

3. 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	19.89	±2066	11.87	±2087.5	-1.60	±2116.5	<u>PASS</u>
	-20	-7.52		-0.62		-18.48		
	-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					
4.2	+25	-6.87	30.82	23.89				
3.6	+25	17.66	-18.80	-18.80				

4. WCDMA 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 9262 (1852.4MHz)		Channel = 9400 (1880.0MHz)		Channel = 9538 (1907.6MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.8	-30	-4.82	±1852.4	-14.67	±1880.0	-7.79	±1907.6	<u>PASS</u>
	-20	19.35		13.28		25.60		
	-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					
4.2	+25	23.23	14.68	21.05				
3.6	+25	24.10	25.37	-26.22				

2.5 Conducted Out of Band Emissions

2.5.1 Requirement

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

2.5.2 Test Description

See section 2.1.2 of this report.

2.5.3 Test Result

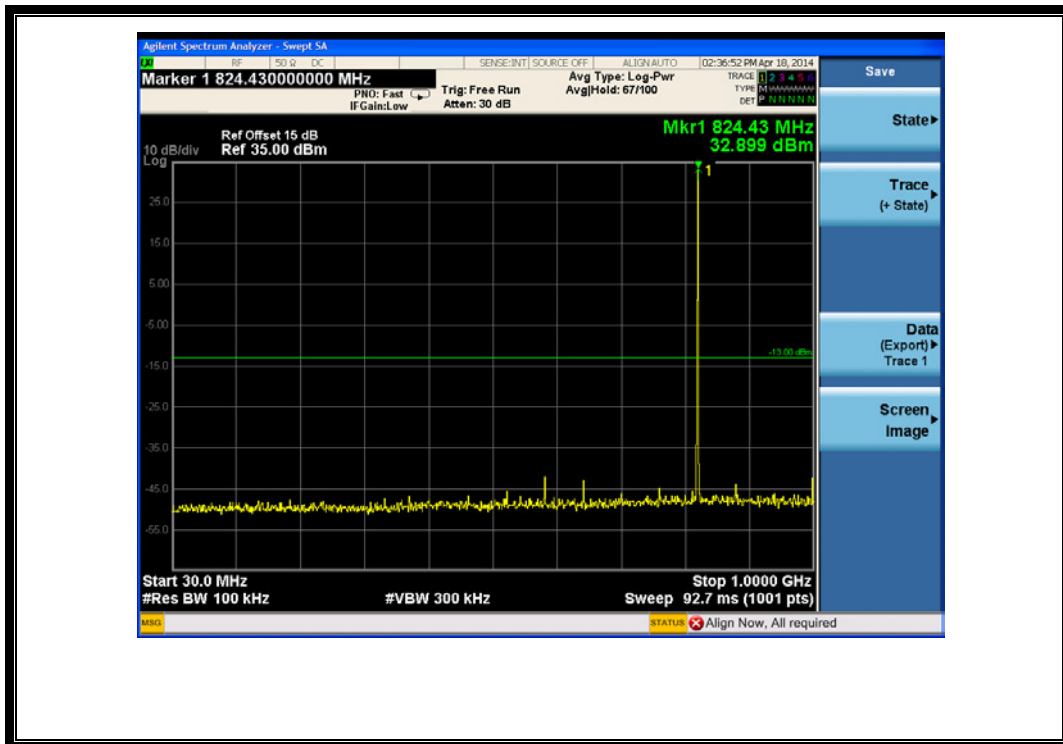
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

1. Test Verdict:

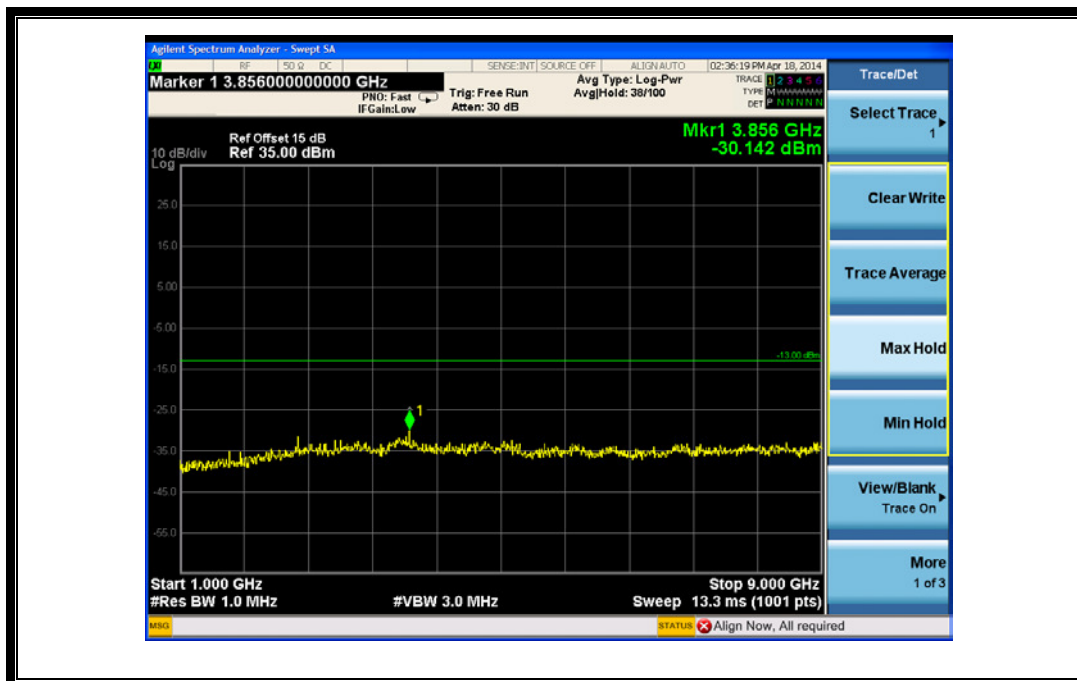
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GSM 850MHz	128	824.2	<-25	Plot A1toA1.1	-13	<u>PASS</u>
	190	836.6	<-25	Plot A2toA2.1		<u>PASS</u>
	251	848.8	<-25	Plot A3toA3.1		<u>PASS</u>
GSM 1900MHz	512	1850.2	<-25	Plot B1toB1.1	-13	<u>PASS</u>
	661	1880.0	<-25	Plot B2toB2.1		<u>PASS</u>
	810	1909.8	<-25	Plot B3toB3.1		<u>PASS</u>
WCDMA 850MHz	4132	826.4	<-25	Plot C1toC1.1	-13	<u>PASS</u>
	4175	835	<-25	Plot C2toC2.1		<u>PASS</u>
	4233	846.6	<-25	Plot C3toC3.1		<u>PASS</u>
WCDMA 1900MHz	9262	1852.4	<-25	Plot D1toD1.1	-13	<u>PASS</u>
	9400	1880	<-25	Plot D2toD2.1		<u>PASS</u>
	9538	1907.6	<-25	Plot D3toD3.1		<u>PASS</u>

2. Test Plots for the Whole Measurement Frequency Range:

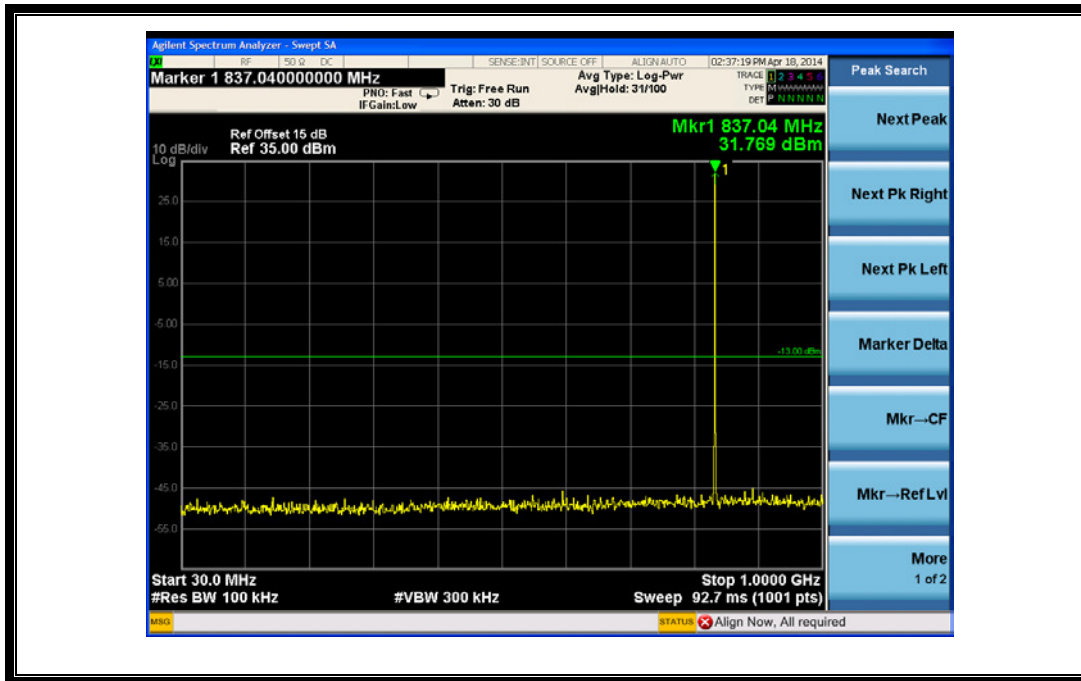
Note: the power of the EUT transmitting frequency should be ignored.



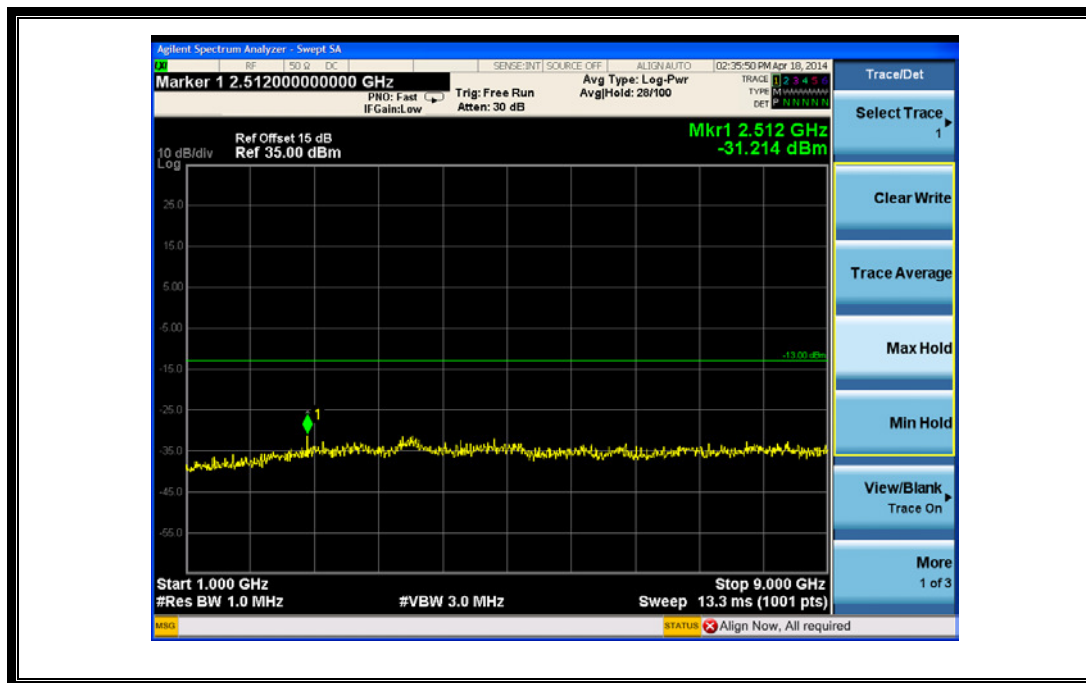
(Plot A1:GSM 850MHz Channel = 128, 30MHz to 1GHz)



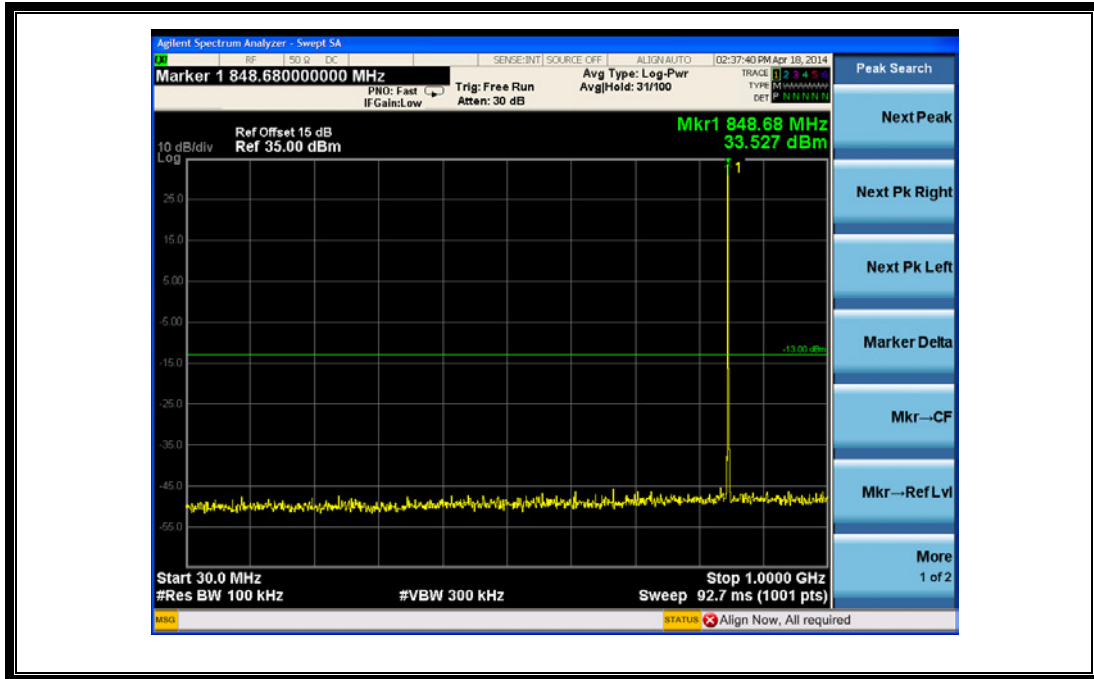
(Plot A1.1: GSM 850MHz Channel = 128, 1GHz to 9GHz)



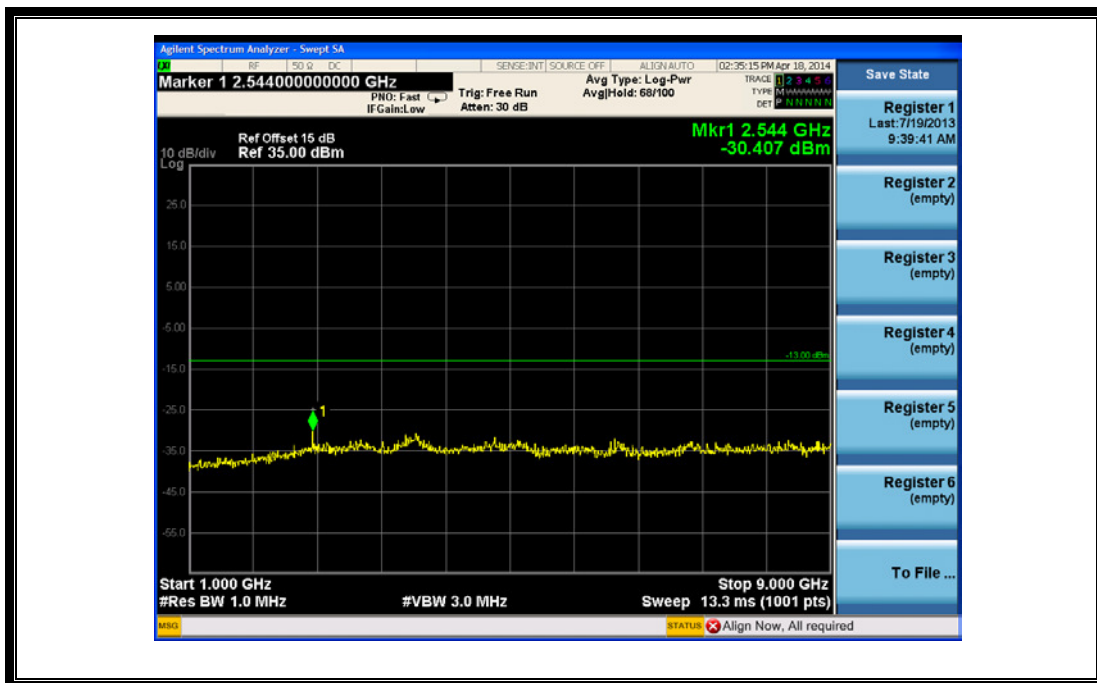
(Plot A2: GSM 850MHz Channel = 190, 30MHz to 1GHz)



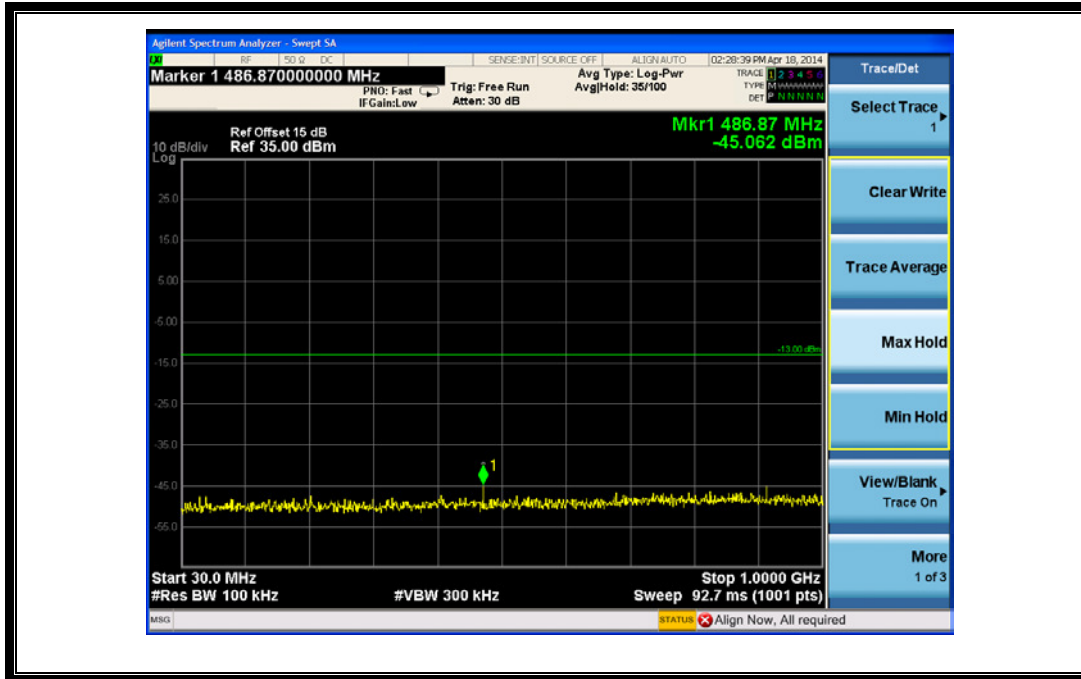
(Plot A2.1: GSM 850MHz Channel = 190, 1GHz to 9GHz)



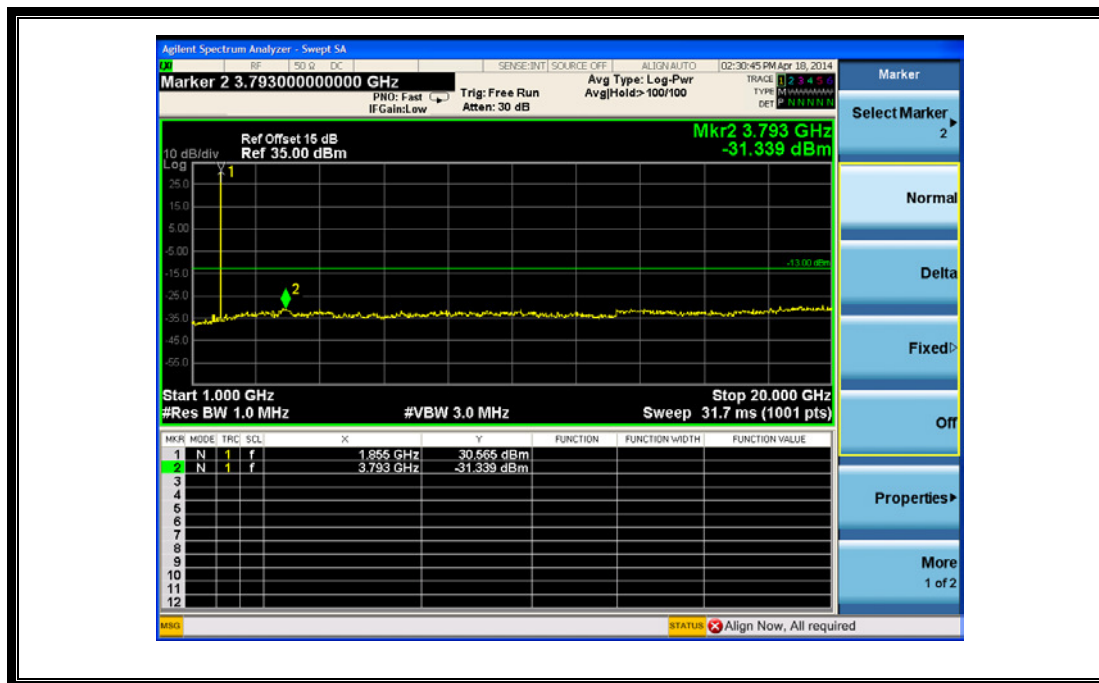
(Plot A3:GSM 850MHz Channel = 251, 30MHz to 1GHz)



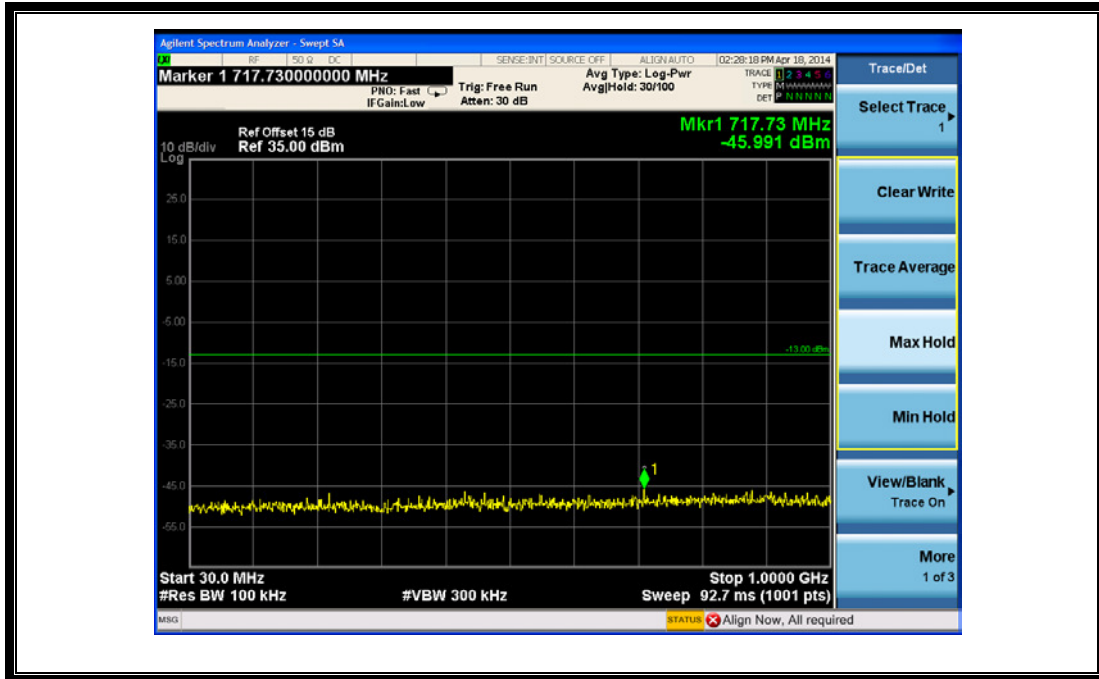
(Plot A3.1: GSM 850MHz Channel = 251, 1GHz to 9GHz)



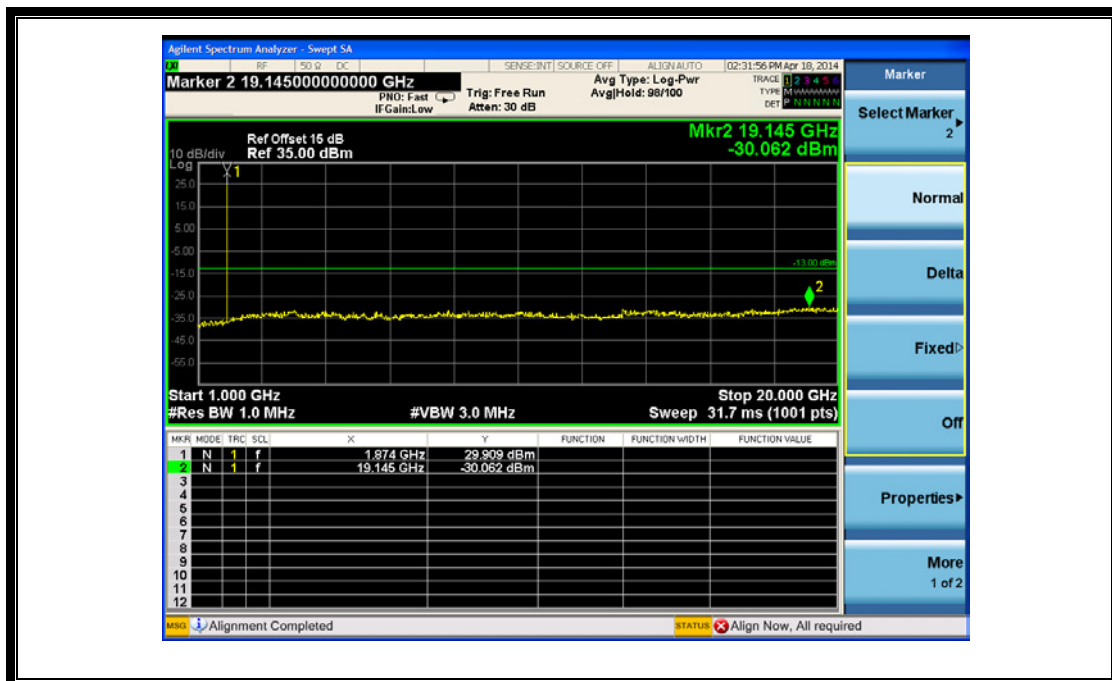
(Plot B1: GSM 1900MHz Channel = 512, 30MHz to 1GHz)



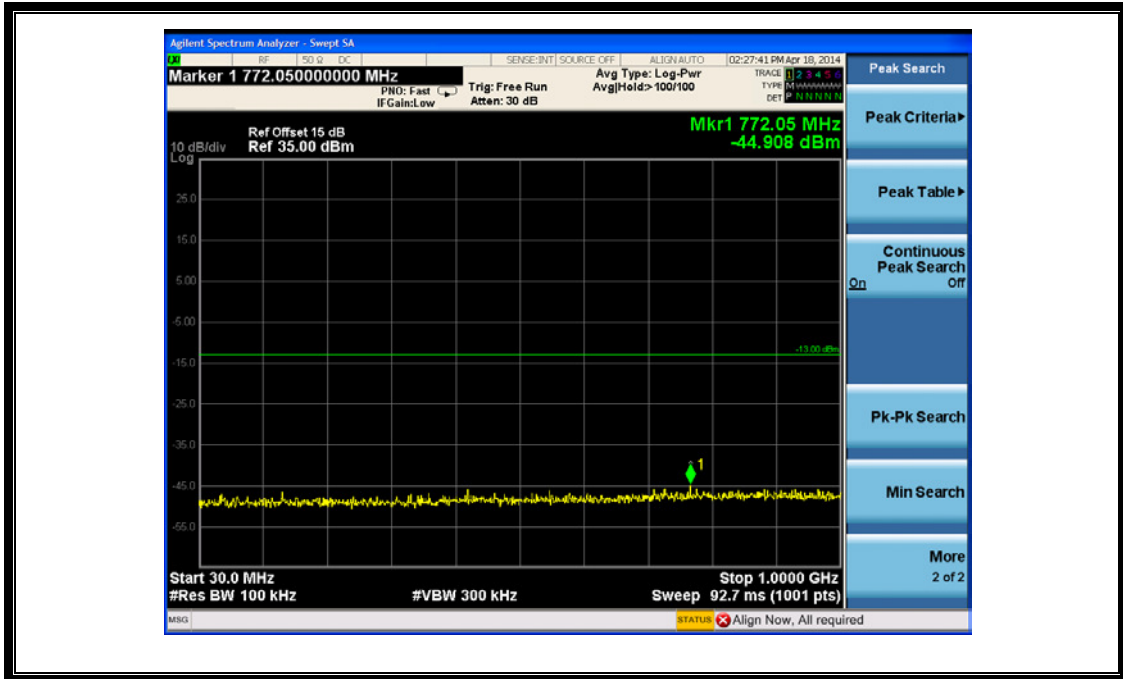
(Plot B1.1: GSM 1900MHz Channel = 512, 1GHz to 20GHz)



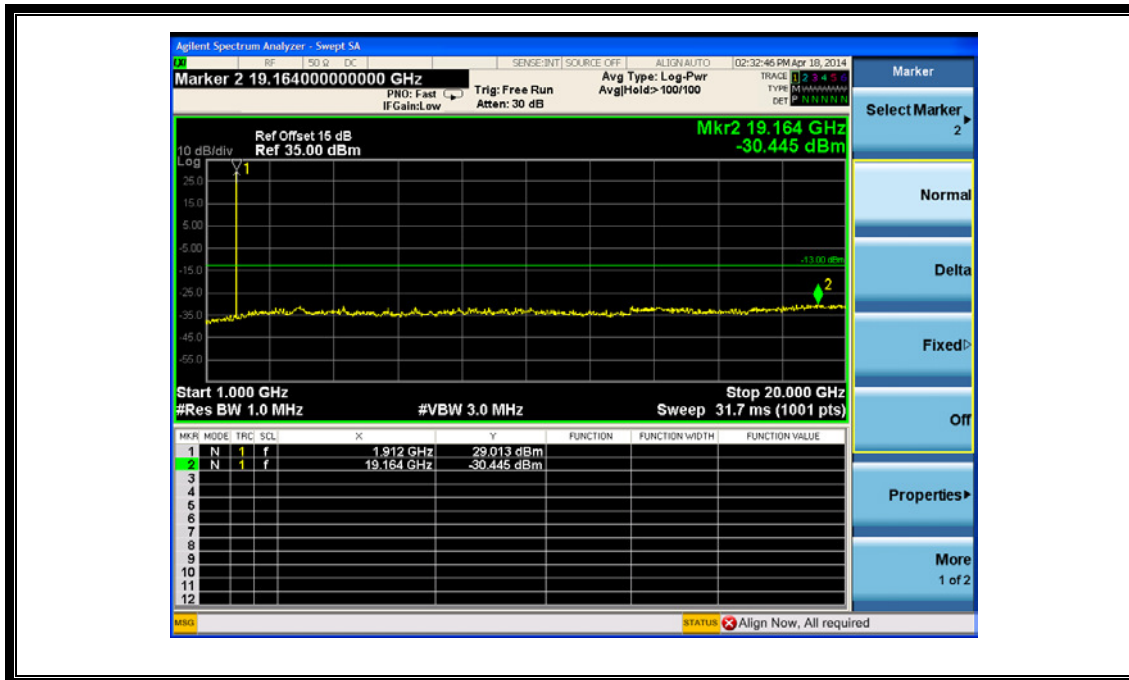
(Plot B2: GSM 1900MHz Channel = 661, 30MHz to 1GHz)



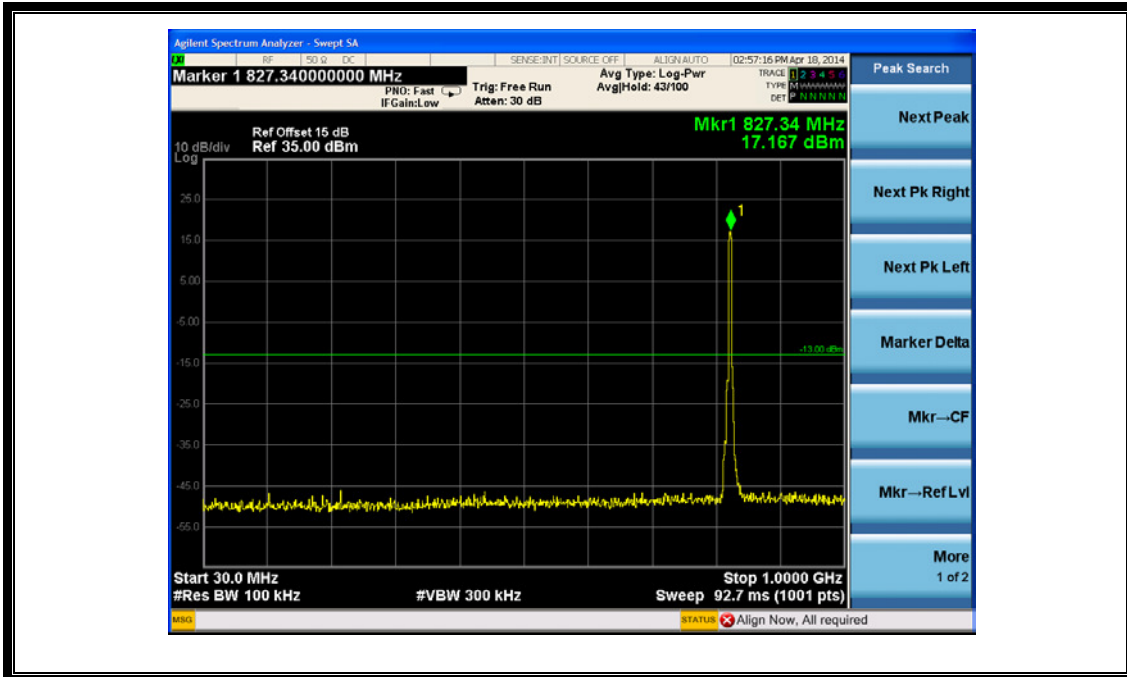
(Plot B2.1: GSM 1900MHz Channel = 661, 1GHz to 20GHz)



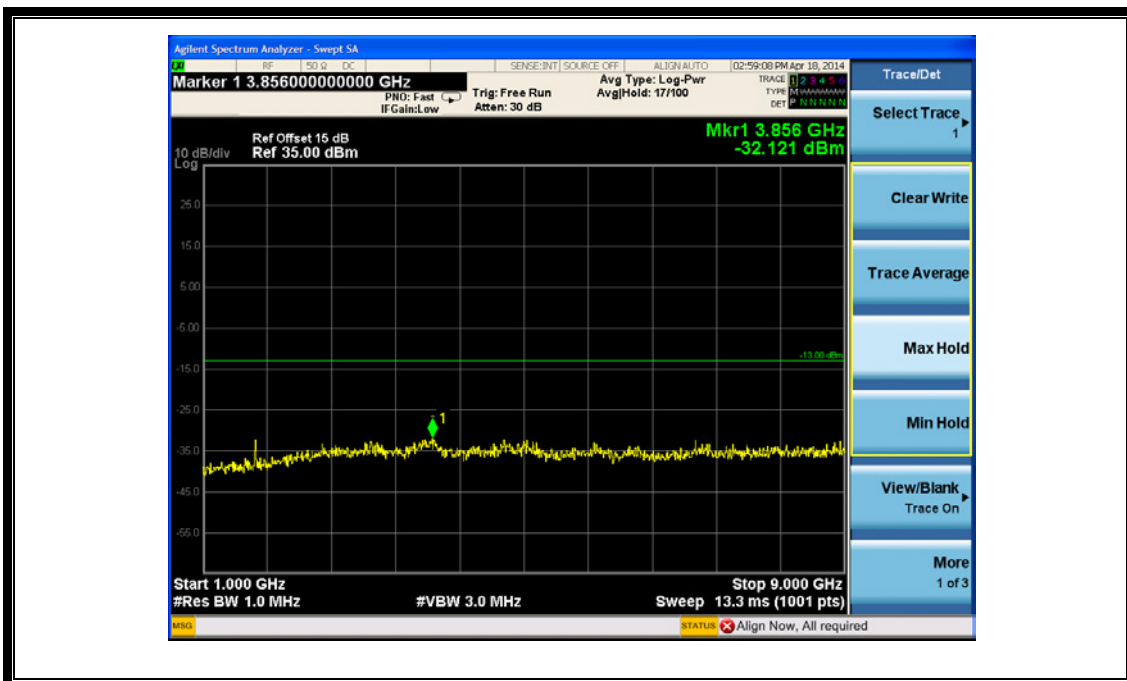
(Plot B3: GSM 1900MHz Channel = 810, 30MHz to 1GHz)



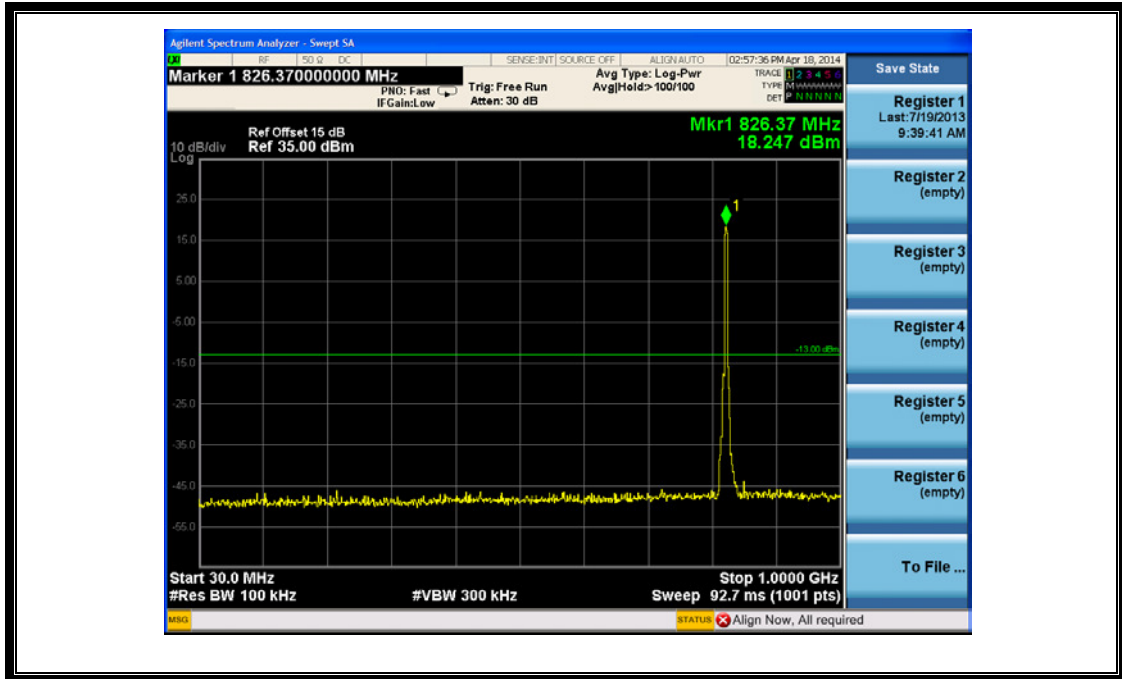
(Plot B3.1: GSM 1900MHz Channel = 810, 1GHz to 20GHz)



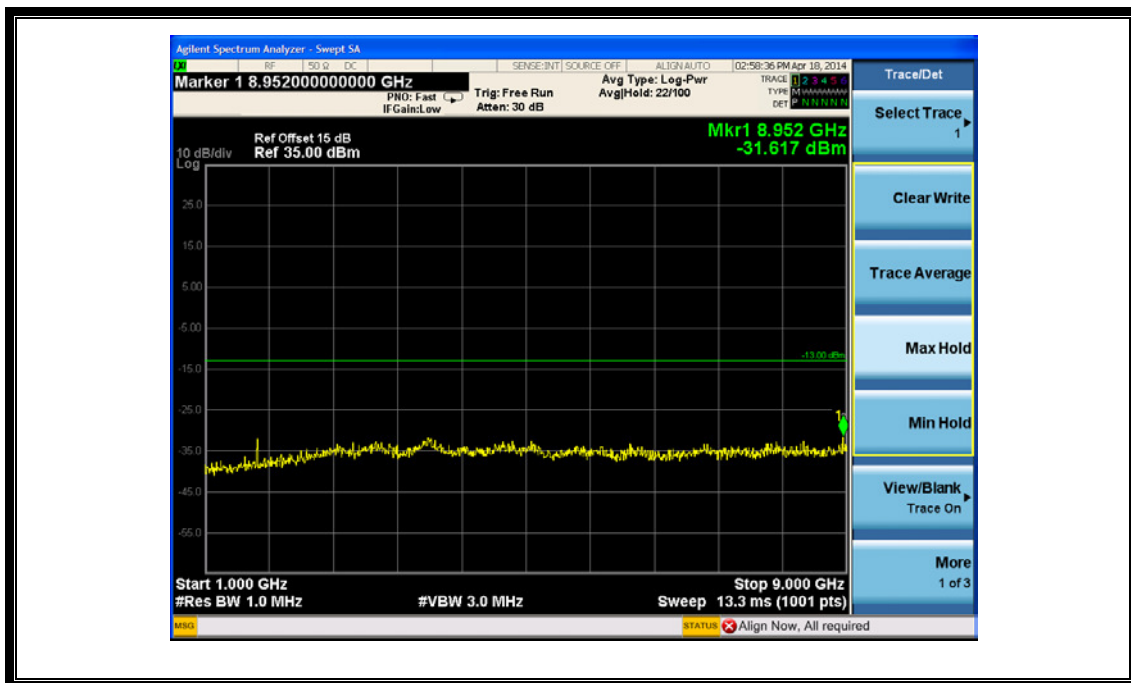
(Plot C1: WCDMA850MHz Channel = 4132, 30MHz to 1GHz)



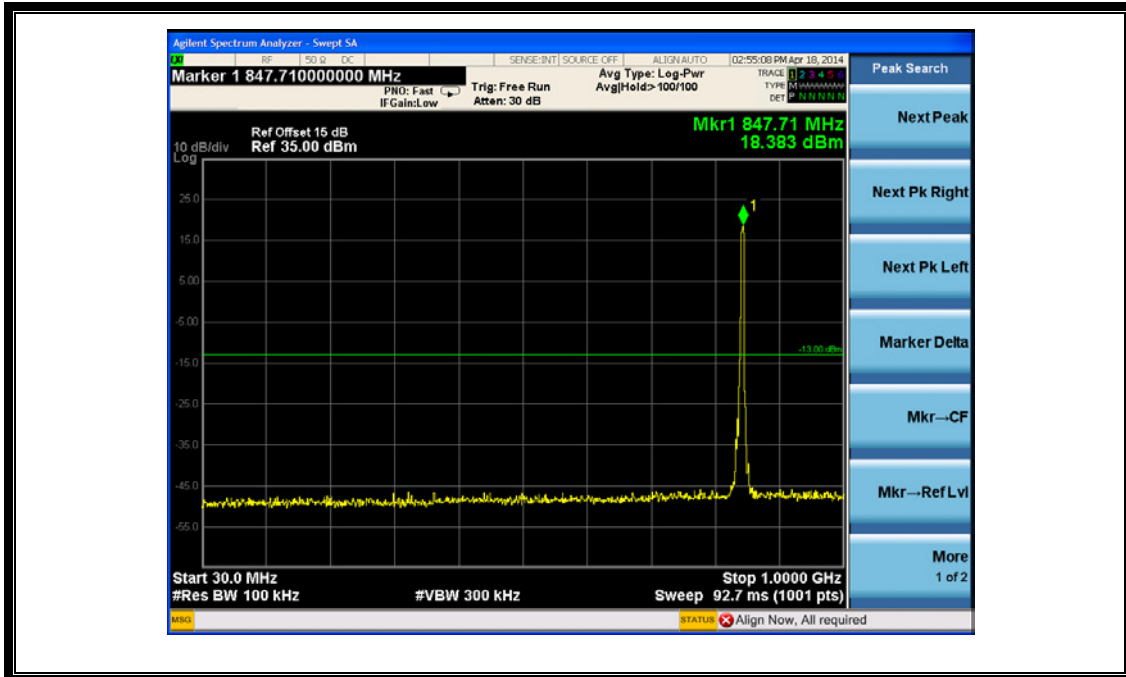
(Plot C1.1: WCDMA850MHz Channel = 4132, 1GHz to 9GHz)



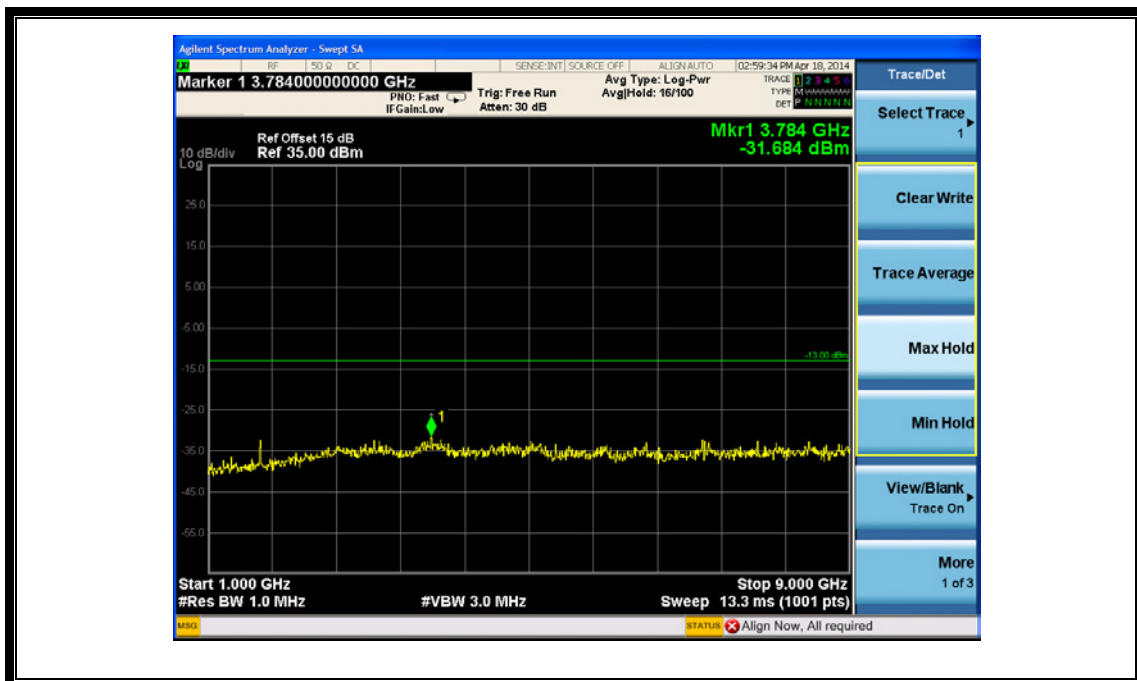
(Plot C 2: WCDMA850MHz Channel = 4175, 30MHz to 1GHz)



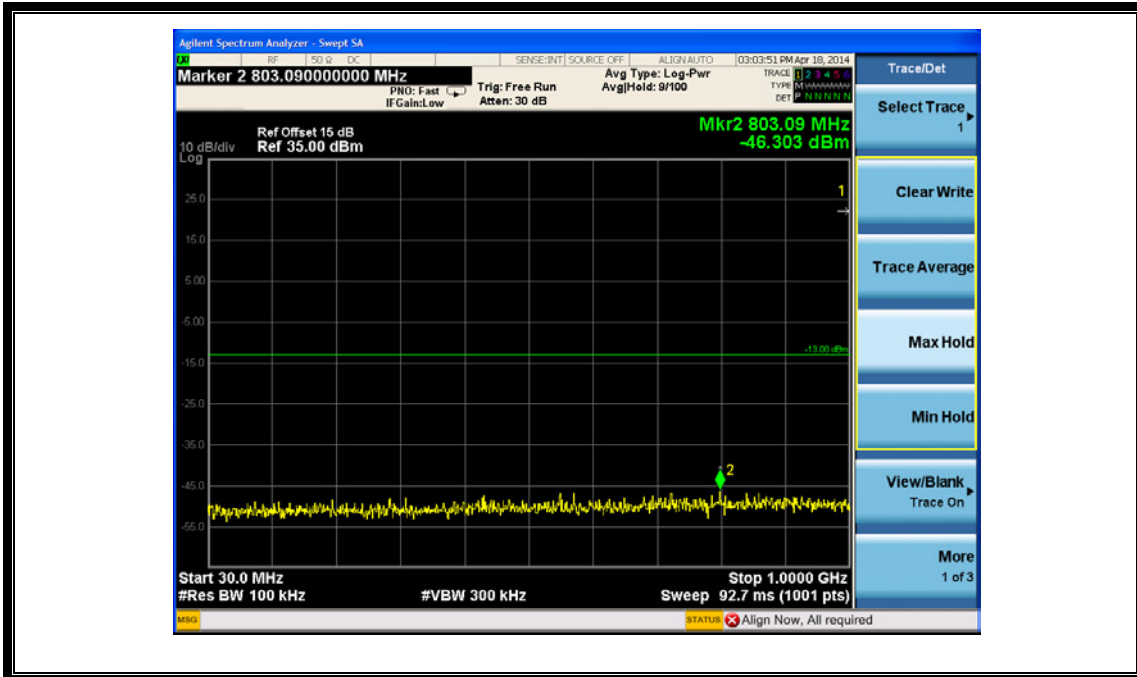
(Plot C 2.1: WCDMA850MHz Channel = 4175, 1GHz to 9GHz)



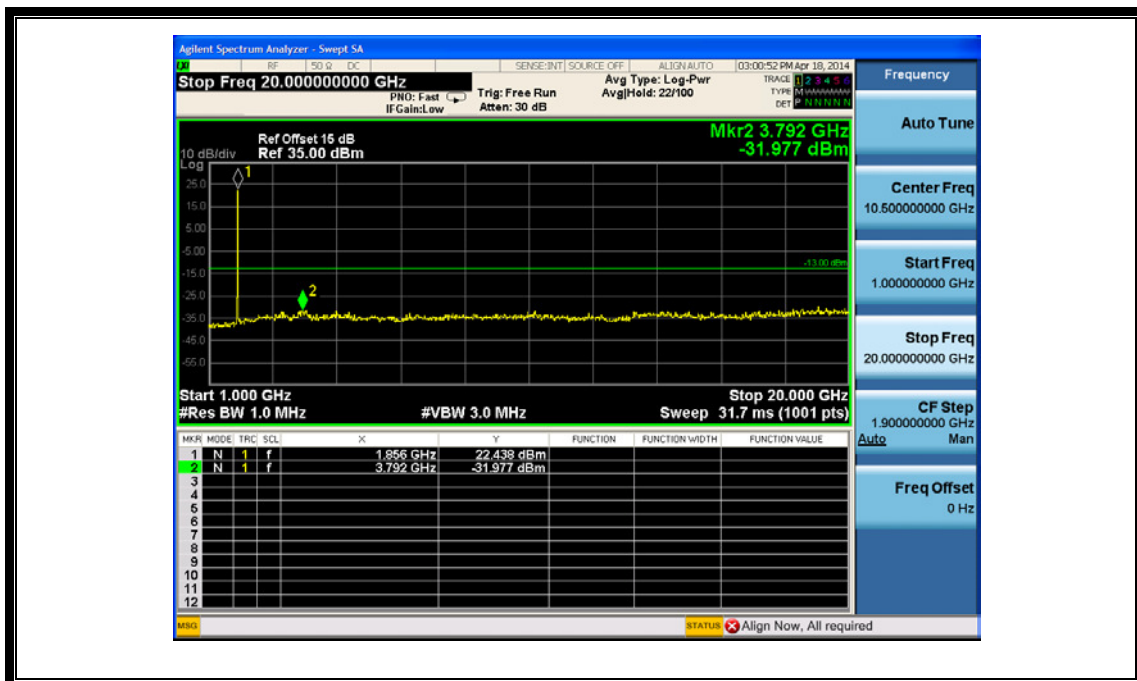
(Plot C3: WCDMA850MHz Channel = 4233, 30MHz to 1GHz)



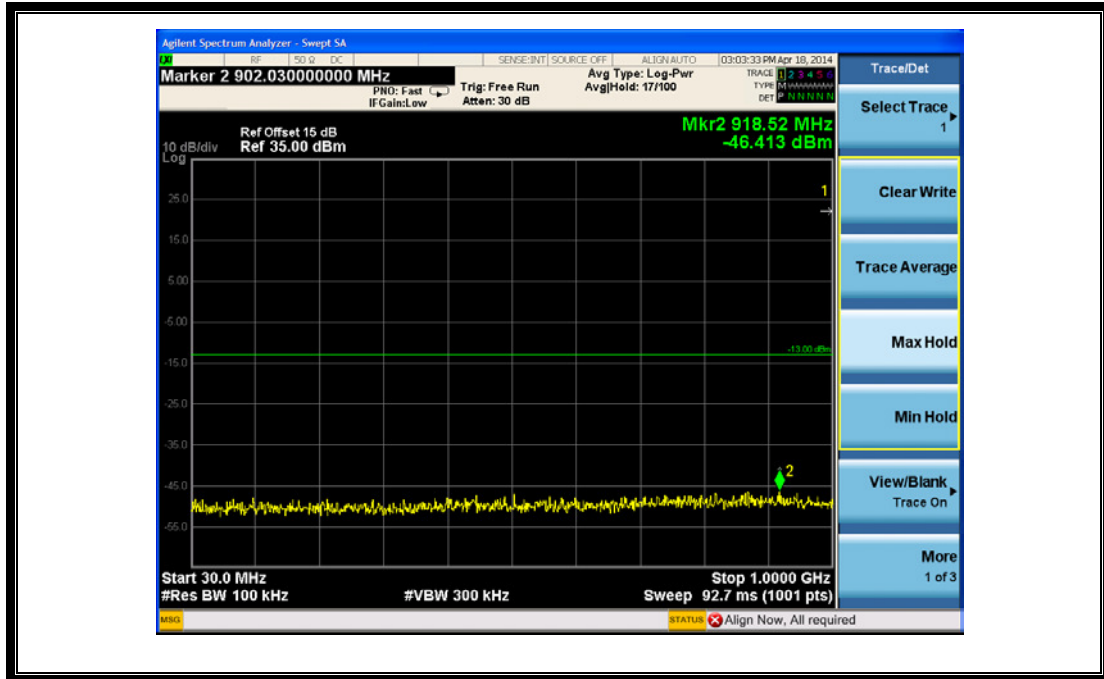
(Plot C3.1: WCDMA850MHz Channel = 4233, 1GHz to 9GHz)



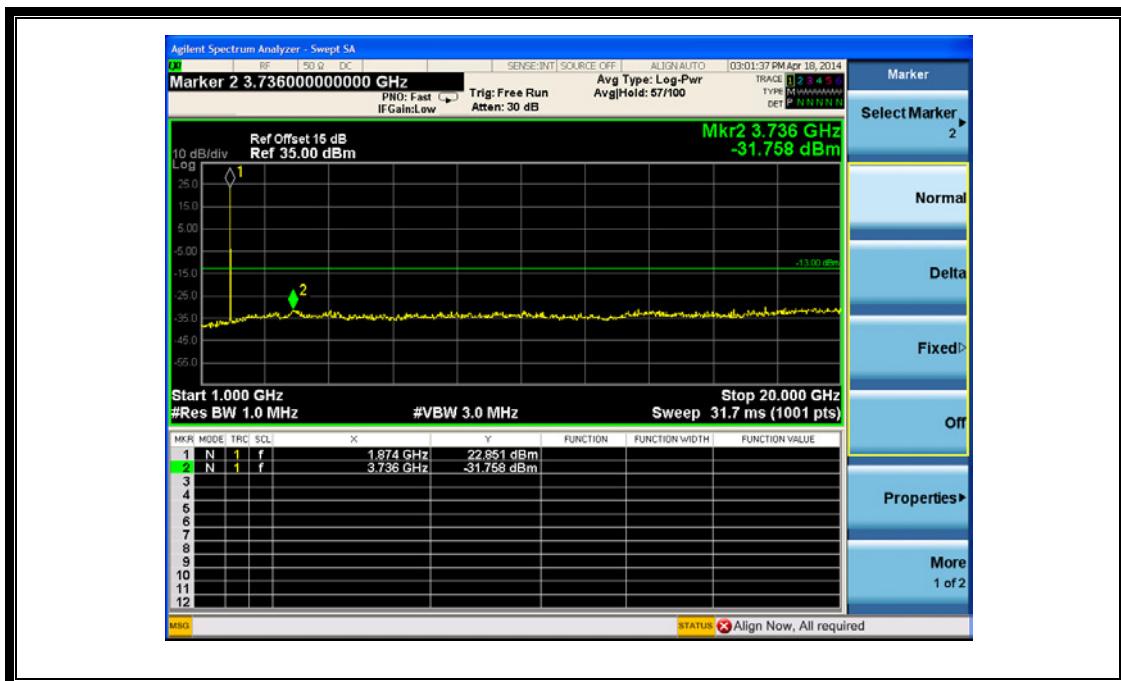
(Plot D1: WCDMA1900MHz Channel = 9262, 30MHz to 1GHz)



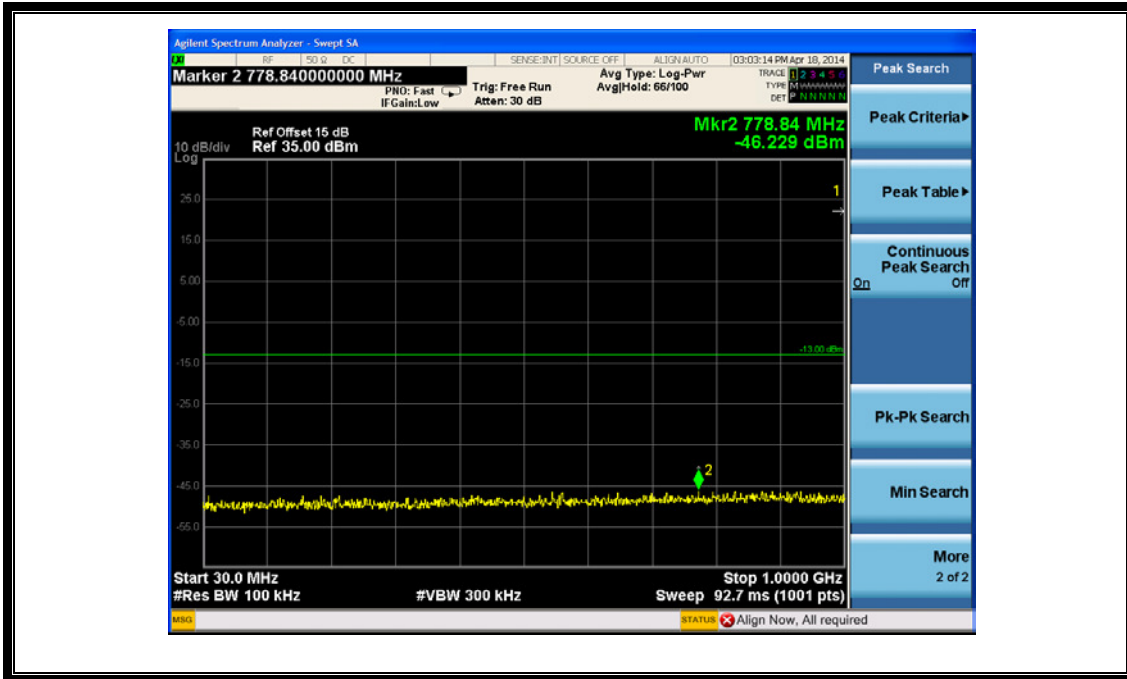
(Plot D1.1: WCDMA1900MHz Channel = 9262, 1GHz to 20GHz)



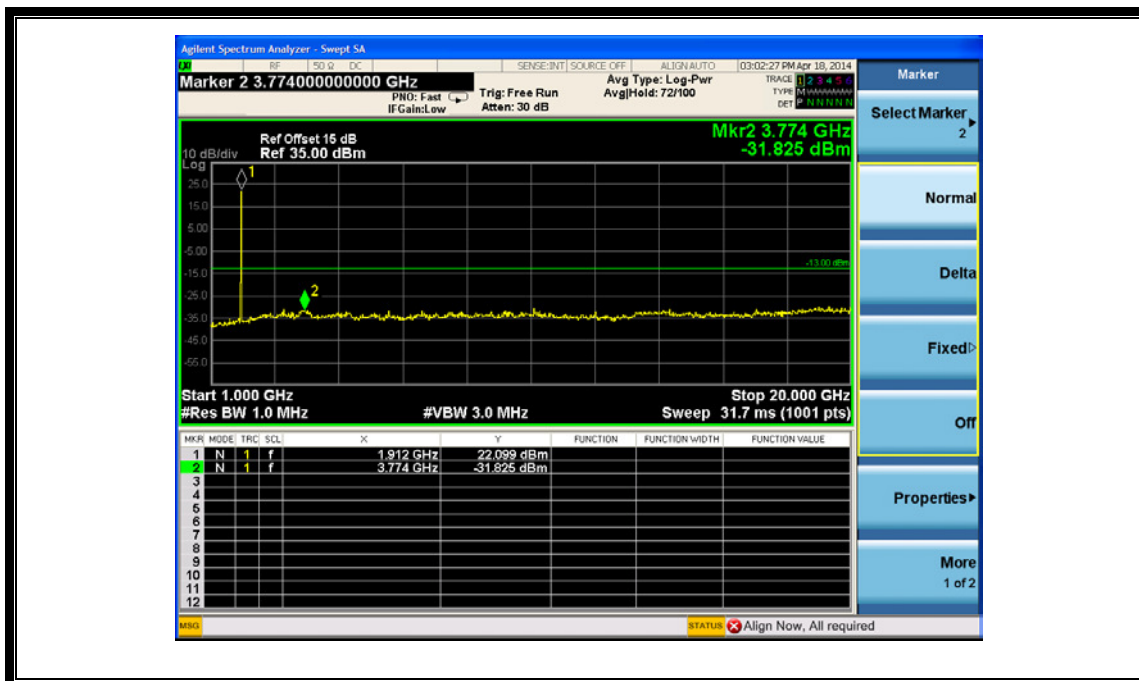
(Plot D2: WCDMA1900MHz Channel = 9400, 30MHz to 1GHz)



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



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



(Plot D3.1: WCDMA1900MHz 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.

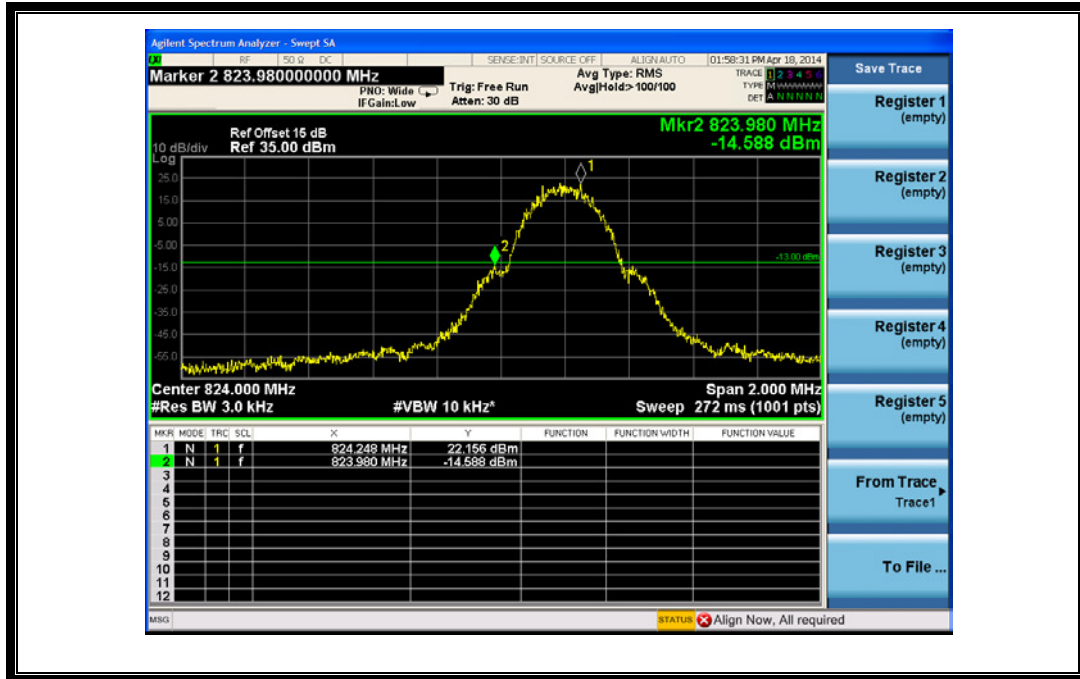
2.6.3 Test Result

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

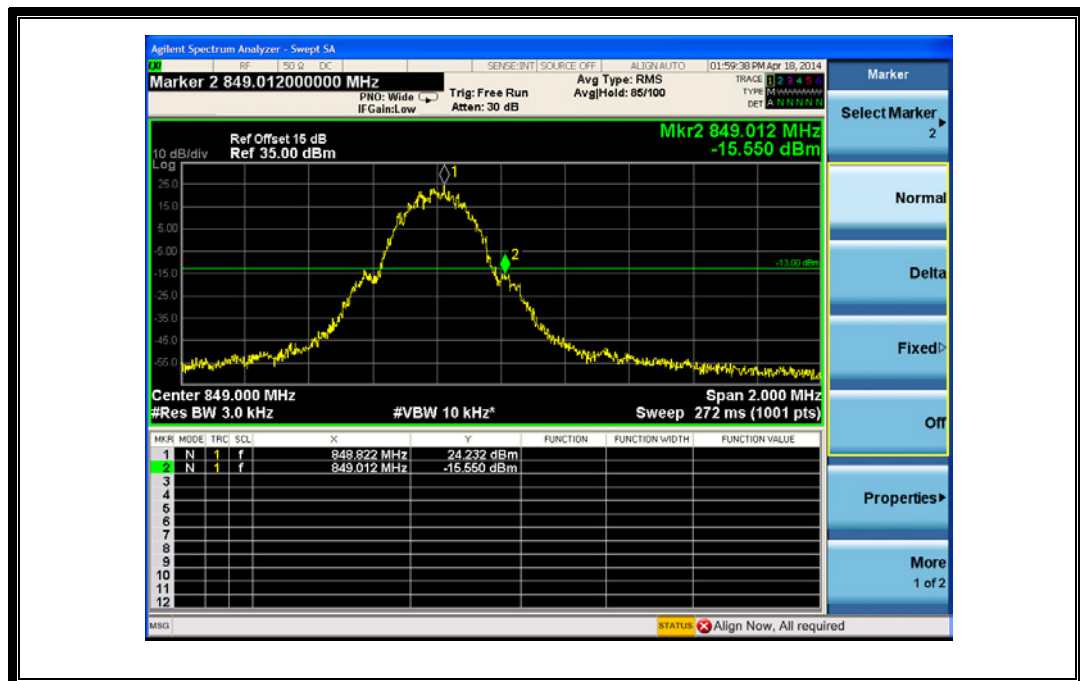
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GSM 850MHz	128	824.2	-14.59	Plat A	-13	<u>PASS</u>
	251	848.8	-15.55	Plot B		<u>PASS</u>
GSM 1900MHz	512	1850.2	-16.66	Plat C	-13	<u>PASS</u>
	810	1909.8	-17.89	Plot D		<u>PASS</u>
WCDMA 850MHz	4132	826.4	-20.40	Plat E	-13	<u>PASS</u>
	4233	846.6	-22.41	Plot F		<u>PASS</u>
WCDMA 1900MHz	9262	1852.4	-25.66	Plat G	-13	<u>PASS</u>
	9538	1907.6	-25.06	Plot H		<u>PASS</u>

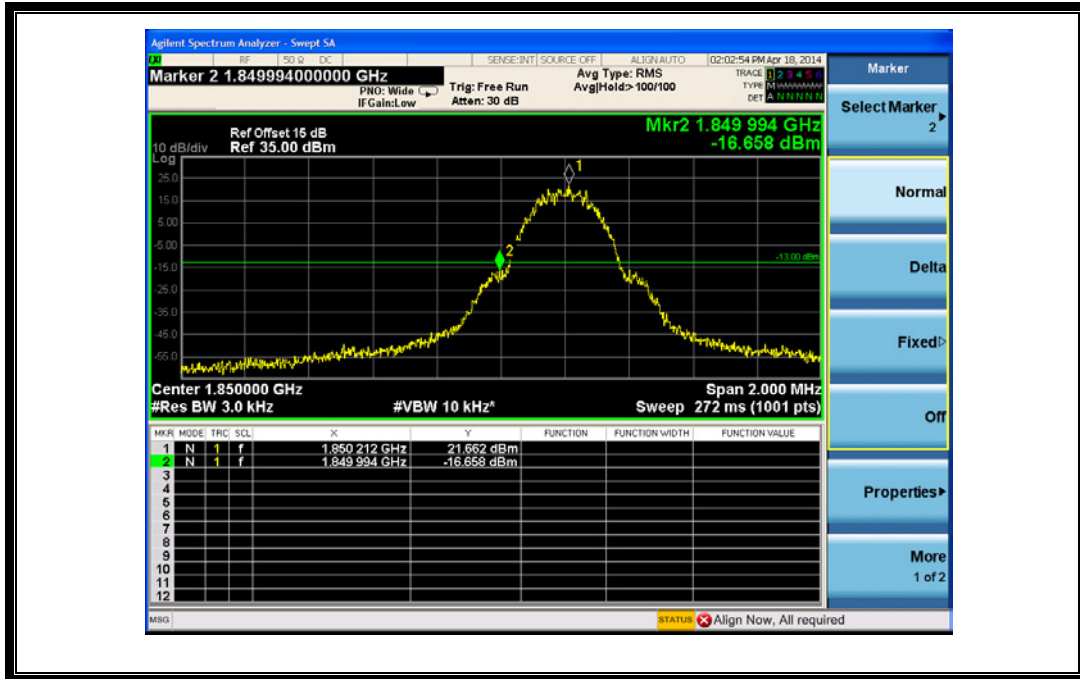
2. Test Plots:



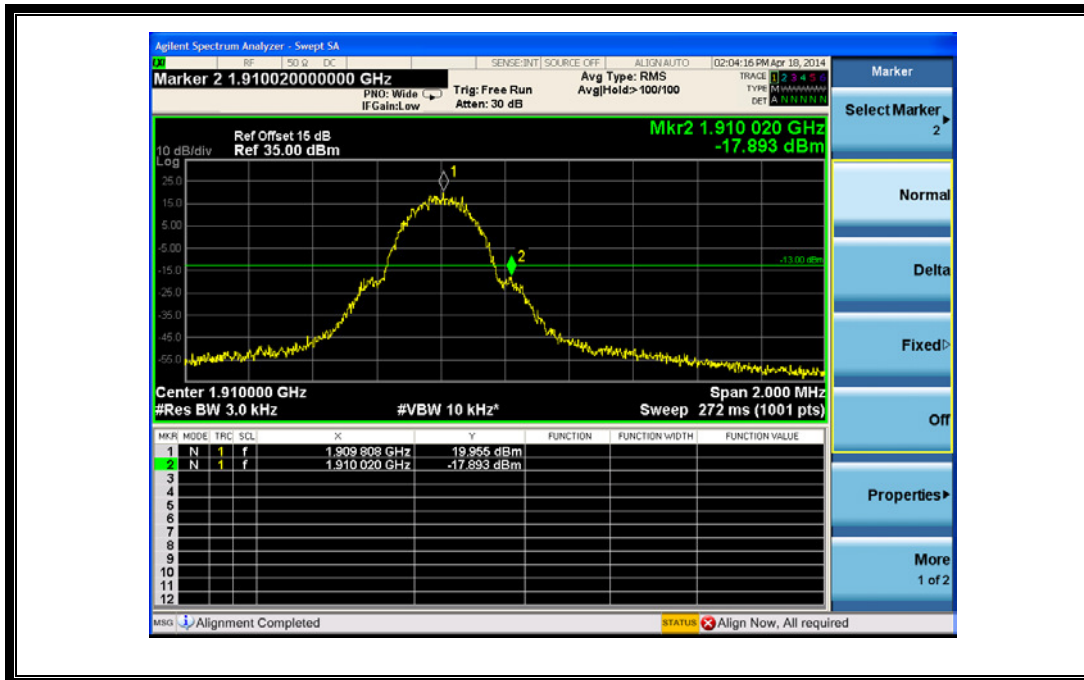
(Plot A: GSM 850 Channel = 128)



(Plot B: GSM 850 Channel = 251)



(Plot C: GSM 1900 Channel = 512)



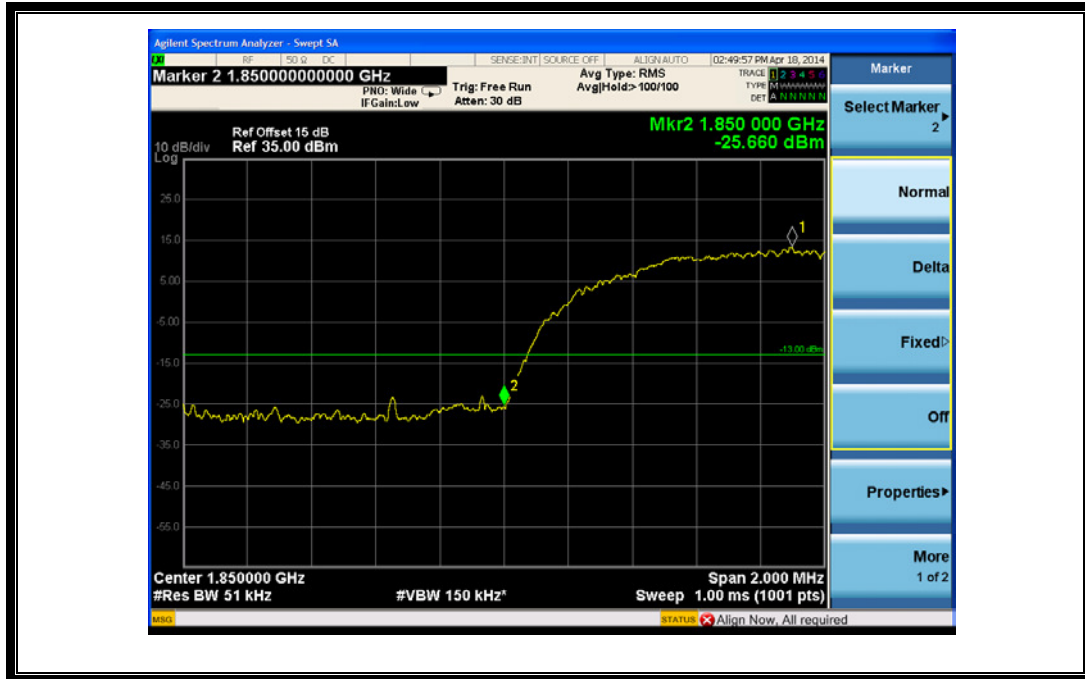
(Plot D: GSM 1900 Channel = 810)



(Plot E: WCDMA 850 Channel = 4132)



(Plot F: WCDMA 850 Channel = 4233)



(Plot G: WCDMA 1900 Channel = 9262)



(Plot H: WCDMA 1900 Channel = 9538)

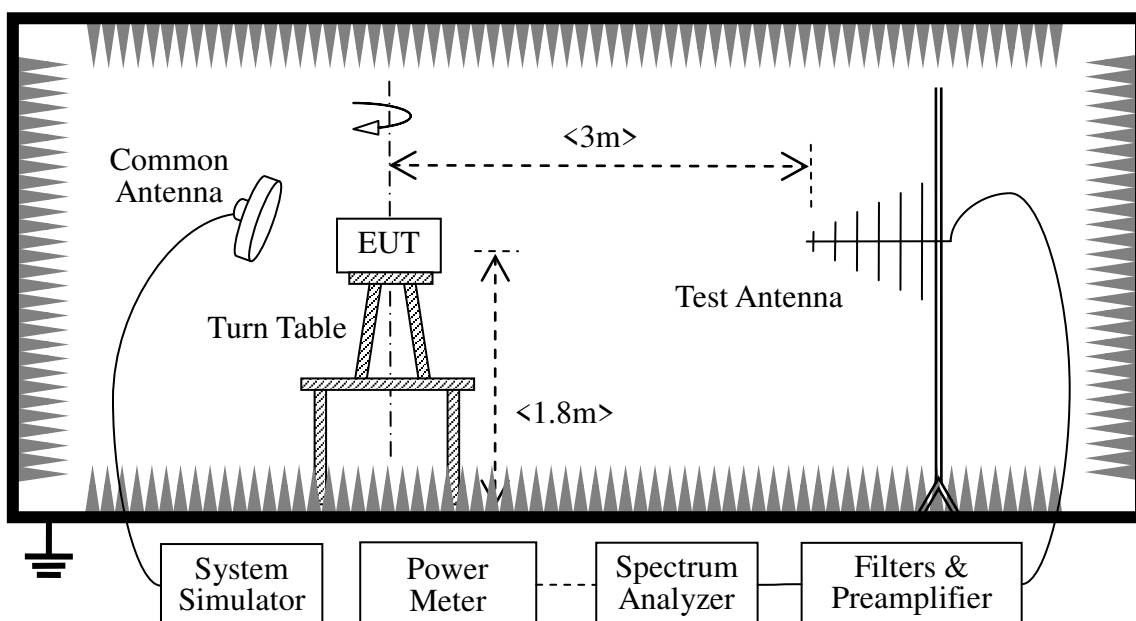
2.7 Transmitter Radiated Power (EIRP/ERP)

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 33.15dBm, GSM 1900 30.46dBm, WCDMA 850 24.54dBm, WCDMA 1900 24.07 dBm, Please refer to section 2.1.3 of this report.

- Step size (dB): 3dB

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

The Test Antenna is a Bi-Log one (used for 30MHz to 1GHz) or a Horn one (used for above 3GHz), and it's located at the same height as the EUT. The Filters consists of Notch Filters and High Pass Filter.

2. Equipments List:

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

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

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

1. GSM Model Test Verdict:

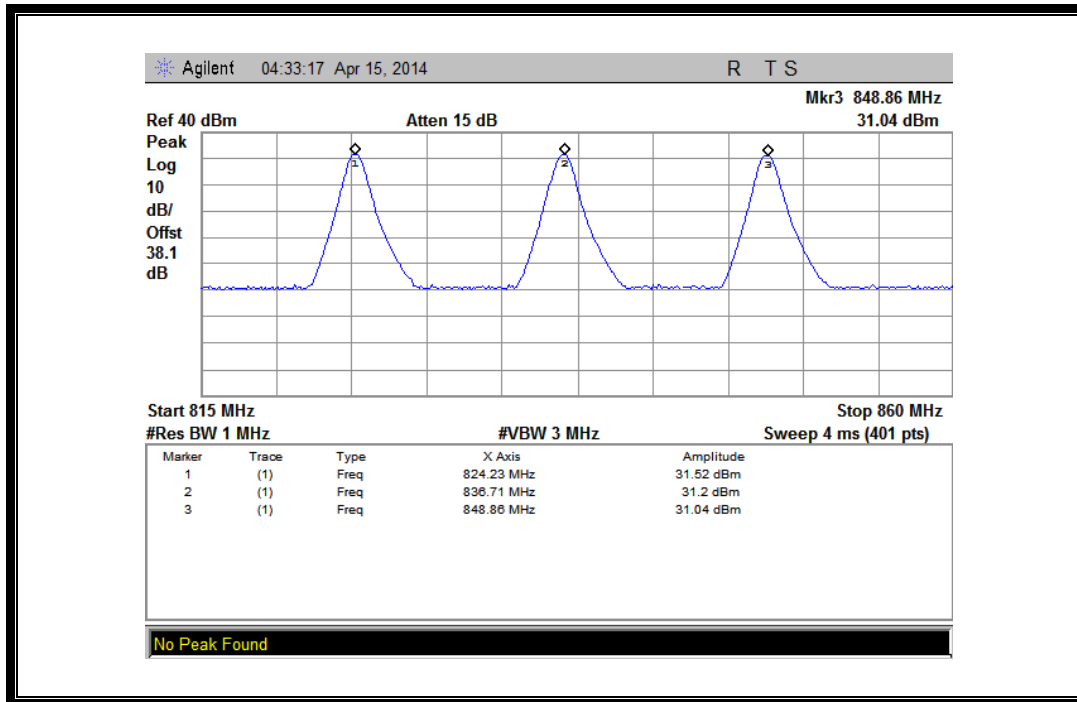
Band	Channel	Frequency (MHz)	PCL	Measured ERP			Limit		Verdict
				dBm	W	Refer to Plot	dBm	W	
GSM 850MHz	128	824.20	5	31.52	1.419	Plot A	38.5	7	PASS
	190	836.60	5	31.2	1.318				PASS
	251	848.80	5	31.04	1.271				PASS
Band	Channel	Frequency (MHz)	PCL	Measured EIRP			Limit		Verdict
				dBm	W	Refer to Plot	dBm	W	
GSM 1900MHz	512	1850.2	0	30.92	1.236	Plot B	33	2	PASS
	661	1880.0	0	30.27	1.064				PASS
	810	1909.8	0	31.15	1.303				PASS

WCDMA Model Test Verdict:

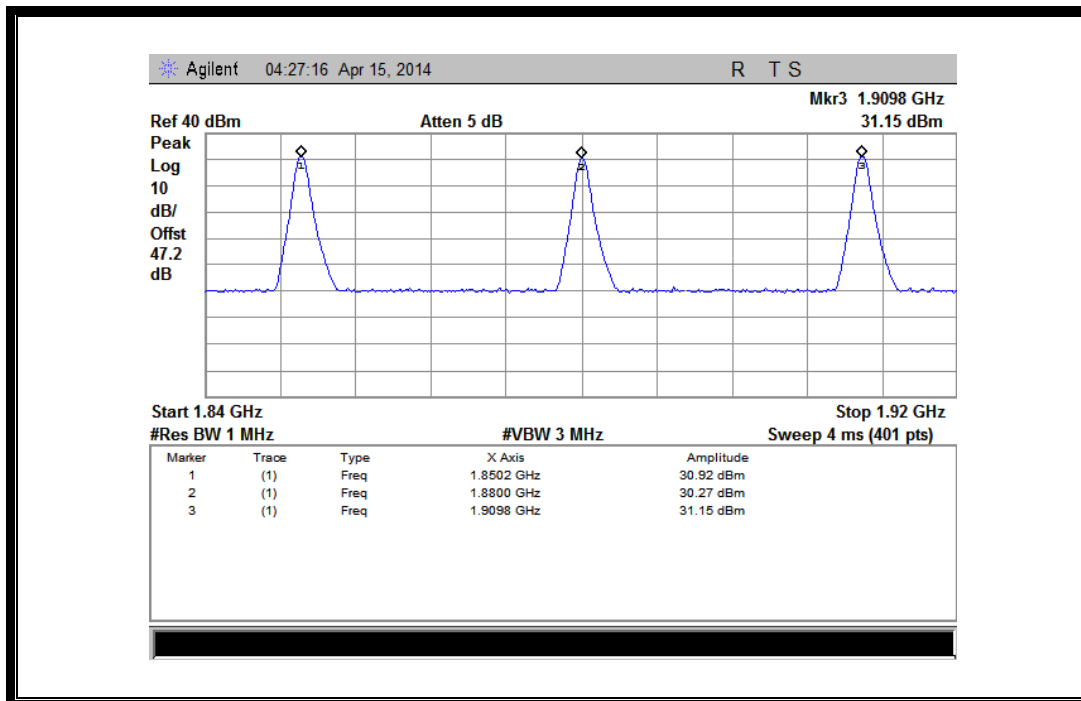
Band	Channel	Frequency (MHz)	Measured ERP			Limit		Verdict
			dBm	W	Refer to Plot	dBm	W	
WCDMA 850MHz	4132	826.4	29.4	0.871	Plot C	38.5	7	PASS
	4175	835	28.78	0.755				PASS
	4233	846.6	29.32	0.855				PASS

Band	Channel	Frequency (MHz)	Measured EIRP			Limit		Verdict
			dBm	W	Refer to Plot	dBm	W	
WCDMA 1900MHz	9262	1852.4	26.24	0.421	Plot D	33	2	PASS
	9400	1880	26.2	0.417				PASS
	9538	1907.6	25.93	0.392				PASS

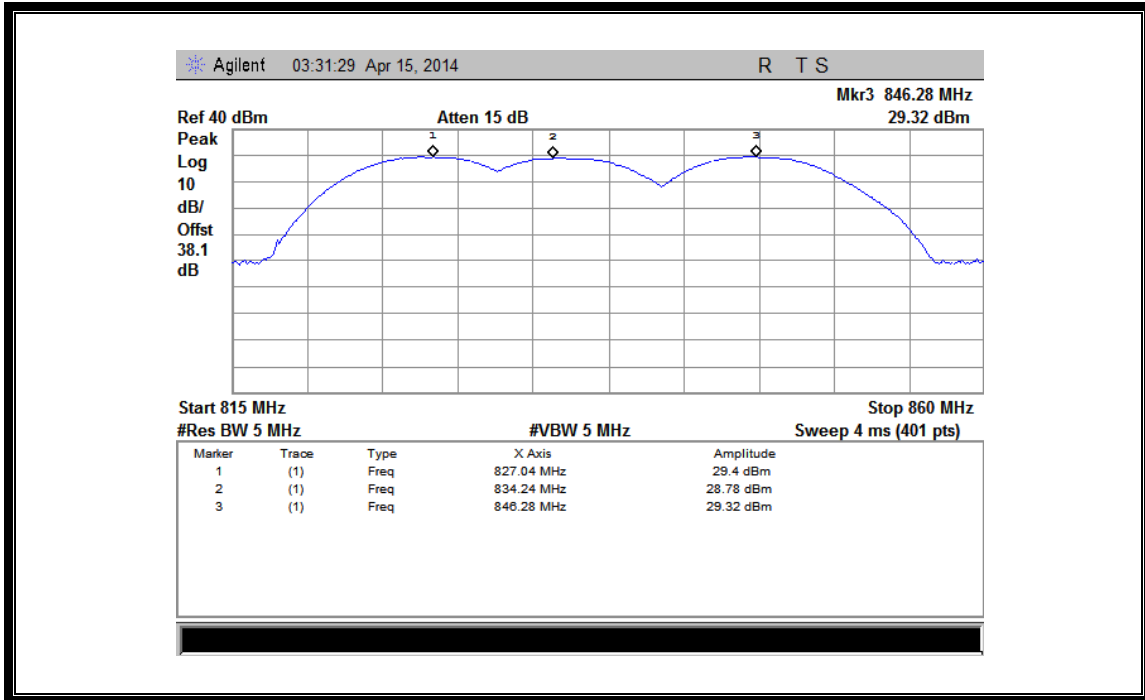
2. Test Plots:



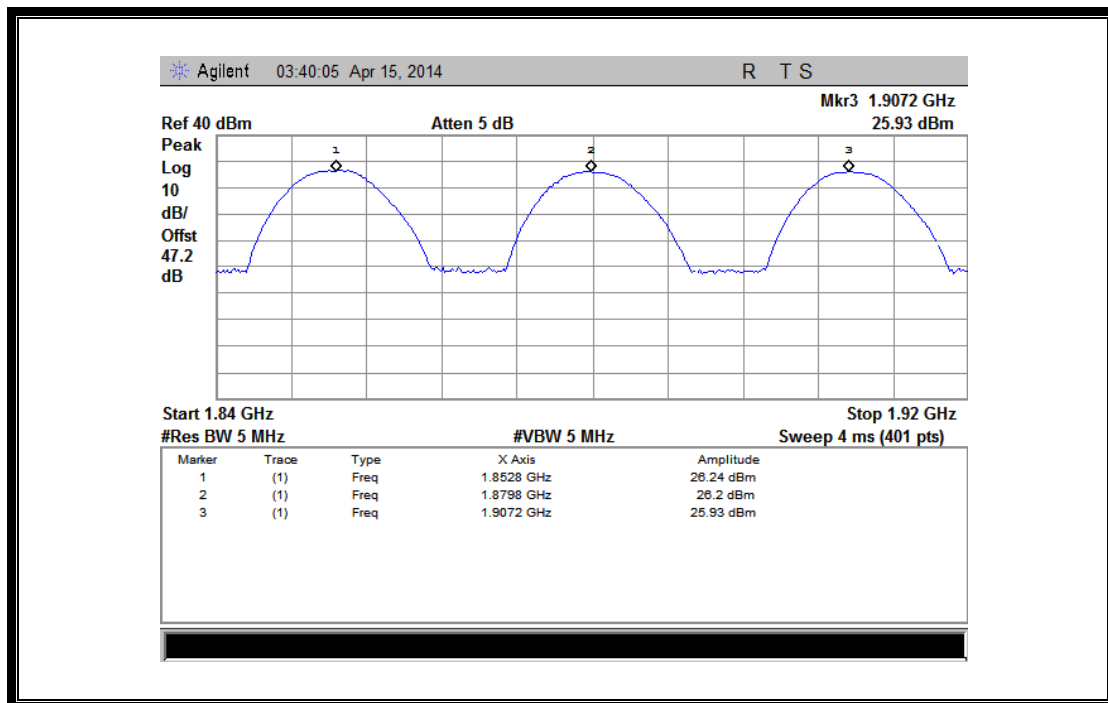
(Plot A: GSM 850MHz Channel = 128, 190, 251)



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



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



(Plot D: WCDMA 1900 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	2014.02.26	2015.02.25
Spectrum Analyzer	Agilent	E7405A	US44210471	2014.02.26	2015.02.25
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2014.02.26	2015.02.25
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2014.02.26	2015.02.25
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2014.02.26	2015.02.25
Substitution Antenna	Schwarzbeck	BBHA 9120C	9120C-384	2014.02.26	2015.02.25
Pre-AMPs	lucix	S10M100L3802	S020180L3203	2014.02.26	2015.02.25
Notch Filter	COM-MW	ZBSF-C836.5-25-X	NA	2014.02.26	2015.02.25
Notch Filter	COM-MW	ZBSF-C1747.5-75-X2	NA	2014.02.26	2015.02.25
Notch Filter	COM-MW	ZBSF-C1880-60-X2	NA	2014.02.26	2015.02.25

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

2.8.3 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.

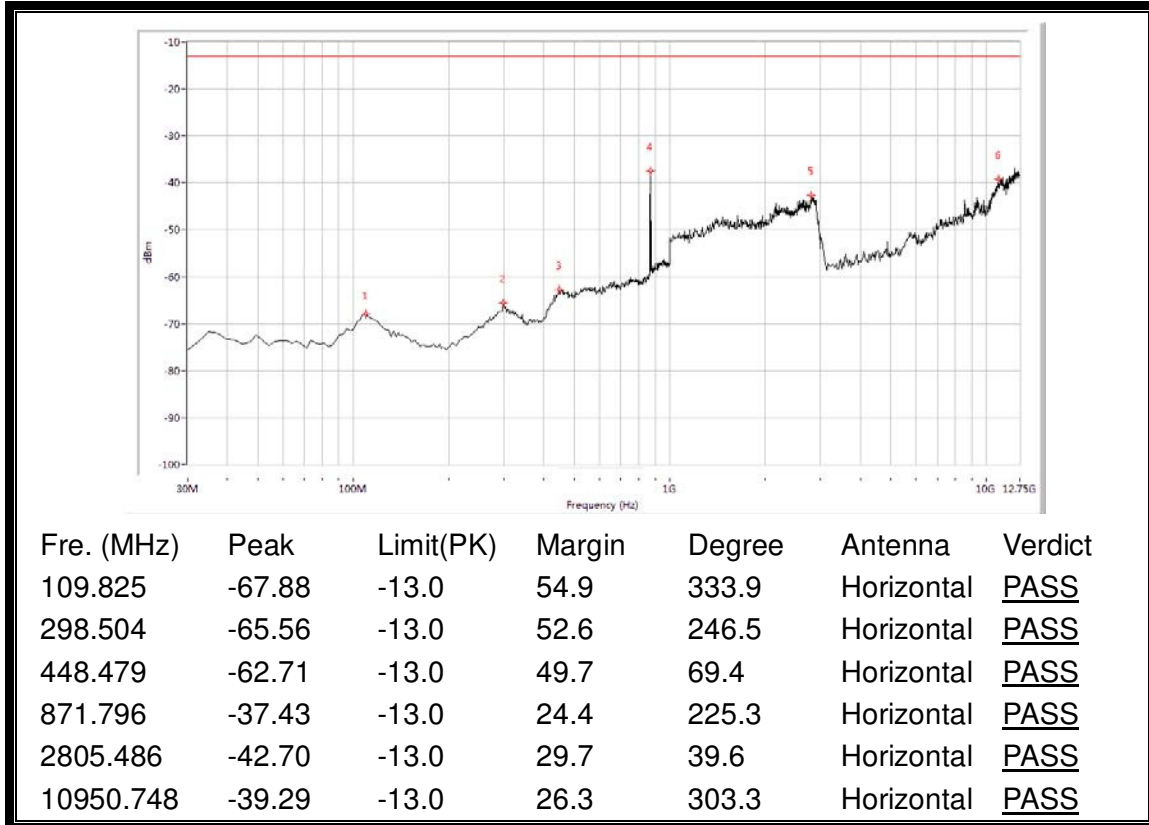
1. Test Verdict:

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	< -21.94	Plot A.1/A.2	-13	<u>PASS</u>
	190	836.6	< -25	< -24.33	Plot A.3/A.4		<u>PASS</u>
	251	848.8	< -25	< -20.08	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>
WCDMA 850MHz	4132	826.4	< -25	< -25	Plot C.1/C.2	-13	<u>PASS</u>
	4175	835	< -25	< -25	Plot C.3/C.4		<u>PASS</u>
	4233	846.6	< -25	< -25	Plot C.5/C.6		<u>PASS</u>
WCDMA 1900MHz	9262	1852.4	< -25	< -25	Plot D.1/D.2	-13	<u>PASS</u>
	9400	1880	< -25	< -25	Plot D.3/D.4		<u>PASS</u>
	9538	1907.6	< -25	< -25	Plot D.5/D.6		<u>PASS</u>

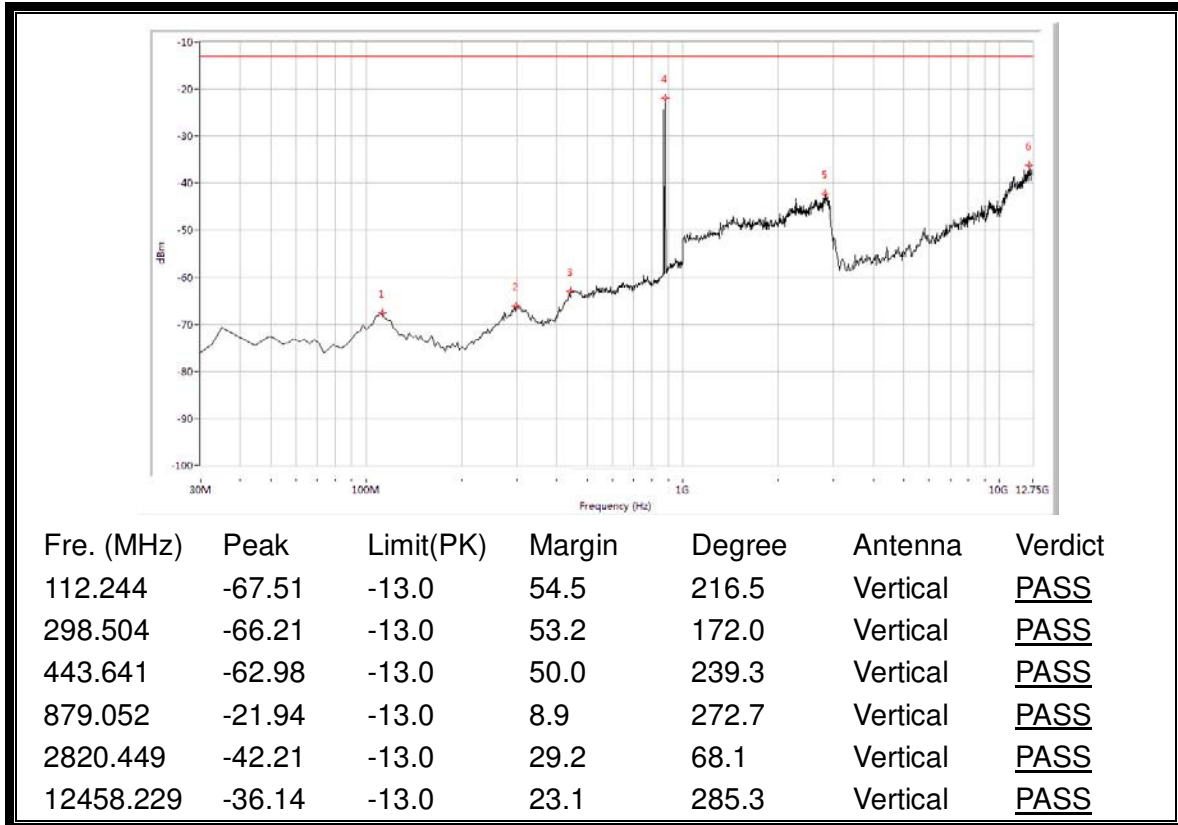
2. Test Plots for the Whole Measurement Frequency Range:

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

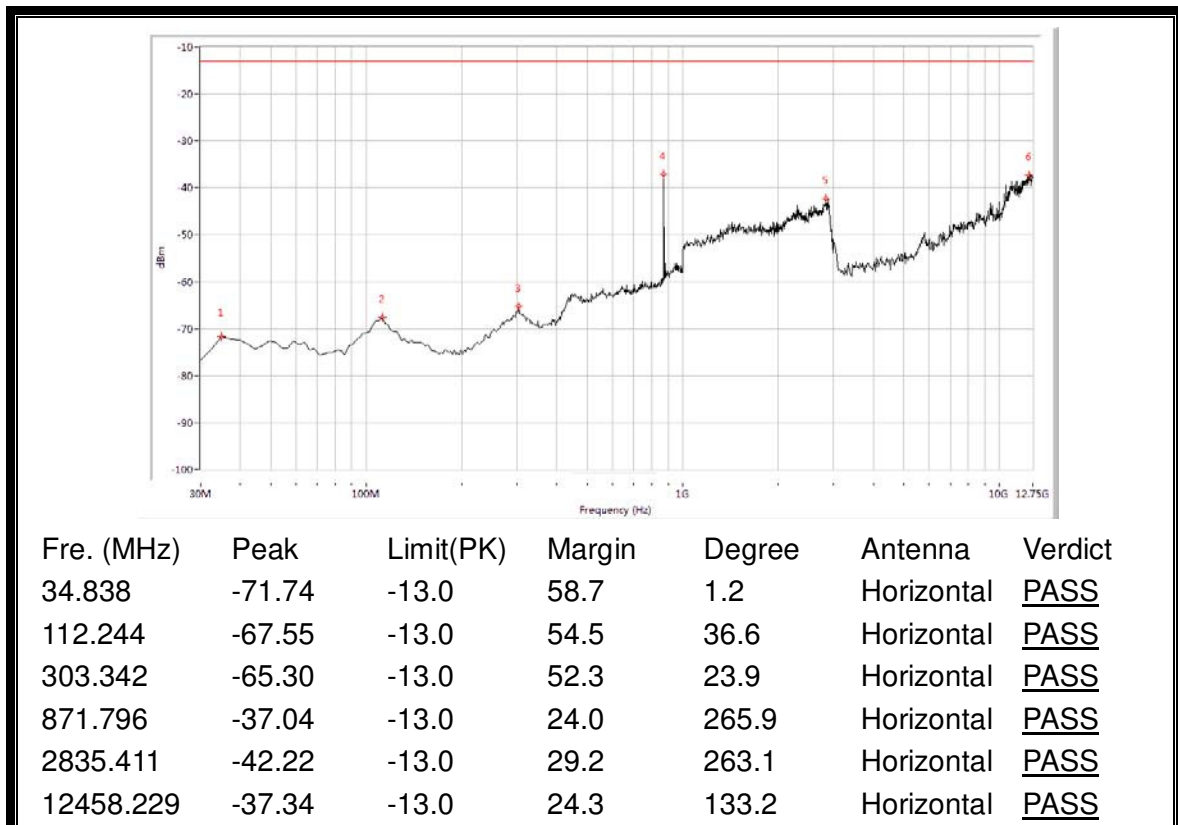
Note2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.



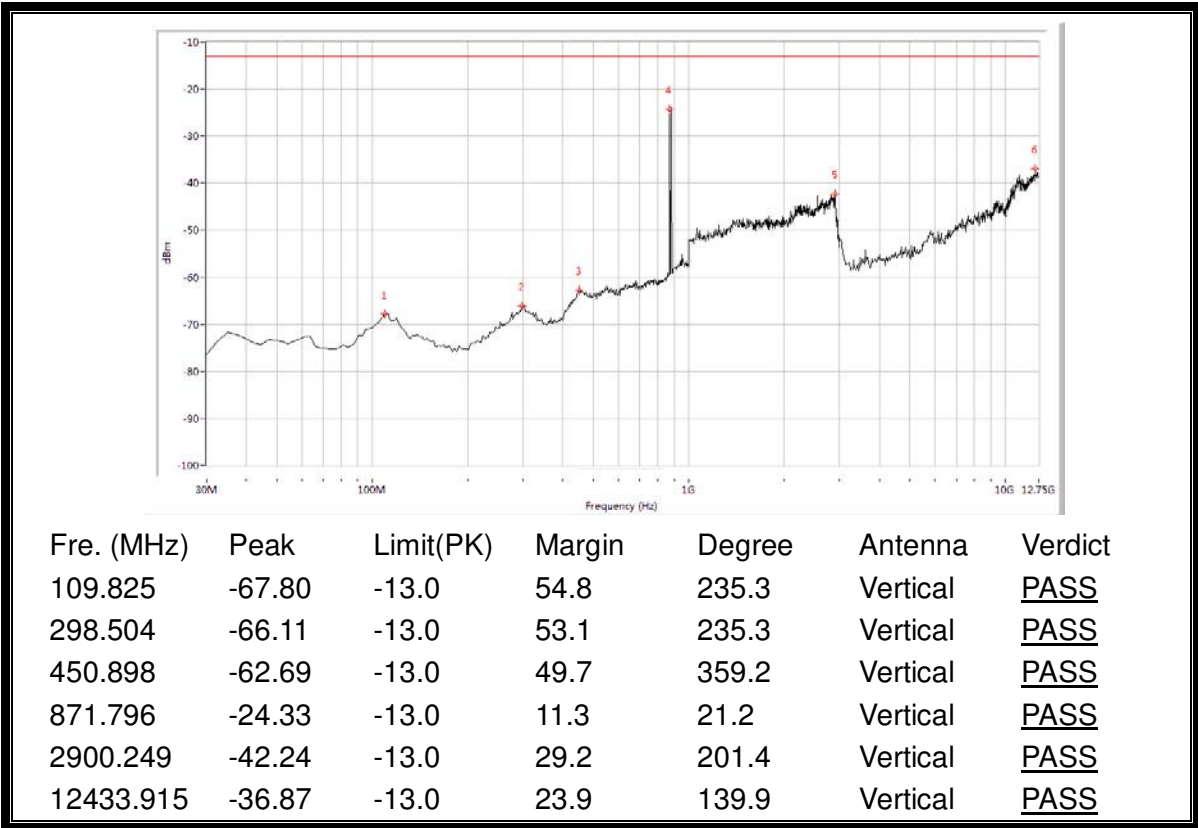
(Plot A.1: GSM 850MHz Channel = 128, Test Antenna Horizontal)



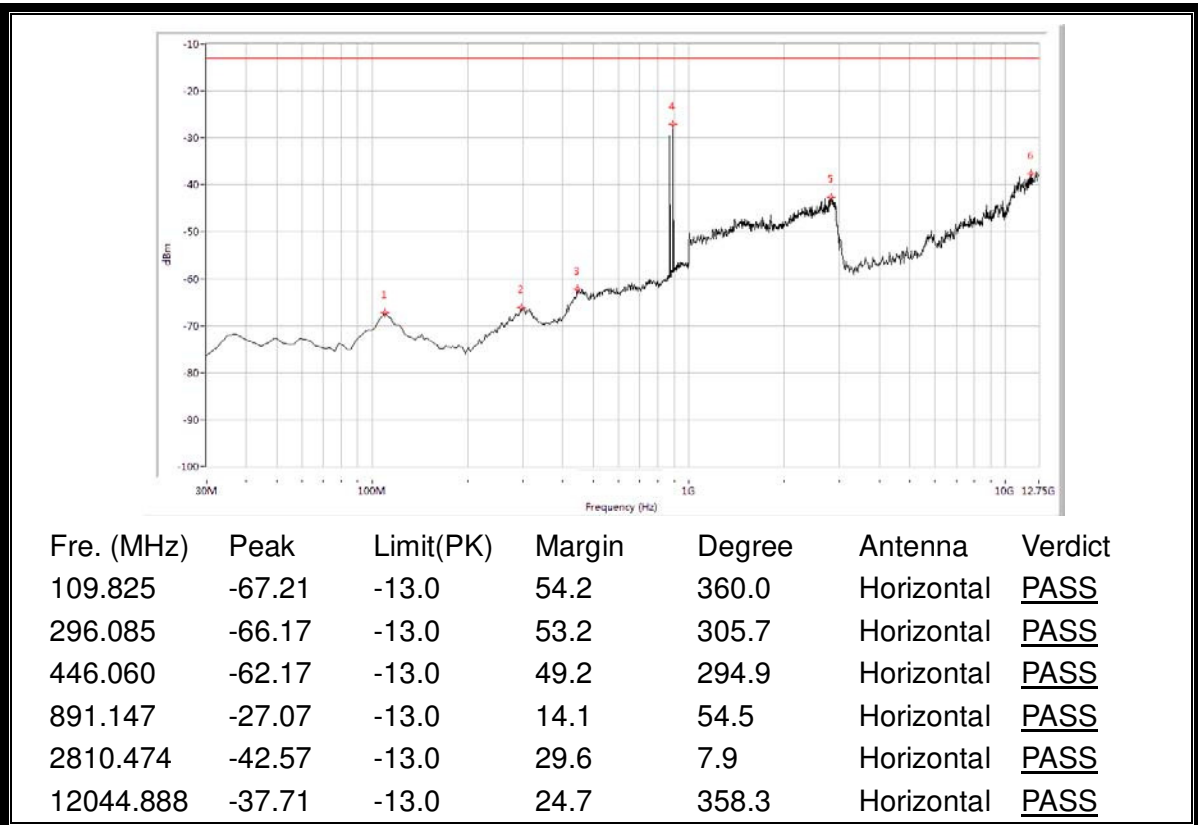
(Plot A.2: GSM 850MHz Channel = 128, Test Antenna Vertical)



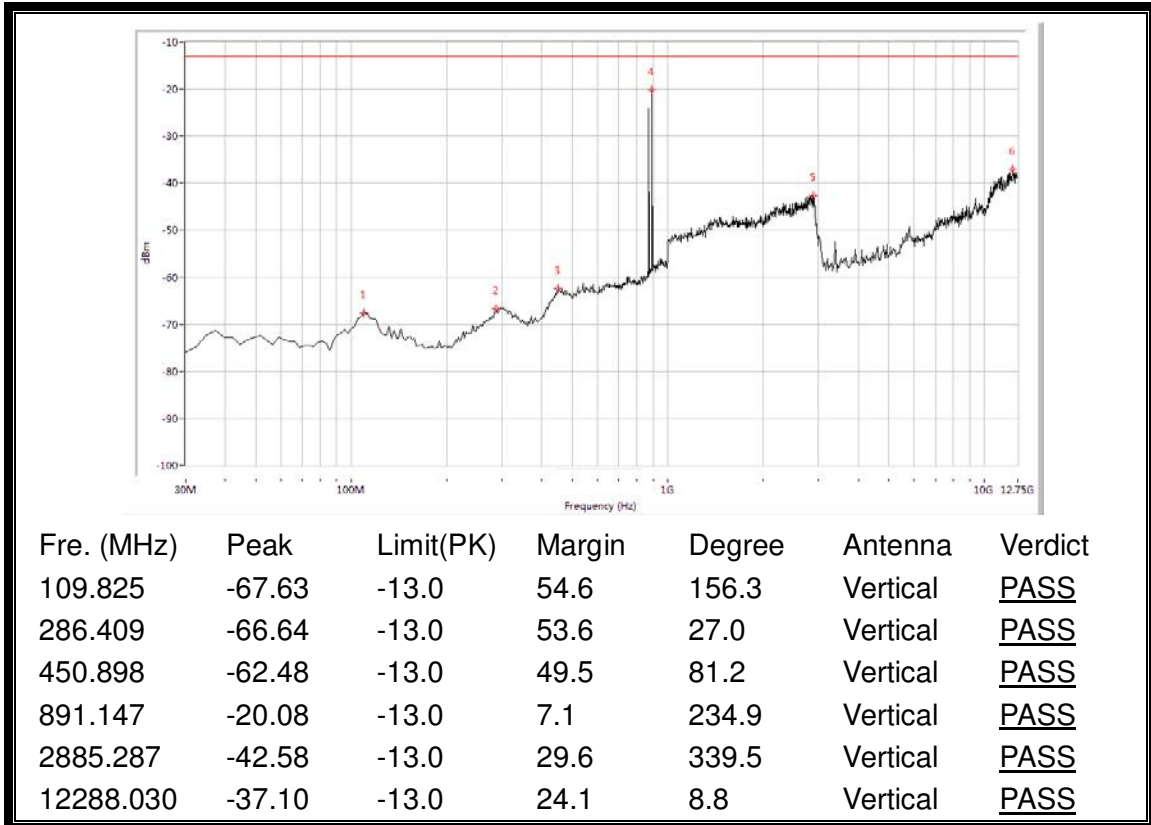
(Plot A.3: GSM 850MHz Channel = 190, Test Antenna Horizontal)



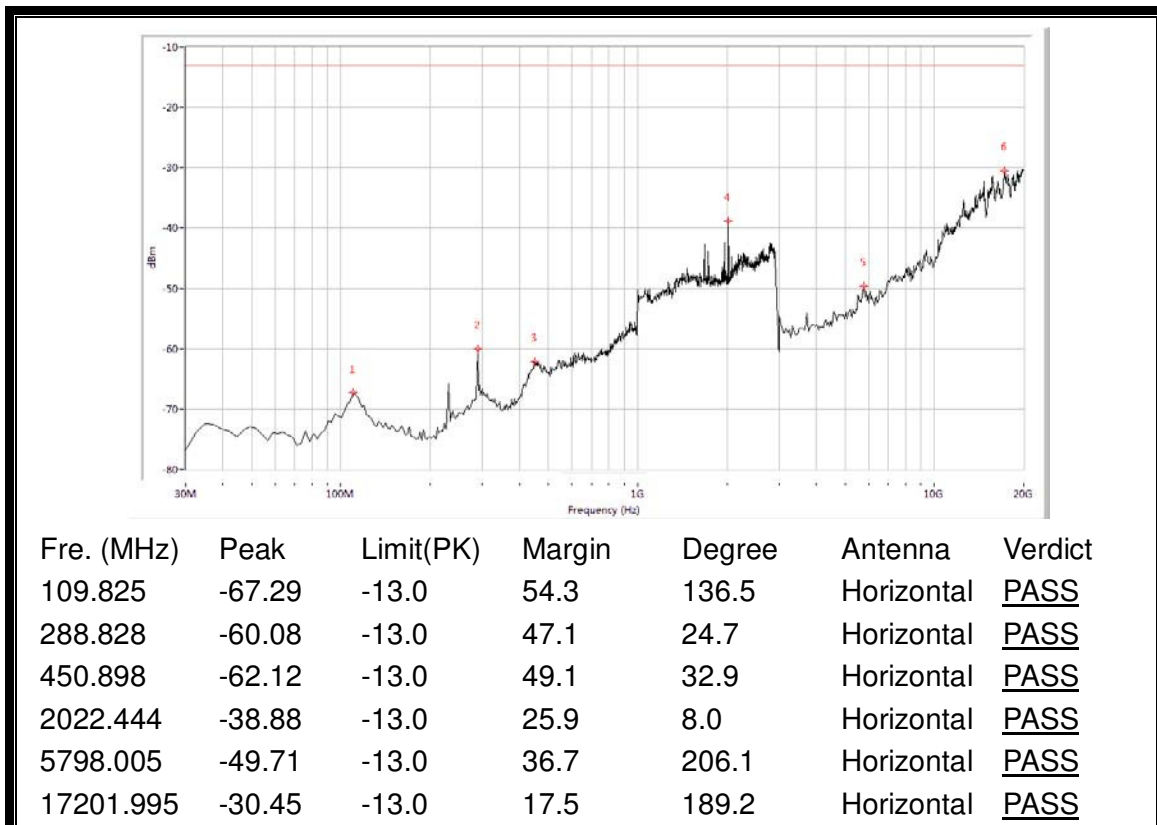
(Plot A.4: GSM 850MHz Channel = 190, Test Antenna Vertical)



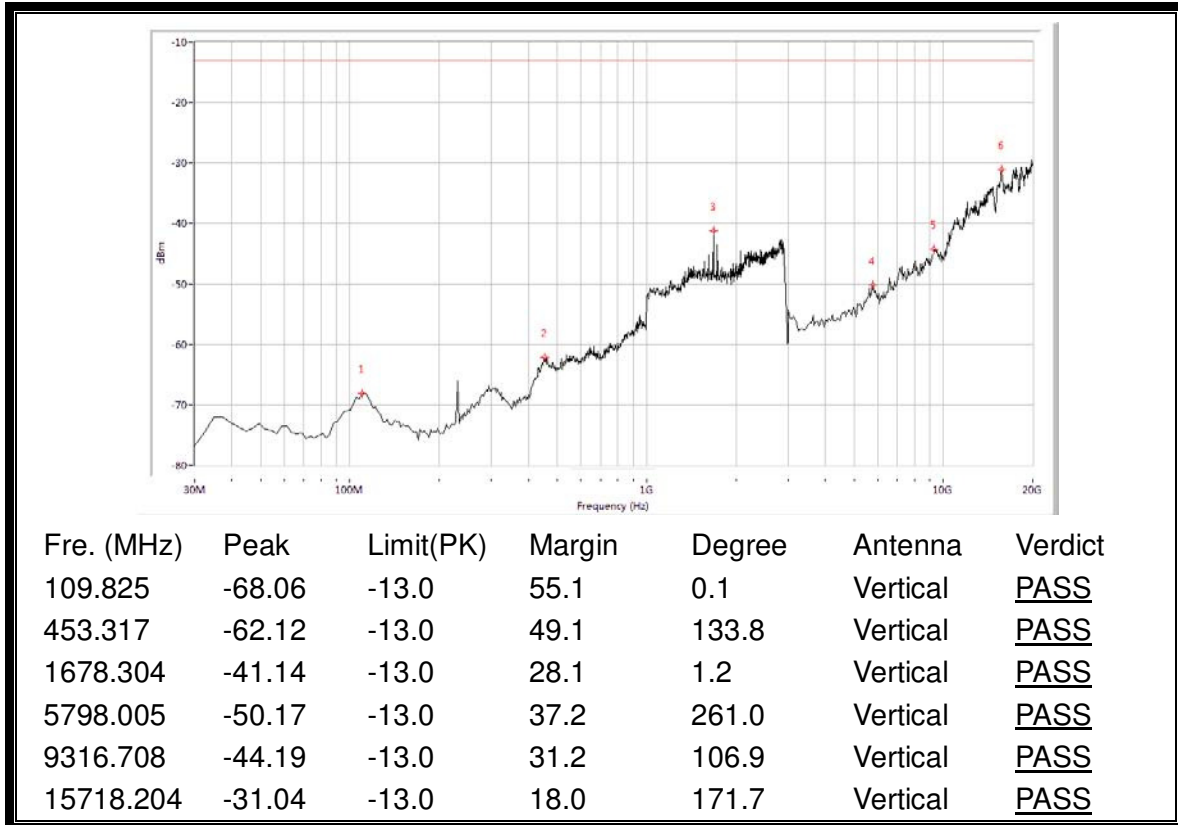
(Plot A.5: GSM 850MHz Channel = 251, Test Antenna Horizontal)



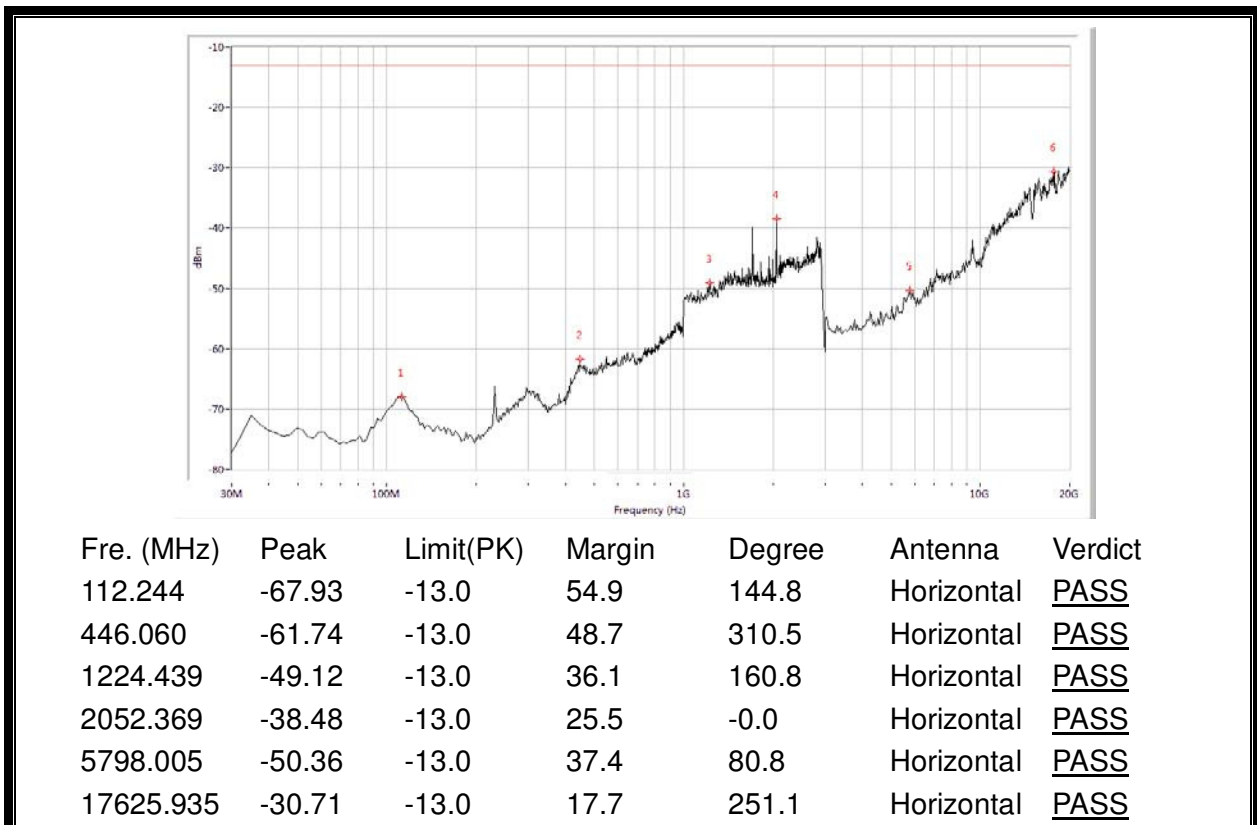
(Plot A.6: GSM 850MHz Channel = 251, Test Antenna Vertical)



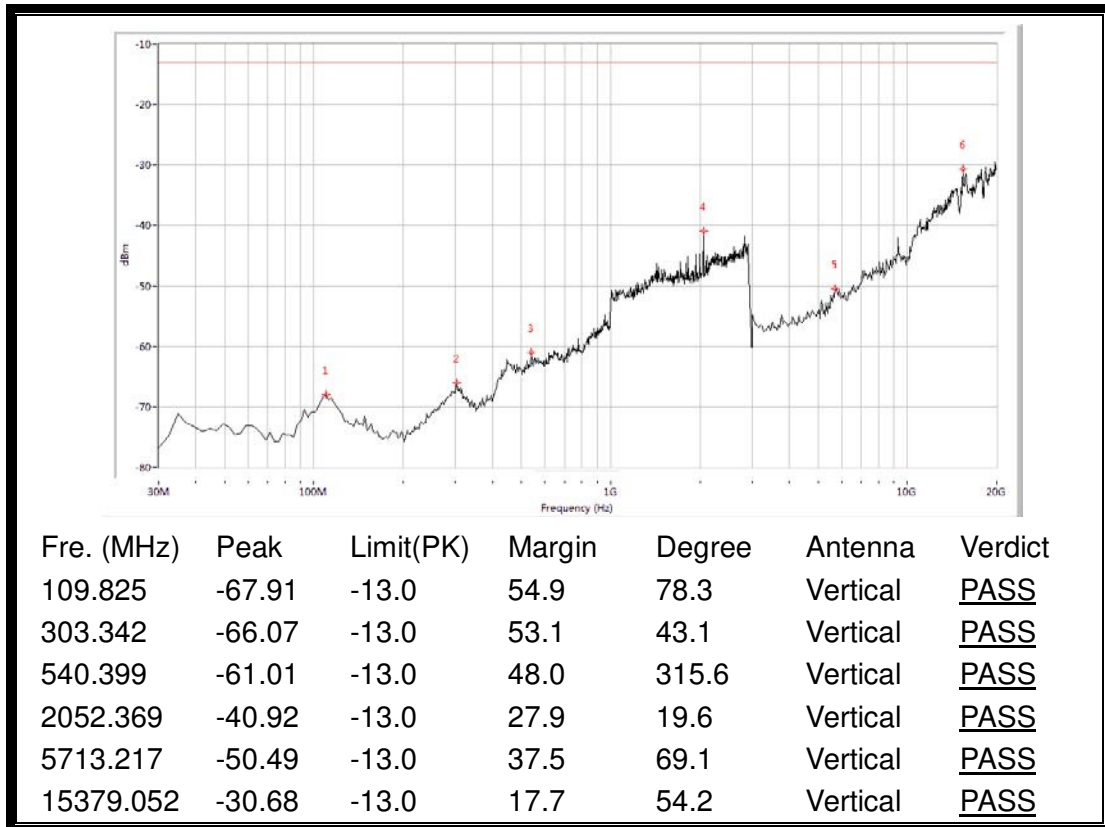
(Plot B.1: GSM 1900MHz Channel = 512, Test Antenna Horizontal)



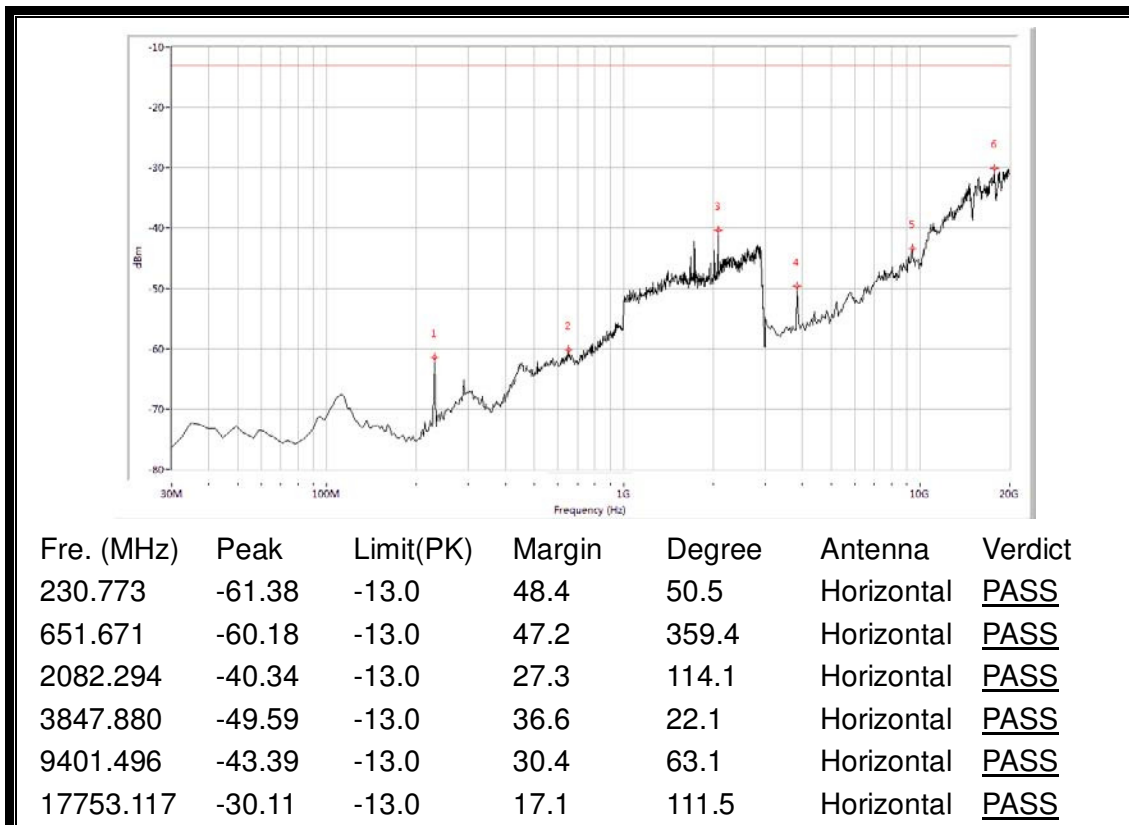
(Plot B.2: GSM 1900MHz Channel = 512, Test Antenna Vertical)



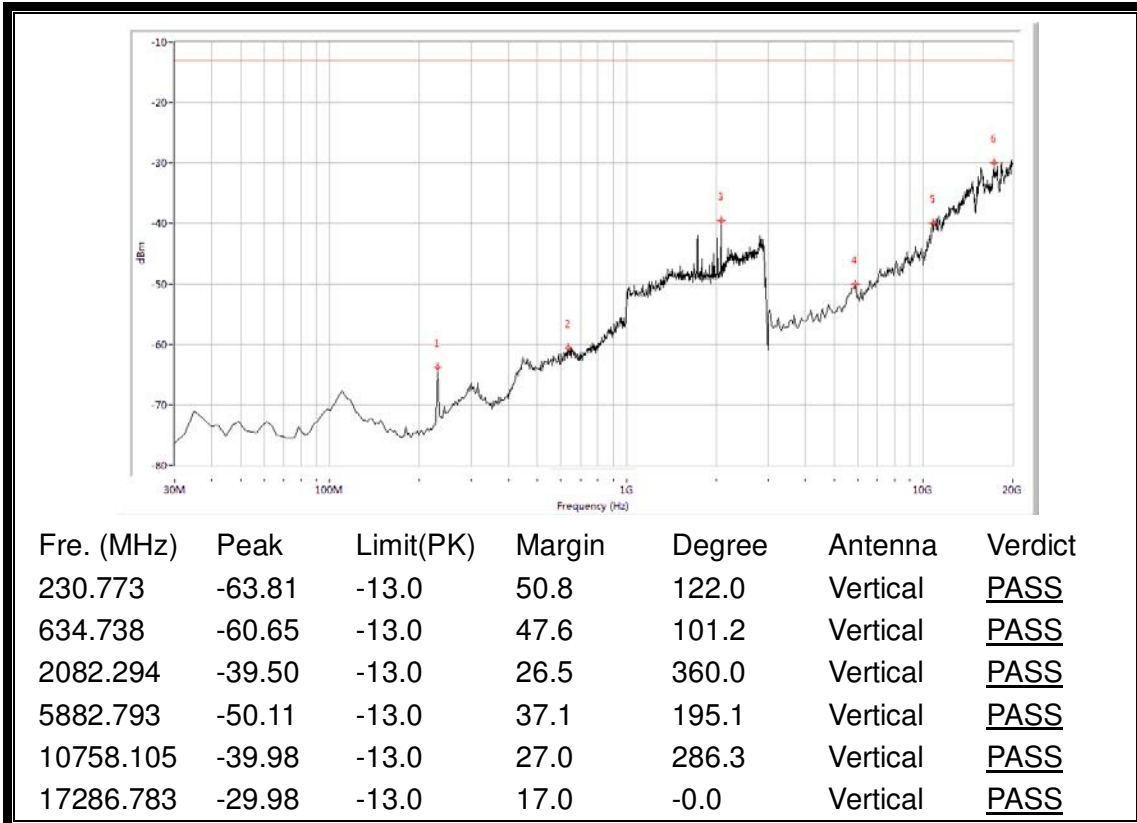
(Plot B.3: GSM 1900MHz Channel = 661, Test Antenna Horizontal)



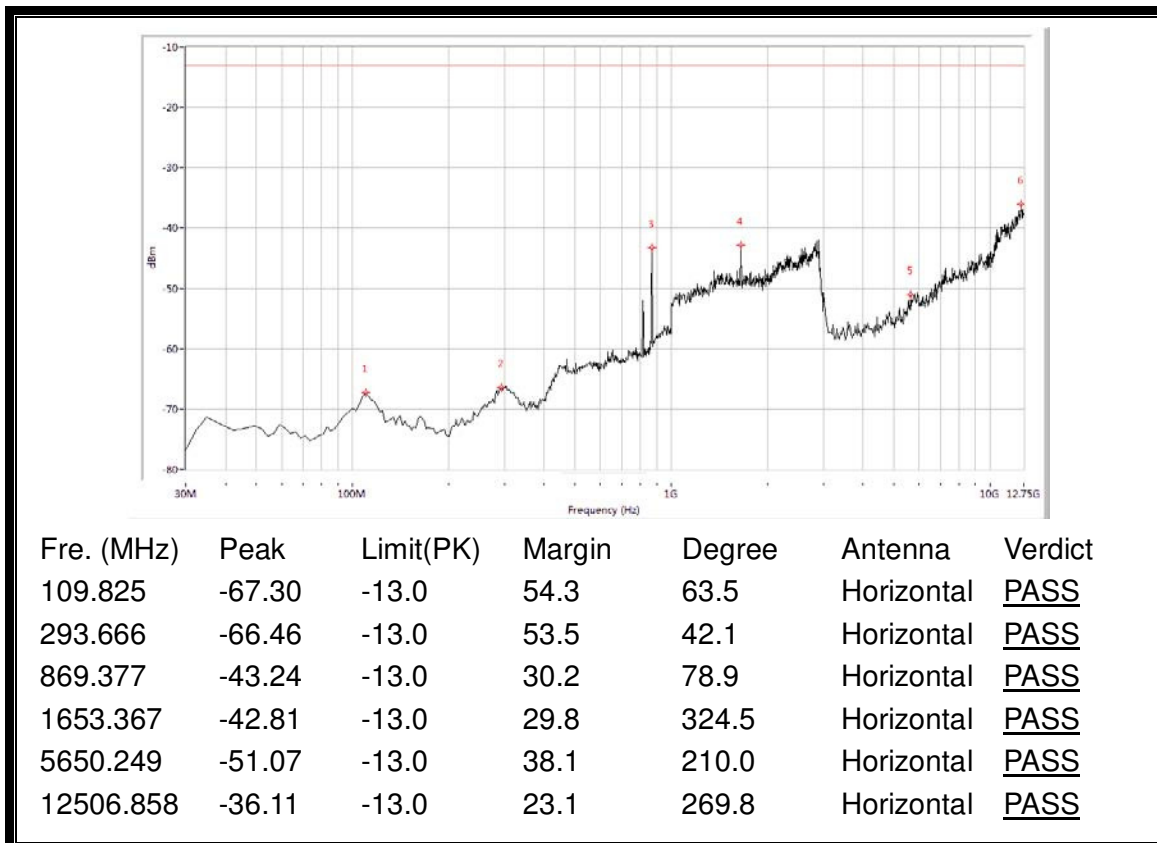
(Plot B.4: GSM 1900MHz Channel = 661, Test Antenna Vertical)



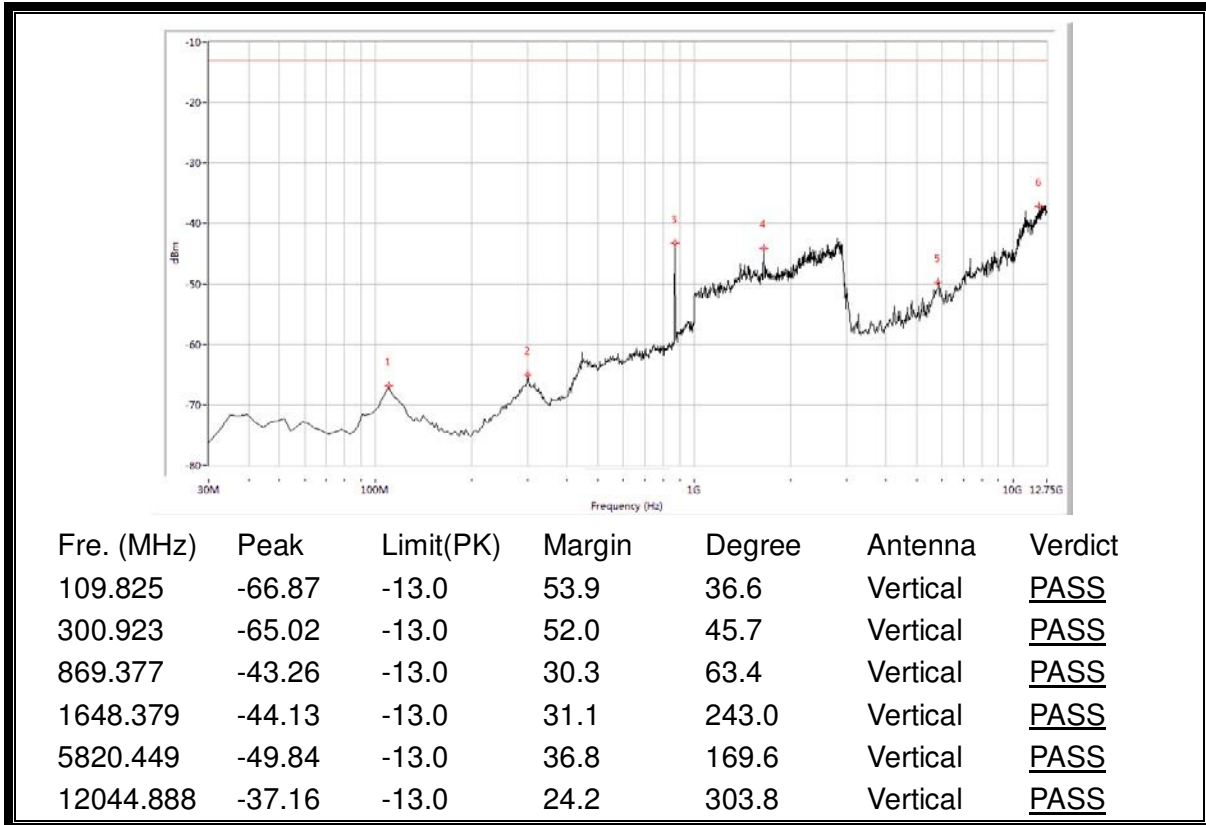
(Plot B.5: GSM 1900MHz Channel = 810, Test Antenna Horizontal)



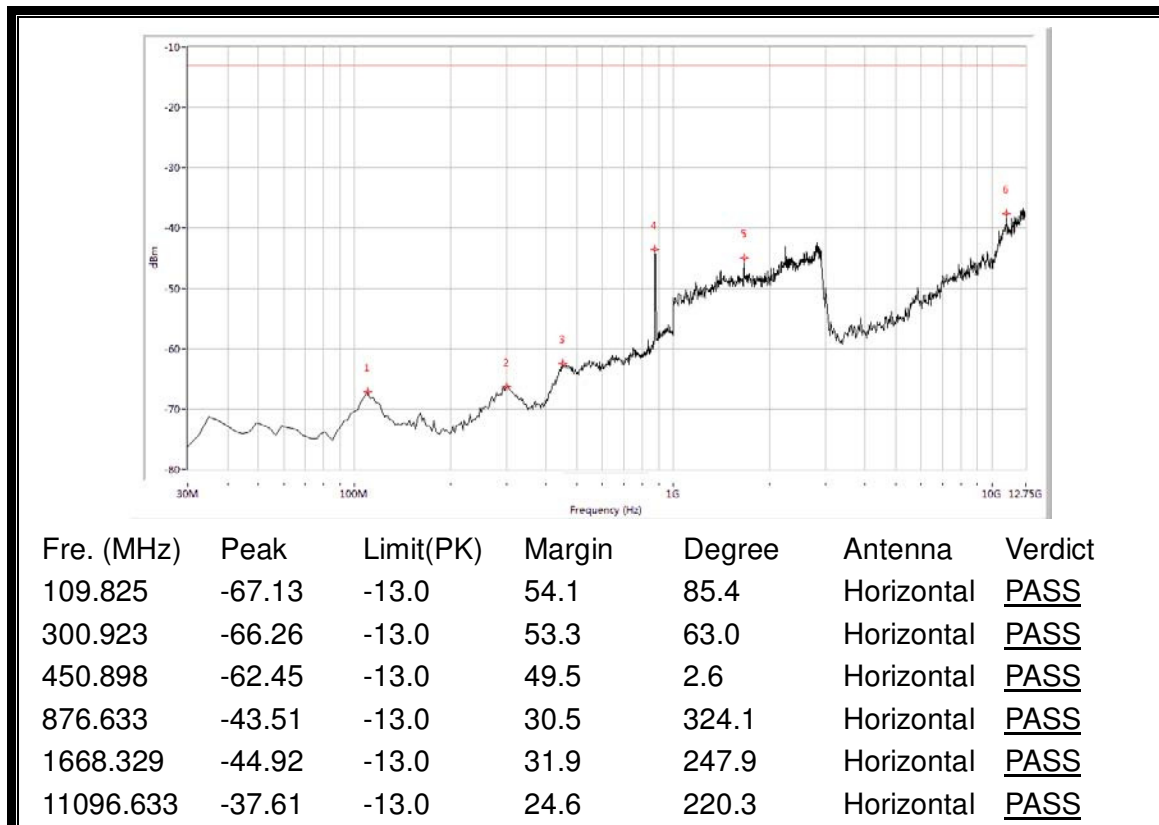
(PlotB.6: GSM 1900MHz Channel = 810, Test Antenna Vertical)



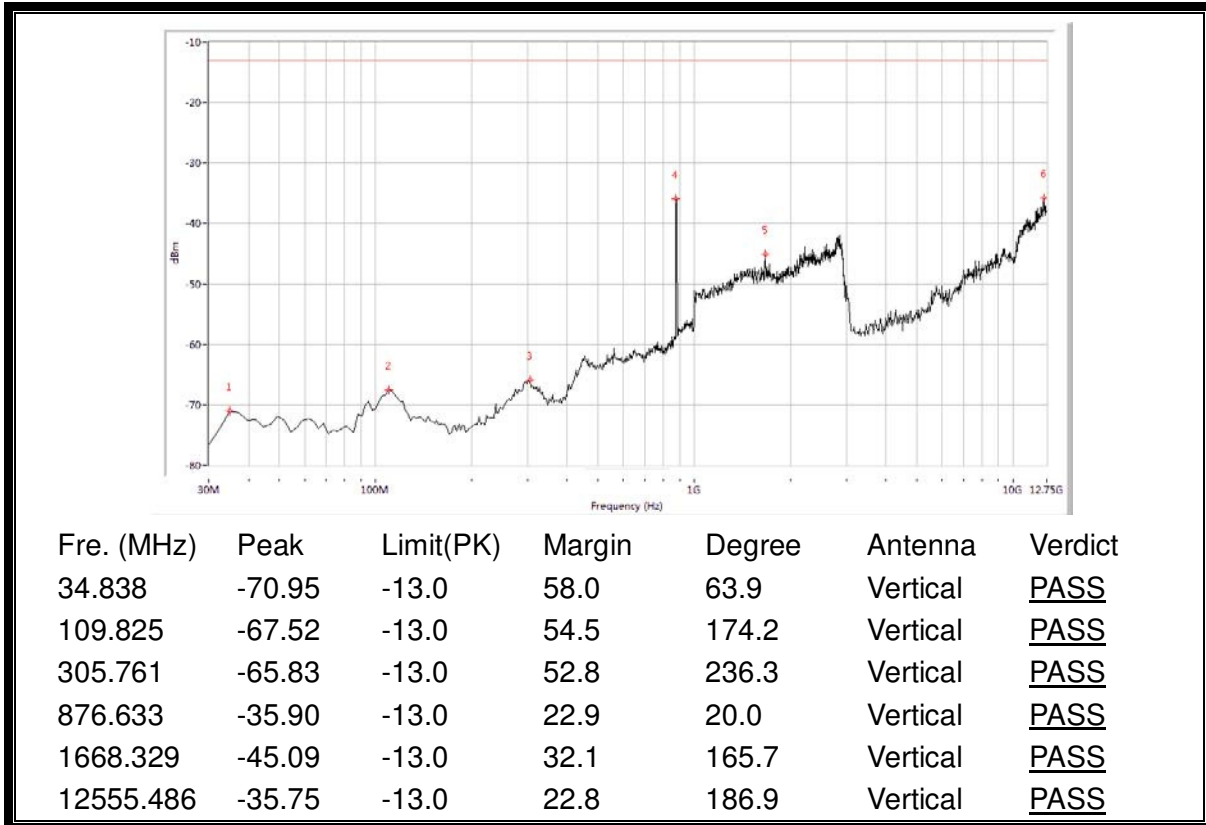
(Plot C.1: WCDMA 850MHz Channel = 4132, Test Antenna Horizontal)



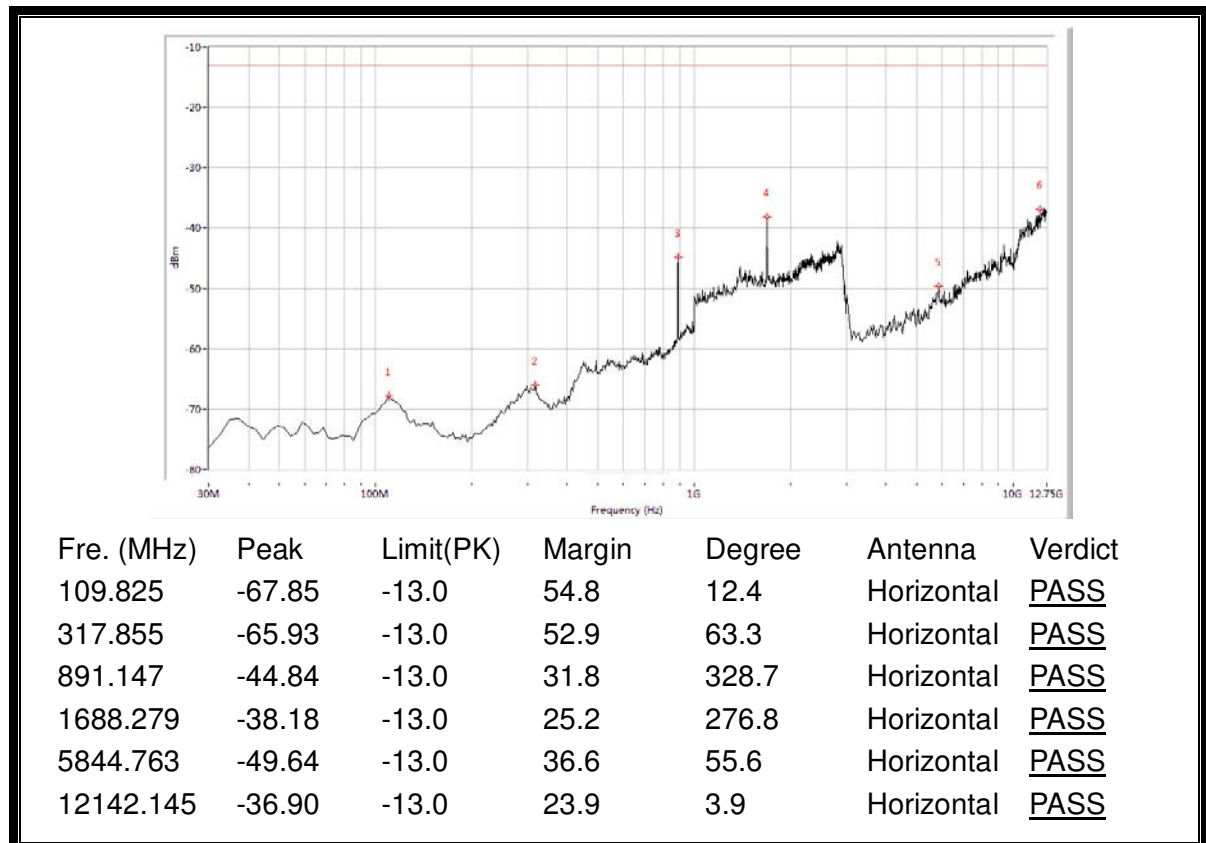
(Plot C.2: WCDMA 850MHz Channel = 4132, Test Antenna Vertical)



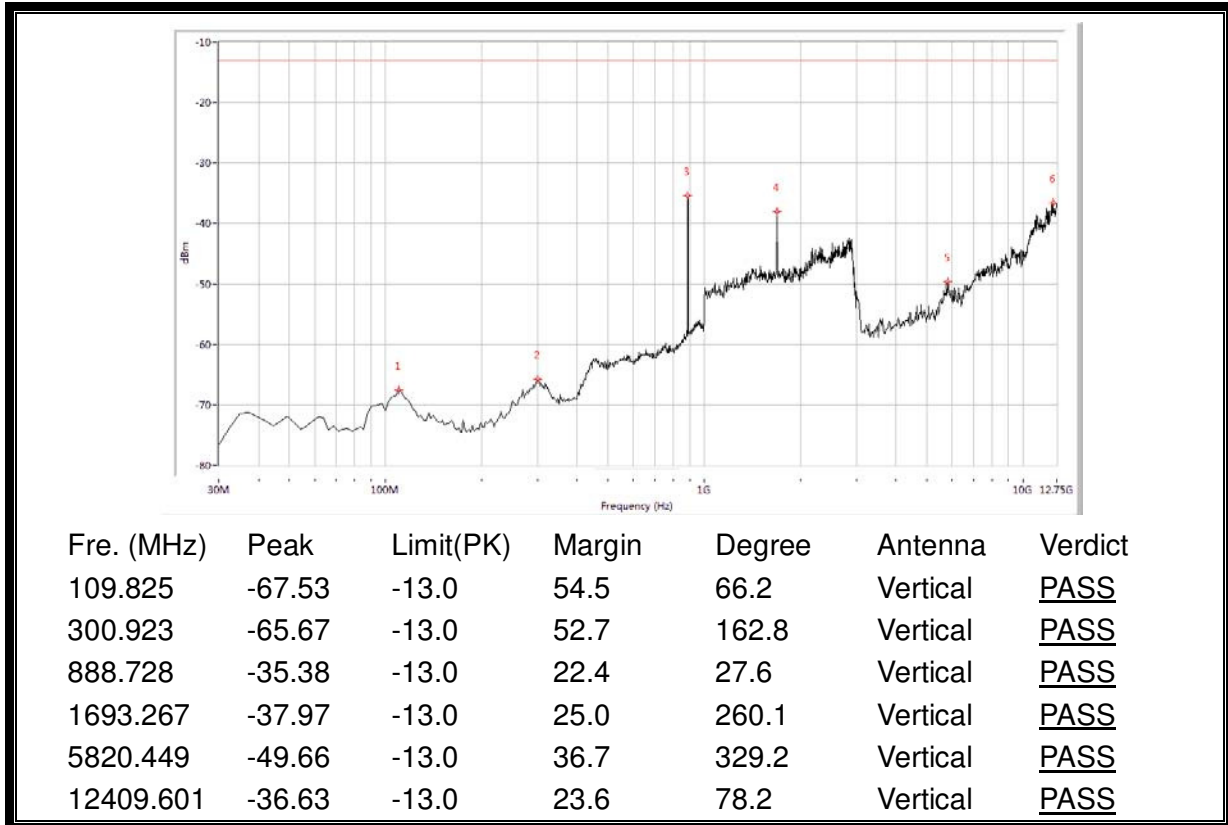
(Plot C.3: WCDMA 850MHz Channel = 4175, Test Antenna Horizontal)



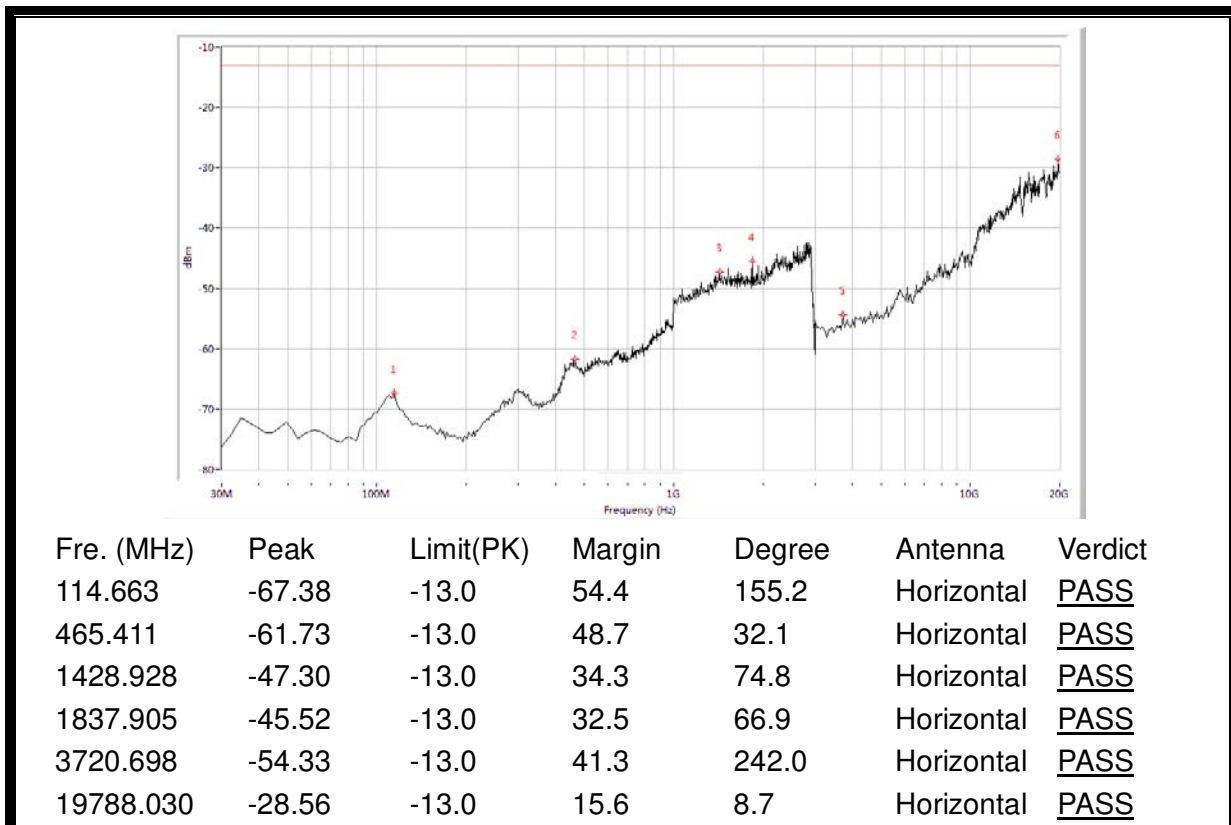
(Plot C.4: WCDMA 850MHz Channel = 4175, Test Antenna Vertical)



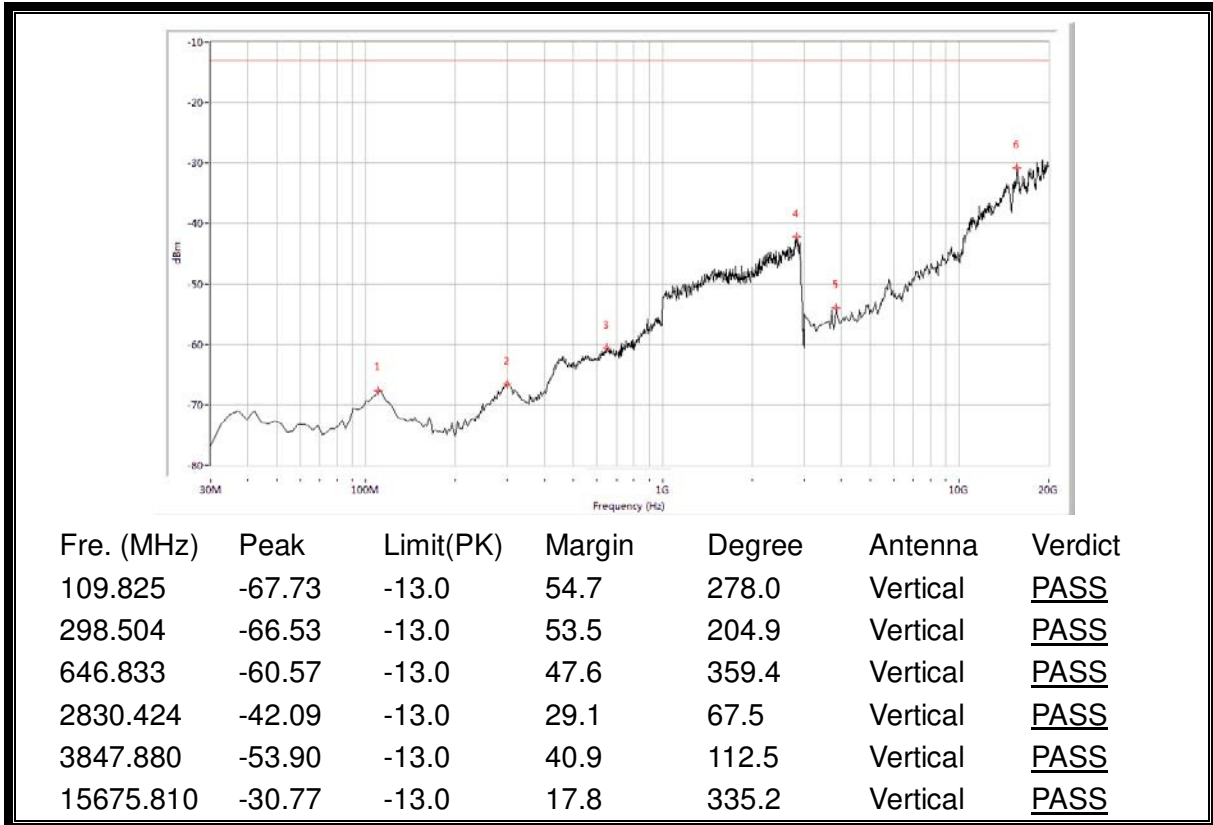
(Plot C.5: WCDMA 850MHz Channel = 4233, Test Antenna Horizontal)



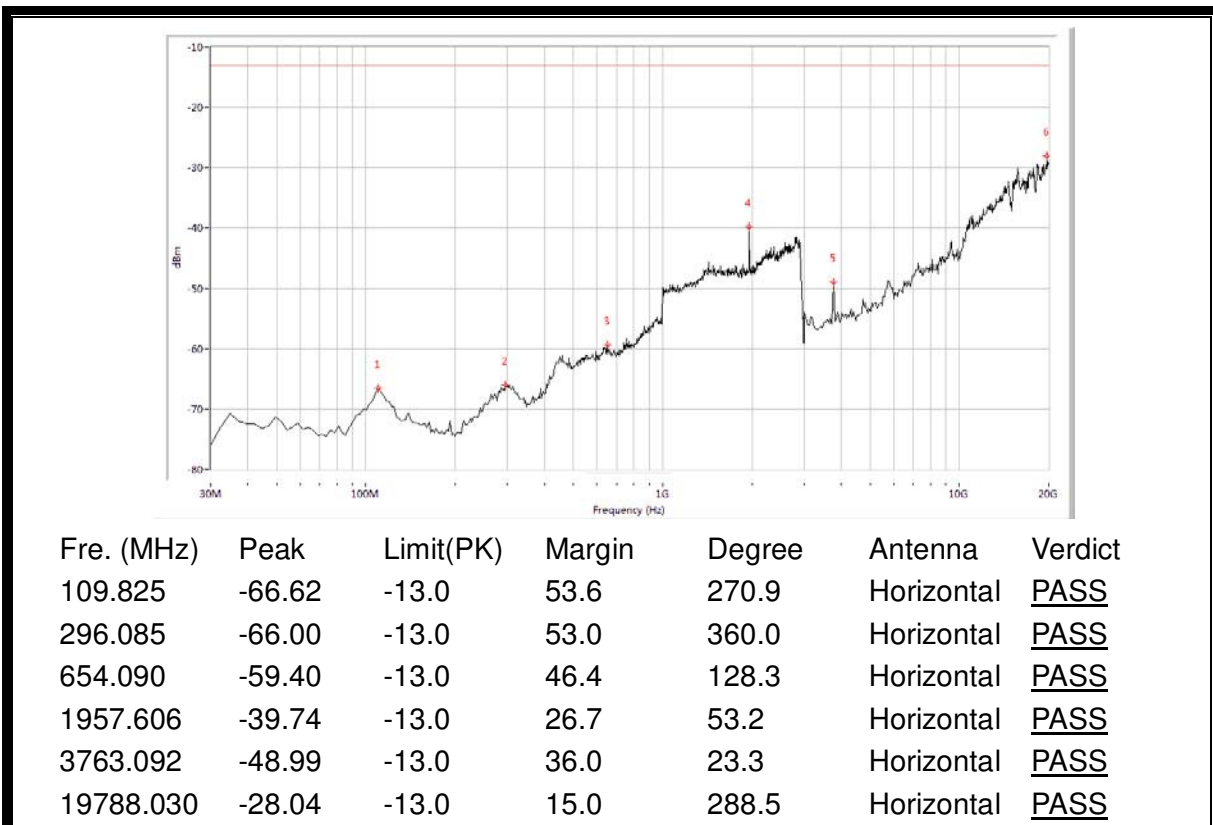
(Plot C.6: WCDMA 850MHz Channel = 4233, Test Antenna Vertical)



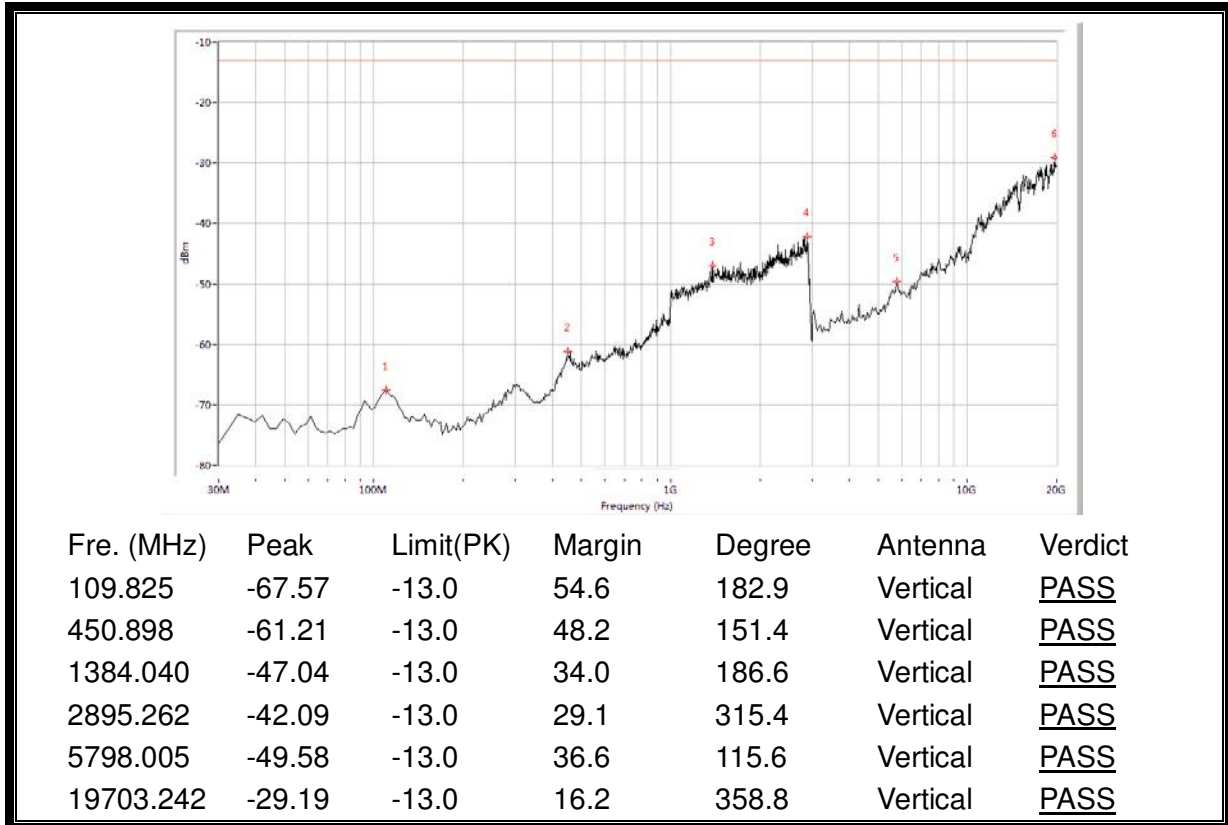
(Plot D.1: WCDMA 1900MHz Channel = 9262, Test Antenna Horizontal)



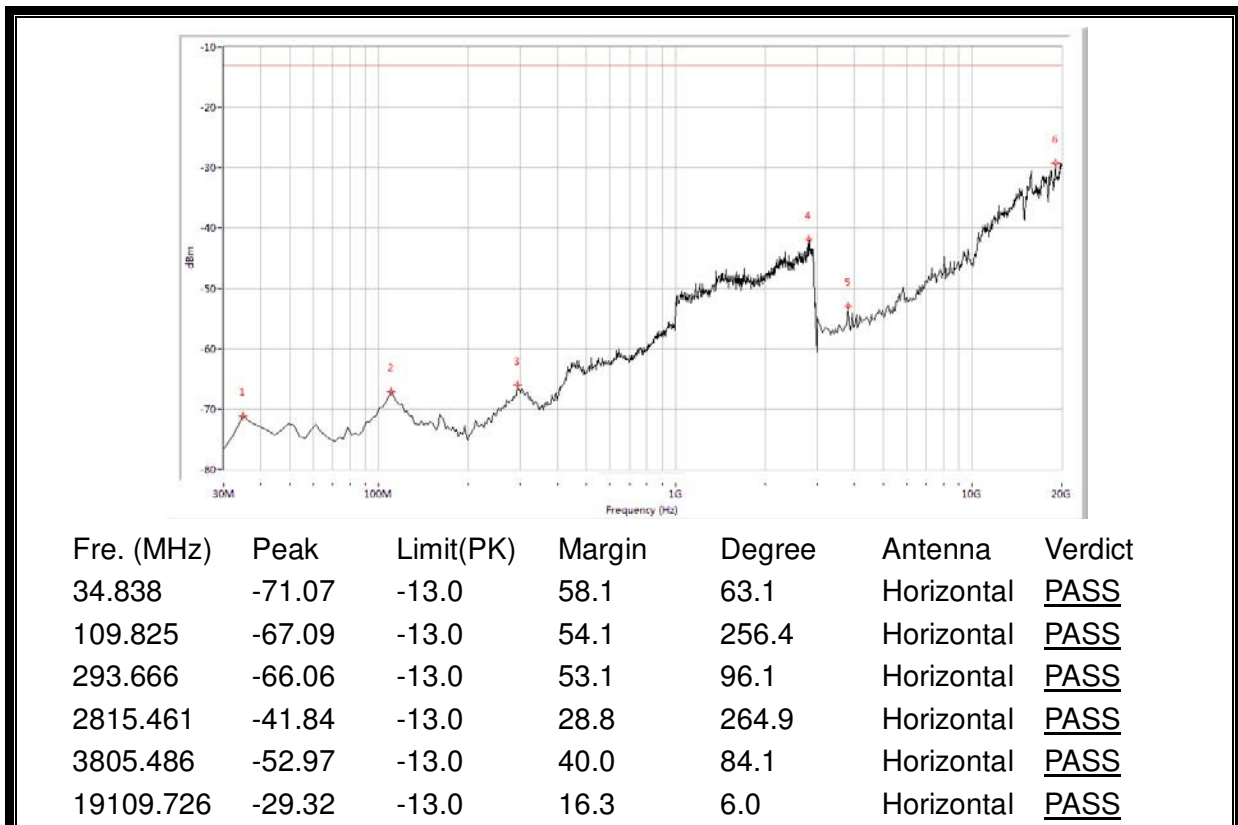
(Plot D.2: WCDMA 1900MHz Channel = 9262, Test Antenna Vertical)



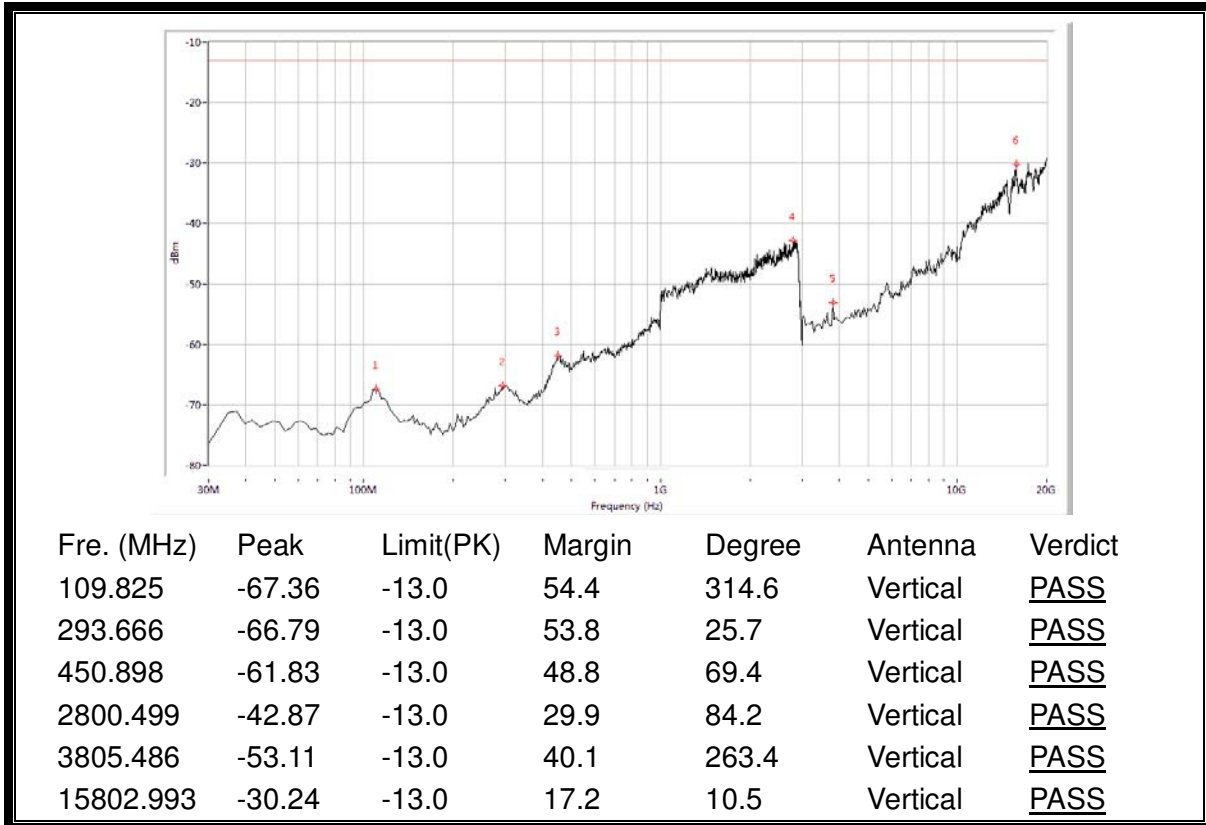
(Plot D.3: WCDMA 1900MHz Channel = 9400, Test Antenna Horizontal)



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



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



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

** END OF REPORT **