

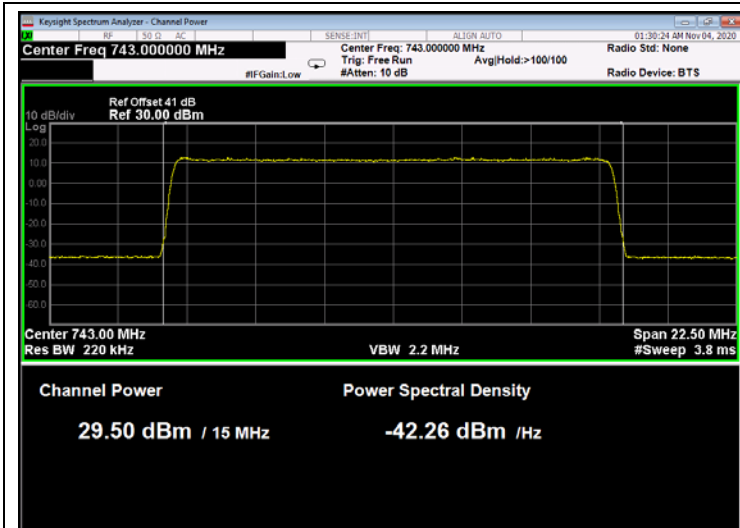


Figure 92: 256QAM 15MHz B.W.; 743.0MHz, 15kHz

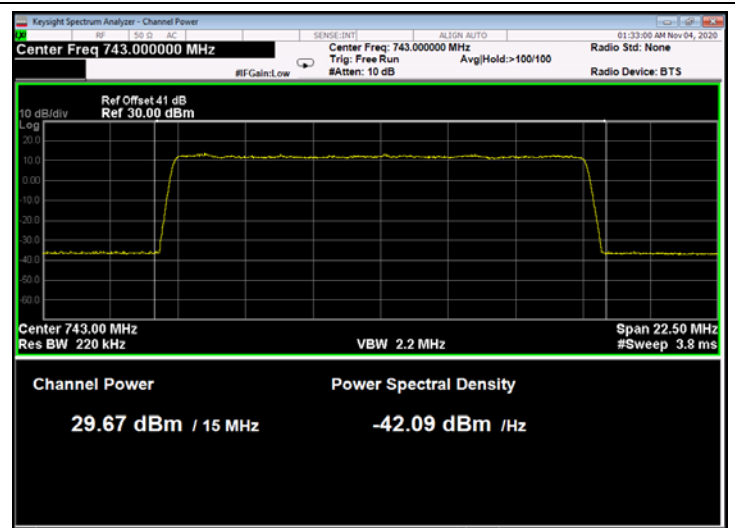


Figure 93: 256QAM 15MHz B.W.; 743.0MHz, 30kHz

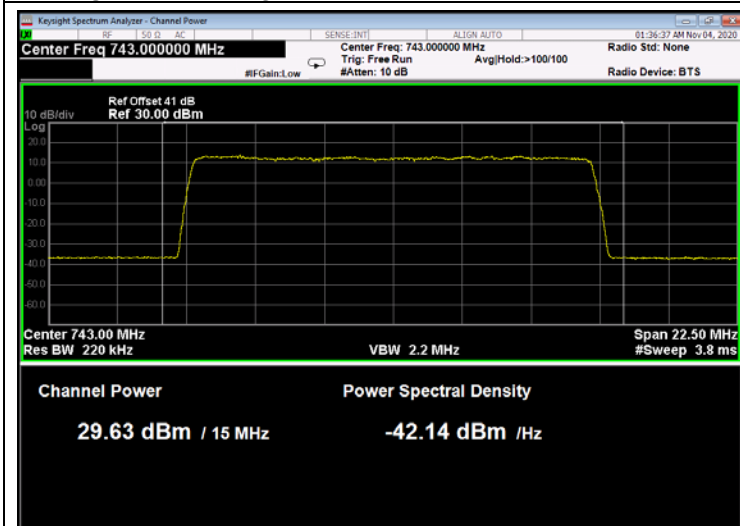


Figure 94: 256QAM 15MHz B.W.; 743.0MHz, 60kHz

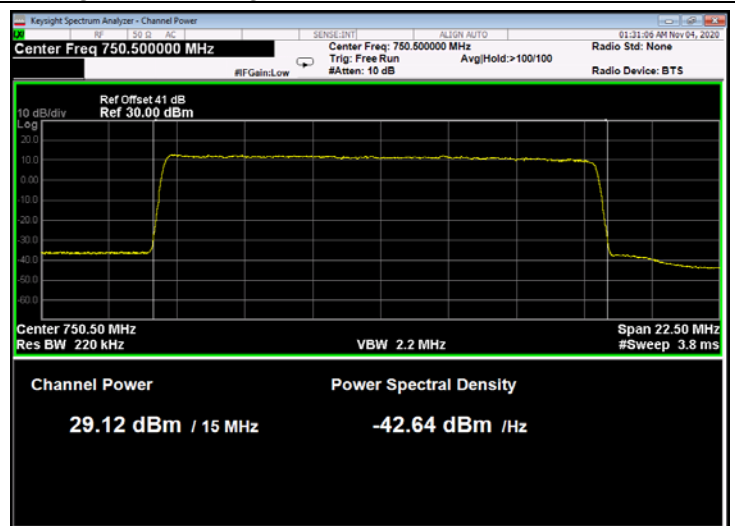


Figure 95: 256QAM 15MHz B.W.; 750.5MHz, 15kHz

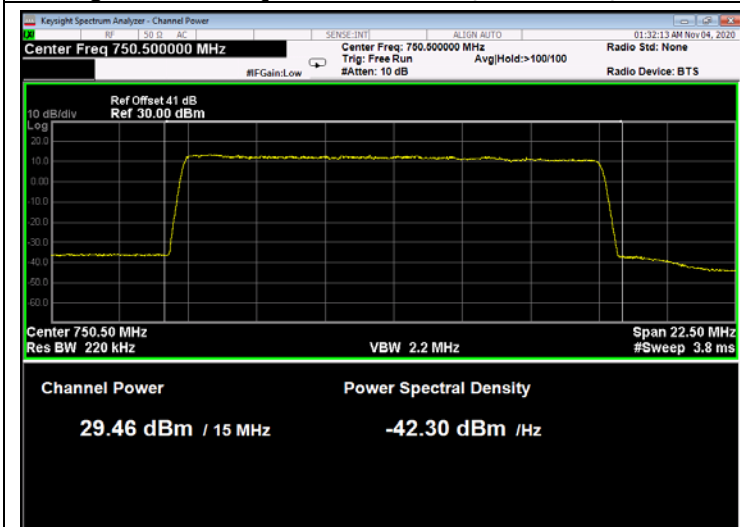


Figure 96: 256QAM 15MHz B.W.; 750.5MHz, 30kHz

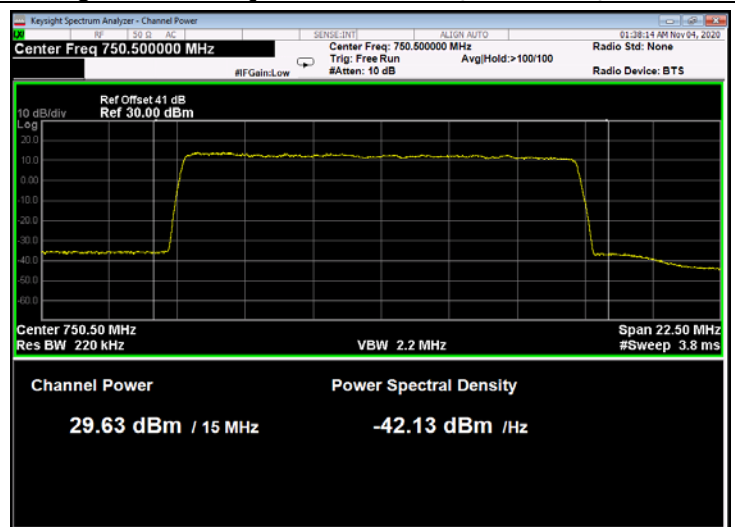


Figure 97: 256QAM 15MHz B.W.; 750.5MHz, 60kHz

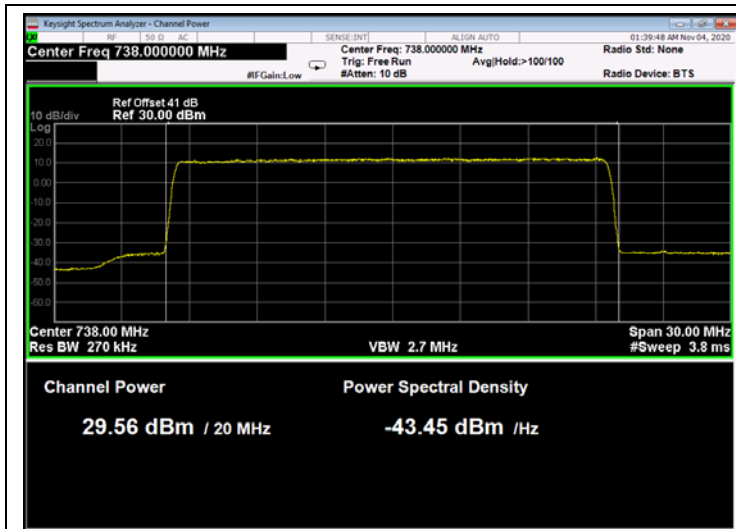


Figure 98: 256QAM 20MHz B.W.; 738.0MHz, 15kHz

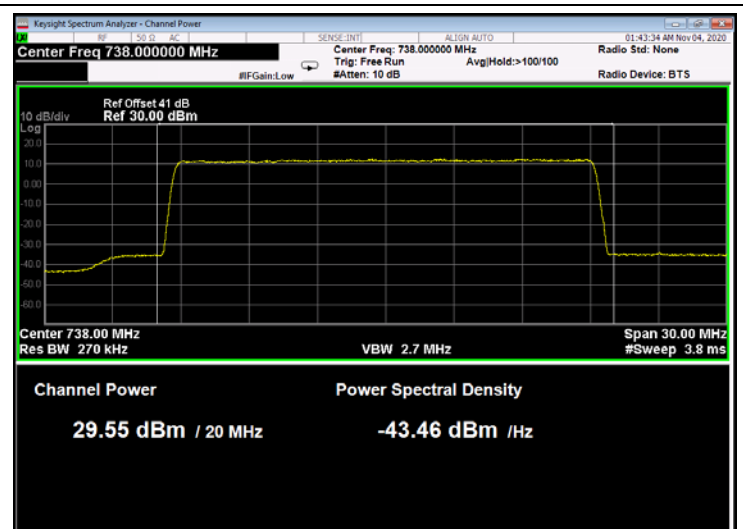


Figure 99: 256QAM 20MHz B.W.; 738.0MHz, 30kHz

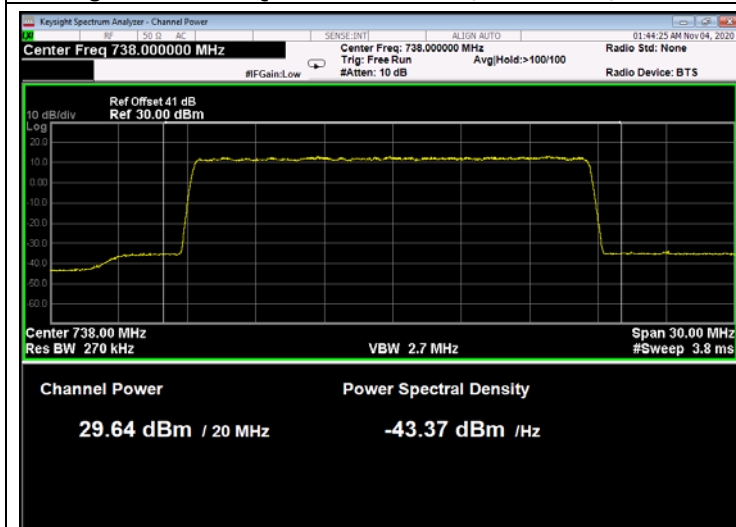


Figure 100: 256QAM 20MHz B.W.; 738.0MHz, 60kHz

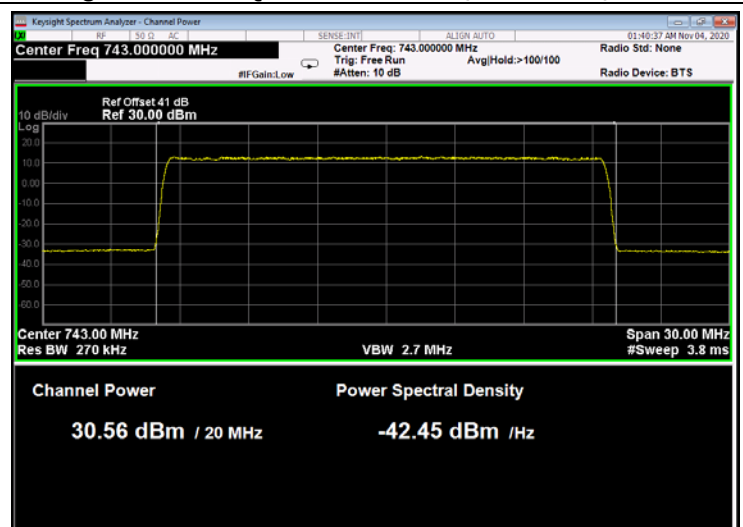


Figure 101: 256QAM 20MHz B.W.; 743.0MHz, 15kHz

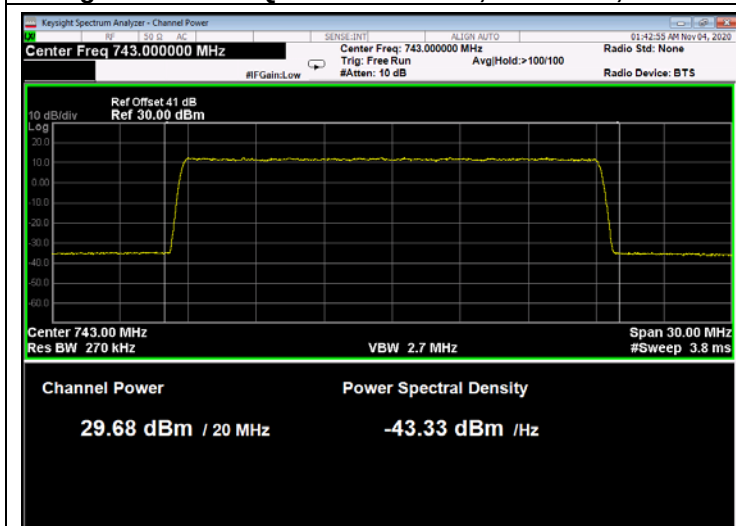


Figure 102: 256QAM 20MHz B.W.; 743.0MHz, 30kHz

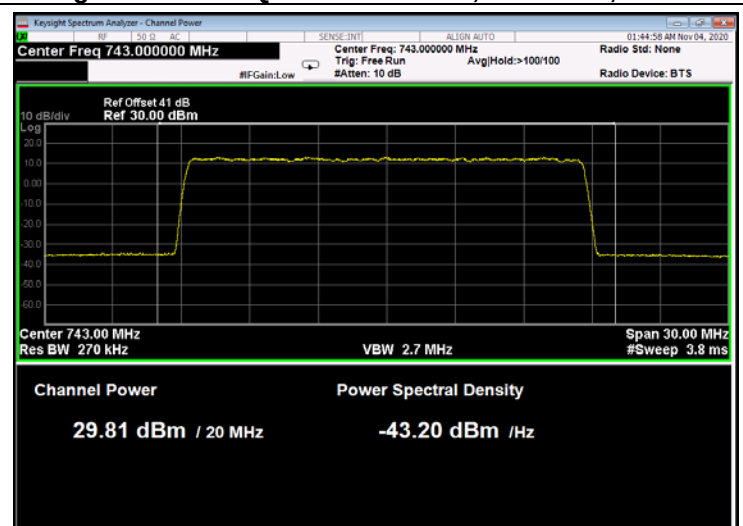


Figure 103: 256QAM 20MHz B.W.; 743.0MHz, 60kHz

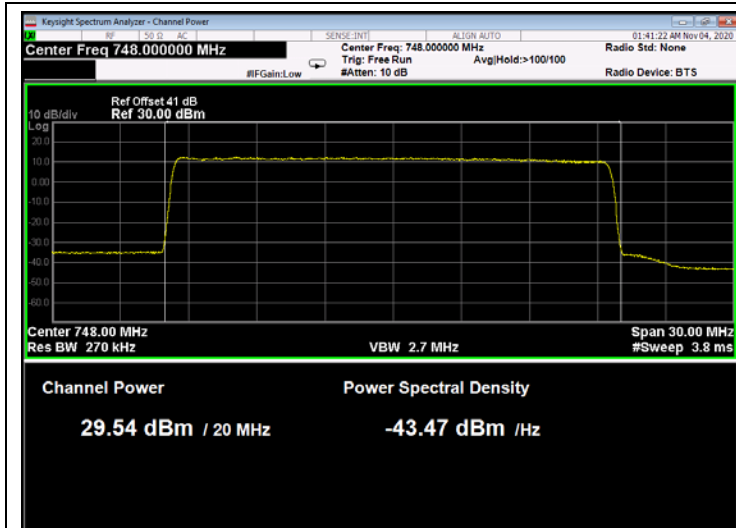


Figure 104: 256QAM 20MHz B.W.; 748.0MHz, 15kHz

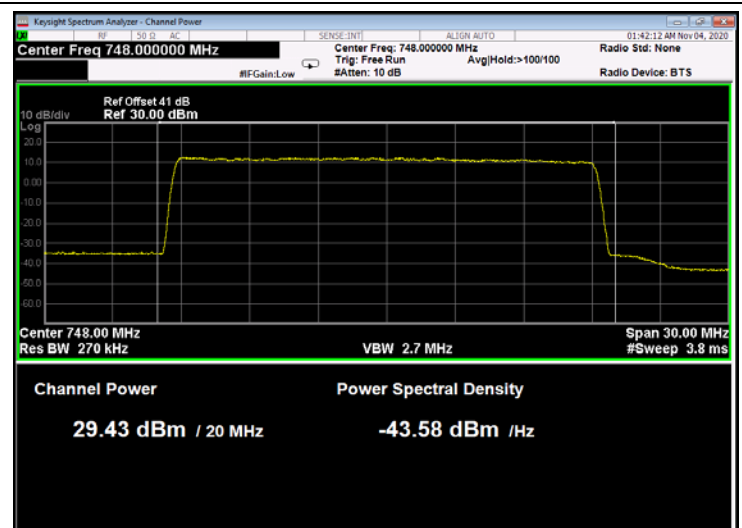


Figure 105: 256QAM 20MHz B.W.; 748.0MHz, 30kHz

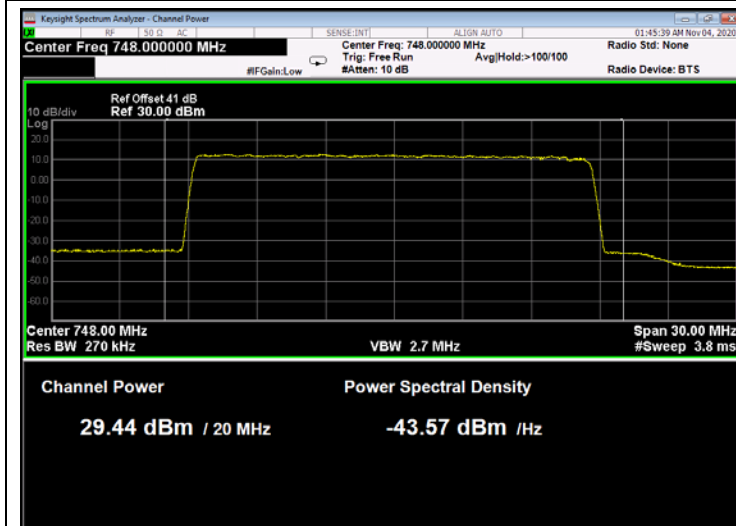


Figure 106: 256QAM 20MHz B.W.; 748.0MHz, 60kHz

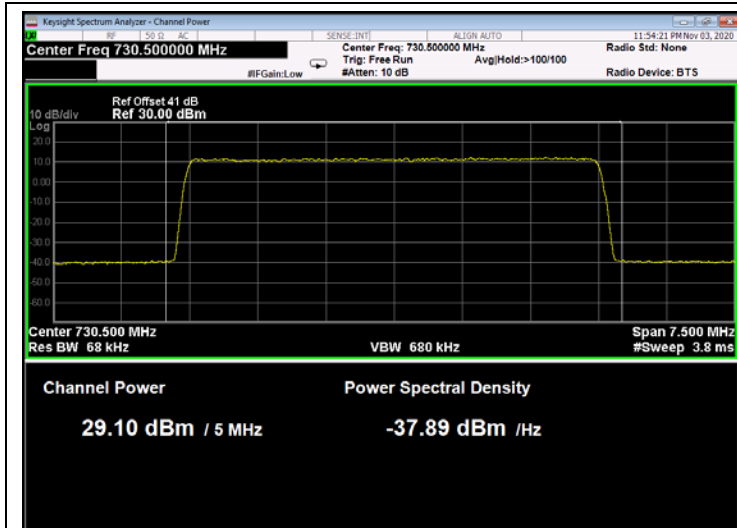


Figure 107: QPSK 5MHz B.W.; 730.5MHz, 15kHz

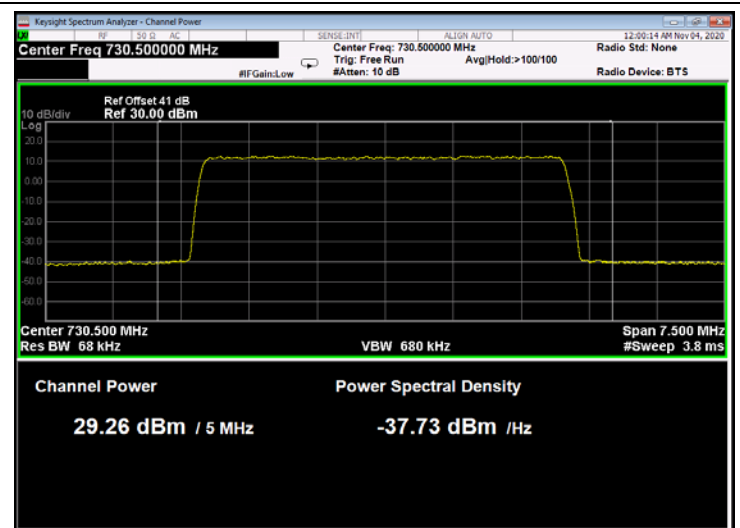


Figure 108: QPSK 5MHz B.W.; 730.5MHz, 30kHz

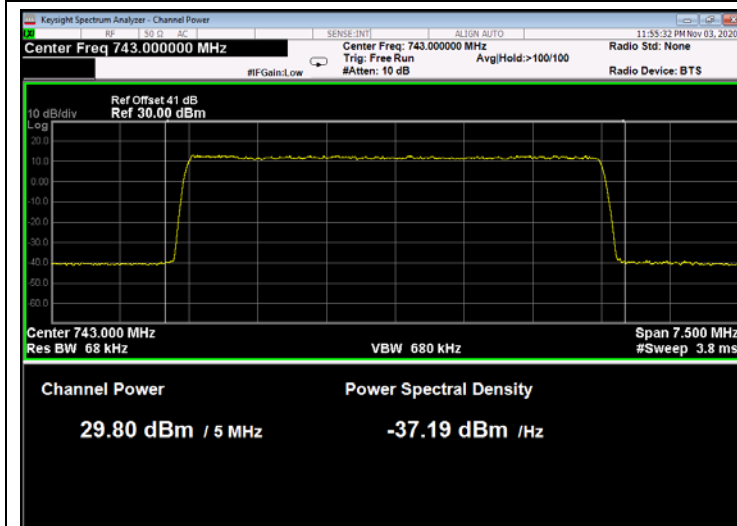


Figure 109: QPSK 5MHz B.W.; 743.0MHz, 15kHz

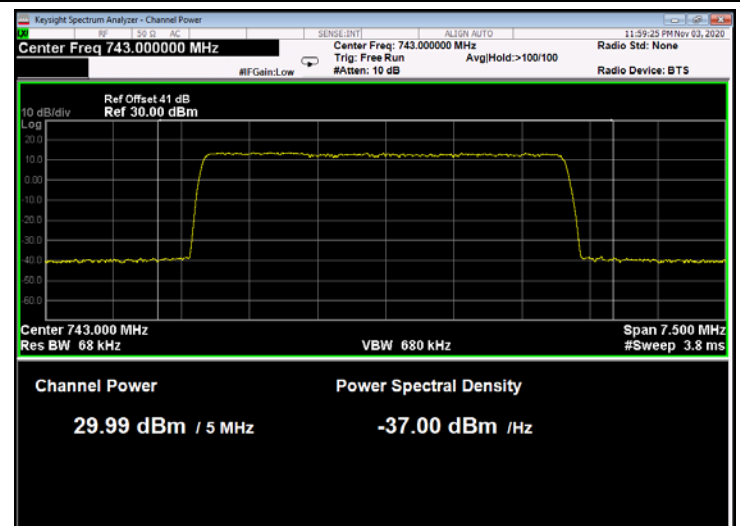


Figure 110: QPSK 5MHz B.W.; 743.0MHz, 30kHz

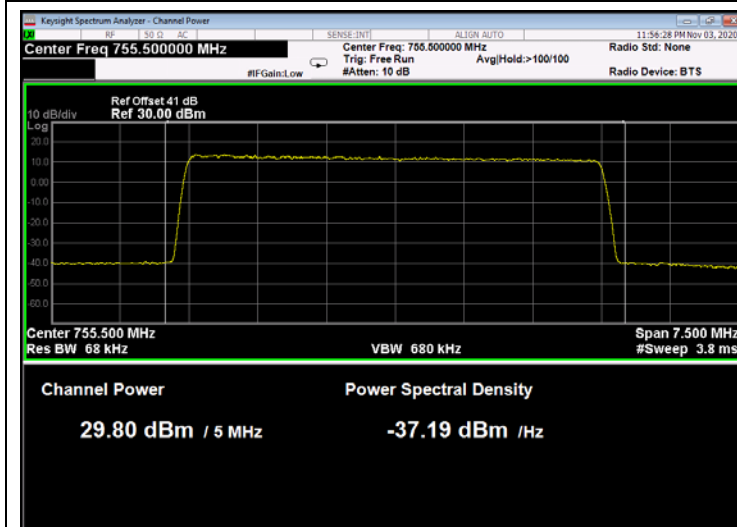


Figure 111: QPSK 5MHz B.W.; 755.50MHz, 15kHz

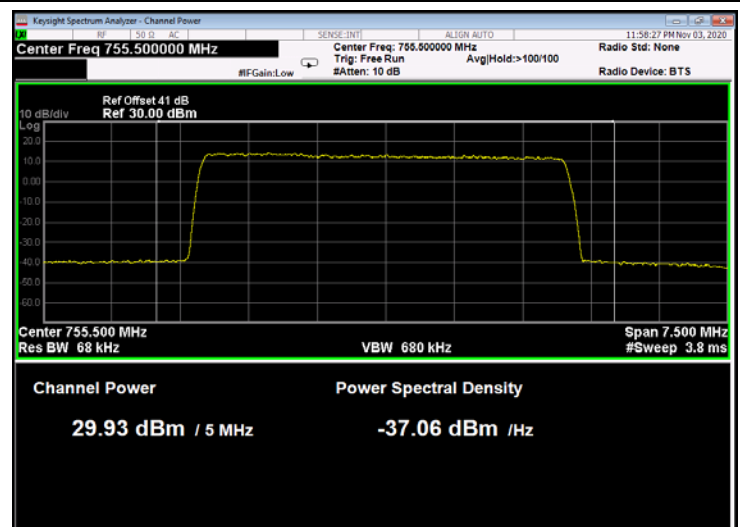


Figure 112: QPSK 5MHz B.W.; 755.5MHz, 30kHz

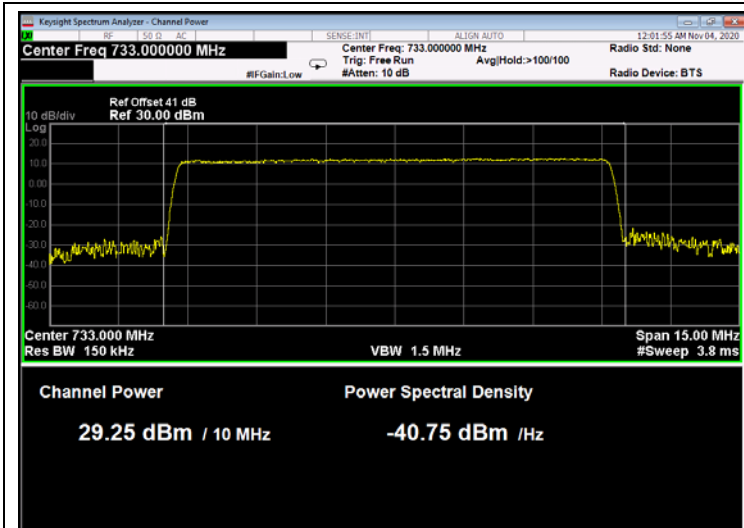


Figure 113: QPSK 10MHz B.W.; 733.0MHz, 15kHz

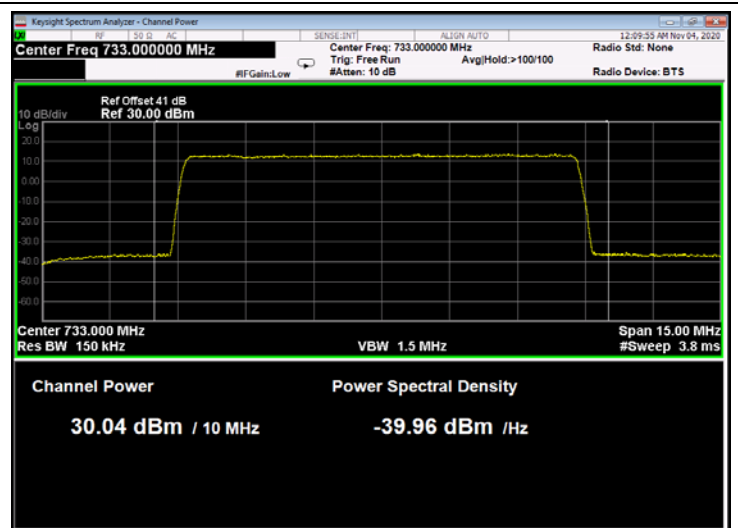


Figure 114: QPSK 10MHz B.W.; 733.0MHz, 30kHz

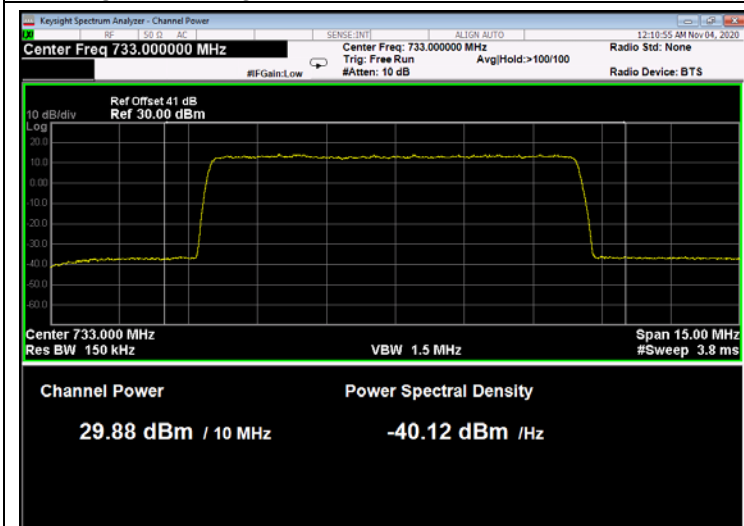


Figure 115: QPSK 10MHz B.W.; 733.0MHz, 60kHz

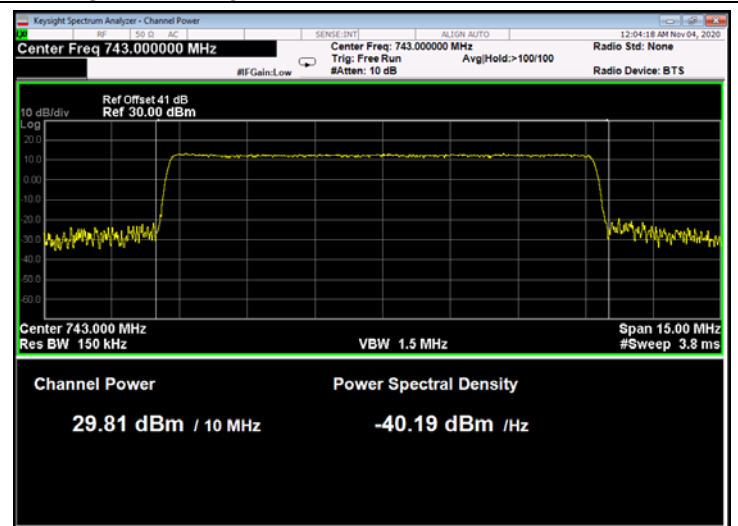


Figure 116: QPSK 10MHz B.W.; 743.0MHz, 15kHz

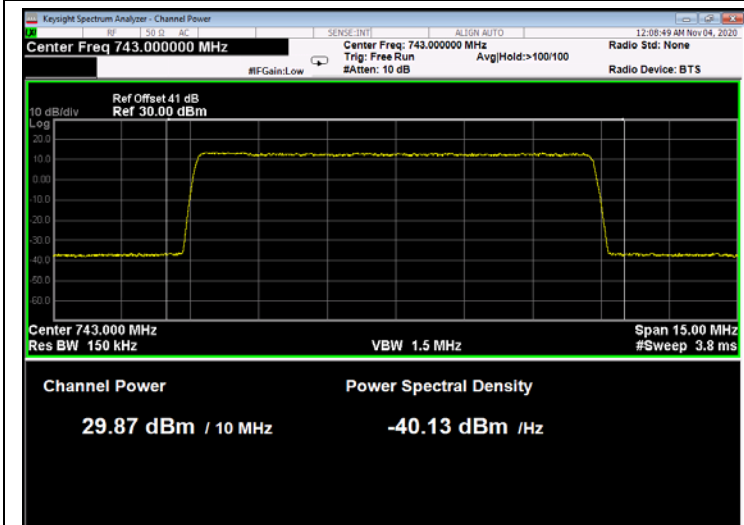


Figure 117: QPSK 10MHz B.W.; 743.0MHz, 30kHz

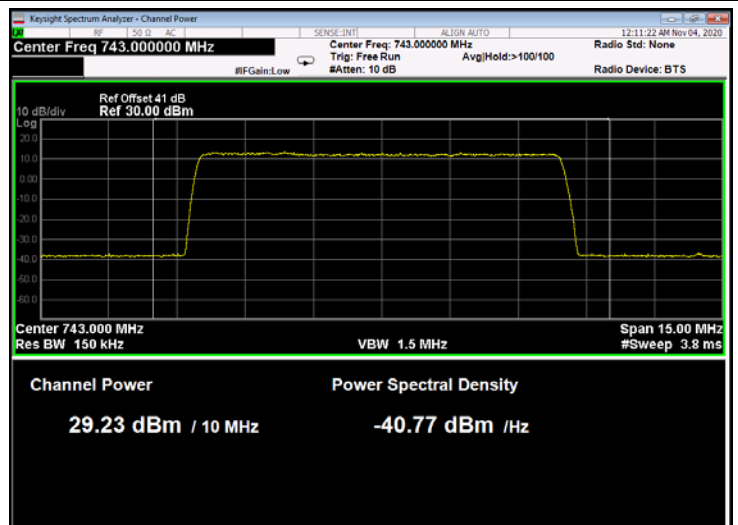


Figure 118: QPSK 10MHz B.W.; 743.0MHz, 60kHz

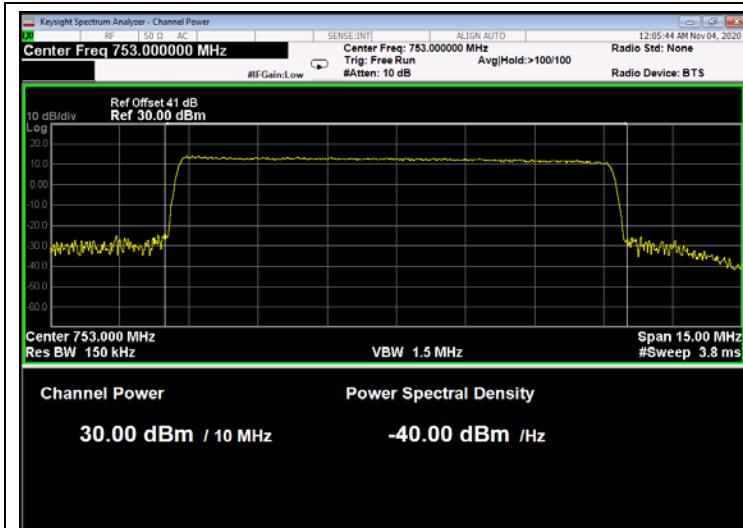


Figure 119: QPSK 10MHz B.W.; 753.0MHz, 15kHz

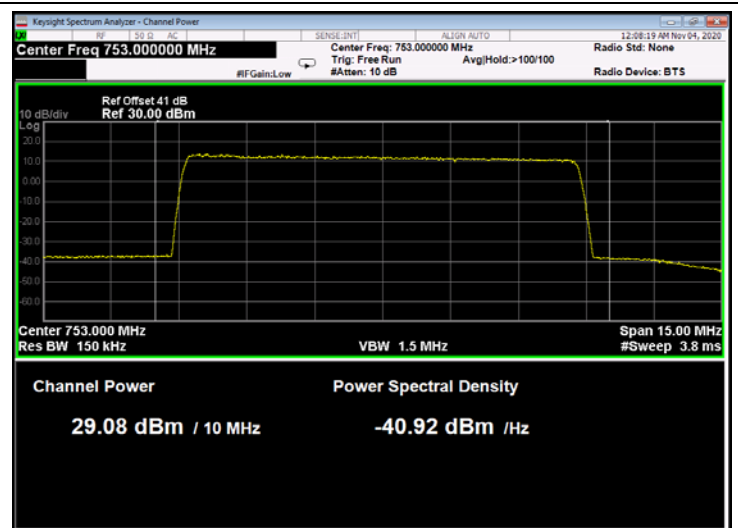


Figure 120: QPSK 10MHz B.W.; 753.0MHz, 30kHz

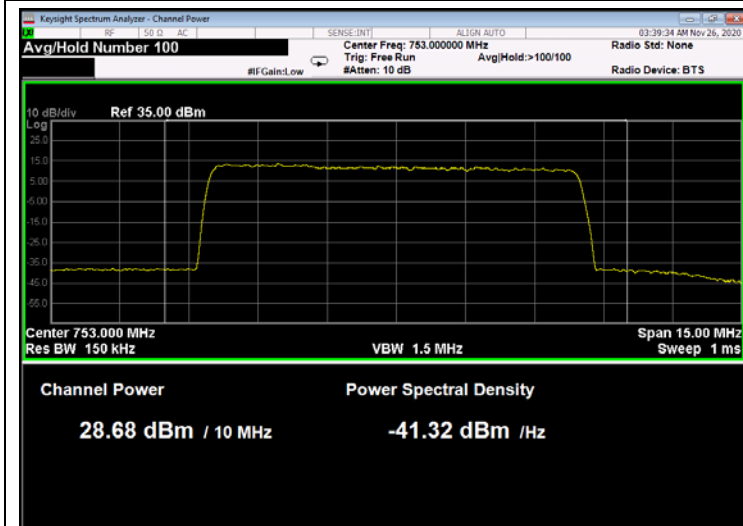


Figure 121: QPSK 10MHz B.W.; 753.0MHz, 60kHz

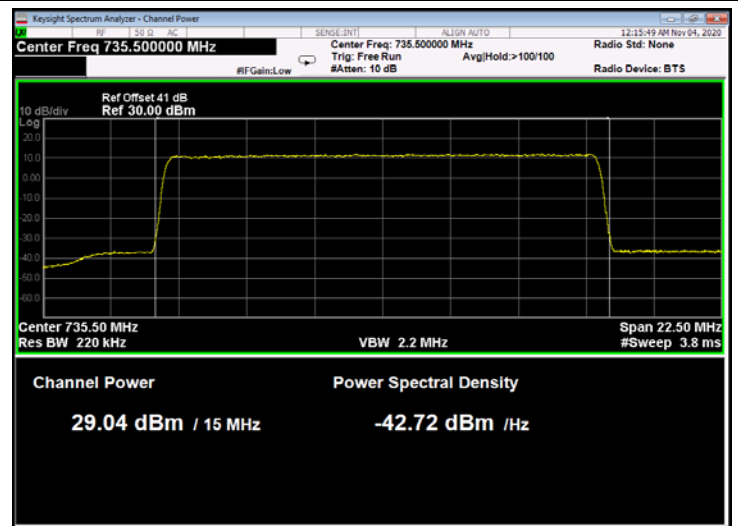


Figure 122: QPSK 15MHz B.W.; 735.5MHz, 15kHz

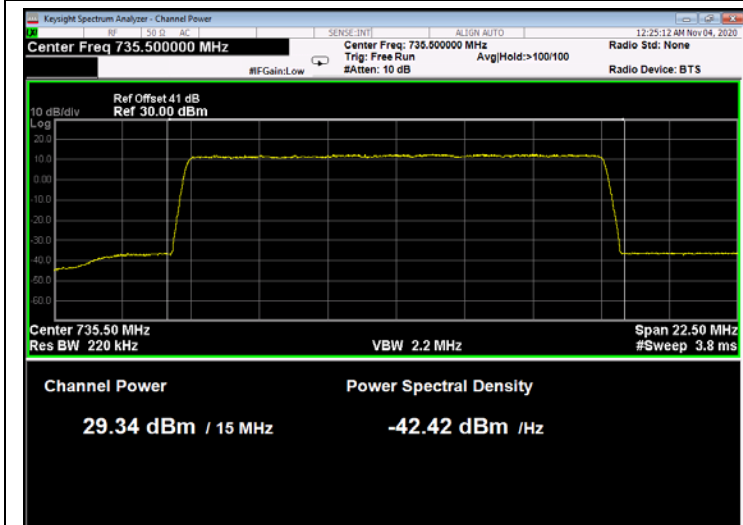


Figure 123: QPSK 15MHz B.W.; 735.5MHz, 30kHz

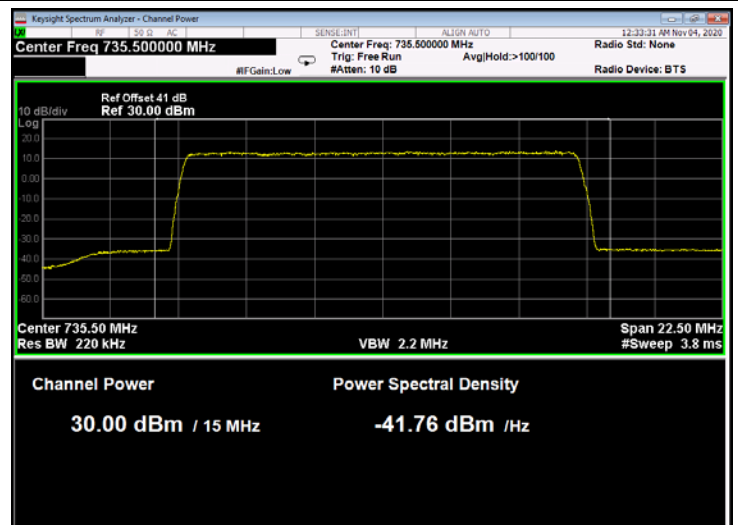


Figure 124: QPSK 15MHz B.W.; 735.5MHz, 60kHz

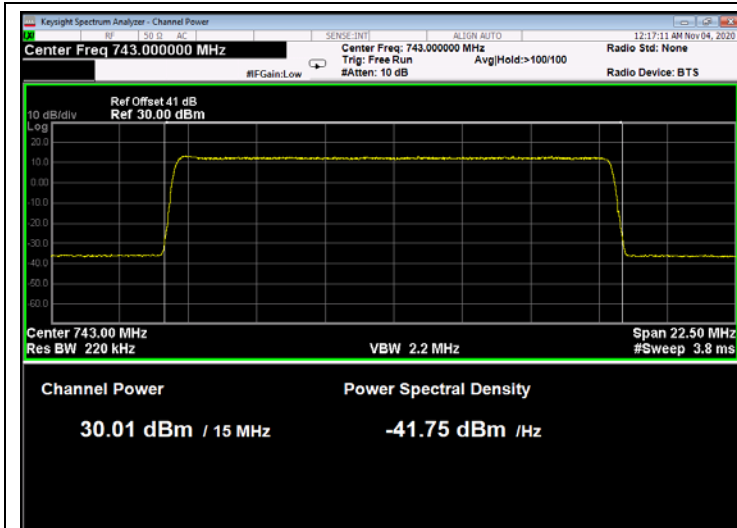


Figure 125: QPSK 15MHz B.W.; 743.0MHz, 15kHz

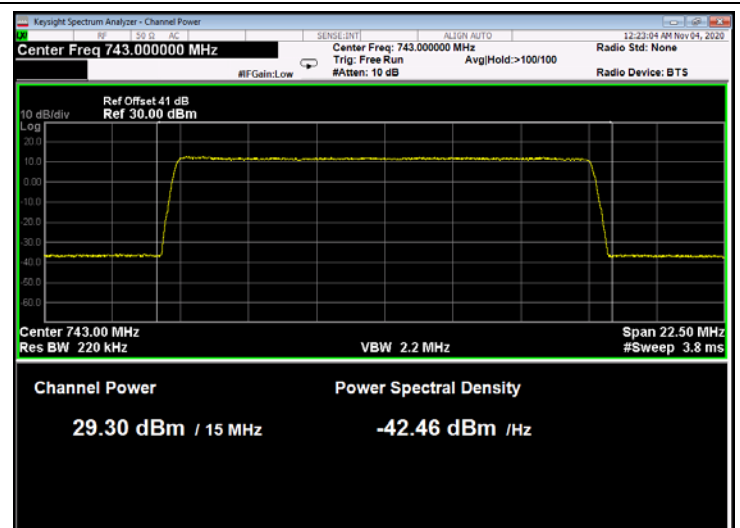


Figure 126: QPSK 15MHz B.W.; 743.0MHz, 30kHz

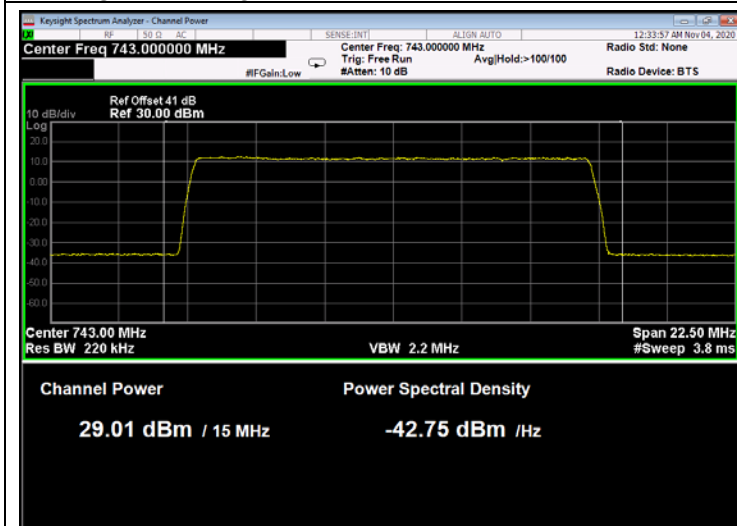


Figure 127: QPSK 15MHz B.W.; 743.0MHz, 60kHz

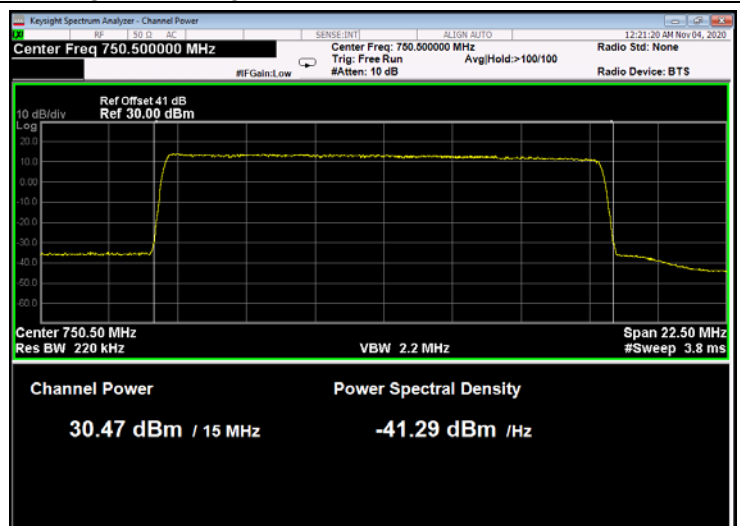


Figure 128: QPSK 15MHz B.W.; 750.5MHz, 15kHz

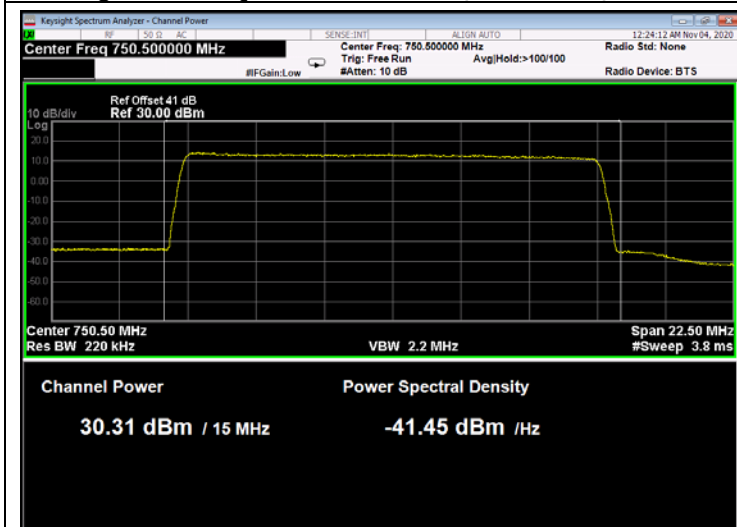


Figure 129: QPSK 15MHz B.W.; 750.5MHz, 30kHz

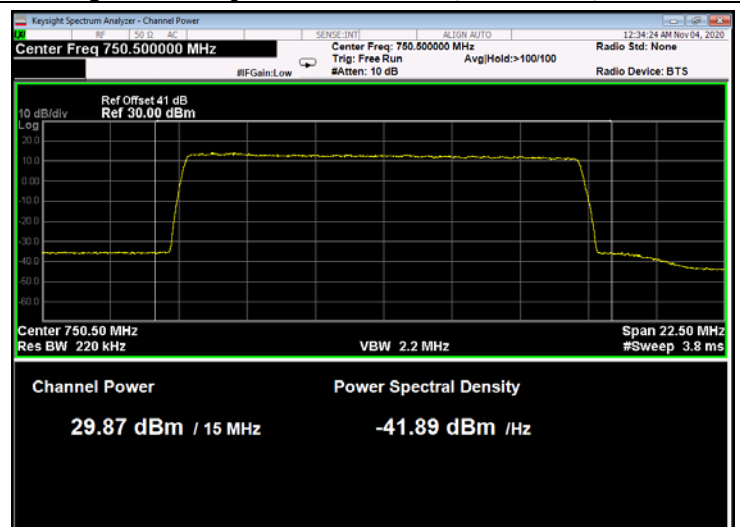


Figure 130: QPSK 15MHz B.W.; 750.5MHz, 60kHz

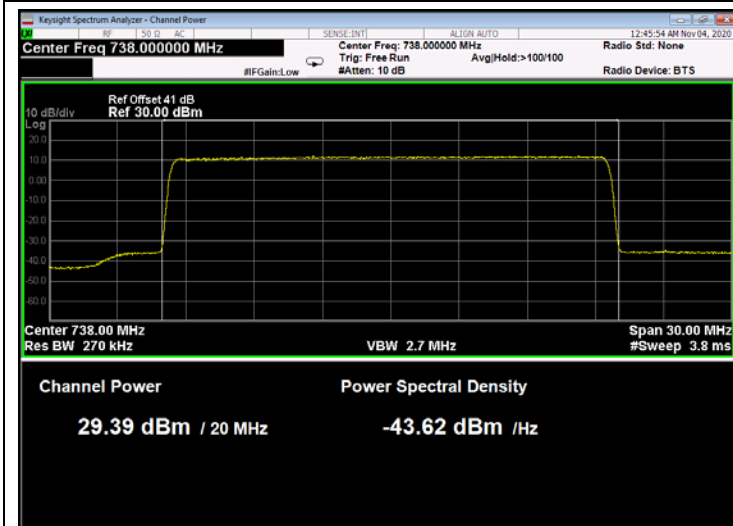


Figure 131: QPSK 20MHz B.W.; 738.0MHz, 15kHz

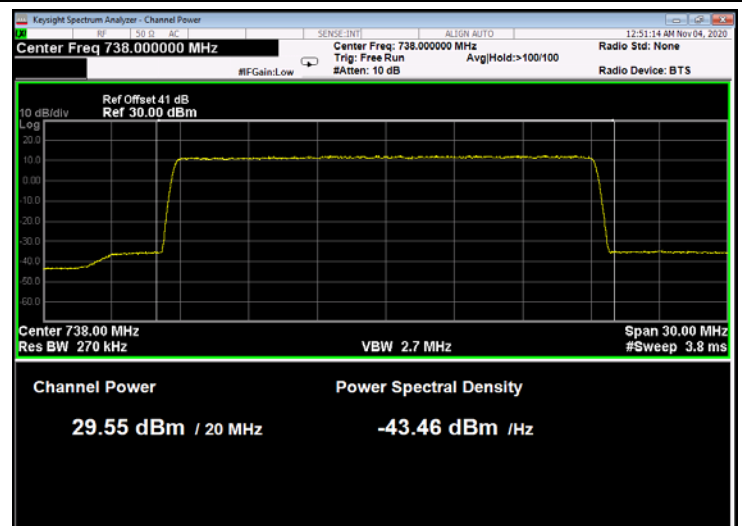


Figure 132: QPSK 20MHz B.W.; 738.0MHz, 30kHz

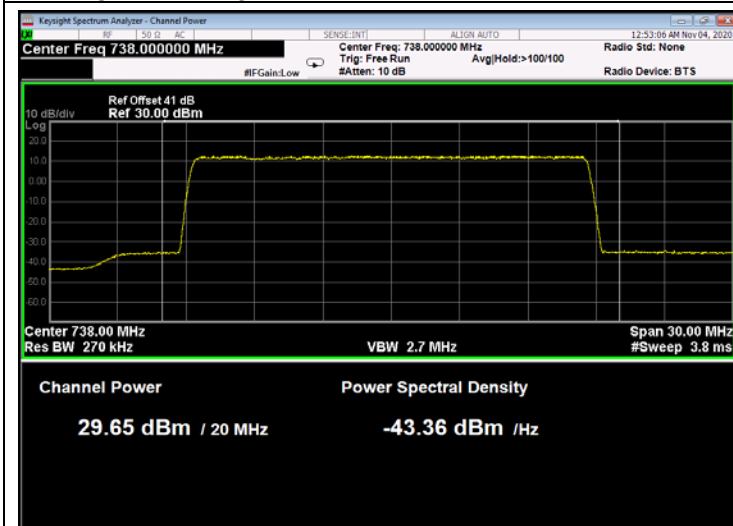


Figure 133: QPSK 20MHz B.W.; 738.0MHz, 60kHz

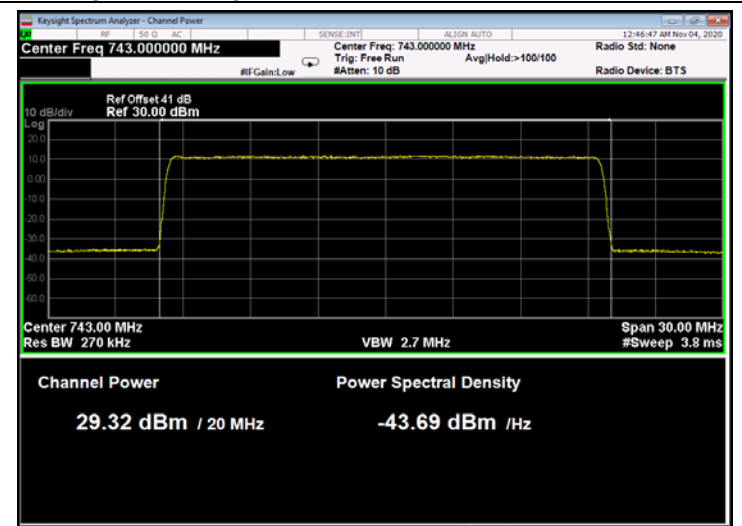


Figure 134: QPSK 20MHz B.W.; 743.0MHz, 15kHz

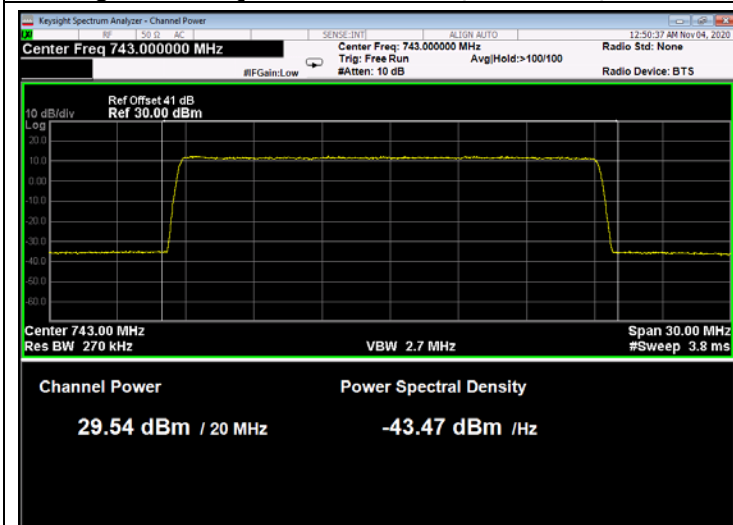


Figure 135: QPSK 20MHz B.W.; 743.0MHz, 30kHz

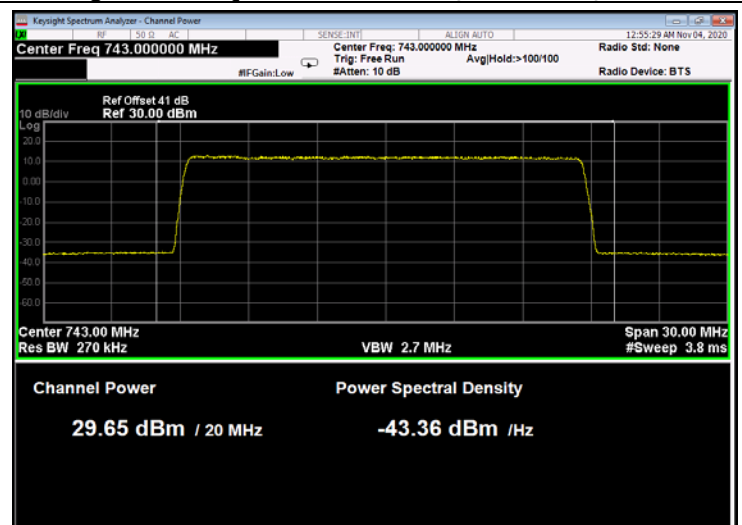


Figure 136: QPSK 20MHz B.W.; 743.0MHz, 60kHz

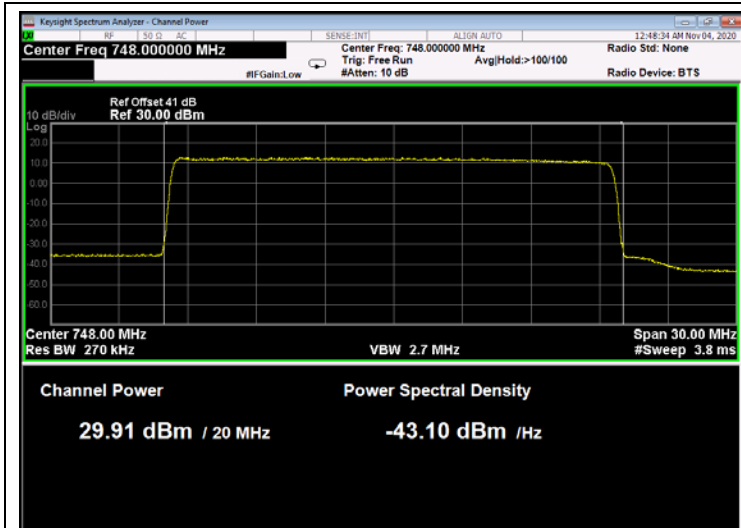


Figure 137: QPSK 20MHz B.W.; 748.0MHz, 15kHz

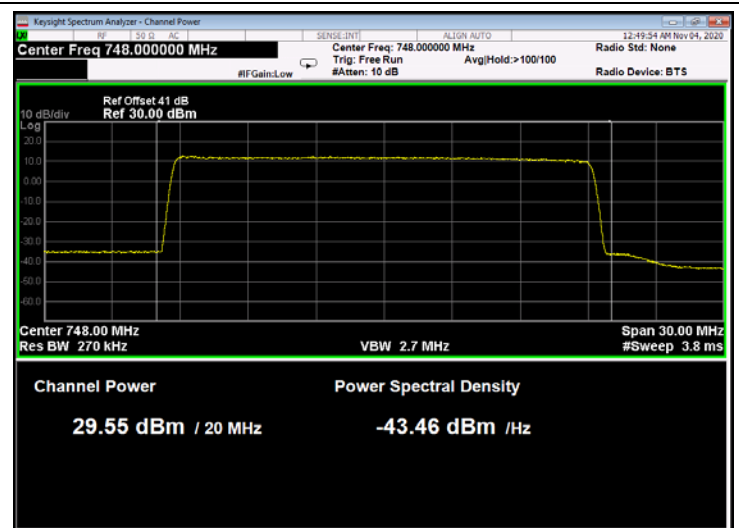


Figure 138: QPSK 20MHz B.W.; 748.0MHz, 30kHz

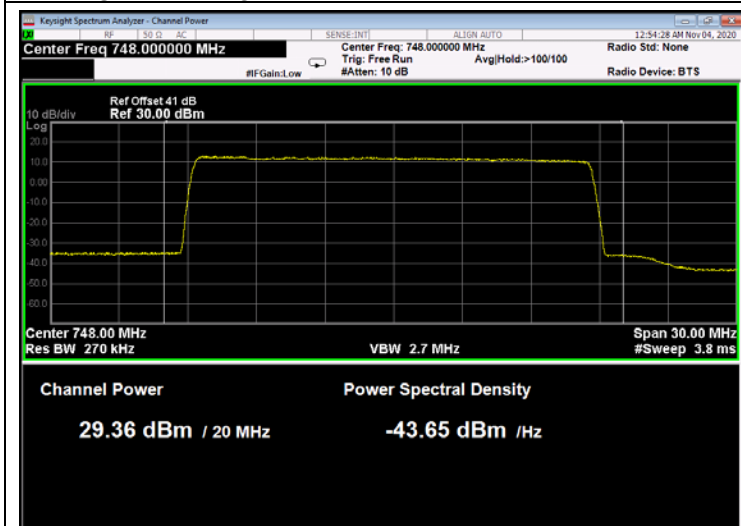


Figure 139: QPSK 20MHz B.W.; 748.0MHz, 60kHz



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	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	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	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	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	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	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
		30	733.0	8.5854
		60	733.0	7.8851
		15	743.0	9.2915
		30	743.0	8.5855
		60	743.0	7.8840
		15	753.0	9.3016
		30	753.0	8.5858
		60	753.0	7.8839
	15	15	735.5	14.183
		30	735.5	13.616
		60	735.5	12.939
		15	743.0	14.195
		30	743.0	13.617
		60	743.0	12.947
		15	750.5	14.191
		30	750.5	13.610
		60	750.5	12.944
	20	15	738.0	18.968
		30	738.0	18.258
		60	738.0	17.167
		15	743.0	18.967
		30	743.0	18.254
		60	743.0	17.167
		15	748.0	18.971
		30	748.0	18.260
		60	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	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	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	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	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	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	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	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	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	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	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	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	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
		30	733.0	8.5852
		60	733.0	7.9160
		15	743.0	9.3108
		30	743.0	8.5955
		60	743.0	7.9225
		15	753.0	9.2938
		30	753.0	8.5823
		60	753.0	7.9143
	15	15	735.5	14.129
		30	735.5	13.650
		60	735.5	12.963
		15	743.0	14.144
		30	743.0	13.666
		60	743.0	12.988
		15	750.5	14.099
		30	750.5	13.632
		60	750.5	12.959
	20	15	738.0	18.886
		30	738.0	18.190
		60	738.0	17.167
		15	743.0	18.905
		30	743.0	18.190
		60	743.0	17.183
		15	748.0	18.834
		30	748.0	18.166
		60	748.0	17.145

Table 13 Occupied Bandwidth QPSK – Output

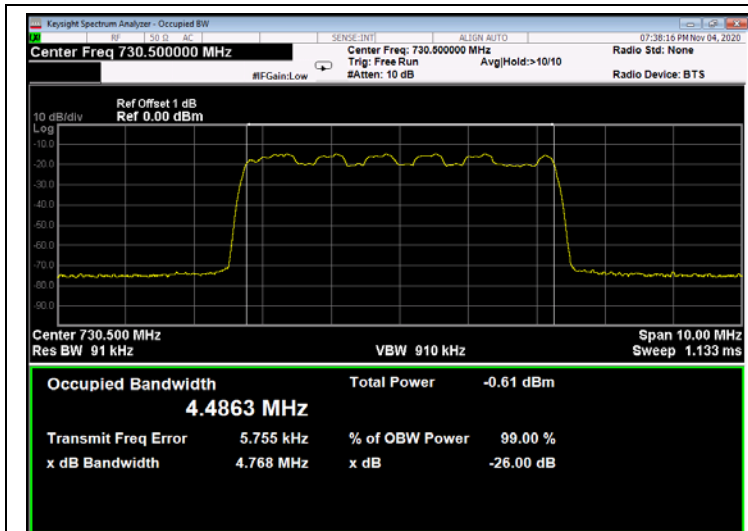


Figure 140: 16QAM 5MHz B.W.; 730.5MHz, 15kHz - Input

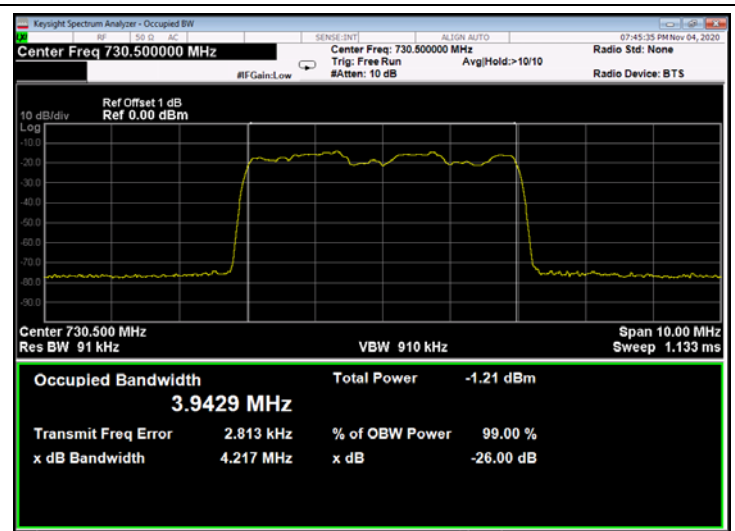


Figure 141: 16QAM 5MHz B.W.; 730.5MHz, 30kHz- Input

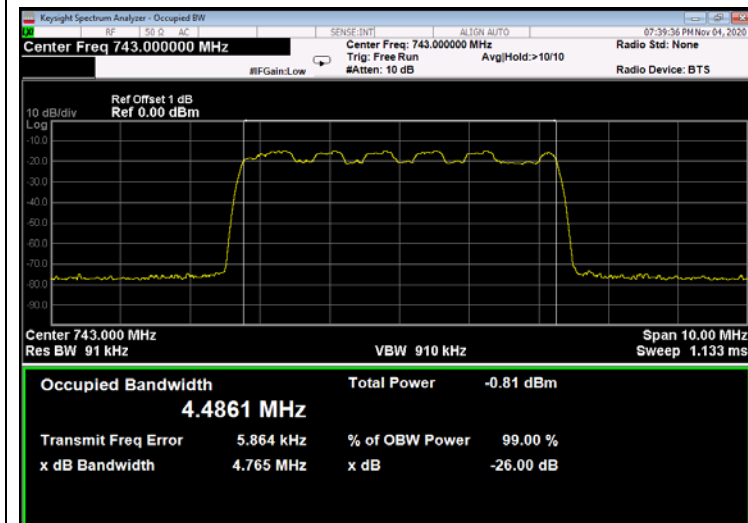


Figure 142: 16QAM 5MHz B.W.; 743.0MHz, 15kHz- Input

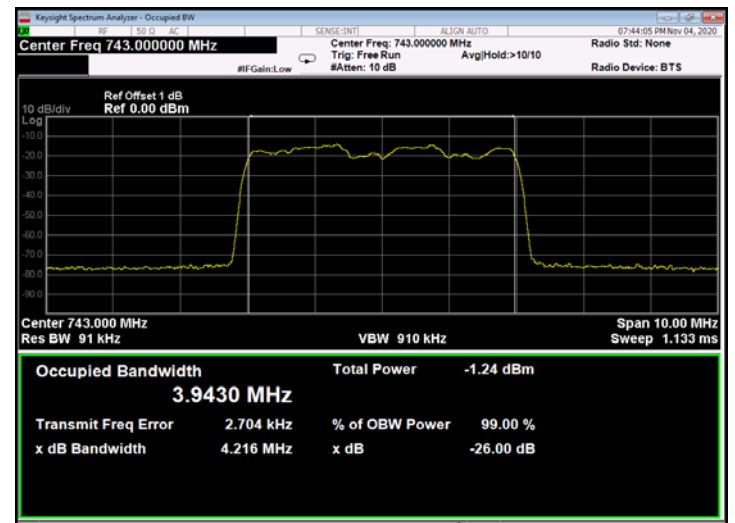


Figure 143: 16QAM 5MHz B.W.; 743.0MHz, 30kHz- Input

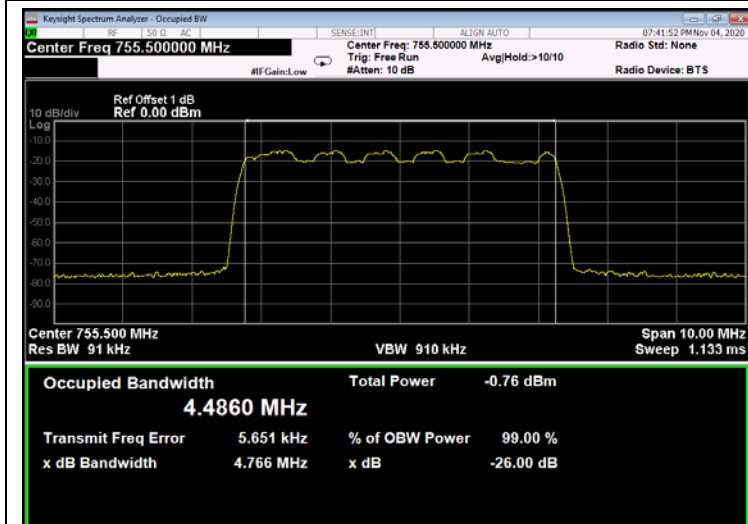


Figure 144: 16QAM 5MHz B.W.; 755.5MHz, 15kHz- Input

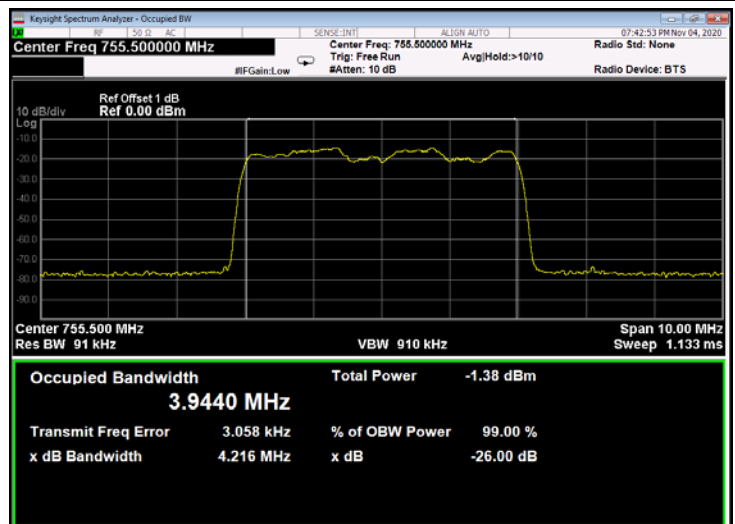


Figure 145: 16QAM 5MHz; 755.5MHz, 30kHz- Input

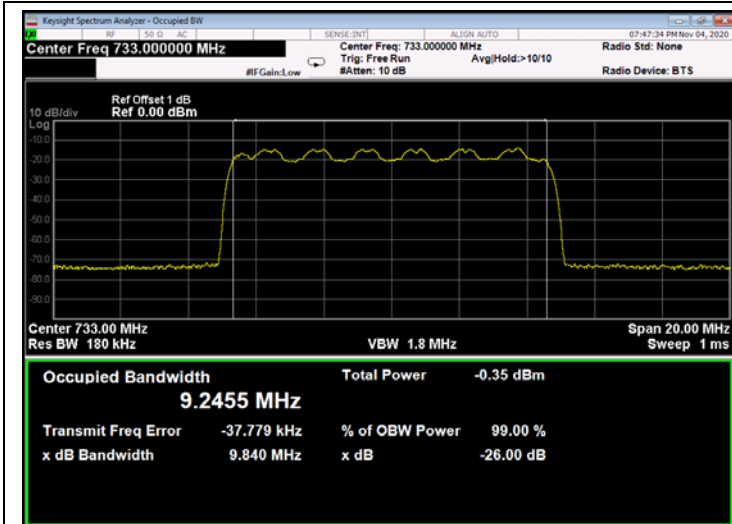


Figure 146: 16QAM 10MHz B.W.; 733.0MHz, 15kHz- Input

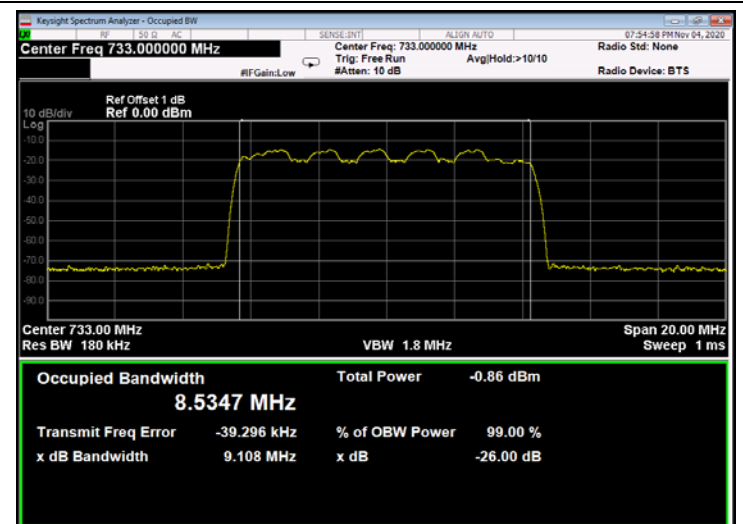


Figure 147: 16QAM 10MHz B.W.; 733.0MHz, 30kHz- Input

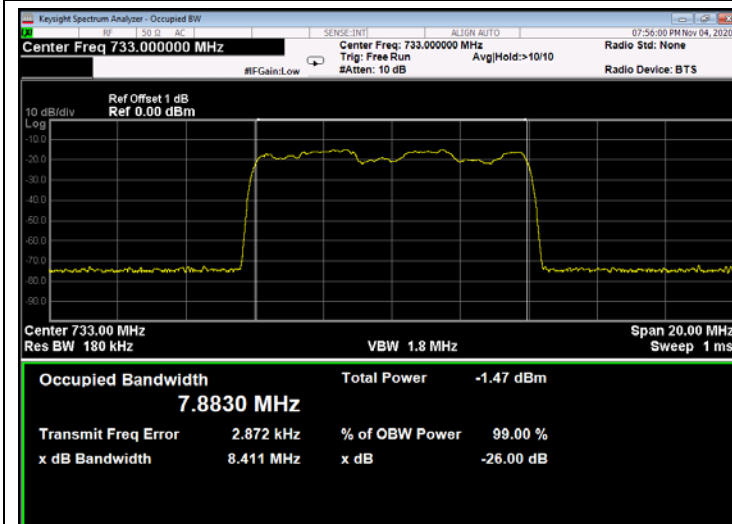


Figure 148: 16QAM 10MHz B.W.; 733.0MHz, 60kHz- Input

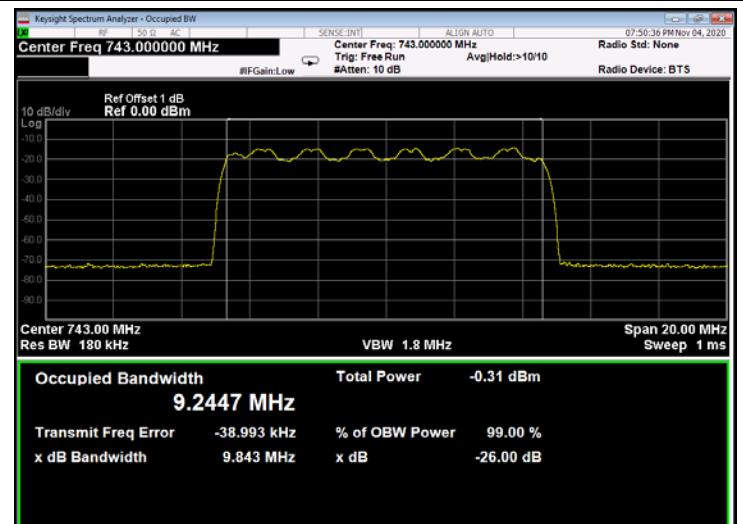


Figure 149: 16QAM 10MHz B.W.; 743.0MHz, 15kHz- Input

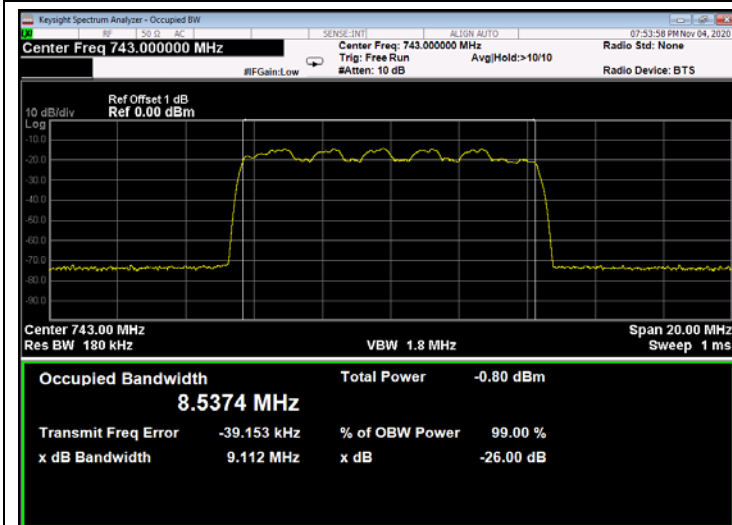


Figure 150: 16QAM 10MHz B.W.; 743.0MHz, 30kHz- Input

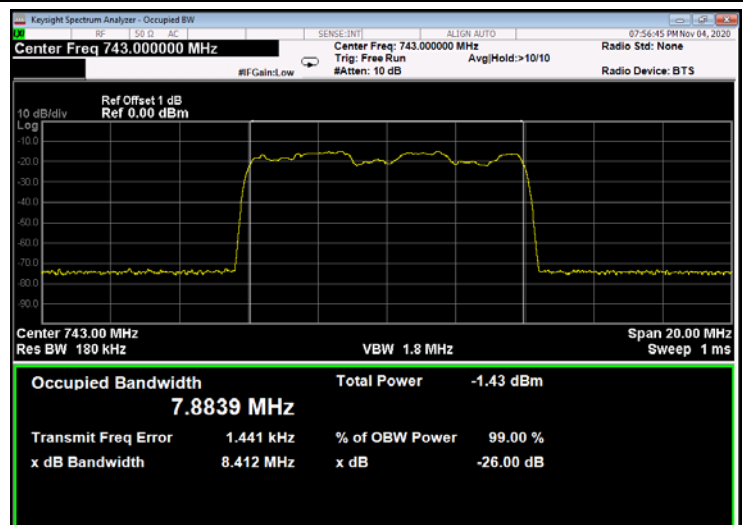


Figure 151: 16QAM 10MHz B.W.; 743.0MHz, 60kHz - Input

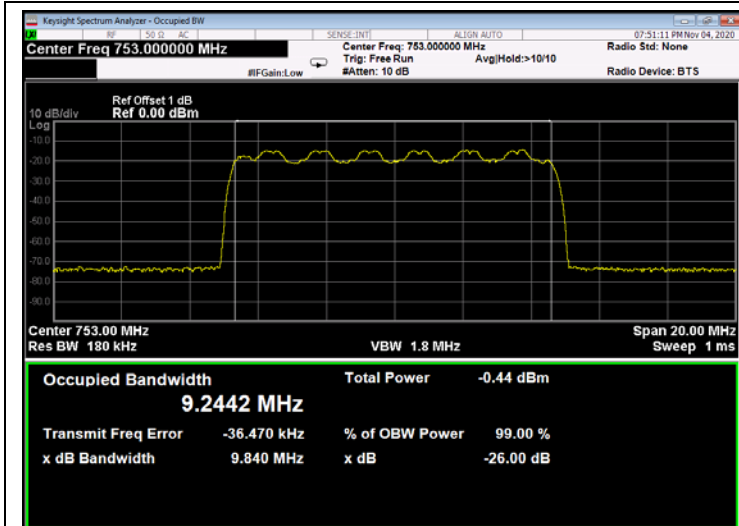


Figure 152: 16QAM 10MHz B.W.; 753.0MHz, 15kHz - Input

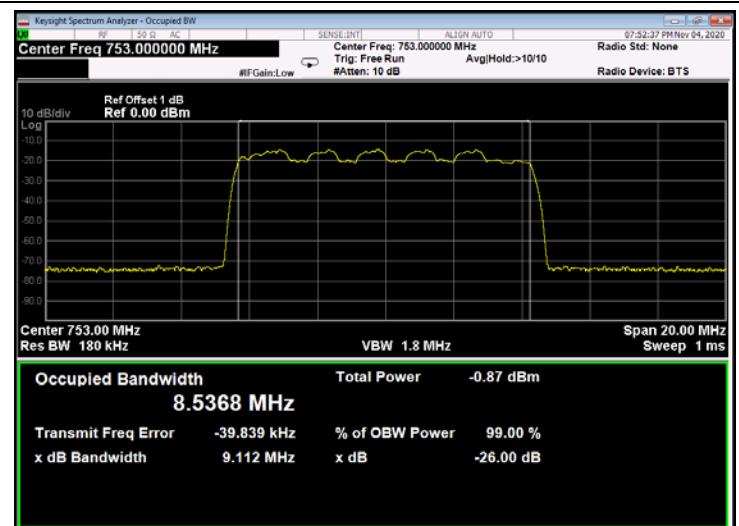


Figure 153: 16QAM 10MHz B.W.; 753.MHz, 30kHz - Input

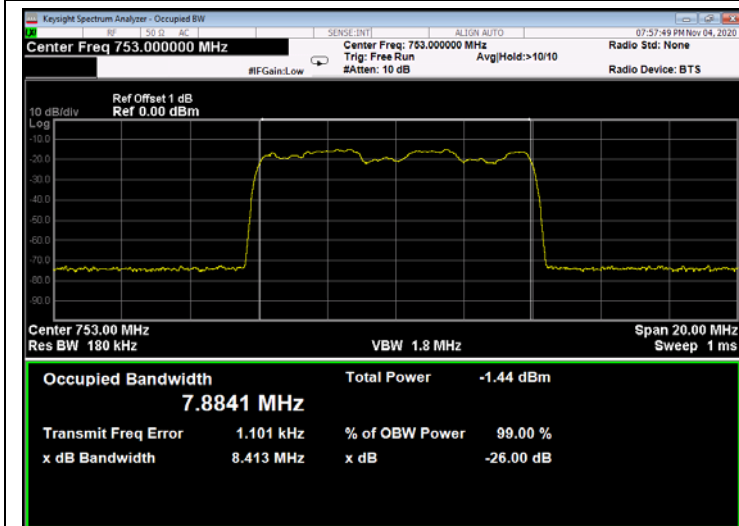


Figure 154: 16QAM 10MHz B.W.; 753.0MHz, 60kHz - Input

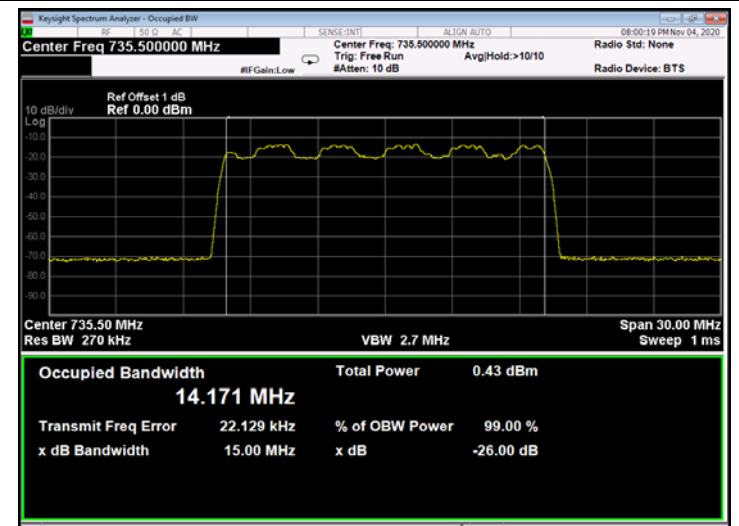


Figure 155: 16QAM 15MHz B.W.; 735.5MHz, 15kHz - Input

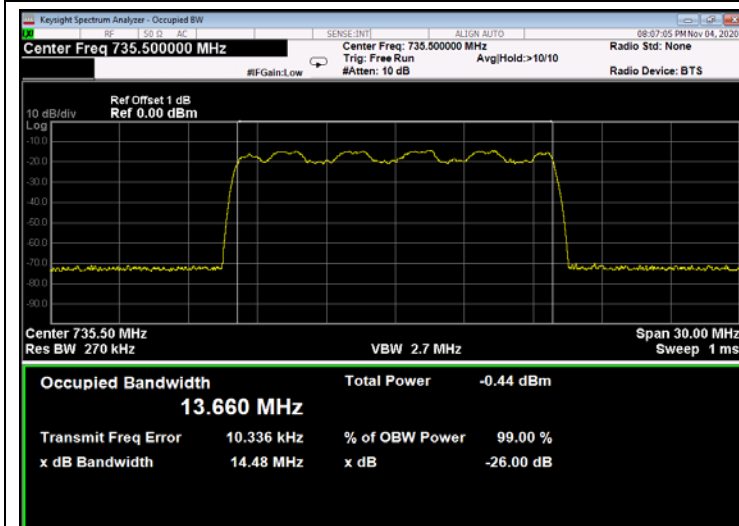


Figure 156: 16QAM 15MHz B.W.; 735.5MHz, 30kHz - Input

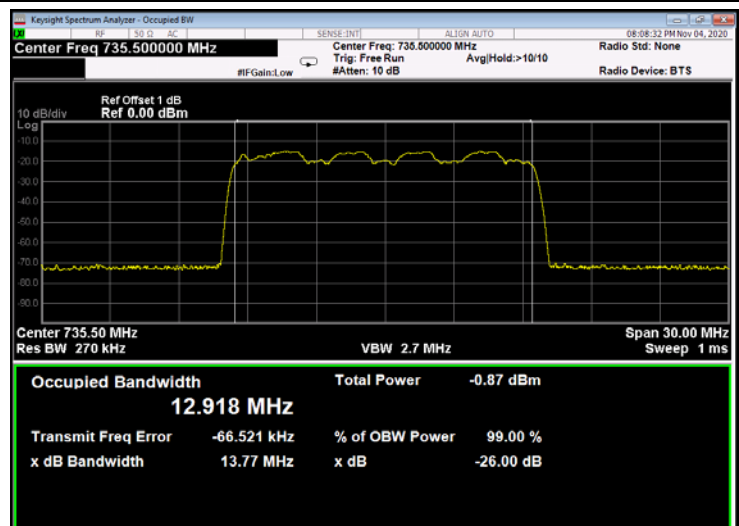


Figure 157: 16QAM 10MHz B.W.; 735.5MHz, 60kHz - Input

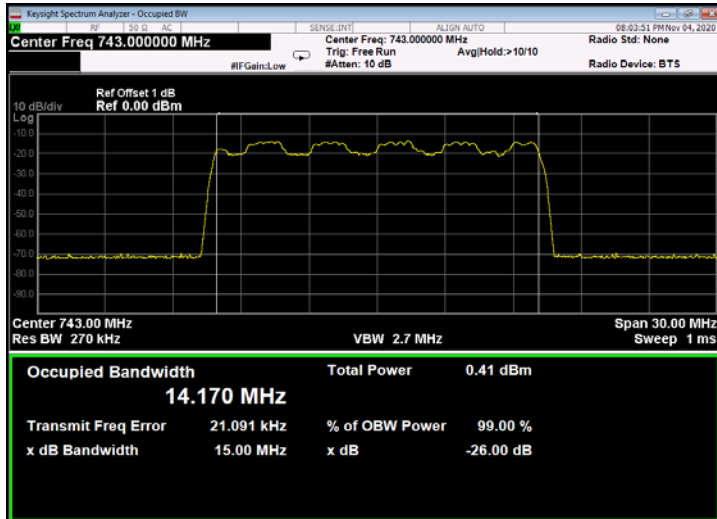


Figure 158: 16QAM 15MHz B.W.; 743.0MHz, 15kHz- Input

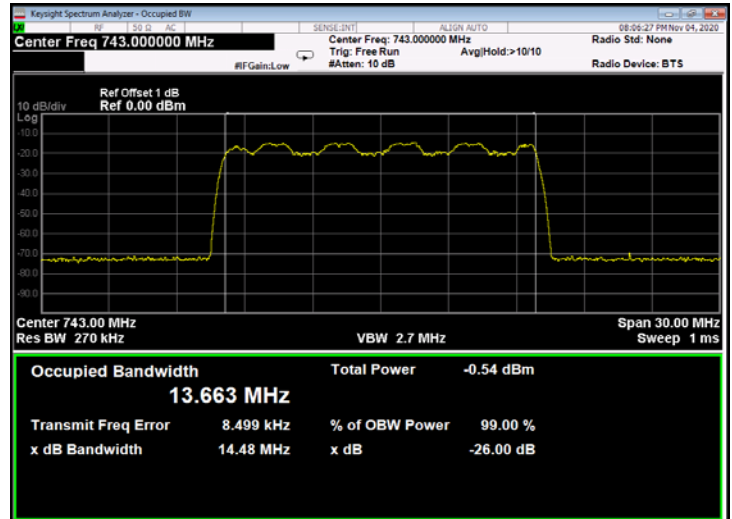


Figure 159: 16QAM 15MHz B.W.; 743.0MHz, 30kHz- Input

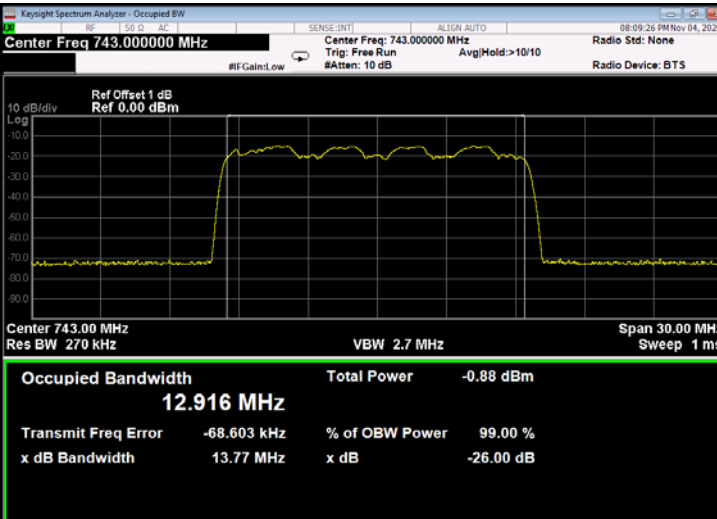


Figure 160: 16QAM 15MHz B.W.; 743.0MHz, 60kHz - Input

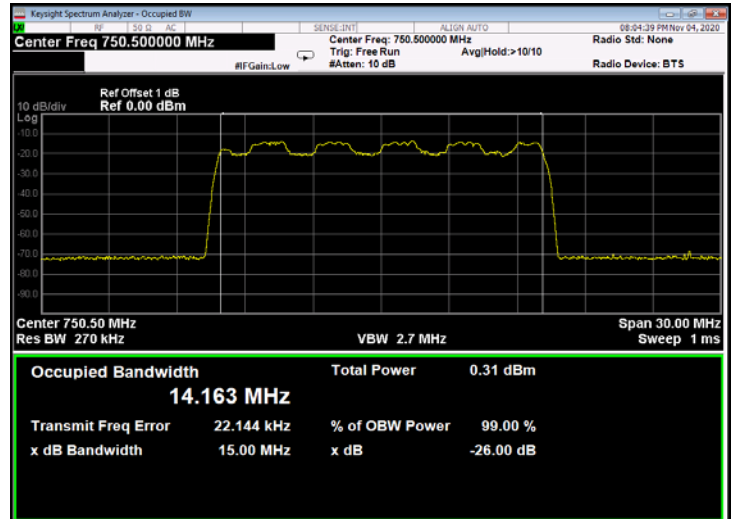


Figure 161: 16QAM 15MHz B.W.; 750.5MHz, 15kHz - Input

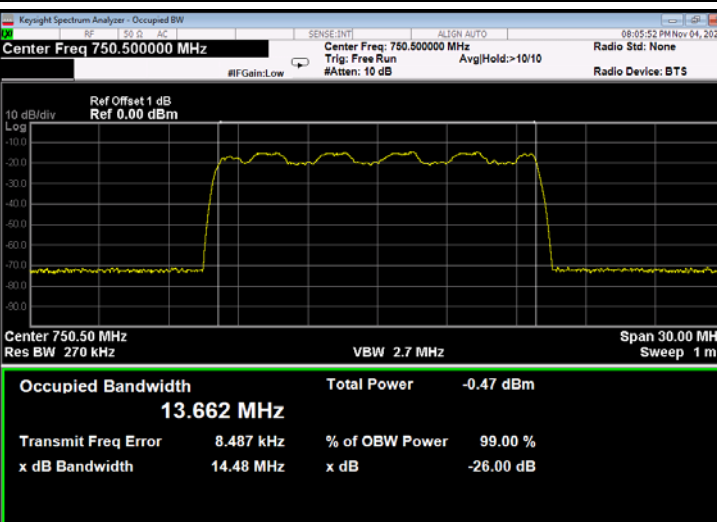


Figure 162: 16QAM 15MHz B.W.; 750.5MHz, 30kHz - Input

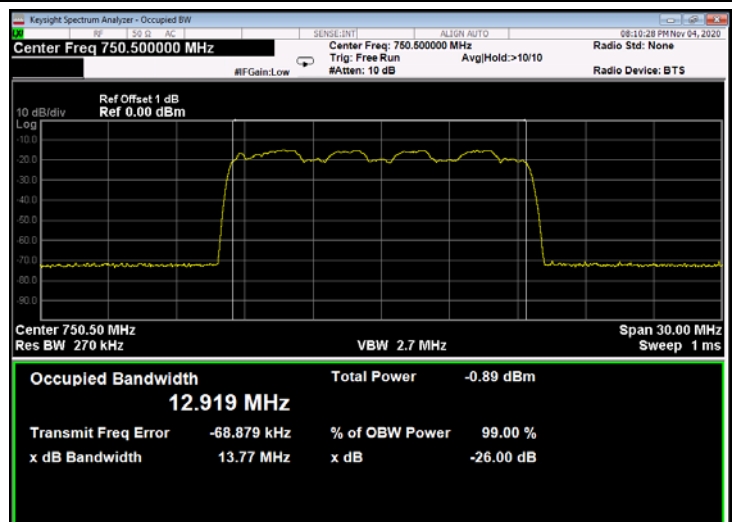


Figure 163: 16QAM 15MHz B.W.; 750.5MHz, 60kHz - Input

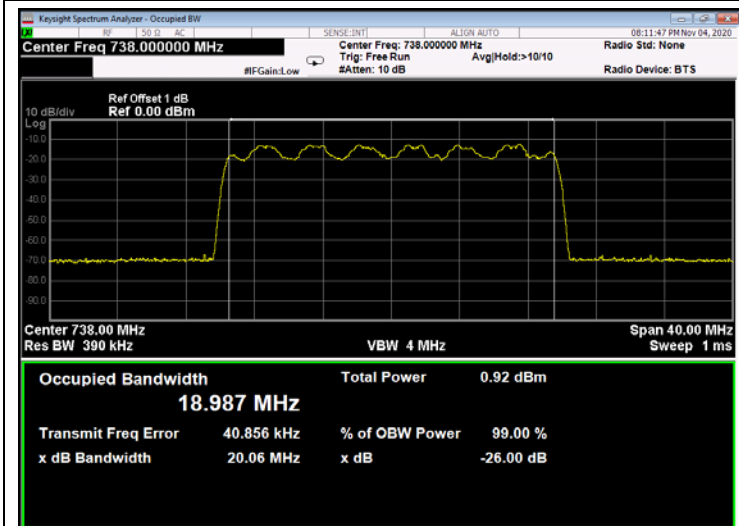


Figure 164: 16QAM 20MHz B.W.; 738.0MHz, 15kHz - Input

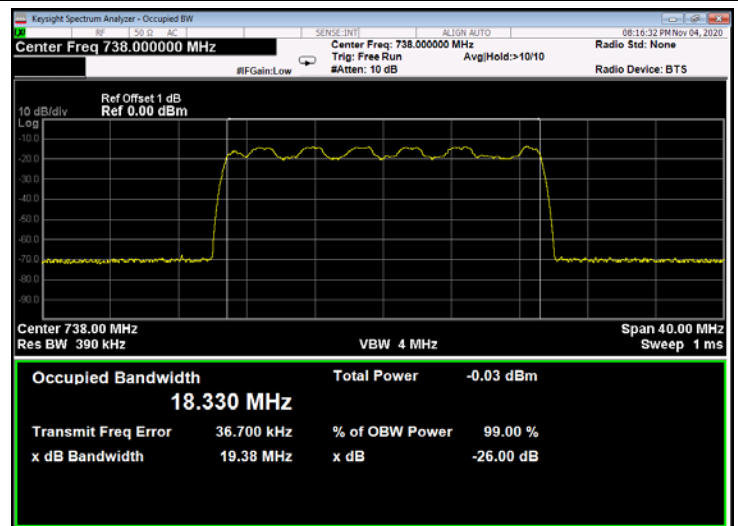


Figure 165: 16QAM 20MHz B.W.; 738.0MHz, 30kHz - Input

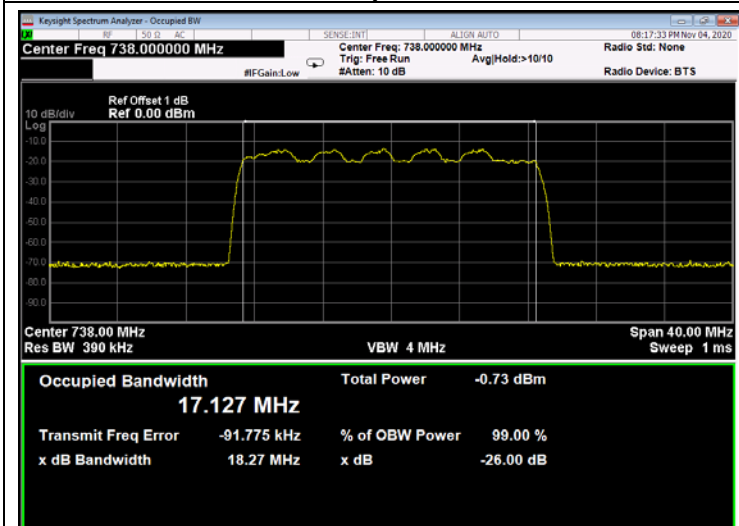


Figure 166: 16QAM 20MHz B.W.; 738.0MHz, 60kHz - Input

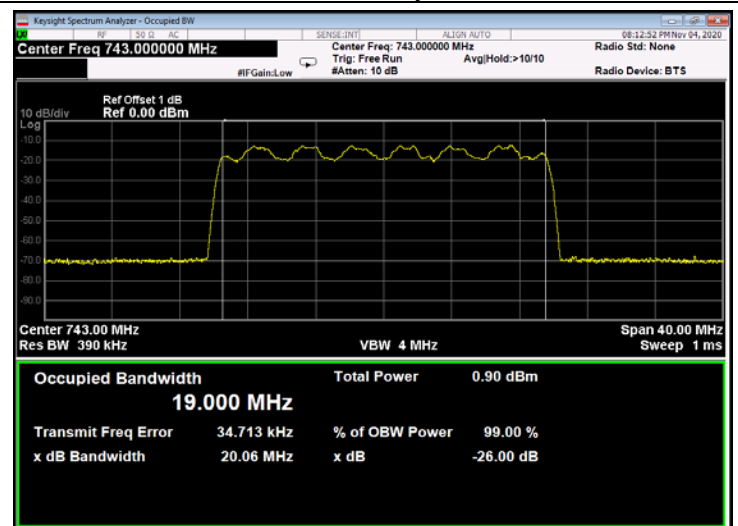


Figure 167: 16QAM 20MHz B.W.; 743.0MHz, 15kHz - Input

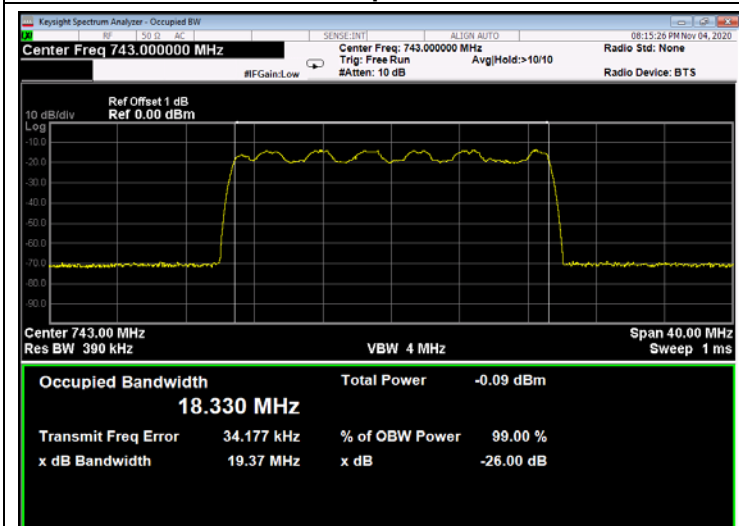


Figure 168: 16QAM 20MHz B.W.; 743.0MHz, 30kHz - Input

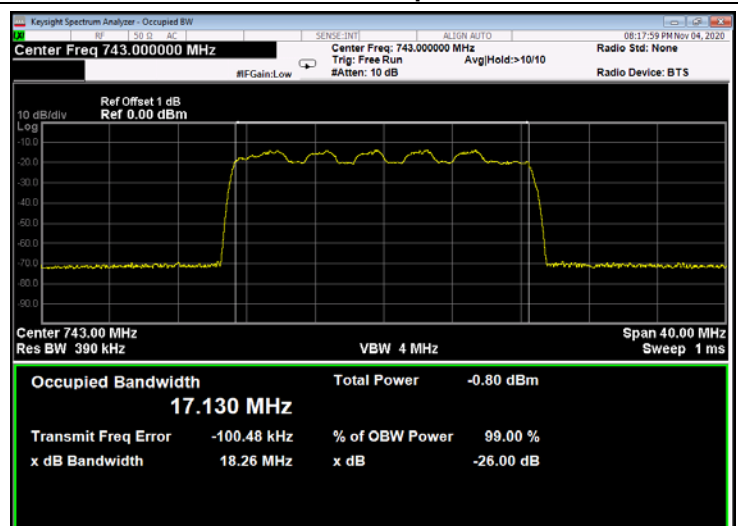


Figure 169: 16QAM 20MHz B.W.; 743.0MHz, 60kHz - Input

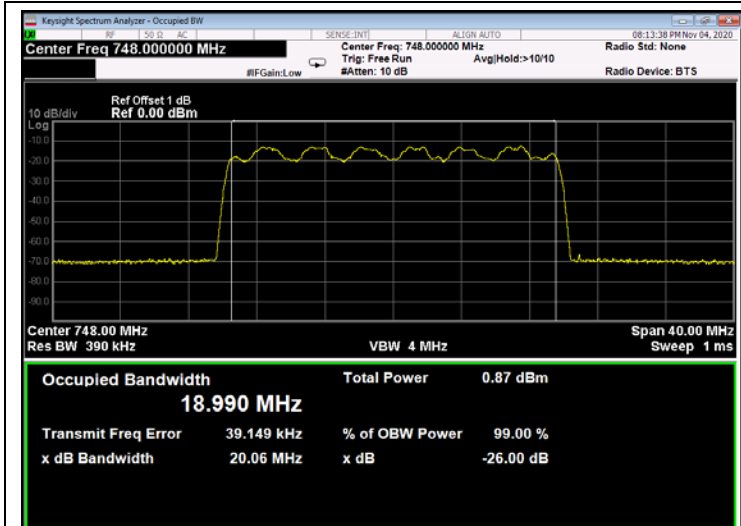


Figure 170: 16QAM 20MHz B.W.; 748.0MHz, 15kHz - Input

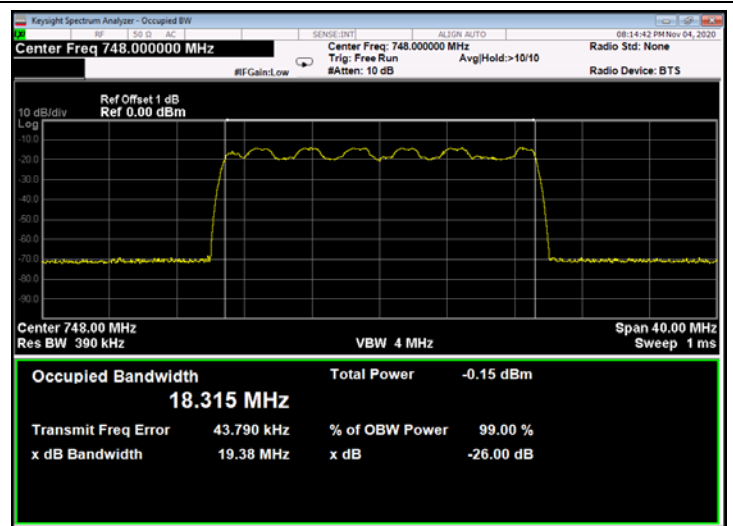


Figure 171: 16QAM 20MHz B.W.; 748.0MHz, 30kHz - Input

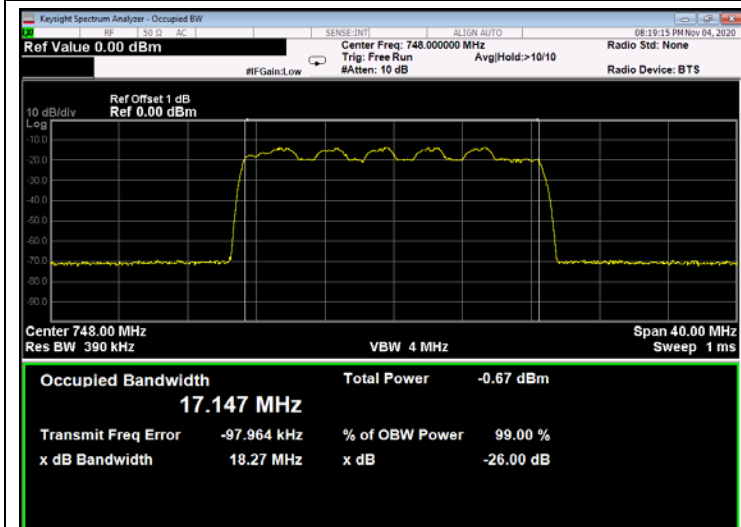


Figure 172: 16QAM 20MHz B.W.; 748.0MHz, 60kHz - Input

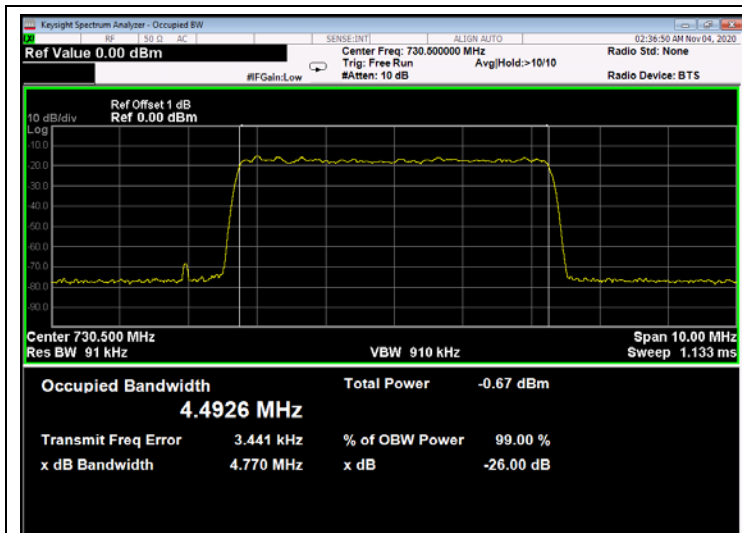


Figure 173: 64QAM 5MHz B.W.; 730.5MHz, 15kHz - Input

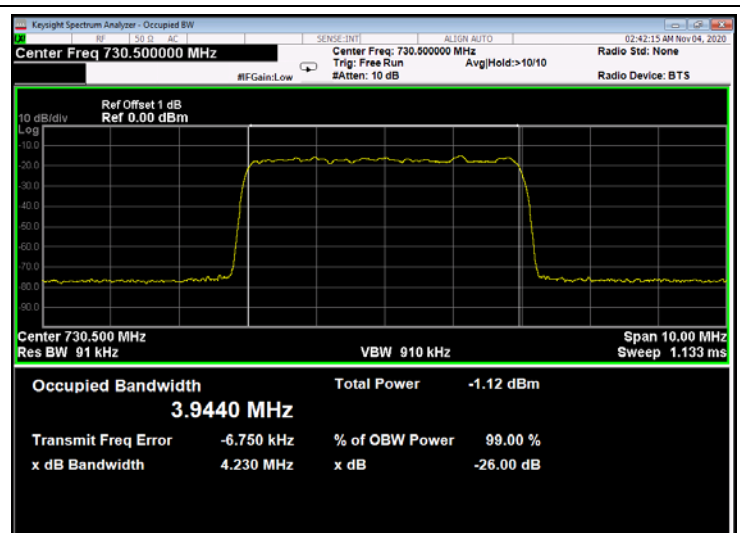


Figure 174: 64QAM 5MHz B.W.; 730.5MHz, 30kHz - Input

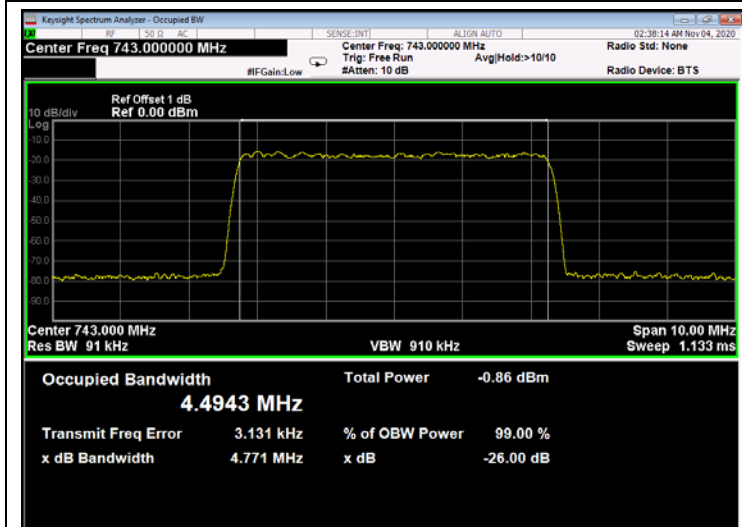


Figure 175: 64QAM 5MHz B.W.; 743.0MHz, 15kHz - Input

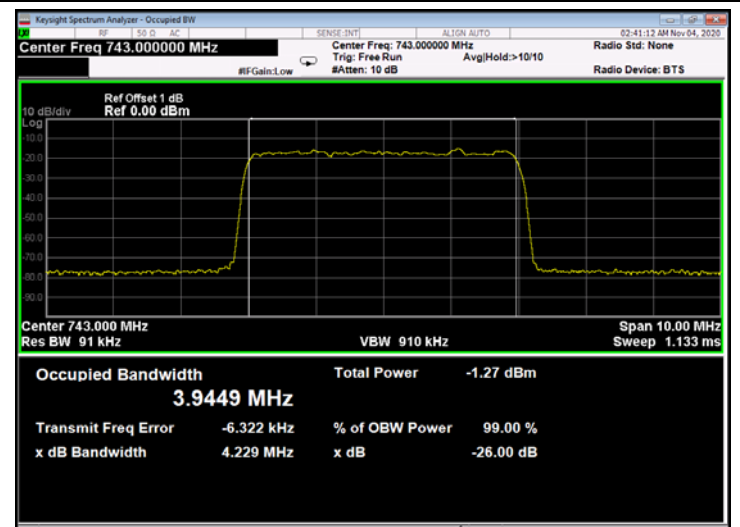


Figure 176: 64QAM 5MHz B.W.; 743.0MHz, 30kHz - Input

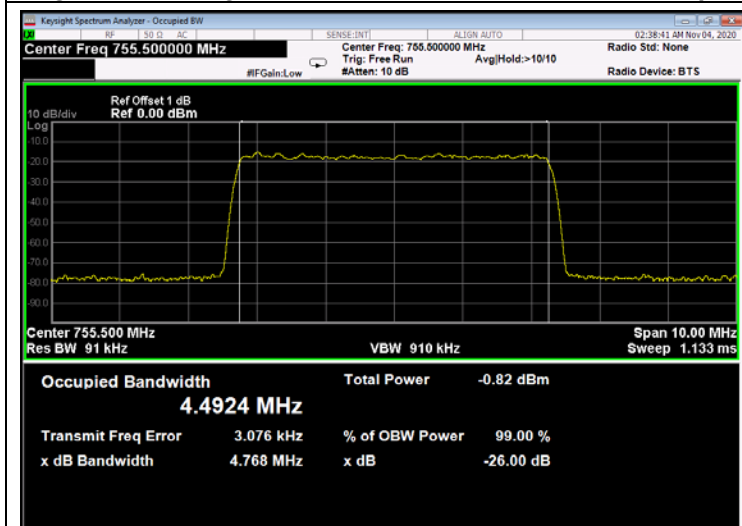


Figure 177: 64QAM 5MHz B.W.; 755.5MHz, 15kHz - Input

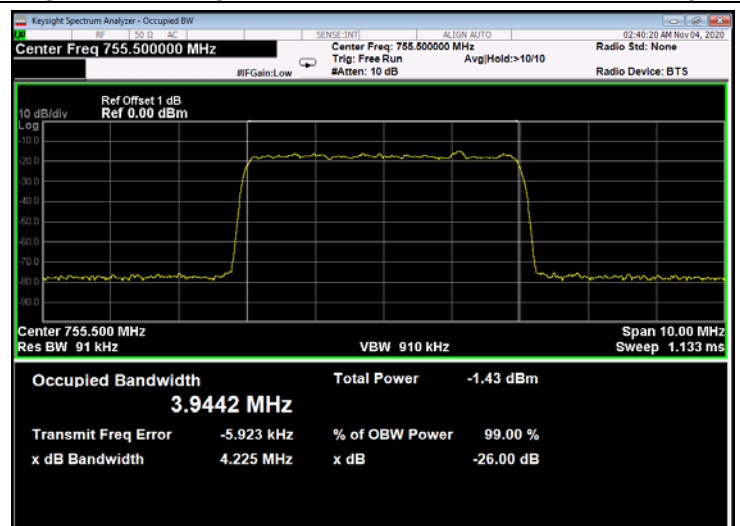


Figure 178: 64QAM 5MHz B.W.; 755.5MHz, 30kHz - Input

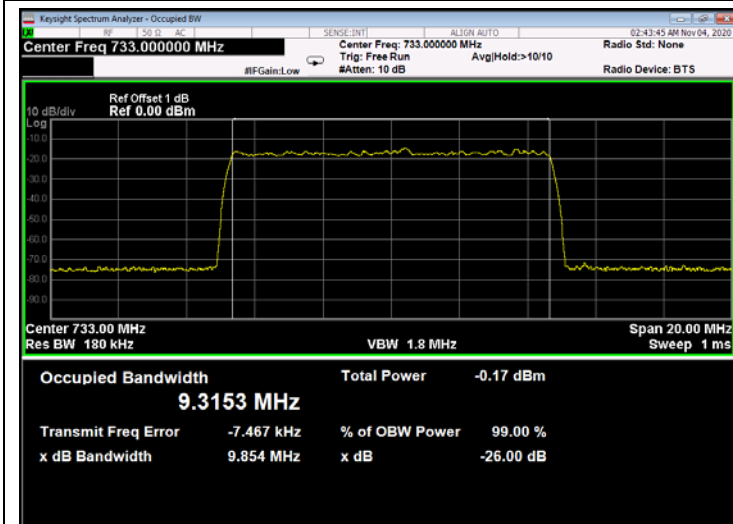


Figure 179: 64QAM 10MHz B.W.; 733.0MHz, 15kHz - Input

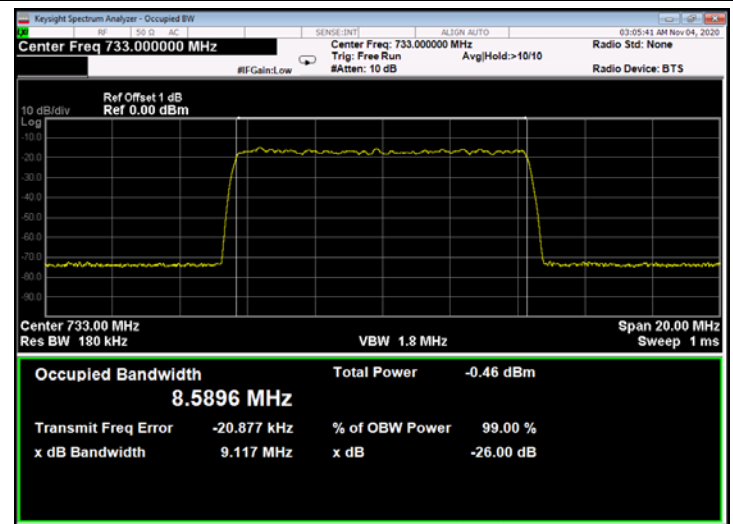


Figure 180: 64QAM 10MHz B.W.; 733.0MHz, 30kHz - Input

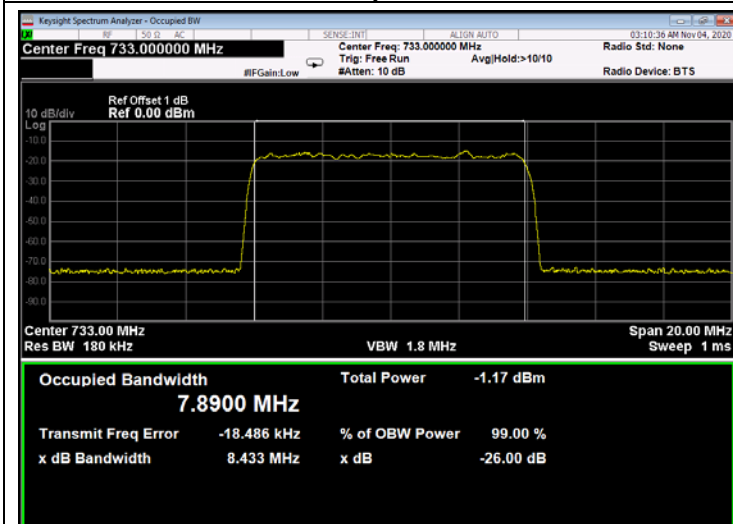


Figure 181: 64QAM 10MHz B.W.; 733.0MHz, 60kHz - Input

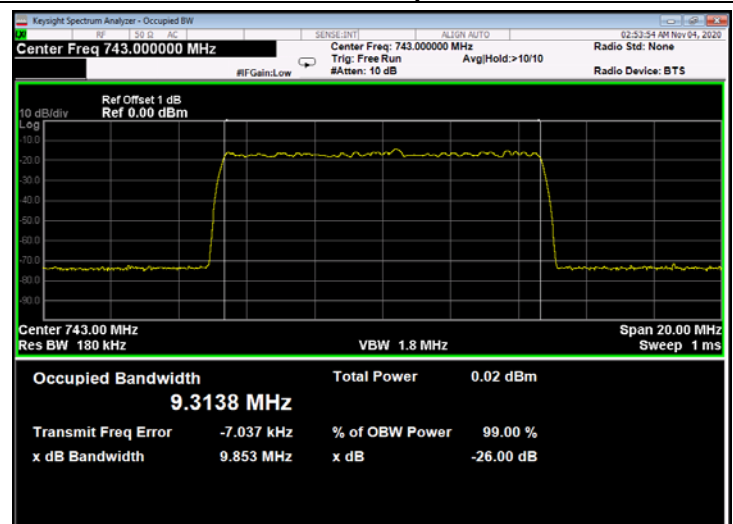


Figure 182: 64QAM 10MHz B.W.; 743.0MHz, 15kHz - Input

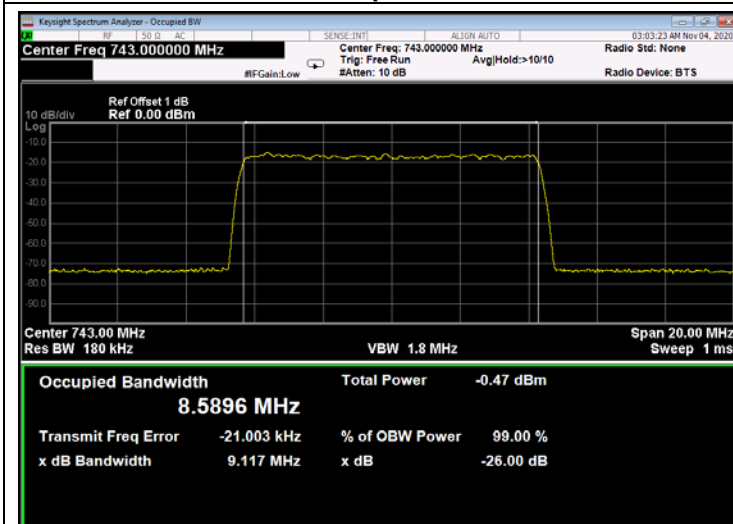


Figure 183: 64QAM 10MHz B.W.; 743.0MHz, 30kHz - Input

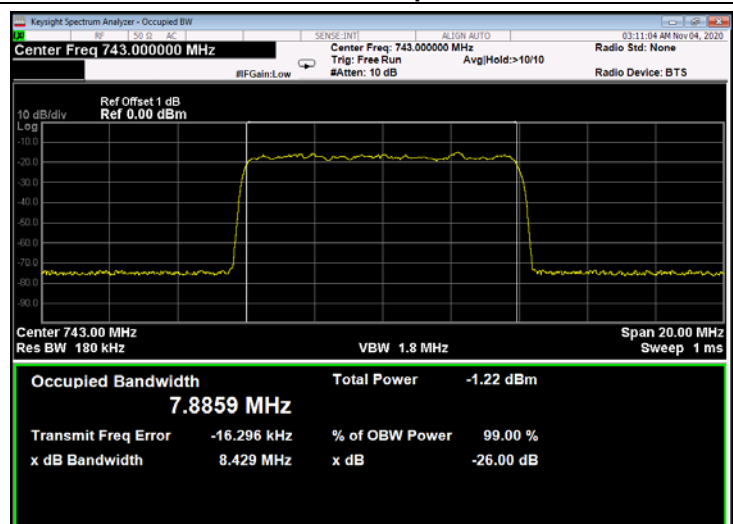


Figure 184: 64QAM 5MHz B.W.; 743.0MHz, 60kHz - Input