FCC TEST REPORT

Issued to

ZTE Corporation

For

GSM Digital Mobile Phone

Model Name:	ZTE F231
Trade Name:	ZTE
Brand Name:	ZTE
FCC ID :	SRQ-F231
Standard:	47 CFR Part 22 Subpart H
	47 CFR Part 24 Subpart E
Test date:	2014-1-9 to 2014-1-14
Issue date:	2014-1-23

By

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Date 2014.1.23	**Date** 2014.1.23	**Date** 2014.1.23

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TABLE OF CONTENTS

GENERAL INFORMATION....3

1.1 EUT DESCRIPTION....3
1.2 TEST STANDARDS AND RESULTS....4
1.3 FACILITIES AND ACCREDITATIONS....5

2. 47 CFR PART 2, PART 22H, 24E REQUIREMENTS....6

2.1 CONDUCTED RF OUTPUT POWER....6
2.2 PEAK TO AVERAGE RATIO....17
2.3 99% OCCUPIED BANDWIDTH....22
2.4 FREQUENCY STABILITY....32
2.5 CONDUCTED OUT OF BAND EMISSIONS....35
2.6 BAND EDGE....48
2.7 TRANSMITTER RADIATED POWER (EIRP/ERP)....53
2.8 RADIATED OUT OF BAND EMISSIONS....59

Change History		
Issue	Date	Reason for change
1.0	2014-1-23	First edition

GENERAL INFORMATION

1.1 EUT Description

EUT Type .....:	GSM Digital Mobile Phone
Serial No.....:	(n.a, marked #1 by test site)
Hardware Version .....:	L693095002AB01
Software Version.....:	S233_V1_Z1_SEFI_DFFM101
Applicant.....:	ZTE Corporation ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park,Nanshan District,Shenzhen,Guangdong,P.R.China
Manufacturer.....:	ZTE Corporation ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park,Nanshan District,Shenzhen,Guangdong,P.R.China
Frequency Range .....:	GSM 850MHz: Tx: 824.20 - 848.80MHz (at intervals of 200kHz); Rx: 869.20 - 893.80MHz (at intervals of 200kHz) GSM 1900MHz: Tx: 1850.20 - 1909.80MHz (at intervals of 200kHz); Rx: 1930.20 - 1989.80MHz (at intervals of 200kHz)
Modulation Type.....:	GSM,GPRS Mode with GMSK Modulation EDGE Mode with 8PSK Modulation
Multislot Class.....:	GPRS: Multislot Class12,EGPRS: Multislot Class12
Antenna Type .....:	PIFA Antenna
Emission Designators.....:	GSM 850:247KGXW,GSM 1900:249KGXW EGPRS850:250KG7W, EGPRS1900:250KG7W

Note 1: The transmitter (Tx) frequency arrangement of the Cellular 850MHz band used by the EUT can be represented with the formula F(n)=824.2+0.2*(n-128), 128<=n<=251; the lowest, middle, highest channel numbers (ARFCHs) used and tested in this report are separately 128 (824.2MHz), 190 (836.6MHz) and 251 (848.8MHz).

Note 2: The transmitter (Tx) frequency arrangement of the PCS 1900MHz band used by the EUT can be represented with the formula F(n)=1850.2+0.2*(n-512), 512<=n<=810; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 512 (1850.2MHz), 661 (1880.0MHz) and 810 (1909.8MHz).

Note 3: 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 the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-12 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 (10-1-12 Edition)	Public Mobile Services
3	47 CFR Part 24 (10-1-12 Edition)	Personal Communications Services

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

No.	Section	Description	Result
1	2.1046	Conducted RF Output Power	PASS
2.	24.232(d)	Peak to average radio	PASS
2	2.1049,22.917 24.238	99% Occupied Bandwidth	PASS
3	2.1055,22.355 24.235	Frequency Stability	PASS
4	2.1051,2.1057 22.917,24.238	Conducted Out of Band Emissions	PASS
5	2.1051,2.1057 22.917,24.238	Band Edge	PASS
6	22.913,24.232	Transmitter Radiated Power (EIPR/ERP)	PASS
7	2.1053,2.1057 22.917,24.238	Radiated Out of Band Emissions	PASS

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

1.3 Facilities and Accreditations

1.3.1 Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, No.8 LongChang Road,Block 67, BaoAn District, ShenZhen, GuangDong Province,P. R. China 518101. The test site is constructed in conformance with the requirements of ANSI C63.7, 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

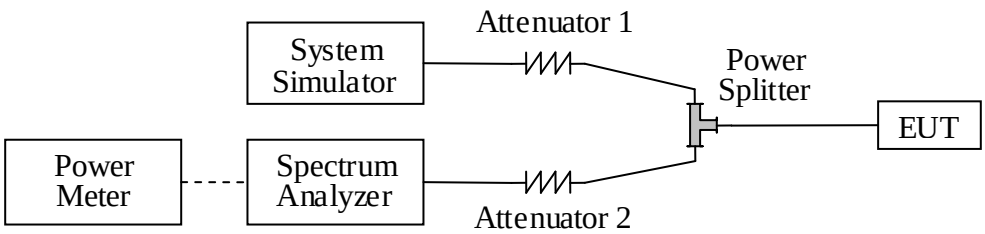
2.1 Conducted RF Output Power

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	2014.05
Spectrum Analyzer	Agilent	E7405A	US44210471	2013.05	2014.05
Power Meter	Agilent	E4418B	GB43318055	2013.05	2014.05
Power Sensor	Agilent	8482A	MY41091706	2013.05	2014.05
Power Splitter	Weinschel	1506A	NW521	2013.05	2014.05
Attenuator 1	Resnet	20dB	(n.a.)	2013.05	2014.05
Attenuator 2	Resnet	3dB	(n.a.)	2013.05	2014.05

2.1.3 Test Results

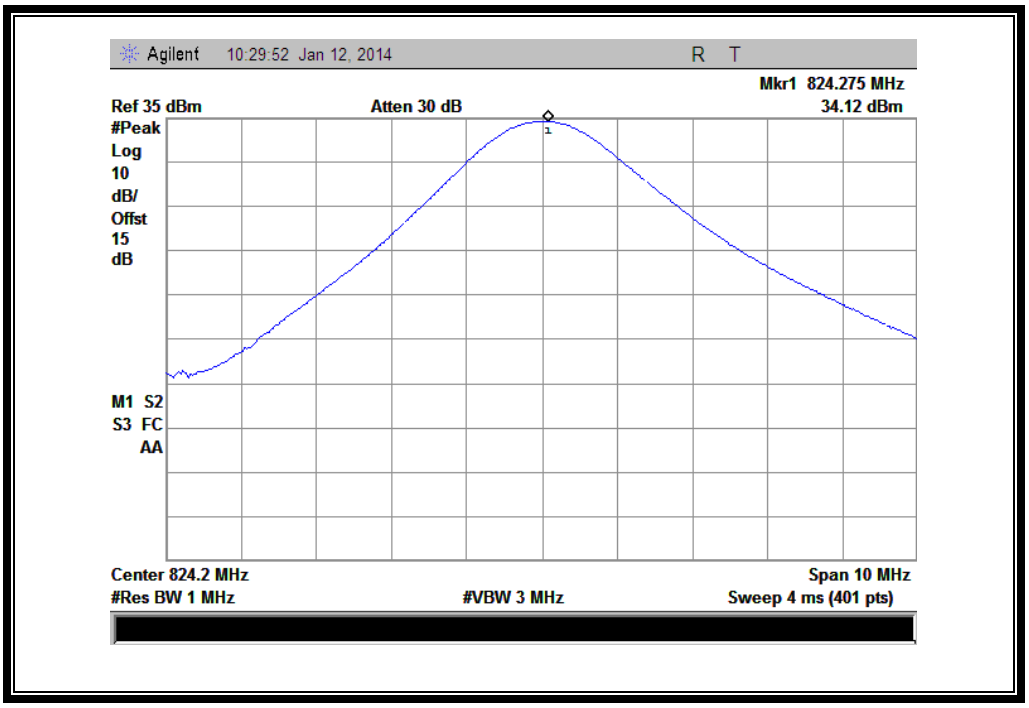
Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.

1. GSM Model Test Verdict:

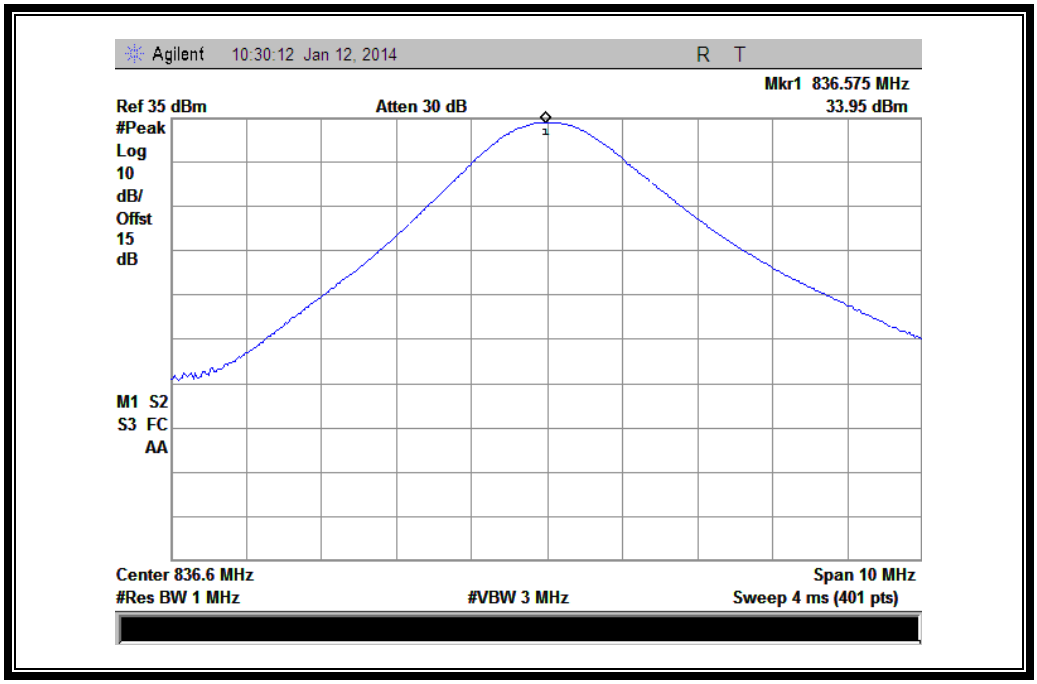
Band	Channel	Frequency (MHz)	Measured Output Power		Limit	Verdict
			dBm	Refer to Plot	dBm	
GSM 850MHz	128	824.2	34.12	Plot A1 to A3	35	PASS
	190	836.6	33.95			PASS
	251	848.8	33.05			PASS
GSM 1900MHz	512	1850.2	30.38	Plot B1 to B3	32	PASS
	661	1880.0	29.49			PASS
	810	1909.8	29.00			PASS
GPRS 850MHz	128	824.2	34.01	Plot C1 to C3[Note 1]	35	PASS
	190	836.6	33.90			PASS
	251	848.8	33.00			PASS
GPRS 1900MHz	512	1850.2	30.33	Plot D1 to D3[Note 1]	32	PASS
	661	1880.0	29.40			PASS
	810	1909.8	28.15			PASS
EGPRS 850MHz	128	824.2	34.28	Plot E1 to E3[Note 1]	35	PASS
	190	836.6	34.05			PASS
	251	848.8	33.18			PASS
EGPRS 1900MHz	512	1850.2	29.87	Plot F1 to F3[Note 1]	32	PASS
	661	1880.0	29.48			PASS
	810	1909.8	29.20			PASS

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

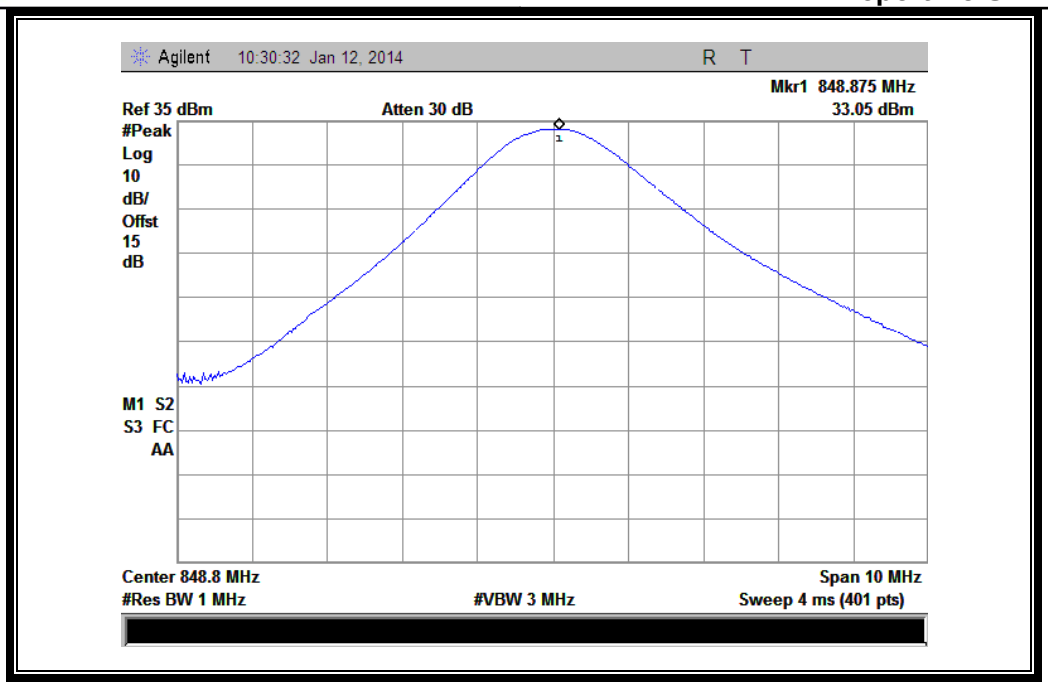
2. GSM Model Test Plots:



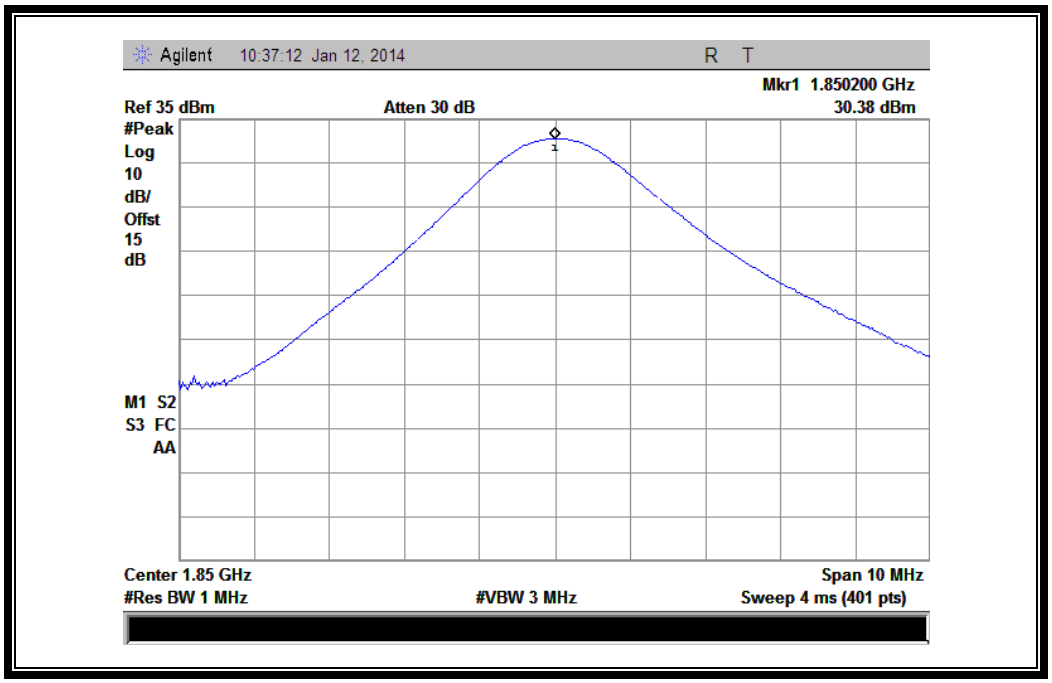
(Plot A1: GSM 850MHz Channel = 128)



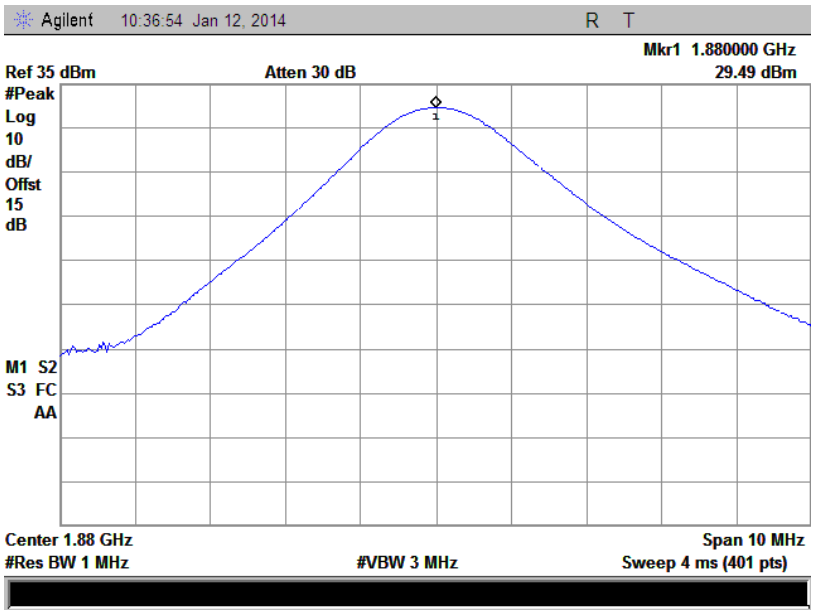
(Plot A2: GSM 850MHz Channel = 190)



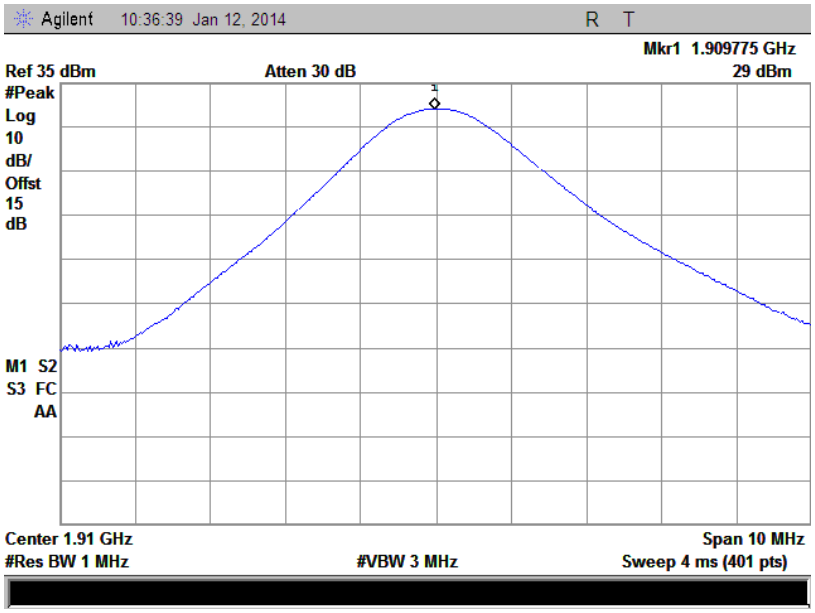
(Plot A3: GSM 850MHz Channel = 251)



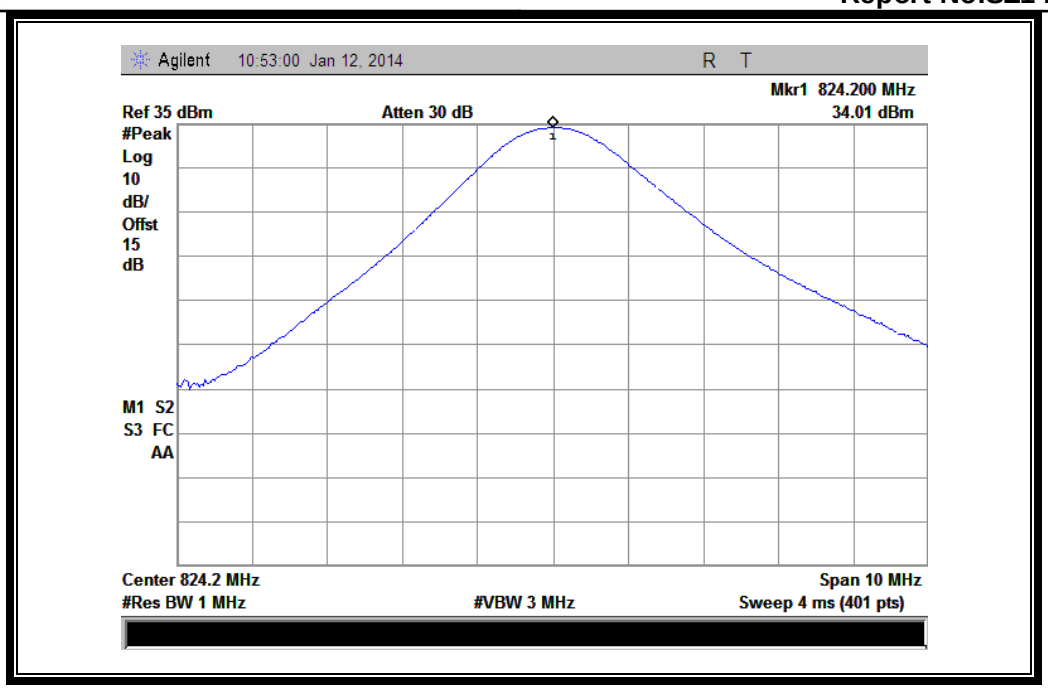
(Plot B1: GSM 1900MHz Channel = 512)



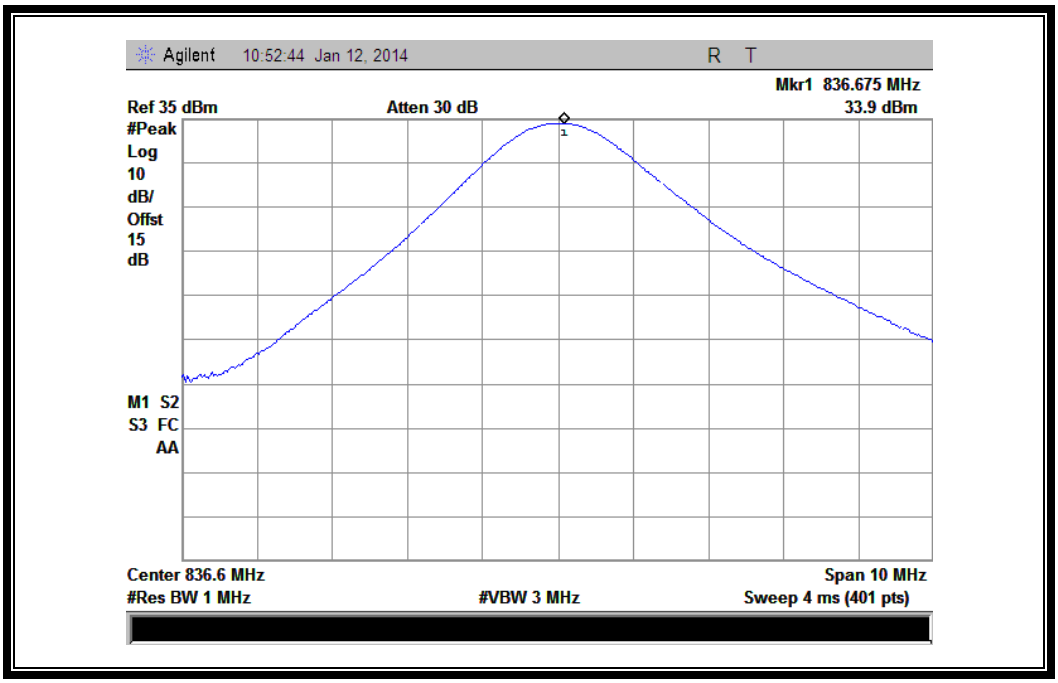
(Plot B2: GSM 1900MHz Channel = 661)



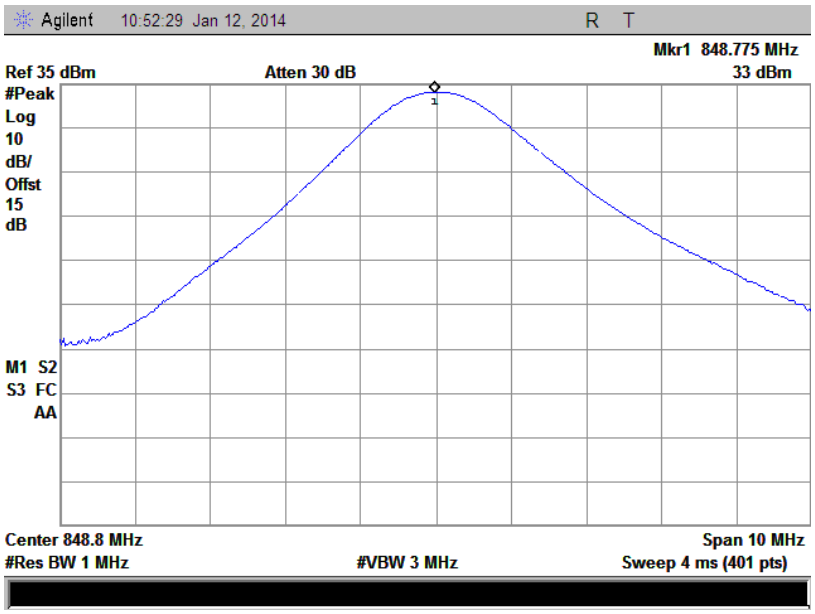
(Plot B3: GSM 1900Hz Channel = 810)



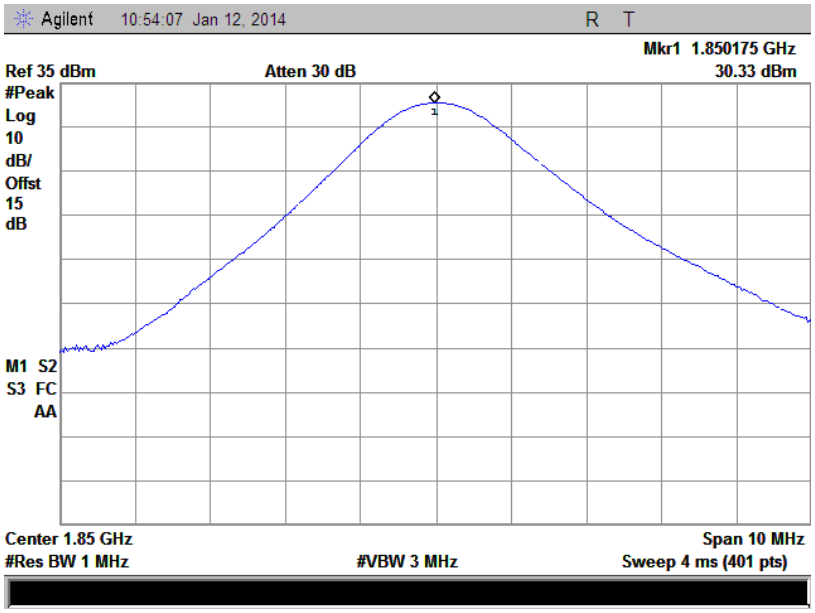
(Plot C 1: GPRS 850MHz Channel = 128)



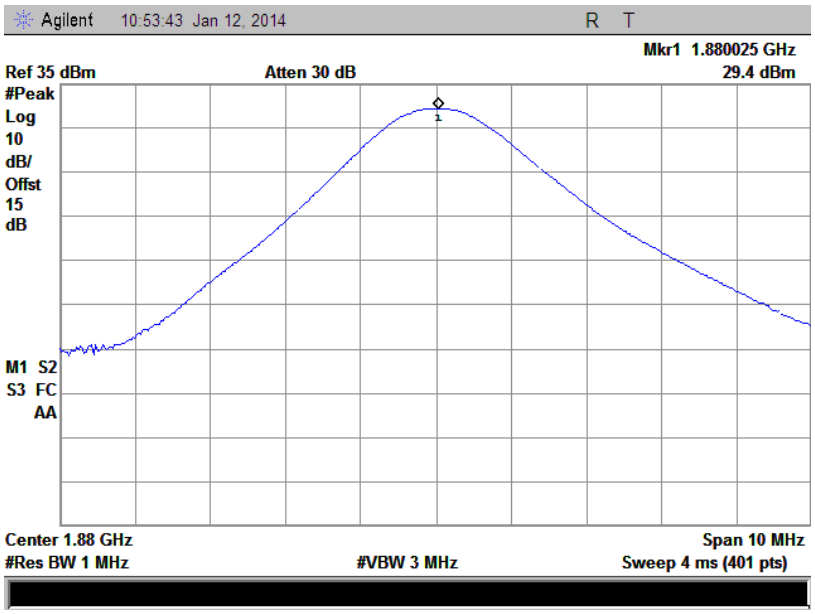
(Plot C 2: GPRS 850MHz Channel = 190)



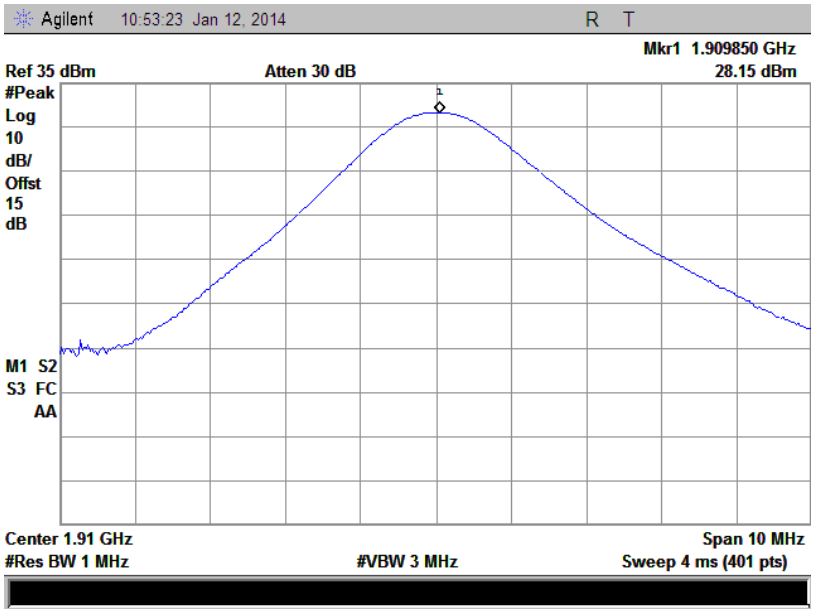
(Plot C 3: GPRS 850MHz Channel = 251)



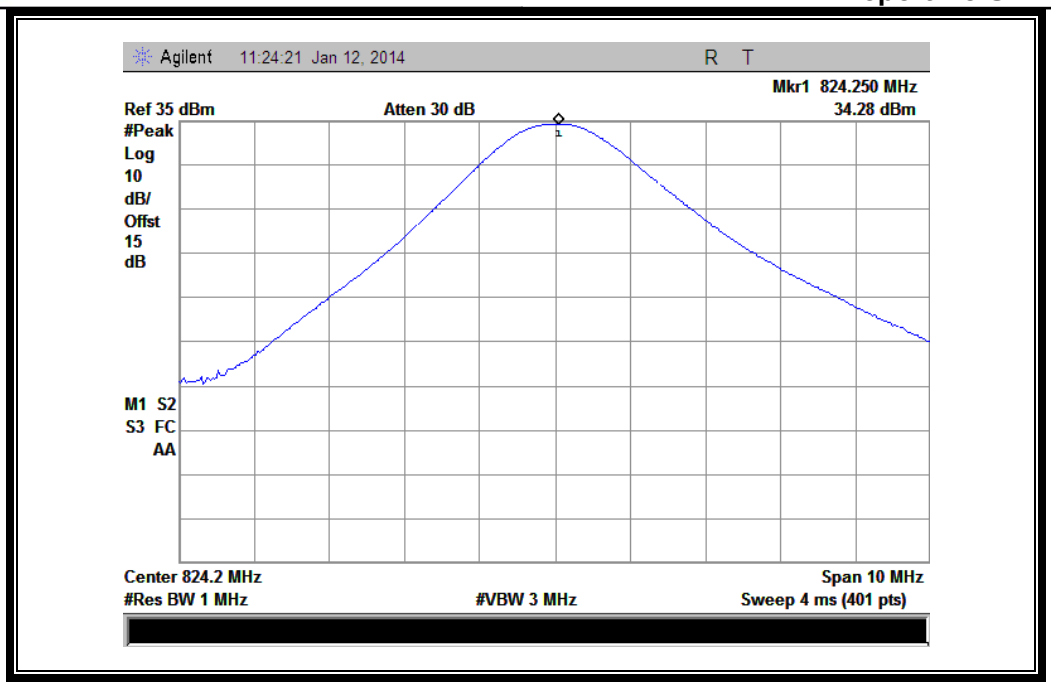
(Plot D 1: GPRS 1900MHz Channel = 512)



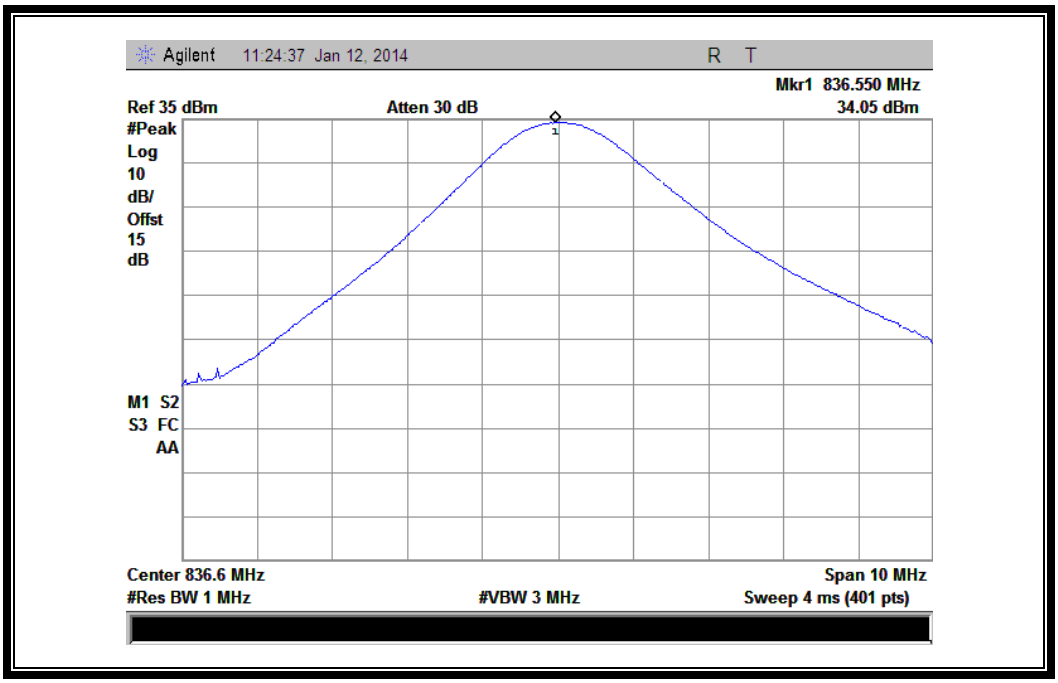
(Plot D 2: GPRS 1900MHz Channel = 661)



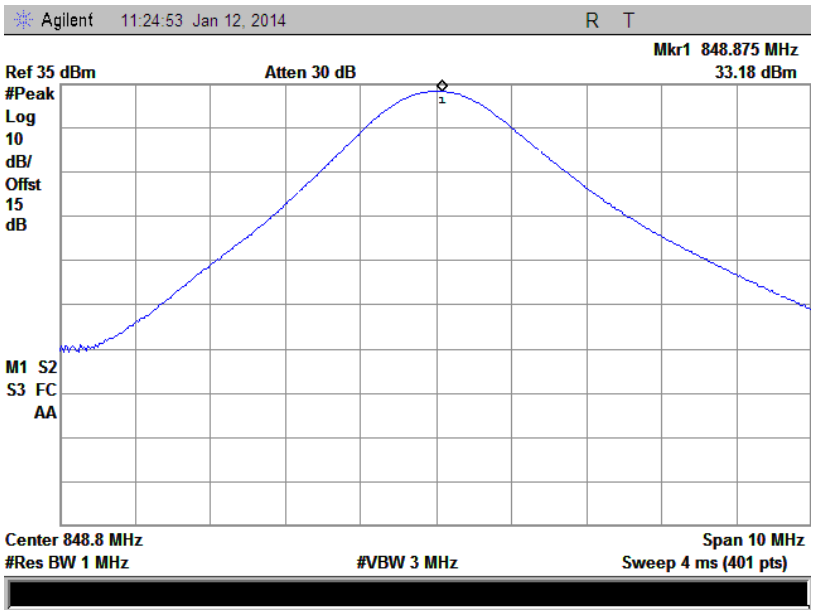
(Plot D 3: GPRS 1900MHz Channel = 810)



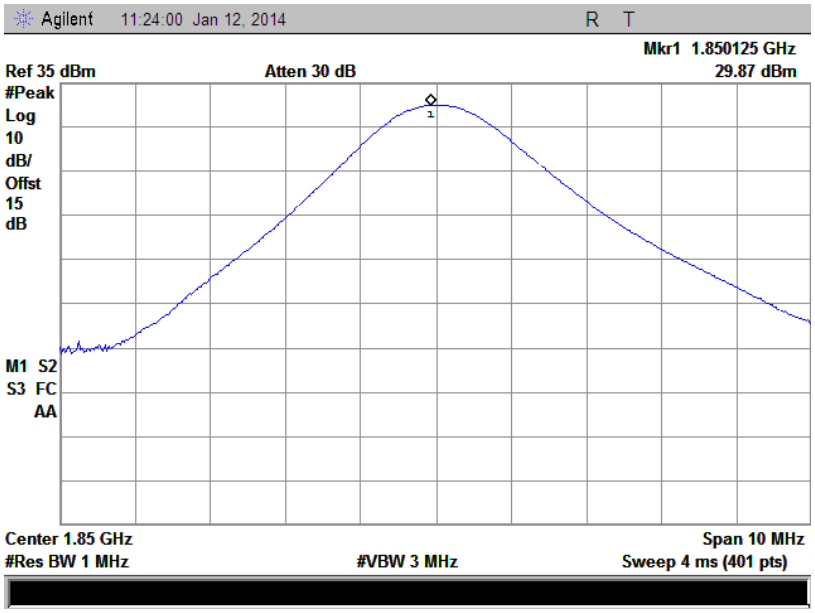
(Plot E1: EGPRS 850MHz Channel = 128)



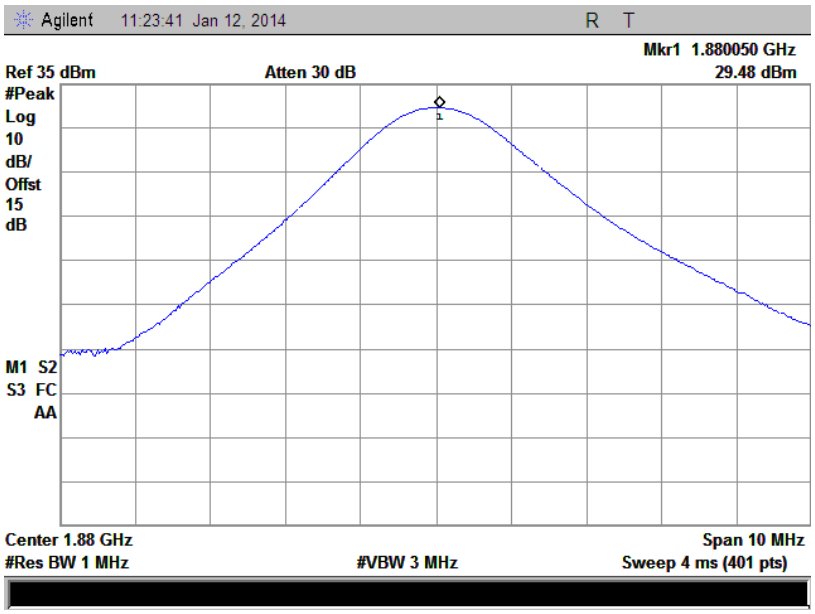
(Plot E2: EGPRS 850MHz Channel = 190)



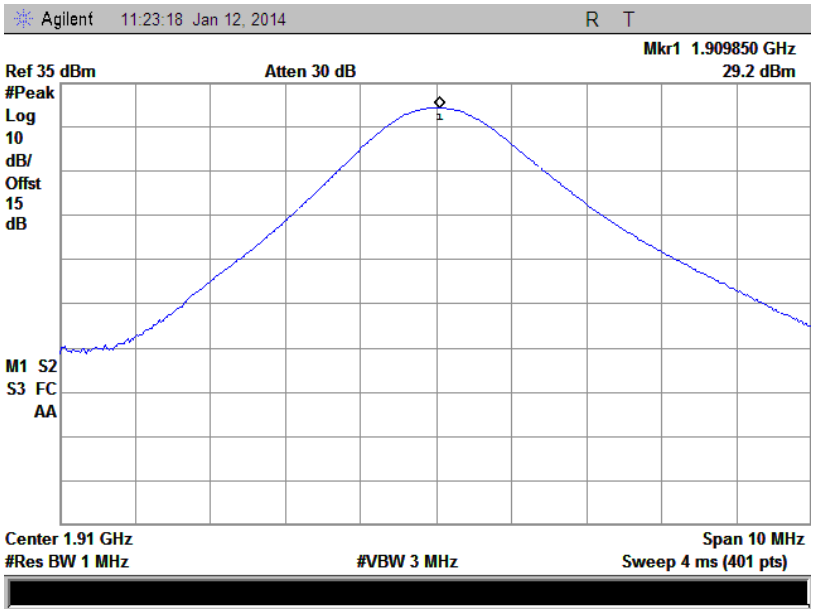
(Plot E3: EGPRS 850MHz Channel = 251)



(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=3MHz, peak detector in spectrum analyzer.

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

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

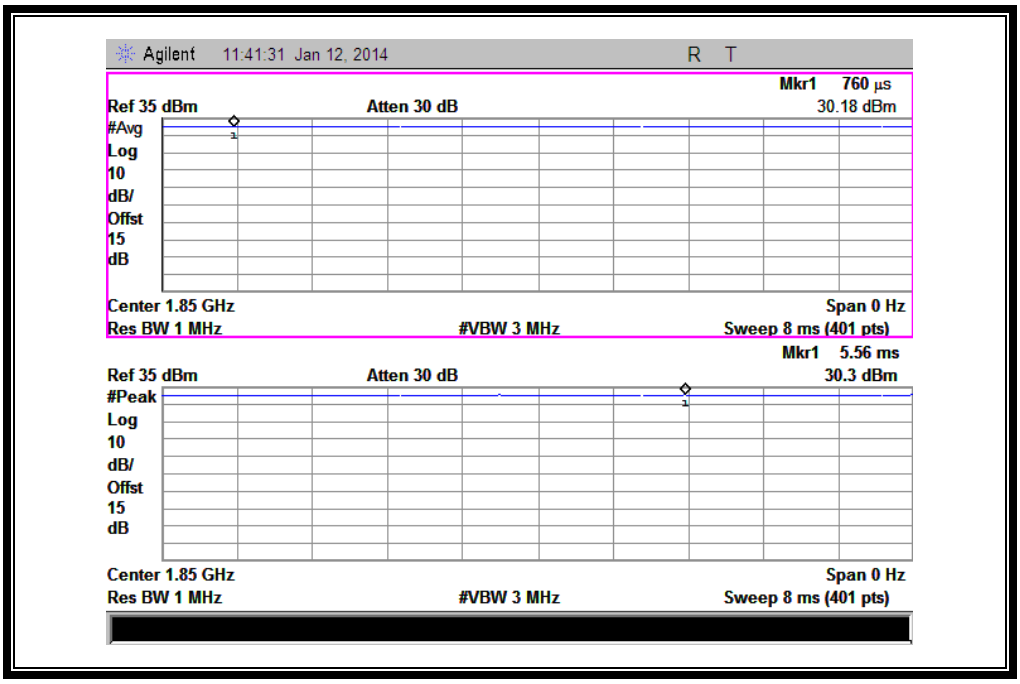
B. For UMTS operating mode:

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

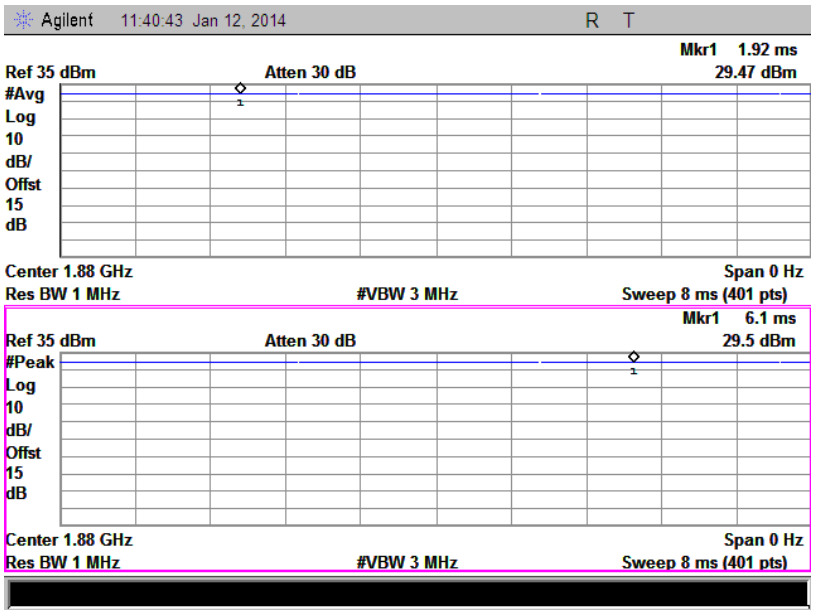
b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.

1. Test Verdict:

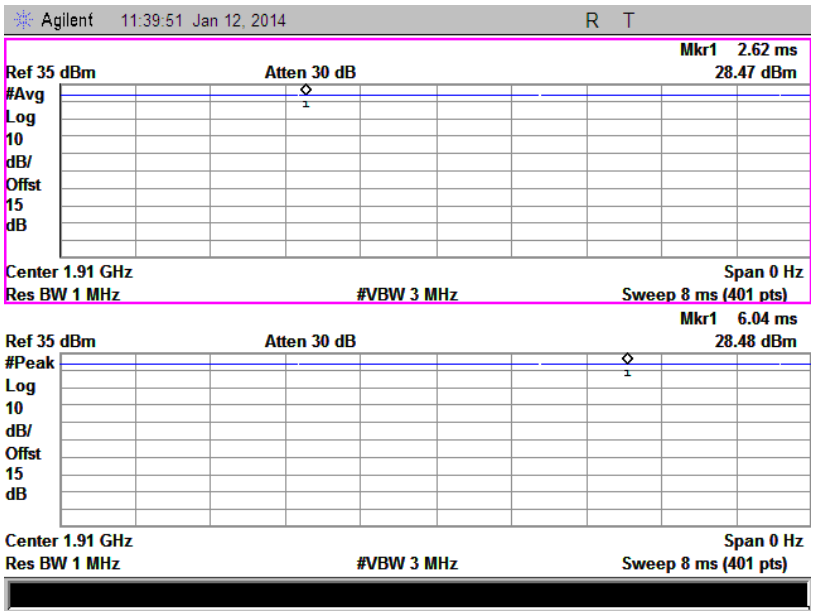
Band	Channel	Frequency (MHz)	Peak to Average radio		Limit	Verdict
			dBm	Refer to Plot	dBm	
GSM 1900MHz	512	1850.2	0.12	Plot A1 to A3	13	PASS
	661	1880.0	0.03			PASS
	810	1909.8	0.01			PASS
EGPRS 1900MHz	512	1850.2	0.04	Plot B1 to B3	13	PASS
	661	1880.0	0.02			PASS
	810	1909.8	0.01			PASS



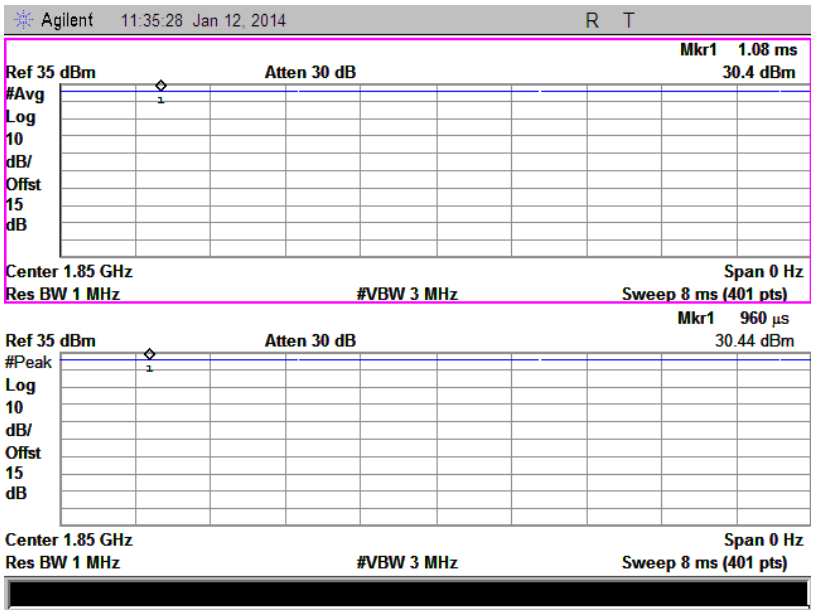
(Plot A1: GSM 1900 MHz Channel = 512)



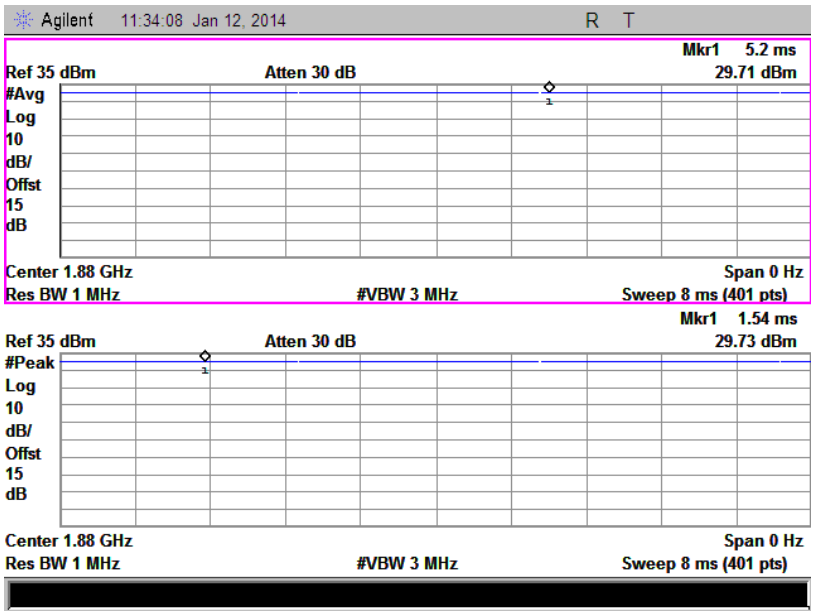
(Plot A2: GSM 1900 MHz Channel = 661)



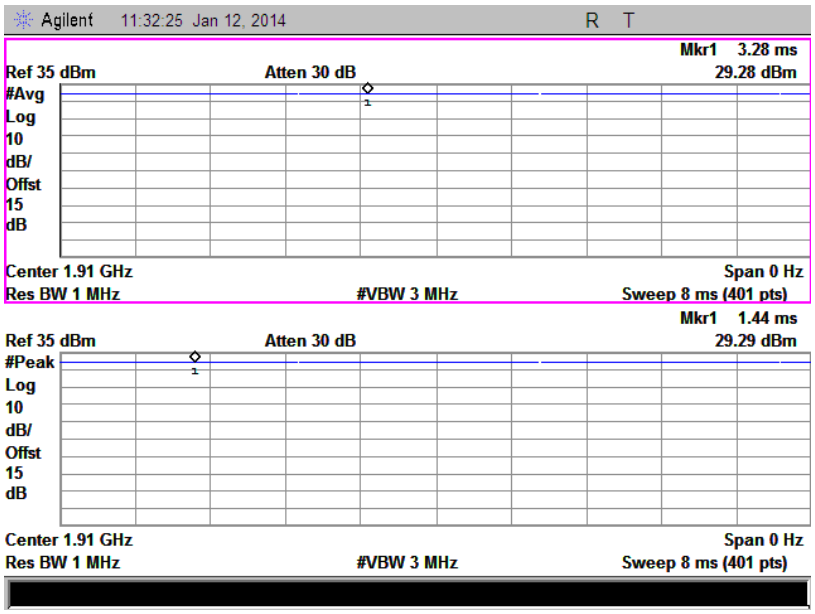
(Plot A3: GSM 1900MHz Channel = 810)



(Plot B1: EGPRS 1900MHz Channel = 512)



(Plot B2: EGPRS 1900MHz Channel = 661)



(Plot B3: EGPRS 1900MHz Channel = 810)

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.

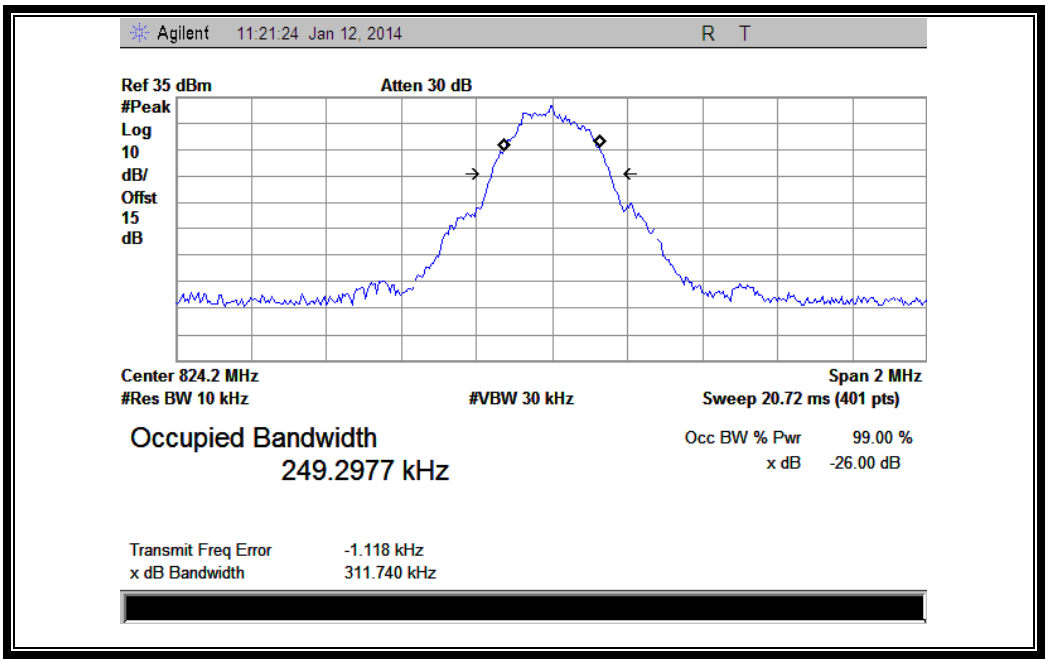
2.3.3 Test Verdict

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

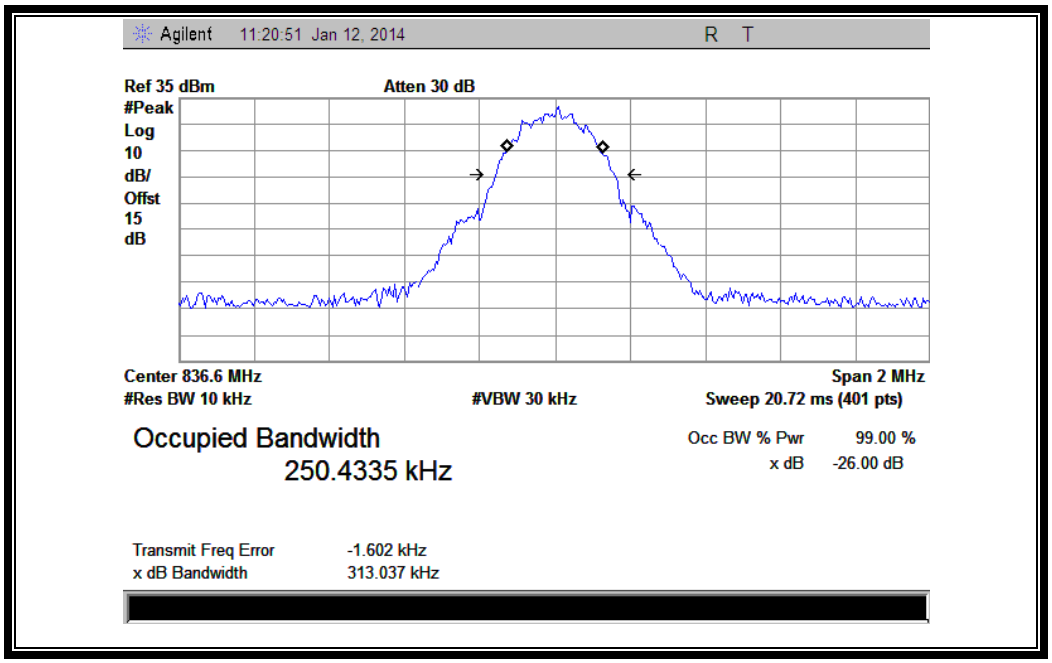
2. Test Verdict:

Band	Channel	Frequency (MHz)	26dB bandwidth	99% Occupied Bandwidth	Refer to Plot
EDGE 850MHz	128	824.2	311.7 KHz	249.30 KHz	Plot A
	190	836.6	313.0 KHz	250.43 KHz	Plot B
	251	848.8	314.6 KHz	241.09 KHz	Plot C
EDGE 1900MHz	512	1850.2	309.6 KHz	233.72 KHz	Plot D
	661	1880.0	323.5 KHz	249.97 KHz	Plot E
	810	1909.8	308.7 KHz	245.21 KHz	Plot F
GSM 850MHz	128	824.2	317.6 KHz	245.12 KHz	Plot G
	190	836.6	310.6 KHz	242.82 KHz	Plot H
	251	848.8	311.4 KHz	247.34 KHz	Plot I
GSM 1900MHz	512	1850.2	312.2 KHz	238.87 KHz	Plot J
	661	1880.0	307.1 KHz	247.90 KHz	Plot K
	810	1909.8	321.6 KHz	249.30 KHz	Plot L
GPRS 850MHz	128	824.2	315.0 KHz	245.09 KHz	Plot M
	190	836.6	311.2 KHz	240.17 KHz	Plot N
	251	848.8	308.4 KHz	242.09 KHz	Plot O
GPRS 1900MHz	512	1850.2	320.7 KHz	245.83 KHz	Plot P
	661	1880.0	326.9 KHz	245.19 KHz	Plot Q
	810	1909.8	312.2 KHz	249.08 KHz	Plot R

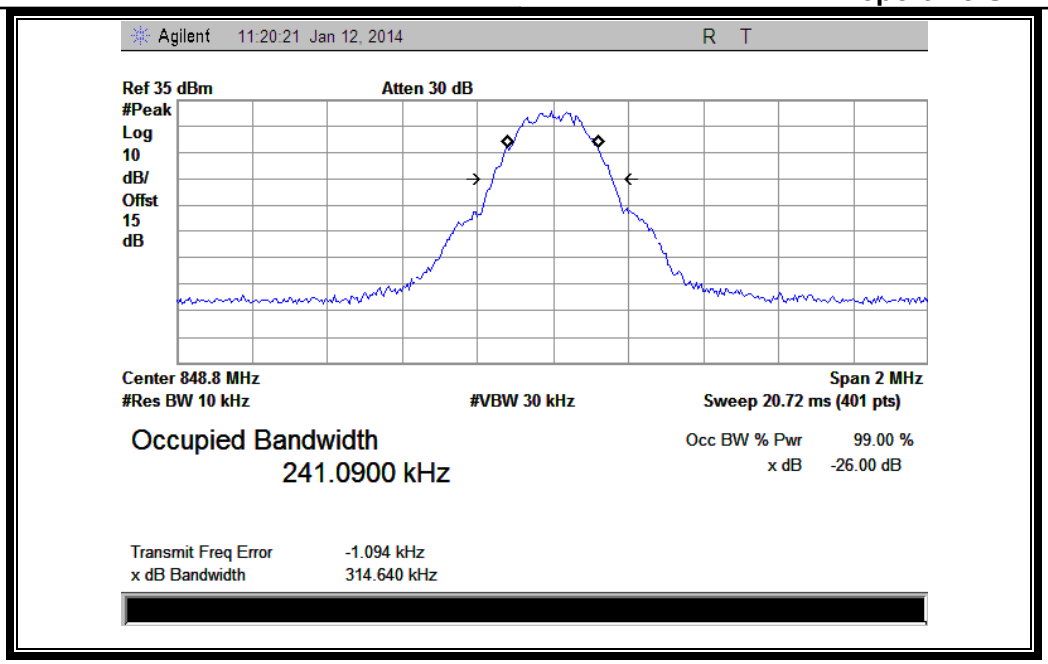
3. Test Plots:



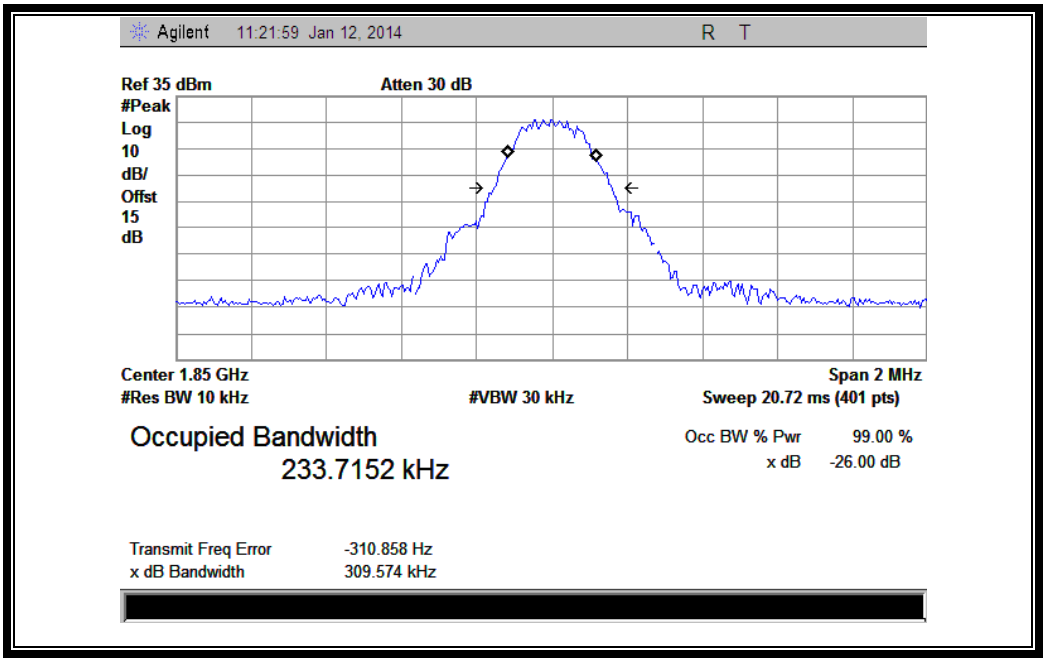
(Plot A: EGPRS 850MHz Channel = 128)



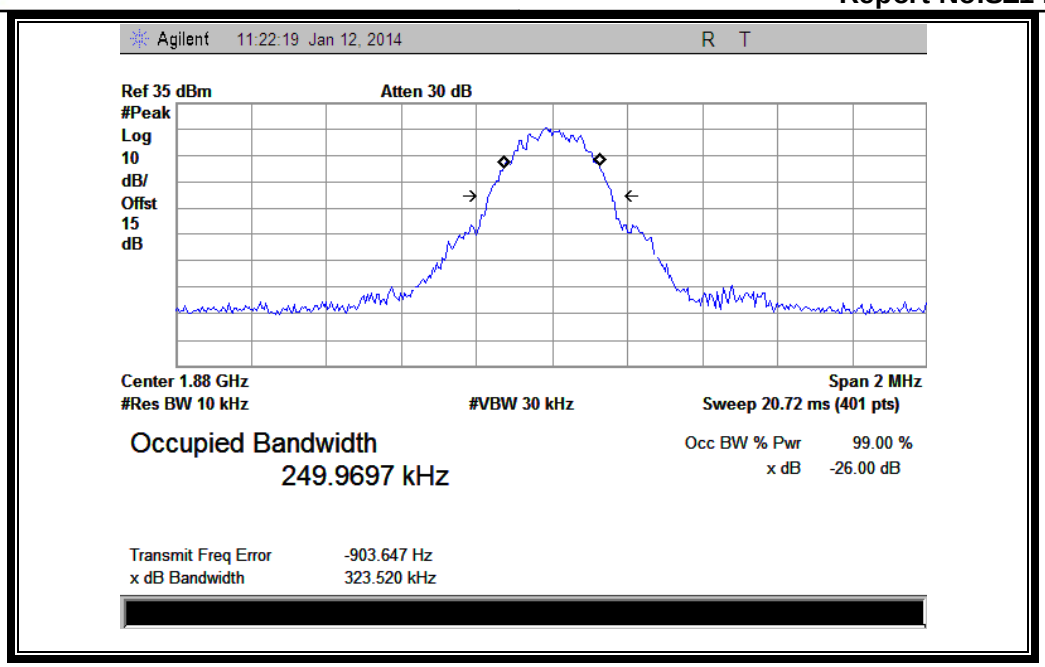
(Plot B: EGPRS 850MHz Channel = 190)



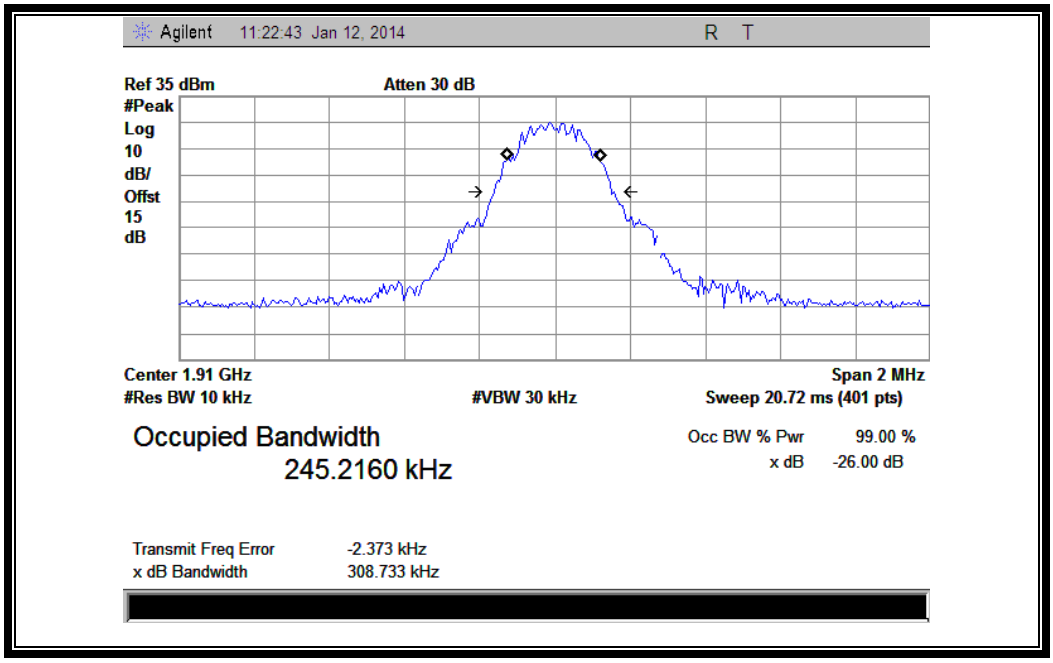
(Plot C: EGPRS 850MHz Channel = 251)



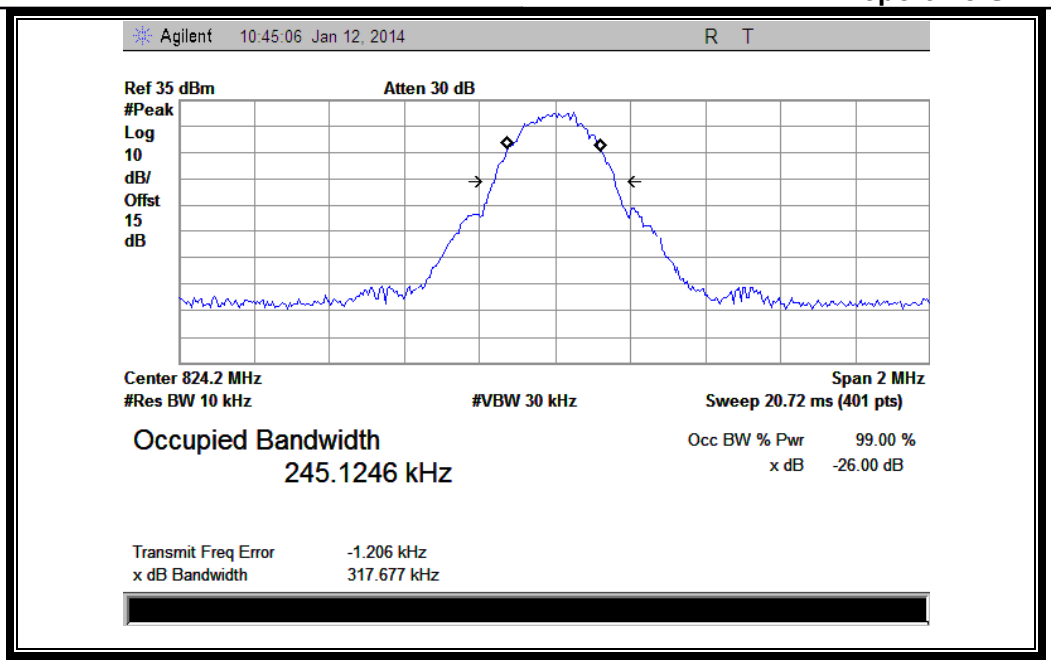
(Plot D: EGPRS1900MHz Channel = 512)



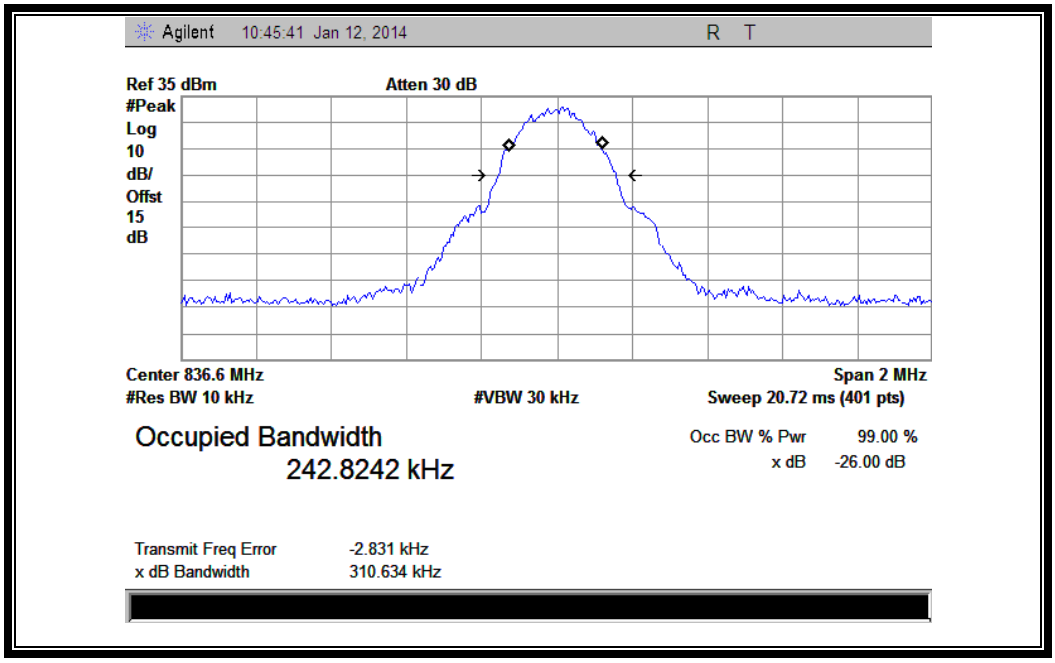
(Plot E: EGPRS1900MHz Channel = 661)



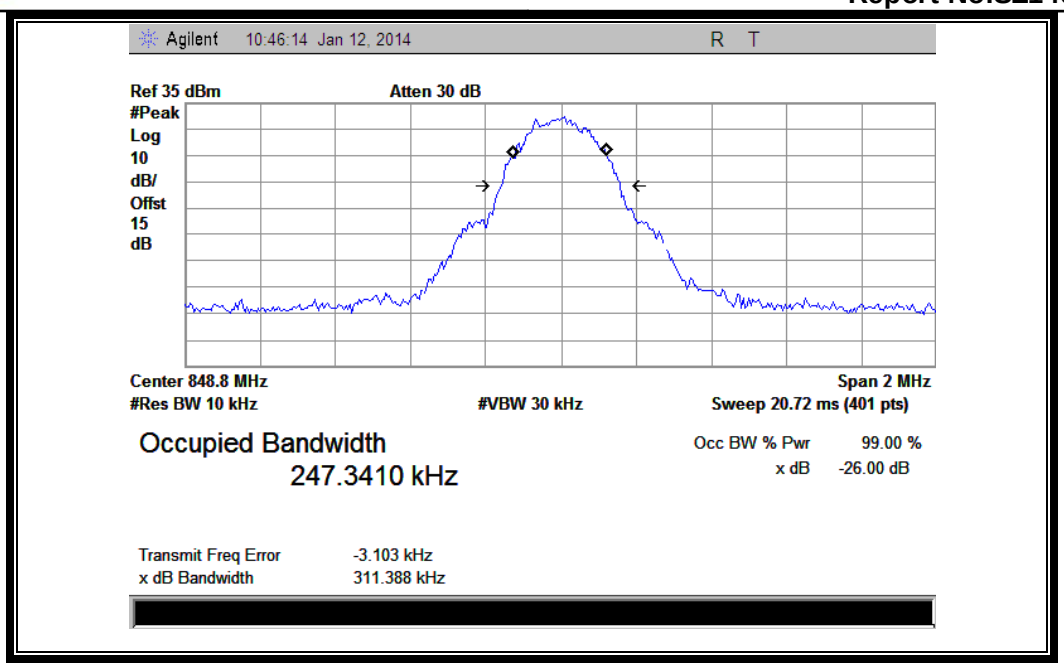
(Plot F: EGPRS 1900MHz Channel = 810)



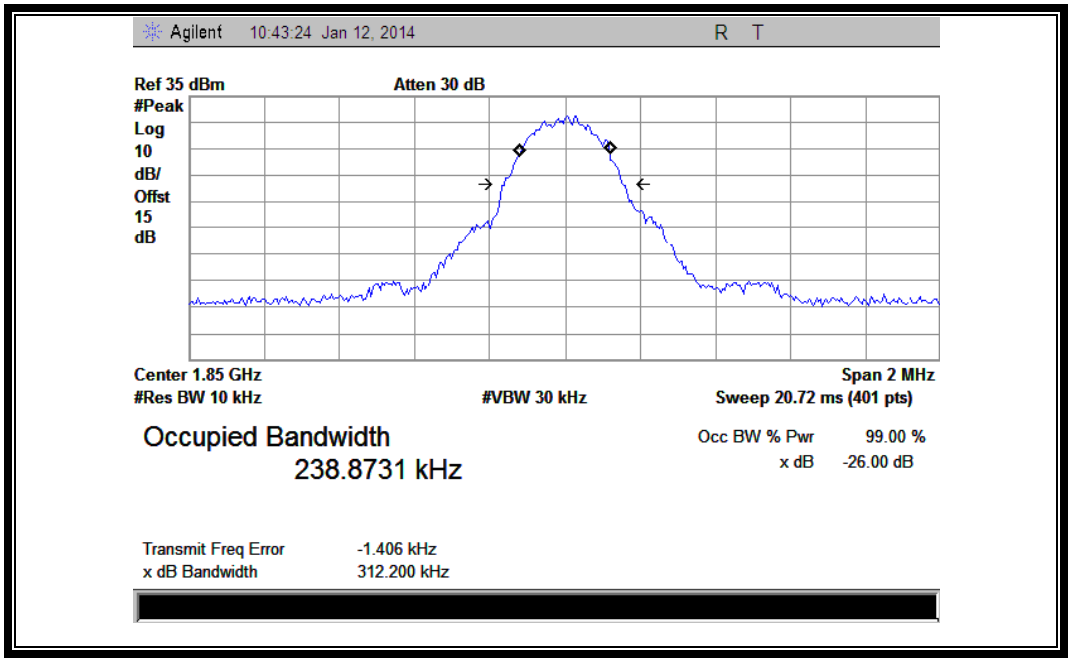
(Plot G: GSM 850MHz Channel = 128)



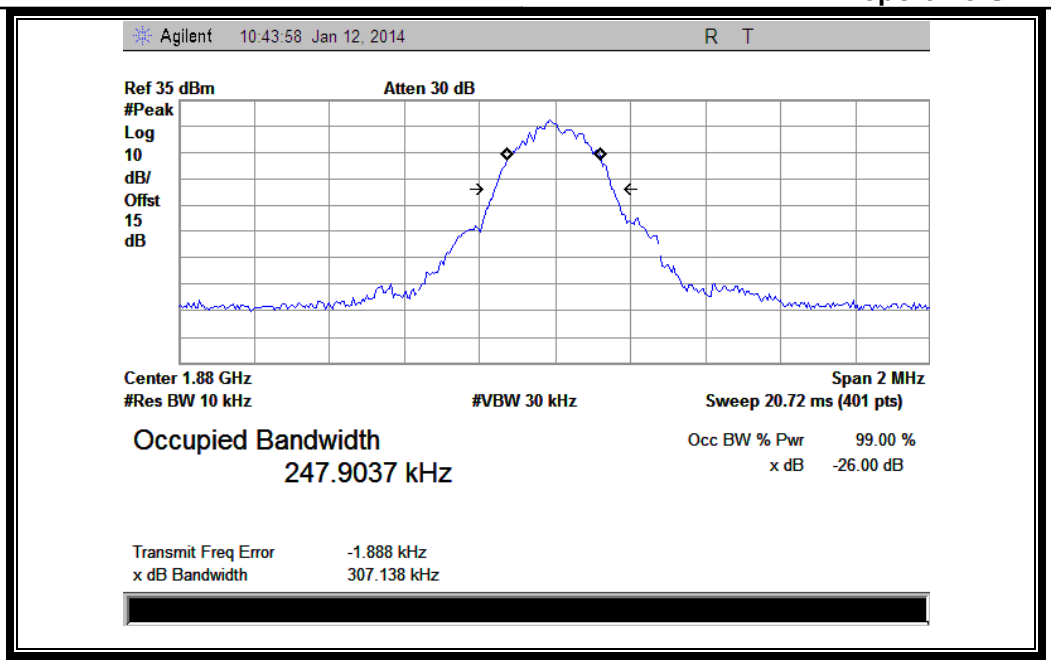
(Plot H: GSM 850MHz Channel = 190)



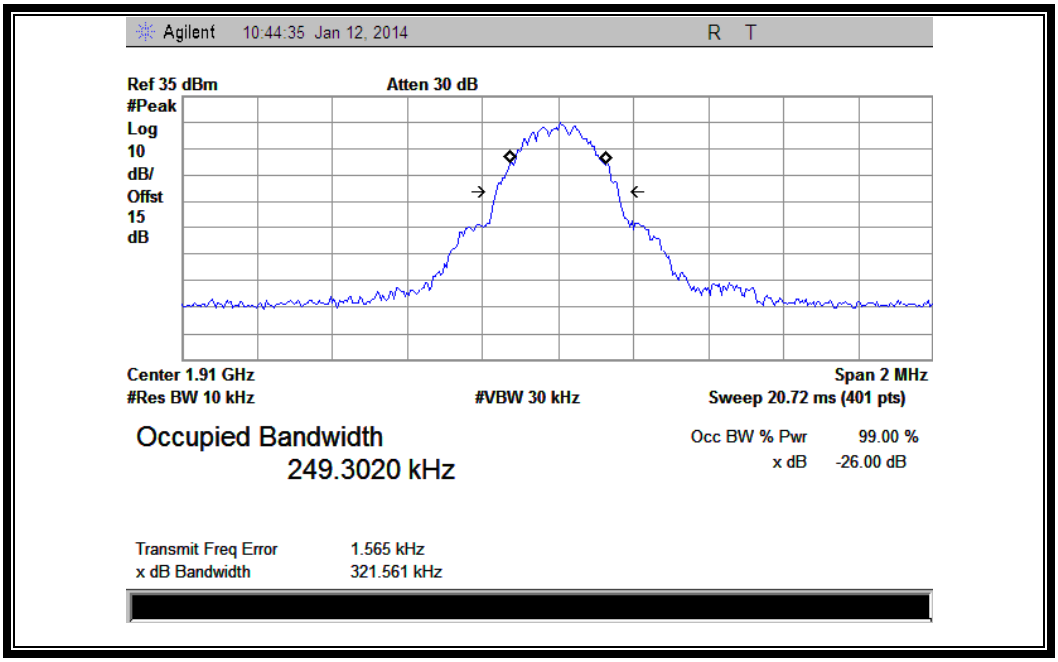
(Plot I: GSM 850MHz Channel = 251)



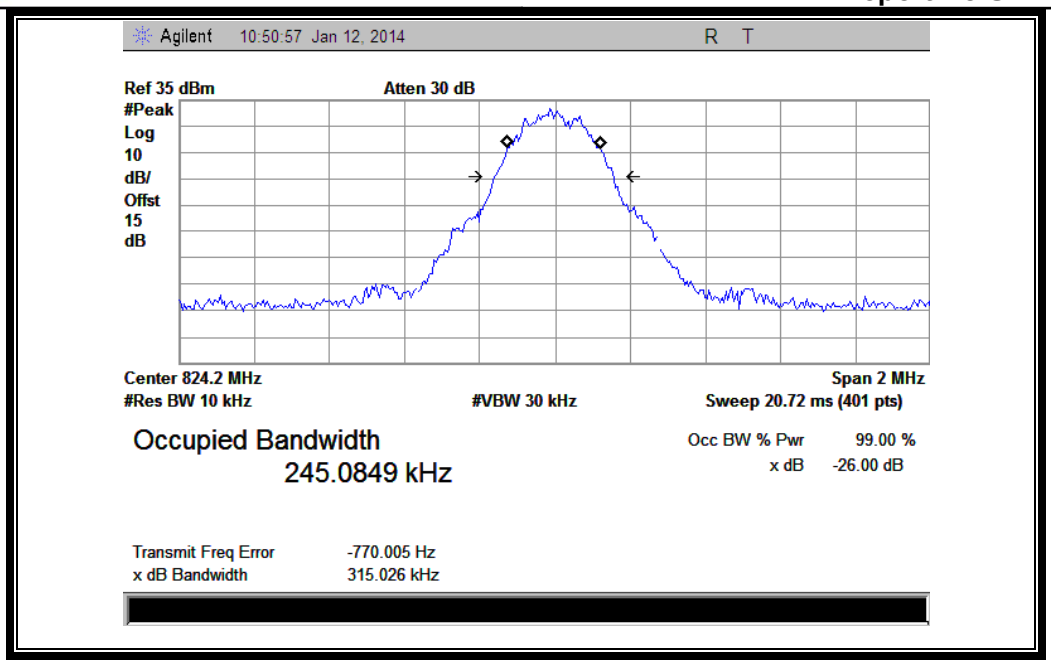
(Plot J: GSM 1900MHz Channel = 512)



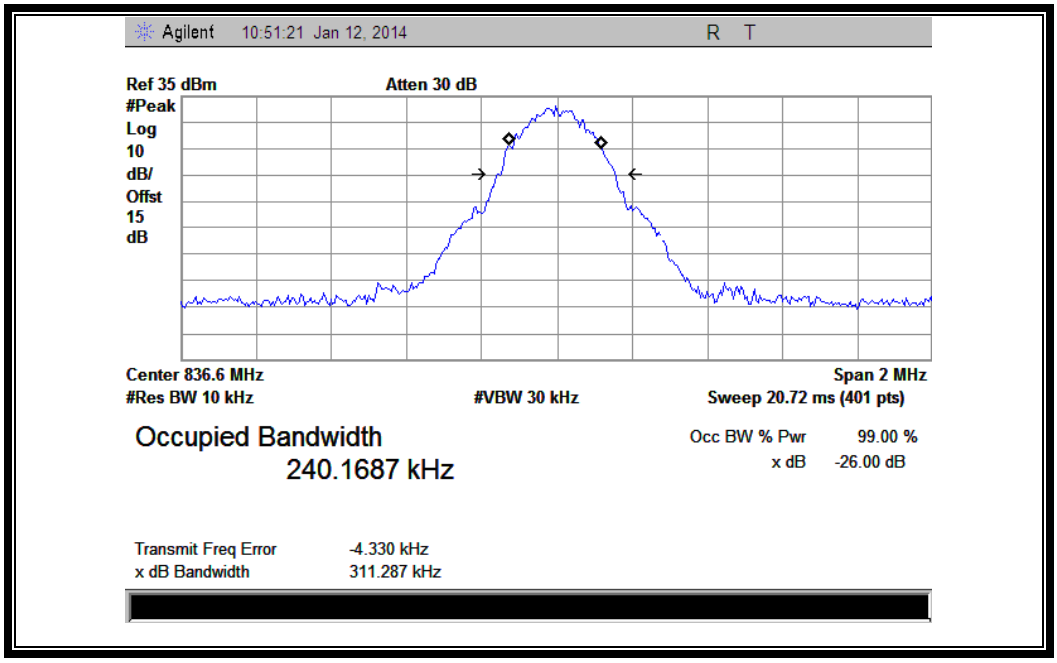
(Plot K: GSM 1900MHz Channel = 661)



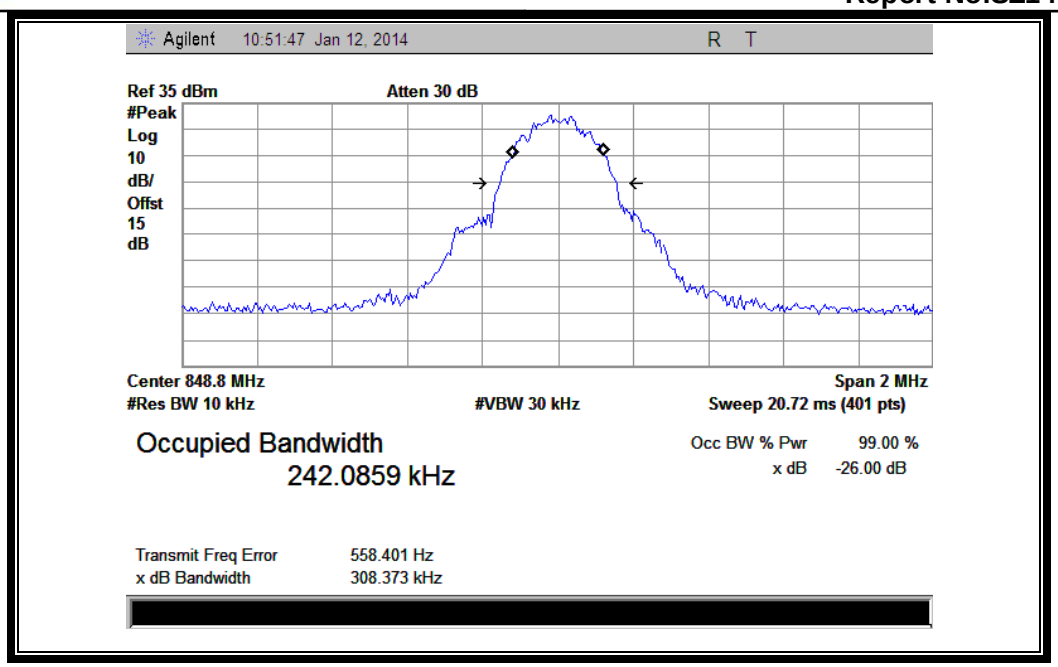
(Plot L: GSM 1900MHz Channel = 810)



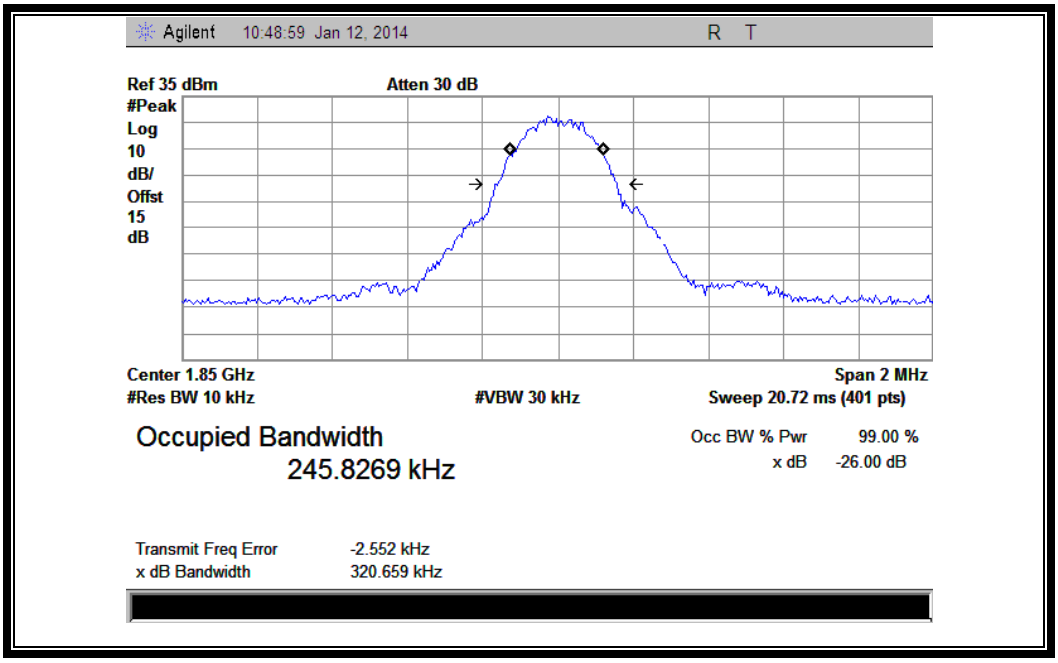
(Plot M: GPRS 850MHz Channel = 128)



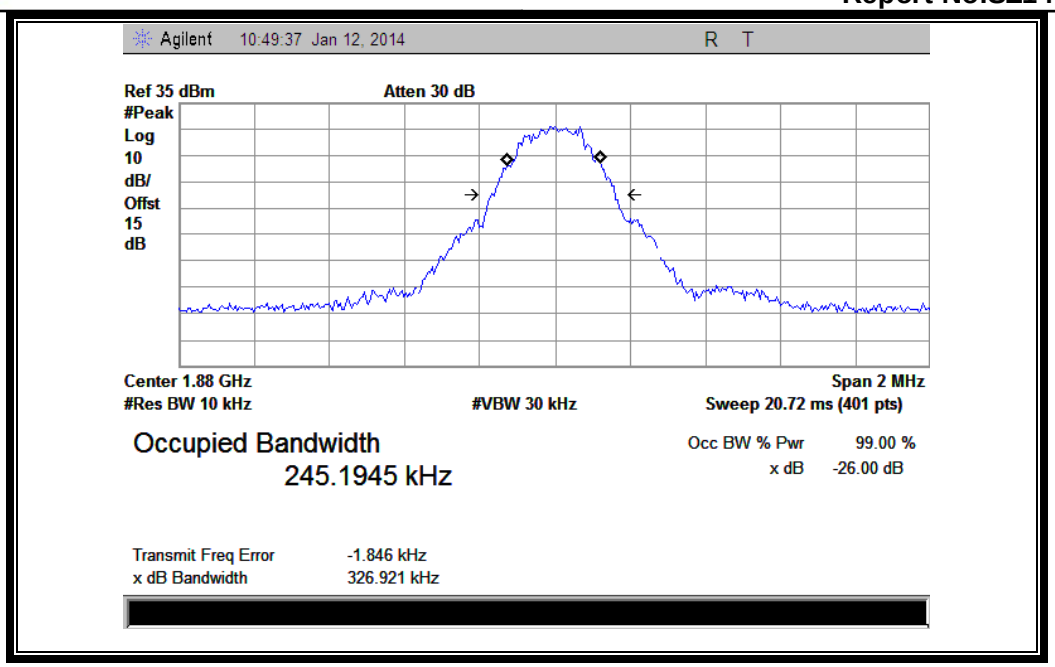
(Plot N: GPRS 850MHz Channel = 190)



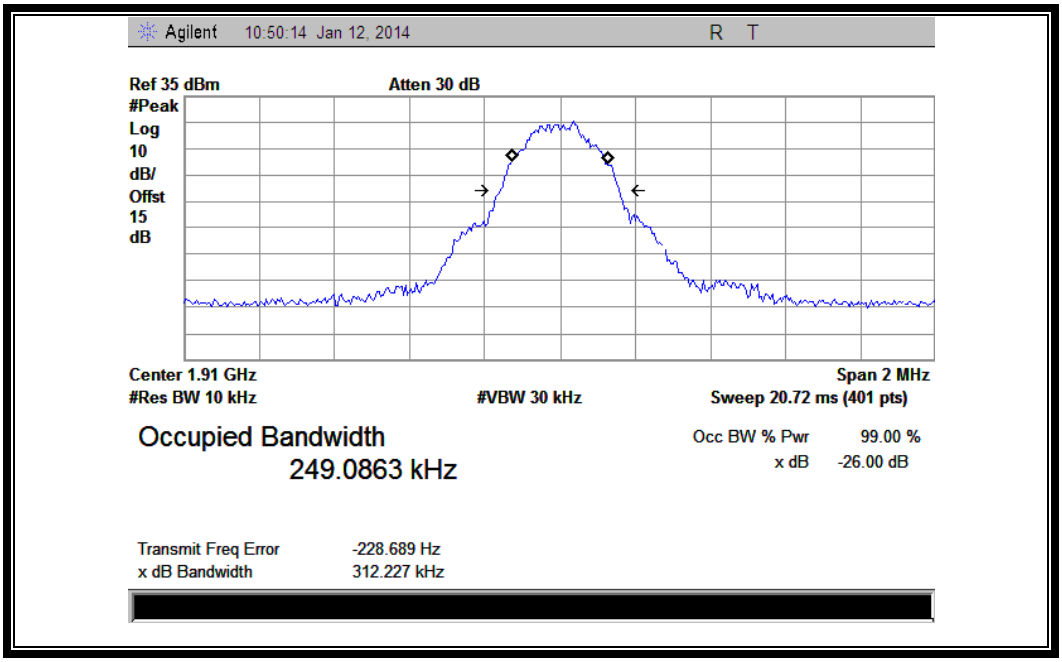
(Plot O: GPRS850MHz Channel = 251)



(Plot P: GPRS 1900MHz Channel = 512)



(Plot Q: GPRS 1900MHz Channel = 661)



(Plot R: GPRS 1900MHz Channel = 810)

2.4 Frequency Stability

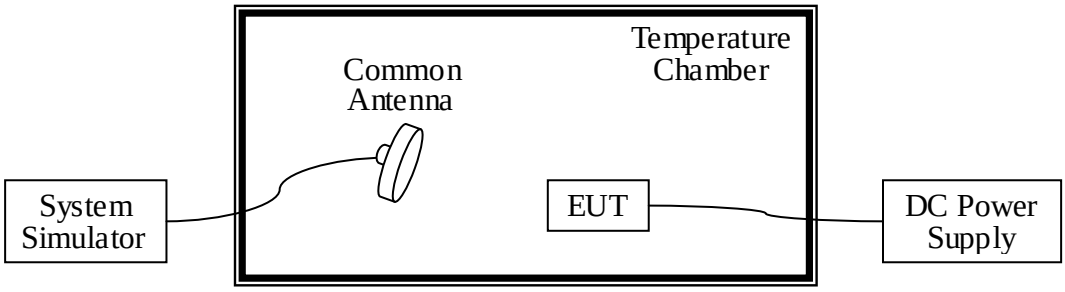
2.4.1 Requirement

According to FCC section 22.355 and FCC section 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

(a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.
(b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.4.2 Test Description

1. Test Setup:



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

2. Equipments List:

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

2.4.3 Test Verdict

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

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

1. GSM 850MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 128 (824.2MHz)		Channel = 190 (836.6MHz)		Channel = 251 (848.8MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.7	-30	-15.77	±2060.5	19.39	±2091.5	-16.15	±2122	PASS
	-20	-16.33		25.15		19.19		
	-10	11.51		30.23		25.27		
	0	21.31		-29.21		30.11		
	+10	30.63		17.24		-29.22		
	+20	-29.17		-19.19		19.09		
	+30	19.39		26.33		-19.17		
	+40	-19.21		18.71		-16.28		
	+55	25.81		19.36		19.39		
4.2	+25	11.35		28.56		25.37		
3.4	+25	-17.01		31.27		30.21		

2. GSM 1900MHz Band

Test Conditions		Frequency Deviation						Verdict
Power (VDC)	Temperature (°C)	Channel = 512 (1850.2MHz)		Channel = 661 (1880.0MHz)		Channel = 810 (1909.8MHz)		
		Hz	Limits	Hz	Limits	Hz	Limits	
3.7	-30	-0.59	±1850.2	-15.29	±1880.0	12.56	±1909.8	PASS
	-20	21.45		17.31		-13.59		
	-10	13.45		22.36		37.10		
	0	1.31		30.27		-20.03		
	+10	-12.52		-29.21		-11.31		
	+20	30.62		19.33		13.76		
	+30	13.45		-19.25		12.22		
	+40	-12.52		26.29		10.07		
	+55	30.62		18.33		13.95		
4.2	+25	-0.59		-16.28		12.56		
3.4	+25	21.91		11.17		-13.11		

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	
3.7	-30	17.31	±2060.5	25.12	±2091.5	18.51	±2122	PASS
	-20	22.31		11.33		11.37		
	-10	30.22		-17.55		-17.11		
	0	-29.21		38.10		38.07		
	+10	19.33		-22.06		-22.13		
	+20	-19.27		-16.11		-16.19		
	+30	26.29		17.76		17.27		
	+40	18.97		15.64		15.55		
	+55	-16.28		3.67		3.59		
4.2	+25	17.31		11.33		13.51		
3.4	+25	22.31		-17.55		11.49		

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	
3.7	-30	-13.11	±1850.2	23.21	±1880.0	2.19	±1909.8	PASS
	-20	0.27		7.15		-11.26		
	-10	21.69		-24.31		-12.22		
	0	12.15		-1.29		13.18		
	+10	-11.79		-18.23		5.31		
	+20	-2.33		-21.15		35.02		
	+30	13.23		14.51		-26.72		
	+40	5.29		-0.98		19.59		
	+55	-2.51		36.81		-16.65		
4.2	+25	17.66		3.78		26.71		
3.4	+25	-8.21		10.32		19.37		

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

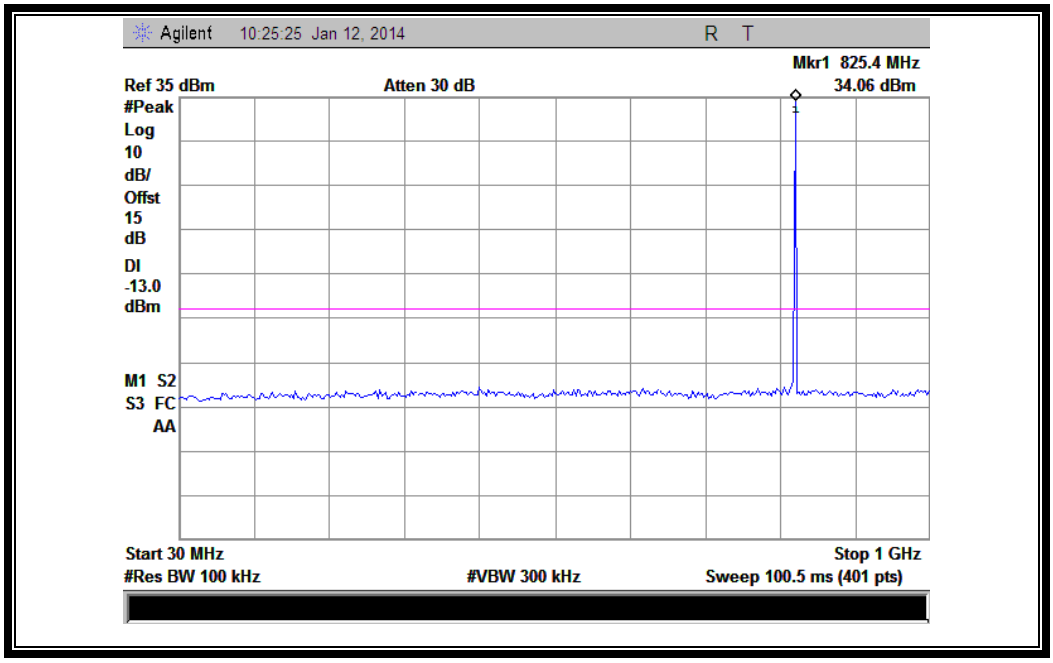
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.

1. Test Verdict:

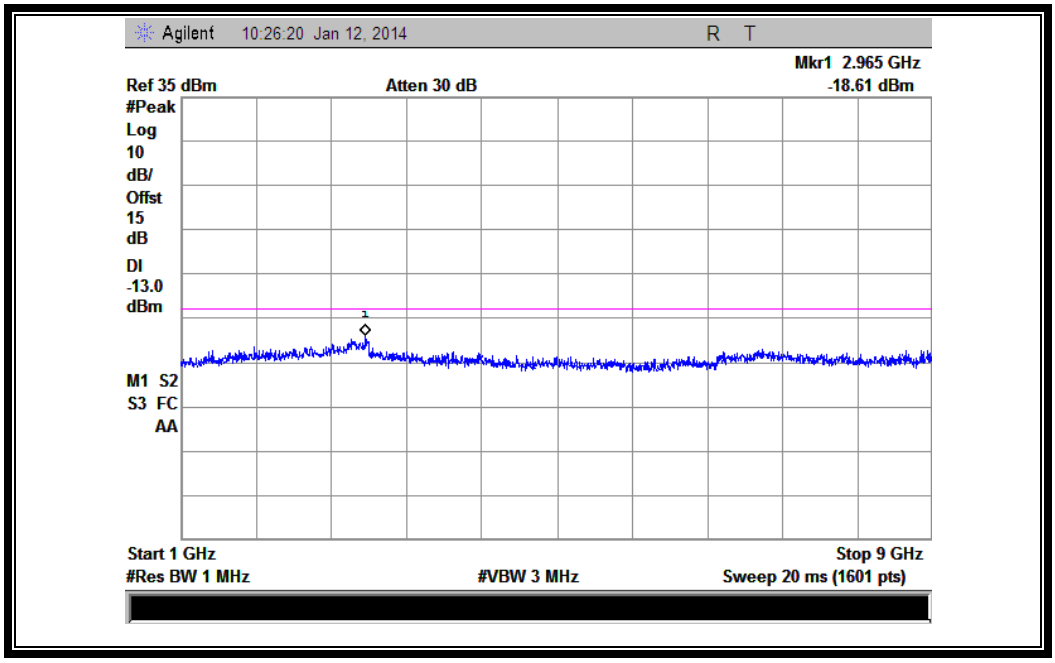
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GSM 850MHz	128	824.2	-18.61	Plot A1toA1.1	-13	PASS
	190	836.6	-19.11	Plot A2toA2.1		PASS
	251	848.8	-18.31	Plot A3toA3.1		PASS
GSM 1900MHz	512	1850.2	-18.99	Plot B1toB1.1	-13	PASS
	661	1880.0	-19.00	Plot B2toB2.1		PASS
	810	1909.8	-19.98	Plot B3toB3.1		PASS
EDGE 850MHz	128	824.2	-17.55	Plot C1toC1.1	-13	PASS
	190	836.6	-18.87	Plot C2toC2.1		PASS
	251	848.8	-19.24	Plot C3toC3.1		PASS
EDGE 1900MHz	512	1850.2	-18.07	Plot D1toD1.1	-13	PASS
	661	1880.0	-19.94	Plot D2toD2.1		PASS
	810	1909.8	-19.74	Plot D3toD3.1		PASS

2. Test Plots for the Whole Measurement Frequency Range:

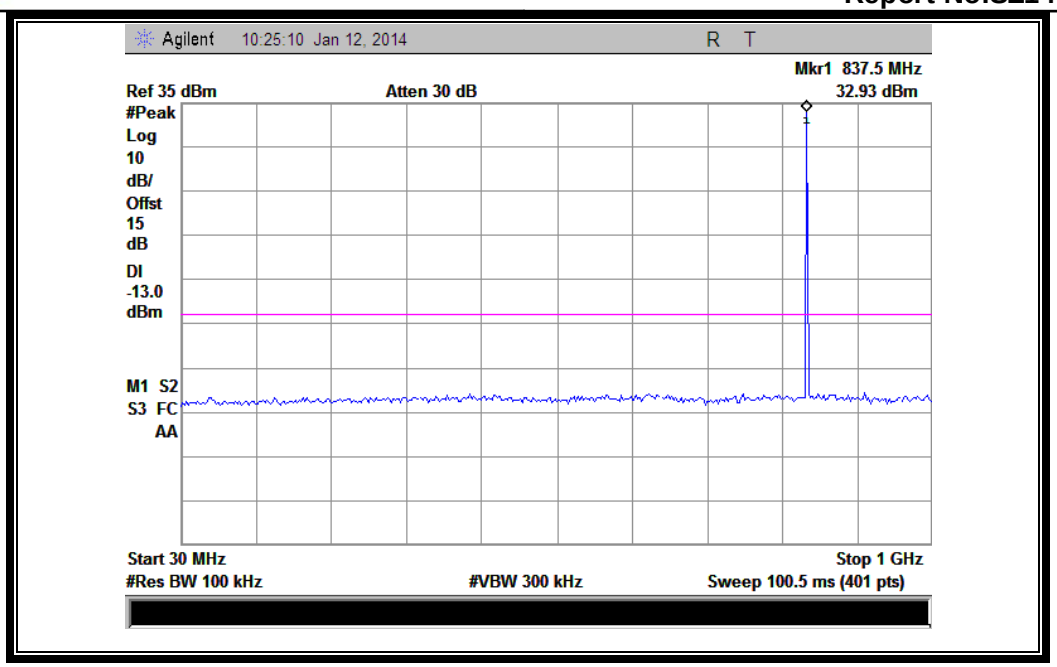
Note: the power of the EUT transmitting frequency should be ignored.



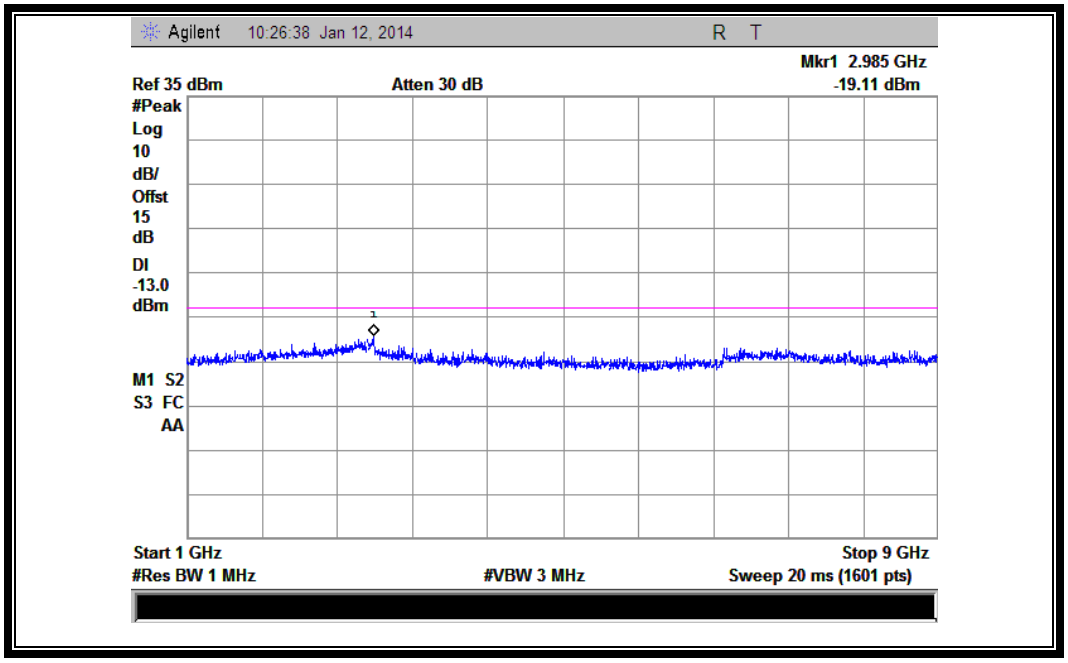
(Plot A1: GSM 850MHz Channel = 128, 30MHz to 1GHz)



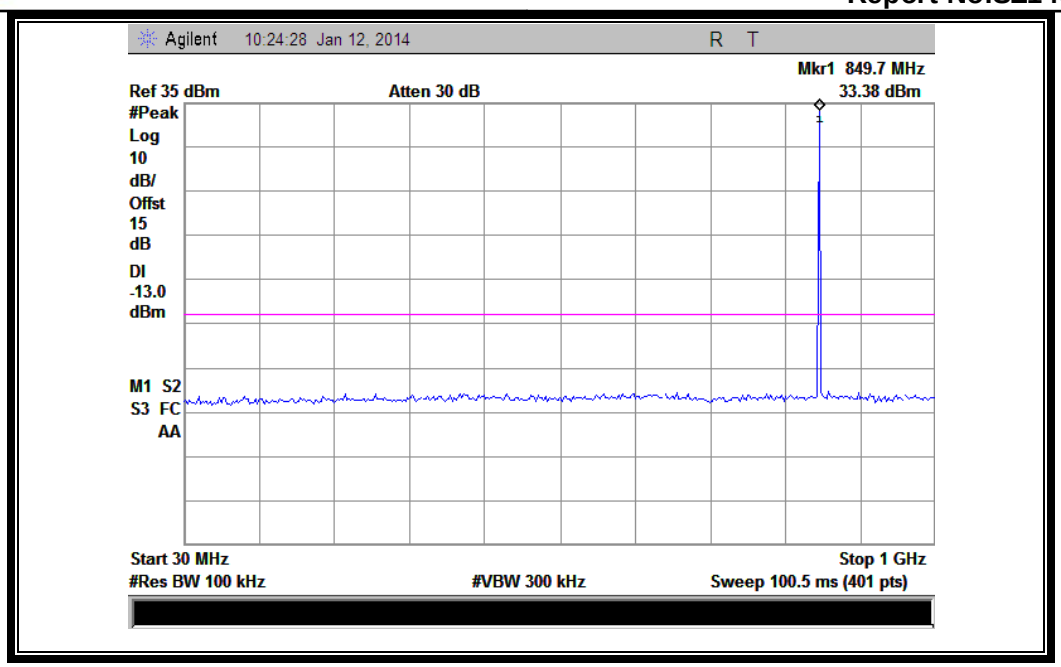
(Plot A1.1: GSM 850MHz Channel = 128, 1GHz to 9GHz)



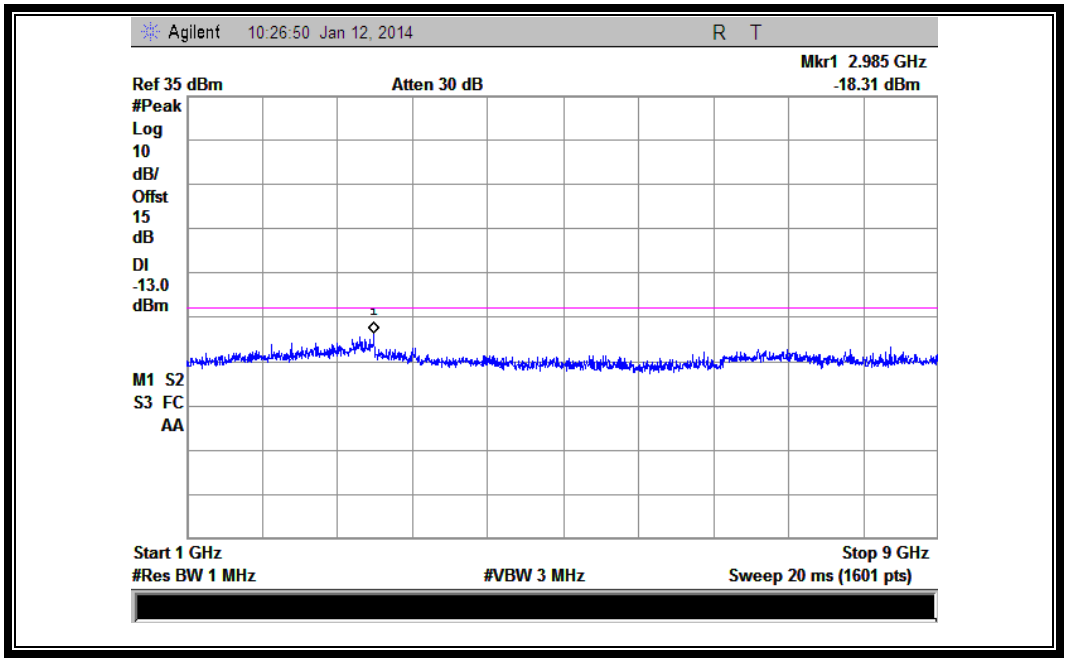
(Plot A2: GSM 850MHz Channel = 190, 30MHz to 1GHz)



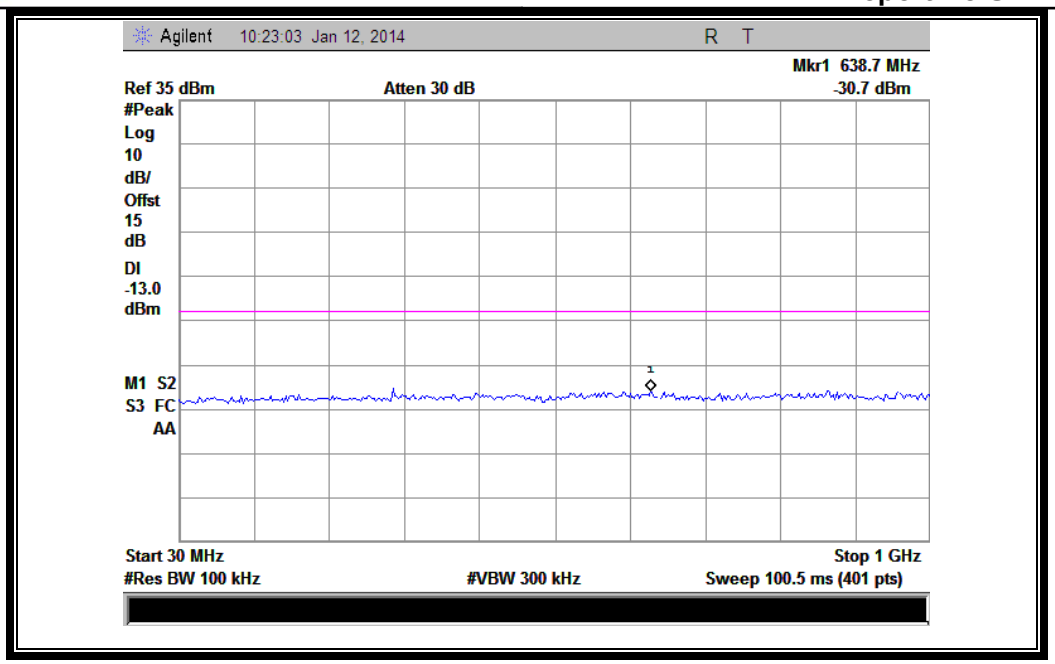
(Plot A2.1: GSM 850MHz Channel = 190, 1GHz to 9GHz)



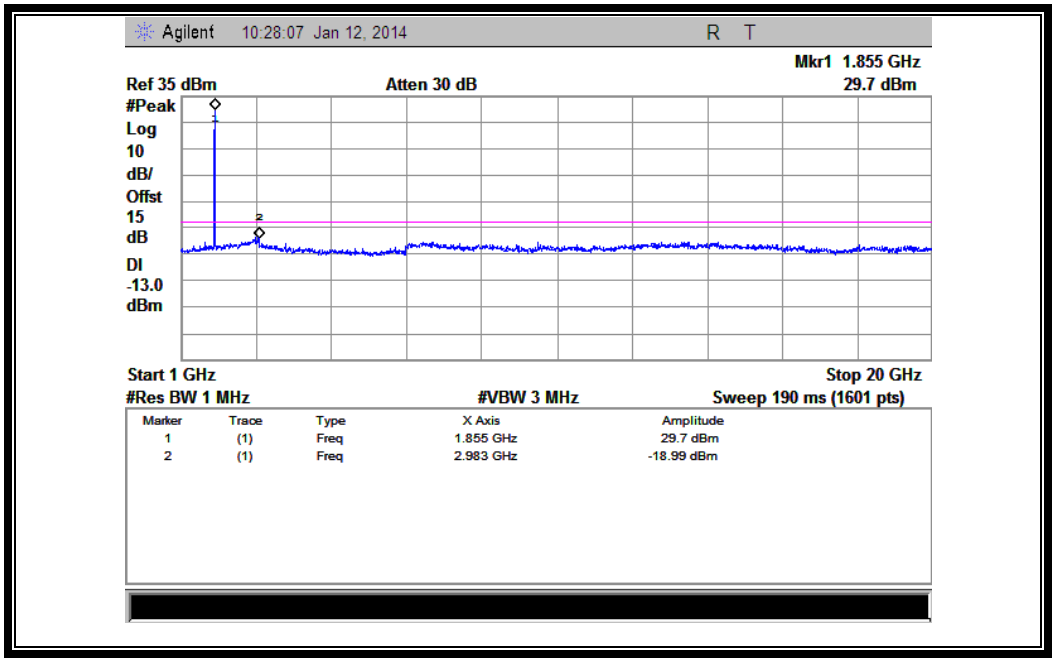
(Plot A3: GSM 850MHz Channel = 251, 30MHz to 1GHz)



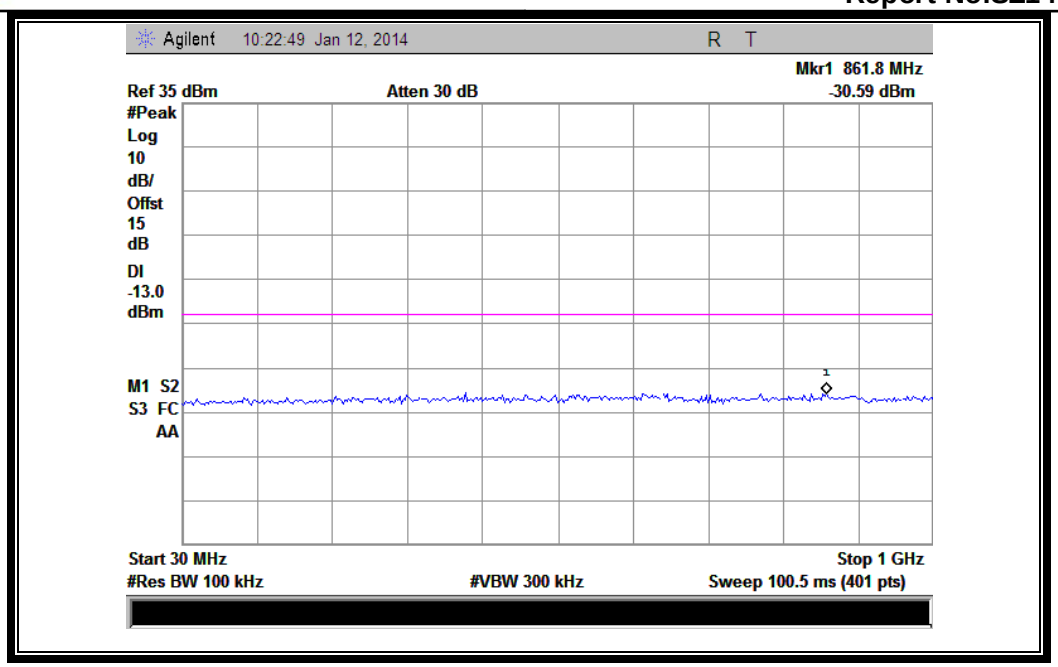
(Plot A3.1: GSM 850MHz Channel = 251, 1GHz to 9GHz)



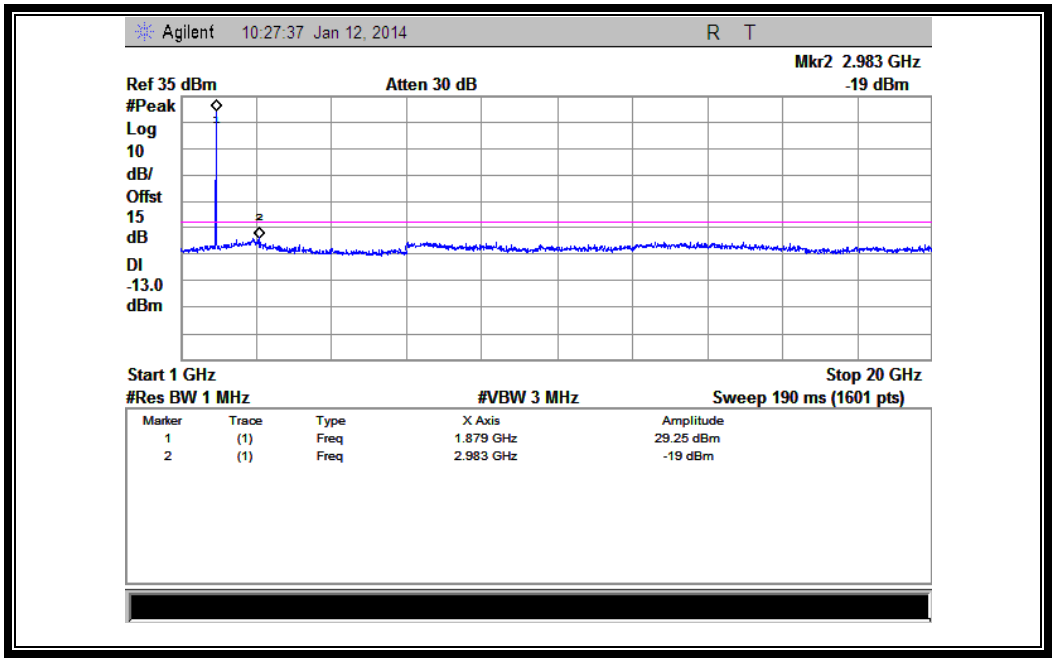
(Plot B1: GSM 1900MHz Channel = 512, 30MHz to 1GHz)



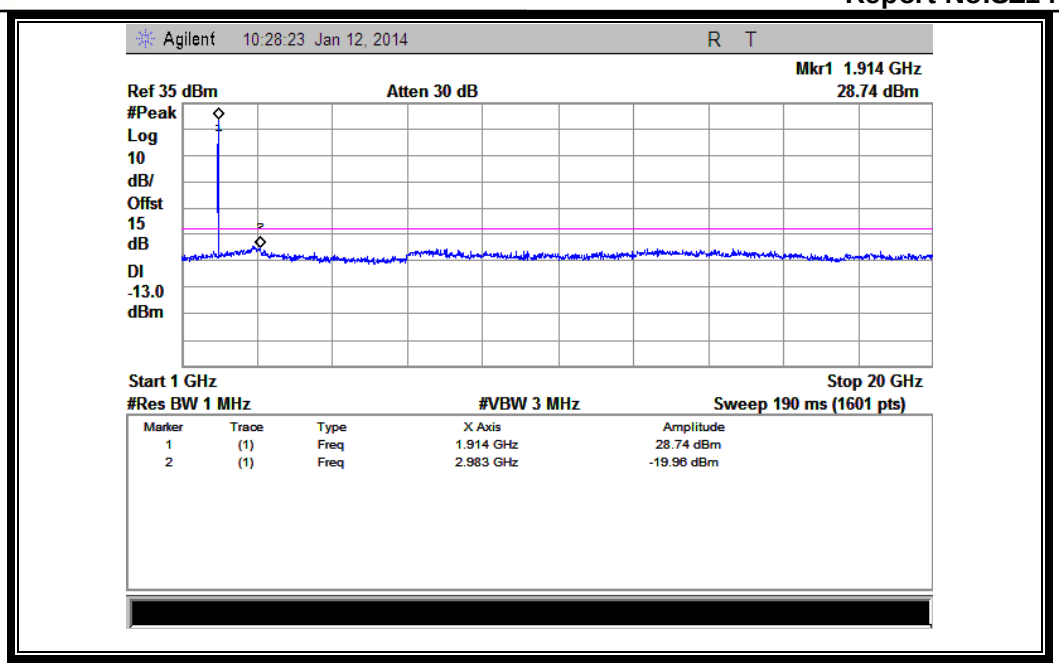
(Plot B1.1: GSM 1900MHz Channel = 512, 1GHz to 20GHz)



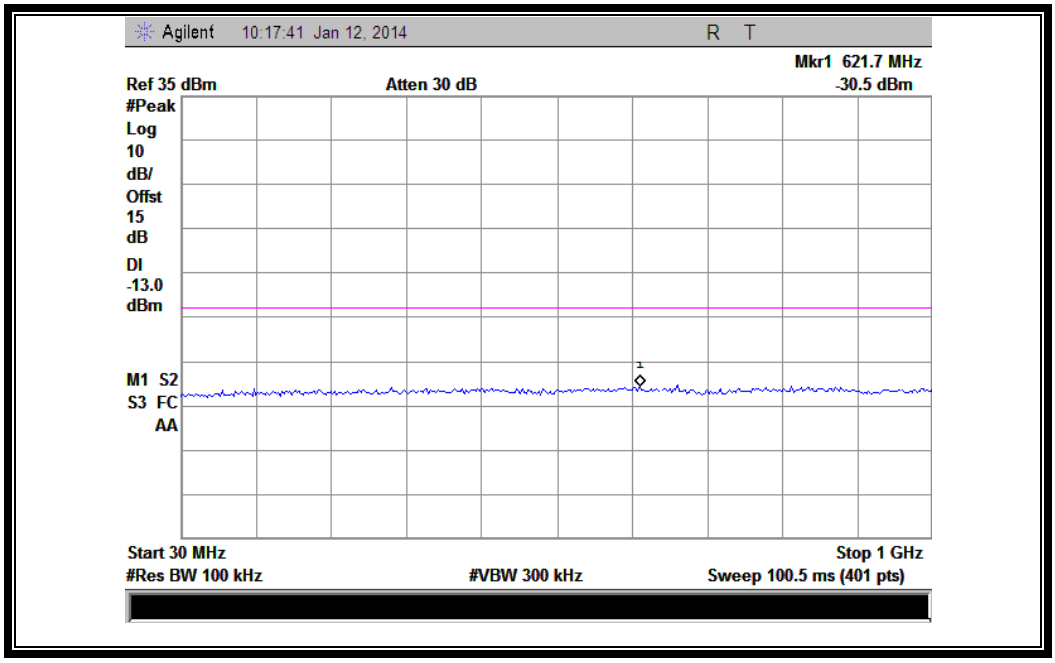
(Plot B2: GSM 1900MHz Channel = 661, 30MHz to 1GHz)



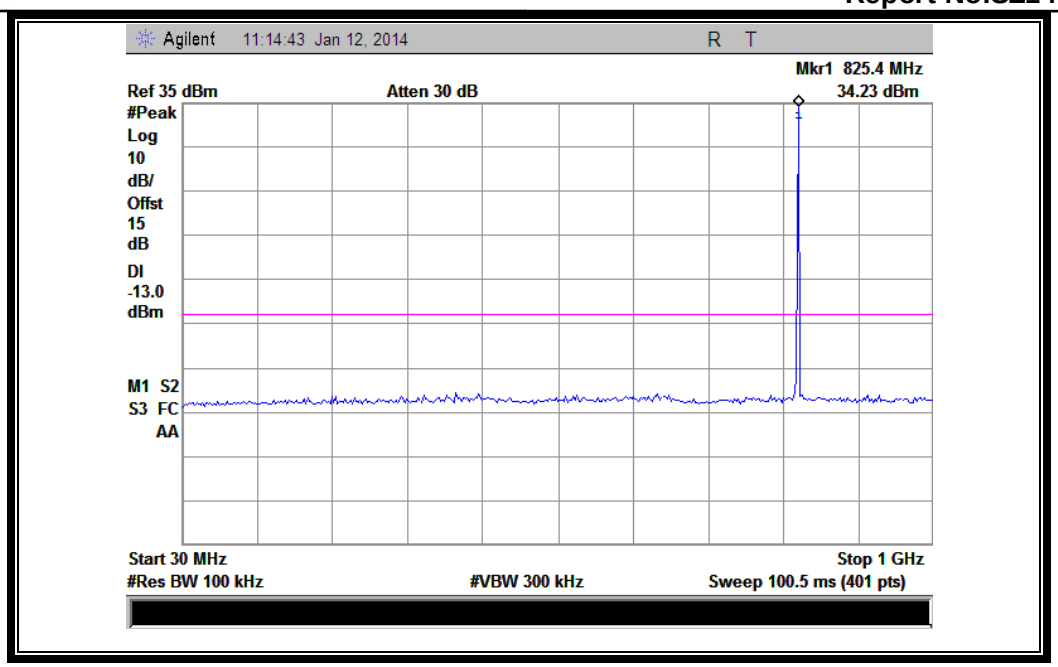
(Plot B2.1: GSM 1900MHz Channel = 661, 1GHz to 20GHz)



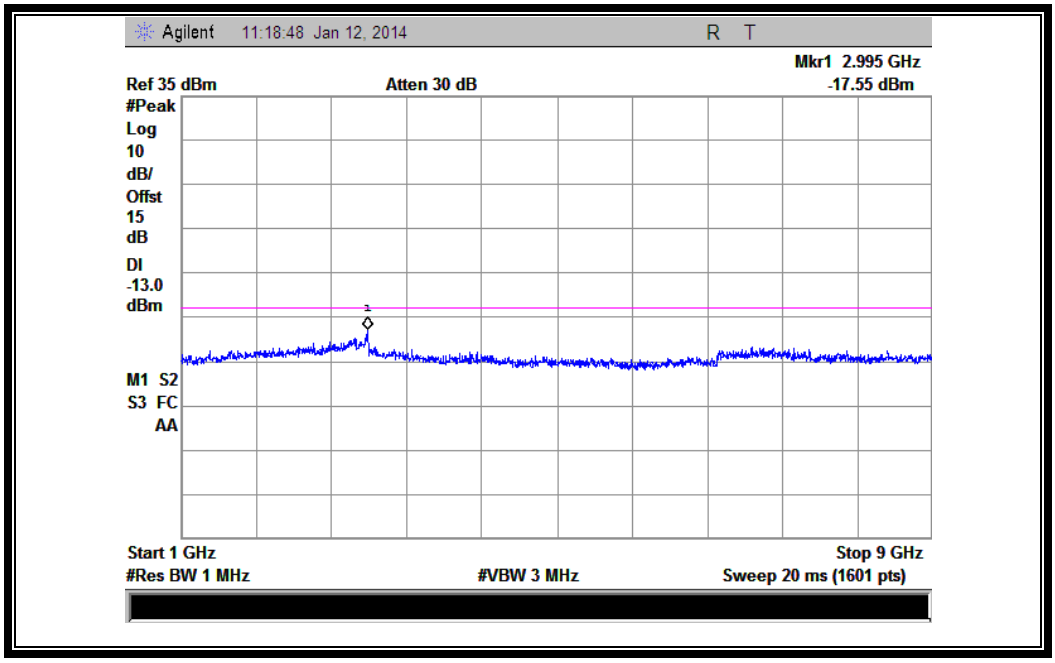
(Plot B3: GSM 1900MHz Channel = 810, 30MHz to 1GHz)



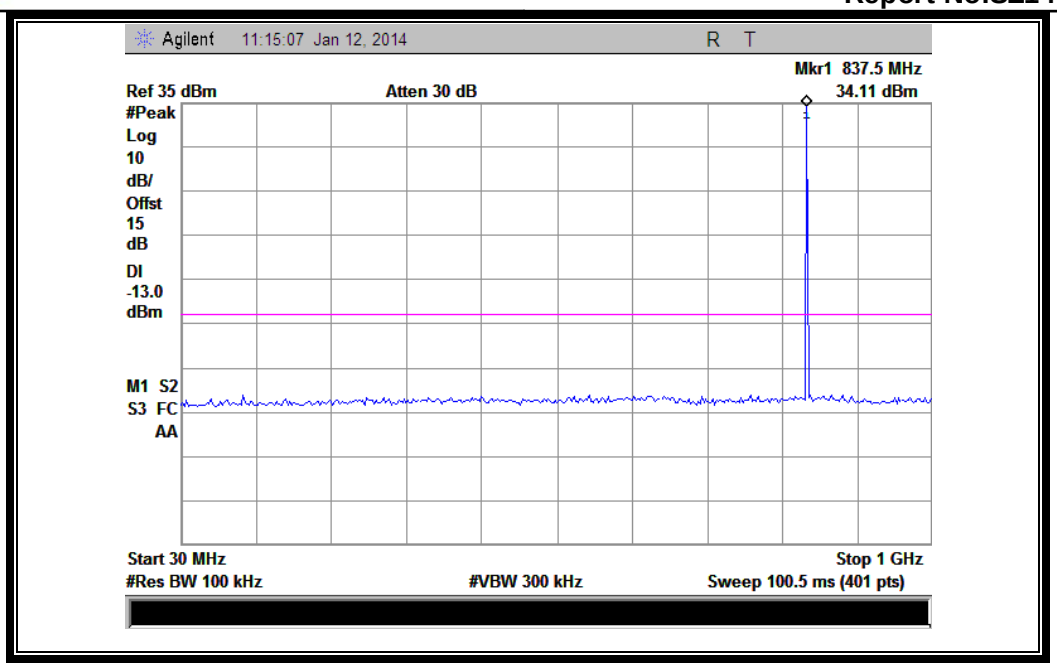
(Plot B3.1: GSM 1900MHz Channel = 810, 1GHz to 20GHz)



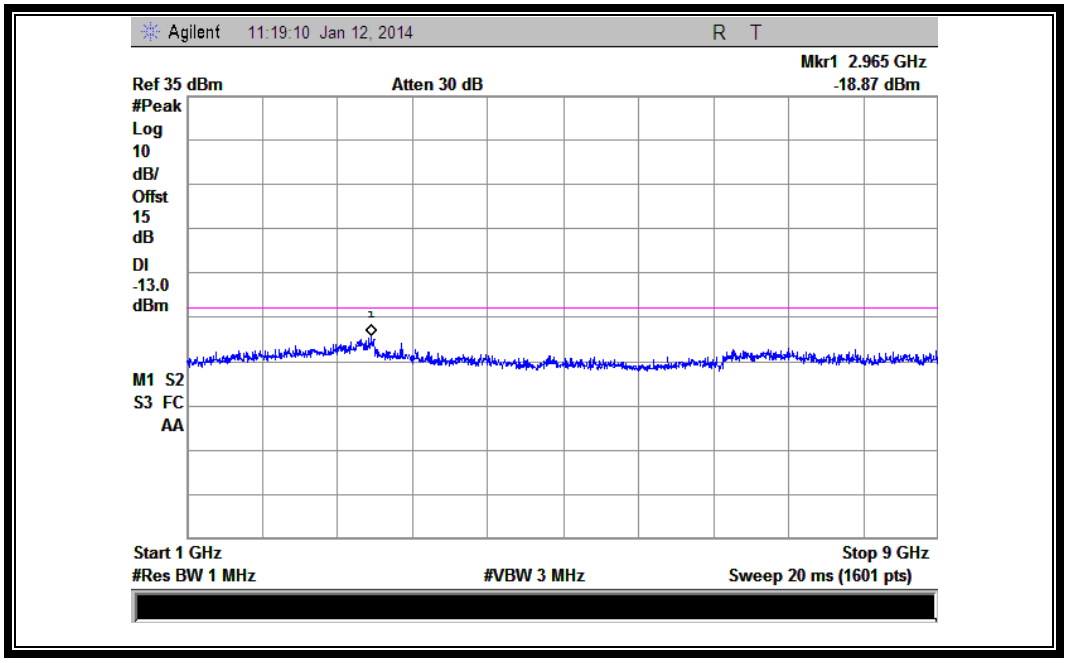
(Plot C1: EDGE 850MHz Channel = 128, 30MHz to 1GHz)



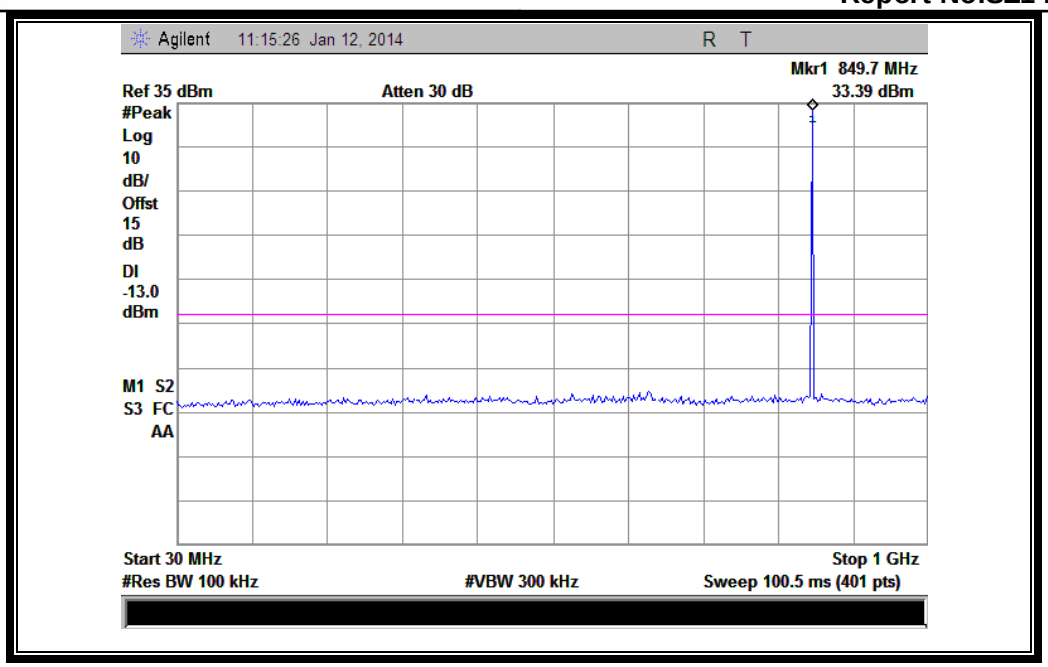
(Plot C1.1: EDGE 850MHz Channel = 128, 1GHz to 9GHz)



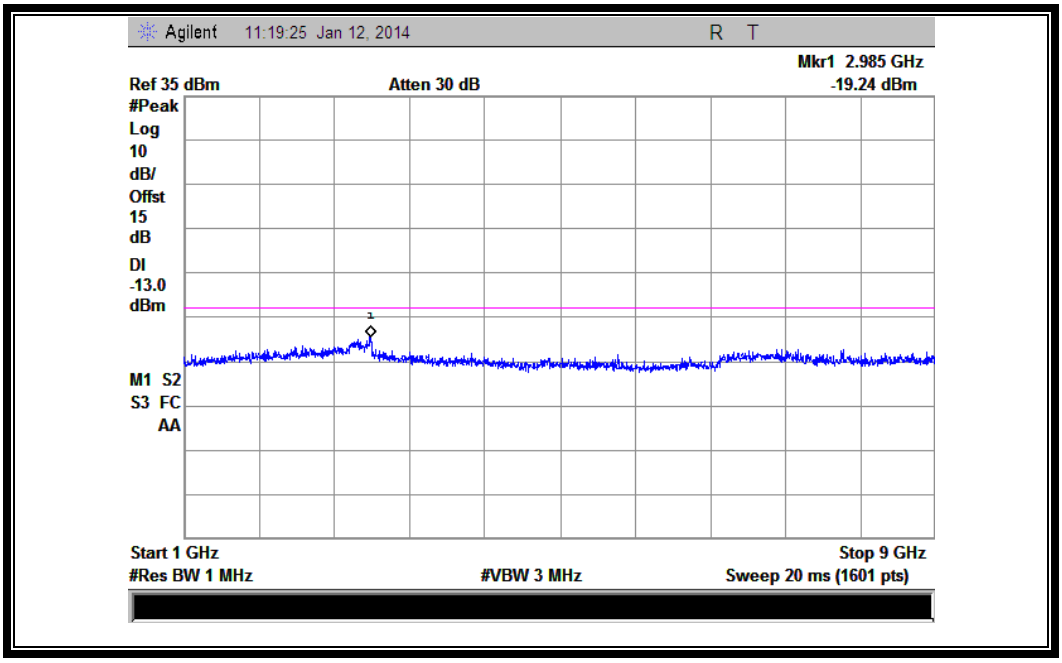
(Plot C2: EDGE 850MHz Channel = 190, 30MHz to 1GHz)



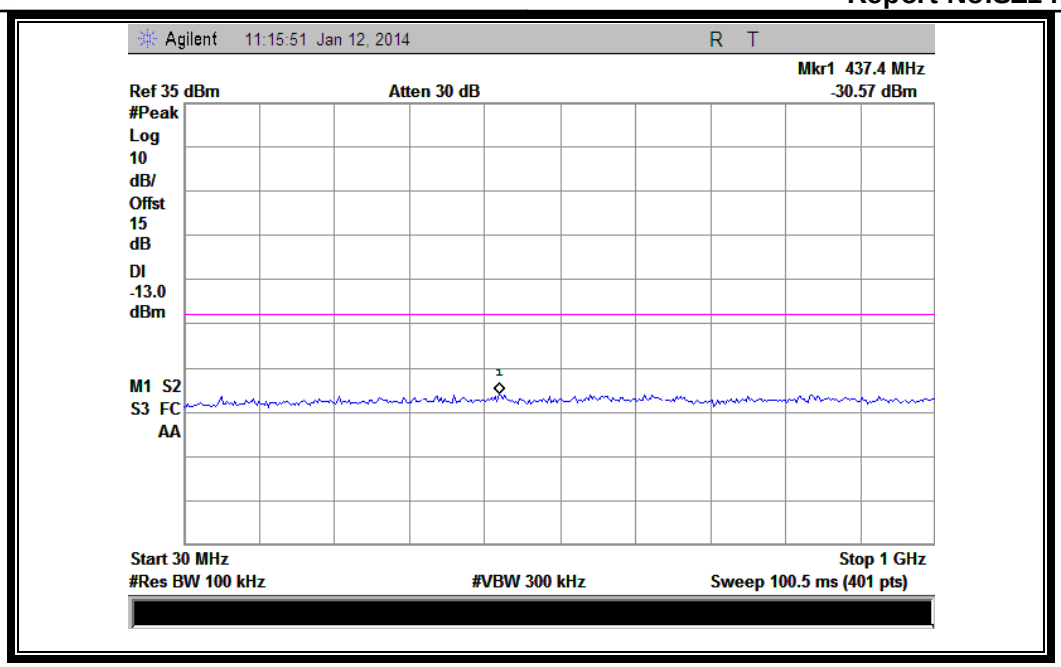
(Plot C2.1: EDGE 850MHz Channel = 190, 1GHz to 9GHz)



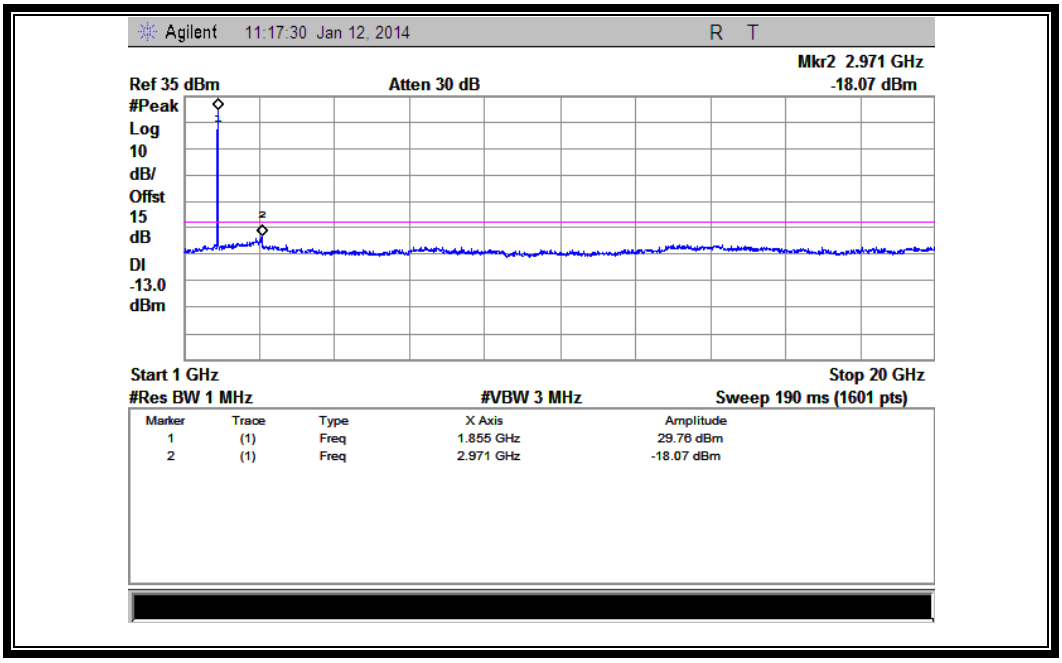
(Plot C3: EDGE 850MHz Channel = 251, 30MHz to 1GHz)



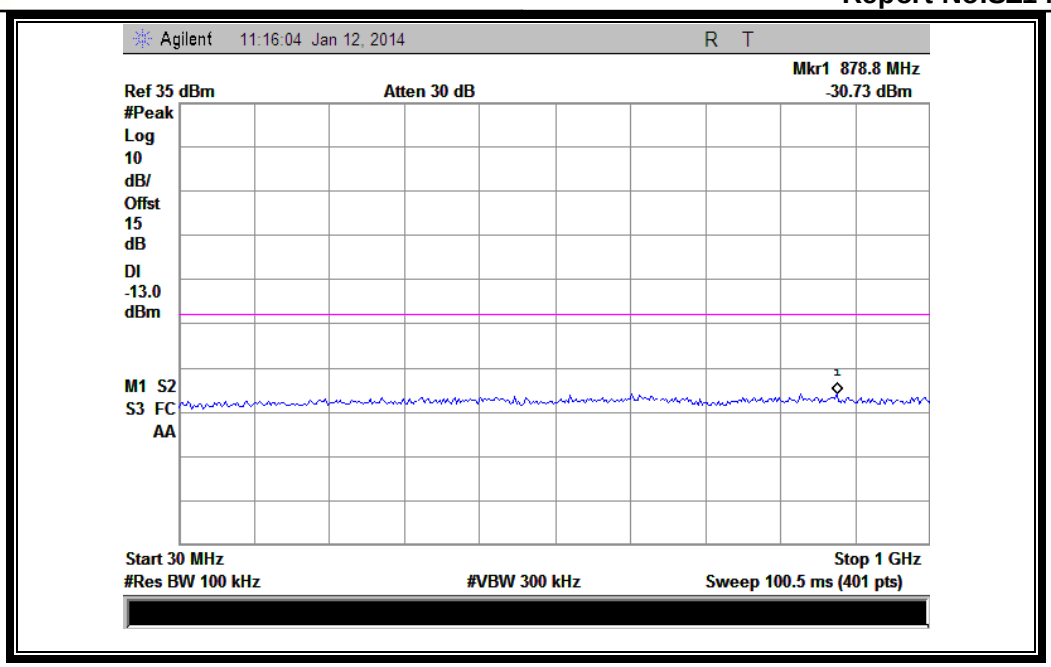
(Plot C3.1: EDGE 850MHz Channel = 251, 1GHz to 9GHz)



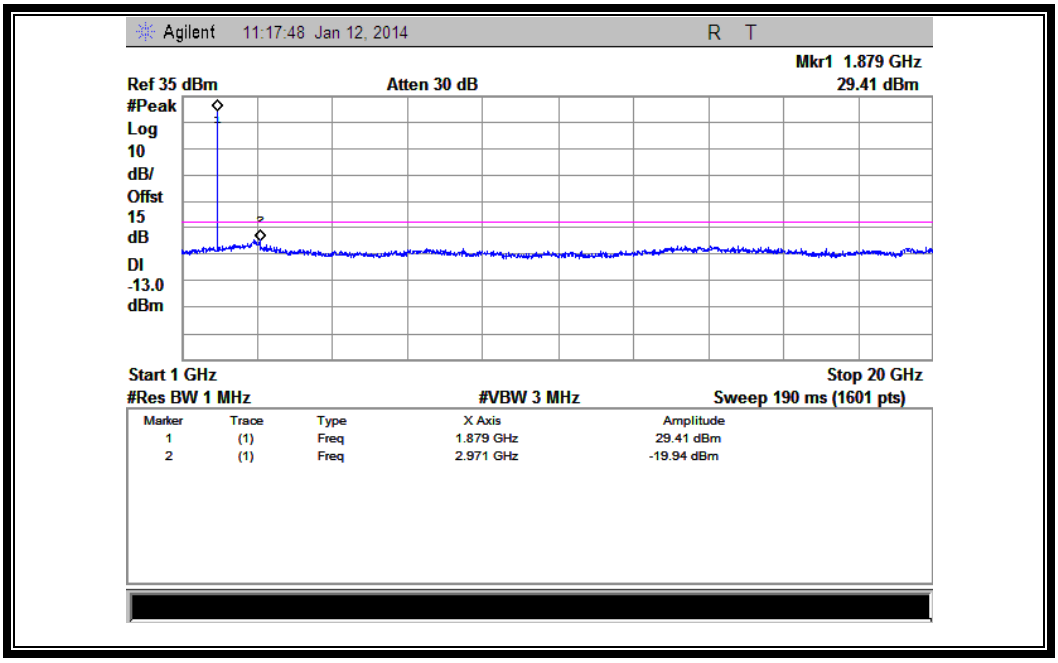
(Plot D1: EDGE 1900MHz Channel = 512, 30MHz to 1GHz)



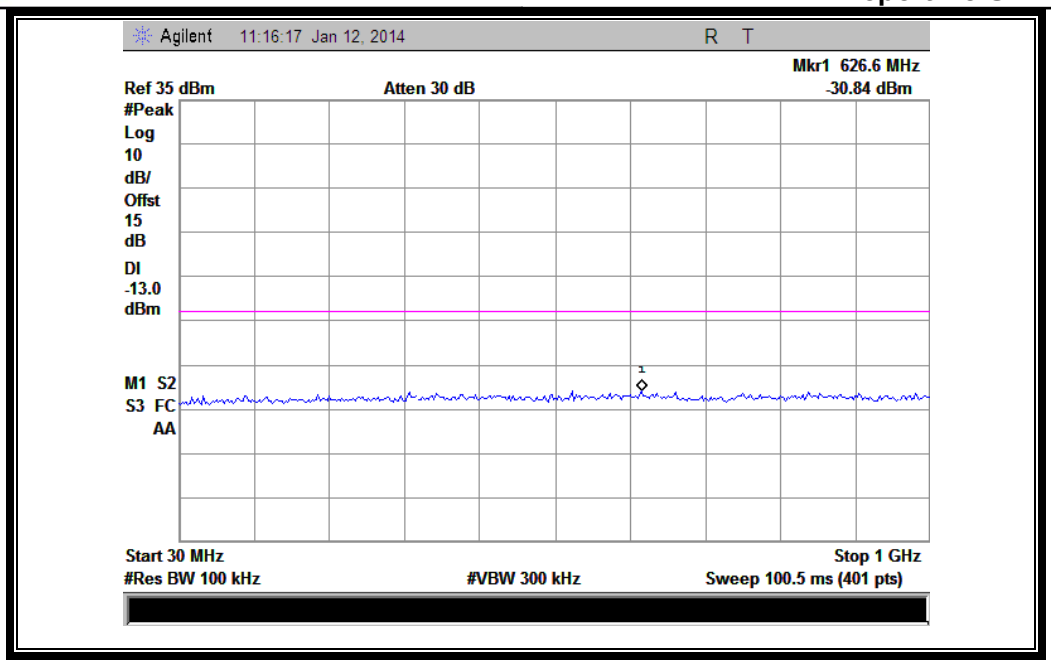
(Plot D1.1: EDGE 1900MHz Channel = 512, 1GHz to 20GHz)



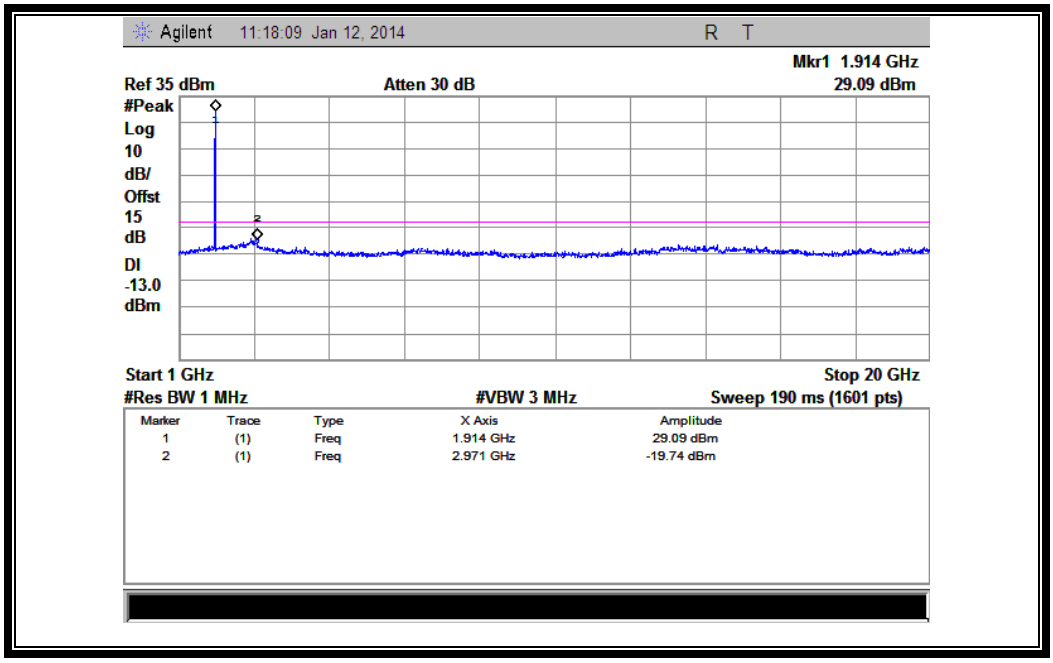
(Plot D2: EDGE 1900MHz Channel = 661, 30MHz to 1GHz)



(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)

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.

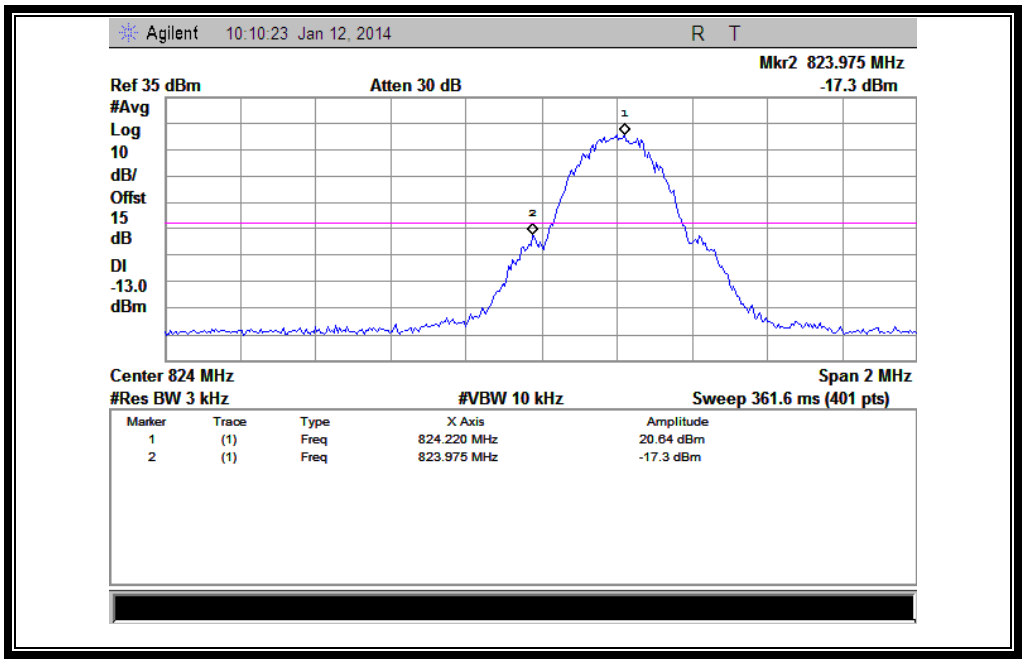
2.6.3 Test Result

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

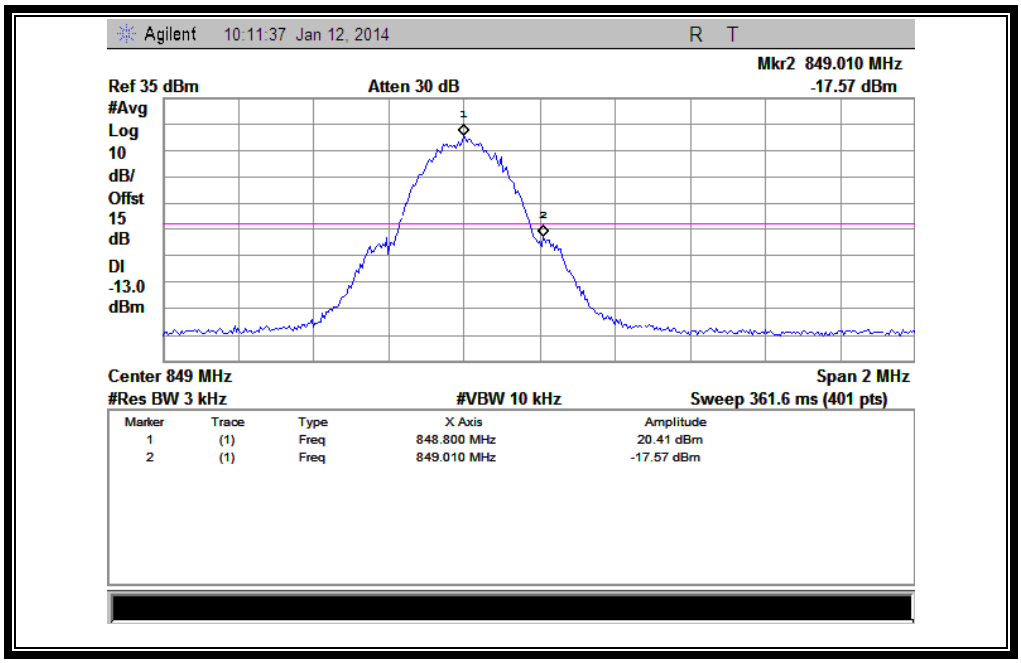
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Band Edge Emission (dBm)	Refer to Plot	Limit (dBm)	Verdict
GSM 850MHz	128	824.2	-17.30	Plat A	-13	PASS
	251	848.8	-17.57	Plot B		PASS
GSM 1900MHz	512	1850.2	-21.87	Plat C	-13	PASS
	810	1909.8	-23.58	Plot D		PASS
EDGE 850MHz	128	824.2	-19.43	Plat E	-13	PASS
	251	848.8	-19.44	Plot F		PASS
EDGE 1900MHz	512	1850.2	-22.39	Plat G	-13	PASS
	810	1909.8	-20.46	Plot H		PASS

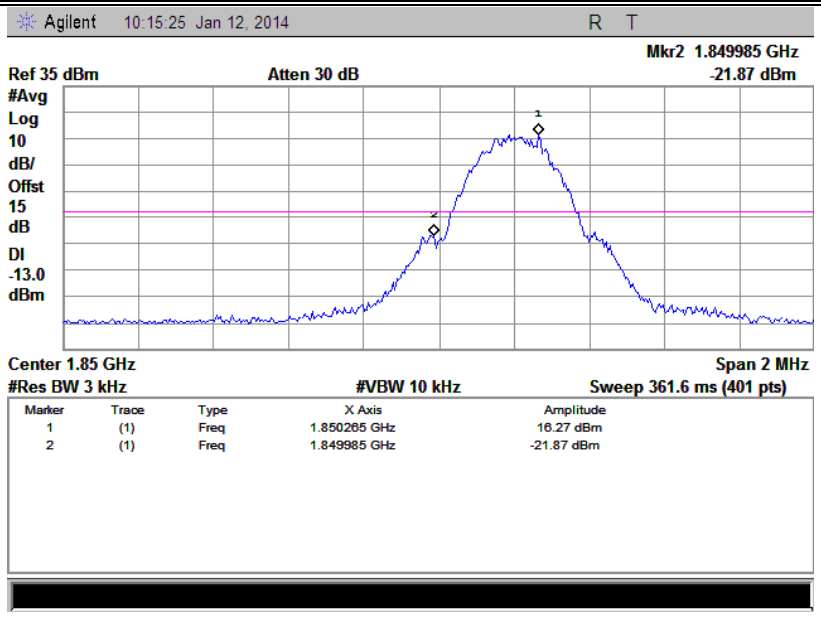
2. Test Plots:



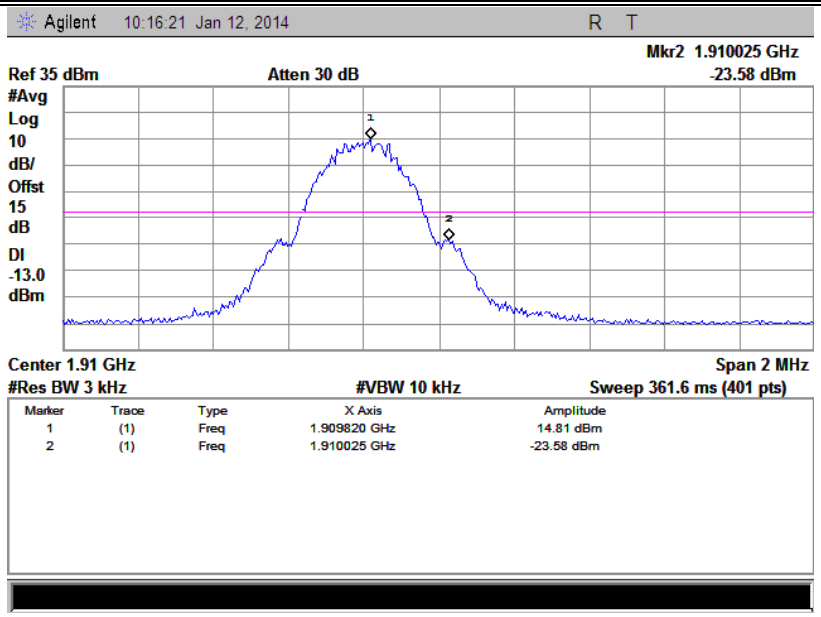
(Plot A: GSM 850 Channel = 128)



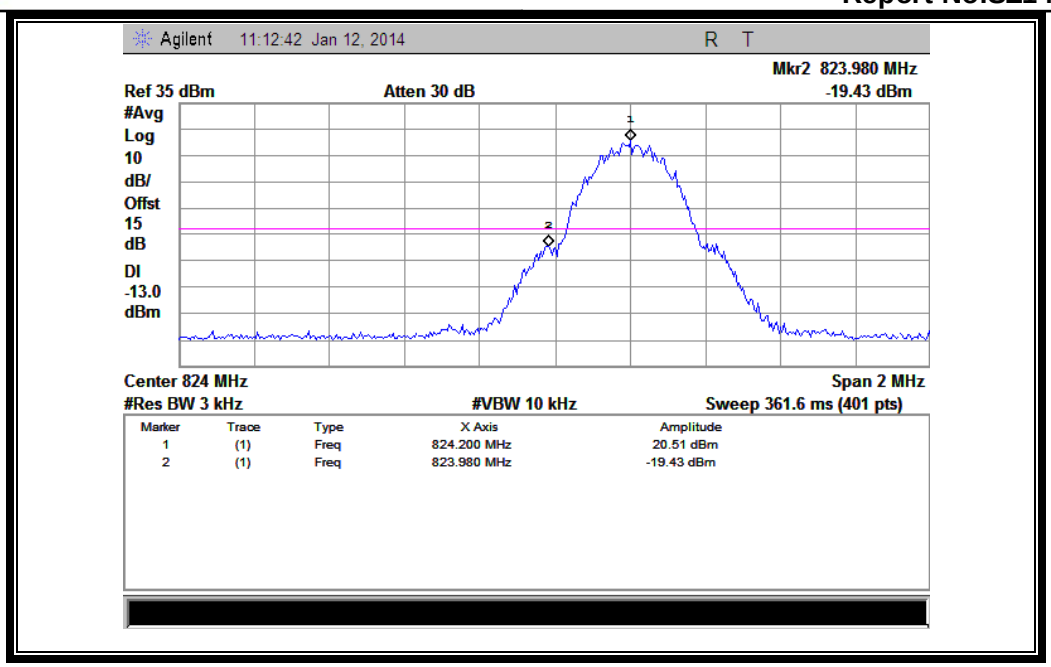
(Plot B: GSM 850 Channel = 251)



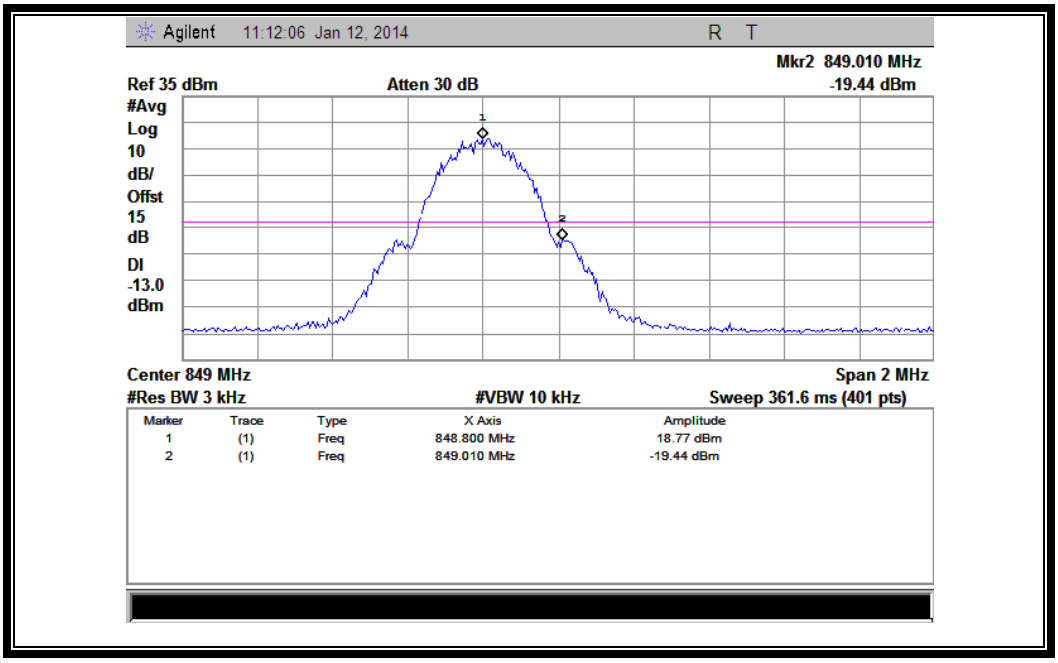
(Plot C: GSM 1900 Channel = 512)



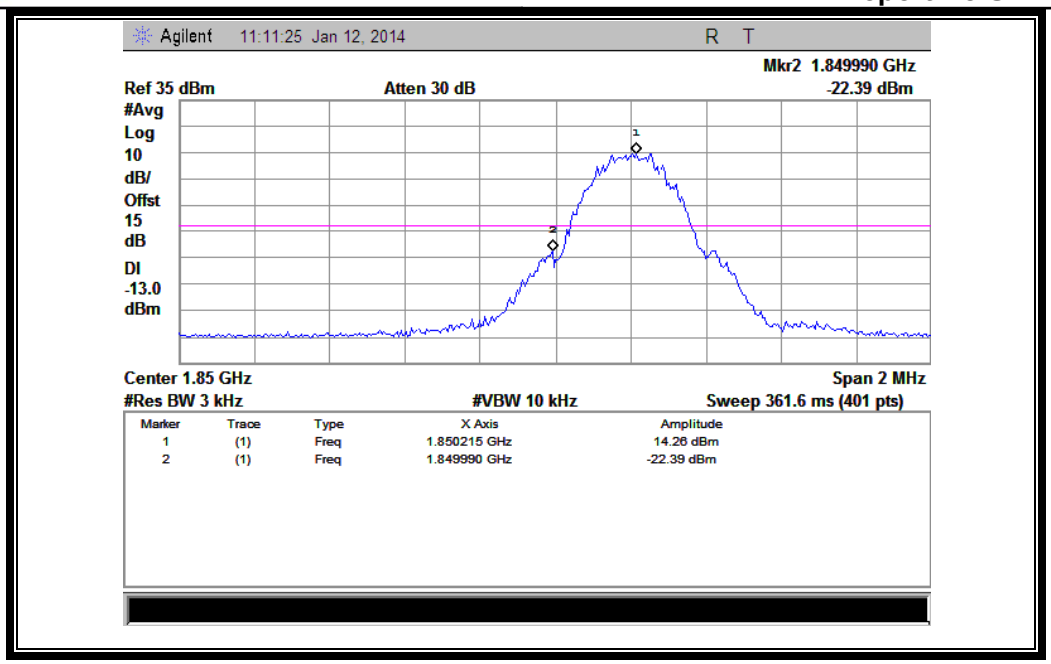
(Plot D: GSM 1900 Channel = 810)



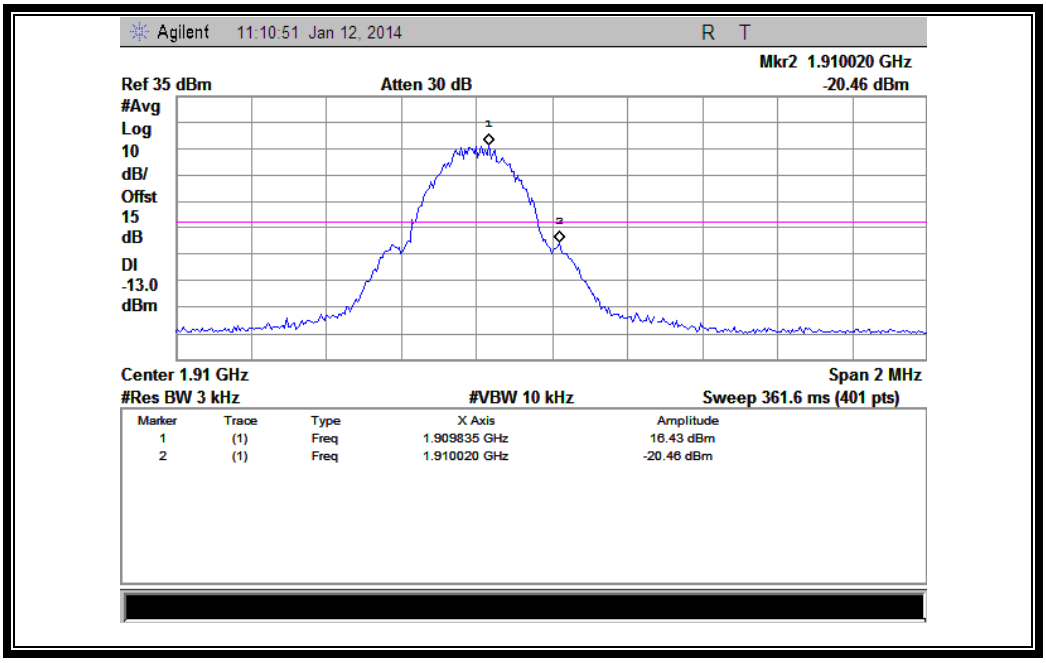
(Plot E: EGPRS 850 Channel = 128)



(Plot F: EGPRS 850 Channel = 251)



(Plot G: EGPRS 1900 Channel = 512)



(Plot H: EGPRS 1900 Channel = 810)

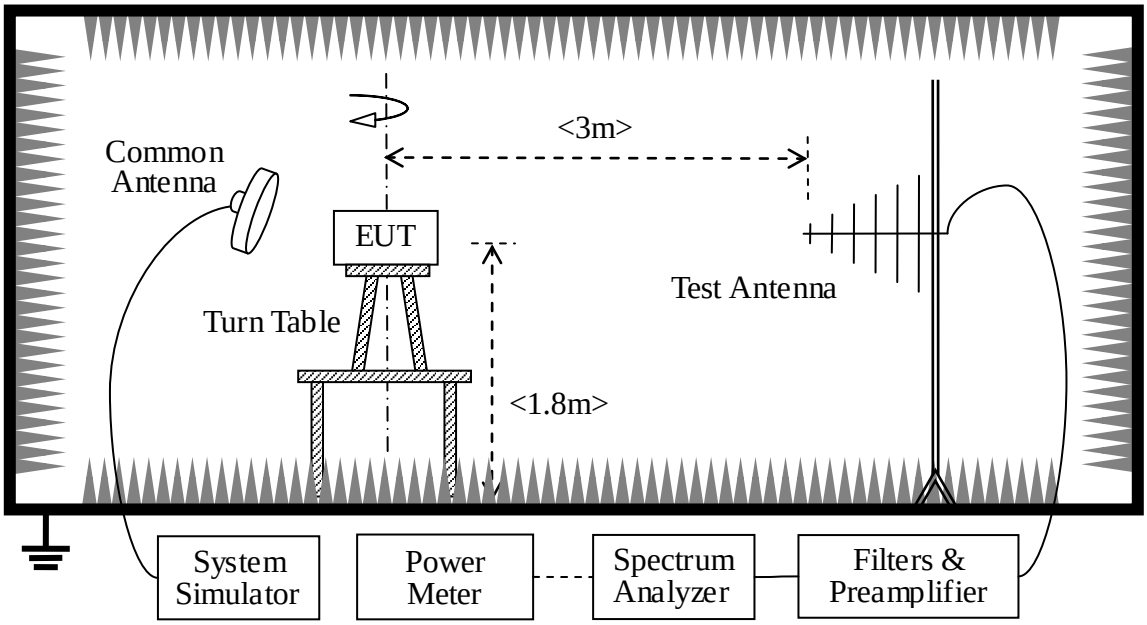
2.7 Transmitter Radiated Power (EIRP/ERP)

2.7.1 Requirement

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

2.7.2 Test Description

1. Test Setup:



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

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

- GSM Maximum RF output power: GSM 850 34.12dBm, GSM 1900 30.38dBm, EGPRS 850 34.28dBm，EGPRS1900 29.87dBm， 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.

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

2. Equipments List:

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

2.7.3 Test Result

The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. The lowest, middle and highest channels are tested.

The substitution corrections are obtained as described below:

$A_{SUBST} = P_{SUBST_TX} - P_{SUBST_RX} - L_{SUBST_CABLES} + G_{SUBST_TX_ANT}$

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

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

P_{SUBST_TX} is signal generator level,

P_{SUBST_RX} is receiver level,

L_{SUBST_CABLES} is cable losses including TX cable,

$G_{SUBST_TX_ANT}$ is substitution antenna gain.

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

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

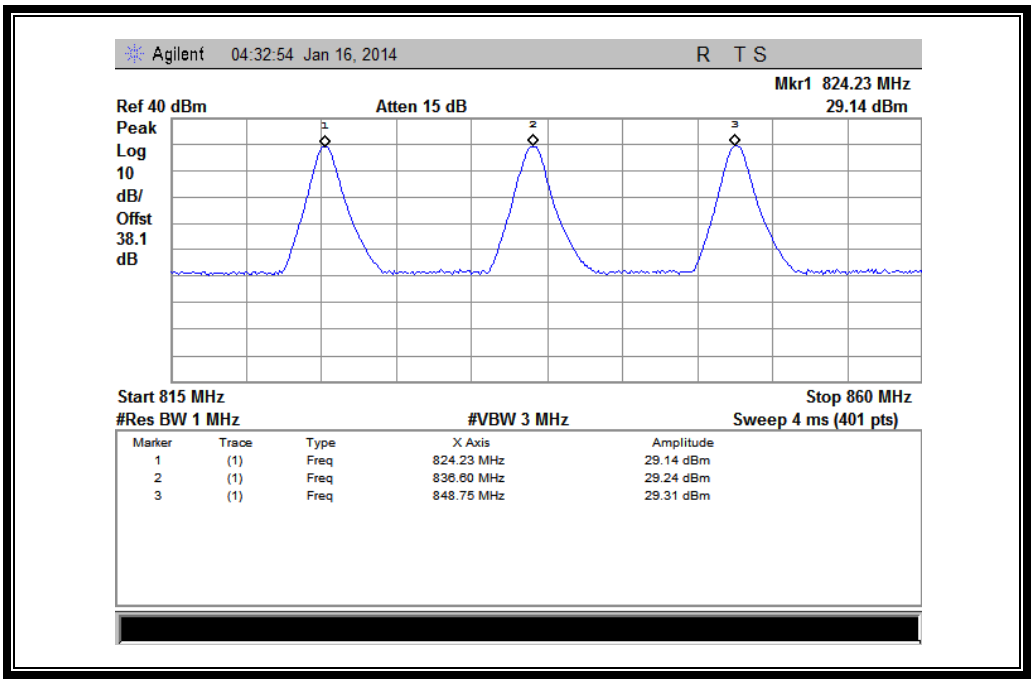
1. GSM Model Test Verdict:

Band	Channel	Frequency (MHz)	PCL	Measured ERP			Limit		Verdict
				dBm	W	Refer to Plot	dBm	W	
GSM 850MHz	128	824.20	5	29.14	0.820	Plot A	38.5	7	PASS
	190	836.60	5	29.24	0.839				PASS
	251	848.80	5	29.31	0.853				PASS
GPRS 850MHz	128	824.20	5	28.14	0.652	Plot B Note 1	38.5	7	PASS
	190	836.60	5	28.16	0.655				PASS
	251	848.80	5	28.14	0.652				PASS
EGPRS 850MHz	128	824.20	5	28.21	0.662	Plot C Note 1	38.5	7	PASS
	190	836.60	5	28.21	0.662				PASS
	251	848.80	5	28.20	0.661				PASS

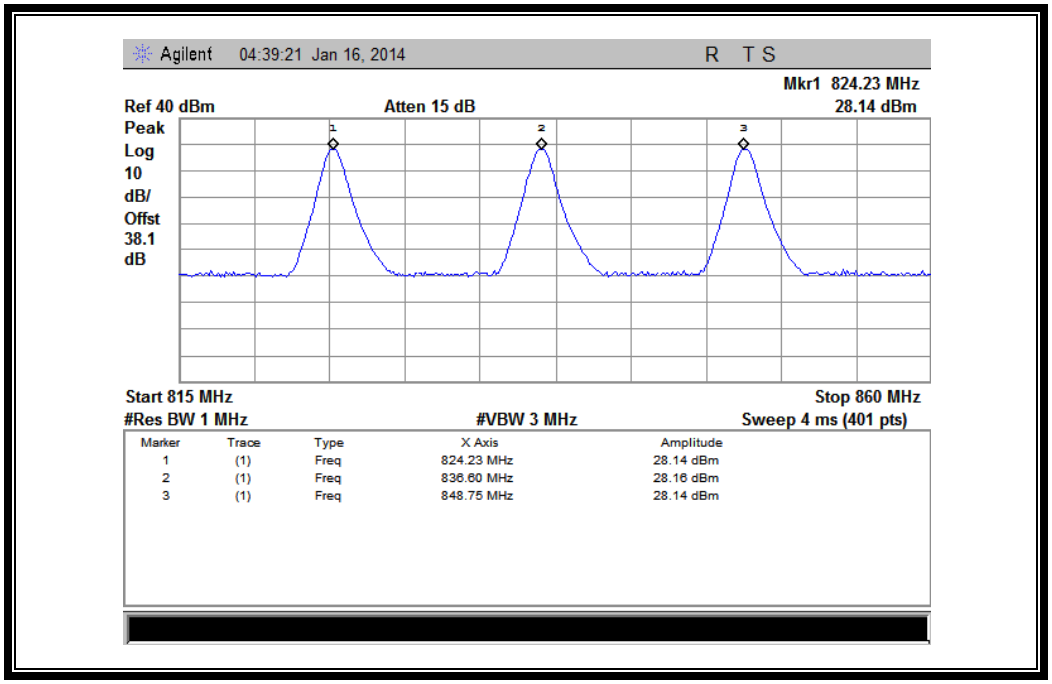
Band	Channel	Frequency (MHz)	PCL	Measured EIRP			Limit		Verdict
				dBm	W	Refer to Plot	dBm	W	
GSM 1900MHz	512	1850.2	0	28.14	0.652	Plot D	33	2	PASS
	661	1880.0	0	28.16	0.655				PASS
	810	1909.8	0	28.28	0.673				PASS
GPRS 1900MHz	512	1850.2	0	27.02	0.504	Plot E Note 1	33	2	PASS
	661	1880.0	0	27.30	0.537				PASS
	810	1909.8	0	27.42	0.552				PASS
EGPRS 1900MHz	512	1850.2	0	28.23	0.665	Plot F Note 1	33	2	PASS
	661	1880.0	0	28.08	0.643				PASS
	810	1909.8	0	29.02	0.798				PASS

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

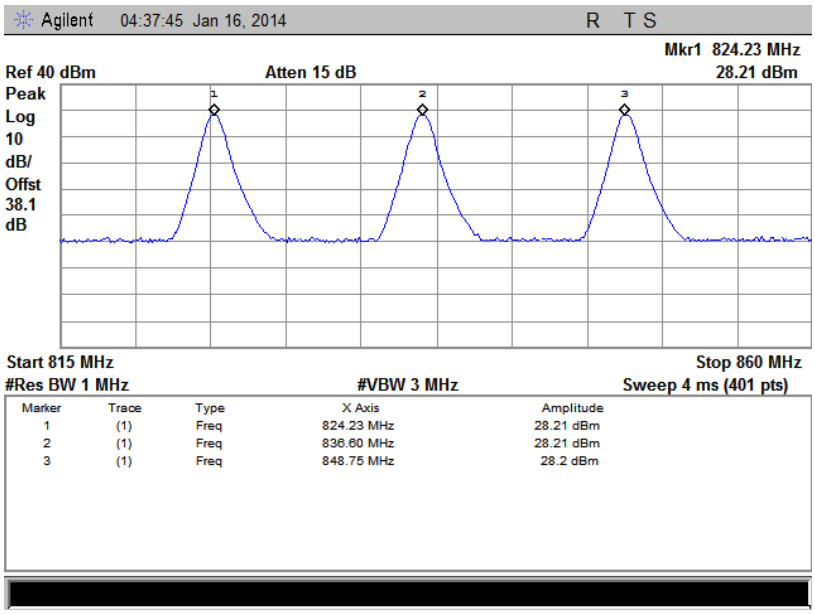
2. Test Plots:



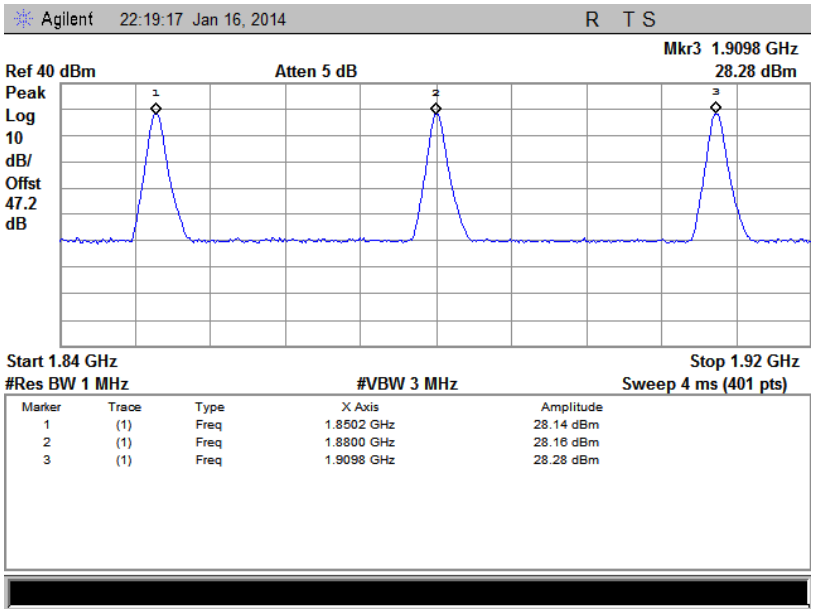
(Plot A: GSM 850MHz Channel = 128, 190, 251)



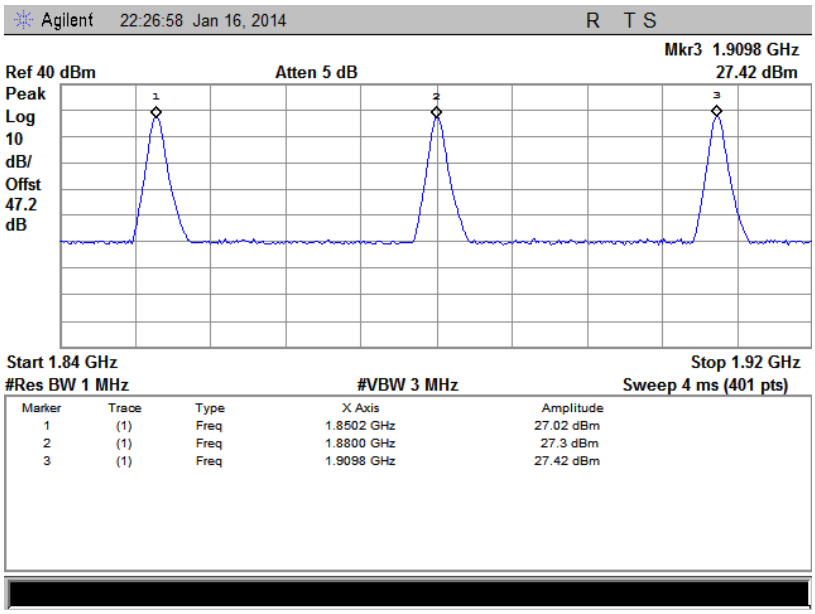
(Plot B: GPRS 850MHz Channel = 128, 190, 251)



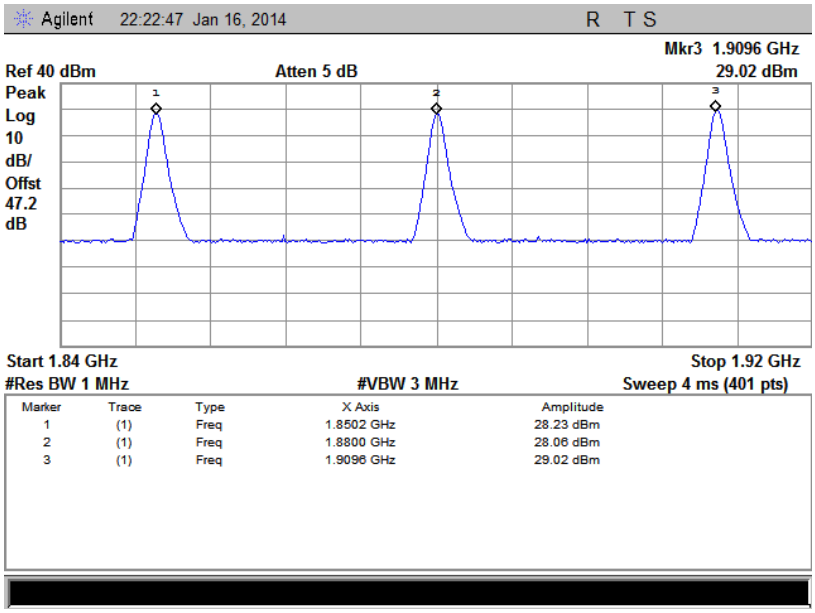
(Plot C: EGPRS 850MHz Channel = 128, 190, 251)



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



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



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

2.8 Radiated Out of Band Emissions

2.8.1 Requirement

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

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

2.8.2 Test Description

See section 2.7.2 of this report.

Equipment List：

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

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

2.8.3 Test Result

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

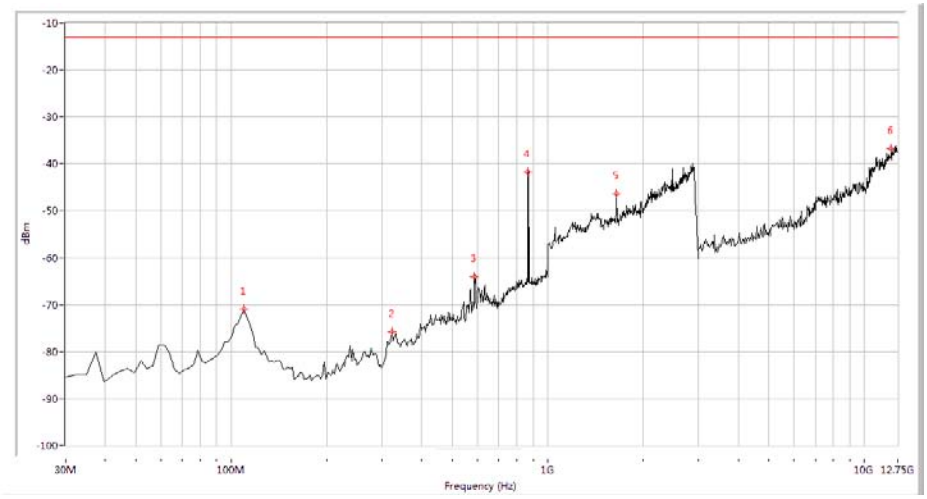
1. Test Verdict:

Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)		Refer to Plot	Limit (dBm)	Verdict
			Test Antenna Horizontal	Test Antenna Vertical			
GSM 850MHz	128	824.2	< -25	< -25	Plot A.1/A.2	-13	PASS
	190	836.6	< -25	< -25	Plot A.3/A.4		PASS
	251	848.8	< -25	< -25	Plot A.5/A.6		PASS
GSM 1900MHz	512	1850.2	< -25	< -25	Plot B.1/B.2	-13	PASS
	661	1880.0	< -25	< -25	Plot B.3/B.4		PASS
	810	1909.8	< -25	< -25	Plot B.5/B.6		PASS
EDGE 850MHz	128	824.2	< -25	< -25	Plot C.1/C.2	-13	PASS
	190	836.6	< -25	< -25	Plot C.3/C.4		PASS
	251	848.8	< -25	< -25	Plot C.5/C.6		PASS
EDGE 1900MHz	512	1850.2	< -25	< -25	Plot D.1/D.2	-13	PASS
	661	1880.0	< -25	< -25	Plot D.3/D.4		PASS
	810	1909.8	< -25	< -25	Plot D.5/D.6		PASS

2. Test Plots for the Whole Measurement Frequency Range:

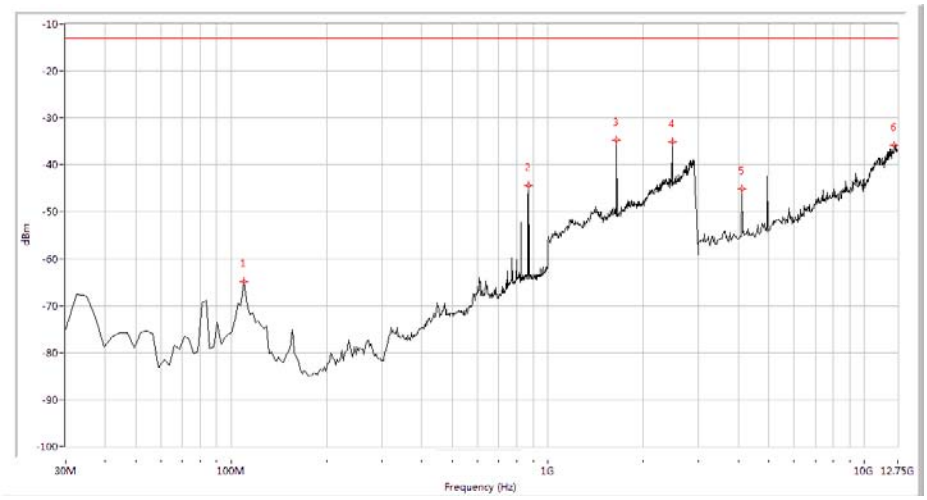
Note1: the power of the EUT transmitting frequency should be ignored.

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



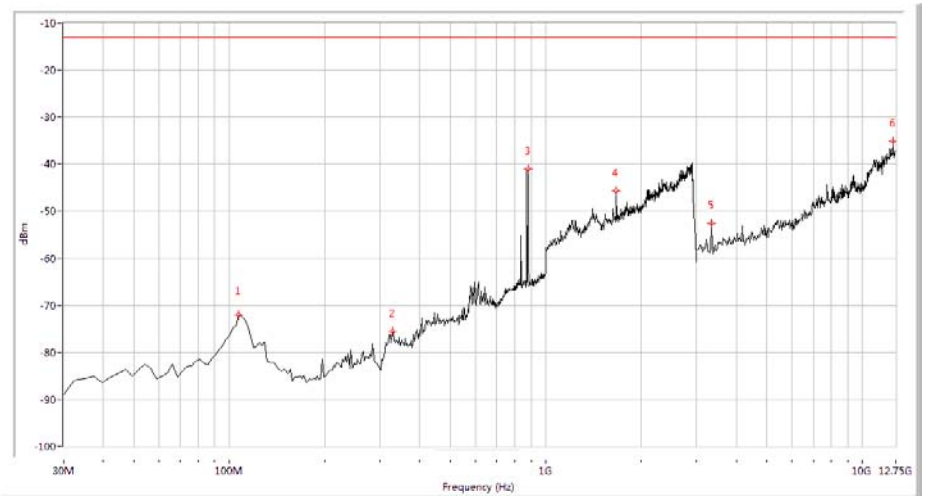
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-70.91	-13.0	57.9	124.5	Horizontal	PASS
322.693	-75.84	-13.0	62.8	27.3	Horizontal	PASS
586.359	-64.07	-13.0	51.1	56.9	Horizontal	PASS
866.958	-41.77	-13.0	28.8	136.8	Horizontal	PASS
1648.379	-46.27	-13.0	33.3	24.7	Horizontal	PASS
12166.459	-36.73	-13.0	23.7	36.1	Horizontal	PASS

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



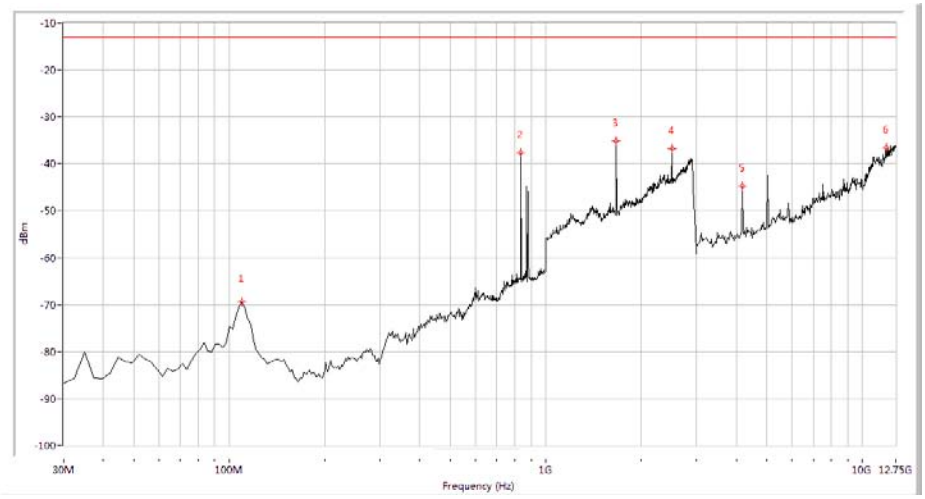
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-64.93	-13.0	51.9	346.7	Vertical	PASS
871.796	-44.36	-13.0	31.4	17.2	Vertical	PASS
1648.379	-34.86	-13.0	21.9	210.4	Vertical	PASS
2471.322	-35.21	-13.0	22.2	333.3	Vertical	PASS
4118.454	-45.04	-13.0	32.0	360.0	Vertical	PASS
12458.229	-35.85	-13.0	22.8	275.1	Vertical	PASS

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



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
107.406	-72.00	-13.0	59.0	123.2	Horizontal	PASS
327.531	-75.54	-13.0	62.5	154.7	Horizontal	PASS
879.052	-41.09	-13.0	28.1	5.9	Horizontal	PASS
1673.317	-45.67	-13.0	32.7	15.8	Horizontal	PASS
3340.399	-52.53	-13.0	39.5	3.3	Horizontal	PASS
12482.544	-35.18	-13.0	22.2	96.5	Horizontal	PASS

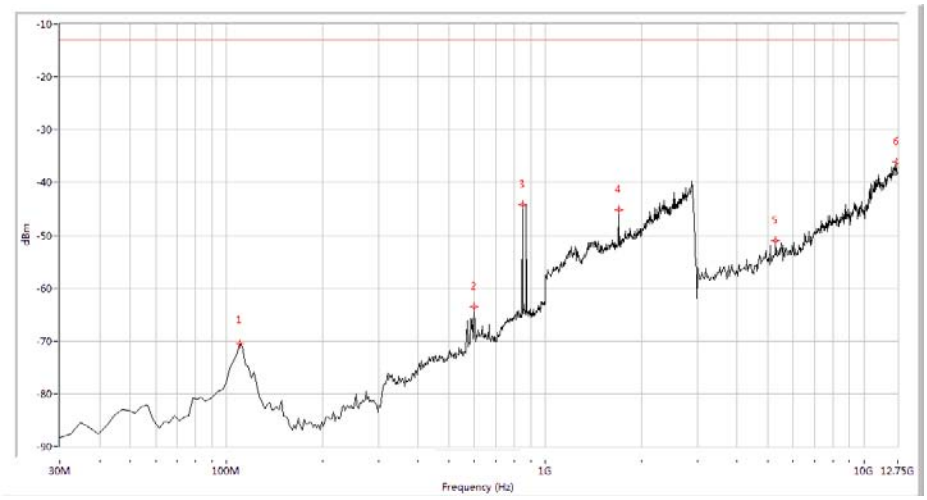
(Plot A.3: GSM 850MHz Channel = 190, Test Antenna Horizontal)



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-69.43	-13.0	56.4	135.5	Vertical	PASS
835.511	-37.55	-13.0	24.6	308.4	Vertical	PASS
1673.317	-35.05	-13.0	22.1	46.8	Vertical	PASS
2506.234	-36.77	-13.0	23.8	338.2	Vertical	PASS
4191.397	-44.81	-13.0	31.8	342.2	Vertical	PASS

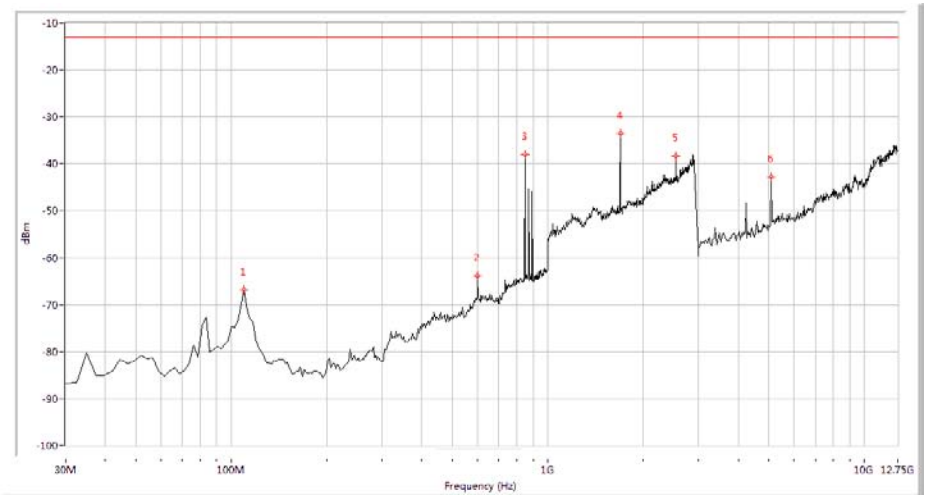
11899.002	-36.64	-13.0	23.6	23.6	Vertical	PASS

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



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-70.51	-13.0	57.5	78.4	Horizontal	PASS
598.454	-63.59	-13.0	50.6	142.5	Horizontal	PASS
847.606	-44.15	-13.0	31.2	36.9	Horizontal	PASS
1698.254	-45.18	-13.0	32.2	9.0	Horizontal	PASS
5285.536	-50.97	-13.0	38.0	42.1	Horizontal	PASS
12677.057	-36.12	-13.0	23.1	213.6	Horizontal	PASS

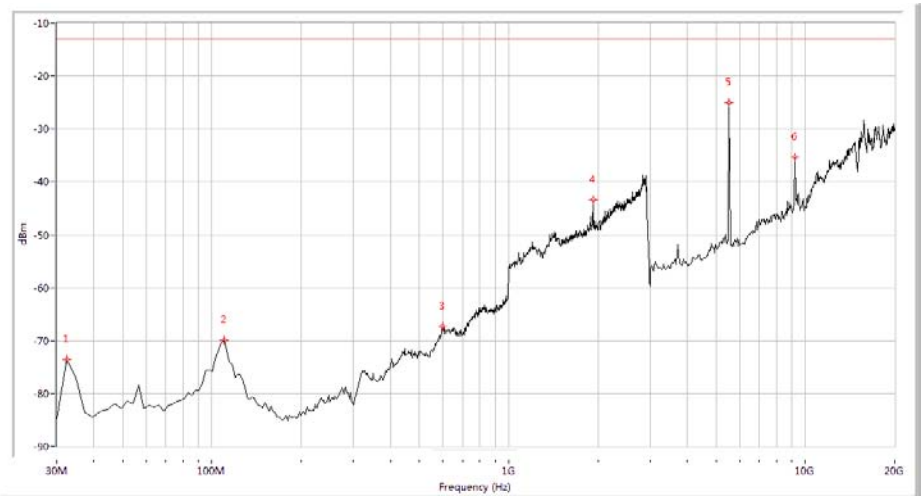
(Plot A.5: GSM 850MHz Channel = 251, Test Antenna Horizontal)



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-66.87	-13.0	53.9	131.7	Vertical	PASS
600.873	-63.87	-13.0	50.9	50.8	Vertical	PASS
847.606	-38.07	-13.0	25.1	311.2	Vertical	PASS
1698.254	-33.52	-13.0	20.5	248.4	Vertical	PASS

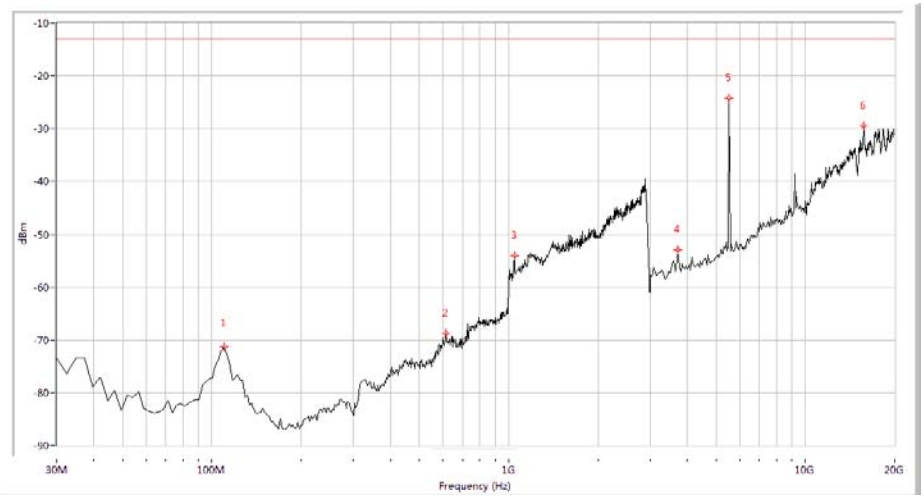
2541.147	-38.41	-13.0	25.4	333.9	Vertical	PASS
5091.022	-42.75	-13.0	29.8	72.8	Vertical	PASS

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



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
32.419	-73.48	-13.0	60.5	12.4	Horizontal	PASS
109.825	-69.87	-13.0	56.9	3.6	Horizontal	PASS
598.454	-67.31	-13.0	54.3	250.8	Horizontal	PASS
1927.681	-43.41	-13.0	30.4	63.1	Horizontal	PASS
5543.641	-25.05	-13.0	12.1	244.0	Horizontal	PASS
9231.920	-35.36	-13.0	22.4	148.0	Horizontal	PASS

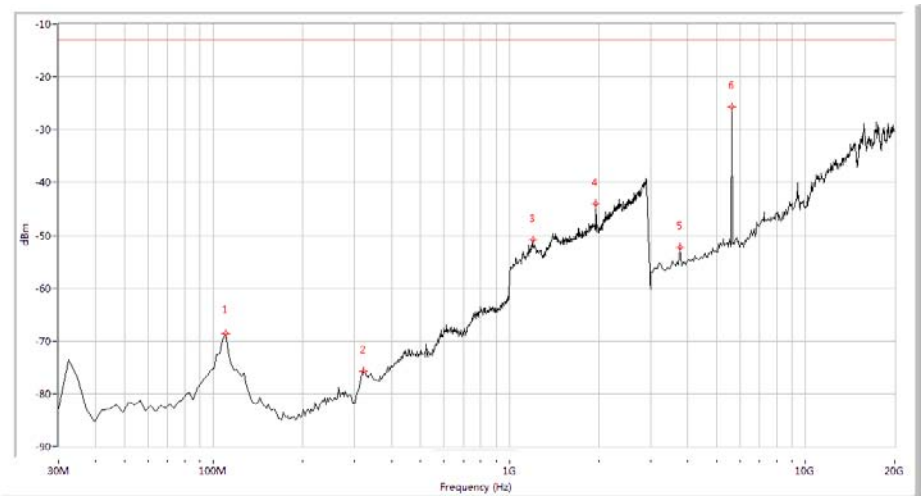
(Plot B.1: GSM 1900MHz Channel = 512, Test Antenna Horizontal)



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-71.23	-13.0	58.2	143.3	Vertical	PASS
615.387	-68.83	-13.0	55.8	6.8	Vertical	PASS
1044.888	-54.08	-13.0	41.1	45.7	Vertical	PASS

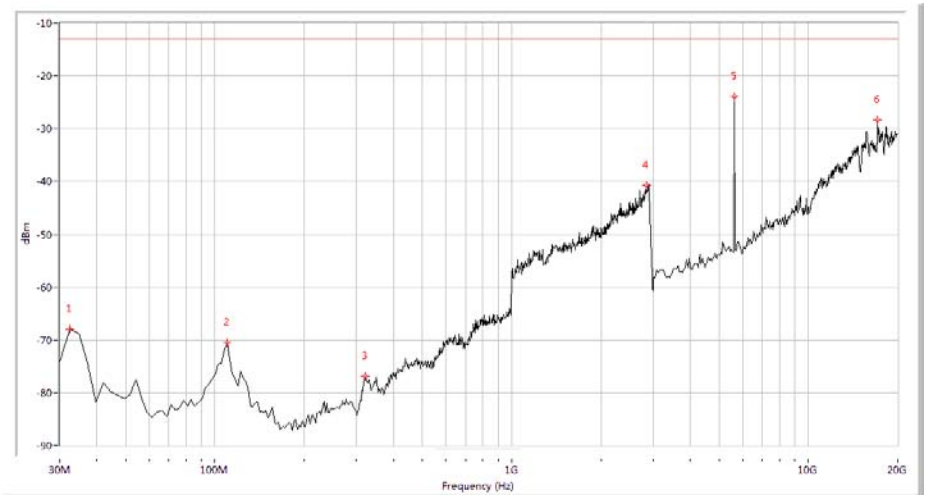
3720.698	-52.85	-13.0	39.9	331.5	Vertical	PASS
5543.641	-24.19	-13.0	11.2	63.9	Vertical	PASS
15760.599	-29.50	-13.0	16.5	211.0	Vertical	PASS

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



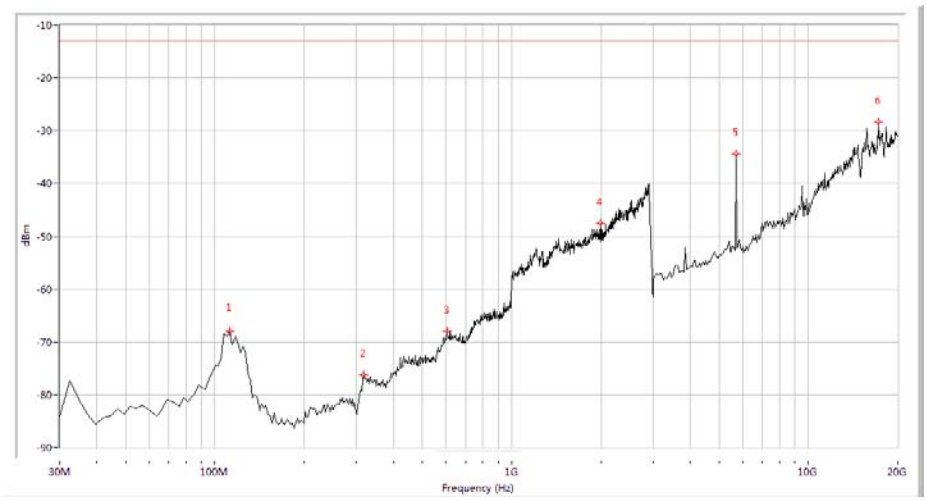
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-68.60	-13.0	55.6	244.1	Horizontal	PASS
320.274	-75.81	-13.0	62.8	360.0	Horizontal	PASS
1199.501	-50.87	-13.0	37.9	1.4	Horizontal	PASS
1957.606	-44.11	-13.0	31.1	63.2	Horizontal	PASS
3763.092	-52.29	-13.0	39.3	198.0	Horizontal	PASS
5628.429	-25.60	-13.0	12.6	237.6	Horizontal	PASS

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



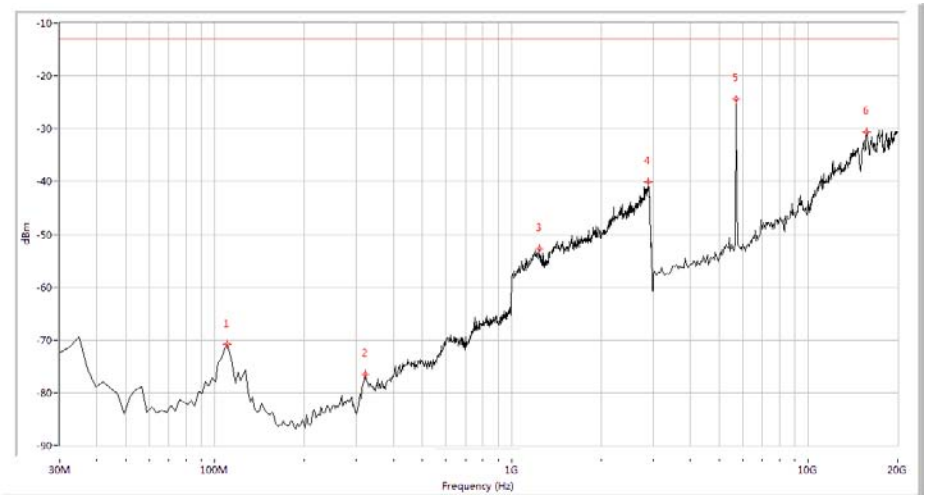
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
32.419	-68.03	-13.0	55.0	14.2	Vertical	PASS
109.825	-70.47	-13.0	57.5	352.3	Vertical	PASS
320.274	-76.89	-13.0	63.9	63.7	Vertical	PASS
2840.399	-40.70	-13.0	27.7	145.6	Vertical	PASS
5628.429	-24.01	-13.0	11.0	24.8	Vertical	PASS
17159.601	-28.44	-13.0	15.4	22.9	Vertical	PASS

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



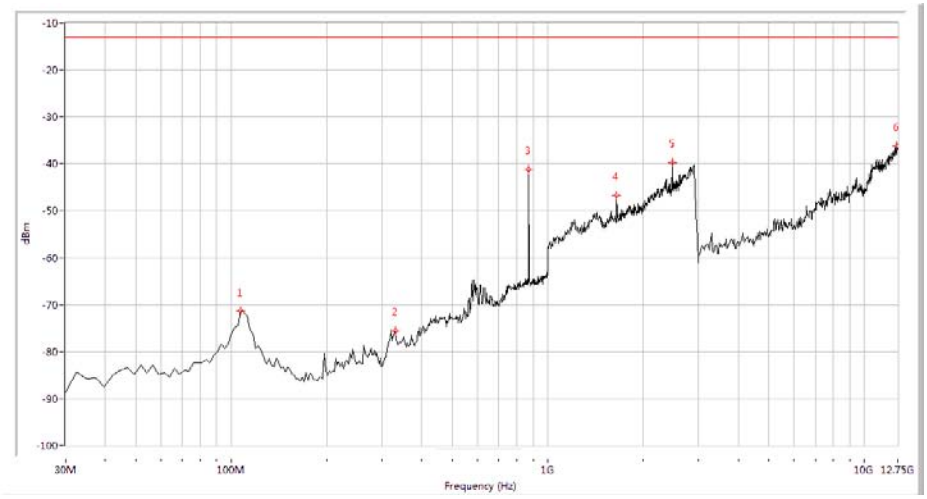
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
112.244	-67.98	-13.0	55.0	12.5	Horizontal	PASS
317.855	-76.29	-13.0	63.3	341.6	Horizontal	PASS
605.711	-67.97	-13.0	55.0	9.6	Horizontal	PASS
1987.531	-47.56	-13.0	34.6	36.4	Horizontal	PASS
5713.217	-34.36	-13.0	21.4	126.7	Horizontal	PASS
17244.389	-28.39	-13.0	15.4	302.9	Horizontal	PASS

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



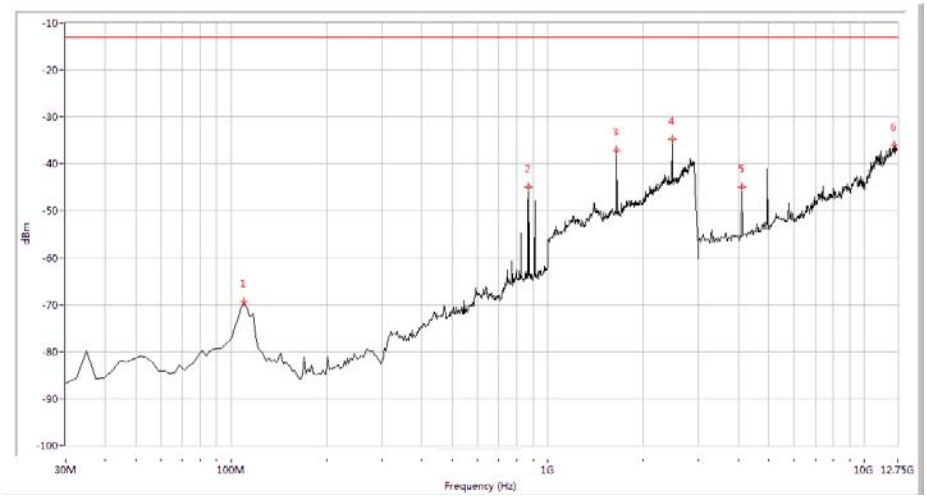
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-70.80	-13.0	57.8	154.7	Vertical	PASS
320.274	-76.51	-13.0	63.5	71.5	Vertical	PASS
1244.389	-52.80	-13.0	39.8	69.3	Vertical	PASS
2885.287	-40.15	-13.0	27.1	210.4	Vertical	PASS
5713.217	-24.37	-13.0	11.4	60.9	Vertical	PASS
15718.204	-30.62	-13.0	17.6	306.6	Vertical	PASS

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



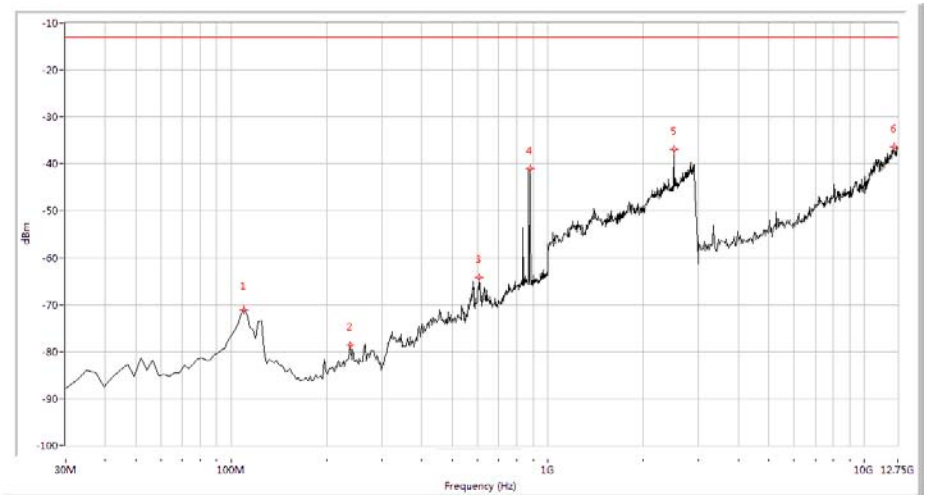
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
107.406	-71.28	-13.0	58.3	142.5	Horizontal	PASS
329.950	-75.57	-13.0	62.6	36.9	Horizontal	PASS
871.796	-41.21	-13.0	28.2	47.2	Horizontal	PASS
1648.379	-46.69	-13.0	33.7	241.3	Horizontal	PASS
2471.322	-39.73	-13.0	26.7	20.7	Horizontal	PASS
12701.372	-36.25	-13.0	23.2	233.6	Horizontal	PASS

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



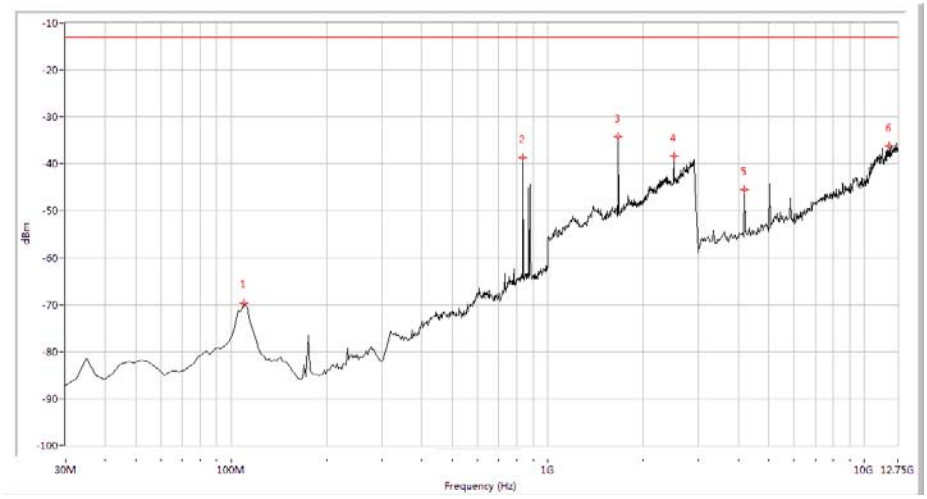
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-69.31	-13.0	56.3	193.8	Vertical	PASS
871.796	-44.99	-13.0	32.0	18.0	Vertical	PASS
1648.379	-37.07	-13.0	24.1	108.8	Vertical	PASS
2471.322	-34.73	-13.0	21.7	338.8	Vertical	PASS
4118.454	-45.02	-13.0	32.0	353.1	Vertical	PASS
12409.601	-36.02	-13.0	23.0	79.3	Vertical	PASS

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



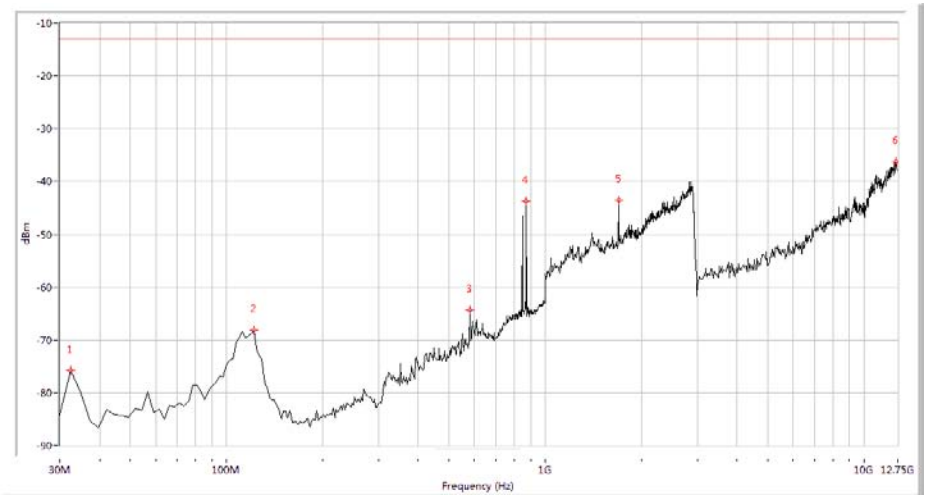
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-71.09	-13.0	58.1	12.3	Horizontal	PASS
238.030	-78.55	-13.0	65.5	21.0	Horizontal	PASS
608.130	-64.10	-13.0	51.1	215.4	Horizontal	PASS
879.052	-41.01	-13.0	28.0	302.9	Horizontal	PASS
2506.234	-36.82	-13.0	23.8	109.7	Horizontal	PASS
12409.601	-36.34	-13.0	23.3	157.6	Horizontal	PASS

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



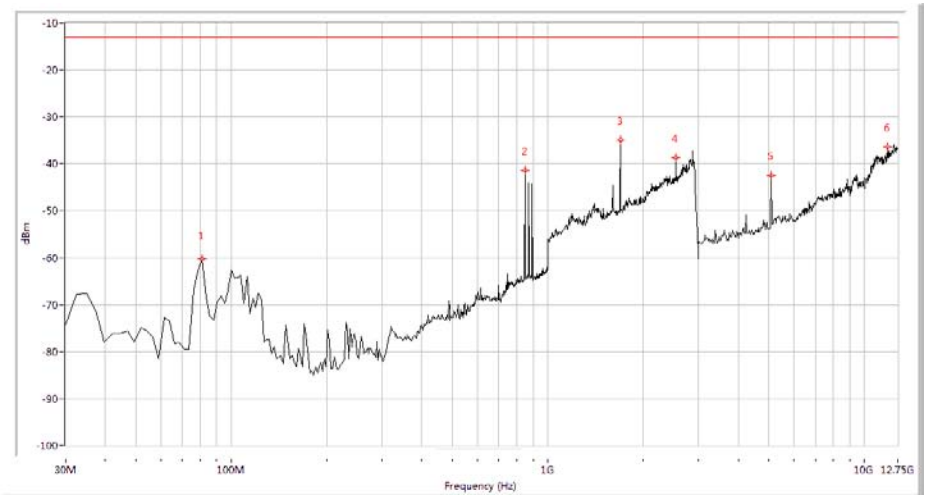
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-69.63	-13.0	56.6	360.0	Vertical	PASS
835.511	-38.74	-13.0	25.7	15.9	Vertical	PASS
1673.317	-34.28	-13.0	21.3	29.5	Vertical	PASS
2506.234	-38.26	-13.0	25.3	218.4	Vertical	PASS
4191.397	-45.41	-13.0	32.4	351.1	Vertical	PASS
11971.945	-36.17	-13.0	23.2	357.4	Vertical	PASS

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



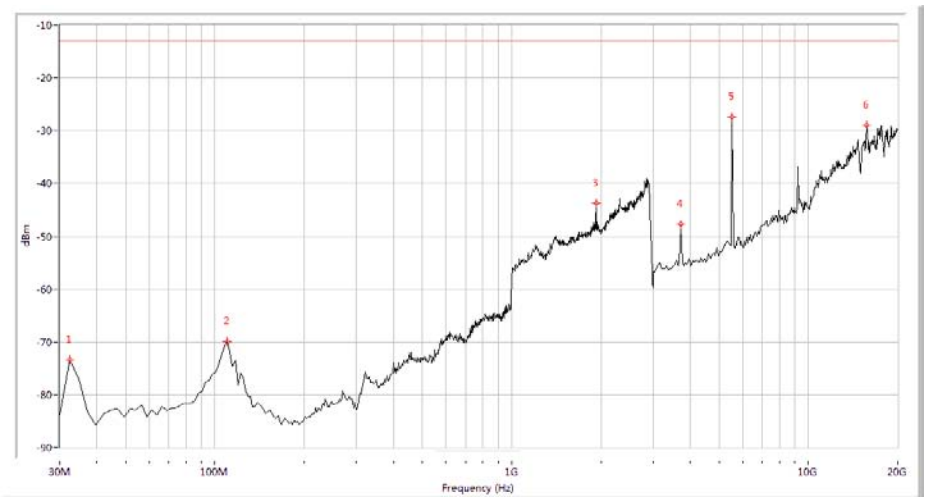
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
32.419	-75.78	-13.0	62.8	143.6	Horizontal	PASS
121.920	-68.19	-13.0	55.2	78.9	Horizontal	PASS
579.102	-64.35	-13.0	51.3	51.0	Horizontal	PASS
871.796	-43.76	-13.0	30.8	116.4	Horizontal	PASS
1698.254	-43.56	-13.0	30.6	323.7	Horizontal	PASS
12628.429	-36.38	-13.0	23.4	9.5	Horizontal	PASS

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



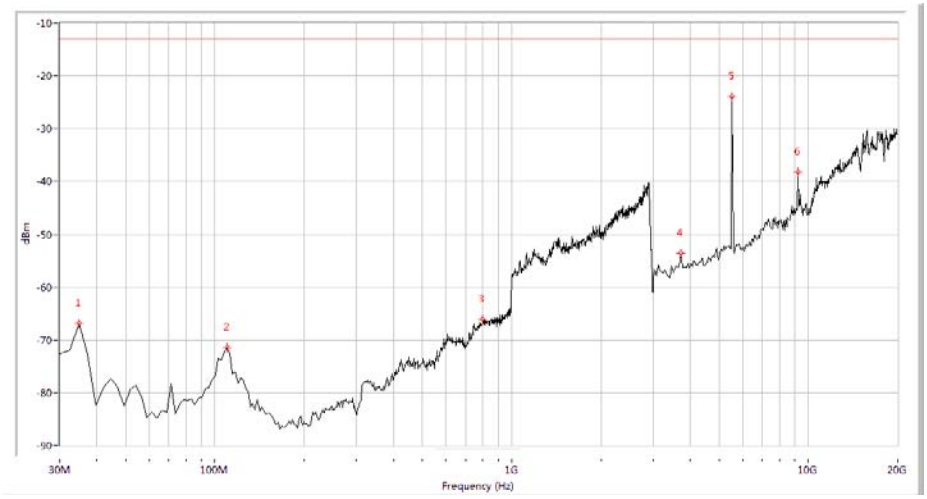
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
80.798	-60.29	-13.0	47.3	358.3	Vertical	PASS
847.606	-41.34	-13.0	28.3	316.6	Vertical	PASS
1698.254	-34.91	-13.0	21.9	216.9	Vertical	PASS
2541.147	-38.75	-13.0	25.8	322.8	Vertical	PASS
5091.022	-42.45	-13.0	29.4	59.8	Vertical	PASS
11874.688	-36.29	-13.0	23.3	30.2	Vertical	PASS

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



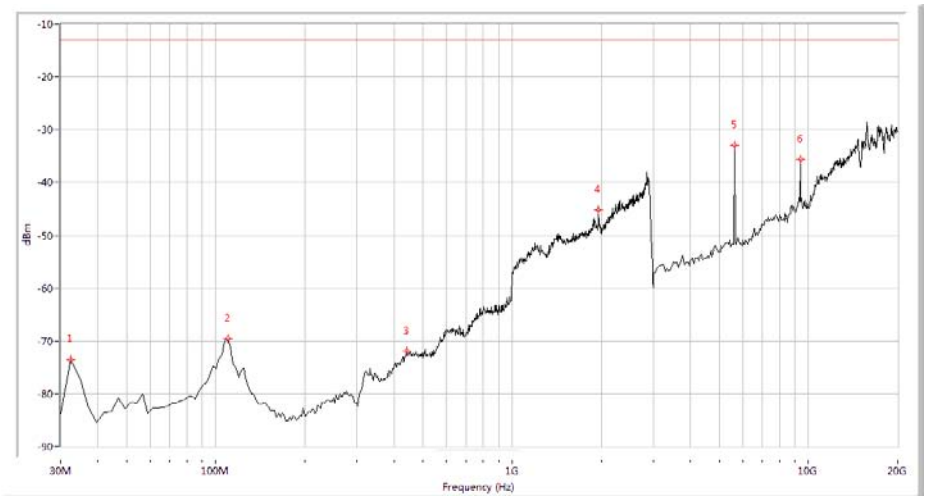
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
32.419	-73.37	-13.0	60.4	241.9	Horizontal	PASS
109.825	-69.94	-13.0	56.9	2.0	Horizontal	PASS
1927.681	-43.78	-13.0	30.8	23.6	Horizontal	PASS
3720.698	-47.73	-13.0	34.7	194.9	Horizontal	PASS
5543.641	-27.50	-13.0	14.5	271.1	Horizontal	PASS
15760.599	-28.96	-13.0	16.0	-0.0	Horizontal	PASS

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



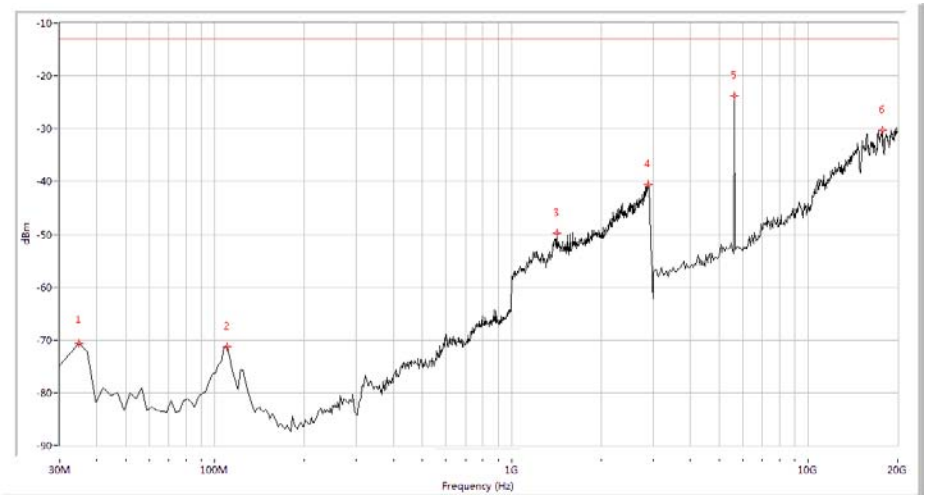
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
34.838	-66.80	-13.0	53.8	12.0	Vertical	PASS
109.825	-71.47	-13.0	58.5	342.6	Vertical	PASS
799.227	-66.13	-13.0	53.1	45.7	Vertical	PASS
3720.698	-53.56	-13.0	40.6	9.8	Vertical	PASS
5543.641	-23.99	-13.0	11.0	32.4	Vertical	PASS
9231.920	-38.23	-13.0	25.2	82.1	Vertical	PASS

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



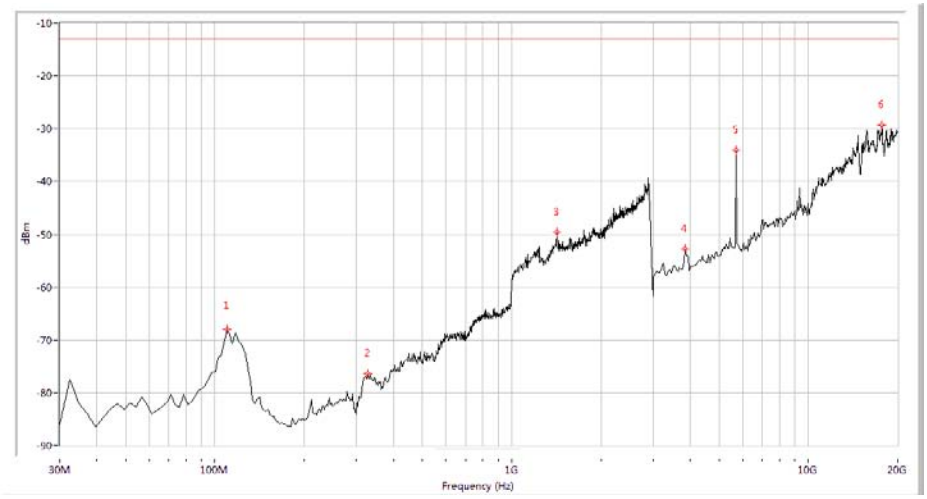
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
32.419	-73.56	-13.0	60.6	295.5	Horizontal	PASS
109.825	-69.62	-13.0	56.6	92.2	Horizontal	PASS
441.222	-72.01	-13.0	59.0	264.1	Horizontal	PASS
1957.606	-45.22	-13.0	32.2	102.1	Horizontal	PASS
5628.429	-32.92	-13.0	19.9	186.2	Horizontal	PASS
9401.496	-35.59	-13.0	22.6	131.0	Horizontal	PASS

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



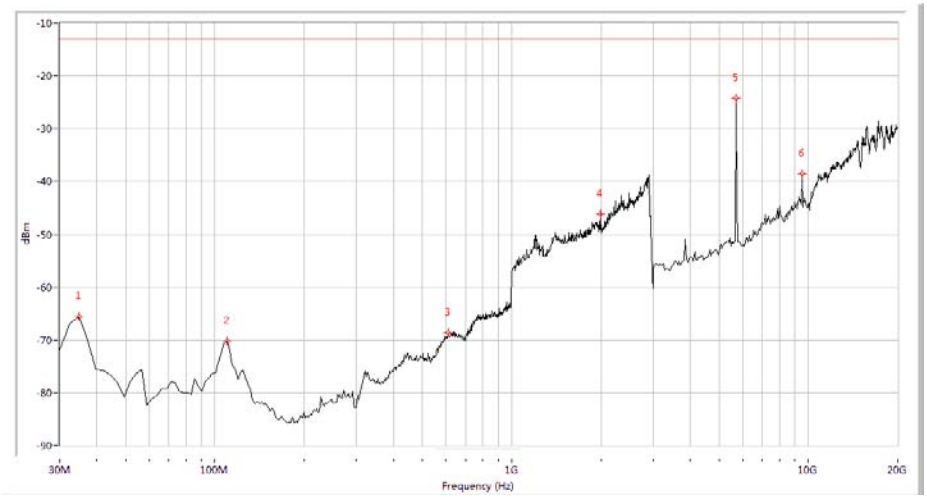
Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
34.838	-70.67	-13.0	57.7	10.2	Vertical	PASS
109.825	-71.29	-13.0	58.3	143.6	Vertical	PASS
1418.953	-49.79	-13.0	36.8	56.7	Vertical	PASS
2885.287	-40.50	-13.0	27.5	89.1	Vertical	PASS
5628.429	-23.81	-13.0	10.8	133.4	Vertical	PASS
17753.117	-30.21	-13.0	17.2	55.8	Vertical	PASS

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



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
109.825	-67.99	-13.0	55.0	63.4	Horizontal	PASS
327.531	-76.36	-13.0	63.4	242.0	Horizontal	PASS
1418.953	-49.61	-13.0	36.6	145.6	Horizontal	PASS
3847.880	-52.79	-13.0	39.8	121.8	Horizontal	PASS
5713.217	-34.03	-13.0	21.0	9.7	Horizontal	PASS
17710.723	-29.26	-13.0	16.3	3.5	Horizontal	PASS

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



Fre. (MHz)	Peak	Limit(PK)	Margin	Degree	Antenna	Verdict
34.838	-65.61	-13.0	52.6	360.0	Vertical	PASS
109.825	-70.14	-13.0	57.1	360.0	Vertical	PASS
610.549	-68.56	-13.0	55.6	246.8	Vertical	PASS
1987.531	-46.13	-13.0	33.1	20.2	Vertical	PASS
5713.217	-24.22	-13.0	11.2	249.6	Vertical	PASS
9528.678	-38.48	-13.0	25.5	120.9	Vertical	PASS

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

** END OF REPORT **