



## 2 Contents

	<b>Page</b>
<b>1 COVER PAGE.....</b>	<b>1</b>
<b>2 CONTENTS .....</b>	<b>2</b>
<b>3 REVISION HISTORY .....</b>	<b>4</b>
<b>4 GENERAL INFORMATION.....</b>	<b>5</b>
4.1 GENERAL DESCRIPTION OF E.U.T. ....	5
4.2 DETAILS OF E.U.T. ....	5
4.3 CHANNEL LIST.....	5
4.4 TEST MODE .....	5
4.5 GENERAL DESCRIPTION OF APPLIED STANDARDS.....	5
<b>5 TEST SUMMARY .....</b>	<b>7</b>
<b>6 EQUIPMENT USED DURING TEST .....</b>	<b>8</b>
6.1 EQUIPMENTS LIST .....	8
6.2 MEASUREMENT UNCERTAINTY .....	9
6.3 TEST EQUIPMENT CALIBRATION .....	9
<b>7 MAX EIRP AND MAXIMUM SPECTRAL DENSITY .....</b>	<b>10</b>
7.1 EUT OPERATION.....	10
7.2 TEST PROCEDURE .....	10
7.3 TEST RESULT .....	11
<b>8 PEAK-TO-AVERAGE POWER RADIO .....</b>	<b>30</b>
8.1 EUT OPERATION.....	30
8.2 TEST PROCEDURE .....	30
8.3 TEST RESULT .....	30
<b>9 OCCUPY BANDWIDTH.....</b>	<b>40</b>
9.1 EUT OPERATION.....	40
9.2 TEST PROCEDURE .....	40
9.3 TEST RESULT .....	41
<b>10 EMISSION OUTSIDE THE FUNDAMENTAL .....</b>	<b>51</b>
10.1 EUT OPERATION .....	51
10.2 TEST PROCEDURE.....	51
10.3 TEST RESULT .....	52
<b>11 OUT OF BAND EMISSION AT ANTENNA TERMINALS.....</b>	<b>56</b>
11.1 EUT OPERATION .....	56
11.2 TEST PROCEDURE.....	56
11.3 TEST RESULT .....	56
<b>12 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT .....</b>	<b>64</b>
12.1 EUT OPERATION .....	64
12.2 TEST SETUP .....	64
12.3 SPECTRUM ANALYZER SETUP .....	65
12.4 TEST PROCEDURE.....	66
12.5 TEST RESULT .....	67
<b>13 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT.....</b>	<b>68</b>
13.1 EUT OPERATION .....	68
13.2 TEST PROCEDURE.....	68
13.3 TEST RESULT .....	70

<b>14</b>	<b>FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT.....</b>	<b>74</b>
14.1	EUT OPERATION.....	74
14.2	TEST PROCEDURE.....	74
14.3	TEST RESULT .....	76
<b>15</b>	<b>PHOTOGRAPHS OF TEST SETUP AND EUT.....</b>	<b>78</b>

### 3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS19S10068 895W001	2019-10-08	2019-10-09 to 2019-11-10	2019-11-11	original	-	Replaced
WTS19S10068 895W001 V1	2019-10-08	2019-10-09 to 2019-11-10	2020-01-14	Version 1	Updated	Valid

## 4 General Information

### 4.1 General Description of E.U.T.

Product:	LTE Outdoor CPE
Model(s):	EG7010A-M11
Model Description:	NA
Storage Location:	Internal Storage
Category of CBSD:	Category B

### 4.2 Details of E.U.T.

Operation Frequency:	LTE Band 48:3550MHz-3700MHz
Type of Modulation:	LTE: Uplink:QPSK, 16QAM;Downlink: QPSK, 16QAM, 64QAM
Antenna installation:	LTE: Internal antenna
Antenna Gain:	14dBi
Ratings:	DC 24V 0.5A

### 4.3 Channel List

Normal

5MHz		10MHz	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low	3552.5	Low	3555
Middle	3625	Middle	3625
High	3697.5	High	3695
15MHz		20MHz	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low	3557.5	Low	3560
Middle	3625	Middle	3625
High	3692.5	High	3690

### 4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Description
Data Mode (QPSK)	Keep the EUT in data communicating mode (QPSK). (5MHz ,10MHz, 15MHz, 20MHz)
Data Mode (16QAM)	Keep the EUT in data communicating mode (16QAM). (5MHz ,10MHz, 15MHz, 20MHz)

### 4.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

47 CFR FCC Part 96

KDB 971168 D01 Power Meas License Digital Systems v03r01

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 940660 D01 Part 96 CBRS Equipment v01

ANSI/TIA/EIA-603-E 2016

ANSI C63.26-2015

## 5 Test Summary

Test Items	Available Channel (MHz)	Tested Channel (MHz)	Channel Bandwidth	Modulation
EIRP	3552.5 to 3697.5	3552.5 to 3697.5	5MHz	QPSK, 16QAM
	3555 to 3695	3555 to 3695	10MHz	QPSK, 16QAM
	3557.5 to 3692.5	3557.5 to 3692.5	15MHz	QPSK, 16QAM
	3560 to 3690	3560 to 3690	20MHz	QPSK, 16QAM
PSD	3552.5 to 3697.5	3552.5 to 3697.5	5MHz	QPSK, 16QAM
	3555 to 3695	3555 to 3695	10MHz	QPSK, 16QAM
	3557.5 to 3692.5	3557.5 to 3692.5	15MHz	QPSK, 16QAM
	3560 to 3690	3560 to 3690	20MHz	QPSK, 16QAM
Frequency stability	3552.5 to 3697.5	3625	5MHz	QPSK
	3555 to 3695	3625	10MHz	QPSK
	3557.5 to 3692.5	3625	15MHz	QPSK
	3560 to 3690	3625	20MHz	QPSK
Occupied Bandwidth	3552.5 to 3697.5	3552.5, 3625, 3697.5	5MHz	QPSK, 16QAM
	3555 to 3695	3555, 3625, 3695	10MHz	QPSK, 16QAM
	3557.5 to 3692.5	3557.5, 3625, 3692.5	15MHz	QPSK, 16QAM
	3560 to 3690	3560, 3625, 3690	20MHz	QPSK, 16QAM
Peak to Average Ratio	3552.5 to 3697.5	3552.5, 3625, 3697.5	5MHz	QPSK
	3555 to 3695	3555, 3625, 3695	10MHz	QPSK
	3557.5 to 3692.5	3557.5, 3625, 3692.5	15MHz	QPSK
	3560 to 3690	3560, 3625, 3690	20MHz	QPSK
Radiated Emission	3552.5 to 3697.5	3552.5, 3625, 3697.5	5MHz	QPSK
	3555 to 3695	3555, 3625, 3695	10MHz	QPSK
	3557.5 to 3692.5	3557.5, 3625, 3692.5	15MHz	QPSK
	3560 to 3690	3560, 3625, 3690	20MHz	QPSK
Conducted Emission	3552.5 to 3697.5	3552.5, 3625, 3697.5	5MHz	QPSK
	3555 to 3695	3555, 3625, 3695	10MHz	QPSK
	3557.5 to 3692.5	3557.5, 3625, 3692.5	15MHz	QPSK
	3560 to 3690	3560, 3625, 3690	20MHz	QPSK

**NOTE 1:** All supported modulation types were evaluated. The Worst case of QPSK was selected. Therefore, the Frequency Stability, Peak to Average Ratio, Conducted Emission and Radiated Emission were presented under QPSK mode only.

**NOTE 2:** The duty cycle correction= $10 \log(1/\text{duty cycle})=10 \log(1/(1.98/4.98))=4(\text{dB})$

Offset factory=ATT loss+Cable loss+Duty cycle correction= $3.5+1+4=8.5(\text{dB})$

## 6 Equipment Used during Test

### 6.1 Equipments List

3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2019-04-20	2020-04-19
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2019-05-24	2020-05-24
3	Cable	HUBER+SUHNER	CBL2	525178	2019-04-20	2020-04-19
4	Amplifier	ANRITSU	MH648A	M43381	2019-04-19	2020-04-18
5	Universal Radio Communication Tester	R&S	CMW500	116543	2019-09-17	2020-09-16
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP40	100501	2019-11-13	2020-11-12
2	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2019-04-19	2020-04-18
3	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2019-04-19	2020-04-18
4	Coaxial Cable	ZT26-NJ-NJ-8M/FA	1GHz-18GHz	NA	2019-04-19	2020-04-18
5	Broad-band Horn Antenna	SCHWARZBECK	BBV 9721	100472	2019-10-25	2020-10-24
6	Coaxial Cable	ZT40-2.92J-2.92J-2.0M	10MHz-40GHz	17100919	2019-10-15	2020-10-14
5	Universal Radio Communication Tester	R&S	CMW500	116543	2019-09-17	2020-09-16
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EXA Signal Analyzer	Malaysia Keysight	N9010A	MY50520207	2019-04-19	2020-04-19
2.	Spectrum Analyzer	R&S	FSP40	100501	2018-11-13	2019-11-12
5	Universal Radio Communication Tester	R&S	CMW500	116543	2019-09-17	2020-09-16



## 6.2 Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission	± 3.64 dB(AC mains 150KHz~30MHz)
Radiated Spurious Emissions	± 5.08 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Radio Frequency	± 1 x 10 <sup>-7</sup> Hz
RF Power	± 0.42 dB
RF Power Density	± 0.7dB
Conducted Spurious Emissions	± 2.76 dB (9kHz~26500MHz)
Confidence interval: 95%. Confidence factor:k=2	

## 6.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

## 7 Max EIRP and maximum spectral density

Test Requirement:	FCC part96.41(b)
Test Method:	ANSI/TIA-603-E:2016, ANSI C63.26:2015
Test Mode:	Data communicating mode
Limit:	

Device	Maximum EIRP(dBm/10MHz)	Maximum PSD(dBm/MHz)
End User Device	23	n/a
Category A CBSD	30	20
Category B CBSD	47	37

### 7.1 EUT Operation

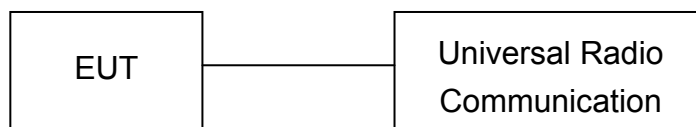
Operating Environment :

Temperature:	22.4 °C
Humidity:	52.2 % RH
Atmospheric Pressure:	101.3kPa

### 7.2 Test Procedure

Conducted method for 15M&20M bandwidth:

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.



For Maximum EIRP

1. Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.
2. Set span to 2 × to 3 × the OBW.
3. Set RBW = 1% to 5% of the OBW.
4. Set VBW ≥ 3 × RBW.
5. Set number of measurement points in sweep ≥ 2 × span / RBW.
6. Sweep time:
  - 1) Set = auto-couple, or
  - 2) Set ≥ [10 × (number of points in sweep) × (transmission symbol period)] for single sweep (automation-compatible) measurement.
7. Detector = power averaging (rms).
8. Set sweep trigger to “free run.”
9. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.
10. Compute power by integrating the spectrum across the OBW(10MHz) of the signal using the instrument's band or channel power measurement function with band/channel limits set equal to the OBW(10MHz) band edges.
11. Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission.
12.  $EIRP = P_{Meas} + G_T$ .

$P_{Meas}$  measured transmitter output power or PSD.  
 $G_T$  gain of the transmitting antenna.

### For Maximum PSD

The PSD is measured following the same procedures described for measuring the maximum EIRP but with the RBW set to the reference bandwidth specified(eg.1MHz) by the applicable regulatory requirement, and by using the marker function to identify the maximum PSD instead of summing the power across the OBW.

## 7.3 Test Result

Transmit Output Power								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 Output Power (dBm/10MHz)	Chain 1 Output Power (dBm/10MHz)	Total Power (dBm/10MHz)	Antenna Gain (dBi)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
5	QPSK	Low	21.42	21.76	24.60	14	38.60	47
		Middle	21.85	21.44	24.66	14	38.66	
		High	21.92	21.44	<b>24.70</b>	14	38.70	
	16QAM	Low	21.93	21.26	24.62	14	38.62	
		Middle	21.69	21.61	<b>24.66</b>	14	38.66	
		High	21.85	21.23	24.56	14	38.56	

PSD								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
5	QPSK	Low	16.32	16.48	19.41	14	33.41	37
		Middle	15.83	16.15	19.00	14	33.00	
		High	16.24	16.44	19.35	14	33.35	
	16QAM	Low	15.53	16.37	18.98	14	32.98	
		Middle	15.20	16.00	18.63	14	32.63	
		High	15.56	15.82	18.70	14	32.70	

Transmit Output Power								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 Output Power (dBm/10MHz)	Chain 1 Output Power (dBm/10MHz)	Total Power (dBm/10MHz)	Antenna Gain (dBi)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
10	QPSK	Low	22.01	21.83	<b>24.93</b>	14	38.93	47
		Middle	21.97	21.65	24.82	14	38.82	
		High	21.93	21.71	24.83	14	38.83	
	16QAM	Low	21.45	21.48	24.48	14	38.48	
		Middle	21.28	21.75	24.53	14	38.53	
		High	21.97	21.67	<b>24.83</b>	14	38.83	

PSD								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
10	QPSK	Low	13.75	10.90	14.26	14	28.26	37
		Middle	14.35	11.41	14.17	14	28.17	
		High	14.16	12.36	13.61	14	27.61	
	16QAM	Low	13.51	13.59	14.26	14	28.26	
		Middle	13.89	13.67	14.17	14	28.17	
		High	13.60	13.86	13.61	14	27.61	

Transmit Output Power								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 Output Power (dBm/10MHz)	Chain 1 Output Power (dBm/10MHz)	Total Power (dBm/10MHz)	Antenna Gain (dBi)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
15	QPSK	Low	21.25	21.23	24.25	14	38.25	47
		Middle	20.97	21.88	24.46	14	38.46	
		High	21.07	21.52	24.31	14	38.31	
	16QAM	Low	21.15	21.27	24.22	14	38.22	
		Middle	20.79	21.37	24.10	14	38.10	
		High	20.88	21.18	24.04	14	38.04	

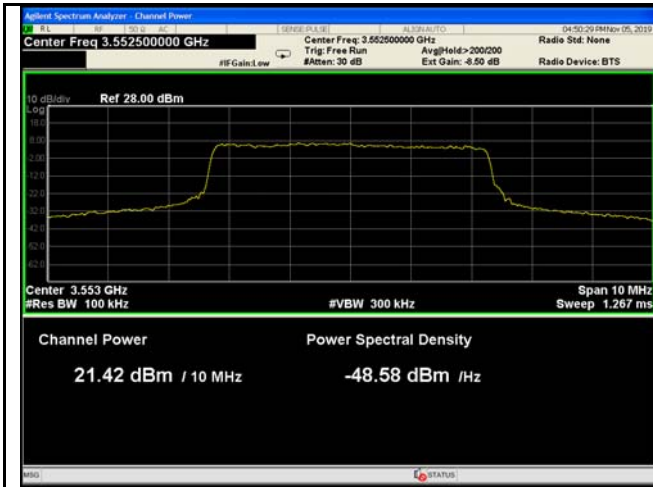
Full Transmit Output Power								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 Output Power (dBm/15MHz)	Chain 1 Output Power (dBm/15MHz)	Total Power (dBm/15MHz)	Antenna Gain (dBi)	EIRP (dBm/15MHz)	EIRP Limit (dBm/15MHz)
15	QPSK	Low	22.26	22.31	25.30	14	39.30	-
		Middle	21.95	22.67	25.34	14	39.34	
		High	22.13	22.36	25.26	14	39.26	
	16QAM	Low	22.21	22.25	25.24	14	39.24	
		Middle	21.92	22.44	25.20	14	39.20	
		High	22.04	22.28	25.17	14	39.17	

PSD								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
15	QPSK	Low	12.43	12.58	15.52	14	29.52	37
		Middle	12.93	13.18	16.07	14	30.07	
		High	12.75	12.98	15.88	14	29.88	
	16QAM	Low	12.35	12.73	15.55	14	29.55	
		Middle	12.53	12.62	15.59	14	29.59	
		High	12.63	12.46	15.56	14	29.56	

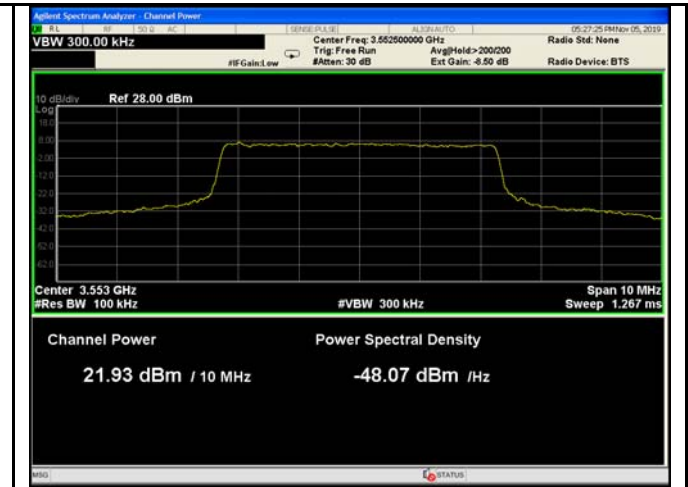
Transmit Output Power								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 Output Power (dBm/10MHz)	Chain 1 Output Power (dBm/10MHz)	Total Power (dBm/10MHz)	Antenna Gain (dBi)	EIRP (dBm/10MHz)	EIRP Limit (dBm/10MHz)
20	QPSK	Low	21.48	21.25	24.38	14	38.38	47
		Middle	21.63	21.84	24.75	14	38.75	
		High	21.20	21.29	24.26	14	38.26	
	16QAM	Low	20.83	20.88	23.87	14	37.87	
		Middle	21.66	21.15	24.42	14	38.42	
		High	21.13	20.93	24.04	14	38.04	
Full Transmit Output Power								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 Output Power (dBm/20MHz)	Chain 1 Output Power (dBm/20MHz)	Total Power (dBm/20MHz)	Antenna Gain (dBi)	EIRP (dBm/20MHz)	EIRP Limit (dBm/20MHz)
20	QPSK	Low	23.51	23.29	26.41	14	40.41	-
		Middle	23.55	23.72	<b>26.65</b>	14	40.65	
		High	23.16	23.31	26.25	14	40.25	
	16QAM	Low	23.08	22.95	26.03	14	40.03	
		Middle	23.45	23.02	<b>26.25</b>	14	40.25	
		High	23.24	23.15	26.21	14	40.21	

PSD								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
20	QPSK	Low	11.99	11.84	14.93	14	28.93	37
		Middle	12.10	12.18	15.15	14	29.15	
		High	11.65	12.07	14.88	14	28.88	
	16QAM	Low	11.25	11.49	14.38	14	28.38	
		Middle	11.57	11.82	14.71	14	28.71	
		High	11.77	11.81	14.80	14	28.80	

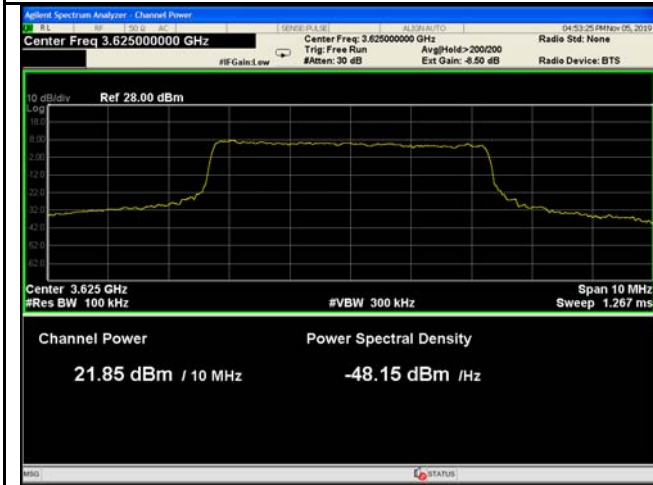
**Transmit Output Power Test Plots  
Chain 0**



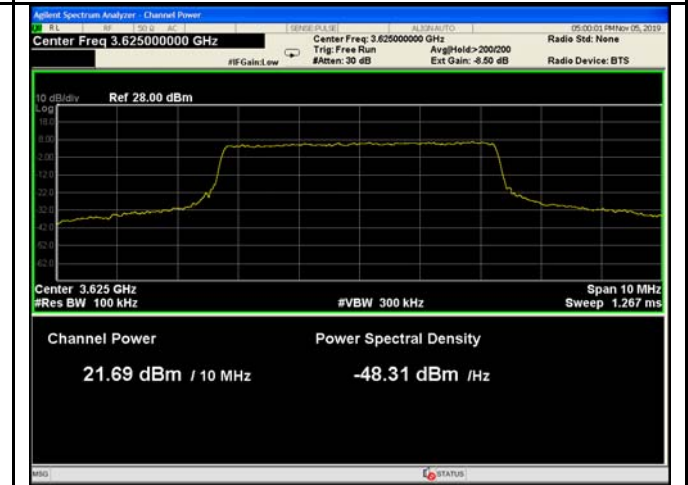
5MHz - Low CH QPSK



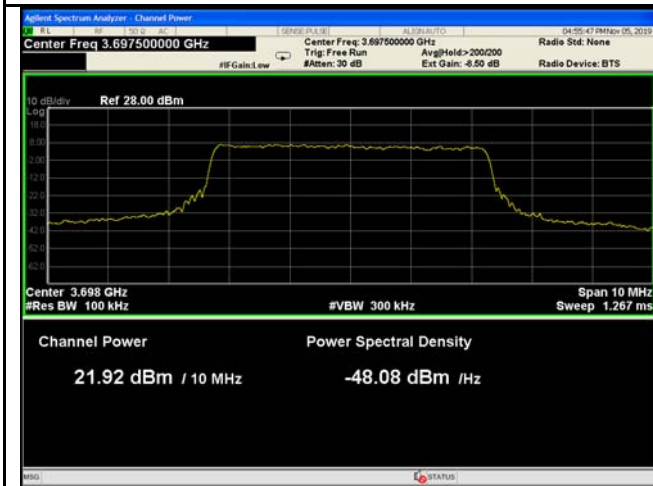
5MHz - Low CH 16QAM



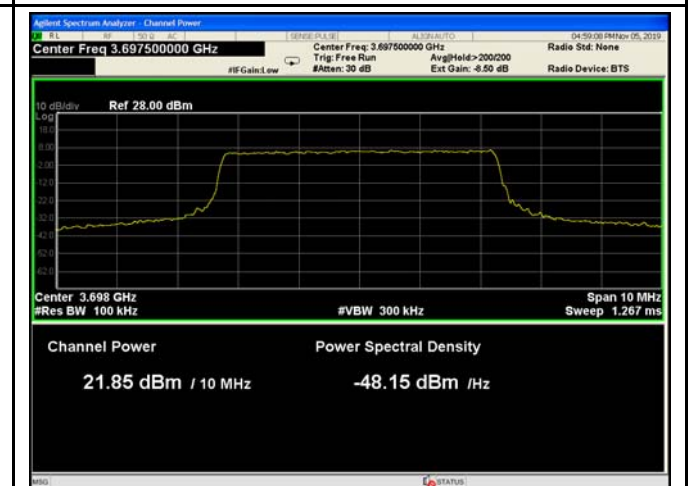
5MHz - Middle CH QPSK



5MHz - Middle CH 16QAM

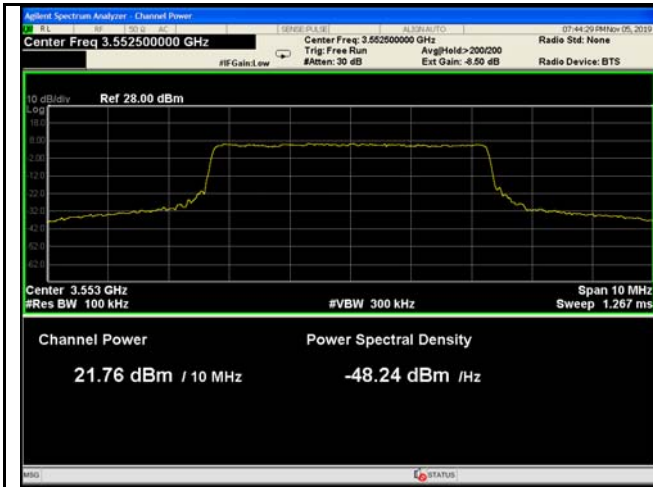


5MHz - High CH QPSK

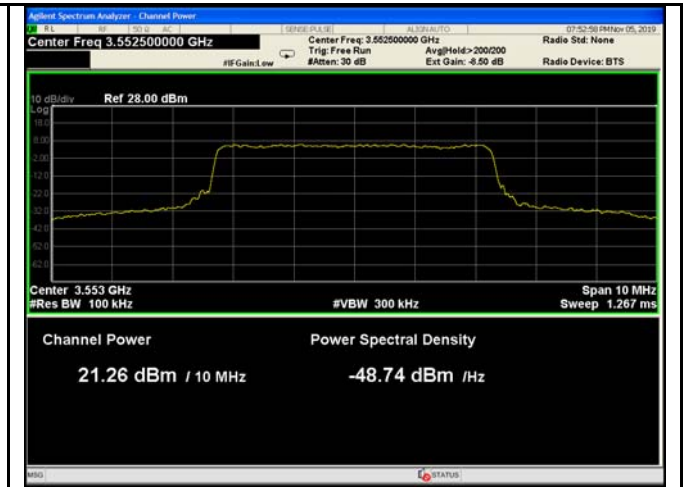


5MHz - High CH 16QAM

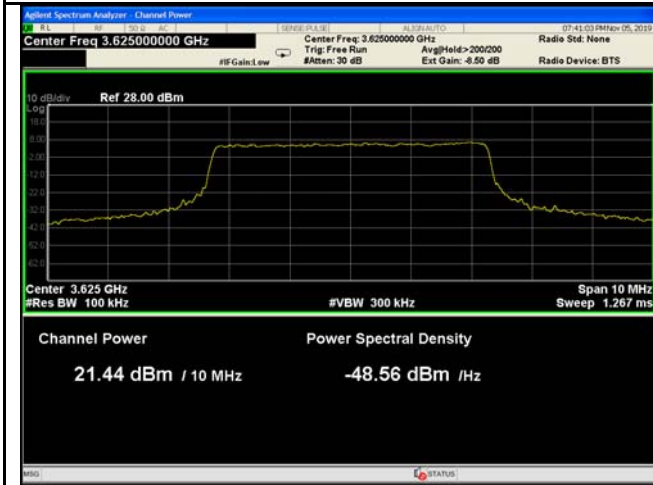
Chain 1



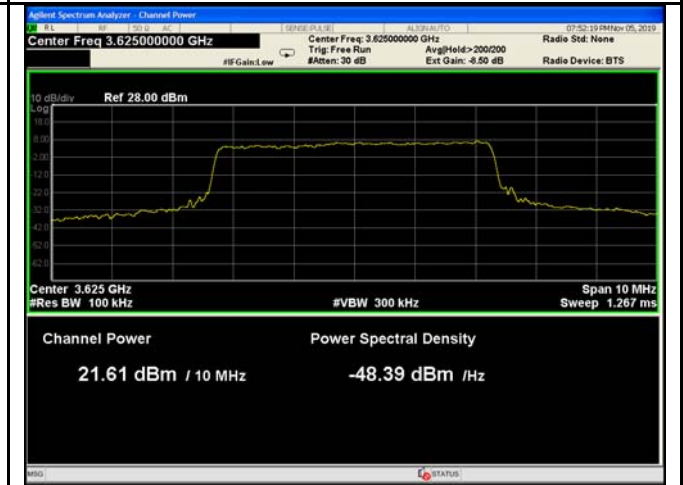
5MHz - Low CH QPSK



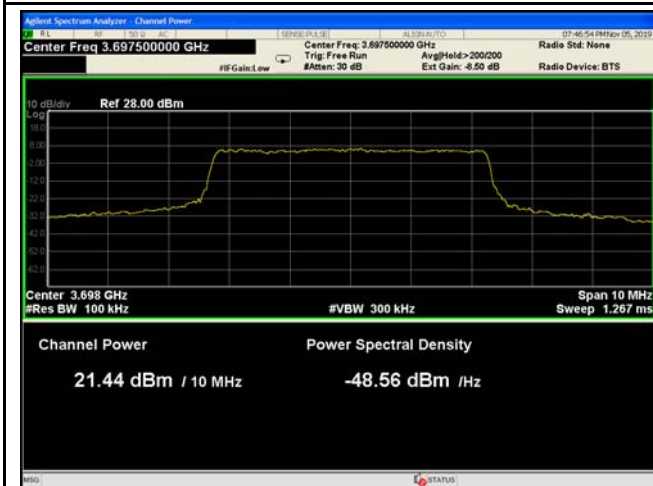
5MHz - Low CH 16QAM



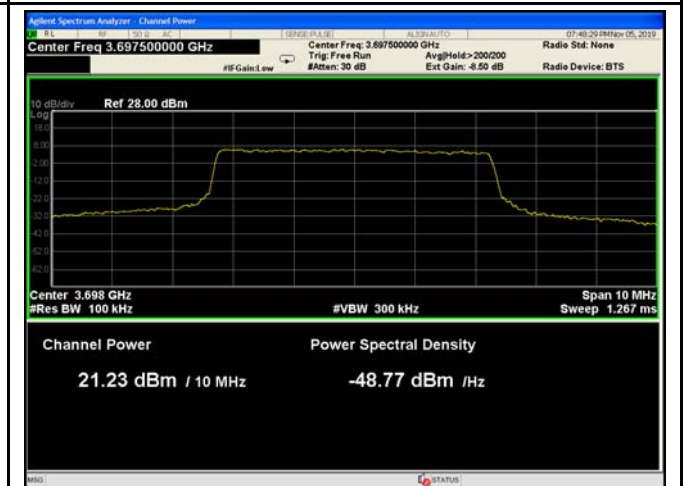
5MHz - Middle CH QPSK



5MHz - Middle CH 16QAM

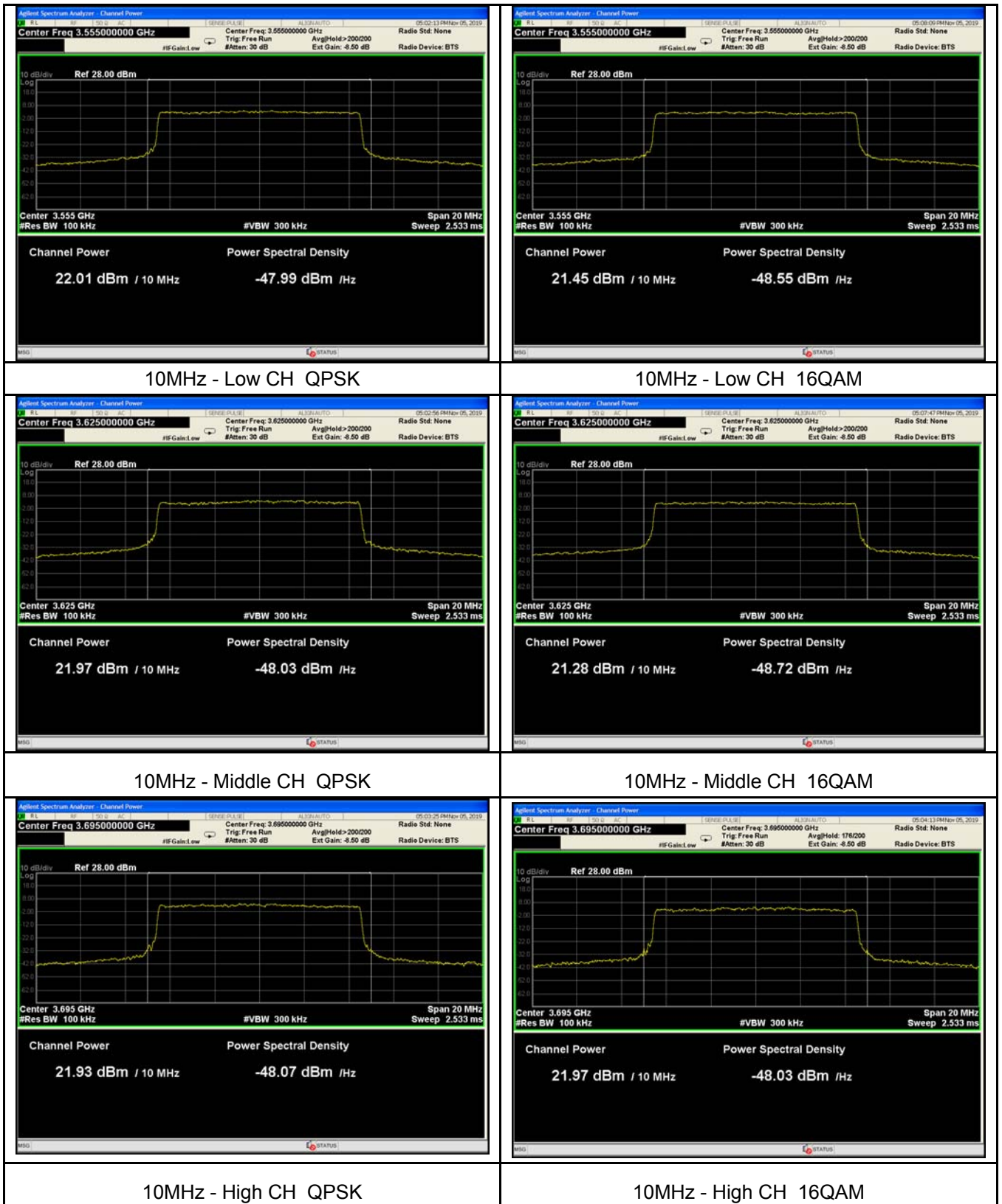


5MHz - High CH QPSK



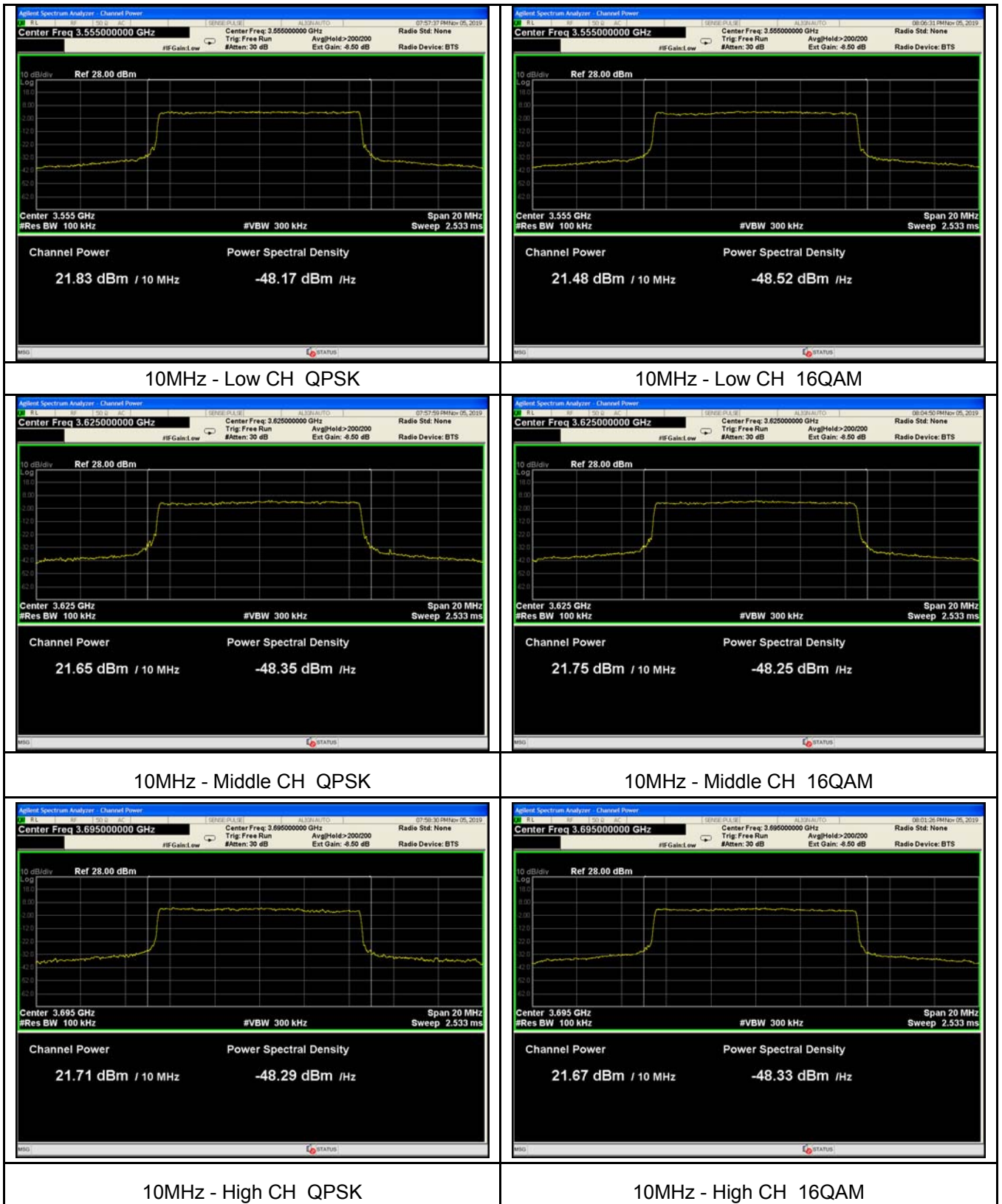
5MHz - High CH 16QAM

Chain 0

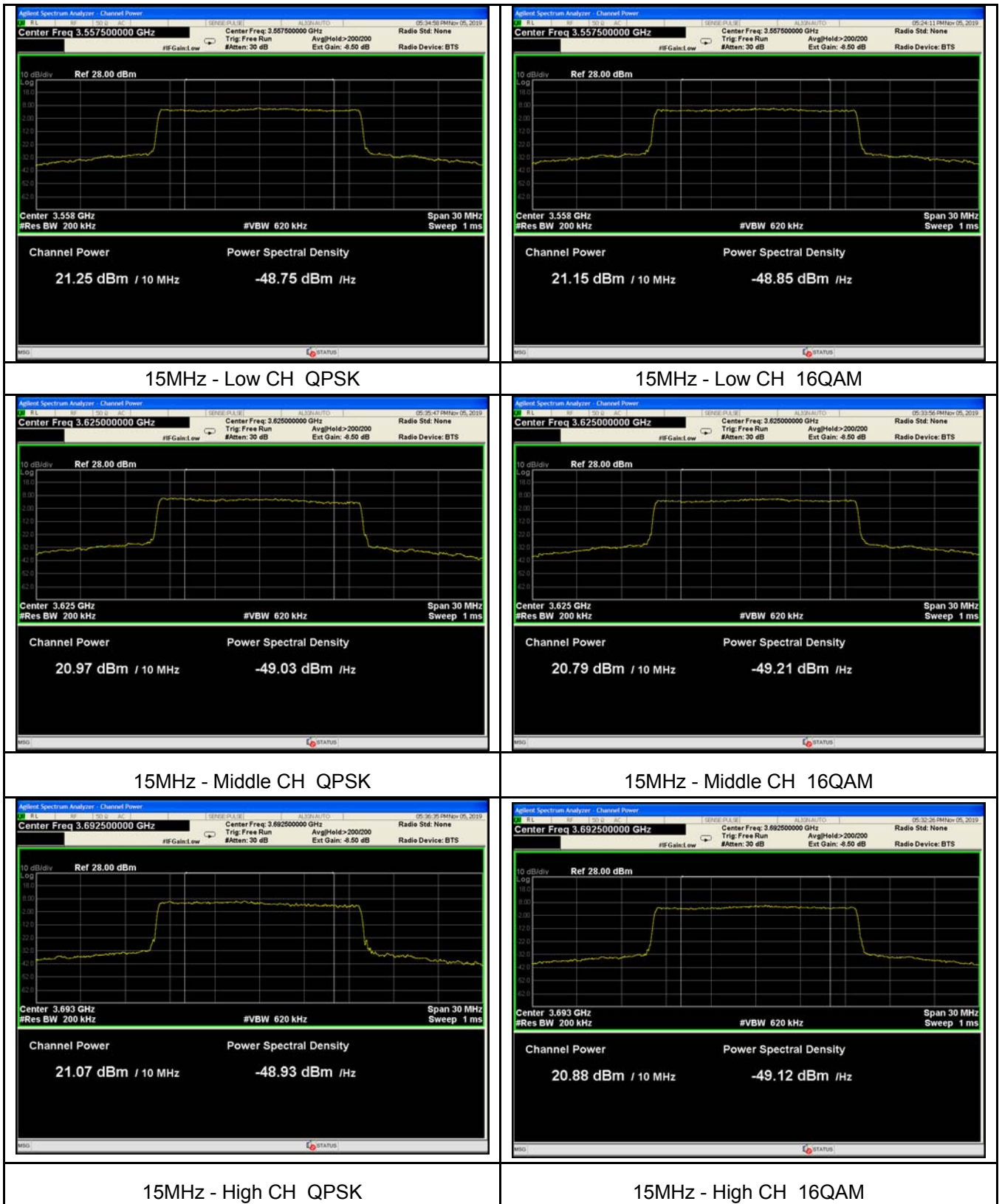




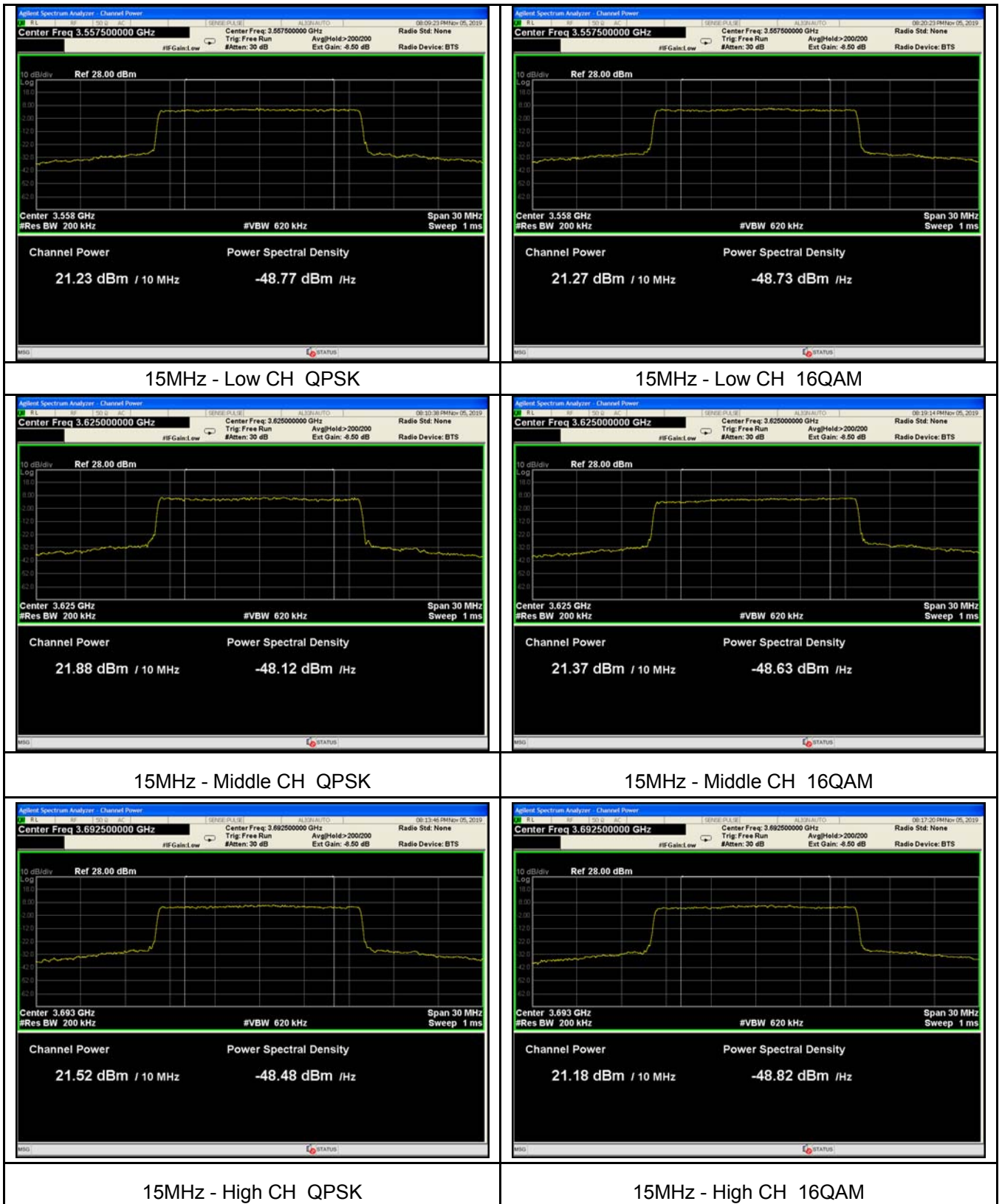
Chain 1



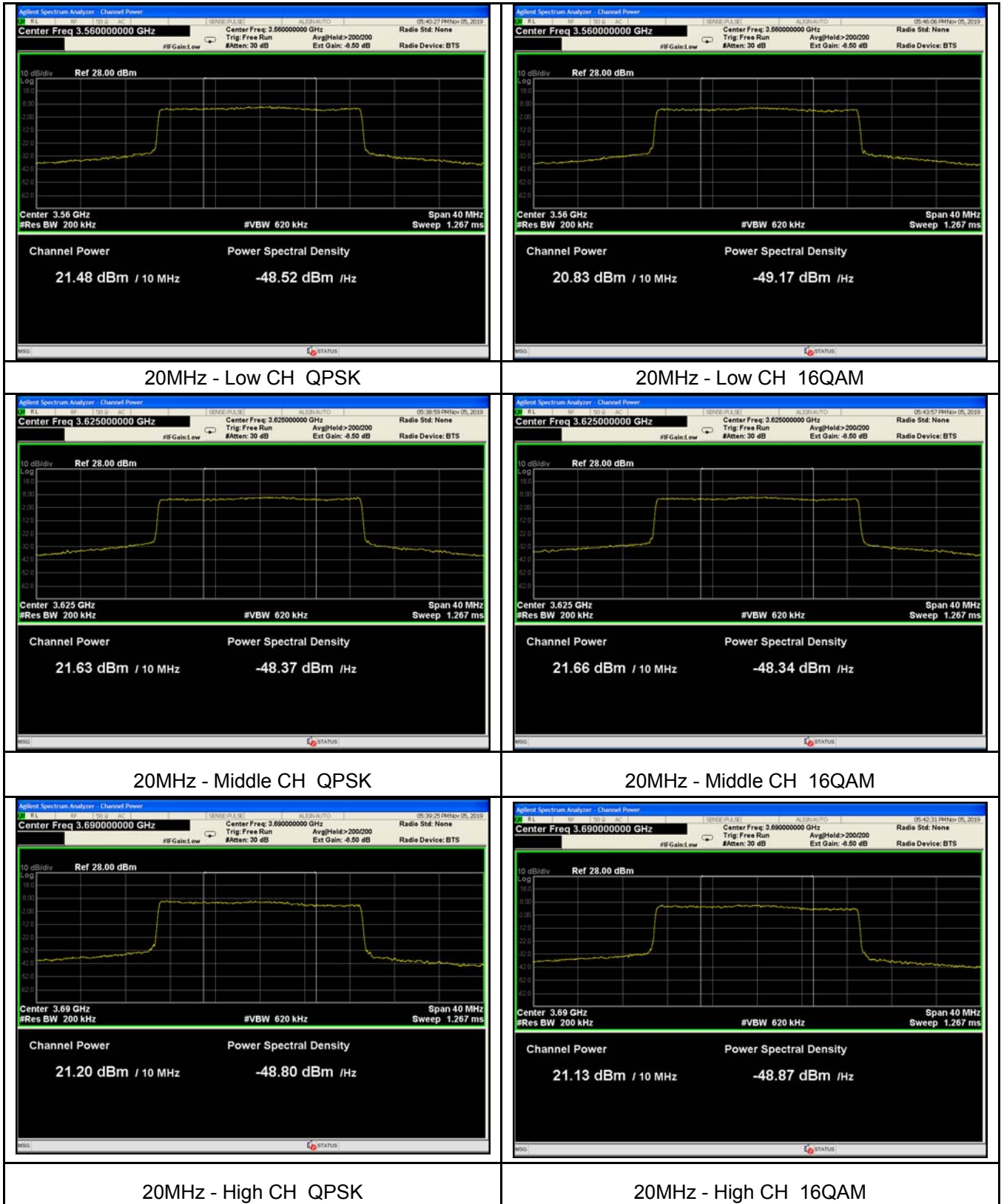
Chain 0



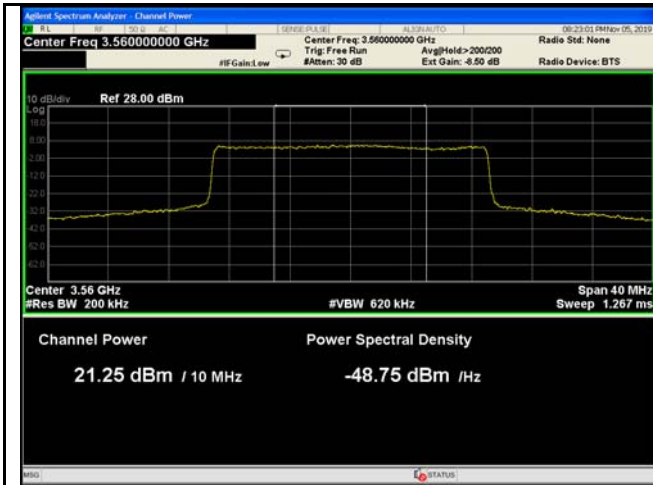
Chain 1



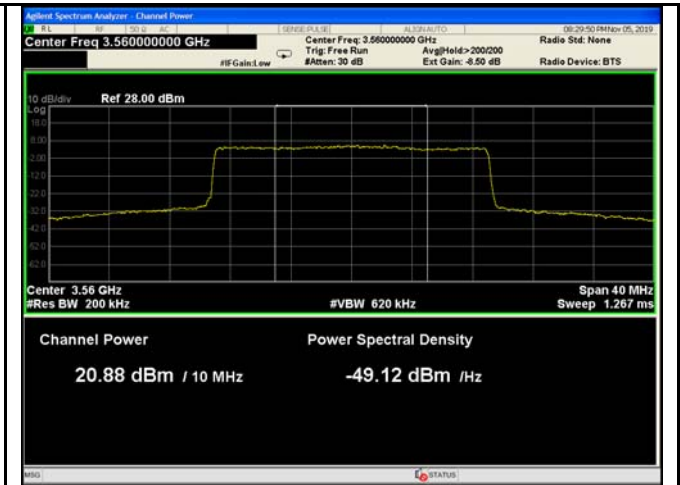
Chain 0



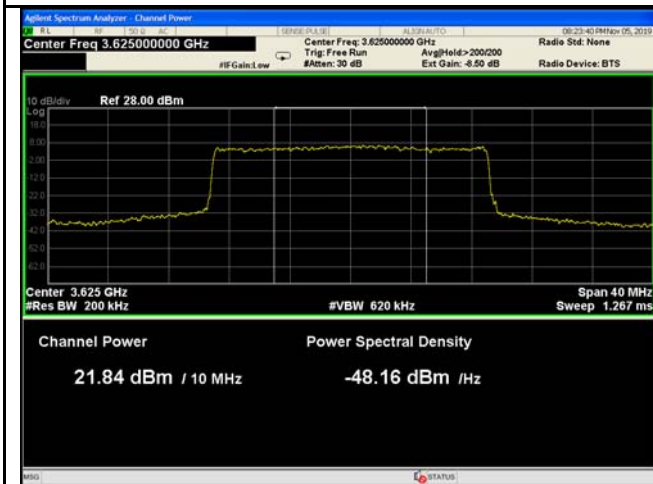
Chain 1



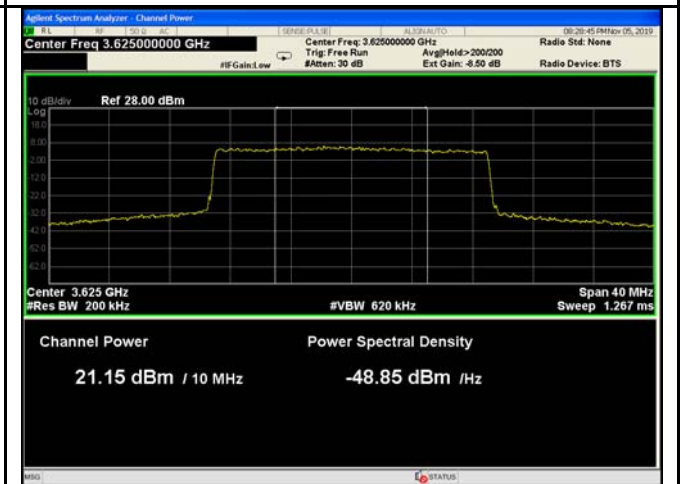
20MHz - Low CH QPSK



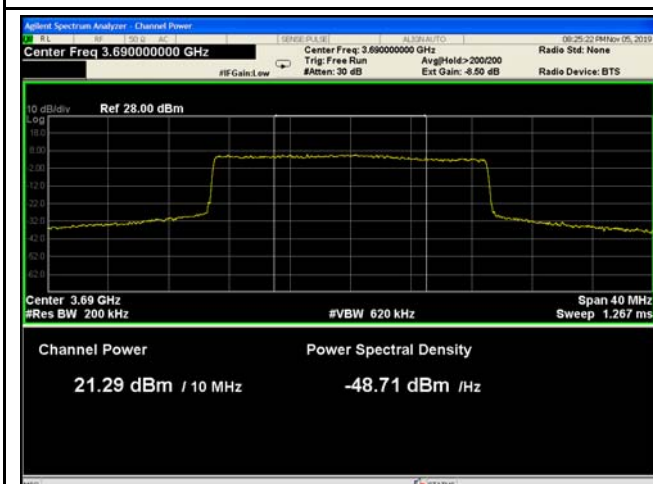
20MHz - Low CH 16QAM



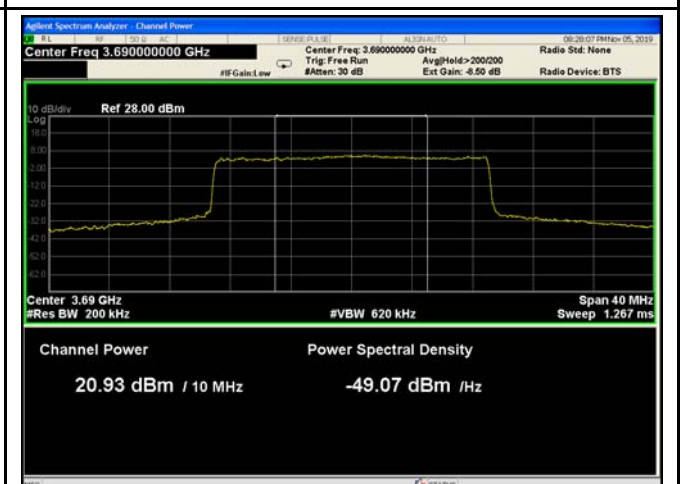
20MHz - Middle CH QPSK



20MHz - Middle CH 16QAM

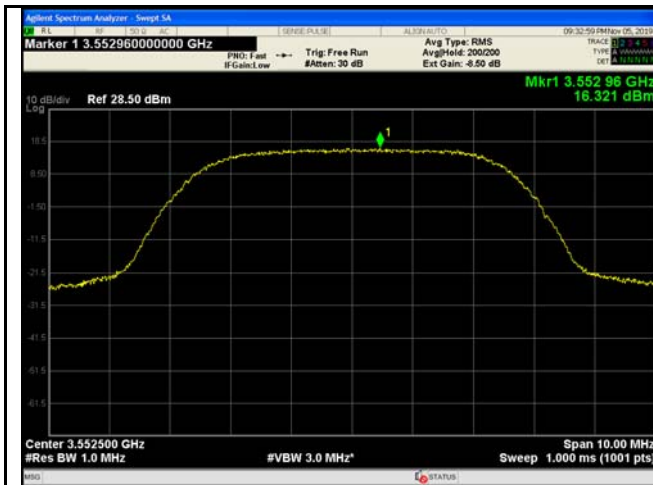


20MHz - High CH QPSK

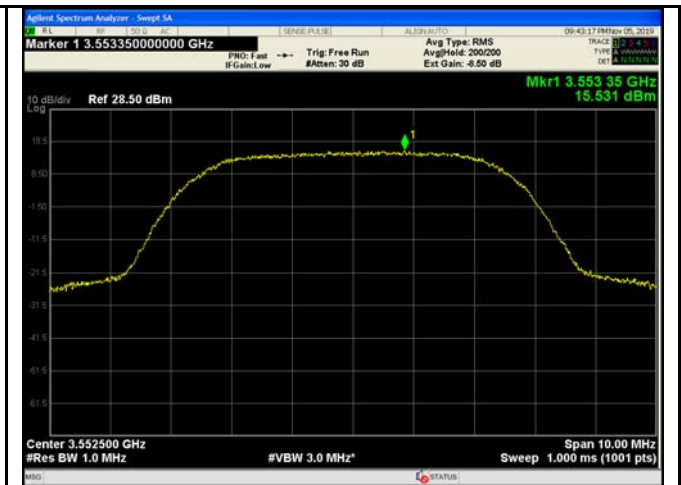


20MHz - High CH 16QAM

PSD Test Plots  
Chain 0



5MHz - Low CH QPSK



5MHz - Low CH 16QAM



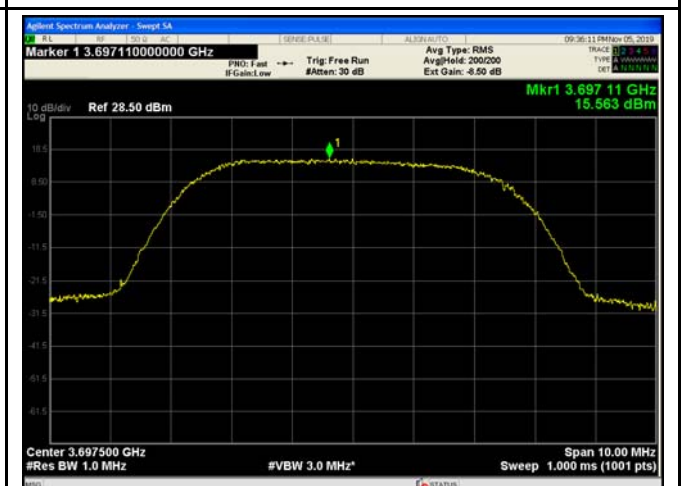
5MHz - Middle CH QPSK



5MHz - Middle CH 16QAM



5MHz - High CH QPSK



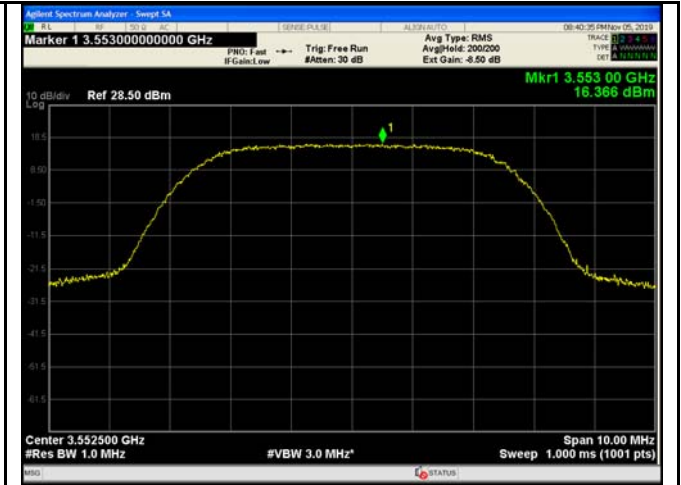
5MHz - High CH 16QAM



Chain 1



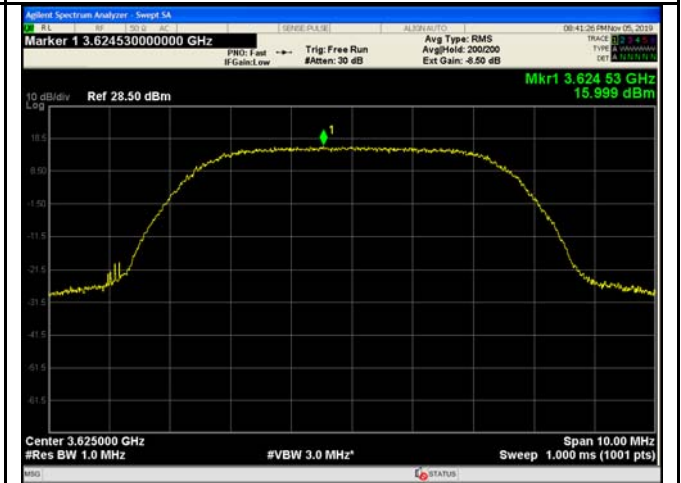
5MHz - Low CH QPSK



5MHz - Low CH 16QAM



5MHz - Middle CH QPSK



5MHz - Middle CH 16QAM

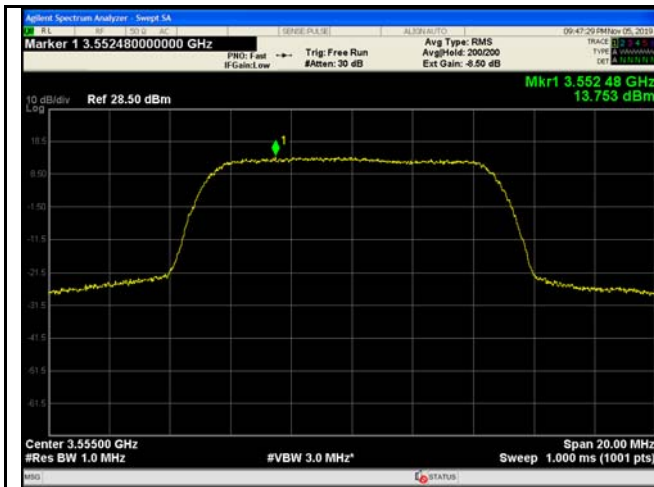


5MHz - High CH QPSK

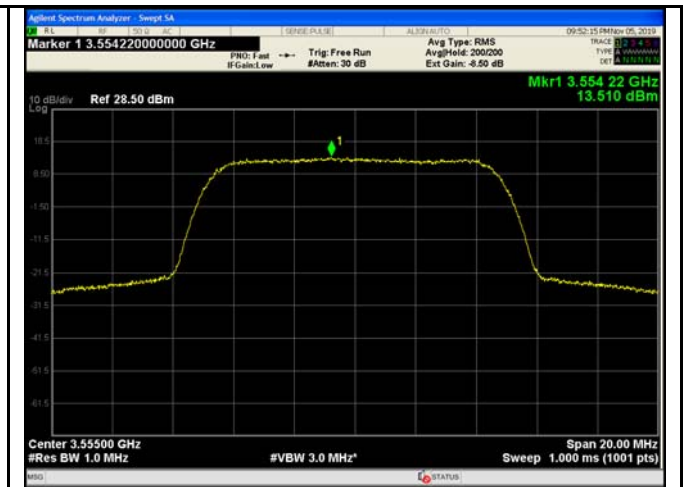


5MHz - High CH 16QAM

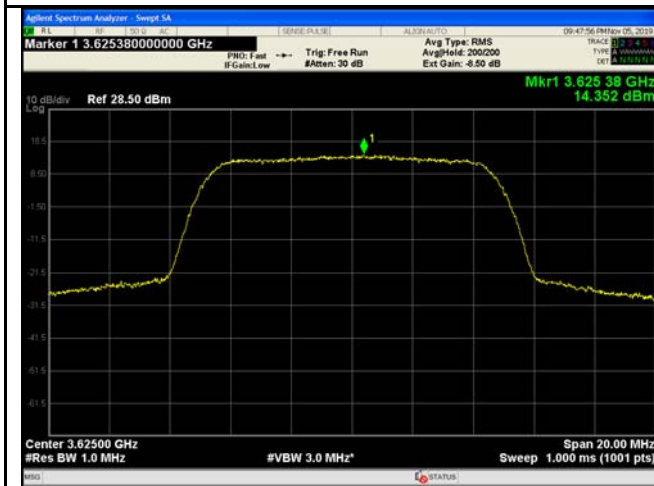
Chain 0



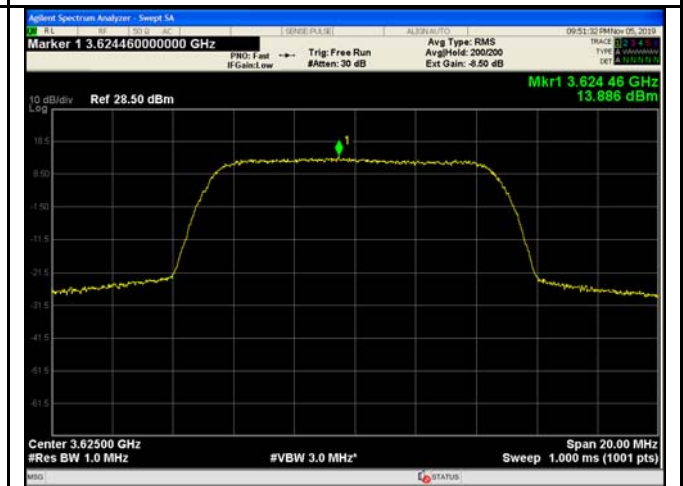
10MHz - Low CH QPSK



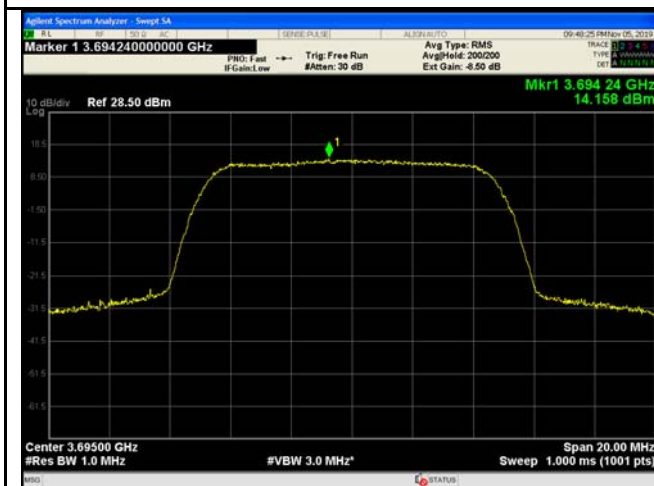
10MHz - Low CH 16QAM



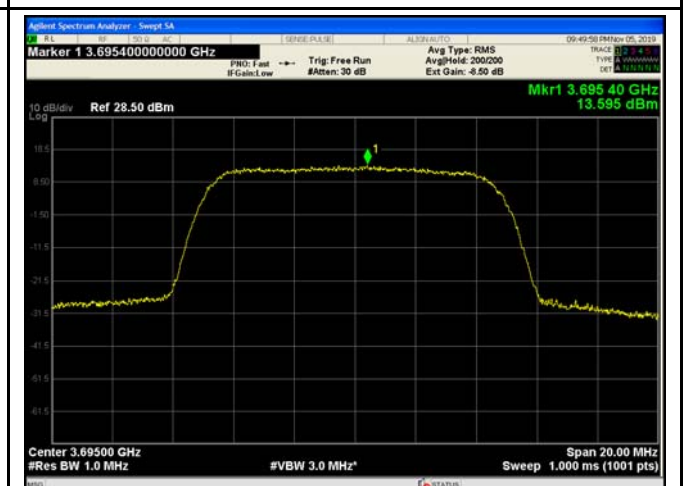
10MHz - Middle CH QPSK



10MHz - Middle CH 16QAM



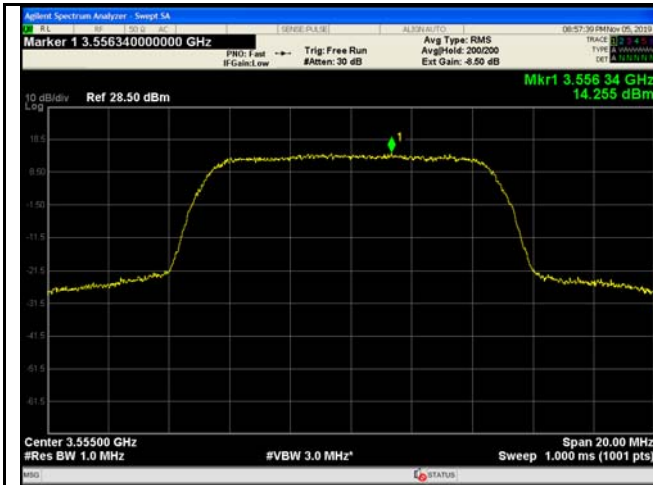
10MHz - High CH QPSK



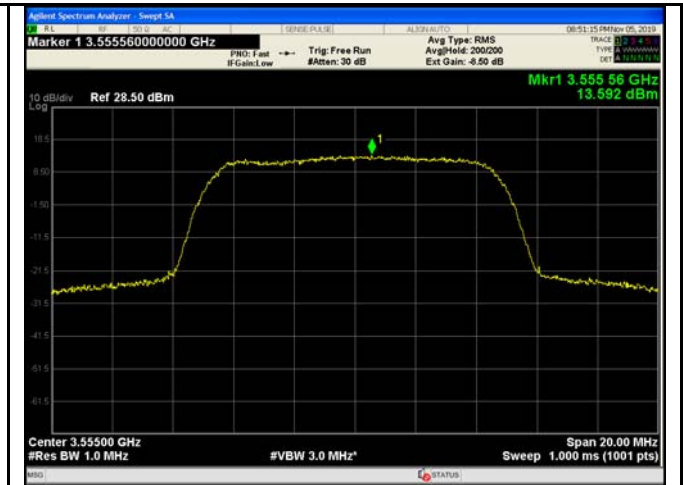
10MHz - High CH 16QAM



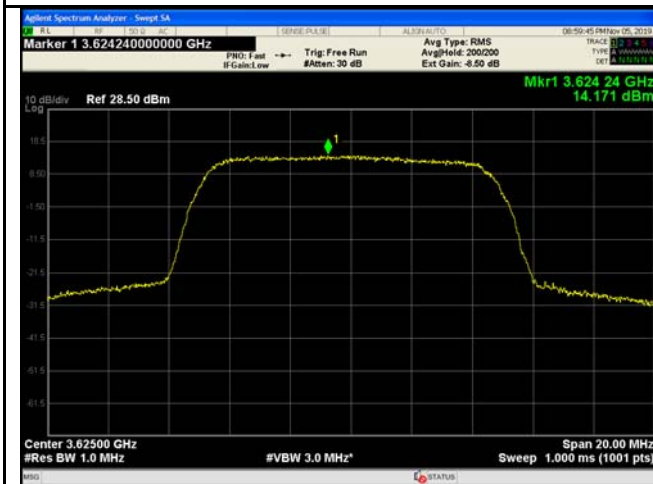
Chain 1



10MHz - Low CH QPSK



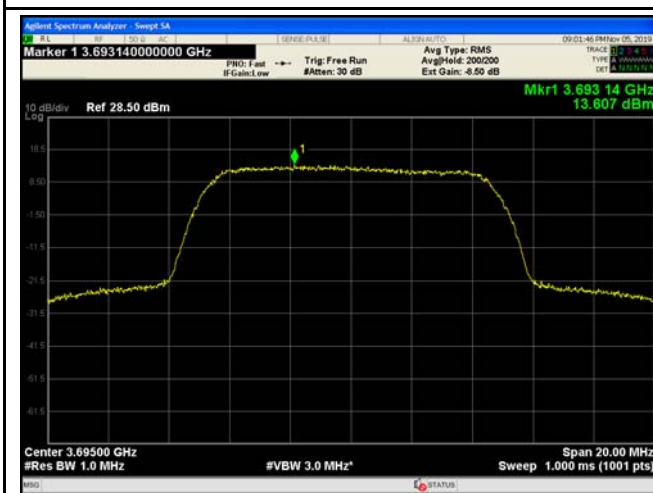
10MHz - Low CH 16QAM



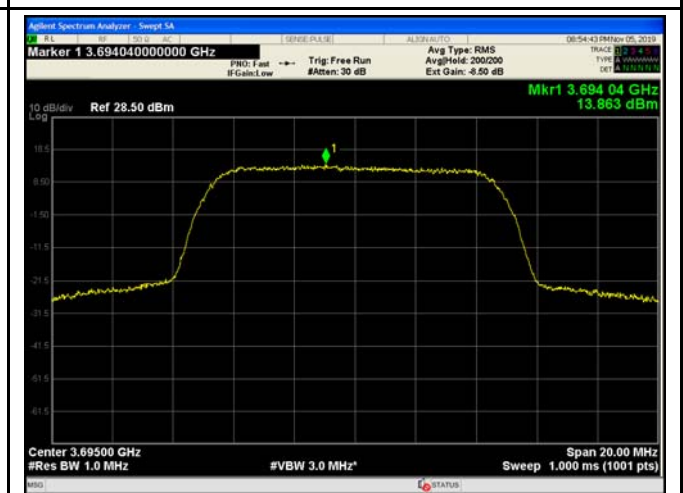
10MHz - Middle CH QPSK



10MHz - Middle CH 16QAM

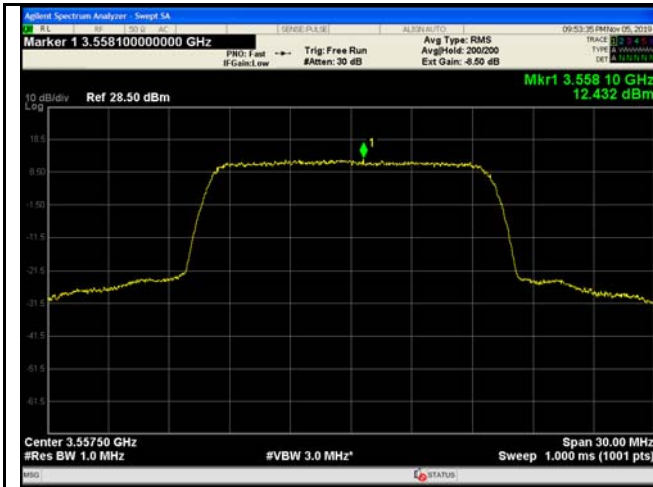


10MHz - High CH QPSK

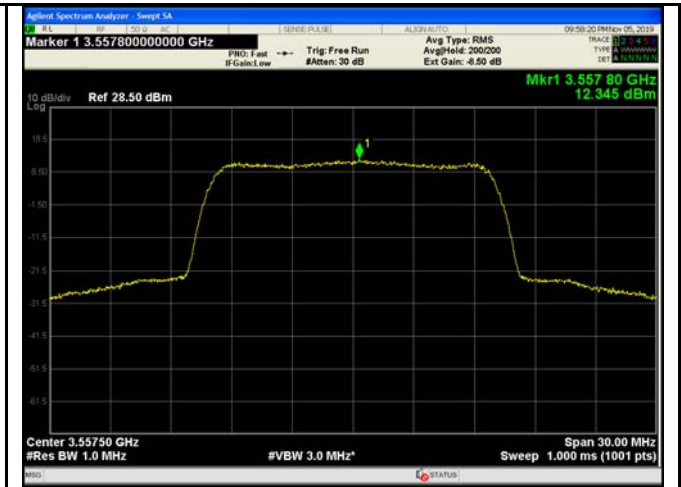


10MHz - High CH 16QAM

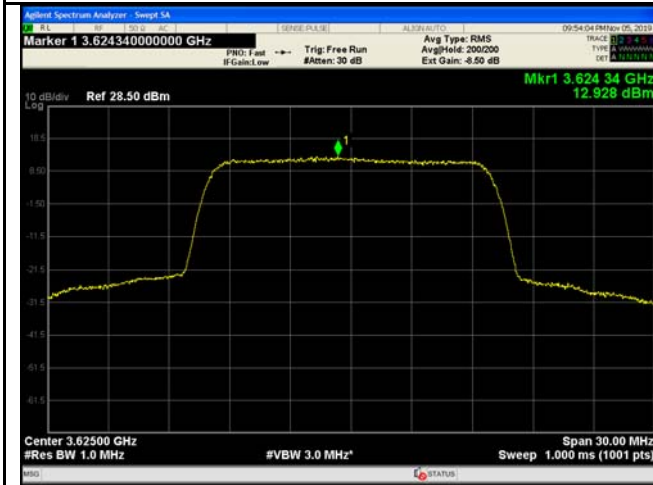
Chain 0



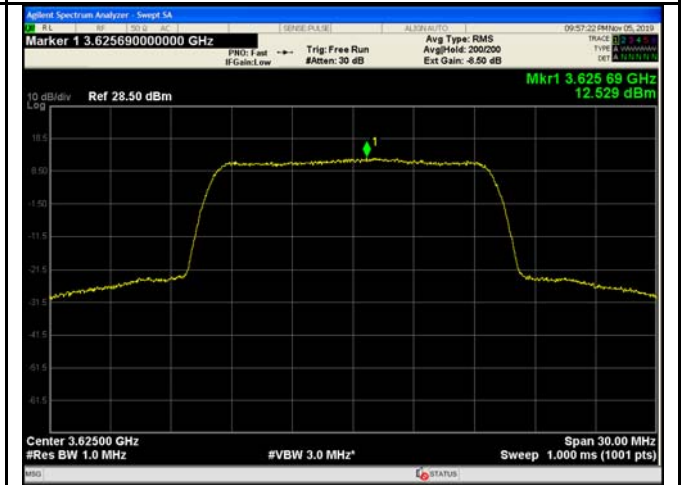
15MHz - Low CH QPSK



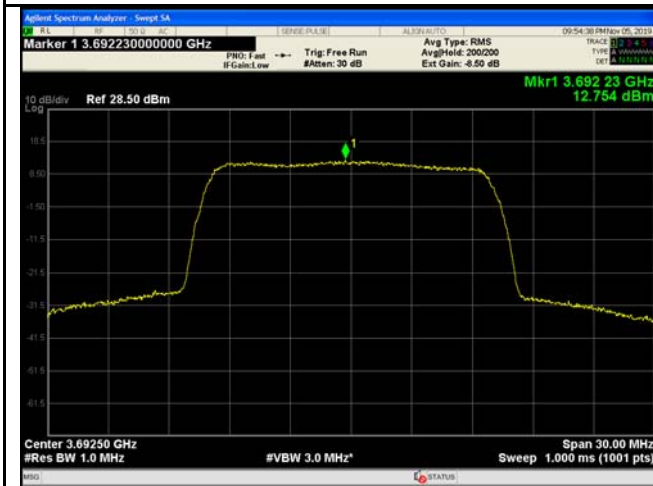
15MHz - Low CH 16QAM



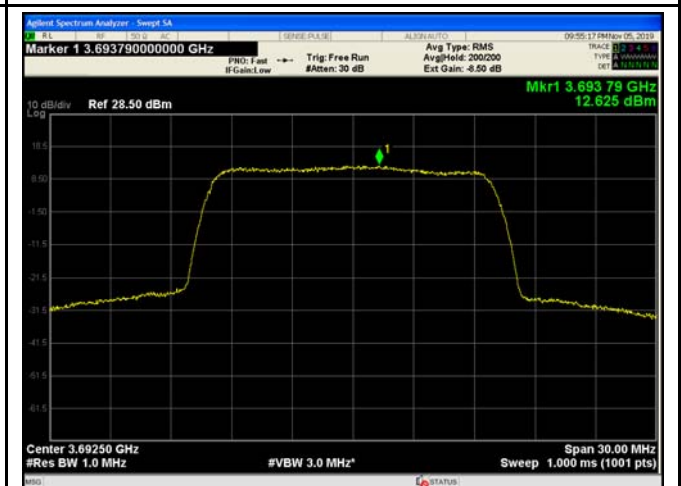
15MHz - Middle CH QPSK



15MHz - Middle CH 16QAM

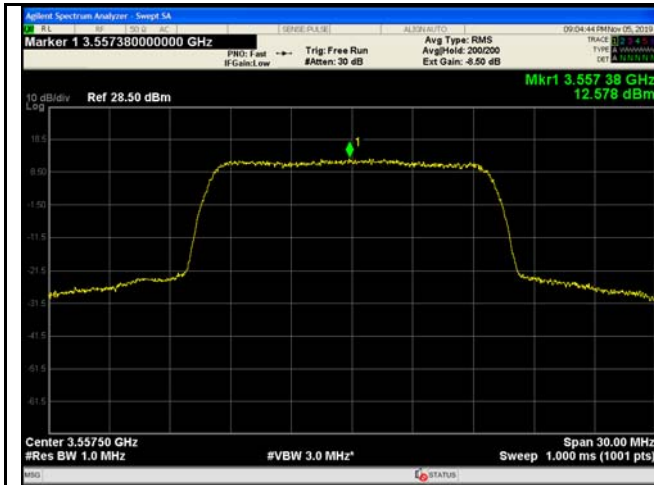


15MHz - High CH QPSK



15MHz - High CH 16QAM

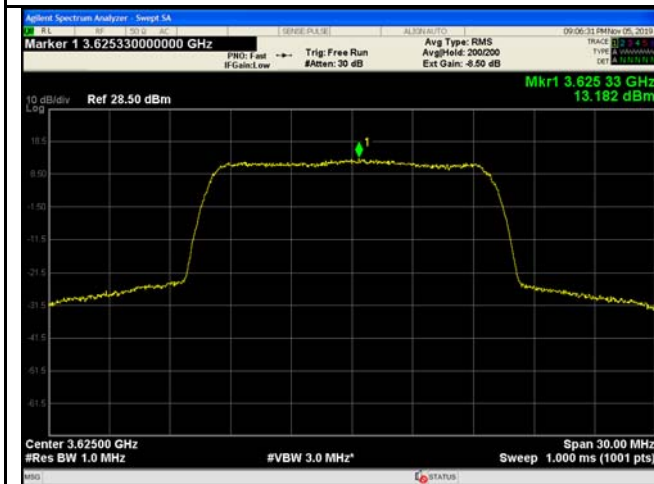
Chain 1



15MHz - Low CH QPSK



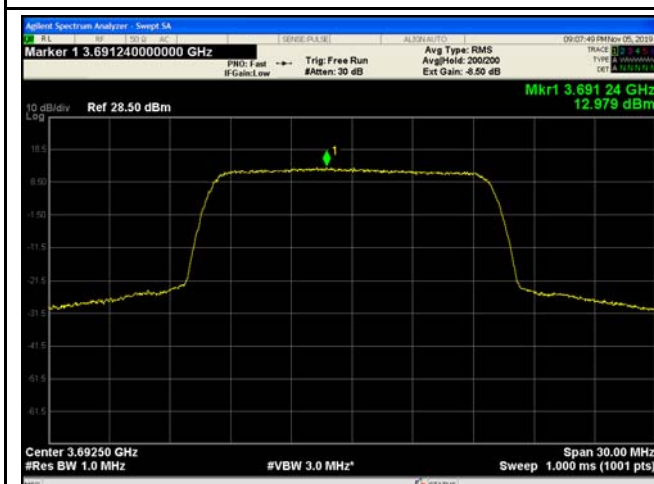
15MHz - Low CH 16QAM



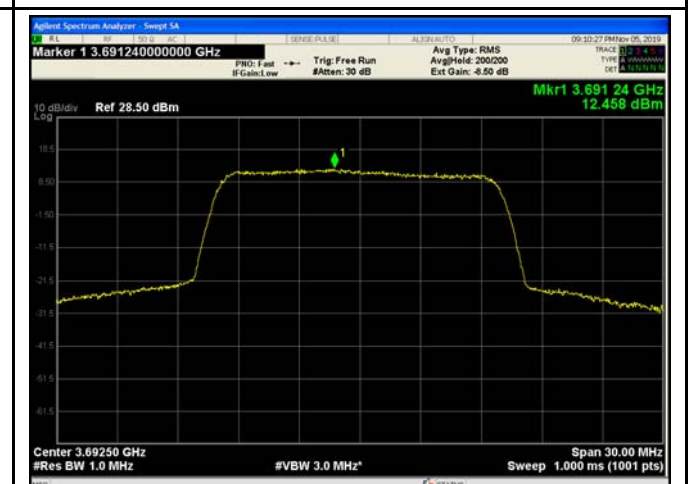
15MHz - Middle CH QPSK



15MHz - Middle CH 16QAM

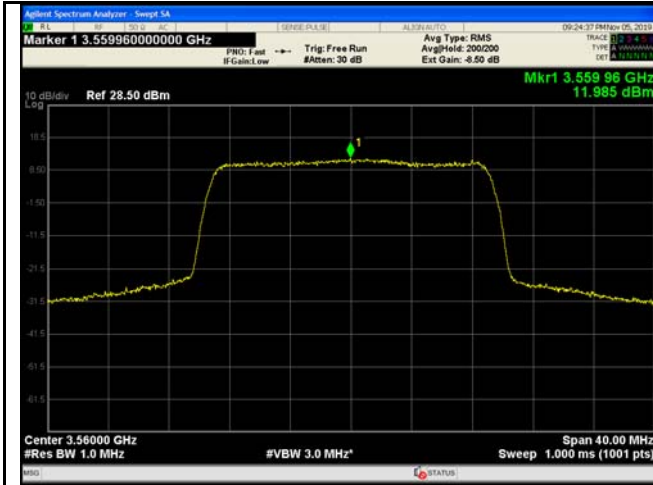


15MHz - High CH QPSK

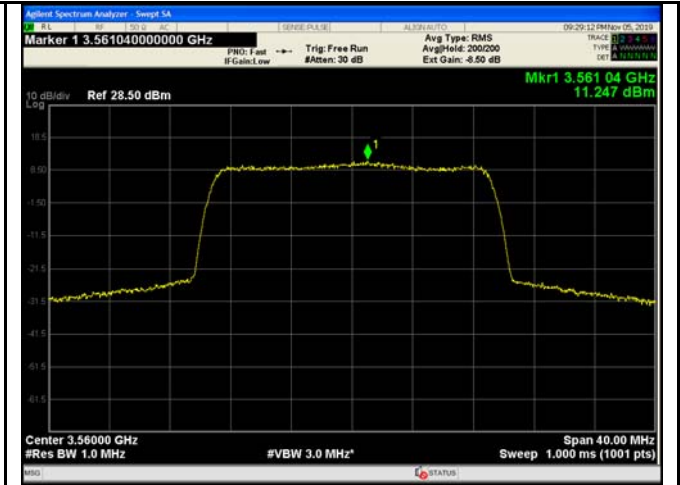


15MHz - High CH 16QAM

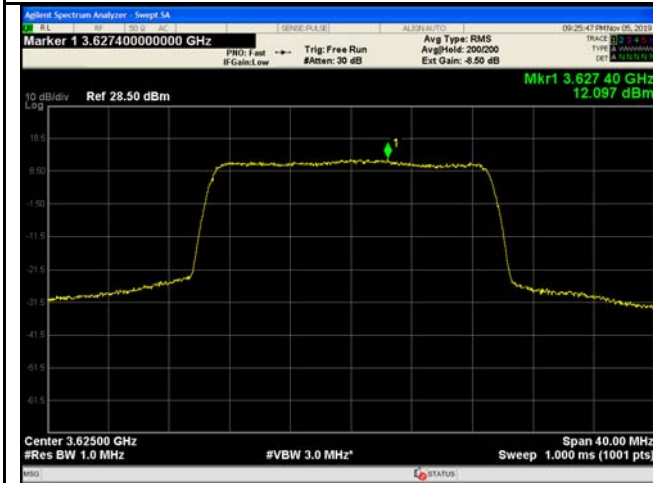
Chain 0



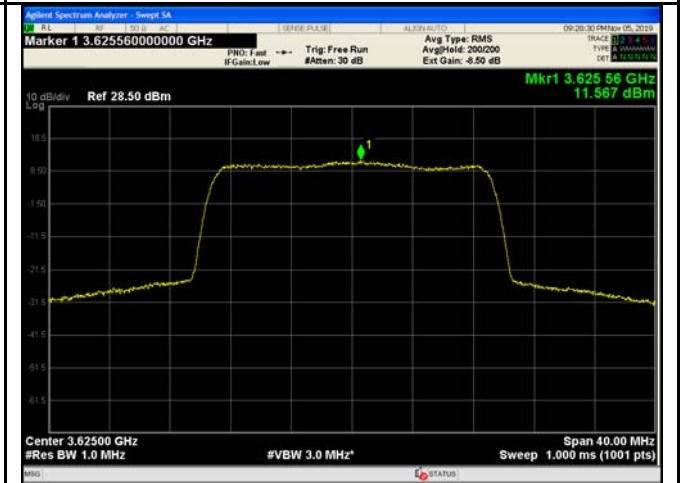
20MHz - Low CH QPSK



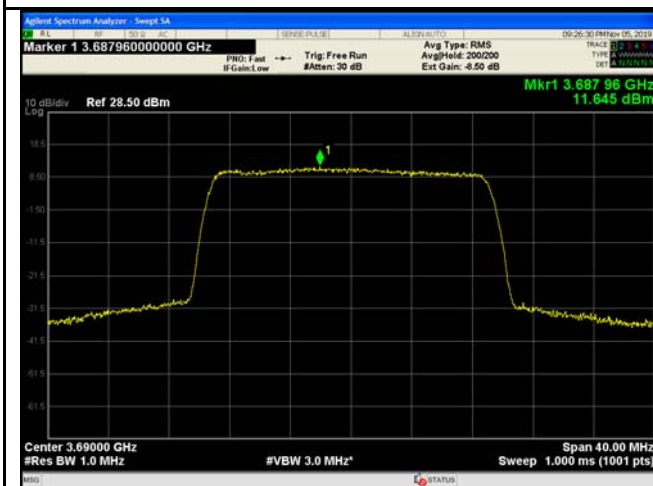
20MHz - Low CH 16QAM



20MHz - Middle CH QPSK



20MHz - Middle CH 16QAM



20MHz - High CH QPSK

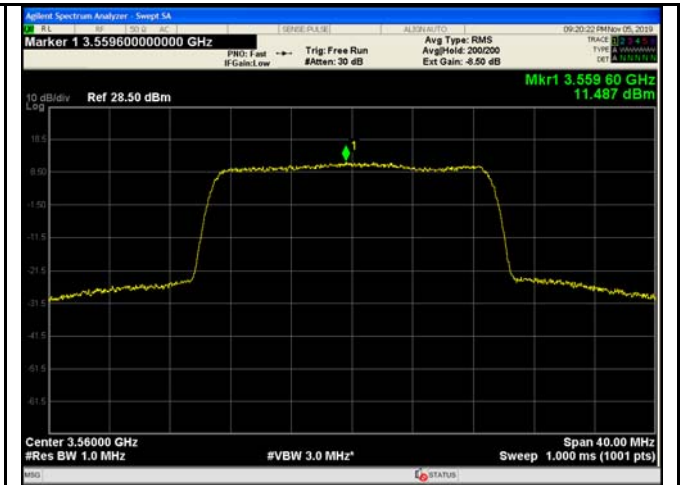


20MHz - High CH 16QAM

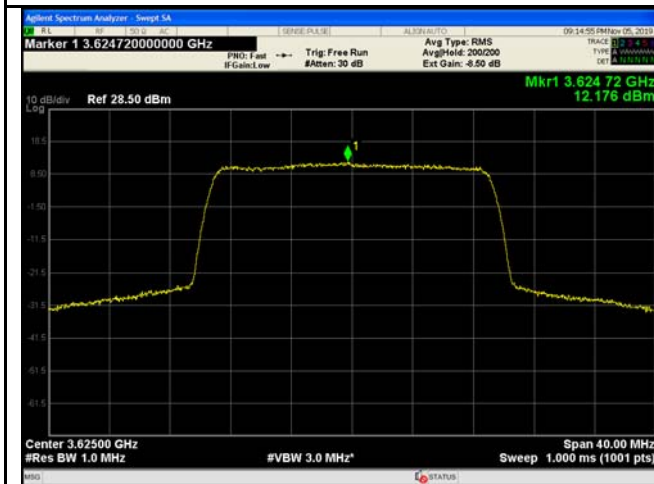
Chain 1



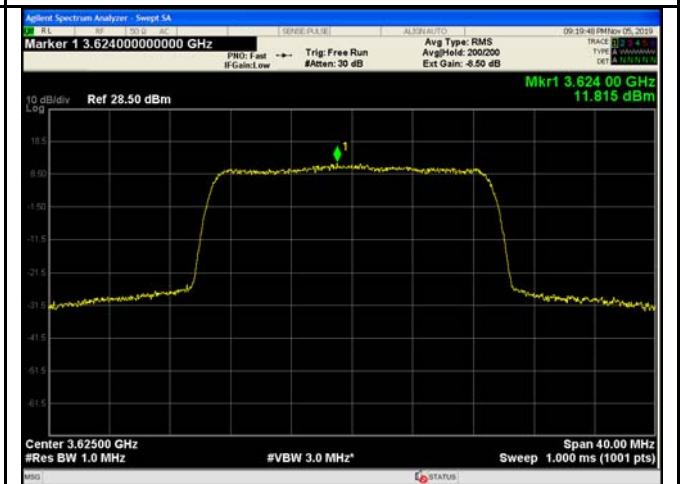
20MHz - Low CH QPSK



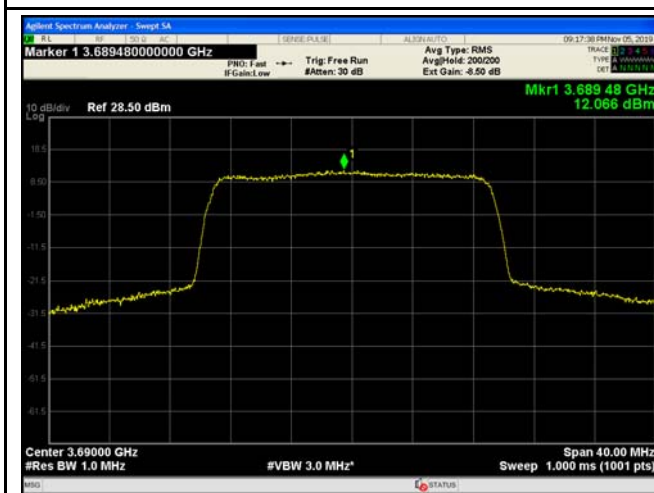
20MHz - Low CH 16QAM



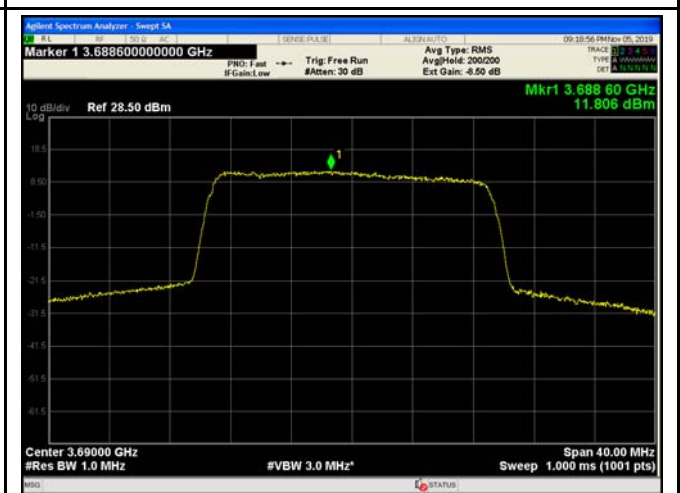
20MHz - Middle CH QPSK



20MHz - Middle CH 16QAM



20MHz - High CH QPSK



20MHz - High CH 16QAM

## 8 Peak-to-average power ratio

Test Requirement:	FCC part96.41(g)
Test Method:	ANSI/TIA-603-E:2016, ANSI C63.26:2015
Test Mode:	Data communicating mode
Limit:	

Probability, %	dB
0.1	13

### 8.1 EUT Operation

Operating Environment :

Temperature:	22.5 °C
Humidity:	52.1 % RH
Atmospheric Pressure:	102.3kPa

Note: Data that only reflects the worst mode is reported

### 8.2 Test Procedure

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. Set EUT to transmit at maximum output power.
3. When the duty cycle is less than 98%, then signal gating will be implemented on the spectrum analyzer by triggering from the system simulator.
4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.

### 8.3 Test Result

#### 5MHz bandwidth

Mode	Chain 0			Chain 1			Limit (dB)	
	Channel	Low	Middle	High	Low	Middle		High
Peak-to-Average Ratio (dB)		10.18	9.45	9.76	10.20	9.98	9.70	13

#### 10MHz bandwidth

Mode	Chain 0			Chain 1			Limit (dB)	
	Channel	Low	Middle	High	Low	Middle		High
Peak-to-Average Ratio (dB)		9.26	8.96	8.94	9.80	9.79	9.44	13

## 15MHz bandwidth

<b>Mode</b>	<b>Chain 0</b>			<b>Chain 1</b>			<b>Limit (dB)</b>
<b>Channel</b>	<b>Low</b>	<b>Middle</b>	<b>High</b>	<b>Low</b>	<b>Middle</b>	<b>High</b>	
Peak-to-Average Ratio (dB)	9.98	9.98	9.61	10.00	9.87	9.59	13

## 20MHz bandwidth

<b>Mode</b>	<b>Chain 0</b>			<b>Chain 1</b>			<b>Limit (dB)</b>
<b>Channel</b>	<b>Low</b>	<b>Middle</b>	<b>High</b>	<b>Low</b>	<b>Middle</b>	<b>High</b>	
Peak-to-Average Ratio (dB)	9.85	9.78	9.58	10.66	9.66	10.14	13



### Test Plots 5M Chain 0



5MHz - Low CH QPSK



5MHz - Middle CH QPSK



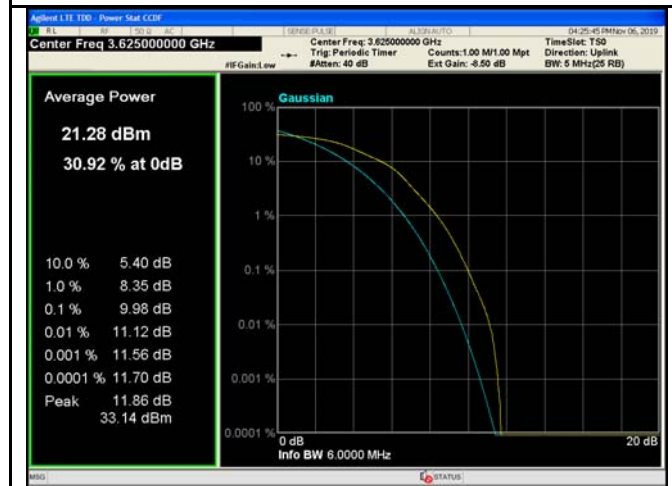
5MHz - High CH QPSK



### 5M Chain 1



### 5MHz - Low CH QPSK



### 5MHz - Middle CH QPSK



### 5MHz - High CH QPSK

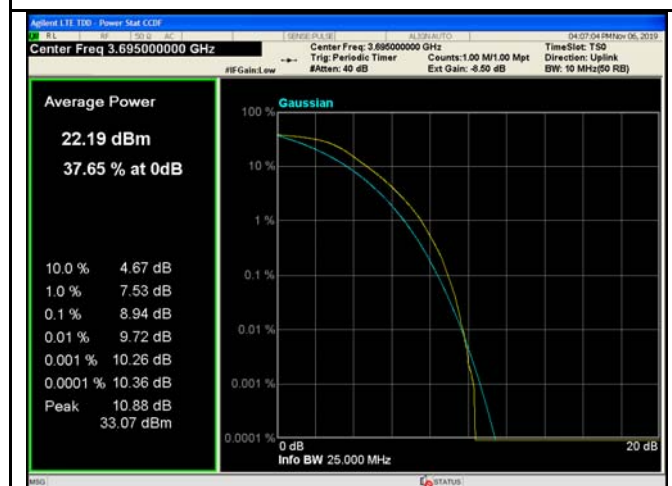
10M Chain 0



10MHz - Low CH QPSK



10MHz - Middle CH QPSK



10MHz - High CH QPSK

### 10M Chain 1



### 10MHz - Low CH QPSK



### 10MHz - Middle CH QPSK



### 10MHz - High CH QPSK

### 15M Chain 0



### 15MHz - Low CH QPSK

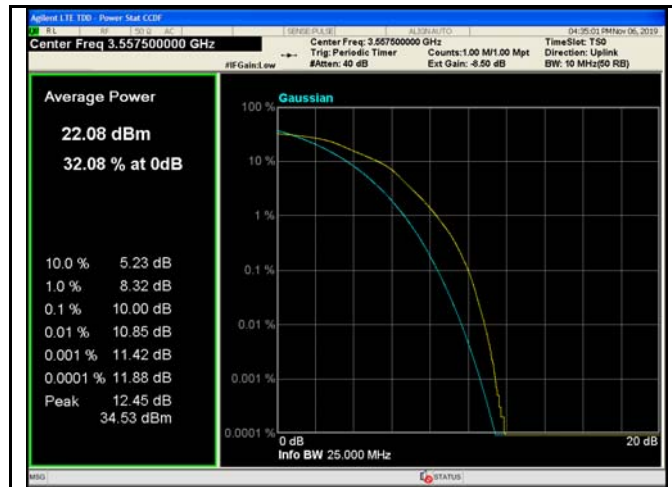


### 15MHz - Middle CH QPSK



### 15MHz - High CH QPSK

### 15M Chain 1



### 15MHz - Low CH QPSK



### 15MHz - Middle CH QPSK



### 15MHz - High CH QPSK

### 20M Chain 0



### 20MHz - Low CH QPSK



### 20MHz - Middle CH QPSK



### 20MHz - High CH QPSK

### 20M Chain 1



### 20MHz - Low CH QPSK



### 20MHz - Middle CH QPSK



### 20MHz - High CH QPSK



## 9 Occupy Bandwidth

Test Requirement:	FCC part 2.1049
Test Method:	ANSI/TIA-603-E:2016, ANSI C63.26:2015
Test Mode:	Data communicating mode

### 9.1 EUT Operation

Operating Environment :	
Temperature:	22.6 °C
Humidity:	52.4 % RH
Atmospheric Pressure:	103.3kPa

### 9.2 Test Procedure

1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer.
2. The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
3. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
4. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.



### 9.3 Test Result

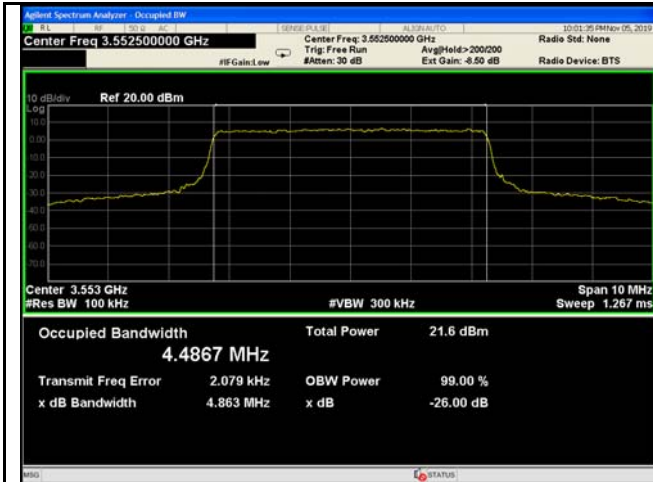
#### Chain 0

Bandwidth (MHz)	Modulation	Test Channel	26dB Down Bandwith	99% Occupy bandwidth (MHz)
5	QPSK	Low	4.863	4.487
		Middle	4.865	4.493
		High	4.882	4.488
	16QAM	Low	4.876	4.501
		Middle	4.855	4.473
		High	4.931	4.489
Bandwidth (MHz)	Modulation	Test Channel	26dB Down Bandwith	99% Occupy bandwidth (MHz)
10	QPSK	Low	9.355	8.927
		Middle	9.313	8.901
		High	9.283	8.915
	16QAM	Low	9.324	8.922
		Middle	9.353	8.924
		High	9.361	8.916
Bandwidth (MHz)	Modulation	Test Channel	26dB Down Bandwith	99% Occupy bandwidth (MHz)
15	QPSK	Low	14.03	13.417
		Middle	14.00	13.407
		High	14.02	13.410
	16QAM	Low	14.04	13.409
		Middle	14.03	13.413
		High	14.09	13.388
Bandwidth (MHz)	Modulation	Test Channel	26dB Down Bandwith	99% Occupy bandwidth (MHz)
20	QPSK	Low	18.53	17.851
		Middle	18.51	17.849
		High	18.53	17.837
	16QAM	Low	18.52	17.828
		Middle	18.55	17.854
		High	18.52	17.812

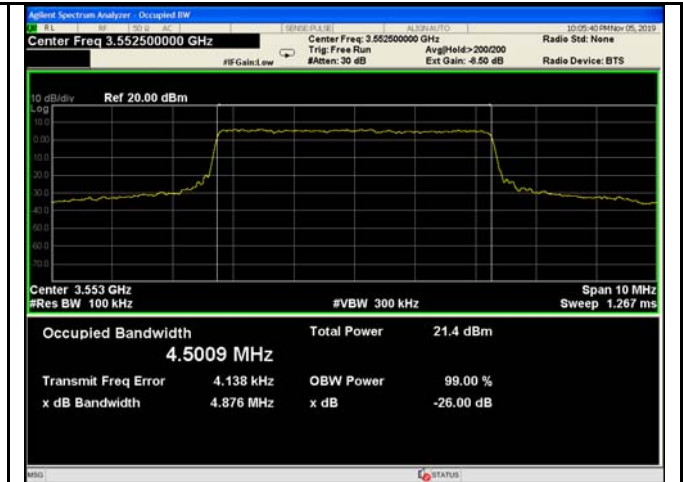
**Chain 1**

<b>Bandwidth (MHz)</b>	<b>Modulation</b>	<b>Test Channel</b>	<b>26dB Down Bandwith</b>	<b>99% Occupy bandwidth (MHz)</b>
5	QPSK	Low	4.843	4.491
		Middle	4.829	4.495
		High	4.857	4.495
	16QAM	Low	4.829	4.497
		Middle	4.851	4.488
		High	4.898	4.499
<b>Bandwidth (MHz)</b>	<b>Modulation</b>	<b>Test Channel</b>	<b>26dB Down Bandwith</b>	<b>99% Occupy bandwidth (MHz)</b>
10	QPSK	Low	9.384	8.922
		Middle	9.310	8.914
		High	9.295	8.913
	16QAM	Low	9.351	8.919
		Middle	9.286	8.908
		High	9.345	8.916
<b>Bandwidth (MHz)</b>	<b>Modulation</b>	<b>Test Channel</b>	<b>26dB Down Bandwith</b>	<b>99% Occupy bandwidth (MHz)</b>
15	QPSK	Low	14.03	13.387
		Middle	14.03	13.401
		High	14.02	13.398
	16QAM	Low	14.05	13.395
		Middle	14.08	13.398
		High	14.01	13.396
<b>Bandwidth (MHz)</b>	<b>Modulation</b>	<b>Test Channel</b>	<b>26dB Down Bandwith</b>	<b>99% Occupy bandwidth (MHz)</b>
20	QPSK	Low	18.54	17.838
		Middle	18.56	17.850
		High	18.52	17.828
	16QAM	Low	18.54	17.877
		Middle	18.53	17.843
		High	18.56	17.845

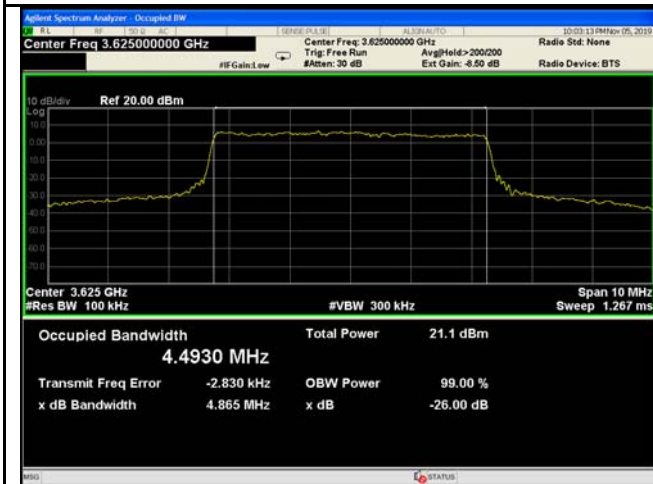
**Test Plots  
Chain 0**



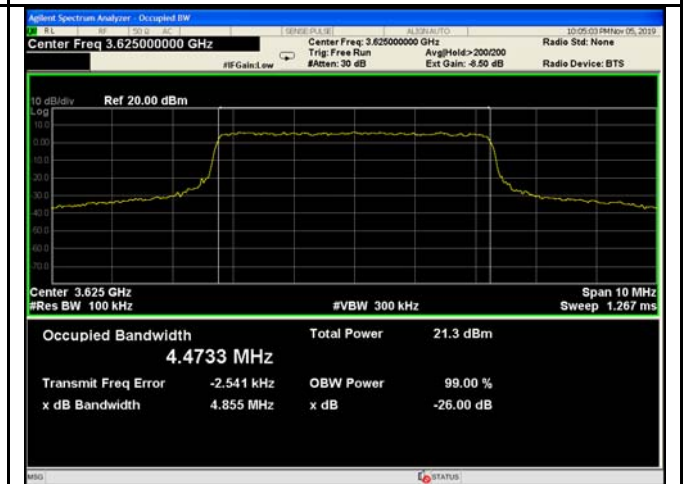
5MHz - Low CH QPSK



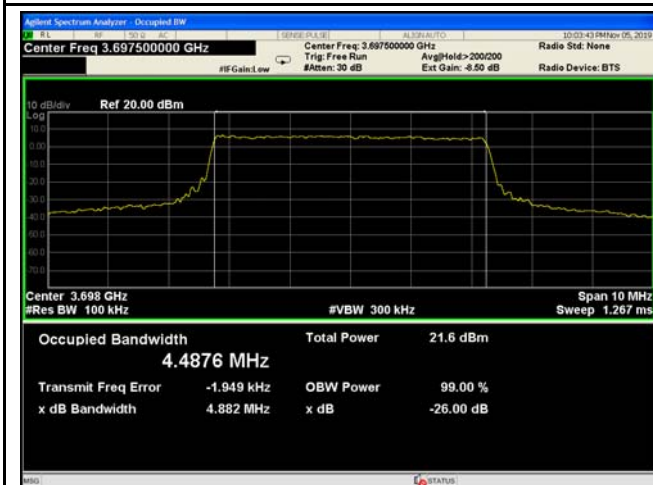
5MHz - Low CH 16QAM



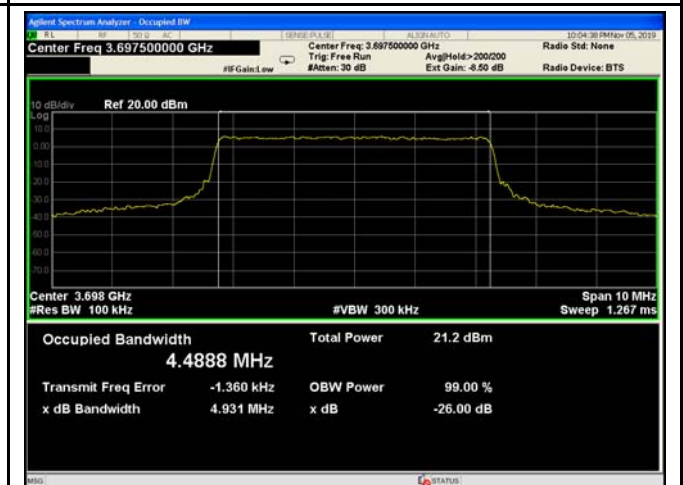
5MHz - Middle CH QPSK



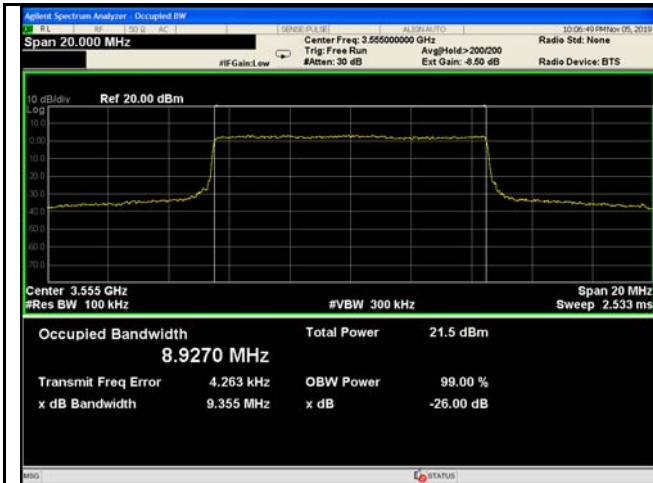
5MHz - Middle CH 16QAM



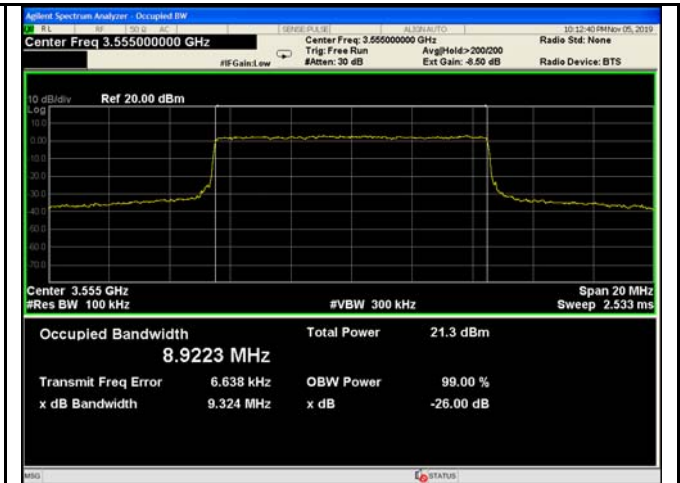
5MHz - High CH QPSK



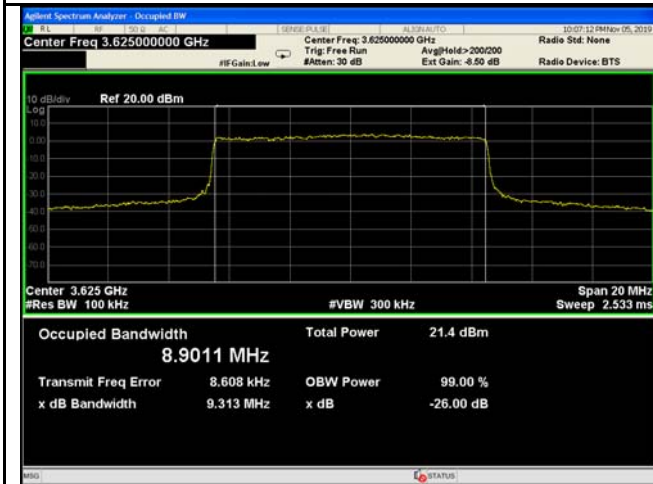
5MHz - High CH 16QAM



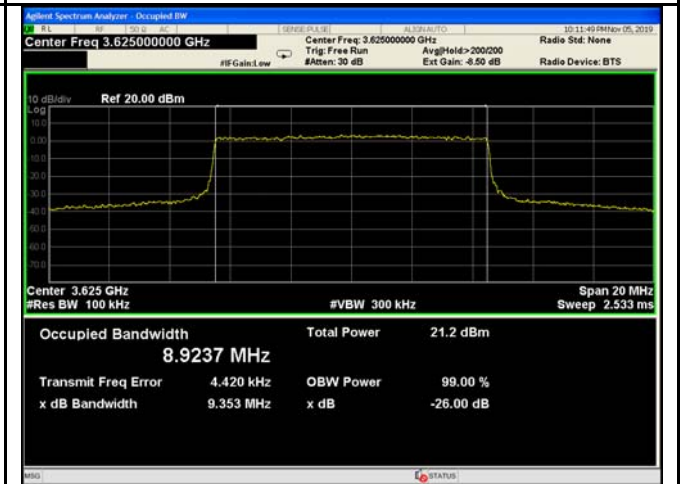
10MHz - Low CH QPSK



10MHz - Low CH 16QAM



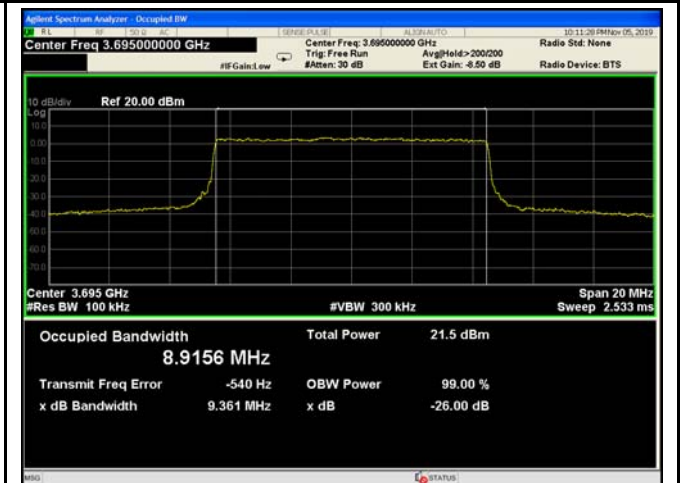
10MHz - Middle CH QPSK



10MHz - Middle CH 16QAM

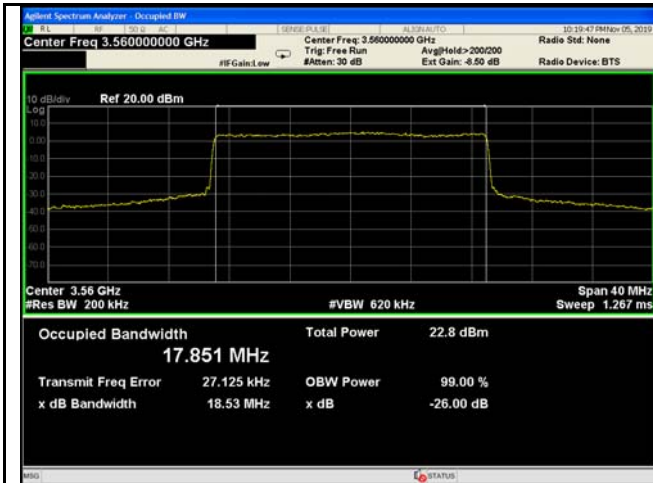


10MHz - High CH QPSK

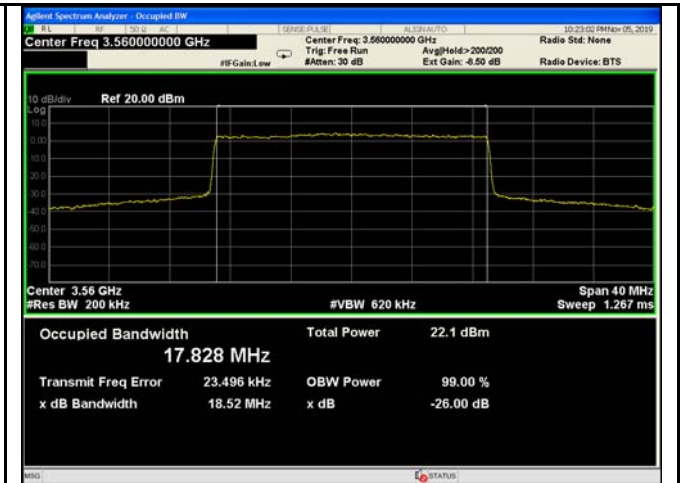


10MHz - High CH 16QAM

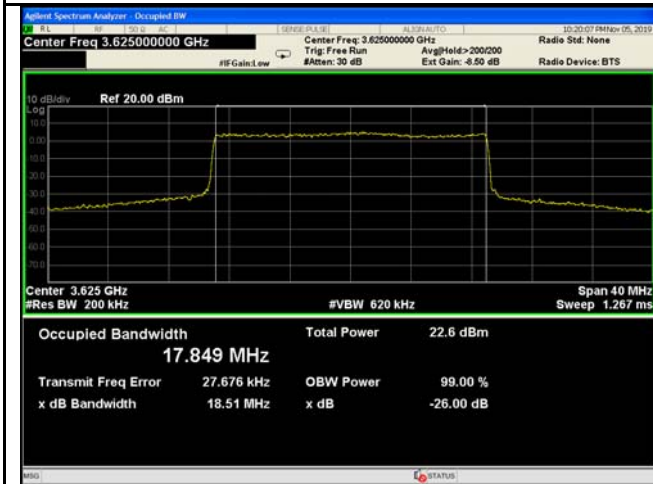




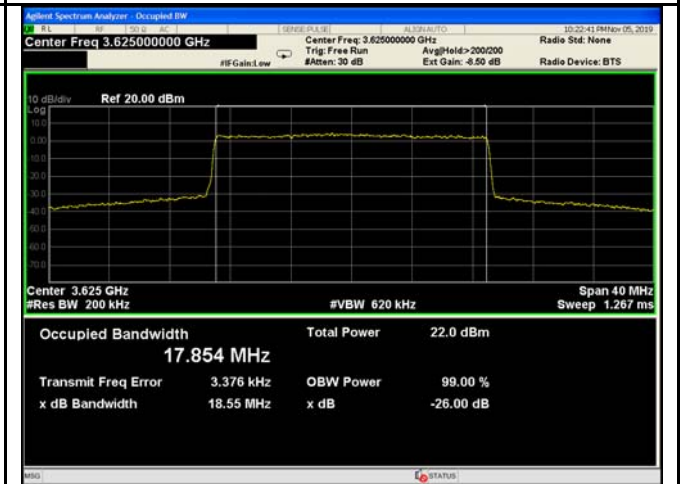
20MHz - Low CH QPSK



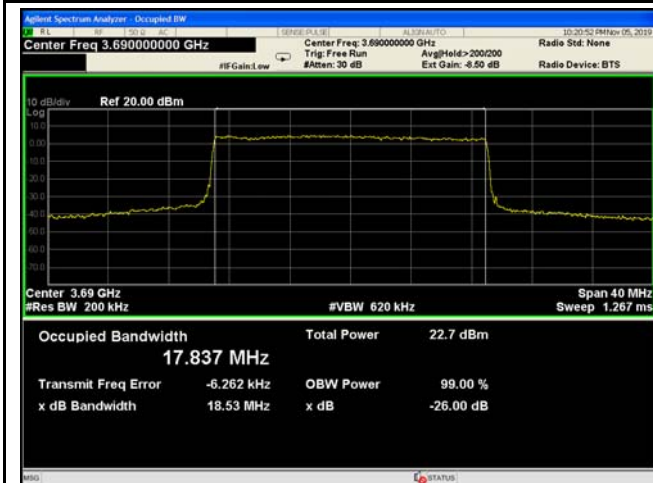
20MHz - Low CH 16QAM



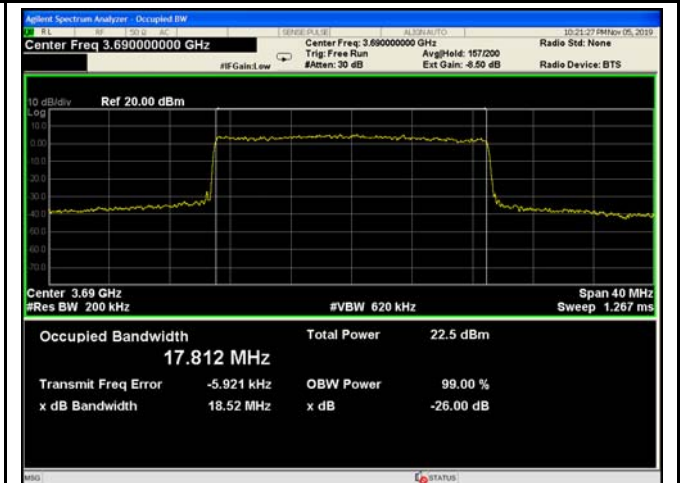
20MHz - Middle CH QPSK



20MHz - Middle CH 16QAM



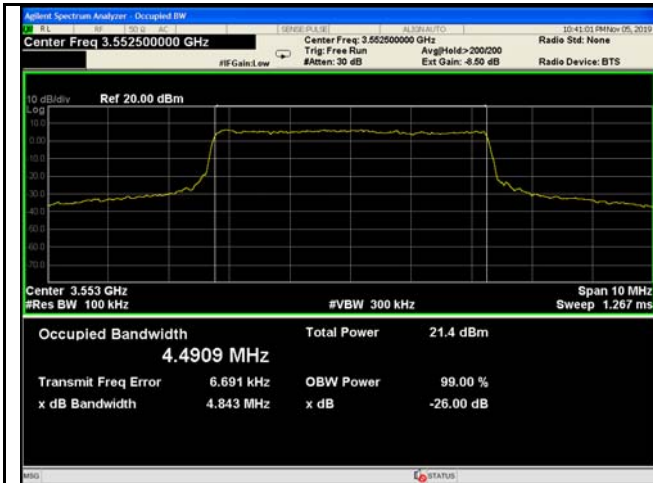
20MHz - High CH QPSK



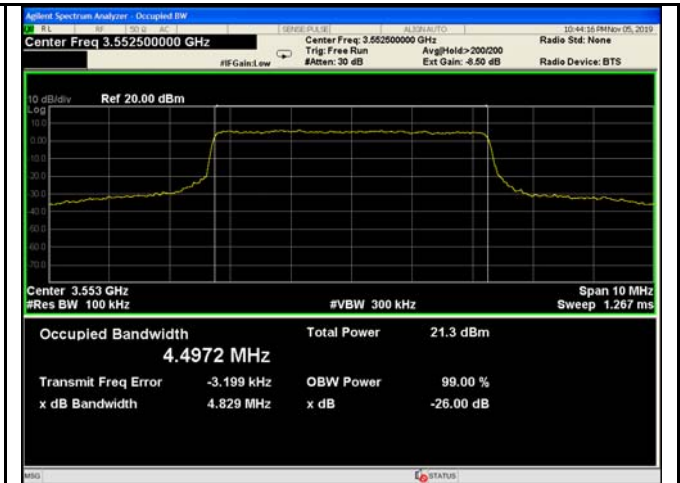
20MHz - High CH 16QAM



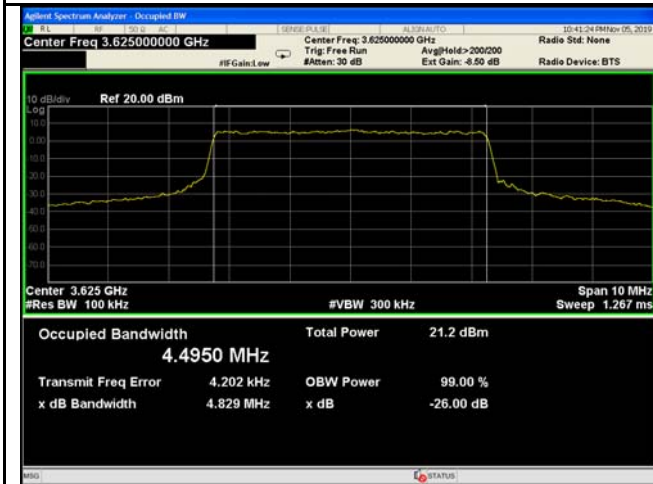
Chain 1



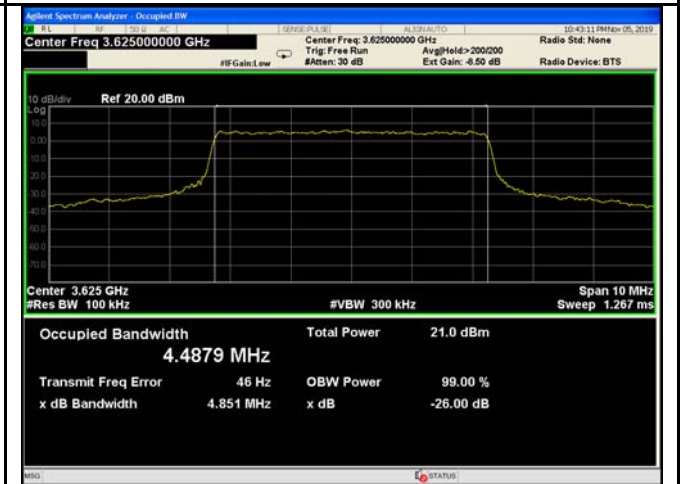
5MHz - Low CH QPSK



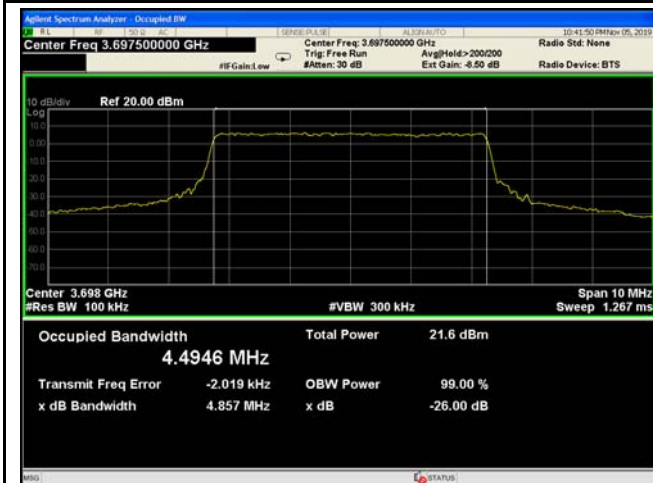
5MHz - Low CH 16QAM



5MHz - Middle CH QPSK



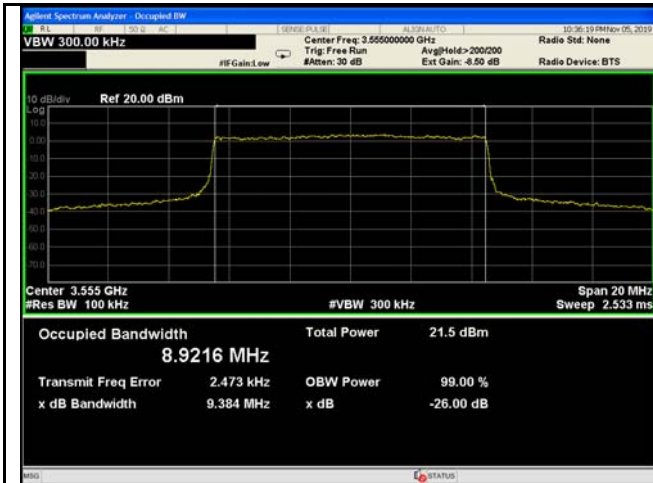
5MHz - Middle CH 16QAM



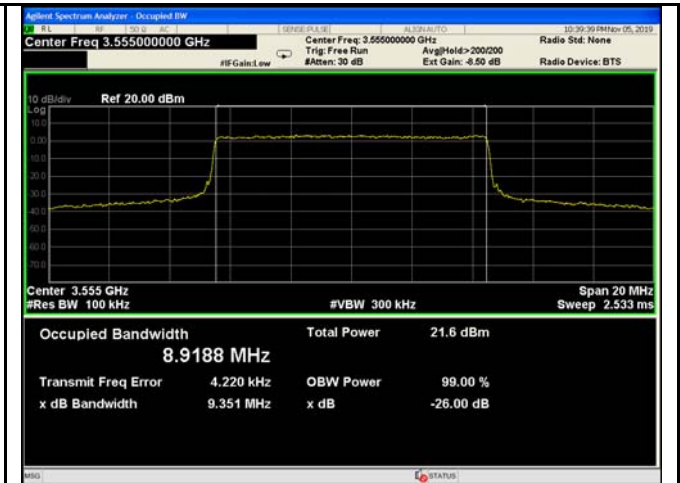
5MHz - High CH QPSK



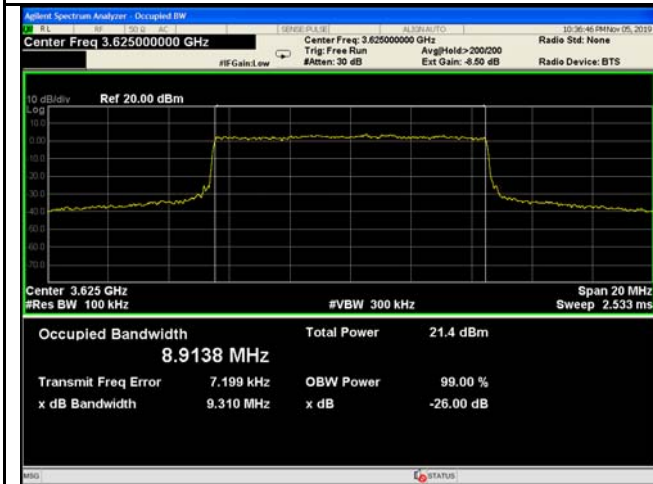
5MHz - High CH 16QAM



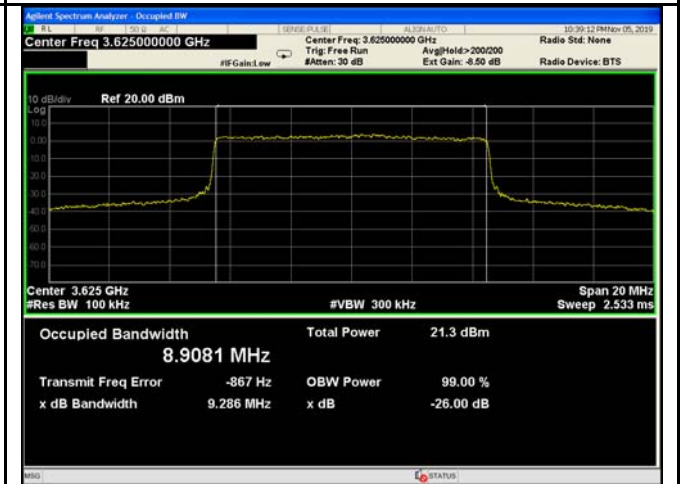
10MHz - Low CH QPSK



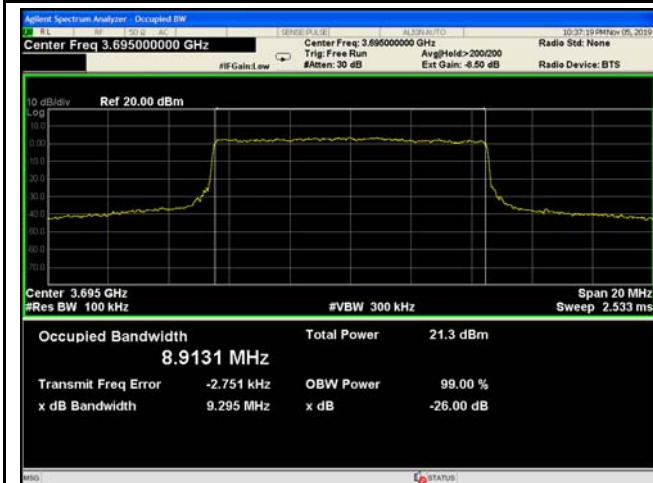
10MHz - Low CH 16QAM



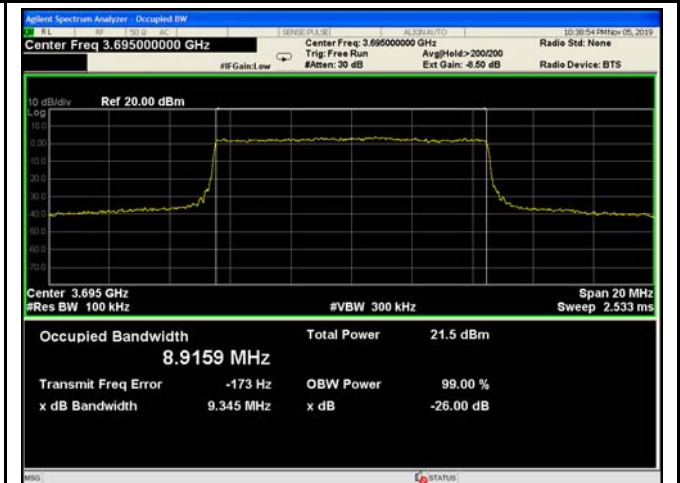
10MHz - Middle CH QPSK



10MHz - Middle CH 16QAM

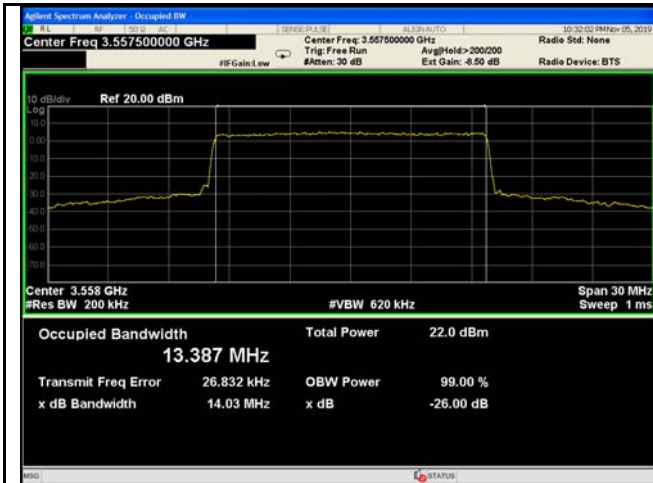


10MHz - High CH QPSK

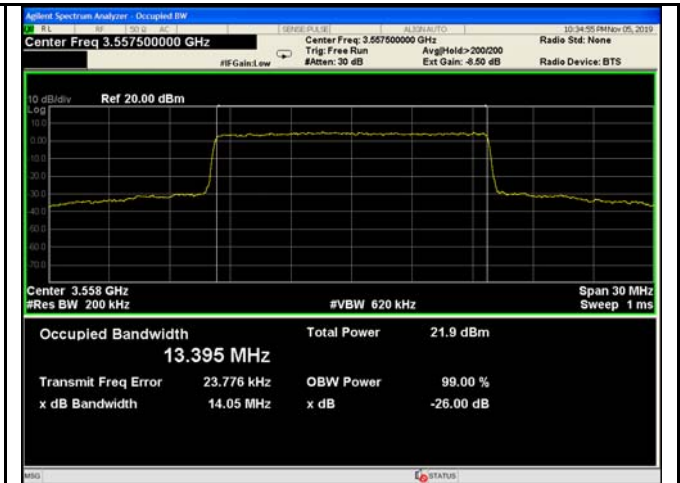


10MHz - High CH 16QAM

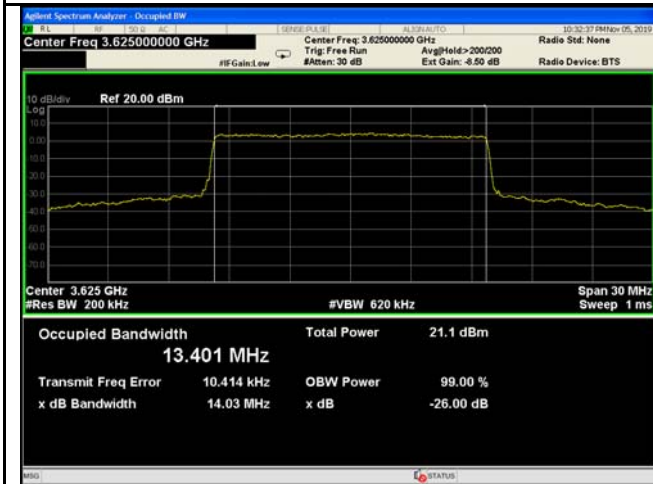




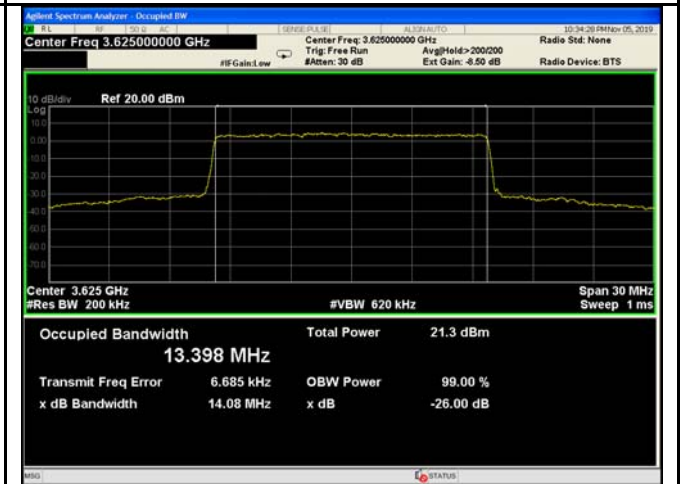
15MHz - Low CH QPSK



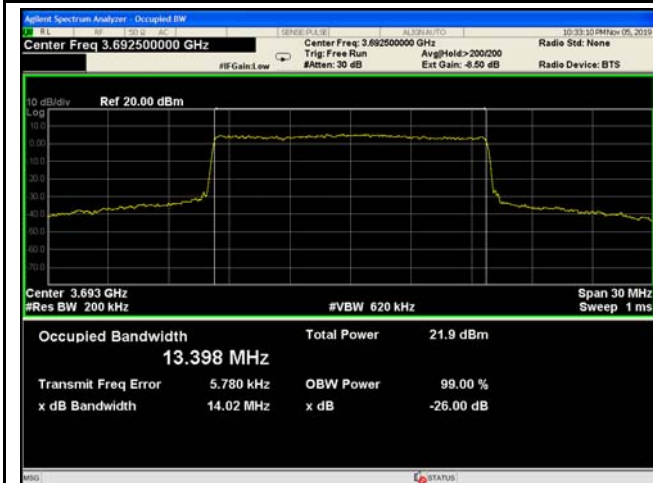
15MHz - Low CH 16QAM



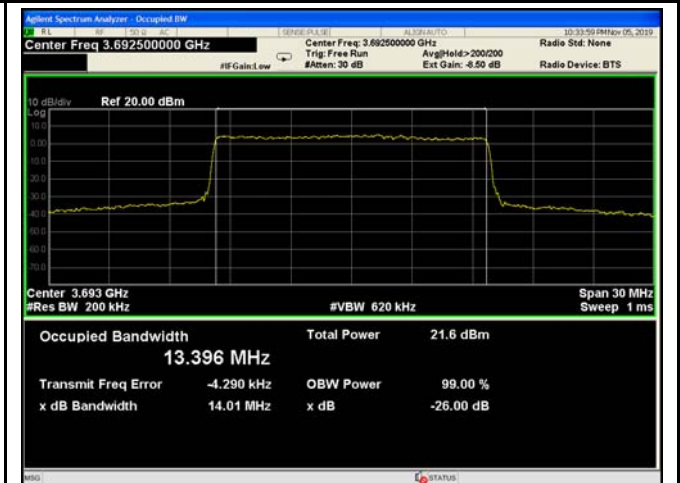
15MHz - Middle CH QPSK



15MHz - Middle CH 16QAM



15MHz - High CH QPSK



15MHz - High CH 16QAM