

Figure 81: 256QAM 10MHz B.W.; 733.0MHz, 15kHz

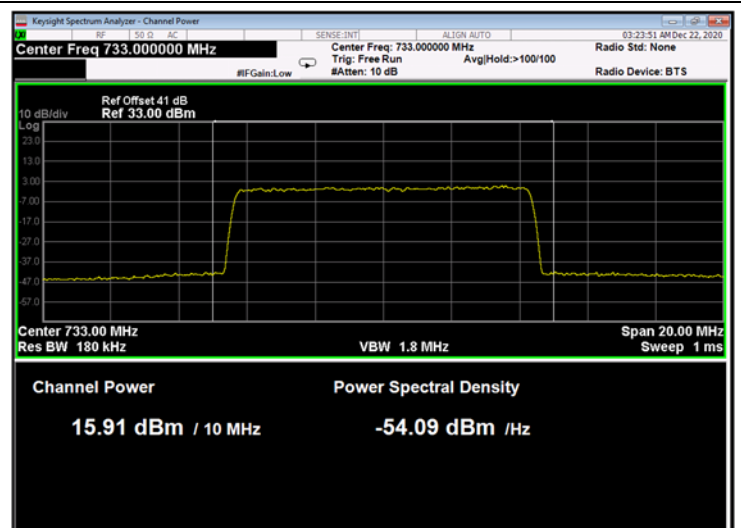


Figure 82: 256QAM 10MHz B.W.; 733.0MHz, 30kHz

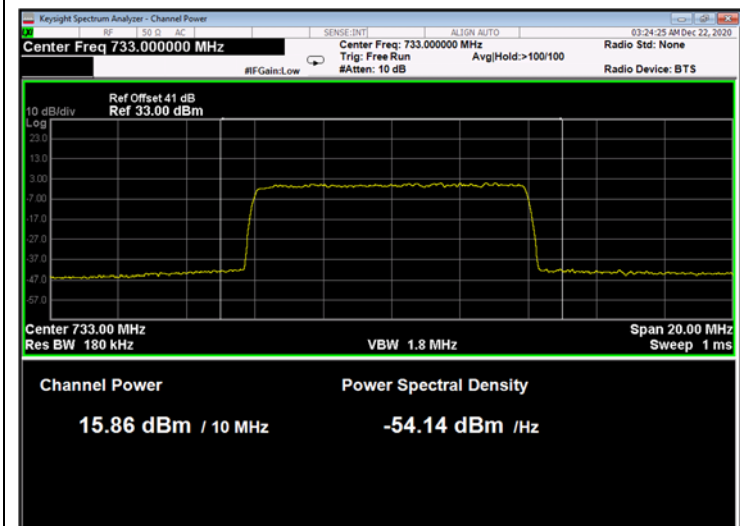


Figure 83: 256QAM 10MHz B.W.; 733.0MHz, 60kHz

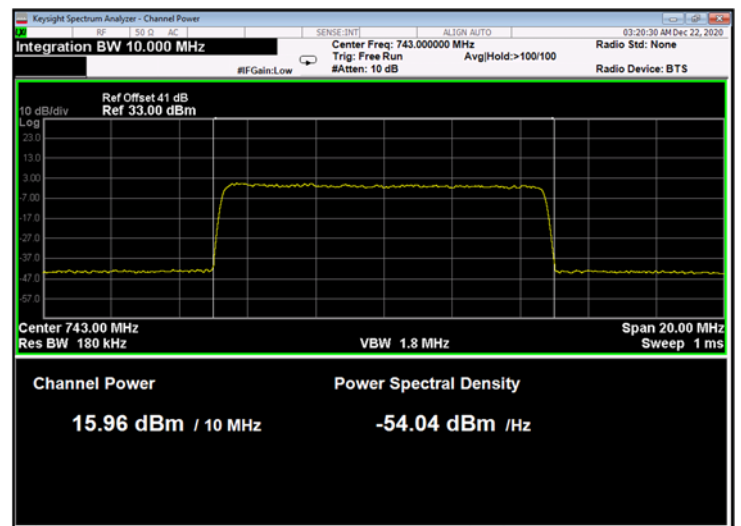


Figure 84: 256QAM 10MHz B.W.; 743.0MHz, 15kHz

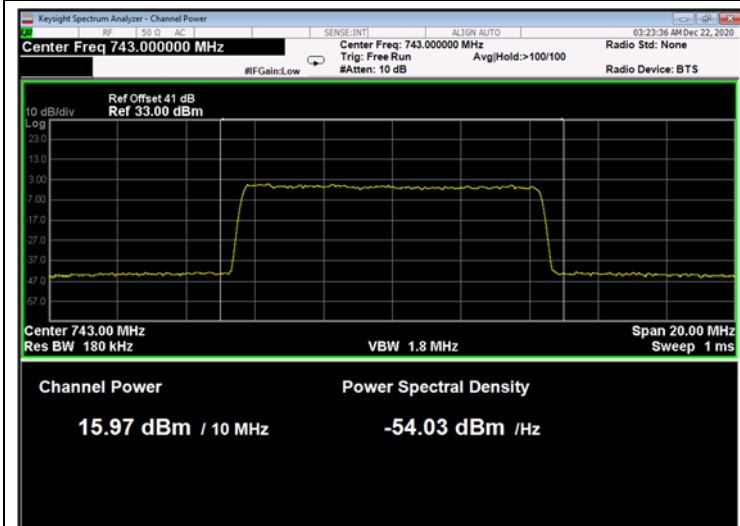


Figure 85: 256QAM 10MHz B.W.; 743.0MHz, 30kHz

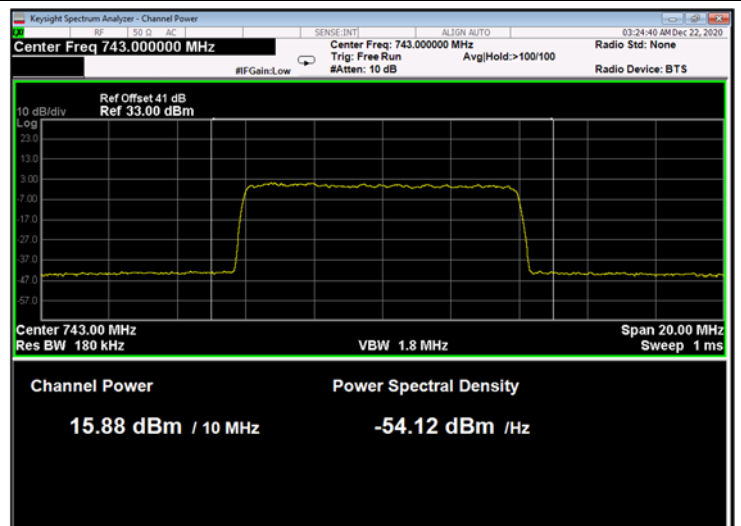


Figure 86: 256QAM 10MHz B.W.; 743.0MHz, 60kHz

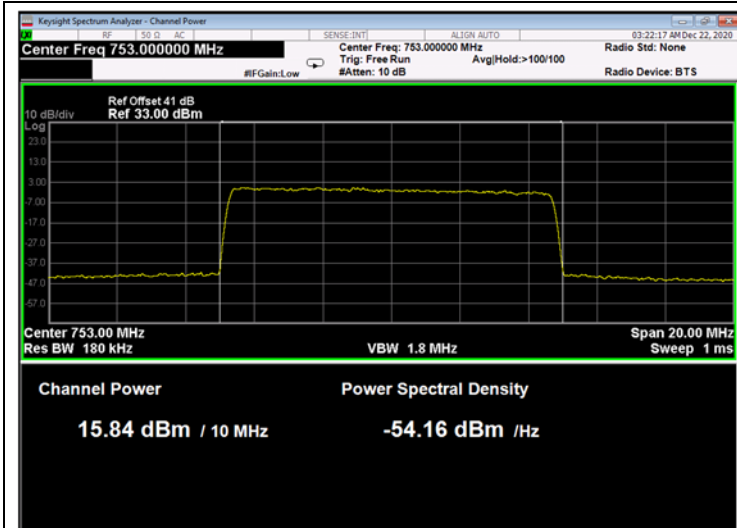


Figure 87: 256QAM 10MHz B.W.; 753.0MHz, 15kHz

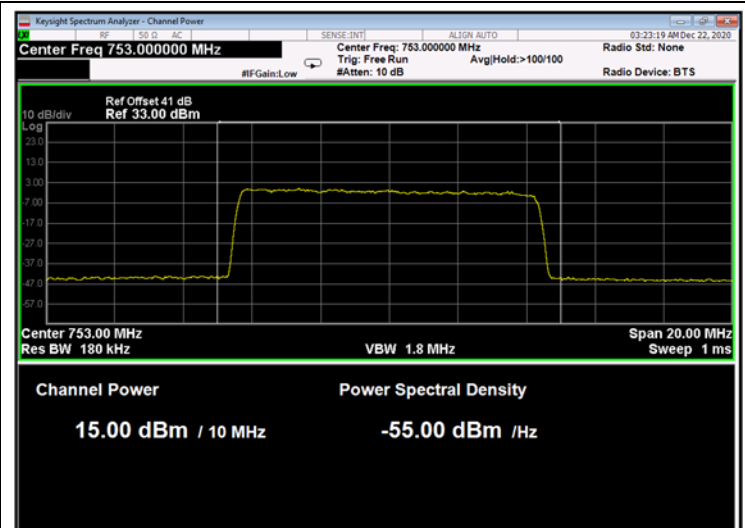


Figure 88: 256QAM 10MHz B.W.; 753.0MHz, 30kHz

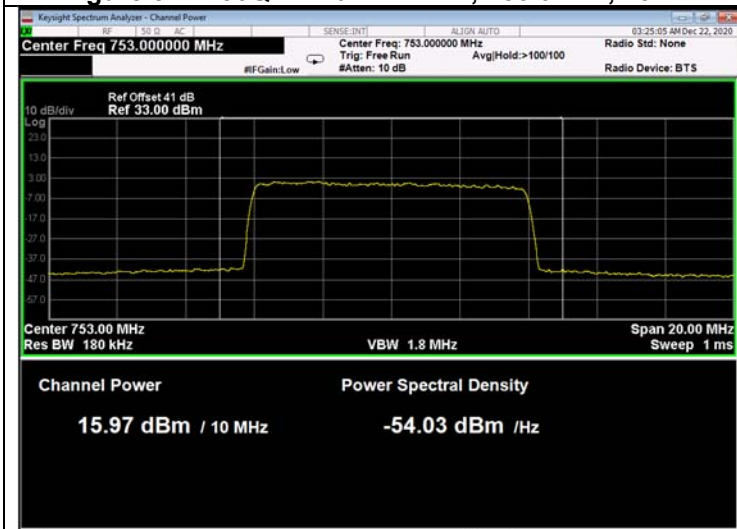


Figure 89: 256QAM 10MHz B.W.; 753.0MHz, 60kHz

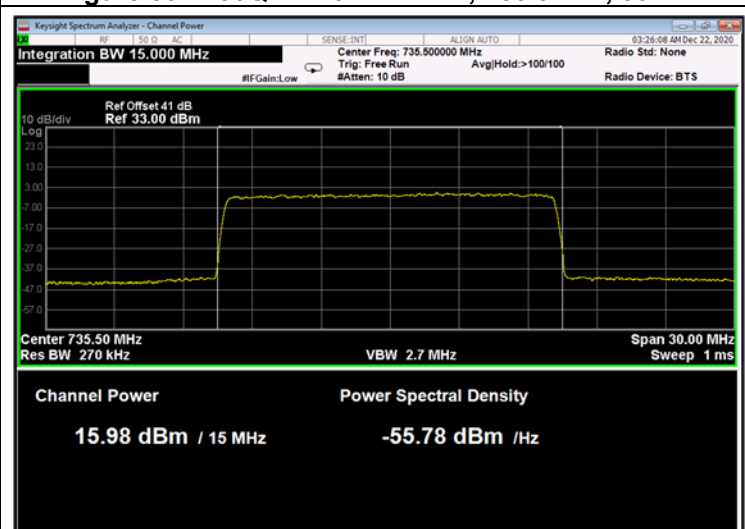


Figure 90: 256QAM 15MHz B.W.; 735.5MHz, 15kHz

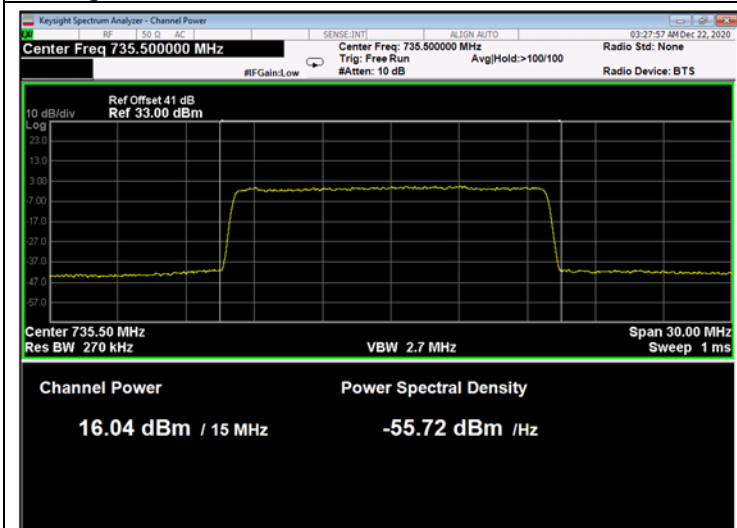


Figure 91: 256QAM 15MHz B.W.; 735.5MHz, 30kHz

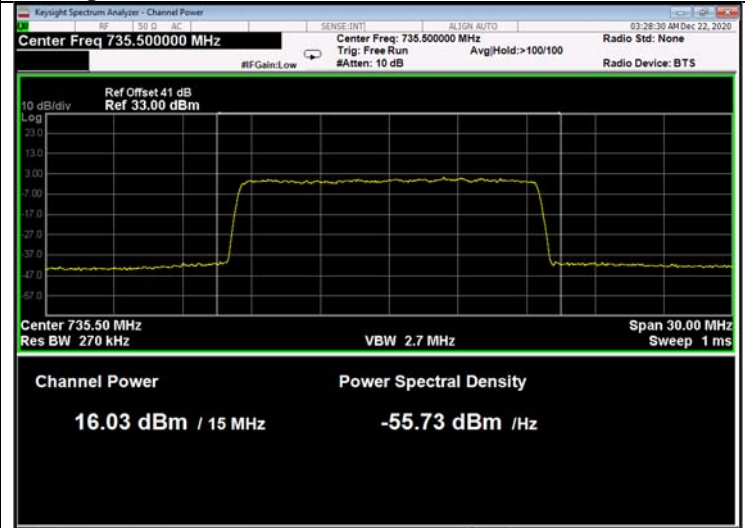


Figure 92: 256QAM 15MHz B.W.; 735.5MHz, 60kHz

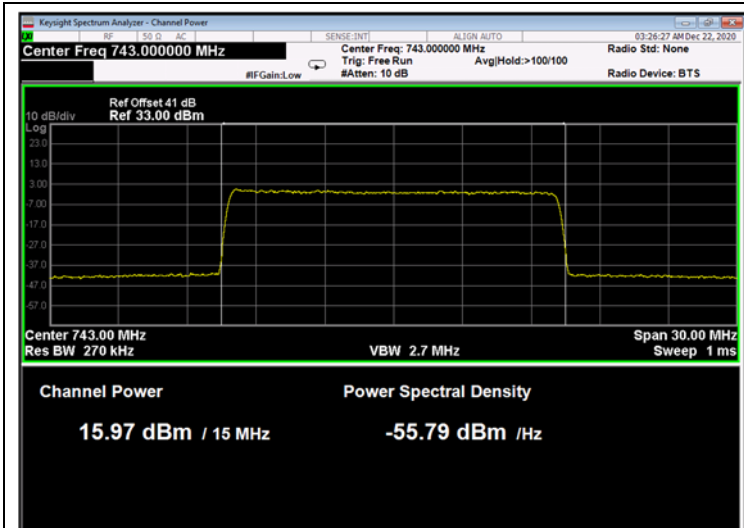


Figure 93: 256QAM 15MHz B.W.; 743.0MHz, 15kHz

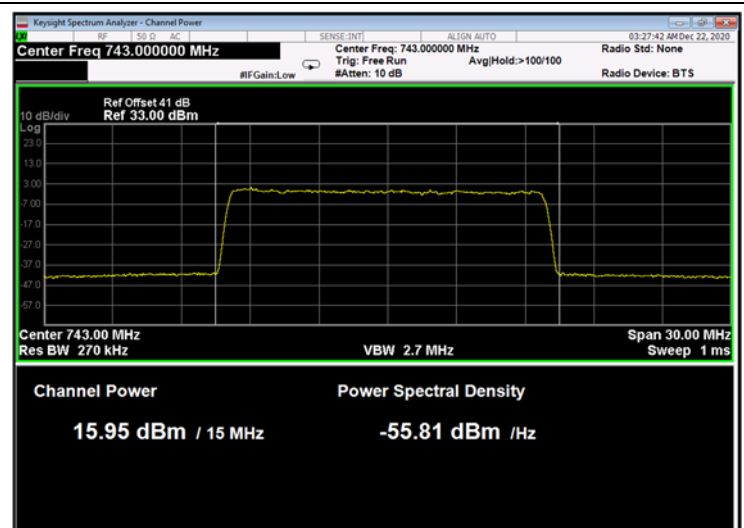


Figure 94: 256QAM 15MHz B.W.; 743.0MHz, 30kHz

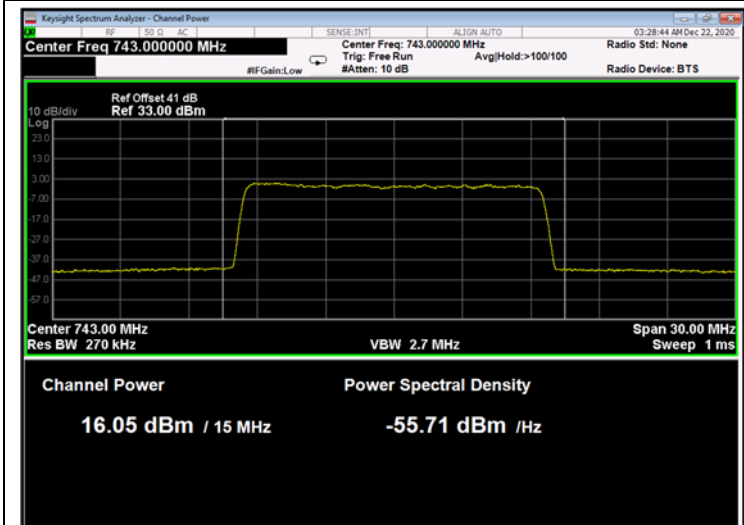


Figure 95: 256QAM 15MHz B.W.; 743.0MHz, 60kHz

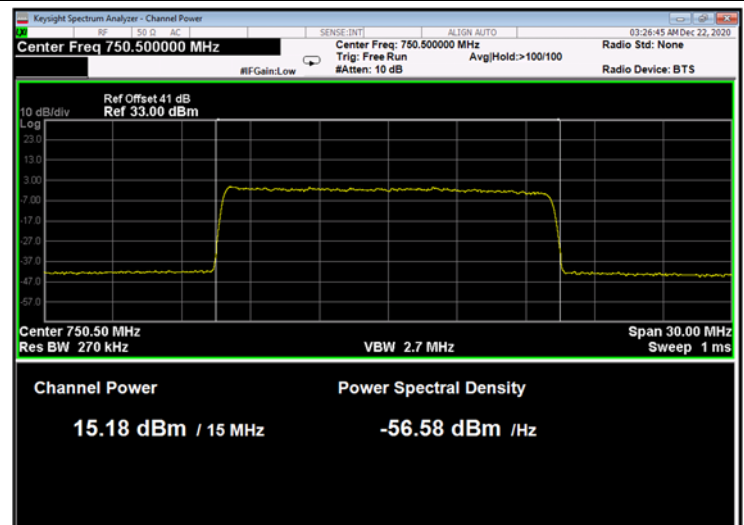


Figure 96: 256QAM 15MHz B.W.; 750.5MHz, 15kHz

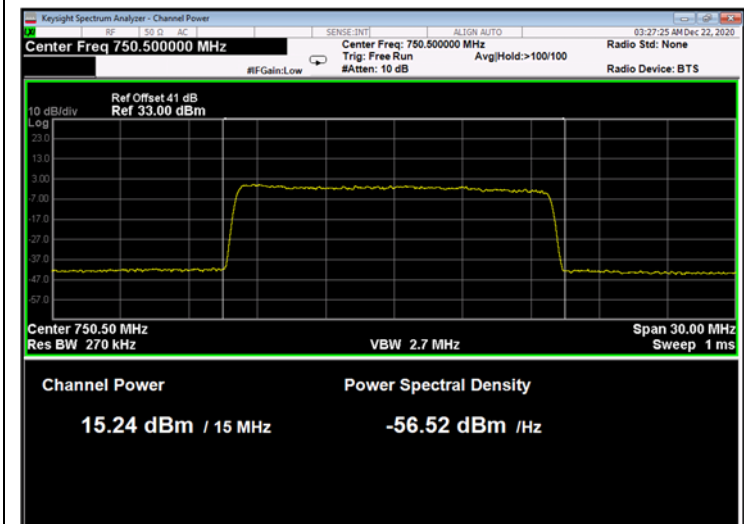


Figure 97: 256QAM 15MHz B.W.; 750.5MHz, 30kHz

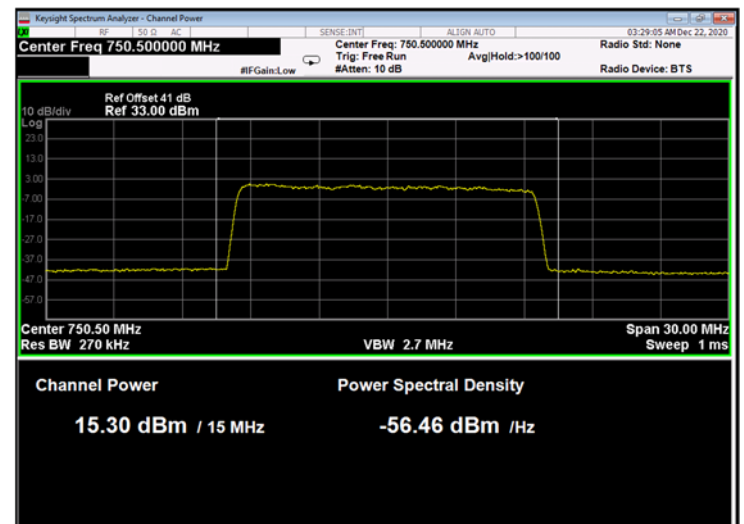


Figure 98: 256QAM 15MHz B.W.; 750.5MHz, 60kHz

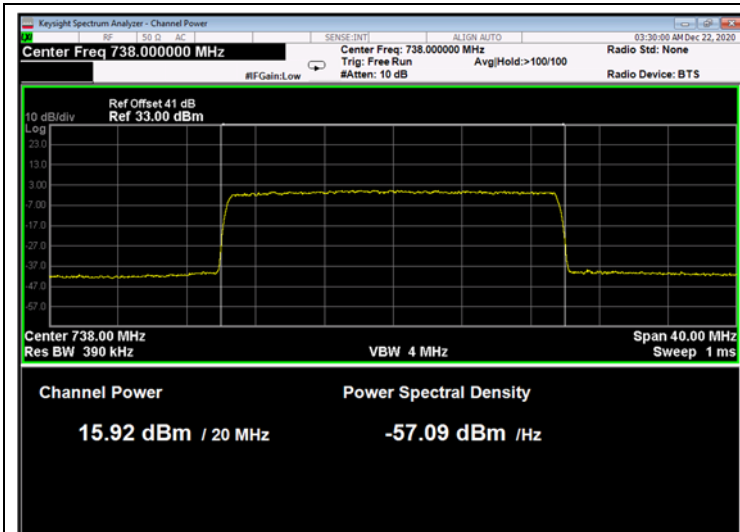


Figure 99: 256QAM 20MHz B.W.; 738.0MHz, 15kHz

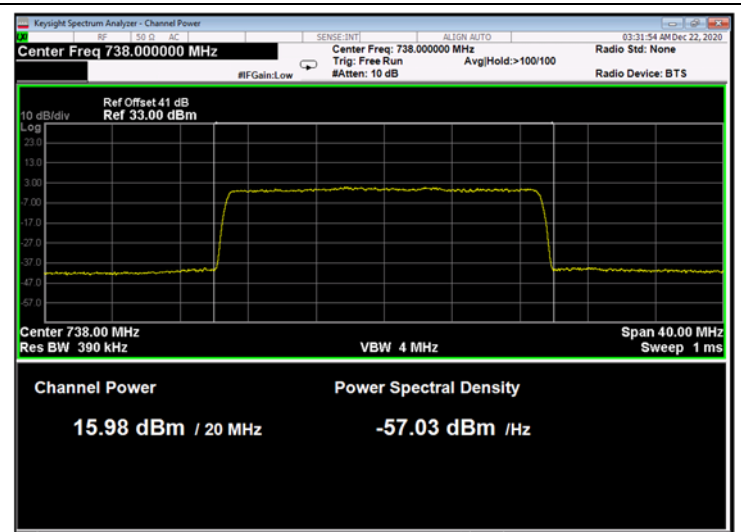


Figure 100: 256QAM 20MHz B.W.; 738.0MHz, 30kHz

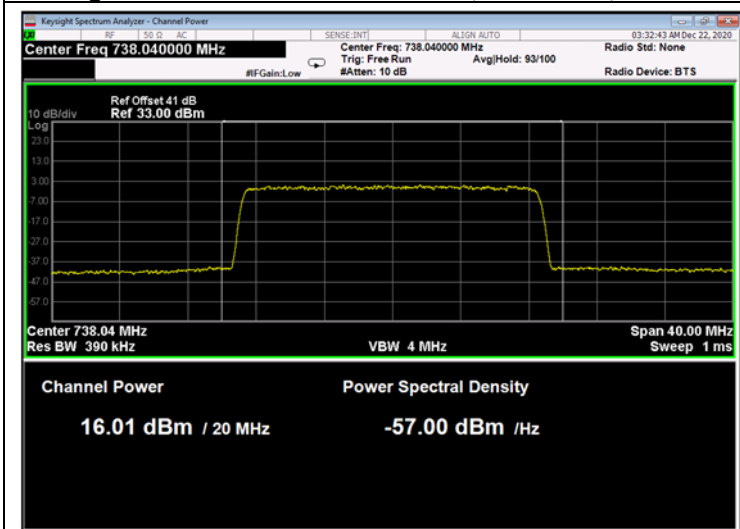


Figure 101: 256QAM 20MHz B.W.; 738.0MHz, 60kHz

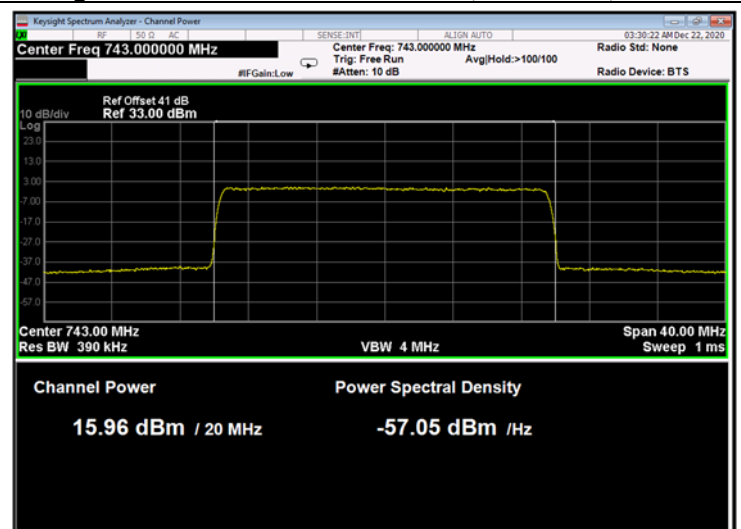


Figure 102: 256QAM 20MHz B.W.; 743.0MHz, 15kHz

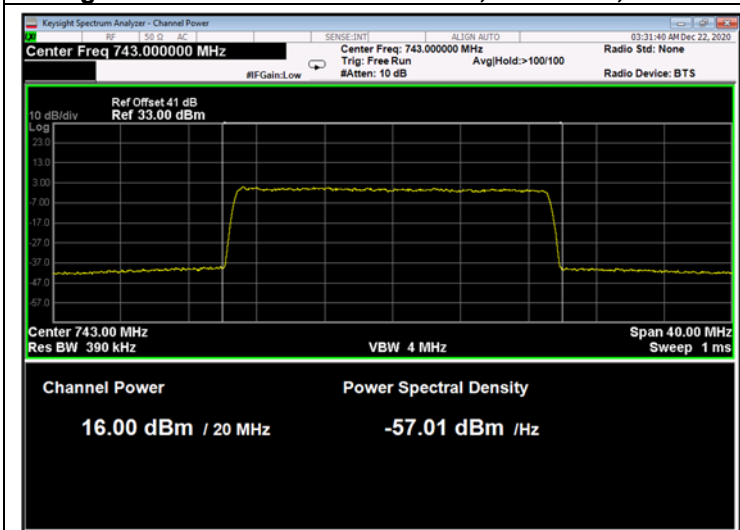


Figure 103: 256QAM 20MHz B.W.; 743.0MHz, 30kHz

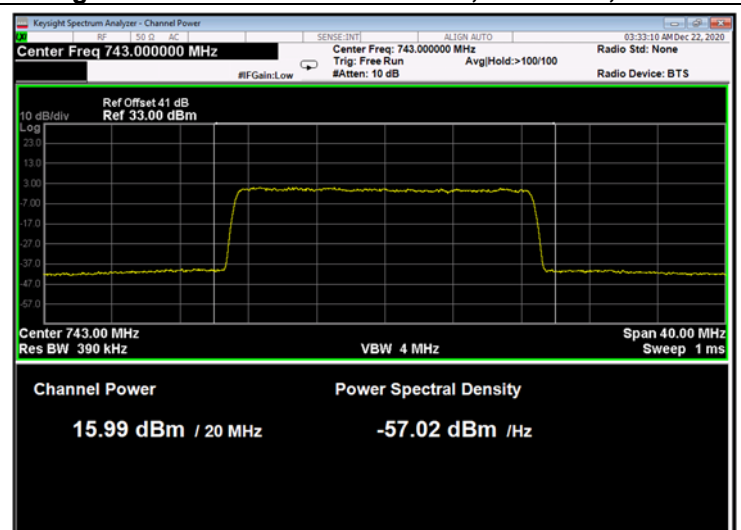


Figure 104: 256QAM 20MHz B.W.; 743.0MHz, 60kHz

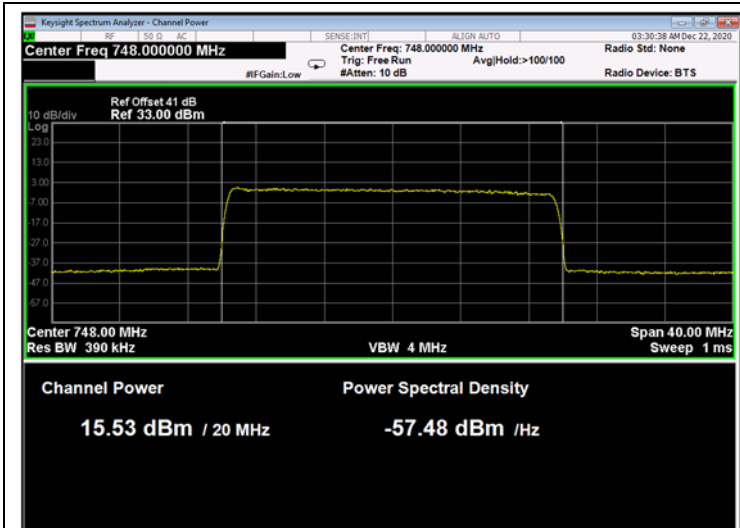


Figure 105: 256QAM 20MHz B.W.; 748.0MHz, 15kHz

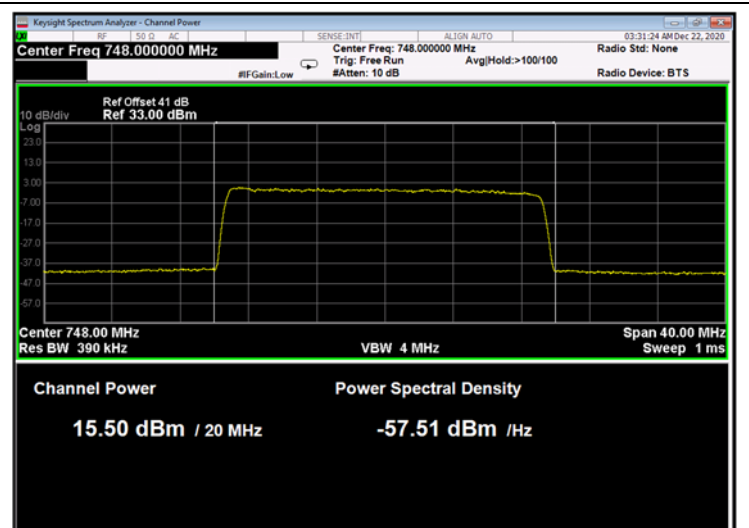


Figure 106: 256QAM 20MHz B.W.; 748.0MHz, 30kHz

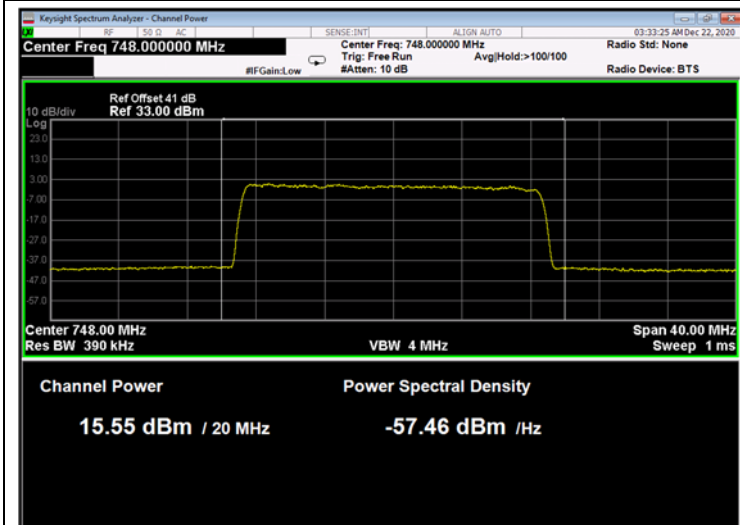


Figure 107: 256QAM 20MHz B.W.; 748.0MHz, 60kHz



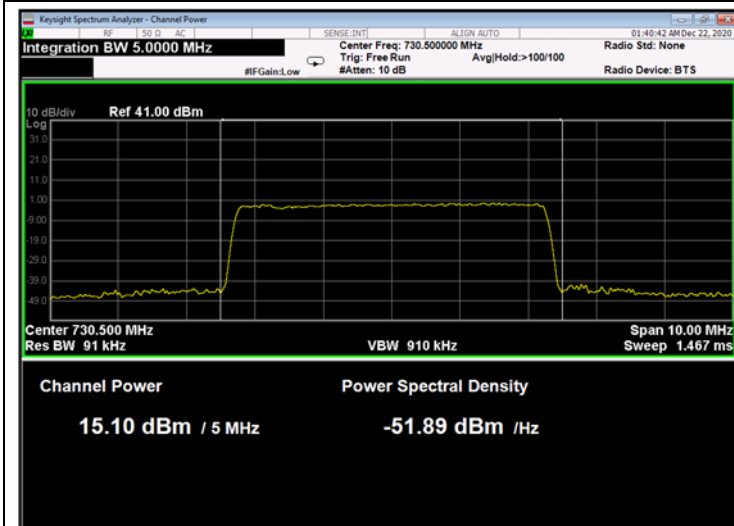


Figure 108: QPSK 5MHz B.W.; 730.5MHz, 15kHz

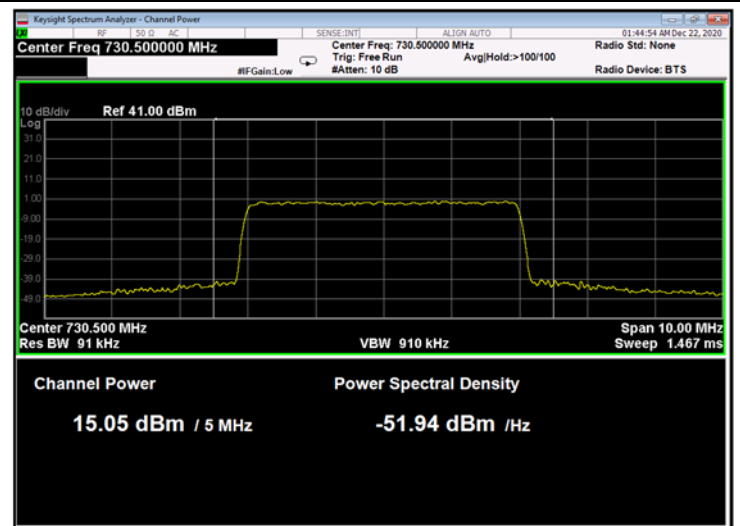


Figure 109: QPSK 5MHz B.W.; 730.5MHz, 30kHz

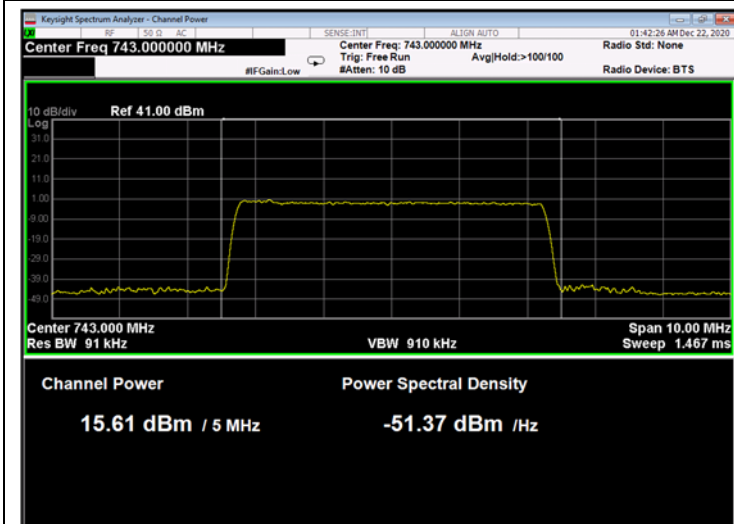


Figure 110: QPSK 5MHz B.W.; 743.0MHz, 15kHz

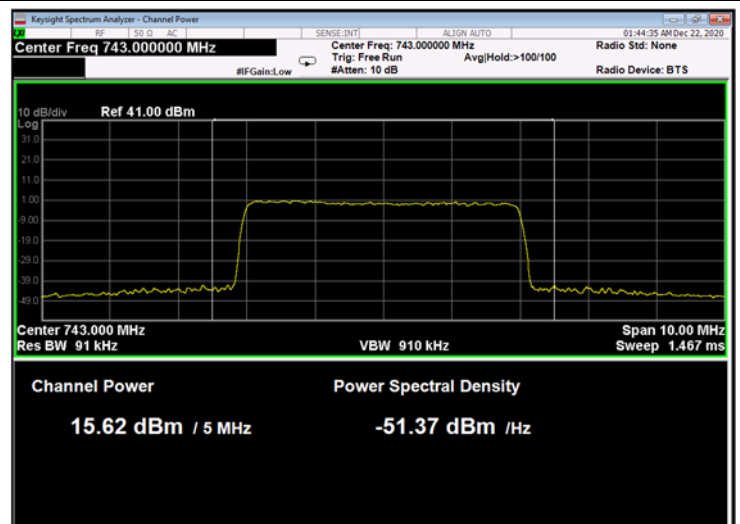


Figure 111: QPSK 5MHz B.W.; 743.0MHz, 30kHz

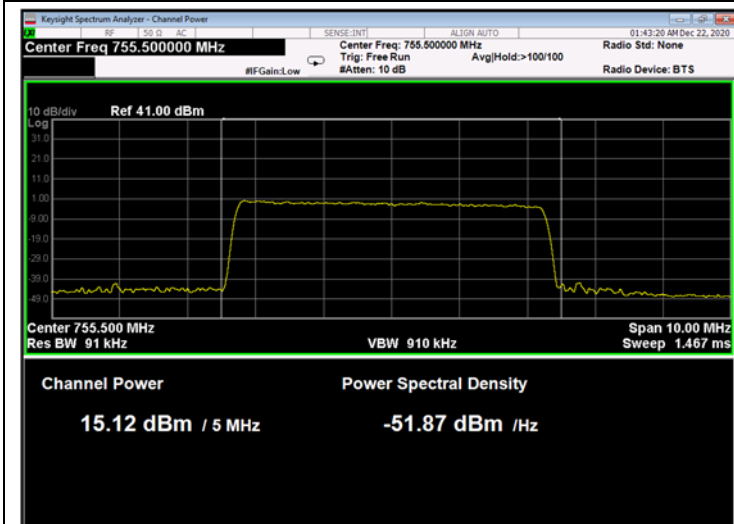


Figure 112: QPSK 5MHz B.W.; 755.50MHz, 15kHz

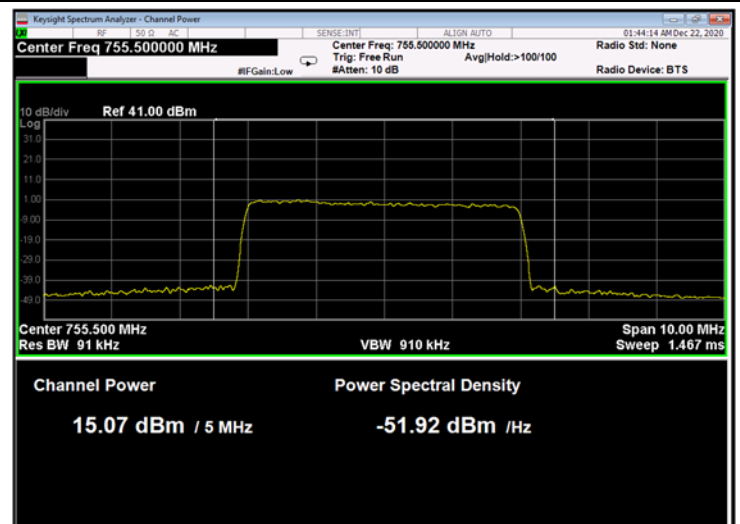


Figure 113: QPSK 5MHz B.W.; 755.5MHz, 30kHz

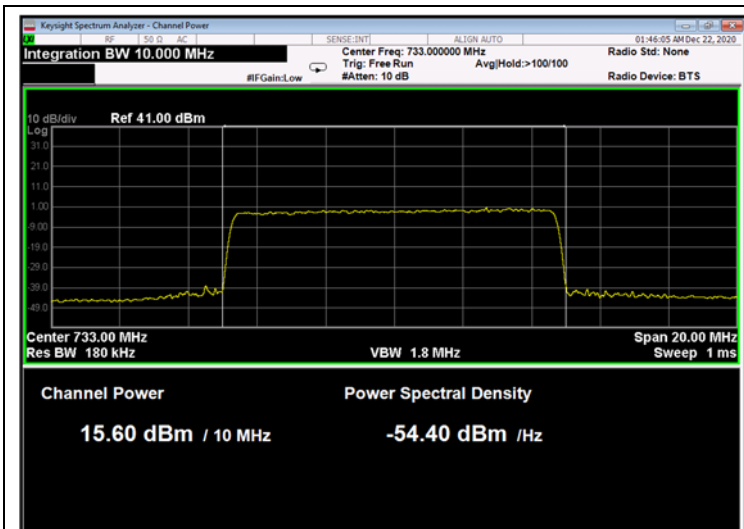


Figure 114: QPSK 10MHz B.W.; 733.0MHz, 15kHz



Figure 115: QPSK 10MHz B.W.; 733.0MHz, 30kHz

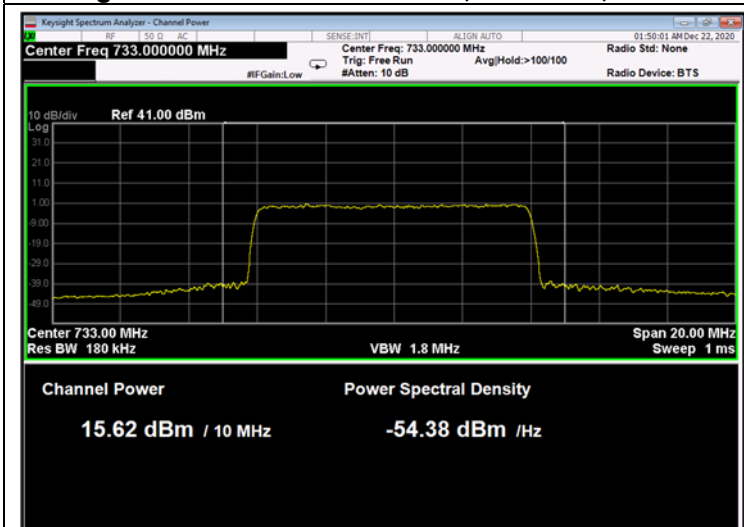


Figure 116: QPSK 10MHz B.W.; 733.0MHz, 60kHz

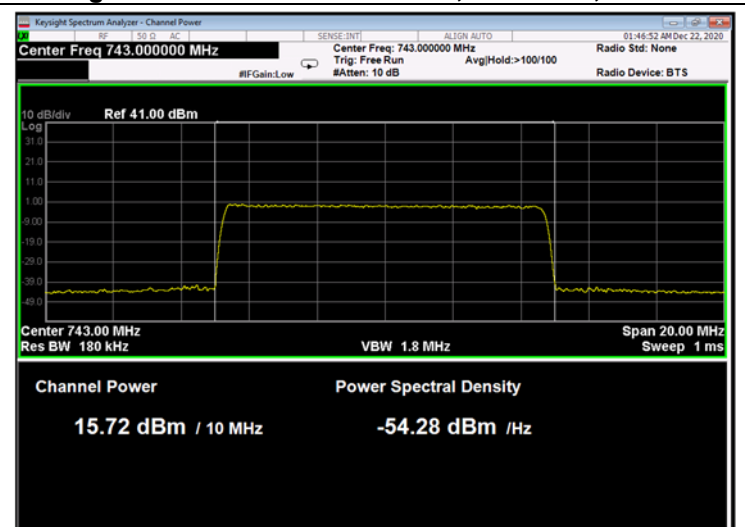


Figure 117: QPSK 10MHz B.W.; 743.0MHz, 15kHz

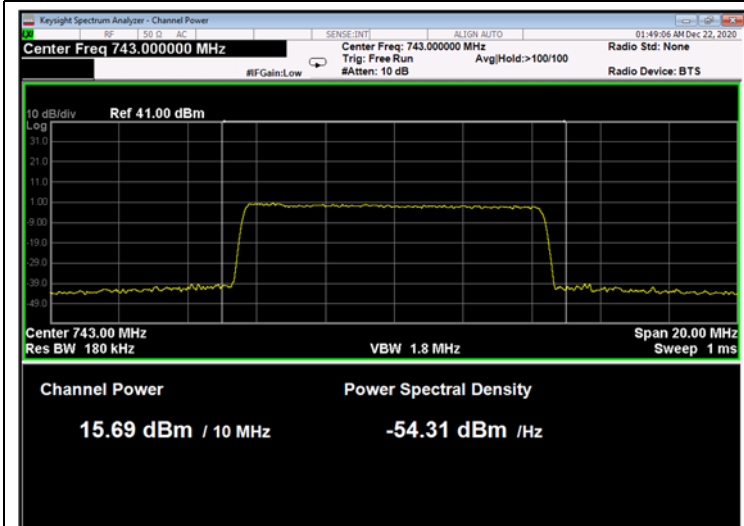


Figure 118: QPSK 10MHz B.W.; 743.0MHz, 30kHz

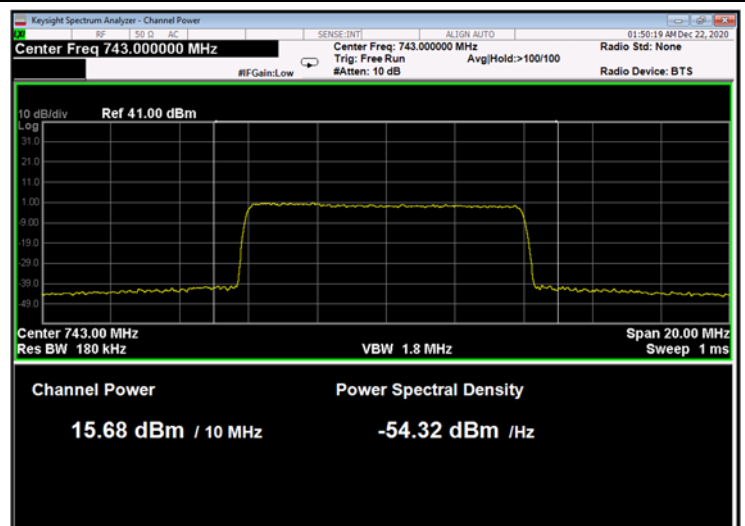


Figure 119: QPSK 10MHz B.W.; 743.0MHz, 60kHz

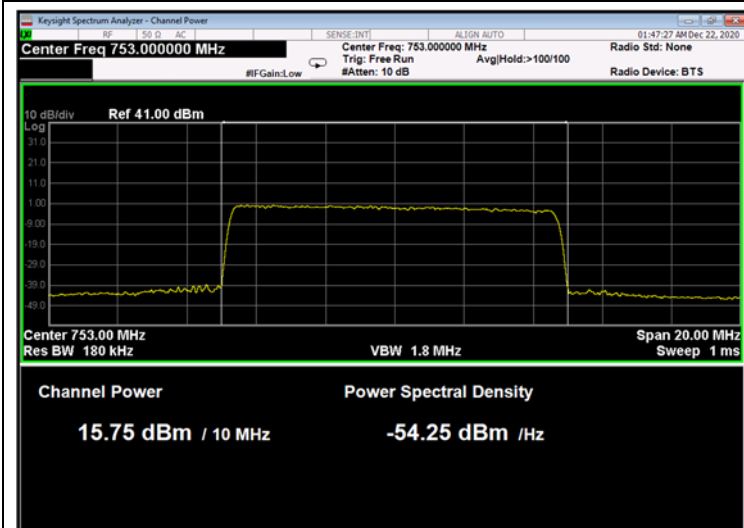


Figure 120: QPSK 10MHz B.W.; 753.0MHz, 15kHz

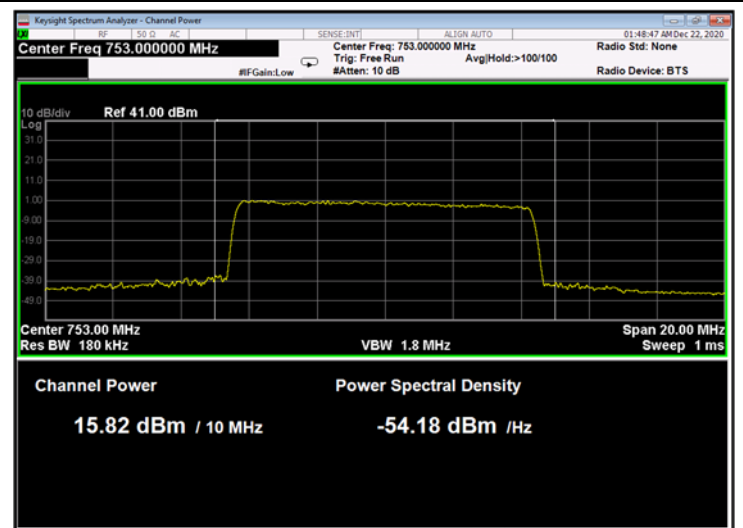


Figure 121: QPSK 10MHz B.W.; 753.0MHz, 30kHz

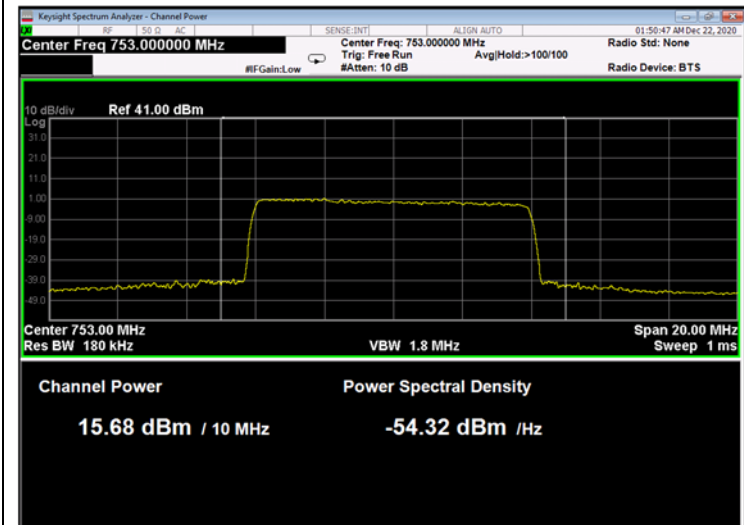


Figure 122: QPSK 10MHz B.W.; 753.0MHz, 60kHz

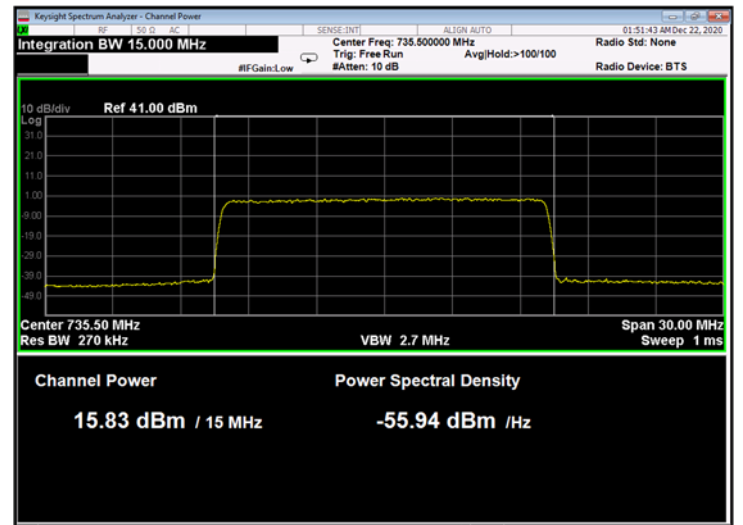


Figure 123: QPSK 15MHz B.W.; 735.5MHz, 15kHz

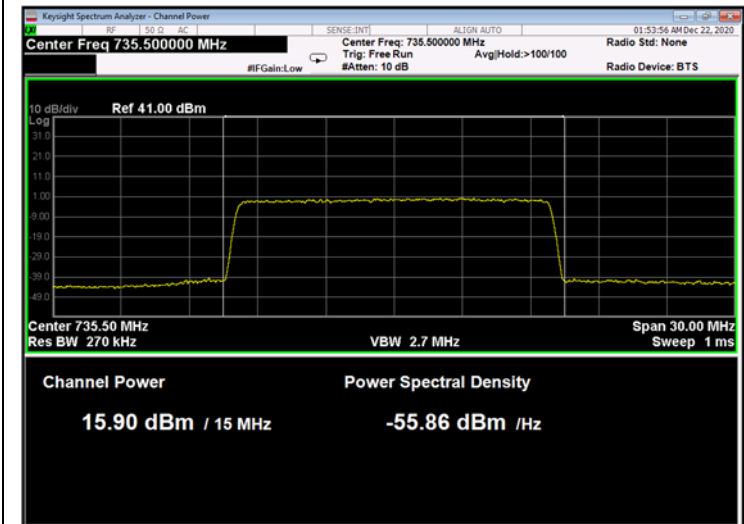


Figure 124: QPSK 15MHz B.W.; 735.5MHz, 30kHz

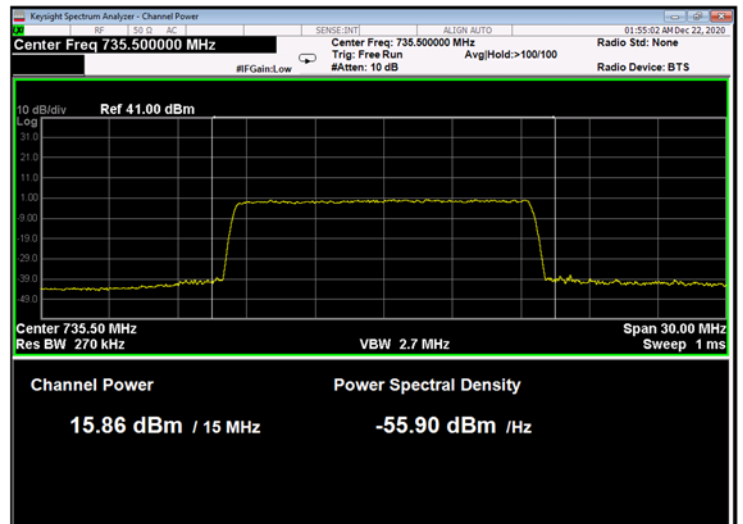


Figure 125: QPSK 15MHz B.W.; 735.5MHz, 60kHz



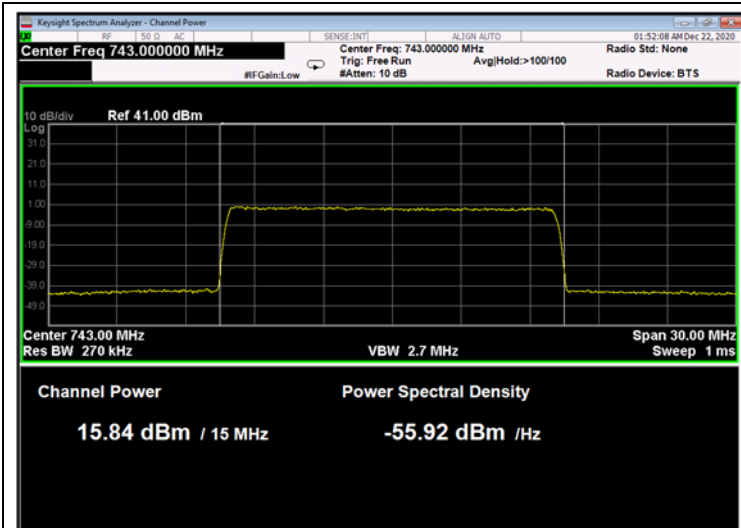


Figure 126: QPSK 15MHz B.W.; 743.0MHz, 15kHz

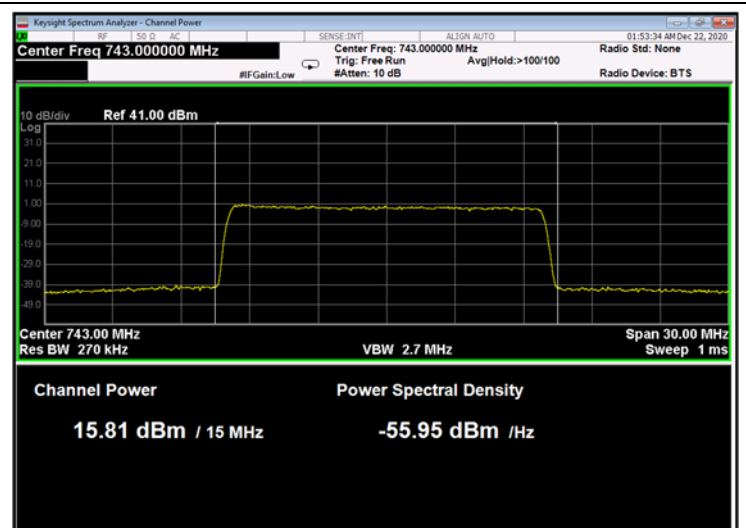


Figure 127: QPSK 15MHz B.W.; 743.0MHz, 30kHz

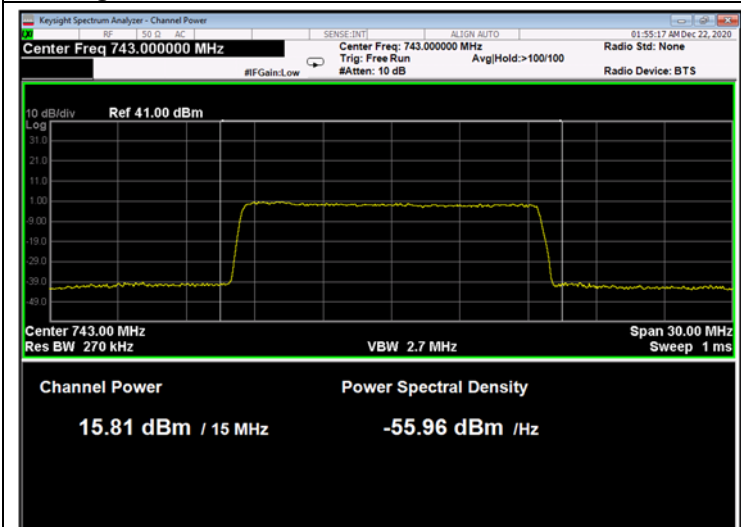


Figure 128: QPSK 15MHz B.W.; 743.0MHz, 60kHz

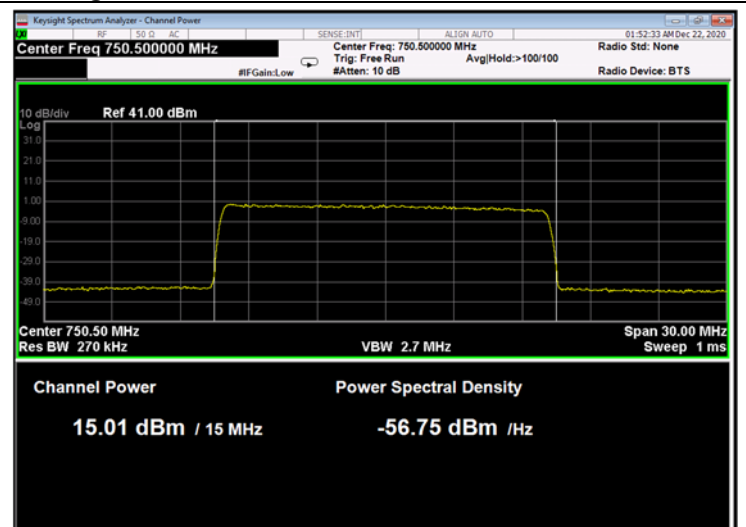


Figure 129: QPSK 15MHz B.W.; 750.5MHz, 15kHz

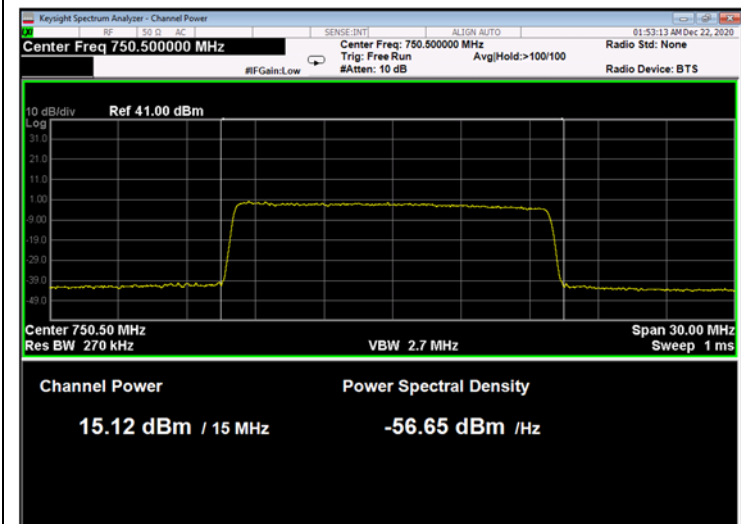


Figure 130: QPSK 15MHz B.W.; 750.5MHz, 30kHz

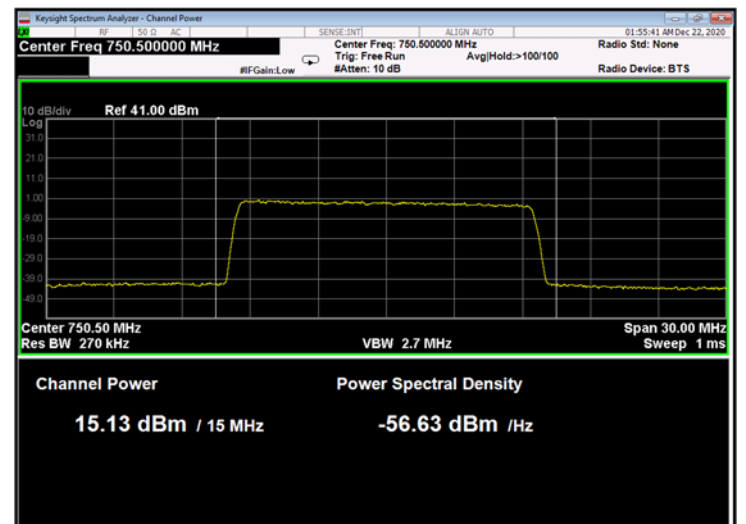


Figure 131: QPSK 15MHz B.W.; 750.5MHz, 60kHz

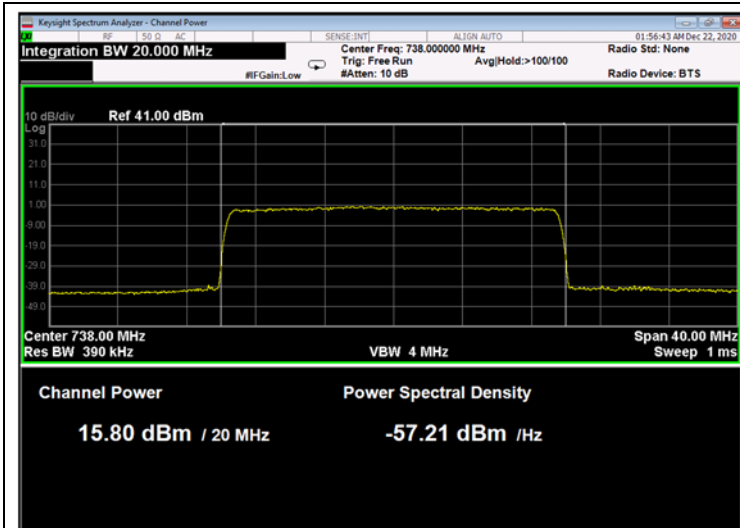


Figure 132: QPSK 20MHz B.W.; 738.0MHz, 15kHz

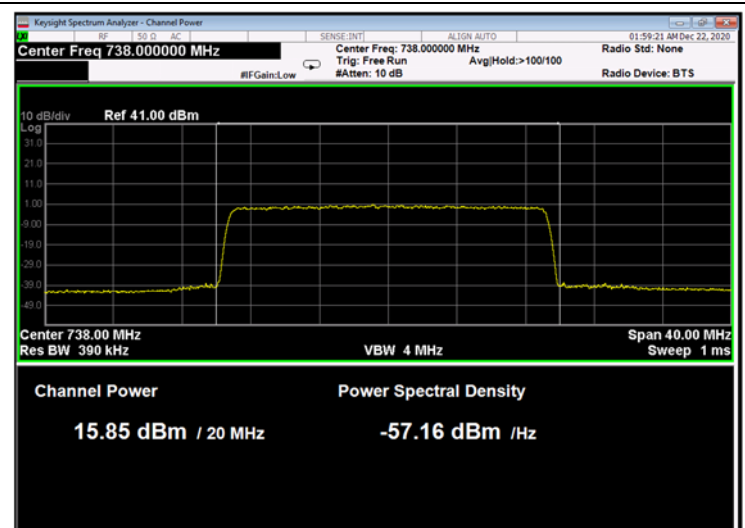


Figure 133: QPSK 20MHz B.W.; 738.0MHz, 30kHz

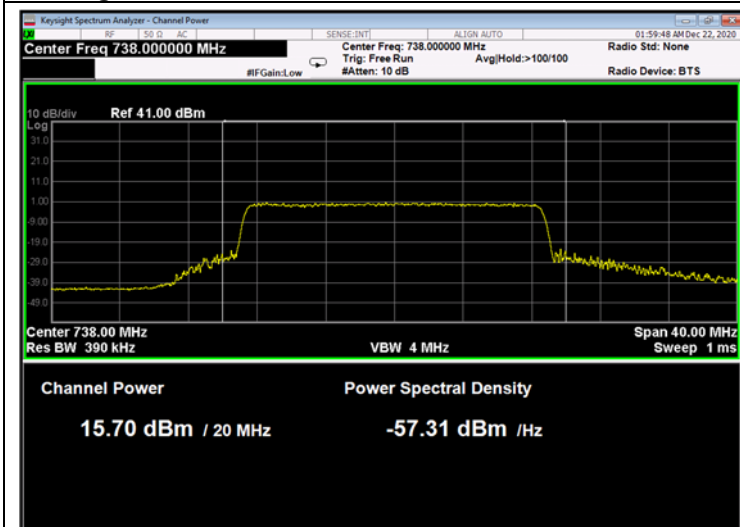


Figure 134: QPSK 20MHz B.W.; 738.0MHz, 60kHz

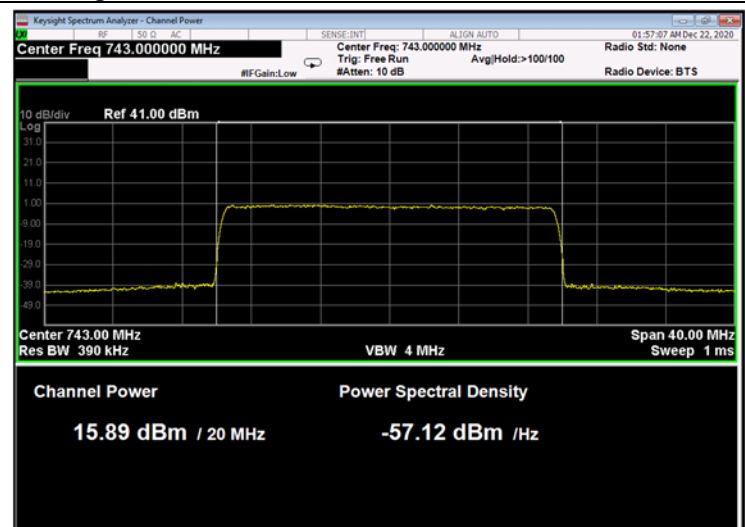


Figure 135: QPSK 20MHz B.W.; 743.0MHz, 15kHz

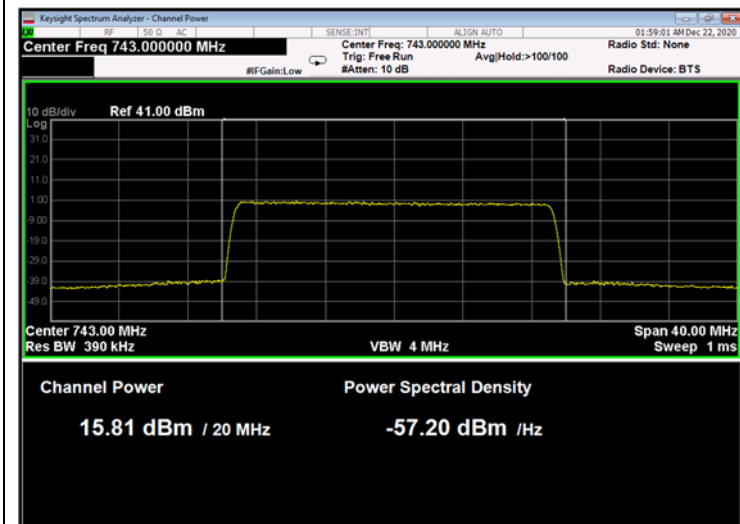


Figure 136: QPSK 20MHz B.W.; 743.0MHz, 30kHz

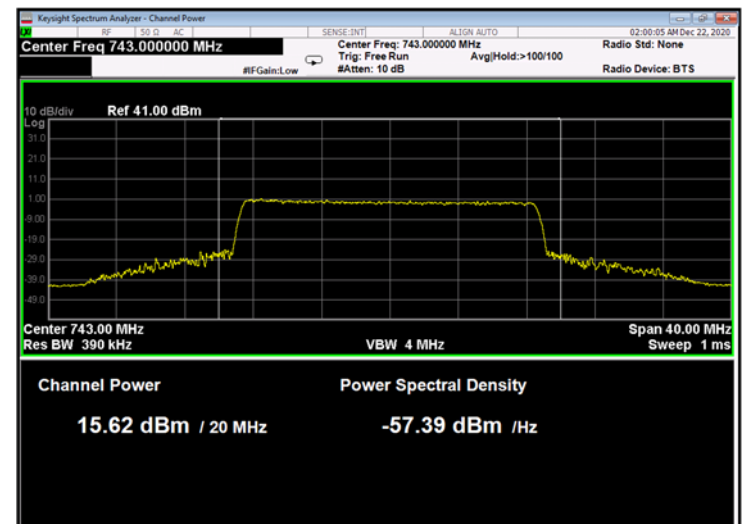


Figure 137: QPSK 20MHz B.W.; 743.0MHz, 60kHz

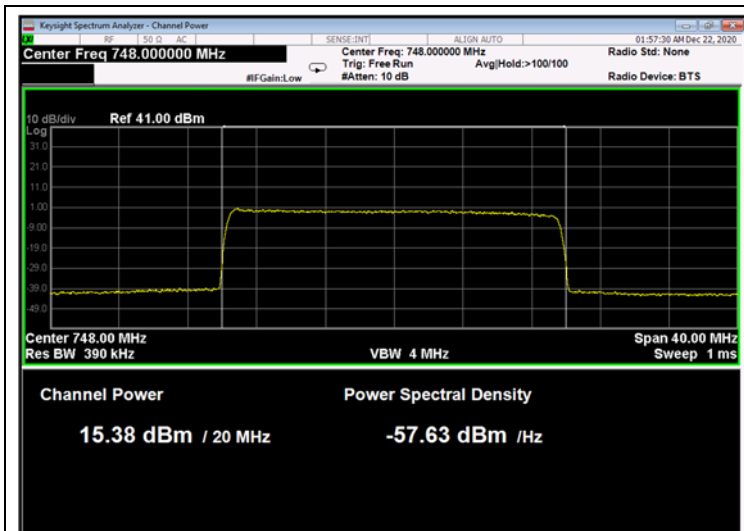


Figure 138: QPSK 20MHz B.W.; 748.0MHz, 15kHz

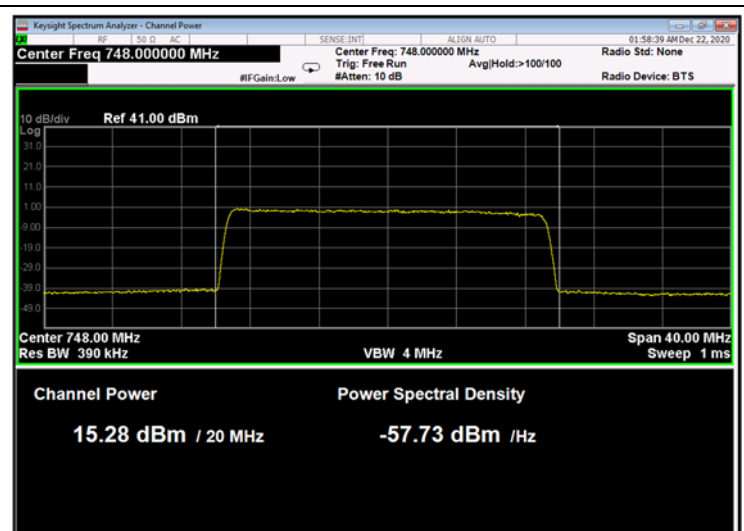


Figure 139: QPSK 20MHz B.W.; 748.0MHz, 30kHz

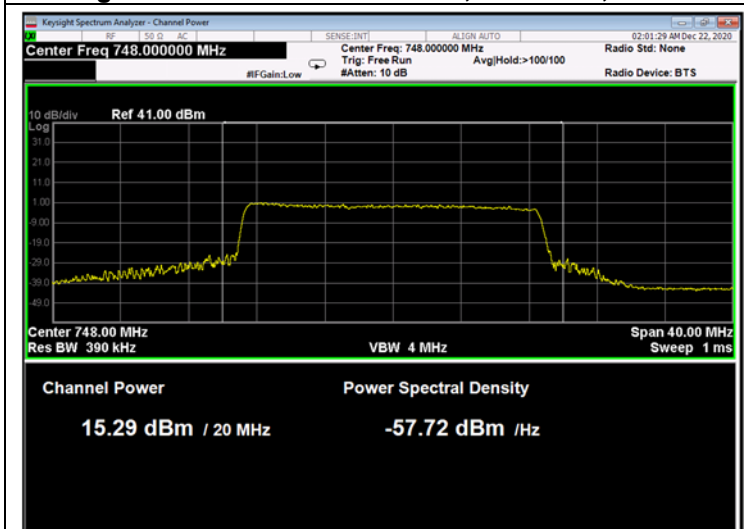


Figure 140: QPSK 20MHz B.W.; 748.0MHz, 60kHz

**4.5 Test Equipment Used; RF Power Output**

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EXA signal Analyzer	Agilent Technologies	N9010A	MY52220686	November 28, 2018	May 30, 2021
Vector Signal Generator	R&S	SMBV100B	1423.1003K02-101470-XE	October 2, 2019	October 2, 2022
40 dB Attenuator	Weinschel	WA 39-40-33	A1323	July 7, 2020	July 31, 2021
RF Cable	Huber Suhner	Sucofelex	27504/4PEA	August 23, 2020	August 31, 2021

**Table 5 Test Equipment Used**

## 5 Occupied Bandwidth

### 5.1 Test Specification

FCC Part 2, Section 1049

### 5.2 Test Procedure

(Temperature (20°C)/ Humidity (57%RH))

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable. The spectrum analyzer was set to proper resolution B.W.

OBW function (99%) was employed for this evaluation.

Occupied bandwidth measured was repeated for each modulation.

### 5.3 Test Limit

N/A

### 5.4 Test Results

JUDGEMENT: Passed

See additional information in *Table 6* to *Table 13* and *Figure 141* to *Figure 404*.



<b>Modulation</b>	<b>Bandwidth (MHz)</b>	<b>Sub Carrier (kHz)</b>	<b>Operation Frequency (MHz)</b>	<b>Reading (MHz)</b>	
16QAM	5	15	730.5	4.4860	
		30	730.5	3.9430	
		15	743.0	4.4860	
		30	743.0	3.9430	
		15	755.5	4.4860	
		30	755.5	3.9440	
	10	10	15	733.0	9.2455
			30	733.0	8.5345
			60	733.0	7.8830
			15	743.0	9.2445
			30	743.0	8.5375
			60	743.0	7.8840
			15	753.0	9.2440
			30	753.0	8.5370
			60	753.0	7.8840
	15	15	15	735.5	14.170
			30	735.5	13.660
			60	735.5	12.920
			15	743.0	14.170
			30	743.0	13.660
			60	743.0	12.915
			15	750.5	14.165
			30	750.5	13.660
			60	750.5	12.920
	20	20	15	738.0	18.990
			30	738.0	18.330
			60	738.0	17.130
			15	743.0	19.000
			30	743.0	18.330
			60	743.0	17.130
			15	748.0	18.990
			30	748.0	18.315
			60	748.0	17.145

**Table 6 Occupied Bandwidth 16QAM - Input**

<b>Modulation</b>	<b>Bandwidth (MHz)</b>	<b>Sub Carrier (kHz)</b>	<b>Operation Frequency (MHz)</b>	<b>Reading (MHz)</b>	
64QAM	5	15	730.5	4.4925	
		30	730.5	3.9440	
		15	743.0	4.4945	
		30	743.0	3.9450	
		15	755.5	4.4925	
		30	755.5	3.9445	
	10	10	15	733.0	9.3155
			30	733.0	8.5895
			60	733.0	7.8900
			15	743.0	9.3140
			30	743.0	8.5900
			60	743.0	7.8860
			15	753.0	9.3145
			30	753.0	8.5900
			60	753.0	7.8875
	15	15	15	735.5	14.145
			30	735.5	13.605
			60	735.5	12.895
			15	743.0	14.140
			30	743.0	13.605
			60	743.0	12.895
			15	750.5	14.145
			30	750.5	13.610
			60	750.5	12.890
	20	20	15	738.0	19.970
			30	738.0	18.235
			60	738.0	17.200
			15	743.0	18.970
			30	743.0	18.240
			60	743.0	17.190
			15	748.0	18.975
			30	748.0	18.235
			60	748.0	17.184

**Table 7 Occupied Bandwidth 64QAM - Input**

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
256QAM	5	15	730.5	4.4955	
		30	730.5	3.9580	
		15	743.0	4.4965	
		30	743.0	3.9567	
		15	755.5	4.4955	
		30	755.5	3.9580	
	10	10	15	733.0	9.3000
			30	733.0	8.5855
			60	733.0	7.8850
			15	743.0	9.2915
			30	743.0	8.5855
			60	743.0	7.8840
			15	753.0	9.3015
			30	753.0	8.5860
			60	753.0	7.8840
	15	15	15	735.5	14.180
			30	735.5	13.615
			60	735.5	12.940
			15	743.0	14.195
			30	743.0	13.615
			60	743.0	12.950
			15	750.5	14.190
			30	750.5	13.610
			60	750.5	12.945
	20	20	15	738.0	18.970
			30	738.0	18.260
			60	738.0	17.165
			15	743.0	18.970
			30	743.0	18.255
			60	743.0	17.165
			15	748.0	18.970
			30	748.0	18.260
			60	748.0	17.170

**Table 8 Occupied Bandwidth 256QAM - Input**

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
QPSK	5	15	730.5	4.4950	
		30	730.5	3.9670	
		15	743.0	4.4920	
		30	743.0	3.9670	
		15	755.5	4.4960	
		30	755.5	3.9665	
	10	10	15	733.0	9.3095
			30	733.0	8.5965
			60	733.0	7.9285
			15	743.0	9.3110
			30	743.0	8.5960
			60	743.0	7.9290
			15	753.0	9.3070
			30	753.0	8.6000
			60	753.0	7.9280
	15	15	15	735.5	14.150
			30	735.5	13.670
			60	735.5	12.995
			15	743.0	14.150
			30	743.0	13.670
			60	743.0	12.995
			15	750.5	14.150
			30	750.5	13.670
			60	750.5	12.995
	20	20	15	738.0	18.940
			30	738.0	18.215
			60	738.0	71.190
			15	743.0	18.935
			30	743.0	18.210
			60	743.0	17.190
			15	748.0	18.910
			30	748.0	18.220
			60	748.0	17.200

**Table 9 Occupied Bandwidth QPSK – Input**

<b>Modulation</b>	<b>Bandwidth (MHz)</b>	<b>Sub Carrier (kHz)</b>	<b>Operation Frequency (MHz)</b>	<b>Reading (MHz)</b>	
16QAM	5	15	730.5	4.900	
		30	730.5	3.9455	
		15	743.0	4.5323	
		30	743.0	3.9498	
		15	755.5	4.4945	
		30	755.5	3.9449	
	10	10	15	733.0	9.7463
			30	733.0	9.1205
			60	733.0	7.8931
			15	743.0	9.4939
			30	743.0	8.8514
			60	743.0	7.9042
			15	753.0	9.3305
			30	753.0	8.6761
			60	753.0	7.8779
	15	15	15	735.5	14.451
			30	735.5	13.818
			60	735.5	13.164
			15	743.0	14.502
			30	743.0	13.871
			60	743.0	13.112
			15	750.5	14.717
			30	750.5	13.780
			60	750.5	12.938
	20	20	15	738.0	21.398
			30	738.0	18.569
			60	738.0	17.796
			15	743.0	21.121
			30	743.0	18.950
			60	743.0	17.978
			15	748.0	20.686
			30	748.0	19.009
			60	748.0	17.691

**Table 10 Occupied Bandwidth 16QAM - Output**



<b>Modulation</b>	<b>Bandwidth (MHz)</b>	<b>Sub Carrier (kHz)</b>	<b>Operation Frequency (MHz)</b>	<b>Reading (MHz)</b>	
64QAM	5	15	730.5	4.4925	
		30	730.5	3.9402	
		15	743.0	4.4942	
		30	743.0	3.9390	
		15	755.5	4.4789	
		30	755.5	3.9402	
	10	10	15	733.0	9.2689
			30	733.0	8.5858
			60	733.0	7.8839
			15	743.0	9.2933
			30	743.0	8.5952
			60	743.0	7.8918
			15	753.0	9.2652
			30	753.0	8.5695
			60	753.0	7.8733
	15	15	15	735.5	14.101
			30	735.5	13.567
			60	735.5	12.885
			15	743.0	14.139
			30	743.0	13.597
			60	743.0	12.895
			15	750.5	14.088
			30	750.5	13.551
			60	750.5	12.859
	20	20	15	738.0	18.898
			30	738.0	18.196
			60	738.0	17.159
			15	743.0	18.943
			30	743.0	18.228
			60	743.0	17.192
			15	748.0	18.897
			30	748.0	18.193
			60	748.0	17.160

**Table 11 Occupied Bandwidth 64QAM - Output**

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
256QAM	5	15	730.5	4.4926	
		30	730.5	3.9371	
		15	743.0	4.5003	
		30	743.0	3.9472	
		15	755.5	4.4941	
		30	755.5	3.9381	
	10	10	15	733.0	9.2677
			30	733.0	8.5827
			60	733.0	7.8743
			15	743.0	9.2958
			30	743.0	8.6042
			60	743.0	7.8775
			15	753.0	9.2821
			30	753.0	8.5850
			60	753.0	7.8728
	15	15	15	735.5	14.104
			30	735.5	13.577
			60	735.5	12.889
			15	743.0	14.146
			30	743.0	13.614
			60	743.0	12.931
			15	750.5	14.105
			30	750.5	13.577
			60	750.5	12.880
	20	20	15	738.0	18.896
			30	738.0	18.218
			60	738.0	17.141
			15	743.0	18.924
			30	743.0	18.248
			60	743.0	17.188
			15	748.0	18.889
			30	748.0	18.234
			60	748.0	17.155

**Table 12 Occupied Bandwidth 256QAM - Output**

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
QPSK	5	15	730.5	4.4987	
		30	730.5	3.9716	
		15	743.0	4.4996	
		30	743.0	3.9675	
		15	755.5	4.4871	
		30	755.5	3.9591	
	10	10	15	733.0	9.3011
			30	733.0	8.6021
			60	733.0	7.9193
			15	743.0	9.3183
			30	743.0	8.6113
			60	743.0	7.9359
			15	753.0	9.2831
			30	753.0	8.5814
			60	753.0	7.8423
	15	15	15	735.5	14.112
			30	735.5	13.638
			60	735.5	12.956
			15	743.0	14.132
			30	743.0	13.683
			60	743.0	13.001
			15	750.5	14.081
			30	750.5	13.634
			60	750.5	12.948
	20	20	15	738.0	18.872
			30	738.0	18.256
			60	738.0	17.173
			15	743.0	18.901
			30	743.0	18.176
			60	743.0	17.218
			15	748.0	18.861
			30	748.0	18.148
			60	748.0	17.180

**Table 13 Occupied Bandwidth QPSK – Output**

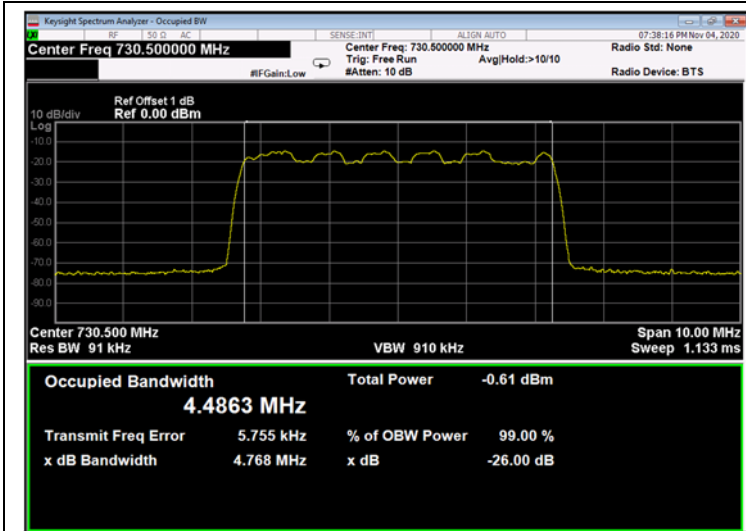


Figure 141: 16QAM 5MHz B.W.; 730.5MHz, 15kHz - Input

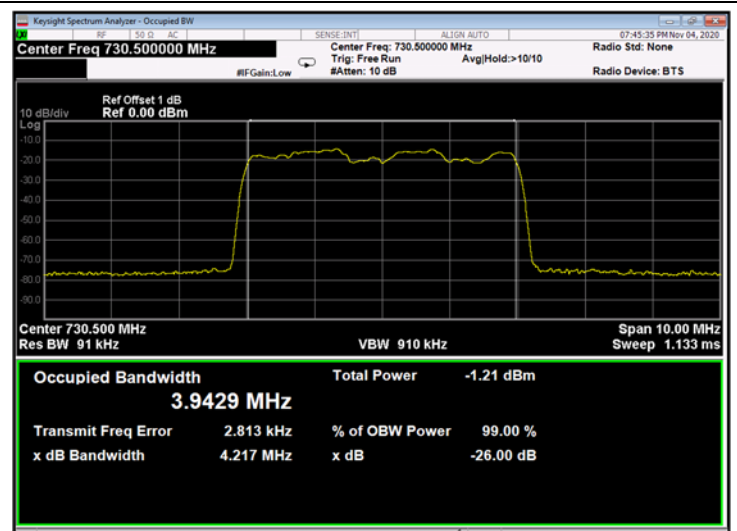


Figure 142: 16QAM 5MHz B.W.; 730.5MHz, 30kHz- Input

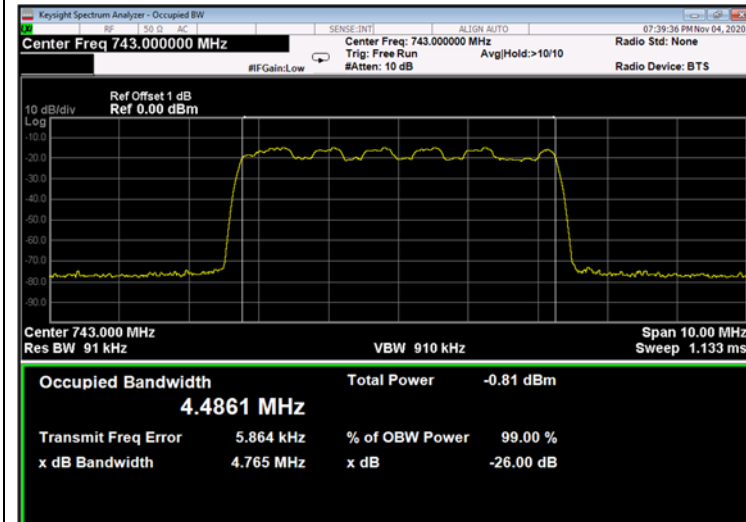


Figure 143: 16QAM 5MHz B.W.; 743.0MHz, 15kHz- Input

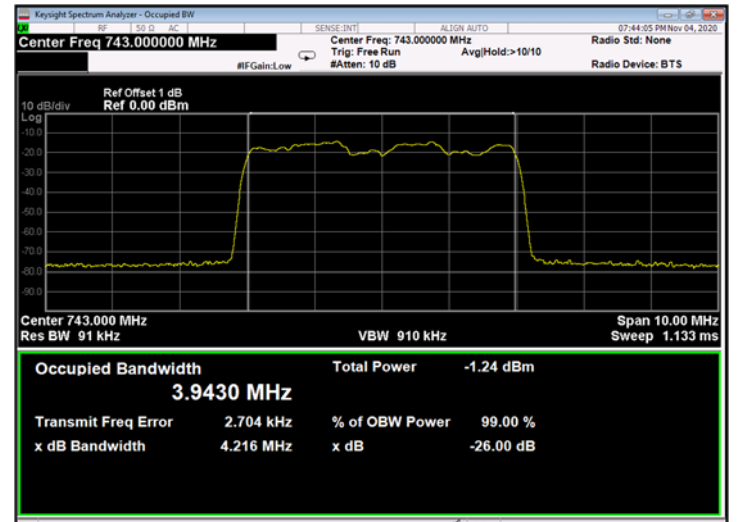


Figure 144: 16QAM 5MHz B.W.; 743.0MHz, 30kHz- Input

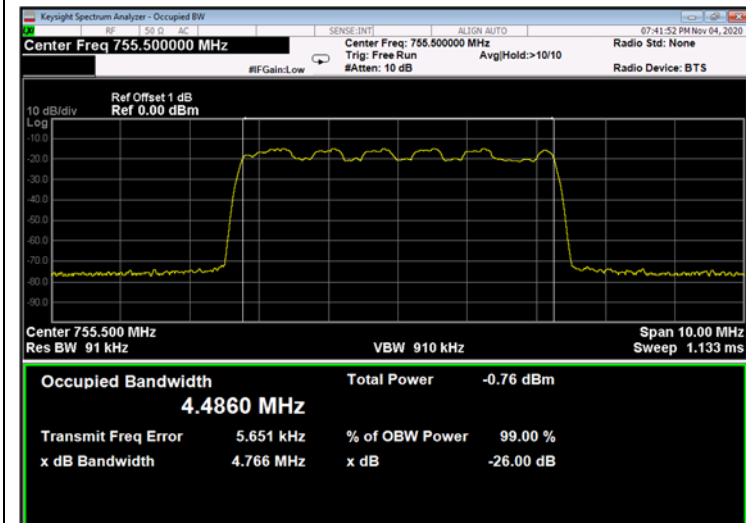


Figure 145: 16QAM 5MHz B.W.; 755.5MHz, 15kHz- Input

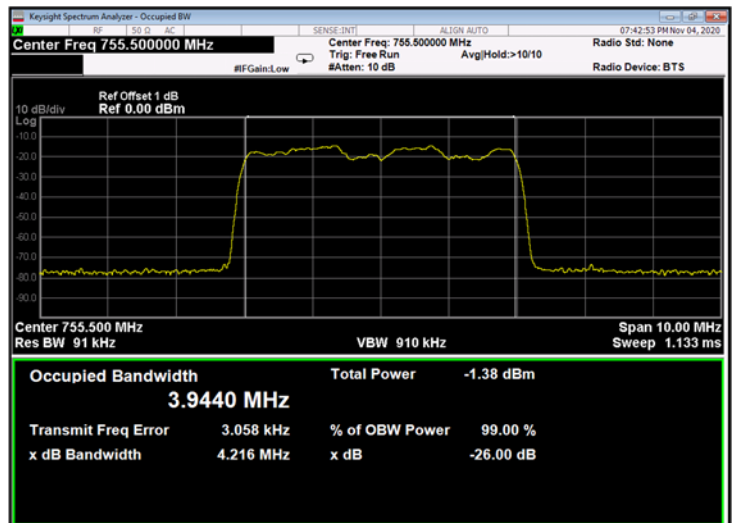


Figure 146: 16QAM 5MHz; 755.5MHz, 30kHz- Input

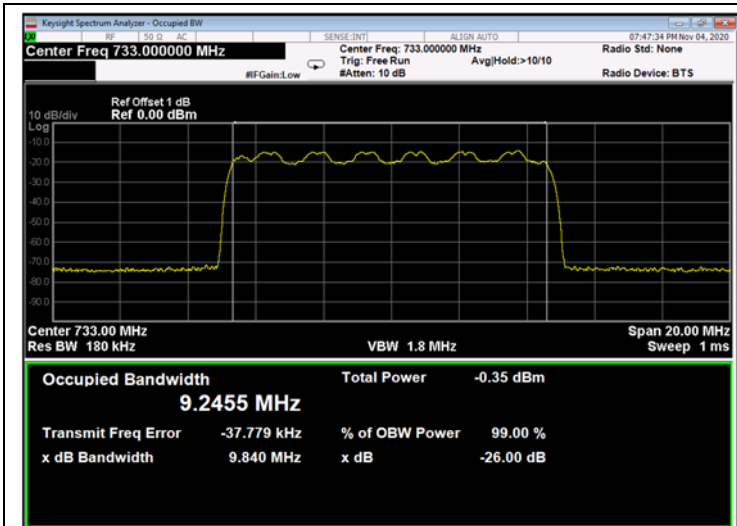


Figure 147: 16QAM 10MHz B.W.; 733.0MHz, 15kHz- Input

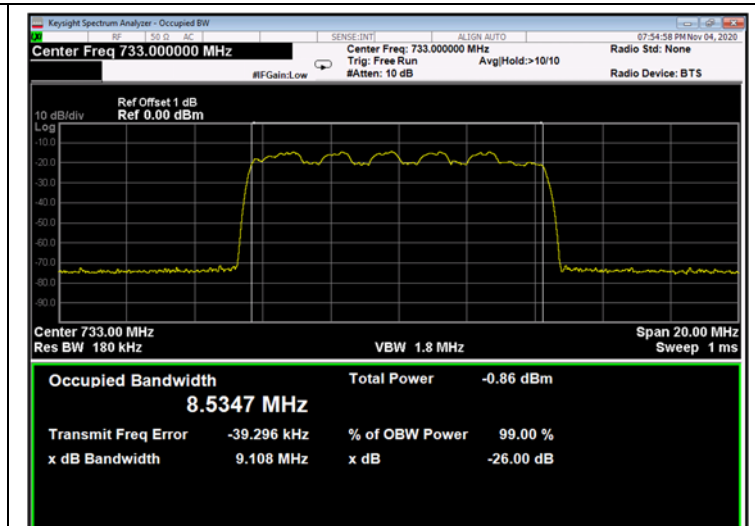


Figure 148: 16QAM 10MHz B.W.; 733.0MHz, 30kHz- Input

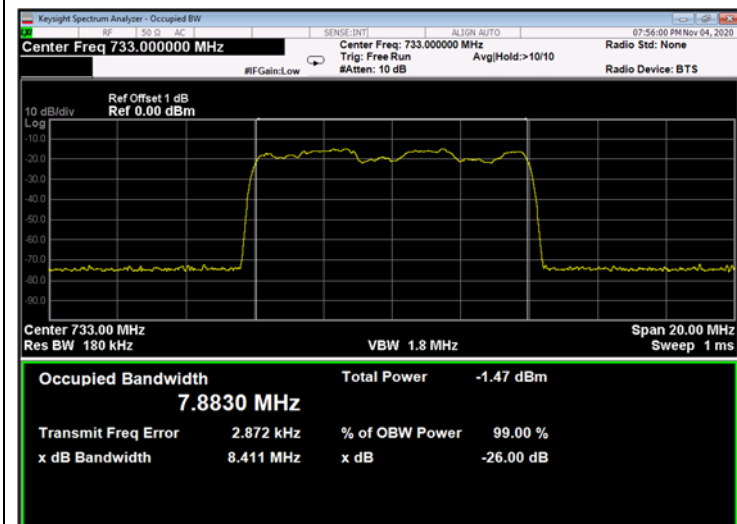


Figure 149: 16QAM 10MHz B.W.; 733.0MHz, 60kHz- Input

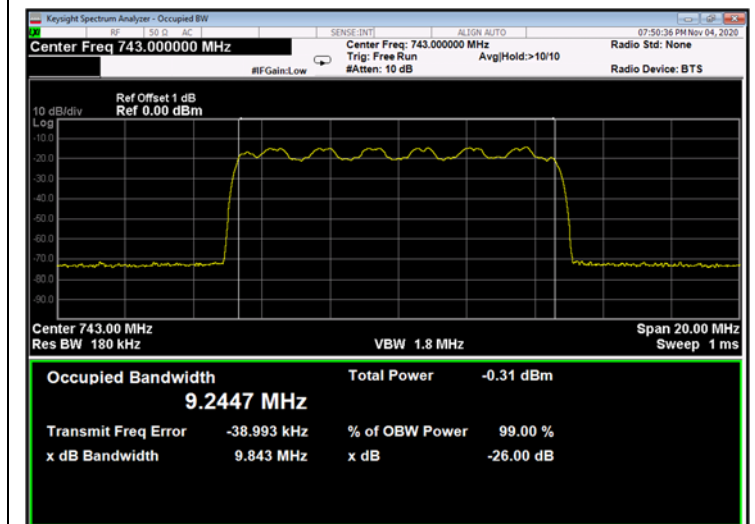


Figure 150: 16QAM 10MHz B.W.; 743.0MHz, 15kHz- Input

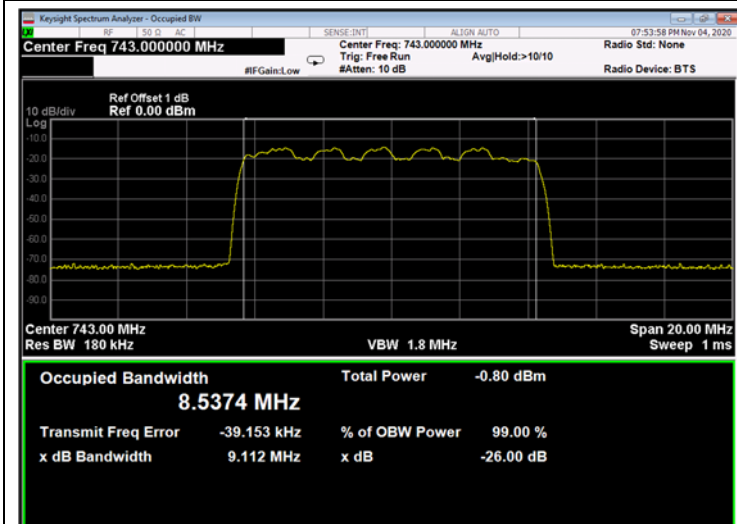


Figure 151: 16QAM 10MHz B.W.; 743.0MHz, 30kHz- Input

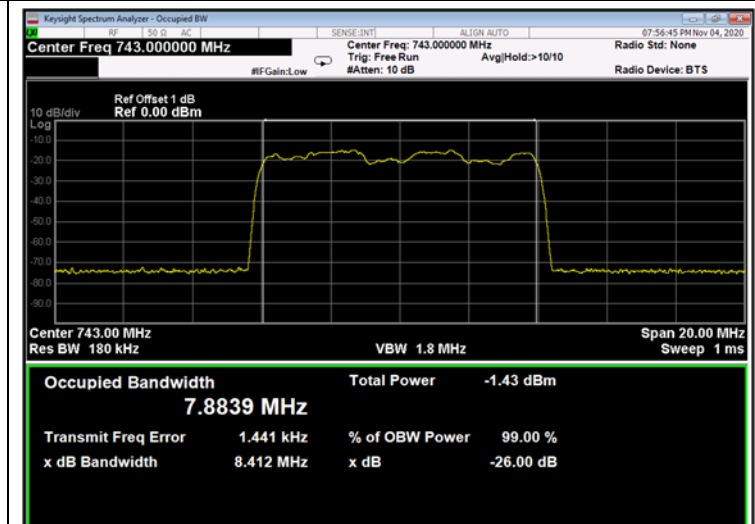


Figure 152: 16QAM 10MHz B.W.; 743.0MHz, 60kHz - Input



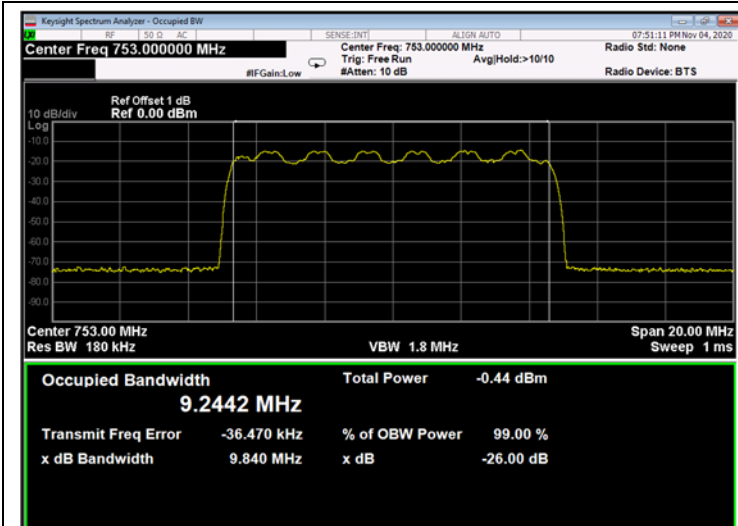


Figure 153: 16QAM 10MHz B.W.; 753.0MHz, 15kHz - Input

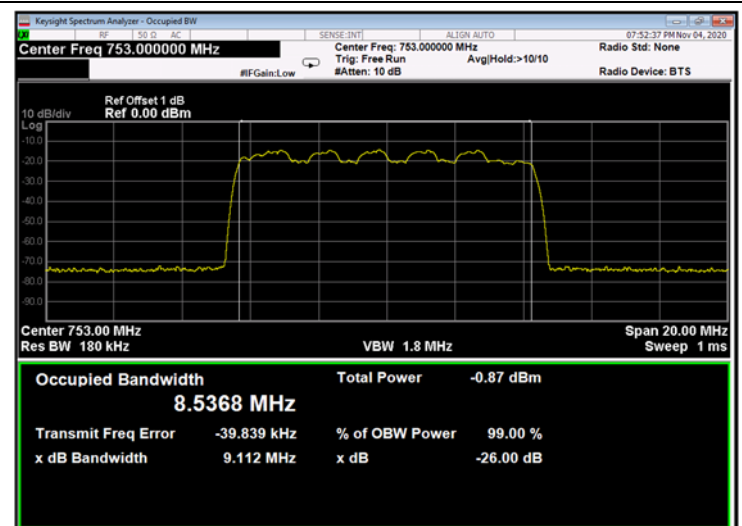


Figure 154: 16QAM 10MHz B.W.; 753.0MHz, 30kHz - Input

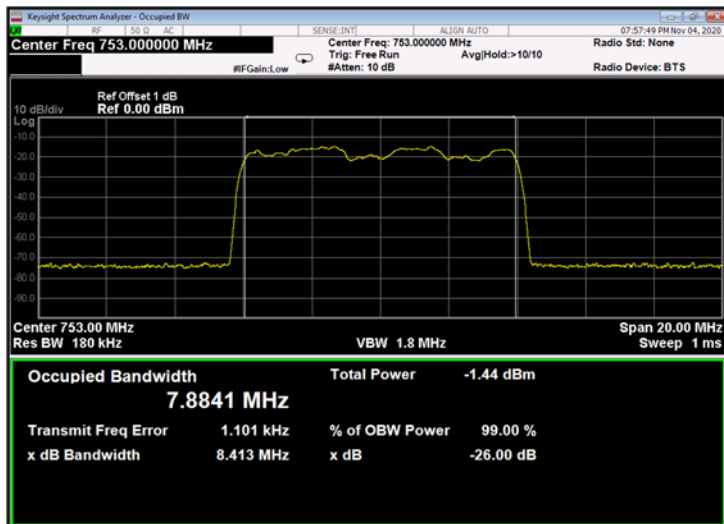


Figure 155: 16QAM 10MHz B.W.; 753.0MHz, 60kHz - Input

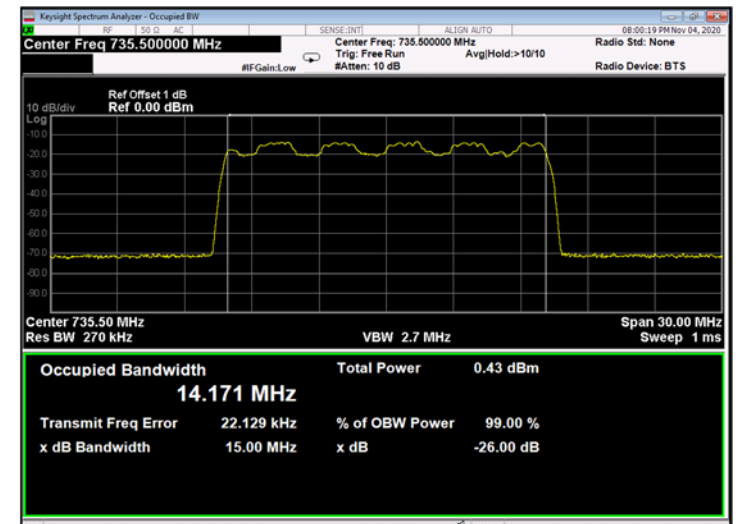


Figure 156: 16QAM 15MHz B.W.; 735.5MHz, 15kHz - Input

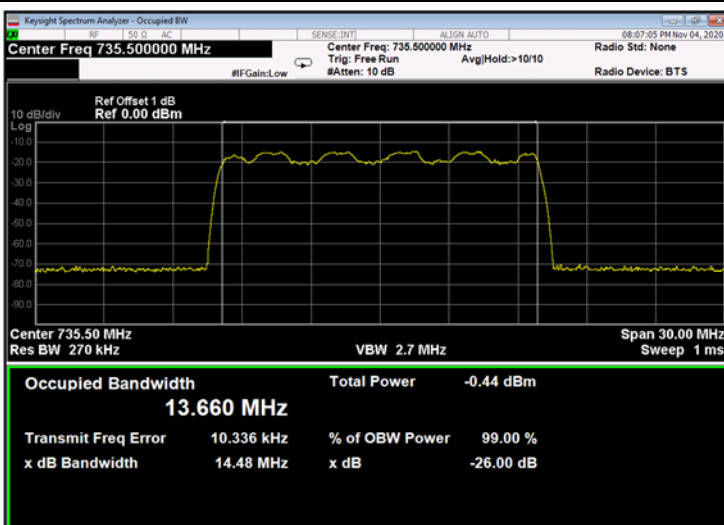


Figure 157: 16QAM 15MHz B.W.; 735.5MHz, 30kHz - Input

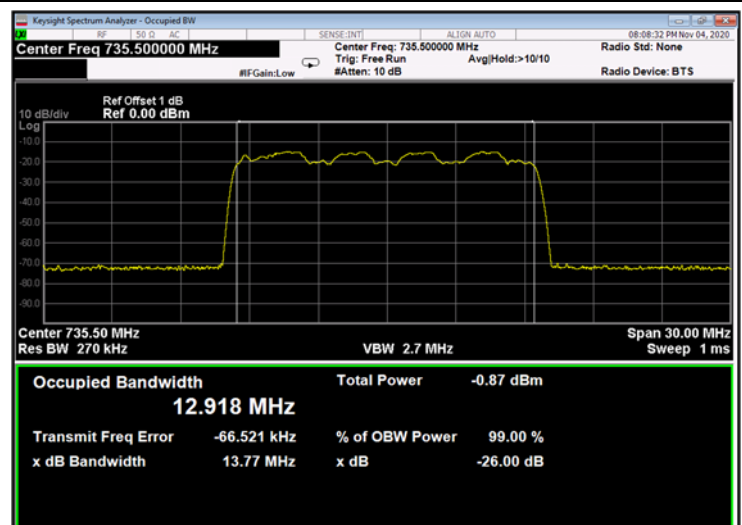


Figure 158: 16QAM 10MHz B.W.; 735.5MHz, 60kHz - Input