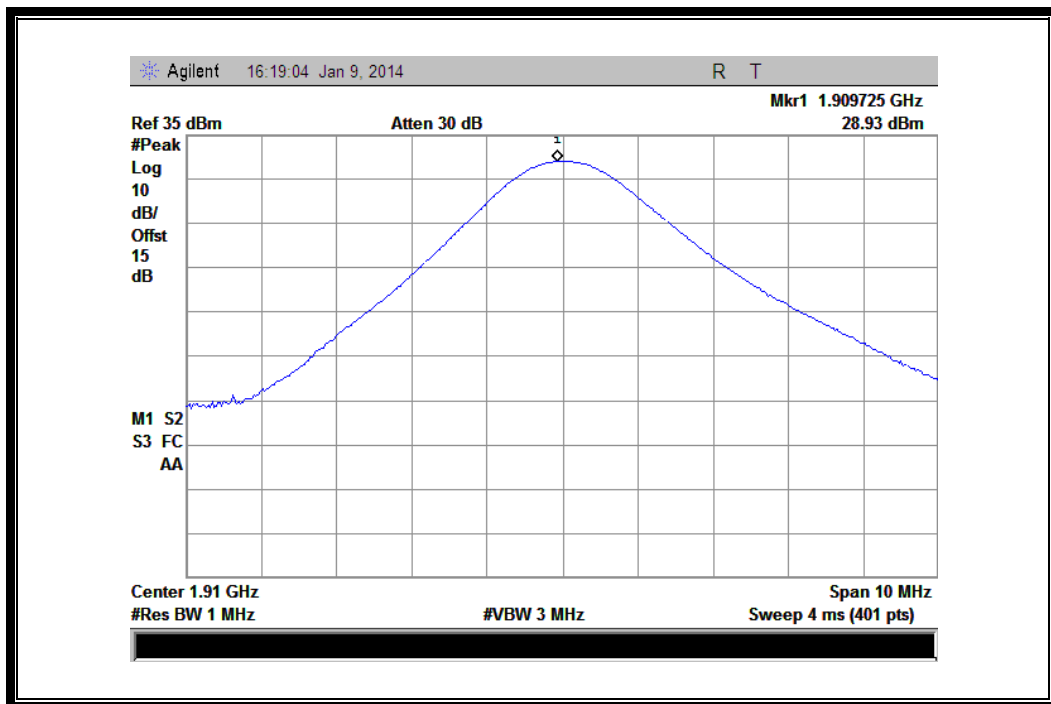
(Plot C 3: GPRS 850MHz Channel = 251)



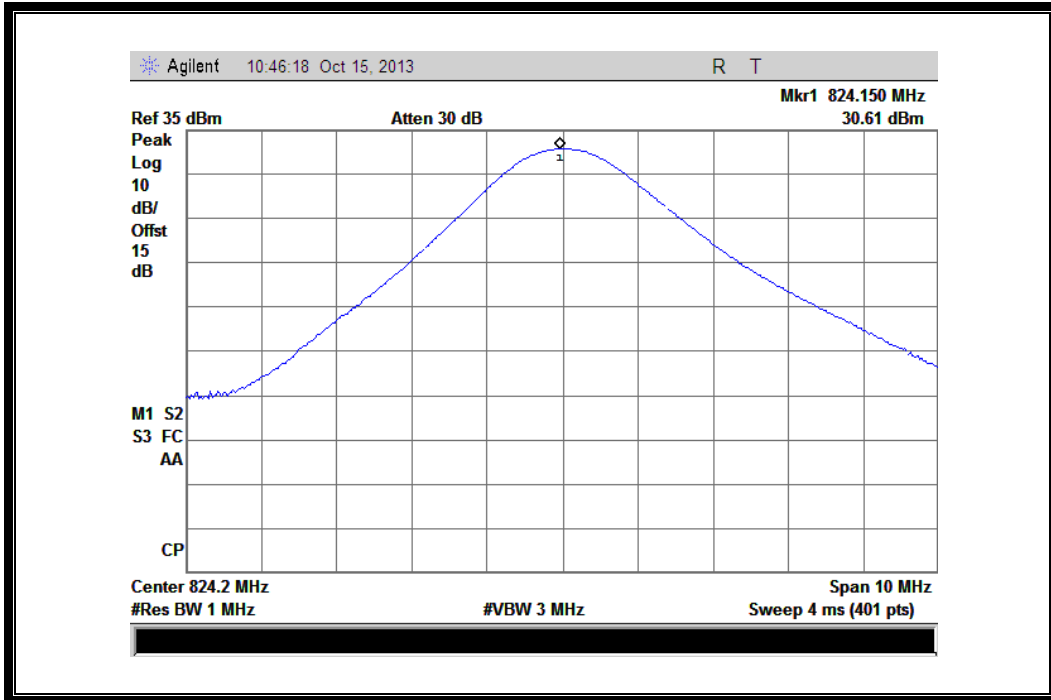
(Plot D 1: GPRS 1900MHz Channel = 512)



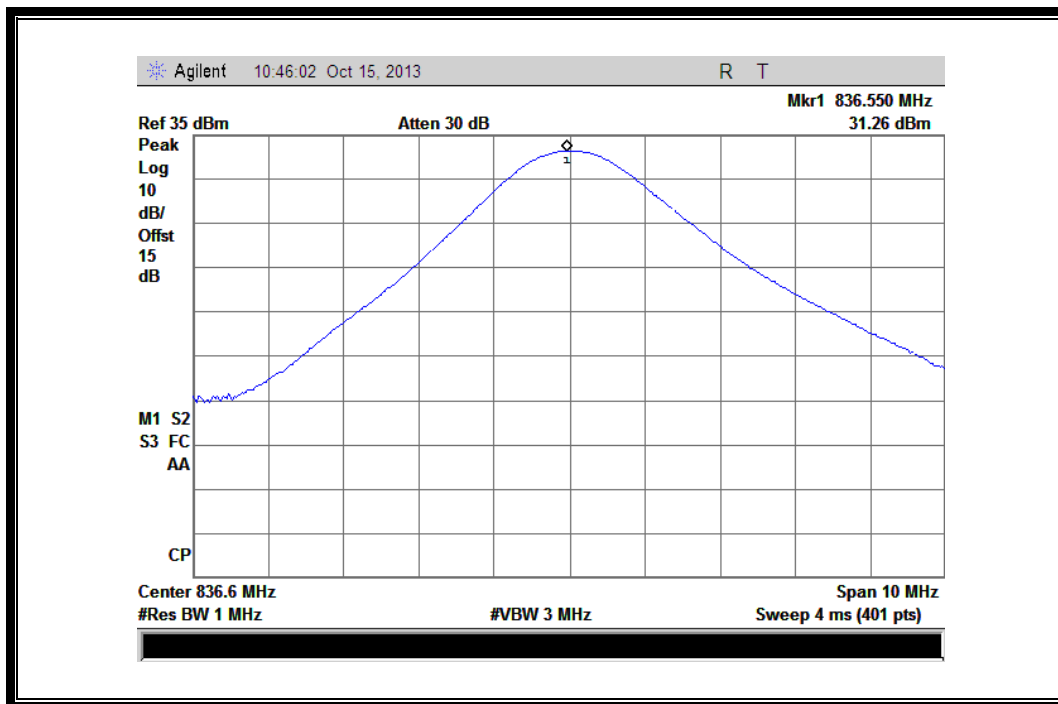
(Plot D 2: GPRS 1900MHz Channel = 661)



(Plot D 3: GPRS 1900MHz Channel = 810)

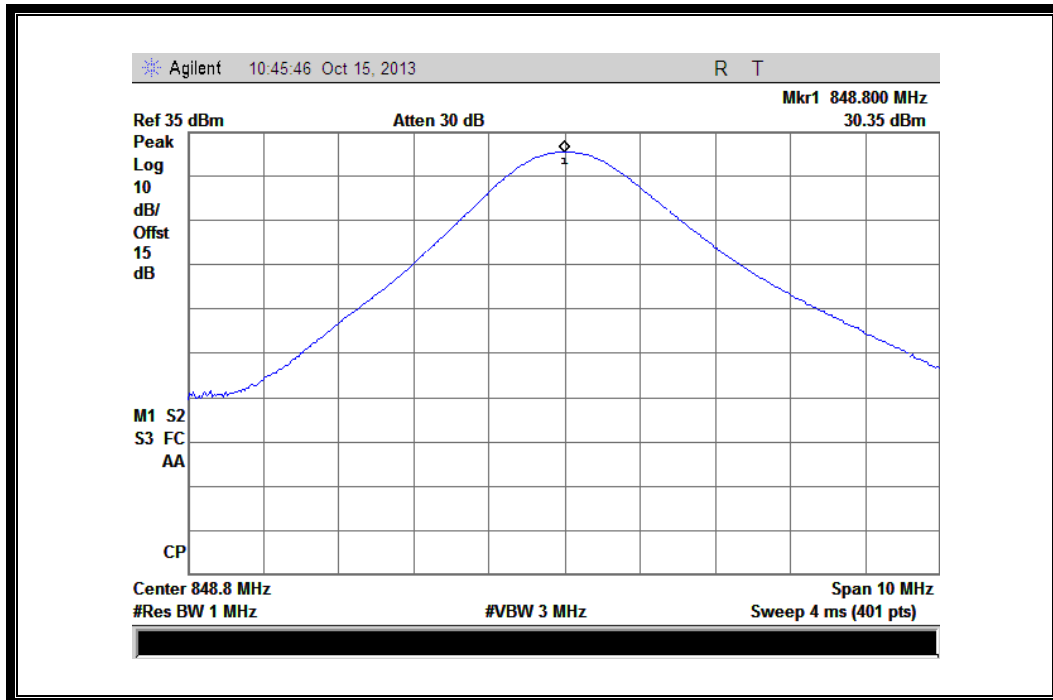


(Plot E1: EGPRS 850MHz Channel = 128)

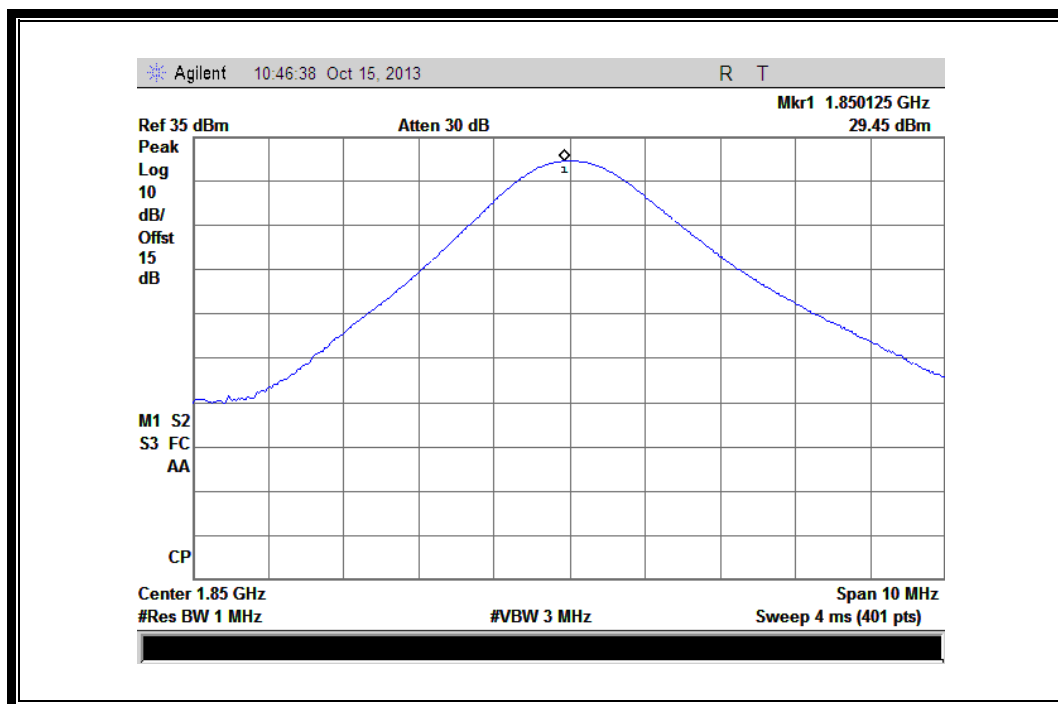


(Plot E2: EGPRS 850MHz Channel = 190)

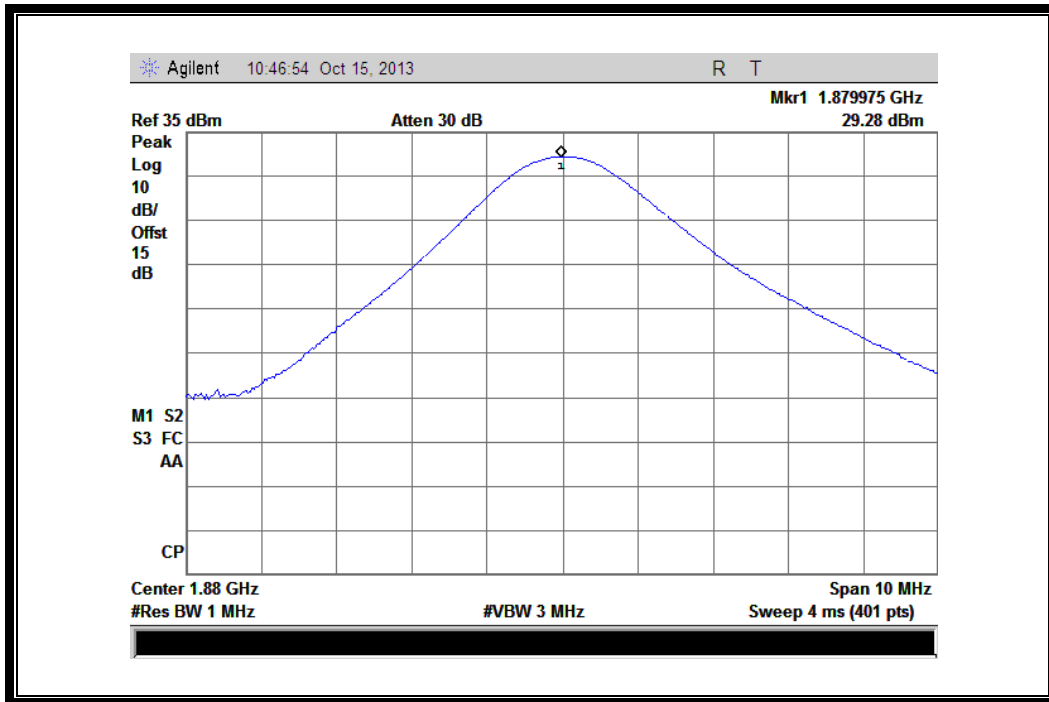




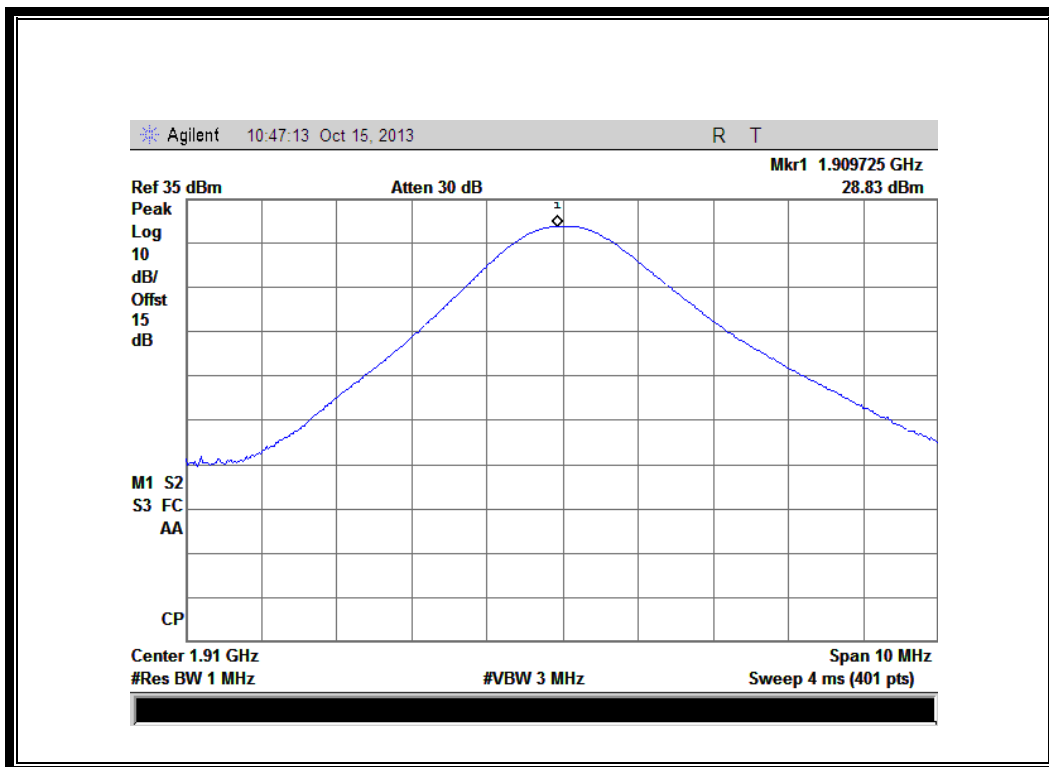
(Plot E3: EGPRS 850MHz Channel = 251)



(Plot F1:EGPRS 1900MHz Channel = 512)



(Plot F2:EGPRS 1900MHz Channel = 661)



(Plot F3:EGPRS 1900Hz Channel = 810)

## 2.2 Peak to Average Ratio

### 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:

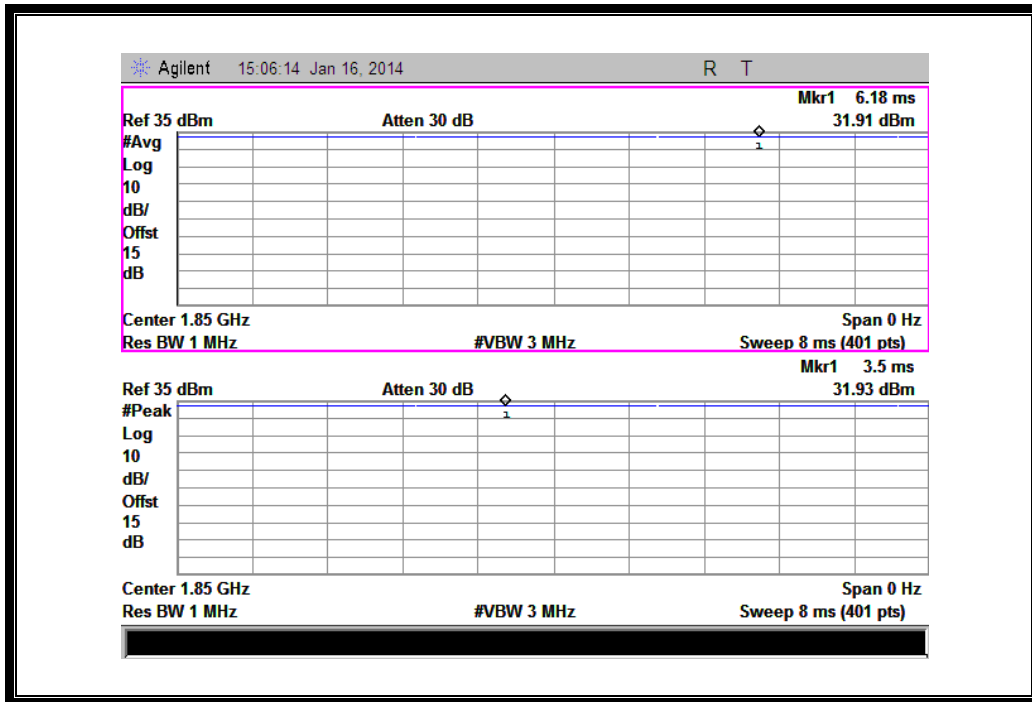
- a. Set RBW=1MHz, VBW=1MHz, peak detector in spectrum analyzer.
- b. Set EUT in maximum output power, and triggered the bust signal.
- c. Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average radio.

B. For UMTS operating mode:

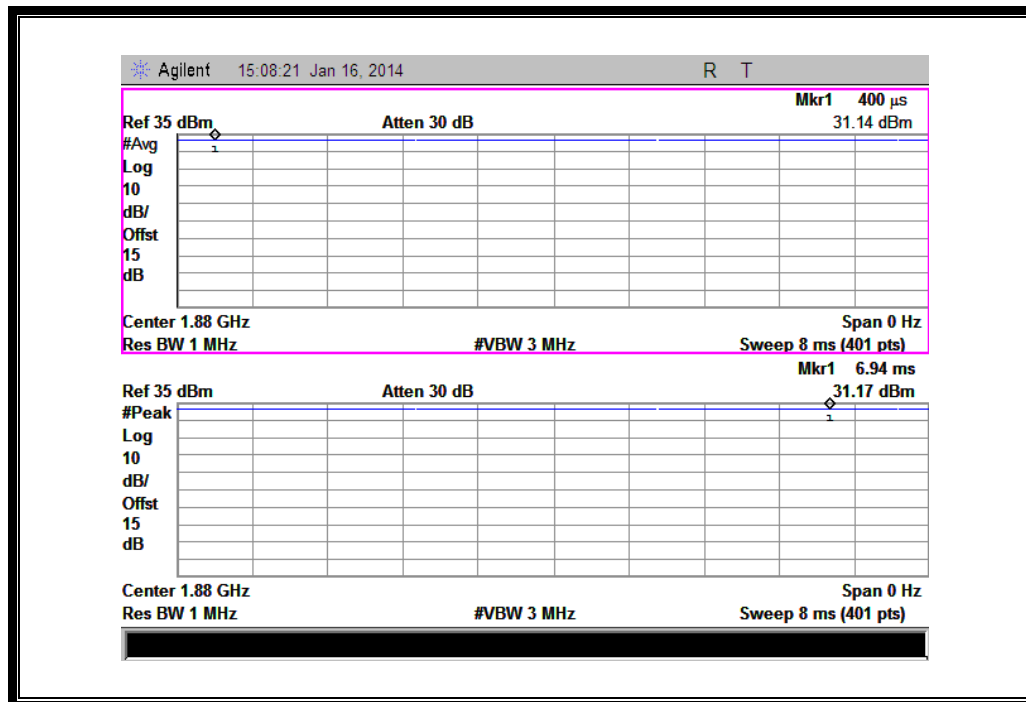
- a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
- b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

1. Test Verdict:

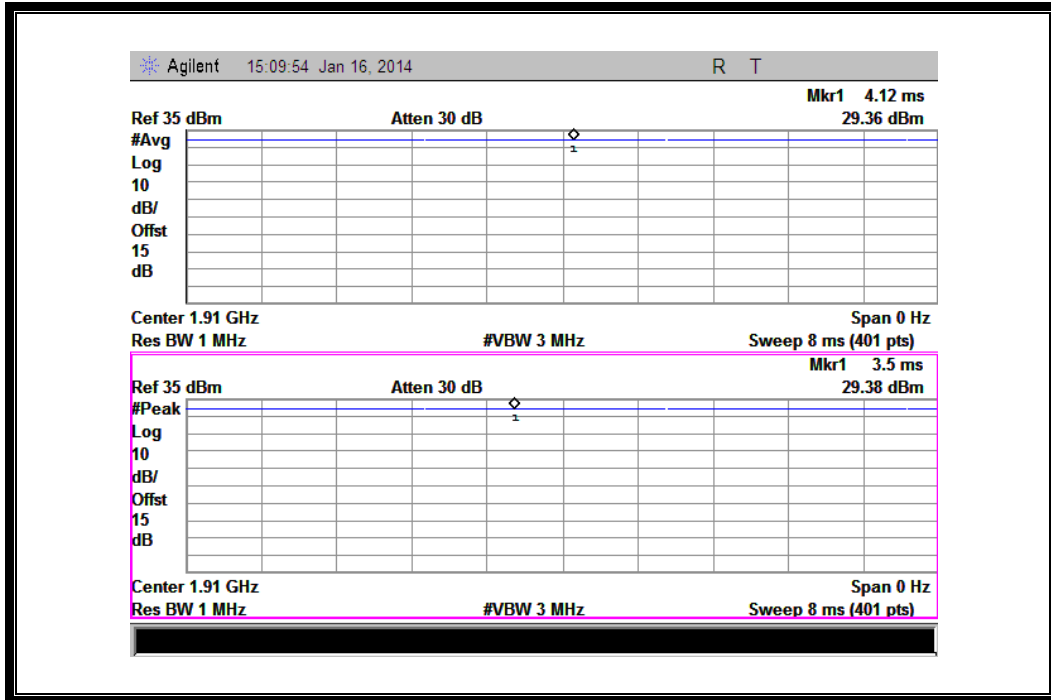
Band	Channel	Frequency (MHz)	Peak to Average radio		Limit dBm	Verdict
			dBm	Refer to Plot		
GSM 1900MHz	512	1850.2	0.02	Plot A1 to A3	13	PASS
	661	1880.0	0.03			PASS
	810	1909.8	0.02			PASS
EGPRS 1900MHz	512	1850.2	0.01	Plot B1 to B3	13	PASS
	661	1880.0	0.03			PASS
	810	1909.8	0.02			PASS
WCDMA 1900MHz	9262	1852.4	3.28	Plot C1 toC3	13	PASS
	9400	1880	3.25			PASS
	9538	1907.6	3.23			PASS



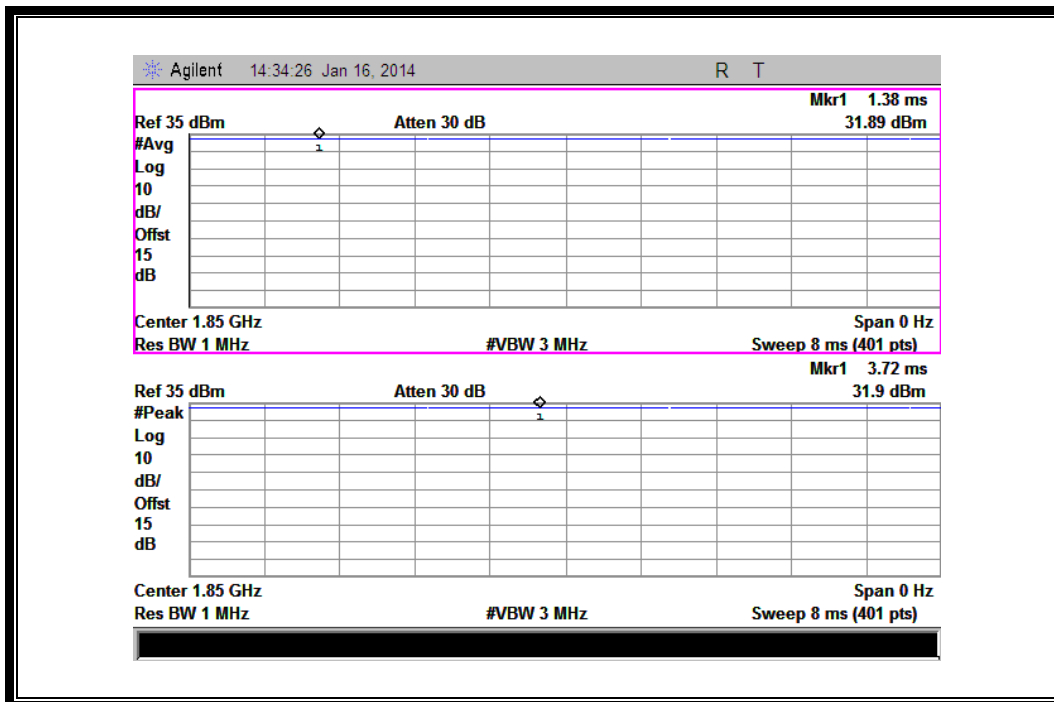
(Plot A1:GSM 1900 MHz Channel = 512)



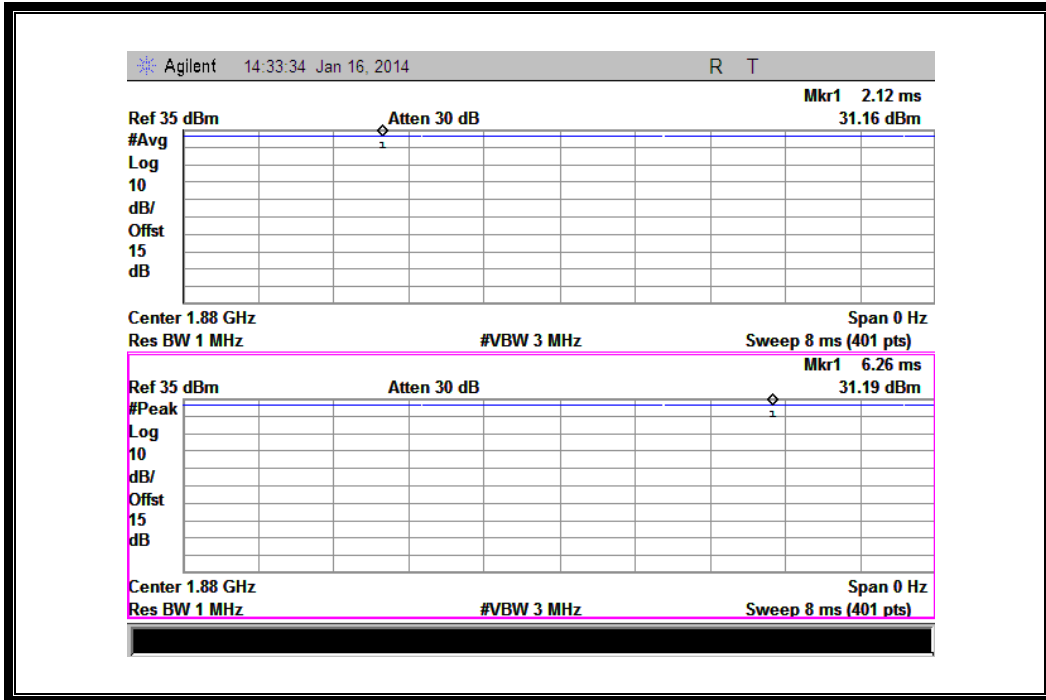
(Plot A2:GSM 1900 MHz Channel = 661)



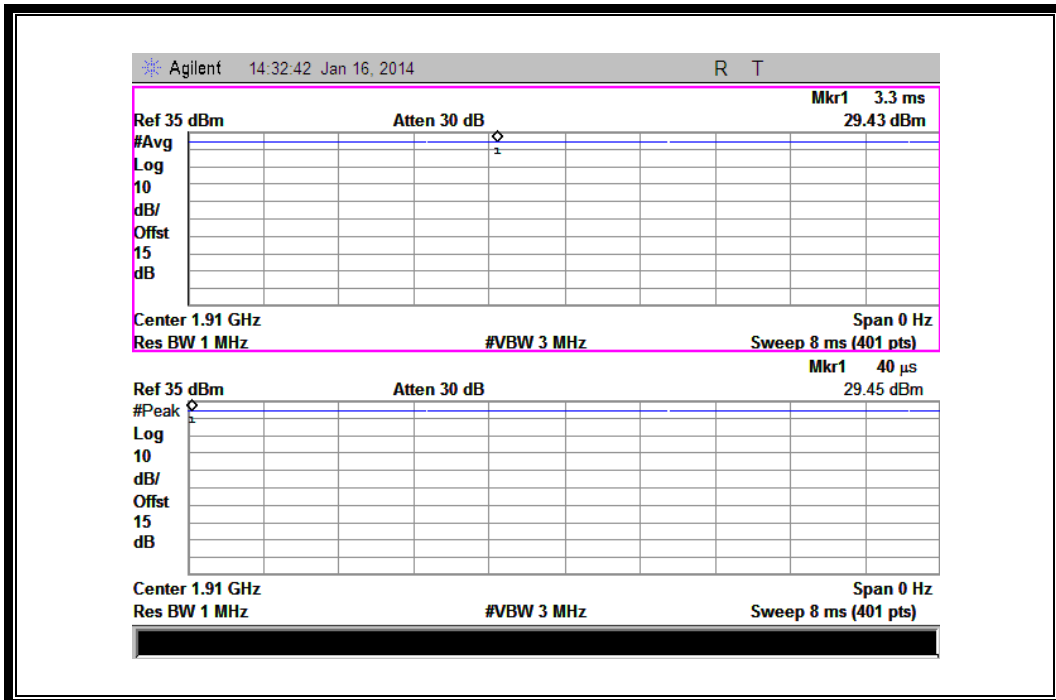
(Plot A3:GSM 1900MHz Channel = 810)



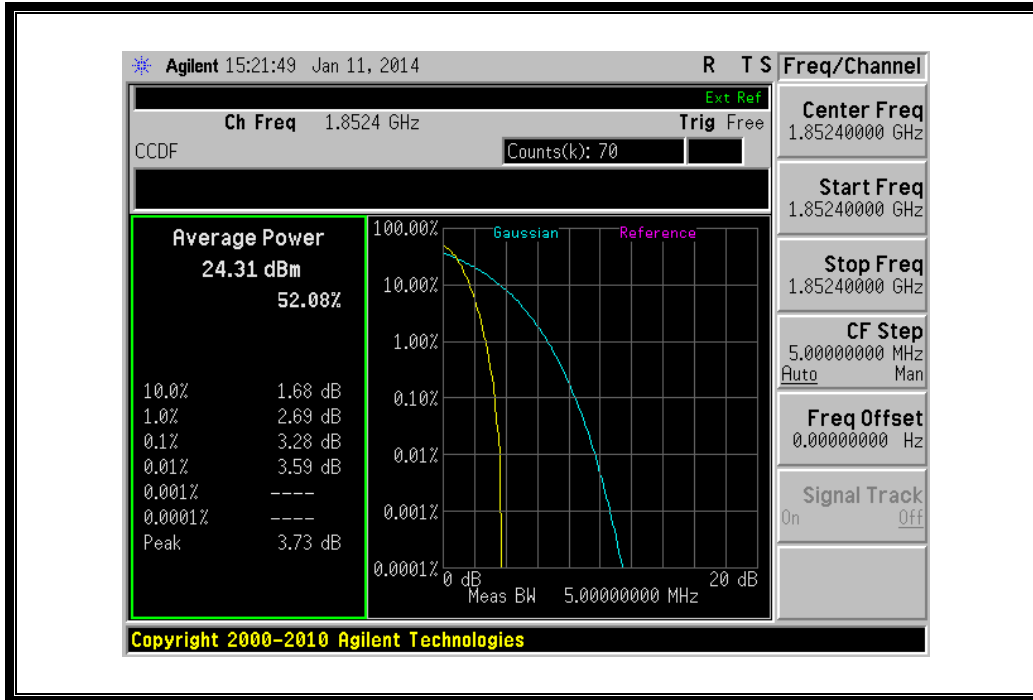
(Plot B1: EGPRS 1900MHz Channel = 512)



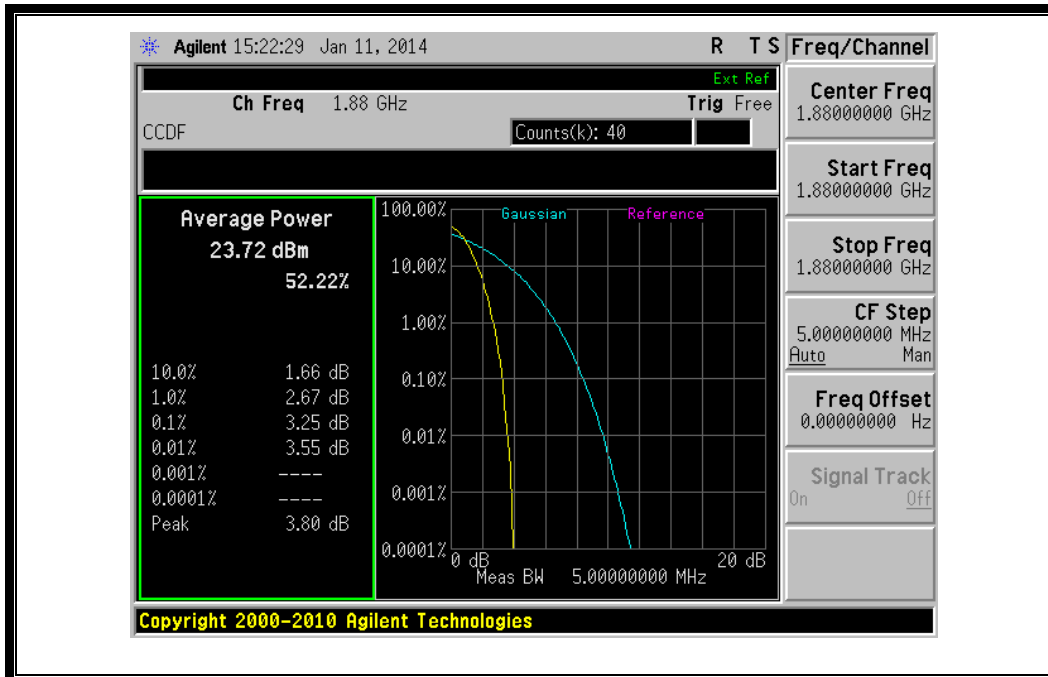
(Plot B2: EGPRS 1900MHz Channel = 661)



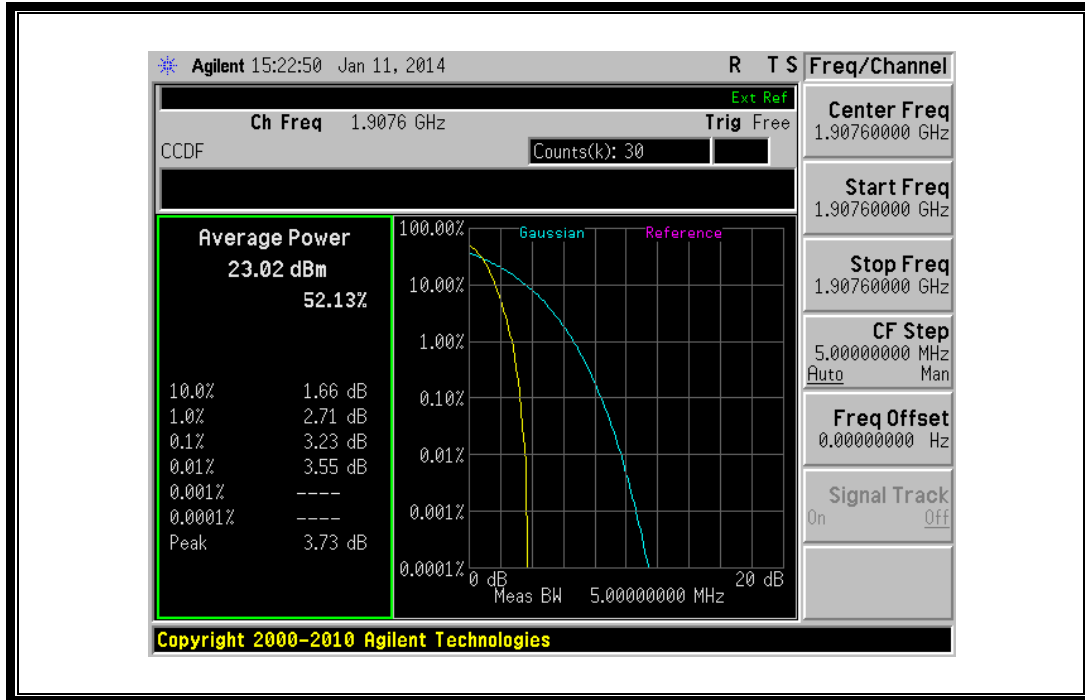
(Plot B3: EGPRS 1900MHz Channel = 810)



(Plot C1: WCDMA 1900MHz Channel = 9262)



(Plot C2: 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

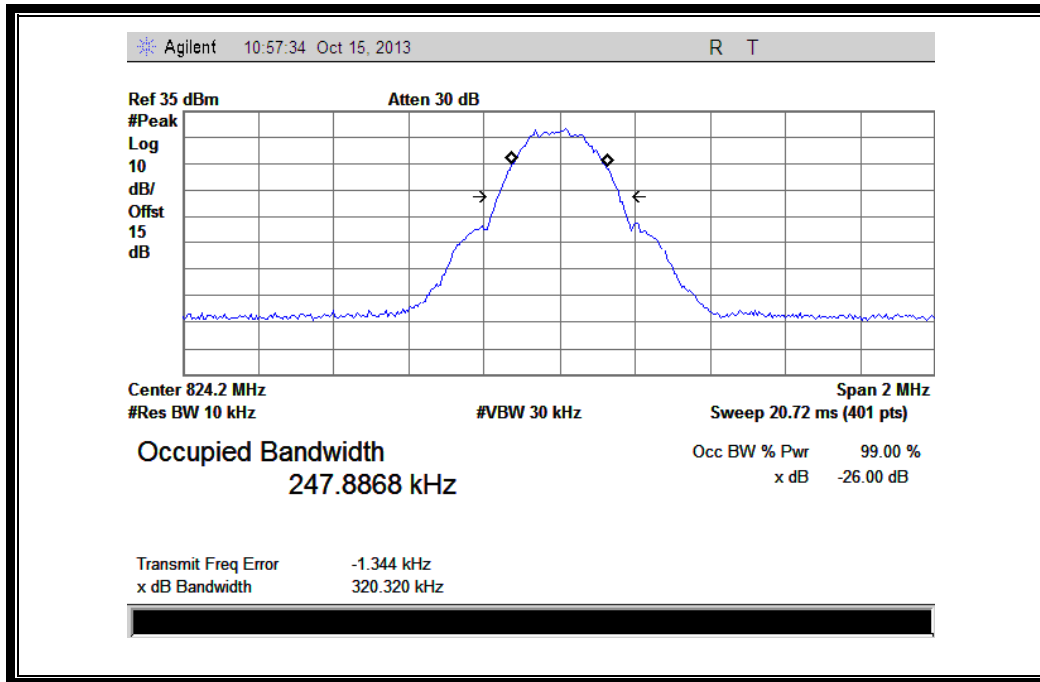
Here the lowest, middle and highest channels are selected to perform testing to verify the 99% occupied bandwidth.

#### 2. Test Verdict:

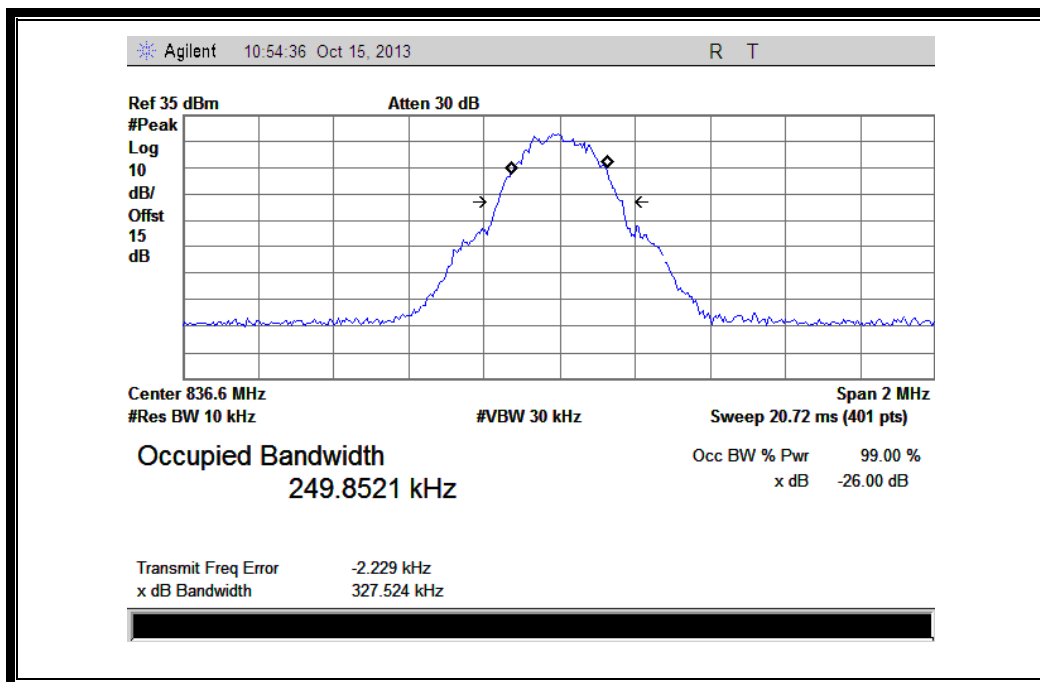
Band	Channel	Frequency (MHz)	26dB bandwidth	99% Occupied Bandwidth	Refer to Plot
EDGE 850MHz	128	824.2	320.320 KHz	247.8868 KHz	Plot A
	190	836.6	327.524 KHz	249.8521 KHz	Plot B
	251	848.8	325.753 KHz	246.4210 KHz	Plot C
EDGE 1900MHz	512	1850.2	315.023 KHz	246.4745 KHz	Plot D
	661	1880.0	310.982 KHz	242.9841 KHz	Plot E
	810	1909.8	315.153 KHz	242.1221 KHz	Plot F
WCDMA 850MHz	4132	826.4	4.654 MHz	4.1799 MHz	Plot G
	4175	835	4.630 MHz	4.1860 MHz	Plot H
	4233	846.6	4.654 MHz	4.1684 MHz	Plot I
WCDMA 1900MHz	9262	1852.4	4.659 MHz	4.1654 MHz	Plot J
	9400	1880	4.656 MHz	4.1892 MHz	Plot K
	9538	1907.6	4.669 MHz	4.1617 MHz	Plot L
HSDPA 850MHz	4132	826.4	4.669 MHz	4.1902 MHz	Plot M
	4175	835	4.674 MHz	4.1714 MHz	Plot N
	4233	846.6	4.640 MHz	4.1878 MHz	Plot O
HSDPA 1900MHz	9262	1852.4	4.624 MHz	4.1624 MHz	Plot P
	9400	1880	4.656 MHz	4.1817 MHz	Plot Q
	9538	1907.6	4.671 MHz	4.1843 MHz	Plot R
HSUPA 850MHz	4132	826.4	4.657 MHz	4.1772 MHz	Plot S
	4175	835	4.668 MHz	4.1654 MHz	Plot T
	4233	846.6	4.670 MHz	4.1749 MHz	Plot U
HSUPA 1900MHz	9262	1852.4	4.662 MHz	4.1871 MHz	Plot V

Band	Channel	Frequency (MHz)	26dB bandwidth	99% Occupied Bandwidth	Refer to Plot
	9400	1880	4.659 MHz	4.2058 MHz	Plot W
	9538	1907.6	4.657 MHz	4.1736 MHz	Plot X
GSM 850MHz	128	824.2	316.615 KHz	244.7246 KHz	Plot Y
	190	836.6	312.329 KHz	246.3391 KHz	Plot Z
	251	848.8	318.045 KHz	251.2502 KHz	Plot A1
GSM 1900MHz	512	1850.2	326.103 KHz	250.0810 KHz	Plot B1
	661	1880.0	317.192 KHz	249.7498 KHz	Plot C1
	810	1909.8	319.209 KHz	253.6518 KHz	Plot D1
GPRS 850MHz	128	824.2	325.966 KHz	248.0178 KHz	Plot E1
	190	836.6	311.549 KHz	241.6350 KHz	Plot F1
	251	848.8	312.681 KHz	244.9943 KHz	Plot G1
GPRS 1900MHz	512	1850.2	319.940 KHz	248.0932 KHz	Plot H1
	661	1880.0	314.152 KHz	246.2721 KHz	Plot I2
	810	1909.8	325.010 KHz	255.3154 KHz	Plot J2

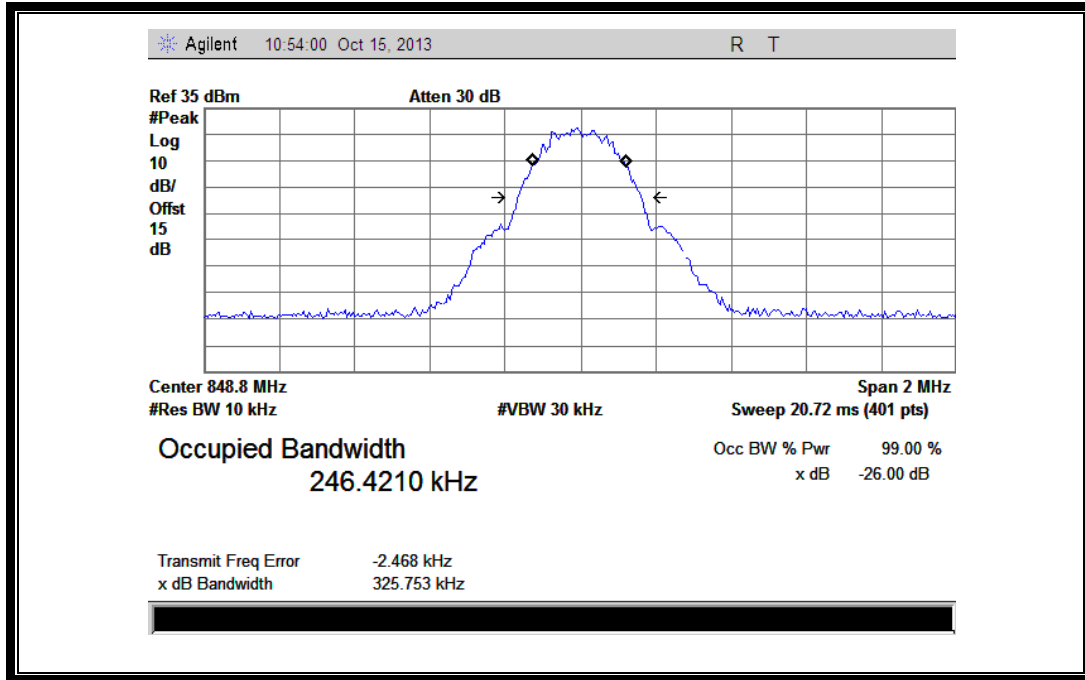
3. Test Plots:



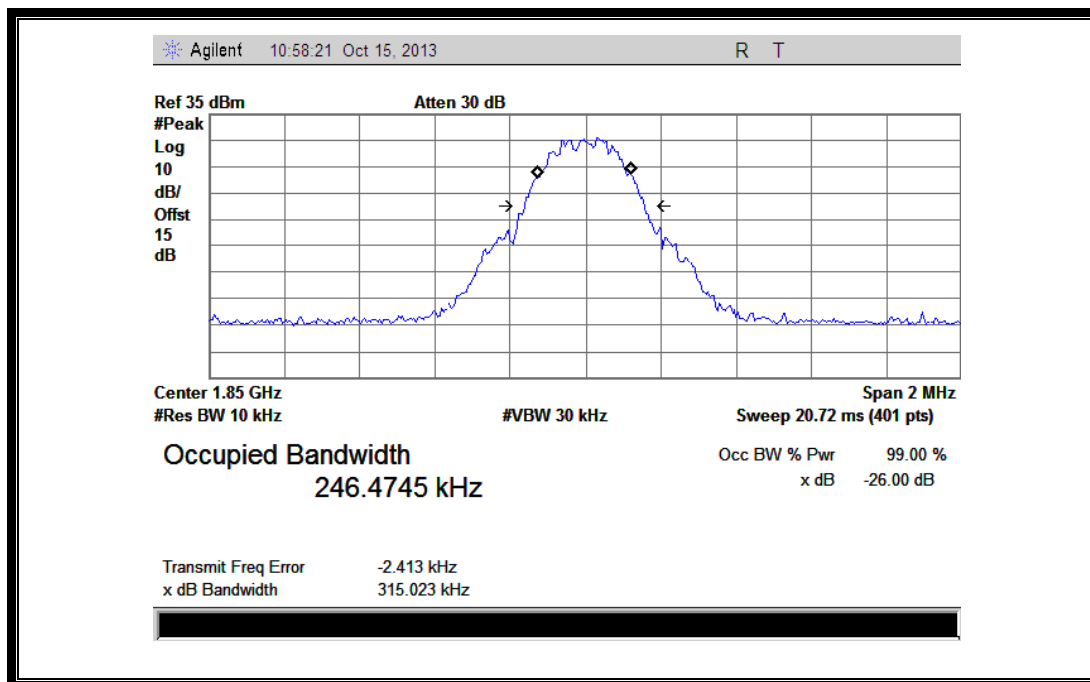
(Plot A: EGPRS 850MHz Channel = 128)



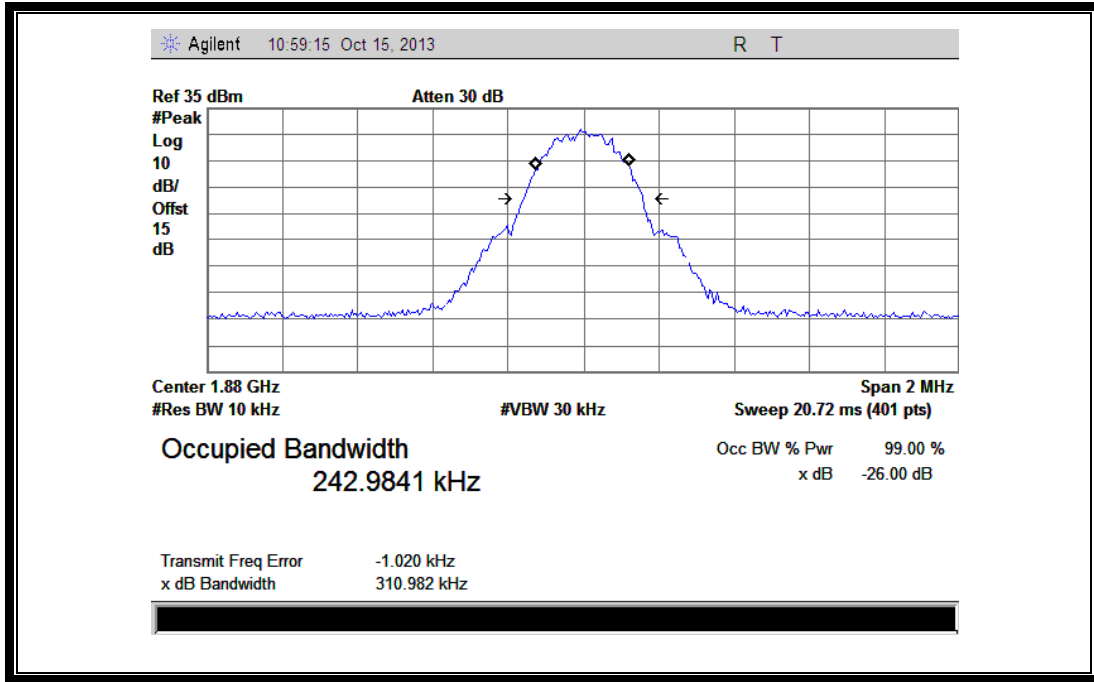
(Plot B: EGPRS 850MHz Channel = 190)



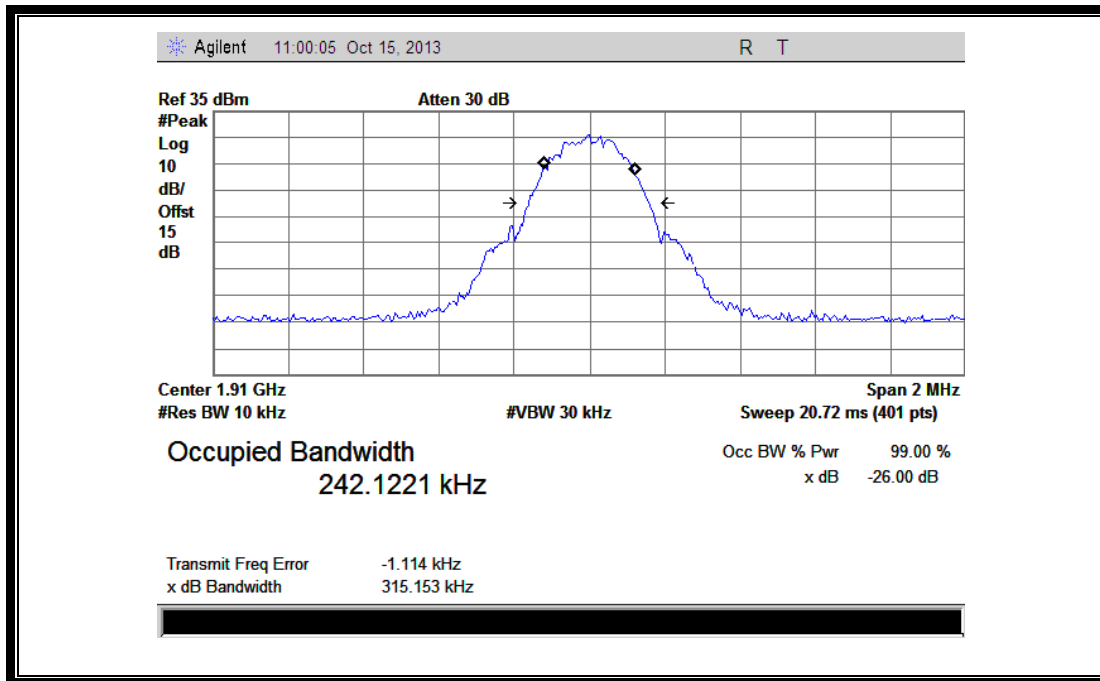
(Plot C: EGPRS 850MHz Channel = 251)



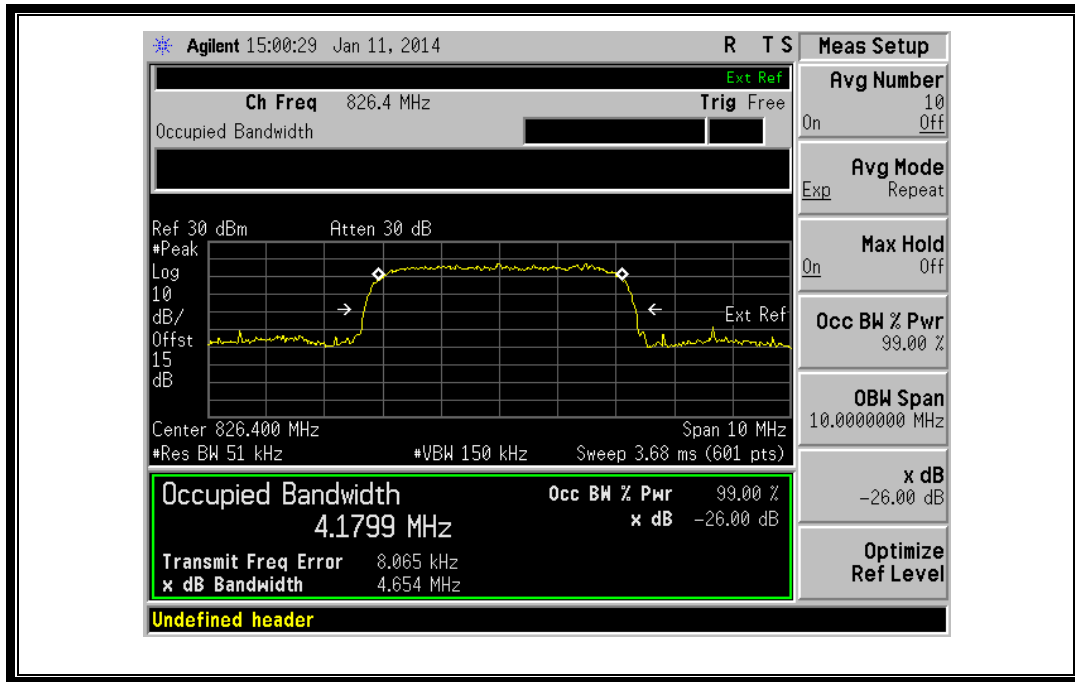
(Plot D: EGPRS1900MHz Channel = 512)



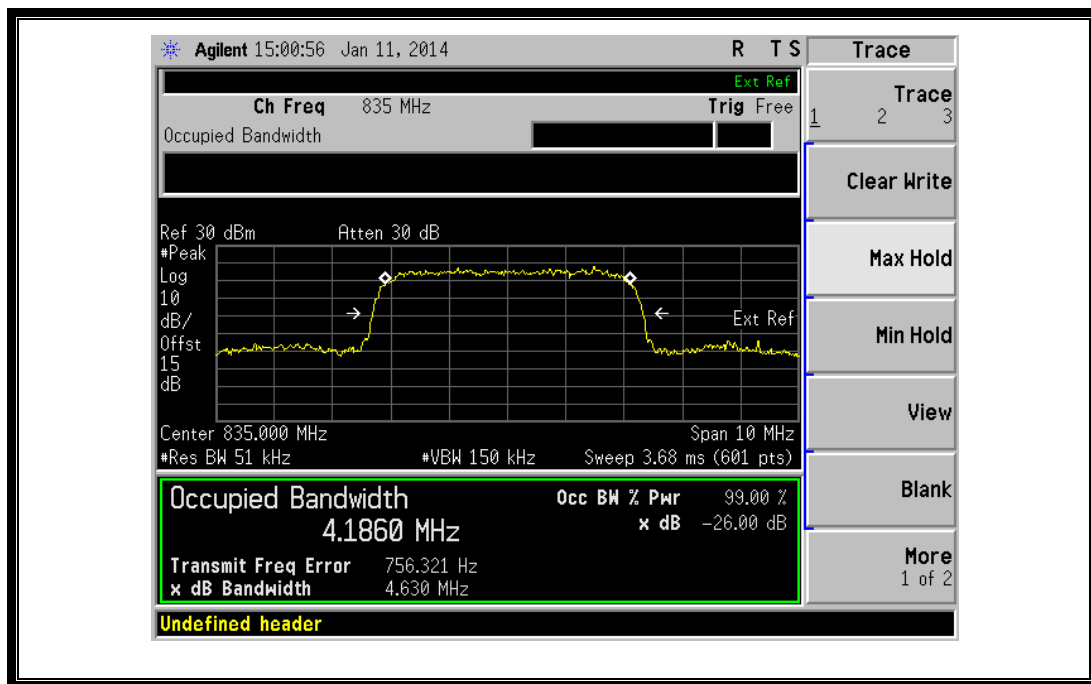
(Plot E: EGPRS1900MHz Channel = 661)



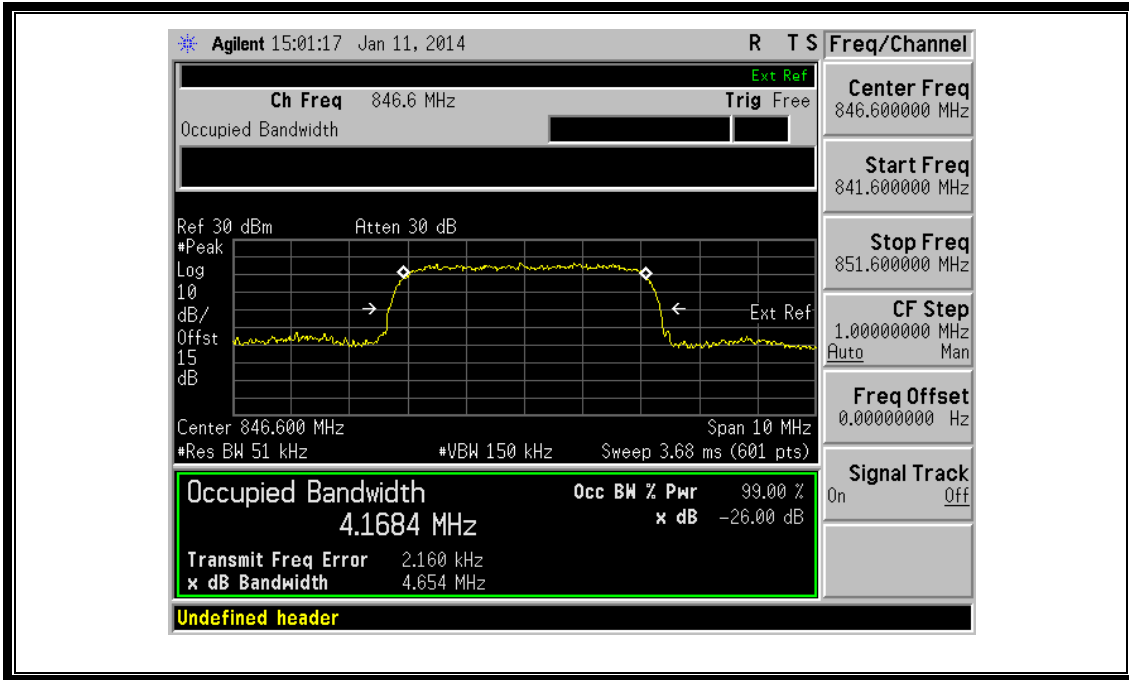
(Plot F: EGPRS 1900MHz Channel = 810)



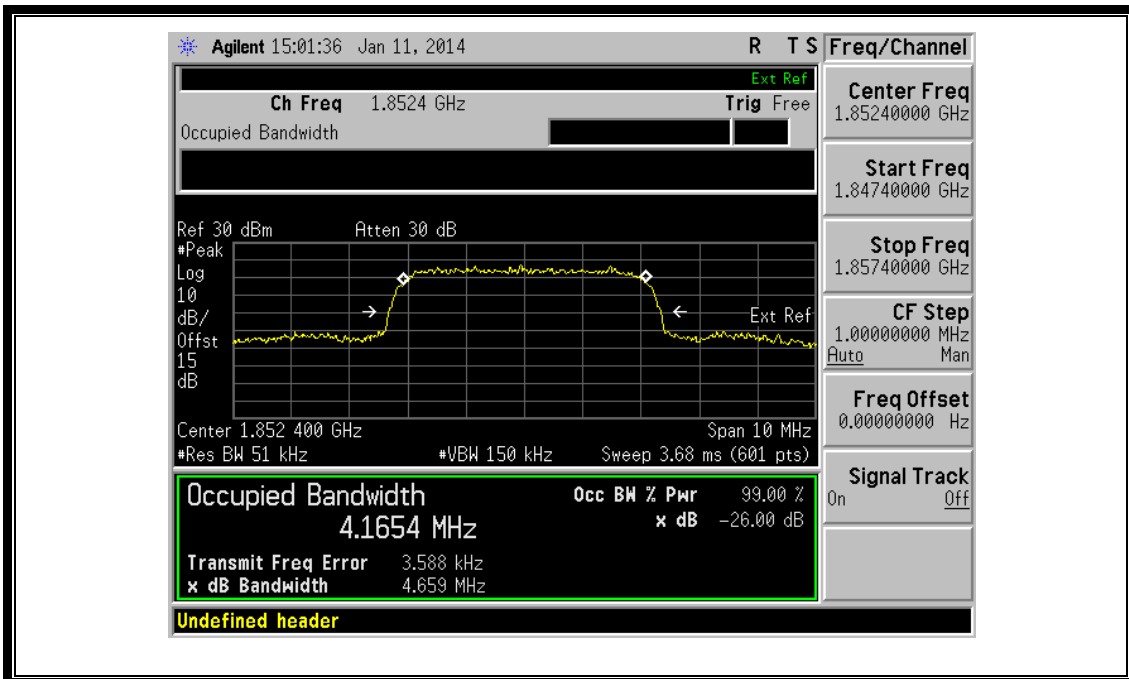
(Plot G: WCDMA 850MHz Channel = 4132)



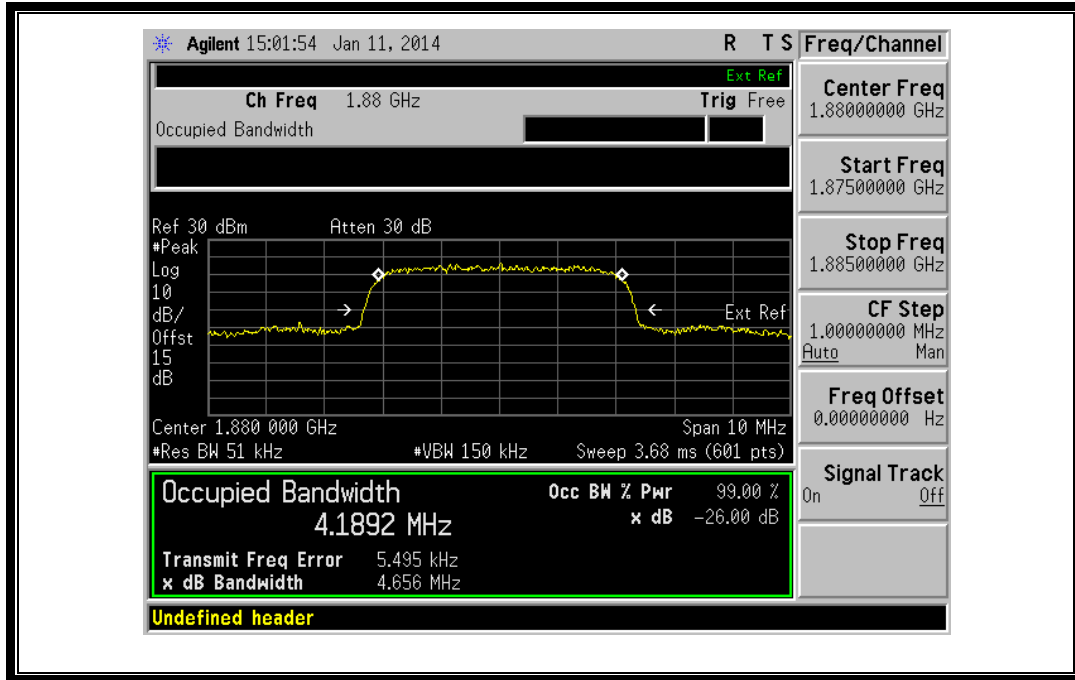
(Plot H: WCDMA 850 MHz Channel = 4175)



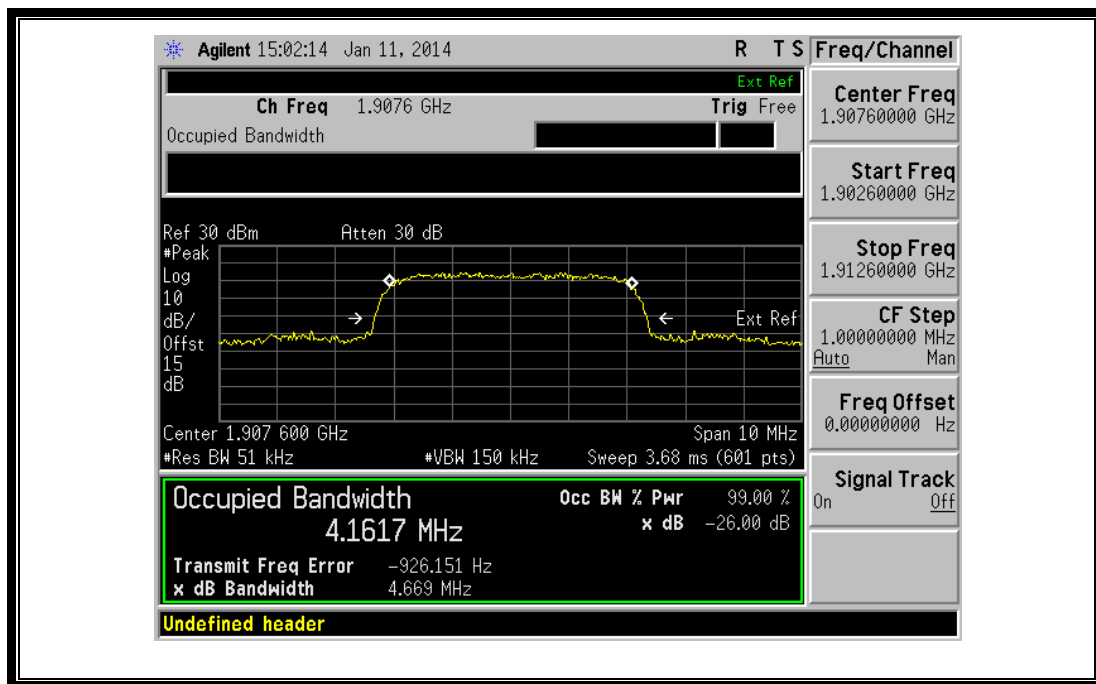
(Plot I: WCDMA 850MHz Channel = 4233)



(Plot J: WCDMA 1900MHz Channel = 9262)

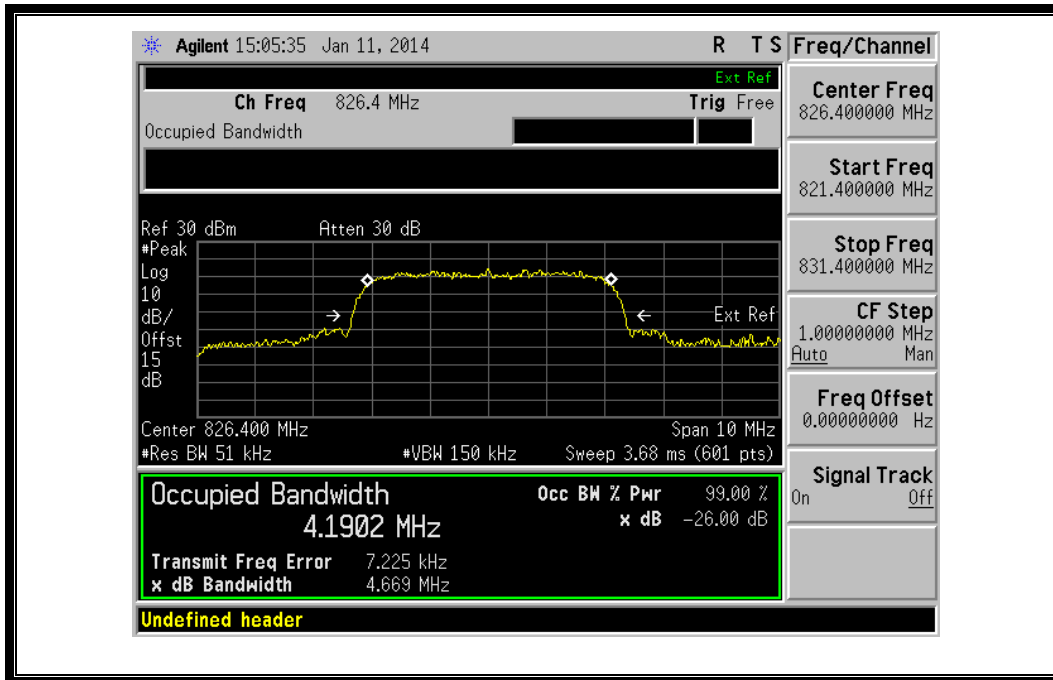


(Plot K: WCDMA 1900 MHz Channel = 9400)

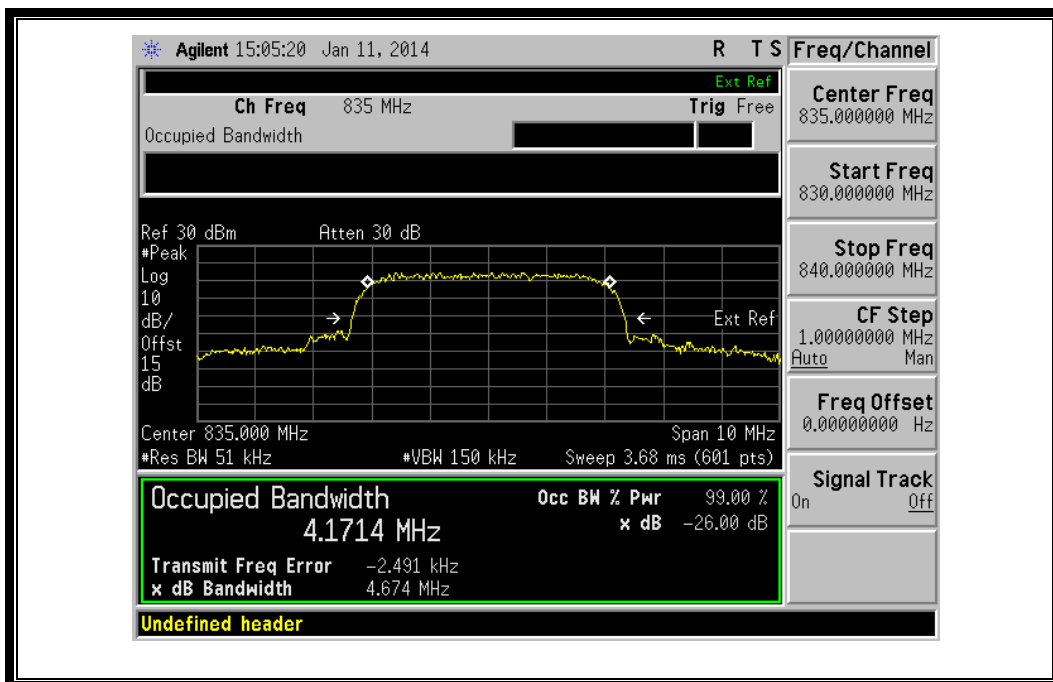


(Plot L: WCDMA1900MHz Channel = 9538)

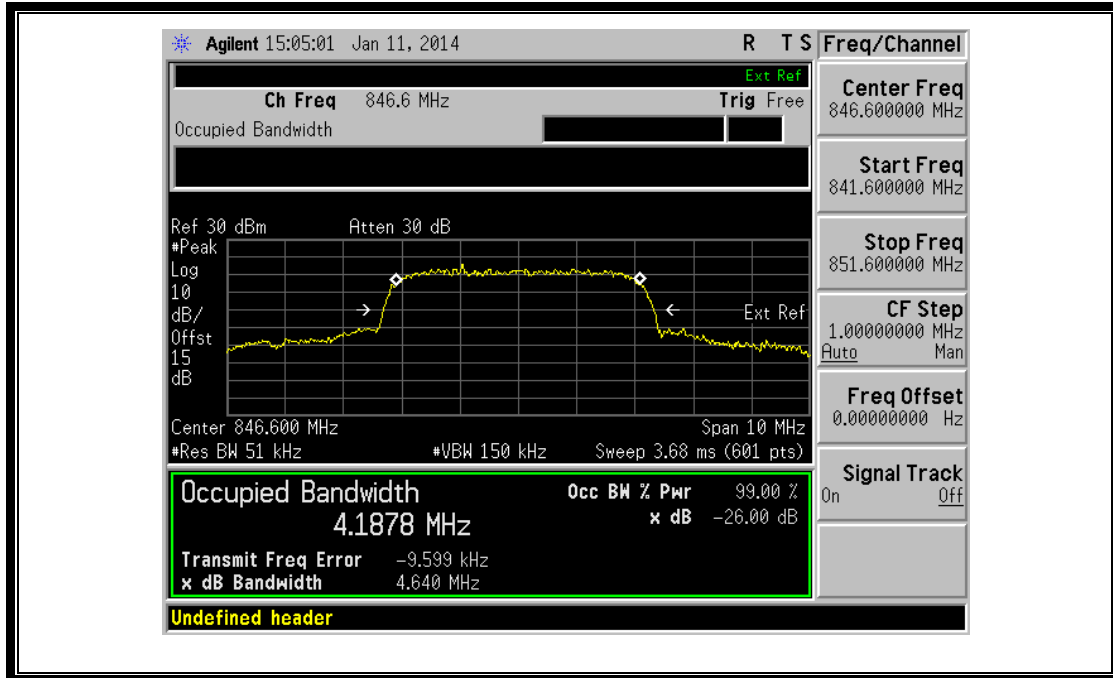




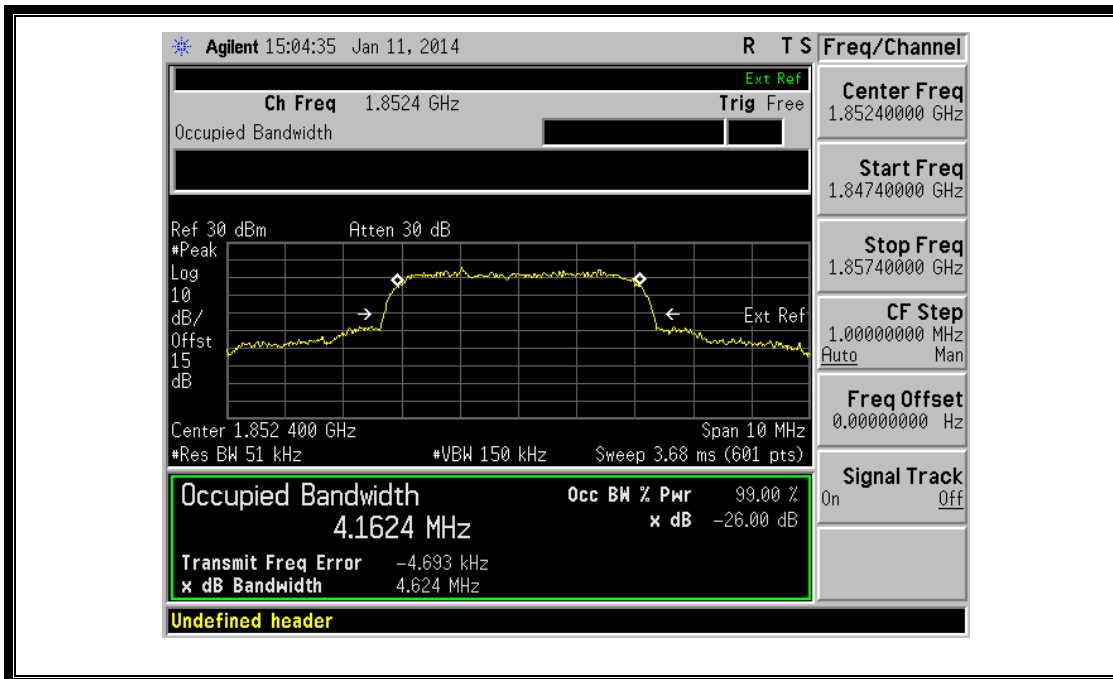
(Plot M: HSDPA 850MHz Channel = 4132)



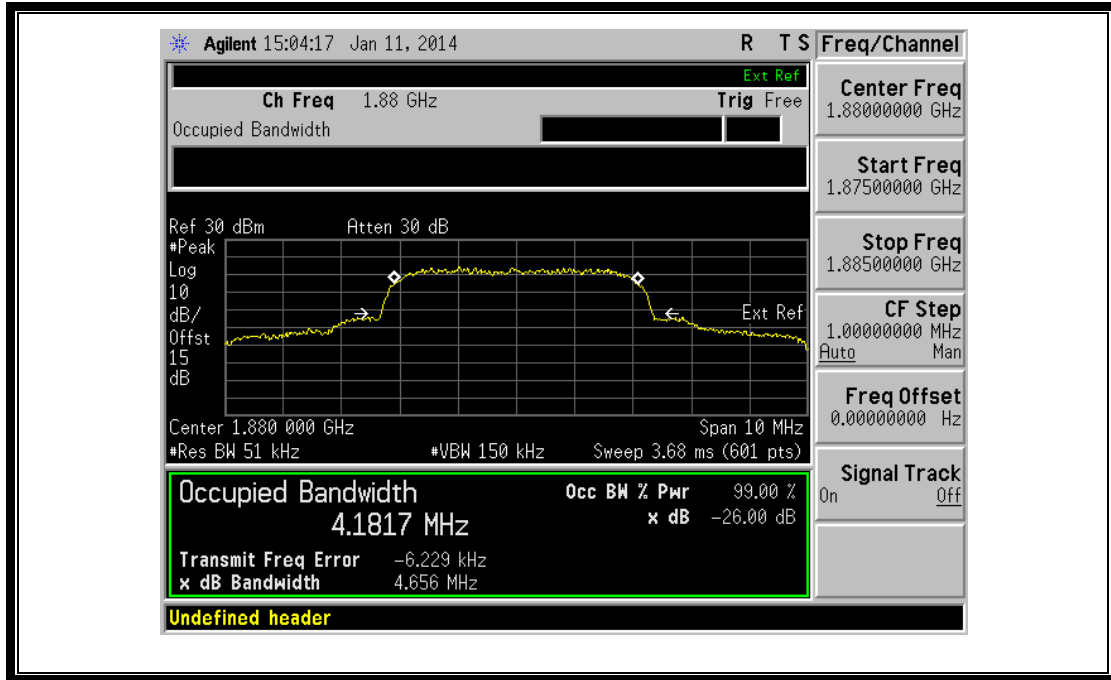
(Plot N: HSDPA850 MHz Channel = 4175)



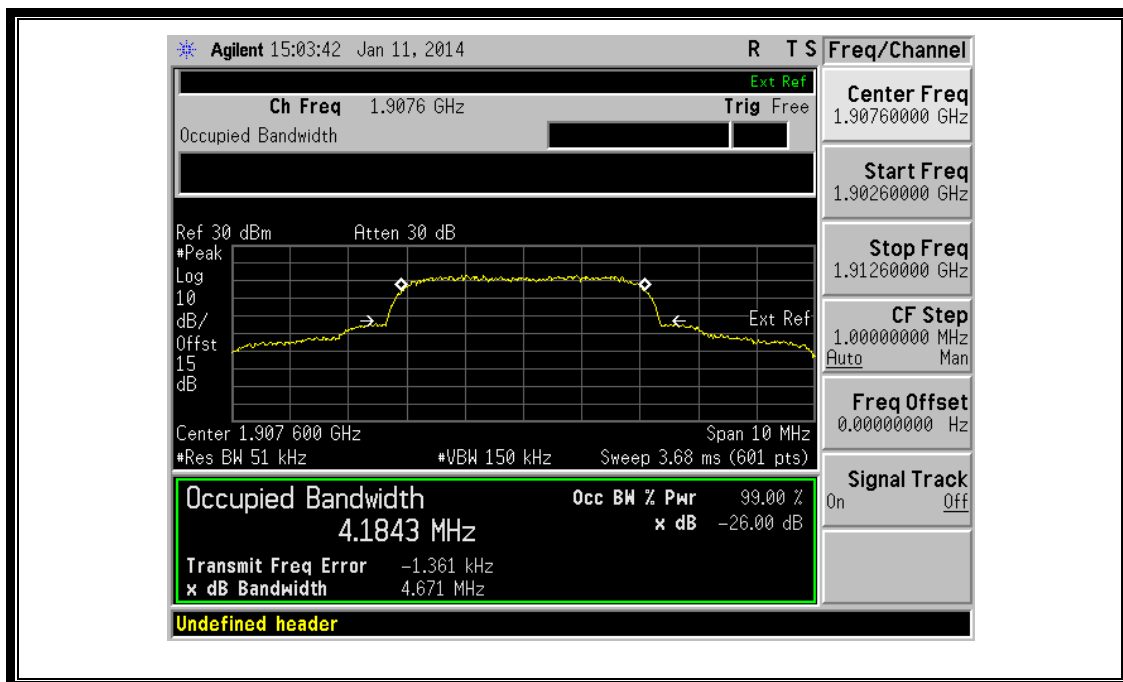
(Plot O: HSDPA 850 MHz Channel = 4233)



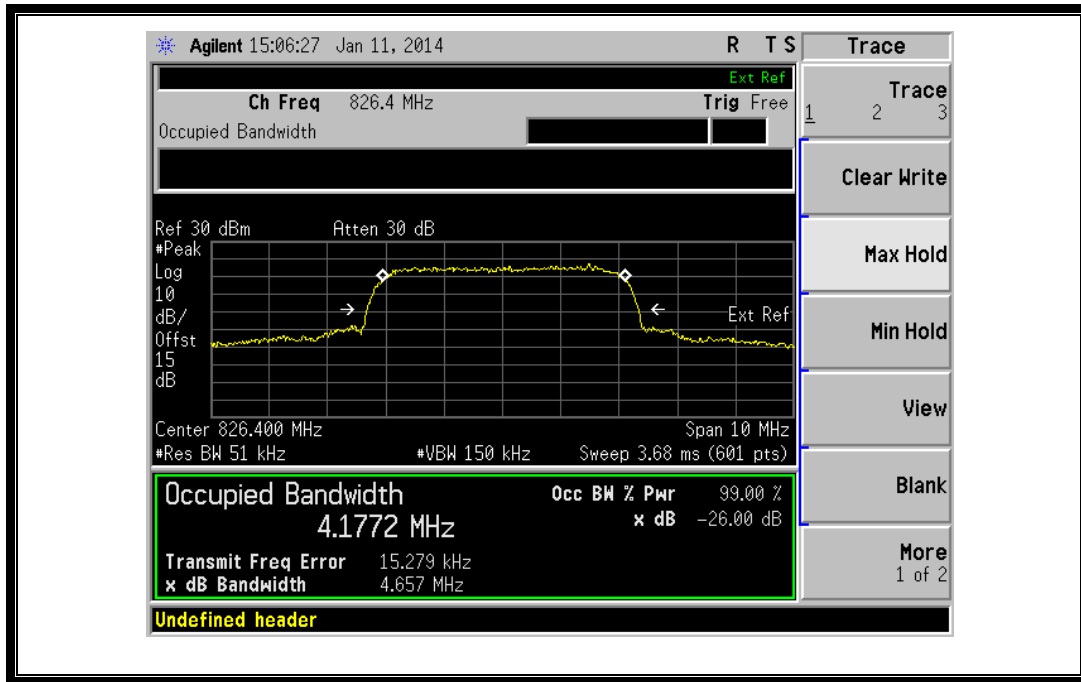
(Plot P: HSDPA1900 MHz Channel = 9262)



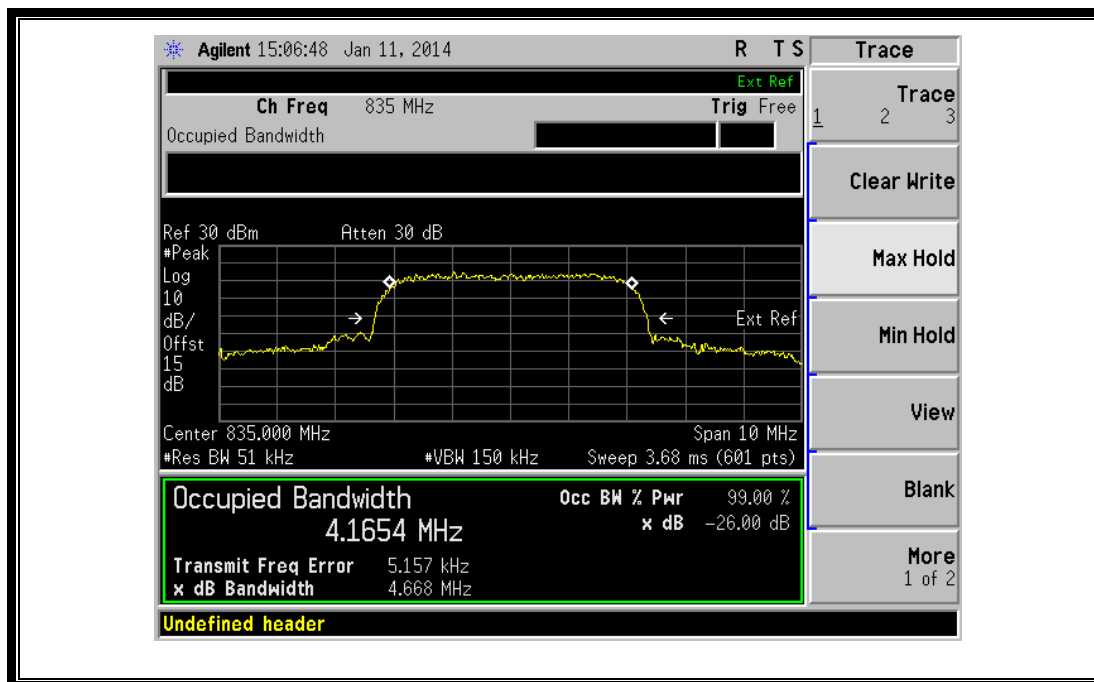
(Plot Q: HSDPA1900 MHz Channel = 9400)



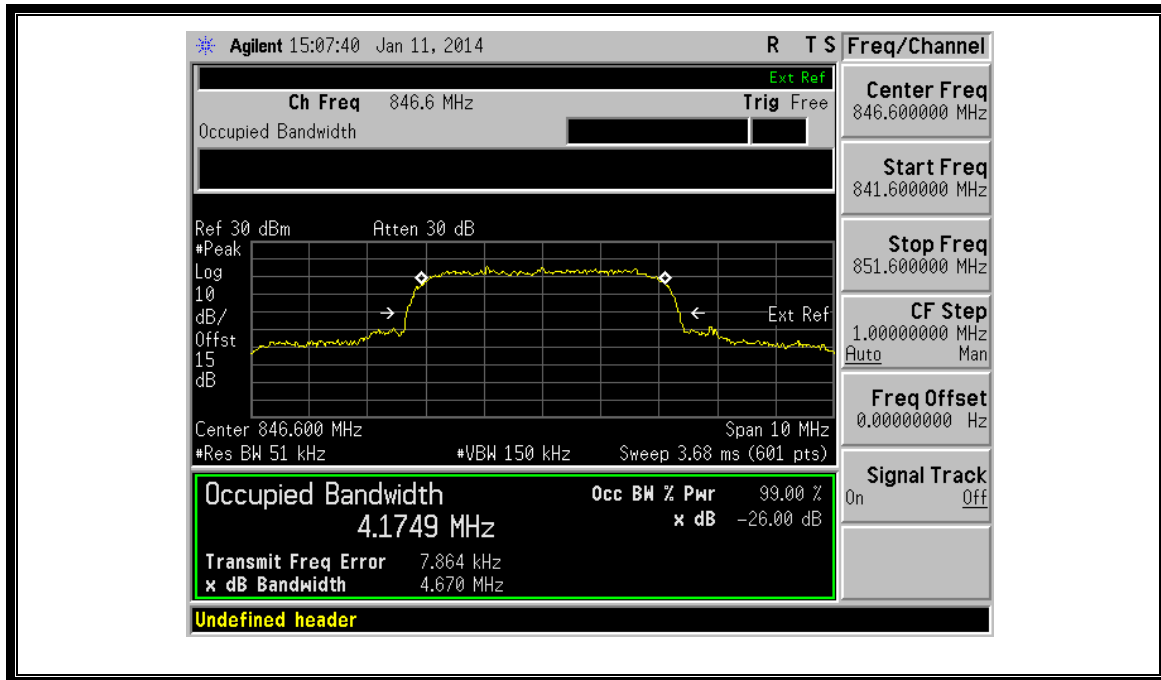
(Plot R: HSDPA 1900 MHz Channel = 9538)



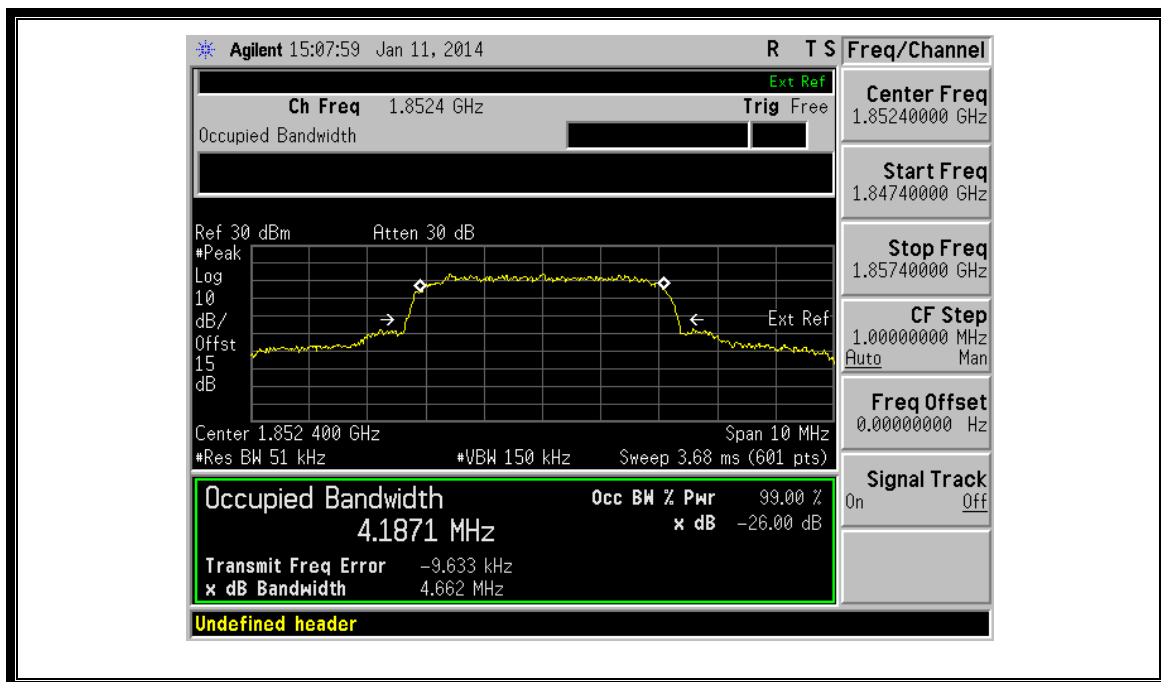
(Plot S: HSUPA850 MHz Channel = 4132)



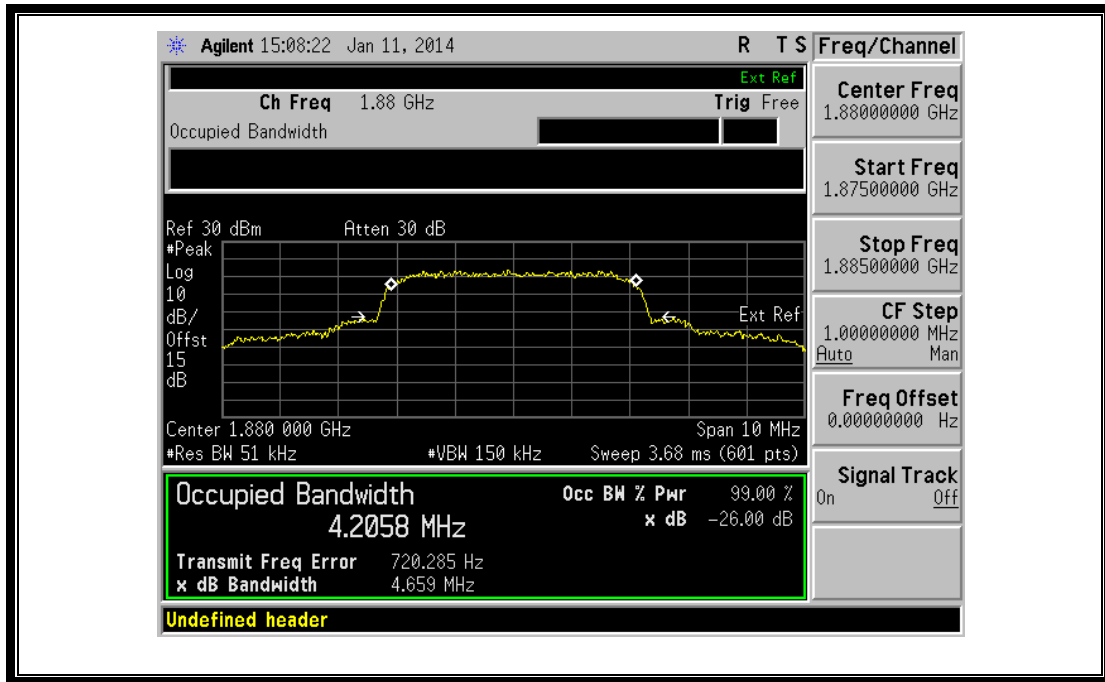
(Plot T: HSUPA850 MHz Channel = 4175)



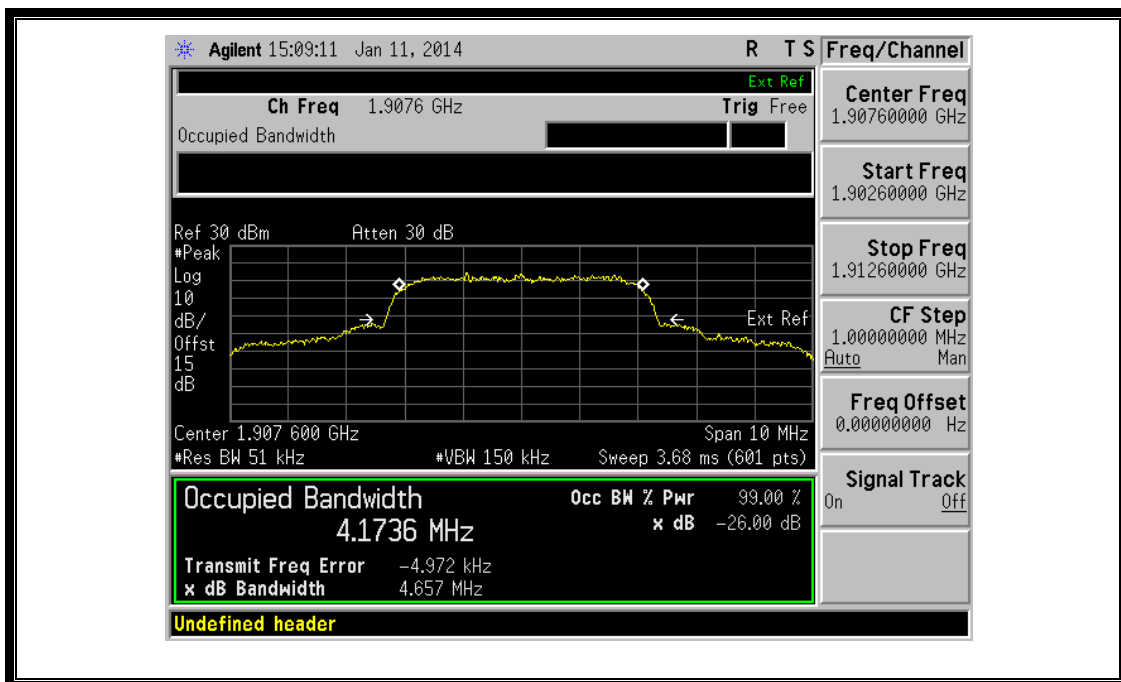
(Plot U: HSUPA850 MHz Channel = 4233)



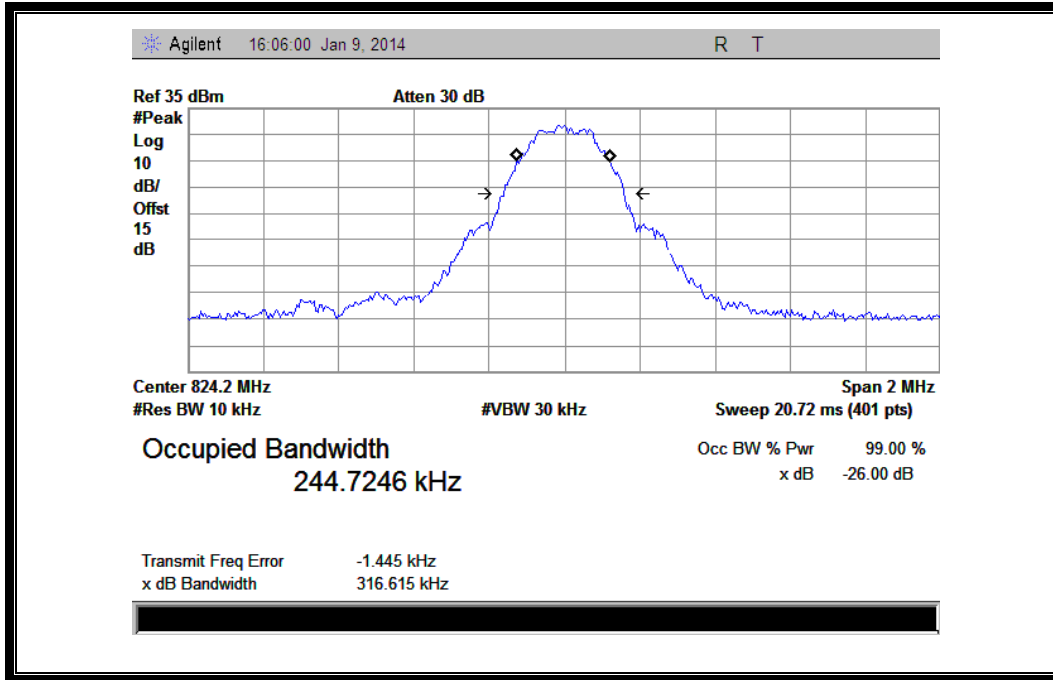
(Plot V: HSUPA1900 MHz Channel = 9262)



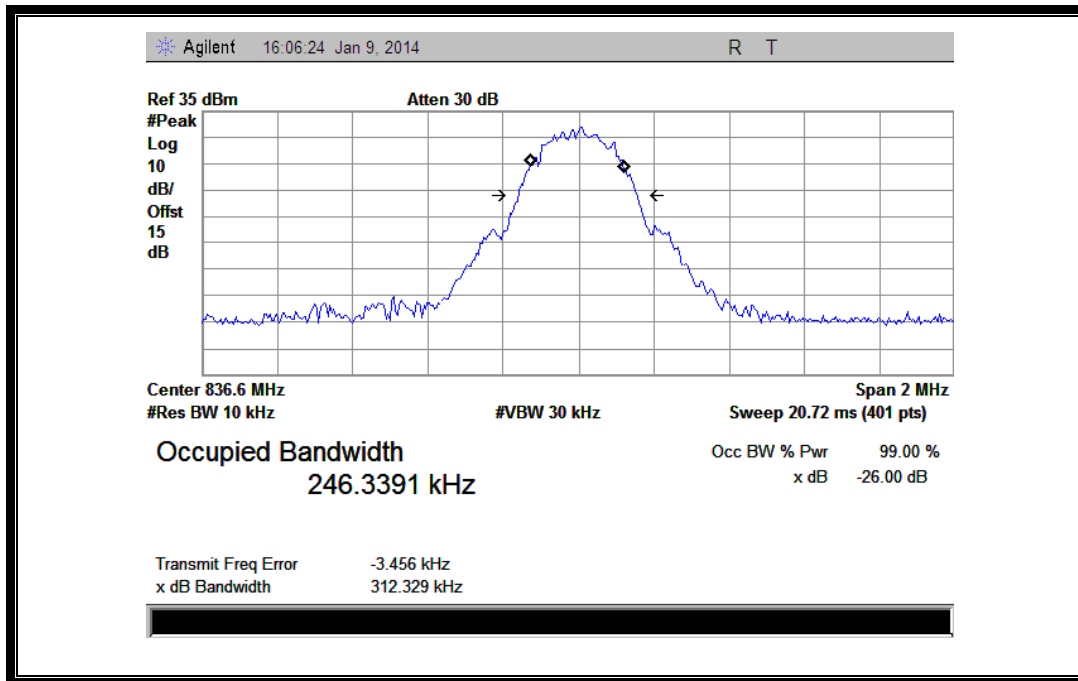
(Plot W: HSUPA1900 MHz Channel = 9400)



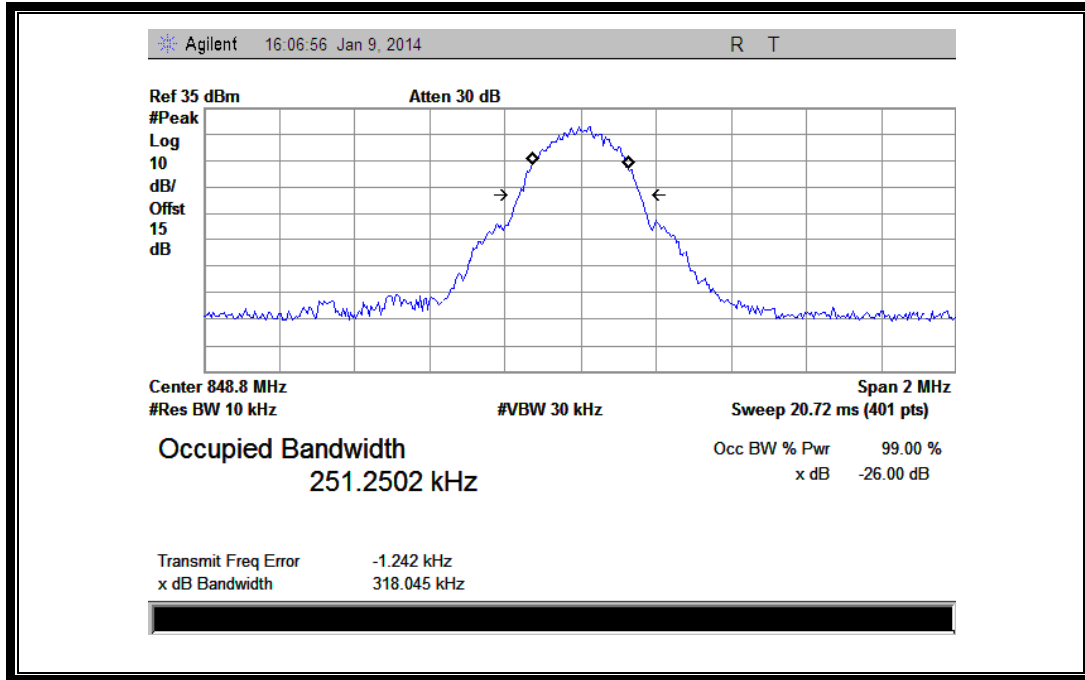
(Plot X: HSUPA1900 MHz Channel = 9538)



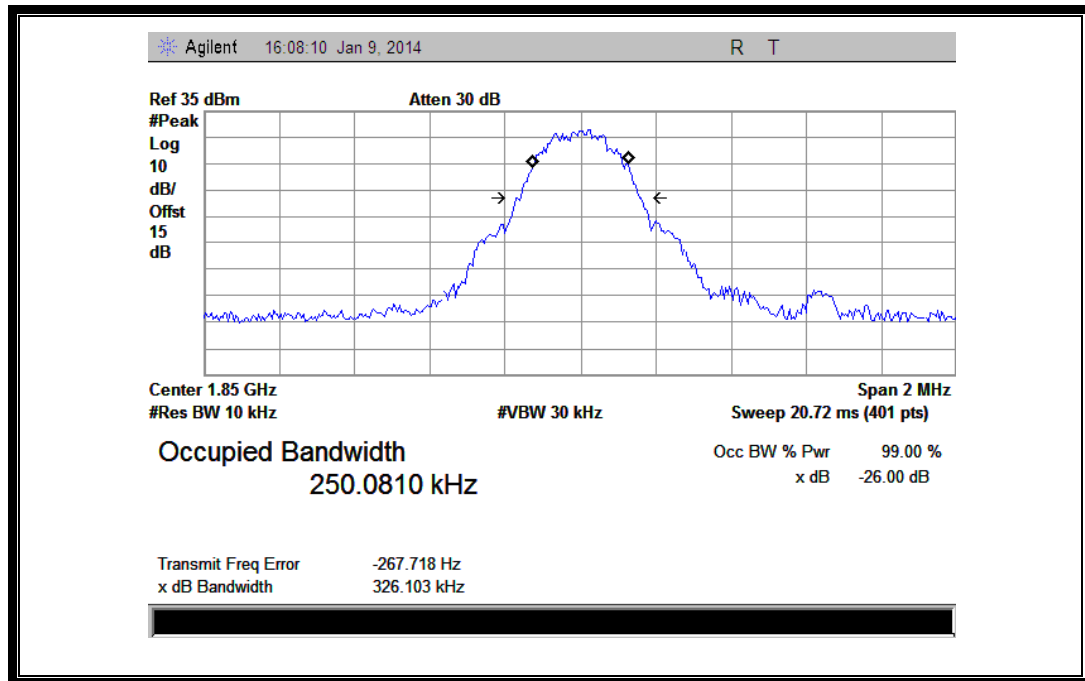
(Plot Y: GSM 850MHz Channel = 128)



(Plot Z: GSM 850MHz Channel = 190)

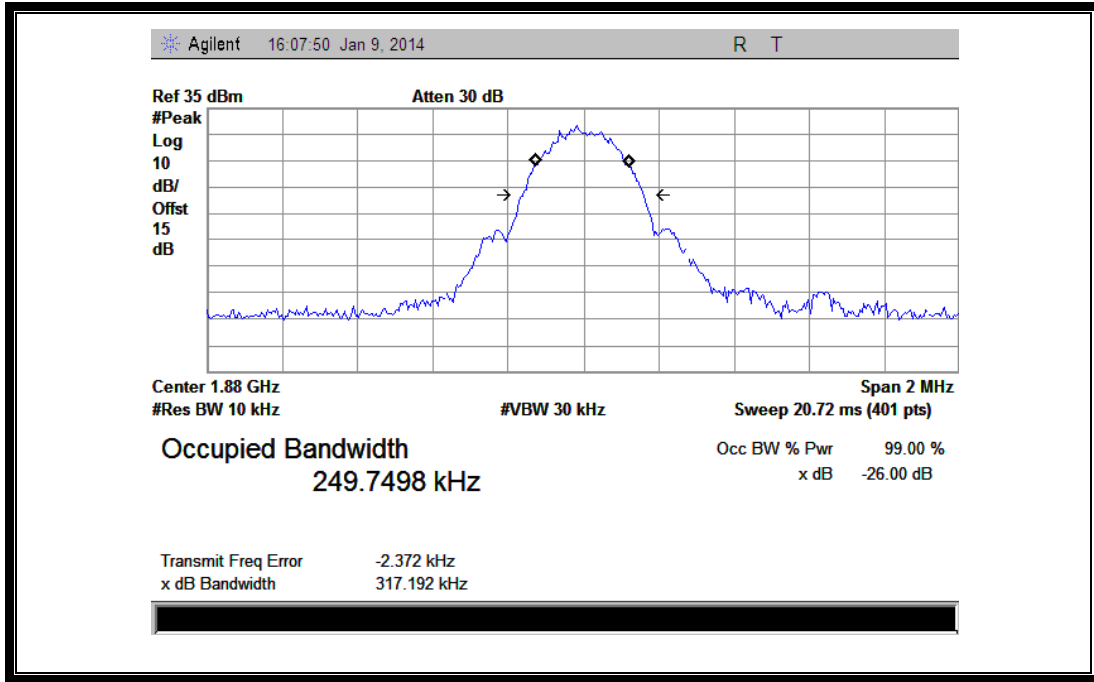


(Plot A1:GSM 850MHz Channel = 251)

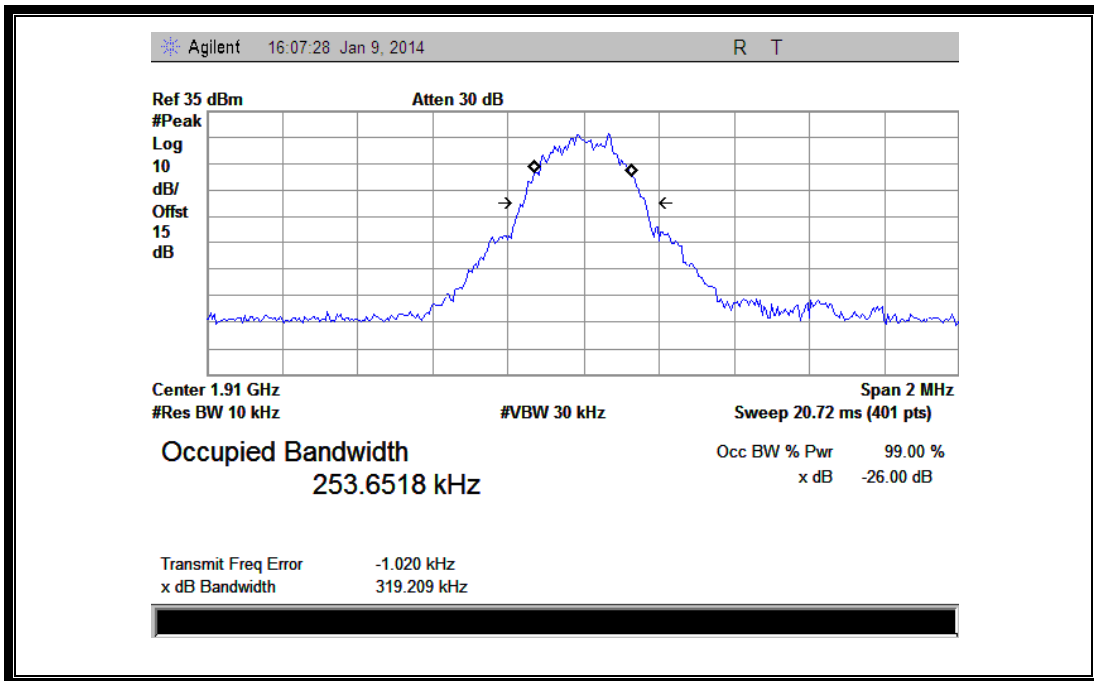


(Plot B1: GSM 1900MHz Channel = 512)

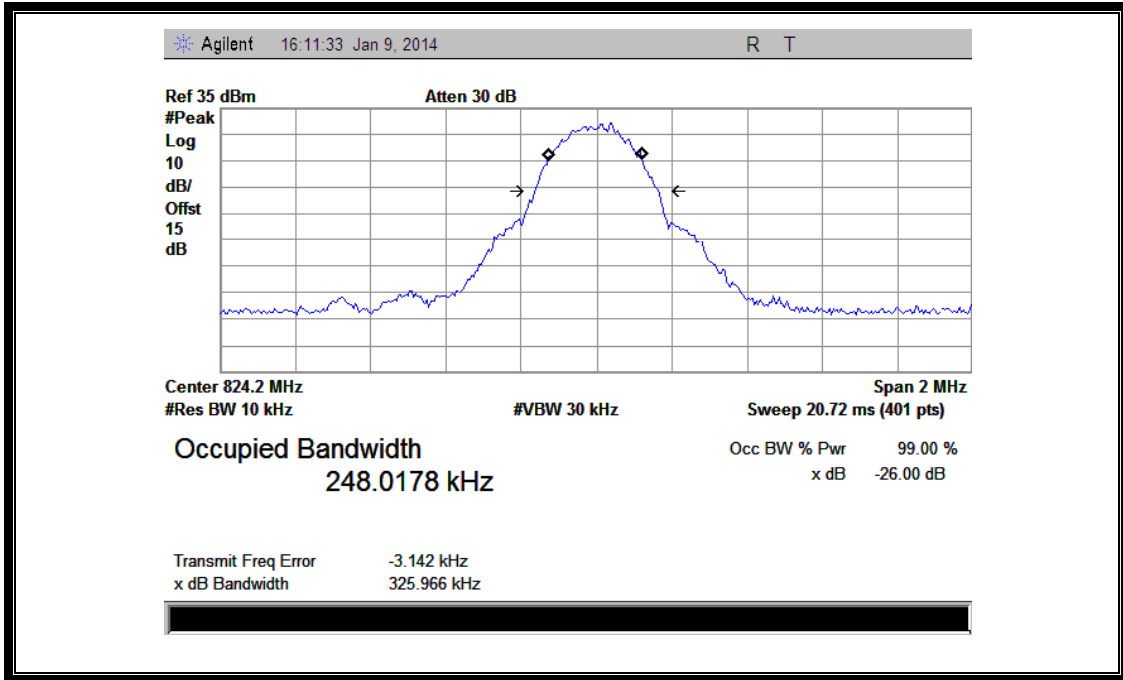




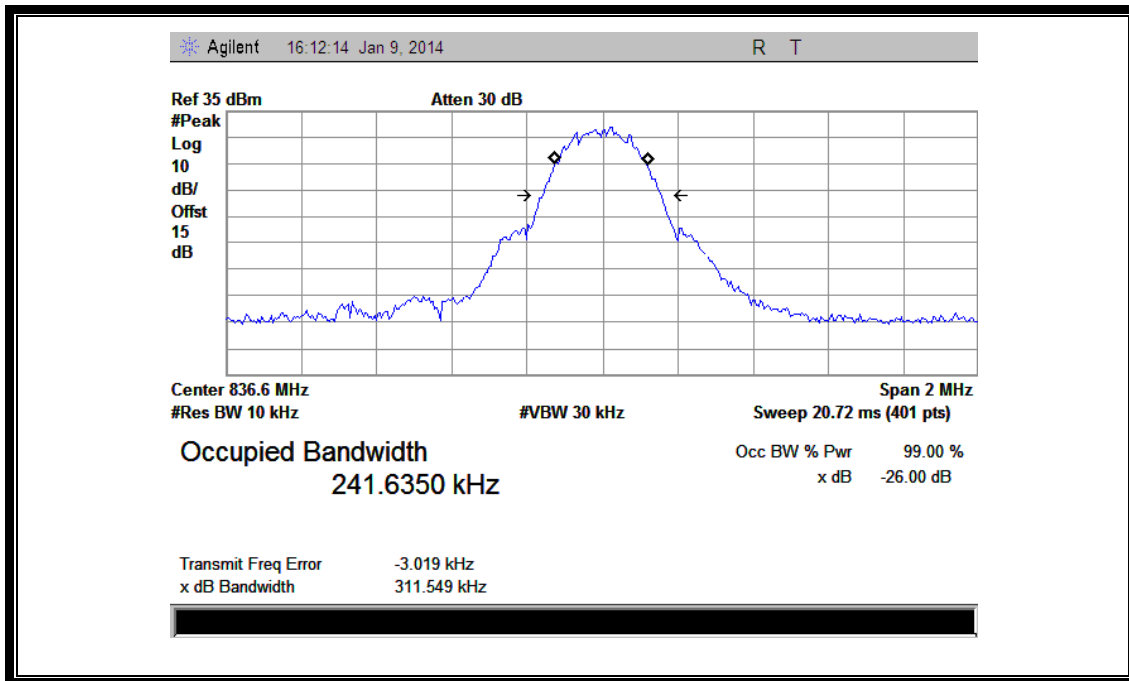
(Plot C1: GSM 1900MHz Channel = 661)



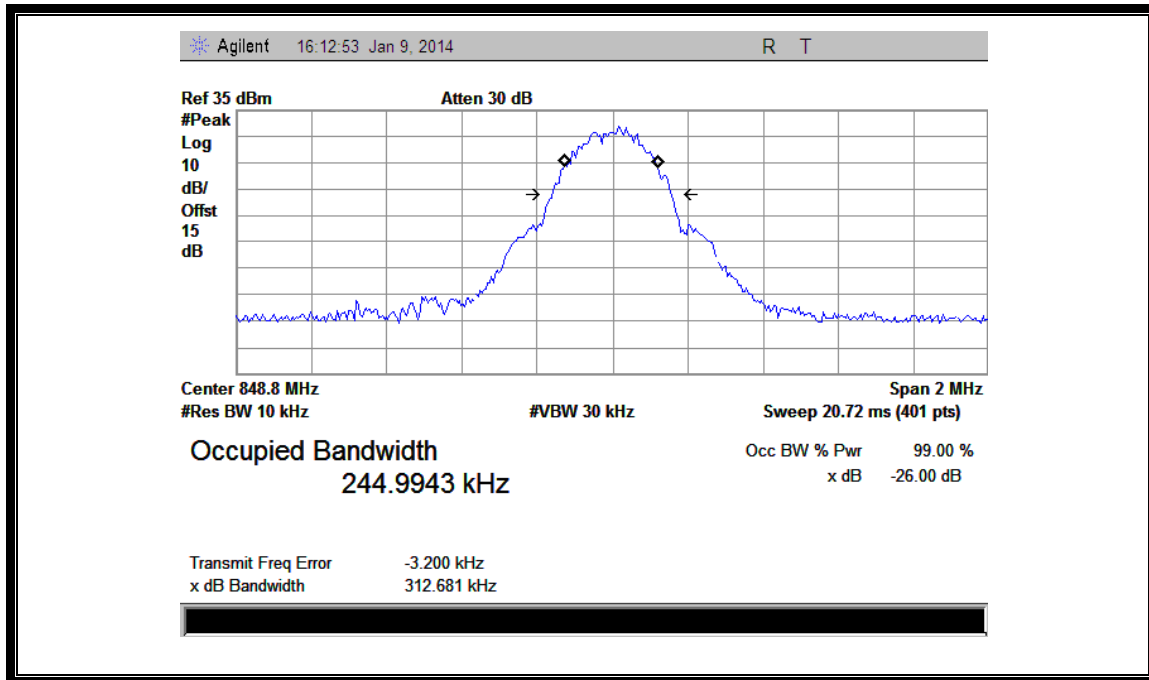
(Plot D1: GSM 1900MHz Channel = 810)



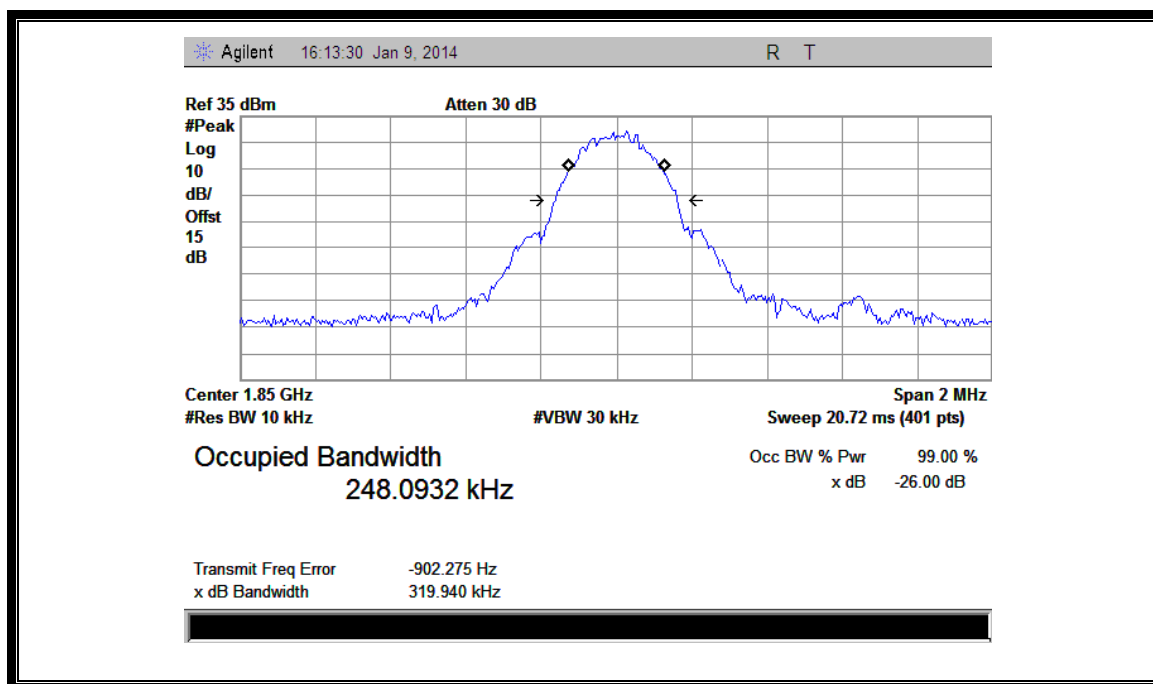
(Plot E1: GPRS 850MHz Channel = 128)



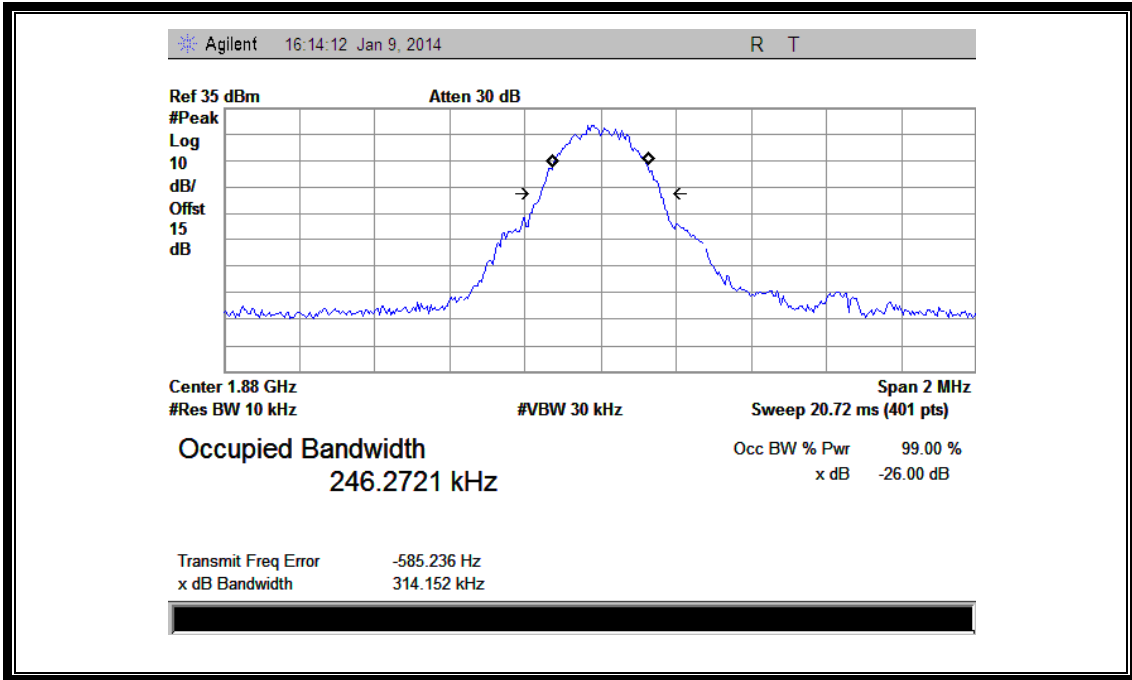
(Plot F1:GPRS 850MHz Channel = 190)



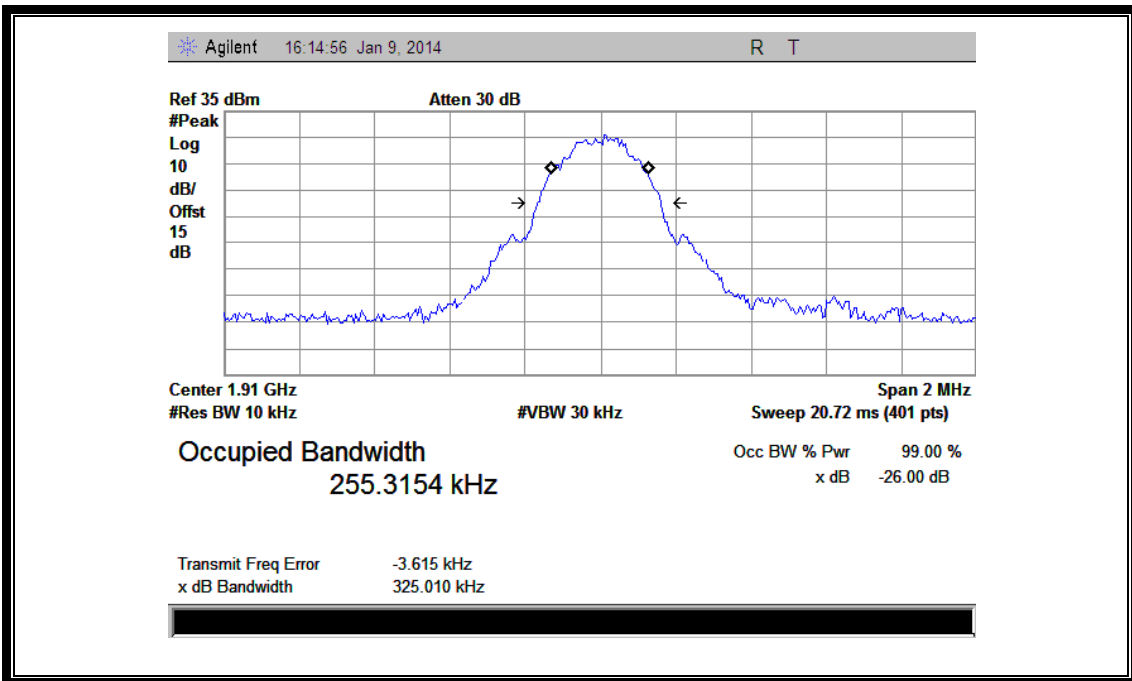
(Plot G1: GPRS850MHz Channel = 251)



(Plot H1: GPRS 1900MHz Channel = 512)



(Plot I2: GPRS 1900MHz Channel = 661)



(Plot J2: GPRS 1900MHz Channel = 810)

## 2.4 Frequency Stability

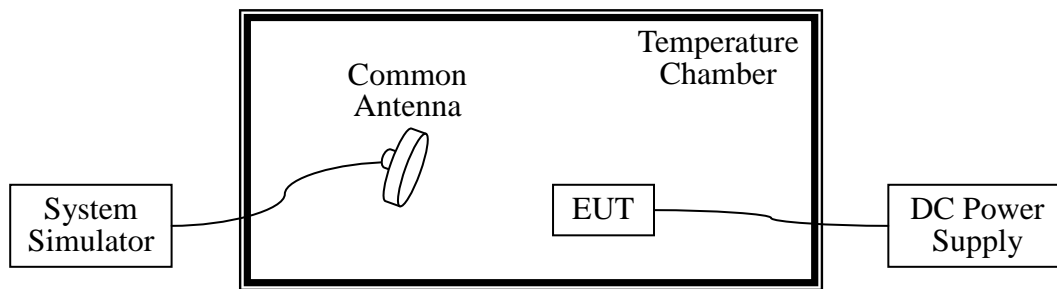
### 2.4.1 Requirement

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	2013.05.13	2014.05.12
DC Power Supply	Good Will	GPS-3030DD	EF920938	2013.05.13	2014.05.12
Temperature Chamber	YinHe Experimental Equip.	HL4003T	(n.a.)	2013.05.13	2014.05.12

### 2.4.3 Test Verdict

The nominal, highest and lowest extreme voltages are separately 3.8VDC, 4.35VDC 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  $\pm 2.5$ ppm, and 1900MHz is  $\pm 1$ ppm, 1700MHz  $\pm 1$ ppm.

### 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	
3.8	-30	-21.45	$\pm 2060.5$	22.12	$\pm 2091.5$	18.87	$\pm 2122$	<u>PASS</u>
	-20	28.31		11.43		-14.02		
	-10	-2.25		-17.46		15.16		
	0	30.26		32.14		5.05		
	+10	21.79		-24.93		3.02		
	+20	-19.56		-17.19		10.76		
	+30	34.36		19.36		-16.53		
	+40	42.63		19.64		-2.13		
	+55	35.28		23.27		-12.89		
4.35	+25	-15.73		29.05		-7.55		
3.6	+25	-18.75		36.73		7.08		

### 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	
3.8	-30	18.21	$\pm 1850.2$	20.98	$\pm 1880.0$	31.25	$\pm 1909.8$	<u>PASS</u>
	-20	37.98		-21.48		-18.78		
	-10	-2.05		-13.76		-16.88		
	0	40.06		-18.38		19.32		
	+10	1.98		-21.61		25.31		
	+20	-19.76		15.52		30.26		
	+30	39.76		-0.78		-29.21		
	+40	46.66		33.37		19.33		
	+55	39.88		24.02		-19.37		
4.35	+25	37.88		23.72		27.09		
3.6	+25	-8.69		16.92		18.99		

## 3. EDGE 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	
3.8	-30	-31.10	±2060.5	25.18	±2091.5	8.41	±2122	<u>PASS</u>
	-20	37.98		12.73		-12.80		
	-10	-2.05		-18.25		13.06		
	0	41.06		38.10		5.05		
	+10	1.99		-22.06		3.02		
	+20	-19.86		-16.11		10.76		
	+30	39.56		17.76		-16.51		
	+40	46.62		15.54		-2.11		
+55	39.98	3.57	-12.89					
4.35	+25	-15.71	14.05	-7.83				
3.6	+25	-18.02	6.73	6.88				

## 4. EDGE 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	
3.8	-30	-14.87	±1850.2	24.02	±1880.0	2.57	±1909.8	<u>PASS</u>
	-20	0.72		7.43		-12.76		
	-10	1.75		-25.78		-13.21		
	0	2.57		-1.36		13.23		
	+10	-10.78		-17.98		5.23		
	+20	-2.11		-21.61		35.16		
	+30	14.03		14.58		-26.88		
	+40	5.43		-0.78		19.34		
+55	-2.46	37.07	-16.77					
4.35	+25	18.02	4.08	26.59				
3.6	+25	-8.29	13.13	19.73				

## 5. WCDMA 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 4123 (826.4MHz)		Channel = 4175 (835MHz)		Channel = 4233 (846.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	18.29	±2066	12.87	±2087.5	-1.30	±2116.5	<u>PASS</u>
	-20	-7.42		-0.52		-18.38		
	-10	-3.43		22.45		7.67		
	0	16.47		13.25		4.32		
	+10	30.18		1.31		-17.33		
	+20	32.07		-12.22		11.90		
	+30	-7.98		30.62		6.63		
	+40	26.31		13.45		28.93		
+55	12.10	-12.42	19.76					
4.35	+25	-6.17		30.52		23.19		
3.6	+25	19.66		-17.90		-19.60		

## 6. WCDMA 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 9262 (1852.4MHz)		Channel = 9400 (1880.0MHz)		Channel = 9538 (1907.6MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.8	-30	-4.72	±1852.4	-13.57	±1880.0	-8.89	±1907.6	<u>PASS</u>
	-20	18.35		12.28		24.60		
	-10	5.35		-14.36		15.11		
	0	18.92		18.59		-3.17		
	+10	31.40		21.39		18.12		
	+20	13.55		37.27		-10.39		
	+30	1.31		2.37		17.47		
	+40	-12.52		-13.47		27.84		
+55	-13.65	-5.81	-2.53					
4.35	+25	23.23		14.68		21.05		
3.6	+25	22.12		27.37		-24.22		



## 7. HSDPA 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 4123 (826.4MHz)		Channel = 4175 (835MHz)		Channel = 4233 (846.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	26.46	±2066	-25.07	±2087.5	16.11	±2116.5	<u>PASS</u>
	-20	-8.66		-14.06		14.41		
	-10	20.85		36.23		21.57		
	0	12.78		-8.41		-24.37		
	+10	-14.75		-13.95		-13.96		
	+20	8.78		-24.37		35.23		
	+30	-1.49		12.88		-8.31		
	+40	17.14		-14.75		-13.95		
+55	-23.61	23.37	25.37					
4.35	+25	32.03		7.93		7.98		
3.6	+25	18.11		-30.21		1.88		

## 8. HSDPA 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 9262 (1852.4MHz)		Channel = 9400 (1880.0MHz)		Channel = 9538 (1907.6MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.8	-30	12.87	±1852.4	-3.81	±1880	2.51	±1907.6	<u>PASS</u>
	-20	-16.05		22.71		-8.48		
	-10	20.42		15.37		-14.02		
	0	-3.11		-12.21		-9.01		
	+10	21.71		10.60		5.64		
	+20	20.12		-4.81		-3.85		
	+30	-15.01		34.31		9.57		
	+40	22.71		8.46		27.54		
+55	16.42	-24.88	-12.42					
4.35	+25	-11.25		29.53		-2.83		
3.6	+25	10.43		-2.37		15.42		

## 9. HSUPA 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 4123 (826.4MHz)		Channel = 4175 (835MHz)		Channel = 4233 (846.6MHz)		
		Hz	Limit	Hz	Limit	Hz	Limit	
3.8	-30	26.02	±2066	13.51	±2087.5	13.75	±2116.5	<u>PASS</u>
	-20	-16.40		-19.43		27.52		
	-10	-12.71		-12.79		37.71		
	0	-14.09		-0.44		-7.32		
	+10	-0.37		0.01		-4.91		
	+20	-11.85		-6.64		21.35		
	+30	29.57		24.25		-5.94		
	+40	-11.89		9.73		13.78		
+55	-0.45	24.76	28.55					
4.35	+25	1.78		-4.67		29.31		
3.6	+25	1.55		6.25		-7.80		

## 10. HSUPA 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 9262 (1852.4MHz)		Channel = 9400 (1880.0MHz)		Channel = 9538 (1907.6MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.8	-30	32.57	±1852.4	-12.79	±1880	7.09	±1907.6	<u>PASS</u>
	-20	28.13		-0.84		2.11		
	-10	7.82		0.11		-4.85		
	0	2.41		14.82		17.08		
	+10	-4.73		-15.25		-1.86		
	+20	16.22		-11.79		23.52		
	+30	-1.55		-0.44		-0.48		
	+40	24.16		1.25		-12.05		
+55	14.79	-7.84	-5.81					
4.35	+25	-8.08		6.71		25.38		
3.6	+25	23.58		-1.73		-15.88		

## 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 10<sup>th</sup> harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

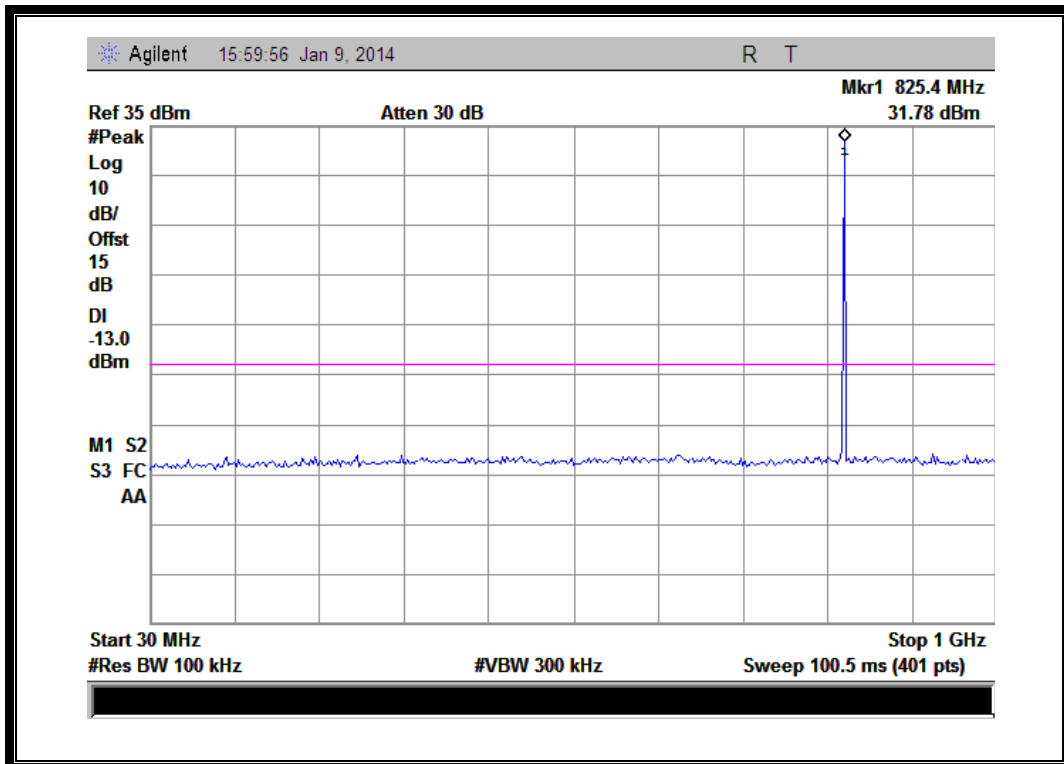
#### 1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GSM 850MHz	128	824.2	-19.25	Plot A1toA1.1	-13	<u>PASS</u>
	190	836.6	-19.28	Plot A2toA2.1		<u>PASS</u>
	251	848.8	-19.23	Plot A3toA3.1		<u>PASS</u>
GSM 1900MHz	512	1850.2	-18.33	Plot B1toB1.1	-13	<u>PASS</u>
	661	1880.0	-18.96	Plot B2toB2.1		<u>PASS</u>
	810	1909.8	-18.96	Plot B3toB3.1		<u>PASS</u>
EDGE 850MHz	128	824.2	-19.87	Plot C1toC1.1	-13	<u>PASS</u>
	190	836.6	-19.41	Plot C2toC2.1		<u>PASS</u>
	251	848.8	-18.81	Plot C3toC3.1		<u>PASS</u>
EDGE 1900MHz	512	1850.2	-19.48	Plot D1toD1.1	-13	<u>PASS</u>
	661	1880.0	-18.88	Plot D2toD2.1		<u>PASS</u>
	810	1909.8	-20.02	Plot D3toD3.1		<u>PASS</u>
WCDMA 850MHz	4132	826.4	-20.17	Plot E1toE1.1	-13	<u>PASS</u>
	4175	835	-20.09	Plot E2toE2.1		<u>PASS</u>
	4233	846.6	-20.17	Plot E3toE3.1		<u>PASS</u>
WCDMA 1900MHz	9262	1852.4	-18.52	Plot F1toF1.1	-13	<u>PASS</u>
	9400	1880	-19.65	Plot F2toF2.1		<u>PASS</u>
	9538	1907.6	-19.30	Plot F3toF3.1		<u>PASS</u>
HSDPA	4132	826.4	-19.98	Plot G1toG1.1	-13	<u>PASS</u>

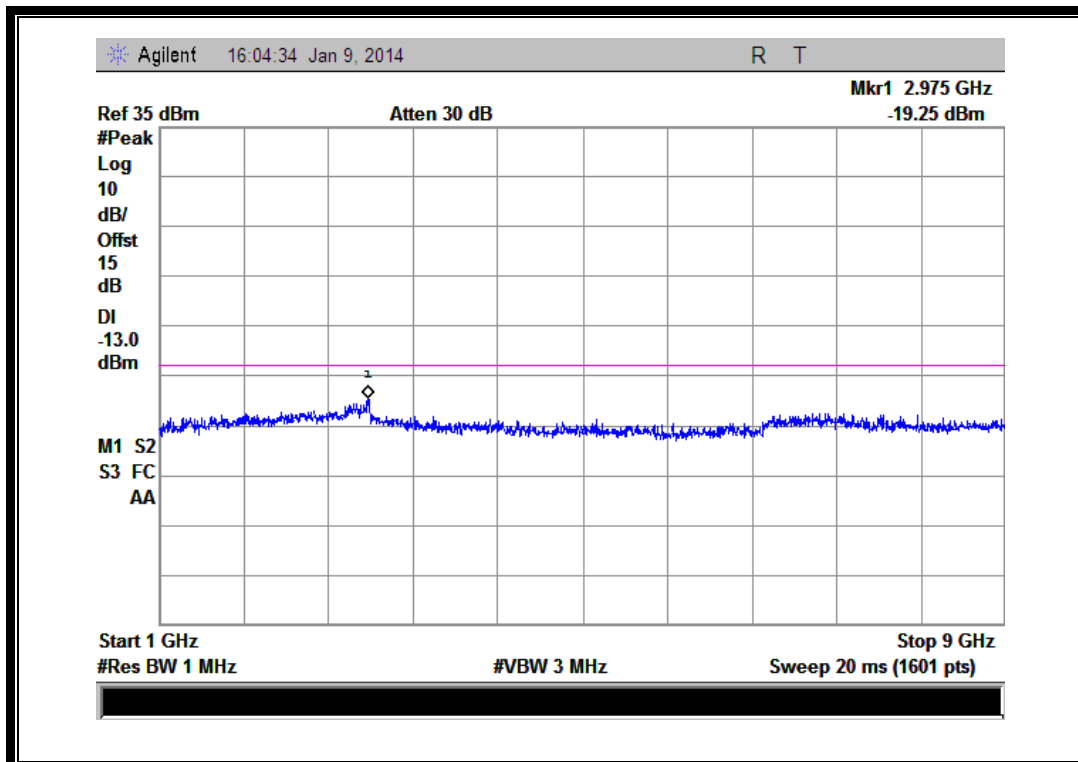
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
850MHz	4175	835	-21.00	Plot G2toG2.1		<u>PASS</u>
	4233	846.6	-20.39	Plot G3toG3.1		<u>PASS</u>
HSDPA 1900MHz	9262	1852.4	-19.55	Plot H1toH1.1	-13	<u>PASS</u>
	9400	1880	-19.35	Plot H2toH2.1		<u>PASS</u>
	9538	1907.6	-19.46	Plot H3toH3.1		<u>PASS</u>
HSUPA 850MHz	4132	826.4	-20.83	Plot I1toI1.1	-13	<u>PASS</u>
	4175	835	-20.59	Plot I2toI2.1		<u>PASS</u>
	4233	846.6	-20.39	Plot I3toI3.1		<u>PASS</u>
HSUPA 1900MHz	9262	1852.4	-19.20	Plot J1toJ1.1	-13	<u>PASS</u>
	9400	1880	-19.99	Plot J2toJ2.1		<u>PASS</u>
	9538	1907.6	-20.89	Plot J3toJ3.1		<u>PASS</u>

2. Test Plots for the Whole Measurement Frequency Range:

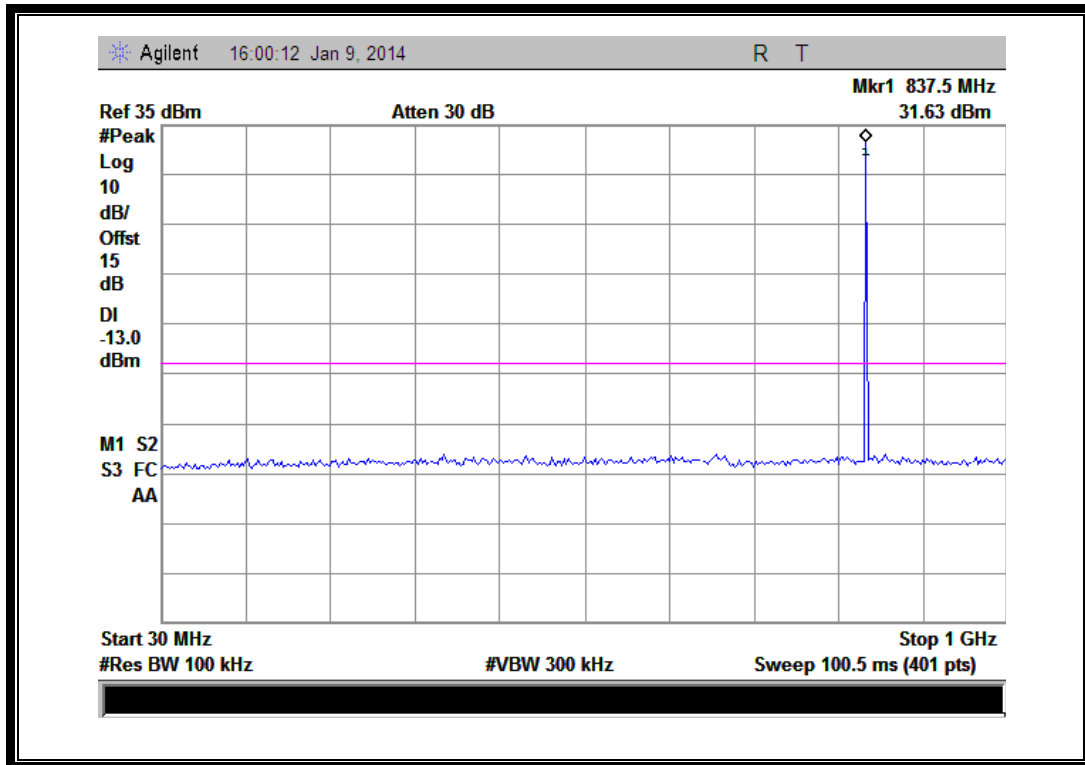
**Note:** the power of the EUT transmitting frequency should be ignored.



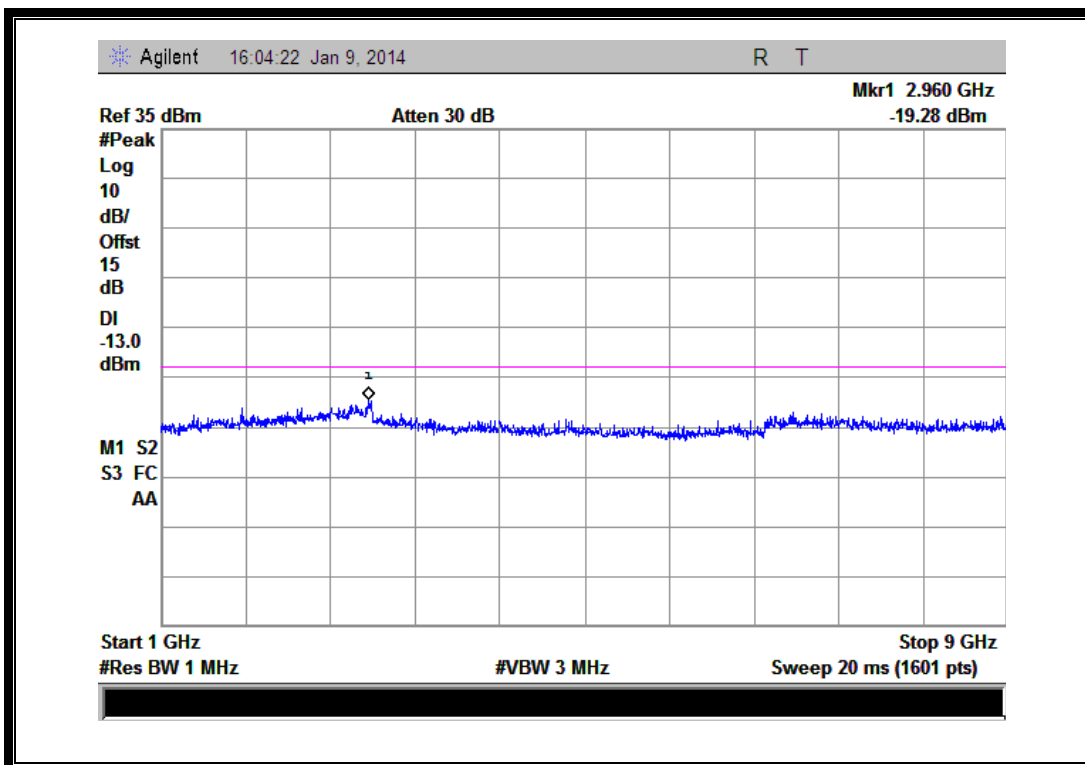
(Plot A1:GSM 850MHz Channel = 128, 30MHz to 1GHz)



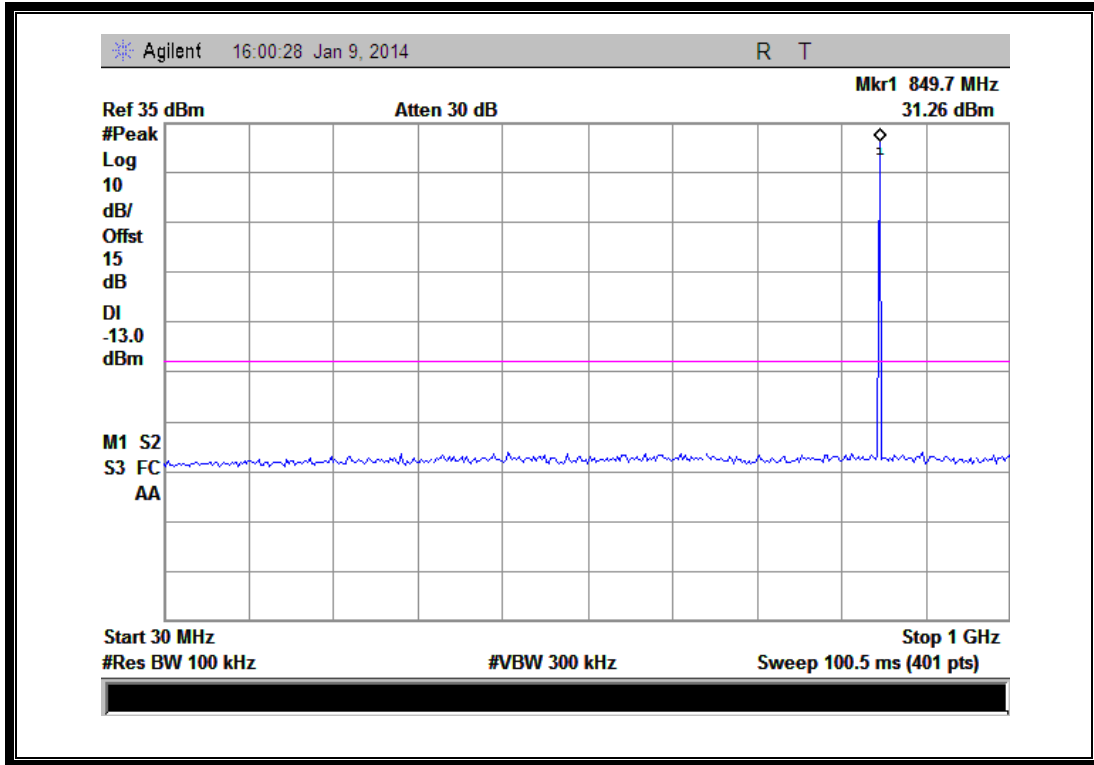
(Plot A1.1: GSM 850MHz Channel = 128, 1GHz to 9GHz)



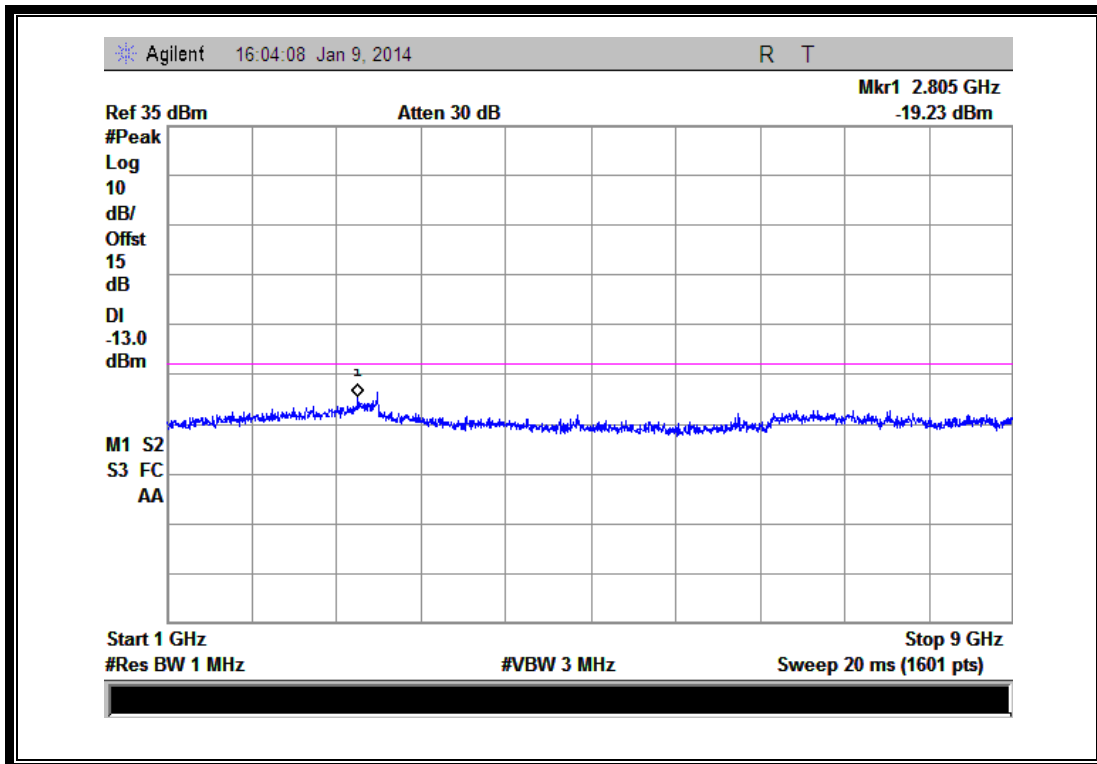
(Plot A2:GSM 850MHz Channel = 190, 30MHz to 1GHz)



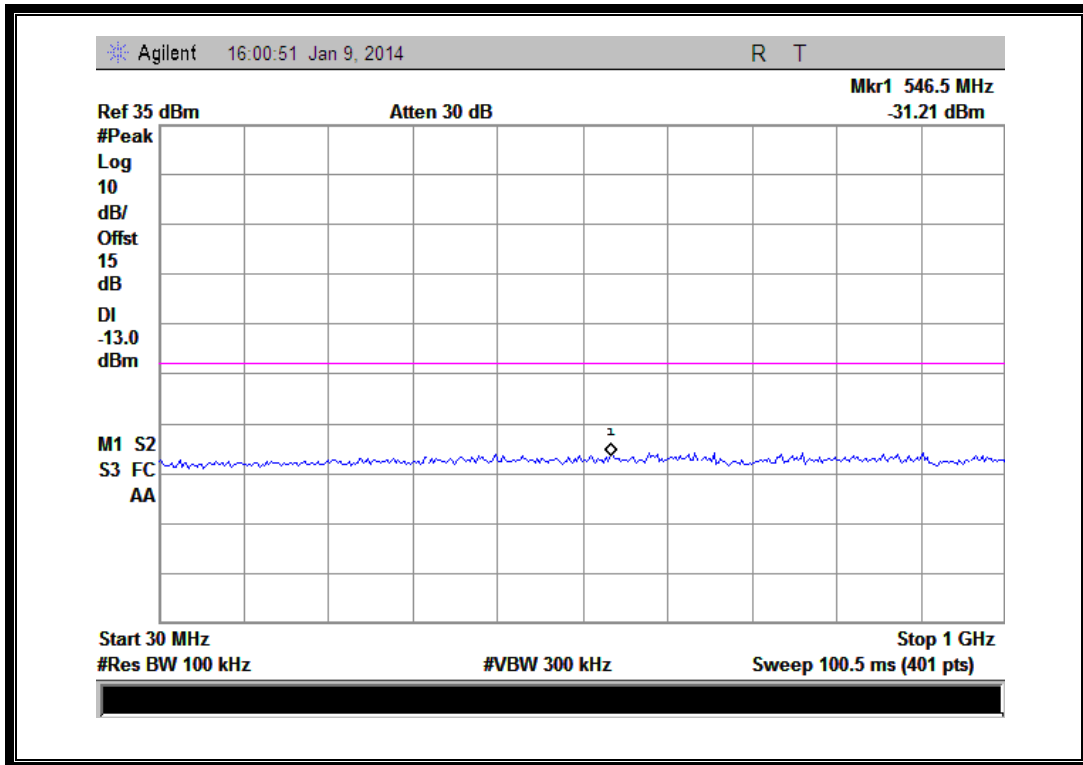
(Plot A2.1: GSM 850MHz Channel = 190, 1GHz to 9GHz)



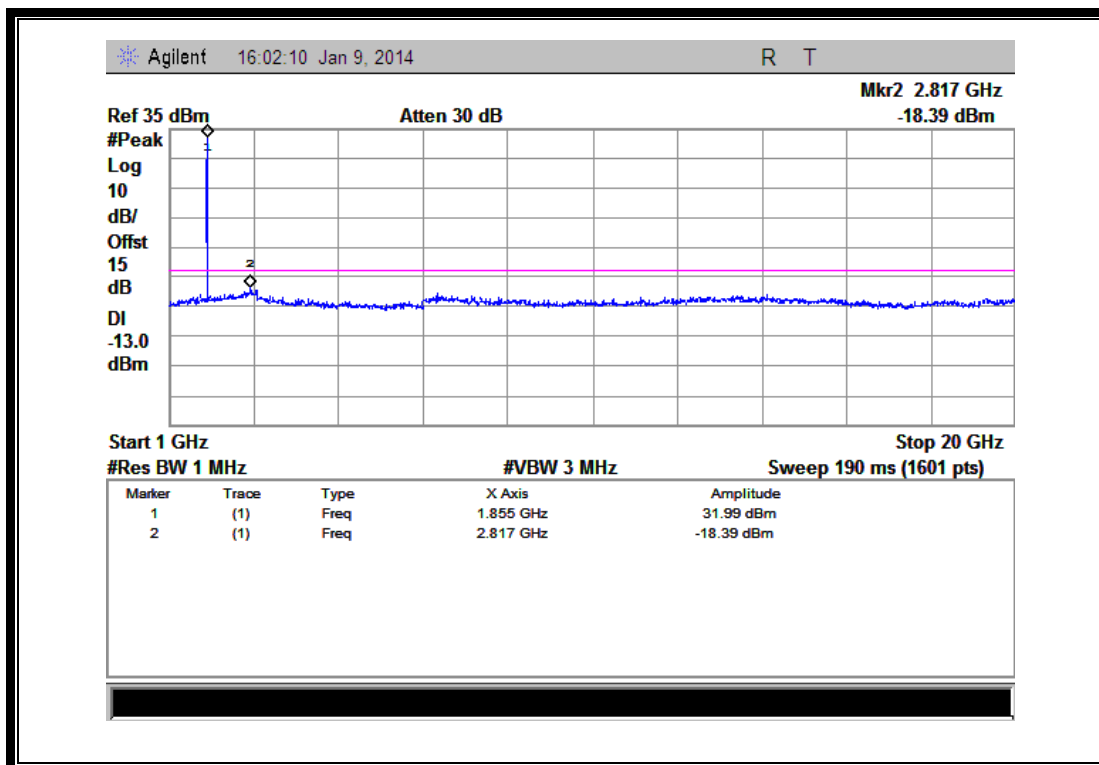
(Plot A3:GSM 850MHz Channel = 251, 30MHz to 1GHz)



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

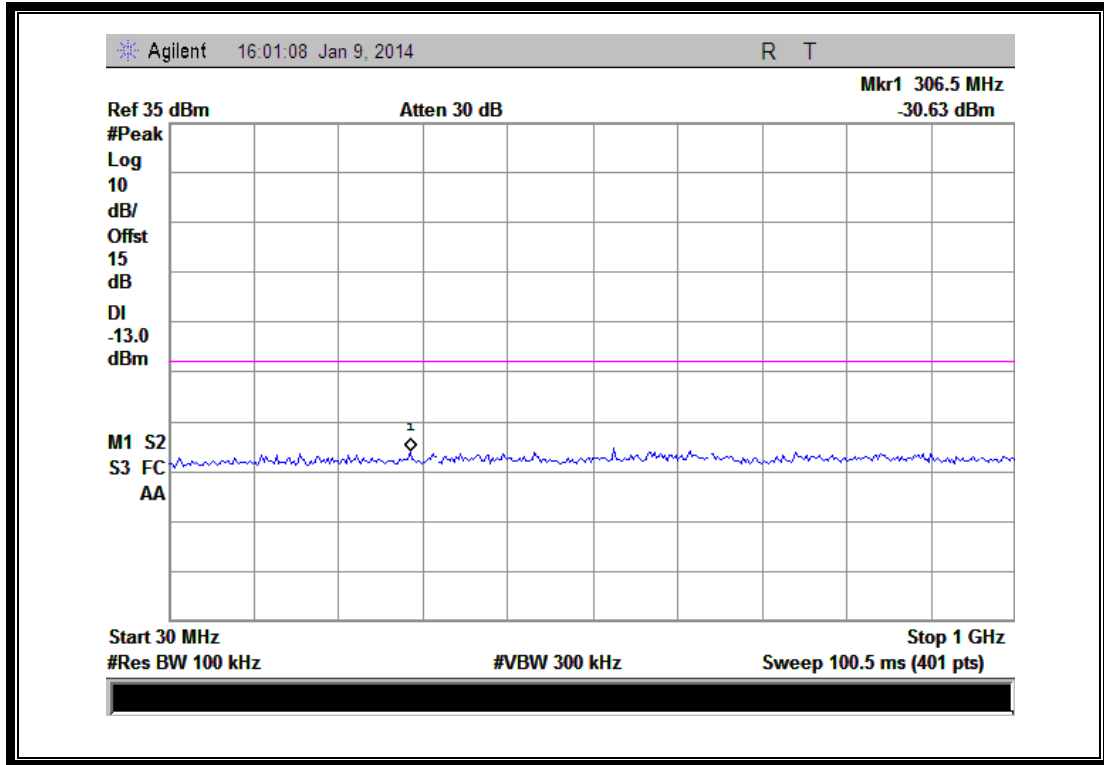


(Plot B1: GSM 1900MHz Channel = 512, 30MHz to 1GHz)

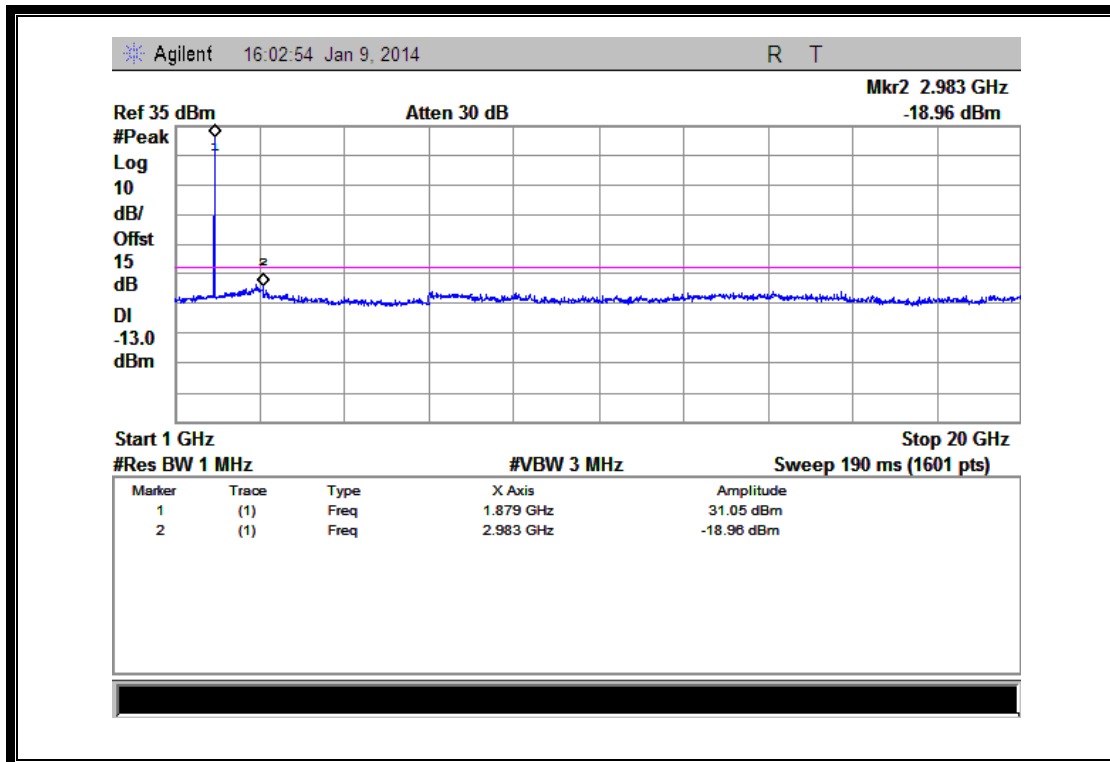


(Plot B1.1: GSM 1900MHz Channel = 512, 1GHz to 20GHz)

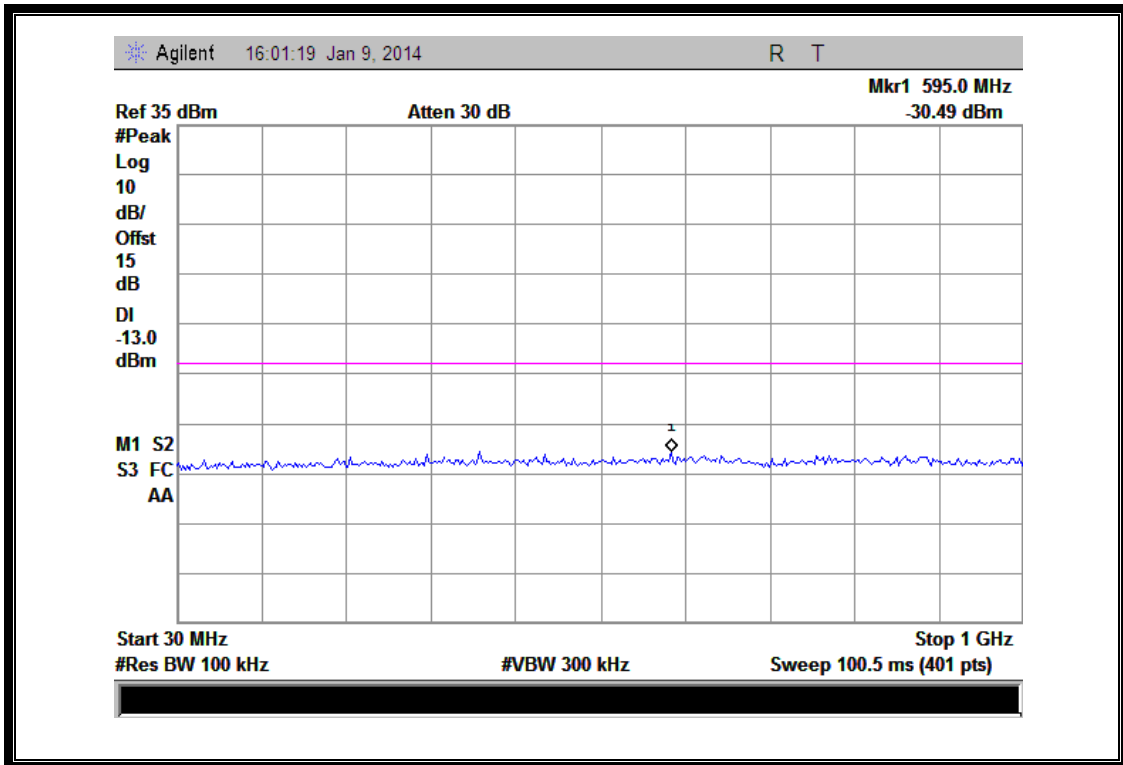




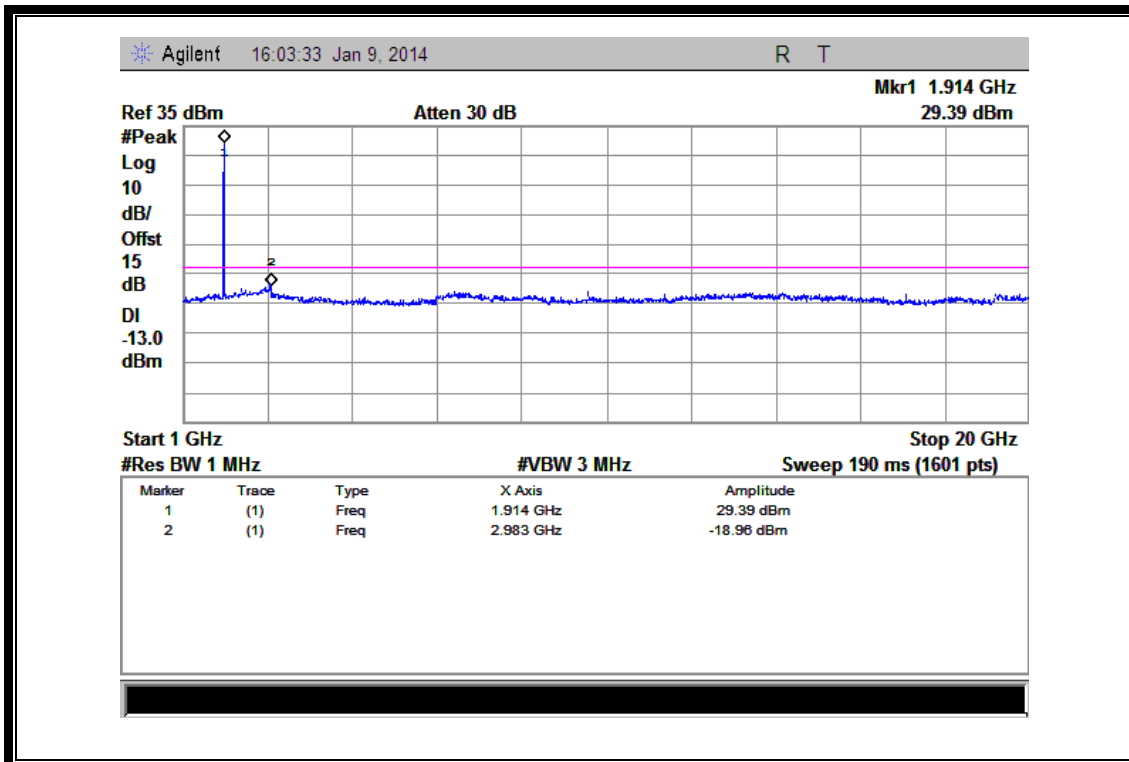
(Plot B2: GSM 1900MHz Channel = 661, 30MHz to 1GHz)



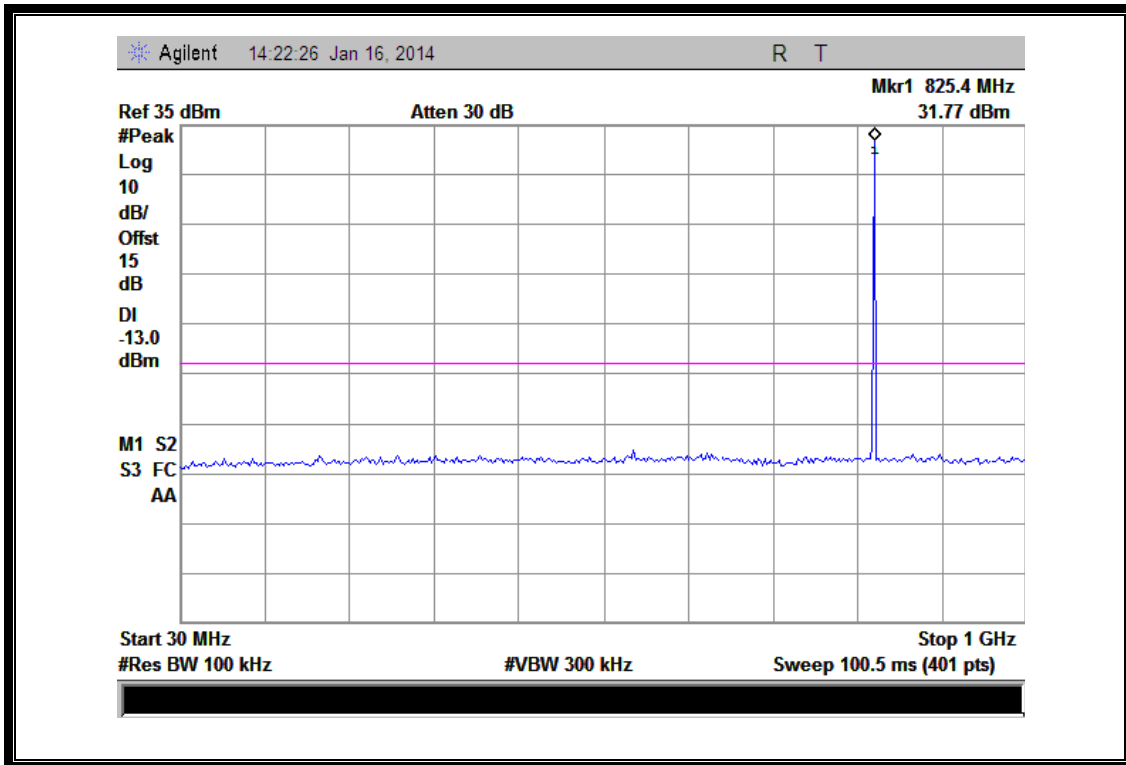
(Plot B2.1: GSM 1900MHz Channel = 661, 1GHz to 20GHz)



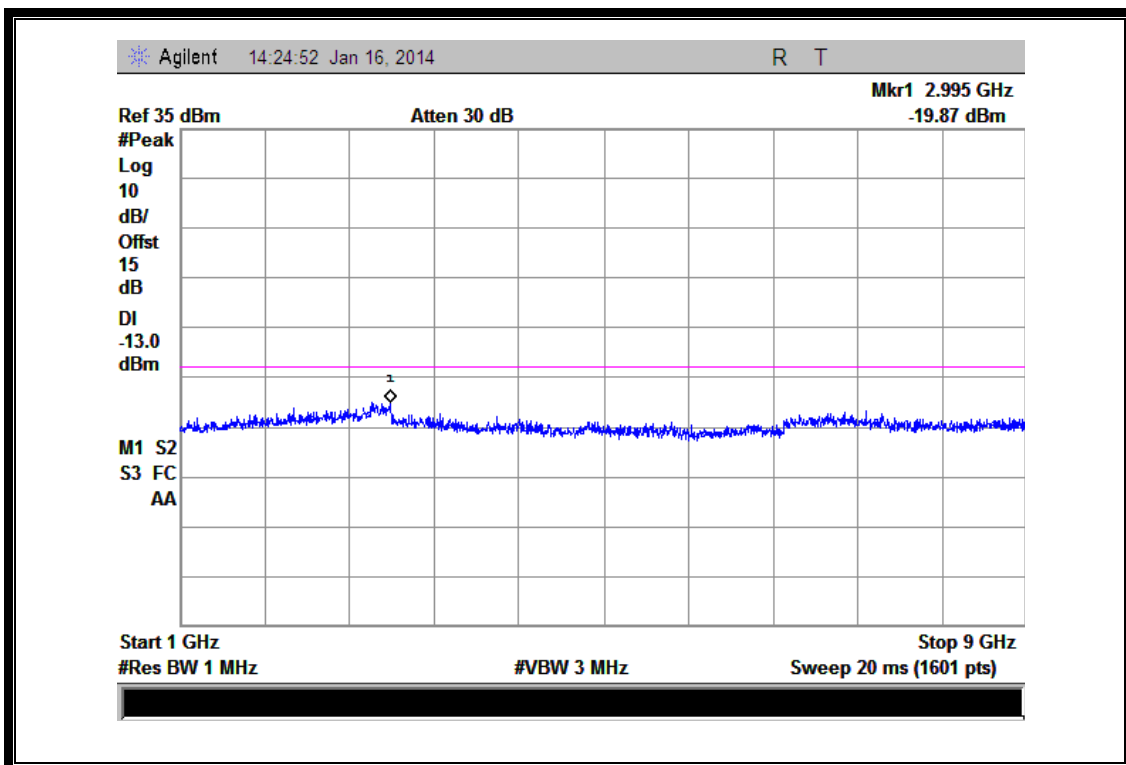
(Plot B3: GSM 1900MHz Channel = 810, 30MHz to 1GHz)



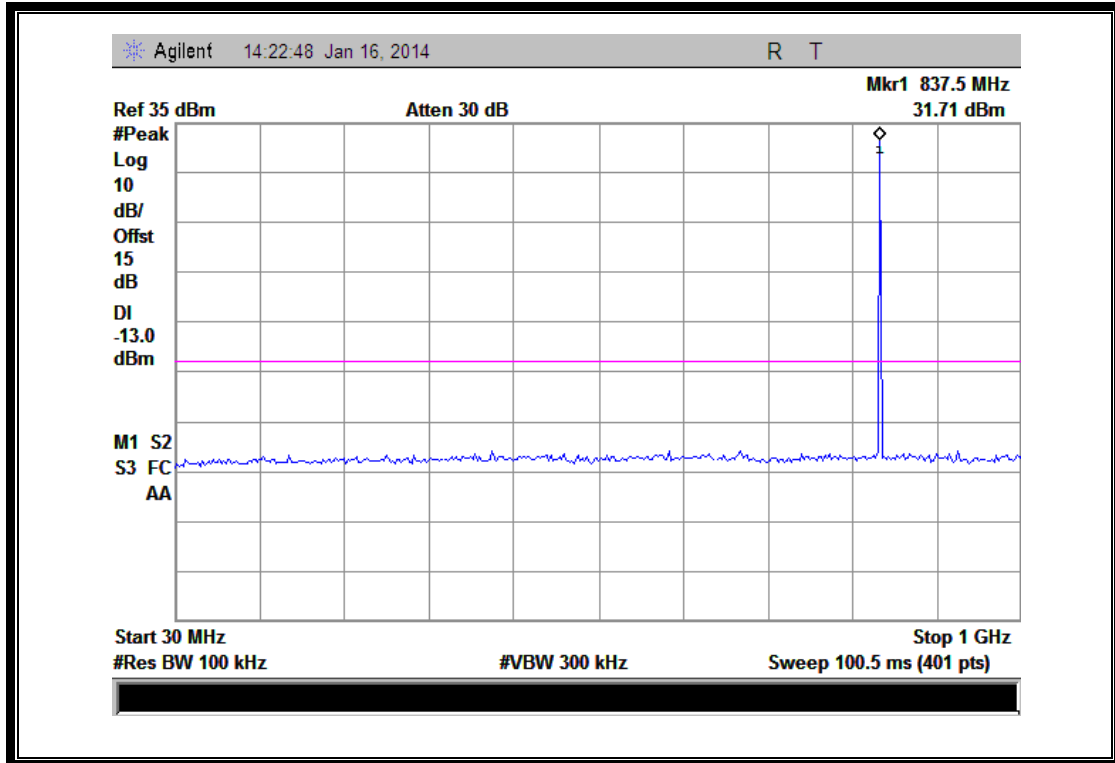
(Plot B3.1: GSM 1900MHz Channel = 810, 1GHz to 20GHz)



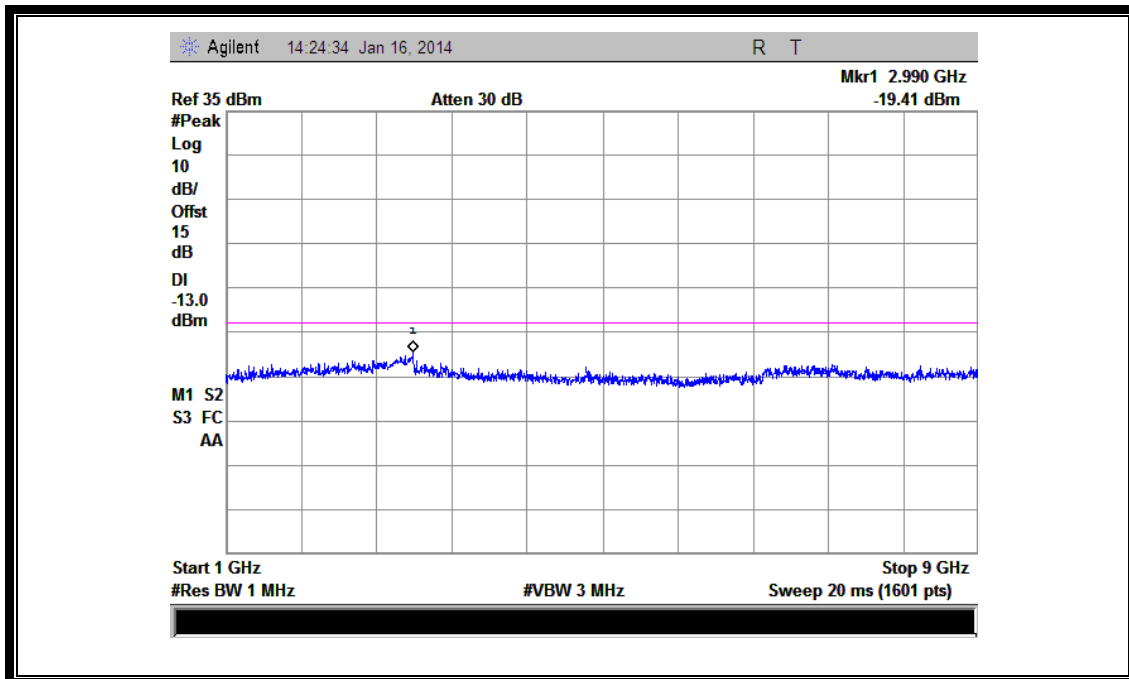
(Plot C1: EDGE 850MHz Channel = 128, 30MHz to 1GHz)



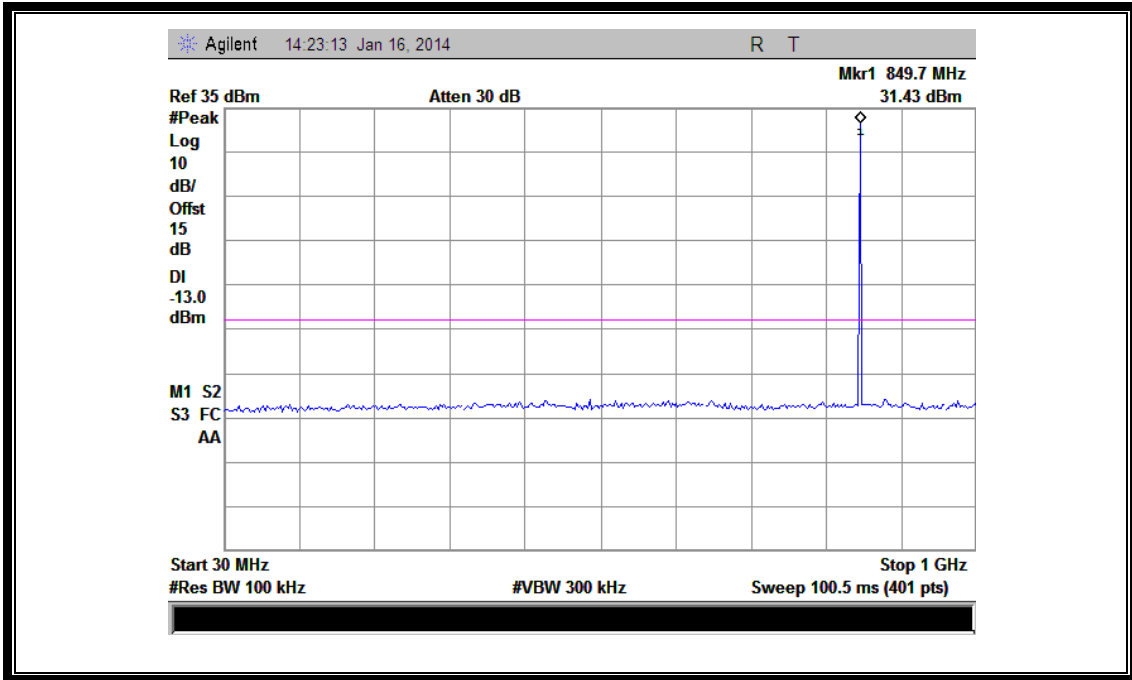
(Plot C1.1: EDGE 850MHz Channel = 128, 1GHz to 9GHz)



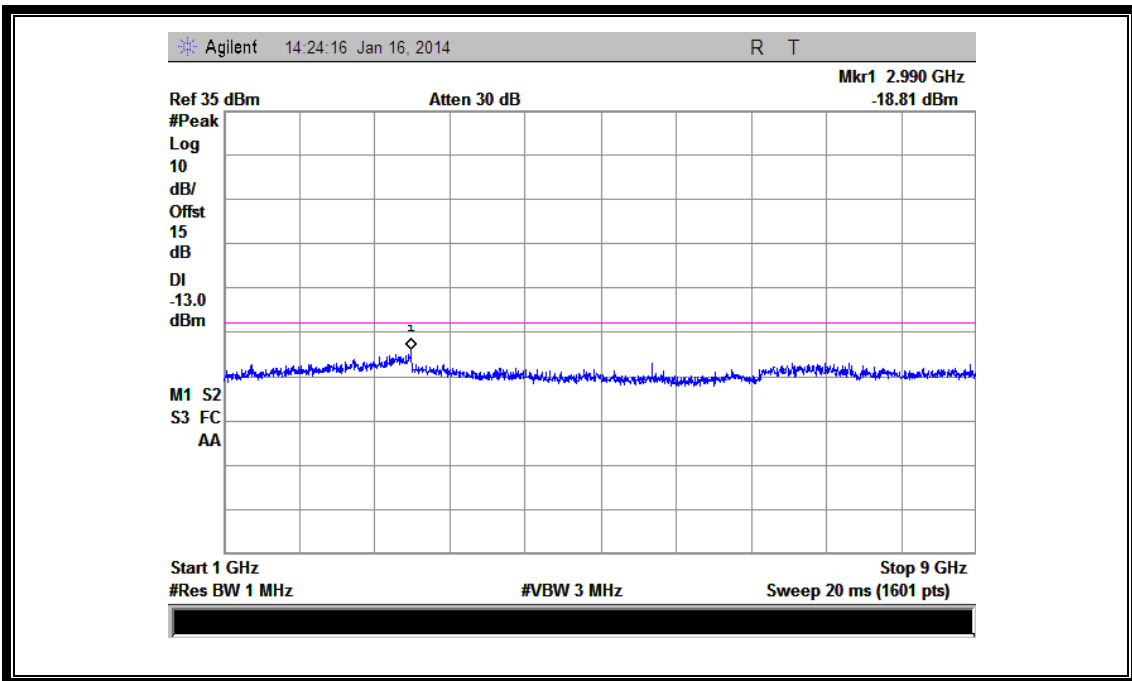
(Plot C2: EDGE 850MHz Channel = 190, 30MHz to 1GHz)



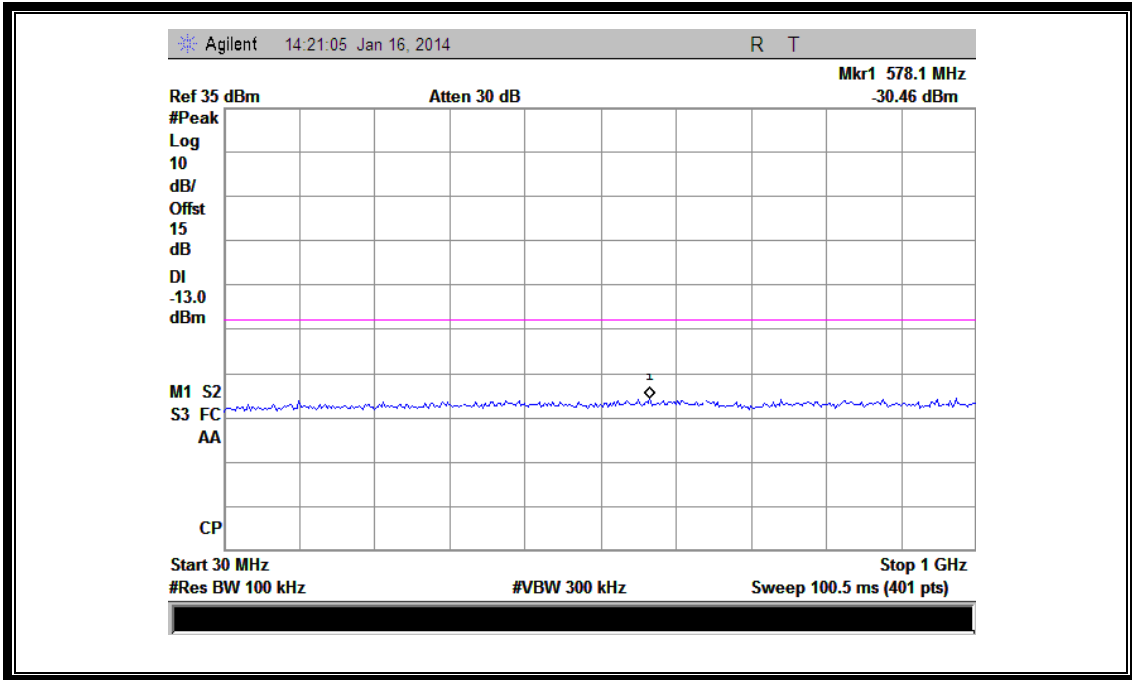
(Plot C2.1: EDGE 850MHz Channel = 190, 1GHz to 9GHz)



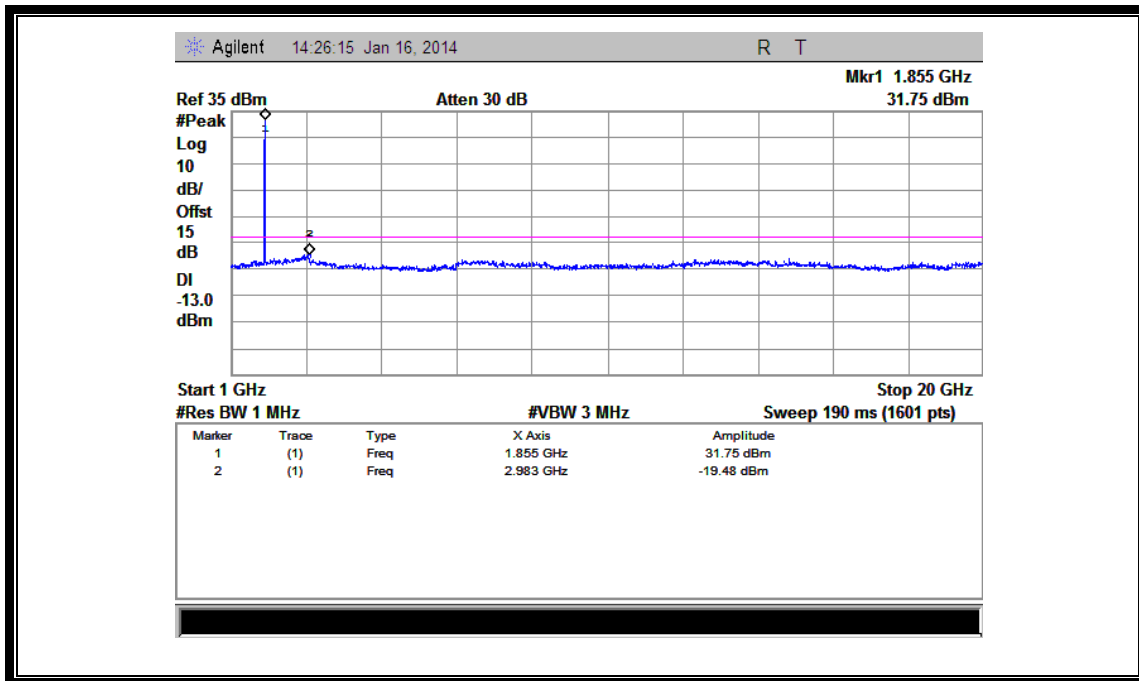
(Plot C3: EDGE 850MHz Channel = 251, 30MHz to 1GHz)



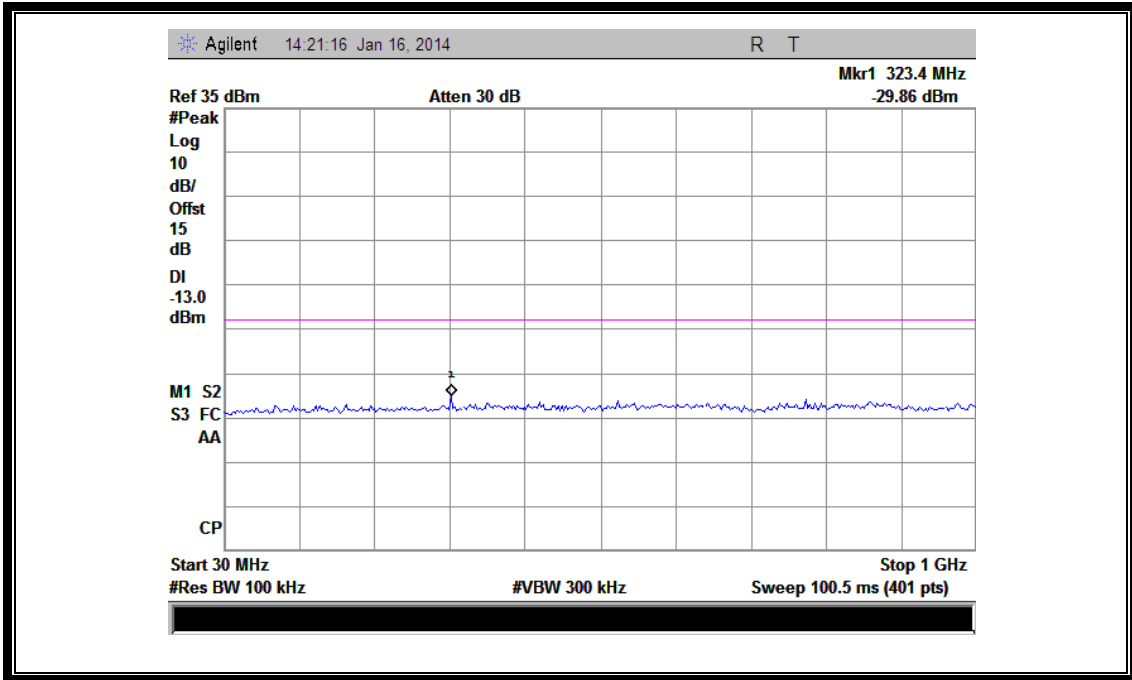
(Plot C3.1: EDGE 850MHz Channel = 251, 1GHz to 9GHz)



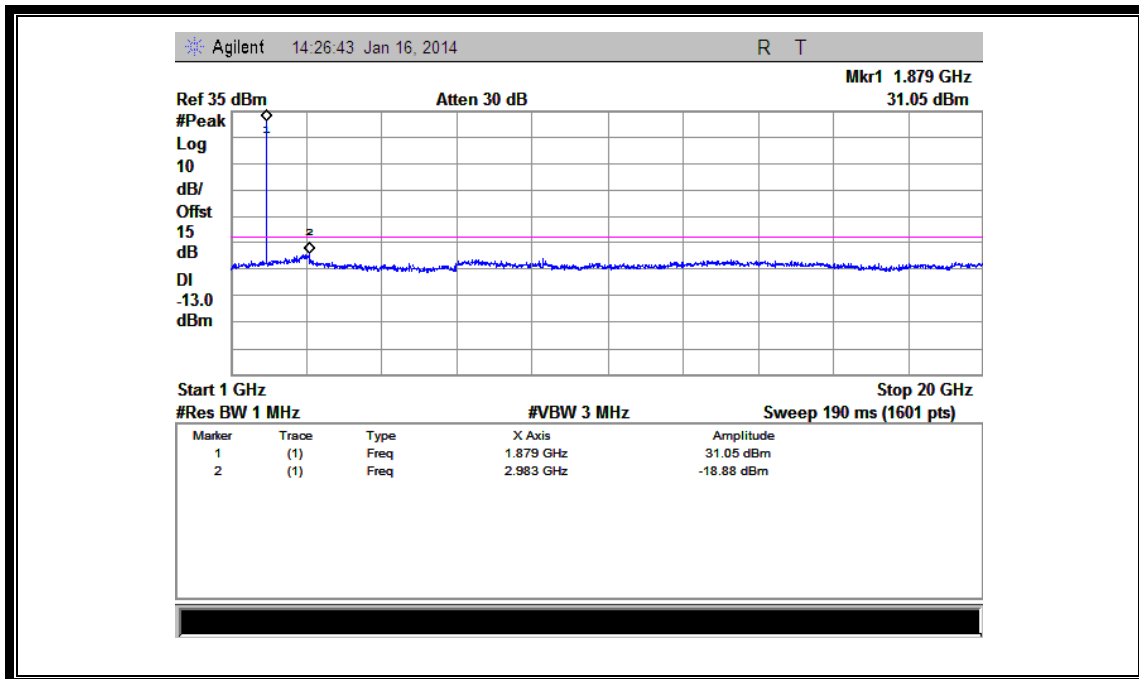
(Plot D1: EDGE 1900MHz Channel = 512, 30MHz to 1GHz)



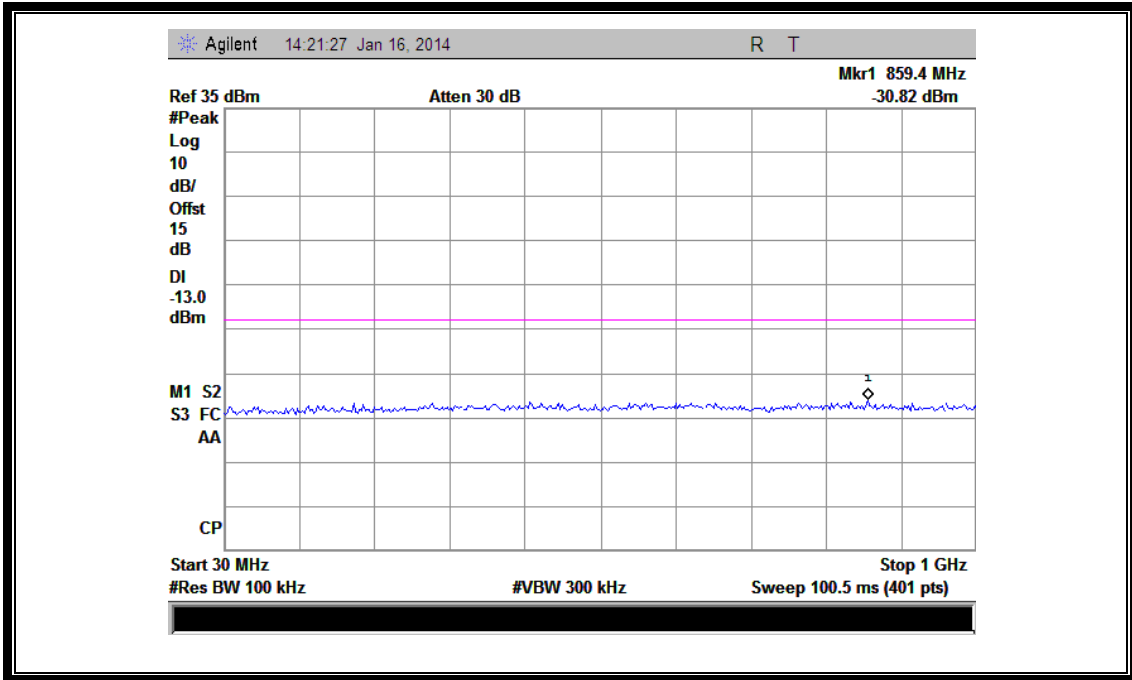
(Plot D1.1: EDGE 1900MHz Channel = 512, 1GHz to 20GHz)



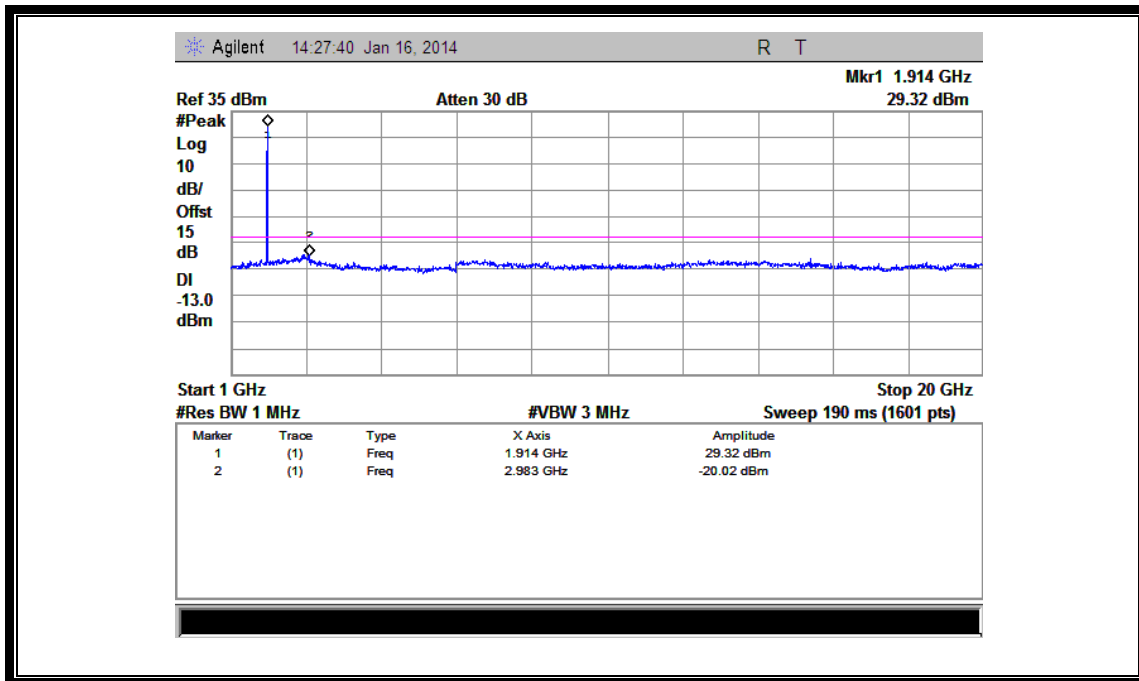
(Plot D2: EDGE 1900MHz Channel = 661, 30MHz to 1GHz)



(Plot D2.1: EDGE 1900MHz Channel = 661, 1GHz to 20GHz)

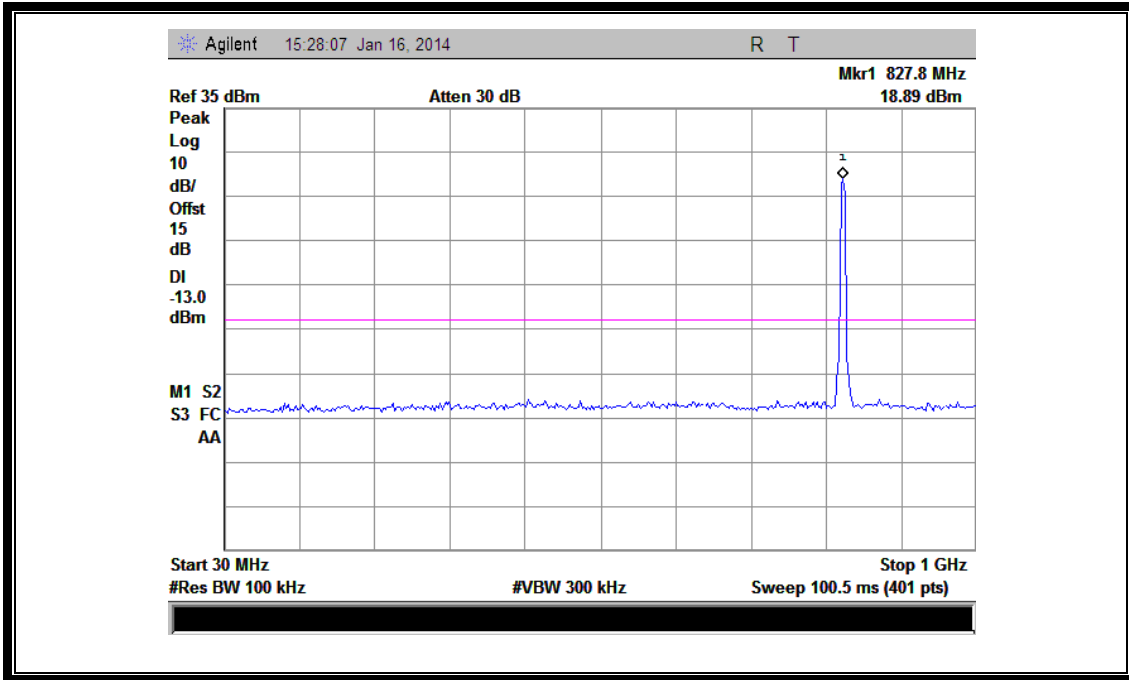


(Plot D3: EDGE 1900MHz Channel = 810, 30MHz to 1GHz)

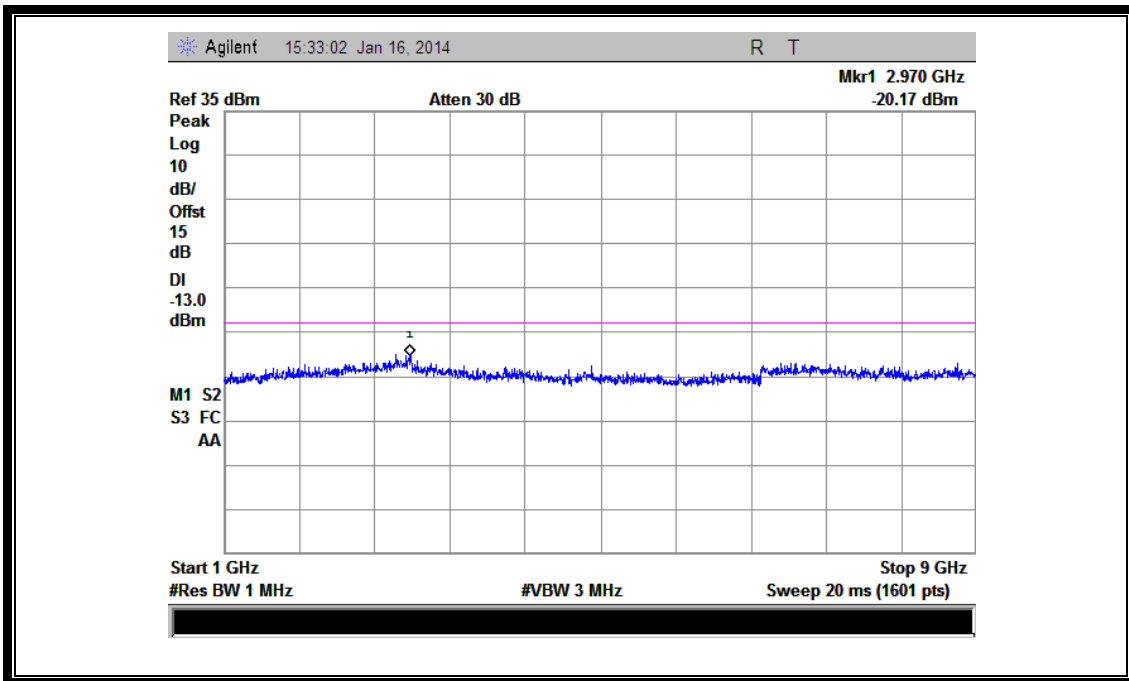


(Plot D3.1: EDGE 1900MHz Channel = 810, 1GHz to 20GHz)

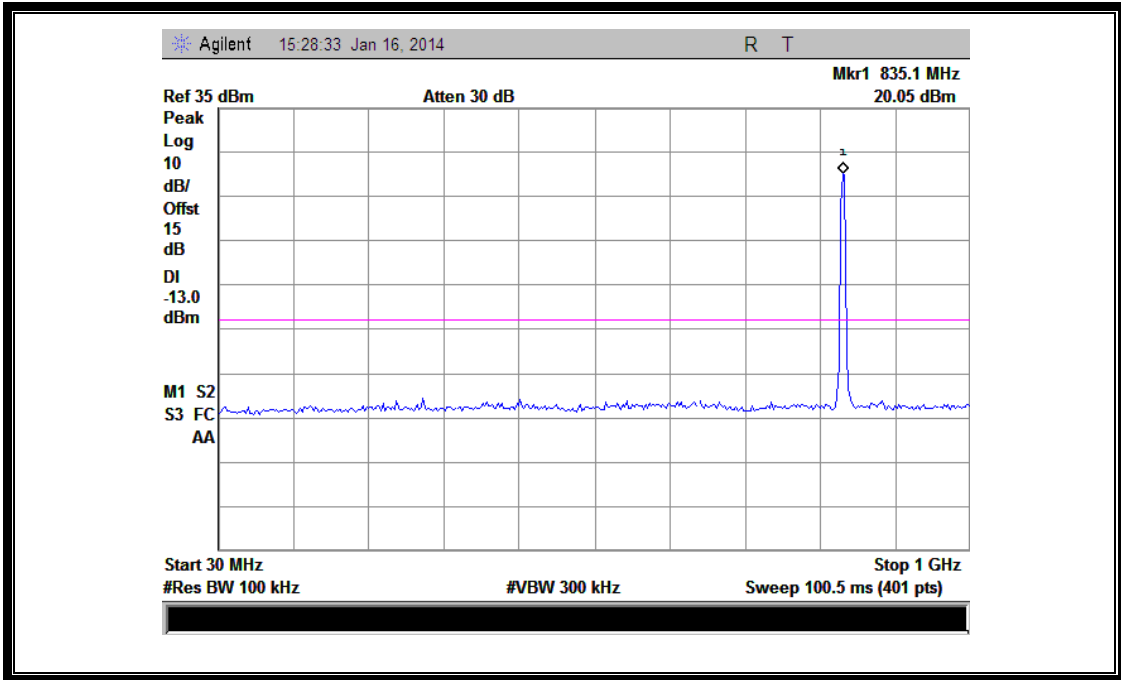




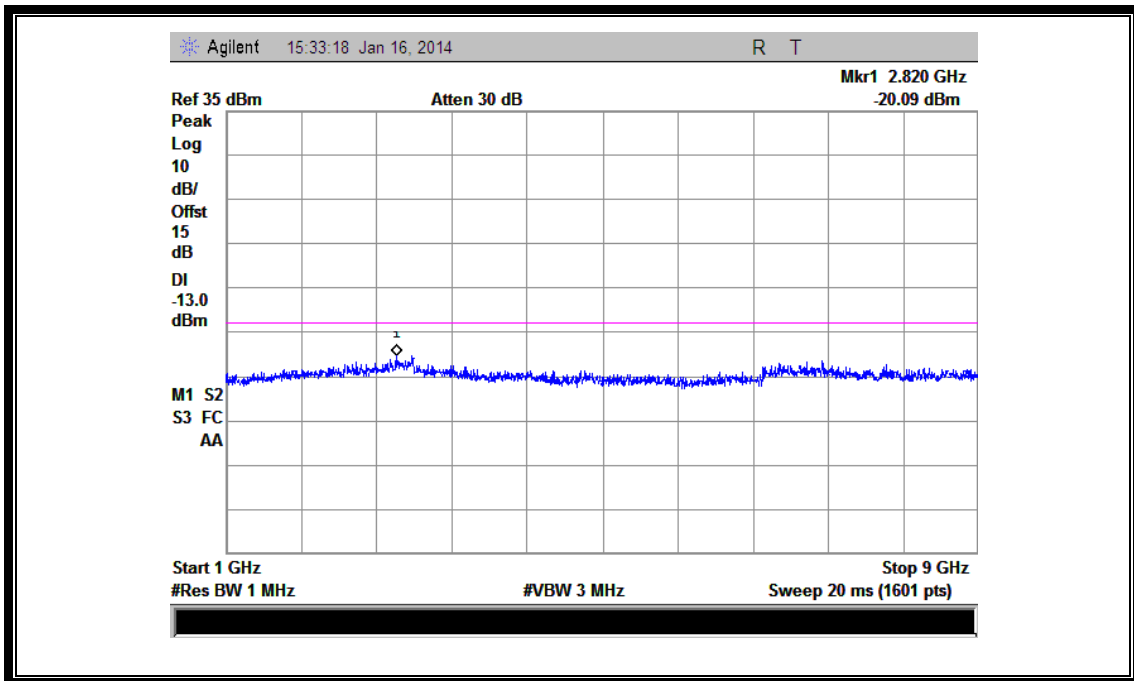
(Plot E1: WCDMA850MHz Channel = 4132, 30MHz to 1GHz)



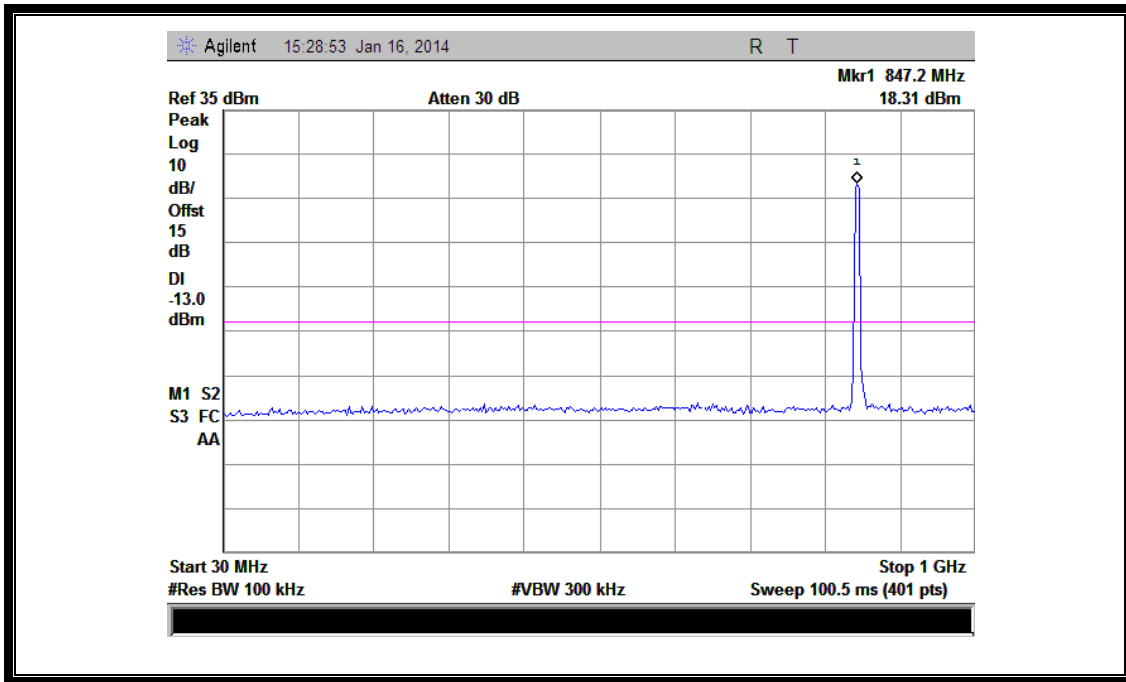
(Plot E1.1: WCDMA850MHz Channel = 4132, 1GHz to 9GHz)



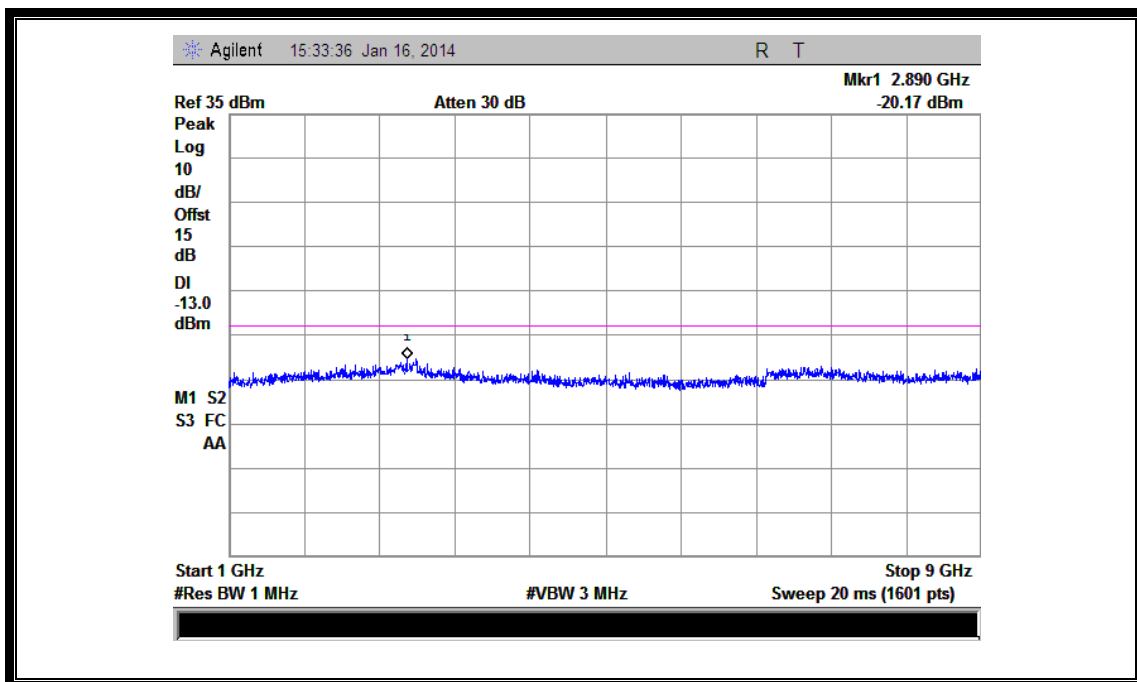
(Plot E2: WCDMA850MHz Channel = 4175, 30MHz to 1GHz)



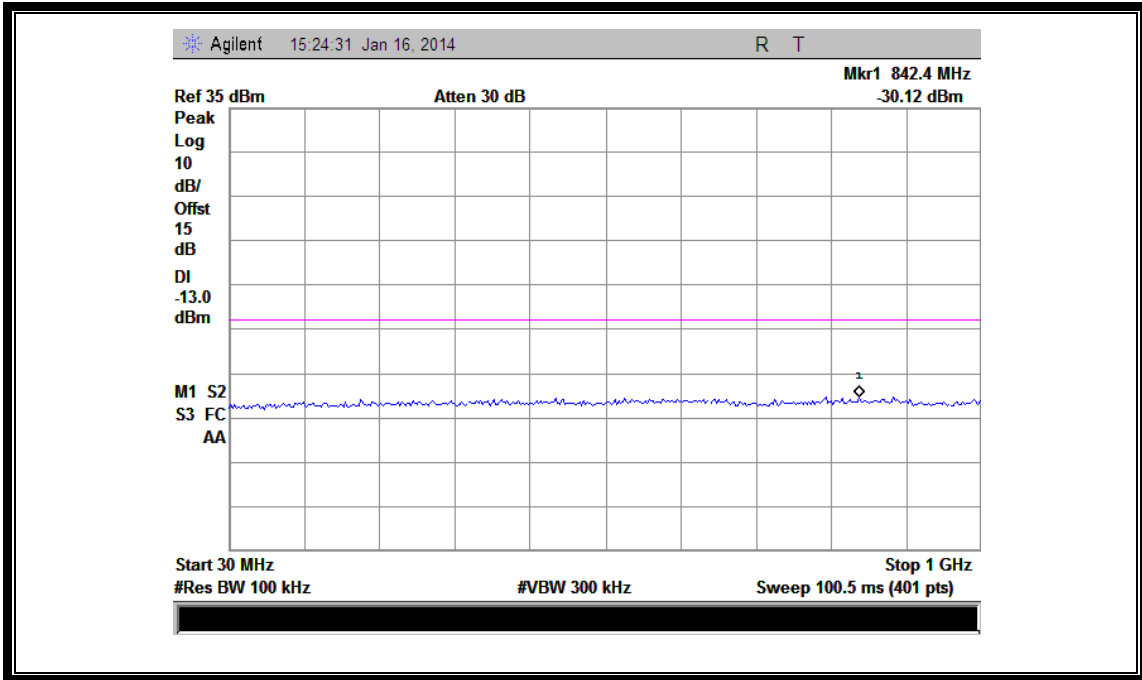
(Plot E2.1: WCDMA850MHz Channel = 4175, 1GHz to 9GHz)



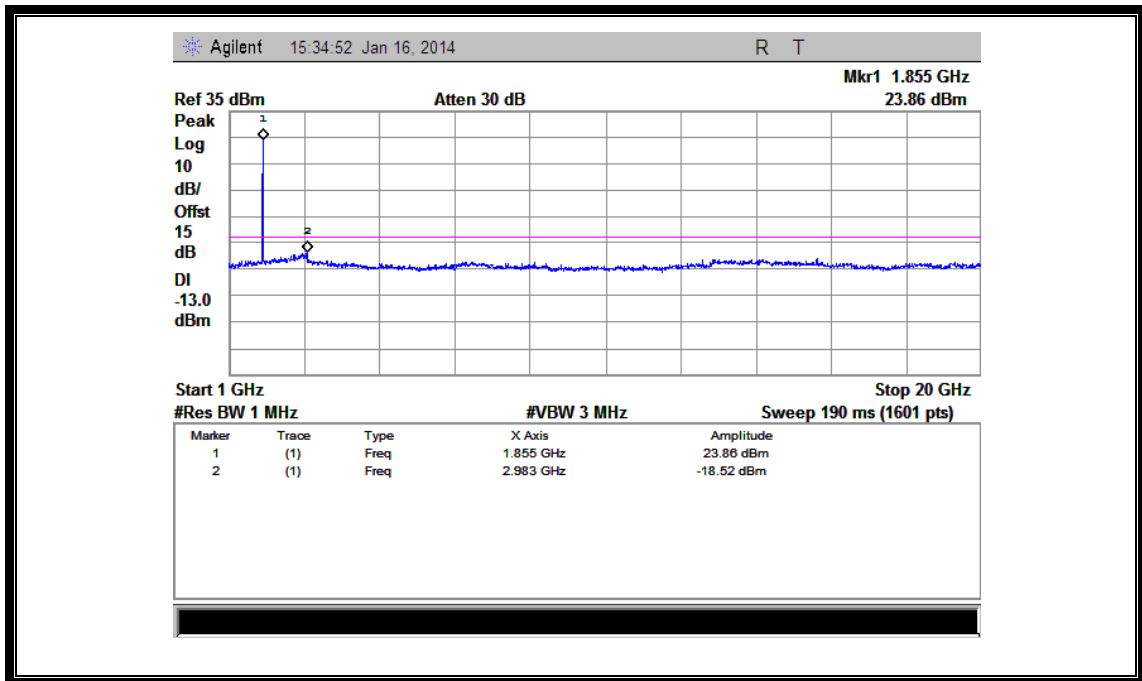
(Plot E3: WCDMA850MHz Channel = 4233, 30MHz to 1GHz)



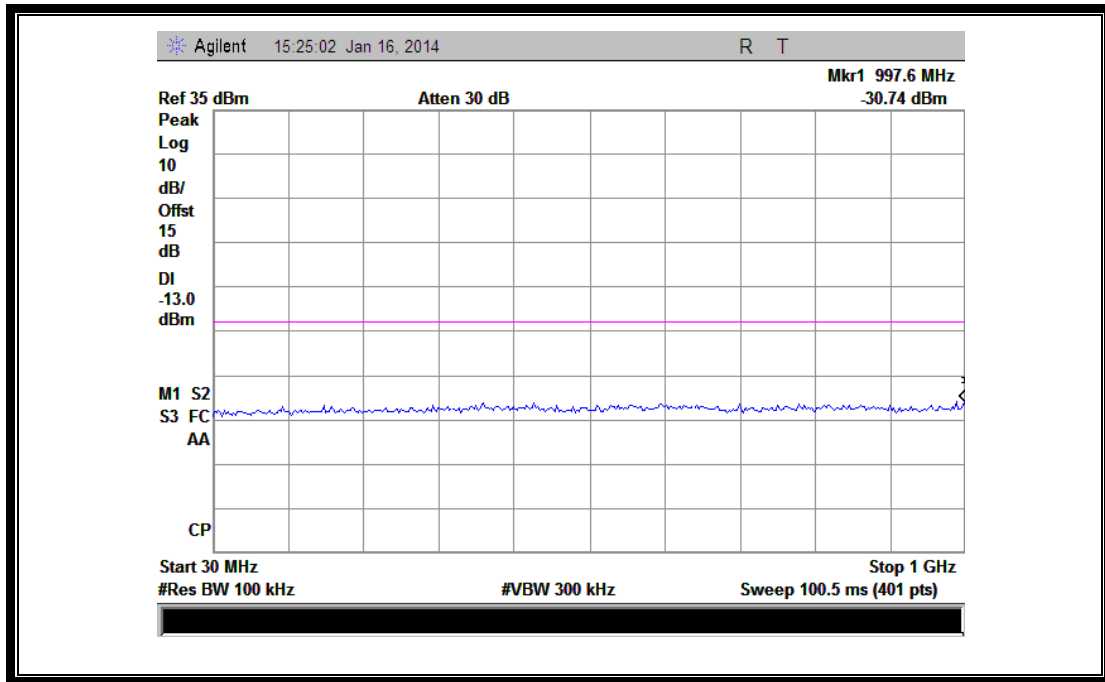
(Plot E3.1: WCDMA850MHz Channel = 4233, 1GHz to 9GHz)



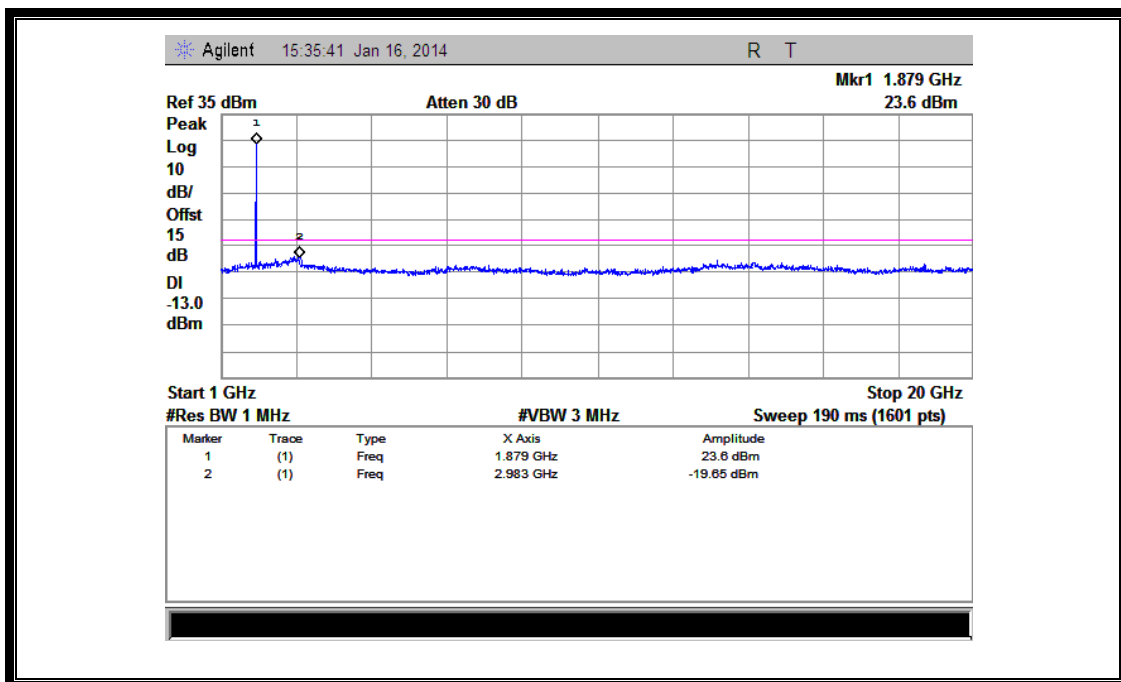
(Plot F1:WCDMA1900MHz Channel = 9262, 30MHz to 1GHz)



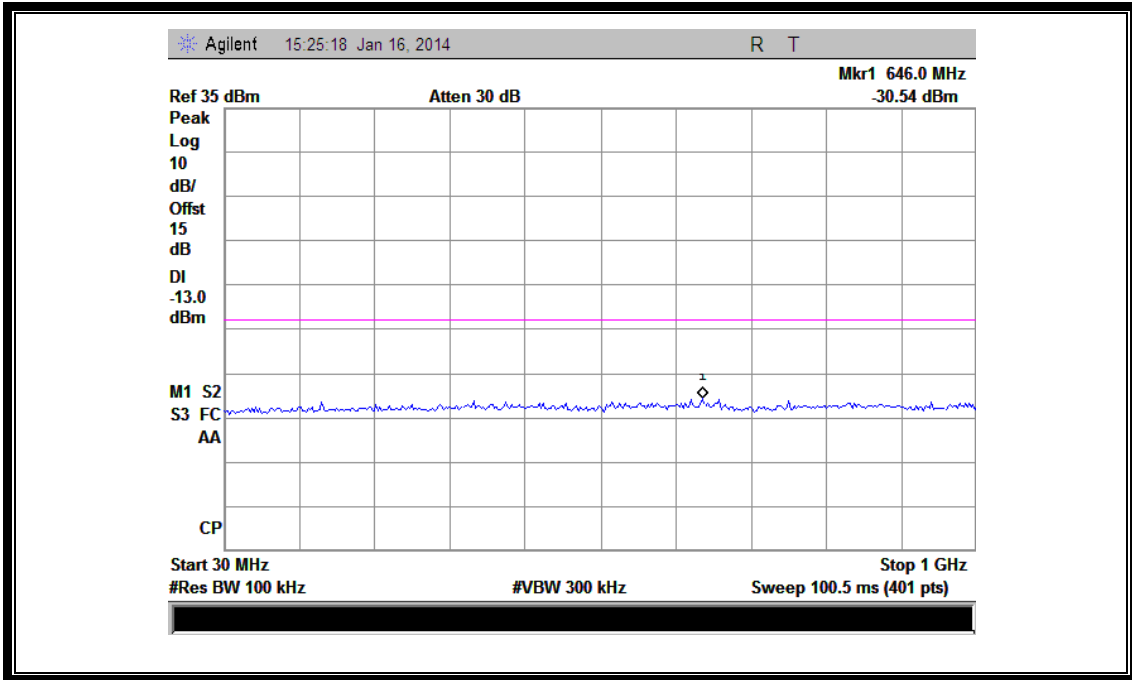
(Plot F1.1: WCDMA1900MHz Channel = 9262, 1GHz to 20GHz)



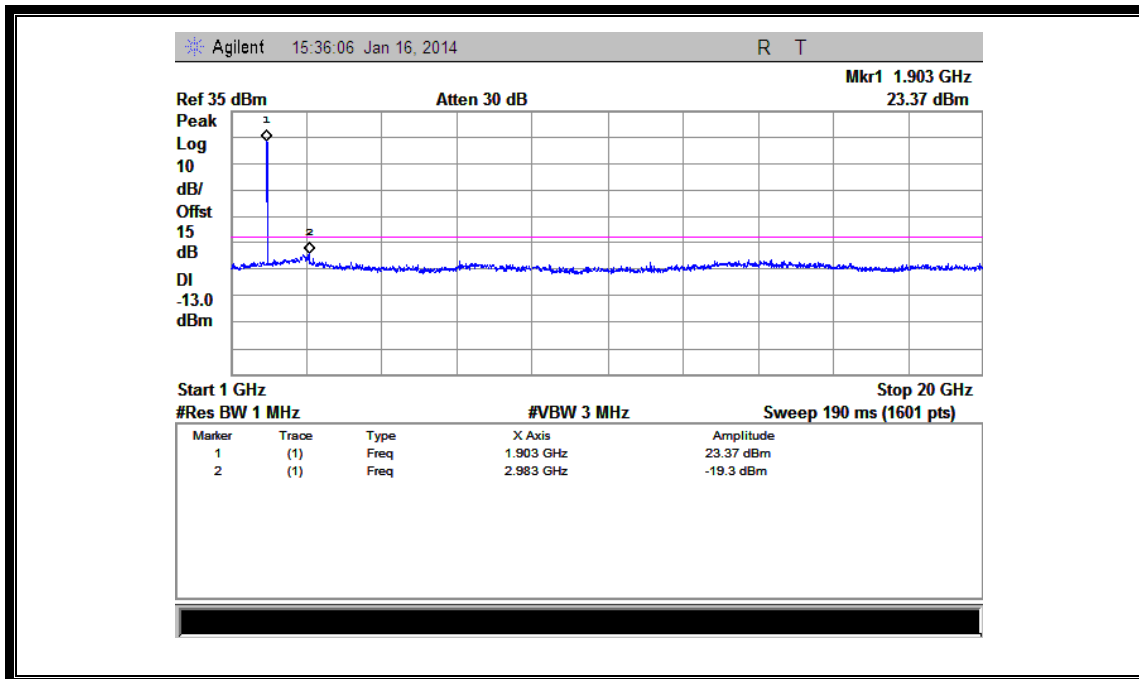
(Plot F2:WCDMA1900MHz Channel = 9400, 30MHz to 1GHz)



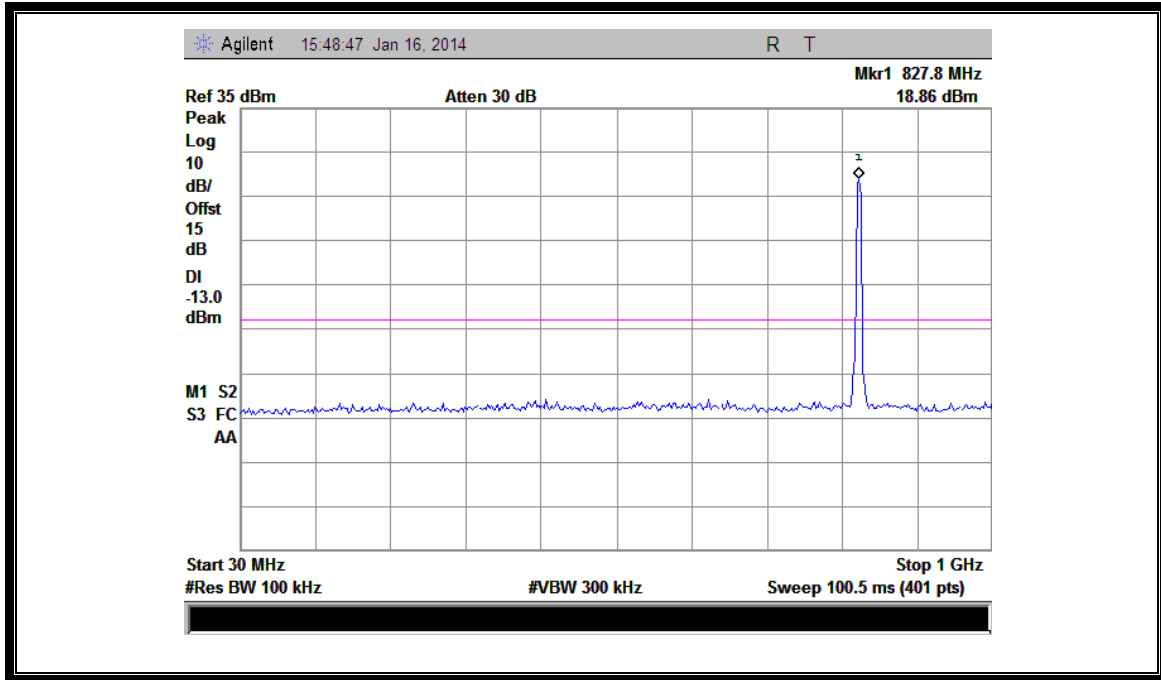
(Plot F2.1: WCDMA1900MHz Channel = 9400, 1GHz to 20GHz)



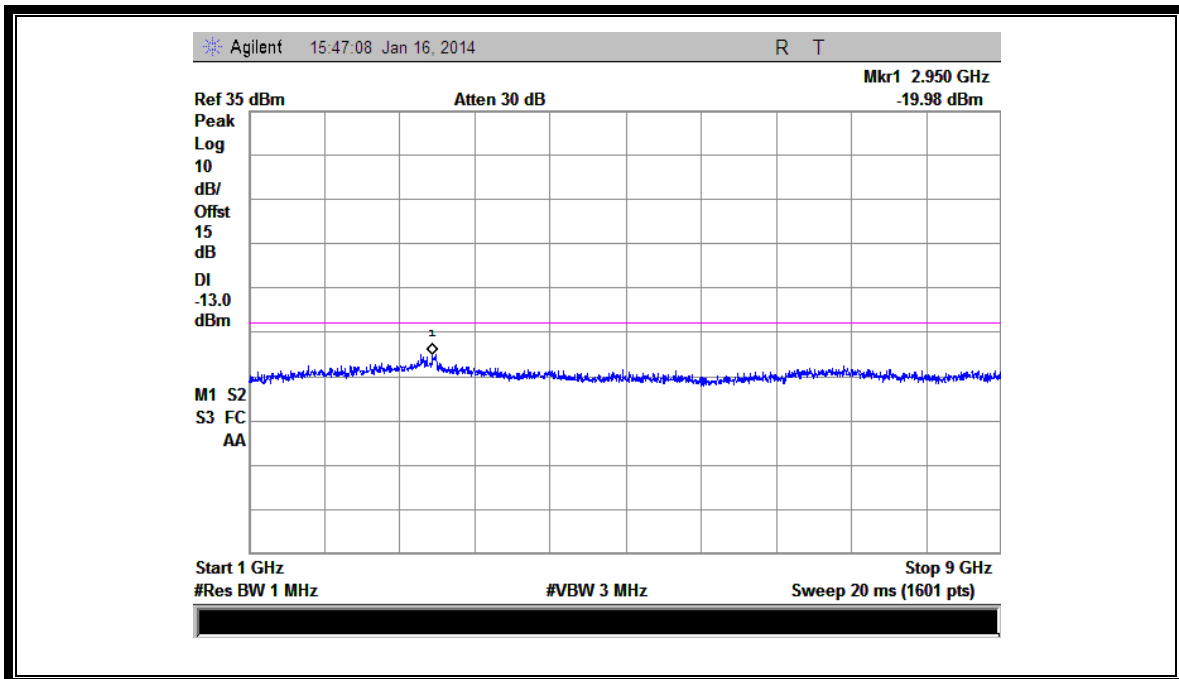
(Plot F3:WCDMA1900MHz Channel = 9538, 30MHz to 1GHz)



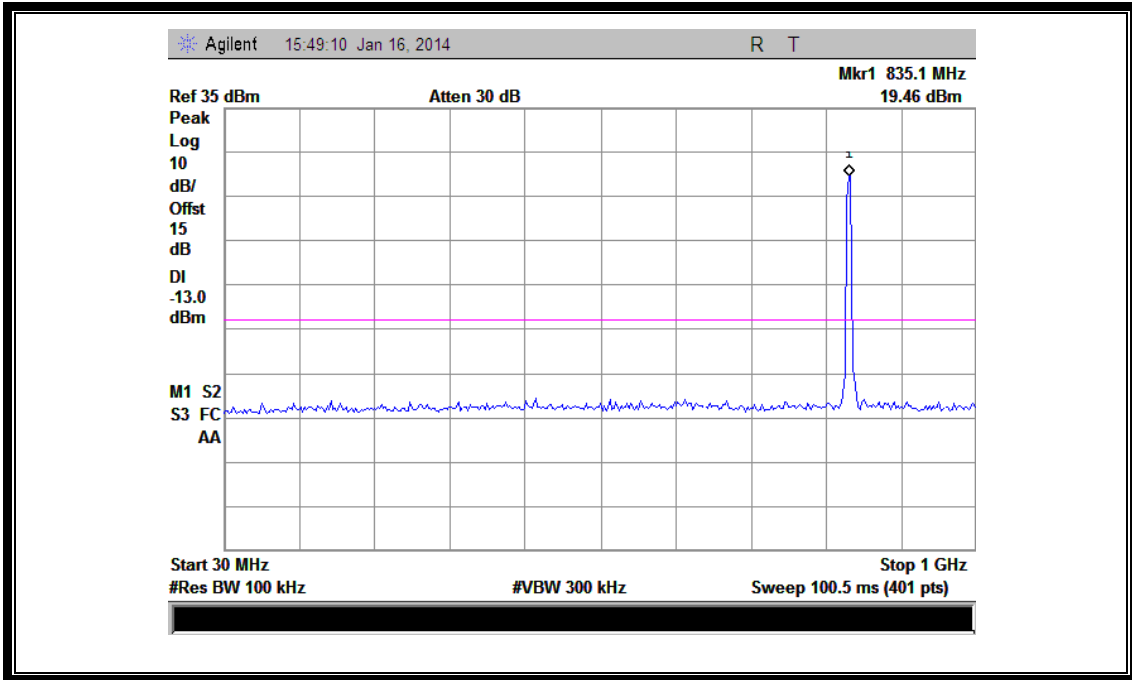
(Plot F3.1: WCDMA1900MHz Channel = 9538 1GHz to 20GHz)



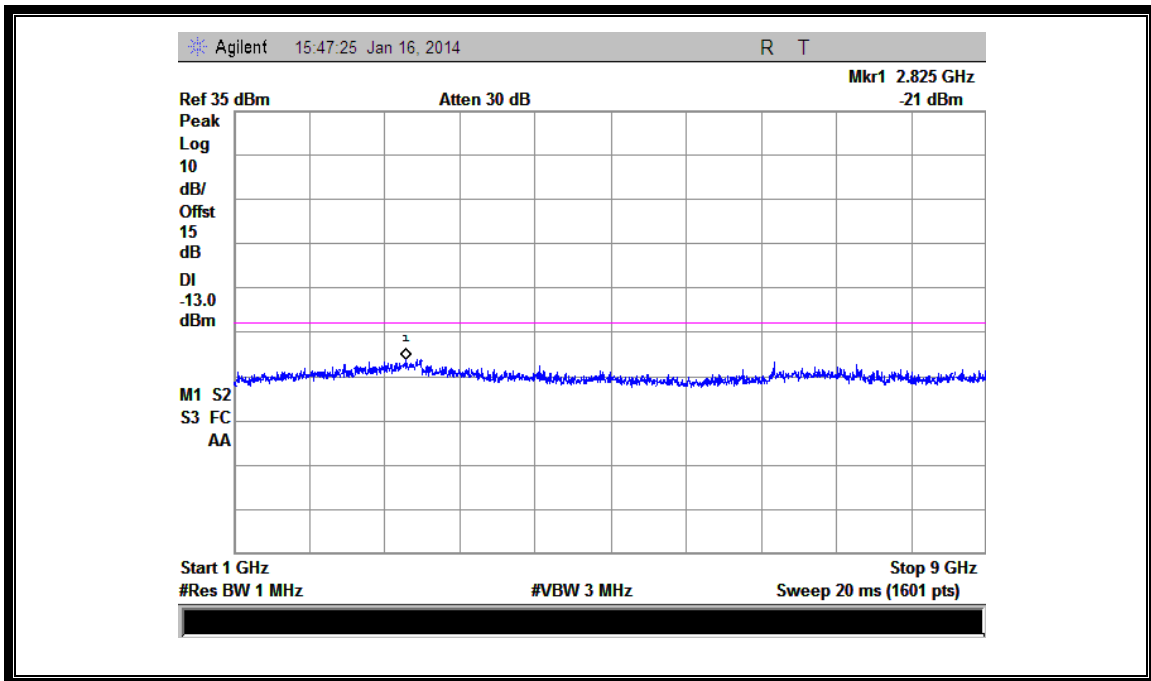
(Plot G1: HSDPA 850MHz Channel = 4132, 30MHz to 1GHz)



(Plot G1.1: HSDPA 850MHz Channel = 4132, 1GHz to 9GHz)

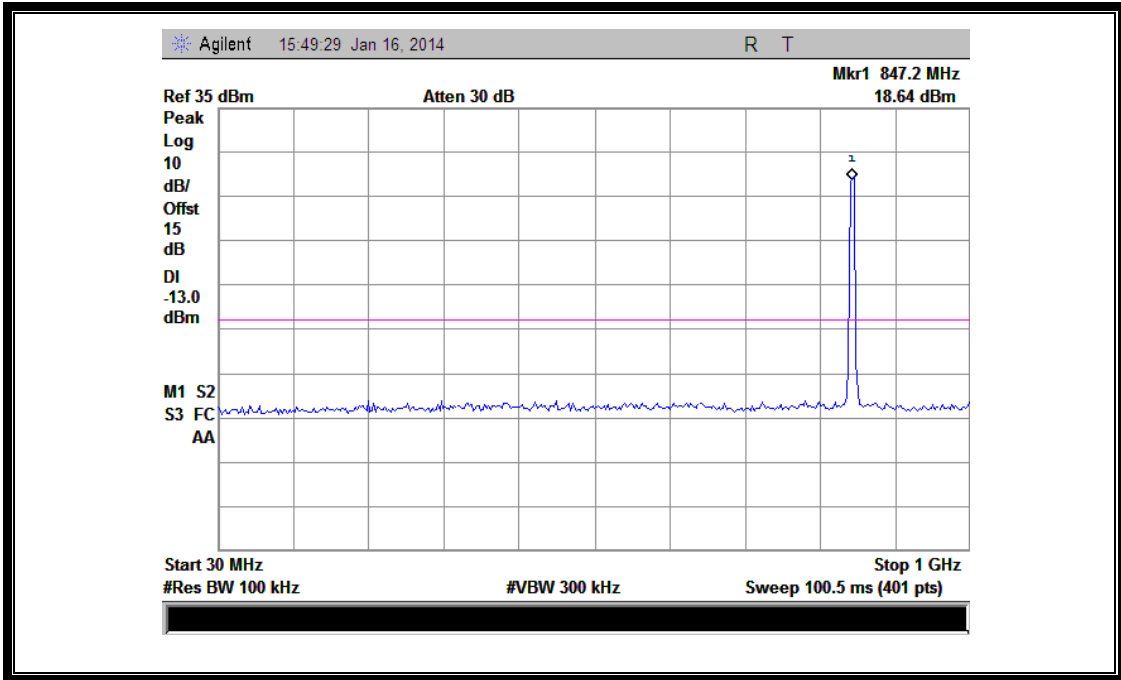


(Plot G2: HSDPA 850MHz Channel = 4175, 30MHz to 1GHz)

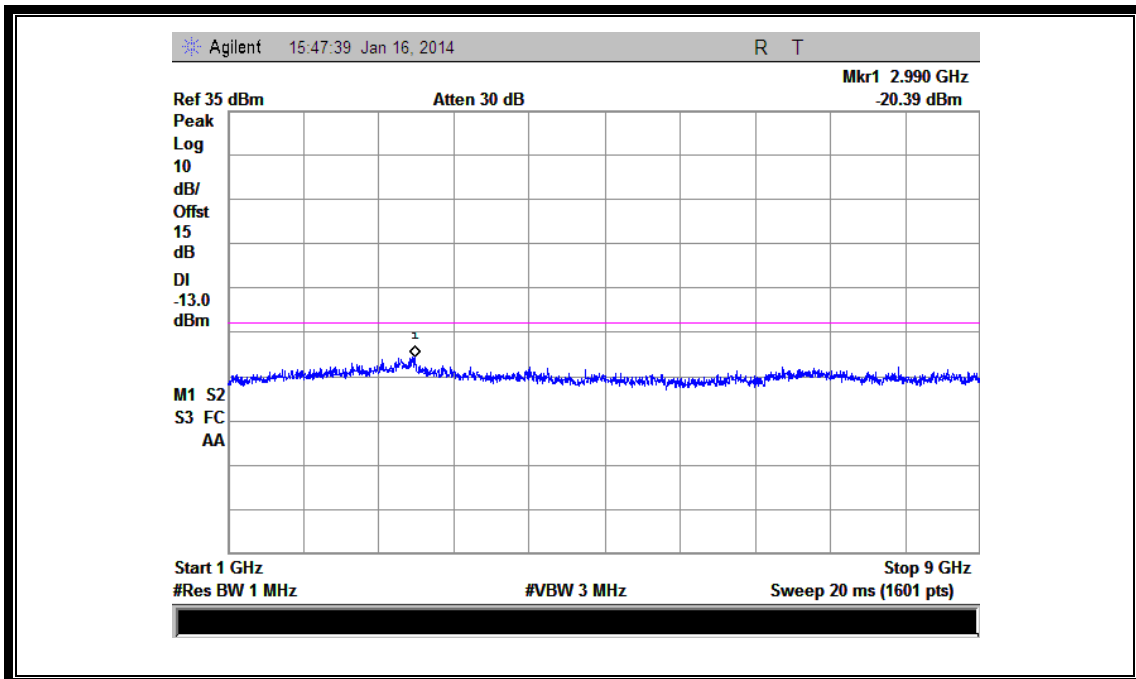


(Plot G2.1: HSDPA 850MHz Channel = 4175, 1GHz to 9GHz)

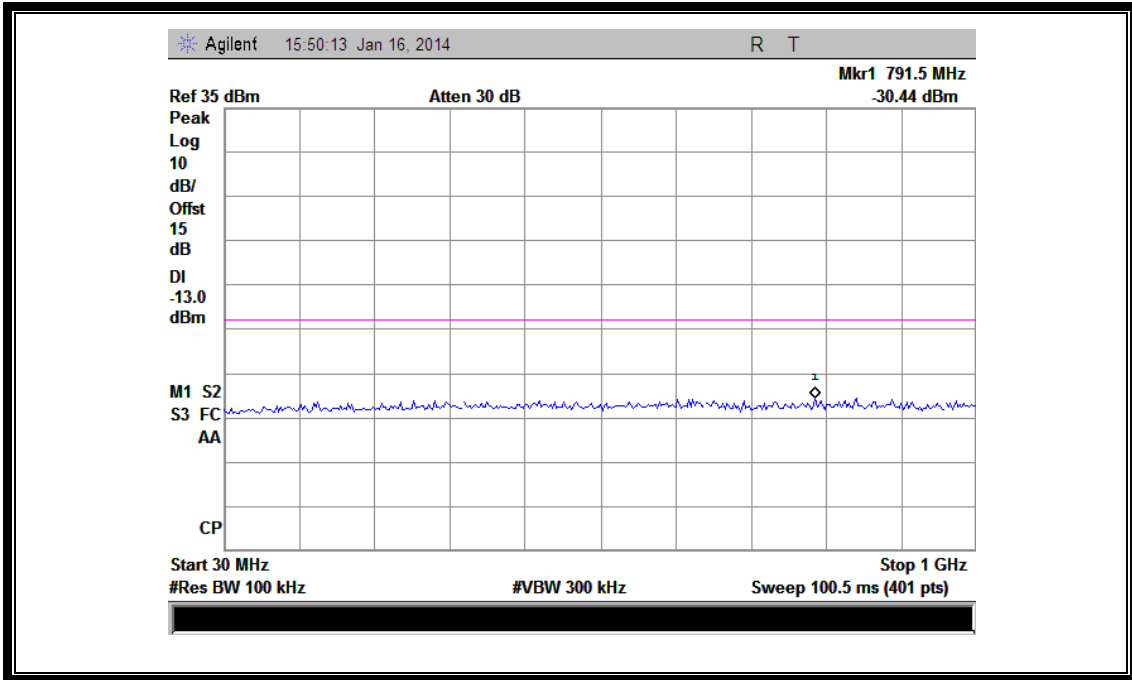




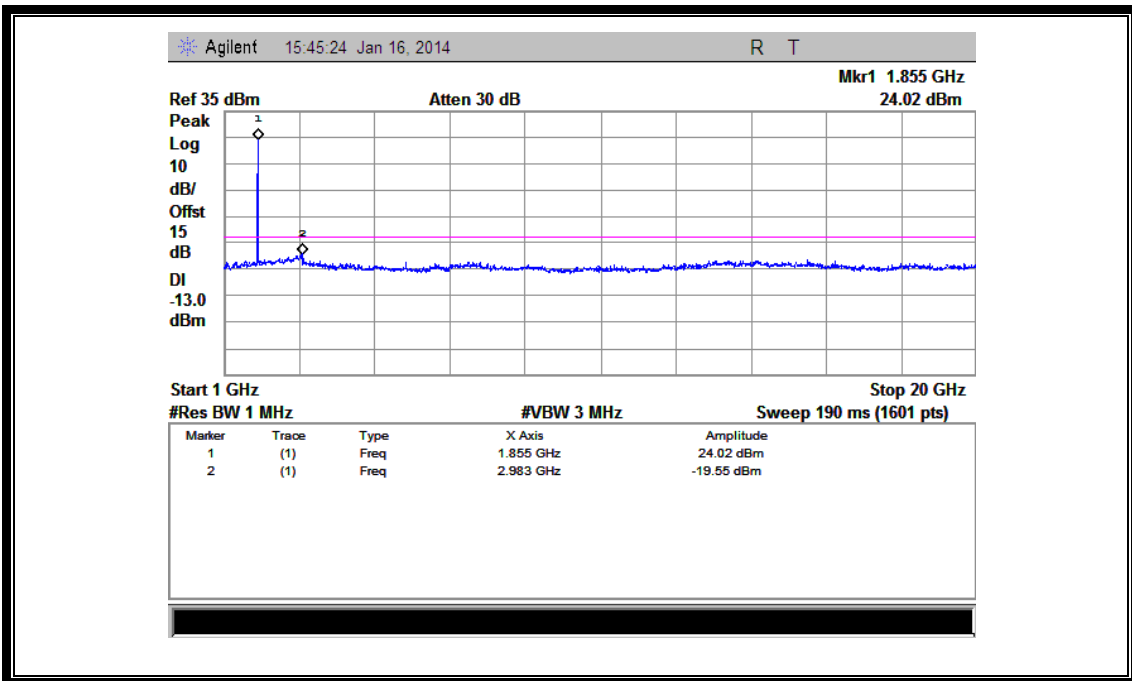
(Plot G3: HSDPA850MHz Channel = 4233, 30MHz to 1GHz)



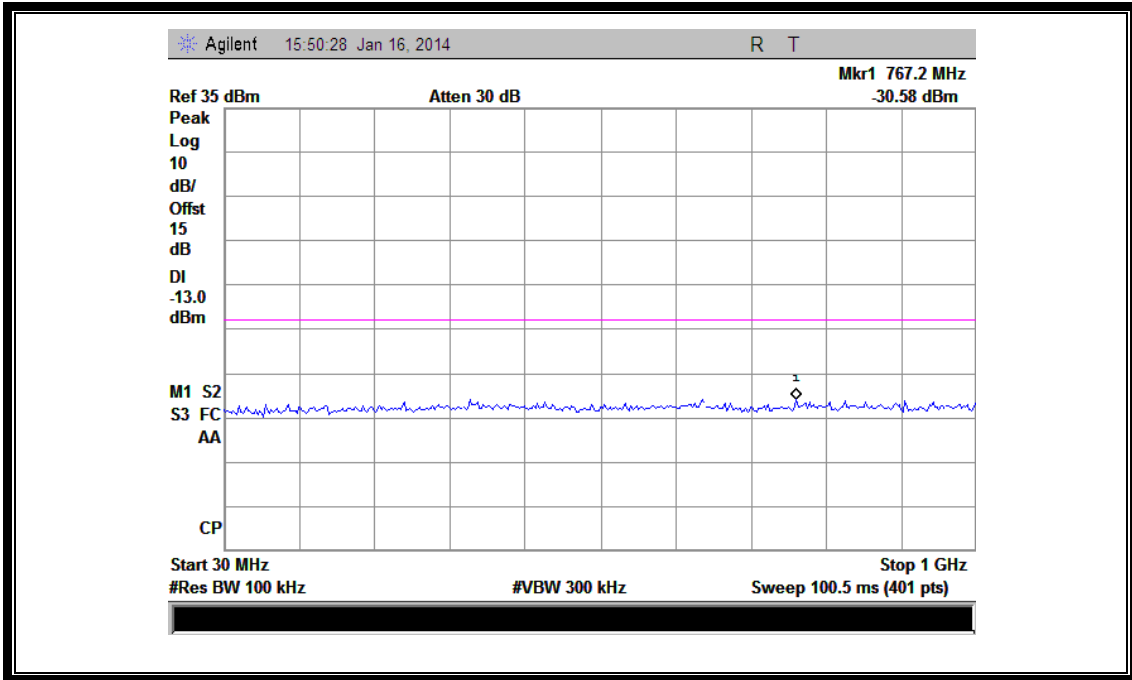
(Plot G3.1: HSDPA850MHz Channel = 4233, 1GHz to 9GHz)



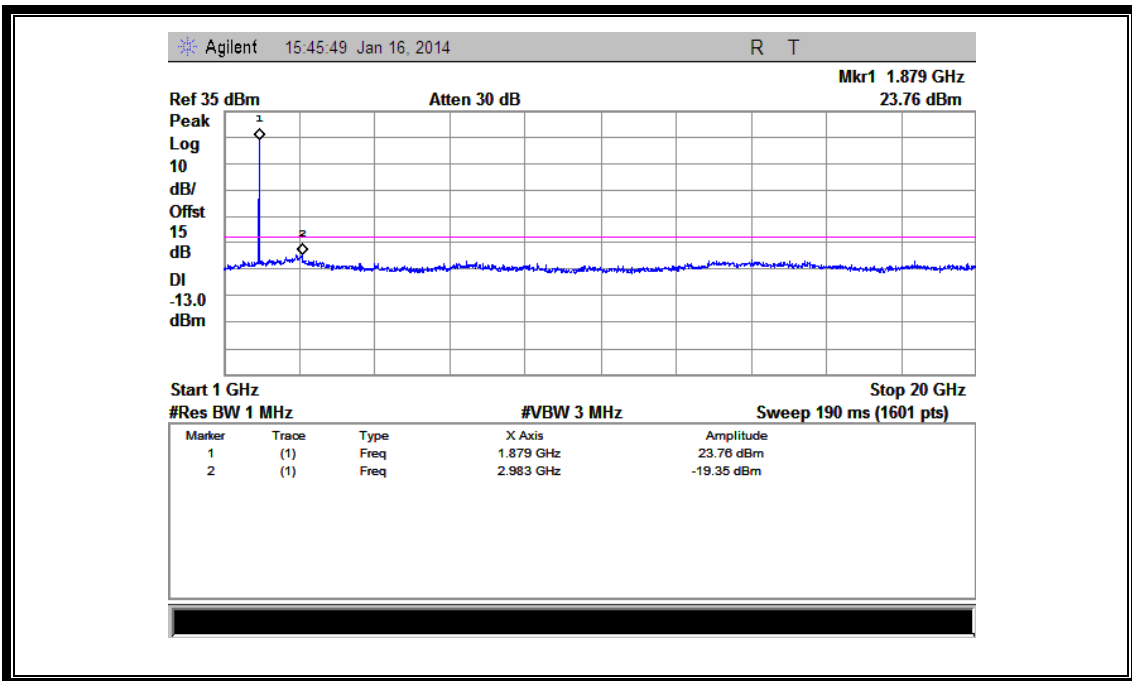
(Plot H1: HSDPA1900MHz Channel = 9262, 30MHz to 1GHz)



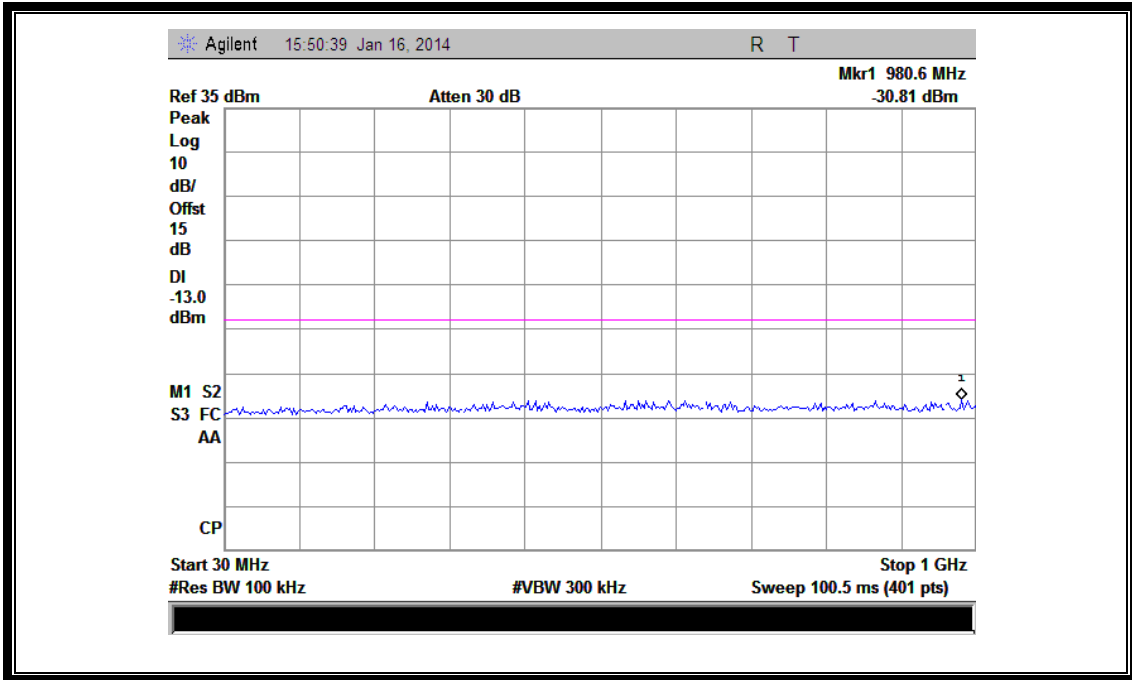
(Plot H1.1: HSDPA1900MHz Channel = 9262, 1GHz to 20GHz)



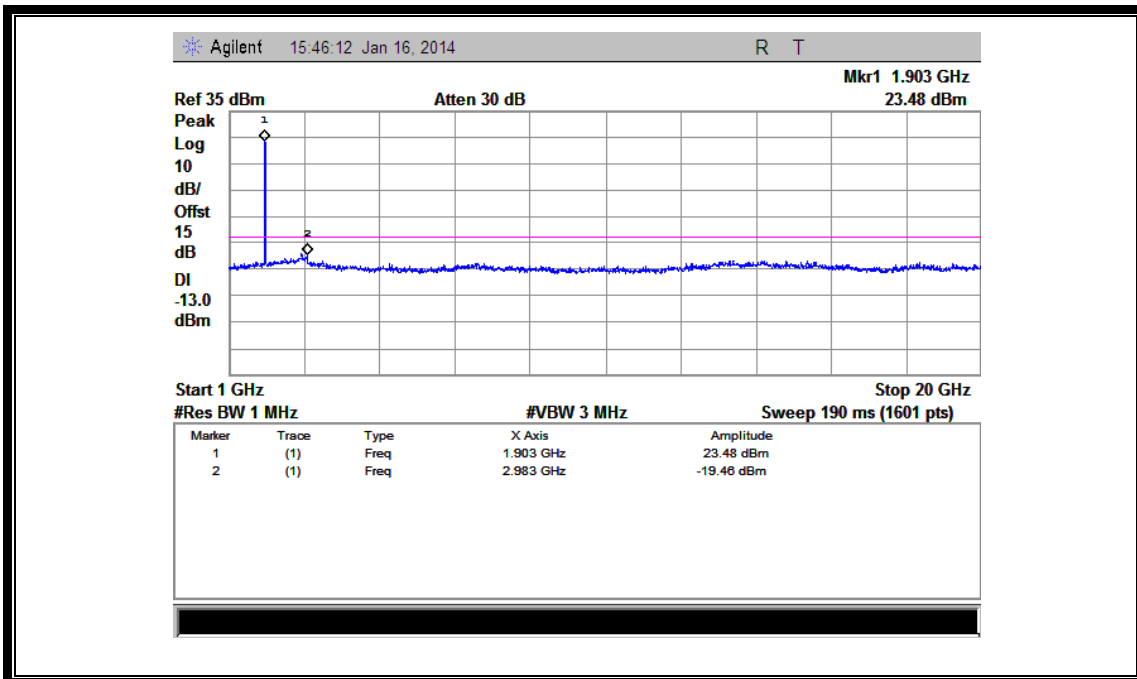
(Plot H2: HSDPA1900MHz Channel = 9400, 30MHz to 1GHz)



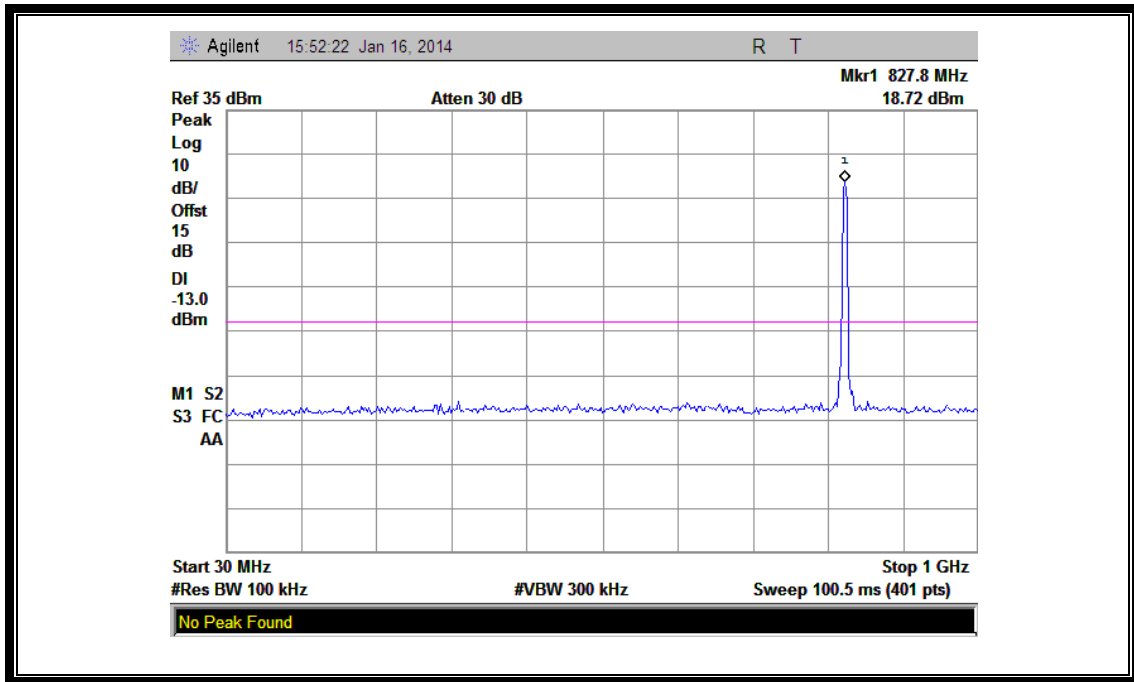
(Plot H2.1: HSDPA1900MHz Channel = 9400, 1GHz to 20GHz)



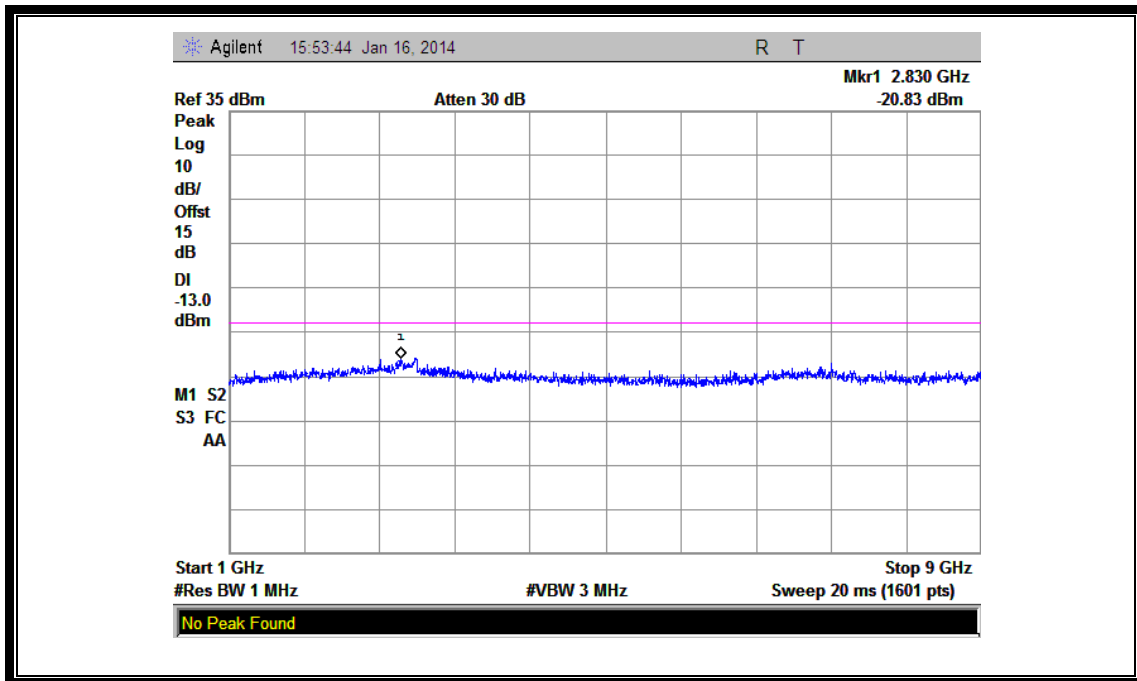
(Plot H3: HSDPA1900MHz Channel = 9538, 30MHz to 1GHz)



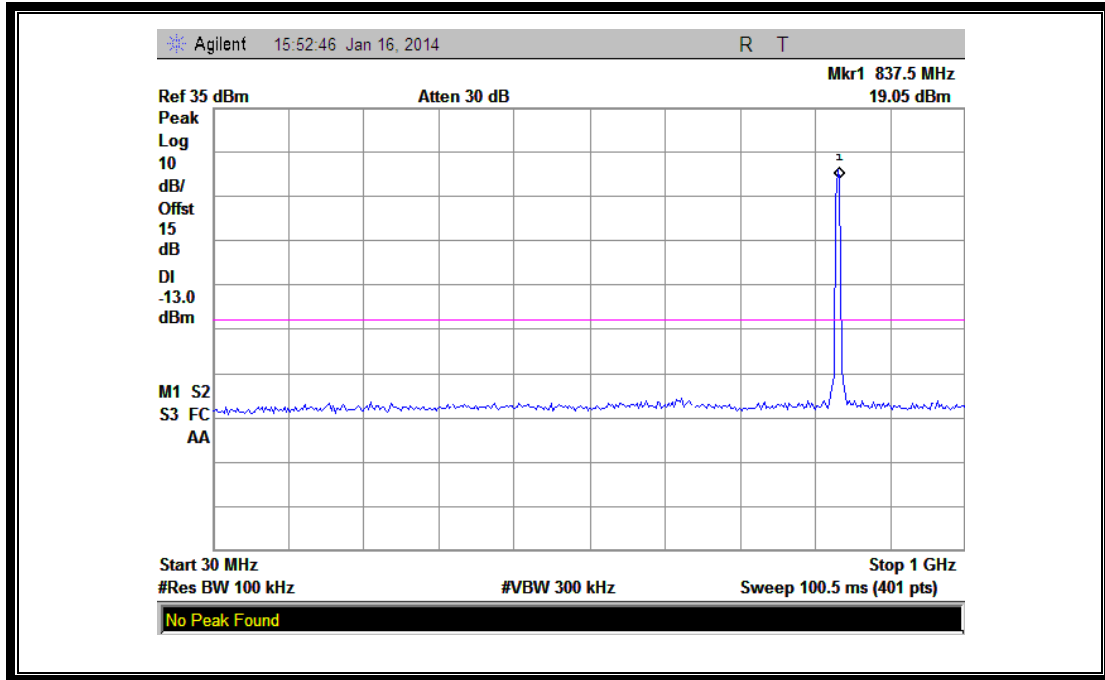
(Plot H3.1: HSDPA1900MHz Channel = 9538 1GHz to 20GHz)



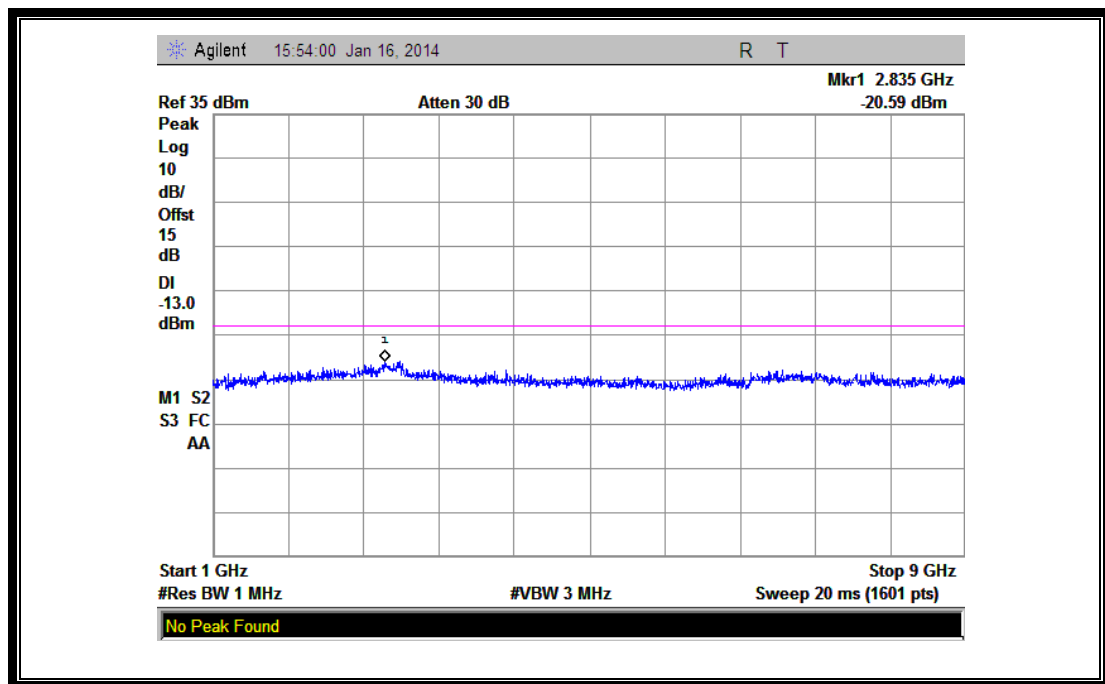
(Plot I 1: HSUPA 850MHz Channel = 4132, 30MHz to 1GHz)



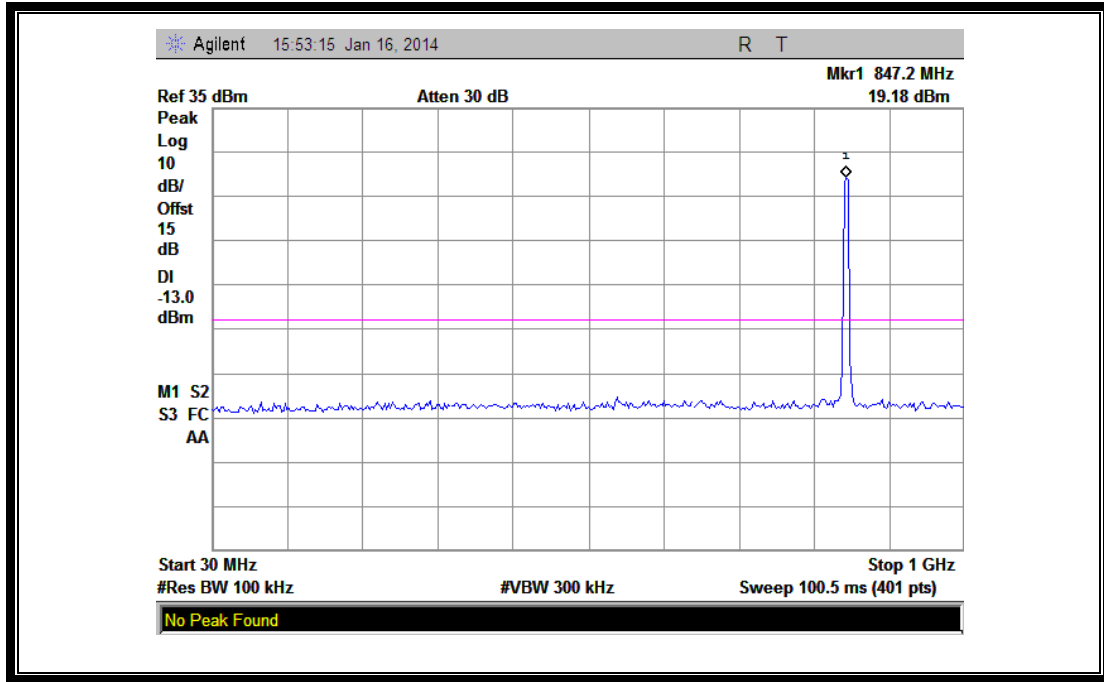
(Plot I1.1: HSUPA 850MHz Channel = 4132, 1GHz to 9GHz)



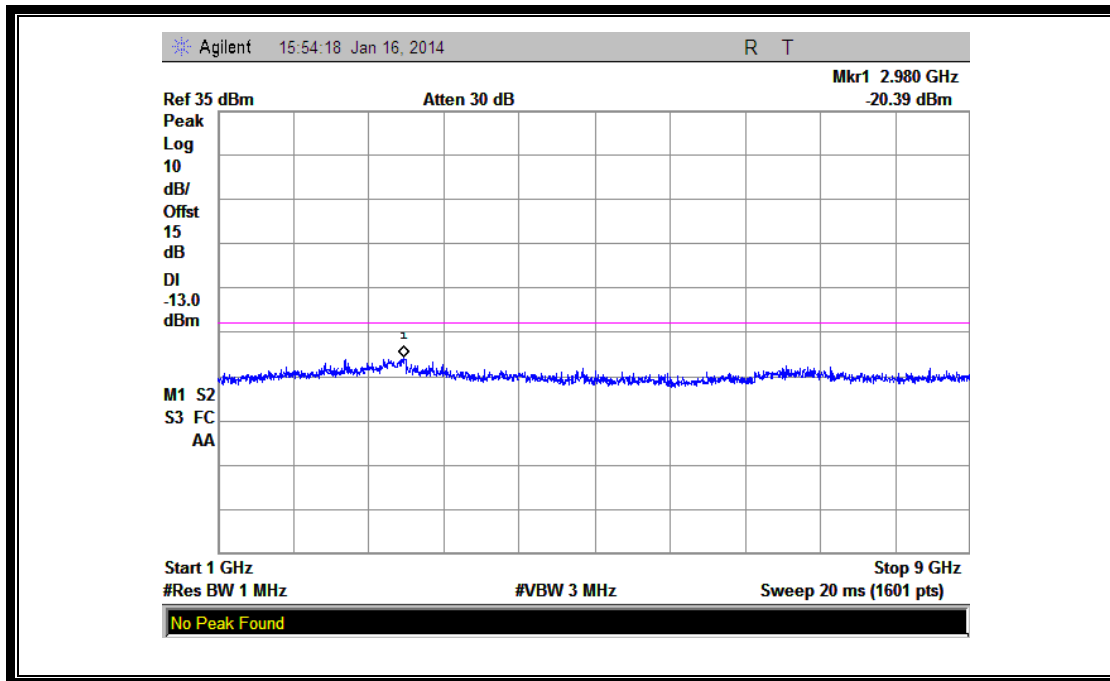
(Plot I 2: HSUPA 850MHz Channel = 4175, 30MHz to 1GHz)



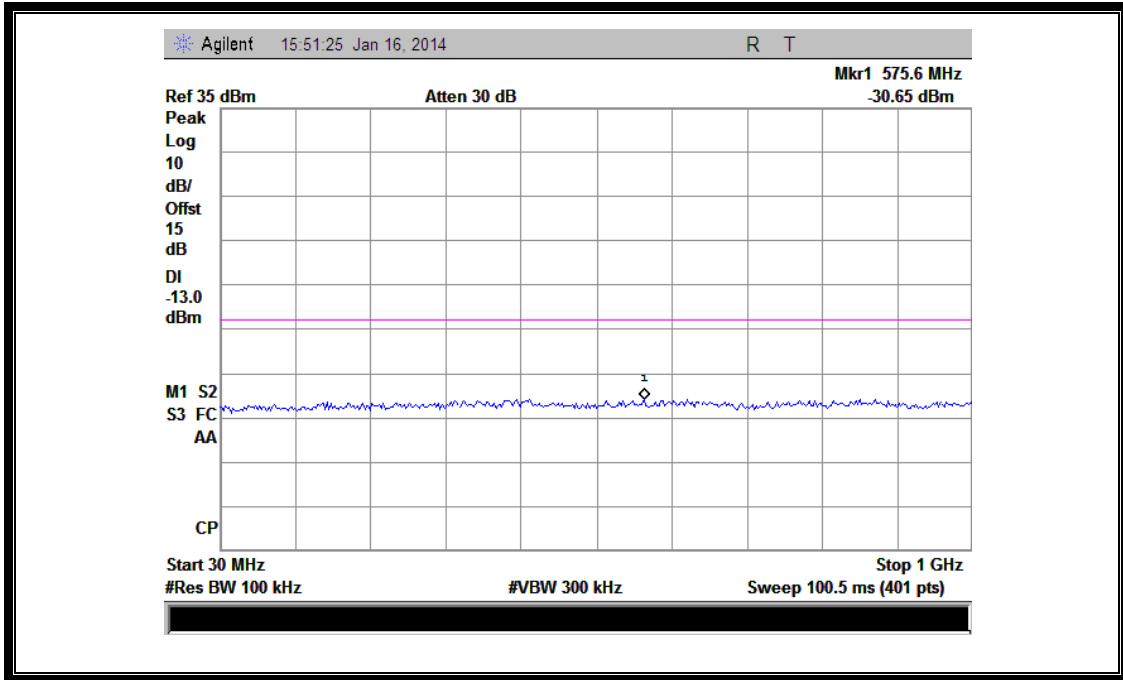
(Plot I2.1: HSUPA 850MHz Channel = 4175, 1GHz to 9GHz)



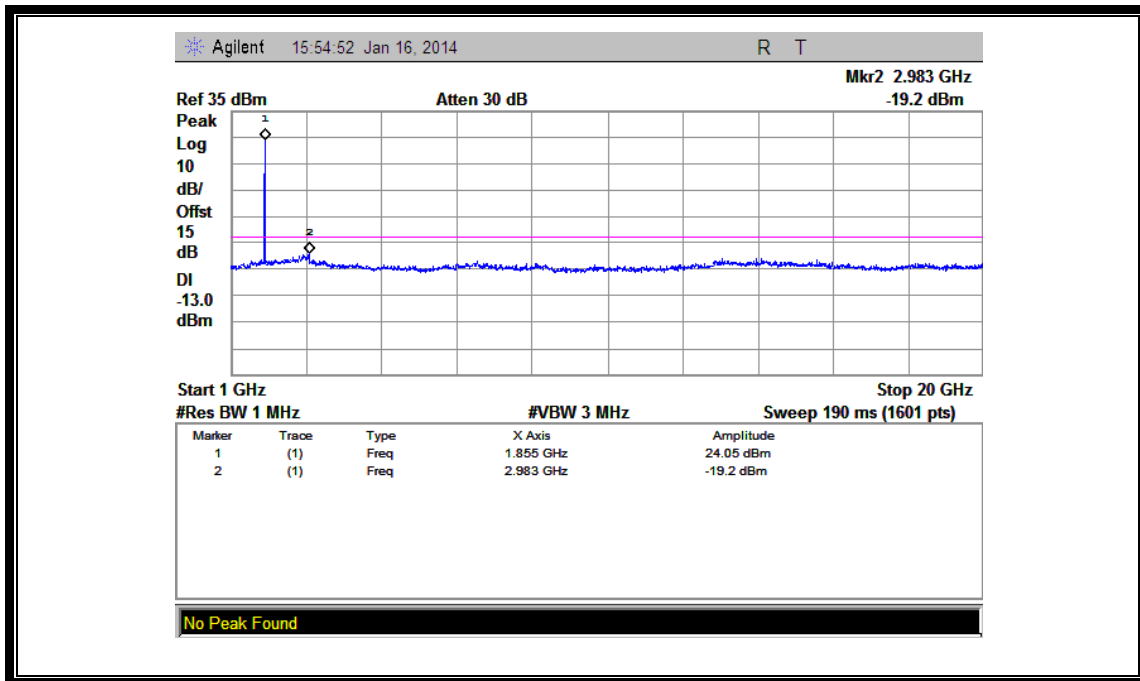
(Plot I 3: HSUPA850MHz Channel = 4233, 30MHz to 1GHz)



(Plot I3.1: HSUPA850MHz Channel = 4233, 1GHz to 9GHz)

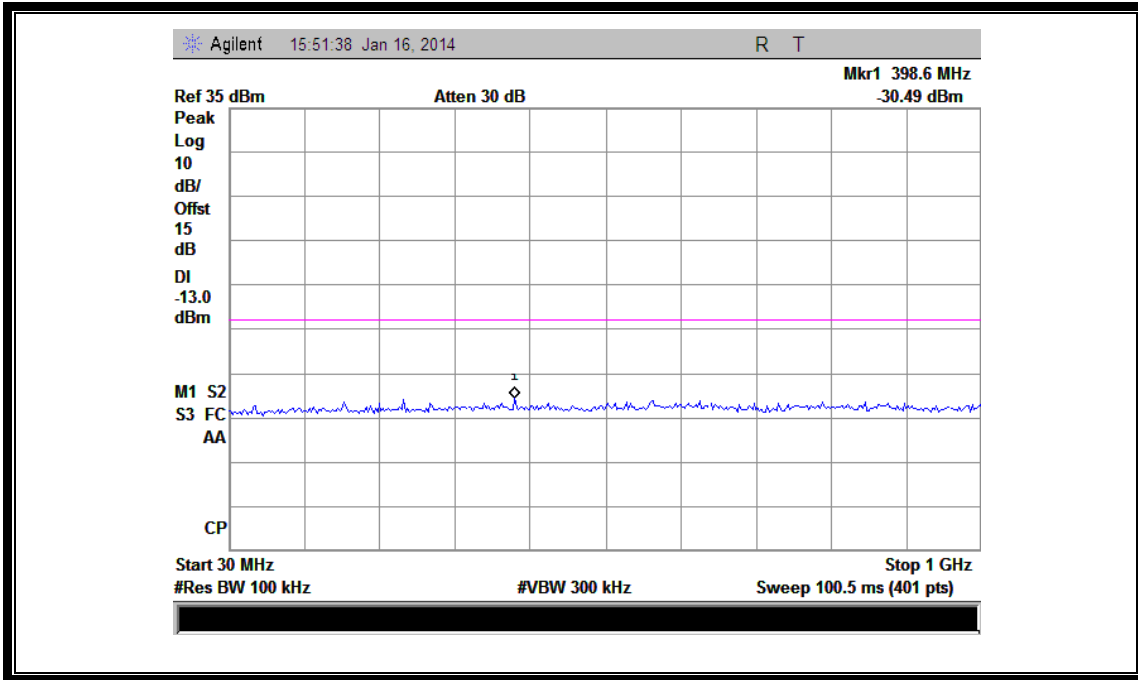


(Plot J 1: HSUPA1900MHz Channel = 9262, 30MHz to 1GHz)

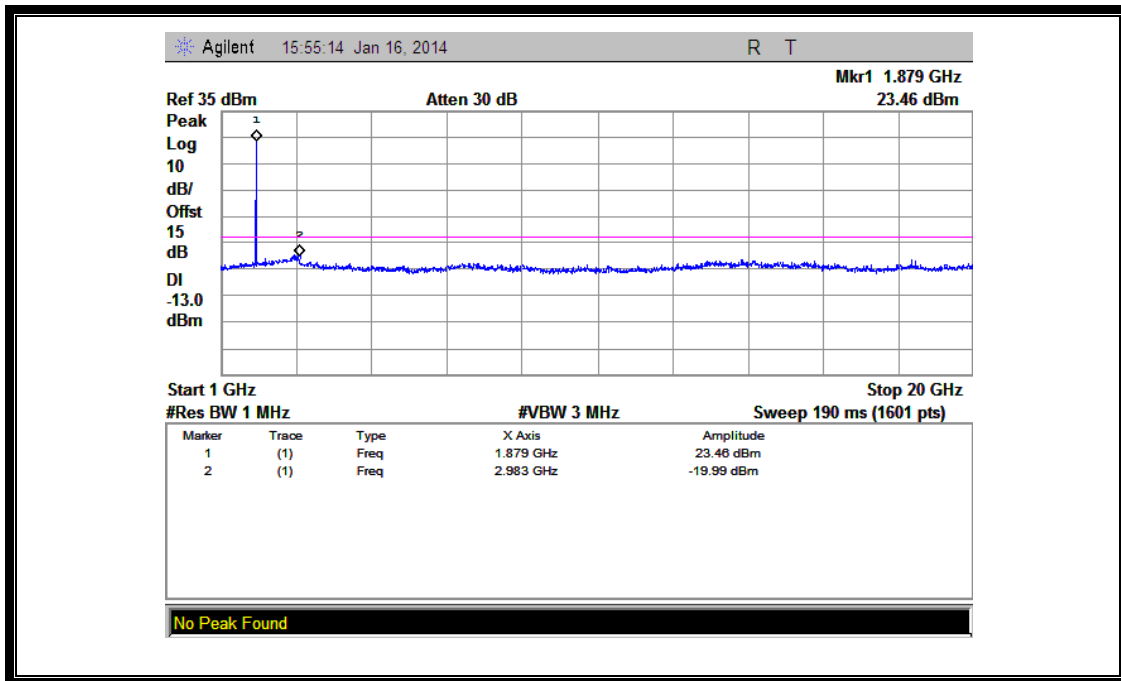


(Plot J1.1: HSUPA1900MHz Channel = 9262, 1GHz to 20GHz)

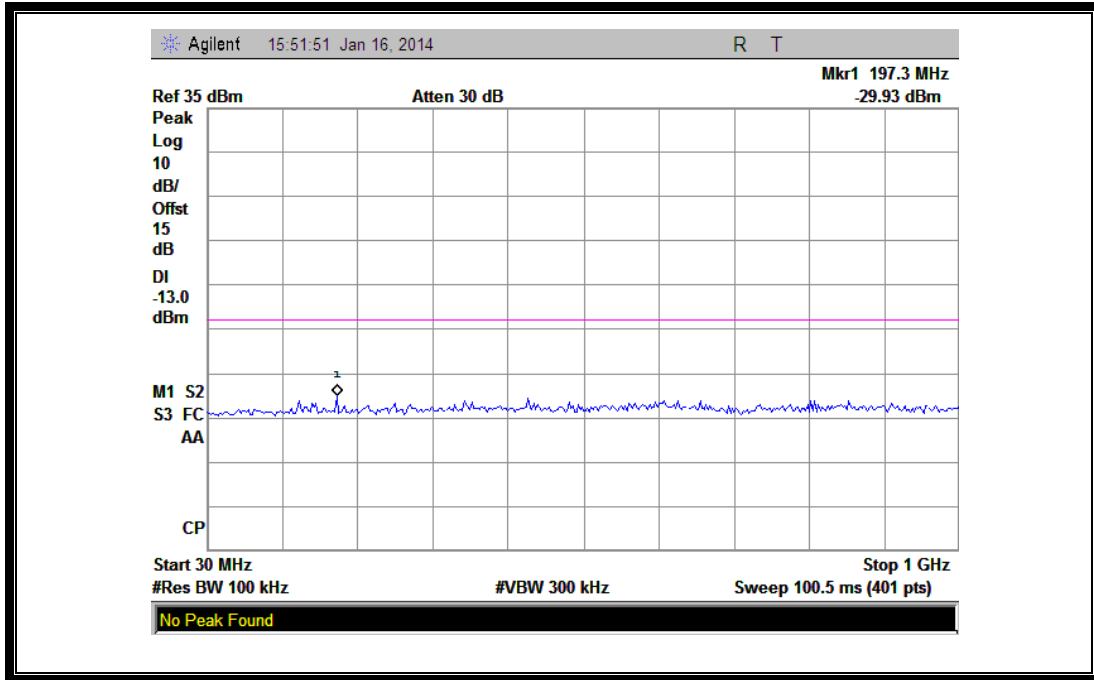




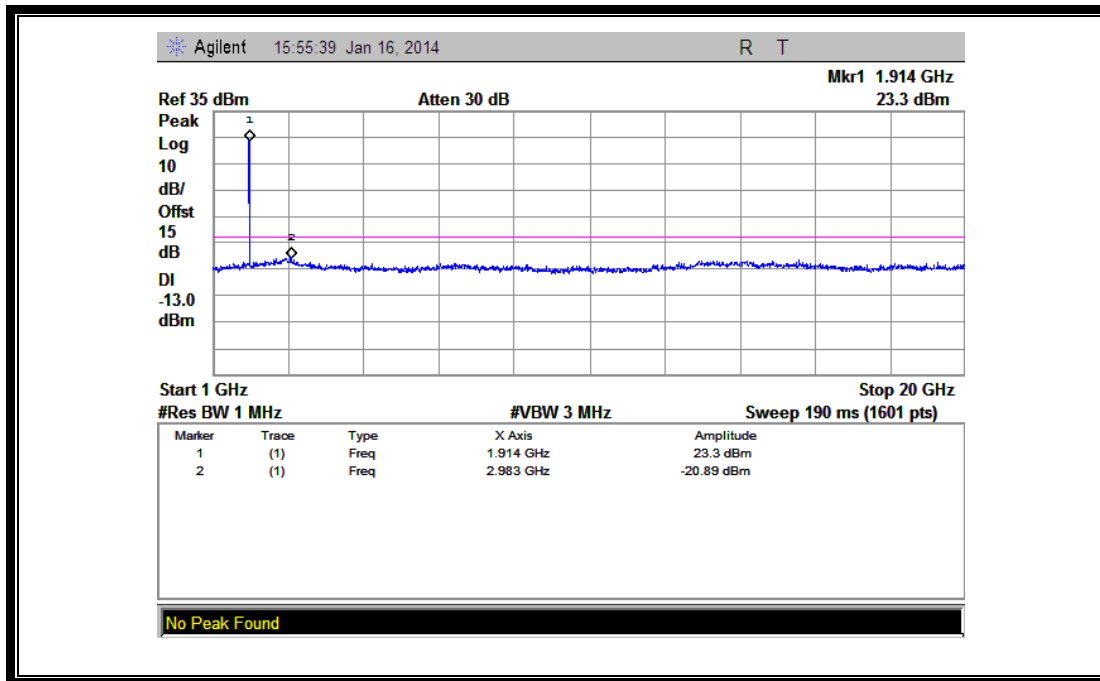
(Plot J 2: HSUPA1900MHz Channel = 9400, 30MHz to 1GHz)



(Plot J2.1: HSUPA1900MHz Channel = 9400, 1GHz to 20GHz)



(Plot J 3: HSUPA1900MHz Channel = 9538, 30MHz to 1GHz)



(Plot J3.1: HSUPA1900MHz 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

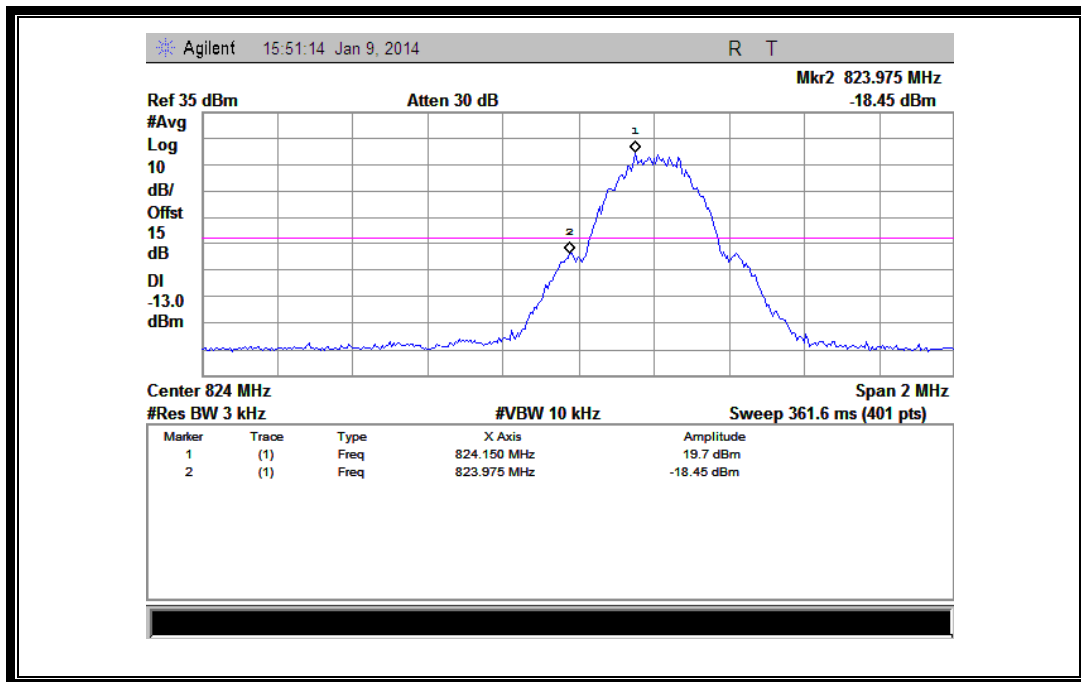
The lowest and highest channels are tested to verify the band edge emissions.

#### 1. Test Verdict:

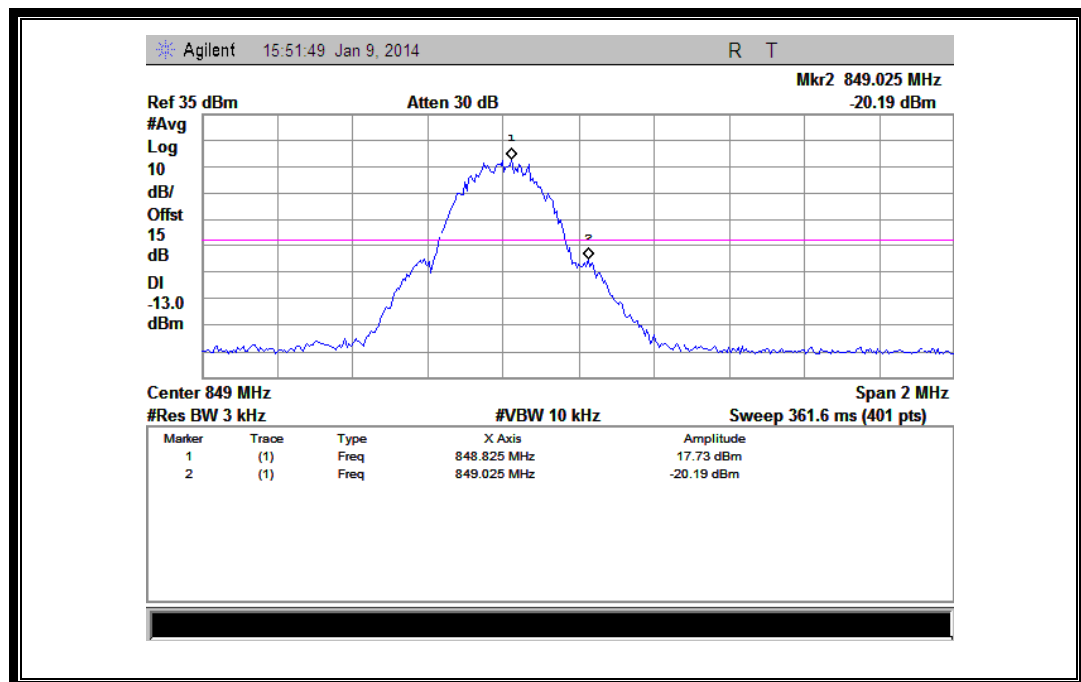
Band	Channel	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GSM 850MHz	128	824.2	-18.45	Plat A	-13	<u>PASS</u>
	251	848.8	-20.19	Plot B		<u>PASS</u>
GSM 1900MHz	512	1850.2	-18.60	Plat C	-13	<u>PASS</u>
	810	1909.8	-20.45	Plot D		<u>PASS</u>
EDGE 850MHz	128	824.2	-19.40	Plat E	-13	<u>PASS</u>
	251	848.8	-19.52	Plot F		<u>PASS</u>
EDGE 1900MHz	512	1850.2	-18.66	Plat G	-13	<u>PASS</u>
	810	1909.8	-21.91	Plot H		<u>PASS</u>
WCDMA 850MHz	4132	826.4	-24.27	Plat I	-13	<u>PASS</u>
	4233	846.6	-24.76	Plot J		<u>PASS</u>
WCDMA 1900MHz	9262	1852.4	-22.22	Plat K	-13	<u>PASS</u>
	9538	1907.6	-19.61	Plot L		<u>PASS</u>
HSDPA 850MHz	4132	826.4	-22.31	Plat M	-13	<u>PASS</u>
	4233	846.6	-19.32	Plot N		<u>PASS</u>
HSDPA 1900MHz	9262	1852.4	-18.76	Plat O	-13	<u>PASS</u>
	9538	1907.6	-16.25	Plot P		<u>PASS</u>
HSUPA 850MHz	4132	826.4	-22.28	Plat Q	-13	<u>PASS</u>
	4233	846.6	-21.73	Plot R		<u>PASS</u>
HSUPA	9262	1852.4	-18.67	Plat S	-13	<u>PASS</u>

1900MHz	9538	1907.6	-13.15	Plot T	PASS
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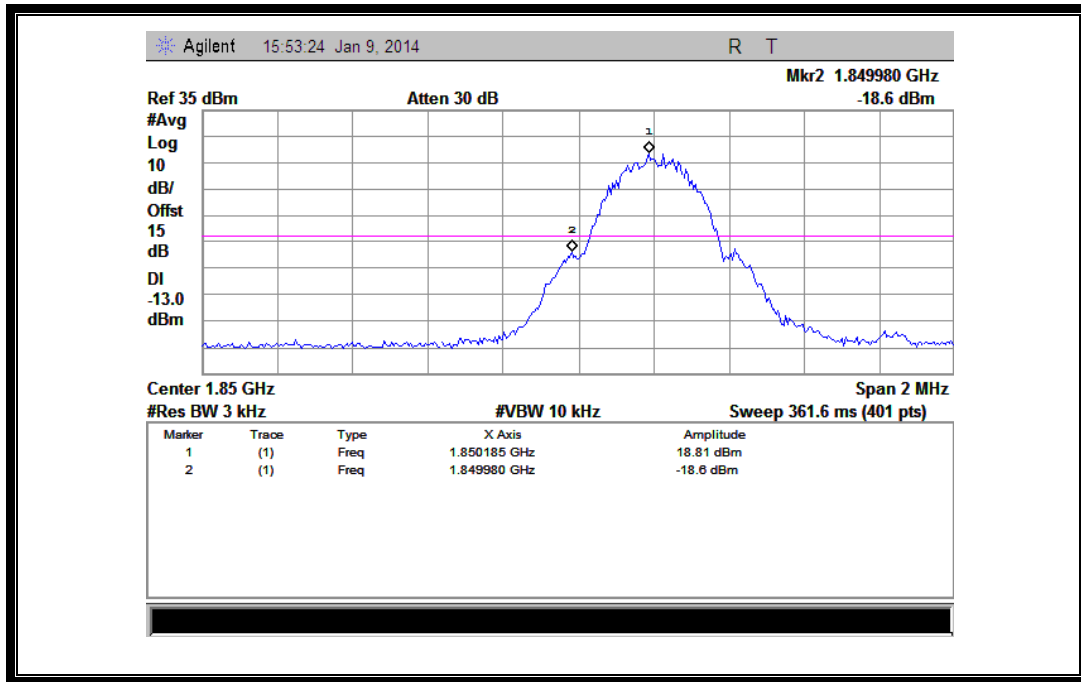
## 2. Test Plots:



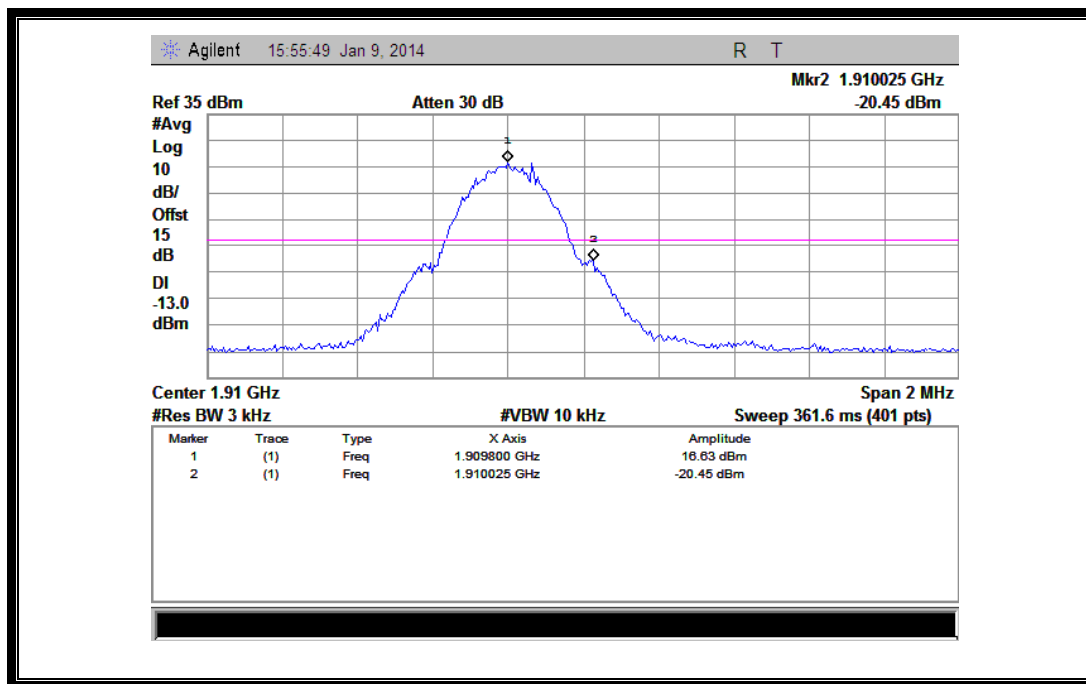
(Plot A: GSM 850 Channel = 128)



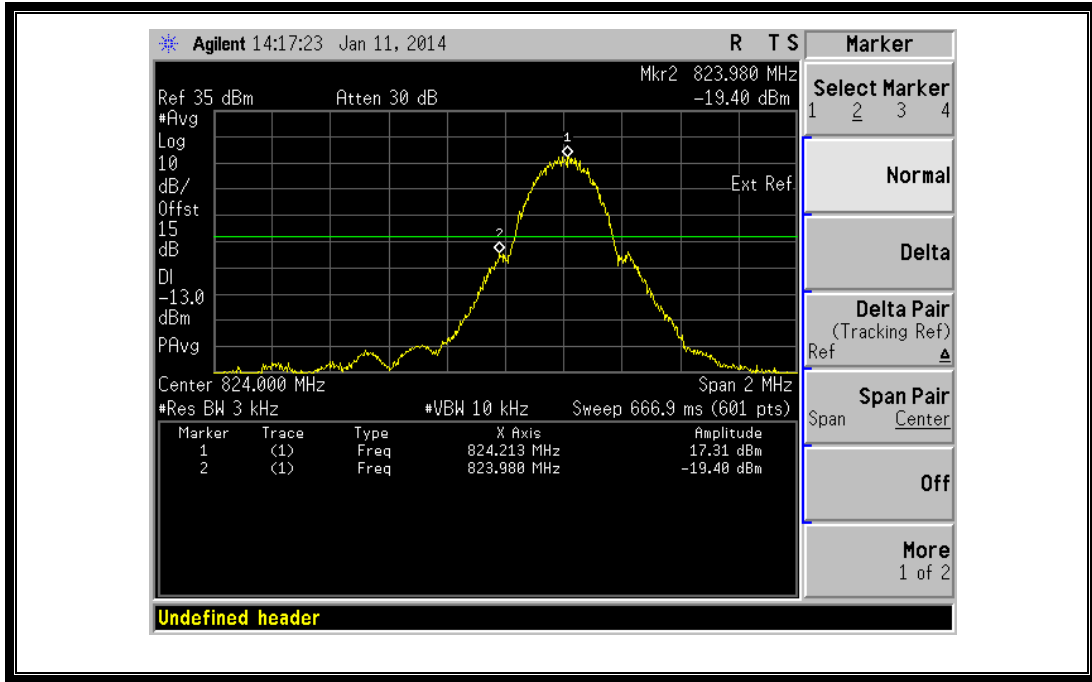
(Plot B: GSM 850 Channel = 251)



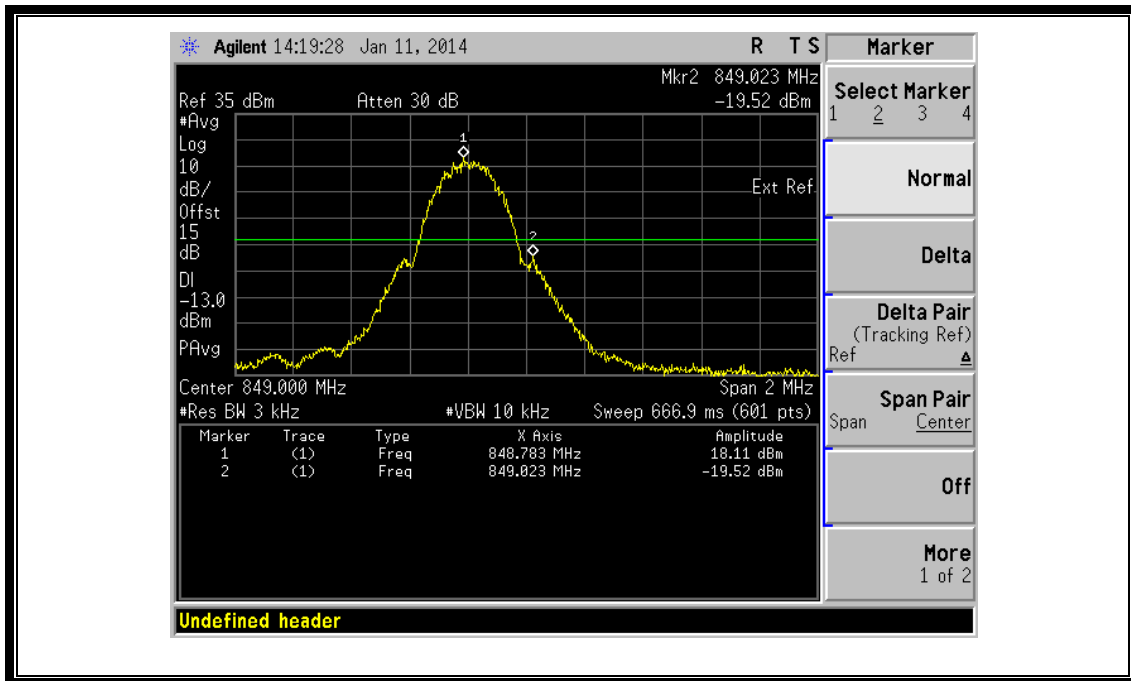
(Plot C: GSM 1900 Channel = 512)



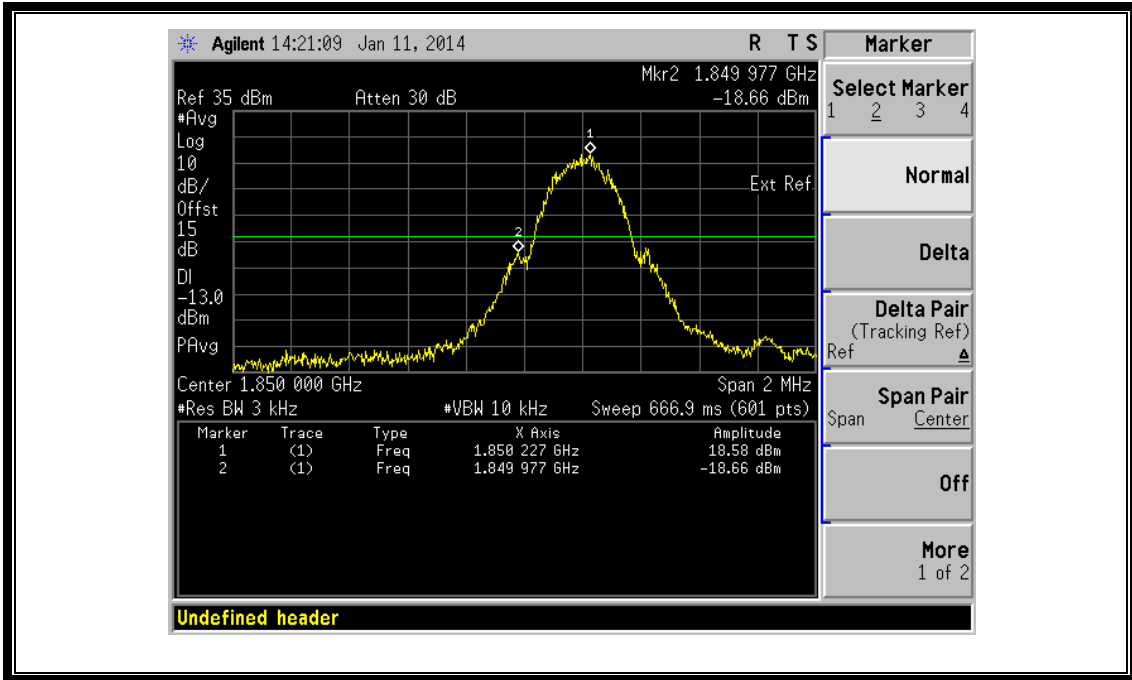
(Plot D: GSM 1900 Channel = 810)



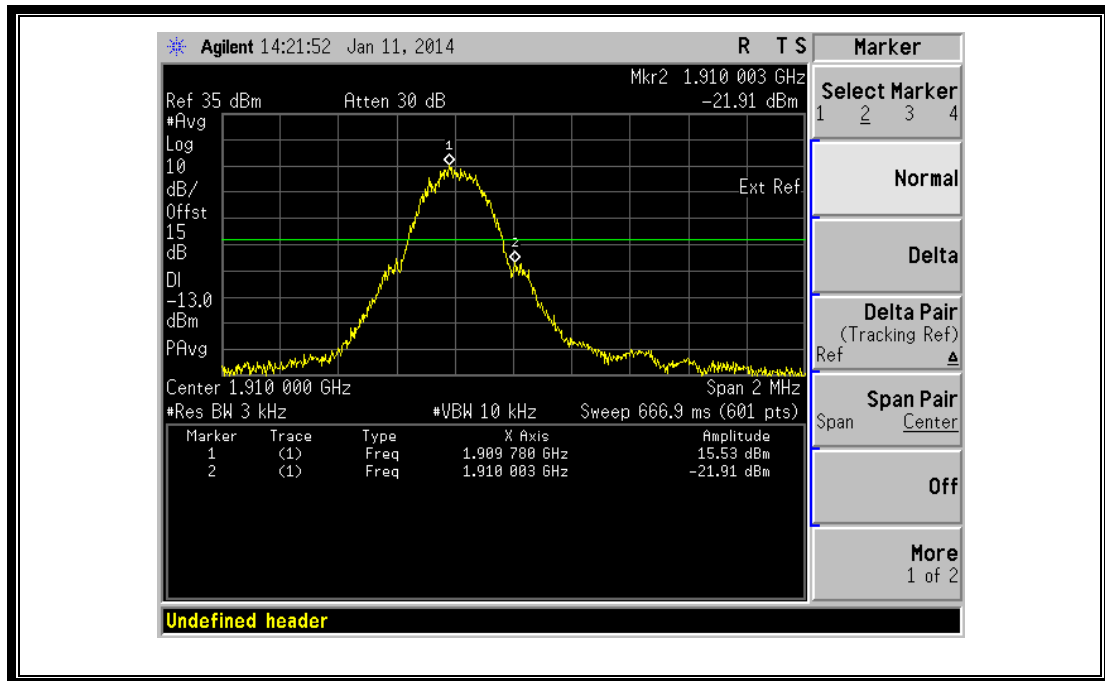
(Plot E: EGPRS 850 Channel = 128)



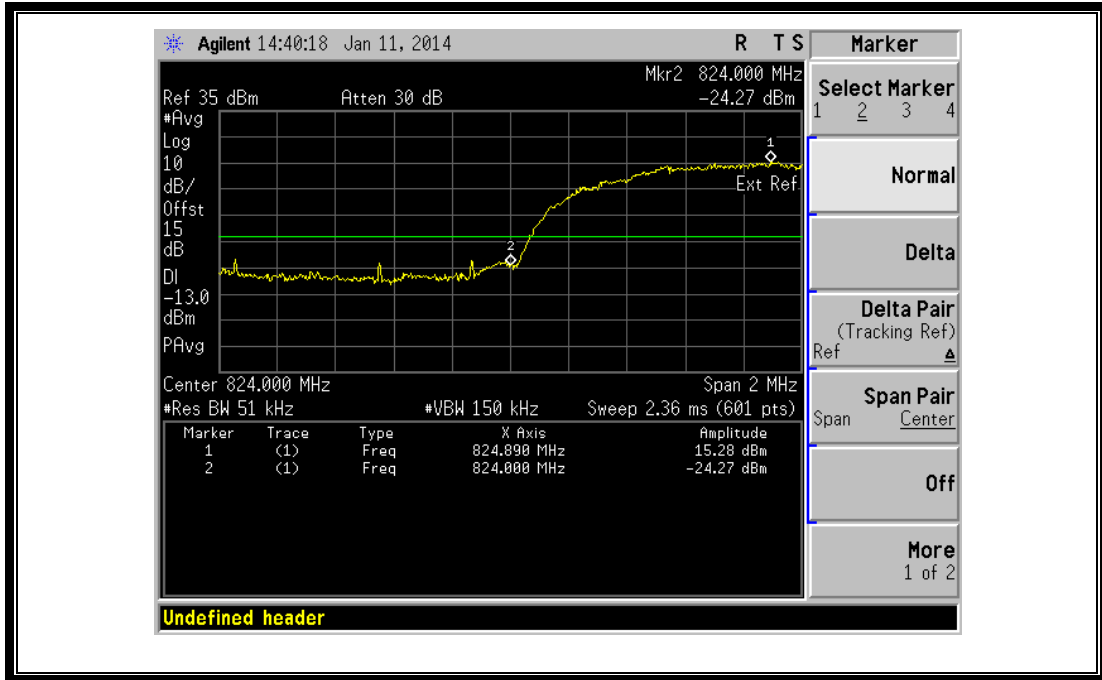
(Plot F: EGPRS 850 Channel = 251)



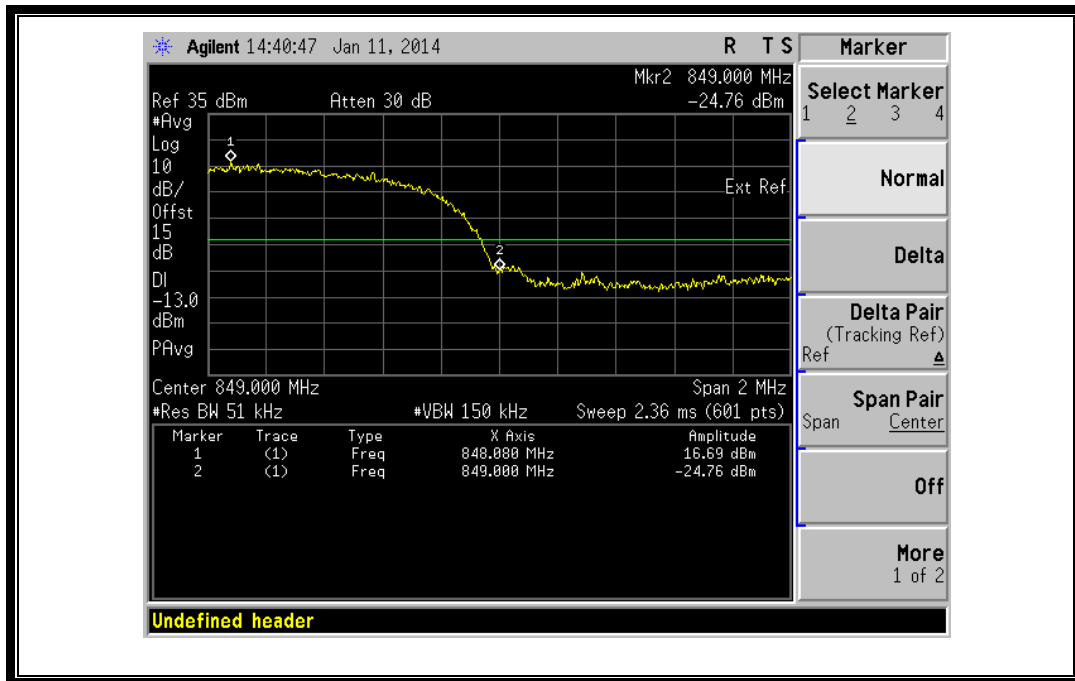
(Plot G: EGPRS 1900 Channel = 512)



(Plot H: EGPRS 1900 Channel = 810)

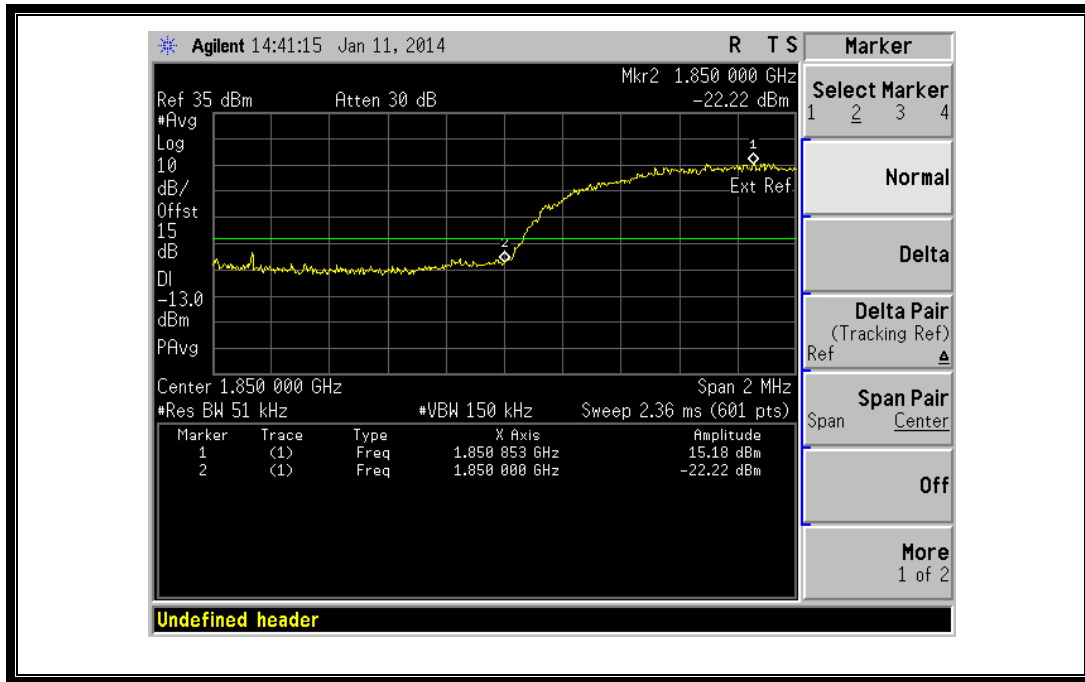


(Plot I: WCDMA 850 Channel = 4132)

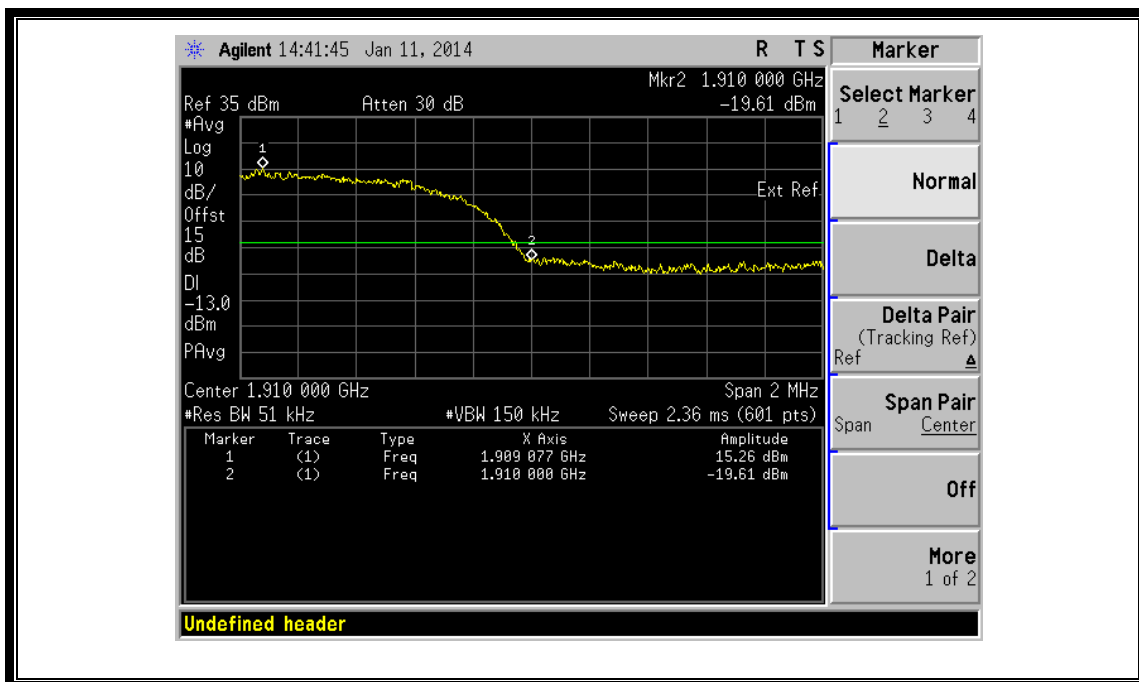


(Plot J: WCDMA 850 Channel = 4233)

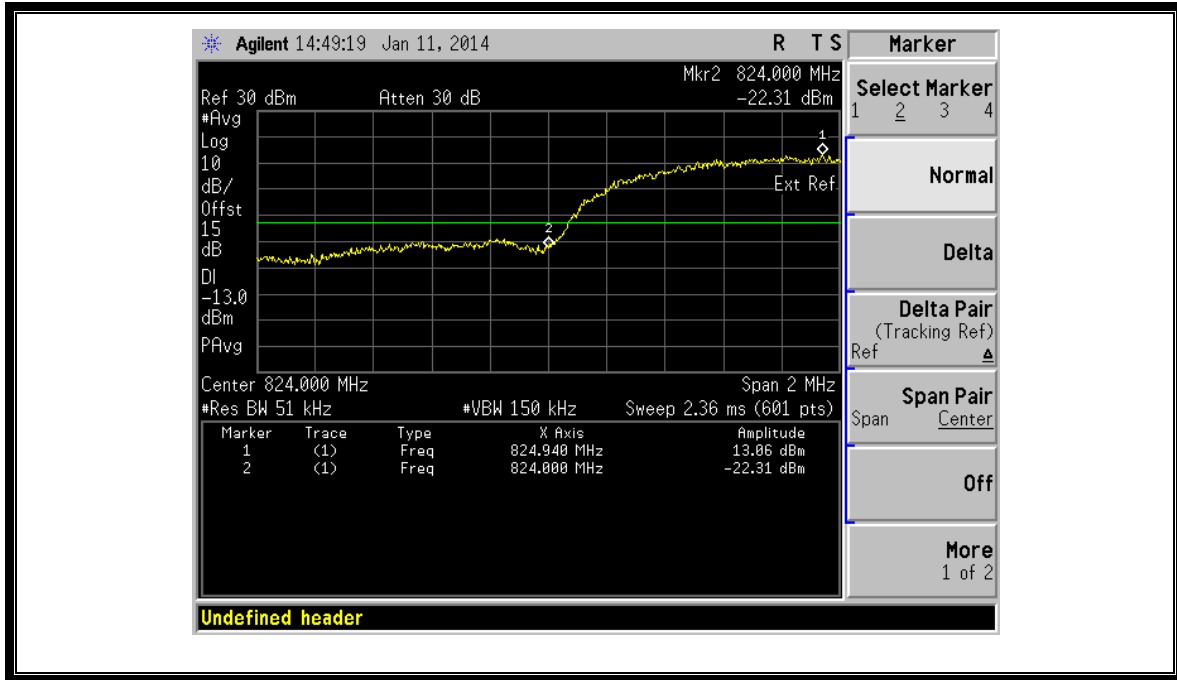




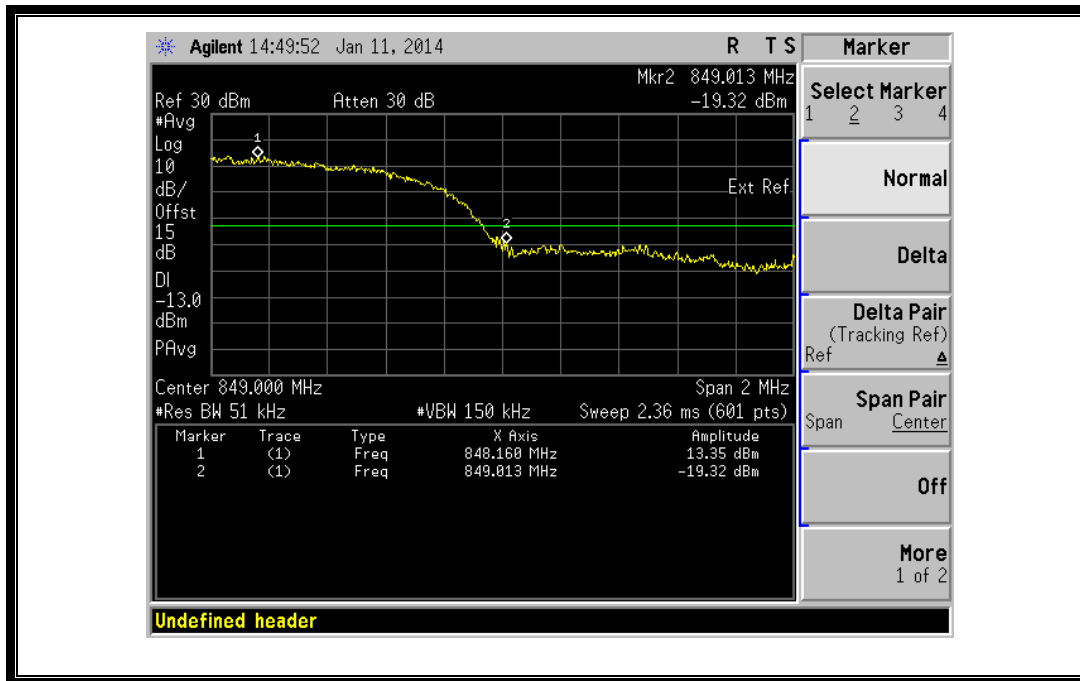
(Plot K: WCDMA 1900 Channel = 9262)



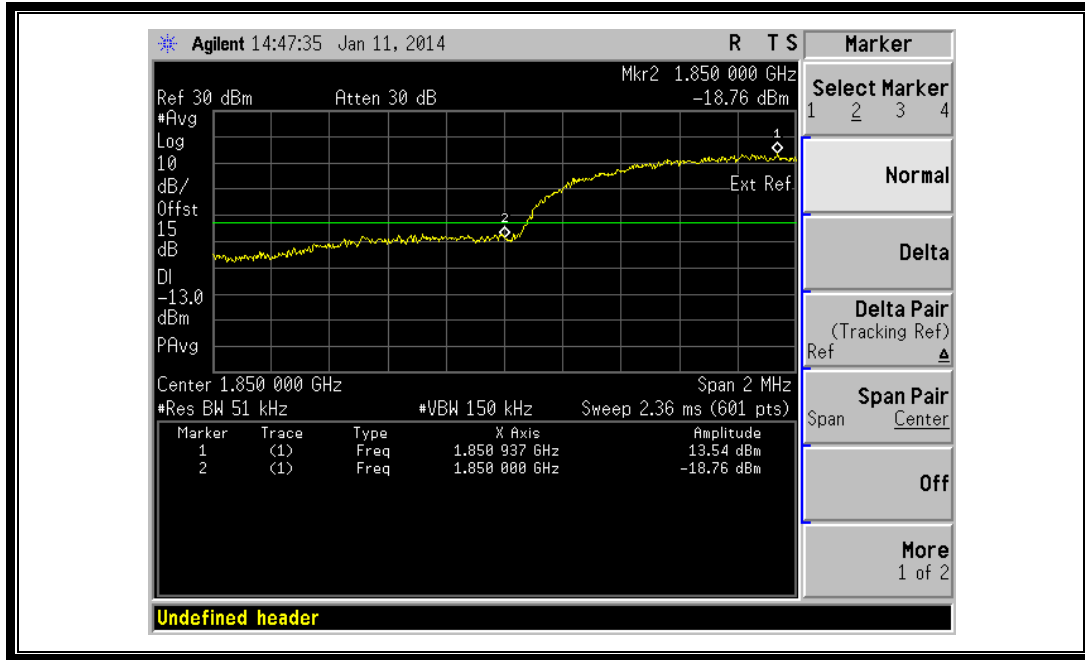
(Plot L: WCDMA 1900 Channel = 9538)



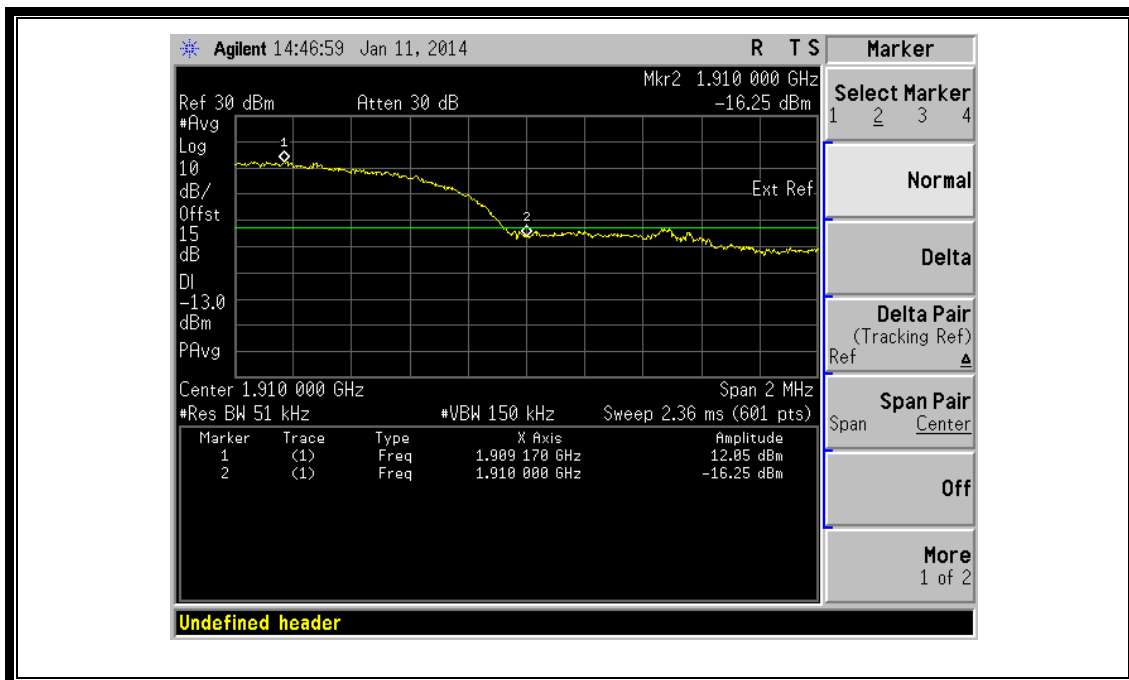
(Plot M: HSDPA 850 Channel = 4132)



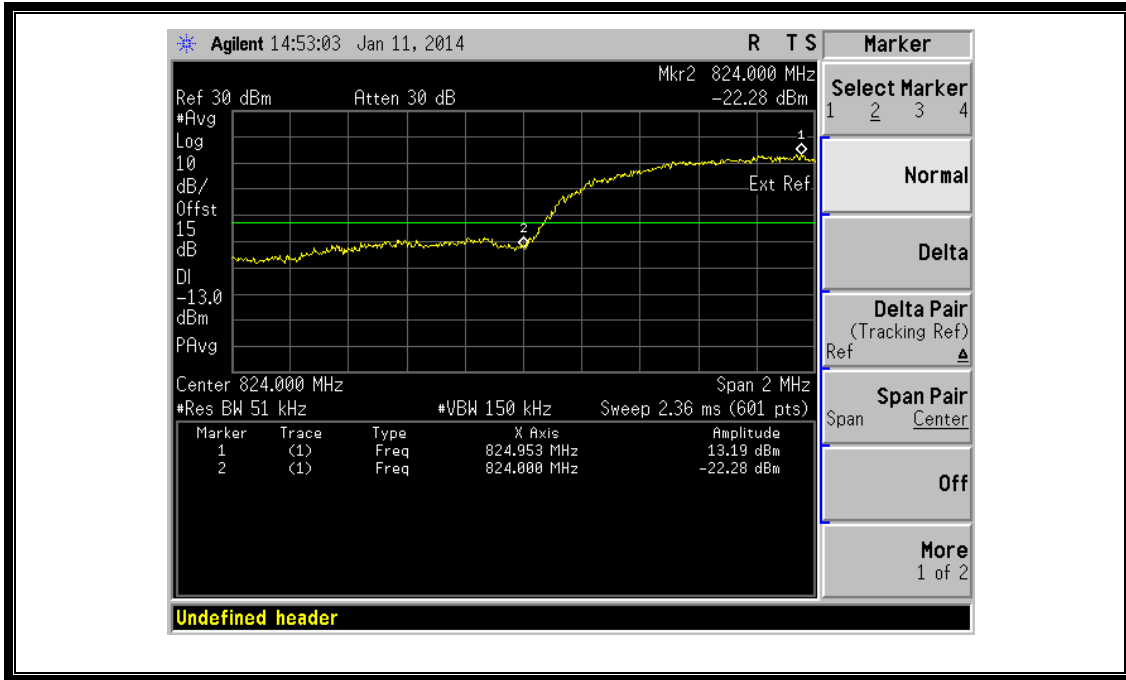
(Plot N: HSDPA850 Channel = 4233)



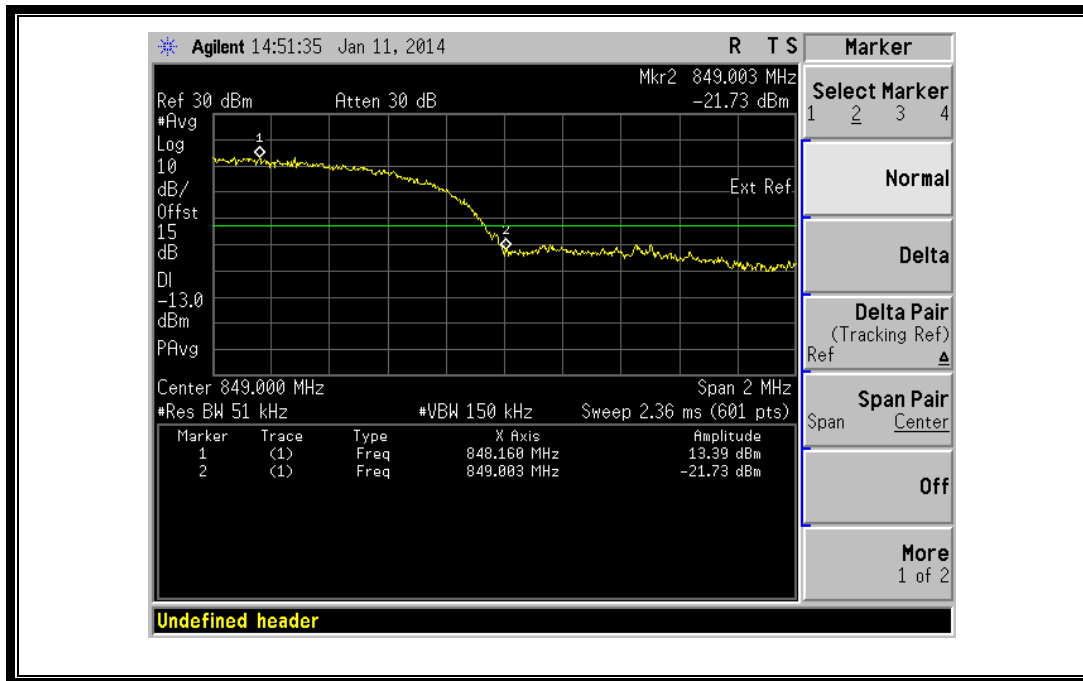
(Plot O: HSDPA 1900 Channel = 9262)



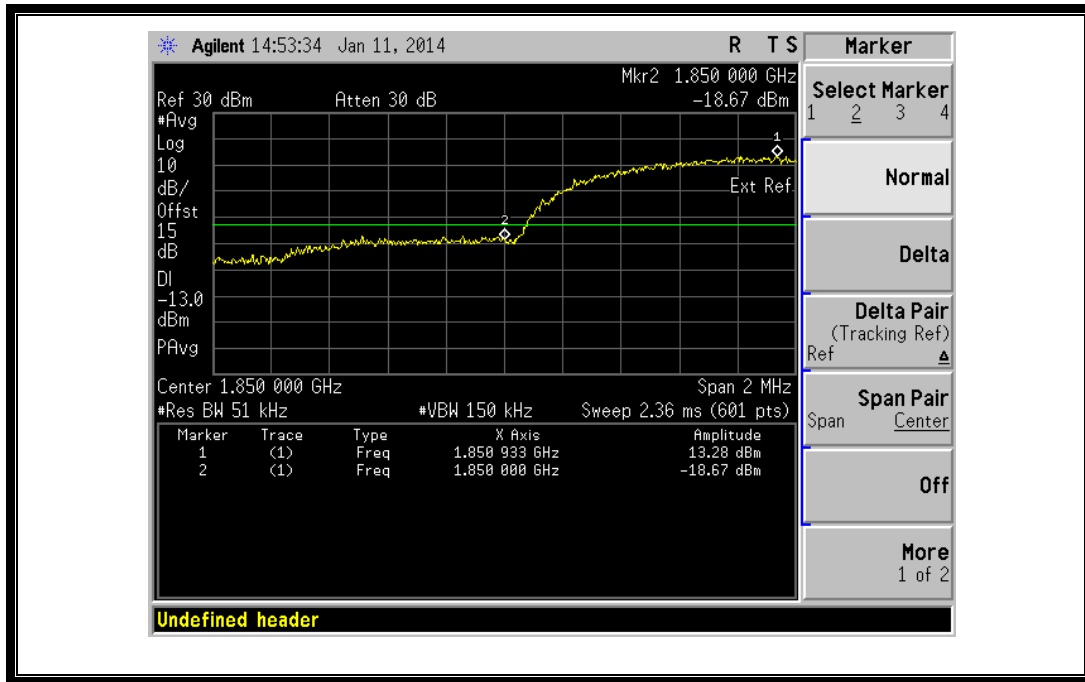
(Plot P: HSDPA 1900 Channel = 9538)



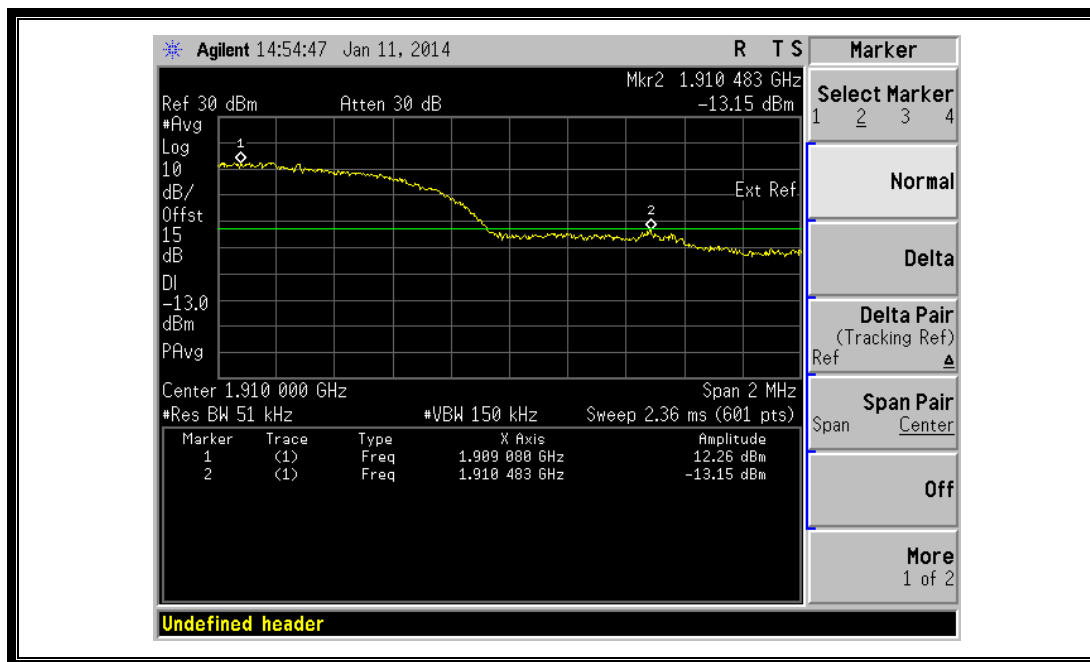
(Plot Q: HSUPA 850 Channel = 4132)



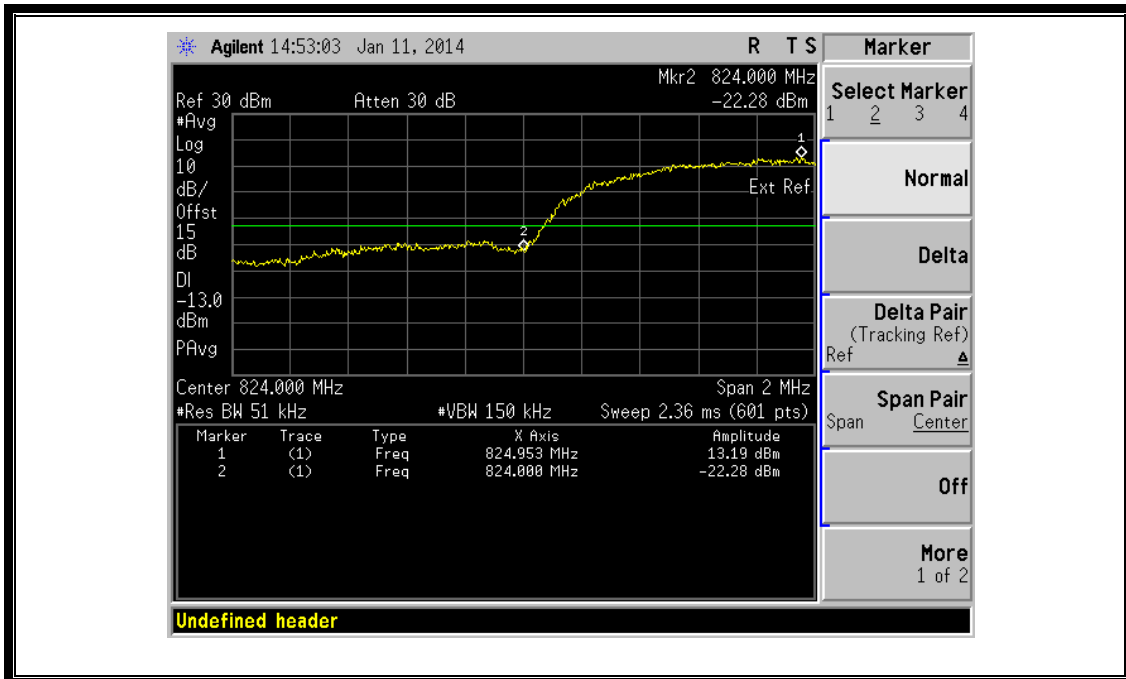
(Plot R: HSUPA850 Channel = 4233)



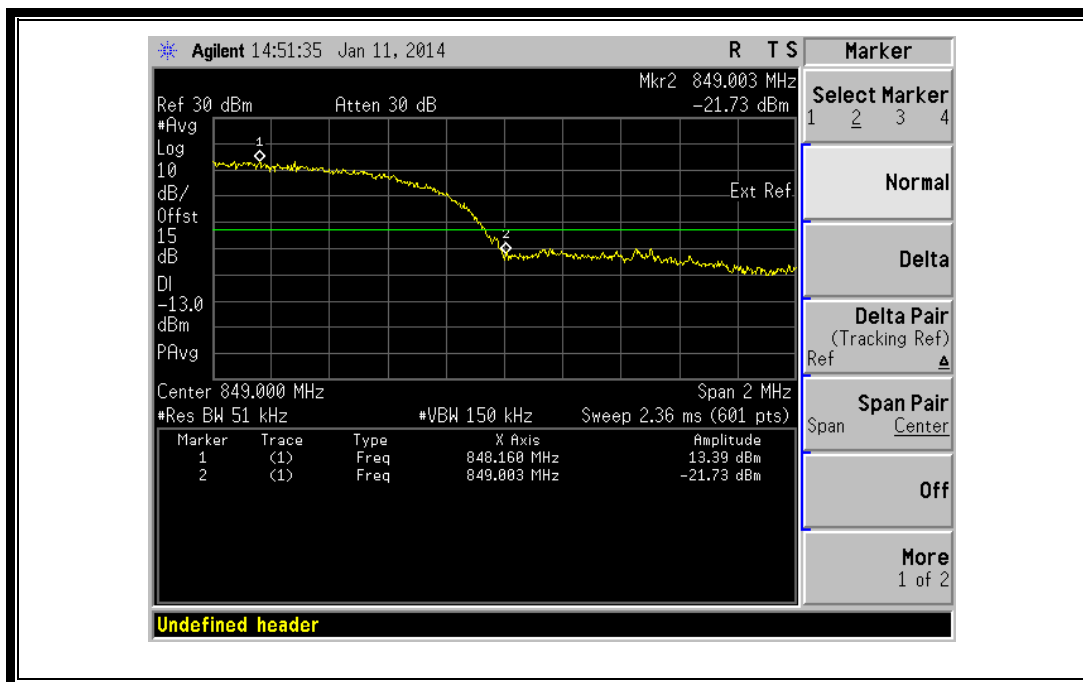
(Plot S: HSUPA 1900 Channel = 9262)



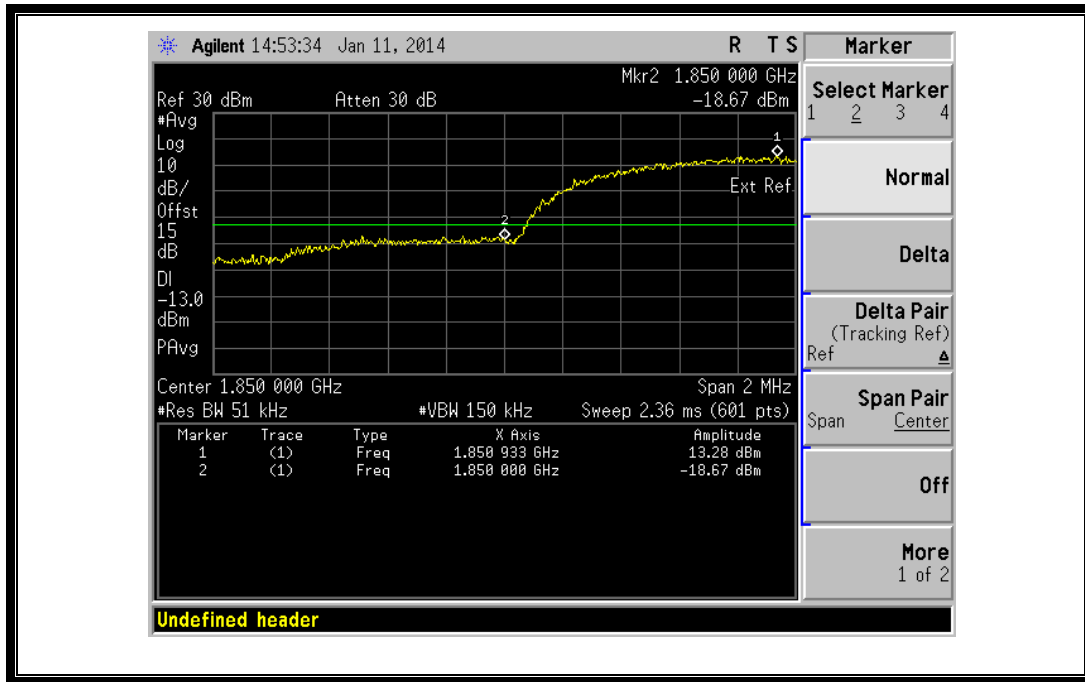
(Plot T: HSUPA 1900 Channel = 9538)



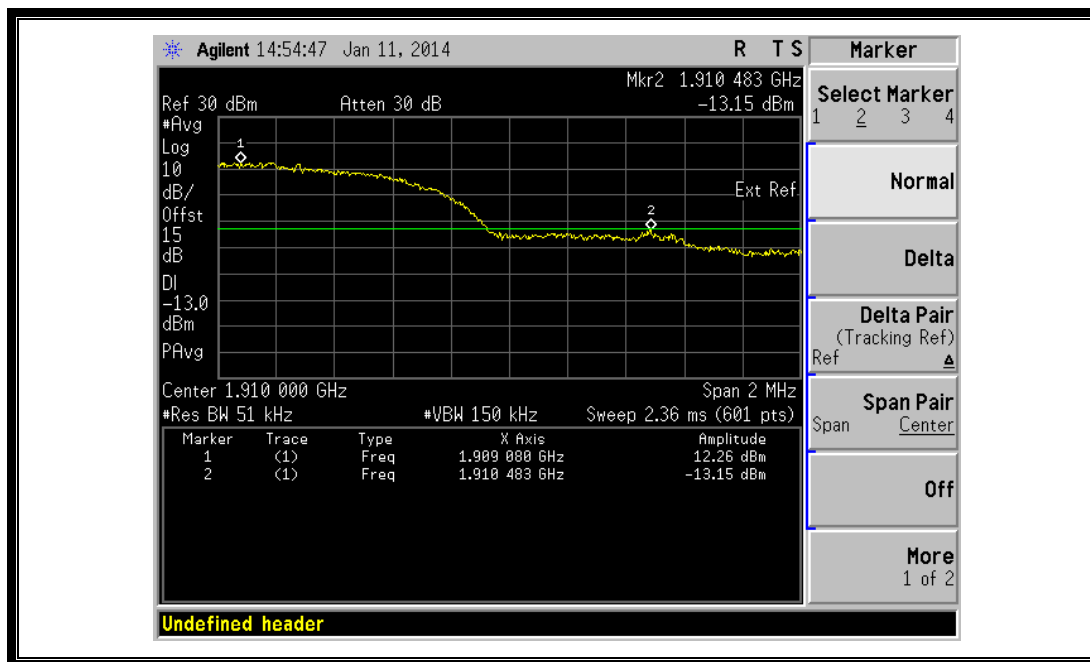
(Plot Q: HSPA+ 850 Channel = 4132)



(Plot R: HSPA+ 850 Channel = 4233)



(Plot S: HSPA+ 1900 Channel = 9262)



(Plot T: HSPA+ 1900 Channel = 9538)

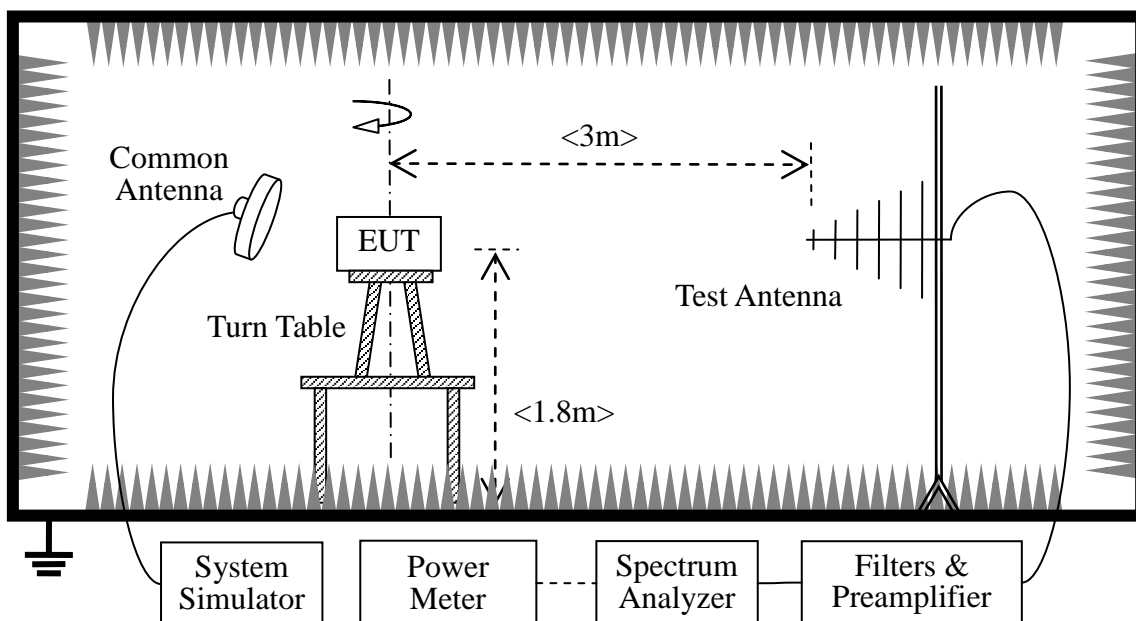
## 2.7 Transmitter Radiated Power (EIRP/ERP)

### 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 33.52dBm, GSM 1900 28.38dBm, EGPRS 850 31.26dBm, EGPRS 1900 29.45, WCDMA 850 22.83dBm, WCDMA 1900 23.68 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, EGPRS 850 3.1dBm, EGPRS 1900



0.21dBm ,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	2013.05.13	2014.05.12
Spectrum Analyzer	Agilent	E7405A	US44210471	2013.05.13	2014.05.12
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2013.05.13	2014.05.12
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2013.05.13	2014.05.12
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2013.05.13	2014.05.12
Substitution Antenna	Schwarzbeck	BBHA 9120C	9120C-384	2013.05.13	2014.05.12
Pre-AMPs	lucix	S10M100L3802	S020180L3203	2013.05.13	2014.05.12
Notch Filter	COM-MW	ZBSF-C836.5-25-X	NA	2013.05.13	2014.05.12
Notch Filter	COM-MW	ZBSF-C1747.5-75-X2	NA	2013.05.13	2014.05.12
Notch Filter	COM-MW	ZBSF-C1880-60-X2	NA	2013.05.13	2014.05.12

### 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:

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

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

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

$P_{\text{SUBST\_TX}}$  is signal generator level,

$P_{\text{SUBST\_RX}}$  is receiver level,

$L_{\text{SUBST\_CABLES}}$  is cable losses including TX cable,

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

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

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

## 1. GSM Model Test Verdict:

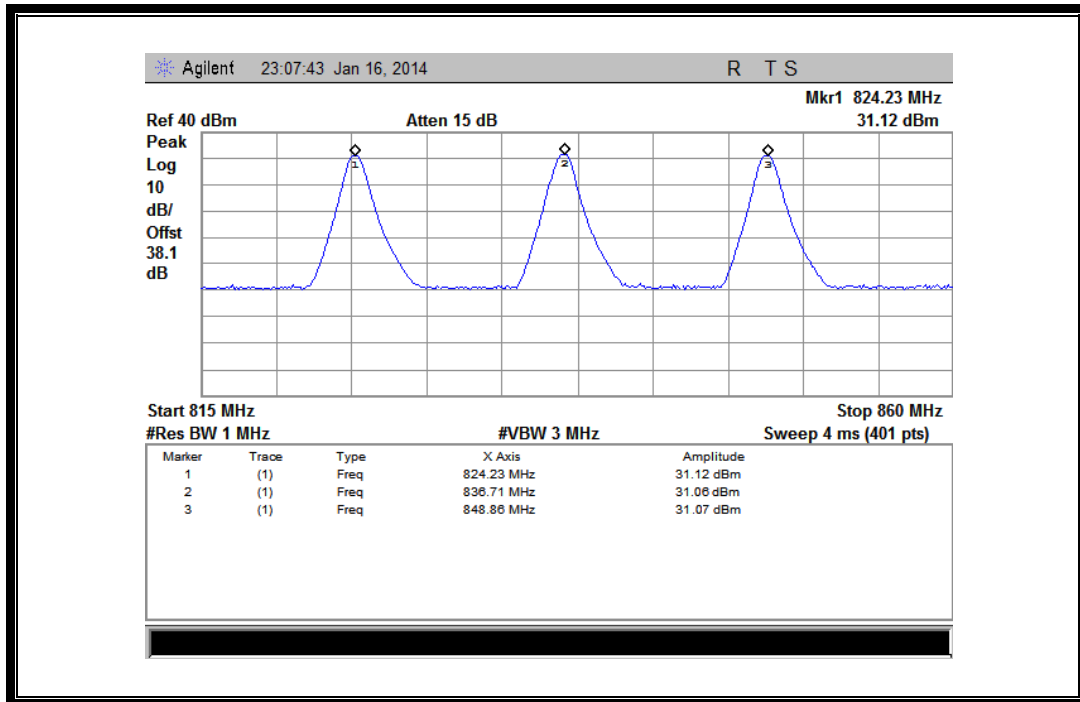
Band	Channel	Frequency (MHz)	PCL	Measured ERP			Limit		Verdict
				dBm	W	Refer to Plot	dBm	W	
GSM 850MHz	128	824.20	5	31.12	1.294	Plot A	38.5	7	PASS
	190	836.60	5	31.06	1.276				PASS
	251	848.80	5	31.07	1.279				PASS
GPRS 850MHz	128	824.20	5	31.03	1.268	Plot B <sup>Note 1</sup>	38.5	7	PASS
	190	836.60	5	30.74	1.186				PASS
	251	848.80	5	30.82	1.208				PASS
EGPRS 850MHz	128	824.20	5	31.28	1.343	Plot C <sup>Note 1</sup>	38.5	7	PASS
	190	836.60	5	31.85	1.531				PASS
	251	848.80	5	31.27	1.340				PASS
Band	Channel	Frequency (MHz)	PCL	Measured EIRP			Limit		Verdict
				dBm	W	Refer to Plot	dBm	W	
GSM 1900MHz	512	1850.2	0	28.63	0.729	Plot D	33	2	PASS
	661	1880.0	0	28.18	0.658				PASS
	810	1909.8	0	29.27	0.845				PASS
GPRS 1900MHz	512	1850.2	0	27.27	0.533	Plot E <sup>Note 1</sup>	33	2	PASS
	661	1880.0	0	27.46	0.557				PASS
	810	1909.8	0	27.12	0.515				PASS
EGPRS 1900MHz	512	1850.2	0	28.60	0.724	Plot F <sup>Note 1</sup>	33	2	PASS
	661	1880.0	0	28.22	0.664				PASS
	810	1909.8	0	28.34	0.682				PASS
Note 1:	For the GPRS and EGPRS model, all the slots were tested and just the worst data was record in this report.								

## 2. WCDMA Model Test Verdict:

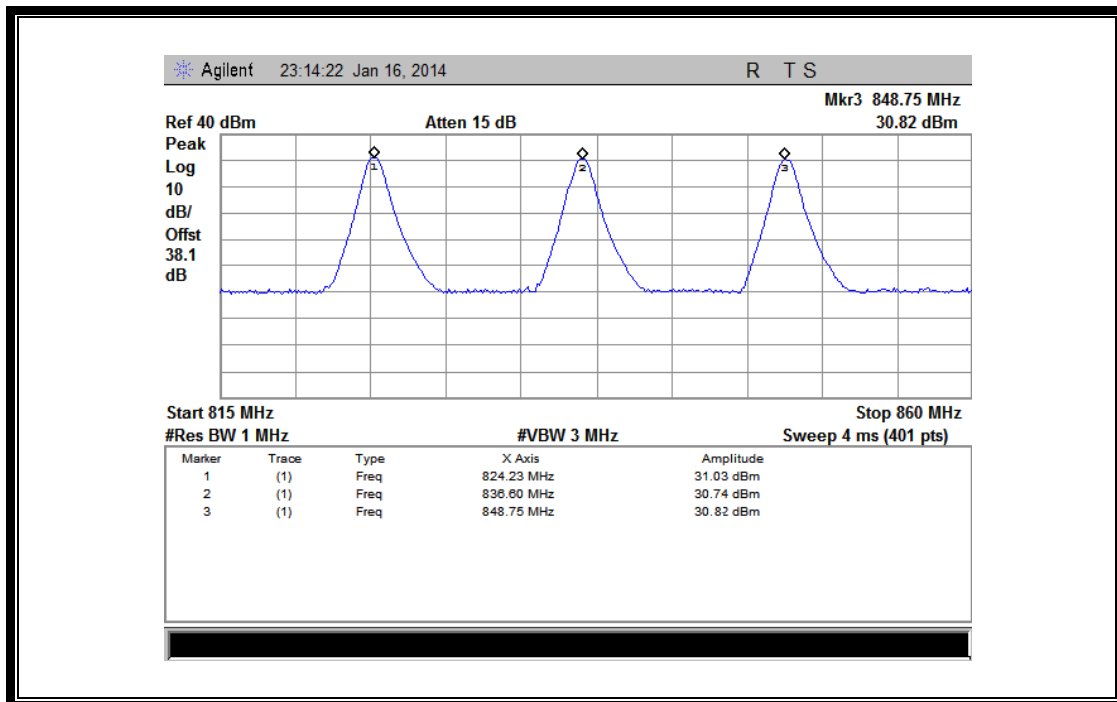
Band	Channel	Frequency (MHz)	Measured ERP			Limit		Verdict
			dBm	W	Refer to Plot	dBm	W	
WCDMA 850MHz	4132	826.4	27.05	0.507	Plot G	38.5	7	PASS
	4175	835	28.53	0.713				PASS
	4233	846.6	28.01	0.632				PASS
HSDPA 850MHz	4132	826.4	27.12	0.515	Plot H	38.5	7	PASS
	4175	835	28.41	0.693				PASS
	4233	846.6	28.01	0.632				PASS
HSUPA 850MHz	4132	826.4	27.18	0.522	Plot I	38.5	7	PASS
	4175	835	28.42	0.695				PASS
	4233	846.6	28.18	0.658				PASS

Band	Channel	Frequency (MHz)	Measured EIRP			Limit		Verdict
			dBm	W		dBm	W	
WCDMA 1900MHz	9262	1852.4	24.58	0.287	Plot J	33	2	PASS
	9400	1880	23.45	0.221				PASS
	9538	1907.6	24.27	0.267				PASS
HSDPA 1900MHz	9262	1852.4	26.85	0.484	Plot K	33	2	PASS
	9400	1880	26.49	0.446				PASS
	9538	1907.6	27.34	0.542				PASS
HSUPA 1900MHz	9262	1852.4	26.89	0.489	Plot L	33	2	PASS
	9400	1880	26.54	0.451				PASS
	9538	1907.6	27.36	0.545				PASS

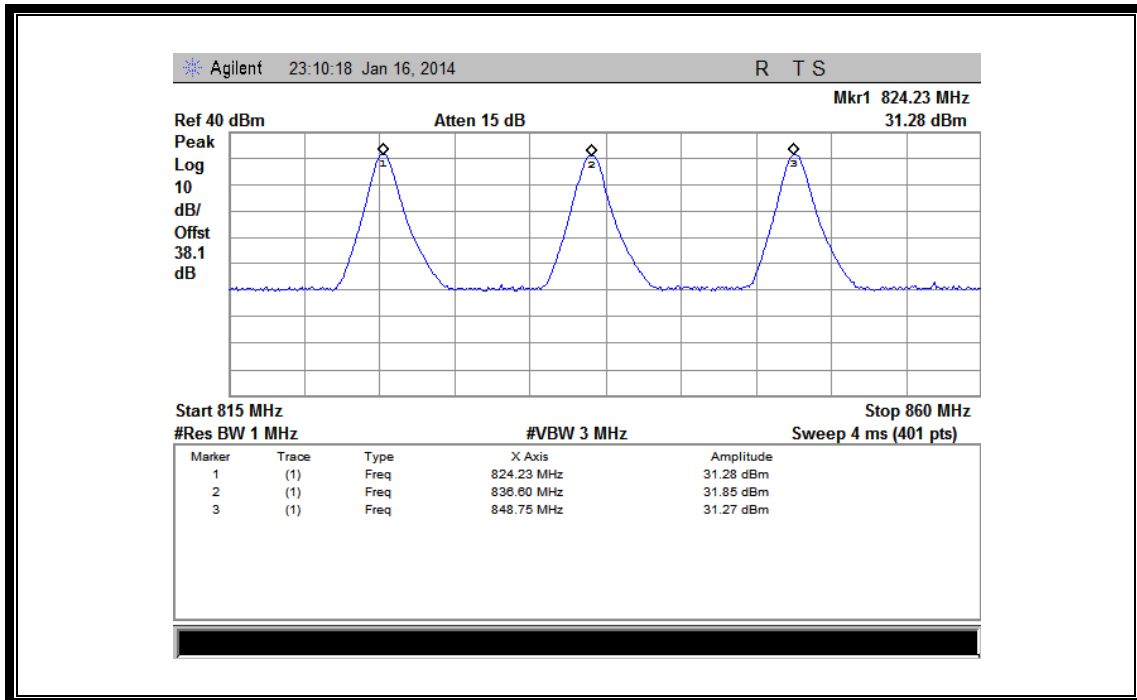
3. Test Plots:



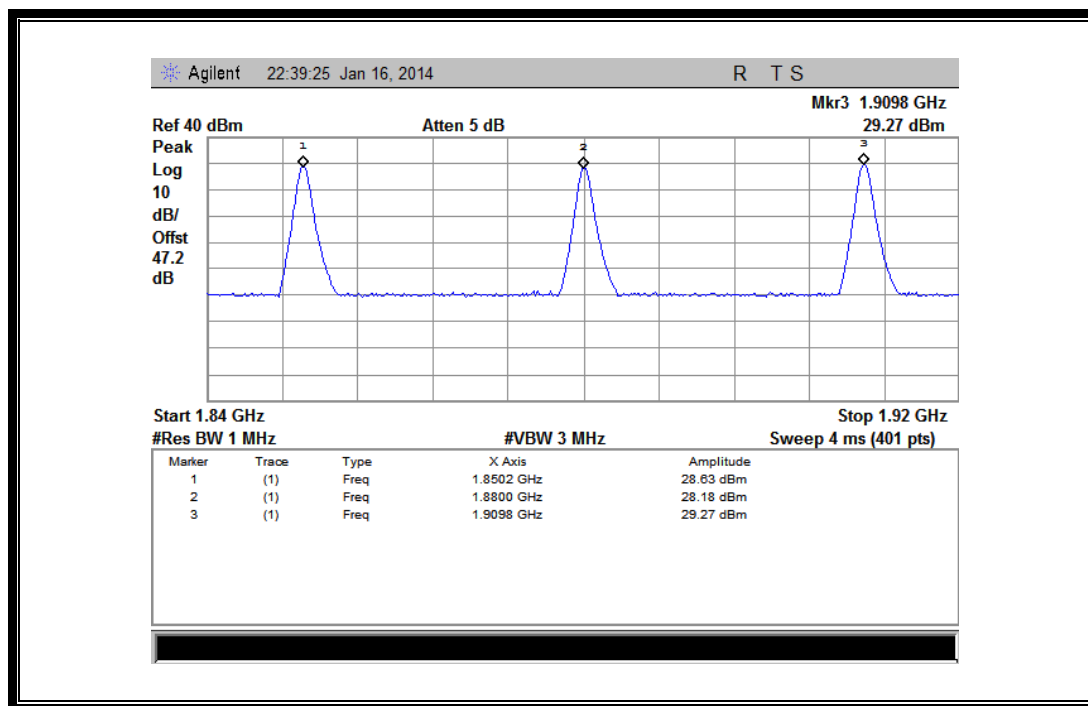
(Plot A: GSM 850MHz Channel = 128, 190, 251)



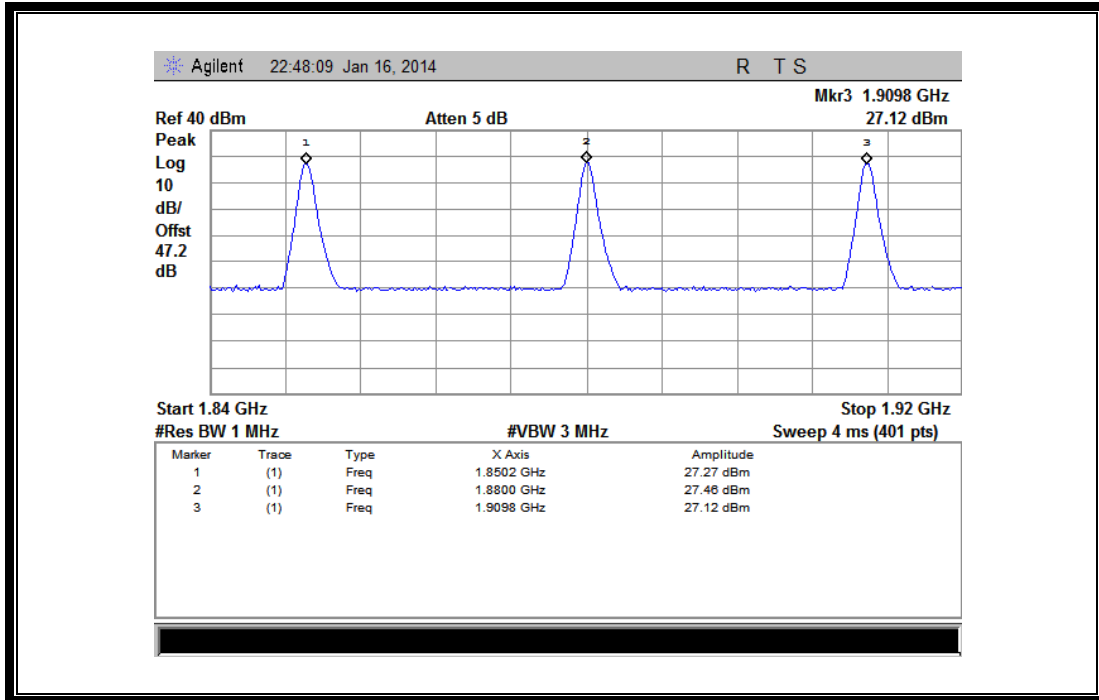
(Plot B: GPRS 850MHz Channel = 128, 190, 251)



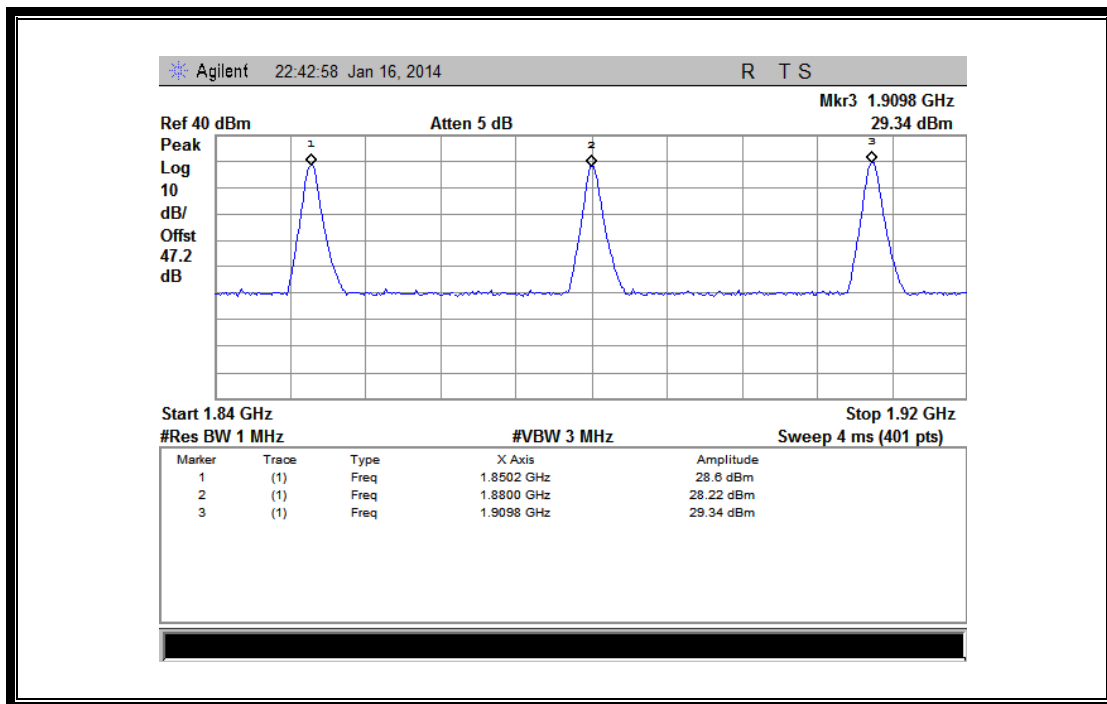
(Plot C: EGPRS 850MHz Channel = 128, 190, 251)



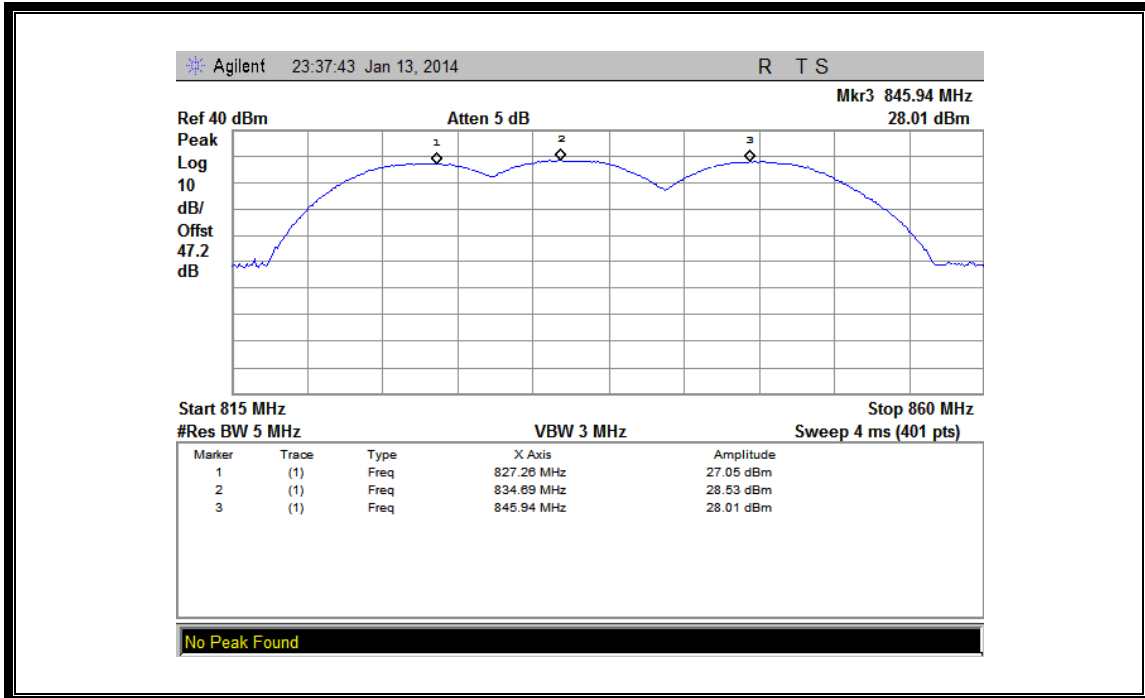
(Plot D: GSM 1900MHz Channel = 512, 661, 810)



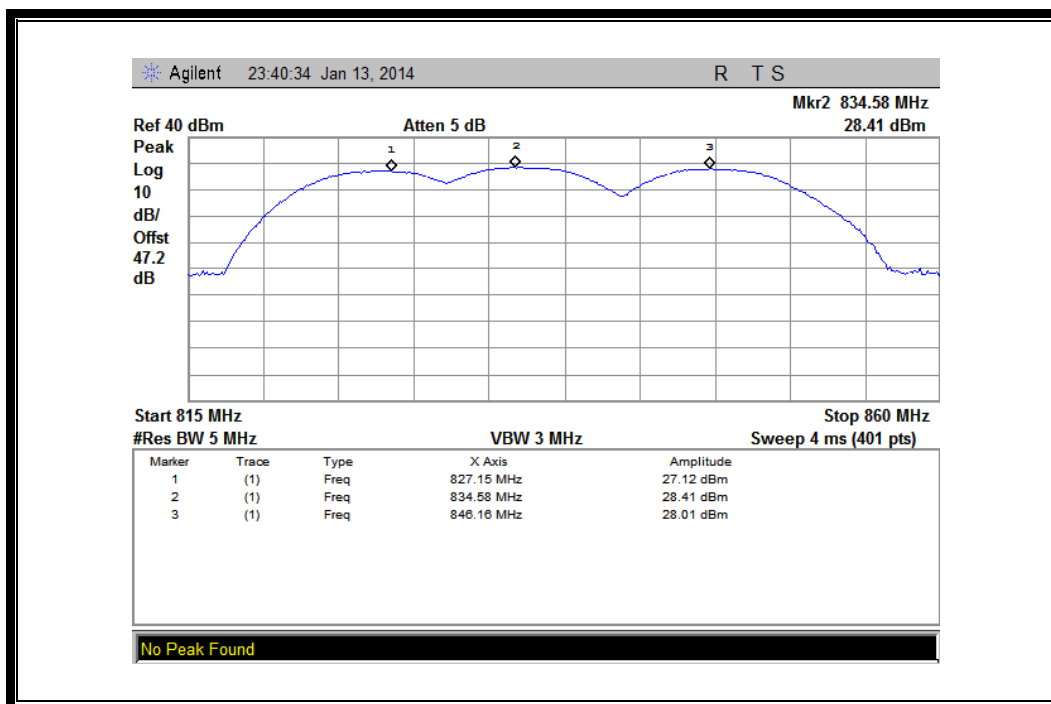
(Plot E: GPRS 1900MHz Channel = 512, 661, 810)



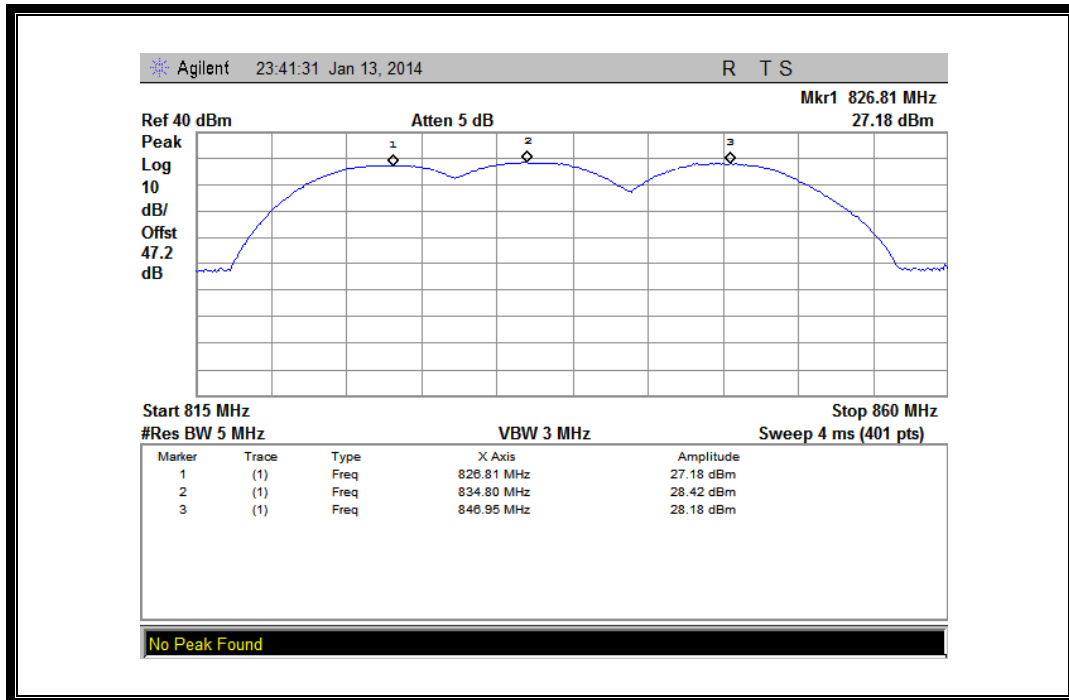
(Plot F: EGPRS 1900MHz Channel = 512, 661, 810)



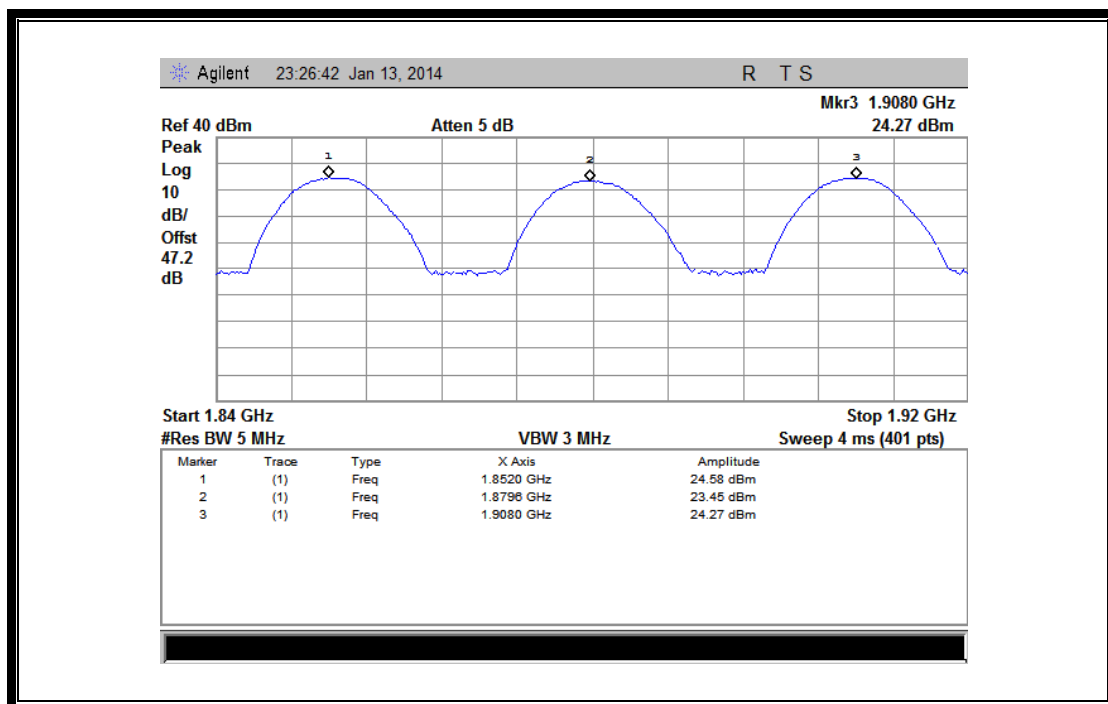
(Plot G: WCDMA 850 MHz Channel = 4132, 4175, 4233)



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

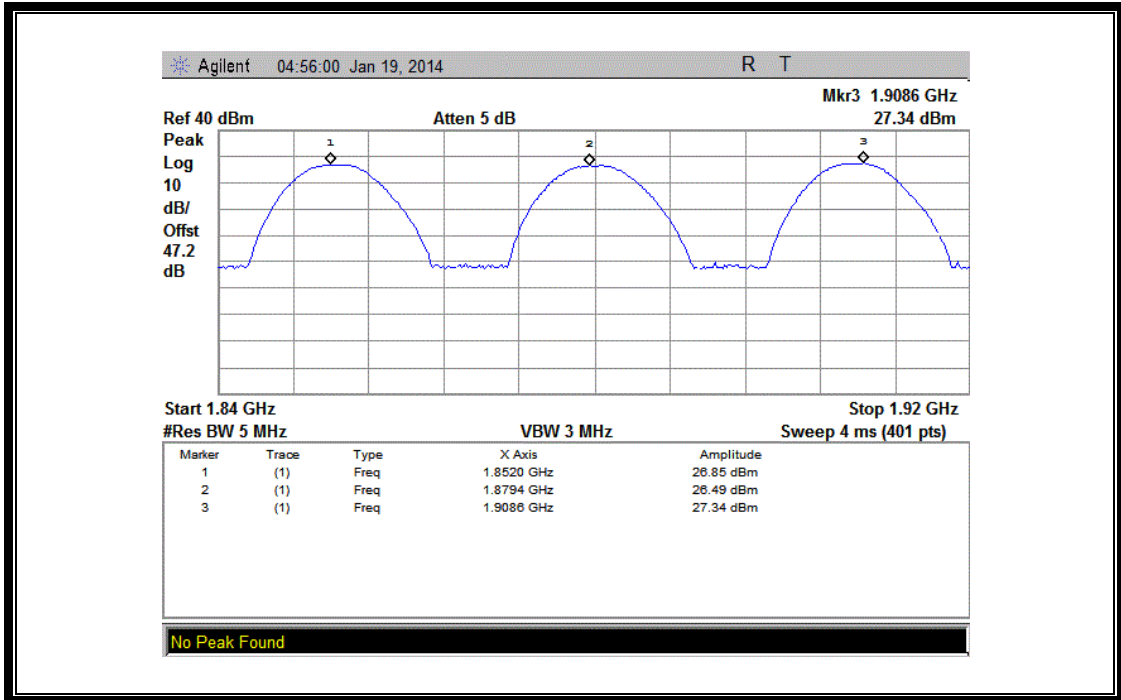


(Plot I: HSUPA 850 MHz Channel = 4132, 4175, 4233)

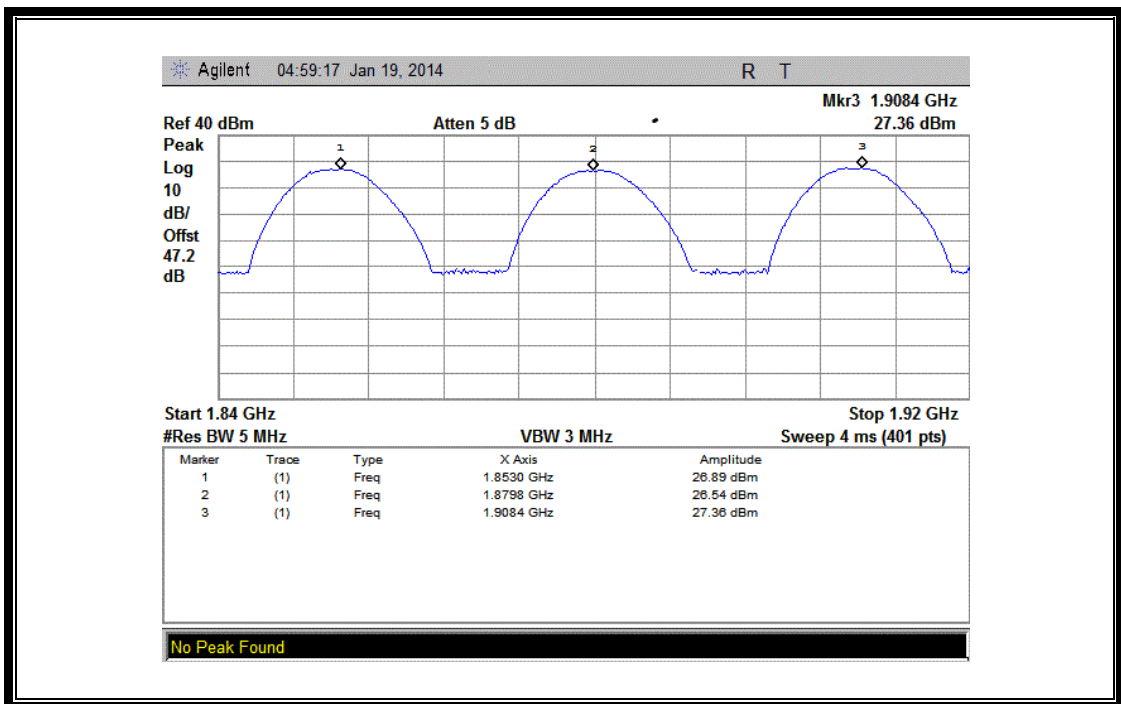


(Plot J: WCDMA 1900 MHz Channel = 9262, 9400, 9538)





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



(Plot L: HSUPA1900 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	2013.05.13	2014.05.12
Spectrum Analyzer	Agilent	E7405A	US44210471	2013.05.13	2014.05.12
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2013.05.13	2014.05.12
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2013.05.13	2014.05.12
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2013.05.13	2014.05.12
Substitution Antenna	Schwarzbeck	BBHA 9120C	9120C-384	2013.05.13	2014.05.12
Pre-AMPs	lucix	S10M100L3802	S020180L3203	2013.05.13	2014.05.12
Notch Filter	COM-MW	ZBSF-C836.5-25-X	NA	2013.05.13	2014.05.12
Notch Filter	COM-MW	ZBSF-C1747.5-75-X2	NA	2013.05.13	2014.05.12
Notch Filter	COM-MW	ZBSF-C1880-60-X2	NA	2013.05.13	2014.05.12

**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:

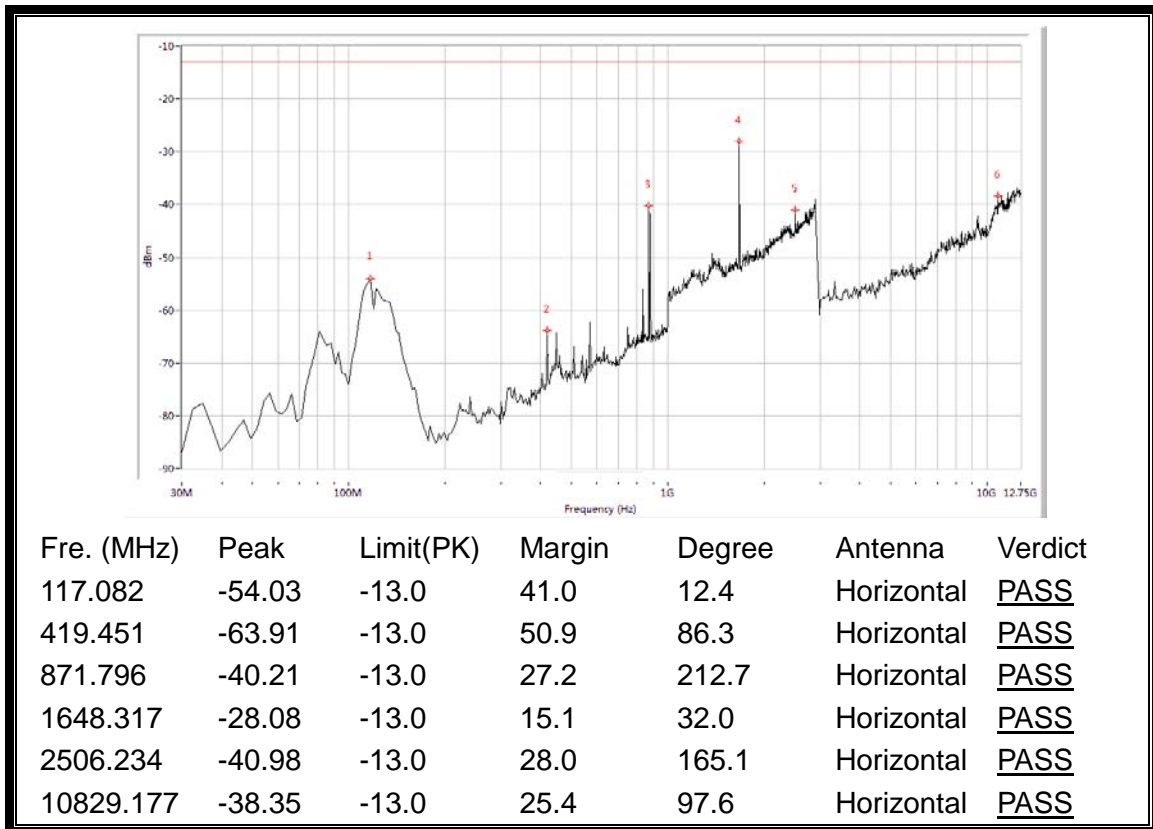
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)		Refer to Plot	Limit (dBm)	Verdict
			Test Antenna Horizontal	Test Antenna Vertical			
GSM 850MHz	128	824.2	< -25	< -25	Plot A.1/A.2	-13	<u>PASS</u>
	190	836.6	< -25	< -25	Plot A.3/A.4		<u>PASS</u>
	251	848.8	< -25	< -25	Plot A.5/A.6		<u>PASS</u>
GSM 1900MHz	512	1850.2	< -25	< -25	Plot B.1/B.2	-13	<u>PASS</u>
	661	1880.0	< -25	< -25	Plot B.3/B.4		<u>PASS</u>
	810	1909.8	< -25	< -25	Plot B.5/B.6		<u>PASS</u>
EDGE 850MHz	128	824.2	< -25	< -25	Plot C.1/C.2	-13	<u>PASS</u>
	190	836.6	< -25	< -25	Plot C.3/C.4		<u>PASS</u>
	251	848.8	< -25	< -25	Plot C.5/C.6		<u>PASS</u>
EDGE 1900MHz	512	1850.2	< -25	< -25	Plot D.1/D.2	-13	<u>PASS</u>
	661	1880.0	< -25	< -25	Plot D.3/D.4		<u>PASS</u>
	810	1909.8	< -25	< -25	Plot D.5/D.6		<u>PASS</u>
WCDMA 850MHz	4132	826.4	< -25	< -25	Plot E.1/E.2	-13	<u>PASS</u>
	4175	835	< -25	< -25	Plot E.3/E.4		<u>PASS</u>
	4233	846.6	< -25	< -25	Plot E.5/E.6		<u>PASS</u>
WCDMA 1900MHz	9262	1852.4	< -25	< -25	Plot F.1/F.2	-13	<u>PASS</u>
	9400	1880	< -25	< -25	Plot F.3/F.4		<u>PASS</u>
	9538	1907.6	< -25	< -25	Plot F.5/F.6		<u>PASS</u>
HSDPA 850MHz	4132	826.4	< -25	< -25	Plot G.1/G.2	-13	<u>PASS</u>
	4175	835	< -25	< -25	Plot G.3/G.4		<u>PASS</u>
	4233	846.6	< -25	< -25	Plot G.5/G.6		<u>PASS</u>
HSDPA 1900MHz	9262	1852.4	< -25	< -25	Plot H.1/H.2	-13	<u>PASS</u>
	9400	1880	< -25	< -25	Plot H.3/H.4		<u>PASS</u>
	9538	1907.6	< -25	< -25	Plot H.5/H.6		<u>PASS</u>
HSUPA 850MHz	4132	826.4	< -25	< -25	Plot I.1/I.2	-13	<u>PASS</u>
	4175	835	< -25	< -25	Plot I.3/I.4		<u>PASS</u>
	4233	846.6	< -25	< -25	Plot I.5/I.6		<u>PASS</u>
HSUPA 1900MHz	9262	1852.4	< -25	< -25	Plot J.1/J.2	-13	<u>PASS</u>
	9400	1880	< -25	< -25	Plot J.3/J.4		<u>PASS</u>
	9538	1907.6	< -25	< -25	Plot J.5/J.6		<u>PASS</u>
	9538	1907.6	< -25	< -25	Plot J.5/J.6		<u>PASS</u>

## 2. Test Plots for the Whole Measurement Frequency Range:

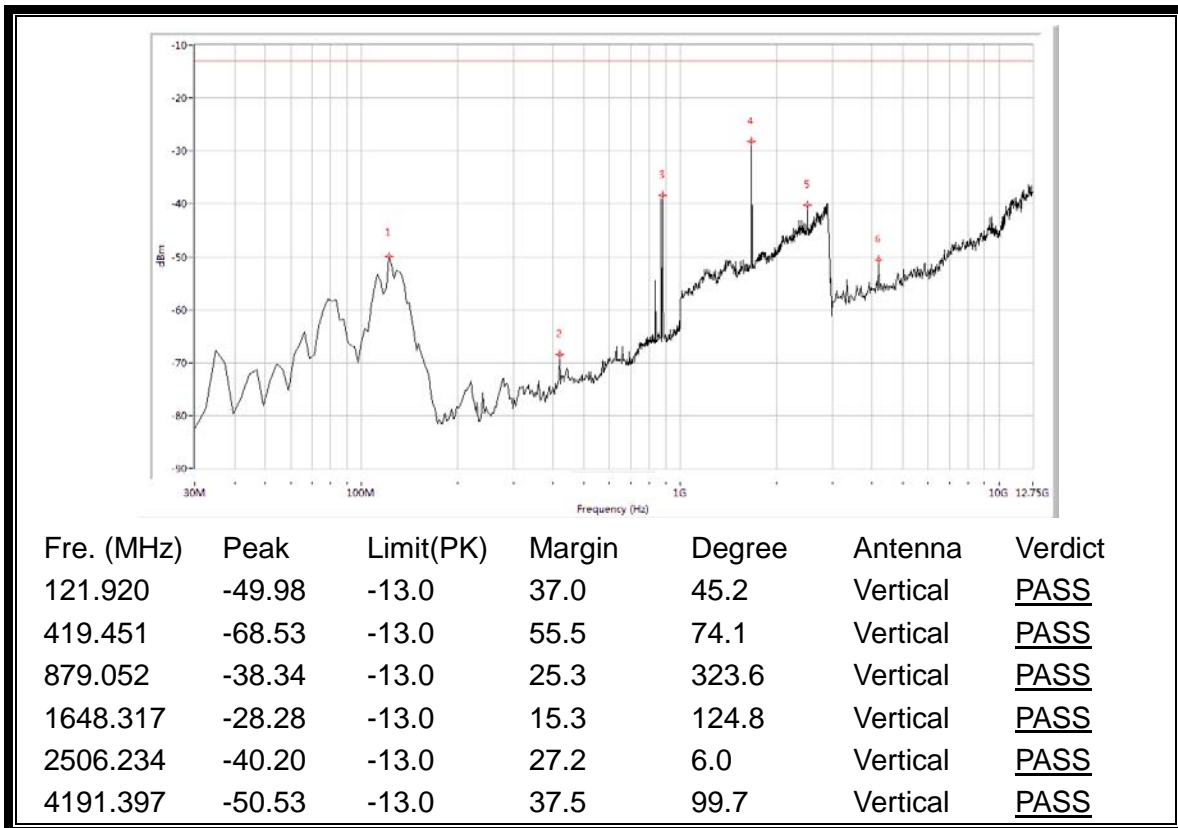
Note1: the power of the EUT transmitting frequency should be ignored.

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

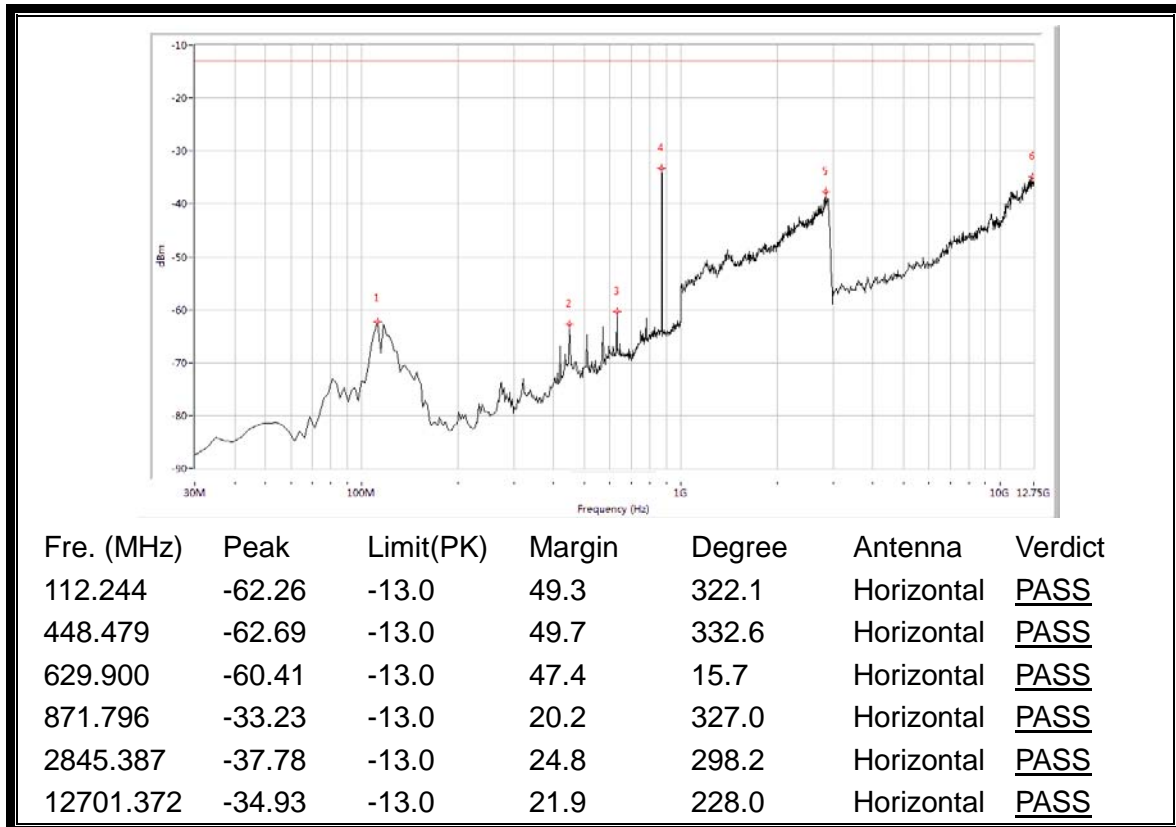
condition was recorded in this test report.



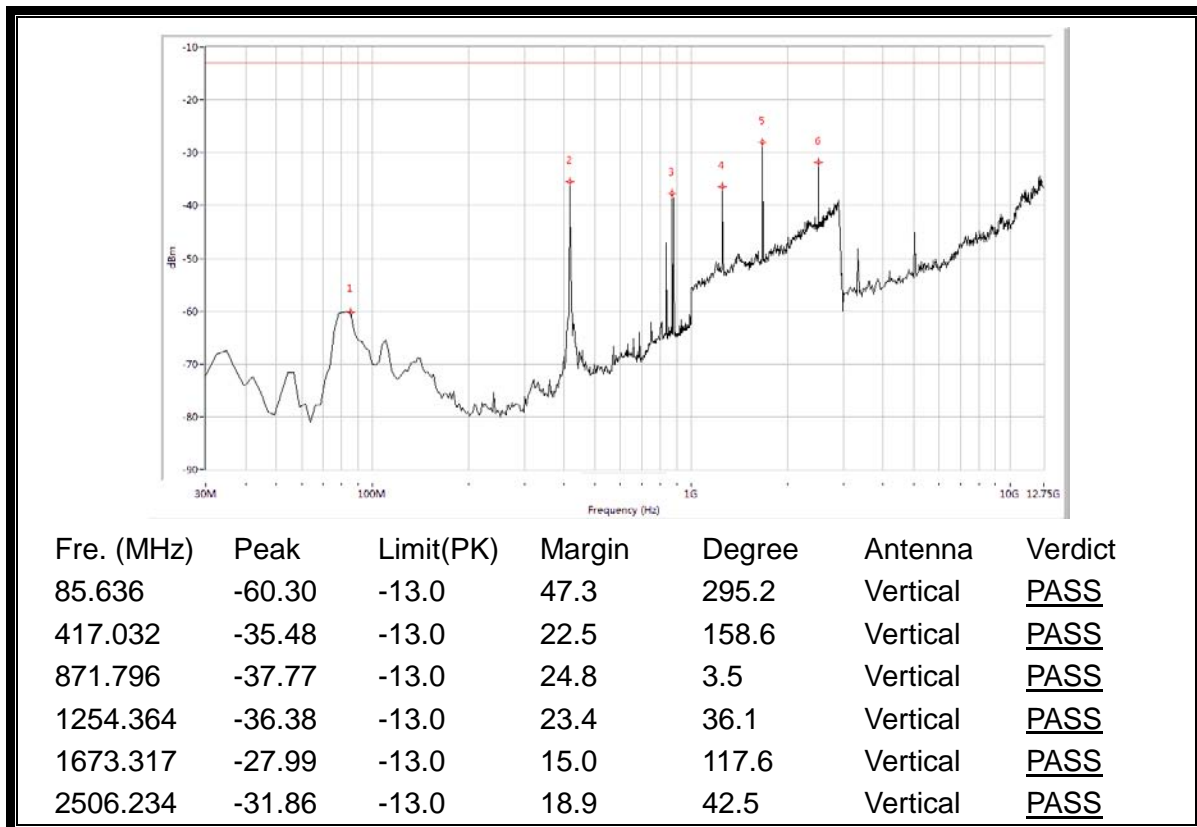
(Plot A.1: GSM 850MHz Channel = 128, Test Antenna Horizontal)



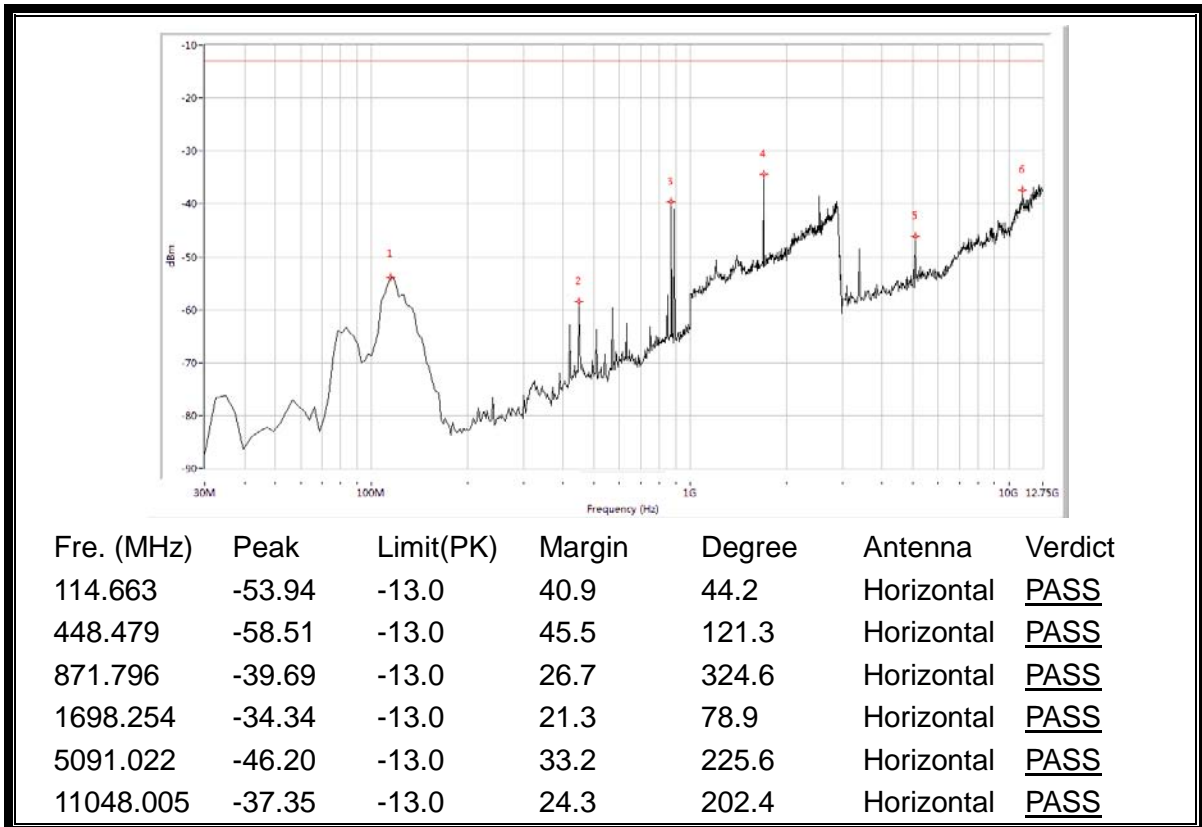
(Plot A.2: GSM 850MHz Channel = 128, Test Antenna Vertical)



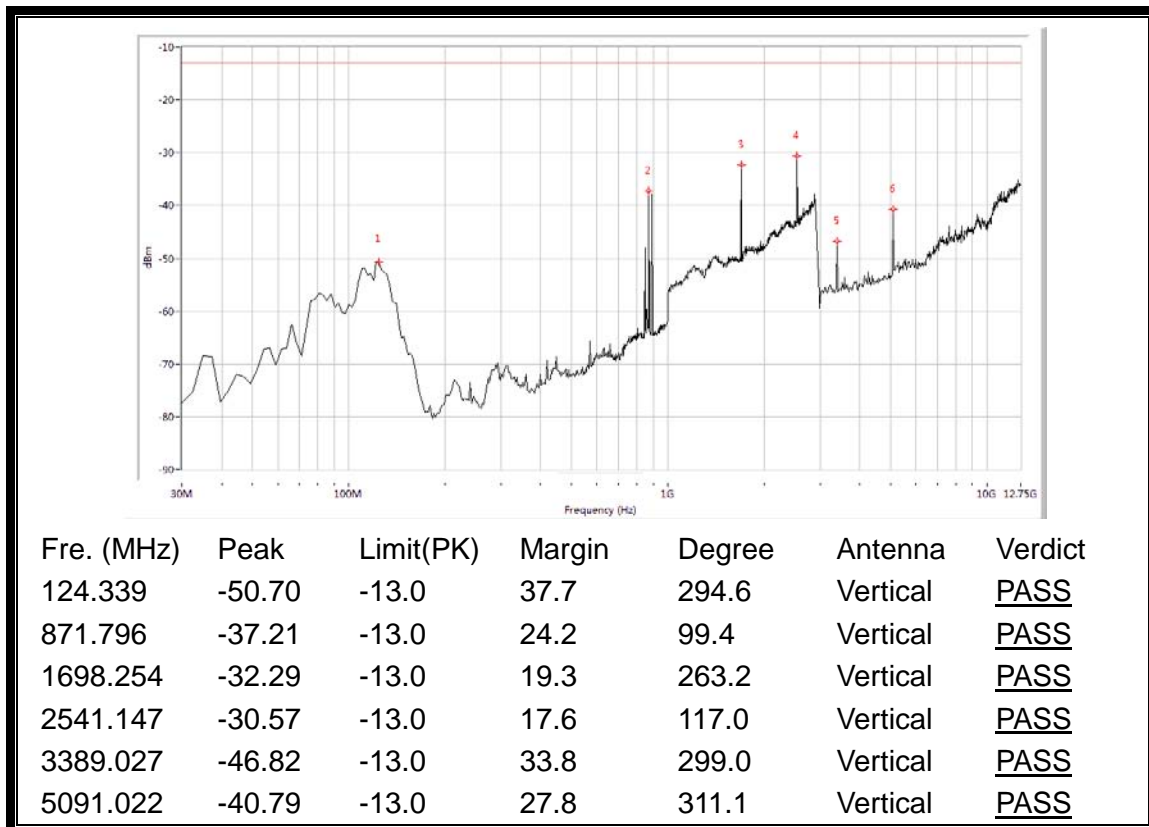
(Plot A.3: GSM 850MHz Channel = 190, Test Antenna Horizontal)



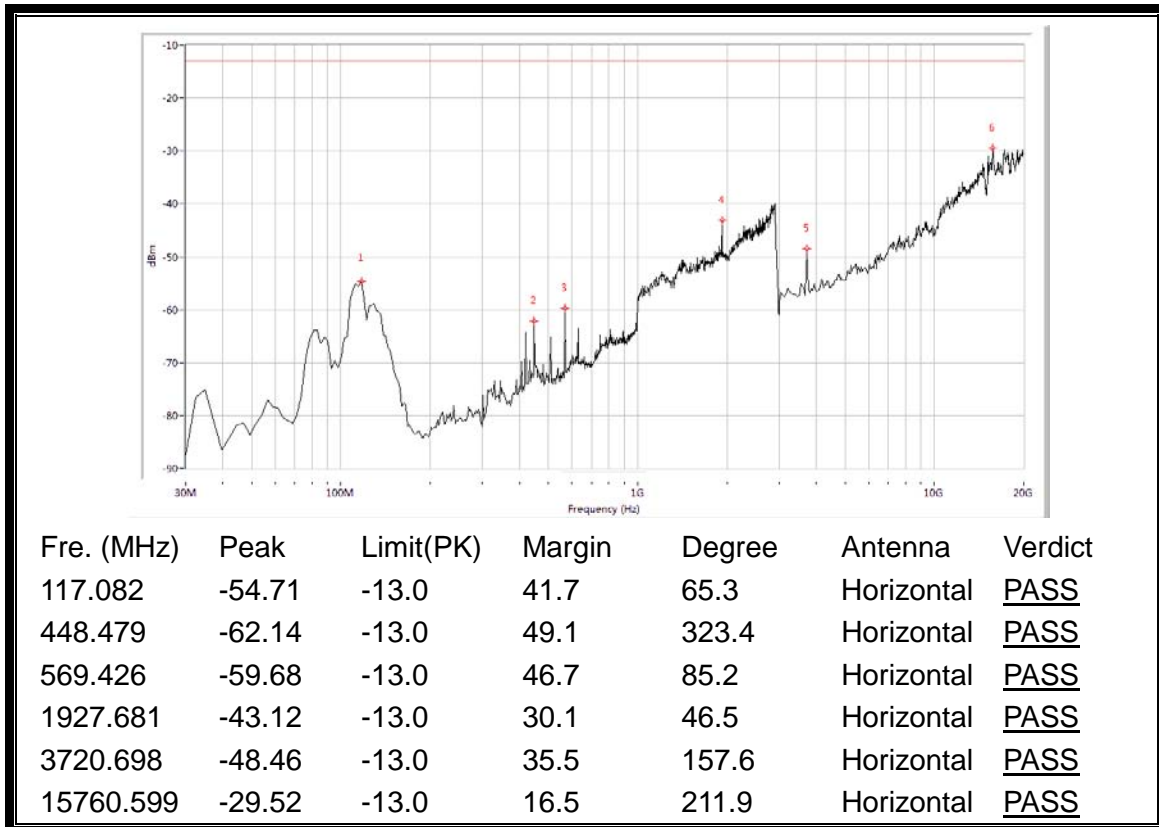
(Plot A.4: GSM 850MHz Channel = 190, Test Antenna Vertical)



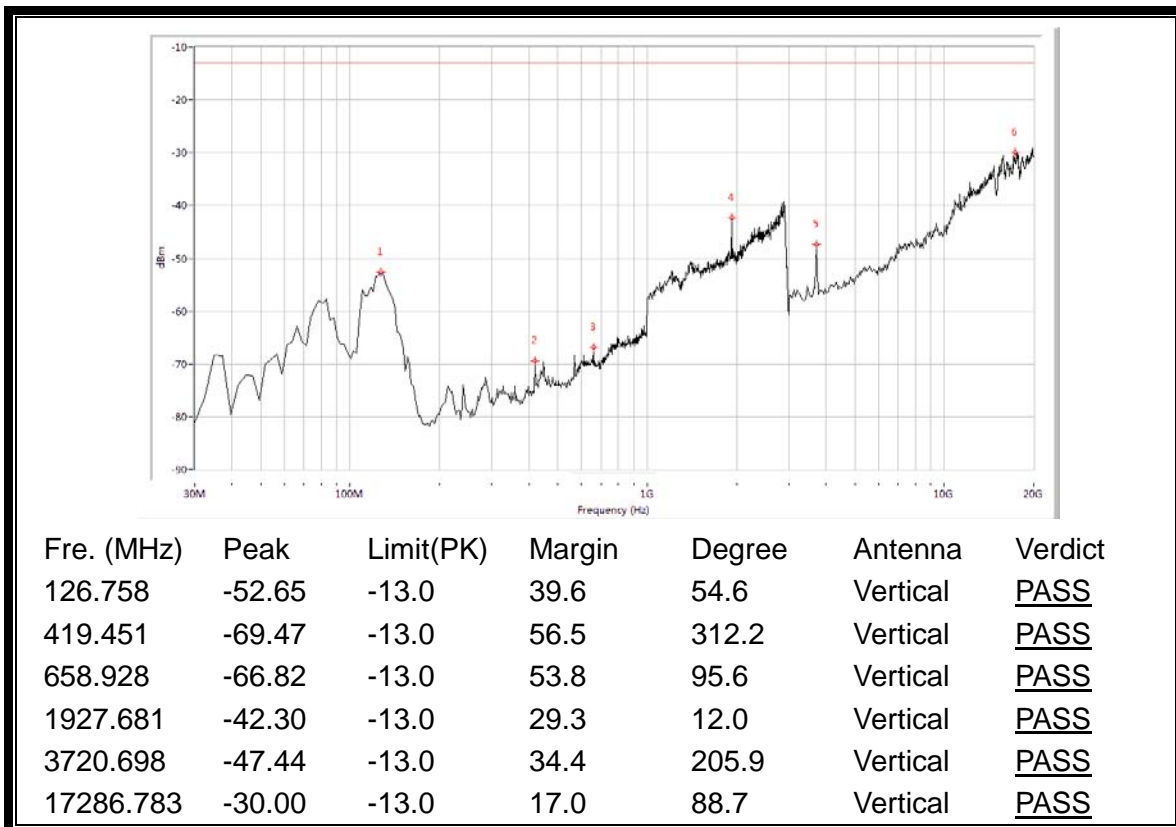
(Plot A.5: GSM 850MHz Channel = 251, Test Antenna Horizontal)



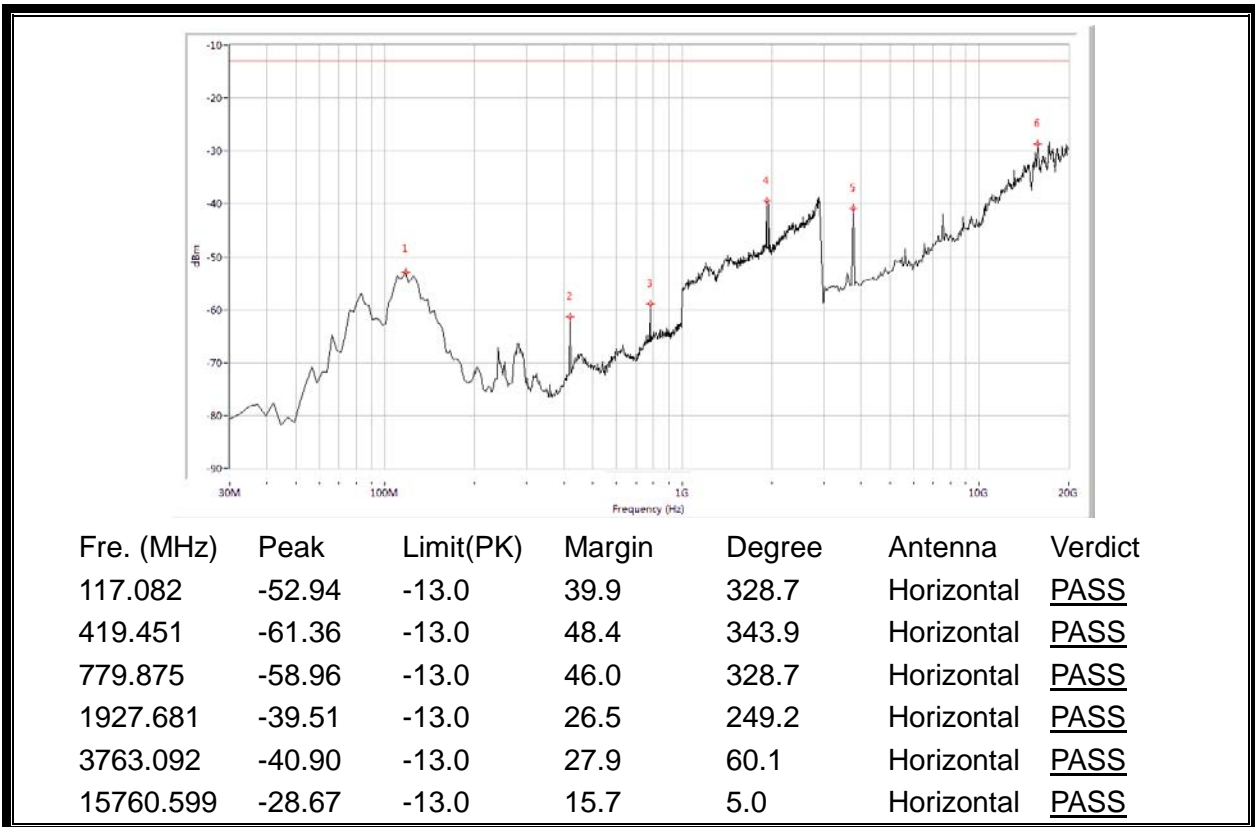
(Plot A.6: GSM 850MHz Channel = 251, Test Antenna Vertical)



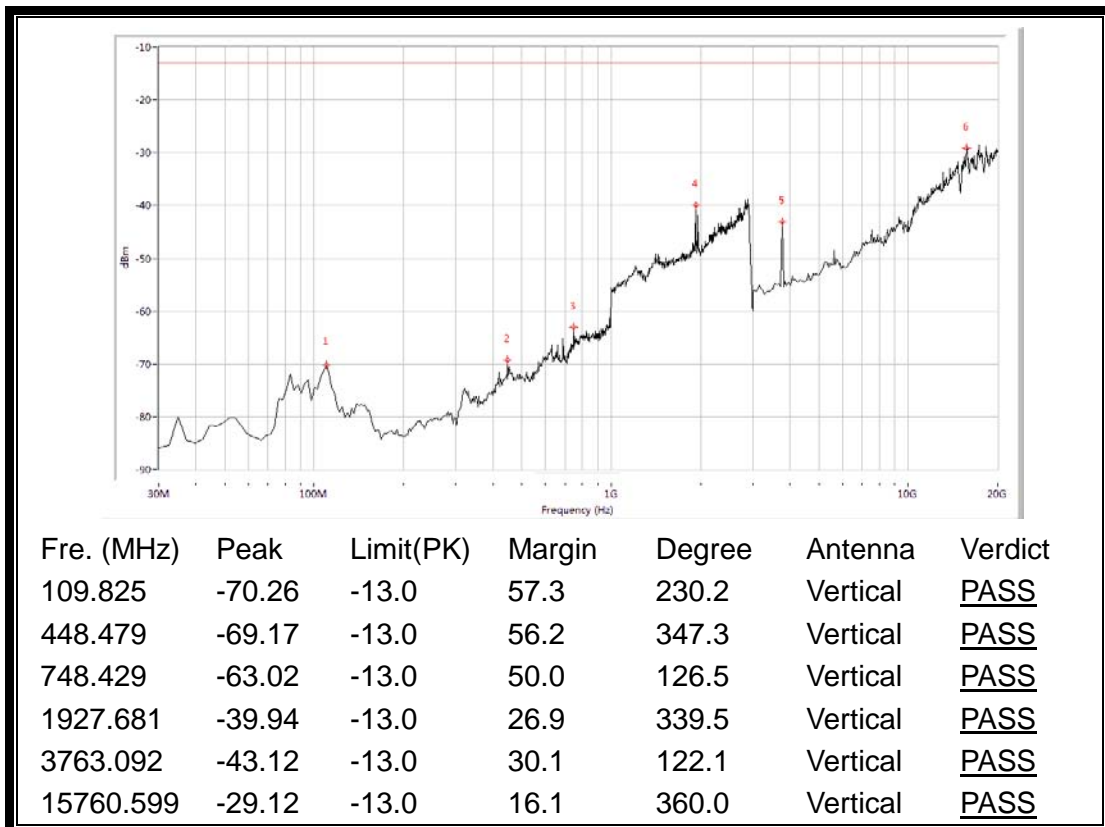
(Plot B.1: GSM 1900MHz Channel = 512, Test Antenna Horizontal)



(Plot B.2: GSM 1900MHz Channel = 512, Test Antenna Vertical)

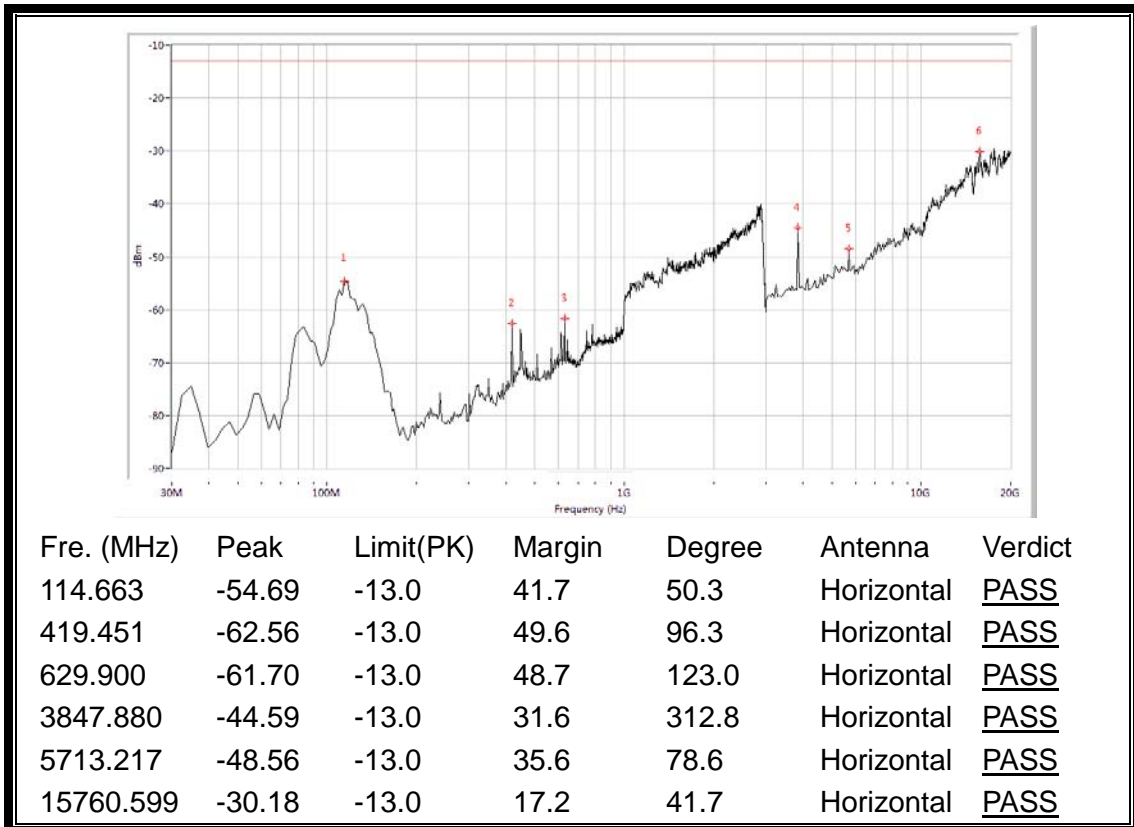


(Plot B.3: GSM 1900MHz Channel = 661, Test Antenna Horizontal)

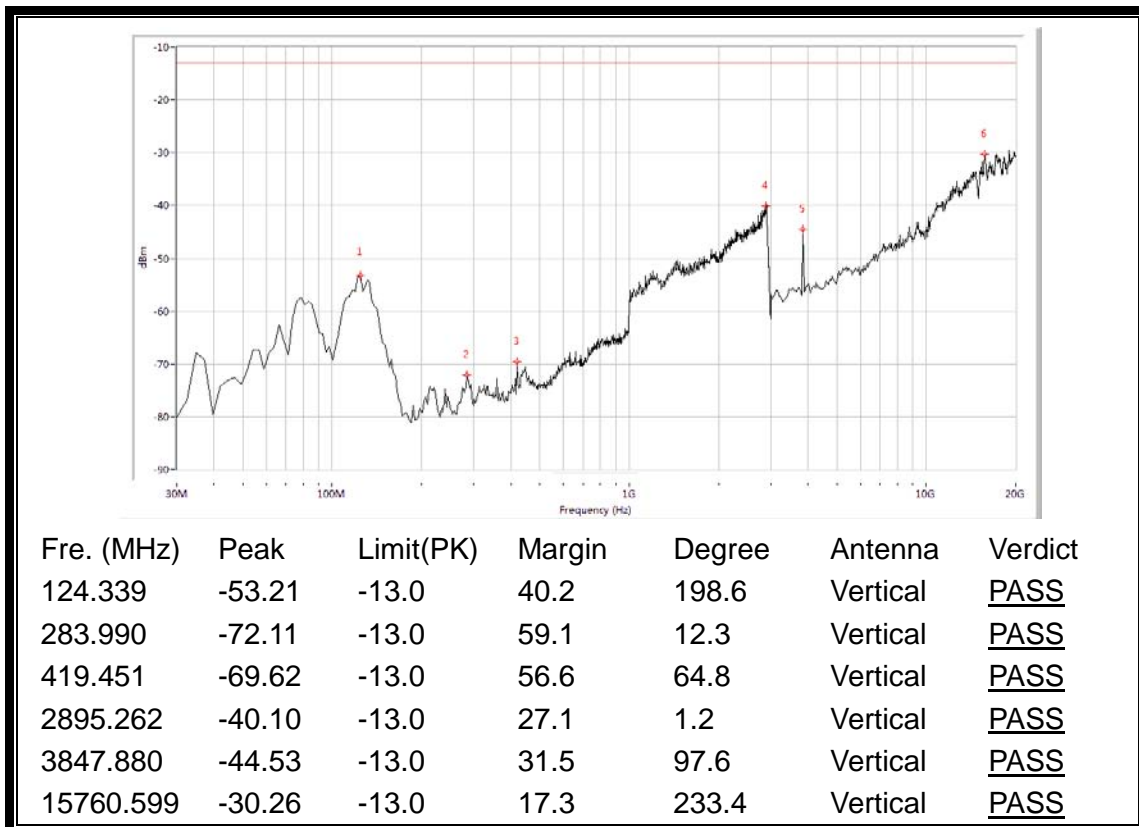




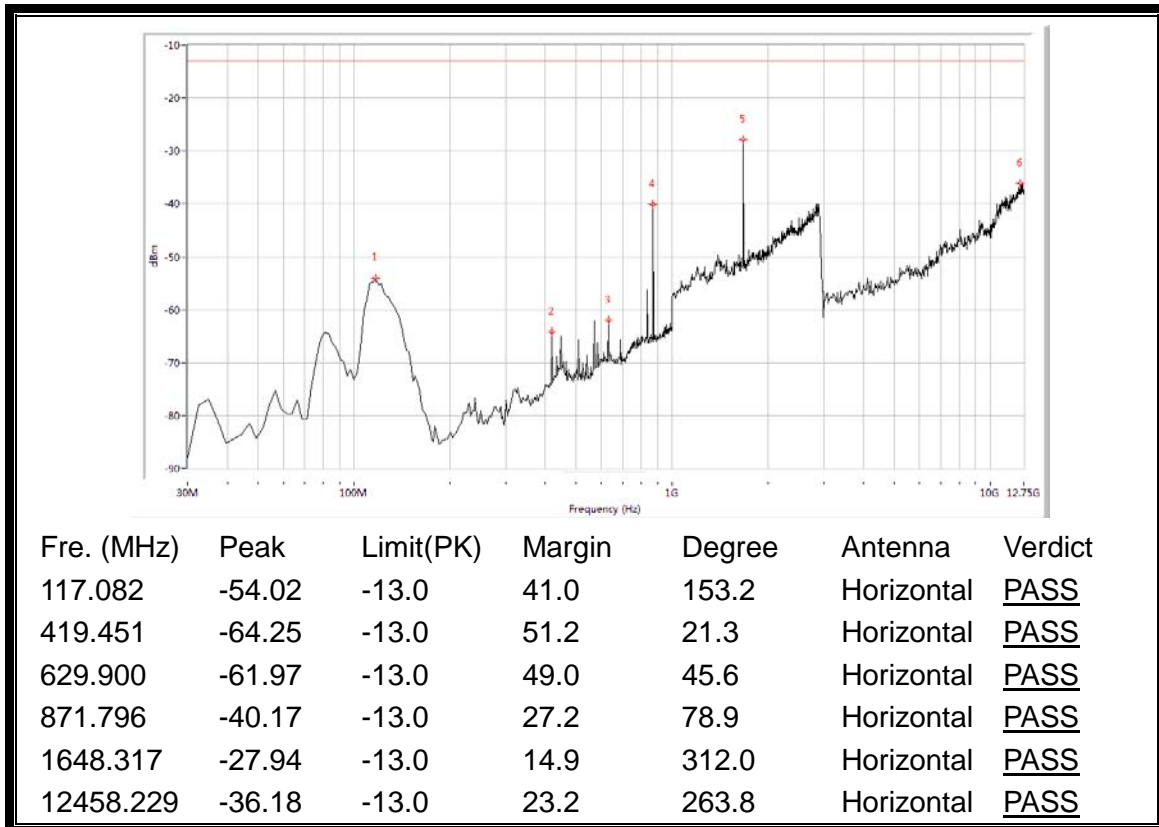
(Plot B.4: GSM 1900MHz Channel = 661, Test Antenna Vertical)



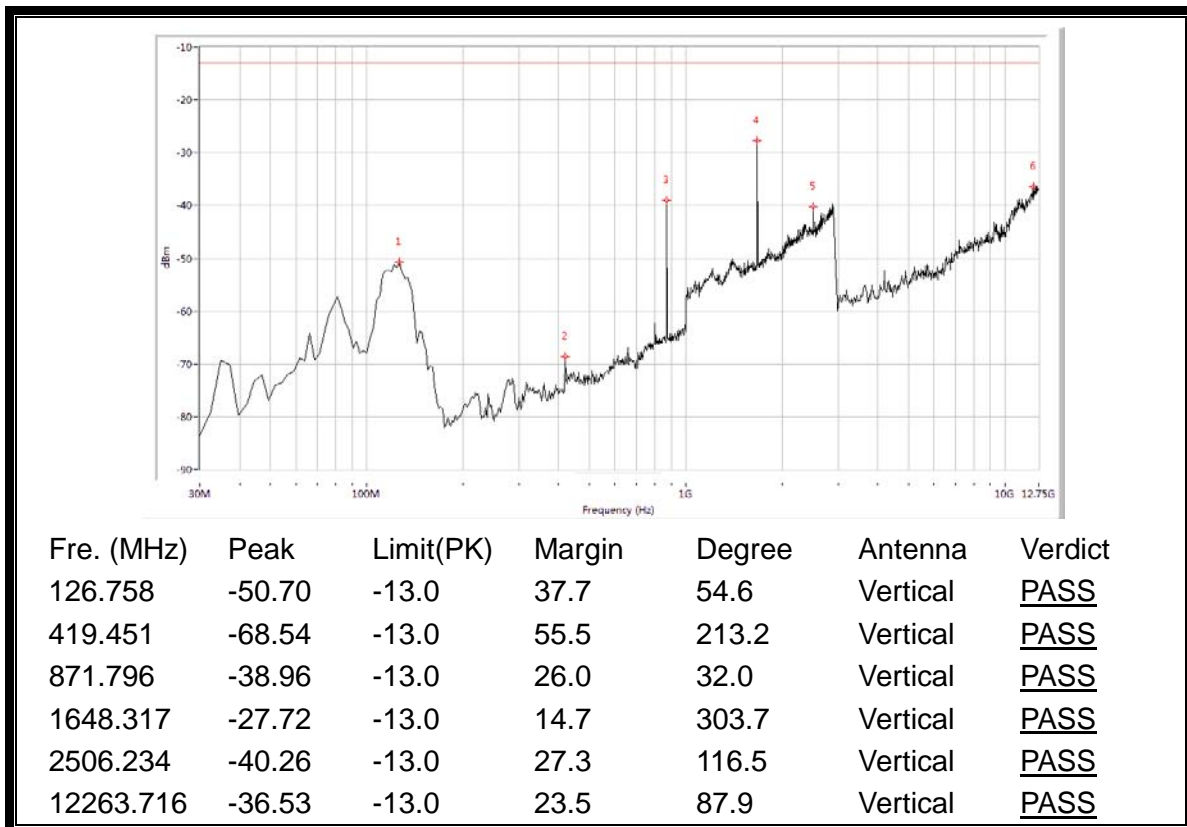
(Plot B.5: GSM 1900MHz Channel = 810, Test Antenna Horizontal)



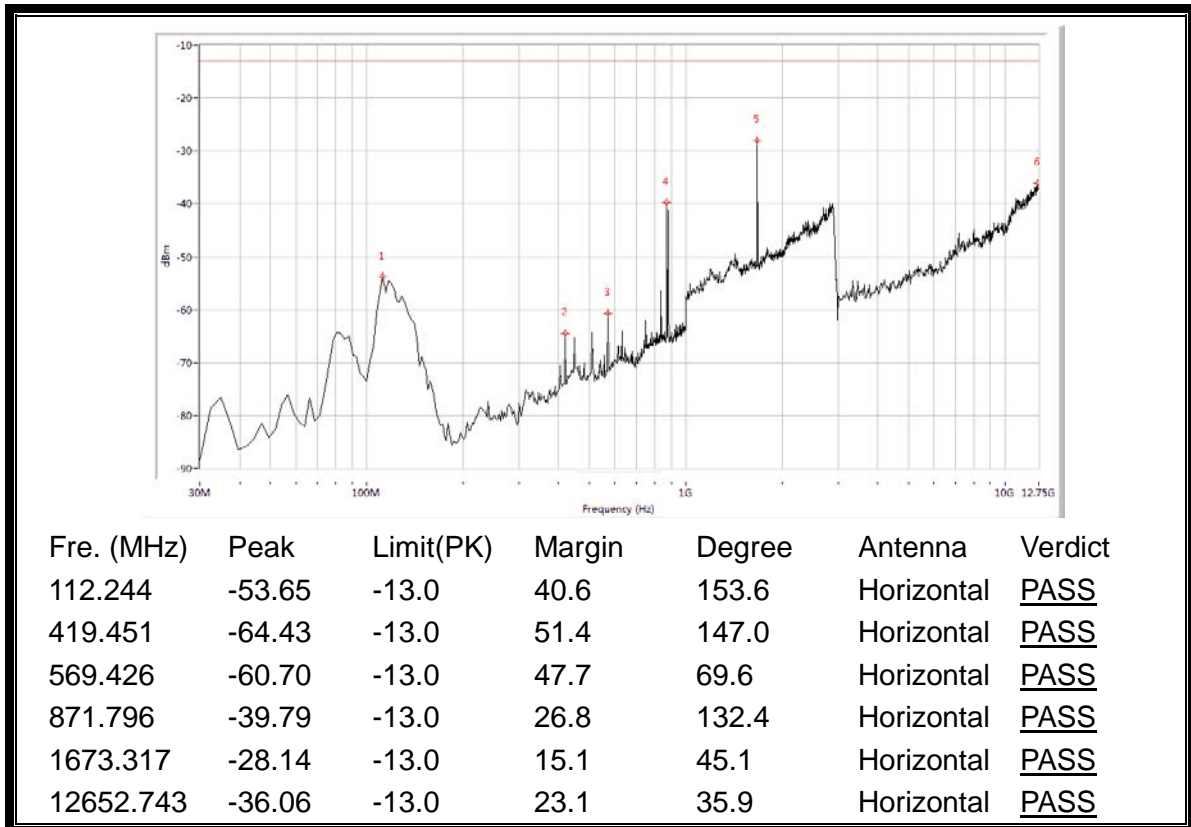
(PlotB.6: GSM 1900MHz Channel = 810, Test Antenna Vertical)



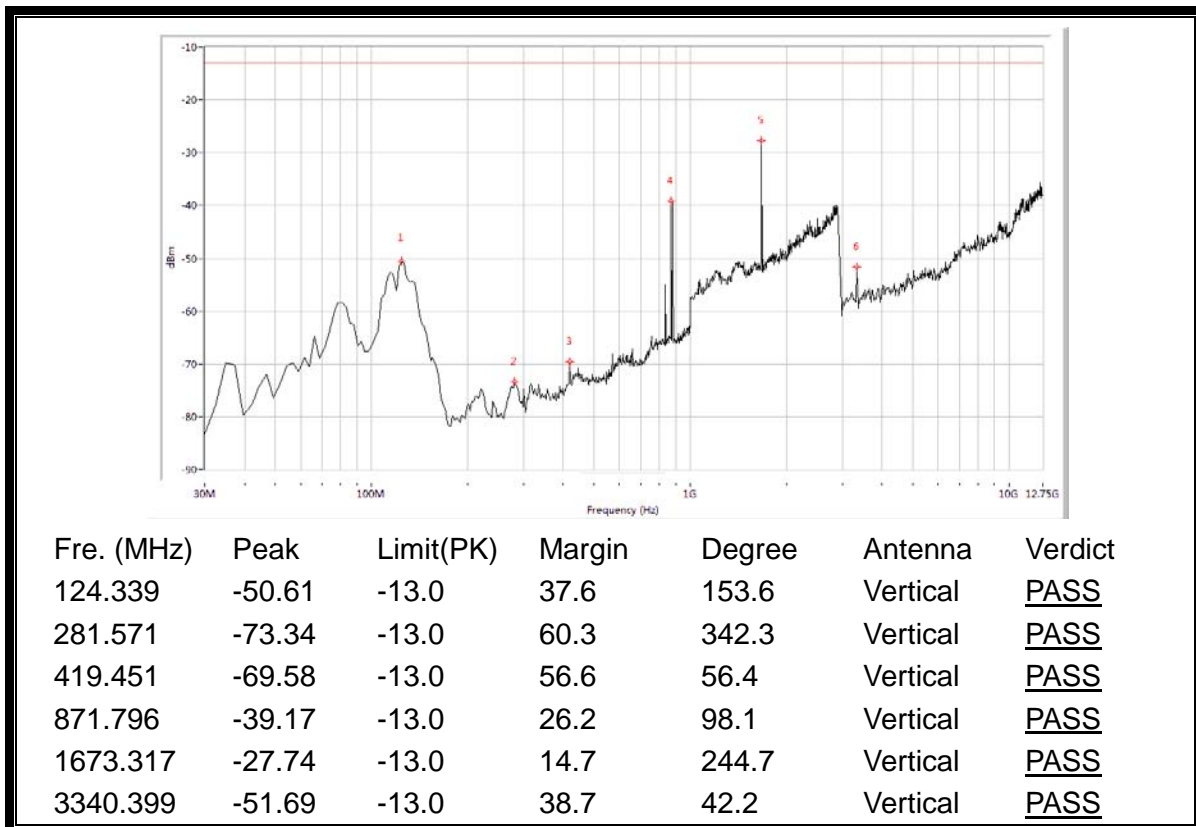
(Plot C.1: EGPRS 850MHz Channel = 128, Test Antenna Horizontal)



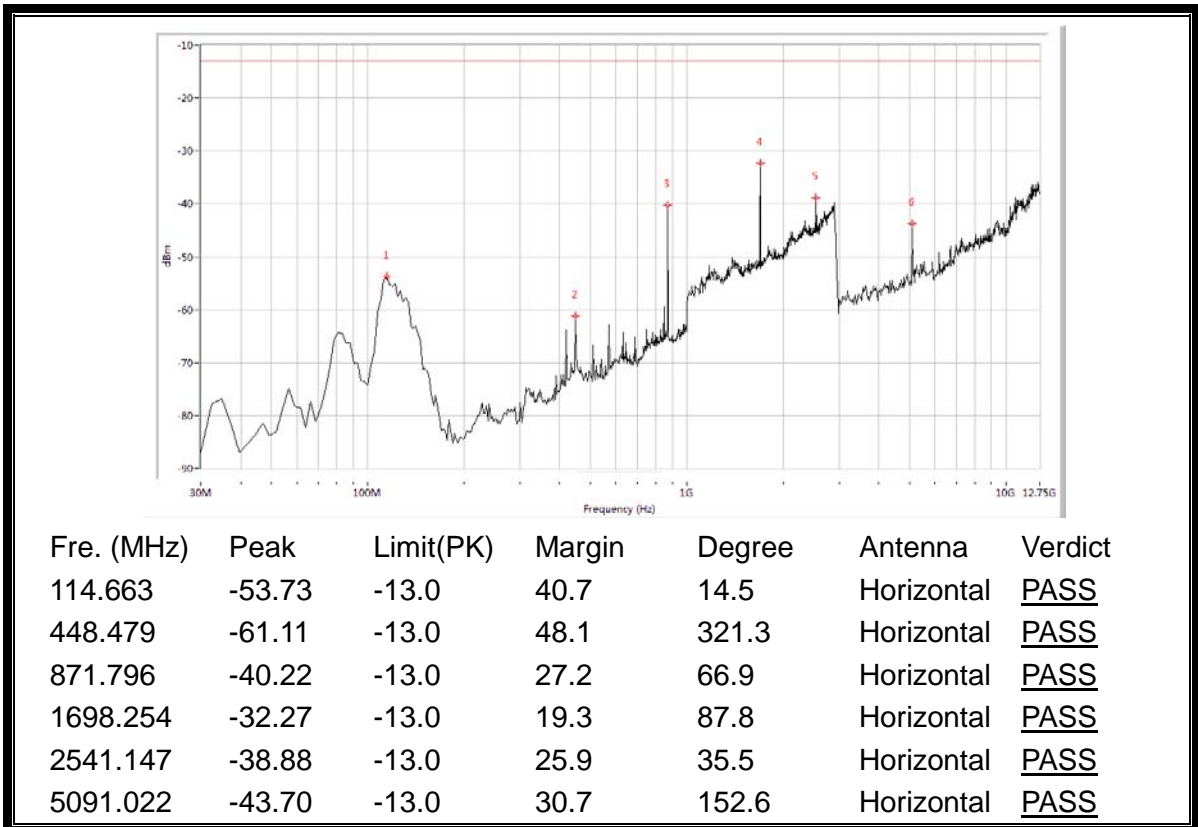
(Plot C.2: EGPRS 850MHz Channel = 128, Test Antenna Vertical)



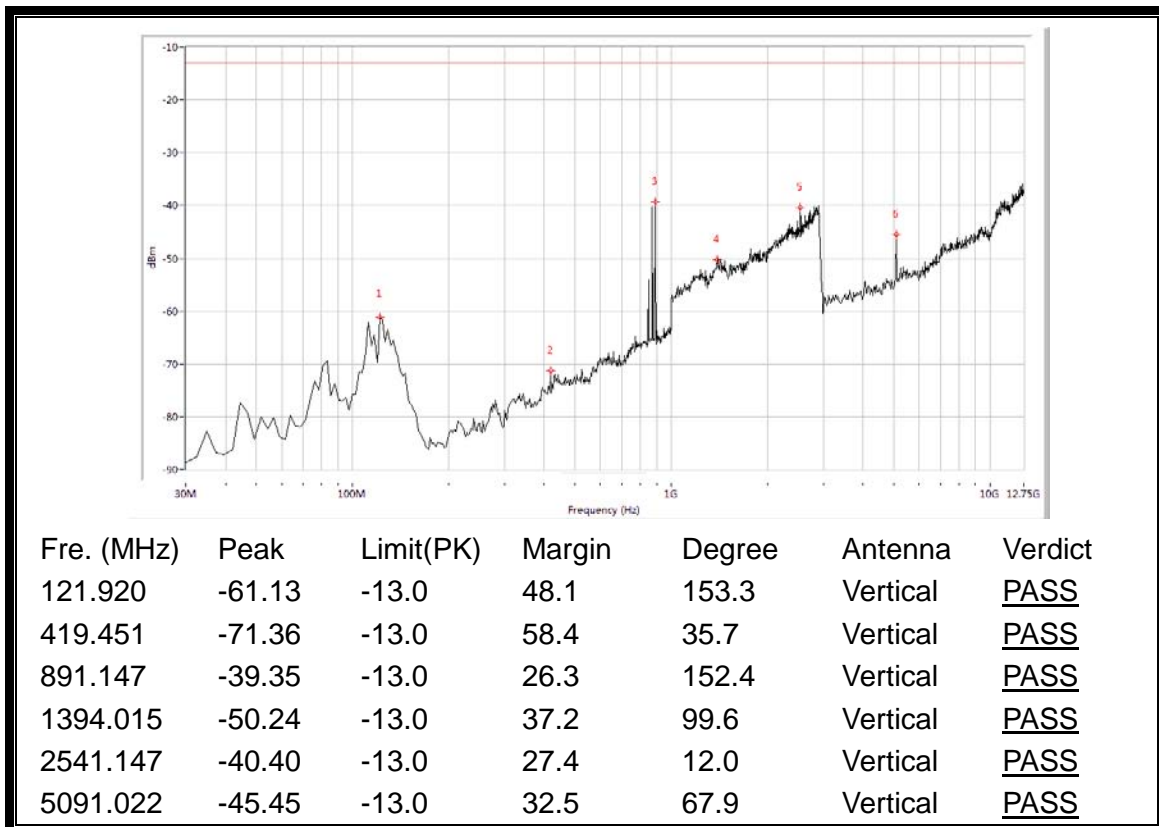
(Plot C.3: EGPRS 850MHz Channel = 190, Test Antenna Horizontal)



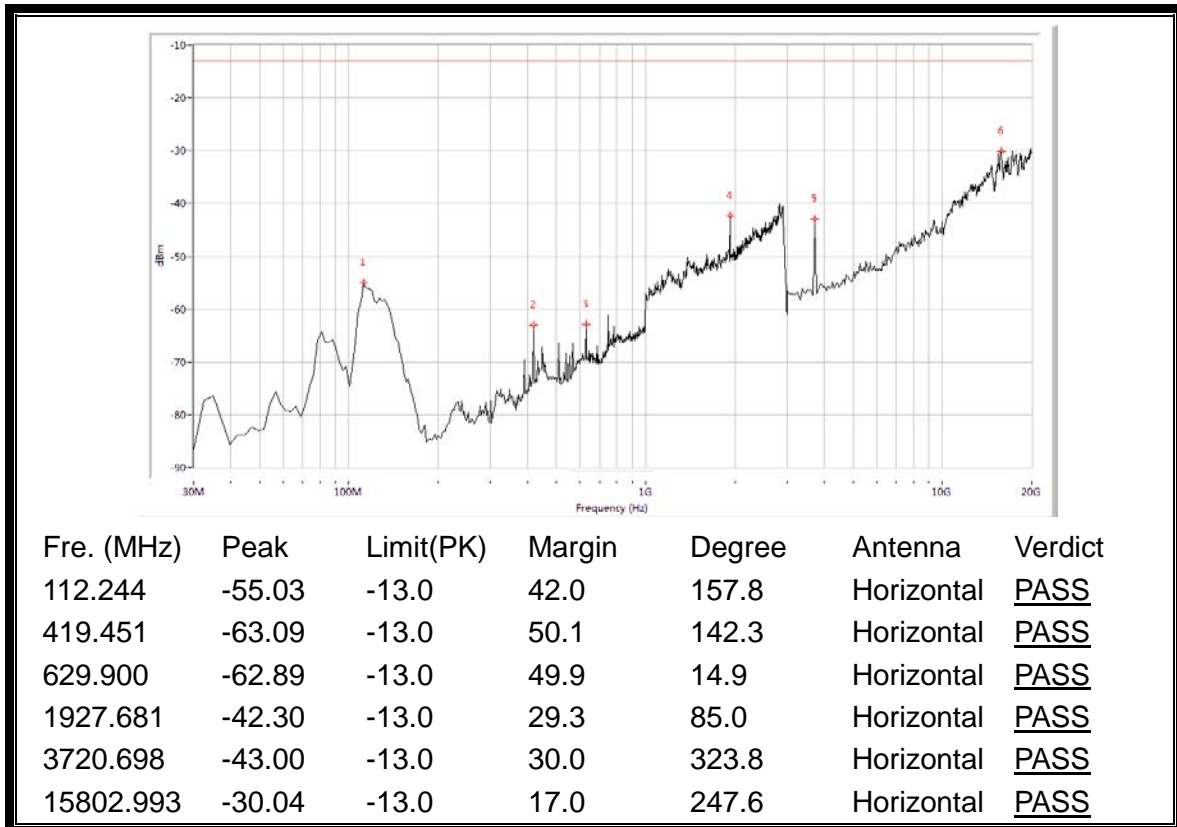
(Plot C.4: EGPRS 850MHz Channel = 190, Test Antenna Vertical)



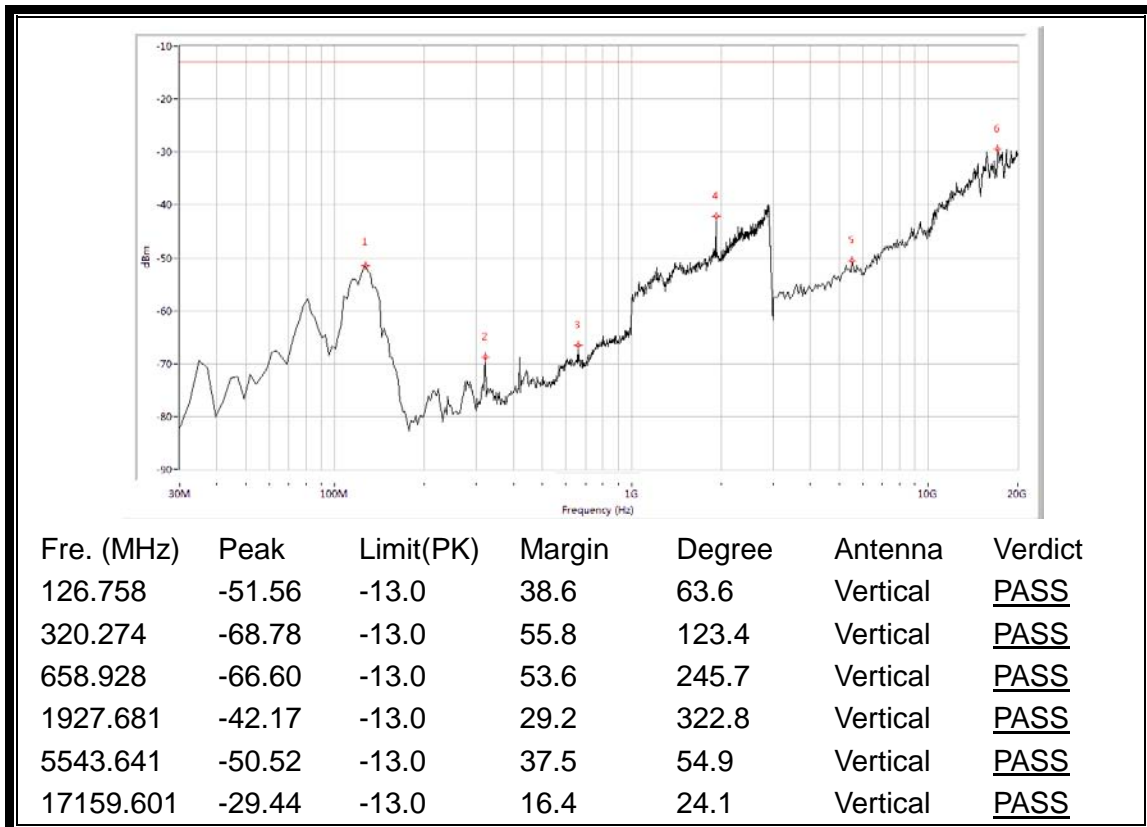
(Plot C.5: EGPRS 850MHz Channel = 251, Test Antenna Horizontal)



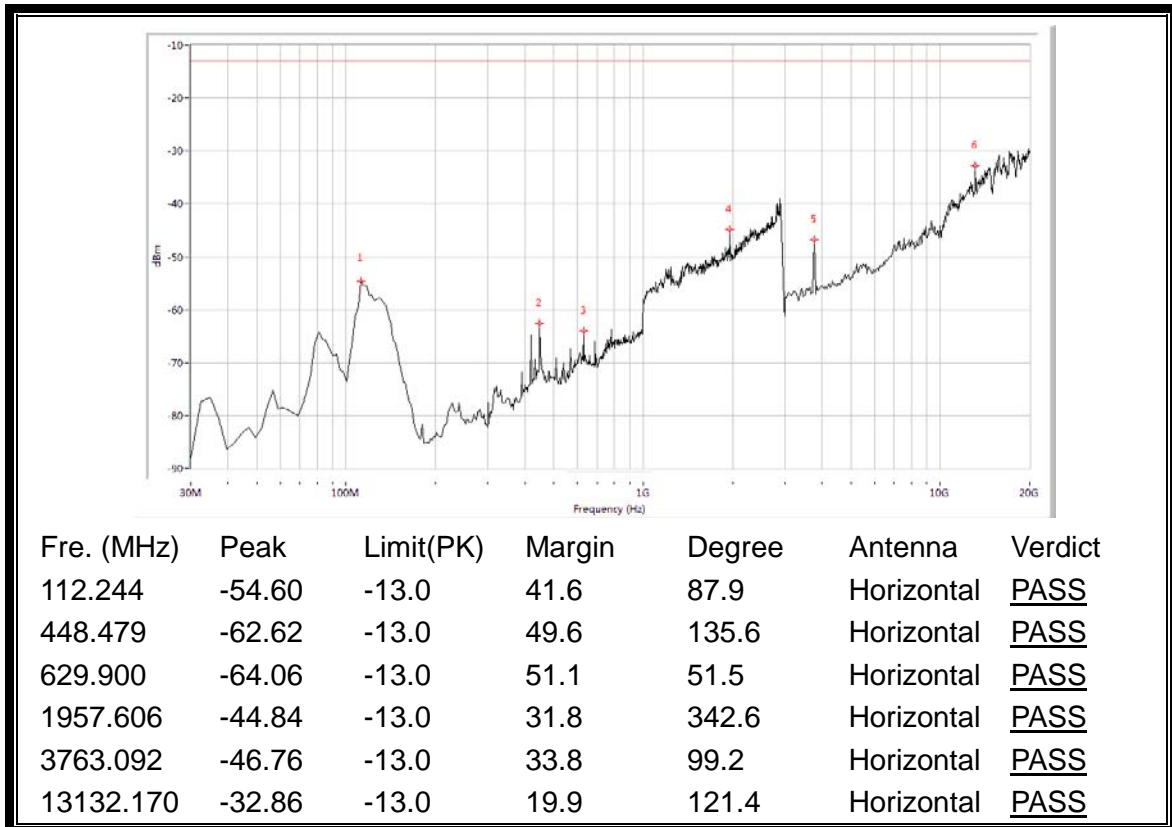
(Plot C.6: EGPRS 850MHz Channel = 251, Test Antenna Vertical)



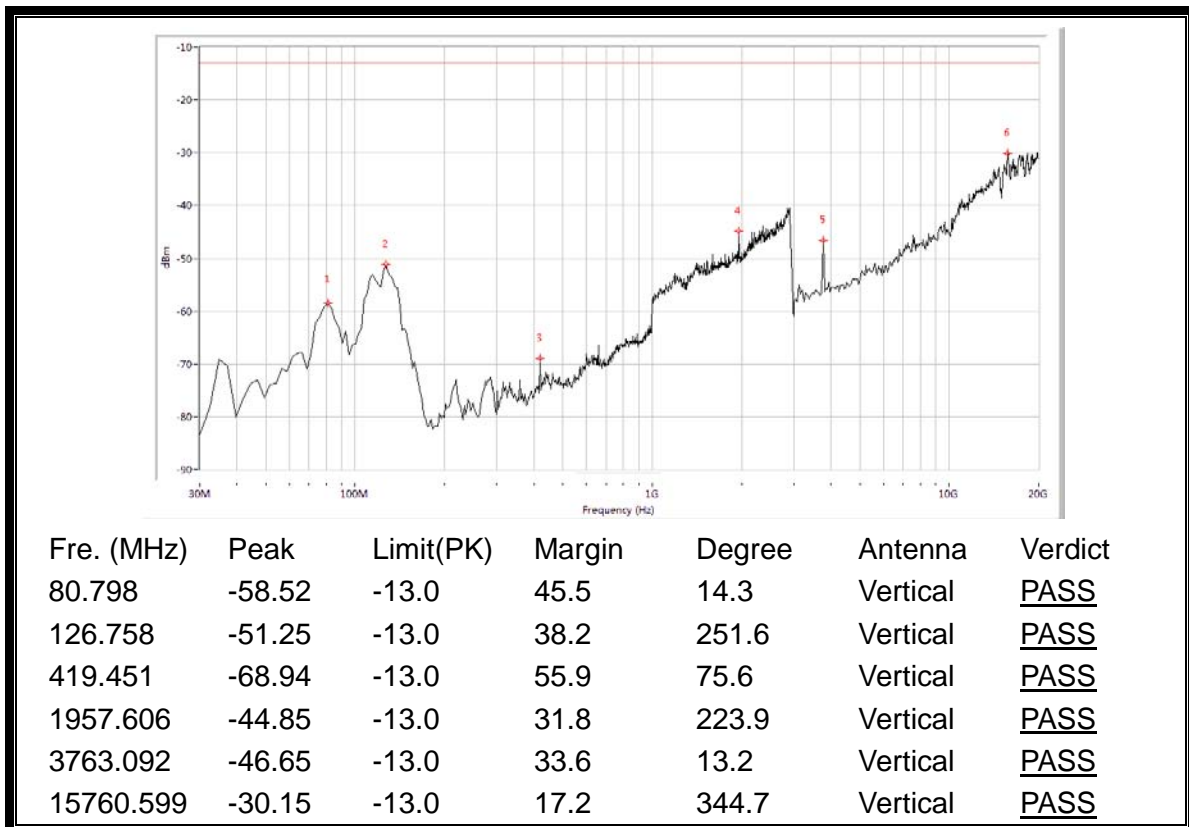
(Plot D.1: EGPRS 1900MHz Channel = 512, Test Antenna Horizontal)



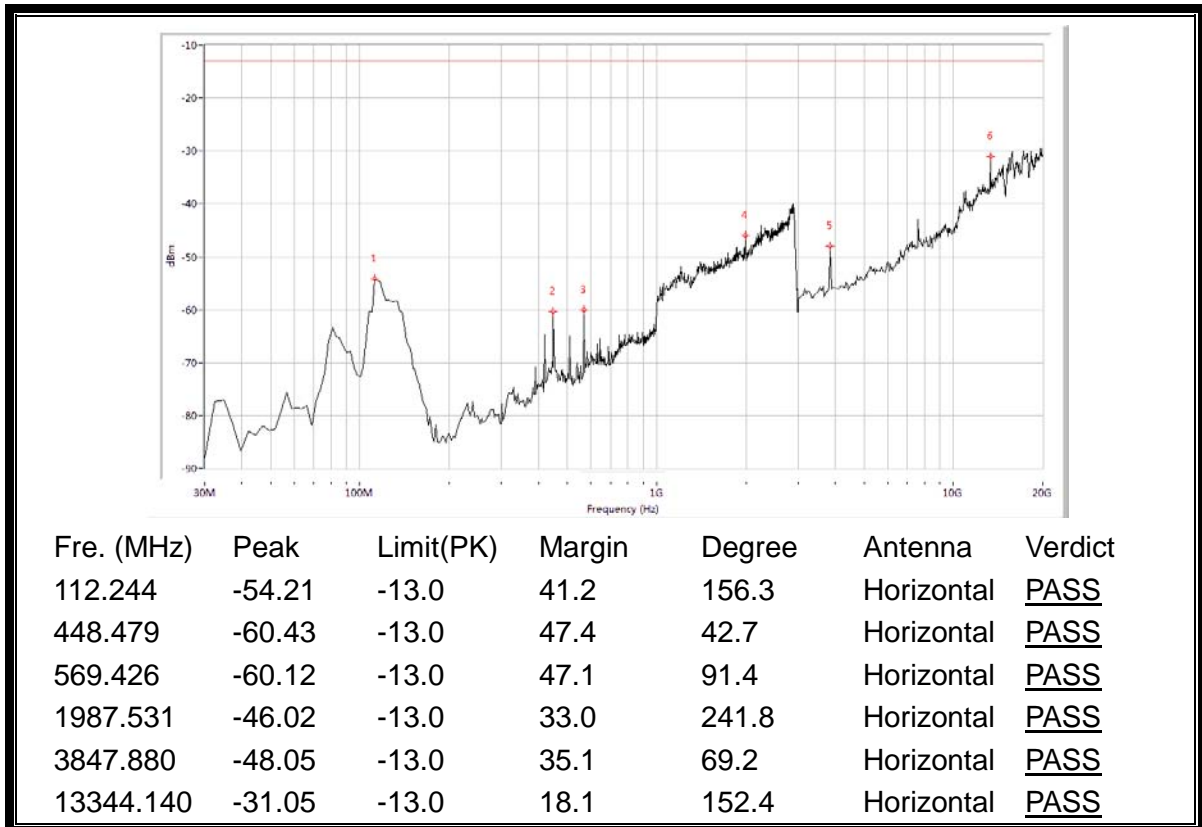
(Plot D.2: EGPRS 1900MHz Channel = 512, Test Antenna Vertical)



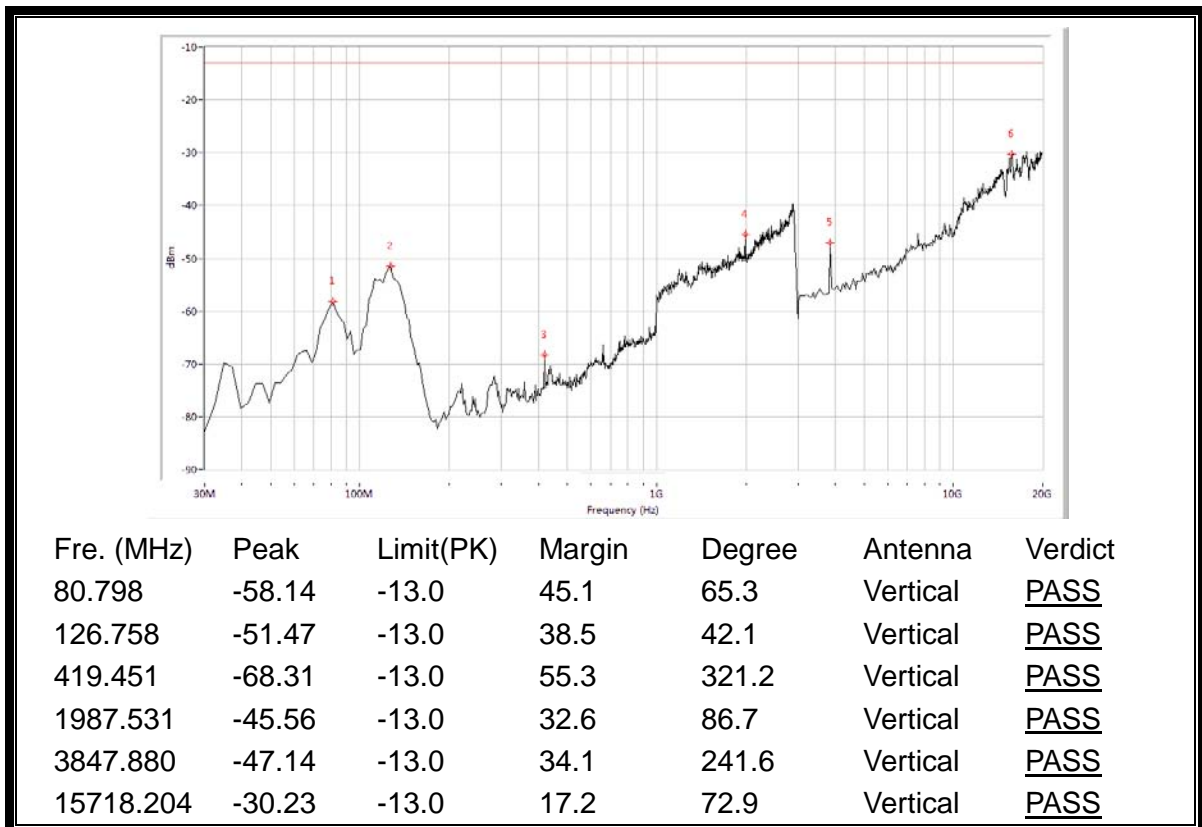
(Plot D.3: EGPRS 1900MHz Channel = 661, Test Antenna Horizontal)



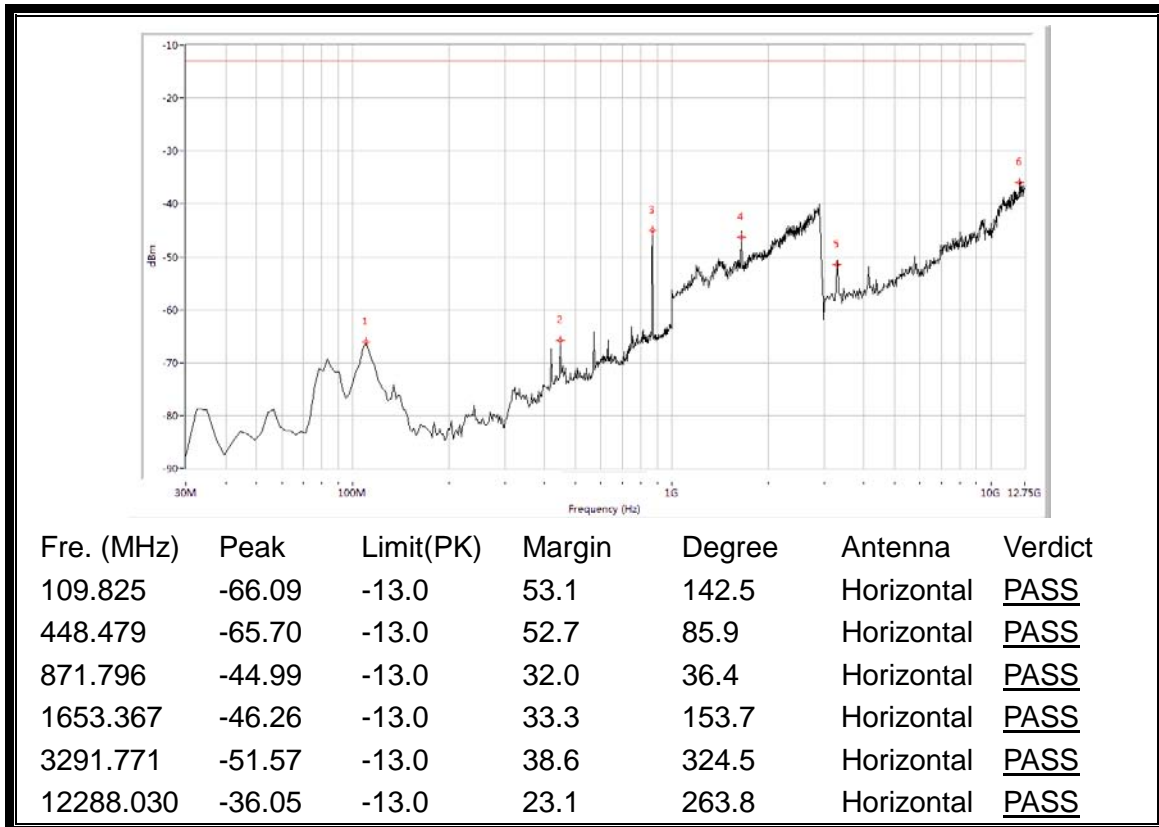
(Plot D.4: EGPRS 1900MHz Channel = 661, Test Antenna Vertical)



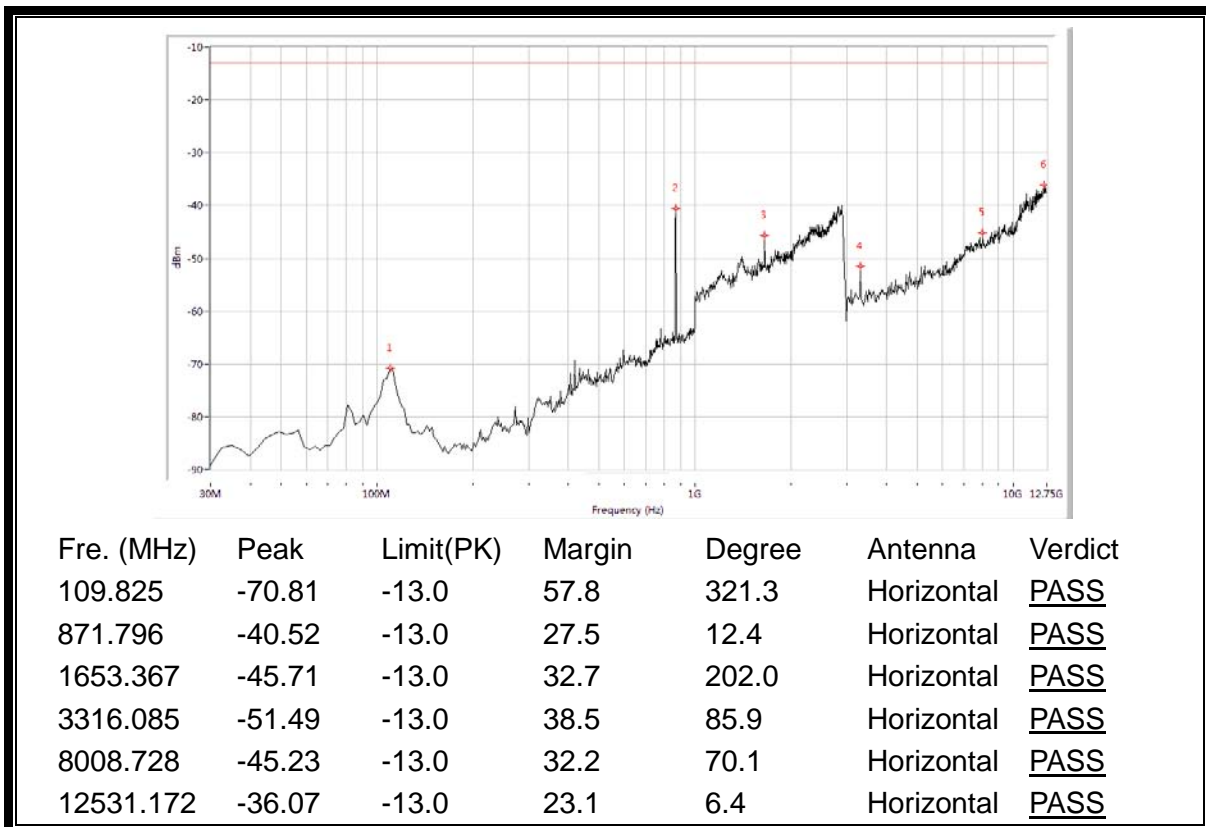
(Plot D.5: EGPRS 1900MHz Channel = 810, Test Antenna Horizontal)



(Plot D.6: EGPRS 1900MHz Channel = 810, Test Antenna Vertical)

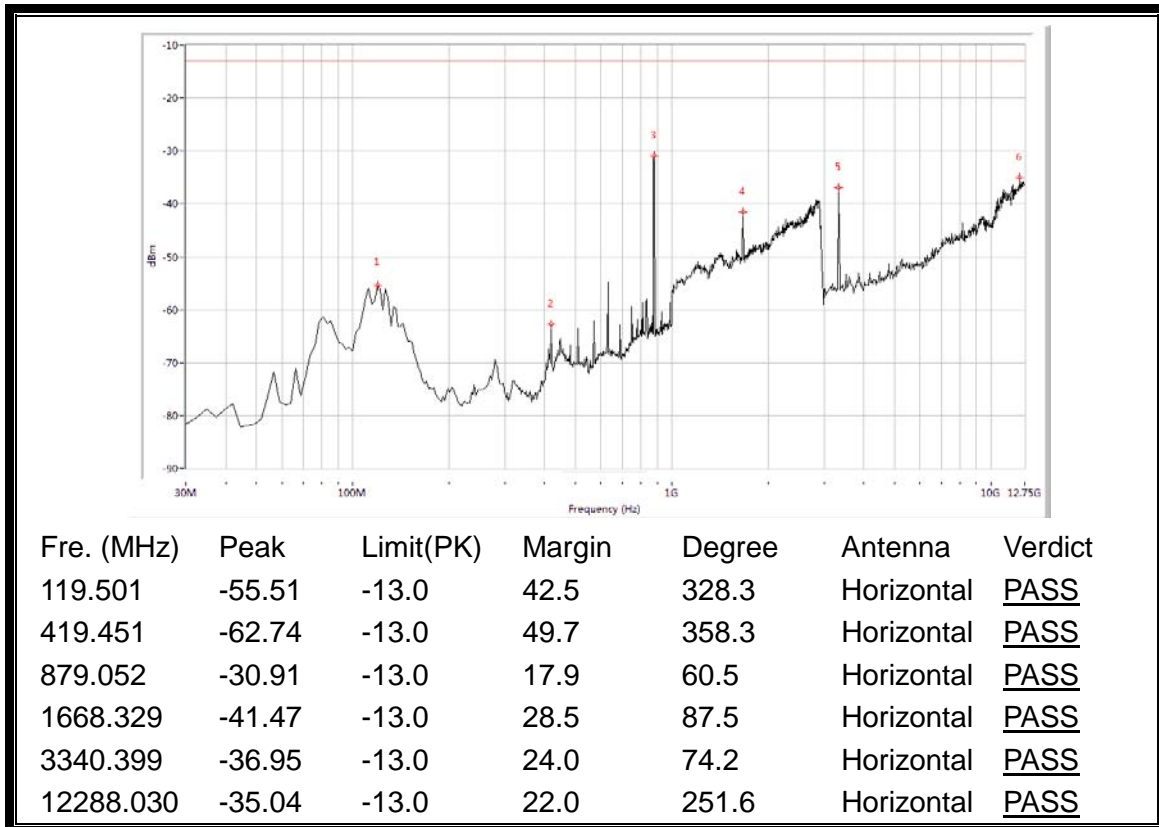


(Plot E.1: WCDMA 850MHz Channel = 4132, Test Antenna Horizontal)

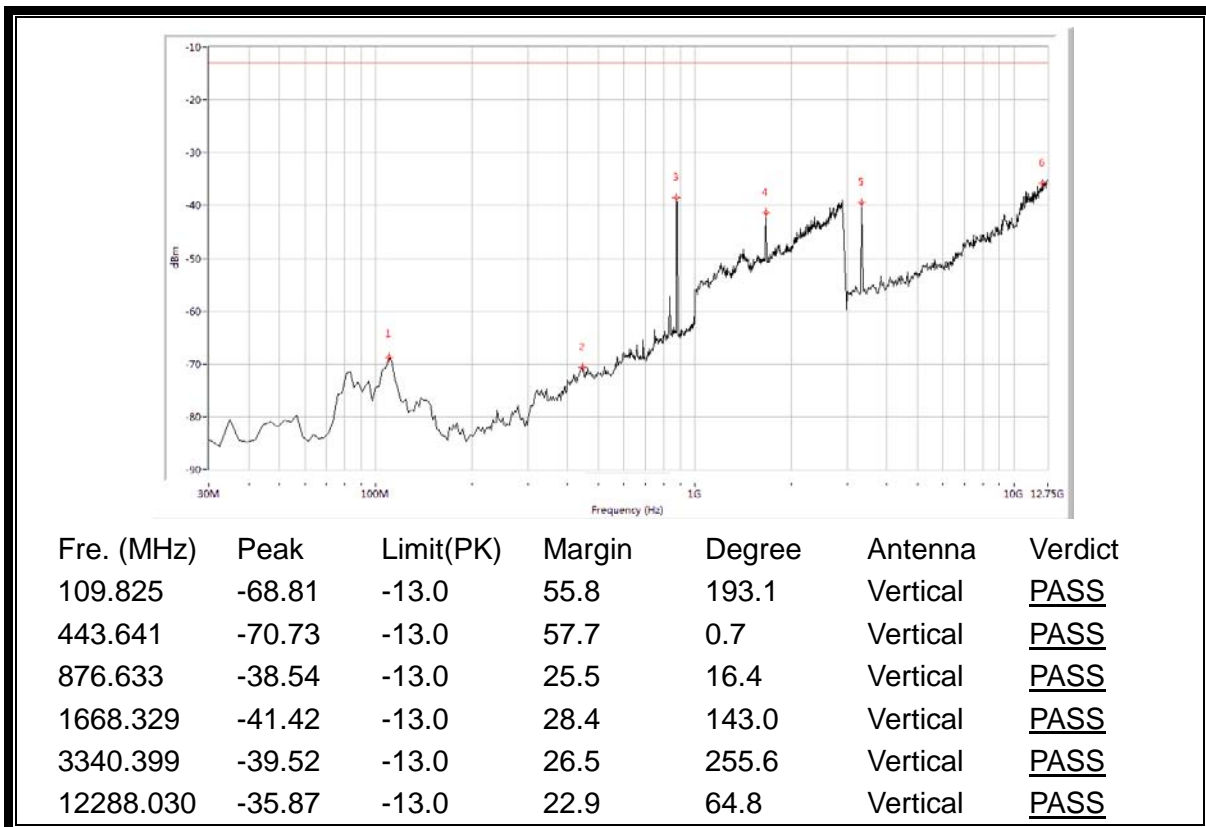




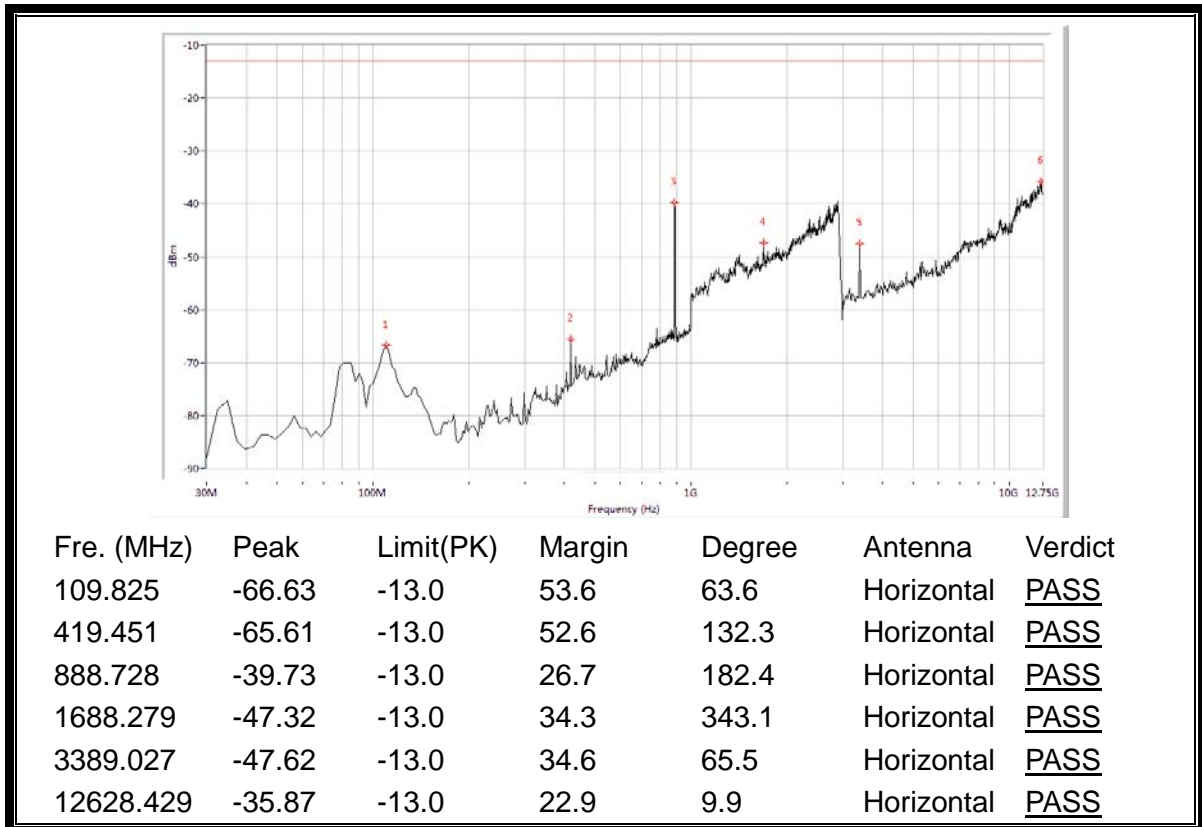
(Plot E.2: WCDMA 850MHz Channel = 4132, Test Antenna Vertical)



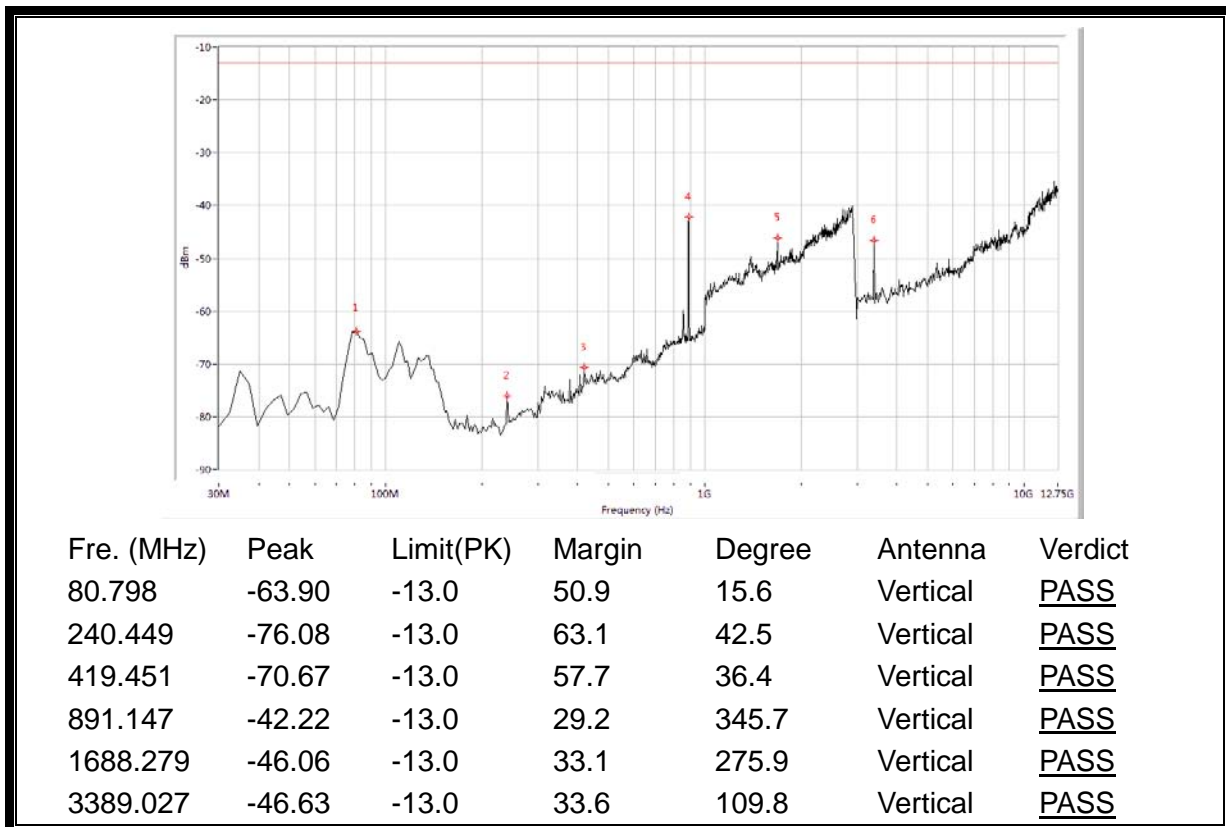
(Plot E.3: WCDMA 850MHz Channel = 4175, Test Antenna Horizontal)



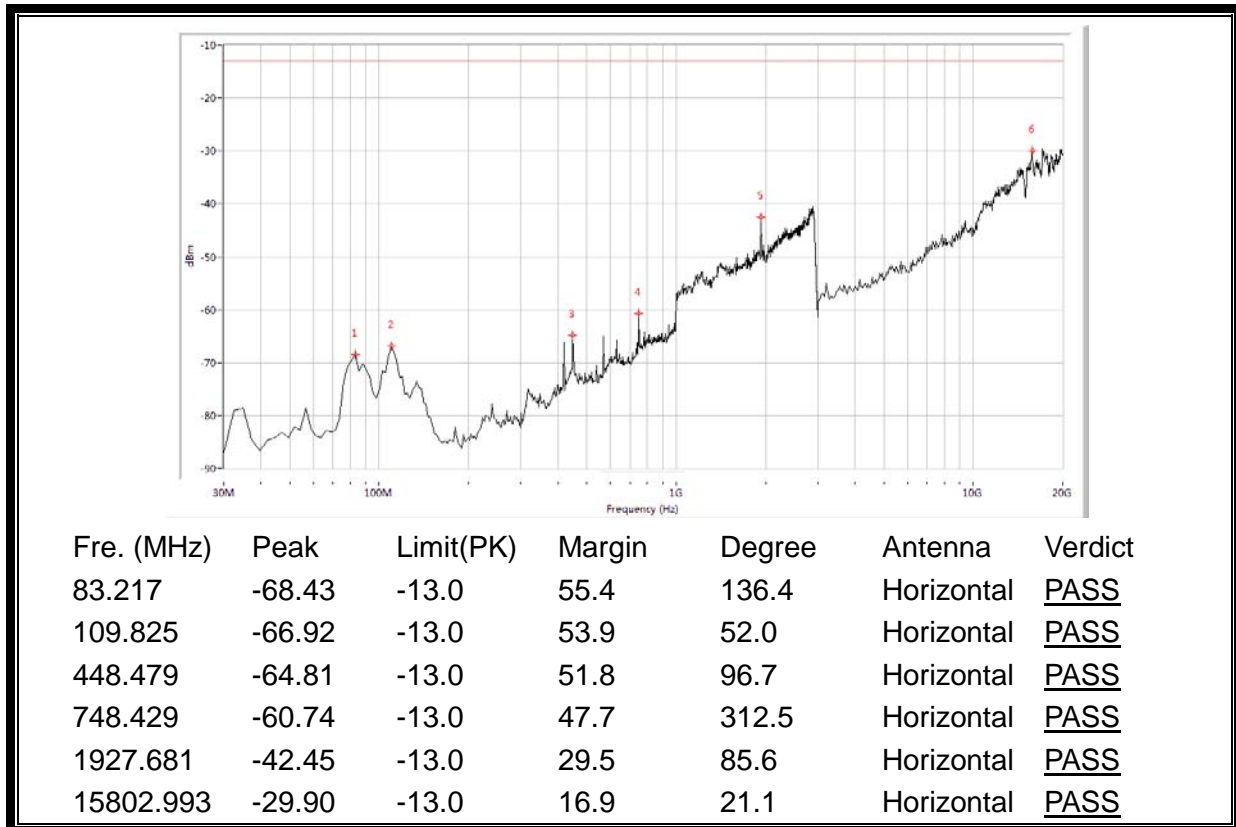
(Plot E.4: WCDMA 850MHz Channel = 4175, Test Antenna Vertical)



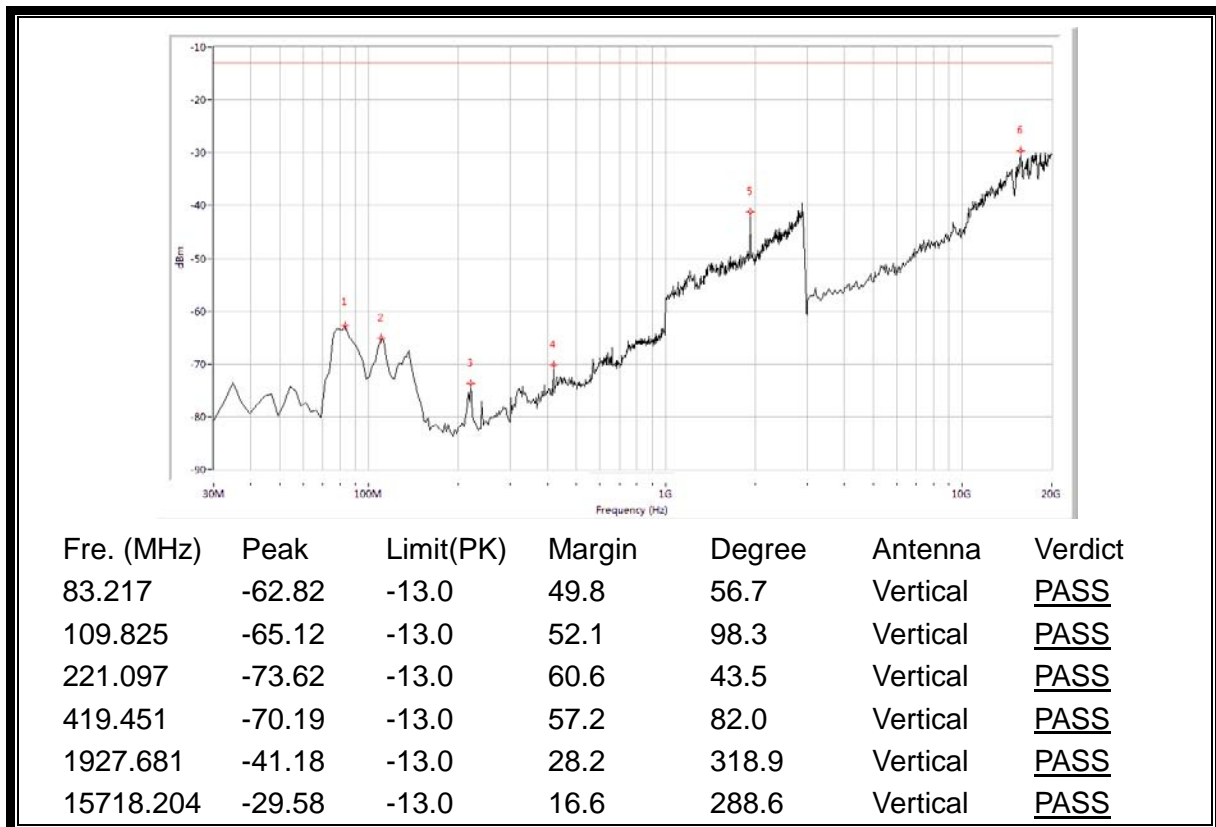
(Plot E.5: WCDMA 850MHz Channel = 4233, Test Antenna Horizontal)



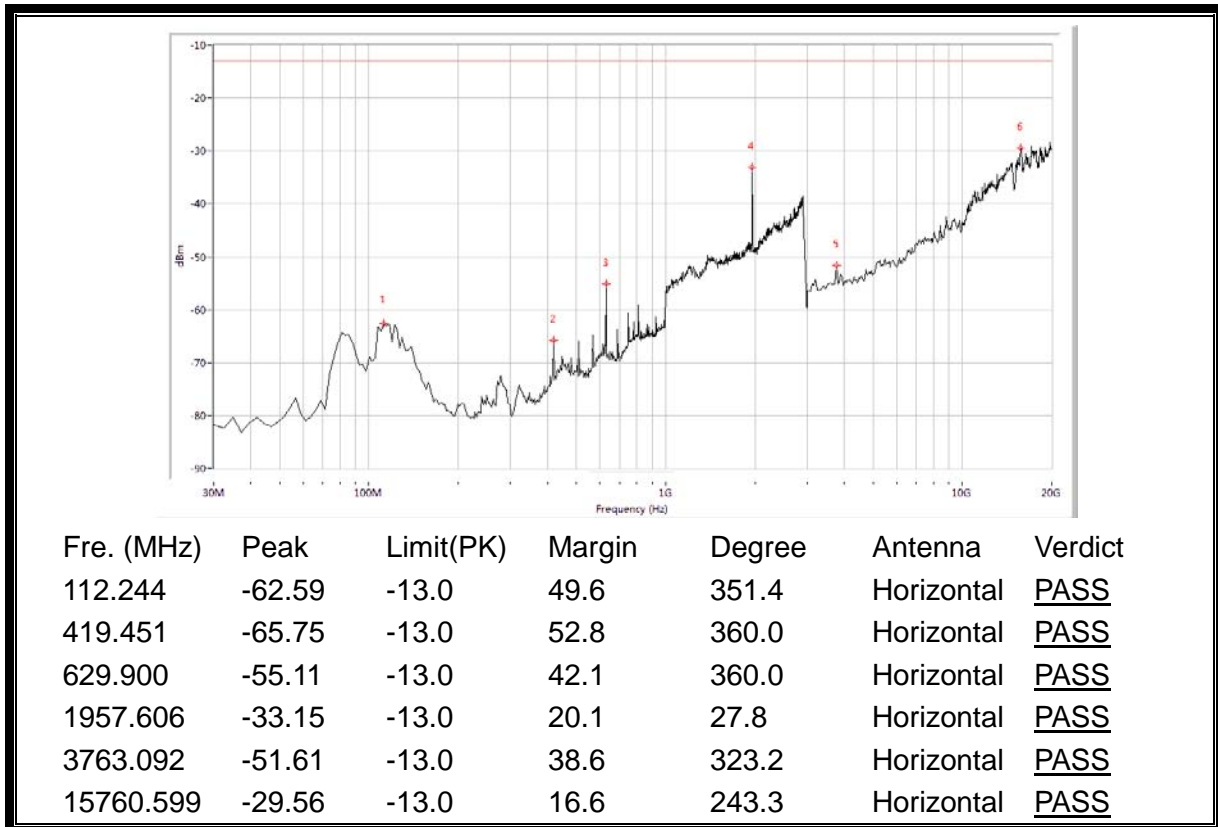
(Plot E.6: WCDMA 850MHz Channel = 4233, Test Antenna Vertical)



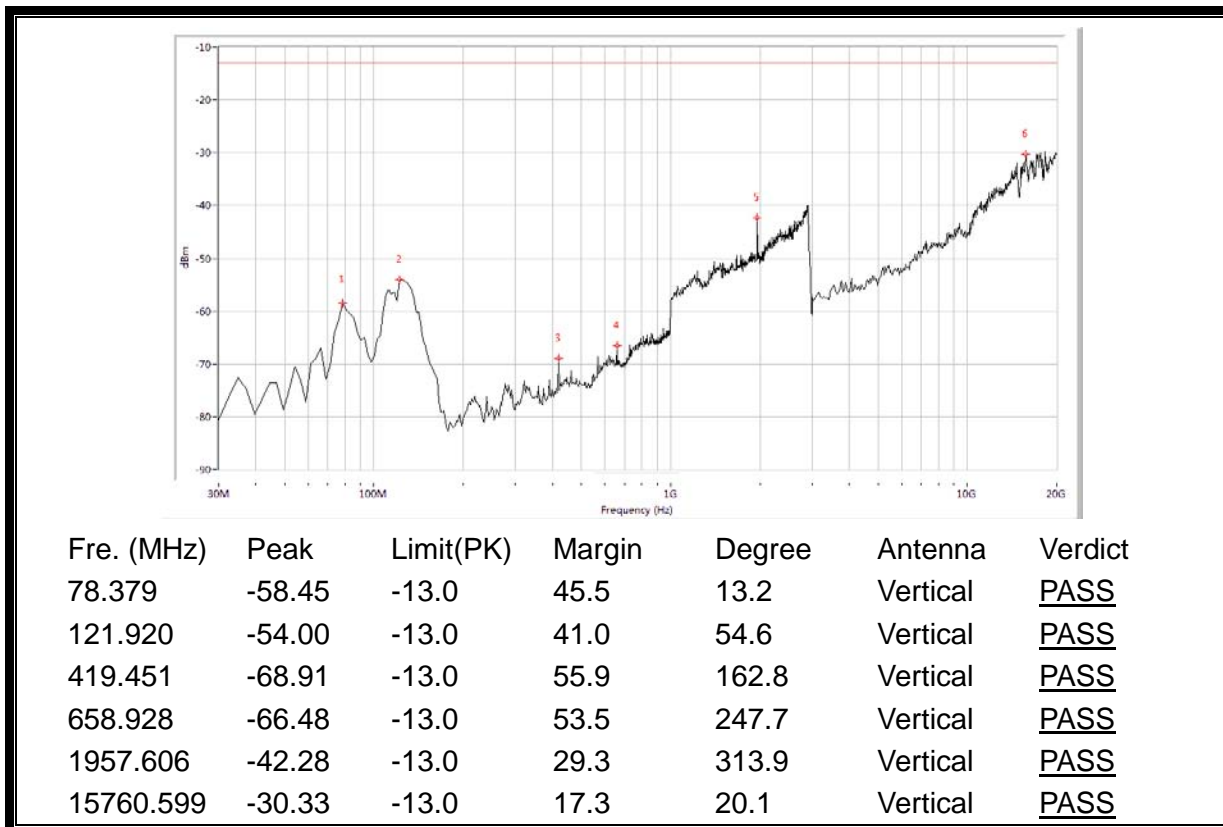
(Plot F.1: WCDMA 1900MHz Channel = 9262, Test Antenna Horizontal)



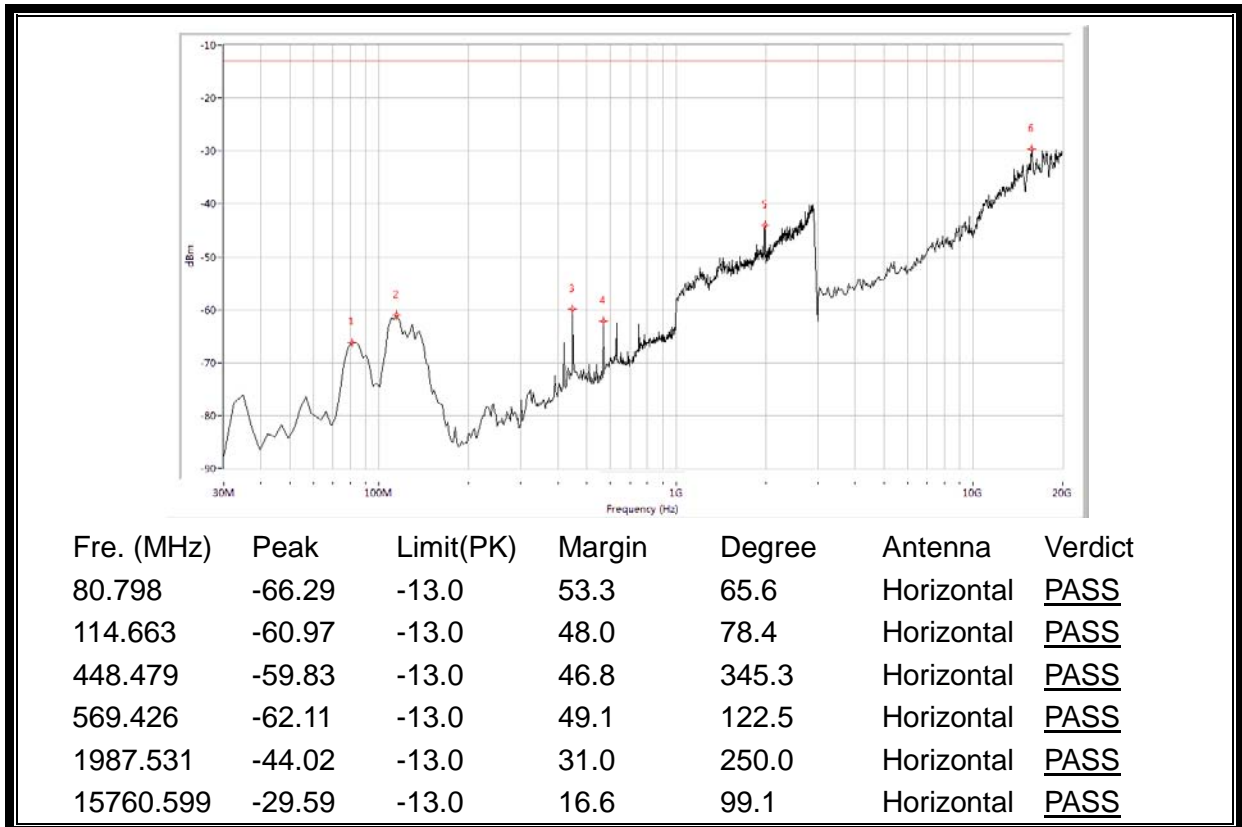
(Plot F.2: WCDMA 1900MHz Channel = 9262, Test Antenna Vertical)



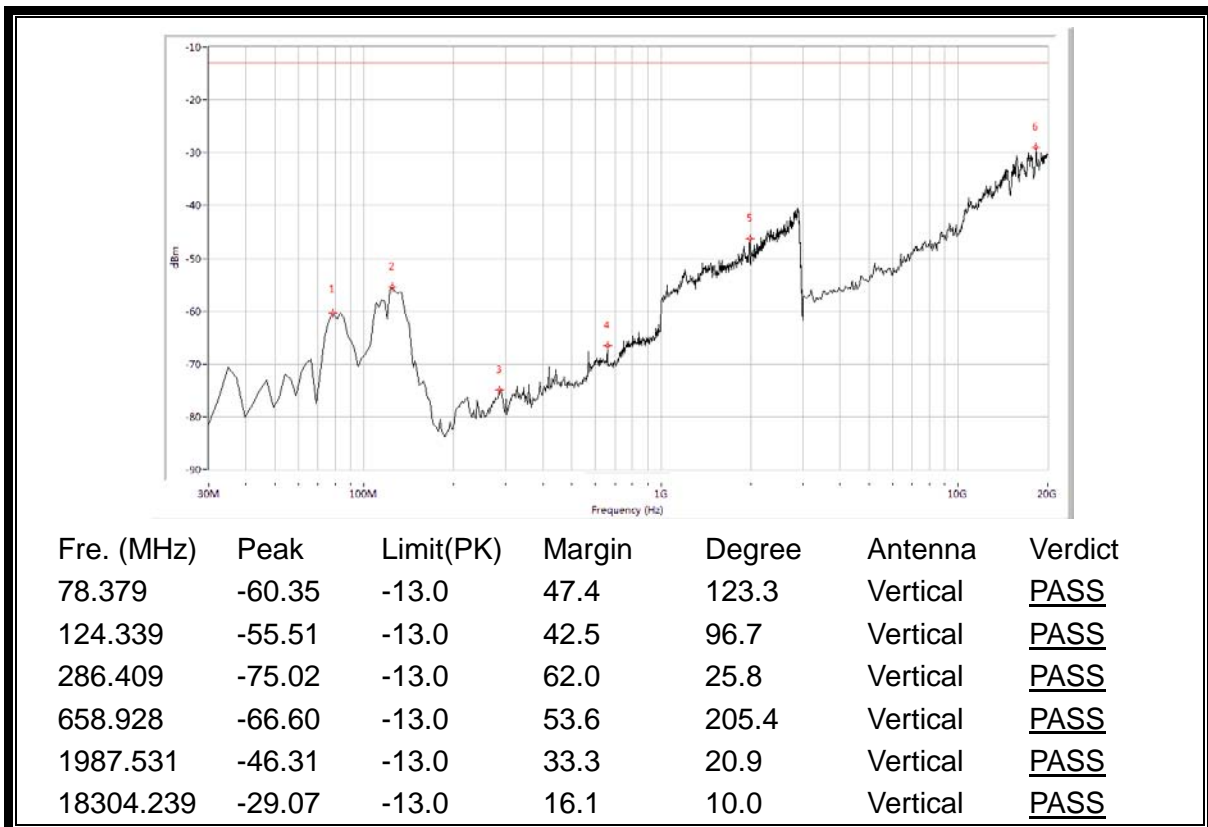
(Plot F.3: WCDMA 1900MHz Channel = 9400, Test Antenna Horizontal)



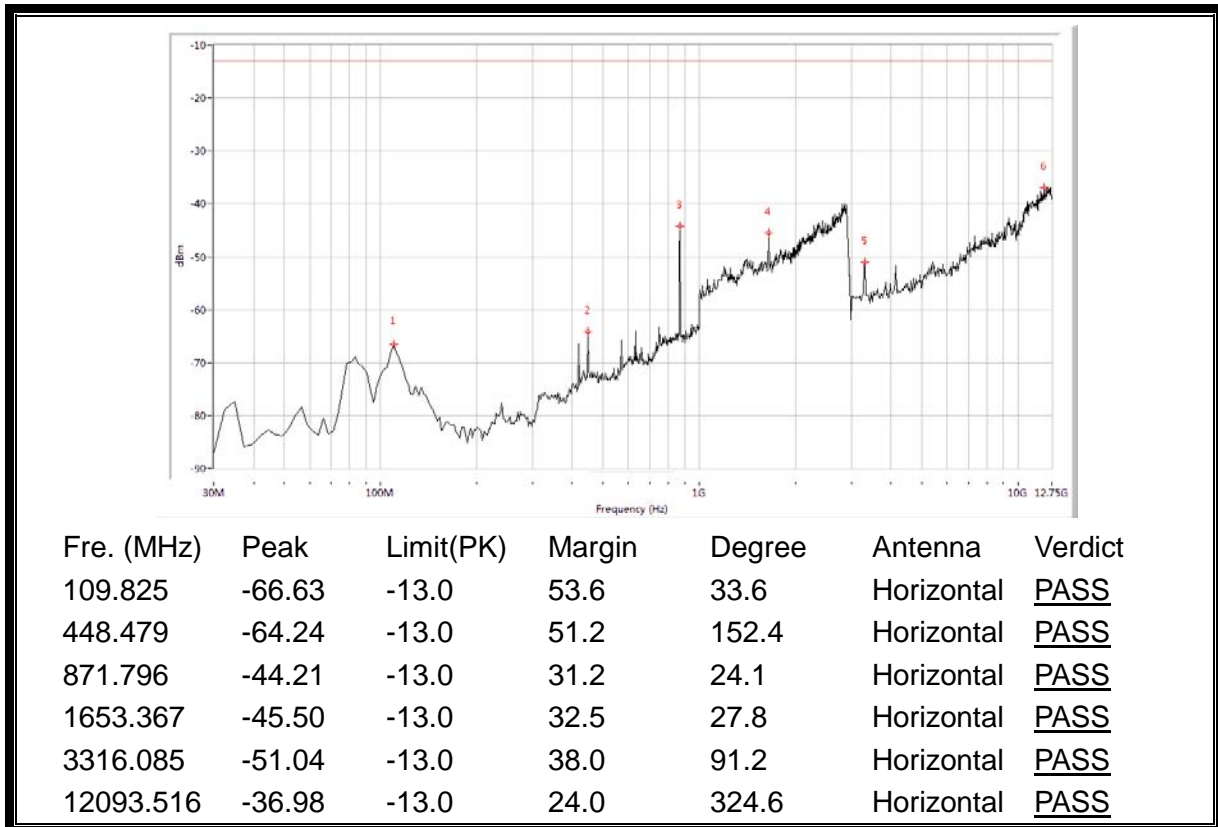
(Plot F.4: WCDMA 1900MHz Channel = 9400, Test Antenna Vertical)



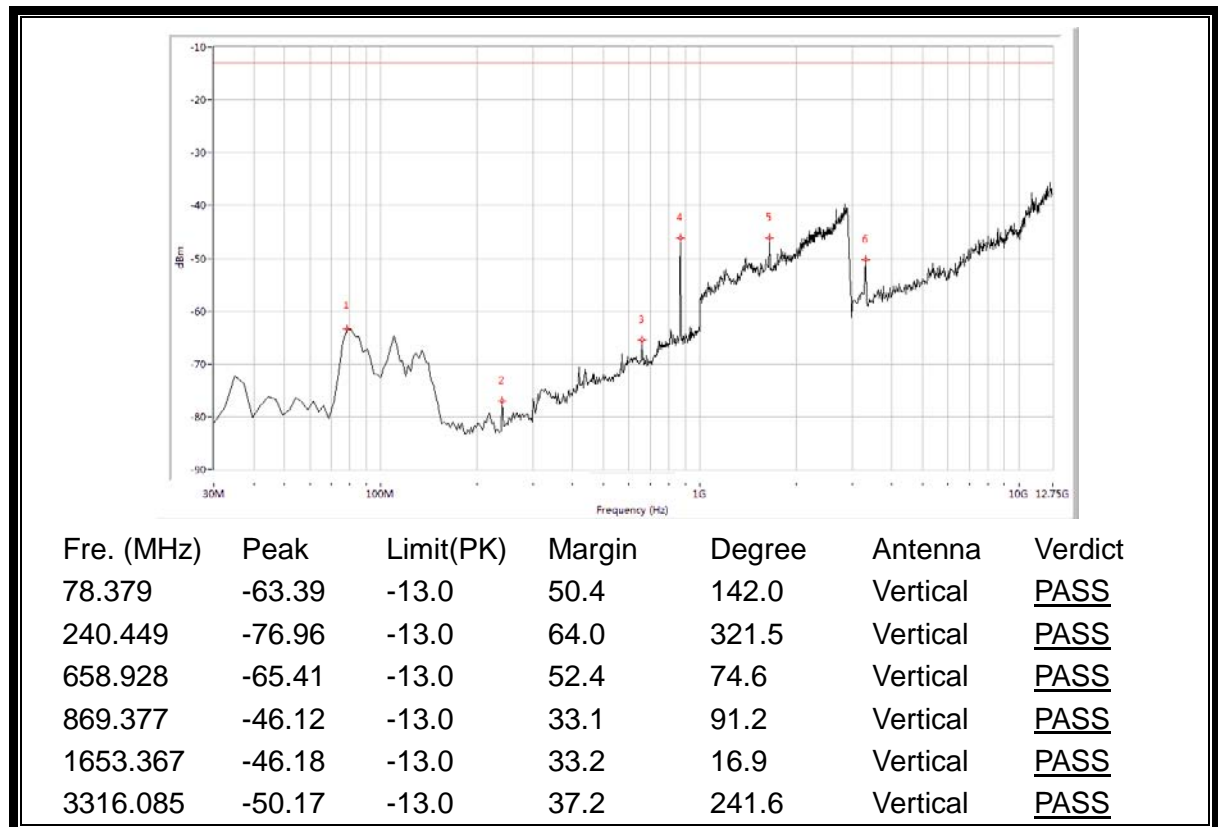
(Plot F.5: WCDMA 1900MHz Channel = 9538, Test Antenna Horizontal)



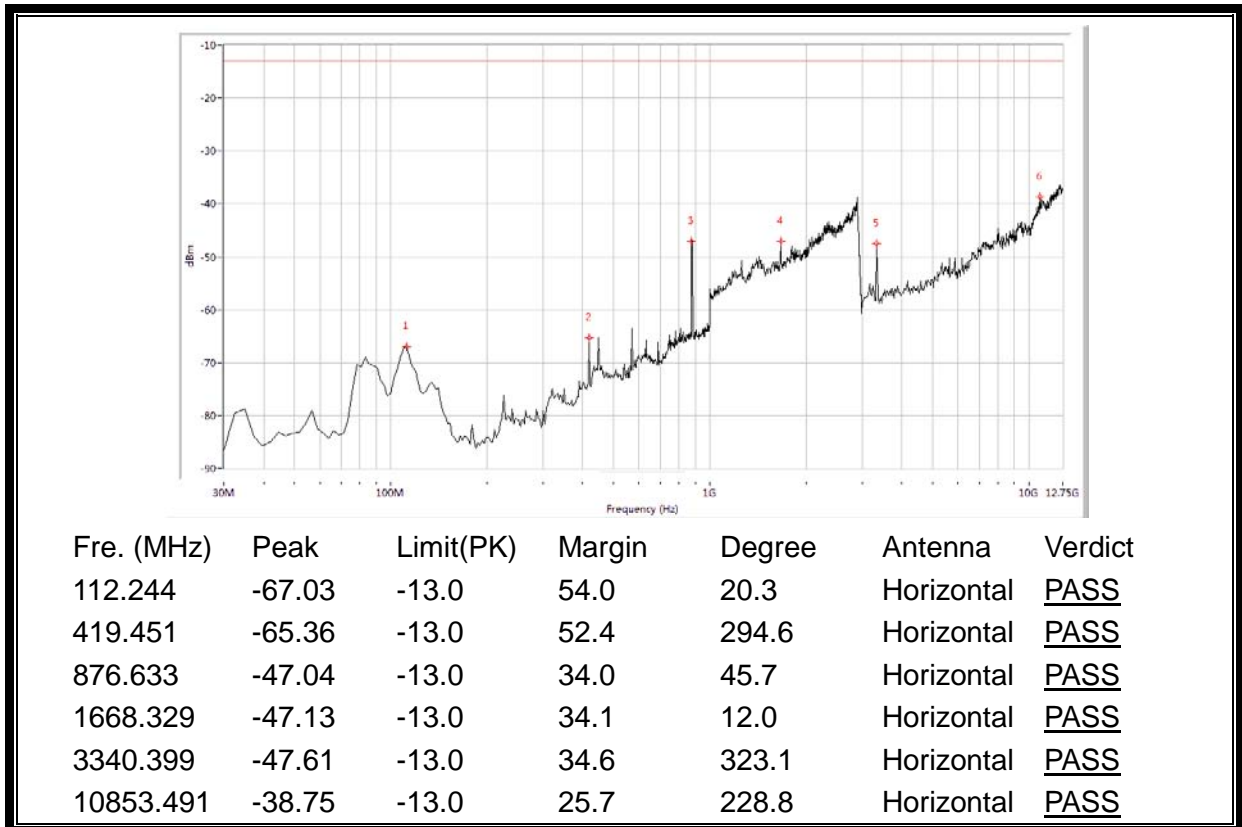
(Plot F.6: WCDMA 1900MHz Channel = 9538, Test Antenna Vertical)



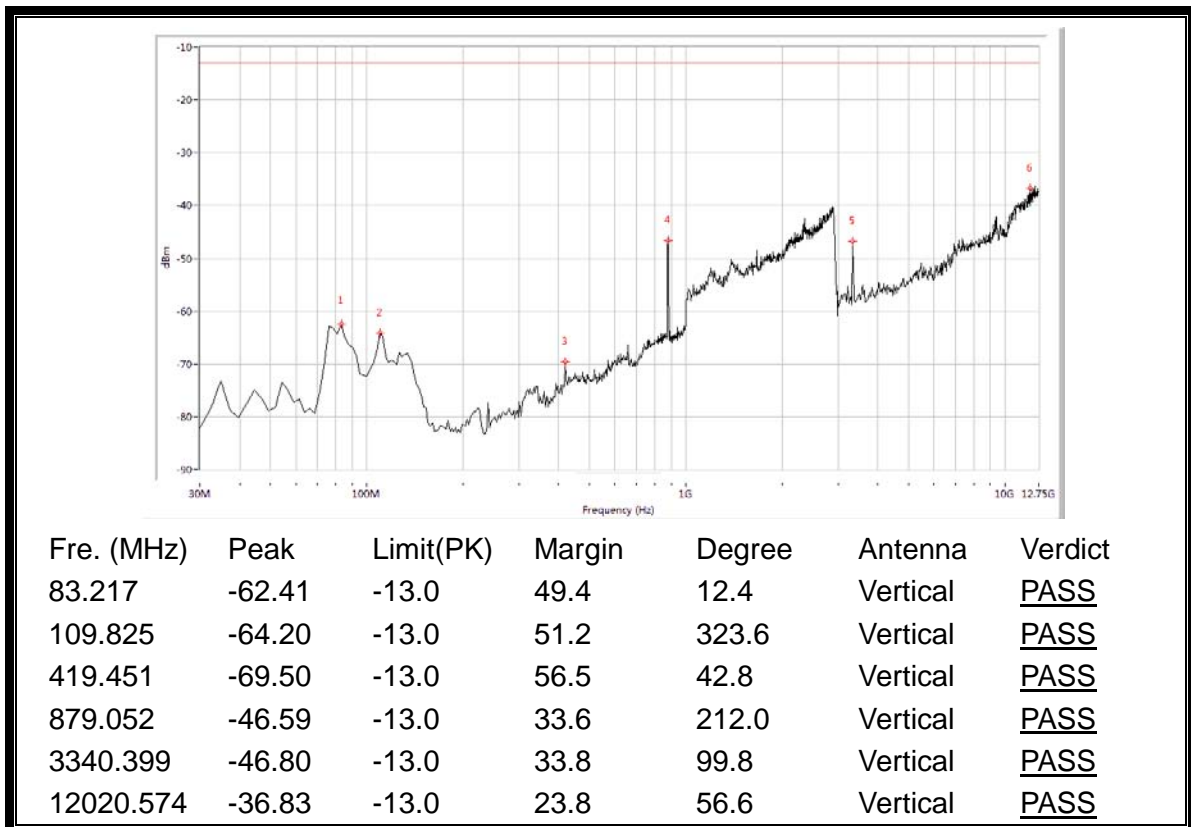
(Plot G.1: HSDPA 850MHz Channel = 4132, Test Antenna Horizontal)



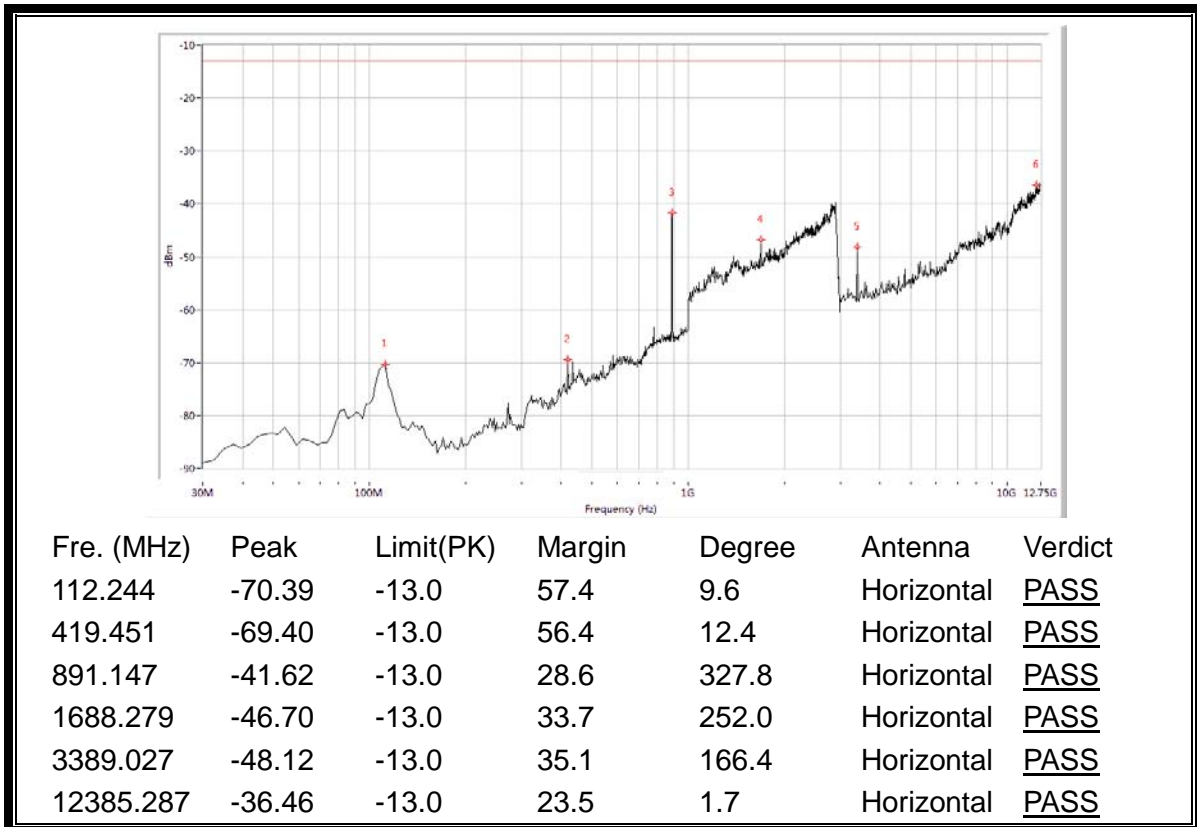
(Plot G.2: HSDPA 850MHz Channel = 4132, Test Antenna Vertical)



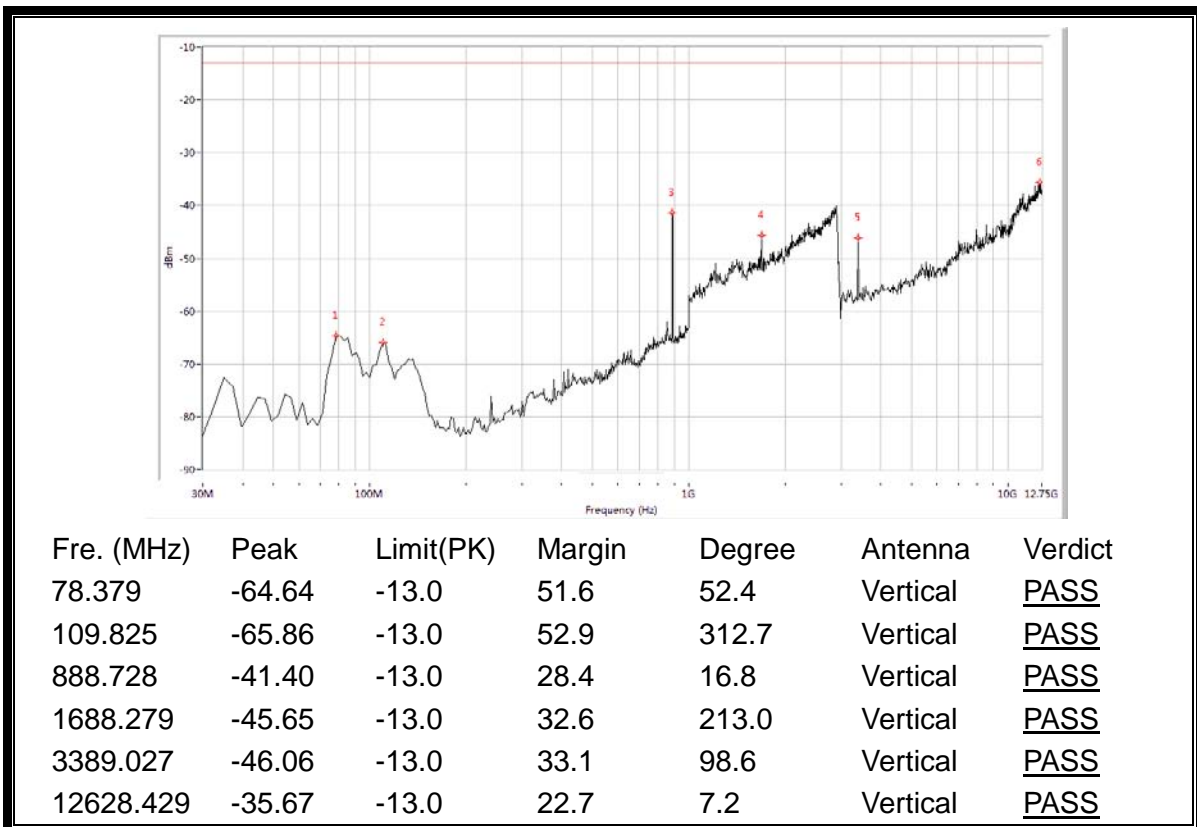
(Plot G.3: HSDPA 850MHz Channel = 4175, Test Antenna Horizontal)



(Plot G.4: HSDPA 850MHz Channel = 4175, Test Antenna Vertical)

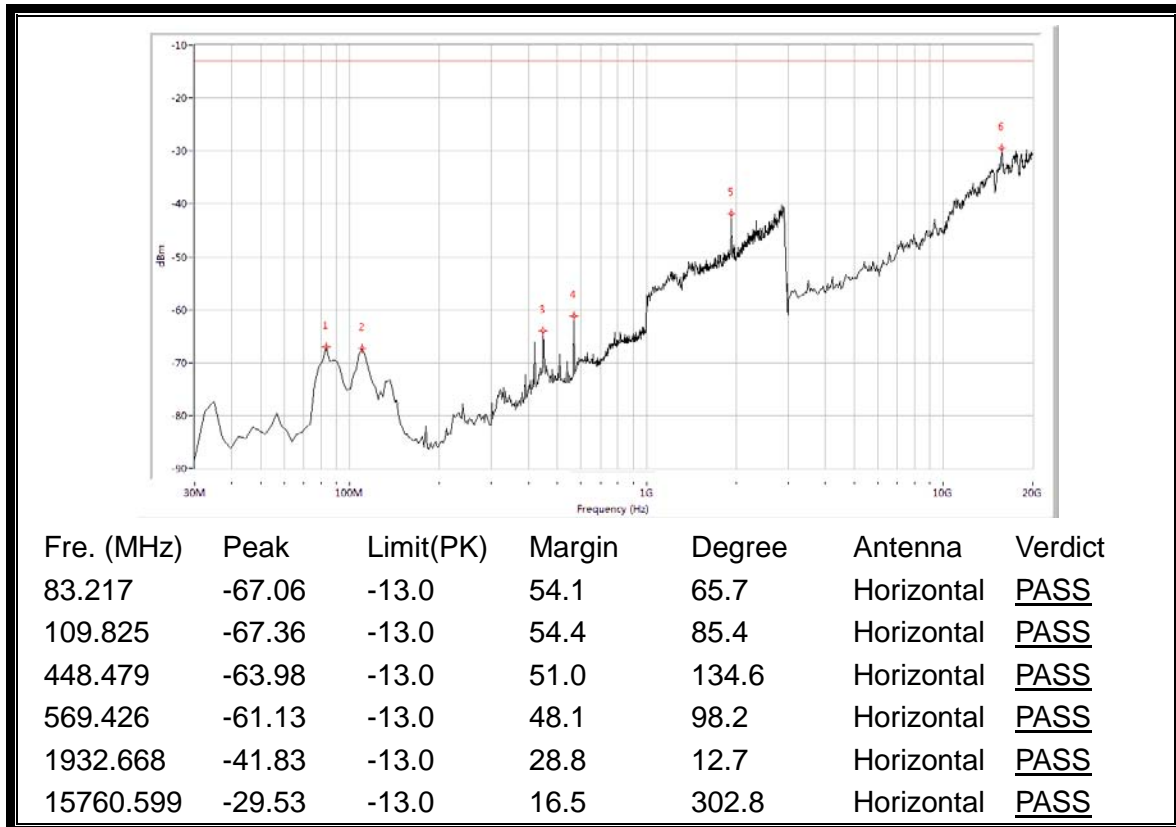


(Plot G.5: HSDPA 850MHz Channel = 4233, Test Antenna Horizontal)

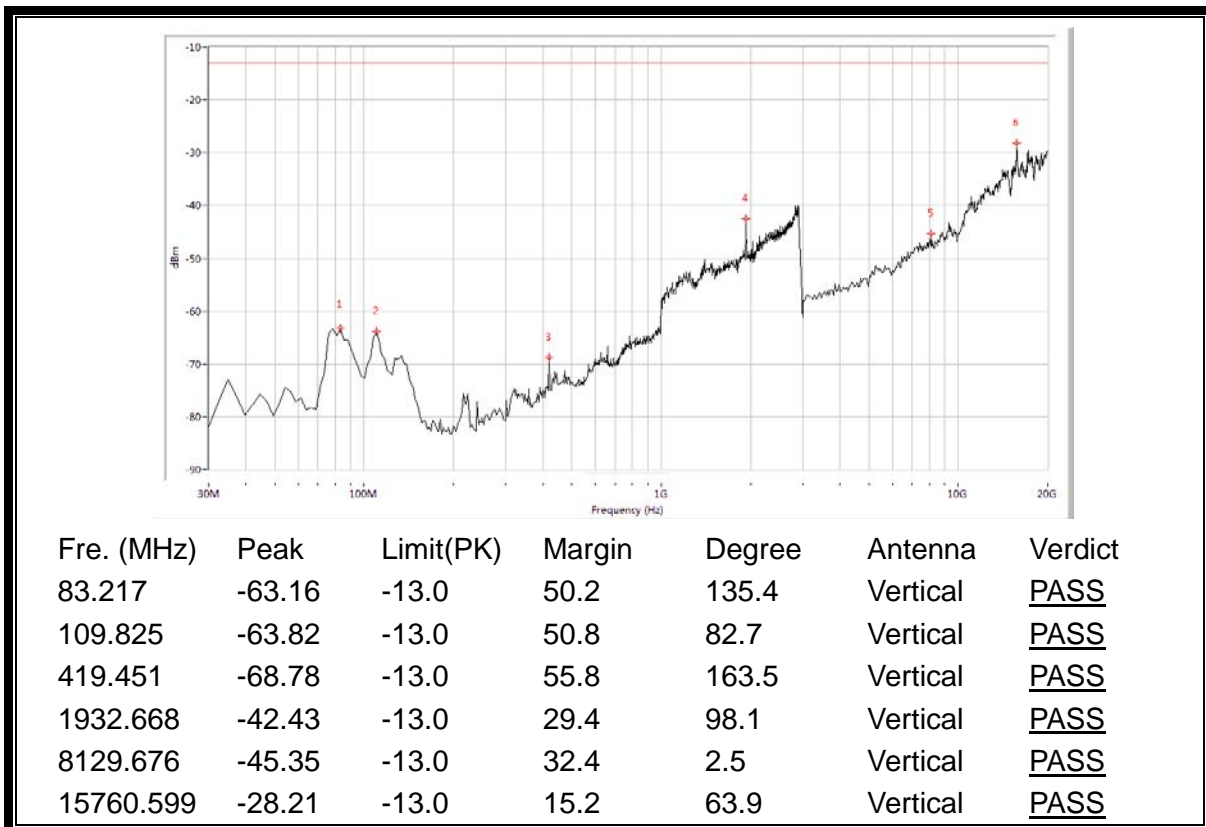




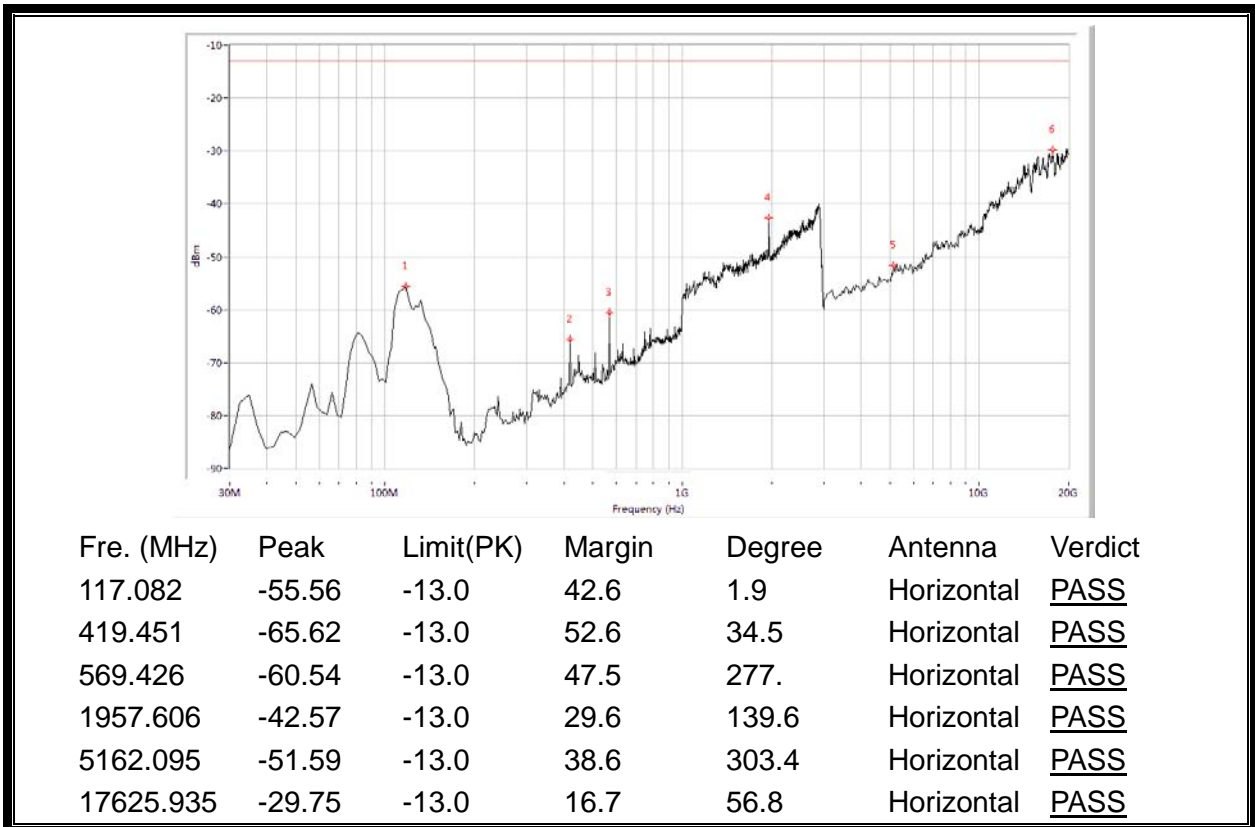
(Plot G.6: HSDPA 850MHz Channel = 4233, Test Antenna Vertical)



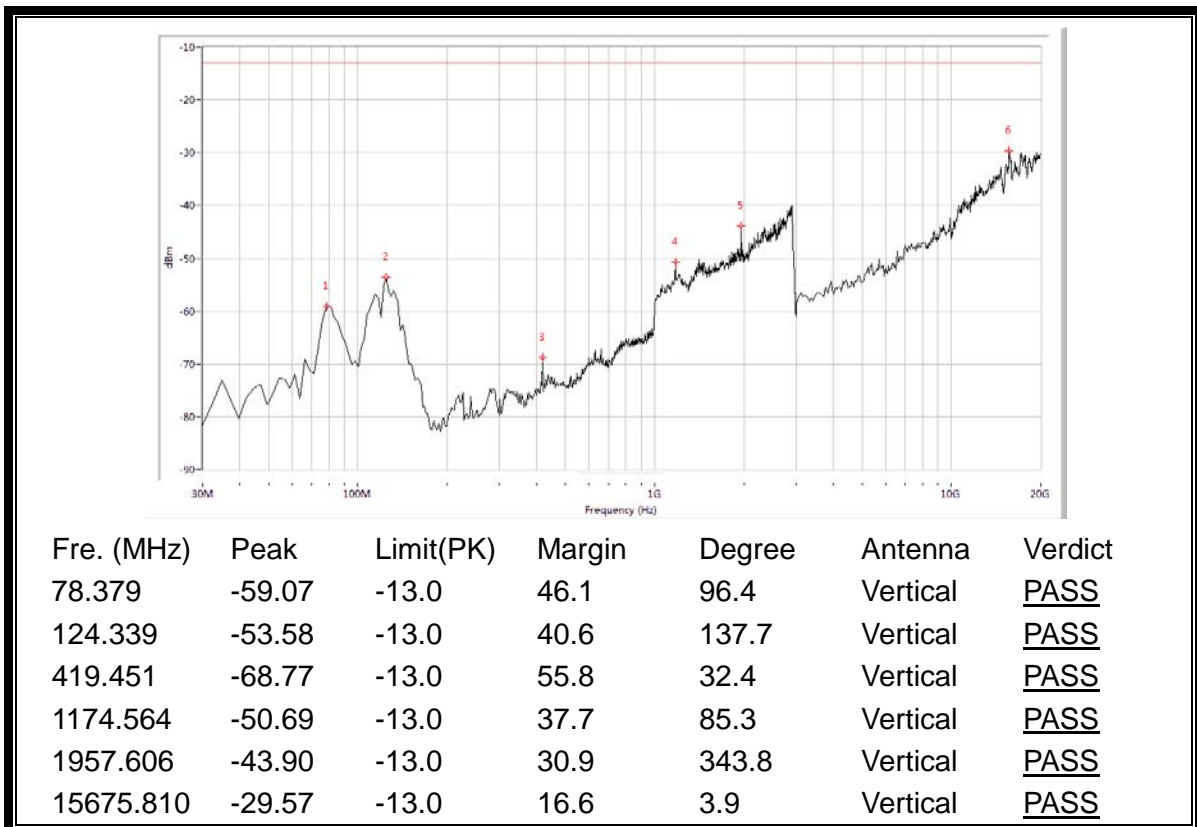
(Plot H.1: HSDPA 1900 MHz Channel = 9262, Test Antenna Horizontal)



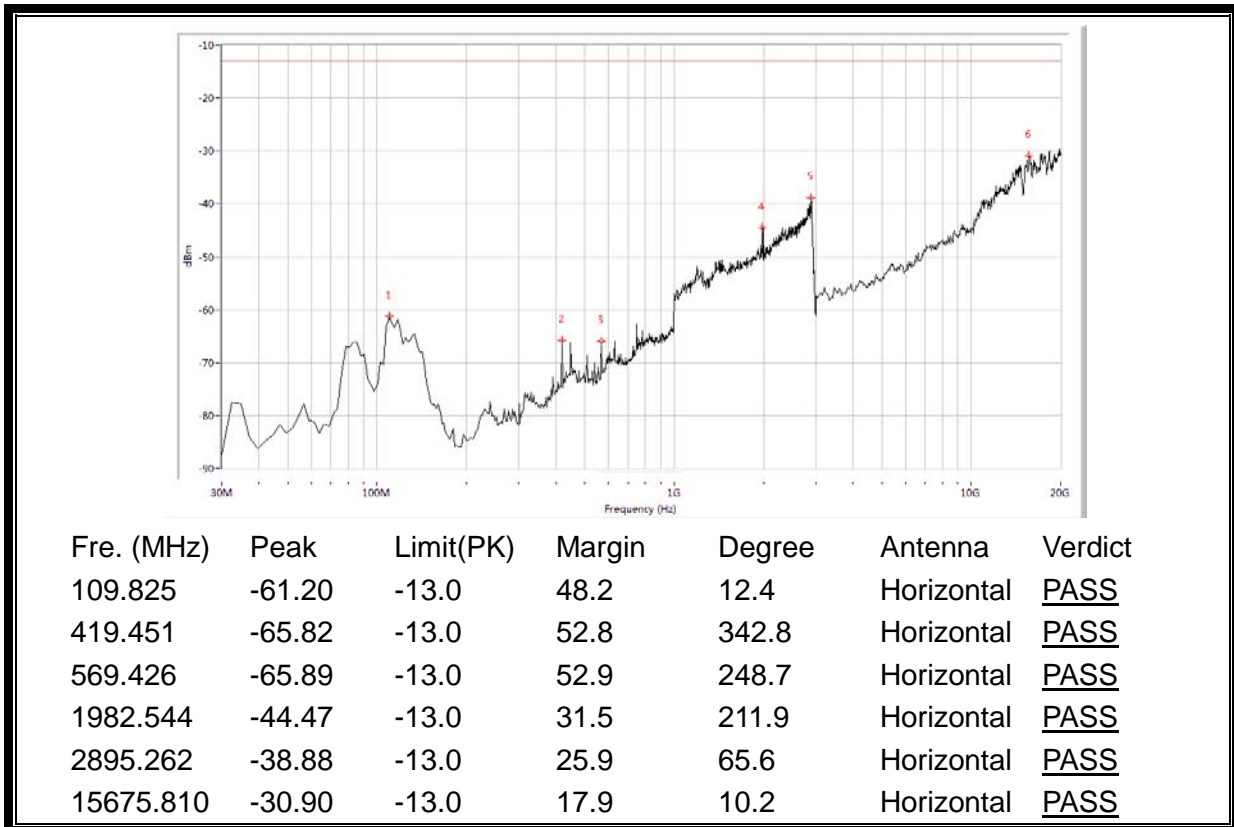
(Plot H.2: HSDPA 1900 MHz Channel = 9262, Test Antenna Vertical)



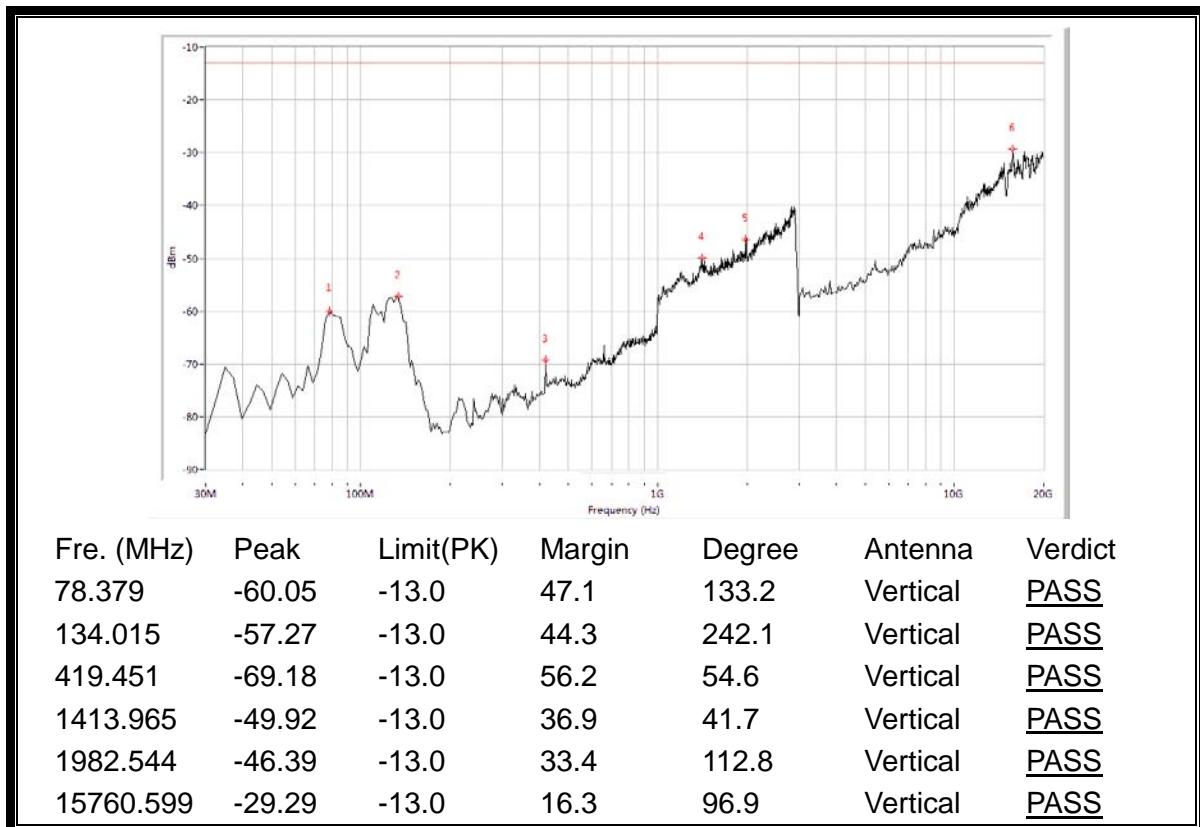
(Plot H.3: HSDPA 1900 MHz Channel = 9400, Test Antenna Horizontal)



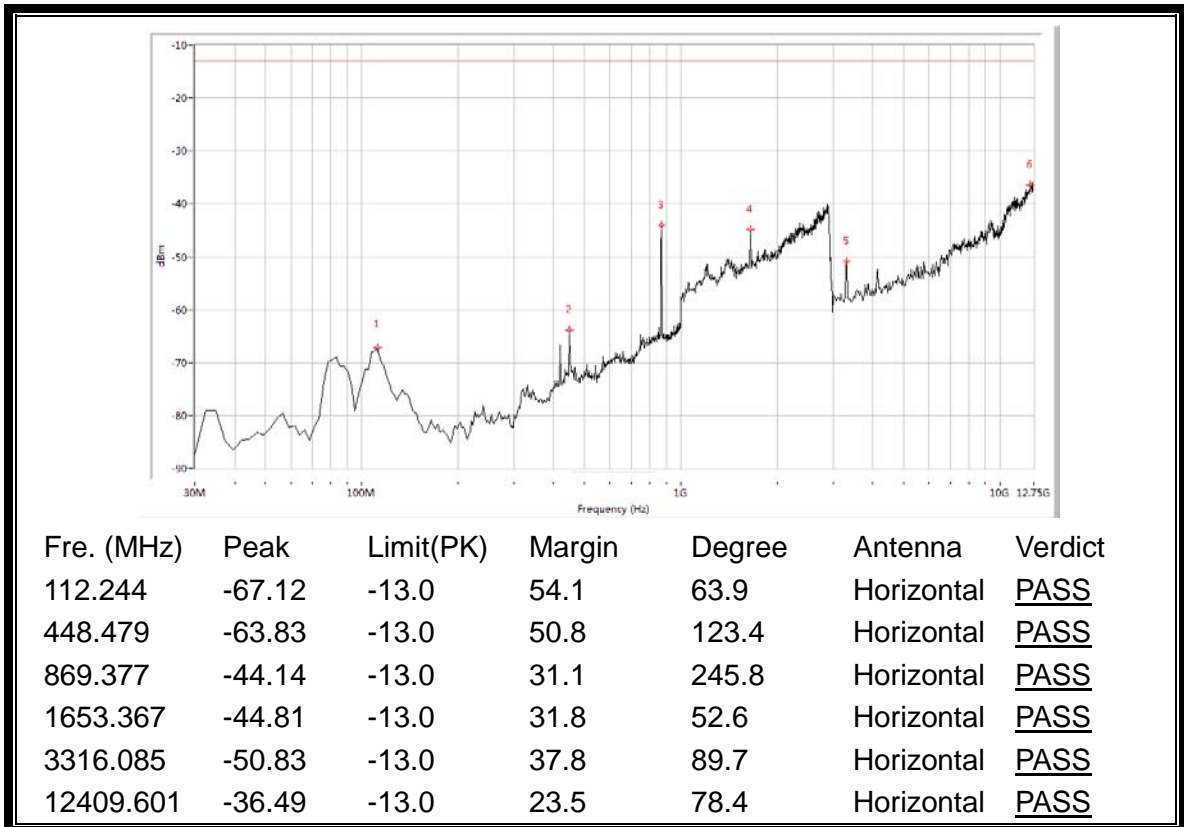
(Plot H.4: HSDPA 1900 MHz Channel = 9400, Test Antenna Vertical)



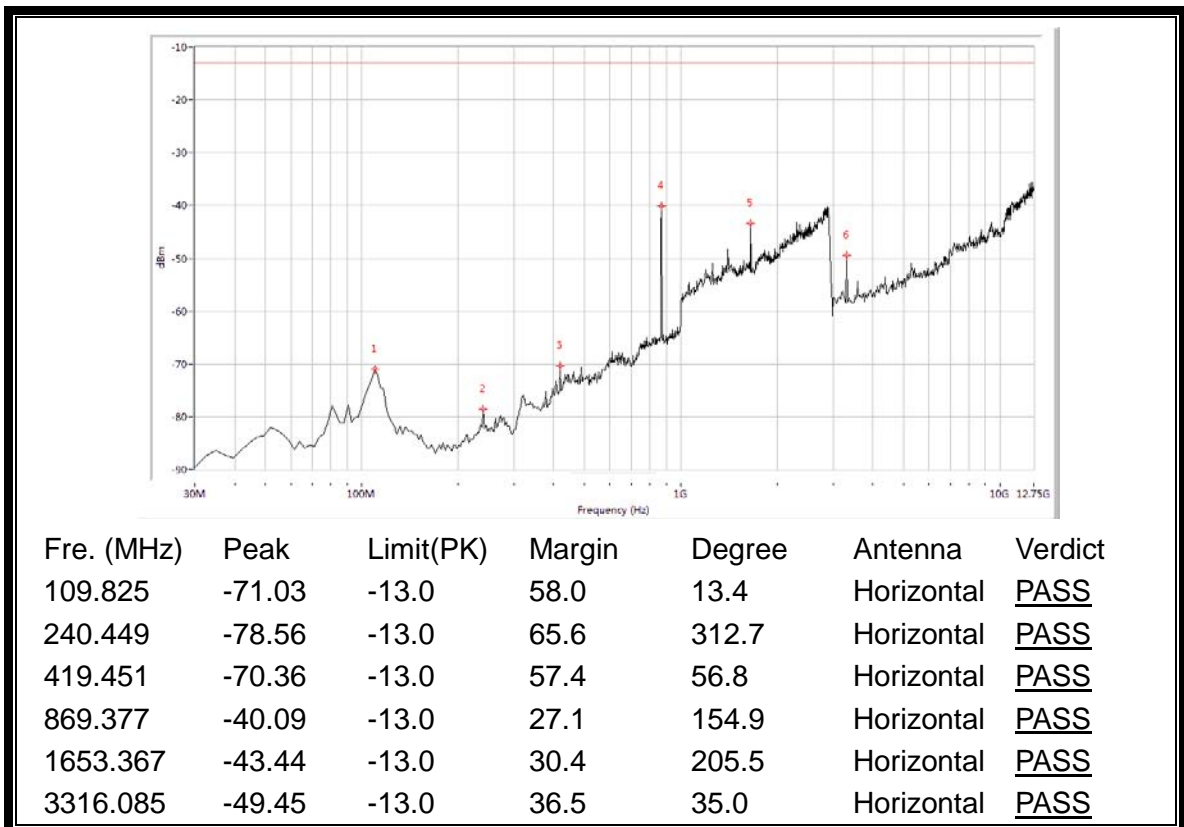
(Plot H.5: HSDPA 1900 MHz Channel = 9538, Test Antenna Horizontal)



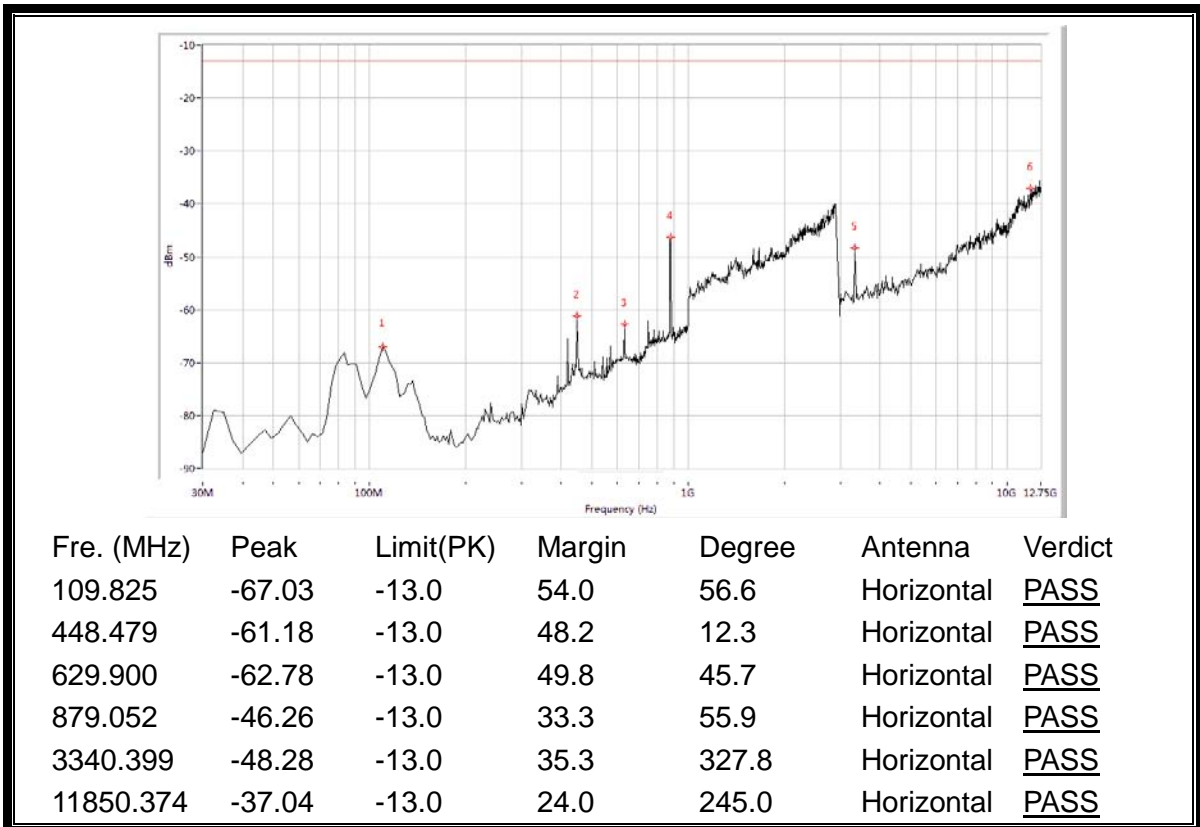
(Plot H.6: HSDPA 1900 MHz Channel = 9538, Test Antenna Vertical)



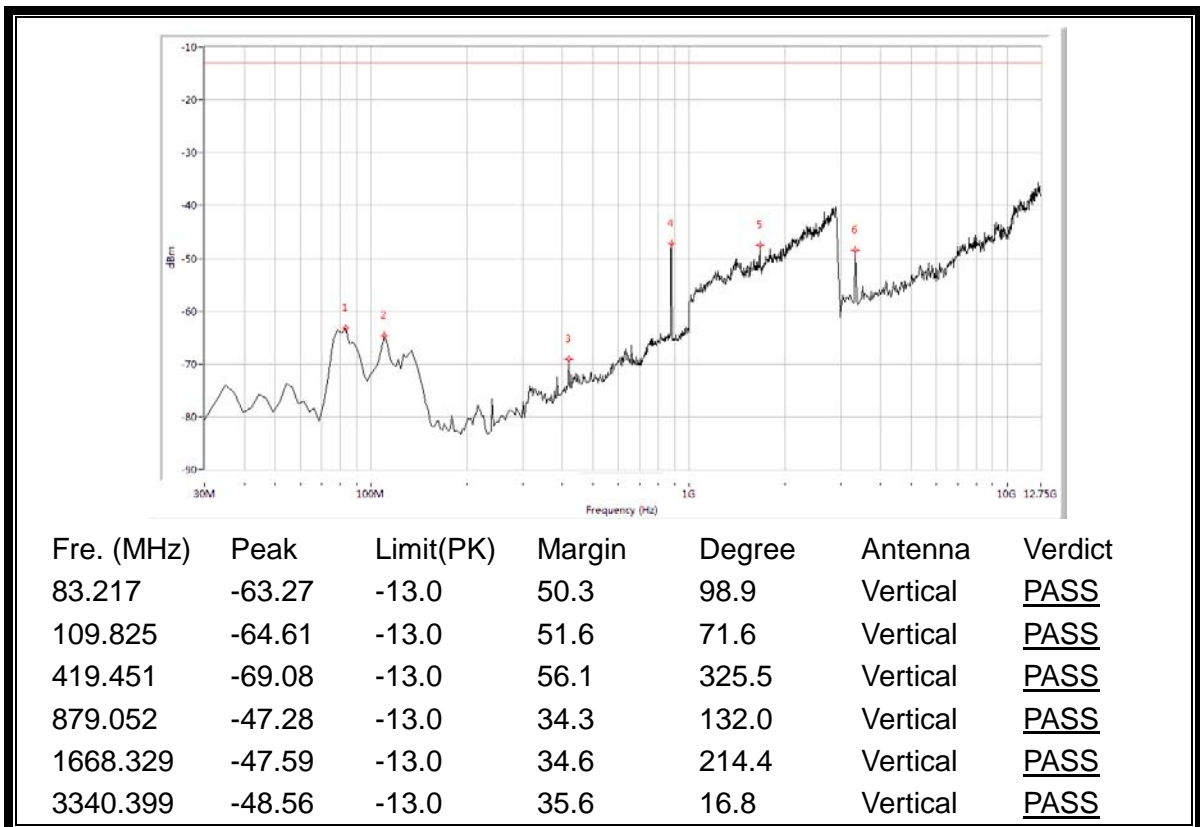
(Plot I.1: HSUPA 850MHz Channel = 4132, Test Antenna Horizontal)



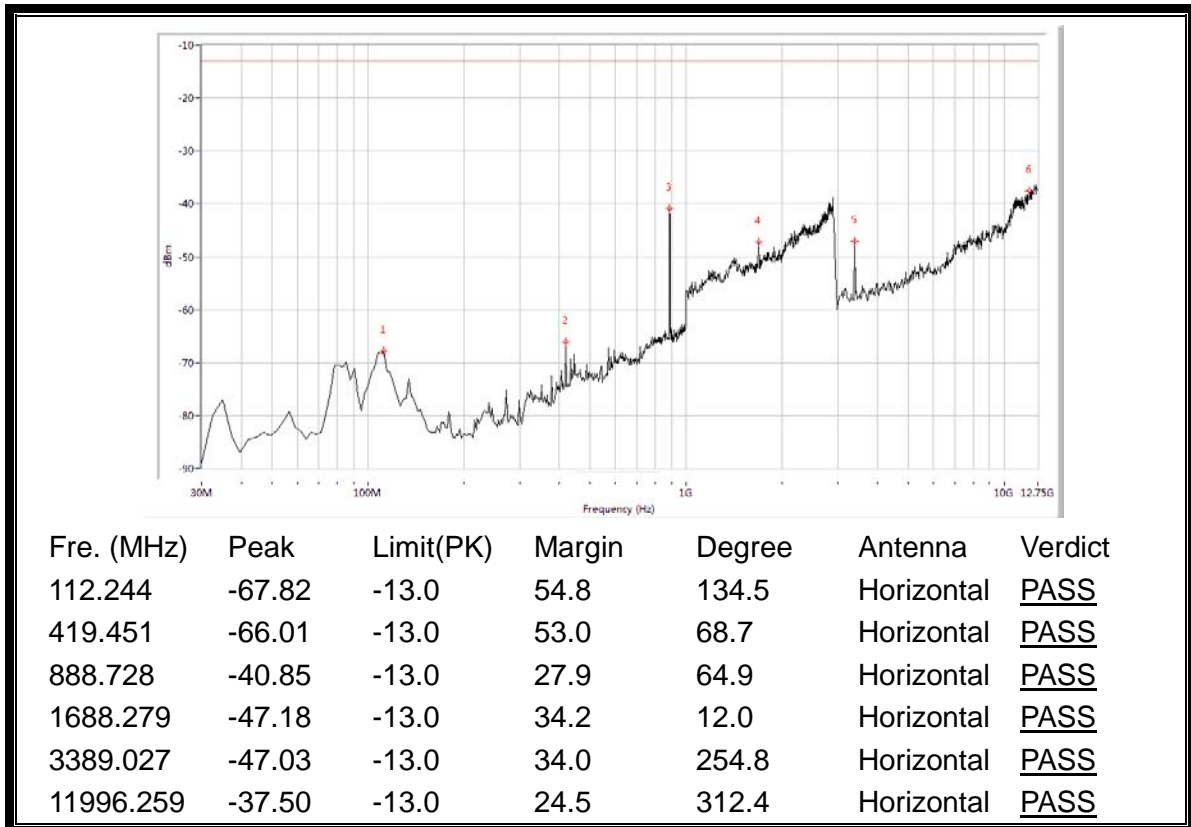
(Plot I.2: HSUPA 850 MHz Channel = 4132, Test Antenna Vertical)



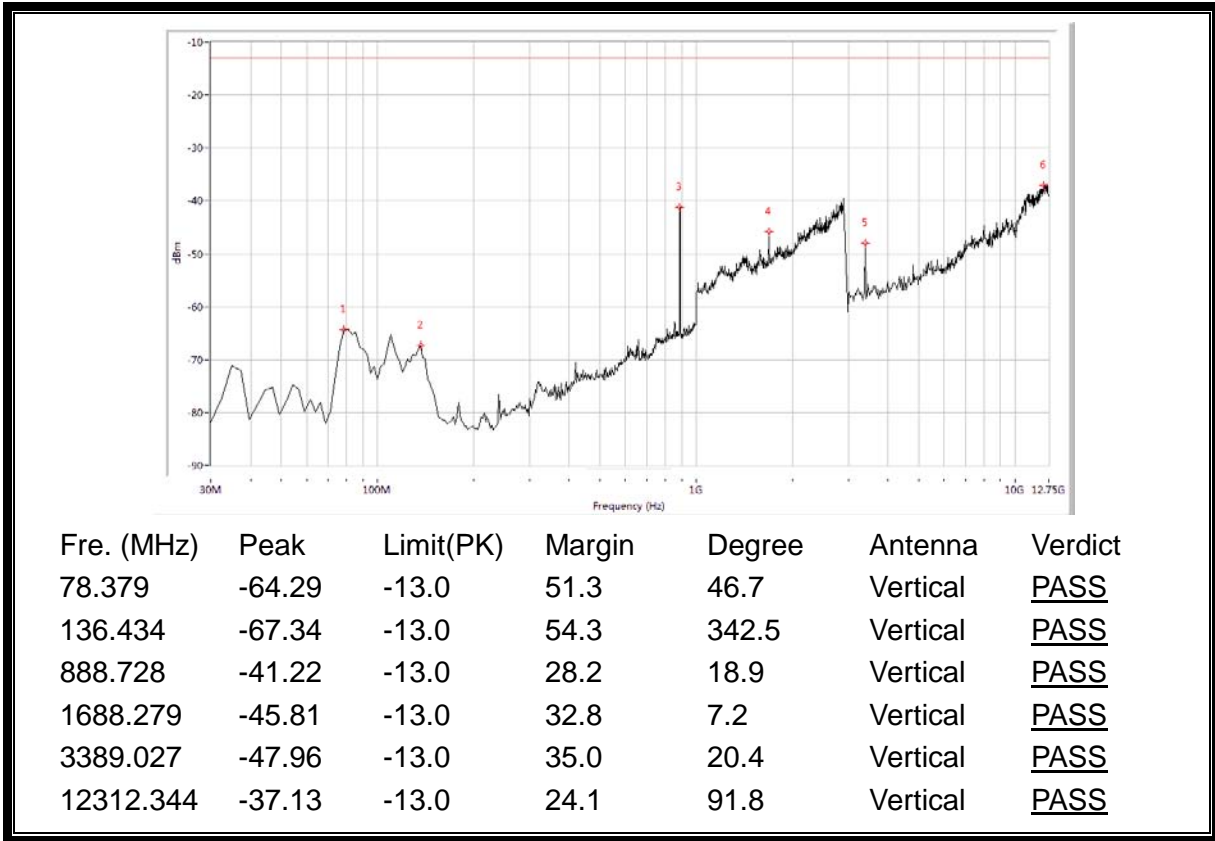
(Plot I.3: HSUPA 850MHz Channel = 4175, Test Antenna Horizontal)



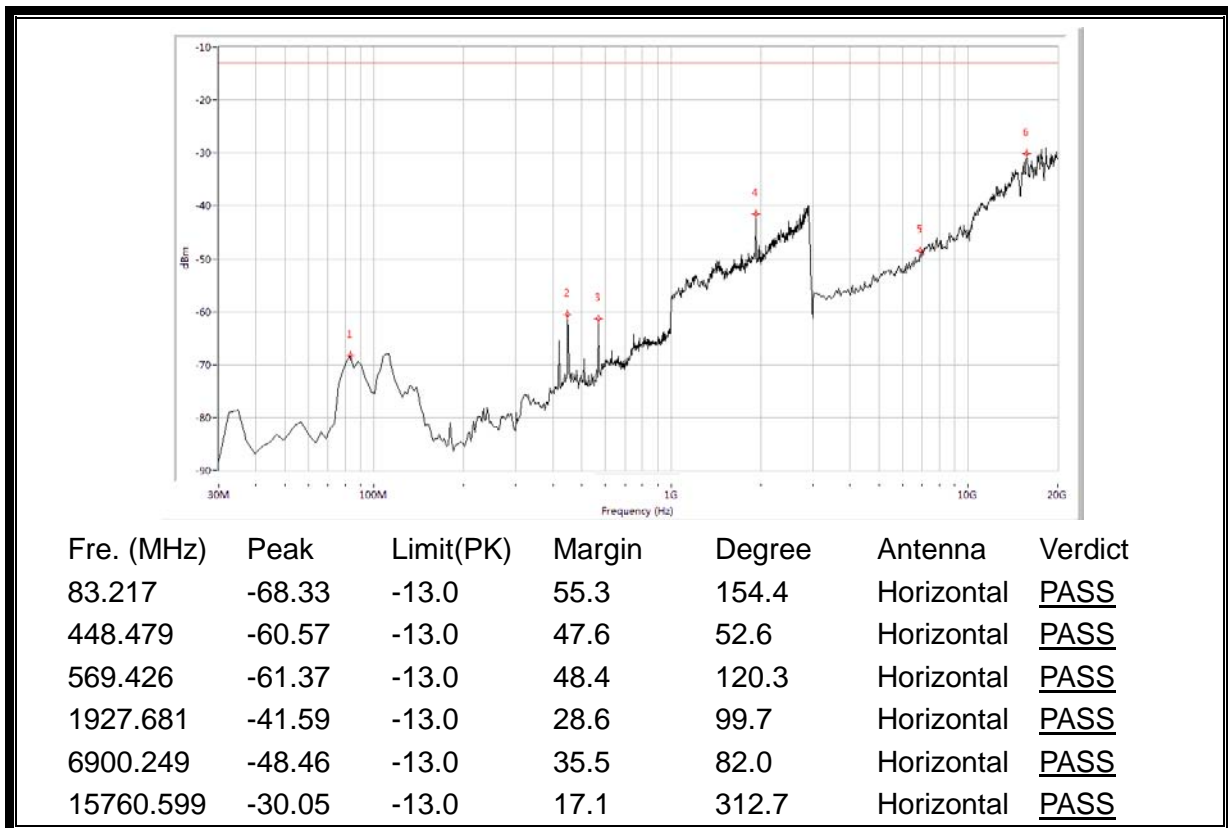
(Plot I.4: HSUPA 850MHz Channel = 4175, Test Antenna Vertical)



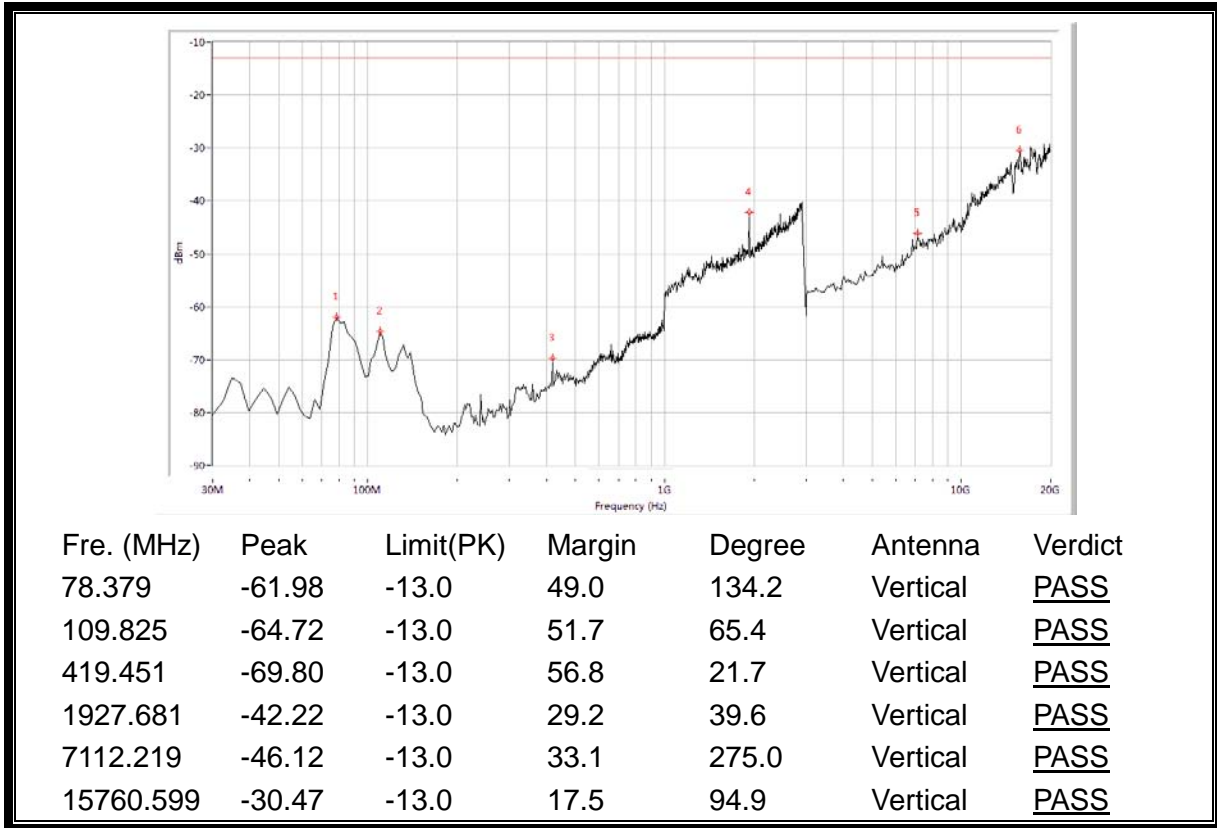
(Plot I.5: HSUPA 850MHz Channel = 4233, Test Antenna Horizontal)



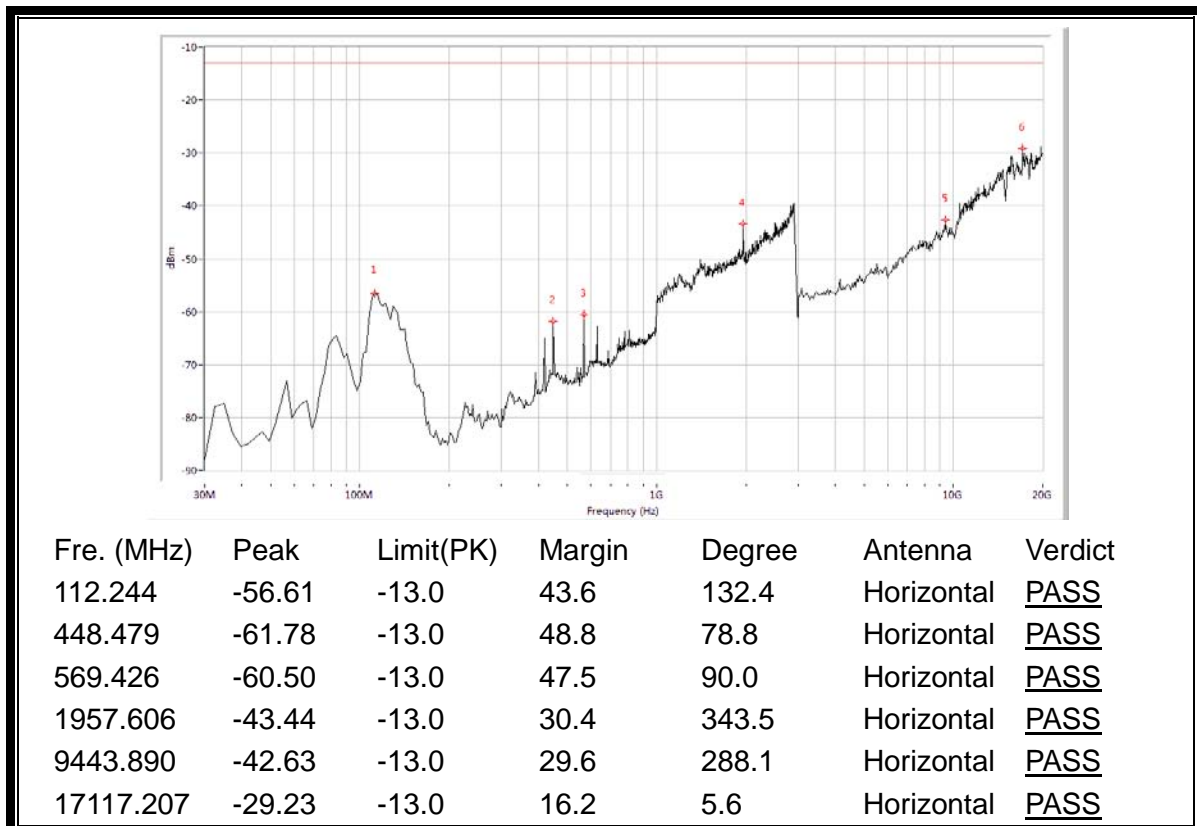
(Plot I.6: HSUPA 850MHz Channel = 4233, Test Antenna Vertical)



(Plot J.1: HSUPA 1900 MHz Channel = 9262, Test Antenna Horizontal)

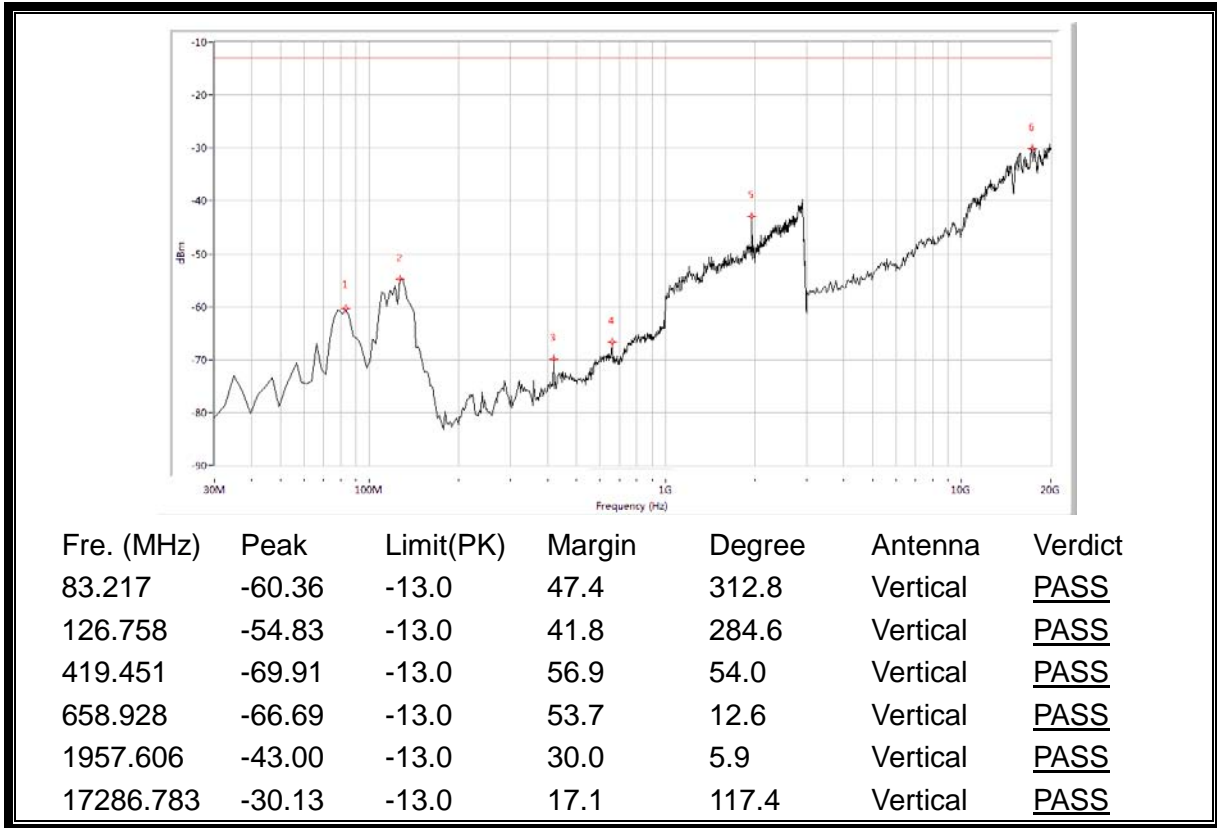


(Plot J.2: HSUPA 1900 MHz Channel = 9262, Test Antenna Vertical)

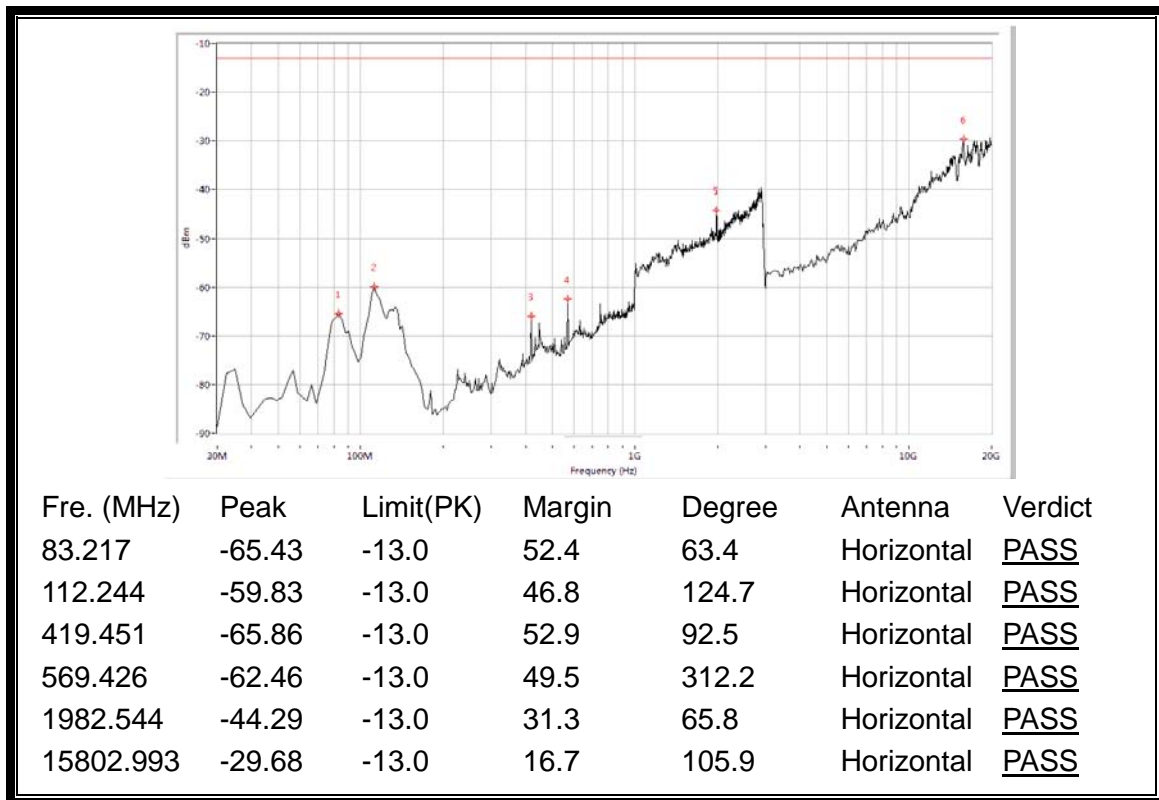


(Plot J.3: HSUPA 1900 MHz Channel = 9400, Test Antenna Horizontal)





(Plot J.4: HSUPA 1900 MHz Channel = 9400, Test Antenna Vertical)



(Plot J.5: HSUPA 1900 MHz Channel = 9538, Test Antenna Horizontal)

\*\* END OF REPORT \*\*