



TEST REPORT

APPLICANT : Hot Pepper, Inc.

PRODUCT NAME : 4G Smart Phone

MODEL NAME : HPP-GS1

BRAND NAME : Hot Pepper

FCC ID : 2APD4-A81C

STANDARD(S) : 47 CFR Part 22 Subpart H
47 CFR Part 24 Subpart E
47 CFR Part 27 Subpart L

TEST DATE : 2019-03-26 to 2019-04-18

ISSUE DATE : 2019-05-22

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Change History		
Version	Date	Reason for change
1.0	2019-05-22	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Hot Pepper, Inc.
Applicant Address:	5151 California Ave., Suite 100, Irvine 92617, USA
Manufacturer:	Hot Pepper, Inc.
Manufacturer Address:	5151 California Ave., Suite 100, Irvine 92617, USA

1.2. Equipment Under Test (EUT) Description

Product Name:	4G Smart Phone
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	A81C_MAINBOARD_P1
Software Version:	HPP- GS1-V1.0.4-190121
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
Operating Frequency Range:	GSM 850MHz: Tx: 824.20 - 848.80MHz Rx: 869.20 - 893.80MHz GSM 1900MHz: Tx: 1850.20 - 1909.80MHz Rx: 1930.20 - 1989.80MHz WCDMA Band II Tx: 1852.4 - 1907.6MHz Rx: 1932.4 - 1987.6MHz WCDMA Band IV Tx: 1712.4 - 1752.6MHz Rx: 2112.4 - 2152.6MHz WCDMA Band V Tx: 826.4 - 846.6MHz Rx: 871.4 - 891.6MHz

Antenna Type:	PIFA Antenna	
Antenna Gain:	Top Antenna	
	GSM 850:	-3 dBi
	GSM1900:	-3 dBi
	WCDMA Band II:	-3 dBi
	WCDMA Band IV:	-3 dBi
	WCDMA Band V:	-3 dBi
Accessory Information:	Battery	
	Manufacturer:	Shenzhen HUATIAN TONG TECHNOLOGY CO.LTD
	Brand Name:	Hot Pepper
	Model No.:	H2019GS1
	Serial No.:	(N/A, marked #1 by test site)
	Capacity:	3850mAh
	Rated Voltage:	3.8V
	Charge Limit:	4.4V
	Manufacturer:	Shenzhen Nine Liyuan Electronic Technology Co., Ltd
	Model No.:	H2019GS1A
	AC Adapter	
	Manufacturer:	Shenzhen Tianyin Electronics Co.,Ltd.
	Brand Name:	Hot Pepper
	Model No.:	TPA-23A050200UU01
	Serial No.:	(N/A, marked #1 by test site)
	Rated Input:	100-240V ~ 50/60Hz 0.3A
	Rated Output:	5V=2.0A

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 Band V 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), 4183(836.6MHz) and 4233 (846.6MHz).

Note 4: The transmitter (Tx) frequency arrangement of the WCDMA Band II 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: The transmitter (Tx) frequency arrangement of the WCDMA 1700MHz band used by the EUT can be represented with the formula $F(n)=1712.4+0.2*(n-1312)$, $1312 \leq n \leq 1513$; the lowest, middle and highest channel numbers (ARFCHs) used and tested in this report are separately 1312 (1712.4MHz), 1413 (1732.6MHz) and 1513 (1752.6MHz).

Note 6: All modes and data rates were considered and evaluated respectively by performing full test. Test modes are chosen to be reported as the worst case below:

GPRS mode and EDGE mode for GSM 850;
GPRS mode and EDGE mode for GSM 1900;
WCDMA mode for WCDMA band II;
WCDMA mode for WCDMA band IV;
WCDMA mode for WCDMA band V;

Note 7: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. Maximum ERP/EIRP and Emission Designator

System	Maximum ERP/EIRP (W)	Emission Designator
GSM850	0.543	247KGXW
EDGE850	0.138	247KG7W
GSM1900	0.428	246KGXW
EDGE1900	0.166	246KG7W
WCDMA Band II	0.085	4M18F9W
WCDMA Band IV	0.079	4M18F9W
WCDMA Band V	0.062	4M17F9W



1.4. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part 22, Part 24 and Part 27 for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22	Public Mobile Services
3	47 CFR Part 24	Personal Communications Services
4	47 CFR Part 27	Miscellaneous Wireless Communications Services

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

No.	Section	Description	Test Date	Test Engineer	Result
1	2.1046	Conducted RF Output Power	Mar 26, 2019	Lion Xiao	PASS
2	22.913(d), 24.232(d), 27.50(d)	Peak - Average Ratio	Mar 26, 2019 Apr 07, 2019	Lion Xiao	PASS
3	2.1049	99% Occupied Bandwidth	Mar 26, 2019 Apr 07, 2019	Lion Xiao	PASS
4	2.1055, 22.355, 24.235, 27.54	Frequency Stability	Mar 26, 2019 Apr 07, 2019	Lion Xiao	PASS
5	2.1051, 22.917(a), 24.238(a), 27.53(h)	Conducted Out of Band Emissions	Apr 07, 2019	Lion Xiao	PASS
6	2.1051, 22.917(a), 24.238(a), 27.53(h)	Band Edge	Apr 07, 2019	Lion Xiao	PASS
7	22.913(a), 24.232(a), 27.50(d)	Transmitter Radiated Power (EIPR/ERP)	Mar 26, 2019 Apr 18, 2019	Jiefeng Zhang	PASS
8	2.1051, 22.917(a), 24.238(a), 27.53(h)	Radiated Out of Band Emissions	Mar 26, 2019 Apr 18, 2019	Jiefeng Zhang	PASS

Note 1: The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03r01 and ANSI/TIA-603-E-2016.



1.5. Environmental 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&27L Requirements

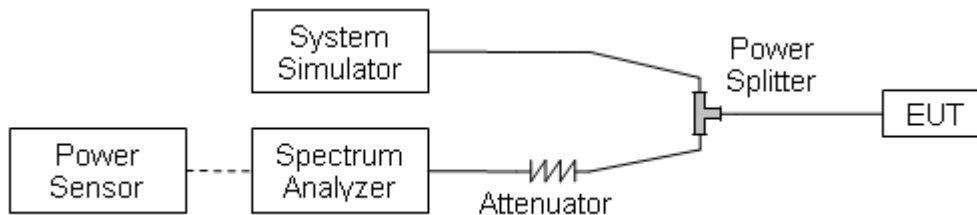
2.1. Conducted RF Output Power

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

Test Setup:



The EUT 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.

**2.1.3. Test Results**

GSM850	Average Power (dBm)		
TX Channel	128	190	251
Frequency (MHz)	824.2	836.6	848.8
GSM 1 Tx slot	32.53	32.54	32.47
GPRS 1 Tx slot	32.50	32.54	32.45
GPRS 2 Tx slots	31.32	31.36	31.25
GPRS 3 Tx slots	29.38	29.40	29.27
GPRS 4 Tx slots	28.43	28.44	28.32
EDGE 1 Tx slot	26.81	27.07	26.82
EDGE 2 Tx slots	25.36	25.03	25.12
EDGE 3 Tx slots	22.76	22.92	22.90
EDGE 4 Tx slots	21.56	21.50	21.68

GSM1900	Average Power (dBm)		
TX Channel	512	661	810
Frequency (MHz)	1850.2	1880	1909.8
GSM 1 Tx slot	29.47	29.46	29.48
GPRS 1 Tx slot	29.43	29.44	29.46
GPRS 2 Tx slots	27.84	27.84	27.87
GPRS 3 Tx slots	25.82	25.81	25.85
GPRS 4 Tx slots	24.87	24.87	24.90
EDGE 1 Tx slot	25.16	25.26	25.42
EDGE 2 Tx slots	24.76	24.02	24.06
EDGE 3 Tx slots	22.00	21.76	21.95
EDGE 4 Tx slots	20.15	20.24	20.31



WCDMA Band II	Average Power (dBm)		
	9262	9400	9538
TX Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
AMR 12.2Kbps	21.73	21.72	21.80
RMC 12.2Kbps	22.73	22.72	22.80
HSDPA Subtest-1	21.59	21.63	21.70
HSDPA Subtest-2	21.42	21.51	21.64
HSDPA Subtest-3	21.04	21.09	21.12
HSDPA Subtest-4	21.00	21.05	21.09
HSUPA Subtest-1	20.13	20.26	20.15
HSUPA Subtest-2	18.64	18.25	18.31
HSUPA Subtest-3	19.56	19.41	19.51
HSUPA Subtest-4	18.56	18.64	18.42
HSUPA Subtest-5	20.10	20.09	20.11
HSPA+ (16QAM) Subtest-1	21.45	21.42	21.47

WCDMA Band IV	Average Power (dBm)		
	1312	1413	1513
TX Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
AMR 12.2Kbps	21.60	21.75	21.68
RMC 12.2Kbps	22.63	22.69	22.70
HSDPA Subtest-1	21.96	21.33	21.53
HSDPA Subtest-2	22.01	21.75	21.54
HSDPA Subtest-3	21.81	21.52	21.32
HSDPA Subtest-4	21.80	21.48	21.43
HSUPA Subtest-1	20.87	20.61	20.46
HSUPA Subtest-2	18.69	18.90	18.24
HSUPA Subtest-3	19.34	19.13	19.96
HSUPA Subtest-4	18.45	18.60	18.61
HSUPA Subtest-5	20.09	20.10	20.13
HSPA+ (16QAM) Subtest-1	21.56	21.69	21.62



WCDMA Band V	Average Power (dBm)		
	4132	4183	4233
TX Channel	4132	4183	4233
Frequency (MHz)	826.4	836.6	846.6
AMR 12.2Kbps	21.37	21.35	21.38
RMC 12.2Kbps	23.35	23.37	23.36
HSDPA Subtest-1	22.19	22.23	22.16
HSDPA Subtest-2	22.06	21.42	21.83
HSDPA Subtest-3	21.87	22.12	22.15
HSDPA Subtest-4	21.84	21.90	21.66
HSUPA Subtest-1	21.23	21.43	22.04
HSUPA Subtest-2	19.89	19.97	19.15
HSUPA Subtest-3	20.12	20.93	20.11
HSUPA Subtest-4	19.31	19.93	19.87
HSUPA Subtest-5	21.30	21.05	21.07
HSPA+ (16QAM) Subtest-1	21.54	21.50	21.59

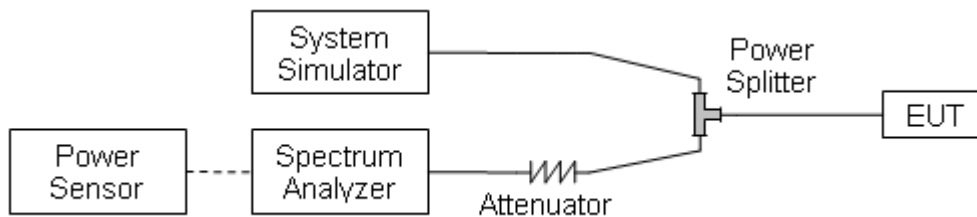
2.2. Peak to Average Ratio

2.2.1. Requirement

According to FCC 24.232(d) & 22.913(d) & 27.50 (d) the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.2.2. Test Description

Test Setup:



The EUT 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.

2.2.3. Test procedure

1. For GSM/EDGE 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 ratio.
2. 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%.



2.2.4. Test Result

The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

A. Test Verdict:

Band	Channel	Frequency (MHz)	Peak to Average ratio	Limit	Verdict
			dB	dB	
GSM 850MHz	128	824.2	0.016	13	PASS
	190	836.6	0.013		PASS
	251	848.8	0.022		PASS
GSM 1900MHz	512	1850.2	0.018		PASS
	661	1880.0	0.108		PASS
	810	1909.8	0.013		PASS
EDGE 850MHz	128	824.2	0.022		PASS
	190	836.6	0.032		PASS
	251	848.8	0.025		PASS
EDGE 1900MHz	512	1850.2	0.019		PASS
	661	1880.0	0.032		PASS
	810	1909.8	0.005		PASS

Band	Channel	Frequency (MHz)	Peak to Average ratio	Limit	Verdict
			dB	dB	
WCDMA Band II	9262	1852.4	2.75	13	PASS
	9400	1880.0	2.52		PASS
	9538	1907.6	2.71		PASS
WCDMA Band IV	1312	1712.4	3.10		PASS
	1413	1732.6	3.16		PASS
	1513	1752.6	2.99		PASS
WCDMA Band V	4132	826.4	2.87		PASS
	4183	836.6	2.98		PASS
	4233	846.6	2.97		PASS



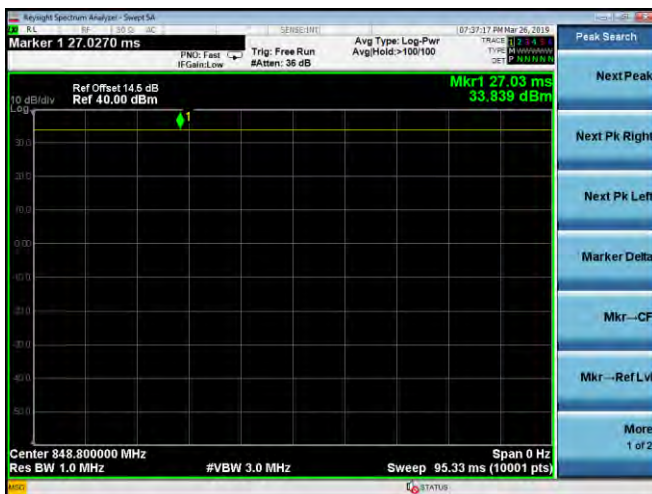
GSM 850MHz CH128 824.2MHz



GSM 850MHz CH190 836.6MHz



GSM 850MHz CH251 848.8MHz





GSM 1900MHz CH512 1850.2MHz



GSM 1900MHz CH661 1880.0MHz



GSM 1900MHz CH810 1909.8MHz





EDGE 850MHz CH128 824.2MHz



EDGE 850MHz CH190 836.6MHz



EDGE 850MHz CH251 848.8MHz





EDGE 1900MHz CH512 1850.2MHz

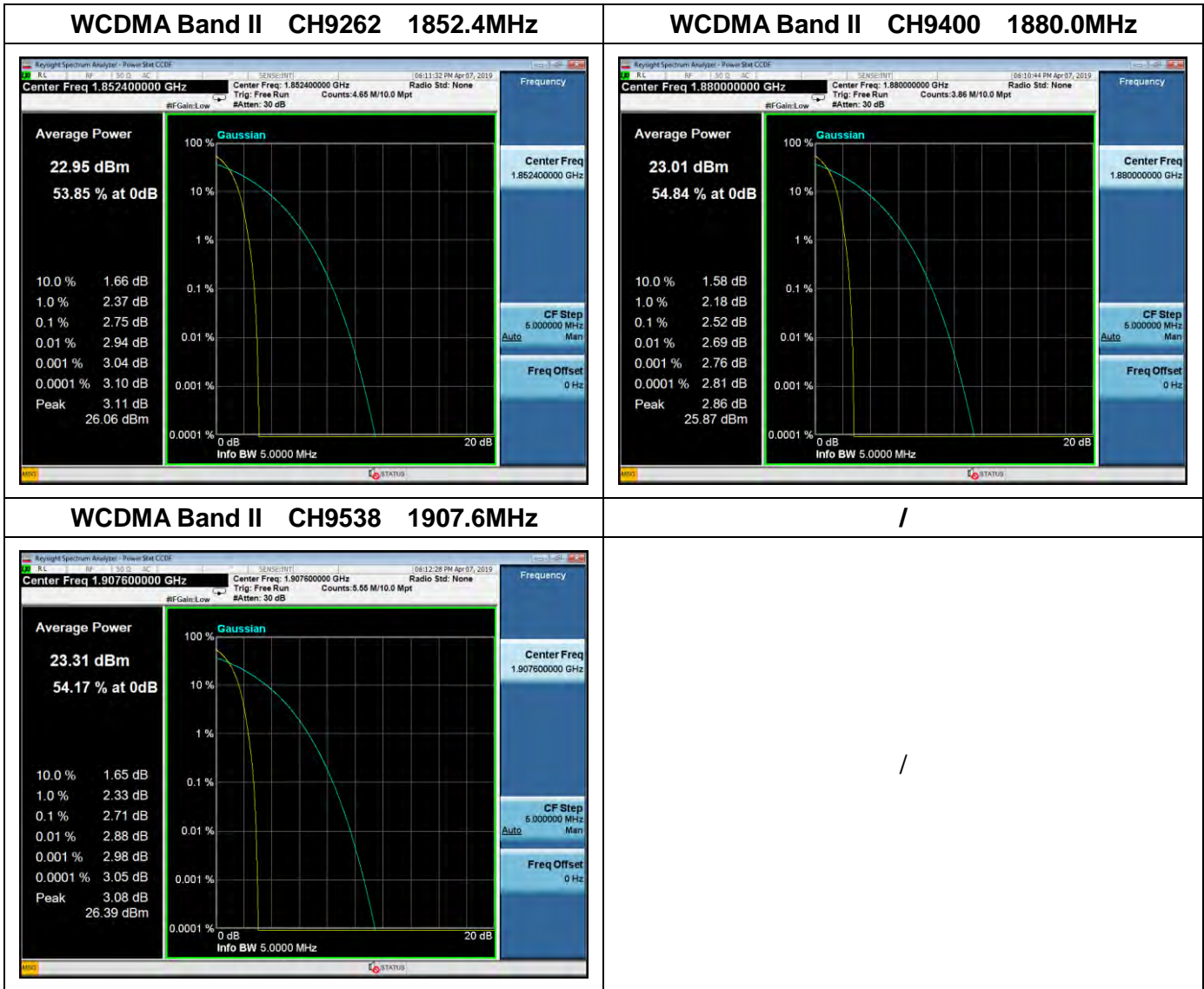


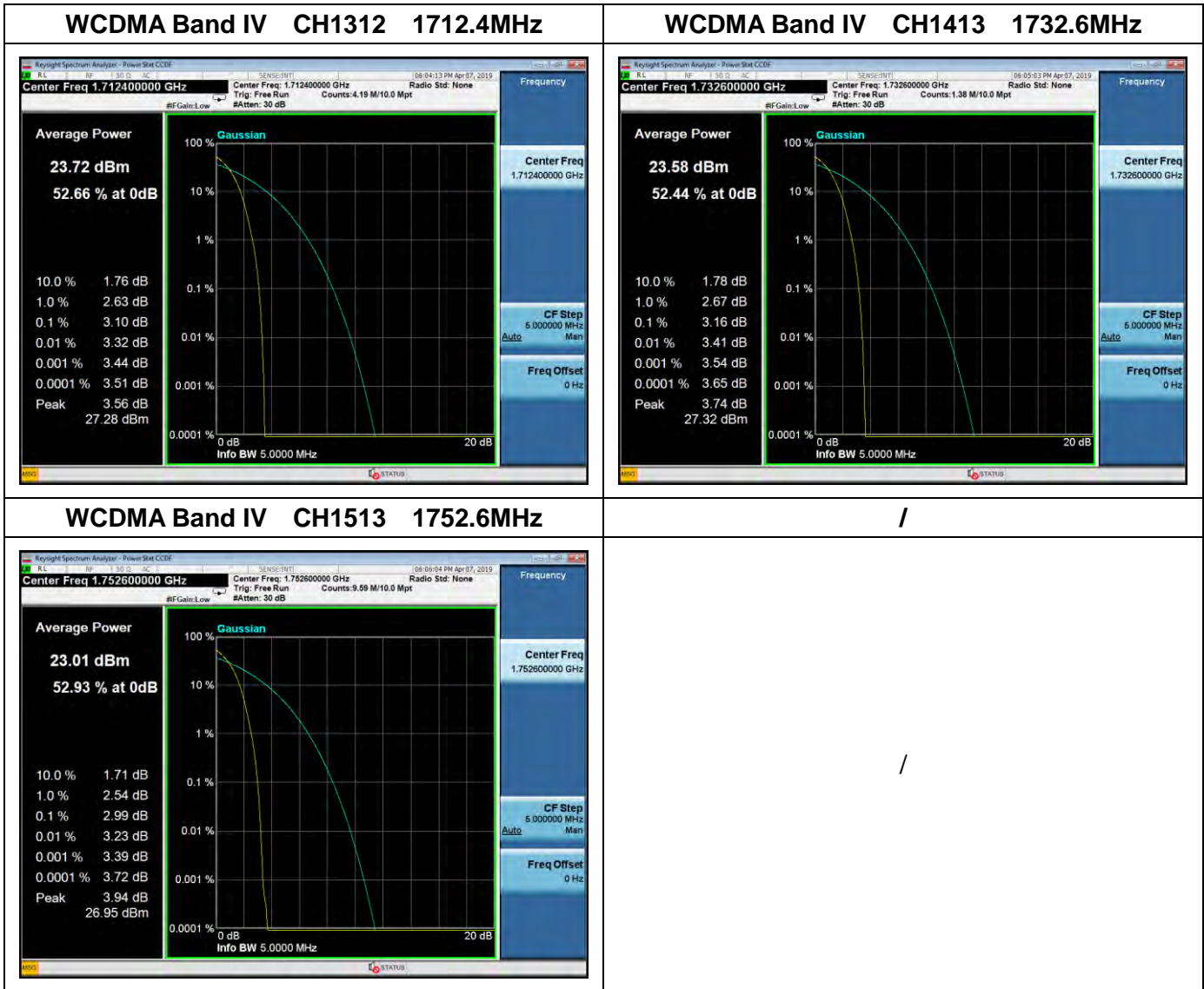
EDGE 1900MHz CH661 1880.0MHz



EDGE 1900MHz CH810 1909.8MHz





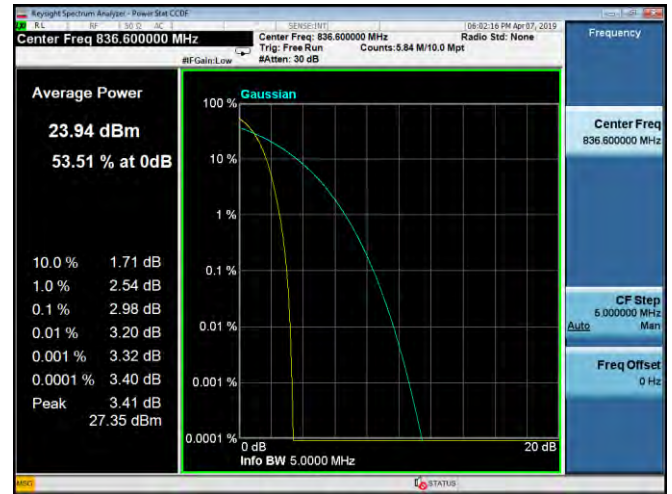




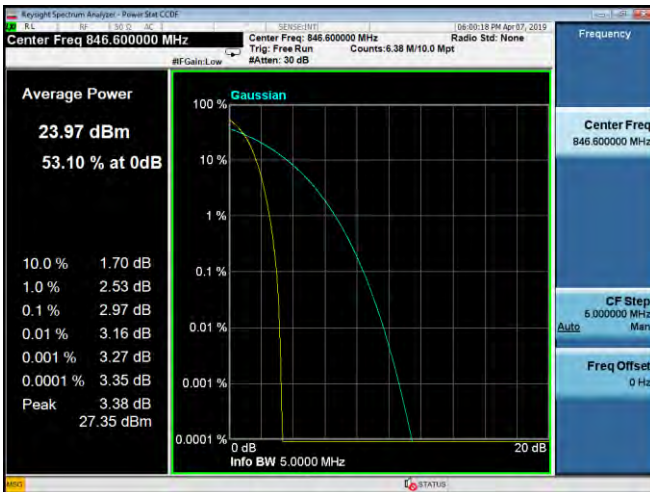
WCDMA Band V CH4132 826.4MHz



WCDMA Band V CH4183 836.6MHz



WCDMA Band V CH4233 846.6MHz



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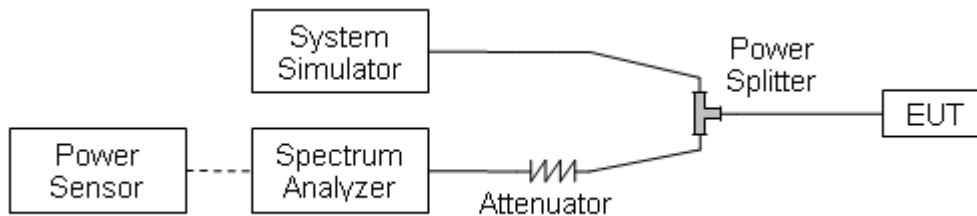
2.3.99% Occupied Bandwidth

2.3.1. Requirement

According to FCC section 2.1049, 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

Test Setup:



The EUT 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.



2.3.3. Test Result

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

GSM Test Verdict:

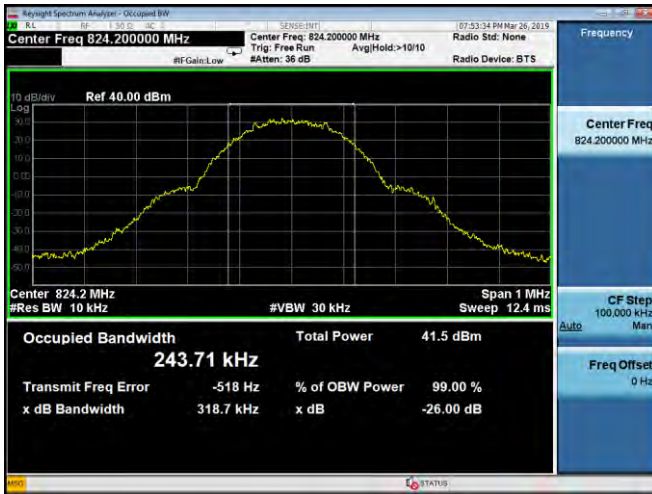
Band	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)
GSM 850MHz	128	824.2	243.71	318.7
	190	836.6	245.40	317.5
	251	848.8	247.41	316.2
GSM 1900MHz	512	1850.2	246.35	317.0
	661	1880.0	242.85	316.6
	810	1909.8	246.42	311.2
EDGE 850MHz	128	824.2	246.91	319.8
	190	836.6	246.05	317.1
	251	848.8	244.68	318.8
EDGE 1900MHz	512	1850.2	244.62	315.9
	661	1880.0	245.80	319.3
	810	1909.8	243.35	318.6

WCDMA Test Verdict:

Band	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
WCDMA Band II	9262	1852.4	4.175	4.702
	9400	1880.0	4.182	4.707
	9538	1907.6	4.166	4.711
WCDMA Band IV	1312	1712.4	4.184	4.689
	1413	1732.6	4.170	4.691
	1513	1752.6	4.175	4.708
WCDMA Band V	4132	826.4	4.162	4.715
	4182	836.4	4.165	4.688
	4233	846.6	4.173	4.710



GSM 850MHz CH128 824.2MHz



GSM 850MHz CH190 836.6MHz



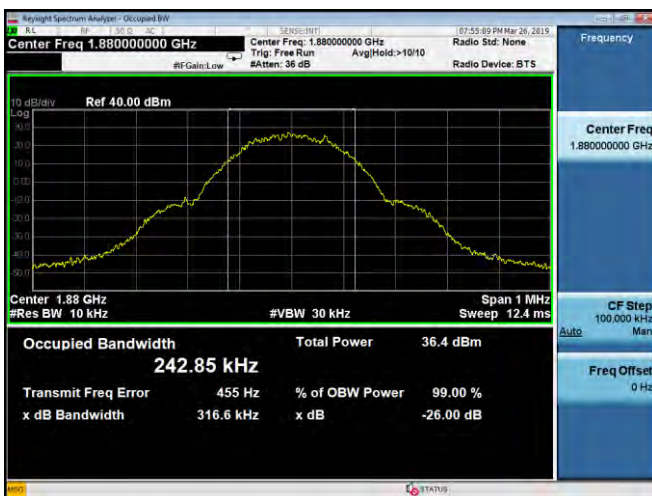
GSM 850MHz CH251 848.8MHz



GSM 1900MHz CH512 1850.2MHz



GSM 1900MHz CH661 1880.0MHz



GSM 1900MHz CH810 1909.8MHz





EDGE 850MHz CH128 824.2MHz



EDGE 850MHz CH190 836.6MHz



EDGE 850MHz CH251 848.8MHz



EDGE 1900MHz CH512 1850.2MHz



EDGE 1900MHz CH661 1880.0MHz



EDGE 1900MHz CH810 1909.8MHz

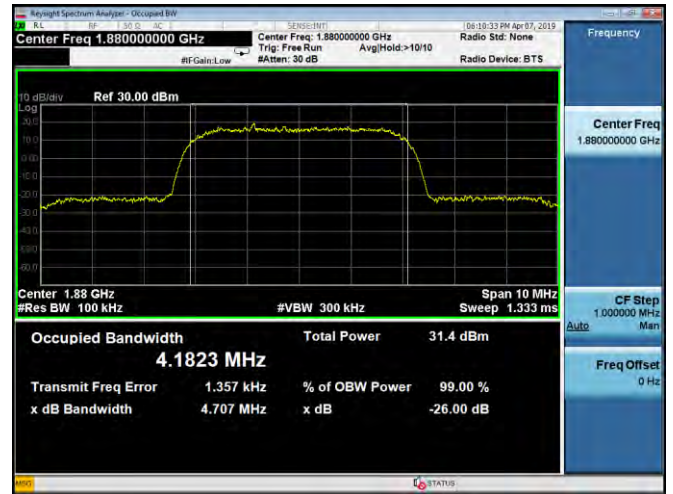




WCDMA Band II CH9262 1852.4MHz



WCDMA Band II CH9400 1880MHz



WCDMA Band II CH9538 1907.6MHz



WCDMA Band IV CH1312 1712.4MHz

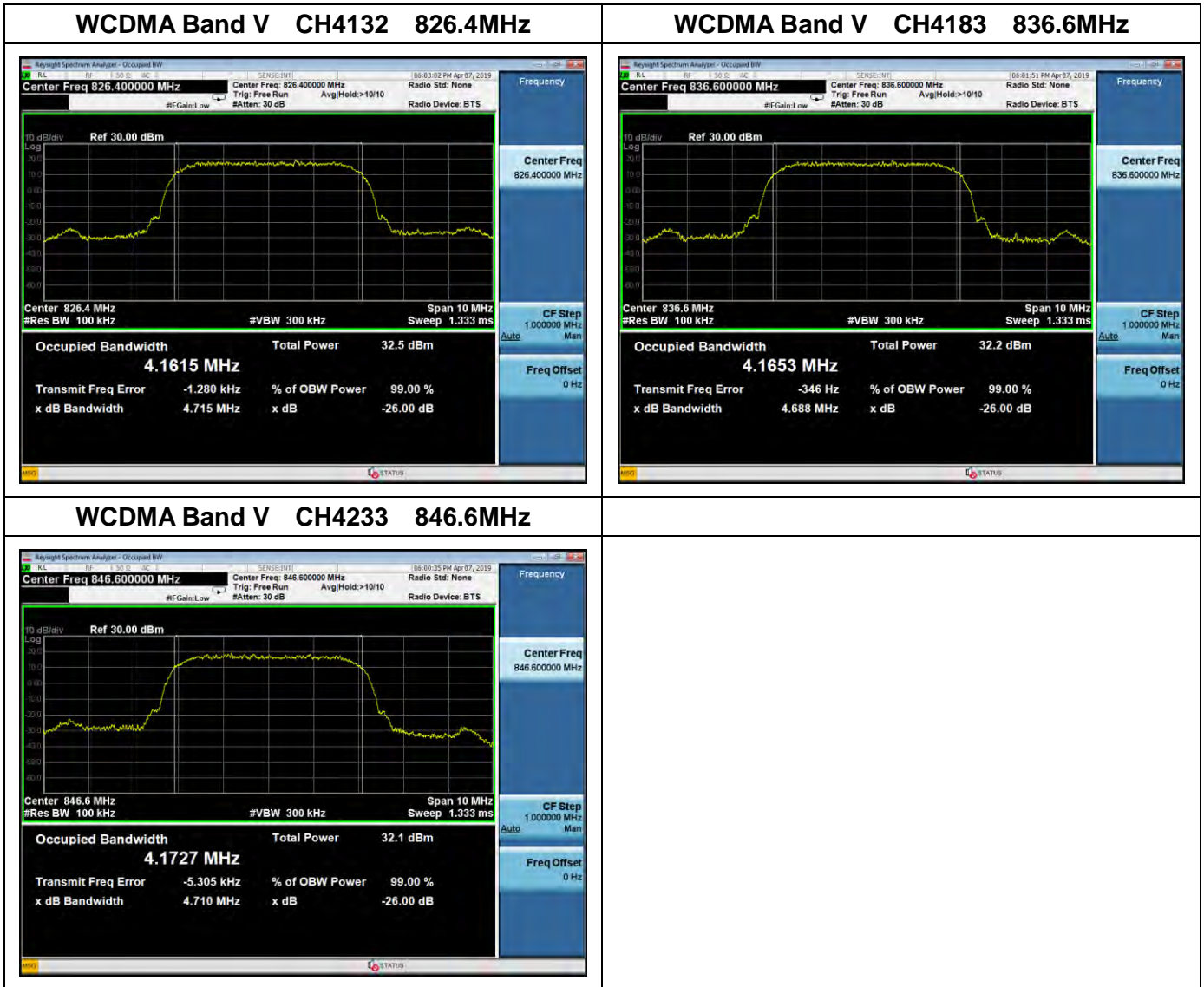


WCDMA Band IV CH1413 1732.6MHz



WCDMA Band IV CH1513 1752.6MHz





2.4. Frequency Stability

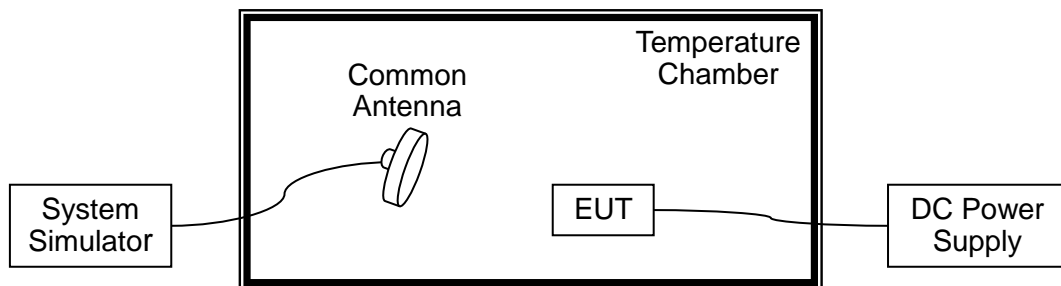
2.4.1. Requirement

According to FCC section 22.355, 24.235 and 27.54 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 $+50^{\circ}\text{C}$ 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

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.



2.4.3. Test Result

GSM 850MHz, Channel 190, Frequency 836.6MHz					
Limit =±2.5ppm					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.8	+20(Ref)	26	0.031	PASS
100		-30	31	0.037	
100		-20	39	0.047	
100		-10	33	0.039	
100		0	30	0.036	
100		+10	22	0.026	
100		+20	28	0.033	
100		+30	34	0.041	
100		+40	38	0.045	
100		+50	41	0.049	
115	4.4	+20	36	0.043	
85	3.5	+20	30	0.036	

GSM 1900MHz, Channel 661, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.8	+20(Ref)	-48	-0.026	PASS
100		-30	-53	-0.028	
100		-20	-41	-0.022	
100		-10	-49	-0.026	
100		0	-56	-0.030	
100		+10	-52	-0.028	
100		+20	-57	-0.030	
100		+30	-45	-0.024	
100		+40	-59	-0.031	
100		+50	-54	-0.029	
115	4.4	+20	-50	-0.027	
85	3.5	+20	-55	-0.029	



EDGE 850MHz, Channel 190, Frequency 836.6MHz					
Limit =±2.5ppm					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.8	+20(Ref)	31	0.037	PASS
100		-30	38	0.045	
100		-20	45	0.054	
100		-10	33	0.039	
100		0	40	0.048	
100		+10	47	0.056	
100		+20	42	0.050	
100		+30	49	0.059	
100		+40	46	0.055	
100		+50	43	0.051	
115	4.4	+20	48	0.057	
85	3.5	+20	50	0.060	

EDGE 1900MHz, Channel 661, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.8	+20(Ref)	-47	-0.025	PASS
100		-30	-53	-0.028	
100		-20	-58	-0.031	
100		-10	-42	-0.022	
100		0	-60	-0.032	
100		+10	-64	-0.034	
100		+20	-57	-0.030	
100		+30	-51	-0.027	
100		+40	-65	-0.035	
100		+50	-69	-0.037	
115	4.4	+20	-63	-0.034	
85	3.5	+20	-55	-0.029	



WCDMA Band II, Channel 9400, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.8	+20(Ref)	-74	-0.039	PASS
100		-30	-79	-0.042	
100		-20	-65	-0.035	
100		-10	-70	-0.037	
100		0	-78	-0.041	
100		+10	-72	-0.038	
100		+20	-86	-0.046	
100		+30	-75	-0.040	
100		+40	-71	-0.038	
100		+50	-77	-0.041	
115	4.4	+20	-73	-0.039	
85	3.5	+20	-79	-0.042	

WCDMA Band IV, Channel 1413, Frequency 1732.6MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.8	+20(Ref)	-60	-0.035	PASS
100		-30	-65	-0.038	
100		-20	-62	-0.036	
100		-10	-78	-0.045	
100		0	-74	-0.043	
100		+10	-71	-0.041	
100		+20	-78	-0.045	
100		+30	-63	-0.036	
100		+40	-68	-0.039	
100		+50	-61	-0.035	
115	4.4	+20	-62	-0.036	
85	3.5	+20(Ref)	-79	-0.046	



WCDMA Band V, Channel 4183, Frequency 836.6MHz					
Limit =±2.5ppm					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.8	+20(Ref)	45	0.054	PASS
100		-30	41	0.049	
100		-20	49	0.059	
100		-10	56	0.067	
100		0	50	0.060	
100		+10	57	0.068	
100		+20	43	0.051	
100		+30	48	0.057	
100		+40	42	0.050	
100		+50	54	0.065	
115		4.4	+20	67	
85	3.5	+20	51	0.061	

2.5. Conducted Out of Band Emissions

2.5.1. Requirement

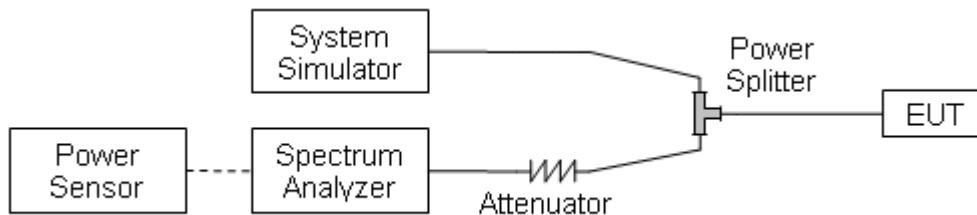
According to FCC section 22.917(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to 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.

According to FCC section 27.53(h), For operations in the 1710–1785MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

2.5.2. Test Description

Test Setup:



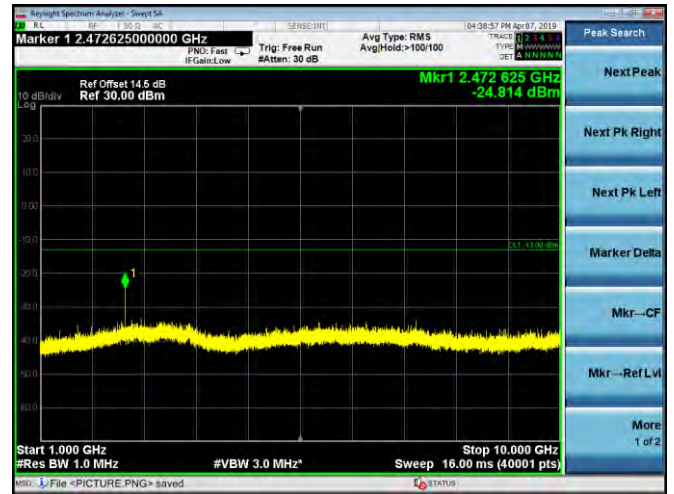
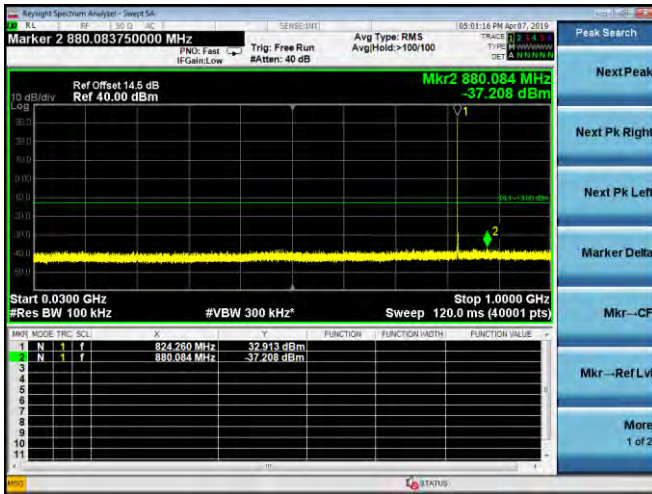
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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

2.5.3. Test Result

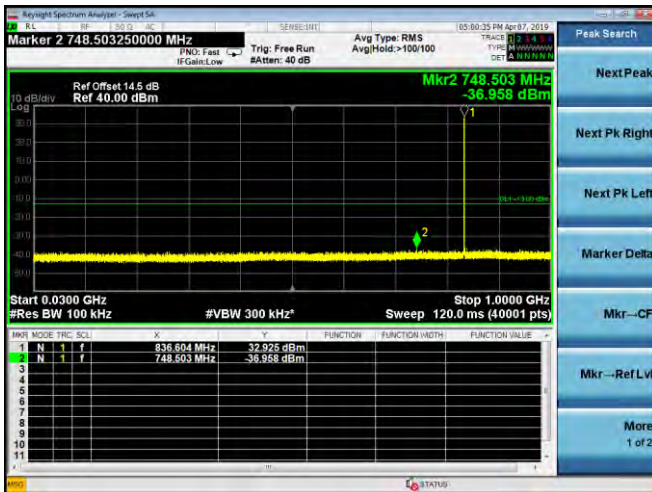
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.



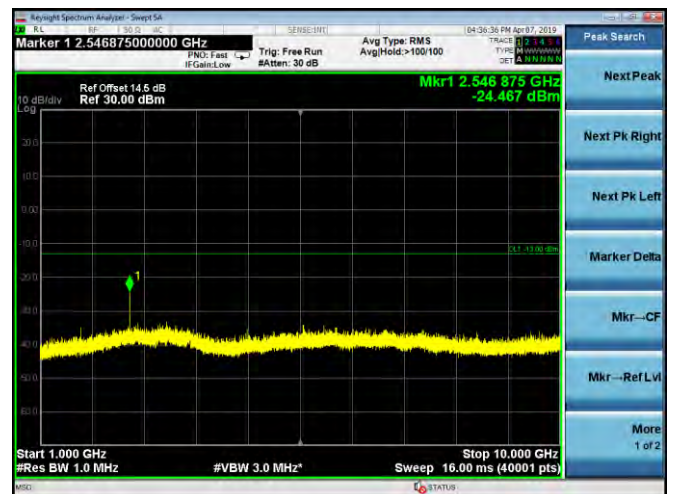
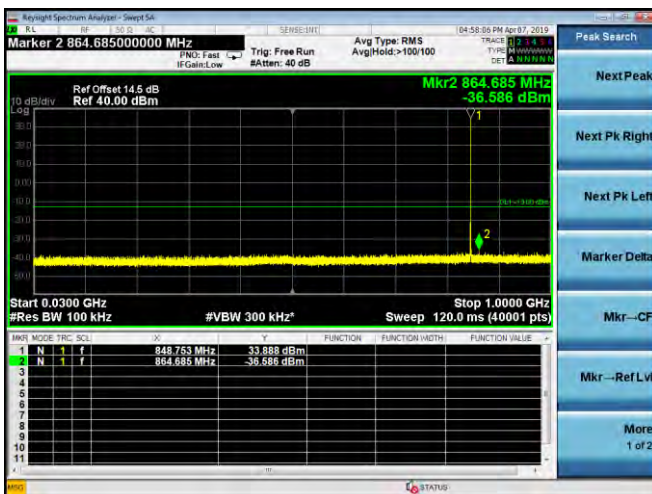
GSM 850MHz CH128 824.2MHz



GSM 850MHz CH190 836.6MHz

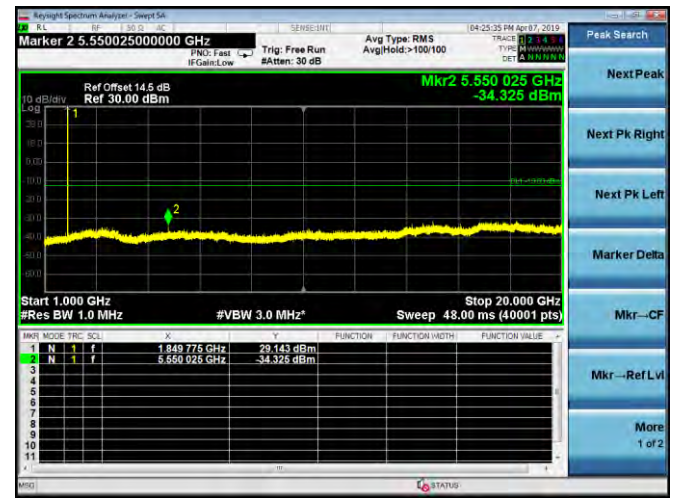
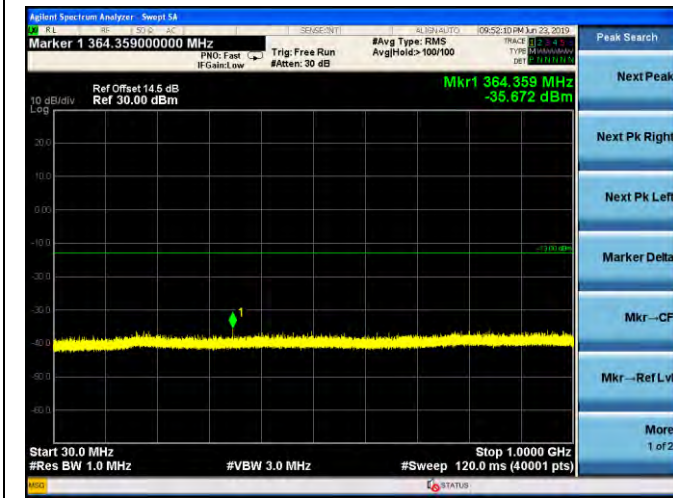


GSM 850MHz CH251 848.8MHz

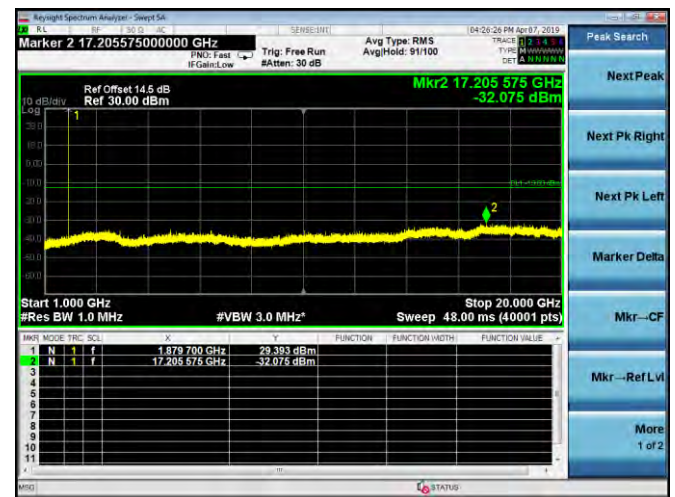
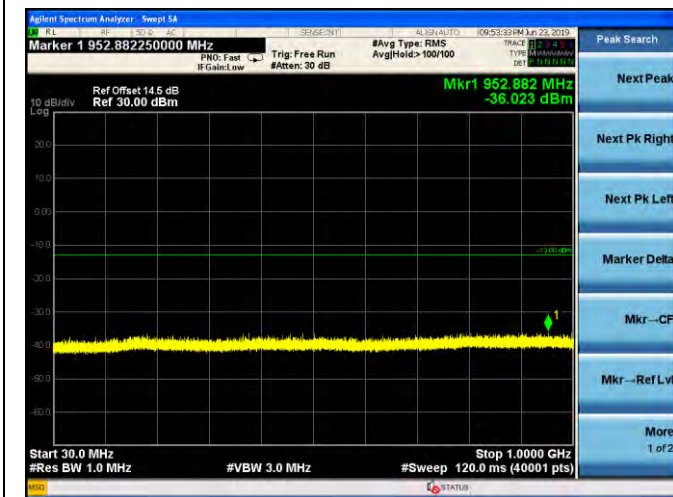




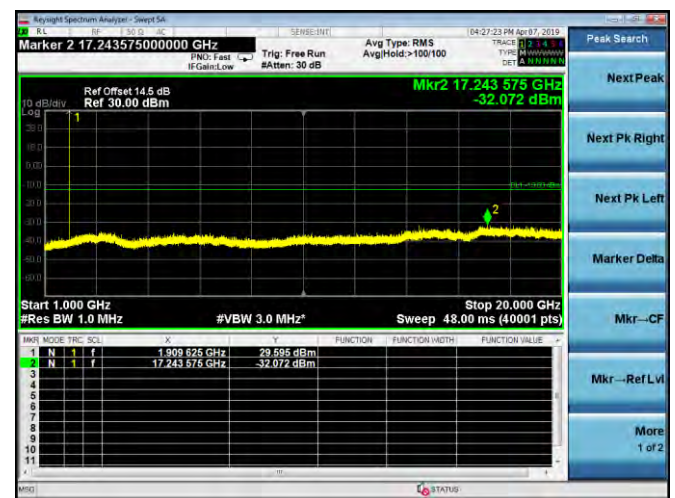
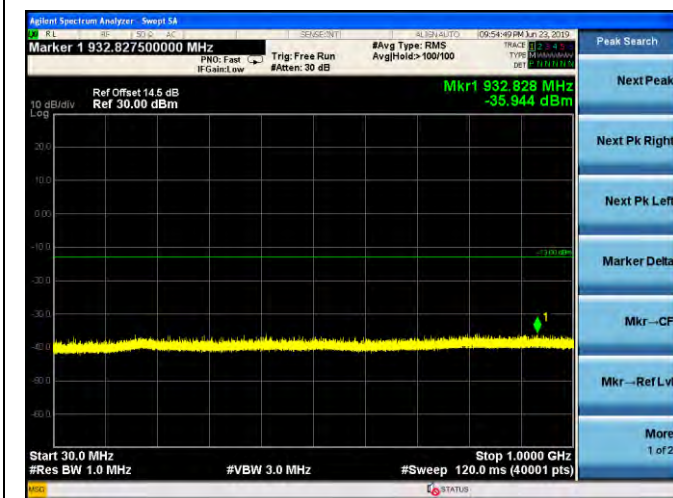
GSM 1900MHz CH512 1850.2MHz



GSM 1900MHz CH661 1880.0MHz

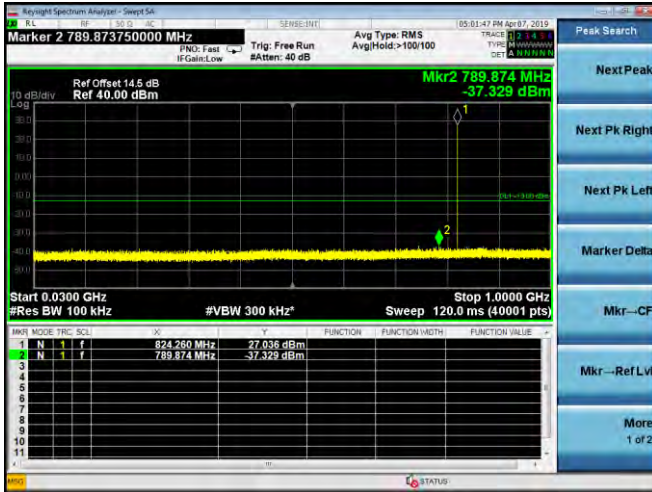


GSM 1900MHz CH810 1909.8MHz

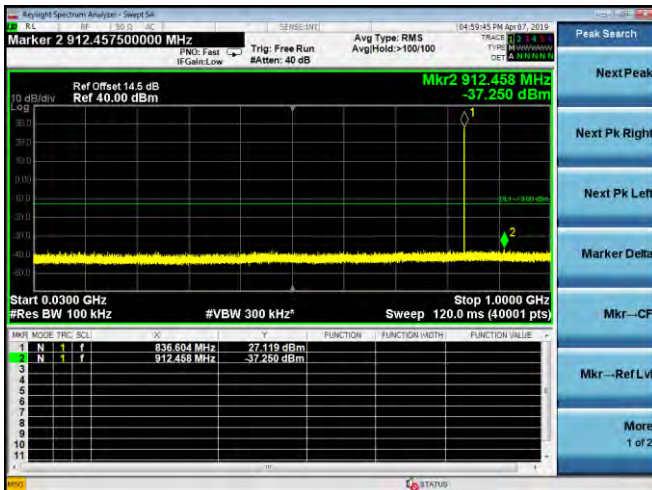




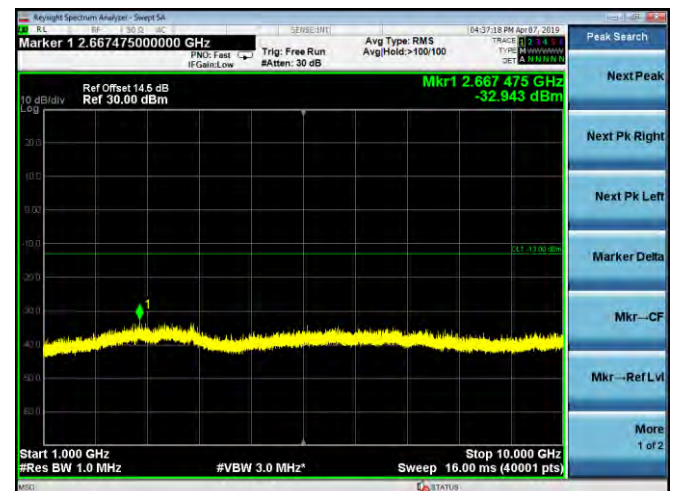
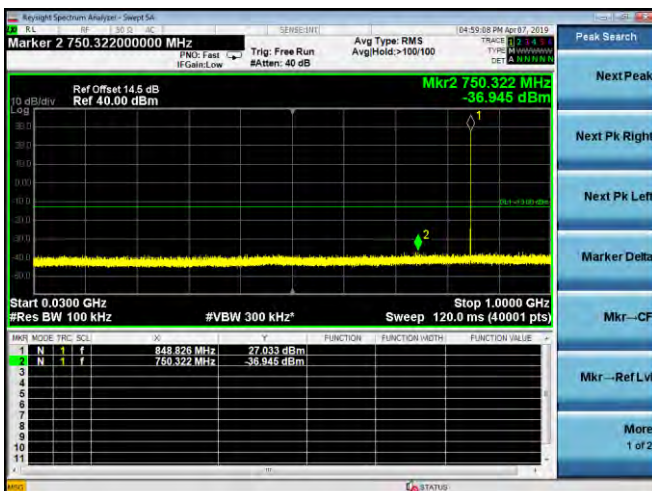
EDGE 850MHz CH128 824.2MHz



EDGE 850MHz CH190 836.6MHz

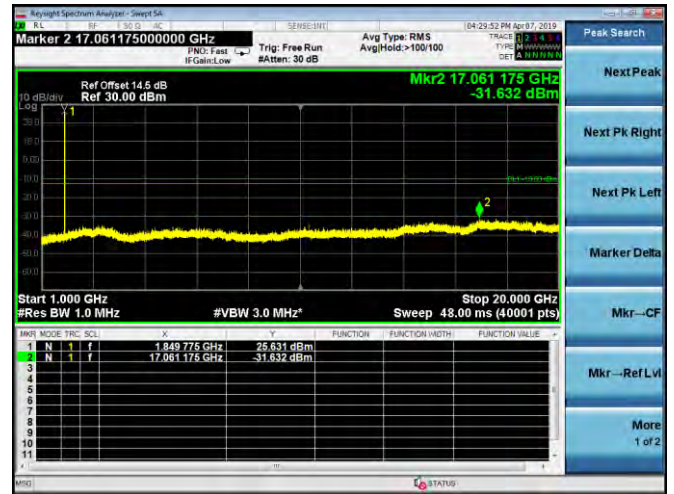
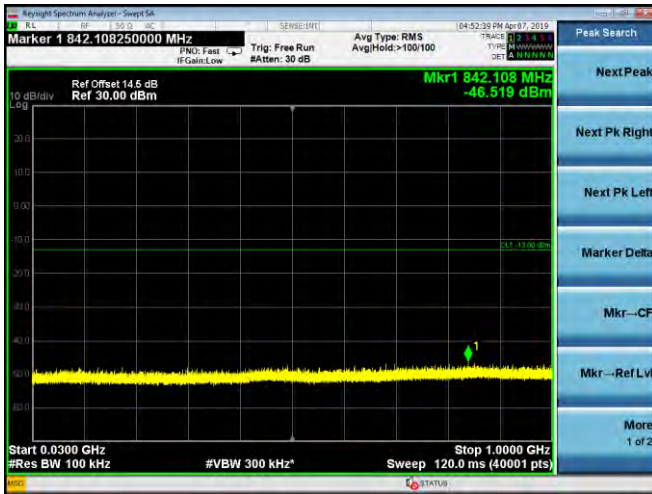


EDGE 850MHz CH251 848.8MHz

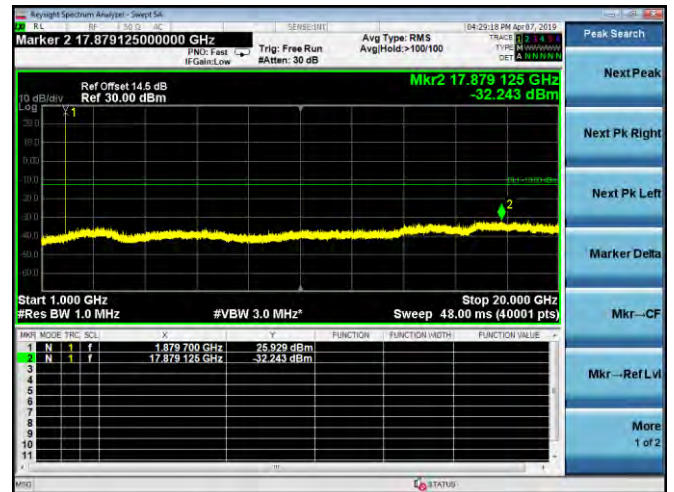
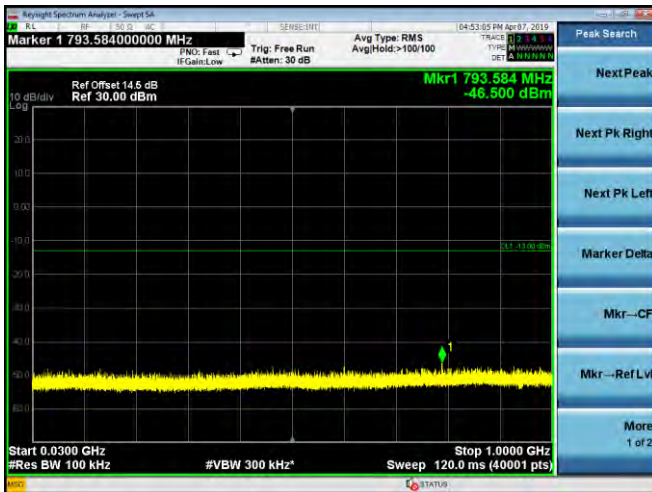




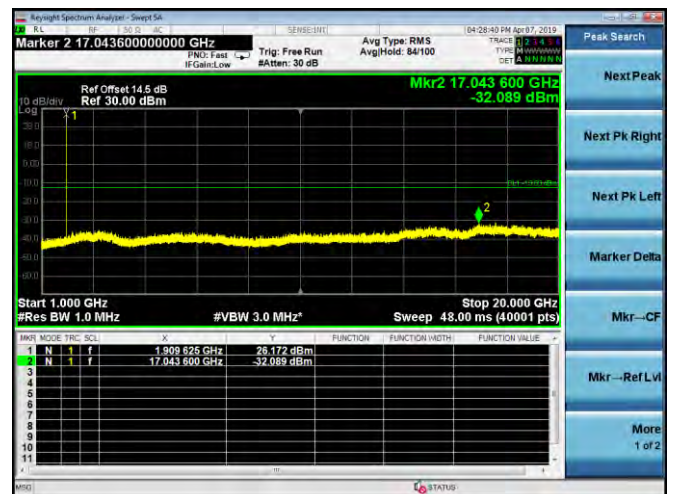
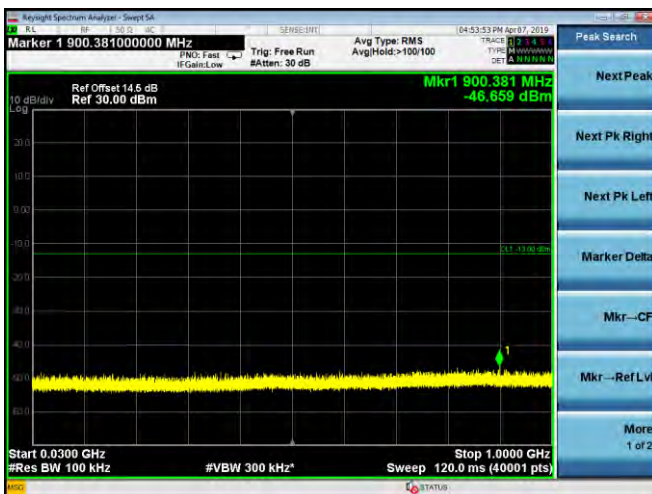
EDGE 1900MHz CH512 1850.2MHz



EDGE 1900MHz CH661 1880.0MHz

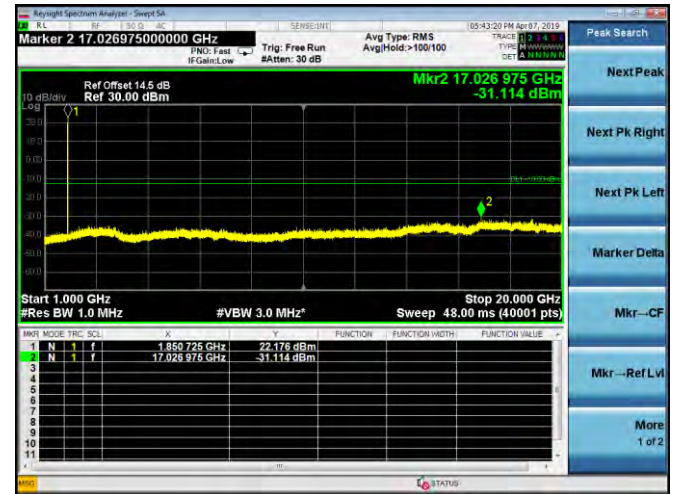
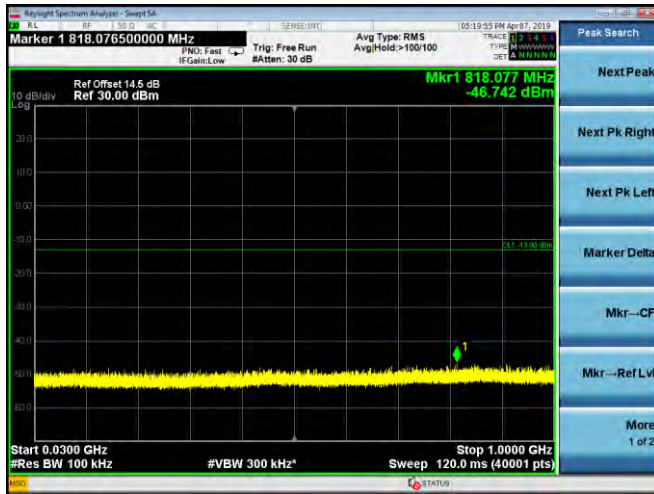


EDGE 1900MHz CH810 1909.8MHz

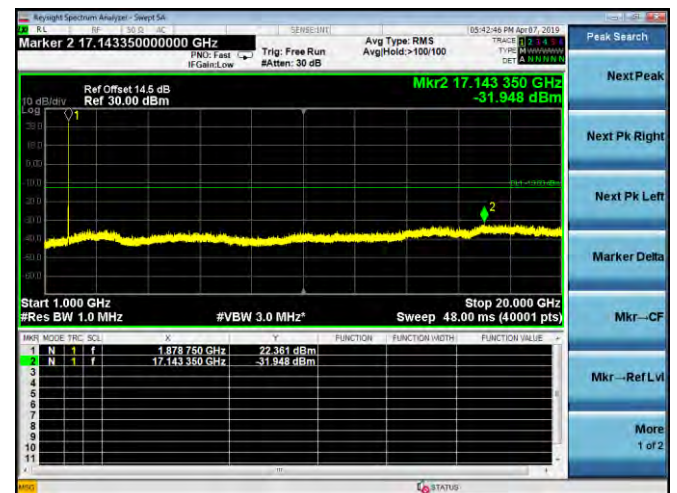
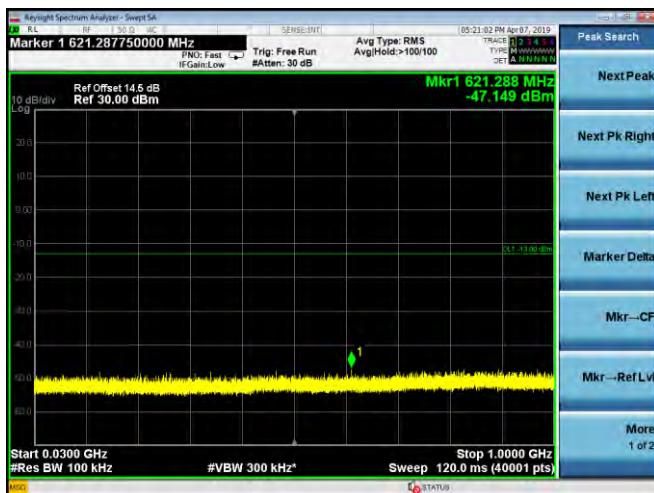




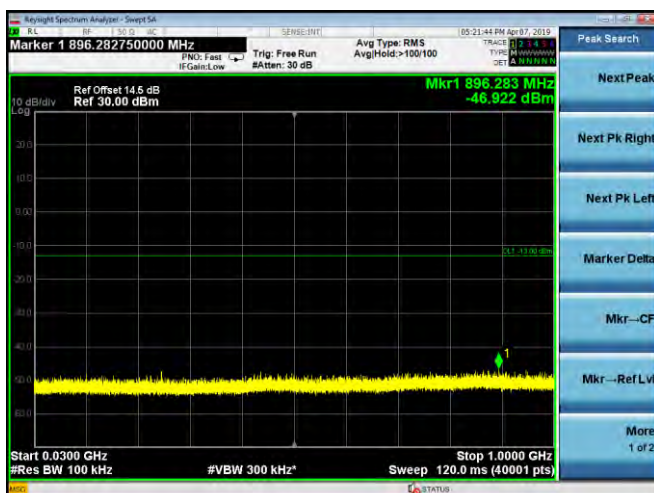
WCDMA Band II CH9262 1852.4MHz



WCDMA Band II CH9400 1880.0MHz

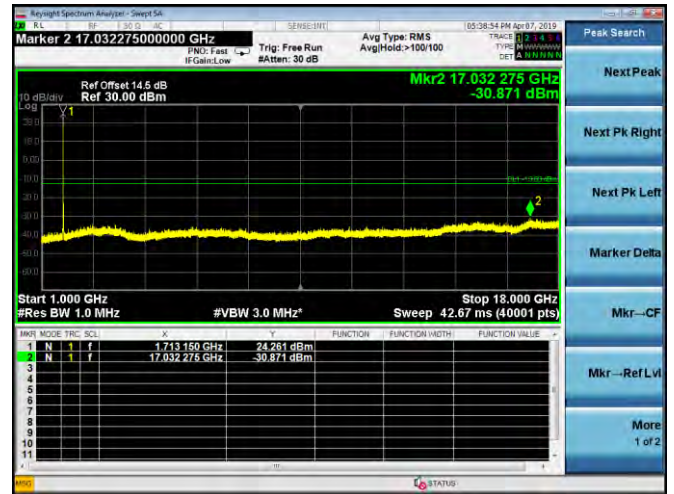
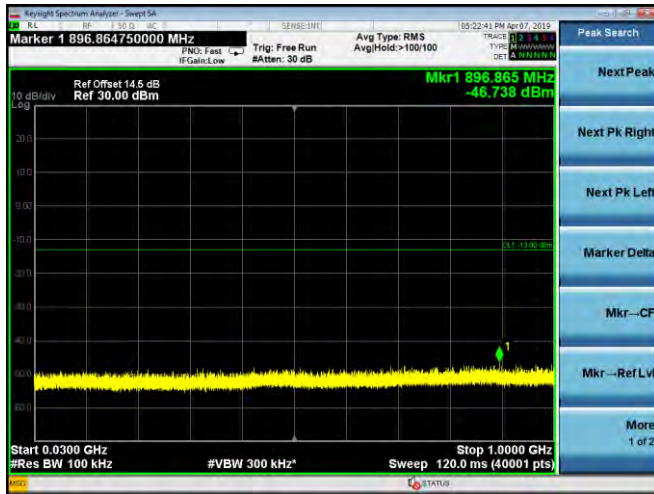


WCDMA Band II CH9538 1907.6MHz

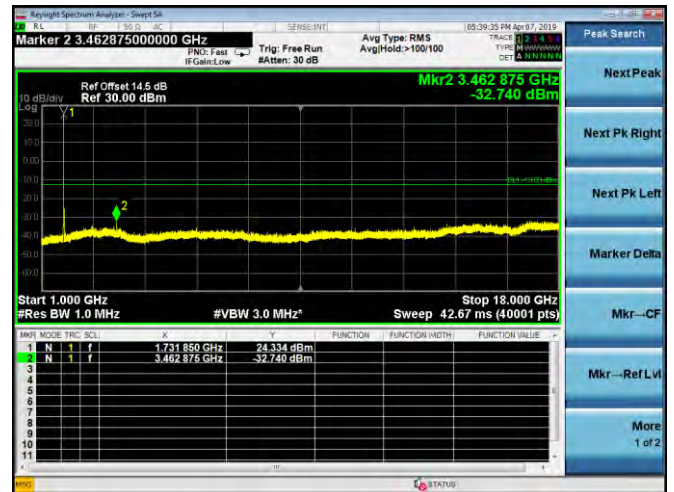
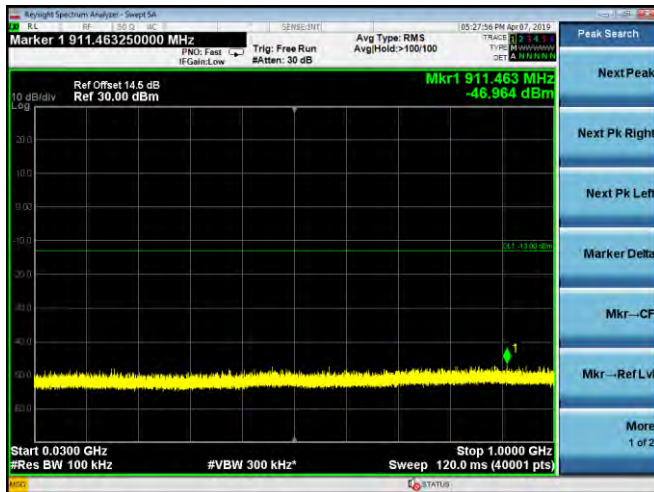




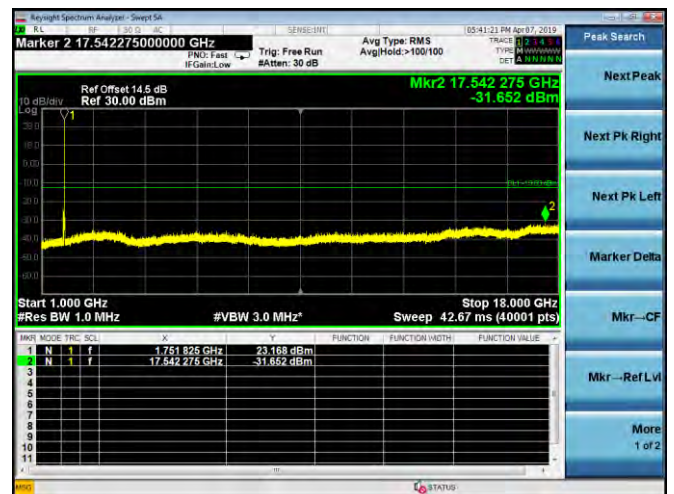
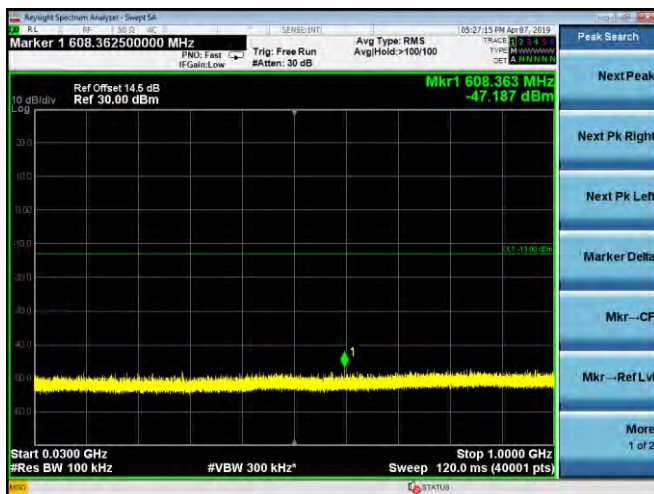
WCDMA Band IV CH1312 1712.4MHz



WCDMA Band IV CH1413 1732.6MHz

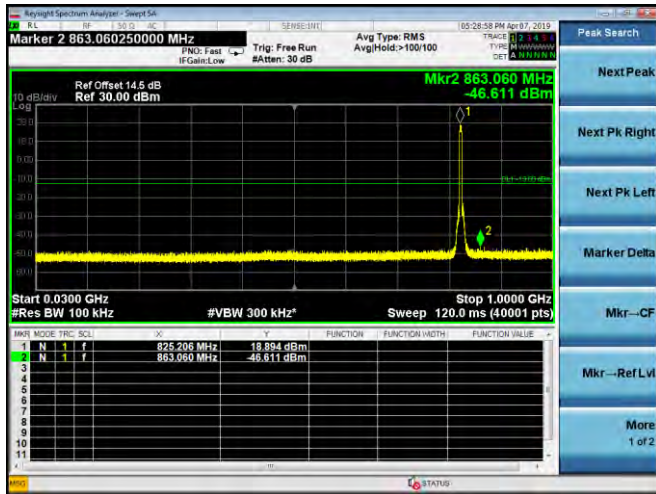


WCDMA Band IV CH1513 1752.6MHz

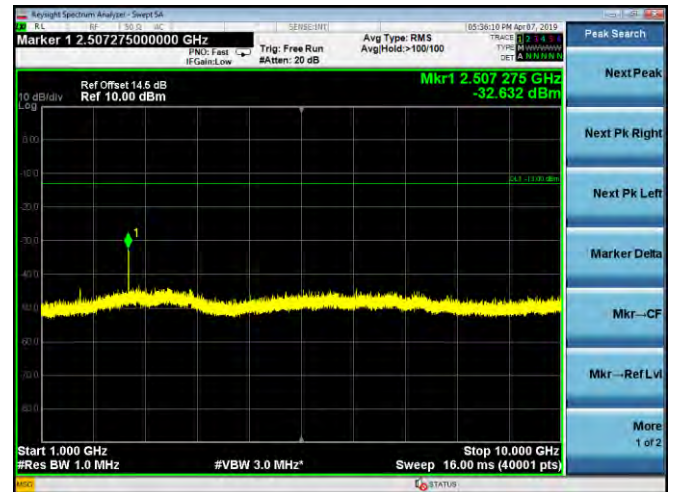
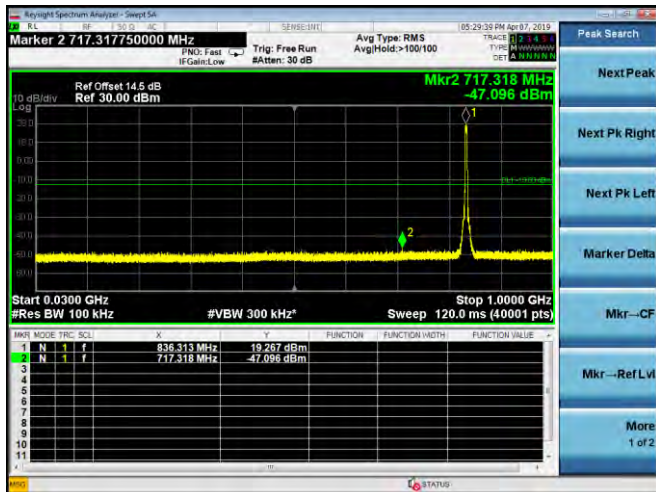




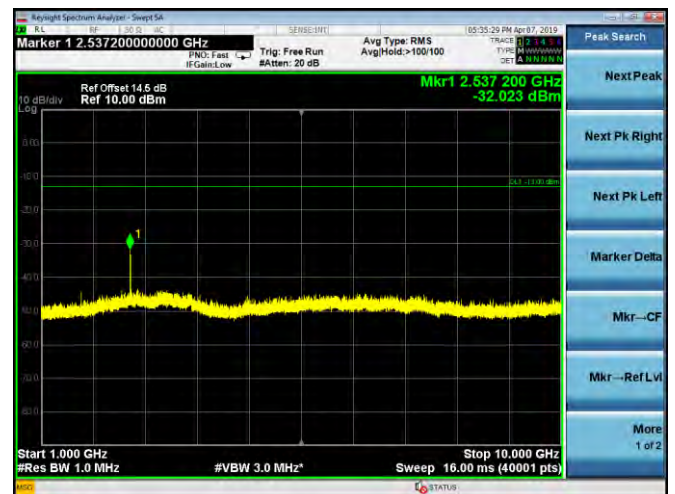
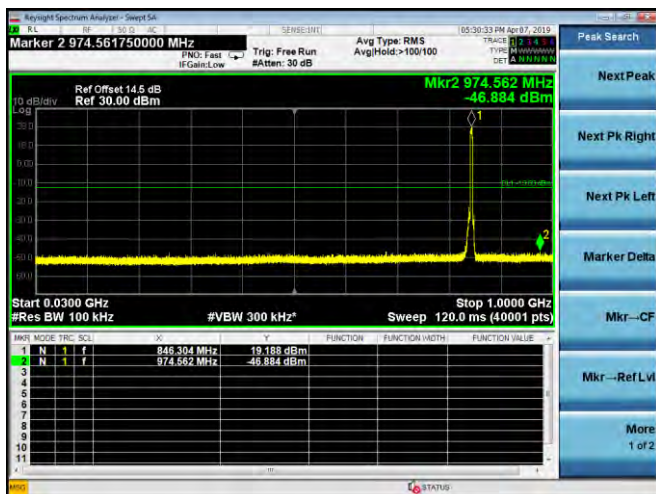
WCDMA Band V CH4132 826.4MHz



WCDMA Band V CH4183 836.6MHz



WCDMA Band V CH4233 846.4MHz



2.6. Band Edge

2.6.1. Requirement

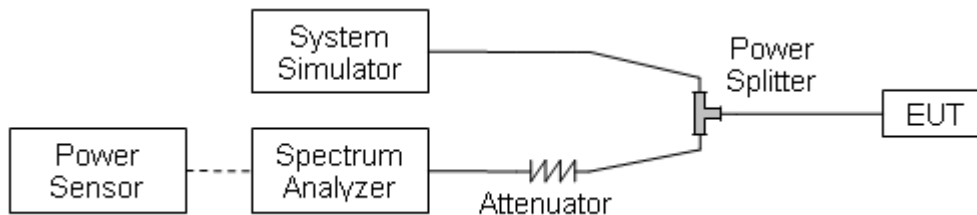
According to FCC section 22.917(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to 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.

According to FCC section 27.53(h), For operations in the 1710–1785MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

2.6.2. Test Description

Test Setup:

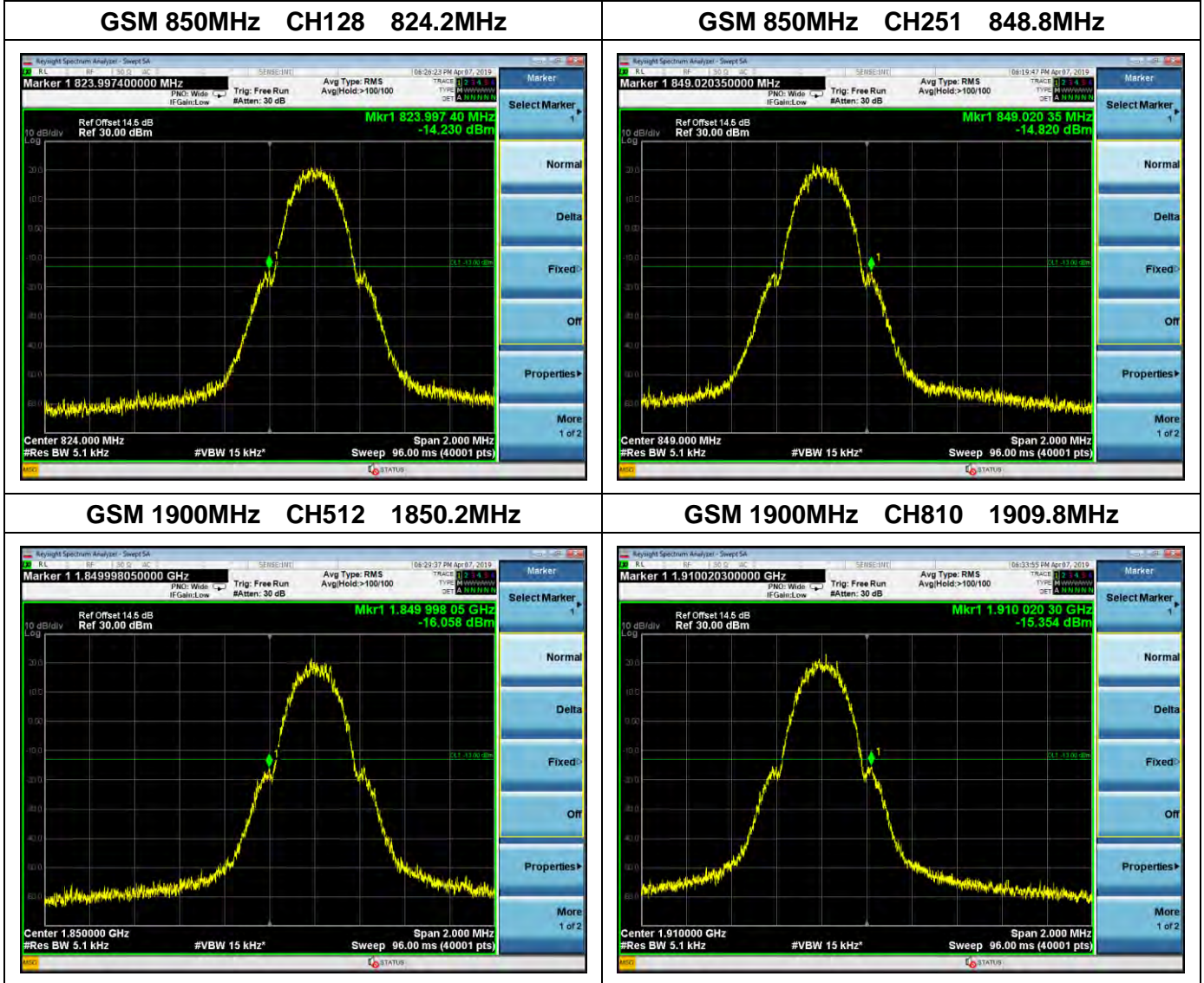


The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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



2.6.3. Test Result

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

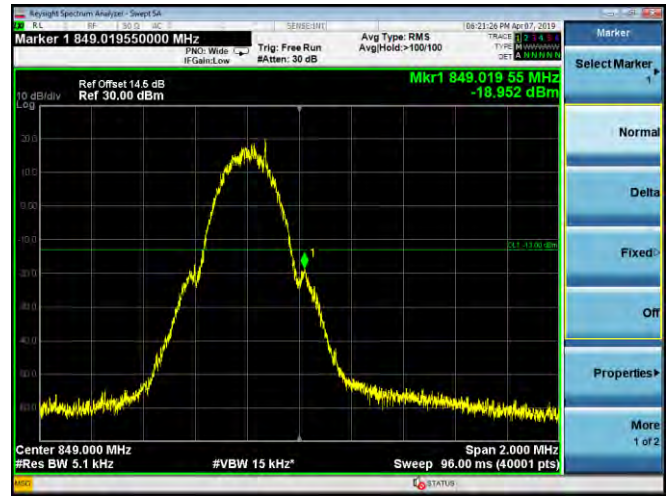




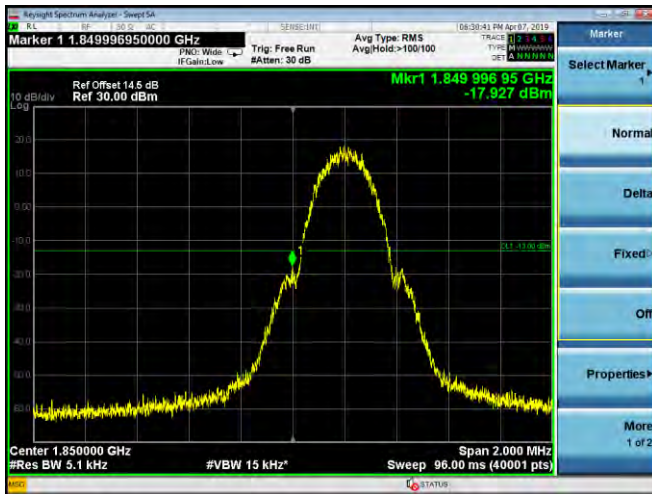
EDGE 850MHz CH128 824.2MHz



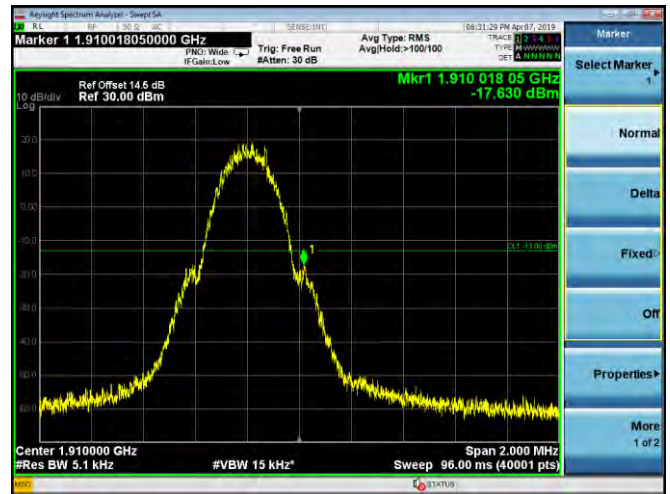
EDGE 850MHz CH251 848.8MHz



EDGE 1900MHz CH512 1850.2MHz



EDGE 1900MHz CH810 1909.8MHz

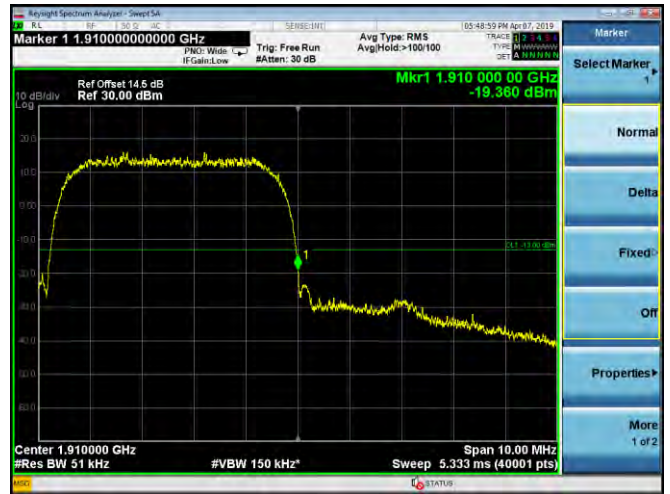




WCDMA Band II CH9262 1852.4MHz



WCDMA Band II CH9538 1907.6MHz



WCDMA Band IV CH1312 1712.4MHz



WCDMA Band IV CH1513 1752.6MHz



WCDMA Band V CH4132 826.4MHz



WCDMA Band V CH4233 846.6MHz



2.7. Transmitter Radiated Power (EIRP/ERP)

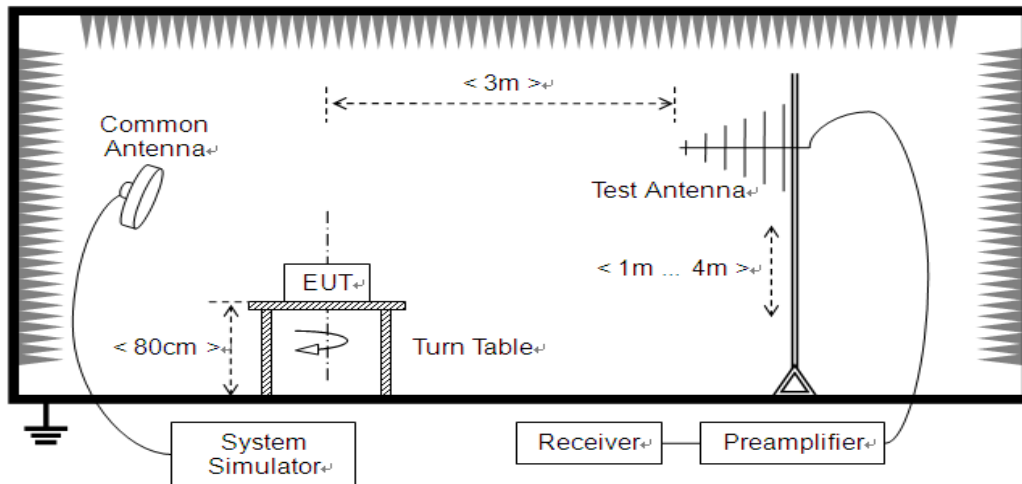
2.7.1. Requirement

According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

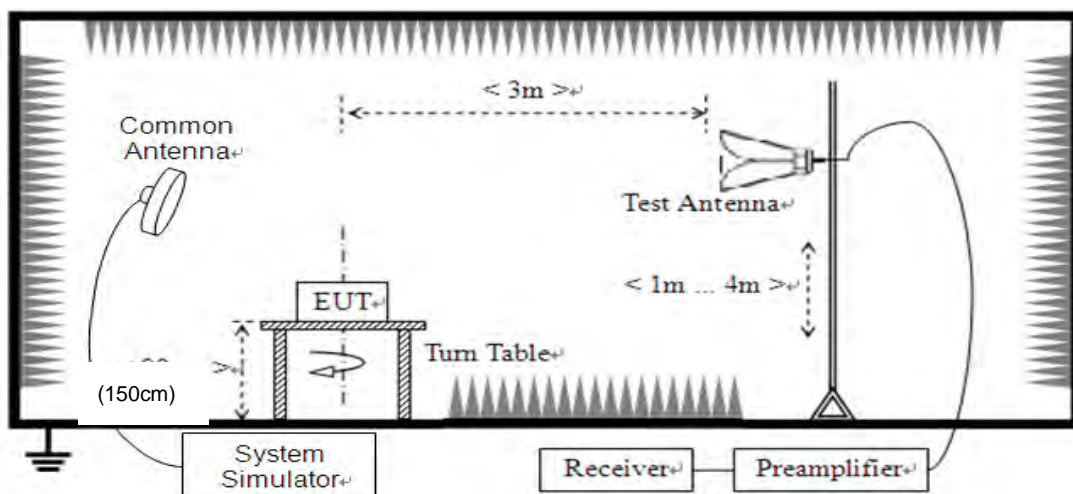
According to FCC section 24.232, the broadband PCS mobile station is limited to 2 Watts EIRP peak power.

According to FCC section 27.50 section 27.50 (d) for WCDMA Band 4, mobile and portable (hand-held) stations is limited to 1 Watts EIRP peak power.

2.7.2. Test Description



(For the test frequency from 30MHz to1GHz)



(For the test frequency above 1GHz)



The testing follows FCC KDB 971168 v03r01 and ANSI/TIA-603-E (2016).

- a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a 3m Full-Anechoic Chamber.
- b) Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).
- c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.
- d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading. $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$
- e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:
 $ERP \text{ (dBm)} = LVL \text{ (dBm)} + LOSS \text{ (dB)}$
- f) The maximum ERP is the maximum value determined in the preceding step.
- g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g. transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:
 $EIRP \text{ (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBd)}$
where: dBd refers to gain relative to an ideal dipole.
 $EIRP \text{ (dBm)} = ERP \text{ (dBm)} + 2.15 \text{ (dB.)}$



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

Band	Channel	Frequency (MHz)	PCL	Measured ERP		Limit		Verdict
				dBm	W	dBm	W	
GSM 850MHz	128	824.20	5	27.09	0.512	38.5	7	PASS
	190	836.60	5	27.35	0.543			PASS
	251	848.80	5	26.88	0.488			PASS
GPRS 850MHz	128	824.20	5	27.01	0.502	38.5	7	PASS
	190	836.60	5	27.25	0.531			PASS
	251	848.80	5	26.75	0.473			PASS
EDGE 850MHz	128	824.20	5	21.40	0.138	38.5	7	PASS
	190	836.60	5	21.33	0.136			PASS
	251	848.80	5	21.17	0.131			PASS

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

Note 2: Both horizontal and vertical polarizations of the test antenna are evaluated respectively, only the worst data (horizontal) were recorded in this report.



Band	Channel	Frequency (MHz)	PCL	Measured EIRP		Limit		Verdict
				dBm	W	dBm	W	
GSM 1900MHz	512	1850.2	0	26.31	0.428	33	2	PASS
	661	1880.0	0	26.05	0.403			PASS
	810	1909.8	0	26.09	0.406			PASS
GPRS 1900MHz	512	1850.2	0	25.98	0.396	33	2	PASS
	661	1880.0	0	25.90	0.389			PASS
	810	1909.8	0	25.85	0.385			PASS
EDGE 1900MHz	512	1850.2	0	21.64	0.146	33	2	PASS
	661	1880.0	0	21.93	0.156			PASS
	810	1909.8	0	22.19	0.166			PASS

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

Note 2: Both horizontal and vertical polarizations of the test antenna are evaluated respectively, only the worst data (horizontal) were recorded in this report.

Band	Channel	Frequency (MHz)	Measured EIRP		Limit		Verdict
			dBm	W	dBm	W	
WCDMA Band II	9262	1852.4	19.31	0.085	33	2	PASS
	9400	1880.0	18.89	0.077			PASS
	9538	1907.6	18.96	0.079			PASS
HSDPA Band II	9262	1852.4	18.05	0.064	33	2	PASS
	9400	1880.0	18.20	0.066			PASS
	9538	1907.6	18.18	0.066			PASS
HSUPA Band II	9262	1852.4	16.60	0.046	33	2	PASS
	9400	1880.0	16.47	0.044			PASS
	9538	1907.6	16.78	0.048			PASS

Note: Both horizontal and vertical polarizations of the test antenna are evaluated respectively, only the worst data (horizontal) were recorded in this report.



Band	Channel	Frequency (MHz)	Measured EIRP		Limit		Verdict
			dBm	W	dBm	W	
WCDMA Band IV	1312	1712.4	18.96	0.079	30	1	PASS
	1413	1732.6	18.68	0.074			PASS
	1513	1752.6	18.74	0.075			PASS
HSDPA Band IV	1312	1712.4	17.90	0.062	30	1	PASS
	1413	1732.6	17.72	0.059			PASS
	1513	1752.6	17.62	0.058			PASS
HSUPA Band IV	1312	1712.4	17.38	0.055	30	1	PASS
	1413	1732.6	17.13	0.052			PASS
	1513	1752.6	16.92	0.049			PASS

Note: Both horizontal and vertical polarizations of the test antenna are evaluated respectively, only the worst data (horizontal) were recorded in this report.

Band	Channel	Frequency (MHz)	Measured ERP		Limit		Verdict
			dBm	W	dBm	W	
WCDMA Band V	4132	826.4	17.95	0.062	38.5	7	PASS
	4182	836.4	17.73	0.059			PASS
	4233	846.6	17.63	0.058			PASS
HSDPA Band V	4132	826.4	16.50	0.045	38.5	7	PASS
	4182	836.4	16.49	0.045			PASS
	4233	846.6	16.55	0.045			PASS
HSUPA Band V	4132	826.4	15.94	0.039	38.5	7	PASS
	4182	836.4	16.03	0.040			PASS
	4233	846.6	16.56	0.045			PASS

Note: Both horizontal and vertical polarizations of the test antenna are evaluated respectively, only the worst data (horizontal) were recorded in this report.

2.8. Radiated Out of Band Emissions

2.8.1. Requirement

According to FCC section 22.917(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.

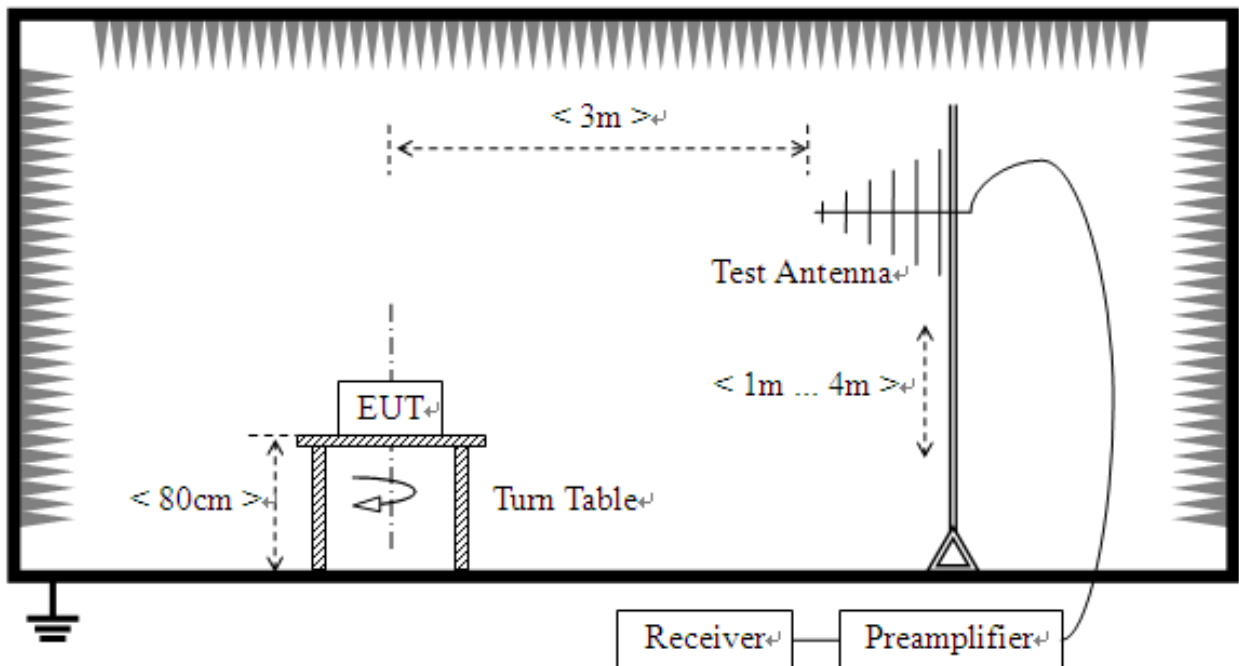
According to FCC section 24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to FCC section 27.53(h), For operations in the 1710–1785MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

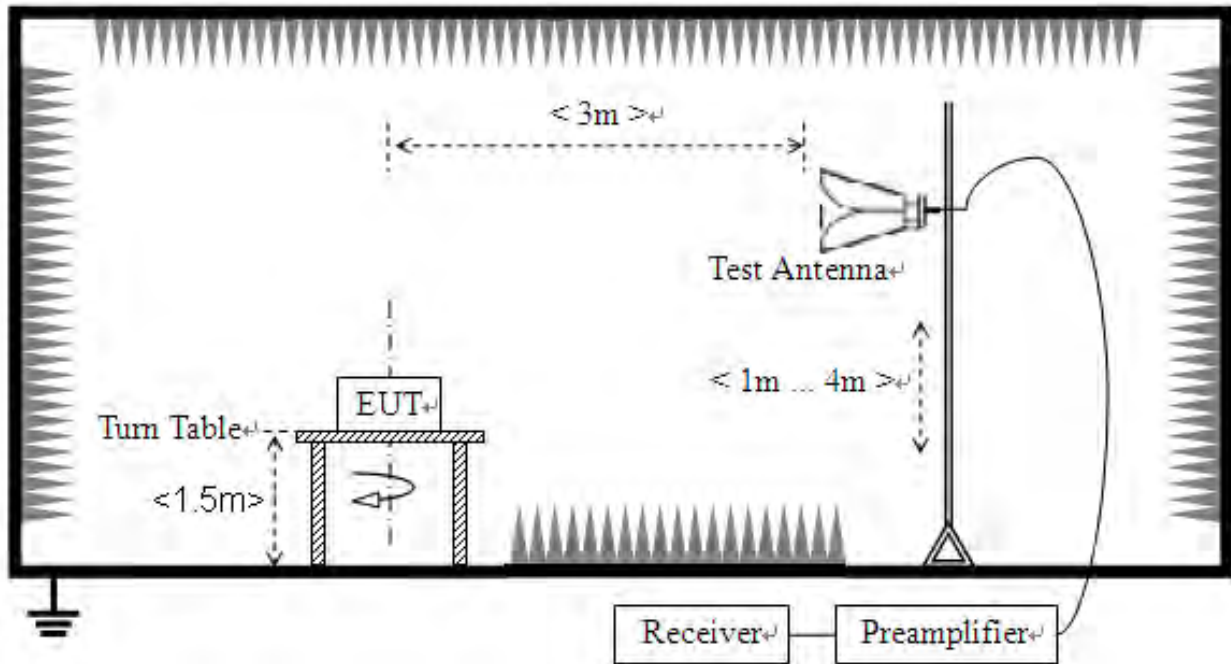
2.8.2. Test Description

Test Setup:

- 1) Below 1GHz



2) Above 1GHz



The EUT 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. Please refer to section 2.1.3 of this report.

- Step size (dB): 3dB

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

For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The table was rotated 360 degrees to determine the position of the highest radiation.

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



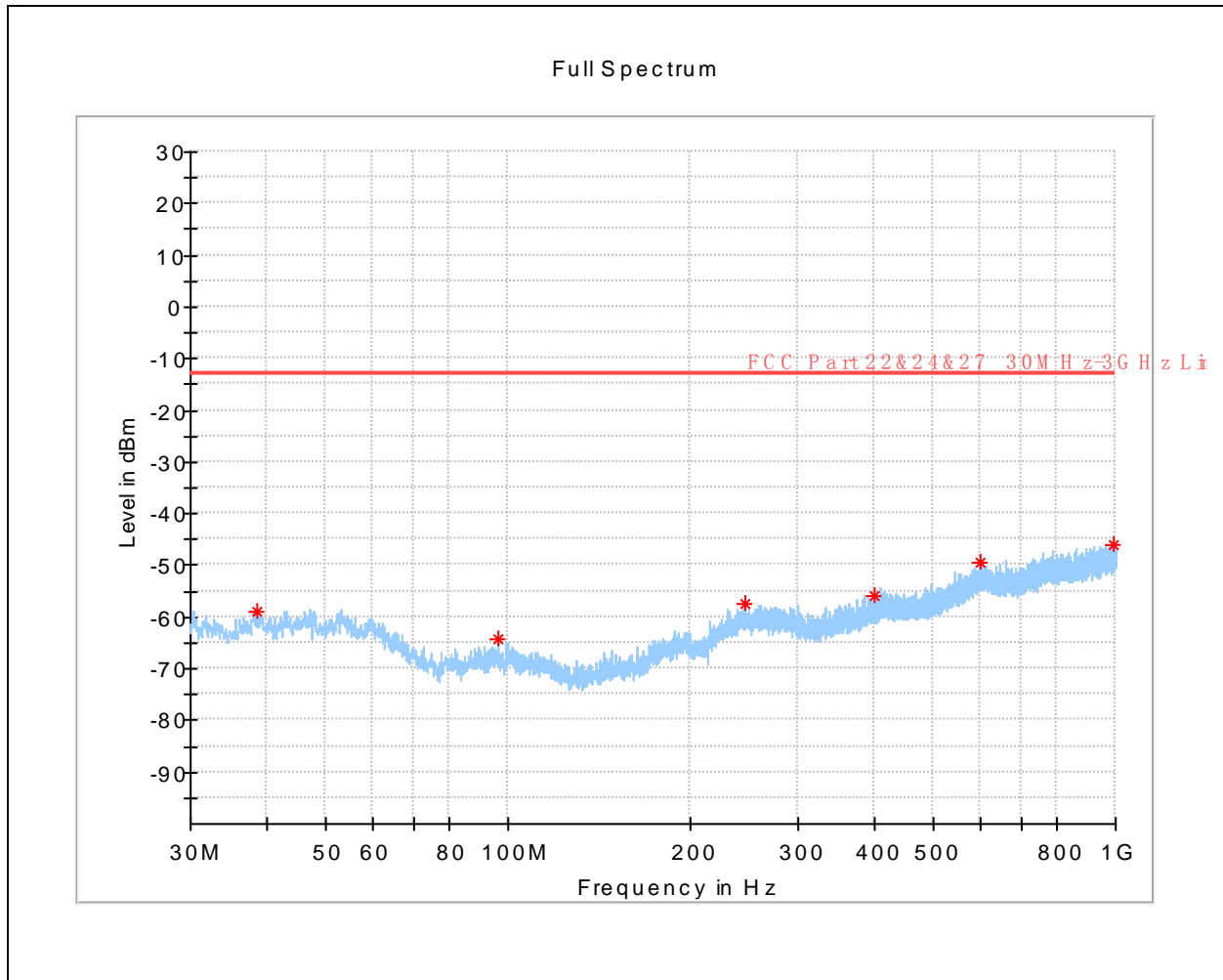
2.8.3. Test Result

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. The power of the EUT transmitting frequency should be ignored.

Note 1: All test mode and condition mentioned were considered and evaluated respectively by performing full test, only the worst data were recorded and reported.

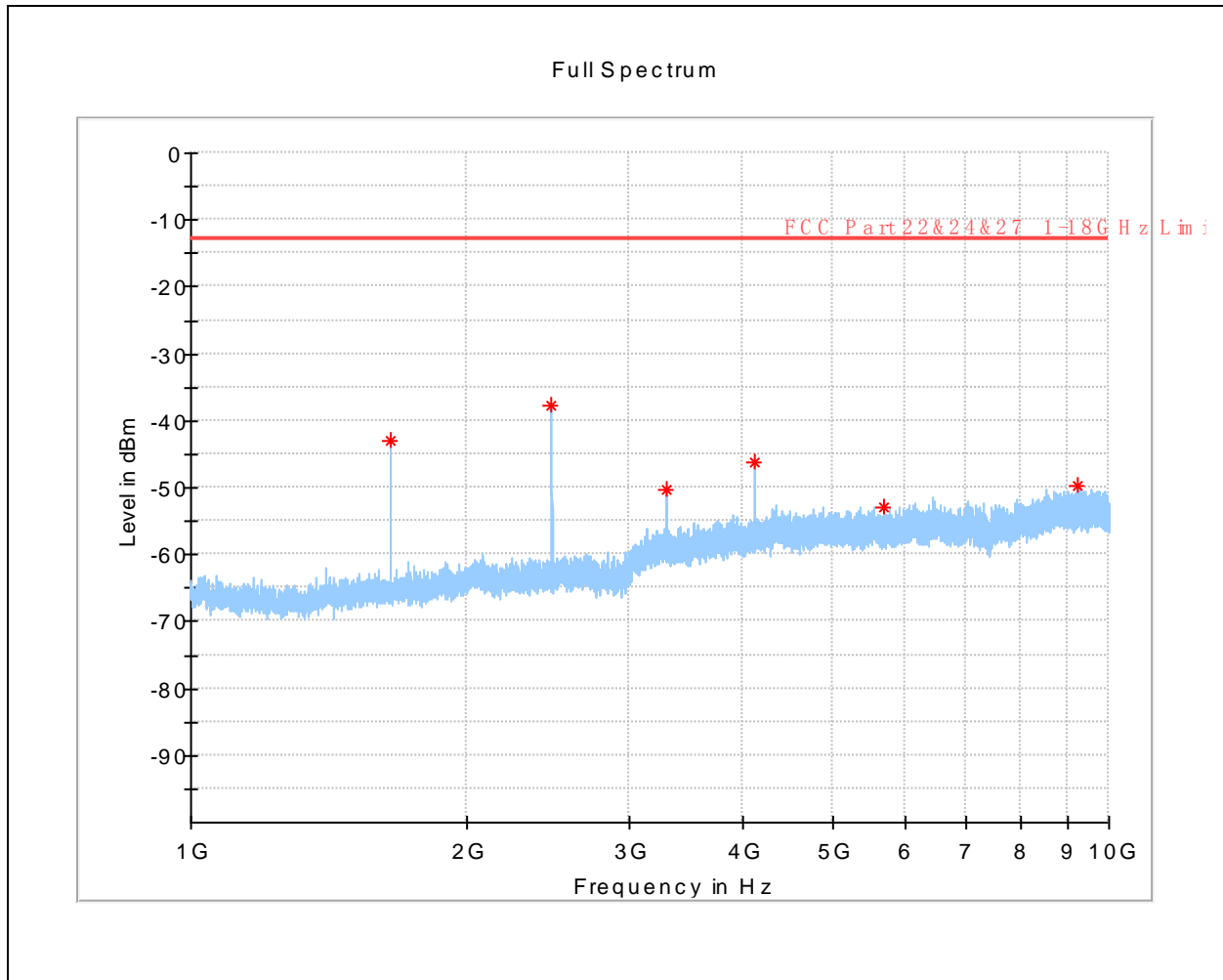
Note 2: All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst case Y axis test condition was recorded in this test report.

Note3: For the frequency, which started from 18GHz to 40GHz, was pre-scanned and the result which was 10dB lower than the limit was not recorded.

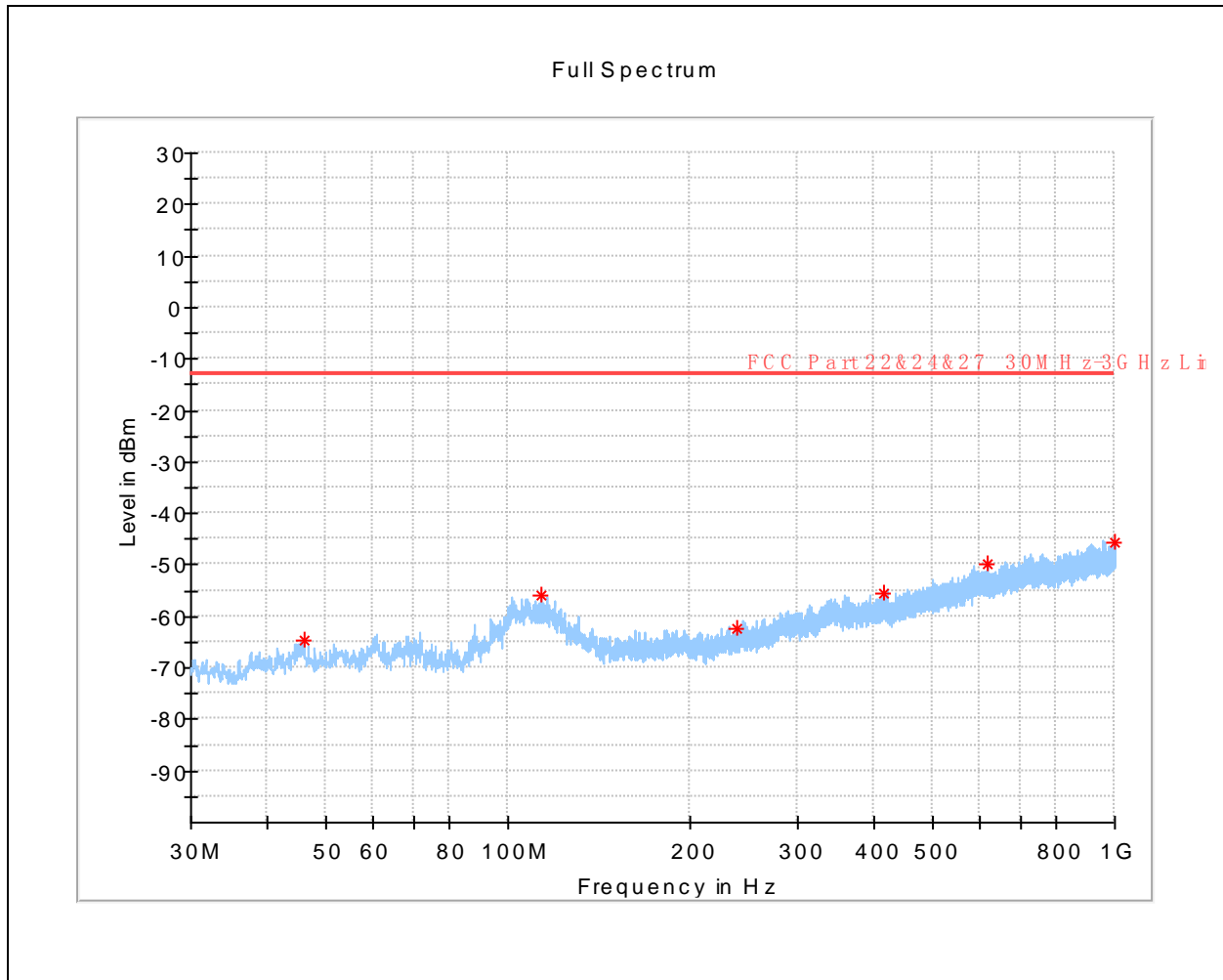


(GSM 850MHz _ Low Channel _ 30MHz to 1GHz _ Horizontal)

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
38.633000	-58.87	-13.00	45.87	H	-76.9
96.396500	-64.17	-13.00	51.17	H	-84.4
245.825000	-57.24	-13.00	44.24	H	-77.2
401.073500	-55.97	-13.00	42.97	H	-75.7
598.371500	-49.57	-13.00	36.57	H	-70.0
995.247000	-46.06	-13.00	33.06	H	-66.0

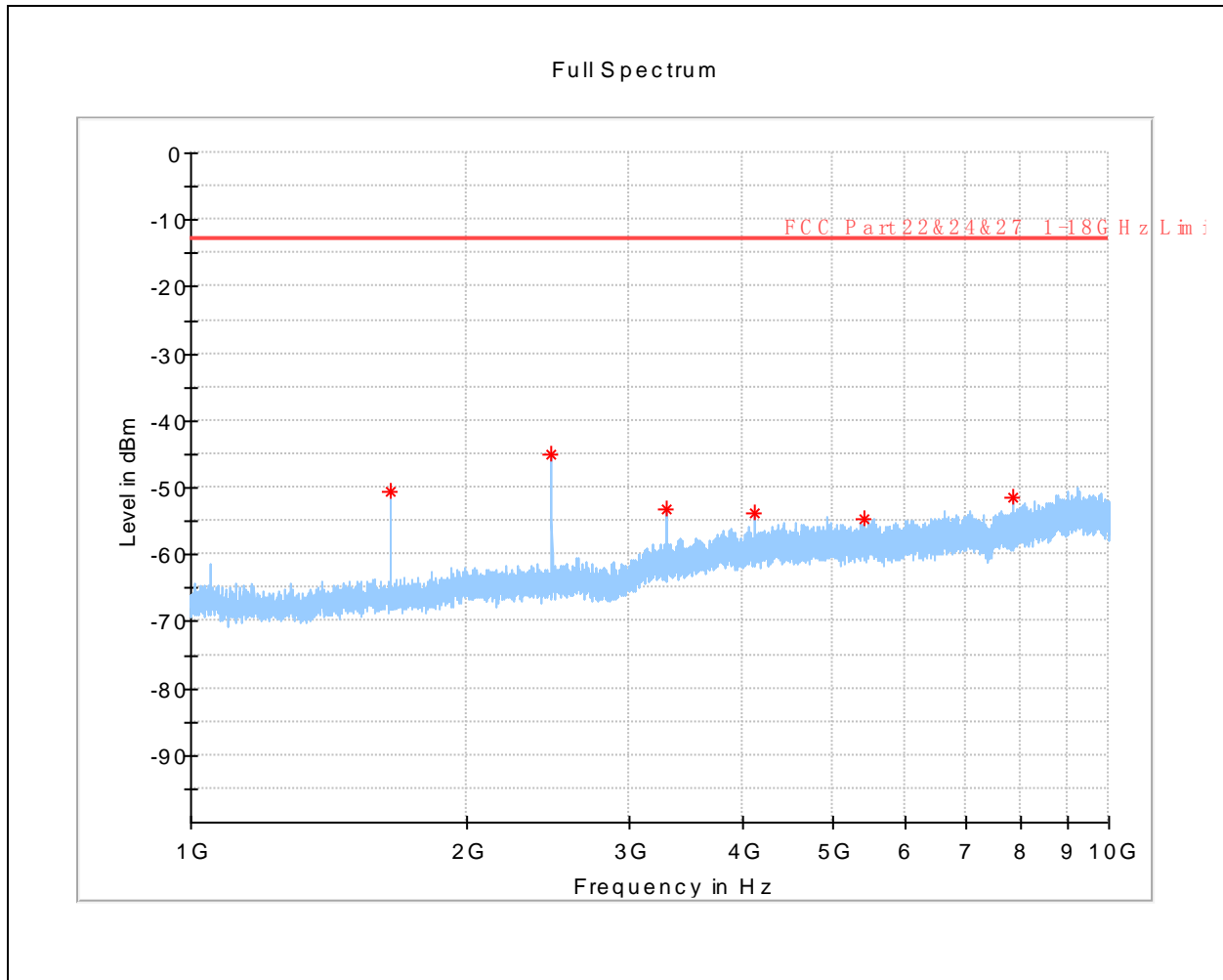


Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
1648.281250	-43.09	-13.00	30.09	H	-110.3
2472.906250	-37.79	-13.00	24.79	H	-106.7
3296.687500	-50.29	-13.00	37.29	H	-101.7
4121.031250	-46.09	-13.00	33.09	H	-100.1
5698.000000	-52.92	-13.00	39.92	H	-98.0
9255.531250	-49.75	-13.00	36.75	H	-94.0

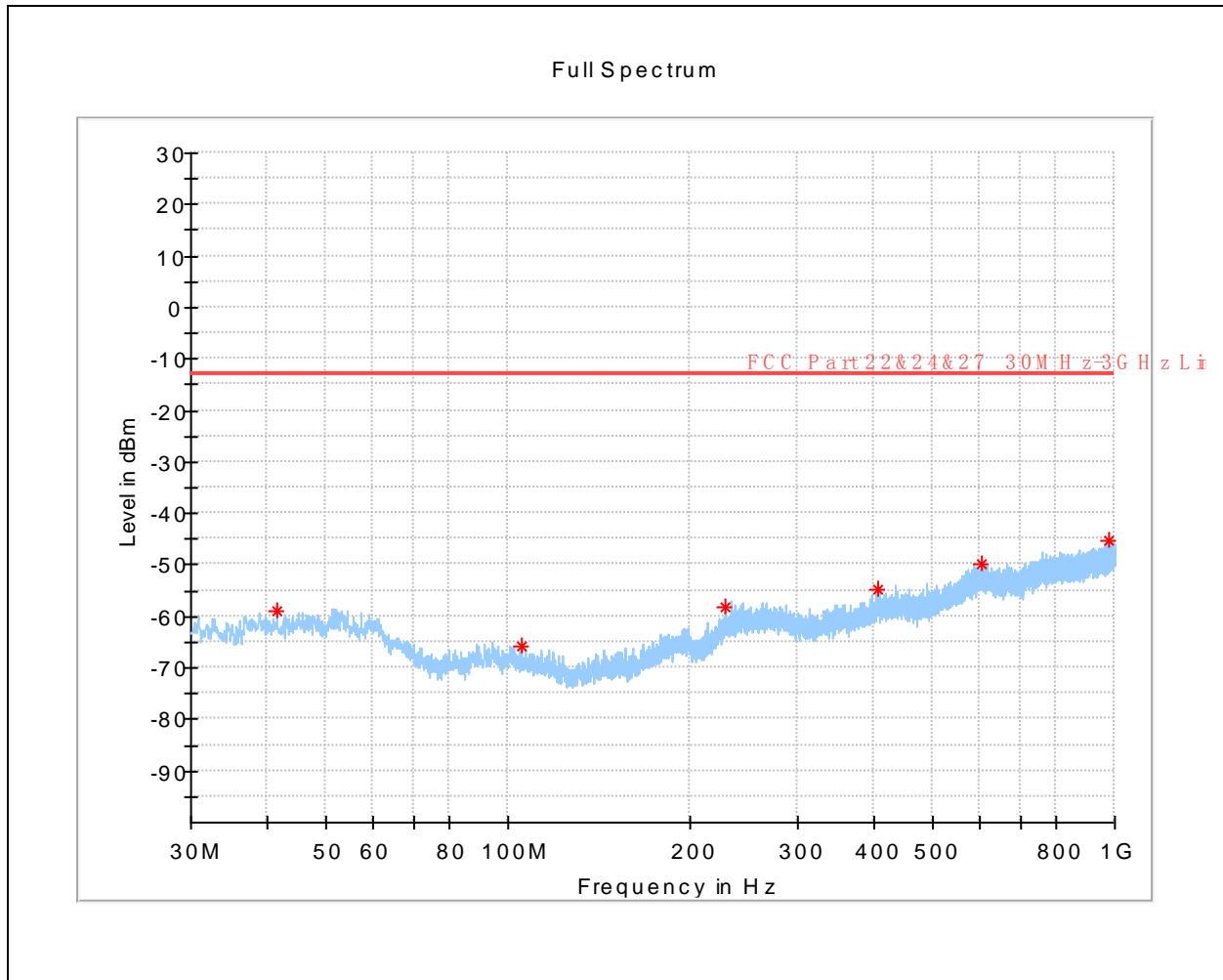


(GSM 850MHz _ Low Channel _ 30MHz to 1GHz _ Vertical)

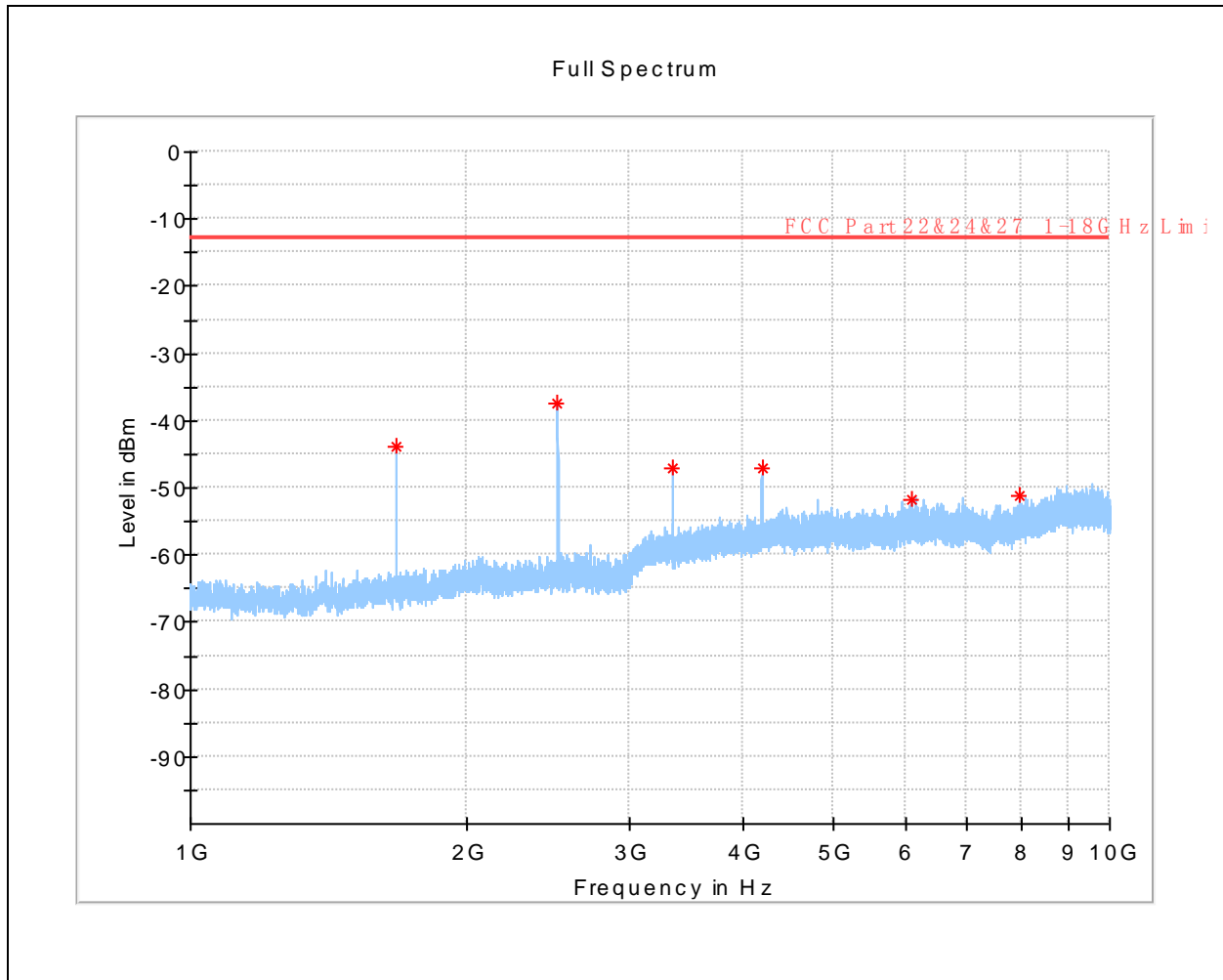
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
46.199000	-64.72	-13.00	51.72	V	-83.1
113.371500	-56.01	-13.00	43.01	V	-75.5
237.677000	-62.23	-13.00	49.23	V	-81.3
416.884500	-55.39	-13.00	42.39	V	-75.6
615.540500	-49.82	-13.00	36.82	V	-71.1
997.623500	-45.67	-13.00	32.67	V	-65.9



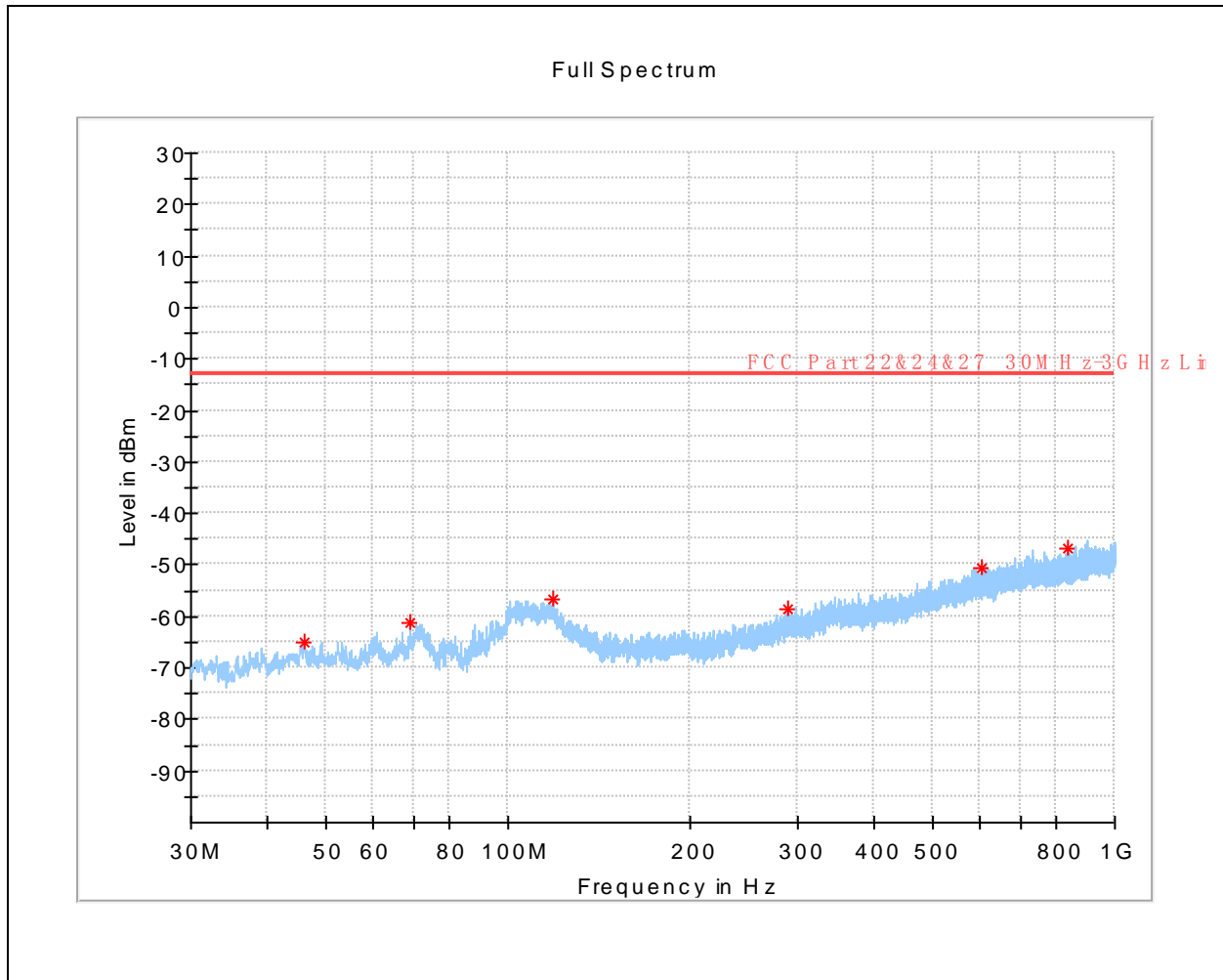
Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
1648.562500	-50.71	-13.00	37.71	V	-111.4
2472.625000	-45.17	-13.00	32.17	V	-107.8
3296.968750	-53.34	-13.00	40.34	V	-103.8
4121.312500	-53.90	-13.00	40.90	V	-102.1
5412.531250	-54.77	-13.00	41.77	V	-100.0
7865.031250	-51.58	-13.00	38.58	V	-97.4



Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
41.591500	-58.99	-13.00	45.99	H	-78.2
105.175000	-65.73	-13.00	52.73	H	-85.4
228.656000	-58.25	-13.00	45.25	H	-78.8
406.505500	-54.96	-13.00	41.96	H	-75.3
602.736500	-49.85	-13.00	36.85	H	-70.0
975.653000	-45.27	-13.00	32.27	H	-66.4

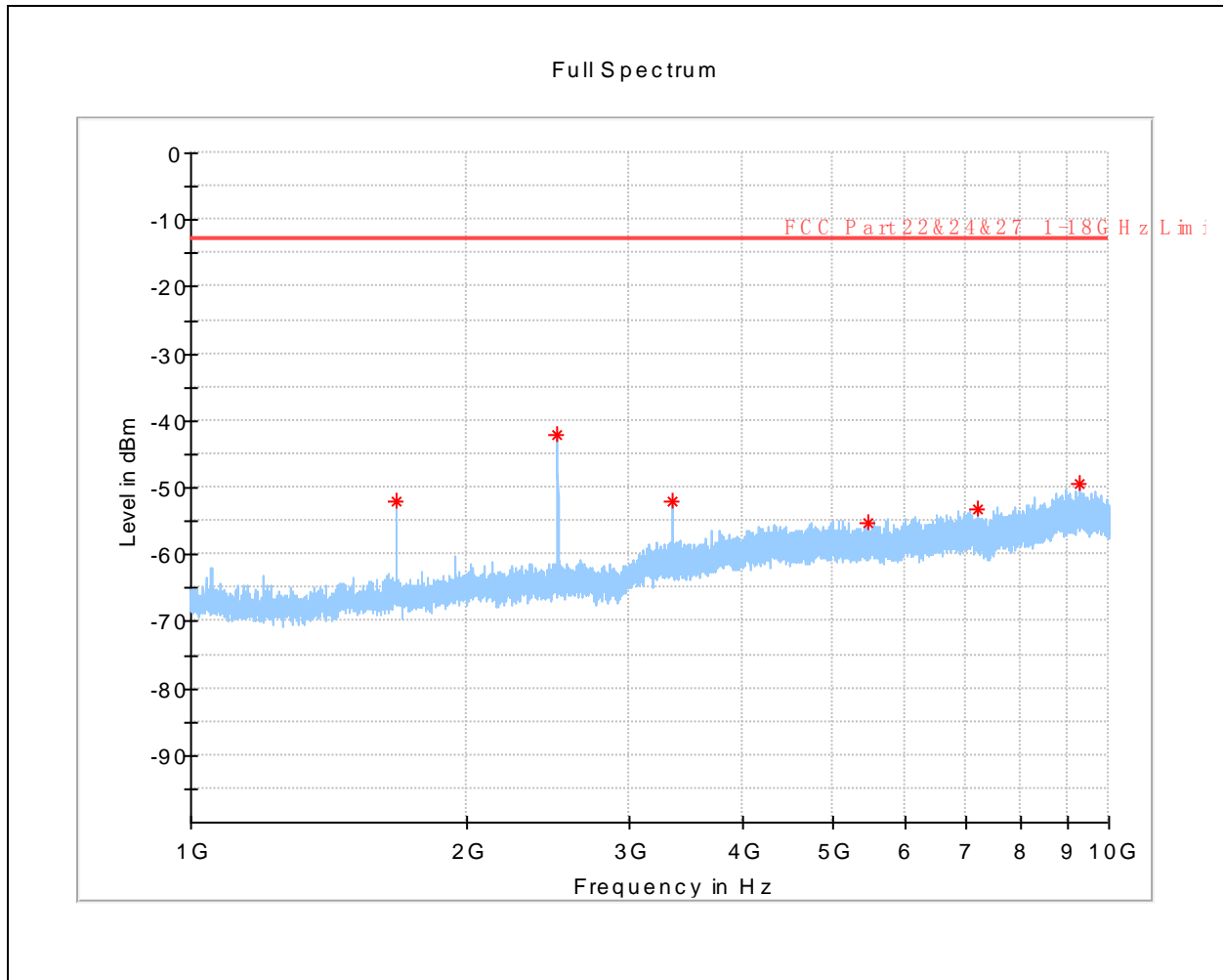


Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
1673.312500	-43.76	-13.00	30.76	H	-109.8
2510.031250	-37.50	-13.00	24.50	H	-106.5
3346.468750	-46.94	-13.00	33.94	H	-101.9
4183.750000	-46.98	-13.00	33.98	H	-99.5
6094.281250	-51.70	-13.00	38.70	H	-97.1
7996.375000	-51.20	-13.00	38.20	H	-95.9



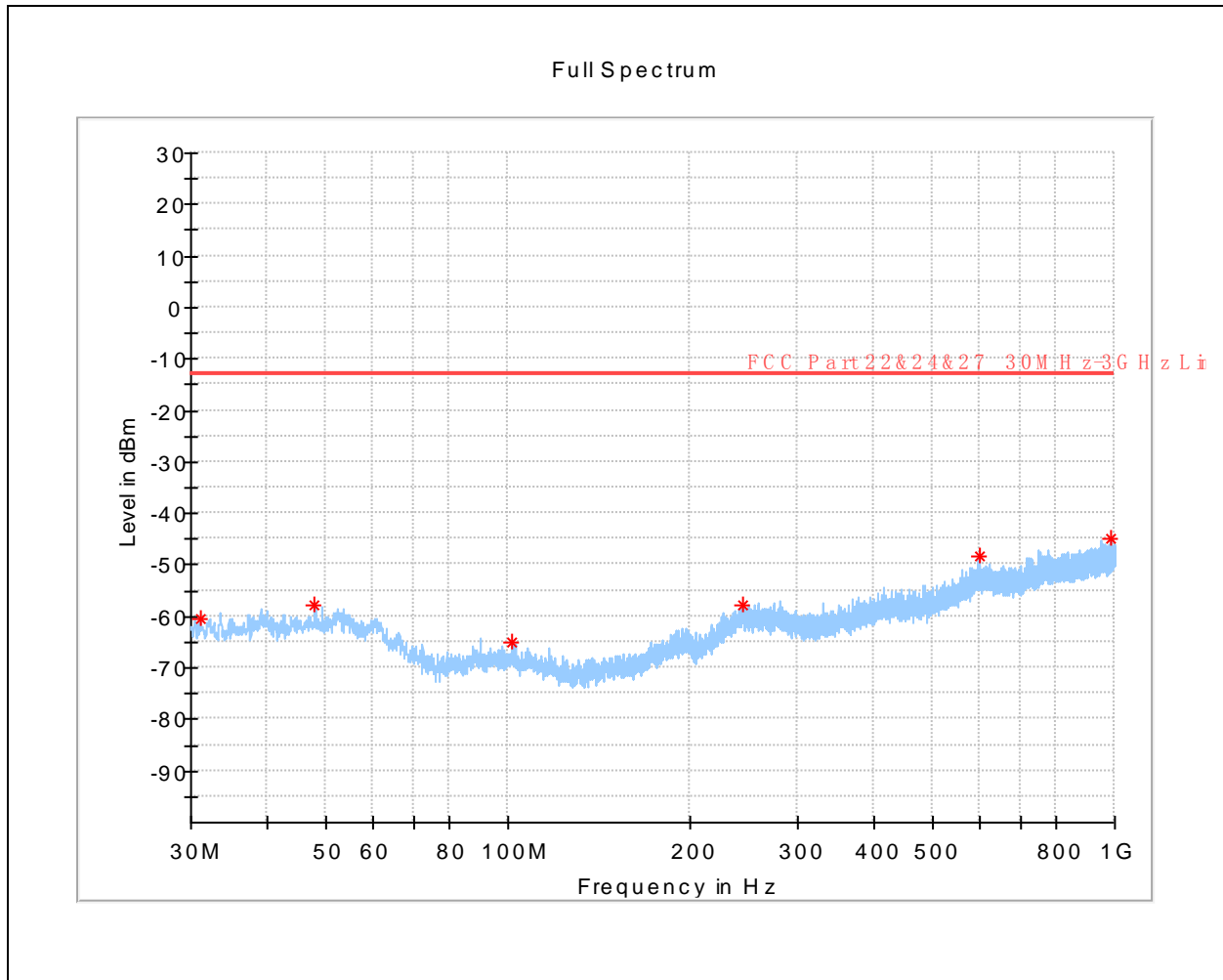
(GSM 850MHz _ Middle Channel _ 30MHz to 1GHz _ Vertical)

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
46.005000	-65.00	-13.00	52.00	V	-82.6
68.945500	-61.33	-13.00	48.33	V	-83.8
118.221500	-56.83	-13.00	43.83	V	-75.5
289.426500	-58.57	-13.00	45.57	V	-78.6
601.233000	-50.55	-13.00	37.55	V	-71.1
836.846000	-46.83	-13.00	33.83	V	-68.2



(GSM 850MHz _ Middle Channel _ 1GHz to 10GHz _ Vertical)

Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
1673.031250	-51.99	-13.00	38.99	V	-110.8
2509.750000	-42.24	-13.00	29.24	V	-107.6
3346.468750	-51.99	-13.00	38.99	V	-103.8
5458.093750	-55.17	-13.00	42.17	V	-100.1
7179.906250	-53.26	-13.00	40.26	V	-97.7
9288.437500	-49.37	-13.00	36.37	V	-94.5



Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Pol	Corr. (dB)
31.067000	-60.44	-13.00	47.44	H	-79.3
48.042000	-57.92	-13.00	44.92	H	-77.4
101.343500	-65.01	-13.00	52.01	H	-83.8
244.418500	-57.89	-13.00	44.89	H	-77.2
596.722500	-48.44	-13.00	35.44	H	-70.1
985.304500	-44.98	-13.00	31.98	H	-66.0