



# RF TEST REPORT

**Report No.:** SET2020-01485

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

**FCC ID:** SRQ-ZTEA320201

**Model No.:** ZTE Blade A3 2020

**Marketing name ::** ZTE Blade A3 2020, Blade A3 2020

**Applicant:** ZTE Corporation.

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

**Dates of Testing:** 02/10/2020 —03/04/2020

**Issued by:** CCIC Southern Testing Co., Ltd.

**Lab Location:** Electronic Testing Building, No. 43 Shahe Road, Xili Street,  
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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** .....: Part2/22/24/27

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

**Tested by** .....: Robin Luo 2020.03.11.  
Robin Luo, Test Engineer

**Reviewed by**.....: Chris You 2020.03.11.  
Chris You, Senior Engineer

**Approved by**.....: Shuangwen Zhang 2020.03.11.  
Shuangwen Zhang, Manager



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Change History		
Issue	Date	Reason for change
1.0	2020.03.11	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 2/3/4/5/12/13/17
Frequency Range (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 12: 699.7MHz~715.3MHz LTE Band 13: 779.5MHz~784.5MHz LTE Band 17: 706.5MHz~713.5MHz
Maximum Output Power to Antenna	LTE Band 2: 22.43dBm LTE Band 4: 22.24dBm LTE Band 5: 23.95dBm LTE Band 12: 23.17dBm LTE Band 13: 22.63dBm LTE Band 17: 22.88dBm
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 12: 1.4MHz/3MHz/5MHz/10MHz LTE Band 13: 5MHz/10MHz LTE Band 17: 5MHz/10MHz
Modulation Type	QPSK/16QAM/64QAM(downlink only)
Antenna Type	Internal Antenna
Antenna Gain	LTE Band 2:2.04dBi LTE Band 4: 1.37dBi LTE Band 5: 2.04dBi LTE Band 12: -2.71dBi LTE Band 13:-3.13dBi LTE Band 17: -2.38dBi
Power supply	DC 3.8V 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	—	0.213
LTE Band 2	16QAM	1.4	1M09W7D	—	0.210
LTE Band 2	QPSK	3	2M68G7D	—	0.196
LTE Band 2	16QAM	3	2M68W7D	—	0.194
LTE Band 2	QPSK	5	4M49G7D	—	0.142
LTE Band 2	16QAM	5	4M49W7D	—	0.143
LTE Band 2	QPSK	10	8M93G7D	0.031	0.147
LTE Band 2	16QAM	10	8M92W7D	—	0.155
LTE Band 2	QPSK	15	13M5G7D	—	0.124
LTE Band 2	16QAM	15	13M5W7D	—	0.125
LTE Band 2	QPSK	20	17M9G7D	—	0.159
LTE Band 2	16QAM	20	17M9W7D	—	0.160
LTE Band 4	QPSK	1.4	1M09G7D	—	0.140
LTE Band 4	16QAM	1.4	1M09W7D	—	0.113
LTE Band 4	QPSK	3	2M68G7D	—	0.142
LTE Band 4	16QAM	3	2M68W7D	—	0.160
LTE Band 4	QPSK	5	4M49G7D	—	0.189
LTE Band 4	16QAM	5	4M48W7D	—	0.163
LTE Band 4	QPSK	10	8M93G7D	0.028	0.150
LTE Band 4	16QAM	10	8M92W7D	—	0.129
LTE Band 4	QPSK	15	13M4G7D	—	0.117
LTE Band 4	16QAM	15	13M4W7D	—	0.095
LTE Band 4	QPSK	20	17M9G7D	—	0.119
LTE Band 4	16QAM	20	17M9W7D	—	0.099



LTE Band 5	QPSK	1.4	1M09G7D	—	0.166
LTE Band 5	16QAM	1.4	1M09W7D	—	0.138
LTE Band 5	QPSK	3	2M68G7D	—	0.169
LTE Band 5	16QAM	3	2M68W7D	—	0.177
LTE Band 5	QPSK	5	4M48G7D	—	0.164
LTE Band 5	16QAM	5	4M48W7D	—	0.169
LTE Band 5	QPSK	10	8M93G7D	0.062	0.169
LTE Band 5	16QAM	10	8M92W7D	—	0.145
LTE Band 12	QPSK	1.4	1M09G7D	—	0.133
LTE Band 12	16QAM	1.4	1M09W7D	—	0.110
LTE Band 12	QPSK	3	2M68G7D	—	0.190
LTE Band 12	16QAM	3	2M68W7D	—	0.112
LTE Band 12	QPSK	5	4M49G7D	—	0.138
LTE Band 12	16QAM	5	4M49W7D	—	0.113
LTE Band 12	QPSK	10	8M91G7D	0.07	0.153
LTE Band 12	16QAM	10	8M91W7D	—	0.125
LTE Band 13	QPSK	5	4M48G7D	—	0.142
LTE Band 13	16QAM	5	4M48W7D	—	0.117
LTE Band 13	QPSK	10	8M93G7D	0.064	0.145
LTE Band 13	16QAM	10	8M92W7D	—	0.119
LTE Band 17	QPSK	5	4M48G7D	—	0.198
LTE Band 17	16QAM	5	4M48W7D	—	0.130
LTE Band 17	QPSK	10	8M92G7D	0.059	0.199
LTE Band 17	16QAM	10	8M91W7D	—	0.136



### 1.3 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part24, Part27, 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)	EIRP < 2Watt	PASS
	§27.50(b)(10) §27.50(c)(10)	Effective Radiated Power (Band 12/17/13)	ERP < 3 Watt	PASS
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	EIRP < 1Watt	PASS
4	2.1049	Occupied Bandwidth	Reporting Only	PASS
5	§2.1051 §22.917(a) §24.238(a) §27.53(c)(2) §27.53(g) §27.53(h) 2.1051	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 17)	< 43+10log10(P[watt])	PASS





6	2.1051 §22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Conducted Spurious Emission Measurement (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 17)	< $43+10\log_{10}(P[\text{watt}])$	PASS
7	2.1053 §22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 12) (Band 13) (Band 17)	< $43+10\log_{10}(P[\text{watt}])$	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	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	12	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	13			✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	17			✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
Peak-to-Average Ratio	2				✓				✓	✓		✓	✓	✓	✓
	4				✓				✓	✓		✓	✓	✓	✓
	5				✓				✓	✓		✓	✓	✓	✓
	12				✓				✓	✓		✓	✓	✓	✓
	13				✓				✓	✓		✓	✓	✓	✓
	17				✓				✓	✓		✓	✓	✓	✓
26dB and 99% Bandwidth	2	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	
	4	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	
	5	✓	✓	✓	✓			✓	✓			✓		✓	
	12	✓	✓	✓	✓			✓	✓			✓		✓	
	13			✓	✓			✓	✓			✓		✓	
	17			✓	✓			✓	✓			✓		✓	
Conducted Band Edge	2	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
	5	✓	✓	✓	✓			✓	✓	✓		✓	✓		✓
	12	✓	✓	✓	✓			✓	✓	✓		✓	✓		✓
	13			✓	✓			✓	✓	✓		✓	✓		✓
	17			✓	✓			✓	✓	✓		✓	✓		✓
Conducted Spurious Emission	2	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	5	✓	✓	✓	✓			✓	✓	✓			✓	✓	✓
	12	✓	✓	✓	✓			✓	✓	✓			✓	✓	✓
	13			✓				✓		✓			✓	✓	✓
	17			✓				✓		✓			✓	✓	✓



Frequency Stability	2				√			√				√		√
	4				√			√				√		√
	5				√			√				√		√
	12				√			√				√		√
	13				√			√				√		√
	17				√			√				√		√
ERP/EIRP	2	√	√	√	√	√	√	√	√	√		√	√	√
	4	√	√	√	√	√	√	√	√	√		√	√	√
	5	√	√	√	√			√	√	√		√	√	√
	12	√	√	√	√			√	√	√		√	√	√
	13			√	√			√	√	√		√	√	√
	17			√	√			√	√	√		√	√	√
Radiated Spurious Emission	2	Worst case											√	
	4	Worst case											√	
	5	Worst case											√	
	12	Worst case											√	
	13	Worst case											√	
	17	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 Testing 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, 2020.

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

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

CCIC Southern Testing 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, 2020.

#### **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

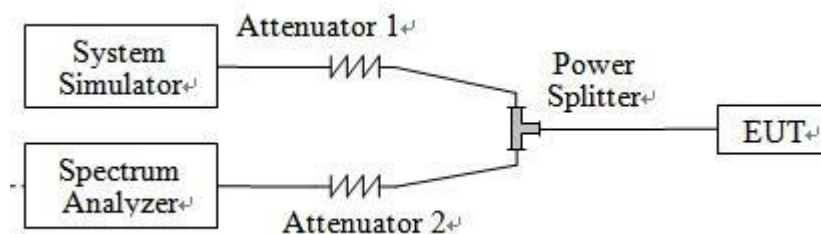
### 2.2.1 Definition

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

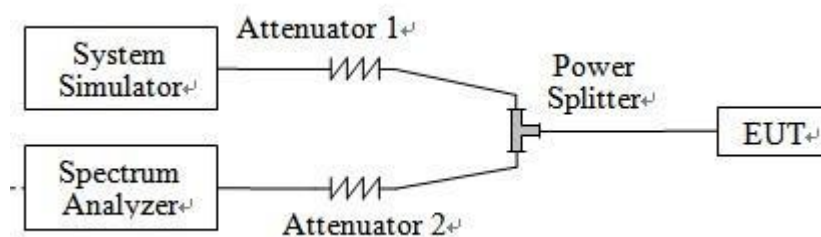
According to FCC section 2.1049, the occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

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

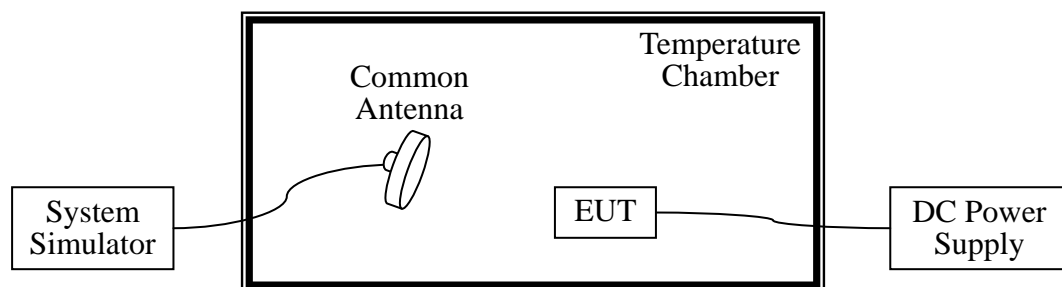
According to FCC requirement, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental 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

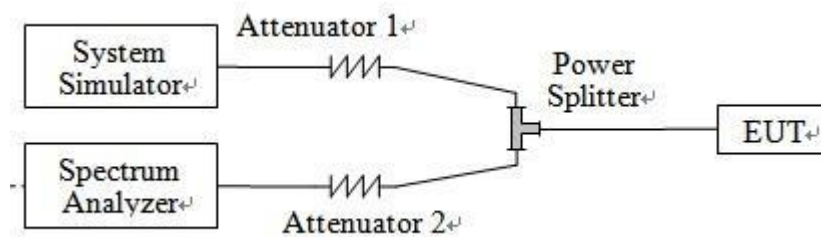
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

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)

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

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

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

8. 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.

27.53(g)

For operations in the 698 – 746 MHz band, the FCC limit is  $43 + 10\log_{10}(P[\text{Watts}])$  dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100kHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least 30kHz may be employed.

27.53(c)(2)

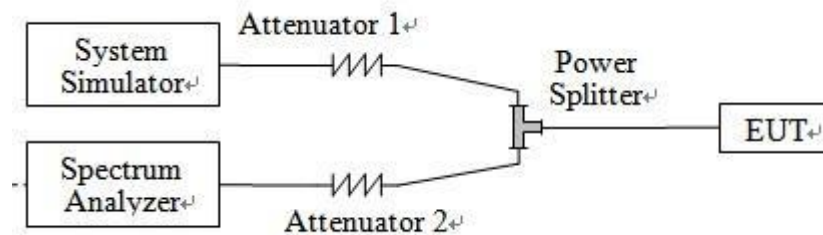
For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;

### 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

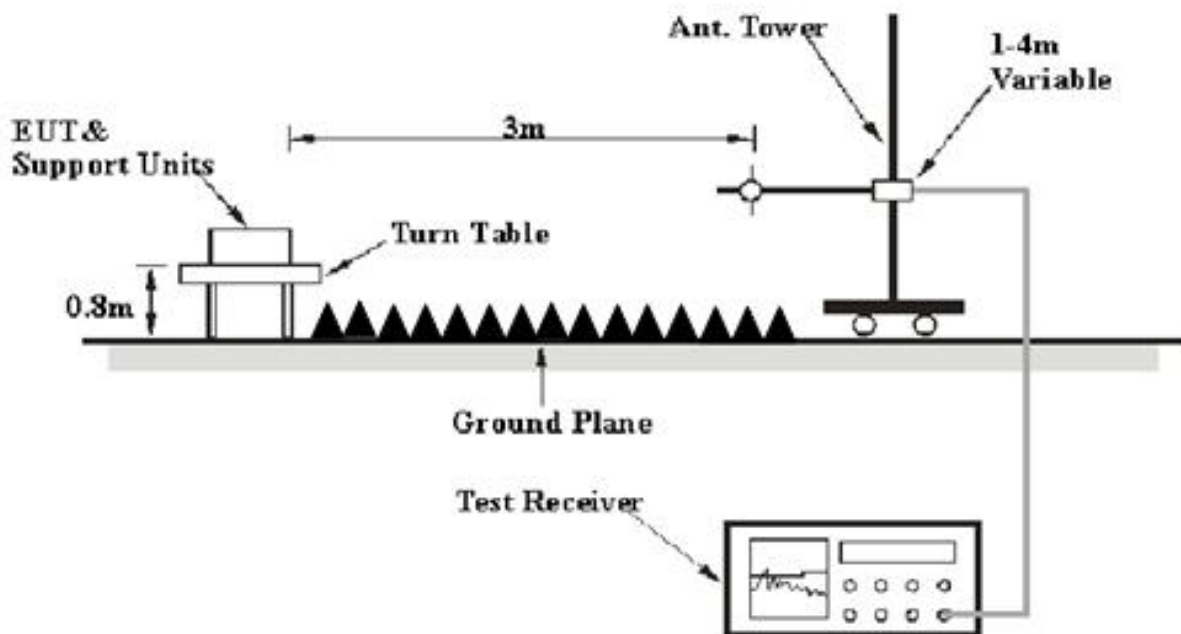
Effective radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-D-2010, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v03r01. Mobile and portable (hand-held) stations operating are limited to average ERP of 7 watts with LTE band 5 and 3 watts with LTE band 12 /13/17.

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 and 1 watt with LTE band 4.

### 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	22.92	PASS
2	1.4	QPSK	1	3	1880	23.29	PASS
2	1.4	QPSK	1	3	1909.3	22.97	PASS
2	1.4	16QAM	1	0	1850.7	22.06	PASS
2	1.4	16QAM	1	0	1880	22.56	PASS
2	1.4	16QAM	1	0	1909.3	23.23	PASS
2	3	QPSK	1	8	1851.5	22.60	PASS
2	3	QPSK	1	8	1880	22.64	PASS
2	3	QPSK	1	8	1908.5	22.92	PASS
2	3	16QAM	1	0	1851.5	22.88	PASS
2	3	16QAM	1	0	1880	22.85	PASS
2	3	16QAM	1	0	1908.5	22.86	PASS
2	5	QPSK	1	0	1852.5	21.52	PASS
2	5	QPSK	1	0	1880	21.49	PASS
2	5	QPSK	1	0	1907.5	21.51	PASS
2	5	16QAM	1	24	1852.5	21.55	PASS
2	5	16QAM	1	24	1880	21.54	PASS
2	5	16QAM	1	24	1907.5	21.52	PASS
2	10	QPSK	1	49	1855	21.64	PASS
2	10	QPSK	1	49	1880	21.66	PASS
2	10	QPSK	1	49	1905	21.63	PASS
2	10	16QAM	1	0	1855	21.89	PASS
2	10	16QAM	1	0	1880	21.87	PASS
2	10	16QAM	1	0	1905	21.90	PASS
2	15	QPSK	1	74	1857.5	20.93	PASS
2	15	QPSK	1	74	1880	20.90	PASS
2	15	QPSK	1	74	1902.5	20.95	PASS
2	15	16QAM	1	0	1857.5	20.97	PASS
2	15	16QAM	1	0	1880	20.95	PASS
2	15	16QAM	1	0	1902.5	20.98	PASS
2	20	QPSK	1	0	1860	22.00	PASS
2	20	QPSK	1	0	1880	22.02	PASS
2	20	QPSK	1	0	1900	22.01	PASS
2	20	16QAM	1	0	1860	22.05	PASS
2	20	16QAM	1	0	1880	22.02	PASS
2	20	16QAM	1	0	1900	21.92	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	21.39	PASS
4	1.4	QPSK	1	0	1732.5	21.47	PASS
4	1.4	QPSK	1	0	1754.3	21.42	PASS
4	1.4	16QAM	1	3	1710.7	20.49	PASS
4	1.4	16QAM	1	3	1732.5	20.52	PASS
4	1.4	16QAM	1	3	1754.3	20.49	PASS
4	3	QPSK	1	0	1711.5	21.50	PASS
4	3	QPSK	1	0	1732.5	21.51	PASS
4	3	QPSK	1	0	1753.5	21.49	PASS
4	3	16QAM	1	14	1711.5	22.05	PASS
4	3	16QAM	1	14	1732.5	22.03	PASS
4	3	16QAM	1	14	1753.5	22.01	PASS
4	5	QPSK	1	0	1712.5	22.74	PASS
4	5	QPSK	1	0	1732.5	22.73	PASS
4	5	QPSK	1	0	1752.5	22.76	PASS
4	5	16QAM	1	0	1712.5	22.12	PASS
4	5	16QAM	1	0	1732.5	22.08	PASS
4	5	16QAM	1	0	1752.5	22.10	PASS
4	10	QPSK	1	0	1715	21.75	PASS
4	10	QPSK	1	0	1732.5	21.73	PASS
4	10	QPSK	1	0	1750	21.72	PASS
4	10	16QAM	1	24	1715	21.09	PASS
4	10	16QAM	1	24	1732.5	21.11	PASS
4	10	16QAM	1	24	1750	21.08	PASS
4	15	QPSK	1	74	1717.5	20.65	PASS
4	15	QPSK	1	74	1732.5	20.68	PASS
4	15	QPSK	1	74	1747.5	20.66	PASS
4	15	16QAM	1	74	1717.5	19.79	PASS
4	15	16QAM	1	74	1732.5	19.74	PASS
4	15	16QAM	1	74	1747.5	19.76	PASS
4	20	QPSK	1	0	1720	20.72	PASS
4	20	QPSK	1	0	1732.5	20.75	PASS
4	20	QPSK	1	0	1745	20.77	PASS
4	20	16QAM	1	0	1720	19.86	PASS
4	20	16QAM	1	0	1732.5	19.89	PASS
4	20	16QAM	1	0	1745	19.96	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	22.16	PASS
5	1.4	QPSK	1	3	836.5	22.19	PASS
5	1.4	QPSK	1	3	848.3	22.18	PASS
5	1.4	16QAM	1	3	824.7	21.23	PASS
5	1.4	16QAM	1	3	836.5	21.21	PASS
5	1.4	16QAM	1	3	848.3	21.40	PASS
5	3	QPSK	1	0	825.5	22.23	PASS
5	3	QPSK	1	0	836.5	22.27	PASS
5	3	QPSK	1	0	847.5	22.25	PASS
5	3	16QAM	1	0	825.5	21.51	PASS
5	3	16QAM	1	0	836.5	21.48	PASS
5	3	16QAM	1	0	847.5	22.49	PASS
5	5	QPSK	1	0	826.5	22.16	PASS
5	5	QPSK	1	0	836.5	22.13	PASS
5	5	QPSK	1	0	846.5	21.14	PASS
5	5	16QAM	1	0	826.5	21.31	PASS
5	5	16QAM	1	0	836.5	21.28	PASS
5	5	16QAM	1	0	846.5	22.29	PASS
5	10	QPSK	1	49	829.0	22.01	PASS
5	10	QPSK	1	49	836.5	22.02	PASS
5	10	QPSK	1	49	844.0	22.28	PASS
5	10	16QAM	1	0	829.0	21.61	PASS
5	10	16QAM	1	0	836.5	21.20	PASS
5	10	16QAM	1	0	844.0	21.07	PASS



## 4.LTE Band 12 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	ERP (dBm)	Verdict
			RB Size	RB Offset			
12	1.4	QPSK	1	0	699.7	21.24	PASS
12	1.4	QPSK	1	0	707.5	21.22	PASS
12	1.4	QPSK	1	0	715.3	21.25	PASS
12	1.4	16QAM	1	0	699.7	20.40	PASS
12	1.4	16QAM	1	0	707.5	20.39	PASS
12	1.4	16QAM	1	0	715.3	20.37	PASS
12	3	QPSK	1	0	700.5	21.80	PASS
12	3	QPSK	1	0	707.5	22.79	PASS
12	3	QPSK	1	0	714.5	22.77	PASS
12	3	16QAM	1	8	700.5	20.45	PASS
12	3	16QAM	1	8	707.5	20.47	PASS
12	3	16QAM	1	8	714.5	20.48	PASS
12	5	QPSK	1	24	701.5	21.40	PASS
12	5	QPSK	1	24	707.5	21.38	PASS
12	5	QPSK	1	24	713.5	21.36	PASS
12	5	16QAM	1	0	701.5	20.50	PASS
12	5	16QAM	1	0	707.5	20.53	PASS
12	5	16QAM	1	0	713.5	20.52	PASS
12	10	QPSK	1	49	704	21.81	PASS
12	10	QPSK	1	49	707.5	21.83	PASS
12	10	QPSK	1	49	711	21.85	PASS
12	10	16QAM	1	0	704	20.98	PASS
12	10	16QAM	1	0	707.5	20.97	PASS
12	10	16QAM	1	0	711	20.94	PASS





## 5. LTE Band 13 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	ERP (dBm)	Verdict
			RB Size	RB Offset			
13	5	QPSK	1	0	779.5	21.5	PASS
13	5	QPSK	1	0	782	21.53	PASS
13	5	QPSK	1	0	784.5	21.52	PASS
13	5	16QAM	1	24	779.5	20.70	PASS
13	5	16QAM	1	24	782	20.66	PASS
13	5	16QAM	1	24	784.5	20.68	PASS
13	10	QPSK	1	49	782	21.61	PASS
13	10	QPSK	1	49	782	21.56	PASS
13	10	QPSK	1	49	782	21.59	PASS
13	10	16QAM	1	0	782	20.77	PASS
13	10	16QAM	1	0	782	20.74	PASS
13	10	16QAM	1	0	782	20.76	PASS

## 6. LTE Band 17 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	EIRP (dBm)	Verdict
			RB Size	RB Offset			
17	5	QPSK	1	24	706.5	22.97	PASS
17	5	QPSK	1	24	710	22.01	PASS
17	5	QPSK	1	12	713.5	22.07	PASS
17	5	16QAM	1	24	706.5	21.13	PASS
17	5	16QAM	1	24	710	21.06	PASS
17	5	16QAM	1	12	713.5	21.11	PASS
17	10	QPSK	1	49	709	22.04	PASS
17	10	QPSK	1	49	710	22.99	PASS
17	10	QPSK	1	49	711	22.94	PASS
17	10	16QAM	1	24	709	21.35	PASS
17	10	16QAM	1	49	710	21.28	PASS
17	10	16QAM	1	24	711	21.26	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

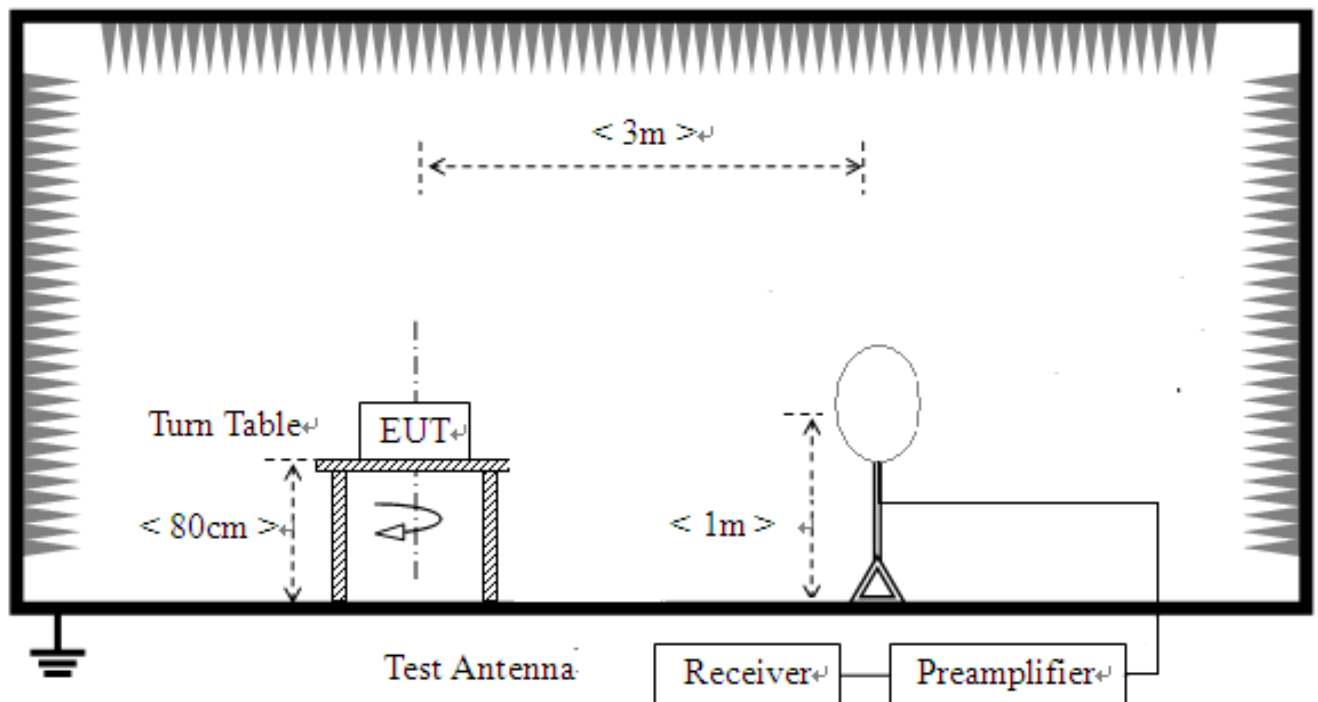
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $55 + 10 \log (P)$  dB.

### 2.8.2 Measuring Instruments

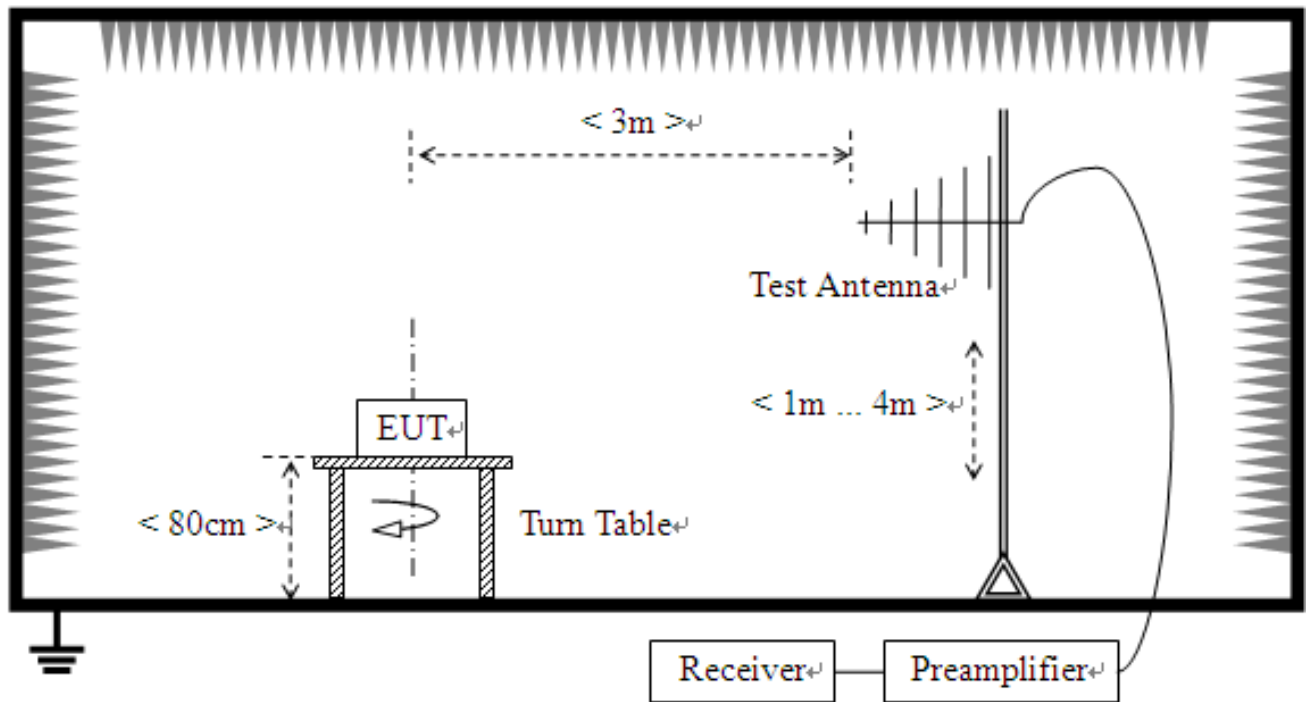
The measuring equipment is listed in the section 3 of this test report.

### 2.8.3 Test Setup

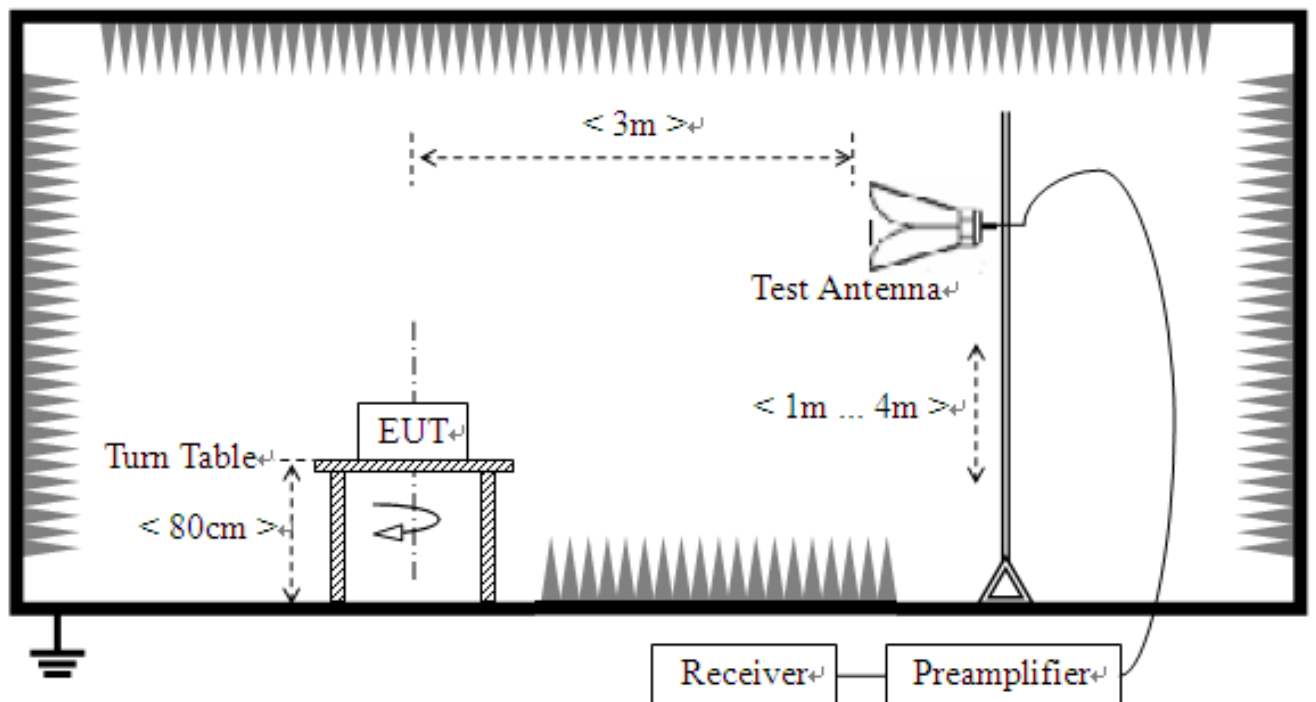
For radiated emissions from 9kHz to 30MHz



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.

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

<For Band 7>

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

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

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	61.0555	-81.23	-62.83	-13.00	49.83	18.40	Horizontal
2	185.2776	-89.03	-67.65	-13.00	54.65	21.38	Horizontal
3	429.8399	-87.83	-62.24	-13.00	49.24	25.59	Horizontal
4	3195.0975	-57.93	-48.76	-13.00	35.76	9.17	Horizontal
5	7749.8749	-58.15	-41.64	-13.00	28.64	16.51	Horizontal
6	10661.330	-61.66	-37.49	-13.00	24.49	24.17	Horizontal

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	61.0555	-81.44	-62.19	-13.00	49.19	19.25	Vertical
2	128.0190	-86.62	-65.91	-13.00	52.91	20.71	Vertical
3	603.0715	-88.28	-58.03	-13.00	45.03	30.25	Vertical
4	3157.5788	-57.86	-49.13	-13.00	36.13	8.73	Vertical
5	5078.5393	-59.66	-45.58	-13.00	32.58	14.08	Vertical
6	7877.4387	-57.92	-41.37	-13.00	28.37	16.55	Vertical

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



## LTE Band 4 QPSK 20MHz BW Middle Channel

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	42.6163	-82.58	-62.28	-13.00	49.28	20.30	Horizontal
2	61.0555	-82.48	-64.08	-13.00	51.08	18.40	Horizontal
3	347.3487	-88.86	-62.07	-13.00	49.07	26.79	Horizontal
4	3817.9090	-57.88	-48.89	-13.00	35.89	8.99	Horizontal
5	7187.0935	-59.93	-42.99	-13.00	29.99	16.94	Horizontal
6	10188.594	-61.88	-38.07	-13.00	25.07	23.81	Horizontal

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	61.0555	-82.38	-63.13	-13.00	50.13	19.25	Vertical
2	247.8739	-89.61	-67.10	-13.00	54.10	22.51	Vertical
3	446.3382	-87.89	-61.10	-13.00	48.10	26.79	Vertical
4	3652.8264	-57.65	-49.36	-13.00	36.36	8.29	Vertical
5	7172.0860	-59.19	-42.63	-13.00	29.63	16.56	Vertical
6	10106.053	-62.01	-38.73	-13.00	25.73	23.28	Vertical

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

## LTE Band 5 QPSK 10MHz BW Middle Channel

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	43.1016	-83.87	-60.47	-13.00	47.47	23.40	Horizontal
2	59.1146	-84.16	-62.38	-13.00	49.38	21.78	Horizontal
3	145.0025	-89.01	-66.11	-13.00	53.11	22.90	Horizontal
4	1973.4867	-56.93	-56.23	-13.00	43.23	0.70	Horizontal
5	3150.0750	-58.02	-49.34	-13.00	36.34	8.68	Horizontal
6	11269.134	-61.61	-38.05	-13.00	25.05	23.56	Horizontal

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	42.6163	-81.40	-59.04	-13.00	46.04	22.36	Vertical
2	59.1146	-84.24	-61.83	-13.00	48.83	22.41	Vertical
3	135.2976	-84.22	-60.90	-13.00	47.90	23.32	Vertical
4	2433.7169	-57.30	-54.03	-13.00	41.03	3.27	Vertical
5	3915.4577	-58.30	-48.25	-13.00	35.25	10.05	Vertical
6	7982.4912	-59.73	-41.77	-13.00	28.77	17.96	Vertical

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



## LTE Band 12 QPSK 10MHz BW Middle Channel

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	42.6163	-83.29	-60.48	-13.00	47.48	22.81	Horizontal
2	59.1146	-85.38	-64.32	-13.00	51.32	21.06	Horizontal
3	172.1761	-89.86	-65.90	-13.00	52.90	23.96	Horizontal
4	1403.2016	-50.47	-52.85	-13.00	39.85	-2.38	Horizontal
5	5318.6593	-59.66	-47.47	-13.00	34.47	12.19	Horizontal
6	9993.4967	-61.73	-38.94	-13.00	25.94	22.79	Horizontal

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	43.5868	-83.01	-61.49	-13.00	48.49	21.52	Vertical
2	59.1146	-84.39	-62.70	-13.00	49.70	21.69	Vertical
3	112.4912	-87.02	-61.79	-13.00	48.79	25.23	Vertical
4	1403.2016	-50.72	-53.40	-13.00	40.40	-2.68	Vertical
5	3930.4652	-58.47	-48.59	-13.00	35.59	9.88	Vertical
6	7239.6198	-59.42	-42.77	-13.00	29.77	16.65	Vertical

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

## LTE Band 13 QPSK 10MHz BW Middle Channel

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	59.1146	-83.33	-62.27	-13.00	49.27	21.06	Horizontal
2	130.9305	-85.76	-63.53	-13.00	50.53	22.23	Horizontal
3	203.2316	-89.55	-64.38	-13.00	51.38	25.17	Horizontal
4	1562.2811	-55.98	-58.35	-13.00	45.35	-2.37	Horizontal
5	3202.6013	-58.50	-49.33	-13.00	36.33	9.17	Horizontal
6	6819.4097	-60.43	-44.97	-13.00	31.97	15.46	Horizontal

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	43.1016	-82.50	-60.91	-13.00	47.91	21.59	Vertical
2	59.1146	-83.79	-62.10	-13.00	49.10	21.69	Vertical
3	105.6978	-84.78	-58.93	-13.00	45.93	25.85	Vertical
4	1710.3552	-49.62	-50.65	-13.00	37.65	-1.03	Vertical
5	3180.0900	-58.26	-49.16	-13.00	36.16	9.10	Vertical
6	5078.5393	-59.02	-44.94	-13.00	31.94	14.08	Vertical

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





## LTE Band 17 QPSK 10MHz BW Middle Channel

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	59.1146	-83.63	-62.57	-13.00	49.57	21.06	Horizontal
2	99.8749	-87.02	-65.89	-13.00	52.89	21.13	Horizontal
3	206.6283	-89.59	-64.59	-13.00	51.59	25.00	Horizontal
4	1418.2091	-54.42	-56.76	-13.00	43.76	-2.34	Horizontal
5	2894.9475	-57.33	-49.49	-13.00	36.49	7.84	Horizontal
6	5723.8619	-58.88	-46.72	-13.00	33.72	12.16	Horizontal

NO.	Freq. [MHz]	Reading Level [dBm]	Absolute Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	42.6163	-83.35	-61.70	-13.00	48.70	21.65	Vertical
2	59.1146	-84.47	-62.78	-13.00	49.78	21.69	Vertical
3	109.0945	-87.87	-62.33	-13.00	49.33	25.54	Vertical
4	1419.2096	-53.16	-55.81	-13.00	42.81	-2.65	Vertical
5	2952.9765	-56.00	-49.15	-13.00	36.15	6.85	Vertical
6	5138.5693	-58.06	-44.70	-13.00	31.70	13.36	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	2019.05.20	2020.05.19	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	2017.07.12	2020.07.11	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
Amplifier 20M~3GHz	MILMEGA	80RF1000-250	1064573	2017.10.09	2020.10.08	Radiation
Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2019.06.05	2020.06.04	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

LTE FDD Band 2				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				18607/1850.7	18900/1880	19193/1909.3	
1.4MHz	QPSK	1	0	22.14	22.23	22.28	22.0±1.0
		1	3	22.13	22.17	22.15	
		1	5	22.11	22.18	22.15	
		3	0	21.99	22.23	22.18	21.5±1.0
		3	2	21.91	22.14	22.12	
		3	3	22.14	22.27	21.95	
	6	0	21.77	21.89	21.8	21.0±1.0	
	16QAM	1	0	21.42	21.54	21.51	21.0±1.0
		1	3	21.56	21.55	21.68	
		1	5	21.56	21.61	21.44	
		3	0	21.33	21.24	21.12	20.5±1.0
		3	2	21.18	21.42	21.24	
		3	3	21.04	21.2	21.31	
	6	0	20.94	21	20.99	20.5±1.0	
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				18615/1851.5	18900/1880	19185/1908.5	
3MHz	QPSK	1	0	22.32	22.34	22.37	22.0±1.0
		1	7	22.15	22.41	22.35	
		1	14	22.29	22.25	22.14	
		8	0	21.89	22.12	22.07	21.5±1.0
		8	4	21.92	22.09	22.17	
		8	7	22.18	22.05	22.04	
	15	0	21.8	21.93	21.84	21.0±1.0	
	16QAM	1	0	21.62	21.56	21.73	21.0±1.0
		1	7	21.64	21.6	21.59	
		1	14	21.57	21.64	21.62	
		8	0	21.04	21.37	21.24	20.5±1.0
		8	4	21.24	21.27	21.09	
		8	7	21.23	21.26	21.15	
	15	0	20.94	21.05	20.95	20.5±1.0	



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	22.38	22.41	22.33	22.0±1.0
		1	13	22.22	22.38	22.25	
		1	24	22.35	22.40	22.18	
		12	0	21.89	22.19	21.98	21.5±1.0
		12	6	21.97	21.99	21.97	
		12	13	21.96	22.2	21.95	
		25	0	21.74	21.83	21.89	21.0±1.0
	16QAM	1	0	21.44	21.73	21.62	21.0±1.0
		1	13	21.49	21.75	21.5	
		1	24	21.47	21.78	21.46	
		12	0	21.14	21.17	21.24	20.5±1.0
		12	6	21.15	21.24	21.25	
		12	13	21.3	21.27	21.18	
		25	0	20.95	21.05	20.99	20.5±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				18650/1855	18900/1880	19150/1905	
10MHz	QPSK	1	0	22.36	22.37	22.40	22.0±1.0
		1	25	22.16	22.22	22.4	
		1	49	22.27	22.22	22.34	
		25	0	22.07	22.27	21.97	21.5±1.0
		25	13	22.03	22.27	22.09	
		25	25	21.9	22.14	21.98	
		50	0	21.77	21.88	21.88	21.0±1.0
	16QAM	1	0	21.63	21.71	21.71	21.0±1.0
		1	25	21.65	21.75	21.67	
		1	49	21.51	21.65	21.68	
		25	0	21.17	21.22	21.32	20.5±1.0
		25	13	21.13	21.27	21.39	
		25	25	21.3	21.35	21.09	
		50	0	20.89	20.99	21.04	20.5±1.0



LTE FDD Band 2				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				18675/1857.5	18900/1880	19125/1902.5	
15MHz	QPSK	1	0	22.22	22.25	22.27	22.0±1.0
		1	38	22.22	22.31	22.40	
		1	74	22.27	22.41	22.32	
		36	0	22	22.12	22.05	21.5±1.0
		36	18	22.08	21.96	22.13	
		36	39	21.81	22.05	21.86	
		75	0	21.65	21.89	21.7	21.0±1.0
	16QAM	1	0	21.54	21.6	21.59	21.0±1.0
		1	38	21.35	21.53	21.4	
		1	74	21.54	21.69	21.59	
		36	0	21.08	21.24	21.13	20.5±1.0
		36	18	21.19	21.11	21.24	
		36	39	21.16	21.21	21.21	
		75	0	20.79	21.06	20.84	20.5±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				18700/1860	18900/1880	19100/1900	
20MHz	QPSK	1	0	22.38	22.43	22.41	21.5±1.0
		1	50	22.32	22.41	22.38	
		1	99	22.35	22.40	22.35	
		50	0	22.23	22.25	22.18	21.5±1.0
		50	25	22.21	22.22	22.15	
		50	50	22.17	22.19	22.08	
		100	0	22.01	22.03	22.00	21.5±1.0
	16QAM	1	0	21.45	21.72	21.61	21.0±1.0
		1	50	21.67	21.68	21.54	
		1	99	21.65	21.72	21.71	
		50	0	21.29	21.38	21.12	20.5±1.0
		50	25	21.16	21.39	21.24	
		50	50	21.23	21.14	21.37	
		100	0	20.9	21.06	21.03	20.5±1.0



2. 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	22.15	22.22	22.18	21.5±1.0
		1	3	22.21	22.21	22.18	
		1	5	22.13	22.11	22.13	
		3	0	22.08	22.09	21.98	21.5±1.0
		3	2	21.79	21.9	21.79	
		3	3	21.96	22	22.07	
	16QAM	6	0	21.94	22.05	21.94	21.5±1.0
		1	0	21.76	21.63	21.87	21.0±1.0
		1	3	21.73	21.61	21.68	
		1	5	21.76	21.77	21.88	
		3	0	21.41	21.35	21.38	21.0±1.0
		3	2	21.48	21.48	21.41	
3	3	21.37	21.4	21.51			
	6	0	21.09	21.13	21.16	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	22.20	22.19	22.19	21.5±1.0
		1	7	22.11	22.15	22.13	
		1	14	22.13	22.13	22.19	
		8	0	22.03	21.94	21.85	21.5±1.0
		8	4	22	22.09	21.85	
		8	7	22.08	22.02	21.94	
	16QAM	15	0	22.03	22.05	22.02	21.5±1.0
		1	0	21.83	21.79	21.64	21.0±1.0
		1	7	21.75	21.63	21.68	
		1	14	21.65	21.65	21.72	
		8	0	21.28	21.56	21.36	21.0±1.0
		8	4	21.29	21.45	21.4	
8	7	21.43	21.56	21.4			
	15	0	21.11	21.11	21.15	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	22.16	22.13	22.12	21.5±1.0
		1	13	22.19	22.16	22.18	
		1	24	22.19	22.17	22.14	
		12	0	21.93	22	21.87	21.5±1.0
		12	6	22.02	21.96	21.85	
		12	13	21.88	22.1	22.08	
	25	0	21.95	21.99	22.02	21.5±1.0	
	16QAM	1	0	21.71	21.84	21.74	21.0±1.0
		1	13	21.88	21.62	21.8	
		1	24	21.78	21.8	21.88	
		12	0	21.5	21.35	21.3	21.0±1.0
		12	6	21.47	21.41	21.34	
		12	13	21.33	21.28	21.35	
	25	0	21.16	21.17	21.13	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	22.21	22.19	22.19	21.5±1.0
		1	25	22.15	22.14	22.16	
		1	49	22.16	22.19	22.21	
		25	0	21.9	21.92	21.98	21.5±1.0
		25	13	22.08	21.81	22.06	
		25	25	21.85	21.85	22.03	
	50	0	22.02	22	21.94	21.5±1.0	
	16QAM	1	0	21.77	21.87	21.66	21.0±1.0
		1	25	21.61	21.7	21.8	
		1	49	21.69	21.78	21.78	
		25	0	21.41	21.41	21.29	21.0±1.0
		25	13	21.53	21.29	21.39	
		25	25	21.28	21.44	21.5	
	50	0	21.18	21.14	21.11	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	22.21	22.18	22.19	21.5±1.0
		1	38	22.11	22.18	22.19	
		1	74	22.06	22.12	22.14	
		36	0	21.78	21.89	22.03	21.5±1.0
		36	18	21.83	21.85	21.82	
		36	39	22.01	21.89	21.91	
		75	0	21.97	21.99	22.02	21.5±1.0
	16QAM	1	0	21.76	21.75	21.64	21.0±1.0
		1	38	21.73	21.69	21.82	
		1	74	21.59	21.65	21.65	
		36	0	21.42	21.56	21.52	21.0±1.0
		36	18	21.47	21.37	21.48	
		36	39	21.38	21.31	21.48	
		75	0	21.14	21.12	21.18	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	22.23	22.24	22.17	21.5±1.0
		1	50	22.17	22.17	22.18	
		1	99	22.18	22.14	22.21	
		50	0	21.84	21.87	21.85	21.0±1.0
		50	25	21.77	21.83	21.79	
		50	50	21.79	21.84	21.82	
		100	0	21.44	21.31	21.34	21.5±1.0
	16QAM	1	0	21.67	21.64	21.66	21.0±1.0
		1	50	21.84	21.63	21.74	
		1	99	21.59	21.85	21.6	
		50	0	21.47	21.28	21.36	21.0±1.0
		50	25	21.53	21.32	21.3	
		50	50	21.47	21.47	21.45	
		100	0	21.1	21.16	21.15	20.5±1.0





3. 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	23.09	23.13	23.13	22.5±1.0
		1	3	23.01	23.09	23.06	
		1	5	23.08	23.09	22.94	
		3	0	22.61	22.57	22.55	22.0±1.0
		3	2	22.72	22.57	22.72	
		3	3	22.67	22.6	22.72	
	16QAM	6	0	22.33	22.46	22.42	22.0±1.0
		1	0	22	22.27	22.21	21.5±1.0
		1	3	22.26	22.28	22.12	
		1	5	22.12	22.02	22.15	
		3	0	21.63	21.81	21.92	21.0±1.0
		3	2	21.93	21.9	21.72	
3	3	21.75	21.83	21.9			
6	0	21.53	21.52	21.49	21.0±1.0		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20415/825.5	20525/836.5	20635/847.5	
3MHz	QPSK	1	0	23.06	23.01	23.04	22.5±1.0
		1	7	22.94	23.08	22.86	
		1	14	22.94	23.1	23.01	
		8	0	22.7	22.65	22.66	22.0±1.0
		8	4	22.75	22.73	22.54	
		8	7	22.62	22.68	22.5	
		15	0	22.41	22.43	22.43	
	16QAM	1	0	22.17	22.3	22.23	21.5±1.0
		1	7	22.09	22.04	22.19	
		1	14	22.18	22.11	22.27	
		8	0	21.91	21.68	21.76	21.0±1.0
		8	4	21.74	21.8	21.7	
		8	7	21.68	21.69	21.69	
		15	0	21.51	21.54	21.58	



LTE FDD Band 5				Conducted Power(dBm)			Tune up
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			
				20425/826.5	20525/836.5	20625/846.5	
5MHz	QPSK	1	0	22.84	23.14	22.92	22.5±1.0
		1	13	23.06	23.06	23.14	
		1	24	22.96	23.03	22.99	
		12	0	22.57	22.68	22.63	22.0±1.0
		12	6	22.73	22.69	22.65	
		12	13	22.73	22.54	22.65	
	25	0	22.37	22.44	22.39	22.0±1.0	
	16QAM	1	0	21.99	22.21	22.28	21.5±1.0
		1	13	22.02	22.14	22.23	
		1	24	22.23	22.16	21.99	
		12	0	21.71	21.96	21.66	21.0±1.0
		12	6	21.81	21.71	21.9	
12		13	21.76	21.75	21.65		
25	0	21.58	21.51	21.51	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	23.95	23.95	23.93	23.0±1.0
		1	25	23.79	23.76	23.82	
		1	49	23.81	23.74	23.66	
		25	0	23.77	23.80	23.78	23.0±1.0
		25	13	22.78	22.77	22.78	
		25	25	22.84	22.89	22.82	
	50	0	22.54	22.55	22.51	22.0±1.0	
	16QAM	1	0	22.22	22.29	22.5	21.5±1.0
		1	25	22.34	22.43	22.49	
		1	49	22.39	22.33	22.34	
		25	0	22.06	21.89	21.96	21.0±1.0
		25	13	21.91	22.06	21.86	
25		25	22.1	21.87	21.92		
50	0	21.72	21.71	21.72	21.0±1.0		



4. LTE Band 12 Conducted Power Test Verdict:

LTE FDD Band 12				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				23017/699.7	23095/707.5	23173/715.3	
1.4MHz	QPSK	1	0	22.99	23	22.91	22.5±1.0
		1	3	23	23.12	23.07	
		1	5	22.91	22.92	23.10	
		3	0	22.62	22.74	22.72	22.0±1.0
		3	2	22.7	22.68	22.58	
		3	3	22.7	22.64	22.82	
	6	0	22.25	22.26	22.22	21.5±1.0	
	16QAM	1	0	21.87	21.92	22.01	21.5±1.0
		1	3	22.1	21.85	22.09	
		1	5	22.13	21.98	22.07	
		3	0	21.78	21.67	21.69	21.0±1.0
		3	2	21.73	21.58	21.61	
3		3	21.62	21.75	21.57		
6	0	21.45	21.41	21.42	20.5±1.0		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				23025/700.5	23095/707.5	23165/714.5	
3MHz	QPSK	1	0	22.97	22.97	23.02	22.5±1.0
		1	7	22.92	23.12	23.06	
		1	14	23.01	23.10	22.84	
		8	0	22.5	22.6	22.56	22.0±1.0
		8	4	22.49	22.64	22.64	
		8	7	22.55	22.89	22.53	
	15	0	22.13	22.25	22.18	21.5±1.0	
	16QAM	1	0	21.8	21.95	22.05	21.5±1.0
		1	7	21.92	21.95	22.03	
		1	14	21.74	21.92	21.87	
		8	0	21.61	21.79	21.6	21.0±1.0
		8	4	21.36	21.7	21.48	
8		7	21.35	21.54	21.63		
15	0	21.22	21.43	21.34	20.5±1.0		



LTE FDD Band 12				Conducted Power(dBm)			Tune up
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			
				23035/701.5	23095/707.5	23155/713.5	
5MHz	QPSK	1	0	22.95	23	22.86	22.5±1.0
		1	13	22.8	23.01	22.81	
		1	24	22.91	22.95	23.02	
		12	0	22.42	22.77	22.6	22.0±1.0
		12	6	22.64	22.61	22.72	
		12	13	22.49	22.88	22.47	
		25	0	22.09	22.29	22.11	21.5±1.0
	16QAM	1	0	21.73	22.13	21.91	21.5±1.0
		1	13	21.72	22.01	21.85	
		1	24	21.77	22.19	21.85	
		12	0	21.52	21.68	21.59	21.0±1.0
		12	6	21.62	21.78	21.62	
		12	13	21.44	21.77	21.43	
		25	0	21.26	21.42	21.31	20.5±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				23060/704	23095/707.5	23130/711	
10MHz	QPSK	1	0	23.12	23.17	23.11	22.5±1.0
		1	25	23.10	23.14	23.15	
		1	49	23.04	23.01	23.11	
		25	0	22.83	22.92	22.84	22.0±1.0
		25	13	22.56	22.91	22.69	
		25	25	22.39	22.79	22.61	
		50	0	22.09	22.38	22.15	21.5±1.0
	16QAM	1	0	22.54	22.88	22.68	21.5±1.0
		1	25	22.37	22.76	22.6	
		1	49	22.07	22.35	22.14	
		25	0	21.47	21.75	21.58	21.0±1.0
		25	13	21.56	21.79	21.76	
		25	25	21.52	21.84	21.68	
		50	0	21.35	21.54	21.45	20.5±1.0



5. LTE Band 13 Conducted Power Test Verdict:

LTE FDD Band 13				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				23035/779.5	23095/782	23155/784.5	
5MHz	QPSK	1	0	22.57	22.61	22.53	22.0±1.0
		1	13	22.43	22.54	22.45	
		1	24	22.37	22.53	22.47	
		12	0	22.11	22.23	22.26	21.5±1.0
		12	6	22.14	22.20	22.11	
		12	13	22.12	22.22	22.12	
		25	0	21.92	22.21	22.14	21.5±1.0
	16QAM	1	0	21.74	21.82	21.75	21.0±1.0
		1	13	21.54	21.69	21.67	
		1	24	21.64	21.80	21.72	
		12	0	21.35	21.46	21.44	20.5±1.0
		12	6	21.32	21.44	21.31	
		12	13	21.27	21.34	21.35	
		25	0	21.12	21.28	21.15	20.5±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				23230/782			
10MHz	QPSK	1	0	22.63			22.0±1.0
		1	25	22.63			
		1	49	22.60			
		25	0	22.31			21.5±1.0
		25	13	22.29			
		25	25	22.27			
		50	0	22.12			21.5±1.0
	16QAM	1	0	22.04			21.5±1.0
		1	25	21.93			
		1	49	21.78			
		25	0	21.65			21.0±1.0
		25	13	21.52			
		25	25	21.49			
		50	0	21.46			20.5±1.0



6. LTE Band 17 Conducted Power Test Verdict:

LTE FDD Band 17				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				23755/706.5	23790/710	23825/713.5	
5MHz	QPSK	1	0	22.79	22.83	22.79	22.5±1.0
		1	13	22.72	22.75	22.75	
		1	24	22.75	22.77	22.72	
		12	0	22.32	22.42	22.47	22.0±1.0
		12	6	22.57	22.46	22.37	
		12	13	22.34	22.42	22.50	
	25	0	22.24	22.43	22.38	21.5±1.0	
	16QAM	1	0	22.05	22.16	22.11	21.5±1.0
		1	13	22.09	22.24	21.95	
		1	24	21.96	22.29	22.07	
		12	0	21.49	21.78	21.59	21.0±1.0
		12	6	21.58	21.82	21.77	
12		13	21.54	21.87	21.69		
25	0	21.37	21.57	21.46	21.0±1.0		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				23780/709	23790/710	23800/711	
10MHz	QPSK	1	0	22.82	22.88	22.87	22.0±1.0
		1	25	22.65	22.85	22.74	
		1	49	22.74	22.81	22.82	
		25	0	22.57	22.56	22.48	21.5±1.0
		25	13	22.43	22.51	22.47	
		25	25	22.38	22.38	22.43	
	50	0	22.01	22.02	21.89	22.0±1.0	
	16QAM	1	0	21.9	22.15	22.12	21.5±1.0
		1	25	21.85	22.13	22.09	
		1	49	21.86	22.18	22.12	
		25	0	21.58	21.82	21.55	21.0±1.0
		25	13	21.6	21.89	21.73	
25		25	21.66	21.88	21.53		
50	0	21.33	21.59	21.37	21.0±1.0		



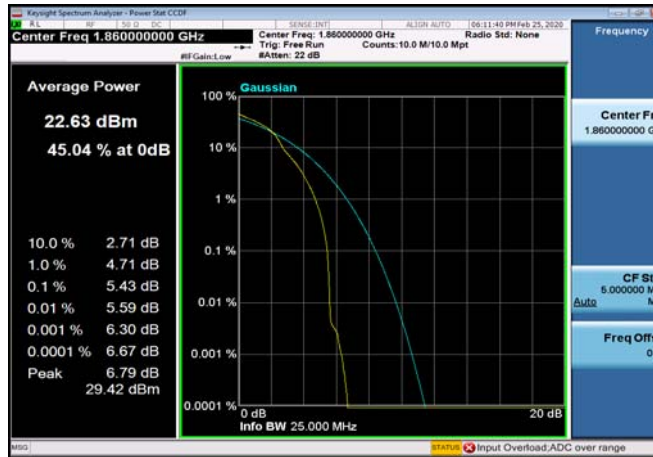
## Peak To Average Ratio

**Test Result and Data**

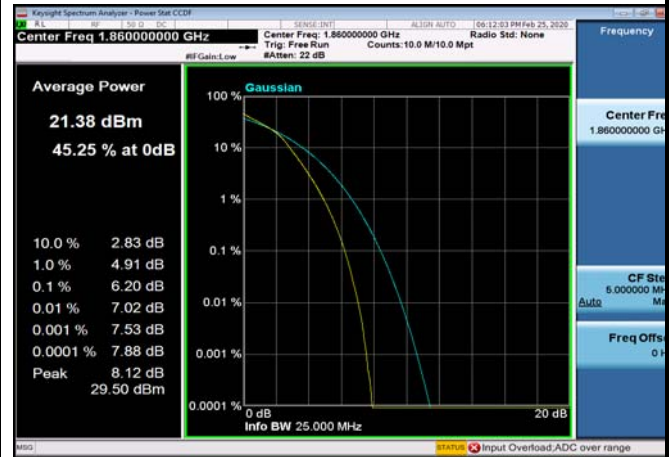
PeakToAveragePowerRatio NormalTC_NormalVol							
Band	Range	BandWidth	RbMode	Modulation	PAPR (dBm)	Limit (dBm)	Result
FDD02	LowRange	20	OneRB_high	Q16	5.43	13.00	Pass
FDD02	LowRange	20	fullRB	Q16	6.20	13.00	Pass
FDD02	MidRange	20	OneRB_high	Q16	5.12	13.00	Pass
FDD02	MidRange	20	fullRB	Q16	6.17	13.00	Pass
FDD02	HighRange	20	OneRB_high	Q16	4.84	13.00	Pass
FDD02	HighRange	20	fullRB	Q16	6.19	13.00	Pass
FDD04	LowRange	20	OneRB_high	Q16	5.38	13.00	Pass
FDD04	LowRange	20	fullRB	Q16	6.16	13.00	Pass
FDD04	MidRange	20	OneRB_high	Q16	6.18	13.00	Pass
FDD04	MidRange	20	fullRB	Q16	6.36	13.00	Pass
FDD04	HighRange	20	OneRB_high	Q16	5.97	13.00	Pass
FDD04	HighRange	20	fullRB	Q16	6.42	13.00	Pass



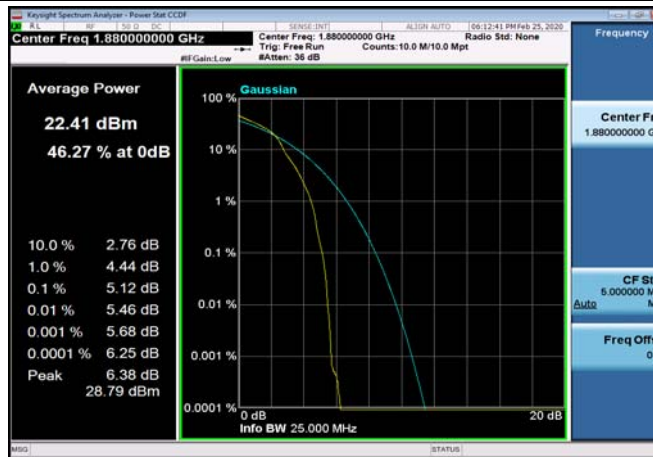
FDD02\_LowRange\_20MHz\_1860\_OneRB  
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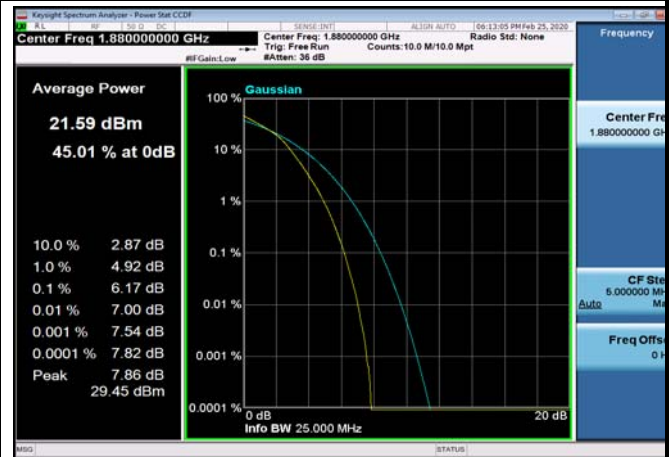
FDD02\_LowRange\_20MHz\_1860\_fullRB  
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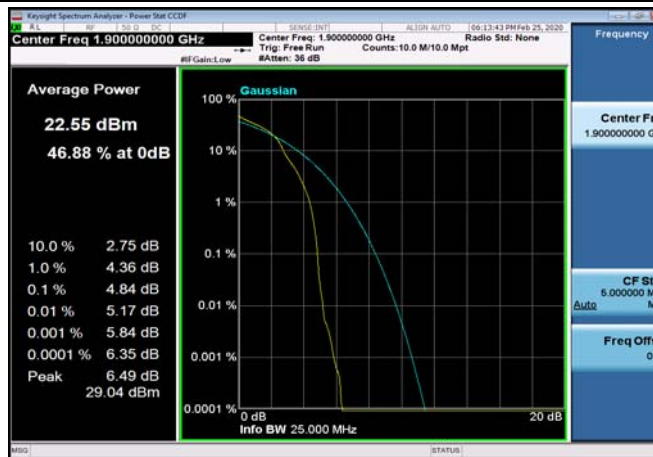
FDD02\_MidRange\_20MHz\_1880\_OneRB  
\_high\_Q16



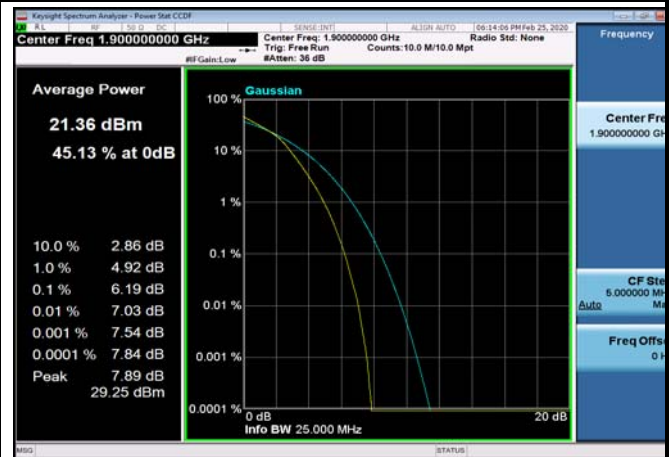
FDD02\_MidRange\_20MHz\_1880\_fullRB  
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FDD02\_HighRange\_20MHz\_1900\_OneRB  
\_high\_Q16



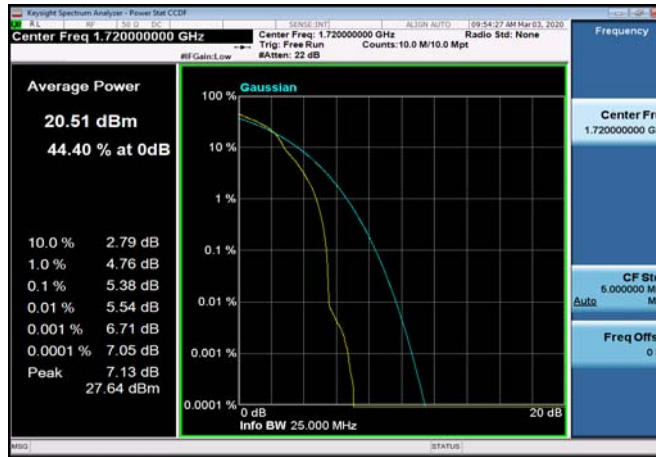
FDD02\_HighRange\_20MHz\_1900\_fullRB  
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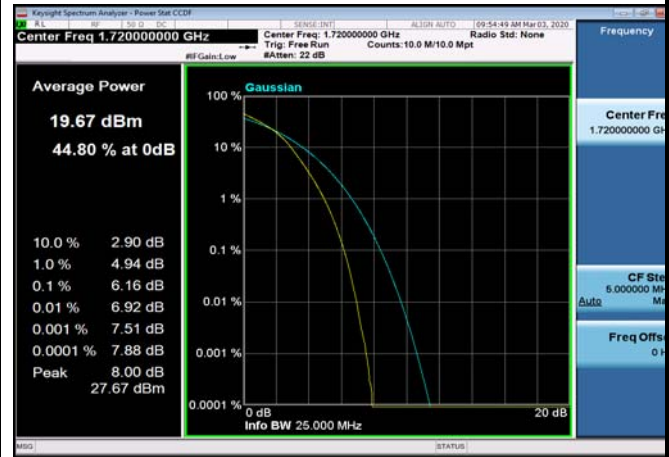




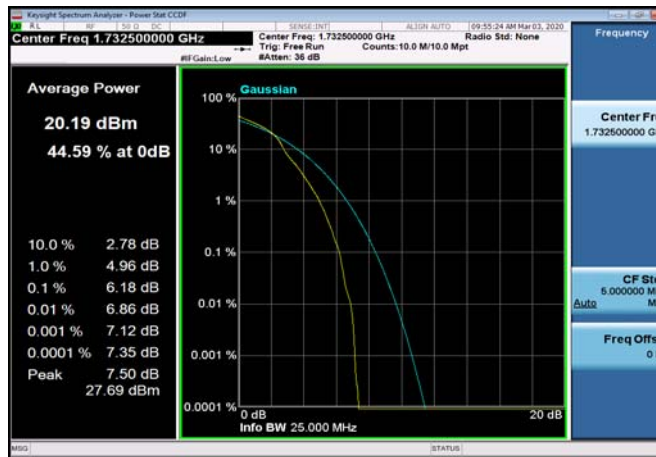
FDD04\_LowRange\_20MHz\_1720\_OneRB  
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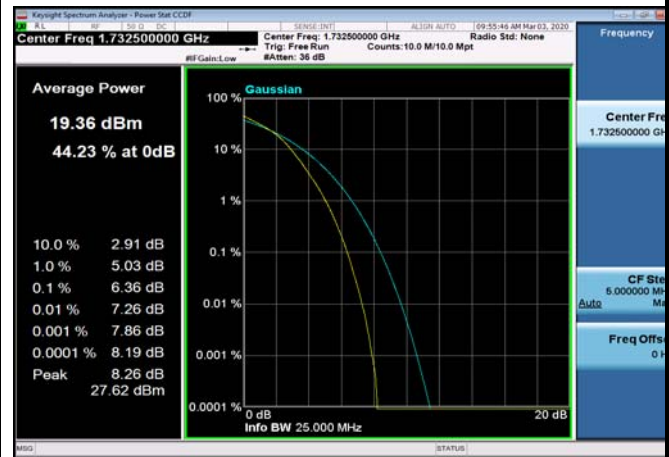
FDD04\_LowRange\_20MHz\_1720\_fullRB  
\_Q16



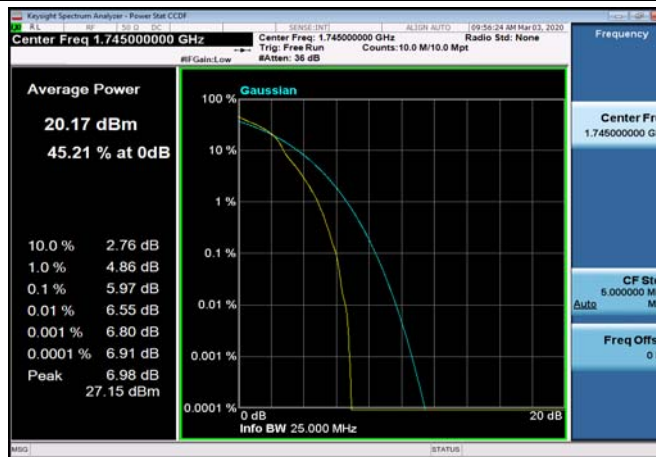
FDD04\_MidRange\_20MHz\_1732.5\_OneRB  
\_high\_Q16



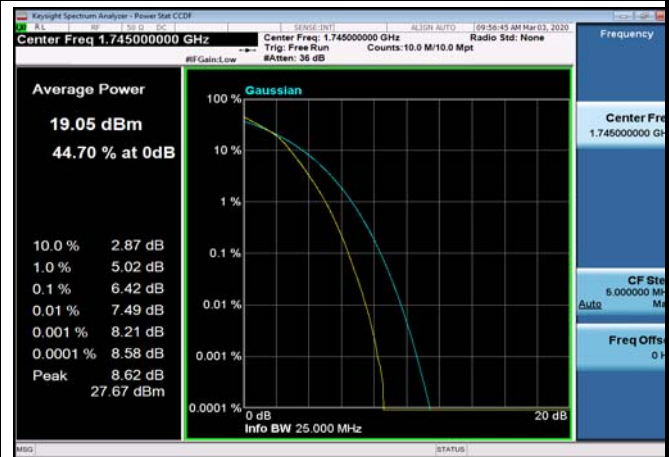
FDD04\_MidRange\_20MHz\_1732.5\_fullRB  
\_Q16



FDD04\_HighRange\_20MHz\_1745\_OneRB  
\_high\_Q16



FDD04\_HighRange\_20MHz\_1745\_fullRB  
\_Q16



**99% Occupied Bandwidth****Test Result and Data**

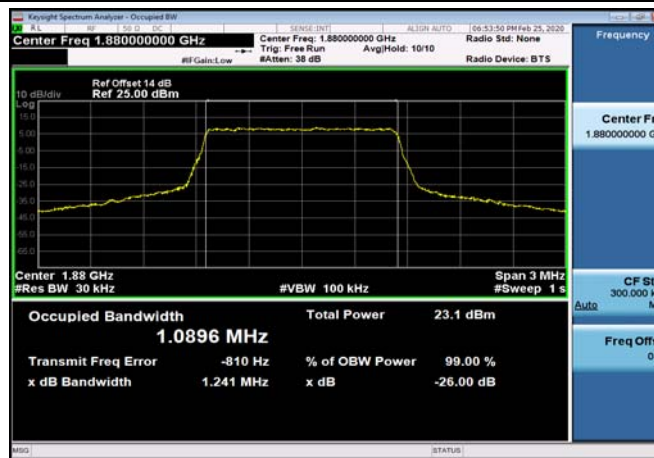
Occupied Bandwidth NormalTC_NormalVol					
Band	Range	BandWidth	Frequency (MHz)	Modulation	Occupied Bandwidth(99%) (MHz)
FDD02	MidRange	1.4	1880	QPSK	1.09
FDD02	MidRange	1.4	1880	Q16	1.085
FDD02	MidRange	3	1880	QPSK	2.679
FDD02	MidRange	3	1880	Q16	2.678
FDD02	MidRange	5	1880	QPSK	4.485
FDD02	MidRange	5	1880	Q16	4.484
FDD02	MidRange	10	1880	QPSK	8.925
FDD02	MidRange	10	1880	Q16	8.918
FDD02	MidRange	15	1880	QPSK	13.44
FDD02	MidRange	15	1880	Q16	13.439
FDD02	MidRange	20	1880	QPSK	17.904
FDD02	MidRange	20	1880	Q16	17.897
FDD04	MidRange	1.4	1732.5	QPSK	1.086
FDD04	MidRange	1.4	1732.5	Q16	1.087
FDD04	MidRange	3	1732.5	QPSK	2.679
FDD04	MidRange	3	1732.5	Q16	2.678
FDD04	MidRange	5	1732.5	QPSK	4.485
FDD04	MidRange	5	1732.5	Q16	4.483
FDD04	MidRange	10	1732.5	QPSK	8.923
FDD04	MidRange	10	1732.5	Q16	8.92
FDD04	MidRange	15	1732.5	QPSK	13.44
FDD04	MidRange	15	1732.5	Q16	13.437
FDD04	MidRange	20	1732.5	QPSK	17.887
FDD04	MidRange	20	1732.5	Q16	17.888
FDD05	MidRange	1.4	836.5	QPSK	1.087



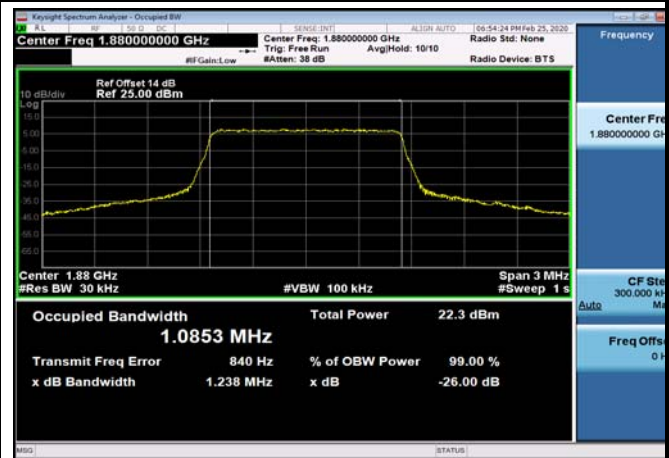
FDD05	MidRange	1.4	836.5	Q16	1.087
FDD05	MidRange	3	836.5	QPSK	2.68
FDD05	MidRange	3	836.5	Q16	2.679
FDD05	MidRange	5	836.5	QPSK	4.486
FDD05	MidRange	5	836.5	Q16	4.485
FDD05	MidRange	10	836.5	QPSK	8.928
FDD05	MidRange	10	836.5	Q16	8.923
FDD12	MidRange	1.4	707.5	QPSK	1.086
FDD12	MidRange	1.4	707.5	Q16	1.087
FDD12	MidRange	3	707.5	QPSK	2.679
FDD12	MidRange	3	707.5	Q16	2.678
FDD12	MidRange	5	707.5	QPSK	4.483
FDD12	MidRange	5	707.5	Q16	4.482
FDD12	MidRange	10	707.5	QPSK	8.914
FDD12	MidRange	10	707.5	Q16	8.911
FDD13	MidRange	5	782	QPSK	4.487
FDD13	MidRange	5	782	Q16	4.482
FDD13	MidRange	10	782	QPSK	8.927
FDD13	MidRange	10	782	Q16	8.919
FDD17	MidRange	5	710	QPSK	4.485
FDD17	MidRange	5	710	Q16	4.48
FDD17	MidRange	10	710	QPSK	8.917
FDD17	MidRange	10	710	Q16	8.909



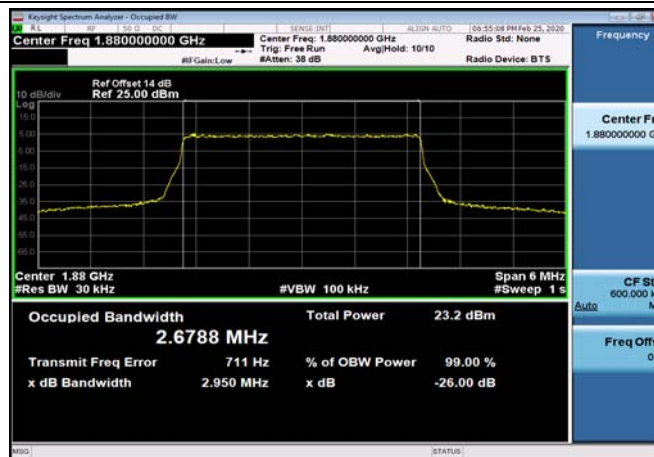
FDD02\_MidRange\_1.4\_1880\_QPSK



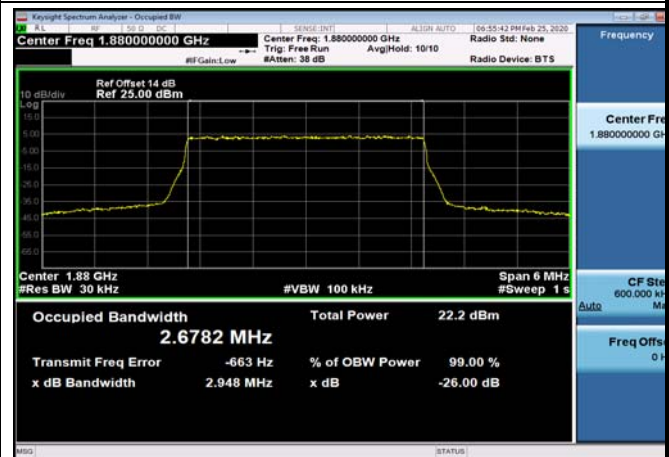
FDD02\_MidRange\_1.4\_1880\_Q16



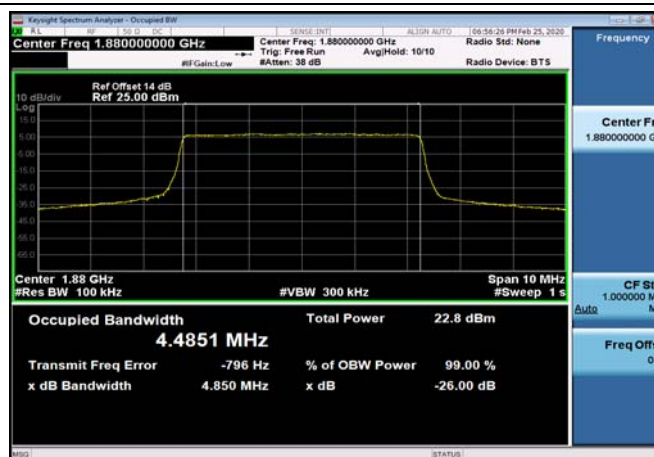
FDD02\_MidRange\_3\_1880\_QPSK



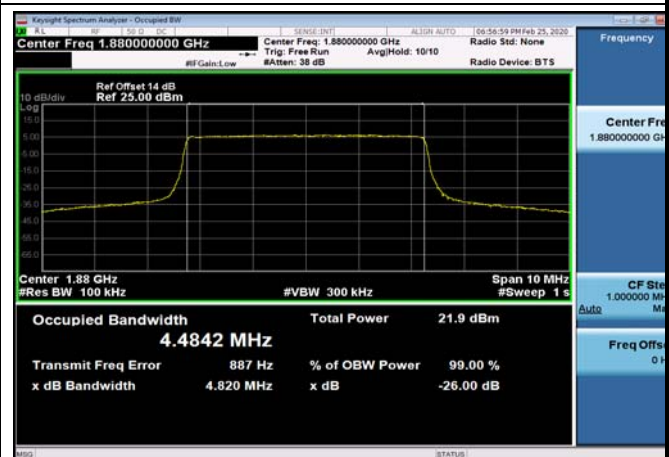
FDD02\_MidRange\_3\_1880\_Q16



FDD02\_MidRange\_5\_1880\_QPSK

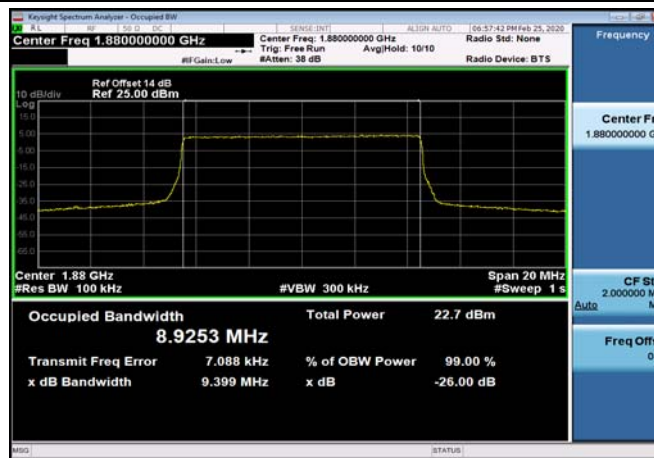


FDD02\_MidRange\_5\_1880\_Q16





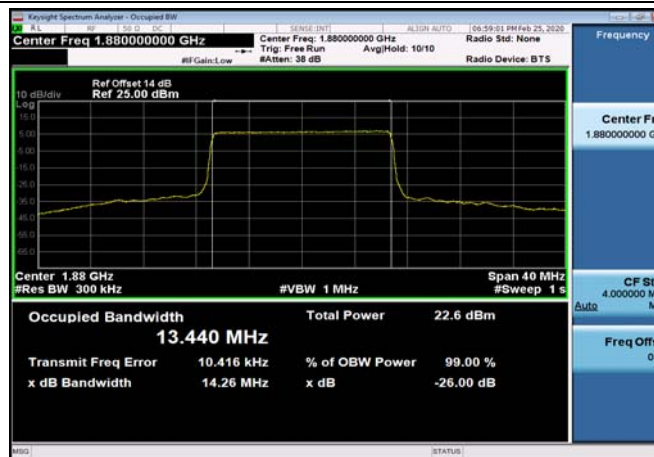
FDD02\_MidRange\_10\_1880\_QPSK



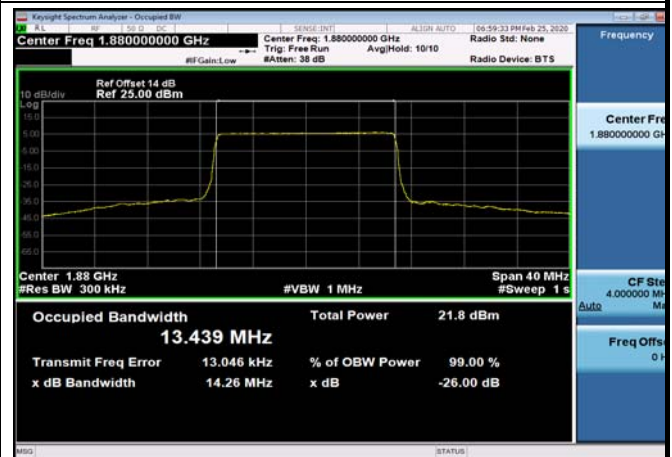
FDD02\_MidRange\_10\_1880\_Q16



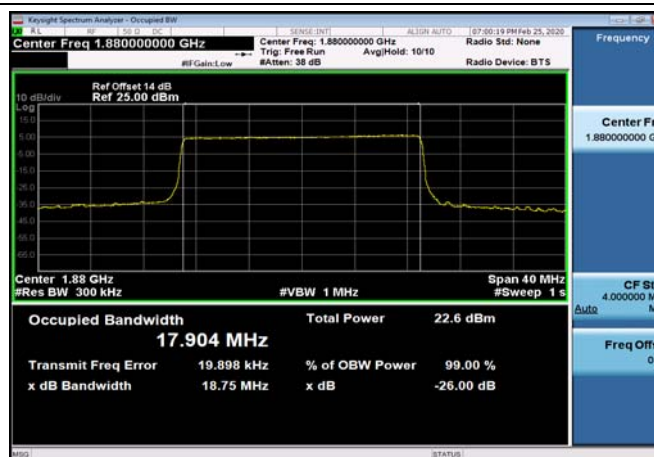
FDD02\_MidRange\_15\_1880\_QPSK



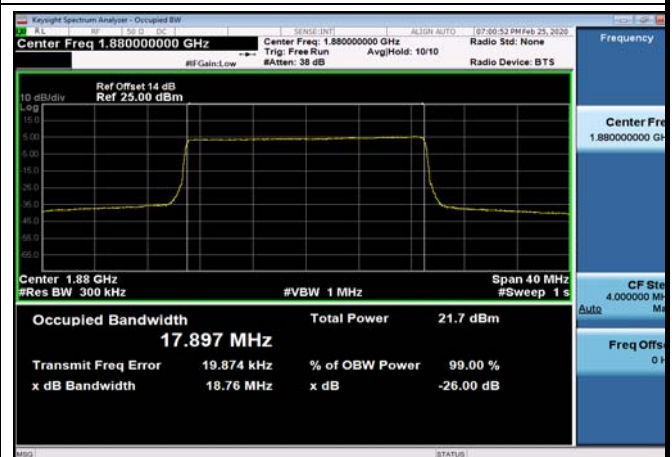
FDD02\_MidRange\_15\_1880\_Q16



FDD02\_MidRange\_20\_1880\_QPSK



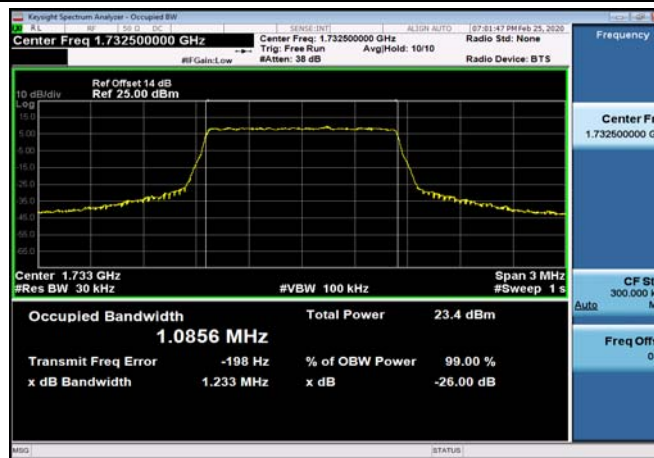
FDD02\_MidRange\_20\_1880\_Q16



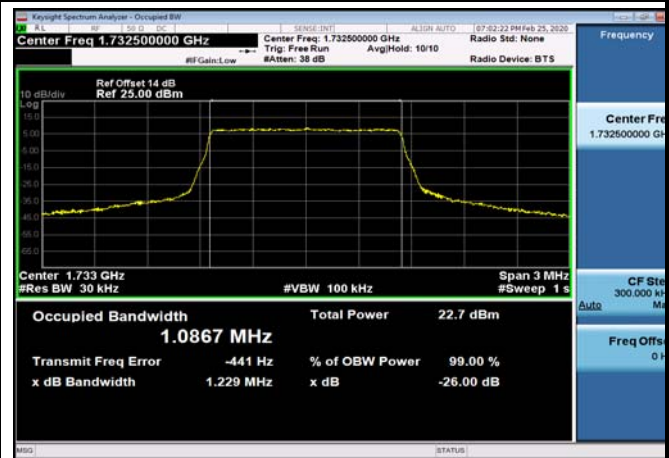




FDD04\_MidRange\_1.4\_1732.5\_QPSK



FDD04\_MidRange\_1.4\_1732.5\_Q16



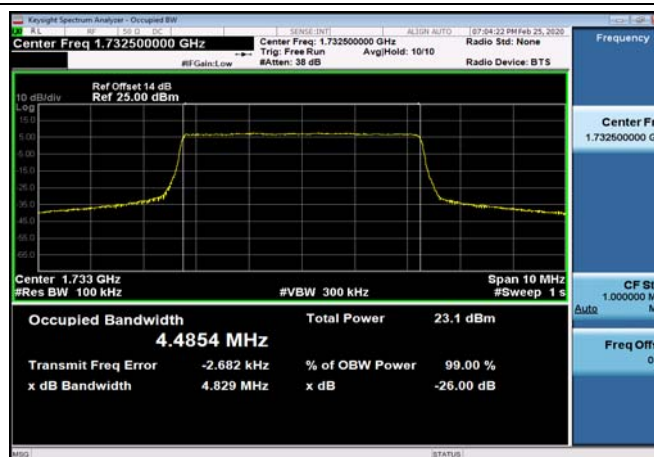
FDD04\_MidRange\_3\_1732.5\_QPSK



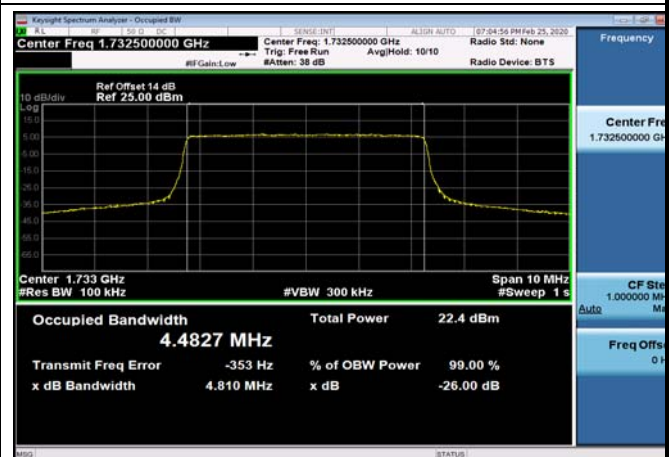
FDD04\_MidRange\_3\_1732.5\_Q16

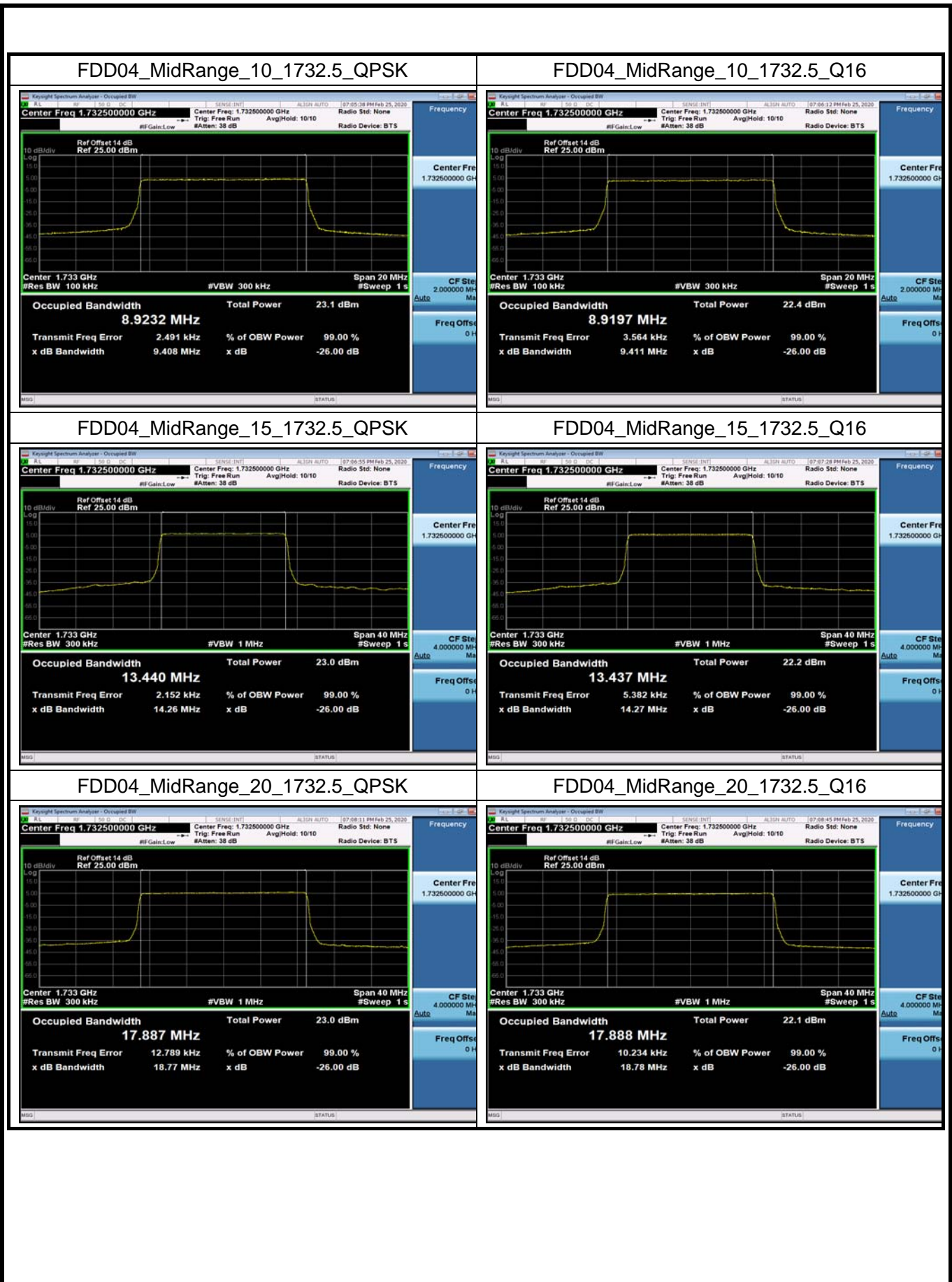


FDD04\_MidRange\_5\_1732.5\_QPSK



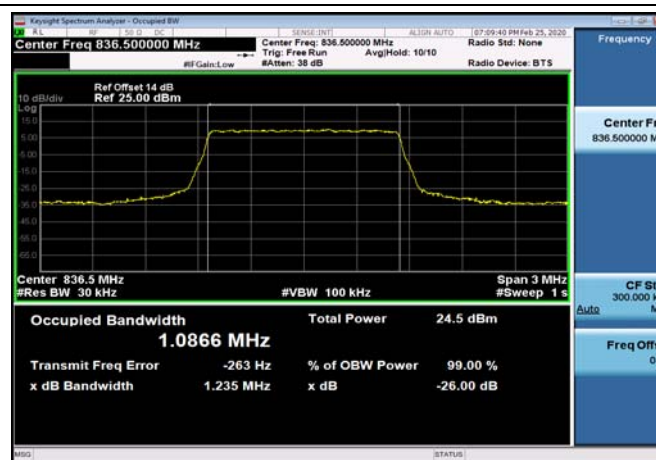
FDD04\_MidRange\_5\_1732.5\_Q16







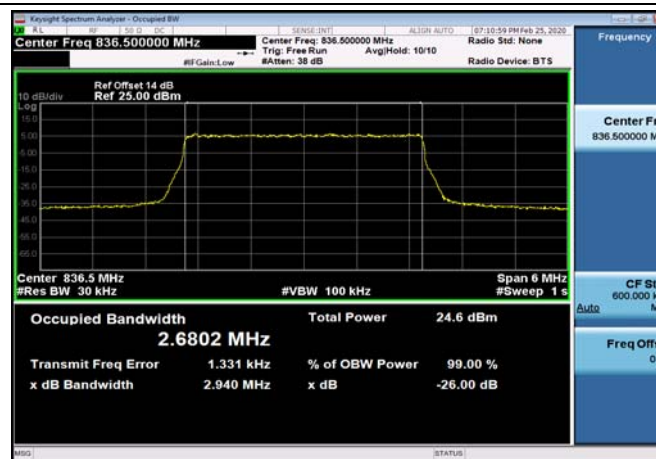
FDD05\_MidRange\_1.4\_836.5\_QPSK



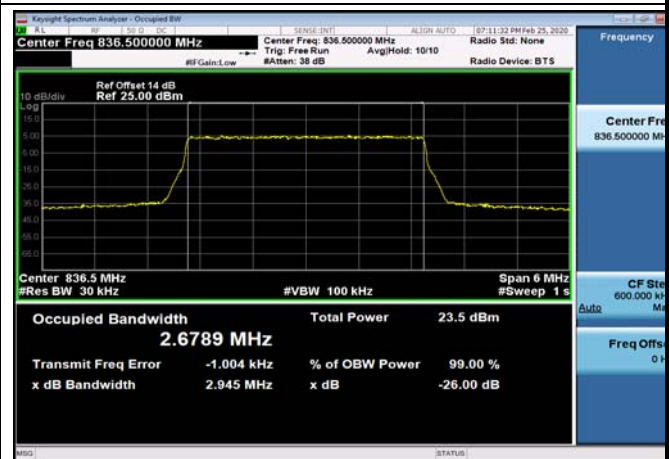
FDD05\_MidRange\_1.4\_836.5\_Q16



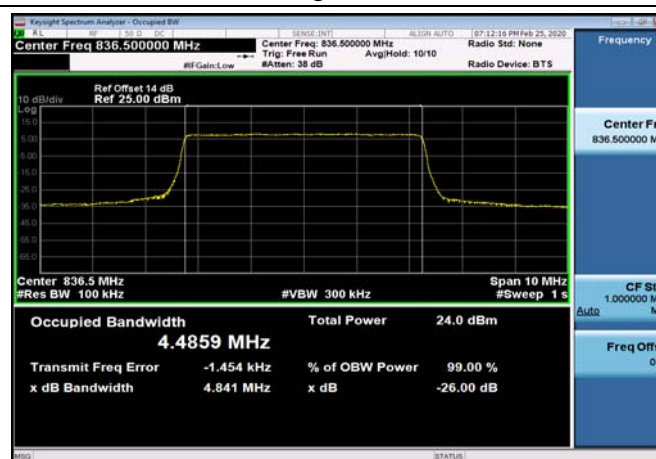
FDD05\_MidRange\_3\_836.5\_QPSK



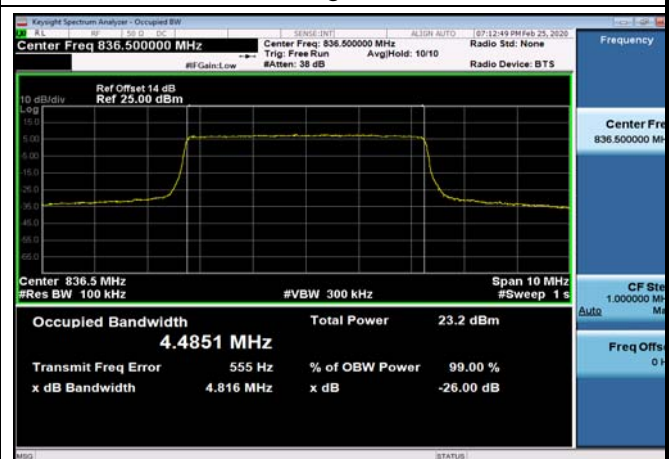
FDD05\_MidRange\_3\_836.5\_Q16



FDD05\_MidRange\_5\_836.5\_QPSK



FDD05\_MidRange\_5\_836.5\_Q16







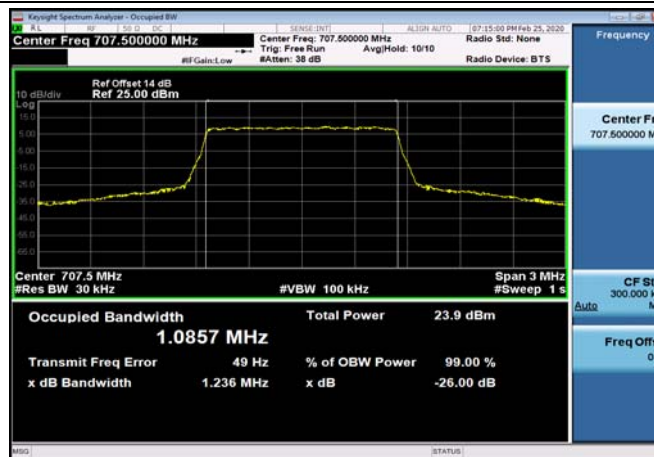
FDD05\_MidRange\_10\_836.5\_QPSK



FDD05\_MidRange\_10\_836.5\_Q16



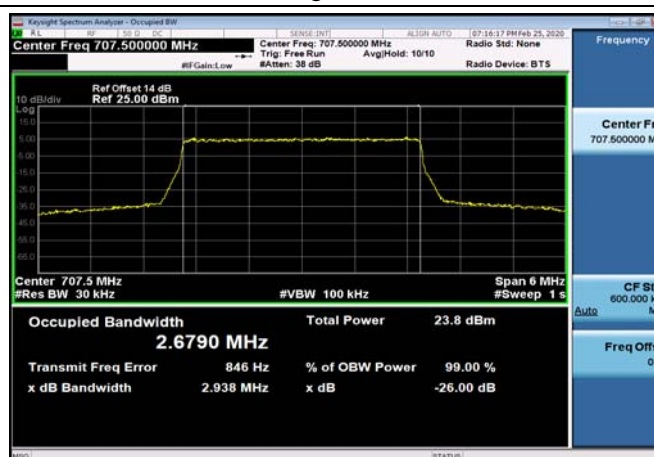
FDD12\_MidRange\_1.4\_707.5\_QPSK



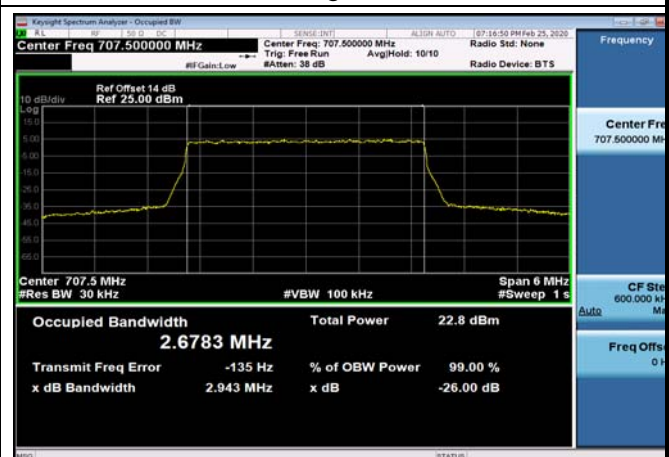
FDD12\_MidRange\_1.4\_707.5\_Q16



FDD12\_MidRange\_3\_707.5\_QPSK



FDD12\_MidRange\_3\_707.5\_Q16





FDD12\_MidRange\_5\_707.5\_QPSK



FDD12\_MidRange\_5\_707.5\_Q16



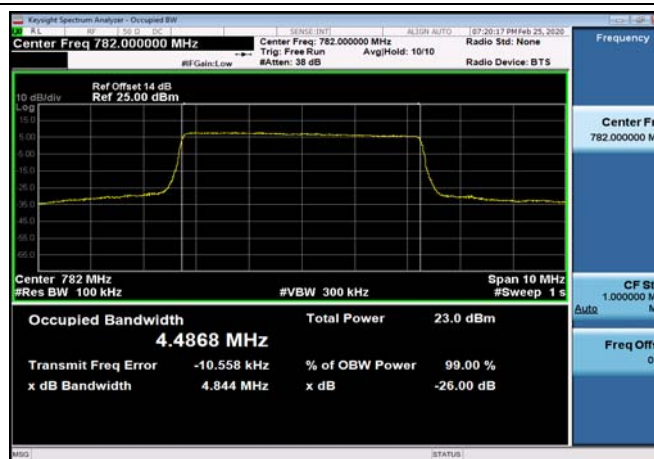
FDD12\_MidRange\_10\_707.5\_QPSK



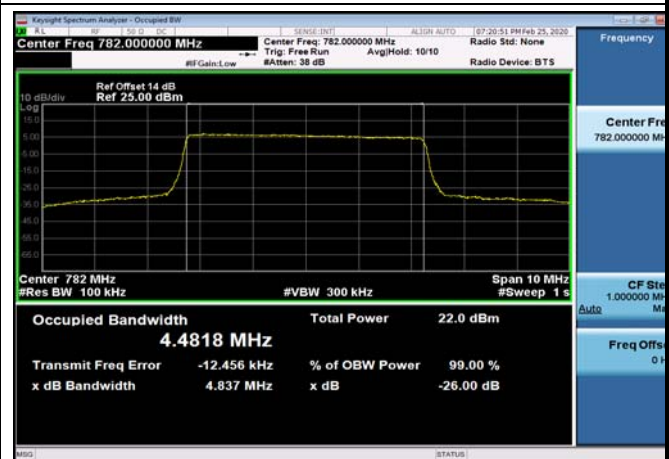
FDD12\_MidRange\_10\_707.5\_Q16



FDD13\_MidRange\_5\_782\_QPSK



FDD13\_MidRange\_5\_782\_Q16





FDD13\_MidRange\_10\_782\_QPSK



FDD13\_MidRange\_10\_782\_Q16



FDD17\_MidRange\_5\_710\_QPSK



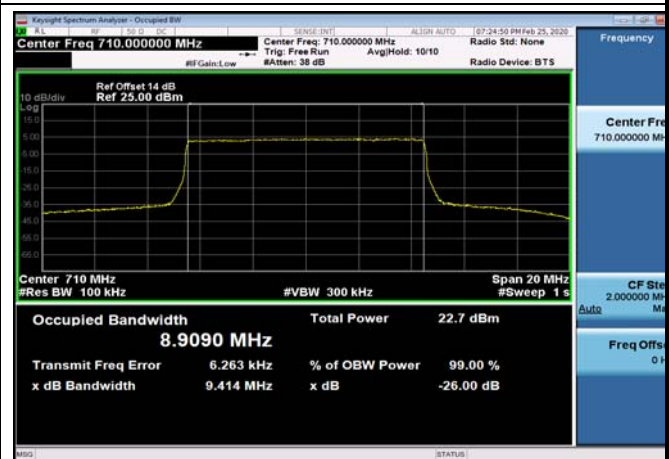
FDD17\_MidRange\_5\_710\_Q16



FDD17\_MidRange\_10\_710\_QPSK



FDD17\_MidRange\_10\_710\_Q16



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

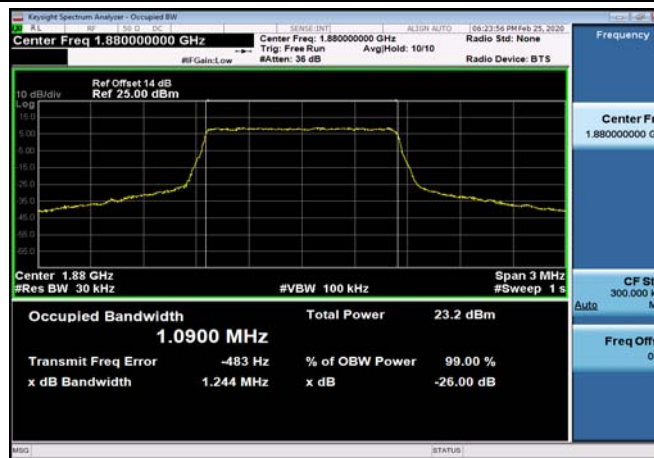
Emission Bandwidth NormalTC_NormalVol					
Band	Range	BandWidth	Frequency (MHz)	Modulation	EmissionBandwidth (MHz)
FDD02	MidRange	1.4	1880	QPSK	1.24
FDD02	MidRange	1.4	1880	Q16	1.23
FDD02	MidRange	3	1880	QPSK	3
FDD02	MidRange	3	1880	Q16	3
FDD02	MidRange	5	1880	QPSK	4.83
FDD02	MidRange	5	1880	Q16	4.81
FDD02	MidRange	10	1880	QPSK	9.4
FDD02	MidRange	10	1880	Q16	9.4
FDD02	MidRange	15	1880	QPSK	14.26
FDD02	MidRange	15	1880	Q16	14.26
FDD02	MidRange	20	1880	QPSK	18.77
FDD02	MidRange	20	1880	Q16	18.77
FDD04	MidRange	1.4	1732.5	QPSK	1.23
FDD04	MidRange	1.4	1732.5	Q16	1.23
FDD04	MidRange	3	1732.5	QPSK	3
FDD04	MidRange	3	1732.5	Q16	3
FDD04	MidRange	5	1732.5	QPSK	4.84
FDD04	MidRange	5	1732.5	Q16	4.81
FDD04	MidRange	10	1732.5	QPSK	9.41
FDD04	MidRange	10	1732.5	Q16	9.41
FDD04	MidRange	15	1732.5	QPSK	14.26
FDD04	MidRange	15	1732.5	Q16	14.26
FDD04	MidRange	20	1732.5	QPSK	18.77
FDD04	MidRange	20	1732.5	Q16	18.78
FDD05	MidRange	3	836.5	QPSK	3
FDD05	MidRange	3	836.5	Q16	3



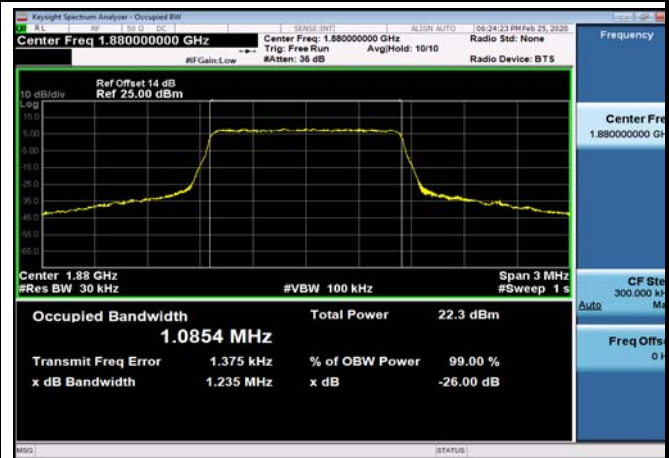
FDD05	MidRange	5	836.5	QPSK	4.84
FDD05	MidRange	5	836.5	Q16	4.82
FDD05	MidRange	10	836.5	QPSK	9.41
FDD05	MidRange	10	836.5	Q16	9.43
FDD12	MidRange	1.4	707.5	QPSK	1.23
FDD12	MidRange	1.4	707.5	Q16	1.23
FDD12	MidRange	3	707.5	QPSK	3
FDD12	MidRange	3	707.5	Q16	3
FDD12	MidRange	5	707.5	QPSK	4.84
FDD12	MidRange	5	707.5	Q16	4.82
FDD12	MidRange	10	707.5	QPSK	9.4
FDD12	MidRange	10	707.5	Q16	9.38
FDD13	MidRange	5	782	QPSK	4.83
FDD13	MidRange	5	782	Q16	4.83
FDD13	MidRange	10	782	QPSK	9.39
FDD13	MidRange	10	782	Q16	9.38
FDD17	MidRange	5	710	QPSK	4.83
FDD17	MidRange	5	710	Q16	4.84
FDD17	MidRange	10	710	QPSK	9.4
FDD17	MidRange	10	710	Q16	9.4



FDD02\_MidRange\_1.4MHz\_1880MHz\_QPSK



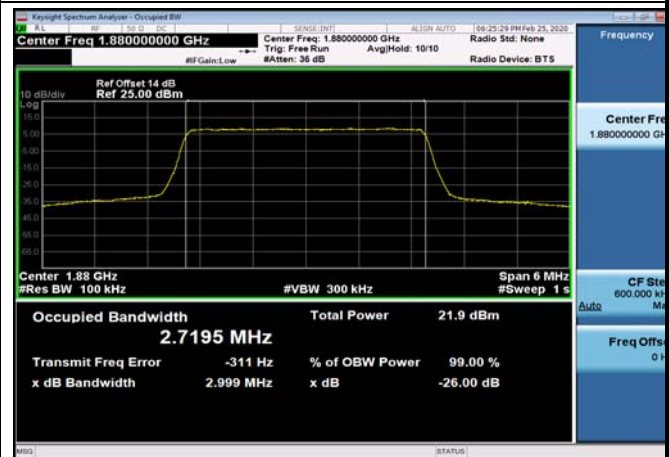
FDD02\_MidRange\_1.4MHz\_1880MHz\_Q16



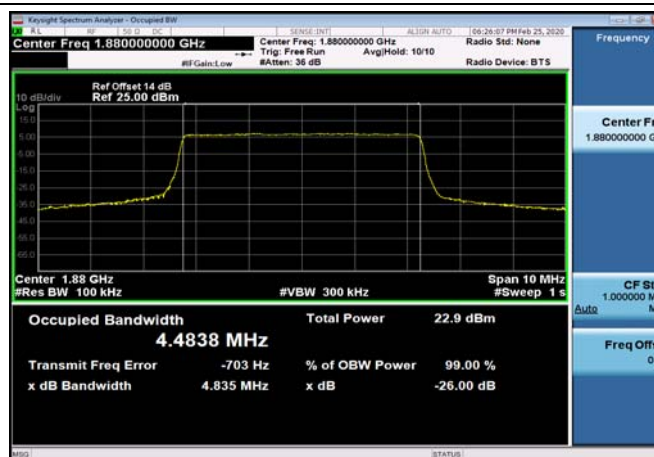
FDD02\_MidRange\_3MHz\_1880MHz\_QPSK



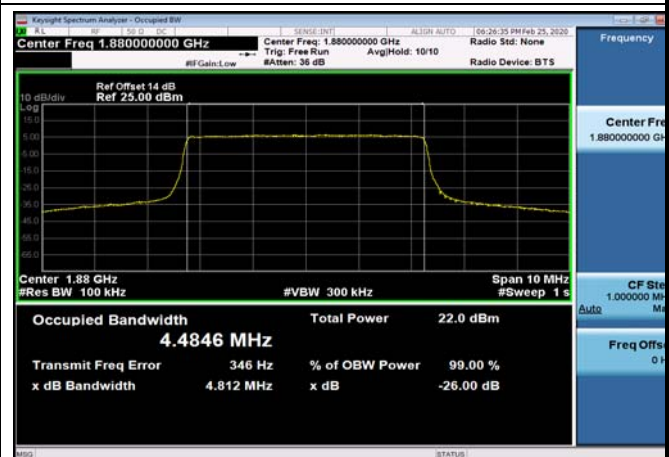
FDD02\_MidRange\_3MHz\_1880MHz\_Q16



FDD02\_MidRange\_5MHz\_1880MHz\_QPSK



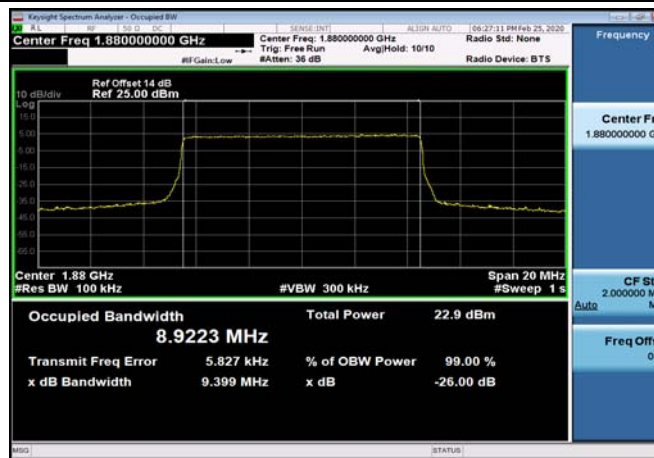
FDD02\_MidRange\_5MHz\_1880MHz\_Q16



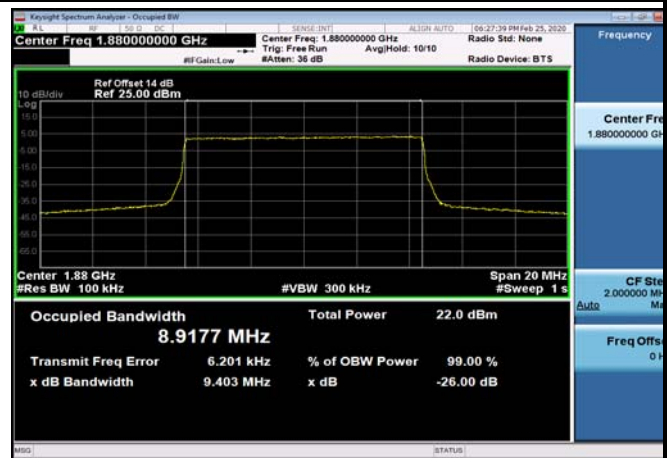




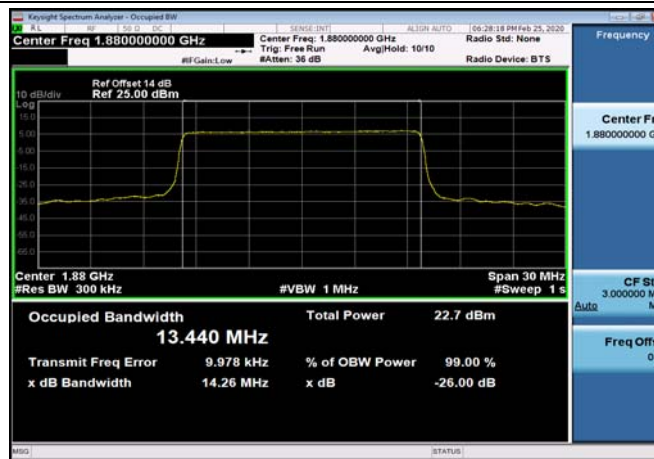
FDD02\_MidRange\_10MHz\_1880MHz\_QPSK



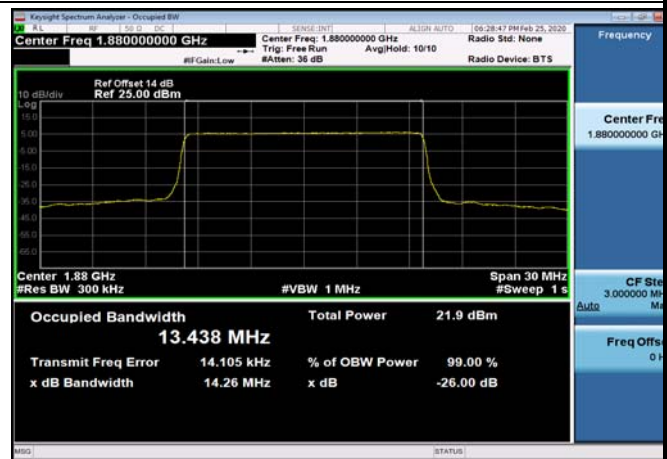
FDD02\_MidRange\_10MHz\_1880MHz\_Q16



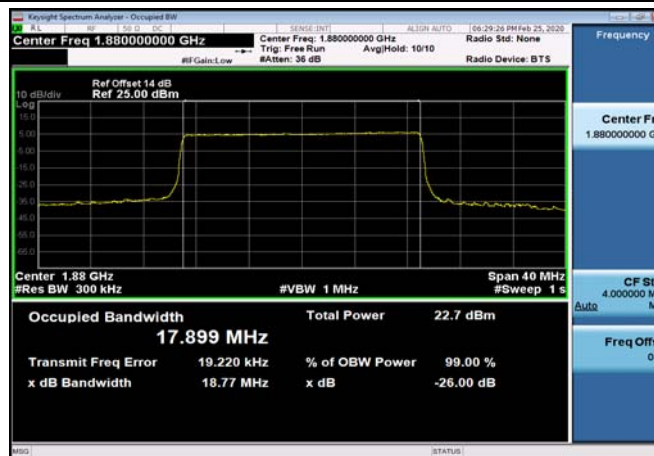
FDD02\_MidRange\_15MHz\_1880MHz\_QPSK



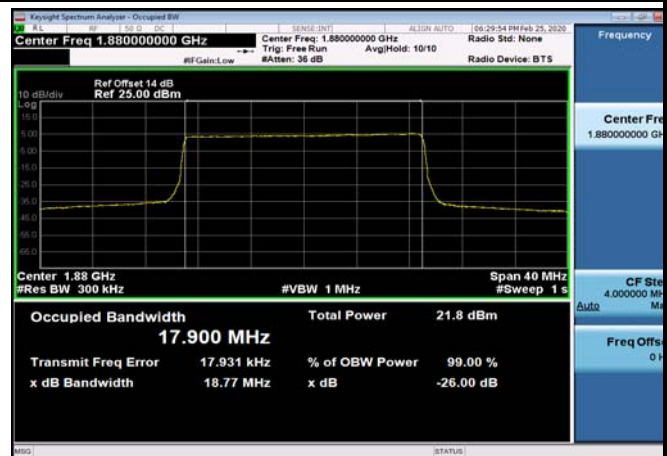
FDD02\_MidRange\_15MHz\_1880MHz\_Q16



FDD02\_MidRange\_20MHz\_1880MHz\_QPSK

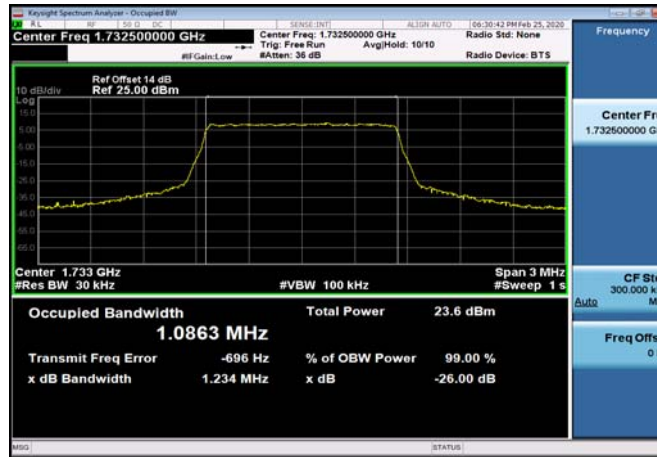


FDD02\_MidRange\_20MHz\_1880MHz\_Q16

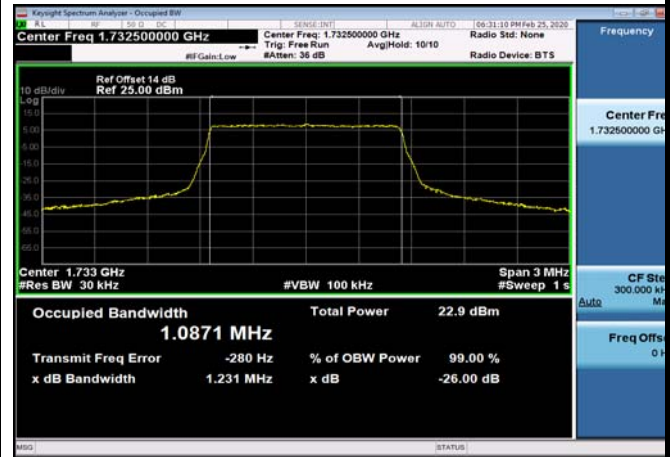




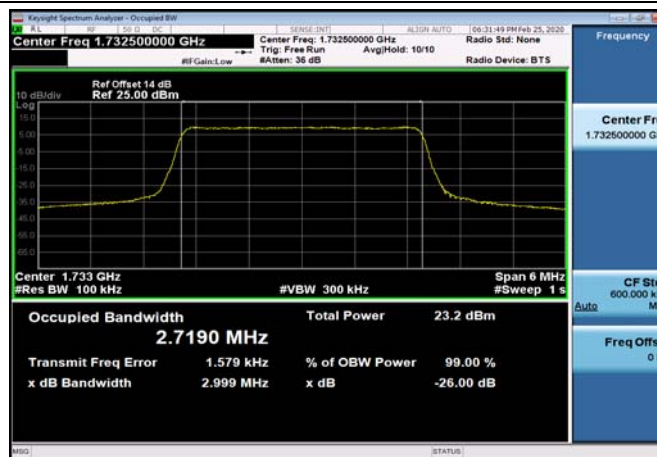
FDD04\_MidRange\_1.4MHz\_1732.5MHz\_QPSK



FDD04\_MidRange\_1.4MHz\_1732.5MHz\_Q16



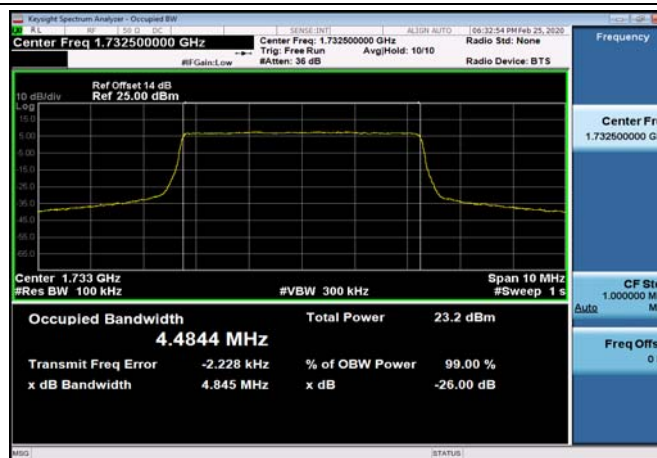
FDD04\_MidRange\_3MHz\_1732.5MHz\_QPSK



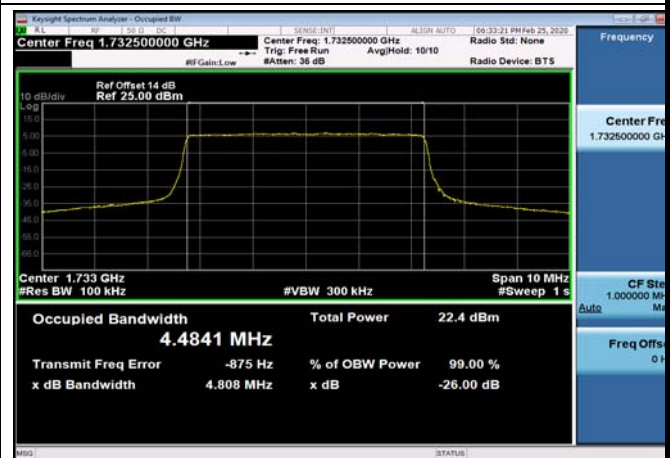
FDD04\_MidRange\_3MHz\_1732.5MHz\_Q16



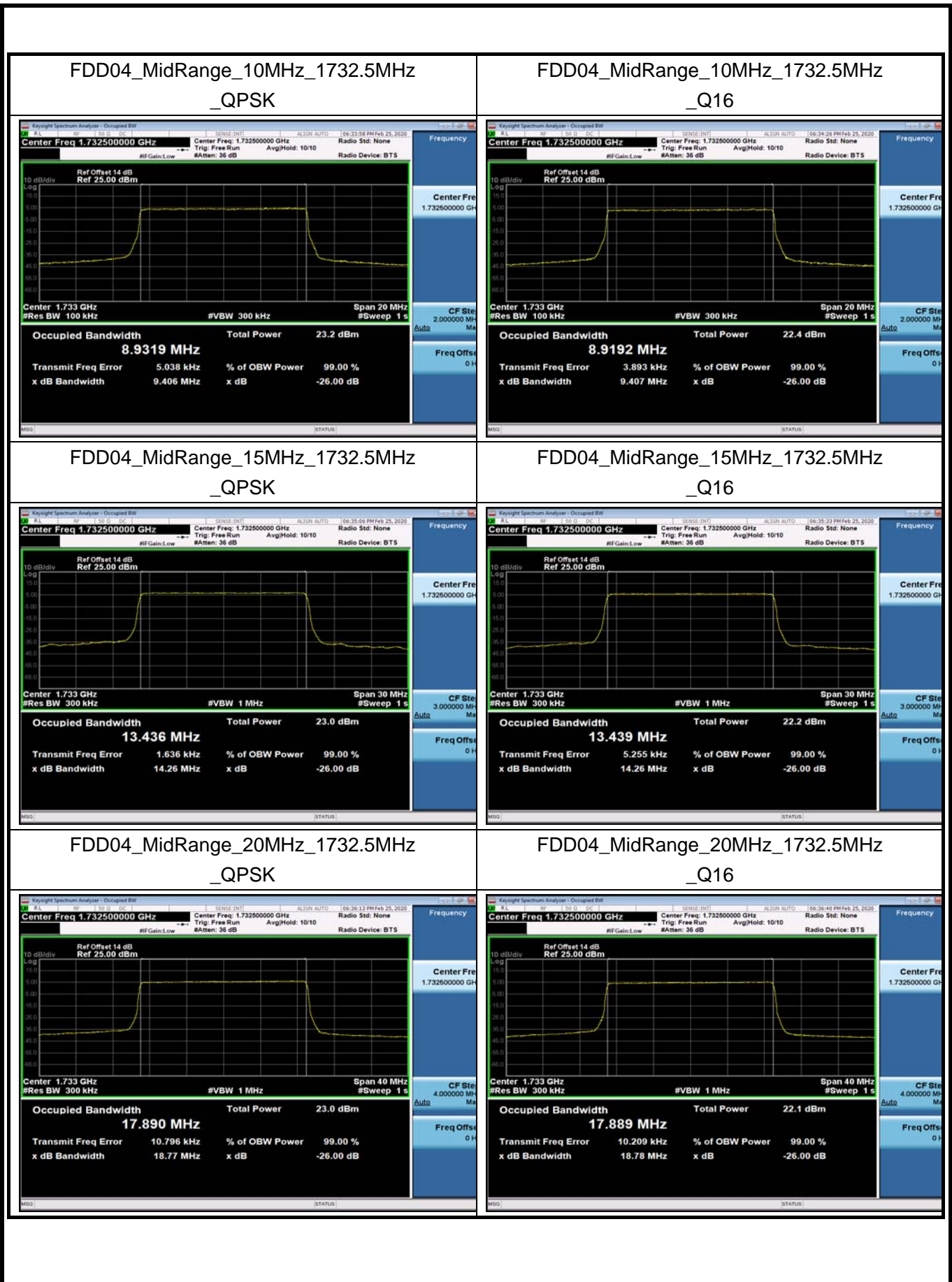
FDD04\_MidRange\_5MHz\_1732.5MHz\_QPSK



FDD04\_MidRange\_5MHz\_1732.5MHz\_Q16









FDD05\_MidRange\_3MHz\_836.5MHz\_QPSK



FDD05\_MidRange\_3MHz\_836.5MHz\_Q16



FDD05\_MidRange\_5MHz\_836.5MHz\_QPSK



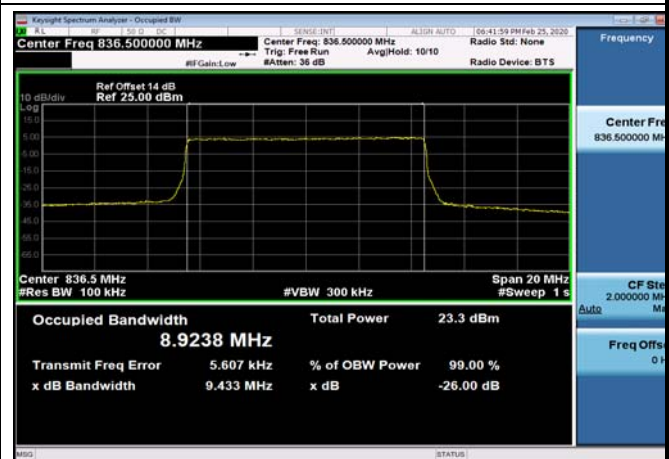
FDD05\_MidRange\_5MHz\_836.5MHz\_Q16



FDD05\_MidRange\_10MHz\_836.5MHz\_QPSK



FDD05\_MidRange\_10MHz\_836.5MHz\_Q16





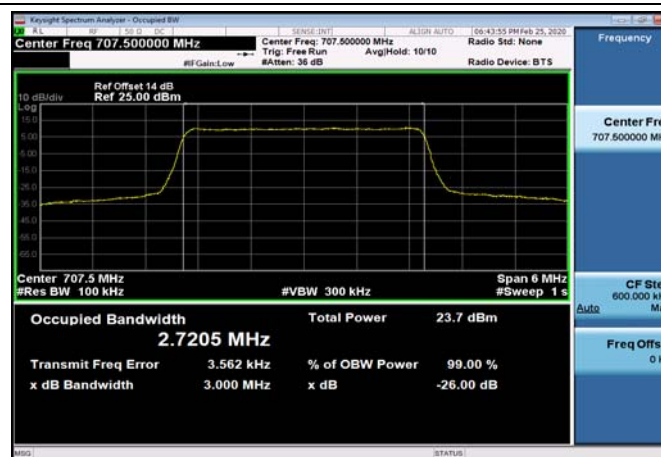
FDD12\_MidRange\_1.4MHz\_707.5MHz\_QPSK



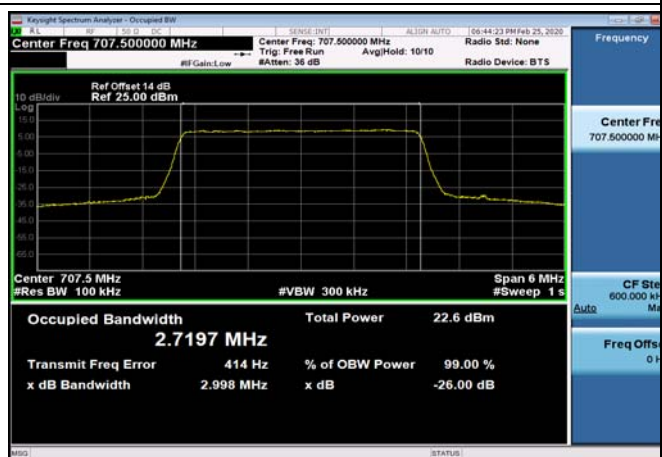
FDD12\_MidRange\_1.4MHz\_707.5MHz\_Q16



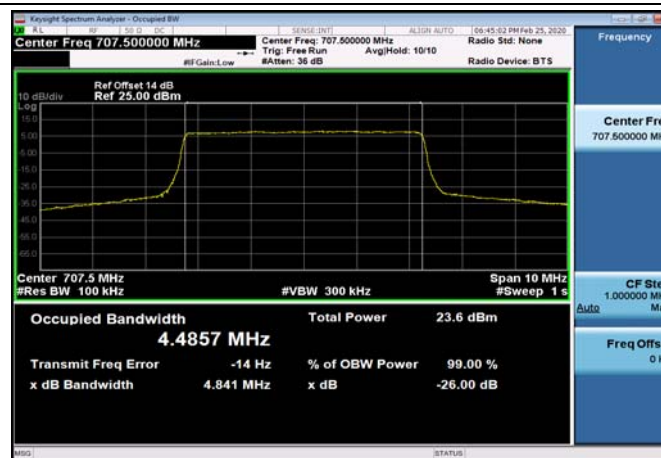
FDD12\_MidRange\_3MHz\_707.5MHz\_QPSK



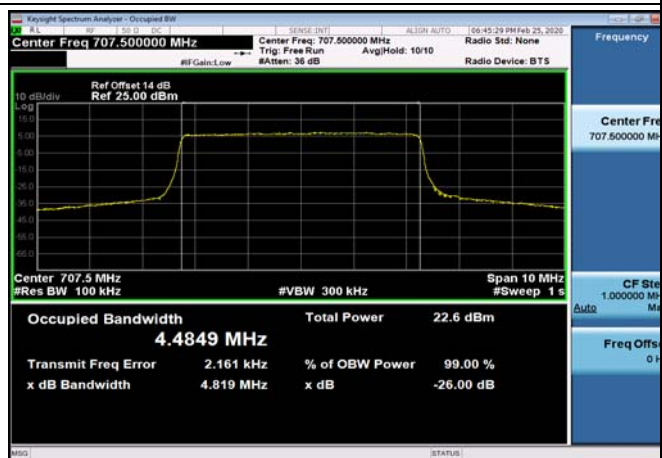
FDD12\_MidRange\_3MHz\_707.5MHz\_Q16



FDD12\_MidRange\_5MHz\_707.5MHz\_QPSK



FDD12\_MidRange\_5MHz\_707.5MHz\_Q16

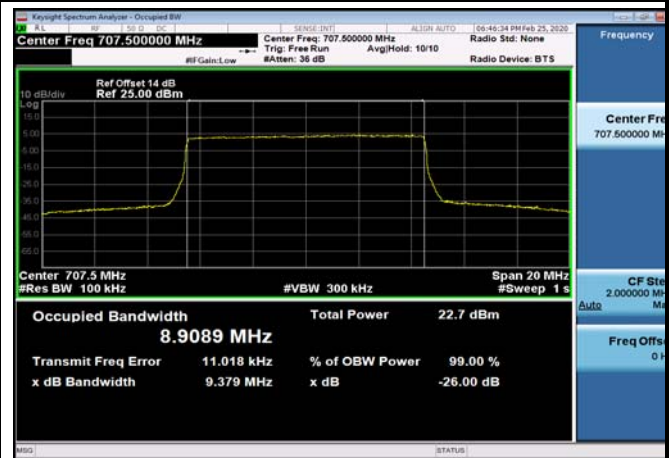




FDD12\_MidRange\_10MHz\_707.5MHz\_QPSK



FDD12\_MidRange\_10MHz\_707.5MHz\_Q16



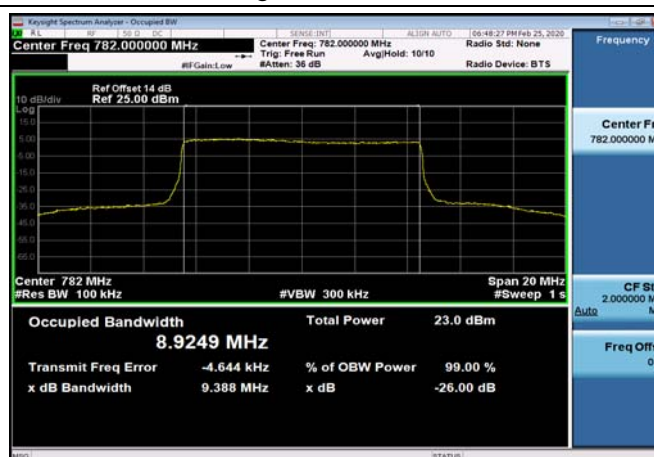
FDD13\_MidRange\_5MHz\_782MHz\_QPSK



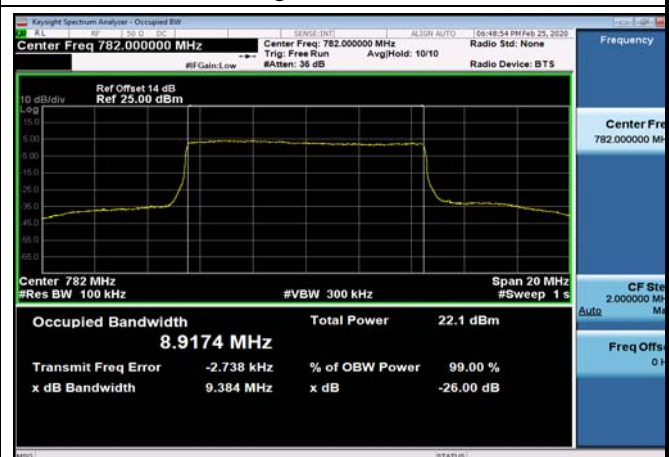
FDD13\_MidRange\_5MHz\_782MHz\_Q16



FDD13\_MidRange\_10MHz\_782MHz\_QPSK



FDD13\_MidRange\_10MHz\_782MHz\_Q16





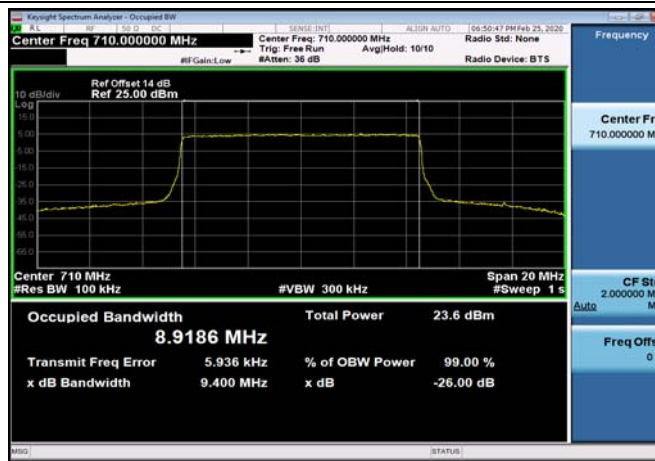
### FDD17\_MidRange\_5MHz\_710MHz\_QPSK



### FDD17\_MidRange\_5MHz\_710MHz\_Q16



### FDD17\_MidRange\_10MHz\_710MHz\_QPSK



### FDD17\_MidRange\_10MHz\_710MHz\_Q16







## 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	-49.825	0.027	±2.5	Pass
Normal	Normal	FDD02	10	fullRB	QPSK	-58.136	0.031	±2.5	Pass
Normal	High	FDD02	10	fullRB	QPSK	-45.547	0.024	±2.5	Pass
50	Normal	FDD02	10	fullRB	QPSK	-48.122	0.026	±2.5	Pass
40	Normal	FDD02	10	fullRB	QPSK	-58.022	0.031	±2.5	Pass
30	Normal	FDD02	10	fullRB	QPSK	-45.061	0.024	±2.5	Pass
20	Normal	FDD02	10	fullRB	QPSK	-45.648	0.024	±2.5	Pass
10	Normal	FDD02	10	fullRB	QPSK	-35.119	0.019	±2.5	Pass
0	Normal	FDD02	10	fullRB	QPSK	-41.685	0.022	±2.5	Pass
-10	Normal	FDD02	10	fullRB	QPSK	-55.833	0.030	±2.5	Pass
-20	Normal	FDD02	10	fullRB	QPSK	-36.106	0.019	±2.5	Pass
-30	Normal	FDD02	10	fullRB	QPSK	-27.137	0.014	±2.5	Pass
Normal	Low	FDD04	10	fullRB	QPSK	-48.780	0.028	±2.5	Pass
Normal	Normal	FDD04	10	fullRB	QPSK	-32.673	0.019	±2.5	Pass
Normal	High	FDD04	10	fullRB	QPSK	-20.328	0.012	±2.5	Pass
50	Normal	FDD04	10	fullRB	QPSK	-41.256	0.024	±2.5	Pass
40	Normal	FDD04	10	fullRB	QPSK	-32.802	0.019	±2.5	Pass
30	Normal	FDD04	10	fullRB	QPSK	-28.567	0.016	±2.5	Pass
20	Normal	FDD04	10	fullRB	QPSK	-13.175	0.008	±2.5	Pass
10	Normal	FDD04	10	fullRB	QPSK	-36.936	0.021	±2.5	Pass
0	Normal	FDD04	10	fullRB	QPSK	-7.725	0.004	±2.5	Pass
-10	Normal	FDD04	10	fullRB	QPSK	-26.808	0.015	±2.5	Pass
-20	Normal	FDD04	10	fullRB	QPSK	-23.947	0.014	±2.5	Pass
-30	Normal	FDD04	10	fullRB	QPSK	-26.579	0.015	±2.5	Pass
Normal	Low	FDD05	10	fullRB	QPSK	-43.473	0.052	±2.5	Pass
Normal	Normal	FDD05	10	fullRB	QPSK	-41.556	0.050	±2.5	Pass
Normal	High	FDD05	10	fullRB	QPSK	-20.041	0.024	±2.5	Pass



50	Normal	FDD05	10	fullRB	QPSK	-50.325	0.060	±2.5	Pass
40	Normal	FDD05	10	fullRB	QPSK	-27.308	0.033	±2.5	Pass
30	Normal	FDD05	10	fullRB	QPSK	-51.627	0.062	±2.5	Pass
20	Normal	FDD05	10	fullRB	QPSK	-21.400	0.026	±2.5	Pass
10	Normal	FDD05	10	fullRB	QPSK	-40.283	0.048	±2.5	Pass
0	Normal	FDD05	10	fullRB	QPSK	-7.253	0.009	±2.5	Pass
-10	Normal	FDD05	10	fullRB	QPSK	-22.073	0.026	±2.5	Pass
-20	Normal	FDD05	10	fullRB	QPSK	-36.135	0.043	±2.5	Pass
-30	Normal	FDD05	10	fullRB	QPSK	-49.067	0.059	±2.5	Pass
Normal	Low	FDD12	10	fullRB	QPSK	-3.562	0.005	±2.5	Pass
Normal	Normal	FDD12	10	fullRB	QPSK	-25.620	0.036	±2.5	Pass
Normal	High	FDD12	10	fullRB	QPSK	-43.945	0.062	±2.5	Pass
50	Normal	FDD12	10	fullRB	QPSK	-10.285	0.015	±2.5	Pass
40	Normal	FDD12	10	fullRB	QPSK	-25.835	0.037	±2.5	Pass
30	Normal	FDD12	10	fullRB	QPSK	-39.740	0.056	±2.5	Pass
20	Normal	FDD12	10	fullRB	QPSK	-49.539	0.070	±2.5	Pass
10	Normal	FDD12	10	fullRB	QPSK	-10.099	0.014	±2.5	Pass
0	Normal	FDD12	10	fullRB	QPSK	-20.256	0.029	±2.5	Pass
-10	Normal	FDD12	10	fullRB	QPSK	-28.410	0.040	±2.5	Pass
-20	Normal	FDD12	10	fullRB	QPSK	-31.500	0.045	±2.5	Pass
-30	Normal	FDD12	10	fullRB	QPSK	-29.411	0.042	±2.5	Pass
Normal	Low	FDD13	10	fullRB	QPSK	12.631	0.016	±2.5	Pass
Normal	Normal	FDD13	10	fullRB	QPSK	-14.148	0.018	±2.5	Pass
Normal	High	FDD13	10	fullRB	QPSK	-35.563	0.045	±2.5	Pass
50	Normal	FDD13	10	fullRB	QPSK	-50.168	0.064	±2.5	Pass
40	Normal	FDD13	10	fullRB	QPSK	-14.620	0.019	±2.5	Pass
30	Normal	FDD13	10	fullRB	QPSK	-20.285	0.026	±2.5	Pass
20	Normal	FDD13	10	fullRB	QPSK	-21.930	0.028	±2.5	Pass
10	Normal	FDD13	10	fullRB	QPSK	-20.385	0.026	±2.5	Pass
0	Normal	FDD13	10	fullRB	QPSK	-19.698	0.025	±2.5	Pass
-10	Normal	FDD13	10	fullRB	QPSK	-23.975	0.031	±2.5	Pass
-20	Normal	FDD13	10	fullRB	QPSK	-24.819	0.032	±2.5	Pass



-30	Normal	FDD13	10	fullRB	QPSK	-26.078	0.033	±2.5	Pass
Normal	Low	FDD17	10	fullRB	QPSK	7.825	0.011	±2.5	Pass
Normal	Normal	FDD17	10	fullRB	QPSK	-20.413	0.029	±2.5	Pass
Normal	High	FDD17	10	fullRB	QPSK	-40.541	0.057	±2.5	Pass
50	Normal	FDD17	10	fullRB	QPSK	-12.116	0.017	±2.5	Pass
40	Normal	FDD17	10	fullRB	QPSK	-22.888	0.032	±2.5	Pass
30	Normal	FDD17	10	fullRB	QPSK	-33.374	0.047	±2.5	Pass
20	Normal	FDD17	10	fullRB	QPSK	-37.408	0.053	±2.5	Pass
10	Normal	FDD17	10	fullRB	QPSK	-38.939	0.055	±2.5	Pass
0	Normal	FDD17	10	fullRB	QPSK	-37.265	0.052	±2.5	Pass
-10	Normal	FDD17	10	fullRB	QPSK	-39.840	0.056	±2.5	Pass
-20	Normal	FDD17	10	fullRB	QPSK	-42.186	0.059	±2.5	Pass
-30	Normal	FDD17	10	fullRB	QPSK	-41.327	0.058	±2.5	Pass

Note: Normal=3.8V, Low=3.5V, High=4.2V

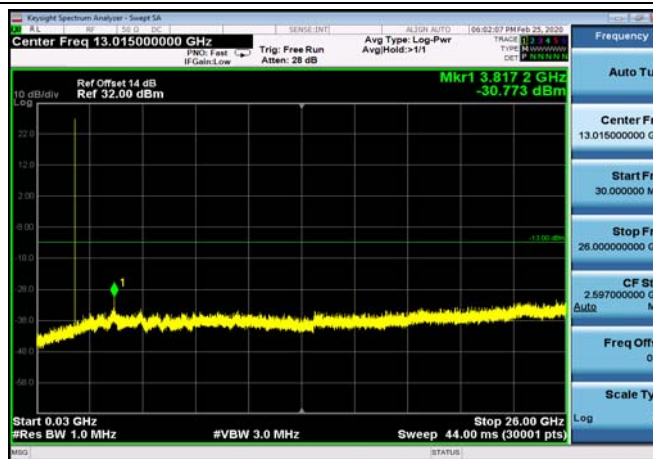




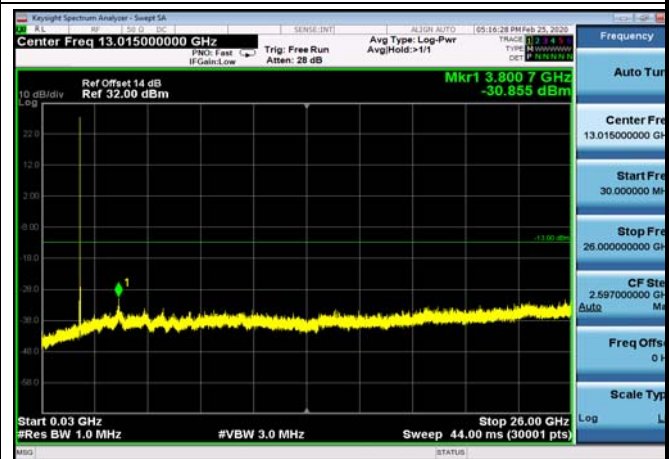
# Conducted Out of Band Emissions

## Test Result and Data

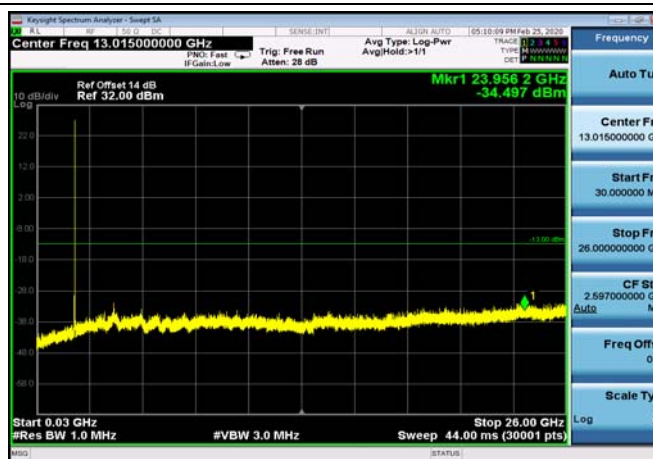
FDD02\_HighRange\_1.4MHz\_30MHz~26GHz



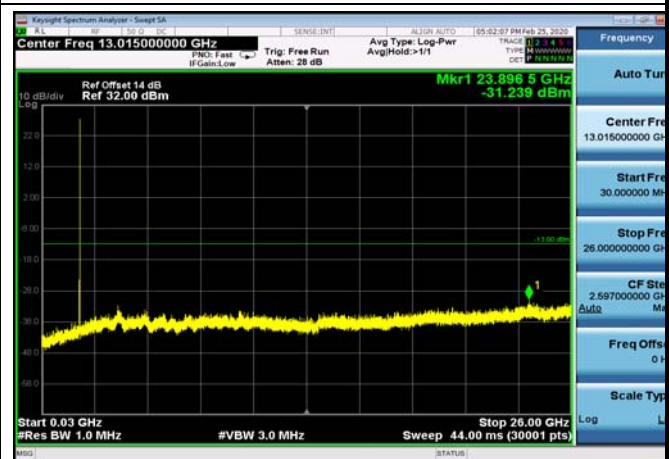
FDD02\_HighRange\_10MHz\_30MHz~26GHz



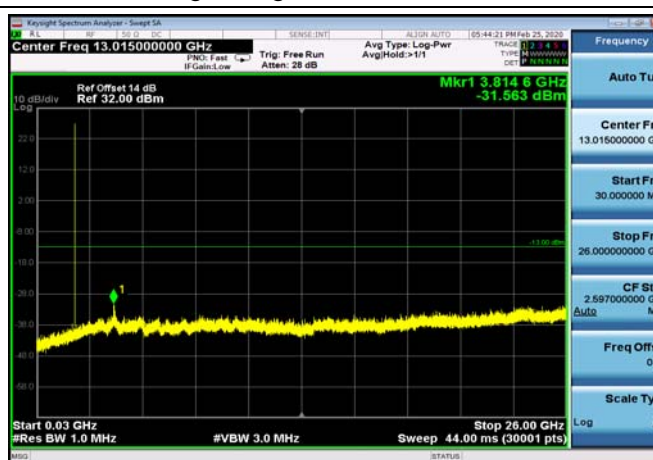
FDD02\_HighRange\_15MHz\_30MHz~26GHz



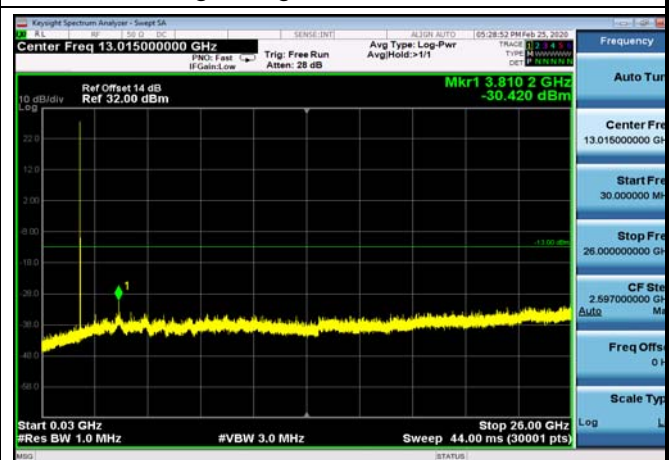
FDD02\_HighRange\_20MHz\_30MHz~26GHz

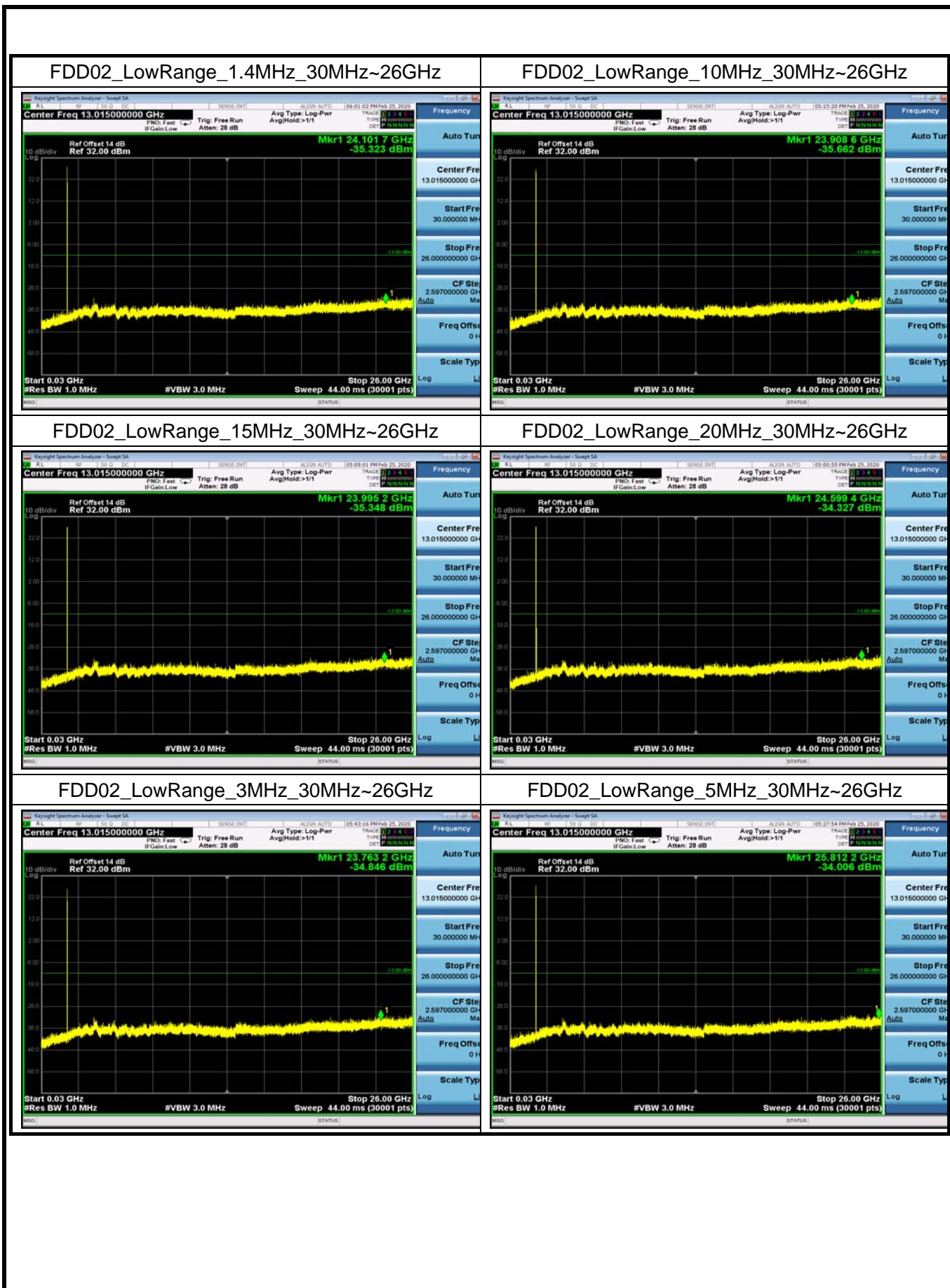


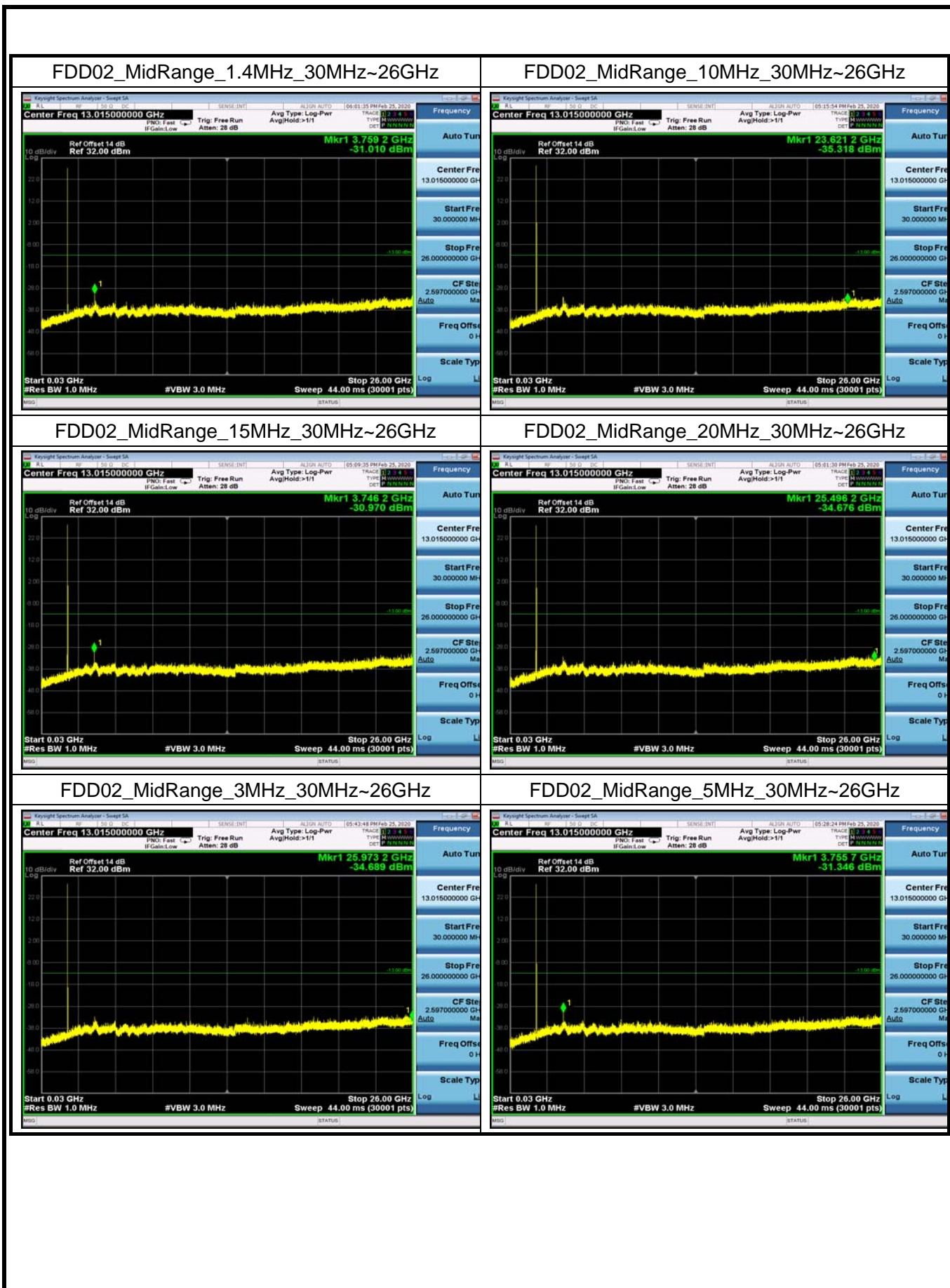
FDD02\_HighRange\_3MHz\_30MHz~26GHz



FDD02\_HighRange\_5MHz\_30MHz~26GHz

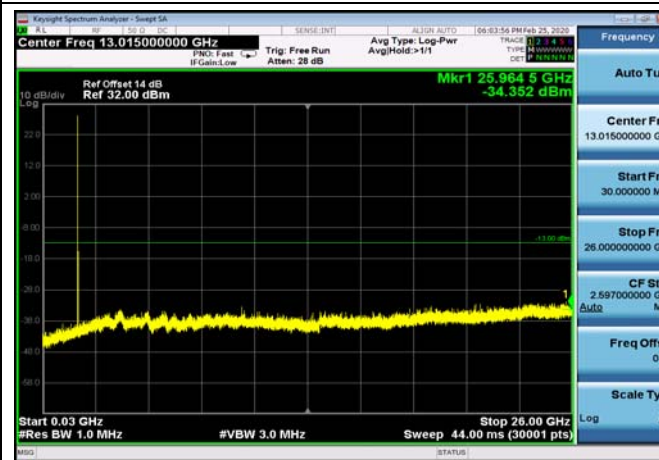




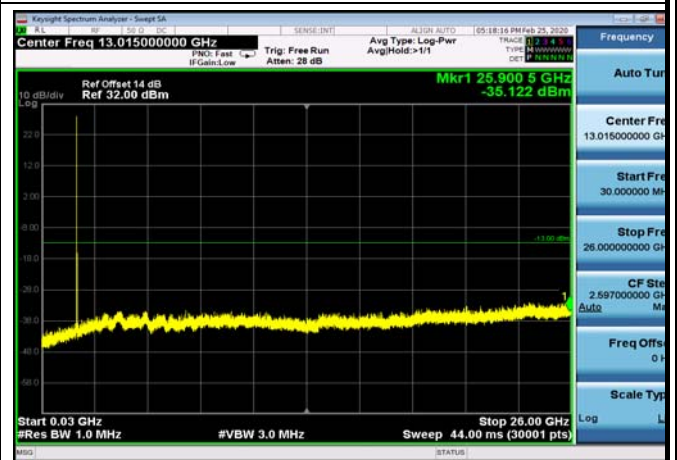




FDD04\_HighRange\_1.4MHz\_30MHz~26GHz



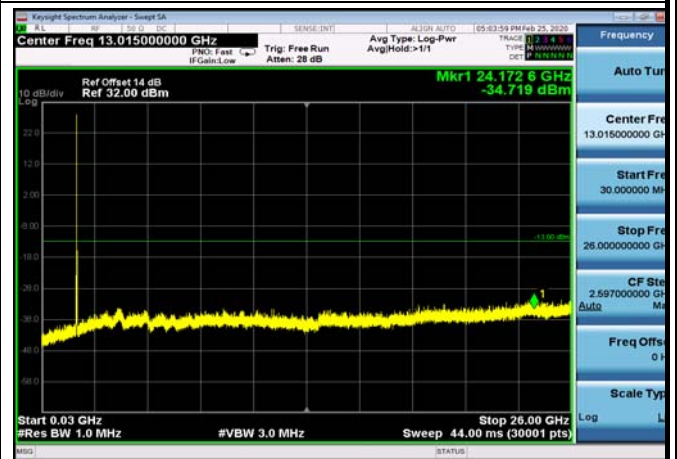
FDD04\_HighRange\_10MHz\_30MHz~26GHz



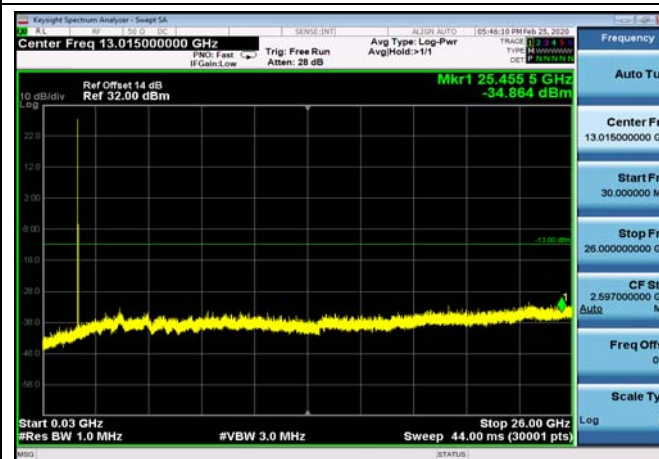
FDD04\_HighRange\_15MHz\_30MHz~26GHz



FDD04\_HighRange\_20MHz\_30MHz~26GHz



FDD04\_HighRange\_3MHz\_30MHz~26GHz



FDD04\_HighRange\_5MHz\_30MHz~26GHz

