ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

Applicant:	DENSO International America, Inc. 2251 Rutherford Rd., Suite 100, Carlsbad, CA. 92008
Product Name:	V2X On-Board Unit
Brand Name:	DENSO
Model No.:	Hercules H7.1E
Model Difference:	N/A
Report Number:	ER/2021/50150
FCC ID	LXC-V2X-OBU-HERC
Issue Date:	August 10, 2021
Date of Test:	May 31, 2021 ~ July 29, 2021
Date of EUT Received:	May 21, 2021

Approved By _____
Blue Yang

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI ANSI C63.26-2015 and the energy emitted by the sample EUT comply with FCC rule part 2.

The results of this report relate only to the sample identified in this report.

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Revision History

Report Number	Revision	Description	Issue Date	Revised By
ER/2021/50150	00	Original	August 10, 2021	Yuri Tsai

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1 GENERAL PRODUCT INFORMATION

1.1 Product Description

Product Name:	V2X On-Board Unit
Brand Name:	DENSO
Model No.:	Hercules H7.1E
Model Difference:	N/A
Hardware Version:	N/A
Firmware Version:	N/A
EUT Series No.:	U12QL1800006C01
Power Supply:	DC 12V

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1.2 Operation Frequency Range

LTE Band 2			
BW (MHz)	Operation Frequency (MHz)		
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

LTE Band 4			
BW (MHz)	Operation Frequency (MHz)		
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

LTE Band 5			
BW (MHz)	Operation Frequency (MHz)		
1.4	824.7	-	848.3
3	825.5	-	847.5
5	826.5	-	846.5
10	829.0	-	844.0

LTE Band 7			
BW (MHz)	Operation Frequency (MHz)		
5	2502.5	-	2567.5
10	2505.0	-	2565.0
15	2507.5	-	2562.5
20	2510.0	-	2560.0

LTE Band 12			
BW (MHz)	Operation Frequency (MHz)		
1.4	699.7	-	715.3
3	700.5	-	714.5
5	701.5	-	713.5
10	704.0	-	711.0

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1.3 Antenna Designation

Antenna Type	Antenna Model No.
Dipole	ANT-LTE-WS-SMA
Note: Transmission in frequencies in this test report are only available by the above antenna(s).	

Modulation	Frequency (MHz)			Peak Antenna Gain (dBi) w cable loss	Peak Antenna Gain (dBi) w/o cable loss
LTE-Band 2	1850	~	1910	1.76	5.86
LTE-Band 4	1710	~	1755	1.76	5.86
LTE-Band 5	824	~	849	1.59	4.09
LTE-Band 7	2500	~	2570	-0.94	4.06
LTE-Band 12	699	~	716	1.59	4.09

Note: 1. Antenna information is provided by the applicant.
2. Cable length 10ft, cable model: RG-174.
3. The measurements were demonstrated by using the antenna gain with cable loss as the worst case scenarios.

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

LTE Band	BW	Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission	Frequency Tolerance (Hz)
2	1.4	QPSK	24.18	EIRP	0.262	1.0897	1M09G7D	12
		16QAM	23.32	EIRP	0.215	1.0913	1M09D7W	12
2	3	QPSK	24.37	EIRP	0.274	2.6907	2M69G7D	12
		16QAM	23.79	EIRP	0.239	2.6938	2M69D7W	12
2	5	QPSK	24.53	EIRP	0.284	4.4786	4M48G7D	12
		16QAM	23.39	EIRP	0.218	4.4852	4M49D7W	12
2	10	QPSK	24.83	EIRP	0.304	8.9713	8M97G7D	12
		16QAM	23.64	EIRP	0.231	8.9397	8M94D7W	12
2	15	QPSK	24.52	EIRP	0.283	13.469	13M5G7D	12
		16QAM	23.68	EIRP	0.233	13.448	13M4D7W	12
2	20	QPSK	24.59	EIRP	0.288	17.936	17M9G7D	12
		16QAM	23.96	EIRP	0.249	17.939	17M9D7W	12

LTE Band	BW	Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission	Frequency Tolerance (Hz)
5	1.4	QPSK	22.29	ERP	0.169	1.0863	1M09G7D	11
		16QAM	21.42	ERP	0.139	1.0850	1M09D7W	11
5	3	QPSK	22.55	ERP	0.180	2.6878	2M69G7D	11
		16QAM	21.40	ERP	0.138	2.6914	2M69D7W	11
5	5	QPSK	22.16	ERP	0.164	4.4830	4M48G7D	11
		16QAM	21.58	ERP	0.144	4.9098	4M91D7W	11
5	10	QPSK	22.47	ERP	0.177	8.9652	8M97G7D	11
		16QAM	21.27	ERP	0.134	8.9424	8M94D7W	11

LTE Band	BW	Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission	Frequency Tolerance (Hz)
12	1.4	QPSK	22.04	ERP	0.160	1.0857	1M09G7D	10
		16QAM	21.38	ERP	0.137	1.0850	1M09D7W	10
12	3	QPSK	22.08	ERP	0.161	2.6898	2M69G7D	10
		16QAM	21.37	ERP	0.137	2.6921	2M69D7W	10
12	5	QPSK	22.18	ERP	0.165	4.4831	4M48G7D	10
		16QAM	21.22	ERP	0.132	4.4870	4M49D7W	10
12	10	QPSK	22.27	ERP	0.169	8.9742	8M97G7D	10
		16QAM	21.29	ERP	0.135	8.9562	8M96D7W	10

LTE Band	BW	Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission	Frequency Tolerance (Hz)
4	1.4	QPSK	24.55	EIRP	0.285	1.0877	1M09G7D	11
		16QAM	24.01	EIRP	0.252	1.0878	1M09D7W	11
4	3	QPSK	24.74	EIRP	0.298	2.6861	2M69G7D	11
		16QAM	24.11	EIRP	0.258	2.6914	2M69D7W	11
4	5	QPSK	24.81	EIRP	0.303	4.4773	4M48G7D	11
		16QAM	24.02	EIRP	0.252	4.4834	4M48D7W	11
4	10	QPSK	24.93	EIRP	0.311	8.9673	8M97G7D	11
		16QAM	24.08	EIRP	0.256	8.9336	8M93D7W	11
4	15	QPSK	24.07	EIRP	0.255	13.4500	13M5G7D	11
		16QAM	23.51	EIRP	0.224	13.4260	13M4D7W	11
4	20	QPSK	23.91	EIRP	0.246	17.9190	17M9G7D	11
		16QAM	23.51	EIRP	0.224	17.9230	17M9D7W	11

LTE Band	BW	Modulation	ERP / EIRP (dBm)		(W)	99%	Type of Emission	Frequency Tolerance (Hz)
7	5	QPSK	21.61	EIRP	0.145	4.4792	4M48G7D	10
		16QAM	20.96	EIRP	0.125	4.4793	4M48D7W	10
7	10	QPSK	22.08	EIRP	0.161	8.9645	8M96G7D	10
		16QAM	21.25	EIRP	0.133	8.9364	8M94D7W	10
7	15	QPSK	21.95	EIRP	0.157	13.4760	13M5G7D	10
		16QAM	21.04	EIRP	0.127	13.4530	13M5D7W	10
7	20	QPSK	22.02	EIRP	0.159	17.9270	17M9G7D	10
		16QAM	21.47	EIRP	0.140	17.9610	18M0D7W	10

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1.5 Test Methodology of Applied Standards

FCC 47 CFR Part 2, 22H, 24E, 27C
ANSI C63.26-2015
KDB971168 D01 Power Meas license Digital System v03r01
KDB412172 D01 Determining ERP and EIRP v01r01

1.6 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan.	SAC 1	TW0027	TW3702
		SAC 3		
		Conduction 1		
		Conducted 1		
		Conducted 2		
		Conducted 3		
		Conducted 4		
		Conducted 5		
		Conducted 6		
	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction A	TW0028	
		SAC C		
		SAC D		
		SAC G		
		Conducted A		
		Conducted B		
		Conducted C		
		Conducted D		
		Conducted E		
		Conducted F		
		Conducted G		

Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.

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1.7 Special Accessories

No special accessories were used during testing.

1.8 Equipment Modifications

There was no modifications incorporated into the EUT.

1.9 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m*9m*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.
There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

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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

The EUT is placed on a 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)

The EUT is placed on a 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.

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)	3.7	10	13.7

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2.5 Final Amplifier Voltage and Current Information:

Test Mode	DC voltage (V)	DC current (mA)
LTE Band 2	12	867
LTE Band 4		850
LTE Band 5		836
LTE Band 7		870
LTE Band 12		851

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2.6 Configuration of Tested System

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

4G

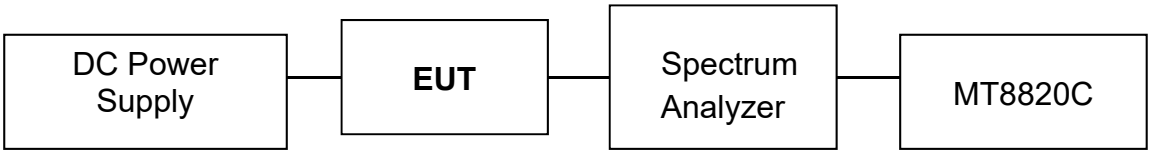
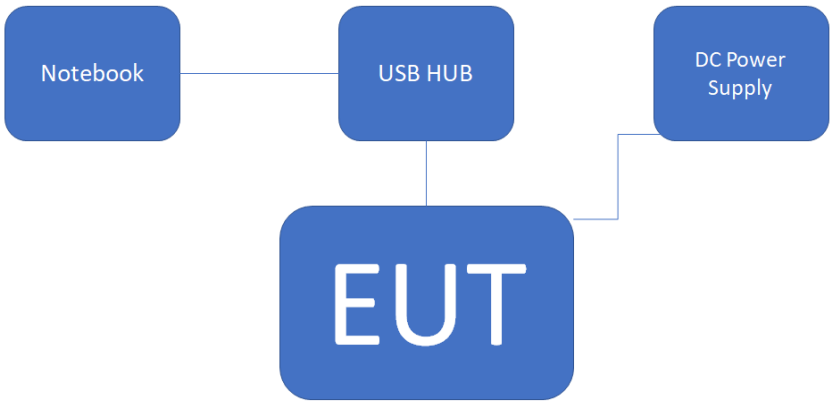


Fig. 2-2 Configuration of Tested System (Fixed Channel-Radiated)



Remote Side

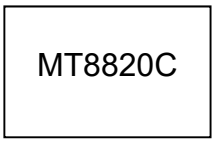


Table 2-1 Equipment Used in

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Radio Communication Analyer	Anritsu	MT8820C	6201465317	N/A	N/A
2.	DC Power Supply	Agilent	E3640A	MY40005907	N/A	N/A
3.	Notebook	Lenovo	L480	PF-1S9NT5	N/A	N/A
4.	4Ports USB HUB	Samrt	HB-560	20080701	N/A	N/A

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3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§2.1046(a)	RF Power Output	Compliant
§22.913(a)(5) §24.232(c) §27.50(c)(9) §27.50(d)(4) §27.50(h)(2)	ERP/ EIRP measurement	Compliant
§2.1049(h)	99% &26dB Occupied Bandwidth	Compliant
§2.1051 §22.917(a)(b) §24.238(a) §27.53(g) §27.53(h) §27.53(m)(2)	Out of Band Emissions at Antenna Terminals and Band Edge / Emission mask requirements	Compliant
§2.1053 §2.1057(a)(1) §22.917(a) §24.238(a) §27.53(g) §27.53(h) §27.53(m)(2)	Field Strength of Spurious Radiation	Compliant
§24.232(d) §27.50(B)	Peak to Average Ratio	Compliant
§2.1055(a)(1) §22.355 §24.235 §27.54	Frequency Stability	Compliant

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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	H PLANE	E1 PLANE	E2 PLANE
LTE Band 2	V		
LTE Band 4	V		
LTE Band 5	V		
LTE Band 7	V		
LTE Band 12	V		

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4.2 Measurement Configuration

Test Items	Band	Test Channel			Bandwidth (MHz)						Modulation		RB #		
		L	M	H	1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full
Max. Output Power	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v	v	v	v	-	-	v	v	v	v	v
	7	v	v	v	-	-	v	v	v	v	v	v	v	v	v
	12	v	v	v	v	v	v	v	-	-	v	v	v	v	v
Freqency Stability	2	-	v	-				v			v	-	-	-	v
	4	-	v	-				v			v	-	-	-	v
	5	-	v	-				v	-	-	v	-	-	-	v
	7	-	v	-	-	-		v			v	-	-	-	v
	12	-	v	-				v	-	-	v	-	-	-	v

Test Items	Band	Test Channel			Bandwidth (MHz)						Modulation		RB #		
		L	M	H	1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full
26dB and 99% Bandwidth	2	v	v	v	v	v	v	v	v	v	v	v	-	-	v
	4	v	v	v	v	v	v	v	v	v	v	v	-	-	v
	5	v	v	v	v	v	v	v	-	-	v	v	-	-	v
	7	v	v	v	-	-	v	v	v	v	v	v	-	-	v
	12	v	v	v	v	v	v	v	-	-	v	v	-	-	v
Peak-to-Average Ratio	2	v	v	v	v	v	v	v	v	v	-	v	-	-	v
	4	v	v	v	v	v	v	v	v	v	-	v	-	-	v
	5	v	v	v	v	v	v	v	-	-	-	v	-	-	v
	7	v	v	v	-	-	v	v	v	v	-	v	-	-	v
	12	v	v	v	v	v	v	v	-	-	-	v	-	-	v

Test Items	Band	Test Channel			Bandwidth (MHz)						Modulation		RB #		
		L	M	H	1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full
Emission Mask	7	v		v	-	-	v	v	v	v	v	-	v	v	v
Band Edge	2	v	-	v	v	v	v	v	v	v	v	-	v	v	v
	4	v	-	v	v	v	v	v	v	v	v	-	v	v	v
	5	v	-	v	v	v	v	v	-	-	v	-	v	v	v
	12	v	-	v	v	v	v	v	-	-	v	-	v	v	v
Conducted Emission	2	v	v	v	v	v	v	v	v	v	v	-	v	-	-
	4	v	v	v	v	v	v	v	v	v	v	-	v	-	-
	5	v	v	v	v	v	v	v	-	-	v	-	v	-	-
	7	v	v	v	-	-	v	v	v	v	v	-	v	-	-
	12	v	v	v	v	v	v	v	-	-	v	-	v	-	-

Test Items	Band	Test Channel			Bandwidth (MHz)						Modulation		RB #		
		L	M	H	1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full
Radiated Emission	2	v	v	v				v			v		v		
	4	v	v	v				v			v		v		
	5	v	v	v		v			-	-	v		v		
	7	v	v	v	-	-		v			v		v		
	12	v	v	v				v	-	-	v		v		

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty		
RF Power Output	+/-	1	dB
ERP/ EIRP measurement	+/-	3	dB
	+/-	3	dB
Emission Bandwidth	+/-	1.53	Hz
Out of Band Emissions at Antenna Terminals and Band Edge	+/-	1.69	dB
Peak to Average Ratio	+/-	1	dB
Frequency Stability vs. Temperature	+/-	1.53	Hz
Frequency Stability vs. Voltage	+/-	1.53	Hz
Temperature	+/-	0.4	°C
Humidity	+/-	3.5	%
DC / AC Power Source	+/-	1	%

Radiated Spurious Emission Measurement Uncertainty				
Polarization: Vertical	**+/-**	**2.64**	**dB**	9kHz~30MHz
	+/-	**4.93**	**dB**	30MHz - 1000MHz
	+/-	**4.81**	**dB**	1GHz - 18GHz
	+/-	**4.52**	**dB**	18GHz - 40GHz
Polarization: Horizontal	**+/-**	**2.64**	**dB**	9kHz~30MHz
	+/-	**4.45**	**dB**	30MHz - 1000MHz
	+/-	**4.81**	**dB**	1GHz - 18GHz
	+/-	**4.52**	**dB**	18GHz - 40GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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6 MAXMUM OUTPUT POWER

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.

6.1.1 ERP/EIRP LIMIT

According to FCC §2.1046

FCC 22.913(a) LTE 5

(5) mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

FCC 24.232(c) LTE 2

Mobile and portable stations are limited to 2 W EIRP.

FCC 27.50(c) LTE 12

(9) Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.

FCC 27.50(d) LTE 4

(4) Mobile, and portable (hand-held) stations operating in the 1710-1755 MHz, 1695-1710 MHz and 1755-1780 MHz bands are limited to 1W EIRP.

FCC 27, 50(h) LTE 7

(2) Mobile and other user stations transmitting in the BRS and EBS bands are limited to 2 W EIRP.

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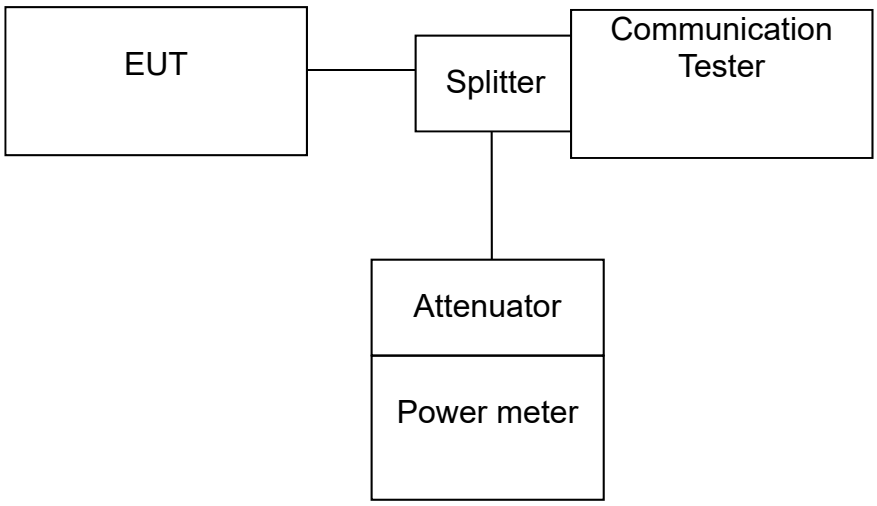
6.2 Test Set-up



Note: *Measurement setup for testing on Antenna connector*

6.3 Output Power Measurement Applicable Guideance

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.
KDB 971168 D01 Power Meas License Digital System as the supplemental test methodology to adjust the proper setting obtaining the measurement results.
All LTE bands conducted average power is obtained from the simulator telecommunication test set.

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6.4 Determining ERP and/or EIRP from conducted RF output power measurements

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$,

$ERP = EIRP - 2.15$,

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power (expressed in the same units as PT, typically dBW, dBm, or power spectral density (PSD)2), relative to either a dipole antenna (ERP) or an isotropic antenna (EIRP);

P_T = transmitter output power, expressed in dBW, dBm, or PSD;

G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

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

6.5 Measurement Equipment Used

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Radio Communication Analyer	Anritsu	MT8820C	6201465317	02/24/2021	02/23/2022
DC Power Supply	Agilent	E3640A	MY52410006	12/17/2020	12/16/2021
Attenuator	Mini-Circuit	BW-S10W2+	2	12/16/2020	12/15/2021

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6.6 Measurement Results:

Antenna gain (dBi)	1.76

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	22.29	24.05	33	-8.95
				1	5	22.28	24.04	33	-8.96
				3	2	22.32	24.08	33	-8.92
				6	0	21.27	23.03	33	-9.97
	18900	1880	QPSK	1	0	22.26	24.02	33	-8.98
				1	5	22.27	24.03	33	-8.97
				3	2	22.28	24.04	33	-8.96
				6	0	21.26	23.02	33	-9.98
	19193	1909.3	QPSK	1	0	22.2	23.96	33	-9.04
				1	5	22.01	23.77	33	-9.23
				3	2	22.42	24.18	33	-8.82
				6	0	21.31	23.07	33	-9.93
1.4	18607	1850.7	16QAM	1	0	21.55	23.31	33	-9.69
				1	5	21.44	23.20	33	-9.8
				3	2	21.56	23.32	33	-9.68
				6	0	20.48	22.24	33	-10.76
	18900	1880	16QAM	1	0	21.5	23.26	33	-9.74
				1	5	21.35	23.11	33	-9.89
				3	2	21.5	23.26	33	-9.74
				6	0	20.41	22.17	33	-10.83
	19193	1909.3	16QAM	1	0	21.54	23.30	33	-9.7
				1	5	21.28	23.04	33	-9.96
				3	2	21.51	23.27	33	-9.73
				6	0	20.45	22.21	33	-10.79

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Antenna gain (dBi)	1.76

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	22.61	24.37	33	-8.63
				1	14	22.48	24.24	33	-8.76
				8	4	21.38	23.14	33	-9.86
				15	0	21.37	23.13	33	-9.87
	18900	1880	QPSK	1	0	22.45	24.21	33	-8.79
				1	14	22.28	24.04	33	-8.96
				8	4	21.42	23.18	33	-9.82
				15	0	21.34	23.10	33	-9.9
	19185	1908.5	QPSK	1	0	22.56	24.32	33	-8.68
				1	14	22.34	24.10	33	-8.9
				8	4	21.44	23.20	33	-9.8
				15	0	21.44	23.20	33	-9.8
3	18615	1851.5	16QAM	1	0	21.94	23.70	33	-9.3
				1	14	21.98	23.74	33	-9.26
				8	4	20.7	22.46	33	-10.54
				15	0	20.76	22.52	33	-10.48
	18900	1880	16QAM	1	0	21.93	23.69	33	-9.31
				1	14	21.8	23.56	33	-9.44
				8	4	20.59	22.35	33	-10.65
				15	0	20.61	22.37	33	-10.63
	19185	1908.5	16QAM	1	0	22.03	23.79	33	-9.21
				1	14	21.91	23.67	33	-9.33
				8	4	20.64	22.40	33	-10.6
				15	0	20.65	22.41	33	-10.59

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Antenna gain (dBi)	1.76

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	22.77	24.53	33	-8.47
				1	24	22.63	24.39	33	-8.61
				12	6	21.57	23.33	33	-9.67
				25	0	21.5	23.26	33	-9.74
	18900	1880	QPSK	1	0	22.57	24.33	33	-8.67
				1	24	22.44	24.20	33	-8.8
				12	6	21.49	23.25	33	-9.75
				25	0	21.47	23.23	33	-9.77
	19175	1907.5	QPSK	1	0	22.77	24.53	33	-8.47
				1	24	22.58	24.34	33	-8.66
				12	6	21.57	23.33	33	-9.67
				25	0	21.54	23.30	33	-9.7
5	18625	1852.5	16QAM	1	0	21.56	23.32	33	-9.68
				1	24	21.51	23.27	33	-9.73
				12	6	20.38	22.14	33	-10.86
				25	0	20.39	22.15	33	-10.85
	18900	1880	16QAM	1	0	21.57	23.33	33	-9.67
				1	24	21.39	23.15	33	-9.85
				12	6	20.26	22.02	33	-10.98
				25	0	20.3	22.06	33	-10.94
	19175	1907.5	16QAM	1	0	21.63	23.39	33	-9.61
				1	24	21.39	23.15	33	-9.85
				12	6	20.33	22.09	33	-10.91
				25	0	20.27	22.03	33	-10.97

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Antenna gain (dBi)	1.76

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	22.93	24.69	33	-8.31
				1	49	22.64	24.40	33	-8.6
				25	12	21.52	23.28	33	-9.72
				50	0	21.58	23.34	33	-9.66
	18900	1880	QPSK	1	0	22.89	24.65	33	-8.35
				1	49	22.54	24.30	33	-8.7
				25	12	21.51	23.27	33	-9.73
				50	0	21.56	23.32	33	-9.68
	19150	1905	QPSK	1	0	23.07	24.83	33	-8.17
				1	49	22.89	24.65	33	-8.35
				25	12	21.64	23.40	33	-9.6
				50	0	21.74	23.50	33	-9.5
10	18650	1855	16QAM	1	0	21.85	23.61	33	-9.39
				1	49	21.58	23.34	33	-9.66
				25	12	20.41	22.17	33	-10.83
				50	0	20.49	22.25	33	-10.75
	18900	1880	16QAM	1	0	21.88	23.64	33	-9.36
				1	49	21.32	23.08	33	-9.92
				25	12	20.34	22.10	33	-10.9
				50	0	20.38	22.14	33	-10.86
	19150	1905	16QAM	1	0	21.82	23.58	33	-9.42
				1	49	21.52	23.28	33	-9.72
				25	12	20.4	22.16	33	-10.84
				50	0	20.5	22.26	33	-10.74

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Antenna gain (dBi)	1.76

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	22.63	24.39	33	-8.61
				1	74	22.53	24.29	33	-8.71
				36	18	21.48	23.24	33	-9.76
				75	0	21.62	23.38	33	-9.62
	18900	1880	QPSK	1	0	22.67	24.43	33	-8.57
				1	74	22.42	24.18	33	-8.82
				36	18	21.56	23.32	33	-9.68
				75	0	21.6	23.36	33	-9.64
	19125	1902.5	QPSK	1	0	22.76	24.52	33	-8.48
				1	74	22.6	24.36	33	-8.64
				36	18	21.63	23.39	33	-9.61
				75	0	21.67	23.43	33	-9.57
15	18675	1857.5	16QAM	1	0	21.74	23.50	33	-9.5
				1	74	21.73	23.49	33	-9.51
				36	18	20.34	22.10	33	-10.9
				75	0	20.48	22.24	33	-10.76
	18900	1880	16QAM	1	0	21.92	23.68	33	-9.32
				1	74	21.6	23.36	33	-9.64
				36	18	20.29	22.05	33	-10.95
				75	0	20.31	22.07	33	-10.93
	19125	1902.5	16QAM	1	0	21.66	23.42	33	-9.58
				1	74	21.52	23.28	33	-9.72
				36	18	20.46	22.22	33	-10.78
				75	0	20.48	22.24	33	-10.76

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Antenna gain (dBi)	1.76

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	22.83	24.59	33	-8.41
				1	99	22.8	24.56	33	-8.44
				50	25	21.58	23.34	33	-9.66
				100	0	21.62	23.38	33	-9.62
	18900	1880	QPSK	1	0	22.83	24.59	33	-8.41
				1	99	22.77	24.53	33	-8.47
				50	25	21.56	23.32	33	-9.68
				100	0	21.59	23.35	33	-9.65
	19100	1900	QPSK	1	0	22.71	24.47	33	-8.53
				1	99	22.55	24.31	33	-8.69
				50	25	21.58	23.34	33	-9.66
				100	0	21.7	23.46	33	-9.54
20	18700	1860	16QAM	1	0	22.16	23.92	33	-9.08
				1	99	22.2	23.96	33	-9.04
				50	25	21.05	22.81	33	-10.19
				100	0	20.93	22.69	33	-10.31
	18900	1880	16QAM	1	0	22.12	23.88	33	-9.12
				1	99	22.08	23.84	33	-9.16
				50	25	20.99	22.75	33	-10.25
				100	0	20.93	22.69	33	-10.31
	19100	1900	16QAM	1	0	22.19	23.95	33	-9.05
				1	99	22.11	23.87	33	-9.13
				50	25	20.94	22.70	33	-10.3
				100	0	21.04	22.80	33	-10.2

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Antenna gain (dBi)	1.76

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	22.71	24.47	30	-5.53
				1	5	22.64	24.40	30	-5.6
				3	2	22.79	24.55	30	-5.45
				6	0	21.84	23.60	30	-6.4
	20175	1732.5	QPSK	1	0	22.26	24.02	30	-5.98
				1	5	22.26	24.02	30	-5.98
				3	2	22.18	23.94	30	-6.06
				6	0	21.14	22.90	30	-7.1
	20393	1754.3	QPSK	1	0	21.96	23.72	30	-6.28
				1	5	21.97	23.73	30	-6.27
				3	2	21.89	23.65	30	-6.35
				6	0	20.92	22.68	30	-7.32
1.4	19957	1710.7	16QAM	1	0	22.25	24.01	30	-5.99
				1	5	22.1	23.86	30	-6.14
				3	2	21.94	23.70	30	-6.3
				6	0	20.87	22.63	30	-7.37
	20175	1732.5	16QAM	1	0	21.66	23.42	30	-6.58
				1	5	21.42	23.18	30	-6.82
				3	2	21.16	22.92	30	-7.08
				6	0	20.27	22.03	30	-7.97
	20393	1754.3	16QAM	1	0	21.24	23.00	30	-7
				1	5	21.31	23.07	30	-6.93
				3	2	21.05	22.81	30	-7.19
				6	0	20.1	21.86	30	-8.14

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Antenna gain (dBi)	1.76

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	22.98	24.74	30	-5.26
				1	14	22.76	24.52	30	-5.48
				8	4	21.81	23.57	30	-6.43
				15	0	21.77	23.53	30	-6.47
	20175	1732.5	QPSK	1	0	22.23	23.99	30	-6.01
				1	14	22.27	24.03	30	-5.97
				8	4	21.23	22.99	30	-7.01
				15	0	21.25	23.01	30	-6.99
	20385	1753.5	QPSK	1	0	22.09	23.85	30	-6.15
				1	14	22.04	23.80	30	-6.2
				8	4	20.96	22.72	30	-7.28
				15	0	20.93	22.69	30	-7.31
3	19965	1711.5	16QAM	1	0	22.35	24.11	30	-5.89
				1	14	22.1	23.86	30	-6.14
				8	4	20.96	22.72	30	-7.28
				15	0	20.84	22.60	30	-7.4
	20175	1732.5	16QAM	1	0	21.61	23.37	30	-6.63
				1	14	21.53	23.29	30	-6.71
				8	4	20.33	22.09	30	-7.91
				15	0	20.23	21.99	30	-8.01
	20385	1753.5	16QAM	1	0	21.39	23.15	30	-6.85
				1	14	21.29	23.05	30	-6.95
				8	4	20.16	21.92	30	-8.08
				15	0	20.05	21.81	30	-8.19

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Antenna gain (dBi)	1.76

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	23.05	24.81	30	-5.19
				1	24	22.9	24.66	30	-5.34
				12	6	21.95	23.71	30	-6.29
				25	0	21.88	23.64	30	-6.36
	20175	1732.5	QPSK	1	0	22.48	24.24	30	-5.76
				1	24	22.28	24.04	30	-5.96
				12	6	21.22	22.98	30	-7.02
				25	0	21.19	22.95	30	-7.05
	20375	1752.5	QPSK	1	0	22.22	23.98	30	-6.02
				1	24	22.03	23.79	30	-6.21
				12	6	20.99	22.75	30	-7.25
				25	0	21.09	22.85	30	-7.15
5	19975	1712.5	16QAM	1	0	22.26	24.02	30	-5.98
				1	24	21.94	23.70	30	-6.3
				12	6	20.91	22.67	30	-7.33
				25	0	20.81	22.57	30	-7.43
	20175	1732.5	16QAM	1	0	21.77	23.53	30	-6.47
				1	24	21.47	23.23	30	-6.77
				12	6	20.27	22.03	30	-7.97
				25	0	20.31	22.07	30	-7.93
	20375	1752.5	16QAM	1	0	21.55	23.31	30	-6.69
				1	24	21.38	23.14	30	-6.86
				12	6	20.18	21.94	30	-8.06
				25	0	20.25	22.01	30	-7.99

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Antenna gain (dBi)	1.76

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	23.17	24.93	30	-5.07
				1	49	23.09	24.85	30	-5.15
				25	12	21.82	23.58	30	-6.42
				50	0	21.88	23.64	30	-6.36
	20175	1732.5	QPSK	1	0	22.51	24.27	30	-5.73
				1	49	22.49	24.25	30	-5.75
				25	12	21.32	23.08	30	-6.92
				50	0	21.39	23.15	30	-6.85
	20350	1750	QPSK	1	0	22.33	24.09	30	-5.91
				1	49	22.21	23.97	30	-6.03
				25	12	20.98	22.74	30	-7.26
				50	0	21.17	22.93	30	-7.07
10	20000	1715	16QAM	1	0	22.31	24.07	30	-5.93
				1	49	22.32	24.08	30	-5.92
				25	12	20.95	22.71	30	-7.29
				50	0	21.01	22.77	30	-7.23
	20175	1732.5	16QAM	1	0	21.98	23.74	30	-6.26
				1	49	21.87	23.63	30	-6.37
				25	12	20.43	22.19	30	-7.81
				50	0	20.57	22.33	30	-7.67
	20350	1750	16QAM	1	0	21.77	23.53	30	-6.47
				1	49	21.57	23.33	30	-6.67
				25	12	20.11	21.87	30	-8.13
				50	0	20.23	21.99	30	-8.01

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Antenna gain (dBi)	1.76

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	22.31	24.07	30	-5.93
				1	74	22.03	23.79	30	-6.21
				36	18	21.33	23.09	30	-6.91
				75	0	21.32	23.08	30	-6.92
	20175	1732.5	QPSK	1	0	21.93	23.69	30	-6.31
				1	74	21.63	23.39	30	-6.61
				36	18	20.85	22.61	30	-7.39
				75	0	20.83	22.59	30	-7.41
	20325	1747.5	QPSK	1	0	21.71	23.47	30	-6.53
				1	74	21.54	23.30	30	-6.7
				36	18	20.87	22.63	30	-7.37
				75	0	20.85	22.61	30	-7.39
15	20025	1717.5	16QAM	1	0	21.75	23.51	30	-6.49
				1	74	21.32	23.08	30	-6.92
				36	18	20.54	22.30	30	-7.7
				75	0	20.51	22.27	30	-7.73
	20175	1732.5	16QAM	1	0	21.38	23.14	30	-6.86
				1	74	21.15	22.91	30	-7.09
				36	18	20.21	21.97	30	-8.03
				75	0	20.14	21.90	30	-8.1
	20325	1747.5	16QAM	1	0	21.14	22.90	30	-7.1
				1	74	20.8	22.56	30	-7.44
				36	18	20.13	21.89	30	-8.11
				75	0	20.12	21.88	30	-8.12

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Antenna gain (dBi)	1.76

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	22.15	23.91	30	-6.09
				1	99	22.05	23.81	30	-6.19
				50	25	21.31	23.07	30	-6.93
				100	0	21.25	23.01	30	-6.99
	20175	1732.5	QPSK	1	0	21.74	23.50	30	-6.5
				1	99	21.63	23.39	30	-6.61
				50	25	20.99	22.75	30	-7.25
				100	0	20.91	22.67	30	-7.33
	20300	1745	QPSK	1	0	21.9	23.66	30	-6.34
				1	99	21.75	23.51	30	-6.49
				50	25	20.98	22.74	30	-7.26
				100	0	20.88	22.64	30	-7.36
20	20050	1720	16QAM	1	0	21.75	23.51	30	-6.49
				1	99	21.6	23.36	30	-6.64
				50	25	20.52	22.28	30	-7.72
				100	0	20.48	22.24	30	-7.76
	20175	1732.5	16QAM	1	0	21.22	22.98	30	-7.02
				1	99	21.19	22.95	30	-7.05
				50	25	20.39	22.15	30	-7.85
				100	0	20.2	21.96	30	-8.04
	20300	1745	16QAM	1	0	21.31	23.07	30	-6.93
				1	99	21.08	22.84	30	-7.16
				50	25	20.22	21.98	30	-8.02
				100	0	20.07	21.83	30	-8.17

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Antenna gain (dBi)	1.59

LTE Band 5_Uplink frequency band : 824 to 849 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	ERP Limit (dBm)	Margin (dB)
1.4	20407	824.7	QPSK	1	0	22.61	22.05	24.20	38.45	-16.40
				1	5	22.6	22.04	24.19	38.45	-16.41
				3	2	22.83	22.27	24.42	38.45	-16.18
				6	0	21.79	21.23	23.38	38.45	-17.22
	20525	836.5	QPSK	1	0	22.48	21.92	24.07	38.45	-16.53
				1	5	22.6	22.04	24.19	38.45	-16.41
				3	2	22.85	22.29	24.44	38.45	-16.16
				6	0	21.78	21.22	23.37	38.45	-17.23
	20643	848.3	QPSK	1	0	22.5	21.94	24.09	38.45	-16.51
				1	5	22.52	21.96	24.11	38.45	-16.49
				3	2	22.79	22.23	24.38	38.45	-16.22
				6	0	21.16	20.60	22.75	38.45	-17.85
1.4	20407	824.7	16QAM	1	0	21.78	21.22	23.37	38.45	-17.23
				1	5	21.82	21.26	23.41	38.45	-17.19
				3	2	21.92	21.36	23.51	38.45	-17.09
				6	0	20.33	19.77	21.92	38.45	-18.68
	20525	836.5	16QAM	1	0	21.9	21.34	23.49	38.45	-17.11
				1	5	21.82	21.26	23.41	38.45	-17.19
				3	2	21.75	21.19	23.34	38.45	-17.26
				6	0	20.61	20.05	22.20	38.45	-18.40
	20643	848.3	16QAM	1	0	21.98	21.42	23.57	38.45	-17.03
				1	5	21.72	21.16	23.31	38.45	-17.29
				3	2	21.66	21.10	23.25	38.45	-17.35
				6	0	20.64	20.08	22.23	38.45	-18.37

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Antenna gain (dBi)	1.59

LTE Band 5_Uplink frequency band : 824 to 849 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	ERP Limit (dBm)	Margin (dB)
3	20415	825.5	QPSK	1	0	22.86	22.30	24.45	38.45	-16.15
				1	14	22.62	22.06	24.21	38.45	-16.39
				8	4	21.4	20.84	22.99	38.45	-17.61
				15	0	21.41	20.85	23.00	38.45	-17.60
	20525	836.5	QPSK	1	0	23.11	22.55	24.70	38.45	-15.90
				1	14	22.62	22.06	24.21	38.45	-16.39
				8	4	21.71	21.15	23.30	38.45	-17.30
				15	0	21.64	21.08	23.23	38.45	-17.37
	20635	847.5	QPSK	1	0	22.56	22.00	24.15	38.45	-16.45
				1	14	22.48	21.92	24.07	38.45	-16.53
				8	4	21.2	20.64	22.79	38.45	-17.81
				15	0	21.17	20.61	22.76	38.45	-17.84
3	20415	825.5	16QAM	1	0	21.8	21.24	23.39	38.45	-17.21
				1	14	21.96	21.40	23.55	38.45	-17.05
				8	4	20.57	20.01	22.16	38.45	-18.44
				15	0	20.61	20.05	22.20	38.45	-18.40
	20525	836.5	16QAM	1	0	21.63	21.07	23.22	38.45	-17.38
				1	14	21.67	21.11	23.26	38.45	-17.34
				8	4	20.49	19.93	22.08	38.45	-18.52
				15	0	20.55	19.99	22.14	38.45	-18.46
	20635	847.5	16QAM	1	0	21.55	20.99	23.14	38.45	-17.46
				1	14	21.69	21.13	23.28	38.45	-17.32
				8	4	20.36	19.80	21.95	38.45	-18.65
				15	0	20.31	19.75	21.90	38.45	-18.70

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Antenna gain (dBi)	1.59

LTE Band 5_Uplink frequency band : 824 to 849 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	ERP Limit (dBm)	Margin (dB)
5	20425	826.5	QPSK	1	0	22.72	22.16	24.31	38.45	-16.29
				1	24	22.49	21.93	24.08	38.45	-16.52
				12	6	21.74	21.18	23.33	38.45	-17.27
				25	0	21.86	21.30	23.45	38.45	-17.15
	20525	836.5	QPSK	1	0	22.6	22.04	24.19	38.45	-16.41
				1	24	21.93	21.37	23.52	38.45	-17.08
				12	6	21.1	20.54	22.69	38.45	-17.91
				25	0	21.21	20.65	22.80	38.45	-17.80
	20625	846.5	QPSK	1	0	22.57	22.01	24.16	38.45	-16.44
				1	24	22.7	22.14	24.29	38.45	-16.31
				12	6	21.42	20.86	23.01	38.45	-17.59
				25	0	21.51	20.95	23.10	38.45	-17.50
5	20425	826.5	16QAM	1	0	21.77	21.21	23.36	38.45	-17.24
				1	24	22.14	21.58	23.73	38.45	-16.87
				12	6	20.72	20.16	22.31	38.45	-18.29
				25	0	20.49	19.93	22.08	38.45	-18.52
	20525	836.5	16QAM	1	0	21.78	21.22	23.37	38.45	-17.23
				1	24	21.7	21.14	23.29	38.45	-17.31
				12	6	20.61	20.05	22.20	38.45	-18.40
				25	0	20.75	20.19	22.34	38.45	-18.26
	20625	846.5	16QAM	1	0	21.6	21.04	23.19	38.45	-17.41
				1	24	21.46	20.90	23.05	38.45	-17.55
				12	6	20.28	19.72	21.87	38.45	-18.73
				25	0	20.37	19.81	21.96	38.45	-18.64

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Antenna gain (dBi)	1.59

LTE Band 5_Uplink frequency band : 824 to 849 MHz										
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	ERP Average (dBm)	EIRP Average (dBm)	ERP Limit (dBm)	Margin (dB)
10	20450	829	QPSK	1	0	22.93	22.37	24.52	38.45	-16.08
				1	49	22.44	21.88	24.03	38.45	-16.57
				25	12	21.32	20.76	22.91	38.45	-17.69
				50	0	21.5	20.94	23.09	38.45	-17.51
	20525	836.5	QPSK	1	0	23.03	22.47	24.62	38.45	-15.98
				1	49	21.92	21.36	23.51	38.45	-17.09
				25	12	21.26	20.70	22.85	38.45	-17.75
				50	0	21.34	20.78	22.93	38.45	-17.67
	20600	844	QPSK	1	0	22.14	21.58	23.73	38.45	-16.87
				1	49	22.1	21.54	23.69	38.45	-16.91
				25	12	20.94	20.38	22.53	38.45	-18.07
				50	0	21.21	20.65	22.80	38.45	-17.80
10	20450	829	16QAM	1	0	21.61	21.05	23.20	38.45	-17.40
				1	49	21.59	21.03	23.18	38.45	-17.42
				25	12	20.44	19.88	22.03	38.45	-18.57
				50	0	20.64	20.08	22.23	38.45	-18.37
	20525	836.5	16QAM	1	0	21.83	21.27	23.42	38.45	-17.18
				1	49	21.53	20.97	23.12	38.45	-17.48
				25	12	20.81	20.25	22.40	38.45	-18.20
				50	0	20.85	20.29	22.44	38.45	-18.16
	20600	844	16QAM	1	0	21.59	21.03	23.18	38.45	-17.42
				1	49	21.53	20.97	23.12	38.45	-17.48
				25	12	20.09	19.53	21.68	38.45	-18.92
				50	0	20.3	19.74	21.89	38.45	-18.71

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Antenna gain (dBi)	-0.94

LTE Band 7_Uplink frequency band : 2500 to 2570 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
5	20775	2502.5	QPSK	1	0	22.3	21.36	33	-11.64
				1	24	22.11	21.17	33	-11.83
				12	6	21.16	20.22	33	-12.78
				25	0	21.13	20.19	33	-12.81
	21100	2535	QPSK	1	0	22.55	21.61	33	-11.39
				1	24	22.53	21.59	33	-11.41
				12	6	21.42	20.48	33	-12.52
				25	0	21.42	20.48	33	-12.52
	21425	2567.5	QPSK	1	0	22.14	21.20	33	-11.8
				1	24	21.86	20.92	33	-12.08
				12	6	20.97	20.03	33	-12.97
				25	0	20.91	19.97	33	-13.03
5	20775	2502.5	16QAM	1	0	21.68	20.74	33	-12.26
				1	24	21.48	20.54	33	-12.46
				12	6	20.23	19.29	33	-13.71
				25	0	20.2	19.26	33	-13.74
	21100	2535	16QAM	1	0	21.9	20.96	33	-12.04
				1	24	21.86	20.92	33	-12.08
				12	6	20.97	20.03	33	-12.97
				25	0	20.85	19.91	33	-13.09
	21425	2567.5	16QAM	1	0	21.64	20.70	33	-12.3
				1	24	21.11	20.17	33	-12.83
				12	6	20.1	19.16	33	-13.84
				25	0	19.96	19.02	33	-13.98

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Antenna gain (dBi)	-0.94

LTE Band 7_Uplink frequency band : 2500 to 2570 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
10	20800	2505	QPSK	1	0	22.69	21.75	33	-11.25
				1	49	22.59	21.65	33	-11.35
				25	12	21.18	20.24	33	-12.76
				50	0	21.39	20.45	33	-12.55
	21100	2535	QPSK	1	0	22.68	21.74	33	-11.26
				1	49	23.02	22.08	33	-10.92
				25	12	21.5	20.56	33	-12.44
				50	0	21.68	20.74	33	-12.26
	21400	2565	QPSK	1	0	22.57	21.63	33	-11.37
				1	49	21.99	21.05	33	-11.95
				25	12	21.24	20.30	33	-12.7
				50	0	21.2	20.26	33	-12.74
10	20800	2505	16QAM	1	0	21.81	20.87	33	-12.13
				1	49	21.85	20.91	33	-12.09
				25	12	20.22	19.28	33	-13.72
				50	0	20.42	19.48	33	-13.52
	21100	2535	16QAM	1	0	22.14	21.20	33	-11.8
				1	49	22.19	21.25	33	-11.75
				25	12	21.77	20.83	33	-12.17
				50	0	21.81	20.87	33	-12.13
	21400	2565	16QAM	1	0	22.06	21.12	33	-11.88
				1	49	21.36	20.42	33	-12.58
				25	12	20.19	19.25	33	-13.75
				50	0	20.2	19.26	33	-13.74

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Antenna gain (dBi)	-0.94

LTE Band 7_Uplink frequency band : 2500 to 2570 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
15	20825	2507.5	QPSK	1	0	21.97	21.03	33	-11.97
				1	74	22.33	21.39	33	-11.61
				36	18	21.34	20.40	33	-12.6
				75	0	21.27	20.33	33	-12.67
	21100	2535	QPSK	1	0	22.6	21.66	33	-11.34
				1	74	22.89	21.95	33	-11.05
				36	18	21.75	20.81	33	-12.19
				75	0	21.77	20.83	33	-12.17
	21375	2562.5	QPSK	1	0	22.51	21.57	33	-11.43
				1	74	21.67	20.73	33	-12.27
				36	18	21.21	20.27	33	-12.73
				75	0	21.14	20.20	33	-12.8
15	20825	2507.5	16QAM	1	0	21.23	20.29	33	-12.71
				1	74	21.52	20.58	33	-12.42
				36	18	20.35	19.41	33	-13.59
				75	0	20.32	19.38	33	-13.62
	21100	2535	16QAM	1	0	21.84	20.90	33	-12.1
				1	74	21.98	21.04	33	-11.96
				36	18	20.24	19.30	33	-13.7
				75	0	20.9	19.96	33	-13.04
	21375	2562.5	16QAM	1	0	21.65	20.71	33	-12.29
				1	74	20.88	19.94	33	-13.06
				36	18	20.28	19.34	33	-13.66
				75	0	20.25	19.31	33	-13.69

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Antenna gain (dBi)	-0.94

LTE Band 7_Uplink frequency band : 2500 to 2570 MHz									
BW (MHz)	UL Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average (dBm)	EIRP Limit (dBm)	Margin (dB)
20	20850	2510	QPSK	1	0	22.25	21.31	33	-11.69
				1	99	22.4	21.46	33	-11.54
				50	25	21.3	20.36	33	-12.64
				100	0	21.33	20.39	33	-12.61
	21100	2535	QPSK	1	0	22.61	21.67	33	-11.33
				1	99	22.96	22.02	33	-10.98
				50	25	21.77	20.83	33	-12.17
				100	0	21.84	20.90	33	-12.1
	21350	2560	QPSK	1	0	22.62	21.68	33	-11.32
				1	99	21.77	20.83	33	-12.17
				50	25	21.31	20.37	33	-12.63
				100	0	21.29	20.35	33	-12.65
20	20850	2510	QPSK	1	0	21.52	20.58	33	-12.42
				1	99	21.83	20.89	33	-12.11
				50	25	20.4	19.46	33	-13.54
				100	0	20.39	19.45	33	-13.55
	21100	2535	QPSK	1	0	22.09	21.15	33	-11.85
				1	99	22.41	21.47	33	-11.53
				50	25	20.74	19.80	33	-13.2
				100	0	20.88	19.94	33	-13.06
	21350	2560	QPSK	1	0	21.95	21.01	33	-11.99
				1	99	21.09	20.15	33	-12.85
				50	25	20.45	19.51	33	-13.49
				100	0	20.44	19.50	33	-13.5

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Antenna gain (dBi)	1.59

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)	ERP Limit (dBm)	Margin (dB)
1.4	23017	699.7	QPSK	1	0	22.44	21.88	24.03	34.77	-12.89
				1	5	22.51	21.95	24.10	34.77	-12.82
				3	2	22.58	22.02	24.17	34.77	-12.75
				6	0	21.6	21.04	23.19	34.77	-13.73
	23095	707.5	QPSK	1	0	22.52	21.96	24.11	34.77	-12.81
				1	5	22.6	22.04	24.19	34.77	-12.73
				3	2	22.57	22.01	24.16	34.77	-12.76
				6	0	21.48	20.92	23.07	34.77	-13.85
	23173	715.5	QPSK	1	0	22.46	21.90	24.05	34.77	-12.87
				1	5	22.44	21.88	24.03	34.77	-12.89
				3	2	22.46	21.90	24.05	34.77	-12.87
				6	0	21.31	20.75	22.90	34.77	-14.02
1.4	23017	699.7	16QAM	1	0	21.34	20.78	22.93	34.77	-13.99
				1	5	21.86	21.30	23.45	34.77	-13.47
				3	2	21.7	21.14	23.29	34.77	-13.63
				6	0	20.78	20.22	22.37	34.77	-14.55
	23095	707.5	16QAM	1	0	21.77	21.21	23.36	34.77	-13.56
				1	5	21.94	21.38	23.53	34.77	-13.39
				3	2	21.7	21.14	23.29	34.77	-13.63
				6	0	20.58	20.02	22.17	34.77	-14.75
	23173	715.5	16QAM	1	0	21.86	21.30	23.45	34.77	-13.47
				1	5	21.93	21.37	23.52	34.77	-13.40
				3	2	21.51	20.95	23.10	34.77	-13.82
				6	0	20.47	19.91	22.06	34.77	-14.86

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Antenna gain (dBi)	1.59

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)	ERP Limit (dBm)	Margin (dB)
3	23025	700.5	QPSK	1	0	22.55	21.99	24.14	34.77	-12.78
				1	14	22.63	22.07	24.22	34.77	-12.70
				8	4	21.63	21.07	23.22	34.77	-13.70
				15	0	21.6	21.04	23.19	34.77	-13.73
	23095	707.5	QPSK	1	0	22.6	22.04	24.19	34.77	-12.73
				1	14	22.56	22.00	24.15	34.77	-12.77
				8	4	21.64	21.08	23.23	34.77	-13.69
				15	0	21.64	21.08	23.23	34.77	-13.69
	23165	714.5	QPSK	1	0	22.64	22.08	24.23	34.77	-12.69
				1	14	22.45	21.89	24.04	34.77	-12.88
				8	4	21.47	20.91	23.06	34.77	-13.86
				15	0	21.49	20.93	23.08	34.77	-13.84
3	23025	700.5	16QAM	1	0	21.51	20.95	23.10	34.77	-13.82
				1	14	21.93	21.37	23.52	34.77	-13.40
				8	4	20.72	20.16	22.31	34.77	-14.61
				15	0	20.68	20.12	22.27	34.77	-14.65
	23095	707.5	16QAM	1	0	21.7	21.14	23.29	34.77	-13.63
				1	14	21.54	20.98	23.13	34.77	-13.79
				8	4	20.71	20.15	22.30	34.77	-14.62
				15	0	20.41	19.85	22.00	34.77	-14.92
	23165	714.5	16QAM	1	0	21.78	21.22	23.37	34.77	-13.55
				1	14	21.56	21.00	23.15	34.77	-13.77
				8	4	20.45	19.89	22.04	34.77	-14.88
				15	0	20.49	19.93	22.08	34.77	-14.84

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Antenna gain (dBi)	1.59

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)	ERP Limit (dBm)	Margin (dB)
5	23035	701.5	QPSK	1	0	22.67	22.11	24.26	34.77	-12.66
				1	24	22.74	22.18	24.33	34.77	-12.59
				12	6	21.66	21.10	23.25	34.77	-13.67
				25	0	21.63	21.07	23.22	34.77	-13.70
	23095	707.5	QPSK	1	0	22.62	22.06	24.21	34.77	-12.71
				1	24	22.66	22.10	24.25	34.77	-12.67
				12	6	21.58	21.02	23.17	34.77	-13.75
				25	0	21.65	21.09	23.24	34.77	-13.68
	23155	713.5	QPSK	1	0	22.65	22.09	24.24	34.77	-12.68
				1	24	22.57	22.01	24.16	34.77	-12.76
				12	6	21.56	21.00	23.15	34.77	-13.77
				25	0	21.6	21.04	23.19	34.77	-13.73
5	23035	701.5	16QAM	1	0	21.68	21.12	23.27	34.77	-13.65
				1	24	21.71	21.15	23.30	34.77	-13.62
				12	6	20.62	20.06	22.21	34.77	-14.71
				25	0	20.63	20.07	22.22	34.77	-14.70
	23095	707.5	16QAM	1	0	21.55	20.99	23.14	34.77	-13.78
				1	24	21.78	21.22	23.37	34.77	-13.55
				12	6	20.54	19.98	22.13	34.77	-14.79
				25	0	20.7	20.14	22.29	34.77	-14.63
	23155	713.5	16QAM	1	0	21.74	21.18	23.33	34.77	-13.59
				1	24	21.66	21.10	23.25	34.77	-13.67
				12	6	20.5	19.94	22.09	34.77	-14.83
				25	0	20.47	19.91	22.06	34.77	-14.86

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Antenna gain (dBi)	1.59

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)	ERP Limit (dBm)	Margin (dB)
10	23060	704	QPSK	1	0	22.69	22.13	24.28	34.77	-12.64
				1	49	22.71	22.15	24.30	34.77	-12.62
				25	12	21.64	21.08	23.23	34.77	-13.69
				50	0	21.71	21.15	23.30	34.77	-13.62
	23095	707.5	QPSK	1	0	22.58	22.02	24.17	34.77	-12.75
				1	49	22.83	22.27	24.42	34.77	-12.50
				25	12	21.64	21.08	23.23	34.77	-13.69
				50	0	21.68	21.12	23.27	34.77	-13.65
	23130	711	QPSK	1	0	22.65	22.09	24.24	34.77	-12.68
				1	49	22.68	22.12	24.27	34.77	-12.65
				25	12	21.65	21.09	23.24	34.77	-13.68
				50	0	21.67	21.11	23.26	34.77	-13.66
10	23060	704	16QAM	1	0	21.83	21.27	23.42	34.77	-13.50
				1	49	21.85	21.29	23.44	34.77	-13.48
				25	12	20.59	20.03	22.18	34.77	-14.74
				50	0	20.66	20.10	22.25	34.77	-14.67
	23095	707.5	16QAM	1	0	21.51	20.95	23.10	34.77	-13.82
				1	49	21.72	21.16	23.31	34.77	-13.61
				25	12	20.57	20.01	22.16	34.77	-14.76
				50	0	20.64	20.08	22.23	34.77	-14.69
	23130	711	16QAM	1	0	21.66	21.10	23.25	34.77	-13.67
				1	49	21.74	21.18	23.33	34.77	-13.59
				25	12	20.61	20.05	22.20	34.77	-14.72
				50	0	20.57	20.01	22.16	34.77	-14.76

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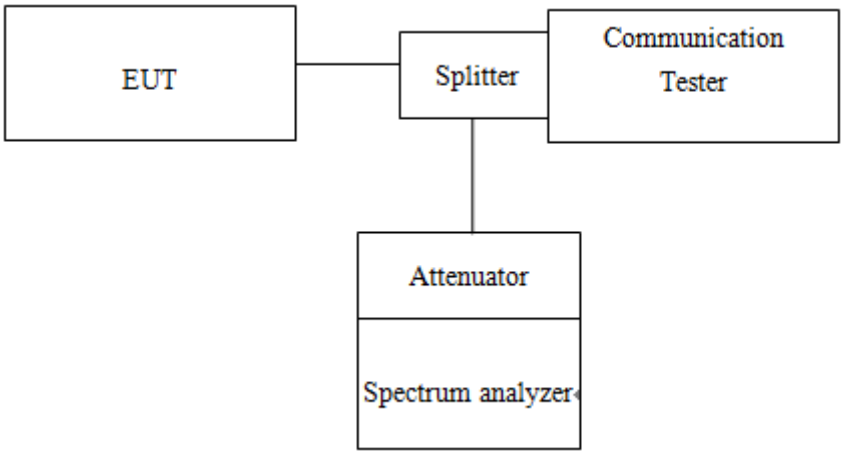
7 OCCUPIED BANDWIDTH MEASUREMENT

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%.

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7.4 Measurement Equipment Used

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Temperature Chamber	Giant Force	GTH-150-40-CP-AR	MAA0512-018	05/19/2021	05/18/2022
Radio Communication Analyer	Anritsu	MT8820C	6201465317	02/24/2021	02/23/2022
DC Power Supply	Agilent	E3640A	MY52410006	12/17/2020	12/16/2021
Attenuator	Mini-Circuit	BW-S10W2+	2	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021
Power Divider	RF-LAMBAD	RFLT2W1G18G	11-JSPF412-018	12/16/2020	12/15/2021

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	1.0879	1.0869	1.342	1.249
1880.0	18900	1.0897	1.0905	1.425	1.494
1909.3	19193	1.0896	1.0913	1.478	1.438

LTE BAND 2 Channel bandwidth: 3MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1851.5	18615	2.6892	2.6938	2.962	3.027
1880.0	18900	2.6874	2.6886	2.966	3.019
1908.5	19185	2.6907	2.6894	2.962	3.006

LTE BAND 2 Channel bandwidth: 5MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1852.5	18625	4.4786	4.4852	4.981	4.944
1880.0	18900	4.4779	4.4773	4.933	4.926
1907.5	19175	4.4765	4.4805	4.941	4.920

LTE BAND 2 Channel bandwidth: 10MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1855.0	18650	8.9489	8.9245	9.684	9.692
1880.0	18900	8.9713	8.9385	9.777	9.672
1905.0	19150	8.9598	8.9397	9.757	9.666

LTE BAND 2 Channel bandwidth: 15MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1857.5	18675	13.408	13.421	14.52	14.61
1880.0	18900	13.452	13.448	14.59	14.63
1902.5	19125	13.469	13.448	14.57	14.55

LTE BAND 2 Channel bandwidth: 20MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1860.0	18700	17.838	17.873	19.18	19.30
1880.0	18900	17.936	17.939	19.41	19.31
1900.0	19100	17.887	17.921	19.21	19.28

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LTE BAND 4 Channel bandwidth: 1.4MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1710.7	19957	1.0865	1.0858	1.241	1.228
1732.5	20175	1.0876	1.0871	1.247	1.235
1754.3	20393	1.0877	1.0878	1.257	1.234

LTE BAND 4 Channel bandwidth: 3MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1711.5	19965	2.6861	2.6902	2.941	2.988
1732.5	20175	2.6856	2.6892	2.974	2.985
1753.5	20385	2.6847	2.6914	2.956	2.994

LTE BAND 4 Channel bandwidth: 5MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1712.5	19975	4.4742	4.4768	4.957	4.920
1732.5	20175	4.4773	4.4834	4.930	4.907
1752.5	20375	4.4749	4.4798	4.956	4.944

LTE BAND 4 Channel bandwidth: 10MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1715.0	20000	8.9564	8.9336	9.725	9.673
1732.5	20175	8.9673	8.9280	9.737	9.703
1750.0	20350	8.9553	8.9271	9.703	9.668

LTE BAND 4 Channel bandwidth: 15MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1717.5	20025	13.423	13.419	14.52	14.58
1732.5	20175	13.426	13.426	14.58	14.62
1747.5	20325	13.450	13.418	14.55	14.59

LTE BAND 4 Channel bandwidth: 20MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
1720.0	20050	17.860	17.912	19.30	19.23
1732.5	20175	17.919	17.907	19.31	19.31
1745.0	20300	17.896	17.923	19.38	19.26

LTE BAND 5 Channel bandwidth: 1.4MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
824.7	20407	1.0853	1.0838	1.224	1.210
836.5	20525	1.0863	1.0850	1.228	1.218
848.3	20643	1.0856	1.0828	1.229	1.219

LTE BAND 5 Channel bandwidth: 3MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
825.5	20415	2.6854	2.6899	2.947	2.969
836.5	20525	2.6870	2.6914	2.962	2.973
847.5	20635	2.6878	2.6857	2.945	2.979

LTE BAND 5 Channel bandwidth: 5MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
826.5	20425	4.4830	4.6652	4.946	7.187
836.5	20525	4.4790	4.6607	4.933	6.486
846.5	20625	4.4812	4.9098	4.937	6.956

LTE BAND 5 Channel bandwidth: 10MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
829.0	20450	8.9641	8.9424	9.729	9.713
836.5	20525	8.9634	8.9327	9.724	9.652
844.0	20600	8.9652	8.9410	9.701	9.682

LTE BAND 7 Channel bandwidth: 5MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
2502.5	20775	4.4777	4.4790	4.953	4.940
2535.0	21100	4.4756	4.4793	4.927	4.923
2567.5	21425	4.4792	4.4775	4.993	4.955

LTE BAND 7 Channel bandwidth: 10MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
2505.0	20800	8.9645	8.9364	9.760	9.748
2535.0	21100	8.9548	8.9340	9.678	9.709
2565.0	21400	8.9505	8.9258	9.798	9.719

LTE BAND 7 Channel bandwidth: 15MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
2507.5	20825	13.476	13.453	14.56	14.75
2535.0	21100	13.434	13.421	14.62	14.63
2562.5	21375	13.441	13.450	14.52	14.74

LTE BAND 7 Channel bandwidth: 20MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
2510.0	20850	17.925	17.961	19.39	19.48
2535.0	21100	17.896	17.916	19.36	19.35
2560.0	21350	17.927	17.929	19.34	19.33

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LTE BAND 12 Channel bandwidth: 1.4MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
699.7	23017	1.0853	1.0850	1.229	1.221
707.5	23095	1.0850	1.0846	1.228	1.215
715.3	23173	1.0857	1.0850	1.225	1.220

LTE BAND 12 Channel bandwidth: 3MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
700.5	23025	2.6887	2.6919	2.944	2.975
707.5	23095	2.6898	2.6921	2.946	2.984
714.5	23165	2.6848	2.6866	2.954	2.997

LTE BAND 12 Channel bandwidth: 5MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
701.5	23035	4.4831	4.4870	4.941	4.931
707.5	23095	4.4816	4.4820	4.932	4.948
713.5	23155	4.4776	4.4811	4.939	4.902

LTE BAND 12 Channel bandwidth: 10MHz					
Freq. (MHz)	CH	99% BW (MHz)		26 dB BW (MHz)	
		QPSK	16QAM	QPSK	16QAM
704.0	23060	8.9401	8.9228	9.738	9.610
707.5	23095	8.9742	8.9431	9.758	9.682
711.0	23130	8.9723	8.9562	9.777	9.703

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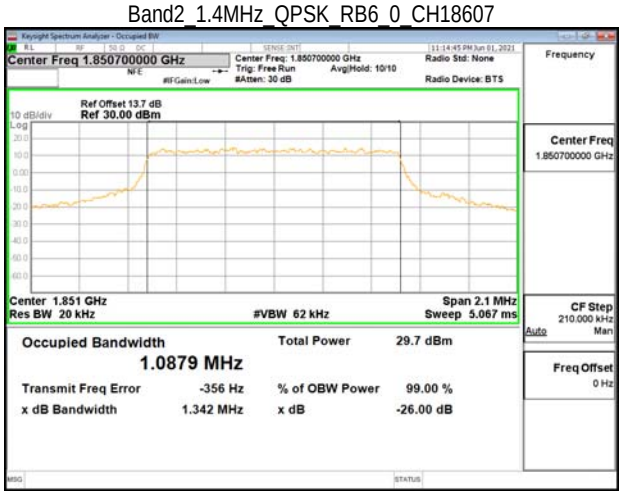
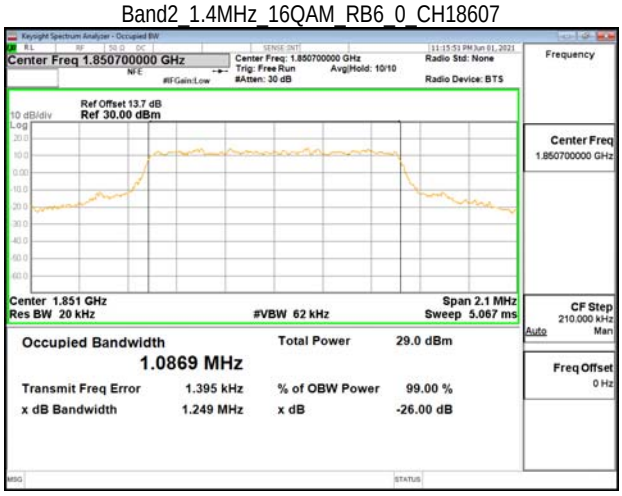
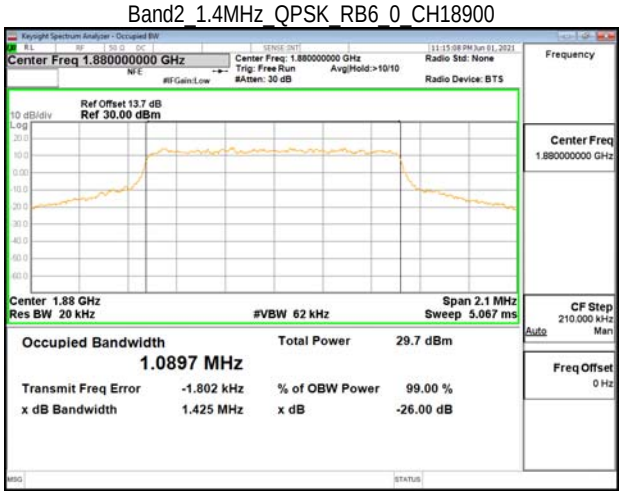
Band2_1.4MHz_QPSK_RB6_0_CH18607



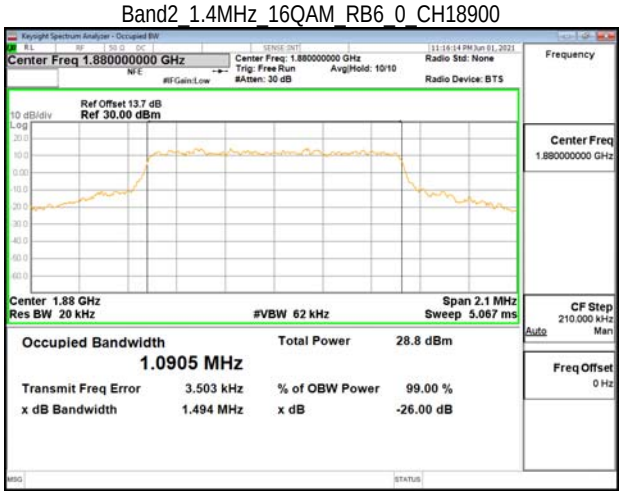
Band2_1.4MHz_16QAM_RB6_0_CH18607



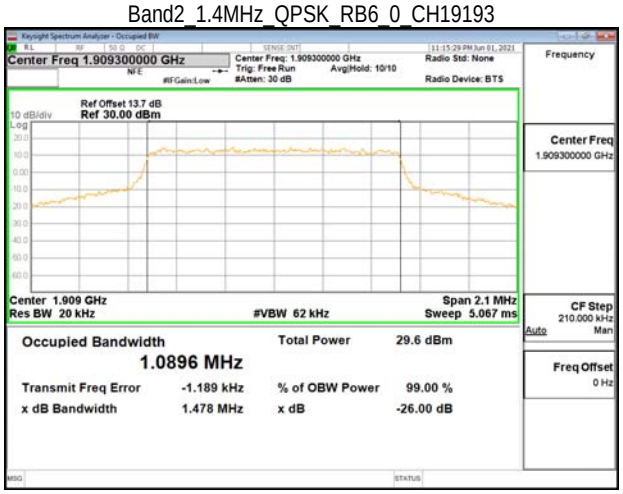
Band2_1.4MHz_QPSK_RB6_0_CH18900



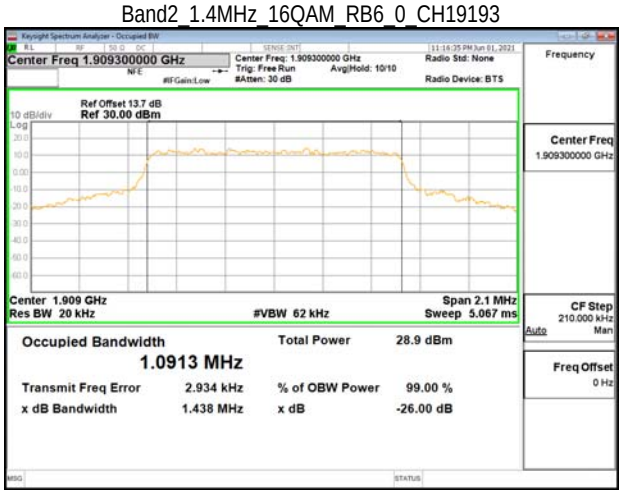
Band2_1.4MHz_16QAM_RB6_0_CH18900



Band2_1.4MHz_QPSK_RB6_0_CH19193



Band2_1.4MHz_16QAM_RB6_0_CH19193



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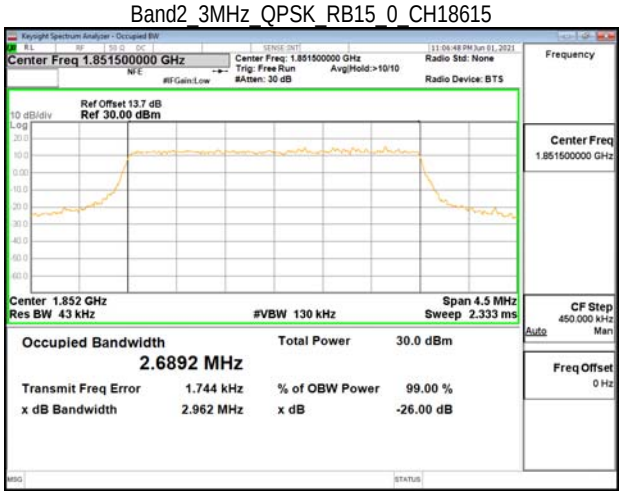
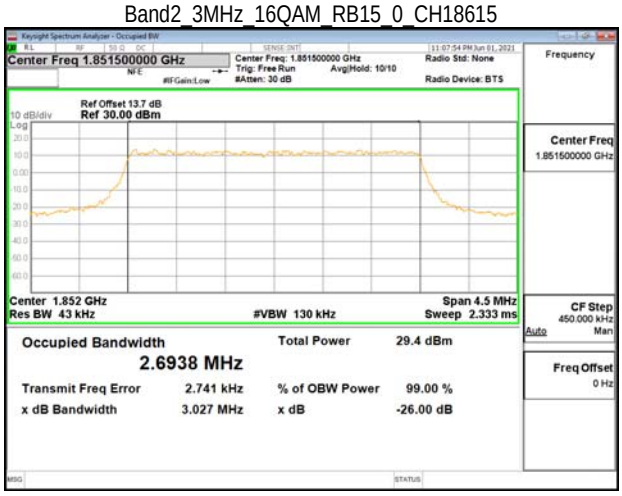
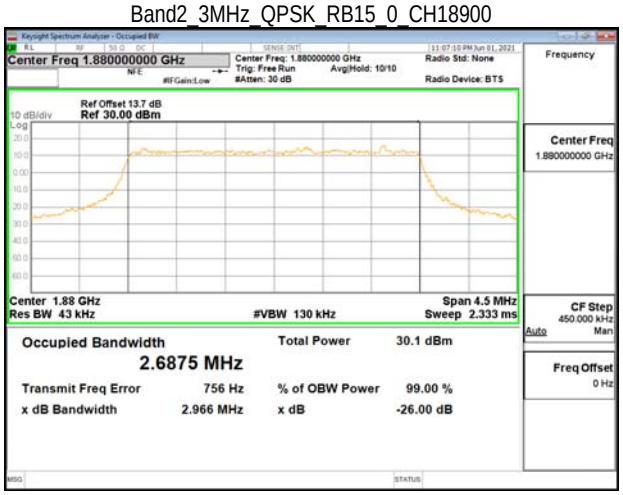
Band2_3MHz_QPSK_RB15_0_CH18615



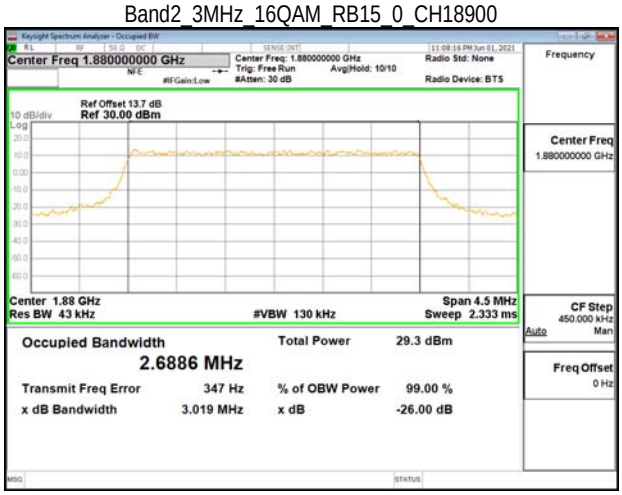
Band2_3MHz_16QAM_RB15_0_CH18615



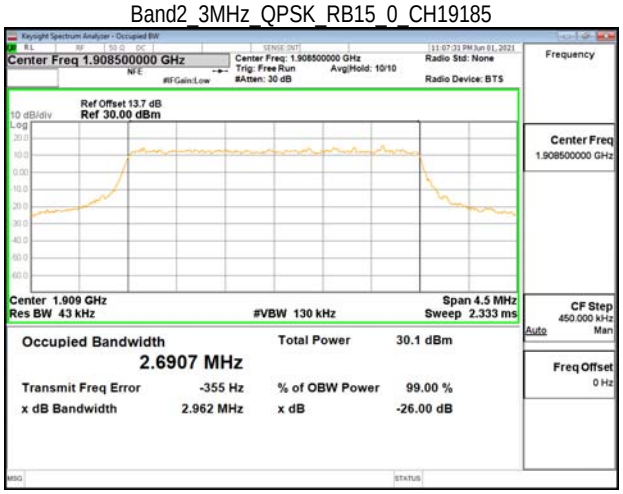
Band2_3MHz_QPSK_RB15_0_CH18900



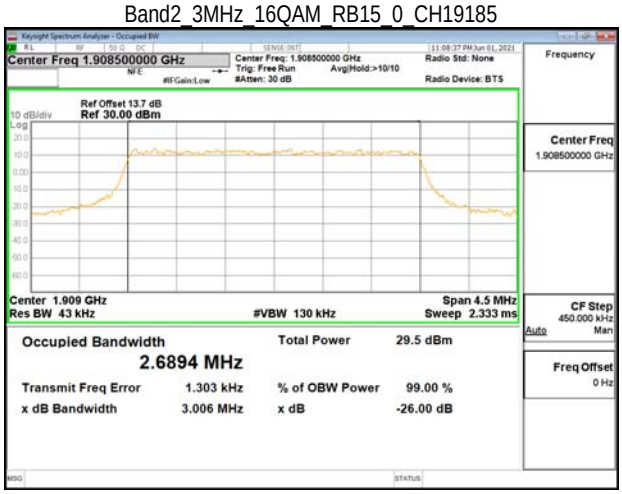
Band2_3MHz_16QAM_RB15_0_CH18900



Band2_3MHz_QPSK_RB15_0_CH19185



Band2_3MHz_16QAM_RB15_0_CH19185



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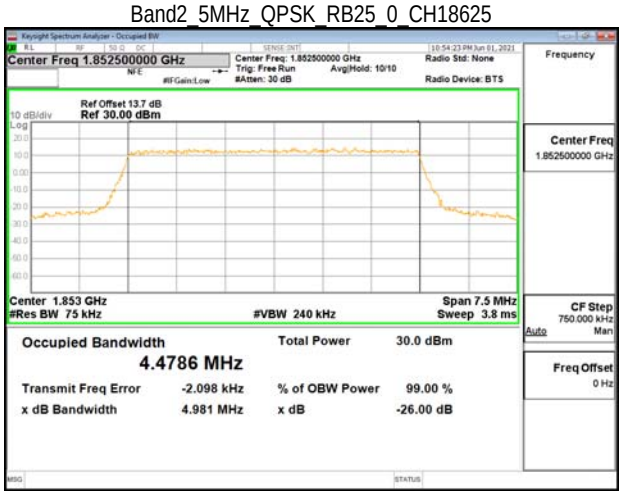
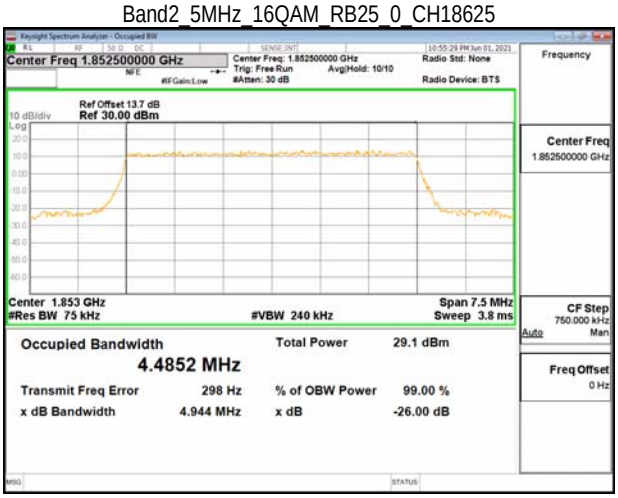
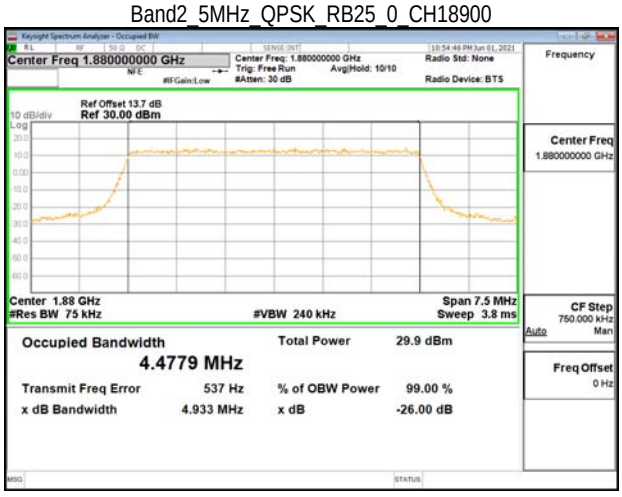
Band2_5MHz_QPSK_RB25_0_CH18625



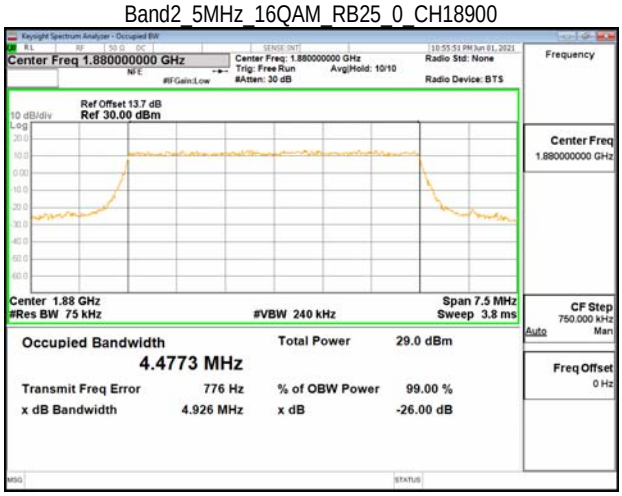
Band2_5MHz_16QAM_RB25_0_CH18625



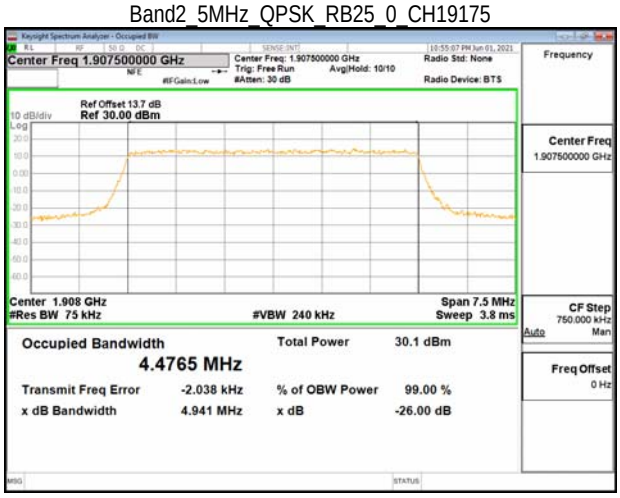
Band2_5MHz_QPSK_RB25_0_CH18900



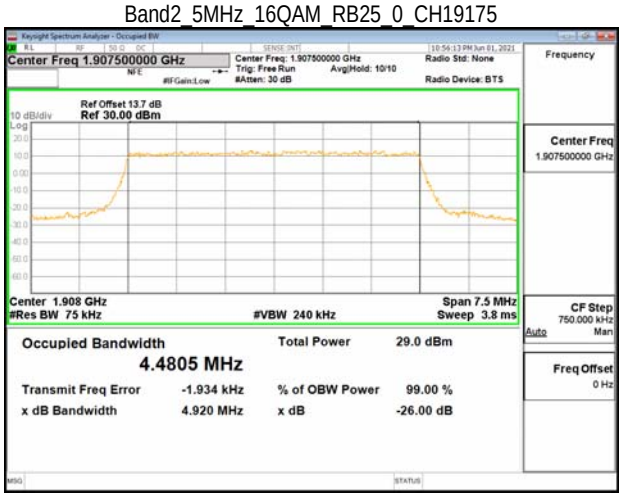
Band2_5MHz_16QAM_RB25_0_CH18900



Band2_5MHz_QPSK_RB25_0_CH19175



Band2_5MHz_16QAM_RB25_0_CH19175



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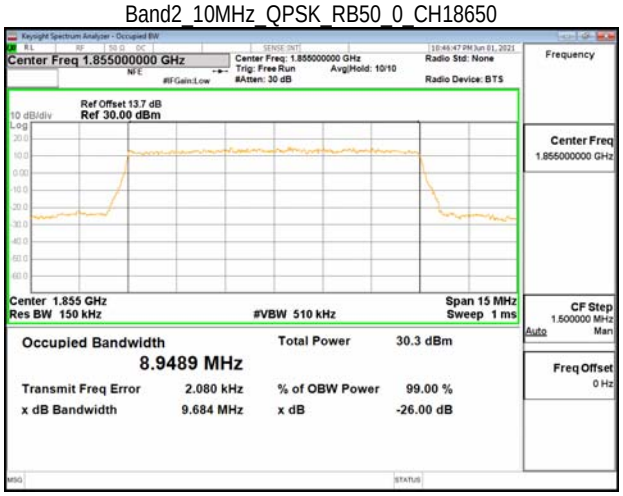
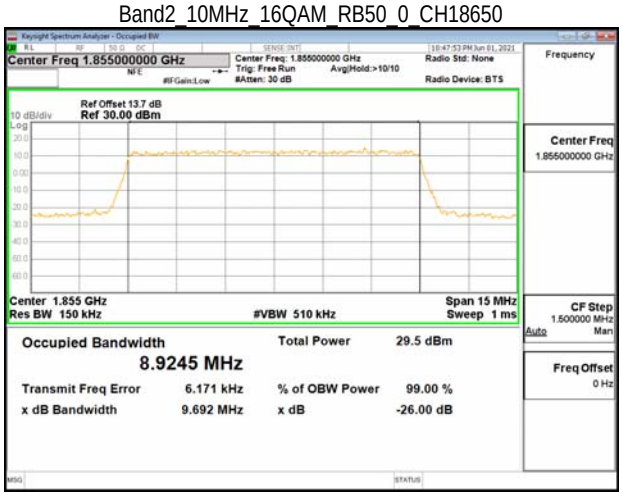
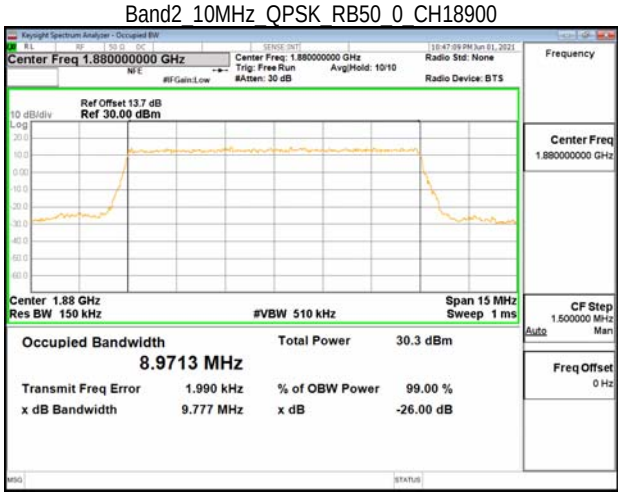
Band2_10MHz_QPSK_RB50_0_CH18650



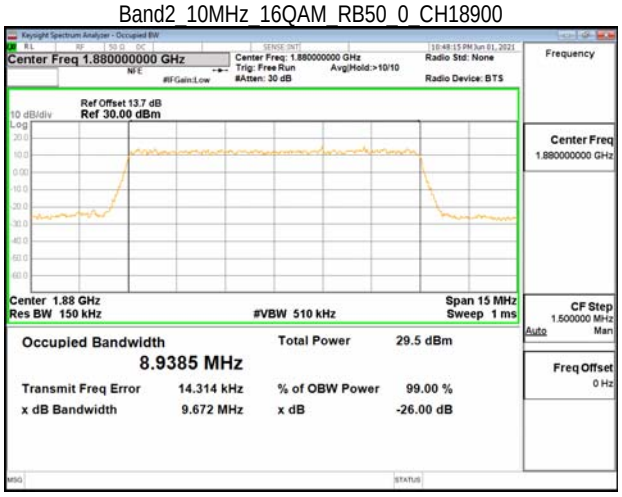
Band2_10MHz_16QAM_RB50_0_CH18650



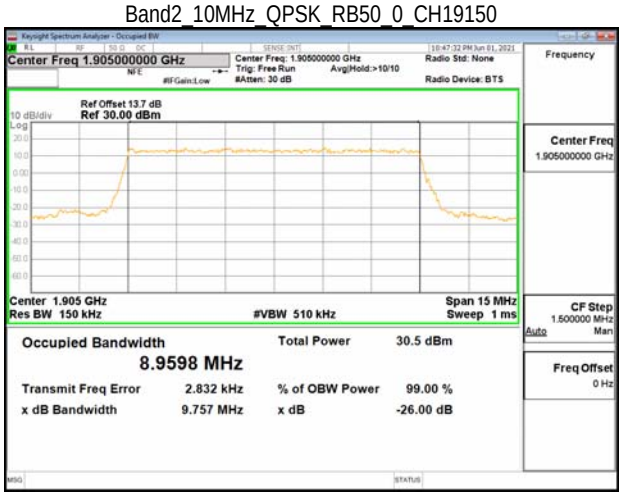
Band2_10MHz_QPSK_RB50_0_CH18900



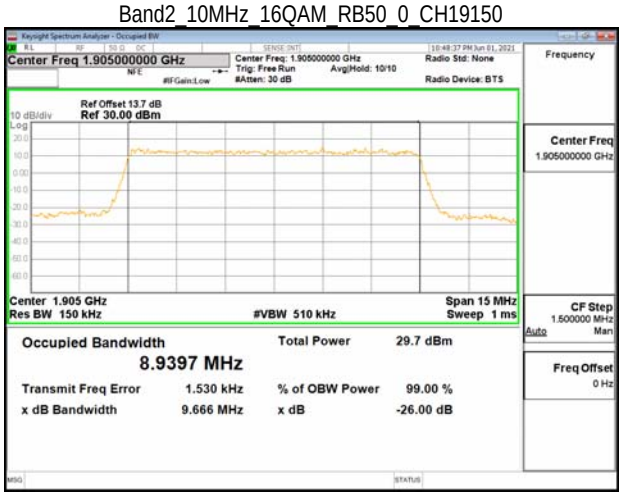
Band2_10MHz_16QAM_RB50_0_CH18900



Band2_10MHz_QPSK_RB50_0_CH19150



Band2_10MHz_16QAM_RB50_0_CH19150



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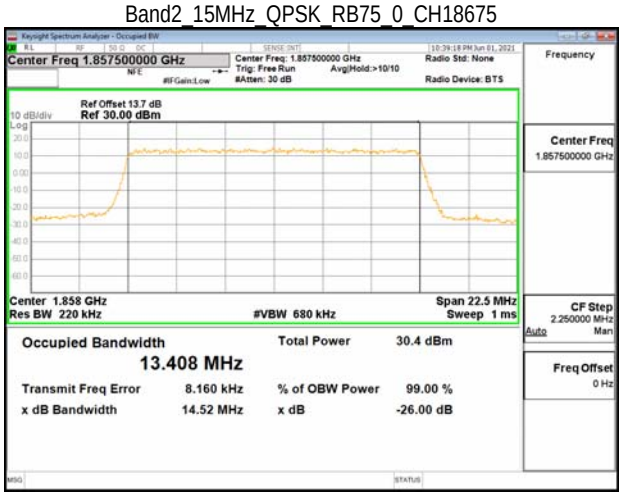
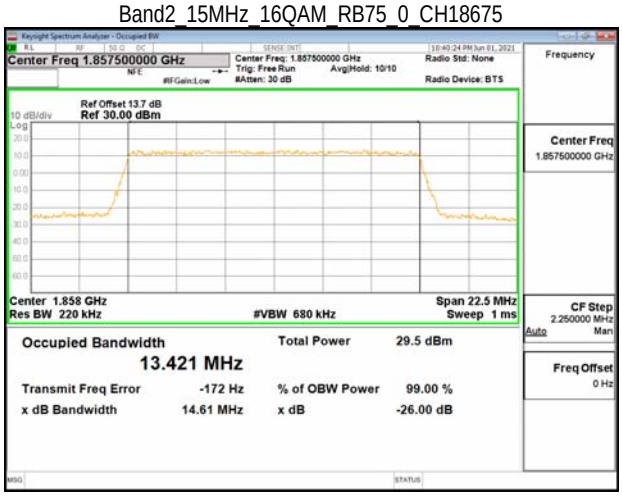
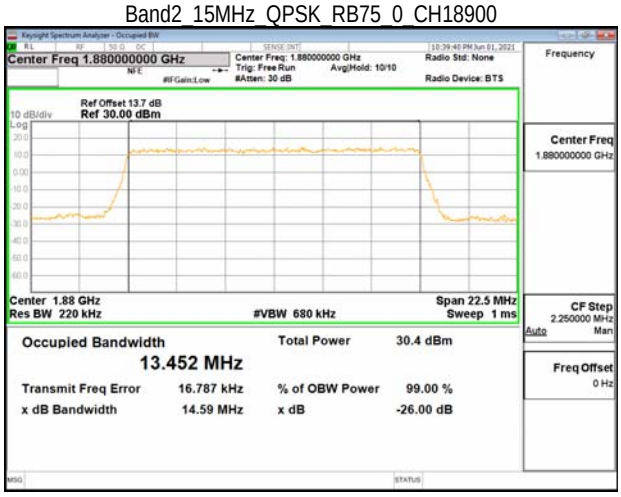
Band2_15MHz_QPSK_RB75_0_CH18675



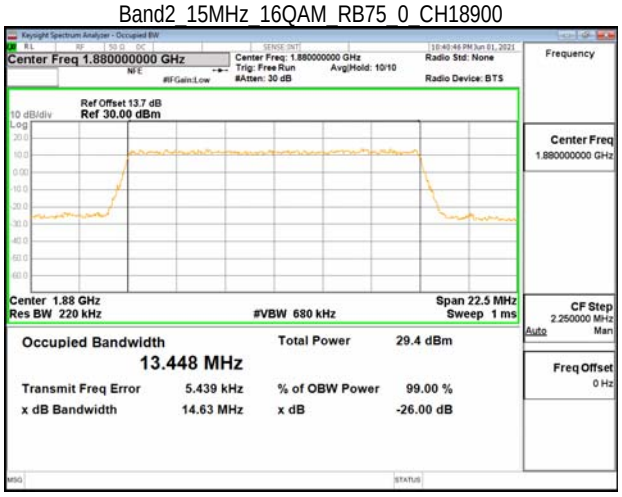
Band2_15MHz_16QAM_RB75_0_CH18675



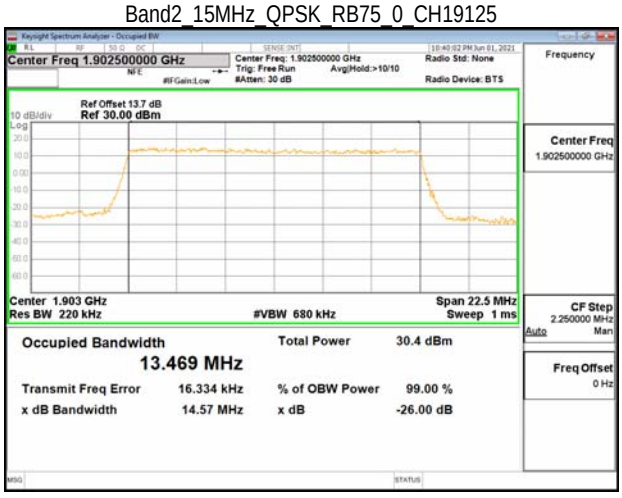
Band2_15MHz_QPSK_RB75_0_CH18900



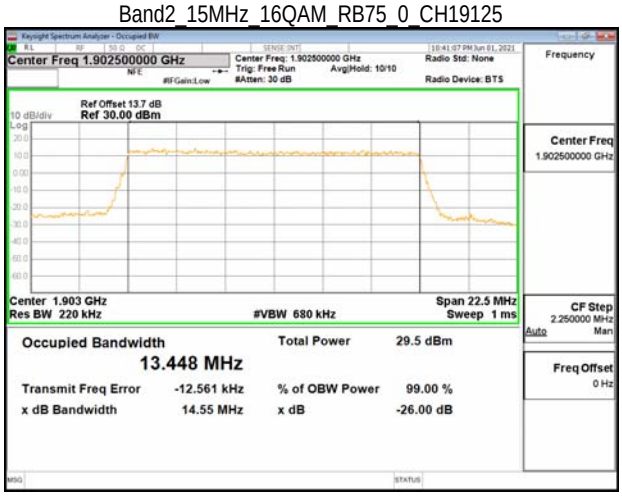
Band2_15MHz_16QAM_RB75_0_CH18900



Band2_15MHz_QPSK_RB75_0_CH19125



Band2_15MHz_16QAM_RB75_0_CH19125



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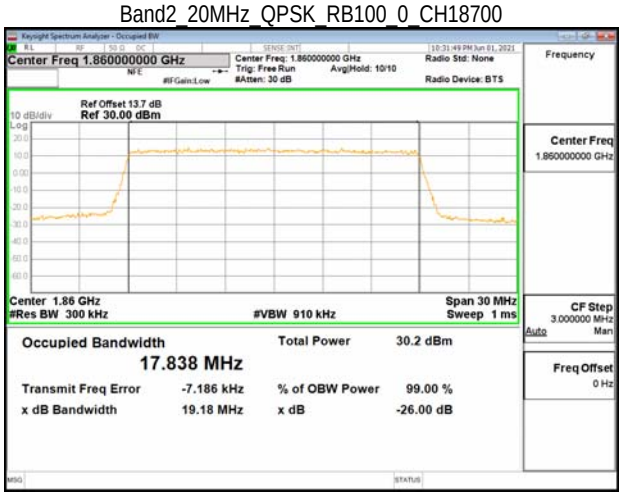
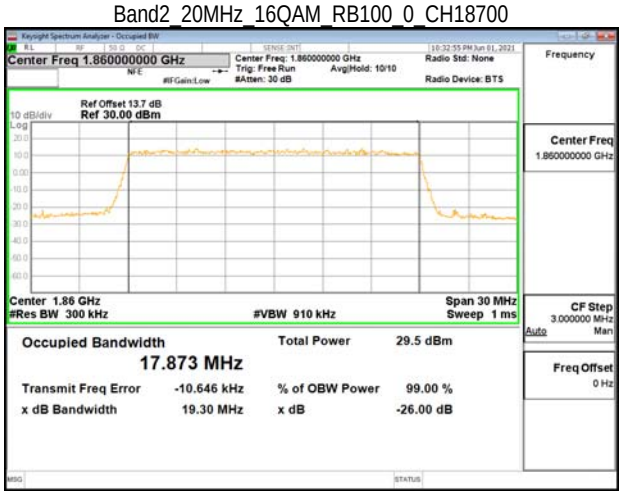
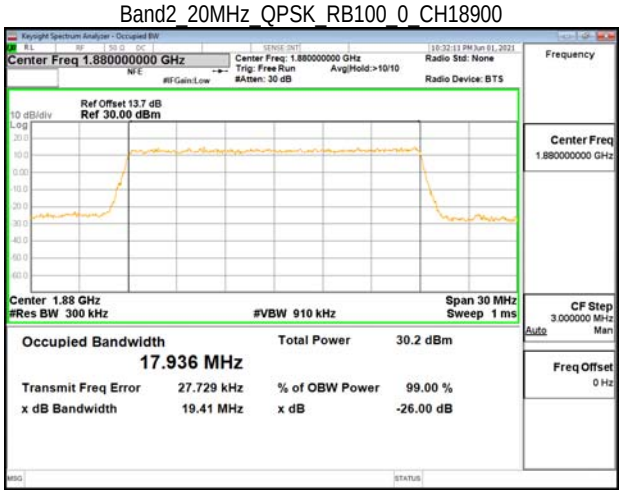
Band2_20MHz_QPSK_RB100_0_CH18700



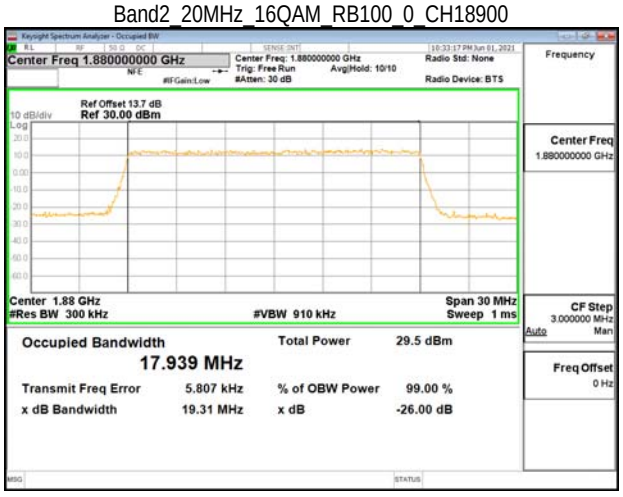
Band2_20MHz_16QAM_RB100_0_CH18700



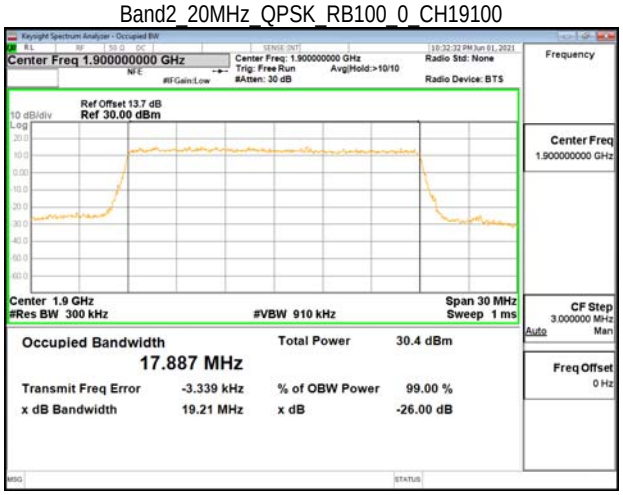
Band2_20MHz_QPSK_RB100_0_CH18900



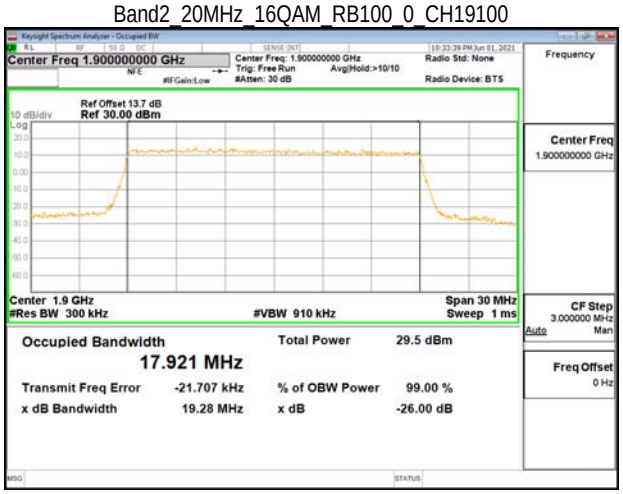
Band2_20MHz_16QAM_RB100_0_CH18900



Band2_20MHz_QPSK_RB100_0_CH19100



Band2_20MHz_16QAM_RB100_0_CH19100



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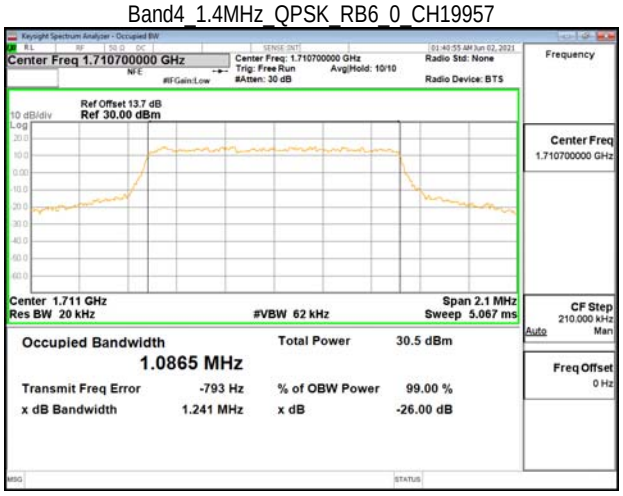
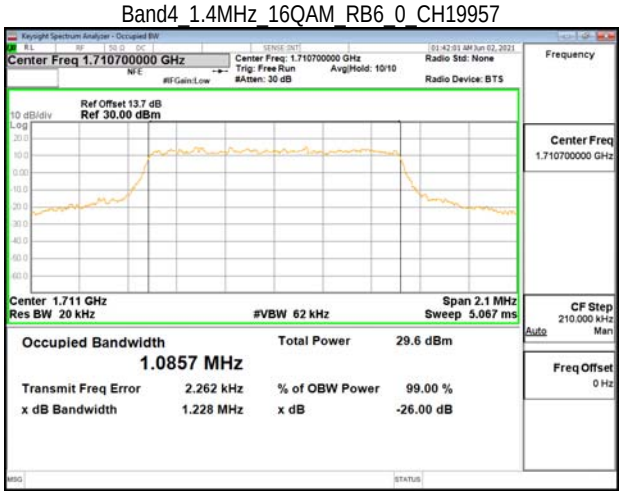
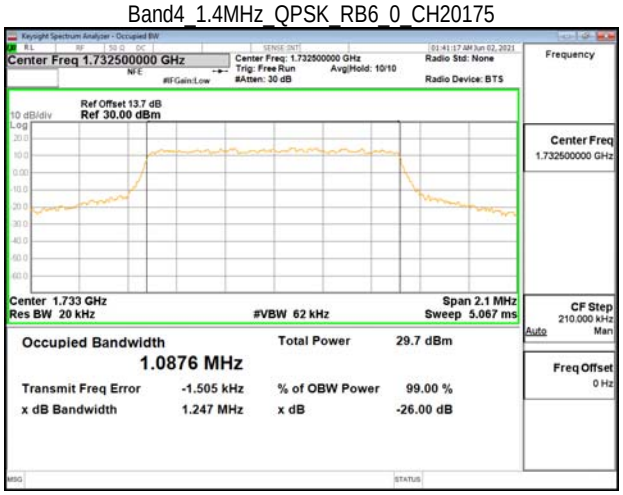
Band4_1.4MHz_QPSK_RB6_0_CH19957



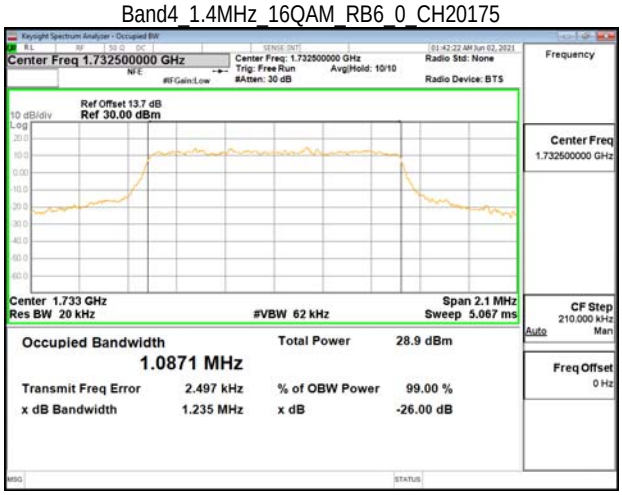
Band4_1.4MHz_16QAM_RB6_0_CH19957



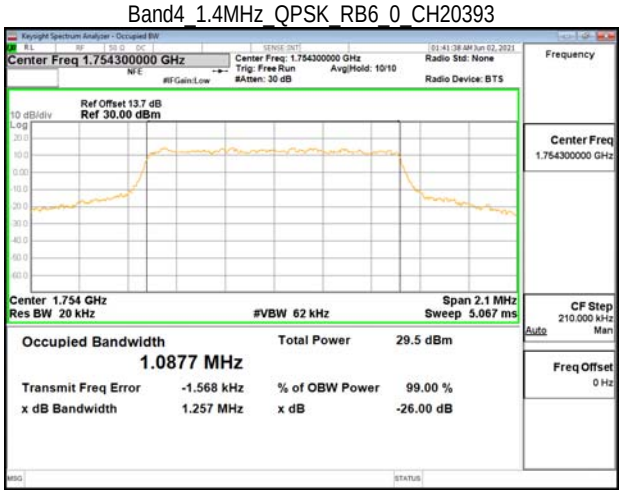
Band4_1.4MHz_QPSK_RB6_0_CH20175



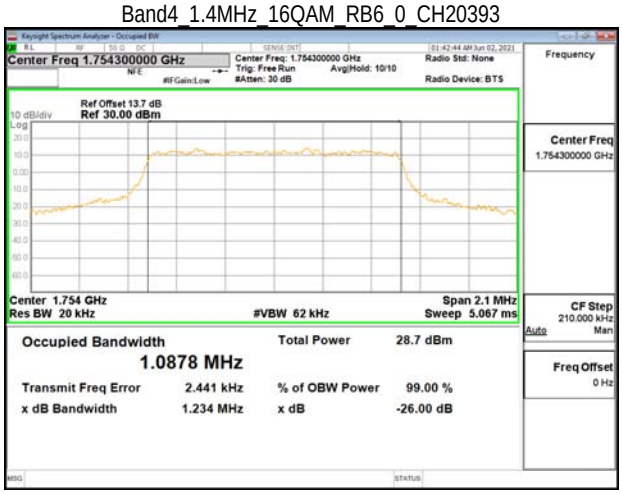
Band4_1.4MHz_16QAM_RB6_0_CH20175



Band4_1.4MHz_QPSK_RB6_0_CH20393



Band4_1.4MHz_16QAM_RB6_0_CH20393



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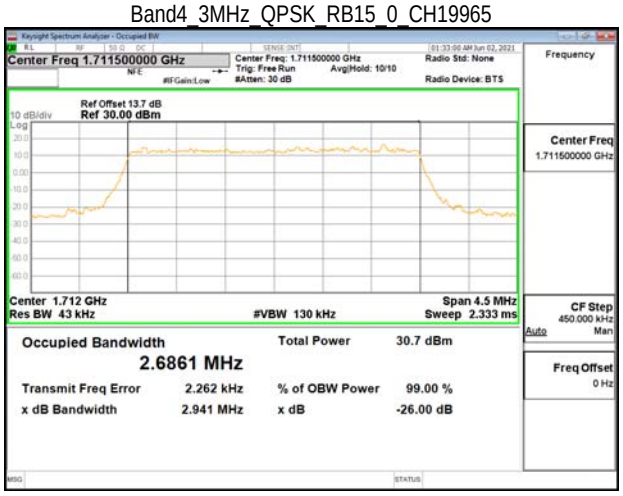
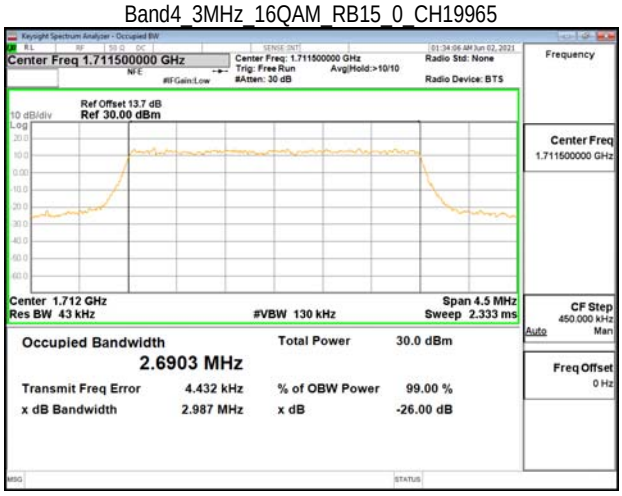
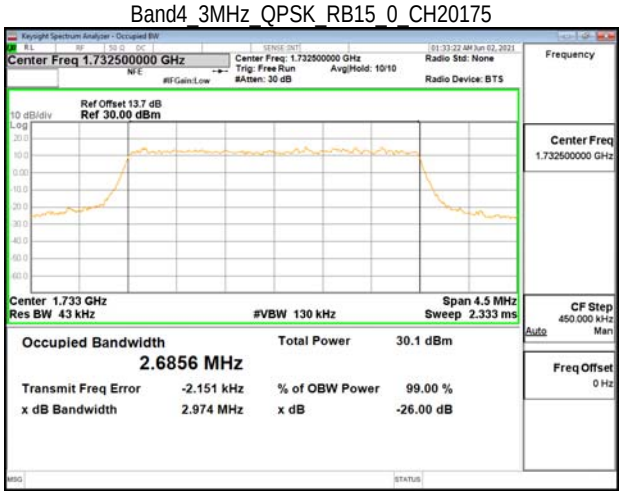
Band4_3MHz_QPSK_RB15_0_CH19965



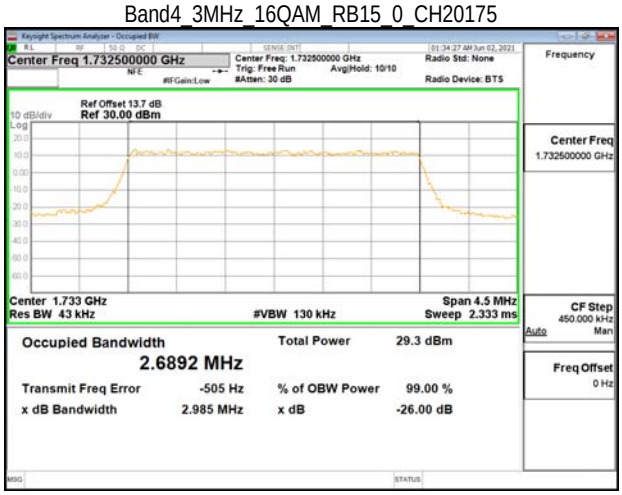
Band4_3MHz_16QAM_RB15_0_CH19965



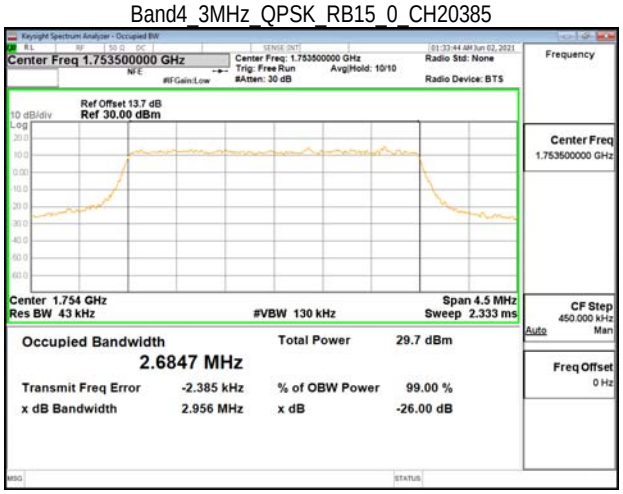
Band4_3MHz_QPSK_RB15_0_CH20175



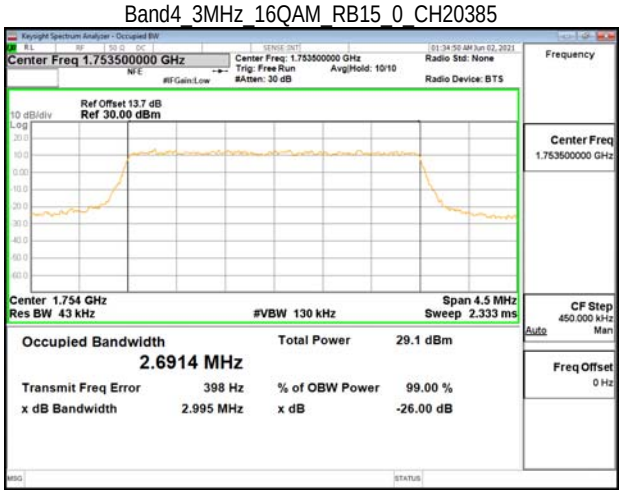
Band4_3MHz_16QAM_RB15_0_CH20175



Band4_3MHz_QPSK_RB15_0_CH20385



Band4_3MHz_16QAM_RB15_0_CH20385



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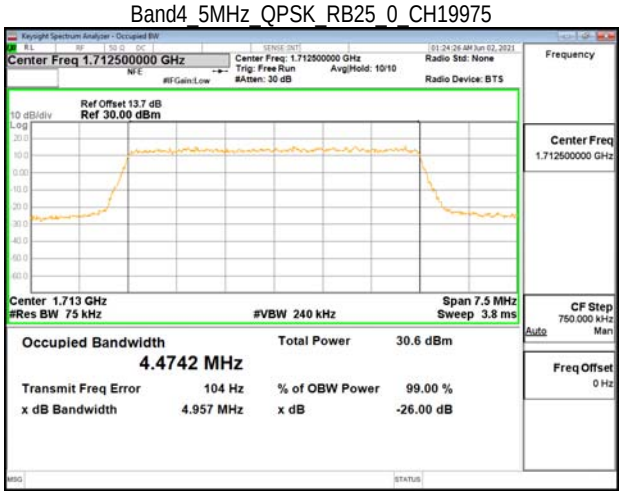
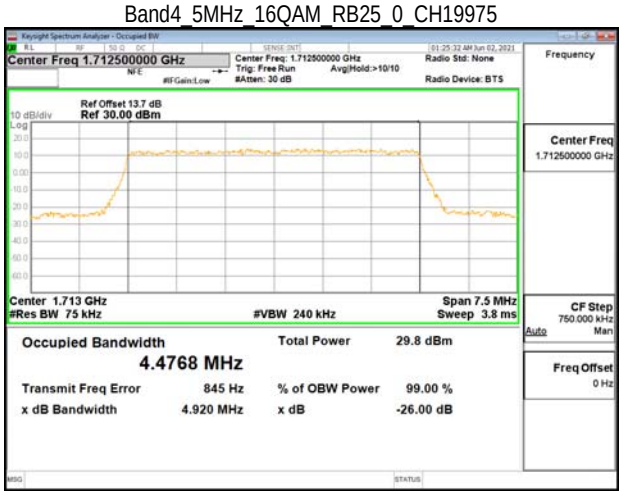
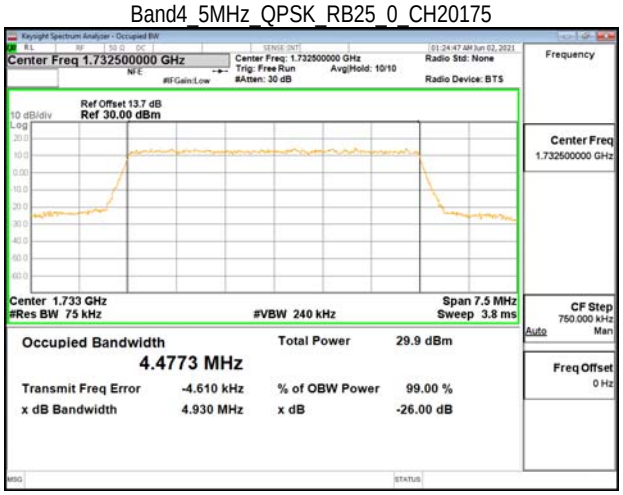
Band4_5MHz_QPSK_RB25_0_CH19975



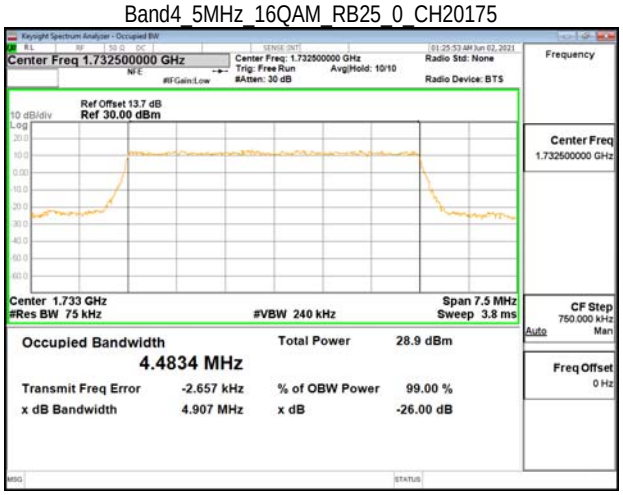
Band4_5MHz_16QAM_RB25_0_CH19975



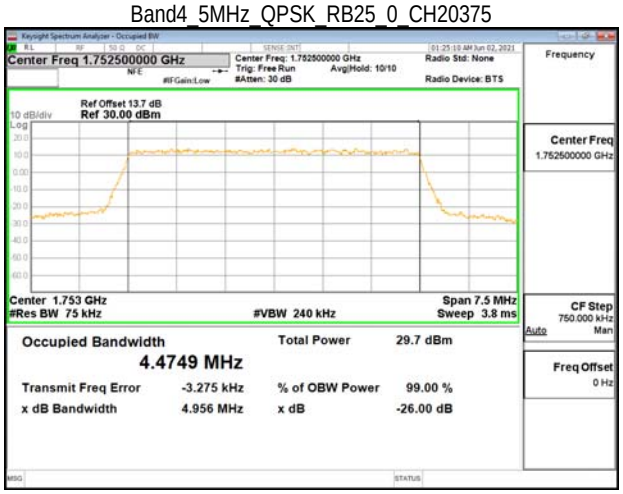
Band4_5MHz_QPSK_RB25_0_CH20175



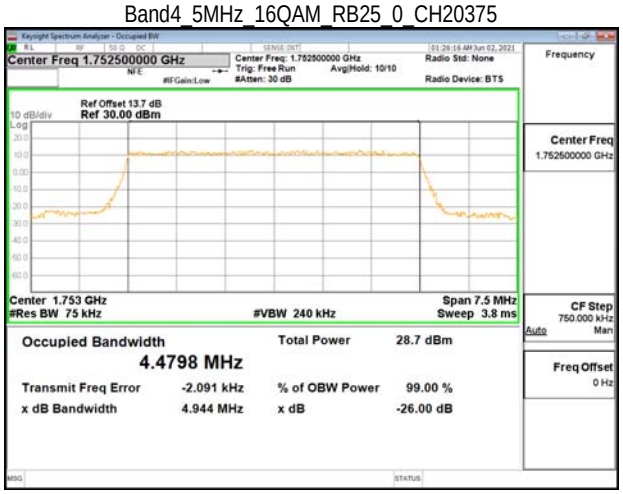
Band4_5MHz_16QAM_RB25_0_CH20175



Band4_5MHz_QPSK_RB25_0_CH20375



Band4_5MHz_16QAM_RB25_0_CH20375



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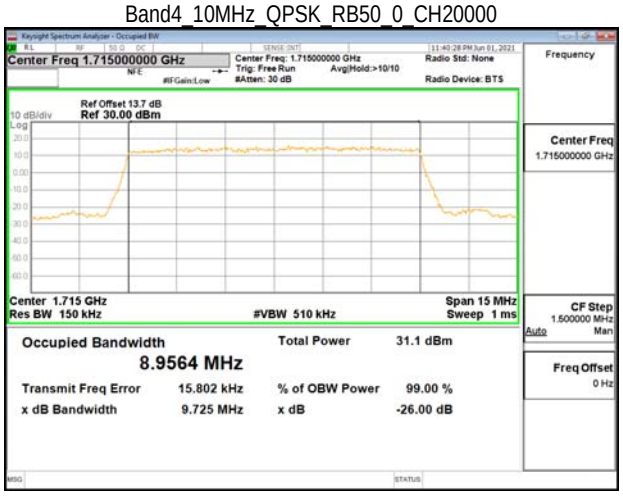
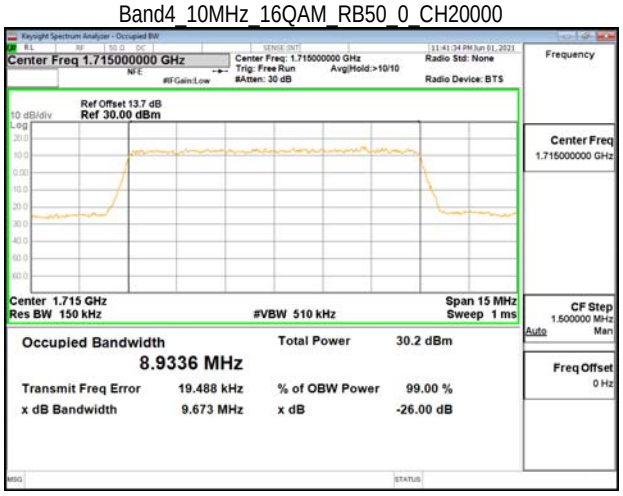
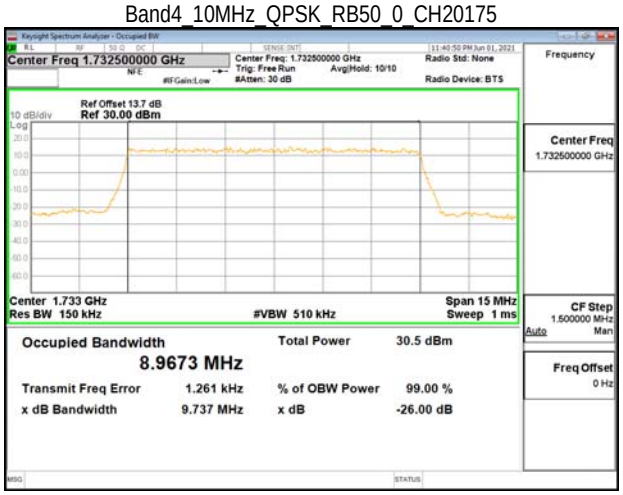
Band4_10MHz_QPSK_RB50_0_CH20000



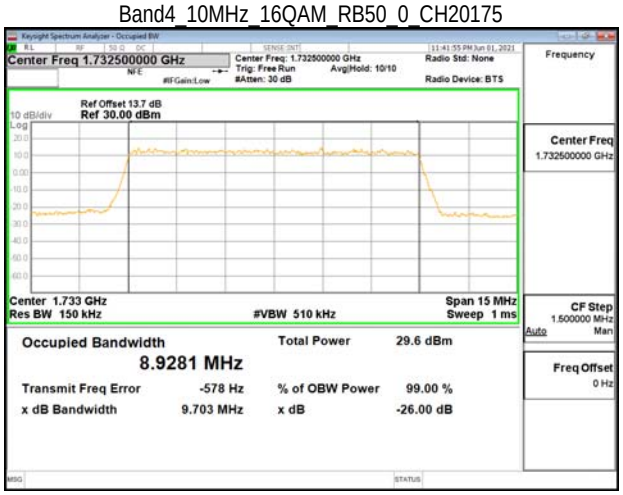
Band4_10MHz_16QAM_RB50_0_CH20000



Band4_10MHz_QPSK_RB50_0_CH20175



Band4_10MHz_16QAM_RB50_0_CH20175



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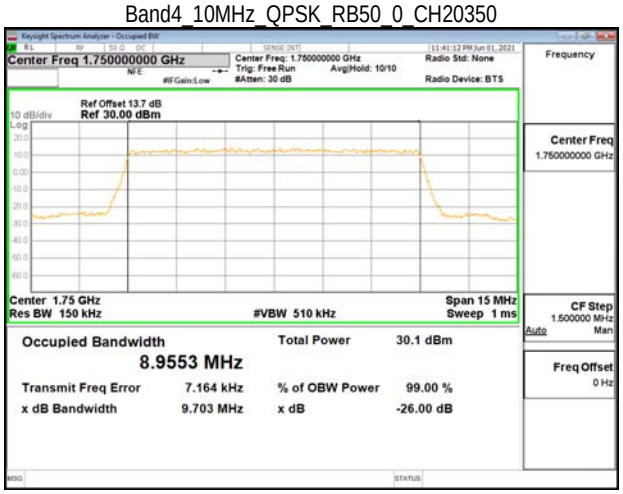

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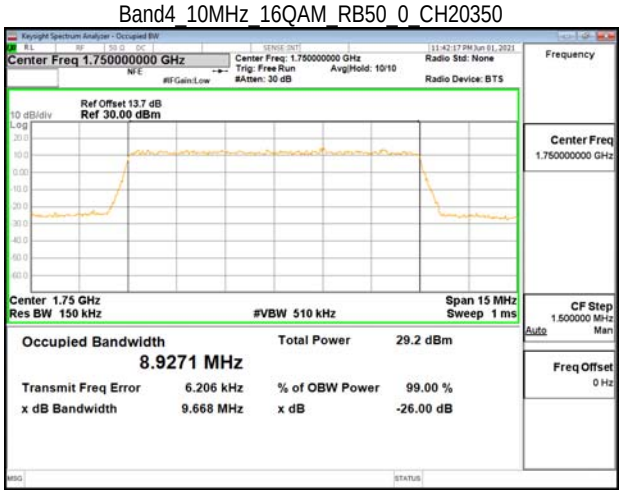

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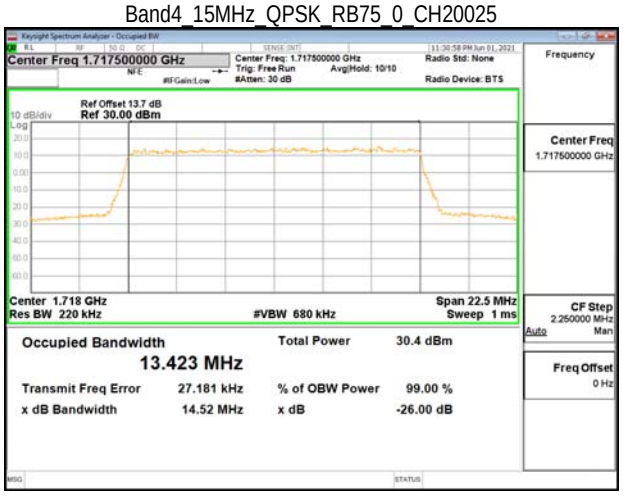
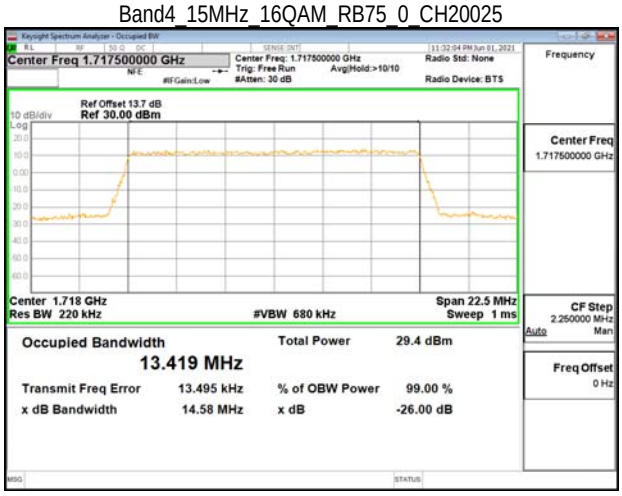
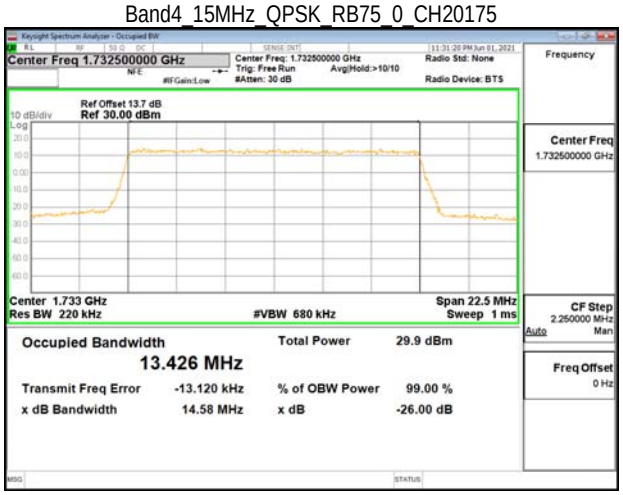
Band4_15MHz_QPSK_RB75_0_CH20025



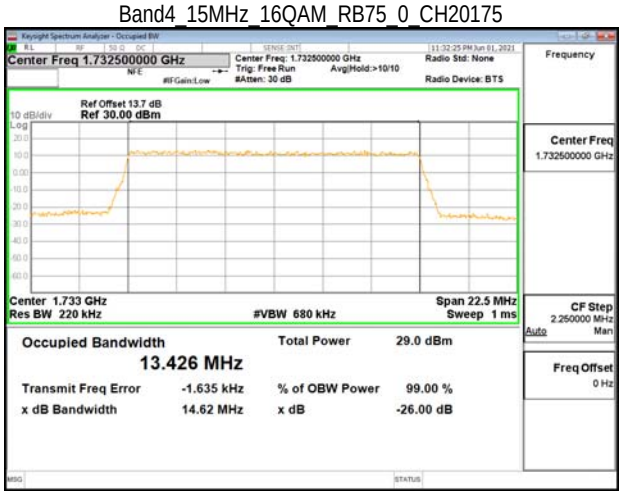
Band4_15MHz_16QAM_RB75_0_CH20025



Band4_15MHz_QPSK_RB75_0_CH20175



Band4_15MHz_16QAM_RB75_0_CH20175



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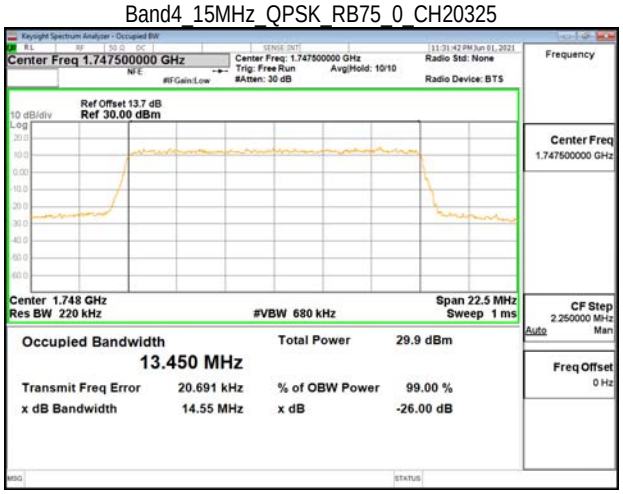
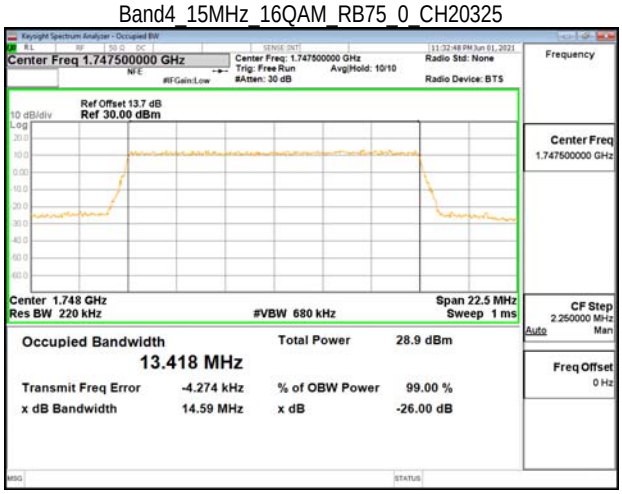


Band4_15MHz_16QAM_RB75_0_CH20325



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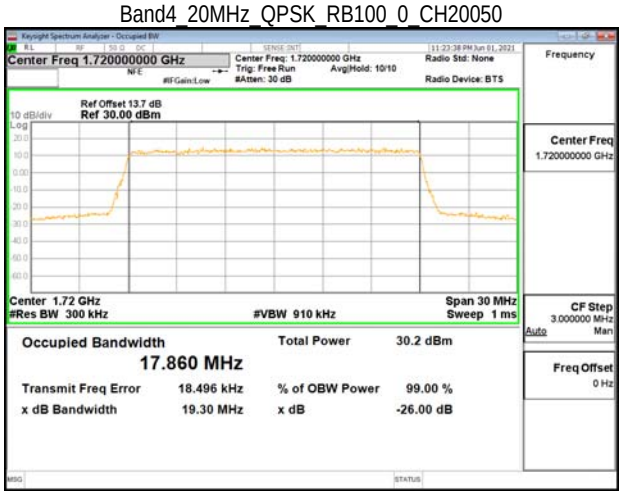
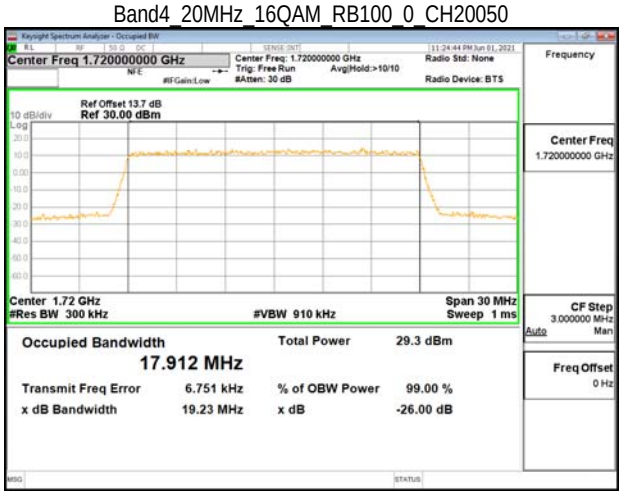
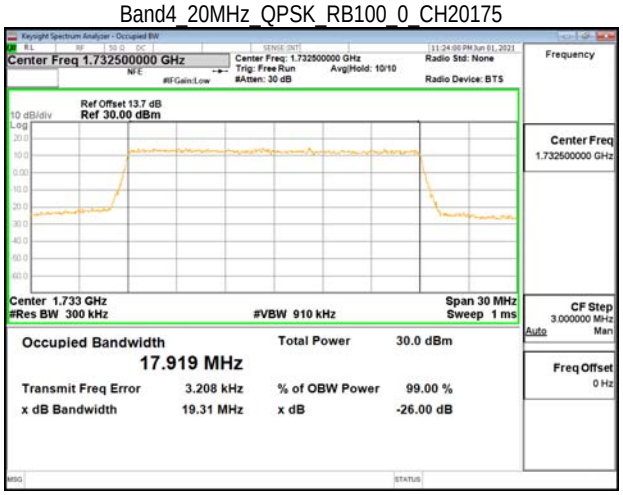
Band4_20MHz_QPSK_RB100_0_CH20050



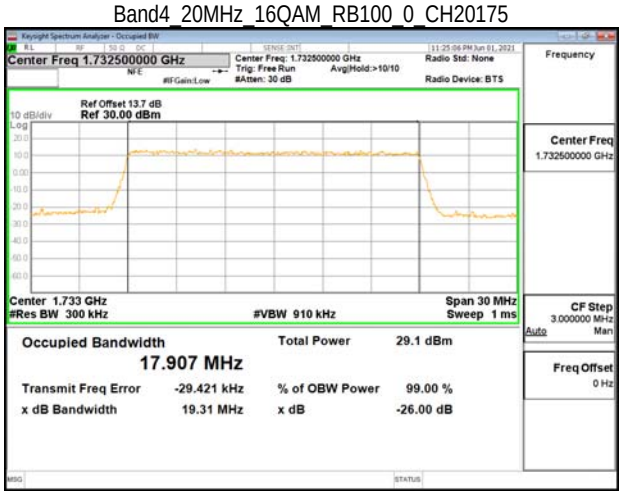
Band4_20MHz_16QAM_RB100_0_CH20050



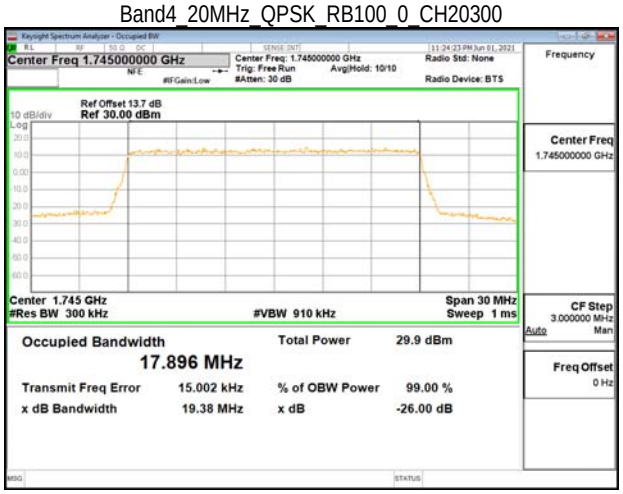
Band4_20MHz_QPSK_RB100_0_CH20175



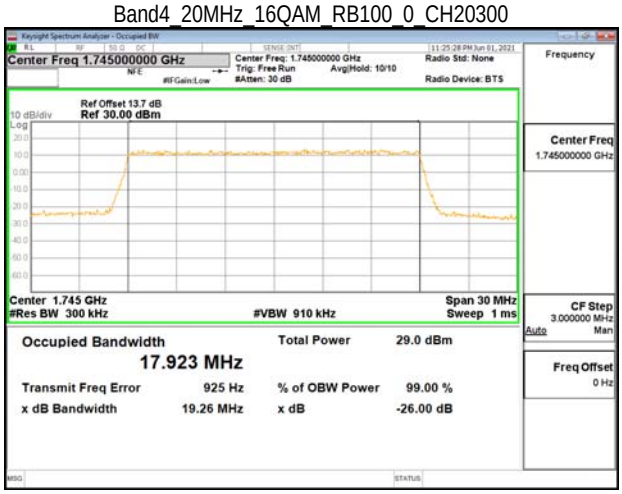
Band4_20MHz_16QAM_RB100_0_CH20175



Band4_20MHz_QPSK_RB100_0_CH20300



Band4_20MHz_16QAM_RB100_0_CH20300



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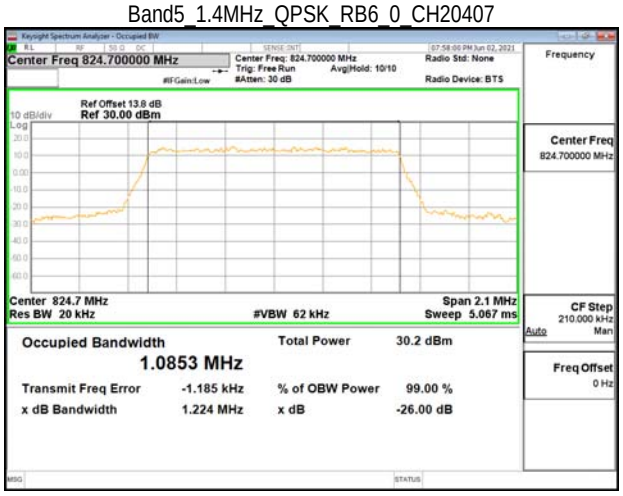
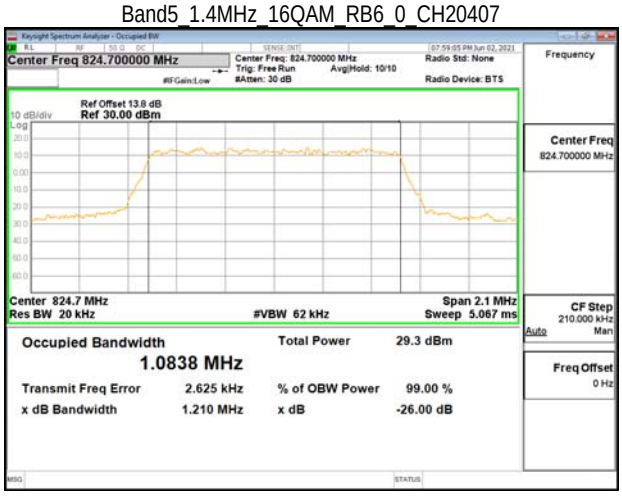
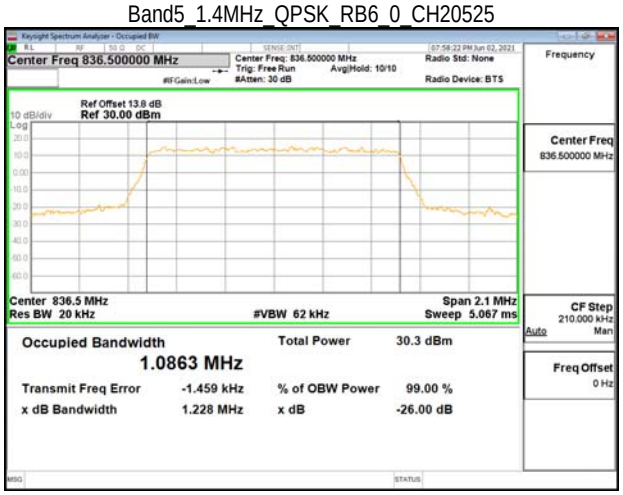
Band5_1.4MHz_QPSK_RB6_0_CH20407



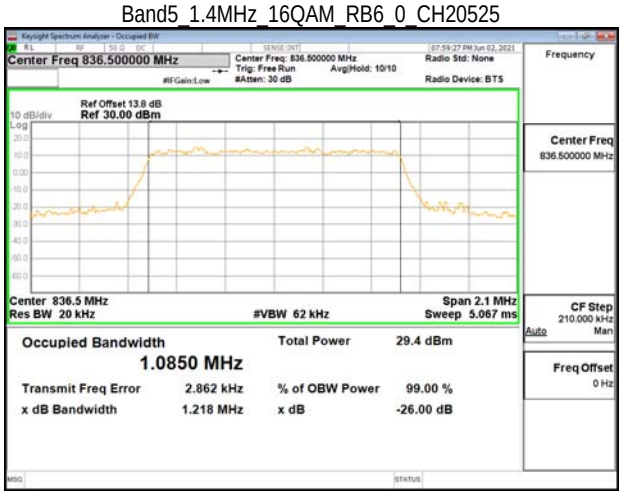
Band5_1.4MHz_16QAM_RB6_0_CH20407



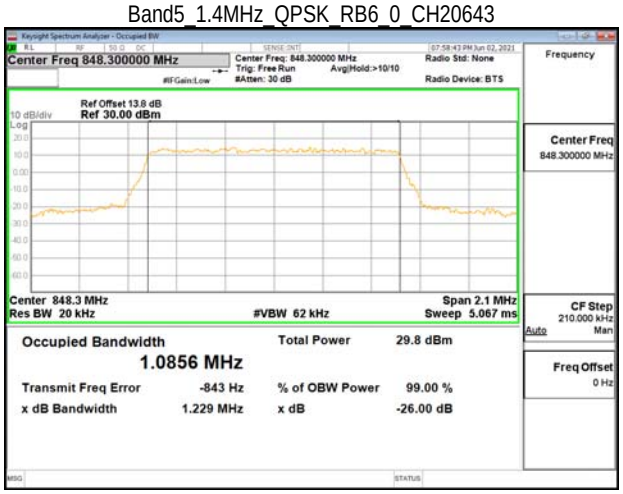
Band5_1.4MHz_QPSK_RB6_0_CH20525



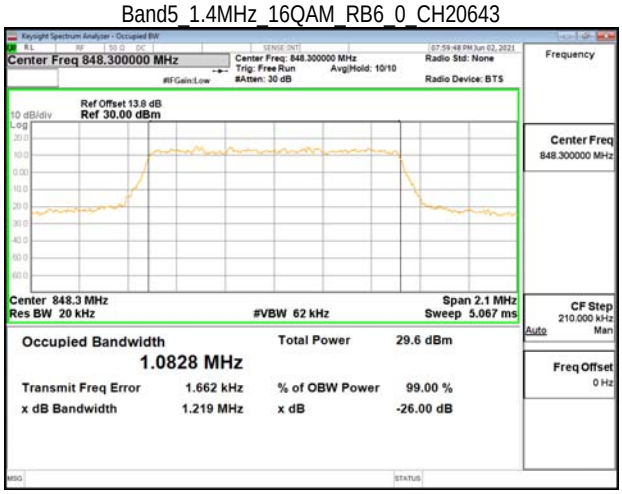
Band5_1.4MHz_16QAM_RB6_0_CH20525



Band5_1.4MHz_QPSK_RB6_0_CH20643



Band5_1.4MHz_16QAM_RB6_0_CH20643



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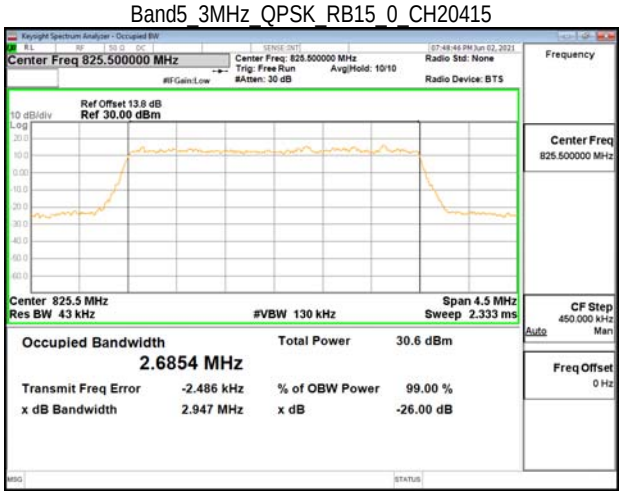
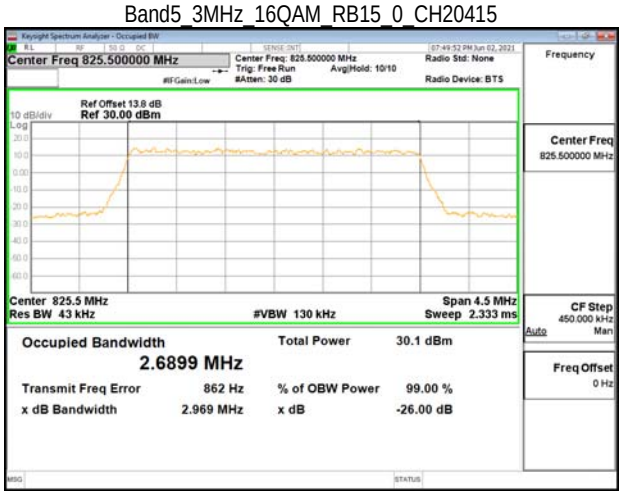
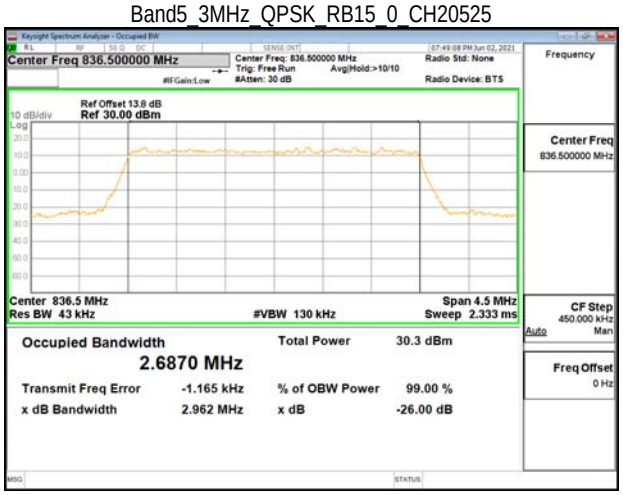
Band5_3MHz_QPSK_RB15_0_CH20415



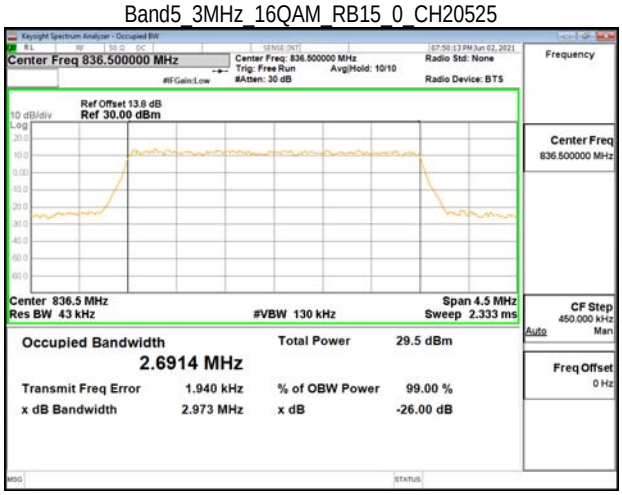
Band5_3MHz_16QAM_RB15_0_CH20415



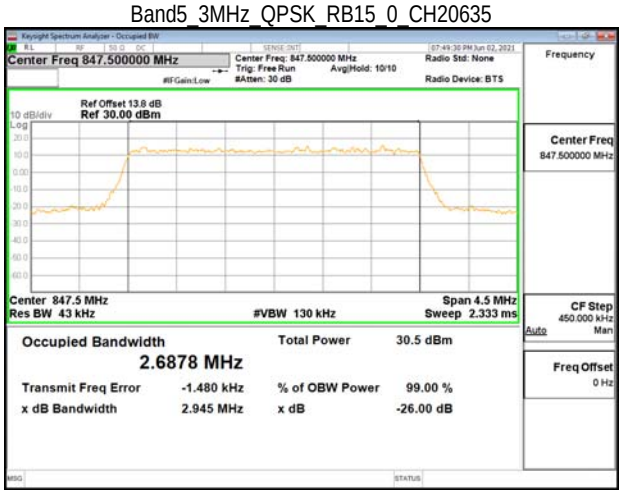
Band5_3MHz_QPSK_RB15_0_CH20525



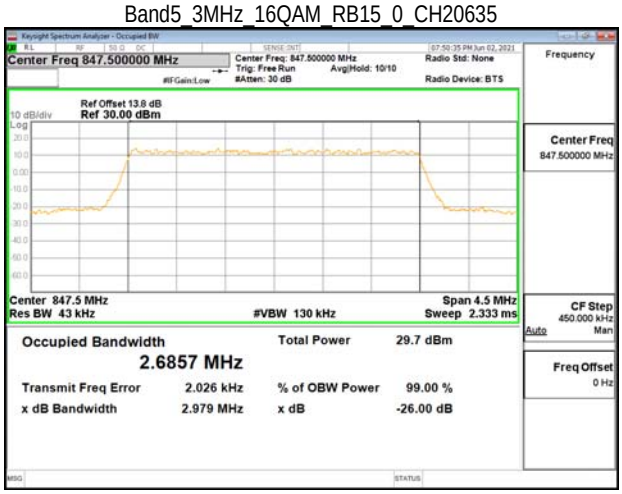
Band5_3MHz_16QAM_RB15_0_CH20525



Band5_3MHz_QPSK_RB15_0_CH20635



Band5_3MHz_16QAM_RB15_0_CH20635



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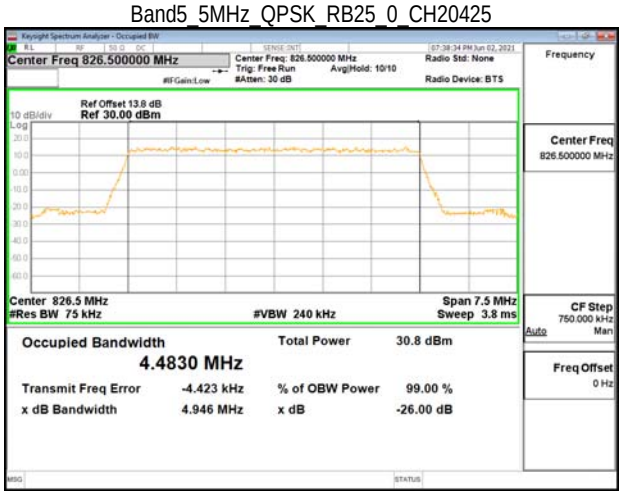
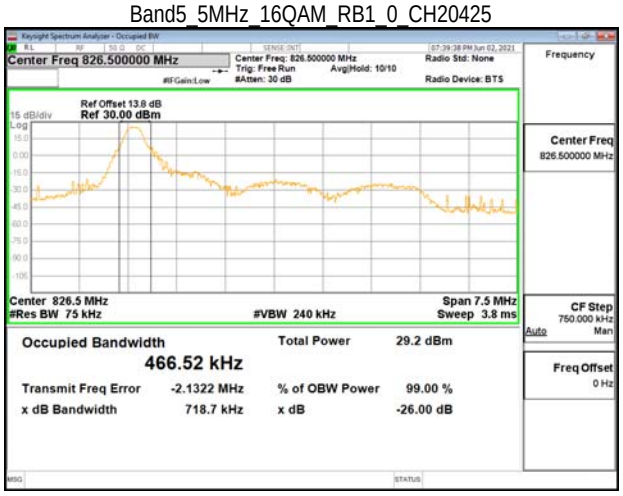
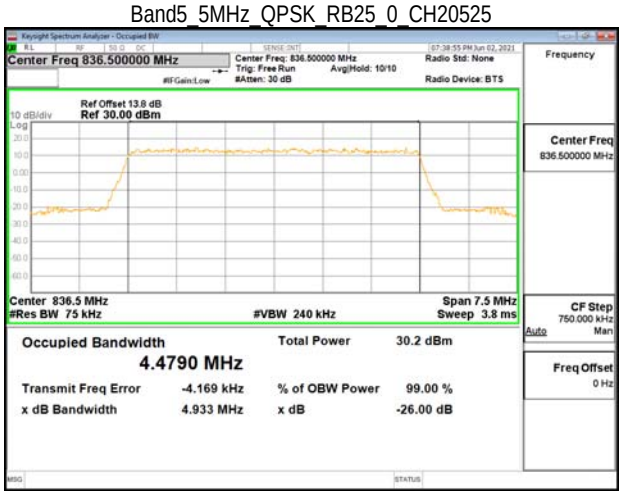
Band5_5MHz_QPSK_RB25_0_CH20425



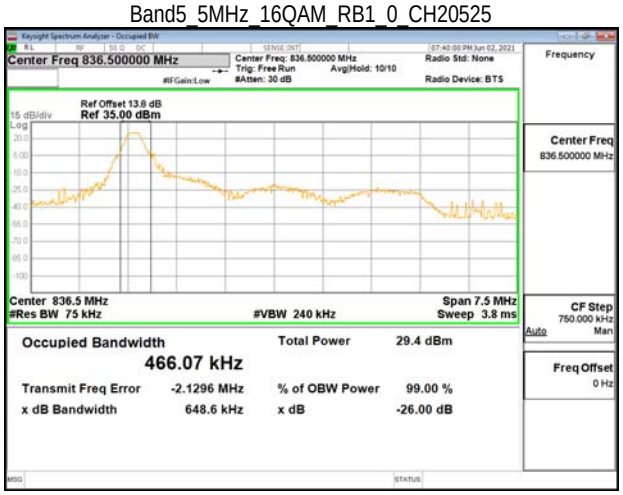
Band5_5MHz_16QAM_RB1_0_CH20425



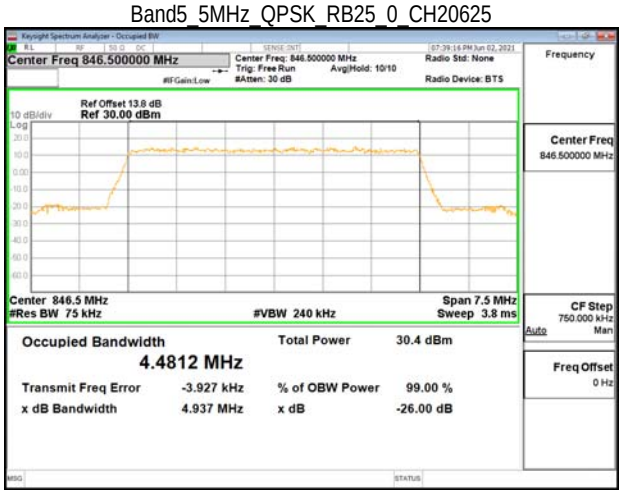
Band5_5MHz_QPSK_RB25_0_CH20525



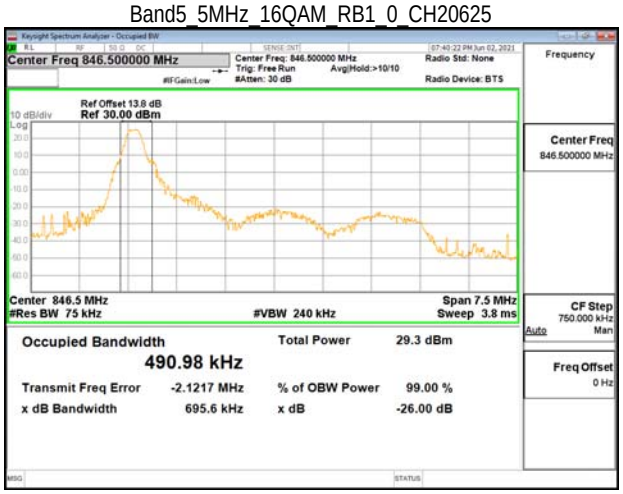
Band5_5MHz_16QAM_RB1_0_CH20525



Band5_5MHz_QPSK_RB25_0_CH20625



Band5_5MHz_16QAM_RB1_0_CH20625



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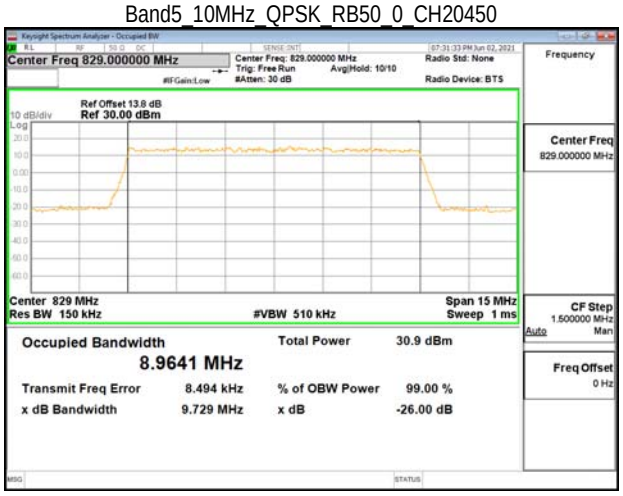
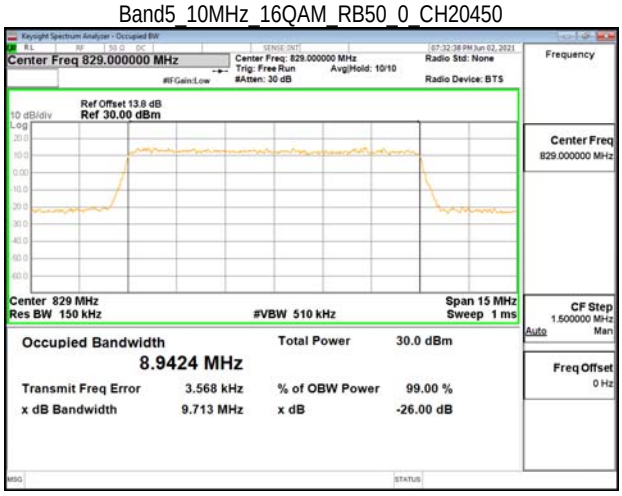
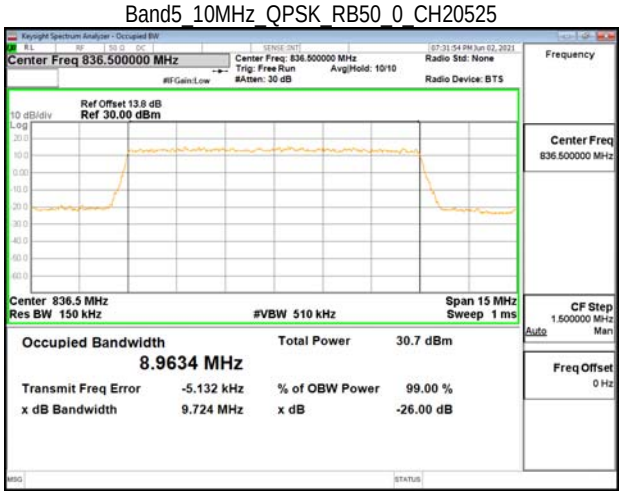
Band5_10MHz_QPSK_RB50_0_CH20450



Band5_10MHz_16QAM_RB50_0_CH20450



Band5_10MHz_QPSK_RB50_0_CH20525



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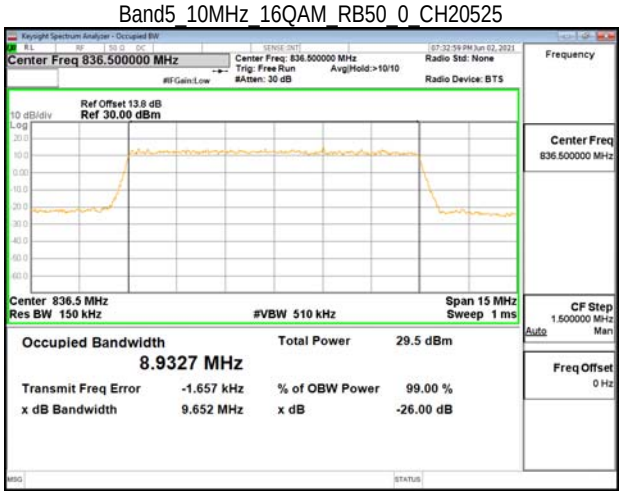

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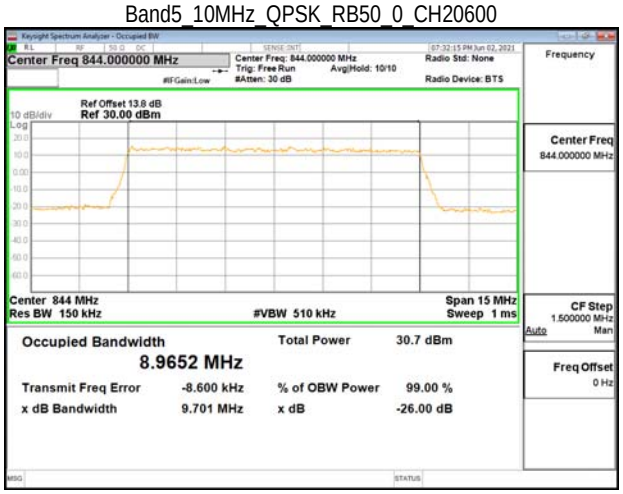

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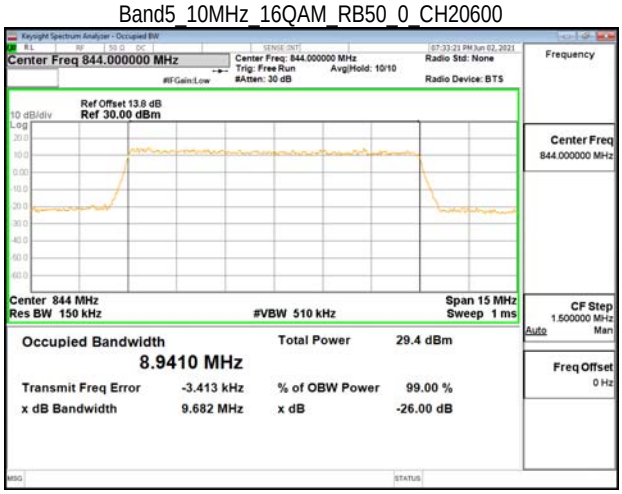

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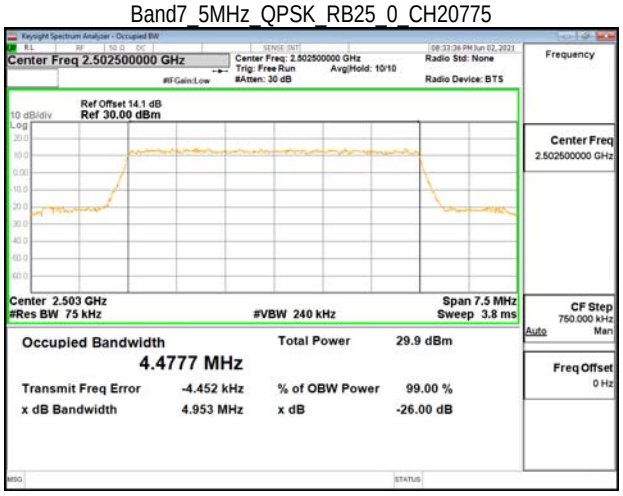
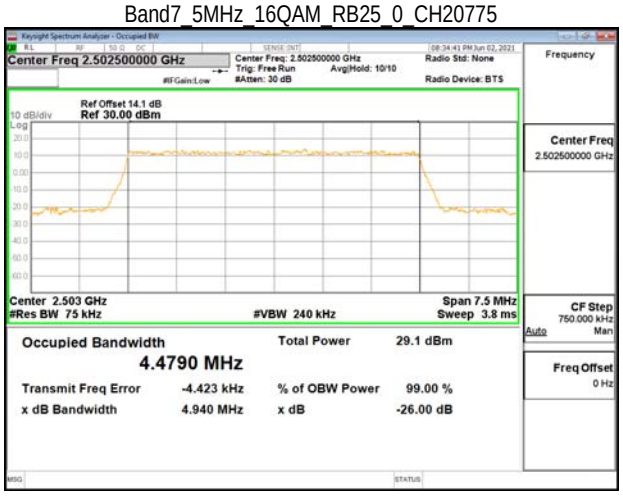
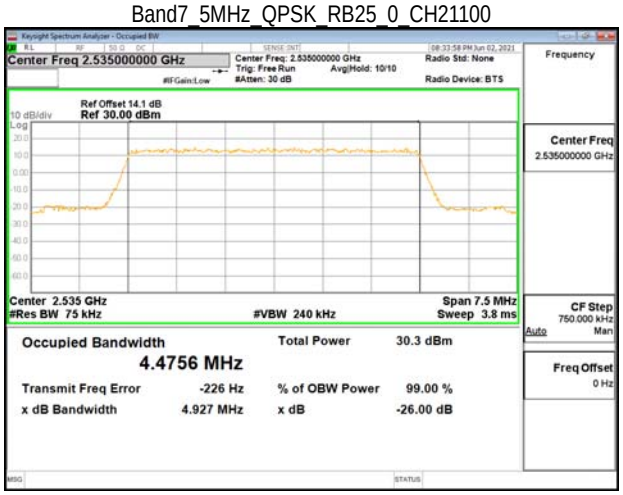
Band7_5MHz_QPSK_RB25_0_CH20775



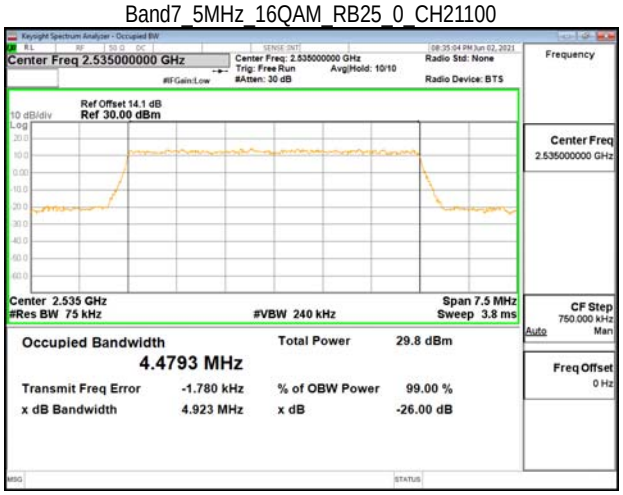
Band7_5MHz_16QAM_RB25_0_CH20775



Band7_5MHz_QPSK_RB25_0_CH21100



Band7_5MHz_16QAM_RB25_0_CH21100



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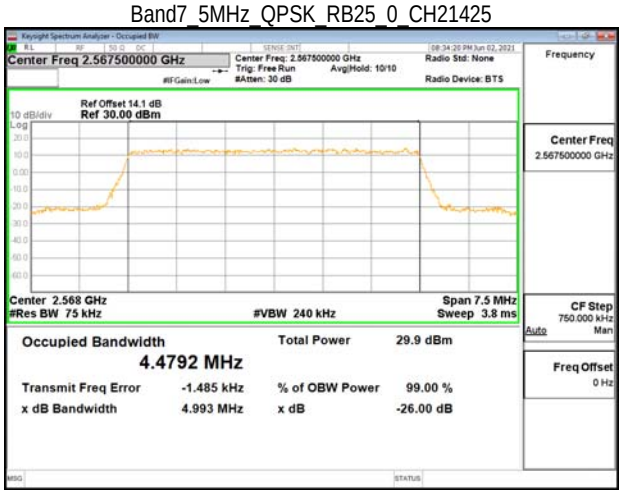
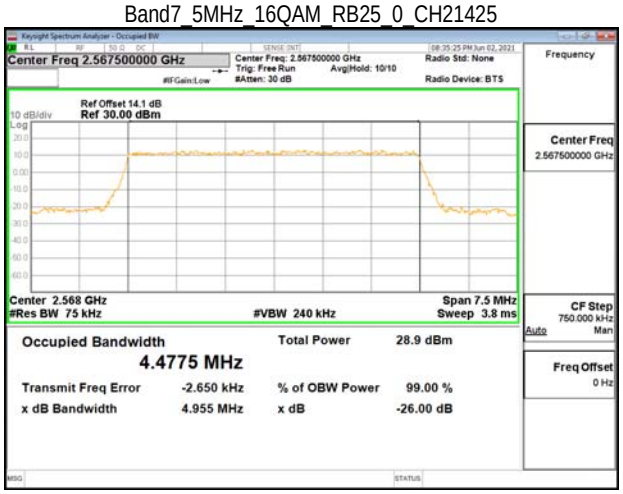


Band7_5MHz_16QAM_RB25_0_CH21425



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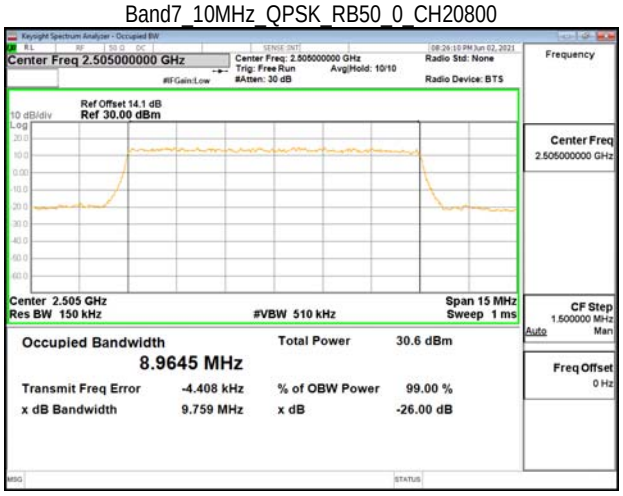
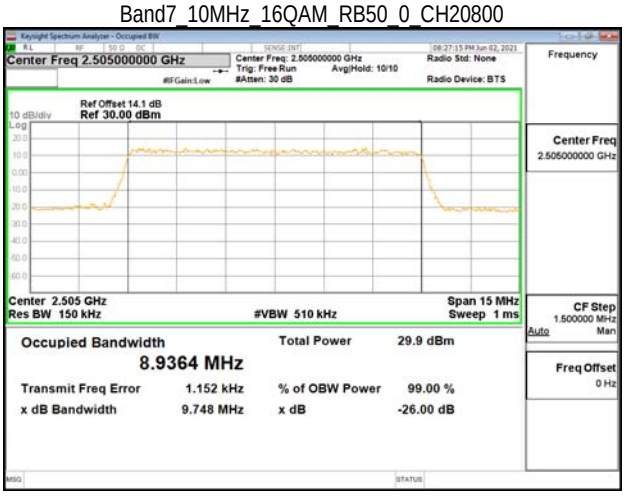
Band7_10MHz_QPSK_RB50_0_CH20800



Band7_10MHz_16QAM_RB50_0_CH20800



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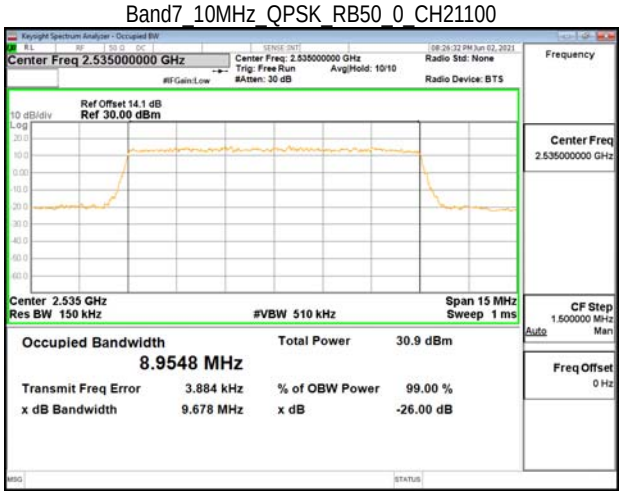

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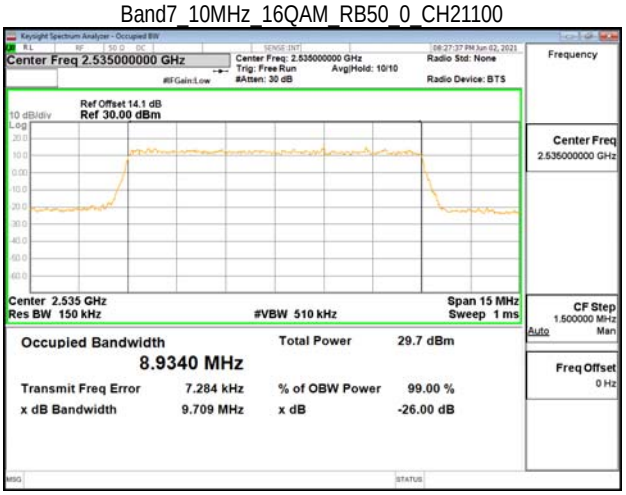
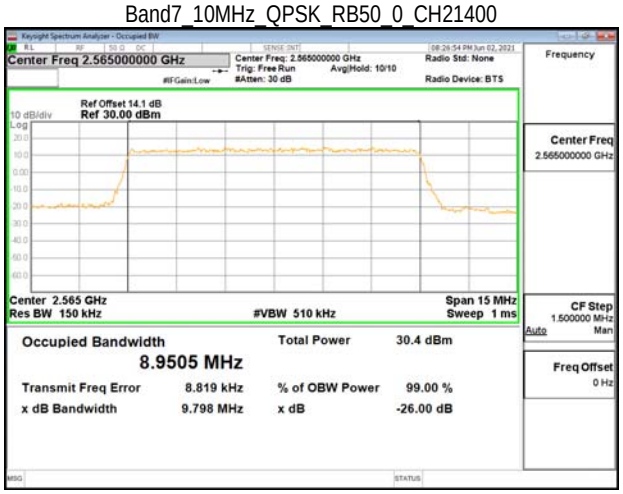
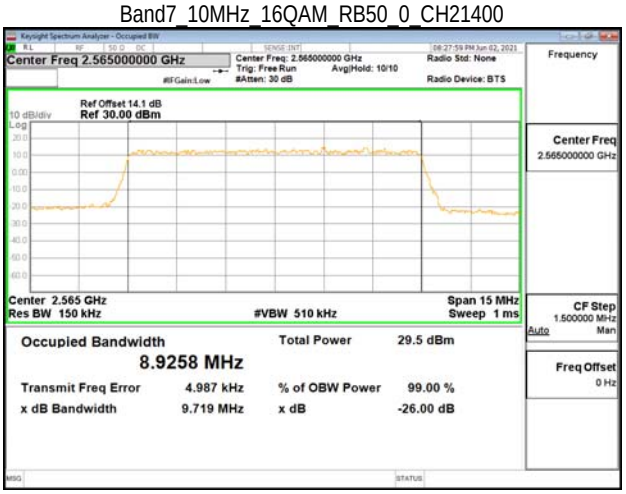


Band7_10MHz_QPSK_RB50_0_CH21400



Band7_10MHz_16QAM_RB50_0_CH21400



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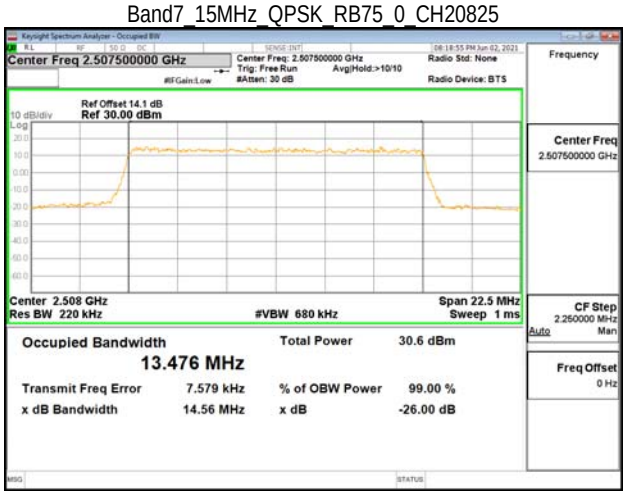
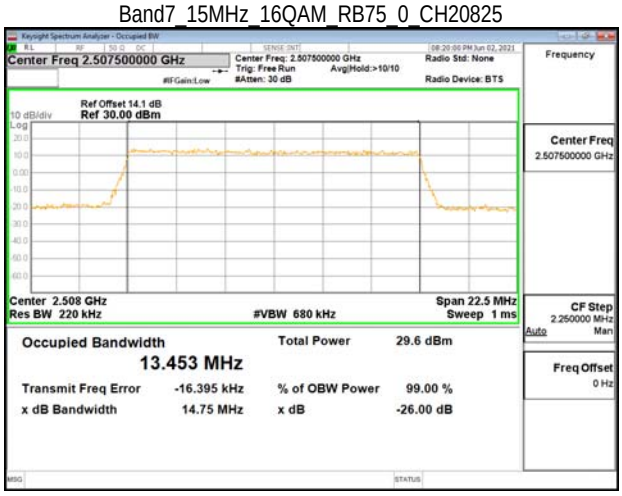
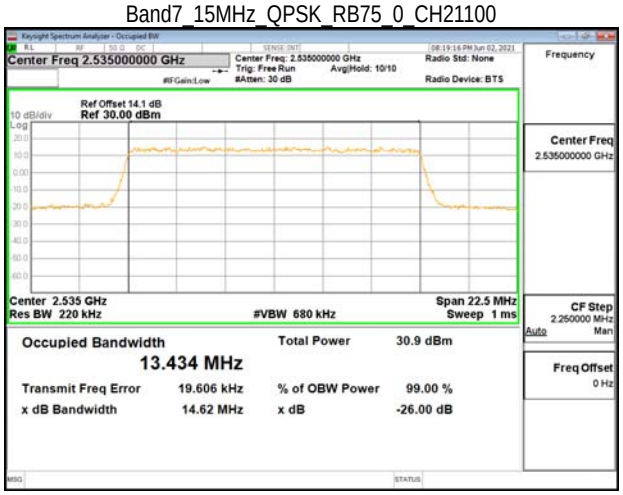
Band7_15MHz_QPSK_RB75_0_CH20825



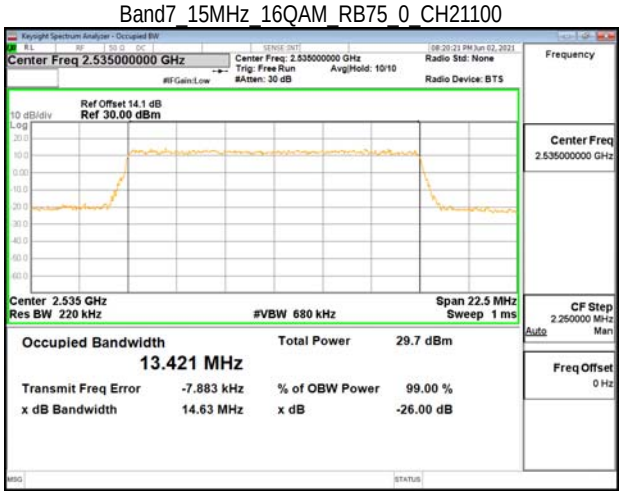
Band7_15MHz_16QAM_RB75_0_CH20825



Band7_15MHz_QPSK_RB75_0_CH21100



Band7_15MHz_16QAM_RB75_0_CH21100



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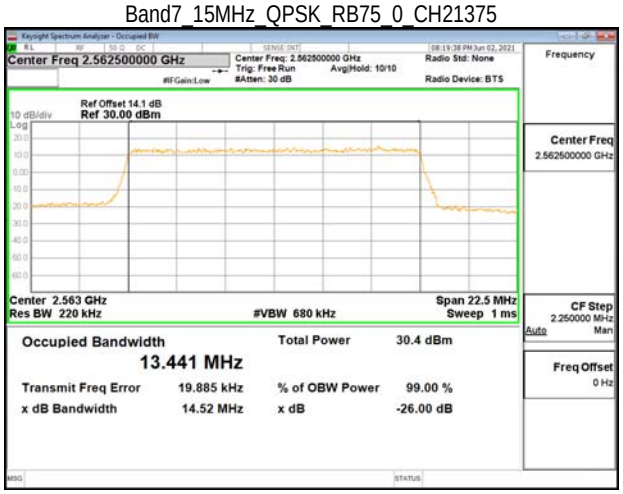
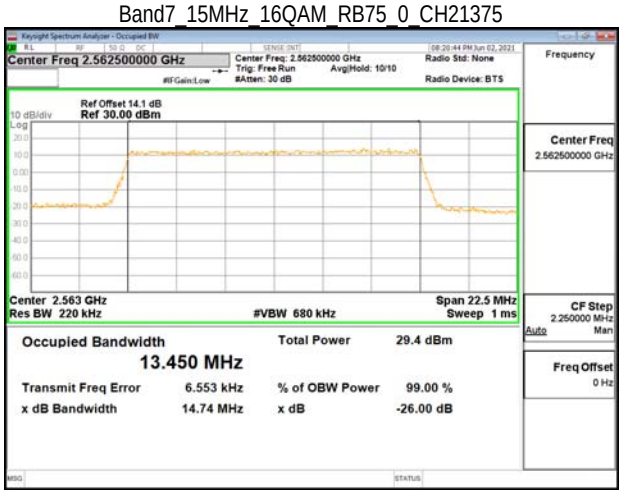


Band7_15MHz_16QAM_RB75_0_CH21375



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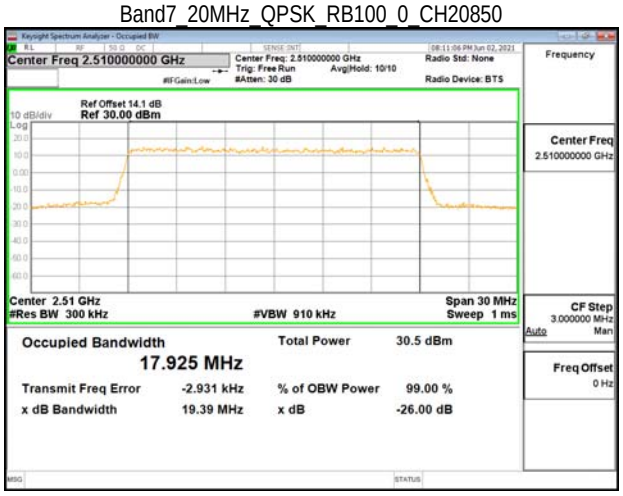
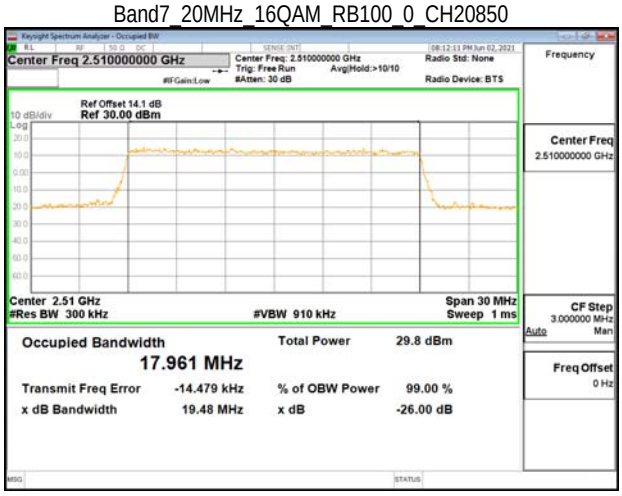
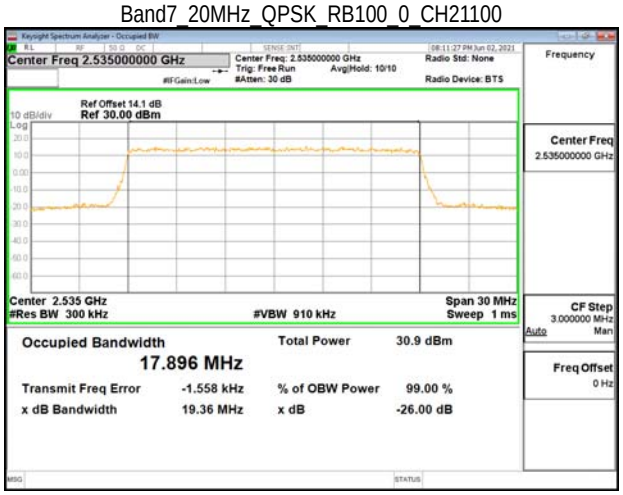
Band7_20MHz_QPSK_RB100_0_CH20850



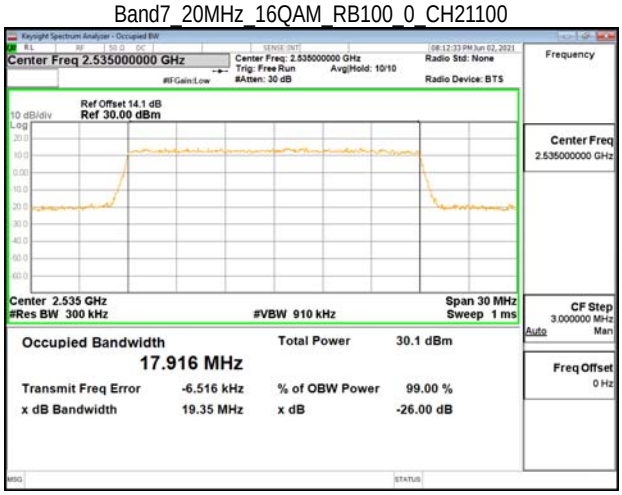
Band7_20MHz_16QAM_RB100_0_CH20850



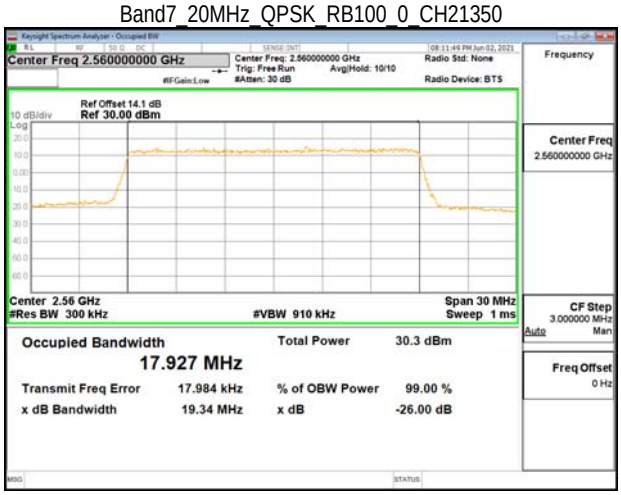
Band7_20MHz_QPSK_RB100_0_CH21100



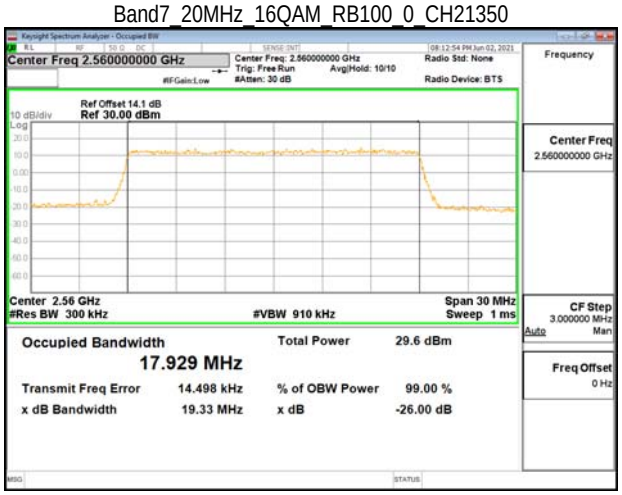
Band7_20MHz_16QAM_RB100_0_CH21100



Band7_20MHz_QPSK_RB100_0_CH21350



Band7_20MHz_16QAM_RB100_0_CH21350



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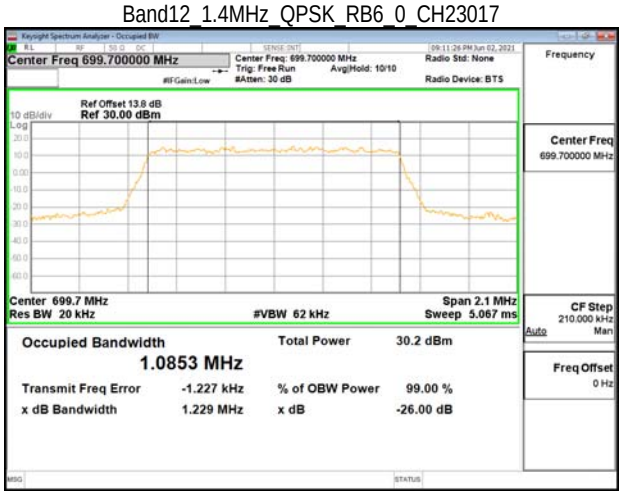
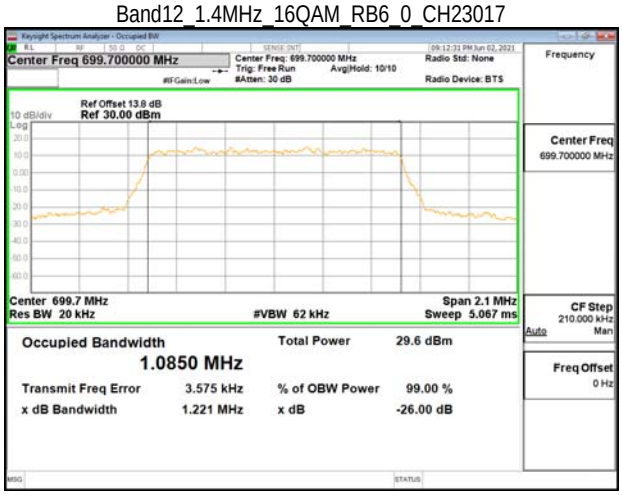
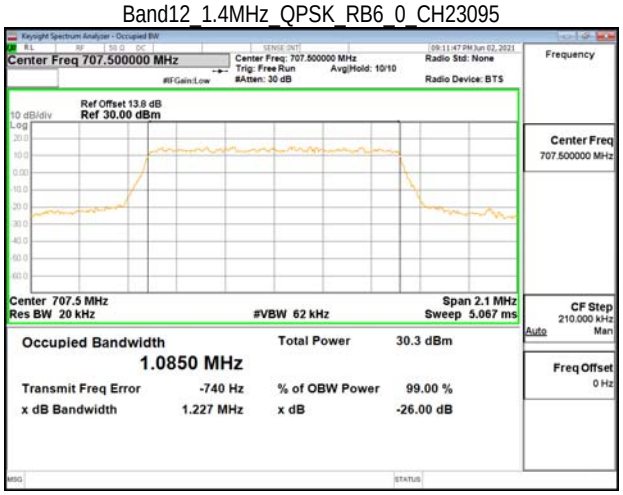
Band12_1.4MHz_QPSK_RB6_0_CH23017



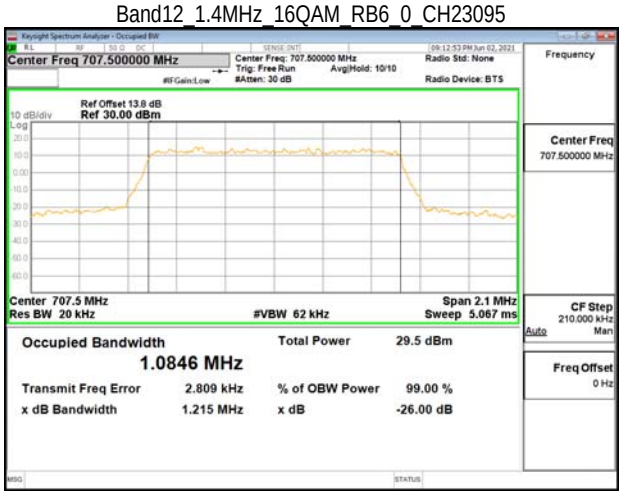
Band12_1.4MHz_16QAM_RB6_0_CH23017



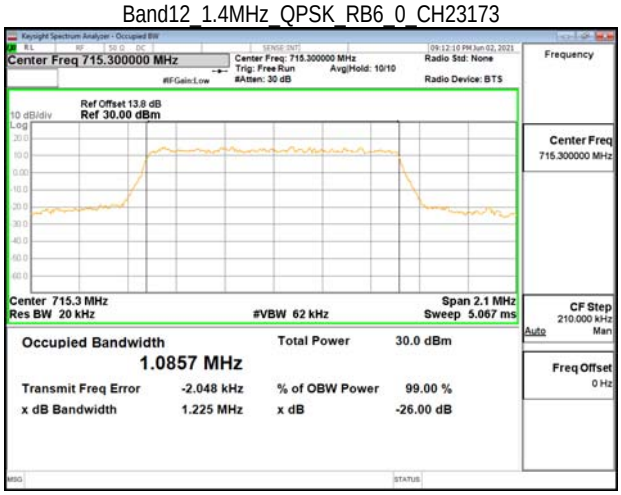
Band12_1.4MHz_QPSK_RB6_0_CH23095



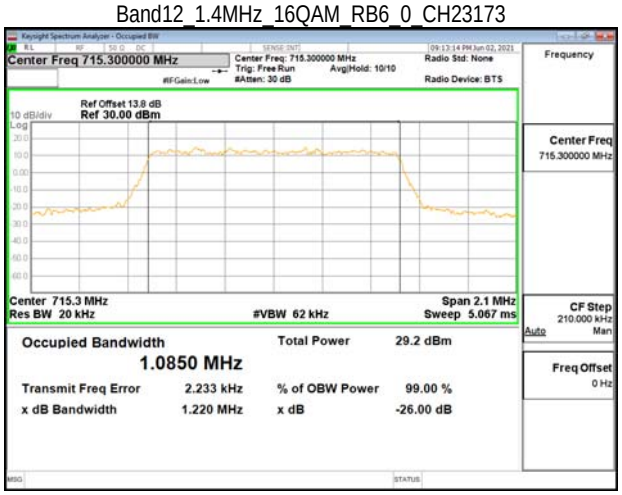
Band12_1.4MHz_16QAM_RB6_0_CH23095



Band12_1.4MHz_QPSK_RB6_0_CH23173



Band12_1.4MHz_16QAM_RB6_0_CH23173



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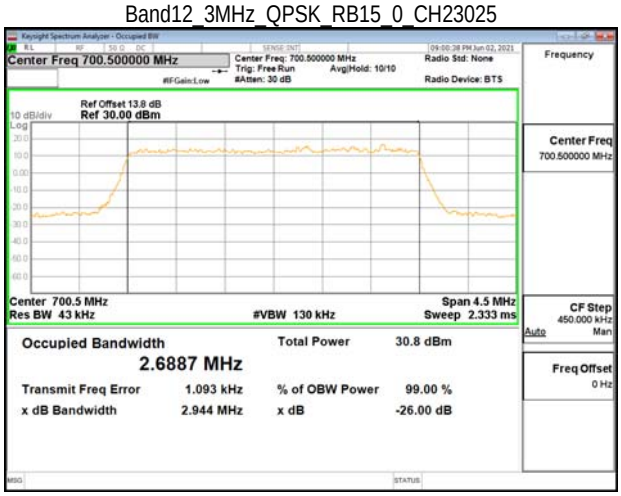
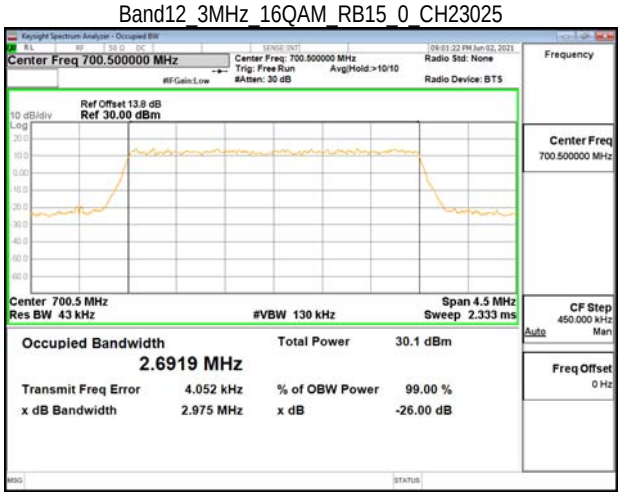
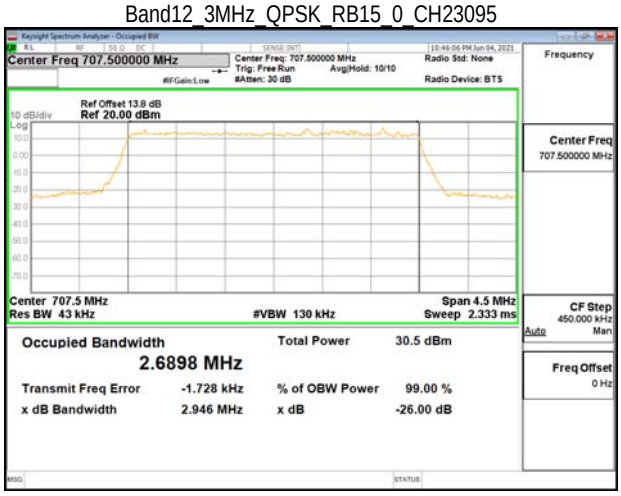
Band12_3MHz_QPSK_RB15_0_CH23025



Band12_3MHz_16QAM_RB15_0_CH23025



Band12_3MHz_QPSK_RB15_0_CH23095



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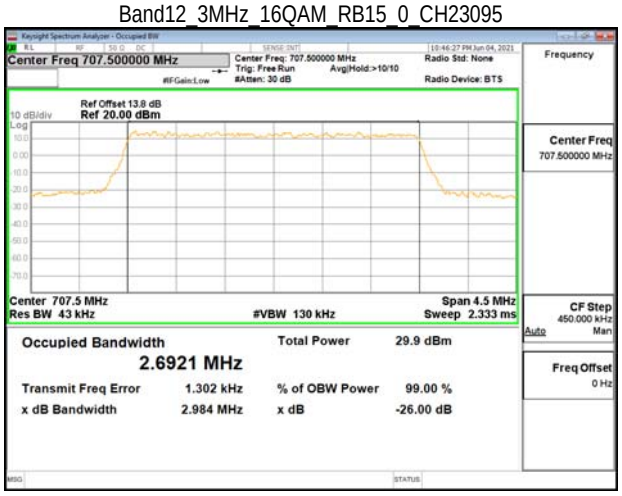
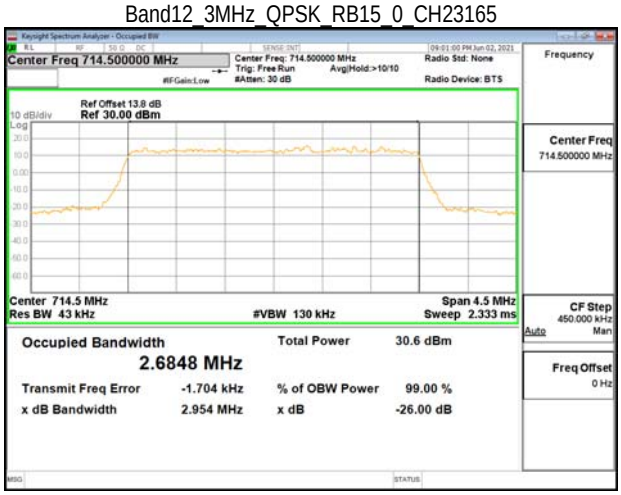
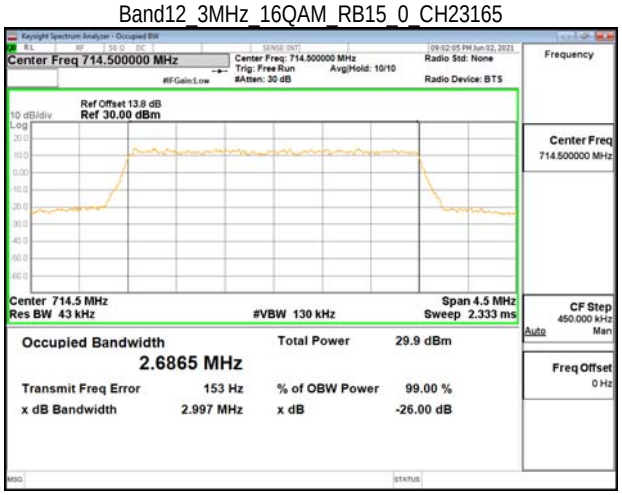


Band12_3MHz_QPSK_RB15_0_CH23165



Band12_3MHz_16QAM_RB15_0_CH23165



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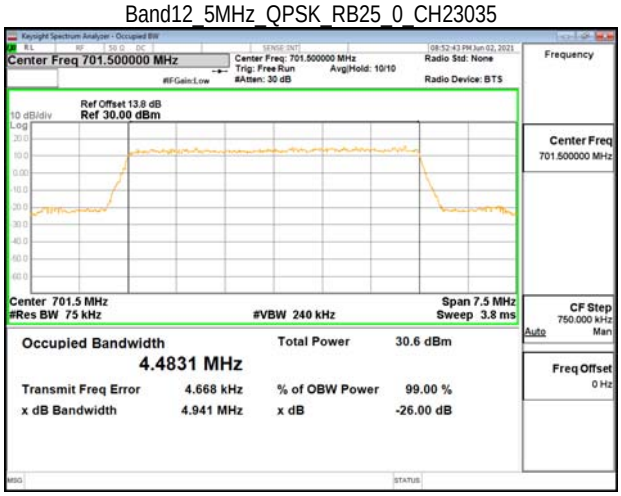
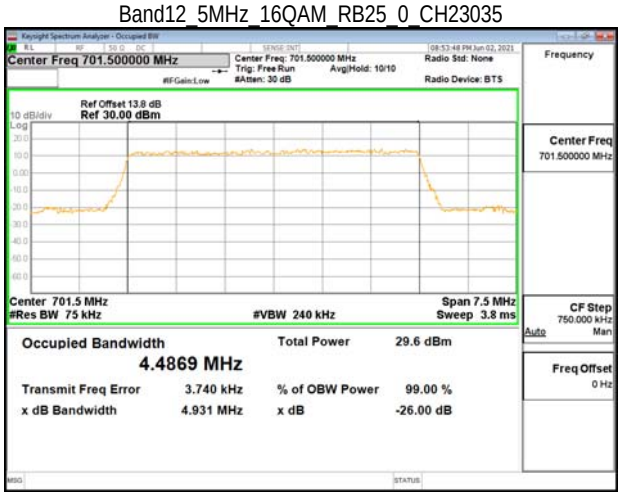
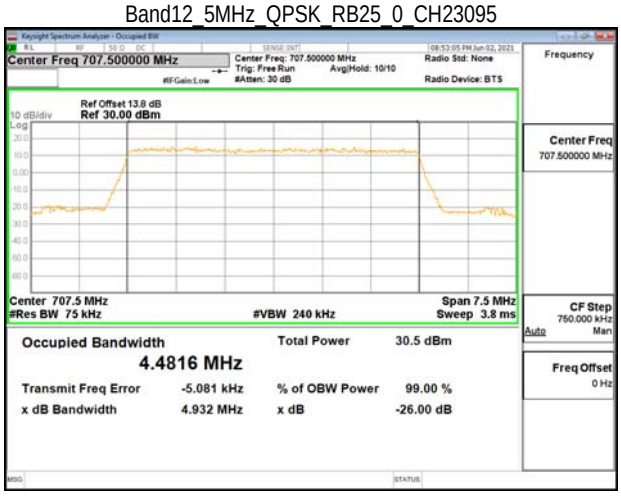
Band12_5MHz_QPSK_RB25_0_CH23035



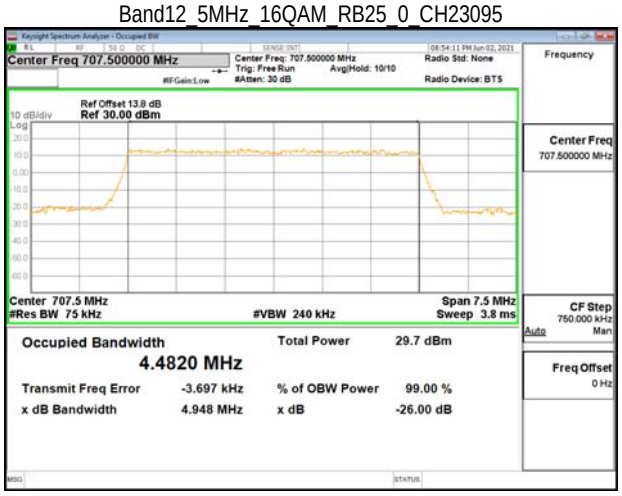
Band12_5MHz_16QAM_RB25_0_CH23035



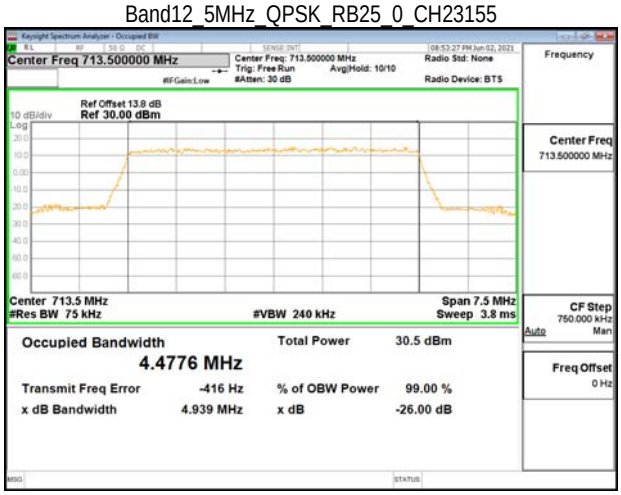
Band12_5MHz_QPSK_RB25_0_CH23095



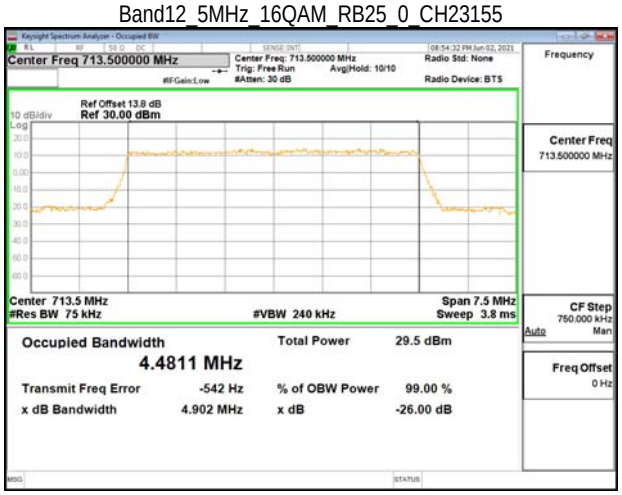
Band12_5MHz_16QAM_RB25_0_CH23095



Band12_5MHz_QPSK_RB25_0_CH23155



Band12_5MHz_16QAM_RB25_0_CH23155



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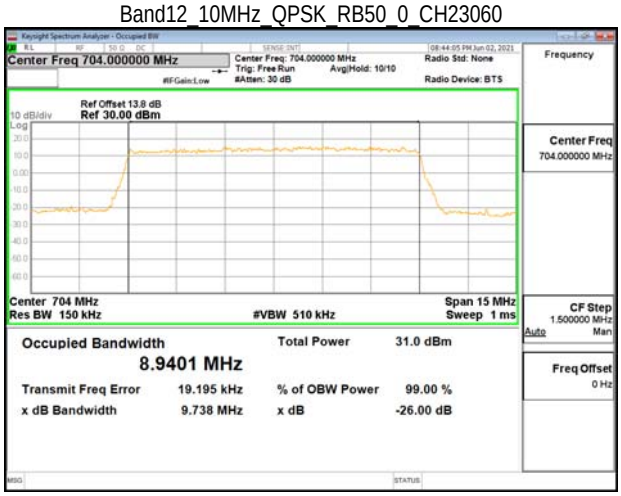
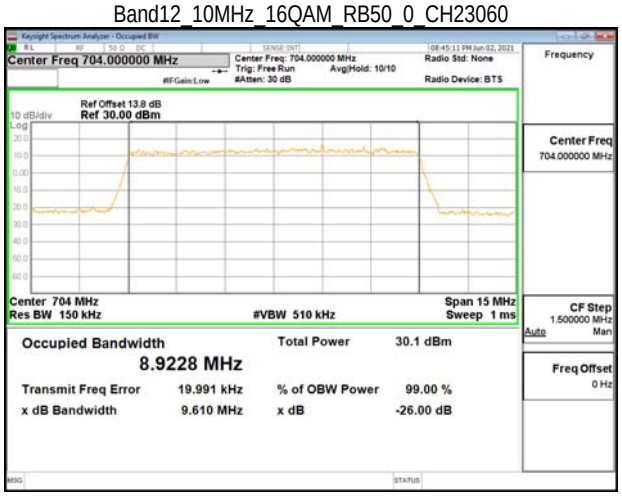
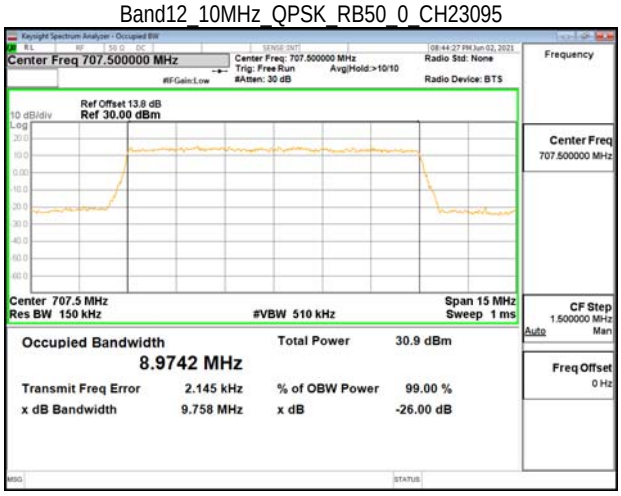
Band12_10MHz_QPSK_RB50_0_CH23060



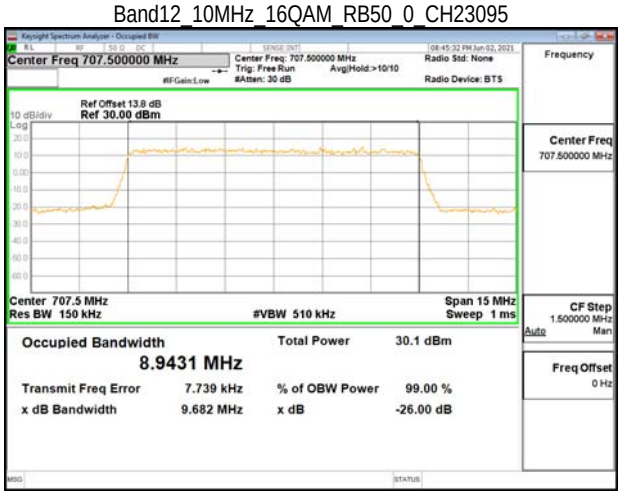
Band12_10MHz_16QAM_RB50_0_CH23060



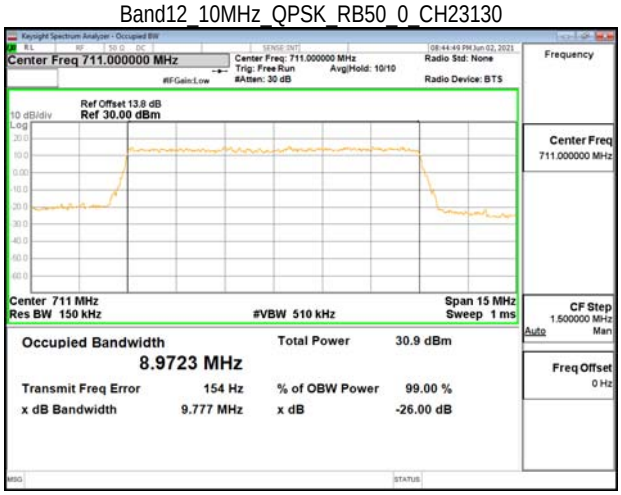
Band12_10MHz_QPSK_RB50_0_CH23095



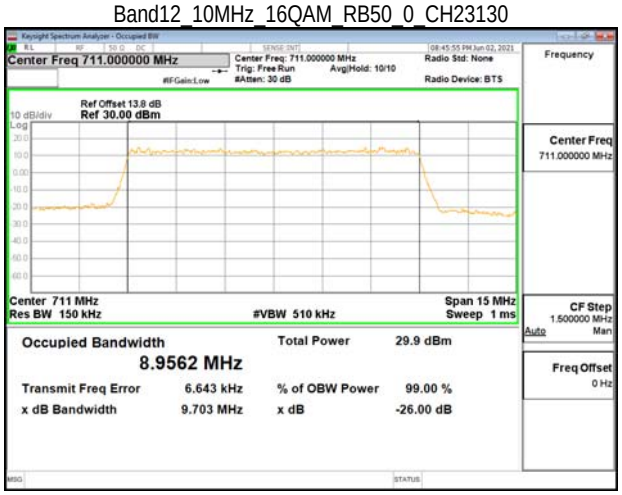
Band12_10MHz_16QAM_RB50_0_CH23095



Band12_10MHz_QPSK_RB50_0_CH23130



Band12_10MHz_16QAM_RB50_0_CH23130



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8 OUT OF BAND EMISSION AT ANTENNA TERMINALS

8.1 Standard Applicable

FCC §22.917(a), §24.238(a), §27.53(h)

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(g) LTE B12

Compliance for operations in the 600 MHz, 698-746 MHz, 746-758 MHz and the 776-788 MHz band with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(2) 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;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;

(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(h)(1) for LTE B4

(h) *AWS emission limits*—(1) *General protection levels.* Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB.

FCC §27.53(m) (4) (6) for LTE B7

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 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 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

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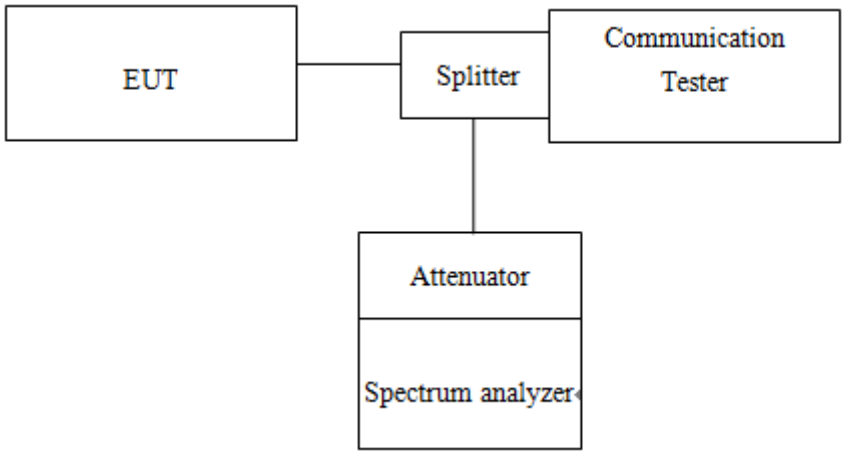
one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

8.2 Test SET-UP



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8.3 Measurement Procedure

8.3.1 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.

8.3.2 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

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
PXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Temperature Chamber	Giant Force	GTH-150-40-CP-AR	MAA0512-018	05/19/2021	05/18/2022
Radio Communication Analyer	Anritsu	MT8820C	6201465317	02/24/2021	02/23/2022
DC Power Supply	Agilent	E3640A	MY52410006	12/17/2020	12/16/2021
Attenuator	Mini-Circuit	BW-S10W2+	2	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021
Power Divider	RF-LAMBAD	RFLT2W1G18G	11-JSPF412-018	12/16/2020	12/15/2021

8.5 Measurement Result:

Refer to next pages.

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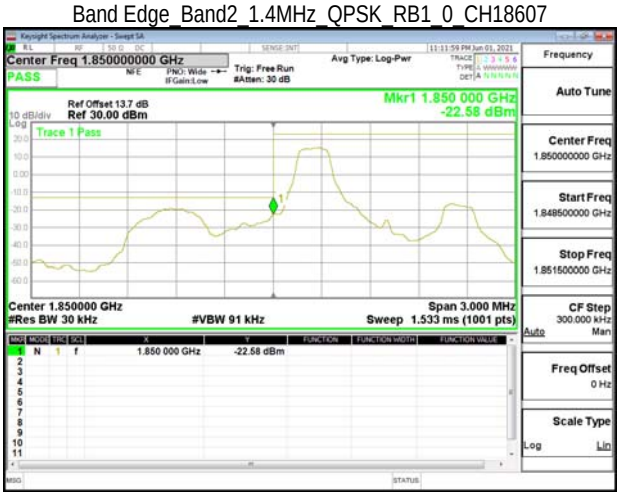
Band Edge_Band2_1.4MHz_QPSK_RB1_0_CH18607



Band Edge_Band2_1.4MHz_QPSK_RB6_0_CH19193

Band Edge_Band2_1.4MHz_QPSK_RB1_5_CH19193

Band Edge_Band2_3MHz_QPSK_RB1_0_CH18615

Band Edge_Band2_1.4MHz_QPSK_RB6_0_CH18607

Band Edge_Band2_3MHz_QPSK_RB1_14_CH19185

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