



# TEST REPORT

**APPLICANT** : Reliance Communications LLC

**PRODUCT NAME** : Orbic Fun Pro 5G

**MODEL NAME** : R678L5SFP

**BRAND NAME** : Orbic

**FCC ID** : 2ABGH-R678L5SFP

**STANDARD(S)** : 47 CFR Part 2  
47 CFR Part 22 Subpart H  
47 CFR Part 24 Subpart E  
47 CFR Part 27 Subpart L

**RECEIPT DATE** : 2023-11-28

**TEST DATE** : 2023-12-27 to 2024-03-05

**ISSUE DATE** : 2024-04-25



Edited by: Peng Mi  
Peng Mi (Rapporteur)

Approved by: Shen Junsheng  
Shen Junsheng (Supervisor)

**NOTE:** This document is issued by Shenzhen Morlab Communications Technology Co., Ltd., the test report shall not be reproduced except in full without prior written permission of the company. The test results apply only to the particular sample(s) tested and to the specific tests carried out which is available on request for validation and information confirmed at our website.





# DIRECTORY

- 1. Technical Information ..... 3**
  - 1.1. Applicant and Manufacturer Information ..... 3**
  - 1.2. Equipment Under Test (EUT) Description ..... 3**
  - 1.3. Maximum E.R.P./E.I.R.P. and Emission Designator ..... 5**
  - 1.4. Test Standards and Results ..... 6**
  - 1.5. Environmental Conditions ..... 7**
- 2. 47 CFR Part 2, Part 22H, 24E&27L Requirements ..... 8**
  - 2.1. Conducted RF Output Power ..... 8**
  - 2.2. Peak to Average Ratio ..... 12**
  - 2.3. Occupied Bandwidth ..... 18**
  - 2.4. Frequency Stability ..... 27**
  - 2.5. Conducted Out of Band Emissions ..... 32**
  - 2.6. Band Edge ..... 40**
  - 2.7. Determining E.R.P. and/or E.I.R.P. from conducted RF output power measurements ..... 44**
  - 2.8. Radiated Out of Band Emissions ..... 49**
- Annex A Test Uncertainty ..... 73**
- Annex B Testing Laboratory Information ..... 74**

Change History		
Version	Date	Reason for change
1.0	2024-04-25	First edition





# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Reliance Communications LLC
<b>Applicant Address:</b>	555 Wireless Blvd. Hauppauge, NY 11788, USA
<b>Manufacturer:</b>	Unimaxcomm
<b>Manufacturer Address:</b>	35F,HBC HuiLong Center Building-II Minzhi Street,Longhua, Shenzhen, P.R. China 518110

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	Orbic Fun Pro 5G	
<b>Sample No.:</b>	3#	
<b>Hardware Version:</b>	V1.0	
<b>Software Version:</b>	R678L5SFP_v1.0.18_LVZ	
<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 DC-HSDPA Mode with QPSK Modulation HSUPA Mode with QPSK Modulation HSPA+ Mode with 16QAM Modulation	
<b>Operating Frequency Range:</b>	GSM 850MHz	Tx: 824MHz-849MHz
		Rx: 869MHz-894MHz
	GSM 1900MHz	Tx: 1850MHz-1910MHz
		Rx: 1930MHz-1990MHz
	WCDMA Band V	Tx: 824MHz-849MHz
		Rx: 869MHz-894MHz
	WCDMA Band IV	Tx: 1710MHz-1755MHz
		Rx: 2110MHz-2155MHz
	WCDMA Band II	Tx: 1850MHz-1910MHz
		Rx: 1930MHz-1990MHz



<b>Antenna Type:</b>	PIFA Antenna	
<b>Antenna Gain:</b>	GSM 850:	ANT 1: -8.22dBi
	GSM1900:	ANT 4: 1.40dBi
	WCDMA Band V:	ANT 1: -8.22dBi
	WCDMA Band IV:	ANT 4: 2.68dBi
	WCDMA Band II:	ANT 4: 1.40dBi
<b>Accessory Information:</b>	Battery	
	Brand Name:	Orbic
	Model No.:	BTE-5004
	Serial No.:	N/A
	Capacity:	4870mAh
	Rated Voltage:	3.87V
	Charge Limit:	4.45V
	Manufacturer:	Shenzhen Aerospace Electronic Co.,Ltd.
	AC Adapter	
	Brand Name:	Orbic
	Model No.:	OACH023US1
	Serial No.:	N/A
	Rated Output:	5V=3A; 9V=2A; 12V=1.5A
	Rated Input:	100-240V~50/60Hz, 0.5A
	Manufacturer 1:	WATAI ELECTRONICS PRIVATE LIMITED
	Manufacturer 2:	KANGYIN ELECTRONIC TECHNOLOGY CO.,LTD
	USB Cable	
	Model No.:	HX-YLMK-06
	Manufacturer:	HUIZHOU WASHIN ELECTRONICS CO.,LTD

**Note 1:** This is a variant report of original report (Report No.: SZ23080316W03, FCC ID: 2ABGH-R678L5S). Based on the similarity between before, only change the product name, model name, software version, FCC ID, appearance and antenna, the others are the same as before. No other changes, all RF parameters remain the same. The changes do not affect the test results.

**Note 2:** 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), 189 (836.4MHz) and 251 (848.8MHz).

**Note 3:** 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 4:** 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 5:** The transmitter (Tx) frequency arrangement of the WCDMA IV 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:** 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 7:** All test 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:

GSM mode and EDGE mode for GSM 850;

GSM mode and EDGE mode for GSM 1900;

WCDMA mode for WCDMA band V;

WCDMA mode for WCDMA band IV;

WCDMA mode for WCDMA band II;

**Note 8:** For a more detailed description, please refer to Specification or User’s Manual supplied by the applicant and/or manufacturer.

### 1.3. Maximum E.R.P./E.I.R.P. and Emission Designator

Test Mode	Maximum E.R.P./E.I.R.P. (W)	Emission Designator
GSM850(GSM)	0.167	248KGXW
GSM850(EDGE)	0.044	247KG7W
GSM1900(GSM)	1.291	246KGXW
GSM1900(EDGE)	0.603	248KG7W
WCDMA Band V	0.024	4M18F9W
WCDMA Band IV	0.387	4M18F9W
WCDMA Band II	0.292	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 (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
4	47 CFR Part 27 (10-1-12 Edition)	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	Method Determination /Remark
1	2.1046	Conducted RF Output Power	Jan. 02, 2024	Shen Biahong	PASS <sub>Note1</sub>	No deviation
2	24.232(d)	Peak -Average Ratio	Nov. 27, 2023 Jan. 03, 2024	Gan Jing	PASS <sub>Note1</sub>	No deviation
3	2.1049	Occupied Bandwidth	Nov. 27, 2023 Jan. 03, 2024	Gan Jing	PASS <sub>Note1</sub>	No deviation
4	2.1055, 22.355, 24.235, 27.54	Frequency Stability	Mar. 05, 2024	Gan Jing	PASS <sub>Note1</sub>	No deviation
5	2.1051, 22.917(a), 24.238(a), 27.53(h)	Conducted Out of Band Emissions	Nov. 27, 2023 Jan. 03, 2024	Gan Jing	PASS <sub>Note1</sub>	No deviation
6	2.1051, 22.917(a), 24.238(a), 27.53(h)	Band Edge	Nov. 27, 2023 Jan. 03, 2024	Gan Jing	PASS <sub>Note1</sub>	No deviation
7	22.913(a), 24.232(c) 27.50(d)	Transmitter Radiated Power (E.I.P.R./E.R.P.)	Jan. 02, 2024	Gan Jing	PASS <sub>Note1</sub>	No deviation
8	2.1051, 22.917(a), 24.238(a),	Radiated Out of Band Emissions	Jan. 19 to 22, 2024	Gao Jianrou	PASS <sub>Note1</sub>	No deviation





27.53(h)					
----------	--	--	--	--	--

**Note 1:** The test results of these test items in this report refer to the test report (Report No.: SZ23080316W03).

**Note 2:** The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03r01 and ANSI/TIA-603-E-2016.

**Note 3:** Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

**Note 4:** When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.

## 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

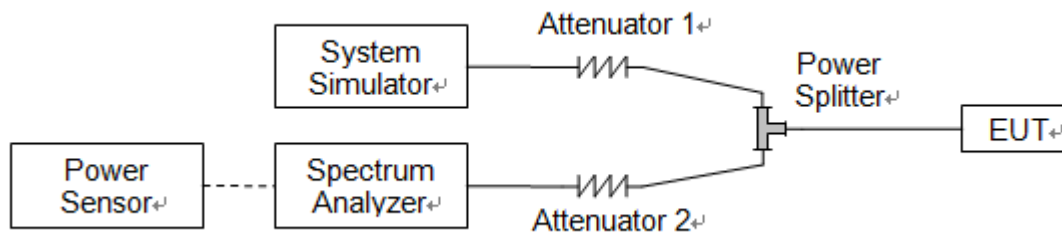
### 2.1. Conducted RF Output Power

#### 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>189</b>	<b>251</b>
<b>Frequency (MHz)</b>	<b>824.2</b>	<b>836.4</b>	<b>848.8</b>
GSM 1 Tx slot	31.86	32.02	32.55
GPRS 1 Tx slot	31.95	32.23	32.61
GPRS 2 Tx slots	28.32	28.59	28.93
GPRS 3 Tx slots	26.29	26.58	26.88
GPRS 4 Tx slots	24.23	24.52	24.85
EDGE 1 Tx slot	26.53	26.65	26.82
EDGE 2 Tx slots	24.42	24.59	24.80
EDGE 3 Tx slots	22.49	22.61	22.87
EDGE 4 Tx slots	20.71	20.89	21.05

<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	29.33	29.60	29.71
GPRS 1 Tx slot	29.31	29.60	29.70
GPRS 2 Tx slots	28.47	28.75	28.89
GPRS 3 Tx slots	26.50	26.69	26.82
GPRS 4 Tx slots	25.09	25.31	25.43
EDGE 1 Tx slot	25.97	26.29	26.40
EDGE 2 Tx slots	24.01	24.25	24.38
EDGE 3 Tx slots	22.12	22.42	22.55
EDGE 4 Tx slots	21.38	21.53	21.69





WCDMA Band V	Average Power (dBm)		
	TX Channel	4132	4182
<b>Frequency (MHz)</b>	<b>826.4</b>	<b>836.4</b>	<b>846.6</b>
RMC 12.2Kbps	24.14	24.25	24.22
HSDPA Subtest-1	23.36	23.52	23.70
HSDPA Subtest-2	23.34	23.53	23.79
HSDPA Subtest-3	22.87	22.96	23.19
HSDPA Subtest-4	22.84	23.02	23.18
DC-HSDPA Subtest-1	23.38	23.54	23.75
DC-HSDPA Subtest-2	23.36	23.58	23.76
DC-HSDPA Subtest-3	22.86	23.06	23.25
DC-HSDPA Subtest-4	22.91	23.06	23.21
HSUPA Subtest-1	23.38	23.57	23.72
HSUPA Subtest-2	22.83	23.00	23.22
HSUPA Subtest-3	23.26	23.53	23.73
HSUPA Subtest-4	23.30	23.53	23.71
HSUPA Subtest-5	23.36	23.45	23.74
HSPA+ (16QAM) Subtest-1	22.85	23.01	23.25

WCDMA Band IV	Average Power (dBm)		
	TX Channel	1312	1413
<b>Frequency (MHz)</b>	<b>1712.4</b>	<b>1732.6</b>	<b>1752.6</b>
RMC 12.2Kbps	23.12	23.20	23.05
HSDPA Subtest-1	22.67	22.84	22.57
HSDPA Subtest-2	22.68	22.87	22.55
HSDPA Subtest-3	22.19	22.34	22.07
HSDPA Subtest-4	22.23	22.37	22.06
DC-HSDPA Subtest-1	22.67	22.91	22.63
DC-HSDPA Subtest-2	22.69	22.90	22.65
DC-HSDPA Subtest-3	22.18	22.39	22.12
DC-HSDPA Subtest-4	22.16	22.41	22.09
HSUPA Subtest-1	22.64	22.83	22.59
HSUPA Subtest-2	22.14	22.28	22.16
HSUPA Subtest-3	22.70	22.85	22.57
HSUPA Subtest-4	22.65	22.81	22.56
HSUPA Subtest-5	22.67	22.86	22.56
HSPA+ (16QAM) Subtest-1	22.10	22.36	22.16





WCDMA Band II	Average Power (dBm)		
	9262	9400	9538
<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	23.25	23.19	23.15
HSDPA Subtest-1	22.90	22.50	22.40
HSDPA Subtest-2	22.88	22.60	22.41
HSDPA Subtest-3	22.40	22.03	21.92
HSDPA Subtest-4	22.41	22.02	21.85
DC-HSDPA Subtest-1	22.91	22.64	22.46
DC-HSDPA Subtest-2	22.93	22.62	22.44
DC-HSDPA Subtest-3	22.38	22.10	22.00
DC-HSDPA Subtest-4	22.42	22.15	21.99
HSUPA Subtest-1	22.95	22.65	22.47
HSUPA Subtest-2	22.40	22.11	21.98
HSUPA Subtest-3	22.88	22.60	22.40
HSUPA Subtest-4	22.94	22.58	22.42
HSUPA Subtest-5	22.96	22.61	22.44
HSPA+ (16QAM) Subtest-1	22.35	22.01	21.92



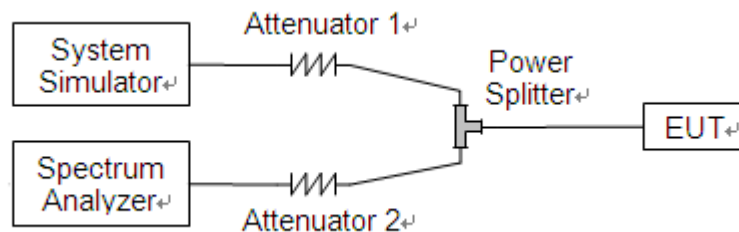
## 2.2. Peak to Average Ratio

### 2.2.1. Requirement

According to FCC 24.232(d) and 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%.



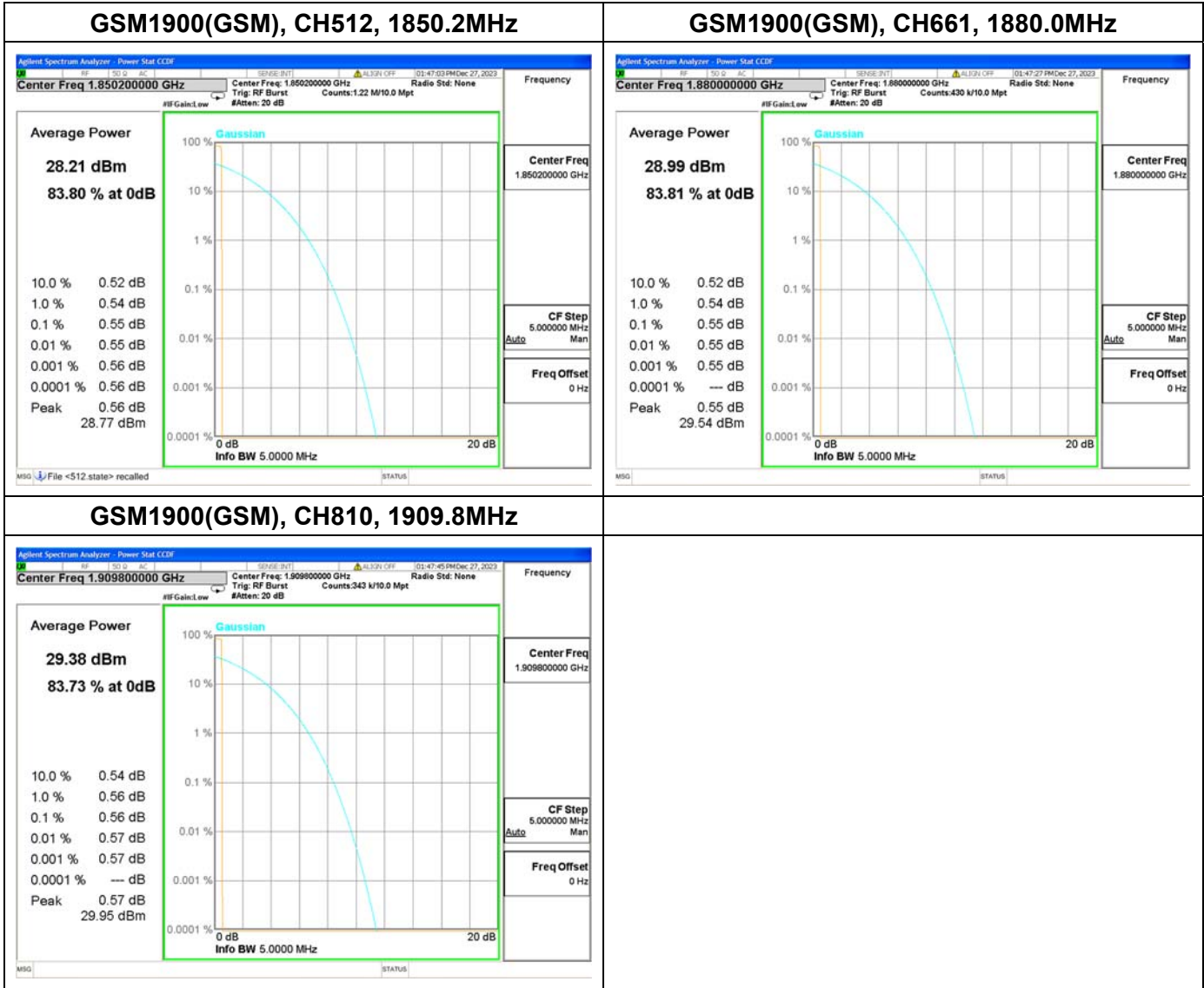
**2.2.4. Test Result****A. Test Verdict:**

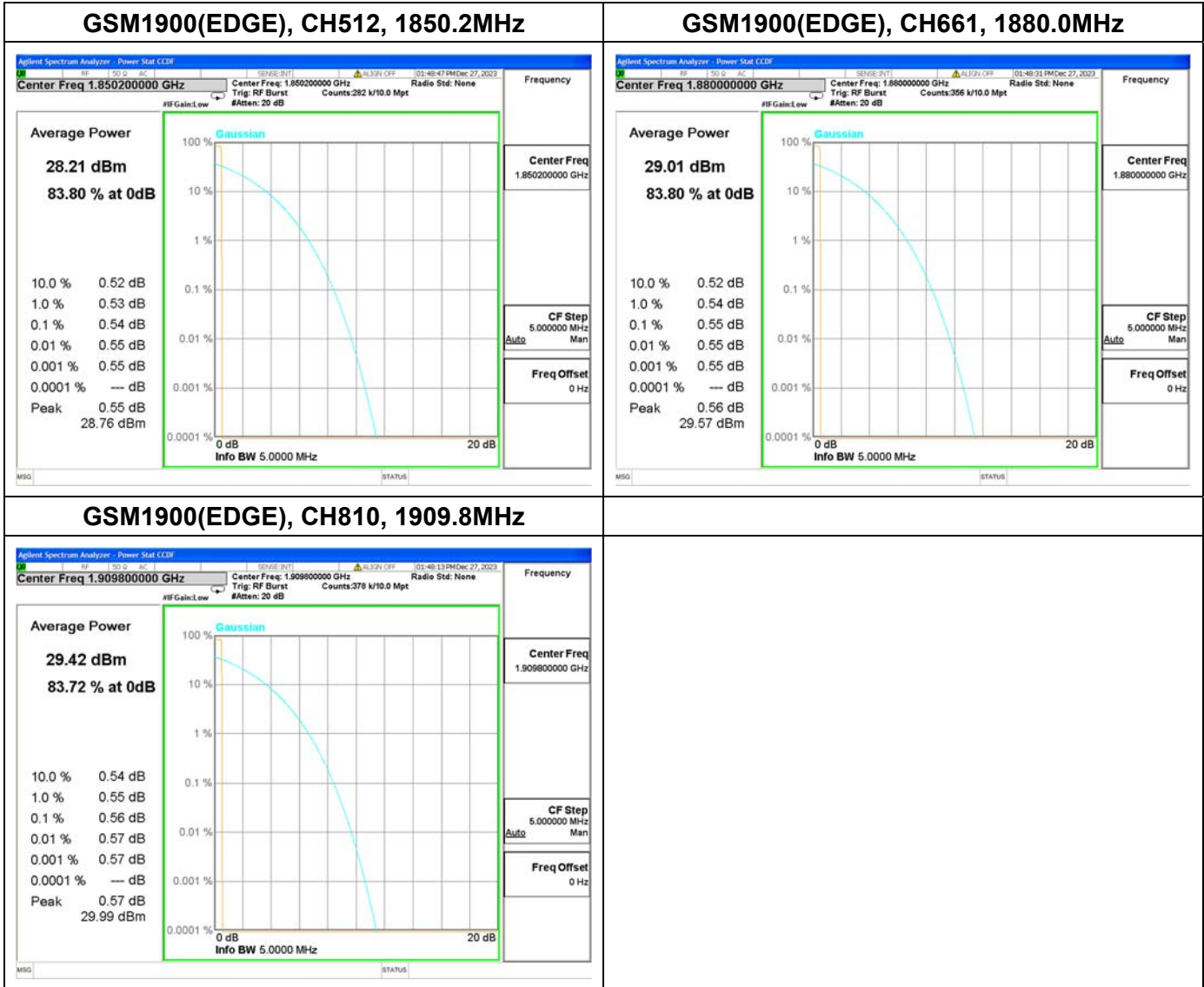
<b>GSM1900</b>					
<b>Mode</b>	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak to Average ratio (dB)</b>	<b>Limit (dB)</b>	<b>Verdict</b>
GSM	512	1850.2	0.55	13	PASS
	661	1880.0	0.55		PASS
	810	1909.8	0.56		PASS
EDGE	512	1850.2	0.54		PASS
	661	1880.0	0.55		PASS
	810	1909.8	0.56		PASS

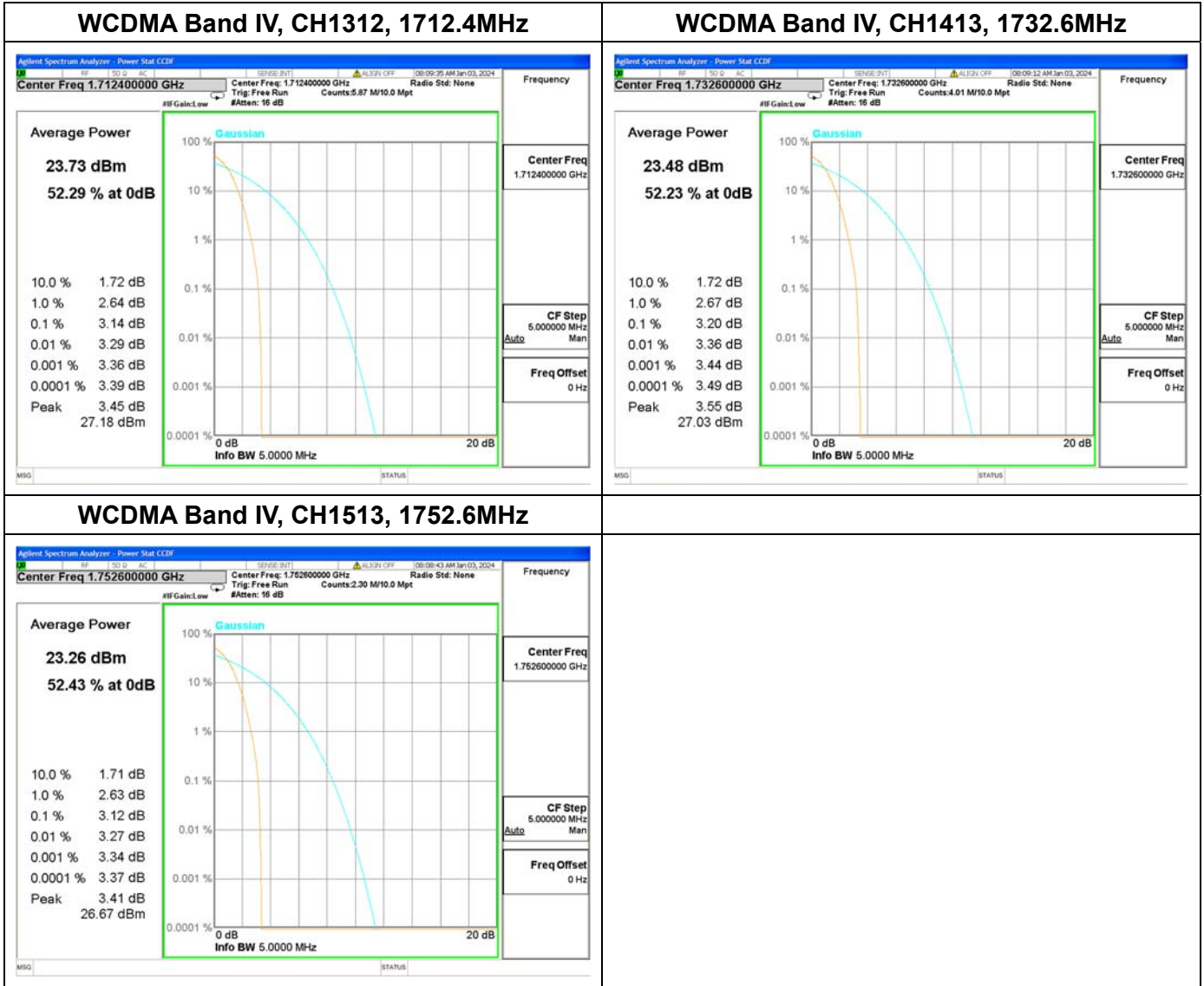
<b>WCDMA Band IV</b>					
<b>Mode</b>	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak to Average ratio (dB)</b>	<b>Limit (dB)</b>	<b>Verdict</b>
WCDMA	1312	1712.4	3.14	13	PASS
	1413	1732.6	3.20		PASS
	1513	1752.6	3.12		PASS

<b>WCDMA Band II</b>					
<b>Mode</b>	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak to Average ratio (dB)</b>	<b>Limit (dB)</b>	<b>Verdict</b>
WCDMA	9262	1852.4	3.07	13	PASS
	9400	1880.0	2.89		PASS
	9538	1907.6	3.12		PASS

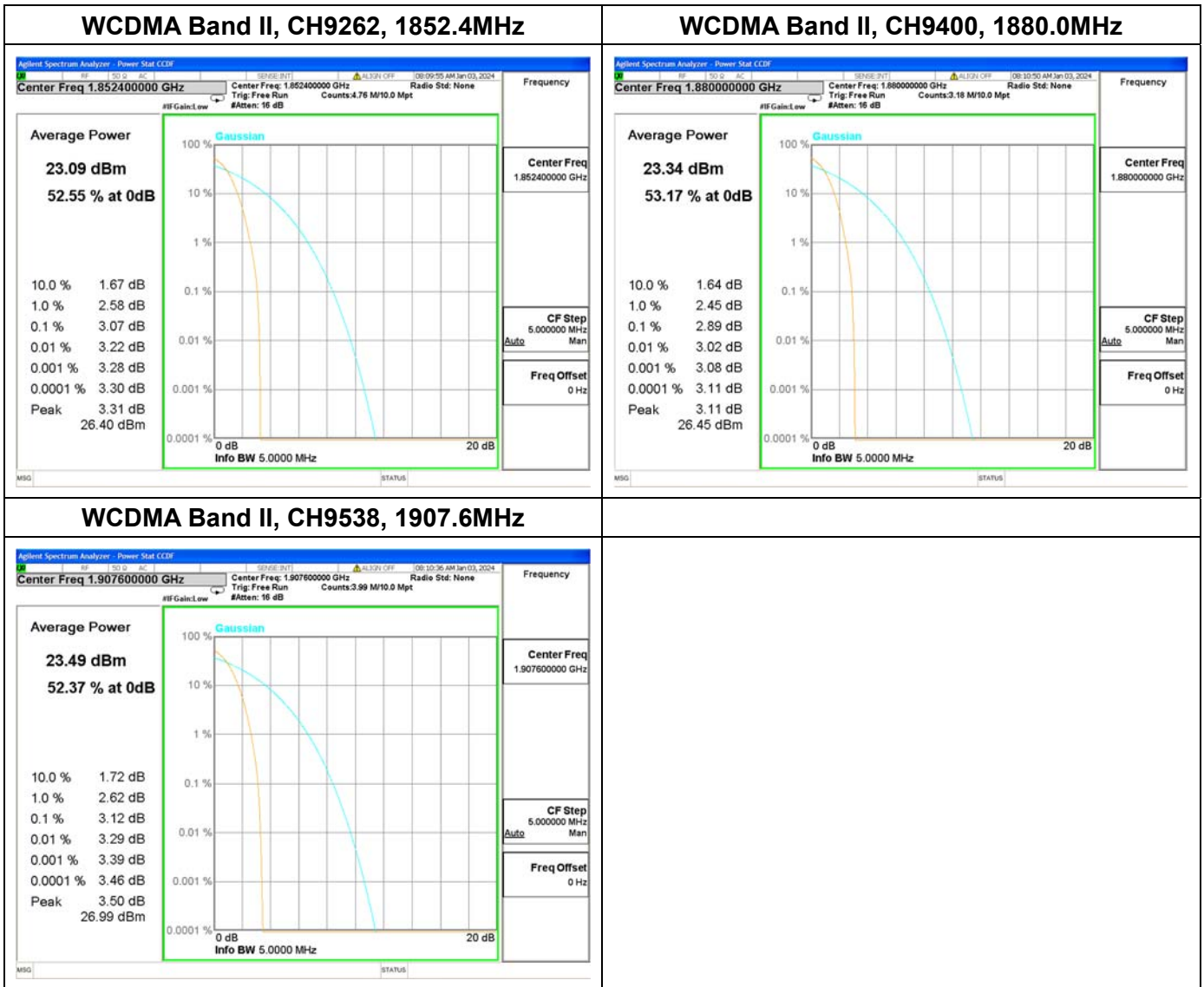












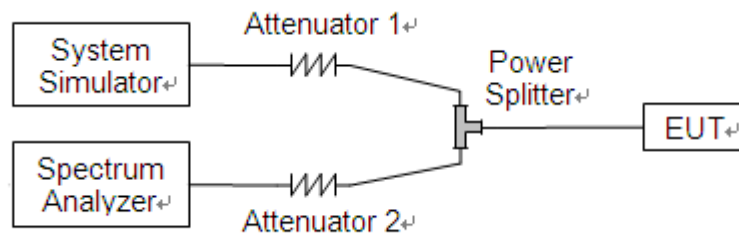
## 2.3. Occupied Bandwidth

### 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**

<b>GSM850</b>				
<b>Mode</b>	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Occupied Bandwidth (kHz)</b>	<b>26dB Bandwidth (kHz)</b>
GSM	128	824.2	245.18	319.0
	189	836.4	247.21	317.0
	251	848.8	248.06	315.2
EDGE	128	824.2	245.26	312.9
	189	836.4	242.46	316.5
	251	848.8	247.07	311.4

<b>GSM1900</b>				
<b>Mode</b>	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Occupied Bandwidth (kHz)</b>	<b>26dB Bandwidth (kHz)</b>
GSM	512	1850.2	242.09	321.8
	661	1880.0	244.46	311.5
	810	1909.8	245.53	314.7
EDGE	512	1850.2	240.36	319.9
	661	1880.0	245.29	315.5
	810	1909.8	248.32	317.2

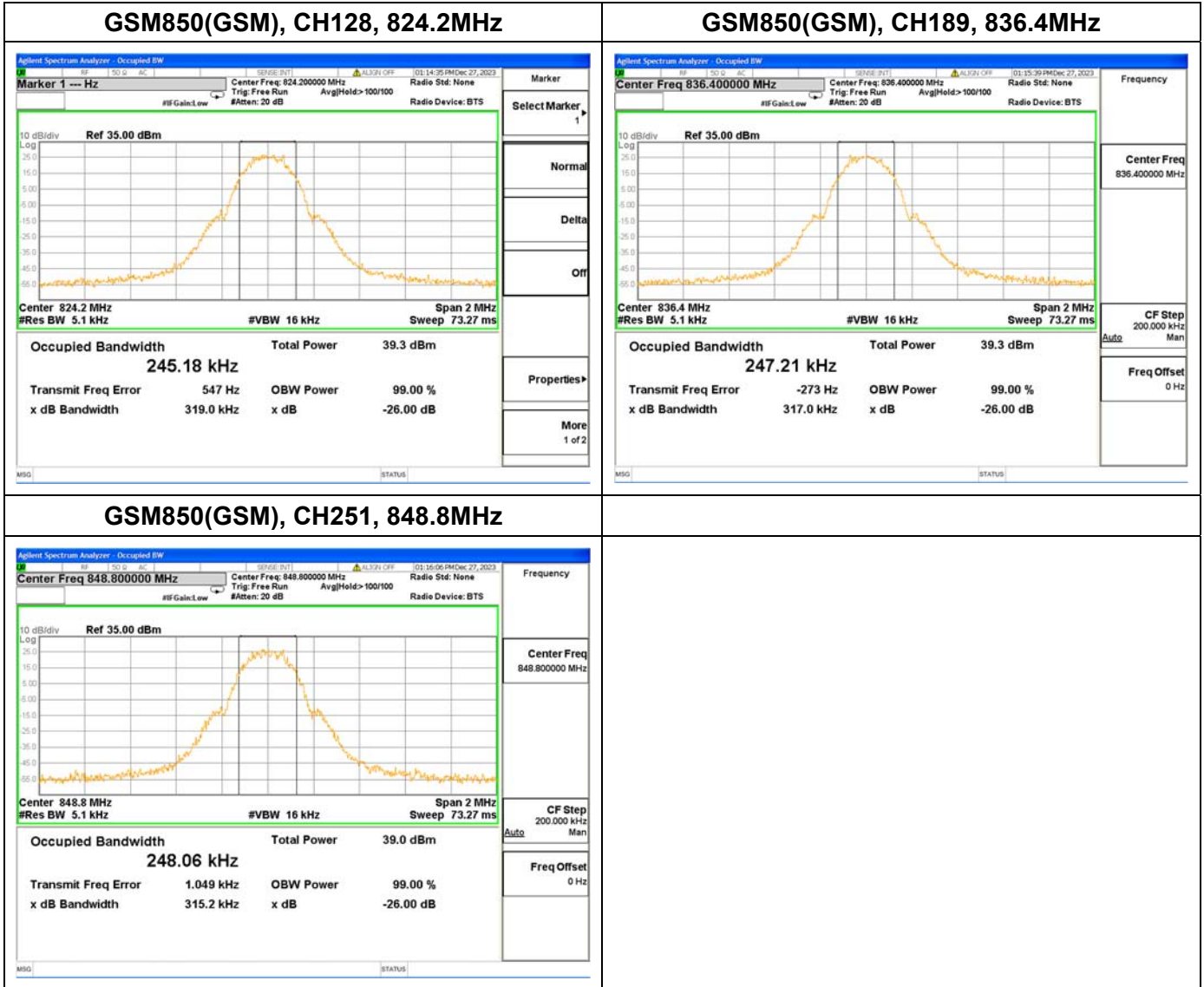
<b>WCDMA Band V</b>				
<b>Mode</b>	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Occupied Bandwidth (MHz)</b>	<b>26dB Bandwidth (MHz)</b>
WCDMA	4132	826.4	4.15	4.75
	4182	836.4	4.15	4.74
	4233	846.6	4.18	4.78

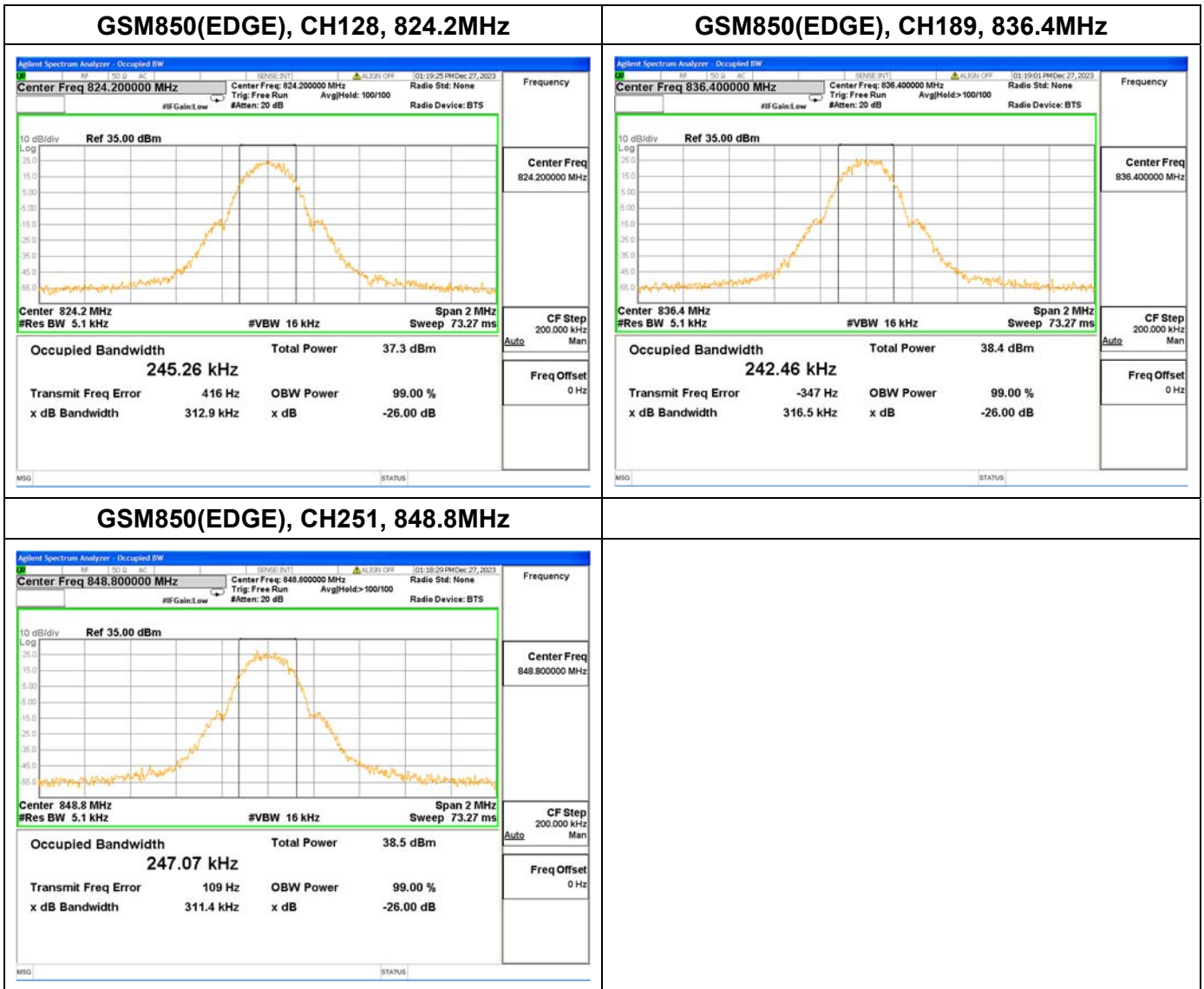
<b>WCDMA Band IV</b>				
<b>Mode</b>	<b>Channel</b>	<b>Frequency (MHz)</b>	<b>99% Occupied Bandwidth (MHz)</b>	<b>26dB Bandwidth (MHz)</b>
WCDMA	1312	1712.4	4.18	4.73
	1413	1732.6	4.16	4.72
	1513	1752.6	4.16	4.71

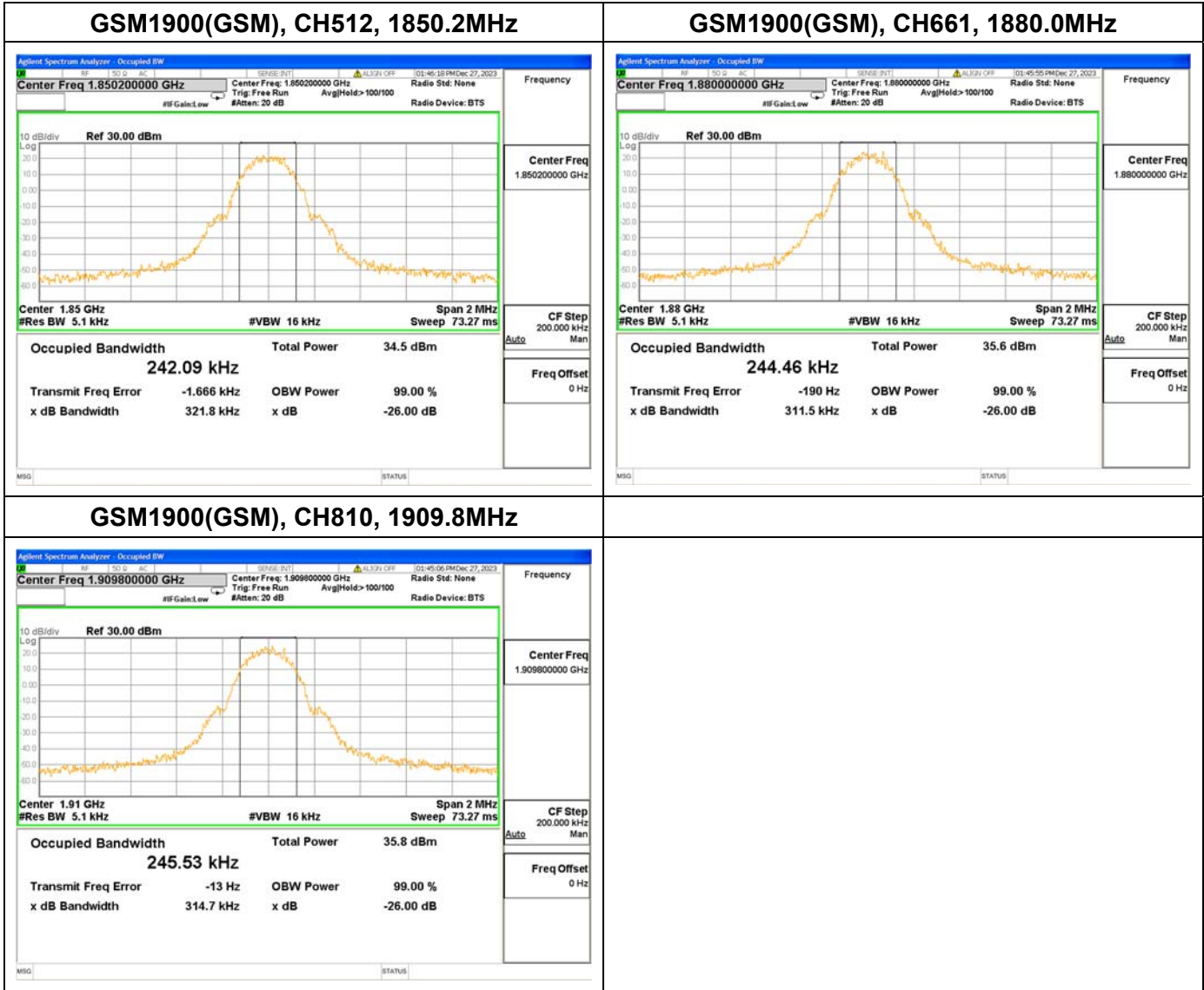




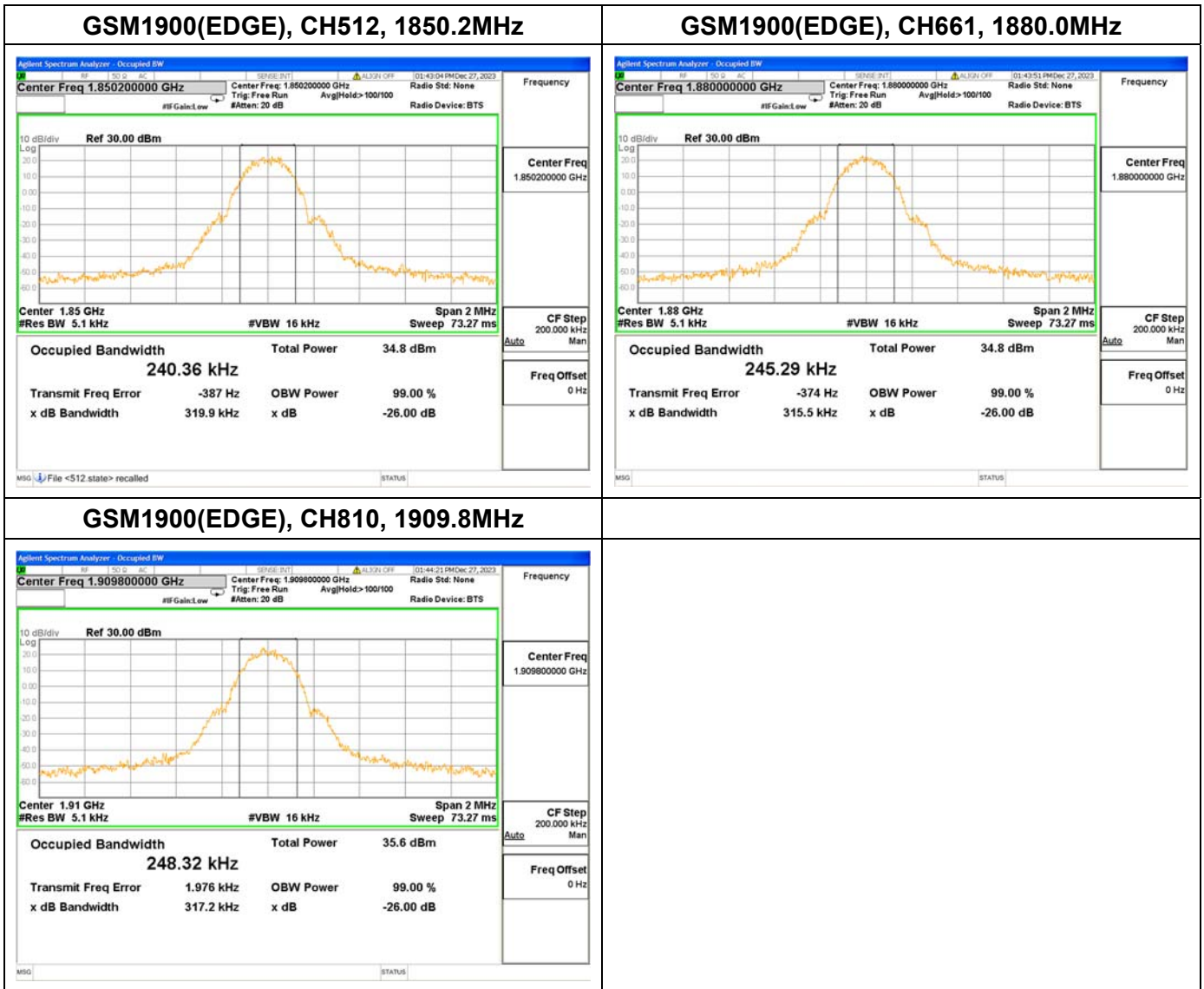
WCDMA Band II				
Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
WCDMA	9262	1852.4	4.16	4.74
	9400	1880.0	4.17	4.75
	9538	1907.6	4.17	4.73





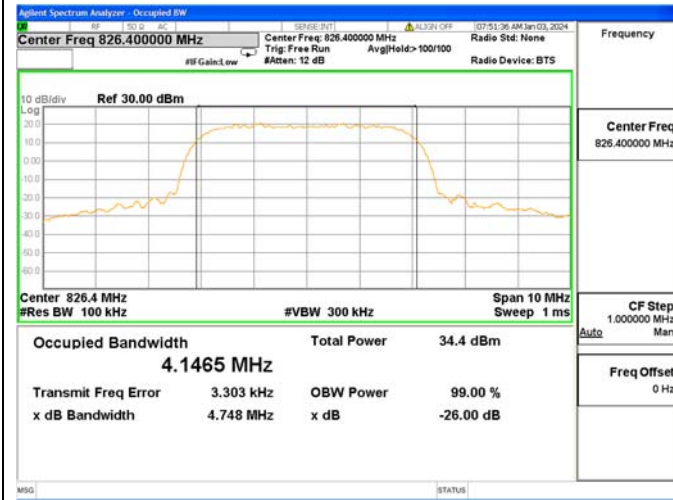




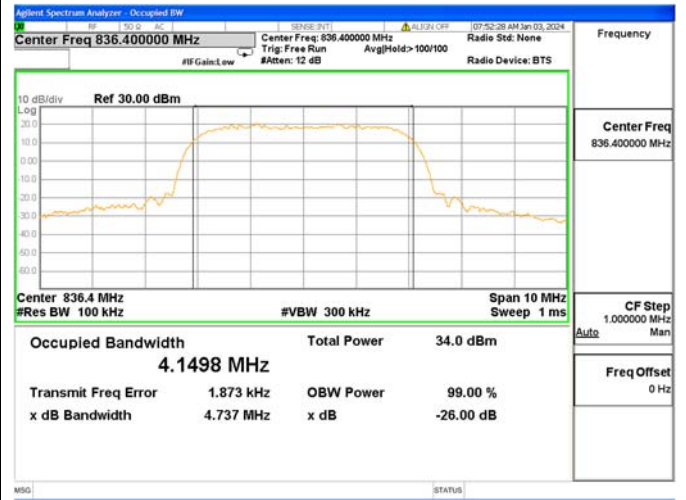




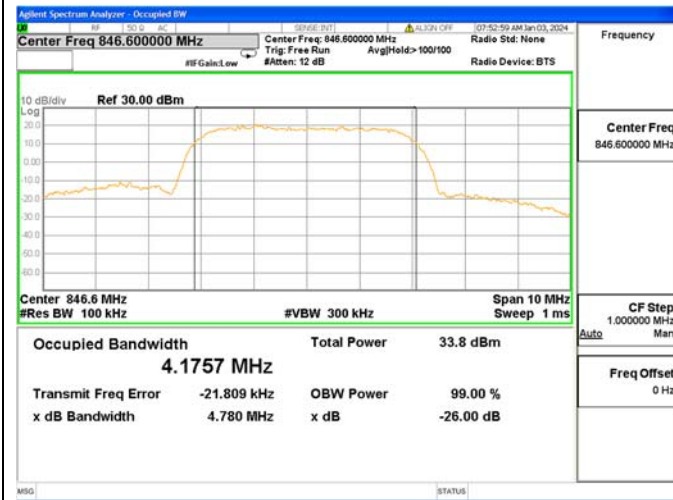
**WCDMA Band V, CH4132, 826.4MHz**



**WCDMA Band V, CH4182, 836.4MHz**



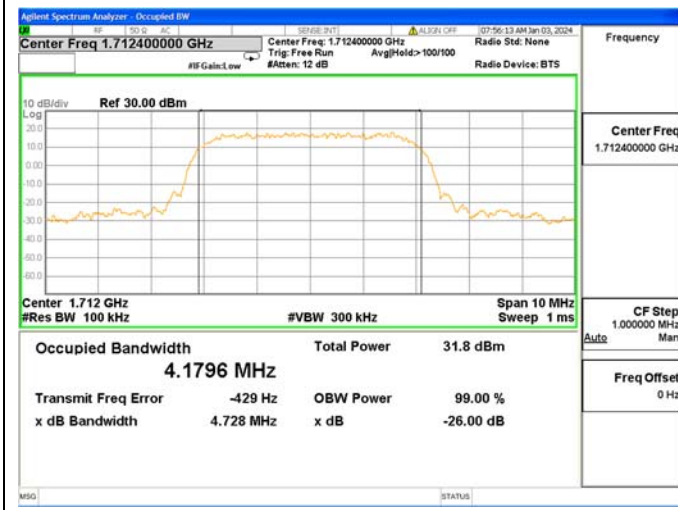
**WCDMA Band V, CH4233, 846.6MHz**



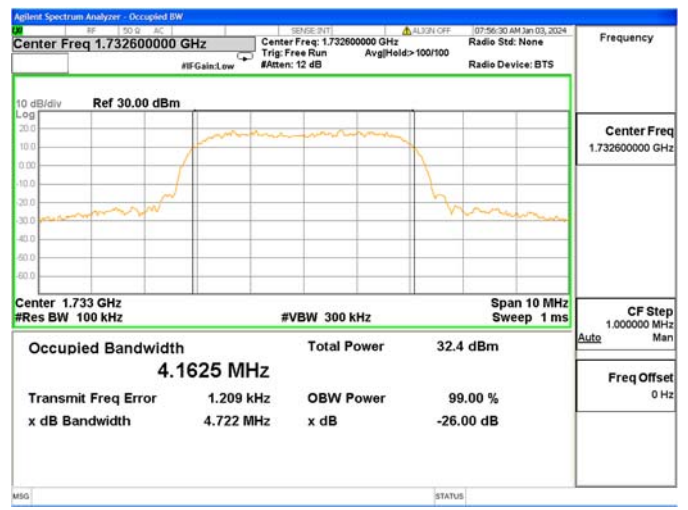




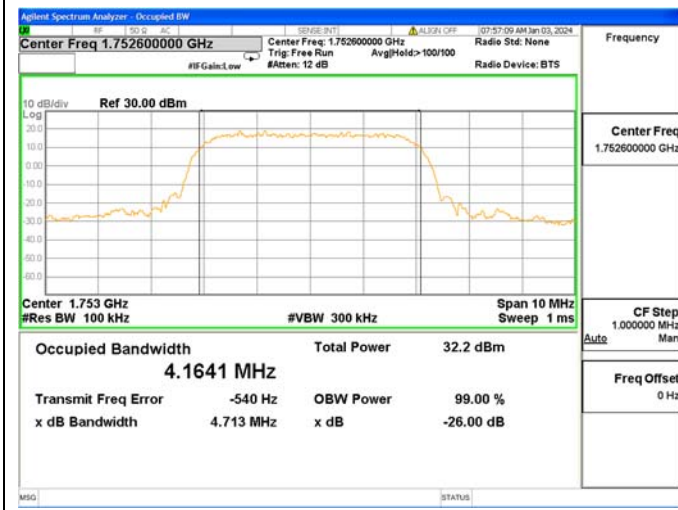
**WCDMA Band IV, CH1312, 1712.4MHz**



**WCDMA Band IV, CH1413, 1732.6MHz**

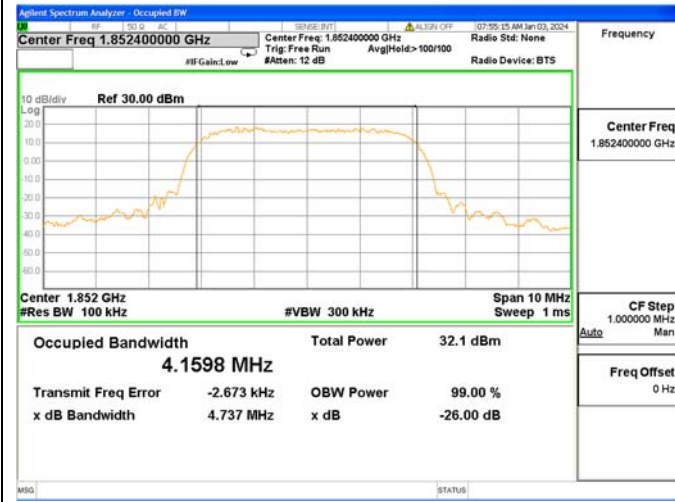


**WCDMA Band IV, CH1513, 1752.6MHz**

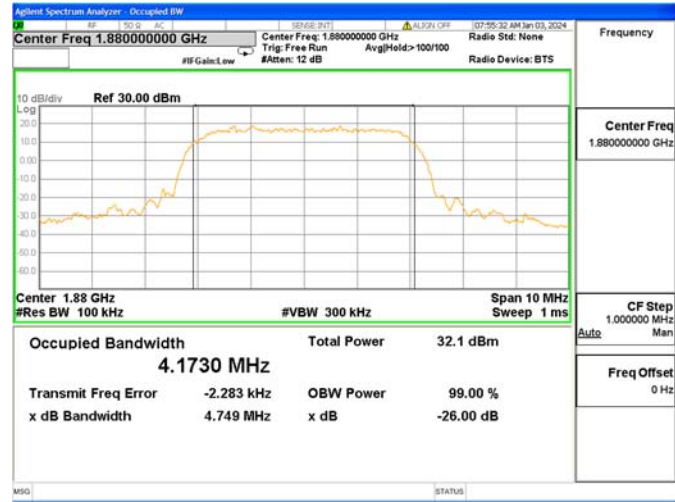




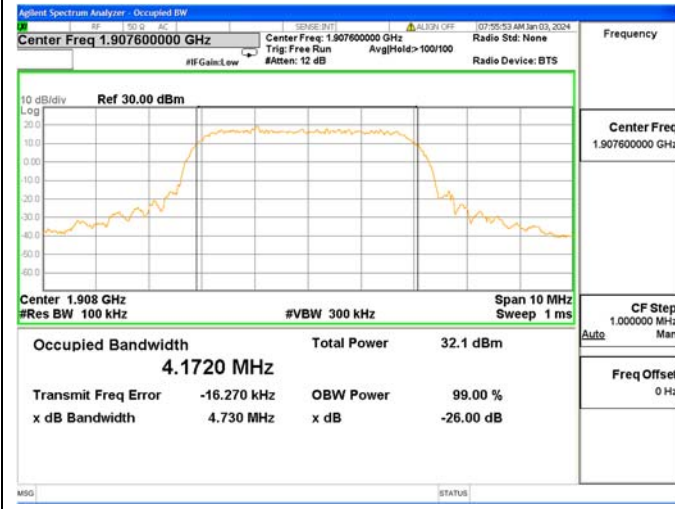
**WCDMA Band II, CH9262, 1852.4MHz**



**WCDMA Band II, CH9400, 1880.0MHz**



**WCDMA Band II, CH9538, 1907.6MHz**



## 2.4. Frequency Stability

### 2.4.1. Requirement

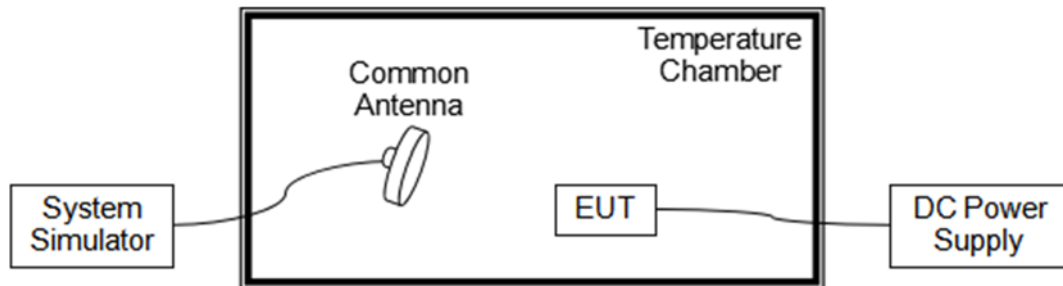
According to FCC section 22.355, 24.235 and 27.54 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at intervals of not more than  $10^{\circ}\text{C}$ .
- (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.

**Note:** The operating temperature of EUT is from  $0^{\circ}\text{C}$  to  $45^{\circ}\text{C}$ , which are specified by the applicant.

### 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**

The nominal, highest and lowest extreme voltages are separately 3.87V, 4.45V and 3.60V, which are specified by the applicant; the normal temperature here used is 20°C.

<b>GSM850(GSM), CH189, 836.4MHz</b>					
<b>Limit =±2.5ppm</b>					
<b>Voltage (%)</b>	<b>Power (VDC)</b>	<b>Temp (°C)</b>	<b>Fre. Dev. (Hz)</b>	<b>Deviation (ppm)</b>	<b>Result</b>
Normal	3.87	+20(Ref)	16	0.019	PASS
Normal		0	13	0.016	
Normal		+10	23	<b>0.027</b>	
Normal		+20	0	0.000	
Normal		+30	14	0.017	
Normal		+40	15	0.018	
Normal		+45	15	0.018	
High	4.45	+20	19	0.023	
BATT.ENDPOINT	3.60	+20	15	0.018	

<b>GSM850(EDGE), CH189, 836.4MHz</b>					
<b>Limit =±2.5ppm</b>					
<b>Voltage (%)</b>	<b>Power (VDC)</b>	<b>Temp (°C)</b>	<b>Fre. Dev. (Hz)</b>	<b>Deviation (ppm)</b>	<b>Result</b>
Normal	3.87	+20(Ref)	14	0.017	PASS
Normal		0	17	0.020	
Normal		+10	-5	-0.006	
Normal		+20	19	0.023	
Normal		+30	16	0.019	
Normal		+40	-20	-0.024	
Normal		+45	20	<b>0.024</b>	
High	4.45	+20	15	0.018	
BATT.ENDPOINT	3.60	+20	-21	-0.025	





GSM1900(GSM), CH661, 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
Normal	3.87	+20(Ref)	19	0.010	PASS
Normal		0	20	<b>0.011</b>	
Normal		+10	15	0.008	
Normal		+20	18	0.010	
Normal		+30	13	0.007	
Normal		+40	19	0.010	
Normal		+45	7	0.004	
High	4.45	+20	13	0.007	
BATT.ENDPOINT	3.60	+20	0	0.000	

GSM1900(EDGE), CH661, 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
Normal	3.87	+20(Ref)	19	0.010	PASS
Normal		0	13	0.007	
Normal		+10	17	0.009	
Normal		+20	22	0.012	
Normal		+30	23	<b>0.012</b>	
Normal		+40	13	0.007	
Normal		+45	23	<b>0.012</b>	
High	4.45	+20	-3	-0.002	
BATT.ENDPOINT	3.60	+20	15	0.008	





WCDMA Band V, CH4182, 836.4MHz					
Limit =±2.5ppm					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
Normal	3.87	+20(Ref)	16	0.019	PASS
Normal		0	17	0.020	
Normal		+10	6	0.007	
Normal		+20	20	<b>0.024</b>	
Normal		+30	-19	-0.023	
Normal		+40	0	0.000	
Normal		+45	16	0.019	
High	4.45	+20	13	0.016	
BATT.ENDPOINT	3.60	+20	9	0.011	

WCDMA Band IV, CH1413, 1732.6MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
Normal	3.87	+20(Ref)	20	<b>0.012</b>	PASS
Normal		0	16	0.009	
Normal		+10	-9	-0.005	
Normal		+20	18	0.010	
Normal		+30	4	0.002	
Normal		+40	20	<b>0.012</b>	
Normal		+45	13	0.008	
High	4.45	+20	20	<b>0.012</b>	
BATT.ENDPOINT	3.60	+20	-12	-0.007	





WCDMA Band II, CH9400, 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
Normal	3.87	+20(Ref)	-8	-0.004	PASS
Normal		0	17	0.009	
Normal		+10	20	<b>0.011</b>	
Normal		+20	-18	-0.010	
Normal		+30	-9	-0.005	
Normal		+40	13	0.007	
Normal		+45	16	0.009	
High		4.45	+20	10	
BATT.ENDPOINT	3.60	+20	16	0.009	



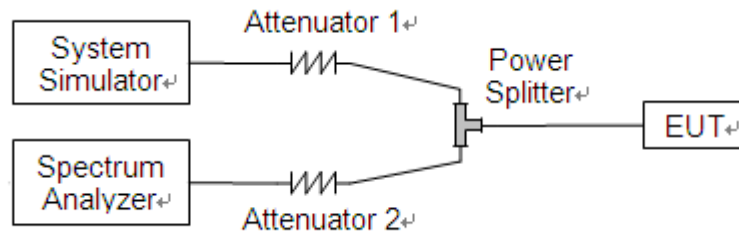
## 2.5. Conducted Out of Band Emissions

### 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. The measurement frequency range is from 30MHz to the 10<sup>th</sup> harmonic of the fundamental frequency.

### 2.5.2. Test Description

Test Setup:



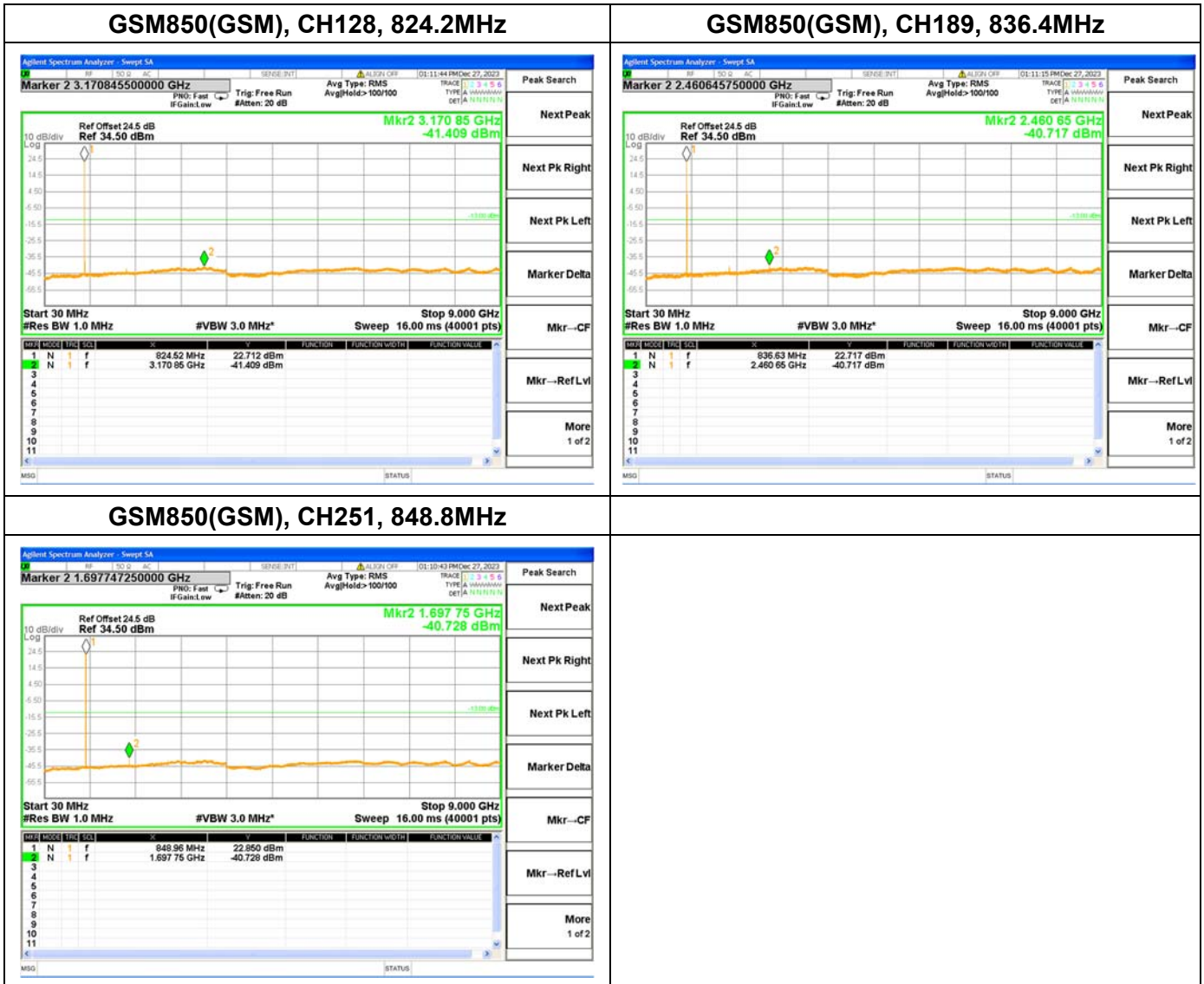
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum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





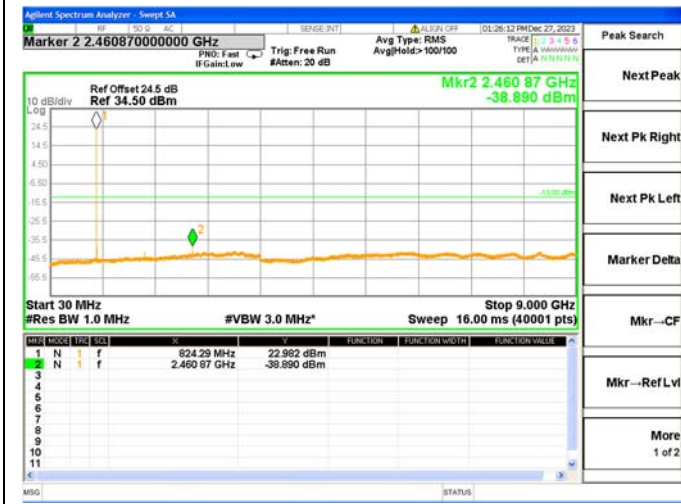


2.5.3.Test Result

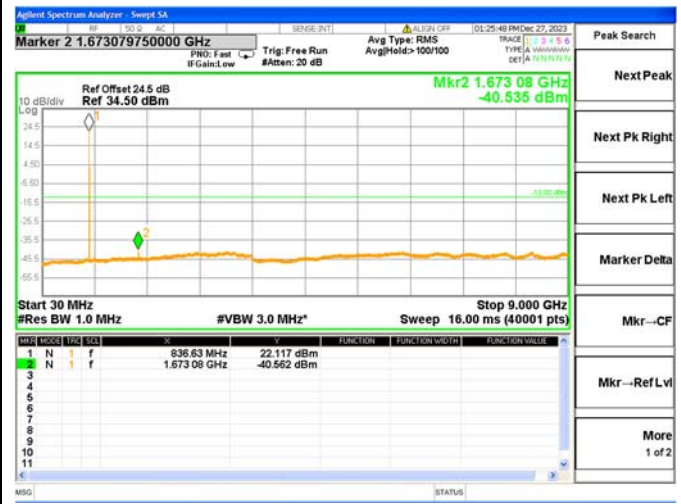




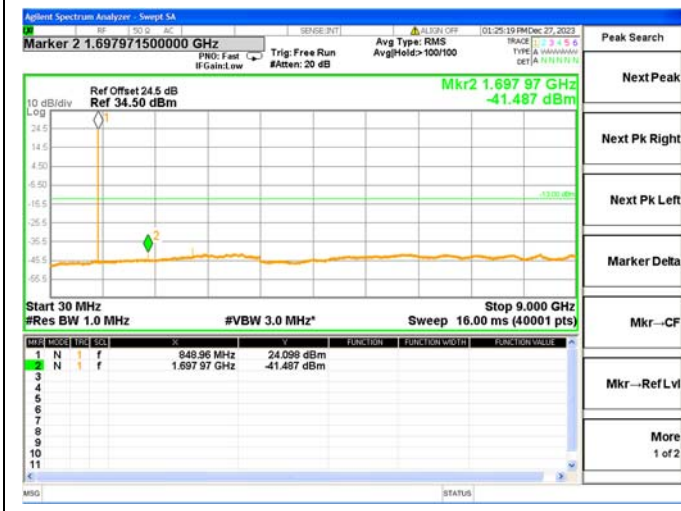
**GSM850(EDGE), CH128, 824.2MHz**



**GSM850(EDGE), CH189, 836.4MHz**

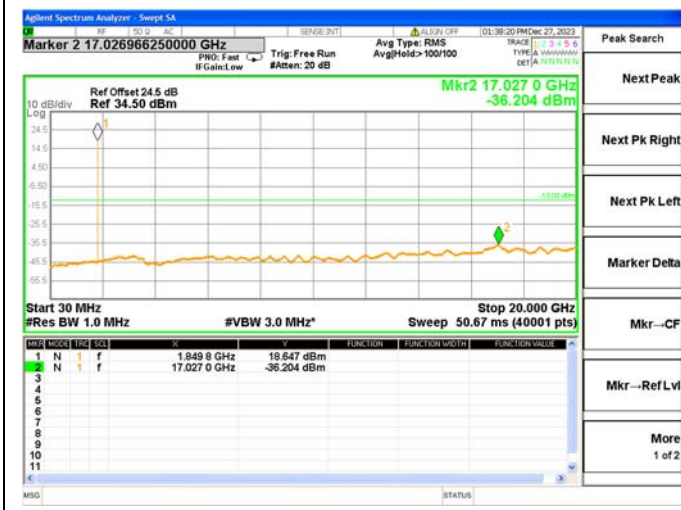


**GSM850(EDGE), CH251, 848.8MHz**

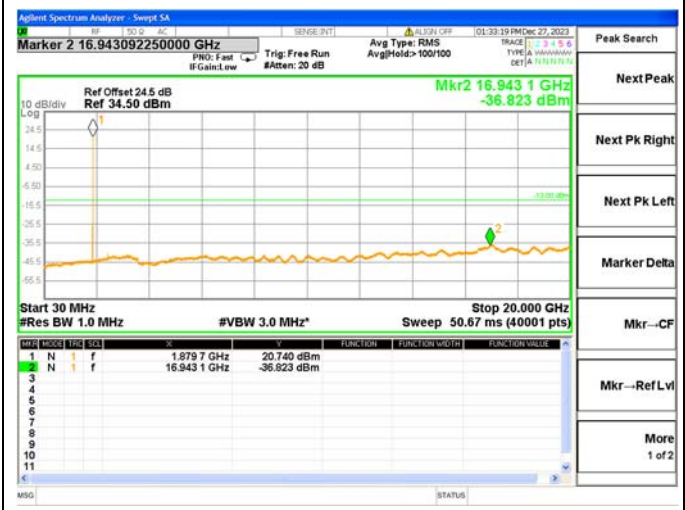




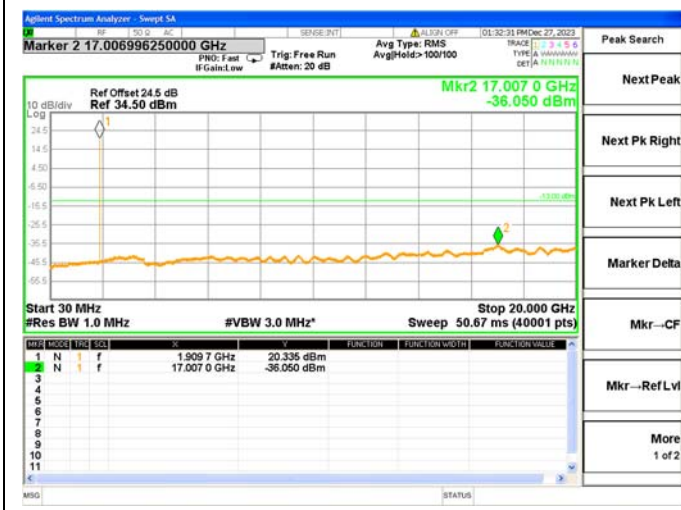
**GSM1900(GSM), CH512, 1850.2MHZ**



**GSM1900(GSM), CH661, 1880.0MHZ**

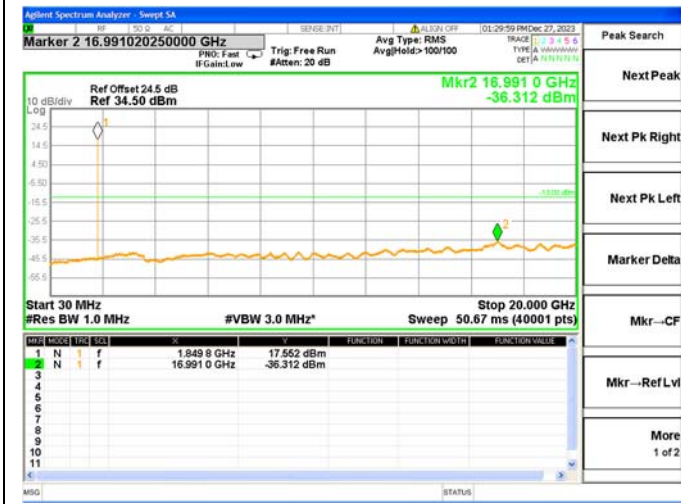


**GSM1900(GSM), CH810, 1909.8MHZ**

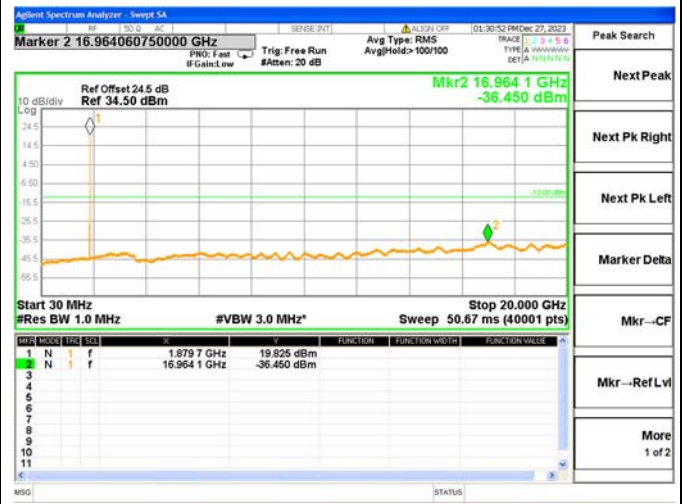




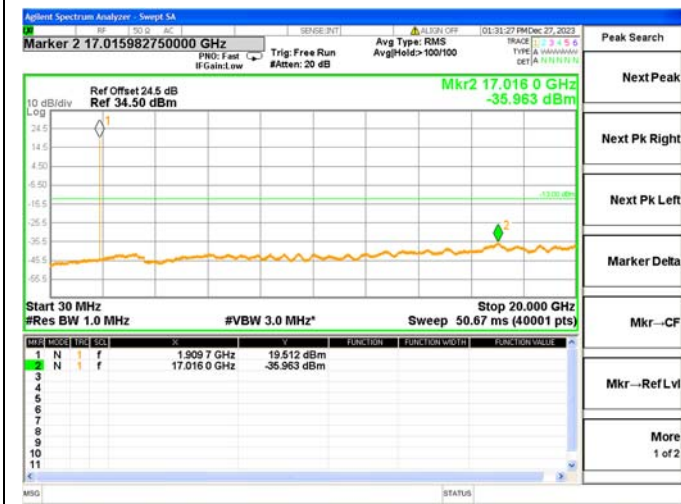
**GSM1900(EDGE), CH512, 1850.2MHz**



**GSM1900(EDGE), CH661, 1880.0MHz**

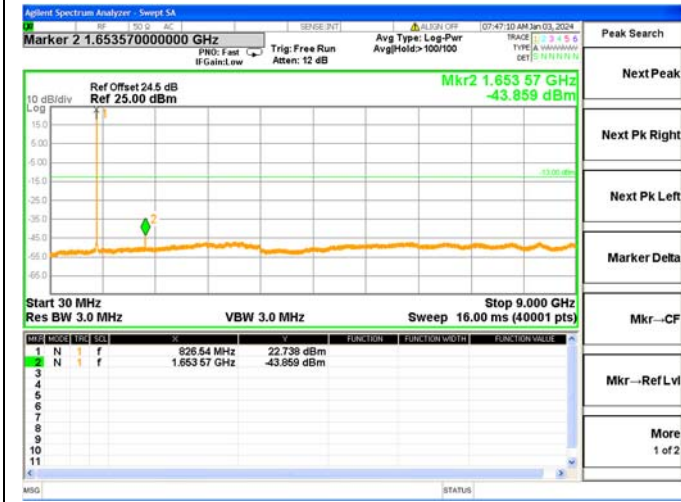


**GSM1900(EDGE), CH810, 1909.8MHz**

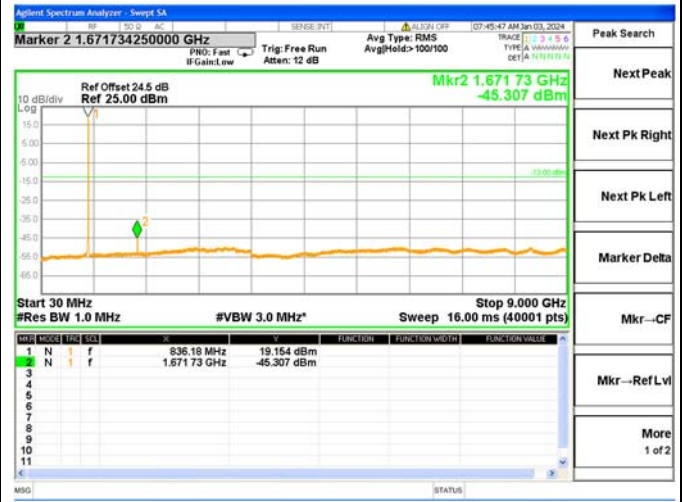




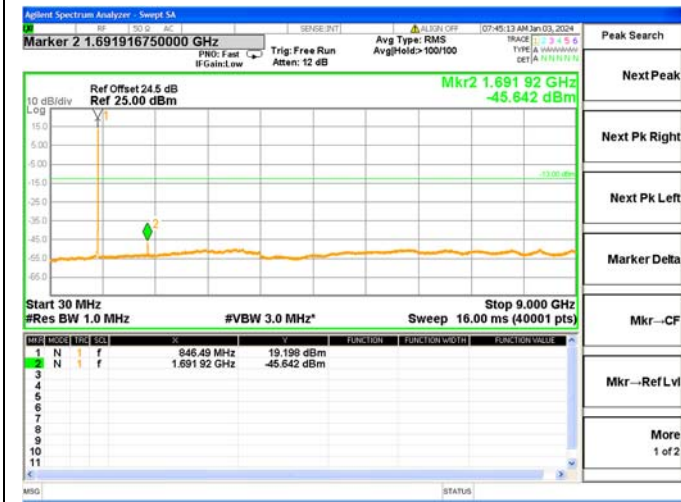
**WCDMA Band V, CH4132, 826.4MHz**



**WCDMA Band V, CH4182, 836.4MHz**



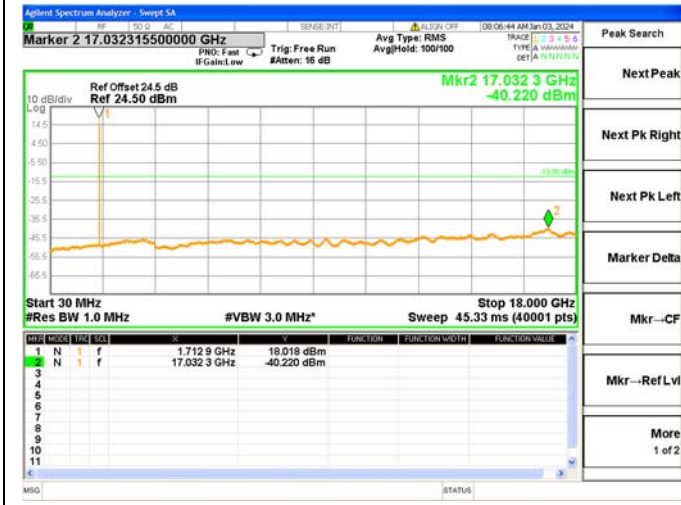
**WCDMA Band V, CH4233, 846.6MHz**







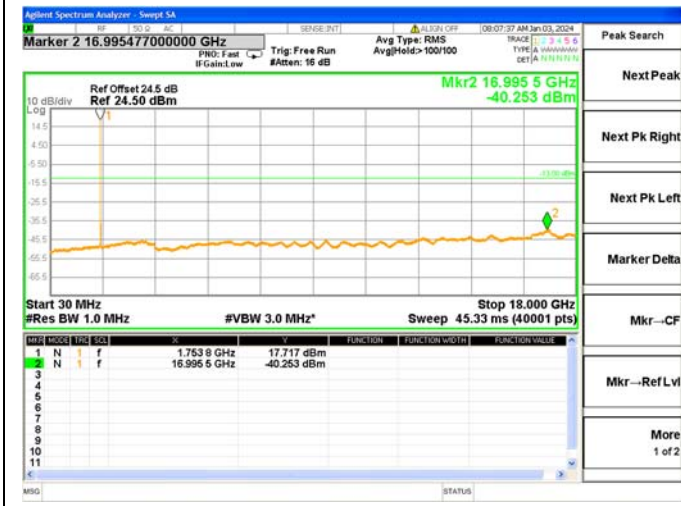
**WCDMA Band IV, CH1312, 1712.4MHz**



**WCDMA Band IV, CH1413, 1732.6MHz**

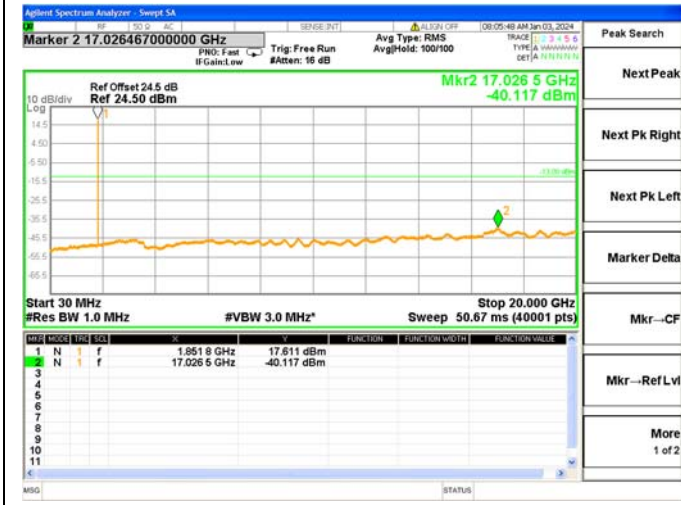


**WCDMA Band IV, CH1513, 1752.6MHz**

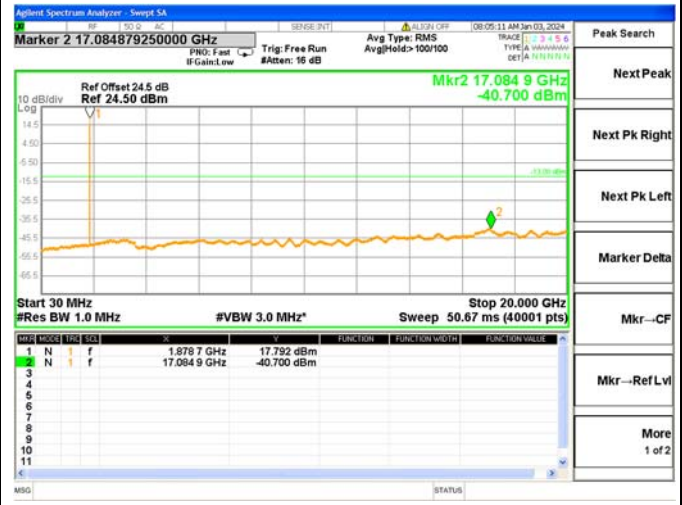




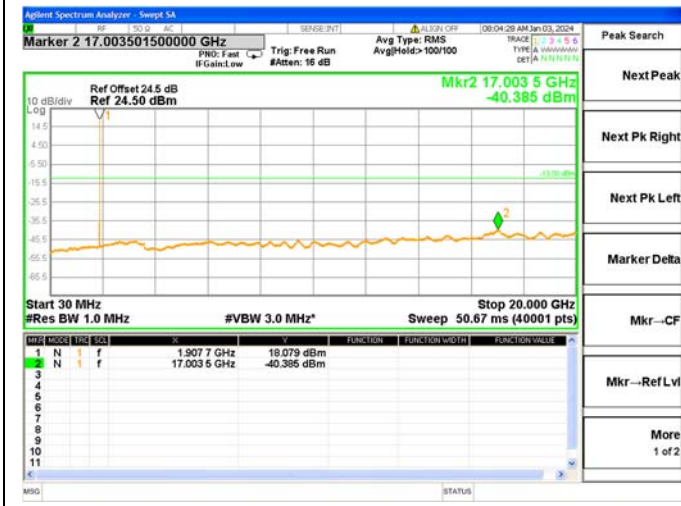
**WCDMA Band II, CH9262, 1852.4MHz**



**WCDMA Band II, CH9400, 1880.0MHz**



**WCDMA Band II, CH9538, 1907.6MHz**



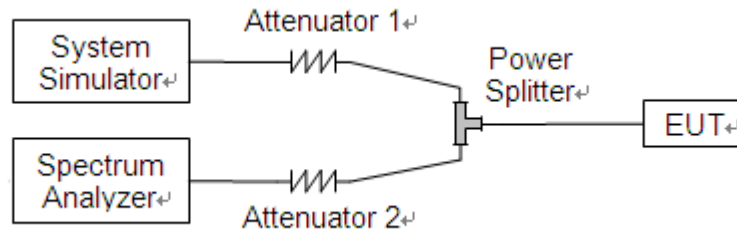
## 2.6. Band Edge

### 2.6.1. 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.

### 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.

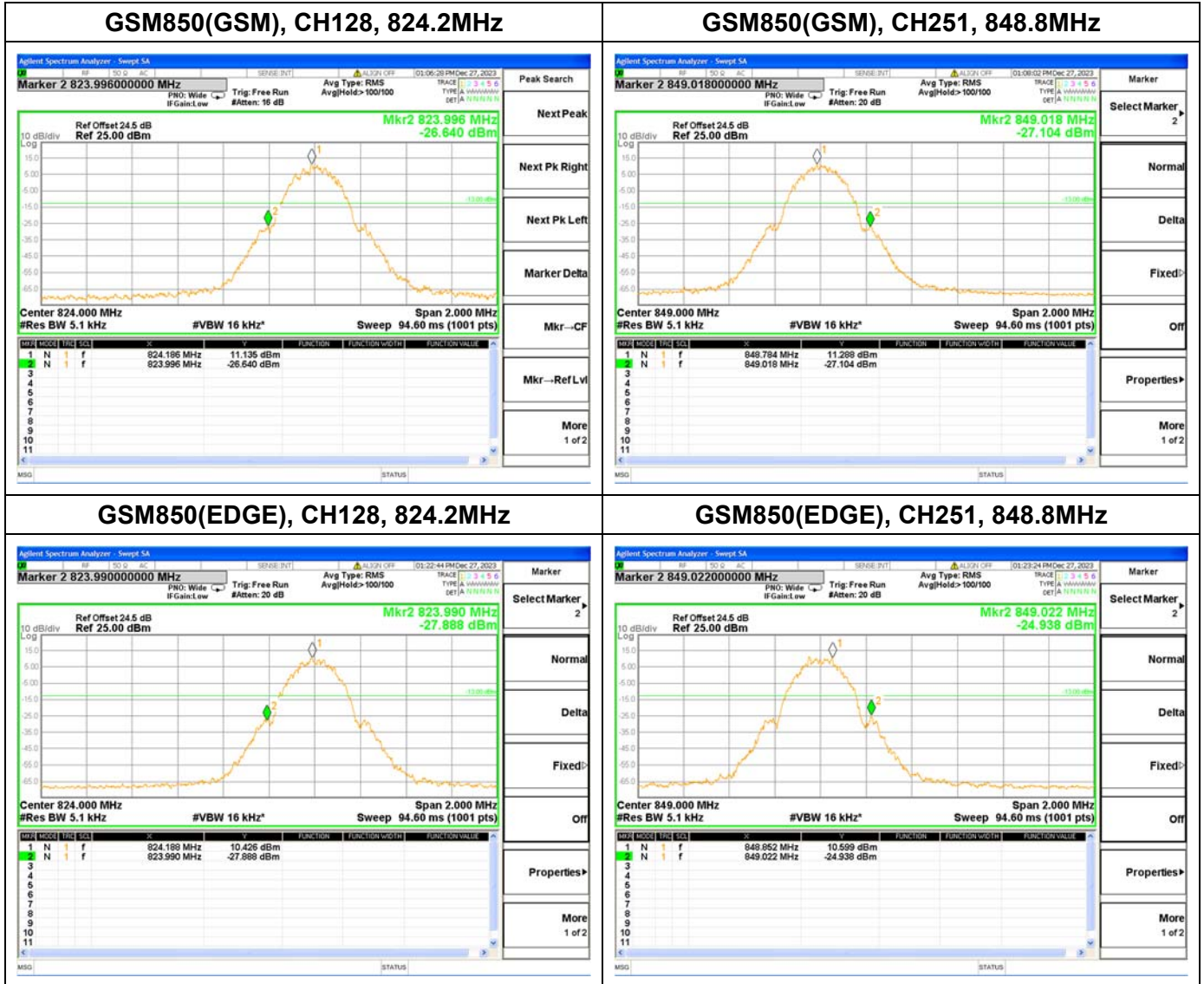


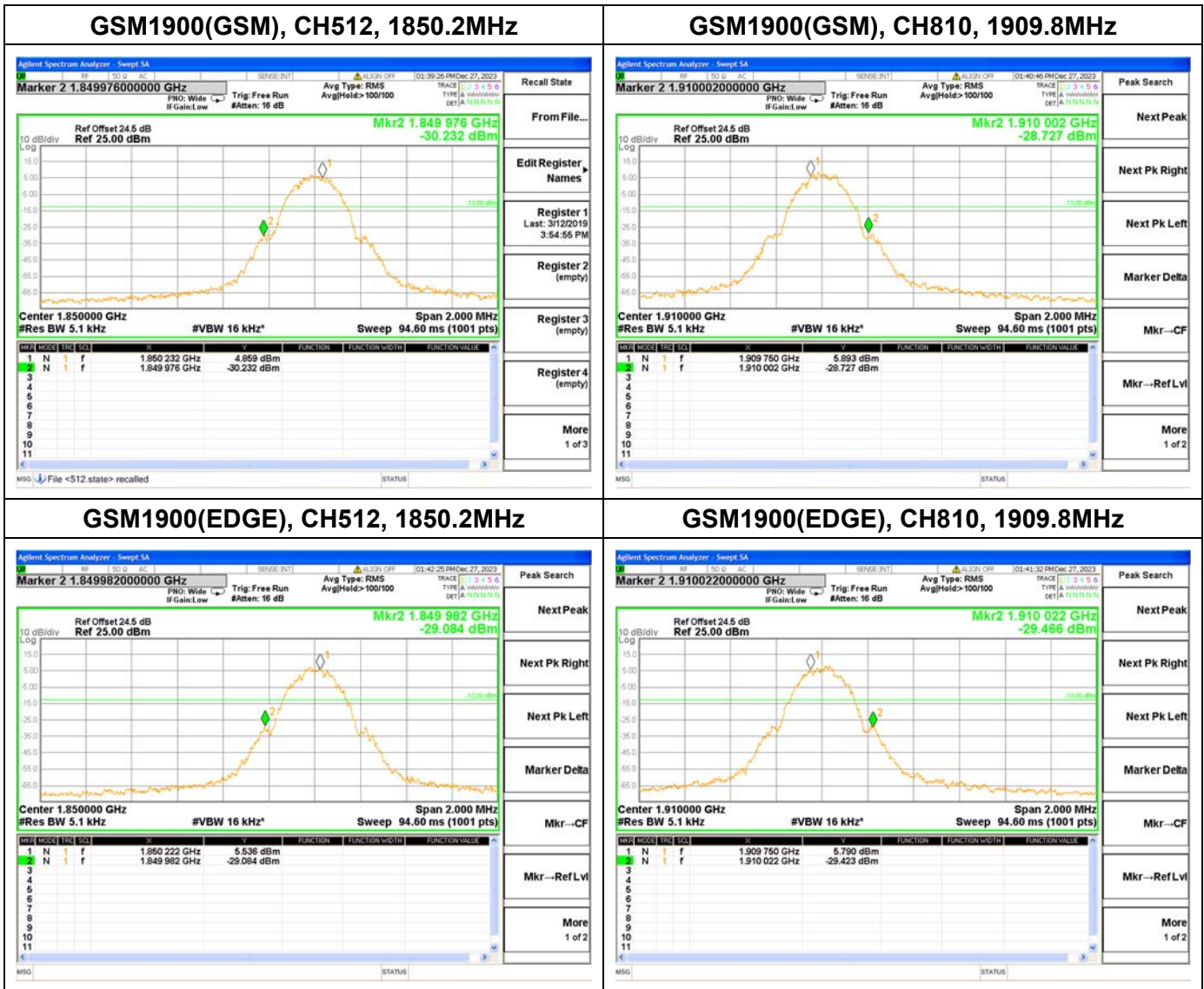




2.6.3. Test Result

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



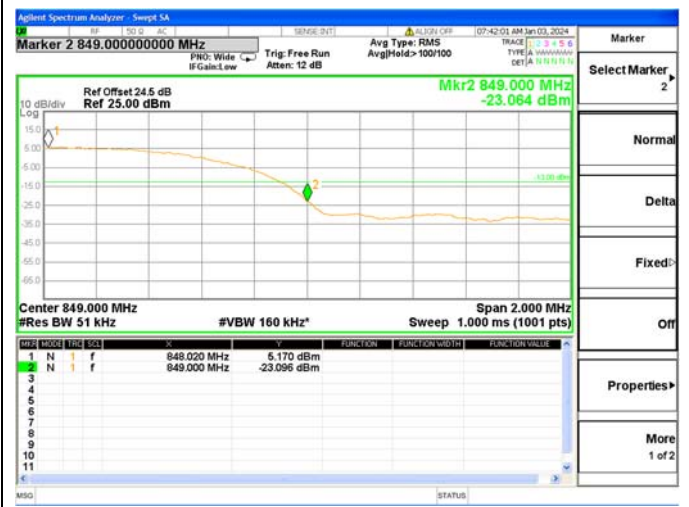




**WCDMA Band V, CH4132, 826.4MHz**



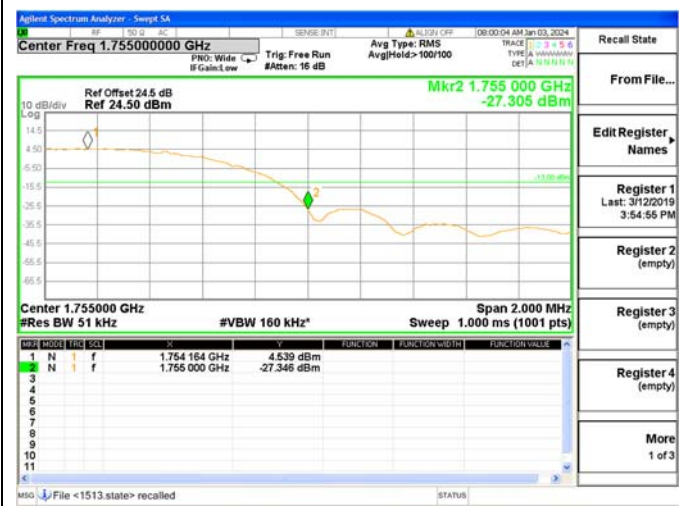
**WCDMA Band V, CH4233, 846.6MHz**



**WCDMA Band IV, CH1312, 1712.4MHz**



**WCDMA Band IV, CH1513, 1752.6MHz**



**WCDMA Band II, CH9262, 1852.4MHz**



**WCDMA Band II, CH9538, 1907.6MHz**





## 2.7. Determining E.R.P. and/or E.I.R.P. from conducted RF output power measurements

### 2.7.1. Requirement

According to FCC section 22.913, the Effective Radiated Power (E.R.P.) 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 e.i.r.p. peak power.

According to FCC section 27.50, mobile, and portable (hand-held) stations is limited to 1 Watts e.i.r.p. peak power.

### 2.7.2. Test Description

The test setups refer to section 2.1.3

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.

The relevant equation for determining the maximum E.R.P. or E.I.R.P. from the measured RF output power is given in Equation (1) as follows:

$$\text{E.R.P. or E.I.R.P.} = P_{\text{Meas}} + G_{\text{T}}$$

Where:

E.R.P. or E.I.R.P. effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as  $P_{\text{Meas}}$ , e.g., dBm or dBW)

$P_{\text{Meas}}$  measured transmitter output power or PSD, in dBm or dBW

$G_{\text{T}}$  gain of the transmitting antenna, in dBd (E.R.P.) or dBi (E.I.R.P.)

For devices utilizing multiple antennas, see ANSI C63.25-2015 6.4 for guidance with respect to determining the effective array transmit antenna gain term to be used in the above equation.

The following equations demonstrate the mathematical relationship between E.R.P. and E.I.R.P.:

a) E.R.P. = E.I.R.P. - 2.15, where E.R.P. and E.I.R.P. are expressed in consistent units.

b) E.I.R.P. = E.R.P. + 2.15, where E.R.P. and E.I.R.P. are expressed in consistent units.





## 2.7.3. Test Result

GSM850								
Band	Channel	Frequency (MHz)	PCL	Measured E.R.P.		Limit		Verdict
				dBm	W	dBm	W	
GSM	128	824.20	5	21.49	0.141	38.5	7	PASS
	189	836.40	5	21.65	0.146			PASS
	251	848.80	5	22.18	0.165			PASS
GPRS	128	824.20	5	21.58	0.144	38.5	7	PASS
	189	836.40	5	21.86	0.153			PASS
	251	848.80	5	22.24	0.167			PASS
EDGE	128	824.20	5	16.16	0.041	38.5	7	PASS
	189	836.40	5	16.28	0.042			PASS
	251	848.80	5	16.45	0.044			PASS

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

GSM1900								
Band	Channel	Frequency (MHz)	PCL	Measured E.I.R.P.		Limit		Verdict
				dBm	W	dBm	W	
GSM	512	1850.2	0	30.73	1.183	33	2	PASS
	661	1880.0	0	31.00	1.259			PASS
	810	1909.8	0	31.11	1.291			PASS
GPRS	512	1850.2	0	30.71	1.178	33	2	PASS
	661	1880.0	0	31.00	1.259			PASS
	810	1909.8	0	31.10	1.288			PASS
EDGE	512	1850.2	0	27.37	0.546	33	2	PASS
	661	1880.0	0	27.69	0.587			PASS
	810	1909.8	0	27.80	0.603			PASS

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





WCDMA Band V							
Band	Channel	Frequency (MHz)	Measured E.R.P.		Limit		Verdict
			dBm	W	dBm	W	
WCDMA	4132	826.4	13.77	0.024	38.5	7	PASS
	4182	836.4	13.88	0.024			PASS
	4233	846.6	13.85	0.024			PASS
HSDPA	4132	826.4	12.99	0.020	38.5	7	PASS
	4182	836.4	13.16	0.021			PASS
	4233	846.6	13.42	0.022			PASS
DC-HSDPA	4132	826.4	13.01	0.020	38.5	7	PASS
	4182	836.4	13.21	0.021			PASS
	4233	846.6	13.39	0.022			PASS
HSUPA	4132	826.4	13.01	0.020	38.5	7	PASS
	4182	836.4	13.20	0.021			PASS
	4233	846.6	13.37	0.022			PASS
HSPA+	4132	826.4	12.48	0.018	38.5	7	PASS
	4182	836.4	12.64	0.018			PASS
	4233	846.6	12.88	0.019			PASS

**Note 1:** For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this report.





WCDMA Band IV							
Band	Channel	Frequency (MHz)	Measured E.I.R.P.		Limit		Verdict
			dBm	W	dBm	W	
WCDMA	1312	1712.4	25.80	0.380	30	1	PASS
	1413	1732.6	25.88	0.387			PASS
	1513	1752.6	25.73	0.374			PASS
HSDPA	1312	1712.4	25.36	0.344	30	1	PASS
	1413	1732.6	25.55	0.359			PASS
	1513	1752.6	25.25	0.335			PASS
DC-HSDPA	1312	1712.4	25.37	0.344	30	1	PASS
	1413	1732.6	25.59	0.362			PASS
	1513	1752.6	25.33	0.341			PASS
HSUPA	1312	1712.4	25.38	0.345	30	1	PASS
	1413	1732.6	25.54	0.358			PASS
	1513	1752.6	25.27	0.337			PASS
HSPA+	1312	1712.4	24.78	0.301	30	1	PASS
	1413	1732.6	25.04	0.319			PASS
	1513	1752.6	24.84	0.305			PASS

**Note 1:** For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this report.





WCDMA Band II							
Band	Channel	Frequency (MHz)	Measured E.I.R.P.		Limit		Verdict
			dBm	W	dBm	W	
WCDMA	9262	1852.4	24.65	0.292	33	2	PASS
	9400	1880.0	24.59	0.288			PASS
	9538	1907.6	24.55	0.285			PASS
HSDPA	9262	1852.4	24.30	0.269	33	2	PASS
	9400	1880.0	24.00	0.251			PASS
	9538	1907.6	23.81	0.240			PASS
DC-HSDPA	9262	1852.4	24.33	0.271	33	2	PASS
	9400	1880.0	24.04	0.254			PASS
	9538	1907.6	23.86	0.243			PASS
HSUPA	9262	1852.4	24.36	0.273	33	2	PASS
	9400	1880.0	24.05	0.254			PASS
	9538	1907.6	23.87	0.244			PASS
HSPA+	9262	1852.4	23.75	0.237	33	2	PASS
	9400	1880.0	23.41	0.219			PASS
	9538	1907.6	23.32	0.215			PASS

**Note 1:** For the HSDPA and HSUPA mode, all the subtests were tested and just the worst data were recorded in this report.



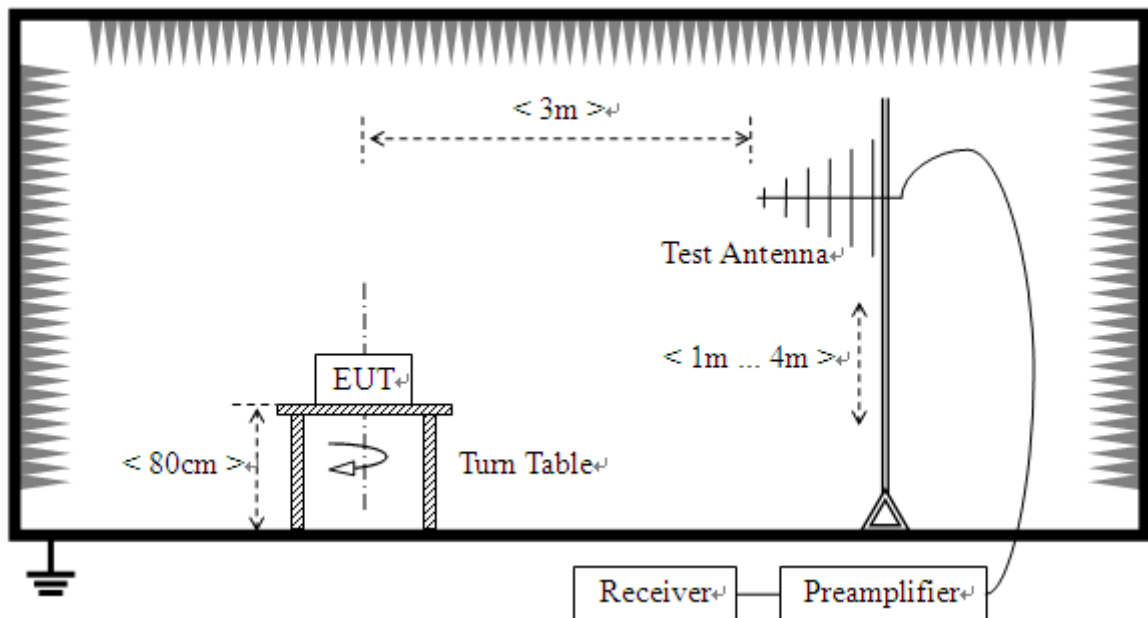


## 2.8. Radiated Out of Band Emissions

### 2.8.1. Requirement

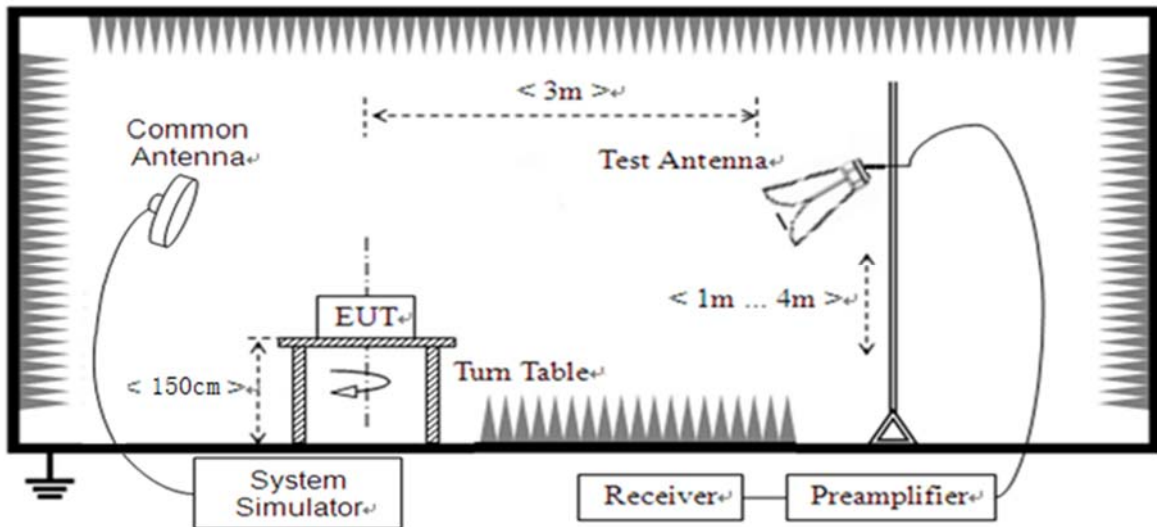
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43+10*\log(P)$ dB. This calculated to be -13dBm. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency.

### 2.8.2. Test Description



(For the test frequency from 30MHz to 1GHz)





(For the test frequency 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 and only the test result of the maximum output power was recorded.

In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground and the Turn Table is actuated to turn from 0° to 360° to determine the maximum value of the radiated power. The emission levels at both horizontal and vertical polarizations should be tested. 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 Procedure

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements.





#### 2.8.4. 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 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  $A_{\text{TOT}}$ .

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

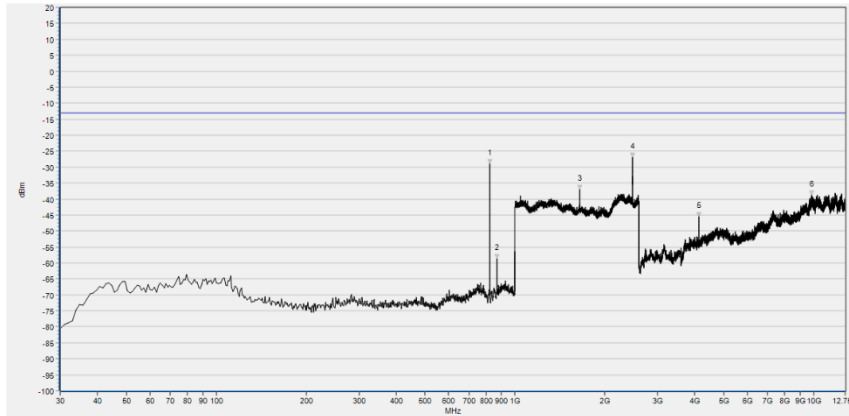
**Note2:** All test mode and condition mentioned were considered and evaluated respectively by performing full test, only the worst data were recorded and reported.

**Note3:** 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.

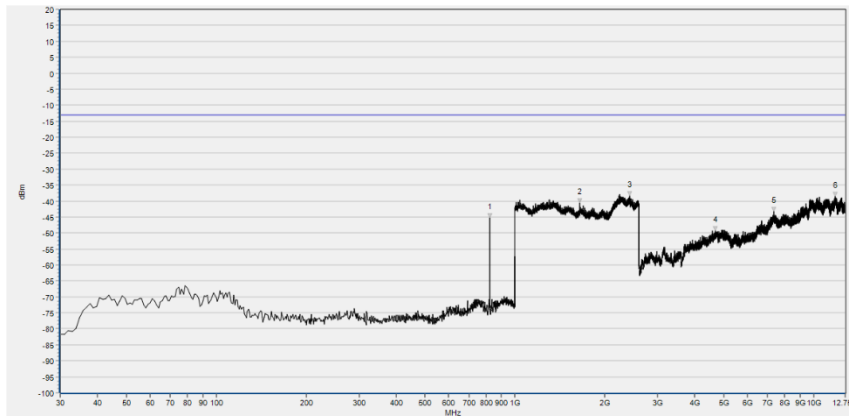
**Note4:** N/A means the frequency is the basic frequency or the base station frequency, they are no need to verdict.



GSM850(GSM), Low Channel



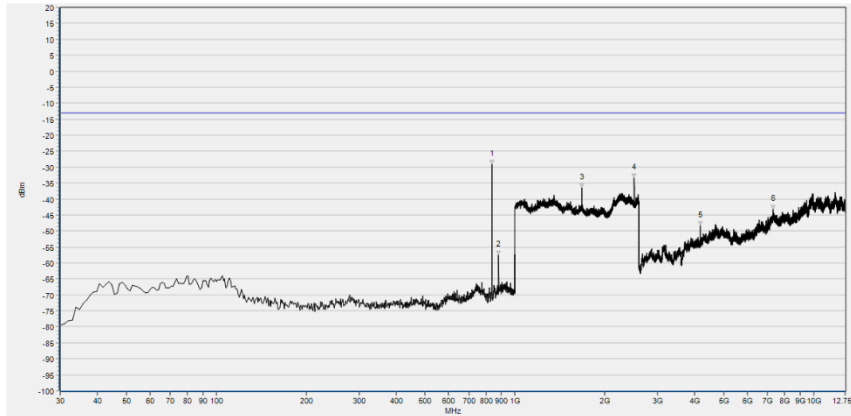
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	824.430	-29.00	-13.00	Horizontal	N/A
2	869.050	-58.75	-13.00	Horizontal	N/A
3	1647.939	-36.96	-13.00	Horizontal	PASS
4	2473.870	-27.00	-13.00	Horizontal	PASS
5	4120.931	-45.48	-13.00	Horizontal	PASS
6	9853.955	-38.85	-13.00	Horizontal	PASS



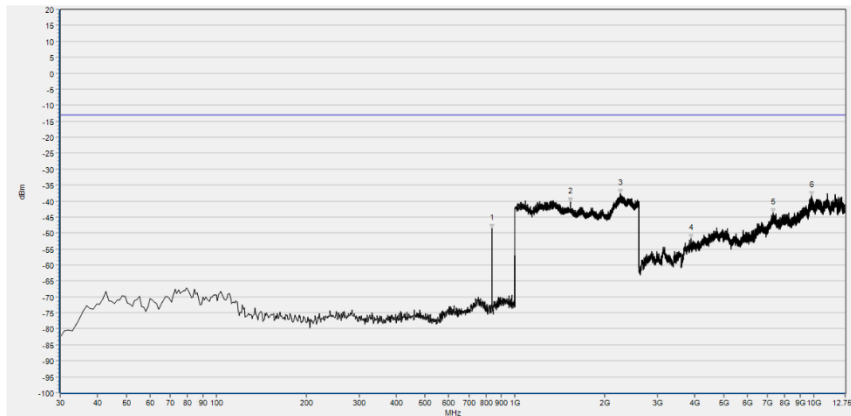
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	824.430	-45.15	-13.00	Vertical	N/A
2	1648.579	-40.62	-13.00	Vertical	PASS
3	2424.570	-38.42	-13.00	Vertical	PASS
4	4694.972	-49.36	-13.00	Vertical	PASS
5	7354.755	-43.28	-13.00	Vertical	PASS
6	11823.413	-38.60	-13.00	Vertical	PASS



GSM850(GSM), Mid Channel



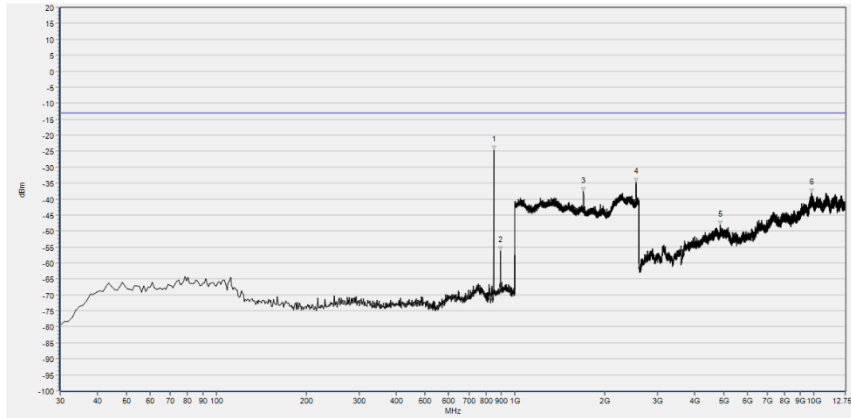
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	836.070	-29.18	-13.00	Horizontal	N/A
2	881.660	-57.47	-13.00	Horizontal	N/A
3	1672.909	-36.59	-13.00	Horizontal	PASS
4	2508.443	-33.30	-13.00	Horizontal	PASS
5	4181.842	-48.46	-13.00	Horizontal	PASS
6	7325.223	-43.33	-13.00	Horizontal	PASS



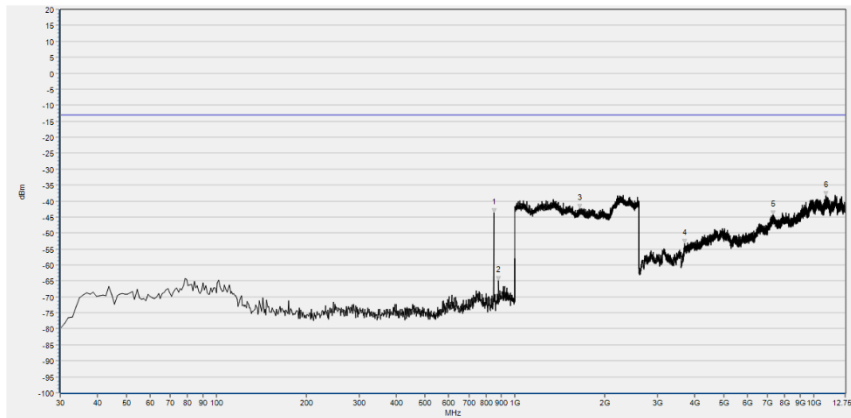
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	836.070	-48.56	-13.00	Vertical	N/A
2	1532.053	-40.31	-13.00	Vertical	PASS
3	2256.823	-37.72	-13.00	Vertical	PASS
4	3880.978	-51.67	-13.00	Vertical	PASS
5	7303.073	-43.72	-13.00	Vertical	PASS
6	9855.801	-38.27	-13.00	Vertical	PASS



GSM850(GSM), High Channel



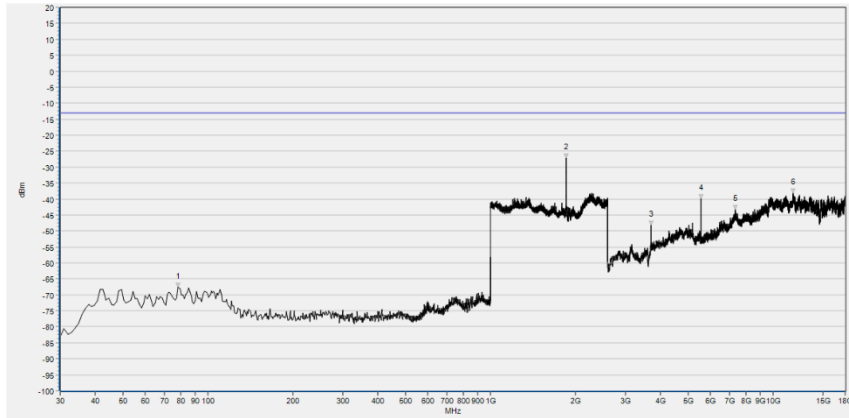
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	848.680	-24.71	-13.00	Horizontal	N/A
2	893.300	-56.29	-13.00	Horizontal	N/A
3	1697.239	-37.64	-13.00	Horizontal	PASS
4	2546.218	-34.81	-13.00	Horizontal	PASS
5	4866.630	-48.21	-13.00	Horizontal	PASS
6	9859.493	-38.15	-13.00	Horizontal	PASS



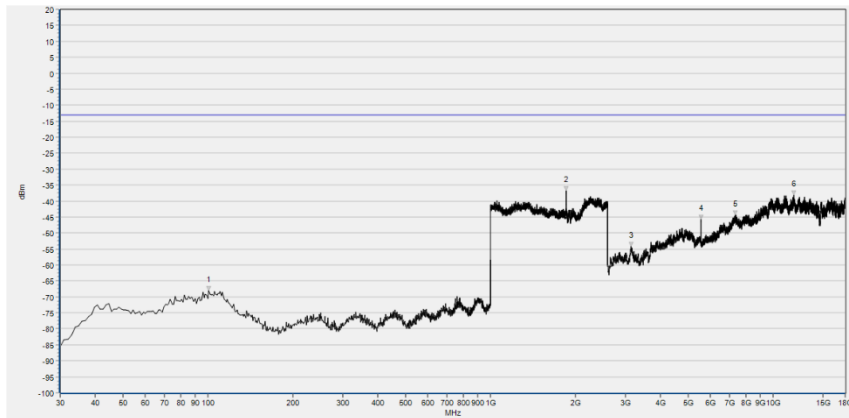
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	848.680	-43.79	-13.00	Vertical	N/A
2	881.660	-64.87	-13.00	Vertical	N/A
3	1649.220	-42.31	-13.00	Vertical	PASS
4	3696.399	-53.39	-13.00	Vertical	PASS
5	7304.919	-44.28	-13.00	Vertical	PASS
6	10983.579	-38.39	-13.00	Vertical	PASS



GSM1900(GSM), Low Channel



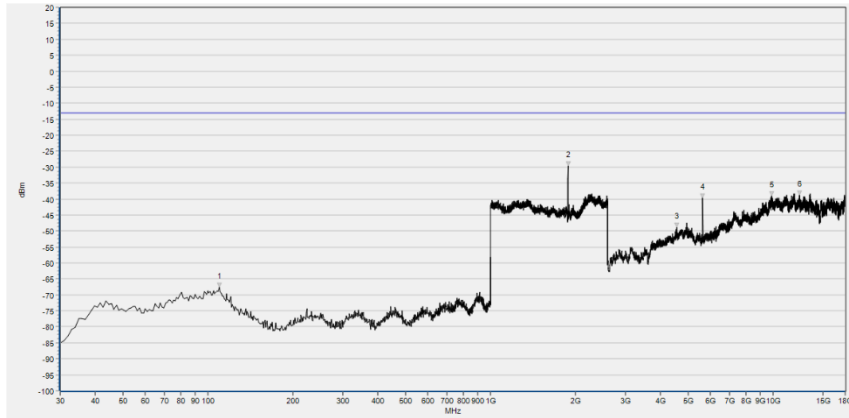
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	78.500	-67.59	-13.00	Horizontal	PASS
2	1850.260	-27.20	-13.00	Horizontal	N/A
3	3700.600	-48.15	-13.00	Horizontal	PASS
4	5551.737	-39.84	-13.00	Horizontal	PASS
5	7346.863	-43.23	-13.00	Horizontal	PASS
6	11794.072	-38.05	-13.00	Horizontal	PASS



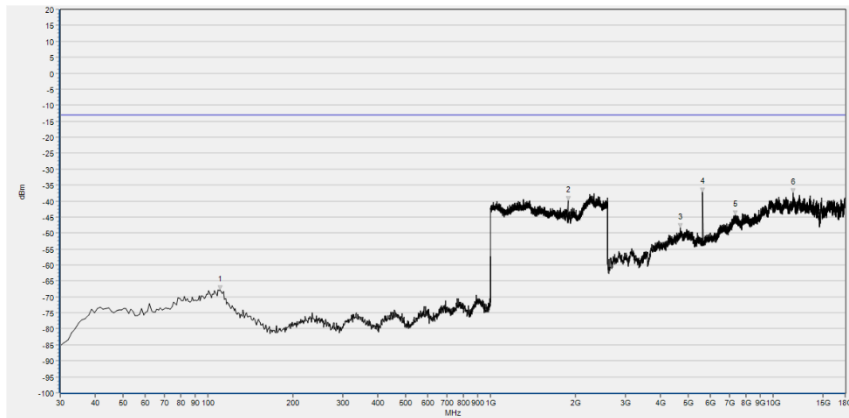
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	100.810	-68.08	-13.00	Vertical	PASS
2	1850.260	-36.74	-13.00	Vertical	N/A
3	3148.900	-54.29	-13.00	Vertical	PASS
4	5551.737	-45.71	-13.00	Vertical	PASS
5	7346.863	-44.30	-13.00	Vertical	PASS
6	11813.675	-38.08	-13.00	Vertical	PASS



GSM1900(GSM), Mid Channel



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	109.540	-67.68	-13.00	Horizontal	PASS
2	1879.712	-29.70	-13.00	Horizontal	N/A
3	4568.758	-48.91	-13.00	Horizontal	PASS
4	5638.552	-39.71	-13.00	Horizontal	PASS
5	9900.927	-39.01	-13.00	Horizontal	PASS
6	12379.378	-38.87	-13.00	Horizontal	PASS

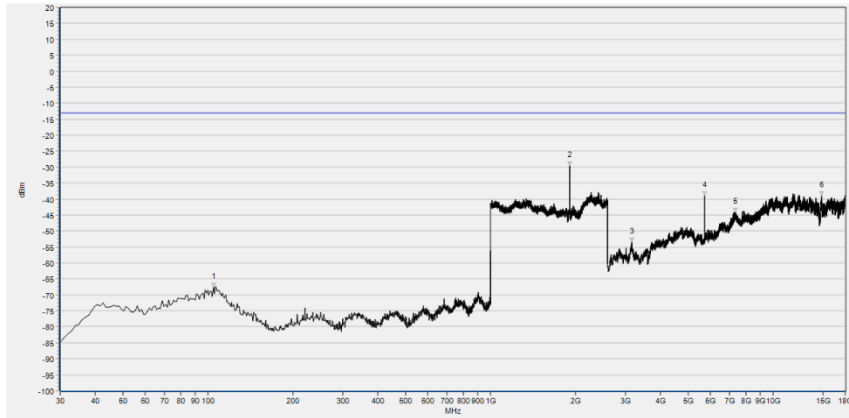


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	110.510	-67.93	-13.00	Vertical	PASS
2	1879.712	-39.81	-13.00	Vertical	N/A
3	4686.379	-48.27	-13.00	Vertical	PASS
4	5638.552	-37.15	-13.00	Vertical	PASS
5	7335.661	-44.36	-13.00	Vertical	PASS
6	11785.670	-37.47	-13.00	Vertical	PASS

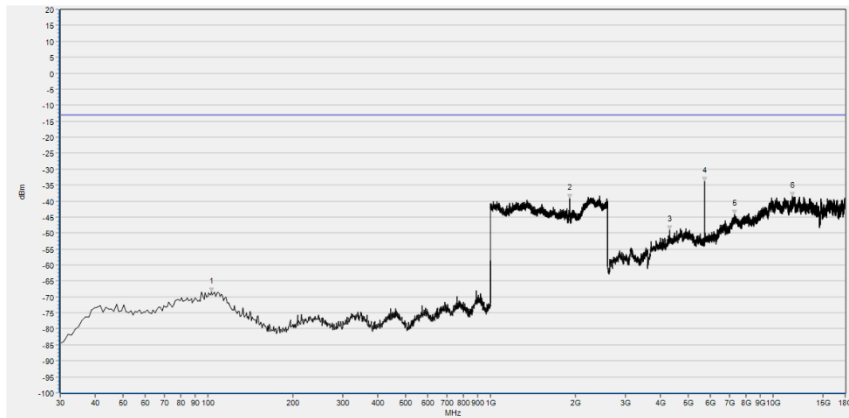




GSM1900(GSM), High Channel



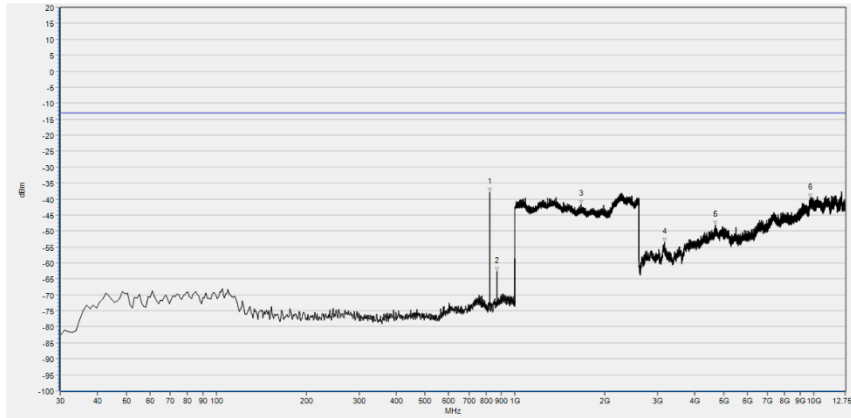
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	104.690	-67.55	-13.00	Horizontal	PASS
2	1909.804	-29.54	-13.00	Horizontal	N/A
3	3154.501	-53.62	-13.00	Horizontal	PASS
4	5728.169	-39.02	-13.00	Horizontal	PASS
5	7330.060	-44.19	-13.00	Horizontal	PASS
6	14821.422	-39.00	-13.00	Horizontal	PASS



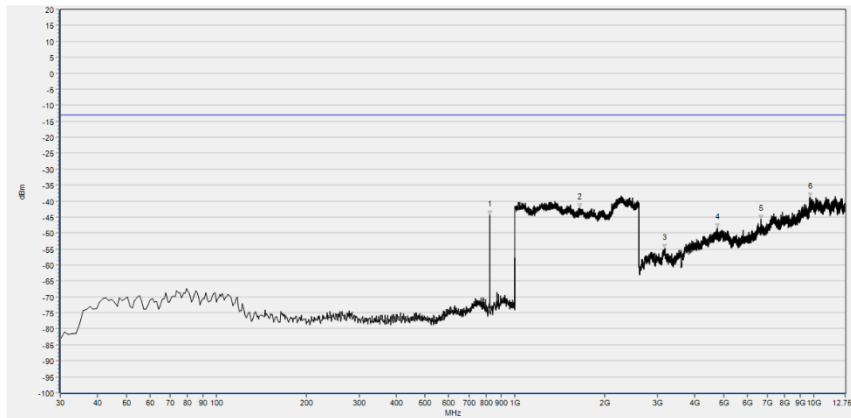
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	102.750	-68.45	-13.00	Vertical	PASS
2	1909.804	-39.15	-13.00	Vertical	N/A
3	4305.510	-49.16	-13.00	Vertical	PASS
4	5728.169	-33.90	-13.00	Vertical	PASS
5	7321.658	-44.21	-13.00	Vertical	PASS
6	11718.458	-38.60	-13.00	Vertical	PASS



GSM850(EDGE), Low Channel



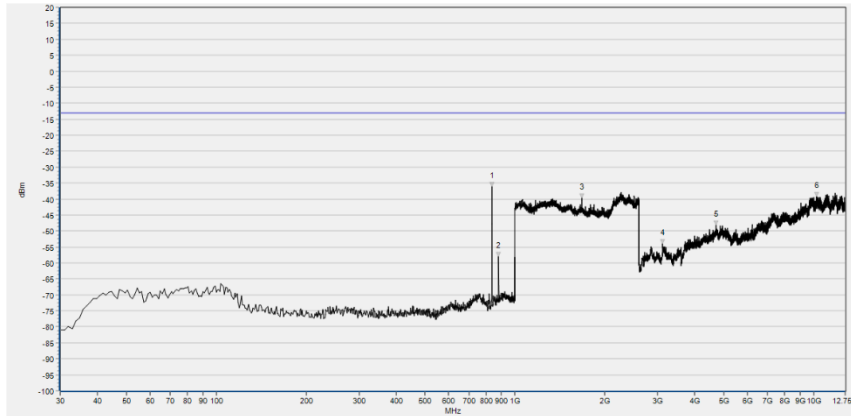
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	824.430	-37.83	-13.00	Horizontal	N/A
2	869.050	-62.63	-13.00	Horizontal	N/A
3	1663.946	-41.72	-13.00	Horizontal	PASS
4	3164.812	-53.57	-13.00	Horizontal	PASS
5	4685.743	-48.08	-13.00	Horizontal	PASS
6	9754.283	-39.58	-13.00	Horizontal	PASS



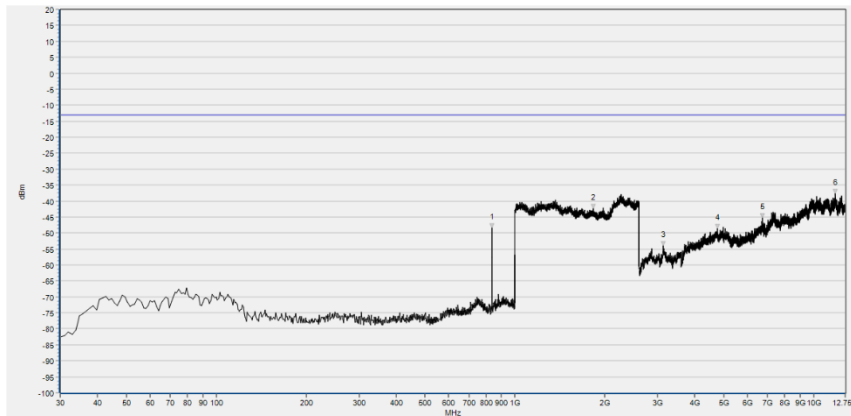
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	824.430	-44.42	-13.00	Vertical	N/A
2	1648.579	-42.02	-13.00	Vertical	PASS
3	3164.812	-54.87	-13.00	Vertical	PASS
4	4759.574	-48.47	-13.00	Vertical	PASS
5	6677.350	-45.80	-13.00	Vertical	PASS
6	9761.666	-38.88	-13.00	Vertical	PASS



GSM850(EDGE), Mid Channel



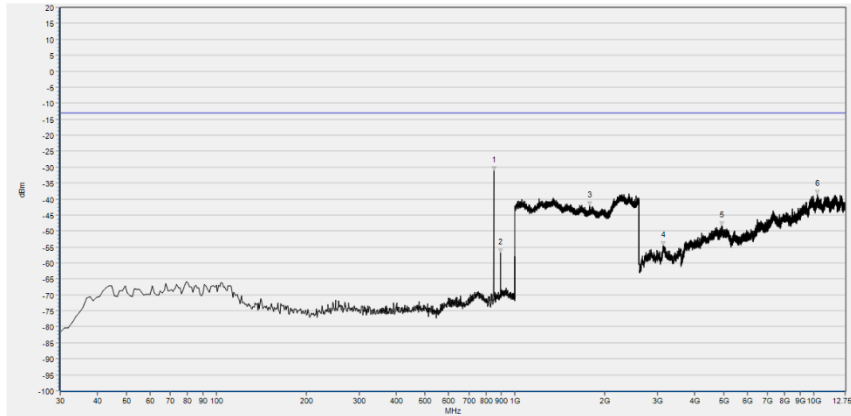
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	836.070	-36.20	-13.00	Horizontal	N/A
2	881.660	-58.05	-13.00	Horizontal	N/A
3	1672.909	-39.77	-13.00	Horizontal	PASS
4	3124.204	-53.87	-13.00	Horizontal	PASS
5	4711.584	-48.12	-13.00	Horizontal	PASS
6	10212.039	-39.15	-13.00	Horizontal	PASS



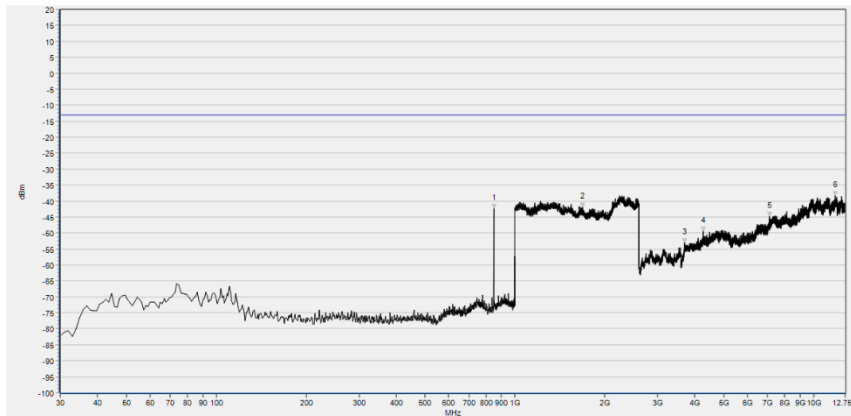
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	836.070	-48.37	-13.00	Vertical	N/A
2	1826.571	-42.37	-13.00	Vertical	PASS
3	3138.971	-54.02	-13.00	Vertical	PASS
4	4761.420	-48.52	-13.00	Vertical	PASS
5	6727.187	-45.22	-13.00	Vertical	PASS
6	11836.334	-37.70	-13.00	Vertical	PASS



GSM850(EDGE), High Channel



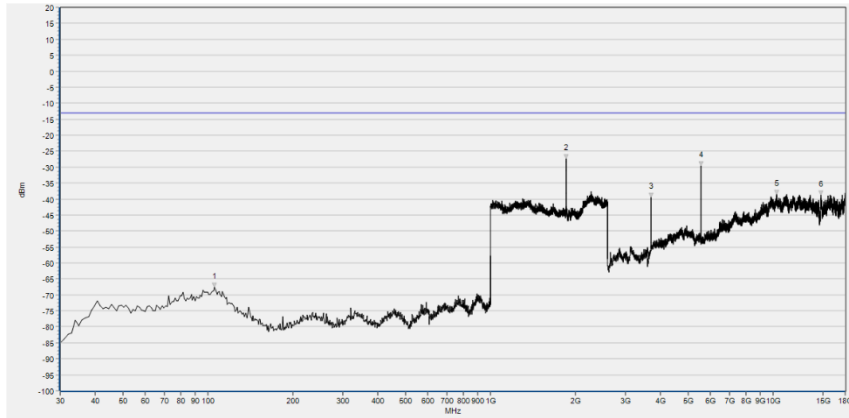
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	848.680	-31.19	-13.00	Horizontal	N/A
2	893.300	-56.93	-13.00	Horizontal	N/A
3	1774.070	-42.08	-13.00	Horizontal	PASS
4	3140.817	-54.63	-13.00	Horizontal	PASS
5	4931.233	-48.32	-13.00	Horizontal	PASS
6	10271.104	-38.51	-13.00	Horizontal	PASS



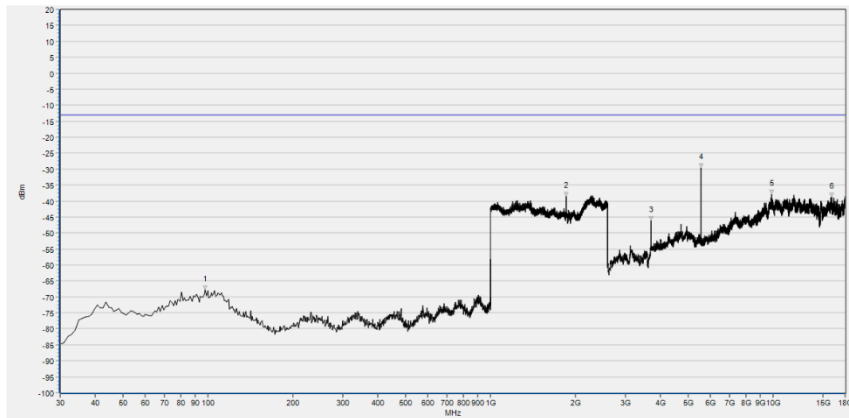
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	v	-42.31	-13.00	Vertical	N/A
2	1682.513	-41.96	-13.00	Vertical	PASS
3	3700.091	-52.99	-13.00	Vertical	PASS
4	4261.211	-49.45	-13.00	Vertical	PASS
5	7125.877	-44.89	-13.00	Vertical	PASS
6	11795.726	-38.42	-13.00	Vertical	PASS



GSM1900(EDGE), Low Channel



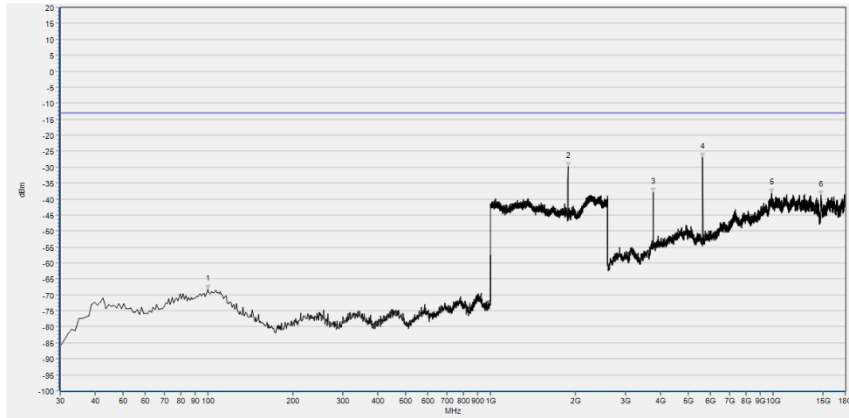
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	105.660	-67.69	-13.00	Horizontal	PASS
2	1850.260	-27.32	-13.00	Horizontal	N/A
3	3700.600	-39.53	-13.00	Horizontal	PASS
4	5548.936	-29.62	-13.00	Horizontal	PASS
5	10292.999	-38.51	-13.00	Horizontal	PASS
6	14762.611	-38.83	-13.00	Horizontal	PASS



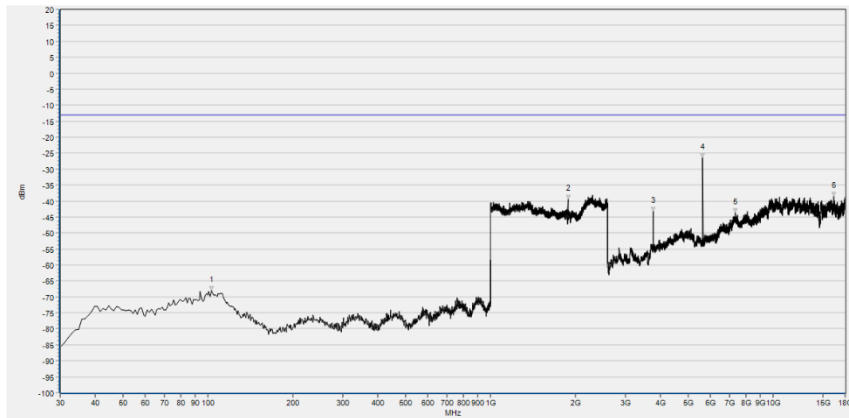
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	97.900	-67.91	-13.00	Vertical	PASS
2	1850.260	-38.61	-13.00	Vertical	N/A
3	3700.600	-46.21	-13.00	Vertical	PASS
4	5551.737	-29.56	-13.00	Vertical	PASS
5	9867.321	-37.89	-13.00	Vertical	PASS
6	16098.454	-38.82	-13.00	Vertical	PASS



GSM1900(EDGE), Mid Channel



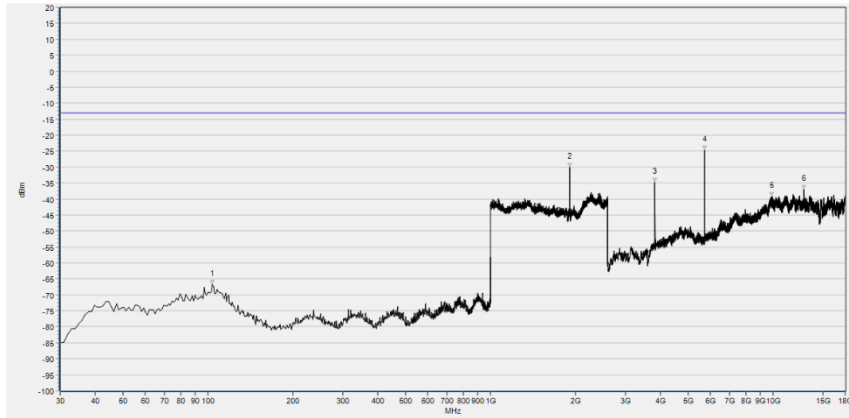
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	99.840	-68.36	-13.00	Horizontal	PASS
2	1879.712	-29.82	-13.00	Horizontal	N/A
3	3759.411	-37.83	-13.00	Horizontal	PASS
4	5641.353	-26.98	-13.00	Horizontal	PASS
5	9867.321	-38.14	-13.00	Horizontal	PASS
6	14776.614	-38.82	-13.00	Horizontal	PASS



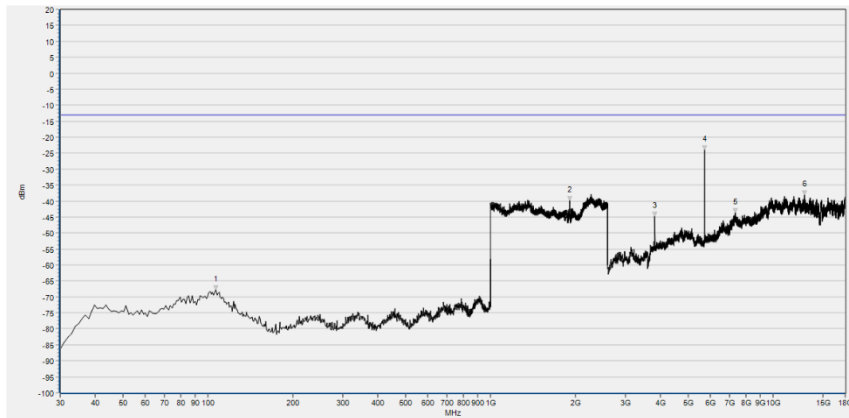
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	102.750	-68.05	-13.00	Vertical	PASS
2	1879.712	-39.54	-13.00	Vertical	N/A
3	3759.411	-43.13	-13.00	Vertical	PASS
4	5638.552	-26.41	-13.00	Vertical	PASS
5	7363.666	-43.69	-13.00	Vertical	PASS
6	16426.114	-38.55	-13.00	Vertical	PASS



GSM1900(EDGD), High Channel



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	103.720	-66.64	-13.00	Horizontal	PASS
2	1909.804	-30.12	-13.00	Horizontal	N/A
3	3818.221	-34.69	-13.00	Horizontal	PASS
4	5728.169	-24.63	-13.00	Horizontal	PASS
5	9914.930	-39.28	-13.00	Horizontal	PASS
6	12883.470	-36.94	-13.00	Horizontal	PASS

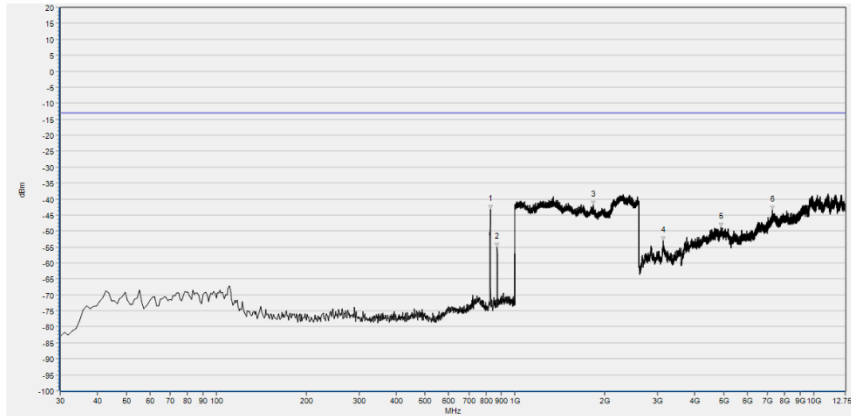


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	106.630	-67.80	-13.00	Vertical	PASS
2	1909.804	-39.96	-13.00	Vertical	N/A
3	3818.221	-44.80	-13.00	Vertical	PASS
4	5728.169	-24.08	-13.00	Vertical	PASS
5	7341.262	-43.80	-13.00	Vertical	PASS
6	12897.472	-38.09	-13.00	Vertical	PASS

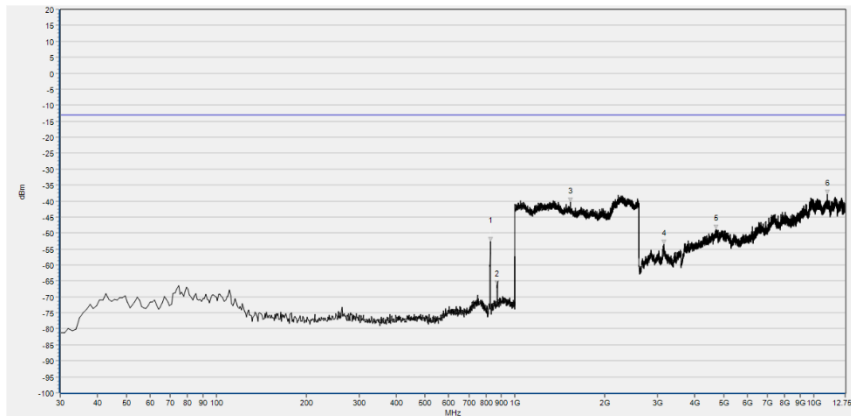




WCDMA Band V(WCDMA), Low Channel



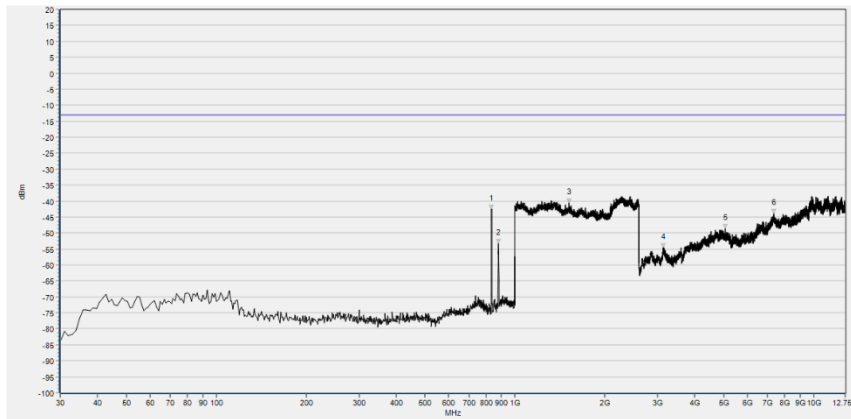
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	827.340	-43.22	-13.00	Horizontal	N/A
2	871.960	-55.00	-13.00	Horizontal	N/A
3	1831.052	-41.99	-13.00	Horizontal	PASS
4	3129.742	-53.03	-13.00	Horizontal	PASS
5	4883.242	-48.81	-13.00	Horizontal	PASS
6	7264.312	-43.49	-13.00	Horizontal	PASS



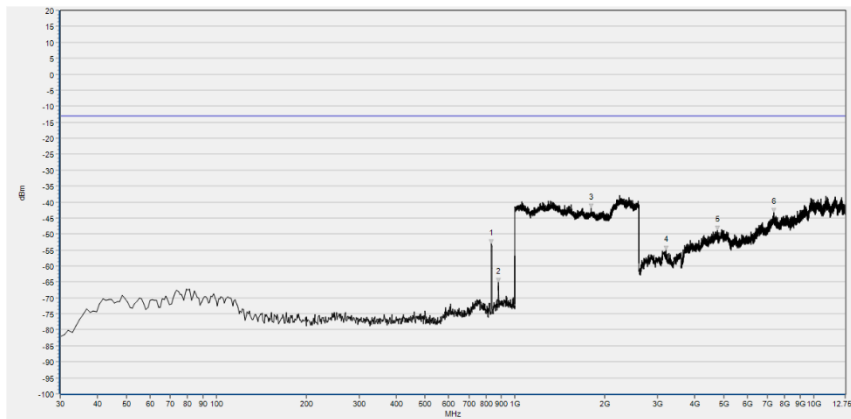
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	828.310	-52.68	-13.00	Vertical	N/A
2	870.990	-66.16	-13.00	Vertical	N/A
3	1532.053	-40.40	-13.00	Vertical	PASS
4	3148.200	-53.58	-13.00	Vertical	PASS
5	4718.967	-48.90	-13.00	Vertical	PASS
6	11134.934	-37.86	-13.00	Vertical	PASS



WCDMA Band V(WCDMA), Mid Channel



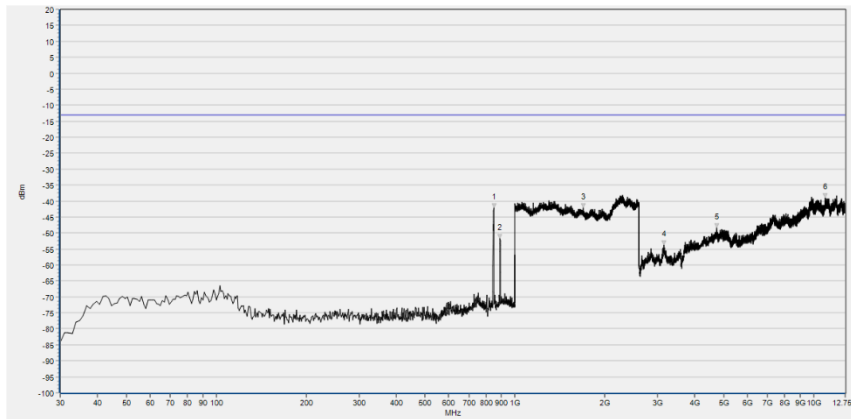
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	834.130	-42.54	-13.00	Horizontal	N/A
2	881.660	-53.26	-13.00	Horizontal	N/A
3	1515.406	-40.64	-13.00	Horizontal	PASS
4	3129.742	-54.68	-13.00	Horizontal	PASS
5	5053.055	-48.66	-13.00	Horizontal	PASS
6	7352.910	-43.90	-13.00	Horizontal	PASS



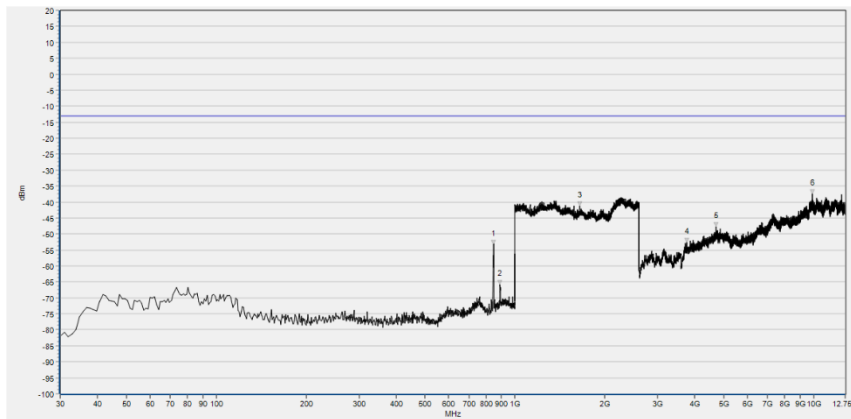
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	834.130	-53.10	-13.00	Vertical	N/A
2	881.660	-65.19	-13.00	Vertical	N/A
3	1797.119	-42.00	-13.00	Vertical	PASS
4	3198.036	-55.07	-13.00	Vertical	PASS
5	4763.266	-48.81	-13.00	Vertical	PASS
6	7365.830	-43.15	-13.00	Vertical	PASS



WCDMA Band V(WCDMA), High Channel



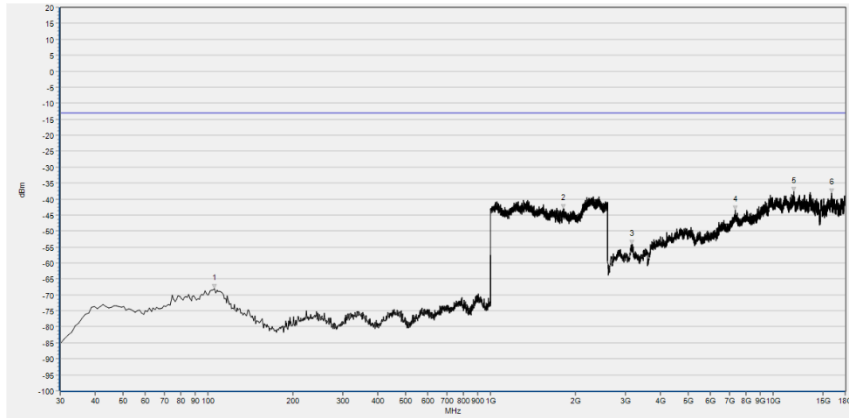
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	848.680	-42.14	-13.00	Horizontal	N/A
2	891.360	-51.77	-13.00	Horizontal	N/A
3	1694.038	-42.07	-13.00	Horizontal	PASS
4	3151.891	-53.80	-13.00	Horizontal	PASS
5	4746.654	-48.35	-13.00	Horizontal	PASS
6	10930.051	-38.96	-13.00	Horizontal	PASS



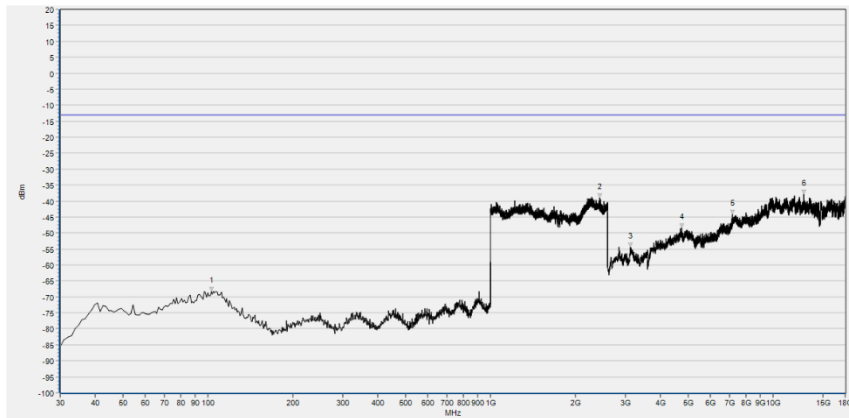
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	847.710	-53.21	-13.00	Vertical	N/A
2	890.390	-65.82	-13.00	Vertical	N/A
3	1648.579	-41.33	-13.00	Vertical	PASS
4	3764.694	-52.59	-13.00	Vertical	PASS
5	4715.276	-47.67	-13.00	Vertical	PASS
6	9881.642	-37.39	-13.00	Vertical	PASS



WCDMA Band IV(WCDMA), Low Channel



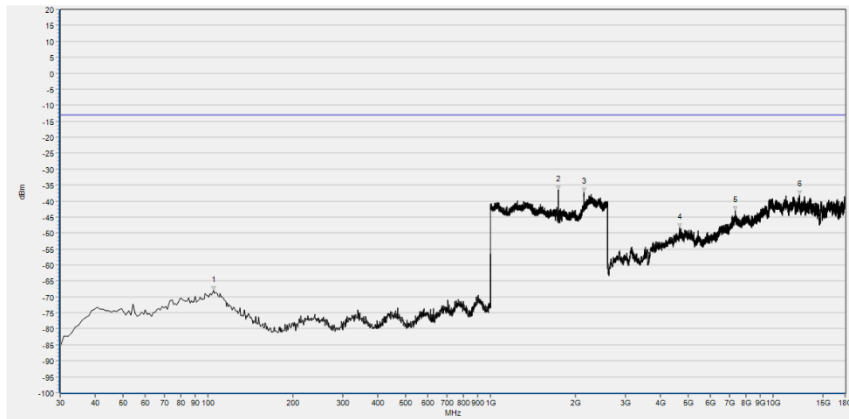
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	105.660	-67.94	-13.00	Horizontal	PASS
2	1811.845	-43.09	-13.00	Horizontal	PASS
3	3154.501	-54.15	-13.00	Horizontal	PASS
4	7344.063	-43.55	-13.00	Horizontal	PASS
5	11822.077	-37.57	-13.00	Horizontal	PASS
6	16090.053	-38.08	-13.00	Horizontal	PASS



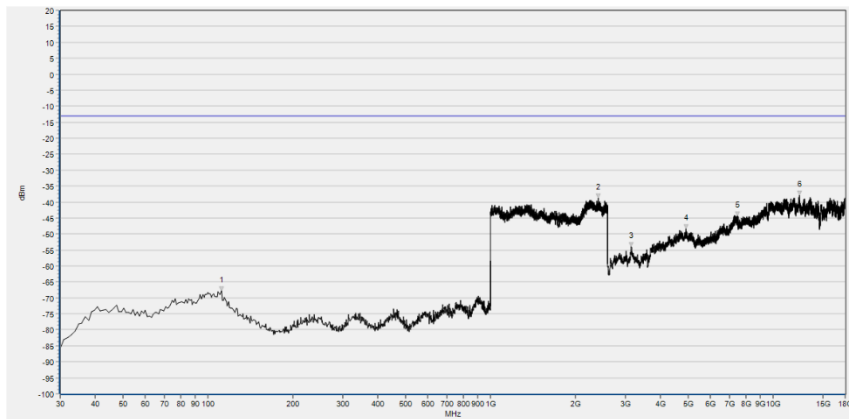
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	102.750	-68.36	-13.00	Vertical	PASS
2	2433.533	-38.98	-13.00	Vertical	PASS
3	3129.296	-54.48	-13.00	Vertical	PASS
4	4759.193	-48.30	-13.00	Vertical	PASS
5	7195.636	-44.06	-13.00	Vertical	PASS
6	12875.068	-37.92	-13.00	Vertical	PASS



WCDMA Band IV(WCDMA), Mid Channel



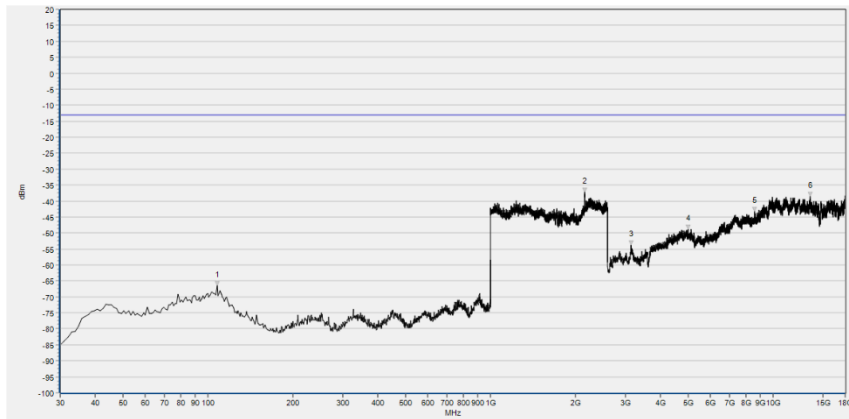
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	104.690	-67.98	-13.00	Horizontal	PASS
2	1738.856	-36.45	-13.00	Horizontal	N/A
3	2139.656	-37.14	-13.00	Horizontal	N/A
4	4680.778	-48.42	-13.00	Horizontal	PASS
5	7355.265	-43.03	-13.00	Horizontal	PASS
6	12373.777	-38.00	-13.00	Horizontal	PASS



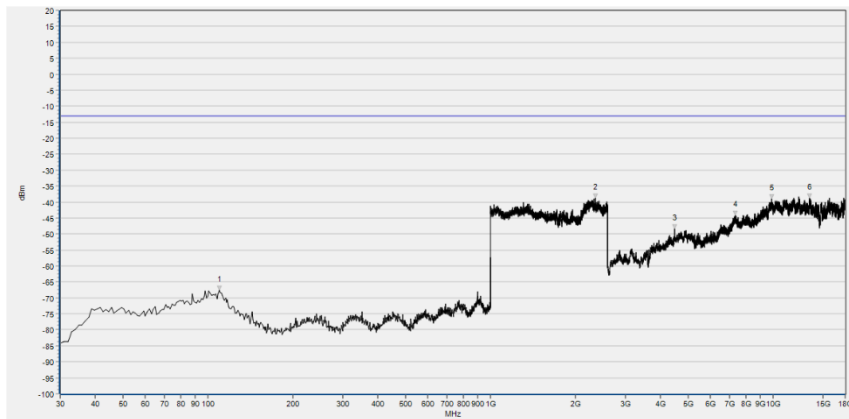
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	111.480	-67.84	-13.00	Vertical	PASS
2	2409.844	-38.78	-13.00	Vertical	PASS
3	3151.700	-53.94	-13.00	Vertical	PASS
4	4916.021	-48.37	-13.00	Vertical	PASS
5	7458.883	-44.43	-13.00	Vertical	PASS
6	12407.383	-37.96	-13.00	Vertical	PASS



WCDMA Band IV(WCDMA), High Channel



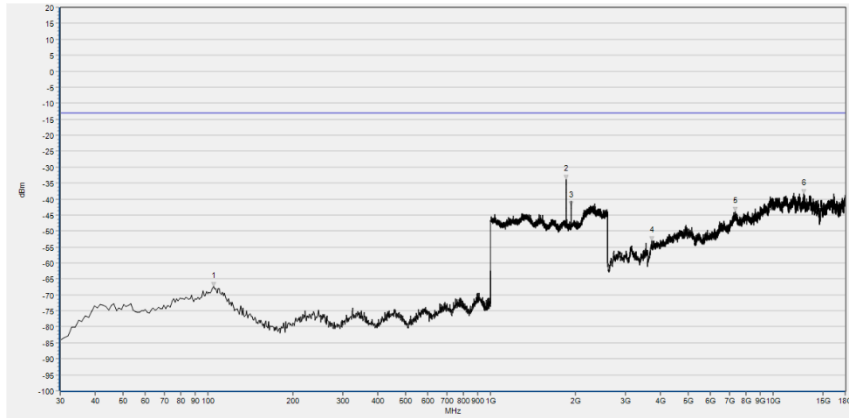
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	107.600	-66.59	-13.00	Horizontal	PASS
2	2153.101	-37.28	-13.00	Horizontal	N/A
3	3140.498	-53.65	-13.00	Horizontal	PASS
4	5005.637	-48.85	-13.00	Horizontal	PASS
5	8615.494	-43.21	-13.00	Horizontal	PASS
6	13547.190	-38.54	-13.00	Horizontal	PASS



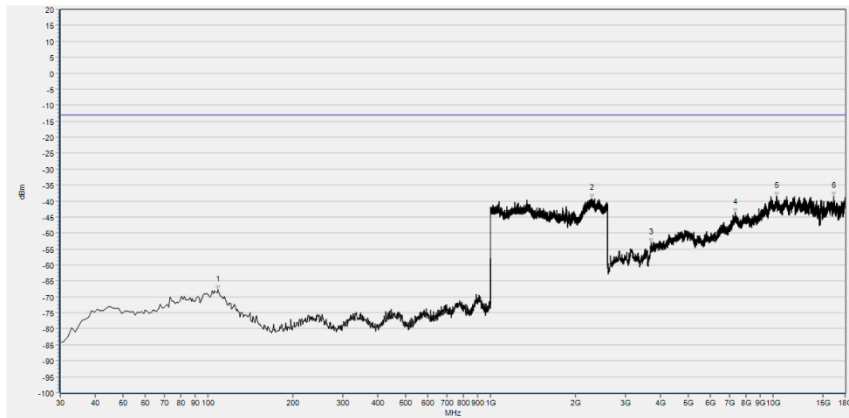
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	109.540	-67.68	-13.00	Vertical	PASS
2	2352.861	-38.77	-13.00	Vertical	PASS
3	4479.142	-48.34	-13.00	Vertical	PASS
4	7344.063	-44.24	-13.00	Vertical	PASS
5	9878.523	-39.06	-13.00	Vertical	PASS
6	13485.579	-38.81	-13.00	Vertical	PASS



WCDMA Band II(WCDMA), Low Channel



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	104.690	-67.39	-13.00	Horizontal	PASS
2	1851.541	-33.79	-13.00	Horizontal	N/A
3	1931.573	-42.06	-13.00	Horizontal	N/A
4	3717.403	-53.04	-13.00	Horizontal	PASS
5	7355.265	-43.80	-13.00	Horizontal	PASS
6	12861.066	-38.29	-13.00	Horizontal	PASS

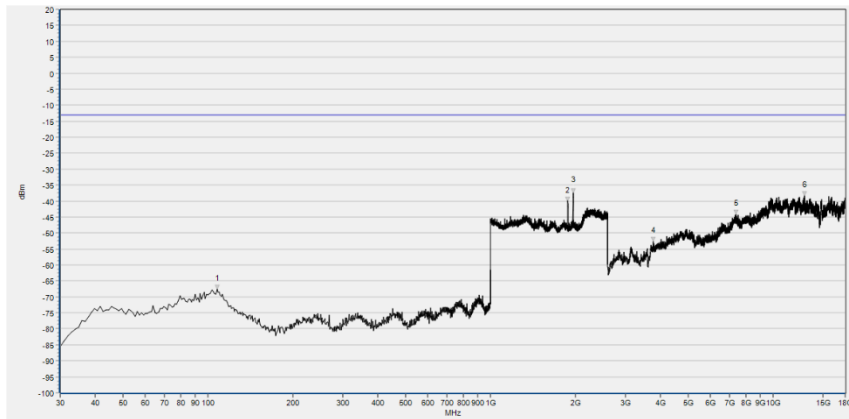


No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	108.570	-67.86	-13.00	Vertical	PASS
2	2284.994	-39.29	-13.00	Vertical	PASS
3	3709.002	-52.98	-13.00	Vertical	PASS
4	7344.063	-43.74	-13.00	Vertical	PASS
5	10284.597	-38.61	-13.00	Vertical	PASS
6	16353.301	-38.61	-13.00	Vertical	PASS

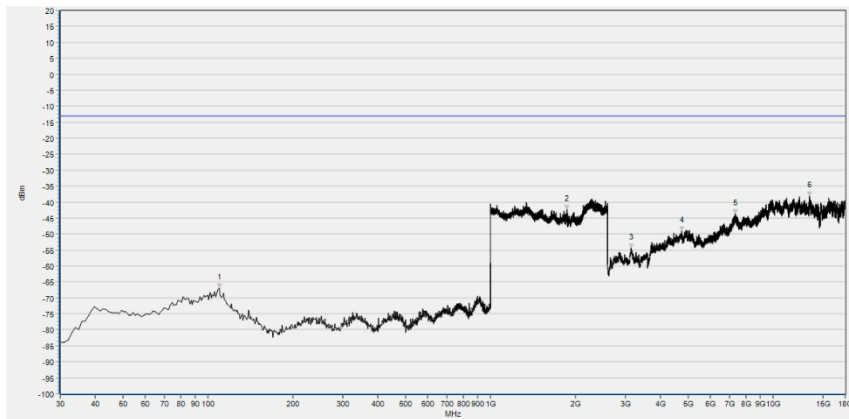




WCDMA Band II(WCDMA), Mid Channel



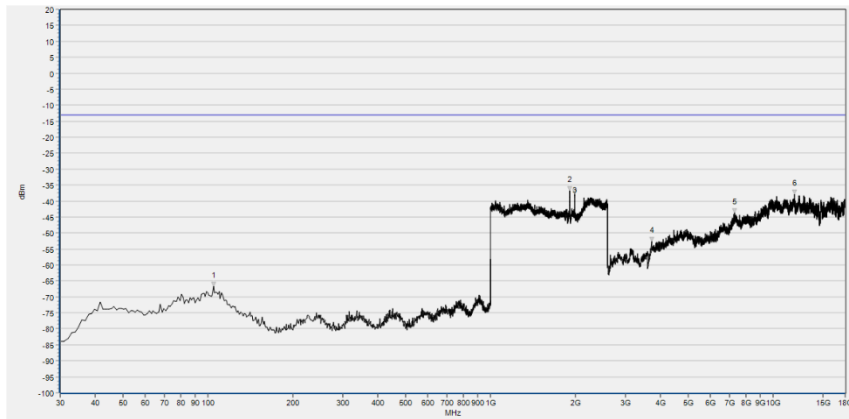
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	107.600	-67.65	-13.00	Horizontal	PASS
2	1878.431	-40.09	-13.00	Horizontal	N/A
3	1959.744	-37.33	-13.00	Horizontal	N/A
4	3756.610	-52.63	-13.00	Horizontal	PASS
5	7374.868	-44.24	-13.00	Horizontal	PASS
6	12894.672	-38.35	-13.00	Horizontal	PASS



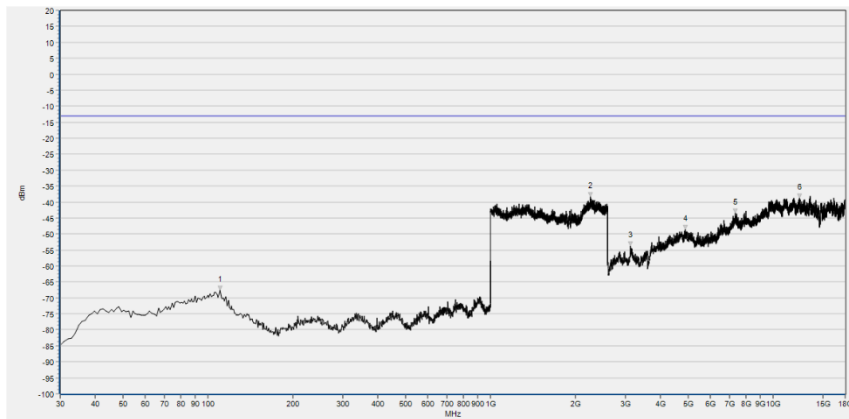
No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	109.540	-67.01	-13.00	Vertical	PASS
2	1861.785	-42.29	-13.00	Vertical	N/A
3	3146.099	-54.34	-13.00	Vertical	PASS
4	4756.392	-49.16	-13.00	Vertical	PASS
5	7349.664	-43.79	-13.00	Vertical	PASS
6	13491.180	-38.20	-13.00	Vertical	PASS



WCDMA Band II(WCDMA), High Channel



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	104.690	-66.81	-13.00	Horizontal	PASS
2	1908.523	-36.84	-13.00	Horizontal	N/A
3	1987.275	-37.76	-13.00	Horizontal	N/A
4	3711.802	-52.61	-13.00	Horizontal	PASS
5	7324.459	-43.59	-13.00	Horizontal	PASS
6	11889.289	-37.92	-13.00	Horizontal	PASS



No.	Fre.(MHz)	PK (dBm)	Limit (dBm)	Antenna	Verdict
1	110.510	-67.70	-13.00	Vertical	PASS
2	2260.024	-38.24	-13.00	Vertical	PASS
3	3123.695	-53.80	-13.00	Vertical	PASS
4	4885.215	-48.61	-13.00	Vertical	PASS
5	7349.664	-43.39	-13.00	Vertical	PASS
6	12404.583	-38.70	-13.00	Vertical	PASS





## Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test Items	Uncertainty
Output Power	$\pm 2.22\text{dB}$
Bandwidth	$\pm 5\%$
Conducted Spurious Emission	$\pm 2.77\text{dB}$
Radiated Emission	$\pm 2.95\text{dB}$

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .





## Annex B Testing Laboratory Information

### 1. Identification of the Responsible Testing Laboratory

<b>Laboratory Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd.
<b>Laboratory Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
<b>Telephone:</b>	+86 755 36698555
<b>Facsimile:</b>	+86 755 36698525

### 2. Identification of the Responsible Testing Location

<b>Name:</b>	Shenzhen Morlab Communications Technology Co., Ltd.
<b>Address:</b>	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

### 3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.





#### 4. Test Equipment Utilized

##### 4.1 Conducted Test Equipment

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
EXA Signal Analyzer	MY51511149	N9020A	Agilent	2023.06.21	2024.06.20
Communication Test Station	6200995016	MT8820C	Anritsu	2023.09.19	2024.09.18
Temperature Chamber	S022177101 00089002	KMT-36LF 1A0	KOMEG	2023.09.19	2024.09.18

##### 4.2 List of Software Used

Description	Manufacturer	Software Version
MORLAB EMCR	MORLAB	V1.2



**4.3 Radiated Test Equipment**

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
System Simulator	152038	CMW500	R&S	2023.10.17	2024.10.16
Receiver	MY54130016	N9038A	Agilent	2023.06.21	2024.06.20
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2023.07.01	2024.06.30
Test Antenna - Horn	9120D-963	BBHA 9120D	Schwarzbeck	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-K K-0.5	Qualwave	2023.07.04	2024.07.03
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-K KF-2	Qualwave	2023.07.04	2024.07.03
Preamplifier (10MHz-6GHz)	46732	S10M100L38 02	LUCIX CORP.	2023.06.27	2024.06.26
Preamplifier (2GHz-18GHz)	61171/61172	S020180L32 03	LUCIX CORP.	2023.06.27	2024.06.26
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2023.07.04	2024.07.03
Notch Filter	N/A	WRCG-GSM 850	Wainwright	N/A	N/A
Notch Filter	N/A	WRCG-GSM 1900	Wainwright	N/A	N/A
Notch Filter	N/A	WRCGV-W Band V	Wainwright	N/A	N/A
Notch Filter	N/A	WRCGV-W Band II	Wainwright	N/A	N/A





Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Notch Filter	N/A	WRCGV-W Band IV	Wainwright	N/A	N/A
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.05.10	2025.05.09

\_\_\_\_\_ END OF REPORT \_\_\_\_\_

