ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART PART 24 SUBPART E and PART 27 SUBPART B, C & L and INDUSTRY CANADA RSS-133, RSS-139 REQUIREMENT REQUIREMENT

OF

Applicant:	Quanta Computer Inc. No. 188, Wenhua 2nd Road, Guishan District, Taoyuan City 33377, Taiwan
Product Name:	Clover Mini Enterprise/Clover Station Pro Terminal
Brand Name:	clover
Model No.:	C303, C503
Model Difference:	C303 is a standalone POS terminal. C503 includes the same POS terminal (C303) but comes with an included peripheral display (S503).
Report Number:	T190612W02-RP1
FCC ID:	HFS-CX03U
IC:	1787B-CX03U
FCC Rule Part:	2 ,24E & 27B, C & L
IC Rule Part:	RSS 133 Issue 6 Jan. 2018, RSS 139 Issue 3 Jul. 2015
Issue Date:	Jul. 12, 2019
Date of Test:	Jun. 14, 2019 ~ Jul. 09, 2019
Date of EUT Received:	Jun. 14, 2019
Issued by:	Compliance Certification Services Inc.Wugu Lab. No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.) service@ccsrf.com

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.26: 2015 and compliance standards.
The test results of this report relate only to the tested sample (EUT) identified in this report
The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory).

Tested By: Hone Hsieh

Hone Hsieh / Engineer

Approved By: Kevin Tsai

Kevin Tsai / Deputy Manager

Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
T190612W02-RP1	Rev.00	Initial creation of document	All	Jul. 12, 2019	Elle Chang

Contents

1. GENERAL PRODUCT INFORMATION

1.1. Product Description

General:

Product Name:	Clover Mini Enterprise/Clover Station Pro Terminal	
Brand Name:	clover	
Model No.:	C303, C503	
Model Difference:	C303 is a standalone POS terminal. C503 includes the same POS terminal (C303) but comes with an included peripheral display (S503)	
Hardware Version:	4.01	
Software Version:	N/A	
Micro Hub:	Model No.: H303, Supplier: clover	
Power Supply:	12V from Hub and Adapter	
	Battery:	Model No.: YJ3B, Supplier: N/A
	Adapter:	Model No.: FSP040-RHBN3, Supplier: FSP

Antenna Designation

Vendor	Type	Main / Aux	Antenna Part No.	Modulation	Frequency (MHz)	Peak Antenna Gain (dBi)
SAA	PIFA	Main	GD9318-15-001-R	LTE Band 2	1850 ~ 1910	0.44
				LTE Band 4	1710 ~ 1755	0.80
				LTE Band 12	699 ~ 716	-2.98
	PIFA	Aux	GD9319-15-001-R	LTE Band 2	1850 ~ 1910	N/A
				LTE Band 4	1710 ~ 1755	N/A
				LTE Band 12	699 ~ 716	N/A
Luxshare-ICT	PIFA	Main	LA81FP019-1H	LTE Band 2	1850 ~ 1910	1.00
				LTE Band 4	1710 ~ 1755	-1.00
				LTE Band 12	699 ~ 716	-5.40
	PIFA	Aux	LA81FP020-1H	LTE Band 2	1850 ~ 1910	N/A
				LTE Band 4	1710 ~ 1755	N/A
				LTE Band 12	699 ~ 716	N/A

1.2. LTE: Cellular Phone Standards Frequency Range

LTE Band	BW (MHz)	Operation Frequency (MHz)		
2	1.4	1850.7	-	1909.3
	3	1851.5	-	1908.5
	5	1852.5	-	1907.5
	10	1855.0	-	1905.0
	15	1857.5	-	1902.5
	20	1860.0	-	1900.0
4	1.4	1710.7	-	1754.3
	3	1711.5	-	1753.5
	5	1712.5	-	1752.5
	10	1715.0	-	1750.0
	15	1717.5	-	1747.5
	20	1720.0	-	1745.0
12	1.4	699.7	-	715.3
	3	700.5	-	714.5
	5	701.5	-	713.5
	10	704.0	-	711.0

1.3. Type of Emission & Max ERP/EIRP Power Measurement Result:

LTE Band	BW	Modulation	ERP / EIRP (dBm)		(W)	Type of Emission
2	1.4	QPSK	22.63	EIRP	0.183	1M10G7D
		16QAM	22.09	EIRP	0.162	1M10D7W
2	3	QPSK	22.61	EIRP	0.182	2M70G7D
		16QAM	21.98	EIRP	0.158	2M71D7W
2	5	QPSK	22.60	EIRP	0.182	4M50G7D
		16QAM	21.81	EIRP	0.152	4M50D7W
2	10	QPSK	22.98	EIRP	0.199	9M02G7D
		16QAM	22.15	EIRP	0.164	8M98D7W
2	15	QPSK	23.26	EIRP	0.212	13M6G7D
		16QAM	22.57	EIRP	0.181	13M5D7W
2	20	QPSK	23.25	EIRP	0.211	18M0G7D
		16QAM	22.77	EIRP	0.189	18M0D7W

LTE Band	BW	Modulation	ERP / EIRP (dBm)		(W)	Type of Emission
4	1.4	QPSK	22.67	EIRP	0.185	1M10G7D
		16QAM	22.10	EIRP	0.162	1M10D7W
4	3	QPSK	22.67	EIRP	0.185	2M70G7D
		16QAM	21.92	EIRP	0.156	2M70D7W
4	5	QPSK	22.79	EIRP	0.190	4M50G7D
		16QAM	22.18	EIRP	0.165	4M50D7W
4	10	QPSK	22.97	EIRP	0.198	9M02G7D
		16QAM	22.31	EIRP	0.170	8M98D7W
4	15	QPSK	22.97	EIRP	0.198	13M6G7D
		16QAM	22.37	EIRP	0.173	13M5D7W
4	20	QPSK	22.93	EIRP	0.196	18M0G7D
		16QAM	22.43	EIRP	0.175	18M0D7W

LTE Band	BW	Modulation	ERP / EIRP (dBm)		(W)	Type of Emission
12	1.4	QPSK	17.05	ERP	0.051	1M11G7D
		16QAM	16.36	ERP	0.043	1M10D7W
12	3	QPSK	16.98	ERP	0.050	2M72G7D
		16QAM	16.37	ERP	0.043	2M71D7W
12	5	QPSK	16.89	ERP	0.049	4M50G7D
		16QAM	16.18	ERP	0.041	4M50D7W
12	10	QPSK	16.87	ERP	0.049	9M04G7D
		16QAM	16.30	ERP	0.043	9M01D7W

1.4. Test Methodology of Applied Standards

CC 47 CFR Part 2, 24, 27.

ANSI C63.26-2015

KDB971168 D01 Power Meas license Digital System v03

TS 151 010-1 is used to set, and measure the output power.

RSS Gen Issue 5 Apr. 2018

RSS-133 Issue 6 Jan. 2018

RSS-139 Issue 3 Jul. 2015

Note: All test items have been performed and record as per the above standards.

1.5. Test Facility

Compliance Certification Services Inc. Wugu Lab. No.11, Wugong 6th Rd.,

Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.) (TAF code 1309)

FCC Designation number: TW1309

Canada Registration number: TW1309

1.6. Special Accessories

No special accessories were used during testing.

1.7. Equipment Modifications

There were no modifications incorporated into the EUT.

2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT (Transmitter) was operated in the continuous transmission mode employed with the simulator of the Base Station that fixates at test default channels to fix the Tx frequency which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Measurement at Antenna Port

According to measurement procured ANSI C63.26-2015, the EUT is placed on a turn table which is 0.8 m above ground plane. A low loss of RF cable was used to connect the antenna port of EUT to measurement equipment.

2.3.2 Radiated Emissions (ERP/EIRP)

According to measurement procured ANSI C63.26-2015, The EUT is a placed on as turn table, for emission measurements below 1 GHz is 0.8 m above ground plane, for emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both Horizontal and Vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna according to the requirements in Section 8 and 13.

2.4. 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 attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

Note:

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

Following shows an offset computation in physical test.

	RF cable loss (dB)	Attenuation factor(dB)	offset(dB)
Low Band (Below 1GHz)	3.8	10	13.8
High Band (Above 1 GHz)	4	10	14

2.5. Final Amplifier Voltage and Current Information:

LTE Band 2

Test mode	DC voltage (V)	DC current (mA)
LTE Band 2_1.4M QPSK	12	594
LTE Band 2_1.4M 16QAM	12	592
LTE Band 2_3M QPSK	12	596
LTE Band 2_3M 16QAM	12	595
LTE Band 2_5M QPSK	12	595
LTE Band 2_5M 16QAM	12	594
LTE Band 2_10M QPSK	12	595
LTE Band 2_10M 16QAM	12	592
LTE Band 2_15M QPSK	12	596
LTE Band 2_15M 16QAM	12	595
LTE Band 2_20M QPSK	12	594
LTE Band 2_20M 16QAM	12	592

LTE Band 4

Test mode	DC voltage (V)	DC current (mA)
LTE Band 4_1.4M QPSK	12	596
LTE Band 4_1.4M 16QAM	12	595
LTE Band 4_3M QPSK	12	595
LTE Band 4_3M 16QAM	12	595
LTE Band 4_5M QPSK	12	594
LTE Band 4_5M 16QAM	12	593
LTE Band 4_10M QPSK	12	592
LTE Band 4_10M 16QAM	12	592
LTE Band 4_15M QPSK	12	596
LTE Band 4_15M 16QAM	12	594
LTE Band 4_20M QPSK	12	595
LTE Band 4_20M 16QAM	12	593

LTE Band 12

Test mode	DC voltage (V)	DC current (mA)
LTE Band 5_1.4M QPSK	12	599
LTE Band 5_1.4M 16QAM	12	598
LTE Band 5_3M QPSK	12	600
LTE Band 5_3M 16QAM	12	599
LTE Band 5_5M QPSK	12	598
LTE Band 5_5M 16QAM	12	598
LTE Band 5_10M QPSK	12	597
LTE Band 5_10M 16QAM	12	596

2.6. Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed Channel-Conducted)

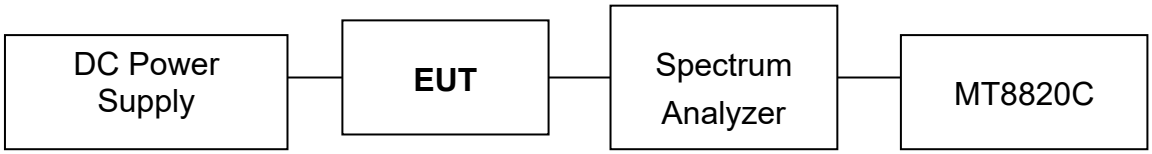
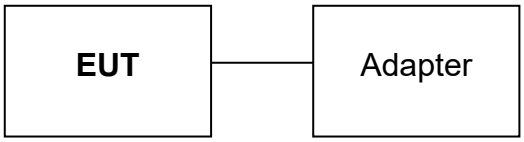


Fig. 2-2 Configuration of Tested System (Fixed Channel-Radiated)



Remote Side

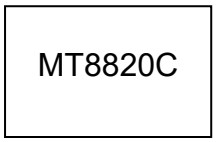


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Radio Communication Analyer	Anritsu	MT8820C	6201465317	shielded	Un-shielded
2.	DC Power Supply	Anritsu	E3640A	MY52410006	N/A	Unshielded

3. SUMMARY OF TEST RESULTS

FCC Rules	IC Rules	Description Of Test	Result
§2.1046(a)	N/A	RF Power Output	Compliant
§2.1046(a) §24.232(c) §27.50(a)(3) §27.50(c)(10) 27.50(d)(4)	§6.8 (RSS-Gen Issue 5) §6.4 (RSS-133) §6.5 (RSS-139)	ERP/ EIRP measurement	Compliant
§2.1049(h)	§6.7 (RSS-Gen Issue 5) §2.3 (RSS-133)	99% & 26dB Occuupied Bandwidth	Compliant
§2.1051 §24.238(a) §27.53(g)(h) §27.50(c)§27.53(m)(4)(6)	§6.13 (RSS-Gen Issue 5) §554 (RSS-132) §6.5 (RSS-133) §6.6 (RSS-139)	Out of Band Emissions at Antenna Terminals and Band Edge / Emission mask requirements	Compliant
§2.1053 §24.238(a) §27.53(c)(2),(4) §27.50(c)(5) §27.53(g)(h) §27.53(m)(4)(6)	§6.12 (RSS-Gen Issue 5) §6.5 (RSS-133) §6.6 (RSS-139)	Field Strength of Spurious Radiation	Compliant
§24.232(d) §27.53(d)(5) §27.50(i)(B)	§6.4 (RSS-133) §6.5 (RSS-139)	Peak to Average Ratio	Compliant
§2.1055(a)(1) §24.235 §27.54	§6.11 (RSS-Gen Issue 5) §6.3 (RSS-133) §6.4 (RSS-139)	Frequency Stability	Compliant

4. DESCRIPTION OF TEST MODES

4.1. The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X(E1)Y(E2)Z(H) axis and antenna ports. The worst case was found as listed below. Following channel(s) was (were) selected for the final test as listed below:

BAND	RADIATED EMISSION
LTE Band 2	E2-plan
LTE Band 4	E2-plan
LTE Band 12	E2-plan

LTE Band 2 MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
EIRP	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	1 RB/ 0,5 RB Offest
	18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	1 RB/ 0,14 RB Offest
	18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	1 RB/ 0,24 RB Offest
	18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	1 RB/ 0,49 RB Offest
	18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	1 RB/ 0,74 RB Offest
	18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	1 RB/ 0,99 RB Offest
FREQUENCY STABILITY	18650 to 19150	18900	10MHz	QPSK,	Full RB
OCCUPIED BAND-WIDTH	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	Full RB
	18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	Full RB
	18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	Full RB
	18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	Full RB
	18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	Full RB
	18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	Full RB
PEAK TO AVERAGE RATIO	18607 to 19193	18607, 18900, 19193	1.4MHz	16QAM	Full RB
	18615 to 19185	18615, 18900, 19185	3MHz	16QAM	Full RB
	18625 to 19175	18625, 18900, 19175	5MHz	16QAM	Full RB
	18650 to 19150	18650, 18900, 19150	10MHz	16QAM	Full RB
	18675 to 19125	18675, 18900, 19125	15MHz	16QAM	Full RB
	18700 to 19100	18700, 18900, 19100	20MHz	16QAM	Full RB
BAND EDGE	18607 to 19193	18607, 19193	1.4MHz	QPSK,	1 RB/ 0,5 RB Offes Full RB
	18615 to 19185	18615, 19185	3MHz	QPSK,	1 RB/ 0,14 RB Offest Full RB
	18625 to 19175	18625, 19175	5MHz	QPSK,	1 RB/ 0,24 RB Offest Full RB
	18650 to 19150	18650, 19150	10MHz	QPSK,	1 RB/ 0,49 RB Offest Full RB
	18675 to 19125	18675, 19125	15MHz	QPSK,	1 RB/ 0,74 RB Offest Full RB
	18700 to 19100	18700, 19100	20MHz	QPSK,	1 RB/ 0,99 RB Offest Full RB
CONDCUDETED EMISSION	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,	1 RB, 0 RB Offest
	18615 to 19185	18615, 18900, 19185	3MHz	QPSK,	1 RB, 0 RB Offest
	18625 to 19175	18625, 18900, 19175	5MHz	QPSK,	1 RB, 0 RB Offest
	18650 to 19150	18650, 18900, 19150	10MHz	QPSK,	1 RB, 0 RB Offest
	18675 to 19125	18675, 18900, 19125	15MHz	QPSK,	1 RB, 0 RB Offest
	18700 to 19100	18700, 18900, 19100	20MHz	QPSK,	1 RB, 0 RB Offest
RADIATED EMISSION	18700 to 19100	18700, 18900, 19100	20MHz	QPSK	1 RB, 0 RB Offest

LTE Band 4 MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
EIRP	19957 to 19393	19957, 20175, 19393	1.4MHz	QPSK, 16QAM	1 RB/ 0,5 RB Offest
	19965 to 22385	19965, 20175, 22385	3MHz	QPSK, 16QAM	1 RB/ 0,14 RB Offest
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1 RB/ 0,24 RB Offest
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1 RB/ 0,49 RB Offest
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1 RB/ 0,74 RB Offest
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1 RB/ 0,99 RB Offest
FREQUENCY STABILITY	20000 to 20350	20175	10MHz	QPSK,	Full RB
OCCUPIED BAND-WIDTH	19957 to 19393	19957, 20175, 19393	1.4MHz	QPSK, 16QAM	Full RB
	19965 to 22385	19965, 20175, 22385	3MHz	QPSK, 16QAM	Full RB
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	Full RB
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	Full RB
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	Full RB
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	Full RB
PEAK TO AVERAGE RATIO	19957 to 19393	19957, 20175, 19393	1.4MHz	16QAM	Full RB
	19965 to 22385	19965, 20175, 22385	3MHz	16QAM	Full RB
	19975 to 20375	19975, 20175, 20375	5MHz	16QAM	Full RB
	20000 to 20350	20000, 20175, 20350	10MHz	16QAM	Full RB
	20025 to 20325	20025, 20175, 20325	15MHz	16QAM	Full RB
	20050 to 20300	20050, 20175, 20300	20MHz	16QAM	Full RB
BAND EDGE	19957 to 19393	19957, 19393	1.4MHz	QPSK,	1 RB/ 0,5 RB Offes Full RB
	19965 to 22385	19965, 22385	3MHz	QPSK,	1 RB/ 0,14 RB Offest Full RB
	19975 to 20375	19975, 20375	5MHz	QPSK,	1 RB/ 0,24 RB Offest Full RB
	20000 to 20350	20000, 20350	10MHz	QPSK,	1 RB/ 0,49 RB Offest Full RB
	20025 to 20325	20025, 20325	15MHz	QPSK,	1 RB/ 0,74 RB Offest Full RB
	20050 to 20300	20050, 20300	20MHz	QPSK,	1 RB/ 0,99 RB Offest Full RB
CONDCUDETED EMISSION	19957 to 19393	19957, 20175, 19393	1.4MHz	QPSK,	1 RB, 0 RB Offest
	19965 to 22385	19965, 20175, 22385	3MHz	QPSK,	1 RB, 0 RB Offest
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK,	1 RB, 0 RB Offest
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK,	1 RB, 0 RB Offest
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK,	1 RB, 0 RB Offest
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK,	1 RB, 0 RB Offest
RADIATED EMISSION	20025 to 20325	20025, 20175, 20325	15MHz	QPSK,	1 RB,0 RB Offest

LTE Band 12 MODE

TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BAND-WIDTH	MODULATION	MODE
ERP	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK, 16QAM,	1 RB/ 0,5 RB Offest
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK, 16QAM,	1 RB/ 0,14 RB Offest
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK, 16QAM,	1 RB/ 0,24 RB Offest
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK, 16QAM,	1 RB/ 0,49 RB Offest
FREQUENCY STABILITY	23060 to 23130	23095	10MHz	QPSK,	Full RB
OCCUPIED BAND-WIDTH	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK, 16QAM,	Full RB
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK, 16QAM,	Full RB
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK, 16QAM,	Full RB
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK, 16QAM,	Full RB
PEAK TO AVERAGE RATIO	23017 to 23173	23017, 23095, 23173	1.4MHz	16QAM,	Full RB
	23025 to 23165	23025, 23095, 23165	3MHz	16QAM,	Full RB
	23035 to 23155	23035, 23095, 23155	5MHz	16QAM,	Full RB
	23060 to 23130	23060, 23095, 23130	10MHz	16QAM,	Full RB
BAND EDGE	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK,	1 RB/ 0,5 RB Offes Full RB
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK,	1 RB/ 0,14 RB Offest Full RB
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK,	1 RB/ 0,24 RB Offest Full RB
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK,	1 RB/ 0,49 RB Offest Full RB
CONDCUDETED EMISSION	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK,	1 RB, 0 RB Offest
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK,	1 RB, 0 RB Offest
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK,	1 RB, 0 RB Offest
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK,	1 RB, 0 RB Offest
RADIATED EMISSION	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK	1 RB, 5 RB Offest

5. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
RF Output Power	+/- 1.15 dB
99% Occupied Bandwidth	+/- 0.89%
Out of Band Emissions at Antenna Terminals and Band Edge	+/- 0.89 dB
Frequency Stability vs. Temperature	+/- 2.64 Hz
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12 dB
3M Semi Anechoic Chamber / 200MHz ~ 1GHz	+/- 4.68
3M Semi Anechoic Chamber / 1GHz ~ 8GHz	+/- 5.18
3M Semi Anechoic Chamber / 8GHz ~ 18GHz	+/- 5.47
3M Semi Anechoic Chamber / 18GHz ~ 26GHz	+/- 3.81
3M Semi Anechoic Chamber / 26GHz ~ 40GHz	+/- 3.87

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

6. RF CONDUCTED OUTPUT POWER MEASUREMENT

6.1. Standard Applicable

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals.

ERP/EIRP LIMIT

According to FCC §2.1046

FCC 24.232(b) Mobile and portable stations are limited to 2 W EIRP.

FCC 27.50(a)(3) Mobile and portable stations (hand-held devices) are limited to 250 mW/ 5MHz EIRP.

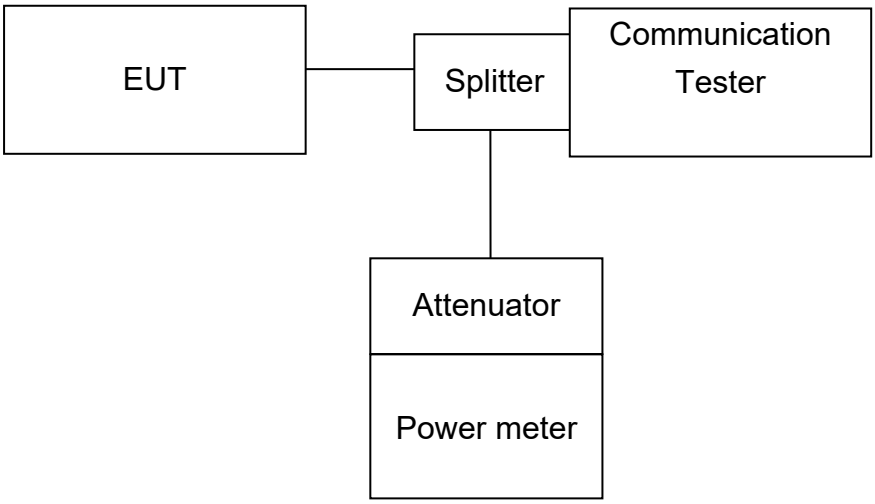
FCC 27.50(c)(10) Portable stations (hand-held devices) are limited to 3 watts ERP.

FCC 27.50(d)(4) Mobile and portable (hand-held) stations are limited to 1 watts EIRP.

FCC 27, 50(h)(2) Mobile and other user stations. Mobile stations are limited to 2 W EIRP

According to RSS-133 §6.4
The peak e.i.r.p. for transmitters operating in the band 1850-1910 MHz shall not exceed the limits 2W given in SRSP-510.
According to RSS 139 §6.4
The average equivalent isotropically radiated power (e.i.r.p.) for fixed, mobile and portable trans-mitters in the 1710-1755 MHz shall not exceed 1 watt.

6.2. Test Set-up



Note: *Measurement setup for testing on Antenna connector*

6.3. Measurement Procedure

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading. TS 151 010-1 is reference to conduct the test measurement of output power.

All LTE bands conducted average power is obtained from the simulator telecommunication test set.
The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP.

TEST PROCEDURE:
ANSI C63.26:2015
KDB 971168 Section 5.6

ERP/EIRP = PMeas + GT-LC

where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);
PMeas = measured transmitter output power or PSD, in dBm or dBW;
GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.2
For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

6.4. Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/16/2019	01/15/2020

6.5. Measurement Result

LTE Result:

FDD Band 2

Antenna gain (dBi) 1

LTE Band 2_Uplink frequency band : 1850 to 1910 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
1.4	18607	1850.7	QPSK	1	0	21.61	22.61	33	-10.39
				1	5	21.59	22.59	33	-10.41
				3	2	21.54	22.54	33	-10.46
				6	0	20.47	21.47	33	-11.53
	18900	1880	QPSK	1	0	21.63	22.63	33	-10.37
				1	5	21.55	22.55	33	-10.45
				3	2	21.56	22.56	33	-10.44
				6	0	20.53	21.53	33	-11.47
	19193	1909.3	QPSK	1	0	21.51	22.51	33	-10.49
				1	5	21.48	22.48	33	-10.52
				3	2	21.46	22.46	33	-10.54
				6	0	20.45	21.45	33	-11.55
	18607	1850.7	16QAM	1	0	21.03	22.03	33	-10.97
				1	5	21.07	22.07	33	-10.93
				3	2	20.51	21.51	33	-11.49
				6	0	19.57	20.57	33	-12.43
	18900	1880	16QAM	1	0	21.08	22.08	33	-10.92
				1	5	21.09	22.09	33	-10.91
				3	2	20.55	21.55	33	-11.45
				6	0	19.61	20.61	33	-12.39
	19193	1909.3	16QAM	1	0	20.75	21.75	33	-11.25
				1	5	20.73	21.73	33	-11.27
				3	2	20.59	21.59	33	-11.41
				6	0	19.55	20.55	33	-12.45

Antenna gain (dBi) 1

LTE Band 2_Uplink frequency band : 1850 to 1910 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
3	18615	1851.5	QPSK	1	0	21.59	22.59	33	-10.41
				1	14	21.49	22.49	33	-10.51
				8	4	20.46	21.46	33	-11.54
				15	0	20.50	21.50	33	-11.5
	18900	1880	QPSK	1	0	21.61	22.61	33	-10.39
				1	14	21.48	22.48	33	-10.52
				8	4	20.48	21.48	33	-11.52
				15	0	20.53	21.53	33	-11.47
	19185	1908.5	QPSK	1	0	21.61	22.61	33	-10.39
				1	14	21.50	22.50	33	-10.5
				8	4	20.41	21.41	33	-11.59
				15	0	20.50	21.50	33	-11.5
	18615	1851.5	16QAM	1	0	20.69	21.69	33	-11.31
				1	14	20.62	21.62	33	-11.38
				8	4	19.55	20.55	33	-12.45
				15	0	19.56	20.56	33	-12.44
	18900	1880	16QAM	1	0	20.74	21.74	33	-11.26
				1	14	20.70	21.70	33	-11.3
				8	4	19.68	20.68	33	-12.32
				15	0	19.79	20.79	33	-12.21
	19185	1908.5	16QAM	1	0	20.98	21.98	33	-11.02
				1	14	20.77	21.77	33	-11.23
				8	4	19.59	20.59	33	-12.41
				15	0	19.65	20.65	33	-12.35

Antenna gain (dBi) 1

LTE Band 2_Uplink frequency band : 1850 to 1910 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
5	18625	1852.5	QPSK	1	0	21.49	22.49	33	-10.51
				1	24	21.37	22.37	33	-10.63
				12	6	20.48	21.48	33	-11.52
				25	0	20.58	21.58	33	-11.42
	18900	1880	QPSK	1	0	21.57	22.57	33	-10.43
				1	24	21.51	22.51	33	-10.49
				12	6	20.52	21.52	33	-11.48
				25	0	20.53	21.53	33	-11.47
	19175	1907.5	QPSK	1	0	21.60	22.60	33	-10.4
				1	24	21.39	22.39	33	-10.61
				12	6	20.48	21.48	33	-11.52
				25	0	20.51	21.51	33	-11.49
	18625	1852.5	16QAM	1	0	20.56	21.56	33	-11.44
				1	24	20.51	21.51	33	-11.49
				12	6	19.58	20.58	33	-12.42
				25	0	19.63	20.63	33	-12.37
	18900	1880	16QAM	1	0	20.81	21.81	33	-11.19
				1	24	20.72	21.72	33	-11.28
				12	6	19.67	20.67	33	-12.33
				25	0	19.63	20.63	33	-12.37
	19175	1907.5	16QAM	1	0	20.78	21.78	33	-11.22
				1	24	20.59	21.59	33	-11.41
				12	6	19.63	20.63	33	-12.37
				25	0	19.56	20.56	33	-12.44

Antenna gain (dBi) 1

LTE Band 2_Uplink frequency band : 1850 to 1910 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
10	18650	1855	QPSK	1	0	21.93	22.93	33	-10.07
				1	49	21.61	22.61	33	-10.39
				25	12	20.56	21.56	33	-11.44
				50	0	20.68	21.68	33	-11.32
	18900	1880	QPSK	1	0	21.90	22.90	33	-10.1
				1	49	21.63	22.63	33	-10.37
				25	12	20.53	21.53	33	-11.47
				50	0	20.63	21.63	33	-11.37
	19150	1905	QPSK	1	0	21.98	22.98	33	-10.02
				1	49	21.46	22.46	33	-10.54
				25	12	20.56	21.56	33	-11.44
				50	0	20.60	21.60	33	-11.4
	18650	1855	16QAM	1	0	21.13	22.13	33	-10.87
				1	49	20.83	21.83	33	-11.17
				25	12	19.66	20.66	33	-12.34
				50	0	19.74	20.74	33	-12.26
	18900	1880	16QAM	1	0	21.11	22.11	33	-10.89
				1	49	20.87	21.87	33	-11.13
				25	12	19.56	20.56	33	-12.44
				50	0	19.69	20.69	33	-12.31
	19150	1905	16QAM	1	0	21.15	22.15	33	-10.85
				1	49	20.64	21.64	33	-11.36
				25	12	19.68	20.68	33	-12.32
				50	0	19.74	20.74	33	-12.26

Antenna gain (dBi) 1

LTE Band 2_Uplink frequency band : 1850 to 1910 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
15	18675	1857.5	QPSK	1	0	22.26	23.26	33	-9.74
				1	74	21.54	22.54	33	-10.46
				36	18	20.63	21.63	33	-11.37
				75	0	20.74	21.74	33	-11.26
	18900	1880	QPSK	1	0	21.99	22.99	33	-10.01
				1	74	21.53	22.53	33	-10.47
				36	18	20.60	21.60	33	-11.4
				75	0	20.65	21.65	33	-11.35
	19125	1902.5	QPSK	1	0	22.21	23.21	33	-9.79
				1	74	21.42	22.42	33	-10.58
				36	18	20.62	21.62	33	-11.38
				75	0	20.70	21.70	33	-11.3
	18675	1857.5	16QAM	1	0	21.57	22.57	33	-10.43
				1	74	21.03	22.03	33	-10.97
				36	18	19.66	20.66	33	-12.34
				75	0	19.76	20.76	33	-12.24
	18900	1880	16QAM	1	0	21.13	22.13	33	-10.87
				1	74	20.62	21.62	33	-11.38
				36	18	19.61	20.61	33	-12.39
				75	0	19.60	20.60	33	-12.4
	19125	1902.5	16QAM	1	0	21.31	22.31	33	-10.69
				1	74	20.59	21.59	33	-11.41
				36	18	19.72	20.72	33	-12.28
				75	0	19.81	20.81	33	-12.19

Antenna gain (dBi) 1

LTE Band 2_Uplink frequency band : 1850 to 1910 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
20	18700	1860	QPSK	1	0	21.90	22.90	33	-10.1
				1	99	20.99	21.99	33	-11.01
				50	25	20.50	21.50	33	-11.5
				100	0	20.61	21.61	33	-11.39
	18900	1880	QPSK	1	0	22.11	23.11	33	-9.89
				1	99	21.37	22.37	33	-10.63
				50	25	20.53	21.53	33	-11.47
				100	0	20.69	21.69	33	-11.31
	19100	1900	QPSK	1	0	22.25	23.25	33	-9.75
				1	99	21.28	22.28	33	-10.72
				50	25	20.65	21.65	33	-11.35
				100	0	20.77	21.77	33	-11.23
	18700	1860	16QAM	1	0	21.05	22.05	33	-10.95
				1	99	20.20	21.20	33	-11.8
				50	25	19.52	20.52	33	-12.48
				100	0	19.63	20.63	33	-12.37
	18900	1880	16QAM	1	0	21.21	22.21	33	-10.79
				1	99	20.59	21.59	33	-11.41
				50	25	19.59	20.59	33	-12.41
				100	0	19.68	20.68	33	-12.32
	19100	1900	16QAM	1	0	21.77	22.77	33	-10.23
				1	99	20.85	21.85	33	-11.15
				50	25	19.68	20.68	33	-12.32
				100	0	19.83	20.83	33	-12.17

FDD Band 4

Antenna gain (dBi) 0.8

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
1.4	19957	1710.7	QPSK	1	0	21.56	22.36	30	-7.64
				1	5	21.49	22.29	30	-7.71
				3	2	21.53	22.33	30	-7.67
				6	0	20.50	21.30	30	-8.7
	20175	1732.5	QPSK	1	0	21.59	22.39	30	-7.61
				1	5	21.60	22.40	30	-7.6
				3	2	21.62	22.42	30	-7.58
				6	0	20.62	21.42	30	-8.58
	20393	1754.3	QPSK	1	0	21.84	22.64	30	-7.36
				1	5	21.84	22.64	30	-7.36
				3	2	21.87	22.67	30	-7.33
				6	0	20.79	21.59	30	-8.41
	19957	1710.7	16QAM	1	0	20.87	21.67	30	-8.33
				1	5	20.78	21.58	30	-8.42
				3	2	20.66	21.46	30	-8.54
				6	0	19.65	20.45	30	-9.55
	20175	1732.5	16QAM	1	0	21.06	21.86	30	-8.14
				1	5	21.08	21.88	30	-8.12
				3	2	20.67	21.47	30	-8.53
				6	0	19.72	20.52	30	-9.48
	20393	1754.3	16QAM	1	0	21.30	22.10	30	-7.9
				1	5	21.26	22.06	30	-7.94
				3	2	20.96	21.76	30	-8.24
				6	0	19.87	20.67	30	-9.33

Antenna gain (dBi) 0.8

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
3	19965	1711.5	QPSK	1	0	21.46	22.26	30	-7.74
				1	14	21.31	22.11	30	-7.89
				8	4	20.52	21.32	30	-8.68
				15	0	20.57	21.37	30	-8.63
	20175	1732.5	QPSK	1	0	21.62	22.42	30	-7.58
				1	14	21.50	22.30	30	-7.7
				8	4	20.53	21.33	30	-8.67
				15	0	20.55	21.35	30	-8.65
	20385	1753.5	QPSK	1	0	21.87	22.67	30	-7.33
				1	14	21.72	22.52	30	-7.48
				8	4	20.80	21.60	30	-8.4
				15	0	20.82	21.62	30	-8.38
	19965	1711.5	16QAM	1	0	20.49	21.29	30	-8.71
				1	14	20.47	21.27	30	-8.73
				8	4	19.49	20.29	30	-9.71
				15	0	19.53	20.33	30	-9.67
	20175	1732.5	16QAM	1	0	20.81	21.61	30	-8.39
				1	14	20.66	21.46	30	-8.54
				8	4	19.50	20.30	30	-9.7
				15	0	19.55	20.35	30	-9.65
	20385	1753.5	16QAM	1	0	21.12	21.92	30	-8.08
				1	14	20.97	21.77	30	-8.23
				8	4	19.86	20.66	30	-9.34
				15	0	19.81	20.61	30	-9.39

Antenna gain (dBi) 0.8

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
5	19975	1712.5	QPSK	1	0	21.55	22.35	30	-7.65
				1	24	21.36	22.16	30	-7.84
				12	6	20.50	21.30	30	-8.7
				25	0	20.51	21.31	30	-8.69
	20175	1732.5	QPSK	1	0	21.76	22.56	30	-7.44
				1	24	21.55	22.35	30	-7.65
				12	6	20.56	21.36	30	-8.64
				25	0	20.60	21.40	30	-8.6
	20375	1752.5	QPSK	1	0	21.99	22.79	30	-7.21
				1	24	21.77	22.57	30	-7.43
				12	6	20.85	21.65	30	-8.35
				25	0	20.89	21.69	30	-8.31
	19975	1712.5	16QAM	1	0	20.85	21.65	30	-8.35
				1	24	20.63	21.43	30	-8.57
				12	6	19.49	20.29	30	-9.71
				25	0	19.46	20.26	30	-9.74
	20175	1732.5	16QAM	1	0	21.01	21.81	30	-8.19
				1	24	20.96	21.76	30	-8.24
				12	6	19.58	20.38	30	-9.62
				25	0	19.60	20.40	30	-9.6
	20375	1752.5	16QAM	1	0	21.38	22.18	30	-7.82
				1	24	21.10	21.90	30	-8.1
				12	6	19.80	20.60	30	-9.4
				25	0	19.82	20.62	30	-9.38

Antenna gain (dBi) 0.8

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
10	20000	1715	QPSK	1	0	21.86	22.66	30	-7.34
				1	49	21.60	22.40	30	-7.6
				25	12	20.47	21.27	30	-8.73
				50	0	20.53	21.33	30	-8.67
	20175	1732.5	QPSK	1	0	21.75	22.55	30	-7.45
				1	49	21.54	22.34	30	-7.66
				25	12	20.57	21.37	30	-8.63
				50	0	20.65	21.45	30	-8.55
	20375	1750	QPSK	1	0	22.17	22.97	30	-7.03
				1	49	21.81	22.61	30	-7.39
				25	12	20.91	21.71	30	-8.29
				50	0	20.95	21.75	30	-8.25
	20000	1715	16QAM	1	0	21.39	22.19	30	-7.81
				1	49	21.14	21.94	30	-8.06
				25	12	19.47	20.27	30	-9.73
				50	0	19.56	20.36	30	-9.64
	20175	1732.5	16QAM	1	0	21.51	22.31	30	-7.69
				1	49	21.00	21.80	30	-8.2
				25	12	19.56	20.36	30	-9.64
				50	0	19.69	20.49	30	-9.51
	20375	1750	16QAM	1	0	21.44	22.24	30	-7.76
				1	49	21.04	21.84	30	-8.16
				25	12	19.89	20.69	30	-9.31
				50	0	19.96	20.76	30	-9.24

Antenna gain (dBi) 0.8

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
15	20025	1717.5	QPSK	1	0	22.06	22.86	30	-7.14
				1	74	21.59	22.39	30	-7.61
				36	18	20.69	21.49	30	-8.51
				75	0	20.79	21.59	30	-8.41
	20175	1732.5	QPSK	1	0	22.09	22.89	30	-7.11
				1	74	21.65	22.45	30	-7.55
				36	18	20.65	21.45	30	-8.55
				75	0	20.71	21.51	30	-8.49
	20325	1747.5	QPSK	1	0	22.17	22.97	30	-7.03
				1	74	21.67	22.47	30	-7.53
				36	18	20.84	21.64	30	-8.36
				75	0	20.95	21.75	30	-8.25
	20025	1717.5	16QAM	1	0	21.57	22.37	30	-7.63
				1	74	21.04	21.84	30	-8.16
				36	18	19.65	20.45	30	-9.55
				75	0	19.76	20.56	30	-9.44
	20175	1732.5	16QAM	1	0	21.32	22.12	30	-7.88
				1	74	20.80	21.60	30	-8.4
				36	18	19.63	20.43	30	-9.57
				75	0	19.62	20.42	30	-9.58
	20325	1747.5	16QAM	1	0	21.25	22.05	30	-7.95
				1	74	20.77	21.57	30	-8.43
				36	18	19.83	20.63	30	-9.37
				75	0	19.86	20.66	30	-9.34

Antenna gain (dBi) 0.8

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
20	20050	1720	QPSK	1	0	22.08	22.88	30	-7.12
				1	99	21.30	22.10	30	-7.9
				50	25	20.62	21.42	30	-8.58
				100	0	20.77	21.57	30	-8.43
	20175	1732.5	QPSK	1	0	22.13	22.93	30	-7.07
				1	99	21.45	22.25	30	-7.75
				50	25	20.57	21.37	30	-8.63
				100	0	20.70	21.50	30	-8.5
	20300	1745	QPSK	1	0	22.12	22.92	30	-7.08
				1	99	21.50	22.30	30	-7.7
				50	25	20.78	21.58	30	-8.42
				100	0	20.95	21.75	30	-8.25
	20050	1720	16QAM	1	0	21.28	22.08	30	-7.92
				1	99	20.58	21.38	30	-8.62
				50	25	19.61	20.41	30	-9.59
				100	0	19.77	20.57	30	-9.43
	20175	1732.5	16QAM	1	0	21.40	22.20	30	-7.8
				1	99	20.72	21.52	30	-8.48
				50	25	19.56	20.36	30	-9.64
				100	0	19.70	20.50	30	-9.5
	20300	1745	16QAM	1	0	21.63	22.43	30	-7.57
				1	99	21.02	21.82	30	-8.18
				50	25	19.74	20.54	30	-9.46
				100	0	19.92	20.72	30	-9.28

FDD Band 12

Antenna gain (dBi) -2.98

LTE Band 12_Uplink frequency band : 699 to 716 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
1.4	23017	699.7	QPSK	1	0	22.07	16.94	19.09	34.77	-15.68
				1	5	22.07	16.94	19.09	34.77	-15.68
				3	2	22.02	16.89	19.04	34.77	-15.73
				6	0	21.10	15.97	18.12	34.77	-16.65
	23095	707.5	QPSK	1	0	22.16	17.03	19.18	34.77	-15.59
				1	5	22.11	16.98	19.13	34.77	-15.64
				3	2	22.15	17.02	19.17	34.77	-15.6
				6	0	21.22	16.09	18.24	34.77	-16.53
	23173	715.5	QPSK	1	0	22.18	17.05	19.20	34.77	-15.57
				1	5	22.11	16.98	19.13	34.77	-15.64
				3	2	22.17	17.04	19.19	34.77	-15.58
				6	0	21.13	16.00	18.15	34.77	-16.62
	23017	699.7	16QAM	1	0	21.34	16.21	18.36	34.77	-16.41
				1	5	21.36	16.23	18.38	34.77	-16.39
				3	2	21.16	16.03	18.18	34.77	-16.59
				6	0	20.14	15.01	17.16	34.77	-17.61
	23095	707.5	16QAM	1	0	21.42	16.29	18.44	34.77	-16.33
				1	5	21.45	16.32	18.47	34.77	-16.3
				3	2	21.28	16.15	18.30	34.77	-16.47
				6	0	20.30	15.17	17.32	34.77	-17.45
	23173	715.5	16QAM	1	0	21.49	16.36	18.51	34.77	-16.26
				1	5	21.48	16.35	18.50	34.77	-16.27
				3	2	21.33	16.20	18.35	34.77	-16.42
				6	0	20.27	15.14	17.29	34.77	-17.48

Antenna gain (dBi) -2.98

LTE Band 12_Uplink frequency band : 699 to 716 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
3	23025	700.5	QPSK	1	0	21.96	16.83	18.98	34.77	-15.79
				1	14	21.86	16.73	18.88	34.77	-15.89
				8	4	20.93	15.80	17.95	34.77	-16.82
				15	0	20.93	15.80	17.95	34.77	-16.82
	23095	707.5	QPSK	1	0	22.10	16.97	19.12	34.77	-15.65
				1	14	22.00	16.87	19.02	34.77	-15.75
				8	4	21.11	15.98	18.13	34.77	-16.64
				15	0	21.09	15.96	18.11	34.77	-16.66
	23165	714.5	QPSK	1	0	21.96	16.83	18.98	34.77	-15.79
				1	14	22.11	16.98	19.13	34.77	-15.64
				8	4	20.98	15.85	18.00	34.77	-16.77
				15	0	21.00	15.87	18.02	34.77	-16.75
	23025	700.5	16QAM	1	0	21.15	16.02	18.17	34.77	-16.6
				1	14	21.11	15.98	18.13	34.77	-16.64
				8	4	20.08	14.95	17.10	34.77	-17.67
				15	0	20.07	14.94	17.09	34.77	-17.68
	23095	707.5	16QAM	1	0	21.19	16.06	18.21	34.77	-16.56
				1	14	21.14	16.01	18.16	34.77	-16.61
				8	4	20.20	15.07	17.22	34.77	-17.55
				15	0	20.16	15.03	17.18	34.77	-17.59
	23165	714.5	16QAM	1	0	21.30	16.17	18.32	34.77	-16.45
				1	14	21.50	16.37	18.52	34.77	-16.25
				8	4	20.08	14.95	17.10	34.77	-17.67
				15	0	20.15	15.02	17.17	34.77	-17.6

Antenna gain (dBi) -2.98

LTE Band 12_Uplink frequency band : 699 to 716 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
5	23035	701.5	QPSK	1	0	21.86	16.73	18.88	34.77	-15.89
				1	24	21.82	16.69	18.84	34.77	-15.93
				12	6	20.93	15.80	17.95	34.77	-16.82
				25	0	20.98	15.85	18.00	34.77	-16.77
	23095	707.5	QPSK	1	0	21.98	16.85	19.00	34.77	-15.77
				1	24	21.89	16.76	18.91	34.77	-15.86
				12	6	21.09	15.96	18.11	34.77	-16.66
				25	0	21.04	15.91	18.06	34.77	-16.71
	23155	713.5	QPSK	1	0	21.98	16.85	19.00	34.77	-15.77
				1	24	22.02	16.89	19.04	34.77	-15.73
				12	6	20.88	15.75	17.90	34.77	-16.87
				25	0	20.94	15.81	17.96	34.77	-16.81
	23035	701.5	16QAM	1	0	21.19	16.06	18.21	34.77	-16.56
				1	24	21.18	16.05	18.20	34.77	-16.57
				12	6	20.05	14.92	17.07	34.77	-17.7
				25	0	20.02	14.89	17.04	34.77	-17.73
	23095	707.5	16QAM	1	0	21.19	16.06	18.21	34.77	-16.56
				1	24	21.18	16.05	18.20	34.77	-16.57
				12	6	20.24	15.11	17.26	34.77	-17.51
				25	0	20.10	14.97	17.12	34.77	-17.65
	23155	713.5	16QAM	1	0	21.23	16.10	18.25	34.77	-16.52
				1	24	21.31	16.18	18.33	34.77	-16.44
				12	6	20.01	14.88	17.03	34.77	-17.74
				25	0	19.98	14.85	17.00	34.77	-17.77

Antenna gain (dBi) -2.98

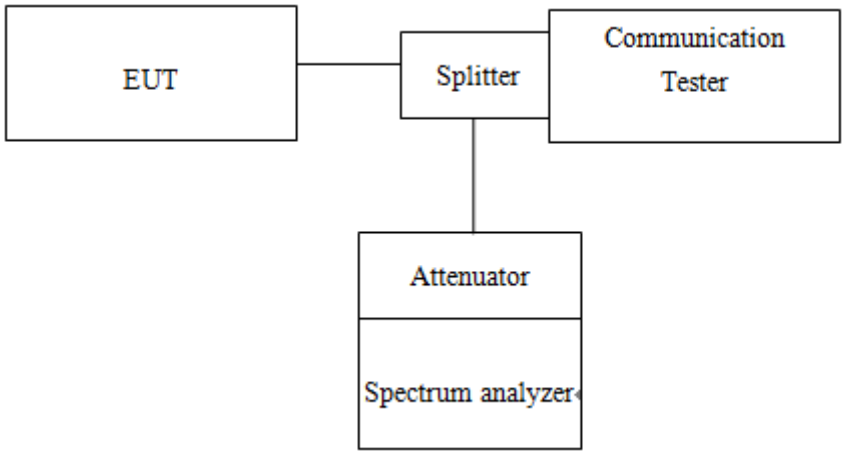
LTE Band 12_Uplink frequency band : 699 to 716 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
10	23060	704	QPSK	1	0	21.85	16.72	18.87	34.77	-15.9
				1	49	21.88	16.75	18.90	34.77	-15.87
				25	12	20.92	15.79	17.94	34.77	-16.83
				50	0	20.93	15.80	17.95	34.77	-16.82
	23095	707.5	QPSK	1	0	21.92	16.79	18.94	34.77	-15.83
				1	49	22.00	16.87	19.02	34.77	-15.75
				25	12	21.06	15.93	18.08	34.77	-16.69
				50	0	21.06	15.93	18.08	34.77	-16.69
	23130	711	QPSK	1	0	21.84	16.71	18.86	34.77	-15.91
				1	49	21.92	16.79	18.94	34.77	-15.83
				25	12	21.06	15.93	18.08	34.77	-16.69
				50	0	21.05	15.92	18.07	34.77	-16.7
	23060	704	16QAM	1	0	21.33	16.20	18.35	34.77	-16.42
				1	49	21.42	16.29	18.44	34.77	-16.33
				25	12	20.02	14.89	17.04	34.77	-17.73
				50	0	20.03	14.90	17.05	34.77	-17.72
	23095	707.5	16QAM	1	0	21.40	16.27	18.42	34.77	-16.35
				1	49	21.43	16.30	18.45	34.77	-16.32
				25	12	20.03	14.90	17.05	34.77	-17.72
				50	0	20.12	14.99	17.14	34.77	-17.63
	23130	711	16QAM	1	0	21.42	16.29	18.44	34.77	-16.33
				1	49	21.31	16.18	18.33	34.77	-16.44
				25	12	20.13	15.00	17.15	34.77	-17.62
				50	0	20.14	15.01	17.16	34.77	-17.61

7. OCCUPIED BANDWIDTH MEASUREMENT

7.1. Standard Applicable

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power.

7.2. Test Set-up



7.3. Measurement Procedure

99% &26dB Bandwidth with detector peak

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW= 3 times RBW, -26dBc display line was placed on the screen (or 26dB bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace. Then set RBW to 99% bandwidth, RBW= 1%, VBW= 3 RBW, with span > 2 * Signal BW, set % Power = 99%.

99% Bandwidth with detector sample

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% ~ 5% of emission BW, VBW= 3 times RBW, -20dBc display line was placed on the screen (or 20dB bandwidth). Set RBW to 99% bandwidth, RBW= 1% ~ 5%, VBW= 3 RBW, with span > 2 * Signal BW, set % Power = 99%.

7.4. Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
DC Block	PASTERNACK	PE8210	RF256	02/26/2019	02/25/2020
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
Thermostatic/Hrgrosatic Chamber	GWINSTEK	GTC-288MH-CC	TH160402	05/16/2019	05/15/2020
Splitter	Woken	DOM35LW1A2	RF83	02/26/2019	02/25/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/16/2019	01/15/2020

7.5. Measurement Result

LTE BAND 2 Channel bandwidth: 1.4MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1850.7	18607	1.1022	1.1012	1.333	1.338
1880.0	18900	1.1035	1.1030	1.369	1.367
1909.3	19193	1.1048	1.1047	1.343	1.358

LTE BAND 2 Channel bandwidth: 3MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1851.5	18615	2.7002	2.7002	2.986	3.029
1880.0	18900	2.7011	2.7054	2.986	3.045
1908.5	19185	2.7019	2.7023	3.007	3.050

LTE BAND 2 Channel bandwidth: 5MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1852.5	18625	4.4877	4.4910	5.039	5.020
1880.0	18900	4.4968	4.4947	5.077	5.072
1907.5	19175	4.4991	4.4956	5.065	5.061

LTE BAND 2 Channel bandwidth: 10MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1855.0	18650	8.9932	8.9697	10.197	10.062
1880.0	18900	9.0229	8.9709	10.273	10.100
1905.0	19150	9.0207	8.9810	10.330	10.269

LTE BAND 2 Channel bandwidth: 15MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1857.5	18675	13.489	13.492	15.662	15.950
1880.0	18900	13.551	13.539	15.889	16.087
1902.5	19125	13.531	13.522	15.632	15.760

LTE BAND 2 Channel bandwidth: 20MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1860.0	18700	17.918	17.971	20.278	20.412
1880.0	18900	18.031	18.032	20.710	20.491
1900.0	19100	17.971	17.983	20.221	20.584

LTE BAND 4 Channel bandwidth: 1.4MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1710.7	19957	1.1016	1.1004	1.329	1.343
1732.5	20175	1.1005	1.0999	1.333	1.340
1754.3	20393	1.1019	1.1016	1.316	1.375

LTE BAND 4 Channel bandwidth: 3MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1711.5	19965	2.6989	2.7013	2.972	3.017
1732.5	20175	2.6979	2.7038	2.991	3.018
1753.5	20385	2.7011	2.6985	2.980	3.004

LTE BAND 4 Channel bandwidth: 5MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1712.5	19957	4.4970	4.4954	5.093	5.028
1732.5	20175	4.5028	4.4941	5.077	5.085
1752.5	20375	4.4947	4.4986	5.068	5.045

LTE BAND 4 Channel bandwidth: 10MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1715.0	20000	9.0145	8.9814	10.308	10.070
1732.5	20175	9.0181	8.9841	10.344	10.133
1750.0	20350	9.0234	8.9812	10.346	10.184

LTE BAND 4 Channel bandwidth: 15MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1717.5	20025	13.521	13.529	15.456	15.875
1732.5	20175	13.500	13.512	15.710	15.682
1747.5	20325	13.553	13.537	15.795	16.021

LTE BAND 4 Channel bandwidth: 20MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1720.0	20050	17.972	18.007	20.431	20.577
1732.5	20175	17.943	17.994	20.314	20.379
1745.0	20300	18.009	18.035	20.357	20.629

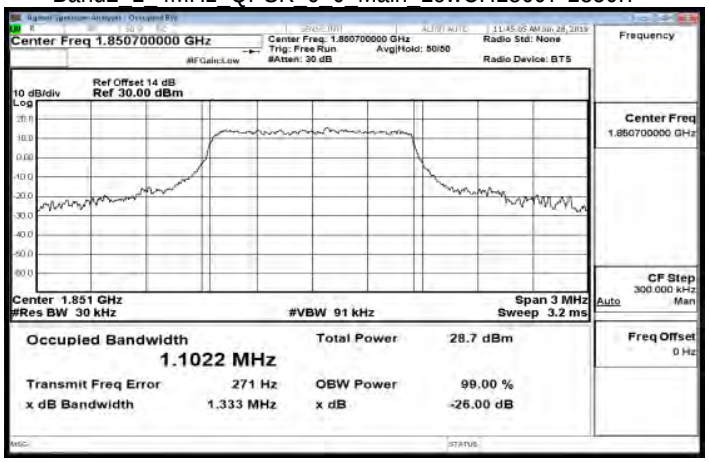
LTE BAND 12 Channel bandwidth: 1.4MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
699.7	23017	1.0997	1.1013	1.320	1.356
707.5	23095	1.1025	1.1003	1.339	1.315
715.3	23173	1.1097	1.1048	1.294	1.342

LTE BAND 12 Channel bandwidth: 3MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
700.5	23025	2.7189	2.6886	2.901	2.885
707.5	23095	2.6944	2.7022	2.963	3.021
714.5	23165	2.7020	2.7059	3.018	3.023

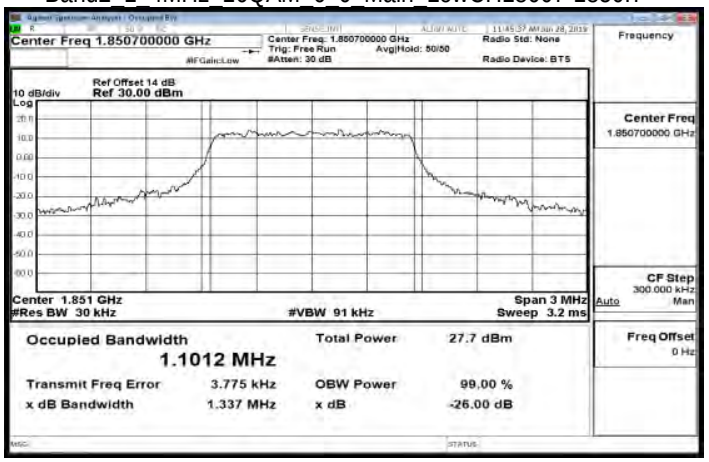
LTE BAND 12 Channel bandwidth: 5MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
701.5	23035	4.4933	4.4925	5.041	4.973
707.5	23095	4.4931	4.4917	5.114	5.012
713.5	23155	4.5031	4.4978	5.056	5.048

LTE BAND 12 Channel bandwidth: 10MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
704.0	23060	9.0435	9.0055	10.351	10.240
707.5	23095	9.0016	8.9666	10.241	10.034
711.0	23130	8.9608	8.9462	10.178	10.026

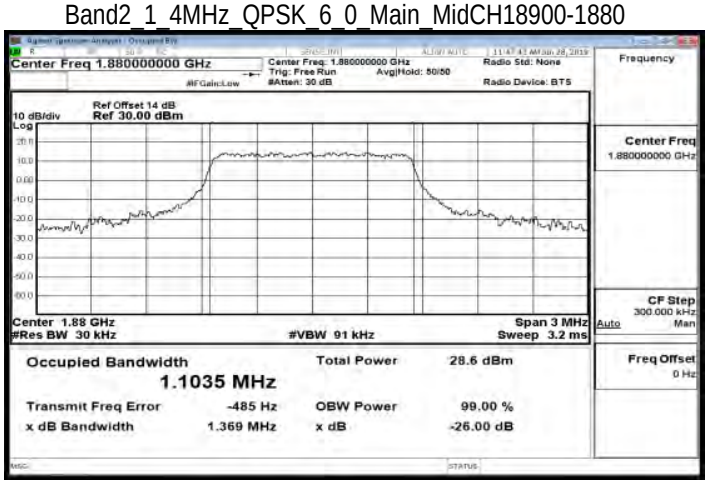
Band2_1_4MHz_QPSK_6_0_Main_LowCH18607-1850.7



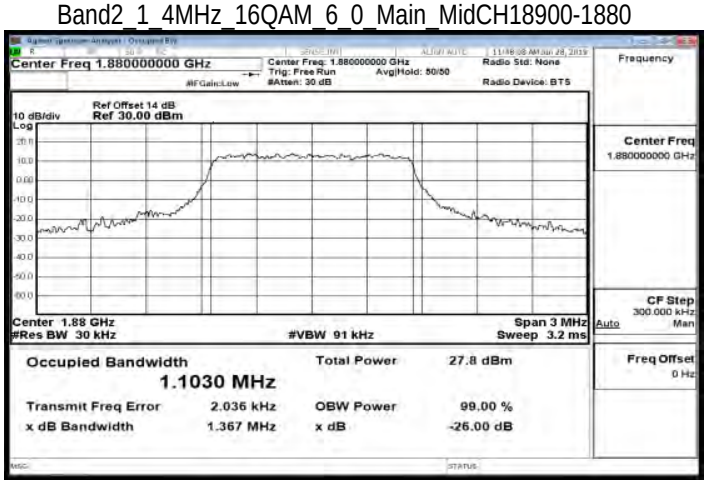
Band2_1_4MHz_16QAM_6_0_Main_LowCH18607-1850.7



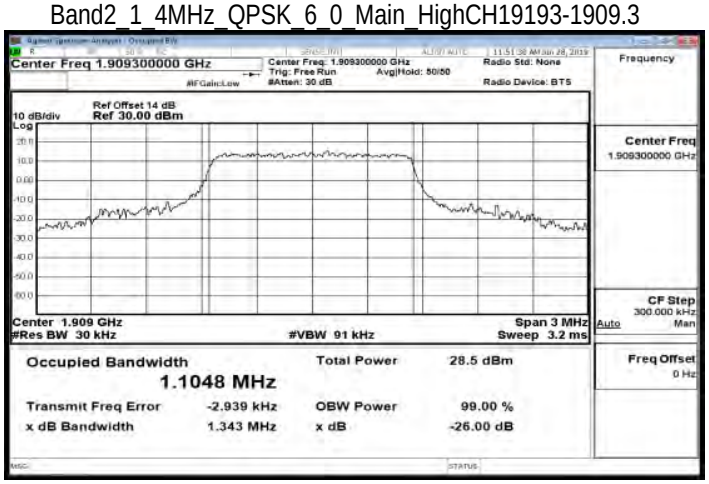
Band2_1_4MHz_QPSK_6_0_Main_MidCH18900-1880



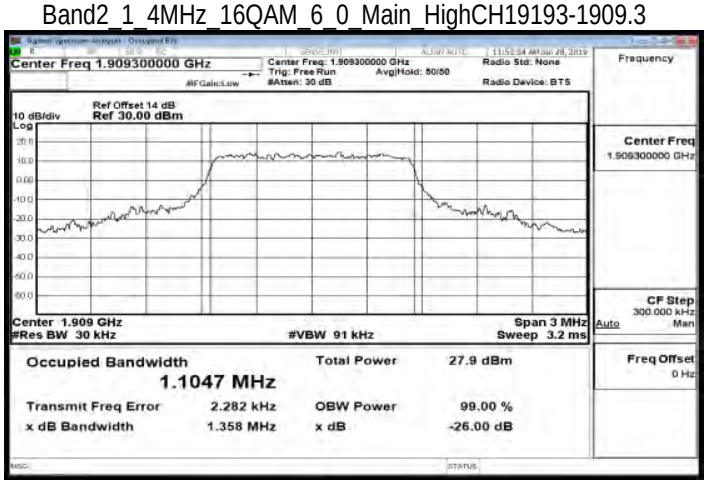
Band2_1_4MHz_16QAM_6_0_Main_MidCH18900-1880



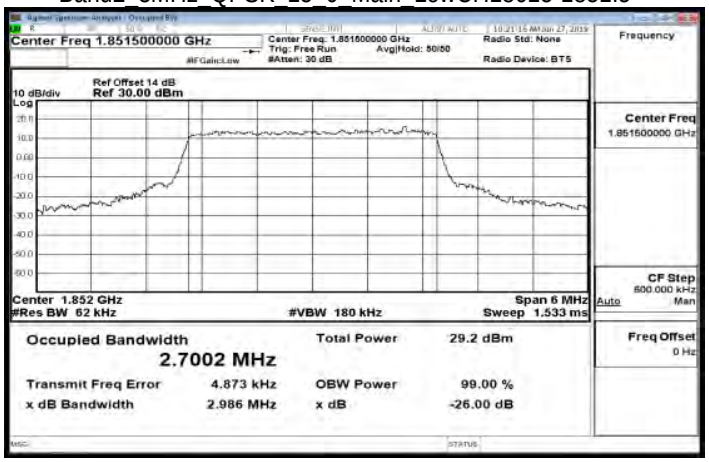
Band2_1_4MHz_QPSK_6_0_Main_HighCH19193-1909.3



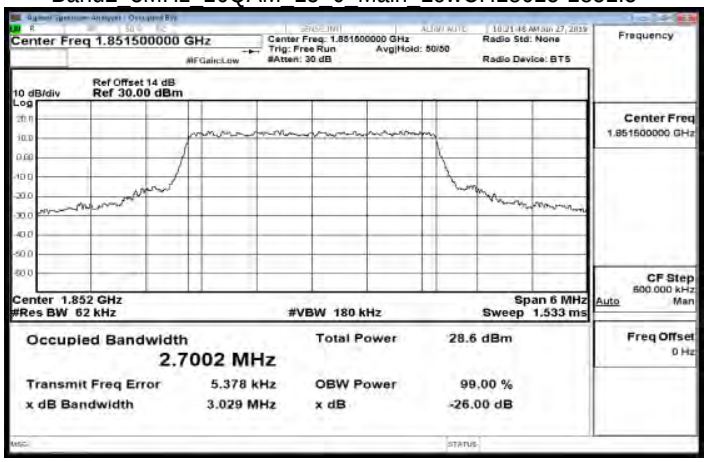
Band2_1_4MHz_16QAM_6_0_Main_HighCH19193-1909.3



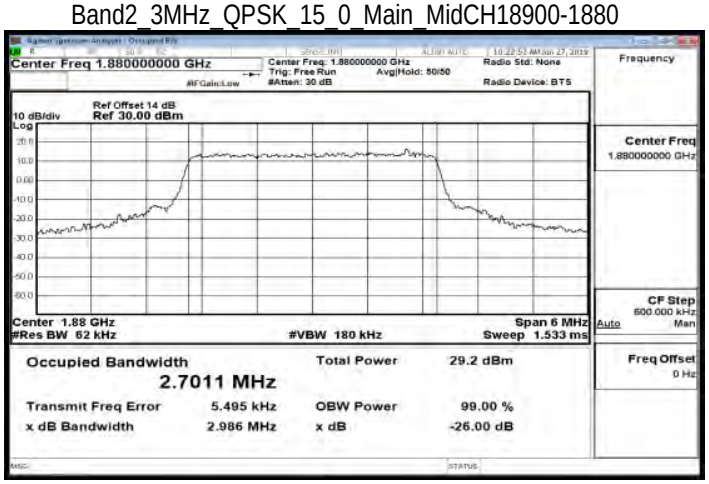
Band2_3MHz_QPSK_15_0_Main_LowCH18615-1851.5



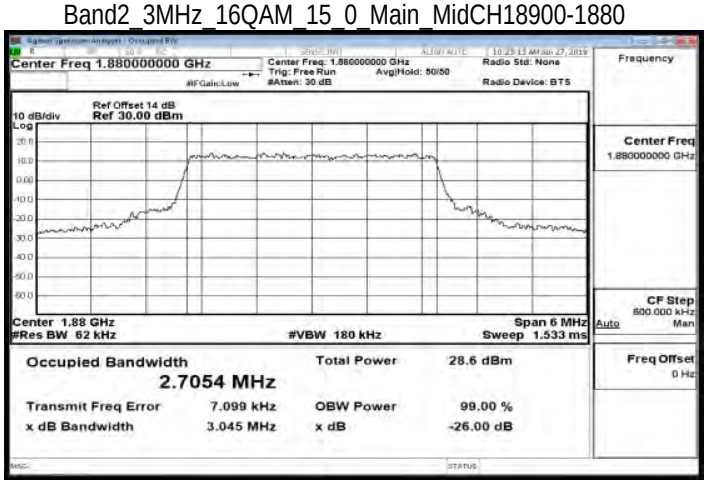
Band2_3MHz_16QAM_15_0_Main_LowCH18615-1851.5



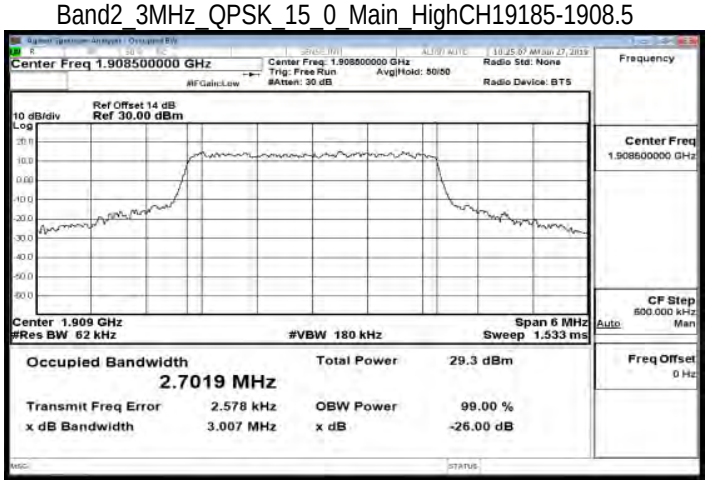
Band2_3MHz_QPSK_15_0_Main_MidCH18900-1880



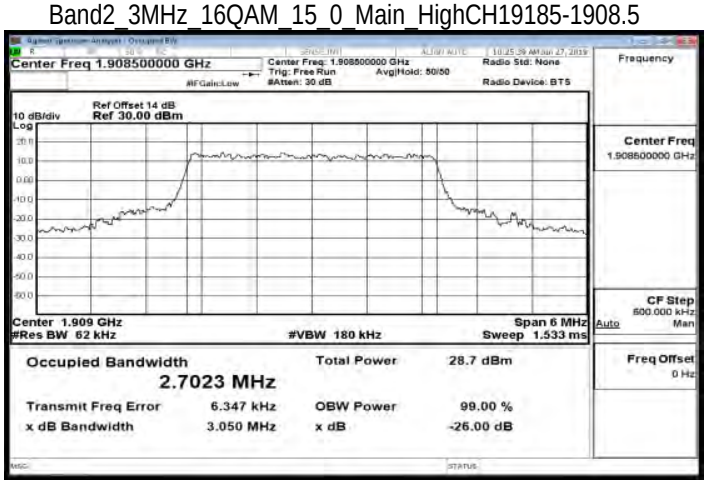
Band2_3MHz_16QAM_15_0_Main_MidCH18900-1880



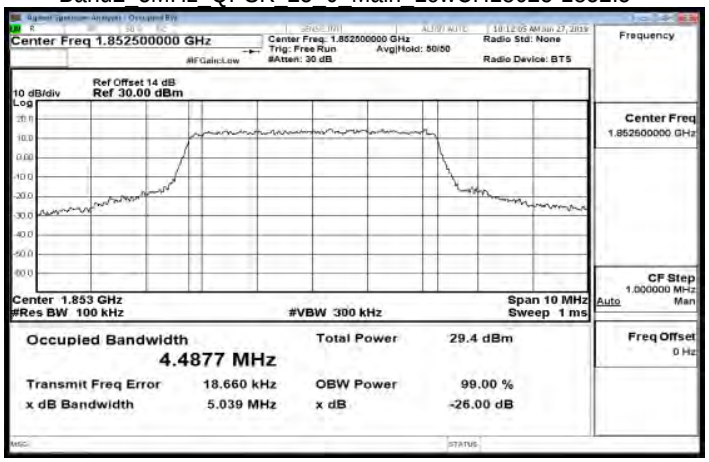
Band2_3MHz_QPSK_15_0_Main_HighCH19185-1908.5



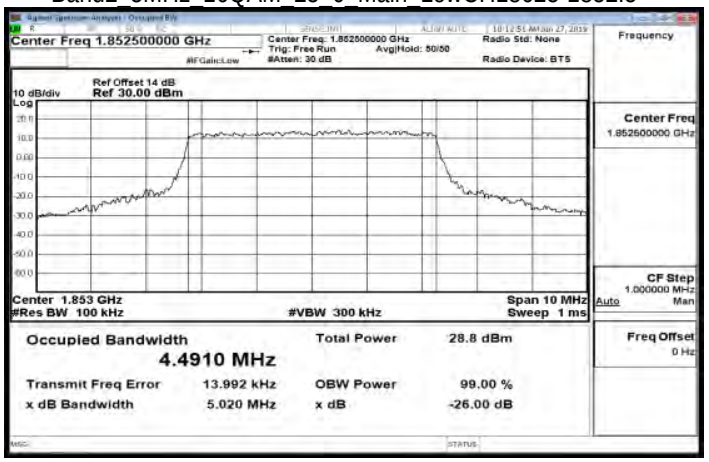
Band2_3MHz_16QAM_15_0_Main_HighCH19185-1908.5



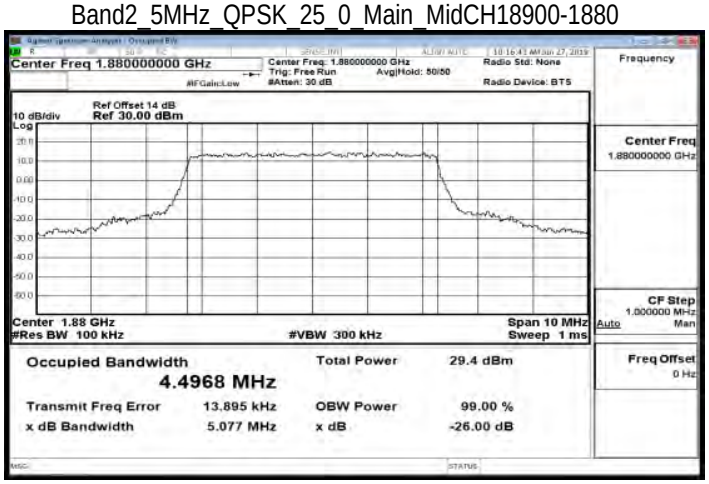
Band2_5MHz_QPSK_25_0_Main_LowCH18625-1852.5



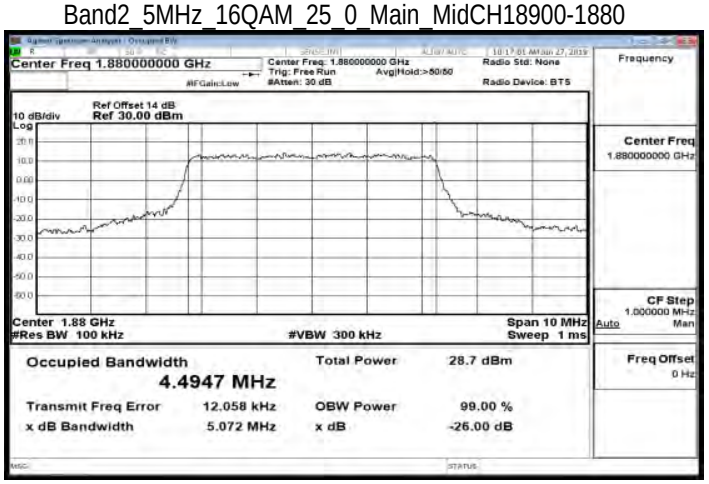
Band2_5MHz_16QAM_25_0_Main_LowCH18625-1852.5



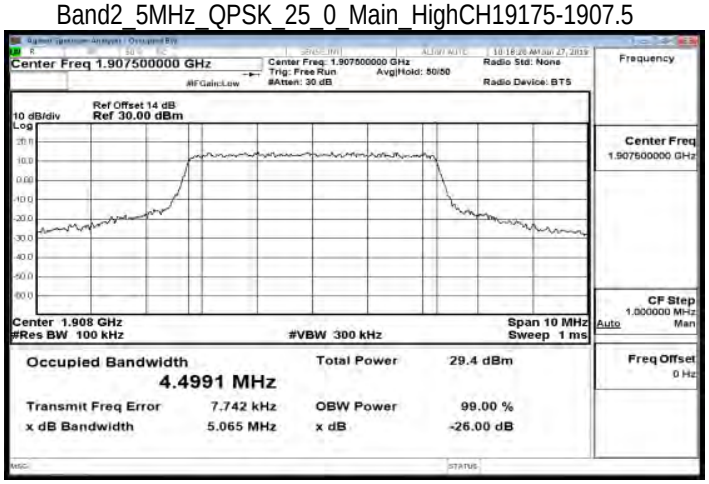
Band2_5MHz_QPSK_25_0_Main_MidCH18900-1880



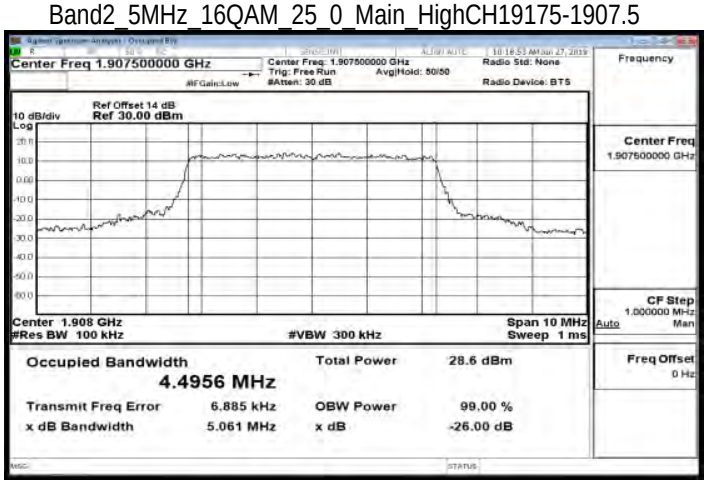
Band2_5MHz_16QAM_25_0_Main_MidCH18900-1880



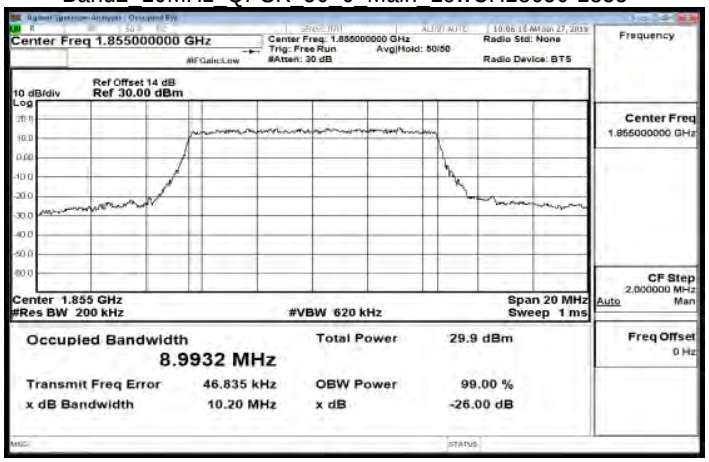
Band2_5MHz_QPSK_25_0_Main_HighCH19175-1907.5



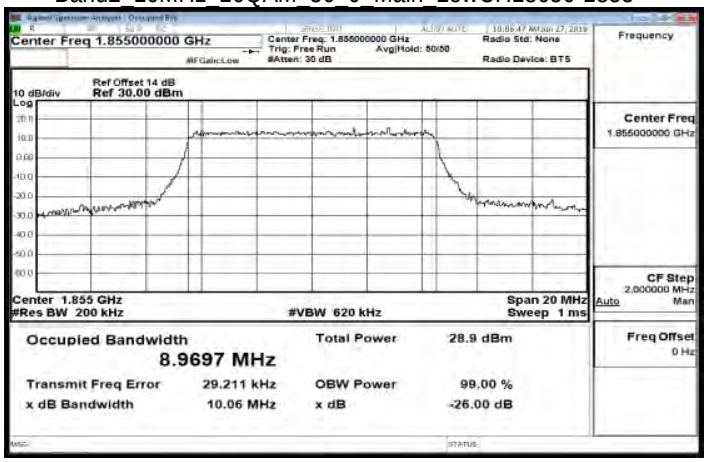
Band2_5MHz_16QAM_25_0_Main_HighCH19175-1907.5



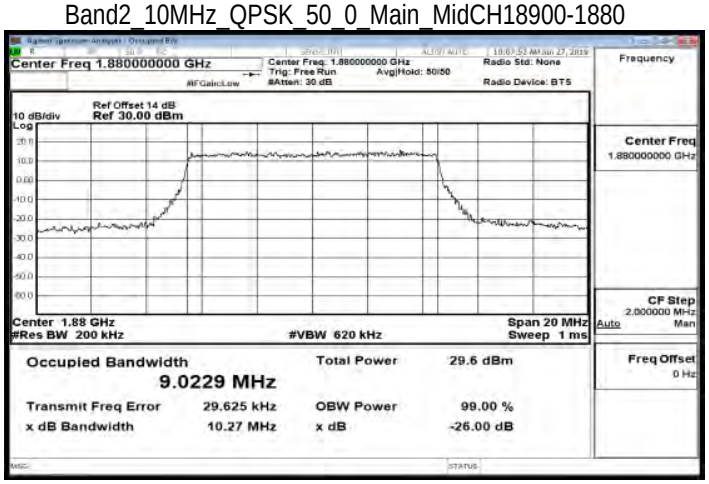
Band2_10MHz_QPSK_50_0_Main_LowCH18650-1855



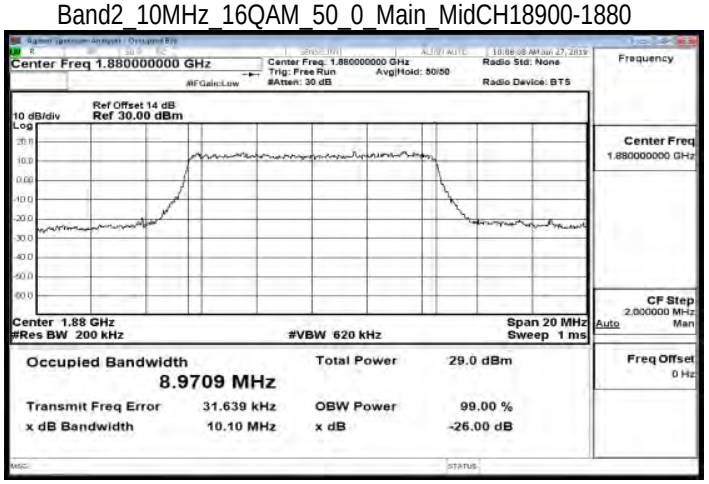
Band2_10MHz_16QAM_50_0_Main_LowCH18650-1855



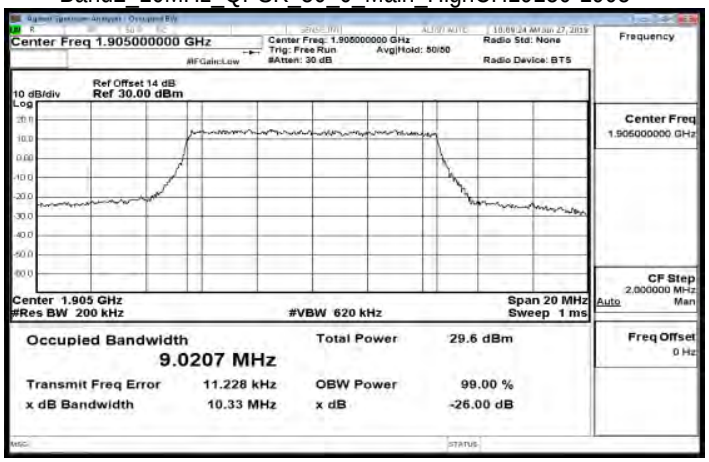
Band2_10MHz_QPSK_50_0_Main_MidCH18900-1880



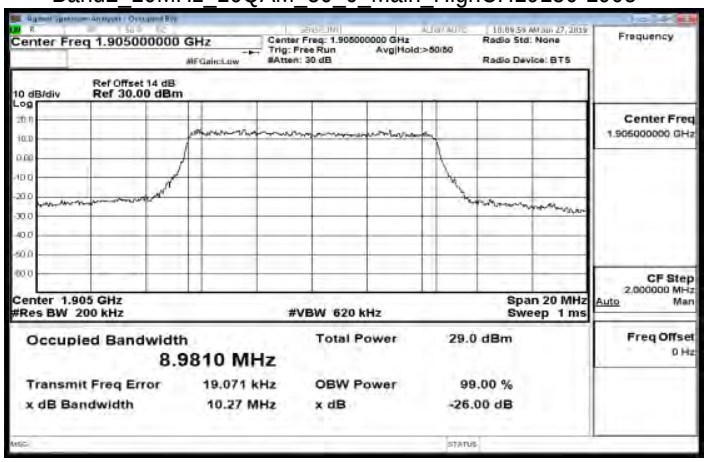
Band2_10MHz_16QAM_50_0_Main_MidCH18900-1880



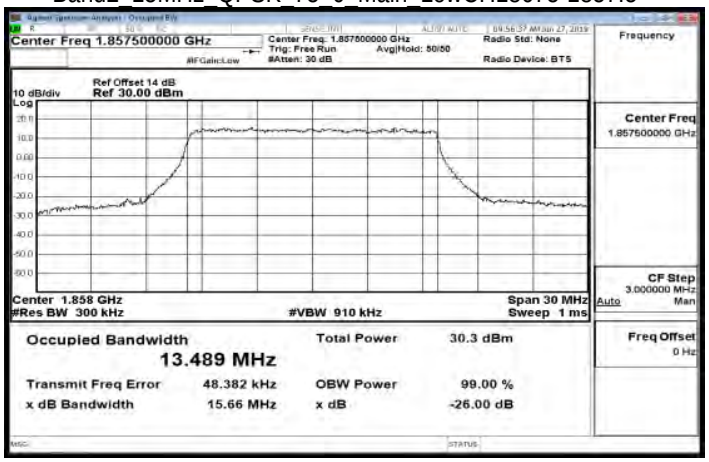
Band2_10MHz_QPSK_50_0_Main_HighCH19150-1905



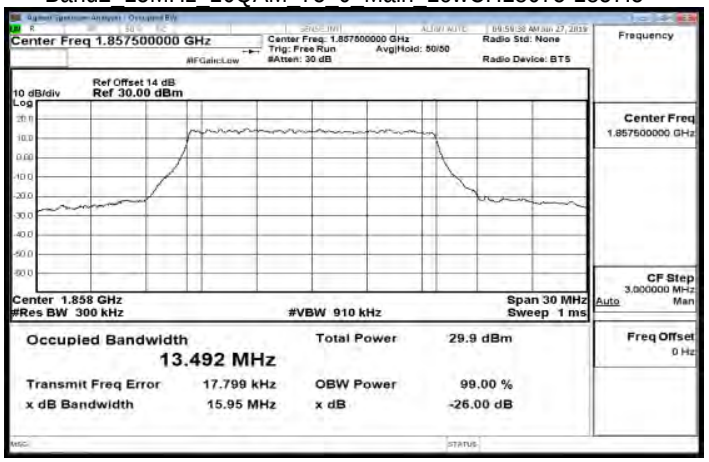
Band2_10MHz_16QAM_50_0_Main_HighCH19150-1905



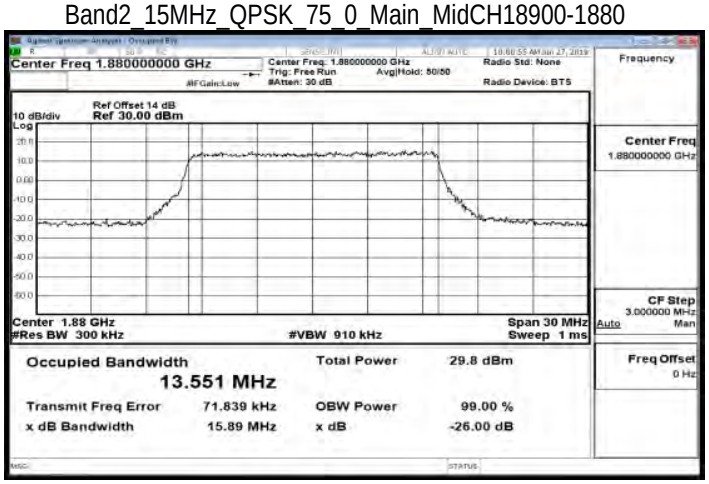
Band2_15MHz_QPSK_75_0_Main_LowCH18675-1857.5



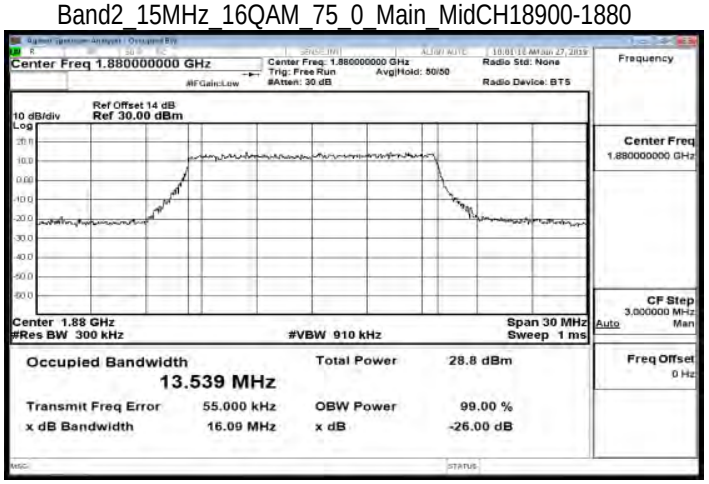
Band2_15MHz_16QAM_75_0_Main_LowCH18675-1857.5



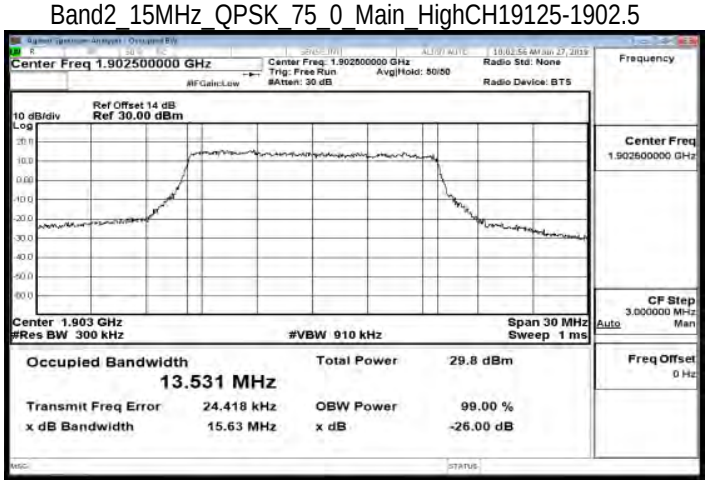
Band2_15MHz_QPSK_75_0_Main_MidCH18900-1880



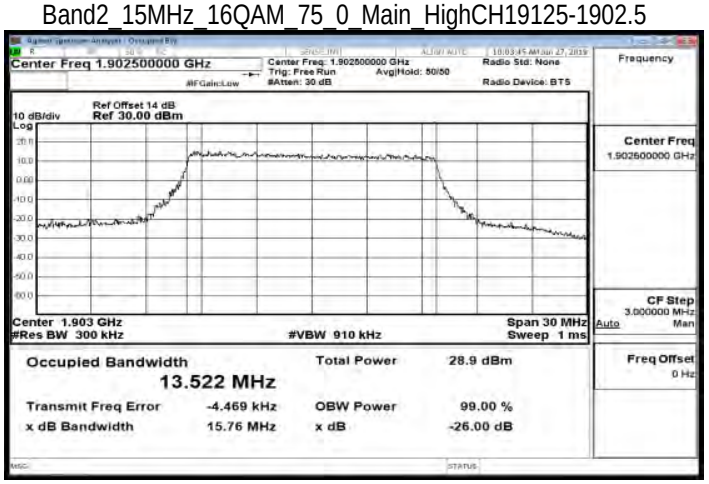
Band2_15MHz_16QAM_75_0_Main_MidCH18900-1880



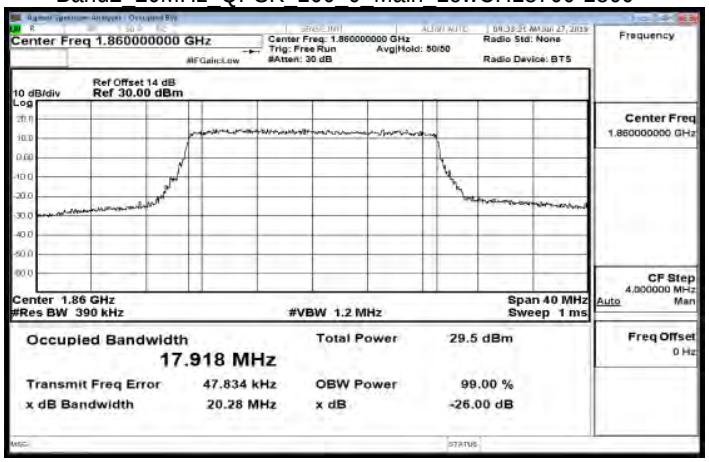
Band2_15MHz_QPSK_75_0_Main_HighCH19125-1902.5



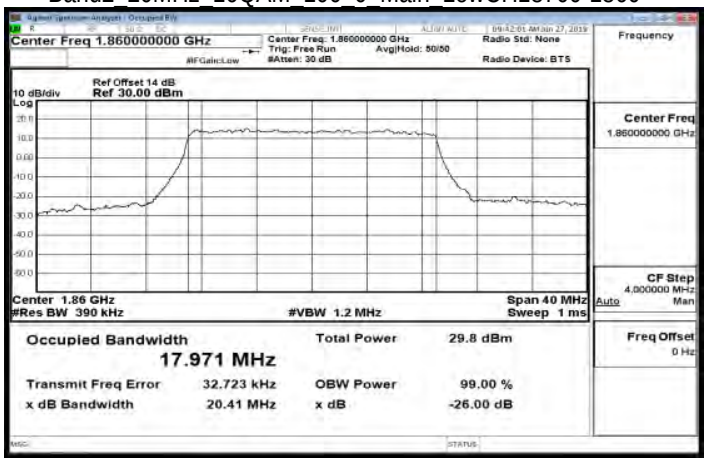
Band2_15MHz_16QAM_75_0_Main_HighCH19125-1902.5



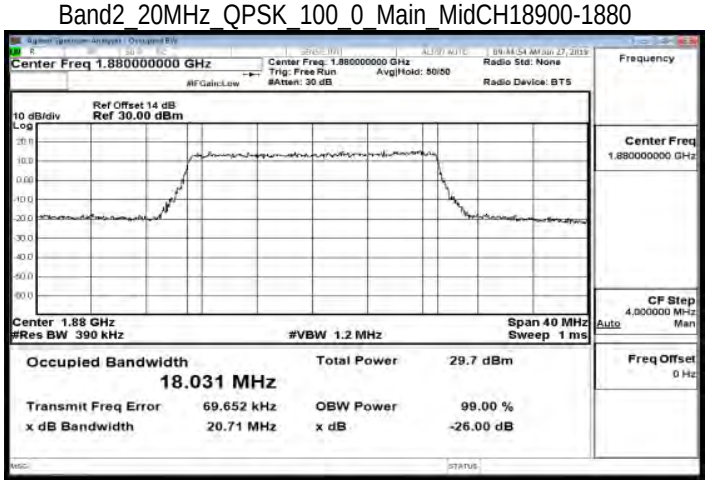
Band2_20MHz_QPSK_100_0_Main_LowCH18700-1860



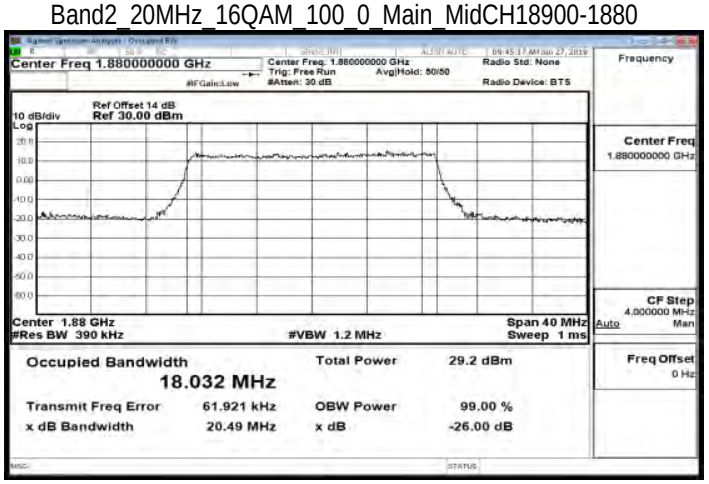
Band2_20MHz_16QAM_100_0_Main_LowCH18700-1860



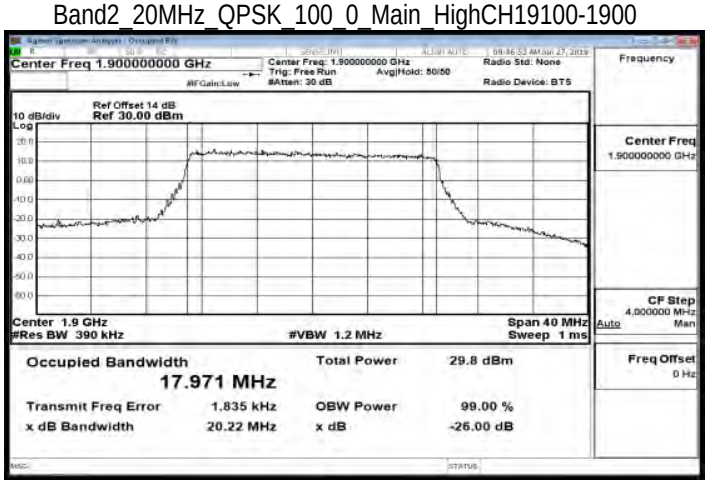
Band2_20MHz_QPSK_100_0_Main_MidCH18900-1880



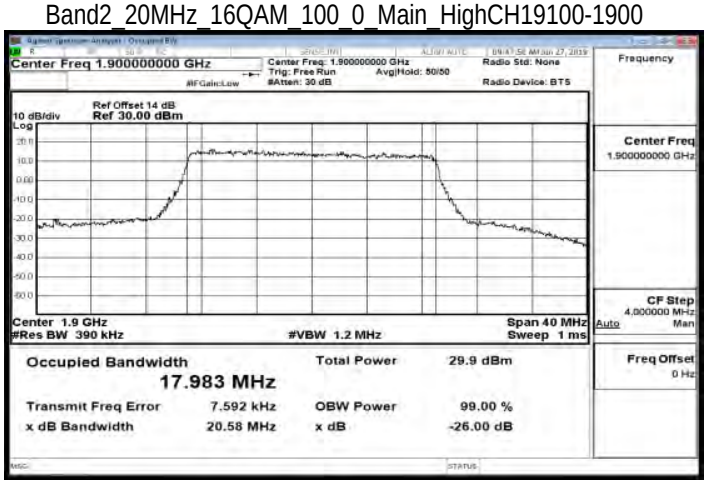
Band2_20MHz_16QAM_100_0_Main_MidCH18900-1880



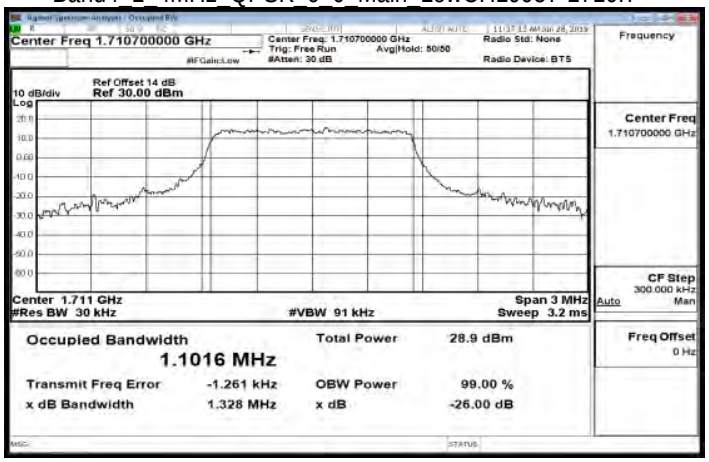
Band2_20MHz_QPSK_100_0_Main_HighCH19100-1900



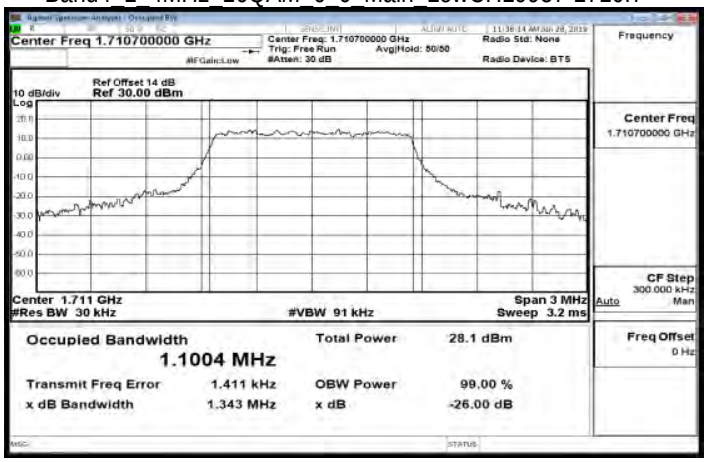
Band2_20MHz_16QAM_100_0_Main_HighCH19100-1900



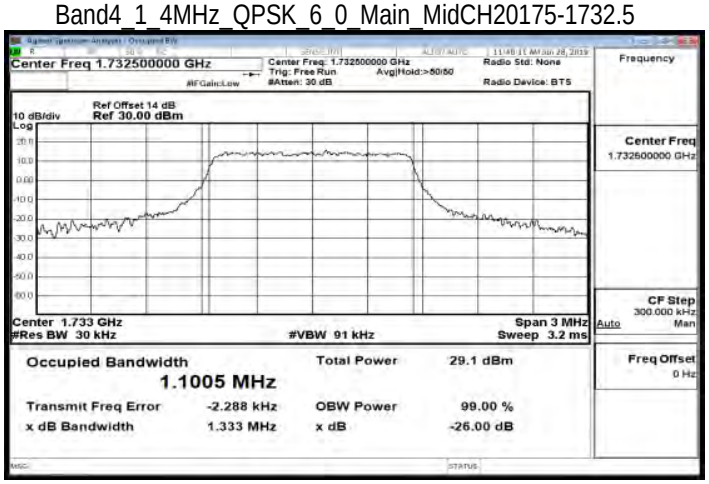
Band4_1_4MHz_QPSK_6_0_Main_LowCH19957-1710.7



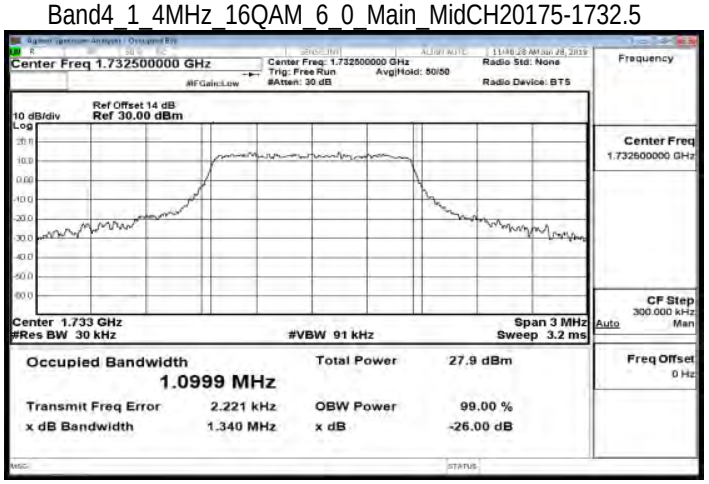
Band4_1_4MHz_16QAM_6_0_Main_LowCH19957-1710.7



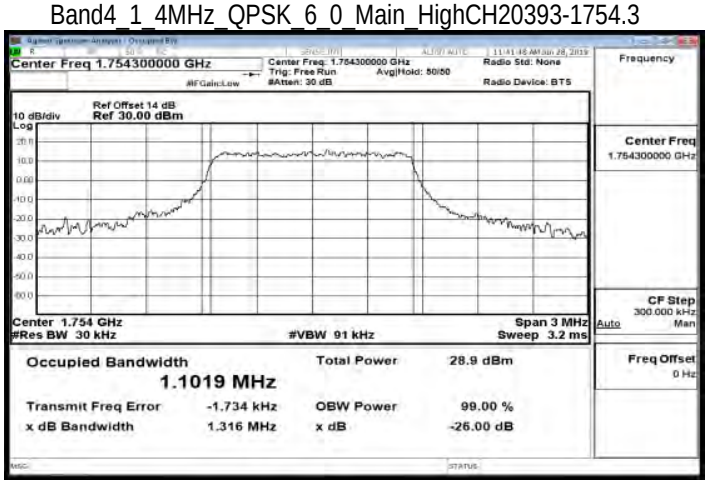
Band4_1_4MHz_QPSK_6_0_Main_MidCH20175-1732.5



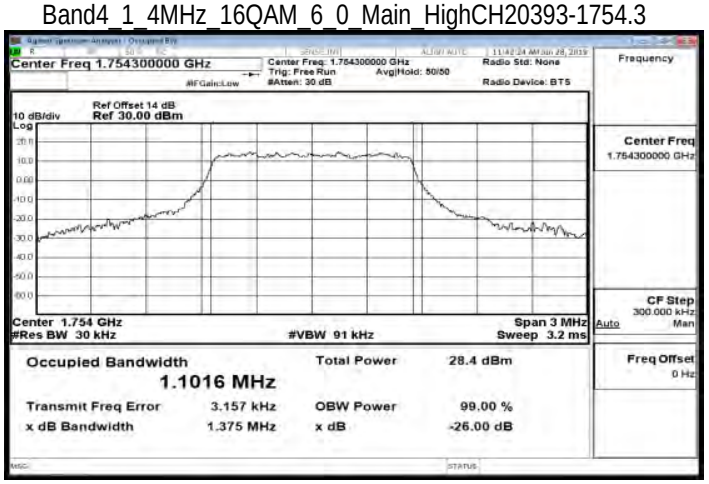
Band4_1_4MHz_16QAM_6_0_Main_MidCH20175-1732.5



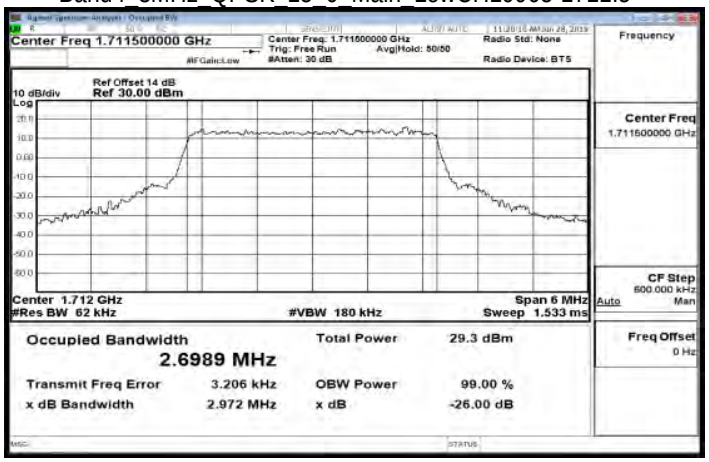
Band4_1_4MHz_QPSK_6_0_Main_HighCH20393-1754.3



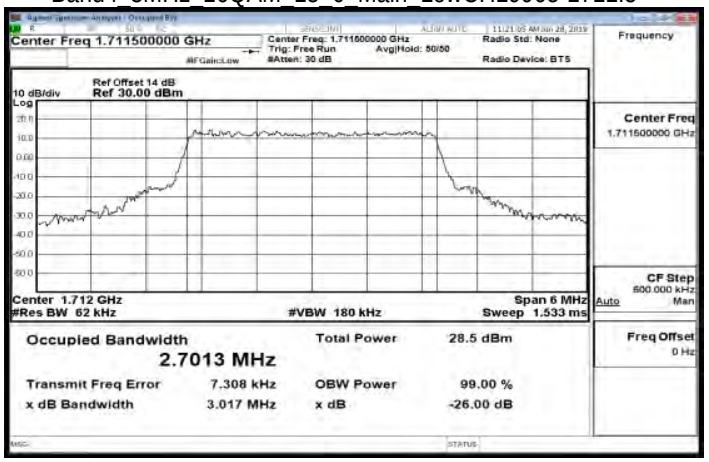
Band4_1_4MHz_16QAM_6_0_Main_HighCH20393-1754.3



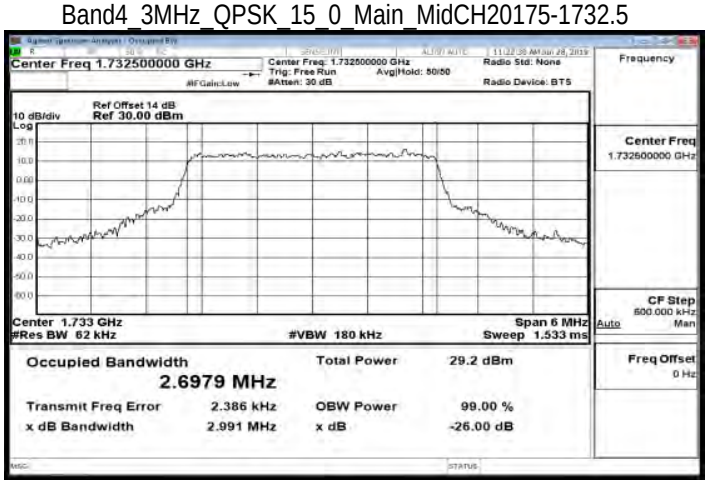
Band4_3MHz_QPSK_15_0_Main_LowCH19965-1711.5



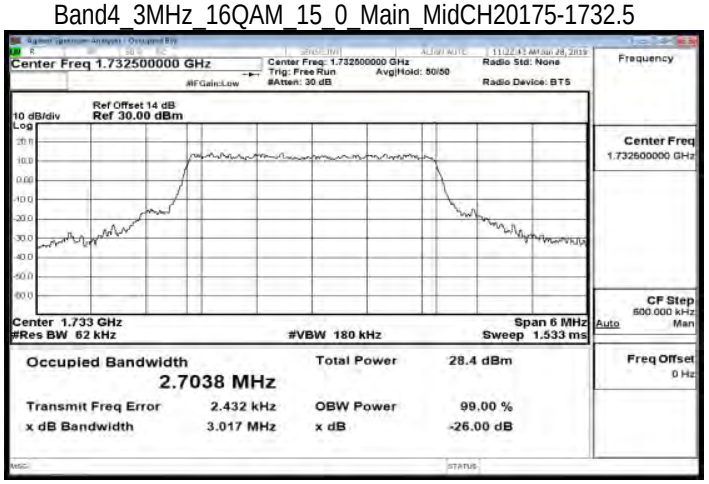
Band4_3MHz_16QAM_15_0_Main_LowCH19965-1711.5



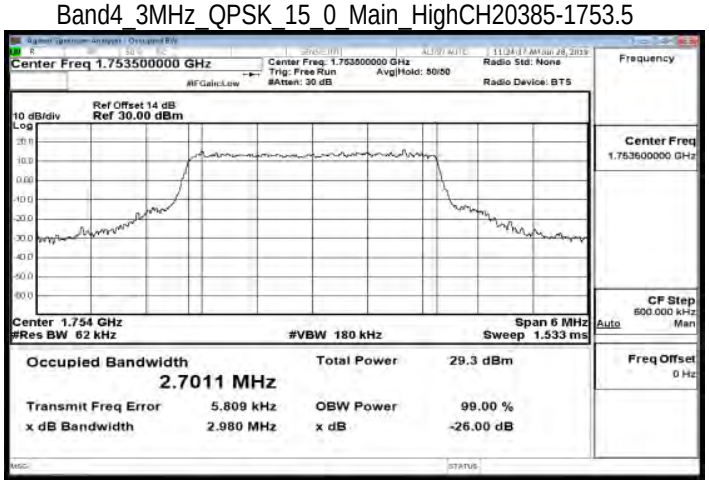
Band4_3MHz_QPSK_15_0_Main_MidCH20175-1732.5



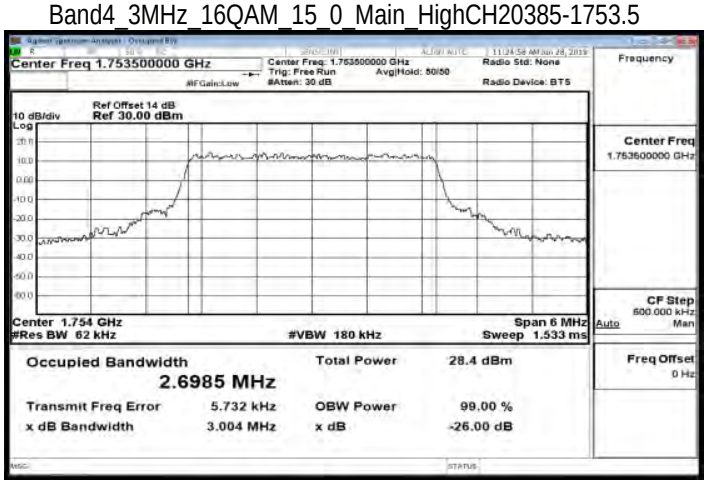
Band4_3MHz_16QAM_15_0_Main_MidCH20175-1732.5



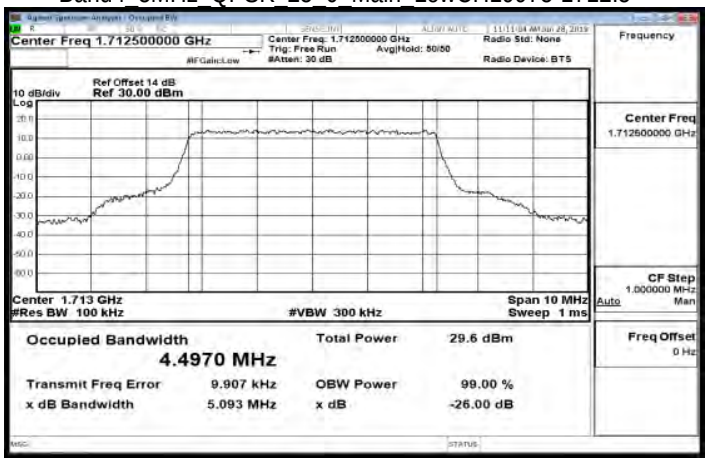
Band4_3MHz_QPSK_15_0_Main_HighCH20385-1753.5



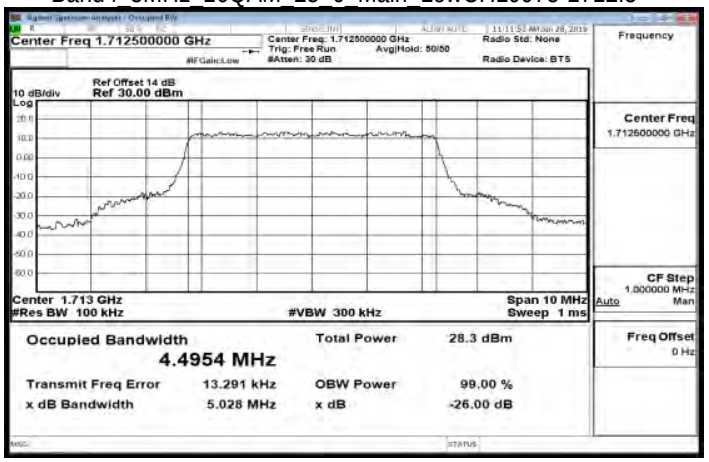
Band4_3MHz_16QAM_15_0_Main_HighCH20385-1753.5



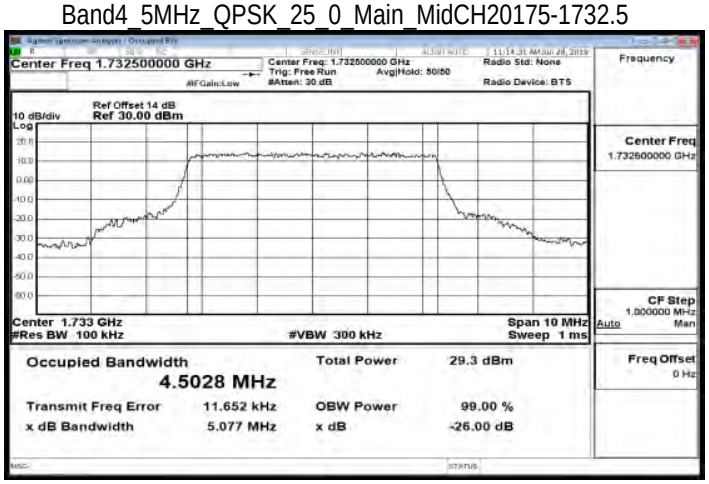
Band4_5MHz_QPSK_25_0_Main_LowCH19975-1712.5



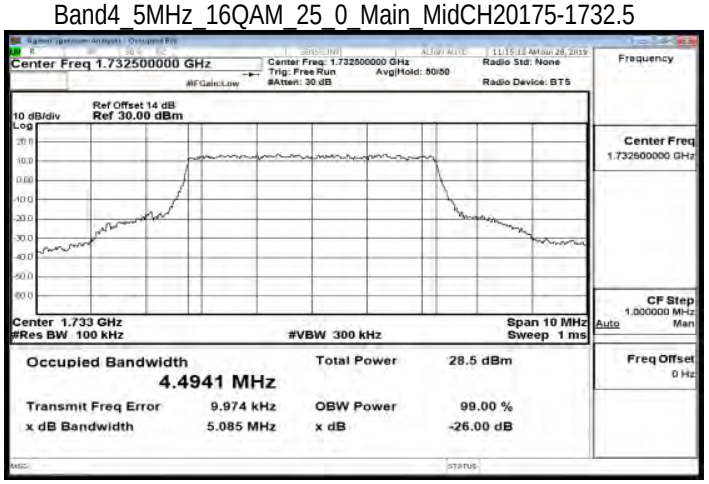
Band4_5MHz_16QAM_25_0_Main_LowCH19975-1712.5



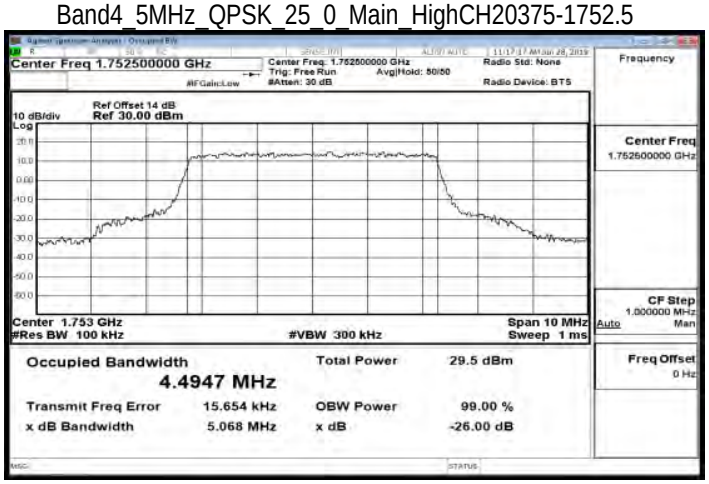
Band4_5MHz_QPSK_25_0_Main_MidCH20175-1732.5



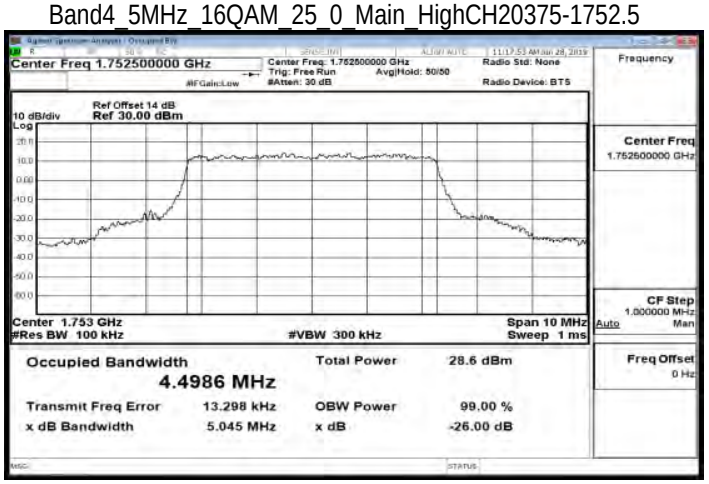
Band4_5MHz_16QAM_25_0_Main_MidCH20175-1732.5



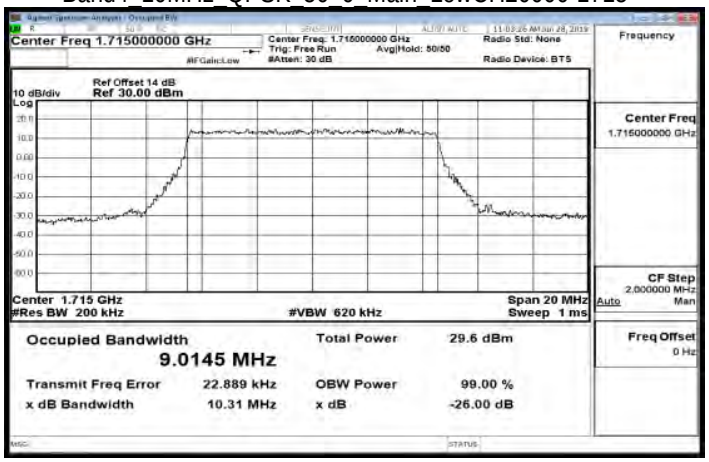
Band4_5MHz_QPSK_25_0_Main_HighCH20375-1752.5



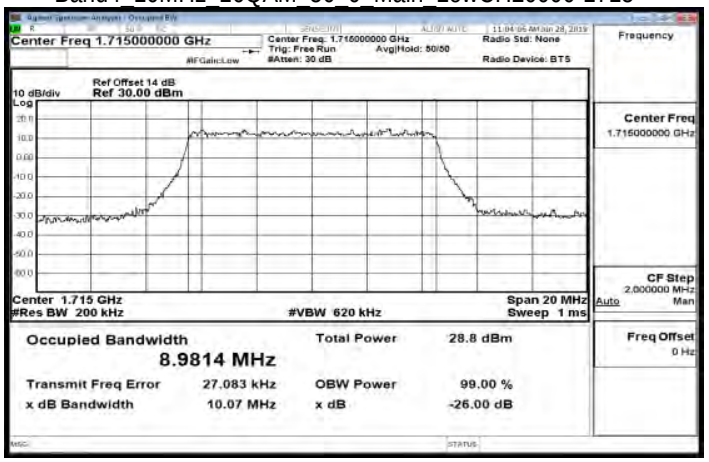
Band4_5MHz_16QAM_25_0_Main_HighCH20375-1752.5



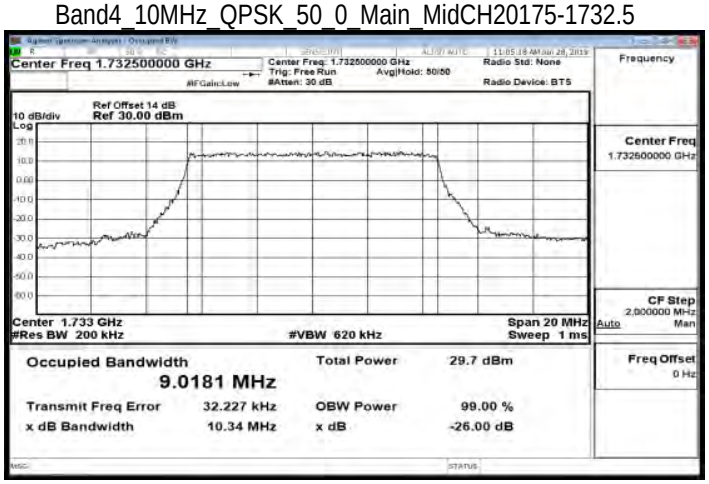
Band4_10MHz_QPSK_50_0_Main_LowCH20000-1715



Band4_10MHz_16QAM_50_0_Main_LowCH20000-1715



Band4_10MHz_QPSK_50_0_Main_MidCH20175-1732.5



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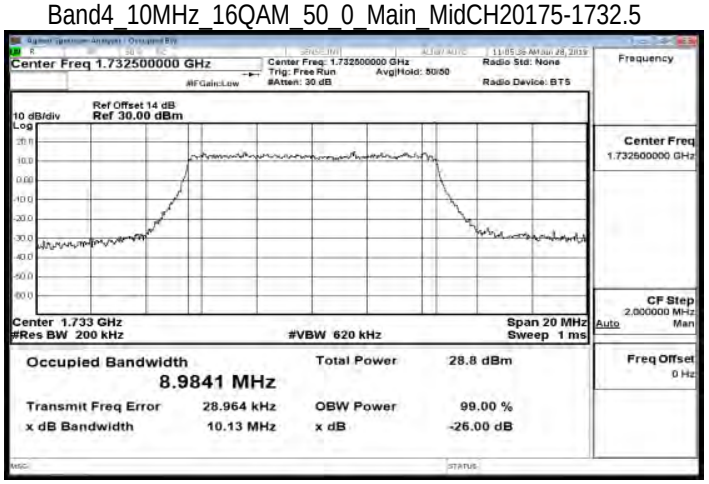

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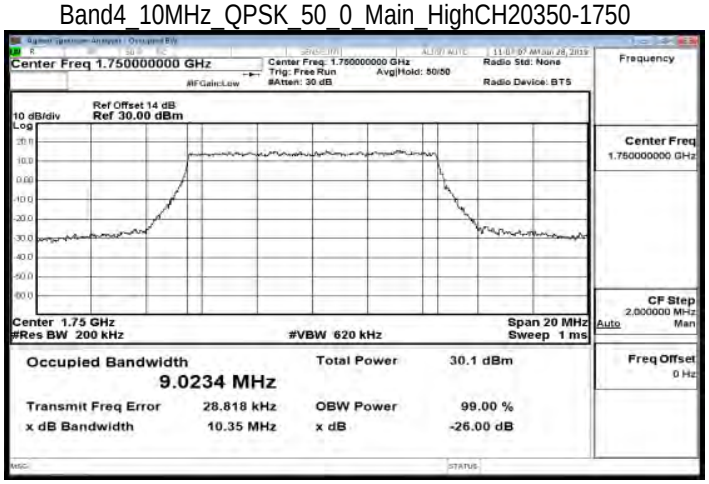

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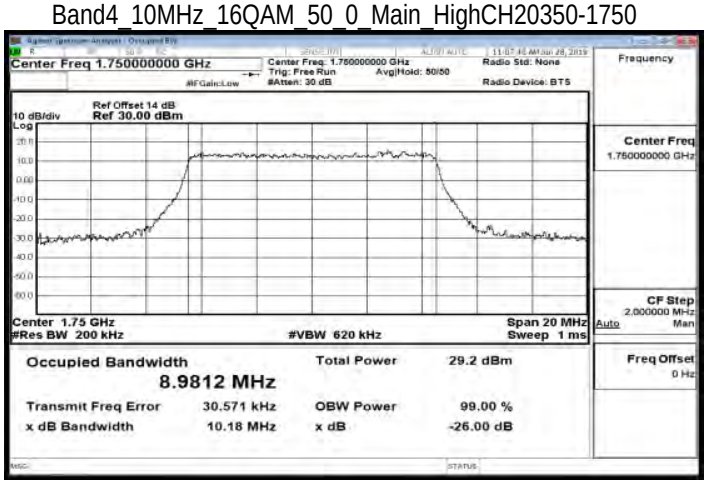

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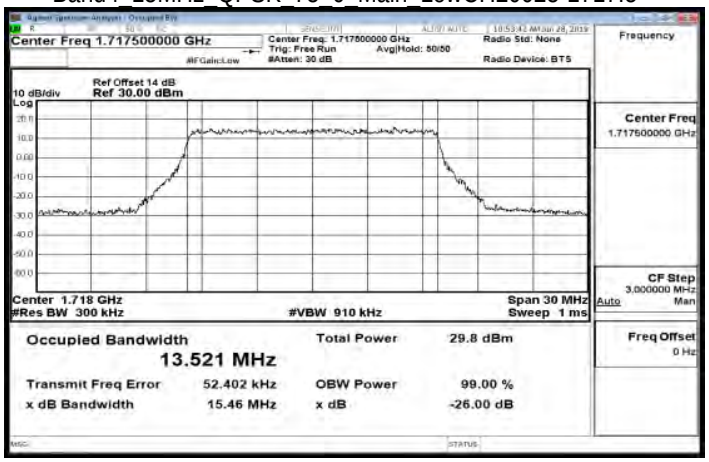

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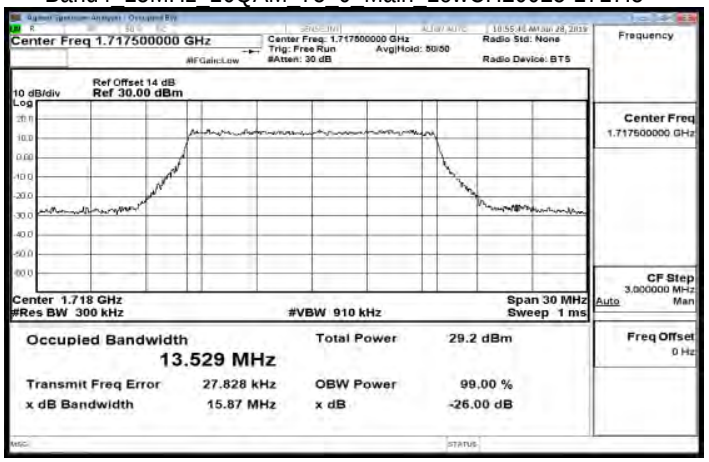

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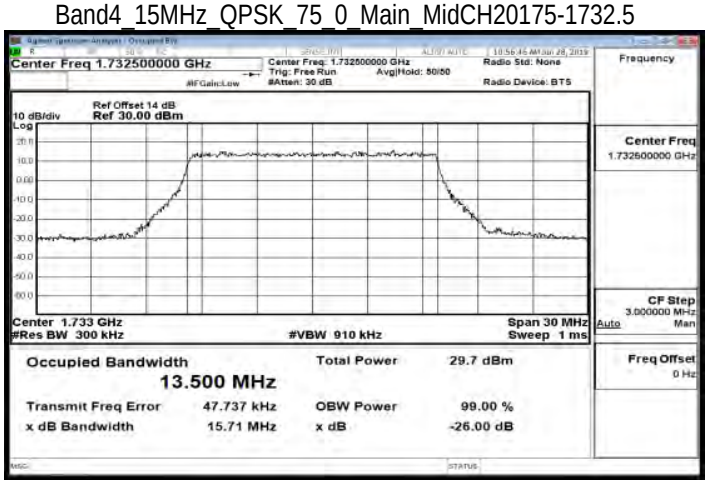

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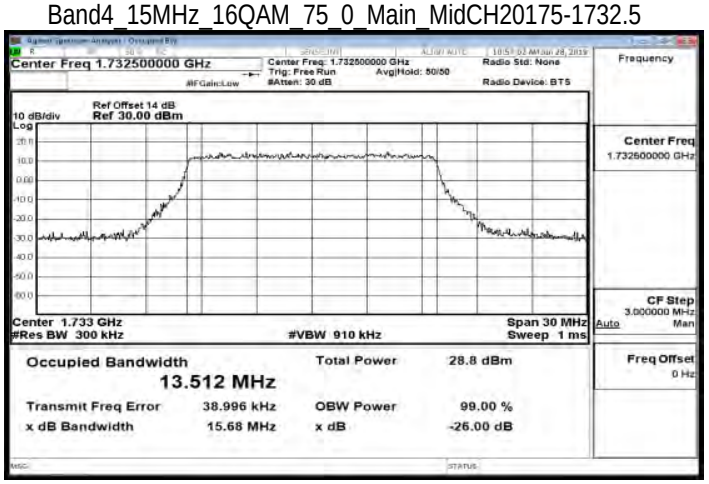

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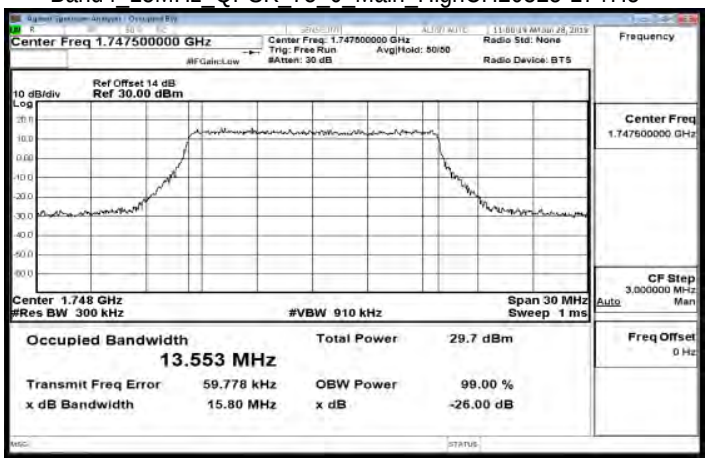

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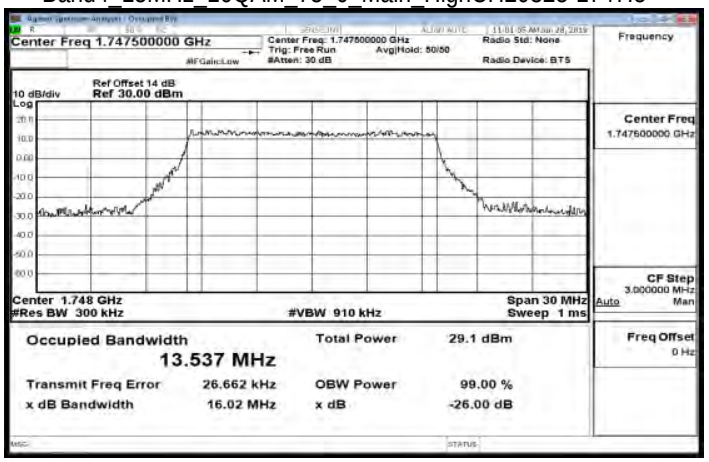

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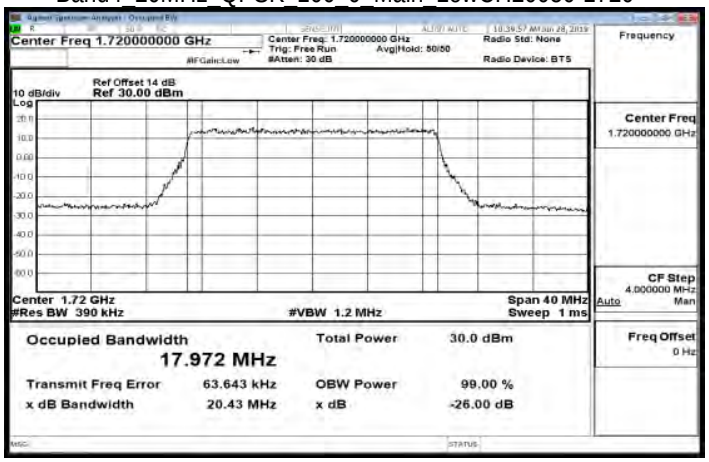

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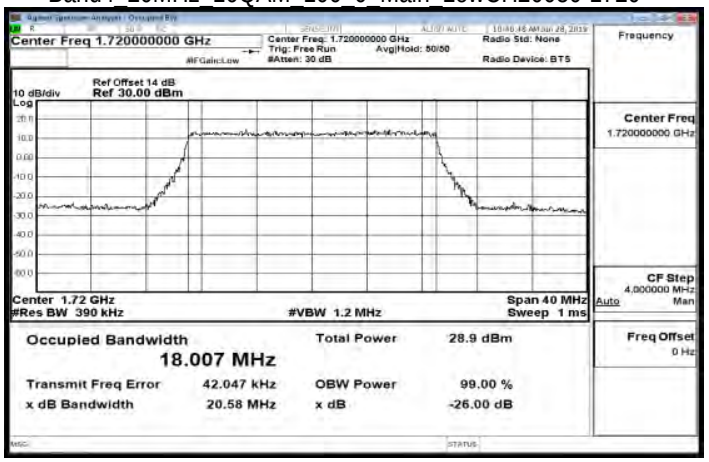

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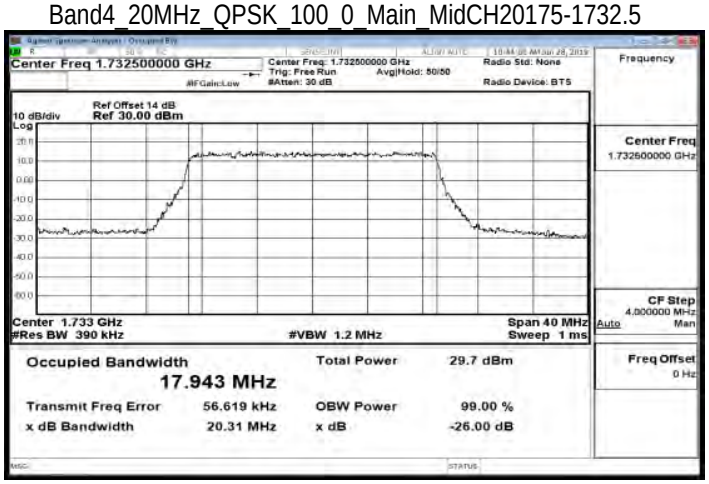

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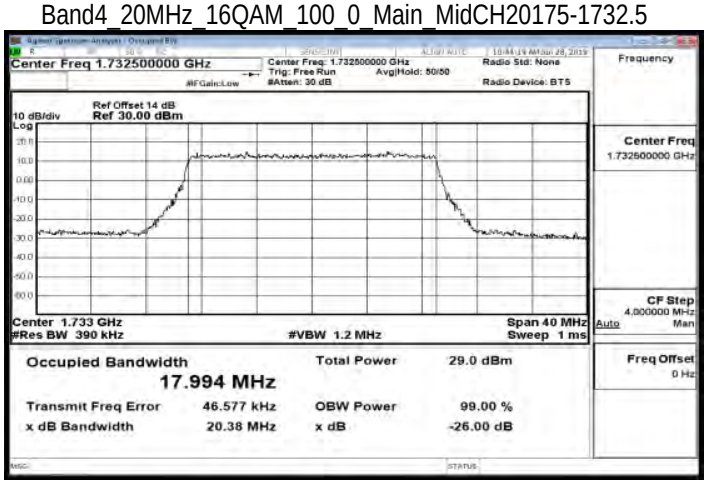

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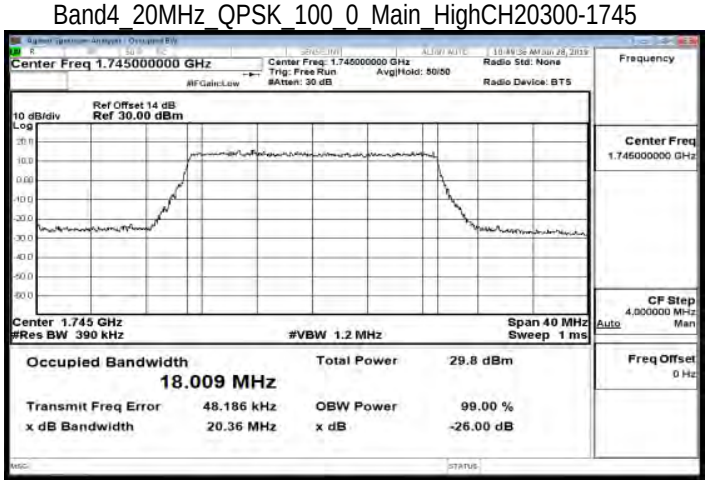

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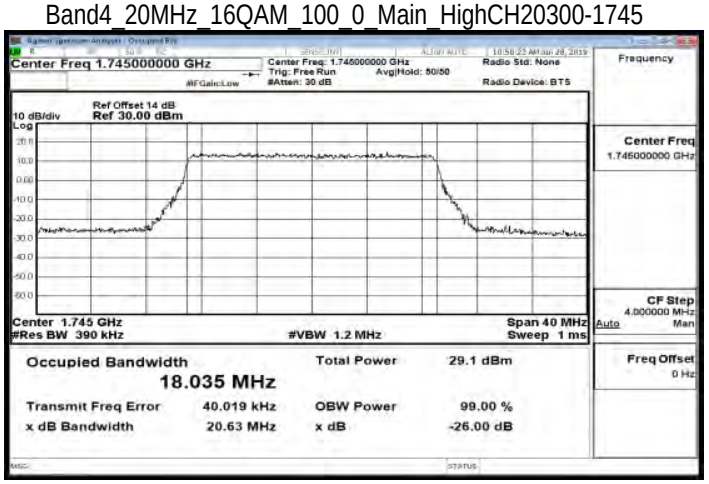
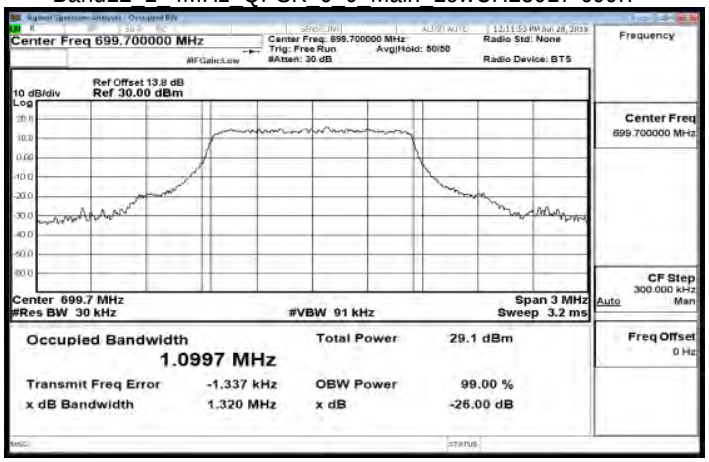
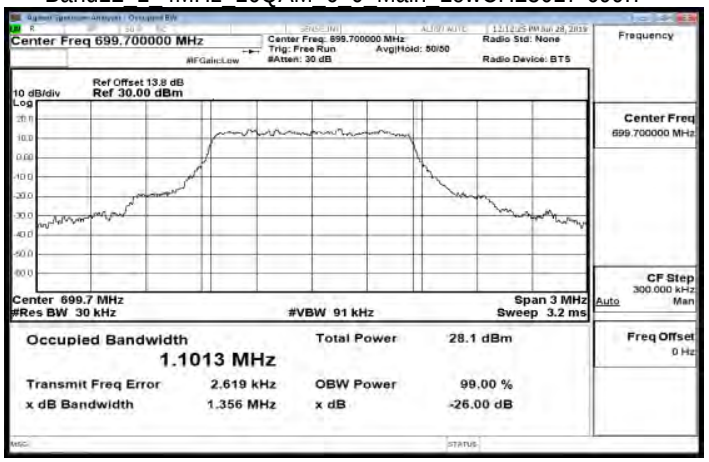


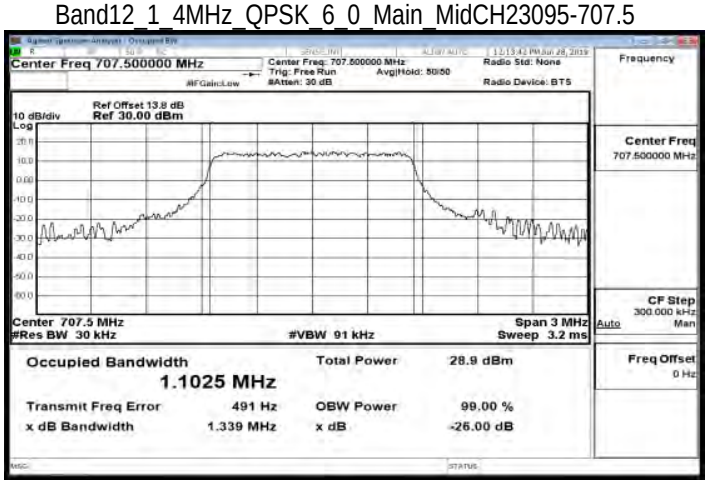
Band12_1_4MHz_QPSK_6_0_Main_LowCH23017-699.7



Band12_1_4MHz_16QAM_6_0_Main_LowCH23017-699.7



Band12_1_4MHz_QPSK_6_0_Main_MidCH23095-707.5



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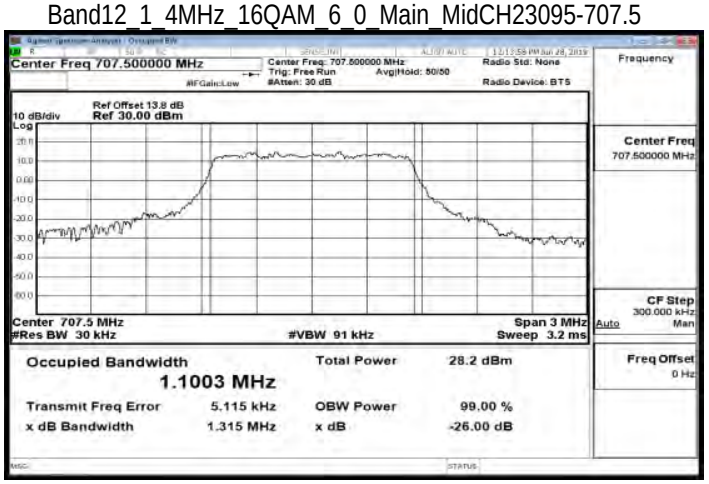

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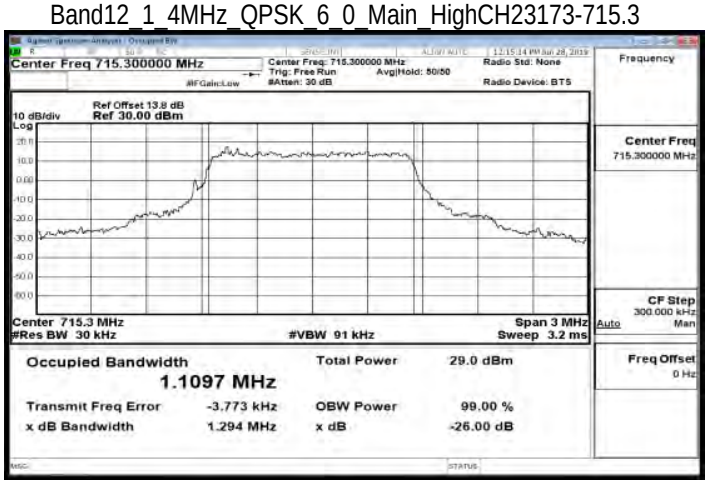

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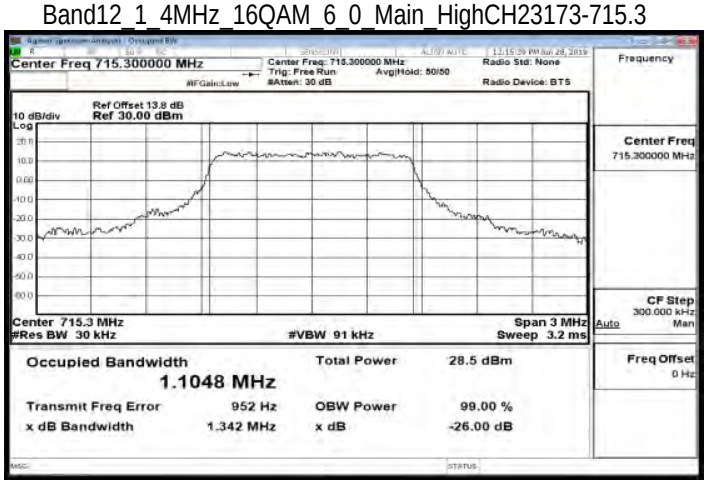

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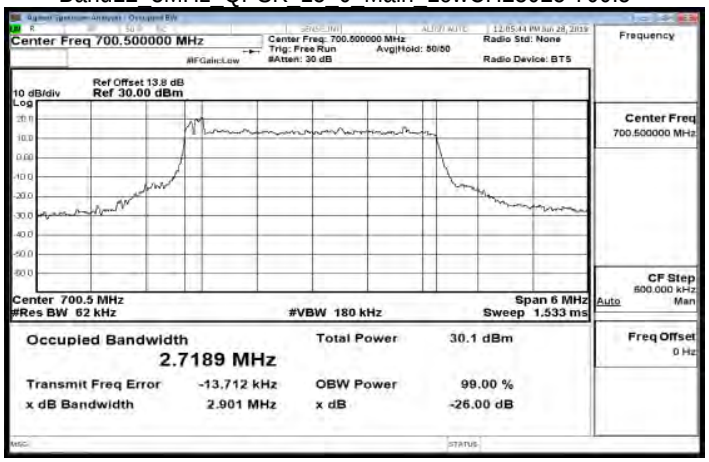

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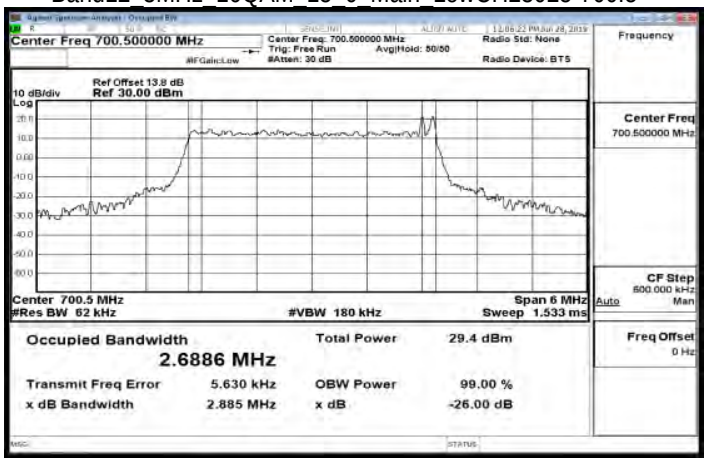
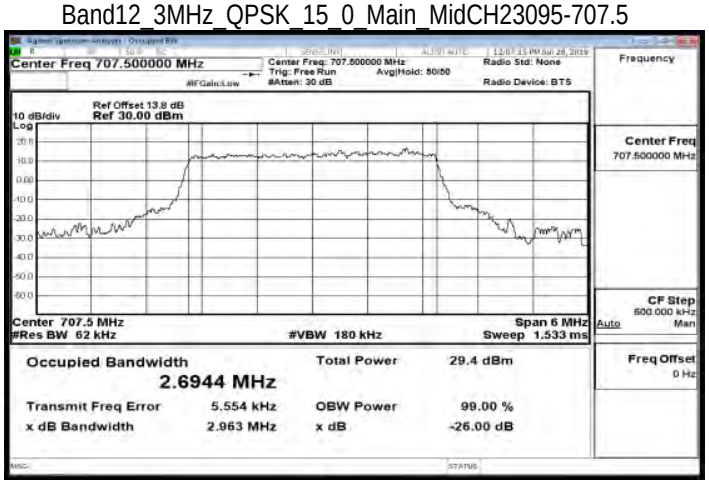
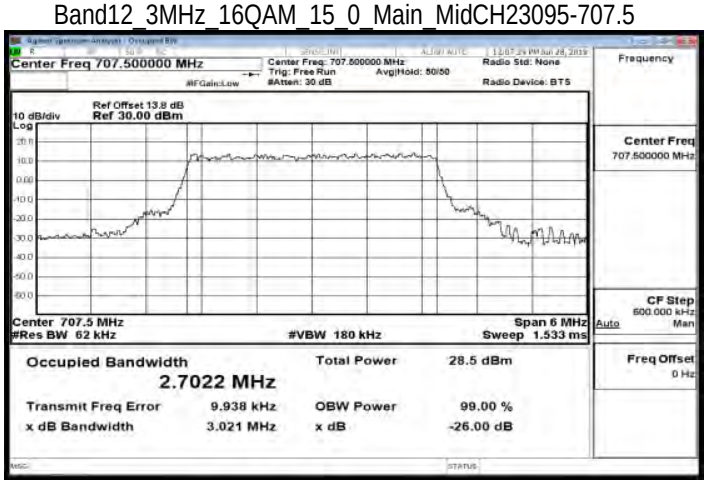


Band12_3MHz_QPSK_15_0_Main_MidCH23095-707.5



Band12_3MHz_16QAM_15_0_Main_MidCH23095-707.5



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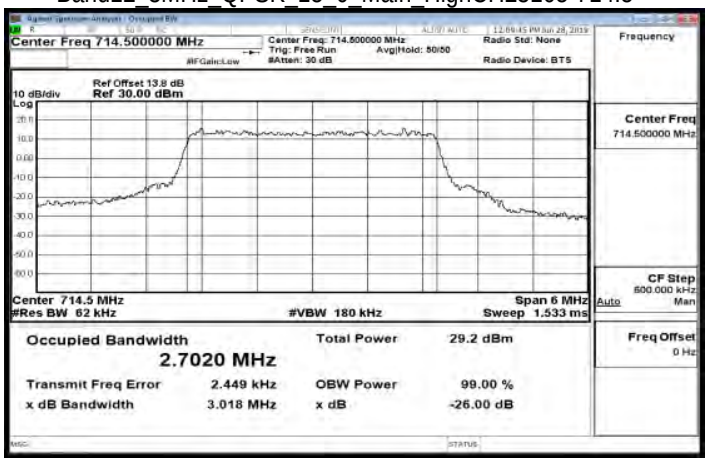
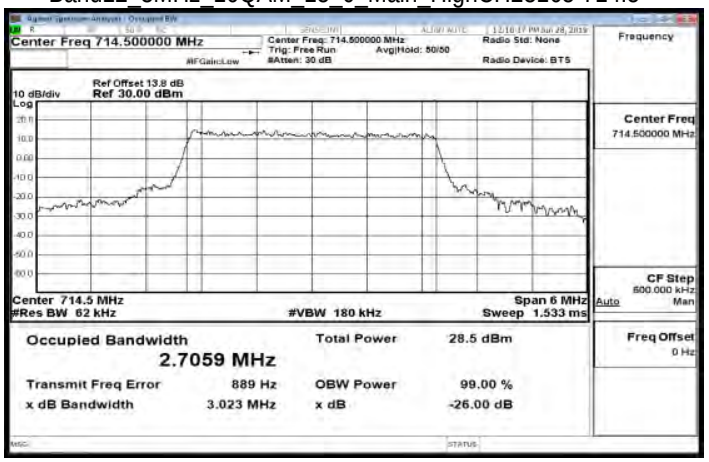


Band12_3MHz_16QAM_15_0_Main_HighCH23165-714.5



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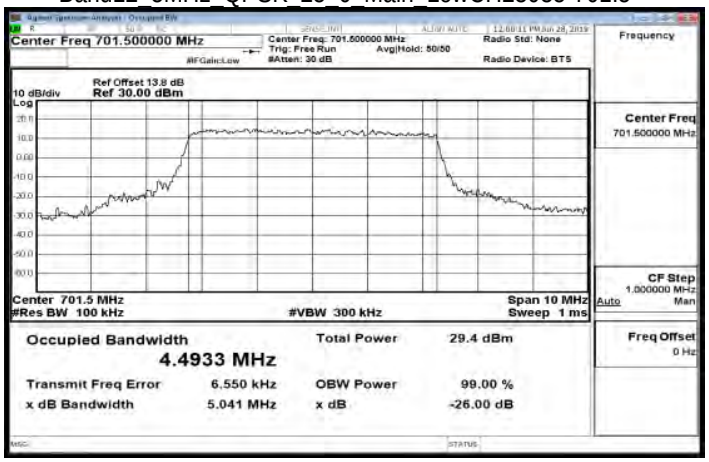
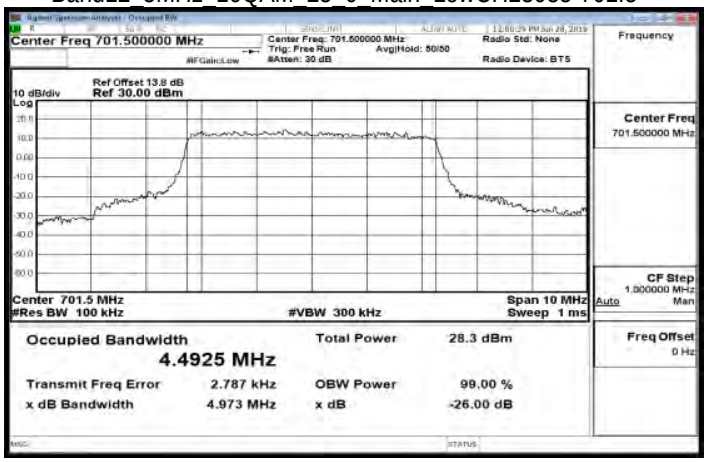
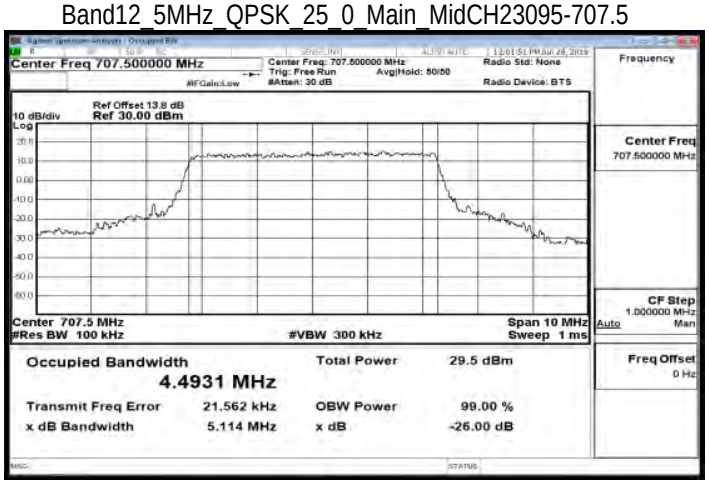


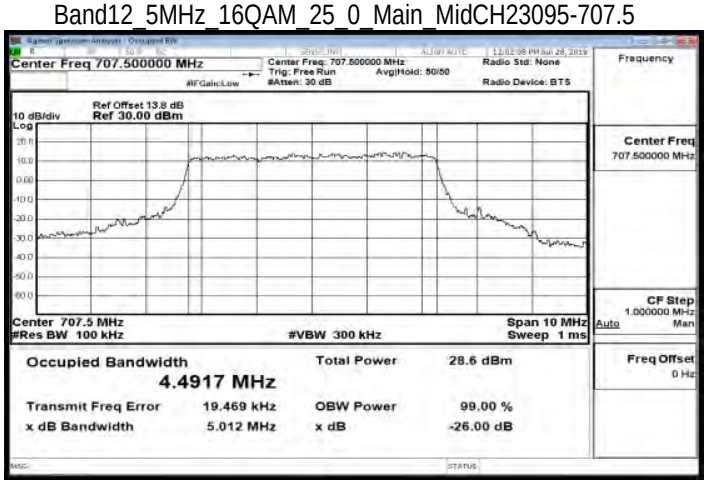
Band12_5MHz_16QAM_25_0_Main_LowCH23035-701.5



Band12_5MHz_QPSK_25_0_Main_MidCH23095-707.5



Band12_5MHz_16QAM_25_0_Main_MidCH23095-707.5



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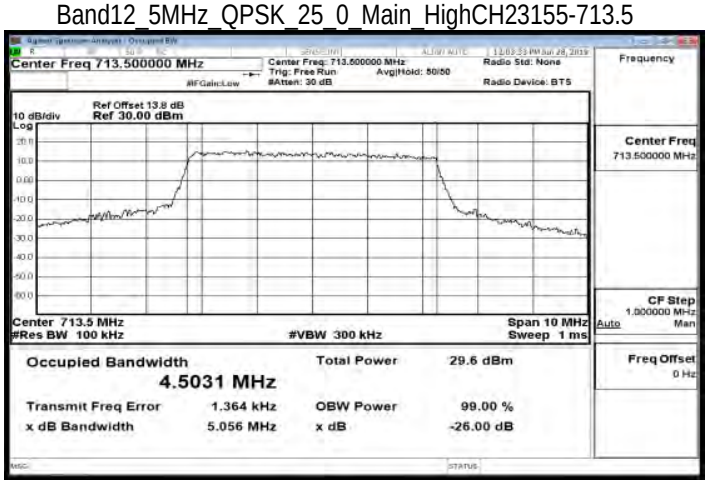
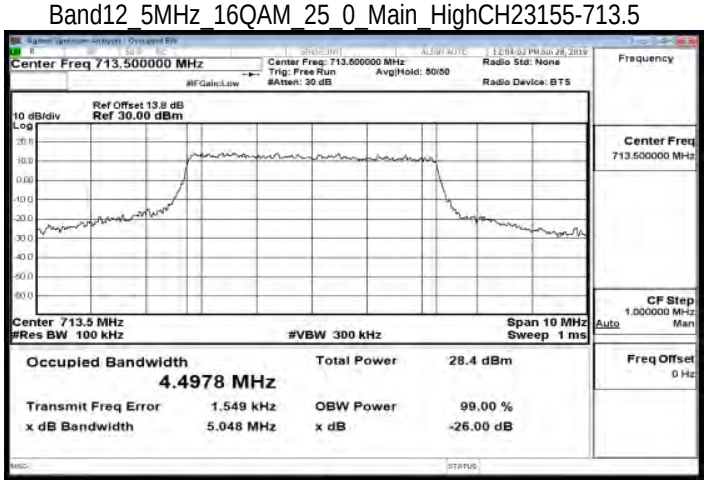


Band12_5MHz_16QAM_25_0_Main_HighCH23155-713.5



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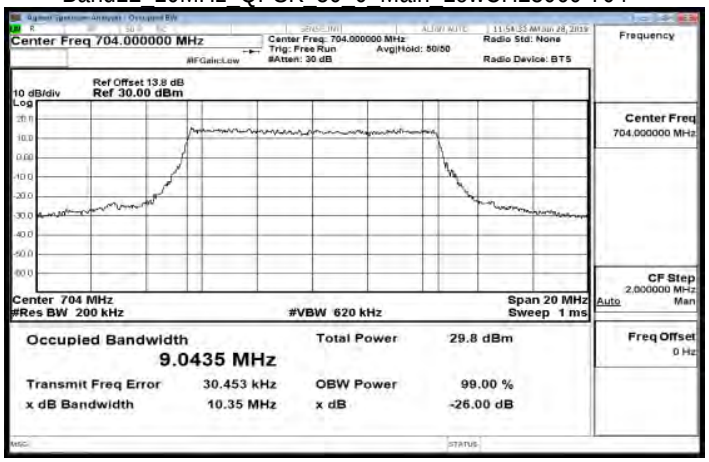

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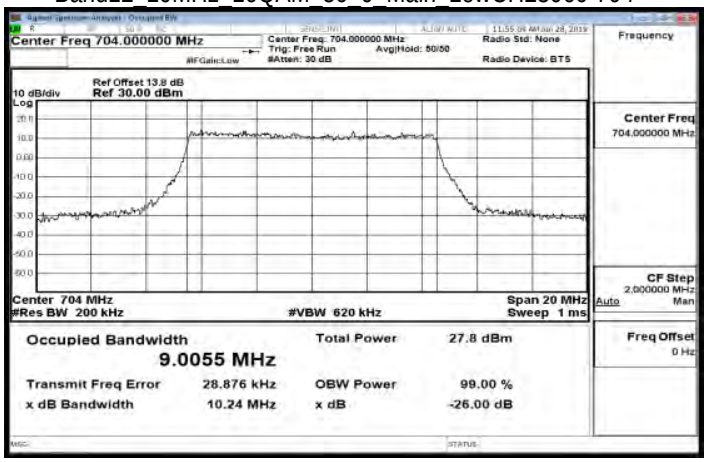
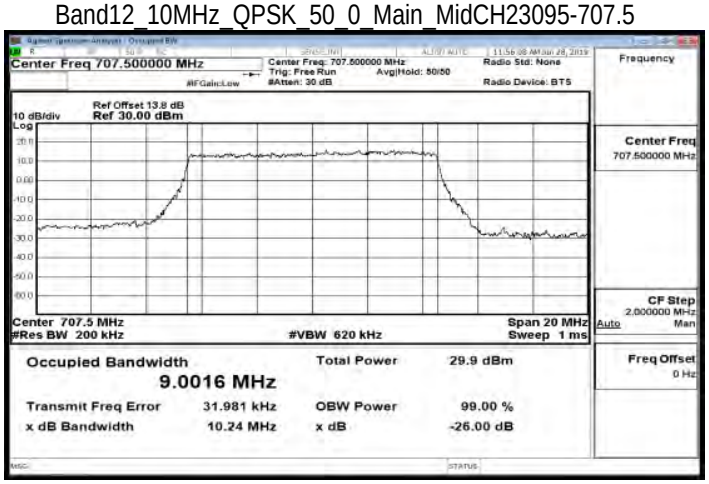
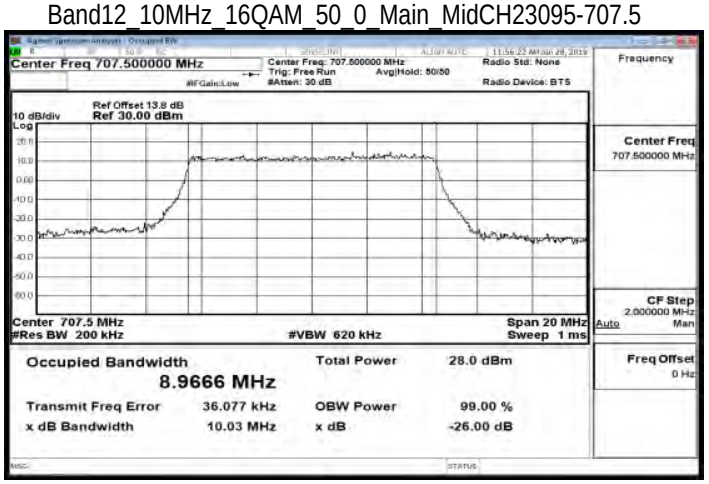


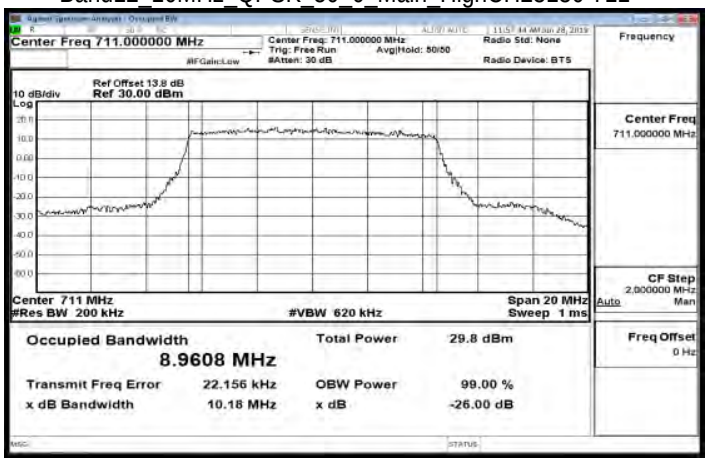
Band12_10MHz_QPSK_50_0_Main_MidCH23095-707.5



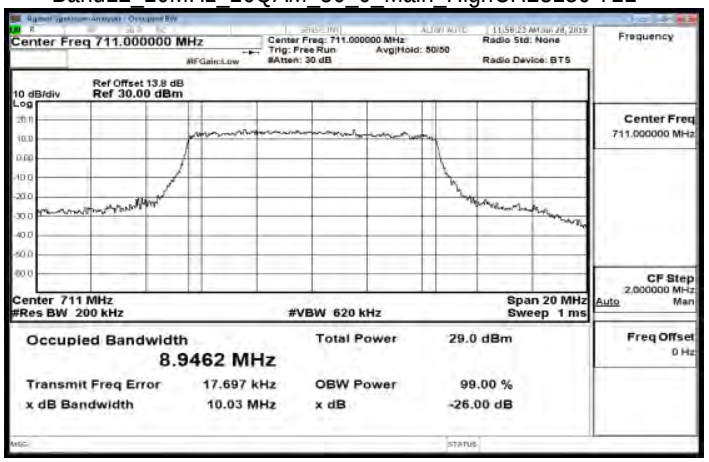
Band12_10MHz_16QAM_50_0_Main_MidCH23095-707.5



Band12_10MHz_QPSK_50_0_Main_HighCH23130-711



Band12_10MHz_16QAM_50_0_Main_HighCH23130-711



8. OUT OF BAND EMISSION AT ANTENNA TERMINALS

8.1. Standard Applicable

FCC §24.238(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.

FCC §27.53(c)
(c) For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:
(2) On any frequency outside the 776– 788 MHz band, the power of any emission shall be at-tenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB (-13dBm)

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

FCC §27.53(f)
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 band-width. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

FCC §27.53(c) (5) & FCC §27.53(g)
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.

FCC §27.53(h) (3)
Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz 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 em-ployed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

FCC §27.53(m) (4) (6)
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 that 43 + 10 log (P) dB on all frequen-cies 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 docu-mented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Measurement procedure. Compliance with these rules is based on the use of measurement nstrumentation employing a resolution bandwidth of 1 megahertz or greater. However, 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; for mobile digital stations, in the 1 megahertz bands immediately outside and ad-jacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is per-mitted in all cases to improve measurement accuracy provided the measured power is inte-grated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emis-sion bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal be-tween two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

According to RSS-133 §6.5

6.5.1 Out-of-Block Emissions

Equipment shall comply with the limits in (i) and (ii) below.

(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

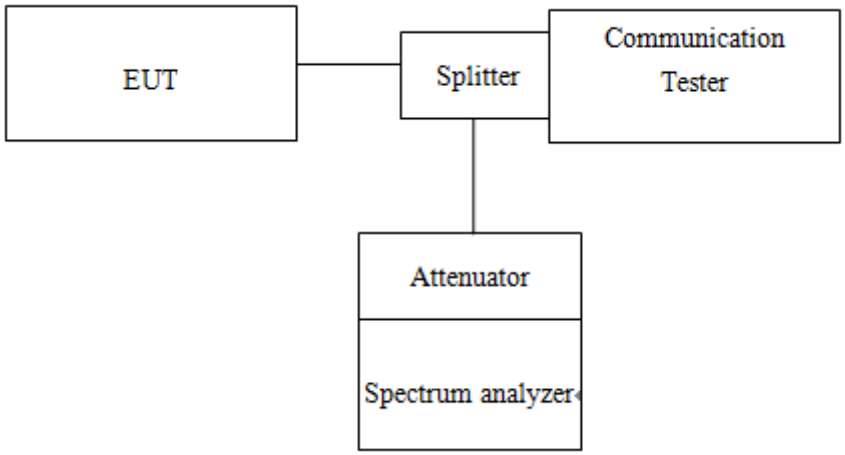
According to RSS-139 §6.5

For Operation Band 1710-1755MHz and 2110-2155MHz

(i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's operating fre-quency block, the emission power per any 1% of the emission bandwidth shall be attenu-ated below the transmitter output power P (in watts) by at least 43 + 10 log10(P), dB. Limit = 13dBm (ii) After the first 1.0 MHz outside the equipment's operating frequency block, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P

(in watts) by at least 43 + 10 log10(P), dB. Limit = -13dBm

8.2. Test SET-UP



8.3. Measurement Procedure

Conducted Emission

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 1MHz & VBW = 1MHz on Spectrum.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

Band Edge

1. To connect Antenna Port of EUT to Spectrum.
2. The band edge of low and high channels for the highest RF powers was measured. Setting RBW ≥ 1% EBW.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

8.4. Measurement Equipment Used

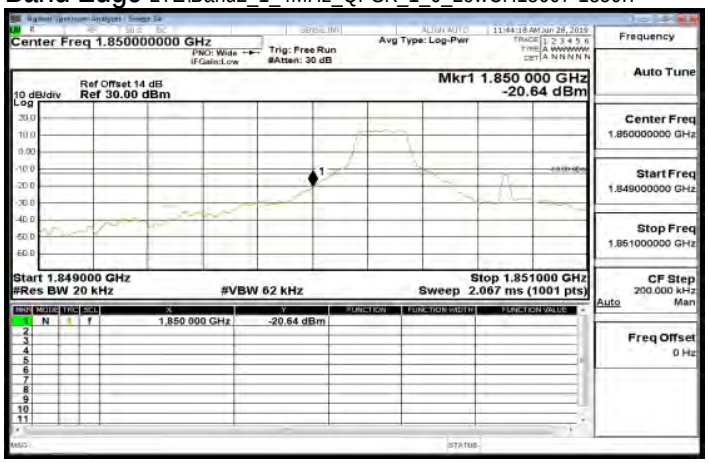
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUM-BER	LAST CAL.	CAL DUE.
DC Block	PASTERNACK	PE8210	RF256	02/26/2019	02/25/2020
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
Thermostatic/Hrgrosatic Chamber	GWINSTEK	GTC-288MH-CC	TH160402	05/16/2019	05/15/2020
Splitter	Woken	DOM35LW1A2	RF83	02/26/2019	02/25/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/16/2019	01/15/2020

8.5. Measurement Result:

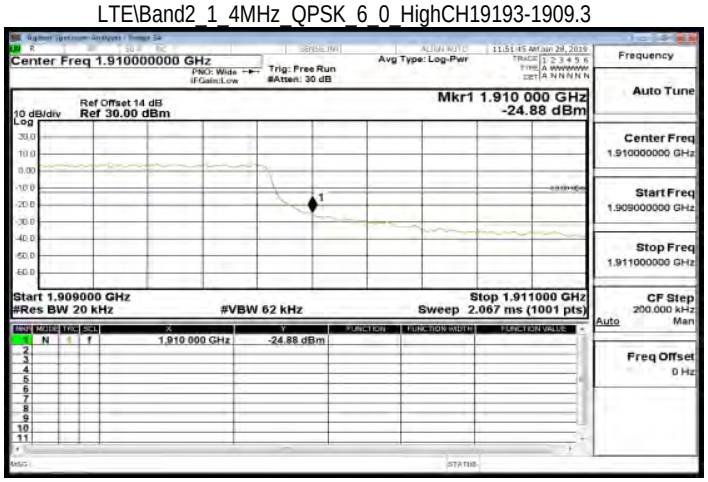
Refer to next pages.

NOTE: The occurrence of the spike on the conducted emission is the signal of the fundamental emission.

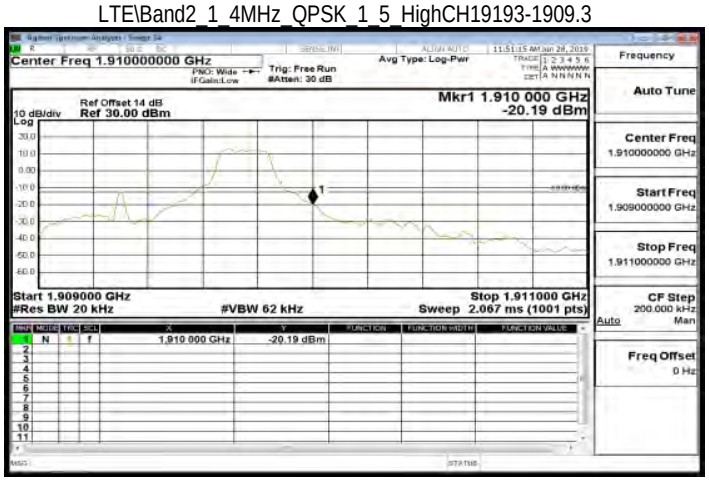
Band Edge LTE\Band2_1_4MHz_QPSK_1_0_LowCH18607-1850.7



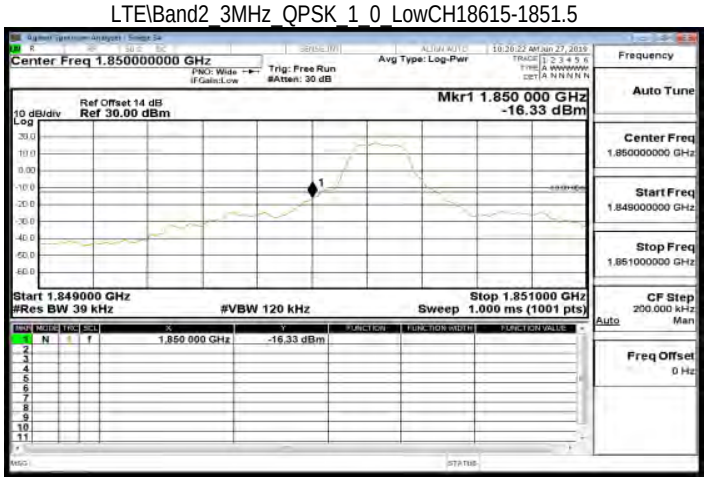
LTE\Band2_1_4MHz_QPSK_6_0_HighCH19193-1909.3



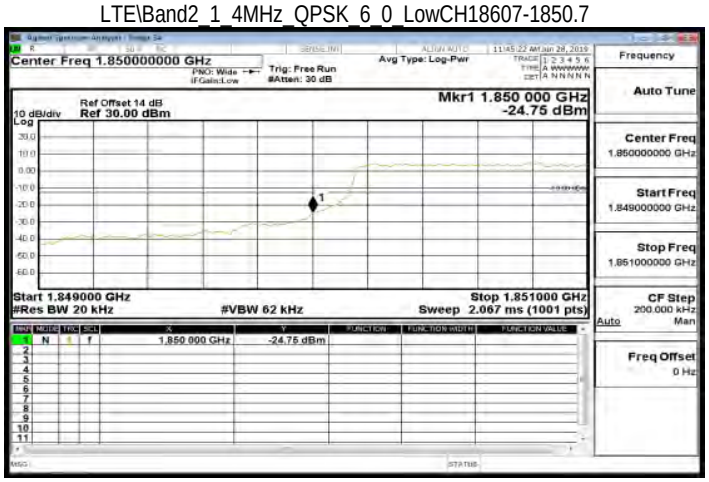
LTE\Band2_1_4MHz_QPSK_1_5_HighCH19193-1909.3



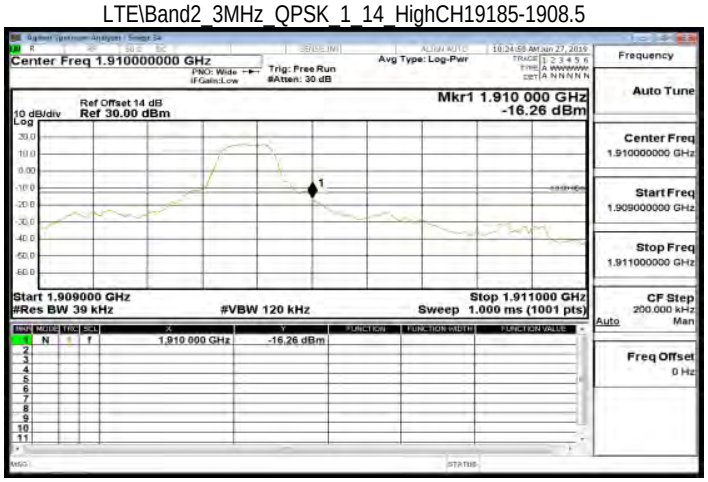
LTE\Band2_3MHz_QPSK_1_0_LowCH18615-1851.5



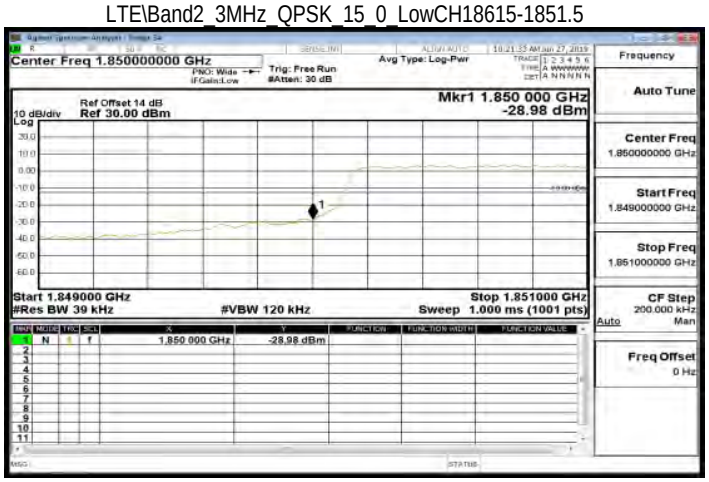
LTE\Band2_1_4MHz_QPSK_6_0_LowCH18607-1850.7



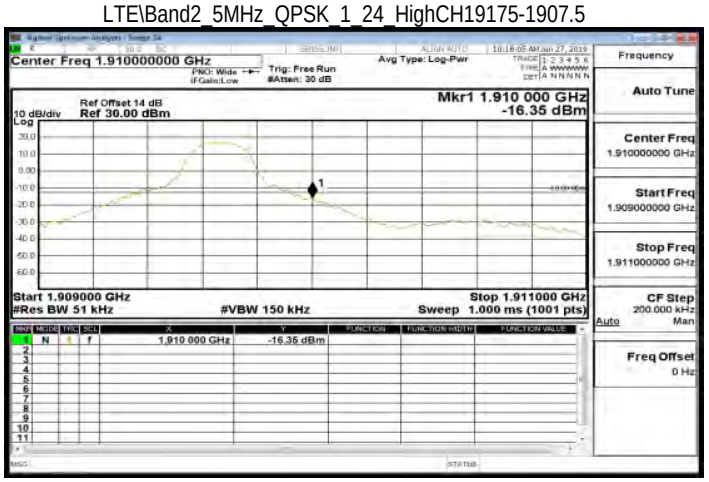
LTE\Band2_3MHz_QPSK_1_14_HighCH19185-1908.5



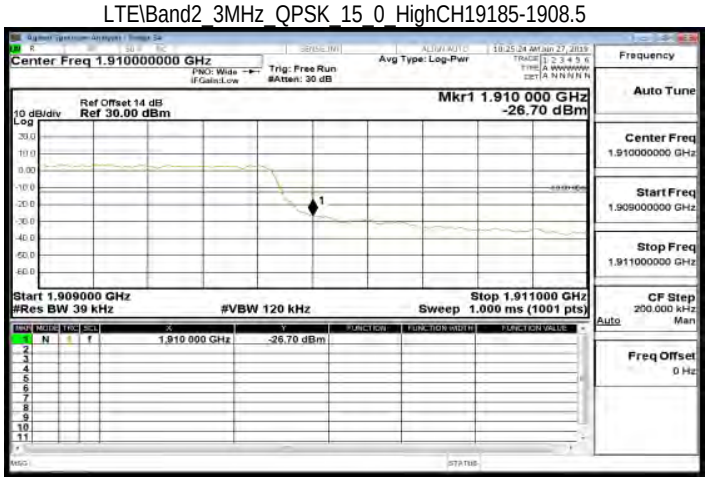
LTE\Band2_3MHz_QPSK_15_0_LowCH18615-1851.5



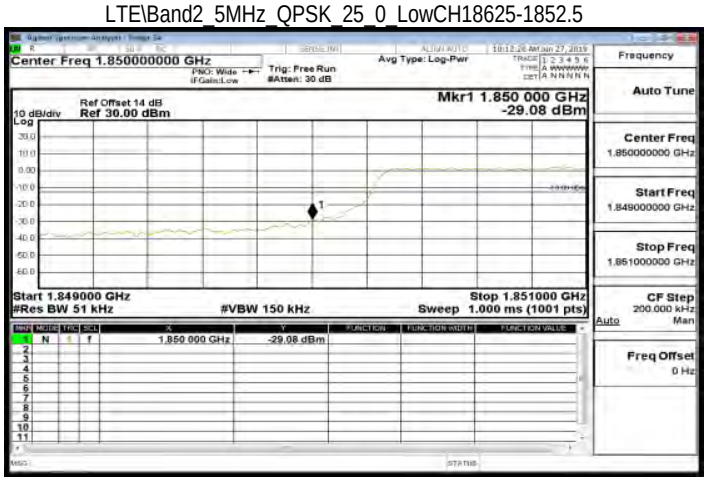
LTE\Band2_5MHz_QPSK_1_24_HighCH19175-1907.5



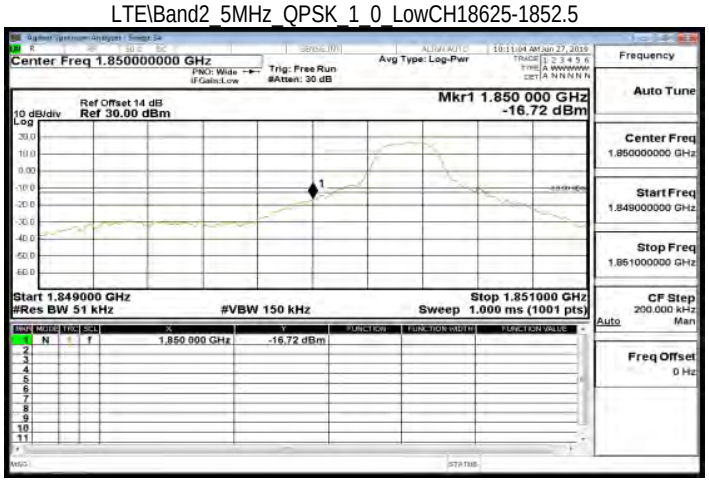
LTE\Band2_3MHz_QPSK_15_0_HighCH19185-1908.5



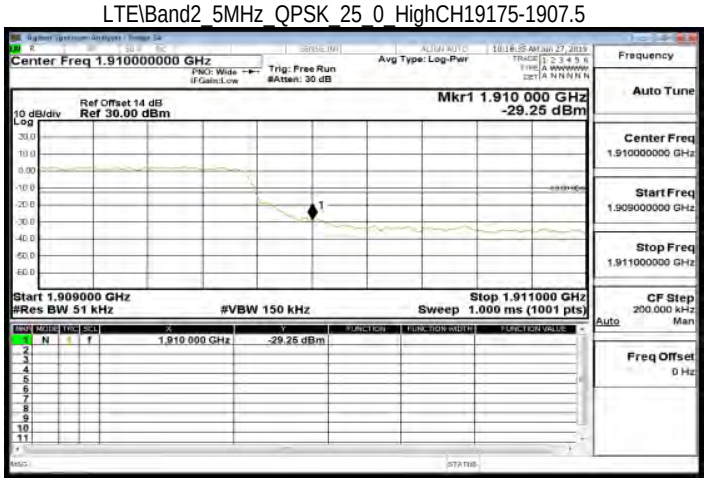
LTE\Band2_5MHz_QPSK_25_0_LowCH18625-1852.5



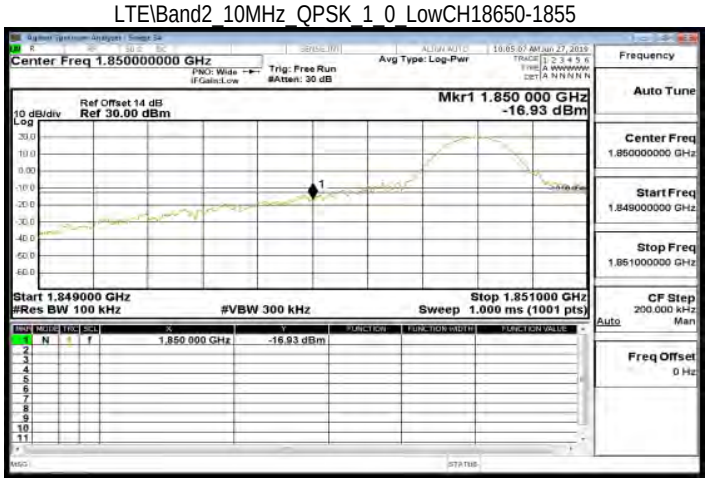
LTE\Band2_5MHz_QPSK_1_0_LowCH18625-1852.5



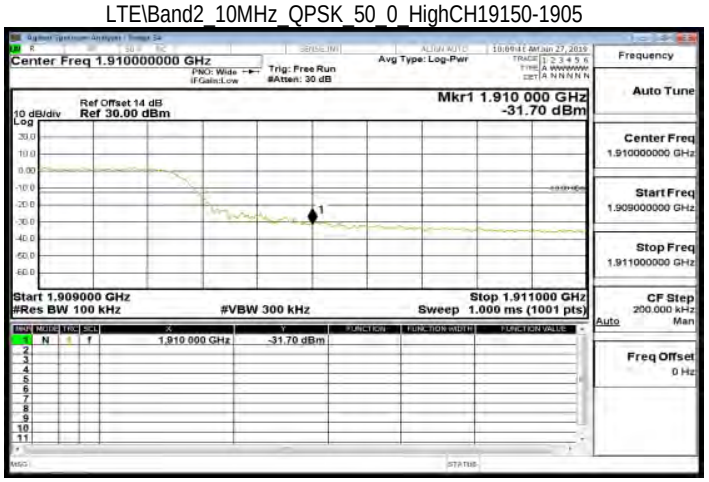
LTE\Band2_5MHz_QPSK_25_0_HighCH19175-1907.5



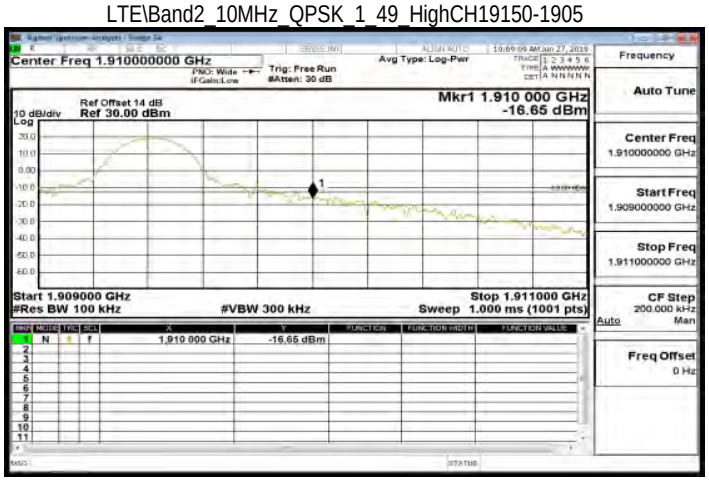
LTE\Band2_10MHz_QPSK_1_0_LowCH18650-1855



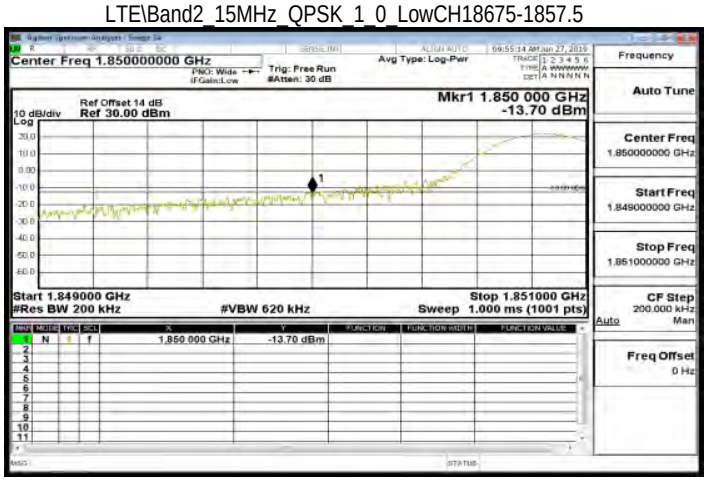
LTE\Band2_10MHz_QPSK_50_0_HighCH19150-1905



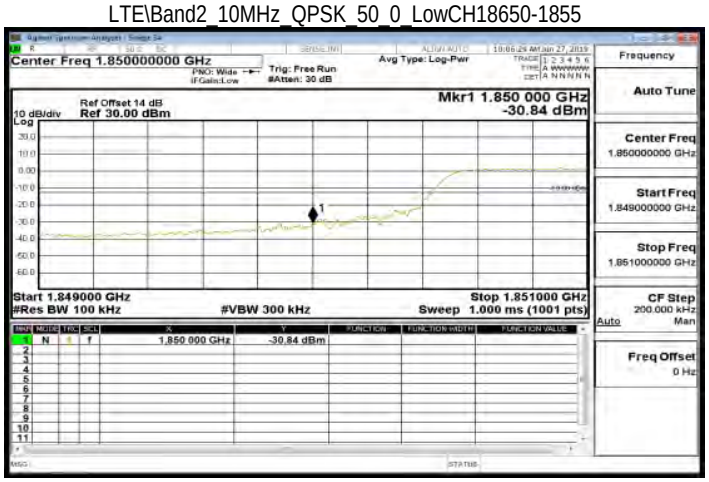
LTE\Band2_10MHz_QPSK_1_49_HighCH19150-1905



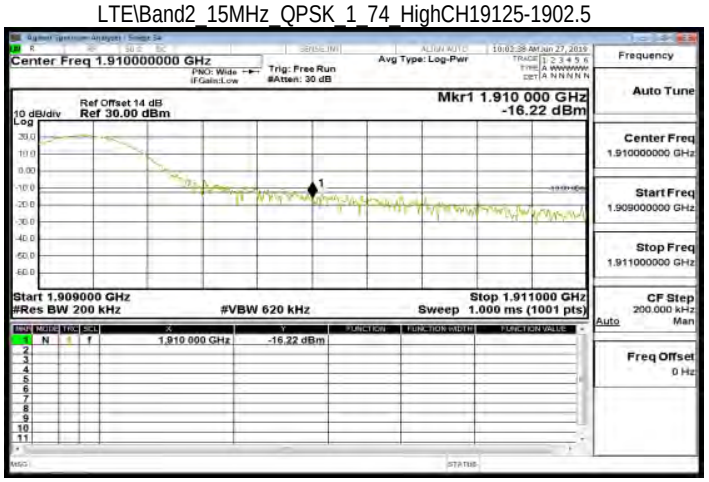
LTE\Band2_15MHz_QPSK_1_0_LowCH18675-1857.5



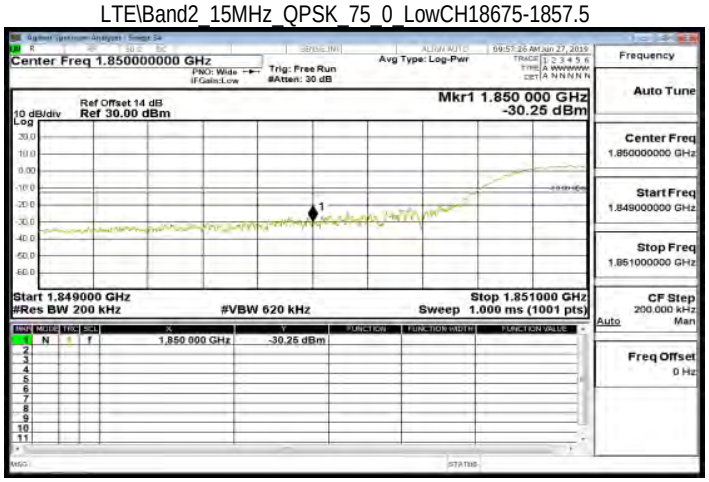
LTE\Band2_10MHz_QPSK_50_0_LowCH18650-1855



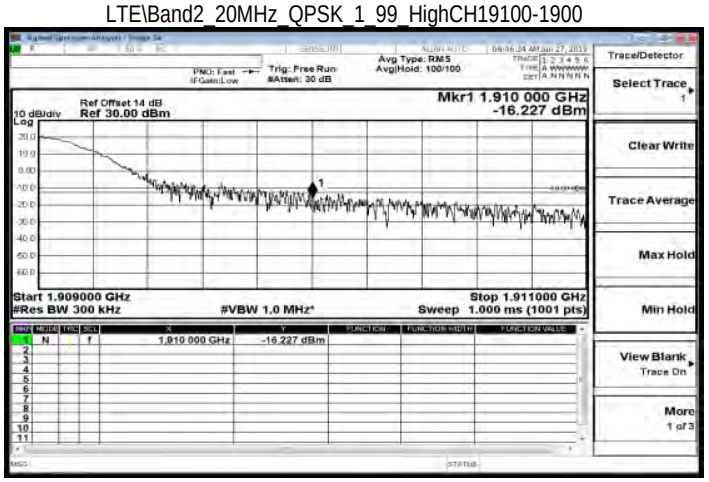
LTE\Band2_15MHz_QPSK_1_74_HighCH19125-1902.5



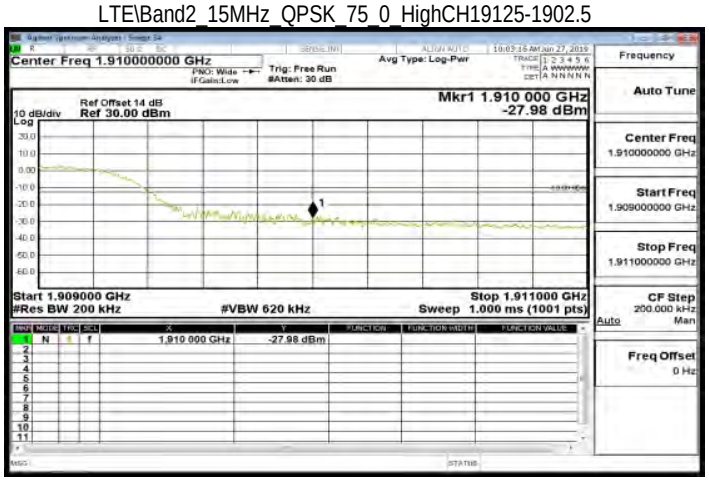
LTE\Band2_15MHz_QPSK_75_0_LowCH18675-1857.5



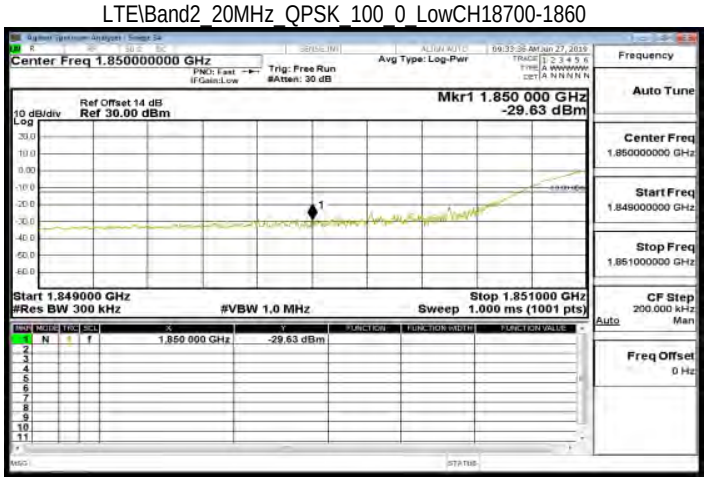
LTE\Band2_20MHz_QPSK_1_99_HighCH19100-1900



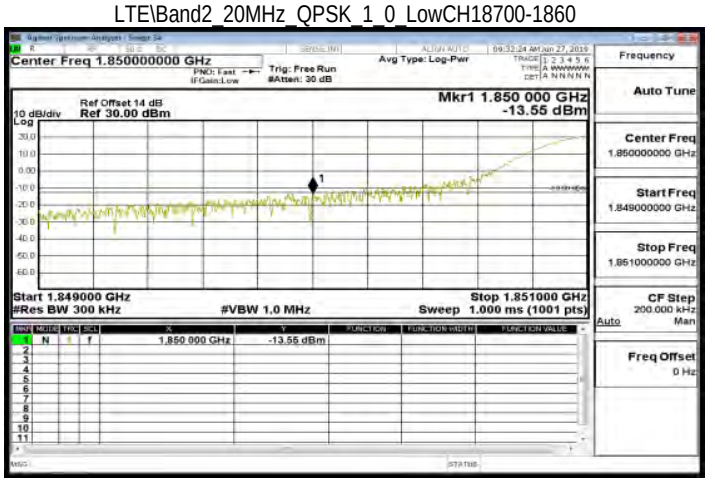
LTE\Band2_15MHz_QPSK_75_0_HighCH19125-1902.5



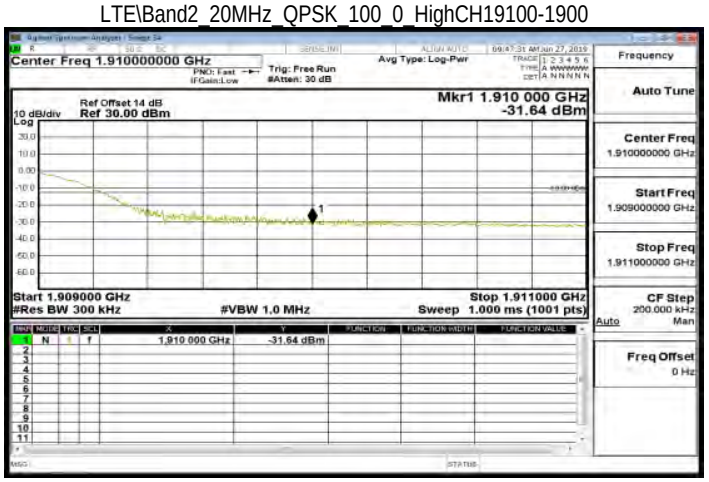
LTE\Band2_20MHz_QPSK_100_0_LowCH18700-1860



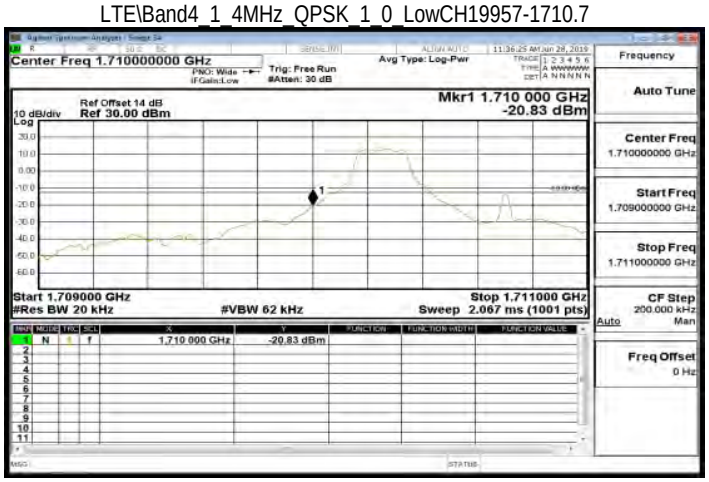
LTE\Band2_20MHz_QPSK_1_0_LowCH18700-1860



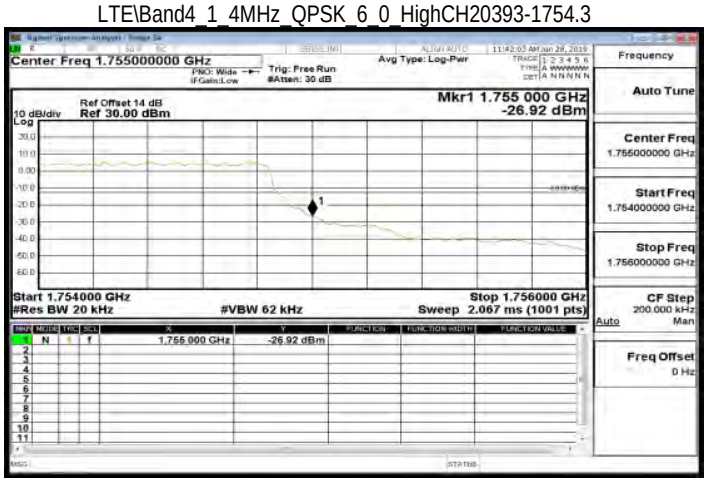
LTE\Band2_20MHz_QPSK_100_0_HighCH19100-1900



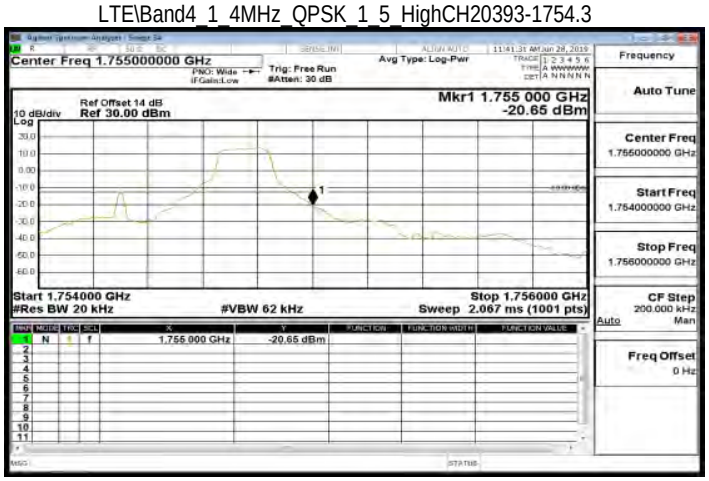
LTE\Band4_1_4MHz_QPSK_1_0_LowCH19957-1710.7



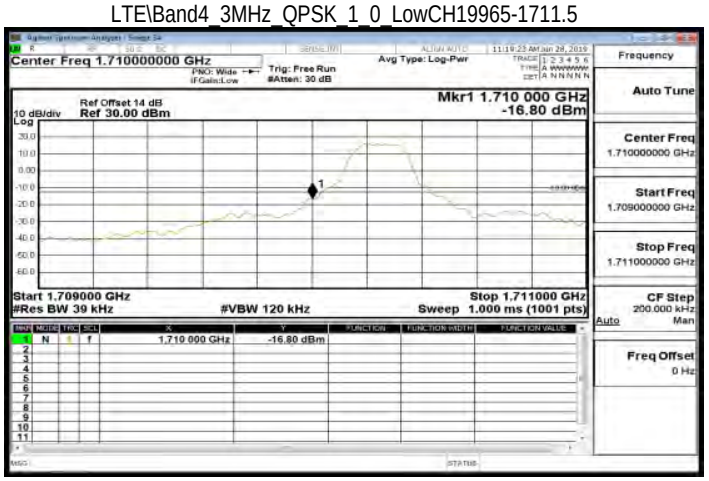
LTE\Band4_1_4MHz_QPSK_6_0_HighCH20393-1754.3



LTE\Band4_1_4MHz_QPSK_1_5_HighCH20393-1754.3



LTE\Band4_3MHz_QPSK_1_0_LowCH19965-1711.5



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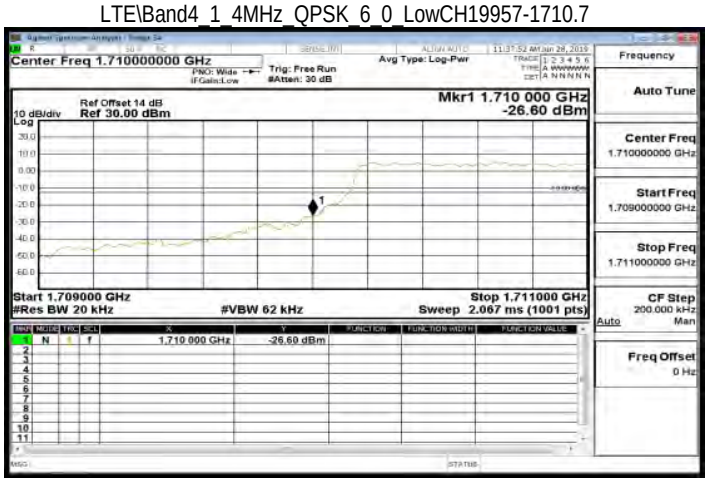
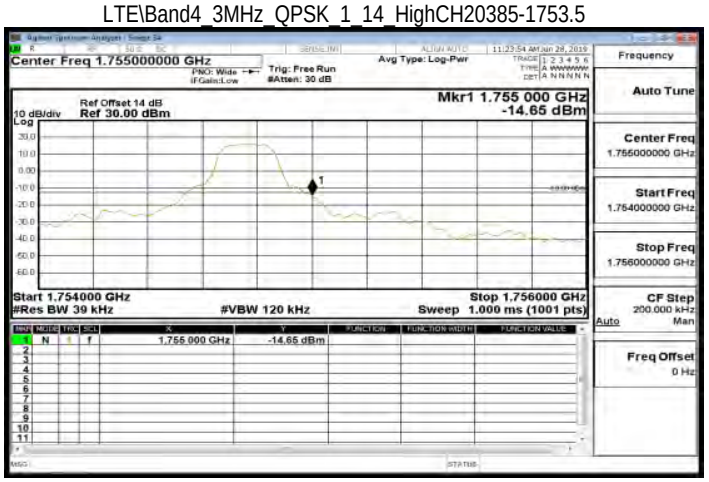
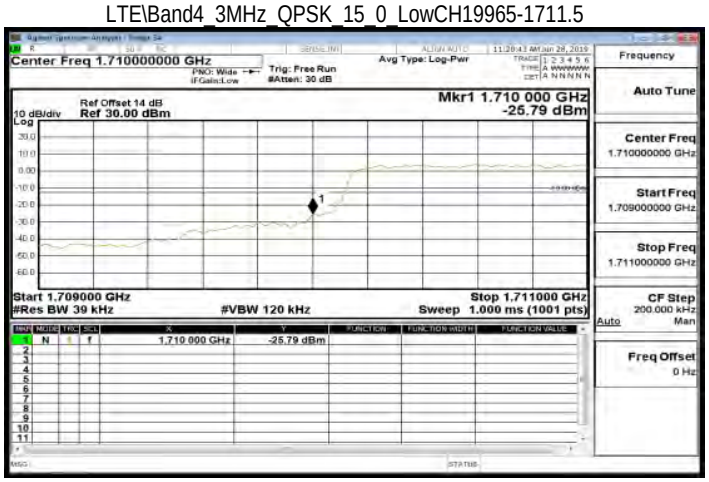


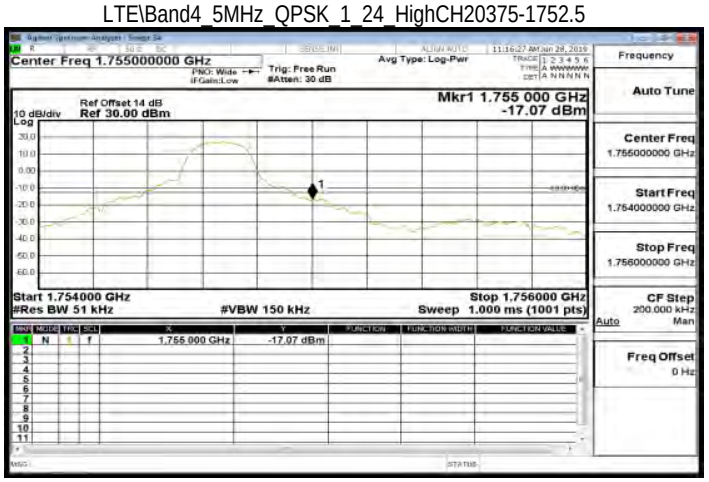
LTE\Band4_3MHz_QPSK_1_14_HighCH20385-1753.5



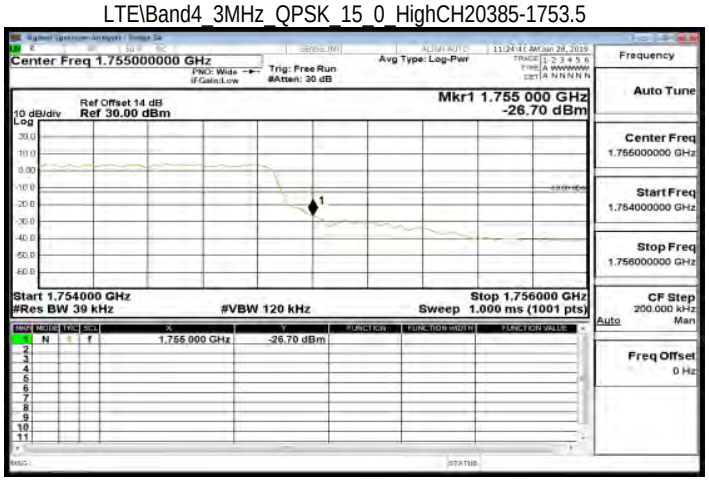
LTE\Band4_3MHz_QPSK_15_0_LowCH19965-1711.5



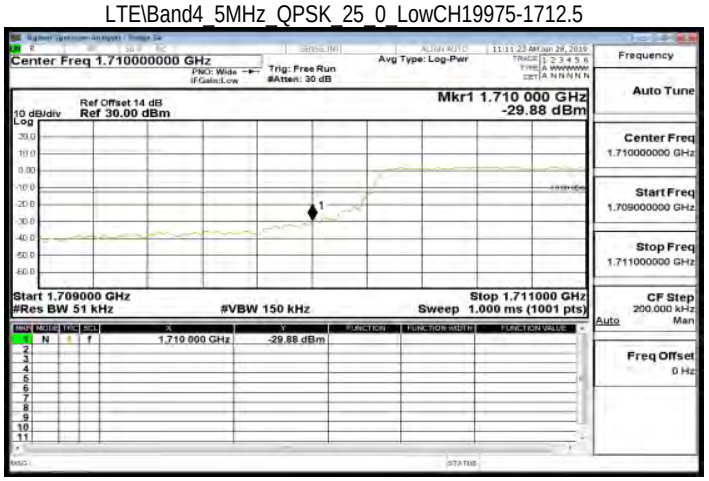
LTE\Band4_5MHz_QPSK_1_24_HighCH20375-1752.5



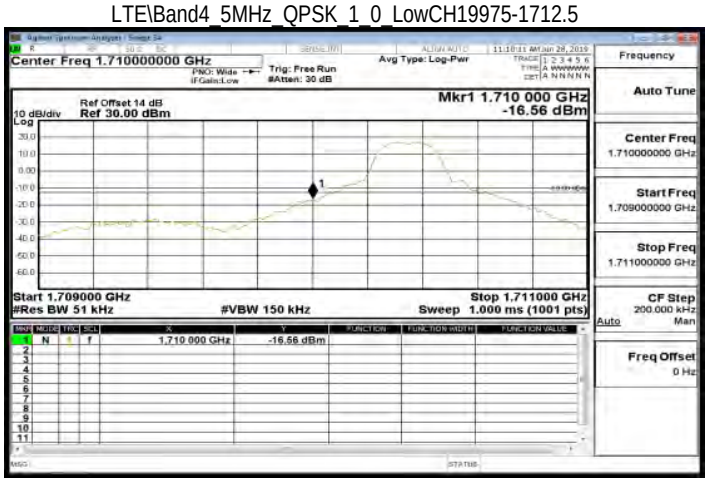
LTE\Band4_3MHz_QPSK_15_0_HighCH20385-1753.5



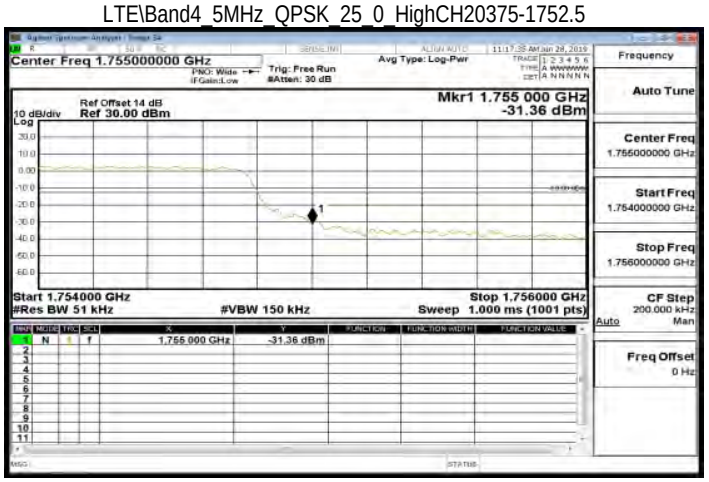
LTE\Band4_5MHz_QPSK_25_0_LowCH19975-1712.5



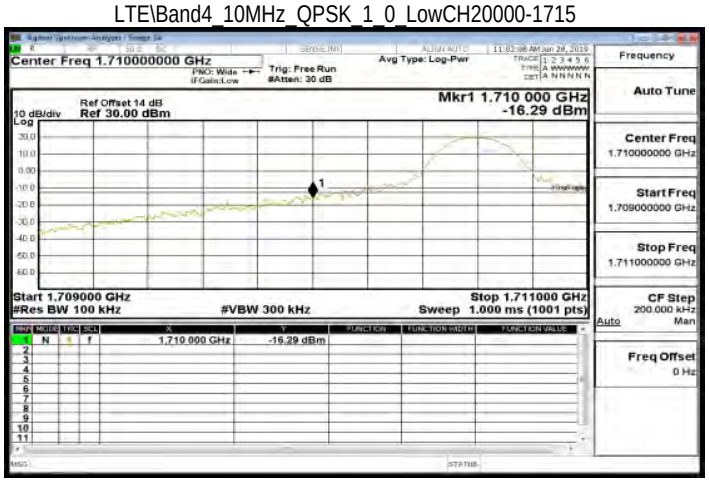
LTE\Band4_5MHz_QPSK_1_0_LowCH19975-1712.5



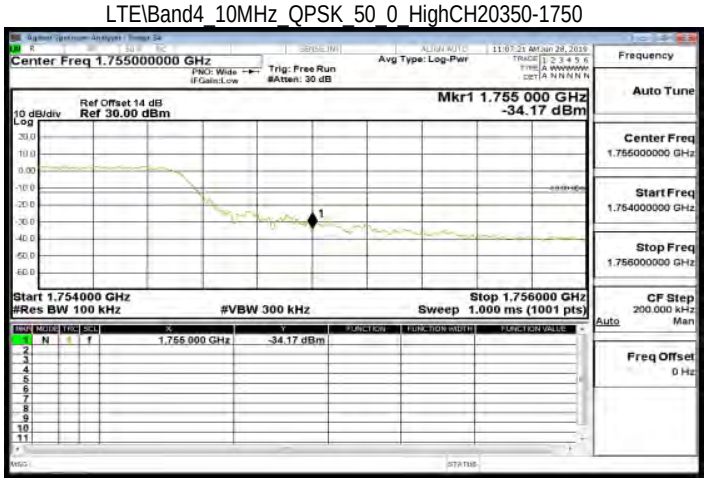
LTE\Band4_5MHz_QPSK_25_0_HighCH20375-1752.5



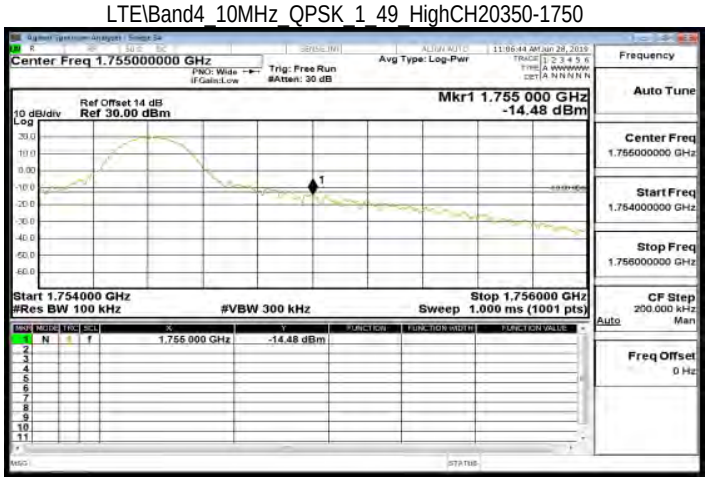
LTE\Band4_10MHz_QPSK_1_0_LowCH20000-1715



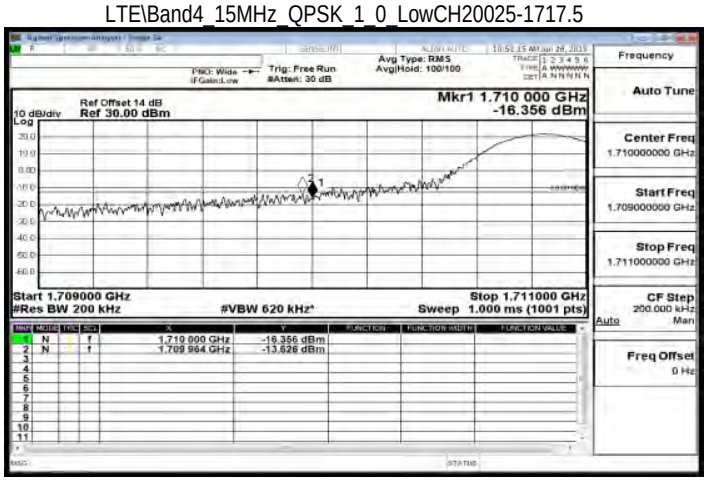
LTE\Band4_10MHz_QPSK_50_0_HighCH20350-1750



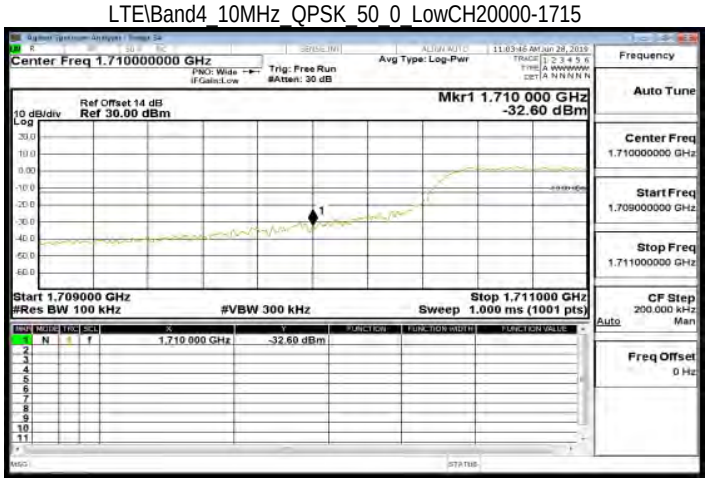
LTE\Band4_10MHz_QPSK_1_49_HighCH20350-1750



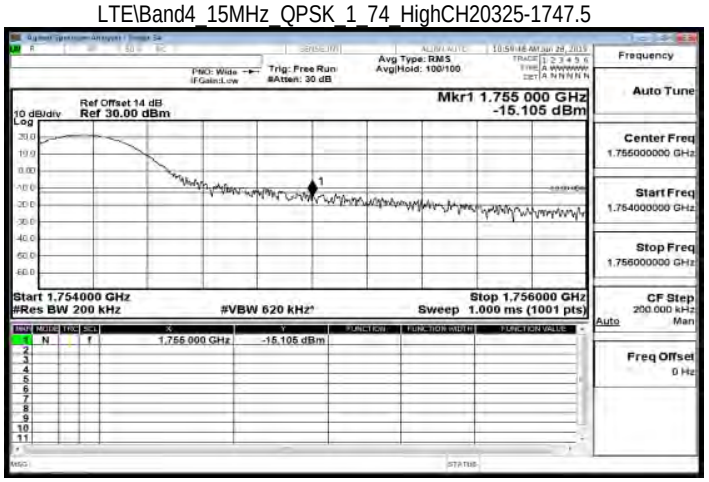
LTE\Band4_15MHz_QPSK_1_0_LowCH20025-1717.5



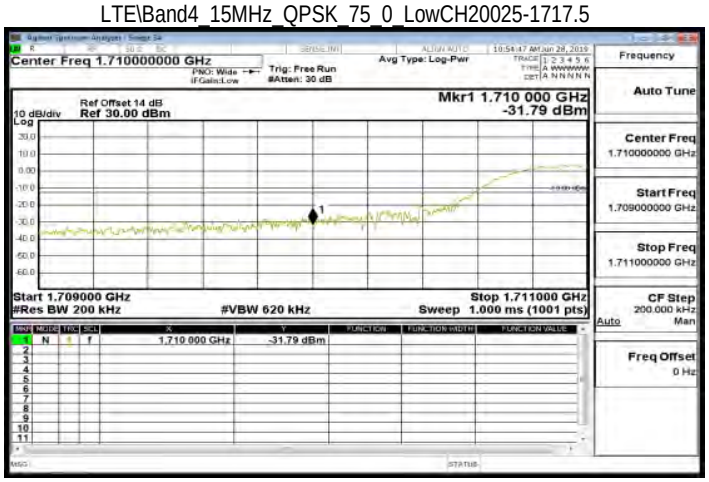
LTE\Band4_10MHz_QPSK_50_0_LowCH20000-1715



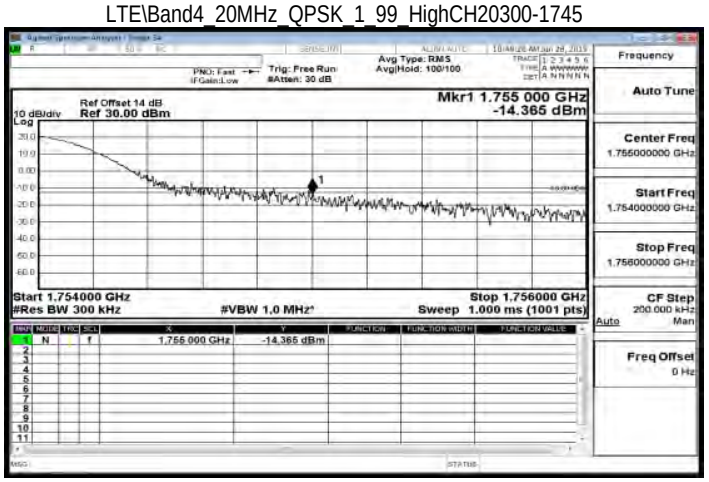
LTE\Band4_15MHz_QPSK_1_74_HighCH20325-1747.5



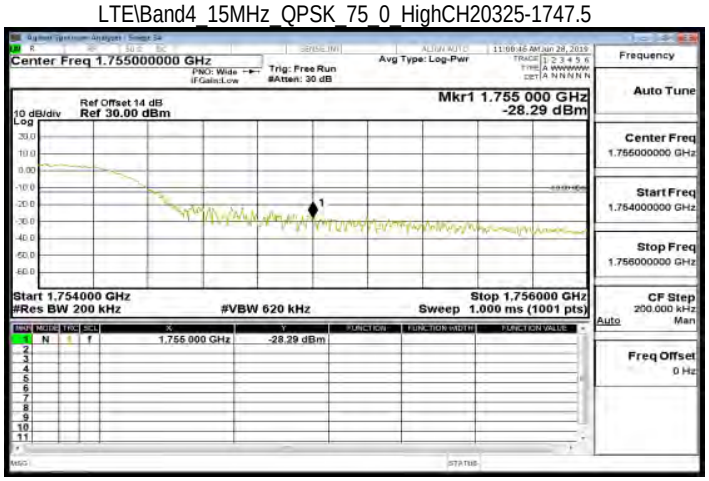
LTE\Band4_15MHz_QPSK_75_0_LowCH20025-1717.5



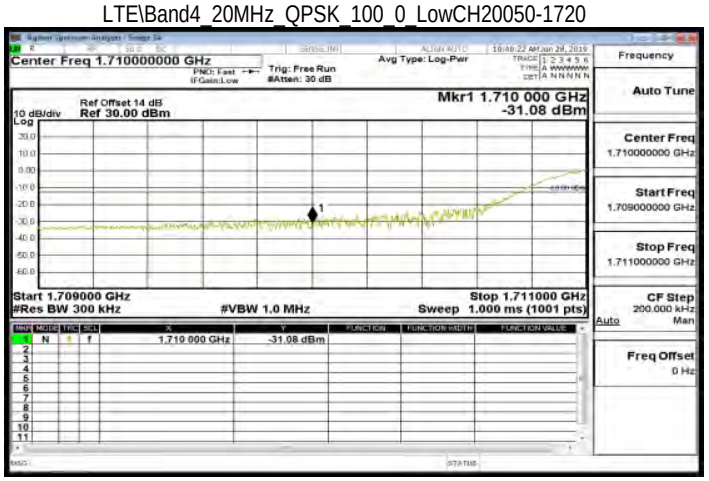
LTE\Band4_20MHz_QPSK_1_99_HighCH20300-1745



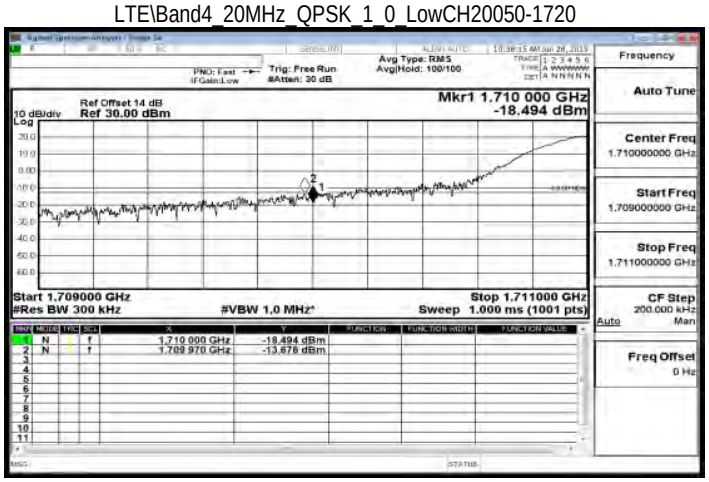
LTE\Band4_15MHz_QPSK_75_0_HighCH20325-1747.5



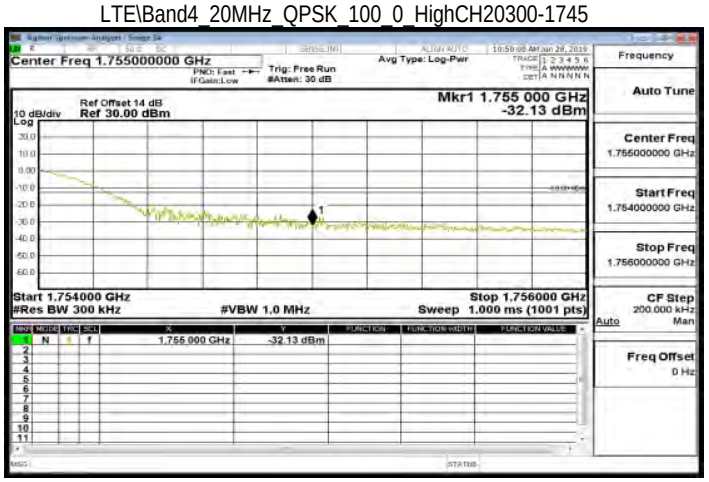
LTE\Band4_20MHz_QPSK_100_0_LowCH20050-1720



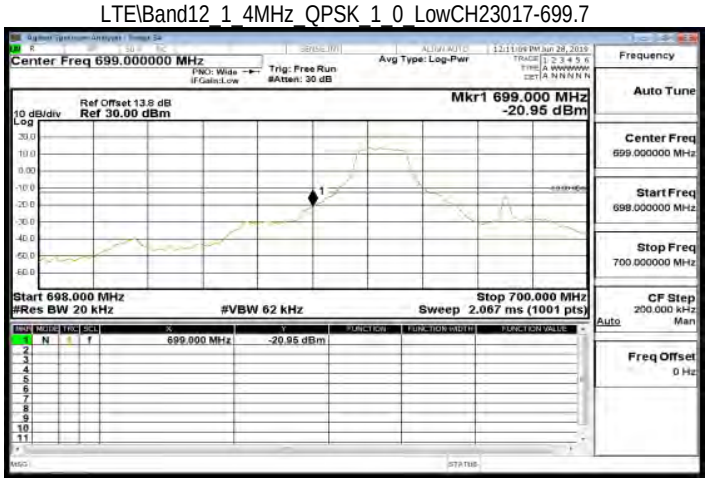
LTE\Band4_20MHz_QPSK_1_0_LowCH20050-1720



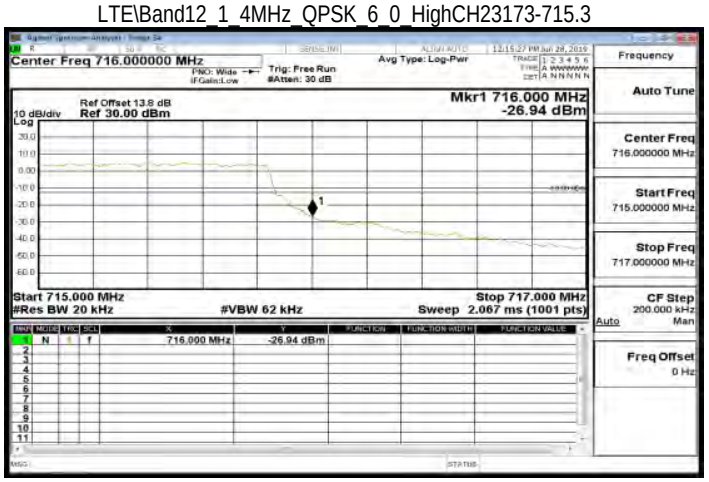
LTE\Band4_20MHz_QPSK_100_0_HighCH20300-1745



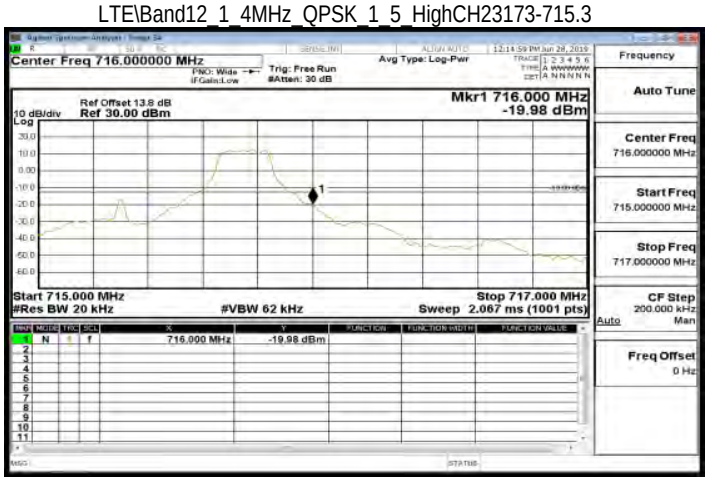
LTE\Band12_1_4MHz_QPSK_1_0_LowCH23017-699.7



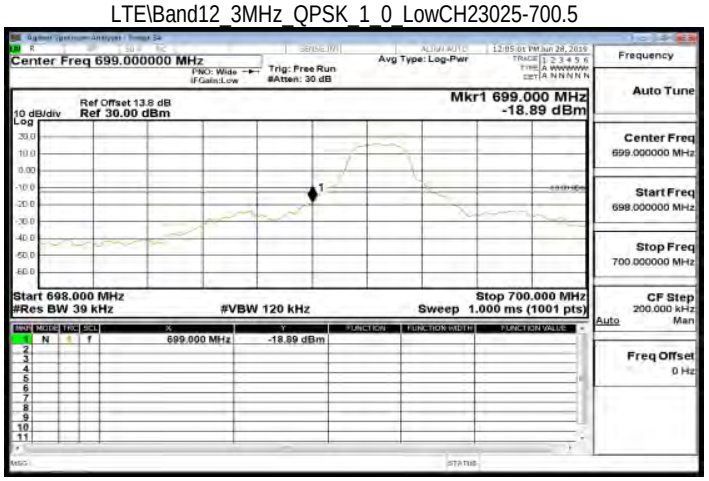
LTE\Band12_1_4MHz_QPSK_6_0_HighCH23173-715.3



LTE\Band12_1_4MHz_QPSK_1_5_HighCH23173-715.3



LTE\Band12_3MHz_QPSK_1_0_LowCH23025-700.5



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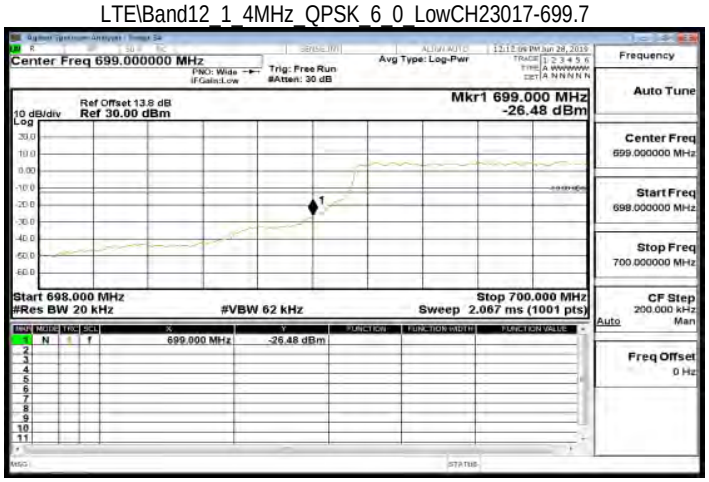

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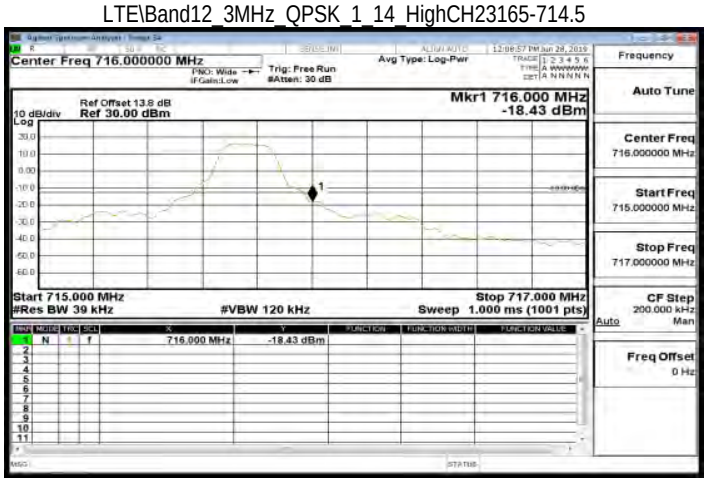
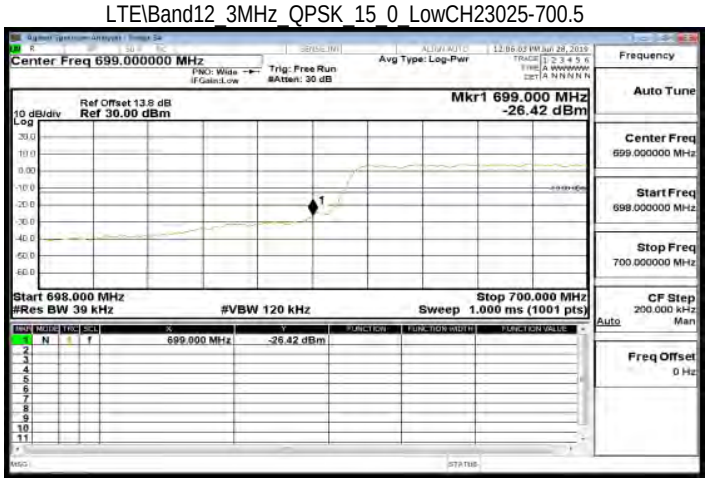
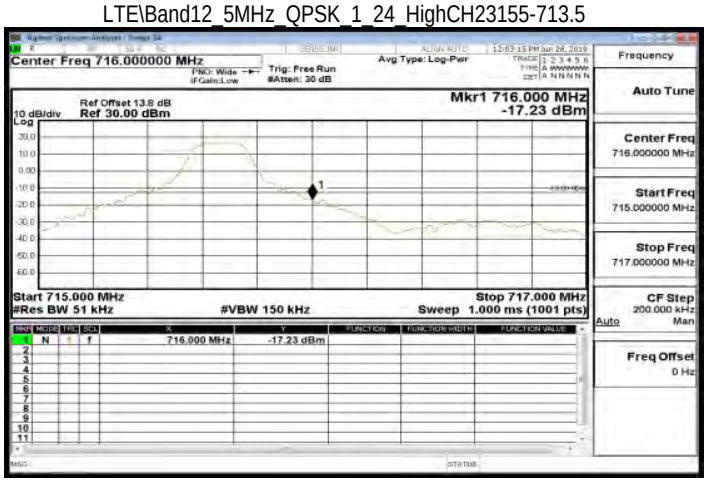


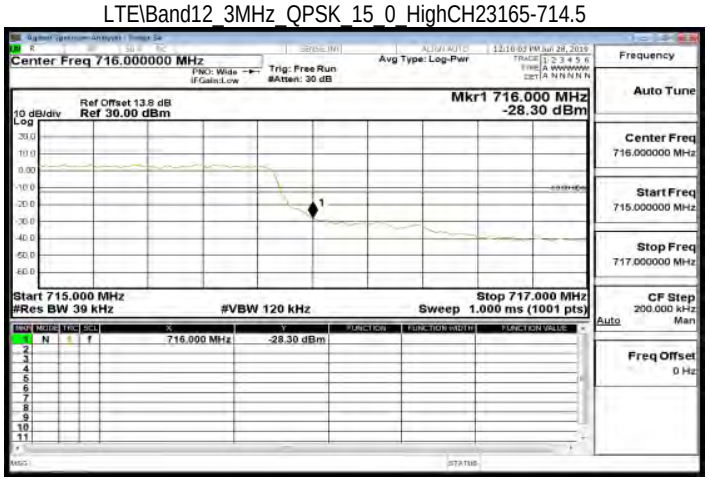
LTE\Band12_3MHz_QPSK_15_0_LowCH23025-700.5



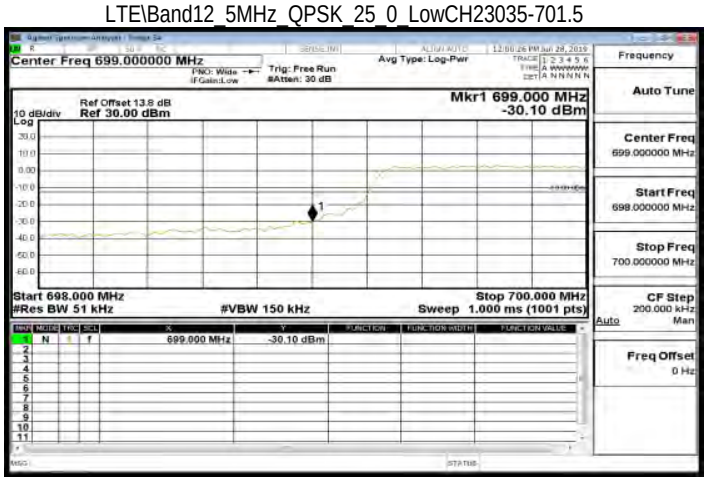
LTE\Band12_5MHz_QPSK_1_24_HighCH23155-713.5



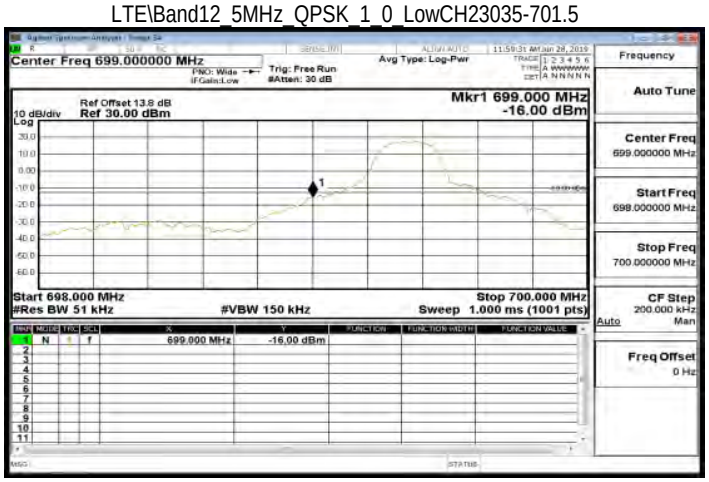
LTE\Band12_3MHz_QPSK_15_0_HighCH23165-714.5



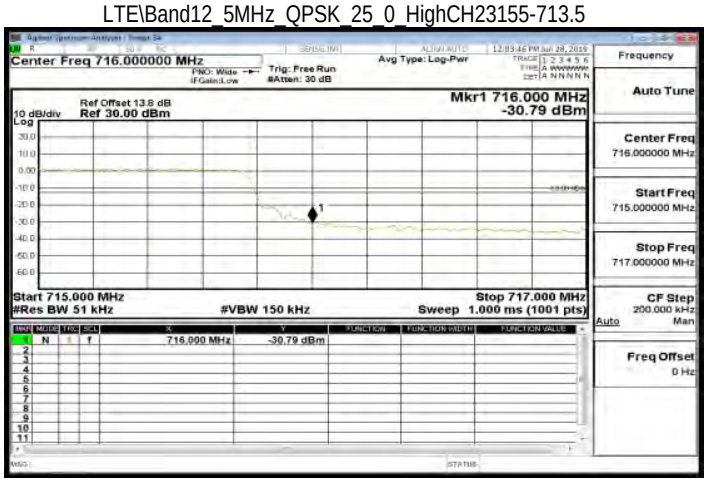
LTE\Band12_5MHz_QPSK_25_0_LowCH23035-701.5



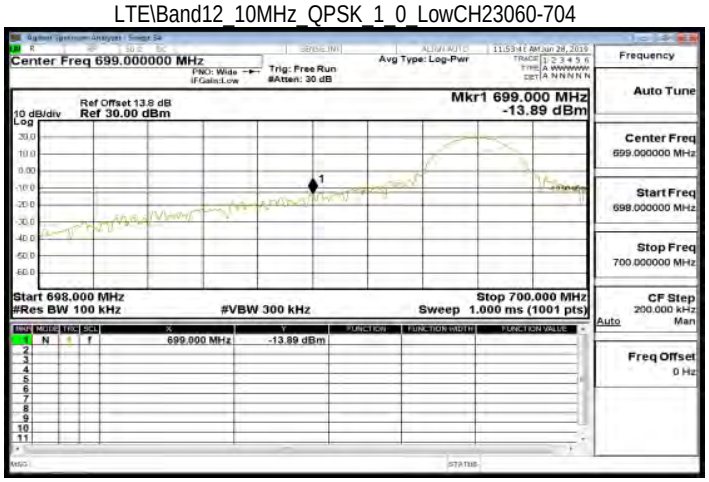
LTE\Band12_5MHz_QPSK_1_0_LowCH23035-701.5



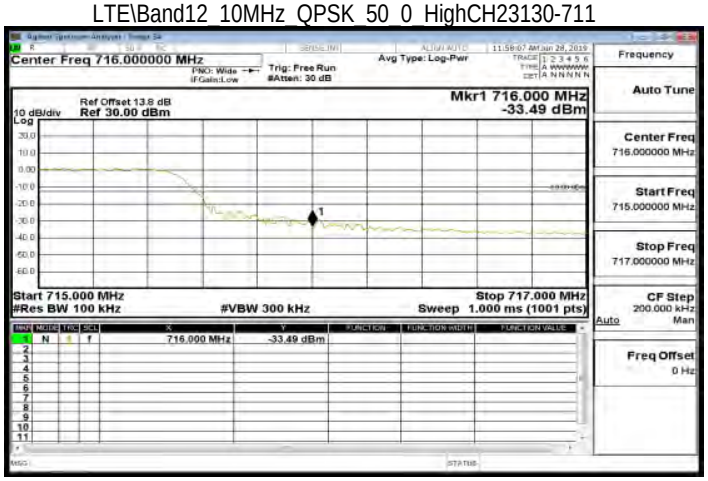
LTE\Band12_5MHz_QPSK_25_0_HighCH23155-713.5



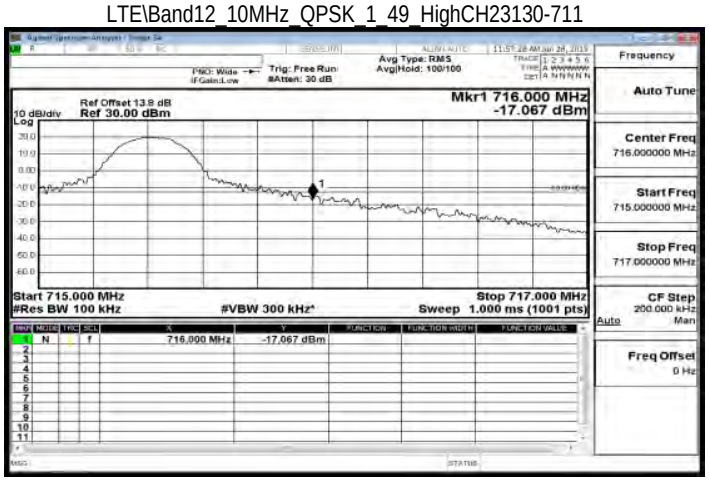
LTE\Band12_10MHz_QPSK_1_0_LowCH23060-704



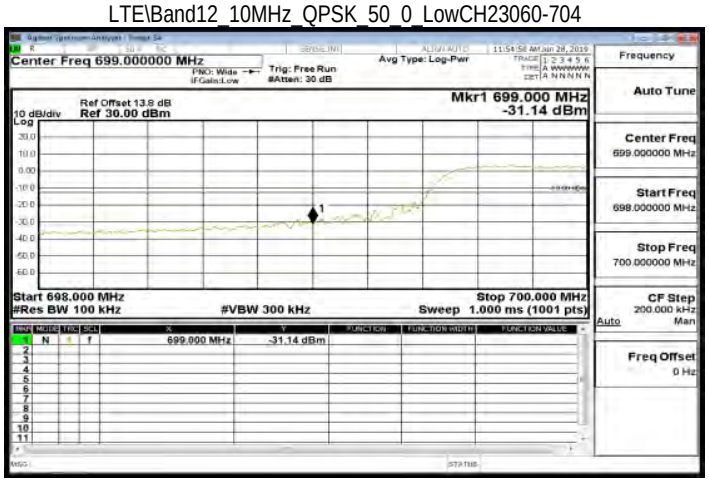
LTE\Band12_10MHz_QPSK_50_0_HighCH23130-711



LTE\Band12_10MHz_QPSK_1_49_HighCH23130-711

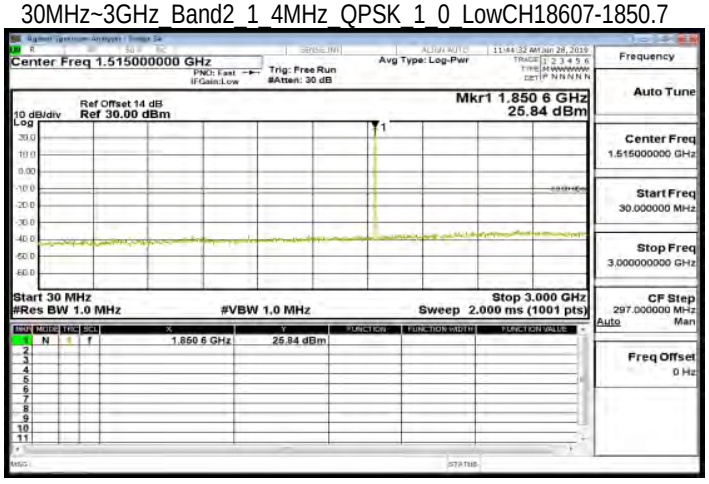


LTE\Band12_10MHz_QPSK_50_0_LowCH23060-704

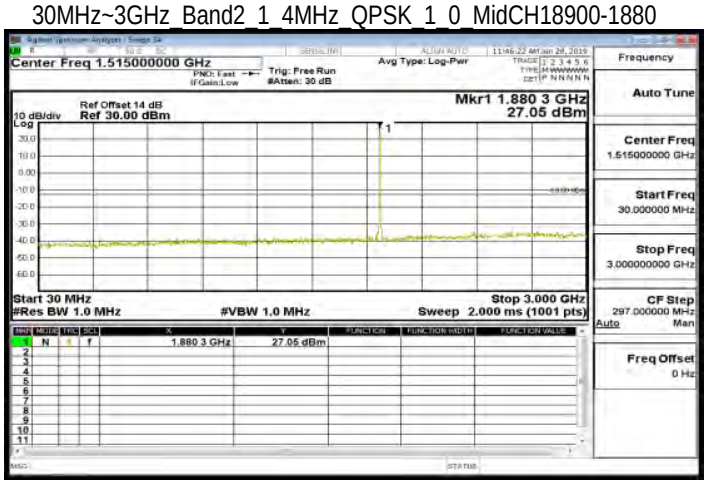


Out of Band Emission

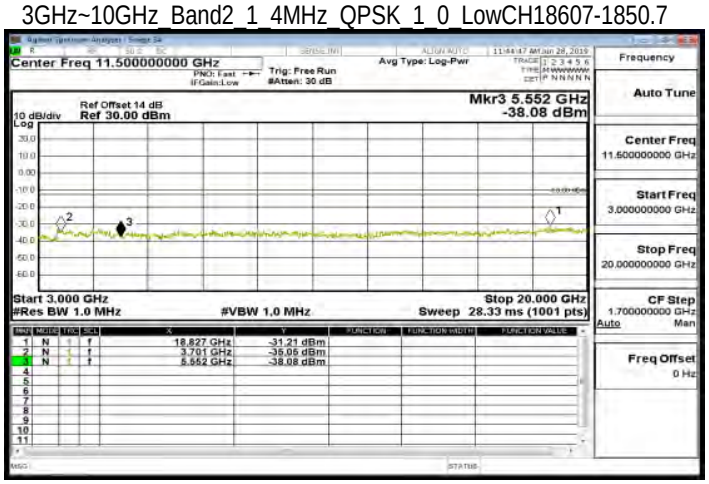
30MHz~3GHz_Band2_1_4MHz_QPSK_1_0_LowCH18607-1850.7



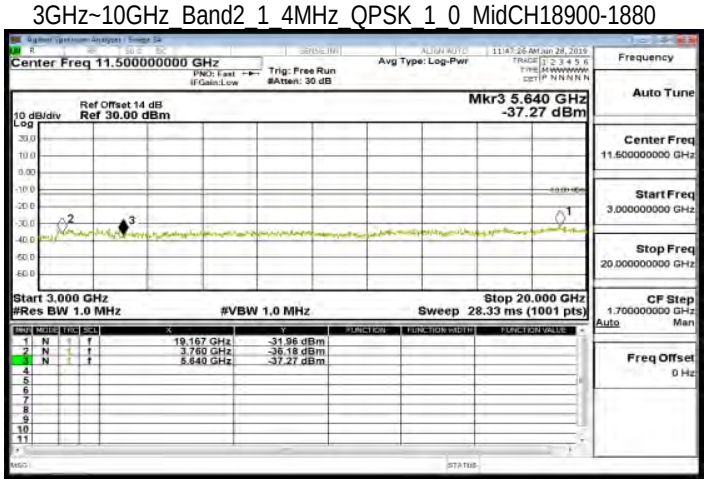
30MHz~3GHz_Band2_1_4MHz_QPSK_1_0_MidCH18900-1880



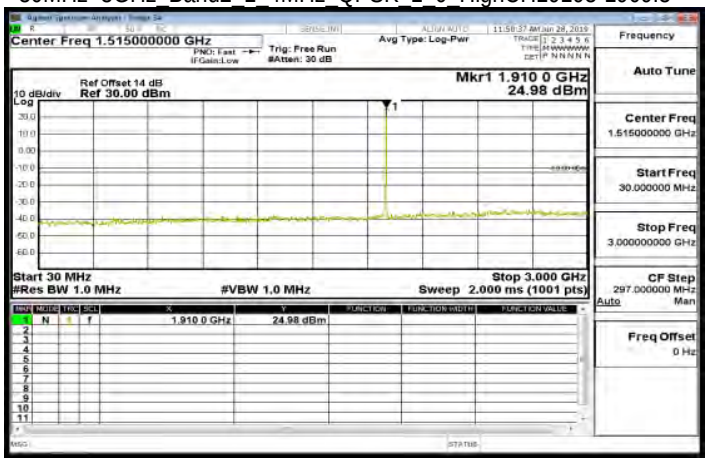
3GHz~10GHz_Band2_1_4MHz_QPSK_1_0_LowCH18607-1850.7



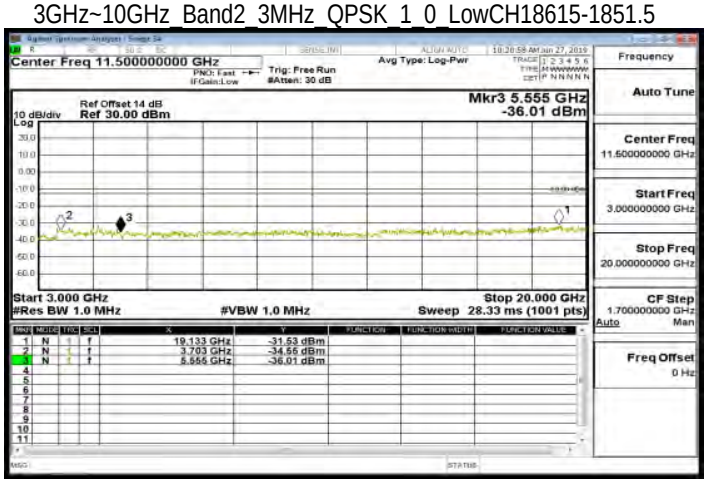
3GHz~10GHz_Band2_1_4MHz_QPSK_1_0_MidCH18900-1880



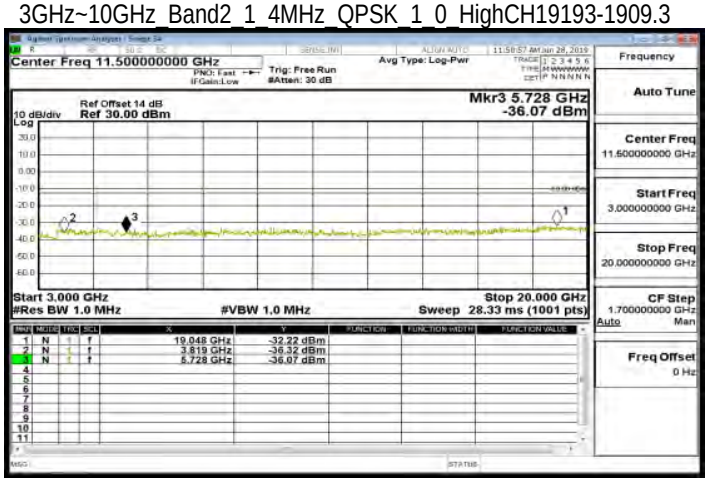
30MHz~3GHz_Band2_1_4MHz_QPSK_1_0_HighCH19193-1909.3



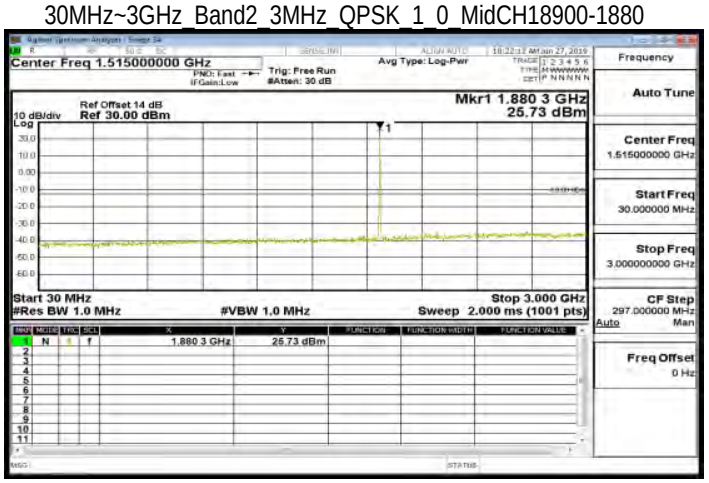
3GHz~10GHz_Band2_3MHz_QPSK_1_0_LowCH18615-1851.5



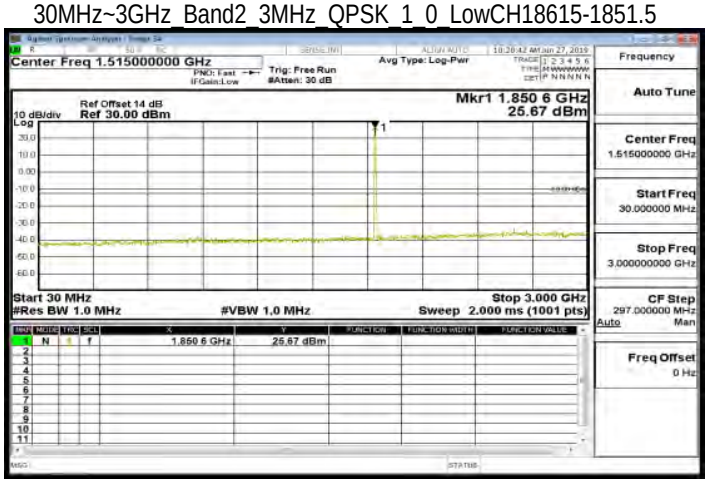
3GHz~10GHz_Band2_1_4MHz_QPSK_1_0_HighCH19193-1909.3



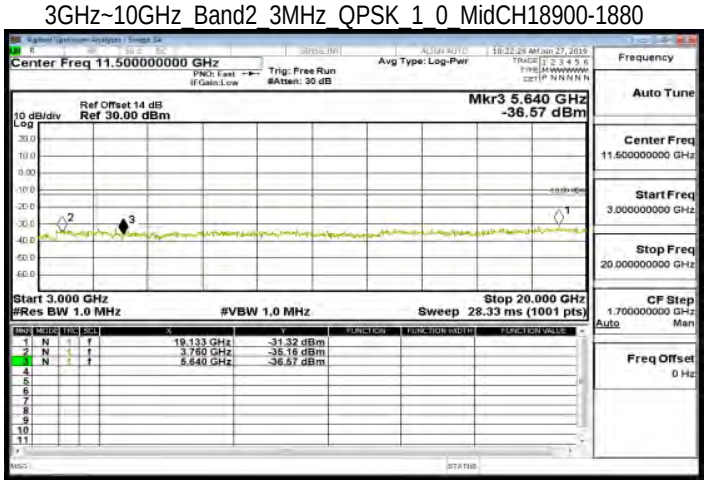
30MHz~3GHz_Band2_3MHz_QPSK_1_0_MidCH18900-1880



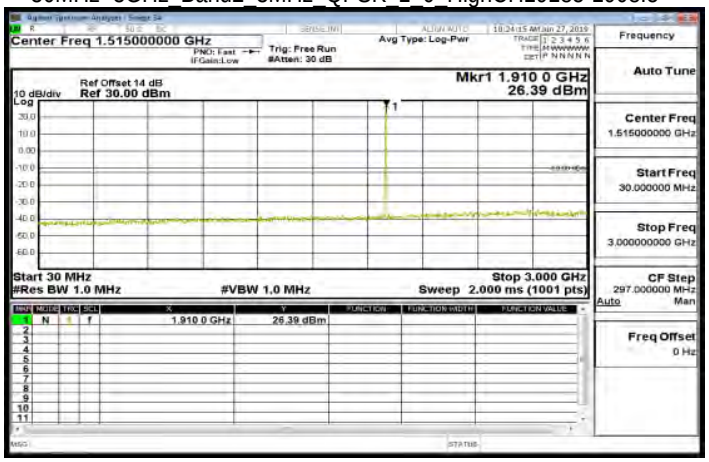
30MHz~3GHz_Band2_3MHz_QPSK_1_0_LowCH18615-1851.5



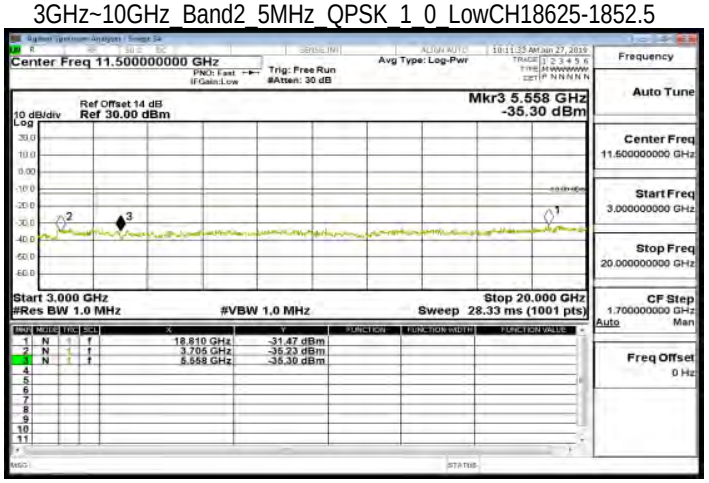
3GHz~10GHz_Band2_3MHz_QPSK_1_0_MidCH18900-1880



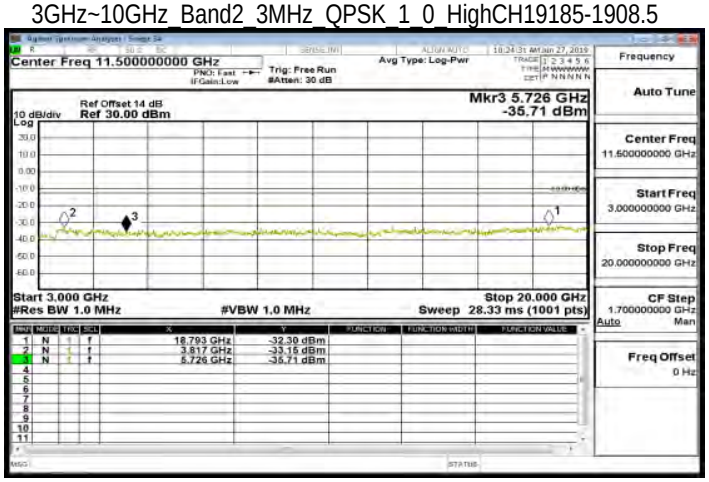
30MHz~3GHz_Band2_3MHz_QPSK_1_0_HighCH19185-1908.5



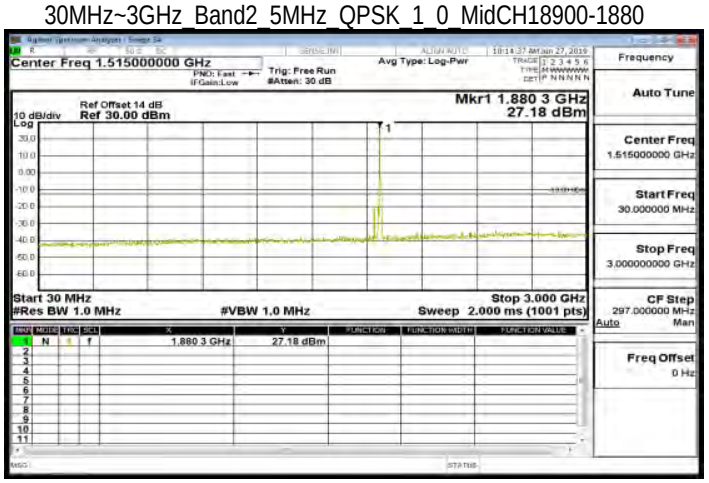
3GHz~10GHz_Band2_5MHz_QPSK_1_0_LowCH18625-1852.5



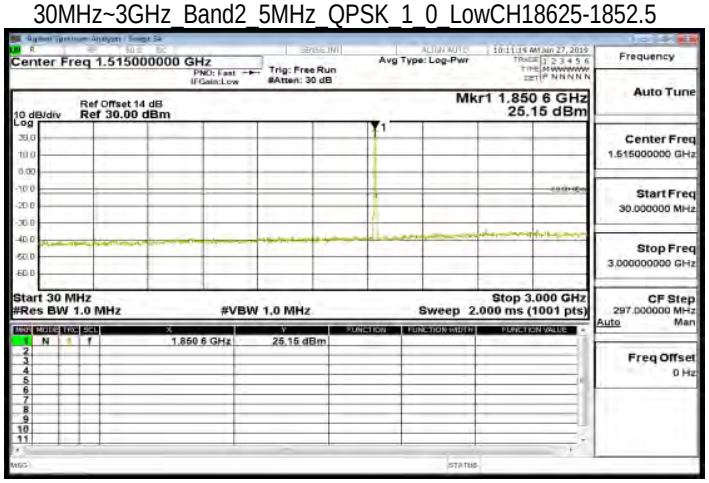
3GHz~10GHz_Band2_3MHz_QPSK_1_0_HighCH19185-1908.5



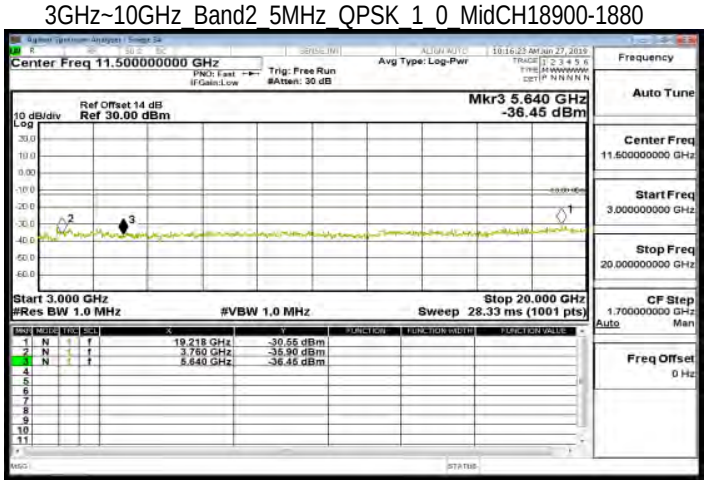
30MHz~3GHz_Band2_5MHz_QPSK_1_0_MidCH18900-1880



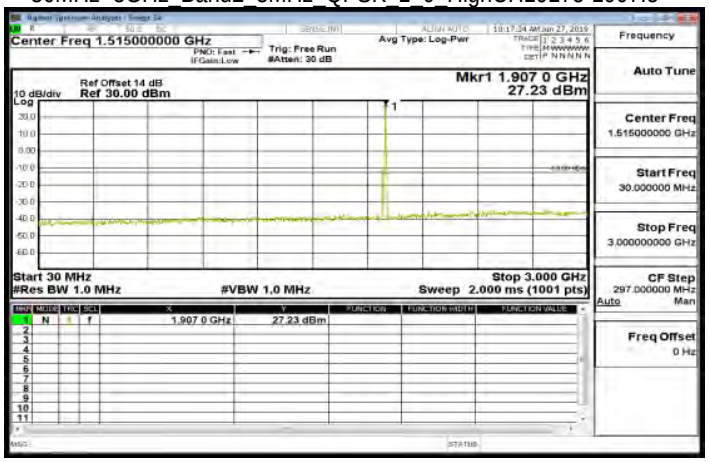
30MHz~3GHz_Band2_5MHz_QPSK_1_0_LowCH18625-1852.5



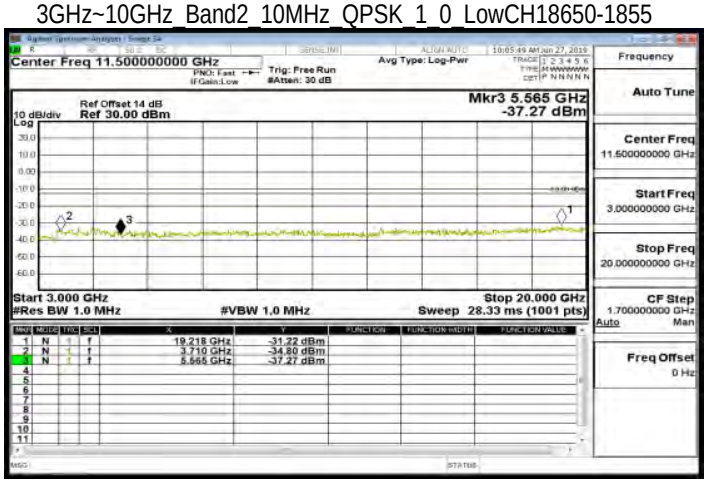
3GHz~10GHz_Band2_5MHz_QPSK_1_0_MidCH18900-1880



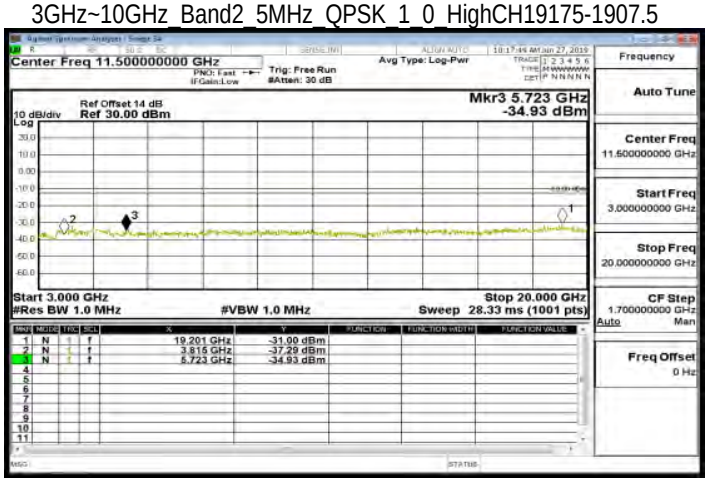
30MHz~3GHz_Band2_5MHz_QPSK_1_0_HighCH19175-1907.5



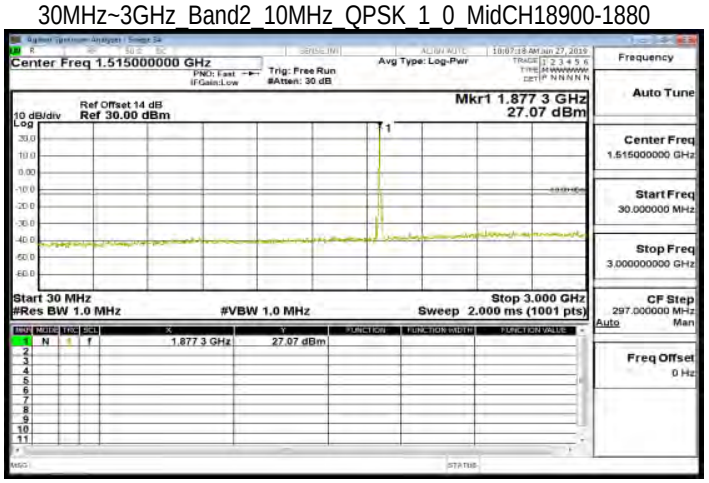
3GHz~10GHz_Band2_10MHz_QPSK_1_0_LowCH18650-1855



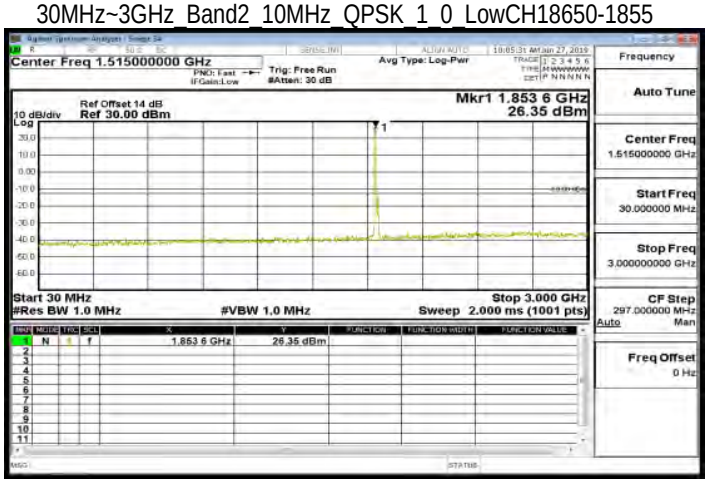
3GHz~10GHz_Band2_5MHz_QPSK_1_0_HighCH19175-1907.5



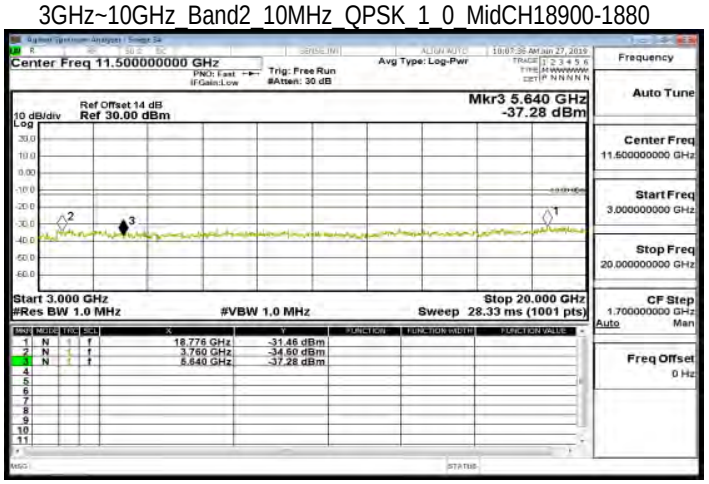
30MHz~3GHz_Band2_10MHz_QPSK_1_0_MidCH18900-1880



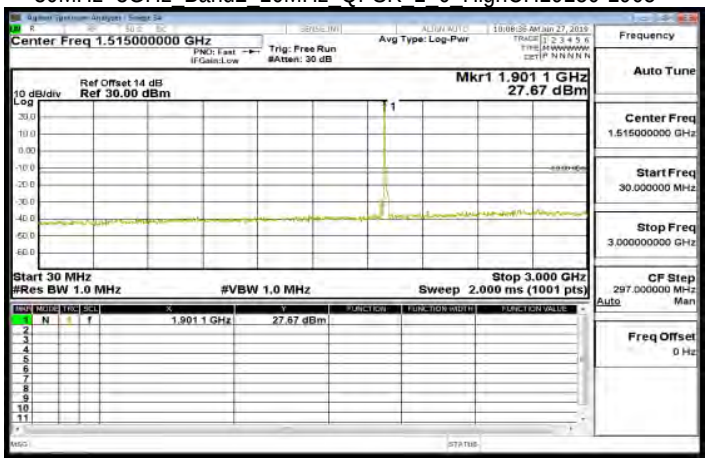
30MHz~3GHz_Band2_10MHz_QPSK_1_0_LowCH18650-1855



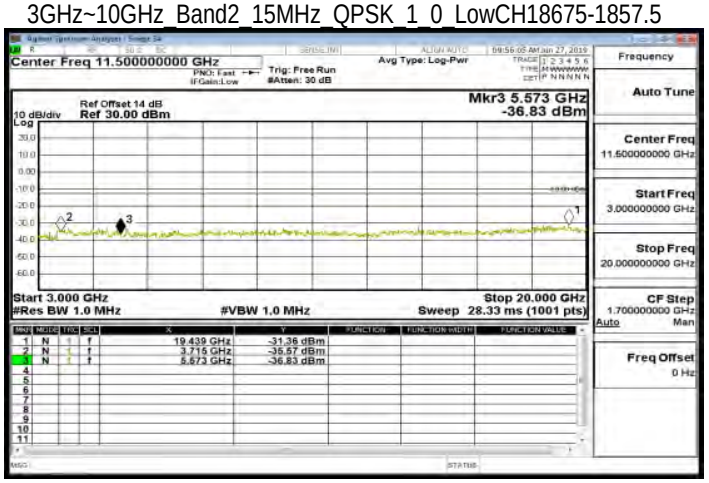
3GHz~10GHz_Band2_10MHz_QPSK_1_0_MidCH18900-1880



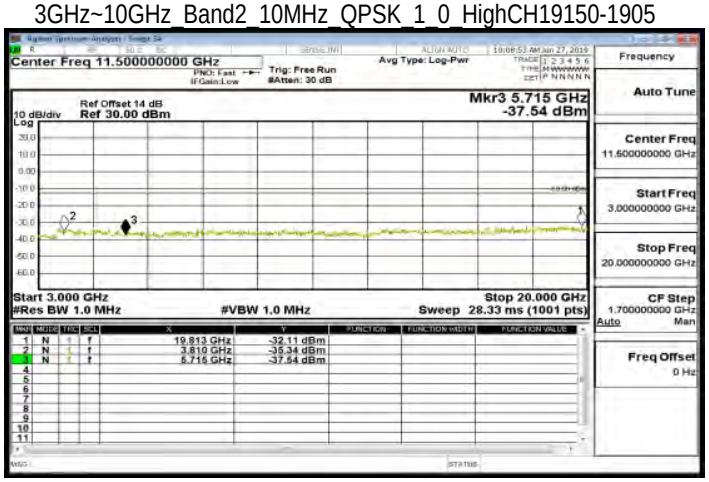
30MHz~3GHz_Band2_10MHz_QPSK_1_0_HighCH19150-1905



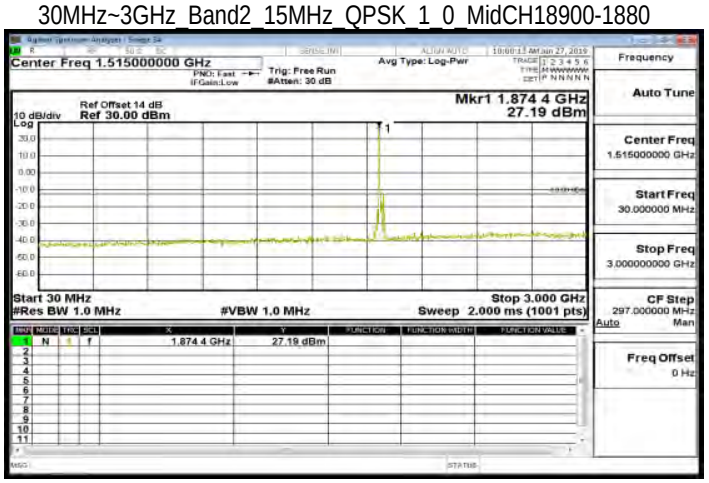
3GHz~10GHz_Band2_15MHz_QPSK_1_0_LowCH18675-1857.5



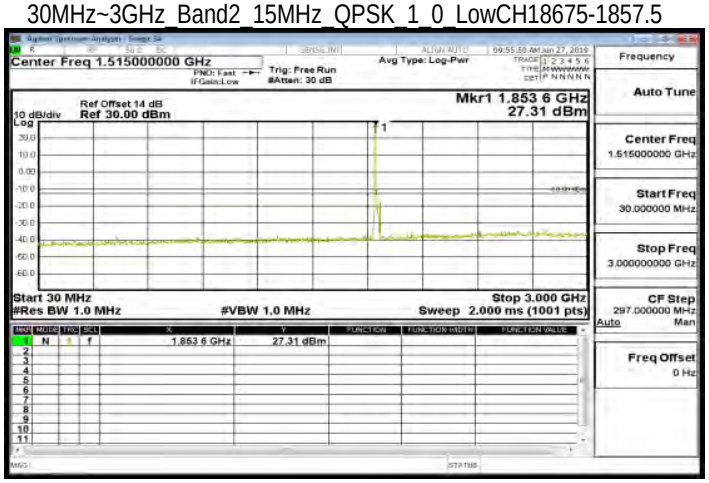
3GHz~10GHz_Band2_10MHz_QPSK_1_0_HighCH19150-1905



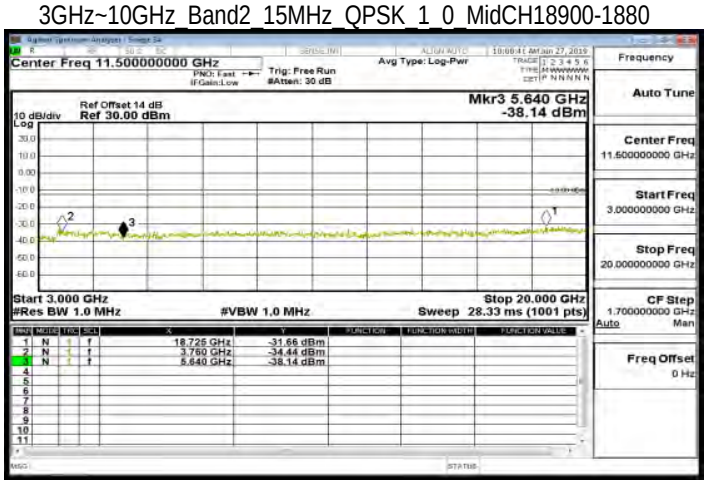
30MHz~3GHz_Band2_15MHz_QPSK_1_0_MidCH18900-1880



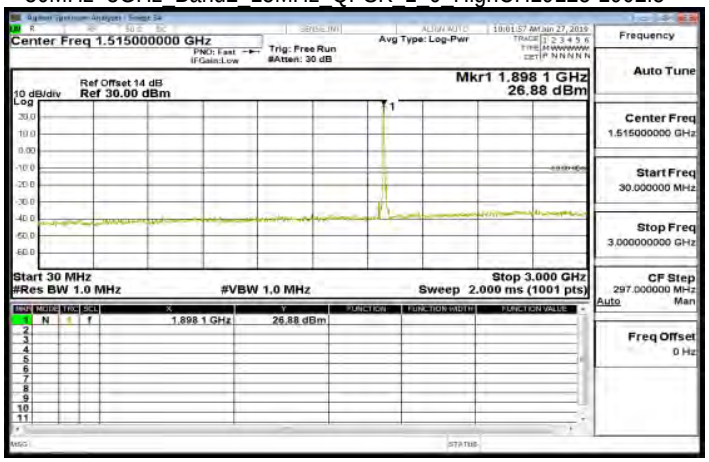
30MHz~3GHz_Band2_15MHz_QPSK_1_0_LowCH18675-1857.5



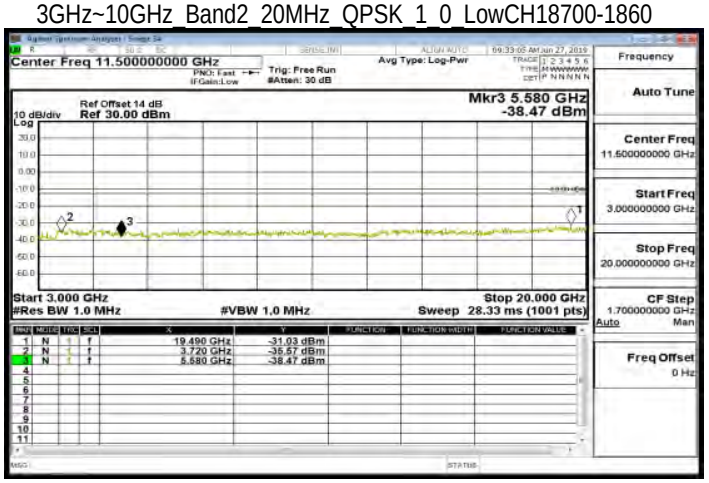
3GHz~10GHz_Band2_15MHz_QPSK_1_0_MidCH18900-1880



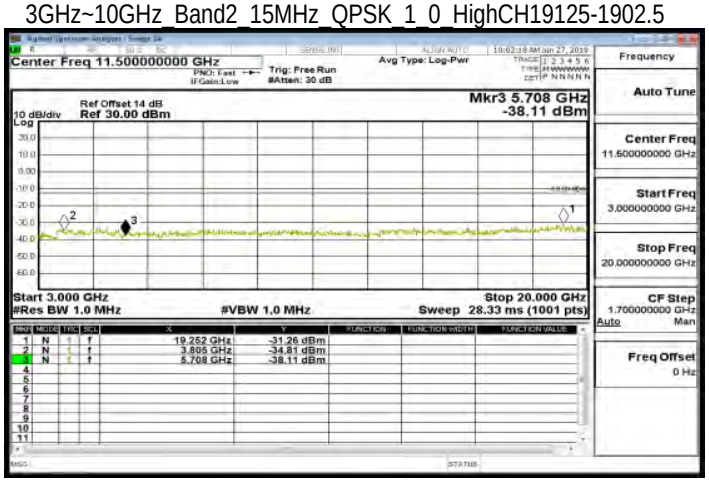
30MHz~3GHz_Band2_15MHz_QPSK_1_0_HighCH19125-1902.5



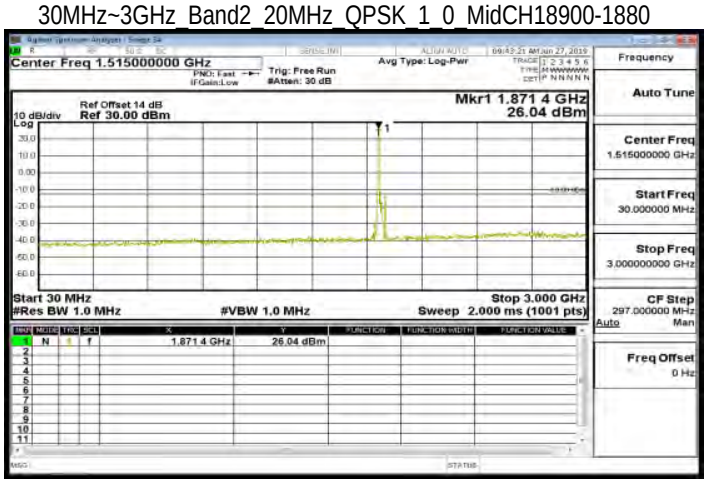
3GHz~10GHz_Band2_20MHz_QPSK_1_0_LowCH18700-1860



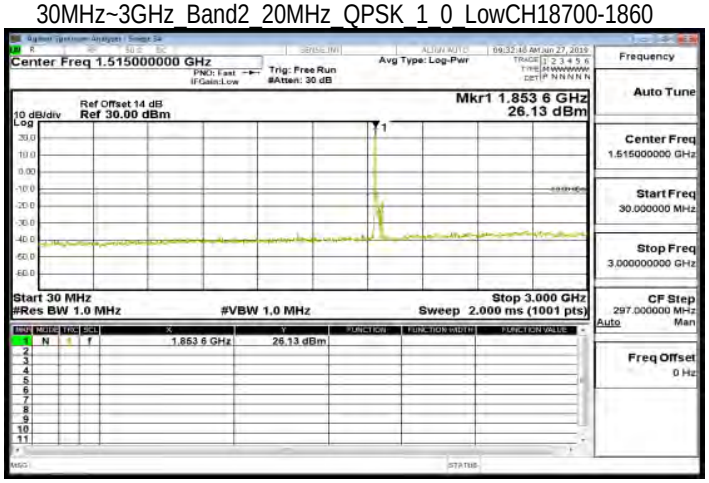
3GHz~10GHz_Band2_15MHz_QPSK_1_0_HighCH19125-1902.5



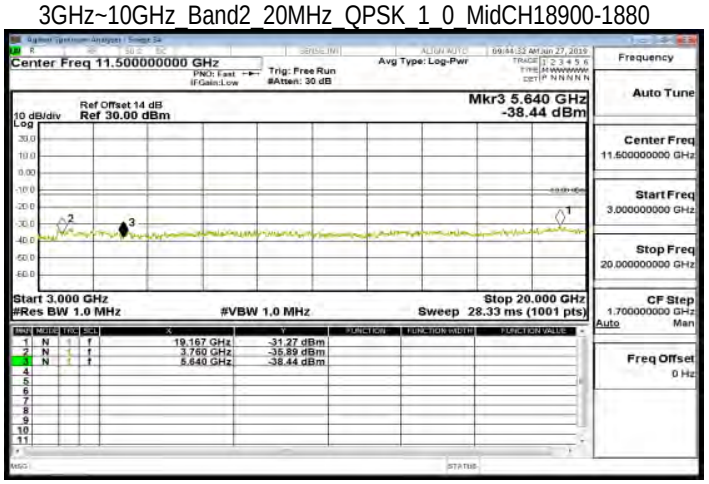
30MHz~3GHz_Band2_20MHz_QPSK_1_0_MidCH18900-1880



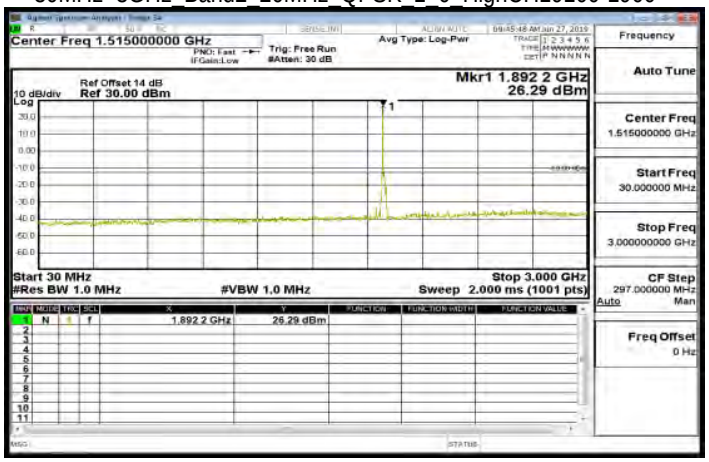
30MHz~3GHz_Band2_20MHz_QPSK_1_0_LowCH18700-1860



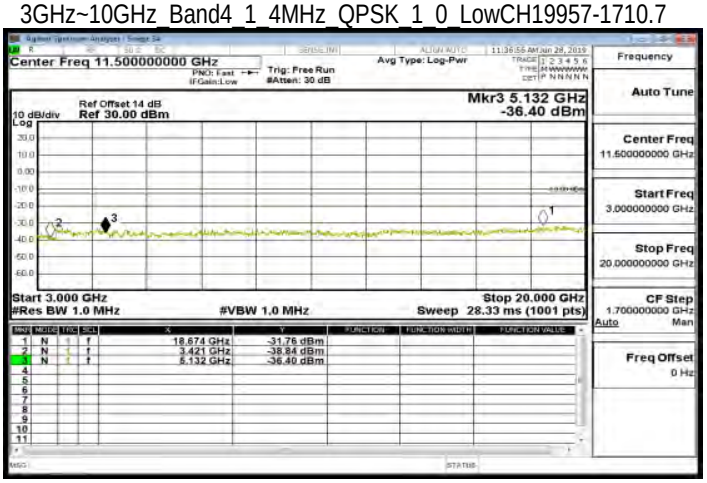
3GHz~10GHz_Band2_20MHz_QPSK_1_0_MidCH18900-1880



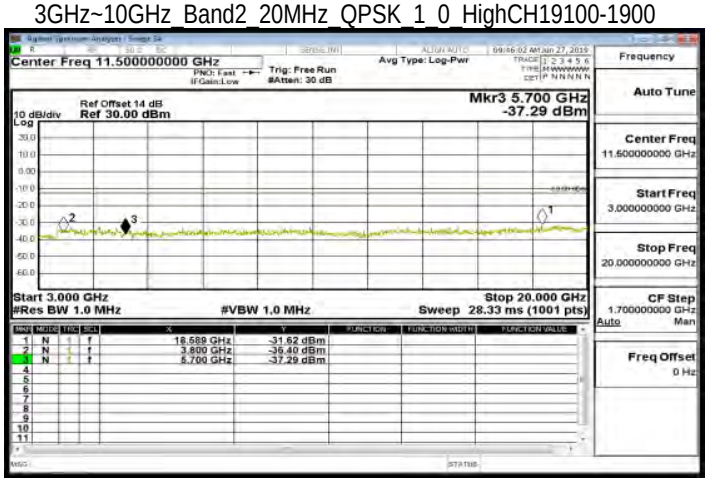
30MHz~3GHz_Band2_20MHz_QPSK_1_0_HighCH19100-1900



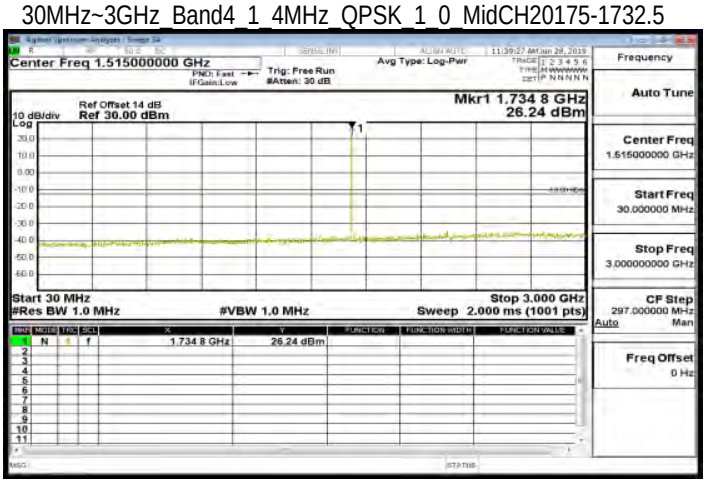
3GHz~10GHz_Band4_1_4MHz_QPSK_1_0_LowCH19957-1710.7



3GHz~10GHz_Band2_20MHz_QPSK_1_0_HighCH19100-1900



30MHz~3GHz_Band4_1_4MHz_QPSK_1_0_MidCH20175-1732.5



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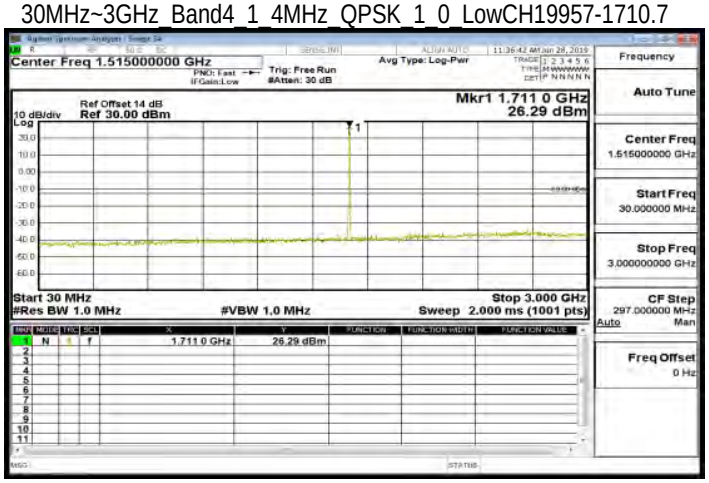
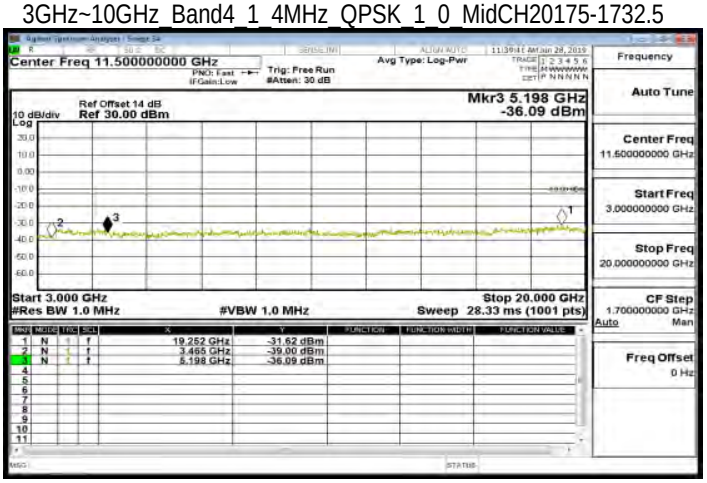
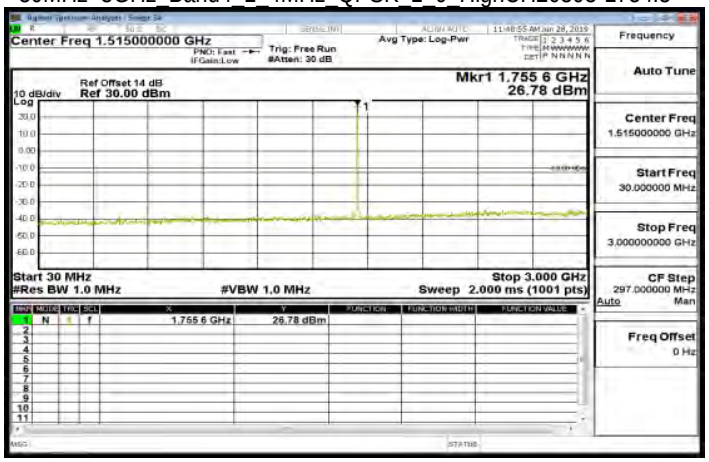


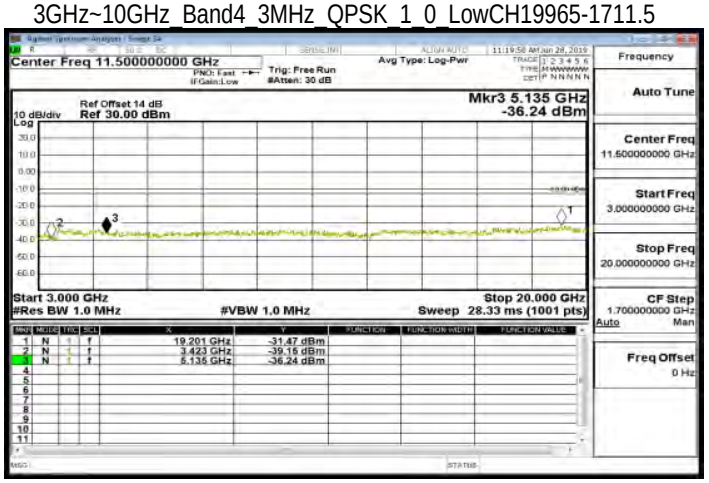
3GHz~10GHz_Band4_1_4MHz_QPSK_1_0_MidCH20175-1732.5



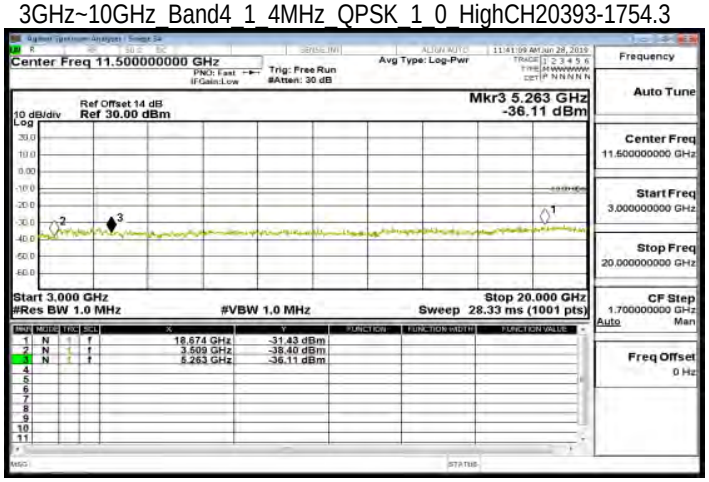
30MHz~3GHz_Band4_1_4MHz_QPSK_1_0_HighCH20393-1754.3



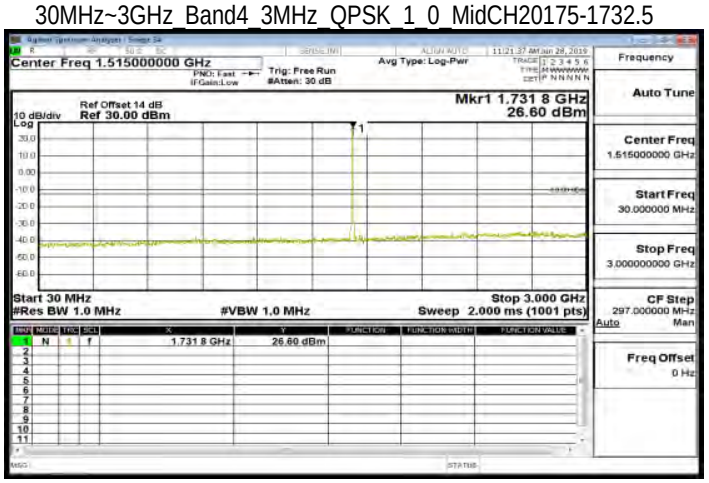
3GHz~10GHz_Band4_3MHz_QPSK_1_0_LowCH19965-1711.5



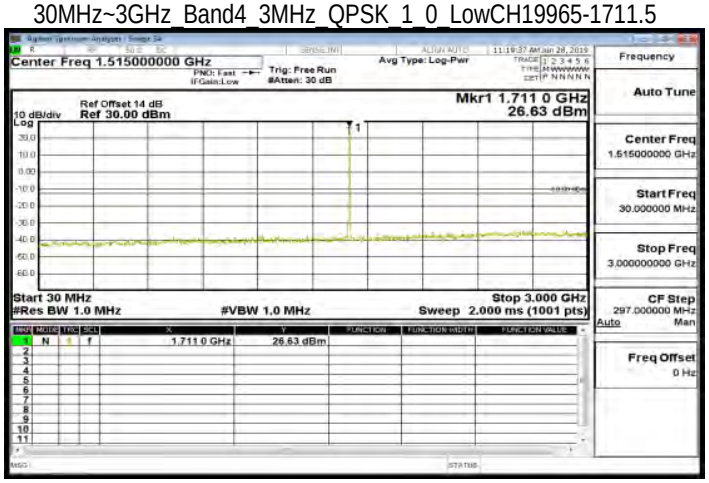
3GHz~10GHz_Band4_1_4MHz_QPSK_1_0_HighCH20393-1754.3



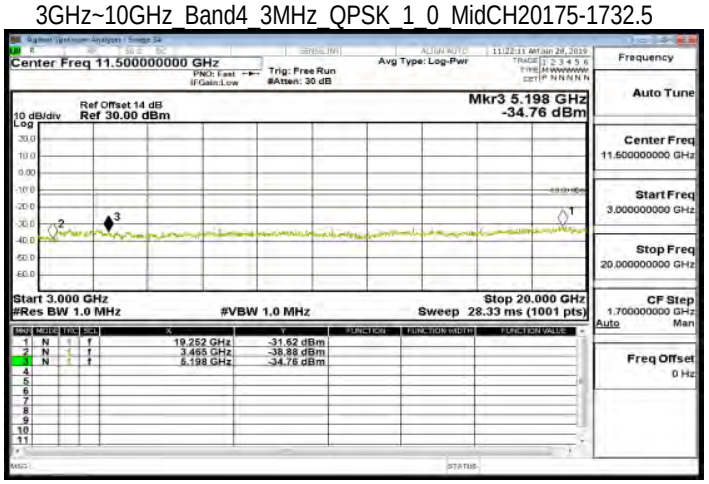
30MHz~3GHz_Band4_3MHz_QPSK_1_0_MidCH20175-1732.5



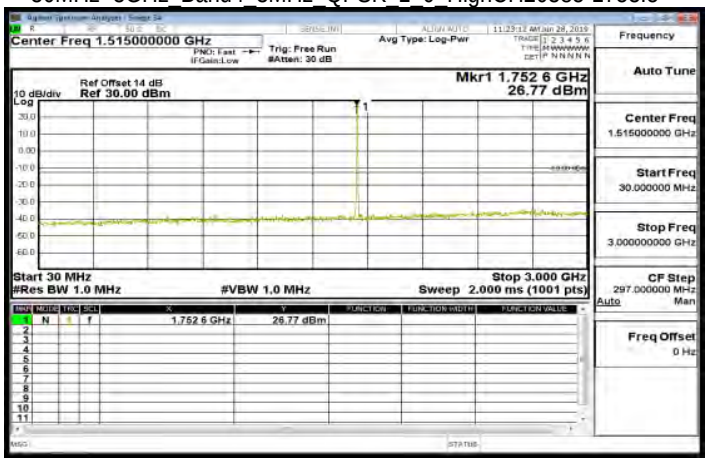
30MHz~3GHz_Band4_3MHz_QPSK_1_0_LowCH19965-1711.5



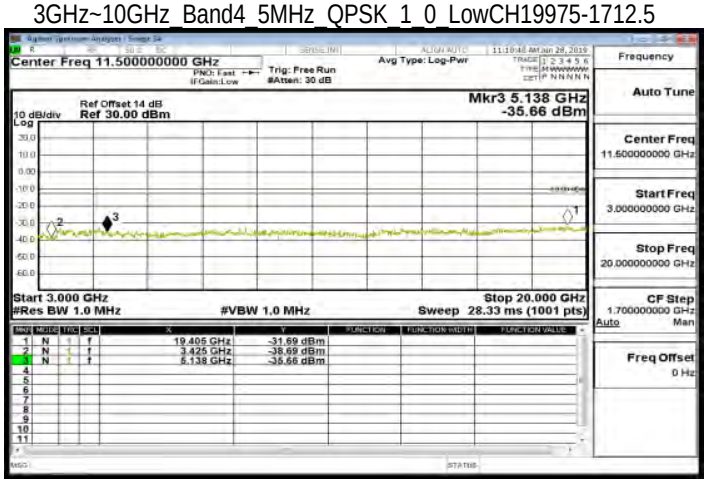
3GHz~10GHz_Band4_3MHz_QPSK_1_0_MidCH20175-1732.5



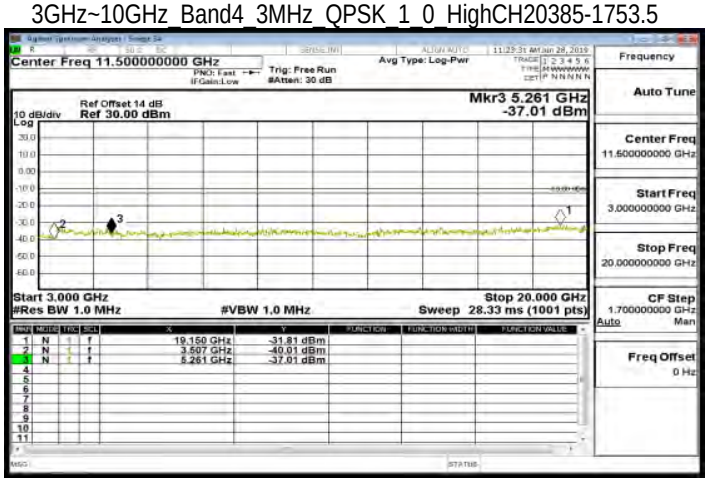
30MHz~3GHz_Band4_3MHz_QPSK_1_0_HighCH20385-1753.5



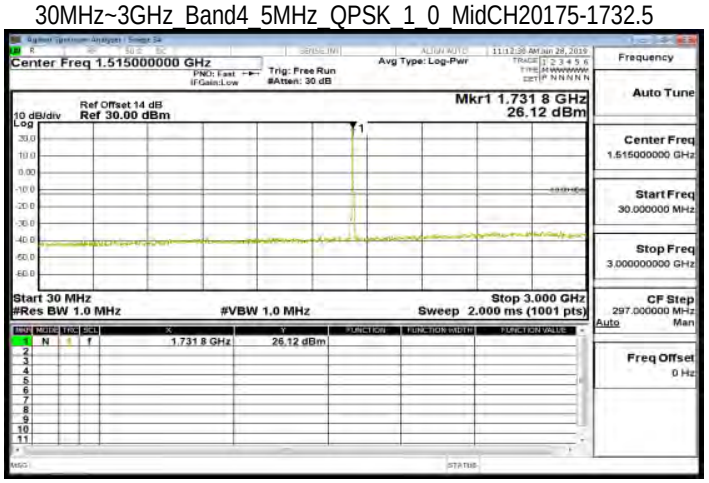
3GHz~10GHz_Band4_5MHz_QPSK_1_0_LowCH19975-1712.5



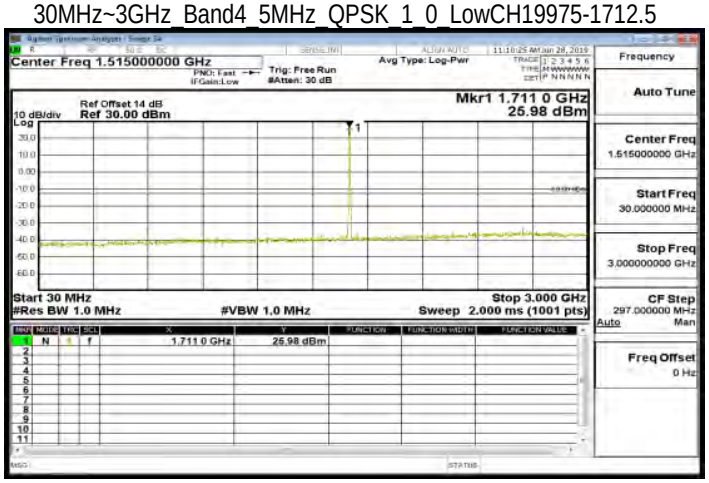
3GHz~10GHz_Band4_3MHz_QPSK_1_0_HighCH20385-1753.5



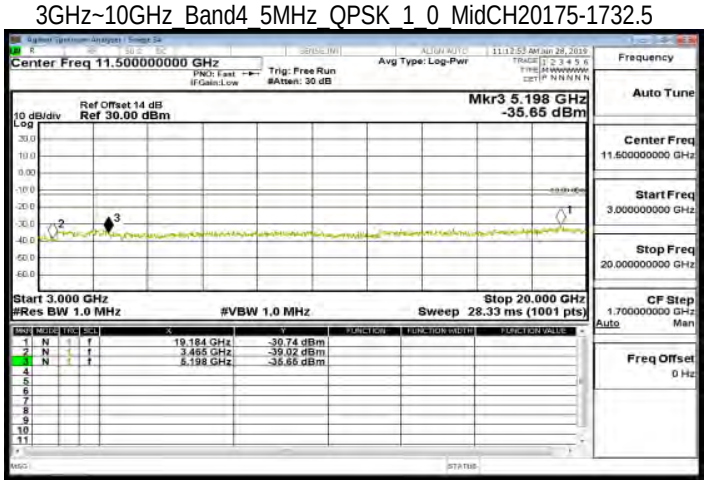
30MHz~3GHz_Band4_5MHz_QPSK_1_0_MidCH20175-1732.5



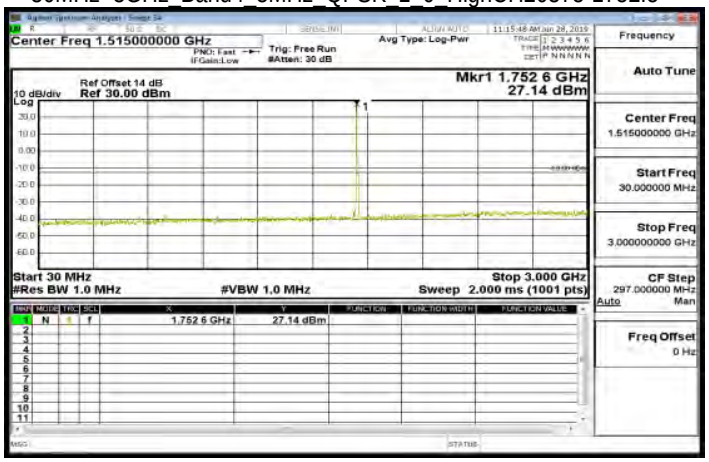
30MHz~3GHz_Band4_5MHz_QPSK_1_0_LowCH19975-1712.5



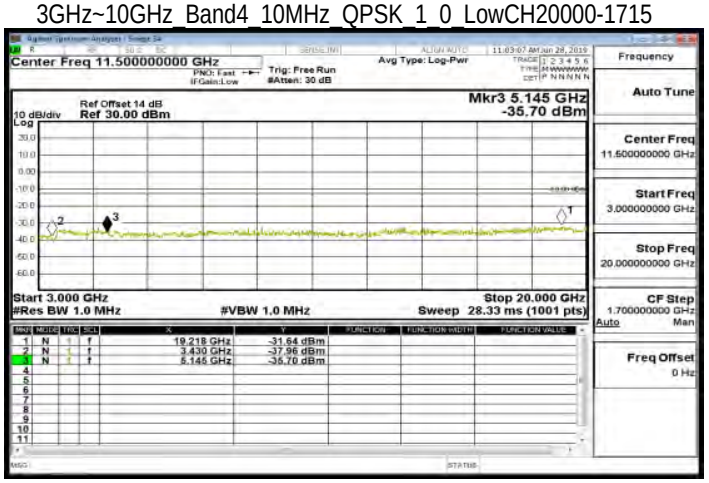
3GHz~10GHz_Band4_5MHz_QPSK_1_0_MidCH20175-1732.5



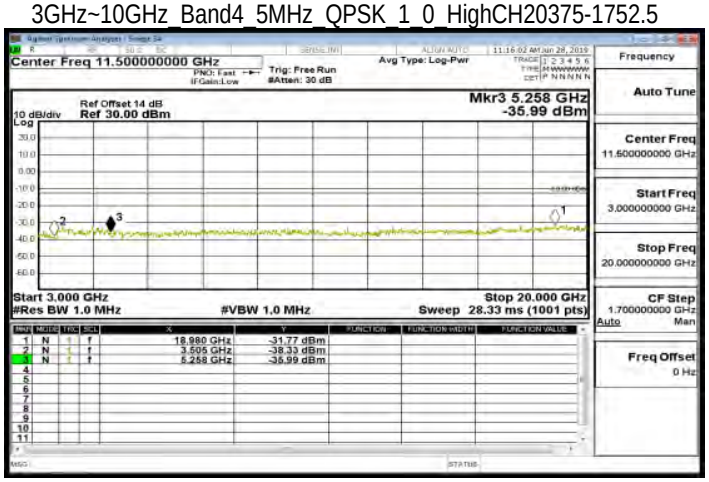
30MHz~3GHz_Band4_5MHz_QPSK_1_0_HighCH20375-1752.5



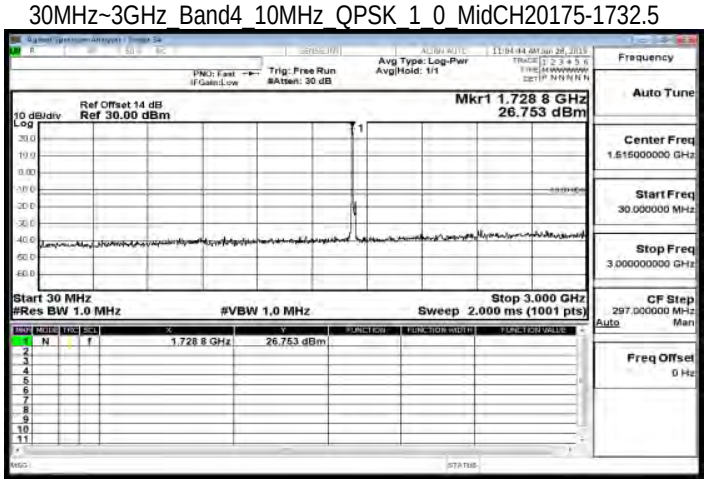
3GHz~10GHz_Band4_10MHz_QPSK_1_0_LowCH20000-1715



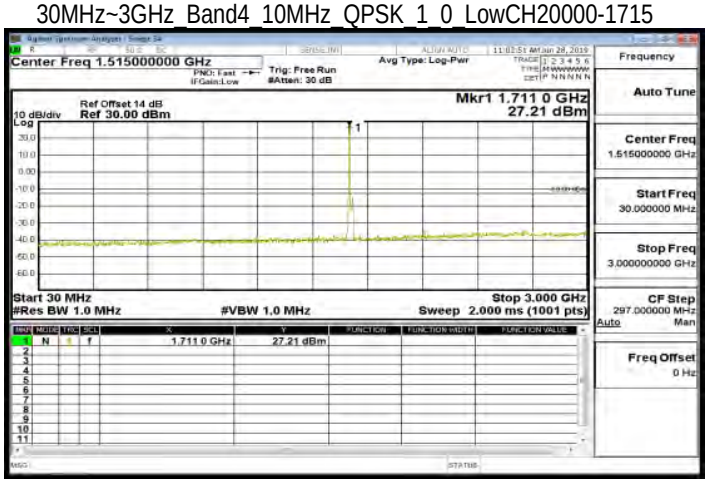
3GHz~10GHz_Band4_5MHz_QPSK_1_0_HighCH20375-1752.5



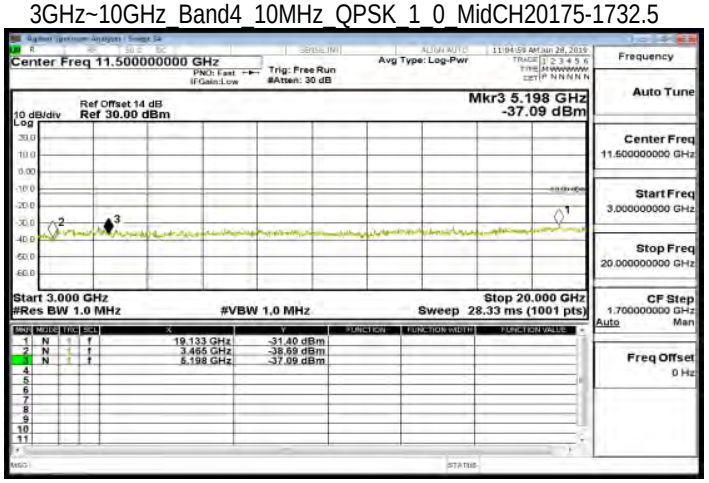
30MHz~3GHz_Band4_10MHz_QPSK_1_0_MidCH20175-1732.5



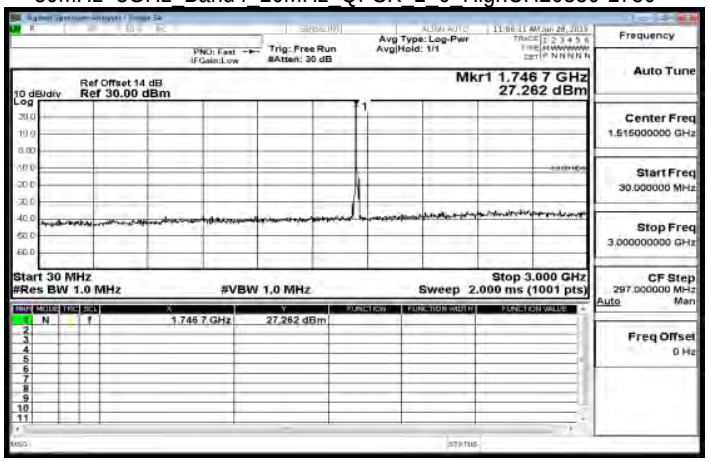
30MHz~3GHz_Band4_10MHz_QPSK_1_0_LowCH20000-1715



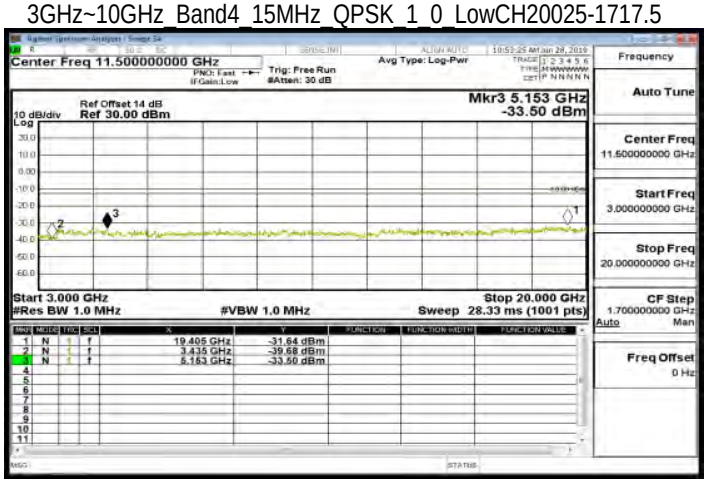
3GHz~10GHz_Band4_10MHz_QPSK_1_0_MidCH20175-1732.5



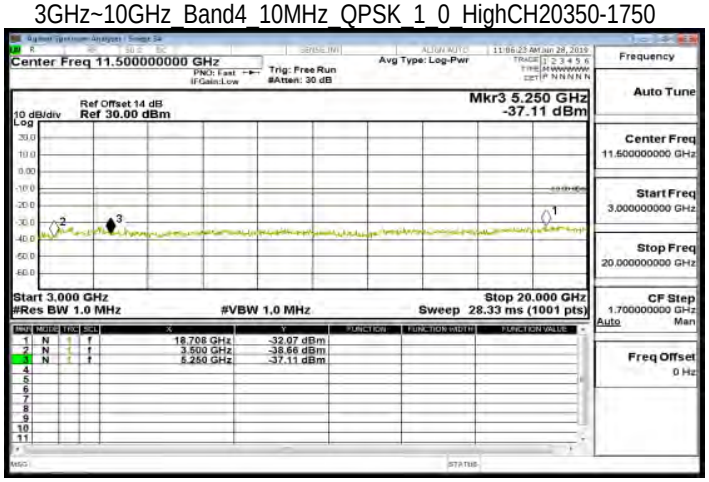
30MHz~3GHz_Band4_10MHz_QPSK_1_0_HighCH20350-1750



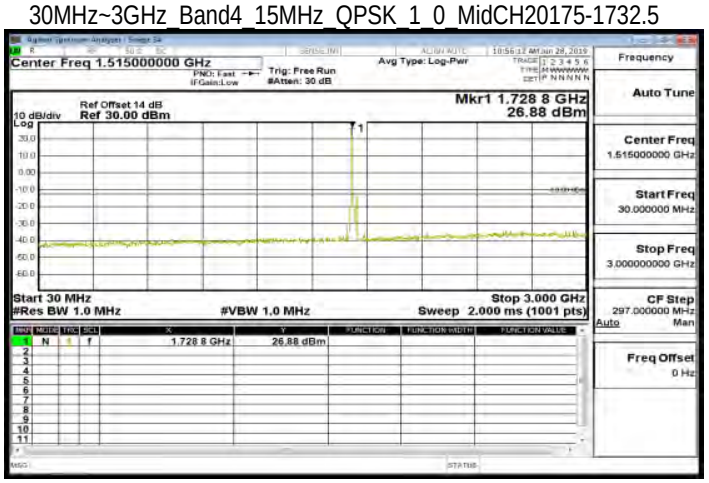
3GHz~10GHz_Band4_15MHz_QPSK_1_0_LowCH20025-1717.5



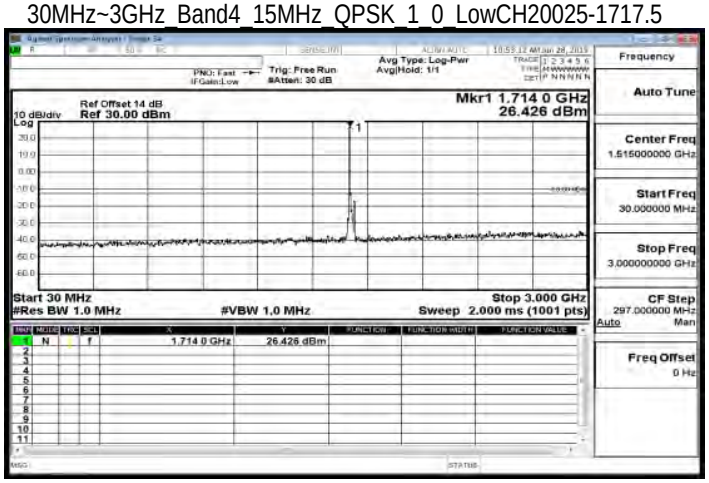
3GHz~10GHz_Band4_10MHz_QPSK_1_0_HighCH20350-1750



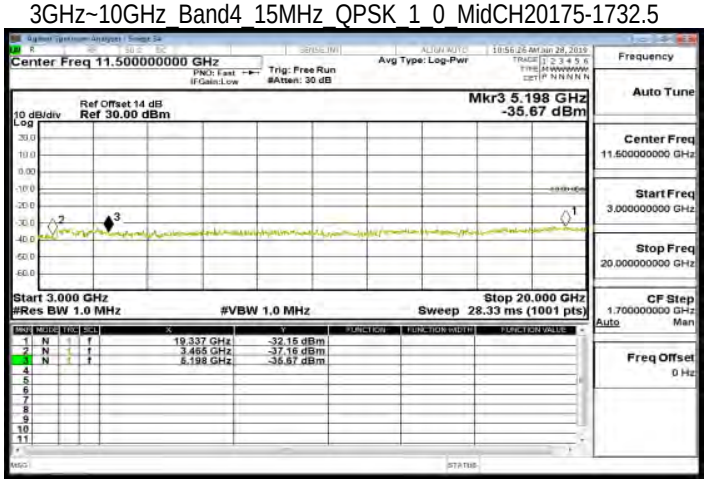
30MHz~3GHz_Band4_15MHz_QPSK_1_0_MidCH20175-1732.5



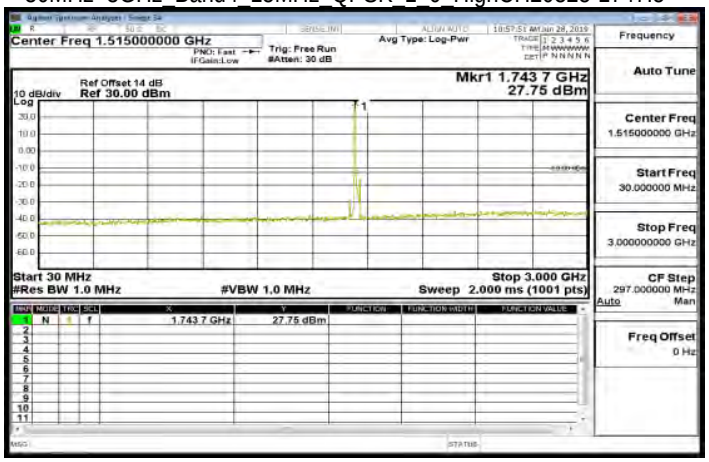
30MHz~3GHz_Band4_15MHz_QPSK_1_0_LowCH20025-1717.5



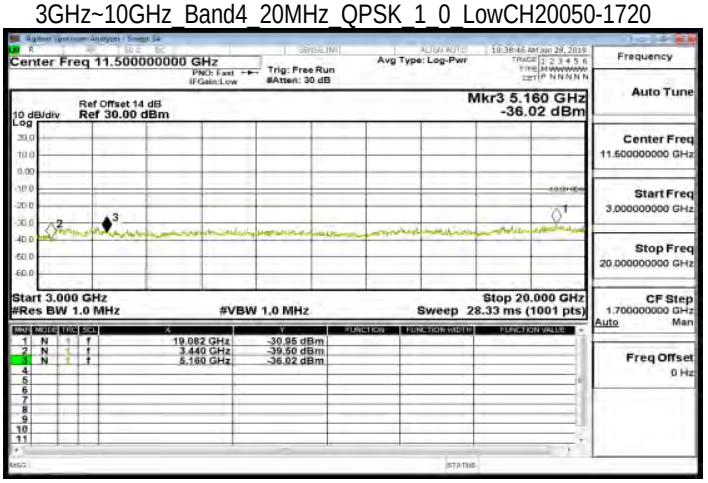
3GHz~10GHz_Band4_15MHz_QPSK_1_0_MidCH20175-1732.5



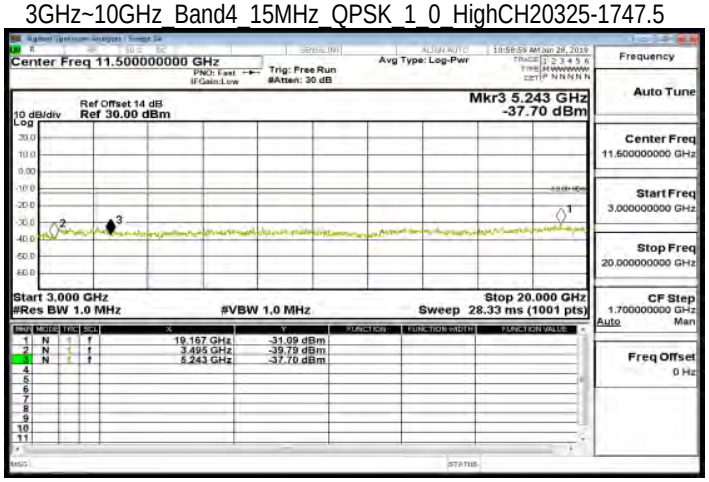
30MHz~3GHz_Band4_15MHz_QPSK_1_0_HighCH20325-1747.5



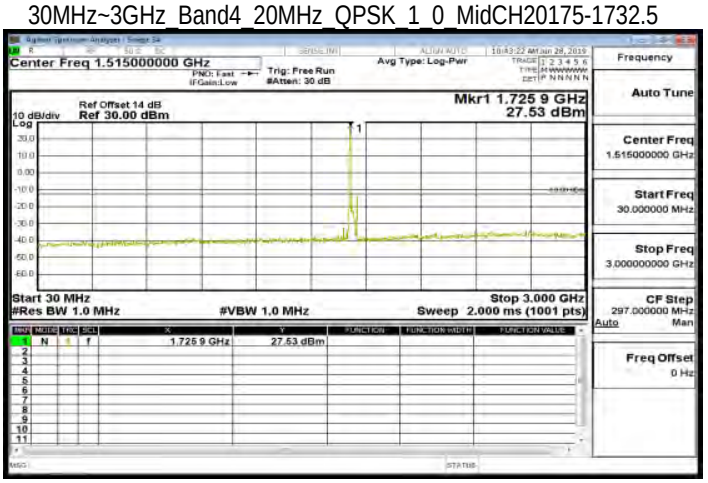
3GHz~10GHz_Band4_20MHz_QPSK_1_0_LowCH20050-1720



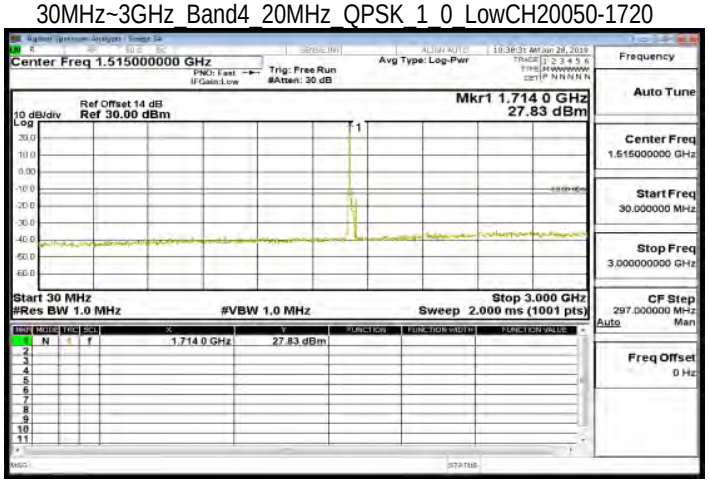
3GHz~10GHz_Band4_15MHz_QPSK_1_0_HighCH20325-1747.5



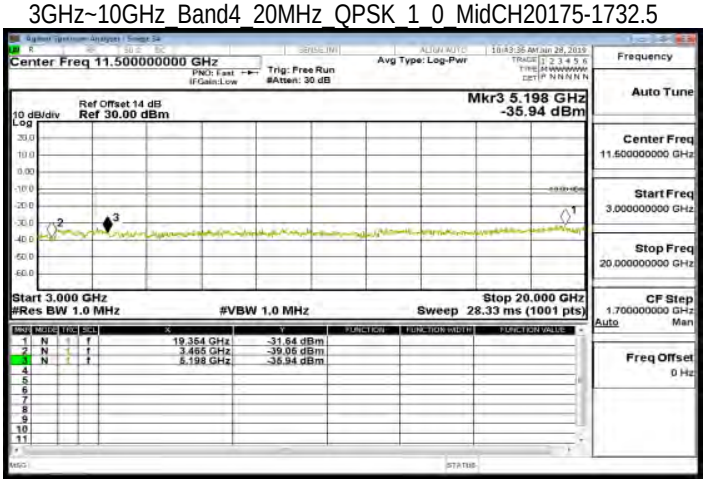
30MHz~3GHz_Band4_20MHz_QPSK_1_0_MidCH20175-1732.5



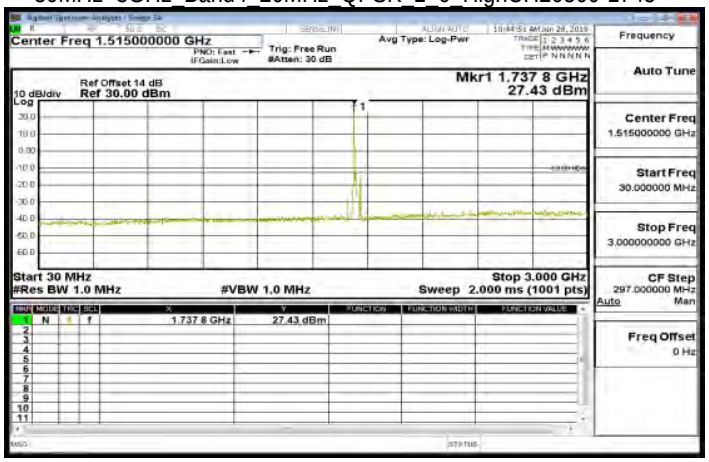
30MHz~3GHz_Band4_20MHz_QPSK_1_0_LowCH20050-1720



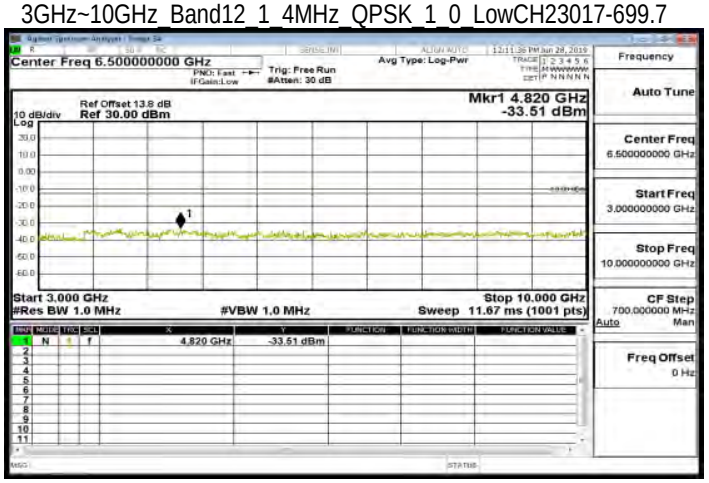
3GHz~10GHz_Band4_20MHz_QPSK_1_0_MidCH20175-1732.5



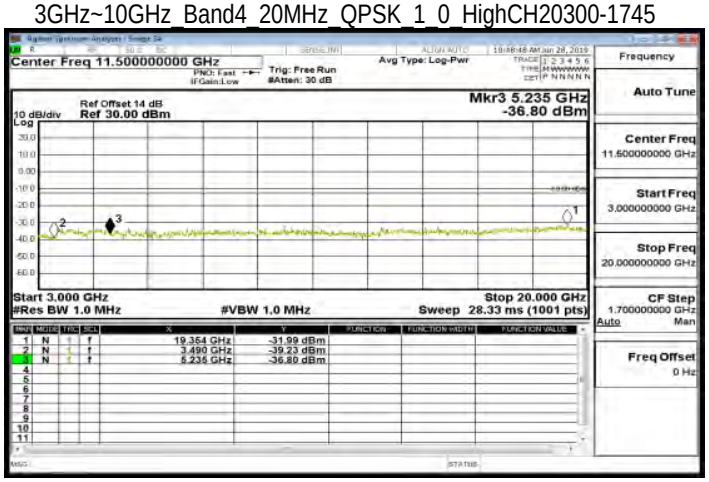
30MHz~3GHz_Band4_20MHz_QPSK_1_0_HighCH20300-1745



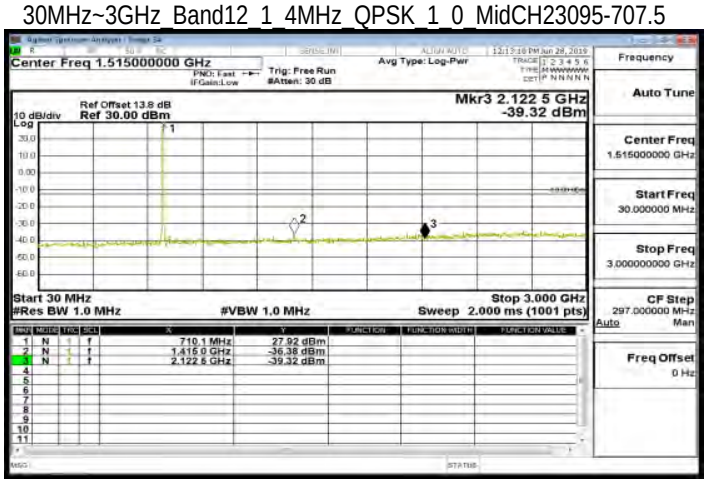
3GHz~10GHz_Band12_1_4MHz_QPSK_1_0_LowCH23017-699.7



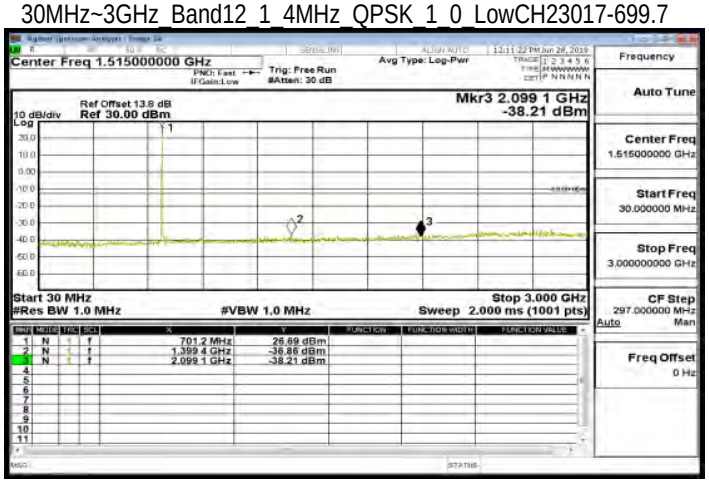
3GHz~10GHz_Band4_20MHz_QPSK_1_0_HighCH20300-1745



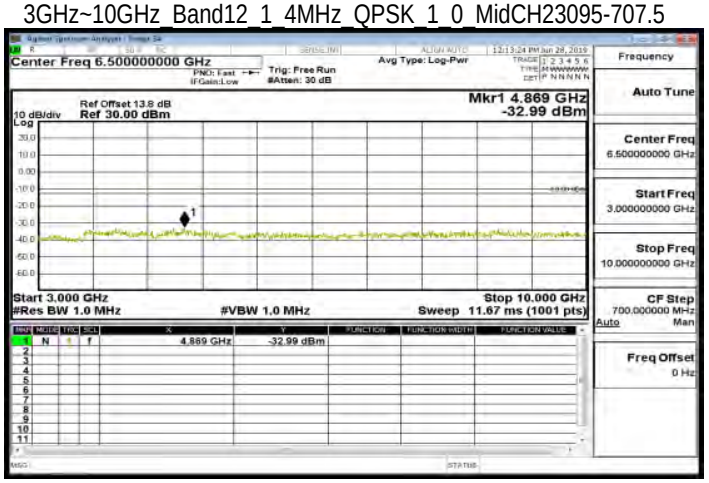
30MHz~3GHz_Band12_1_4MHz_QPSK_1_0_MidCH23095-707.5



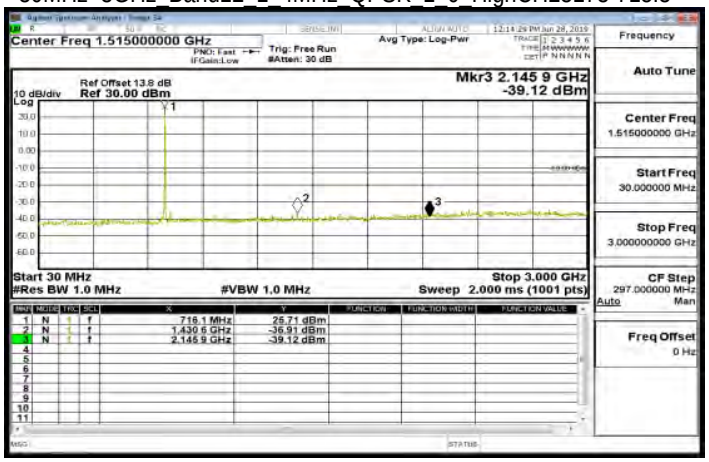
30MHz~3GHz_Band12_1_4MHz_QPSK_1_0_LowCH23017-699.7



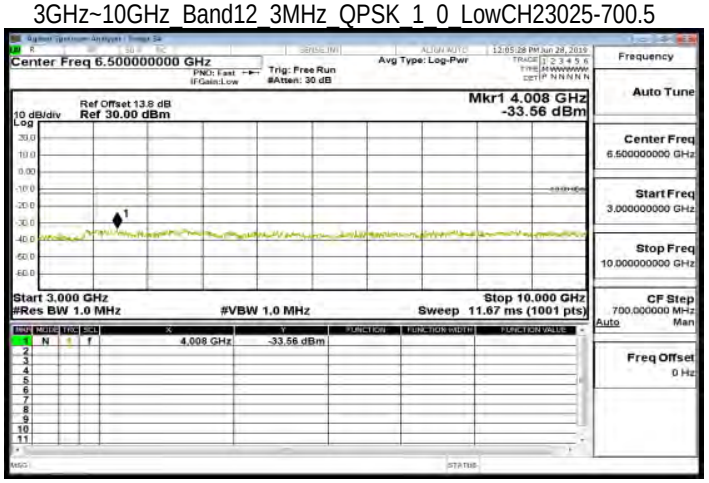
3GHz~10GHz_Band12_1_4MHz_QPSK_1_0_MidCH23095-707.5



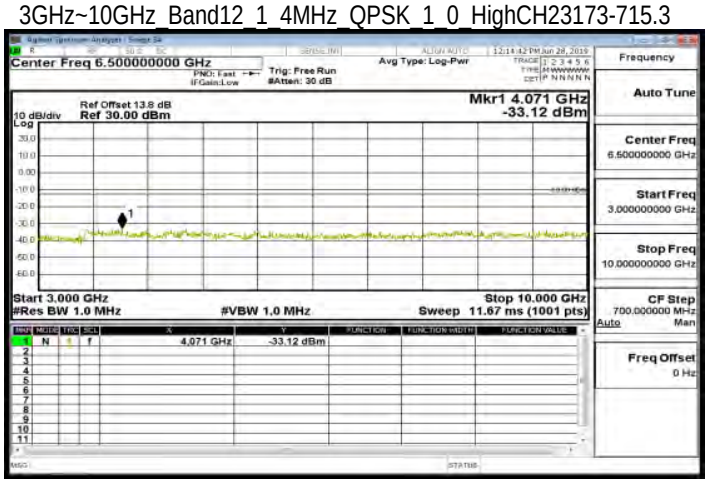
30MHz~3GHz_Band12_1_4MHz_QPSK_1_0_HighCH23173-715.3



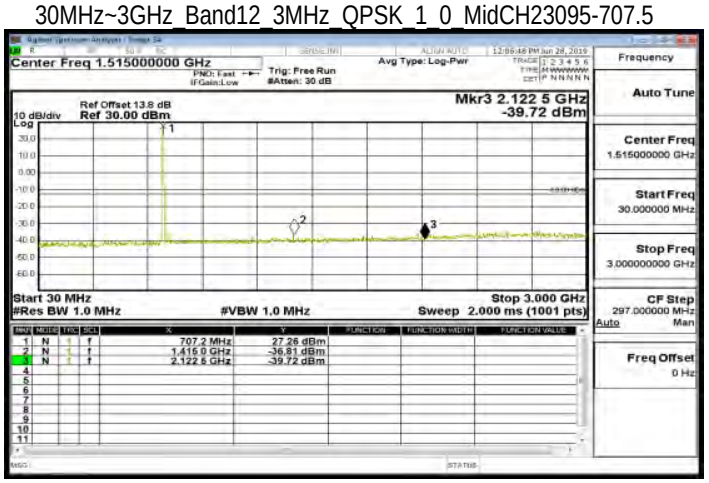
3GHz~10GHz_Band12_3MHz_QPSK_1_0_LowCH23025-700.5



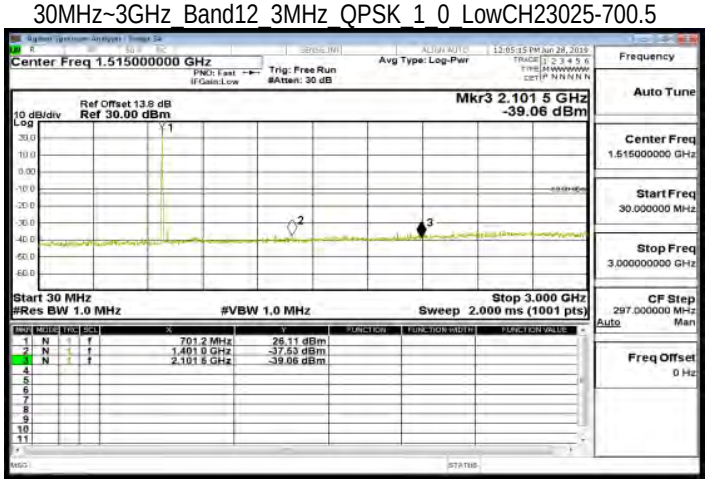
3GHz~10GHz_Band12_1_4MHz_QPSK_1_0_HighCH23173-715.3



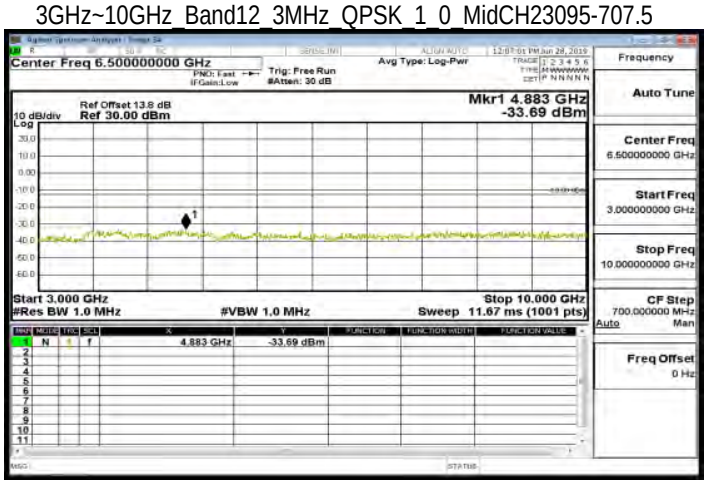
30MHz~3GHz_Band12_3MHz_QPSK_1_0_MidCH23095-707.5



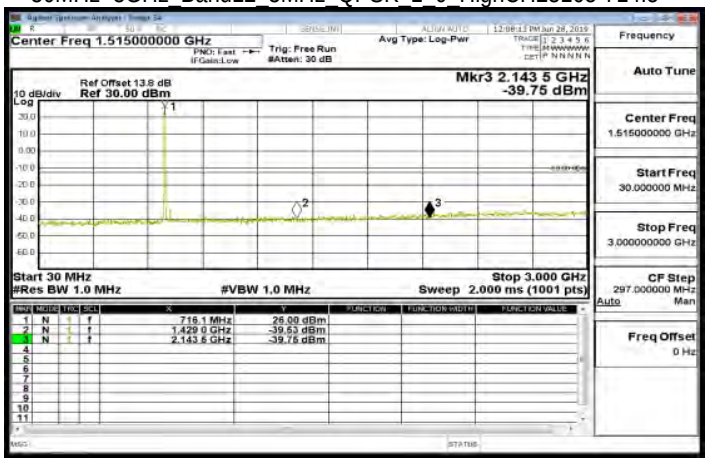
30MHz~3GHz_Band12_3MHz_QPSK_1_0_LowCH23025-700.5



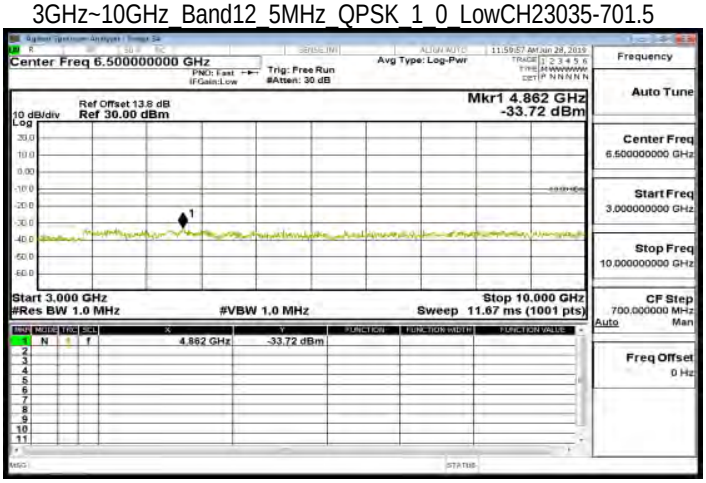
3GHz~10GHz_Band12_3MHz_QPSK_1_0_MidCH23095-707.5



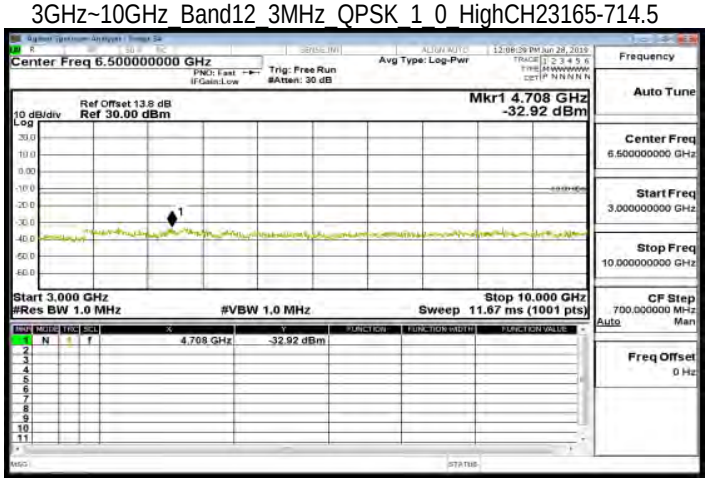
30MHz~3GHz_Band12_3MHz_QPSK_1_0_HighCH23165-714.5



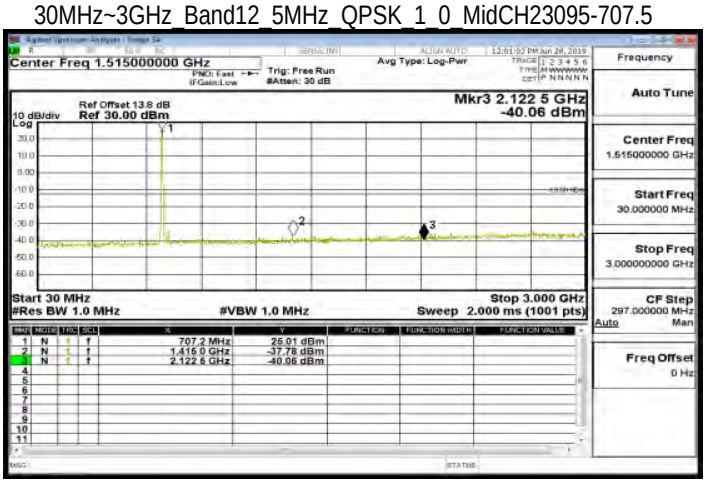
3GHz~10GHz_Band12_5MHz_QPSK_1_0_LowCH23035-701.5



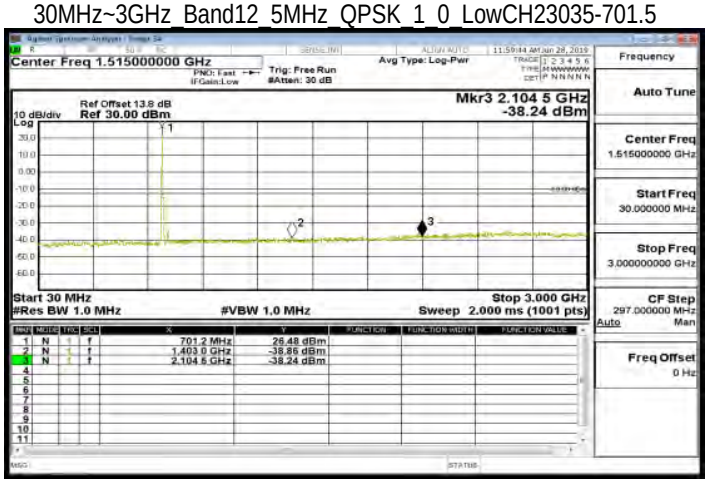
3GHz~10GHz_Band12_3MHz_QPSK_1_0_HighCH23165-714.5



30MHz~3GHz_Band12_5MHz_QPSK_1_0_MidCH23095-707.5



30MHz~3GHz_Band12_5MHz_QPSK_1_0_LowCH23035-701.5



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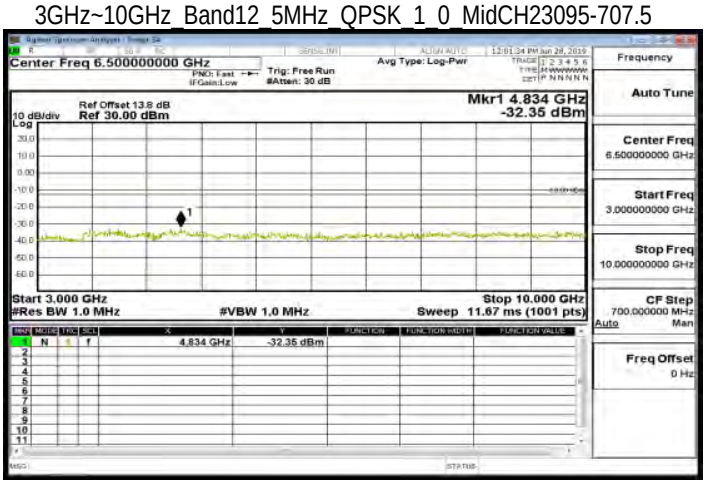

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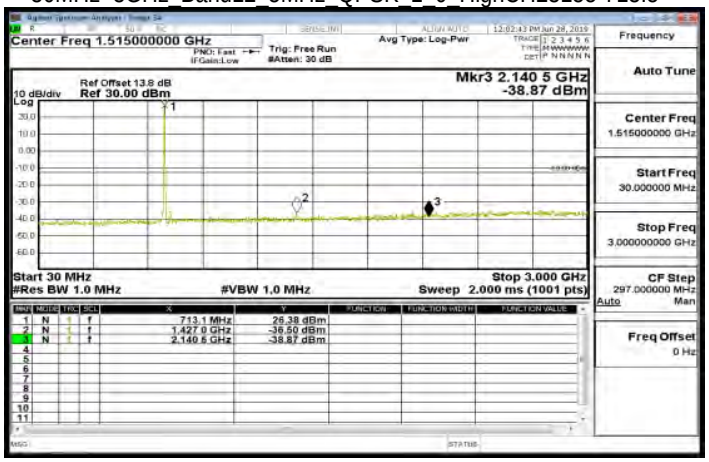

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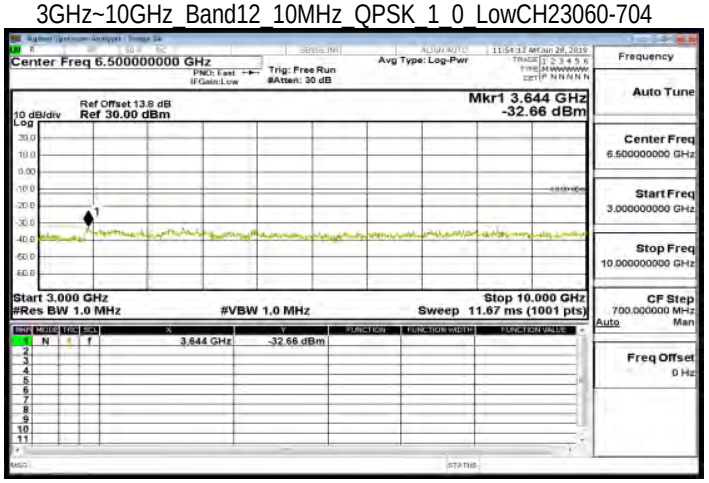

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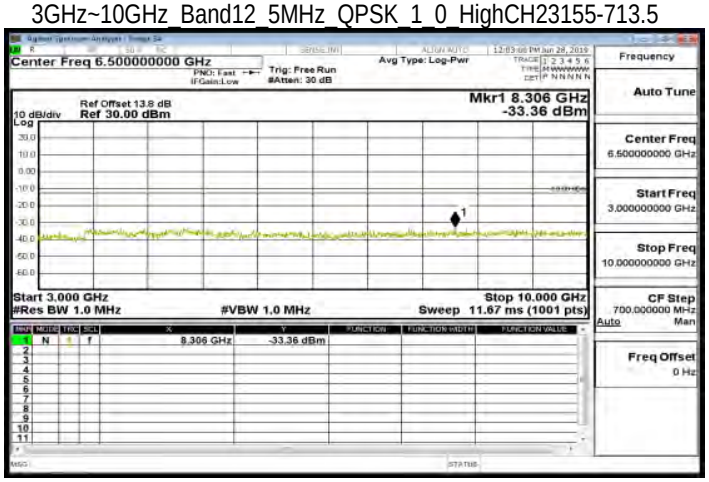

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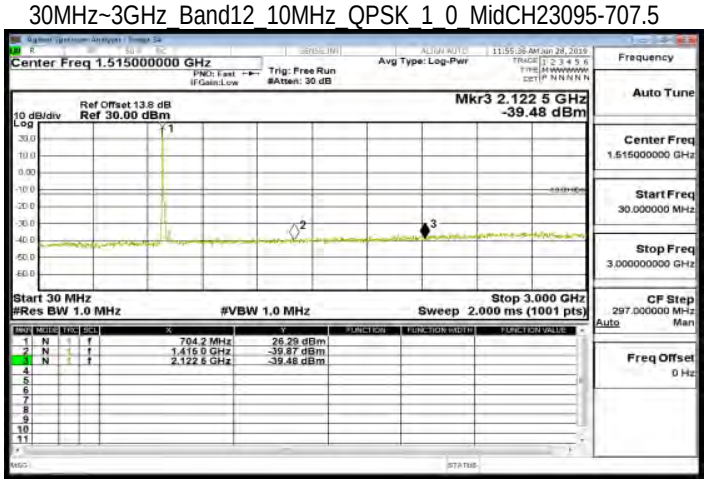
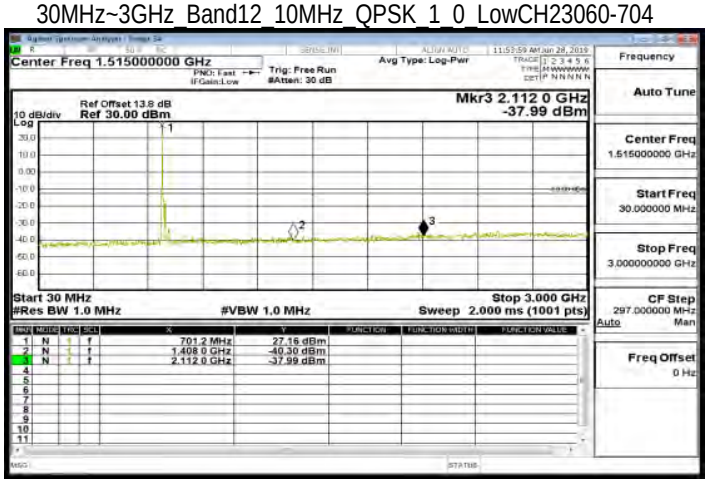


30MHz~3GHz_Band12_10MHz_QPSK_1_0_LowCH23060-704



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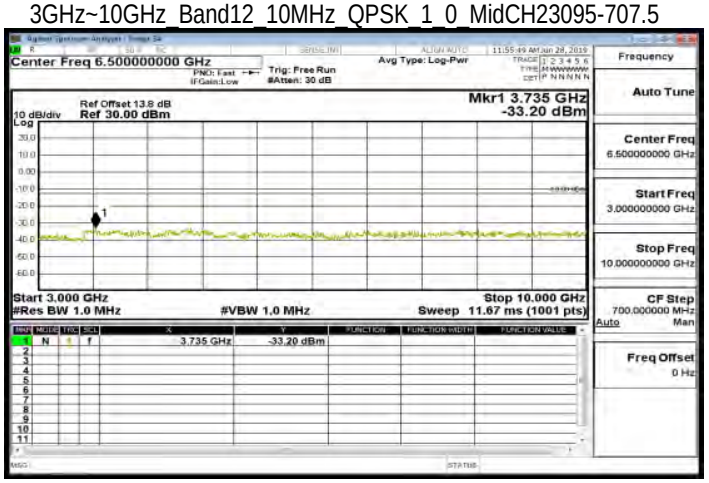
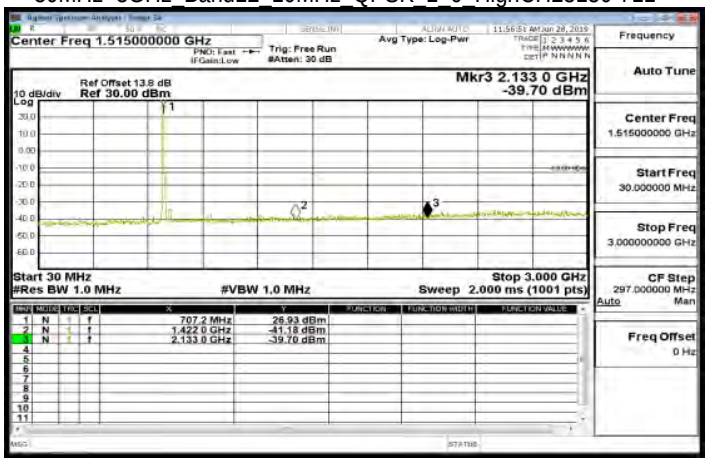
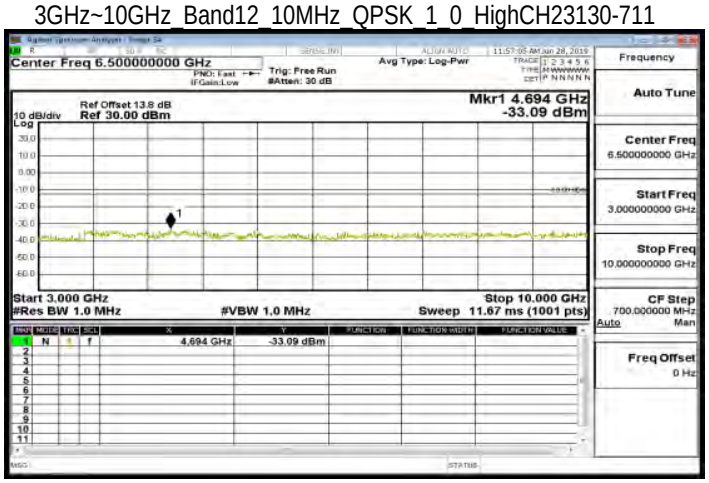


30MHz~3GHz_Band12_10MHz_QPSK_1_0_HighCH23130-711



3GHz~10GHz_Band12_10MHz_QPSK_1_0_HighCH23130-711



9. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

9.1. Standard Applicable

FCC§24.238(a) , §27.53 (h) , the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than 43 + 10 log (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm).

§27.53 (c)
(2) On any frequency outside the 776– 788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB (-13dBm)

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

§27.53 (f) 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. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

FCC §27.53(c) (5) & FCC §27.53(g)
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.

FCC §27.53(h) (3)

Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

FCC §27.53(m) (4) (6)

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 that 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.

Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, 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; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

According to RSS-133 §6.5.1
Equipment shall comply with the limits in (i) and (ii) below.
(i) In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

According to RSS-139 §6.5
(i) In the first 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least 43 + 10 log10(P), dB.
(ii) After the first 1.0 MHz outside the equipment's operating frequency block, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in watts) by at least 43 + 10 log10(P), dB.

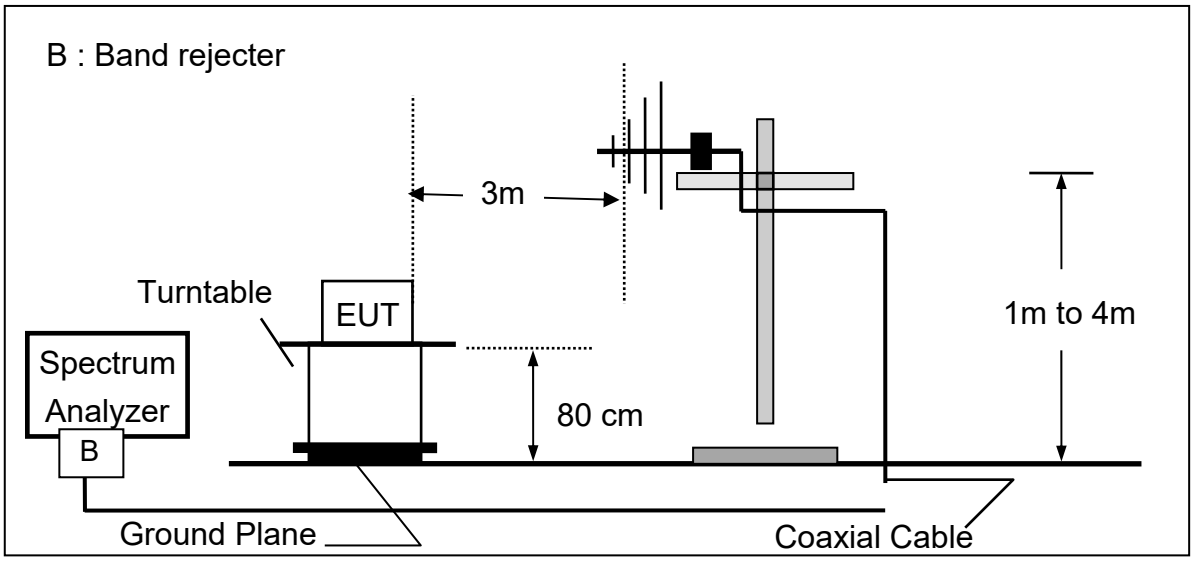
Table 2 — Unwanted Emissions for Mobile, Portable and Low-Power Fixed Subscriber Equipment

Frequency (MHz)	Attenuation (dB)
<2200	$43 + 10 \log_{10}(p)$
2200 - 2288	$70 + 10 \log_{10}(p)$
2288 - 2292	$67 + 10 \log_{10}(p)$
2292 - 2296	$61 + 10 \log_{10}(p)$
2296 - 2300	$55 + 10 \log_{10}(p)$
2300 - 2305	$43 + 10 \log_{10}(p)$
2305 - 2320	$43 + 10 \log_{10}(p)$ Note
2320 - 2324	$55 + 10 \log_{10}(p)$
2324 - 2328	$61 + 10 \log_{10}(p)$
2328 - 2337	$67 + 10 \log_{10}(p)$
2337 - 2341	$61 + 10 \log_{10}(p)$
2341 - 2345	$55 + 10 \log_{10}(p)$
2345 - 2360	$43 + 10 \log_{10}(p)$ Note
2360 - 2365	$43 + 10 \log_{10}(p)$
2365 - 2395	$70 + 10 \log_{10}(p)$
>2395	$43 + 10 \log_{10}(p)$

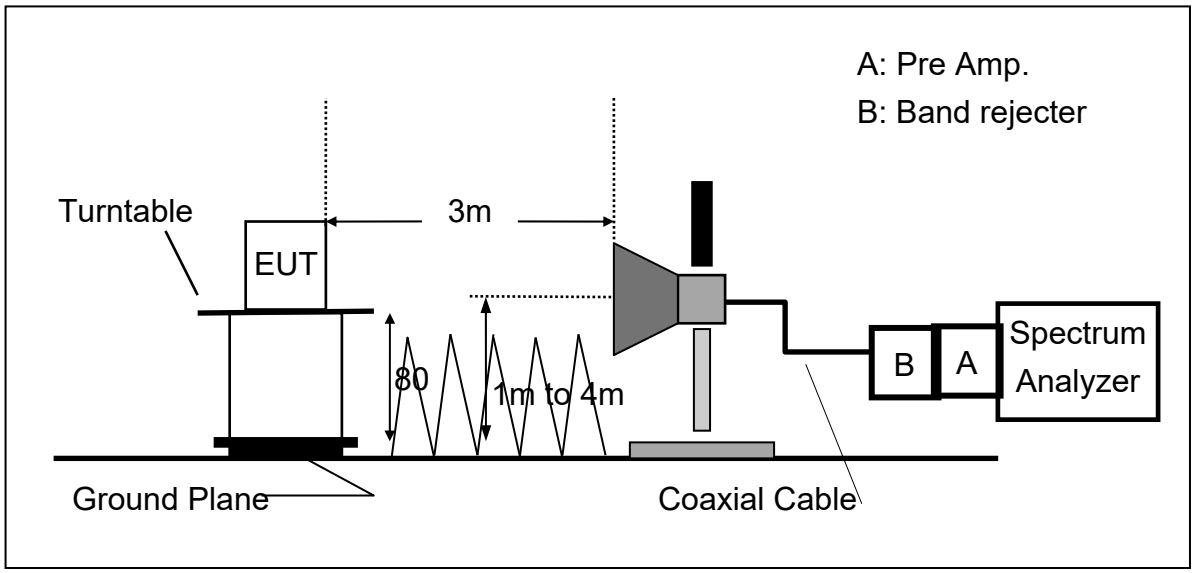
Note: Measured at the edges of the highest and lowest frequency range(s) in which the equipment is designed to operate. See Section 1.2 for the permitted frequency ranges for various equipment types.

9.2. EUT Setup

Radiated Emission Test Set-Up, Frequency Below 1000MHz



Radiated Emission Test Set-UP Frequency Over 1 GHz



9.3. Measurement Procedure:

The EUT was placed on a non-conductive; the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequencies (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.
ERP (dBm) = SG Level(dBm) + Antenna Gain(dBd) + Cable Loss(dB)
EIRP (dBm) = SG Level(dBm) + Antenna Gain(dBi) + Cable Loss(dB)

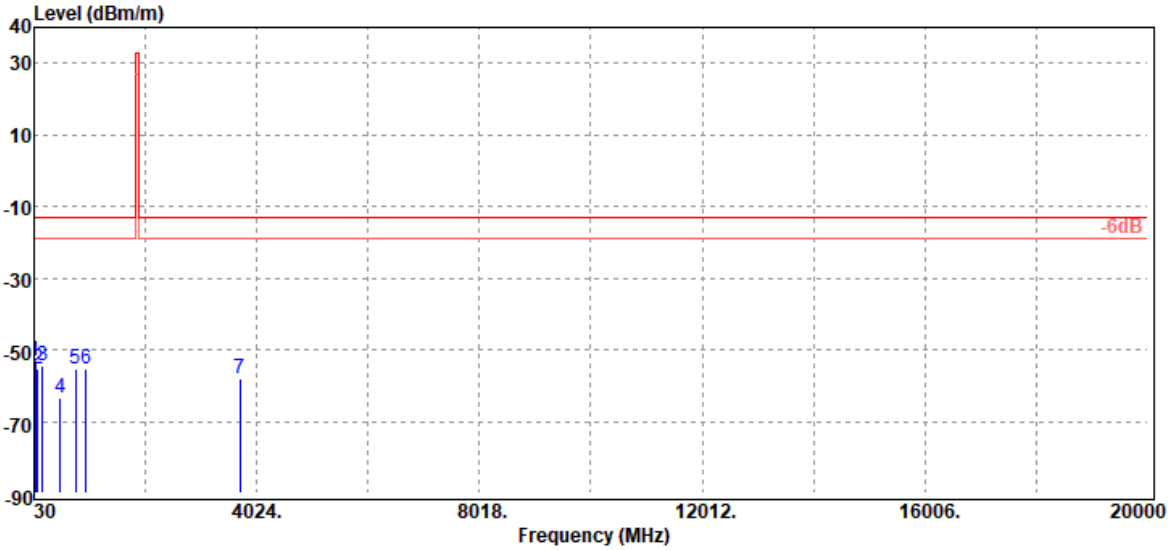
9.4. Measurement Equipment Used:

966A Chamber					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	05/29/2019	05/28/2020
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/30/2019	01/29/2020
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	02/26/2019	02/25/2020
Pre-Amplifier	EMEC	EM330	60609	02/26/2019	02/25/2020
Pre-Amplifier	HP	8449B	3008A00965	02/26/2019	02/25/2020
Horn Antenna	Schwarzbeck	BBHA9170	184	12/27/2018	12/26/2019
Horn Antenna	ETS LINDGREN	3116	26370	12/26/2018	12/25/2019
Horn Antenna	SCHWARZBECK	BBHA 9120D	779	03/09/2019	03/08/2020
Bilog Antenna	Sunol Sciences	JB3	A030105	07/13/2018	07/12/2019
Bilog Antenna	Sunol Sciences	JB1	A052609	03/06/2019	03/05/2020
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	08/20/2018	08/19/2019
Loop Antenna	COM-POWER	AL-130	121051	03/22/2019	03/21/2020
Loop Antenna	ETS.LINDGREN	6502	148045	10/08/2018	10/07/2019
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020
Anritsu	MT8820C	6201465317	01/16/2019	01/15/2020	04/19/2019
Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	02/26/2019	02/25/2020
Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/26/2019	02/25/2020
High Pass Filter	Woken	EWT-57-0209	RF43	02/26/2019	02/25/2020
High Pass Filter	R&S	F13 HPF 3GHz	RF64	02/26/2019	02/25/2020
Notch Filter	EWT	EWT-54-0037	RF53	02/26/2019	02/25/2020
Notch Filter	EWT	EWT-54-0038	RF55	02/26/2019	02/25/2020
Software	e3 V6.11-20180413				

9.5. Measurement Result:

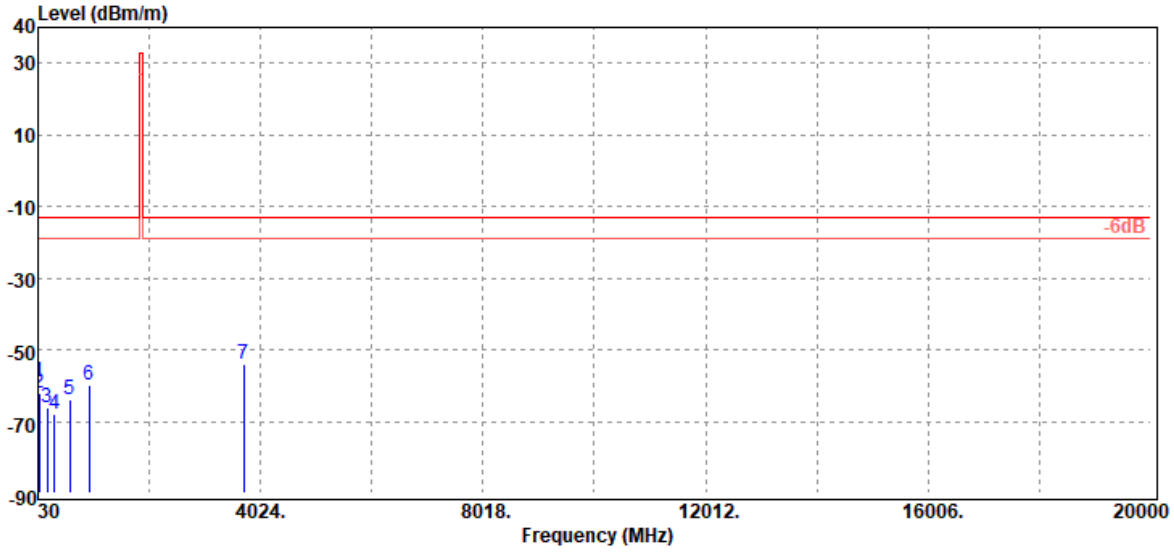
Radiated Spurious Emission Measurement Result: LTE-Band 2 (The Worst Case)

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B2 15M QPSK RB1,0	Temp./Humi.	:29/51
Test Mode	:TX CH LOW	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1857.5 MHz		



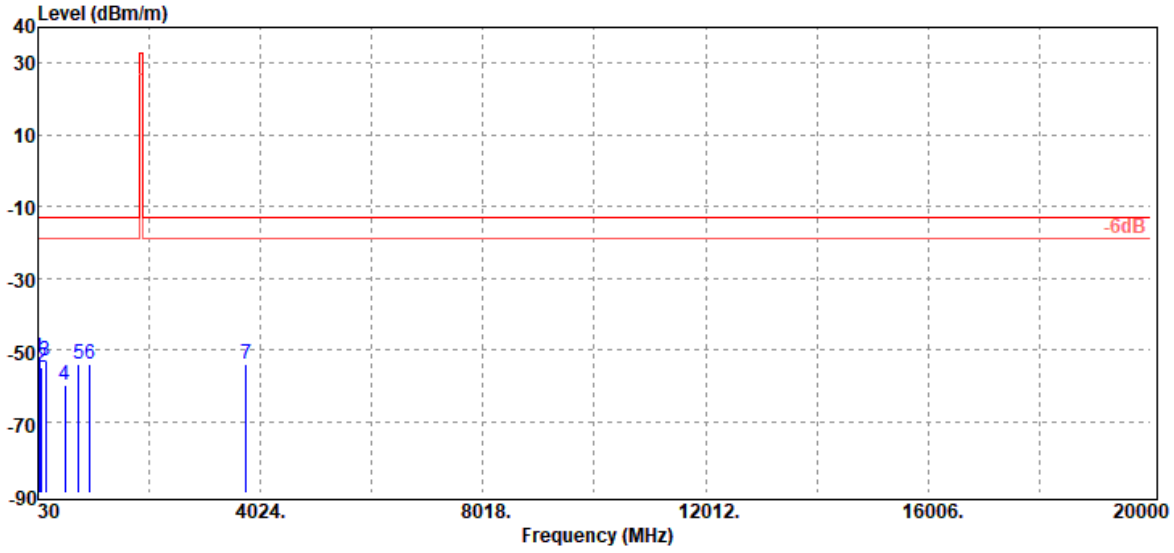
Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
57.16	-52.93	-41.85	-10.47	-0.61	-13.00	-39.93
99.84	-55.25	-46.18	-8.25	-0.82	-13.00	-42.25
182.29	-54.36	-49.05	-4.20	-1.11	-13.00	-41.36
505.30	-63.28	-59.51	-1.89	-1.88	-13.00	-50.28
772.05	-55.42	-51.69	-1.40	-2.33	-13.00	-42.42
958.29	-55.42	-51.53	-1.27	-2.62	-13.00	-42.42
3715.00	-58.08	-64.83	12.47	-5.72	-13.00	-45.08

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B2 15M QPSK RB1,0	Temp./Humi.	:29/51
Test Mode	:TX CH LOW	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1857.5 MHz		



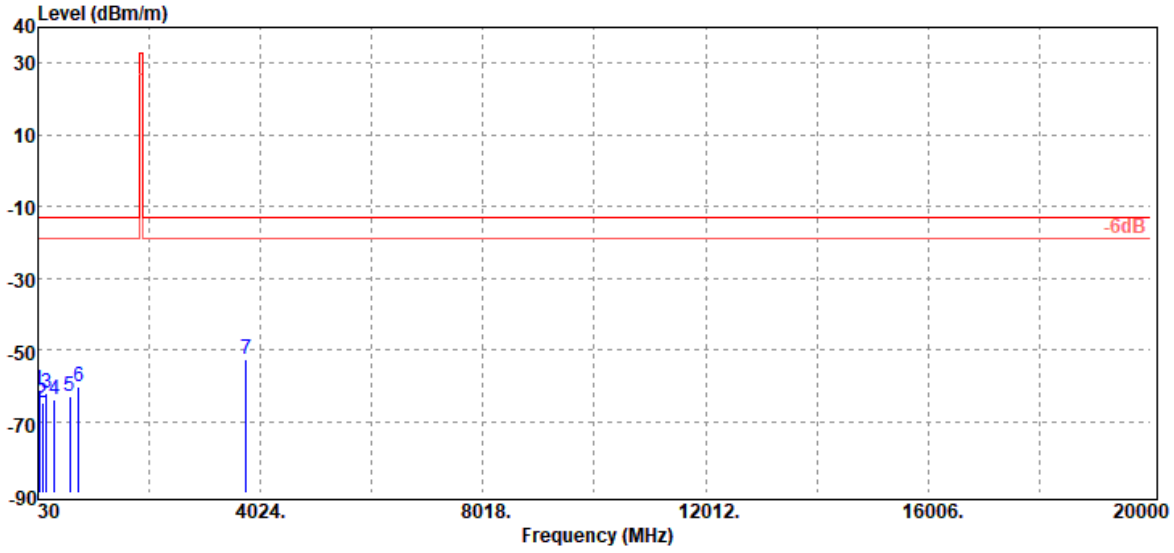
Freq.	EIRP/ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	dBm	dBm	dBi/dBd	dB	dBm	dB
32.91	-58.97	-31.31	-27.19	-0.47	-13.00	-45.97
54.25	-62.04	-50.79	-10.65	-0.60	-13.00	-49.04
190.05	-66.07	-60.94	-4.00	-1.13	-13.00	-53.07
325.85	-67.84	-64.57	-1.78	-1.49	-13.00	-54.84
607.15	-63.78	-60.66	-1.04	-2.08	-13.00	-50.78
951.50	-59.68	-55.86	-1.20	-2.62	-13.00	-46.68
3715.00	-54.00	-60.75	12.47	-5.72	-13.00	-41.00

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B2 15M QPSK RB1,0	Temp./Humi.	:29/51
Test Mode	:TX CH MID	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1880 MHz		



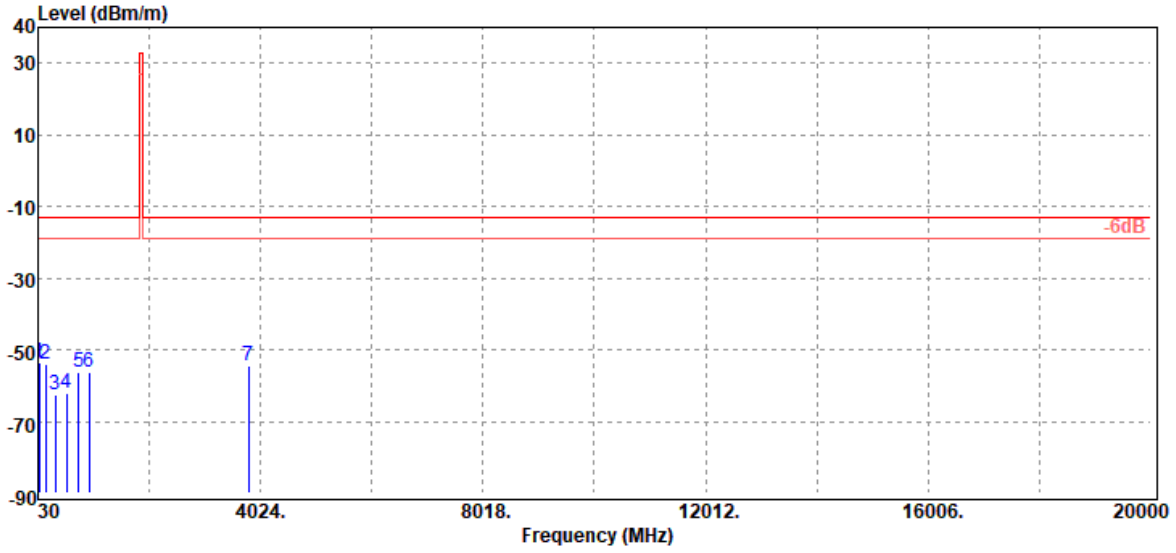
Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
57.16	-52.37	-41.29	-10.47	-0.61	-13.00	-39.37
99.84	-54.92	-45.85	-8.25	-0.82	-13.00	-41.92
170.65	-53.22	-46.82	-5.33	-1.07	-13.00	-40.22
519.85	-60.03	-56.72	-1.40	-1.91	-13.00	-47.03
765.26	-54.21	-50.48	-1.40	-2.33	-13.00	-41.21
958.29	-54.00	-50.11	-1.27	-2.62	-13.00	-41.00
3760.00	-53.99	-60.65	12.42	-5.76	-13.00	-40.99

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B2 15M QPSK RB1,0	Temp./Humi.	:29/51
Test Mode	:TX CH MID	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1880 MHz		



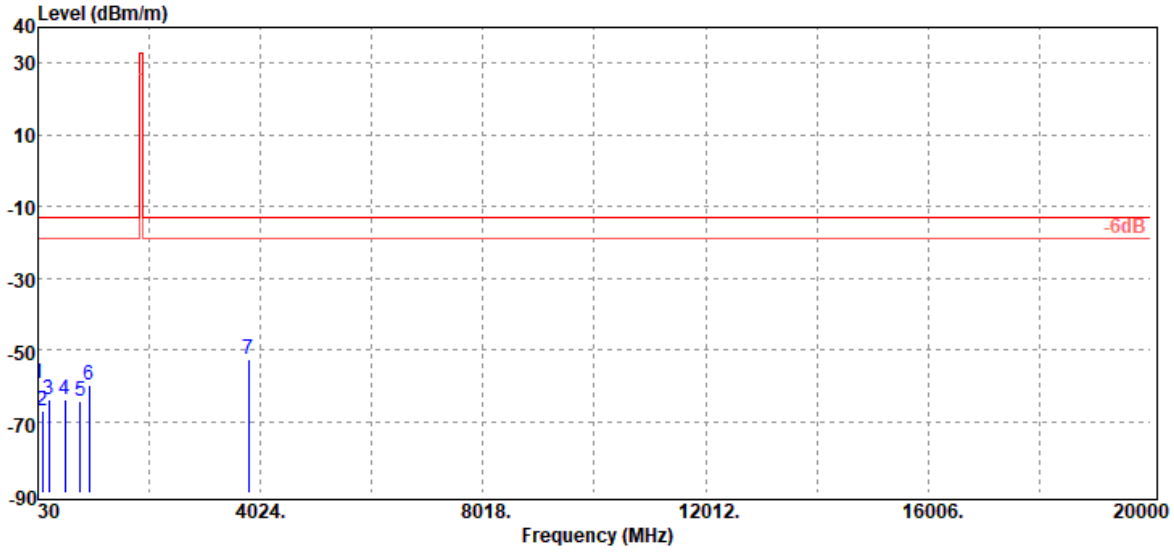
Freq.	EIRP/ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	dBm	dBm	dBi/dBd	dB	dBm	dB
54.25	-61.03	-49.78	-10.65	-0.60	-13.00	-48.03
105.66	-64.69	-54.48	-9.37	-0.84	-13.00	-51.69
187.14	-61.90	-56.78	-3.99	-1.13	-13.00	-48.90
328.76	-63.94	-60.72	-1.72	-1.50	-13.00	-50.94
605.21	-63.17	-60.09	-1.00	-2.08	-13.00	-50.17
760.41	-60.16	-56.44	-1.40	-2.32	-13.00	-47.16
3760.00	-52.57	-59.23	12.42	-5.76	-13.00	-39.57

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B2 15M QPSK RB1,0	Temp./Humi.	:29/51
Test Mode	:TX CH HIGH	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1902.5 MHz		



Freq.	EIRP/ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	dBm	dBm	dBi/dBd	dB	dBm	dB
56.19	-53.49	-42.38	-10.50	-0.61	-13.00	-40.49
168.71	-53.88	-47.38	-5.43	-1.07	-13.00	-40.88
333.61	-62.67	-59.53	-1.63	-1.51	-13.00	-49.67
539.25	-62.28	-59.05	-1.30	-1.93	-13.00	-49.28
765.26	-56.46	-52.73	-1.40	-2.33	-13.00	-43.46
951.50	-56.43	-52.61	-1.20	-2.62	-13.00	-43.43
3805.00	-54.33	-61.02	12.49	-5.80	-13.00	-41.33

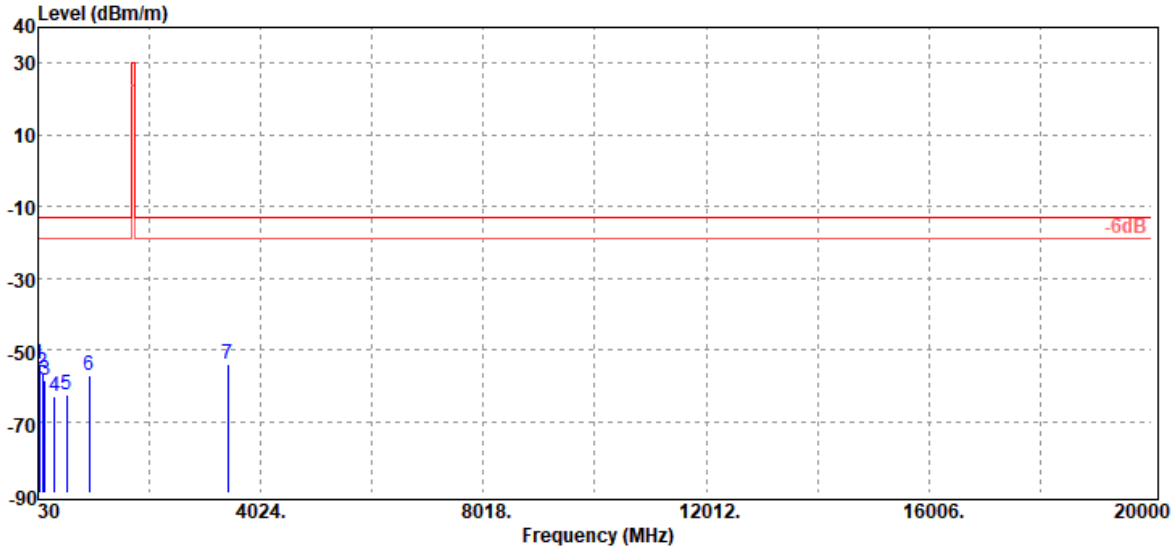
Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B2 15M QPSK RB1,0	Temp./Humi.	:29/51
Test Mode	:TX CH HIGH	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1902.5 MHz		



Freq.	EIRP/ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	dBm	dBm	dBi/dBd	dB	dBm	dB
32.91	-59.43	-31.77	-27.19	-0.47	-13.00	-46.43
105.66	-67.00	-56.79	-9.37	-0.84	-13.00	-54.00
224.00	-63.96	-60.81	-1.92	-1.23	-13.00	-50.96
515.00	-63.98	-60.58	-1.50	-1.90	-13.00	-50.98
781.75	-64.45	-60.68	-1.43	-2.34	-13.00	-51.45
951.50	-59.68	-55.86	-1.20	-2.62	-13.00	-46.68
3805.00	-52.72	-59.41	12.49	-5.80	-13.00	-39.72

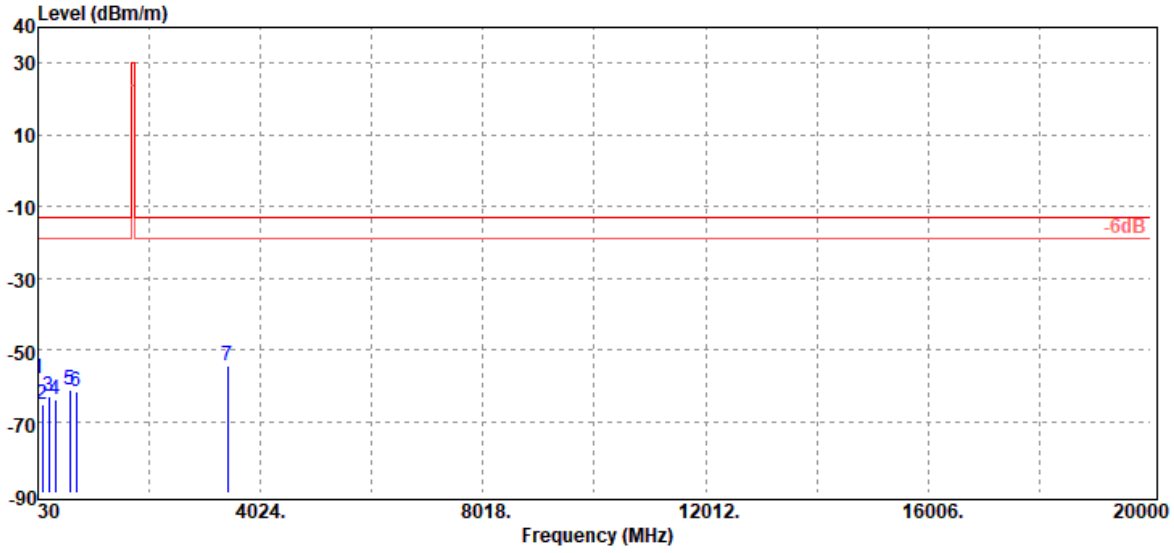
Radiated Spurious Emission Measurement Result: LTE-Band 4 (The Worst Case)

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B4 15M QPSK RB1,0	Temp./Humi.	:28/50
Test Mode	:TX CH LOW	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1717.5 MHz		



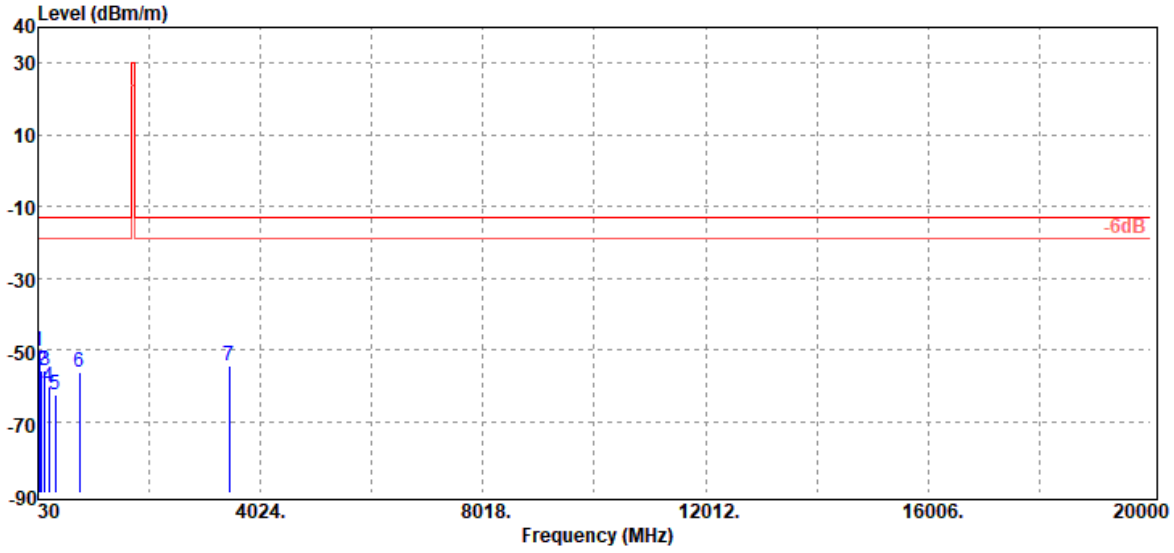
Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
56.19	-54.07	-42.96	-10.50	-0.61	-13.00	-41.07
105.66	-56.14	-45.93	-9.37	-0.84	-13.00	-43.14
159.01	-58.38	-50.94	-6.40	-1.04	-13.00	-45.38
325.85	-63.22	-59.95	-1.78	-1.49	-13.00	-50.22
547.01	-62.74	-59.60	-1.20	-1.94	-13.00	-49.74
951.50	-57.38	-53.56	-1.20	-2.62	-13.00	-44.38
3435.00	-53.96	-61.19	12.73	-5.50	-13.00	-40.96

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B4 15M QPSK RB1,0	Temp./Humi.	:28/50
Test Mode	:TX CH LOW	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1717.5 MHz		



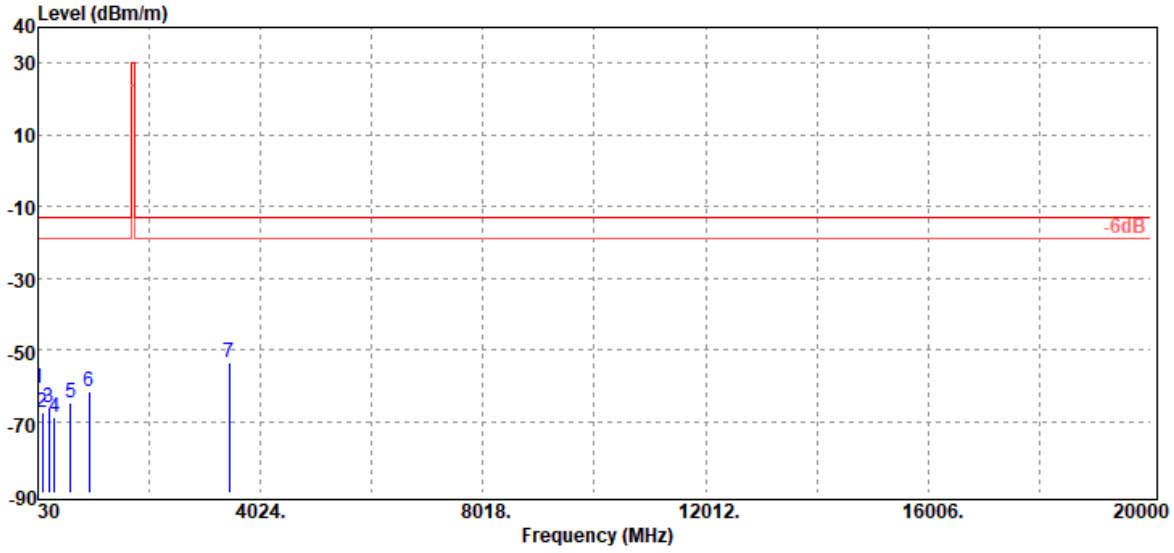
Freq.	EIRP/ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	dBm	dBm	dBi/dBd	dB	dBm	dB
32.91	-57.85	-30.19	-27.19	-0.47	-13.00	-44.85
105.66	-65.34	-55.13	-9.37	-0.84	-13.00	-52.34
221.09	-62.82	-59.62	-1.98	-1.22	-13.00	-49.82
342.34	-63.97	-60.94	-1.50	-1.53	-13.00	-50.97
605.21	-61.39	-58.31	-1.00	-2.08	-13.00	-48.39
711.91	-61.48	-57.83	-1.40	-2.25	-13.00	-48.48
3435.00	-54.68	-61.91	12.73	-5.50	-13.00	-41.68

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B4 15M QPSK RB1,0	Temp./Humi.	:28/50
Test Mode	:TX CH MID	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1732.5 MHz		



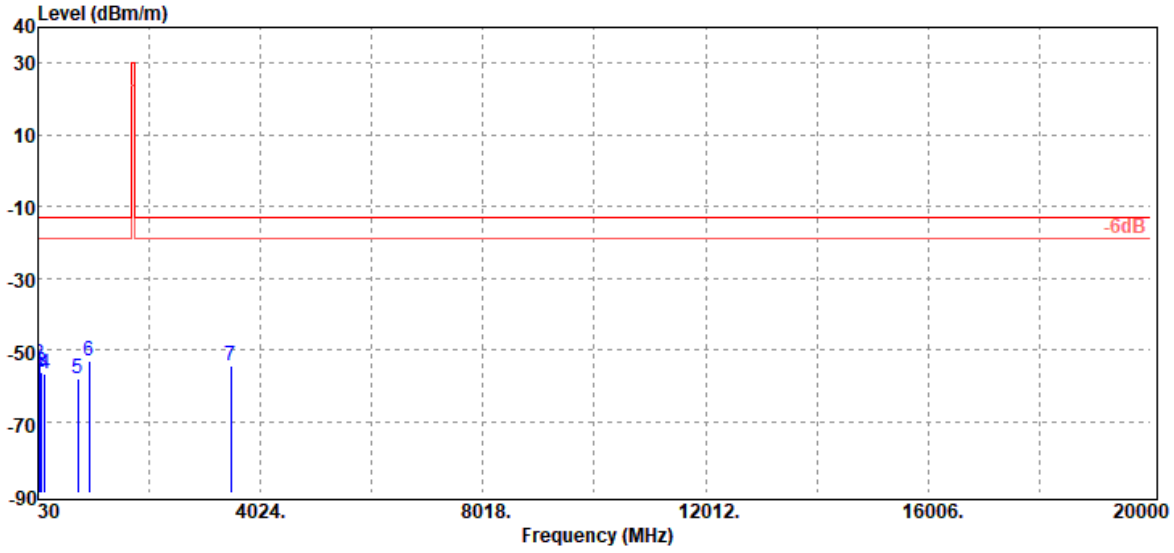
Freq.	EIRP/ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	dBm	dBm	dBi/dBd	dB	dBm	dB
57.16	-50.39	-39.31	-10.47	-0.61	-13.00	-37.39
99.84	-55.62	-46.55	-8.25	-0.82	-13.00	-42.62
152.22	-55.93	-48.06	-6.86	-1.01	-13.00	-42.93
220.12	-60.48	-57.26	-2.00	-1.22	-13.00	-47.48
333.61	-62.45	-59.31	-1.63	-1.51	-13.00	-49.45
773.99	-56.28	-52.54	-1.40	-2.34	-13.00	-43.28
3465.00	-54.68	-61.79	12.64	-5.53	-13.00	-41.68

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B4 15M QPSK RB1,0	Temp./Humi.	:28/50
Test Mode	:TX CH MID	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1732.5 MHz		



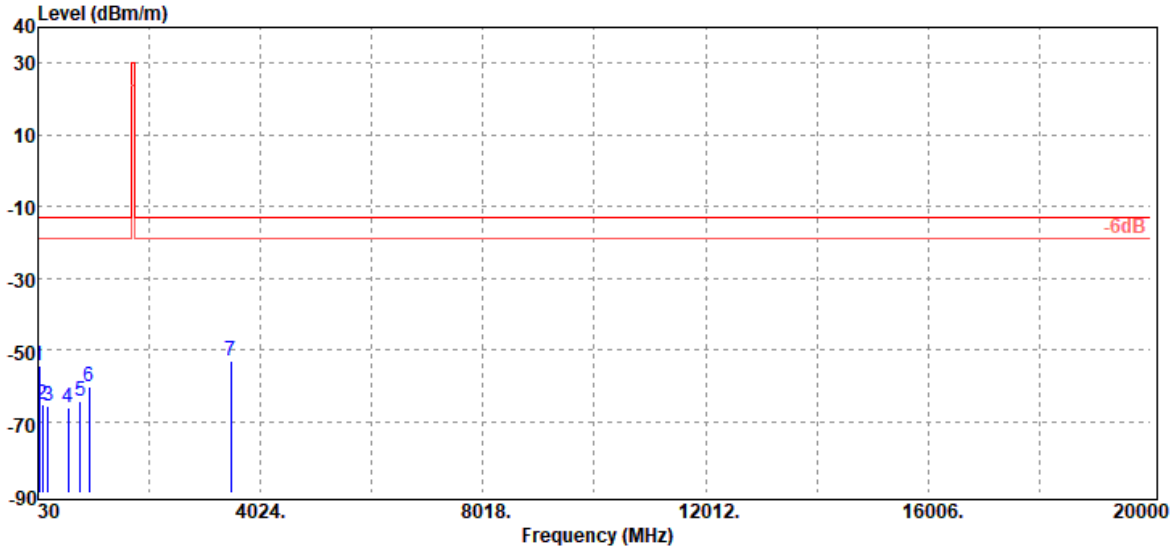
Freq.	EIRP/ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	dBm	dBm	dBi/dBd	dB	dBm	dB
32.91	-60.67	-33.01	-27.19	-0.47	-13.00	-47.67
105.66	-67.29	-57.08	-9.37	-0.84	-13.00	-54.29
222.06	-66.07	-62.89	-1.96	-1.22	-13.00	-53.07
327.79	-68.93	-65.69	-1.74	-1.50	-13.00	-55.93
612.00	-64.91	-61.64	-1.18	-2.09	-13.00	-51.91
951.50	-61.78	-57.96	-1.20	-2.62	-13.00	-48.78
3465.00	-53.79	-60.90	12.64	-5.53	-13.00	-40.79

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B4 15M QPSK RB1,0	Temp./Humi.	:28/50
Test Mode	:TX CH HIGH	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1747.5 MHz		



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
34.85	-56.45	-30.65	-25.32	-0.48	-13.00	-43.45
52.31	-54.14	-42.51	-11.04	-0.59	-13.00	-41.14
99.84	-56.28	-47.21	-8.25	-0.82	-13.00	-43.28
151.25	-56.62	-48.56	-7.05	-1.01	-13.00	-43.62
745.86	-58.01	-54.31	-1.40	-2.30	-13.00	-45.01
953.44	-53.16	-49.34	-1.20	-2.62	-13.00	-40.16
3495.00	-54.38	-61.35	12.52	-5.55	-13.00	-41.38

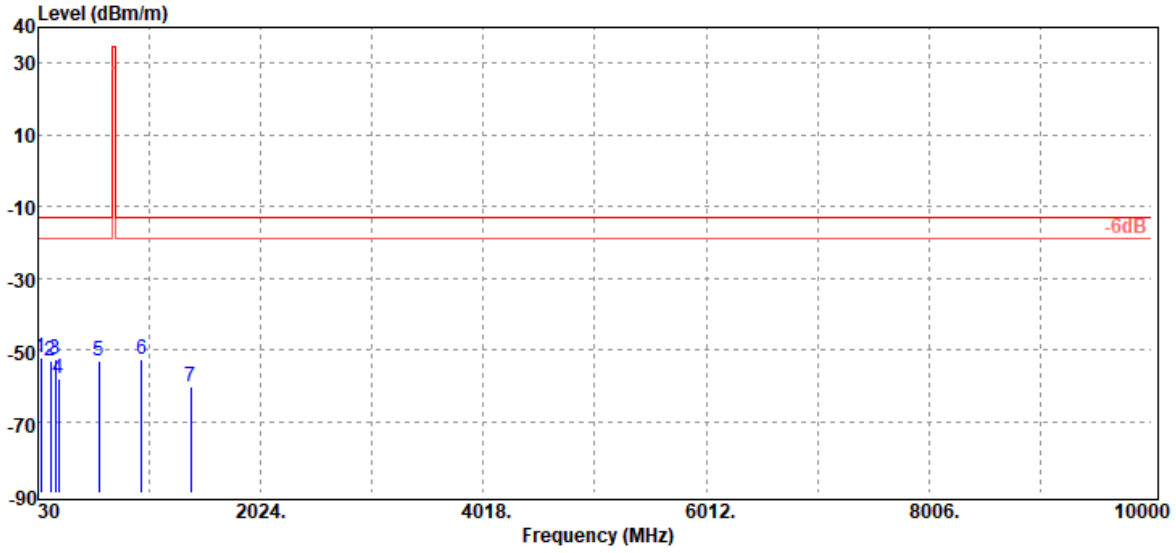
Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B4 15M QPSK RB1,0	Temp./Humi.	:28/50
Test Mode	:TX CH HIGH	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:1747.5 MHz		



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
50.37	-54.28	-41.90	-11.81	-0.57	-13.00	-41.28
105.66	-65.36	-55.15	-9.37	-0.84	-13.00	-52.36
217.21	-65.52	-62.25	-2.06	-1.21	-13.00	-52.52
576.11	-66.34	-62.93	-1.40	-2.01	-13.00	-53.34
794.36	-64.38	-60.81	-1.21	-2.36	-13.00	-51.38
951.50	-60.34	-56.52	-1.20	-2.62	-13.00	-47.34
3495.00	-53.29	-60.26	12.52	-5.55	-13.00	-40.29

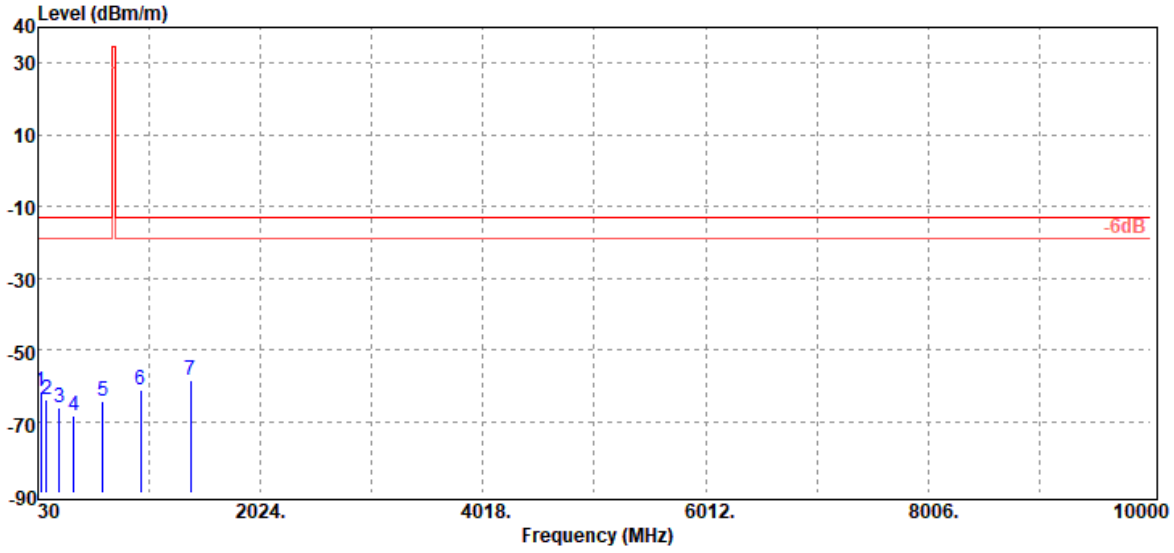
Radiated Spurious Emission Measurement Result: LTE-Band 12 (The Worst Case)

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B12 1.4M QPSK 1.0	Temp./Humi.	:29/51
Test Mode	:TX CH LOW	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:699.7 MHz		



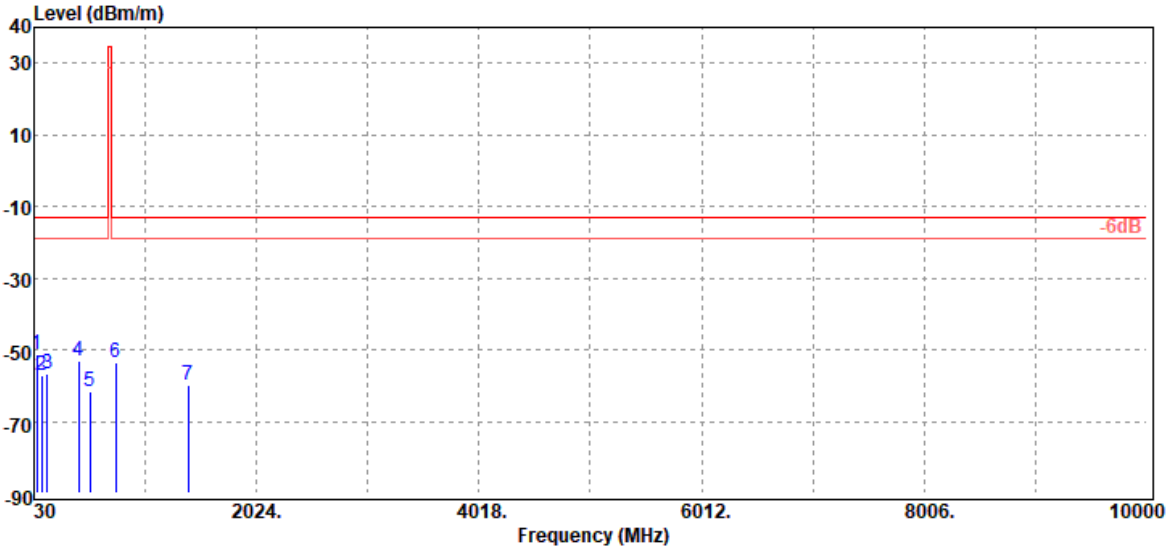
Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
56.19	-52.04	-40.93	-10.50	-0.61	-13.00	-39.04
139.61	-53.06	-43.51	-8.58	-0.97	-13.00	-40.06
187.14	-52.66	-47.54	-3.99	-1.13	-13.00	-39.66
216.24	-58.21	-54.92	-2.08	-1.21	-13.00	-45.21
573.20	-53.16	-49.75	-1.40	-2.01	-13.00	-40.16
953.44	-52.57	-48.75	-1.20	-2.62	-13.00	-39.57
1399.40	-60.49	-65.26	8.00	-3.23	-13.00	-47.49

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B12 1.4M QPSK 1.0	Temp./Humi.	:29/51
Test Mode	:TX CH LOW	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:699.7 MHz		



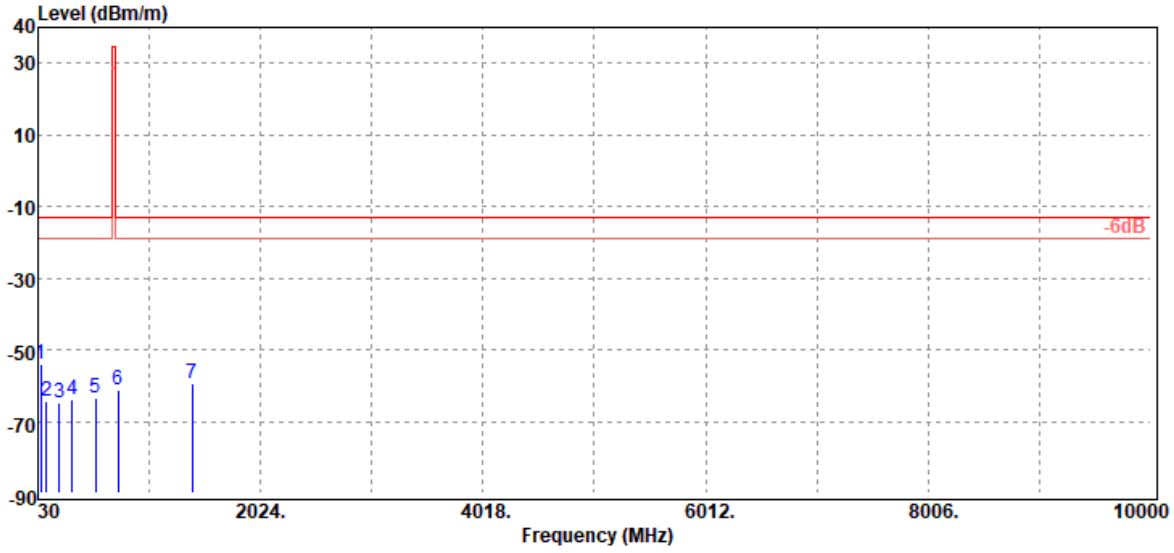
Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
52.31	-61.64	-50.01	-11.04	-0.59	-13.00	-48.64
105.66	-64.01	-53.80	-9.37	-0.84	-13.00	-51.01
222.06	-66.04	-62.86	-1.96	-1.22	-13.00	-53.04
352.04	-68.53	-65.52	-1.46	-1.55	-13.00	-55.53
613.94	-64.35	-61.00	-1.26	-2.09	-13.00	-51.35
951.50	-61.03	-57.21	-1.20	-2.62	-13.00	-48.03
1399.40	-58.74	-63.51	8.00	-3.23	-13.00	-45.74

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B12 1.4M QPSK 1.0	Temp./Humi.	:29/51
Test Mode	:TX CH MID	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:707.5 MHz		



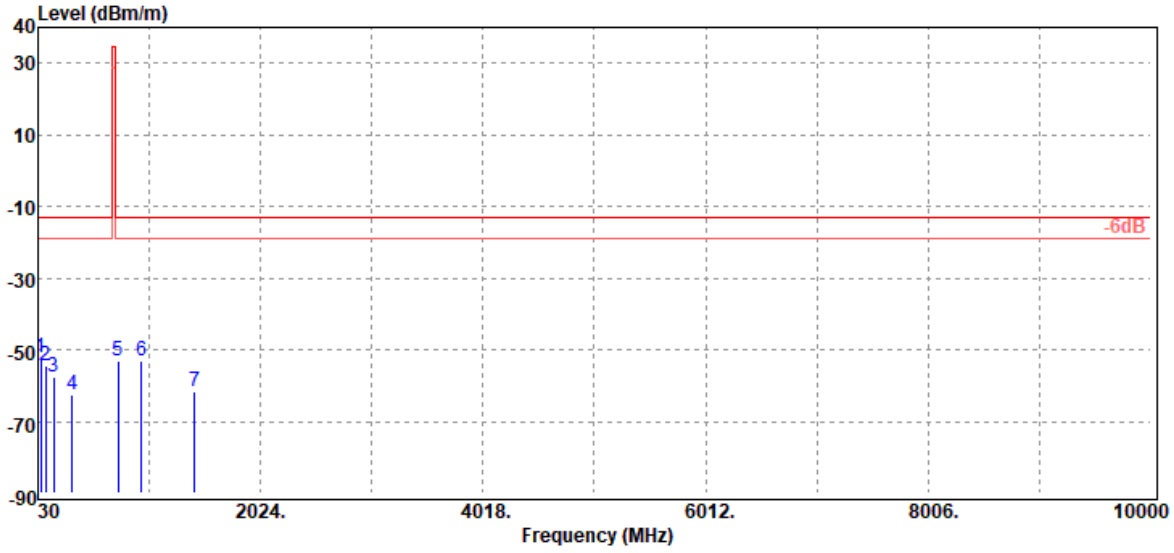
Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
57.16	-51.15	-40.07	-10.47	-0.61	-13.00	-38.15
97.90	-57.26	-48.56	-7.89	-0.81	-13.00	-44.26
150.28	-56.75	-48.64	-7.10	-1.01	-13.00	-43.75
427.70	-53.12	-49.51	-1.90	-1.71	-13.00	-40.12
531.49	-61.72	-58.50	-1.30	-1.92	-13.00	-48.72
764.29	-53.79	-50.06	-1.40	-2.33	-13.00	-40.79
1415.00	-59.80	-64.64	8.09	-3.25	-13.00	-46.80

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B12 1.4M QPSK 1.0	Temp./Humi.	:29/51
Test Mode	:TX CH MID	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:707.5 MHz		



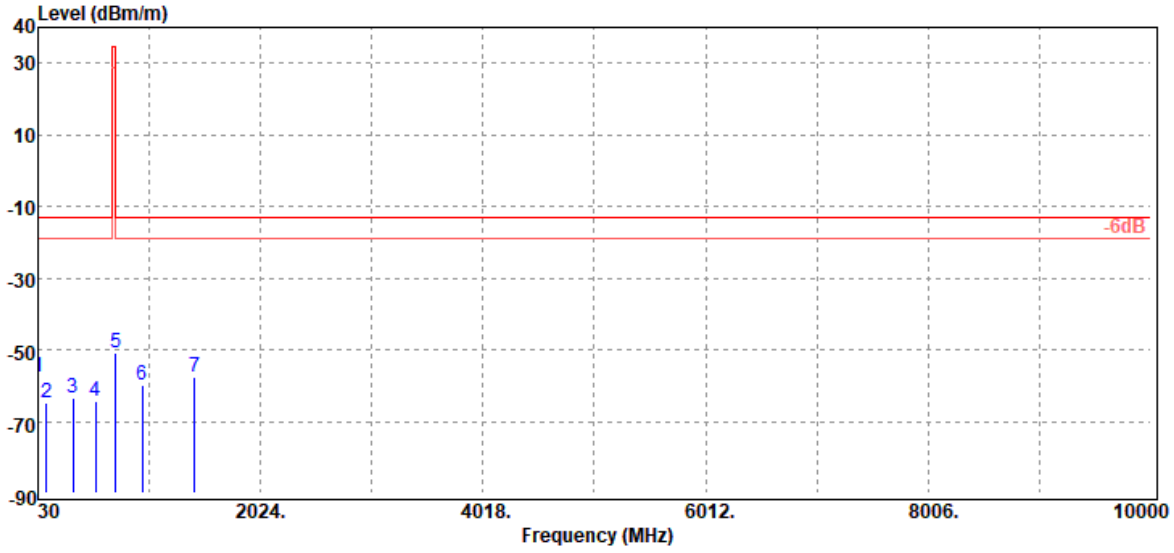
Freq.	EIRP/ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	dBm	dBm	dBi/dBd	dB	dBm	dB
55.22	-54.01	-42.91	-10.50	-0.60	-13.00	-41.01
105.66	-64.35	-54.14	-9.37	-0.84	-13.00	-51.35
222.06	-64.83	-61.65	-1.96	-1.22	-13.00	-51.83
337.49	-64.10	-61.03	-1.55	-1.52	-13.00	-51.10
547.01	-63.34	-60.20	-1.20	-1.94	-13.00	-50.34
744.89	-61.35	-57.65	-1.40	-2.30	-13.00	-48.35
1415.00	-59.53	-64.37	8.09	-3.25	-13.00	-46.53

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B12 1.4M QPSK 1.0	Temp./Humi.	:29/51
Test Mode	:TX CH HIGH	Antenna Pol.	:VERTICAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:715.3 MHz		



Freq.	EIRP/ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	dBm	dBm	dBi/dBd	dB	dBm	dB
56.19	-52.19	-41.08	-10.50	-0.61	-13.00	-39.19
99.84	-54.66	-45.59	-8.25	-0.82	-13.00	-41.66
173.56	-57.46	-51.39	-4.99	-1.08	-13.00	-44.46
333.61	-62.67	-59.53	-1.63	-1.51	-13.00	-49.67
747.80	-53.31	-49.60	-1.40	-2.31	-13.00	-40.31
958.29	-52.99	-49.10	-1.27	-2.62	-13.00	-39.99
1430.60	-61.44	-66.34	8.18	-3.28	-13.00	-48.44

Report Number	:T190612W02	Test Date	:2019-07-01
Operation Mode	:LTE B12 1.4M QPSK 1.0	Temp./Humi.	:29/51
Test Mode	:TX CH HIGH	Antenna Pol.	:HORIZONTAL
EUT Pol	:E2 Plan	Engineer	:Kailin
Test Channel	:715.3 MHz		



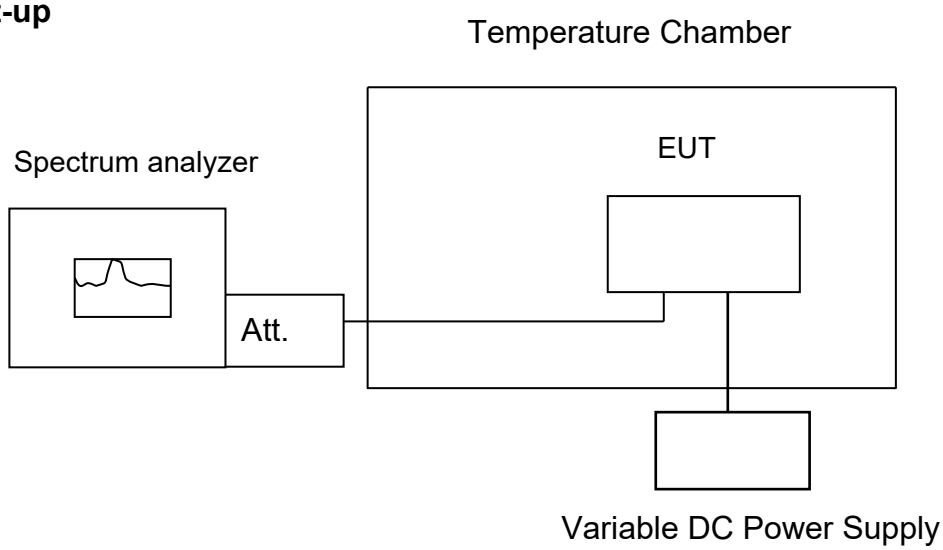
Freq.	EIRP/ERP	SG Output Level	Antenna Gain	Cable Loss	Limit	Margin
MHz	dBm	dBm	dBi/dBd	dB	dBm	dB
32.91	-57.53	-29.87	-27.19	-0.47	-13.00	-44.53
105.66	-64.88	-54.67	-9.37	-0.84	-13.00	-51.88
342.34	-63.53	-60.50	-1.50	-1.53	-13.00	-50.53
547.01	-64.19	-61.05	-1.20	-1.94	-13.00	-51.19
729.37	-51.01	-47.33	-1.40	-2.28	-13.00	-38.01
961.20	-59.75	-55.82	-1.30	-2.63	-13.00	-46.75
1430.60	-57.64	-62.54	8.18	-3.28	-13.00	-44.64

10. FREQUENCY STABILITY MEASUREMENT

10.1. Standard Applicable

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

10.2. Test Set-up



Note: Measurement setup for testing on Antenna connector

10.3. Measurement Procedure

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Set chamber temperature to 25℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint as declared by the manufacturer, record the maximum frequency change.

10.4. Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
DC Block	PASTERNACK	PE8210	RF256	02/26/2019	02/25/2020
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
Thermostatic/Hrgrosatic Chamber	GWINSTEK	GTC-288MH-CC	TH160402	05/16/2019	05/15/2020
Splitter	Woken	DOM35LW1A2	RF83	02/26/2019	02/25/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

10.5. Measurement Result

Reference Freq.:	LTE B2 Mid Channel	1880	MHz 20M QPSK CH 18900	
Power Supply Vdc	Temp. (℃)	Freq. (MHz)	Delta (Hz)	Limit = +/- 2.5 ppm (Hz)
Freq. ERROR vs. VOLTAGE				
12.6	25	1880.000008	8	4700
12	25	1880.000017	17	4700
11.4	25	1880.000017	17	4700
11 (End Point)	25	1879.999984	-16	4700
Freq. ERROR vs. Temp.				
12	-30	1879.999996	-4	4700
12	-20	1879.999980	-20	4700
12	-10	1879.999991	-9	4700
12	0	1880.000008	8	4700
12	10	1880.000010	10	4700
12	20	1879.999997	-3	4700
12	30	1879.999992	-8	4700
12	40	1879.999983	-17	4700
12	50	1880.000015	15	4700

Reference Freq.:	LTE B4 Mid Channel	1732.5	MHz 20M QPSK CH 20175
Power Supply Vdc	Temp. (℃)	Freq. (MHz)	Delta (Hz)	Limit = +/- 2.5 ppm (Hz)
Freq. ERROR vs. VOLTAGE				
12.6	25	1732.499984	-16	4331
12	25	1732.500012	12	4331
11.4	25	1732.500003	3	4331
11 (End Point)	25	1732.499997	-3	4331
Freq. ERROR vs. Temp.				
12	-30	1732.499995	-5	4331
12	-20	1732.500014	14	4331
12	-10	1732.500018	18	4331
12	0	1732.499982	-18	4331
12	10	1732.500007	7	4331
12	20	1732.500016	16	4331
12	30	1732.499995	-5	4331
12	40	1732.500021	21	4331
12	50	1732.500001	1	4331

Reference Freq.:	LTE B12 Mid Channel	707.5	MHz 10M QPSK CH 23095
Power Supply Vdc	Temp. (℃)	Freq. (MHz)	Delta (Hz)	Limit = +/- 2.5 ppm (Hz)
Freq. ERROR vs. VOLTAGE				
12.6	25	707.499984	-16	1769
12	25	707.500012	12	1769
11.4	25	707.500006	6	1769
11 (End Point)	25	707.499985	-15	1769
Freq. ERROR vs. Temp.				
12	-30	707.500006	6	1769
12	-20	707.499997	-3	1769
12	-10	707.500008	8	1769
12	0	707.500011	11	1769
12	10	707.499992	-8	1769
12	20	707.500003	3	1769
12	30	707.500018	18	1769
12	40	707.499989	-11	1769
12	50	707.500008	8	1769

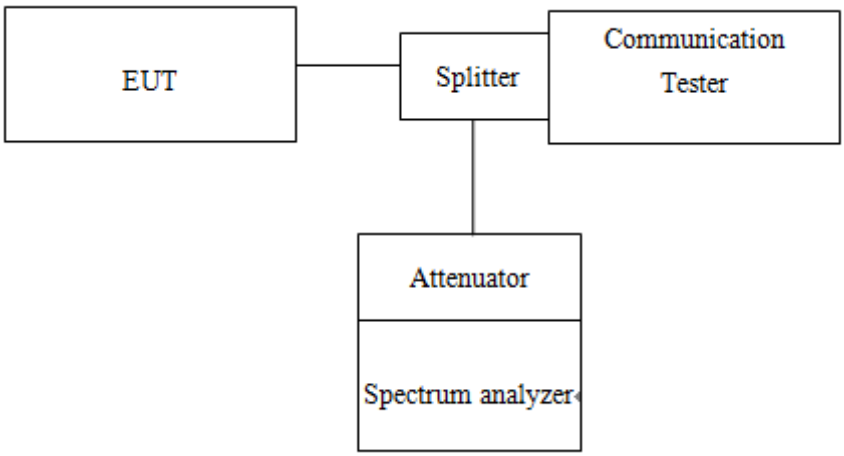
Note: The power supply is rated 12Vdc.

11. PEAK TO AVERAGE RATIO

11.1. Standard Applicable

The peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

11.2. Test SET-UP



11.3. Measurement Procedure

1. KDB 971168 D01 is employed as the following procedure is proper adjusted accordingly:
2. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth; & internal =1ms
3. Set the number of counts to a value that stabilizes the measured CCDF curve.

11.4. Measurement Equipment Used

EQUIPMENT TYPE	MFR	MODEL NUM-BER	SERIAL NUMBER	LAST CAL.	CAL DUE.
DC Block	PASTERNACK	PE8210	RF256	02/26/2019	02/25/2020
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
Thermostatic/Hrgrosatic Chamber	GWINSTEK	GTC-288MH-CC	TH160402	05/16/2019	05/15/2020
Splitter	Woken	DOM35LW1A2	RF83	02/26/2019	02/25/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020
Radio Communication Analyer	Anritsu	MT8820C	6201465317	01/16/2019	01/15/2020

11.5. Measurement Result

Tabular Results:

LTE BAND 2							
Channel bandwidth: 1.4MHz				Channel bandwidth: 3MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		16QAM	Limit			16QAM	Limit
1850.7	18607	6.43	13	1851.5	18615	6.54	13
1880.0	18900	6.62	13	1880.0	18900	6.63	13
1909.3	19193	6.29	13	1908.5	19185	6.53	13

LTE BAND 2							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		16QAM	Limit			16QAM	Limit
1852.5	18625	6.24	13	1855.0	18650	6.06	13
1880.0	18900	6.55	13	1880.0	18900	6.24	13
1907.5	19175	6.31	13	1905.0	19150	6.30	13

LTE BAND 2							
Channel bandwidth: 15MHz				Channel bandwidth: 20MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		16QAM	Limit			16QAM	Limit
1857.5	18675	6.58	13	1860.0	18700	6.99	13
1880.0	18900	6.73	13	1880.0	18900	7.15	13
1902.5	19125	6.84	13	1900.0	19100	7.13	13

LTE BAND 4							
Channel bandwidth: 1.4MHz				Channel bandwidth: 3MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		16QAM	Limit			16QAM	Limit
1710.7	19957	6.52	13	1711.5	19965	6.55	13
1732.5	20175	6.64	13	1732.5	20175	6.61	13
1754.3	20393	6.64	13	1753.5	20385	6.76	13

LTE BAND 4							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		16QAM	Limit			16QAM	Limit
1712.5	19957	6.48	13	1715.0	20000	6.27	13
1732.5	20175	6.38	13	1732.5	20175	6.20	13
1752.5	20375	6.53	13	1750.0	20350	6.27	13

LTE BAND 4							
Channel bandwidth: 15MHz				Channel bandwidth: 20MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		16QAM	Limit			16QAM	Limit
1717.5	20025	6.71	13	1720.0	20050	7.14	13
1732.5	20175	6.69	13	1732.5	20175	6.98	13
1747.5	20325	6.70	13	1745.0	20300	7.05	13

LTE BAND 12							
Channel bandwidth: 1.4MHz				Channel bandwidth: 3MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		16QAM	Limit			16QAM	Limit
699.7	23017	6.59	13	700.5	23025	6.33	13
707.5	23095	6.74	13	707.5	23095	6.84	13
715.3	23173	6.96	13	714.5	23165	6.56	13

LTE BAND 12							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		16QAM	Limit			16QAM	Limit
701.5	23035	6.24	13	704.0	23060	6.35	13
707.5	23095	6.57	13	707.5	23095	6.27	13
713.5	23155	6.04	13	711.0	23130	5.98	13

Measurement Results:

Please refer to next pages.