



# RF TEST REPORT

**Report No.:** SET2019-11736

**Product Name:** LTE/WCDMA/GSM (GPRS) Multi-Mode Digital Mobile Phone

**FCC ID:** SRQ-ZTEA52020

**Model No. :** ZTE Blade A5 2020, EA52020

**Marketing No.:** ZTE Blade A5 2020, Blade A5 2020, ZTE BLADE A5 2020,  
BLADE A5 2020

**Applicant:** ZTE Corporation.

**Address:** ZTE Plaza, Keji Road South, Shenzhen, China

**Dates of Testing:** 08/10/2019 —09/09/2019

**Issued by:** CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd.

**Lab Location:** Building 28/29, East of Shigu Xili Industrial Zone, Nanshan District Shenzhen, Guangdong 518055, China.

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## Test Report

**Product** .....: LTE/WCDMA/GSM (GPRS) Multi-Mode Digital Mobile Phone

**Brand Name**.....: ZTE

**Trade Name** .....: ZTE

**Applicant** .....: ZTE Corporation.

**Applicant Address** .....: ZTE Plaza, Keji Road South, Shenzhen, China

**Manufacturer** .....: ZTE Corporation.

**Manufacturer Address** .....: ZTE Plaza, Keji Road South, Shenzhen, China

**Test Standards** .....: 47 CFR Part 2/22/24/27

**Test Result**.....: PASS

**Tested by** .....: Robin Luo 2019.09.09.  
Shallwe Yang, Test Engineer

**Reviewed by**.....: Chris You 2019.09.09.  
Chris You, Senior Engineer

**Approved by**.....: Shuangwen Zhang 2019.09.09.  
Shuangwen Zhang, Manager



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Change History		
Issue	Date	Reason for change
1.0	2019.09.09	First edition



## 1. GENERAL INFORMATION

### 1.1 EUT Description

EUT Type	LTE/WCDMA/GSM (GPRS) Multi-Mode Digital Mobile Phone
EUT supports Radios application	LTE Band 2/4/5/7/28/66
Test Band	LTE Band 2: 1850.7MHz~1909.3MHz LTE Band 4: 1710.7MHz~1754.3MHz LTE Band 5: 824.7MHz~848.3MHz LTE Band 7: 2502.5MHz~2567.5MHz LTE Band 66: 1710.7MHz~1779.3MHz
Maximum Output Power to Antenna	LTE Band 2: 22.82dBm LTE Band 4: 23.05dBm LTE Band 5: 23.31dBm LTE Band 7: 22.06dBm LTE Band 66: 23.04dBm
Bandwidth	LTE Band 2: 1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz LTE Band 4: 1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz LTE Band 5: 1.4MHz/3MHz/5MHz/10MHz LTE Band 7: 5MHz/10MHz/15MHz/20MHz LTE Band 66: 1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz
Modulation Type	QPSK/16QAM/64QAM(downlink only)
Antenna Type	Internal Antenna
Antenna Gain(Max)	LTE Band 2:0.53dBi LTE Band 4: -0.05dBi LTE Band 5: -1.3dBi LTE Band 7: -0.75dBi LTE Band 66: -0.05dBi
Power supply	DC 3.85V from battery DC 5V from adapter

## 1.2 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

Band	Type of Modulation	BW (MHz)	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP/EIRP(W)
LTE Band 2	QPSK	1.4	1M09G7D	—	0.136
LTE Band 2	16QAM	1.4	1M09W7D	—	0.096
LTE Band 2	QPSK	3	2M68G7D	—	0.135
LTE Band 2	16QAM	3	2M68W7D	—	0.099
LTE Band 2	QPSK	5	4M49G7D	—	0.135
LTE Band 2	16QAM	5	4M48W7D	—	0.097
LTE Band 2	QPSK	10	8M93G7D	0.030	0.121
LTE Band 2	16QAM	10	8M92W7D	—	0.107
LTE Band 2	QPSK	15	13M5G7D	—	0.150
LTE Band 2	16QAM	15	13M5W7D	—	0.092
LTE Band 2	QPSK	20	17M9G7D	—	0.140
LTE Band 2	16QAM	20	17M9W7D	—	0.147
LTE Band 4	QPSK	1.4	1M09G7D	—	0.132
LTE Band 4	16QAM	1.4	1M09W7D	—	0.087
LTE Band 4	QPSK	3	2M68G7D	—	0.130
LTE Band 4	16QAM	3	2M69W7D	—	0.087
LTE Band 4	QPSK	5	4M48G7D	—	0.131
LTE Band 4	16QAM	5	4M48W7D	—	0.103
LTE Band 4	QPSK	10	8M93G7D	0.028	0.138
LTE Band 4	16QAM	10	8M92W7D	—	0.081
LTE Band 4	QPSK	15	13M4G7D	—	0.139
LTE Band 4	16QAM	15	13M4W7D	—	0.090
LTE Band 4	QPSK	20	17M9G7D	—	0.153
LTE Band 4	16QAM	20	17M9W7D	—	0.089



LTE Band 5	QPSK	1.4	1M09G7D	—	0.142
LTE Band 5	16QAM	1.4	1M09W7D	—	0.120
LTE Band 5	QPSK	3	2M68G7D	—	0.137
LTE Band 5	16QAM	3	2M68W7D	—	0.119
LTE Band 5	QPSK	5	4M49G7D	—	0.142
LTE Band 5	16QAM	5	4M48W7D	—	0.116
LTE Band 5	QPSK	10	8M93G7D	0.052	0.157
LTE Band 5	16QAM	10	8M92W7D	—	0.104
LTE Band 7	QPSK	5	4M49G7D	—	0.130
LTE Band 7	16QAM	5	4M48W7D	—	0.083
LTE Band 7	QPSK	10	8M93G7D	0.021	0.129
LTE Band 7	16QAM	10	8M93W7D	—	0.087
LTE Band 7	QPSK	15	13M5G7D	—	0.133
LTE Band 7	16QAM	15	13M5W7D	—	0.110
LTE Band 7	QPSK	20	17M9G7D	—	0.157
LTE Band 7	16QAM	20	17M9W7D	—	0.106
LTE Band 66	QPSK	1.4	1M09G7D	—	0.141
LTE Band 66	16QAM	1.4	1M09W7D	—	0.118
LTE Band 66	QPSK	3	2M68G7D	—	0.158
LTE Band 66	16QAM	3	2M68W7D	—	0.116
LTE Band 66	QPSK	5	4M48G7D	—	0.145
LTE Band 66	16QAM	5	4M48W7D	—	0.110
LTE Band 66	QPSK	10	8M93G7D	0.021	0.137
LTE Band 66	16QAM	10	8M92W7D	—	0.110
LTE Band 66	QPSK	15	13M5G7D	—	0.134
LTE Band 66	16QAM	15	13M5W7D	—	0.112
LTE Band 66	QPSK	20	17M9G7D	—	0.158
LTE Band 66	16QAM	20	17M9W7D	—	0.129



### 1.3 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part24, Part27 , Part90, for the EUT FCC ID Certification:

1.47 CFR Part 2,22,24,27

2. ANSI/TIA/EIA-603-D-2010

3. FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01

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

No.	Section	Description	Limit	Result
1	2.1046	Conducted RF Output Power	Reporting Only	PASS
2	§24.232(d)	Peak to Average Ratio	< 13dB	PASS
3	§22.913(a)(2)	Effective Radiated Power (Band 5)	ERP < 7 Watt	PASS
	§24.232(c) §27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2/7)	EIRP < 2Watt	PASS
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4) (Band 66)	EIRP < 1Watt	PASS
4	2.1049	Occupied Bandwidth	Reporting Only	PASS
5	§2.1051 §22.917(a) §24.238(a) §27.53(h) §90.691 2.1051 27.53(m)(4)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 66) (Band 7)	< $43+10\log_{10}(P[\text{watt}])$ < 5.5MHz: -13dBm $\geq 5.5\text{MHz}$ : -25dBm (Band7)	PASS





6	2.1051 §22.917(a) 24.238(a) 27.53(h)	Conducted Spurious Emission Measurement (Band 2) (Band 4) (Band 5) (Band 66)	< $43+10\log_{10}(P[\text{watt}])$	PASS
	2.1051 27.53(m)(4) 27.53(i)(4)	Conducted Spurious Emission Measurement (Band 7)	< $55+10\log_{10}(P[\text{watt}])$	PASS
7	2.1053 §22.917(a) 24.238(a) 27.53(h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 66)	< $43+10\log_{10}(P[\text{watt}])$	PASS
	2.1053 27.53(m)(4) 27.53(i)(4)	Radiated Spurious Emission (Band 7)	< $55+10\log_{10}(P[\text{watt}])$	PASS
8	2.1055 22.335 24.235 27.54	Frequency Stability	<2.5ppm	PASS

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



### 1.4 Test Configuration of Equipment Under Test

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth(MHz)						Modulation		RB#			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	5	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	7			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	66	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Peak-to-Average Ratio	2						✓		✓	✓		✓	✓	✓	✓
	4														
	5														
	7														
	66														
26dB and 99% Bandwidth	2	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	
	4	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	
	5	✓	✓	✓	✓			✓	✓			✓		✓	
	7			✓	✓	✓	✓	✓	✓			✓		✓	
	66	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	
Conducted Band Edge	2	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
	5	✓	✓	✓	✓			✓	✓	✓		✓	✓		✓
	7			✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
	66	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
Conducted Spurious Emission	2	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	5	✓	✓	✓	✓			✓	✓	✓			✓	✓	✓
	7			✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	66	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Frequency Stability	2				✓			✓				✓		✓	
	4				✓			✓				✓		✓	
	5				✓			✓				✓		✓	
	7				✓			✓				✓		✓	
	66				✓			✓				✓		✓	



ERP/EIRP	2	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	5	✓	✓	✓	✓			✓	✓	✓			✓	✓	✓
	7			✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	66	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Radiated Spurious Emission	2	Worst case												✓	
	4	Worst case												✓	
	5	Worst case												✓	
	7	Worst case												✓	
	66	Worst case												✓	
Note	<p>1. The mark “ ✓ ” means that this configuration is chosen for testing.</p> <p>2. The mark “ - ” means that this bandwidth is not supported.</p> <p>3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.</p> <p>4. For E.R.P/E.I.R.P. measurement, the widest bandwidth and the bandwidth with the highest conducted power of each band is chosen for testing. Besides, the lowest bandwidth of each band is also measured for reporting only.</p>														

### 1.5 Measurement Results Explanation Example

#### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 7dB and 10dB attenuator.

Example:

$$\begin{aligned} \text{Offset (dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\ &= 7 + 10 = 17 \text{ (dB)} \end{aligned}$$



## 1.6 Facilities and Accreditations

### 1.6.1 Test Facilities

#### **CNAS-Lab Code: L1659**

CCIC-SET is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659.

#### **FCC-Registration No.: CN5031**

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN5031, valid time is until December 31, 2019.

#### **ISED Registration: 11185A-1**

#### **CAB identifier: CN0064**

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Dec. 03, 2019.

#### **NVLAP Lab Code: 201008-0**

CCIC-SET is a third party testing organization accredited by NVLAP according to ISO/IEC 17025. The accreditation certificate number is 201008-0.

### 1.6.2 Test Environment Conditions

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

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

## 2. 47 CFR PART 2 REQUIREMENTS

### 2.1 Conducted RF Output Power

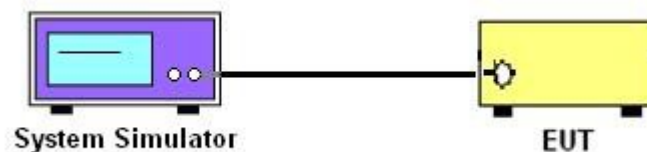
#### 2.1.1 Requirement

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 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

#### 2.1.3 Test Setup



#### 2.1.4 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.



### **2.1.5 Test Results**

Please refer to Appendix A for detail

## 2.2 Peak to Average Ratio

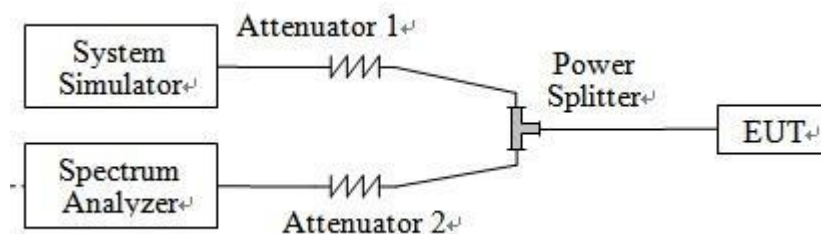
### 2.2.1 Definition

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. 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.

### 2.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 2.2.3 Test Description



### 2.2.4 Test Procedures

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.



### **2.2.5 Test Results of Peak-to-Average Ratio**

Please refer to Appendix A for detail



## 2.3 99% Occupied Bandwidth and 26dB Bandwidth

### 2.3.1 Definition

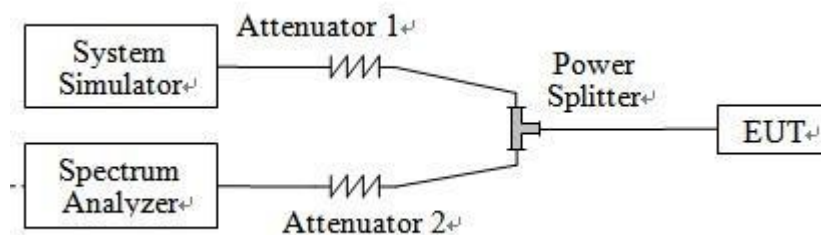
According to FCC section 2.1049, the occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

### 2.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 2.3.3 Test Setup



### 2.3.4 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.



### **2.3.5 Test Result of 99% Occupied Bandwidth and 26dB Bandwidth**

Please refer to Appendix A for detail

## 2.4 Frequency Stability

### 2.4.1 Requirement

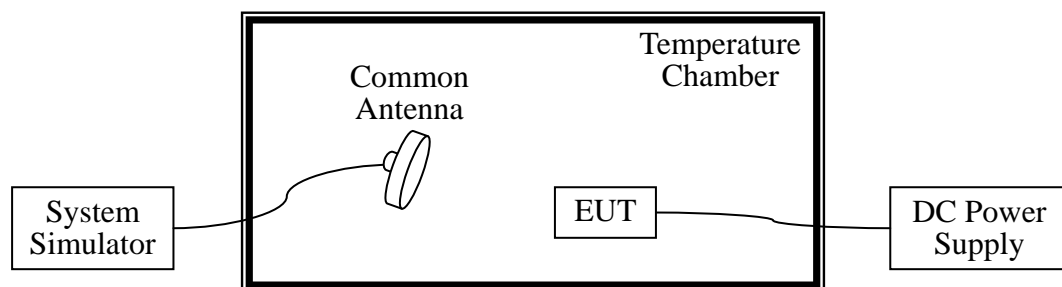
According to FCC requirement, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5\text{ppm}$ ) of the center frequency. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from  $-30^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$  at intervals of not more than  $10^{\circ}\text{C}$ .
- (b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

### 2.4.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.4.3 Test Setup



### 2.4.4 Test Procedures

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to  $-30^{\circ}\text{C}$  and the EUT was stabilized



before testing. Power was applied and the maximum change in frequency was recorded within one minute.

3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. The nominal, highest and lowest extreme voltages were tested, which are specified by the applicant; the normal temperature here used is 25°C.
5. The variation in frequency was measured for the worst case.



#### **2.4.5 Test Result of Frequency Stability**

Please refer to Appendix A for detail

## 2.5 Conducted Out of Band Emissions

### 2.5.1 Requirement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

For Band 7:

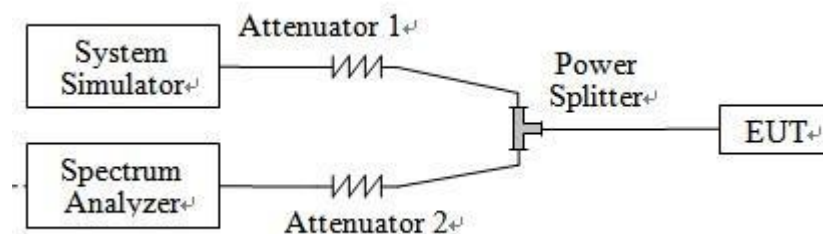
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $55 + 10 \log (P)$  dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

### 2.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 2.5.3 Test Setup



### 2.5.4 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.



5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from  $43 + 10\log(P)$ dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)]$  (dB)  
 $= [30 + 10\log(P)]$  (dBm) -  $[43 + 10\log(P)]$  (dB)  
 $= -13$ dBm.
8. For Band 7  
The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)  
 $= P(W) - [55 + 10\log(P)]$  (dB)  
 $= [30 + 10\log(P)]$  (dBm) -  $[55 + 10\log(P)]$  (dB)  
 $= -25$ dBm.
9. For 9KHz to 30MHz: the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



### **2.5.5 Test Result of Conducted Spurious Emission**

Please refer to Appendix A for detail





## 2.6 Conducted Band Edge

### 2.6.1 Description of Conducted Band Edge Measurement

22.917(a)

Out of band emissions. 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.

24.238(a)

For operations in the 1850 -1910 MHz band, the FCC limit is  $43 + 10 \log_{10}(P [\text{Watts}])$  dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53(h)

For operations in the 1710 – 1755 MHz band, the FCC limit is  $43 + 10 \log_{10}(P[\text{Watts}])$  dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

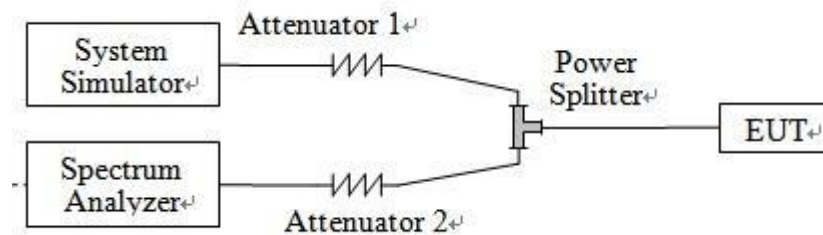
27.53m(4)

For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

### 2.6.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.6.3 Test Setup



### 2.6.4 Test Procedures

1. The testing follows FCC KDB 971168 v03r01 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.
4. Set RBW  $\geq$  1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.  
The limit line is derived from  $43 + 10\log(P)$ dB below the transmitter power P(Watts)
9. For LTE Band 7 the other 40 dB, and 55 dB have additionally applied same calculation above.

### 2.6.5 Test Result of Conducted Band Edge

Please refer to Appendix A for detail

## 2.7 Transmitter Radiated Power (EIRP/ERP)

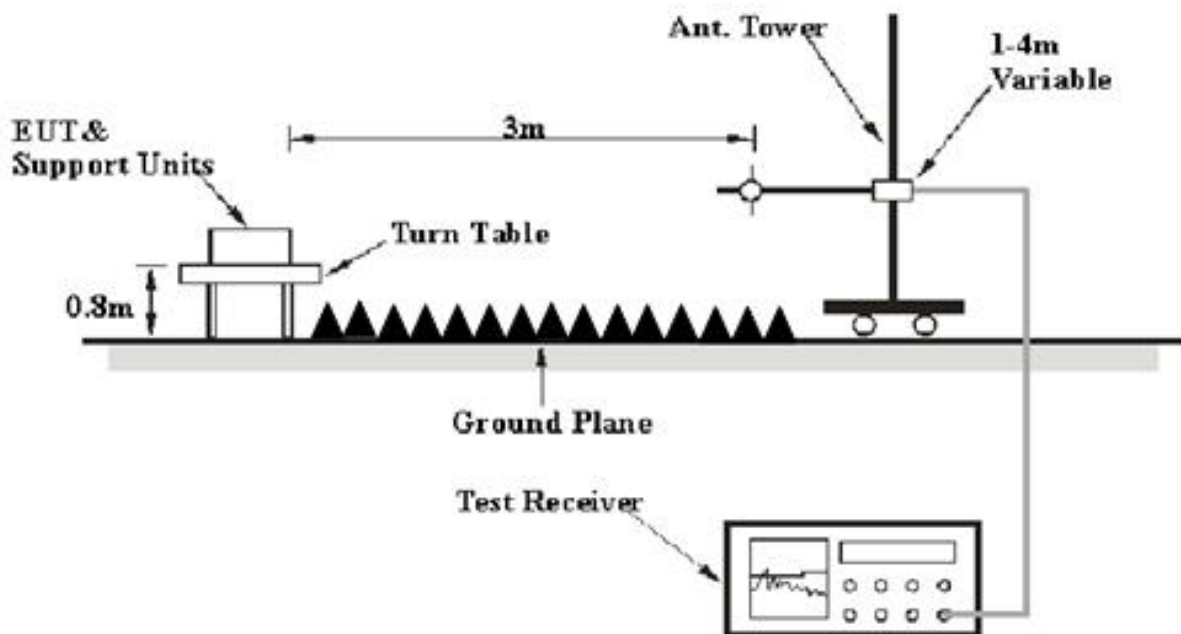
### 2.7.1 Requirement

Effective radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-D-2010, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v03r01. Mobile and portable (hand-held) stations operating are limited to average ERP of 7 watts with LTE band 5 Equivalent isotropic radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-D-2010, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v03r01. Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE band 2/7 and 1 watt with LTE band 4 and 66.

### 2.7.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

### 2.7.3 Test Setup





#### 2.7.4 Test Procedures

1. The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
2. The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer which used a channel power option across EUT's signal bandwidth per section 4.0 of KDB 971168 D01v03r01.
4. The table was rotated 360 degrees to determine the position of the highest radiated power.
5. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
6. Taking the record of maximum ERP/EIRP.
7. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
8. The conducted power at the terminal of the dipole antenna is measured.
9. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
10.  $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$

$P_s$  (dBm): Input power to substitution antenna.

$G_s$  (dBi or dBd): Substitution antenna Gain.

$E_t = R_t + AF$

$E_s = R_s + AF$

$AF$  (dB/m): Receive antenna factor

$R_t$ : The highest received signal in spectrum analyzer for EUT.

$R_s$ : The highest received signal in spectrum analyzer for substitution antenna.

**2.7.5 Test Result of ERP/EIRP**

## 1. LTE Band 2 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	EIRP (dBm)	Verdict
			RB Size	RB Offset			
2	1.4	QPSK	1	3	1850.7	21.33	PASS
2	1.4	QPSK	1	3	1880	21.31	PASS
2	1.4	QPSK	1	3	1909.3	21.34	PASS
2	1.4	16QAM	1	0	1850.7	19.74	PASS
2	1.4	16QAM	1	0	1880	19.75	PASS
2	1.4	16QAM	1	0	1909.3	19.83	PASS
2	3	QPSK	1	8	1851.5	21.29	PASS
2	3	QPSK	1	8	1880	21.27	PASS
2	3	QPSK	1	8	1908.5	21.30	PASS
2	3	16QAM	1	0	1851.5	19.89	PASS
2	3	16QAM	1	0	1880	19.93	PASS
2	3	16QAM	1	0	1908.5	19.96	PASS
2	5	QPSK	1	0	1852.5	21.28	PASS
2	5	QPSK	1	0	1880	21.22	PASS
2	5	QPSK	1	0	1907.5	21.29	PASS
2	5	16QAM	1	24	1852.5	19.87	PASS
2	5	16QAM	1	24	1880	19.80	PASS
2	5	16QAM	1	24	1907.5	19.88	PASS
2	10	QPSK	1	49	1855	20.81	PASS
2	10	QPSK	1	49	1880	20.70	PASS
2	10	QPSK	1	49	1905	20.79	PASS
2	10	16QAM	1	0	1855	20.30	PASS
2	10	16QAM	1	0	1880	20.28	PASS
2	10	16QAM	1	0	1905	20.31	PASS
2	15	QPSK	1	74	1857.5	21.67	PASS
2	15	QPSK	1	74	1880	21.77	PASS
2	15	QPSK	1	74	1902.5	21.71	PASS
2	15	16QAM	1	0	1857.5	19.55	PASS
2	15	16QAM	1	0	1880	19.58	PASS
2	15	16QAM	1	0	1902.5	19.66	PASS
2	20	QPSK	1	0	1860	21.46	PASS
2	20	QPSK	1	0	1880	21.4	PASS
2	20	QPSK	1	0	1900	21.39	PASS
2	20	16QAM	1	0	1860	21.64	PASS
2	20	16QAM	1	0	1880	21.59	PASS
2	20	16QAM	1	0	1900	21.66	PASS



## 2. LTE Band 4 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	EIRP (dBm)	Verdict
			RB Size	RB Offset			
4	1.4	QPSK	1	0	1710.7	21.13	PASS
4	1.4	QPSK	1	0	1732.5	21.21	PASS
4	1.4	QPSK	1	0	1754.3	21.14	PASS
4	1.4	16QAM	1	3	1710.7	19.34	PASS
4	1.4	16QAM	1	3	1732.5	19.25	PASS
4	1.4	16QAM	1	3	1754.3	19.39	PASS
4	3	QPSK	1	0	1711.5	21.12	PASS
4	3	QPSK	1	0	1732.5	21.01	PASS
4	3	QPSK	1	0	1753.5	21.13	PASS
4	3	16QAM	1	14	1711.5	19.34	PASS
4	3	16QAM	1	14	1732.5	19.39	PASS
4	3	16QAM	1	14	1753.5	19.32	PASS
4	5	QPSK	1	0	1712.5	21.18	PASS
4	5	QPSK	1	0	1732.5	21.07	PASS
4	5	QPSK	1	0	1752.5	21.13	PASS
4	5	16QAM	1	0	1712.5	20.12	PASS
4	5	16QAM	1	0	1732.5	20.05	PASS
4	5	16QAM	1	0	1752.5	20.13	PASS
4	10	QPSK	1	0	1715	21.38	PASS
4	10	QPSK	1	0	1732.5	21.36	PASS
4	10	QPSK	1	0	1750	21.41	PASS
4	10	16QAM	1	24	1715	19.05	PASS
4	10	16QAM	1	24	1732.5	18.98	PASS
4	10	16QAM	1	24	1750	19.06	PASS
4	15	QPSK	1	74	1717.5	21.36	PASS
4	15	QPSK	1	74	1732.5	21.28	PASS
4	15	QPSK	1	74	1747.5	21.42	PASS
4	15	16QAM	1	74	1717.5	19.49	PASS
4	15	16QAM	1	74	1732.5	19.54	PASS
4	15	16QAM	1	74	1747.5	19.42	PASS
4	20	QPSK	1	0	1720	21.76	PASS
4	20	QPSK	1	0	1732.5	21.83	PASS
4	20	QPSK	1	0	1745	21.85	PASS
4	20	16QAM	1	0	1720	19.46	PASS
4	20	16QAM	1	0	1732.5	19.39	PASS
4	20	16QAM	1	0	1745	19.47	PASS



## 3. LTE Band 5 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	ERP (dBm)	Verdict
			RB Size	RB Offset			
5	1.4	QPSK	1	3	824.7	21.47	PASS
5	1.4	QPSK	1	3	836.5	21.51	PASS
5	1.4	QPSK	1	3	848.3	21.50	PASS
5	1.4	16QAM	1	3	824.7	20.73	PASS
5	1.4	16QAM	1	3	836.5	20.66	PASS
5	1.4	16QAM	1	3	848.3	20.8	PASS
5	3	QPSK	1	0	825.5	21.38	PASS
5	3	QPSK	1	0	836.5	21.29	PASS
5	3	QPSK	1	0	847.5	21.34	PASS
5	3	16QAM	1	0	825.5	20.73	PASS
5	3	16QAM	1	0	836.5	20.66	PASS
5	3	16QAM	1	0	847.5	20.74	PASS
5	5	QPSK	1	0	826.5	21.47	PASS
5	5	QPSK	1	0	836.5	21.51	PASS
5	5	QPSK	1	0	846.5	21.46	PASS
5	5	16QAM	1	0	826.5	20.53	PASS
5	5	16QAM	1	0	836.5	20.66	PASS
5	5	16QAM	1	0	846.5	20.60	PASS
5	10	QPSK	1	49	829.0	21.10	PASS
5	10	QPSK	1	49	836.5	21.05	PASS
5	10	QPSK	1	49	844.0	21.96	PASS
5	10	16QAM	1	0	829.0	20.03	PASS
5	10	16QAM	1	0	836.5	20.05	PASS
5	10	16QAM	1	0	844.0	20.17	PASS



## 4. LTE Band 7 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	EIRP (dBm)	Verdict
			RB Size	RB Offset			
7	5	QPSK	1	12	2502.5	21.04	PASS
7	5	QPSK	1	0	2535	21.08	PASS
7	5	QPSK	1	24	2567.5	21.14	PASS
7	5	16QAM	1	24	2502.5	19.2	PASS
7	5	16QAM	1	24	2535	19.13	PASS
7	5	16QAM	1	0	2567.5	19.18	PASS
7	10	QPSK	1	24	2505	21.11	PASS
7	10	QPSK	1	49	2535	21.06	PASS
7	10	QPSK	1	24	2565	21.01	PASS
7	10	16QAM	1	24	2505	19.42	PASS
7	10	16QAM	1	49	2535	19.35	PASS
7	10	16QAM	1	24	2565	19.33	PASS
7	15	QPSK	1	37	2507.5	21.23	PASS
7	15	QPSK	1	74	2535	21.25	PASS
7	15	QPSK	1	0	2562.5	21.19	PASS
7	15	16QAM	1	37	2507.5	20.36	PASS
7	15	16QAM	1	18	2535	20.41	PASS
7	15	16QAM	1	0	2562.5	20.39	PASS
7	20	QPSK	1	0	2510	21.94	PASS
7	20	QPSK	1	0	2535	21.88	PASS
7	20	QPSK	1	0	2560	21.97	PASS
7	20	16QAM	1	0	2510	20.24	PASS
7	20	16QAM	1	0	2535	20.16	PASS
7	20	16QAM	1	0	2560	20.19	PASS





## 5. LTE Band 66 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	EIRP (dBm)	Verdict
			RB Size	RB Offset			
66	1.4	QPSK	1	0	1710.7	21.25	PASS
66	1.4	QPSK	1	0	1732.5	21.48	PASS
66	1.4	QPSK	1	0	1754.3	21.39	PASS
66	1.4	16QAM	1	3	1710.7	20.65	PASS
66	1.4	16QAM	1	3	1732.5	20.73	PASS
66	1.4	16QAM	1	3	1754.3	20.59	PASS
66	3	QPSK	1	0	1711.5	21.98	PASS
66	3	QPSK	1	0	1732.5	22.00	PASS
66	3	QPSK	1	0	1753.5	21.51	PASS
66	3	16QAM	1	14	1711.5	20.62	PASS
66	3	16QAM	1	14	1732.5	20.56	PASS
66	3	16QAM	1	14	1753.5	20.64	PASS
66	5	QPSK	1	0	1712.5	21.48	PASS
66	5	QPSK	1	0	1732.5	21.61	PASS
66	5	QPSK	1	0	1752.5	21.54	PASS
66	5	16QAM	1	0	1712.5	20.33	PASS
66	5	16QAM	1	0	1732.5	20.31	PASS
66	5	16QAM	1	0	1752.5	20.40	PASS
66	10	QPSK	1	0	1715	21.34	PASS
66	10	QPSK	1	0	1732.5	21.37	PASS
66	10	QPSK	1	0	1750	21.33	PASS
66	10	16QAM	1	24	1715	20.35	PASS
66	10	16QAM	1	24	1732.5	20.40	PASS
66	10	16QAM	1	24	1750	20.38	PASS
66	15	QPSK	1	74	1717.5	21.25	PASS
66	15	QPSK	1	74	1732.5	21.28	PASS
66	15	QPSK	1	74	1747.5	21.26	PASS
66	15	16QAM	1	74	1717.5	20.43	PASS
66	15	16QAM	1	74	1732.5	20.48	PASS
66	15	16QAM	1	74	1747.5	20.50	PASS
66	20	QPSK	1	0	1720	21.96	PASS
66	20	QPSK	1	0	1732.5	21.99	PASS
66	20	QPSK	1	0	1745	21.91	PASS
66	20	16QAM	1	0	1720	21.10	PASS
66	20	16QAM	1	0	1732.5	21.03	PASS
66	20	16QAM	1	0	1745	21.02	PASS

## 2.8 Radiated Out of Band Emissions

### 2.8.1 Requirement

The radiated spurious emission was measured by substitution method according to ANSI / TIA /EIA-603-C-2004. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

For Band 7

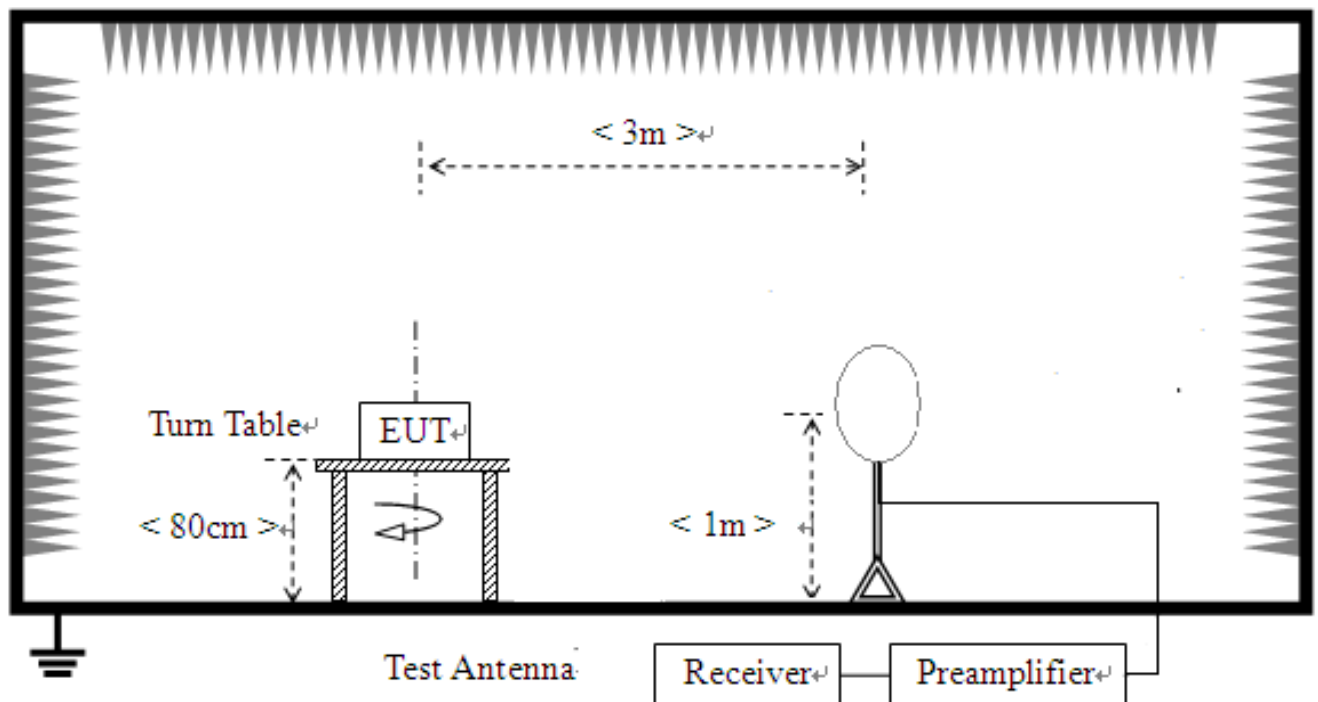
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $55 + 10 \log (P)$  dB.

### 2.8.2 Measuring Instruments

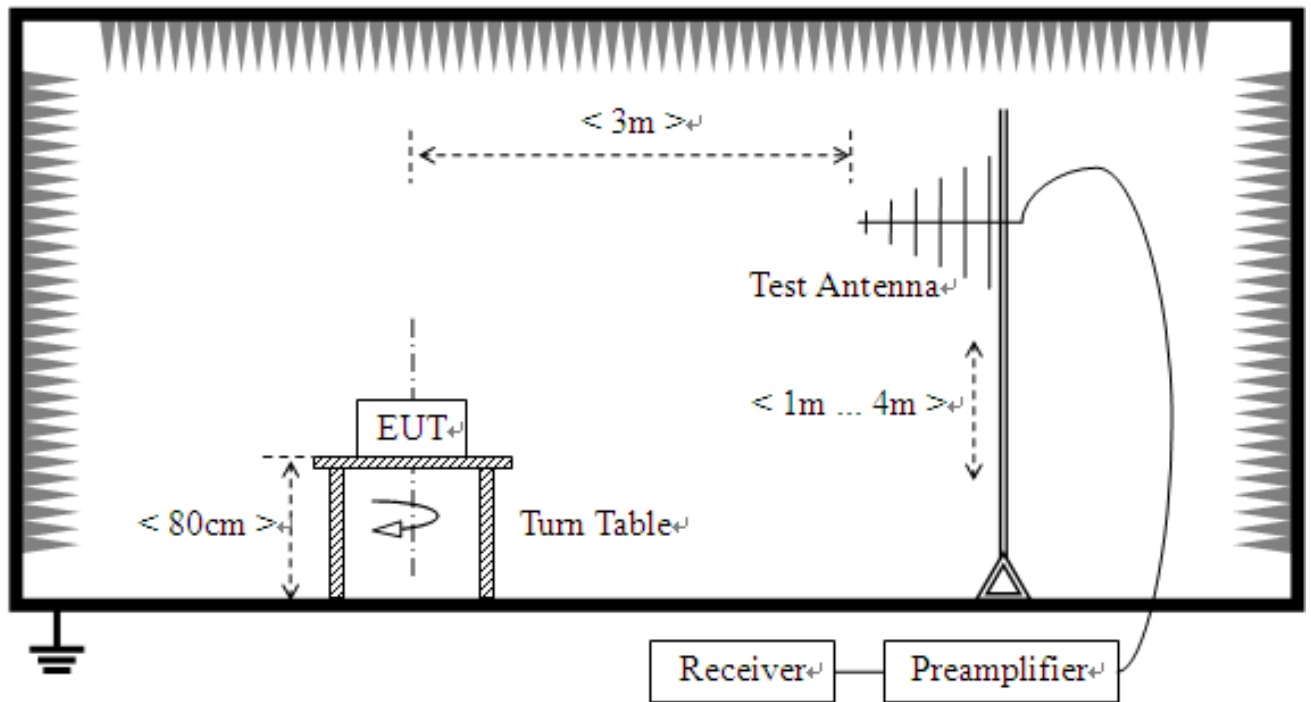
The measuring equipment is listed in the section 3 of this test report.

### 2.8.3 Test Setup

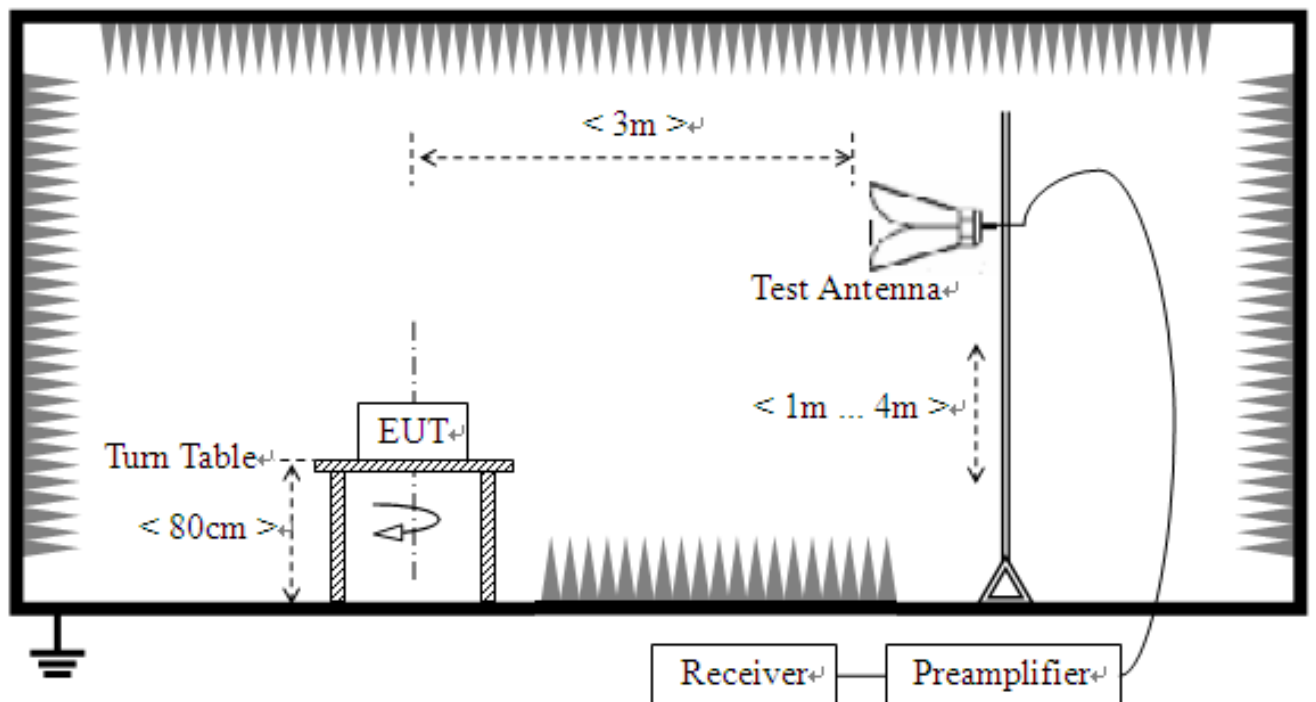
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



#### 2.8.4 Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from  $43 + 10\log(P)$ dB below the transmitter power P(Watts)  
 $= P(W) - [43 + 10\log(P)]$  (dB)  
 $= [30 + 10\log(P)]$  (dBm) -  $[43 + 10\log(P)]$  (dB)  
 $= -13$ dBm.

<For Band 7>

The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)  
 $= P(W) - [55 + 10\log(P)]$  (dB)  
 $= [30 + 10\log(P)]$  (dBm) -  $[55 + 10\log(P)]$  (dB)  
 $= -25$ dBm.

11. All Spurious Emission tests were performed in X, Y, Z axis direction and low, middle, high channel. And only the worst axis test condition was recorded in this test report.
12. The spectrum is measured from 9 KHz to the 10<sup>th</sup> harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. The worst case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.



13. The maximum RB configurations of the Radiated Spurious Emissions as RB Size 1,  
RB Offset 0

### 2.8.5 Test Result (Plots) of Radiated Spurious Emission

Note: 1. within 30MHz-1GHz were found more than 20dB below limit line

Note: 2. Absolute Level=Reading Level + Factor

#### LTE Band 2 QPSK 20MHz BW Middle Channel

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-90.44	-65.04	-13.00	52.04	25.40	Horizontal
2	59.1291	-89.01	-67.23	-13.00	54.23	21.78	Horizontal
3	103.793	-92.70	-71.09	-13.00	58.09	21.61	Horizontal
4	520.340	-104.13	-70.72	-13.00	57.72	33.41	Horizontal
5	7128.56	-59.34	-42.72	-13.00	29.72	16.62	Horizontal
6	10010.0	-60.17	-37.09	-13.00	24.09	23.08	Horizontal

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-92.30	-68.86	-13.00	55.86	23.44	Vertical
2	61.0711	-88.87	-66.25	-13.00	53.25	22.62	Vertical
3	103.793	-91.65	-65.29	-13.00	52.29	26.36	Vertical
4	879.599	-103.10	-65.56	-13.00	52.56	37.54	Vertical
5	3804.40	-57.11	-48.42	-13.00	35.42	8.69	Vertical
6	10250.1	-60.62	-37.51	-13.00	24.51	23.11	Vertical

Note: other spurious emissions are 20dB below limit line and no need to report



## LTE Band 4 QPSK 20MHz BW Middle Channel

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-90.74	-65.34	-13.00	52.34	25.40	Horizontal
2	59.1291	-88.26	-66.48	-13.00	53.48	21.78	Horizontal
3	103.793	-92.30	-70.69	-13.00	57.69	21.61	Horizontal
4	507.717	-105.19	-71.54	-13.00	58.54	33.65	Horizontal
5	794.154	-103.53	-65.85	-13.00	52.85	37.68	Horizontal
6	6210.10	-70.56	-44.85	-13.00	31.85	25.71	Horizontal

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-91.66	-68.22	-13.00	55.22	23.44	Vertical
2	59.1291	-89.82	-67.41	-13.00	54.41	22.41	Vertical
3	103.793	-92.20	-65.84	-13.00	52.84	26.36	Vertical
4	760.170	-102.90	-66.11	-13.00	53.11	36.79	Vertical
5	5080.04	-58.88	-44.79	-13.00	31.79	14.09	Vertical
6	10340.1	-61.19	-37.62	-13.00	24.62	23.57	Vertical

Note: other spurious emissions are 20dB below limit line and no need to report



## LTE Band 5 QPSK 10MHz BW Middle Channel

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-91.37	-65.97	-13.00	52.97	25.40	Horizontal
2	59.1291	-87.57	-65.79	-13.00	52.79	21.78	Horizontal
3	103.793	-91.70	-70.09	-13.00	57.09	21.61	Horizontal
4	2111.55	-56.91	-54.15	-13.00	41.15	2.76	Horizontal
5	2892.94	-56.07	-48.26	-13.00	35.26	7.81	Horizontal
6	6516.25	-59.23	-44.25	-13.00	31.25	14.98	Horizontal

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-90.80	-67.36	-13.00	54.36	23.44	Vertical
2	59.1291	-89.35	-66.94	-13.00	53.94	22.41	Vertical
3	103.793	-92.43	-66.07	-13.00	53.07	26.36	Vertical
4	1773.38	-56.96	-56.52	-13.00	43.52	0.44	Vertical
5	3186.09	-57.92	-48.72	-13.00	35.72	9.20	Vertical
6	4983.99	-58.33	-45.07	-13.00	32.07	13.26	Vertical

Note: other spurious emissions are 20dB below limit line and no need to report





## LTE Band 7 QPSK 20MHz BW Middle Channel

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-91.85	-66.45	-25.00	41.45	25.40	Horizontal
2	59.1291	-87.55	-65.77	-25.00	40.77	21.78	Horizontal
3	103.793	-92.08	-70.47	-25.00	45.47	21.61	Horizontal
4	879.599	-100.90	-62.82	-25.00	37.82	38.08	Horizontal
5	3843.42	-57.49	-48.28	-25.00	23.28	9.21	Horizontal
6	10580.2	-61.62	-37.69	-25.00	12.69	23.93	Horizontal

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-91.21	-67.77	-25.00	42.77	23.44	Vertical
2	59.1291	-89.16	-66.75	-25.00	41.75	22.41	Vertical
3	103.793	-91.89	-65.53	-25.00	40.53	26.36	Vertical
4	1222.11	-57.50	-59.82	-25.00	34.82	-2.32	Vertical
5	5116.05	-59.35	-45.45	-25.00	20.45	13.90	Vertical
6	10310.1	-60.21	-36.89	-25.00	11.89	23.32	Vertical

Note: other spurious emissions are 20dB below limit line and no need to report



## LTE Band 66 QPSK 20MHz BW Middle Channel

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-91.90	-66.50	-13.00	53.50	25.40	Horizontal
2	53.3033	-87.86	-66.14	-13.00	53.14	21.72	Horizontal
3	103.793	-92.29	-70.68	-13.00	57.68	21.61	Horizontal
4	502.862	-104.60	-70.82	-13.00	57.82	33.78	Horizontal
5	3160.58	-57.07	-48.28	-13.00	35.28	8.79	Horizontal
6	10352.1	-61.07	-37.31	-13.00	24.31	23.76	Horizontal

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	34.8549	-92.78	-69.34	-13.00	56.34	23.44	Vertical
2	59.1291	-88.46	-66.05	-13.00	53.05	22.41	Vertical
3	103.793	-91.85	-65.49	-13.00	52.49	26.36	Vertical
4	939.799	-100.61	-61.60	-13.00	48.60	39.01	Vertical
5	5071.03	-57.04	-43.03	-13.00	30.03	14.01	Vertical
6	10142.0	-60.42	-37.49	-13.00	24.49	22.93	Vertical

Note: other spurious emissions are 20dB below limit line and no need to report



### 3. LIST OF MEASURING EQUIPMENT

Description	Manufacturer	Model	Serial No.	Cal. Date	Due Date	Remark
EMI Test Receiver	R&S	ESIB26	A0304218	2018.09.03	2019.09.20	Radiation
Loop Antenna	Schwarz beck	HFH2-Z2	100047	2019.04.26	2022.04.25	Radiation
Broadband antenna (30MHz~1GHz)	R&S	HL562	101341	2017.07.14	2020.07.13	Radiation
Broadband antenna (30MHz~1GHz)	R&S	HL562	101339	2017.07.14	2020.07.13	Radiation
Double ridge horn antenna (1GHz~18GHz)	R&S	HF906	100150	2019.04.27	2022.04.26	Radiation
Double ridge horn antenna (1GHz~18GHz)	R&S	HF906	100149	2019.04.17	2022.04.16	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4002A	305753	2017.11.10	2020.11.09	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4003A	0329293	2018.09.17	2020.09.16	Radiation
Amplifier 1GHz-18GHz	AR	25S1G4AM1	22018	2018.09.17	2020.09.16	Radiation
Ampilier 20M~3GHz	MILMEGA	80RF1000-250	1064573	2017.10.09	2020.10.08	Radiation
Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2018.11.15	2019.11.14	Conducted
LISN	ROHDE&SC HWARZ	ESH2-Z5	A0304221	2019.04.30	2020.04.29	Conducted
Test Receiver	R&S	ESCS30	A0304260	2019.05.25	2020.05.24	Conducted
Temperature chamber	Dongguan gaoda instrument CO.LTD	GD-7005-100	130130101	2019.04.22	2020.04.21	Conducted
Wideband Radio Communication tester	R&S	CMW500	149332	2019.04.01	2020.03.31	Conducted
Power Supply	R&S	NGMO1	101037	2019.08.03	2020.08.02	Conducted



## APPENDIX A

### Conducted RF (Average) Output Power

#### Test Result and Data

1. LTE Band 2 Conducted Power Test Verdict:

LTE FDD Band 2				Conducted Power(dBm)			Tune up
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			
				18607/1850.7	18900/1880	19193/1909.3	
1.4MHz	QPSK	1	0	22.67	22.5	22.64	22.0±1.0
		1	3	22.52	22.75	22.54	
		1	5	22.65	22.65	22.51	
		3	0	22.34	22.34	22.38	21.5±1.0
		3	2	22.36	22.22	22.21	
		3	3	22.15	22.31	22.32	
		6	0	22.09	22	22.09	
	16QAM	1	0	21.84	21.93	21.65	21.0±1.0
		1	3	21.69	21.84	21.78	
		1	5	21.79	21.68	21.87	
		3	0	21.34	21.45	21.59	21.0±1.0
		3	2	21.5	21.5	21.45	
		3	3	21.46	21.52	21.55	
		6	0	21.16	21.15	21.22	
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
3MHz	QPSK	1	0	22.8	22.67	22.77	22.0±1.0
		1	7	22.5	22.78	22.8	
		1	14	22.69	22.61	22.8	
		8	0	22.15	22.27	22.27	21.5±1.0
		8	4	22.15	22.43	22.43	
		8	7	22.45	22.19	22.38	
		15	0	22.06	22.02	22.08	
	16QAM	1	0	21.94	21.66	21.89	21.0±1.0
		1	7	21.95	21.92	21.94	
		1	14	21.72	21.8	21.66	
		8	0	21.59	21.3	21.51	21.0±1.0
		8	4	21.39	21.31	21.54	
		8	7	21.3	21.34	21.47	
		15	0	21.19	21.25	21.24	



LTE FDD Band 2				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				18625/1852.5	18900/1880	19175/1907.5	
5MHz	QPSK	1	0	22.58	22.79	22.68	22.0±1.0
		1	13	22.74	22.59	22.55	
		1	24	22.58	22.54	22.56	
		12	0	22.42	22.33	22.19	21.5±1.0
		12	6	22.39	22.35	22.2	
		12	13	22.3	22.2	22.39	
	25	0	22.1	22.05	22.07	21.5±1.0	
	16QAM	1	0	21.74	21.93	21.67	21.0±1.0
		1	13	21.85	21.72	21.88	
		1	24	21.76	21.93	21.91	
		12	0	21.36	21.53	21.3	21.0±1.0
		12	6	21.55	21.4	21.39	
12		13	21.35	21.42	21.51		
25	0	21.17	21.25	21.23	20.5±1.0		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				18650/1855	18900/1880	19150/1905	
10MHz	QPSK	1	0	22.6	22.67	22.59	22.0±1.0
		1	25	22.75	22.58	22.54	
		1	49	22.63	22.53	22.55	
		25	0	22.26	22.3	22.31	21.5±1.0
		25	13	22.43	22.27	22.16	
		25	25	22.45	22.33	22.34	
	50	0	22.03	22.03	22	21.5±1.0	
	16QAM	1	0	21.78	21.65	21.88	21.0±1.0
		1	25	21.69	21.74	21.67	
		1	49	21.81	21.7	21.72	
		25	0	21.44	21.37	21.48	21.0±1.0
		25	13	21.35	21.44	21.6	
25		25	21.51	21.35	21.33		
50	0	21.24	21.21	21.16	20.5±1.0		



LTE FDD Band 2				Conducted Power(dBm)			Tune up
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			
				18675/1857.5	18900/1880	19125/1902.5	
15MHz	QPSK	1	0	22.79	22.57	22.58	22.0±1.0
		1	38	22.76	22.64	22.51	
		1	74	22.7	22.8	22.79	
		36	0	22.25	22.44	22.37	21.5±1.0
		36	18	22.33	22.24	22.2	
		36	39	22.44	22.19	22.45	
		75	0	22.09	22.05	22.08	21.5±1.0
	16QAM	1	0	21.88	21.7	21.88	21.0±1.0
		1	38	21.93	21.74	21.76	
		1	74	21.75	21.92	21.66	
		36	0	21.39	21.32	21.56	21.0±1.0
		36	18	21.46	21.33	21.53	
		36	39	21.54	21.56	21.4	
		75	0	21.2	21.15	21.18	20.5±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				18700/1860	18900/1880	19100/1900	
20MHz	QPSK	1	0	22.76	22.82	22.72	22.0±1.0
		1	50	22.55	22.51	22.61	
		1	99	22.6	22.6	22.71	
		50	0	22.27	22.41	22.29	21.5±1.0
		50	25	22.28	22.29	22.17	
		50	50	22.16	22.17	22.4	
		100	0	22.07	22.03	22.05	21.5±1.0
	16QAM	1	0	21.86	21.72	21.82	21.0±1.0
		1	50	21.85	21.82	21.77	
		1	99	21.87	21.71	21.86	
		50	0	21.54	21.3	21.42	21.0±1.0
		50	25	21.49	21.53	21.42	
		50	50	21.45	21.57	21.48	
		100	0	21.25	21.19	21.15	20.5±1.0



LTE Band 4 Conducted Power Test Verdict:

LTE FDD Band 4				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				19957/1710.7	20175/1732.5	20393/1754.3	
1.4MHz	QPSK	1	0	22.77	22.82	22.91	22.0±1.0
		1	3	22.74	22.92	22.93	
		1	5	22.73	22.72	22.75	
		3	0	22.57	22.42	22.62	22.0±1.0
		3	2	22.43	22.51	22.42	
		3	3	22.48	22.53	22.51	
	6	0	22.27	22.21	22.23	21.5±1.0	
	16QAM	1	0	21.94	21.91	22.11	21.5±1.0
		1	3	21.95	22.08	21.88	
		1	5	21.96	22.04	21.91	
		3	0	21.7	21.8	21.59	21.0±1.0
		3	2	21.8	21.57	21.57	
		3	3	21.61	21.52	21.62	
	6	0	21.44	21.44	21.43	20.5±1.0	
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				19965/1711.5	20175/1732.5	20385/1753.5	
3MHz	QPSK	1	0	22.98	22.95	22.95	22.0±1.0
		1	7	22.88	22.98	22.81	
		1	14	22.97	22.94	22.76	
		8	0	22.48	22.59	22.51	22.0±1.0
		8	4	22.42	22.51	22.52	
		8	7	22.59	22.63	22.52	
	15	0	22.23	22.21	22.2	21.5±1.0	
	16QAM	1	0	22.11	22.02	22.09	21.5±1.0
		1	7	22.14	21.91	22.07	
		1	14	21.88	21.87	22.15	
		8	0	21.8	21.68	21.62	21.0±1.0
		8	4	21.58	21.69	21.51	
		8	7	21.59	21.61	21.52	
		15	0	21.43	21.43	21.43	20.5±1.0



LTE FDD Band 4				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				19975/1712.5	20175/1732.5	20375/1752.5	
5MHz	QPSK	1	0	22.74	22.73	22.7	22.0±1.0
		1	13	22.99	22.73	22.88	
		1	24	22.91	22.94	22.87	
		12	0	22.63	22.57	22.46	22.0±1.0
		12	6	22.65	22.47	22.55	
		12	13	22.41	22.56	22.58	
	25	0	22.21	22.29	22.22	21.5±1.0	
	16QAM	1	0	22.1	21.86	21.96	21.5±1.0
		1	13	21.85	21.89	21.88	
		1	24	22.09	21.95	21.87	
		12	0	21.59	21.73	21.6	21.0±1.0
		12	6	21.74	21.53	21.76	
		12	13	21.59	21.65	21.73	
		25	0	21.39	21.42	21.42	20.5±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20000/1715	20175/1732.5	20350/1750	
10MHz	QPSK	1	0	22.75	22.9	22.78	22.0±1.0
		1	25	22.77	22.73	22.71	
		1	49	22.75	22.89	22.88	
		25	0	22.64	22.57	22.43	22.0±1.0
		25	13	22.56	22.61	22.45	
		25	25	22.55	22.35	22.44	
		50	0	22.24	22.24	22.2	21.5±1.0
	16QAM	1	0	21.88	21.88	22.15	21.5±1.0
		1	25	21.99	21.92	22.14	
		1	49	22.14	22.04	21.85	
		25	0	21.54	21.65	21.58	21.0±1.0
		25	13	21.79	21.5	21.72	
		25	25	21.53	21.8	21.52	
		50	0	21.38	21.42	21.41	20.5±1.0





LTE FDD Band 4				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20025/1717.5	20175/1732.5	20325/1747.5	
15MHz	QPSK	1	0	22.8	22.7	22.82	22.0±1.0
		1	38	22.71	22.79	22.75	
		1	74	22.95	22.88	22.77	
		36	0	22.4	22.56	22.39	22.0±1.0
		36	18	22.38	22.43	22.54	
		36	39	22.48	22.39	22.39	
	75	0	22.2	22.2	22.29	21.5±1.0	
	16QAM	1	0	22.03	22.1	21.99	21.5±1.0
		1	38	22.1	21.85	22.02	
		1	74	21.91	22.04	22.03	
		36	0	21.8	21.61	21.58	21.0±1.0
		36	18	21.68	21.5	21.78	
		36	39	21.57	21.51	21.53	
	75	0	21.39	21.4	21.38	20.5±1.0	
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20050/1720	20175/1732.5	20300/1745	
20MHz	QPSK	1	0	22.93	23.05	22.99	22.5±1.0
		1	50	22.98	22.93	22.88	
		1	99	22.78	22.74	22.91	
		50	0	22.35	22.64	22.46	22.0±1.0
		50	25	22.57	22.38	22.6	
		50	50	22.38	22.37	22.53	
	100	0	22.3	22.23	22.29	21.5±1.0	
	16QAM	1	0	21.86	22.01	21.92	21.5±1.0
		1	50	22.1	22.13	21.86	
		1	99	21.98	22.12	22.09	
		50	0	21.7	21.56	21.58	21.0±1.0
		50	25	21.68	21.72	21.56	
		50	50	21.67	21.72	21.51	
	100	0	21.38	21.43	21.4	20.5±1.0	



LTE Band 5 Conducted Power Test Verdict:

LTE FDD Band 5				Conducted Power(dBm)			Tune up
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			
				20407/824.7	20525/836.5	20643/848.3	
1.4MHz	QPSK	1	0	23.08	23.23	23.2	22.5±1.0
		1	3	23.21	23.05	23.11	
		1	5	23.01	23.21	23	
		3	0	22.83	22.94	22.81	22.0±1.0
		3	2	22.95	22.74	22.89	
		3	3	22.67	22.72	22.68	
	6	0	22.53	22.58	22.52	22.0±1.0	
	16QAM	1	0	22.15	22.26	22.37	21.5±1.0
		1	3	22.38	22.32	22.36	
		1	5	22.22	22.29	22.35	
		3	0	21.94	21.99	21.87	21.5±1.0
		3	2	22.02	21.83	21.89	
		3	3	21.8	21.81	21.8	
	6	0	21.7	21.7	21.67	21.0±1.0	
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
3MHz	QPSK	1	0	23.05	23.11	23.2	22.5±1.0
		1	7	23.15	23.04	23.04	
		1	14	23.16	23.11	23.11	
		8	0	22.66	22.84	22.65	22.0±1.0
		8	4	22.94	22.92	22.72	
		8	7	22.74	22.87	22.82	
	15	0	22.54	22.58	22.52	22.0±1.0	
	16QAM	1	0	22.25	22.39	22.24	21.5±1.0
		1	7	22.34	22.21	22.16	
		1	14	22.28	22.17	22.16	
		8	0	21.92	22.03	21.82	21.5±1.0
		8	4	21.82	21.81	21.91	
		8	7	21.89	21.93	21.99	
	15	0	21.7	21.7	21.66	21.0±1.0	



LTE FDD Band 5				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20425/826.5	20525/836.5	20625/846.5	
5MHz	QPSK	1	0	23.23	23	23.08	22.5±1.0
		1	13	23.05	23.12	23.23	
		1	24	23.21	23.03	23.12	
		12	0	22.76	22.88	22.91	22.0±1.0
		12	6	22.82	22.77	22.87	
		12	13	22.66	22.92	22.86	
	25	0	22.53	22.55	22.53	22.0±1.0	
	16QAM	1	0	22.37	22.31	22.29	21.5±1.0
		1	13	22.36	22.26	22.28	
		1	24	22.43	22.36	22.36	
		12	0	21.85	21.97	21.85	21.5±1.0
		12	6	22.08	21.89	21.96	
12		13	22.02	21.97	22.1		
25	0	21.74	21.65	21.69	21.0±1.0		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20450/829	20525/836.5	20600/844	
10MHz	QPSK	1	0	23.26	23.31	23.15	22.5±1.0
		1	25	23.15	23.23	23.09	
		1	49	23.29	23.01	23.25	
		25	0	22.83	22.94	22.88	22.0±1.0
		25	13	22.87	22.69	22.68	
		25	25	22.89	22.84	22.67	
		50	0	22.54	22.53	22.51	
	16QAM	1	0	22.27	22.34	22.45	21.5±1.0
		1	25	22.22	22.43	22.41	
		1	49	22.23	22.2	22.35	
		25	0	22.06	21.93	21.86	21.5±1.0
		25	13	21.96	21.81	21.95	
		25	25	22.08	21.99	21.98	
		50	0	21.67	21.68	21.68	



LTE Band 7 Conducted Power Test Verdict:

LTE FDD Band 7				Conducted Power(dBm)			Tune up
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			
				20775/2502.5	21100/2535	21425/2567.5	
5MHz	QPSK	1	0	21.74	21.77	21.76	21.0±1.0
		1	13	21.96	21.79	21.84	
		1	24	21.94	21.94	21.98	
		12	0	21.6	21.65	21.65	21.0±1.0
		12	6	21.51	21.55	21.59	
		12	13	21.35	21.64	21.51	
	16QAM	25	0	21.28	21.23	21.24	20.5±1.0
		1	0	20.94	21.05	20.95	20.5±1.0
		1	13	20.85	20.92	21.04	
		1	24	21.09	20.93	20.9	
		12	0	20.8	20.57	20.72	20.0±1.0
		12	6	20.59	20.66	20.71	
		12	13	20.56	20.67	20.8	
		25	0	20.45	20.38	20.41	19.5±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
10MHz	QPSK	1	0	21.83	21.91	21.76	21.0±1.0
		1	25	21.76	21.83	21.76	
		1	49	21.97	21.91	21.73	
		25	0	21.41	21.43	21.6	21.0±1.0
		25	13	21.49	21.64	21.57	
		25	25	21.52	21.52	21.59	
	16QAM	50	0	21.22	21.3	21.23	20.5±1.0
		1	0	20.86	21.13	20.92	20.5±1.0
		1	25	20.86	21.07	21.12	
		1	49	20.88	21.02	21.01	
		25	0	20.54	20.67	20.61	20.0±1.0
		25	13	20.72	20.67	20.73	
		25	25	20.59	20.8	20.8	
		50	0	20.37	20.39	20.42	19.5±1.0



LTE FDD Band 7				Conducted Power(dBm)			Tune up
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			
				20825/2507.5	21100/2535	21375/2562.5	
15MHz	QPSK	1	0	21.76	21.76	21.92	21.0±1.0
		1	38	21.88	21.76	21.82	
		1	74	21.88	21.79	21.84	
		36	0	21.54	21.59	21.55	21.0±1.0
		36	18	21.47	21.41	21.44	
		36	39	21.65	21.42	21.55	
		75	0	21.2	21.27	21.26	20.5±1.0
	16QAM	1	0	21.15	21.07	20.98	20.5±1.0
		1	38	21	21.02	20.88	
		1	74	21.05	20.87	21.12	
		36	0	20.62	20.71	20.8	20.0±1.0
		36	18	20.72	20.65	20.57	
		36	39	20.77	20.71	20.65	
		75	0	20.41	20.37	20.42	19.5±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20850/2510	21100/2535	21350/2560	
20MHz	QPSK	1	0	21.95	21.83	22.06	21.5±1.0
		1	50	21.74	21.71	21.8	
		1	99	21.71	22	21.78	
		50	0	21.54	21.49	21.64	21.0±1.0
		50	25	21.59	21.55	21.49	
		50	50	21.4	21.44	21.6	
		100	0	21.26	21.25	21.21	20.5±1.0
	16QAM	1	0	20.91	20.91	20.96	20.5±1.0
		1	50	21.05	21.13	20.97	
		1	99	21.09	20.97	21.14	
		50	0	20.68	20.73	20.61	20.0±1.0
		50	25	20.7	20.74	20.61	
		50	50	20.58	20.65	20.59	
		100	0	20.38	20.43	20.44	19.5±1.0



LTE Band 66 Conducted Power Test Verdict:

LTE FDD Band 66				Conducted Power(dBm)			Tune up
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			
				131979/1710.7	132322/1745	132665/1779.3	
1.4MHz	QPSK	1	0	22.97	22.9	22.93	22.0±1.0
		1	3	22.79	22.98	22.7	
		1	5	22.85	22.79	22.78	
		3	0	22.57	22.61	22.58	22.0±1.0
		3	2	22.4	22.55	22.39	
		3	3	22.56	22.62	22.62	
	6	0	22.23	22.23	22.27	21.5±1.0	
	16QAM	1	0	21.85	22.01	21.85	21.5±1.0
		1	3	21.94	22.1	21.95	
		1	5	22.1	22.1	22.09	
		3	0	21.61	21.58	21.63	21.0±1.0
		3	2	21.64	21.55	21.65	
		3	3	21.66	21.52	21.64	
		6	0	21.41	21.36	21.45	
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				131987/1711.5	12322/1745	132657/1778.5	
3MHz	QPSK	1	0	22.9	22.84	22.73	22.0±1.0
		1	7	22.84	22.77	22.95	
		1	14	22.92	22.94	22.84	
		8	0	22.39	22.65	22.6	22.0±1.0
		8	4	22.63	22.48	22.61	
		8	7	22.64	22.61	22.61	
		15	0	22.22	22.25	22.25	21.5±1.0
	16QAM	1	0	21.9	22.13	22.1	21.5±1.0
		1	7	22.1	21.86	22.01	
		1	14	21.86	21.96	21.86	
		8	0	21.71	21.65	21.51	21.0±1.0
		8	4	21.56	21.72	21.54	
		8	7	21.59	21.68	21.51	
		15	0	21.35	21.43	21.43	



LTE FDD Band 66				Conducted Power(dBm)			Tune up
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			
				131997/1712.5	132322/1745	132647/1777.5	
5MHz	QPSK	1	0	22.71	22.81	22.82	22.0±1.0
		1	13	22.97	22.9	22.8	
		1	24	22.98	22.99	22.72	
		12	0	22.52	22.51	22.39	22.0±1.0
		12	6	22.45	22.58	22.5	
		12	13	22.48	22.41	22.56	
		25	0	22.3	22.3	22.25	21.5±1.0
	16QAM	1	0	22.06	21.94	22.1	21.5±1.0
		1	13	21.94	21.85	21.85	
		1	24	21.85	21.93	21.98	
		12	0	21.57	21.61	21.69	21.0±1.0
		12	6	21.68	21.69	21.6	
		12	13	21.53	21.73	21.66	
		25	0	21.37	21.4	21.37	20.5±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
10MHz	QPSK	1	0	22.81	22.97	22.98	22.0±1.0
		1	25	22.84	22.84	22.7	
		1	49	22.79	22.81	22.78	
		25	0	22.35	22.59	22.4	22.0±1.0
		25	13	22.56	22.36	22.41	
		25	25	22.44	22.5	22.44	
		50	0	22.26	22.22	22.27	21.5±1.0
	16QAM	1	0	22.08	22.05	21.95	21.5±1.0
		1	25	22.02	21.86	22.09	
		1	49	22.11	22.1	21.91	
		25	0	21.51	21.56	21.68	21.0±1.0
		25	13	21.7	21.54	21.55	
		25	25	21.51	21.72	21.79	
		50	0	21.35	21.44	21.35	20.5±1.0



LTE FDD Band 66				Conducted Power(dBm)			Tune up
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			
				132047/1717.5	132322/1745	132597/1772.5	
15MHz	QPSK	1	0	22.85	22.95	22.97	22.0±1.0
		1	38	22.73	22.88	22.73	
		1	74	22.87	22.91	22.7	
		36	0	22.58	22.38	22.59	22.0±1.0
		36	18	22.52	22.53	22.59	
		36	39	22.4	22.64	22.6	
		75	0	22.27	22.23	22.24	21.5±1.0
	16QAM	1	0	21.99	21.91	21.9	21.5±1.0
		1	38	21.94	22.14	21.85	
		1	74	22.08	22.08	21.89	
		36	0	21.78	21.7	21.62	21.0±1.0
		36	18	21.59	21.68	21.72	
		36	39	21.76	21.57	21.78	
		75	0	21.44	21.36	21.44	20.5±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				132072/1720	132322/1745	132572/1770	
20MHz	QPSK	1	0	22.98	23.04	22.86	22.5±1.0
		1	50	22.93	22.74	22.77	
		1	99	22.8	22.81	22.84	
		50	0	22.41	22.65	22.55	22.0±1.0
		50	25	22.38	22.61	22.62	
		50	50	22.64	22.54	22.43	
		100	0	22.24	22.3	22.21	21.5±1.0
	16QAM	1	0	22.1	21.98	22.12	21.5±1.0
		1	50	21.99	22.15	21.94	
		1	99	22.14	21.93	22.04	
		50	0	21.67	21.54	21.79	21.0±1.0
		50	25	21.67	21.77	21.57	
		50	50	21.76	21.65	21.55	
		100	0	21.42	21.37	21.35	20.5±1.0

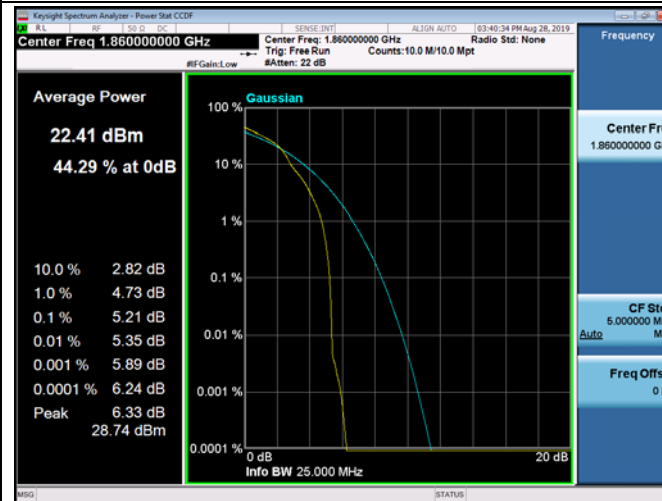


**Peak To Average Ratio****Test Result and Data**

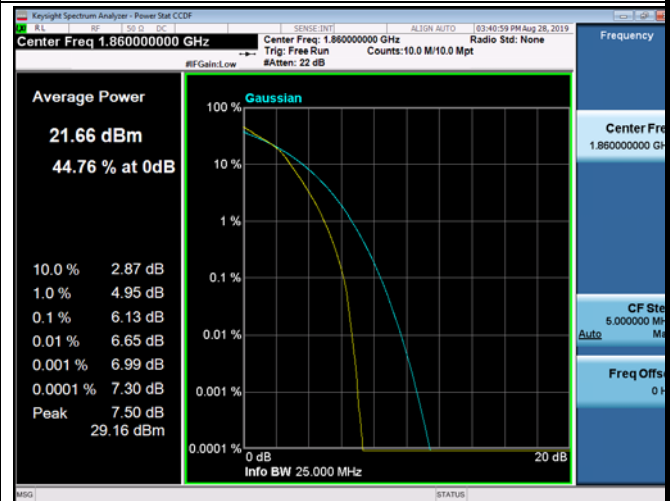
PeakToAveragePowerRatio NormalTC_NormalVol							
Band	Range	BandW idth	RbMode	Modulation	PAPR (dBm)	Limit (dBm)	Result
FDD02	LowRange	20	OneRB_high	Q16	5.21	13.00	Pass
FDD02	LowRange	20	fullRB	Q16	6.13	13.00	Pass
FDD02	MidRange	20	OneRB_high	Q16	5.58	13.00	Pass
FDD02	MidRange	20	fullRB	Q16	6.29	13.00	Pass
FDD02	HighRange	20	OneRB_high	Q16	4.79	13.00	Pass
FDD02	HighRange	20	fullRB	Q16	6.04	13.00	Pass



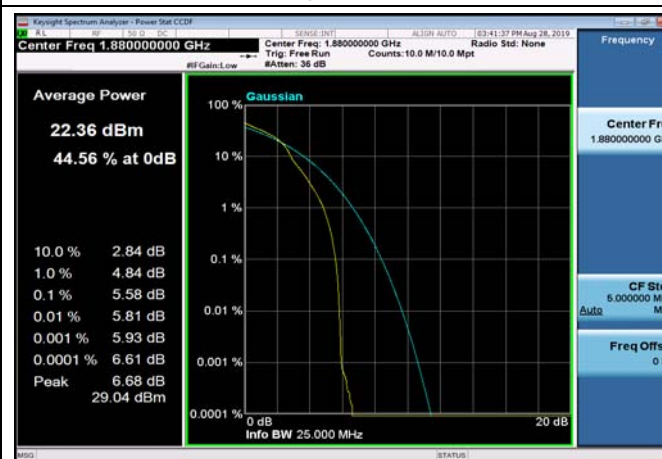
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\_high\_Q16



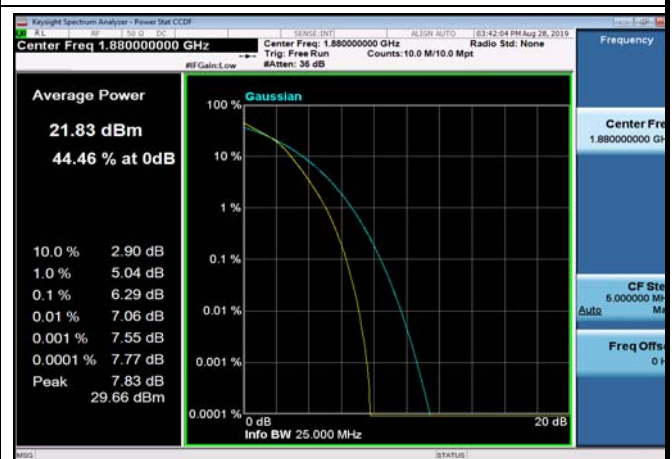
FDD02\_LowRange\_20MHz\_1860\_fullRB  
\_Q16



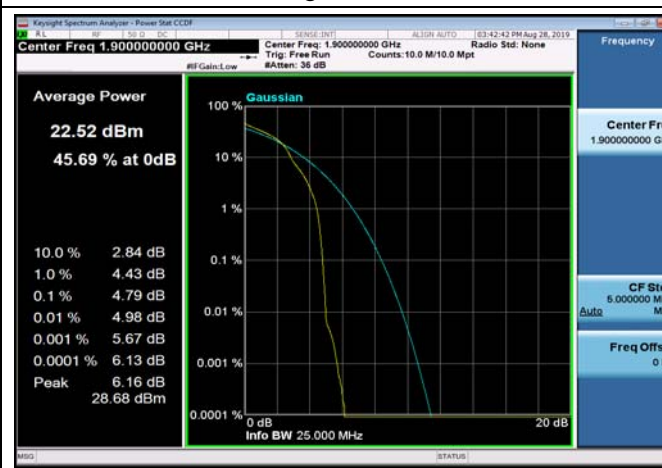
FDD02\_MidRange\_20MHz\_1880\_OneRB  
\_high\_Q16



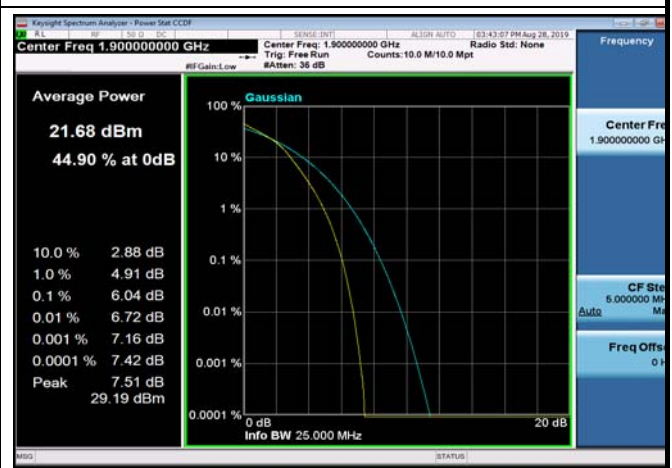
FDD02\_MidRange\_20MHz\_1880\_fullRB  
\_Q16



FDD02\_HighRange\_20MHz\_1900\_OneRB  
\_high\_Q16



FDD02\_HighRange\_20MHz\_1900\_fullRB  
\_Q16





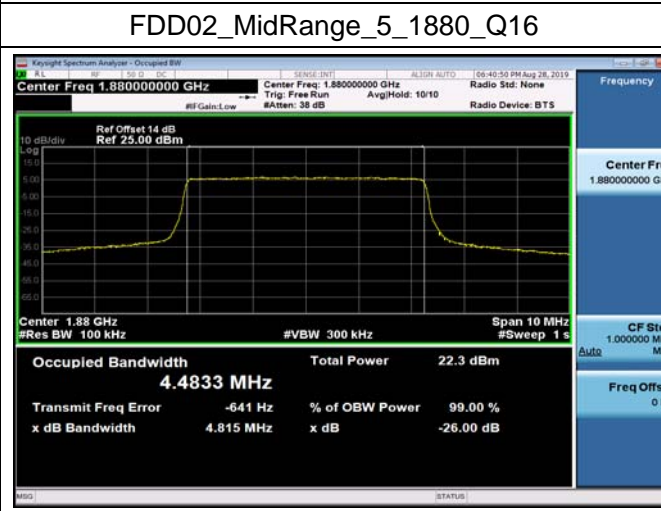
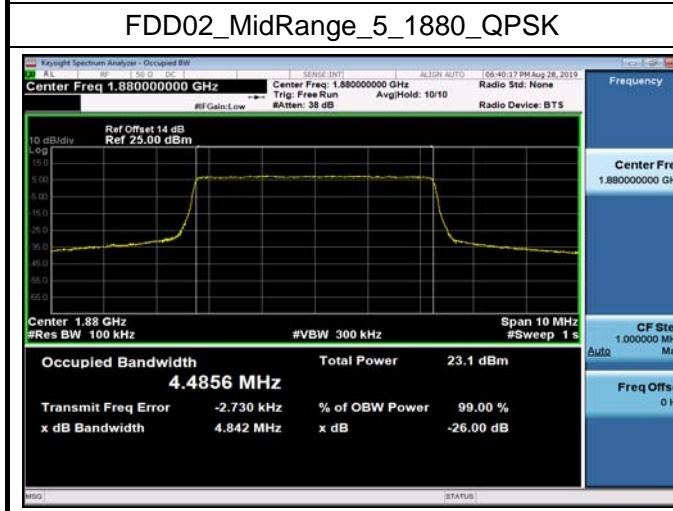
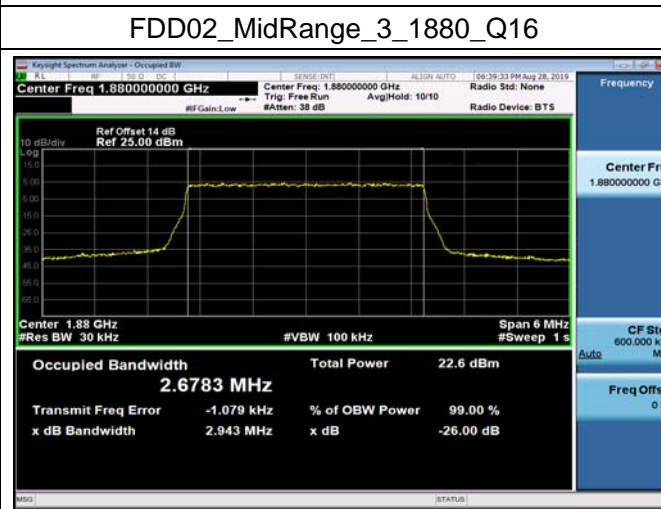
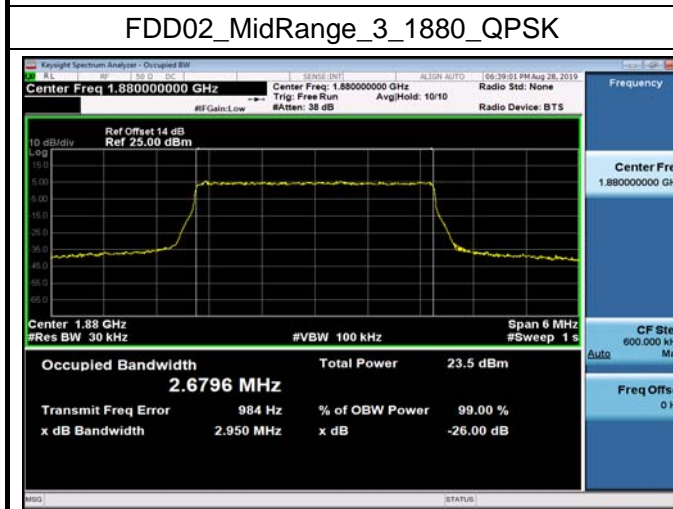
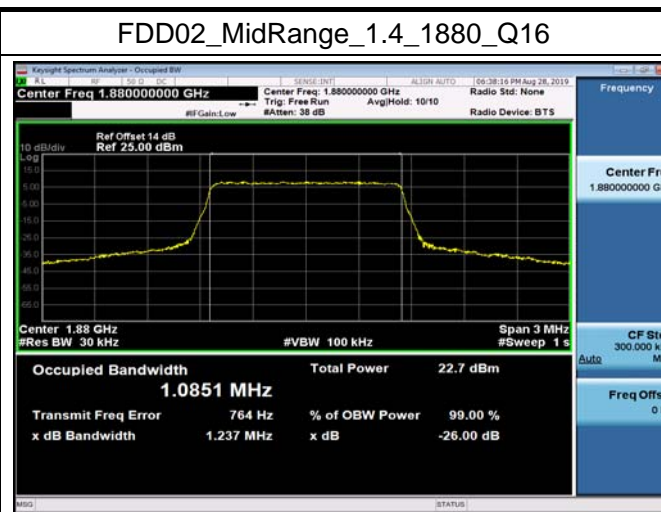
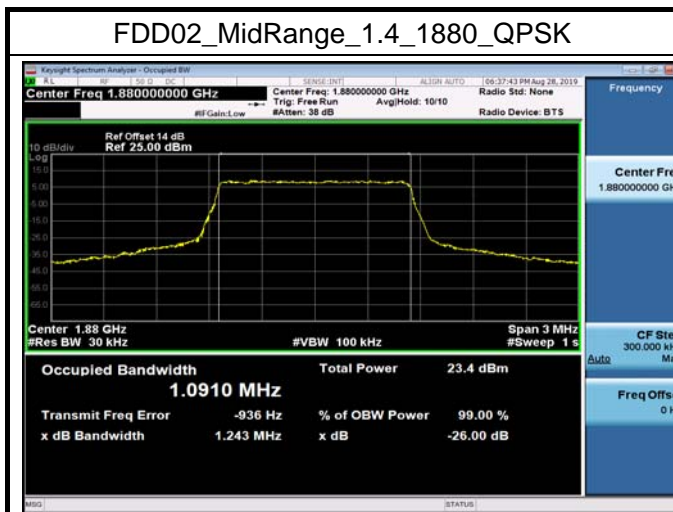
## 99% Occupied Bandwidth

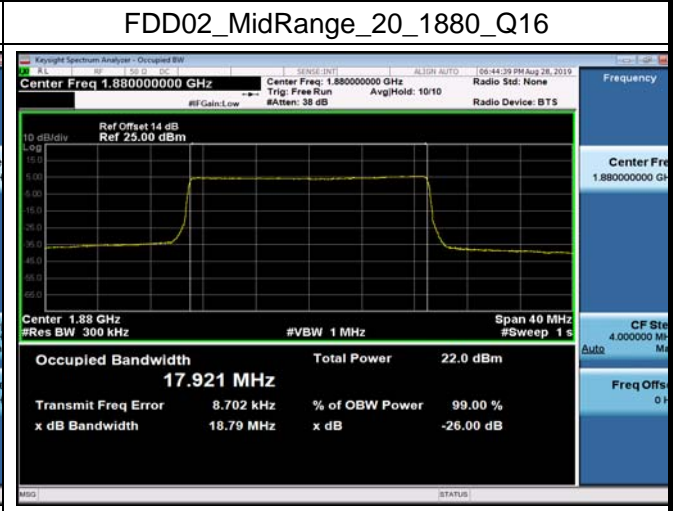
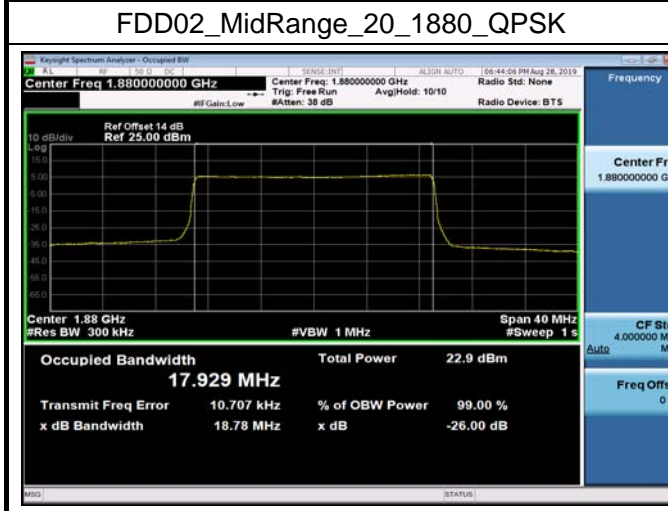
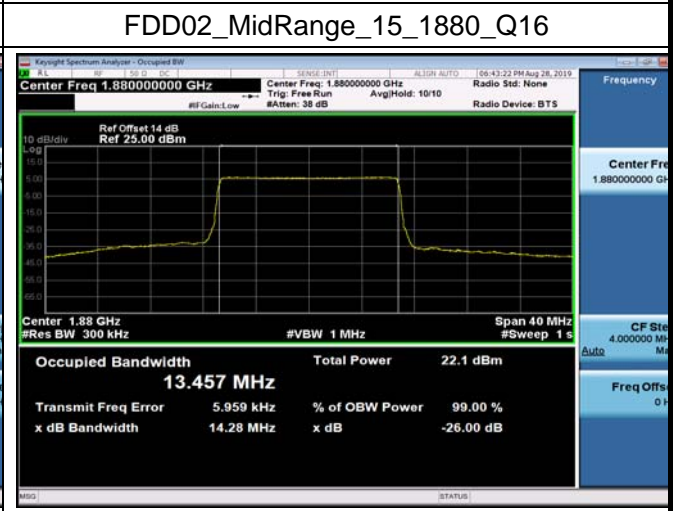
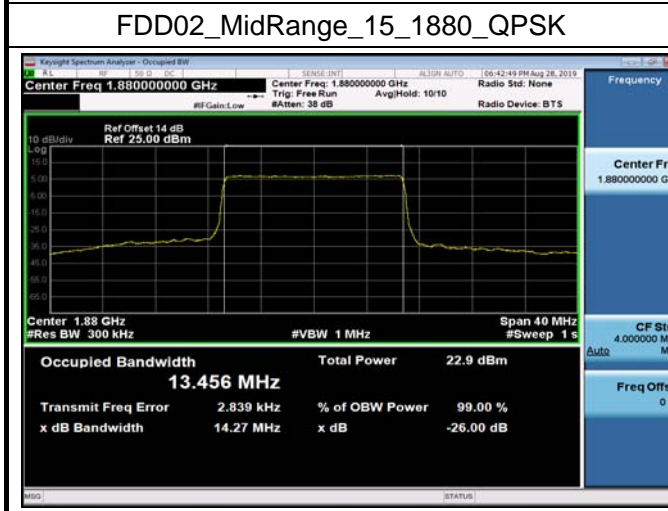
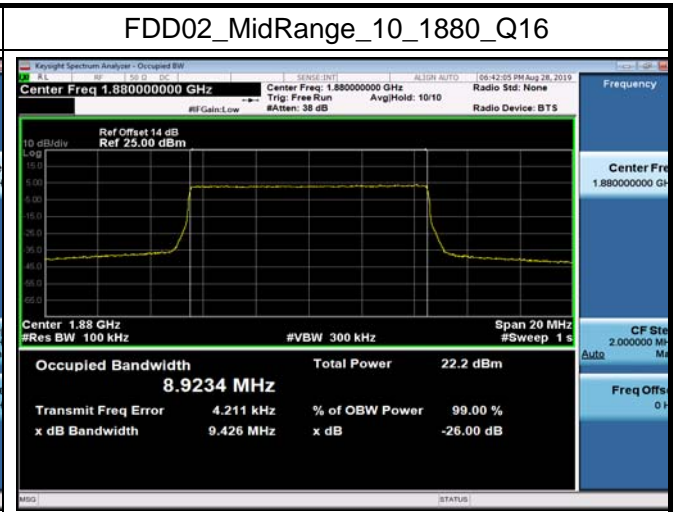
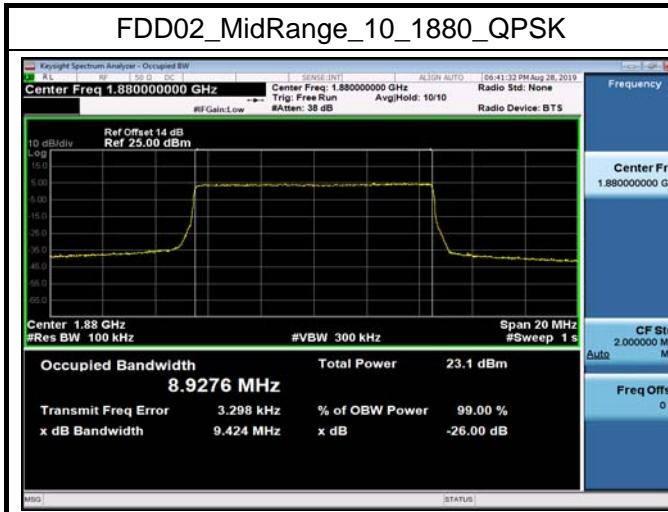
### Test Result and Data

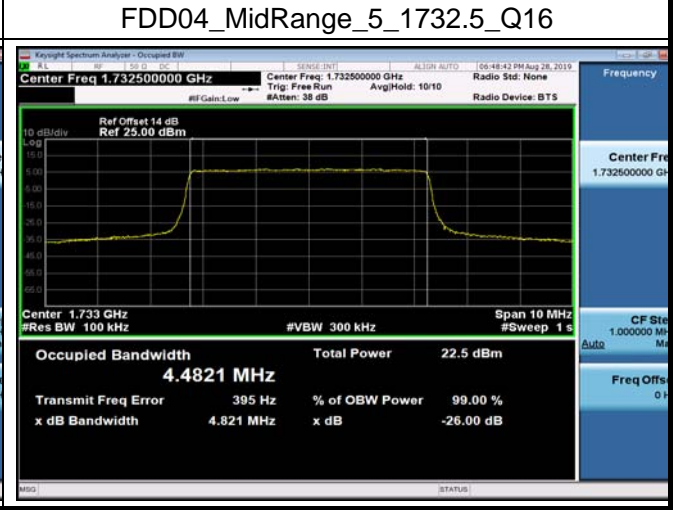
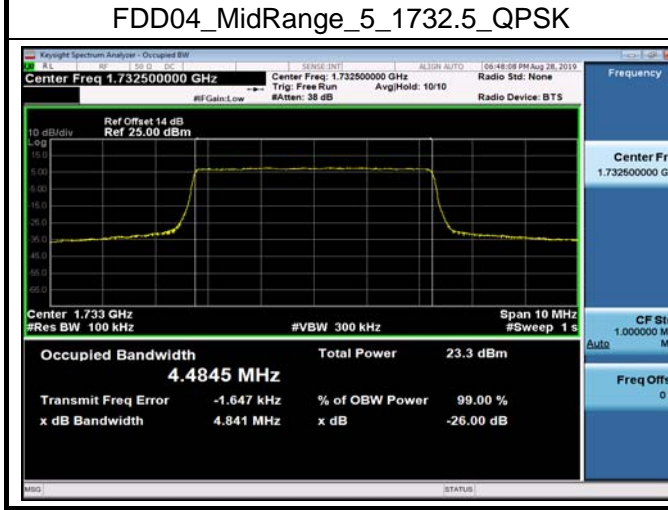
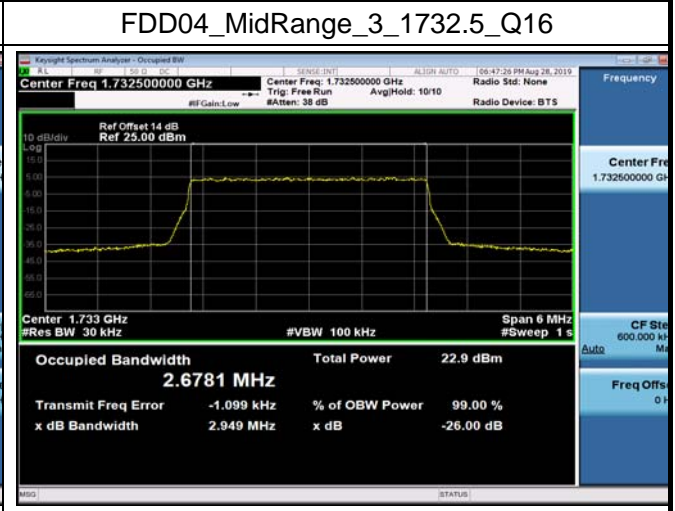
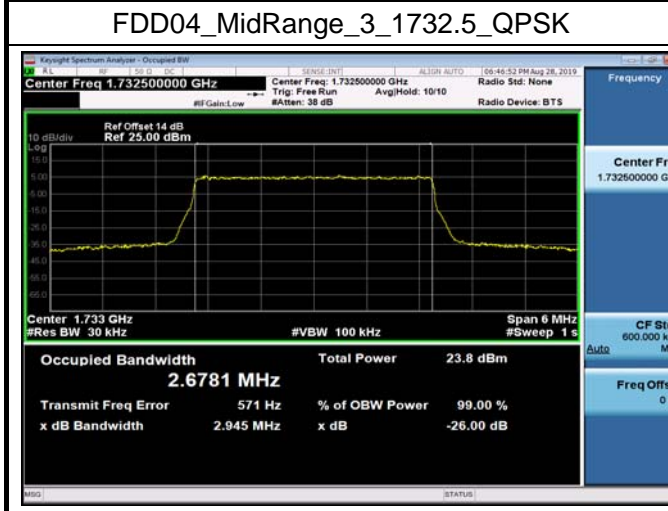
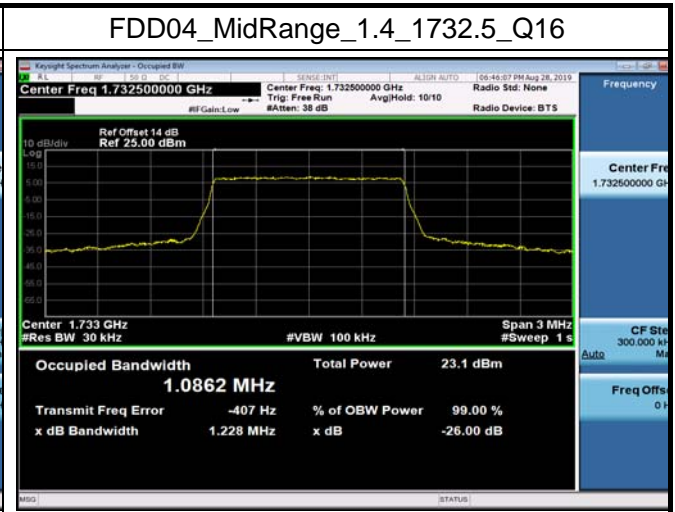
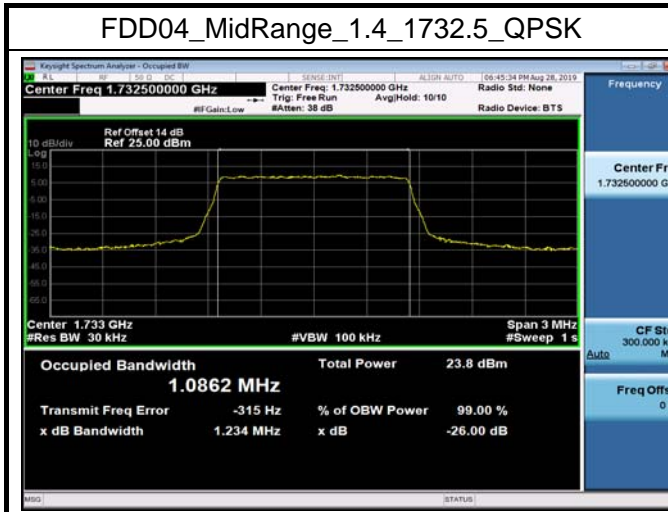
Occupied Bandwidth NormalTC_NormalVol					
Band	Range	BandWidth	Frequency (MHz)	Modulation	Occupied Bandwidth(99%) (MHz)
FDD02	MidRange	1.4	1880	QPSK	1.091
FDD02	MidRange	1.4	1880	Q16	1.085
FDD02	MidRange	3	1880	QPSK	2.680
FDD02	MidRange	3	1880	Q16	2.678
FDD02	MidRange	5	1880	QPSK	4.486
FDD02	MidRange	5	1880	Q16	4.483
FDD02	MidRange	10	1880	QPSK	8.928
FDD02	MidRange	10	1880	Q16	8.923
FDD02	MidRange	15	1880	QPSK	13.456
FDD02	MidRange	15	1880	Q16	13.457
FDD02	MidRange	20	1880	QPSK	17.929
FDD02	MidRange	20	1880	Q16	17.921
FDD04	MidRange	1.4	1732.5	QPSK	1.086
FDD04	MidRange	1.4	1732.5	Q16	1.086
FDD04	MidRange	3	1732.5	QPSK	2.678
FDD04	MidRange	3	1732.5	Q16	2.678
FDD04	MidRange	5	1732.5	QPSK	4.484
FDD04	MidRange	5	1732.5	Q16	4.482
FDD04	MidRange	10	1732.5	QPSK	8.927
FDD04	MidRange	10	1732.5	Q16	8.922
FDD04	MidRange	15	1732.5	QPSK	13.443
FDD04	MidRange	15	1732.5	Q16	13.444
FDD04	MidRange	20	1732.5	QPSK	17.893
FDD04	MidRange	20	1732.5	Q16	17.891
FDD05	MidRange	1.4	836.5	QPSK	1.086
FDD05	MidRange	1.4	836.5	Q16	1.087

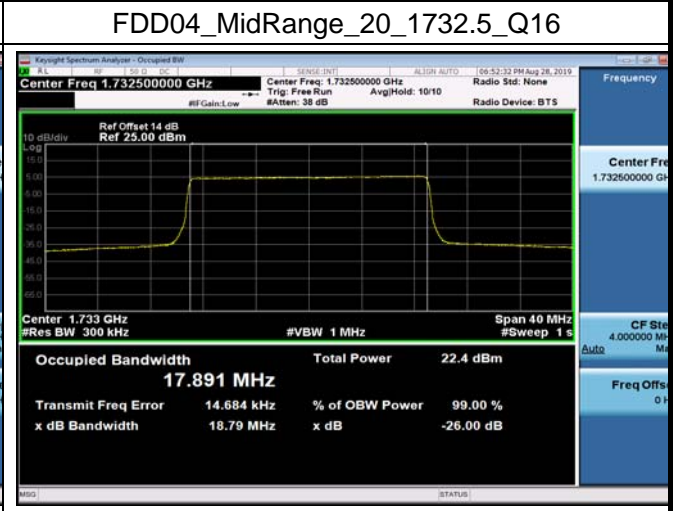
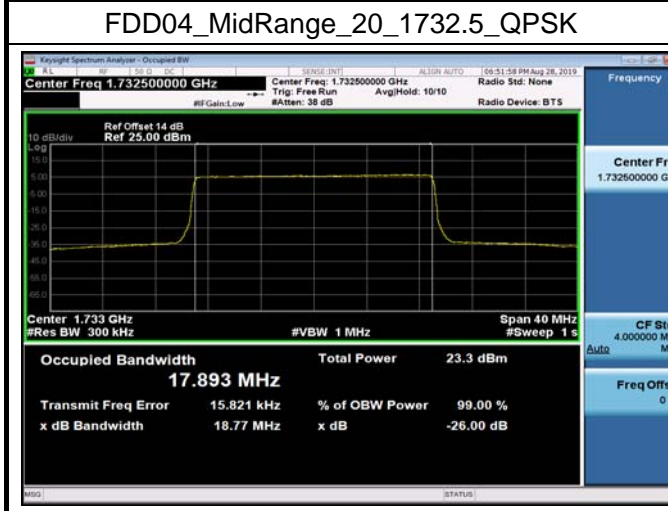
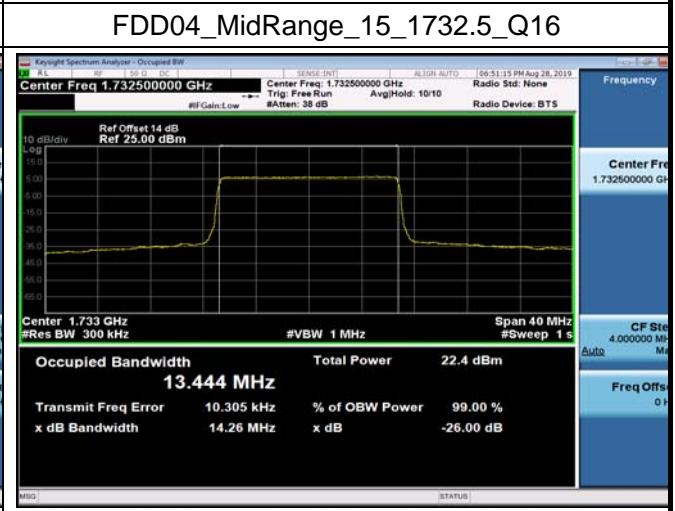
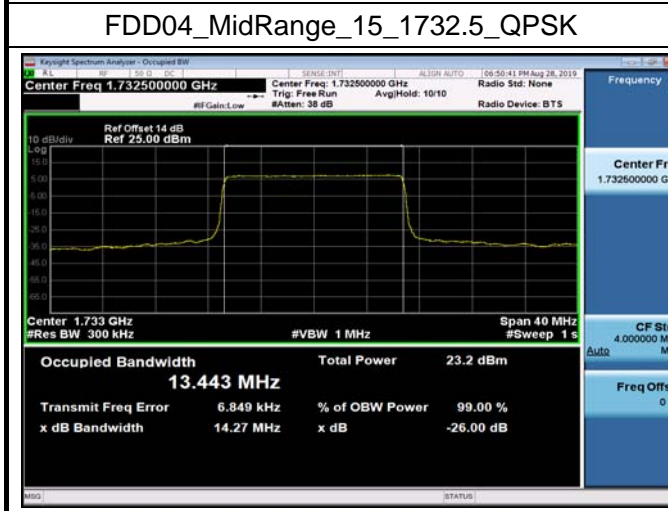
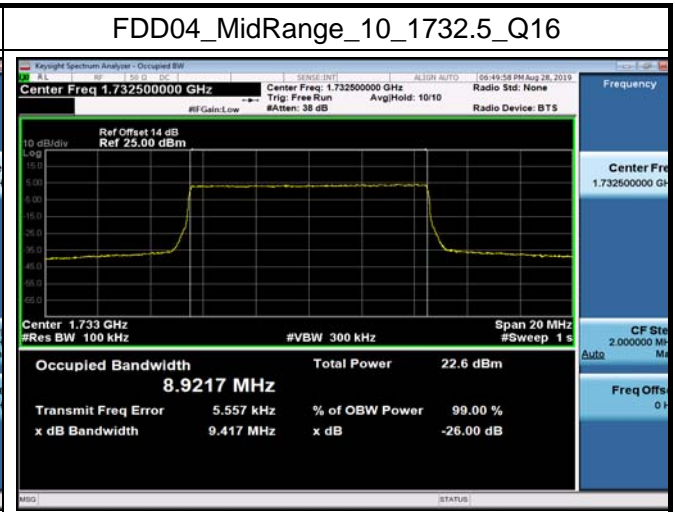
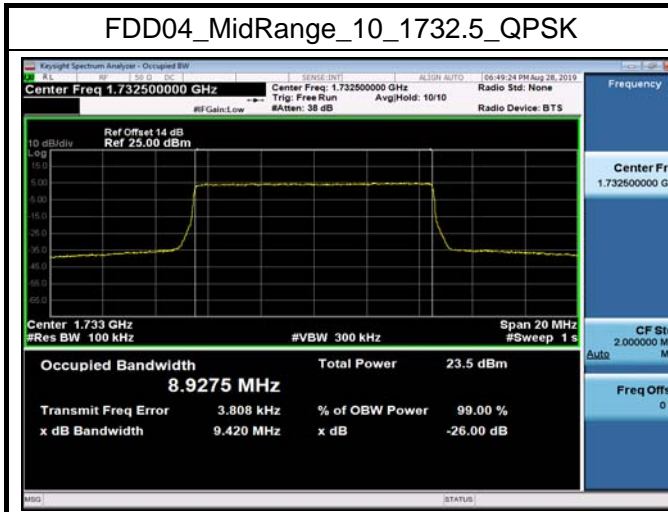


FDD05	MidRange	3	836.5	QPSK	2.679
FDD05	MidRange	3	836.5	Q16	2.677
FDD05	MidRange	5	836.5	QPSK	4.486
FDD05	MidRange	5	836.5	Q16	4.483
FDD05	MidRange	10	836.5	QPSK	8.927
FDD05	MidRange	10	836.5	Q16	8.92
FDD07	MidRange	5	2535	QPSK	4.486
FDD07	MidRange	5	2535	Q16	4.484
FDD07	MidRange	10	2535	QPSK	8.933
FDD07	MidRange	10	2535	Q16	8.925
FDD07	MidRange	15	2535	QPSK	13.454
FDD07	MidRange	15	2535	Q16	13.451
FDD07	MidRange	20	2535	QPSK	17.911
FDD07	MidRange	20	2535	Q16	17.908
FDD66	MidRange	1.4	1745	QPSK	1.087
FDD66	MidRange	1.4	1745	Q16	1.086
FDD66	MidRange	3	1745	QPSK	2.68
FDD66	MidRange	3	1745	Q16	2.678
FDD66	MidRange	5	1745	QPSK	4.484
FDD66	MidRange	5	1745	Q16	4.484
FDD66	MidRange	10	1745	QPSK	8.928
FDD66	MidRange	10	1745	Q16	8.923
FDD66	MidRange	15	1745	QPSK	13.452
FDD66	MidRange	15	1745	Q16	13.451
FDD66	MidRange	20	1745	QPSK	17.913
FDD66	MidRange	20	1745	Q16	17.911

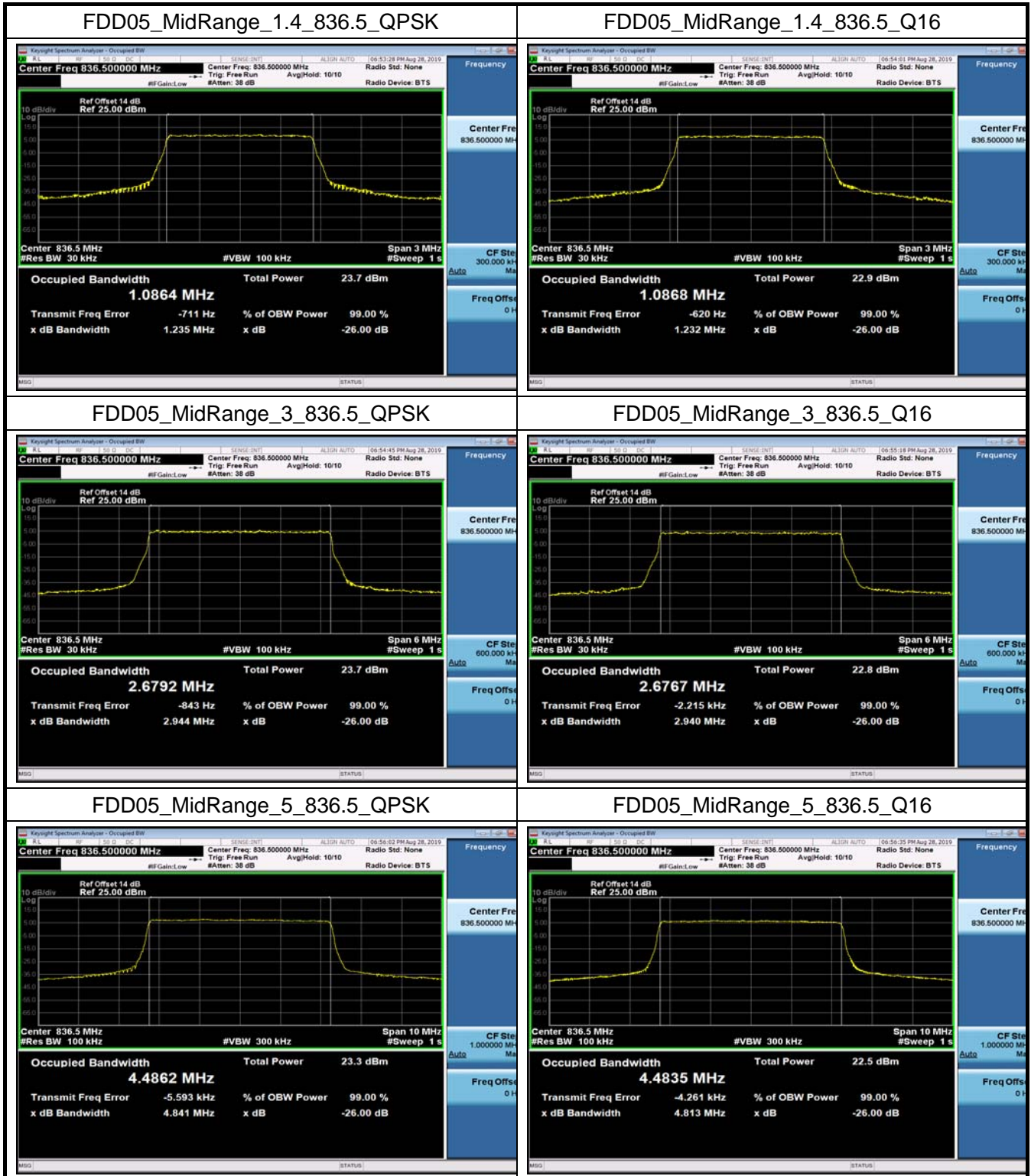


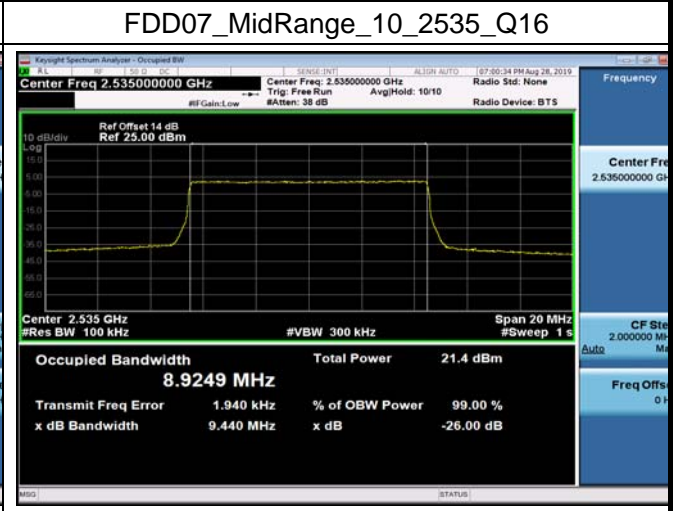
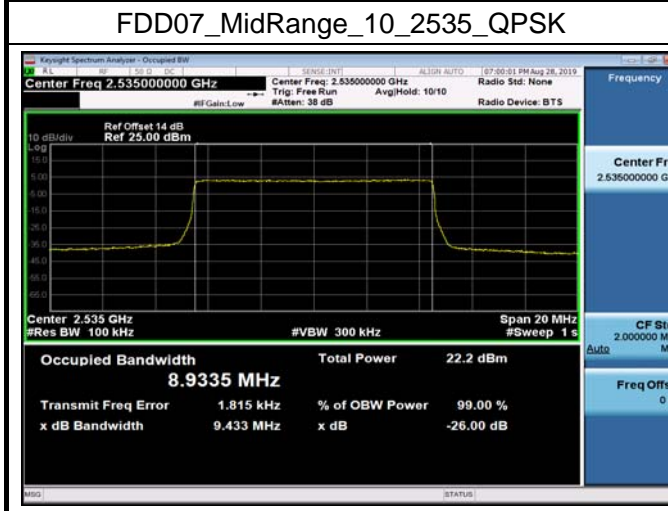
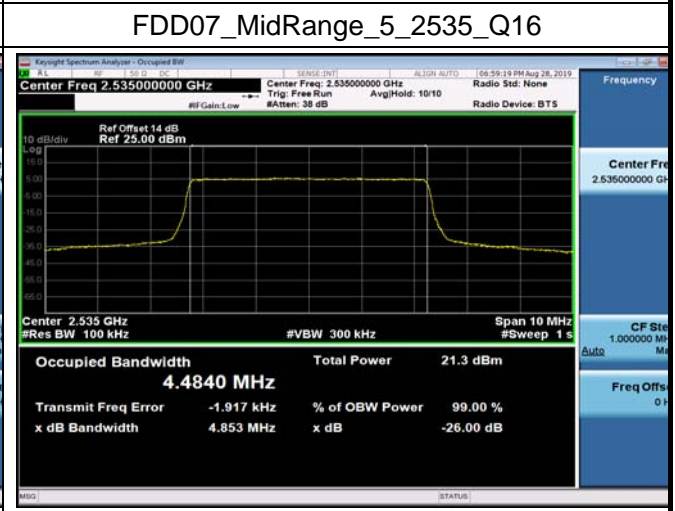
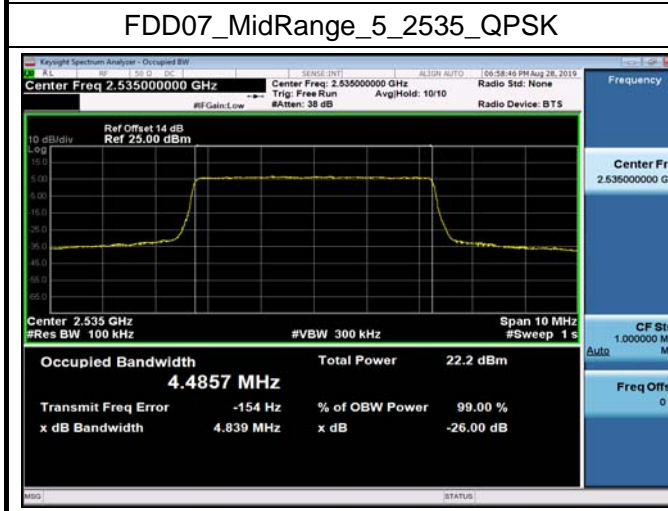
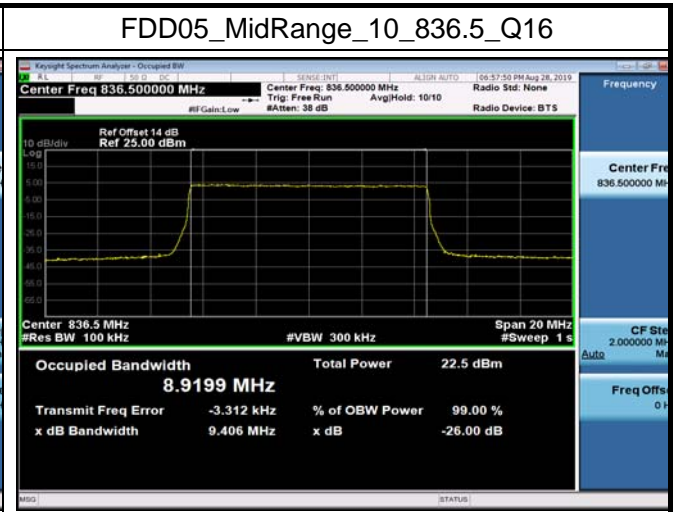
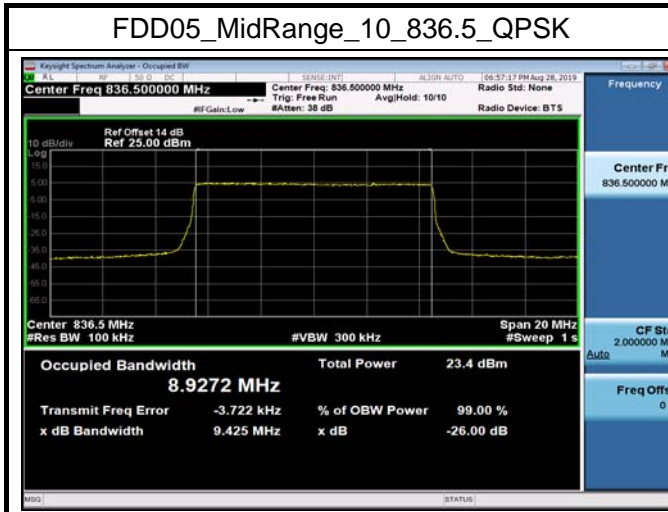


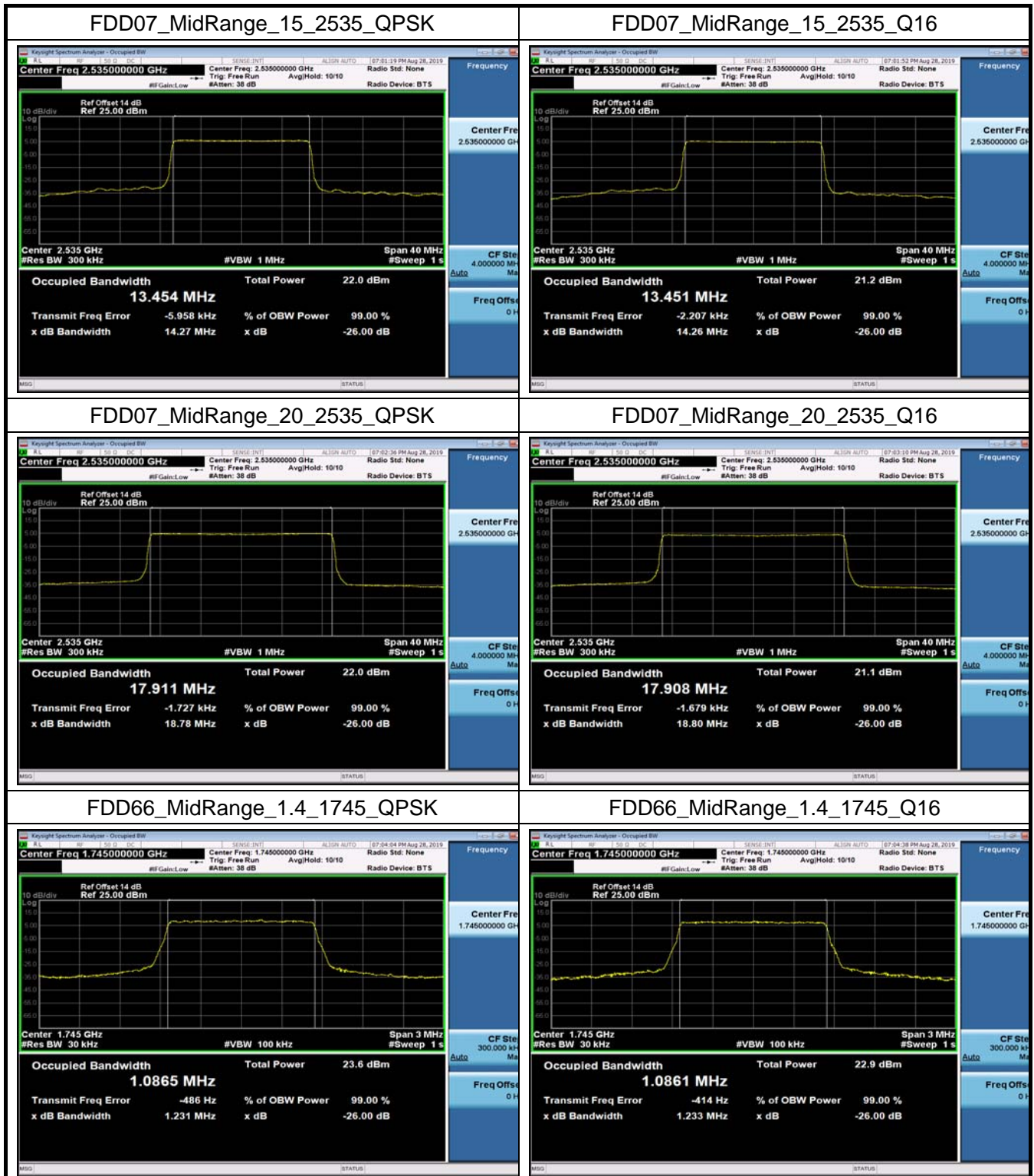


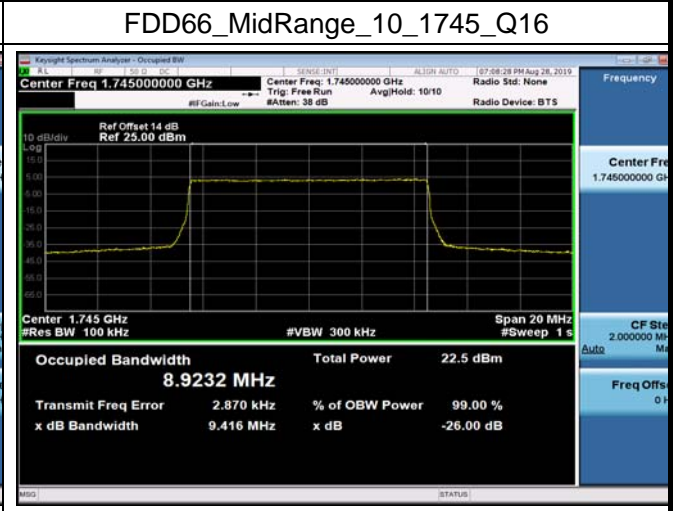
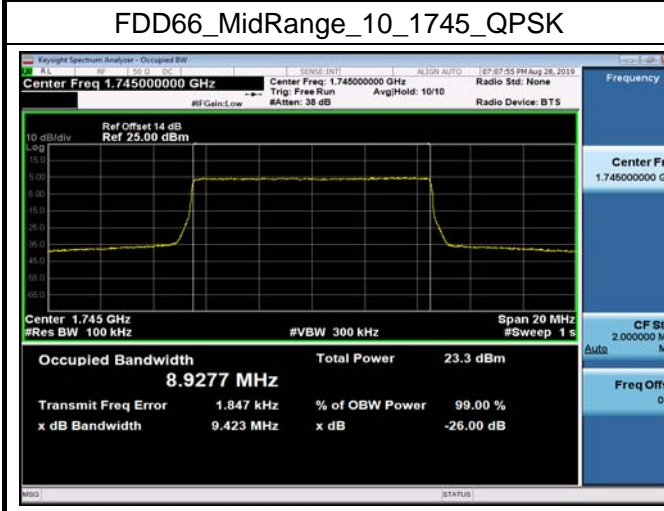
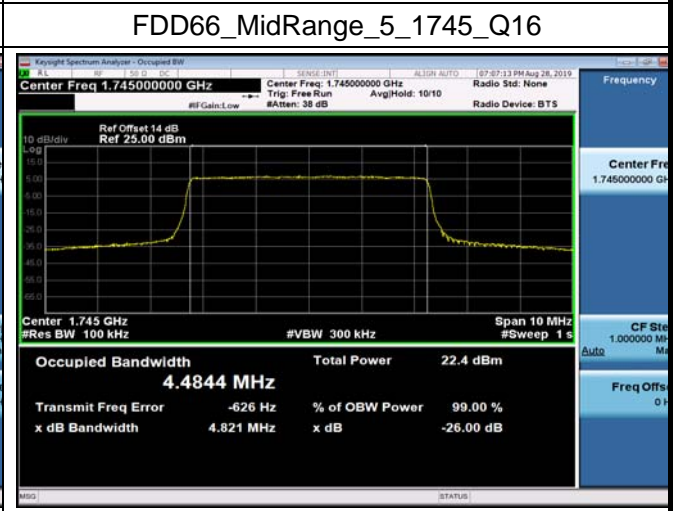
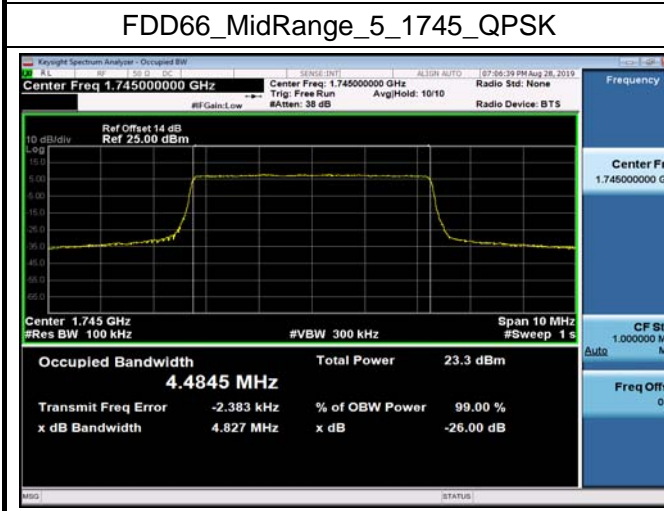
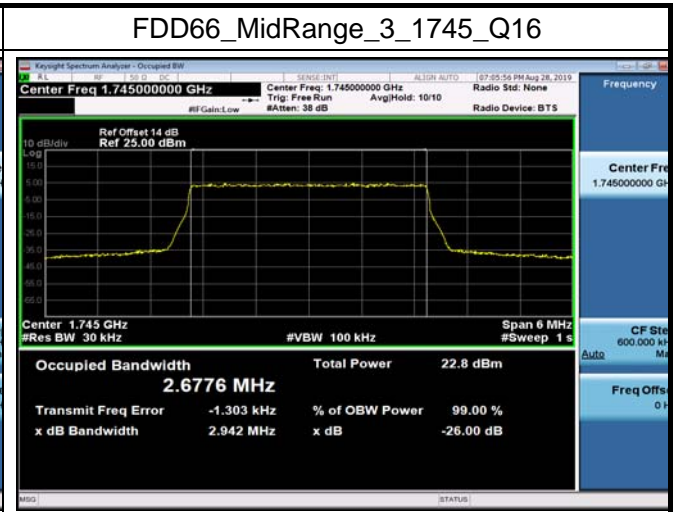
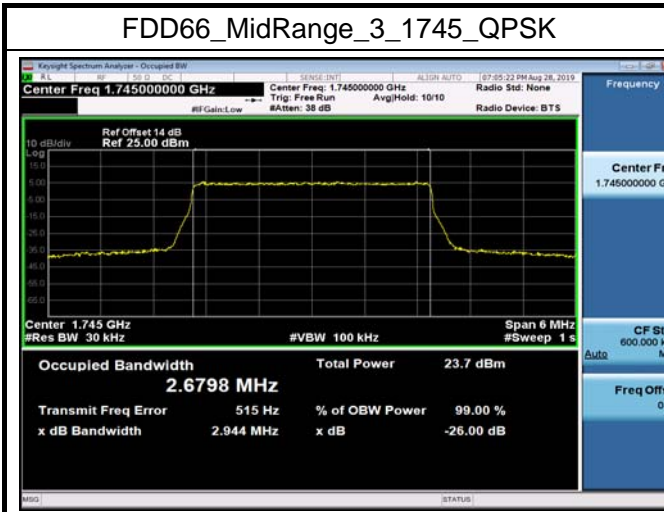


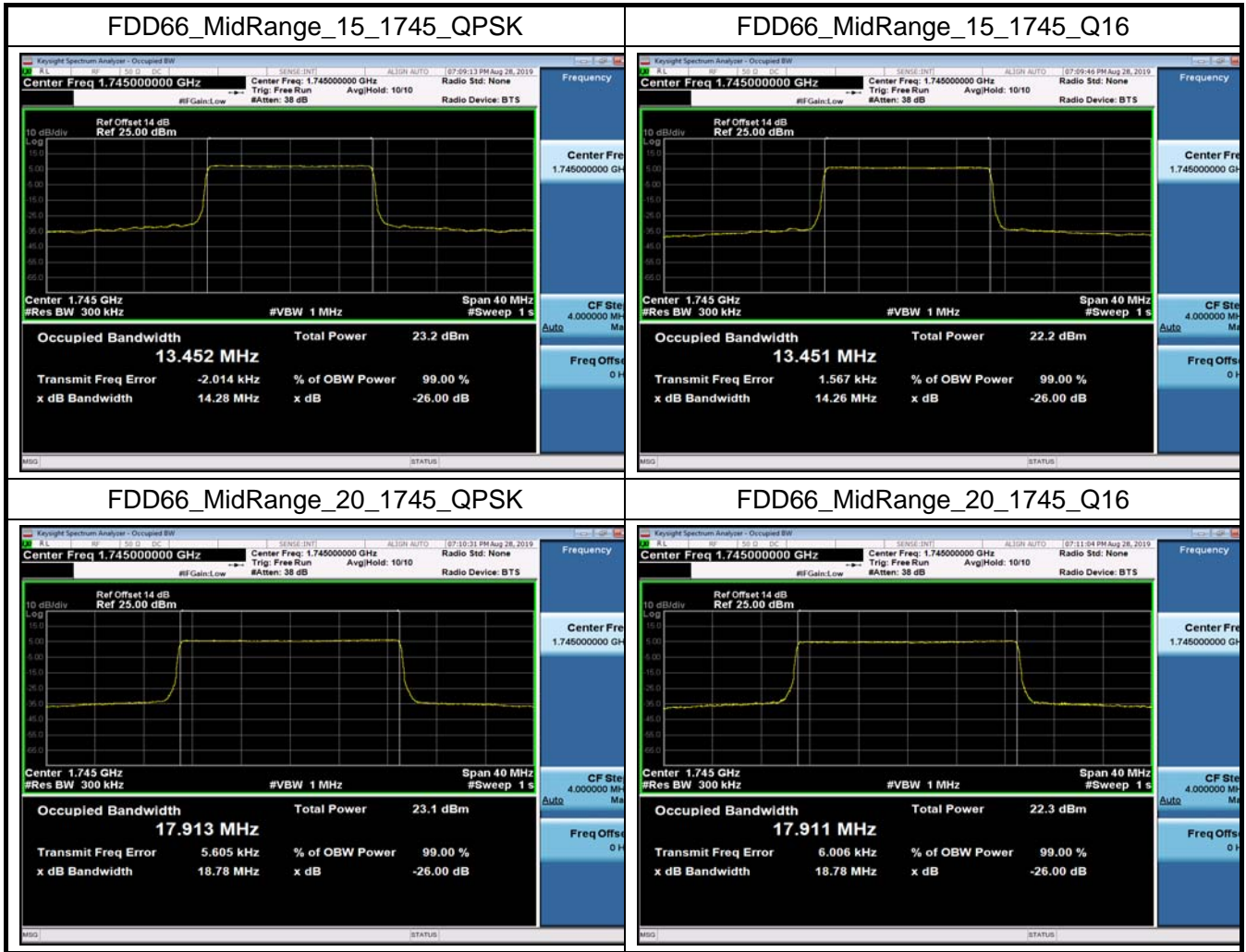










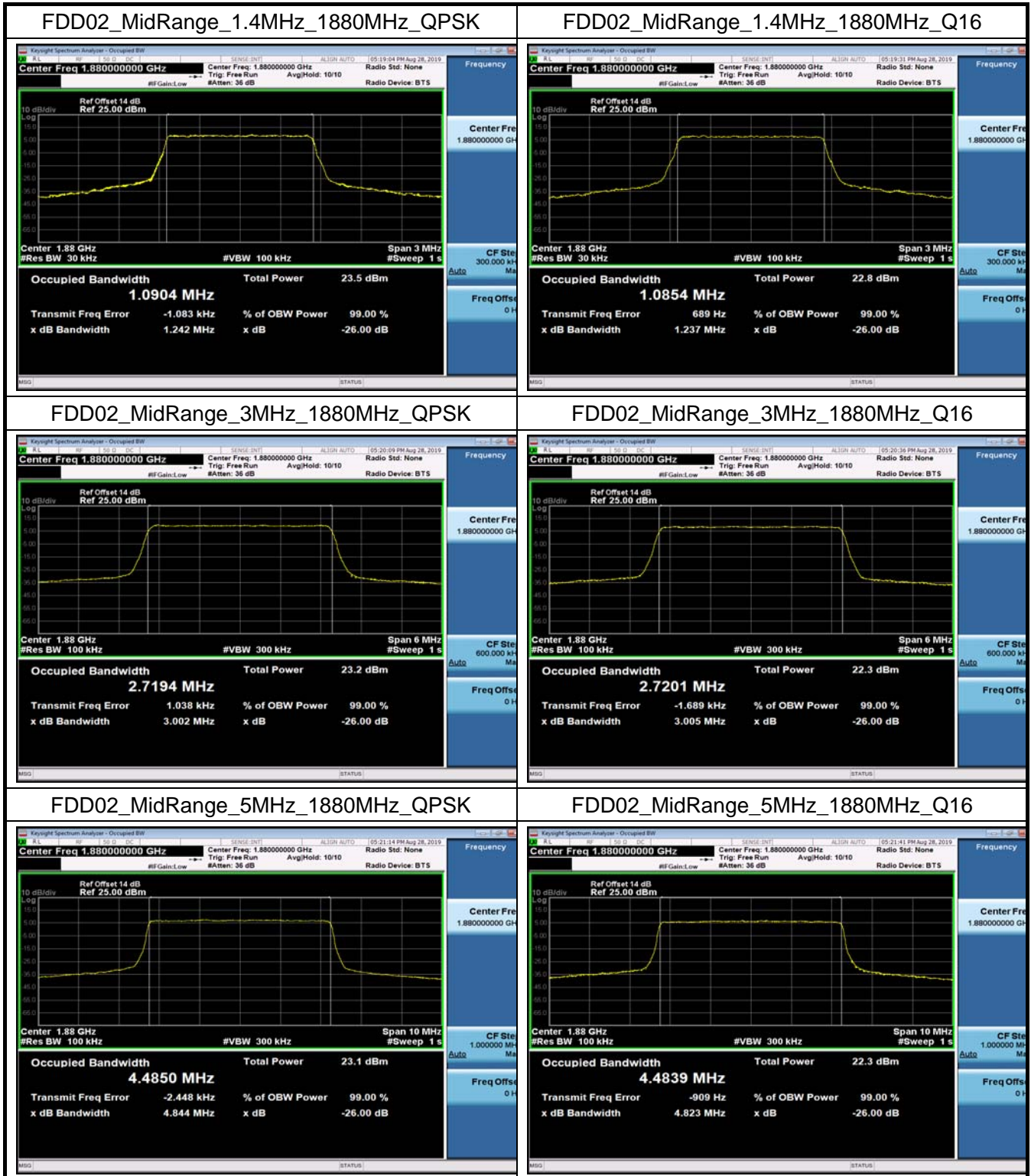


**26dB Bandwidth****Test Result and Data**

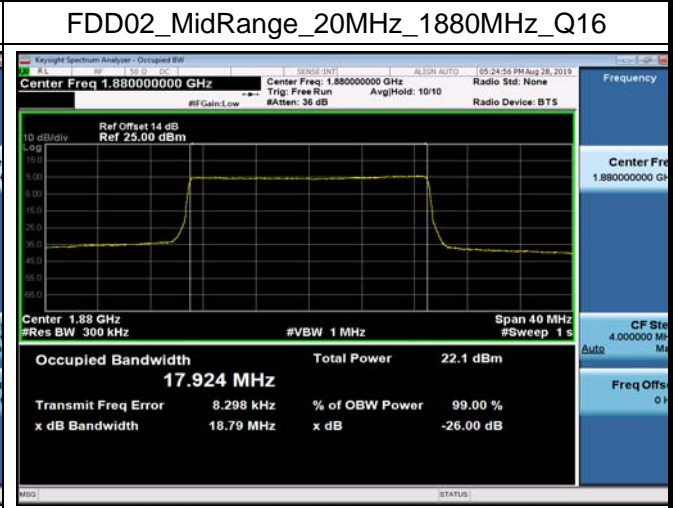
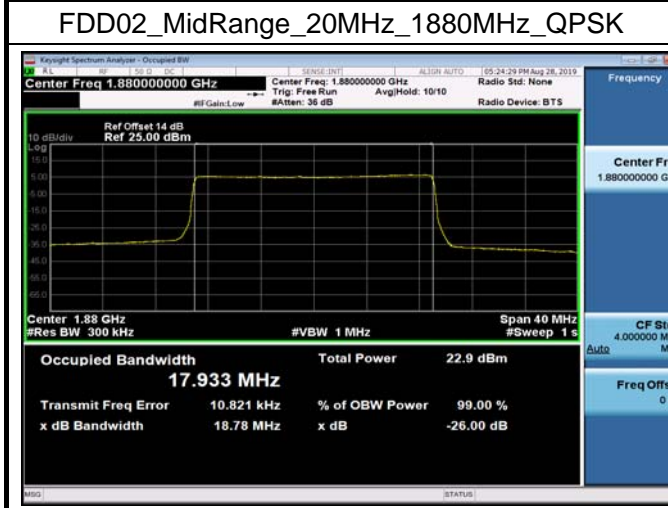
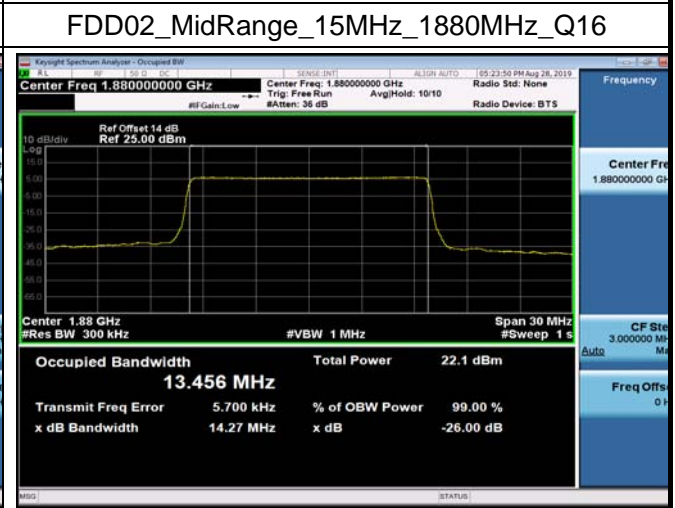
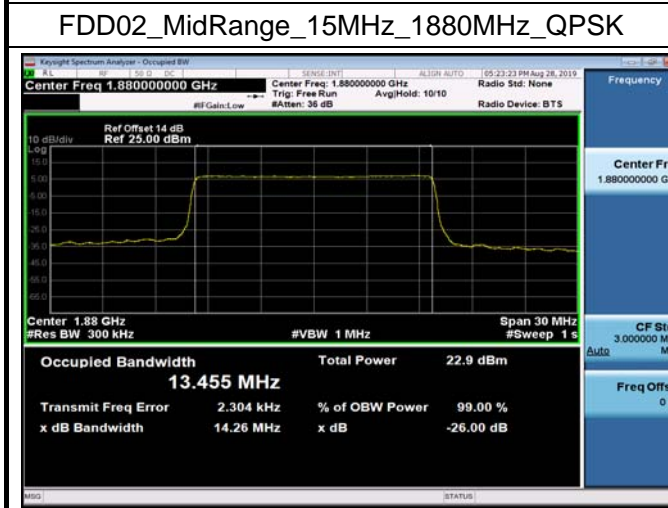
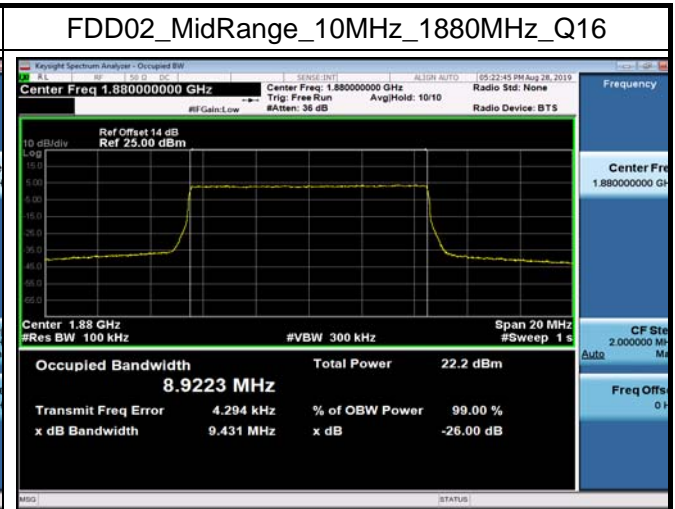
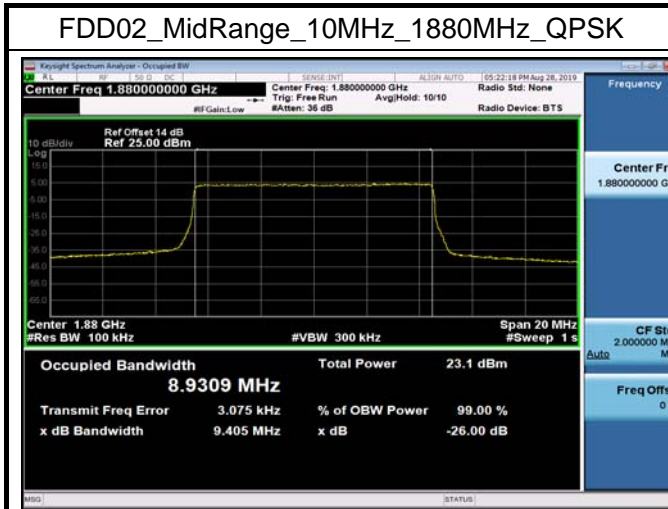
Emission Bandwidth NormalTC_NormalVol					
Band	Range	BandWidth	Frequency (MHz)	Modulation	EmissionBandwidth (MHz)
FDD02	MidRange	1.4	1880	QPSK	1.24
FDD02	MidRange	1.4	1880	Q16	1.24
FDD02	MidRange	3	1880	QPSK	3
FDD02	MidRange	3	1880	Q16	3.01
FDD02	MidRange	5	1880	QPSK	4.84
FDD02	MidRange	5	1880	Q16	4.82
FDD02	MidRange	10	1880	QPSK	9.4
FDD02	MidRange	10	1880	Q16	9.43
FDD02	MidRange	15	1880	QPSK	14.26
FDD02	MidRange	15	1880	Q16	14.27
FDD02	MidRange	20	1880	QPSK	18.78
FDD02	MidRange	20	1880	Q16	18.79
FDD04	MidRange	3	1732.5	QPSK	3
FDD04	MidRange	3	1732.5	Q16	3
FDD04	MidRange	5	1732.5	QPSK	4.85
FDD04	MidRange	5	1732.5	Q16	4.82
FDD04	MidRange	10	1732.5	QPSK	9.42
FDD04	MidRange	10	1732.5	Q16	9.41
FDD04	MidRange	15	1732.5	QPSK	14.27
FDD04	MidRange	15	1732.5	Q16	14.27
FDD04	MidRange	20	1732.5	QPSK	18.77
FDD04	MidRange	20	1732.5	Q16	18.8
FDD05	MidRange	1.4	836.5	QPSK	1.23
FDD05	MidRange	1.4	836.5	Q16	1.23
FDD05	MidRange	3	836.5	QPSK	3
FDD05	MidRange	3	836.5	Q16	2.99
FDD05	MidRange	5	836.5	QPSK	4.84

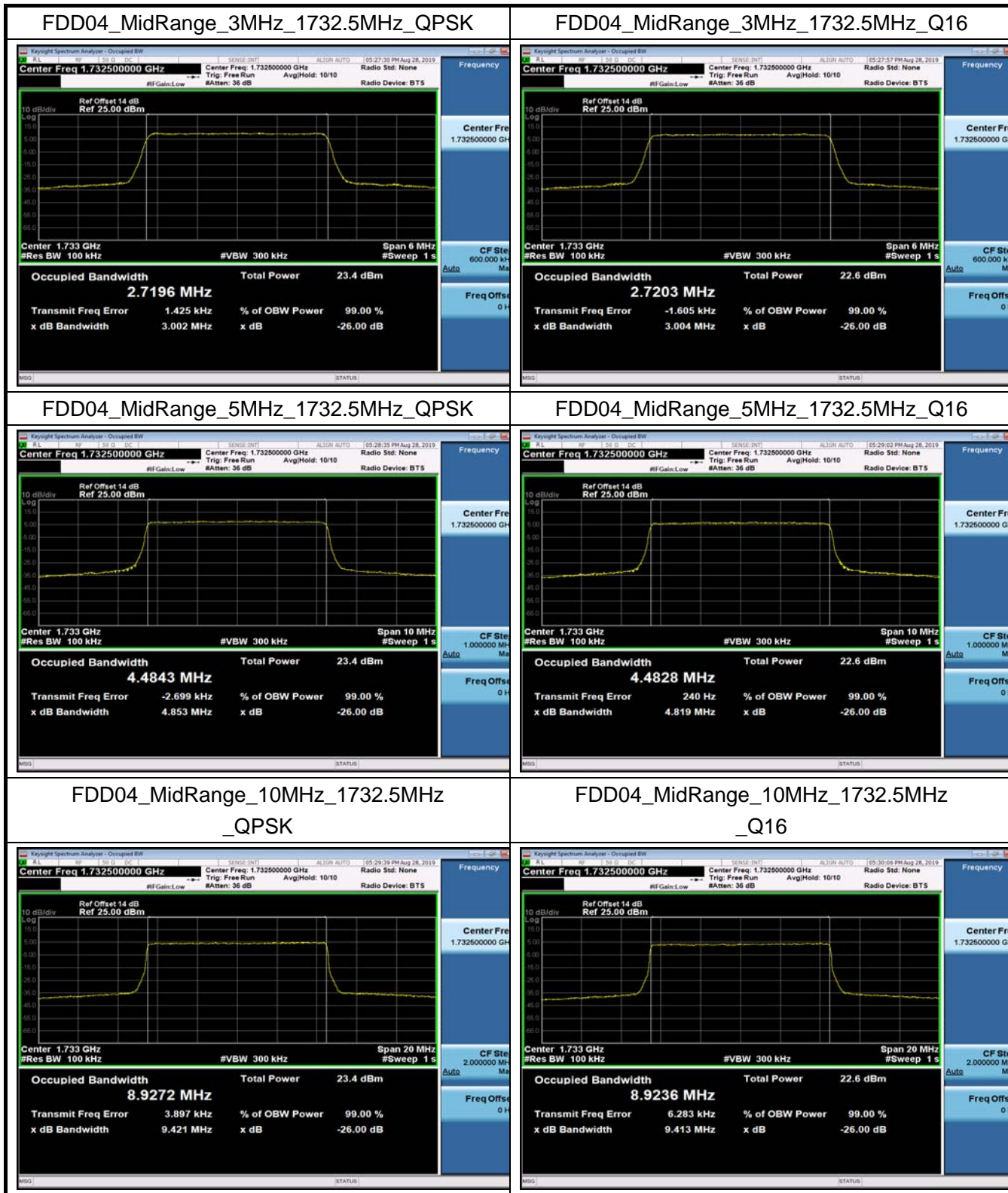


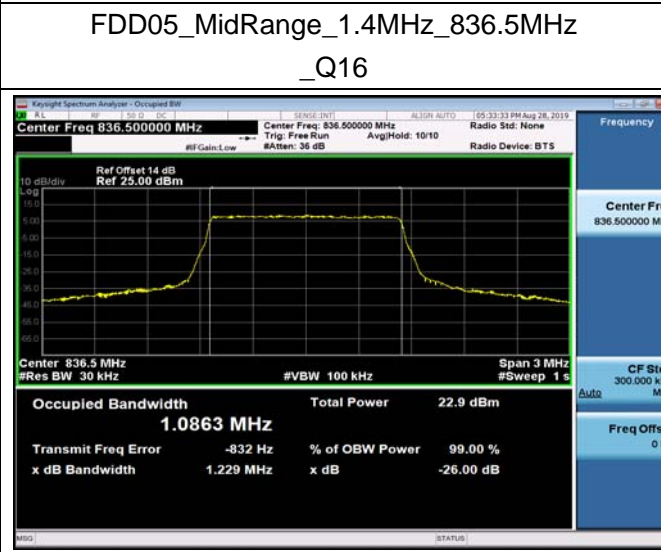
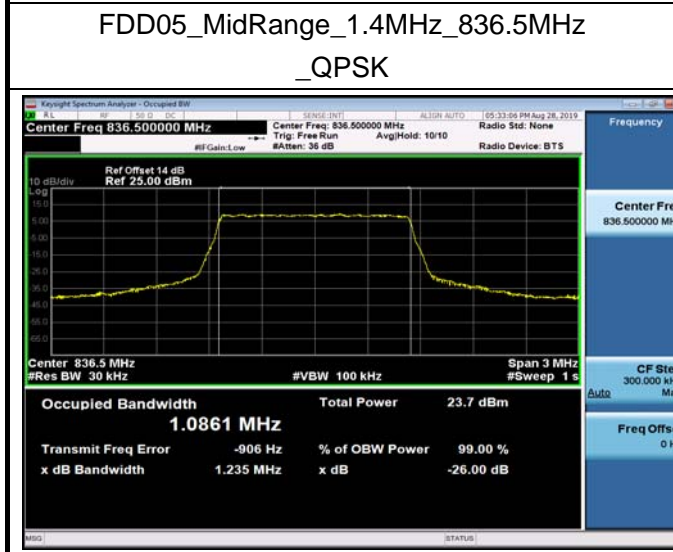
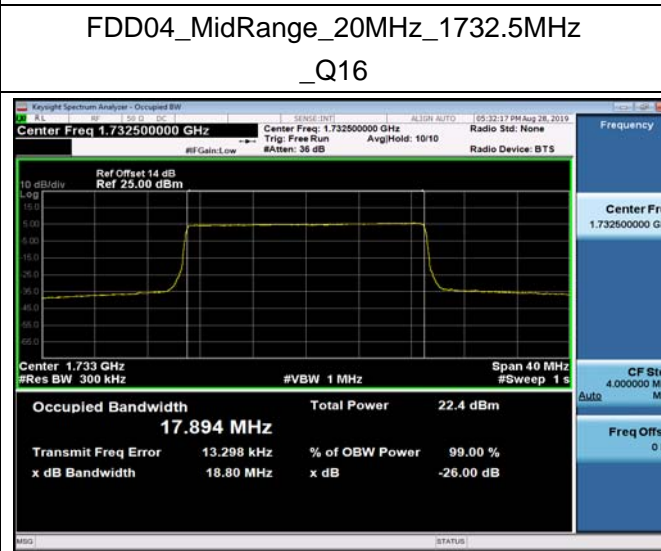
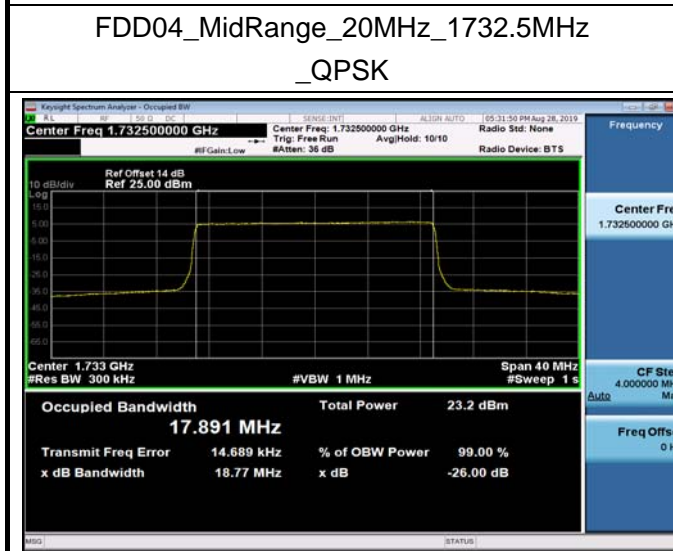
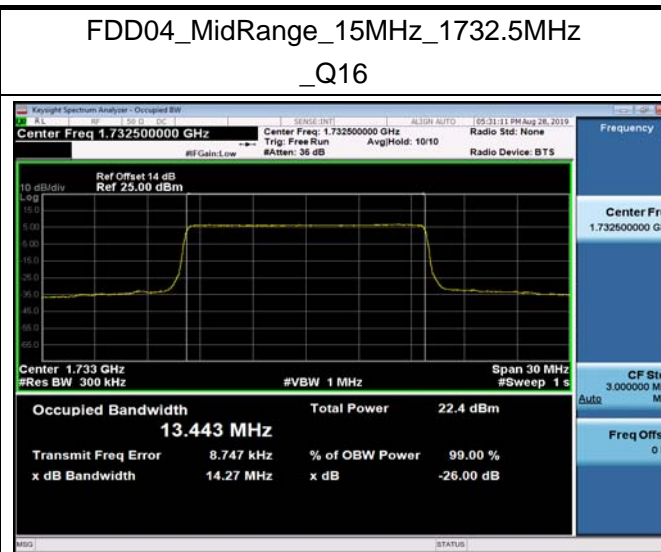
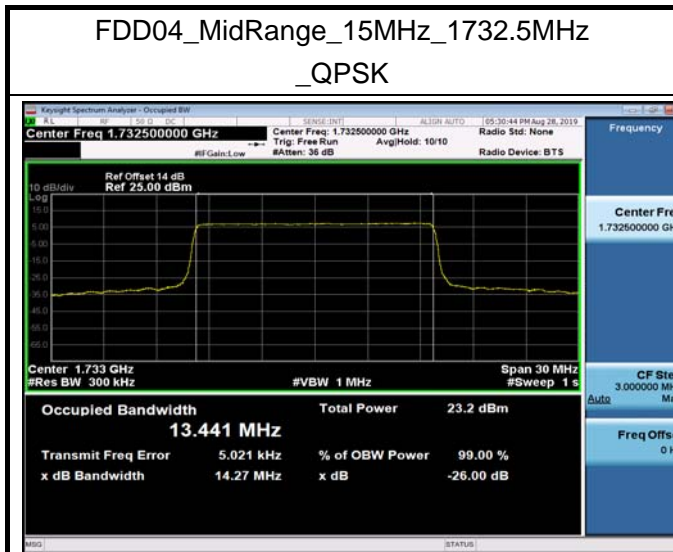
FDD05	MidRange	5	836.5	Q16	4.82
FDD05	MidRange	10	836.5	QPSK	9.43
FDD05	MidRange	10	836.5	Q16	9.41
FDD07	MidRange	5	2535	QPSK	4.84
FDD07	MidRange	5	2535	Q16	4.85
FDD07	MidRange	10	2535	QPSK	9.43
FDD07	MidRange	10	2535	Q16	9.42
FDD07	MidRange	15	2535	QPSK	14.27
FDD07	MidRange	15	2535	Q16	14.27
FDD07	MidRange	20	2535	QPSK	18.78
FDD07	MidRange	20	2535	Q16	18.8
FDD66	MidRange	1.4	1745	QPSK	1.23
FDD66	MidRange	1.4	1745	Q16	1.23
FDD66	MidRange	3	1745	QPSK	2.99
FDD66	MidRange	3	1745	Q16	3
FDD66	MidRange	5	1745	QPSK	4.85
FDD66	MidRange	5	1745	Q16	4.82
FDD66	MidRange	10	1745	QPSK	9.41
FDD66	MidRange	10	1745	Q16	9.42
FDD66	MidRange	15	1745	QPSK	14.26
FDD66	MidRange	15	1745	Q16	14.26
FDD66	MidRange	20	1745	QPSK	18.77
FDD66	MidRange	20	1745	Q16	18.79

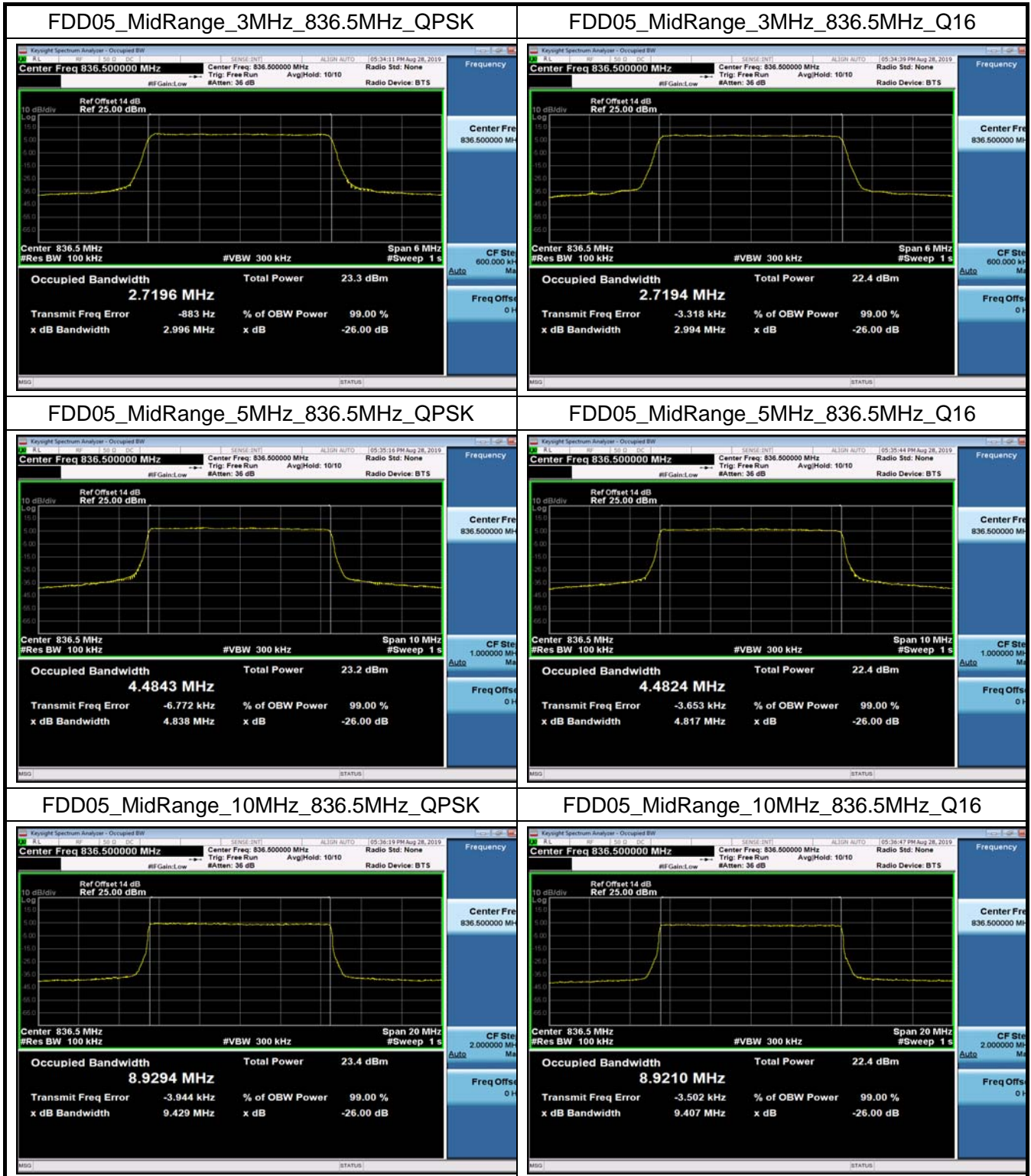


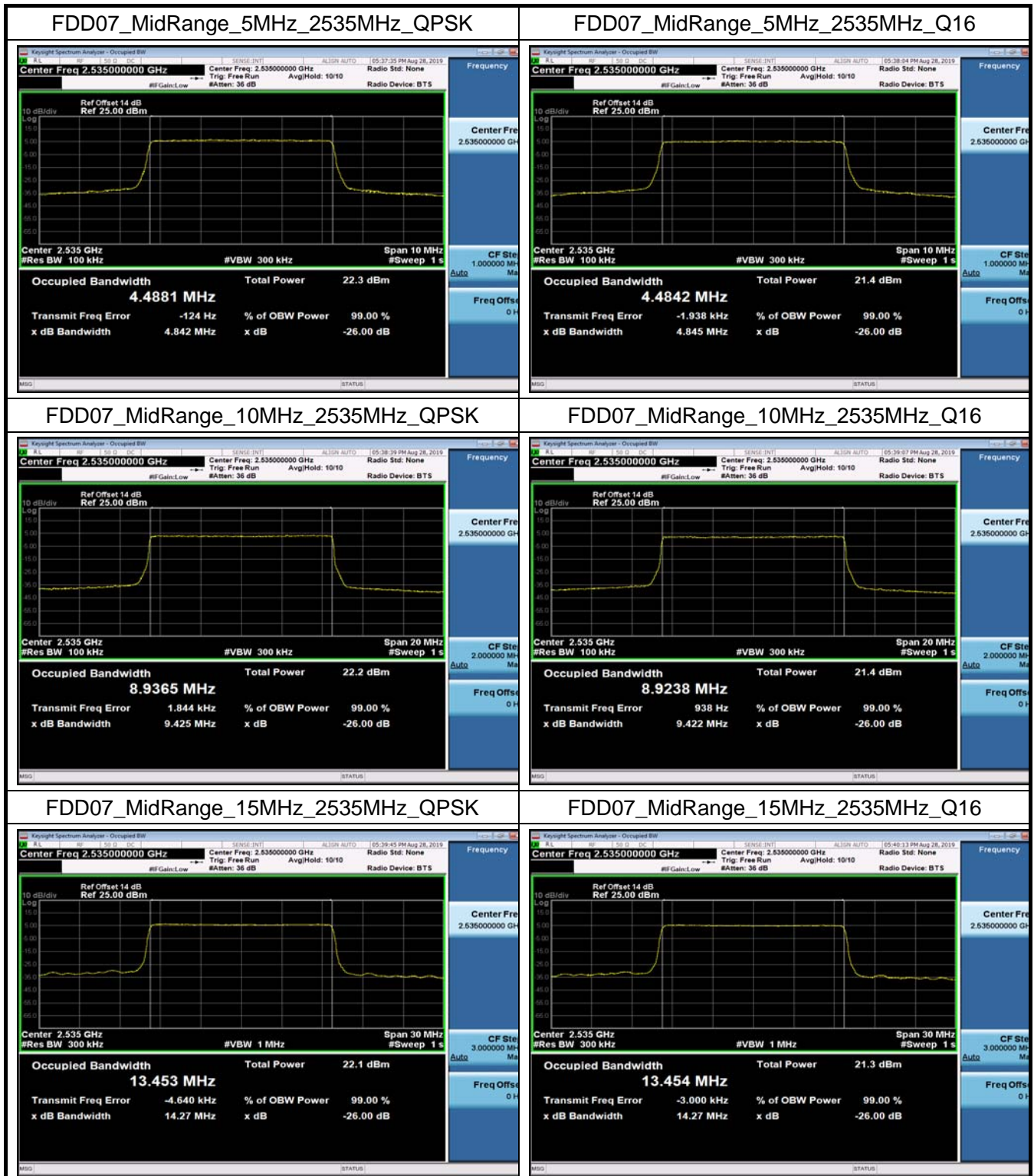


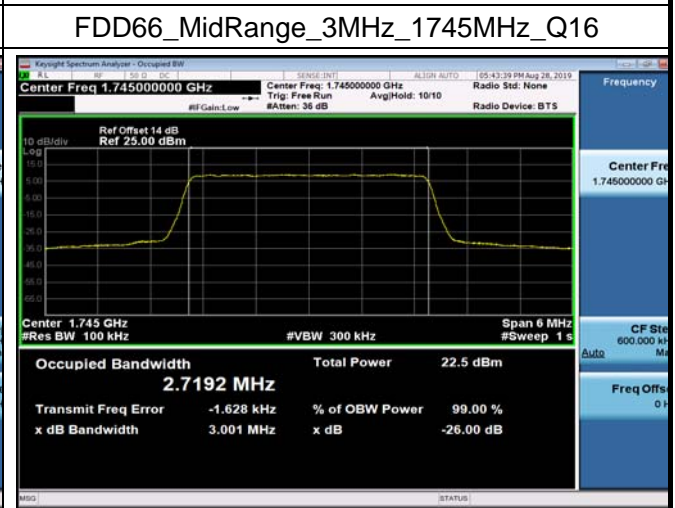
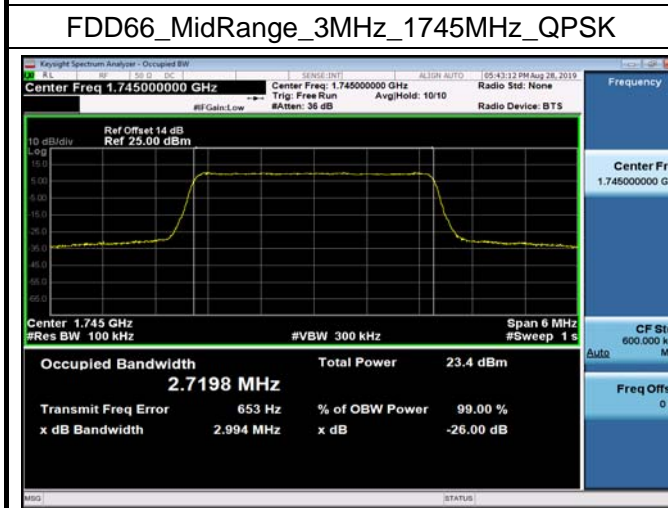
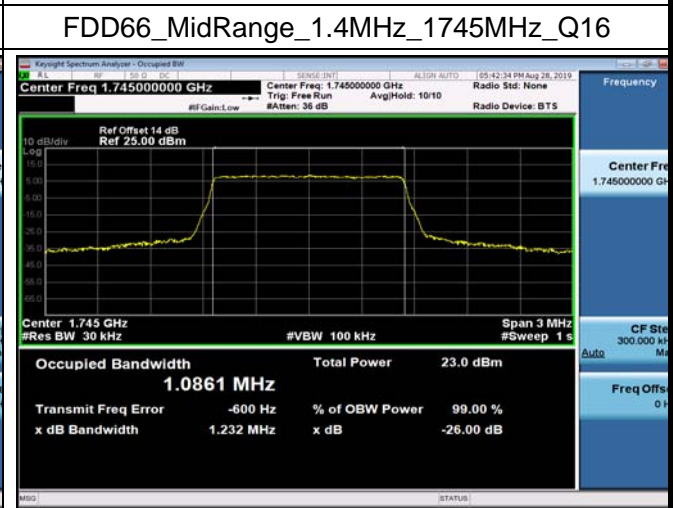
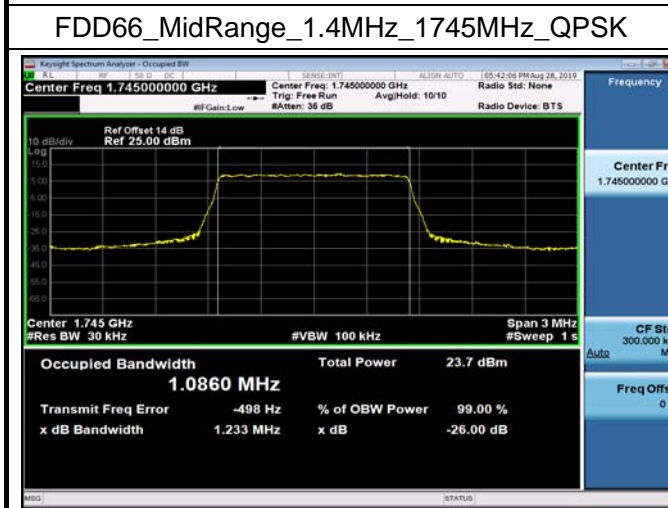
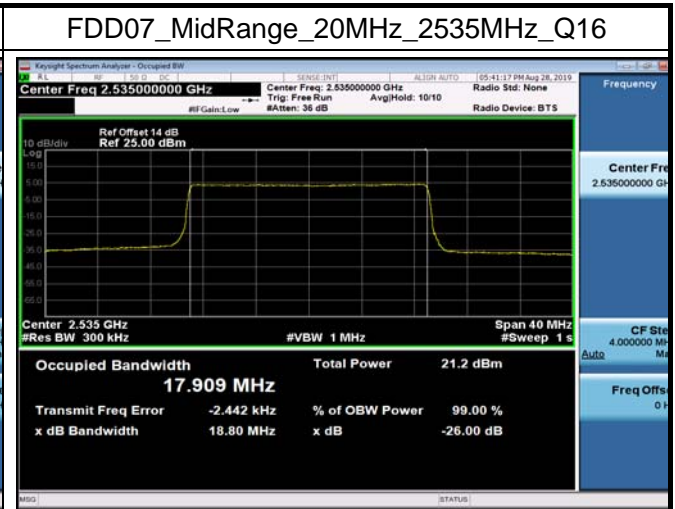
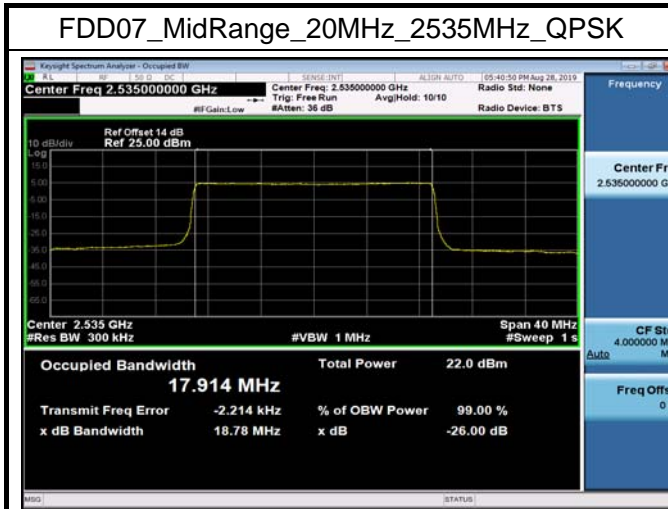


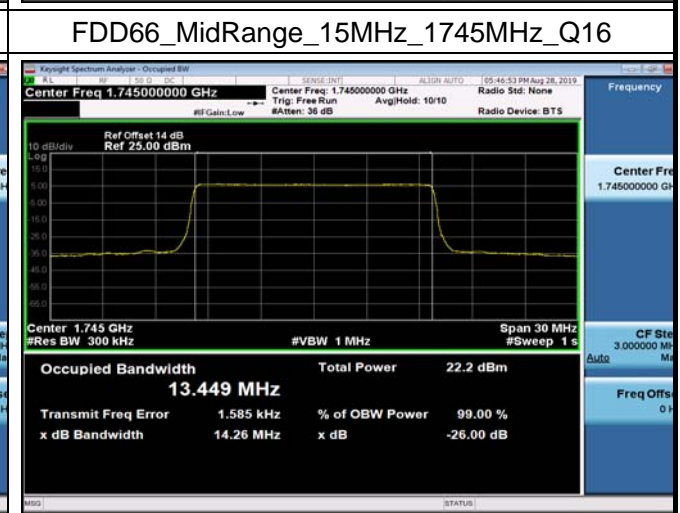
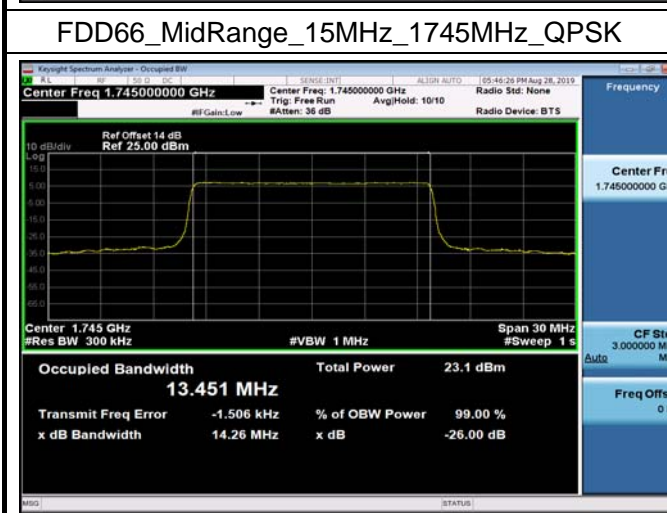
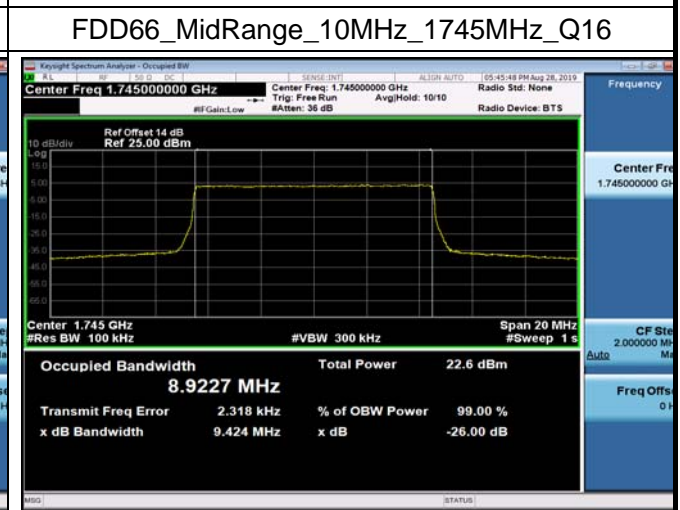
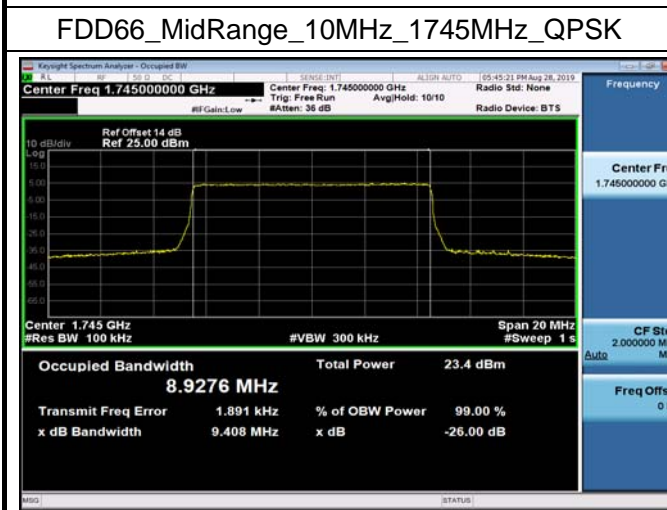
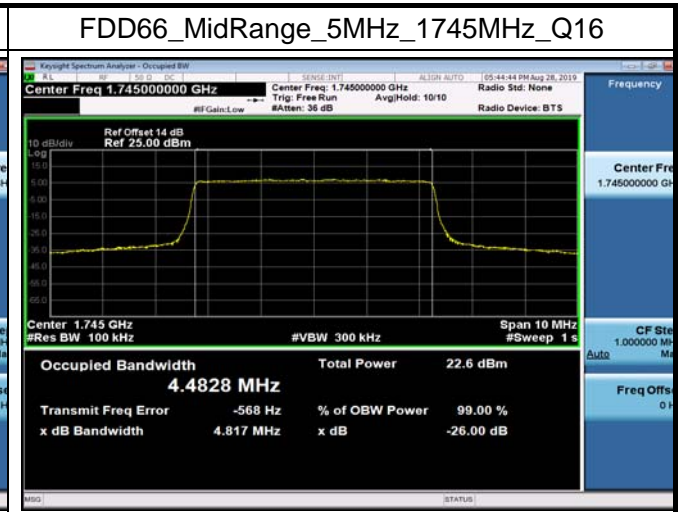
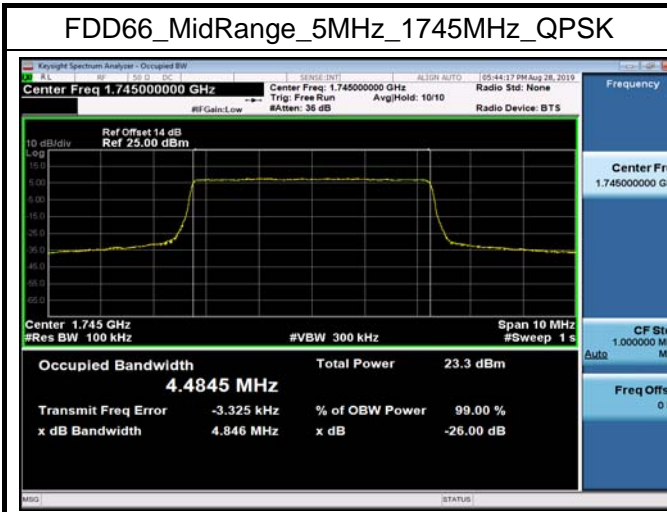


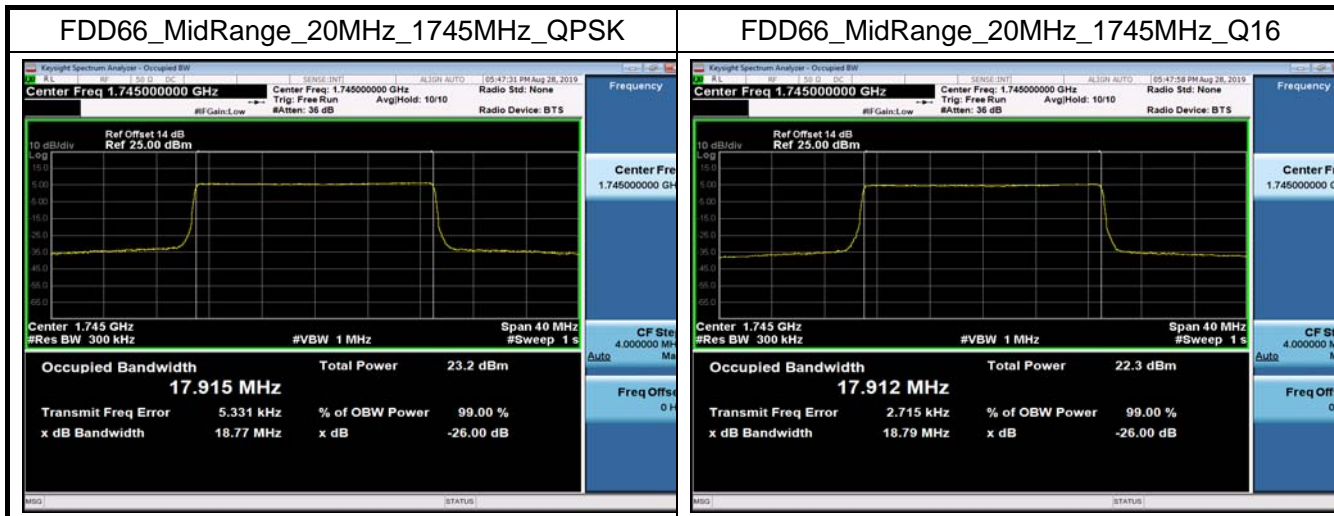
















## Frequency Stability

### Test Result and Data

Frequency Stability NormalTC_NormalVol									
Temperature	Voltage	Band	BandWidth (MHz)	RbMode	Modulation	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Result
Normal	Low	FDD02	10	fullRB	QPSK	-51.112	0.027	0.10	Pass
Normal	Normal	FDD02	10	fullRB	QPSK	-56.863	0.030	0.10	Pass
Normal	High	FDD02	10	fullRB	QPSK	-47.350	0.025	0.10	Pass
50	Normal	FDD02	10	fullRB	QPSK	-44.303	0.024	0.10	Pass
40	Normal	FDD02	10	fullRB	QPSK	-15.306	0.008	0.10	Pass
30	Normal	FDD02	10	fullRB	QPSK	-27.509	0.015	0.10	Pass
20	Normal	FDD02	10	fullRB	QPSK	-13.247	0.007	0.10	Pass
10	Normal	FDD02	10	fullRB	QPSK	-39.611	0.021	0.10	Pass
0	Normal	FDD02	10	fullRB	QPSK	-22.631	0.012	0.10	Pass
-10	Normal	FDD02	10	fullRB	QPSK	-40.011	0.021	0.10	Pass
-20	Normal	FDD02	10	fullRB	QPSK	-10.486	0.006	0.10	Pass
-30	Normal	FDD02	10	fullRB	QPSK	-22.087	0.012	0.10	Pass
Normal	Low	FDD04	10	fullRB	QPSK	-46.034	0.027	0.10	Pass
Normal	Normal	FDD04	10	fullRB	QPSK	-40.483	0.023	0.10	Pass
Normal	High	FDD04	10	fullRB	QPSK	-37.451	0.022	0.10	Pass
50	Normal	FDD04	10	fullRB	QPSK	-28.553	0.016	0.10	Pass
40	Normal	FDD04	10	fullRB	QPSK	-17.223	0.010	0.10	Pass
30	Normal	FDD04	10	fullRB	QPSK	-38.509	0.022	0.10	Pass
20	Normal	FDD04	10	fullRB	QPSK	-13.518	0.008	0.10	Pass
10	Normal	FDD04	10	fullRB	QPSK	-28.224	0.016	0.10	Pass
0	Normal	FDD04	10	fullRB	QPSK	-35.191	0.020	0.10	Pass
-10	Normal	FDD04	10	fullRB	QPSK	-42.872	0.025	0.10	Pass
-20	Normal	FDD04	10	fullRB	QPSK	-48.079	0.028	0.10	Pass
-30	Normal	FDD04	10	fullRB	QPSK	-17.209	0.010	0.10	Pass
Normal	Low	FDD05	10	fullRB	QPSK	-43.287	0.052	0.10	Pass
Normal	Normal	FDD05	10	fullRB	QPSK	-22.159	0.026	0.10	Pass
Normal	High	FDD05	10	fullRB	QPSK	-41.313	0.049	0.10	Pass



50	Normal	FDD05	10	fullRB	QPSK	-7.010	0.008	0.10	Pass
40	Normal	FDD05	10	fullRB	QPSK	-14.863	0.018	0.10	Pass
30	Normal	FDD05	10	fullRB	QPSK	-19.641	0.023	0.10	Pass
20	Normal	FDD05	10	fullRB	QPSK	-25.220	0.030	0.10	Pass
10	Normal	FDD05	10	fullRB	QPSK	-29.626	0.035	0.10	Pass
0	Normal	FDD05	10	fullRB	QPSK	-32.730	0.039	0.10	Pass
-10	Normal	FDD05	10	fullRB	QPSK	-37.179	0.044	0.10	Pass
-20	Normal	FDD05	10	fullRB	QPSK	-40.140	0.048	0.10	Pass
-30	Normal	FDD05	10	fullRB	QPSK	-42.114	0.050	0.10	Pass
Normal	Low	FDD07	10	fullRB	QPSK	-53.687	0.021	0.10	Pass
Normal	Normal	FDD07	10	fullRB	QPSK	-27.823	0.011	0.10	Pass
Normal	High	FDD07	10	fullRB	QPSK	-22.645	0.009	0.10	Pass
50	Normal	FDD07	10	fullRB	QPSK	-19.913	0.008	0.10	Pass
40	Normal	FDD07	10	fullRB	QPSK	-35.577	0.014	0.10	Pass
30	Normal	FDD07	10	fullRB	QPSK	-25.392	0.010	0.10	Pass
20	Normal	FDD07	10	fullRB	QPSK	-23.332	0.009	0.10	Pass
10	Normal	FDD07	10	fullRB	QPSK	-43.731	0.017	0.10	Pass
0	Normal	FDD07	10	fullRB	QPSK	-7.052	0.003	0.10	Pass
-10	Normal	FDD07	10	fullRB	QPSK	-22.445	0.009	0.10	Pass
-20	Normal	FDD07	10	fullRB	QPSK	-49.224	0.019	0.10	Pass
-30	Normal	FDD07	10	fullRB	QPSK	12.603	0.005	0.10	Pass
Normal	Low	FDD66	10	fullRB	QPSK	-32.229	0.018	0.10	Pass
Normal	Normal	FDD66	10	fullRB	QPSK	-29.426	0.017	0.10	Pass
Normal	High	FDD66	10	fullRB	QPSK	-16.909	0.010	0.10	Pass
50	Normal	FDD66	10	fullRB	QPSK	-36.507	0.021	0.10	Pass
40	Normal	FDD66	10	fullRB	QPSK	7.496	0.004	0.10	Pass
30	Normal	FDD66	10	fullRB	QPSK	-12.059	0.007	0.10	Pass
20	Normal	FDD66	10	fullRB	QPSK	-21.744	0.012	0.10	Pass
10	Normal	FDD66	10	fullRB	QPSK	-25.077	0.014	0.10	Pass
0	Normal	FDD66	10	fullRB	QPSK	-27.351	0.016	0.10	Pass
-10	Normal	FDD66	10	fullRB	QPSK	-32.315	0.019	0.10	Pass
-20	Normal	FDD66	10	fullRB	QPSK	-31.857	0.018	0.10	Pass



-30	Normal	FDD66	10	fullRB	QPSK	-33.302	0.019	0.10	Pass
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Note: Normal=3.85V, Low=3.5V, High=4.2V



# Conducted Out of Band Emissions

## Test Result and Data

