RF TEST REPORT

Report No.:	20230417G03299X-W4
Product Name:	LTE Flip Feature Phone
Model No.:	SH3320
FCC ID:	2AWF6-SH3320
Applicant:	START USA, INC.
Address:	6860 Dallas Parkway, Suite 200, Plano, TX 75024, USA
Dates of Testing:	04/19/2023 - 06/16/2023
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	Electronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China. **Tel**：86 755 26627338 **Fax**：86 755 26627238

Test Report

Product .....:	LTE Flip Feature Phone
Brand Name.....:	START, Consumer Cellular, Verve, IRIS
Trade Name .....:	START, Consumer Cellular, Verve, IRIS
Marketing Name .....:	Cactus
Applicant.....:	START USA, INC.
Applicant Address.....:	6860 Dallas Parkway, Suite 200, Plano, TX 75024, USA
Manufacturer .....:	THINKSTART ELECTRONIC TECHNOLOGY CO., LTD.
Manufacturer Address .....:	Unit A1-403, Kexing Science Park, 15 Keyuan Road, Nanshan District, Shenzhen, CHINA
Test Standards .....:	47 CFR Part 2/22/24/27
Test Result.....:	Pass

Tested by .....:	Kim Li	2023.06.20
	Kim Li, Test Engineer	
Reviewed by .....:	Chris You	2023.06.20
	Chris You, Senior Engineer	
Approved by .....:	Yang Fan	2023.06.20
	Yang Fan, Manager	

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Change History		
Issue	Date	Reason for change
1.0	2023.06.20	First edition

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	LTE Flip Feature Phone
Model No.	SH3320
Hardware Version	SH3320HV1.0
Software Version	SH3320SV014
EUT supports Radios application	LTE Band 2/4/5/12/66
Frequency Range(Tx)	LTE Band 2: 1850MHz~1910MHz LTE Band 4: 1710MHz~1755MHz LTE Band 5: 824MHz~849MHz LTE Band 12: 699MHz~716MHz LTE Band 66: 1710MHz~1780MHz
Channel Bandwidth	LTE Band 2/4/66: 1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz LTE Band 5/12: 1.4MHz/3MHz/5MHz/10MHz
Modulation Type	QPSK/16QAM/64QAM(downlink only)
Maximum ERP/EIRP	LTE Band 2: 25.68dBm LTE Band 4: 24.63dBm LTE Band 5: 19.57dBm LTE Band 12: 17.74dBm LTE Band 66: 24.61dBm
Antenna Type	Internal Antenna
Antenna gain	LTE Band 2: 2.06dBi LTE Band 4: 0.9dBi LTE Band 5: -2.39dBi LTE Band 12: -4.18dBi LTE Band 66: 0.98dBi
Power supply	Rechargeable Li-ion Battery DC3.8V/2000mAh

1.2. Maximum ERP/EIRP, Frequency Tolerance and Emission Designator

Band	Type of Modulation	BW (MHz)	Emission Designator	Frequency Tolerance (ppm)	Maximum EIRP(W)
LTE Band 2	QPSK	1.4	1M09G7D	—	0.370
LTE Band 2	16QAM	1.4	1M09W7D	—	0.302
LTE Band 2	QPSK	3	2M68G7D	—	0.361
LTE Band 2	16QAM	3	2M68W7D	—	0.311
LTE Band 2	QPSK	5	4M50G7D	—	0.361
LTE Band 2	16QAM	5	4M50W7D	—	0.298
LTE Band 2	QPSK	10	8M93G7D	0.005	0.361
LTE Band 2	16QAM	10	8M91W7D	—	0.301
LTE Band 2	QPSK	15	13M4G7D	—	0.352
LTE Band 2	16QAM	15	13M4W7D	—	0.309
LTE Band 2	QPSK	20	17M9G7D	—	0.356
LTE Band 2	16QAM	20	17M9W7D	—	0.293
LTE Band 4	QPSK	1.4	1M09G7D	—	0.271
LTE Band 4	16QAM	1.4	1M09W7D	—	0.226
LTE Band 4	QPSK	3	2M69G7D	—	0.282
LTE Band 4	16QAM	3	2M68W7D	—	0.236
LTE Band 4	QPSK	5	4M50G7D	—	0.284
LTE Band 4	16QAM	5	4M50W7D	—	0.222
LTE Band 4	QPSK	10	8M93G7D	0.003	0.290
LTE Band 4	16QAM	10	8M92W7D	—	0.228
LTE Band 4	QPSK	15	13M4G7D	—	0.283
LTE Band 4	16QAM	15	13M4W7D	—	0.231
LTE Band 4	QPSK	20	17M9G7D	—	0.290
LTE Band 4	16QAM	20	17M9W7D	—	0.232
LTE Band 66	QPSK	1.4	1M09G7D	—	0.289
LTE Band 66	16QAM	1.4	1M09W7D	—	0.234
LTE Band 66	QPSK	3	2M68G7D	—	0.283
LTE Band 66	16QAM	3	2M68W7D	—	0.232
LTE Band 66	QPSK	5	4M50G7D	—	0.281

LTE Band 66	16QAM	5	4M49W7D	—	0.224
LTE Band 66	QPSK	10	8M92G7D	0.006	0.288
LTE Band 66	16QAM	10	8M91W7D	—	0.244
LTE Band 66	QPSK	15	13M4G7D	—	0.283
LTE Band 66	16QAM	15	13M4W7D	—	0.232
LTE Band 66	QPSK	20	17M9G7D	—	0.289
LTE Band 66	16QAM	20	17M8W7D	—	0.235

Band	Type of Modulation	BW (MHz)	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP(W)
LTE Band 5	QPSK	1.4	1M10G7D	—	0.088
LTE Band 5	16QAM	1.4	1M09W7D	—	0.072
LTE Band 5	QPSK	3	2M68G7D	—	0.090
LTE Band 5	16QAM	3	2M68W7D	—	0.073
LTE Band 5	QPSK	5	4M49G7D	—	0.088
LTE Band 5	16QAM	5	4M50W7D	—	0.069
LTE Band 5	QPSK	10	8M92G7D	0.005	0.091
LTE Band 5	16QAM	10	8M91W7D	—	0.072
LTE Band 12	QPSK	1.4	1M09G7D	—	0.059
LTE Band 12	16QAM	1.4	1M09W7D	—	0.048
LTE Band 12	QPSK	3	2M68G7D	—	0.059
LTE Band 12	16QAM	3	2M68W7D	—	0.049
LTE Band 12	QPSK	5	4M50G7D	—	0.058
LTE Band 12	16QAM	5	4M50W7D	—	0.048
LTE Band 12	QPSK	10	8M94G7D	0.005	0.059
LTE Band 12	16QAM	10	8M93W7D	—	0.048

1.3. Test Standards and Results

The purpose of the report is to conduct testing according to the following FCC certification standards:

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22	Public Mobile Services
3	47 CFR Part 24	Personal Communications Services
4	47 CFR Part 27	Miscellaneous Wireless Communications Services
6	KDB 971168 D01 Power Meas License Digital Systems v03r01	Measurement Guidance For Certification of Licensed Digital Transmitters
7	KDB 412172 D01 Determining ERP and EIRP v01r01	Guidelines for Determining the Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) of an RF Transmitting Systems
8	ANSI/TIA-603-E-2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
9	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

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

No.	FCC Rule	Description	Limit	Result
1	2.1046	Conducted Output Power	Reporting Only	PASS
2	22.913 (d) 24.232 (d) 27.50 (d)(5)	Peak to Average Radio	< 13dB	PASS
3	24.232 (c)	Equivalent Isotropic Radiated Power (Band 2)	EIRP < 2W	PASS
	27.50 (d)(4)	Equivalent Isotropic Radiated Power (Band 4/66)	EIRP < 1W	PASS
	22.913 (a)(5)	Effective Radiated Power (Band 5)	ERP < 7W	PASS
	27.50 (c)(10)	Effective Radiated Power (Band 12)	ERP < 3W	PASS
4	2.1049	Occupied Bandwidth	Reporting Only	PASS
5	2.1051 22.917 (a) 24.238 (a) 27.53 (h) 27.53 (g)	Conducted Spurious Emission and Conducted Band Edge	< 43+10log10(P[watt])	PASS
6	2.1053 22.917 (a) 24.238 (a) 27.53 (h) 27.53 (g)	Radiated Spurious Emission	< $43+10\log_{10}$(P[Watts])	PASS
7	2.1055 22.355 24.235 27.54	Frequency Stability (Band 5)	< ±2.5ppm	PASS
		Frequency Stability (Band 2/4/12/66)	Within the Authorized Band	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 Configuration			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Conducted Output Power and ERP/EIRP	2	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	4	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	5	√	√	√	√			√	√	√	√	√	√	√	√
	12	√	√	√	√			√	√	√	√	√	√	√	√
	66	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Peak-to-Average Ratio	2						√		√	√		√	√	√	√
	4						√		√	√		√	√	√	√
	5				√				√	√		√	√	√	√
	12				√				√	√		√	√	√	√
	66						√		√	√		√	√	√	√
99% OBW and 26dB EBW	2	√	√	√	√	√	√	√	√			√		√	
	4	√	√	√	√	√	√	√	√			√		√	
	5	√	√	√	√			√	√			√		√	
	12	√	√	√	√			√	√			√		√	
	66	√	√	√	√	√	√	√	√			√		√	
Conducted Band Edge	2	√	√	√	√	√	√	√	√	√		√	√		√
	4	√	√	√	√	√	√	√	√	√		√	√		√
	5	√	√	√	√			√	√	√		√	√		√
	12	√	√	√	√			√	√	√		√	√		√
	66	√	√	√	√	√	√	√	√	√		√	√		√
Conducted Spurious Emission	2						√	√		√			√	√	√
	4						√	√		√			√	√	√
	5				√			√		√			√	√	√
	12				√			√		√			√	√	√
	66						√	√		√			√	√	√
Frequency Stability	2				√			√				√		√	
	4				√			√				√		√	
	5				√			√				√		√	
	12				√			√				√		√	
	66				√			√				√		√	
Radiated Spurious Emission	2	Worst case												√	
	4	Worst case												√	
	5	Worst case												√	
	12	Worst case												√	

	66	**Worst case**		√	
Note 1: The mark “ √ ” means that this configuration is chosen for testing.					

1.5. Measurement Results Explanation Example

For all conduction 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 + Power Splitter + attenuator factor..
Following shows an offset computation example with cable loss 1dB, 3dB Power Splitter, 10dB attenuator.

Example: Offset (dB) = RF cable loss(dB) + Power Splitter(dB) + attenuator factor(dB).

= 1 + 3 + 10 = 14 (dB)

1.6. Laboratory Facilities

FCC-Registration No.: 406086

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 June 30, 2023.

ISED Registration: 11185A-1

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 June 30, 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.

1.7. Test Environment Conditions

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

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

2. 47 CFR Part 2 Requirements

2.1. Conducted Output Power and ERP/EIRP

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).

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 2.

The EIRP of mobile transmitters must not exceed 1 Watts for LTE Band 4/66.

The ERP of mobile transmitters must not exceed 7 Watts for LTE Band 5.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 12.

According to KDB 412172 D01 Determining ERP and EIRP v01r01.

EIRP = P_T + $_{GT}$ - L_C, ERP = EIRP - 2.15, where

P_T = transmitter output power in dBm;

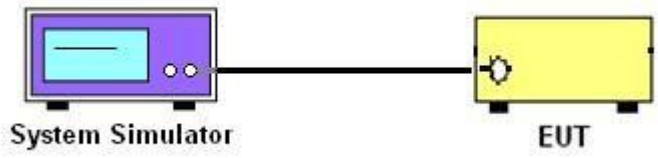
G_T = gain of the transmitting antenna in dBi;

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB.

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 of Conducted Output Power and ERP/EIRP

Please refer to Appendix A for detail

2.2. Peak-to-average power ratio (PAPR)

2.2.1. Requirement

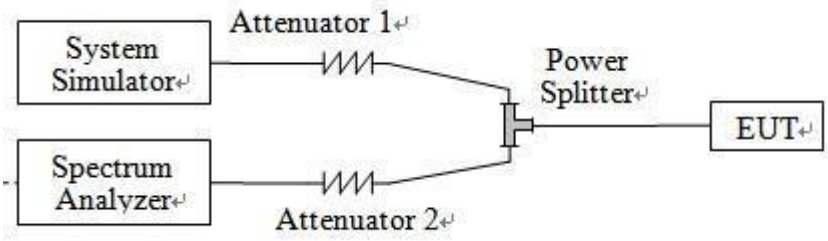
Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement 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 power ratio (PAPR) of the transmission may not exceed 13 dB.

2.2.2. Measuring Instruments

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

2.2.3. Test Description



2.2.4. Test Procedures

1. The testing follows the of KDB 971168 D01 v03r01 Section 5.7.2 and ANSI C63.26-2015 Section 5.2.3.4.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider, Path loss compensation is then performed on the spectrum analyzer and the system simulator respectively.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. Set resolution/measurement bandwidth ≥ OBW or specified reference bandwidth.
5. Set the number of counts to a value that stabilizes the measured CCDF curve.
6. Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level.
7. Repeat step 3~6 at other frequency and modulations.

2.2.5. Test Results of Peak-to-average power ratio (PAPR)

Please refer to Appendix A for detail

2.3. 99% Occupied Bandwidth and 26dB Emission Bandwidth

2.3.1. Requirement

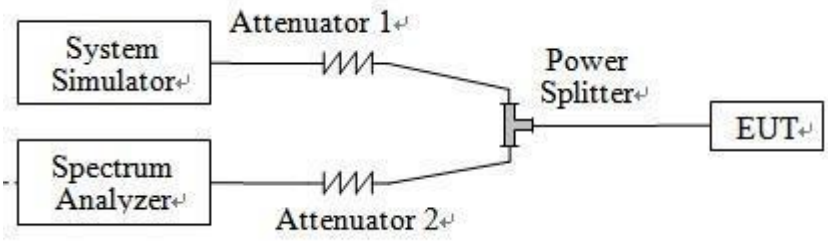
The Occupied Bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

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 3 of this test report.

2.3.3. Test Setup



2.3.4. Test Procedures

1. The testing follows the of KDB 971168 D01 v03r01 Section 4 and ANSI C63.26-2015 Section 5.4.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider, Path loss compensation is then performed on the spectrum analyzer and the system simulator respectively.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency.
4. Set span to be approximately 1.5 to 5 times the OBW.
5. The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW.
6. Set VBW ≥ 3 × RBW.
7. Set Detection mode = peak.
8. Set Trace mode = max hold.
9. Allow trace to stabilize.
10. Repeat step 3~9 at other frequency and modulations.

2.3.5. Test Result of 99% Occupied Bandwidth and 26dB Emission Bandwidth

Please refer to Appendix A for detail

2.4. Conducted Band Edge

2.4.1. Requirement

For Band 2 [Part 24.238 (a)]:

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.he 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 4&66 [Part 27.53 (h)]:

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 5 [Part 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.

In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy, provided that the measured power is integrated over the full required reference bandwidth (i.e., 100 kHz or 1 percent of emission bandwidth, as specified).

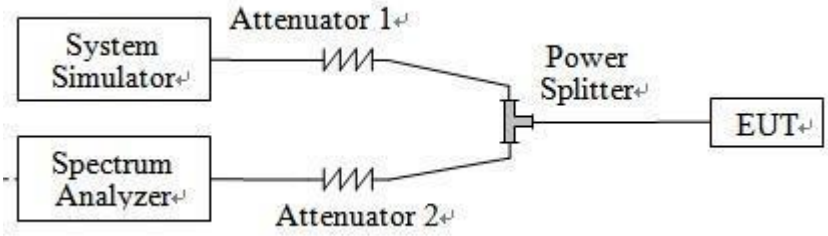
For Band 12 [Part 27.53 (g)]:

For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a 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, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

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 testing follows the of KDB 971168 D01 v03r01 Section 6 and ANSI C63.26-2015 Section 5.7.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider, Path loss compensation is then performed on the spectrum analyzer and the system simulator respectively.
3. Span was set large enough so as to capture all out of band emissions near the Channel Edge.
4. Use RBW ≥ 1% EBW in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, and use RBW = 1 MHz outside 1 MHz of the authorized frequency channel.
5. Set VBW ≥ 3 × RBW
6. Set Detector = power averaging (rms).
7. Set the number of points in sweep ≥ 2 × span / RBW.
8. Set sweep trigger to “free run.”
9. Set the Sweep time > (number of points in sweep) × (transmitter period) (i.e., the transmit on-time + the off-time).
10. Perform a trace average of at least 100 traces.
11. Repeat step 3~10 at other frequency and modulations.

2.4.5. Test Result of Conducted Band Edge

Please refer to Appendix A for detail

2.5. Conducted Spurious Emission

2.5.1. Requirement

For Band 2 & 4 & 5 & 12 & 66:

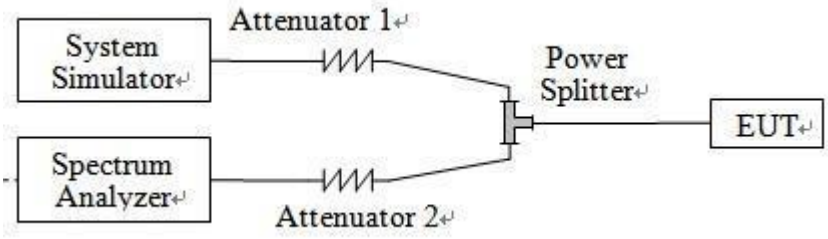
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

2.5.2. Measuring Instruments

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

2.5.3. Test Setup



2.5.4. Test Procedures

1. The testing follows the of KDB 971168 D01 v03r01 Section 6 and ANSI C63.26-2015 Section 5.7.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider, Path loss compensation is then performed on the spectrum analyzer and the system simulator respectively.
3. Set the spectrum analyzer start frequency to 9kHz and stop frequency to the tenth harmonic of the highest fundamental frequency.
4. Set RBW = 1MHz, VBW ≥ 3 × RBW
5. Set Detector = peak.
6. Set Trace mode = max hold.
7. Set Sweep time = auto-couple.
8. Identify and measure the highest spurious emission levels in each frequency range.
9. Compare the results with the corresponding limit in the applicable regulation.
10. Repeat step 3~9 at other frequency and modulations.

2.5.5. Test Result of Conducted Spurious Emission

Please refer to Appendix A for detail

2.6. Radiated Spurious Emission

2.6.1. Requirement

The radiated spurious emission was measured by substitution method according to ANSI/TIA-603-E-2016.

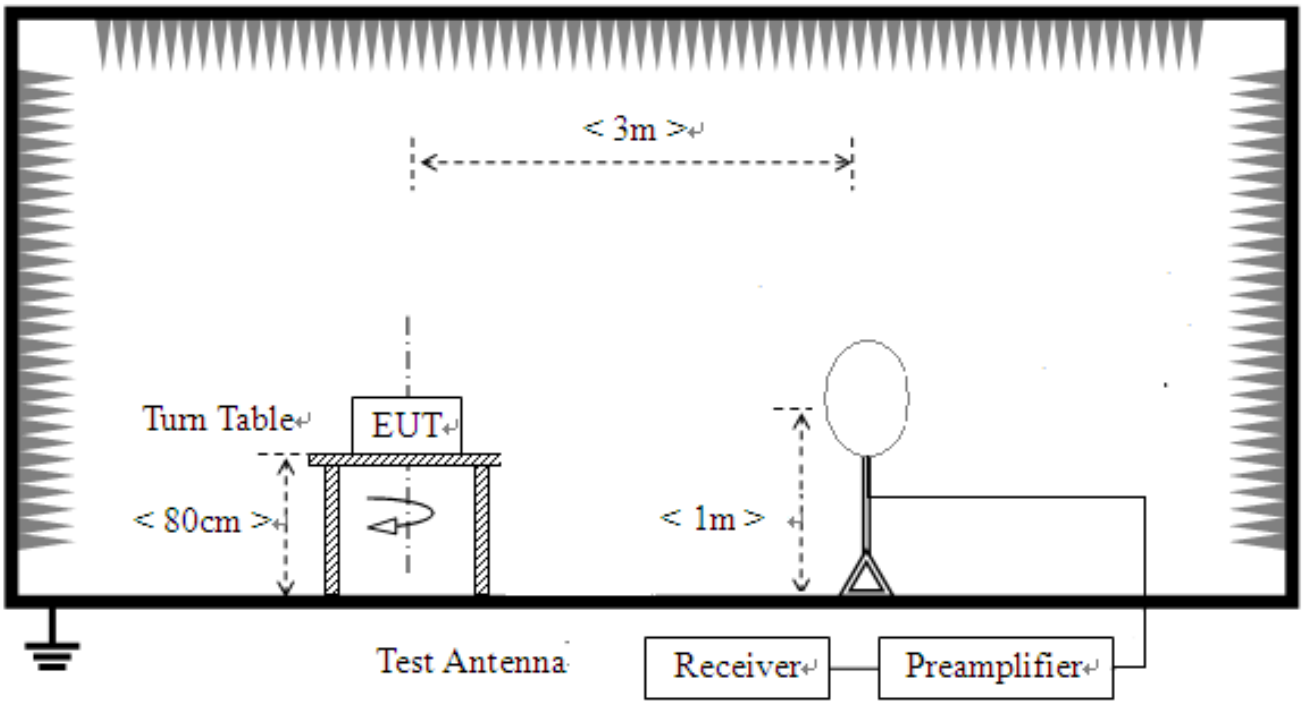
For Band 2 & 4 & 5 & 12 & 66:
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

2.6.2. Measuring Instruments

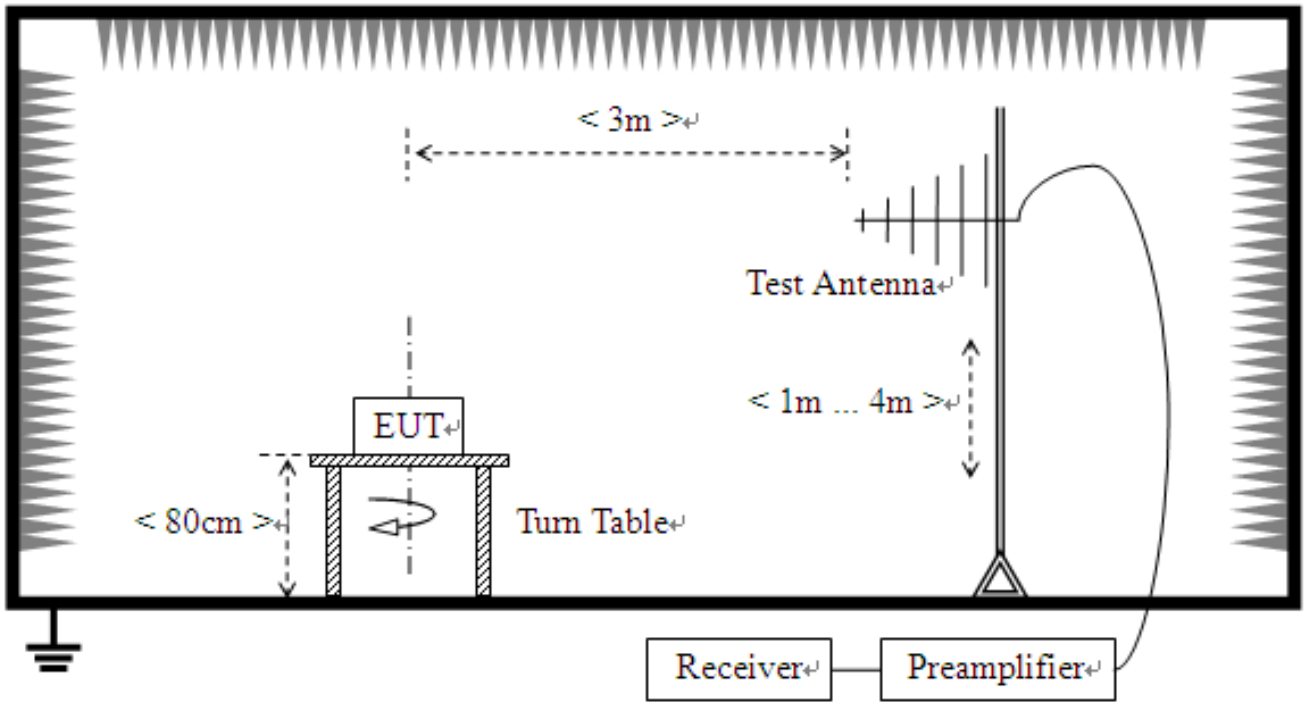
The measuring equipment is listed in the section 3 of this test report.

2.6.3. Test Setup

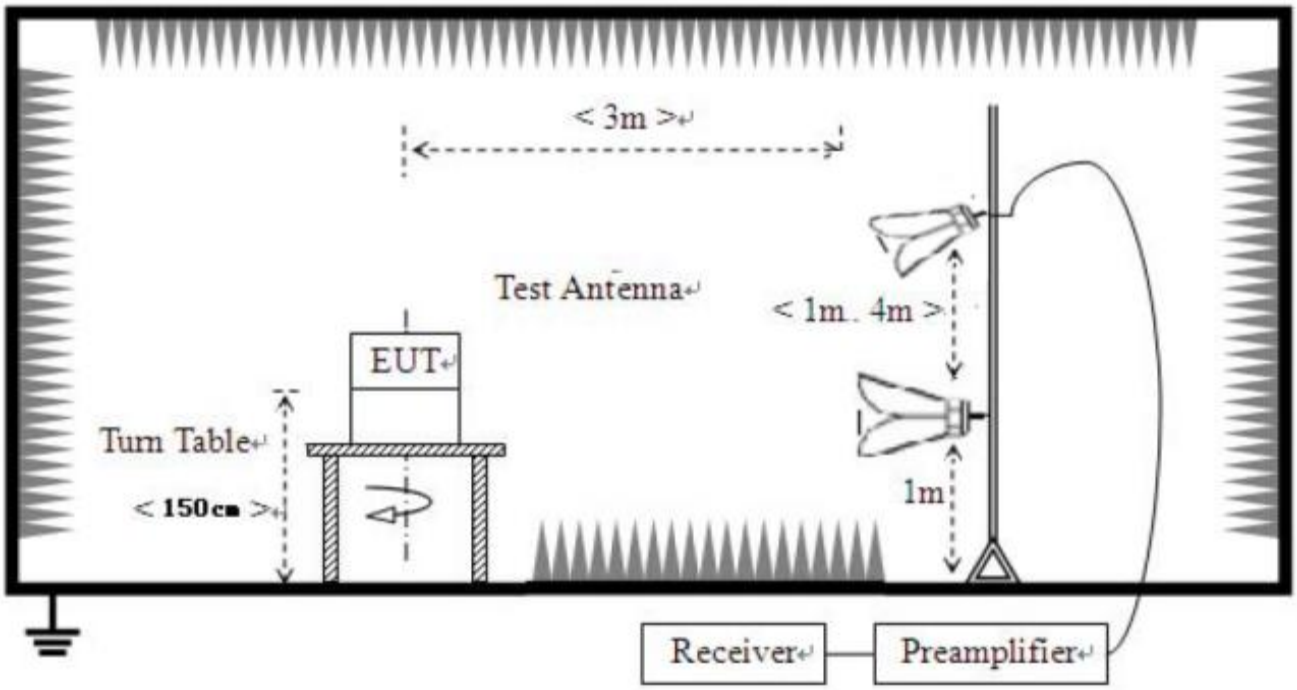
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



2.6.4. Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter (for below 1GHz) / 1.5 meters (for above 1GHz) 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.
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^{th} 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 full, RB Offset 0.

2.6.5. Test Result of Radiated Spurious Emission

Note: 1. The emission levels of above 18GHz are lower than the limit 20dB and not show in test report.

Note: 2. Absolute Level = Reading Level + Factor

LTE Band 2 QPSK 20MHz BW Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	668.094	-103.22	-68.50	-13.00	55.50	34.72	Horizontal
2	823.856	-103.02	-65.98	-13.00	52.98	37.04	Horizontal
3	1214.51	-57.45	-59.71	-13.00	46.71	-2.26	Horizontal
4	4794.71	-58.92	-44.26	-13.00	31.26	14.66	Horizontal
5	7587.37	-60.36	-40.73	-13.00	27.73	19.63	Horizontal
6	17425.5	-64.24	-35.28	-13.00	22.28	28.96	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	513.786	-103.61	-72.75	-13.00	59.75	30.86	Vertical
2	858.794	-105.03	-69.35	-13.00	56.35	35.68	Vertical
3	1209.21	-57.55	-59.81	-13.00	46.81	-2.26	Vertical
4	4797.86	-57.66	-42.95	-13.00	29.95	14.71	Vertical
5	7488.47	-59.20	-39.54	-13.00	26.54	19.66	Vertical
6	17276.6	-62.49	-33.83	-13.00	20.83	28.66	Vertical

LTE Band 4 QPSK 20MHz BW Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	656.448	-104.66	-69.83	-13.00	56.83	34.83	Horizontal
2	836.958	-104.64	-67.54	-13.00	54.54	37.10	Horizontal
3	1401.72	-56.81	-59.12	-13.00	46.12	-2.31	Horizontal
4	5218.23	-57.56	-43.31	-13.00	30.31	14.25	Horizontal
5	7519.52	-60.60	-40.94	-13.00	27.94	19.66	Horizontal
6	17434.1	-64.50	-35.67	-13.00	22.67	28.83	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	512.331	-103.38	-72.53	-13.00	59.53	30.85	Vertical
2	788.434	-104.07	-68.00	-13.00	55.00	36.07	Vertical
3	1338.41	-57.28	-59.61	-13.00	46.61	-2.33	Vertical
4	4884.14	-58.87	-44.13	-13.00	31.13	14.74	Vertical
5	7112.98	-59.17	-40.94	-13.00	27.94	18.23	Vertical
6	17416.3	-65.01	-35.91	-13.00	22.91	29.10	Vertical

LTE Band 5 QPSK 10MHz BW Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	514.757	-103.33	-70.89	-13.00	57.89	32.44	Horizontal
2	648.684	-105.73	-70.99	-13.00	57.99	34.74	Horizontal
3	1395.31	-57.18	-59.49	-13.00	46.49	-2.31	Horizontal
4	4806.26	-58.81	-44.08	-13.00	31.08	14.73	Horizontal
5	7492.49	-59.28	-39.61	-13.00	26.61	19.67	Horizontal
6	17400.8	-64.73	-35.38	-13.00	22.38	29.35	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	445.852	-104.71	-75.45	-13.00	62.45	29.26	Vertical
2	614.232	-104.27	-71.36	-13.00	58.36	32.91	Vertical
3	1393.21	-57.06	-59.38	-13.00	46.38	-2.32	Vertical
4	5094.50	-58.05	-43.46	-13.00	30.46	14.59	Vertical
5	7399.92	-60.10	-40.40	-13.00	27.40	19.70	Vertical
6	17249.0	-63.83	-35.32	-13.00	22.32	28.51	Vertical

LTE Band 12 QPSK 10MHz BW Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	353.656	-104.98	-76.08	-13.00	63.08	28.90	Horizontal
2	514.757	-104.03	-71.59	-13.00	58.59	32.44	Horizontal
3	1547.02	-57.26	-58.89	-13.00	45.89	-1.63	Horizontal
4	4909.52	-58.79	-44.10	-13.00	31.10	14.69	Horizontal
5	7494.79	-60.86	-41.18	-13.00	28.18	19.68	Horizontal
6	17434.7	-63.48	-34.66	-13.00	21.66	28.82	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	456.043	-105.16	-75.70	-13.00	62.70	29.46	Vertical
2	608.894	-103.91	-71.06	-13.00	58.06	32.85	Vertical
3	1894.64	-58.17	-57.50	-13.00	44.50	0.67	Vertical
4	4825.16	-58.26	-43.53	-13.00	30.53	14.73	Vertical
5	7491.92	-60.50	-40.83	-13.00	27.83	19.67	Vertical
6	17408.8	-64.49	-35.27	-13.00	22.27	29.22	Vertical

LTE Band 66 QPSK 20MHz BW Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	650.140	-105.60	-70.77	-13.00	57.77	34.83	Horizontal
2	852.971	-104.65	-67.53	-13.00	54.53	37.12	Horizontal
3	1292.71	-56.95	-59.29	-13.00	46.29	-2.34	Horizontal
4	5072.45	-58.82	-44.32	-13.00	31.32	14.50	Horizontal
5	7301.01	-59.60	-40.87	-13.00	27.87	18.73	Horizontal
6	17284.6	-63.74	-35.03	-13.00	22.03	28.71	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	490.980	-105.72	-75.42	-13.00	62.42	30.30	Vertical
2	783.581	-104.01	-67.95	-13.00	54.95	36.06	Vertical
3	1286.71	-57.33	-59.67	-13.00	46.67	-2.34	Vertical
4	4796.98	-58.67	-43.99	-13.00	30.99	14.68	Vertical
5	7599.45	-59.70	-40.08	-13.00	27.08	19.62	Vertical
6	16412.3	-64.48	-38.76	-13.00	25.76	25.72	Vertical

2.7. Frequency Stability

2.7.1. 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 ±0.00025% (±2.5ppm) of the center frequency. According to FCC section 2.1055, the test conditions are:

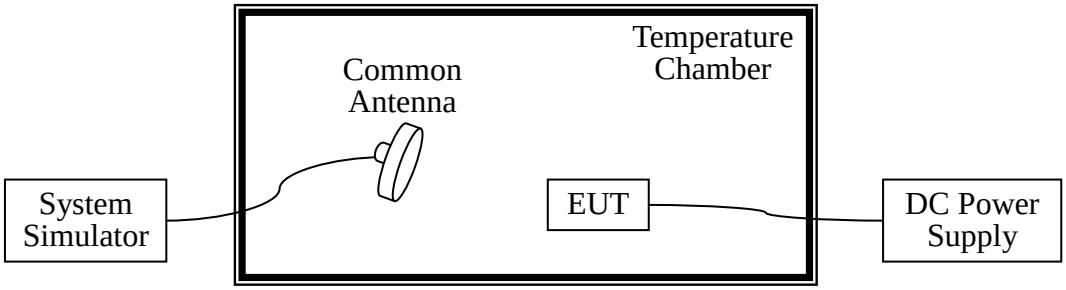
(1) The temperature is varied from -30 ℃ to +50 ℃ at intervals of not more than 10 ℃.

(2) 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.

2.7.2. 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 set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30 ℃ 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 ℃ step up to 50 ℃. 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 20 ℃.
5. The variation in frequency was measured for the worst case.

2.7.5. Test Result of Frequency Stability

Please refer to Appendix A for detail

3. List of measuring equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2022.07.21	2023.07.20
2	5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2022.06.09	2027.06.08
3	Loop Antenna	Schwarz beck	HFH2-Z2	A0304220	2022.05.02	2025.05.01
4	Broadband antenna (30MHz~1GHz)	R&S	HL562	A0304224	2020.06.19	2023.06.18
5	EMI Horn Ant. (1-18G)	ETC	1209	A150402241	2021.01.02	2024.01.01
6	Horn antenna (18GHz~26.5GHz)	AR	AT4510	A0804450	2020.06.19	2023.06.18
7	Amplifier 30M~1GHz	MILMEGA	80RF1000-10004	A140101634	2022.12.13	2023.12.12
8	Amplifier 1G~18GHz	MILMEGA	AS0104R-800/400	A160302517	2022.12.13	2023.12.12
9	Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2023.02.20	2024.02.19
10	Test Receiver	R&S	ESIB7	A0501375	2023.03.16	2024.03.15
11	Broadband Ant.	2786	ETC	A150402240	2021.09.16	2024.03.03
12	3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2019.03.26	2024.03.25
13	Temperature chamber	TABAI	PS-232	A8708054	2022.08.18	2023.08.17
14	Wideband Radio Communication tester	R&S	CMW500	A130101034	2022.06.23	2023.06.22
15	Test Receiver	KEYSIGHT	N9038A	A141202036	2022.07.21	2023.07.20
16	LISN	ROHDE&SCHWARZ	ENV216	A140701847	2022.07.21	2023.07.20
17	Cable	MATCHING PAD	W7	/	2022.07.21	2023.07.20

4. Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence . The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150kHz~30MHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	2.8dB

Uncertainty of Radiated Emission Measurement (9kHz~30MHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	3.5dB

Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	3.91dB

Uncertainty of Radiated Emission Measurement (1GHz~18GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	4.5dB

Uncertainty of Radiated Emission Measurement (18GHz~40GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	4.9dB

Uncertainty of RF Conducted Measurement (9kHz~40GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	1.2dB

APPENDIX A

Conducted Output Power and ERP/EIRP

LTE Band 2 - 1.4MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			18607	18900	19193			
			1850.7MHz	1880.0MHz	1909.3MHz			
QPSK	1	0	23.30	23.22	23.62	2.06	25.68	33.00
	1	2	23.05	23.25	23.40			
	1	5	23.12	23.19	23.38			
	3	0	22.36	22.30	22.42			
	3	1	22.29	22.23	22.53			
	3	2	22.23	22.12	22.36			
	6	0	22.15	22.19	22.30			
16QAM	1	0	22.69	22.74	22.41	2.06	24.8	33.00
	1	2	22.65	22.37	22.53			
	1	5	22.32	22.50	22.56			
	3	0	21.38	21.22	21.40			
	3	1	21.37	21.21	21.48			
	3	2	21.23	21.45	21.59			
	6	0	21.22	21.30	21.41			
LTE Band 2 - 3MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			18615	18900	19185			
			1851.5MHz	1880.0MHz	1908.5MHz			
QPSK	1	0	23.28	23.23	23.48	2.06	25.57	33.00
	1	7	23.19	23.16	23.51			
	1	14	23.32	23.37	23.29			
	8	0	22.30	22.29	22.45			
	8	4	22.27	22.35	22.56			
	8	7	22.29	22.32	22.42			
	15	0	22.26	22.34	22.46			
16QAM	1	0	22.70	22.69	22.69	2.06	24.93	33.00
	1	7	22.65	22.69	22.87			
	1	14	22.48	22.68	22.72			
	8	0	21.49	21.44	21.75			
	8	4	21.64	21.65	21.84			
	8	7	21.59	21.64	21.88			
	15	0	21.43	21.55	21.67			

LTE Band 2 - 5MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			18625	18900	19175			
			1852.5MHz	1880.0MHz	1907.5MHz			
QPSK	1	0	23.34	23.32	23.47	2.06	25.57	33.00
	1	12	23.18	23.45	23.29			
	1	24	23.24	23.20	23.51			
	12	0	22.21	22.24	22.37			
	12	6	22.14	22.26	22.30			
	12	11	22.15	22.20	22.32			
	25	0	22.09	22.12	22.21			
16QAM	1	0	22.68	22.44	22.46	2.06	24.74	33.00
	1	12	22.51	22.28	22.53			
	1	24	22.63	22.45	22.24			
	12	0	21.41	21.28	21.46			
	12	6	21.30	21.42	21.35			
	12	11	21.27	21.22	21.46			
	25	0	21.28	21.26	21.38			

LTE Band 2 - 10MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			18650	18900	19150			
			1855.0MHz	1880.0MHz	1905.0MHz			
QPSK	1	0	23.38	23.26	23.33	2.06	25.57	33.00
	1	24	23.11	23.37	23.41			
	1	49	23.23	23.17	23.51			
	25	0	22.31	22.26	22.44			
	25	12	22.24	22.32	22.38			
	25	24	22.22	22.23	22.46			
	50	0	22.18	22.24	22.31			
16QAM	1	0	22.52	22.51	22.69	2.06	24.78	33.00
	1	24	22.63	22.58	22.65			
	1	49	22.43	22.47	22.72			
	25	0	21.31	21.38	21.35			
	25	12	21.43	21.29	21.47			
	25	24	21.30	21.42	21.56			
	50	0	21.20	21.31	21.45			

LTE Band 2 - 15MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			18675	18900	19125			
			1857.5MHz	1880.0MHz	1902.5MHz			
QPSK	1	0	23.39	23.30	23.30	2.06	25.46	33.00
	1	37	23.16	23.36	23.39			
	1	74	23.29	23.23	23.40			
	36	0	22.37	22.26	22.42			
	36	16	22.26	22.28	22.40			
	36	35	22.40	22.33	22.37			
	75	0	22.20	22.25	22.35			
16QAM	1	0	22.57	22.67	22.73	2.06	24.9	33.00
	1	37	22.51	22.73	22.81			
	1	74	22.67	22.84	22.79			
	36	0	21.35	21.48	21.71			
	36	16	21.24	21.58	21.69			
	36	35	21.41	21.56	21.57			
	75	0	21.25	21.43	21.54			
LTE Band 2 - 20MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			18700	18900	19100			
			1860.0MHz	1880.0MHz	1900.0MHz			
QPSK	1	0	23.27	23.34	23.31	2.06	25.52	33.00
	1	49	23.36	23.46	23.40			
	1	99	23.23	23.43	23.46			
	50	0	22.23	22.25	22.39			
	50	24	22.34	22.28	22.41			
	50	49	22.26	22.26	22.44			
	100	0	22.23	22.32	22.38			
16QAM	1	0	22.50	22.38	22.35	2.06	24.67	33.00
	1	49	22.61	22.41	22.56			
	1	99	22.42	22.47	22.51			
	50	0	21.33	21.31	21.54			
	50	24	21.25	21.32	21.55			
	50	49	21.28	21.37	21.51			
	100	0	21.27	21.39	21.43			

LTE Band 4 - 1.4MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			19957	20175	20393			
			1710.7MHz	1732.5MHz	1754.3MHz			
QPSK	1	0	23.35	23.43	23.32	0.9	24.33	30.00
	1	2	23.17	23.12	23.29			
	1	5	23.30	23.37	23.41			
	3	0	22.42	22.34	22.46			
	3	1	22.35	22.18	22.39			
	3	2	22.36	22.21	22.37			
	6	0	22.38	22.25	22.33			
16QAM	1	0	22.48	22.58	22.45	0.9	23.54	30.00
	1	2	22.57	22.49	22.50			
	1	5	22.61	22.64	22.56			
	3	0	21.43	21.32	21.49			
	3	1	21.36	21.28	21.41			
	3	2	21.54	21.47	21.38			
	6	0	21.46	21.49	21.43			
LTE Band 4 - 3MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			19965	20175	20385			
			1711.5MHz	1732.5MHz	1753.5MHz			
QPSK	1	0	23.49	23.32	23.56	0.9	24.51	30.00
	1	7	23.36	23.39	23.61			
	1	14	23.37	23.25	23.45			
	8	0	22.49	22.28	22.59			
	8	4	22.49	22.39	22.60			
	8	7	22.51	22.38	22.62			
	15	0	22.42	22.44	22.52			
16QAM	1	0	22.82	22.66	22.68	0.9	23.72	30.00
	1	7	22.75	22.59	22.76			
	1	14	22.80	22.61	22.53			
	8	0	21.70	21.63	21.82			
	8	4	21.69	21.59	21.80			
	8	7	21.78	21.69	21.73			
	15	0	21.55	21.53	21.60			

LTE Band 4 - 5MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			19975	20175	20375			
			1712.5MHz	1732.5MHz	1752.5MHz			
QPSK	1	0	23.26	23.41	23.53	0.9	24.54	30.00
	1	12	23.21	23.18	23.48			
	1	24	23.42	23.43	23.64			
	12	0	22.27	22.29	22.46			
	12	6	22.29	22.32	22.57			
	12	11	22.39	22.37	22.62			
	25	0	22.35	22.44	22.48			
16QAM	1	0	22.45	22.35	22.47	0.9	23.46	30.00
	1	12	22.47	22.51	22.34			
	1	24	22.56	22.44	22.36			
	12	0	21.32	21.33	21.50			
	12	6	21.27	21.44	21.49			
	12	11	21.28	21.38	21.46			
	25	0	21.21	21.25	21.37			

LTE Band 4 - 10MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			20000	20175	20350			
			1715.0MHz	1732.5MHz	1750.0MHz			
QPSK	1	0	23.49	23.42	23.57	0.9	24.62	30.00
	1	24	23.26	23.39	23.72			
	1	49	23.64	23.65	23.58			
	25	0	22.40	22.41	22.51			
	25	12	22.41	22.32	22.62			
	25	24	22.45	22.37	22.53			
	50	0	22.30	22.34	22.47			
16QAM	1	0	22.68	22.48	22.56	0.9	23.58	30.00
	1	24	22.57	22.47	22.61			
	1	49	22.63	22.61	22.63			
	25	0	21.46	21.50	21.48			
	25	12	21.54	21.50	21.53			
	25	24	21.51	21.39	21.43			
	50	0	21.39	21.45	21.42			

LTE Band 4 - 15MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			20025	20175	20325			
			1717.5MHz	1732.5MHz	1747.5MHz			
QPSK	1	0	23.42	23.28	23.42	0.9	24.52	30.00
	1	37	23.34	23.33	23.62			
	1	74	23.51	23.40	23.54			
	36	0	22.43	22.57	22.62			
	36	16	22.36	22.68	22.65			
	36	35	22.48	22.55	22.47			
	75	0	22.41	22.42	22.58			
16QAM	1	0	22.56	22.73	22.59	0.9	23.64	30.00
	1	37	22.70	22.66	22.68			
	1	74	22.74	22.59	22.63			
	36	0	21.63	21.56	21.63			
	36	16	21.49	21.68	21.70			
	36	35	21.69	21.64	21.62			
	75	0	21.57	21.48	21.56			
LTE Band 4 - 20MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			20050	20175	20300			
			1720.0MHz	1732.5MHz	1745.0MHz			
QPSK	1	0	23.51	23.49	23.53	0.9	24.63	30.00
	1	49	23.40	23.44	23.60			
	1	99	23.67	23.72	23.73			
	50	0	22.43	22.42	22.61			
	50	24	22.45	22.39	22.64			
	50	49	22.52	22.45	22.52			
	100	0	22.35	22.37	22.46			
16QAM	1	0	22.68	22.63	22.69	0.9	23.66	30.00
	1	49	22.71	22.69	22.59			
	1	99	22.54	22.76	22.72			
	50	0	21.45	21.46	21.60			
	50	24	21.45	21.39	21.65			
	50	49	21.53	21.45	21.54			
	100	0	21.36	21.41	21.43			

LTE Band 5 - 1.4MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. ERP (dBm)	ERP Limit (dBm)
			20407	20525	20643			
			824.7MHz	836.5MHz	848.3MHz			
QPSK	1	0	23.84	23.97	23.90	-2.39	19.43	38.45
	1	2	23.76	23.77	23.86			
	1	5	23.81	23.92	23.78			
	3	0	22.83	22.95	22.85			
	3	1	22.84	22.86	22.79			
	3	2	22.77	22.93	22.96			
	6	0	22.78	22.84	22.80			
16QAM	1	0	23.08	23.01	22.93	-2.39	18.57	38.45
	1	2	22.87	22.92	22.86			
	1	5	22.91	23.11	23.04			
	3	0	22.12	22.21	22.15			
	3	1	22.20	22.15	22.07			
	3	2	22.23	22.17	22.20			
	6	0	22.07	22.09	22.05			
LTE Band 5 - 3MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. ERP (dBm)	ERP Limit (dBm)
			20415	20525	20635			
			825.5MHz	836.5MHz	847.5MHz			
QPSK	1	0	23.94	23.85	24.02	-2.39	19.56	38.45
	1	7	23.89	23.76	24.00			
	1	14	24.01	24.10	24.06			
	8	0	22.93	22.81	22.92			
	8	4	23.02	22.91	23.01			
	8	7	23.08	22.89	22.99			
	15	0	22.97	22.92	23.05			
16QAM	1	0	23.01	23.12	23.08	-2.39	18.62	38.45
	1	7	23.13	22.91	23.05			
	1	14	23.06	23.07	23.16			
	8	0	22.25	22.27	22.25			
	8	4	22.26	22.07	22.24			
	8	7	22.22	22.31	22.41			
	15	0	22.09	22.05	22.18			

LTE Band 5 - 5MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. ERP (dBm)	ERP Limit (dBm)
			20425	20525	20625			
			826.5MHz	836.5MHz	846.5MHz			
QPSK	1	0	23.98	23.83	23.92	-2.39	19.44	38.45
	1	12	23.81	23.84	23.67			
	1	24	23.78	23.73	23.97			
	12	0	22.70	22.87	22.77			
	12	6	22.78	22.80	22.69			
	12	11	22.84	22.85	22.81			
	25	0	22.80	22.78	22.79			
16QAM	1	0	22.76	22.80	22.93	-2.39	18.39	38.45
	1	12	22.71	22.64	22.80			
	1	24	22.84	22.75	22.89			
	12	0	21.87	21.96	21.89			
	12	6	21.75	21.87	21.98			
	12	11	21.96	21.80	22.02			
	25	0	21.92	21.85	21.87			
LTE Band 5 - 10MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. ERP (dBm)	ERP Limit (dBm)
			20450	20525	20600			
			829.0MHz	836.5MHz	844.0MHz			
QPSK	1	0	23.98	24.05	23.94	-2.39	19.57	38.45
	1	24	23.79	24.11	23.87			
	1	49	24.06	24.03	24.03			
	25	0	22.91	22.89	22.90			
	25	12	22.92	22.91	22.85			
	25	24	22.97	22.92	22.89			
	50	0	22.84	22.84	22.86			
16QAM	1	0	23.08	23.06	22.95	-2.39	18.6	38.45
	1	24	22.93	22.97	23.09			
	1	49	23.11	23.14	22.86			
	25	0	21.93	21.93	21.98			
	25	12	21.93	22.02	21.91			
	25	24	21.97	22.12	22.02			
	50	0	21.90	21.97	21.90			

LTE Band 12 - 1.4MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. ERP (dBm)	ERP Limit (dBm)
			23017	23095	23173			
			699.7MHz	707.5MHz	715.3MHz			
QPSK	1	0	23.87	23.94	23.86	-4.18	17.69	33.77
	1	2	23.79	23.77	23.81			
	1	5	23.93	23.84	24.02			
	3	0	22.95	22.96	22.95			
	3	1	22.78	23.04	23.07			
	3	2	22.93	22.87	23.01			
	6	0	22.83	22.90	22.82			
16QAM	1	0	23.05	22.82	22.84	-4.18	16.78	33.77
	1	2	22.99	22.94	23.04			
	1	5	23.10	23.11	23.06			
	3	0	21.81	21.85	21.92			
	3	1	21.90	21.94	21.91			
	3	2	21.84	21.92	22.06			
	6	0	21.83	21.93	21.93			

LTE Band 12 - 3MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. ERP (dBm)	ERP Limit (dBm)
			23025	23095	23165			
			700.5MHz	707.5MHz	714.5MHz			
QPSK	1	0	23.96	23.93	24.00	-4.18	17.74	33.77
	1	7	23.83	23.82	24.07			
	1	14	23.98	23.87	23.96			
	8	0	22.85	22.83	22.93			
	8	4	22.94	22.85	23.02			
	8	7	22.92	22.83	23.00			
	15	0	22.84	22.78	22.94			
16QAM	1	0	23.09	23.05	23.06	-4.18	16.86	33.77
	1	7	23.14	23.16	23.19			
	1	14	23.03	23.07	23.13			
	8	0	22.16	22.07	22.17			
	8	4	22.05	22.12	22.14			
	8	7	21.97	22.06	22.21			
	15	0	21.85	21.98	22.04			

LTE Band 12 - 5MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. ERP (dBm)	ERP Limit (dBm)
			23035	23095	23155			
			701.5MHz	707.5MHz	713.5MHz			
QPSK	1	0	23.95	23.84	23.97	-4.18	17.64	33.77
	1	12	23.79	23.77	23.87			
	1	24	22.85	23.88	23.83			
	12	0	22.66	22.83	22.85			
	12	6	22.75	22.84	22.87			
	12	11	22.76	22.74	22.77			
	25	0	22.80	22.81	22.80			
16QAM	1	0	23.05	23.03	22.96	-4.18	16.77	33.77
	1	12	22.86	22.94	23.10			
	1	24	22.99	22.86	23.06			
	12	0	21.83	21.82	21.95			
	12	6	21.72	21.92	21.96			
	12	11	21.90	21.79	21.74			
	25	0	21.85	21.89	21.85			
LTE Band 12 - 10MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. ERP (dBm)	ERP Limit (dBm)
			23060	23095	23130			
			704.0MHz	707.5MHz	711.0MHz			
QPSK	1	0	23.96	23.89	23.94	-4.18	17.72	33.77
	1	24	23.85	23.84	23.86			
	1	49	24.02	23.99	24.05			
	25	0	22.77	22.82	22.85			
	25	12	22.80	22.76	22.81			
	25	24	22.76	22.85	22.80			
	50	0	22.71	22.76	22.78			
16QAM	1	0	22.98	22.95	23.01	-4.18	16.77	33.77
	1	24	22.90	23.06	23.05			
	1	49	23.07	23.00	23.10			
	25	0	21.88	21.85	21.96			
	25	12	21.89	21.87	22.03			
	25	24	21.79	21.95	21.96			
	50	0	21.73	21.82	21.91			

LTE Band 66 - 1.4MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			131979	132322	132665			
			1710.7MHz	1745.0MHz	1779.3MHz			
QPSK	1	0	23.40	23.58	23.49	0.98	24.61	30.00
	1	2	23.34	23.38	23.28			
	1	5	23.45	23.63	23.43			
	3	0	22.35	22.41	22.37			
	3	1	22.18	22.40	22.32			
	3	2	22.24	22.39	22.48			
	6	0	22.21	22.34	22.33			
16QAM	1	0	22.47	22.47	22.48	0.98	23.7	30.00
	1	2	22.38	22.52	22.52			
	1	5	22.50	22.72	22.59			
	3	0	21.46	21.54	21.50			
	3	1	21.32	21.53	21.39			
	3	2	21.53	21.50	21.41			
	6	0	21.29	21.38	21.32			
LTE Band 66 - 3MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			131987	132322	132657			
			1711.5MHz	1745.0MHz	1778.5MHz			
QPSK	1	0	23.42	23.54	23.40	0.98	24.52	30.00
	1	7	23.32	23.48	23.36			
	1	14	23.38	23.45	23.39			
	8	0	22.37	22.46	22.45			
	8	4	22.35	22.48	22.46			
	8	7	22.29	22.41	22.51			
	15	0	22.27	22.46	22.49			
16QAM	1	0	22.44	22.60	22.47	0.98	23.65	30.00
	1	7	22.57	22.51	22.67			
	1	14	22.43	22.49	22.57			
	8	0	21.56	21.56	21.77			
	8	4	21.46	21.69	21.75			
	8	7	21.47	21.61	21.81			
	15	0	21.48	21.50	21.67			

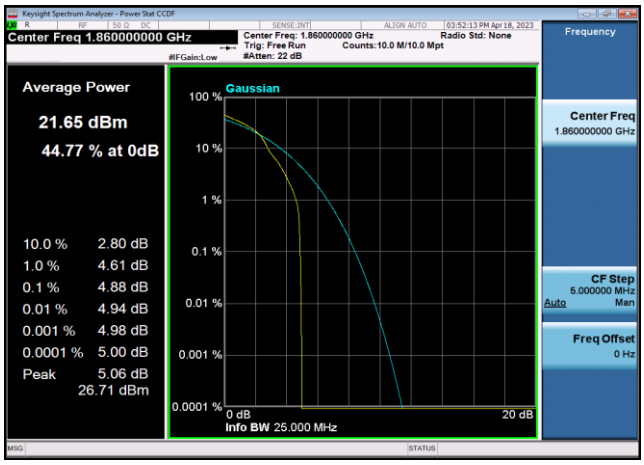
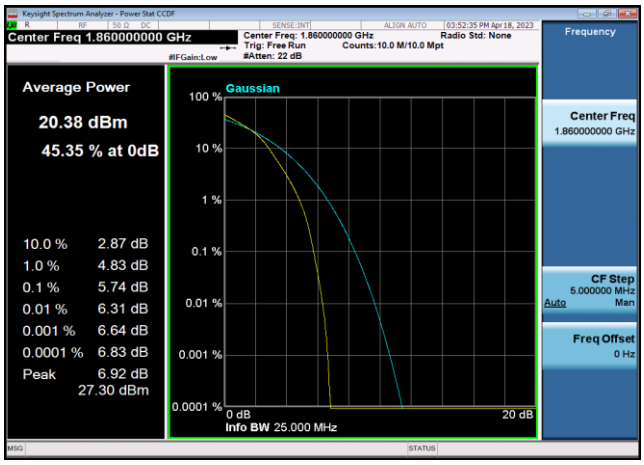
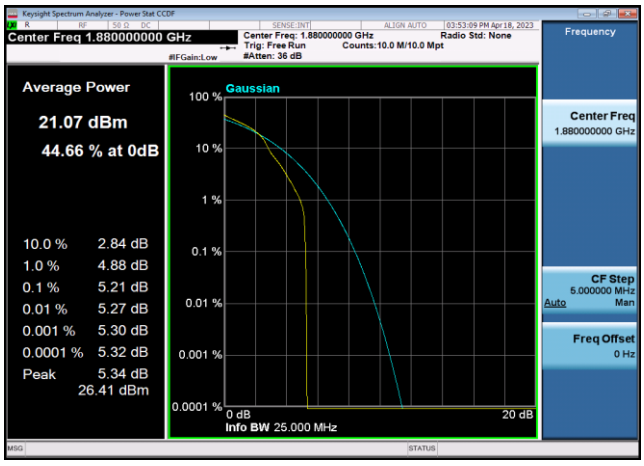
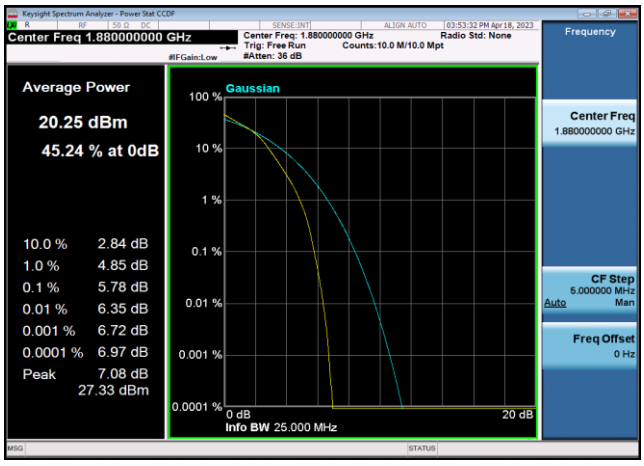
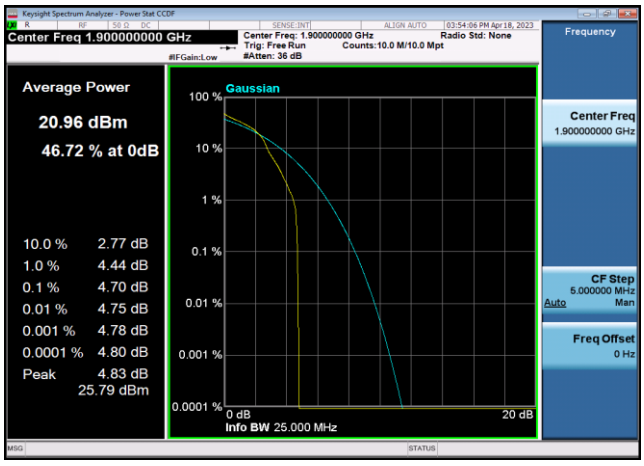
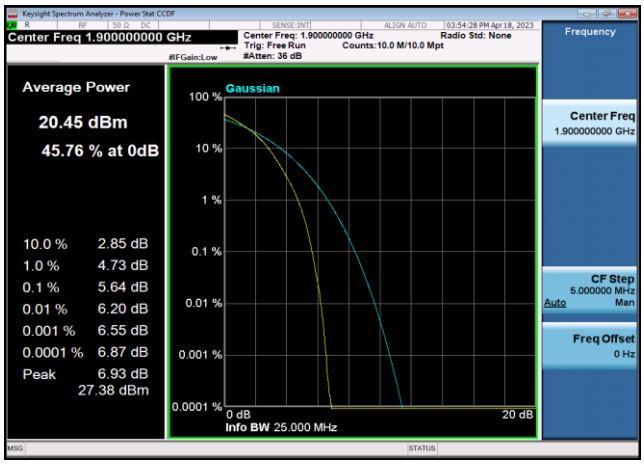
LTE Band 66 - 5MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			131997	132322	132647			
			1712.5MHz	1745.0MHz	1777.5MHz			
QPSK	1	0	23.38	23.51	23.42	0.98	24.49	30.00
	1	12	23.30	23.39	23.28			
	1	24	23.25	23.46	23.39			
	12	0	22.38	22.44	22.38			
	12	6	22.20	22.51	22.31			
	12	11	22.42	22.46	22.46			
	25	0	22.28	22.43	22.31			
16QAM	1	0	22.48	22.51	22.46	0.98	23.50	30.00
	1	12	22.47	22.49	22.48			
	1	24	22.35	22.41	22.52			
	12	0	21.23	21.40	21.42			
	12	6	21.10	21.42	21.41			
	12	11	21.18	21.38	21.36			
	25	0	21.18	21.36	21.31			
LTE Band 66 - 10MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			132022	132322	132622			
			1715.0MHz	1745.0MHz	1775.0MHz			
QPSK	1	0	23.40	23.47	23.33	0.98	24.60	30.00
	1	24	23.27	23.62	23.34			
	1	49	23.58	23.40	23.42			
	25	0	22.36	22.46	22.47			
	25	12	22.38	22.55	22.49			
	25	24	22.40	22.50	22.46			
	50	0	22.36	22.47	22.37			
16QAM	1	0	22.60	22.78	22.78	0.98	23.87	30.00
	1	24	22.54	22.73	22.66			
	1	49	22.76	22.89	22.83			
	25	0	21.54	21.67	21.62			
	25	12	21.62	21.60	21.52			
	25	24	21.57	21.57	21.54			
	50	0	21.34	21.48	21.57			

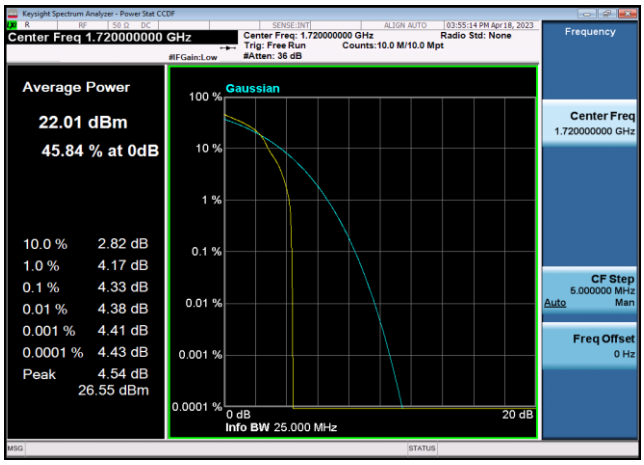
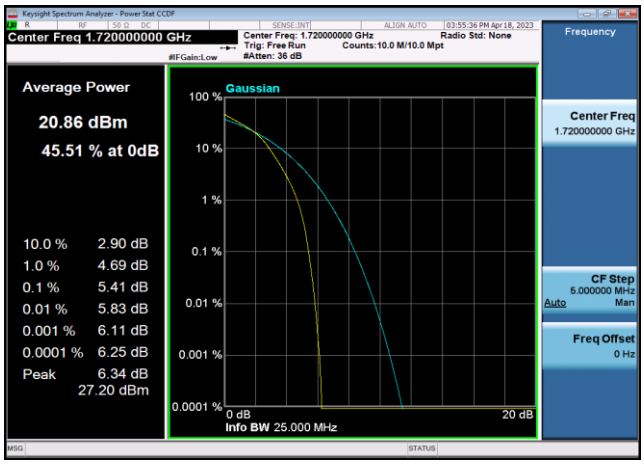
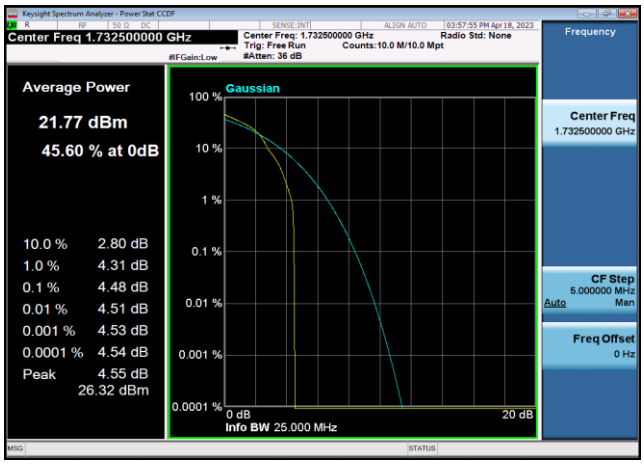
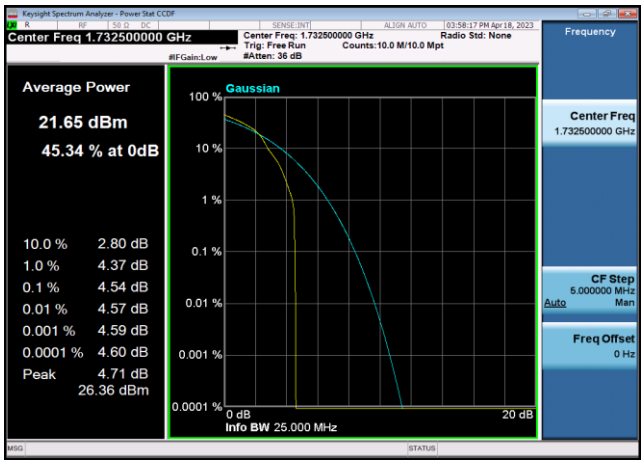
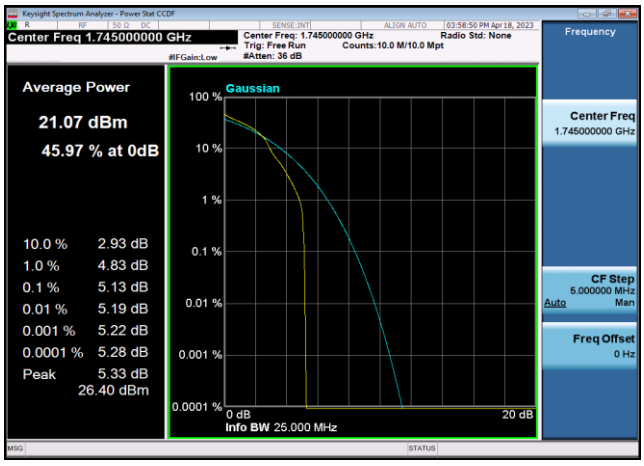
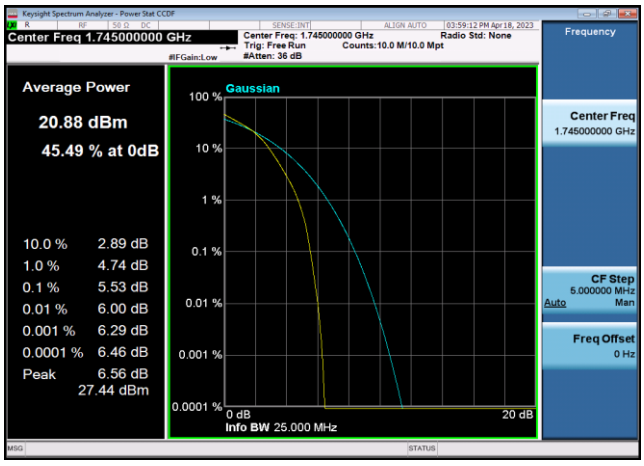
LTE Band 66 - 15MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			132047	132322	132597			
			1717.5MHz	1745.0MHz	1772.5MHz			
QPSK	1	0	23.43	23.53	23.42	0.98	24.52	30.00
	1	37	23.39	23.51	23.27			
	1	74	23.40	23.34	23.54			
	36	0	22.23	22.38	22.35			
	36	16	22.34	22.40	22.41			
	36	35	22.40	22.31	22.28			
	75	0	22.24	22.36	22.23			
16QAM	1	0	22.43	22.59	22.45	0.98	23.65	30.00
	1	37	22.51	22.67	22.57			
	1	74	22.46	22.57	22.60			
	36	0	21.53	21.69	21.74			
	36	16	21.62	21.71	21.74			
	36	35	21.66	21.68	21.68			
	75	0	21.48	21.55	21.52			

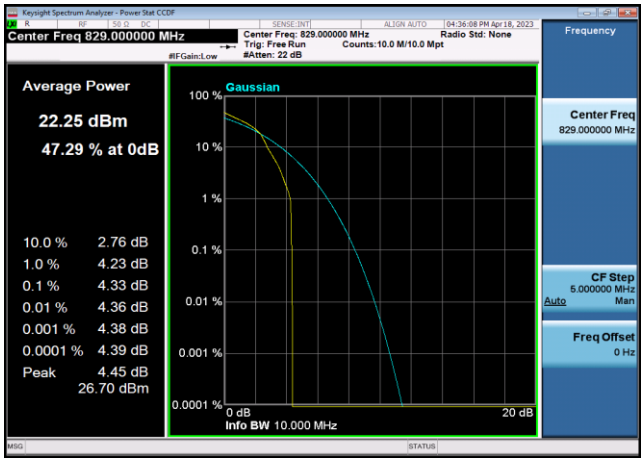
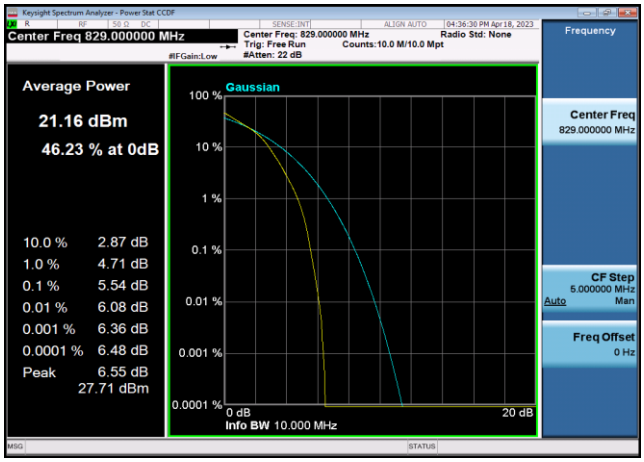
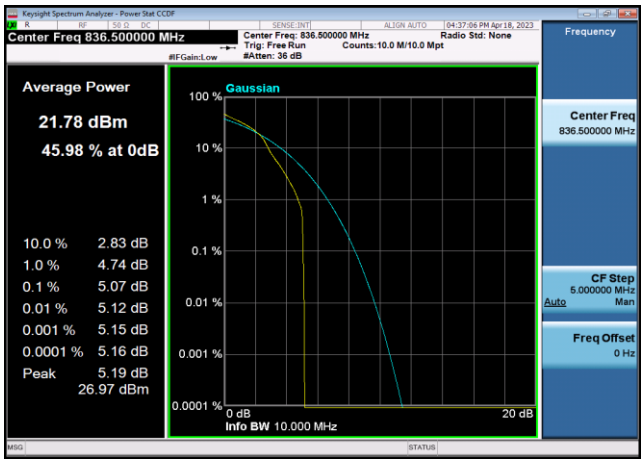
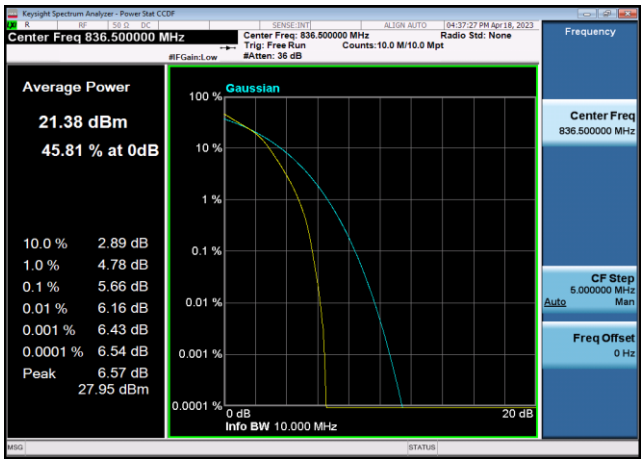
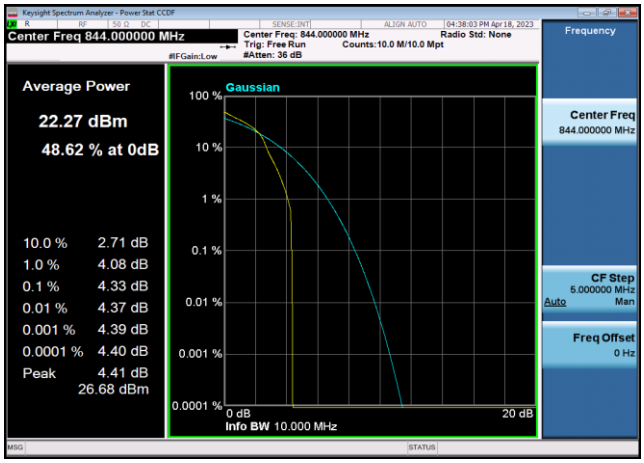
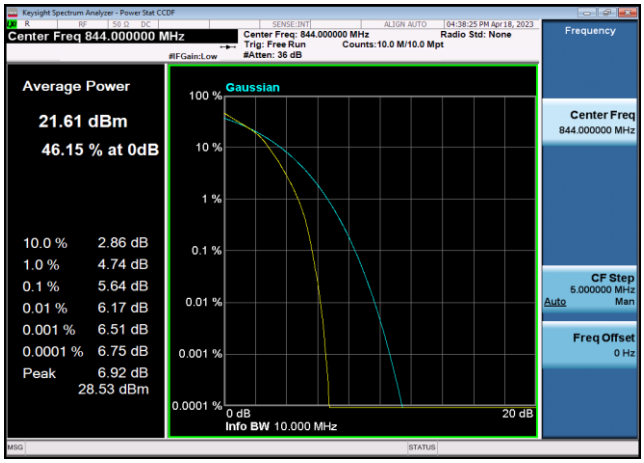
LTE Band 66 - 20MHz Bandwidth								
Modulation	RB Size	RB Offset	Average Power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
			132072	132322	132572			
			1720.0MHz	1745.0MHz	1770.0MHz			
QPSK	1	0	23.52	23.37	23.48	0.98	24.61	30.00
	1	49	23.36	23.43	23.32			
	1	99	23.63	23.57	23.60			
	50	0	22.39	22.53	22.42			
	50	24	22.31	22.50	22.34			
	50	49	22.41	22.57	22.42			
	100	0	22.33	22.48	22.35			
16QAM	1	0	22.66	22.65	22.71	0.98	23.71	30.00
	1	49	22.43	22.73	22.64			
	1	99	22.51	22.64	22.68			
	50	0	21.39	21.56	21.53			
	50	24	21.42	21.49	21.45			
	50	49	21.40	21.61	21.37			
	100	0	21.35	21.44	21.32			

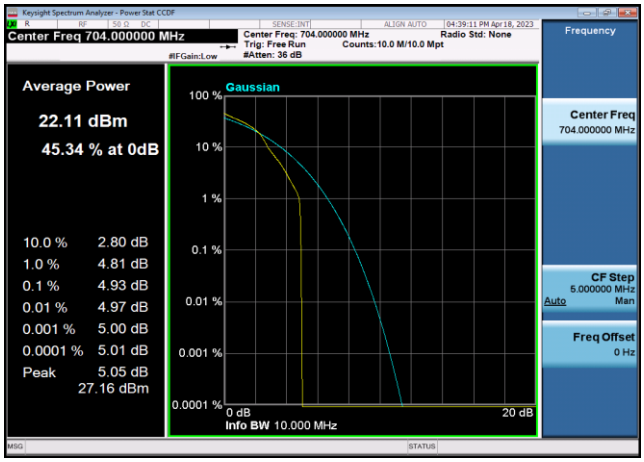
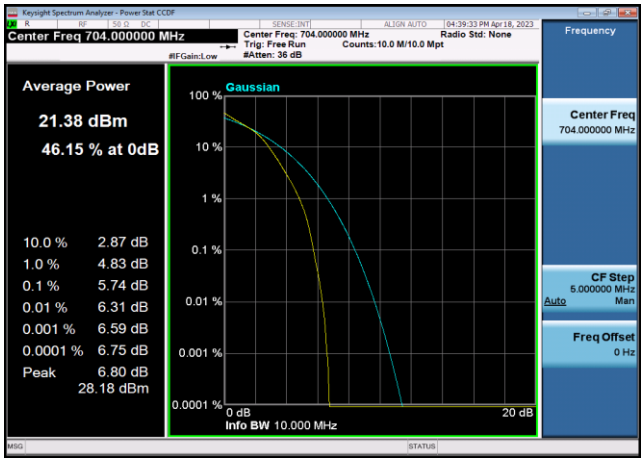
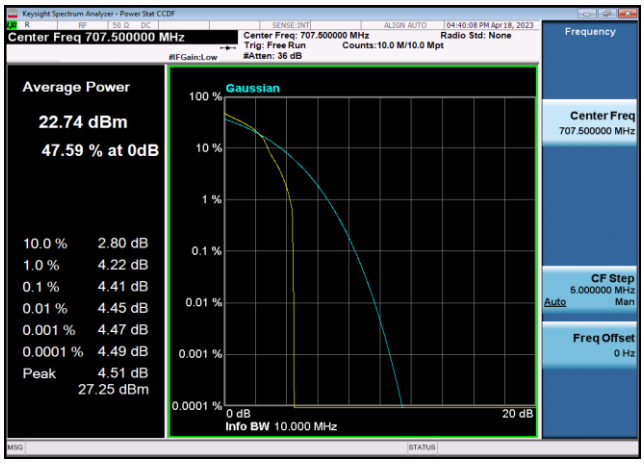
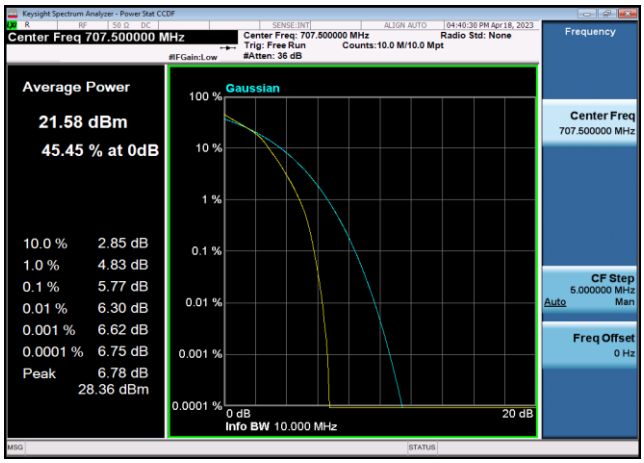
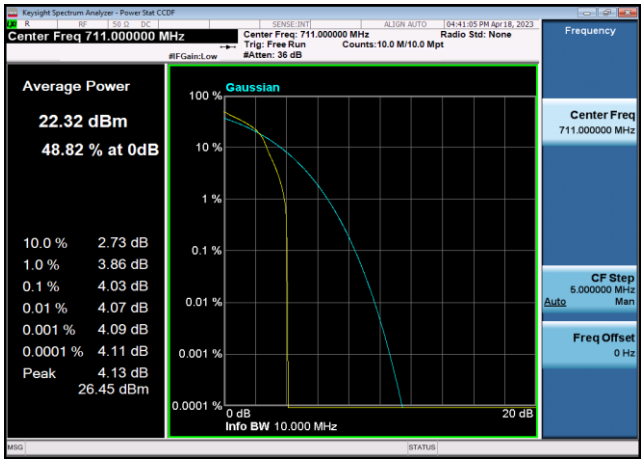
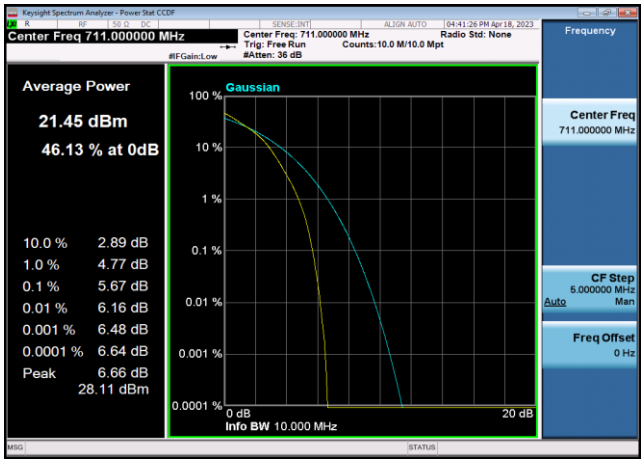
Peak To Average Ratio

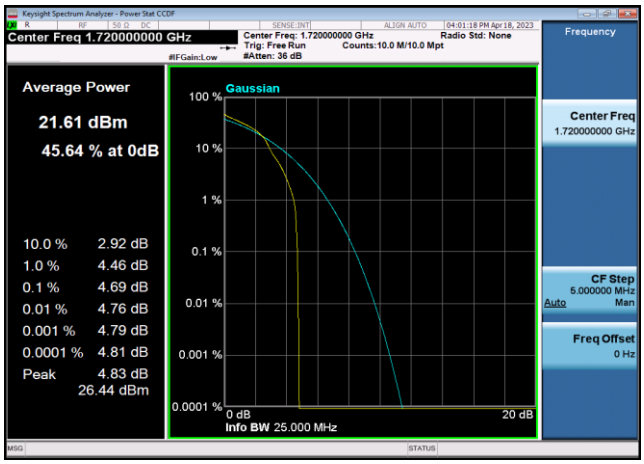
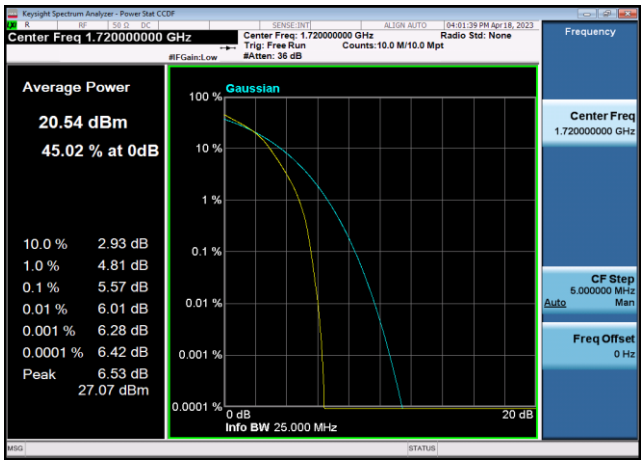
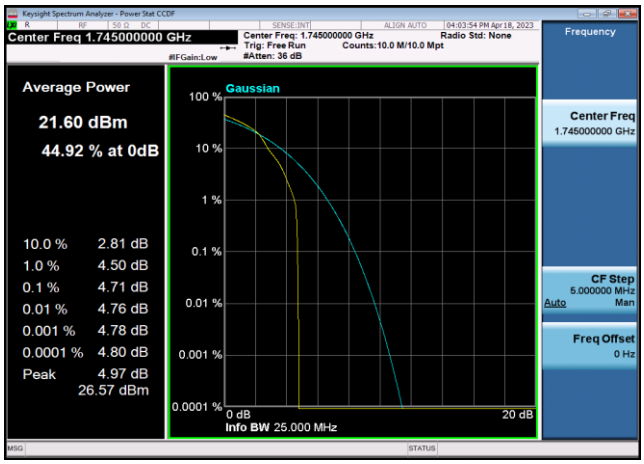
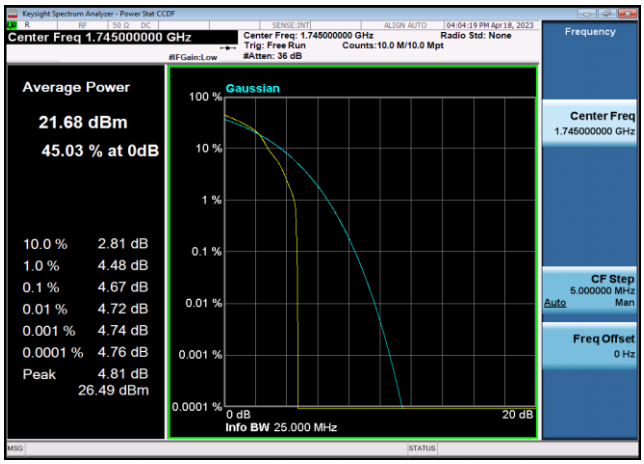
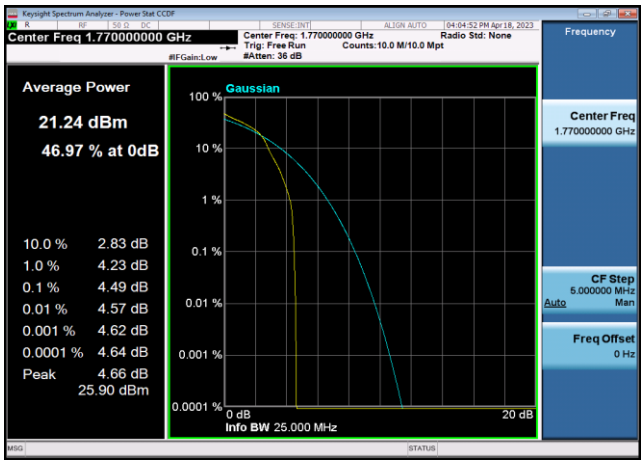
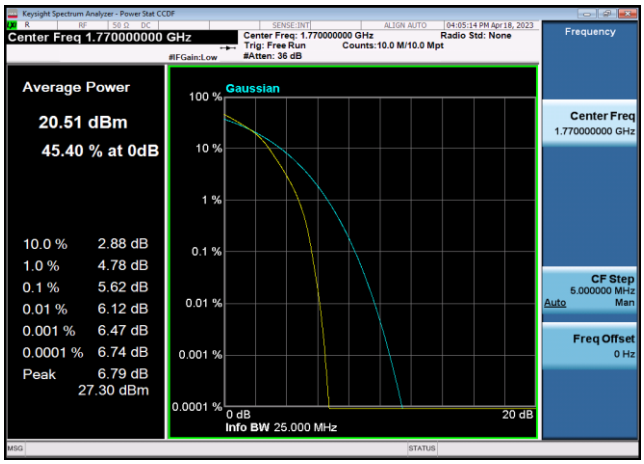
PeakToAveragePowerRatio NormalTC_NormalVol							
Band	Range	BandWidth	RbMode	Modulation	PAPR (dBm)	Limit (dBm)	Result
FDD02	LowRange	20	OneRB_high	Q16	4.88	13.00	Pass
FDD02	LowRange	20	fullRB	Q16	5.74	13.00	Pass
FDD02	MidRange	20	OneRB_high	Q16	5.21	13.00	Pass
FDD02	MidRange	20	fullRB	Q16	5.78	13.00	Pass
FDD02	HighRange	20	OneRB_high	Q16	4.70	13.00	Pass
FDD02	HighRange	20	fullRB	Q16	5.64	13.00	Pass
FDD04	LowRange	20	OneRB_high	Q16	4.33	13.00	Pass
FDD04	LowRange	20	fullRB	Q16	5.41	13.00	Pass
FDD04	MidRange	20	OneRB_high	Q16	4.48	13.00	Pass
FDD04	MidRange	20	fullRB	Q16	4.54	13.00	Pass
FDD04	HighRange	20	OneRB_high	Q16	5.13	13.00	Pass
FDD04	HighRange	20	fullRB	Q16	5.53	13.00	Pass
FDD05	LowRange	10	OneRB_high	Q16	4.33	13.00	Pass
FDD05	LowRange	10	fullRB	Q16	5.54	13.00	Pass
FDD05	MidRange	10	OneRB_high	Q16	5.07	13.00	Pass
FDD05	MidRange	10	fullRB	Q16	5.66	13.00	Pass
FDD05	HighRange	10	OneRB_high	Q16	4.33	13.00	Pass
FDD05	HighRange	10	fullRB	Q16	5.64	13.00	Pass
FDD12	LowRange	10	OneRB_high	Q16	4.93	13.00	Pass
FDD12	LowRange	10	fullRB	Q16	5.74	13.00	Pass
FDD12	MidRange	10	OneRB_high	Q16	4.41	13.00	Pass
FDD12	MidRange	10	fullRB	Q16	5.77	13.00	Pass
FDD12	HighRange	10	OneRB_high	Q16	4.03	13.00	Pass
FDD12	HighRange	10	fullRB	Q16	5.67	13.00	Pass
FDD66	LowRange	20	OneRB_high	Q16	4.69	13.00	Pass
FDD66	LowRange	20	fullRB	Q16	5.57	13.00	Pass
FDD66	MidRange	20	OneRB_high	Q16	4.71	13.00	Pass
FDD66	MidRange	20	fullRB	Q16	4.67	13.00	Pass
FDD66	HighRange	20	OneRB_high	Q16	4.49	13.00	Pass
FDD66	HighRange	20	fullRB	Q16	5.62	13.00	Pass

FDD02_LowRange_20MHz_1860_OneRB_high_Q16	FDD02_LowRange_20MHz_1860_fullRB_Q16
	
FDD02_MidRange_20MHz_1880_OneRB_high_Q16	FDD02_MidRange_20MHz_1880_fullRB_Q16
	
FDD02_HighRange_20MHz_1900_OneRB_high_Q16	FDD02_HighRange_20MHz_1900_fullRB_Q16
	

FDD04_LowRange_20MHz_1720_OneRB_high_Q16	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
	

FDD05_LowRange_10MHz_829_OneRB_high_Q16	FDD05_LowRange_10MHz_829_fullRB_Q16
	
FDD05_MidRange_10MHz_836.5_OneRB_high_Q16	FDD05_MidRange_10MHz_836.5_fullRB_Q16
	
FDD05_HighRange_10MHz_844_OneRB_high_Q16	FDD05_HighRange_10MHz_844_fullRB_Q16
	

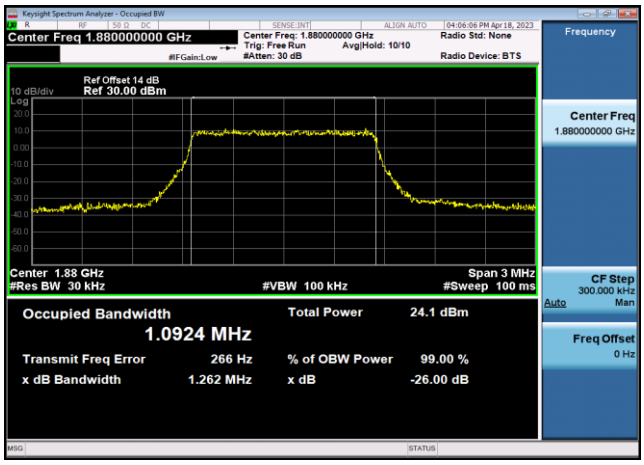
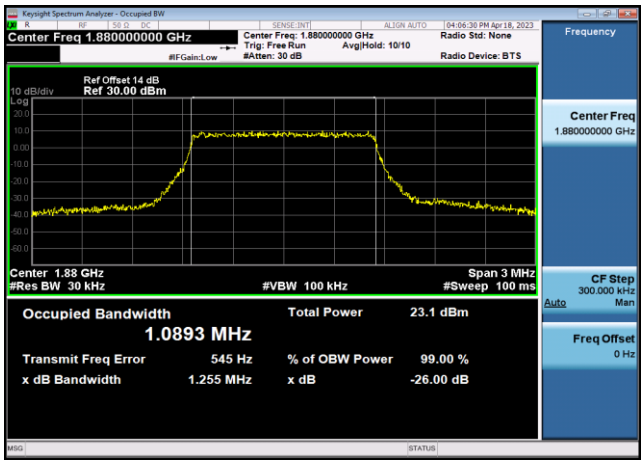
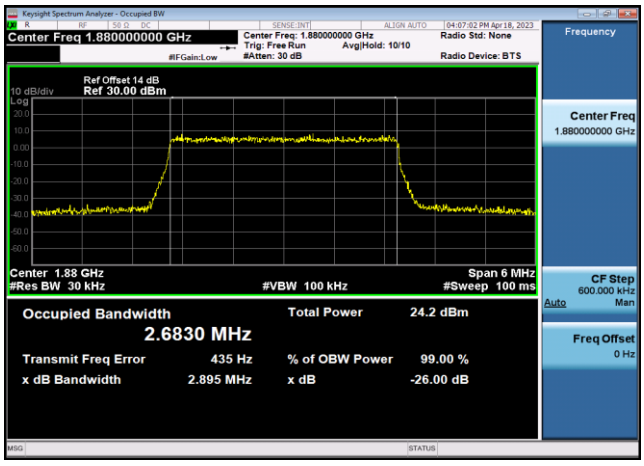
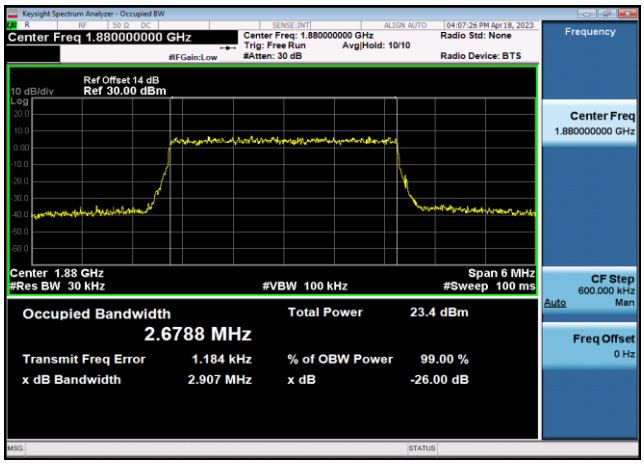
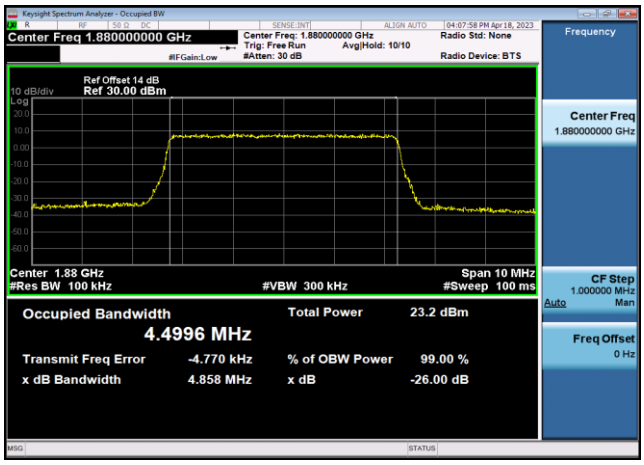
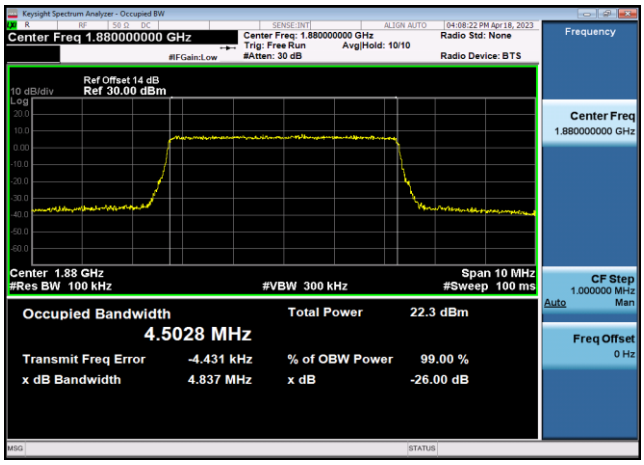
FDD12_LowRange_10MHz_704_OneRB_high_Q16	FDD12_LowRange_10MHz_704_fullRB_Q16
	
FDD12_MidRange_10MHz_707.5_OneRB_high_Q16	FDD12_MidRange_10MHz_707.5_fullRB_Q16
	
FDD12_HighRange_10MHz_711_OneRB_high_Q16	FDD12_HighRange_10MHz_711_fullRB_Q16
	

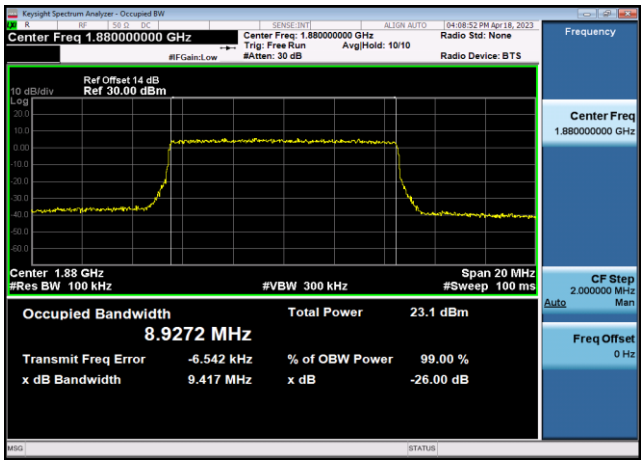
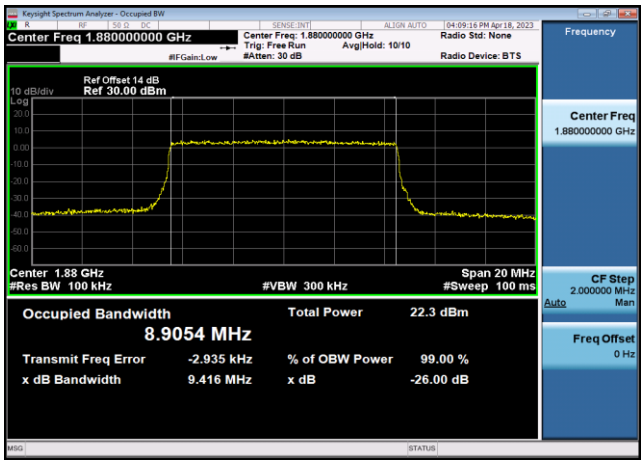
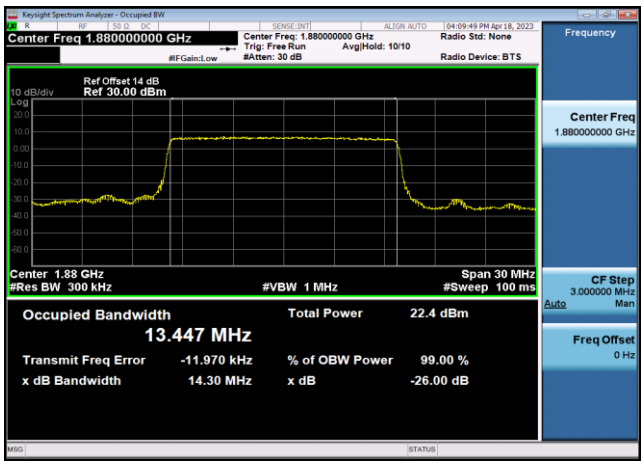
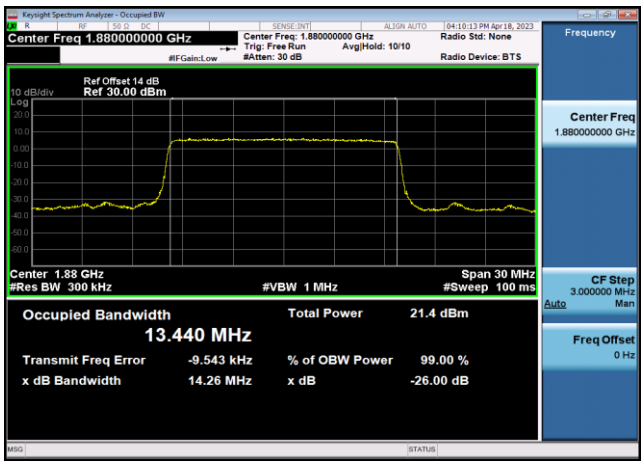
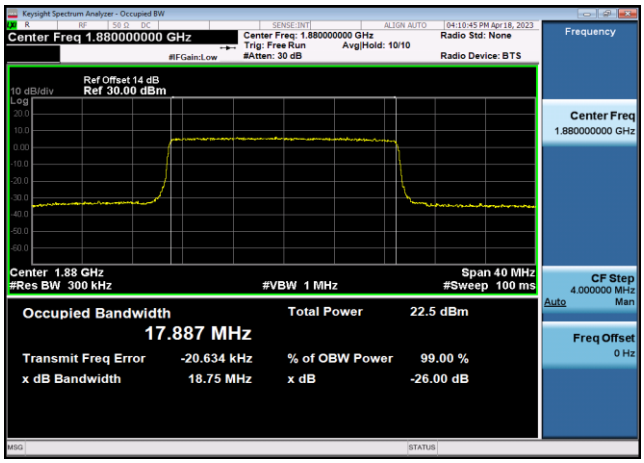
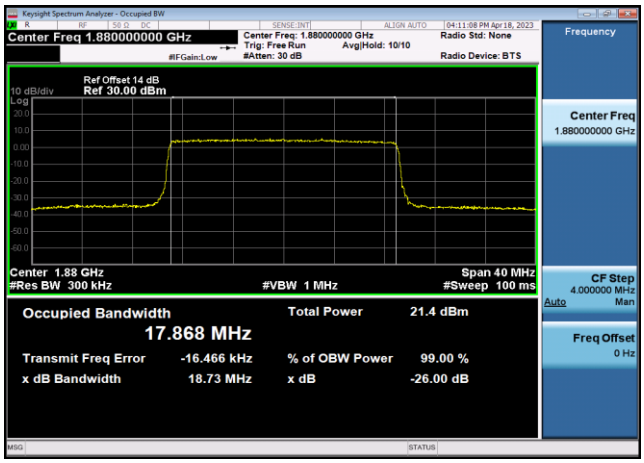
FDD66_LowRange_20MHz_1720_OneRB_high_Q16	FDD66_LowRange_20MHz_1720_fullRB_Q16
	
FDD66_MidRange_20MHz_1745_OneRB_high_Q16	FDD66_MidRange_20MHz_1745_fullRB_Q16
	
FDD66_HighRange_20MHz_1770_OneRB_high_Q16	FDD66_HighRange_20MHz_1770_fullRB_Q16
	

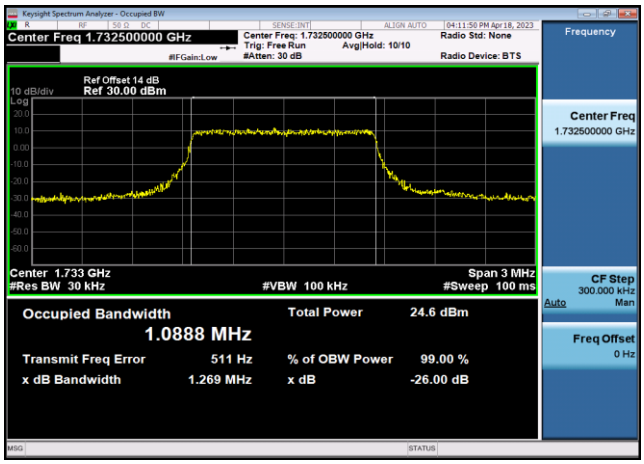
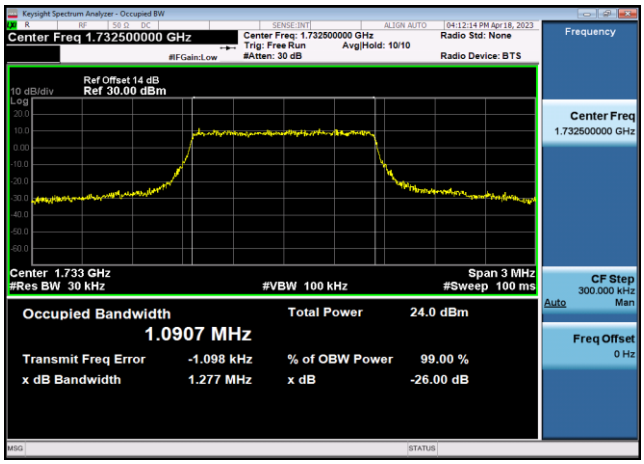
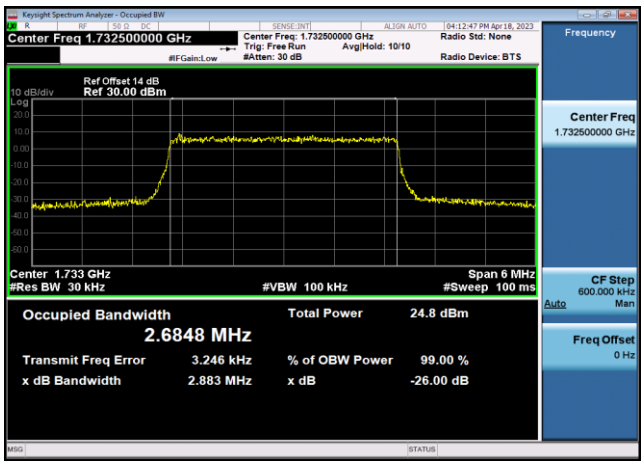
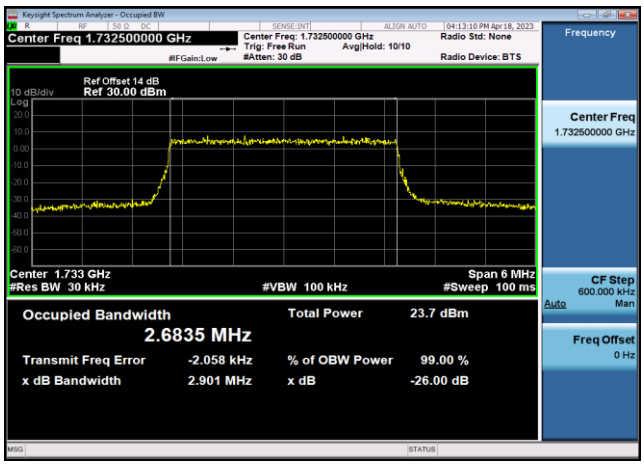
99% Occupied Bandwidth and 26dB Emission Bandwidth

Occupied Bandwidth NormalTC_NormalVol						
Band	Range	BandWidth	Frequency (MHz)	Modulation	OBW(99%) (MHz)	26dB EBW (MHz)
FDD02	MidRange	1.4	1880	QPSK	1.092	1.262
FDD02	MidRange	1.4	1880	Q16	1.089	1.255
FDD02	MidRange	3	1880	QPSK	2.683	2.895
FDD02	MidRange	3	1880	Q16	2.679	2.907
FDD02	MidRange	5	1880	QPSK	4.5	4.858
FDD02	MidRange	5	1880	Q16	4.503	4.837
FDD02	MidRange	10	1880	QPSK	8.927	9.417
FDD02	MidRange	10	1880	Q16	8.905	9.416
FDD02	MidRange	15	1880	QPSK	13.447	14.30
FDD02	MidRange	15	1880	Q16	13.44	14.26
FDD02	MidRange	20	1880	QPSK	17.887	18.75
FDD02	MidRange	20	1880	Q16	17.868	18.73
FDD04	MidRange	1.4	1732.5	QPSK	1.089	1.269
FDD04	MidRange	1.4	1732.5	Q16	1.091	1.277
FDD04	MidRange	3	1732.5	QPSK	2.685	2.883
FDD04	MidRange	3	1732.5	Q16	2.683	2.901
FDD04	MidRange	5	1732.5	QPSK	4.496	4.865
FDD04	MidRange	5	1732.5	Q16	4.5	4.848
FDD04	MidRange	10	1732.5	QPSK	8.927	9.411
FDD04	MidRange	10	1732.5	Q16	8.919	9.373
FDD04	MidRange	15	1732.5	QPSK	13.445	14.25
FDD04	MidRange	15	1732.5	Q16	13.433	14.22
FDD04	MidRange	20	1732.5	QPSK	17.859	18.72
FDD04	MidRange	20	1732.5	Q16	17.86	18.73
FDD05	MidRange	1.4	836.5	QPSK	1.097	1.257
FDD05	MidRange	1.4	836.5	Q16	1.092	1.250
FDD05	MidRange	3	836.5	QPSK	2.684	2.885
FDD05	MidRange	3	836.5	Q16	2.681	2.871
FDD05	MidRange	5	836.5	QPSK	4.494	4.863
FDD05	MidRange	5	836.5	Q16	4.501	4.836

FDD05	MidRange	10	836.5	QPSK	8.915	9.457
FDD05	MidRange	10	836.5	Q16	8.908	9.372
FDD12	MidRange	1.4	707.5	QPSK	1.09	1.255
FDD12	MidRange	1.4	707.5	Q16	1.09	1.268
FDD12	MidRange	3	707.5	QPSK	2.682	2.886
FDD12	MidRange	3	707.5	Q16	2.684	2.880
FDD12	MidRange	5	707.5	QPSK	4.501	4.894
FDD12	MidRange	5	707.5	Q16	4.502	4.885
FDD12	MidRange	10	707.5	QPSK	8.937	9.480
FDD12	MidRange	10	707.5	Q16	8.925	9.433
FDD66	MidRange	1.4	1745	QPSK	1.093	1.247
FDD66	MidRange	1.4	1745	Q16	1.091	1.260
FDD66	MidRange	3	1745	QPSK	2.682	2.893
FDD66	MidRange	3	1745	Q16	2.678	2.901
FDD66	MidRange	5	1745	QPSK	4.499	4.871
FDD66	MidRange	5	1745	Q16	4.491	4.828
FDD66	MidRange	10	1745	QPSK	8.921	9.393
FDD66	MidRange	10	1745	Q16	8.91	9.362
FDD66	MidRange	15	1745	QPSK	13.43	14.28
FDD66	MidRange	15	1745	Q16	13.425	14.25
FDD66	MidRange	20	1745	QPSK	17.862	18.75
FDD66	MidRange	20	1745	Q16	17.846	18.75

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
	
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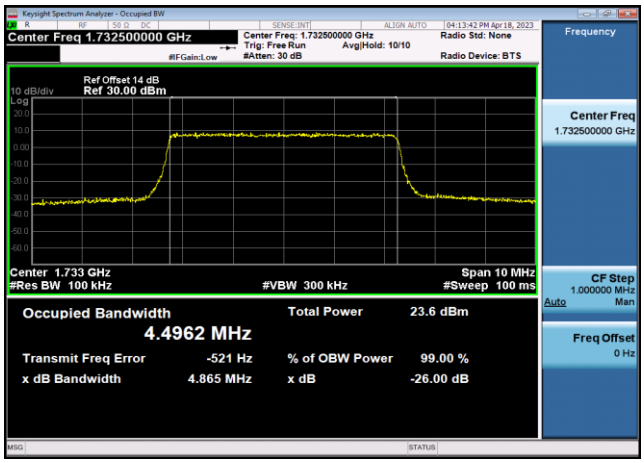	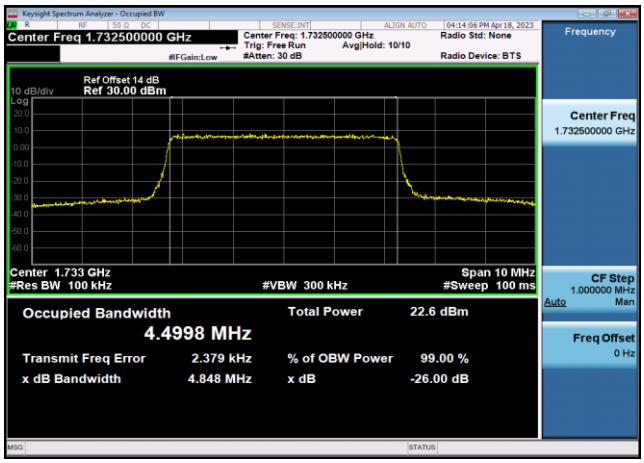

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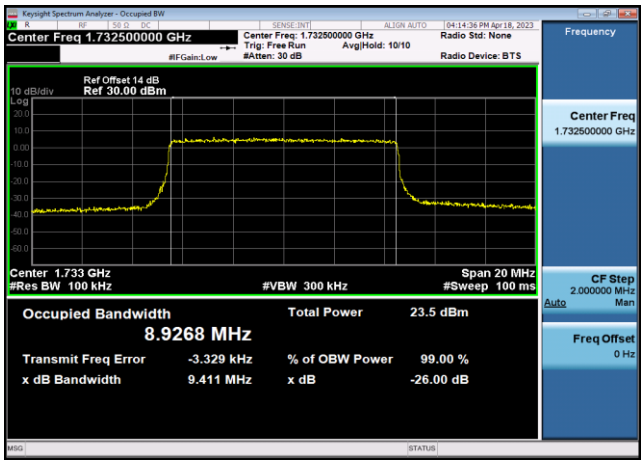
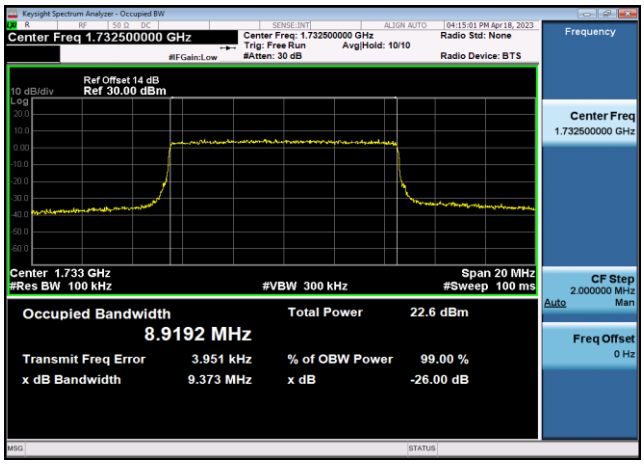
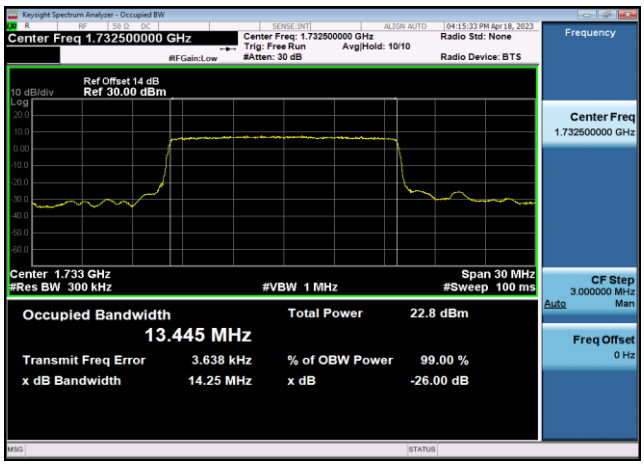
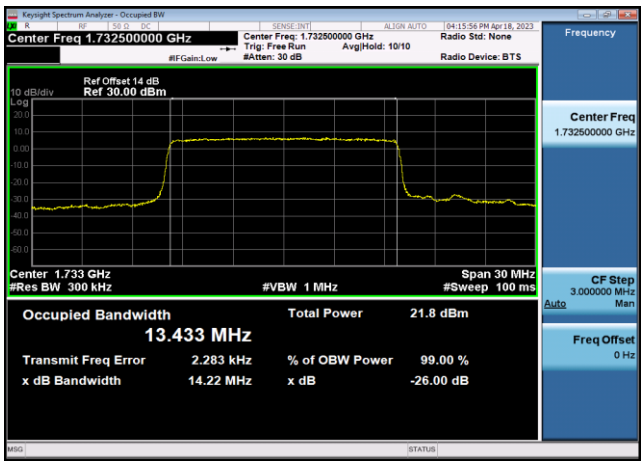
	
FDD04_MidRange_15_1732.5_QPSK	**FDD04_MidRange_15_1732.5_Q16**
	
FDD04_MidRange_20_1732.5_QPSK	**FDD04_MidRange_20_1732.5_Q16**