



RF TEST REPORT

Report No.: SET2021-05529

Product Name: Electrocardiograph

FCC ID: 2A3AMSMARTECGT

Model No.: NeoECG T180, NeoECG T120, LeECG OT12

Applicant: Shenzhen Carewell Electronics Co., Ltd.

Floor 4, BLD 9, Baiwangxin High-Tech Industrial Park, Songbai
Address: Road, Xili Street, Nanshan District 518108, Shenzhen, P.R.
China

Dates of Testing: 08/11/2021 —08/18/2021

Issued by: CCIC Southern Testing Co., Ltd.

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Test Report

Product: Electrocardiograph

Brand Name.....: N/A

Trade Name: N/A

Applicant: Shenzhen Carewell Electronics Co., Ltd.

Applicant Address: Floor 4, BLD 9, Baiwangxin High-Tech Industrial Park,
Songbai Road, Xili Street, Nanshan District 518108,
Shenzhen, P.R. China.

Manufacturer: Shenzhen Carewell Electronics Co., Ltd.

Manufacturer Address: Floor 4, BLD 9, Baiwangxin High-Tech Industrial Park,
Songbai Road, Xili Street, Nanshan District 518108,
Shenzhen, P.R. China.

Test Standards: 47 CFR Part 2/22/27

Test Result.....: PASS

Tested by:

Vincent

2021.09.08

Vincent, Test Engineer

Reviewed by.....:

Chris You

2021.09.08

Chris You, Senior Engineer

Approved by.....:

Shuangwen Zhang

2021.09.08

Shuangwen Zhang, Manager



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Change History		
Issue	Date	Reason for change
1.0	2021.09.08	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type	Electrocardiograph
EUT supports Radios application	LTE Band5/7/41
Hardware Version	V1.0
Software Version	V1.0.0.0
Frequency Range	LTE Band 5: 824.7MHz~848.3MHz LTE Band 7: 2502.5MHz~2567.5MHz LTE Band 41: 2557.5 MHz~2652.5MHz
Maximum Output Power to Antenna	LTE Band 5: 22.30dBm LTE Band 7: 20.26dBm LTE Band41:21.44 dBm
Bandwidth	LTE Band 5: 1.4MHz/3MHz/5MHz/10MHz LTE Band 7: 5MHz/10MHz/15MHz/20MHz LTE Band 41: 5MHz/10MHz/15MHz/20MHz
Modulation Type	QPSK/16QAM/64QAM(downlink only)
Antenna Type	Internal Antenna
Power supply	DC 7.4V from rechargeable lithium battery

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 5	QPSK	1.4	1M09G7D	—	0.212
LTE Band 5	16QAM	1.4	1M09W7D	—	0.170
LTE Band 5	QPSK	3	2M68G7D	—	0.249
LTE Band 5	16QAM	3	2M67W7D	—	0.197
LTE Band 5	QPSK	5	4M49G7D	—	0.242
LTE Band 5	16QAM	5	4M49W7D	—	0.188
LTE Band 5	QPSK	10	8M92G7D	-0.034	0.245
LTE Band 5	16QAM	10	8M92W7D	—	0.198
LTE Band 7	QPSK	5	4M48G7D	—	0.114
LTE Band 7	16QAM	5	4M49W7D	—	0.095
LTE Band 7	QPSK	10	8M92G7D	-0.008	0.125
LTE Band 7	16QAM	10	8M92W7D	—	0.105
LTE Band 7	QPSK	15	13M5G7D	—	0.108
LTE Band 7	16QAM	15	13M5W7D	—	0.091
LTE Band 7	QPSK	20	17M9G7D	—	0.113
LTE Band 7	16QAM	20	17M9W7D	—	0.092
LTE Band 41	QPSK	5	4M48G7D	—	0.176
LTE Band 41	16QAM	5	4M48W7D	—	0.154
LTE Band 41	QPSK	10	8M92G7D	-0.011	0.181
LTE Band 41	16QAM	10	8M92W7D	—	0.149
LTE Band 41	QPSK	15	13M4G7D	—	0.187
LTE Band 41	16QAM	15	13M4W7D	—	0.136
LTE Band 41	QPSK	20	17M9G7D	—	0.195
LTE Band 41	16QAM	20	17M9W7D	—	0.161

1.3 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part22, Part27, for the EUT FCC ID Certification:

1. 47 CFR Part 2, 22(H), 27(M)
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	27.50(h)(2)	Effective Radiated Power(Band 7/41)	EIRP<2Watt	PASS
	22.913(a)(2)	Effective Radiated Power(Band 5)	ERP<7Watt	PASS
3	2.1049	Occupied Bandwidth	Reporting Only	PASS
4	2.1051 22.917(a)	Conducted Band Edge(Band 5)	$<43+10\log_{10}(P[\text{watt}])$	PASS
	2.1051 27.53(i)(4)	Conducted Band Edge(Band 7/41)	Refer to 27.53(m)(4)	PASS
5	2.1051 22.917(a)	Conducted Spurious Emission (Band 5)	$<43+10\log_{10}(P[\text{watt}])$	PASS
	2.1051 27.53(i)(4)	Conducted Spurious Emission (Band 7/41)	$<55+10\log_{10}(P[\text{watt}])$	PASS
6	2.1053 22.917(a)	Radiated Spurious Emission (Band 5)	$<43+10\log_{10}(P[\text{watt}])$	PASS
	2.1053 27.53(i)(4)	Radiated Spurious Emission (Band 7/41)	$<55+10\log_{10}(P[\text{watt}])$	PASS
7	2.1055, 22.355 27.54	Frequency Stability	$<2.5\text{ppm}$	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	/														
	/														
	5	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓
	7			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	41			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	/														
Peak-to-Average Ratio	/														
	/														
	5				✓				✓	✓		✓	✓	✓	✓
	7						✓		✓	✓		✓	✓	✓	✓
	41						✓		✓	✓		✓	✓	✓	✓
	/														
26dB and 99% Bandwidth	/														
	/														
	5	✓	✓	✓	✓			✓	✓			✓		✓	
	7			✓	✓	✓	✓	✓	✓			✓		✓	
	41			✓	✓	✓	✓	✓	✓			✓		✓	
	/														
Conducted Band Edge	/														
	/														
	5	✓	✓	✓	✓			✓	✓	✓		✓	✓		✓
	7			✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
	41			✓	✓	✓	✓	✓	✓			✓		✓	
	/														
Conducted Spurious Emission	/														
	/														
	5	✓						✓		✓			✓	✓	✓
	7			✓				✓		✓			✓	✓	✓
	41			✓				✓		✓			✓	✓	✓
	/														



Frequency Stability	/														
	/														
	5				✓			✓				✓		✓	
	7				✓			✓				✓		✓	
	41				✓			✓				✓		✓	
	/														
ERP/EIRP	/														
	/														
	5	✓	✓	✓	✓			✓	✓	✓			✓	✓	✓
	7			✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	41			✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	/														
Radiated Spurious Emission	/														
	/														
	5	Worst case											✓		
	7	Worst case											✓		
	41	Worst case											✓		
	/														
Note	1. The mark “ ✓ ” means that this configuration is chosen for testing. 2. 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.														

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:

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

Note: RF adapter/cable insert loss provided by manufacture.



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.: CN1283

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: CN1283, valid time is until April 19th, 2023.

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 April 19th, 2023.

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01.

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

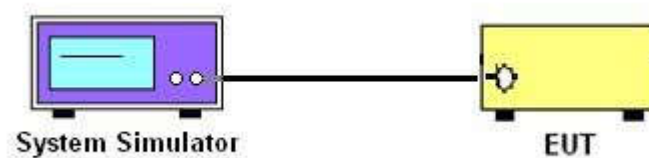
2.1.1 Requirement

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

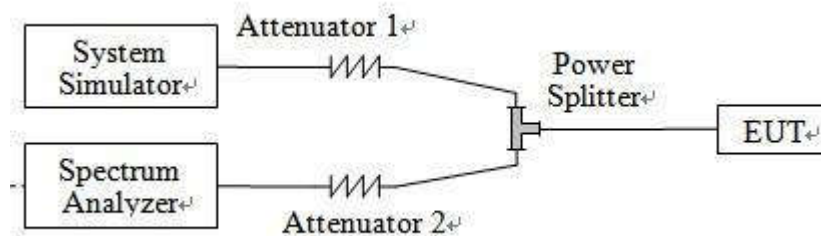
2.2.1 Definition

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

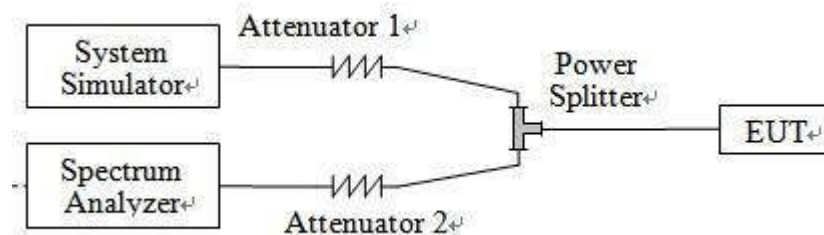
According to FCC section 2.1049, the occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

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

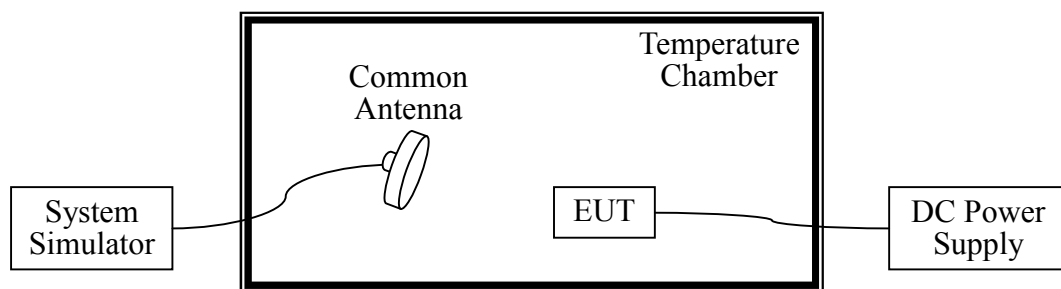
According to FCC requirement, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental 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°C to $+50^{\circ}\text{C}$ at intervals of not more than 10°C .
- (b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the 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°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:

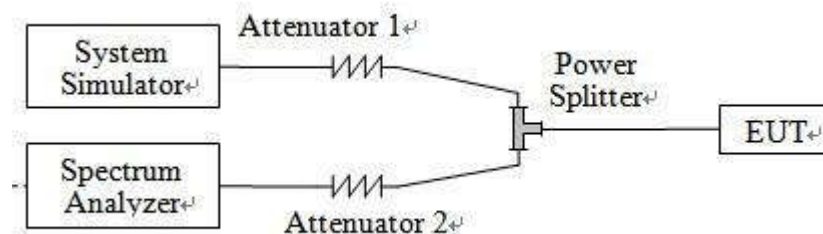
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

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)
$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$
$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$
$$= -13\text{dBm}.$$
8. For Band 7
The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)
$$= P(W) - [55 + 10\log(P)] \text{ (dB)}$$
$$= [30 + 10\log(P)] \text{ (dBm)} - [55 + 10\log(P)] \text{ (dB)}$$
$$= -25\text{dBm}.$$
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.

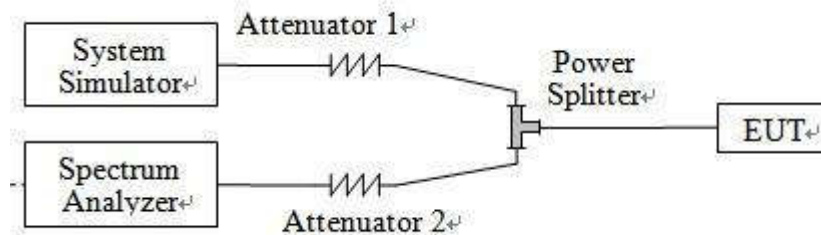
27.53m(4)

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

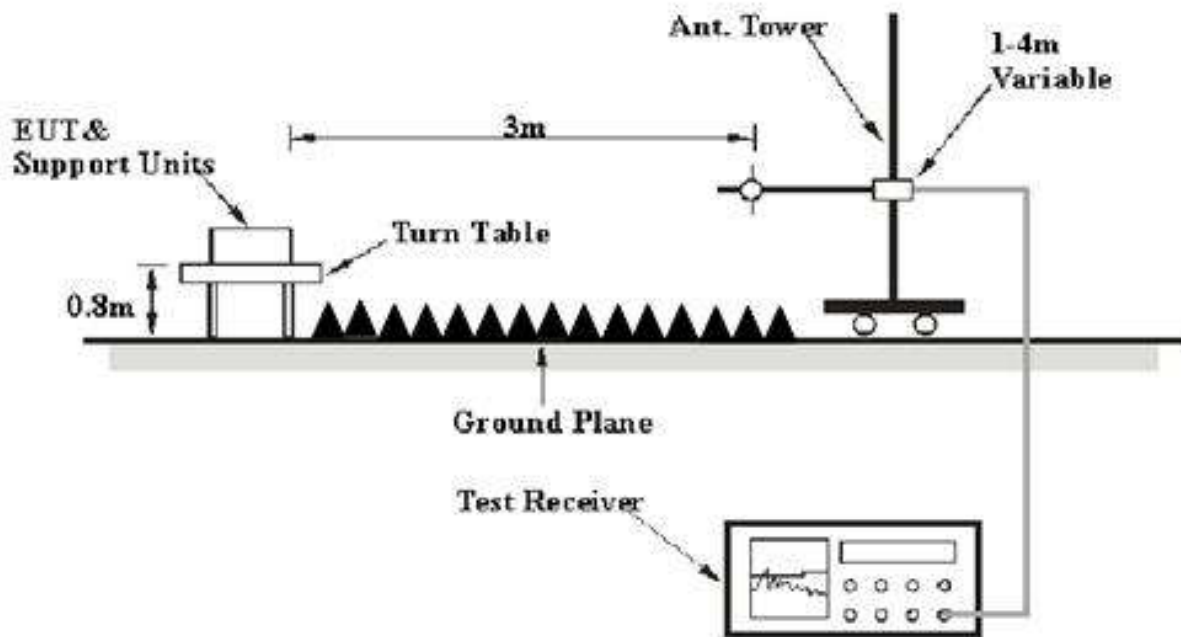
Effective radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-D-2010, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v03r01. Mobile and portable (hand-held) stations operating are limited to average ERP of 7 watts 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 7/41

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

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	5	824.7	23.15	PASS
5	1.4	QPSK	1	2	836.5	23.26	PASS
5	1.4	QPSK	1	5	848.3	23.15	PASS
5	1.4	16QAM	1	5	824.7	22.19	PASS
5	1.4	16QAM	1	2	836.5	22.30	PASS
5	1.4	16QAM	1	0	848.3	22.18	PASS
5	3	QPSK	1	5	825.5	23.04	PASS
5	3	QPSK	1	5	836.5	23.97	PASS
5	3	QPSK	1	5	848.3	23.12	PASS
5	3	16QAM	1	5	825.5	22.94	PASS
5	3	16QAM	1	14	836.5	22.00	PASS
5	3	16QAM	1	5	848.3	22.86	PASS
5	5	QPSK	1	14	826.5	23.80	PASS
5	5	QPSK	1	14	836.5	23.84	PASS
5	5	QPSK	1	14	846.5	23.83	PASS
5	5	16QAM	1	12	826.5	22.71	PASS
5	5	16QAM	1	24	836.5	22.74	PASS
5	5	16QAM	1	0	846.5	22.75	PASS
5	10	QPSK	1	24	829	23.89	PASS
5	10	QPSK	1	24	836.5	23.82	PASS
5	10	QPSK	1	24	844	23.78	PASS
5	10	16QAM	1	24	829	22.96	PASS
5	10	16QAM	1	49	836.5	22.82	PASS
5	10	16QAM	1	24	844	22.88	PASS

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	20.35	PASS
7	5	QPSK	1	0	2535	20.47	PASS
7	5	QPSK	1	24	2567.5	20.55	PASS
7	5	16QAM	1	24	2502.5	19.78	PASS
7	5	16QAM	1	24	2535	19.28	PASS
7	5	16QAM	1	0	2567.5	19.35	PASS
7	10	QPSK	1	24	2505	20.98	PASS
7	10	QPSK	1	49	2535	20.93	PASS
7	10	QPSK	1	24	2565	20.74	PASS
7	10	16QAM	1	24	2505	20.04	PASS
7	10	16QAM	1	49	2535	20.01	PASS
7	10	16QAM	1	24	2565	20.22	PASS
7	15	QPSK	1	37	2507.5	20.32	PASS
7	15	QPSK	1	74	2535	20.28	PASS
7	15	QPSK	1	0	2562.5	20.24	PASS
7	15	16QAM	1	37	2507.5	19.58	PASS
7	15	16QAM	1	18	2535	19.48	PASS
7	15	16QAM	1	0	2562.5	19.33	PASS
7	20	QPSK	1	0	2510	20.38	PASS
7	20	QPSK	1	0	2535	20.52	PASS
7	20	QPSK	1	0	2560	20.25	PASS
7	20	16QAM	1	0	2510	19.58	PASS
7	20	16QAM	1	0	2535	19.65	PASS
7	20	16QAM	1	0	2560	19.35	PASS

LTE Band 41 Test Verdict:

LTE Band	BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	EIRP (dBm)	Verdict
			RB Size	RB Offset			
41	5	QPSK	1	0	2557.5	22.35	PASS
41	5	QPSK	1	0	2605	22.45	PASS
41	5	QPSK	1	0	2652.5	22.37	PASS
41	5	16QAM	1	0	2557.5	21.26	PASS
41	5	16QAM	1	0	2605	21.35	PASS
41	5	16QAM	1	0	2652.5	21.87	PASS
41	10	QPSK	1	49	2560	22.46	PASS
41	10	QPSK	1	49	2605	22.57	PASS
41	10	QPSK	1	49	2650	22.34	PASS
41	10	16QAM	1	0	2560	21.15	PASS
41	10	16QAM	1	0	2605	21.35	PASS
41	10	16QAM	1	0	2650	21.74	PASS
41	15	QPSK	1	0	2562.5	22.72	PASS
41	15	QPSK	1	0	2605	22.71	PASS
41	15	QPSK	1	0	2647.5	22.39	PASS
41	15	16QAM	1	74	2562.5	21.25	PASS
41	15	16QAM	1	74	2605	21.24	PASS
41	15	16QAM	1	74	2647.5	21.34	PASS
41	20	QPSK	1	0	2565	22.89	PASS
41	20	QPSK	1	0	2605	22.52	PASS
41	20	QPSK	1	0	2645	22.24	PASS
41	20	16QAM	1	49	2565	22.07	PASS
41	20	16QAM	1	49	2605	21.98	PASS
41	20	16QAM	1	49	2645	21.94	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

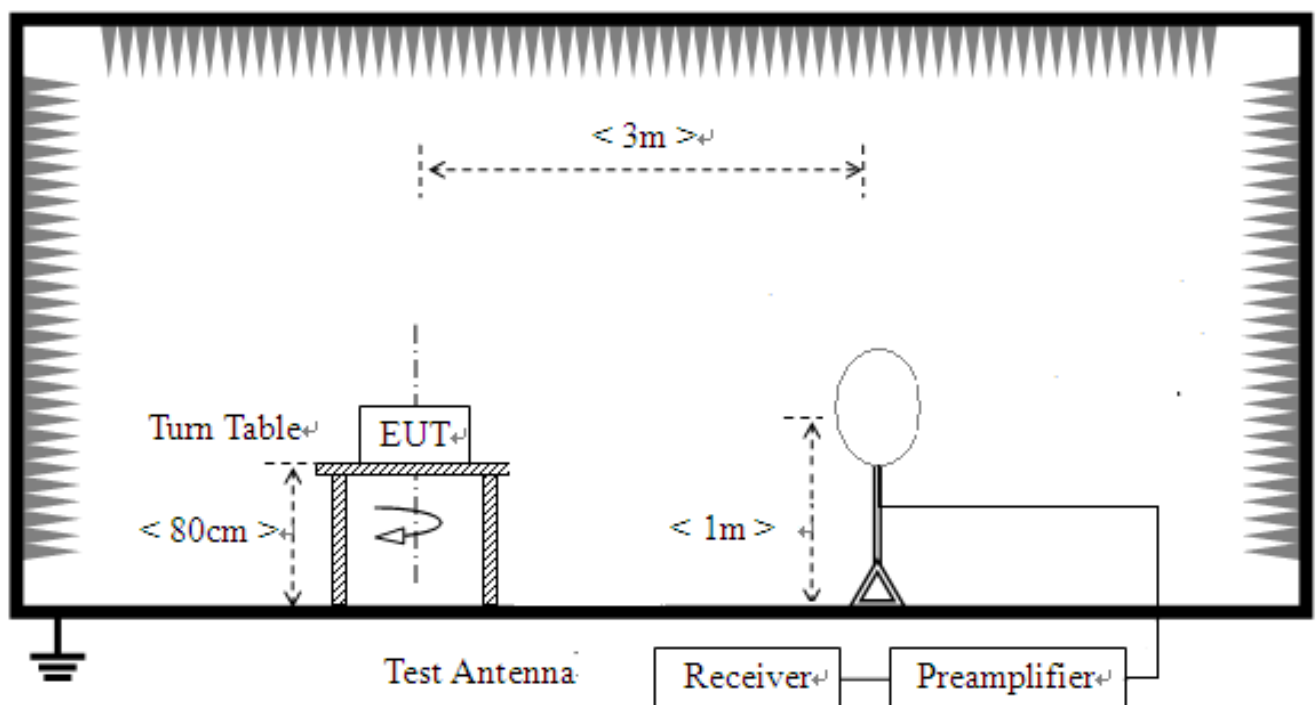
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

2.8.2 Measuring Instruments

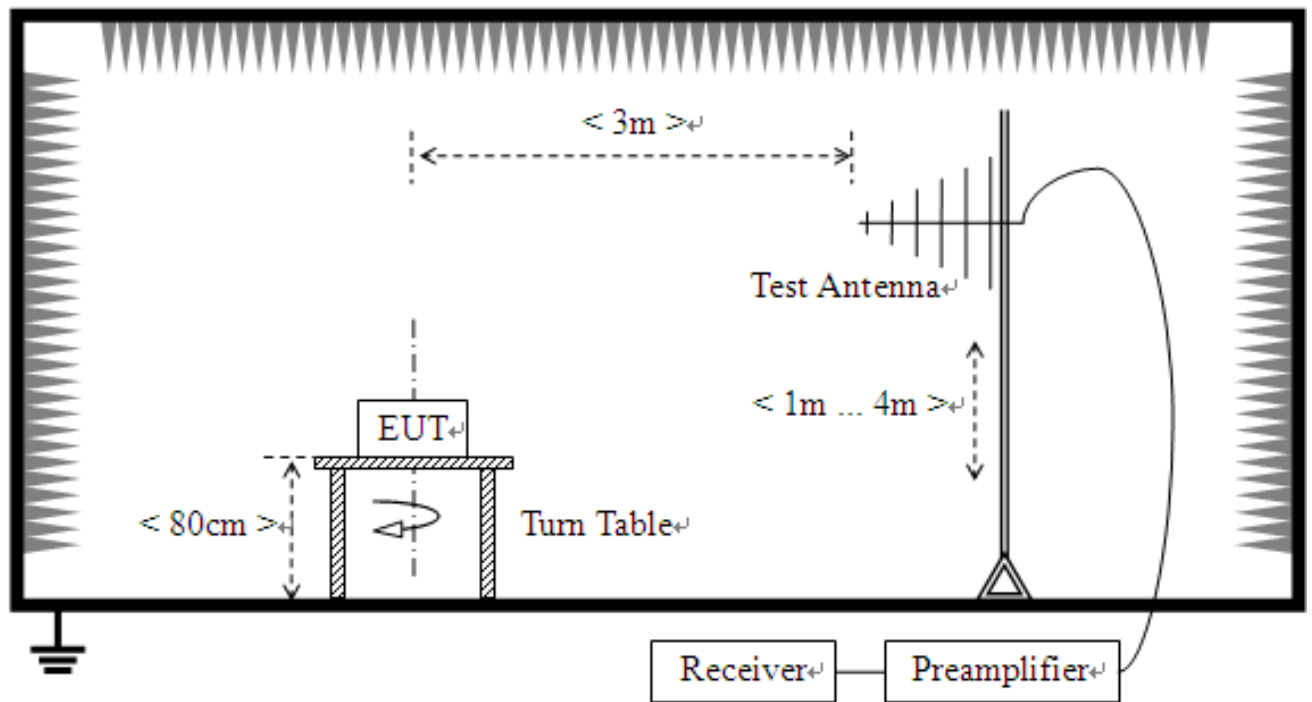
The measuring equipment is listed in the section 3 of this test report.

2.8.3 Test Setup

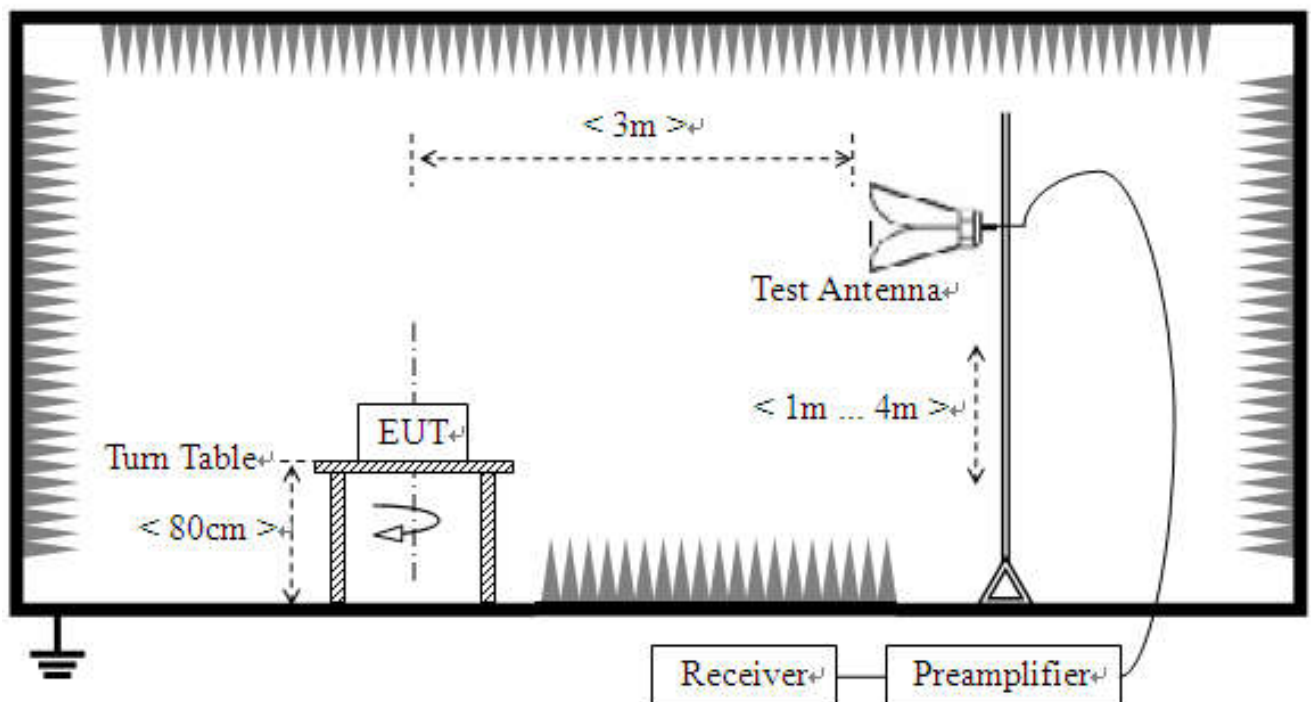
For radiated emissions from 9kHz to 30MHz



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 10th 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: Absolute Level=Reading Level + Factor

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	36.7968	-84.58	-60.22	-13	47.22	24.36	Horizontal
2	73.6937	-88.6	-67.34	-13	54.34	21.26	Horizontal
3	181.471	-95.63	-71.21	-13	58.21	24.42	Horizontal
4	364.985	-94.21	-64.53	-13	51.53	29.68	Horizontal
5	2434.21	-55.15	-52.3	-13	39.3	2.85	Horizontal
6	3950.72	-59.78	-50.37	-13	37.37	9.41	Horizontal

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	36.7968	-85.81	-63.21	-13	50.21	22.6	Vertical
2	103.793	-94.94	-68.82	-13	55.82	26.12	Vertical
3	365.956	-94.05	-65.87	-13	52.87	28.18	Vertical
4	1728.86	-58.49	-59.09	-13	46.09	-0.6	Vertical
5	3210.10	-58.91	-50.78	-13	37.78	8.13	Vertical
6	5061.65	-59.72	-45.66	-13	32.66	14.06	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	43.3887	-76.77	-56.64	-25	31.64	20.13	Horizontal
2	76.1812	-88.35	-69.99	-25	44.99	18.36	Horizontal
3	185.231	-100.57	-79.19	-25	54.19	21.38	Horizontal
4	360.448	-101.23	-74.74	-25	49.74	26.49	Horizontal
5	3828.91	-58.02	-48.94	-25	23.94	9.08	Horizontal
6	6216.19	-59.16	-44.92	-25	19.92	14.24	Horizontal

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	42.8066	-77.6	-58.48	-25	33.48	19.12	Vertical
2	75.9872	-87.43	-66.54	-25	41.54	20.89	Vertical
3	131.676	-98.33	-77.98	-25	52.98	20.35	Vertical
4	507.723	-101.27	-73.13	-25	48.13	28.14	Vertical
5	5065.46	-60.03	-46.07	-25	21.07	13.96	Vertical
6	7123.12	-58.86	-42.44	-25	17.44	16.42	Vertical

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

LTE Band 41 QPSK 20MHz BW Middle Channel

Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	56.2162	-78.07	-59.58	-25	34.58	18.49	Horizontal
2	98.9389	-82.01	-63.81	-25	38.81	18.20	Horizontal
3	330.03	-85.88	-60.05	-25	35.05	25.83	Horizontal
4	1784.39	-55.33	-55.67	-25	30.67	-0.34	Horizontal
5	3951.10	-57.91	-48.7	-25	23.7	9.21	Horizontal
6	7970.11	-59.38	-41	-25	16	18.38	Horizontal
Suspected List							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	52.8064	-90.76	-69.13	-25	44.13	21.63	Vertical
2	101.330	-96.03	-69.5	-25	44.5	26.53	Vertical
3	375.007	-97.48	-69.08	-25	44.08	28.4	Vertical
4	5108.55	-60.15	-46.07	-25	21.07	14.08	Vertical
5	7929.96	-59.19	-42.08	-25	17.08	17.11	Vertical
6	10413.7	-62.27	-37.83	-25	12.83	24.44	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	ESW26	A180502935	2020.08.13	2021.08.12	Radiation
Loop Antenna	Schwarz beck	HFH2-Z2	100047	2019.04.26	2022.04.25	Radiation
Broadband antenna (30MHz~1GHz)	Schwarbeck	BBHA 9120 J	A190503537	2019.01.07	2022.01.06	Radiation
Broadband antenna (30MHz~1GHz)	R&S	VULB9160	A0805560	2019.05.24	2022.05.23	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	AT4510	A0804450	2020.06.19	2023.06.18	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4003A	0329293	2020.09.17	2021.09.16	Radiation
Amplifier 30M~1GHz	MILMEGA	80RF1000-10004	A140101634	2020.09.22	2023.09.21	Radiation
Amplifier 1G~18GHz	MILMEGA	AS0104R-800/40 0	A160302517	2021.01.26	2022.01.25	Radiation
Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2021.04.26	2022.04.25	Conducted
Test Receiver	R&S	ESIB7	A0501375	2020.06.24	2021.06.23	Conducted
Temperature chamber	TABAI	PS-232	A8708054	2020.10.30	2021.10.29	Conducted
Wideband Radio Communication tester	R&S	CMW500	A130101034	2021.01.26	2023.01.25	Conducted
Power Supply	R&S	WYJ-60100	A141102031	2020.01.16	2023.01.15	Conducted
Test software	ECIT	Eagle	V2.0	N/A	N/A	Conducted

APPENDIX A

Conducted RF (Average) Output Power

LTE Band 5 Conducted Power Test Verdict:

LTE FDD Band 5				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20407/824.7	20525/836.5	20643/848.3	
1.4MHz	QPSK	1	0	22.17	22.22	22.22	21.5±1.0
		1	3	22.16	22.02	22.1	
		1	5	22.1	22.13	22.04	
		3	0	21.76	21.65	21.77	21.0±1.0
		3	2	21.76	21.82	21.81	
		3	3	21.7	21.8	21.86	
		6	0	21.54	21.54	21.46	21.0±1.0
	16QAM	1	0	21.19	21.12	21.25	20.5±1.0
		1	3	21.4	21.29	21.13	
		1	5	21.39	21.17	21.24	
		3	0	20.82	20.98	20.9	20.0±1.0
		3	2	20.81	20.92	20.96	
		3	3	20.92	20.83	20.94	
		6	0	20.59	20.64	20.62	20.0±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	22.24	22.01	22.2	21.5±1.0
		1	7	22.14	22	22.15	
		1	14	22	22.17	22.24	
		8	0	21.87	21.68	21.79	21.0±1.0
		8	4	21.6	21.89	21.68	
		8	7	21.62	21.9	21.66	
		15	0	21.54	21.45	21.45	21.0±1.0
	16QAM	1	0	21.28	21.2	21.4	20.5±1.0
		1	7	21.35	21.2	21.32	
		1	14	21.27	21.15	21.12	
		8	0	20.8	20.81	20.81	20.0±1.0
		8	4	20.89	20.85	20.91	
		8	7	20.9	20.71	20.84	
		15	0	20.57	20.65	20.59	20.0±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	22.03	22.07	22.2	21.5±1.0
		1	13	21.97	21.99	22.02	
		1	24	22.23	22.1	22.17	
		12	0	21.66	21.72	21.82	21.0±1.0
		12	6	21.78	21.85	21.83	
		12	13	21.84	21.89	21.84	
		25	0	21.52	21.45	21.46	21.0±1.0
	16QAM	1	0	21.1	21.13	21.29	20.5±1.0
		1	13	21.17	21.36	21.21	
		1	24	21.14	21.38	21.2	
		12	0	20.84	20.73	20.7	20.0±1.0
		12	6	20.78	20.73	20.71	
		12	13	20.74	20.79	21	
		25	0	20.6	20.64	20.55	20.0±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20450/829	20525/836.5	20600/844	
10MHz	QPSK	1	0	22.26	22.3	22.22	21.5±1.0
		1	25	22.16	22.07	22.24	
		1	49	22.16	22.15	22.23	
		25	0	21.64	21.86	21.73	21.0±1.0
		25	13	21.62	21.64	21.8	
		25	25	21.85	21.68	21.71	
		50	0	21.53	21.55	21.47	21.0±1.0
	16QAM	1	0	21.33	21.1	21.37	20.5±1.0
		1	25	21.27	21.37	21.34	
		1	49	21.25	21.34	21.37	
		25	0	20.7	20.86	20.77	20.0±1.0
		25	13	20.96	20.96	20.97	
		25	25	20.79	20.71	20.77	
		50	0	20.64	20.56	20.64	20.0±1.0



LTE FDD Band 7				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20775/2502.5	21100/2535	21425/2567.5	
5MHz	QPSK	1	0	20.09	20.17	19.95	20.5±1.0
		1	13	20.13	19.91	19.98	
		1	24	20.03	20.12	20.11	
		12	0	19.8	19.78	19.65	20.0±1.0
		12	6	19.69	19.72	19.78	
		12	13	19.73	19.84	19.84	
		25	0	19.48	19.48	19.49	19.5±1.0
	16QAM	1	0	19.27	19.3	19.1	19.5±1.0
		1	13	19.09	19.09	19.25	
		1	24	19.15	19.22	19.23	
		12	0	18.9	18.96	18.81	19.0±1.0
		12	6	18.92	18.98	18.72	
		12	13	18.9	18.81	18.8	
		25	0	18.56	18.55	18.56	19.0±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20800/2505	21100/2535	21400/2565	
10MHz	QPSK	1	0	20.14	19.91	19.98	20.5±1.0
		1	25	20.04	19.97	19.94	
		1	49	20.11	19.94	19.99	
		25	0	19.61	19.84	19.65	20.0±1.0
		25	13	19.7	19.6	19.8	
		25	25	19.68	19.84	19.79	
		50	0	19.46	19.45	19.47	19.5±1.0
	16QAM	1	0	19.15	19.14	19.09	19.5±1.0
		1	25	19.27	19.18	19.33	
		1	49	19.27	19.07	19.07	
		25	0	18.78	18.72	18.79	19.0±1.0
		25	13	18.72	19	18.82	
		25	25	18.95	18.76	18.74	
		50	0	18.64	18.61	18.59	19.0±1.0



LTE FDD Band 7				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20825/2507.5	21100/2535	21375/2562.5	
15MHz	QPSK	1	0	19.91	20.03	19.99	20.5±1.0
		1	38	19.98	20.13	19.94	
		1	74	20.11	19.97	19.94	
		36	0	19.61	19.56	19.66	20.0±1.0
		36	18	19.76	19.66	19.84	
		36	39	19.57	19.75	19.61	
		75	0	19.49	19.42	19.48	19.5±1.0
	16QAM	1	0	19.26	19.29	19.33	19.5±1.0
		1	38	19.3	19.05	19.14	
		1	74	19.15	19.17	19.32	
		36	0	18.85	18.89	18.81	19.0±1.0
		36	18	18.8	18.82	18.79	
		36	39	18.78	18.99	19	
		75	0	18.61	18.65	18.59	19.0±1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				20850/2510	21100/2535	21350/2560	
20MHz	QPSK	1	0	20.19	20.26	20.21	20.5±1.0
		1	50	20.08	20.02	20.08	
		1	99	20.02	19.94	20	
		50	0	19.78	19.82	19.66	20.0±1.0
		50	25	19.8	19.76	19.64	
		50	50	19.69	19.66	19.65	
		100	0	19.42	19.47	19.43	19.5±1.0
	16QAM	1	0	19.13	19.31	19.26	19.5±1.0
		1	50	19.27	19.23	19.3	
		1	99	19.35	19.28	19.11	
		50	0	19	18.76	18.77	19.0±1.0
		50	25	18.7	18.94	18.73	
		50	50	18.95	18.75	18.95	
		100	0	18.56	18.56	18.62	19.0±1.0



LTE FDD Band 41				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				40265/2557.5	40740/2605	41215/2652.5	
5MHz	QPSK	1	0	21.26	21.34	21.14	20.5 ± 1.0
		1	13	21.15	21.22	21.11	
		1	24	21.31	21.1	21.26	
		12	0	20.75	20.8	20.81	20.0 ± 1.0
		12	6	20.84	20.72	20.94	
		12	13	20.93	20.82	20.75	
		25	0	20.57	20.57	20.65	20.0 ± 1.0
	16QAM	1	0	20.46	20.48	20.43	19.5 ± 1.0
		1	13	20.4	20.36	20.39	
		1	24	20.32	20.32	20.35	
		12	0	20.03	19.93	19.91	19.5 ± 1.0
		12	6	20.03	20.03	20.14	
		12	13	19.96	20.08	19.93	
		25	0	19.75	19.76	19.75	19.0 ± 1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				40290/2560	40740/2605	41190/2650	
10MHz	QPSK	1	0	21.15	21.35	21.39	20.5 ± 1.0
		1	25	21.35	21.18	21.17	
		1	49	21.26	21.32	21.25	
		25	0	20.93	20.7	20.74	20.0 ± 1.0
		25	13	20.85	20.83	20.91	
		25	25	20.95	20.86	20.96	
		50	0	20.65	20.57	20.59	20.0 ± 1.0
	16QAM	1	0	20.2	20.36	20.25	19.5 ± 1.0
		1	25	20.2	20.22	20.48	
		1	49	20.32	20.26	20.21	
		25	0	20.14	20.13	20.13	19.5 ± 1.0
		25	13	19.97	19.97	20.12	
		25	25	20.08	20.06	20.07	
		50	0	19.79	19.71	19.77	19.0 ± 1.0

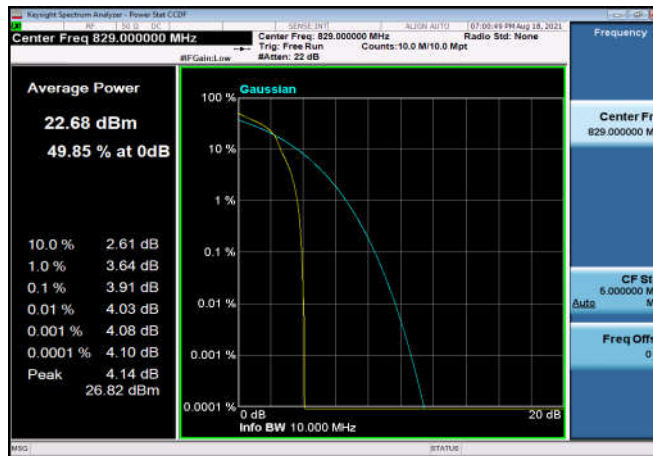
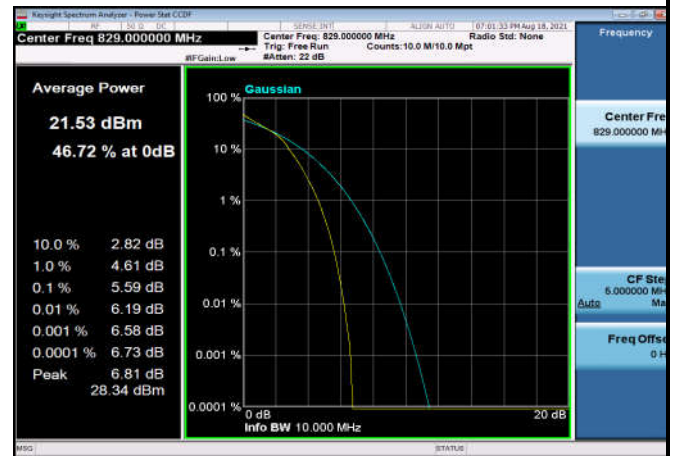
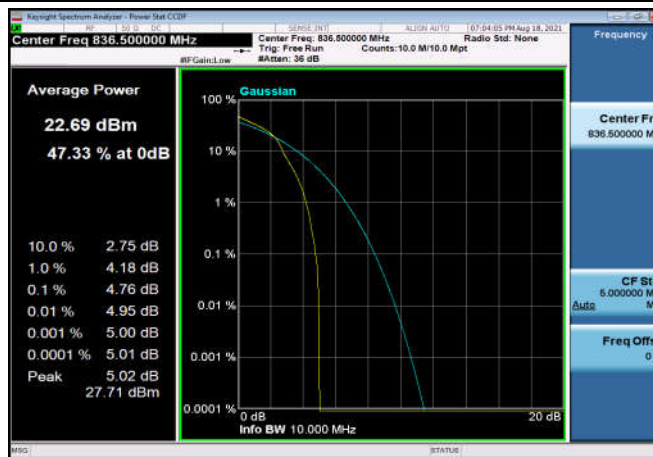
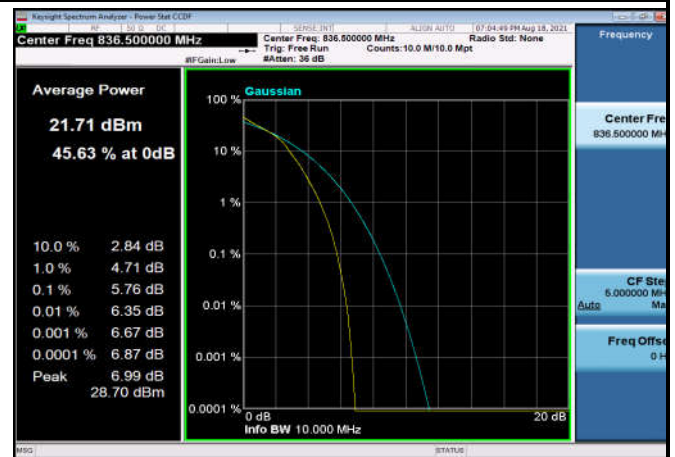
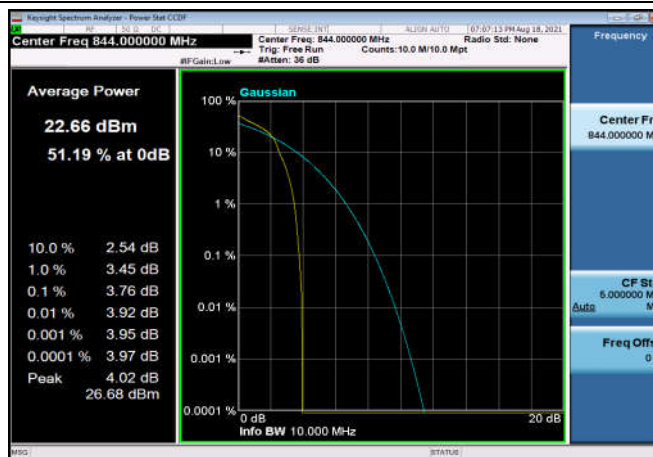
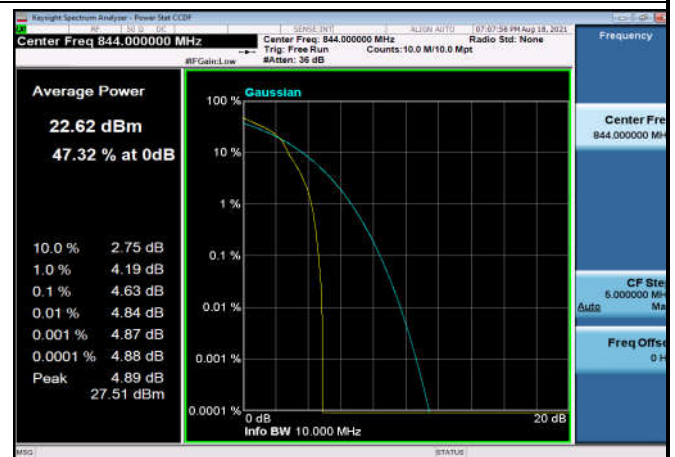


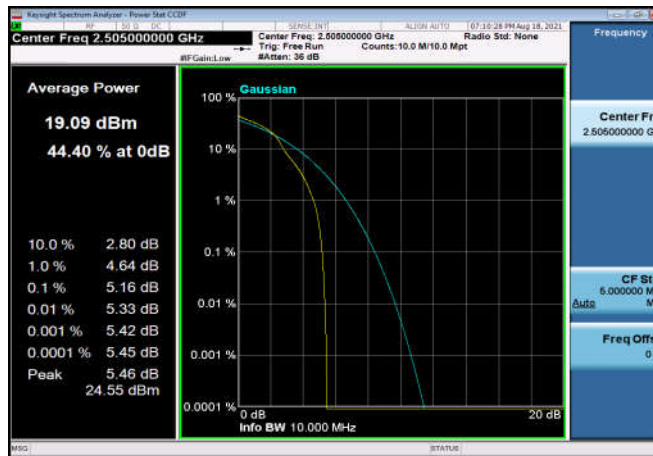
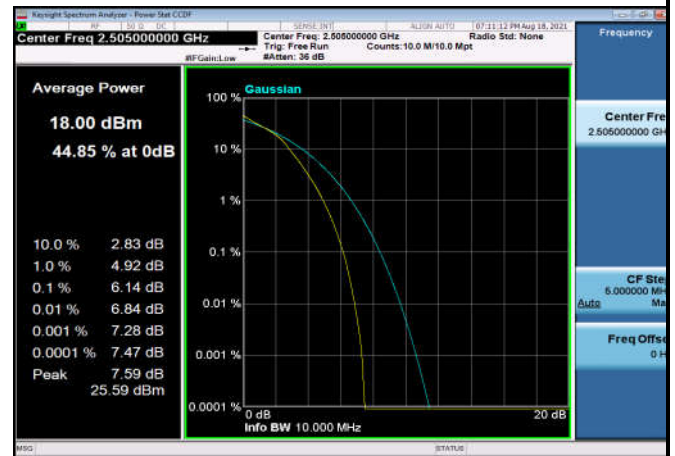
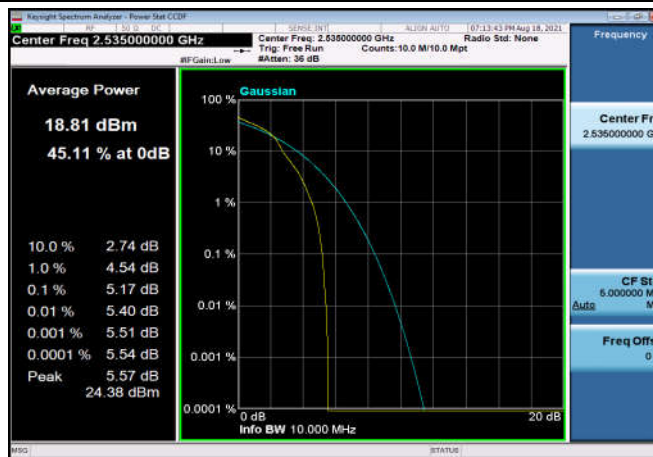
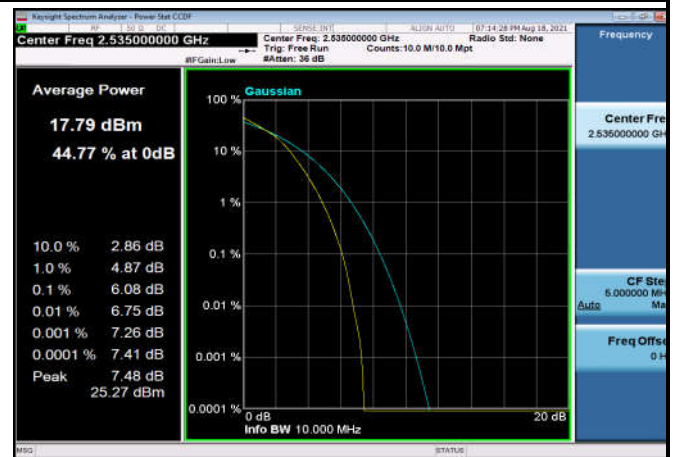
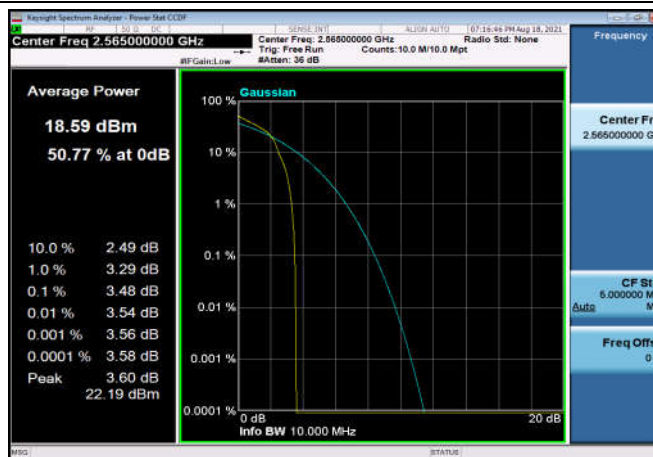
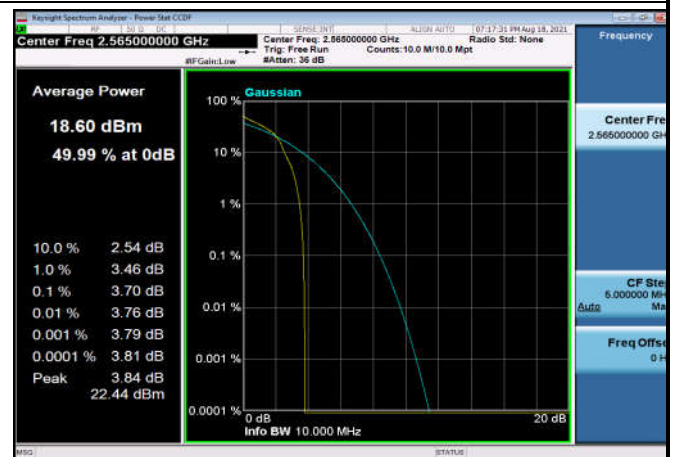
LTE FDD Band 41				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				40315/2562.5	40740/2605	41165/2647.5	
15MHz	QPSK	1	0	21.34	21.39	21.32	20.5 ± 1.0
		1	38	21.24	21.27	21.31	
		1	74	21.32	21.2	21.16	
		36	0	20.99	20.86	20.75	20.0 ± 1.0
		36	18	20.74	20.83	20.87	
		36	39	20.86	20.72	20.83	
		75	0	20.63	20.65	20.63	20.0 ± 1.0
	16QAM	1	0	20.49	20.32	20.34	19.5 ± 1.0
		1	38	20.5	20.36	20.5	
		1	74	20.22	20.38	20.31	
		36	0	20.03	19.96	19.91	19.5 ± 1.0
		36	18	20.09	20	19.94	
		36	39	20.01	19.88	19.91	
		75	0	19.79	19.8	19.75	19.0 ± 1.0
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency			Tune up
				40340/2565	40740/2605	41140/2645	
20MHz	QPSK	1	0	21.41	21.44	21.37	20.5 ± 1.0
		1	50	21.35	21.15	21.3	
		1	99	21.38	21.21	21.22	
		50	0	20.94	20.98	20.76	20.0 ± 1.0
		50	25	20.92	20.81	20.75	
		50	50	20.89	20.9	20.82	
		100	0	20.58	20.6	20.56	20.0 ± 1.0
	16QAM	1	0	20.25	20.21	20.3	19.5 ± 1.0
		1	50	20.2	20.36	20.32	
		1	99	20.26	20.25	20.4	
		50	0	20.01	19.89	19.98	19.5 ± 1.0
		50	25	20.13	19.93	20.11	
		50	50	19.97	20.13	19.88	
		100	0	19.72	19.8	19.8	19.0 ± 1.0

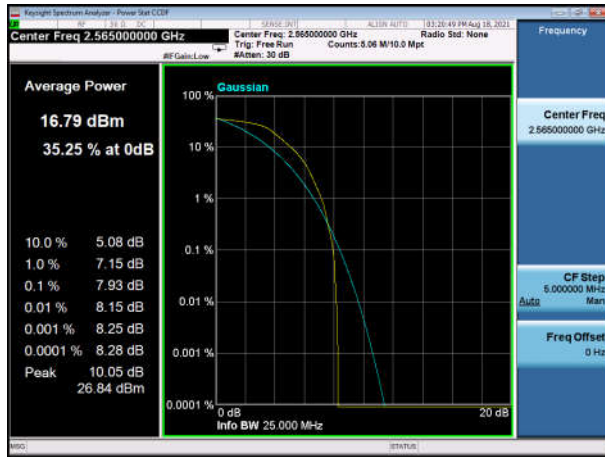
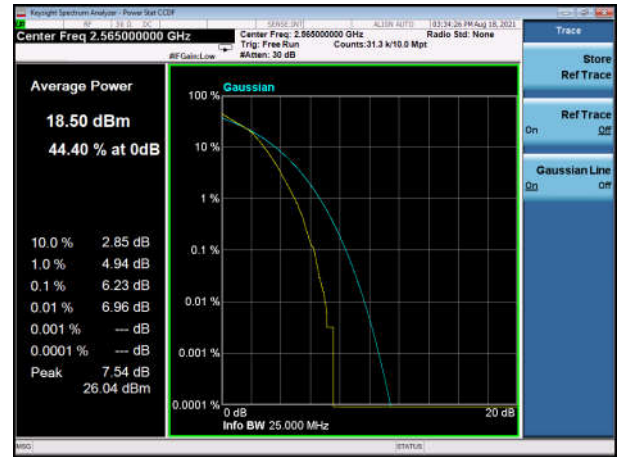
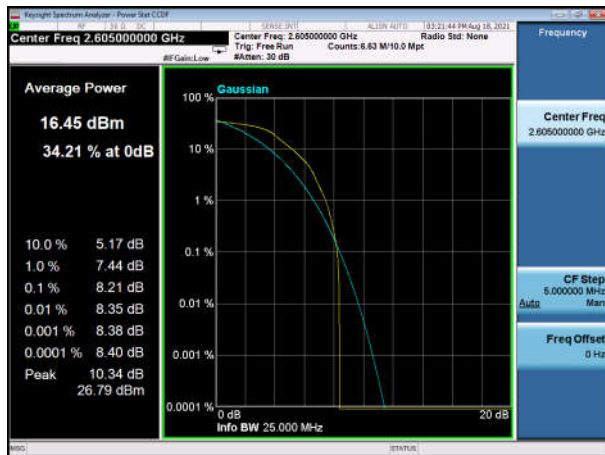
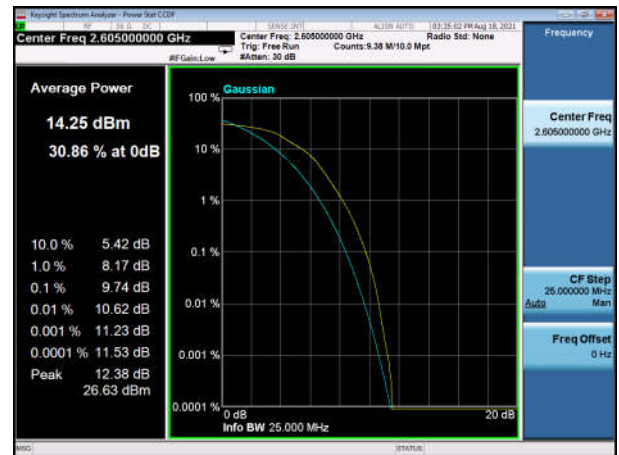
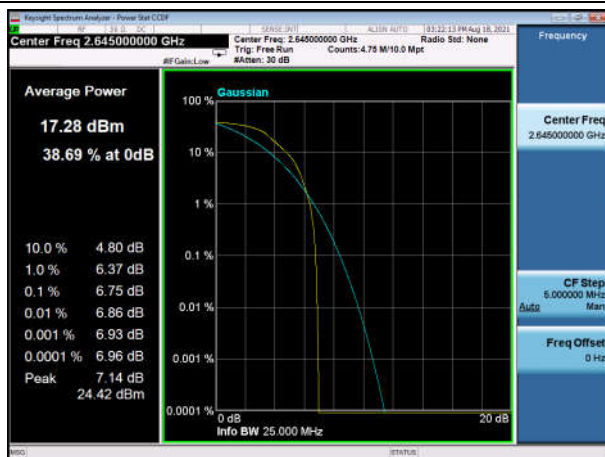
**Peak To Average Ratio**

Test Result and Data

PeakToAveragePowerRatio NormalTC_NormalVol							
Band	Range	BandWidth	RbMode	Modulation	PAPR (dBm)	Limit (dBm)	Result
FDD05	LowRange	10	OneRB_high	Q16	3.91	13.00	Pass
FDD05	LowRange	10	fullRB	Q16	5.59	13.00	Pass
FDD05	MidRange	10	OneRB_high	Q16	4.76	13.00	Pass
FDD05	MidRange	10	fullRB	Q16	5.76	13.00	Pass
FDD05	HighRange	10	OneRB_high	Q16	3.76	13.00	Pass
FDD05	HighRange	10	fullRB	Q16	4.63	13.00	Pass
FDD07	LowRange	10	OneRB_high	Q16	5.16	13.00	Pass
FDD07	LowRange	10	fullRB	Q16	6.14	13.00	Pass
FDD07	MidRange	10	OneRB_high	Q16	5.17	13.00	Pass
FDD07	MidRange	10	fullRB	Q16	6.08	13.00	Pass
FDD07	HighRange	10	OneRB_high	Q16	3.48	13.00	Pass
FDD07	HighRange	10	fullRB	Q16	3.70	13.00	Pass
TDD41	LowRange	20	OneRB_high	Q16	7.93	13.00	Pass
TDD41	LowRange	20	fullRB	Q16	6.23	13.00	Pass
TDD41	MidRange	20	OneRB_high	Q16	8.21	13.00	Pass
TDD41	MidRange	20	fullRB	Q16	9.74	13.00	Pass
TDD41	HighRange	20	OneRB_high	Q16	6.75	13.00	Pass
TDD41	HighRange	20	fullRB	Q16	9.5	13.00	Pass

FDD05_LowRange_10MHz_829_OneRB
_high_Q16FDD05_LowRange_10MHz_829_fullIRB
_Q16FDD05_MidRange_10MHz_836.5_OneRB
_high_Q16FDD05_MidRange_10MHz_836.5_fullIRB
_Q16FDD05_HighRange_10MHz_844_OneRB
_high_Q16FDD05_HighRange_10MHz_844_fullIRB
_Q16

FDD07_LowRange_10MHz_2505_OneRB
_high_Q16FDD07_LowRange_10MHz_2505_fullRB
_Q16FDD07_MidRange_10MHz_2535_OneRB
_high_Q16FDD07_MidRange_10MHz_2535_fullRB
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_Q16

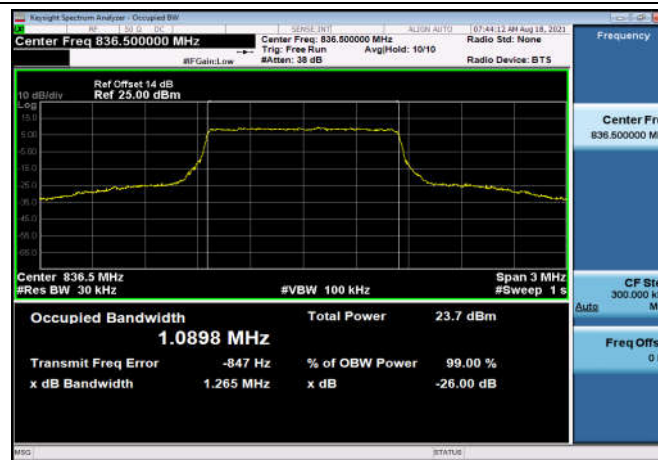
TDD41_LowRange_20MHz_2565_OneRB
_high_Q16

TDD41_LowRange_20MHz_2565_fullRB
_Q16

TDD41_MidRange_20MHz_2605_OneRB
_high_Q16

TDD41_MidRange_20MHz_2605_fullRB
_Q16

TDD41_HighRange_20MHz_2645_OneRB
_high_Q16

TDD41_HighRange_20MHz_2645_fullRB
_Q16


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

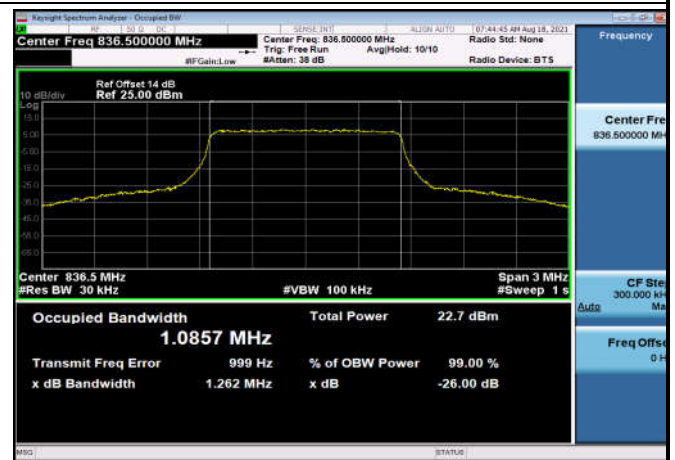
Occupied Bandwidth NormalTC_NormalVol					
Band	Range	BandWidth	Frequency (MHz)	Modulation	Occupied Bandwidth(99%) (MHz)
FDD05	MidRange	1.4	836.5	QPSK	1.09
FDD05	MidRange	1.4	836.5	Q16	1.086
FDD05	MidRange	3	836.5	QPSK	2.681
FDD05	MidRange	3	836.5	Q16	2.674
FDD05	MidRange	5	836.5	QPSK	4.489
FDD05	MidRange	5	836.5	Q16	4.487
FDD05	MidRange	10	836.5	QPSK	8.918
FDD05	MidRange	10	836.5	Q16	8.918
FDD07	MidRange	5	2535	QPSK	4.484
FDD07	MidRange	5	2535	Q16	4.487
FDD07	MidRange	10	2535	QPSK	8.919
FDD07	MidRange	10	2535	Q16	8.92
FDD07	MidRange	15	2535	QPSK	13.451
FDD07	MidRange	15	2535	Q16	13.453
FDD07	MidRange	20	2535	QPSK	17.868
FDD07	MidRange	20	2535	Q16	17.872
TDD41	MidRange	5	2605	QPSK	4.4815
TDD41	MidRange	5	2605	Q16	4.4845
TDD41	MidRange	10	2605	QPSK	8.9183
TDD41	MidRange	10	2605	Q16	8.9203
TDD41	MidRange	15	2605	QPSK	13.442
TDD41	MidRange	15	2605	Q16	13.437
TDD41	MidRange	20	2605	QPSK	17.858
TDD41	MidRange	20	2605	Q16	17.859



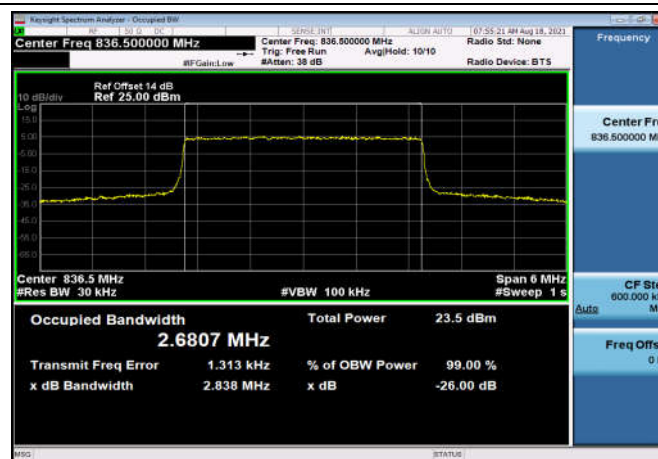
FDD05_MidRange_1.4_836.5_QPSK



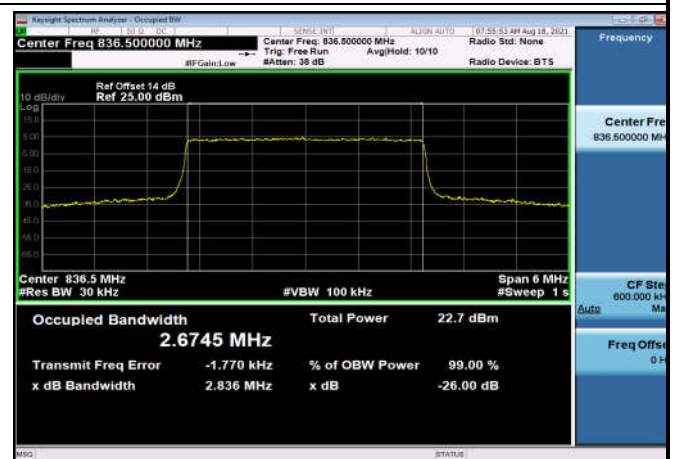
FDD05_MidRange_1.4_836.5_Q16



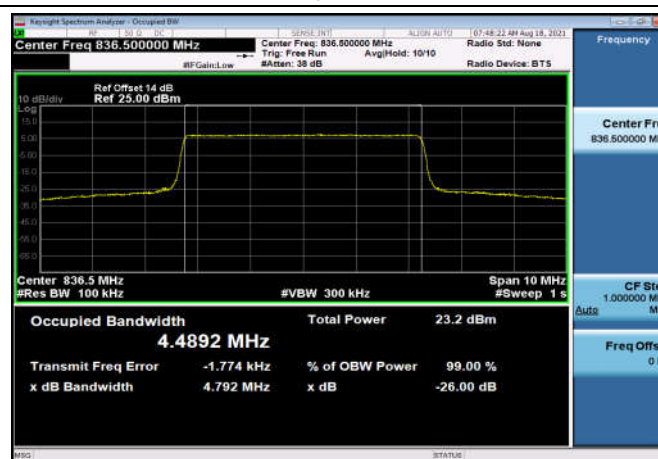
FDD05_MidRange_3_836.5_QPSK



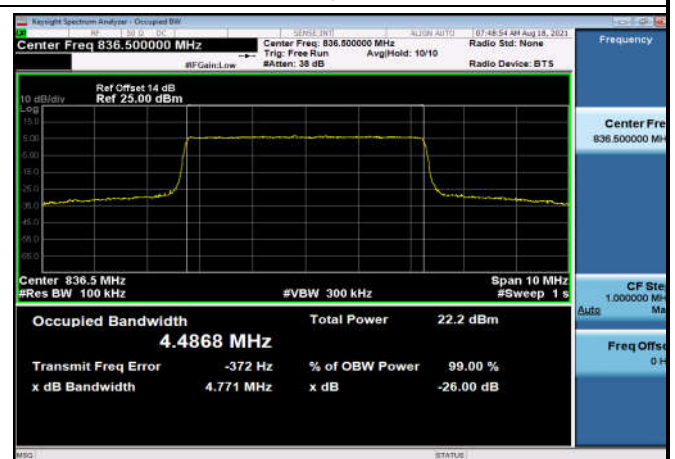
FDD05_MidRange_3_836.5_Q16



FDD05_MidRange_5_836.5_QPSK

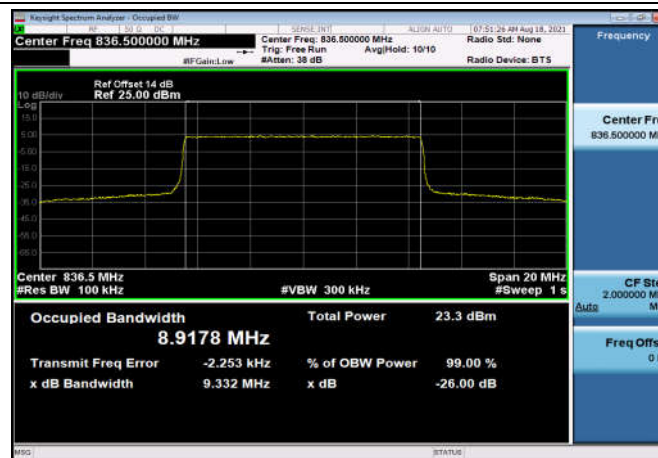


FDD05_MidRange_5_836.5_Q16

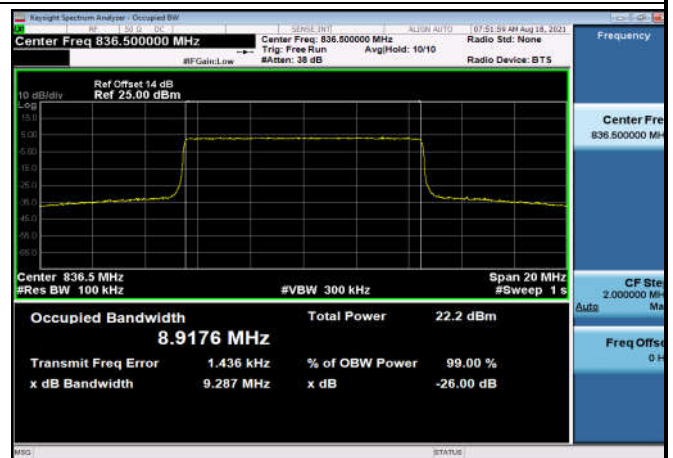




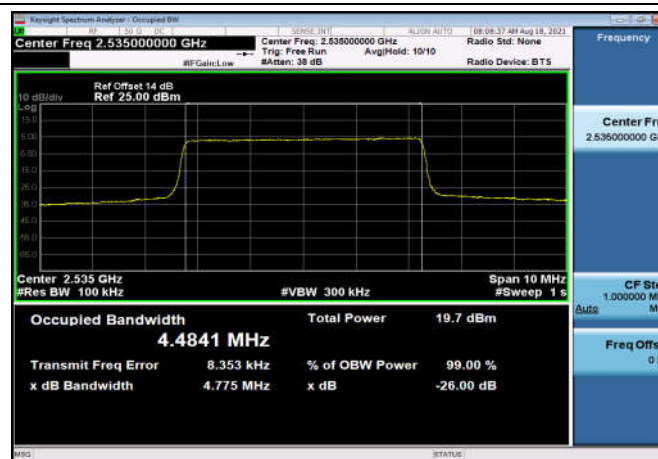
FDD05_MidRange_10_836.5_QPSK



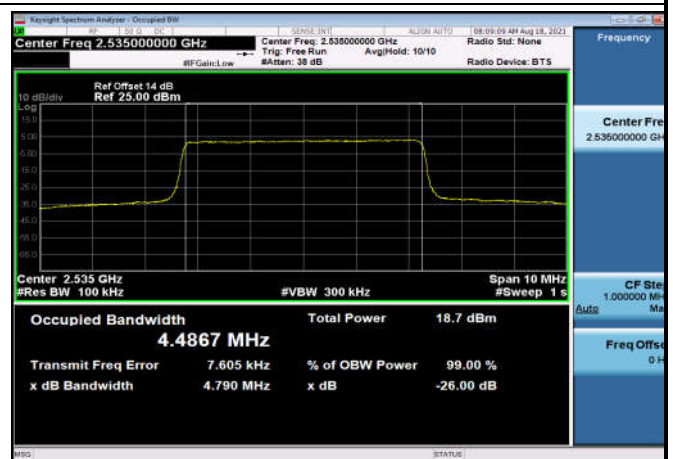
FDD05_MidRange_10_836.5_Q16



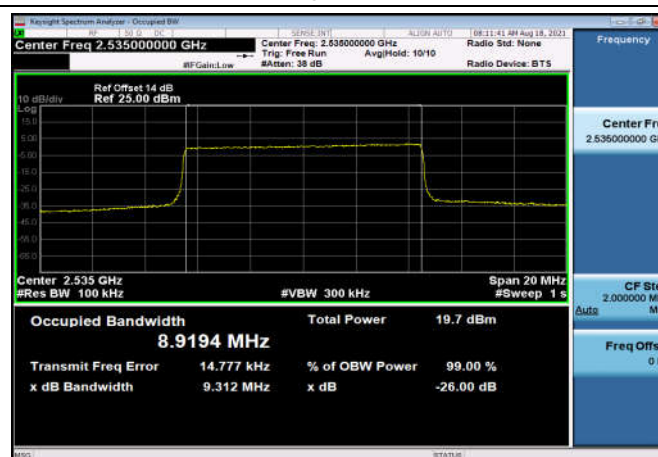
FDD07_MidRange_5_2535_QPSK



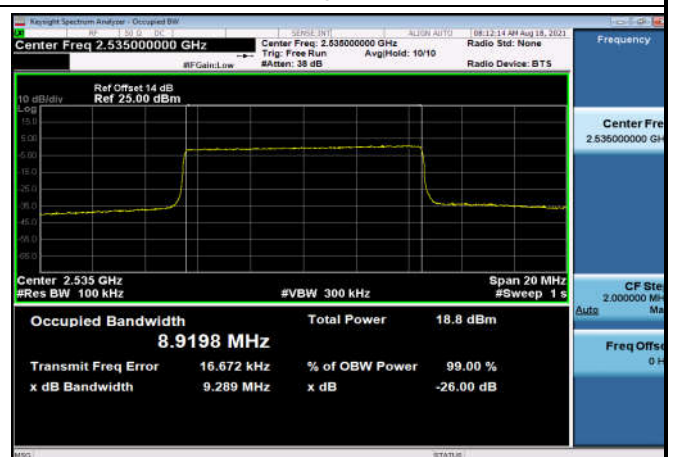
FDD07_MidRange_5_2535_Q16



FDD07_MidRange_10_2535_QPSK

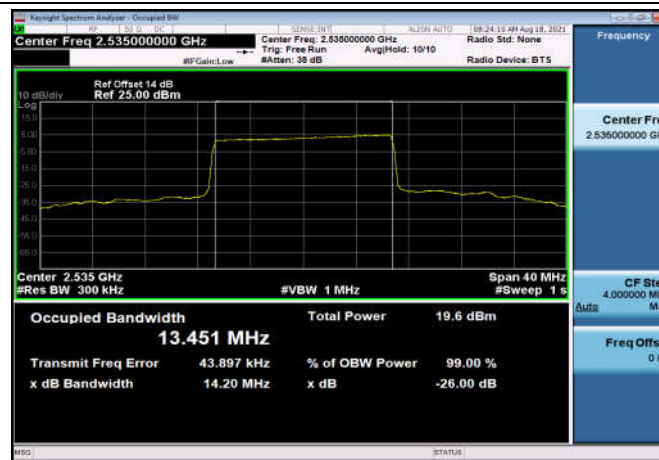


FDD07_MidRange_10_2535_Q16

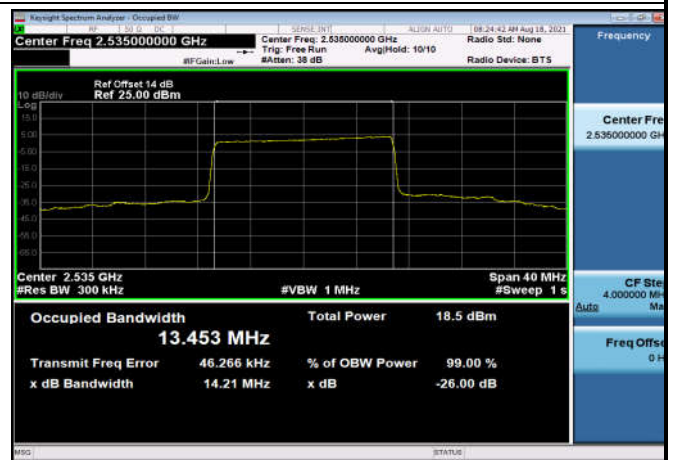




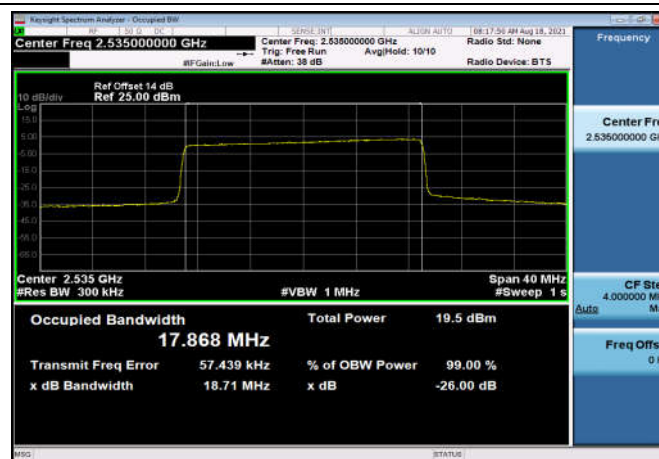
FDD07_MidRange_15_2535_QPSK



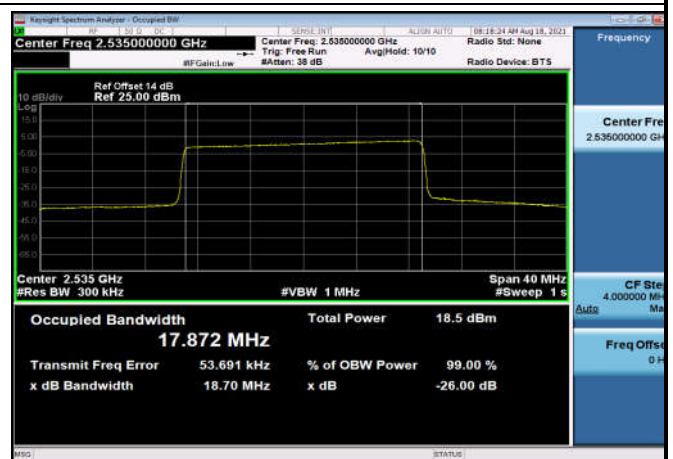
FDD07_MidRange_15_2535_Q16



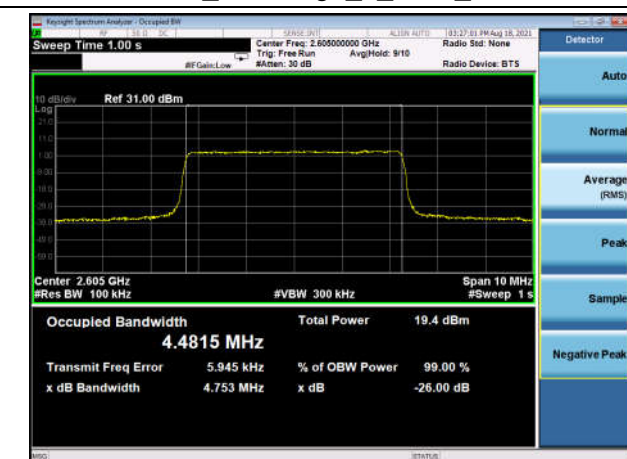
FDD07_MidRange_20_2535_QPSK



FDD07_MidRange_20_2535_Q16



TDD41_MidRange_5_2605_QPSK

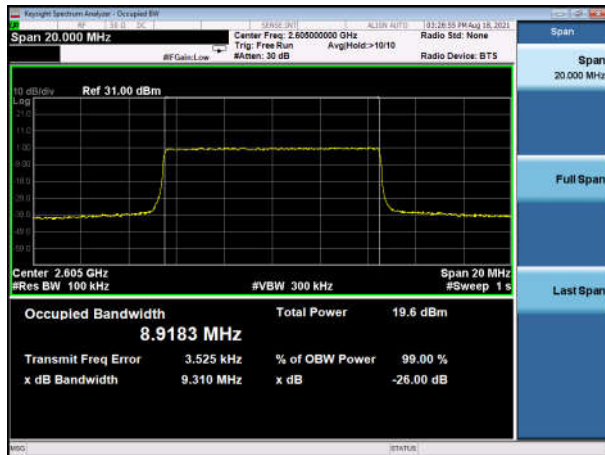


TDD41_MidRange_5_2605_Q16

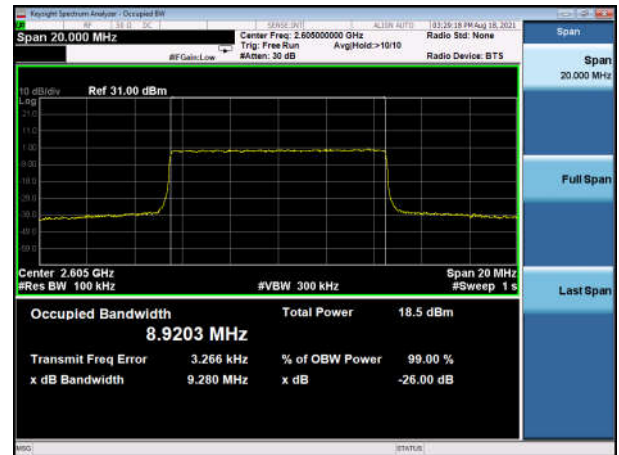




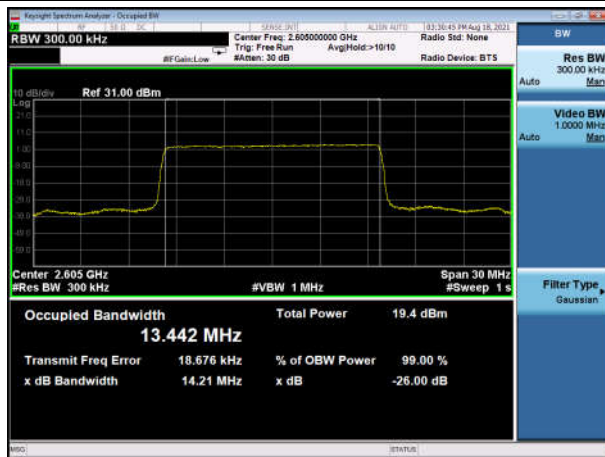
TDD41_MidRange_10_2605_QPSK



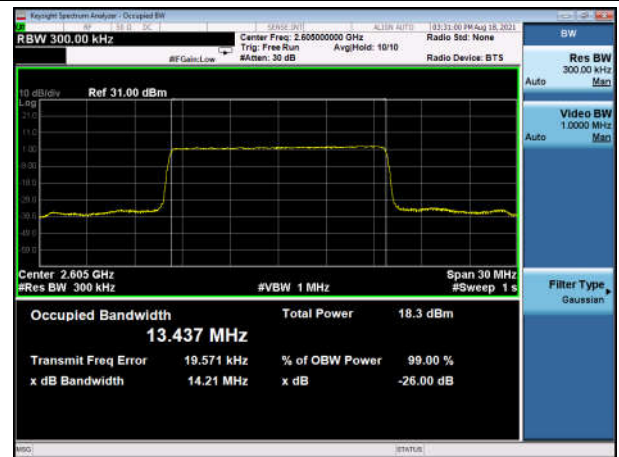
TDD41_MidRange_10_2605_Q16



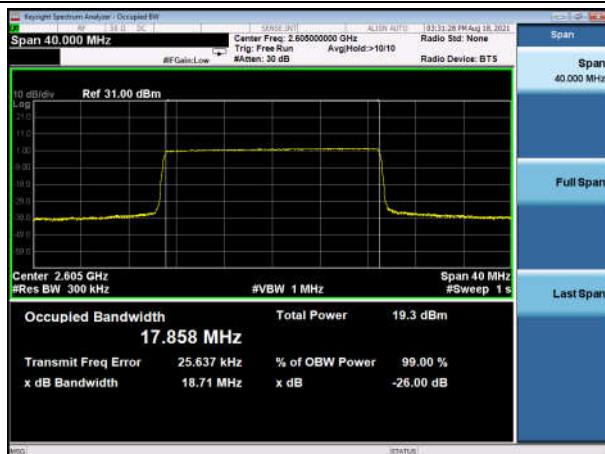
TDD41_MidRange_15_2605_QPSK



TDD41_MidRange_15_2605_Q16



TDD41_MidRange_20_2605_QPSK

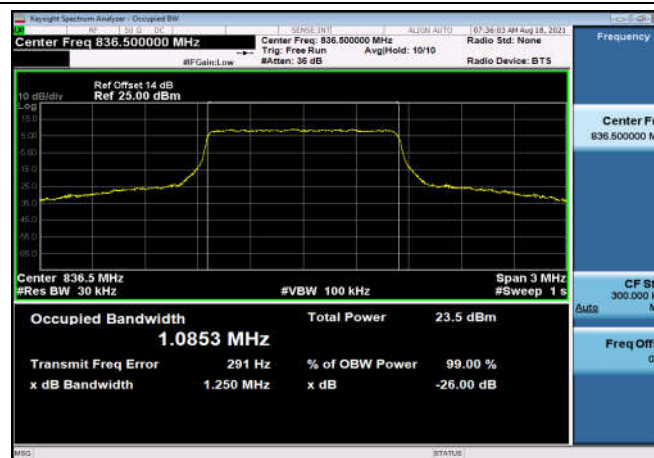
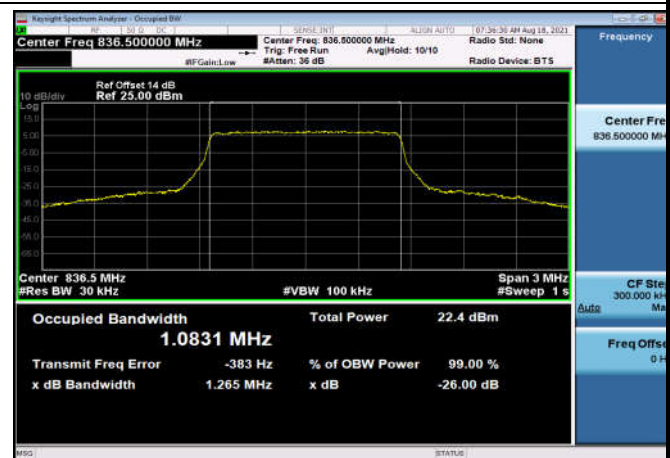


TDD41_MidRange_20_2605_Q16

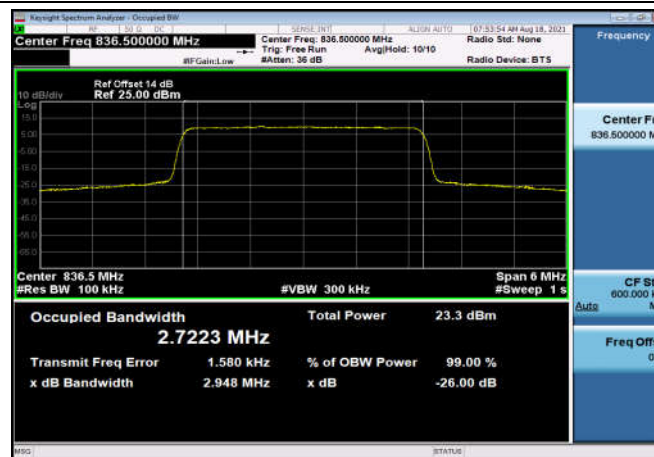


**26dB Bandwidth
Test Result and Data**

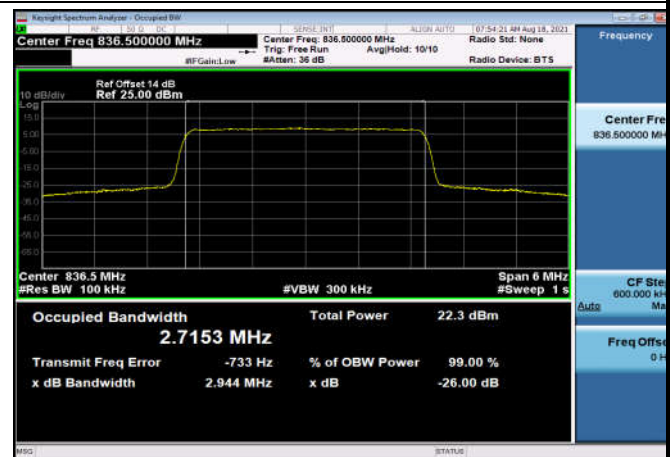
Emission Bandwidth NormalTC_NormalVol					
Band	Range	BandWidth	Frequency (MHz)	Modulation	EmissionBandwidth (MHz)
FDD05	MidRange	1.4	836.5	QPSK	1.25
FDD05	MidRange	1.4	836.5	Q16	1.26
FDD05	MidRange	3	836.5	QPSK	2.95
FDD05	MidRange	3	836.5	Q16	2.94
FDD05	MidRange	5	836.5	QPSK	4.8
FDD05	MidRange	5	836.5	Q16	4.78
FDD05	MidRange	10	836.5	QPSK	9.33
FDD05	MidRange	10	836.5	Q16	9.31
FDD07	MidRange	5	2535	QPSK	4.77
FDD07	MidRange	5	2535	Q16	4.78
FDD07	MidRange	10	2535	QPSK	9.31
FDD07	MidRange	10	2535	Q16	9.31
FDD07	MidRange	15	2535	QPSK	14.21
FDD07	MidRange	15	2535	Q16	14.2
TDD41	MidRange	5	2605	QPSK	4.753
TDD41	MidRange	5	2605	Q16	4.764
TDD41	MidRange	10	2605	QPSK	9.310
TDD41	MidRange	10	2605	Q16	9.280
TDD41	MidRange	15	2605	QPSK	14.21
TDD41	MidRange	15	2605	Q16	14.21
TDD41	MidRange	20	2605	QPSK	18.71
TDD41	MidRange	20	2605	Q16	18.71

FDD05_MidRange_1.4MHz_836.5MHz
_QPSKFDD05_MidRange_1.4MHz_836.5MHz
_Q16

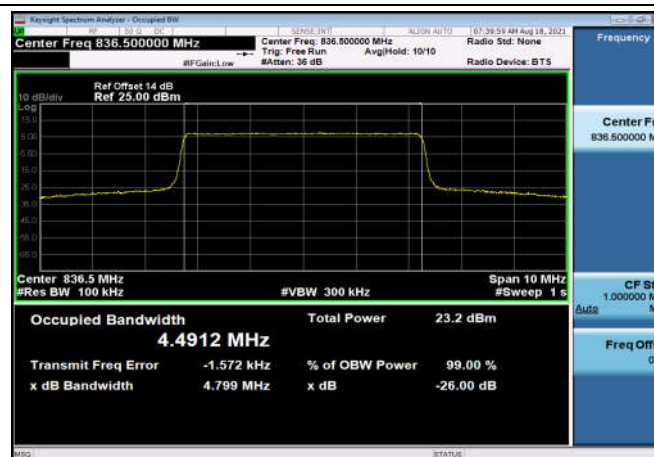
FDD05_MidRange_3MHz_836.5MHz_QPSK



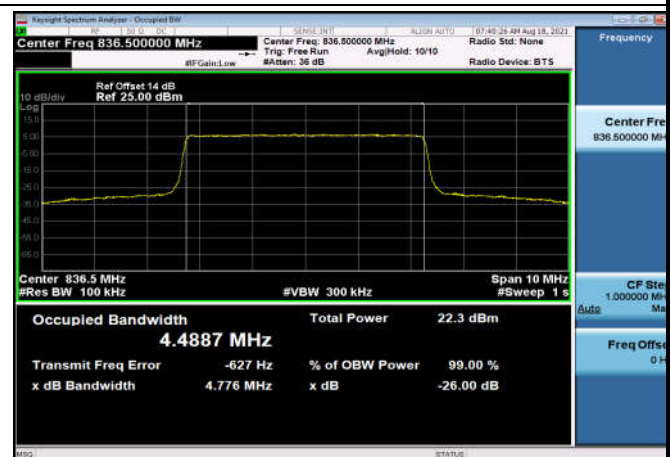
FDD05_MidRange_3MHz_836.5MHz_Q16



FDD05_MidRange_5MHz_836.5MHz_QPSK

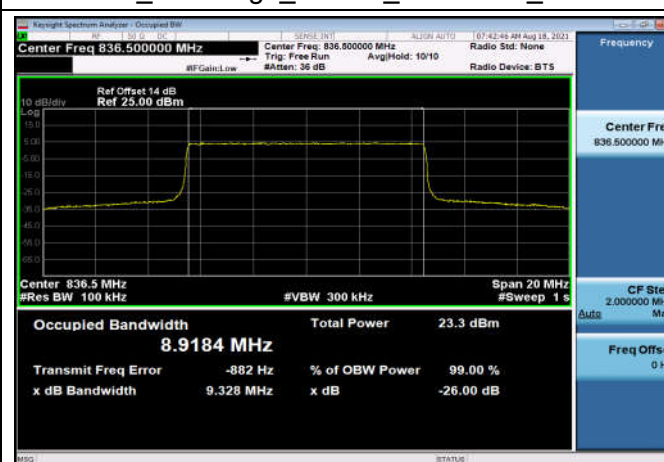


FDD05_MidRange_5MHz_836.5MHz_Q16

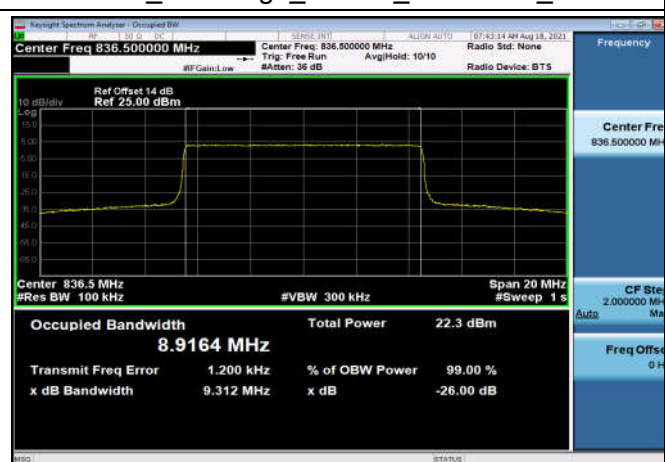




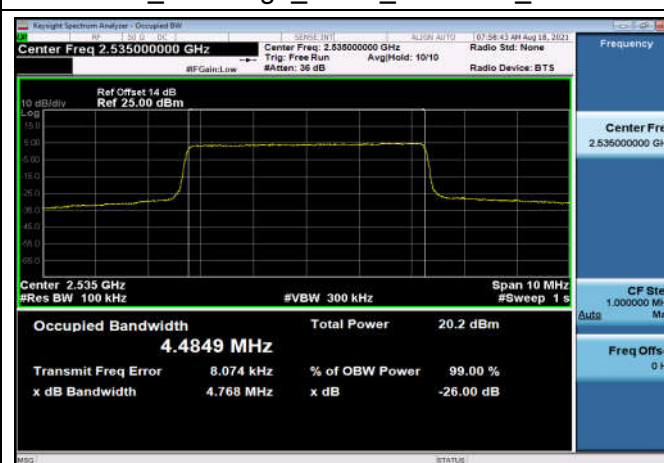
FDD05	MidRange	10MHz	836.5MHz	QPSK
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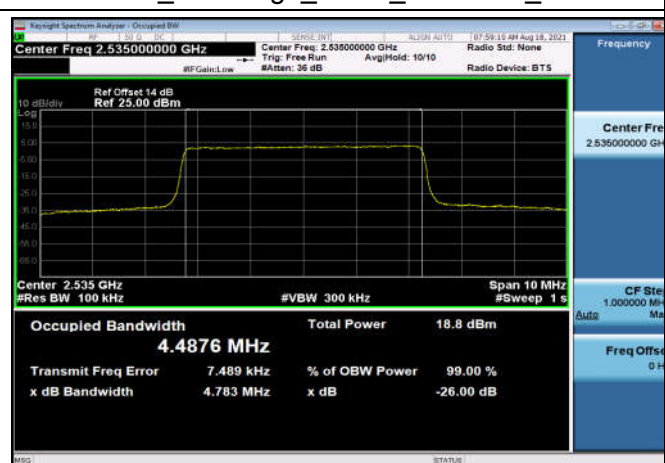
FDD05	MidRange	10MHz	836.5MHz	Q16
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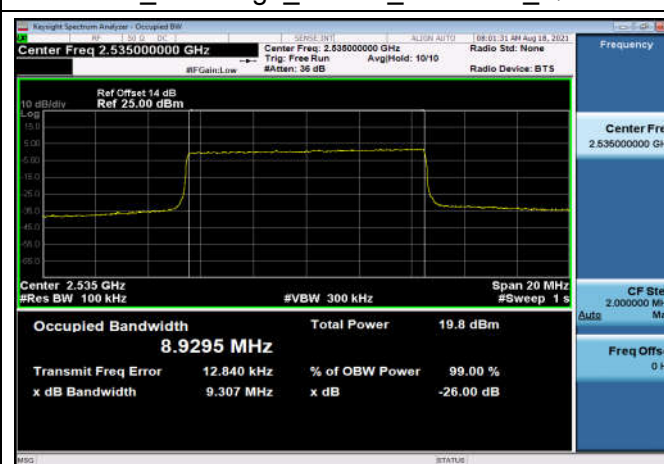
FDD07	MidRange	5MHz	2535MHz	QPSK
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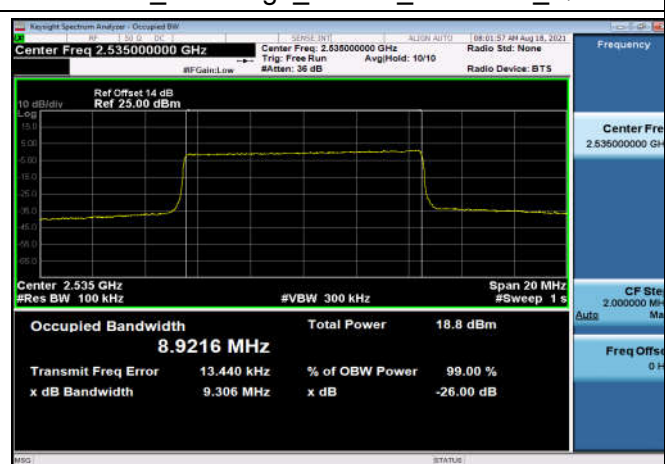
FDD07	MidRange	5MHz	2535MHz	Q16
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FDD07	MidRange	10MHz	2535MHz	QPSK
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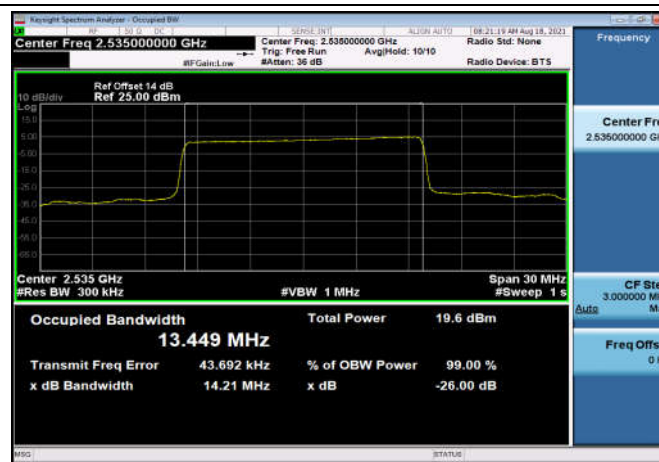


FDD07 MidRange 10MHz 2535MHz Q16

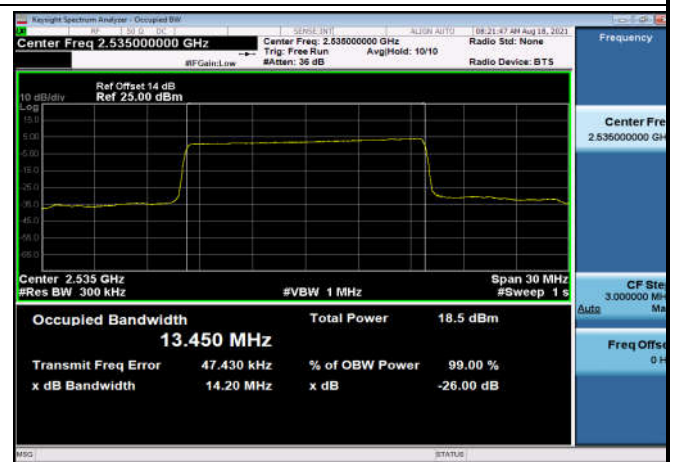




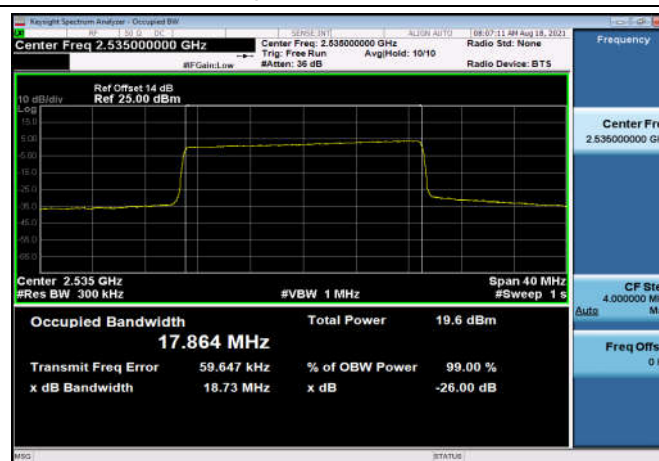
FDD07_MidRange_15MHz_2535MHz_QPSK



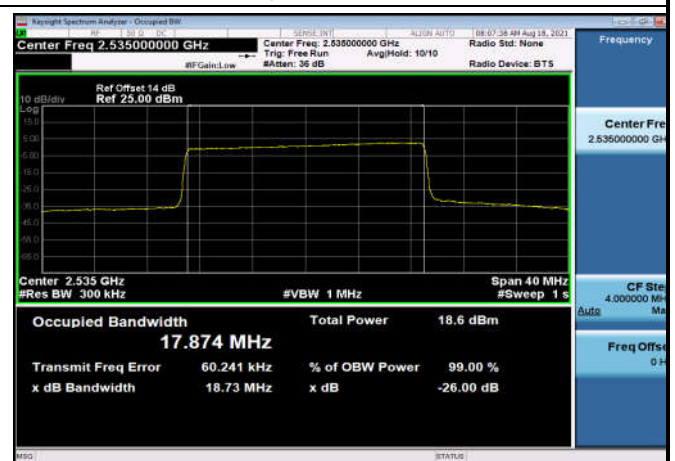
FDD07_MidRange_15MHz_2535MHz_Q16



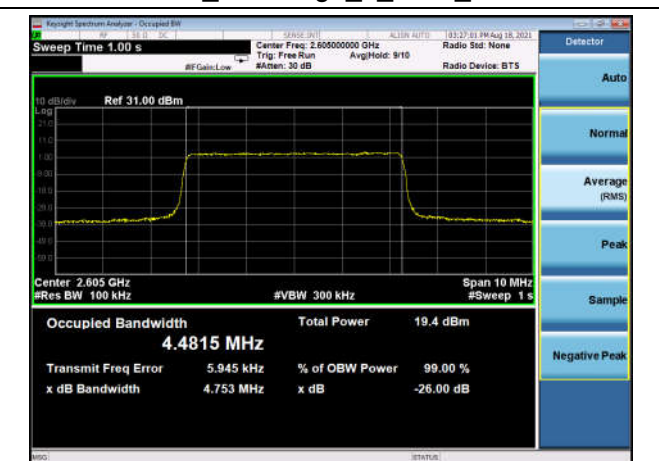
FDD07_MidRange_20MHz_2535MHz_QPSK



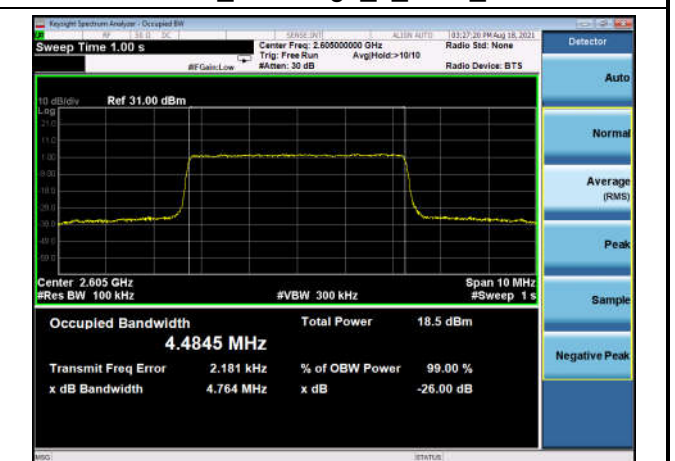
FDD07_MidRange_20MHz_2535MHz_Q16



TDD41_MidRange_5_2605_QPSK

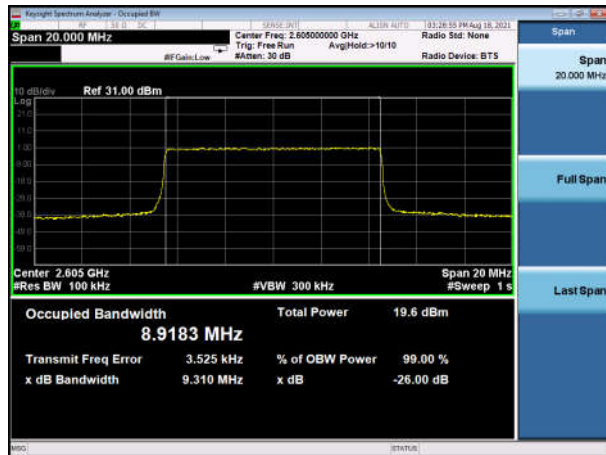


TDD41_MidRange_5_2605_Q16

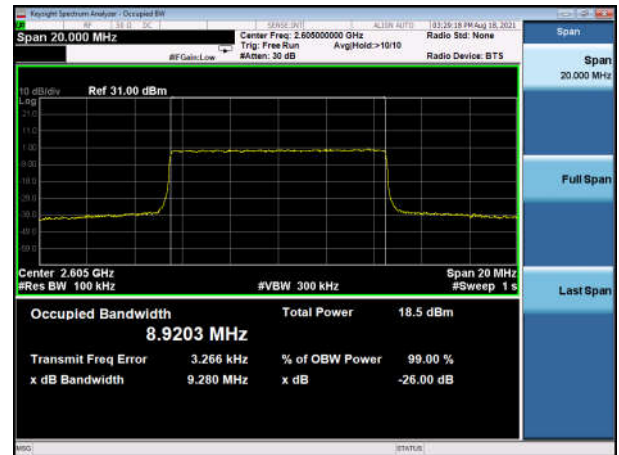




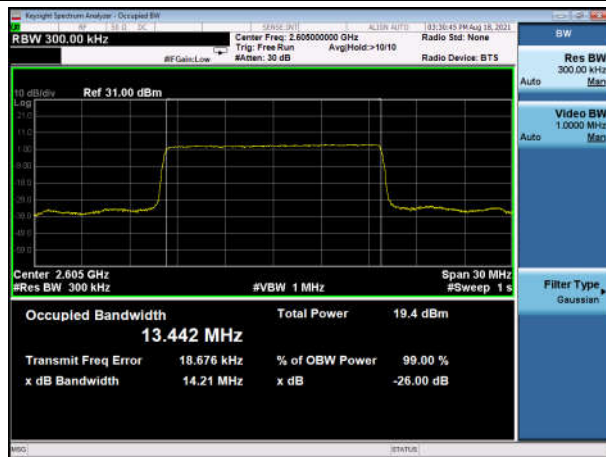
TDD41_MidRange_10_2605_QPSK



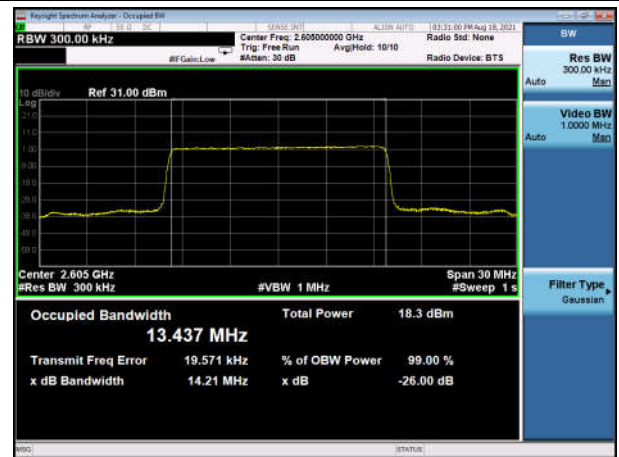
TDD41_MidRange_10_2605_Q16



TDD41_MidRange_15_2605_QPSK



TDD41_MidRange_15_2605_Q16



TDD41_MidRange_20_2605_QPSK



TDD41_MidRange_20_2605_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	FDD05	10	fullRB	QPSK	-10.314	-0.012	±2.5	Pass
Normal	Normal	FDD05	10	fullRB	QPSK	-9.327	-0.011	±2.5	Pass
Normal	High	FDD05	10	fullRB	QPSK	-7.982	-0.010	±2.5	Pass
50	Normal	FDD05	10	fullRB	QPSK	-28.152	-0.034	±2.5	Pass
40	Normal	FDD05	10	fullRB	QPSK	-7.510	-0.009	±2.5	Pass
30	Normal	FDD05	10	fullRB	QPSK	-9.542	-0.011	±2.5	Pass
20	Normal	FDD05	10	fullRB	QPSK	-8.740	-0.010	±2.5	Pass
10	Normal	FDD05	10	fullRB	QPSK	-5.608	-0.007	±2.5	Pass
0	Normal	FDD05	10	fullRB	QPSK	-8.011	-0.010	±2.5	Pass
-10	Normal	FDD05	10	fullRB	QPSK	-11.830	-0.014	±2.5	Pass
-20	Normal	FDD05	10	fullRB	QPSK	-9.084	-0.011	±2.5	Pass
-30	Normal	FDD05	10	fullRB	QPSK	-9.499	-0.011	±2.5	Pass
Normal	Low	FDD07	10	fullRB	QPSK	-7.925	-0.003	±2.5	Pass
Normal	Normal	FDD07	10	fullRB	QPSK	-7.982	-0.003	±2.5	Pass
Normal	High	FDD07	10	fullRB	QPSK	-9.584	-0.004	±2.5	Pass
50	Normal	FDD07	10	fullRB	QPSK	-8.011	-0.003	±2.5	Pass
40	Normal	FDD07	10	fullRB	QPSK	-7.739	-0.003	±2.5	Pass
30	Normal	FDD07	10	fullRB	QPSK	-19.341	-0.008	±2.5	Pass
20	Normal	FDD07	10	fullRB	QPSK	-12.646	-0.005	±2.5	Pass
10	Normal	FDD07	10	fullRB	QPSK	-7.038	-0.003	±2.5	Pass
0	Normal	FDD07	10	fullRB	QPSK	-7.553	-0.003	±2.5	Pass
-10	Normal	FDD07	10	fullRB	QPSK	-8.411	-0.003	±2.5	Pass
-20	Normal	FDD07	10	fullRB	QPSK	-7.825	-0.003	±2.5	Pass
-30	Normal	FDD07	10	fullRB	QPSK	-7.668	-0.003	±2.5	Pass
Normal	Low	TDD41	10	fullRB	QPSK	26.464	0.010	±2.5	Pass



Normal	Normal	TDD41	10	fullRB	QPSK	-25.048	-0.010	± 2.5	Pass
Normal	High	TDD41	10	fullRB	QPSK	-27.022	-0.010	± 2.5	Pass
50	Normal	TDD41	10	fullRB	QPSK	-27.065	-0.010	± 2.5	Pass
40	Normal	TDD41	10	fullRB	QPSK	-23.804	-0.009	± 2.5	Pass
30	Normal	TDD41	10	fullRB	QPSK	-24.877	-0.010	± 2.5	Pass
20	Normal	TDD41	10	fullRB	QPSK	-25.148	-0.010	± 2.5	Pass
10	Normal	TDD41	10	fullRB	QPSK	-16.551	-0.006	± 2.5	Pass
0	Normal	TDD41	10	fullRB	QPSK	-22.717	-0.009	± 2.5	Pass
-10	Normal	TDD41	10	fullRB	QPSK	-23.975	-0.009	± 2.5	Pass
-20	Normal	TDD41	10	fullRB	QPSK	-20.900	-0.008	± 2.5	Pass
-30	Normal	TDD41	10	fullRB	QPSK	-27.766	-0.011	± 2.5	Pass

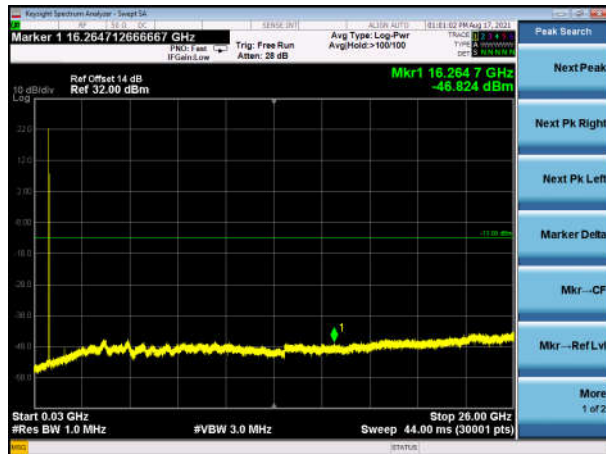
Note: Normal=7.4V, Low=6.7V, High=7.7V



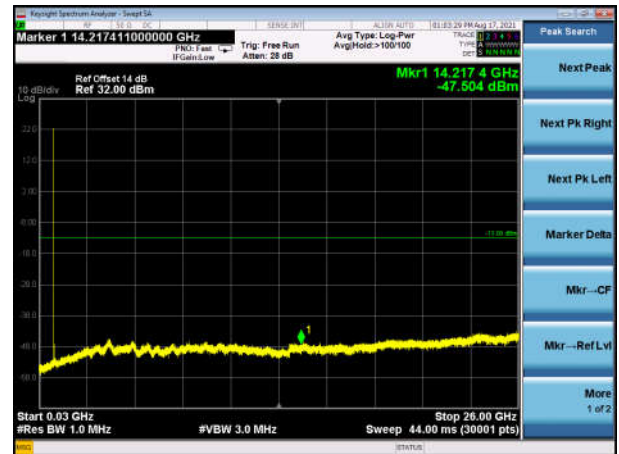
Conducted Out of Band Emissions

Test Result and Data

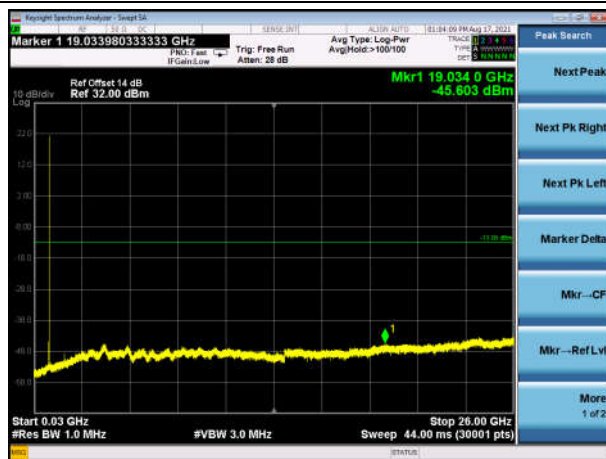
FDD05_LowRange_10MHz_30MHz~26GHz



FDD05_MidRange_10MHz_30MHz~26GHz

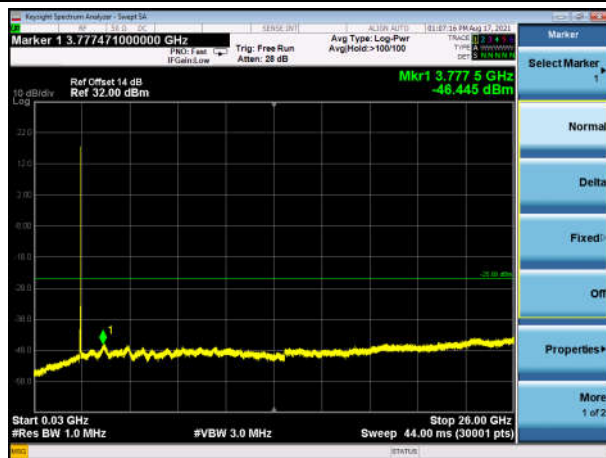


FDD05_HighRange_10MHz_30MHz~26GHz





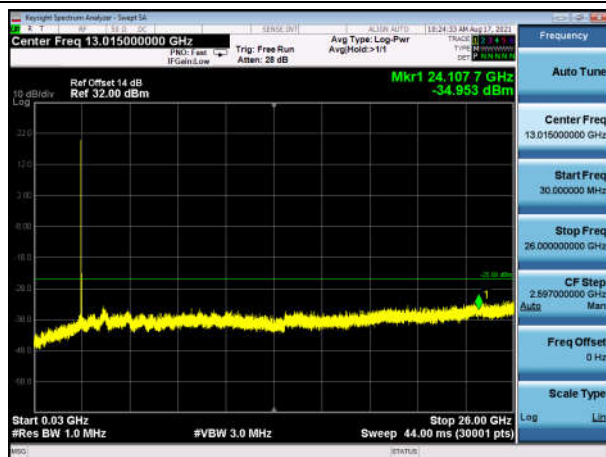
FDD07_LowRange_20MHz_30MHz~26GHz



FDD07_HighRange_20MHz_30MHz~26GHz

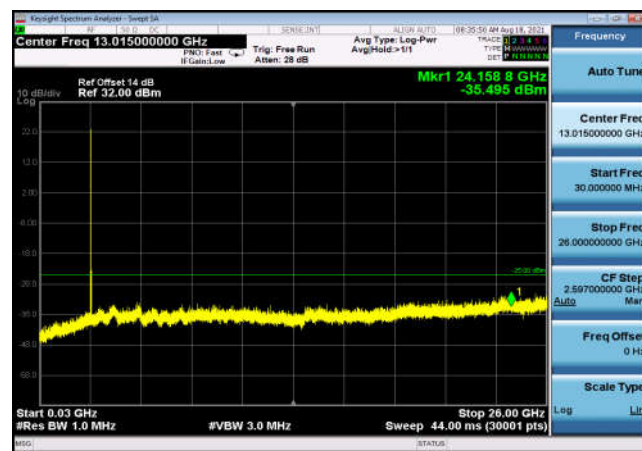


FDD07_MidRange_20MHz_30MHz~26GHz

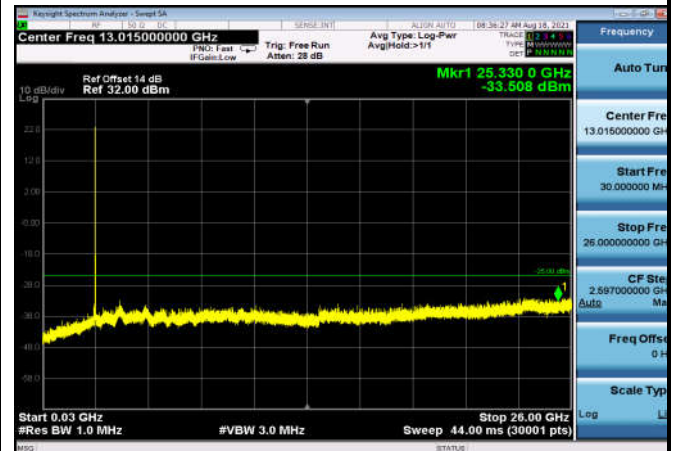




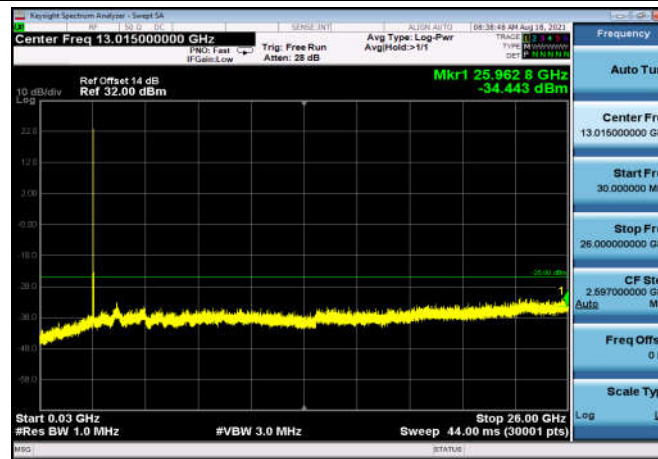
TDD41_LowRange_20MHz_30MHz~26GHz



TDD41_MidRange_20MHz_30MHz~26GHz



TDD41_HighRange_20MHz_30MHz~26GHz

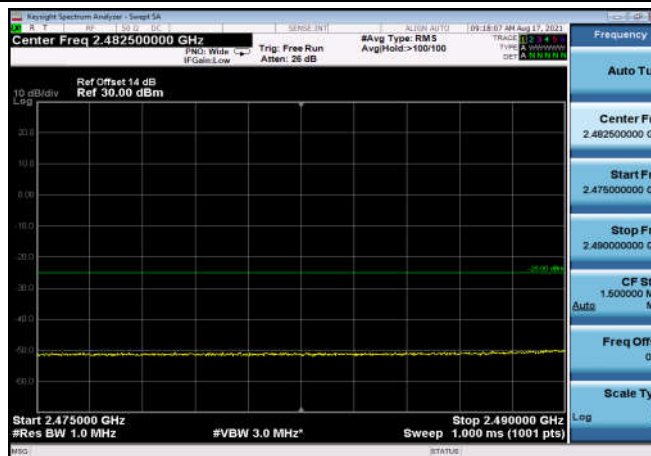




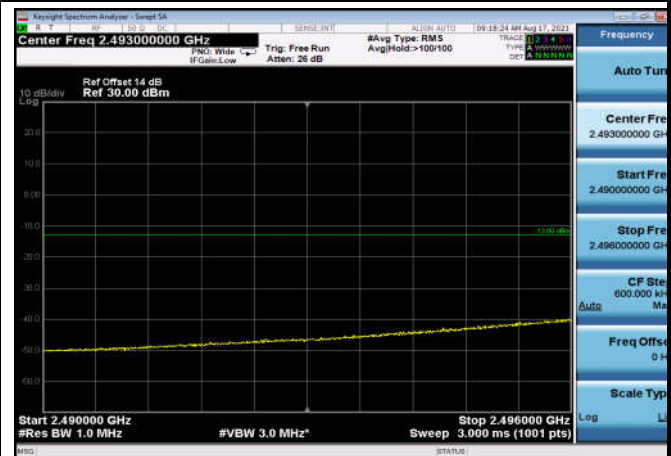
Conducted Band Edge

Test Result and Data

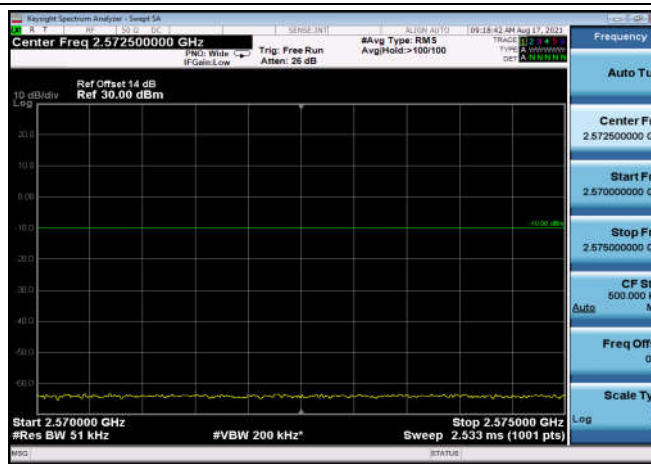
FDD07_10MHz_2505_Q16_fullIRB_ExtraBand
s_Range_2475~2490



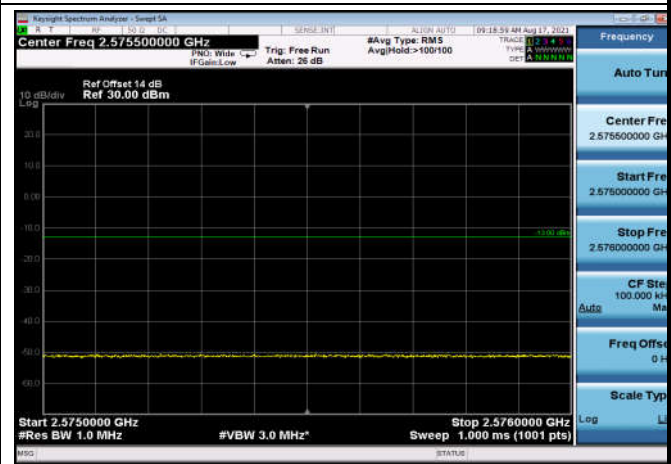
FDD07_10MHz_2505_Q16_fullIRB_ExtraBand
s_Range_2490~2496



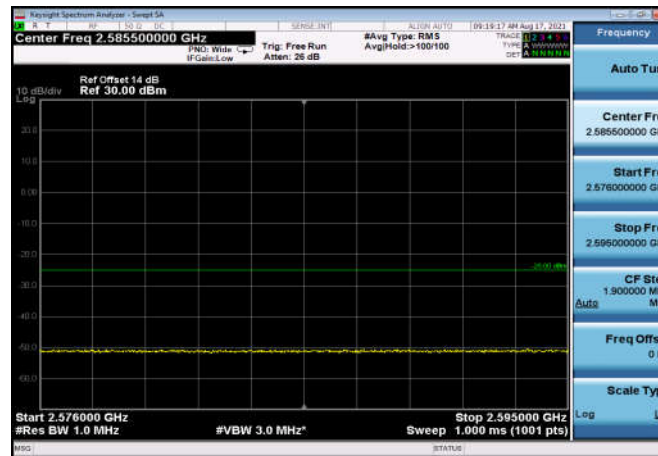
FDD07_10MHz_2505_Q16_fullIRB_ExtraBand
s_Range_2570~2575



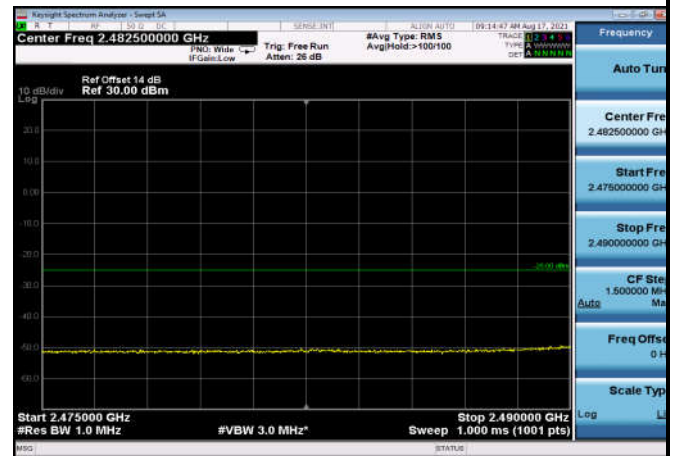
FDD07_10MHz_2505_Q16_fullIRB_ExtraBand
s_Range_2575~2576



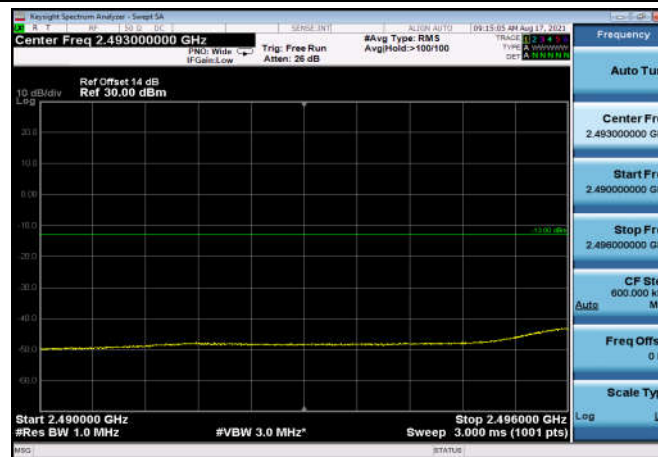
FDD07_10MHz_2505_Q16_fullRB_ExtraBand
s_Range_2576~2595



FDD07_10MHz_2505_Q16_OneRB_low
_ExtraBands_Range_2475~2490



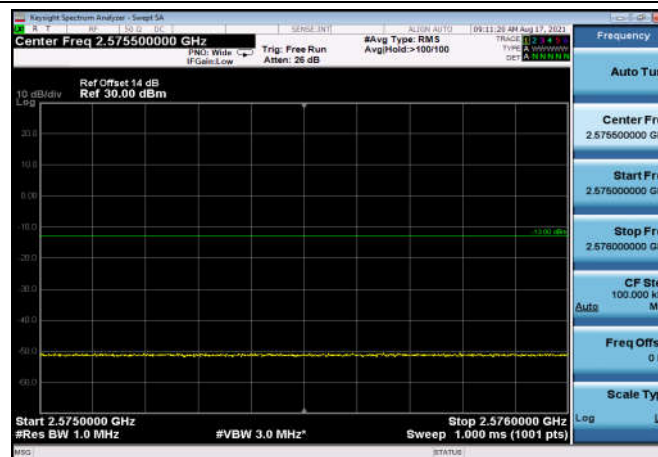
FDD07_10MHz_2505_Q16_OneRB_low
_ExtraBands_Range_2490~2496



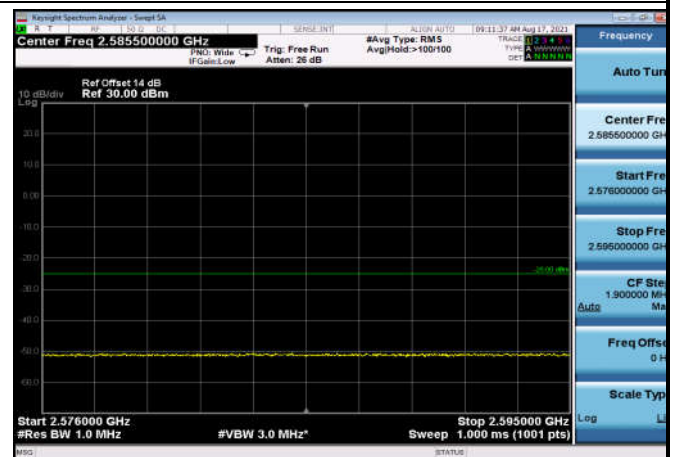
FDD07_10MHz_2505_QPSK_OneRB_high
_ExtraBands_Range_2570~2575

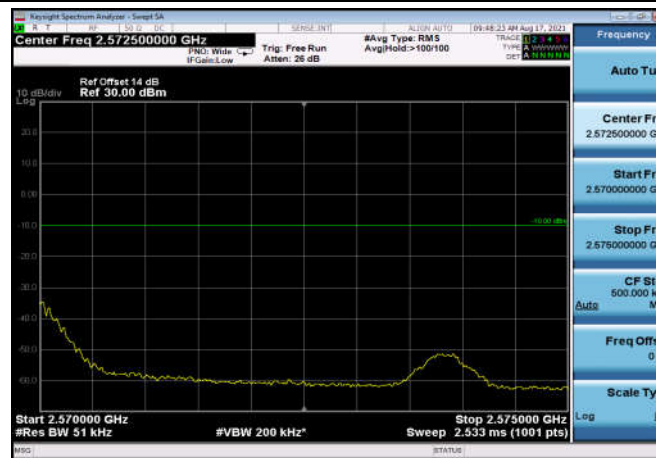
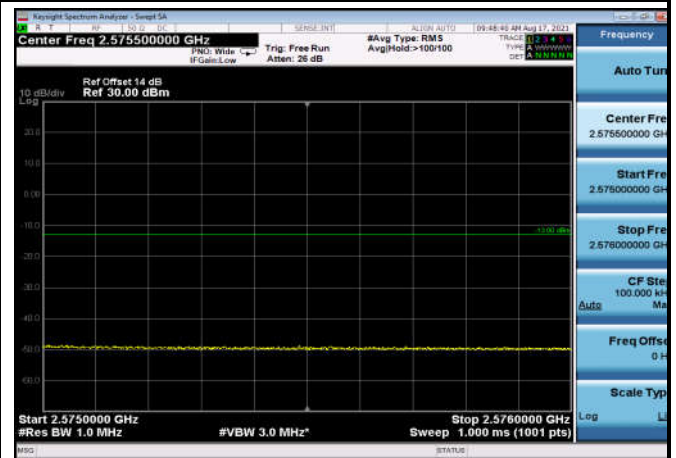
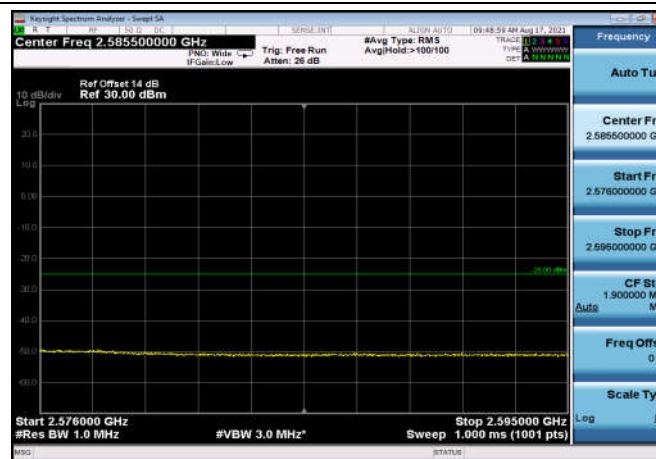
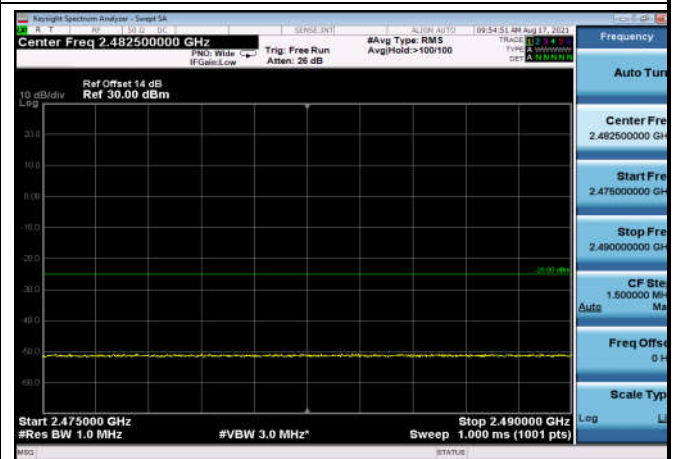
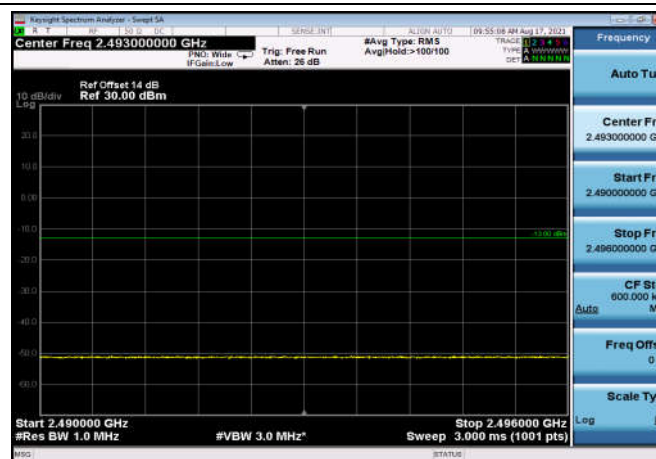
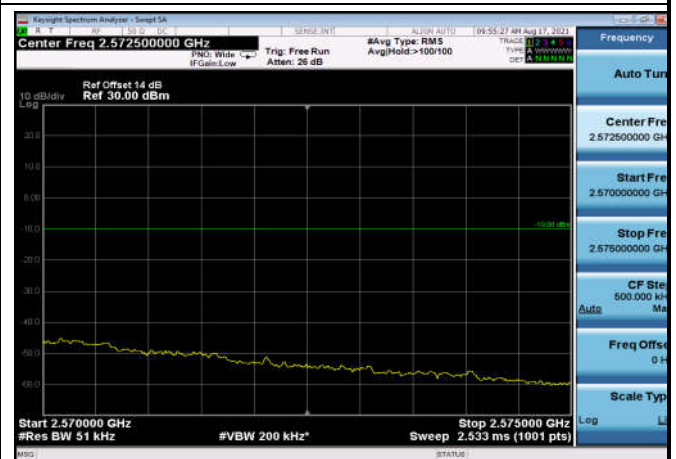


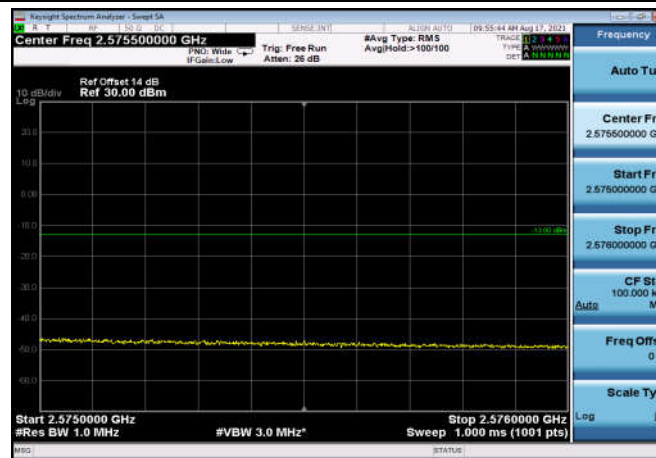
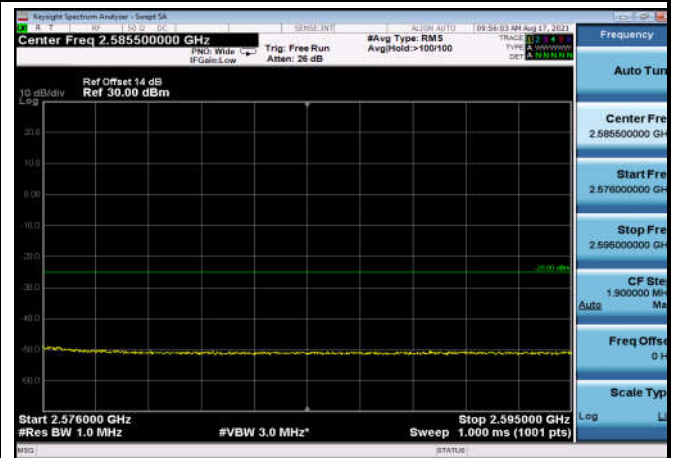
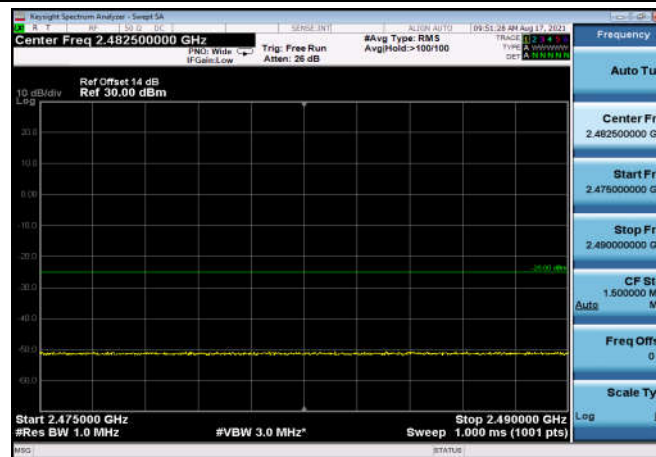
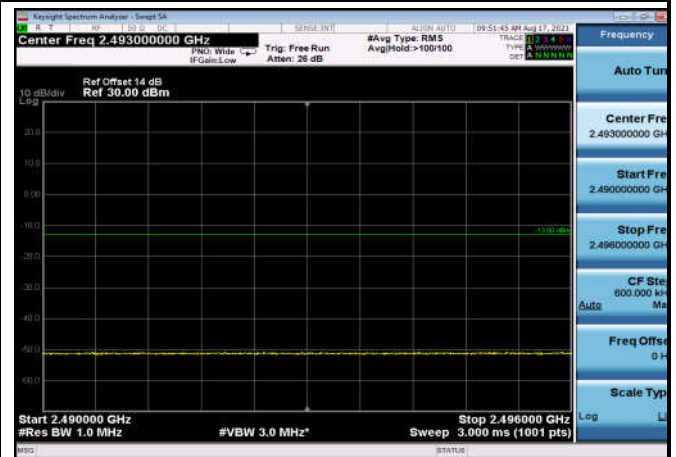
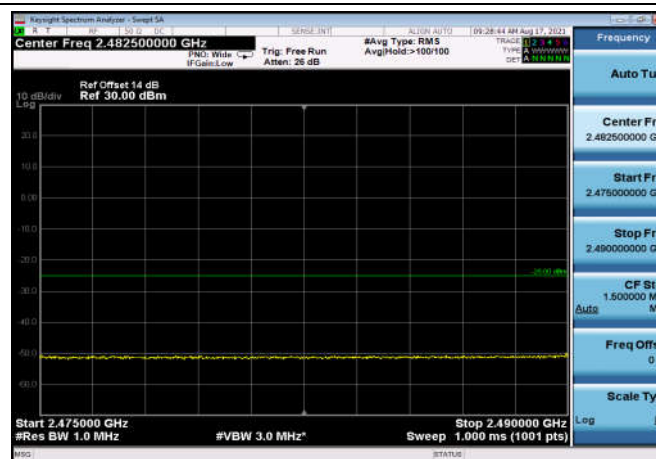
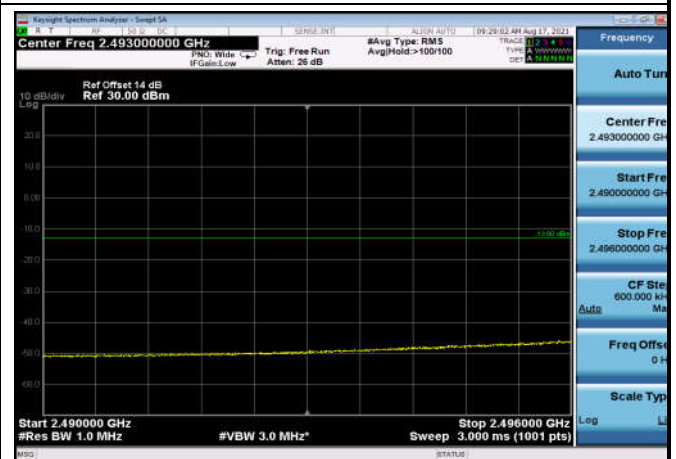
FDD07_10MHz_2505_QPSK_OneRB_high
_ExtraBands_Range_2575~2576



FDD07_10MHz_2505_QPSK_OneRB_high
_ExtraBands_Range_2576~2595

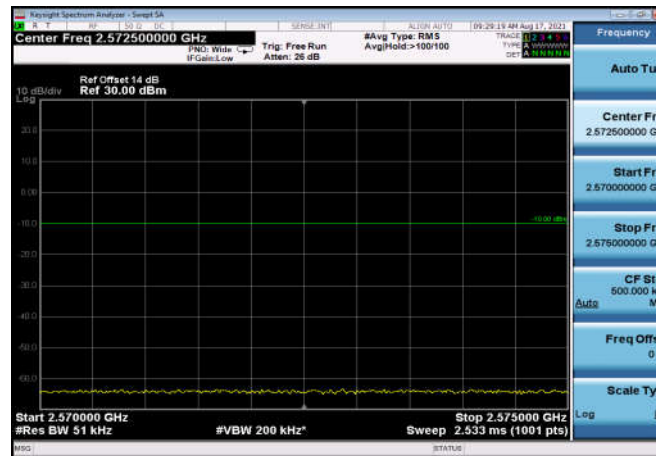


FDD07_10MHz_2565_Q16_OneRB_high
_ExtraBands_Range_2570~2575FDD07_10MHz_2565_Q16_OneRB_high
_ExtraBands_Range_2575~2576FDD07_10MHz_2565_Q16_OneRB_high
_ExtraBands_Range_2576~2595FDD07_10MHz_2565_QPSK_fullIRB_ExtraBan
ds_Range_2475~2490FDD07_10MHz_2565_QPSK_fullIRB_ExtraBan
ds_Range_2490~2496FDD07_10MHz_2565_QPSK_fullIRB_ExtraBan
ds_Range_2570~2575

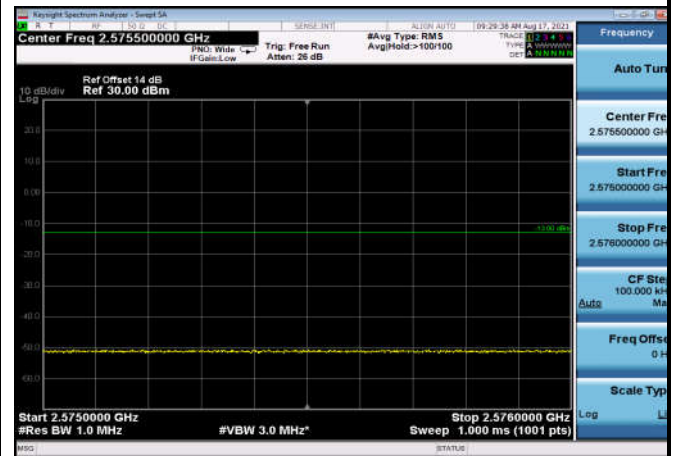
FDD07_10MHz_2565_QPSK_fullIRB_ExtraBan
ds_Range_2575~2576FDD07_10MHz_2565_QPSK_fullIRB_ExtraBan
ds_Range_2576~2595FDD07_10MHz_2565_QPSK_OneRB_low
_ExtraBands_Range_2475~2490FDD07_10MHz_2565_QPSK_OneRB_low
_ExtraBands_Range_2490~2496FDD07_15MHz_2507.5_Q16_fullIRB_ExtraBa
nds_Range_2475~2490FDD07_15MHz_2507.5_Q16_fullIRB_ExtraBa
nds_Range_2490~2496



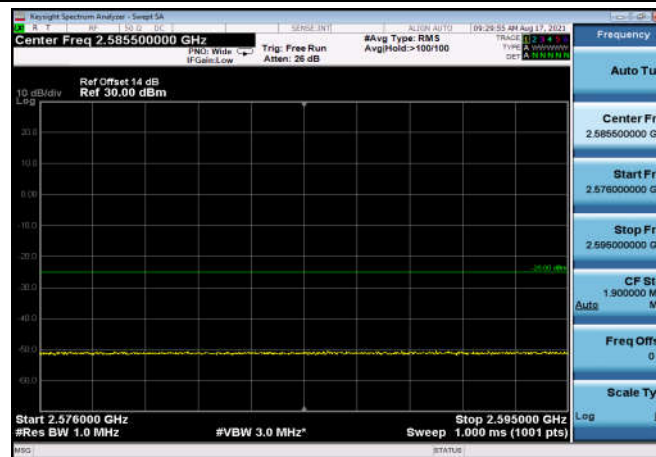
FDD07_15MHz_2507.5_Q16_fullRB_ExtraBands_Range_2570~2575



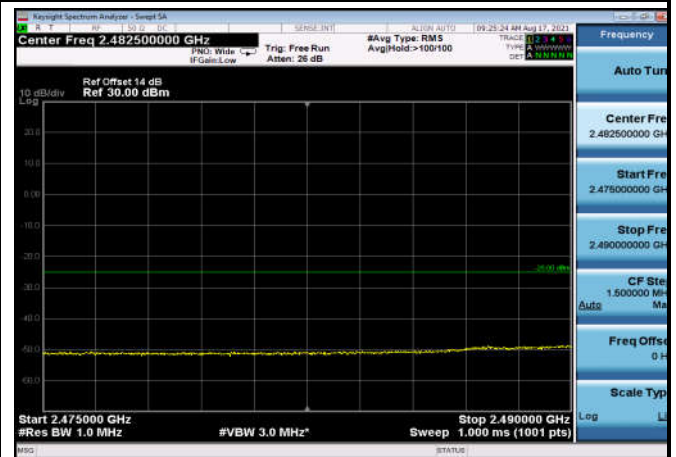
FDD07_15MHz_2507.5_Q16_fullRB_ExtraBands_Range_2575~2576



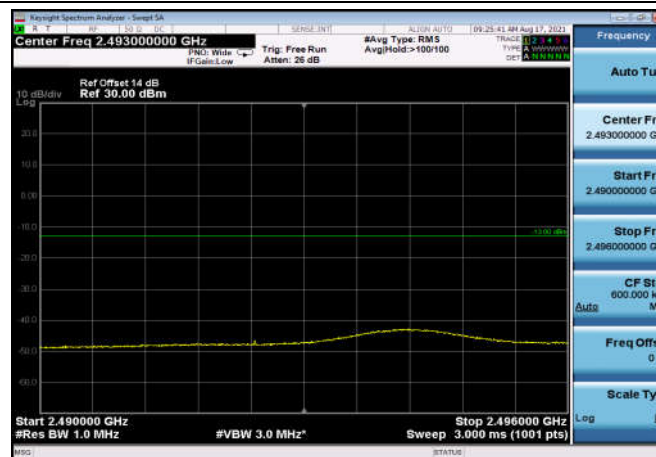
FDD07_15MHz_2507.5_Q16_fullRB_ExtraBands_Range_2576~2595



FDD07_15MHz_2507.5_Q16_OneRB_low_ExtraBands_Range_2475~2490

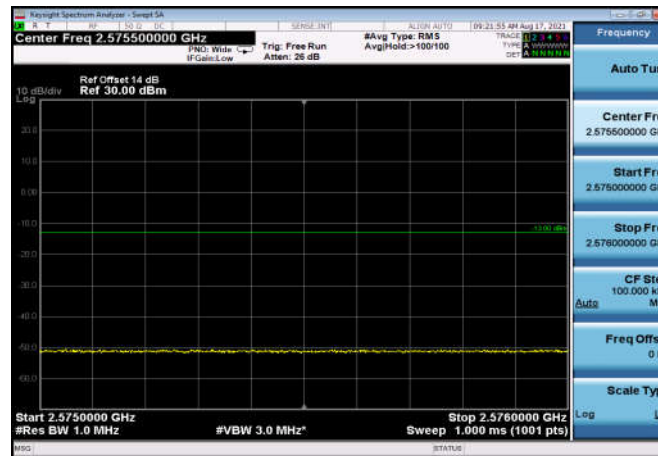
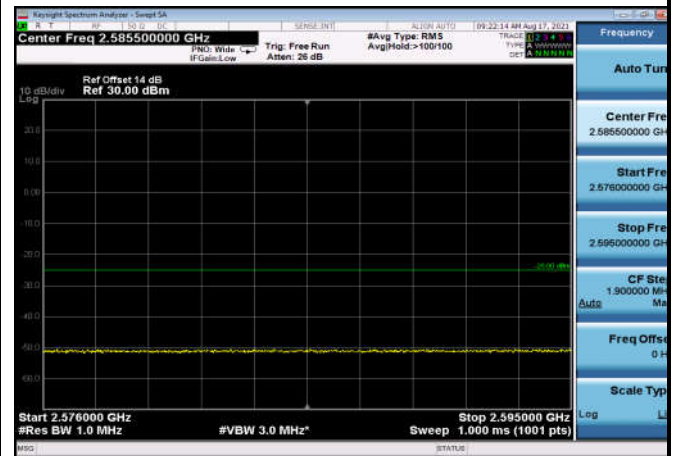
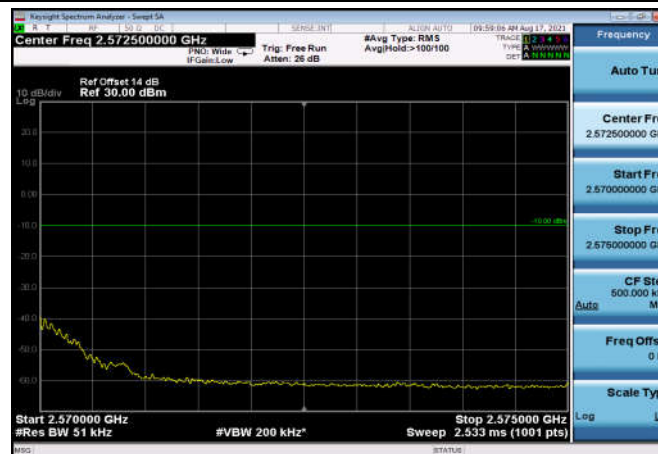
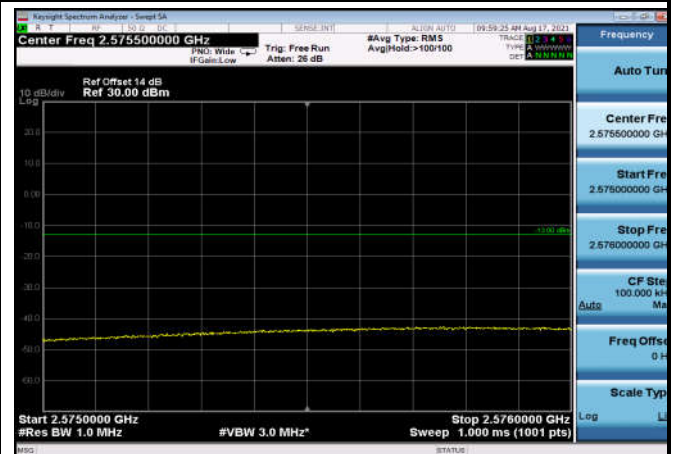
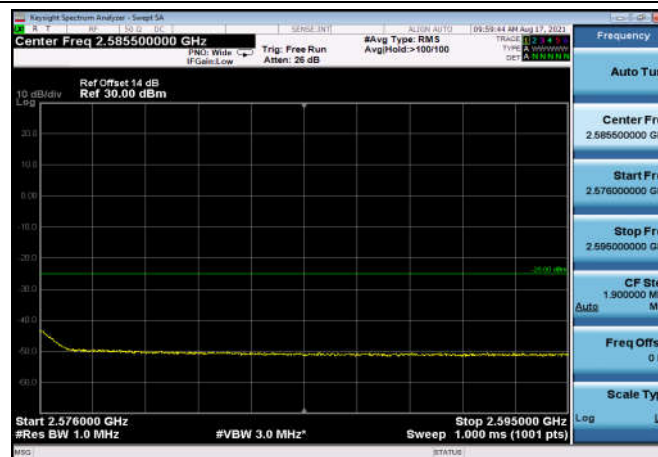
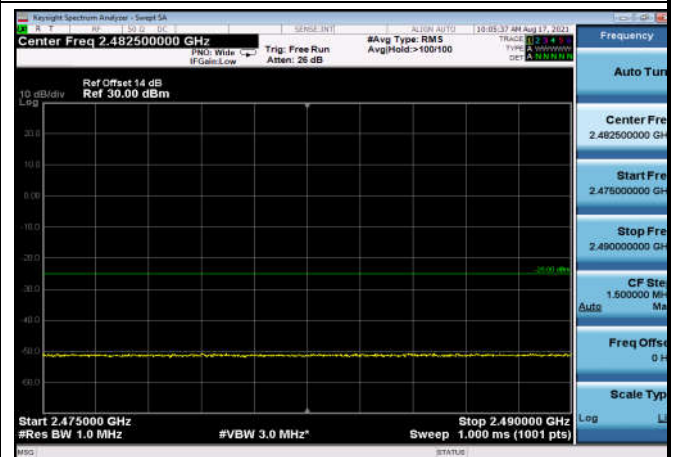


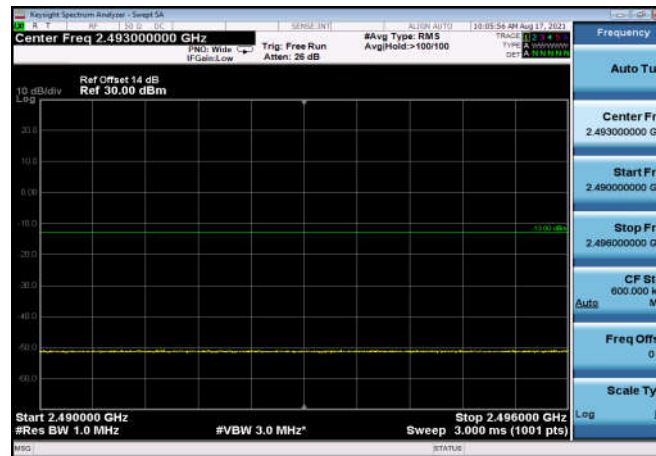
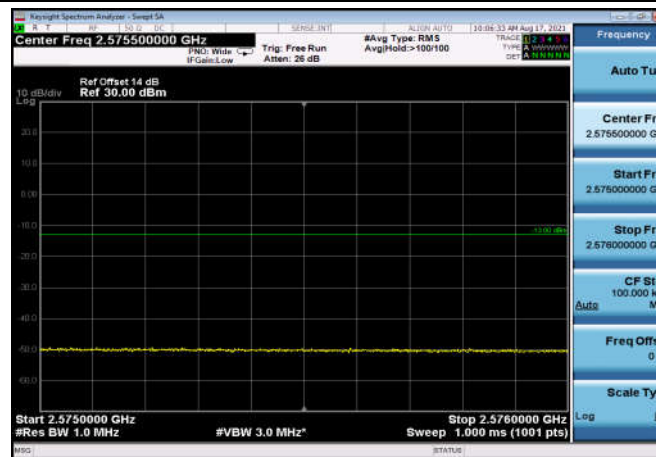
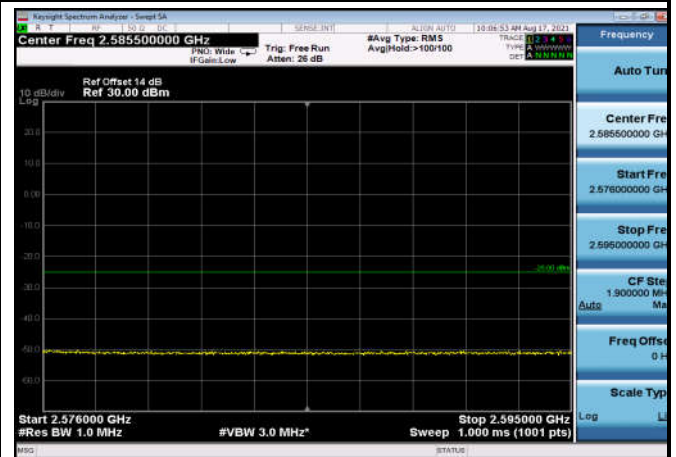
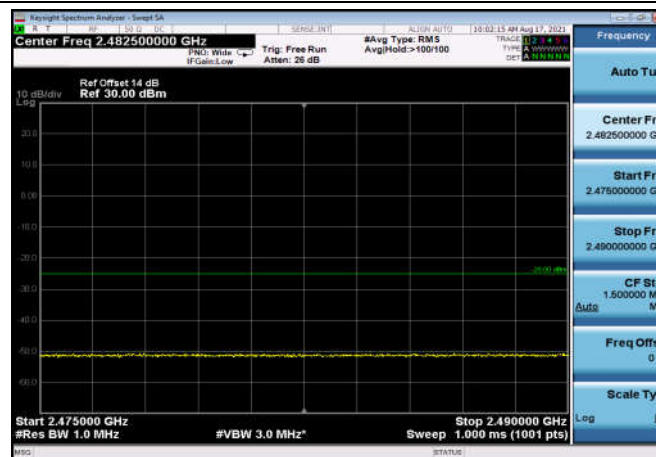
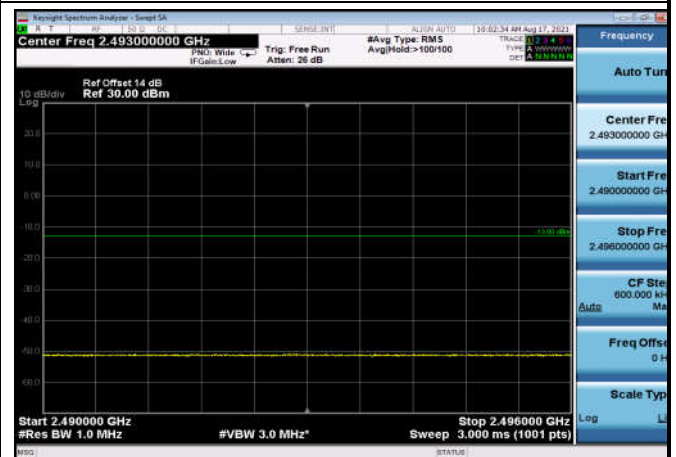
FDD07_15MHz_2507.5_Q16_OneRB_low_ExtraBands_Range_2490~2496

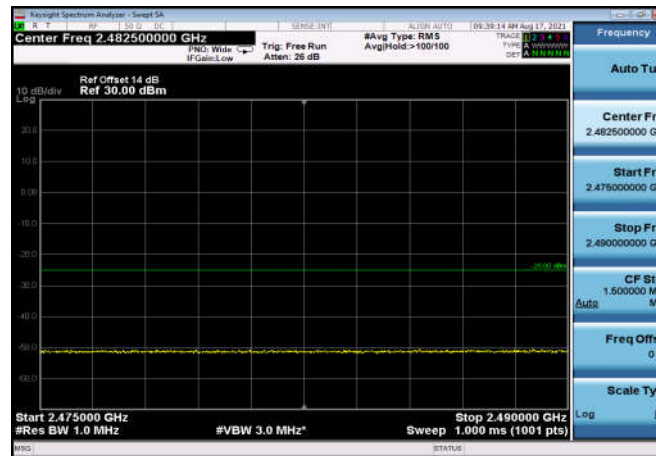
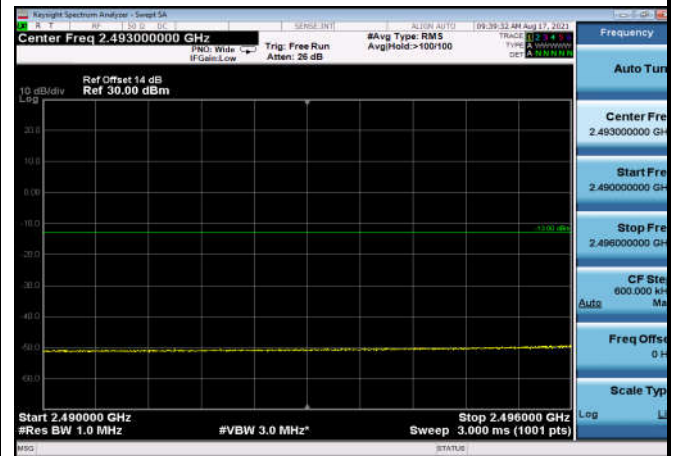
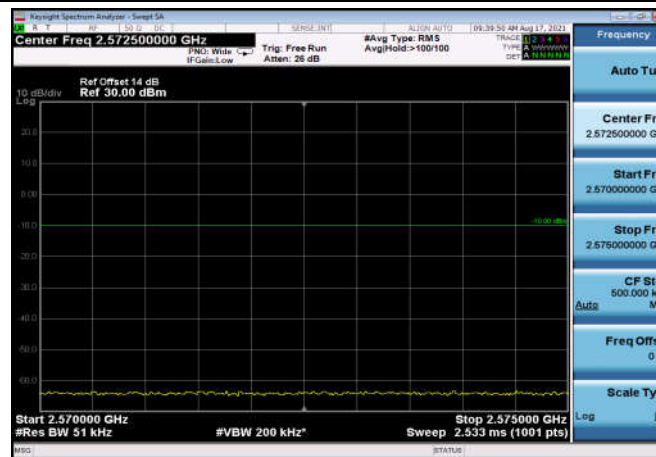
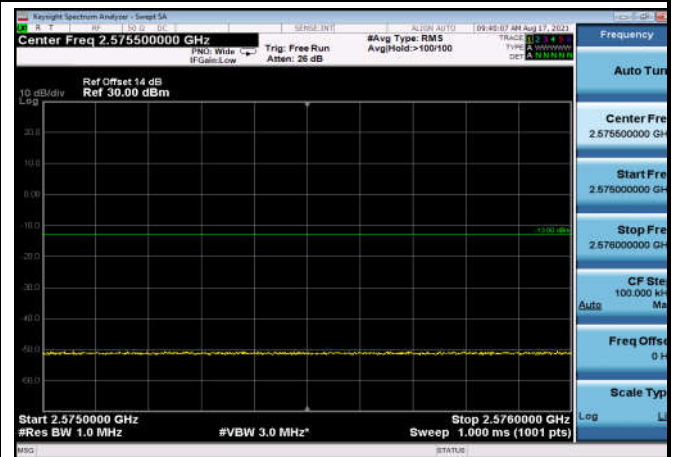
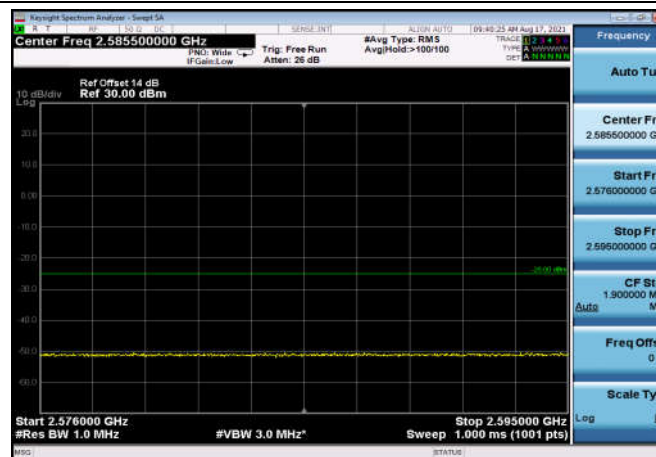
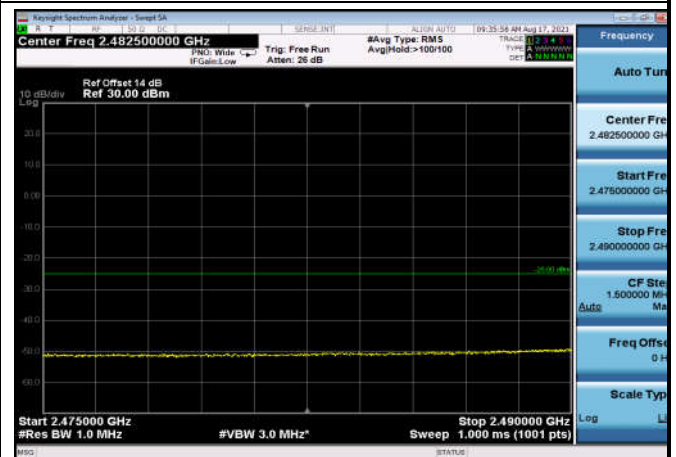


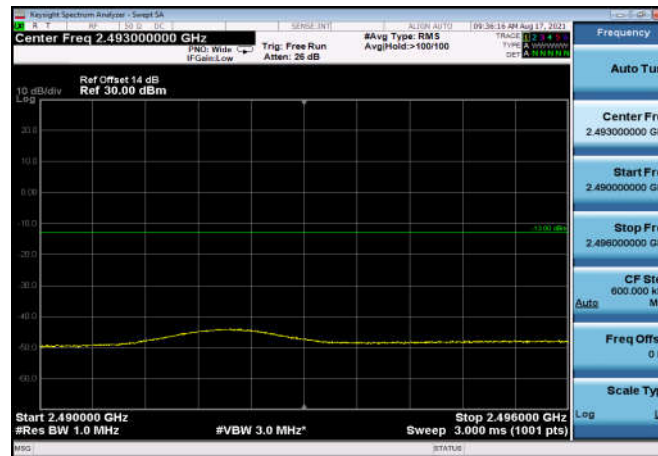
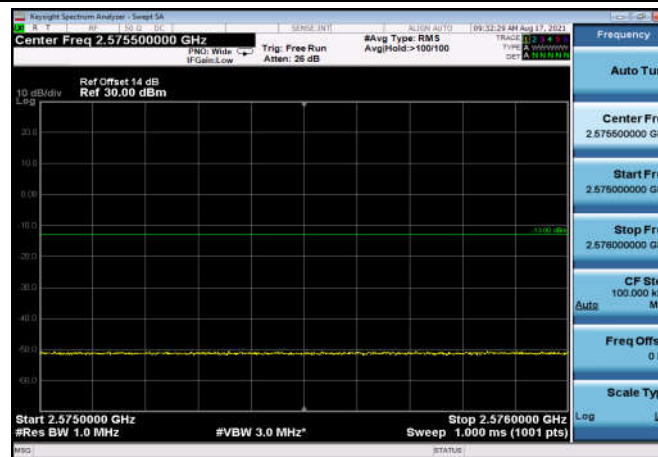
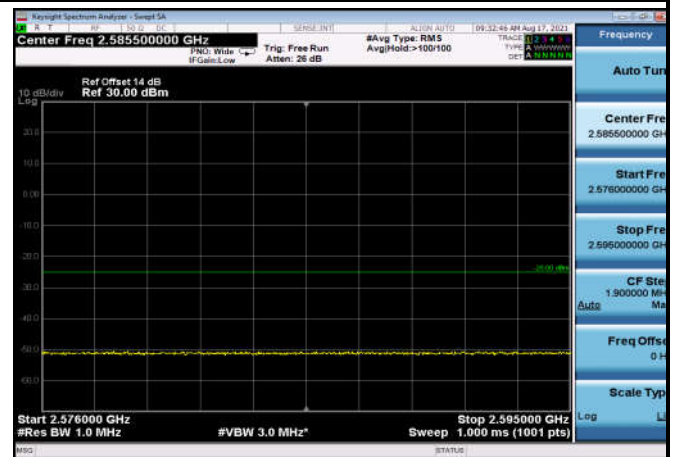
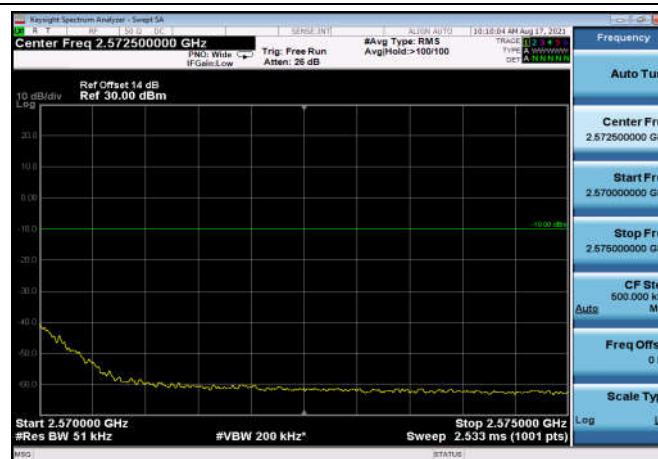
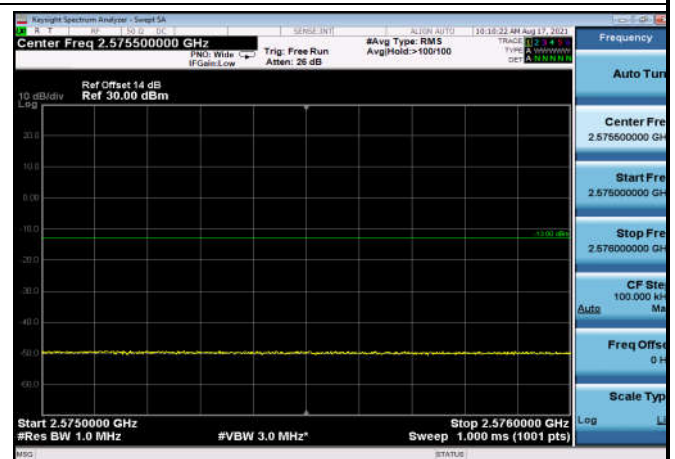
FDD07_15MHz_2507.5_QPSK_OneRB_high_ExtraBands_Range_2570~2575

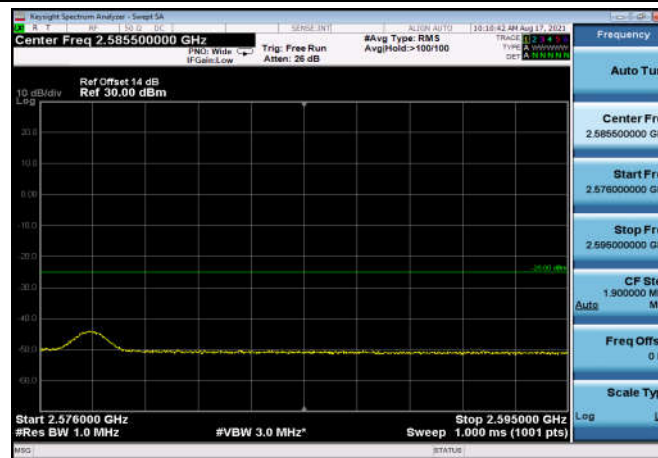
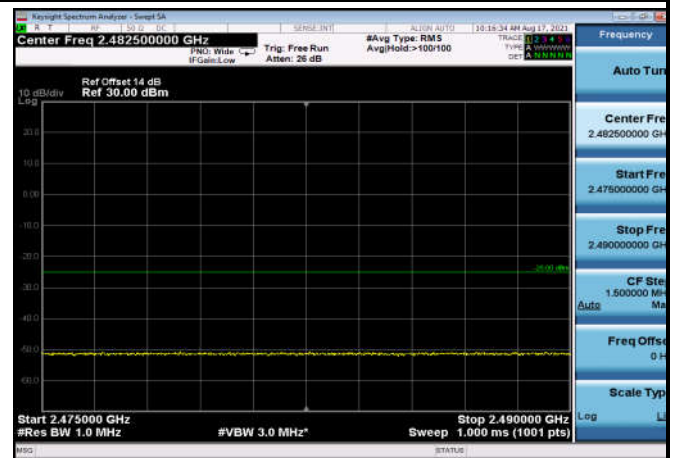
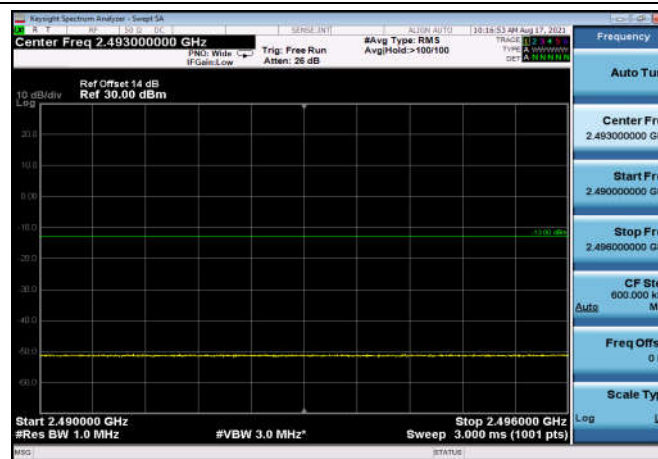
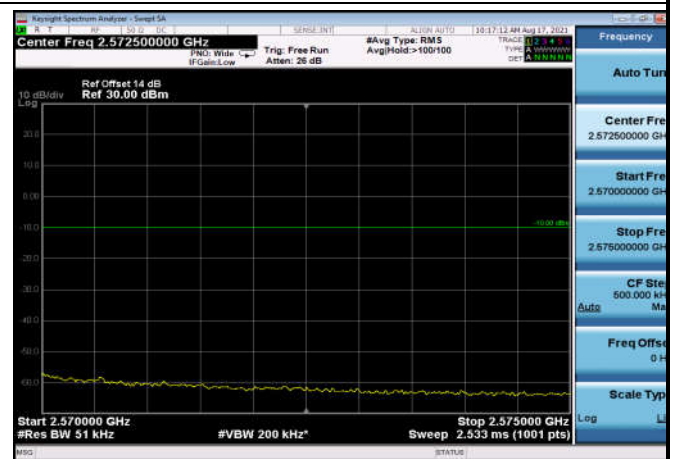
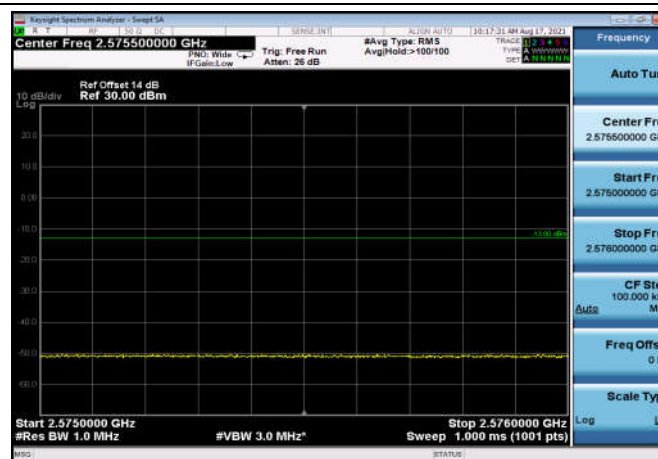
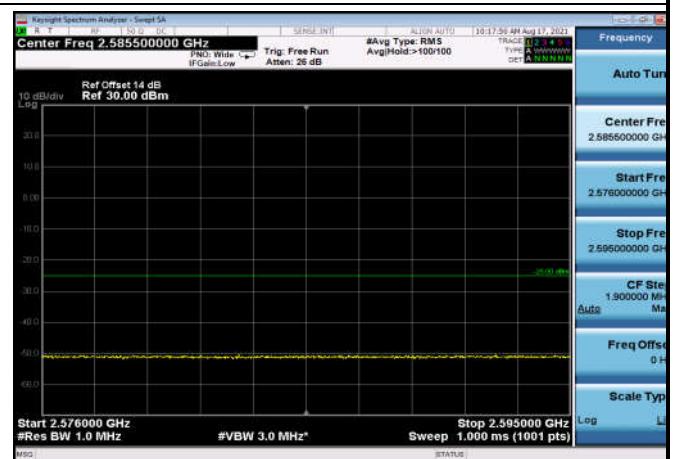


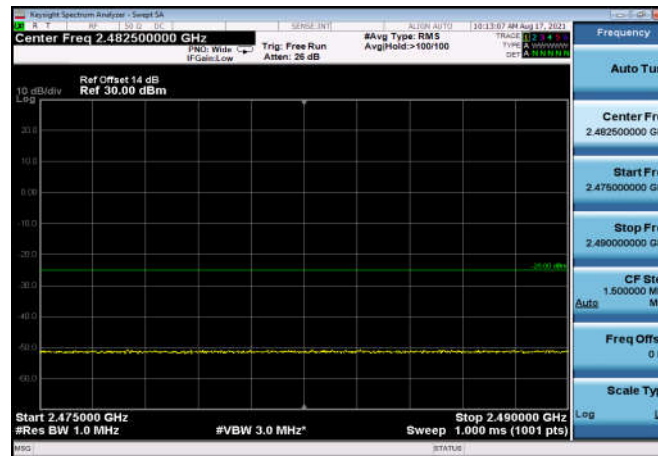
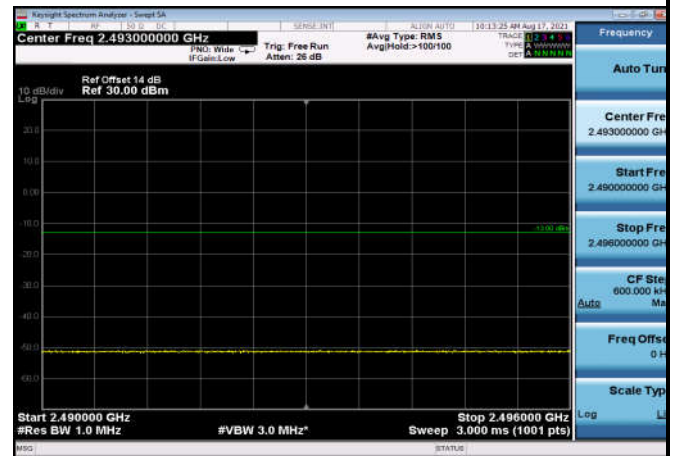
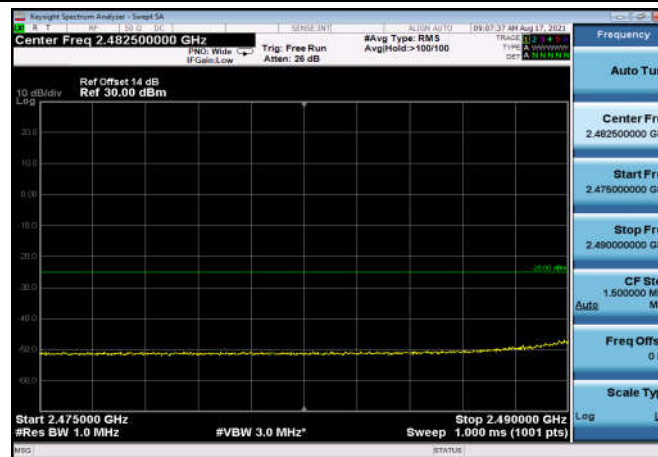
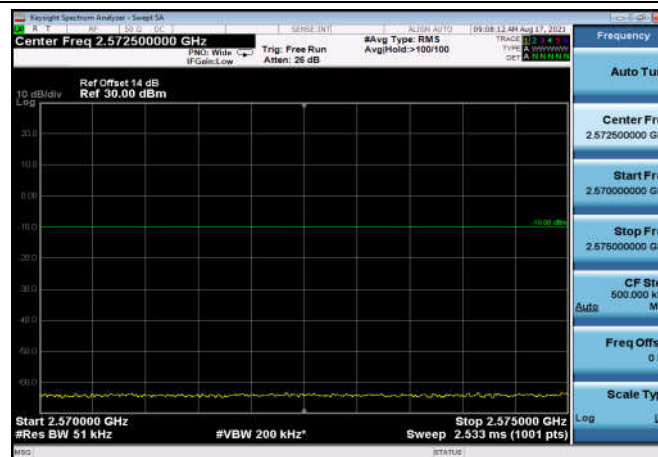
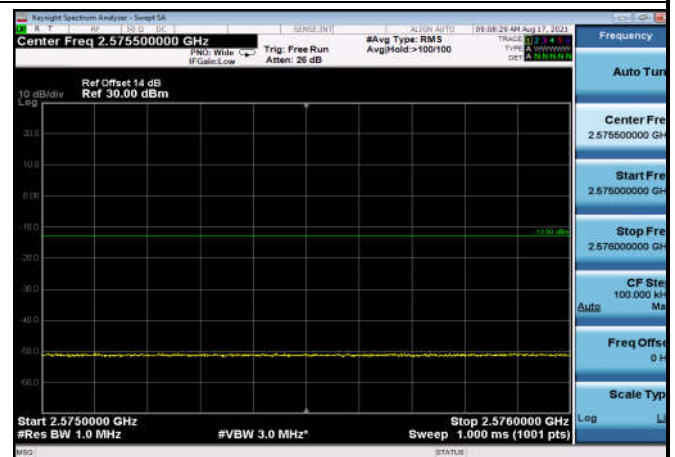
FDD07_15MHz_2507.5_QPSK_OneRB_high
_ExtraBands_Range_2575~2576FDD07_15MHz_2507.5_QPSK_OneRB_high
_ExtraBands_Range_2576~2595FDD07_15MHz_2562.5_Q16_OneRB_high
_ExtraBands_Range_2570~2575FDD07_15MHz_2562.5_Q16_OneRB_high
_ExtraBands_Range_2575~2576FDD07_15MHz_2562.5_Q16_OneRB_high
_ExtraBands_Range_2576~2595FDD07_15MHz_2562.5_QPSK_fullIRB
_ExtraBands_Range_2475~2490

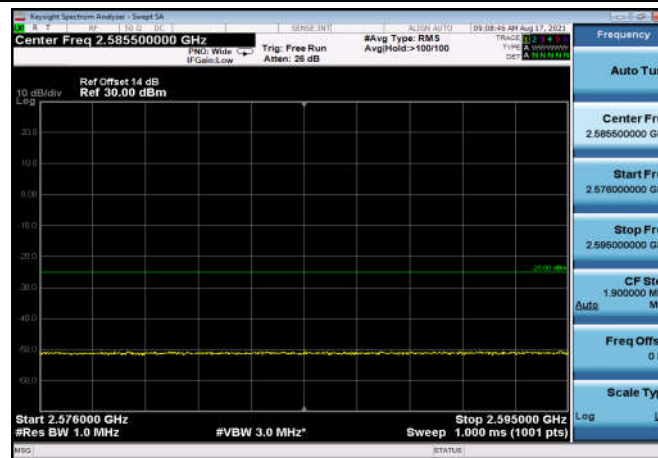
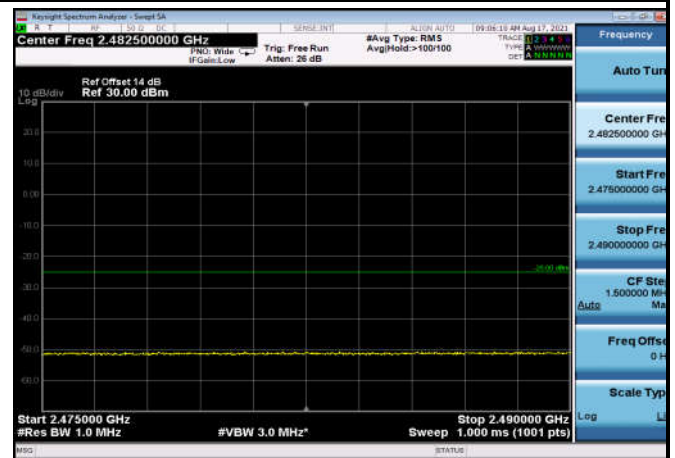
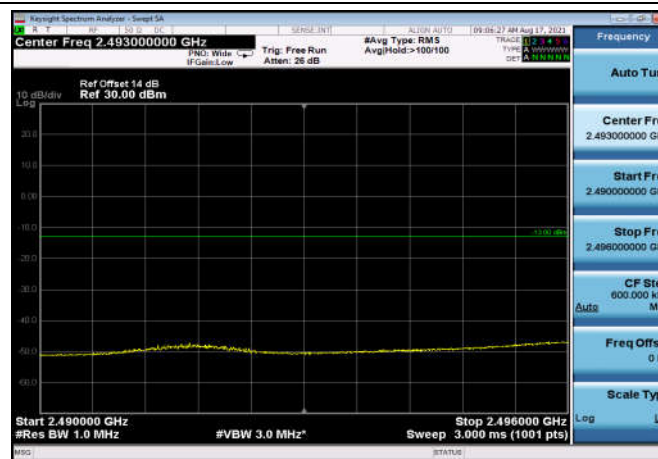
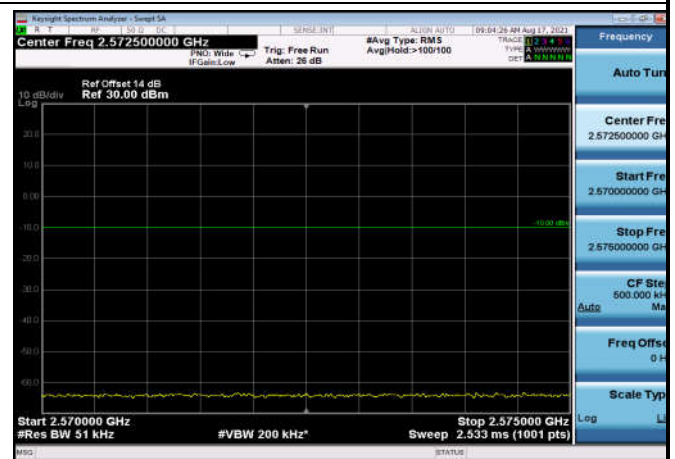
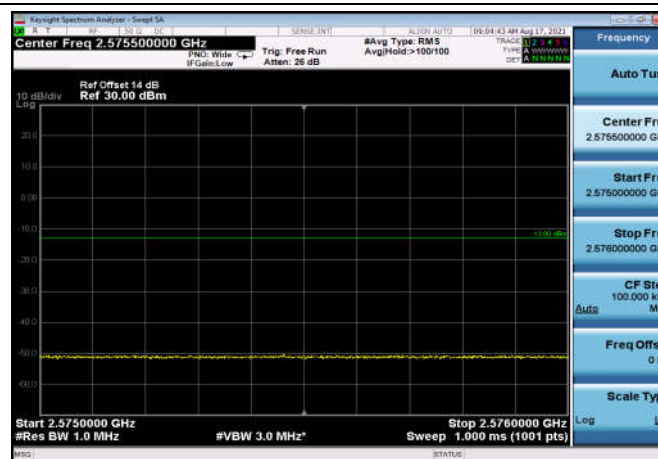
FDD07_15MHz_2562.5_QPSK_fullIRB
_ExtraBands_Range_2490~2496FDD07_15MHz_2562.5_QPSK_fullIRB
_ExtraBands_Range_2570~2575FDD07_15MHz_2562.5_QPSK_fullIRB
_ExtraBands_Range_2575~2576FDD07_15MHz_2562.5_QPSK_fullIRB
_ExtraBands_Range_2576~2595FDD07_15MHz_2562.5_QPSK_OneRB_low
_ExtraBands_Range_2475~2490FDD07_15MHz_2562.5_QPSK_OneRB_low
_ExtraBands_Range_2490~2496

FDD07_20MHz_2510_Q16_fullRB_ExtraBand
s_Range_2475~2490FDD07_20MHz_2510_Q16_fullRB_ExtraBand
s_Range_2490~2496FDD07_20MHz_2510_Q16_fullRB_ExtraBand
s_Range_2570~2575FDD07_20MHz_2510_Q16_fullRB_ExtraBand
s_Range_2575~2576FDD07_20MHz_2510_Q16_fullRB_ExtraBand
s_Range_2576~2595FDD07_20MHz_2510_Q16_OneRB_low
_ExtraBands_Range_2475~2490

FDD07_20MHz_2510_Q16_OneRB_low
_ExtraBands_Range_2490~2496FDD07_20MHz_2510_QPSK_OneRB_high
_ExtraBands_Range_2570~2575FDD07_20MHz_2510_QPSK_OneRB_high
_ExtraBands_Range_2575~2576FDD07_20MHz_2510_QPSK_OneRB_high
_ExtraBands_Range_2576~2595FDD07_20MHz_2560_Q16_OneRB_high
_ExtraBands_Range_2570~2575FDD07_20MHz_2560_Q16_OneRB_high
_ExtraBands_Range_2575~2576

FDD07_20MHz_2560_Q16_OneRB_high
_ExtraBands_Range_2576~2595FDD07_20MHz_2560_QPSK_fullRB_ExtraBan
ds_Range_2475~2490FDD07_20MHz_2560_QPSK_fullRB_ExtraBan
ds_Range_2490~2496FDD07_20MHz_2560_QPSK_fullRB_ExtraBan
ds_Range_2570~2575FDD07_20MHz_2560_QPSK_fullRB_ExtraBan
ds_Range_2575~2576FDD07_20MHz_2560_QPSK_fullRB_ExtraBan
ds_Range_2576~2595

FDD07_20MHz_2560_QPSK_OneRB_low
_ExtraBands_Range_2475~2490FDD07_20MHz_2560_QPSK_OneRB_low
_ExtraBands_Range_2490~2496FDD07_5MHz_2502.5_Q16_fullRB_ExtraBan
ds_Range_2475~2490FDD07_5MHz_2502.5_Q16_fullRB_ExtraBan
ds_Range_2490~2496FDD07_5MHz_2502.5_Q16_fullRB_ExtraBan
ds_Range_2570~2575FDD07_5MHz_2502.5_Q16_fullRB_ExtraBan
ds_Range_2575~2576

FDD07_5MHz_2502.5_Q16_fullRB_ExtraBan
ds_Range_2576~2595FDD07_5MHz_2502.5_Q16_OneRB_low
_ExtraBands_Range_2475~2490FDD07_5MHz_2502.5_Q16_OneRB_low
_ExtraBands_Range_2490~2496FDD07_5MHz_2502.5_QPSK_OneRB_high
_ExtraBands_Range_2570~2575FDD07_5MHz_2502.5_QPSK_OneRB_high
_ExtraBands_Range_2575~2576FDD07_5MHz_2502.5_QPSK_OneRB_high
_ExtraBands_Range_2576~2595