



REPORT No.: SZ19080162W01

# TEST REPORT

**APPLICANT** : Power Idea Technology  
(Shenzhen) Co., Ltd.

**PRODUCT NAME** : LTE SMARTPHONE

**MODEL NAME** : RG170

**BRAND NAME** : RugGear

**FCC ID** : ZLE-RG170

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

**RECEIPT DATE** : 2019-08-22

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Peng Huarui ( Supervisor )

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Change History		
Version	Date	Reason for change
1.0	2019-09-09	First edition

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# 1. Technical Information

**Note:** Provide by applicant.

## 1.1. Applicant and Manufacturer Information

<b>Applicant:</b>	Power Idea Technology (Shenzhen) Co., Ltd.
<b>Applicant Address:</b>	4th Floor, A Section, Languang Science&technology Building, No.7 Xinxin RD, Hi-Tech Industrial Park North, Nanshan District, Shenzhen, P.R.C.
<b>Manufacturer:</b>	Power Idea Technology (Shenzhen) Co., Ltd.
<b>ManufacturerAddress:</b>	4th Floor, A Section, Languang Science&technology Building, No.7 Xinxin RD, Hi-Tech Industrial Park North, Nanshan District, Shenzhen, P.R.C.

## 1.2. Equipment Under Test (EUT) Description

<b>Product Name:</b>	LTE SMARTPHONE
<b>Serial No:</b>	(N/A, marked #1 by test site)
<b>Hardware Version:</b>	V1.0
<b>Software Version:</b>	RG170_US_1.0.0.0.0_1_20190903
<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 HSUPA Mode with QPSK Modulation
<b>Operating Frequency Range:</b>	<b>GSM 850MHz:</b> Tx: 824.20 - 848.80MHz Rx: 869.20 - 893.80MHz <b>GSM 1900MHz:</b> Tx: 1850.20 - 1909.80MHz Rx: 1930.20 - 1989.80MHz <b>WCDMA Band V</b> Tx: 826.4 - 846.6MHz Rx: 871.4 - 891.6MHz <b>WCDMA Band II</b> Tx: 1852.4 - 1907.6MHz



	Rx: 1932.4 - 1987.6MHz <b>WCDMA Band IV</b> Tx: 1712.4 – 1752.6MHz Rx: 2112.4 - 2152.6MHz
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<b>Antenna Type:</b>	PIFA Antenna
	GSM 850: -0.5 dBi
	GSM1900: 0.8 dBi
	WCDMA Band V: -0.5 dBi
	WCDMA Band II: 0.8 dBi
	WCDMA Band IV: 0.5 dBi
	Battery 1
	Brand Name: (N/A, marked #1 by test site)
	Model No.: BL280MP
	Serial No.: (N/A, marked #1 by test site)
	Capacity: 2800mAh
	Rated Voltage: 3.7V
	Charge Limit: 4.2V
	Battery 2
	Brand Name: (N/A, marked #1 by test site)
	Model No.: BL312NP
	Serial No.: (N/A, marked #1 by test site)
	Capacity: 3120mAh
	Rated Voltage: 3.6V
	Charge Limit: 4.2V
<b>Accessory Information:</b>	AC Adapter 1
	Brand Name: (N/A, marked #1 by test site)
	Model No.: HKC0055010-2D
	Serial No.: (N/A, marked #1 by test site)
	Rated Input: 100-240V~50/60Hz 0.2A
	Rated Output: 5V=1.0A

**Note 1:** The transmitter (Tx) frequency arrangement of the Cellular 850MHz band used by the EUT can be represented with the formula  $F(n)=824.2+0.2*(n-128)$ ,  $128 \leq n \leq 251$ ; the lowest, middle, highest channel numbers (ARFCNs) 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 (ARFCNs) 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 (ARFCNs) 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 (ARFCNs) 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 (ARFCNs) used and tested in this report are separately 1312 (1712.4MHz), 1413 (1732.6MHz) and 1513 (1752.6MHz).

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

- GPRS mode and EDGE mode for GSM 850;
- GPRS mode and EDGE mode for GSM 1900;
- WCDMA mode for WCDMA band 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.



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

System	Emission Designator	
GSM850	0.845	249KGXW
EDGE850	0.638	247KG7W
GSM1900	1.069	248KGXW
EDGE1900	0.472	247KG7W
WCDMA Band V	0.106	4M16F9W
WCDMA Band II	0.189	4M17F9W
WCDMA Band IV	0.187	4M17F9W

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## 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
1	2.1046	Conducted RF Output Power	Aug 26, 2019	Gao Mingzhou	PASS
2	24.232(d),27.50(d)	Peak -Average Ratio	Aug 27, 2019	Gao Mingzhou	PASS
3	2.1049	99% Occupied Bandwidth	Aug 27, 2019	Gao Mingzhou	PASS
4	2.1055,22.355, 24.235, 27.54	Frequency Stability	Sept 1, 2019	Gao Mingzhou	PASS
5	2.1051,22.917(a),2 4.238(a), 27.53(h)	Conducted Out of Band Emissions	Aug 27, 2019 Sept 2, 2019	Gao Mingzhou	PASS
6	2.1051,22.917(a),2 4.238(a), 27.53(h)	Band Edge	Aug 30, 2019	Gao Mingzhou	PASS
7	22.913(a),24.232(a )	Transmitter Radiated Power (EIPR/ERP)	Aug 23&24, 2019	Wang Dalong	PASS
8	2.1051,22.917(a),2 4.238(a), 27.53(h)	Radiated Out of Band Emissions	Aug 23&24, 2019	Wang Dalong	PASS

**Note 1:** The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03 (Oct 27, 2017)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.



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## 1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

## 2. 47 CFR Part 2, Part 22H , 24E&27L Requirements

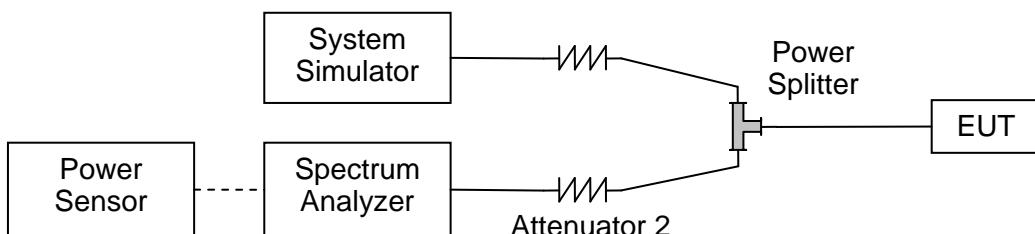
### 2.1. Conducted RF Output Power

#### 2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

#### 2.1.2. Test Description

Test Setup:



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



### 2.1.3. Test Results

GSM850	Average Power (dBm)		
<b>TX Channel</b>	<b>128</b>	<b>190</b>	<b>251</b>
<b>Frequency (MHz)</b>	<b>824.2</b>	<b>836.6</b>	<b>848.8</b>
GSM 1 Tx slot	31.67	31.55	31.49
GPRS 1 Tx slot	31.75	31.62	31.57
GPRS 2 Tx slots	30.48	30.41	30.48
GPRS 3 Tx slots	28.47	28.44	28.32
GPRS 4 Tx slots	27.39	27.29	27.27
EDGE 1 Tx slot	26.77	26.11	26.65
EDGE 2 Tx slots	24.16	23.98	24.07
EDGE 3 Tx slots	22.05	21.85	21.90
EDGE 4 Tx slots	21.45	21.18	21.28

GSM1900	Average Power (dBm)		
<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	29.46	29.49	29.35
GPRS 1 Tx slot	29.20	29.20	29.10
GPRS 2 Tx slots	28.40	28.50	28.40
GPRS 3 Tx slots	26.60	26.70	26.60
GPRS 4 Tx slots	25.50	25.61	25.60
EDGE 1 Tx slot	25.94	25.69	25.65
EDGE 2 Tx slots	24.61	24.35	24.46
EDGE 3 Tx slots	22.45	22.13	22.06
EDGE 4 Tx slots	21.15	20.78	20.68



WCDMA Band V	Average Power (dBm)		
TX Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
AMR 12.2Kbps	22.81	22.82	22.88
RMC 12.2Kbps	22.84	22.83	22.89
HSDPA Subtest-1	21.45	21.44	21.46
HSDPA Subtest-2	21.43	21.4	21.46
HSDPA Subtest-3	20.97	20.95	20.95
HSDPA Subtest-4	20.91	20.96	20.98
HSUPA Subtest-1	19.46	19.49	19.46
HSUPA Subtest-2	19.45	19.45	19.47
HSUPA Subtest-3	20.39	20.45	20.44
HSUPA Subtest-4	19	18.99	18.98
HSUPA Subtest-5	20.37	20.39	20.36
HSPA+ (16QAM) Subtest-1	19.29	19.28	19.27

WCDMA Band II	Average Power (dBm)		
TX Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
AMR 12.2Kbps	22.23	22.25	22.23
RMC 12.2Kbps	22.24	22.26	22.24
HSDPA Subtest-1	21.58	21.61	21.58
HSDPA Subtest-2	21.55	21.59	21.58
HSDPA Subtest-3	21.02	21.1	21.11
HSDPA Subtest-4	21	21.1	21.07
HSUPA Subtest-1	19.45	19.52	19.51
HSUPA Subtest-2	19.47	19.52	19.51
HSUPA Subtest-3	20.42	20.48	20.47
HSUPA Subtest-4	18.99	19.02	19.03
HSUPA Subtest-5	20.37	20.43	20.43
HSPA+ (16QAM) Subtest-1	19.28	19.51	19.26



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	22.20	22.12	22.01
RMC 12.2Kbps	22.21	22.13	22.03
HSDPA Subtest-1	21.23	21.34	21.23
HSDPA Subtest-2	21.24	21.32	21.2
HSDPA Subtest-3	20.74	20.82	20.7
HSDPA Subtest-4	20.7	20.81	20.69
HSUPA Subtest-1	19.28	19.32	19.25
HSUPA Subtest-2	19.28	19.29	19.21
HSUPA Subtest-3	20.21	20.25	20.21
HSUPA Subtest-4	18.8	18.85	18.76
HSUPA Subtest-5	20.2	20.22	20.16
HSPA+ (16QAM) Subtest-1	19.21	19.32	19.09

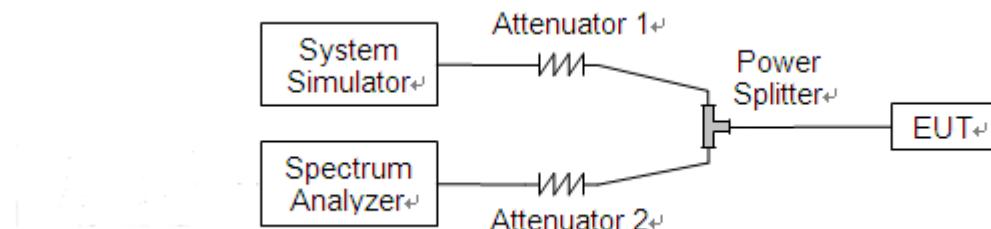
## 2.2. Peak to Average Ratio

### 2.2.1. Requirement

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

### 2.2.2. Test Description

Test Setup:



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

### 2.2.3. Test procedure

- 1 .For GSM/EDGE operating mode:
  - a. Set RBW=1MHz, VBW=3MHz, peak detector in spectrum analyzer.
  - b. Set EUT in maximum output power, and triggered the burst signal.
  - c. Measured respectively the peak level and mean level, and the deviation was recorded as Peak to Average ratio.
2. For UMTS operating mode:
  - a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
  - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1%.



#### 2.2.4. Test Result

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

##### A. Test Verdict:

Band	Channel	Frequency (MHz)	Peak to Average ratio		Limit dB	Verdict
			dB			
GSM850M Hz	128	824.2	0.004		13	PASS
	190	836.6	0.006			PASS
	251	848.8	0.016			PASS
GSM 1900MHz	512	1850.2	0.012		13	PASS
	661	1880.0	0.009			PASS
	810	1909.8	0.006			PASS
EDGE850 MHz	128	824.2	0.012		13	PASS
	190	836.6	0.003			PASS
	251	848.8	0.015			PASS
EDGE 1900MHz	512	1850.2	0.007		13	PASS
	661	1880.0	0.022			PASS
	810	1909.8	0.003			PASS

Band	Channel	Frequency (MHz)	Peak to Average ratio		Limit dB	Verdict
			dB			
WCDMA Band V	4132	826.4	3.04		13	PASS
	4182	836.4	3.05			PASS
	4233	846.6	3.05			PASS
WCDMA Band II	9262	1852.4	2.99		13	PASS
	9400	1880.0	3.03			PASS
	9538	1907.6	2.90			PASS
WCDMA Band IV	1312	1712.4	2.83		13	PASS
	1413	1732.6	2.90			PASS
	1513	1752.6	2.84			PASS



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## GSM 850MHz CH128 824.2MHz



## GSM 850MHz CH190 836.6MHz



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## GSM 850MHz CH251 848.8MHz



## GSM 1900MHz CH512 1850.2MHz



## GSM 1900MHz CH661 1880.0MHz



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## GSM 1900MHz CH810 1909.8MHz



## EDGE 850MHz CH128 824.2MHz



## EDGE 850MHz CH190 836.6MHz



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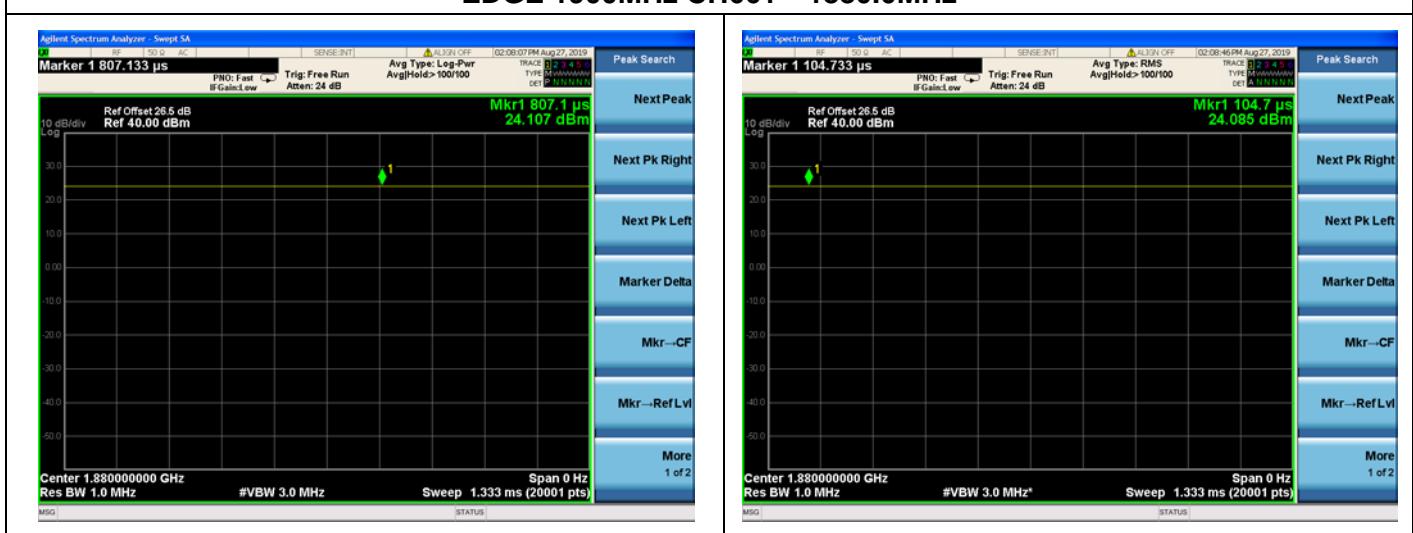
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## EDGE 1900MHz CH512 1850.2MHz



## EDGE 1900MHz CH661 1880.0MHz



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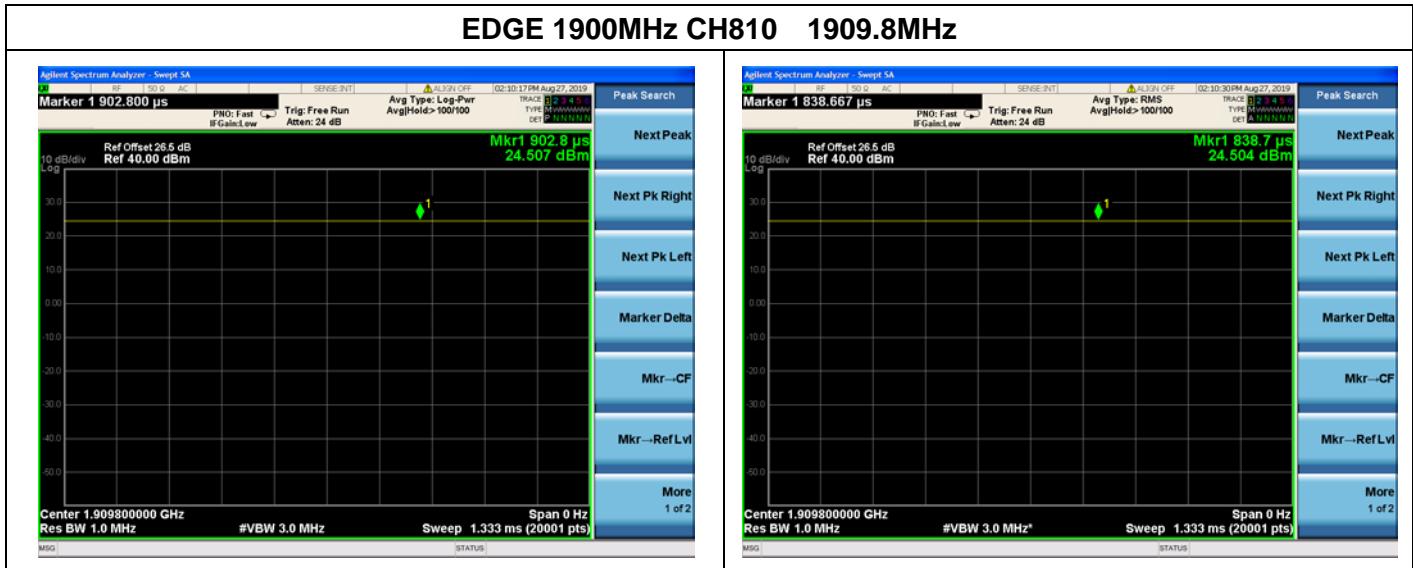
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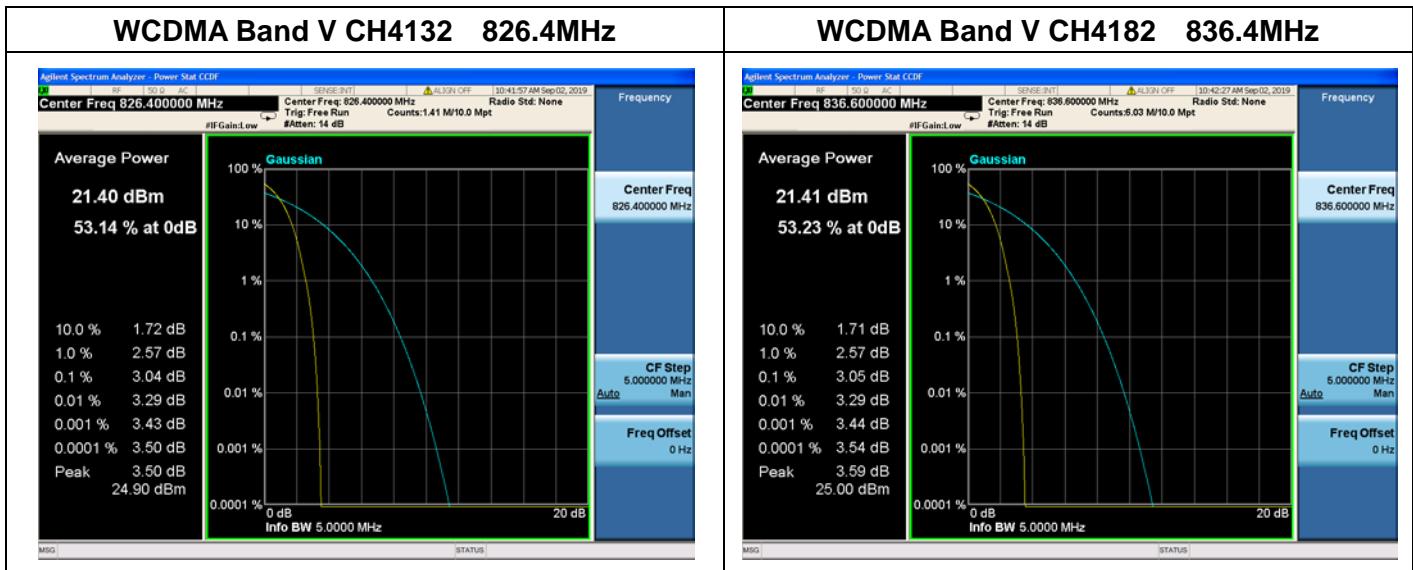
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## EDGE 1900MHz CH810 1909.8MHz



## WCDMA Band V CH4132 826.4MHz

## WCDMA Band V CH4182 836.4MHz



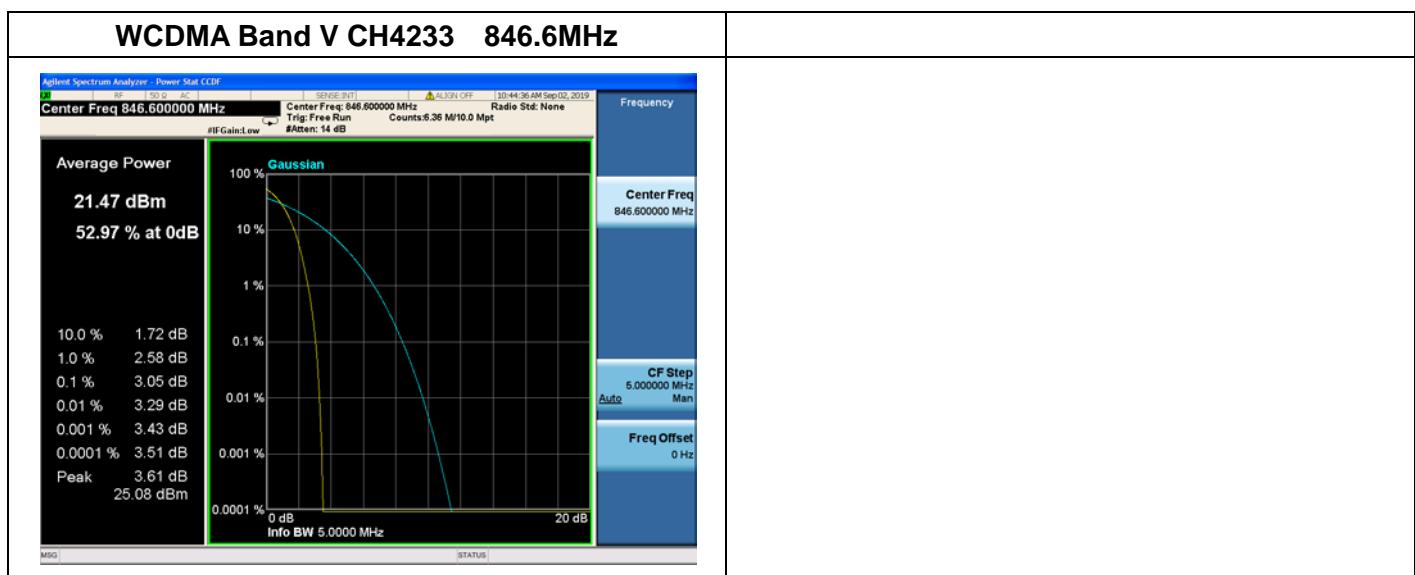
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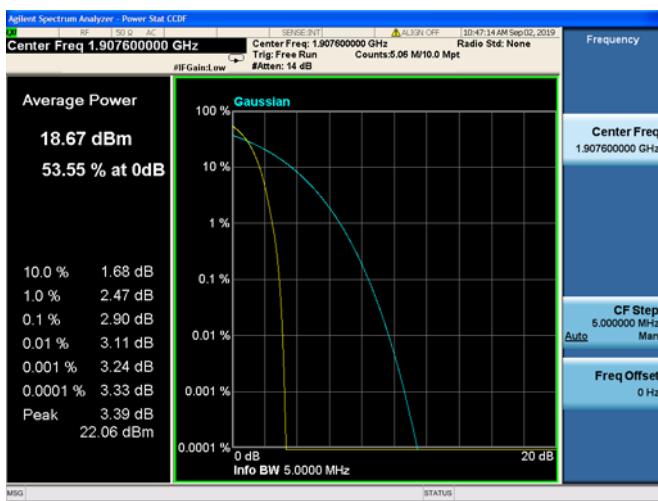
## WCDMA Band II CH9262 1852.4MHz



## WCDMA Band II CH9400 1880.0MHz



## WCDMA Band II CH9538 1907.6MHz



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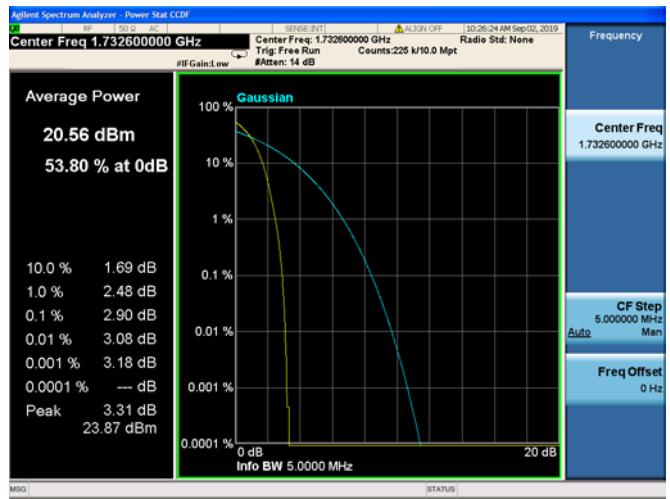


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## WCDMA Band IV CH1312 1712.4MHz



## WCDMA Band IV CH1413 1732.6MHz



## WCDMA Band IV CH1513 1752.6MHz



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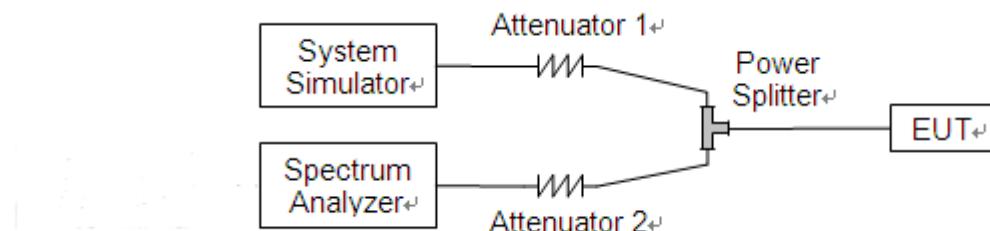
## 2.3.99% Occupied Bandwidth

### 2.3.1. Requirement

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

### 2.3.2. Test Description

Test Setup:



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



### 2.3.3. Test Result

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

#### GSM Test Verdict:

Band	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)
GSM 850MHz	128	824.2	247.49	317.5
	190	836.6	249.47	317.3
	251	848.8	243.63	317.8
GSM 1900MHz	512	1850.2	246.03	313.5
	661	1880.0	241.86	318.5
	810	1909.8	247.90	318.1
EDGE 850MHz	128	824.2	247.06	319.2
	190	836.6	245.76	317.0
	251	848.8	247.83	310.4
EDGE 1900MHz	512	1850.2	241.31	322.9
	661	1880.0	247.34	318.9
	810	1909.8	243.76	315.8

#### WCDMA Test Verdict:

Band	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
WCDMA Band V	4132	826.4	4.166	4.696
	4182	836.4	4.154	4.689
	4233	846.6	4.159	4.694
WCDMA Band II	9262	1852.4	4.170	4.677
	9400	1880.0	4.153	4.683
	9538	1907.6	4.175	4.748
WCDMA Band IV	1312	1712.4	4.163	4.703
	1413	1732.6	4.176	4.663
	1513	1752.6	4.160	4.688



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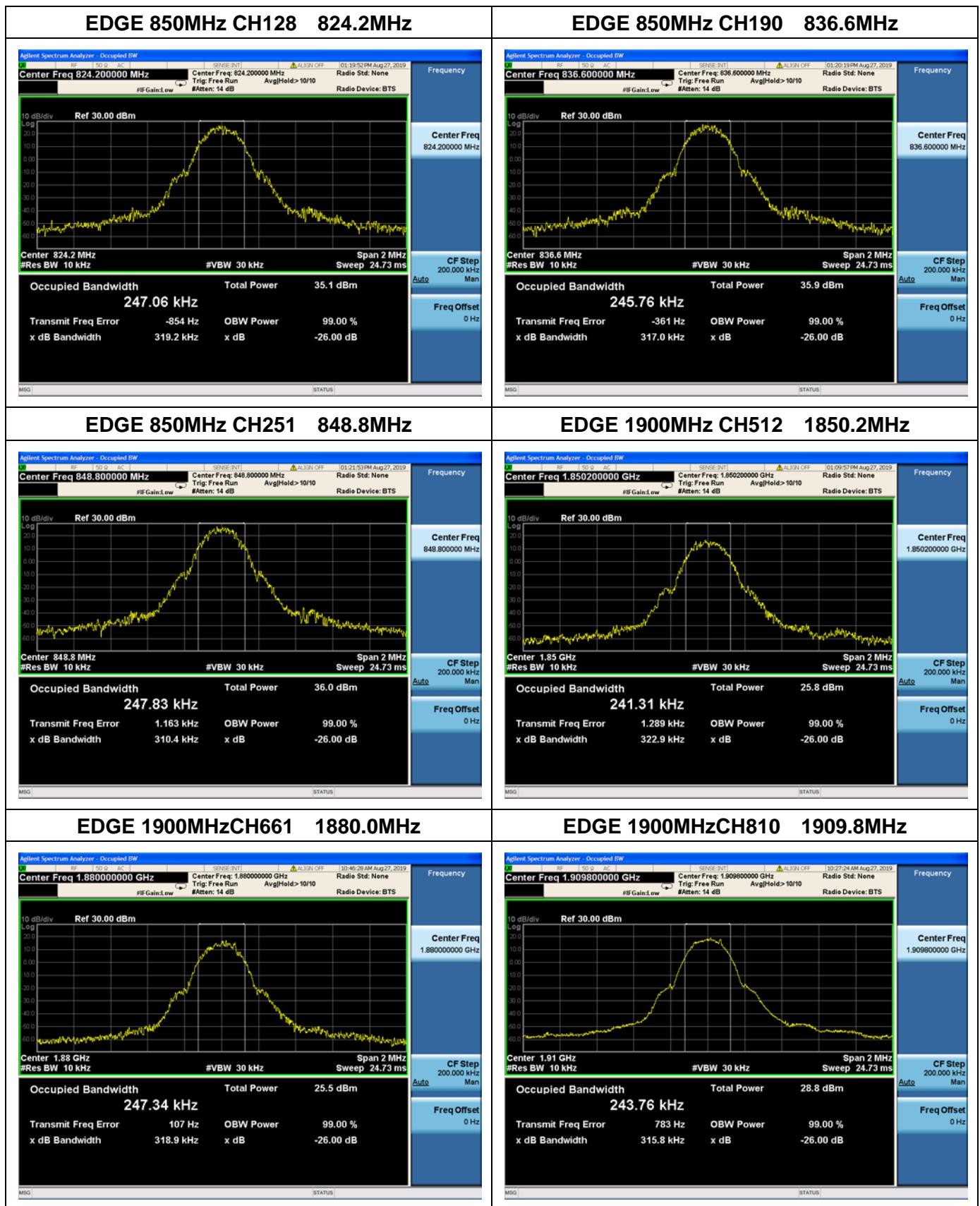
GSM 850MHz CH128 824.2MHz	GSM 850MHz CH190 836.6MHz
<p>Agilent Spectrum Analyzer - Occupied BW Center Freq 824.200000 MHz Center Freq: 824.200000 MHz SENSE INTL ALIGN OFF 01:19:10PM Aug 27, 2019 Trig: Free Run #Attenuation: 14 dB Radio Std: None Avg Hold&gt;10/10 Radio Device: BTS 10 dB/div Ref 30.00 dBm Log Center 824.2 MHz #Res BW 10 kHz #VBW 30 kHz Span 2 MHz Sweep 24.73 ms Occupied Bandwidth Total Power 36.2 dBm 247.49 kHz Transmit Freq Error 944 Hz OBW Power 99.00 % x dB Bandwidth 317.6 kHz x dB -26.00 dB</p>	<p>Agilent Spectrum Analyzer - Occupied BW Center Freq 836.600000 MHz Center Freq: 836.600000 MHz SENSE INTL ALIGN OFF 01:20:52PM Aug 27, 2019 Trig: Free Run #Attenuation: 14 dB Radio Std: None Avg Hold&gt;10/10 Radio Device: BTS 10 dB/div Ref 30.00 dBm Log Center 836.6 MHz #Res BW 10 kHz #VBW 30 kHz Span 2 MHz Sweep 24.73 ms Occupied Bandwidth Total Power 36.0 dBm 249.47 kHz Transmit Freq Error 958 Hz OBW Power 99.00 % x dB Bandwidth 317.3 kHz x dB -26.00 dB</p>
GSM 850MHz CH251 848.8MHz	GSM 1900MHz CH512 1850.2MHz
<p>Agilent Spectrum Analyzer - Occupied BW Center Freq 848.800000 MHz Center Freq: 848.800000 MHz SENSE INTL ALIGN OFF 01:21:25PM Aug 27, 2019 Trig: Free Run #Attenuation: 14 dB Radio Std: None Avg Hold&gt;10/10 Radio Device: BTS 10 dB/div Ref 30.00 dBm Log Center 848.8 MHz #Res BW 10 kHz #VBW 30 kHz Span 2 MHz Sweep 24.73 ms Occupied Bandwidth Total Power 37.1 dBm 243.63 kHz Transmit Freq Error -1.109 kHz OBW Power 99.00 % x dB Bandwidth 317.8 kHz x dB -26.00 dB</p>	<p>Agilent Spectrum Analyzer - Occupied BW Center Freq 1.850200000 GHz Center Freq: 1.850200000 GHz SENSE INTL ALIGN OFF 01:13:52PM Aug 27, 2019 Trig: Free Run #Attenuation: 14 dB Radio Std: None Avg Hold&gt;10/10 Radio Device: BTS 10 dB/div Ref 30.00 dBm Log Center 1.85 GHz #Res BW 10 kHz #VBW 30 kHz Span 2 MHz Sweep 24.73 ms Occupied Bandwidth Total Power 26.6 dBm 246.03 kHz Transmit Freq Error 1.451 kHz OBW Power 99.00 % x dB Bandwidth 313.6 kHz x dB -26.00 dB</p>
GSM 1900MHz CH661 1880.0MHz	GSM 1900MHz CH810 1909.8MHz
<p>Agilent Spectrum Analyzer - Occupied BW Center Freq 1.880000000 GHz Center Freq: 1.880000000 GHz SENSE INTL ALIGN OFF 10:45:49AM Aug 27, 2019 Trig: Free Run #Attenuation: 14 dB Radio Std: None Avg Hold&gt;10/10 Radio Device: BTS 10 dB/div Ref 30.00 dBm Log Center 1.88 GHz #Res BW 10 kHz #VBW 30 kHz Span 2 MHz Sweep 24.73 ms Occupied Bandwidth Total Power 28.7 dBm 241.86 kHz Transmit Freq Error 183 Hz OBW Power 99.00 % x dB Bandwidth 318.5 kHz x dB -26.00 dB</p>	<p>Agilent Spectrum Analyzer - Occupied BW Center Freq 1.909800000 GHz Center Freq: 1.909800000 GHz SENSE INTL ALIGN OFF 10:29:30AM Aug 27, 2019 Trig: Free Run #Attenuation: 14 dB Radio Std: None Avg Hold&gt;10/10 Radio Device: BTS 10 dB/div Ref 30.00 dBm Log Center 1.91 GHz #Res BW 10 kHz #VBW 30 kHz Span 2 MHz Sweep 24.73 ms Occupied Bandwidth Total Power 25.1 dBm 247.90 kHz Transmit Freq Error -837 Hz OBW Power 99.00 % x dB Bandwidth 318.1 kHz x dB -26.00 dB</p>

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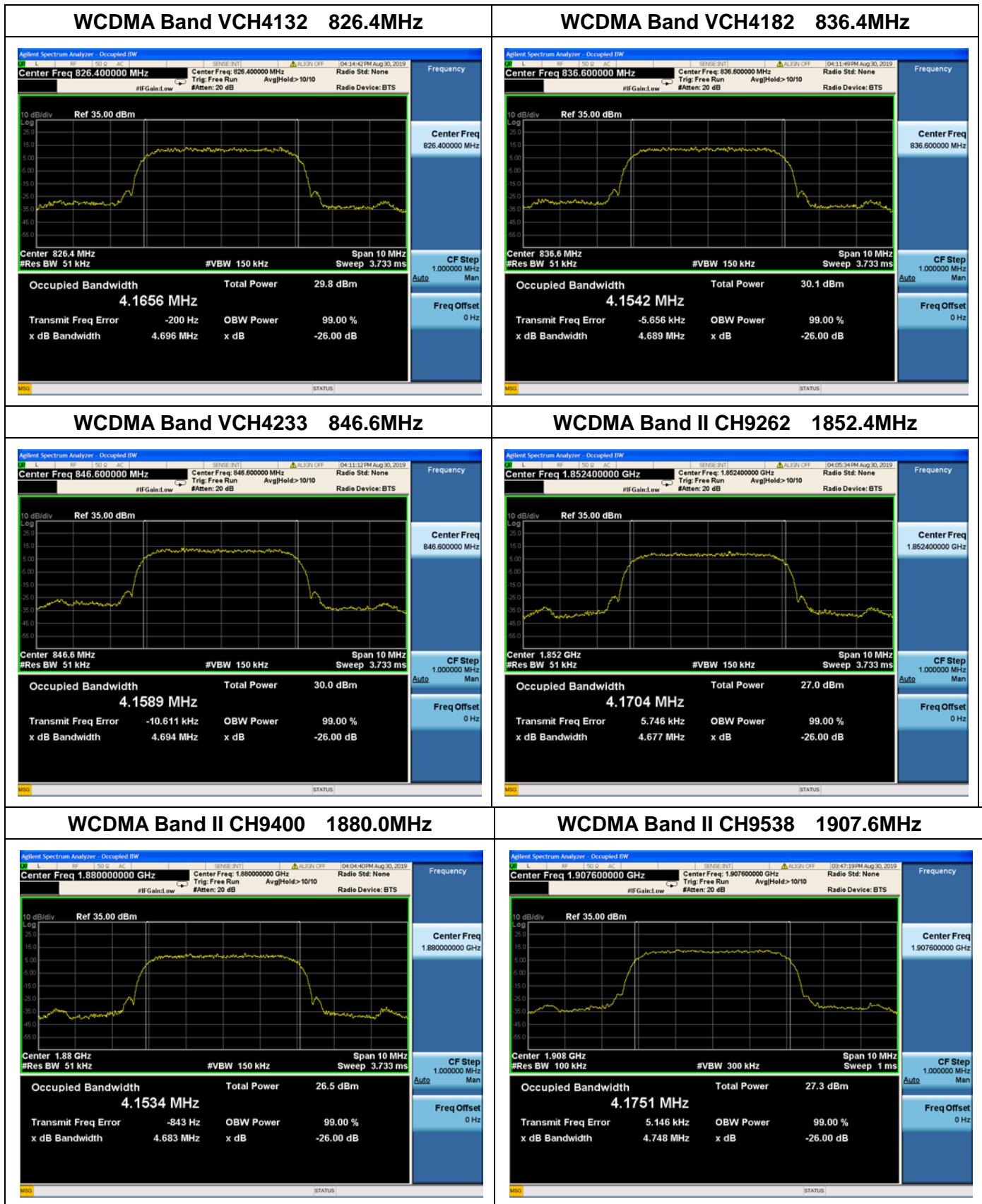


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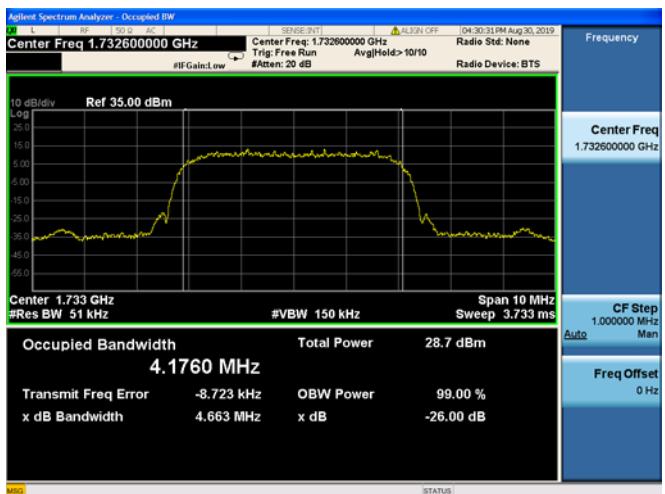


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## WCDMA Band IV CH1312 1712.4MHz



## WCDMA Band IV CH1413 1732.6MHz



## WCDMA Band IV CH1513 1752.6MHz





## 2.4. Frequency Stability

### 2.4.1. Requirement

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

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

### 2.4.2. Test Description

Test Setup:



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



### 2.4.3. Test Result

#### A. Test Verdict:

GSM 850MHz, Channel 190, Frequency 836.6MHz					
Limit =±2.5ppm					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.7V	+20(Ref)	23	0.027	PASS
100		-10	-49	-0.059	
100		0	-27	-0.032	
100		+10	15	0.018	
100		+20	25	0.030	
100		+30	75	0.090	
100		+40	64	0.077	
100		+50	84	0.100	
115	4.2V	+20	-6	-0.007	
85	3.0V	+20	-71	-0.085	

GSM 1900MHz, Channel 661, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.7V	+20(Ref)	97	0.052	PASS
100		-10	-26	-0.014	
100		0	-29	-0.015	
100		+10	-53	-0.028	
100		+20	42	0.022	
100		+30	73	0.039	
100		+40	31	0.016	
100		+50	82	0.044	
115	4.2V	+20	16	0.009	
85	3.0V	+20	-58	-0.031	



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**EDGE 850MHz, Channel 190, Frequency 836.6MHz**  
**Limit =±2.5ppm**

Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.7V	+20(Ref)	25	0.030	PASS
100		-10	-74	-0.088	
100		0	-25	-0.030	
100		+10	54	0.065	
100		+20	15	0.018	
100		+30	26	0.031	
100		+40	25	0.030	
100		+50	74	0.088	
115	4.2V	+20	-36	-0.043	
85	3.0V	+20	-47	-0.056	

**EDGE 1900MHz, Channel 661, Frequency 1880.0MHz**  
**Limit =Within Authorized Band**

Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.7V	+20(Ref)	42	0.022	PASS
100		-10	-26	-0.014	
100		0	-85	-0.045	
100		+10	-84	-0.045	
100		+20	27	0.014	
100		+30	84	0.045	
100		+40	16	0.009	
100		+50	15	0.008	
115	4.2V	+20	16	0.009	
85	3.0V	+20	-25	-0.013	



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WCDMA Band V, Channel 4182, Frequency 836.4MHz Limit =±2.5ppm					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.7V	+20(Ref)	31	0.037	PASS
100		-10	-28	-0.034	
100		0	-35	-0.042	
100		+10	32	0.038	
100		+20	16	0.019	
100		+30	26	0.031	
100		+40	47	0.056	
100		+50	62	0.074	
115	4.2V	+20	-65	-0.078	
85	3.0V	+20	-35	-0.042	

WCDMA Band II, Channel 9400, Frequency 1880.0MHz Limit =Within Authorized Band					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.7V	+20(Ref)	25	0.013	PASS
100		-10	-85	-0.045	
100		0	-37	-0.020	
100		+10	-26	-0.014	
100		+20	86	0.046	
100		+30	83	0.044	
100		+40	52	0.028	
100		+50	15	0.008	
115	4.2V	+20	43	0.023	
85	3.0V	+20	-86	-0.046	

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WCDMA Band IV, Channel 1413, Frequency 1732.6MHz					
Limit =Within Authorized Band					
Voltage(%)	Power(V DC)	Temp(°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.7V	+20(Ref)	-54	-0.031	PASS
100		-10	-68	-0.039	
100		0	-53	-0.031	
100		+10	-39	-0.023	
100		+20	-64	-0.037	
100		+30	-37	-0.021	
100		+40	67	0.039	
100		+50	15	0.009	
115	4.2V	+20	15	0.009	
100	3.0V	+20	-54	-0.031	

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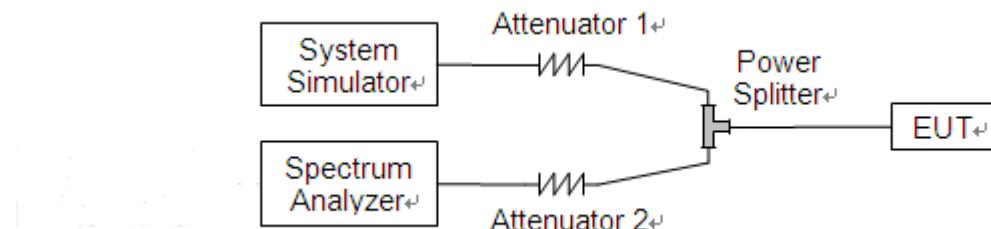
## 2.5. Conducted Out of Band Emissions

### 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.

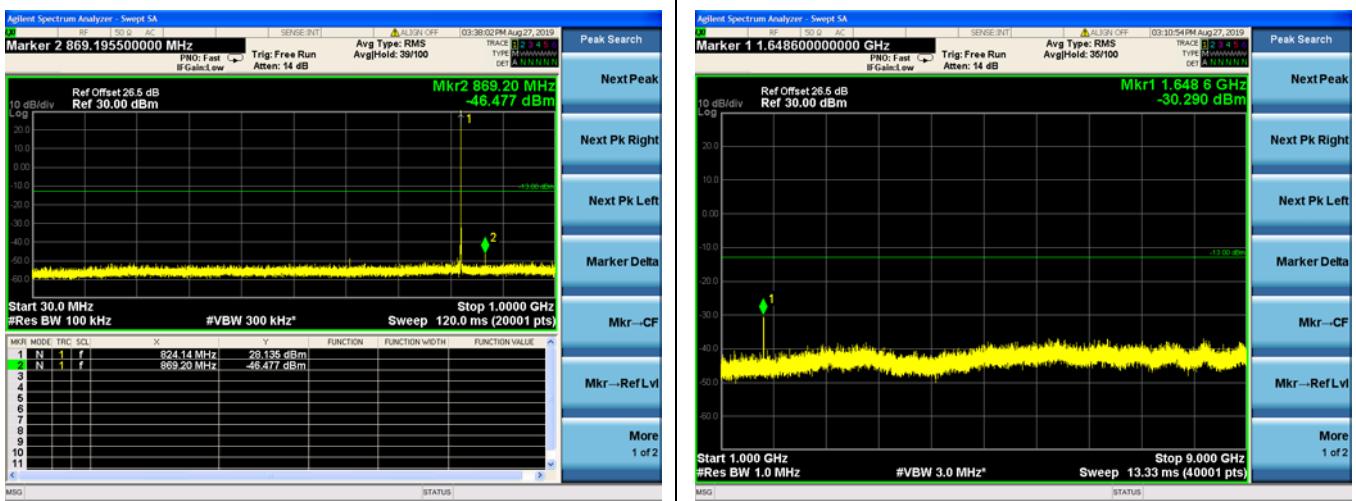
### 2.5.3. Test Result

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.

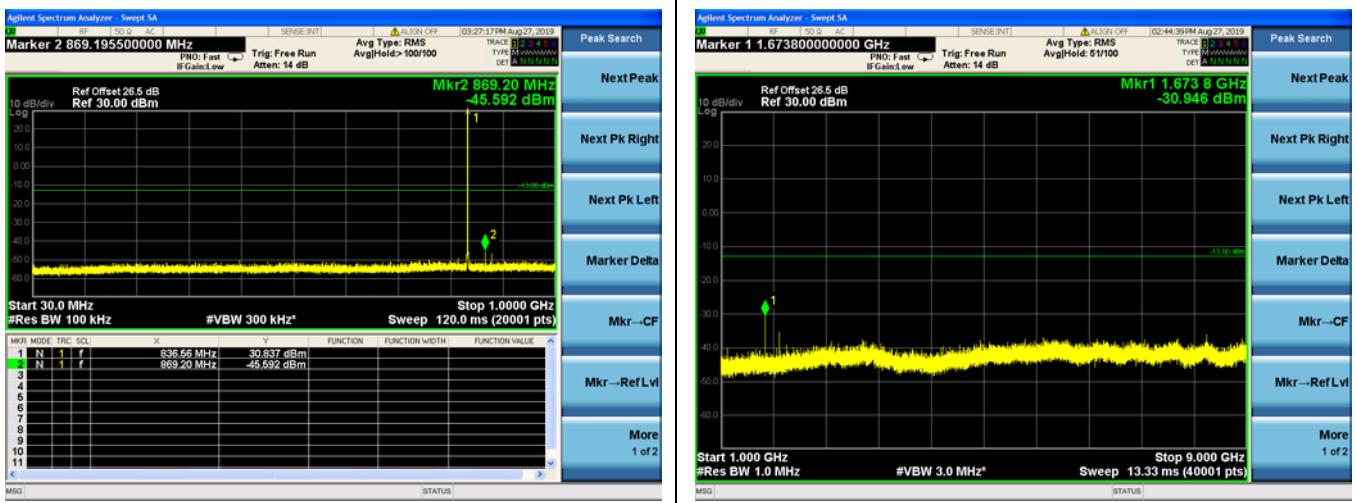


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## GSM 850MHz CH128 824.2MHz



## GSM 850MHz CH190 836.6MHz



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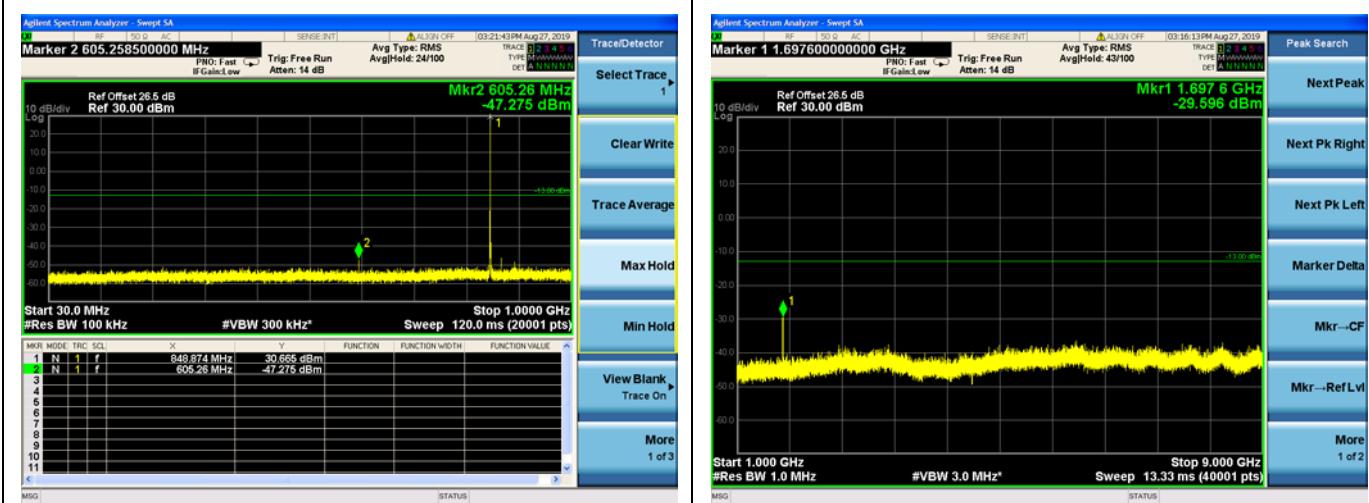
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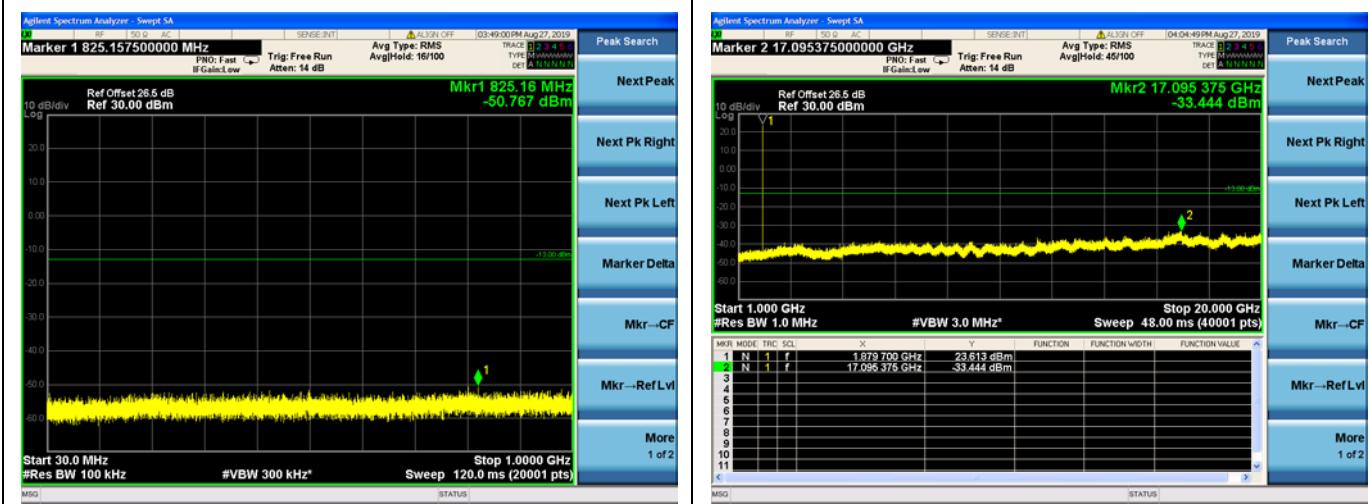
## GSM 850MHz CH251 848.8MHz



## GSM 1900MHz CH521 1850.2MHz



## GSM 1900MHz CH661 1880.0MHz



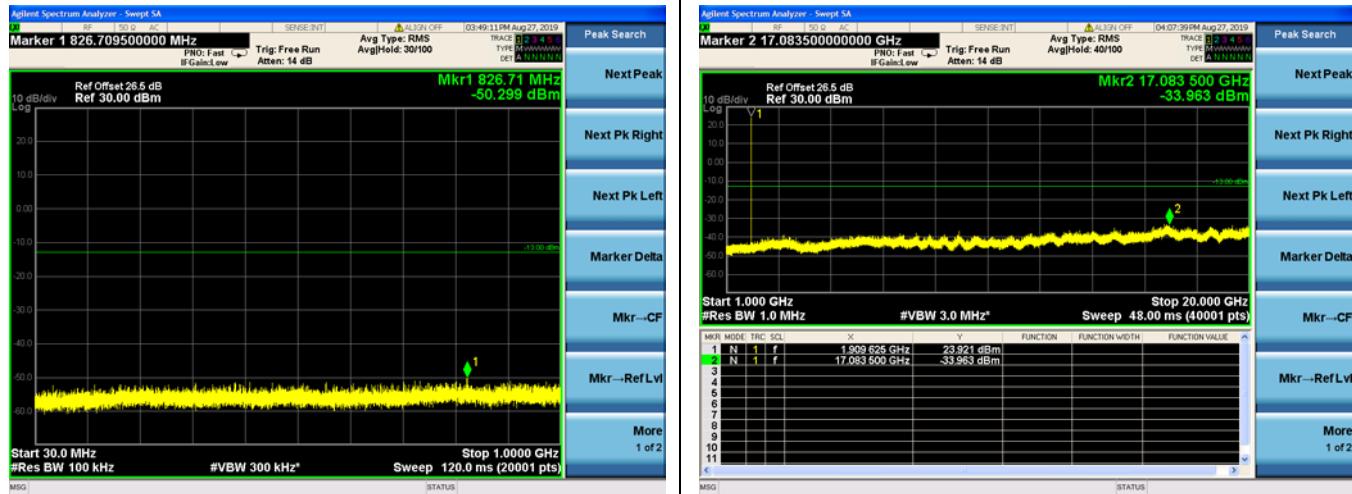
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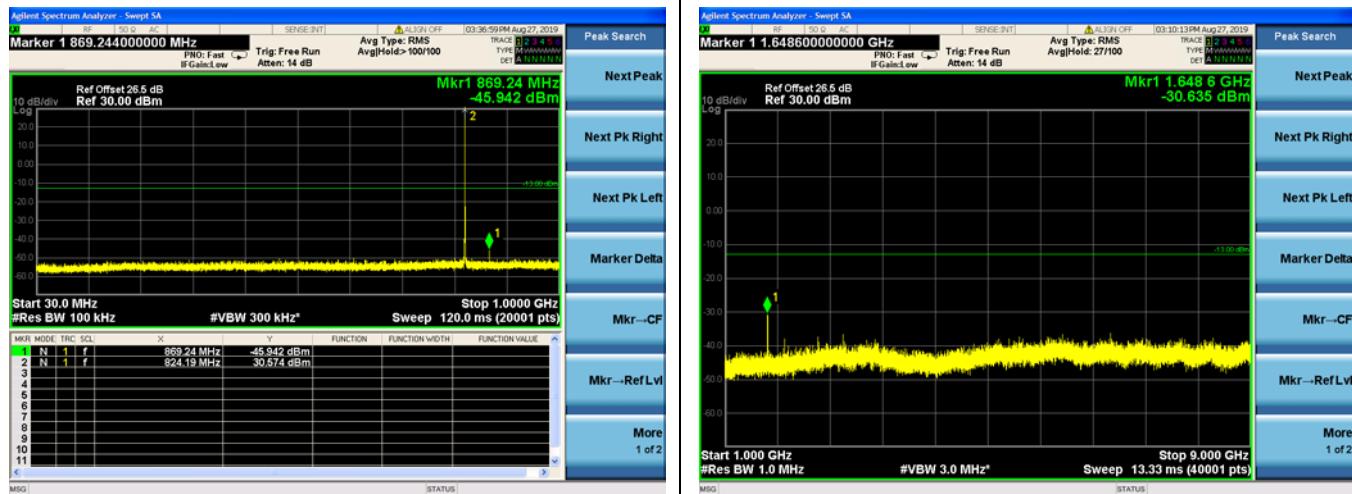


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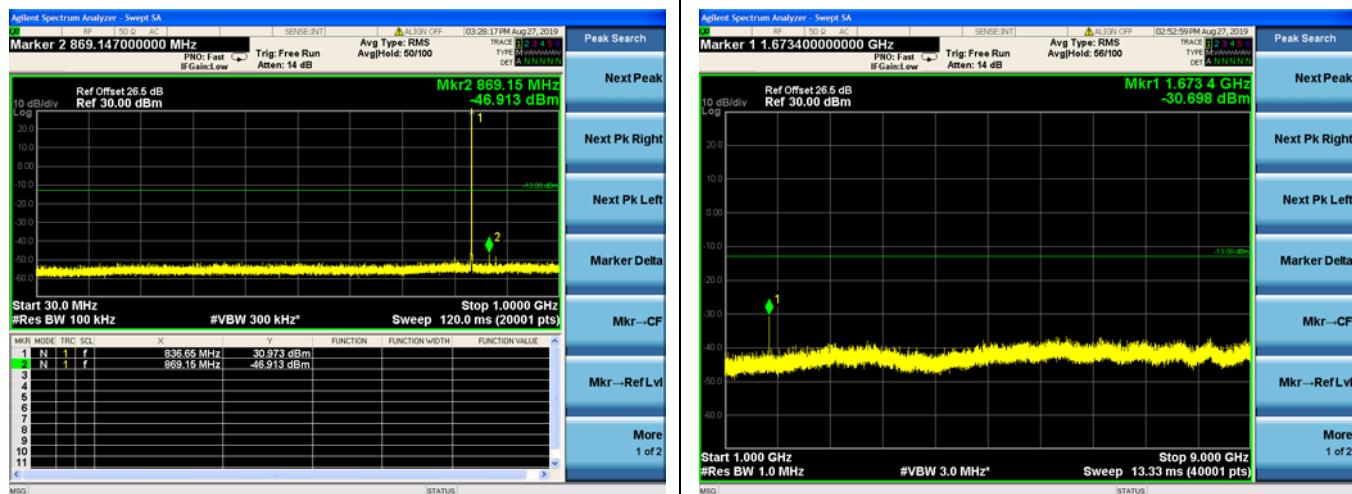
## GSM 1900MHz CH810 1909.8MHz



## EDGE 850MHz CH128 824.2MHz



## EDGE 850MHz CH190 836.6MHz



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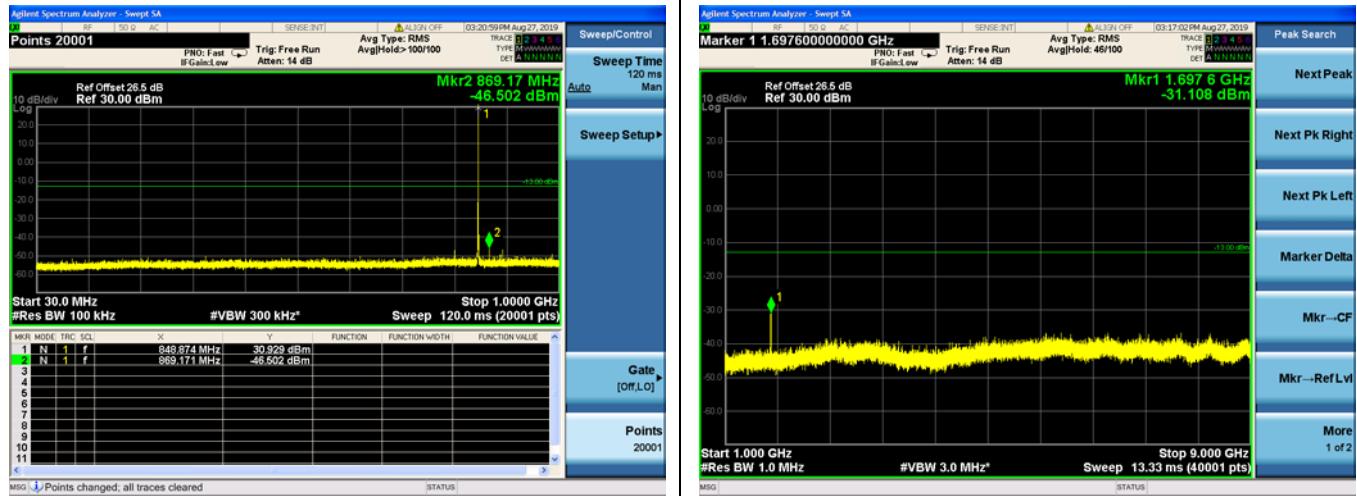
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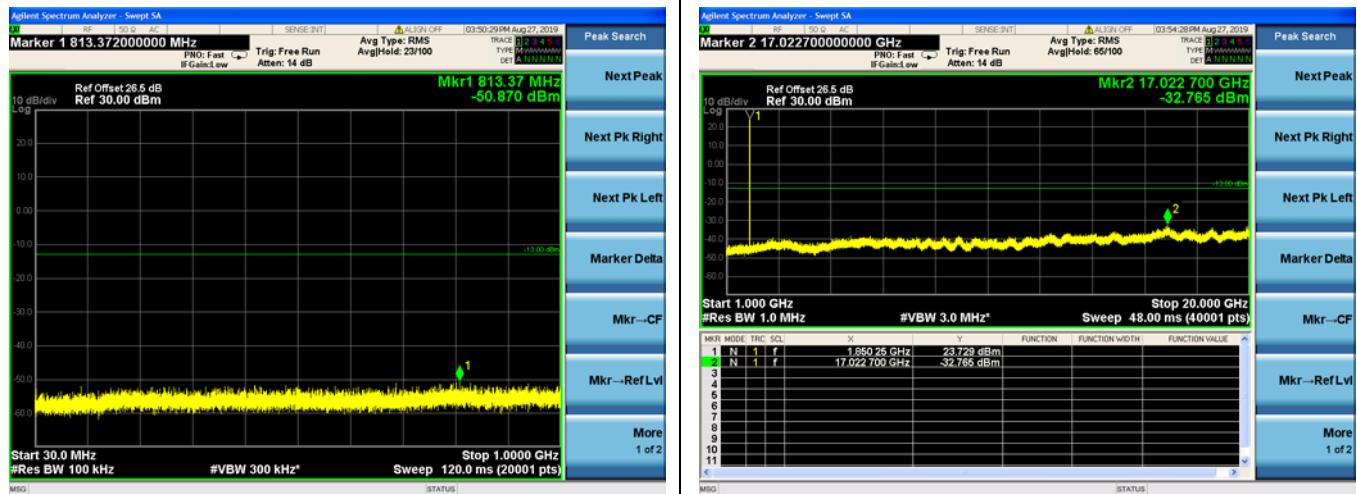


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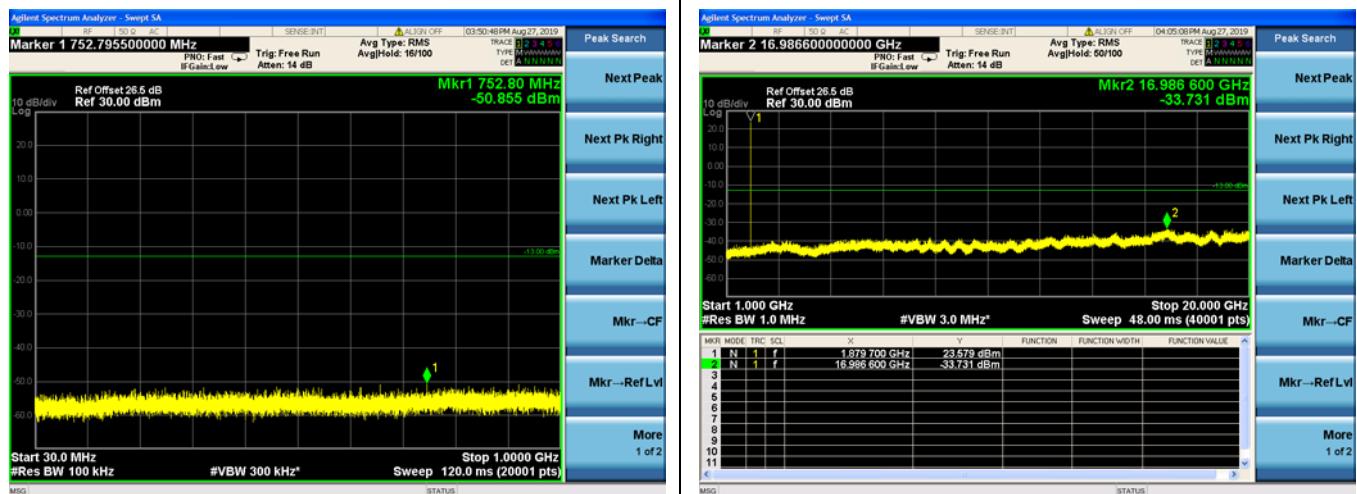
## EDGE 850MHz CH251 848.8MHz



## EDGE 1900MHz CH521 1850.2MHz



## EDGE 1900MHz CH661 1880.0MHz



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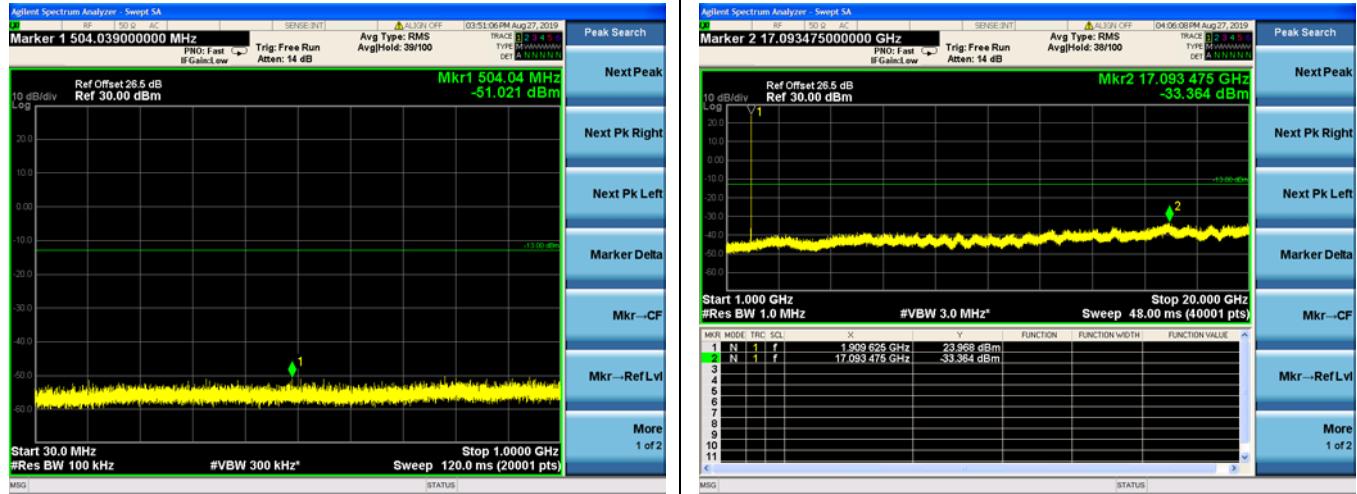
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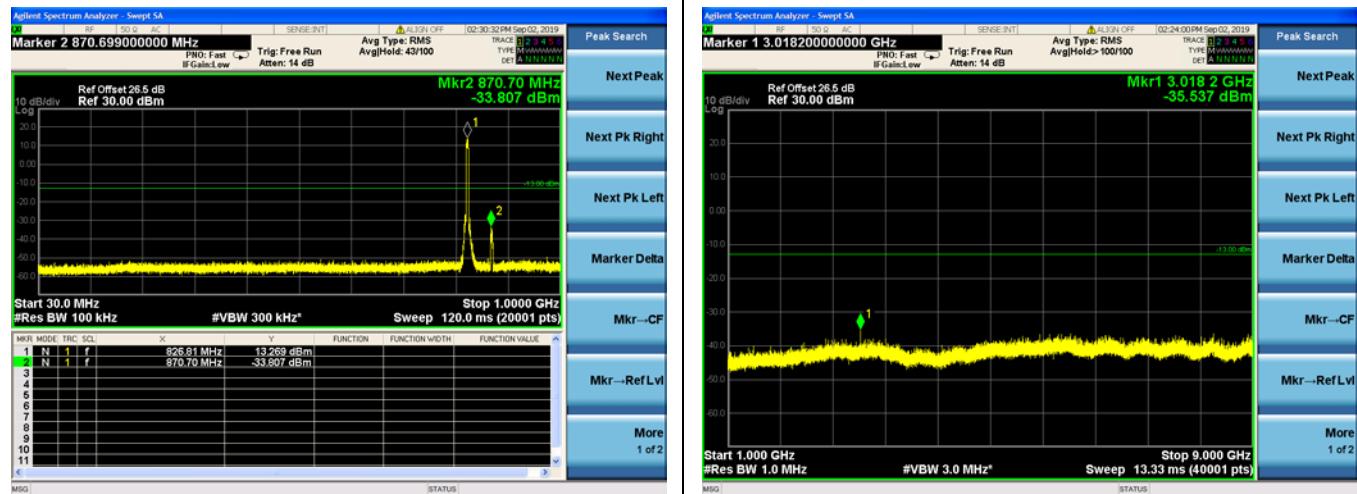


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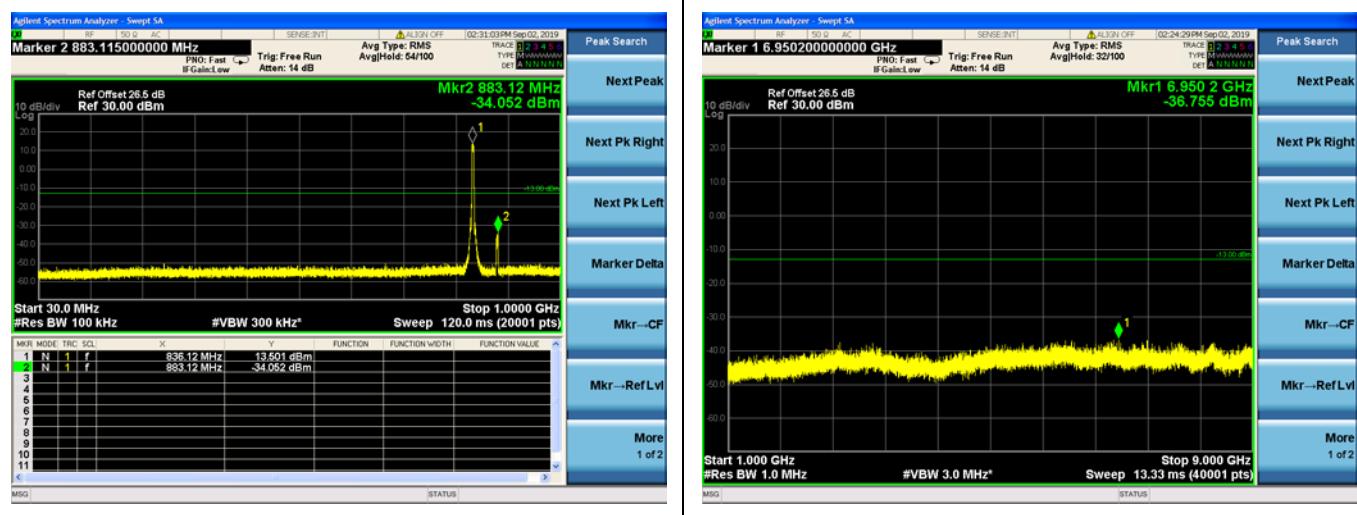
## EDGE 1900MHz CH810 1909.8MHz



## WCDMA Band V CH4132 826.4MHz



## WCDMA Band V CH4182 836.4MHz



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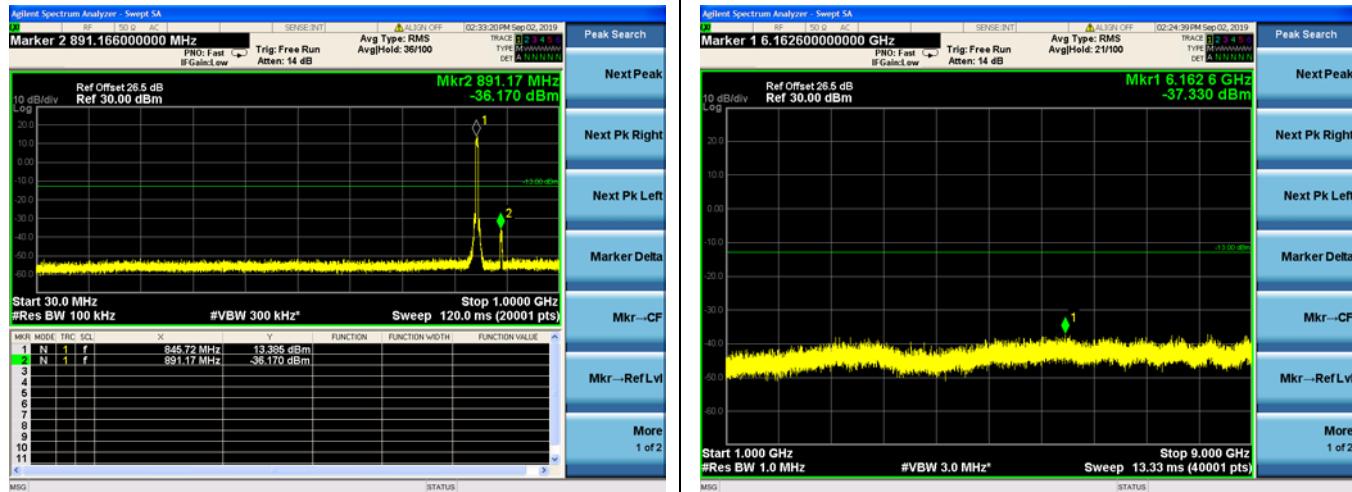
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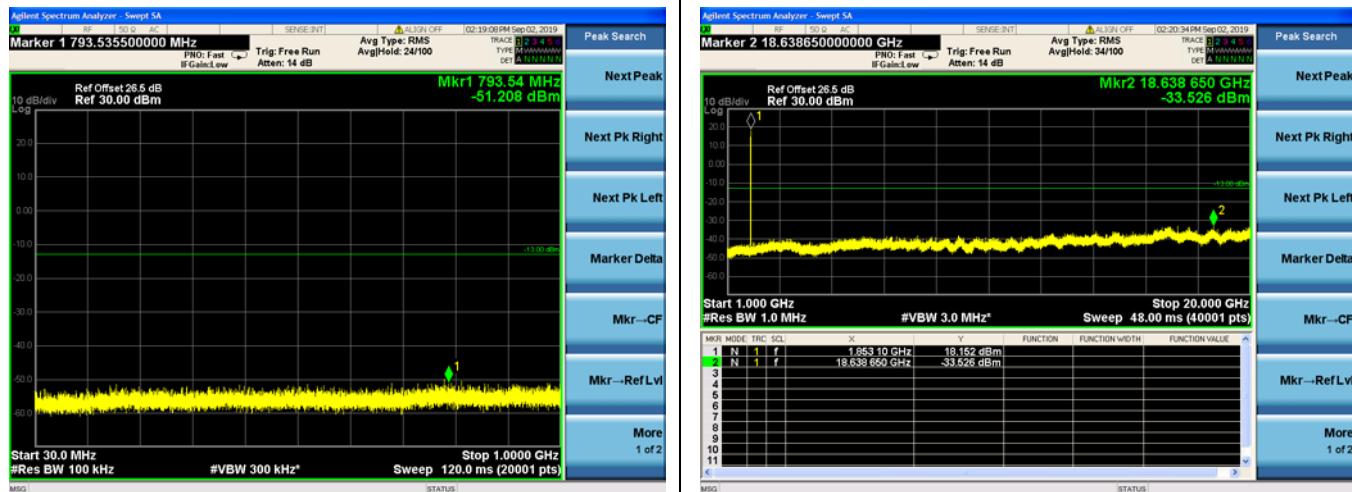


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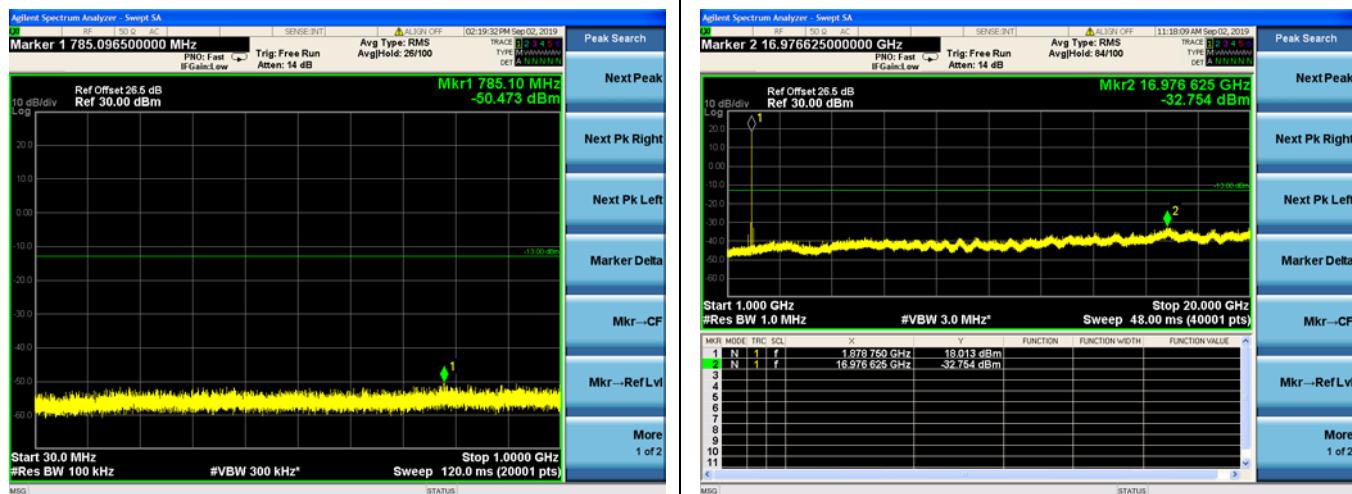
## WCDMA Band V CH4233 846.6MHz



## WCDMA Band II CH9262 1852.4MHz



## WCDMA Band II CH9400 1880.0MHz



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