



# TEST REPORT

**APPLICANT** : Jiangsu SEUIC Technology Co.,Ltd.  
**PRODUCT NAME** : Portable Data Collection Terminal  
**MODEL NAME** : CRUISE 1  
**BRAND NAME** : CRUISE/SEUIC  
**FCC ID** : 2AC68-CRUISE1S  
**STANDARD(S)** : 47 CFR Part 22 Subpart H  
: 47 CFR Part 24 Subpart E  
**RECEIPT DATE** : 2019-12-13  
**TEST DATE** : 2019-12-13 to 2020-01-13  
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<b>Change History</b>		
<b>Version</b>	<b>Date</b>	<b>Reason for change</b>
1.0	2020-01-15	First edition

# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Jiangsu SEUIC Technology Co.,Ltd.
<b>Applicant Address:</b>	NO.15 Xinghuo Road, Nanjing New & High Technology Industry Development Zone, 210061, Nanjing City, Jiangsu Province, China
<b>Manufacturer:</b>	Jiangsu SEUIC Technology Co.,Ltd.
<b>ManufacturerAddress:</b>	NO.15 Xinghuo Road, Nanjing New & High Technology Industry Development Zone, 210061, Nanjing City, Jiangsu Province, China

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	Portable Data Collection Terminal
<b>Hardware Version:</b>	SLB761X_MB_V1.00_PCB
<b>Software Version:</b>	D700S_G_V0.3.0
<b>Modulation Type:</b>	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 HSPA+
<b>Operating Frequency Range:</b>	<b>GSM 850MHz:</b> Tx: 824.20 - 848.80MHz Rx: 869.20 - 893.80MHz <b>GSM 1900MHz:</b> Tx: 1850.20 - 1909.80MHz Rx: 1930.20 - 1989.80MHz <b>WCDMA Band V</b> Tx: 826.4 - 846.6MHz Rx: 871.4 - 891.6MHz <b>WCDMA Band II</b> Tx: 1852.4 - 1907.6MHz Rx: 1932.4 - 1987.6MHz

<b>Antenna Type:</b>	Fixed Internal	
<b>Antenna Gain:</b>	GSM 850:	-3.35 dBi
	GSM1900:	-2.00 dBi
	WCDMA Band V:	-3.35 dBi
	WCDMA Band II:	-2.00 dBi
<b>Accessory Information:</b>	Battery	
	Brand Name:	N/A
	Model No.:	BT01700CRUISE
	Capacity:	4500mAh
	Rated Voltage:	3.80V
	Charge Limit:	4.35V
	AC Adapter 1	
	Brand Name:	N/A
	Model No.:	TPA-23A050200UU01
	Rated Input:	100-240V~50/60Hz 0.3A
	Rated Output:	5V=2A

**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), 4182(836.4MHz) 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:** 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 V;

WCDMA mode for WCDMA band II;

**Note 6:** 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	0.443	248KGXW
EDGE850	0.132	247KG7W
GSM1900	0.618	247KGXW
EDGE1900	0.249	249KG7W
WCDMA Band V	0.142	4M17F9W
WCDMA Band II	0.169	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 for the EUT FCC ID Certification:

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



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

No.	Section	Description	Test Date	Test Engineer	Result	Method determination/ Remark
1	2.1046	Conducted RF Output Power	Dec 29, 2019	Gao Mingzhou	PASS	No deviation
2	24.232(d)	Peak -Average Ratio	Dec 26, 2019 and Jan 11, 2020	Gao Mingzhou	PASS	No deviation
3	2.1049	99% Occupied Bandwidth	Dec 13 to 28, 2019	Gao Mingzhou	PASS	No deviation
4	2.1055,22.355, 24.235,	Frequency Stability	Dec 26, 2019 and Jan 11, 2020	Gao Mingzhou	PASS	No deviation
5	2.1051,22.917(a),24.238(a),	Conducted Out of Band Emissions	Dec 11 to 13, 2019	Gao Mingzhou	PASS	No deviation
6	2.1051,22.917(a),24.238(a),	Band Edge	Dec 11, and 16, 2019	Gao Mingzhou	PASS	No deviation
7	22.913(a), 24.232(a)	Transmitter Radiated Power (EIPR/ERP)	Dec 29 , 2019	PengXuewei	PASS	No deviation
8	2.1051,22.917(a),24.238(a)	Radiated Out of Band Emissions	Dec 29, 2019	PengXuewei	PASS	No deviation

**Note 1:** The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03 and ANSI/TIA-603-E-2016.

**Note 2:** The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The ref offset 26.5dB contains two parts that cable loss 16.5dB and Attenuator 10dB.

## 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

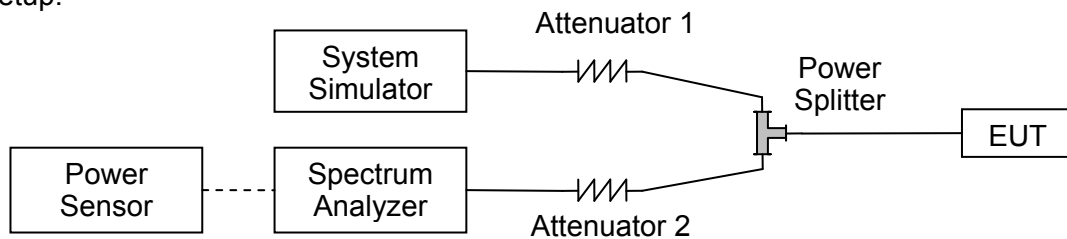
### 2.1. Conducted RF Output Power

#### 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

<b>GSM850</b>	<b>Average Power (dBm)</b>		
<b>TX Channel</b>	<b>128</b>	<b>190</b>	<b>251</b>
<b>Frequency (MHz)</b>	<b>824.2</b>	<b>836.6</b>	<b>848.8</b>
GSM 1 Tx slot	31.91	31.95	31.89
GPRS 1 Tx slot	31.89	31.96	31.87
GPRS 2 Tx slots	29.09	29.13	29.05
GPRS 3 Tx slots	27.15	27.25	27.11
GPRS 4 Tx slots	25.51	25.66	25.49
EDGE 1 Tx slot	25.76	26.70	25.99
EDGE 2 Tx slots	25.15	26.07	25.39
EDGE 3 Tx slots	22.54	23.45	22.78
EDGE 4 Tx slots	21.34	22.25	21.71

<b>GSM1900</b>	<b>Average Power (dBm)</b>		
<b>TX Channel</b>	<b>512</b>	<b>661</b>	<b>810</b>
<b>Frequency (MHz)</b>	<b>1850.2</b>	<b>1880</b>	<b>1909.8</b>
GSM 1 Tx slot	29.79	29.84	29.74
GPRS 1 Tx slot	29.80	29.91	29.76
GPRS 2 Tx slots	27.91	27.95	27.85
GPRS 3 Tx slots	26.64	26.53	26.57
GPRS 4 Tx slots	25.51	25.56	25.51
EDGE 1 Tx slot	25.48	25.97	25.32
EDGE 2 Tx slots	25.32	25.78	24.91
EDGE 3 Tx slots	22.71	22.67	21.96
EDGE 4 Tx slots	20.50	20.50	19.79

<b>WCDMA Band V</b>	<b>Average Power (dBm)</b>		
<b>TX Channel</b>	<b>4132</b>	<b>4182</b>	<b>4233</b>
<b>Frequency (MHz)</b>	<b>826.4</b>	<b>836.4</b>	<b>846.6</b>
RMC 12.2Kbps	21.51	21.53	21.45
HSDPA Subtest-1	21.23	21.13	21.21
HSDPA Subtest-2	21.2	21.11	21.23
HSDPA Subtest-3	20.73	20.64	20.76
HSDPA Subtest-4	20.71	20.63	20.75
HSUPA Subtest-1	19.76	19.71	19.73
HSUPA Subtest-2	19.25	19.2	19.27
HSUPA Subtest-3	20.23	20.18	20.23
HSUPA Subtest-4	18.76	18.66	18.72
HSUPA Subtest-5	21.24	21.17	21.22

<b>WCDMA Band II</b>	<b>Average Power (dBm)</b>		
<b>TX Channel</b>	<b>9262</b>	<b>9400</b>	<b>9538</b>
<b>Frequency (MHz)</b>	<b>1852.4</b>	<b>1880.0</b>	<b>1907.6</b>
RMC 12.2Kbps	22.24	22.27	22.17
HSDPA Subtest-1	21.36	21.26	21.34
HSDPA Subtest-2	21.32	21.23	21.33
HSDPA Subtest-3	20.86	20.75	20.85
HSDPA Subtest-4	20.83	20.57	20.82
HSUPA Subtest-1	19.90	19.76	19.85
HSUPA Subtest-2	19.37	18.75	19.32
HSUPA Subtest-3	20.39	20.20	20.28
HSUPA Subtest-4	18.85	18.75	18.79
HSUPA Subtest-5	21.37	21.20	21.32

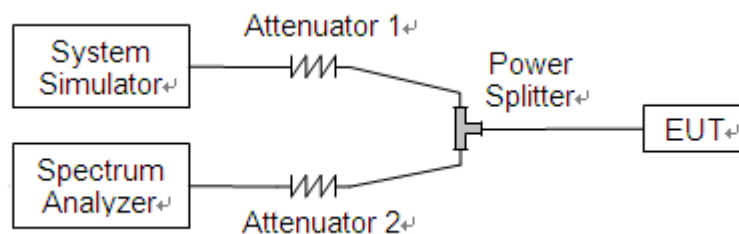
## 2.2. Peak to Average Ratio

### 2.2.1. Requirement

According to FCC 24.232(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

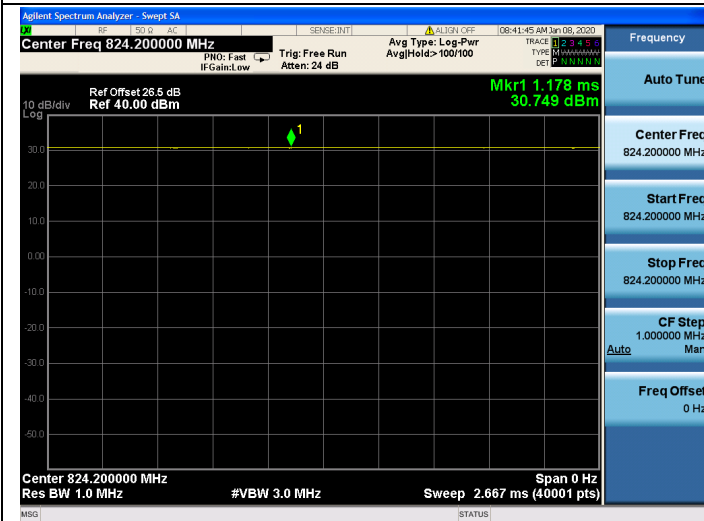
The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

#### A. Test Verdict:

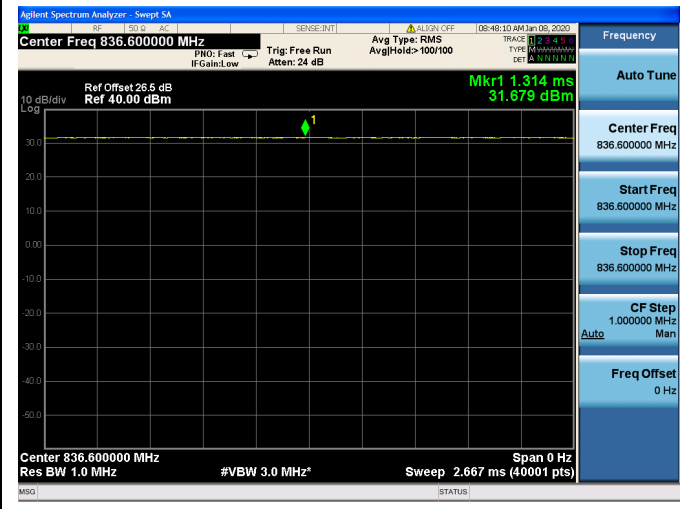
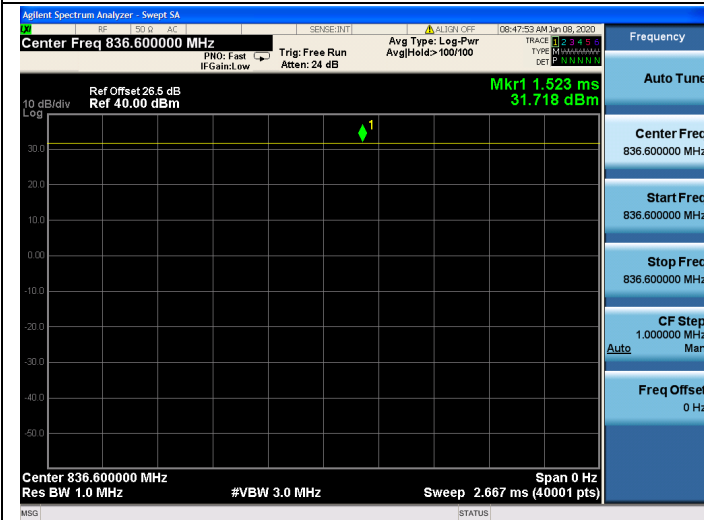
Band	Channel	Frequency (MHz)	Peak to Average ratio	Limit	Verdict
			dB	dB	
GSM 850MHz	128	824.2	0.006	13	PASS
	190	836.6	0.039		PASS
	251	848.8	0.003		PASS
GSM 1900MHz	512	1850.2	0.011		PASS
	661	1880.0	0.010		PASS
	810	1909.8	0.009		PASS
EDGE 850MHz	128	824.2	0.004		PASS
	190	836.6	0.003		PASS
	251	848.8	0.733		PASS
EDGE 1900MHz	512	1850.2	0.016		PASS
	661	1880.0	0.007		PASS
	810	1909.8	0.048		PASS

Band	Channel	Frequency (MHz)	Peak to Average ratio	Limit	Verdict
			dB	dB	
WCDMA Band V	4132	826.4	3.05	13	PASS
	4182	836.4	3.09		PASS
	4233	846.6	3.08		PASS
WCDMA Band II	9262	1852.4	3.15		PASS
	9400	1880.0	3.08		PASS
	9538	1907.6	2.94		PASS

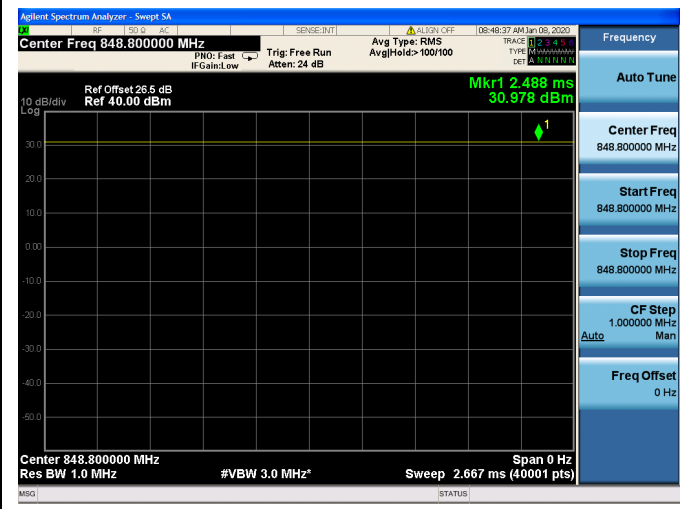
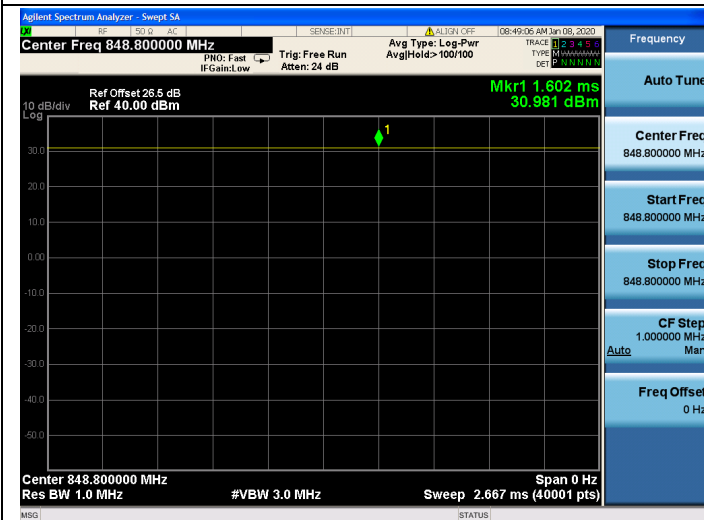
### GSM 850MHz CH128 824.2MHz



### GSM 850MHz CH190 836.6MHz

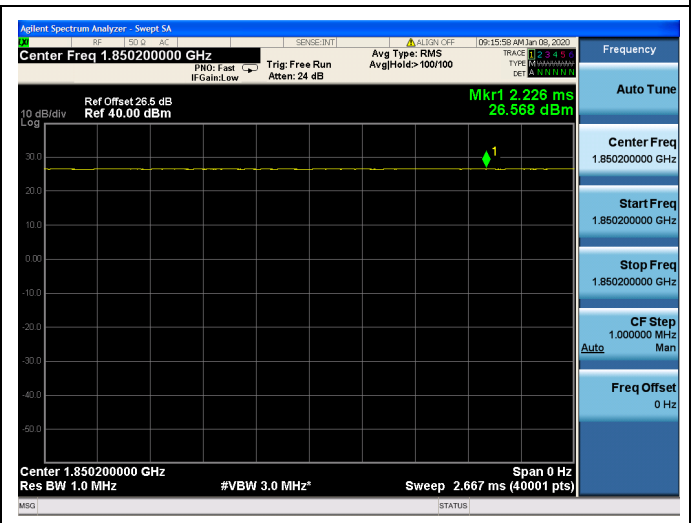
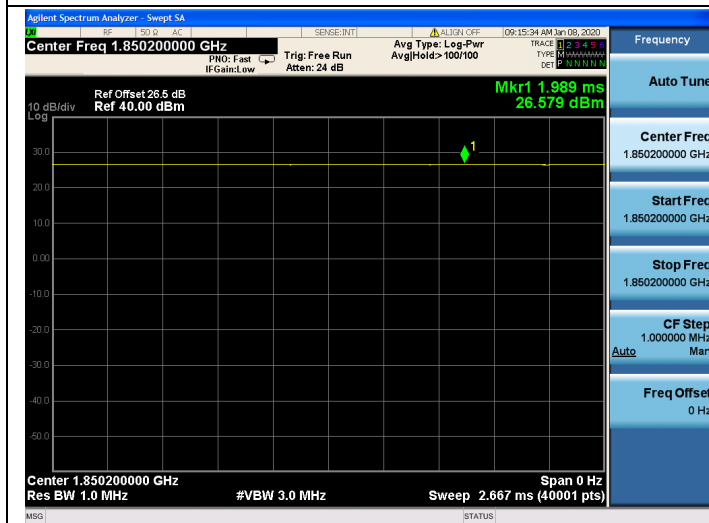


### GSM 850MHz CH251 848.8MHz

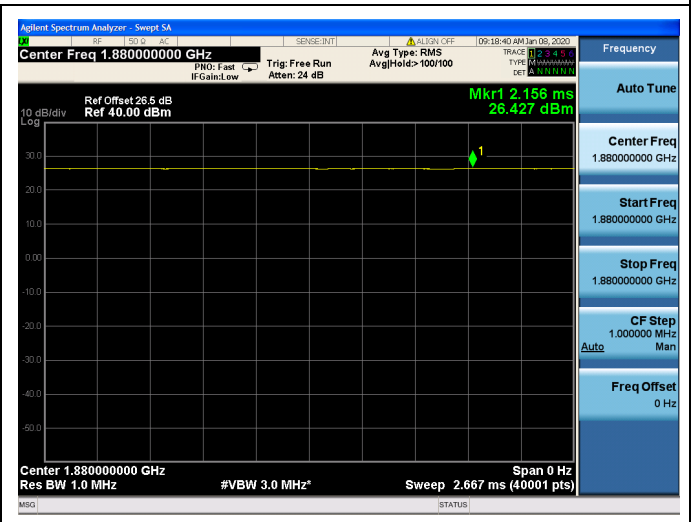
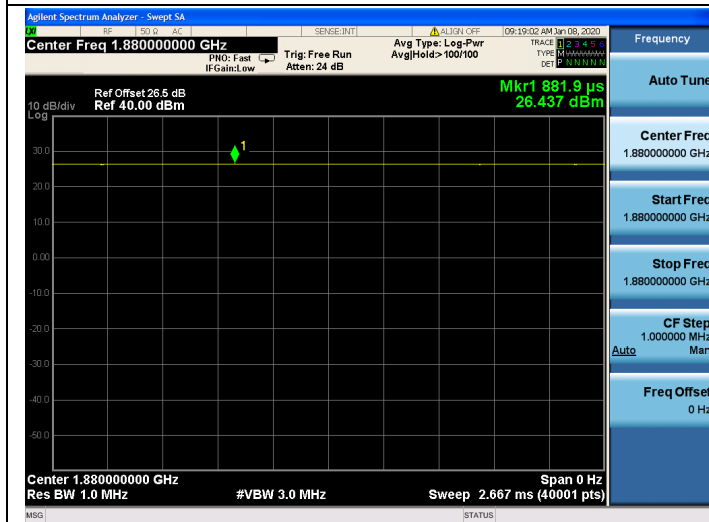




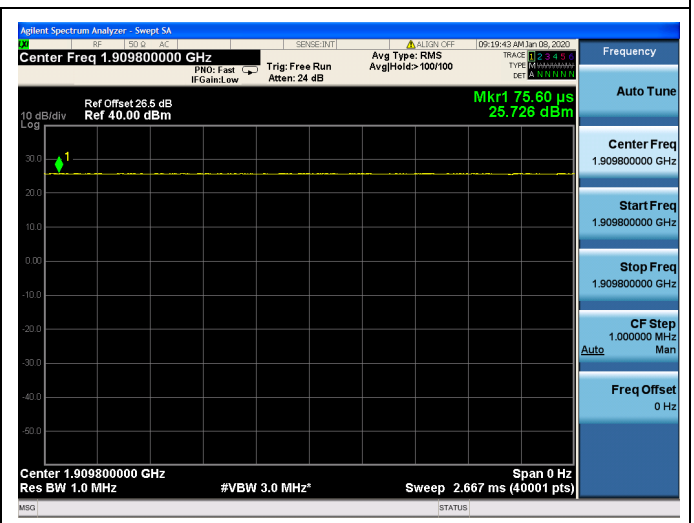
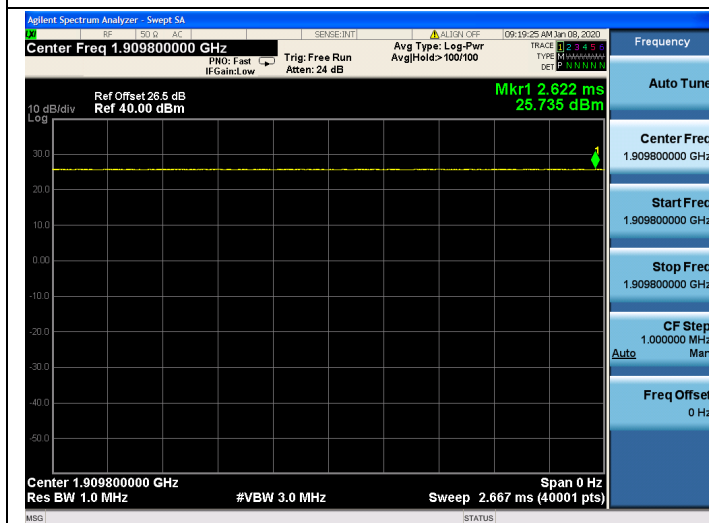
**GSM 1900MHz CH512 1850.2MHz**



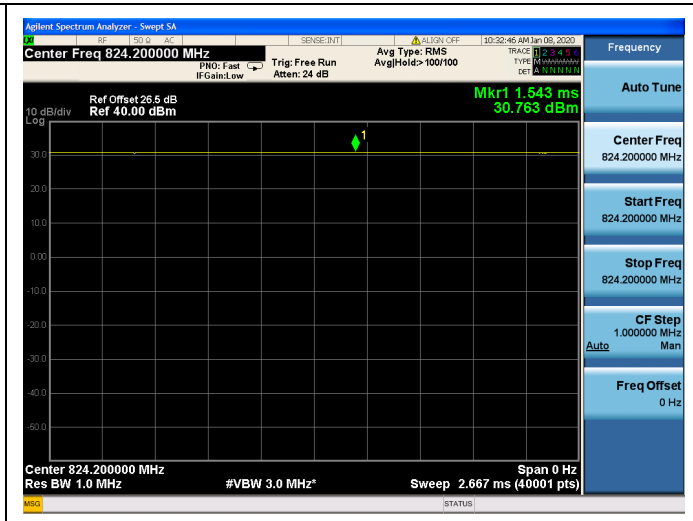
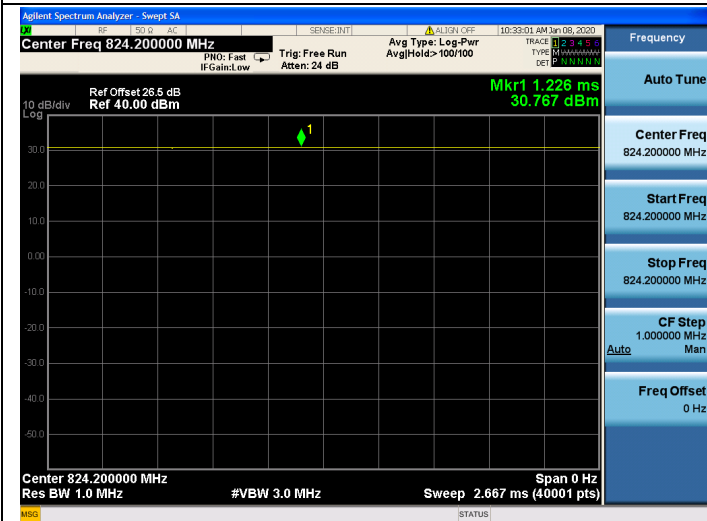
**GSM 1900MHz CH661 1880.0MHz**



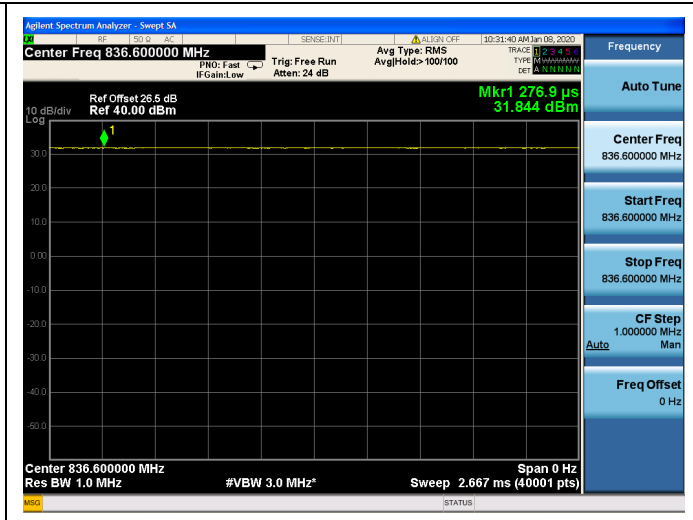
**GSM 1900MHz CH810 1909.8MHz**



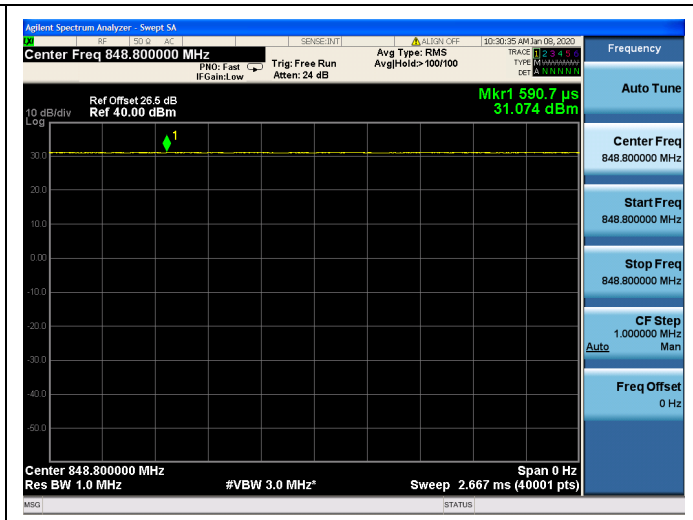
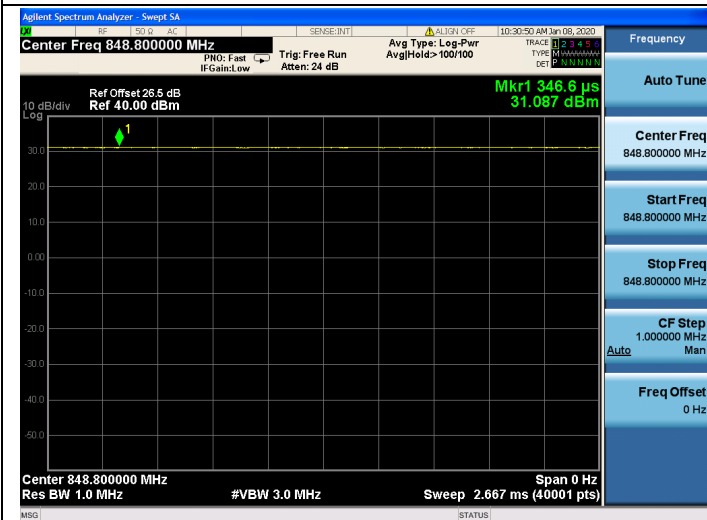
**EDGE 850MHz CH128 824.2MHz**



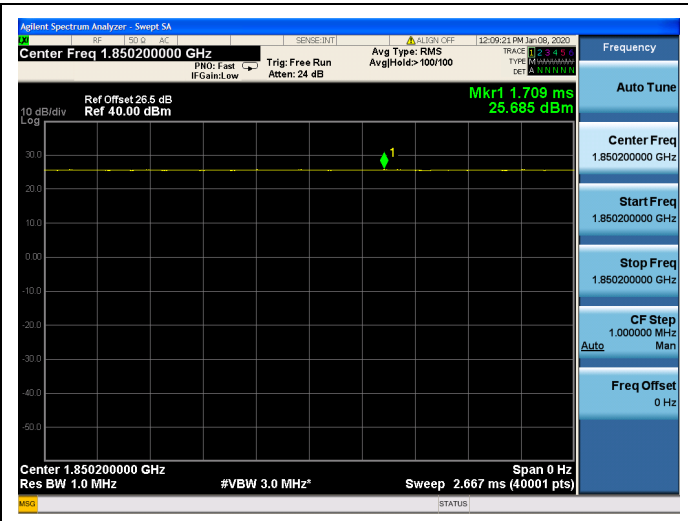
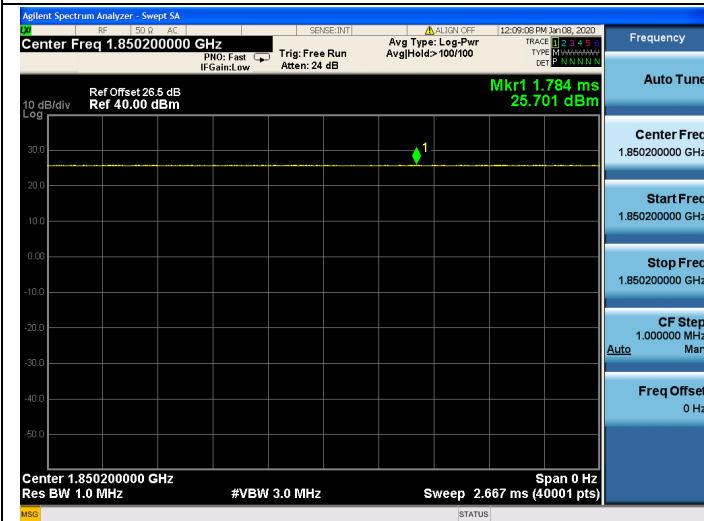
**EDGE 850MHz CH190 836.6MHz**



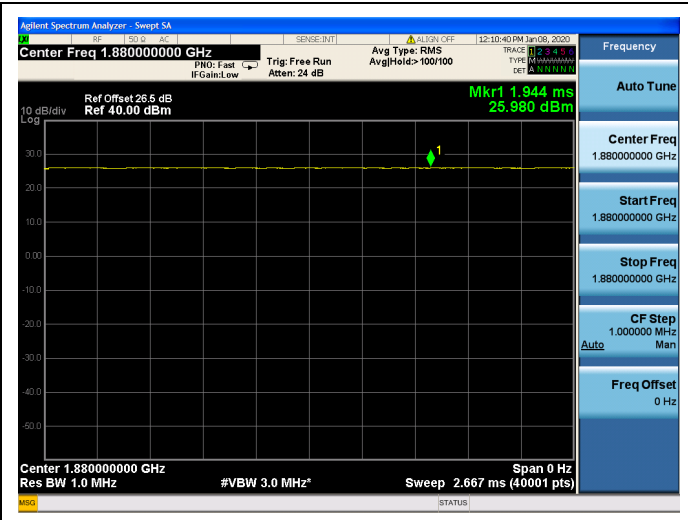
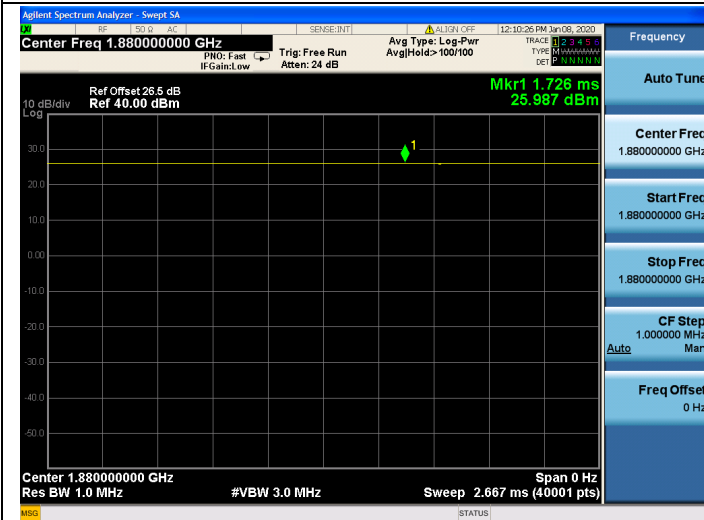
**EDGE 850MHz CH251 848.8MHz**



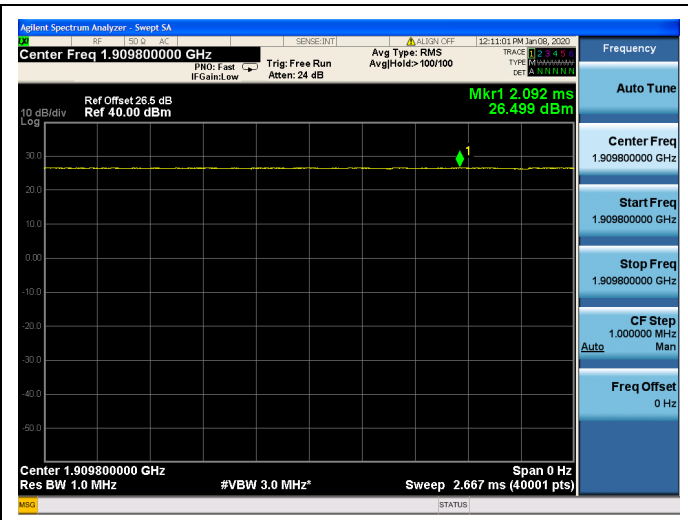
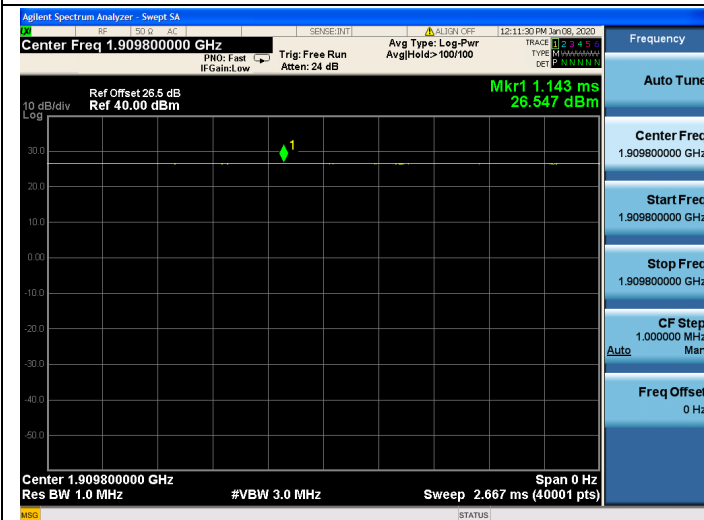
**EDGE 1900MHz CH512 1850.2MHz**

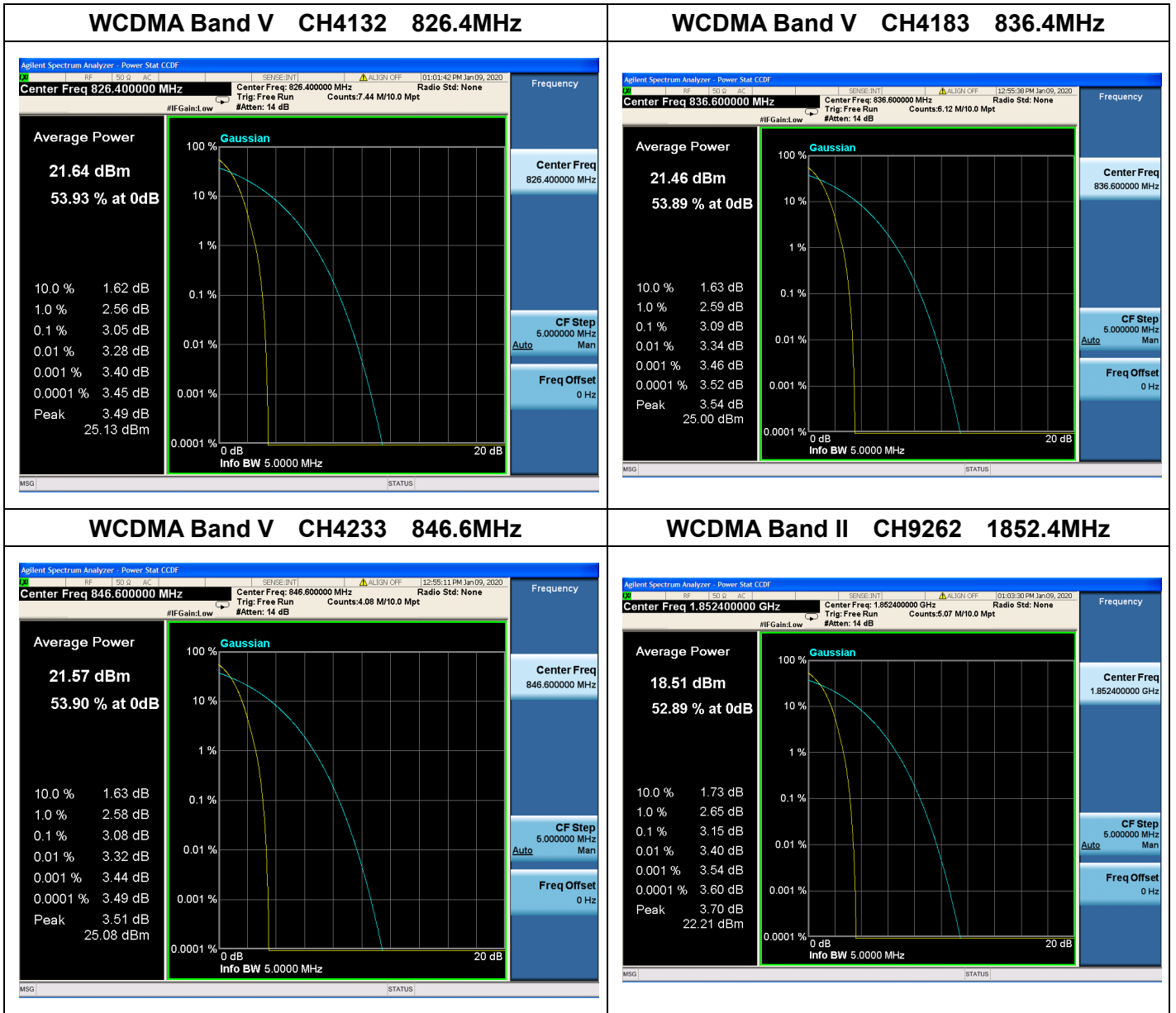


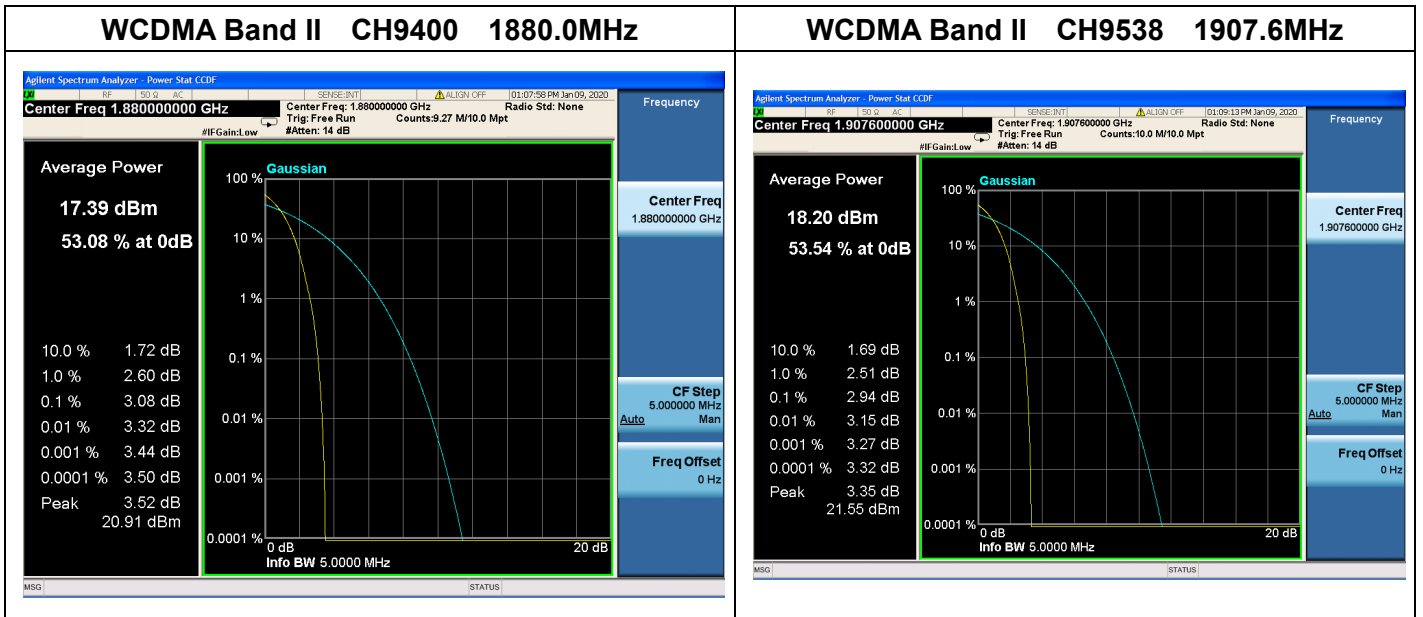
**EDGE 1900MHz CH661 1880.0MHz**



**EDGE 1900MHz CH810 1909.8MHz**







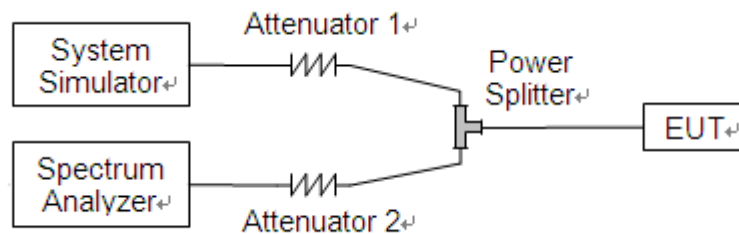
## 2.3. 99% Occupied Bandwidth

### 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 50 Ohm; 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

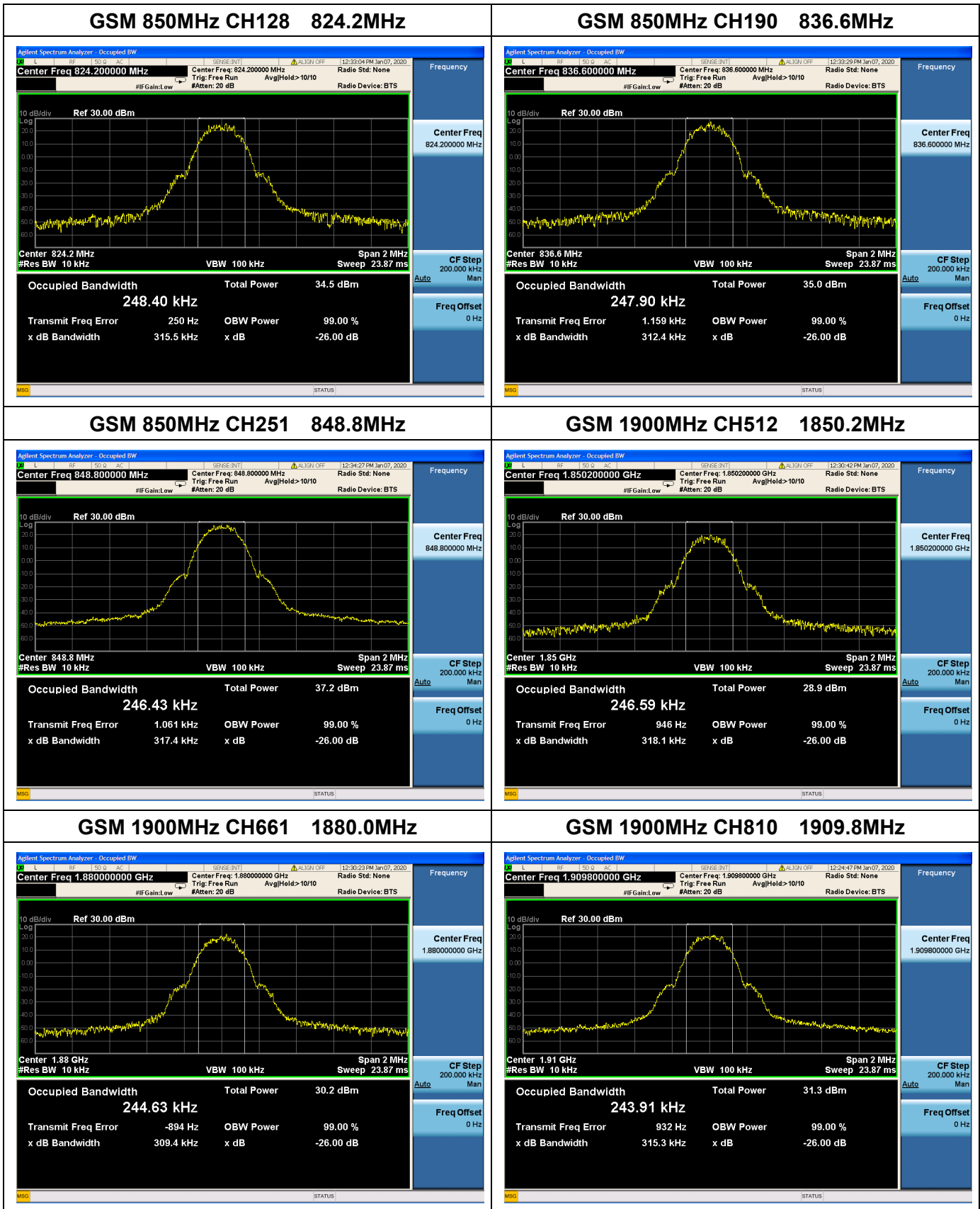
The lowest, middle and highest channels are selected to perform testing to record the 99% occupied bandwidth.

#### GSM Test Verdict:

Band	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)
GSM 850MHz	128	824.2	248.40	315.5
	190	836.6	247.90	312.4
	251	848.8	246.43	317.4
GSM 1900MHz	512	1850.2	246.59	318.1
	661	1880.0	244.63	309.4
	810	1909.8	243.91	315.3
EDGE 850MHz	128	824.2	246.63	316.9
	190	836.6	243.57	324.5
	251	848.8	245.34	318.8
EDGE 1900MHz	512	1850.2	248.96	321.8
	661	1880.0	246.10	322.3
	810	1909.8	247.33	320.4

#### WCDMA Test Verdict:

Band	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
WCDMA Band V	4132	826.4	4.172	4.701
	4183	836.4	4.155	4.754
	4233	846.6	4.131	4.709
WCDMA Band II	9262	1852.4	4.166	4.697
	9400	1880.0	4.174	4.686
	9538	1907.6	4.133	4.702



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 Block67, BaoAn District, ShenZhen , Guangdong Province, P. R. China

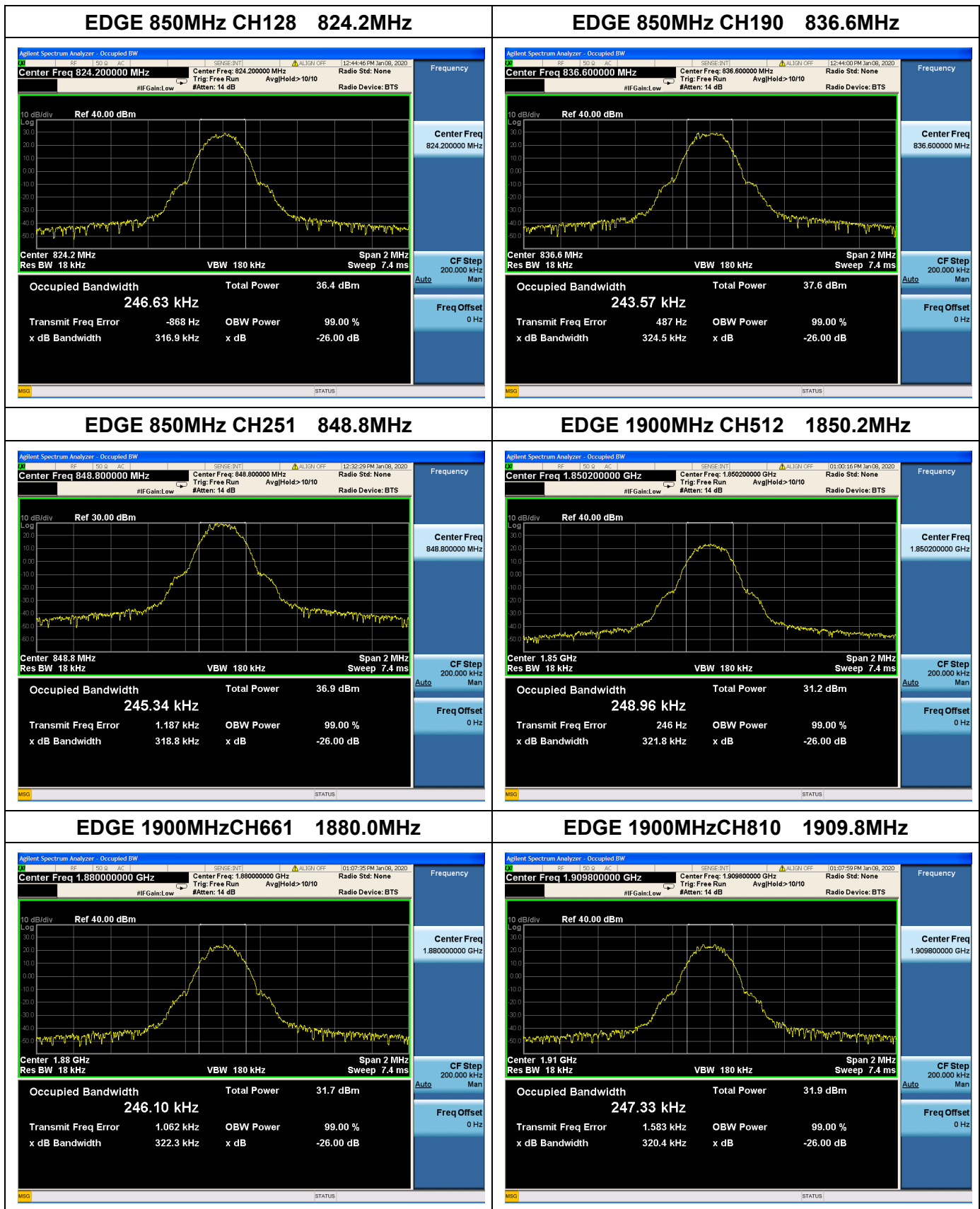
Tel: 86-755-36698555

Http://www.morlab.cn

Fax: 86-755-36698525

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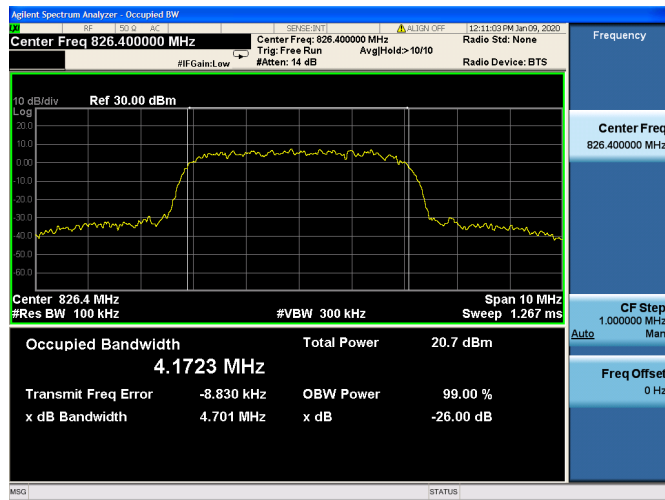
Tel: 86-755-36698555

Fax: 86-755-36698525

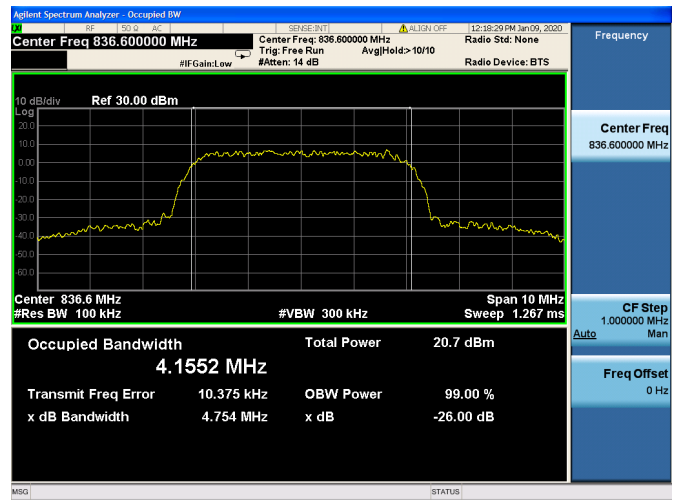
Http://www.morlab.cn

E-mail: service@morlab.cn

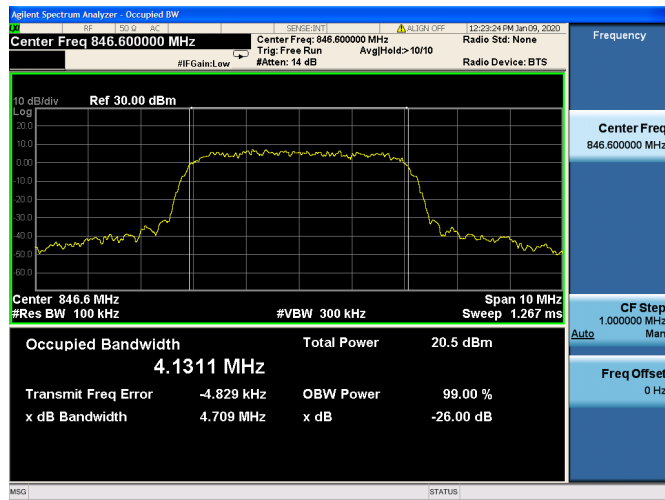
**WCDMA Band V CH4132 826.4MHz**



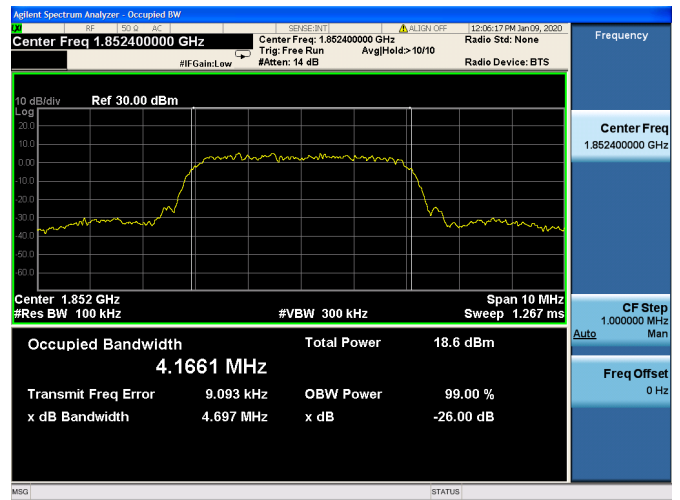
**WCDMA Band V CH4183 836.4MHz**



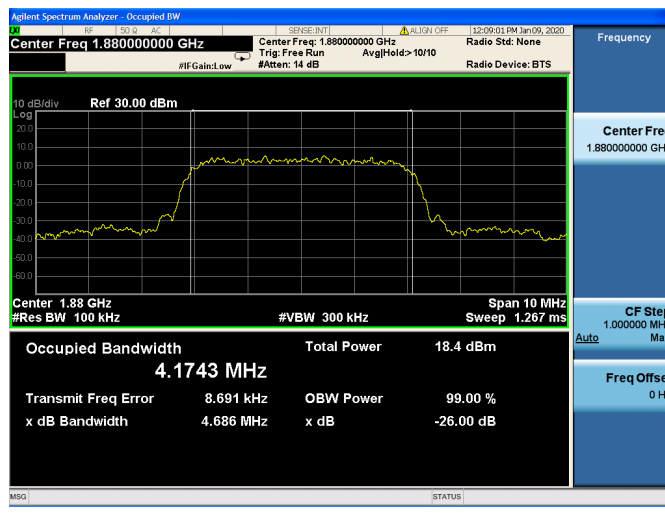
**WCDMA Band V CH4233 846.6MHz**



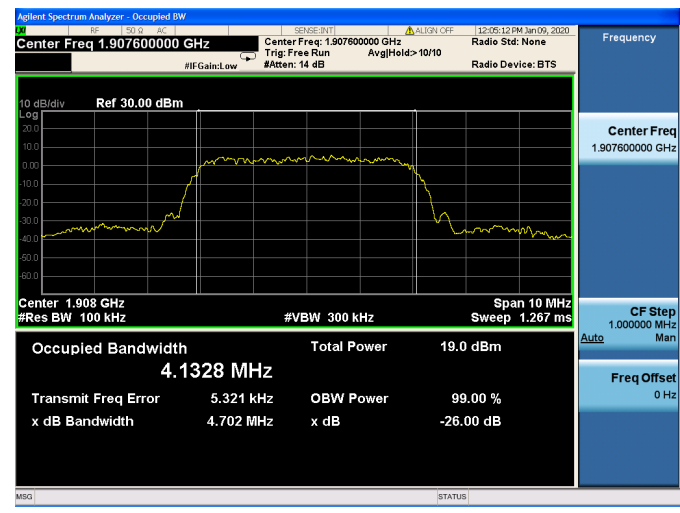
**WCDMA Band II CH9262 1852.4MHz**



**WCDMA Band II CH9400 1880.0MHz**



**WCDMA Band II CH9538 1907.6MHz**



## 2.4. Frequency Stability

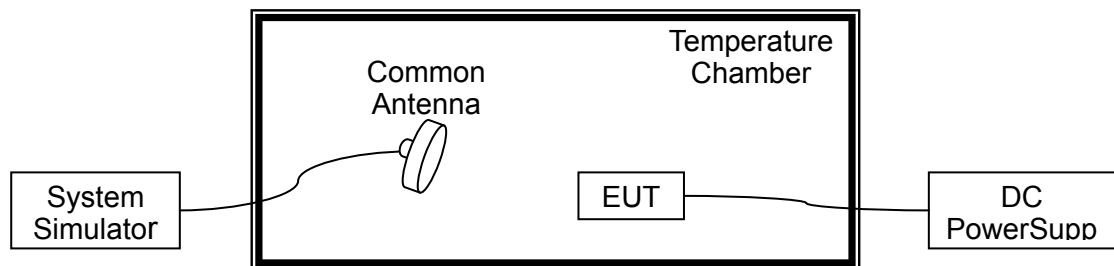
### 2.4.1. Requirement

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 0°C to +55°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

A. Test Verdict:

GSM 850MHz, Channel 190, Frequency 836.6MHz					
Limit =±2.5ppm					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.80	+20(Ref)	41	0.049	PASS
100		0	-35	-0.042	
100		+10	-58	-0.069	
100		+20	37	0.044	
100		+30	25	0.030	
100		+40	26	0.031	
100		+50	57	0.068	
115	4.35	+20	-48	-0.057	
85	3.50	+20	-16	-0.019	

GSM 1900MHz, Channel 661, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.80	+20(Ref)	53	0.028	PASS
100		0	34	0.018	
100		+10	-48	-0.026	
100		+20	-73	-0.039	
100		+30	54	0.029	
100		+40	62	0.033	
100		+50	41	0.022	
115	4.35	+20	-17	-0.009	
85	3.50	+20	15	0.008	

EDGE 850MHz, Channel 190, Frequency 836.6MHz					
Limit =±2.5ppm					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.80	+20(Ref)	47	0.056	PASS
100		0	-63	-0.075	
100		+10	-43	-0.051	
100		+20	41	0.049	
100		+30	35	0.042	
100		+40	26	0.031	
100		+50	74	0.088	
115	4.35	+20	-76	-0.091	
85	3.50	+20	-33	-0.039	

EDGE 1900MHz, Channel 661, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.80	+20(Ref)	42	0.022	PASS
100		0	-88	-0.047	
100		+10	63	0.034	
100		+20	-63	-0.034	
100		+30	-73	-0.039	
100		+40	42	0.022	
100		+50	23	0.012	
115	4.35	+20	15	0.008	
85	3.50	+20	-17	-0.009	

WCDMA Band V, Channel 4182, Frequency 836.4MHz					
Limit =±2.5ppm					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.80	+20(Ref)	32	0.038	PASS
100		0	-17	-0.020	
100		+10	-58	-0.069	
100		+20	31	0.037	
100		+30	65	0.078	
100		+40	32	0.038	
100		+50	13	0.016	
115	4.35	+20	-76	-0.091	
85	3.50	+20	-59	-0.071	

WCDMA Band II, Channel 9400, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.80	+20(Ref)	34	0.018	PASS
100		0	15	0.008	
100		+10	-63	-0.034	
100		+20	-58	-0.031	
100		+30	31	0.016	
100		+40	23	0.012	
100		+50	24	0.013	
115	4.35	+20	-69	-0.037	
85	3.50	+20	24	0.013	

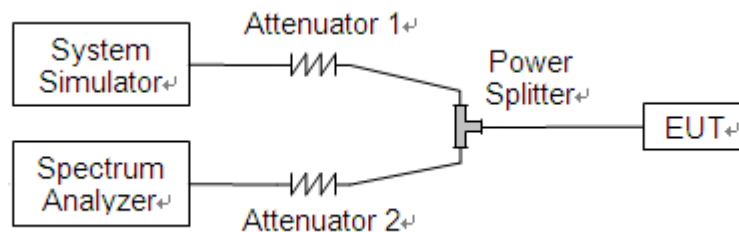
## 2.5. Conducted Out of Band Emissions

### 2.5.1. Requirement

According to FCC section 22.917(a), 24.238(a) and 27.53(h) 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

Test Setup:

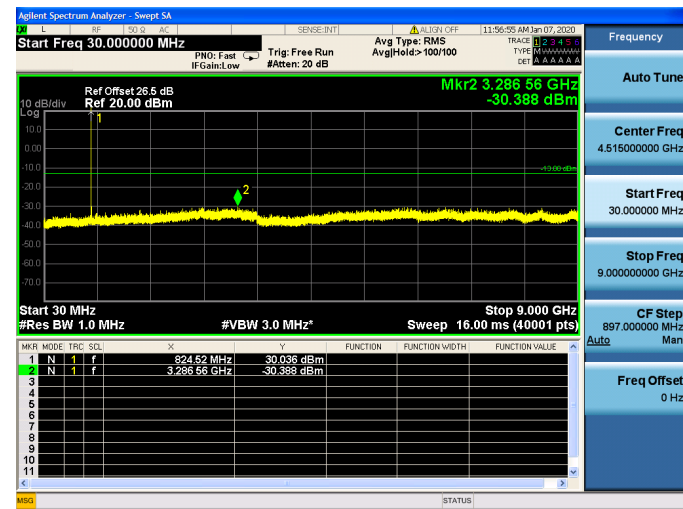


The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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

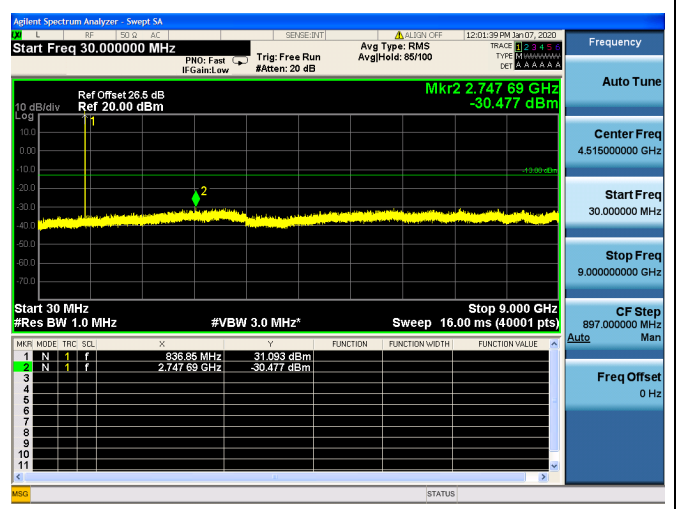
### 2.5.3. Test Result

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

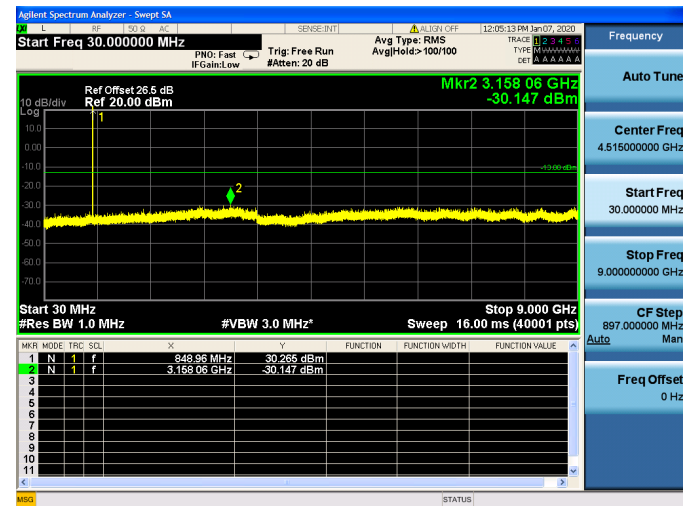
**GSM 850MHz CH128 824.2MHz**



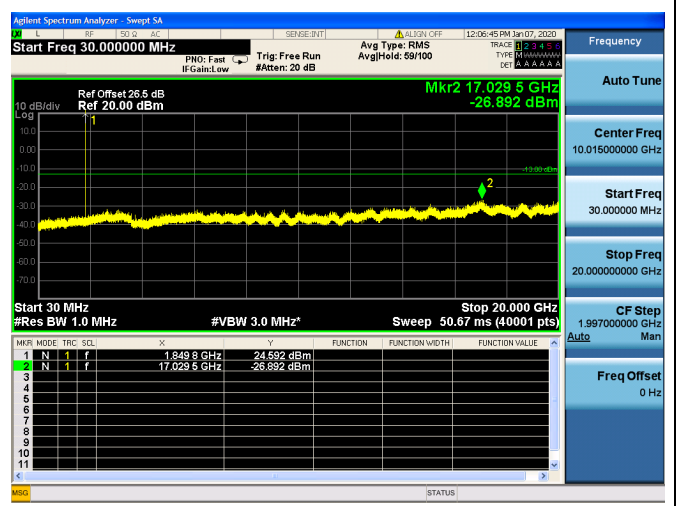
**GSM 850MHz CH190 836.6MHz**



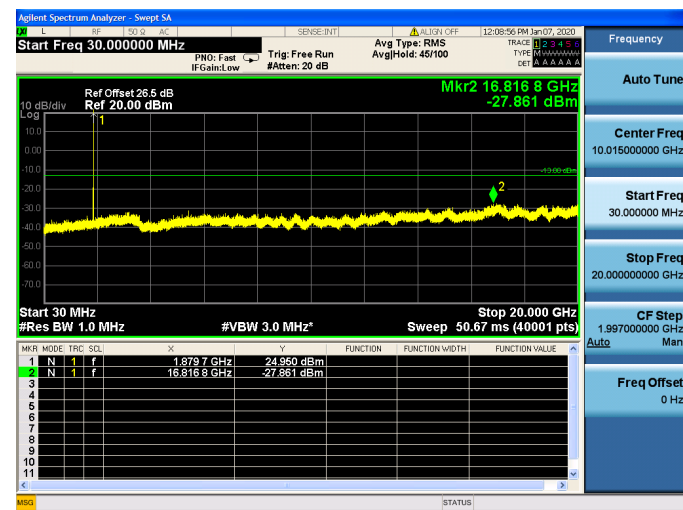
**GSM 850MHz CH251 848.8MHz**



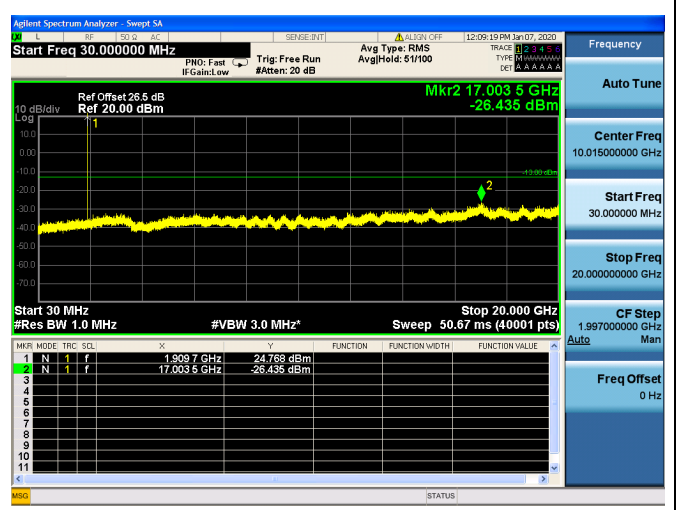
**GSM 1900MHz CH521 1850.2MHz**



**GSM 1900MHz CH661 1880.0MHz**

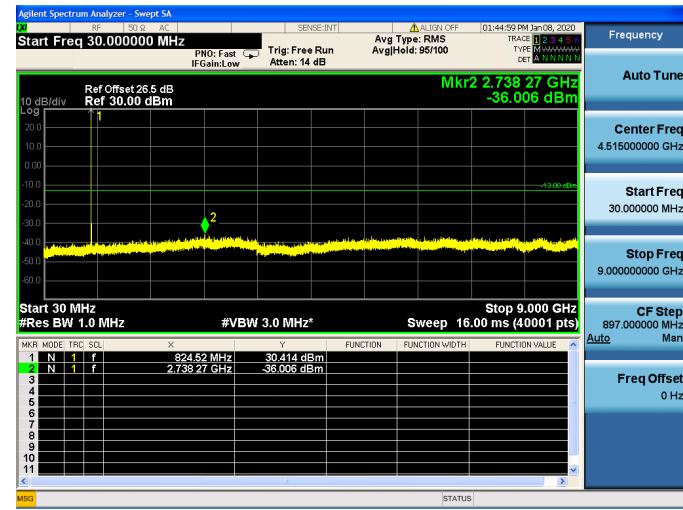


**GSM 1900MHz CH810 1909.8MHz**

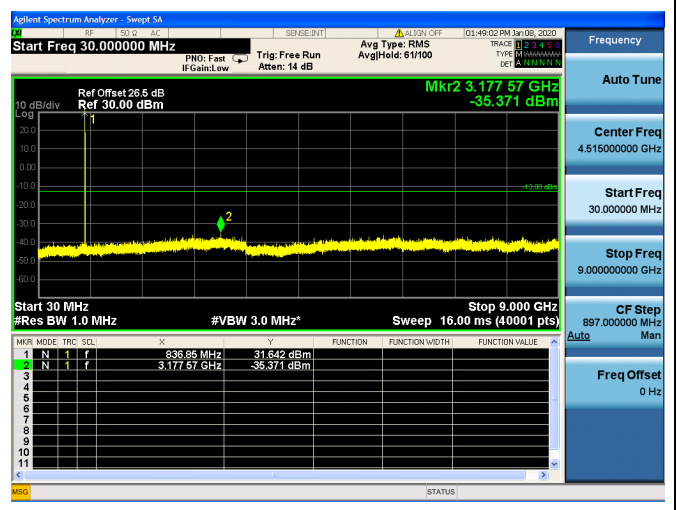




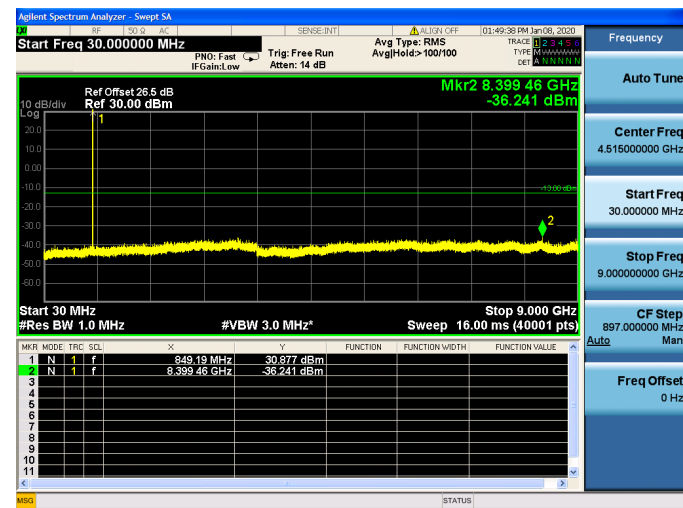
**EDGE 850MHz CH128 824.2MHz**



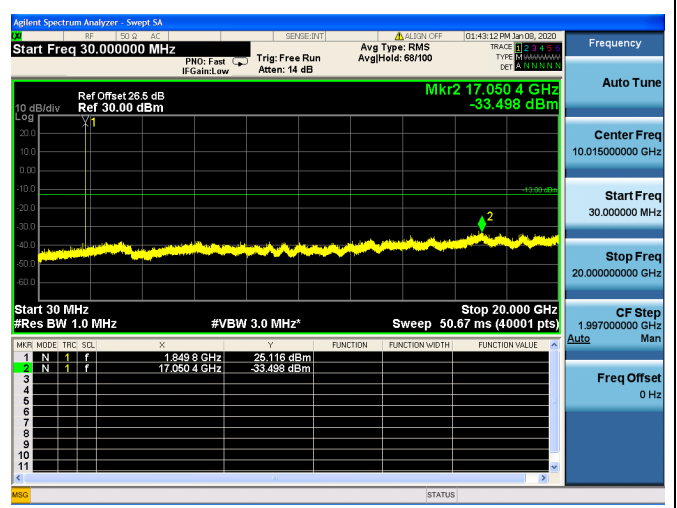
**EDGE 850MHz CH190 836.6MHz**



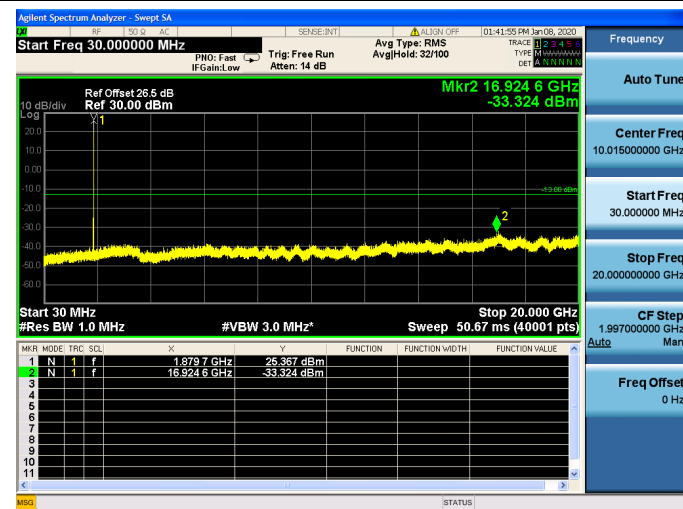
**EDGE 850MHz CH251 848.8MHz**



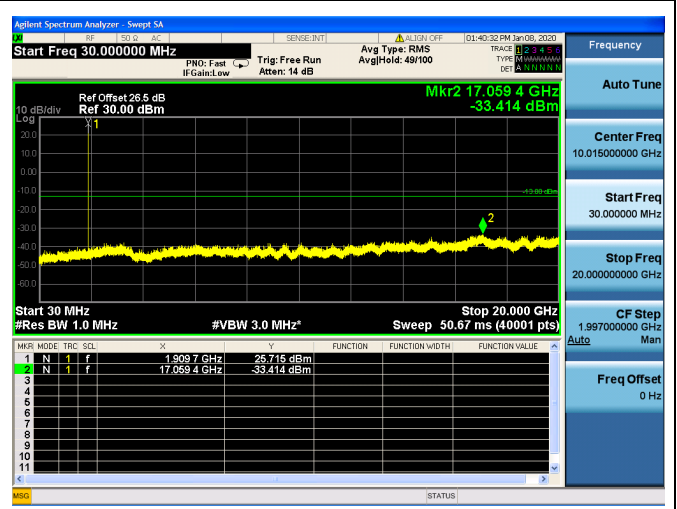
**EDGE 1900MHz CH521 1850.2MHz**



**EDGE 1900MHz CH661 1880.0MHz**



**EDGE 1900MHz CH810 1909.8MHz**





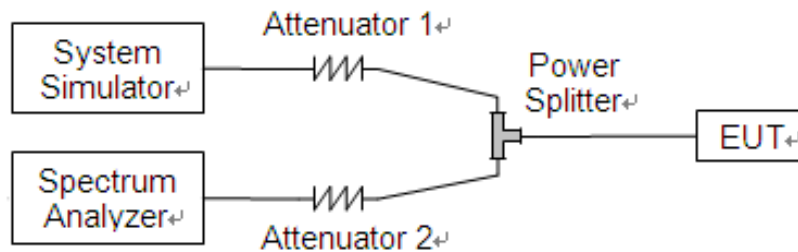
## 2.6. Band Edge

### 2.6.1. Requirement

According to FCC section 22.917(b), 24.238(b) and 27.53(h) 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

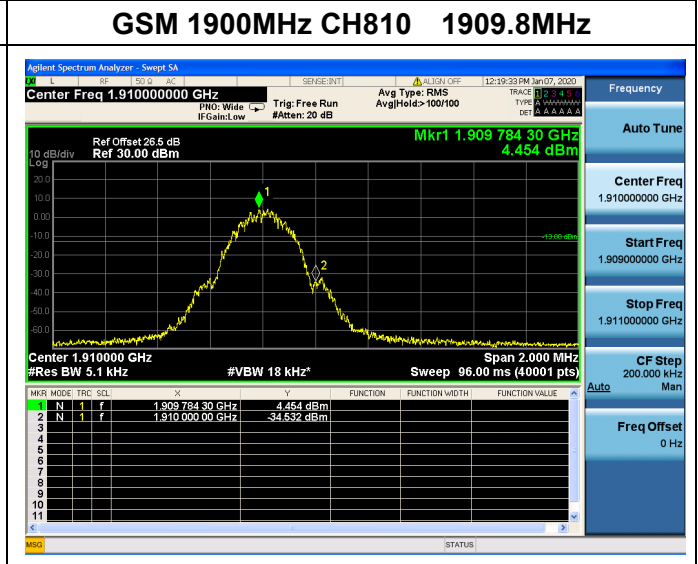
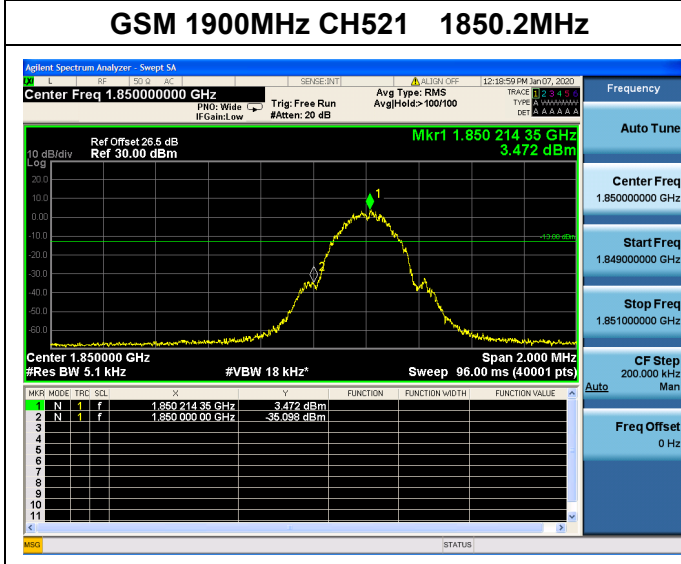
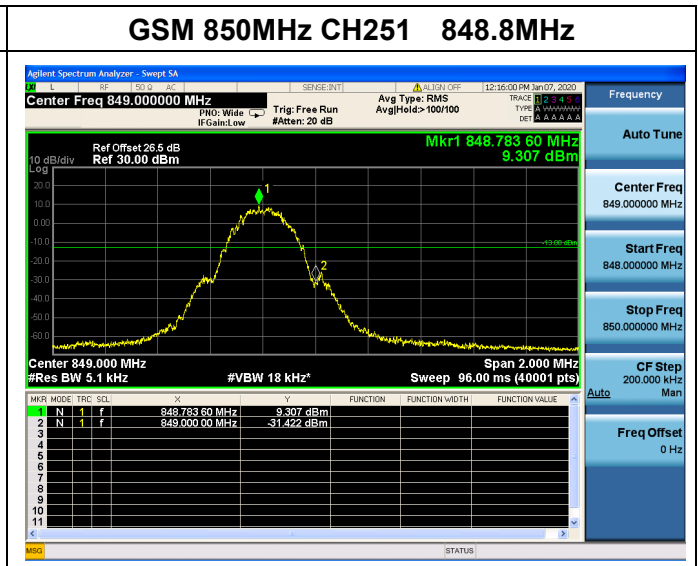
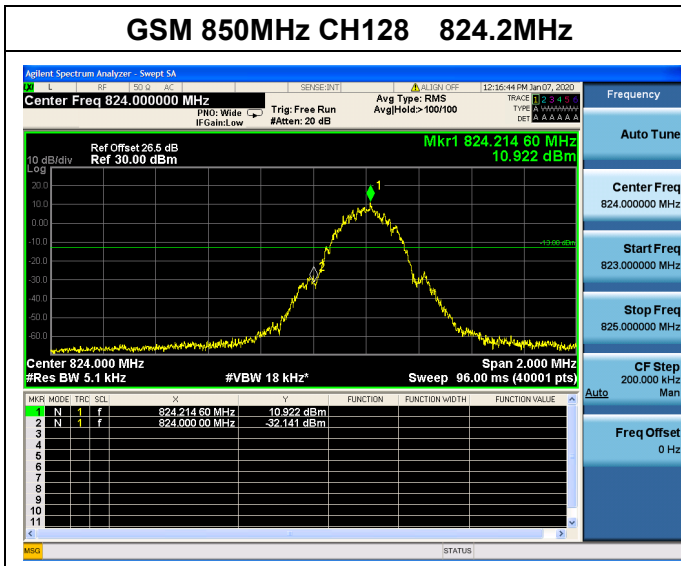
Test Setup:

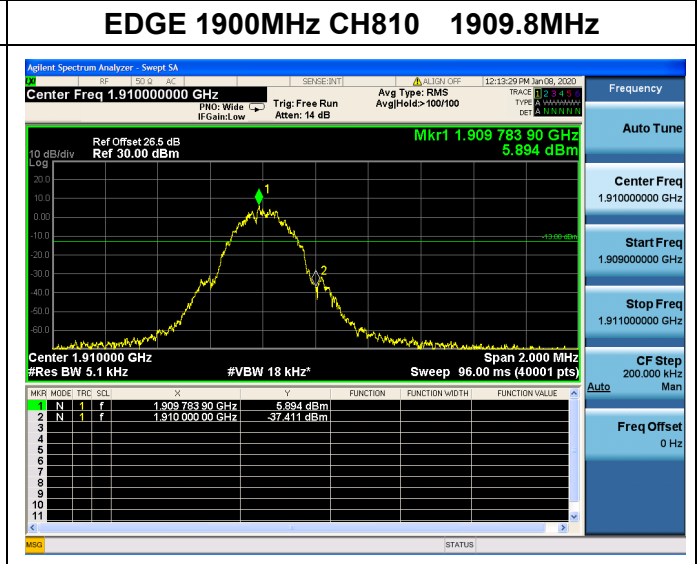
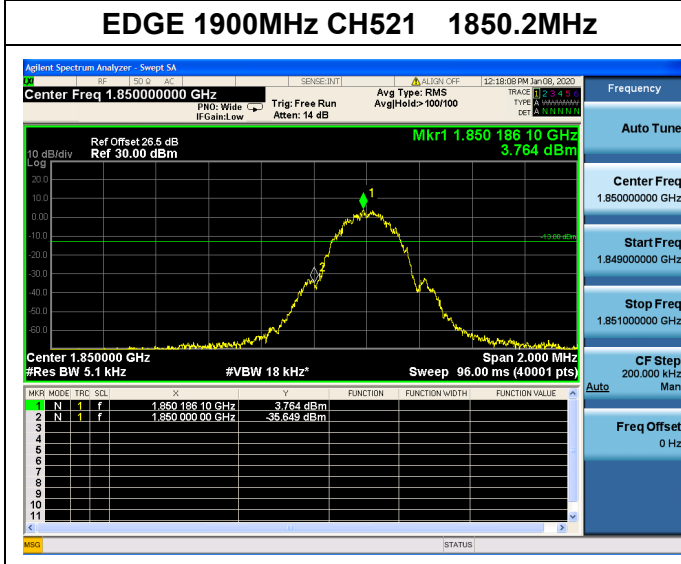
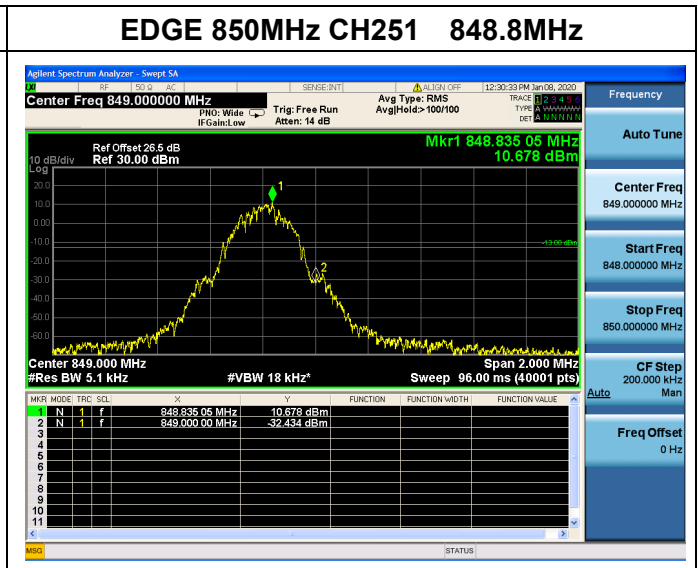
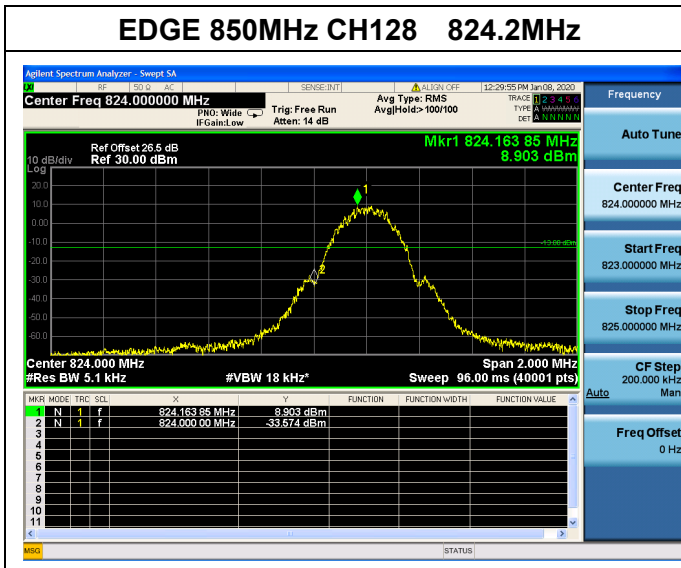


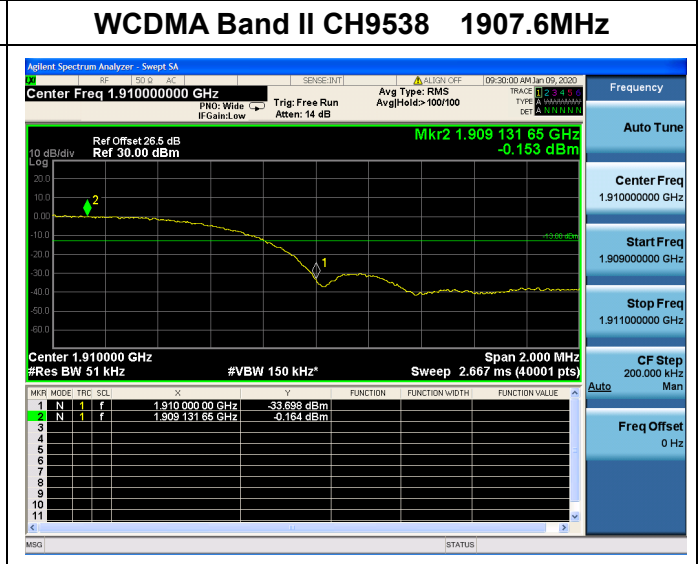
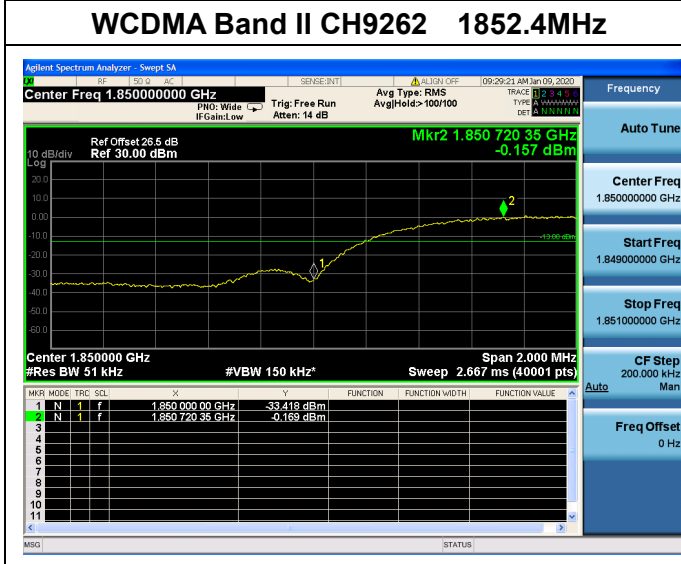
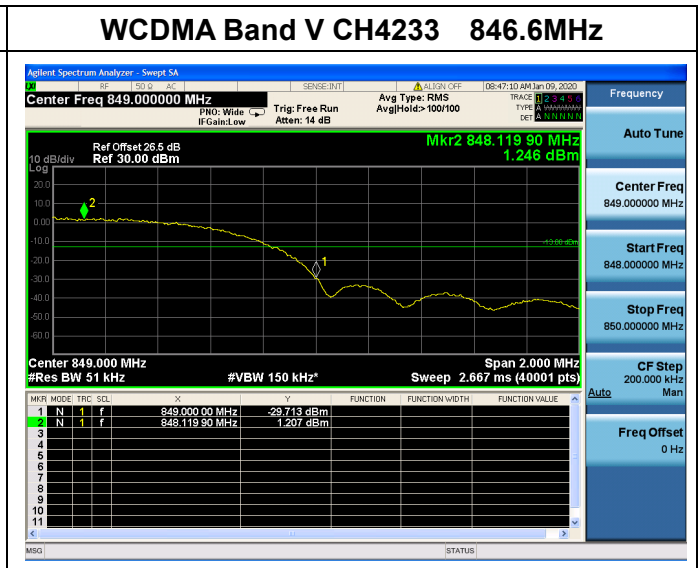
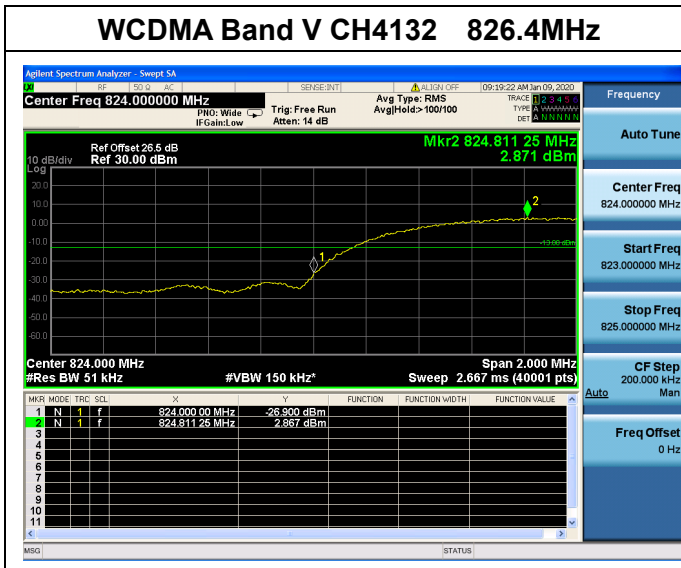
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum 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.







## 2.7. Transmitter Radiated Power (EIRP/ERP)

### 2.7.1. Requirement

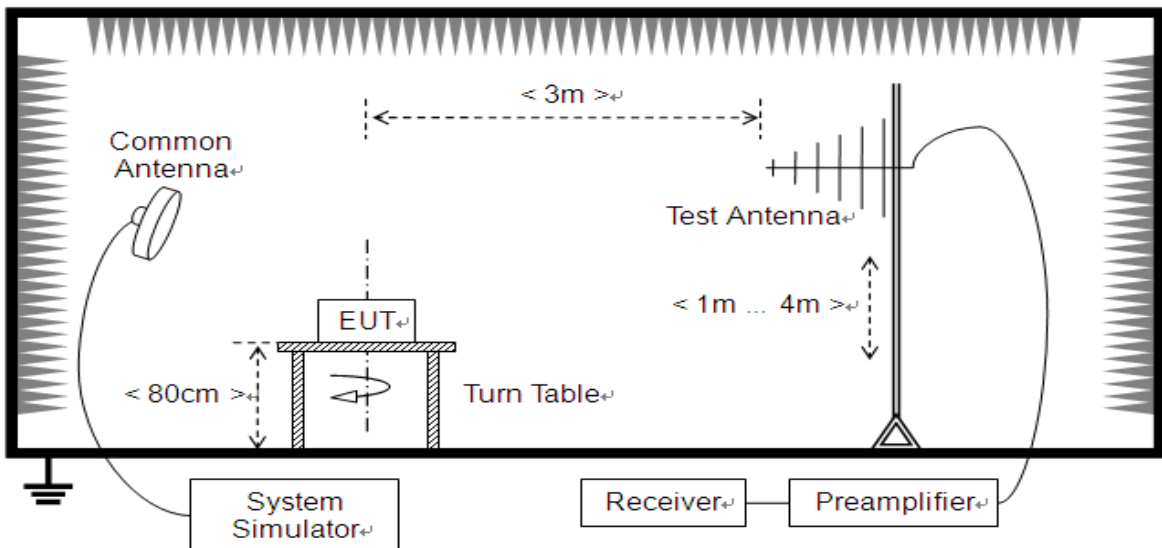
According to FCC section 22.913, the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7Watts.

According to 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

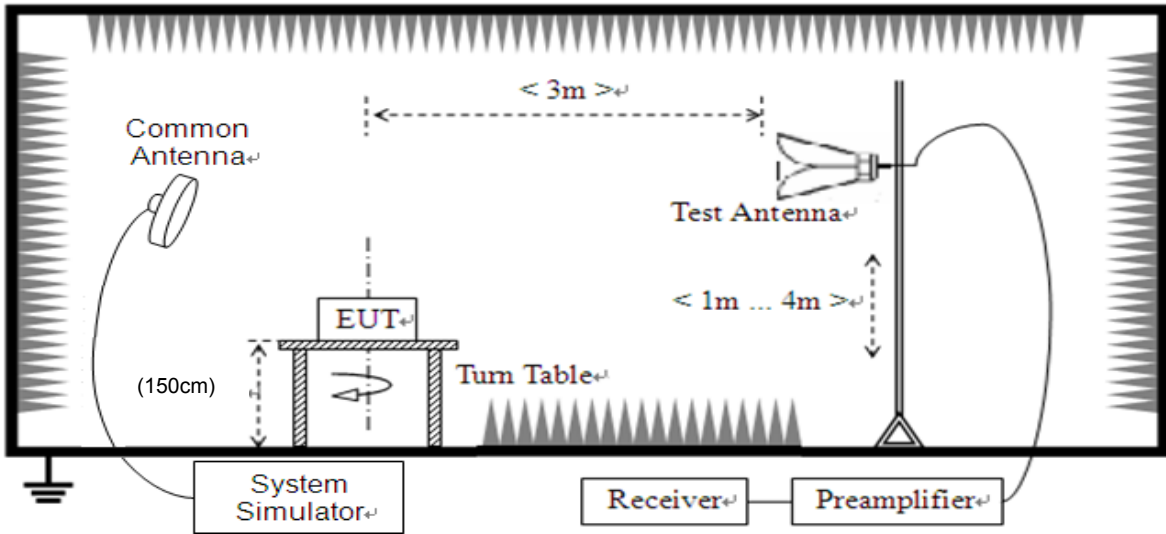
Test Setup:

- 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) or a Horn one (used for above 3GHz), it's located at the same height as the EUT. The Filters consists of Notch Filters and High Pass Filter.



### 2.7.3. Test Result

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

The substitution corrections are obtained as described below:

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

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

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

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

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

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

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

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

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

**GSM Test verdict:**

Band	Channel	Frequency (MHz)	PCL	Measured ERP		Limit		Verdict
				dBm	W	dBm	W	
GSM 850MHz	128	824.20	5	26.41	0.438	38.5	7	PASS
	190	836.60	5	26.45	0.442			PASS
	251	848.80	5	26.39	0.436			PASS
GPRS 850MHz	128	824.20	5	26.39	0.436	38.5	7	PASS
	190	836.60	5	26.46	0.443			PASS
	251	848.80	5	26.37	0.434			PASS
EDGE 850MHz	128	824.20	5	20.26	0.106	38.5	7	PASS
	190	836.60	5	21.20	0.132			PASS
	251	848.80	5	20.49	0.112			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	27.79	0.601	33	2	PASS
	661	1880.0	0	27.84	0.608			PASS
	810	1909.8	0	27.74	0.594			PASS
GPRS 1900MHz	512	1850.2	0	27.80	0.603	33	2	PASS
	661	1880.0	0	27.91	0.618			PASS
	810	1909.8	0	27.76	0.597			PASS
EDGE 1900MHz	512	1850.2	0	23.48	0.223	33	2	PASS
	661	1880.0	0	23.97	0.249			PASS
	810	1909.8	0	23.32	0.215			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.

**WCDMA Test verdict:**

Band	Channel	Frequency (MHz)	Measured ERP		Limit		Verdict
			dBm	W	dBm	W	
WCDMA Band V	4132	826.4	21.51	0.142	38.5	7	PASS
	4182	836.4	21.53	0.142			PASS
	4233	846.6	21.45	0.140			PASS
HSDPA Band V	4132	826.4	21.23	0.133	38.5	7	PASS
	4182	836.4	21.13	0.130			PASS
	4233	846.6	21.21	0.132			PASS
HSUPA Band V	4132	826.4	19.76	0.095	38.5	7	PASS
	4182	836.4	19.71	0.094			PASS
	4233	846.6	19.73	0.094			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 II	9262	1852.4	22.24	0.167	33	2	PASS
	9400	1880.0	22.27	0.169			PASS
	9538	1907.6	22.17	0.165			PASS
HSDPA Band II	9262	1852.4	21.36	0.137	33	2	PASS
	9400	1880.0	21.26	0.134			PASS
	9538	1907.6	21.34	0.136			PASS
HSUPA Band II	9262	1852.4	19.90	0.098	33	2	PASS
	9400	1880.0	19.76	0.095			PASS
	9538	1907.6	19.85	0.097			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

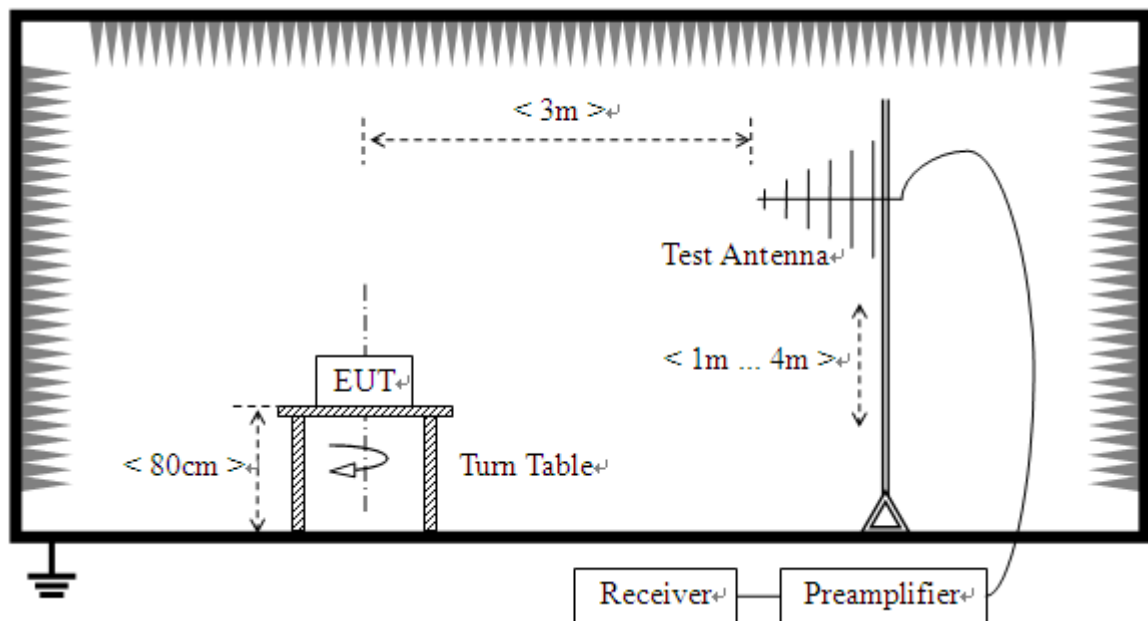
### 2.8.1. Requirement

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  $43 + 10 \cdot \log(P)$  dB. This calculated to be -13dBm.

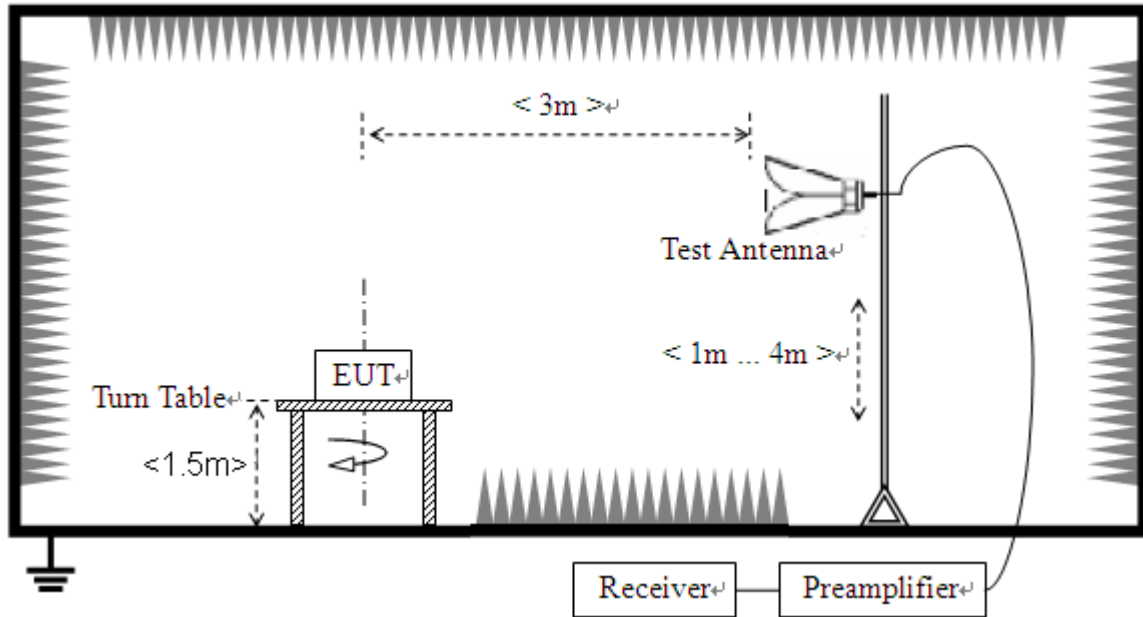
### 2.8.2. Test Description

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 3GHz), it's located at the same height as the EUT. The Filters consists of Notch Filters and High Pass Filter.

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

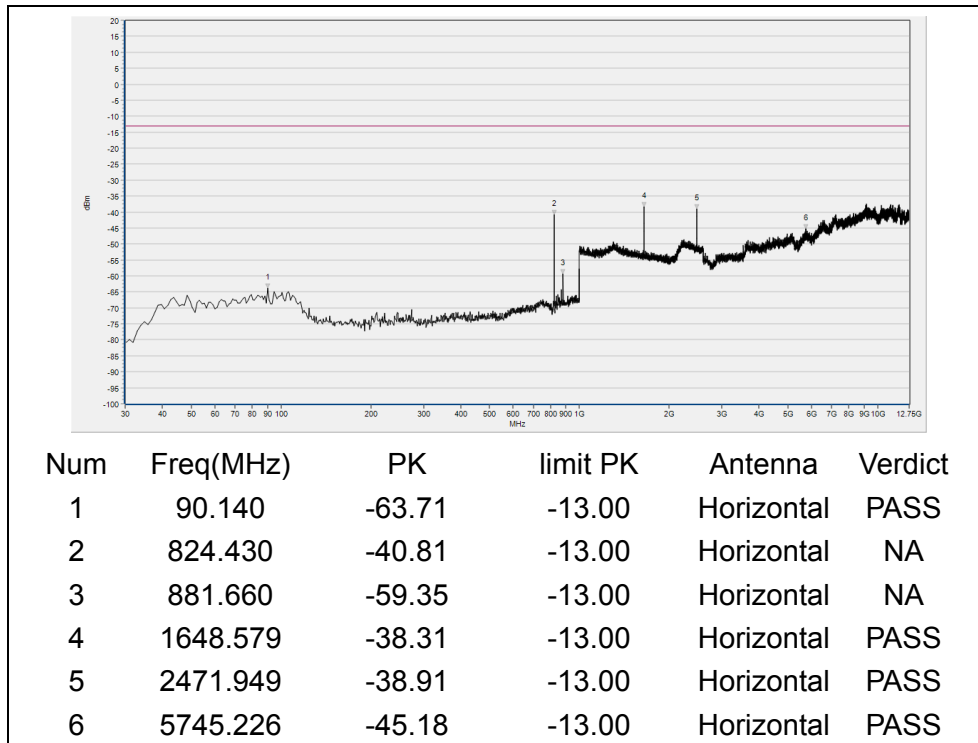
### 2.8.3. Test Result

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.

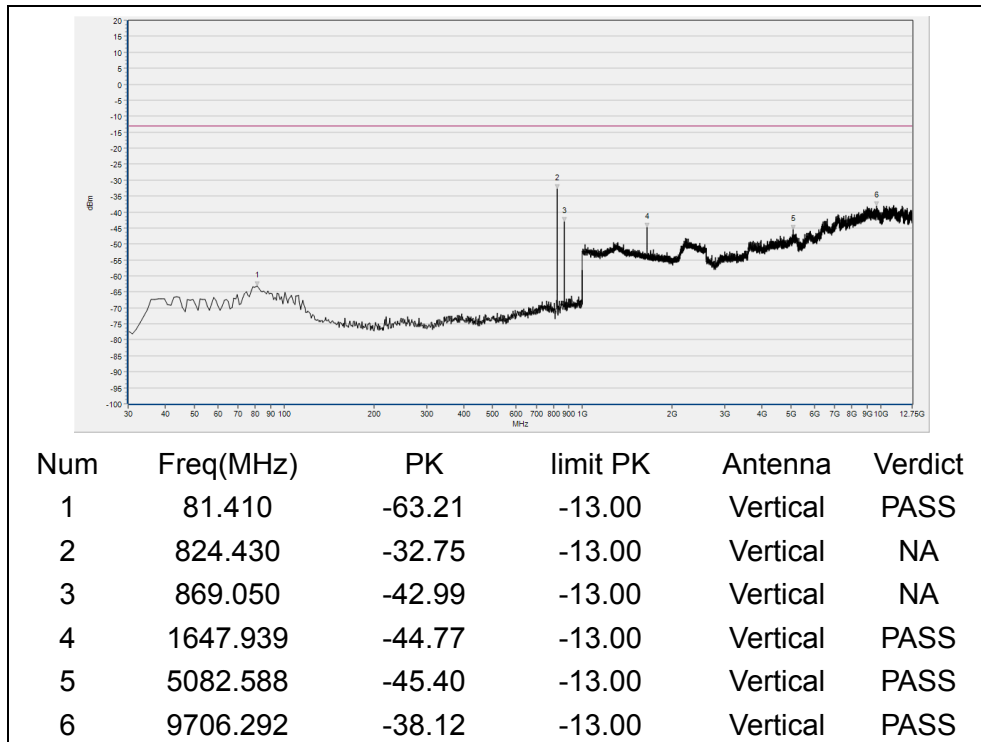
Band	Channel	Frequency (MHz)	Measured Max. Spurious Emission (dBm)		Limit (dBm)	Verdict
			Test Antenna Horizontal	Test Antenna Vertical		
GSM 850MHz	128	824.2	< -25	< -25	-13	PASS
	190	836.6	< -25	< -25		PASS
	251	848.8	< -25	< -25		PASS
GSM 1900MHz	512	1850.2	< -25	< -25	-13	PASS
	661	1880.0	< -25	< -25		PASS
	810	1909.8	< -25	< -25		PASS
EDGE 850MHz	128	824.2	< -25	< -25	-13	PASS
	190	836.6	< -25	< -25		PASS
	251	848.8	< -25	< -25		PASS
EDGE 1900MHz	512	1850.2	< -25	< -25	-13	PASS
	661	1880.0	< -25	< -25		PASS
	810	1909.8	< -25	< -25		PASS
WCDMA Band V	4132	826.4	< -25	< -25	-13	PASS
	4183	836.4	< -25	< -25		PASS
	4233	846.6	< -25	< -25		PASS
WCDMA Band II	9262	1852.4	< -25	< -25	-13	PASS
	9400	1880.0	< -25	< -25		PASS
	9538	1907.6	< -25	< -25		PASS

**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.

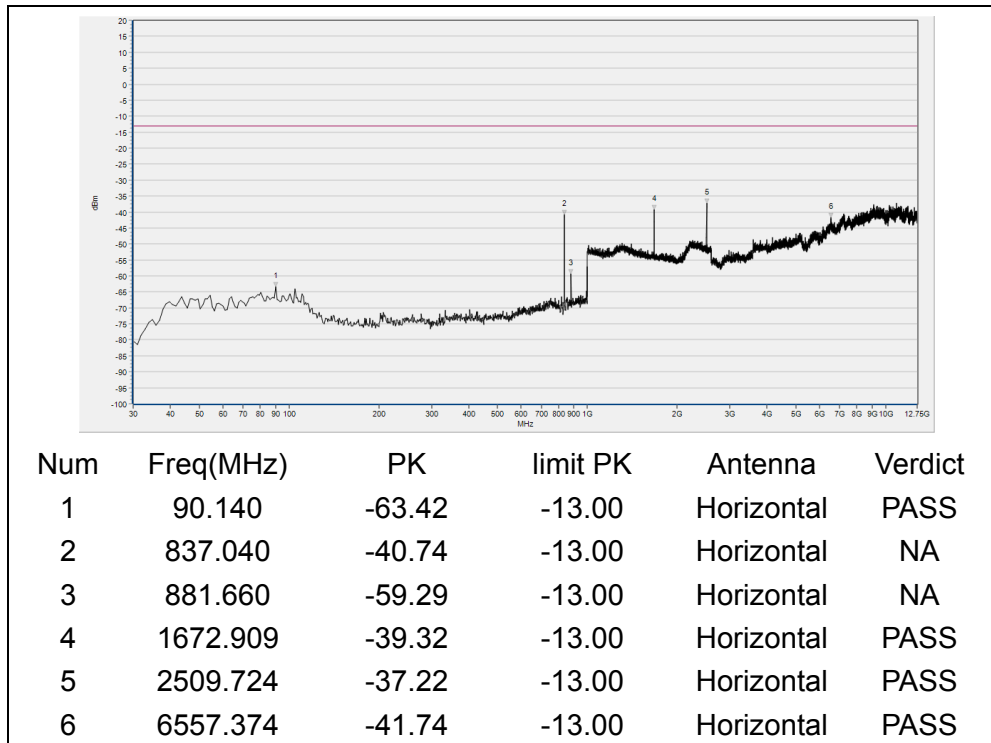
**Note 2:** All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.



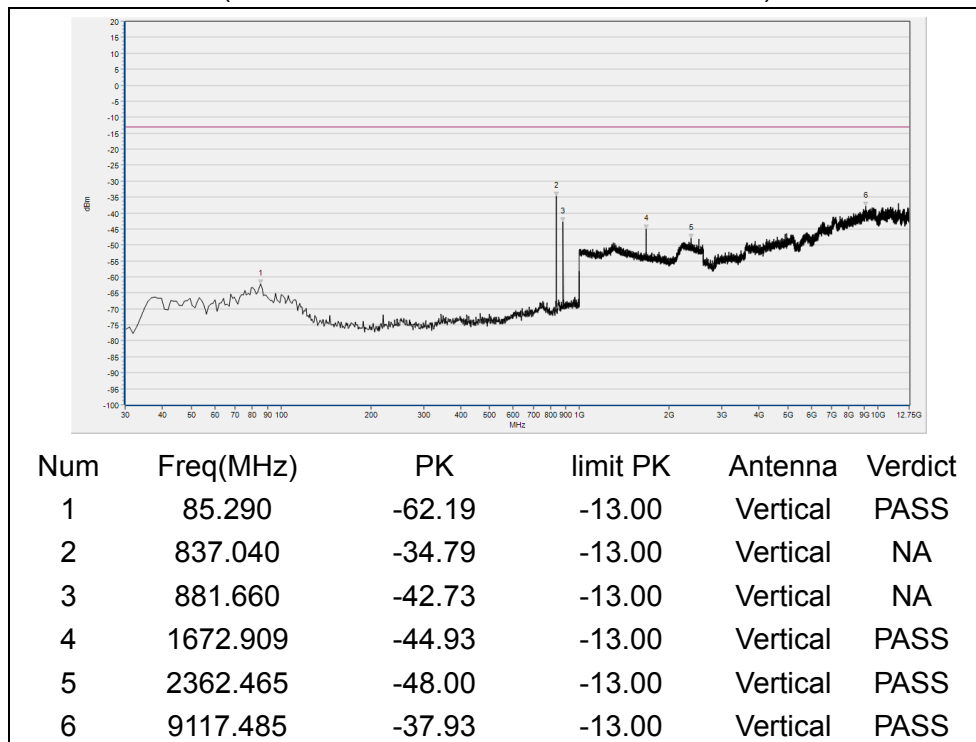
(GSM 850MHz, Channel = 128, Horizontal)



(GSM 850MHz, Channel = 128, Vertical)

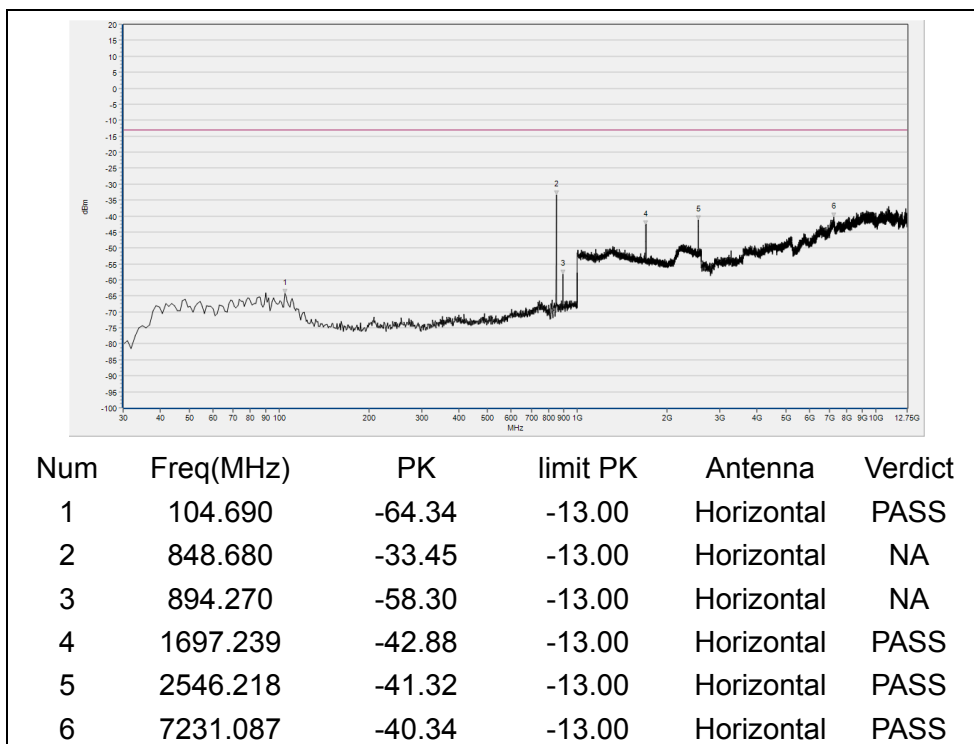


(GSM850MHz, Channel = 190, Horizontal)

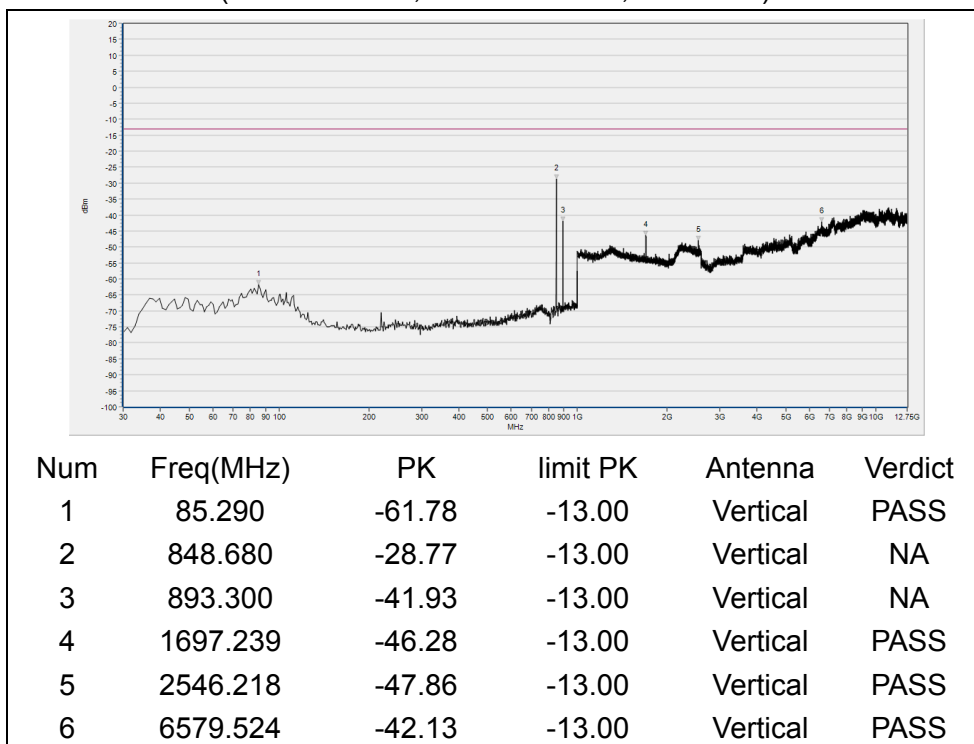


(GSM 850MHz, Channel = 190, Vertical)

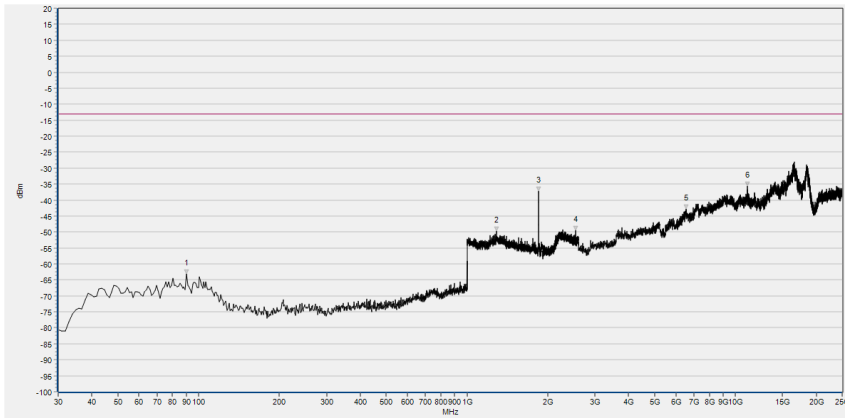




(GSM 850MHz, Channel = 251,Horizontal)

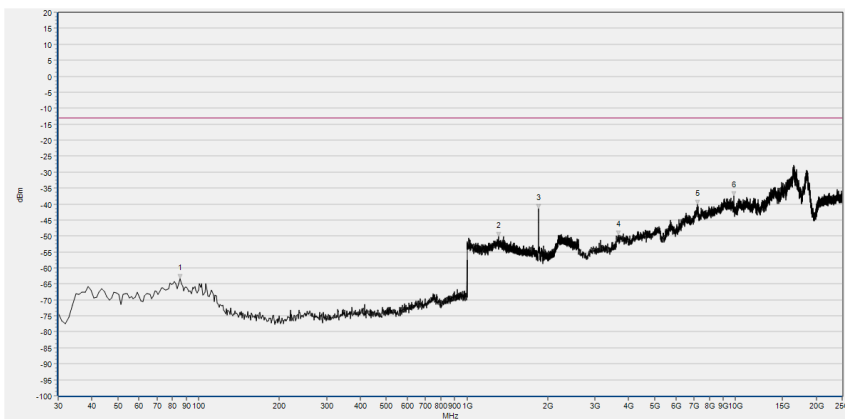


(GSM 850MHz, Channel = 251, Vertical)



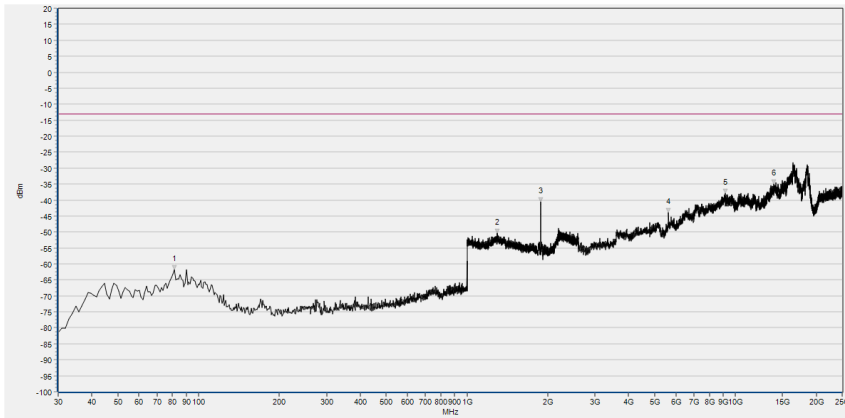
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	90.140	-63.10	-13.00	Horizontal	PASS
2	1290.676	-49.73	-13.00	Horizontal	PASS
3	1850.260	-37.18	-13.00	Horizontal	NA
4	2542.377	-49.41	-13.00	Horizontal	PASS
5	6571.631	-42.90	-13.00	Horizontal	PASS
6	11072.813	-35.62	-13.00	Horizontal	PASS

(GSM 1900MHz, Channel = 512, Horizontal)



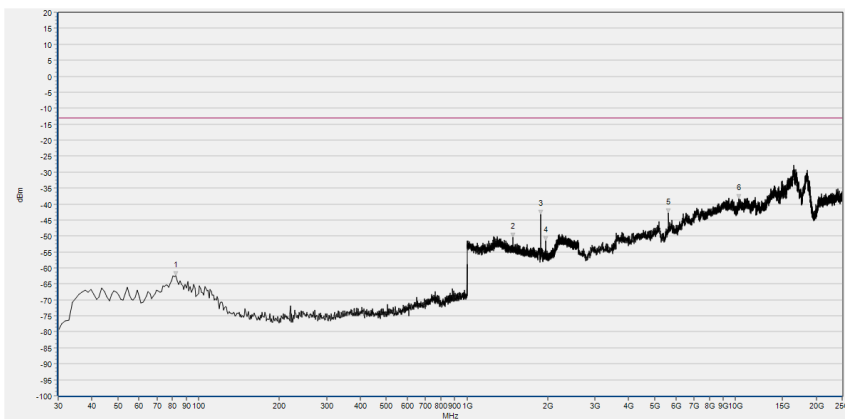
Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	85.290	-63.30	-13.00	Vertical	PASS
2	1311.164	-50.06	-13.00	Vertical	PASS
3	1850.260	-41.54	-13.00	Vertical	NA
4	3659.102	-49.71	-13.00	Vertical	PASS
5	7235.606	-40.19	-13.00	Vertical	PASS
6	9850.773	-37.52	-13.00	Vertical	PASS

(GSM 1900MHz, Channel = 512, Vertical)



Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	81.410	-61.81	-13.00	Horizontal	PASS
2	1296.439	-50.46	-13.00	Horizontal	PASS
3	1879.712	-40.64	-13.00	Horizontal	NA
4	5638.807	-43.89	-13.00	Horizontal	PASS
5	9158.283	-37.97	-13.00	Horizontal	PASS
6	13936.461	-34.94	-13.00	Horizontal	PASS

(GSM 1900MHz, Channel = 661, Horizontal)



Num	Freq(MHz)	PK	limit PK	Antenna	Verdict
1	82.380	-62.37	-13.00	Vertical	PASS
2	1485.314	-50.42	-13.00	Vertical	PASS
3	1879.712	-43.23	-13.00	Vertical	NA
4	1959.744	-51.40	-13.00	Vertical	NA
5	5638.807	-42.73	-13.00	Vertical	PASS
6	10302.928	-38.42	-13.00	Vertical	PASS

(GSM 1900MHz, Channel = 661, Vertical)