

# FCC Radio Test Report

## FCC ID: QISME919BS-567BN

This report concerns (check one):  Original Grant  Class II Change

**Project No.** : 1702C029  
**Equipment** : LTE Module  
**Model Name** : ME919Bs-567bN  
**Applicant** : Huawei Technologies Co.,Ltd.  
**Address** : Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District Shenzhen China

**Date of Receipt** : Feb. 08, 2017  
**Date of Test** : Feb. 08, 2017 ~ Feb. 15, 2017  
**Issued Date** : Feb. 16 2017  
**Tested by** : BTL Inc.

**Technical Engineer** : Shawn Xiao  
(Shawn Xiao)

**Authorized Signatory** : Steven Lu  
(Steven Lu)

# B T L I N C .

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### **Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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### REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCCP-1-1702C029	Original Issue.	Feb. 16 2017

## 1. CERTIFICATION

Equipment : LTE Module  
Brand Name : HUAWEI  
Model Name : ME919Bs-567bN  
Applicant : Huawei Technologies Co.,Ltd.  
Manufacturer : Huawei Technologies Co.,Ltd.  
Address : Administration Building, Headquarters of Huawei Technologies Co., Ltd.,  
Bantian, Longgang District Shenzhen China  
Factory : Huawei Technologies Co.,Ltd.  
Address : Administration Building, Headquarters of Huawei Technologies Co., Ltd.,  
Bantian, Longgang District Shenzhen China  
Date of Test : Feb. 08, 2017 ~ Feb. 15, 2017  
Test Sample : Engineering Sample  
Standard(s) : 47 CFR FCC Part 22 Subpart H  
47 CFR FCC Part 2  
ANSI/TIA-603-D-2010  
KDB 971168 D01 Power Meas License Digital Systems v02r02

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-1-1702C029) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

**Test result included in this report is only for the GSM850, WCDMA Band 5 and LTE Band 5 part.**

## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part 22 Subpart H& Part 2			
Standard(s) Section	Test Item	Judgment	Tested By
2.1046 22.913(a)	Radiated power	PASS	Paul Li
2.1046 22.913(a)	Conducted Output Power	PASS	Paul Li
2.1049(h) 22.917(a)	Occupied Bandwidth	PASS	Paul Li
2.1051 22.917(a)	Conducted Spurious Emissions	PASS	Paul Li
2.1053 22.917(a)	Radiated Spurious Emissions	PASS	Shaohua Peng
22.917(a)	Band Edge Measurements	PASS	Paul Li
-	Peak To Average Ratio	PASS	Paul Li
2.1055 22.355	Frequency Stability	PASS	Paul Li

NOTE:

(1) "N/A" denotes test is not applicable to this device.

**2.1 TEST FACILITY**

Conducted: No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

Radiated: No.2 New City Avenue Songshan Lake Sci. &Tech. Industry Park, Dongguan, Guangdong, P.R.C

BTL's test firm number for FCC: 319330

HUAWEI's test firm number for FCC: 97456

**2.2 MEASUREMENT UNCERTAINTY**

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. The BTL / HUAWEI measurement uncertainty is less than the CISPR 16-4-2  $U_{cispr}$  requirement.

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95%**.

System Measurement Uncertainty	
Items	Extended Uncertainty
RE(9KHz-30MHz)	$U(E)=4.2, k=2$
RSE(30MHz-26.5GHz)	$U=4.9, k=2$



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

Equipment	LTE Module		
Brand Name	HUAWEI		
Model Name	ME919Bs-567bN		
Model Difference	N/A		
Modulation Type	GSM/GPRS	GMSK	
	EDGE	GMSK, 8PSK	
	WCDMA	Uplink: BPSK Downlink: QPSK	
	WCDMA(HSDPA/HSUPA/HSPA+/DC-HSDPA/DC-HSUPA)	16QAM/64QAM	
	LTE	QPSK, 16QAM	
Operation Frequency	GSM /EDGE/GPRS	824.2 ~ 848.8 MHz	
	WCDMA Band 5	826.4 ~ 846.6 MHz	
	LTE 5 (Channel Bandwidth: 1.4MHz)	824.7 ~ 848.3 MHz	
	LTE 5 (Channel Bandwidth: 3MHz)	825.5 ~ 847.5 MHz	
	LTE 5 (Channel Bandwidth: 5MHz)	826.5 ~ 846.5 MHz	
	LTE 5 (Channel Bandwidth: 10MHz)	829.0 ~ 844.0 MHz	
Max. ERP Power	GSM/GPRS	GMSK	29.78 dBm
	EDGE	8PSK	25.72 dBm
	WCDMA	BPSK	21.44 dBm
	WCDMA_HSDPA	16QAM	21.42 dBm
	WCDMA_HSUPA	16QAM	21.42 dBm
	LTE 5 (Channel Bandwidth: 1.4MHz)	QPSK	21.61 dBm
		16QAM	20.87 dBm
	LTE 5 (Channel Bandwidth: 3MHz)	QPSK	21.74 dBm
		16QAM	21.23 dBm
	LTE 5 (Channel Bandwidth: 5MHz)	QPSK	22.06 dBm
16QAM		21.25 dBm	
LTE 5 (Channel Bandwidth: 10MHz)	QPSK	21.90 dBm	
	16QAM	21.21 dBm	
Antenna Type	External Antenna		
Antenna Gain	2.5 dBi for GSM, 2.5 dBi for WCDMA, 2.5 dBi for LTE		
Hardware Version	RM1ME919BSTM		
Software Version	11.670.05.00.1400		

IMEI No.1	Radiated	863663030004896
	Conducted	863663030007800
Power Source	#1 Supplied from PC USB port or adapter. #2 Battery Supplied.	
Power Rating	#1 100-240V~ 50/60Hz #2 4.0V	

### 3.2 DESCRIPTION OF TEST MODES AND TEST CONDITION

GSM MODE			
Test Item	Available Channel	Tested Channel	Mode
ERP	128 to 251	128, 190, 251	GSM, EDGE
Conducted Output Power	128 to 251	128, 190, 251	GSM, EDGE
Occupied Bandwidth	128 to 251	128, 190, 251	GSM, EDGE
Condcudeted Emission	128 to 251	190	GSM, EDGE
Radiated Emission	128 to 251	190	GSM, EDGE
Band Edge	128 to 251	128, 251	GSM, EDGE
Peak to Average Ratio	128 to 251	128, 190, 251	GSM, EDGE
Frequency Stability	128 to 251	190	GSM, EDGE

WCDMA MODE			
Test Item	Available Channel	Tested Channel	Mode
ERP	4132 to 4233	4132, 4182, 4233	WCDMA, HSDPA, HSUPA
Conducted Output Power	4132 to 4233	4132, 4182, 4233	WCDMA, HSDPA, HSUPA
Condcudeted Emission	4132 to 4233	4182	WCDMA, HSDPA, HSUPA
Radiated Emission	4132 to 4233	4182	WCDMA, HSDPA, HSUPA
Band Edge	4132 to 4233	4132, 4233	WCDMA, HSDPA, HSUPA
Peak to Average Ratio	4132 to 4233	4132, 4182, 4233	WCDMA, HSDPA, HSUPA
Frequency Stability	4132 to 4233	4182	WCDMA, HSDPA, HSUPA

**Note:** 1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in **QPSK** modulation.

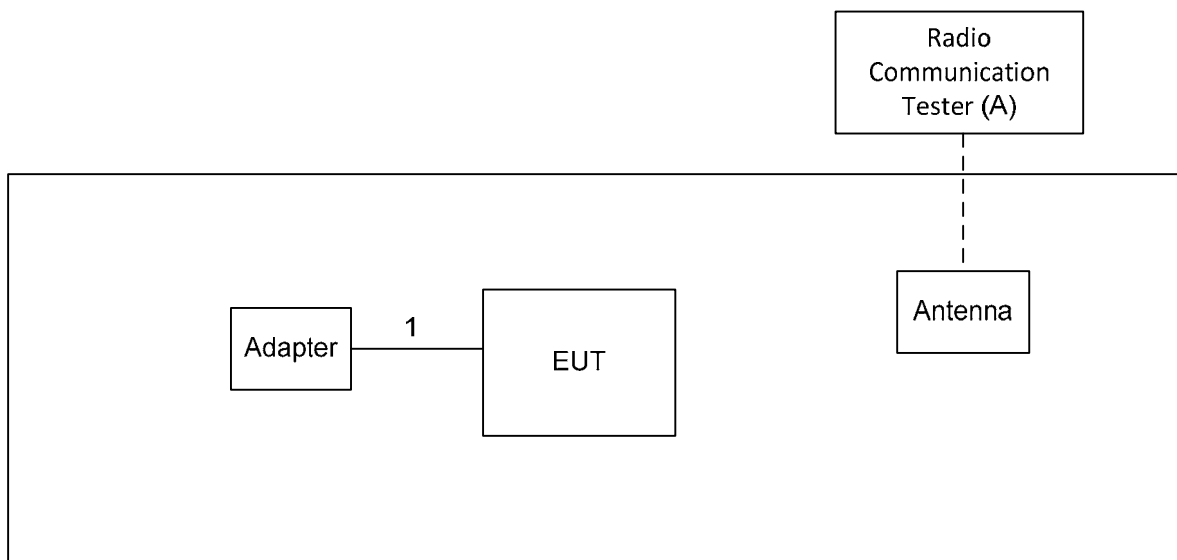
2. For 18G to 26.5G, the highest bandwidth is worst case and recording in the test report.

LTE BAND 5 MODE						
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode	
ERP	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset	
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset	
Occupied Bandwidth	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK, 16QAM	6 RB / 0 RB Offset	
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK, 16QAM	15 RB / 0 RB Offset	
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset	
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset	
Conducted Emission	20407 to 20643	20525	1.4MHz	QPSK	1 RB / 0 RB Offset	
	20415 to 20635	20525	3MHz	QPSK	1 RB / 0 RB Offset	
	20425 to 20625	20525	5MHz	QPSK	1 RB / 0 RB Offset	
	20450 to 20600	20525	10MHz	QPSK	1 RB / 0 RB Offset	
Radiated Emission	20407 to 20643	20525	1.4MHz	QPSK	1 RB / 0 RB Offset	
	20450 to 20600	20525	10MHz	QPSK	1 RB / 0 RB Offset	
Band Edge	20407 to 20643	20407	1.4MHz	QPSK	1 RB / 0 RB Offset 6 RB / 0 RB Offset	
		20643	1.4MHz	QPSK	1 RB / 5 RB Offset 6 RB / 0 RB Offset	
	20415 to 20635	20415	3MHz	QPSK	1 RB / 0 RB Offset 15 RB / 0 RB Offset	
		20635	3MHz	QPSK	1 RB / 14 RB Offset 15 RB / 0 RB Offset	
	20425 to 20625	20425	5MHz	QPSK	1 RB / 0 RB Offset 25 RB / 0 RB Offset	
		20625	5MHz	QPSK	1 RB / 24 RB Offset 25 RB / 0 RB Offset	
	20450 to 20600	20450	10MHz	QPSK	1 RB / 0 RB Offset 50 RB / 0 RB Offset	
		20600	10MHz	QPSK	1 RB / 49 RB Offset 50 RB / 0 RB Offset	
	Peak To Average Ratio	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		20415 to 20635	20415, 20525, 20635	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
20425 to 20625		20425, 20525, 20625	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset	
20450 to 20600		20450, 20525, 20600	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset	
Frequency Stability	20407 to 20643	20525	1.4MHz	QPSK	1 RB / 0 RB Offset	
	20415 to 20635	20525	3MHz	QPSK	1 RB / 0 RB Offset	
	20425 to 20625	20525	5MHz	QPSK	1 RB / 0 RB Offset	
	20450 to 20600	20525	10MHz	QPSK	1 RB / 0 RB Offset	

**EUT TEST CONDITIONS:**

Test Item	Environmental Conditions	Test Voltage
ERP	25°C, 60%RH	DC 4.0V
Conducted Output Power	25°C, 65%RH	DC 4.0V
Occupied Bandwidth	25°C, 65%RH	DC 4.0V
Conducted Emission	25°C, 65%RH	DC 4.0V
Radiated Emission	25°C, 60%RH	AC 120V/60Hz
Band Edge	25°C, 65%RH	DC 4.0V
Peak to Average Ratio	25°C, 65%RH	DC 4.0V
Frequency Stability	25°C, 65%RH	DC 4.0V

**3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED FOR RADIATED**



### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
A	Radio Communication Tester	R&S	CMU200	N/A	3608082535
		Anritsu	MT8820C	N/A	A110518805
B	Adaptor	Huawei	HW-050200U3W	N/A	HWHKA8G62400013

Item	Shielded Type	Ferrite Core	Length	Note
1	YES	NO	1m	USB cable

## 4. TEST RESULT

### 4.1 OUTPUT POWER MEASUREMENT

#### 4.1.1 LIMIT

Mobile / Portable station are limited to 7 watts e.r.p.

#### 4.1.2 TEST PROCEDURE

##### EIRP/ERP:

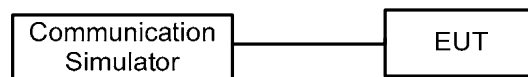
1. EIRP= Conducted Power +Antenan gain  
ERP power=EIPR power-2.15dBi.

##### Conducted Power:

The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

#### 4.1.3 TESTSETUP LAYOUT

##### Conducted Power Measurement



#### 4.1.4 TEST DEVIATION

No deviation

#### 4.1.5 TEST RESULTS

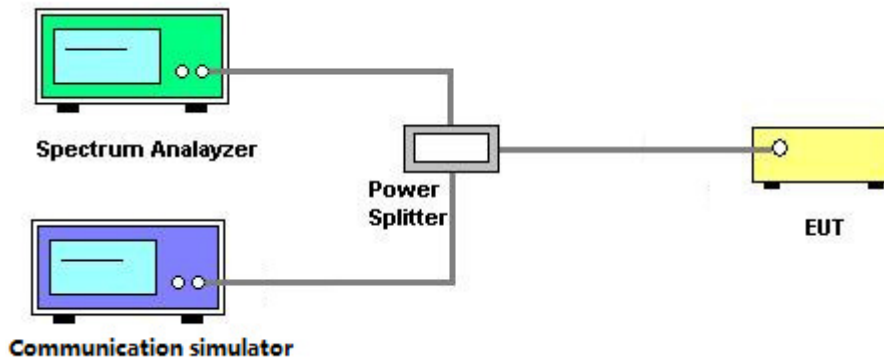
Please refer to the Attachment A.

## 4.2 OCCUPIED BANDWIDTH MEASUREMENT

### 4.2.1 TEST PROCEDURE

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth and 26dB bandwidth.

### 4.2.2 TEST SETUP LAYOUT



### 4.2.3 TEST DEVIATION

No deviation

### 4.2.4 TEST RESULTS

Please refer to the Attachment B.



### 4.3 CONDUCTED EMISSIONS MEASUREMENT

#### 4.3.1 LIMIT

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. The emission limit equal to  $-13\text{dBm}$ .

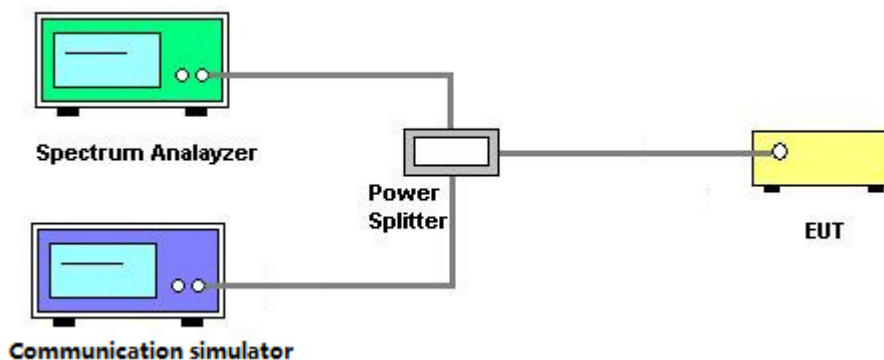
#### 4.3.2 TEST PROCEDURES

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured. Set  $\text{RBW} \geq 1\%$  EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from  $43+10\log(P)\text{dB}$  below the transmitter power P(Watts)
 
$$= P(\text{W}) - [43 + 10\log(P)](\text{dB})$$

$$= [30 + 10\log(P)](\text{dBm}) - [43 + 10\log(P)](\text{dB})$$

$$= -13\text{dBm}$$

#### 4.3.3 TESTSETUP LAYOUT



#### 4.3.4 TESTDEVIATION

No deviation

#### 4.3.5 TEST RESULTS

Please refer to the Attachment C.

## 4.4 RADIATED EMISSIONS MEASUREMENT

### 4.4.1 LIMIT

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. The emission limit equal to -13dBm.

### 4.4.2 TEST PROCEDURES

1. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
2. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value " of step a. Record the power level of S.G
3. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
4. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 4.4.3 TESTSETUP LAYOUT

This test setup layout is the same as that shown in **section 4.1.3**.

### 4.4.4 TESTDEVIATION

No deviation

### 4.4.5 TEST RESULTS

Please refer to the Attachment D.

## 4.5 BAND EDGE MEASUREMENT

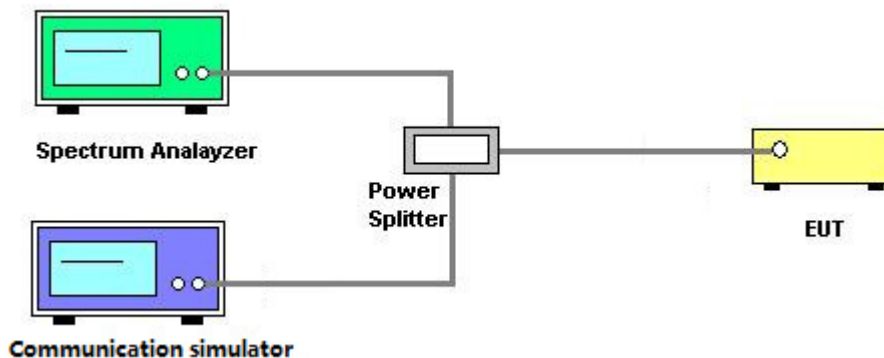
### 4.5.1 LIMIT

A 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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

### 4.5.2 TEST PROCEDURES

1. All measurements were done at low and high operational frequency range.
2. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 3kHz and VB of the spectrum is 10kHz (GSM/GPRS/EDGE).
3. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (WCDMA).
4. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 13kHz and VB of the spectrum is 51kHz (LTE Bandwidth 1.4MHz).
5. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Bandwidth 3MHz).
6. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Bandwidth 5MHz/10MHz).
7. Record the max trace plot into the test report.

### 4.5.3 TESTSETUP LAYOUT



### 4.5.4 TESTDEVIATION

No deviation

### 4.5.5 TEST RESULTS

Please refer to the Attachment E.

## 4.6 PEAK TO AVERAGE RATIO MEASUREMENT

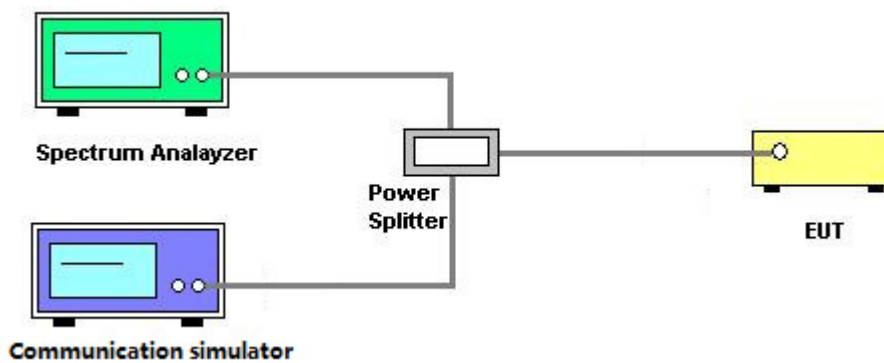
### 4.6.1 LIMIT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

### 4.6.2 TEST PROCEDURES

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

### 4.6.3 TESTSETUP LAYOUT



### 4.6.4 TESTDEVIATION

No deviation

### 4.6.5 TEST RESULTS

Please refer to the Attachment F.

## 4.7 FREQUENCY STABILITY MEASUREMENT

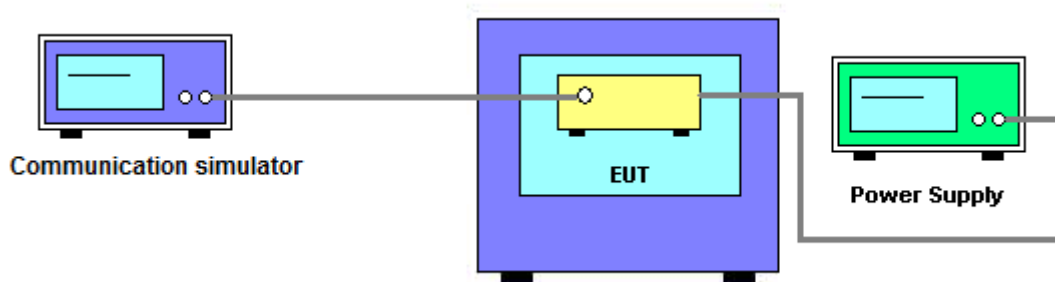
### 4.7.1 LIMIT

1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

### 4.7.2 TEST PROCEDURES

1. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
2. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
3. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the  $\pm 0.5^{\circ}\text{C}$  during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.
4. The frequency error was recorded frequency error from the communication simulator.

### 4.7.3 TESTSETUP LAYOUT



### 4.7.4 TESTDEVIATION

No deviation

### 4.7.5 TEST RESULTS

Please refer to the Attachment G.

### 5. List of measurement equipments

Radiated Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Test receiver	R&S	ESU26	100387	Jul. 21, 2017
2	LOOP Antennas(9kHz-30MHz)	R&S	HFH2-Z2	100263	Apr. 29, 2017
3	Spectrum analyzer	R&S	FSU3	200474	May 24, 2017
4	Spectrum analyzer	R&S	FSU43	100144	Jun. 02, 2017
5	Trilog Broadband Antenna (30M~3GHz)	SCHWARZBECK	VULB 9163	9163-521	Apr. 08, 2017
6	Double-Ridged Waveguide Horn Antenna (1G~18GHz)	R&S	HF907	100304	Apr. 29, 2017
7	Pyramidal Horn Antenna(18GHz-26.5 GHz)	ETS-Lindgren	Sep-60	5140299	Jul. 14, 2017
8	Radio Communication Tester	R&S	CMU200	3608082535	Mar. 30, 2017
9	Radio Communication Tester	Anritsu	MT8820C	A110518805	May 23, 2017

Conducted Emission & Band Edge & Occupied Bandwidth Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Mar. 27, 2017
2	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 27, 2017
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 26, 2017
4	wideband radio communication tester	R&S	CMW500	152372	Mar. 27, 2017
5	Cable	N/A	RG316(0.3m)	N/A	Jul. 06, 2017
6	Cable	N/A	RG316(0.3m)	N/A	Jul. 06, 2017

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Mar. 27, 2017
2	DC power supply	GW Instek	GPC-3030DN	EK880675	Oct. 13, 2017
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 26, 2017
4	wideband radio communication tester	R&S	CMW500	152372	Mar. 27, 2017
5	Const Temp, & Humidity Chamber	Giant?Force	ITH-225-20-S	IAB0309-001	Sep. 04, 2017
6	Cable	N/A	RG316(0.3m)	N/A	Jul. 06, 2017

Remark: "N/A" denotes no model name, serial no. or calibration specified.  
 All calibration period of equipment list is one year.

## ATTACHMENT A - OUTPUT POWER



**Conducted Power:**

GSM850 (Capsensor Off)	Burst Conducted Power (dBm)		
	128CH	190CH	251CH
	824.2MHz	836.6MHz	848.8MHz
GSM (CS)	-	-	-
GPRS/EDGE (GMSK)	31.90	31.93	31.84
	30.35	30.25	30.30
	29.41	29.41	29.50
	27.42	27.52	27.50
EDGE (8PSK)	27.87	27.66	27.42
	25.36	25.32	25.54
	24.06	24.10	24.15
	22.46	22.63	22.72

Modulation	Band	WCDMA V(Capsensor Off)		
	Tx Channel	4132CH	4182CH	4233CH
	Rx Channel	4357CH	4407CH	4458CH
	Frequency	826.4MHz	836.4MHz	846.6MHz
BPSK	RMC 12.2K	23.44	23.37	23.52
	RMC 64K	23.48	23.33	23.56
	RMC 144K	23.47	23.44	23.59
	RMC 384K	23.45	23.45	23.54
16QAM	HSDPA Subtest-1	23.45	23.41	23.57
	HSDPA Subtest-2	22.99	22.90	23.02
	HSDPA Subtest-3	22.37	22.29	22.41
	HSDPA Subtest-4	22.34	22.32	22.42
16QAM	HSUPA Subtest-1	22.95	22.90	23.02
	HSUPA Subtest-2	23.52	23.44	23.53
	HSUPA Subtest-3	22.34	22.32	22.42
	HSUPA Subtest-4	23.50	23.33	23.51
	HSUPA Subtest-5	23.48	23.44	23.57

LTE Band / BW	Modulation	RB Sizing	RB Offset	Low CH	Mid CH	High CH
				20407 CH	20525 CH	20643 CH
				824.7 MHz	836.5 MHz	848.3 MHz
5 / 1.4M	QPSK	1	0	23.51	23.28	22.91
		1	2	23.68	23.47	23.00
		1	5	23.70	23.52	22.84
		3	0	23.68	23.37	22.94
		3	1	23.73	23.46	22.94
		3	3	23.76	23.51	22.91
	16QAM	6	0	23.15	22.96	22.32
		1	0	22.78	22.80	22.08
		1	2	22.94	22.95	22.18
		1	5	22.94	23.02	22.02
		3	0	22.87	22.62	22.22
		3	1	22.93	22.69	22.23
		3	3	22.96	22.75	22.19
		6	0	22.31	22.08	21.54

LTE Band / BW	Modulation	RB Sizing	RB Offset	Low CH	Mid CH	High CH
				20415 CH	20525 CH	20635 CH
				825.5 MHz	836.5 MHz	847.5 MHz
5 / 3M	QPSK	1	0	23.36	22.97	22.64
		1	7	23.89	23.53	23.00
		1	14	23.36	23.55	22.67
		8	0	23.14	22.71	22.15
		8	3	23.27	22.98	22.30
		8	7	23.12	23.08	22.26
	16QAM	15	0	23.16	22.96	22.22
		1	0	22.80	22.34	22.03
		1	7	23.38	23.03	22.39
		1	14	22.79	23.06	21.99
		8	0	22.23	21.89	21.32
		8	3	22.39	22.11	21.47
		8	7	22.20	22.20	21.42
		15	0	22.23	22.01	21.34

LTE Band / BW	Modulation	RB Sizing	RB Offset	Low CH	Mid CH	High CH
				20425 CH	20525 CH	20625 CH
				826.5 MHz	836.5 MHz	846.5 MHz
5 / 5M	QPSK	1	0	24.00	23.22	23.42
		1	12	23.73	23.60	22.85
		1	24	23.53	24.21	23.15
		12	0	23.20	22.53	22.25
		12	6	23.21	22.93	22.22
		12	13	23.00	23.11	22.23
	16QAM	25	0	23.04	22.81	22.18
		1	0	23.29	22.49	22.81
		1	12	23.12	22.87	22.23
		1	24	22.83	23.40	22.49
		12	0	22.29	21.69	21.37
		12	6	22.32	22.00	21.33
		12	13	22.11	22.18	21.35
		25	0	22.15	21.86	21.31

LTE Band / BW	Modulation	RB Sizing	RB Offset	Low CH	Mid CH	High CH
				20450 CH	20525 CH	20600 CH
				829.0 MHz	836.5 MHz	844.0 MHz
5 / 10M	QPSK	1	0	23.66	22.60	24.00
		1	24	23.10	23.57	23.27
		1	49	22.66	24.05	22.88
		25	0	22.91	22.22	23.06
		25	12	22.55	22.89	22.48
		25	25	21.89	23.09	22.02
		50	0	22.44	22.73	22.43
	16QAM	1	0	22.99	22.01	23.12
		1	24	22.40	22.91	22.34
		1	49	21.98	23.36	22.03
		25	0	21.96	21.32	22.01
		25	12	21.58	21.94	21.54
		25	25	20.97	22.05	21.14
		50	0	21.51	21.69	21.46

**ERP Power:**

GSM850 (Capsensor Off)	ERP Power (dBm)		
	128CH	190CH	251CH
	824.2MHz	836.6MHz	848.8MHz
GSM (CS)	-	-	-
GPRS/EDGE (GMSK)	29.75	<b>29.78</b>	29.69
	28.20	28.10	28.15
	27.26	27.26	27.35
	25.27	25.37	25.35
EDGE (8PSK)	<b>25.72</b>	25.51	25.27
	23.21	23.17	23.39
	21.91	21.95	22.00
	20.31	20.48	20.57

Modulation	Band	WCDMA V(Capsensor Off)		
	Tx Channel	4132CH	4182CH	4233CH
Rx Channel	4357CH	4407CH	4458CH	
Frequency	826.4MHz	836.4MHz	846.6MHz	
RMC 12.2K	21.29			

BPSK

LTE Band / BW	Modulation	RB Sizat	RB Offset	Low CH	Mid CH	High CH
				20407 CH	20525 CH	20643 CH
				824.7 MHz	836.5 MHz	848.3 MHz
		1	0	21.36		

QPSK

5 / 1.4M

LTE Band / BW	Modulation	RB Sizat	RB Offset	Low CH	Mid CH	High CH
				20450 CH	20525 CH	20600 CH
				829.0 MHz	836.5 MHz	844.0 MHz
		1	0	21.51		

QPSK

5 / 10M

## ATTACHMENT B - OCCUPIED BANDWIDTH

GSM850					
GSM			EDGE		
CS			8PSK		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
128	824.2	0.241	128	824.2	0.255
190	836.6	0.245	190	836.6	0.252
251	848.8	0.245	251	848.8	0.251
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
128	824.2	0.311	128	824.2	0.322
190	836.6	0.313	190	836.6	0.323
251	848.8	0.313	251	848.8	0.320

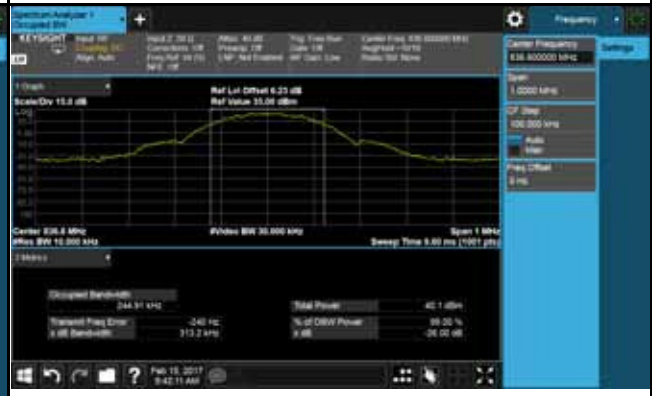


### Spectrum Plot

GSM -128



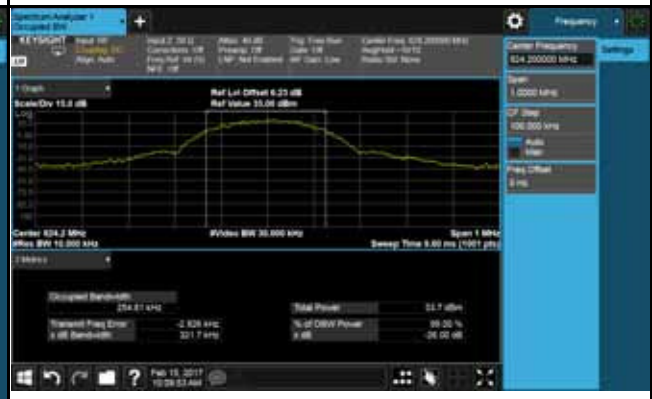
GSM-190



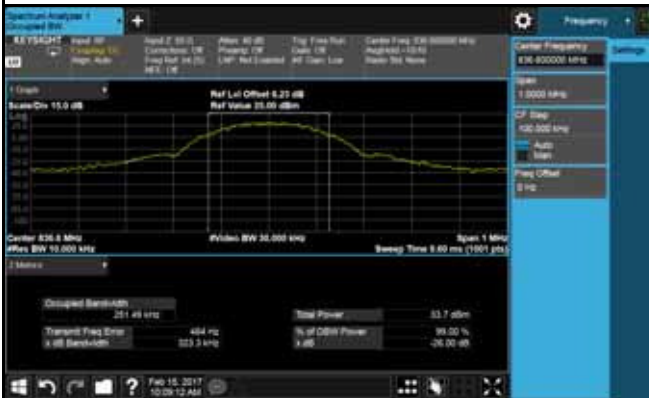
GSM-251



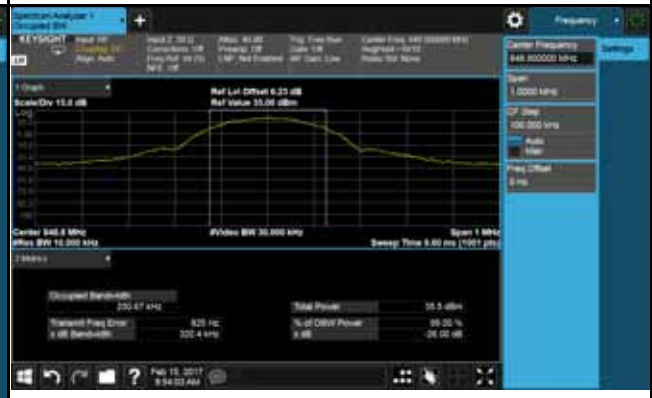
EDGE-128



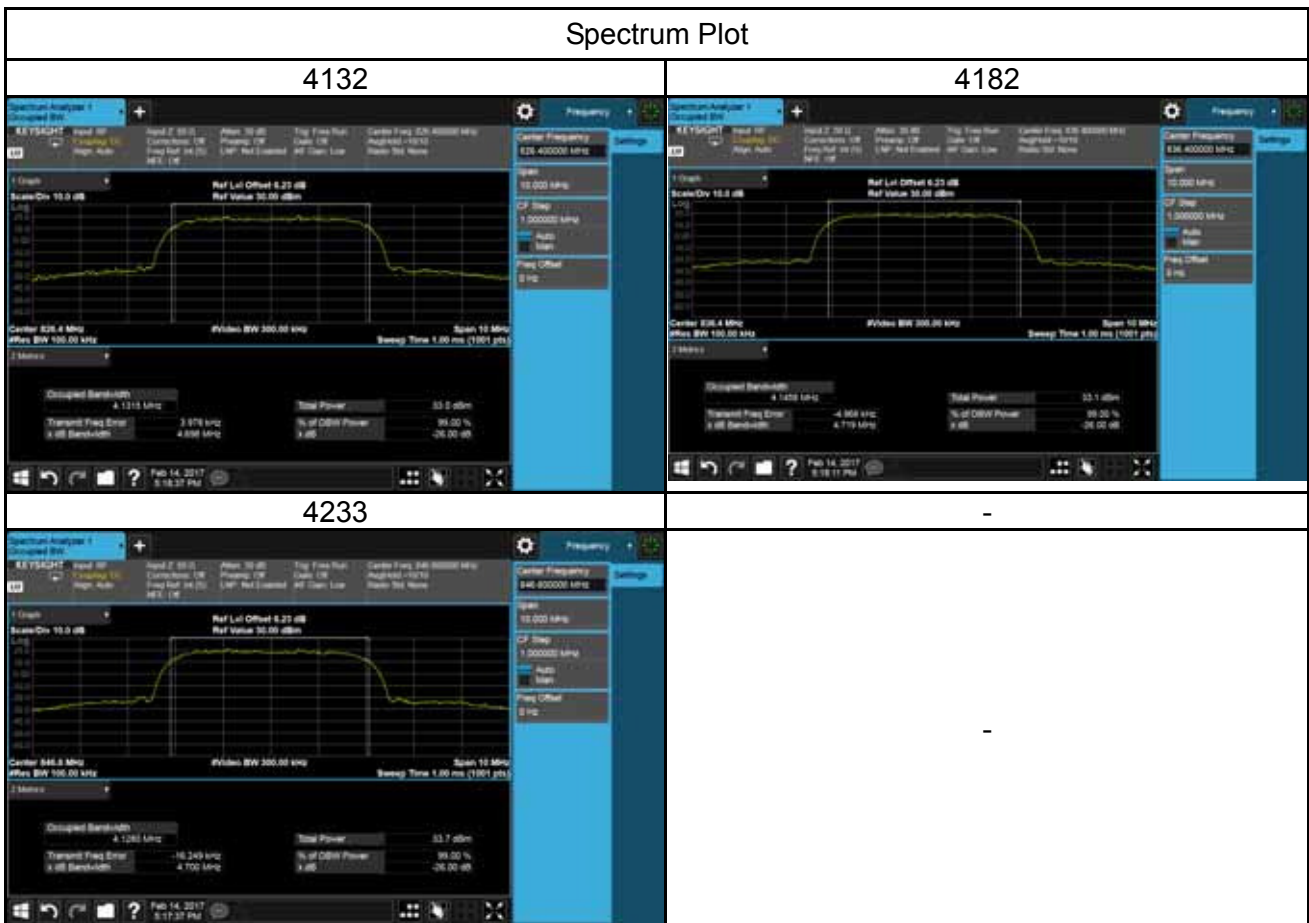
EDGE-190



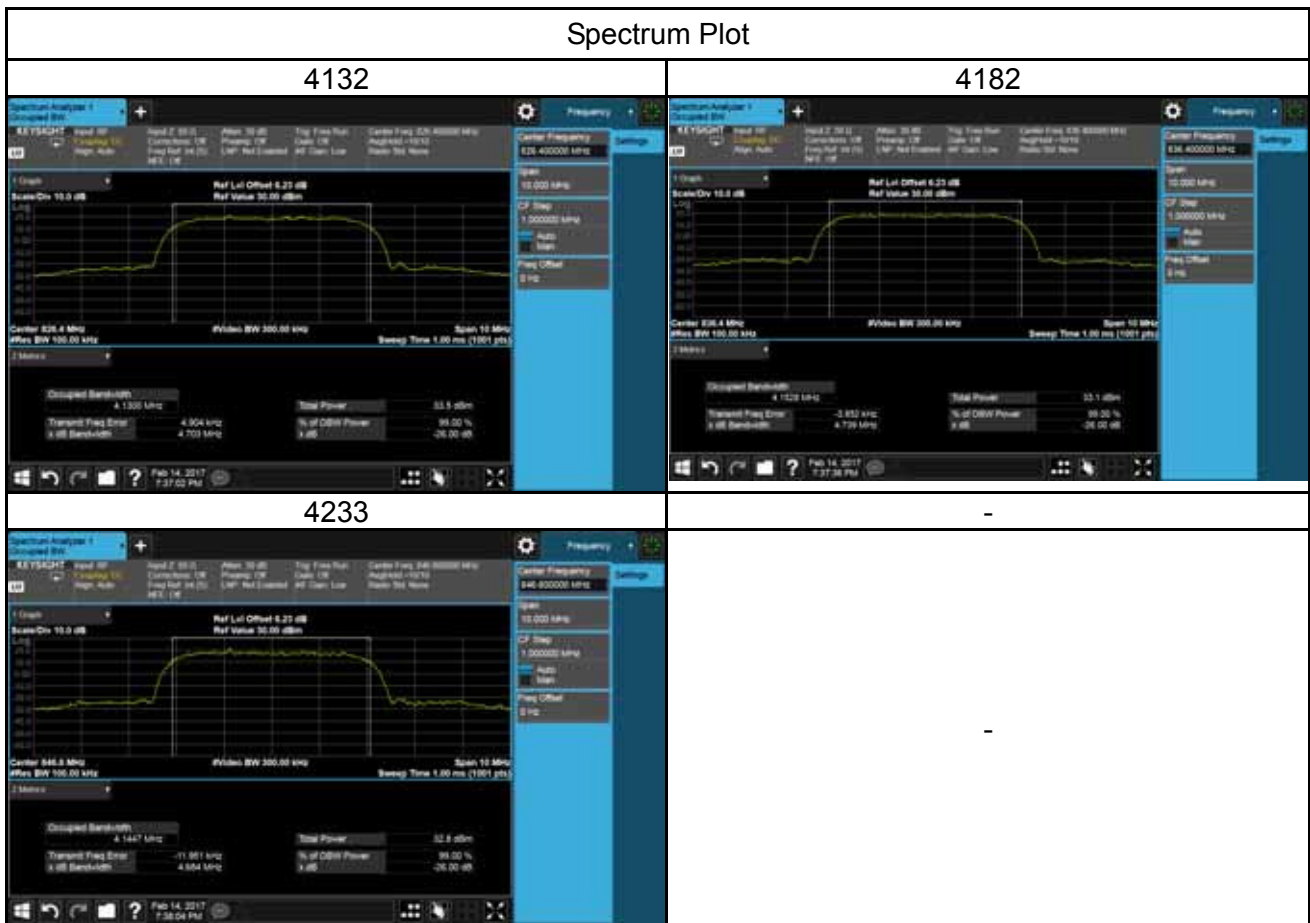
EDGE-251



WCDMA Band V					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4132	826.4	4.132	4132	826.4	4.698
4182	836.4	4.146	4182	836.4	4.719
4233	846.6	4.128	4233	846.6	4.700



WCDMA_HSDPA Band V					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4132	826.4	4.130	4132	826.4	4.703
4182	836.4	4.153	4182	836.4	4.739
4233	846.6	4.145	4233	846.6	4.684



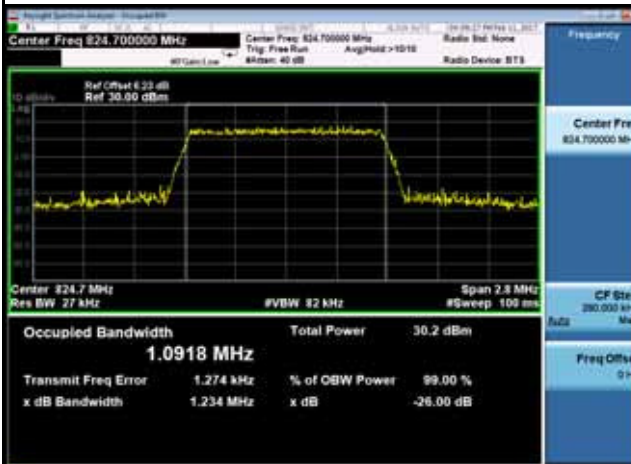
WCDMA_HSUPA Band V					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4132	826.4	4.132	4132	826.4	4.706
4182	836.4	4.152	4182	836.4	4.727
4233	846.6	4.1349	4233	846.6	4.687



LTE Band 5_1.4M					
QPSK			16QAM		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
20407	824.7	1.092	20407	824.7	1.090
20525	836.5	1.093	20525	836.5	1.091
20643	848.3	1.090	20643	848.3	1.090
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20407	824.7	1.234	20407	824.7	1.228
20525	836.5	1.227	20525	836.5	1.237
20643	848.3	1.232	20643	848.3	1.237

### Spectrum Plot

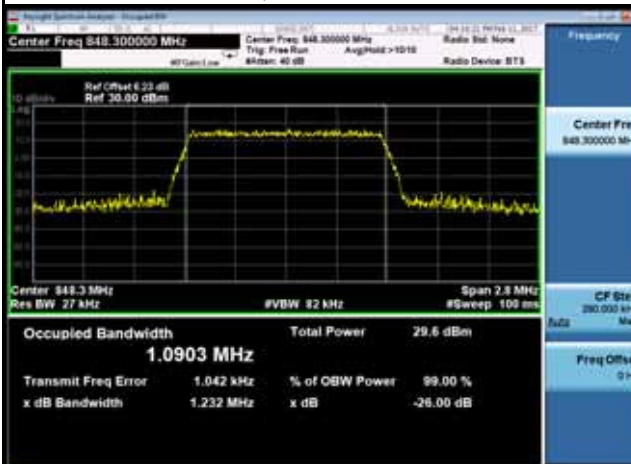
QPSK-20407



QPSK-20525



QPSK-20643



16QAM-20407



16QAM-20525



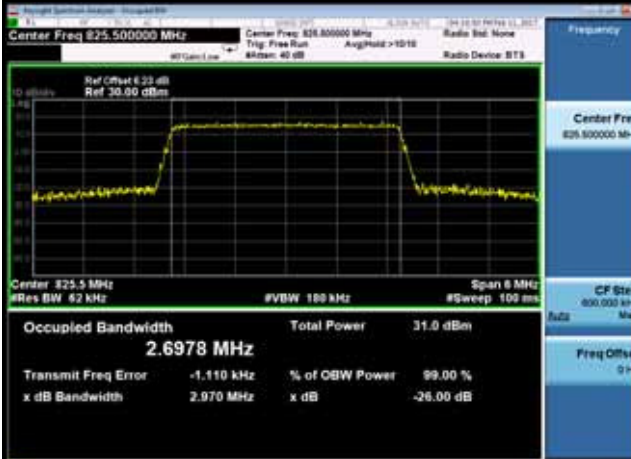
16QAM-20643



LTE Band 5_3M					
QPSK			16QAM		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
20415	825.5	2.698	20415	825.5	2.698
20525	836.5	2.702	20525	836.5	2.700
20635	847.5	2.700	20635	847.5	2.692
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20415	825.5	2.970	20415	825.5	2.964
20525	836.5	2.962	20525	836.5	2.985
20635	847.5	2.961	20635	847.5	2.967

### Spectrum Plot

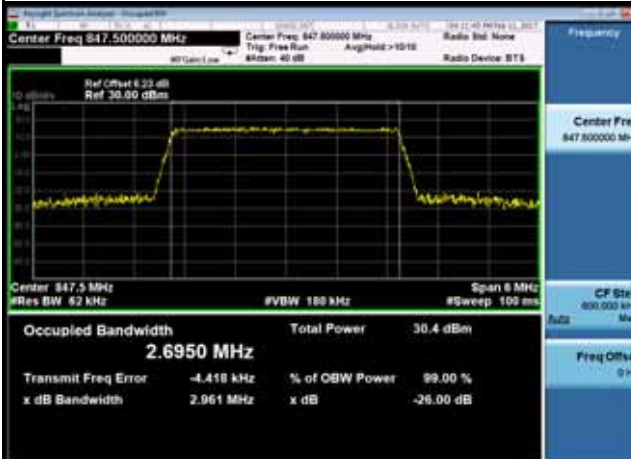
QPSK-20415



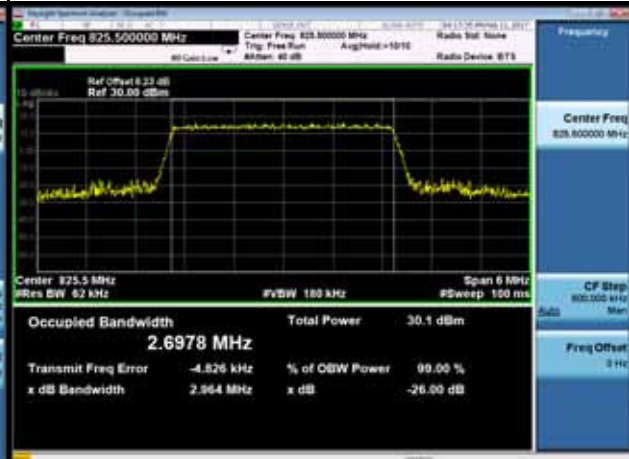
QPSK-20525



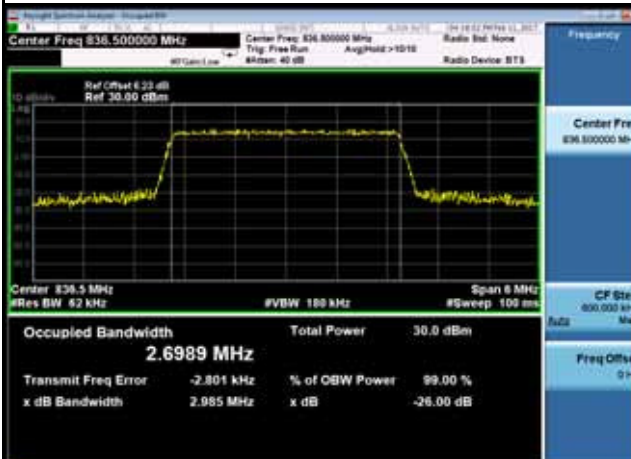
QPSK-20635



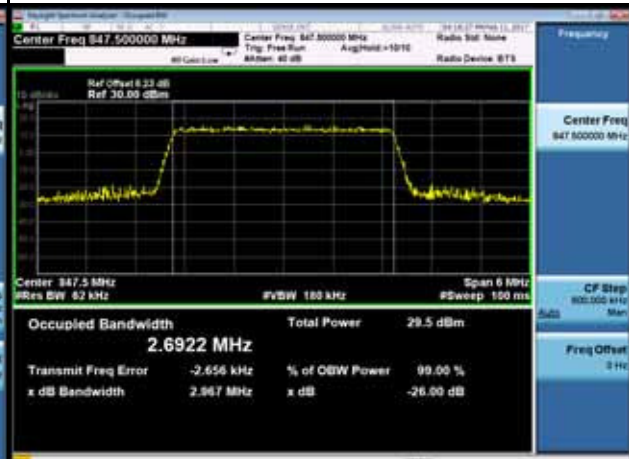
16QAM-20415



16QAM-20525



16QAM-20635

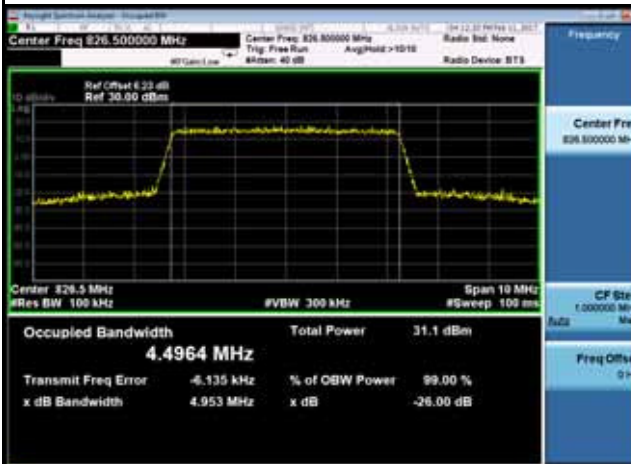




LTE Band 5_5M					
QPSK			16QAM		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
20425	826.5	4.496	20425	826.5	4.504
20525	836.5	4.503	20525	836.5	4.516
20625	846.5	4.503	20625	846.5	4.503
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20425	826.5	4.953	20425	826.5	4.941
20525	836.5	4.928	20525	836.5	4.943
20625	846.5	4.966	20625	846.5	4.930

### Spectrum Plot

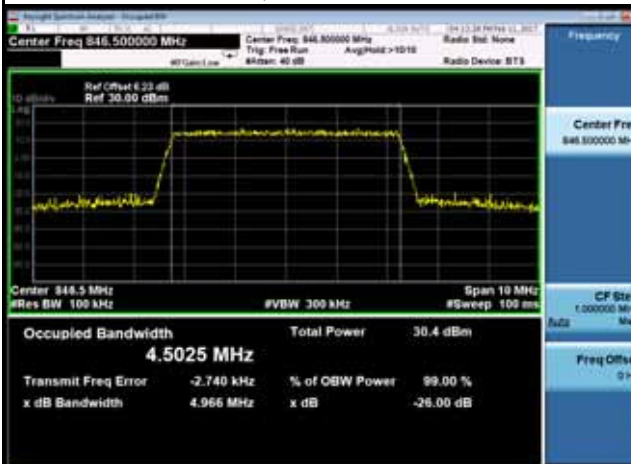
QPSK-20425



QPSK-20525



QPSK-20625



16QAM-20425



16QAM-20525



16QAM-20625



LTE Band 5_10M					
QPSK			16QAM		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
20450	829.0	8.971	20450	829.0	8.972
20525	836.5	9.002	20525	836.5	8.988
20600	844.0	8.977	20600	844.0	8.959
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20450	829.0	9.979	20450	829.0	9.762
20525	836.5	9.809	20525	836.5	9.880
20600	844.0	9.803	20600	844.0	9.799

### Spectrum Plot

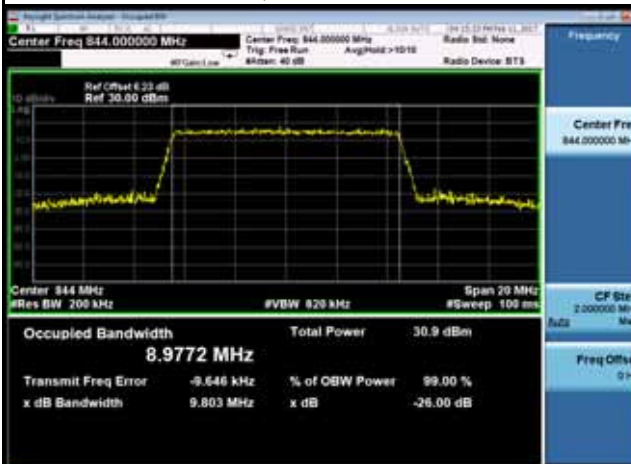
**QPSK-20450**



**QPSK-20525**



**QPSK-20600**



**16QAM-20450**



**16QAM-20525**



**16QAM-20600**



## ATTACHMENT C - CONDUCTED EMISSIONS

GSM850			
GSM		GSM	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
190	836.6	190	836.6
GSM		EDGE	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
190	836.6	190	836.6
EDGE		EDGE	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
190	836.6	190	836.6

WCDMA Band V			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
4182	836.4	4182	836.4
Channel	Frequency(MHz)	-	-
4182	836.4	-	-
		-	

WCDMA_HSDPA Band V			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
4182	836.4	4182	836.4
Channel	Frequency(MHz)	-	-
4182	836.4	-	-
		-	



WCDMA_HSUPA Band V			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
4182	836.4	4182	836.4
Channel	Frequency(MHz)	-	-
4182	836.4	-	-
		-	

LTE Band 5_1.4M			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
20525	836.5	20525	836.5
Channel	Frequency(MHz)	-	-
20525	836.5	-	-
		-	

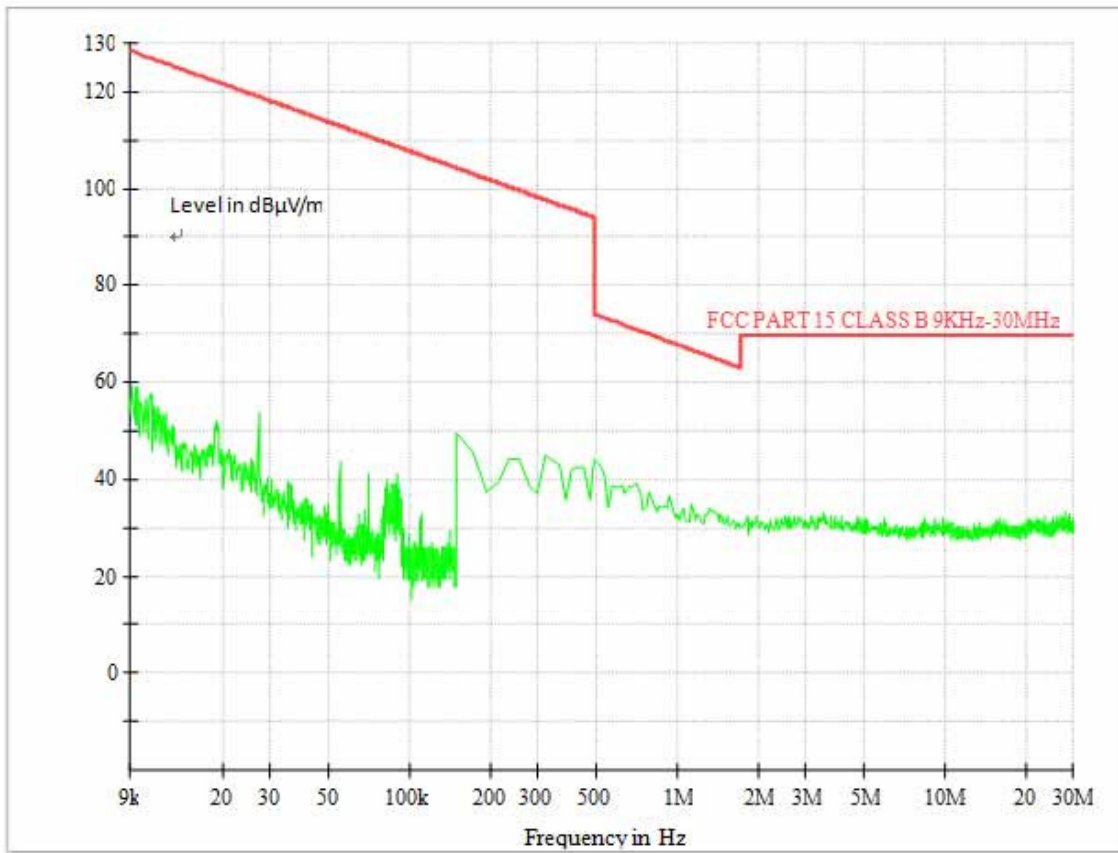
LTE Band 5_3M			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
20525	836.5	20525	836.5
Channel	Frequency(MHz)	-	-
20525	836.5	-	-
		-	

LTE Band 5_5M			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
20525	836.5	20525	836.5
Channel	Frequency(MHz)	-	-
20525	836.5	-	-
		-	

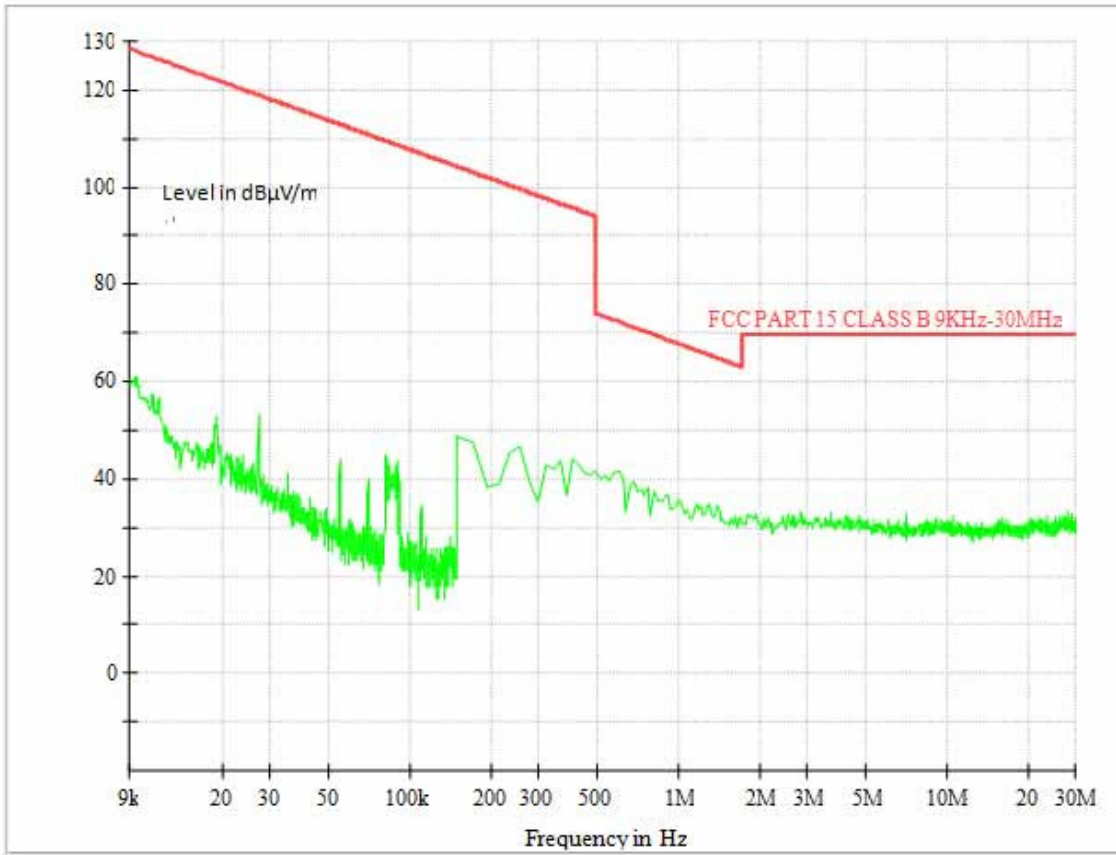
LTE Band 5_10M			
Channel	Frequency(MHz)	Channel	Frequency(MHz)
20525	836.5	20525	836.5
Channel	Frequency(MHz)	-	-
20525	836.5	-	-
		-	

## ATTACHMENT D - RADIATED EMISSION

Test Mode: TX Mode\_GSM850

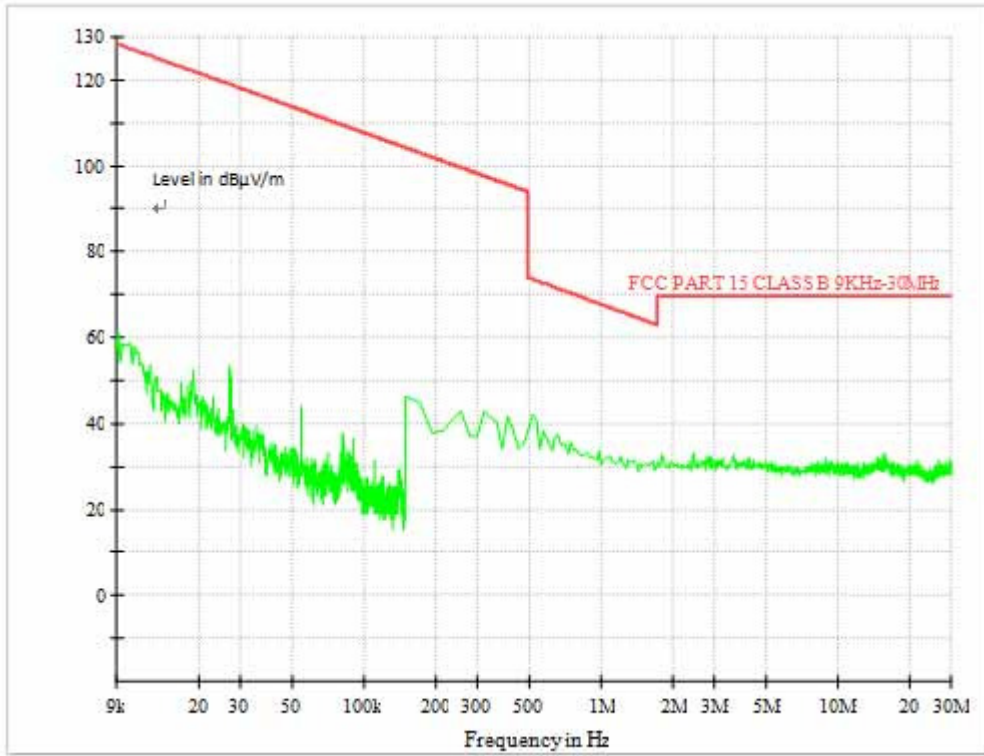


Test Mode: TX Mode\_WCDMABand 5

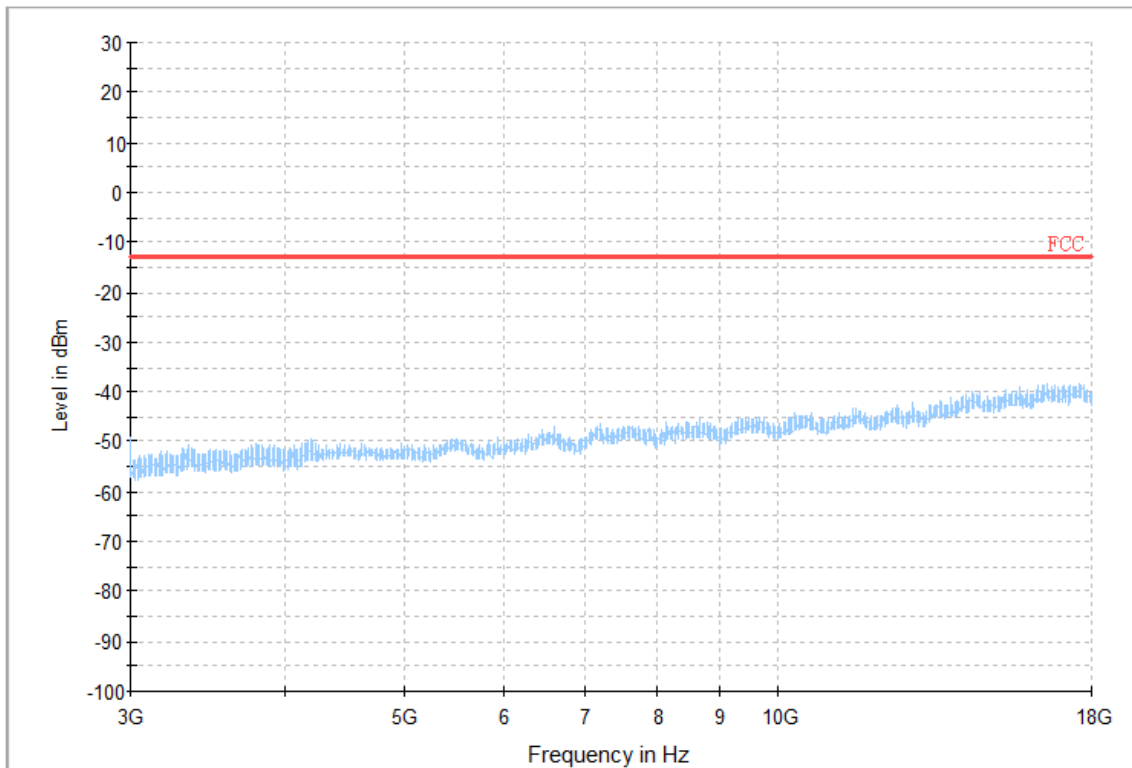
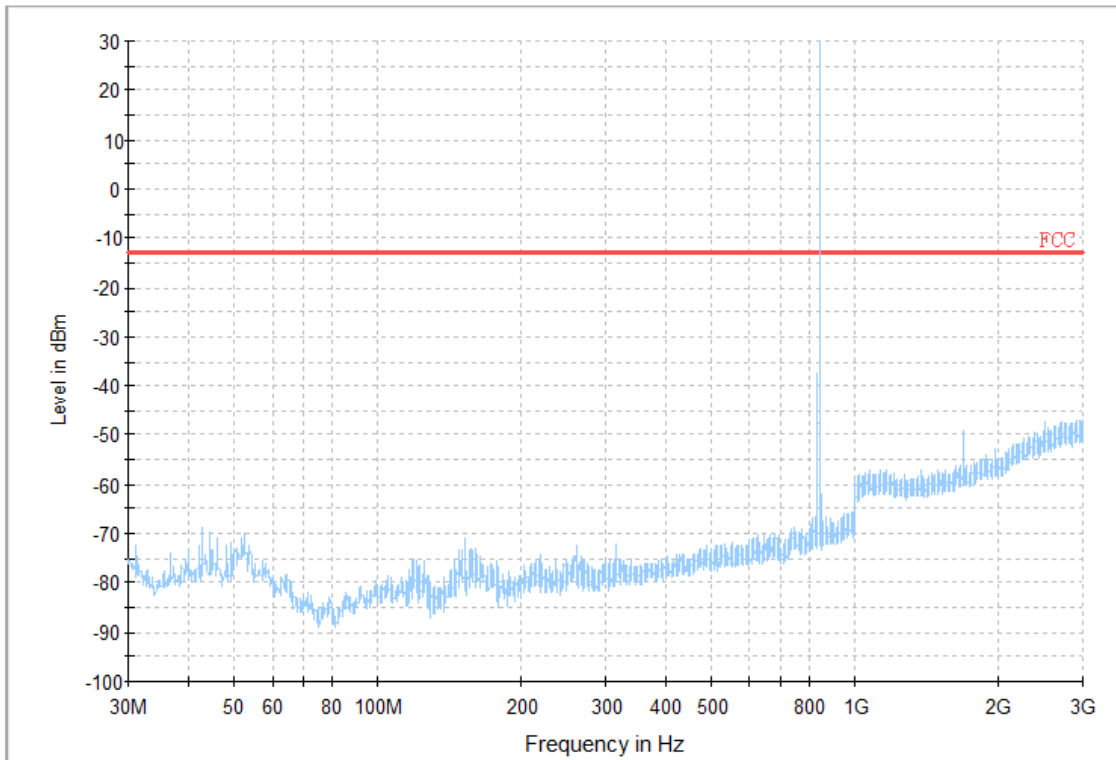




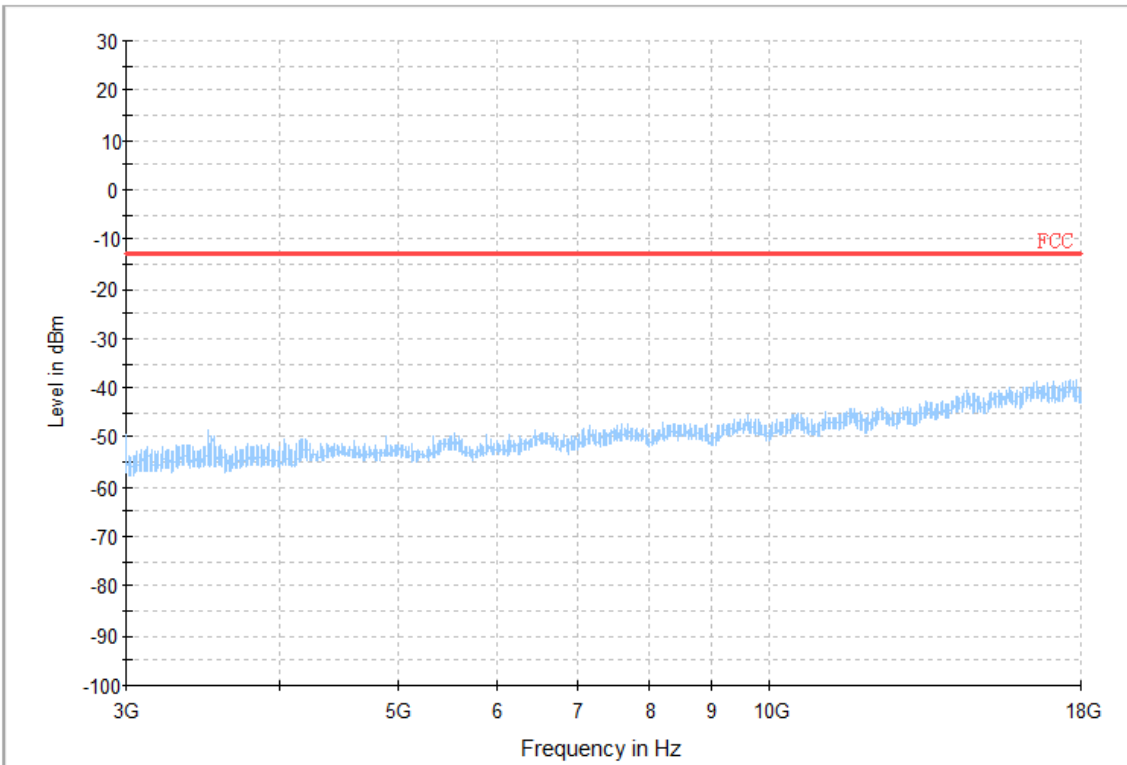
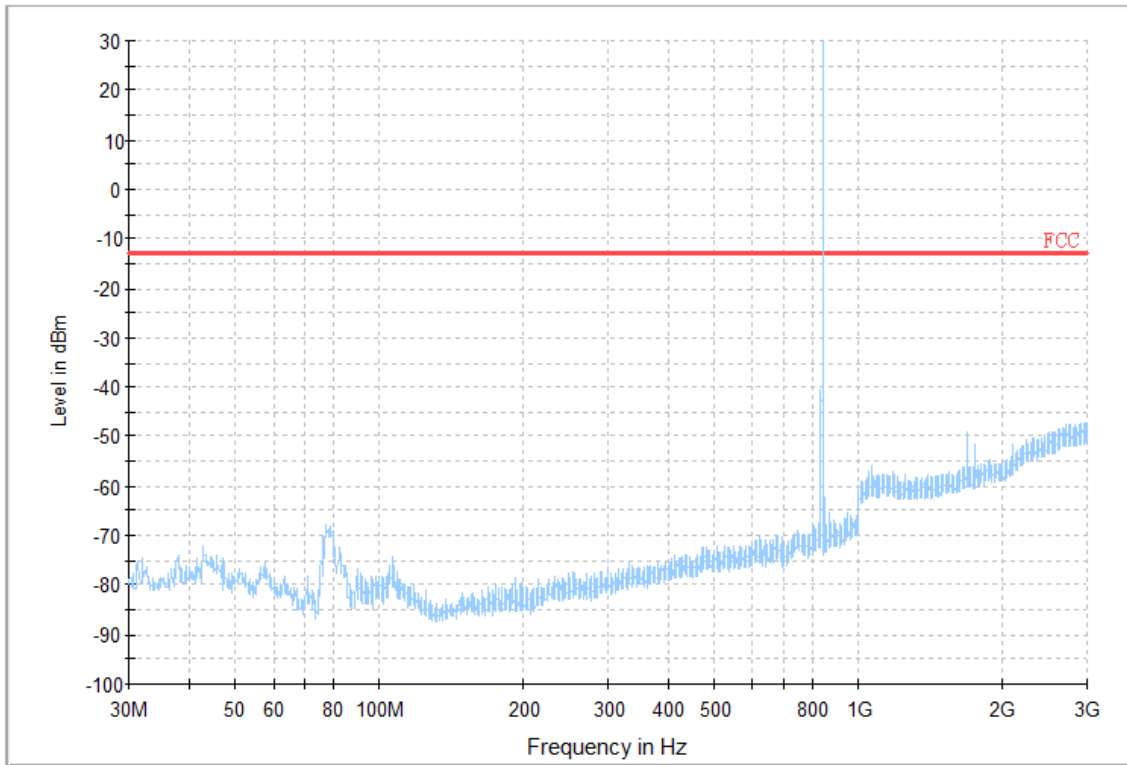
Test Mode: TX Mode\_LTEBand 5



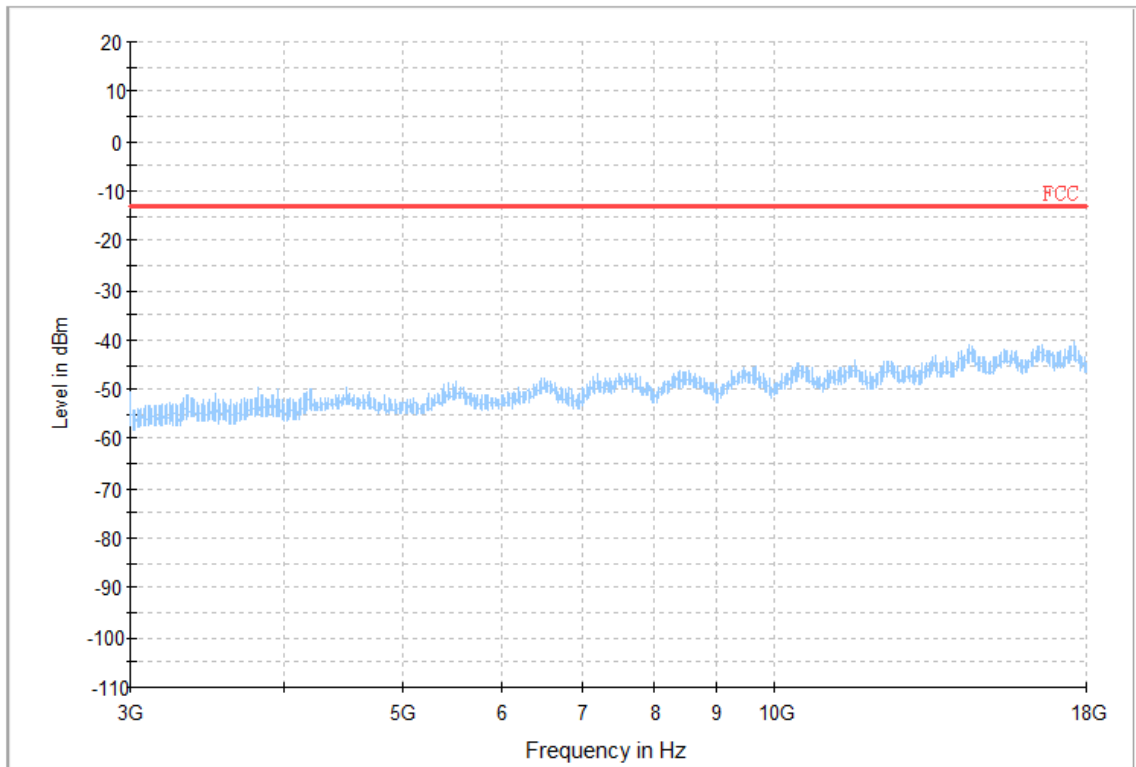
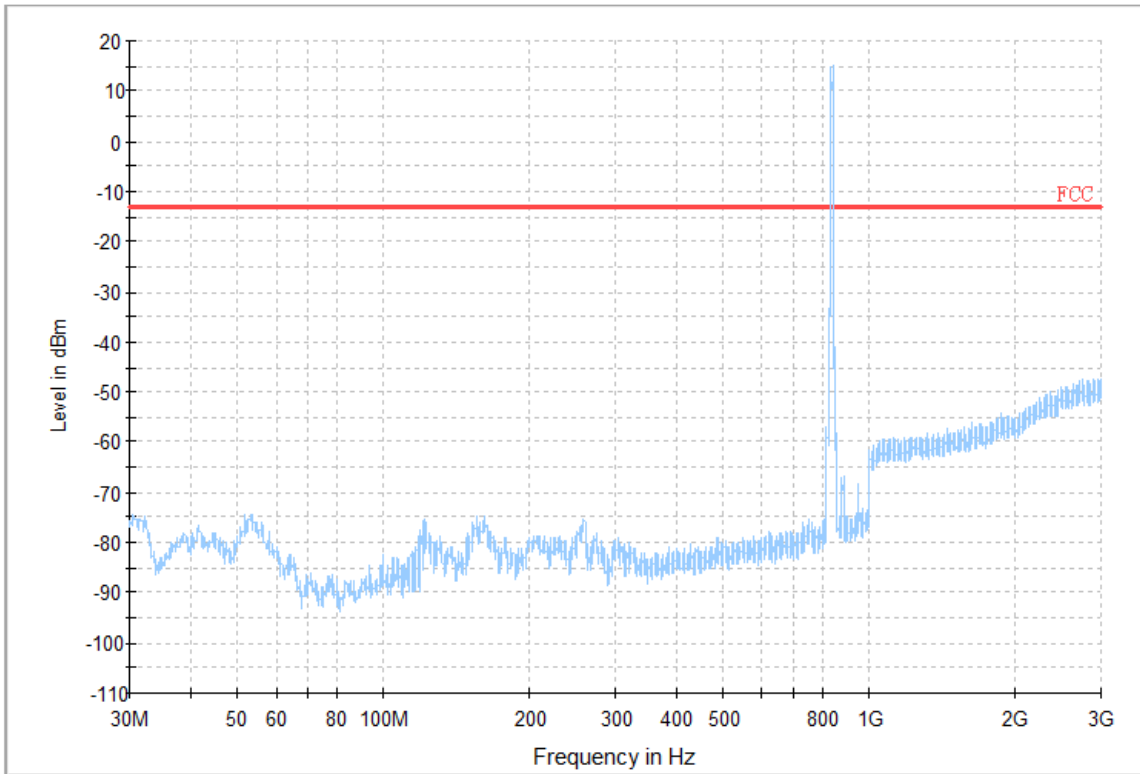
Test Mode: GSM850\_TX CH190\_GSM



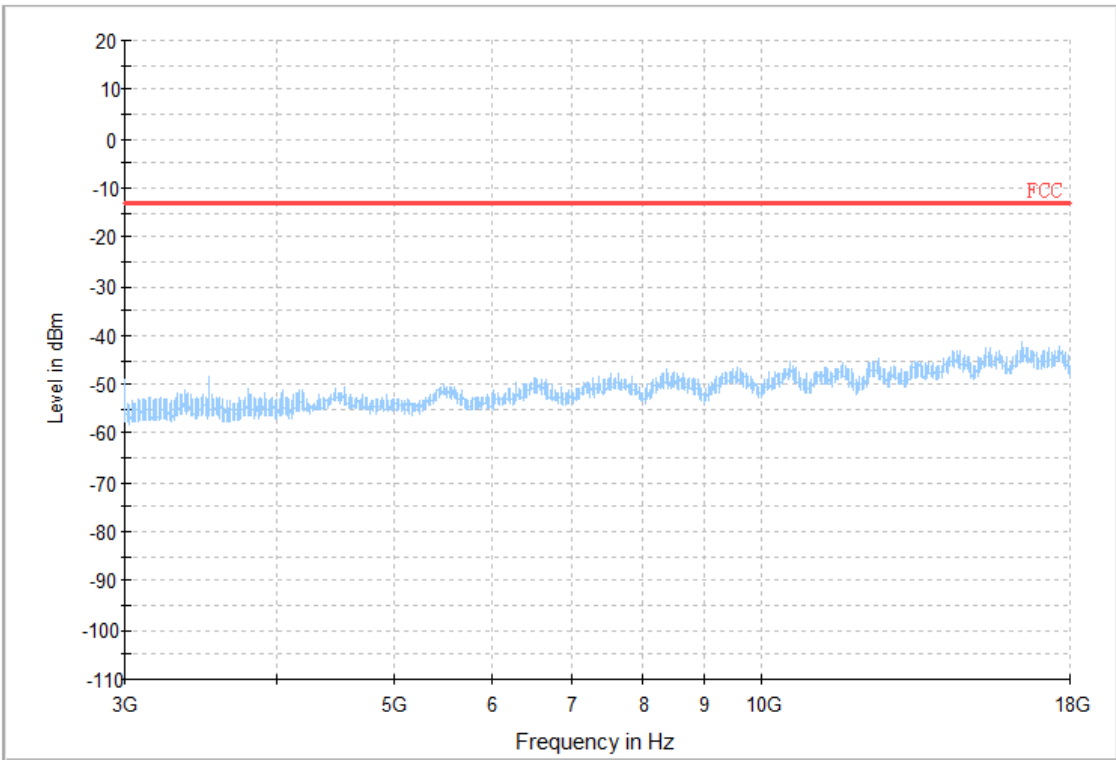
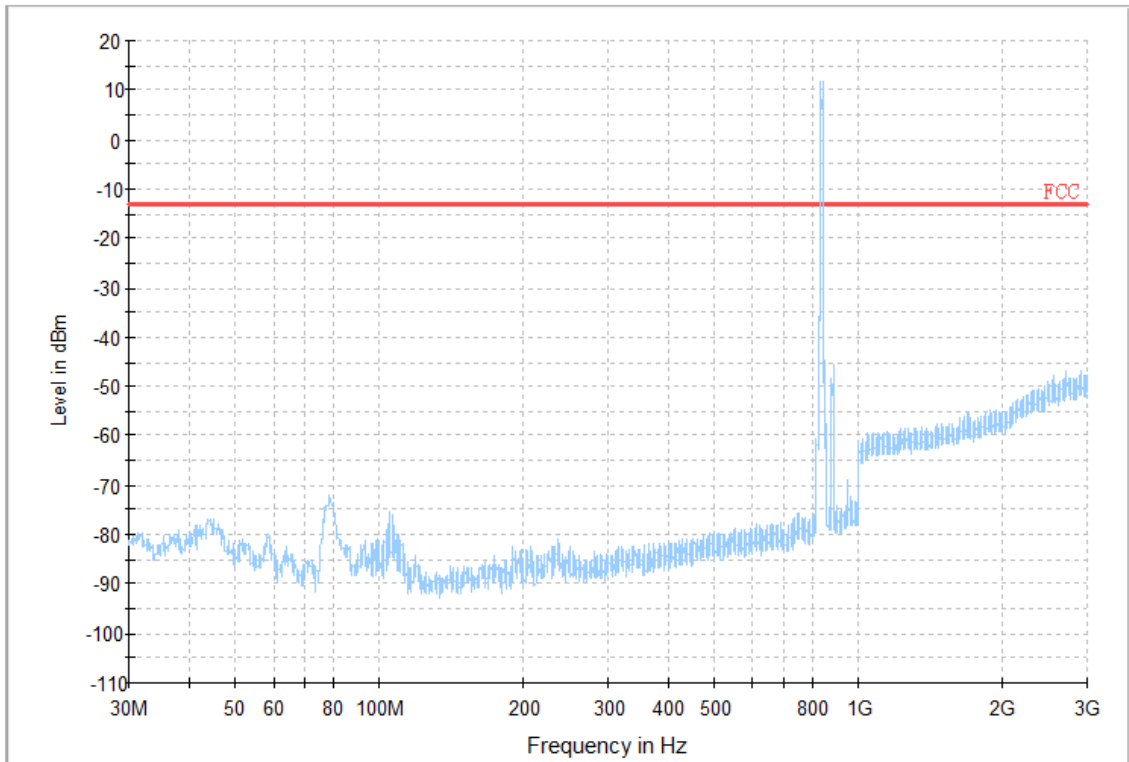
Test Mode: GSM850\_TX CH190\_EDGE



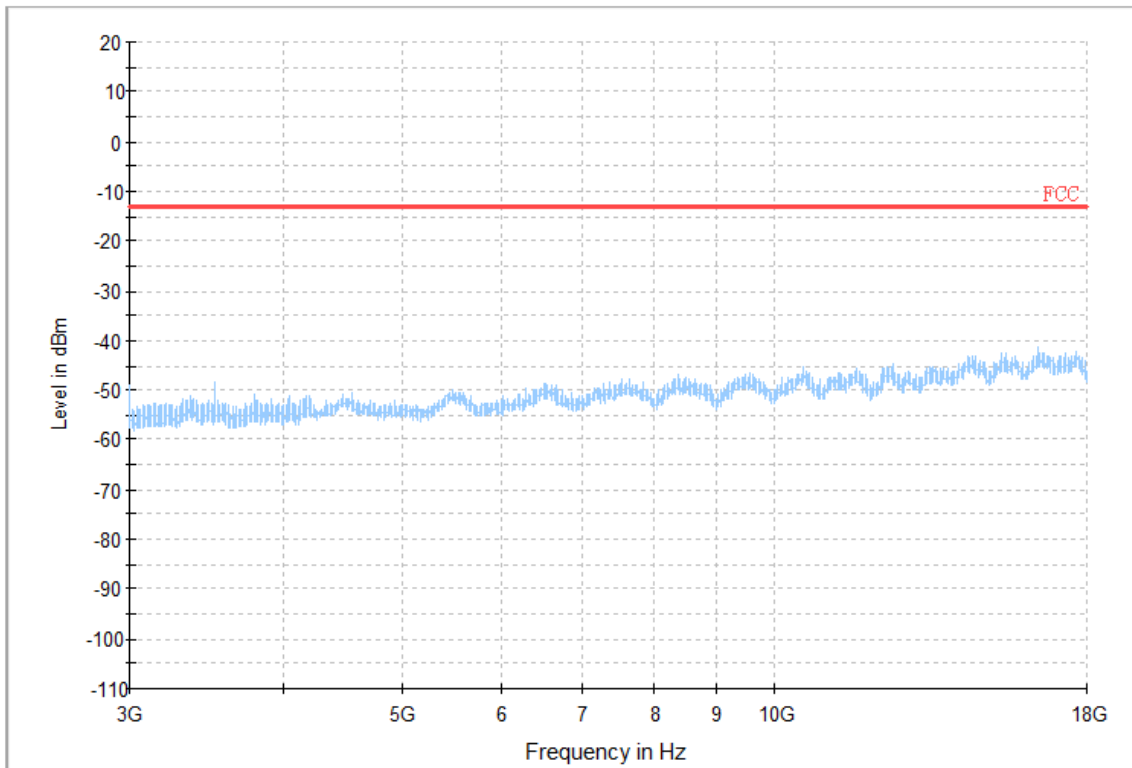
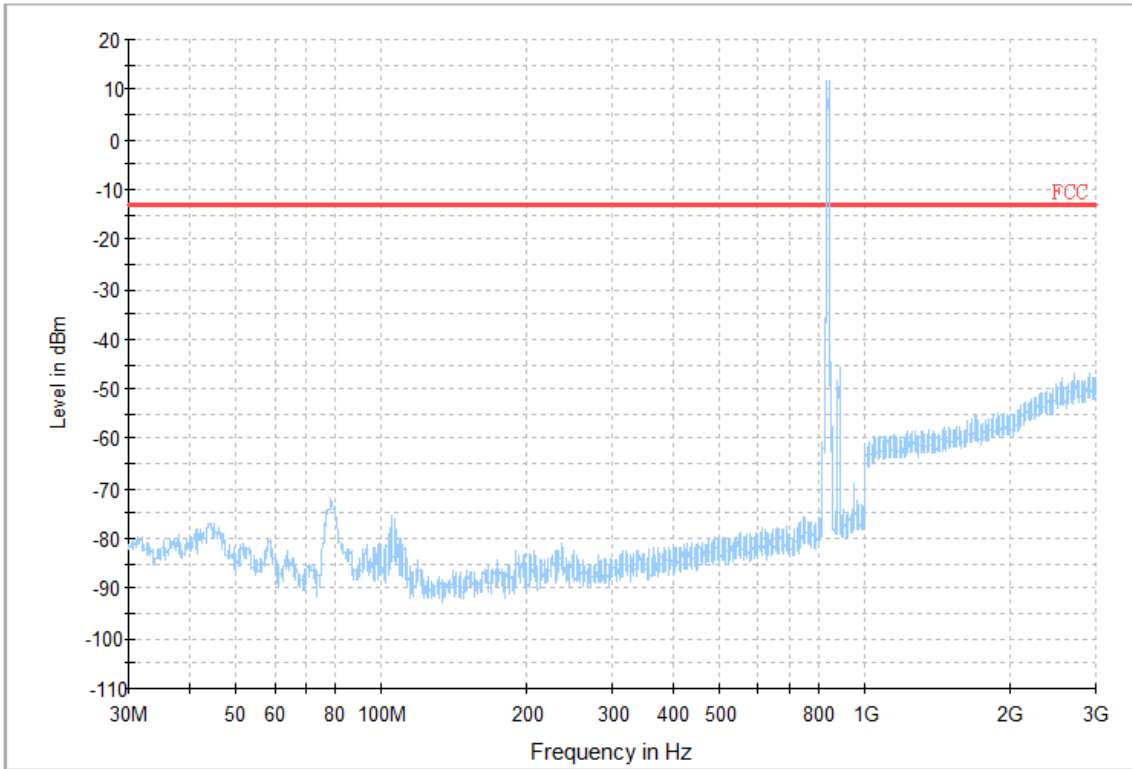
Test Mode: WCDMA Band 5\_TX CH4182



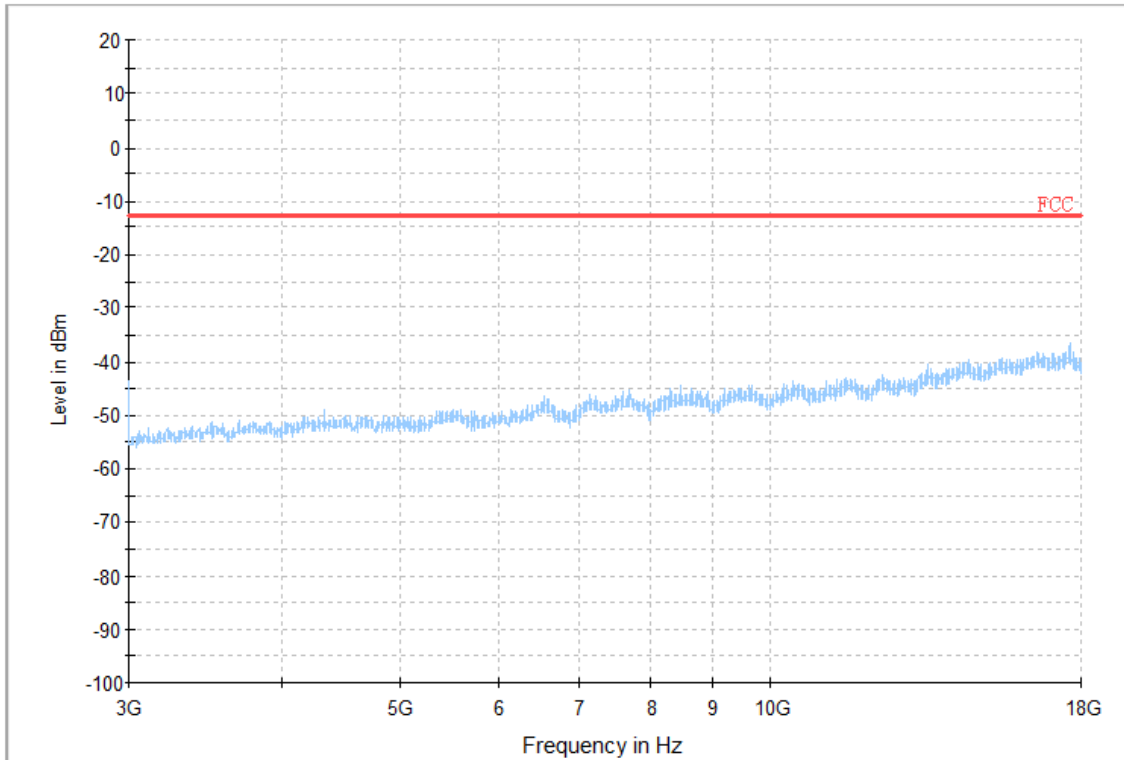
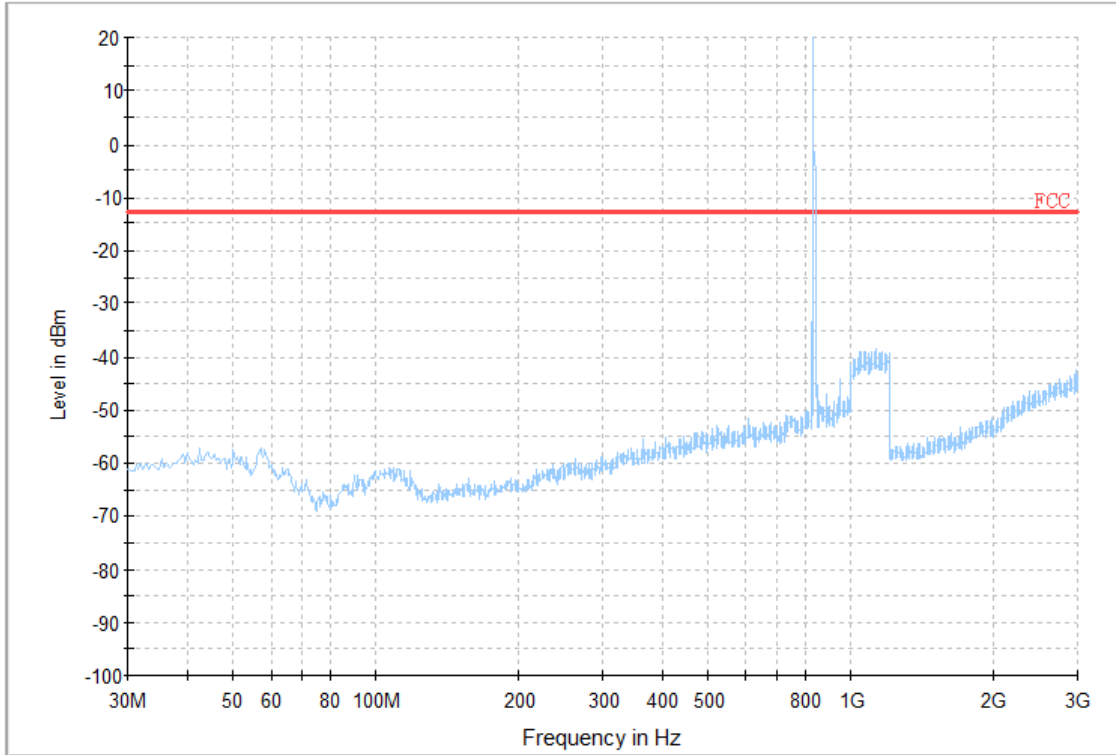
Test Mode: HSUPA Band V\_TX CH4182



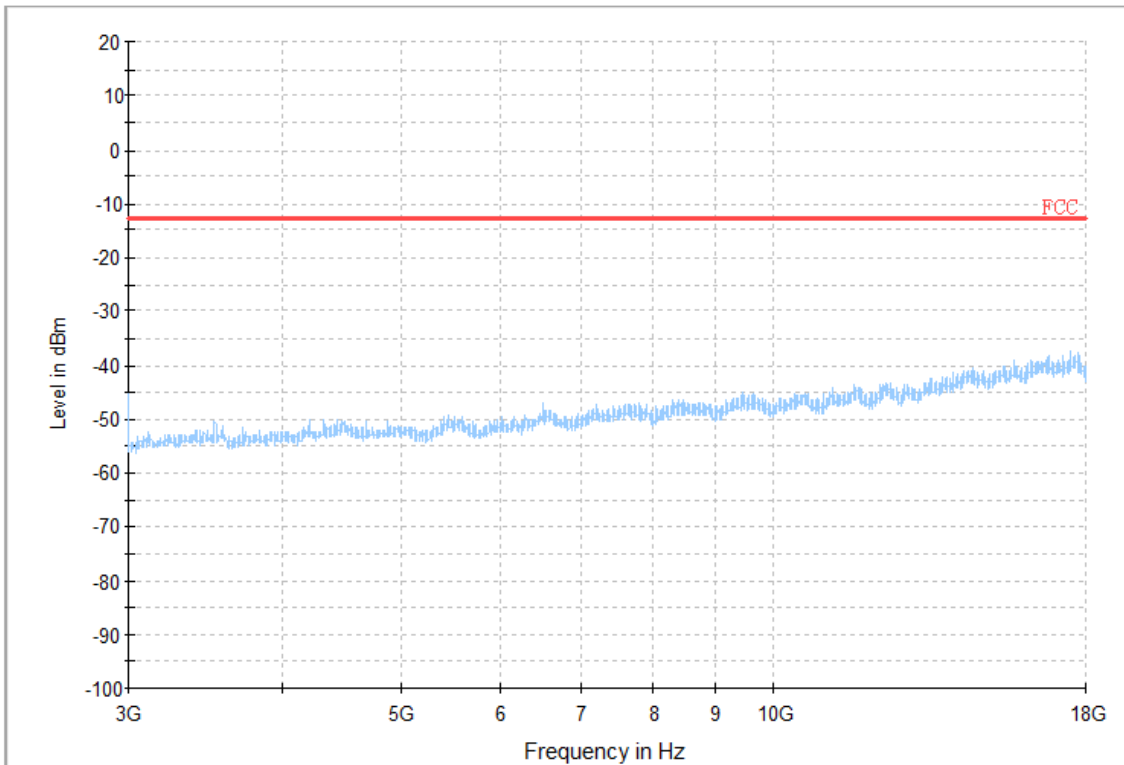
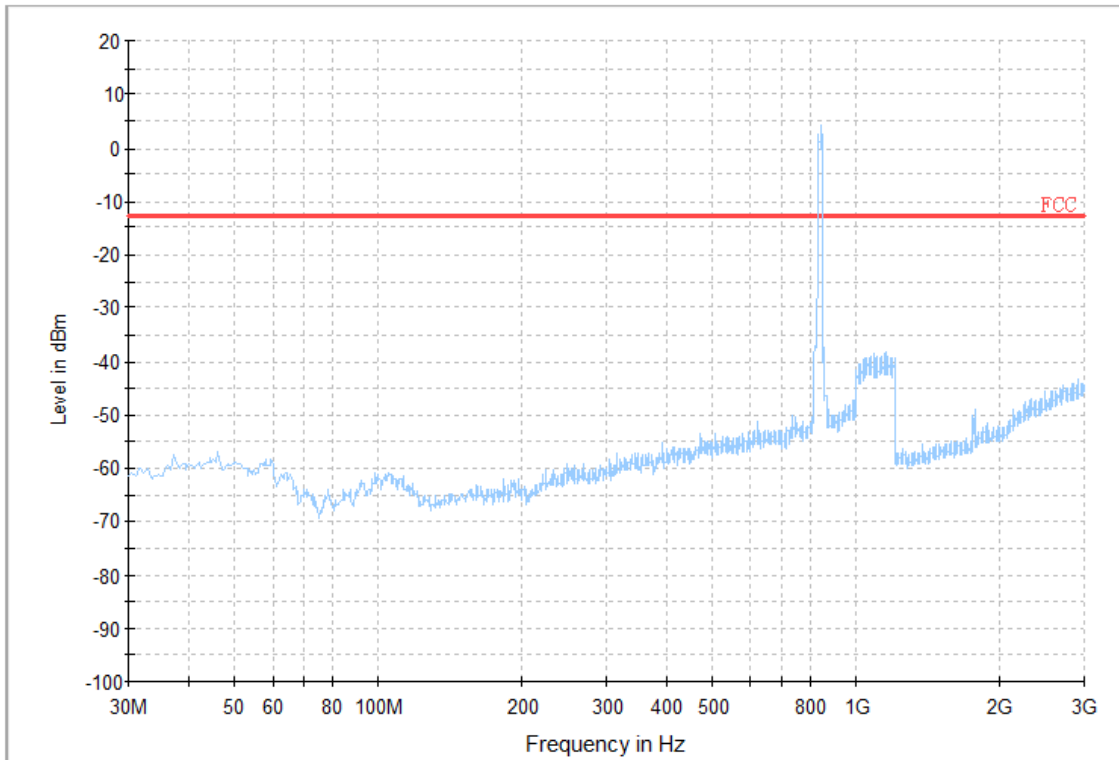
Test Mode: HSDPA Band V\_TX CH4182



Test Mode: LTE Band 5\_TX CH20525\_1.4M



Test Mode: LTE Band 5\_TX CH20525\_10M



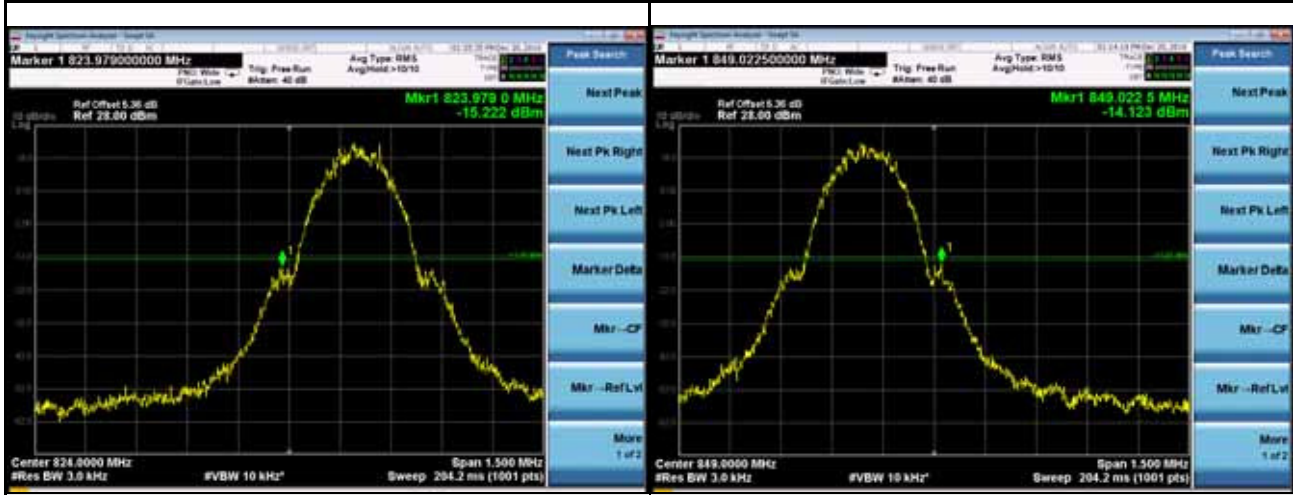


## ATTACHMENT E - BAND EDGE

GSM850

GSM

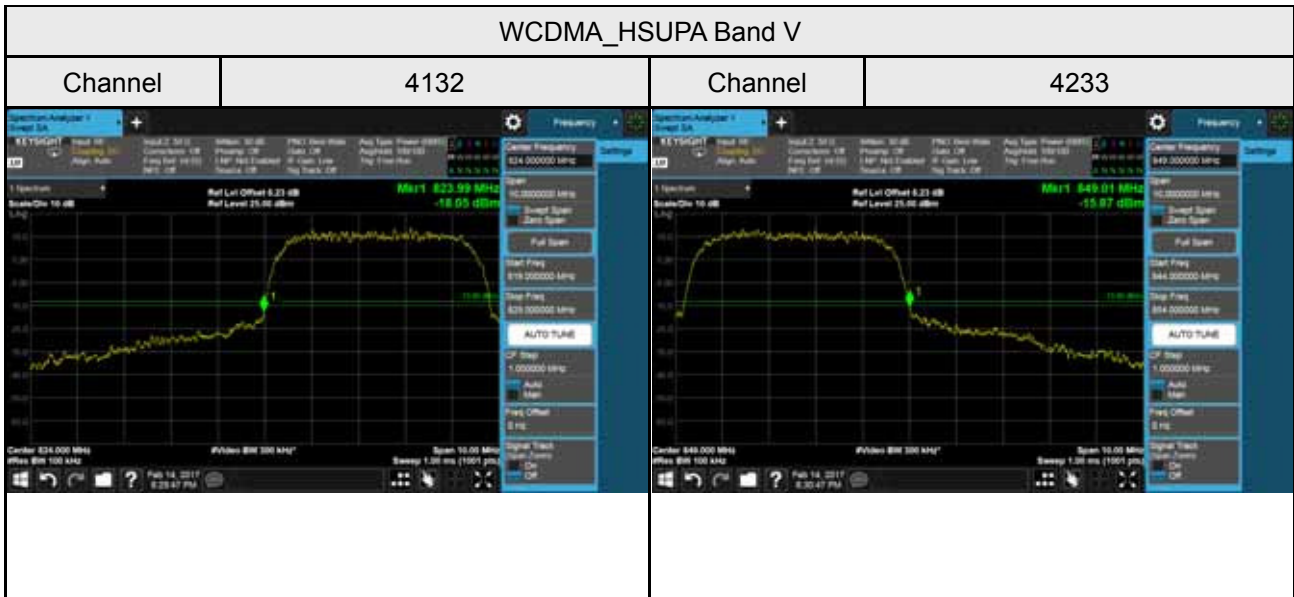
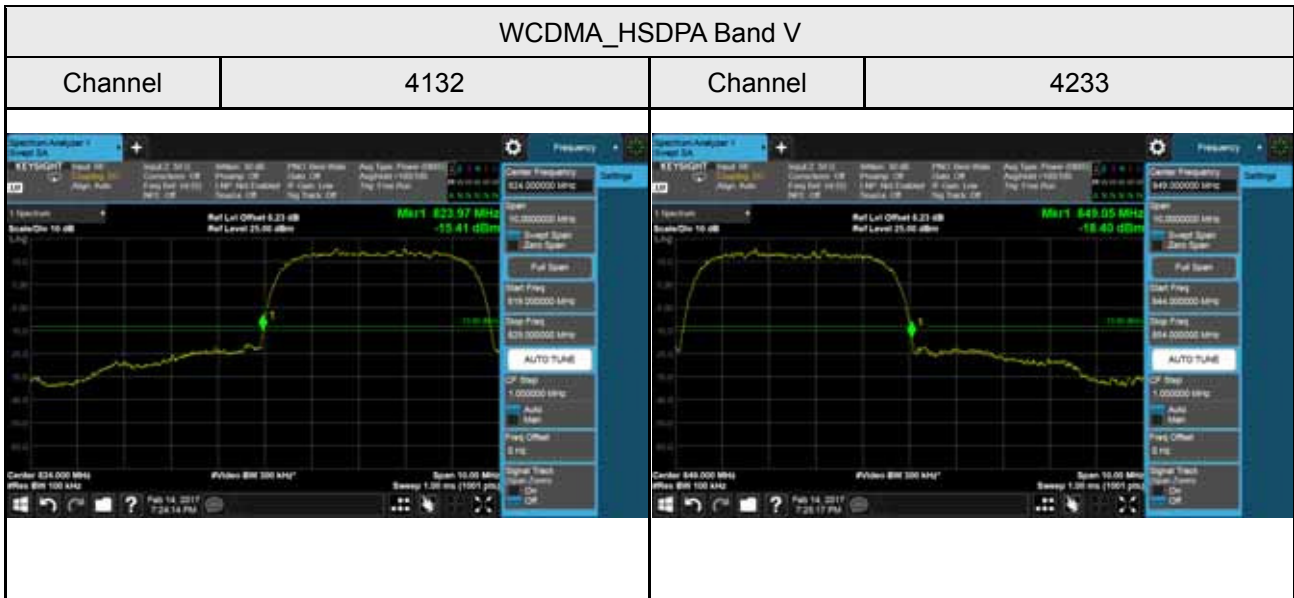
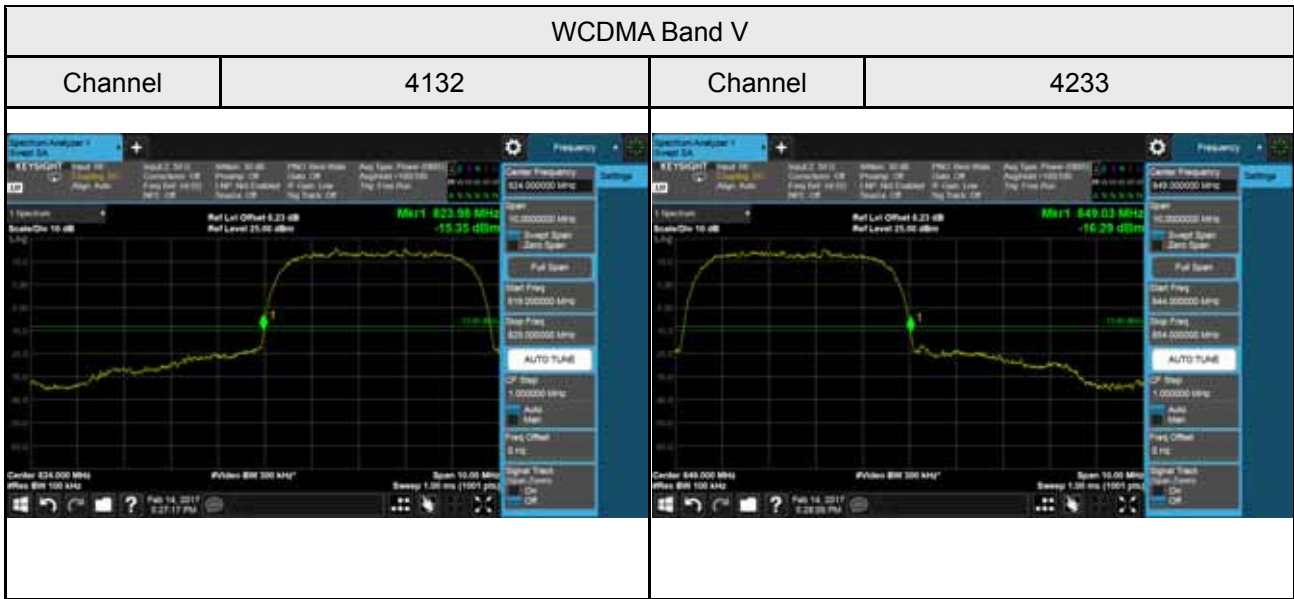
Channel	128	Channel	251
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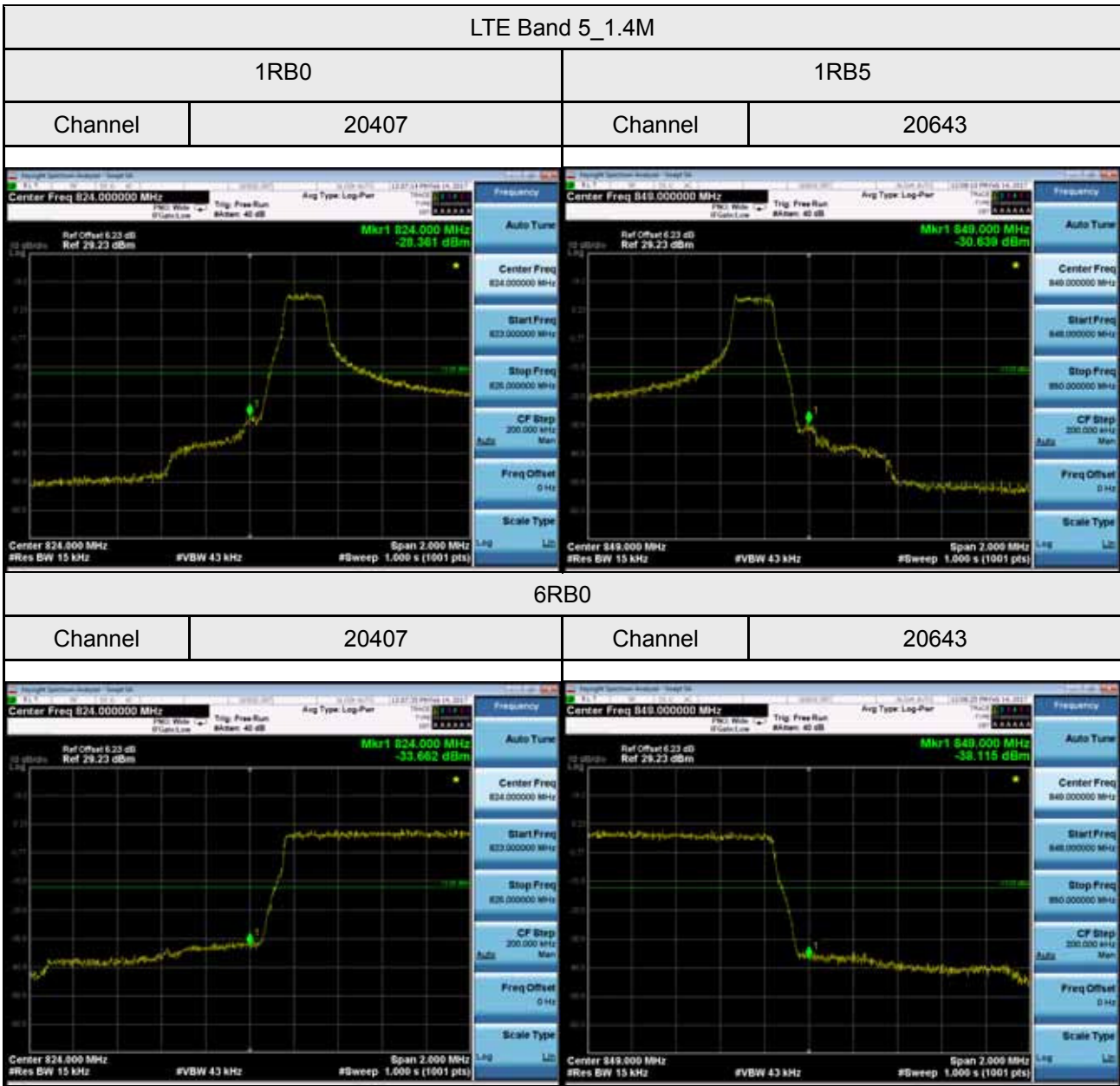


EDGE

Channel	128	Channel	251
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LTE Band 5\_3M

1RB0

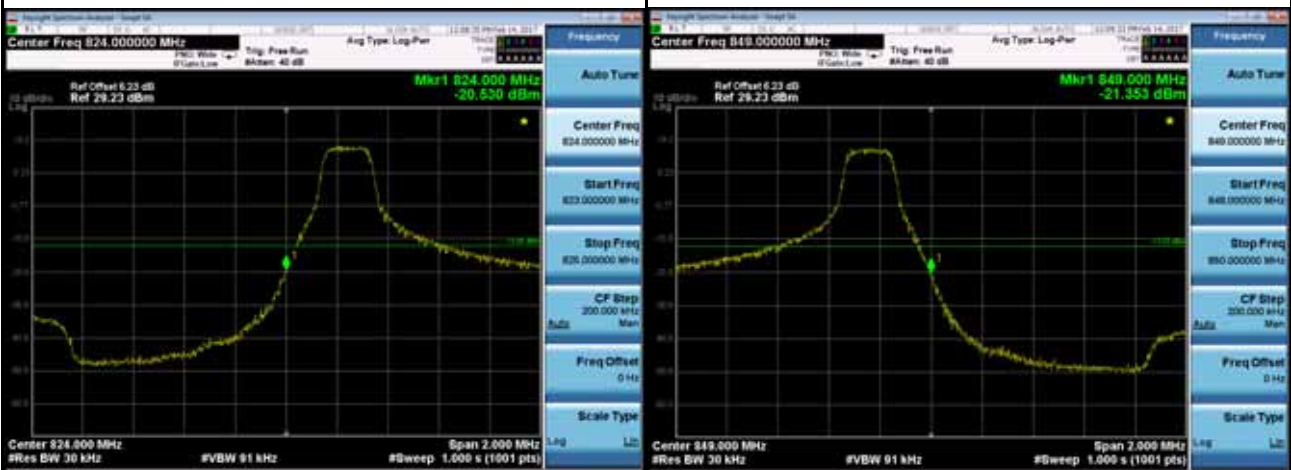
1RB14

Channel

20415

Channel

20635



15RB0

Channel

20415

Channel

20635



LTE Band 5\_5M

1RB0

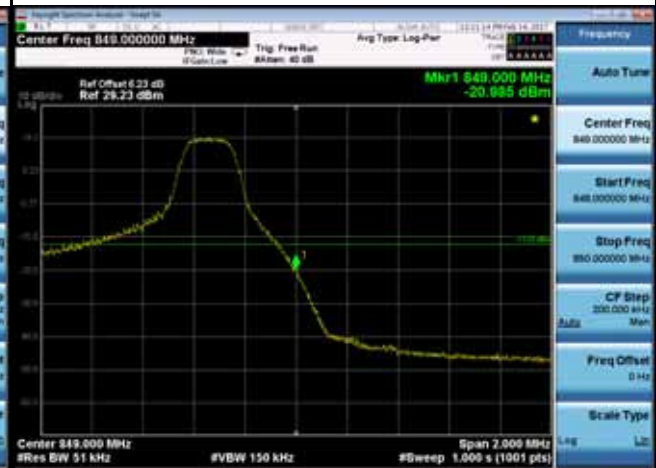
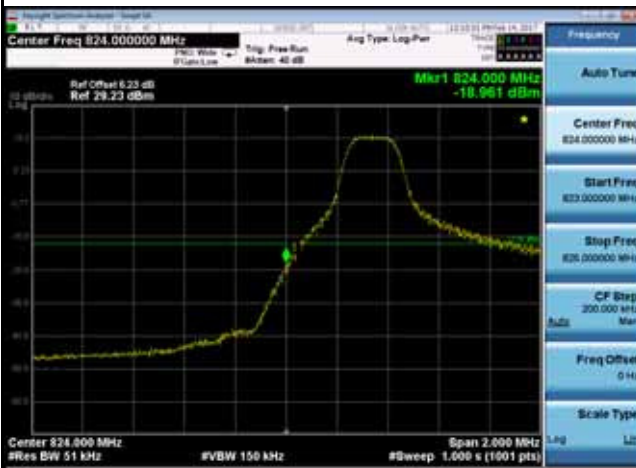
1RB24

Channel

20425

Channel

20625



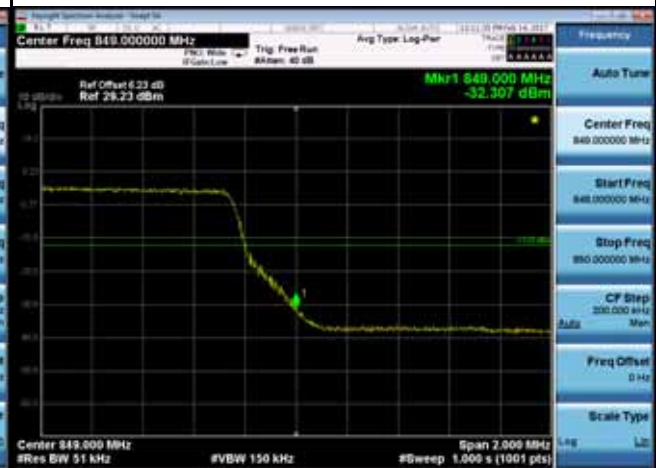
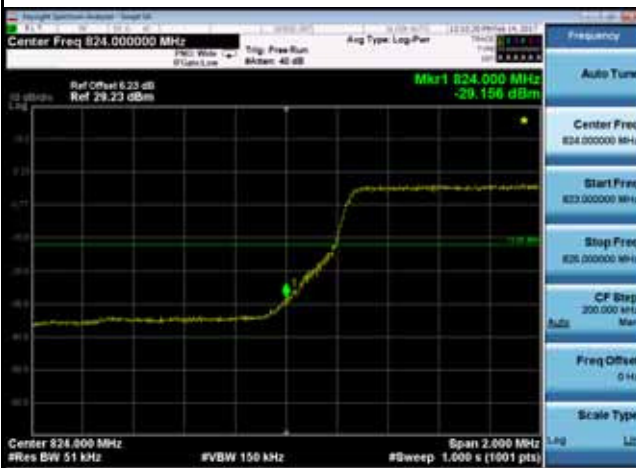
25RB0

Channel

20425

Channel

20625



LTE Band 5\_10M

1RB0	1RB49
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Channel	20450	Channel	20600
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50RB0

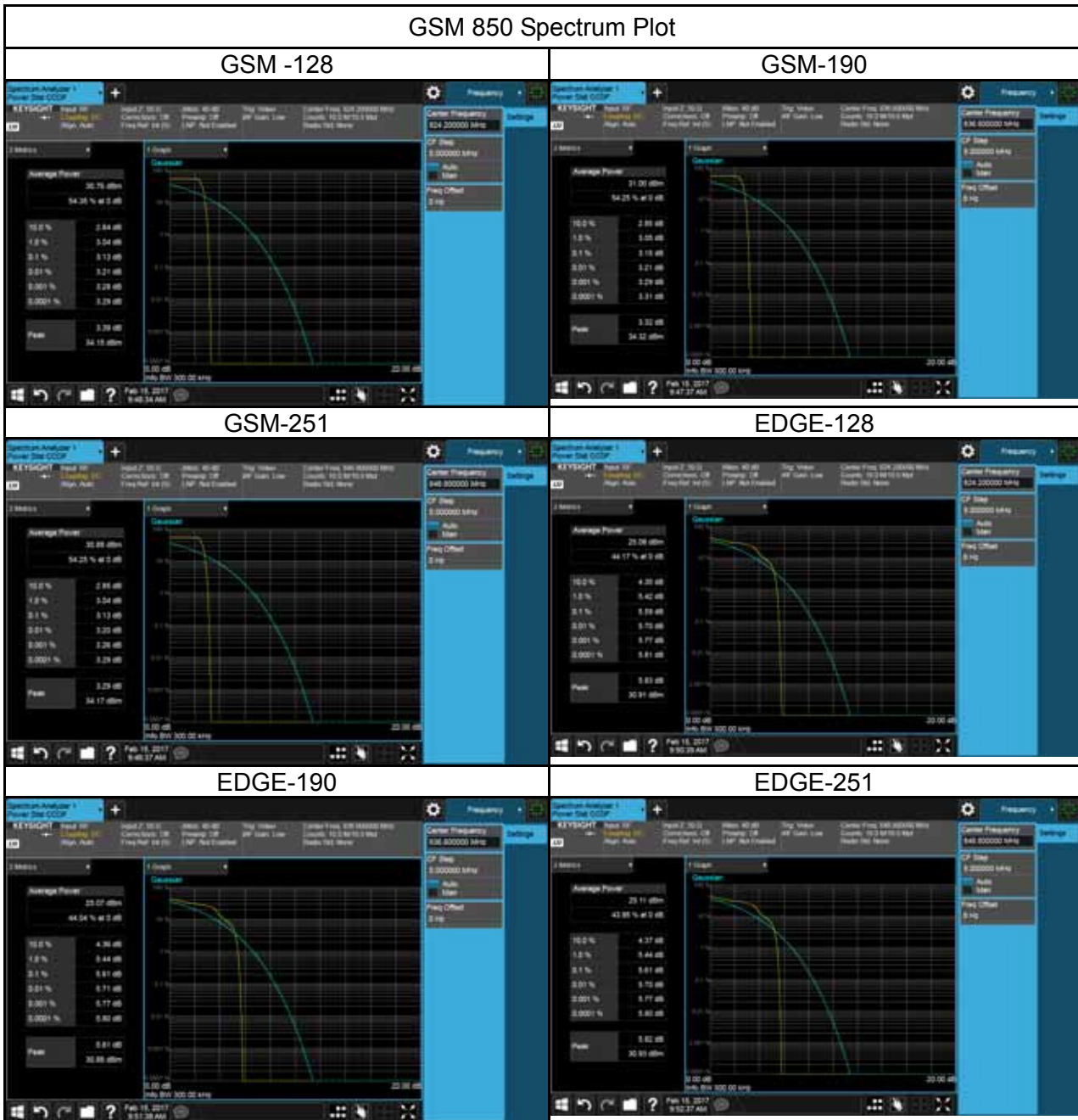
Channel	20450	Channel	20600
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## ATTACHMENT F - PEAK TO AVERAGE RATIO



### GSM 850 Spectrum Plot



### WCDMA Band V Spectrum Plot

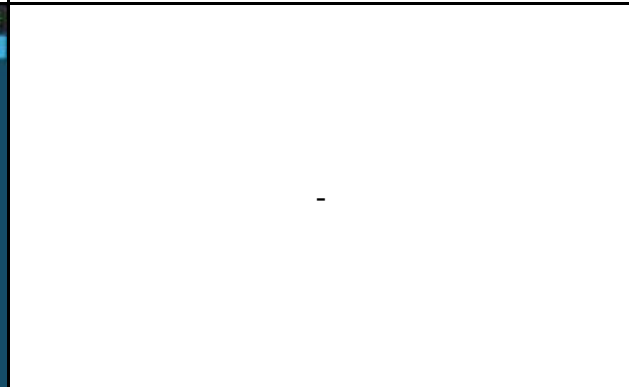
4132

4182



4233

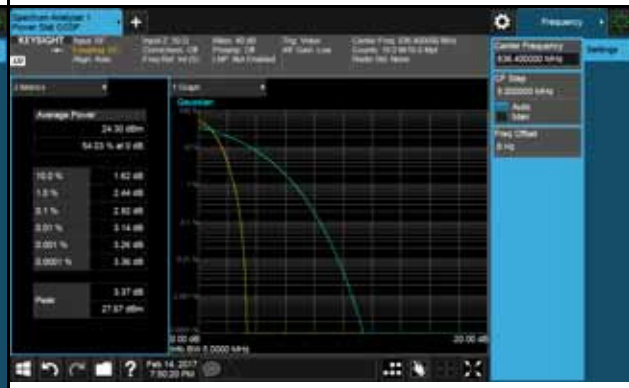
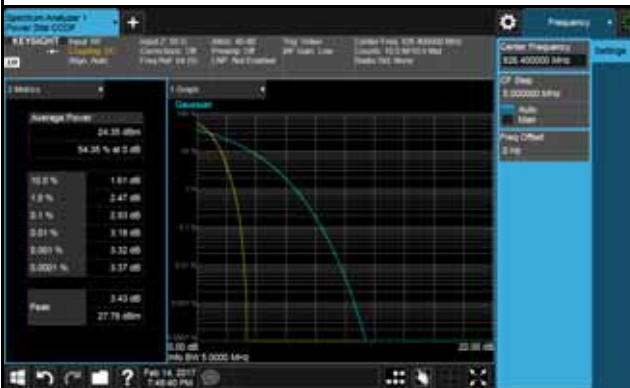
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### WCDMA\_HSDPA Band V Spectrum Plot

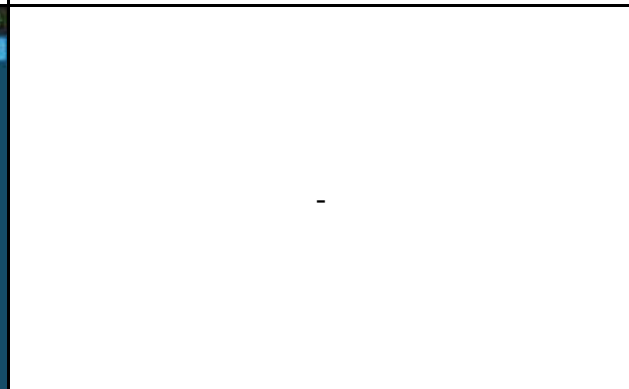
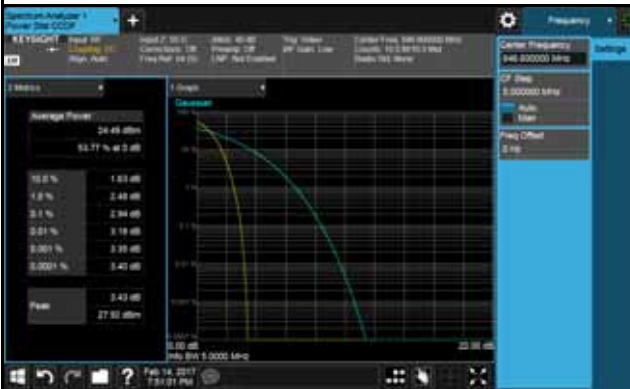
4132

4182



4233

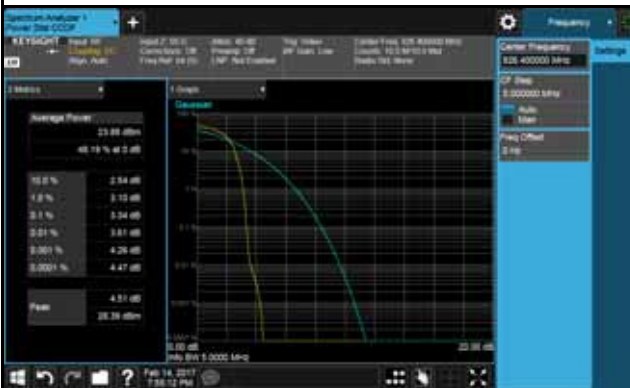
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### WCDMA\_HSUPA Band V Spectrum Plot

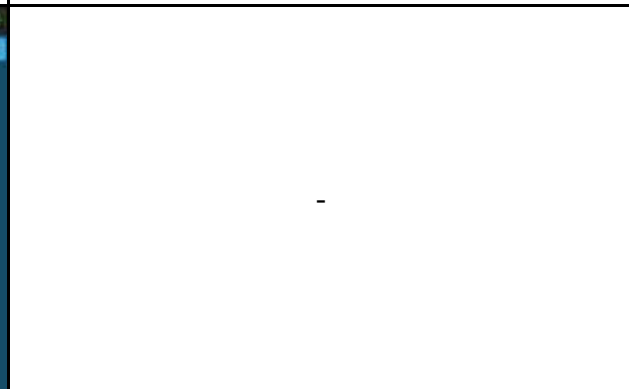
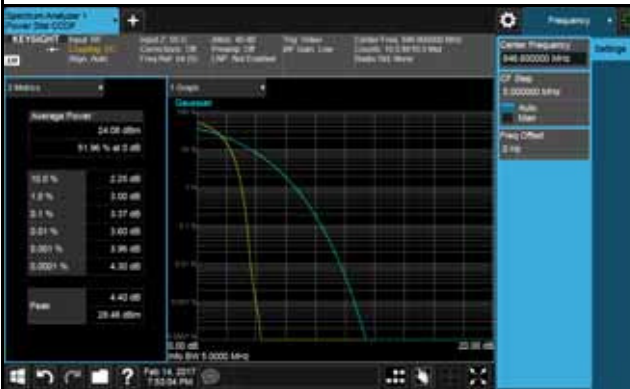
4132

4182



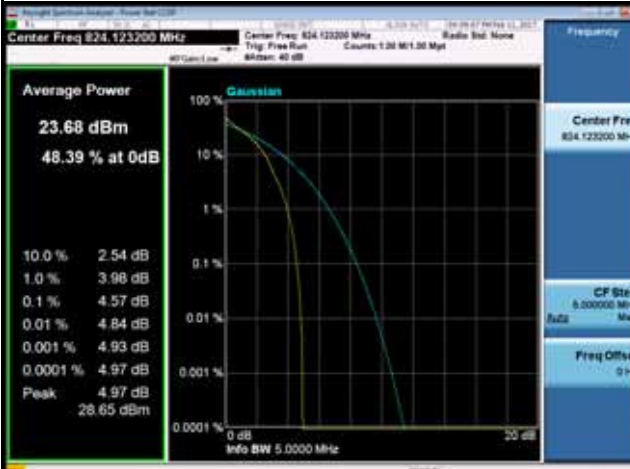
4233

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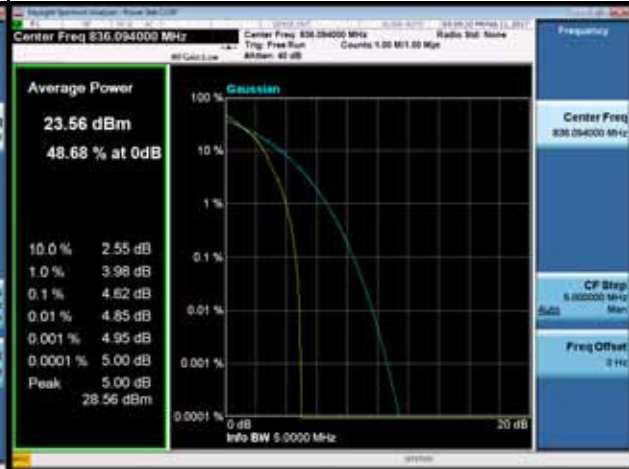


### LTE Band 5 Spectrum Plot\_1.4M

QPSK-20407



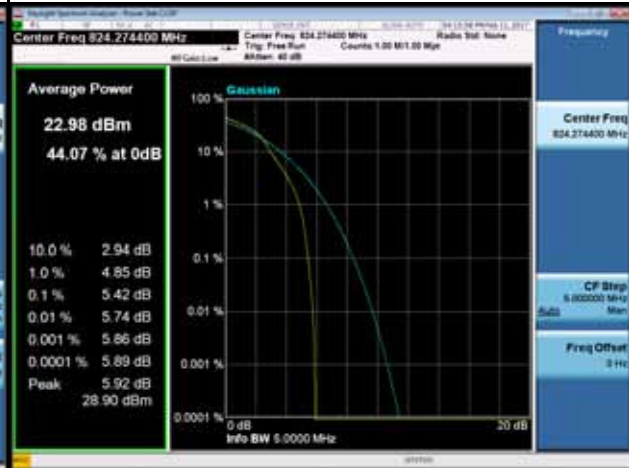
QPSK-20525



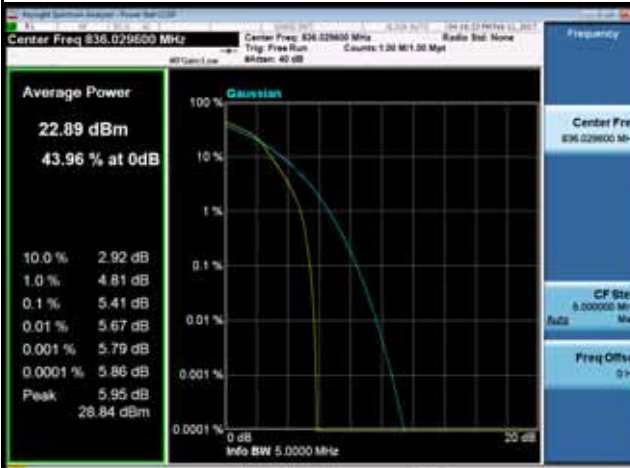
QPSK-20643



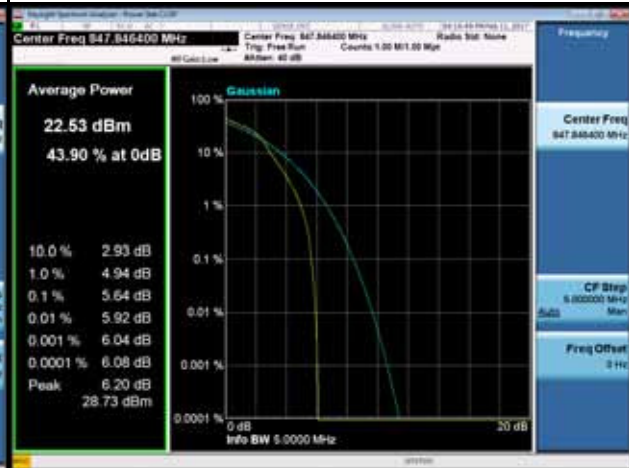
16QAM-20407



16QAM-20525



16QAM-20643

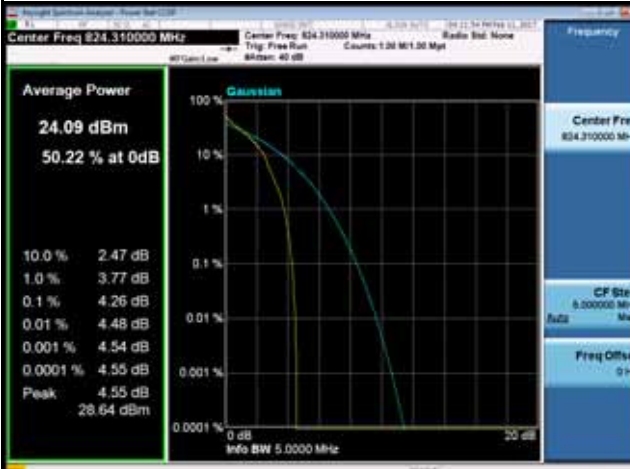


### LTE Band 5 Spectrum Plot\_3M

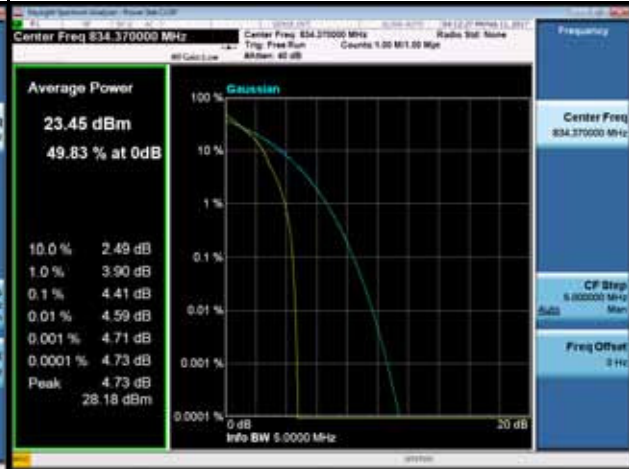


### LTE Band 5 Spectrum Plot\_5M

QPSK-20425



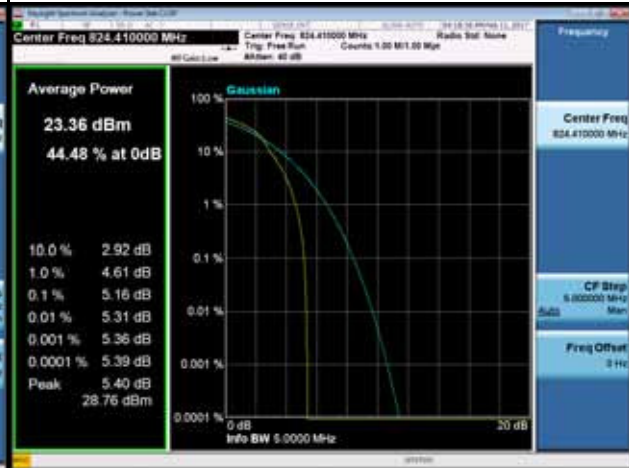
QPSK-20525



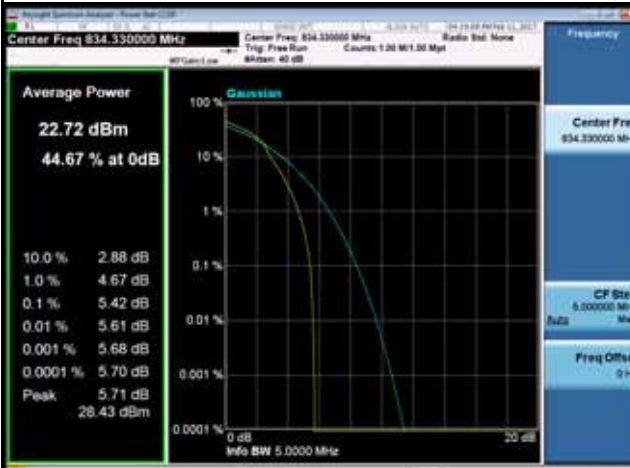
QPSK-20625



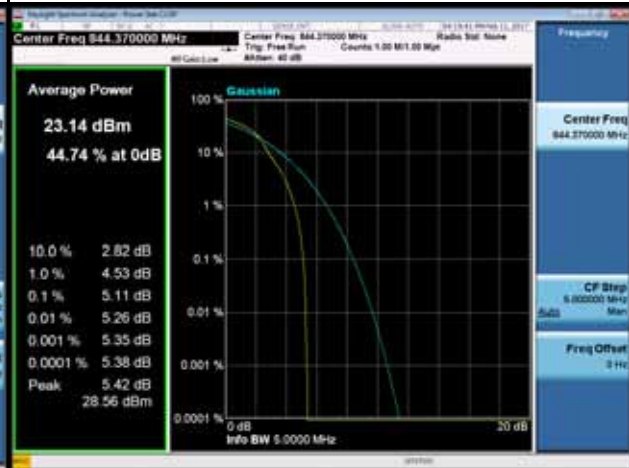
16QAM-20425



16QAM-20525

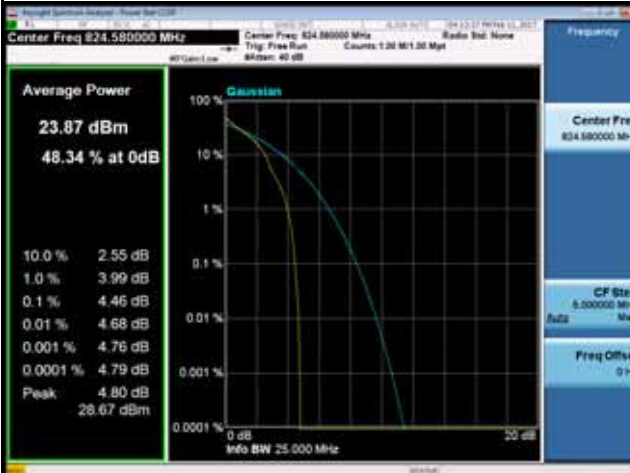


16QAM-20625

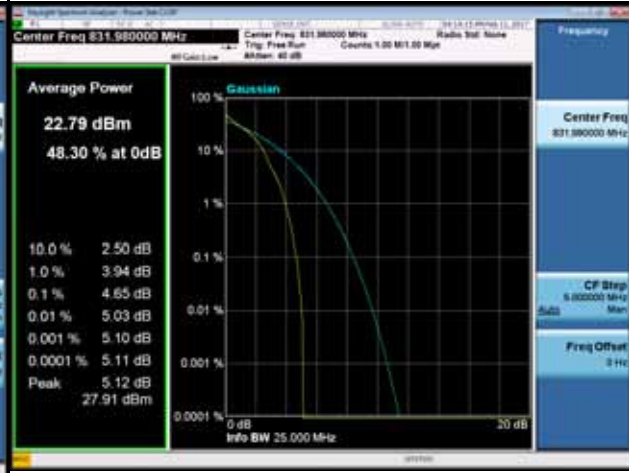


### LTE Band 5 Spectrum Plot\_10M

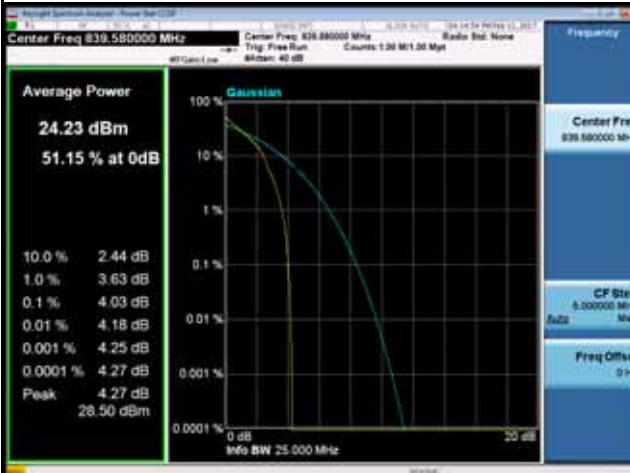
QPSK-20450



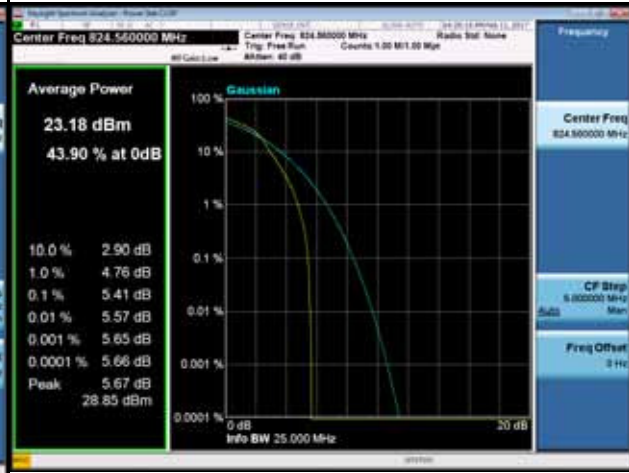
QPSK-20525



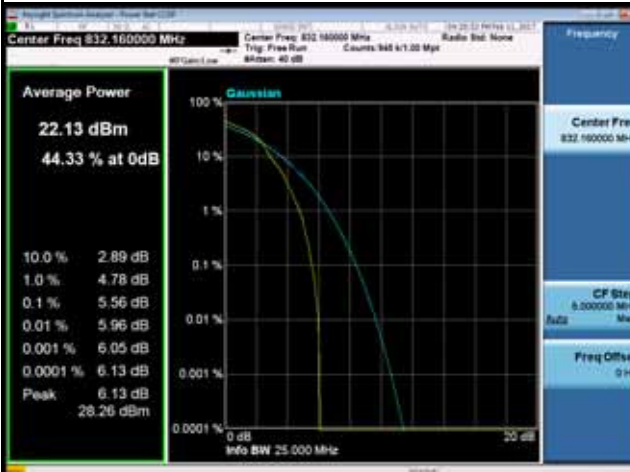
QPSK-20600



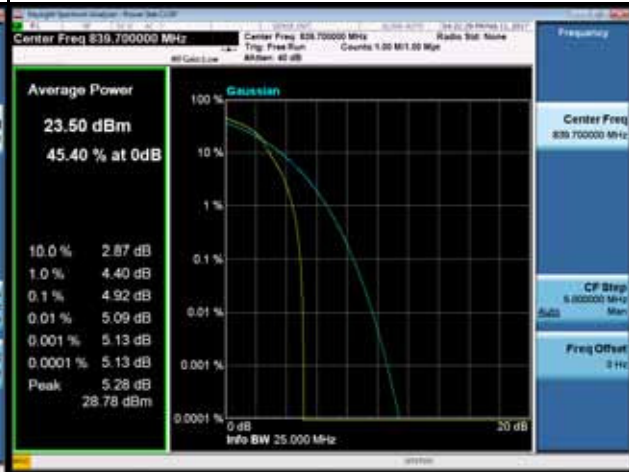
16QAM-20450



16QAM-20525



16QAM-20600





## ATTACHMENT G - FREQUENCY STABILITY

Test Mode:	GSM850_CH190
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### Temperature vs. Frequency Stability

Temperature(

Test Mode:	WCDMA Band 5_CH4182
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### Temperature vs. Frequency Stability

Temperature(

Test Mode:	LTE Band 5_CH20525_1.4M
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### Temperature vs. Frequency Stability

Temperature(

Test Mode:	LTE Band 5_CH20525_3M
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### Temperature vs. Frequency Stability

Temperature(

Test Mode:	LTE Band 5_CH20525_5M
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### Temperature vs. Frequency Stability

Temperature(

Test Mode:	LTE Band 5_CH20525_10M
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### Temperature vs. Frequency Stability

Temperature(