

Figure 92: 256QAM 15MHz B.W.; 743.0MHz, 15kHz

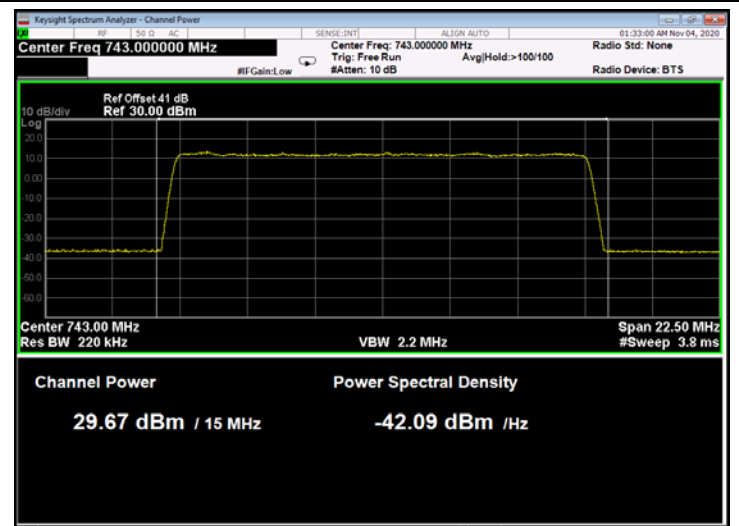


Figure 93: 256QAM 15MHz B.W.; 743.0MHz, 30kHz

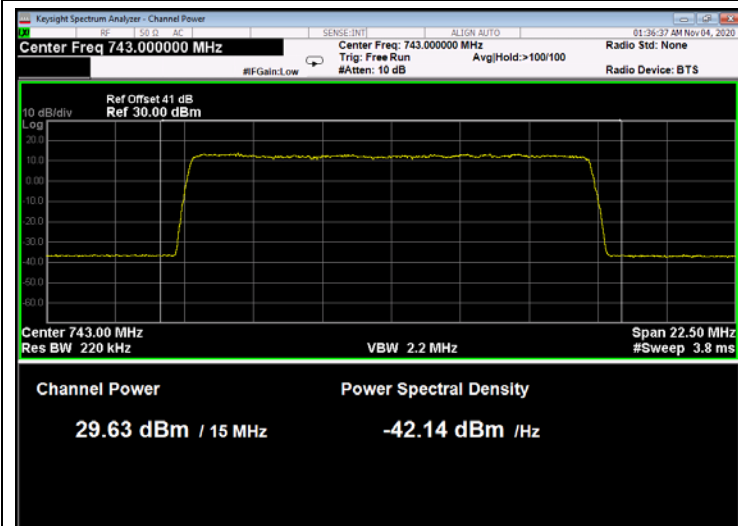


Figure 94: 256QAM 15MHz B.W.; 743.0MHz, 60kHz

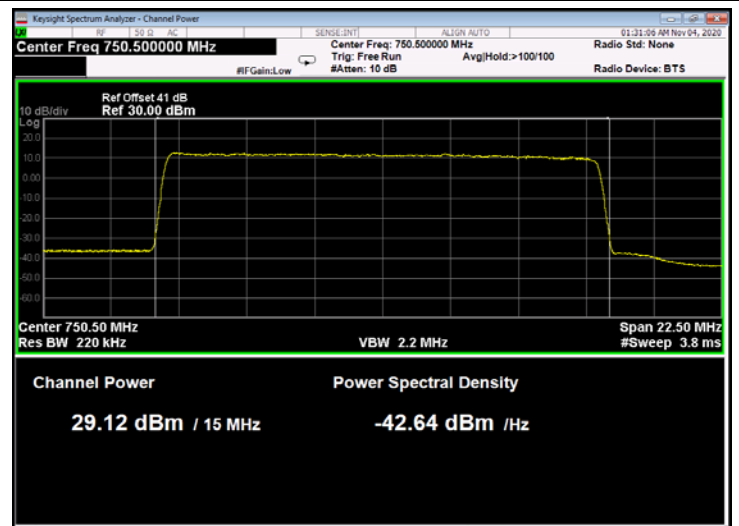


Figure 95: 256QAM 15MHz B.W.; 750.5MHz, 15kHz

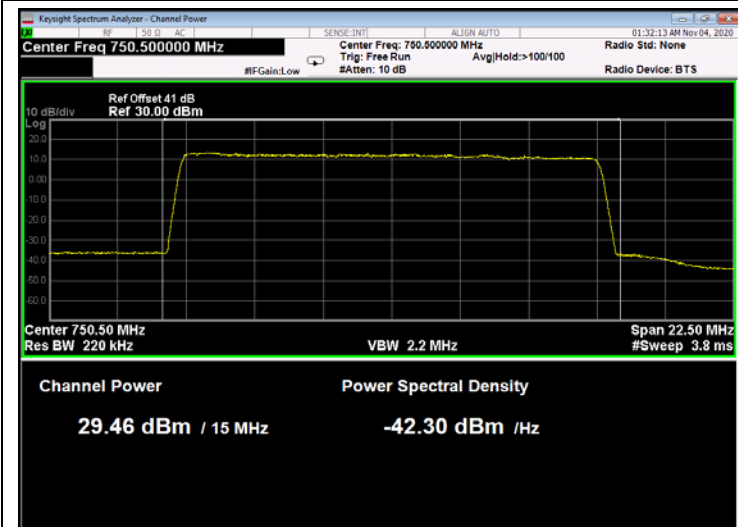


Figure 96: 256QAM 15MHz B.W.; 750.5MHz, 30kHz

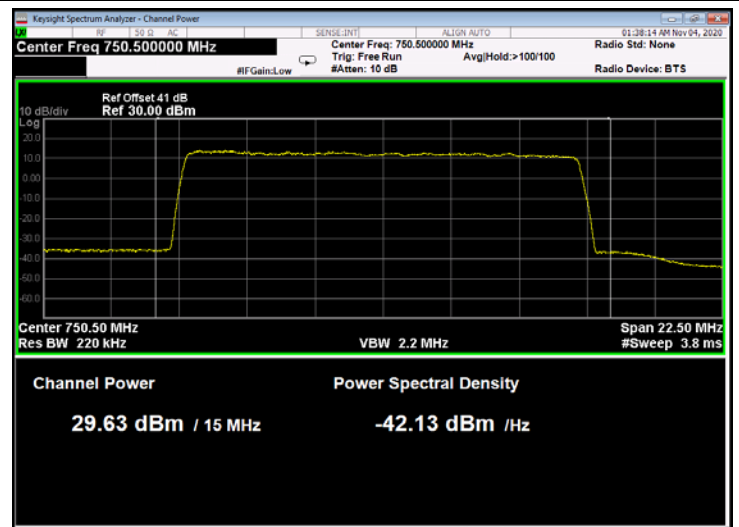


Figure 97: 256QAM 15MHz B.W.; 750.5MHz, 60kHz

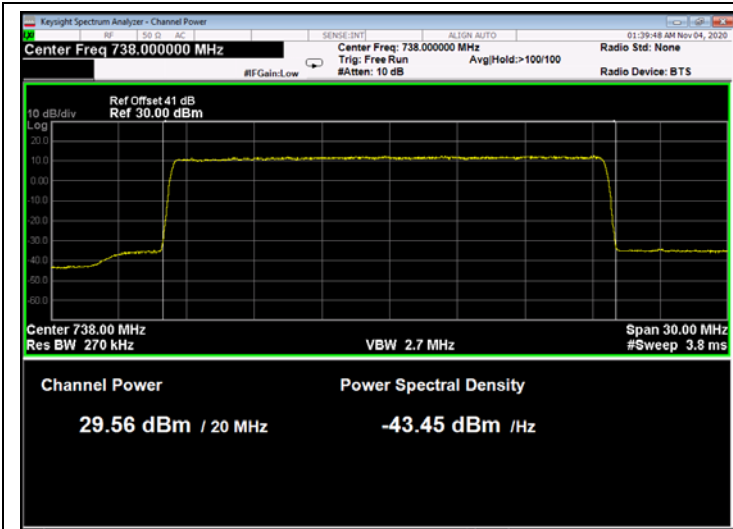


Figure 98: 256QAM 20MHz B.W.; 738.0MHz, 15kHz

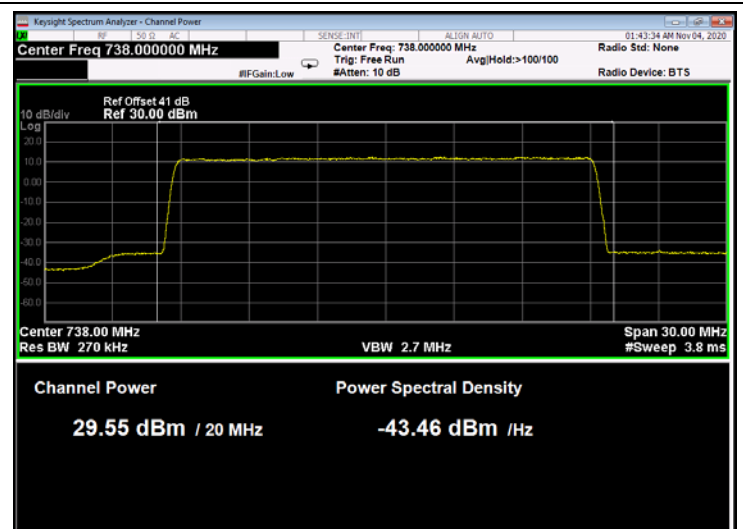


Figure 99: 256QAM 20MHz B.W.; 738.0MHz, 30kHz

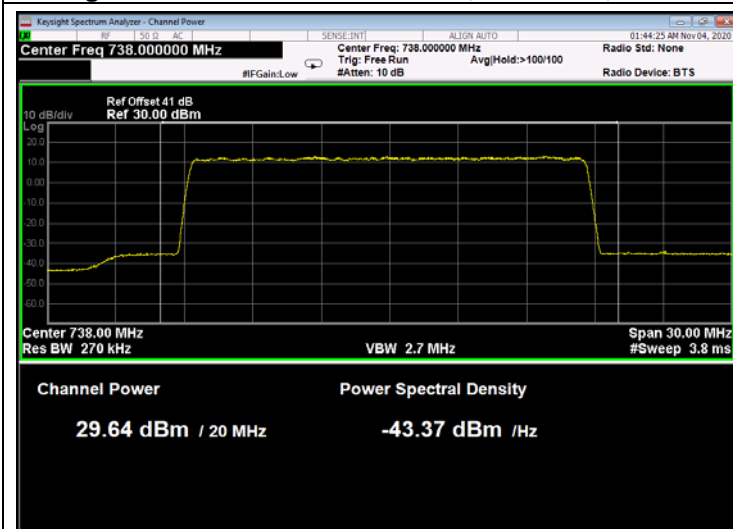


Figure 100: 256QAM 20MHz B.W.; 738.0MHz, 60kHz

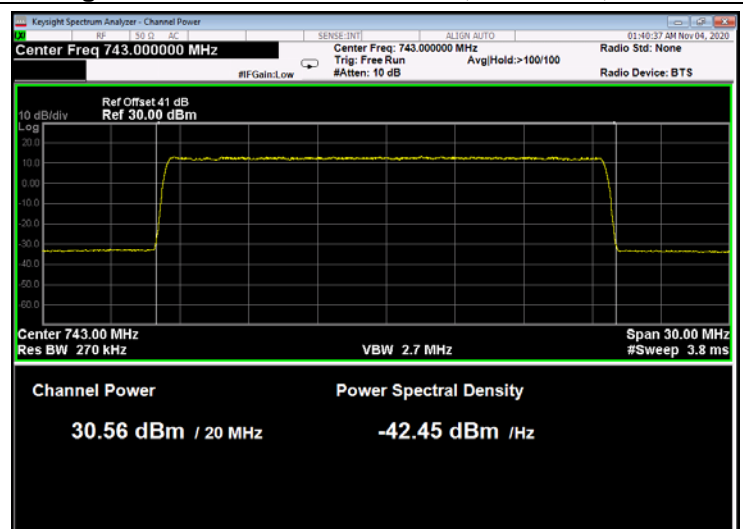


Figure 101: 256QAM 20MHz B.W.; 743.0MHz, 15kHz

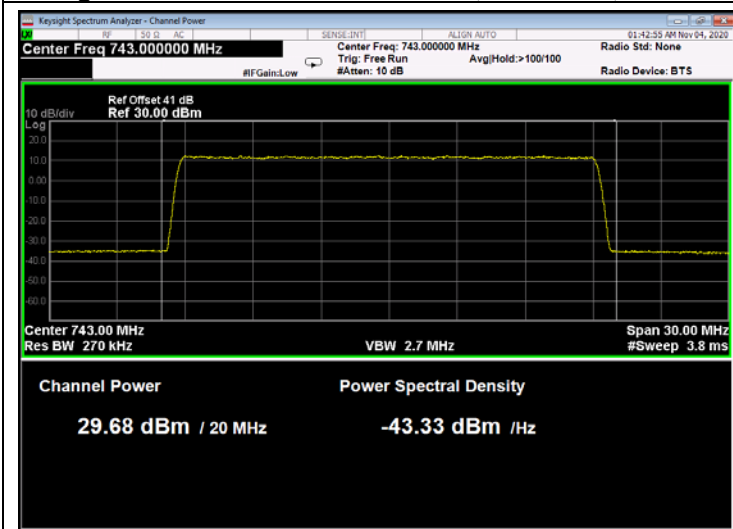


Figure 102: 256QAM 20MHz B.W.; 743.0MHz, 30kHz

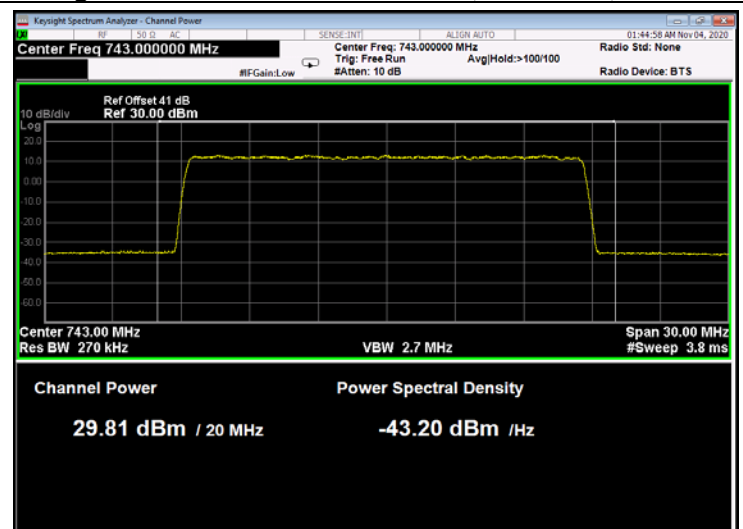


Figure 103: 256QAM 20MHz B.W.; 743.0MHz, 60kHz

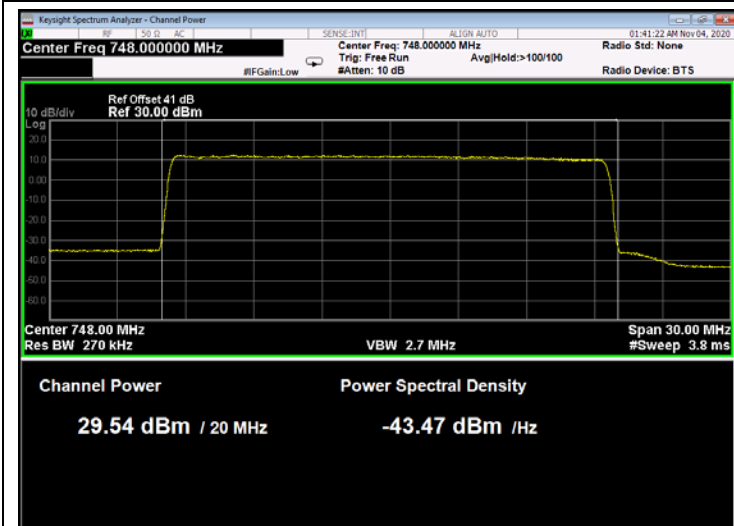


Figure 104: 256QAM 20MHz B.W.; 748.0MHz, 15kHz

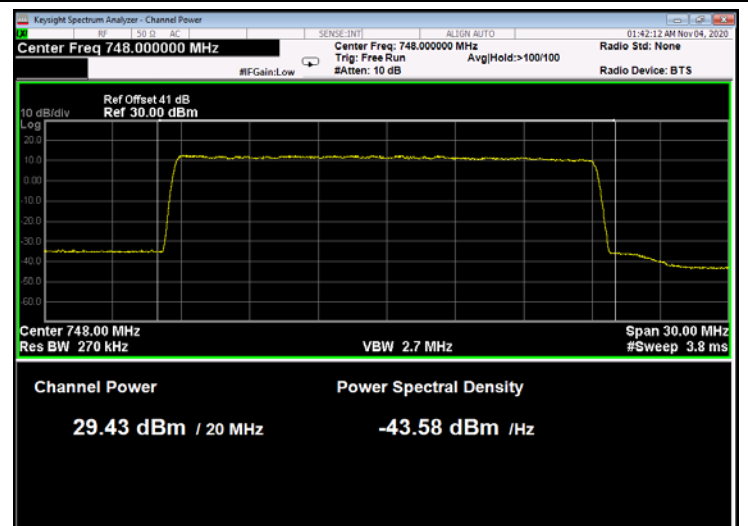


Figure 105: 256QAM 20MHz B.W.; 748.0MHz, 30kHz

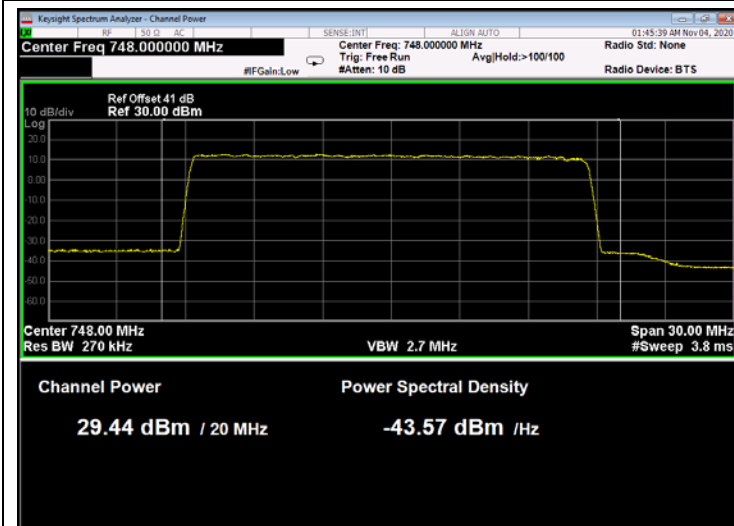


Figure 106: 256QAM 20MHz B.W.; 748.0MHz, 60kHz

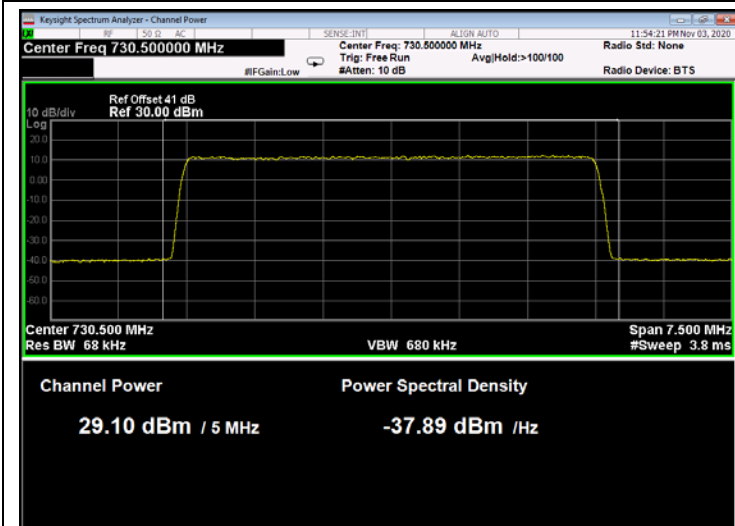


Figure 107: QPSK 5MHz B.W.; 730.5MHz, 15kHz

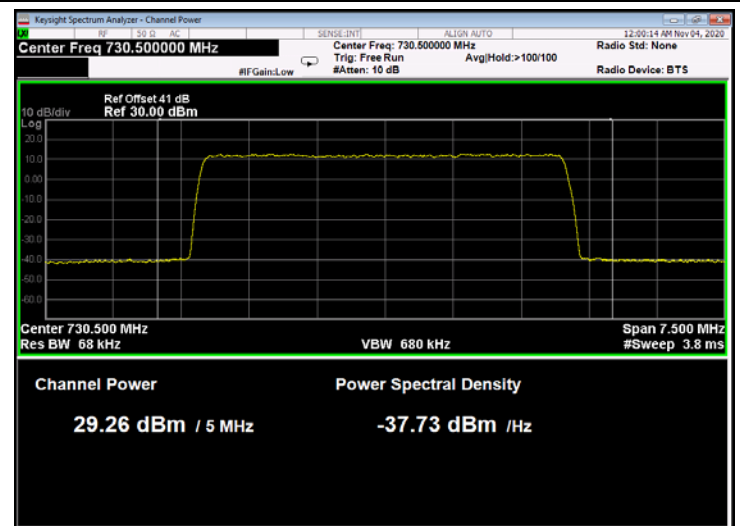


Figure 108: QPSK 5MHz B.W.; 730.5MHz, 30kHz

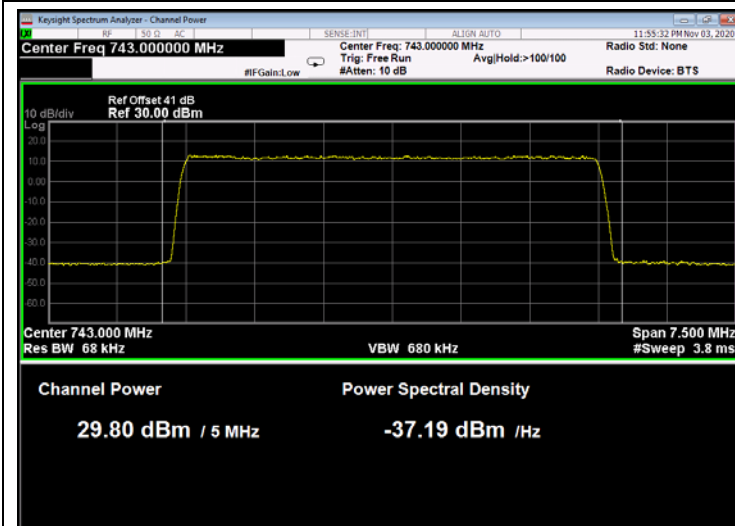


Figure 109: QPSK 5MHz B.W.; 743.0MHz, 15kHz

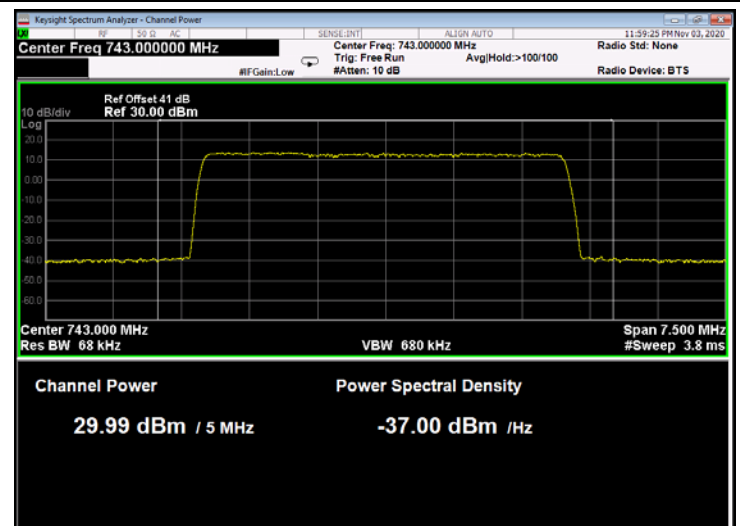


Figure 110: QPSK 5MHz B.W.; 743.0MHz, 30kHz

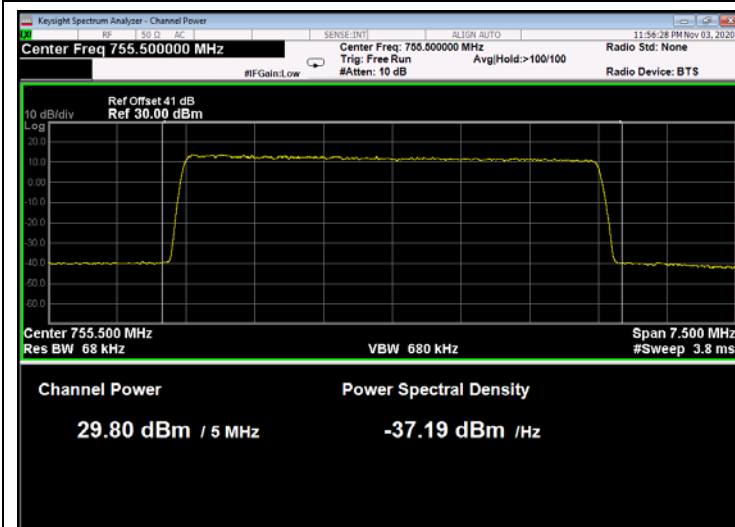


Figure 111: QPSK 5MHz B.W.; 755.5MHz, 15kHz

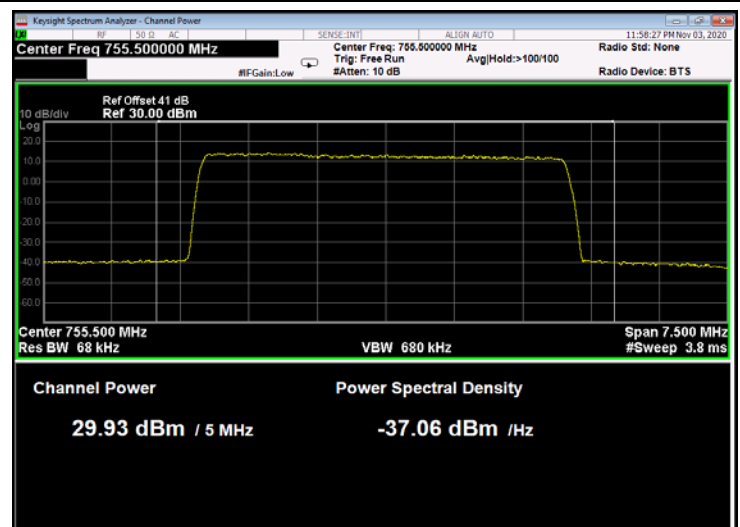


Figure 112: QPSK 5MHz B.W.; 755.5MHz, 30kHz

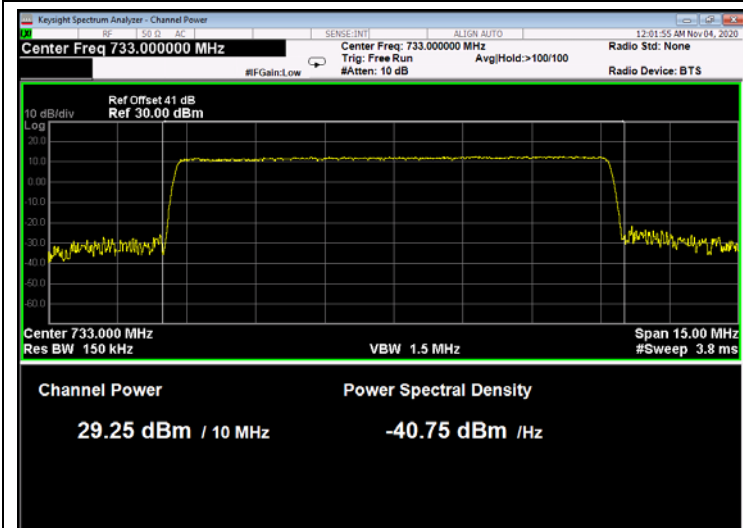


Figure 113: QPSK 10MHz B.W.; 733.0MHz, 15kHz

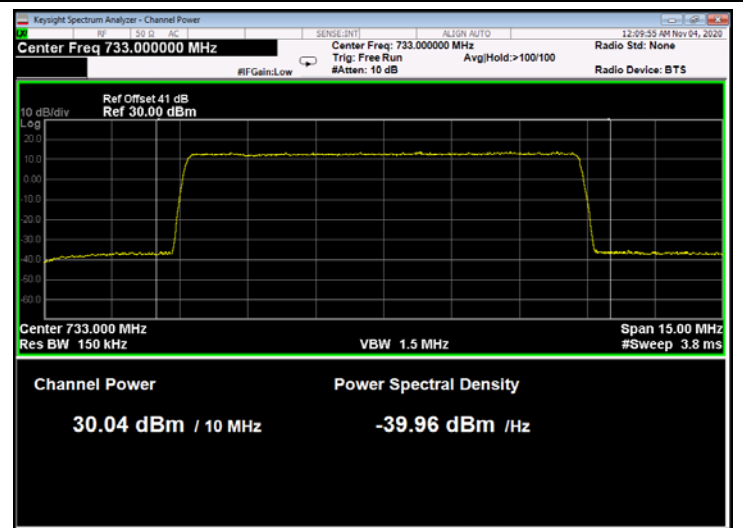


Figure 114: QPSK 10MHz B.W.; 733.0MHz, 30kHz

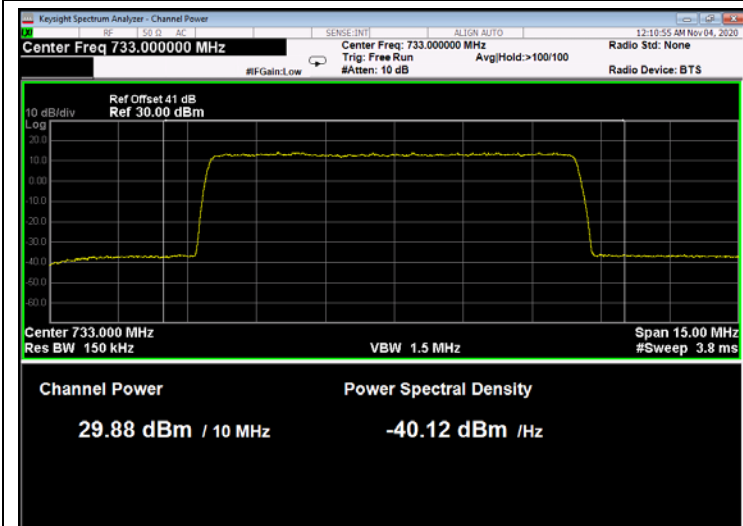


Figure 115: QPSK 10MHz B.W.; 733.0MHz, 60kHz

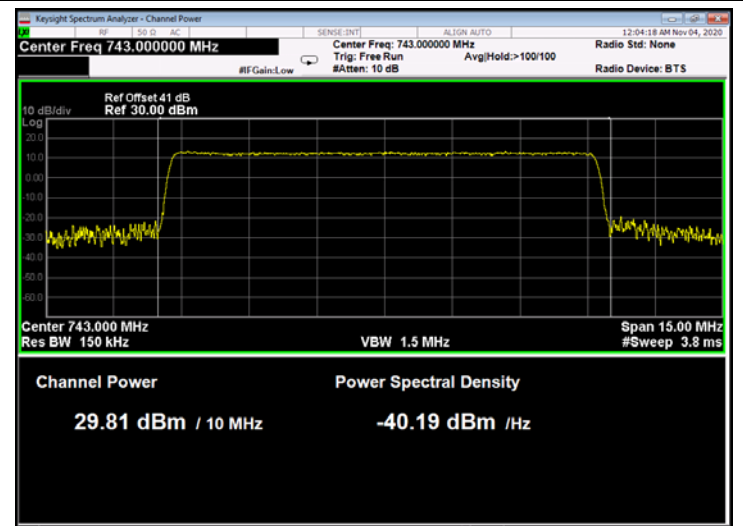


Figure 116: QPSK 10MHz B.W.; 743.0MHz, 15kHz

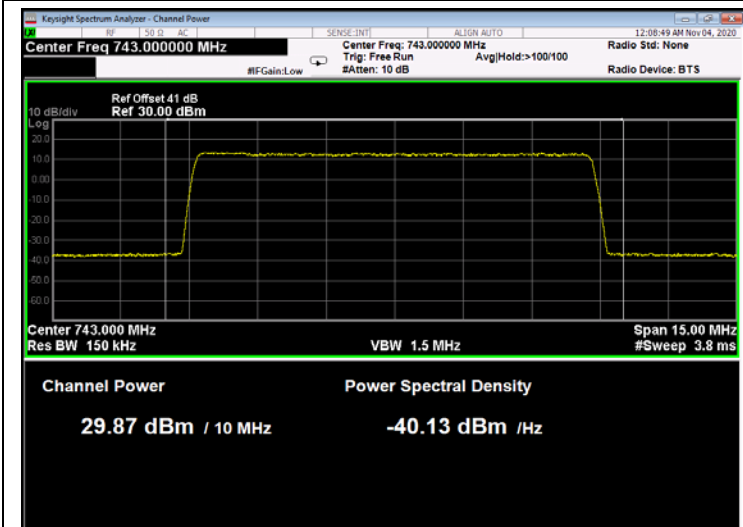


Figure 117: QPSK 10MHz B.W.; 743.0MHz, 30kHz

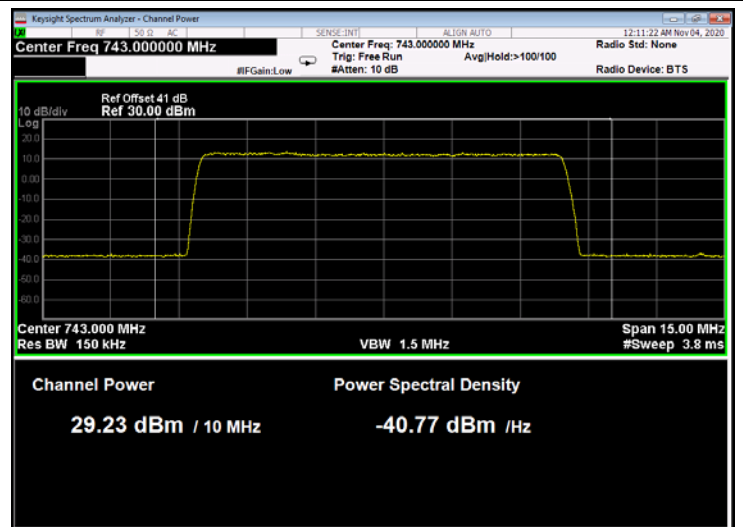


Figure 118: QPSK 10MHz B.W.; 743.0MHz, 60kHz

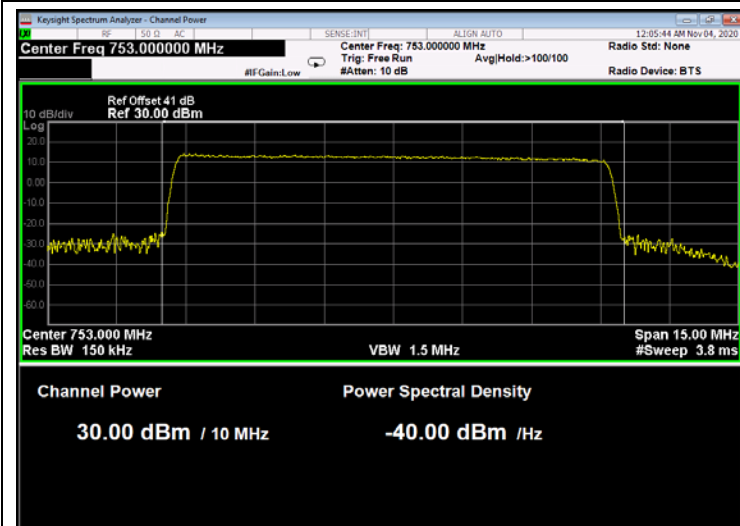


Figure 119: QPSK 10MHz B.W.; 753.0MHz, 15kHz

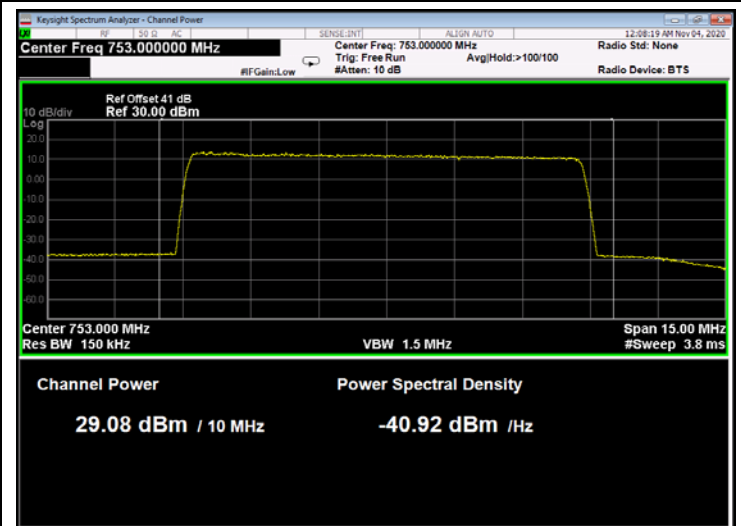


Figure 120: QPSK 10MHz B.W.; 753.0MHz, 30kHz

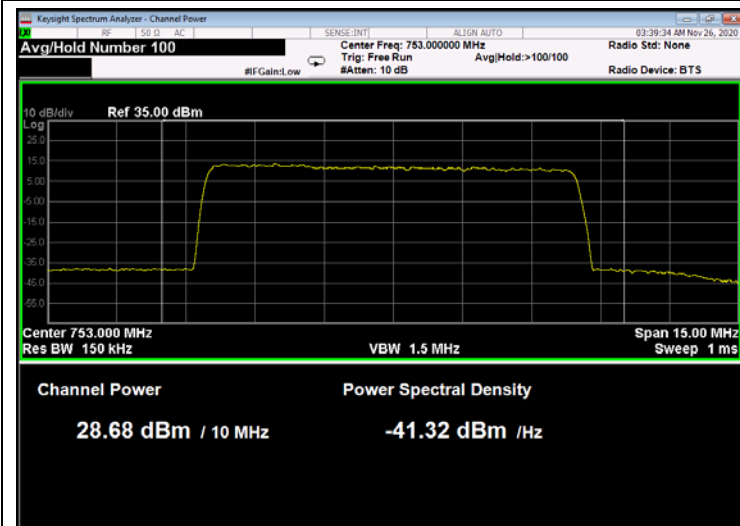


Figure 121: QPSK 10MHz B.W.; 753.0MHz, 60kHz

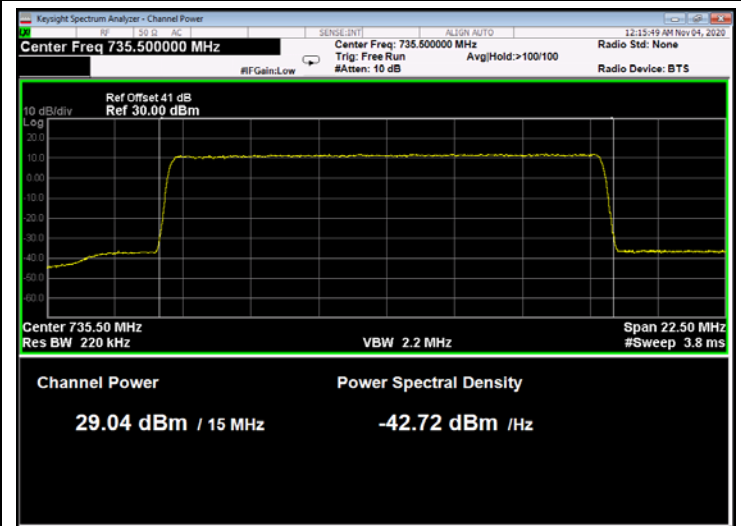


Figure 122: QPSK 15MHz B.W.; 735.5MHz, 15kHz

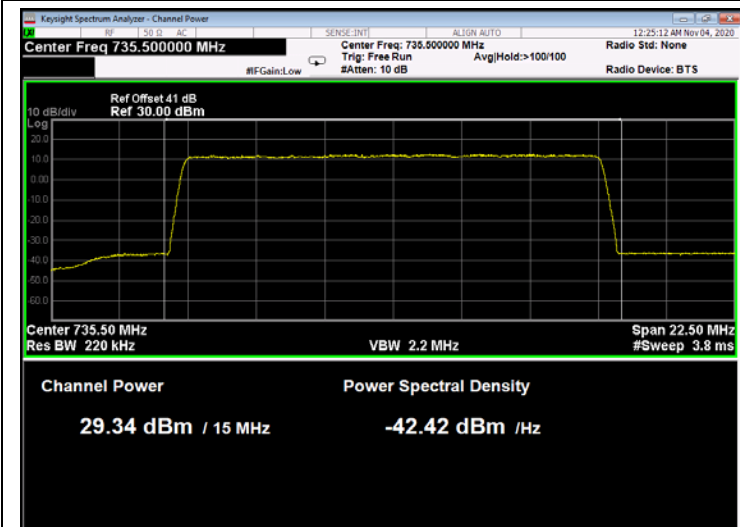


Figure 123: QPSK 15MHz B.W.; 735.5MHz, 30kHz

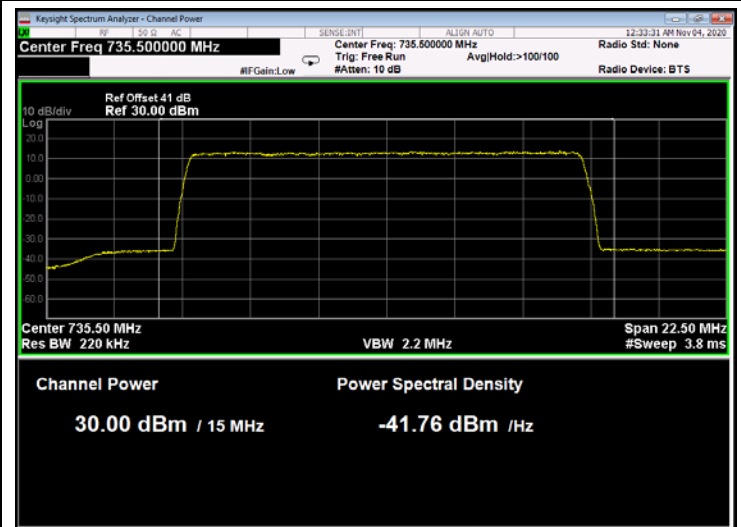


Figure 124: QPSK 15MHz B.W.; 735.5MHz, 60kHz

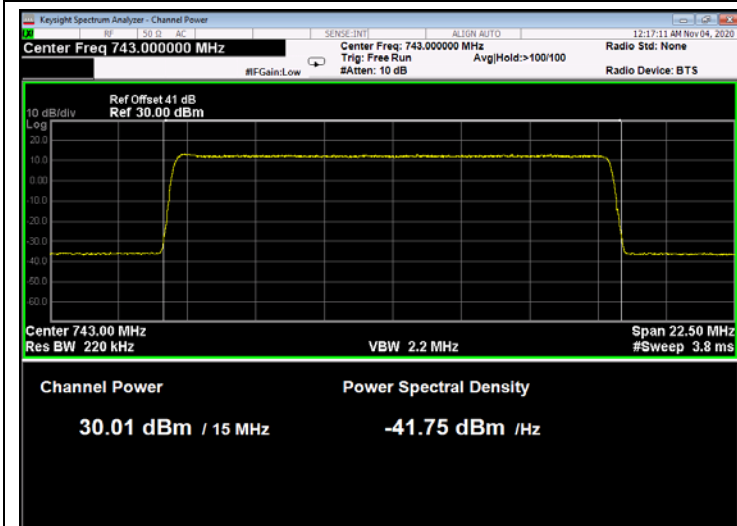


Figure 125: QPSK 15MHz B.W.; 743.0MHz, 15kHz

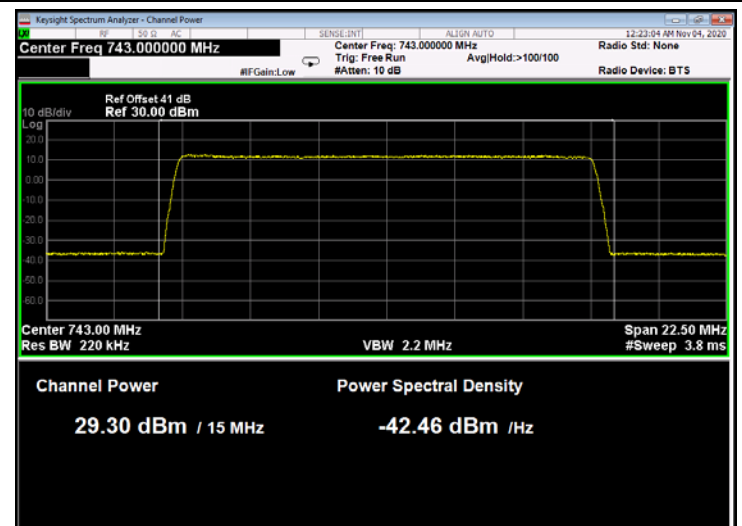


Figure 126: QPSK 15MHz B.W.; 743.0MHz, 30kHz

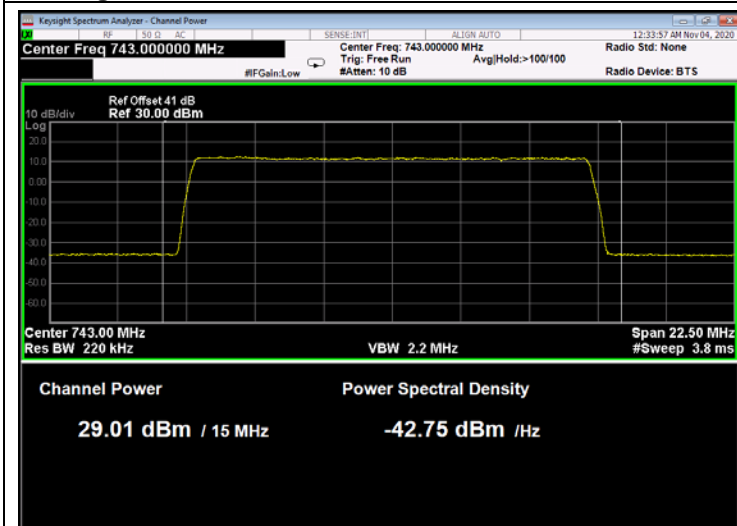


Figure 127: QPSK 15MHz B.W.; 743.0MHz, 60kHz

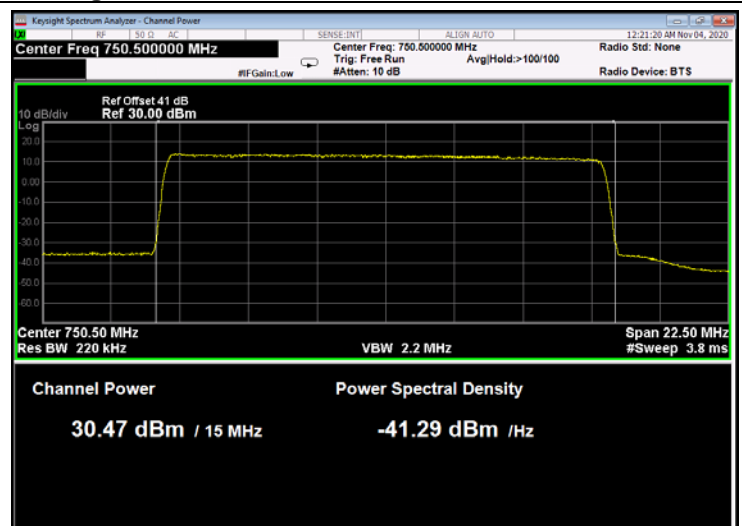


Figure 128: QPSK 15MHz B.W.; 750.5MHz, 15kHz

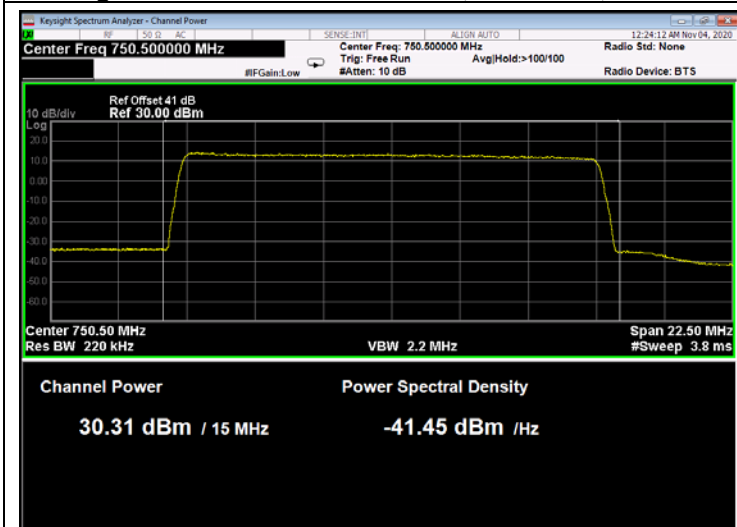


Figure 129: QPSK 15MHz B.W.; 750.5MHz, 30kHz

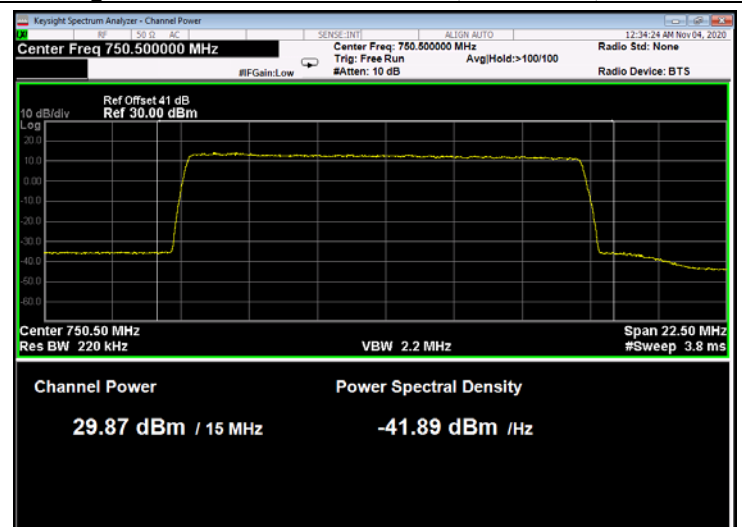


Figure 130: QPSK 15MHz B.W.; 750.5MHz, 60kHz

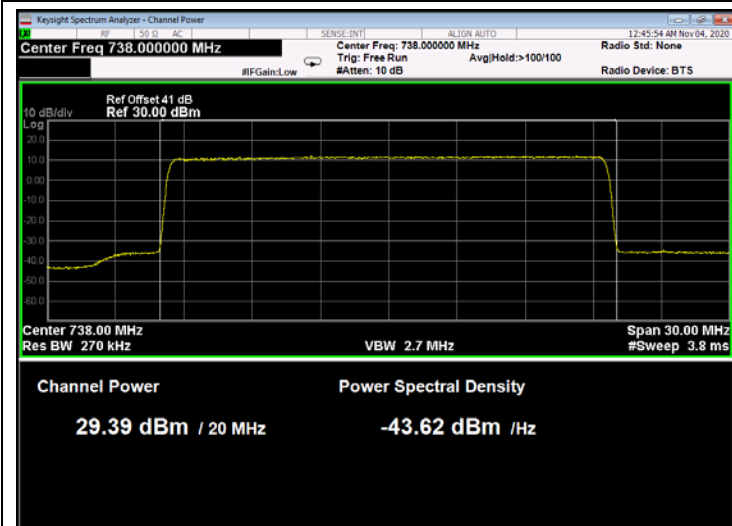


Figure 131: QPSK 20MHz B.W.; 738.0MHz, 15kHz

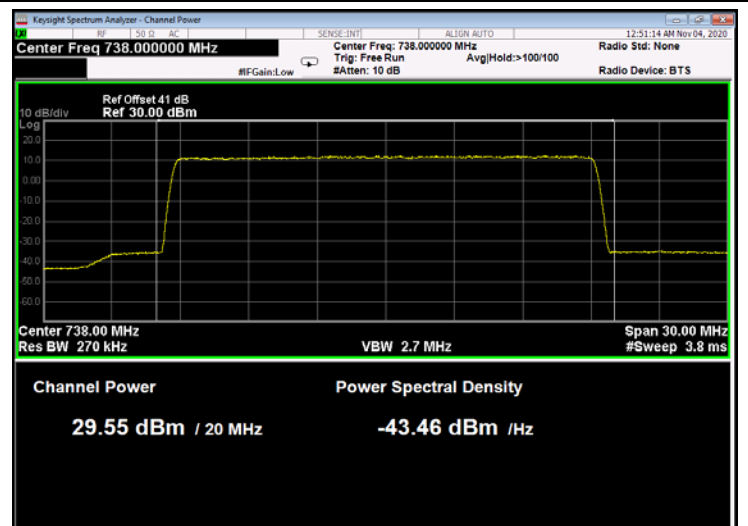


Figure 132: QPSK 20MHz B.W.; 738.0MHz, 30kHz

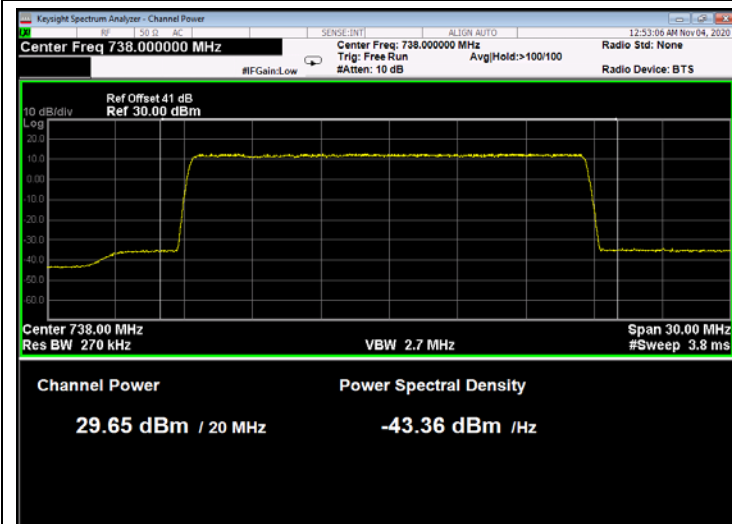


Figure 133: QPSK 20MHz B.W.; 738.0MHz, 60kHz

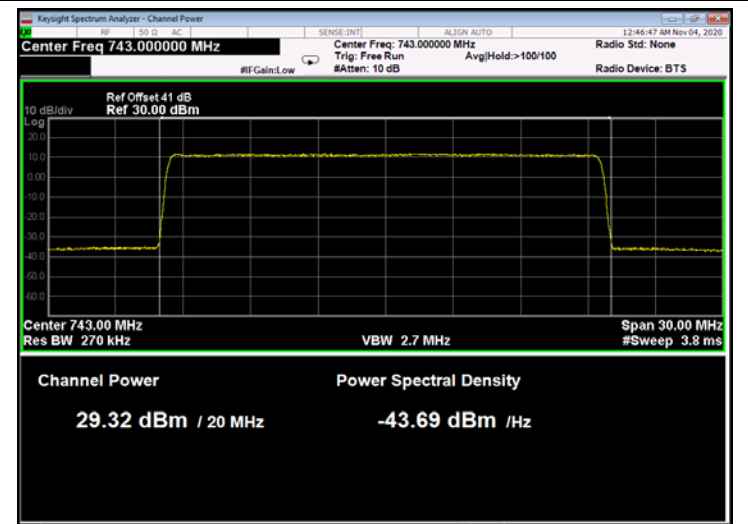


Figure 134: QPSK 20MHz B.W.; 743.0MHz, 15kHz

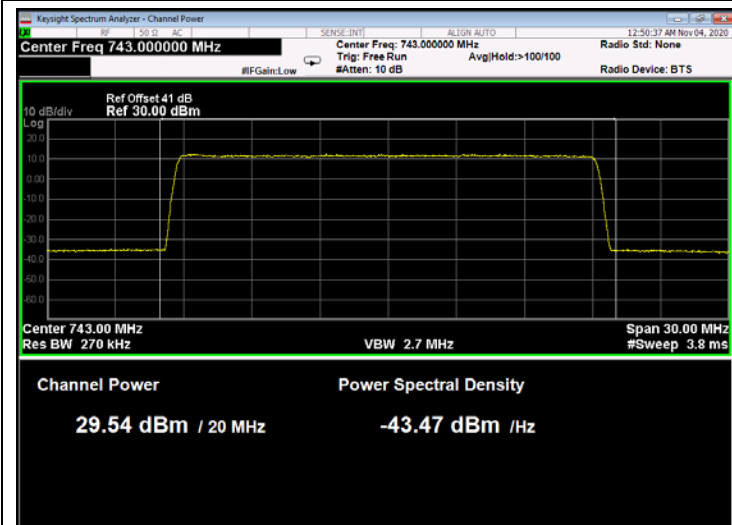


Figure 135: QPSK 20MHz B.W.; 743.0MHz, 30kHz

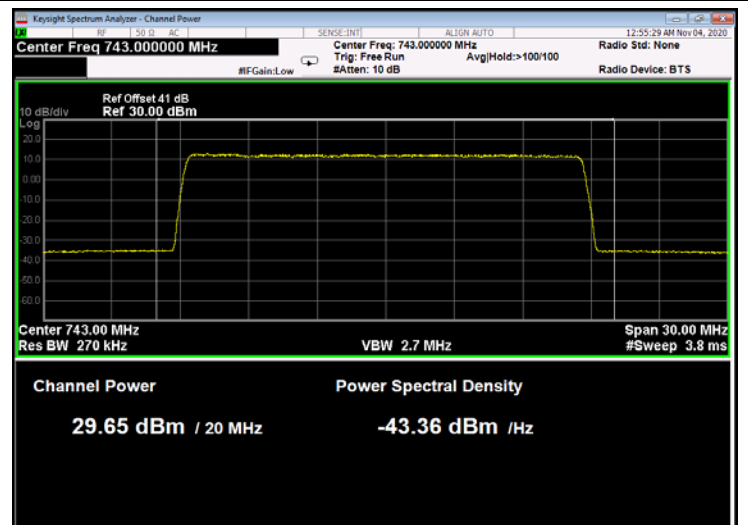


Figure 136: QPSK 20MHz B.W.; 743.0MHz, 60kHz

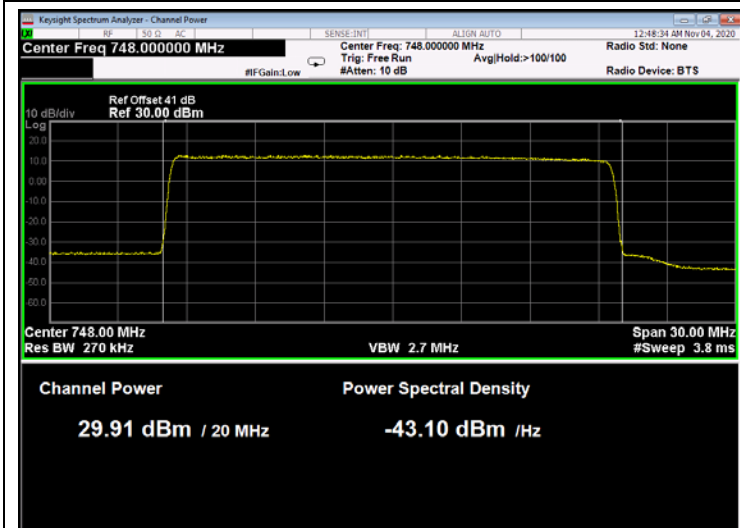


Figure 137: QPSK 20MHz B.W.; 748.0MHz, 15kHz

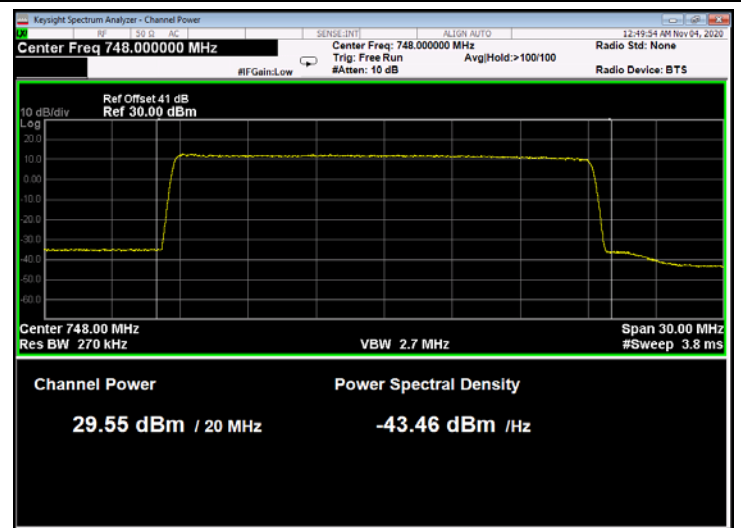


Figure 138: QPSK 20MHz B.W.; 748.0MHz, 30kHz

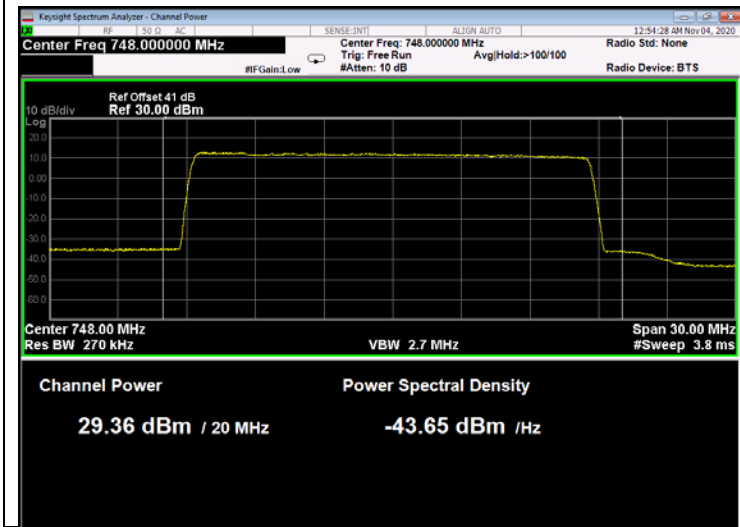


Figure 139: QPSK 20MHz B.W.; 748.0MHz, 60kHz



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	November 28, 2020
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 140 to Figure 403.

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
16QAM	5	15	730.5	4.4863	
		30	730.5	3.9429	
		15	743.0	4.4861	
		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	9.2447
			30	743.0	8.5374
			60	743.0	7.8839
			15	753.0	9.2442
			30	753.0	8.5368
			60	753.0	7.8841
	15	15	15	735.5	14.171
			30	735.5	13.660
			60	735.5	12.918
			15	743.0	14.170
			30	743.0	13.663
			60	743.0	12.916
			15	750.5	14.163
			30	750.5	13.662
			60	750.5	12.919
	20	20	15	738.0	18.987
			30	738.0	18.330
			60	738.0	17.127
			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	17.147

Table 6 Occupied Bandwidth 16QAM - Input

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
64QAM	5	15	730.5	4.4926	
		30	730.5	3.9440	
		15	743.0	4.4943	
		30	743.0	3.9449	
		15	755.5	4.4924	
		30	755.5	3.9442	
	10	10	15	733.0	9.3153
			30	733.0	8.5896
			60	733.0	7.8900
			15	743.0	9.3138
			30	743.0	8.5896
			60	743.0	7.8859
			15	753.0	9.3145
			30	753.0	8.5897
			60	753.0	7.8874
	15	15	15	735.5	14.146
			30	735.5	13.604
			60	735.5	12.894
			15	743.0	14.140
			30	743.0	13.603
			60	743.0	12.895
			15	750.5	14.143
			30	750.5	13.608
			60	750.5	12.889
	20	20	15	738.0	18.968
			30	738.0	18.235
			60	738.0	17.188
			15	743.0	18.972
			30	743.0	18.242
			60	743.0	17.188
			15	748.0	18.973
			30	748.0	18.234
			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	4.4956
		30	730.5	3.9580
		15	743.0	4.4965
		30	743.0	3.9567
		15	755.5	4.4955
		30	755.5	3.9579
	10	15	733.0	9.3001
			733.0	8.5854
			733.0	7.8851
		30	743.0	9.2915
			743.0	8.5855
			743.0	7.8840
		60	753.0	9.3016
			753.0	8.5858
			753.0	7.8839
	15	15	735.5	14.183
			735.5	13.616
			735.5	12.939
		30	743.0	14.195
			743.0	13.617
			743.0	12.947
		60	750.5	14.191
			750.5	13.610
			750.5	12.944
	20	15	738.0	18.968
			738.0	18.258
			738.0	17.167
		30	743.0	18.967
			743.0	18.254
			743.0	17.167
		60	748.0	18.971
			748.0	18.260
			748.0	17.169

Table 8 Occupied Bandwidth 256QAM - Input

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
QPSK	5	15	730.5	4.4951	
		30	730.5	3.9672	
		15	743.0	4.4922	
		30	743.0	3.9673	
		15	755.5	4.4957	
		30	755.5	3.9666	
	10	10	15	733.0	9.3094
			30	733.0	8.5965
			60	733.0	7.9284
			15	743.0	9.3111
			30	743.0	8.5962
			60	743.0	7.9288
			15	753.0	9.3068
			30	753.0	8.5997
			60	753.0	7.9278
	15	15	15	735.5	14.152
			30	735.5	13.670
			60	735.5	12.995
			15	743.0	14.147
			30	743.0	13.669
			60	743.0	12.994
			15	750.5	14.154
			30	750.5	13.670
			60	750.5	12.994
	20	20	15	738.0	18.938
			30	738.0	18.217
			60	738.0	71.193
			15	743.0	18.935
			30	743.0	18.210
			60	743.0	17.191
			15	748.0	18.911
			30	748.0	18.218
			60	748.0	17.198

Table 9 Occupied Bandwidth QPSK – Input

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
16QAM	5	15	730.5	4.4818	
		30	730.5	3.9403	
		15	743.0	4.4866	
		30	743.0	3.9433	
		15	755.5	4.4830	
		30	755.5	3.9398	
	10	10	15	733.0	9.2450
			30	733.0	8.5301
			60	733.0	7.8746
			15	743.0	9.2654
			30	743.0	8.5398
			60	743.0	7.8823
			15	753.0	9.2272
			30	753.0	8.5078
			60	753.0	7.8710
	15	15	15	735.5	14.145
			30	735.5	13.635
			60	735.5	12.897
			15	743.0	14.207
			30	743.0	13.662
			60	743.0	12.911
			15	750.5	14.146
			30	750.5	13.642
			60	750.5	12.864
	20	20	15	738.0	19.103
			30	738.0	18.271
			60	738.0	17.135
			15	743.0	19.175
			30	743.0	18.318
			60	743.0	17.137
			15	748.0	19.060
			30	748.0	18.294
			60	748.0	17.094

Table 10 Occupied Bandwidth 16QAM - Output

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
64QAM	5	15	730.5	4.4887	
		30	730.5	3.9405	
		15	743.0	4.4926	
		30	743.0	3.9455	
		15	755.5	4.4879	
		30	755.5	3.9406	
	10	10	15	733.0	9.3023
			30	733.0	8.5830
			60	733.0	7.8796
			15	743.0	9.3147
			30	743.0	8.5898
			60	743.0	7.8856
			15	753.0	9.3015
			30	753.0	8.5747
			60	753.0	7.8717
	15	15	15	735.5	14.121
			30	735.5	13.577
			60	735.5	12.874
			15	743.0	14.138
			30	743.0	13.595
			60	743.0	12.892
			15	750.5	14.100
			30	750.5	13.567
			60	750.5	12.859
	20	20	15	738.0	18.928
			30	738.0	18.210
			60	738.0	17.166
			15	743.0	18.951
			30	743.0	18.213
			60	743.0	17.173
			15	748.0	18.903
			30	748.0	18.182
			60	748.0	17.142

Table 11 Occupied Bandwidth 64QAM - Output

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
256QAM	5	15	730.5	4.4917	
		30	730.5	3.9379	
		15	743.0	4.4957	
		30	743.0	3.9421	
		15	755.5	4.4940	
		30	755.5	3.9386	
	10	10	15	733.0	9.2871
			30	733.0	8.5728
			60	733.0	7.8771
			15	743.0	9.2998
			30	743.0	8.5863
			60	743.0	7.8844
			15	753.0	9.2842
			30	753.0	8.5709
			60	753.0	7.8724
	15	15	15	735.5	14.121
			30	735.5	13.592
			60	735.5	12.923
			15	743.0	14.141
			30	743.0	13.613
			60	743.0	12.937
			15	750.5	14.106
			30	750.5	13.583
			60	750.5	12.907
	20	20	15	738.0	18.919
			30	738.0	18.227
			60	738.0	17.140
			15	743.0	18.930
			30	743.0	18.240
			60	743.0	17.148
			15	748.0	18.904
			30	748.0	18.210
			60	748.0	17.115

Table 12 Occupied Bandwidth 256QAM - Output

Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)
QPSK	5	15	730.5	4.4927
		30	730.5	3.9640
		15	743.0	4.4948
		30	743.0	3.9671
		15	755.5	4.4886
		30	755.5	3.9635
	10	15	733.0	9.2968
			733.0	8.5852
			733.0	7.9160
		30	743.0	9.3108
			743.0	8.5955
			743.0	7.9225
		60	753.0	9.2938
			753.0	8.5823
			753.0	7.9143
	15	15	735.5	14.129
			735.5	13.650
			735.5	12.963
		30	743.0	14.144
			743.0	13.666
			743.0	12.988
		60	750.5	14.099
			750.5	13.632
			750.5	12.959
	20	15	738.0	18.886
			738.0	18.190
			738.0	17.167
		30	743.0	18.905
			743.0	18.190
			743.0	17.183
		60	748.0	18.834
			748.0	18.166
			748.0	17.145

Table 13 Occupied Bandwidth QPSK – Output

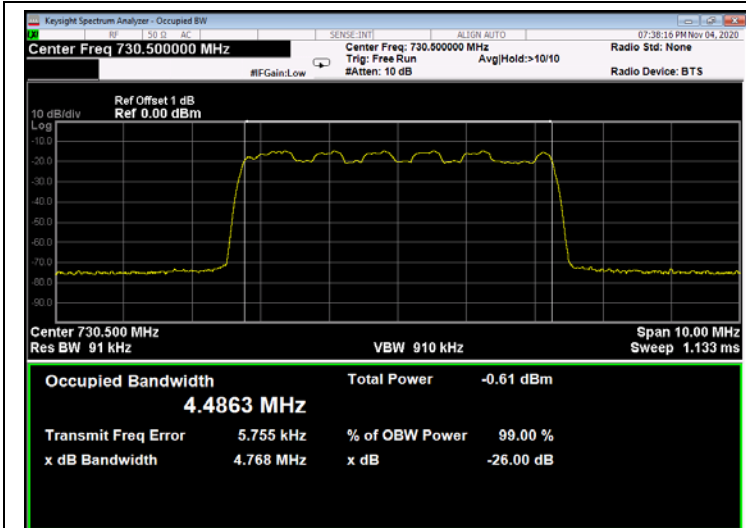


Figure 140: 16QAM 5MHz B.W.; 730.5MHz, 15kHz - Input

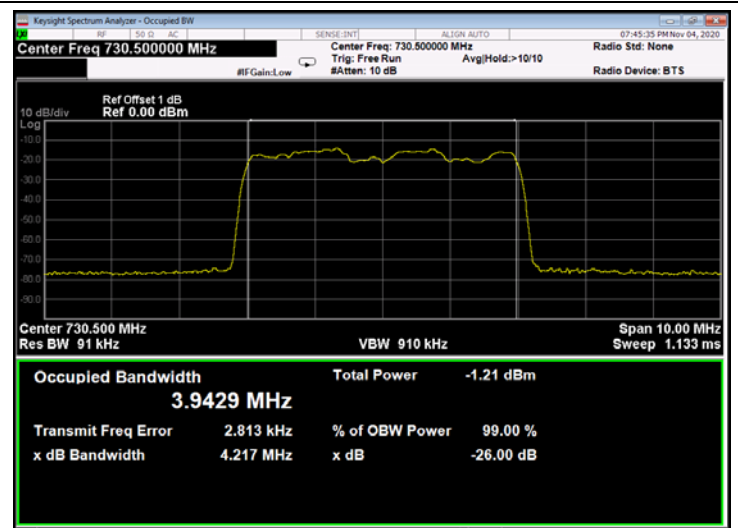


Figure 141: 16QAM 5MHz B.W.; 730.5MHz, 30kHz- Input

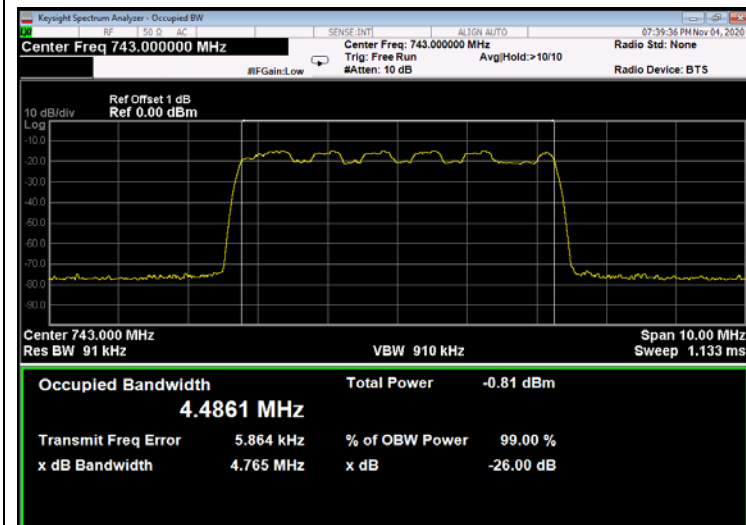


Figure 142: 16QAM 5MHz B.W.; 743.0MHz, 15kHz- Input

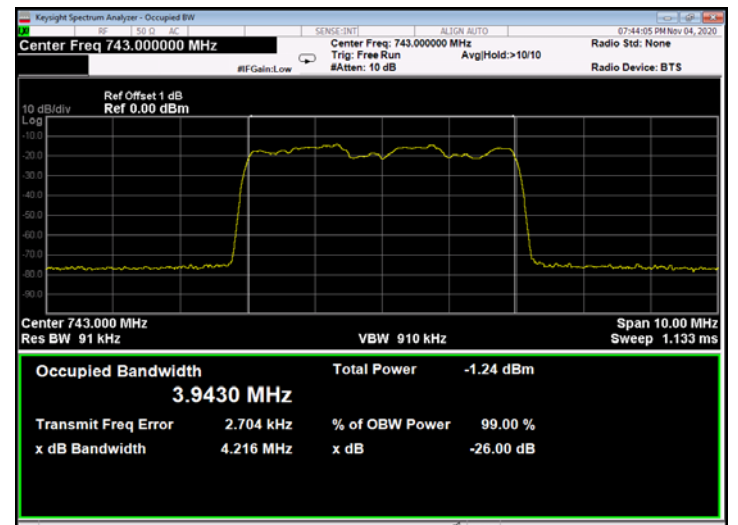


Figure 143: 16QAM 5MHz B.W.; 743.0MHz, 30kHz- Input

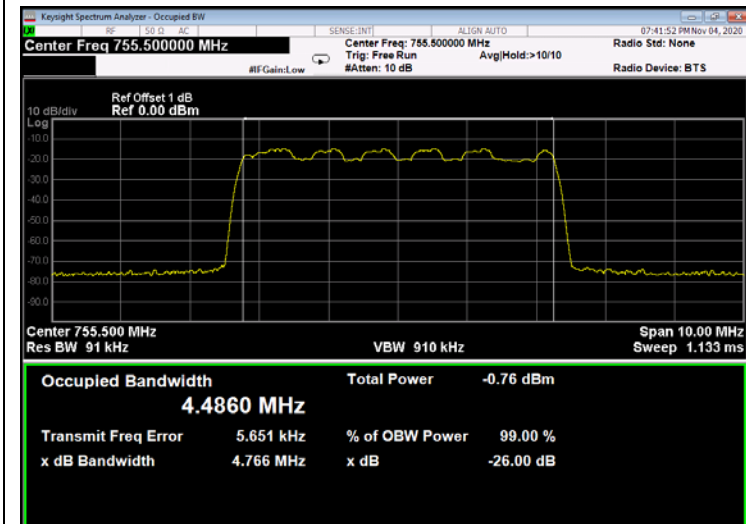


Figure 144: 16QAM 5MHz B.W.; 755.5MHz, 15kHz- Input

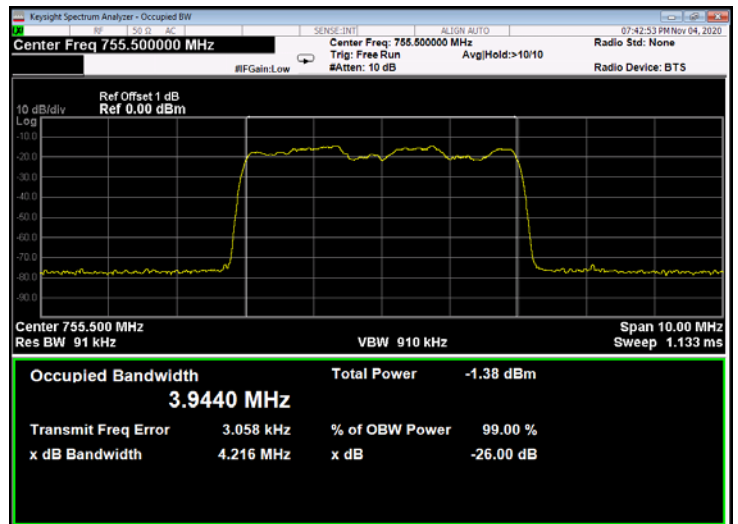


Figure 145: 16QAM 5MHz; 755.5MHz, 30kHz- Input

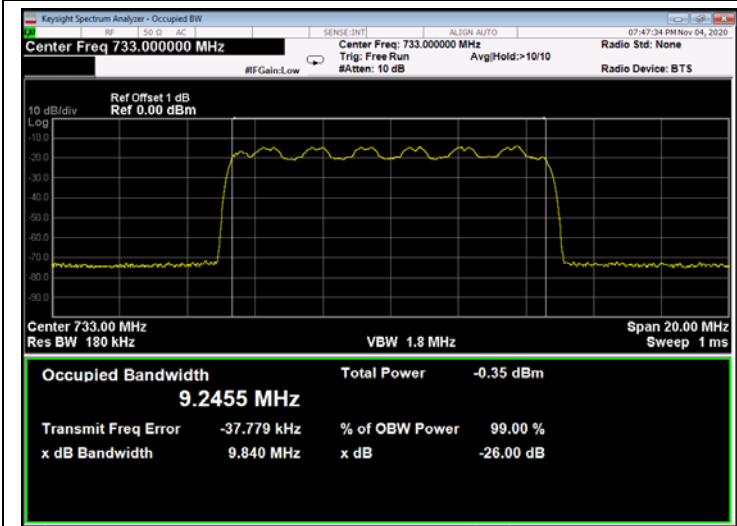


Figure 146: 16QAM 10MHz B.W.; 733.0MHz, 15kHz- Input

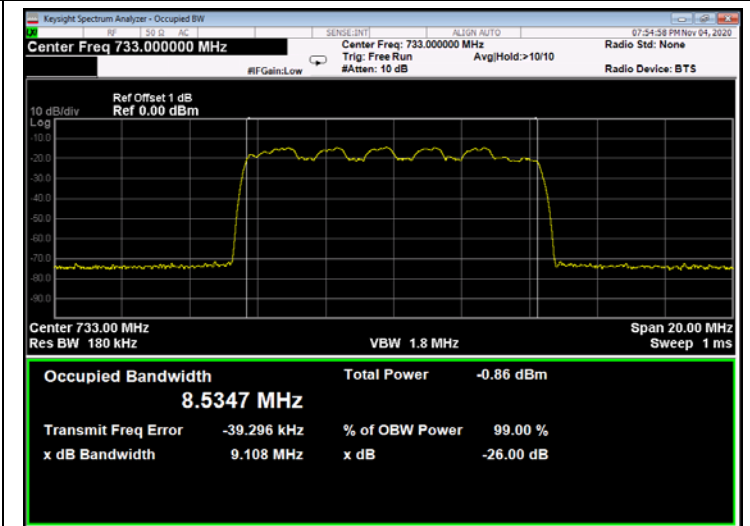


Figure 147: 16QAM 10MHz B.W.; 733.0MHz, 30kHz- Input

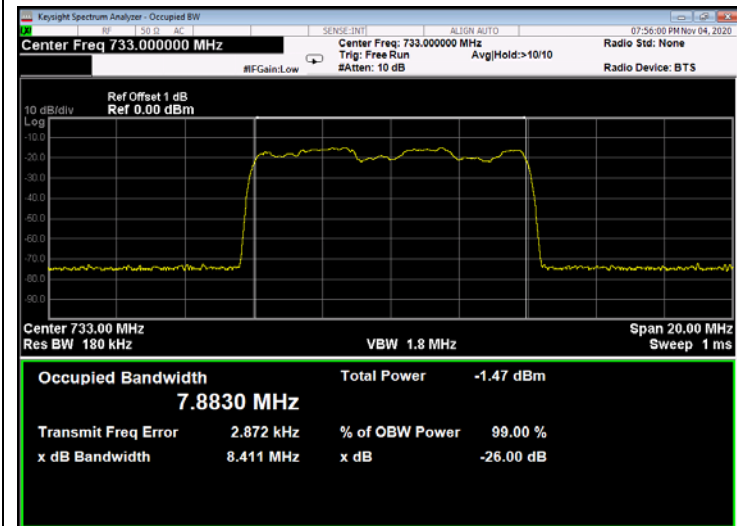


Figure 148: 16QAM 10MHz B.W.; 733.0MHz, 60kHz- Input

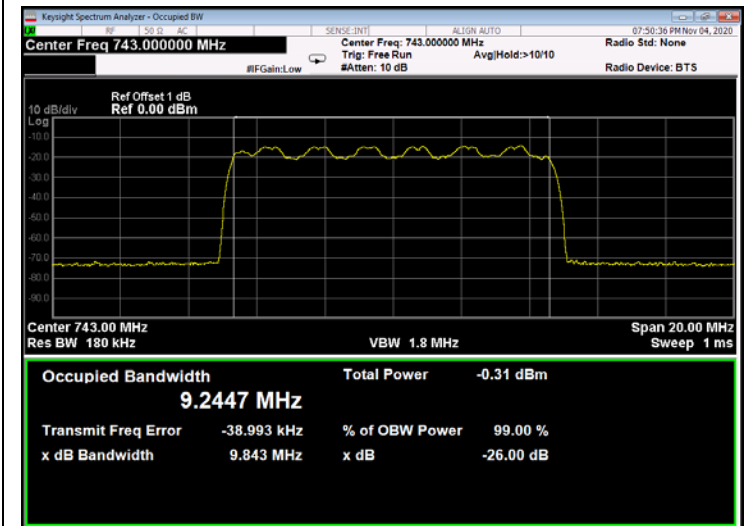


Figure 149: 16QAM 10MHz B.W.; 743.0MHz, 15kHz- Input

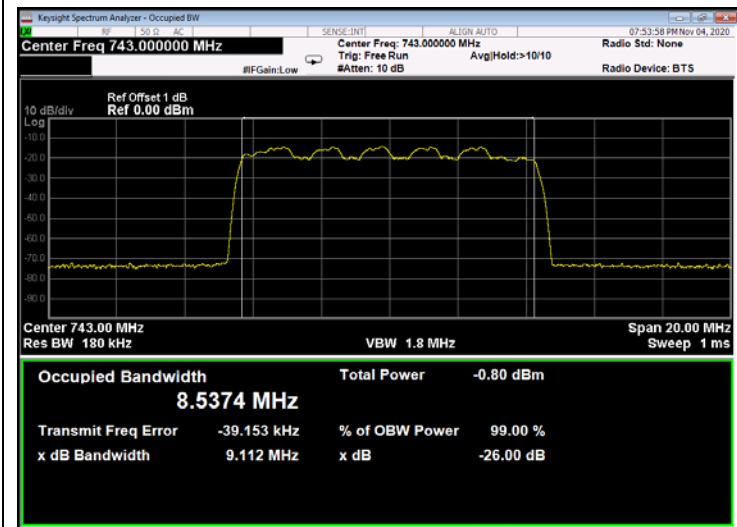


Figure 150: 16QAM 10MHz B.W.; 743.0MHz, 30kHz- Input

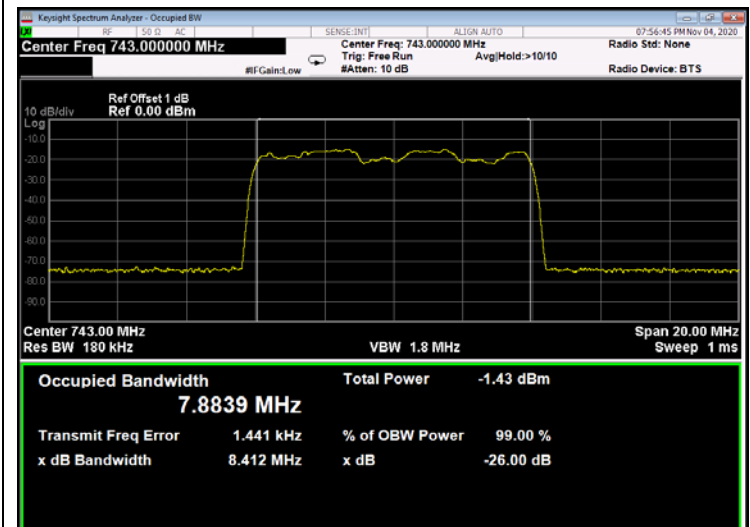


Figure 151: 16QAM 10MHz B.W.; 743.0MHz, 60kHz - Input

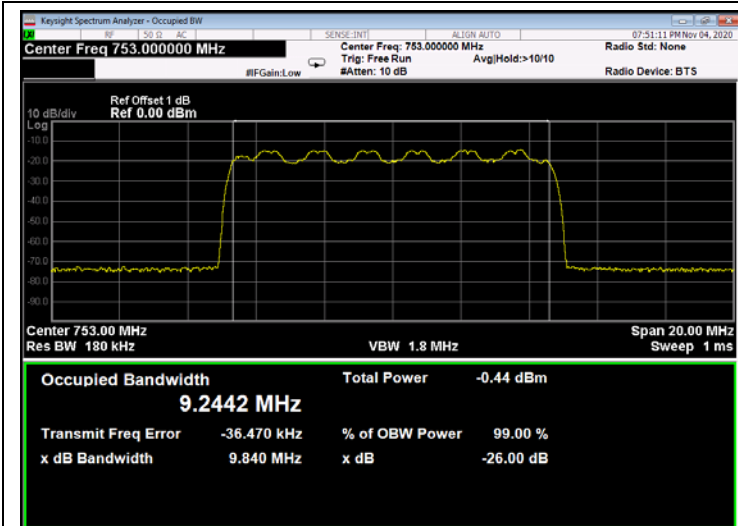


Figure 152: 16QAM 10MHz B.W.; 753.0MHz, 15kHz - Input

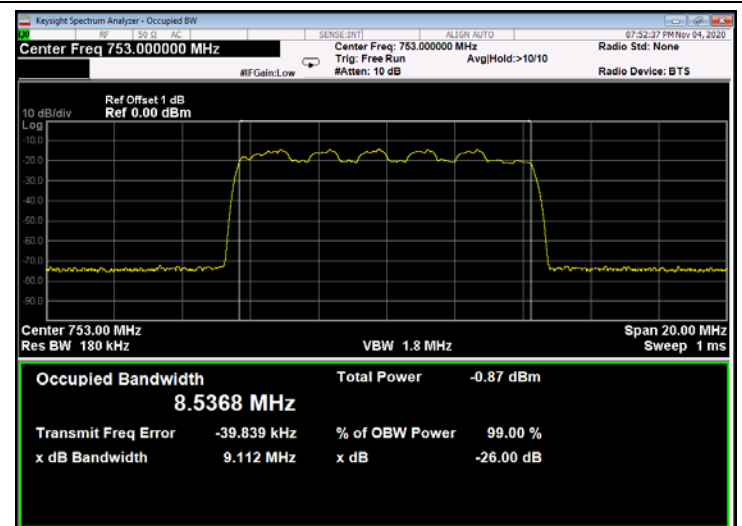


Figure 153: 16QAM 10MHz B.W.; 753.MHz, 30kHz - Input

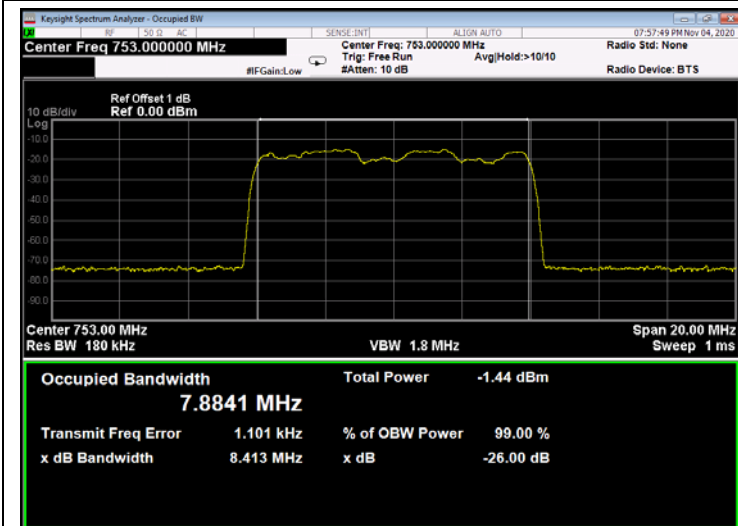


Figure 154: 16QAM 10MHz B.W.; 753.0MHz, 60kHz - Input

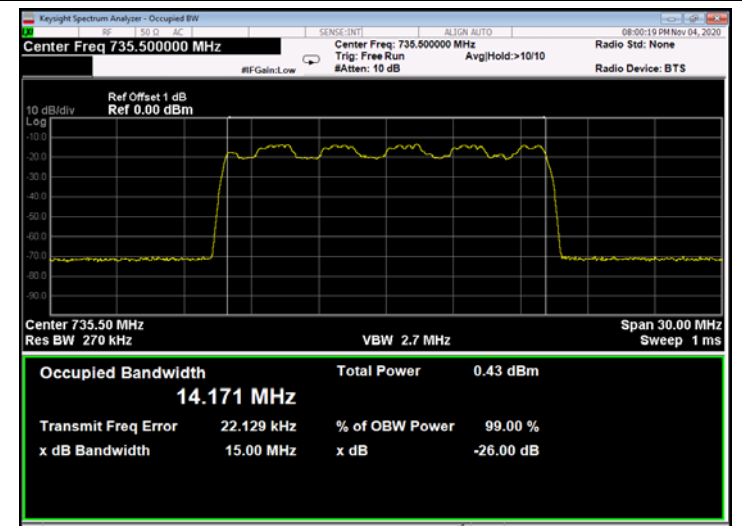


Figure 155: 16QAM 15MHz B.W.; 735.5MHz, 15kHz - Input

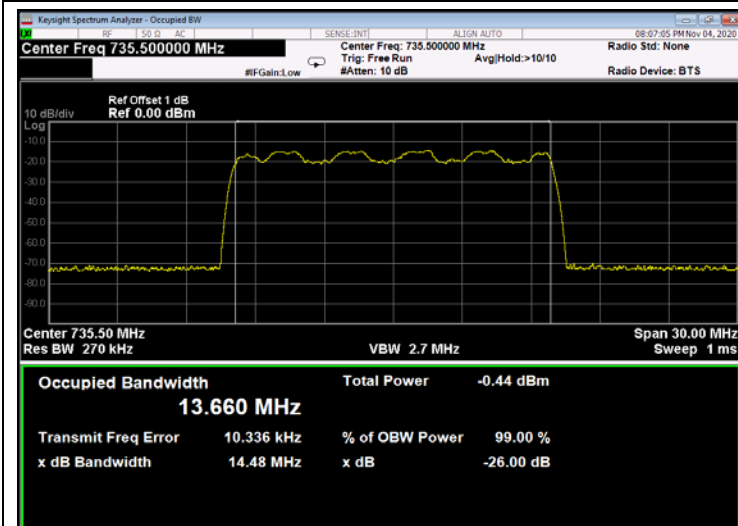


Figure 156: 16QAM 15MHz B.W.; 735.5MHz, 30kHz - Input

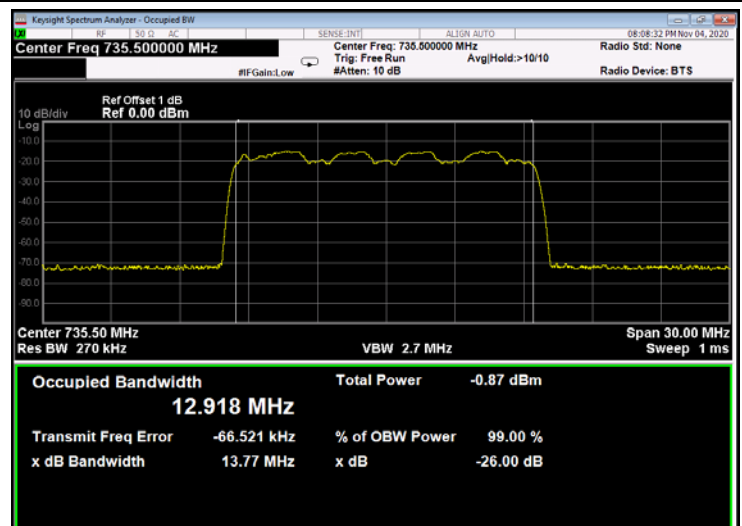


Figure 157: 16QAM 10MHz B.W.; 735.5MHz, 60kHz - Input

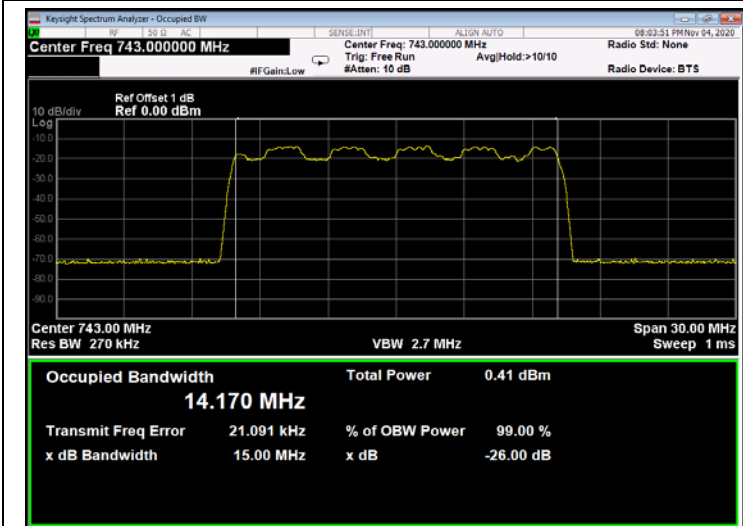


Figure 158: 16QAM 15MHz B.W.; 743.0MHz, 15kHz- Input

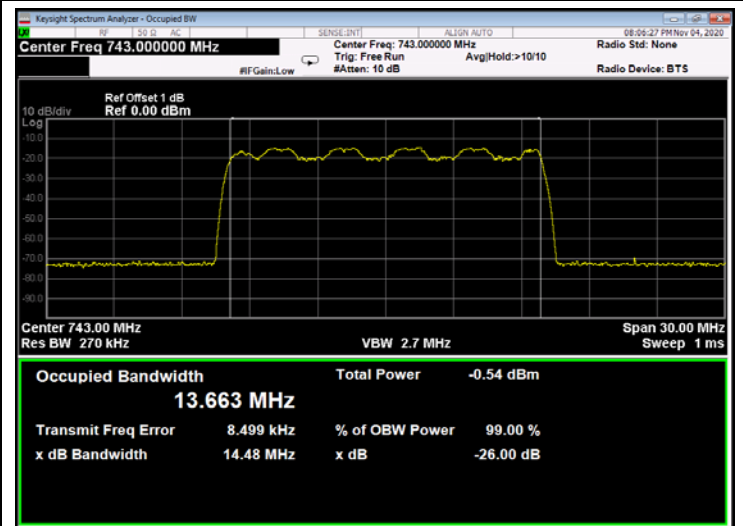


Figure 159: 16QAM 15MHz B.W.; 743.0MHz, 30kHz- Input

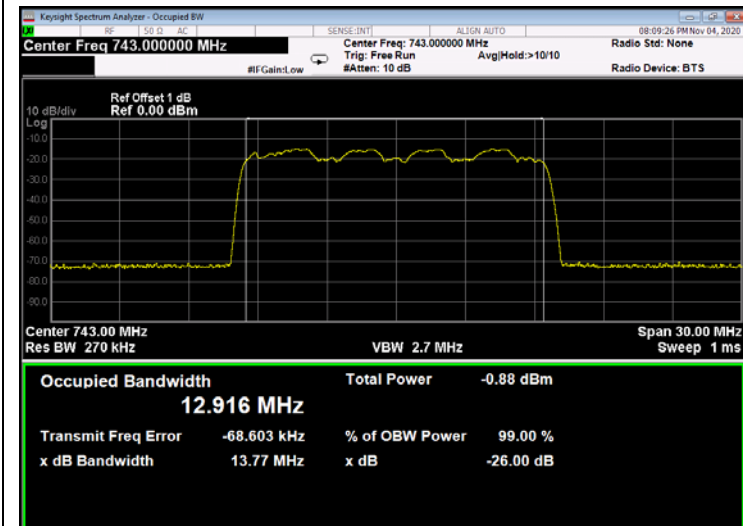


Figure 160: 16QAM 15MHz B.W.; 743.0MHz, 60kHz - Input

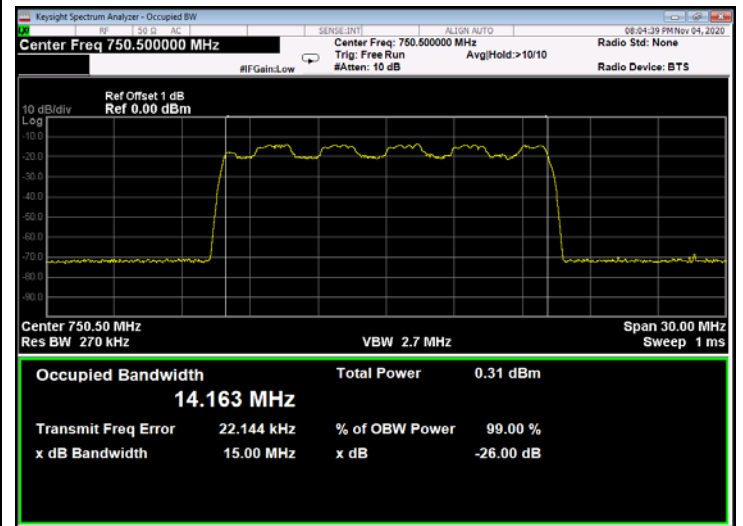


Figure 161: 16QAM 15MHz B.W.; 750.5MHz, 15kHz - Input

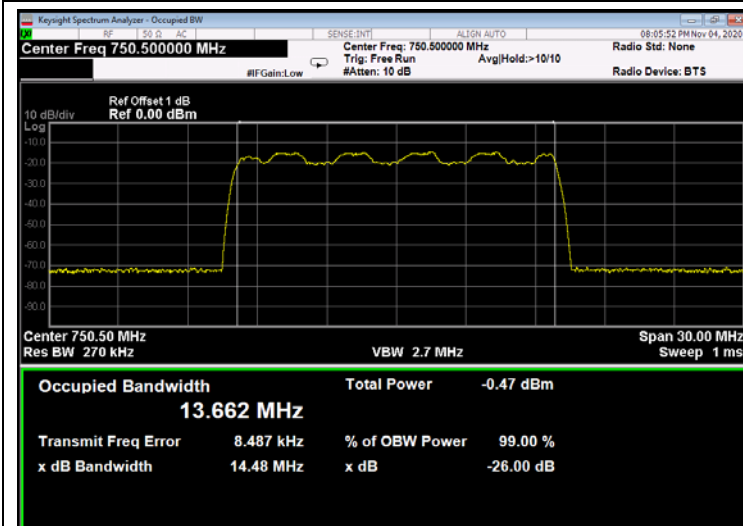


Figure 162: 16QAM 15MHz B.W.; 750.5MHz, 30kHz - Input

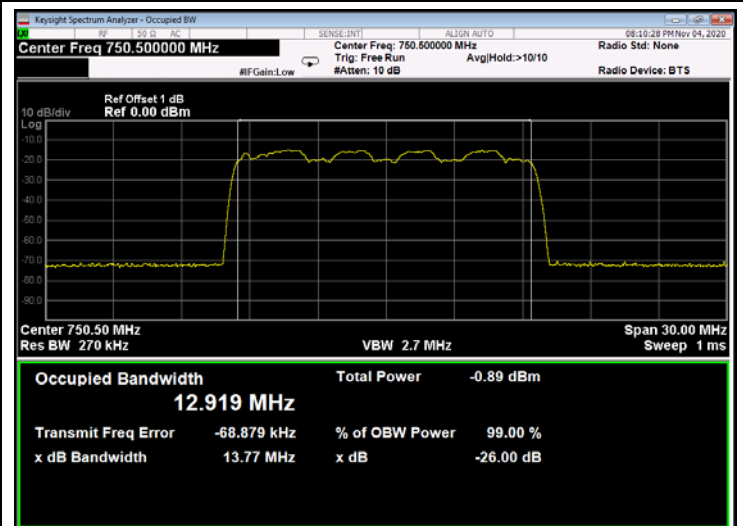


Figure 163: 16QAM 15MHz B.W.; 750.5MHz, 60kHz - Input

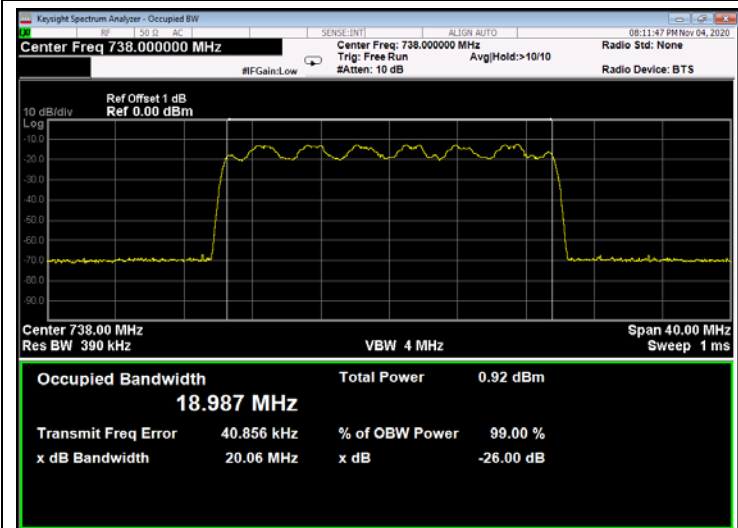


Figure 164: 16QAM 20MHz B.W.; 738.0MHz, 15kHz - Input

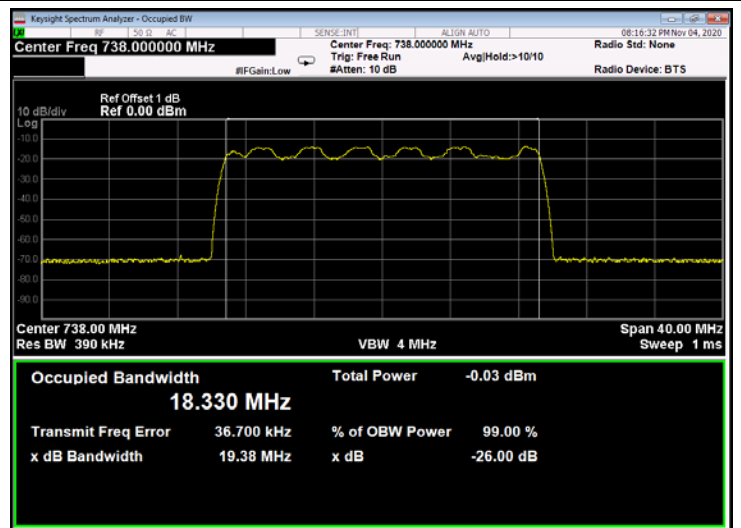


Figure 165: 16QAM 20MHz B.W.; 738.0MHz, 30kHz - Input

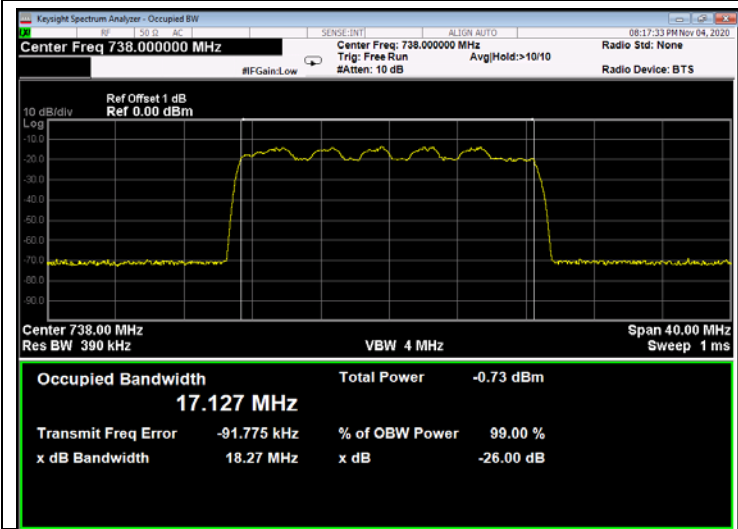


Figure 166: 16QAM 20MHz B.W.; 738.0MHz, 60kHz - Input

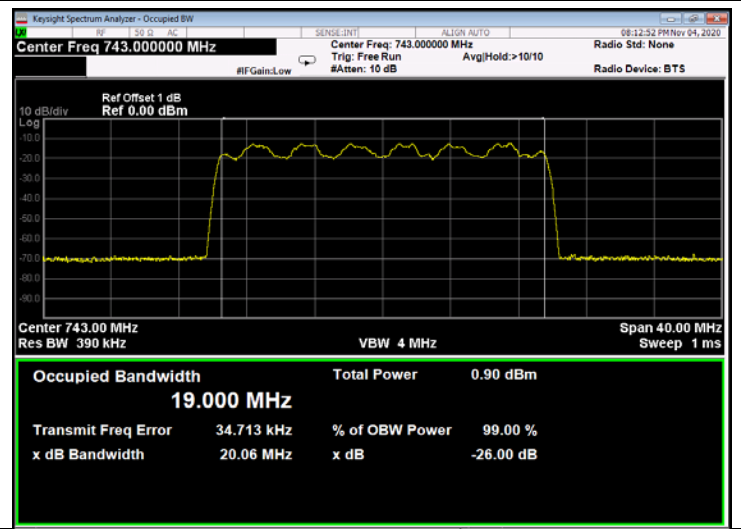


Figure 167: 16QAM 20MHz B.W.; 743.0MHz, 15kHz - Input

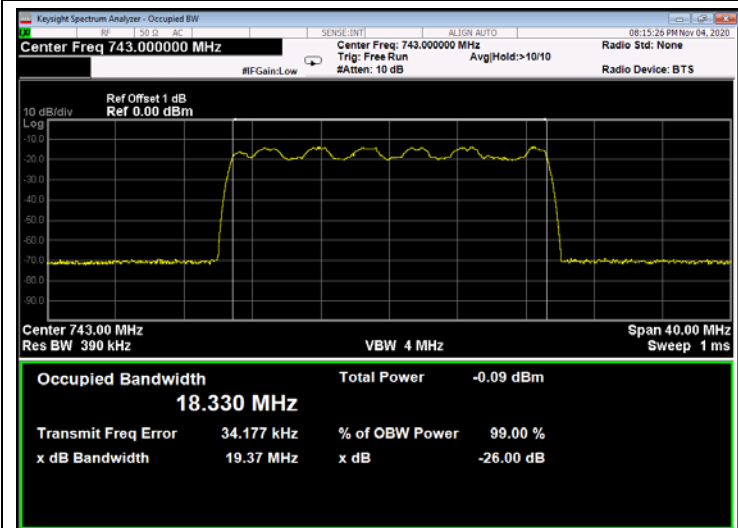


Figure 168: 16QAM 20MHz B.W.; 743.0MHz, 30kHz - Input

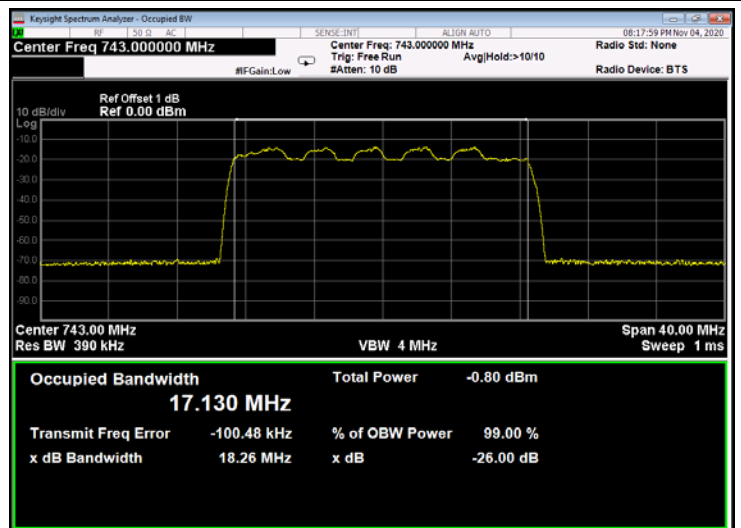


Figure 169: 16QAM 20MHz B.W.; 743.0MHz, 60kHz - Input

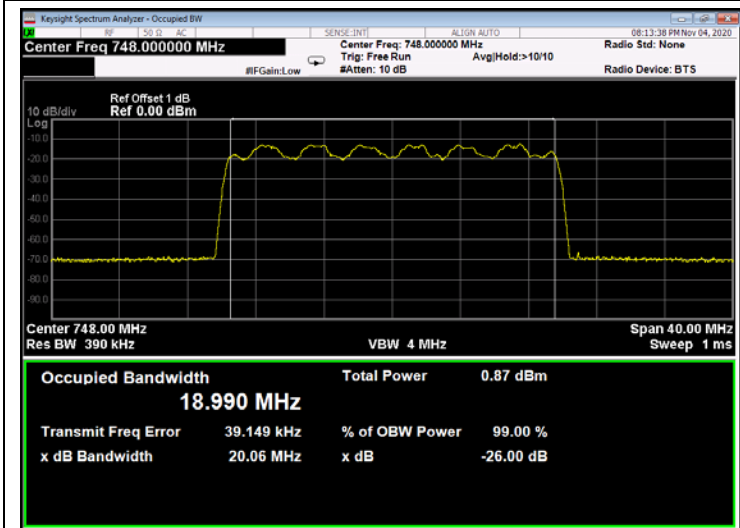


Figure 170: 16QAM 20MHz B.W.; 748.0MHz, 15kHz - Input

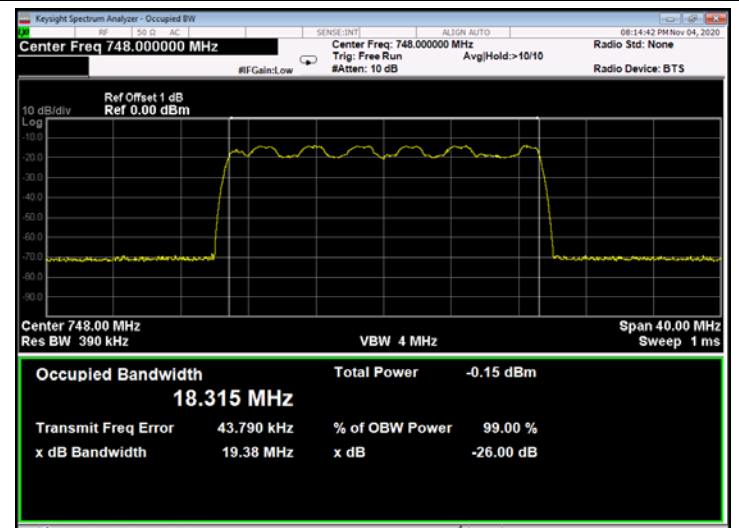


Figure 171: 16QAM 20MHz B.W.; 748.0MHz, 30kHz - Input

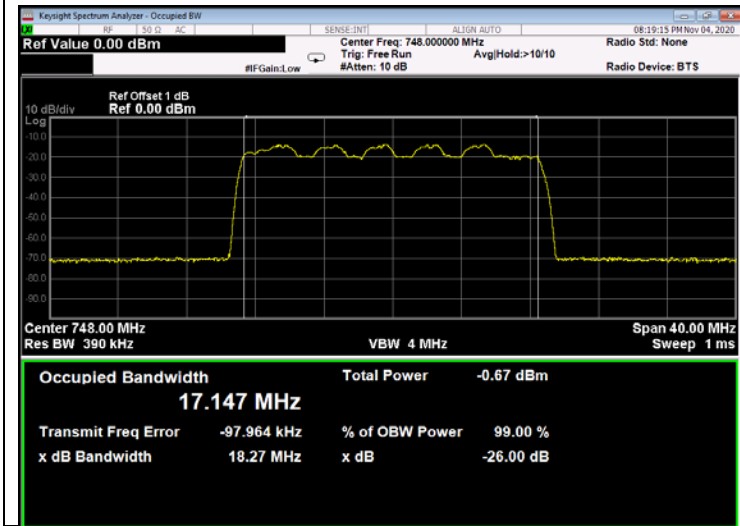


Figure 172: 16QAM 20MHz B.W.; 748.0MHz, 60kHz - Input

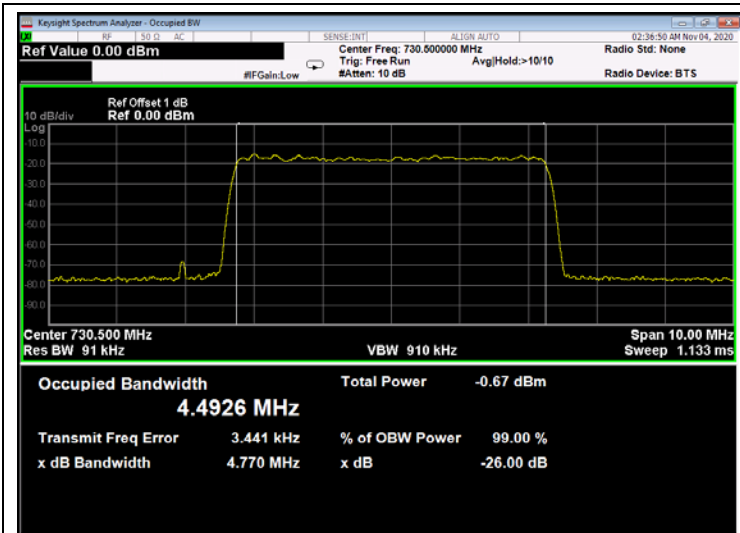


Figure 173: 64QAM 5MHz B.W.; 730.5MHz, 15kHz - Input

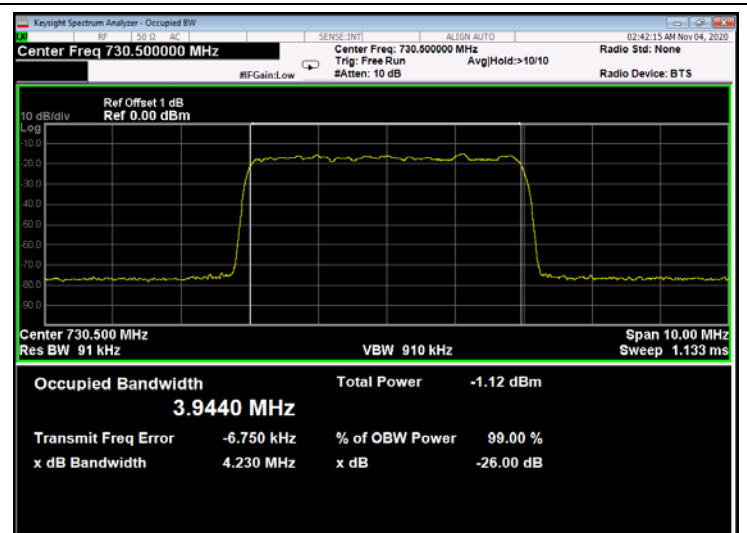


Figure 174: 64QAM 5MHz B.W.; 730.5MHz, 30kHz - Input

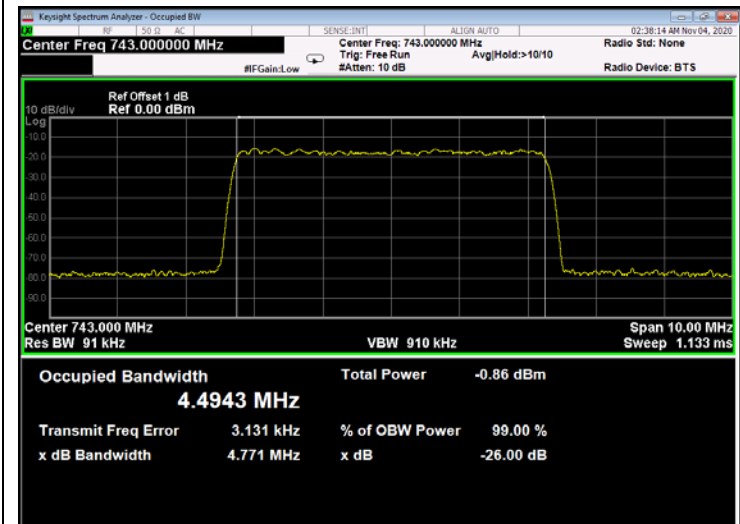


Figure 175: 64QAM 5MHz B.W.; 743.0MHz, 15kHz - Input

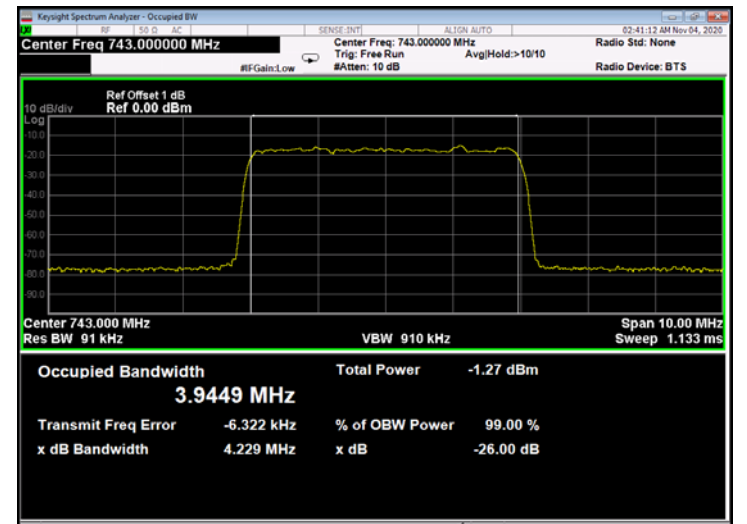


Figure 176: 64QAM 5MHz B.W.; 743.0MHz, 30kHz - Input

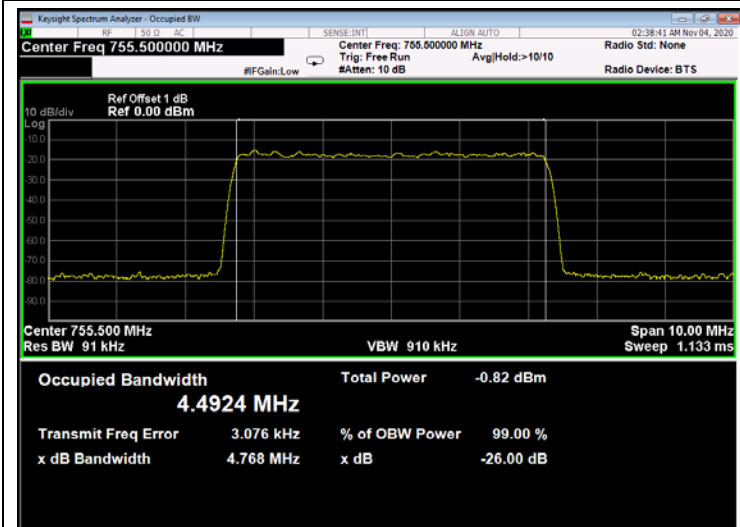


Figure 177: 64QAM 5MHz B.W.; 755.5MHz, 15kHz - Input

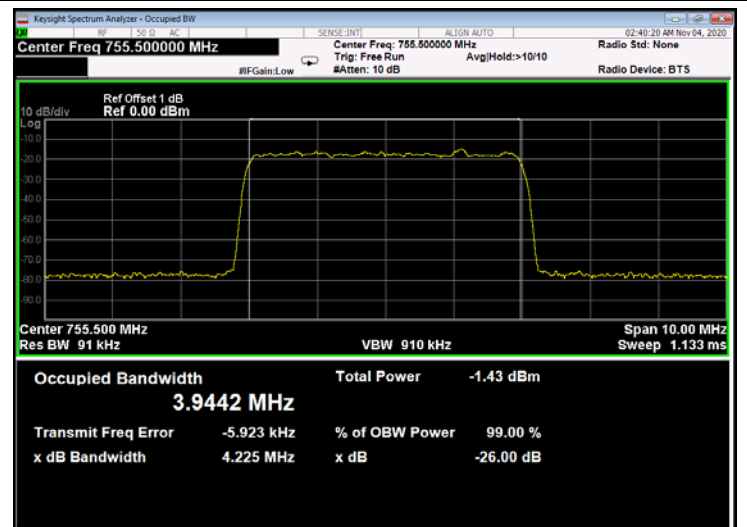


Figure 178: 64QAM 5MHz B.W.; 755.5MHz, 30kHz - Input

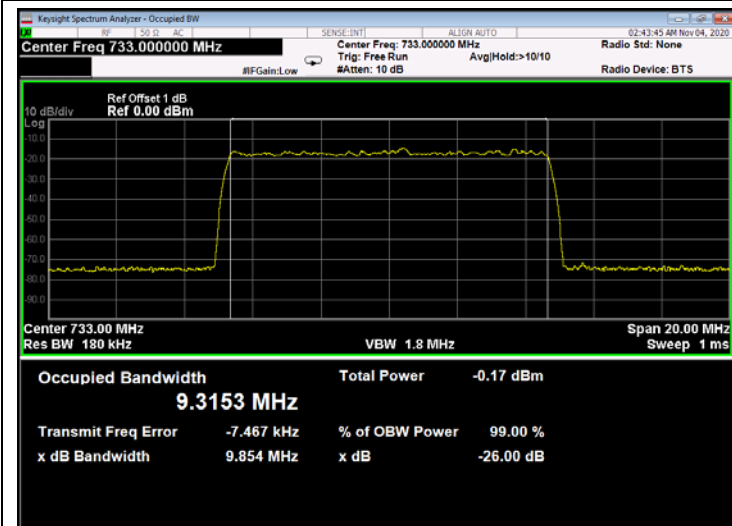


Figure 179: 64QAM 10MHz B.W.; 733.0MHz, 15kHz - Input

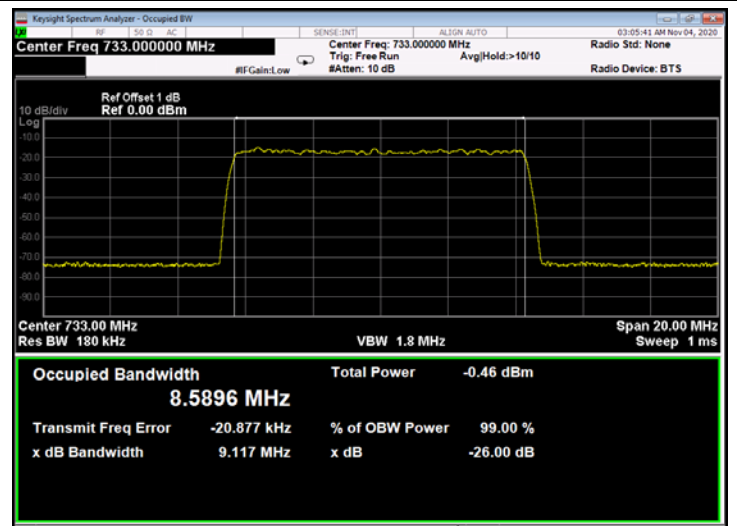


Figure 180: 64QAM 10MHz B.W.; 733.0MHz, 30kHz - Input

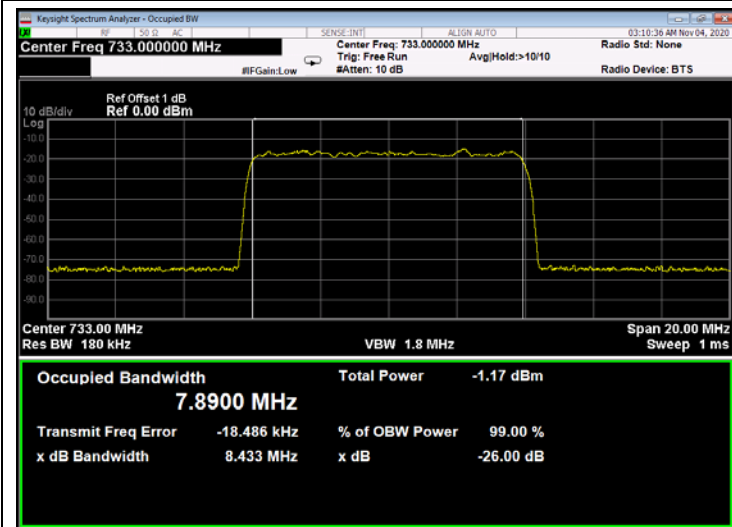


Figure 181: 64QAM 10MHz B.W.; 733.0MHz, 60kHz - Input

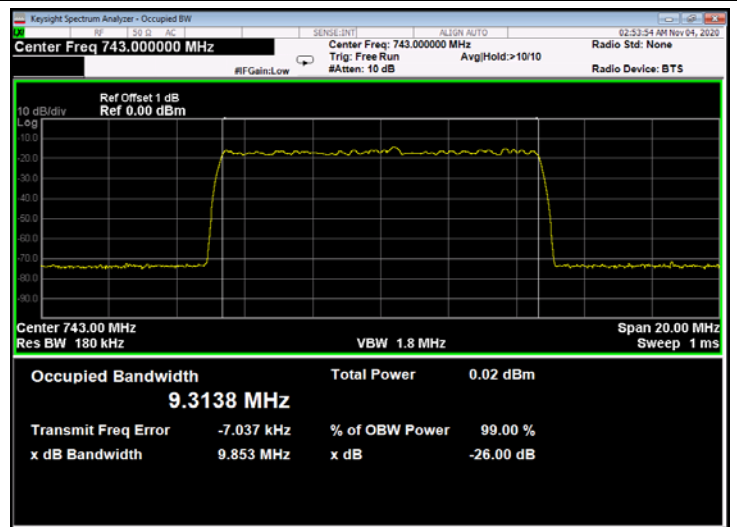


Figure 182: 64QAM 10MHz B.W.; 743.0MHz, 15kHz - Input

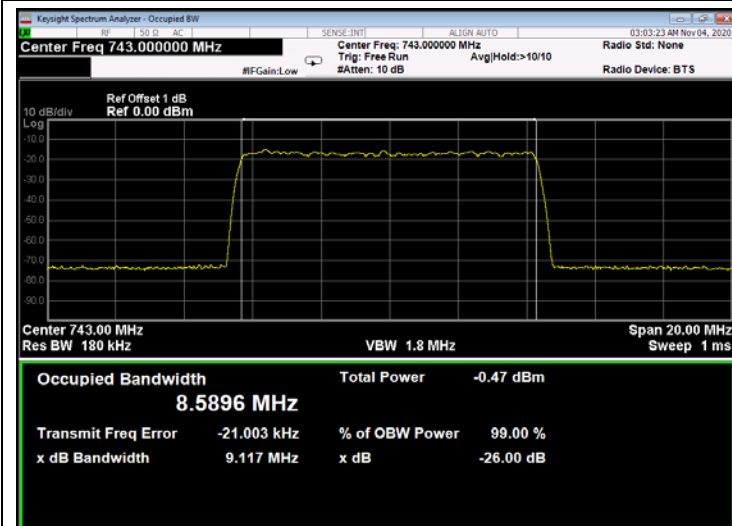


Figure 183: 64QAM 10MHz B.W.; 743.0MHz, 30kHz - Input

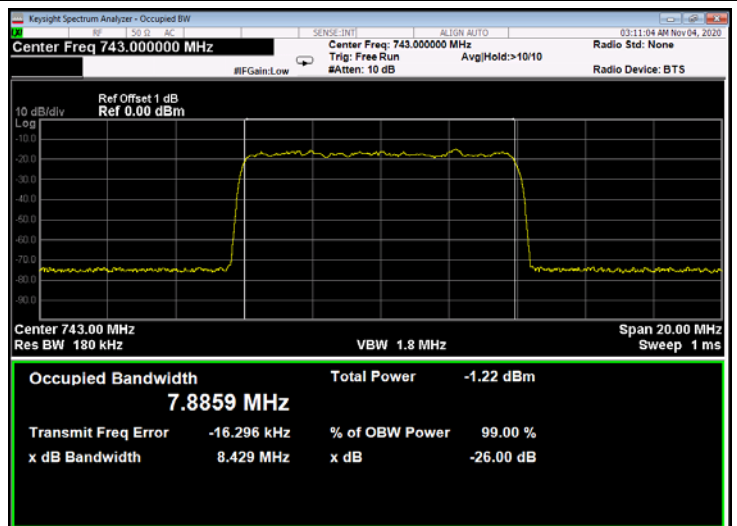


Figure 184: 64QAM 5MHz B.W.; 743.0MHz, 60kHz - Input