



# TEST REPORT

**APPLICANT** : Great Talent Technology Limited  
**PRODUCT NAME** : Smart phone  
**MODEL NAME** : freedom turbo XL  
**BRAND NAME** : Shock  
**FCC ID** : 2ALZM-TURBOXL  
**STANDARD(S)** : 47 CFR Part 22 Subpart H  
                  : 47 CFR Part 24 Subpart E  
                  : 47 CFR Part 27 Subpart L  
**RECEIPT DATE** : 2020-06-30  
**TEST DATE** : 2020-07-01 to 2020-07-29  
**ISSUE DATE** : 2020-10-20

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Change History		
Version	Date	Reason for change
1.0	2020-10-20	First edition



# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Great Talent Technology Limited
<b>Applicant Address:</b>	RM602,T3 Software Park,Nanshan,Shenzhen,China
<b>Manufacturer:</b>	Unimaxcomm
<b>Manufacturer Address:</b>	Floor 35th, HBC Huilong Centre 2nd Phase office building, Minzhi Street, Longhua District, Shenzhen, P.R. China 518057

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	Smart phone		
<b>Hardware Version:</b>	V10_0506		
<b>Software Version:</b>	Q6501_SFT656128_V1.0.29-userdebug		
<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+ Mode with QPSK Modulation		
<b>Operating Frequency Range:</b>	<b>GSM 850MHz:</b> Tx: 824MHz - 849MHz Rx: 869MHz - 894MHz  <b>GSM 1900MHz:</b> Tx: 1850MHz - 1910MHz Rx: 1930MHz - 1990MHz	<b>WCDMA Band V</b> Tx: 824MHz - 849MHz Rx: 869MHz - 894MHz  <b>WCDMA Band II</b> Tx: 1850MHz - 1910MHz Rx: 1930MHz - 1990MHz  <b>WCDMA Band IV</b> Tx: 1710MHz - 1755MHz Rx: 2110MHz - 2155MHz	



<b>Antenna Type:</b>	Fixed Internal	
<b>Antenna Gain:</b>	GSM 850:	1.36 dBi
	GSM1900:	1.08 dBi
	WCDMA Band V:	1.36 dBi
	WCDMA Band II:	1.08 dBi
	WCDMA Band IV:	0.29 dBi
<b>Accessory Information:</b>	<b>Battery</b>	
	Brand Name:	Milai
	Model No.:	426684P4000
	Capacity:	4000.00mAh
	Rated Voltage:	3.85V
	Charge Limit:	4.40V
	Manufacturer:	DONGGUAN MILLET ELECTRONIC CO.LTD
	<b>AC Adapter</b>	
	Brand Name:	Schok
	Model No.:	BLJ-QC06HU
	Rated Input:	100-240V ~ 50/60Hz 0.5A
	Rated Output:	12V=1.5A or 9V=2.0A or 5V=3.0A
	Manufacturer:	ZhongShan Baolijin Electronic Co., Ltd



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

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

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

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



### 1.3. Maximum ERP/EIRP and Emission Designator

System	Maximum ERP/EIRP (W)	Emission Designator
GSM850	1.400	251KGXW
EDGE850	0.420	249KG7W
GSM1900	1.230	247KGXW
EDGE1900	0.516	238KG7W
WCDMA Band V	0.221	4M17F9W
WCDMA Band II	0.201	4M13F9W
WCDMA Band IV	0.155	4M15F9W



## 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	Jul 1 to 6, 2020	Zhou Xiaolong	PASS	No deviation
2	24.232(d)	Peak -Average Ratio	Jul 6 to 8, 2020	Zhou Xiaolong	PASS	No deviation
3	2.1049	99% Occupied Bandwidth	Jul 8 to 10, 2020	Zhou Xiaolong	PASS	No deviation
4	2.1055, 22.355, 24.235, 27.54	Frequency Stability	Jul 13 to 15, 2020	Zhou Xiaolong	PASS	No deviation
5	2.1051, 22.917(a), 24.238(a),	Conducted Out of Band Emissions	Jul 16 to 21, 2020	Zhou Xiaolong	PASS	No deviation
6	2.1051, 22.917(a), 24.238(a),	Band Edge	Jul 22 to 29, 2020	Zhou Xiaolong	PASS	No deviation
7	22.913(a), 24.232(a)	Transmitter Radiated Power (EIPR/ERP)	Jul 18, to 20, 2020	Gao Jianrou	PASS	No deviation
8	2.1051, 22.917(a), 24.238(a)	Radiated Out of Band Emissions	Jul 15	Gao Jianrou	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

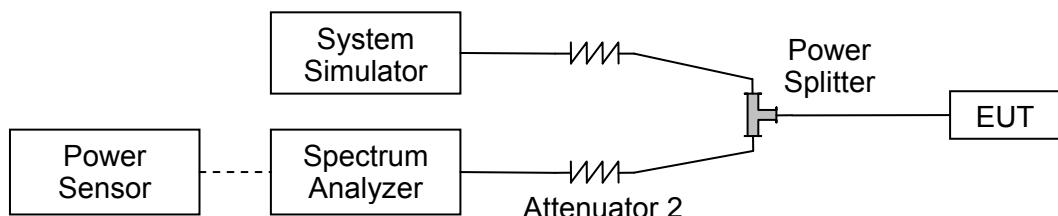
### 2.1. Conducted RF Output Power

#### 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	32.00	32.08	32.06	
GPRS 1 Tx slot	32.25	32.05	31.93	
GPRS 2 Tx slots	31.02	31.12	31.03	
GPRS 3 Tx slots	29.50	29.55	29.60	
GPRS 4 Tx slots	27.20	27.27	27.35	
EDGE 1 Tx slot	27.02	26.80	26.72	
EDGE 2 Tx slots	26.80	26.61	26.58	
EDGE 3 Tx slots	26.65	26.45	26.44	
EDGE 4 Tx slots	26.39	26.26	26.27	

<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	29.80	29.80	29.82	
GPRS 1 Tx slot	29.82	29.80	29.79	
GPRS 2 Tx slots	28.61	28.60	28.53	
GPRS 3 Tx slots	27.62	27.61	27.54	
GPRS 4 Tx slots	25.03	25.07	25.10	
EDGE 1 Tx slot	26.05	26.03	25.82	
EDGE 2 Tx slots	25.06	24.89	24.76	
EDGE 3 Tx slots	23.50	23.90	23.57	
EDGE 4 Tx slots	22.48	22.85	22.68	



WCDMA Band V	Average Power (dBm)		
<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>
AMR 12.2Kbps	23.70	23.83	23.70
RMC 12.2Kbps	22.70	22.56	22.65
HSDPA Subtest-1	21.66	21.64	21.74
HSDPA Subtest-2	20.89	20.76	20.82
HSDPA Subtest-3	20.84	20.76	21.07
HSDPA Subtest-4	21.64	21.44	21.71
HSUPA Subtest-1	21.61	21.54	21.69
HSUPA Subtest-2	21.41	21.38	21.44
HSUPA Subtest-3	22.59	22.54	22.55
HSUPA Subtest-4	21.65	21.45	21.35
HSUPA Subtest-5	22.01	21.89	21.88
HSPA+ (16QAM) Subtest-1	23.70	23.83	23.70

WCDMA Band II	Average Power (dBm)		
<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>
AMR 12.2Kbps	22.36	22.25	22.28
RMC 12.2Kbps	21.94	21.88	21.89
HSDPA Subtest-1	21.93	21.86	21.89
HSDPA Subtest-2	21.43	21.37	21.43
HSDPA Subtest-3	21.42	21.39	21.42
HSDPA Subtest-4	21.82	21.76	21.80
HSUPA Subtest-1	21.80	21.76	21.82
HSUPA Subtest-2	20.84	20.77	20.82
HSUPA Subtest-3	19.82	19.78	19.82
HSUPA Subtest-4	19.82	19.78	19.82
HSUPA Subtest-5	17.93	17.31	17.30
HSPA+ (16QAM) Subtest-1	22.36	22.25	22.28



WCDMA Band IV	Average Power (dBm)		
<b>TX Channel</b>	<b>1312</b>	<b>1413</b>	<b>1513</b>
<b>Frequency (MHz)</b>	<b>1712.4</b>	<b>1732.6</b>	<b>1752.6</b>
AMR 12.2Kbps	21.60	21.32	21.39
RMC 12.2Kbps	20.62	20.73	20.76
HSDPA Subtest-1	20.58	20.68	20.74
HSDPA Subtest-2	20.13	20.25	20.27
HSDPA Subtest-3	20.12	20.24	19.94
HSDPA Subtest-4	20.63	20.74	20.76
HSUPA Subtest-1	20.60	20.70	20.75
HSUPA Subtest-2	19.59	19.73	19.78
HSUPA Subtest-3	18.61	18.72	18.73
HSUPA Subtest-4	18.61	18.72	18.76
HSUPA Subtest-5	18.75	18.57	18.45
HSPA+ (16QAM) Subtest-1	21.60	21.32	21.39

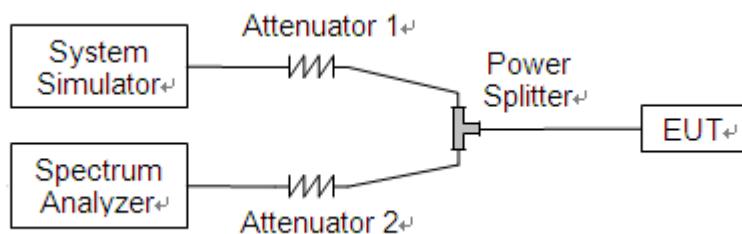
## 2.2. Peak to Average Ratio

### 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:

- Set RBW=1MHz, VBW=3MHz, peak detector in spectrum analyzer.
- Set EUT in maximum output power, and triggered the burst signal.
- Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average ratio.

2. For UMTS operating mode:

- Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
- 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 dB	Verdict
			dB		
GSM 1900MHz	512	1850.2	0.016	13	PASS
	661	1880.0	0.022		PASS
	810	1909.8	0.012		PASS
EDGE 1900MHz	512	1850.2	0.030	13	PASS
	661	1880.0	0.010		PASS
	810	1909.8	0.020		PASS

Band	Channel	Frequency (MHz)	Peak to Average ratio	Limit dB	Verdict
			dB		
WCDMA Band II	9262	1852.4	3.540	13	PASS
	9400	1880.0	3.580		PASS
	9538	1907.6	3.560		PASS
WCDMA Band IV	1312	1712.4	3.380	13	PASS
	1413	1732.6	3.420		PASS
	1513	1752.6	3.860		PASS



REPORT No. : SZ20060303W01

## GSM 1900MHz CH512 1850.2MHz



## GSM 1900MHz CH661 1880.0MHz



## GSM 1900MHz CH810 1909.8MHz

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REPORT No. : SZ20060303W01

**EDGE 1900MHz CH512 1850.2MHz**



EDGE 1900MHz CH661 1880.0MHz



EDGE 1900MHz CH810 1909.8MHz



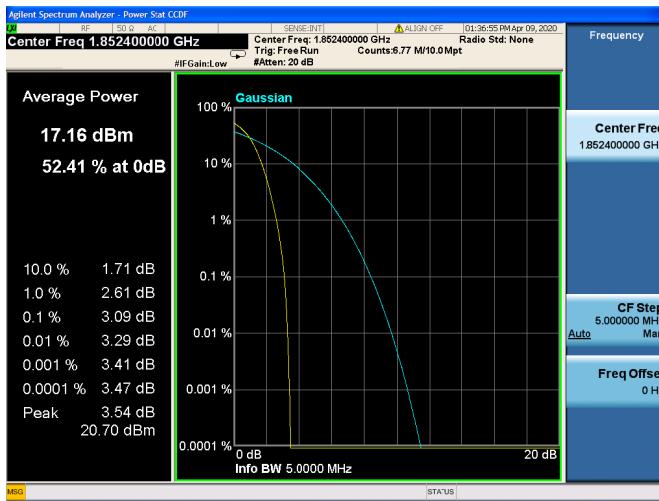
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## WCDMA Band II CH9262 1852.4MHz

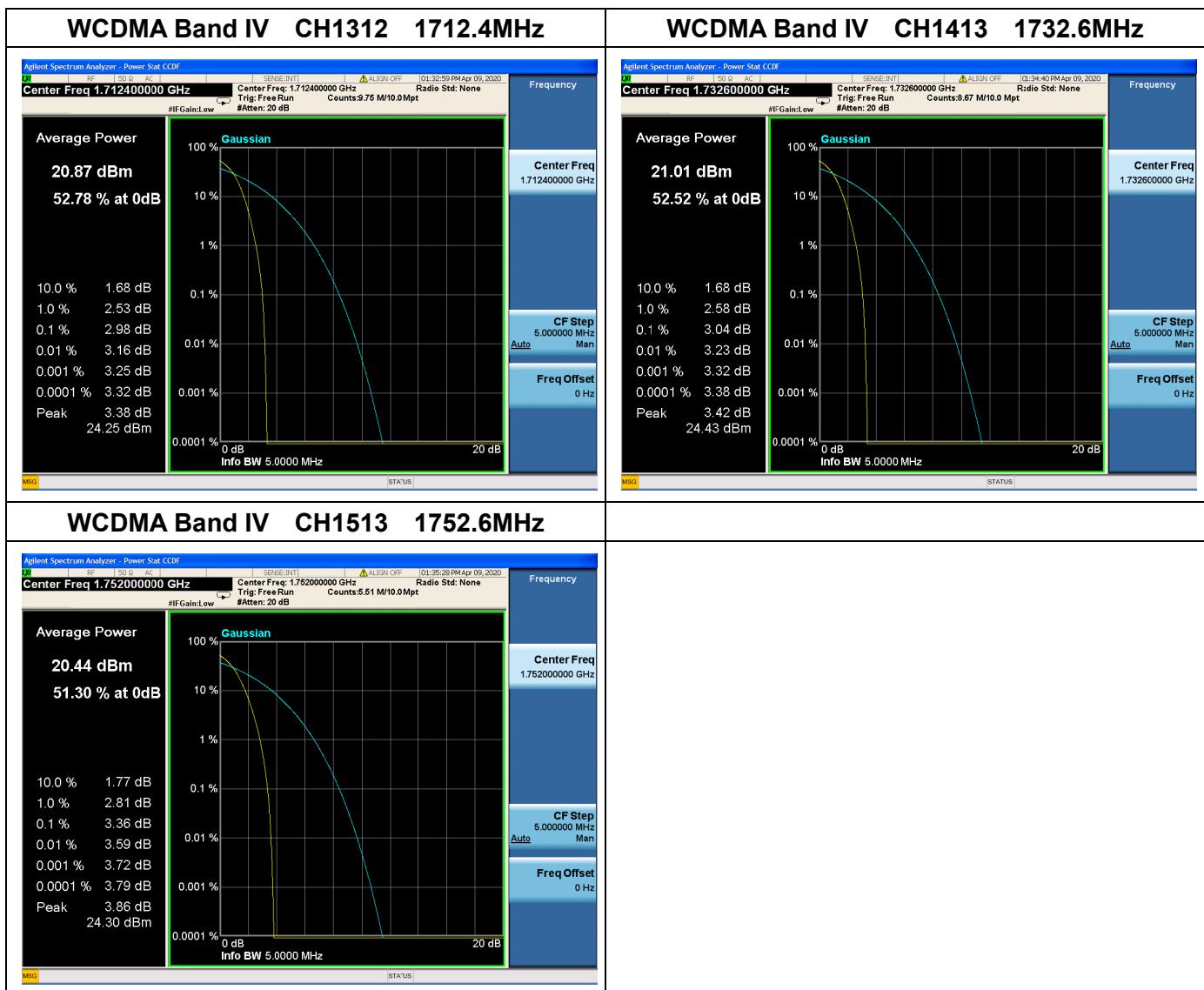


## WCDMA Band II CH9400 1880.0MHz



## WCDMA Band II CH9538 1907.6MHz





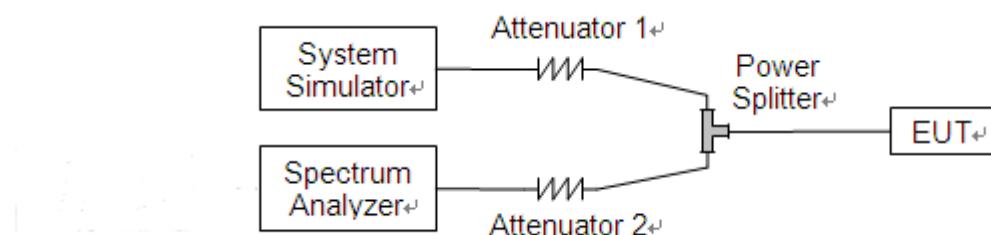
## 2.3.99% Occupied Bandwidth

### 2.3.1. Requirement

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. Occupied bandwidth is also known as the 99% emission bandwidth.

### 2.3.2. Test Description

Test Setup:



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



### 2.3.3. Test Result

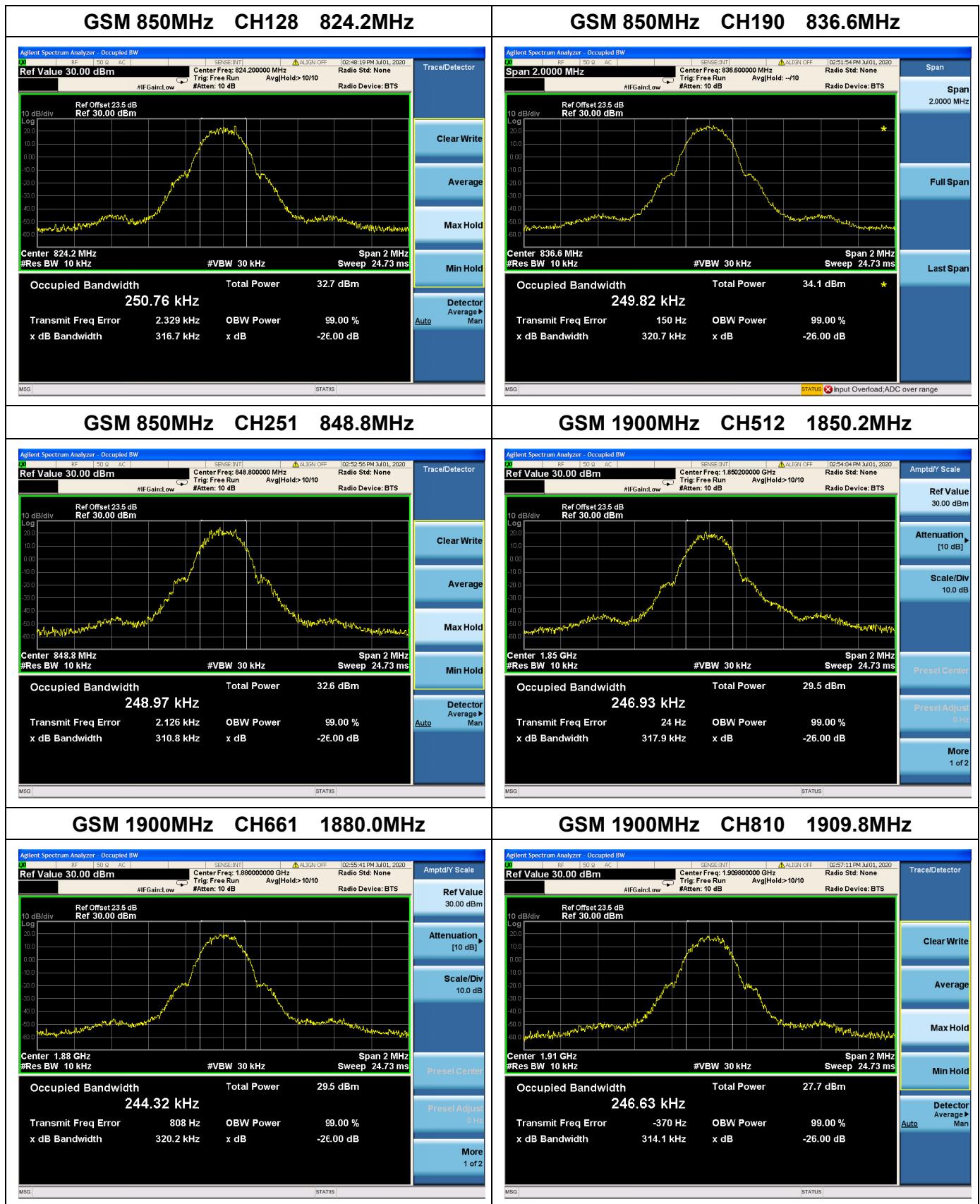
The lowest, middle and highest channels are selected to perform testing to record the 99% occupied bandwidth.

#### GSM Test Verdict:

Band	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)
GSM 850MHz	128	824.2	250.76	316.70
	190	836.6	249.82	320.70
	251	848.8	248.97	310.80
GSM 1900MHz	512	1850.2	246.93	317.90
	661	1880.0	244.32	320.20
	810	1909.8	246.63	314.10
EDGE 850MHz	128	824.2	248.70	322.40
	190	836.6	242.12	316.80
	251	848.8	245.64	311.70
EDGE 1900MHz	512	1850.2	238.30	310.80
	661	1880.0	237.40	311.20
	810	1909.8	236.89	313.30

#### WCDMA Test Verdict:

Band	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
WCDMA Band V	4132	826.4	4.167	4.769
	4182	836.4	4.157	4.766
	4233	846.6	4.112	4.732
WCDMA Band II	9262	1852.4	4.129	4.693
	9400	1880.0	4.130	4.715
	9538	1907.6	4.125	4.708
WCDMA Band IV	1312	1712.4	4.145	4.742
	1413	1732.6	4.144	4.733
	1513	1752.6	4.138	4.677





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**EDGE 850MHz CH128 824.2MHz**

Agilent Spectrum Analyzer - Occupied BW

Ref Value 30.00 dBm

Center Freq: 824.00000 MHz

#IFGain:Low

#Atten: 10 dB

Trig: Free Run

Avg|Hold>10/10

Radio Std: None

Radio Device: BTS

SENSE:INT

ALIGN OFF

10:13:57 AM Jul 02, 2020

10 dB/div

Ref Offset 23.5 dB

Ref 30.00 dBm

Log

20.0

10.0

0.0

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

Center 824.2 MHz

#Res BW 10 kHz

#VBW 30 kHz

Span 2 MHz

Sweep 24.73 ms

Occupied Bandwidth 248.70 kHz

Total Power 33.2 dBm

Transmit Freq Error -680 Hz

OBW Power 99.00 %

x dB Bandwidth 322.4 kHz

x dB -26.00 dB

MSG

STATUS

Clear Write

Average

Max Hold

Min Hold

Detector Average

Auto

Filter Type

Gaussian

**EDGE 850MHz CH190 836.6MHz**

Agilent Spectrum Analyzer - Occupied BW

Ref Value 30.00 dBm

Center Freq 836.600000 MHz

#IFGain:Low

#Atten: 10 dB

Trig: Free Run

Avg|Hold>10/10

Radio Std: None

Radio Device: BTS

SENSE:INT

ALIGN OFF

10:14:55 AM Jul 02, 2020

10 dB/div

Ref Offset 23.5 dB

Ref 30.00 dBm

Log

20.0

10.0

0.0

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

Center 836.6 MHz

#Res BW 10 kHz

#VBW 30 kHz

Span 2 MHz

Sweep 24.73 ms

Occupied Bandwidth 242.12 kHz

Total Power 32.9 dBm

Transmit Freq Error -264 Hz

OBW Power 99.00 %

x dB Bandwidth 316.8 kHz

x dB -26.00 dB

MSG

STATUS

**EDGE 850MHz CH251 848.8MHz**

Agilent Spectrum Analyzer - Occupied BW

Ref Value 30.00 dBm

Center Freq 848.800000 MHz

#IFGain:Low

#Atten: 10 dB

Trig: Free Run

Avg|Hold>10/10

Radio Std: None

Radio Device: BTS

SENSE:INT

ALIGN OFF

10:15:16 AM Jul 02, 2020

10 dB/div

Ref Offset 23.5 dB

Ref 30.00 dBm

Log

20.0

10.0

0.0

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

Center 848.8 MHz

#Res BW 10 kHz

#VBW 30 kHz

Span 2 MHz

Sweep 24.73 ms

Occupied Bandwidth 245.64 kHz

Total Power 31.7 dBm

Transmit Freq Error 2.287 kHz

OBW Power 99.00 %

x dB Bandwidth 311.7 kHz

x dB -26.00 dB

MSG

STATUS

Frequency

Center Freq 848.800000 MHz

CF Step 200.000 kHz

Auto

Freq Offset 0 Hz

**EDGE 1900MHz CH512 1850.2MHz**

Agilent Spectrum Analyzer - Occupied BW

Ref Value 30.00 dBm

Center Freq 1.850200000 GHz

#IFGain:Low

#Atten: 10 dB

Trig: Free Run

Avg|Hold>10/10

Radio Std: None

Radio Device: BTS

SENSE:INT

ALIGN OFF

10:15:28 AM Jul 02, 2020

10 dB/div

Ref Offset 23.5 dB

Ref 30.00 dBm

Log

20.0

10.0

0.0

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

Center 1.85 GHz

#Res BW 10 kHz

#VBW 30 kHz

Span 2 MHz

Sweep 24.73 ms

Occupied Bandwidth 238.30 kHz

Total Power 30.3 dBm

Transmit Freq Error -1.906 kHz

OBW Power 99.00 %

x dB Bandwidth 310.8 kHz

x dB -26.00 dB

MSG

STATUS

Frequency

Center Freq 1.850200000 GHz

CF Step 200.000 kHz

Auto

Freq Offset 0 Hz

**EDGE 1900MHz CH661 1880.0MHz**

Agilent Spectrum Analyzer - Occupied BW

Ref Value 30.00 dBm

Center Freq 1.880000000 GHz

#IFGain:Low

#Atten: 10 dB

Trig: Free Run

Avg|Hold>10/10

Radio Std: None

Radio Device: BTS

SENSE:INT

ALIGN OFF

10:16:06 AM Jul 02, 2020

10 dB/div

Ref Offset 23.5 dB

Ref 30.00 dBm

Log

20.0

10.0

0.0

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

Center 1.88 GHz

#Res BW 10 kHz

#VBW 30 kHz

Span 2 MHz

Sweep 24.73 ms

Occupied Bandwidth 237.40 kHz

Total Power 29.8 dBm

Transmit Freq Error -1.639 kHz

OBW Power 99.00 %

x dB Bandwidth 311.2 kHz

x dB -26.00 dB

MSG

STATUS

Frequency

Center Freq 1.880000000 GHz

CF Step 200.000 kHz

Auto

Freq Offset 0 Hz

**EDGE 1900MHz CH810 1909.8MHz**

Agilent Spectrum Analyzer - Occupied BW

Ref Value 30.00 dBm

Center Freq 1.909800000 GHz

#IFGain:Low

#Atten: 10 dB

Trig: Free Run

Avg|Hold>10/10

Radio Std: None

Radio Device: BTS

SENSE:INT

ALIGN OFF

10:16:38 AM Jul 02, 2020

10 dB/div

Ref Offset 23.5 dB

Ref 30.00 dBm

Log

20.0

10.0

0.0

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

Center 1.91 GHz

#Res BW 10 kHz

#VBW 30 kHz

Span 2 MHz

Sweep 24.73 ms

Occupied Bandwidth 236.89 kHz

Total Power 29.3 dBm

Transmit Freq Error -914 Hz

OBW Power 99.00 %

x dB Bandwidth 313.3 kHz

x dB -26.00 dB

MSG

STATUS

Frequency

Center Freq 1.909800000 GHz

CF Step 200.000 kHz

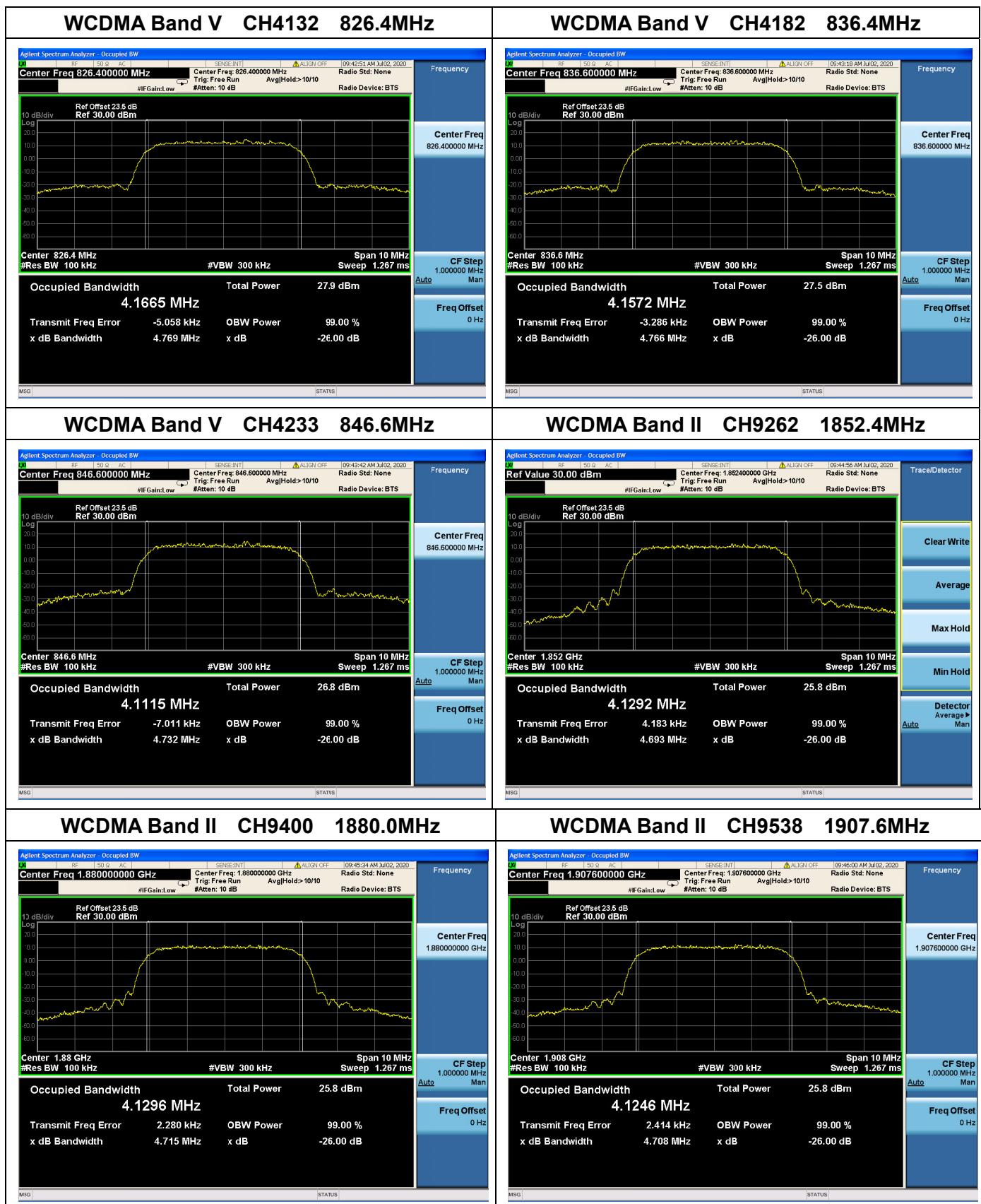
Auto

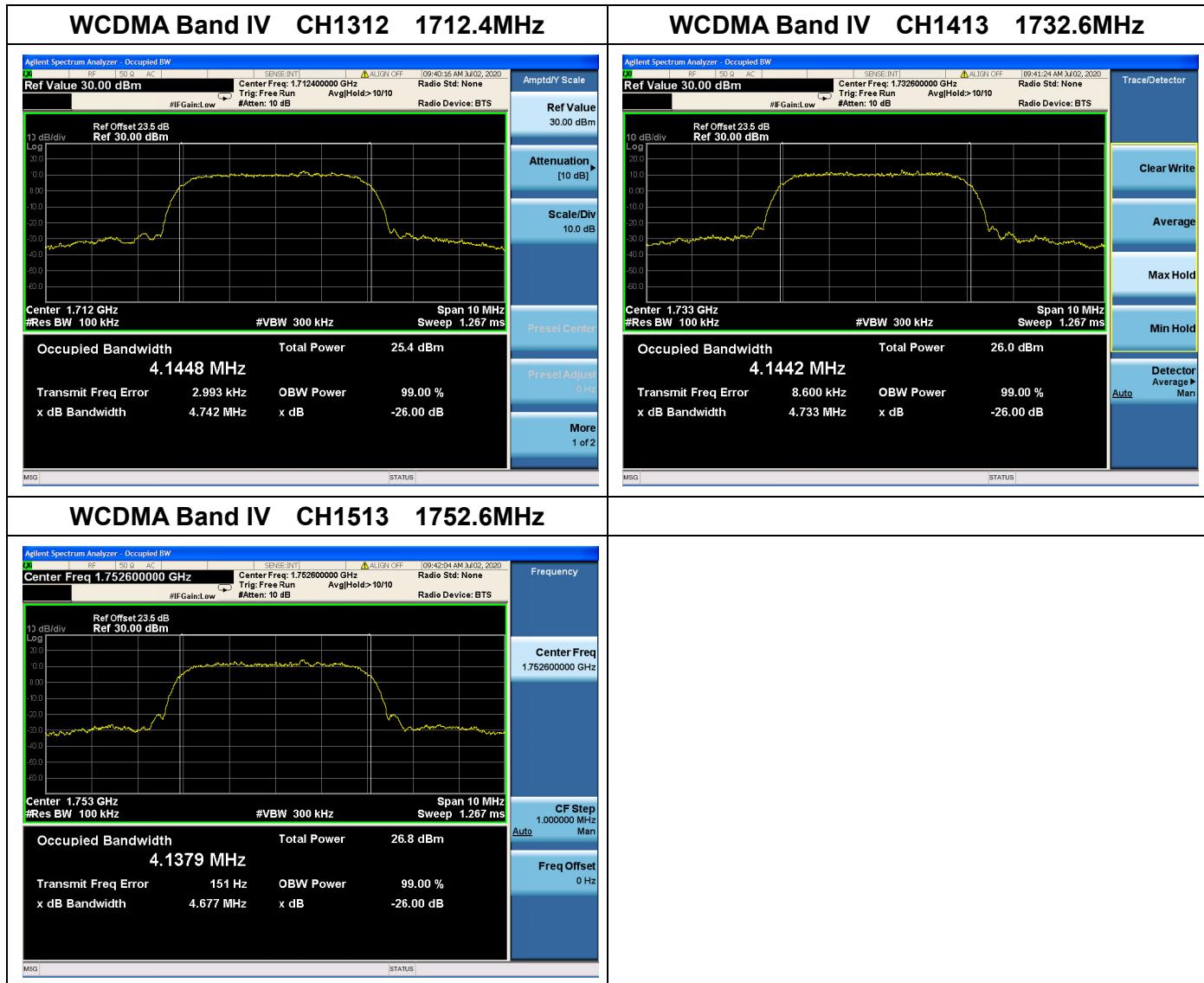
Freq Offset 0 Hz

MORLAB

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## 2.4. Frequency Stability

### 2.4.1. Requirement

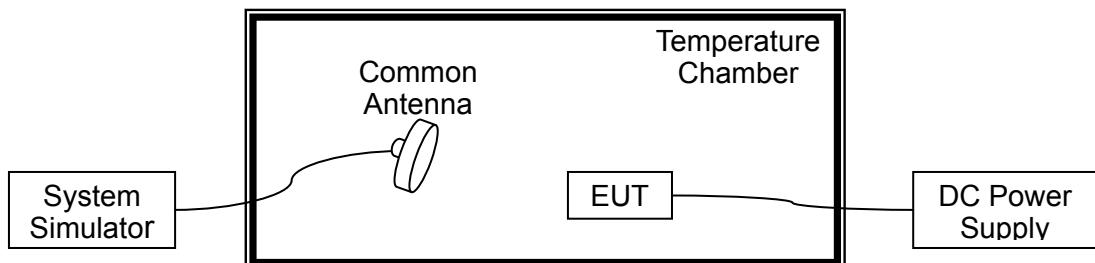
According to FCC section 22.355, 24.235 and 27.54 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from -30°C to +50°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 manufacturer. 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.

Product operating temperature from -10°C to +45°C

### 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 3.85VDC, 4.40VDC and 3.70VDC, which are specified by the applicant; the normal temperature here used is 20°C.

#### A. Test Verdict:

GSM 850MHz, Channel 190, Frequency 836.6MHz					
Limit = $\pm 2.5$ ppm					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	24	0.029	PASS
100		-10	-45	-0.054	
100		0	26	0.031	
100		+10	13	0.016	
100		+20	22	0.026	
100		+30	76	0.091	
100		+40	62	0.074	
100		+45	52	0.062	
115	4.40	+20	-9	-0.011	
85	3.70	+20	-67	-0.080	

GSM 1900MHz, Channel 661, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	93	0.049	PASS
100		-10	-24	-0.013	
100		0	-25	-0.013	
100		+10	-51	-0.027	
100		+20	40	0.021	
100		+30	-74	-0.039	
100		+40	33	0.018	
100		+45	27	0.014	
115	4.40	+20	15	0.008	
85	3.70	+20	-54	-0.029	



EDGE 850MHz, Channel 190, Frequency 836.6MHz					
Limit = $\pm 2.5$ ppm					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	22	0.026	PASS
100		-10	-70	-0.084	
100		0	-25	-0.030	
100		+10	53	0.063	
100		+20	12	0.014	
100		+30	25	0.030	
100		+40	23	0.027	
100		+45	36	0.043	
115	4.40	+20	-31	-0.037	
85	3.70	+20	-45	-0.054	

EDGE 1900MHz, Channel 661, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	40	0.021	PASS
100		-10	-25	-0.013	
100		0	-87	-0.046	
100		+10	-81	-0.043	
100		+20	29	0.015	
100		+30	81	0.043	
100		+40	18	0.010	
100		+45	27	0.014	
115	4.40	+20	18	0.010	
85	3.70	+20	-22	-0.012	



WCDMA Band V, Channel 4182, Frequency 836.4MHz					
Limit = $\pm 2.5$ ppm					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	33	0.039	PASS
100		-10	-25	-0.030	
100		0	-38	-0.045	
100		+10	31	0.037	
100		+20	15	0.018	
100		+30	23	0.027	
100		+40	42	0.050	
100		+45	58	0.069	
115	4.40	+20	-63	-0.075	
85	3.70	+20	-30	-0.036	

WCDMA Band II, Channel 9400, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	23	0.012	PASS
100		-10	-82	-0.044	
100		0	-30	-0.016	
100		+10	-28	-0.015	
100		+20	85	0.045	
100		+30	89	0.047	
100		+40	55	0.029	
100		+45	42	0.022	
115	4.40	+20	41	0.022	
85	3.70	+20	-87	-0.046	



WCDMA Band IV, Channel 1413, Frequency 1732.6MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	-52	-0.030	PASS
100		-10	-65	-0.038	
100		0	-58	-0.033	
100		+10	-32	-0.018	
100		+20	-67	-0.039	
100		+30	-34	-0.020	
100		+40	69	0.040	
100		+45	73	0.042	
115	4.40	+20	12	0.007	
85	3.70	+20	-58	-0.033	

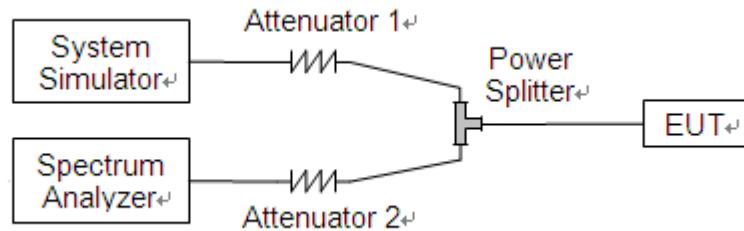
## 2.5. Conducted Out of Band Emissions

### 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.

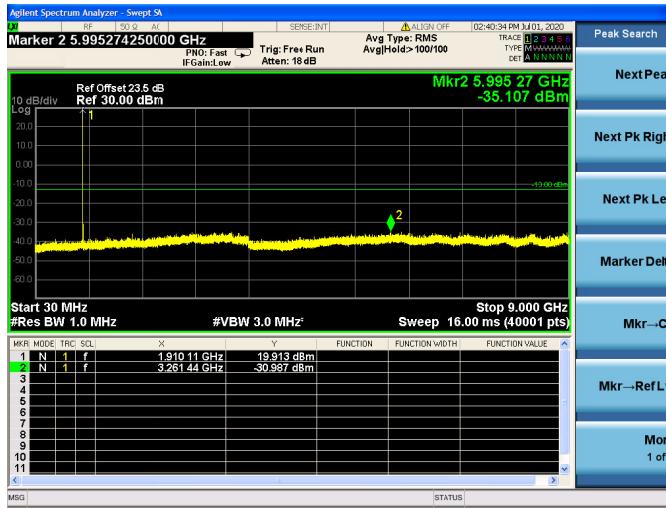
### 2.5.3. Test Result

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.

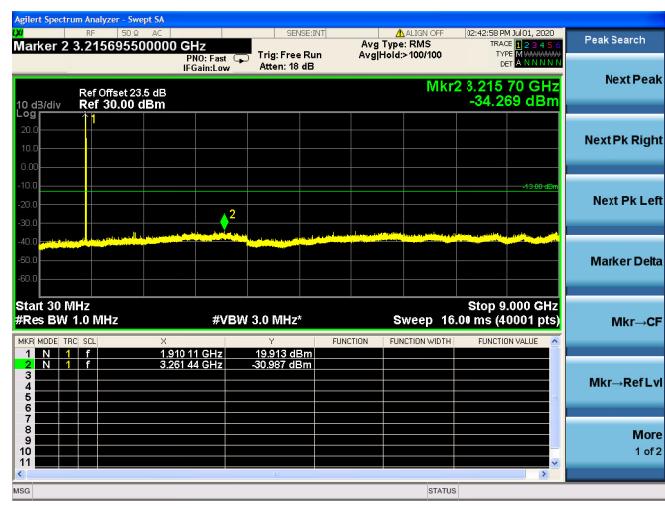


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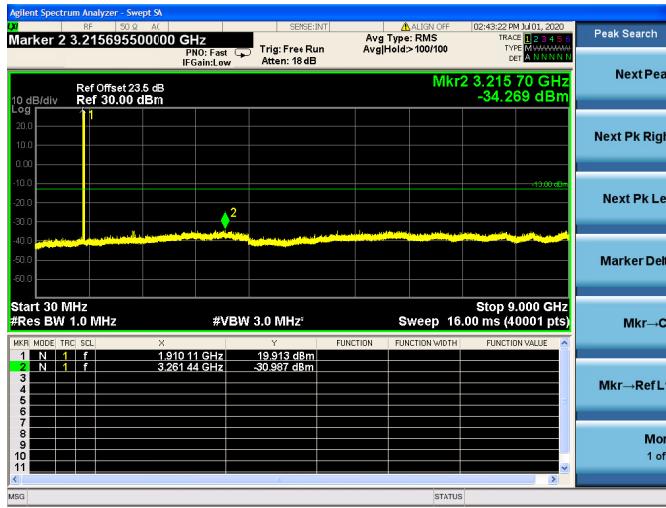
## GSM 850MHz CH128 824.2MHz



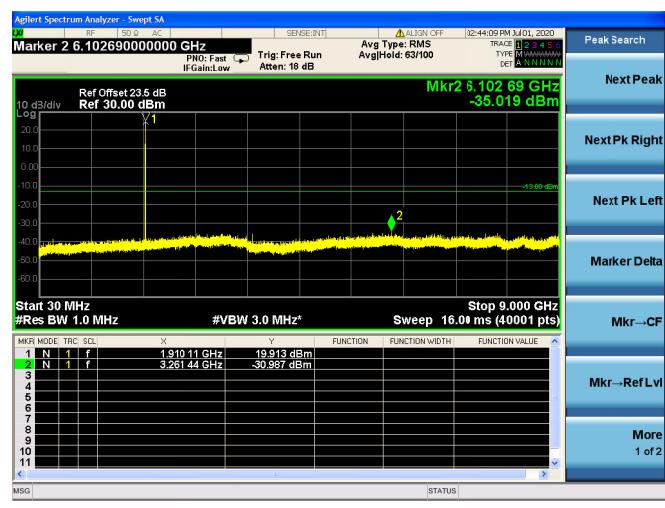
## GSM 850MHz CH190 836.6MHz



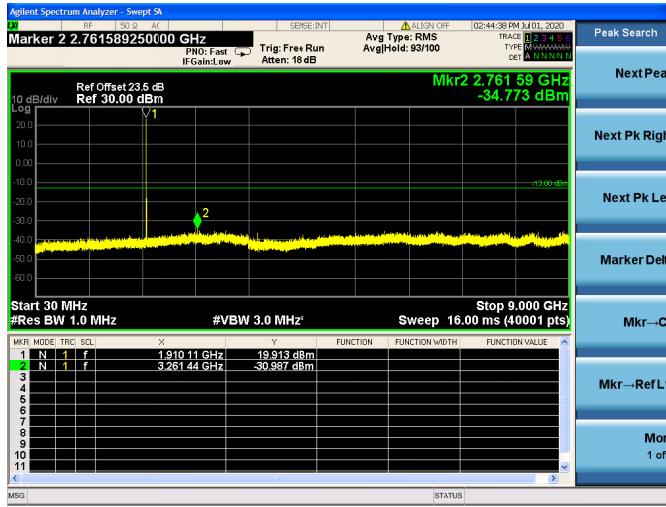
## GSM 850MHz CH251 848.8MHz



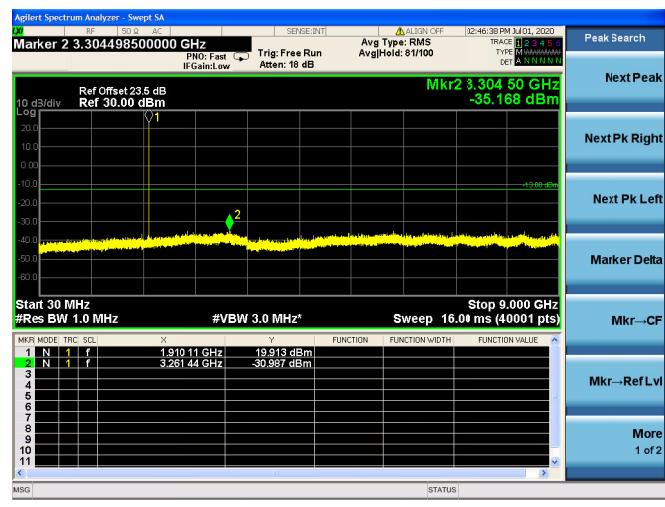
## GSM 1900MHz CH512 1850.2MHz

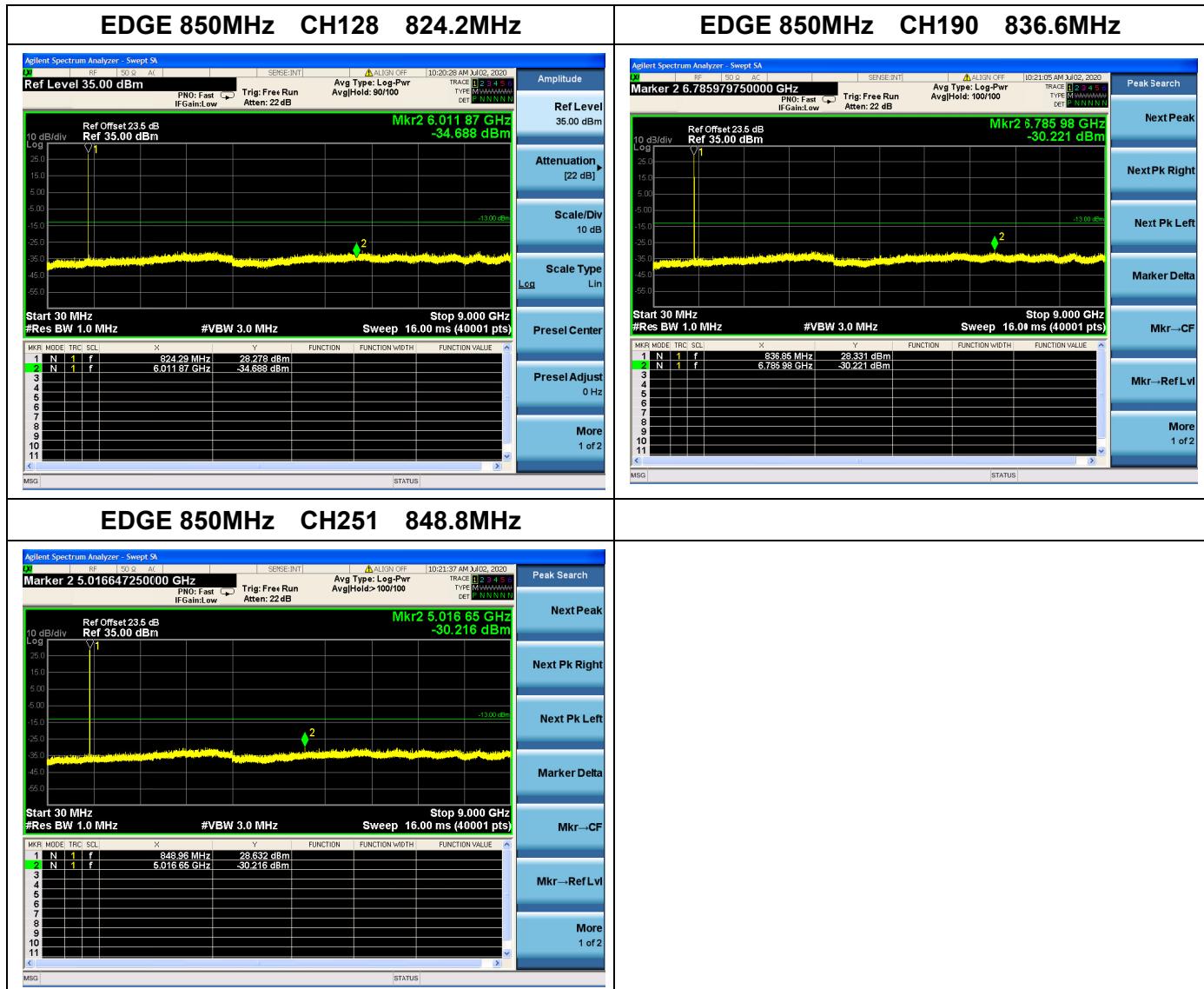


## GSM 1900MHz CH661 1880.0MHz



## GSM 1900MHz CH810 1909.8MHz

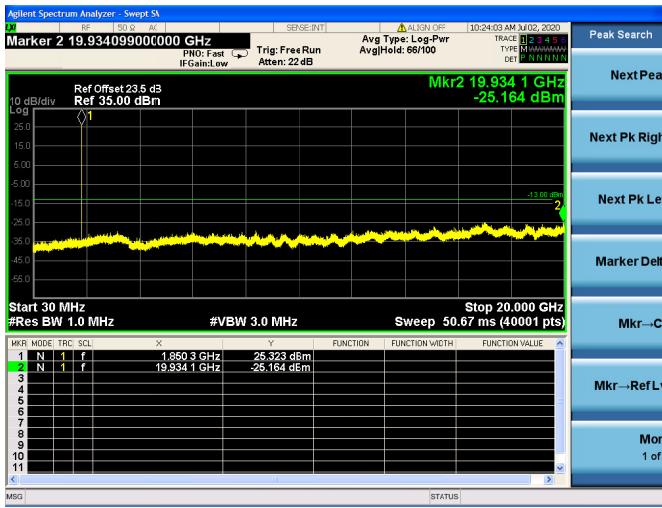
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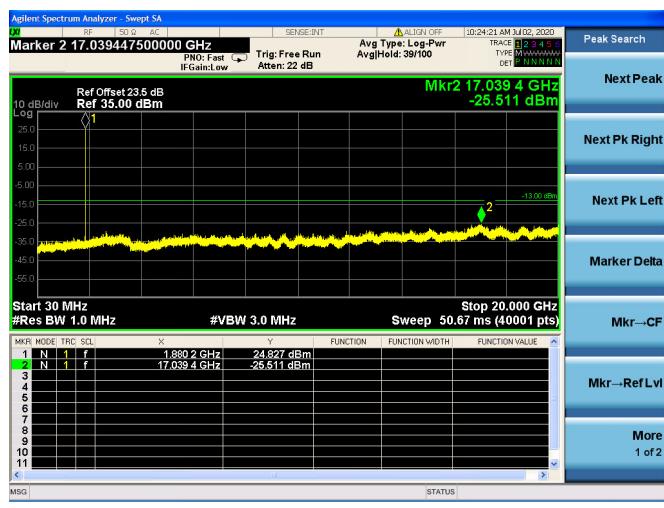


REPORT No. : SZ20060303W01

**EDGE 1900MHz CH512 1850.2MHz**



EDGE 1900MHz CH661 1880.0MHz



**EDGE 1900MHz CH810 1909.8MHz**

