

6 Occupied Bandwidth

6.1 Test Specification

FCC Part 2, Section 1049

6.2 Test Procedure

(Temperature (22°C)/ Humidity (35%RH))

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (loss=20.8 dB). 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.

6.3 Test Limit

N/A

6.4 Test Results

JUDGEMENT: Passed

See additional information in Table 11 to Table 18 and Figure 97 to Figure 216.

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
16QAM	5	15	760.5	4.5389
		30	760.5	4.0031
		15	763.5	4.5363
		30	763.5	4.0077
		15	766.5	4.5397
		30	766.5	4.0035
	10	15	763.0	9.2957
		30	763.0	8.5876
		60	763.0	7.9803
		15	763.5	9.2984
		30	763.5	8.5905
		60	763.5	7.9886
		15	764.0	9.3011
		30	764.0	8.5868
		60	764.0	7.9900

Table 11 Occupied Bandwidth 16 QAM Input

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
16QAM	5	15	760.5	4.5887
		30	760.5	4.0317
		15	763.5	4.5835
		30	763.5	4.0327
		15	766.5	4.5676
		30	766.5	4.0231
	10	15	763.0	9.4356
		30	763.0	8.6985
		60	763.0	8.0780
		15	763.5	9.4034
		30	763.5	8.6783
		60	763.5	8.0783
		15	764.0	9.3645
		30	764.0	8.6790
		60	764.0	8.0625

Table 12 Occupied Bandwidth 16QAM Output

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
64QAM	5	15	760.5	4.5028
		30	760.5	3.9851
		15	763.0	4.4983
		30	763.0	3.9894
		15	766.5	4.5015
		30	766.5	3.9884
	10	15	763.0	9.3148
		30	763.0	8.6466
		60	763.0	7.9267
		15	763.5	9.3123
		30	763.5	8.6433
		60	763.5	7.9406
		15	764.0	9.3154
		30	764.0	8.6464
		60	764.0	7.9354

Table 13 Occupied Bandwidth 64 QAM Input

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
64QAM	5	15	760.5	4.5281
		30	760.5	4.0105
		15	763.0	4.5290
		30	763.0	4.0051
		15	766.5	4.5098
		30	766.5	3.9972
	10	15	763.0	9.3605
		30	763.0	8.7044
		60	763.0	8.0275
		15	763.5	9.3415
		30	763.5	8.6969
		60	763.5	8.0193
		15	764.0	9.3336
		30	764.0	8.6801
		60	764.0	8.0074

Table 14 Occupied Bandwidth 64QAM Output

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
256QAM	5	15	760.5	4.5167
		30	760.5	3.9821
		15	763.0	4.5195
		30	763.0	3.9817
		15	766.5	4.5193
		30	766.5	3.9829
	10	15	763.0	9.3332
		30	763.0	8.6623
		60	763.0	7.9449
		15	763.5	9.3325
		30	763.5	8.6682
		60	763.5	7.9455
		15	764.0	9.3330
		30	764.0	8.6673
		60	764.0	7.9445

Table 15 Occupied Bandwidth 256 QAM Input

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
256QAM	5	15	760.5	4.6227
		30	760.5	4.0186
		15	763.0	4.6252
		30	763.0	4.0190
		15	766.5	4.5821
		30	766.5	4.0031
	10	15	763.0	9.8261
		30	763.0	8.9100
		60	763.0	8.1782
		15	763.5	9.8699
		30	763.5	8.8879
		60	763.5	8.1664
		15	764.0	9.8270
		30	764.0	8.8484
		60	764.0	8.1615

Table 16 Occupied Bandwidth 256QAM Output

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
QPSK	(MHz)	(kHz)	(MHz)	(MHz)
	5	15	760.5	4.4933
		30	760.5	3.9812
		15	763.0	4.4936
		30	763.0	3.9814
		15	766.5	4.4966
		30	766.5	3.9809
	10	15	763.0	9.2967
		30	763.0	8.6460
		60	763.0	7.9441
		15	763.5	9.3022
		30	763.5	8.6473
		60	763.5	7.9462
		15	764.0	9.2984
		30	764.0	8.6469
		60	764.0	7.9489

Table 17 Occupied Bandwidth QPSK Input

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
QPSK	(MHz)	(kHz)	(MHz)	(MHz)
	5	15	760.5	4.6125
		30	760.5	4.0780
		15	763.5	4.5940
		30	763.5	4.0729
		15	766.5	4.5670
		30	766.5	4.0574
	10	15	763.0	9.4021
		30	763.0	8.8668
		60	763.0	8.1509
		15	763.5	9.3900
		30	763.5	8.8515
		60	763.5	8.1370
		15	764.0	9.3750
		30	764.0	8.8309
		60	764.0	8.1192

Table 18 Occupied Bandwidth QPSK Output

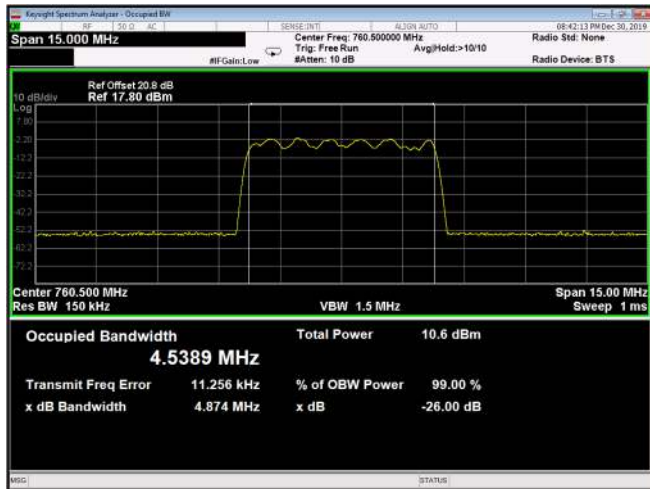


Figure 97: 16QAM 5MHz B.W.; 760.5MHz, 15kHz Input

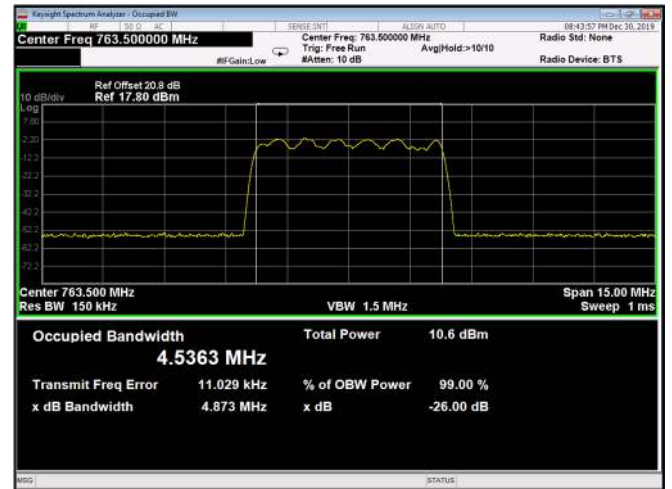


Figure 98: 16QAM 5MHz B.W.; 763.5MHz, 15kHz Input

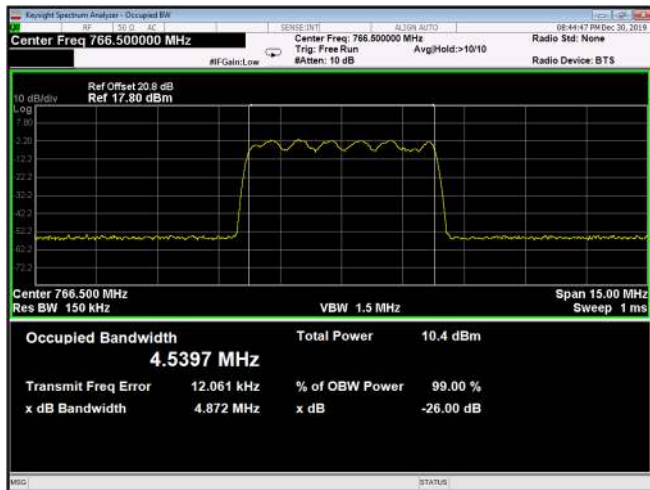


Figure 99: 16QAM 5MHz B.W.; 766.5MHz, 15kHz Input

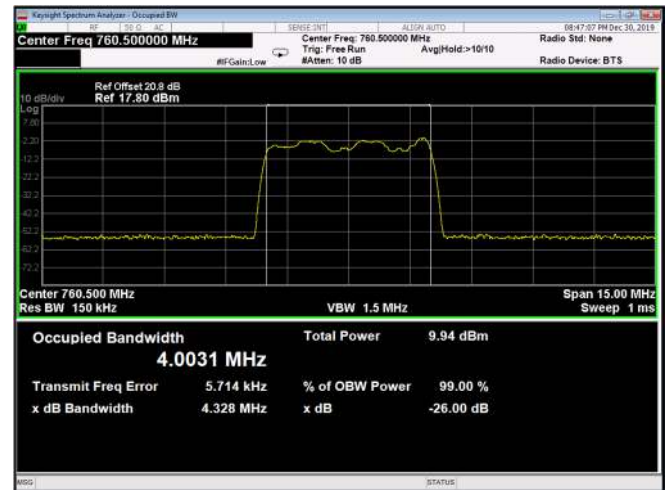


Figure 100: 16QAM 5MHz B.W.; 760.5MHz, 30kHz Input

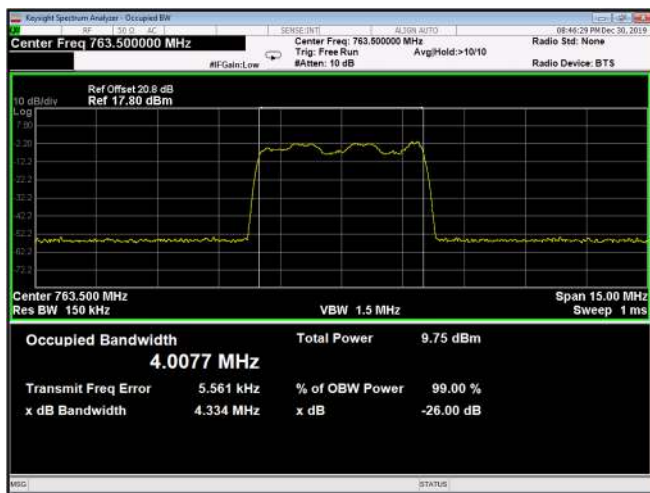


Figure 101: 16QAM 5MHz B.W.; 763.5MHz, 30kHz Input

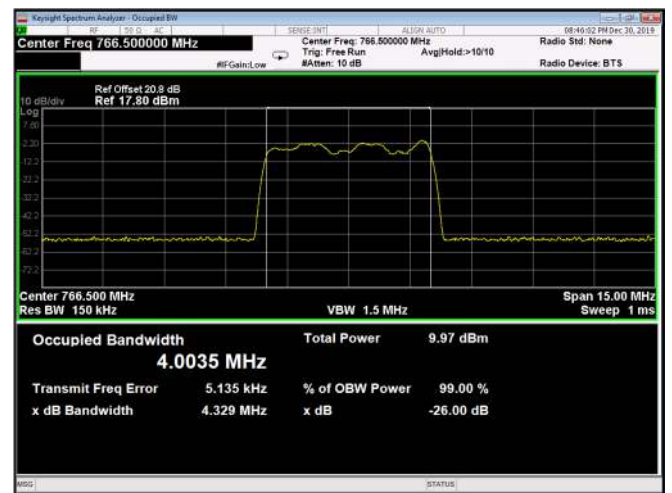


Figure 102: 16QAM 5MHz C.S.; 766.5MHz, 30kHz Input

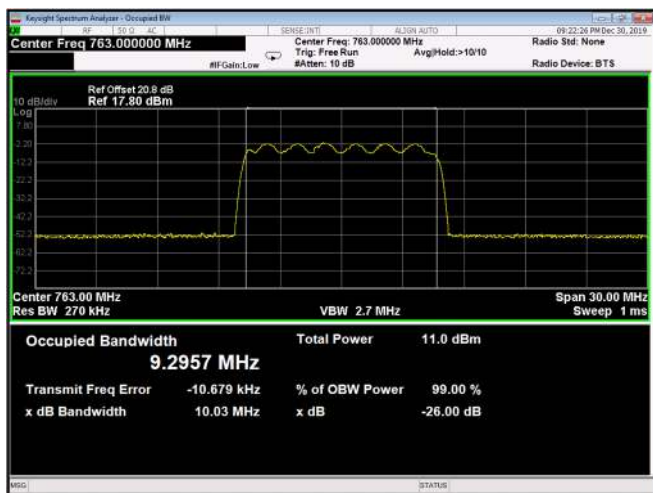


Figure 103: 16QAM 10MHz B.W.; 763.0MHz, 15kHz Input

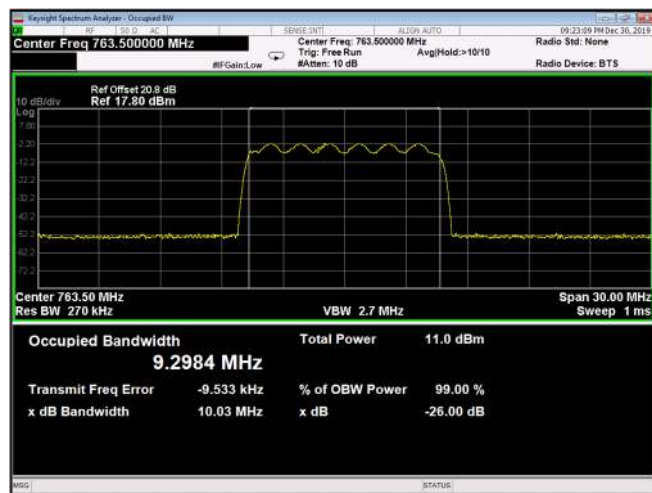


Figure 104: 16QAM 10MHz B.W.; 763.5MHz, 15kHz Input

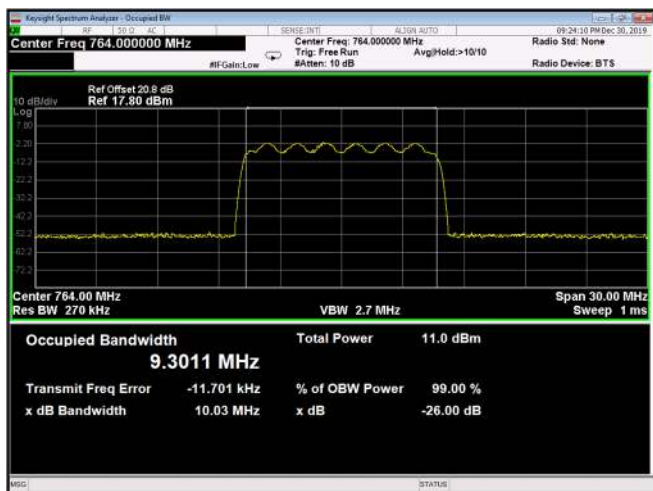


Figure 105: 16QAM 10MHz B.W.; 764.0MHz, 15kHz Input

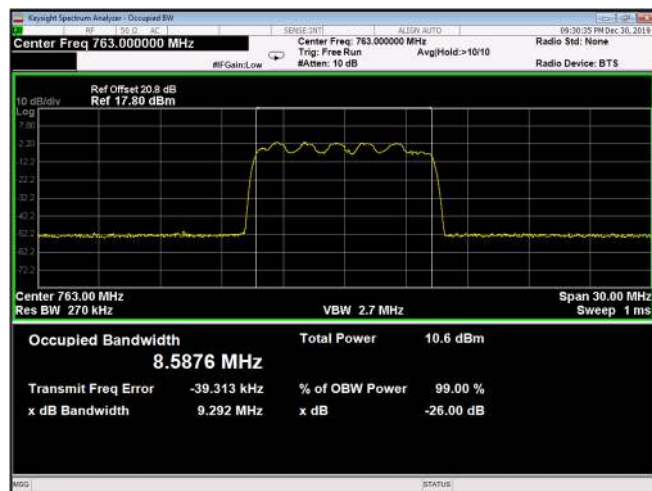


Figure 106: 16QAM 10MHz B.W.; 763.0MHz, 30kHz Input

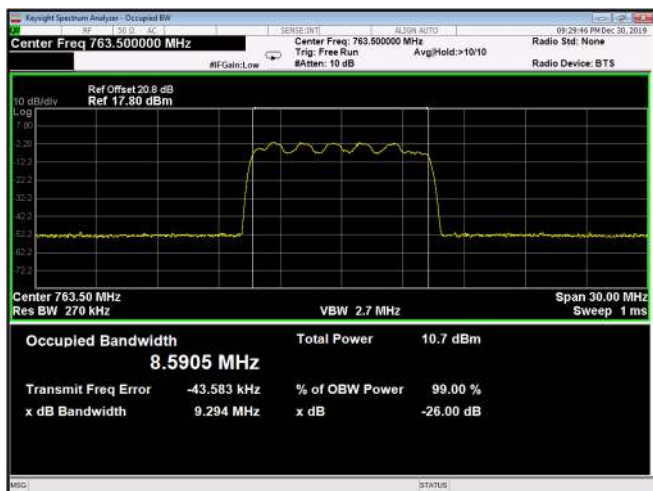


Figure 107: 16QAM 10MHz B.W.; 763.5MHz, 30kHz Input

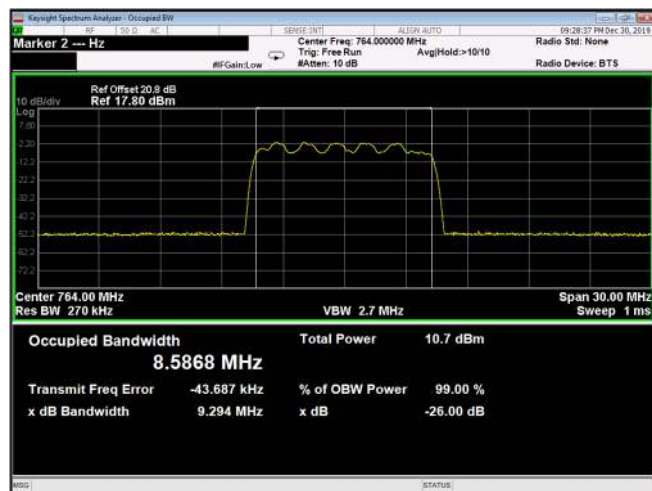


Figure 108: 16QAM 10MHz B.W.; 764.0MHz, 30kHz Input

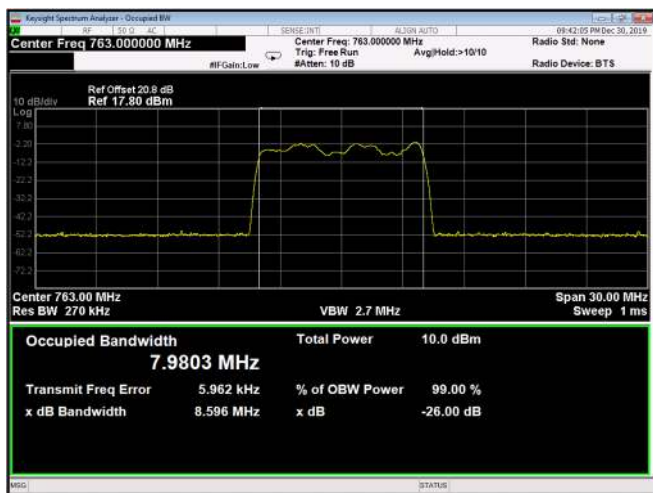


Figure 109: 16QAM 10MHz B.W.; 763.0MHz, 60kHz Input

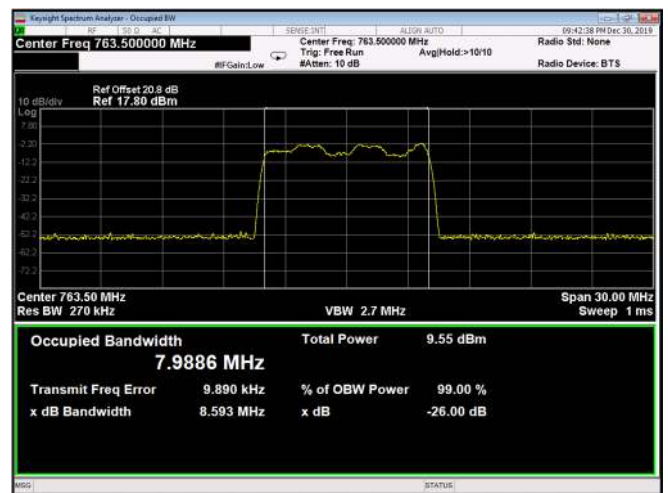


Figure 110: 16QAM 10MHz C.S; 763.5MHz, 60kHz Input

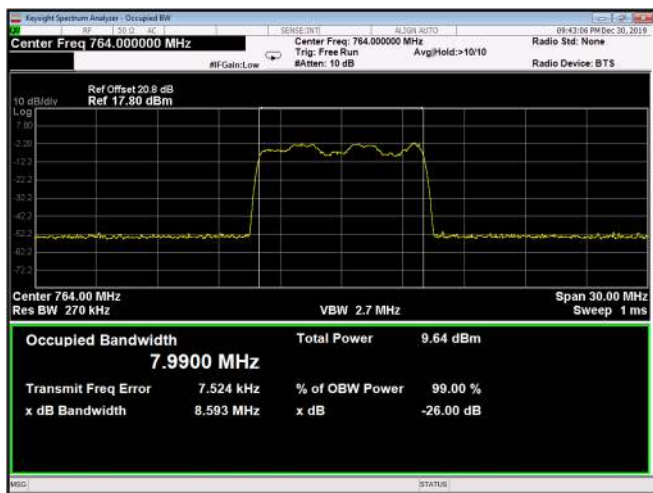


Figure 111: 16QAM 10MHz B.W.; 764.0MHz, 60kHz Input

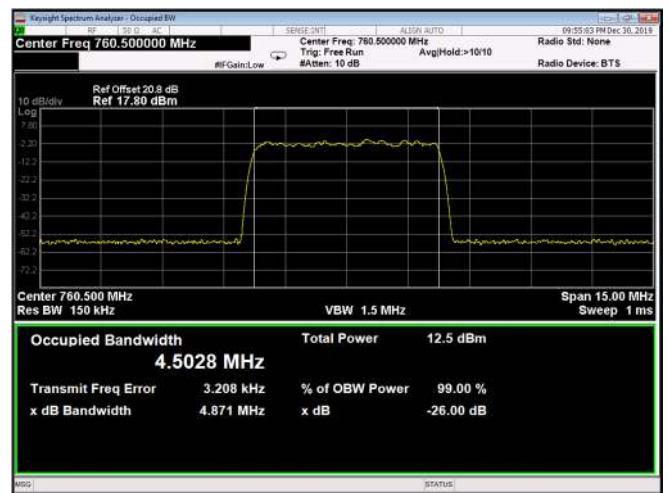


Figure 112: 64QAM 5MHz B.W.; 760.5MHz, 15kHz Input

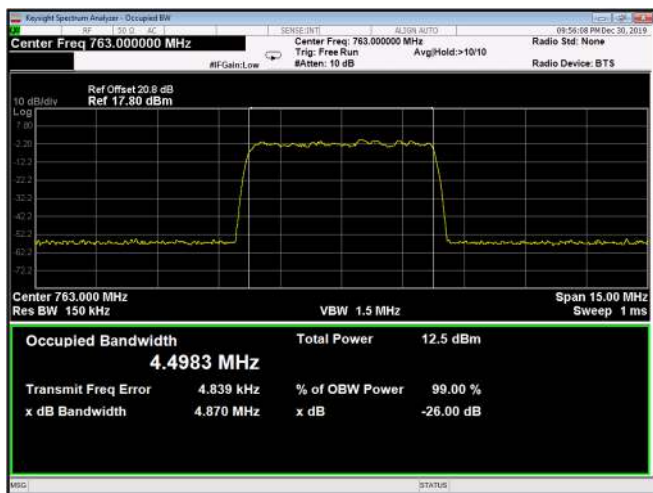


Figure 113: 64QAM 5MHz B.W.; 763.0MHz, 15kHz Input

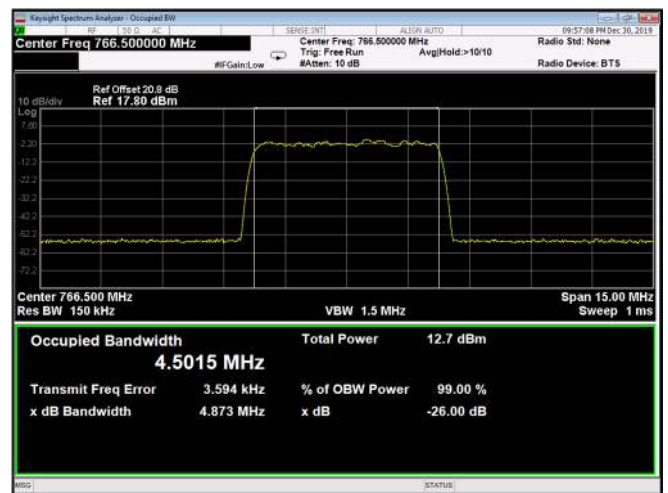


Figure 114: 64QAM 5MHz B.W.; 766.5MHz, 15kHz Input

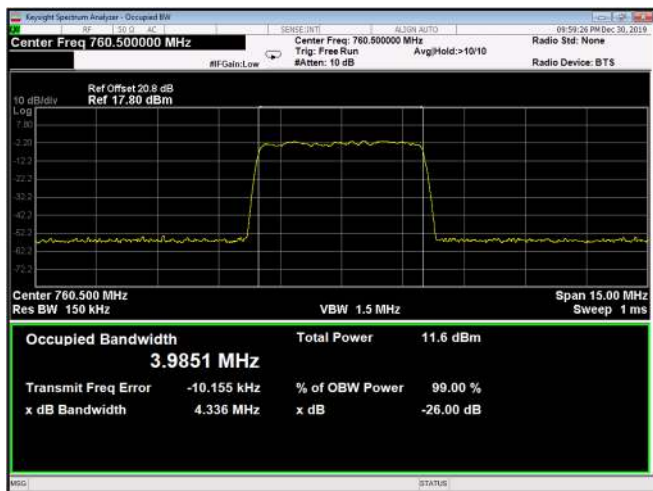


Figure 115: 64QAM 5MHz B.W.; 760.5MHz, 30kHz Input

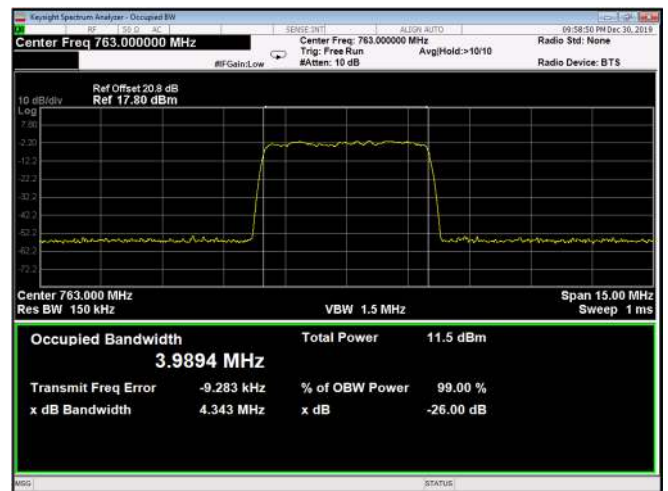


Figure 116: 64QAM 5MHz B.W.; 763.0MHz, 30kHz Input

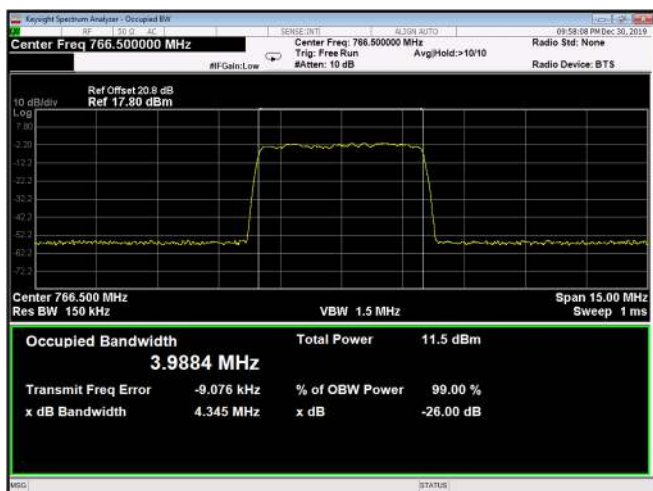


Figure 117: 64QAM 5MHz B.W.; 766.5MHz, 30kHz Input

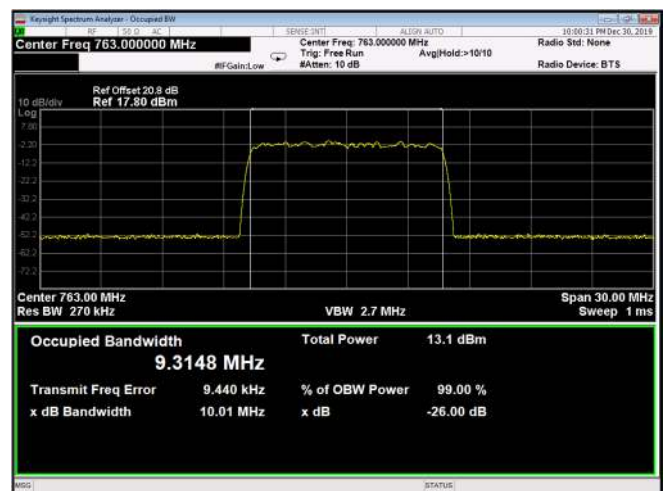


Figure 118: 64QAM 10MHz B.W.; 763.0MHz, 15kHz Input

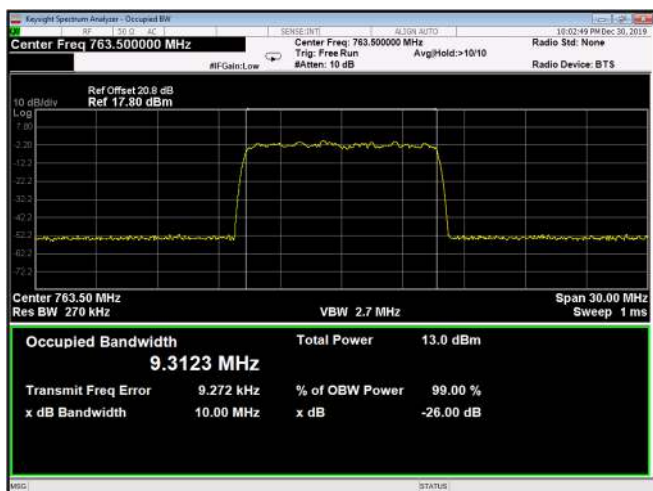


Figure 119: 64QAM 10MHz B.W.; 763.5MHz, 15kHz Input

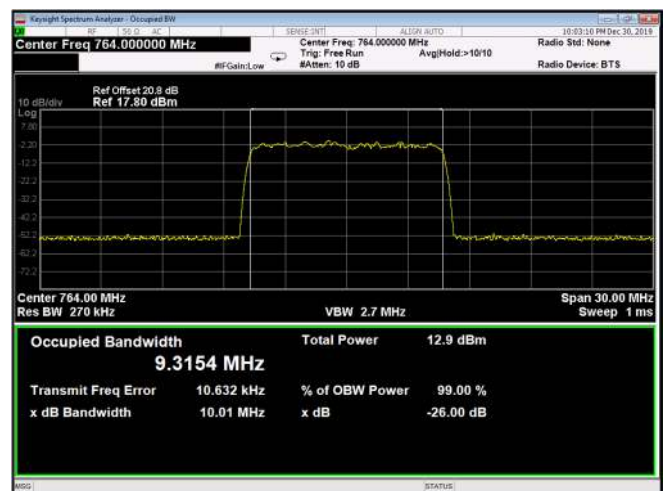


Figure 120: 64QAM 10MHz B.W.; 764.0MHz, 15kHz Input

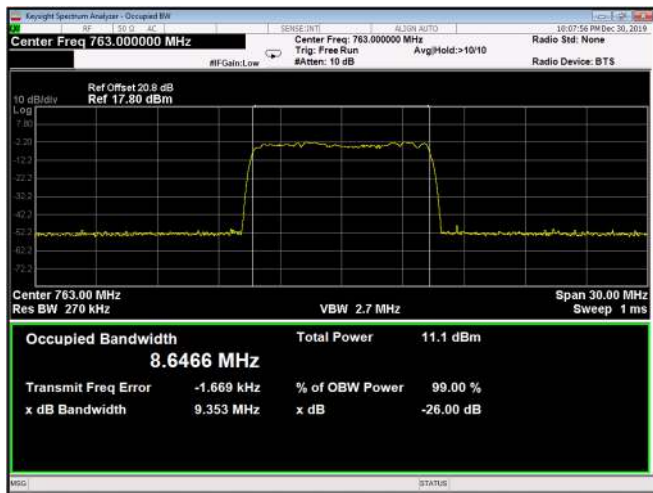


Figure 121: 64QAM 10MHz B.W.; 763.0MHz, 30kHz Input

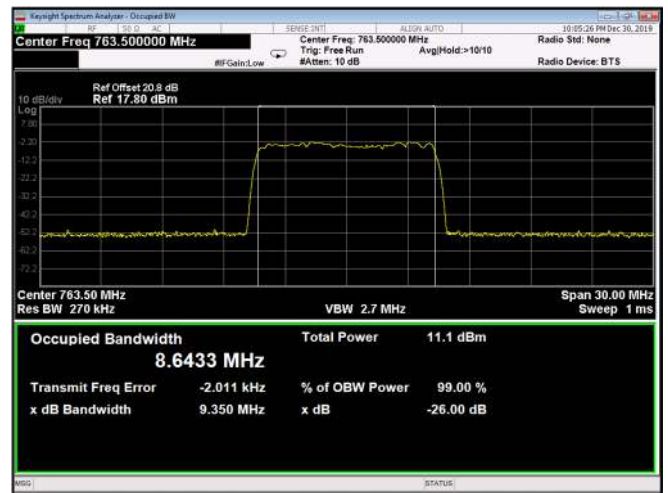


Figure 122: 64QAM 10MHz B.W.; 763.5MHz, 30kHz Input

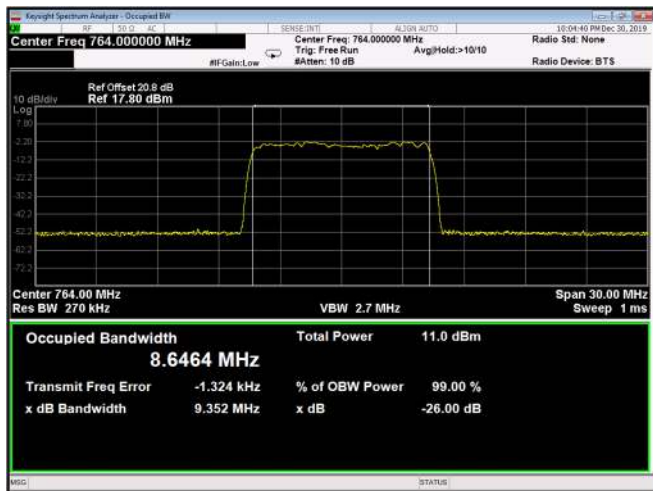


Figure 123: 64QAM 5MHz B.W.; 764.0MHz, 30kHz Input

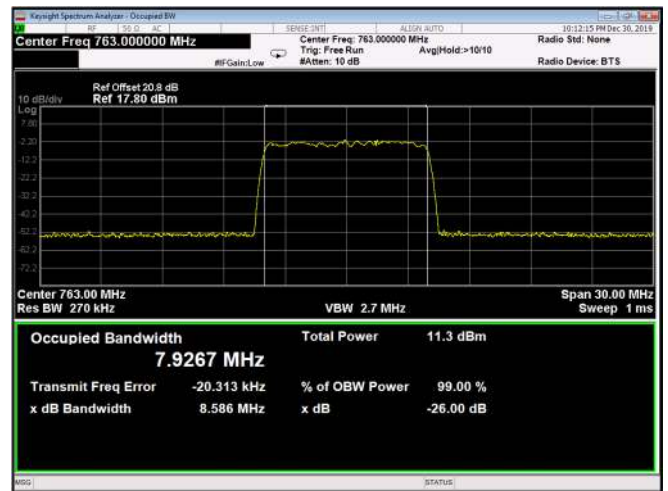


Figure 124: 64QAM 10MHz B.W.; 763.0MHz, 60kHz Input

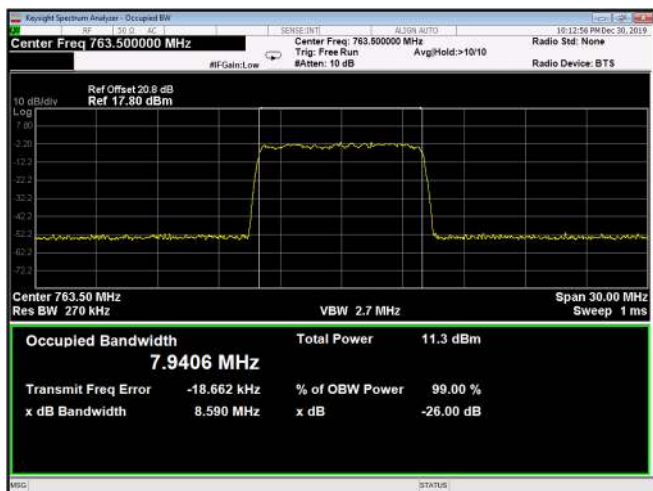


Figure 125: 64QAM 10MHz B.W.; 766.5MHz, 60kHz Input

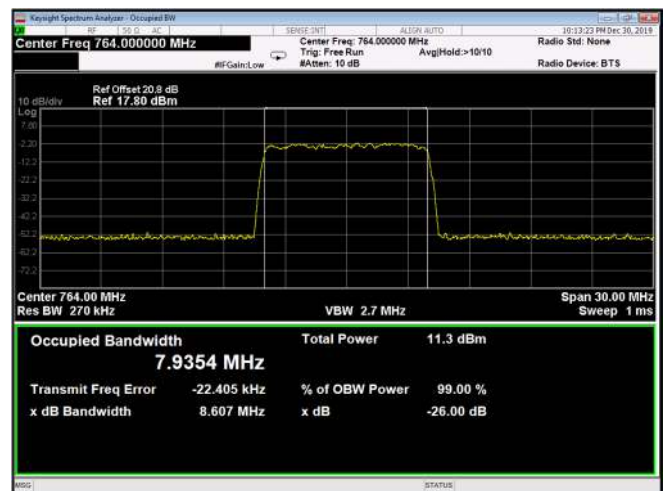


Figure 126: 64QAM 10MHz B.W.; 764.0MHz, 60kHz Input

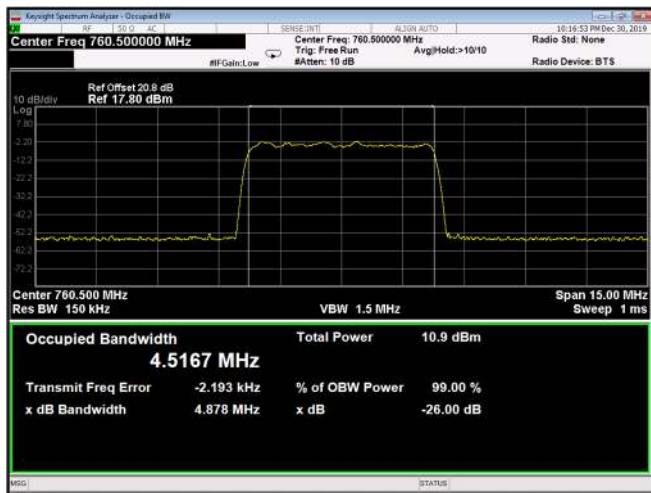


Figure 127: 256QAM 5MHz B.W.; 760.5MHz, 15kHz Input

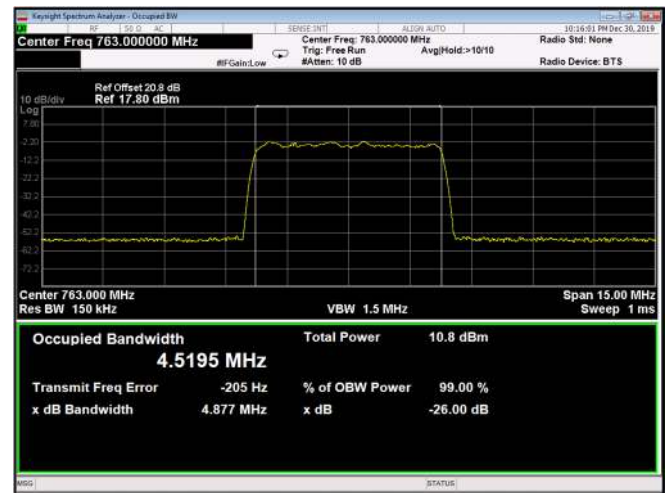


Figure 128: 256QAM 5MHz B.W.; 763.0MHz, 15kHz Input

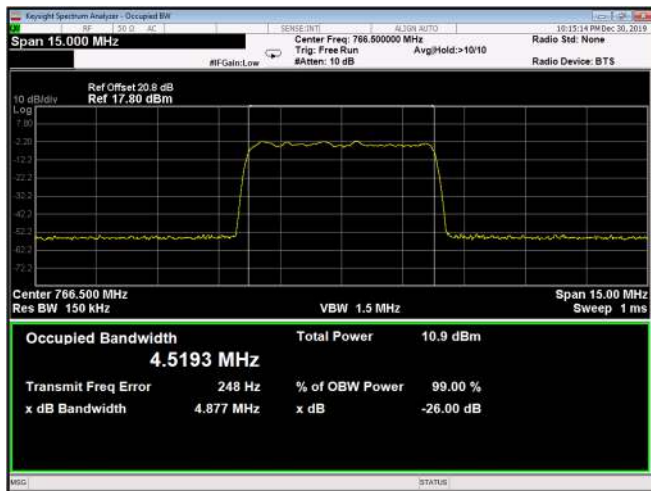


Figure 129: 256QAM 5MHz B.W.; 766.5MHz, 15kHz Input

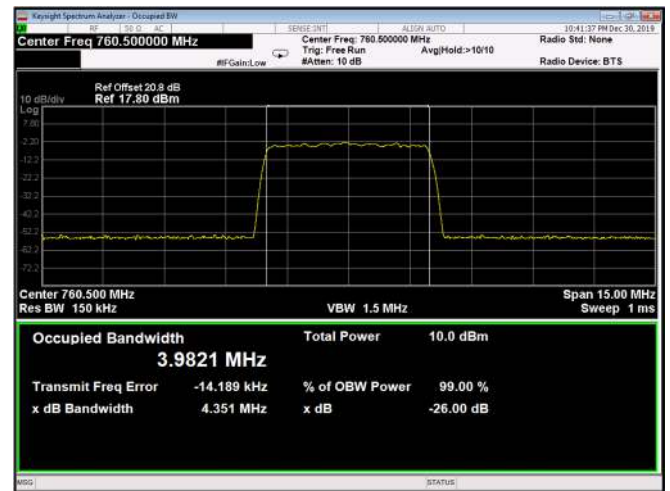


Figure 130: 256QAM 5MHz B.W.; 760.5MHz, 30kHz Input

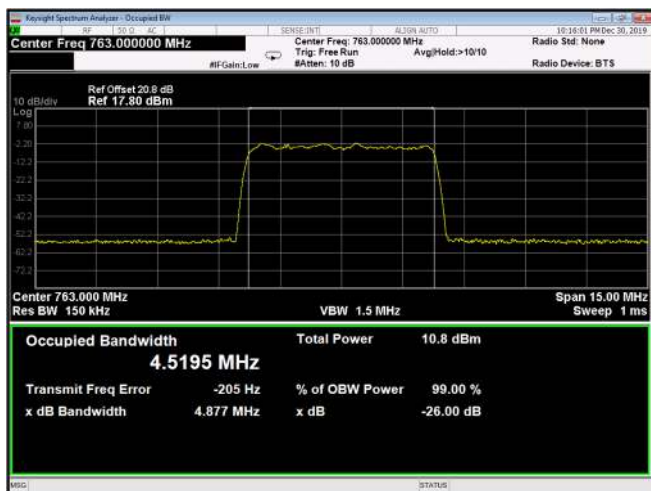


Figure 131: 256QAM 5MHz B.W.; 763.0MHz, 30kHz Input

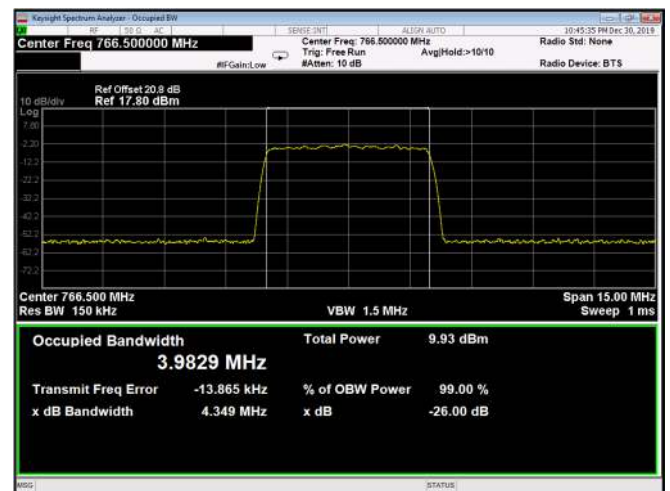


Figure 132: 256QAM 5MHz B.W.; 766.5MHz, 30kHz Input

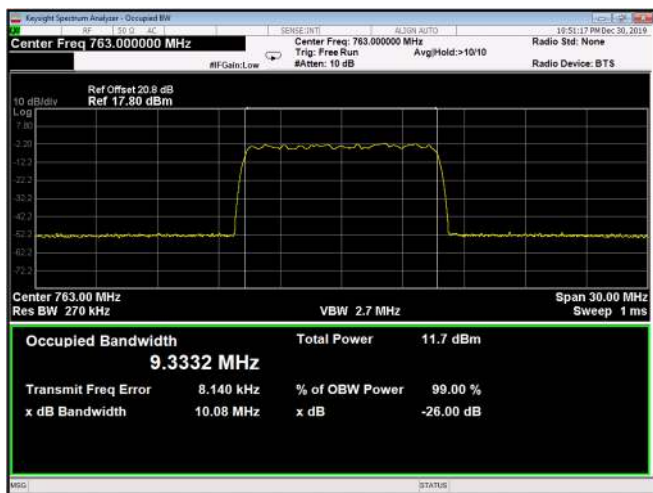


Figure 133: 256QAM 10MHz B.W.; 763.0MHz, 15kHz Input

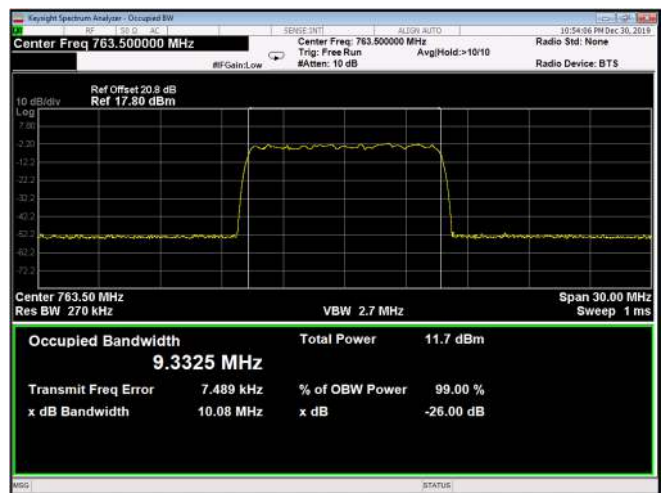


Figure 134: 256QAM 10MHz B.W.; 763.5MHz, 15kHz Input

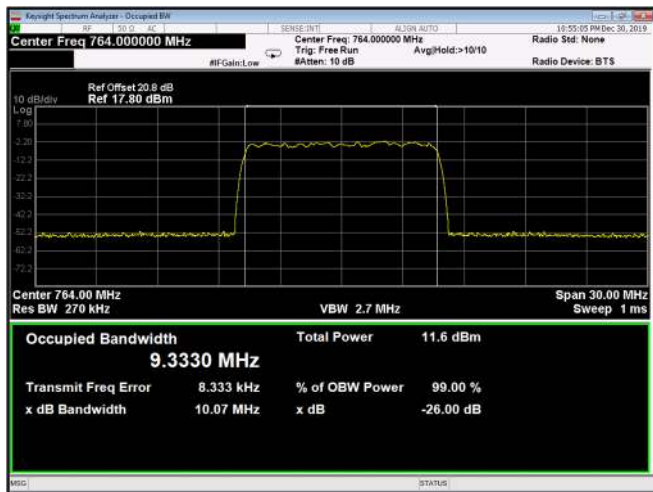


Figure 135: 256QAM 10MHz B.W.; 764.0MHz, 15kHz Input

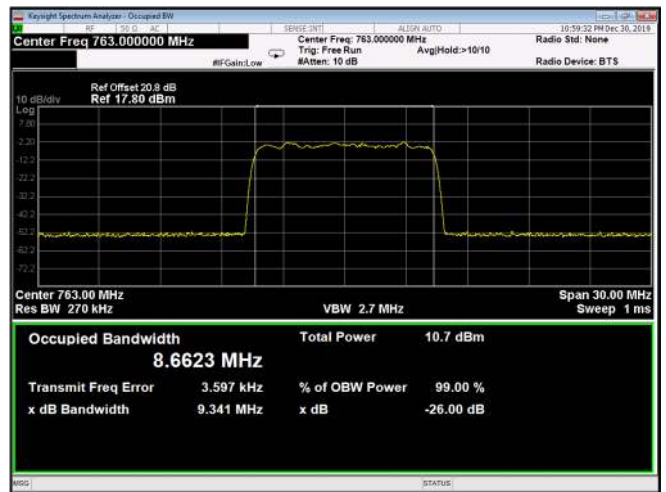


Figure 136: 256QAM 10MHz B.W.; 763.0MHz, 30kHz Input

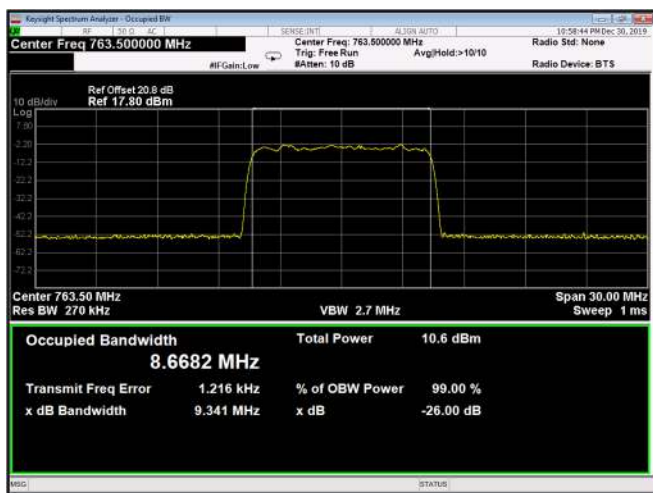


Figure 137: 256QAM 10MHz B.W.; 763.5MHz, 30kHz Input

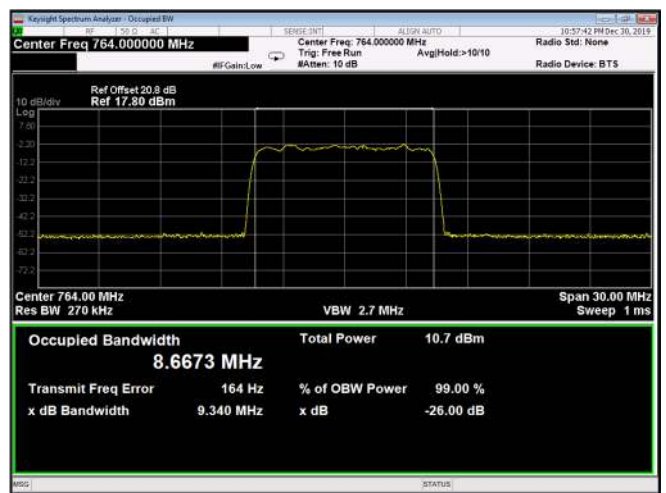


Figure 138: 256QAM 10MHz B.W.; 764.0MHz, 30kHz Input

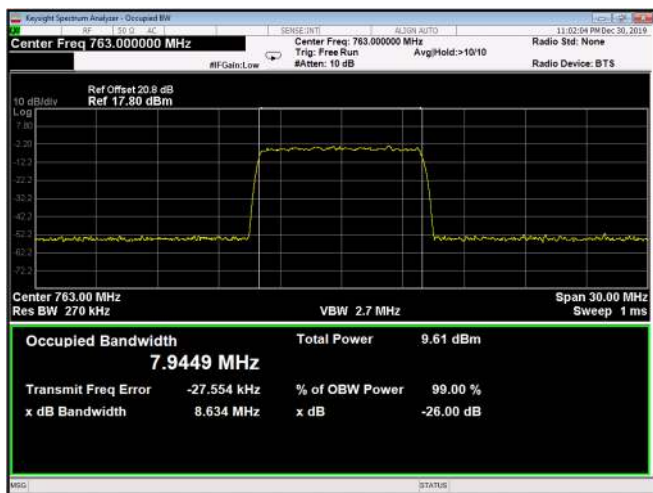


Figure 139: 256QAM 10MHz B.W.; 763.0MHz, 60kHz Input

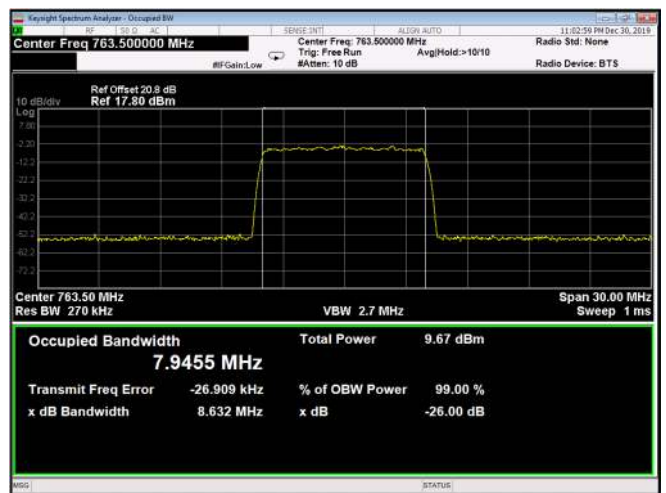


Figure 140: 256QAM 10MHz B.W.; 763.5MHz, 60kHz Input

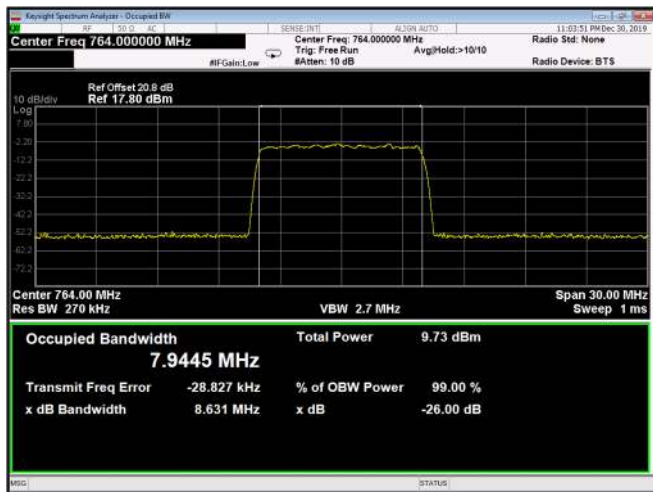


Figure 141: 256QAM 10MHz B.W.; 764.0MHz, 60kHz Input

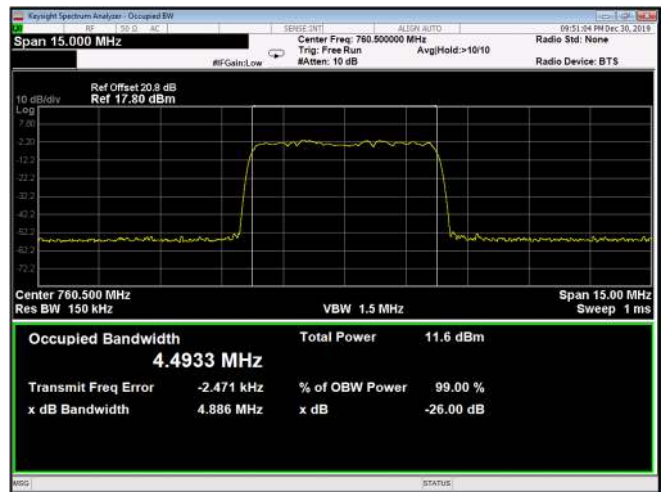


Figure 142: QPSK 5MHz B.W.; 760.5MHz, 15kHz Input

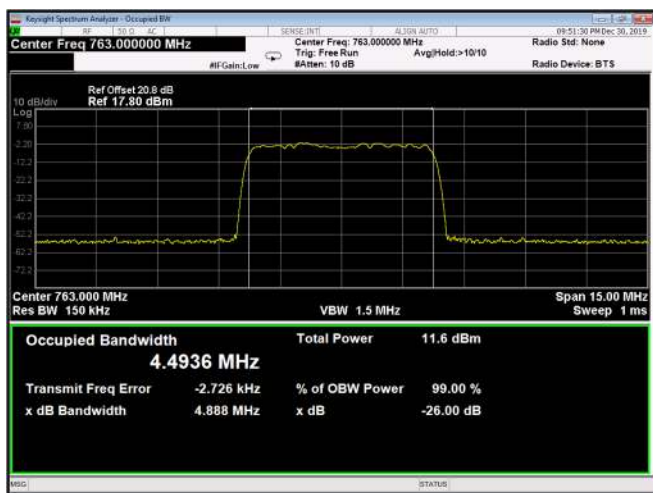


Figure 143: QPSK 5MHz B.W.; 763.0MHz, 15kHz Input

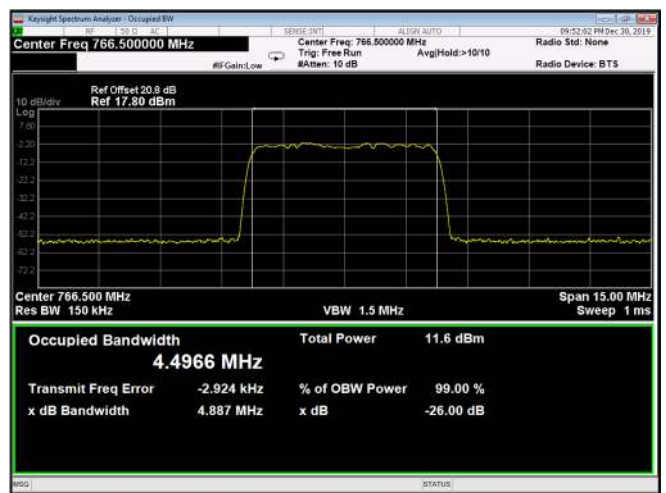


Figure 144: QPSK 5MHz B.W.; 766.5MHz, 15kHz Input

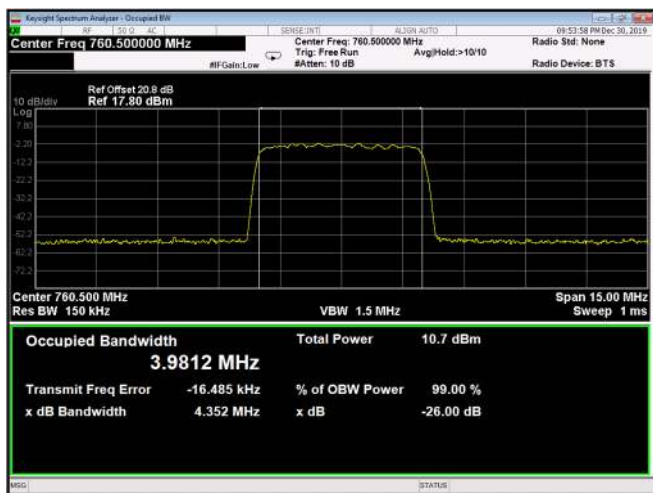


Figure 145: QPSK 5MHz B.W.; 760.5MHz, 30kHz Input

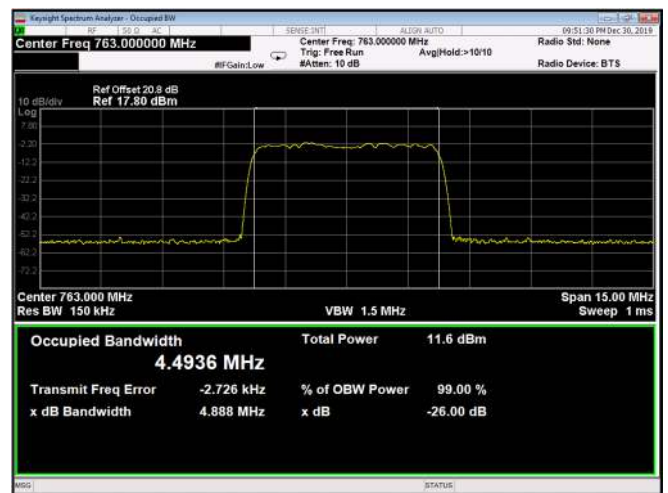


Figure 146: QPSK 5MHz B.W.; 763.0MHz, 30kHz Input

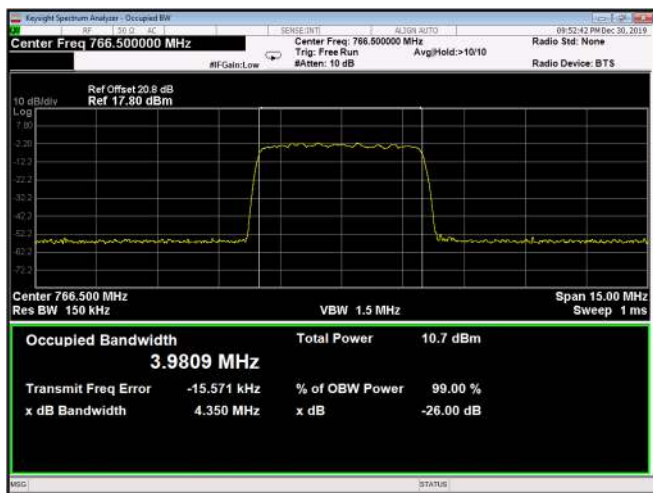


Figure 147: QPSK 5MHz B.W.; 766.5MHz, 30kHz Input

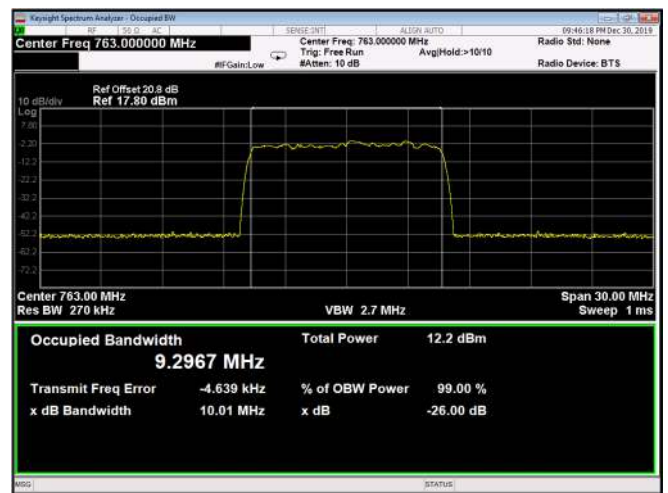


Figure 148: QPSK 10MHz B.W.; 763.0MHz, 15kHz Input

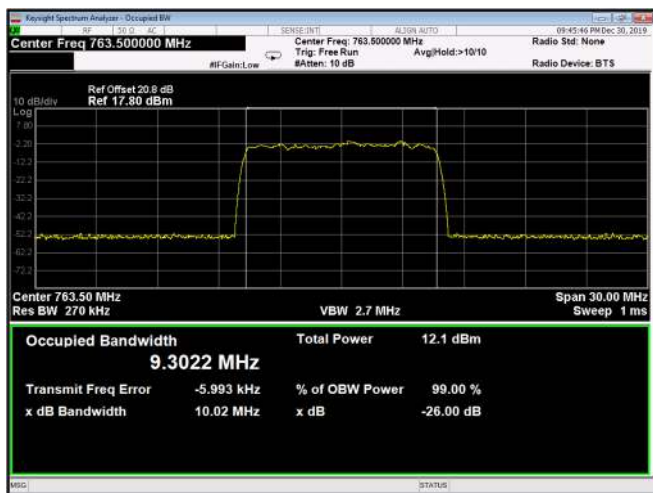


Figure 149: QPSK 10MHz B.W.; 763.5MHz, 15kHz Input

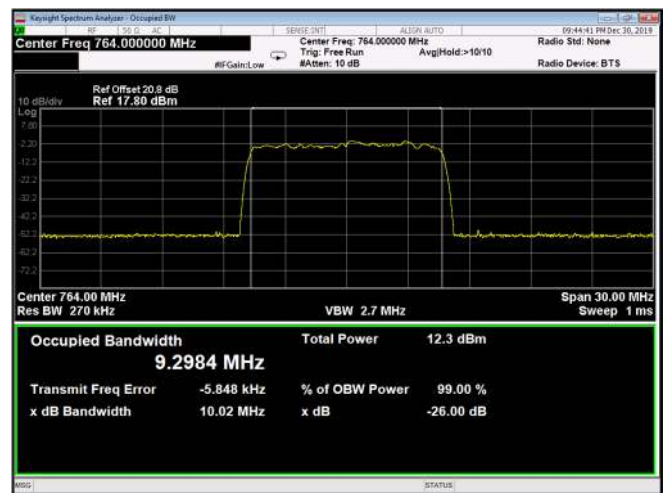


Figure 150: QPSK 10MHz B.W.; 764.0MHz, 15kHz Input

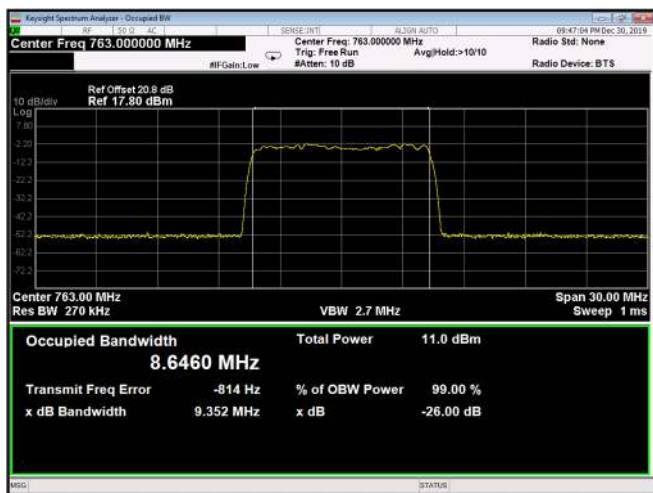


Figure 151: QPSK 10MHz B.W.; 763.0MHz, 30kHz Input

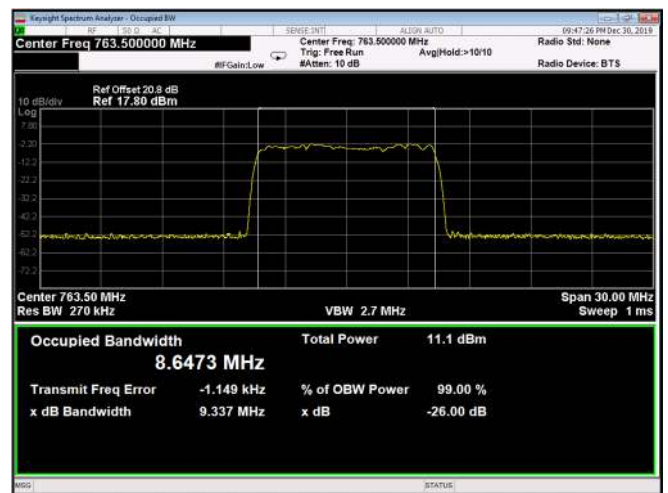


Figure 152: QPSK 10MHz B.W.; 763.5MHz, 30kHz Input

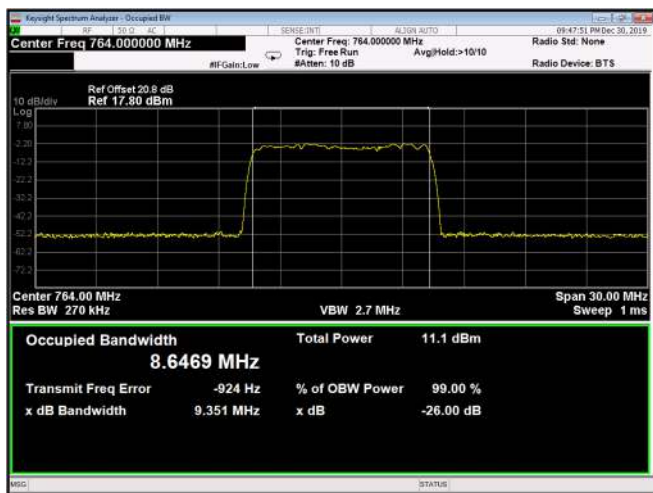


Figure 153: QPSK 10MHz B.W.; 764.0MHz, 30kHz Input

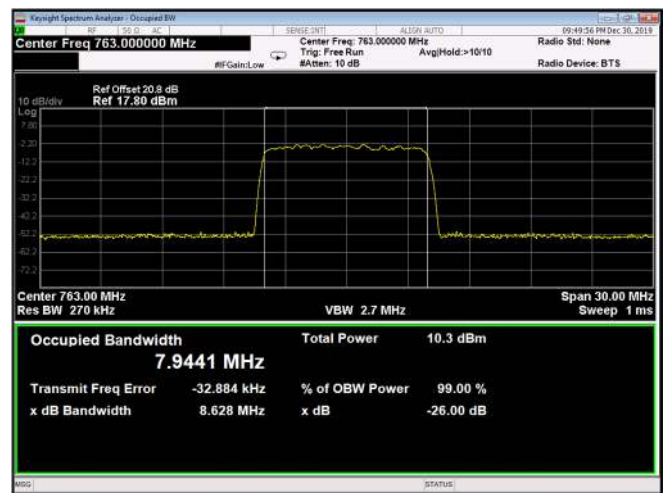


Figure 154: QPSK 10MHz B.W.; 763.0MHz, 60kHz Input

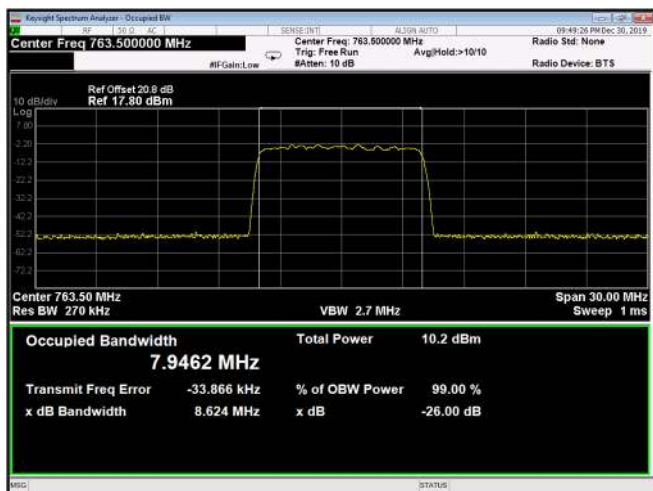


Figure 155: QPSK 10MHz B.W.; 763.5MHz, 60kHz Input

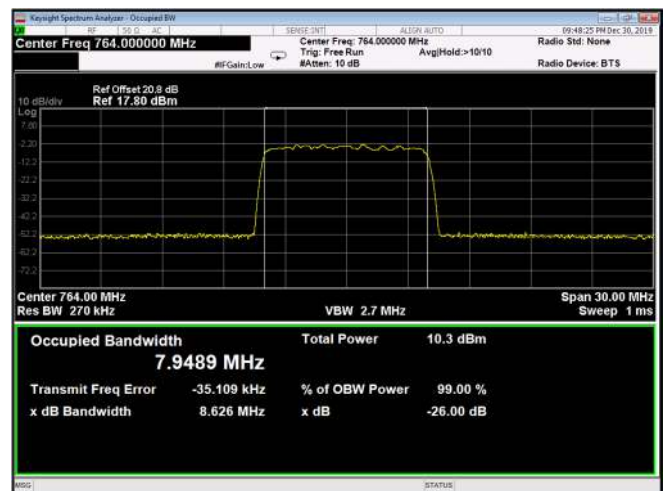


Figure 156: QPSK 10MHz B.W.; 764.0MHz, 60kHz Input

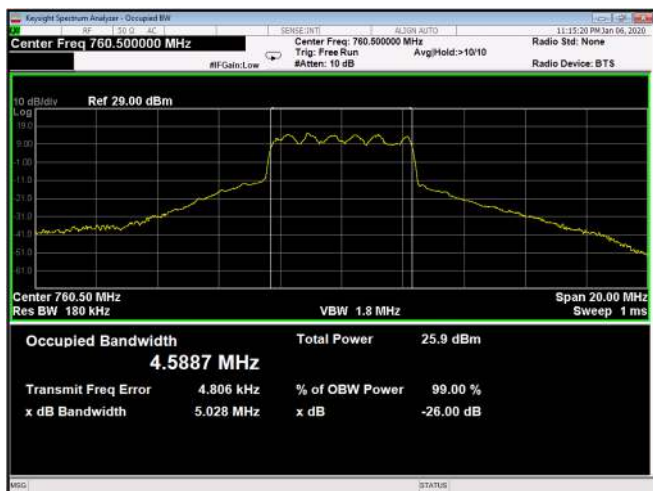


Figure 157: 16QAM 5MHz B.W.; 760.5MHz, 15kHz Output

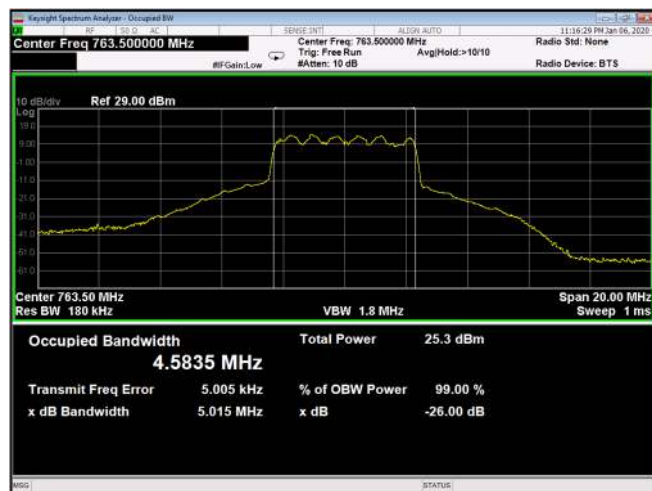


Figure 158: 16QAM 5MHz B.W.; 763.5MHz, 15kHz Output

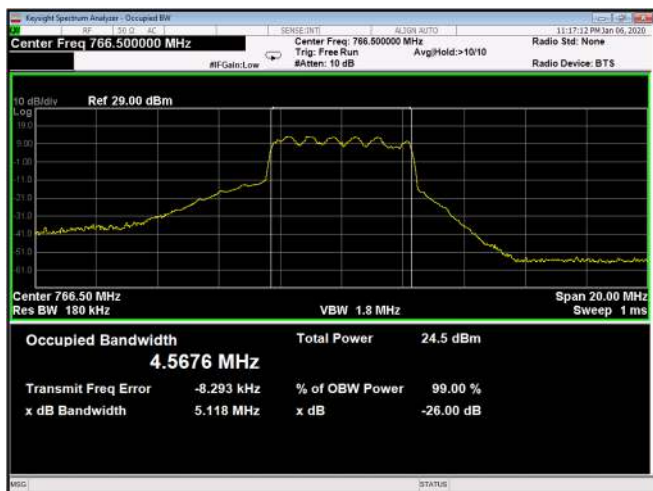


Figure 159: 16QAM 5MHz B.W.; 766.5MHz, 15kHz Output

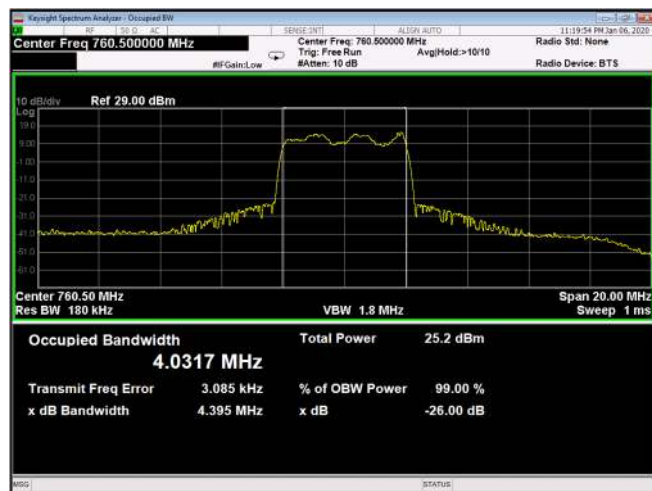


Figure 160: 16QAM 5MHz B.W.; 760.5MHz, 30kHz Output

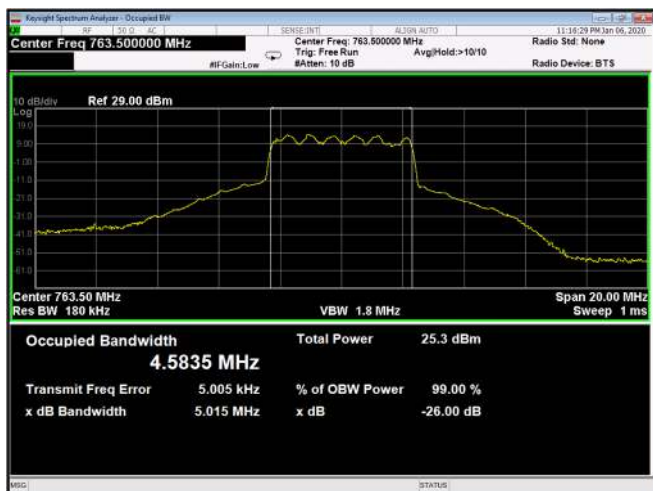


Figure 161: 16QAM 5MHz B.W.; 763.5MHz, 30kHz Output

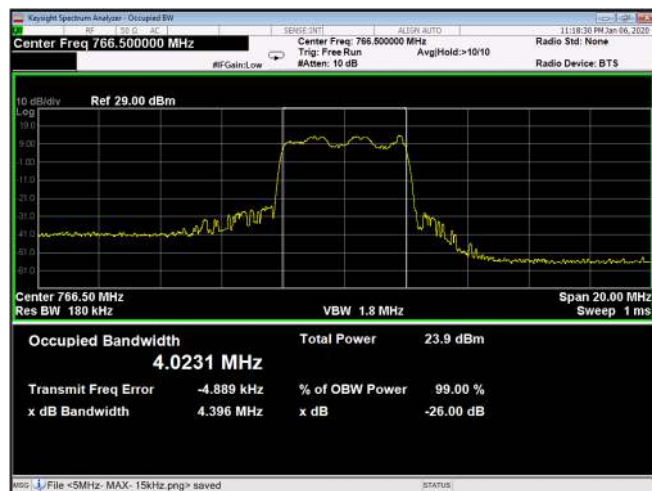


Figure 162: 16QAM 5MHz C.S.; 766.5MHz, 30kHz Output

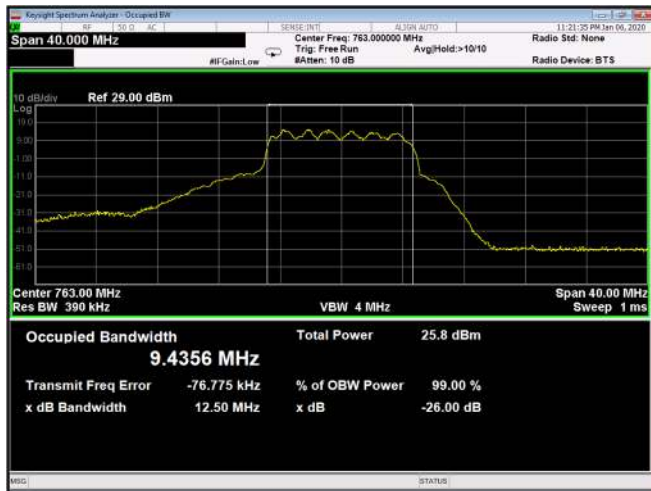


Figure 163: 16QAM 10MHz B.W.; 763.0MHz, 15kHz Output

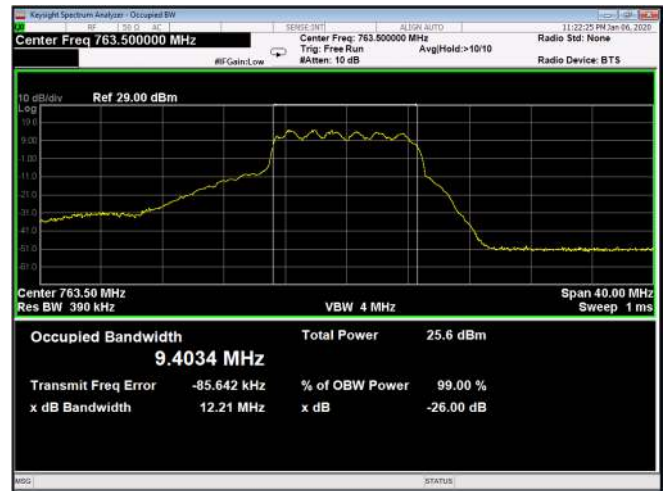


Figure 164: 16QAM 10MHz B.W.; 763.5MHz, 15kHz Output



Figure 165: 16QAM 10MHz B.W.; 764.0MHz, 15kHz Output

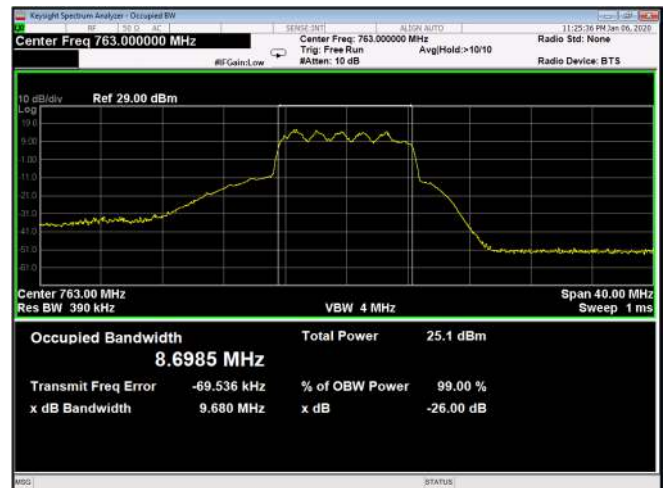


Figure 166: 16QAM 10MHz B.W.; 763.0MHz, 30kHz Output

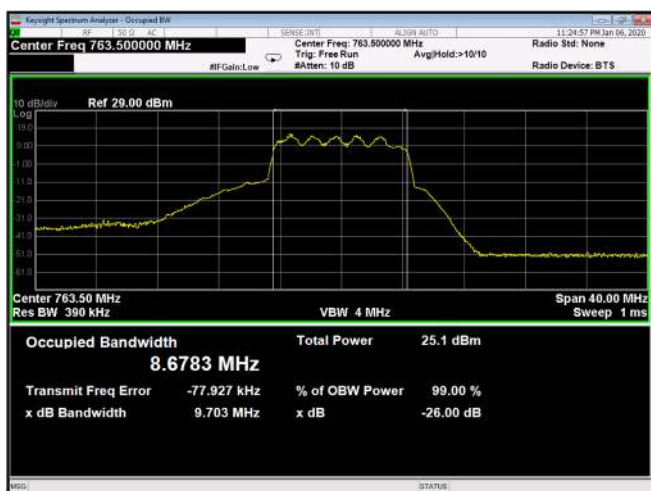


Figure 167: 16QAM 10MHz B.W.; 763.5MHz, 30kHz Output

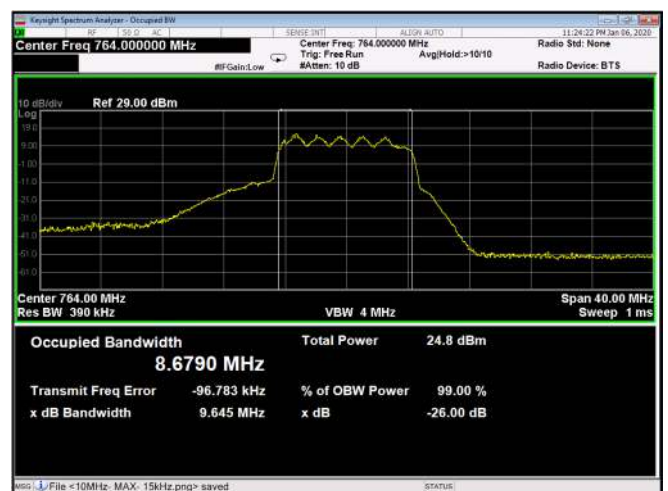


Figure 168: 16QAM 10MHz B.W.; 764.0MHz, 30Hz Output



Figure 169: 16QAM 10MHz B.W.; 763.0MHz, 60kHz Output



Figure 170: 16QAM 10MHz C.S; 763.5MHz, 60kHz Output



Figure 171: 16QAM 10MHz B.W.; 764.0MHz, 60kHz Output

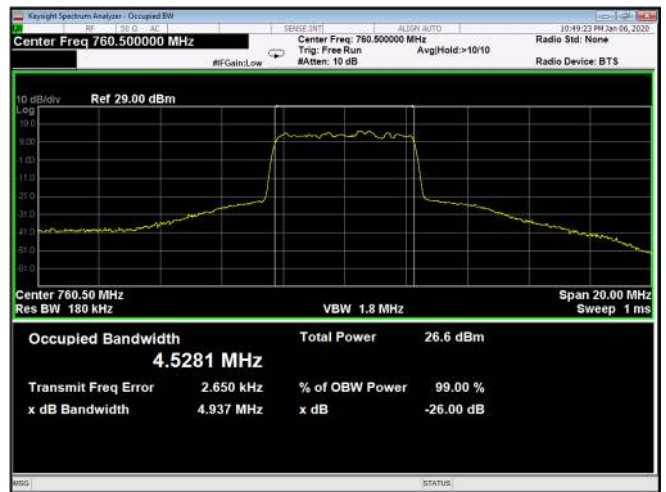


Figure 172: 64QAM 5MHz B.W.; 760.5MHz, 15kHz Output



Figure 173: 64QAM 5MHz B.W.; 763.5MHz, 15kHz Output



Figure 174: 64QAM 5MHz C.S; 766.5MHz, 15kHz Output



Figure 175: 64QAM 5MHz B.W.; 760.5MHz, 30kHz Output



Figure 176: 64QAM 5MHz B.W.; 763.5MHz, 30kHz Output



Figure 177: 64QAM 5MHz B.W.; 766.5MHz, 30kHz Output

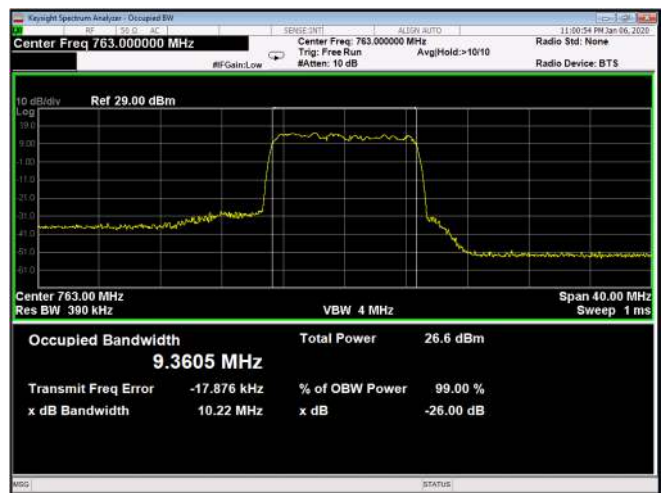


Figure 178: 64QAM 10MHz B.W.; 763.0MHz, 15kHz Output



Figure 179: 64QAM 10MHz B.W.; 763.5MHz, 15kHz Output

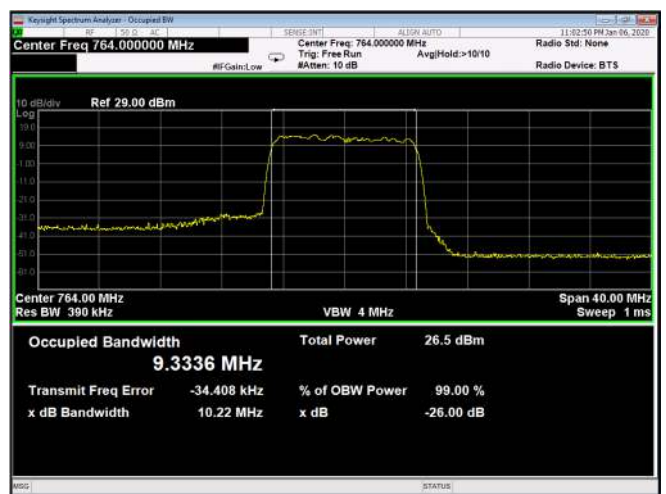


Figure 180: 64QAM 10MHz B.W.; 764.0MHz, 15kHz Output



Figure 181: 64QAM 10MHz B.W.; 763.0MHz, 30kHz Output

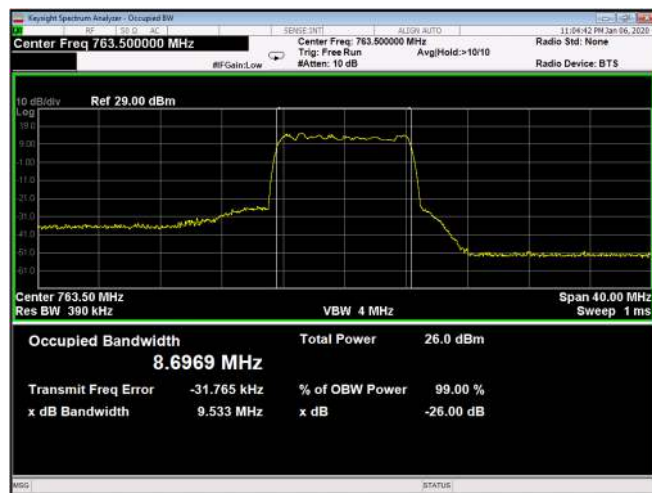


Figure 182: 64QAM 10MHz B.W.; 763.5MHz, 30kHz Output



Figure 183: 64QAM 10MHz B.W.; 764.0MHz, 30kHz Output

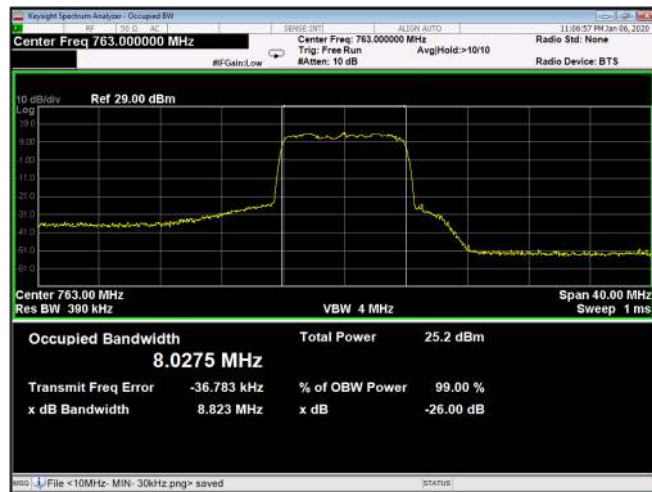


Figure 184: 64QAM 10MHz B.W.; 763.0MHz, 60kHz Output



Figure 185: 64QAM 10MHz B.W.; 763.5MHz, 60kHz Output

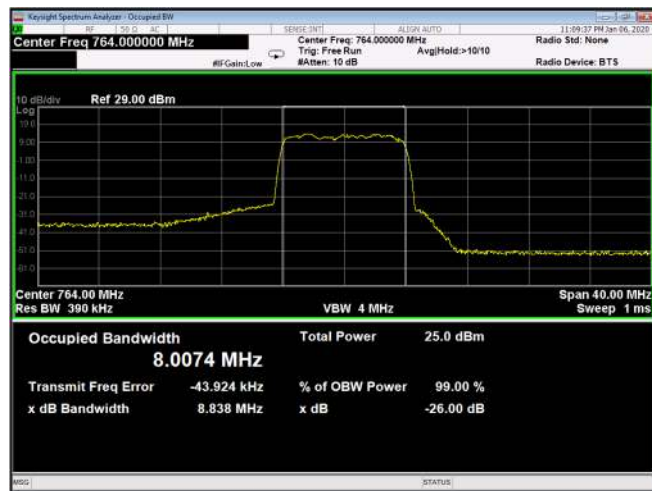


Figure 186: 64QAM 10MHz B.W.; 764.0MHz, 60kHz Output



Figure 187: 256QAM 5MHz B.W.; 760.5MHz, 15kHz Output

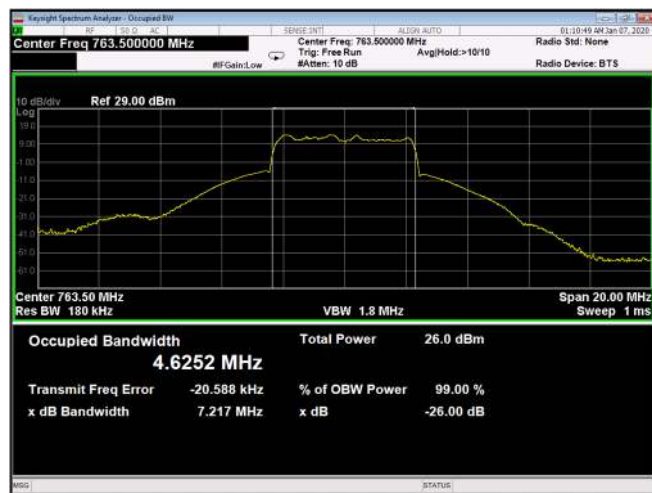


Figure 188: 256QAM 5MHz B.W.; 763.5MHz, 15kHz Output



Figure 189: 256QAM 5MHz B.W.; 766.5MHz, 15kHz Output

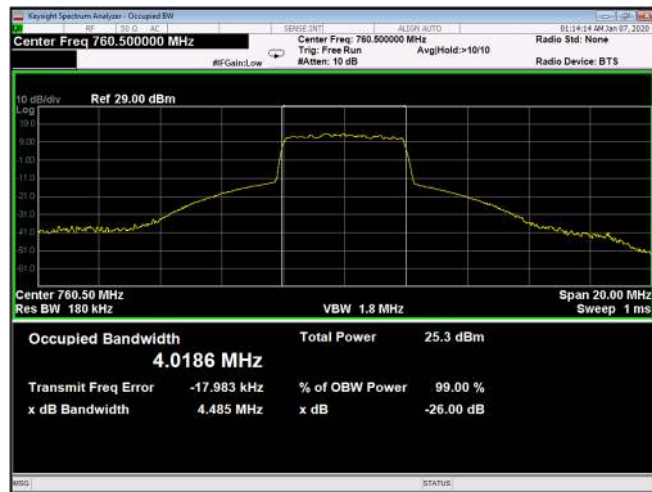


Figure 190: 256QAM 5MHz B.W.; 760.5MHz, 30kHz Output



Figure 191: 256QAM 5MHz B.W.; 763.5MHz, 30kHz Output

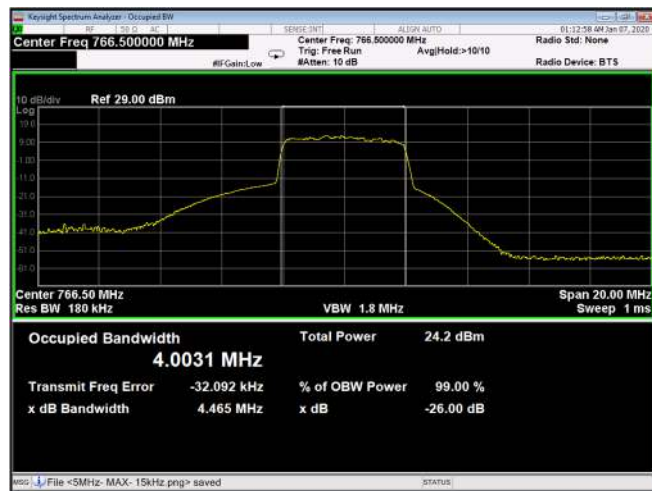


Figure 192: 256QAM 5MHz B.W.; 766.5MHz, 30kHz Output

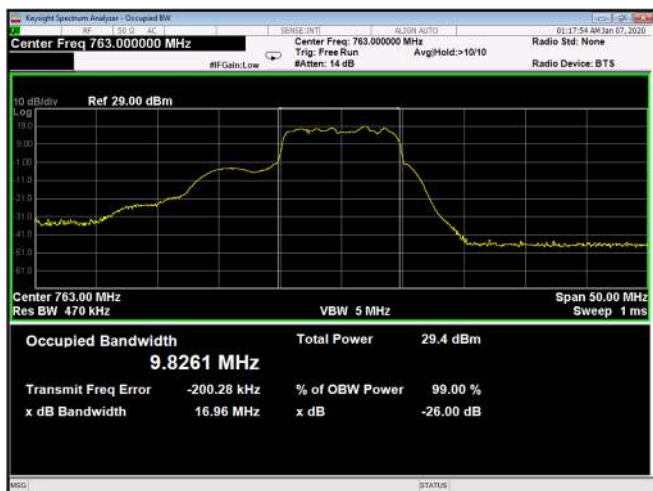


Figure 193: 256QAM 10MHz B.W.; 763.0MHz, 15kHz Output

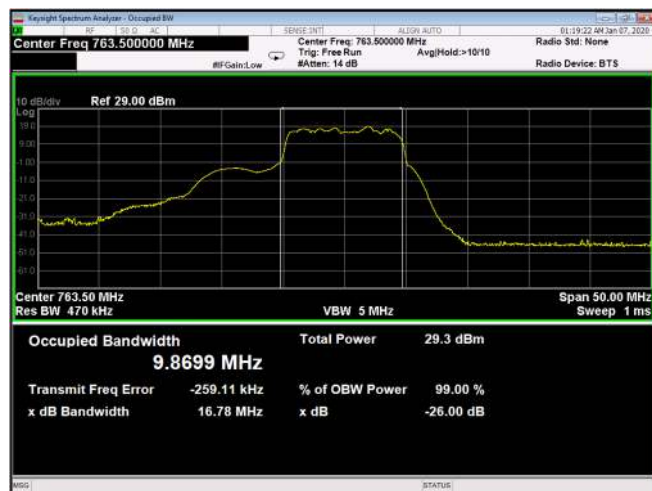


Figure 194: 256QAM 10MHz B.W.; 763.5MHz, 15kHz Output



Figure 195: 256QAM 10MHz B.W.; 764.0MHz, 15kHz Output

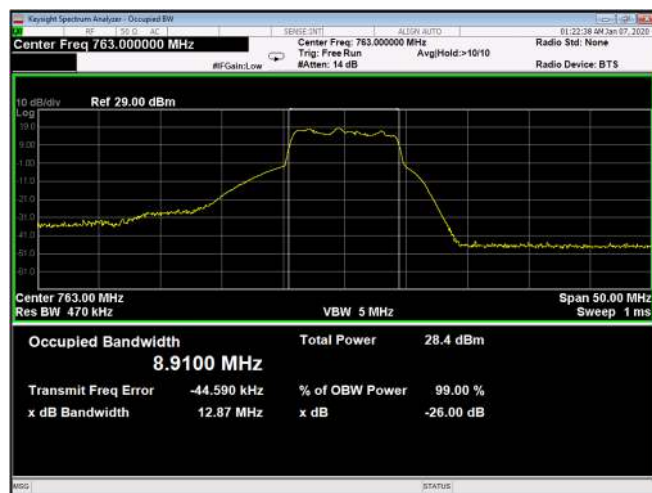


Figure 196: 256QAM 10MHz B.W.; 763.0MHz, 30kHz Output

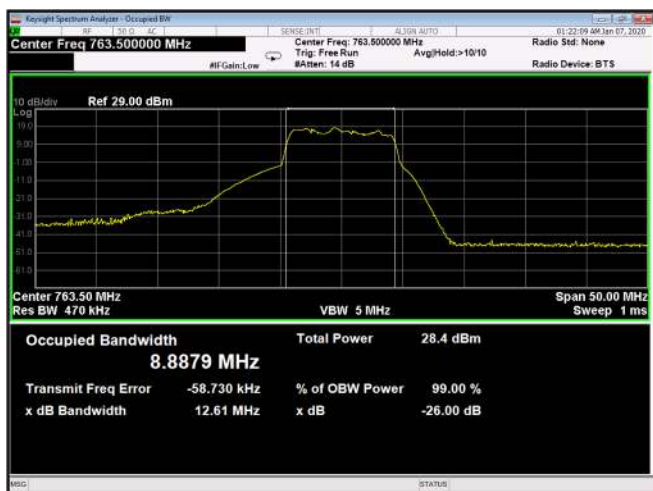


Figure 197: 256QAM 10MHz B.W.; 763.5MHz, 30kHz Output

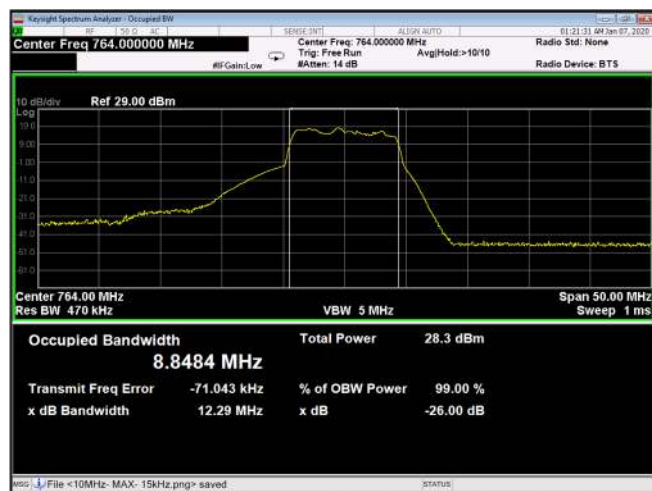


Figure 198: 256QAM 10MHz B.W.; 764.0MHz, 30kHz Output

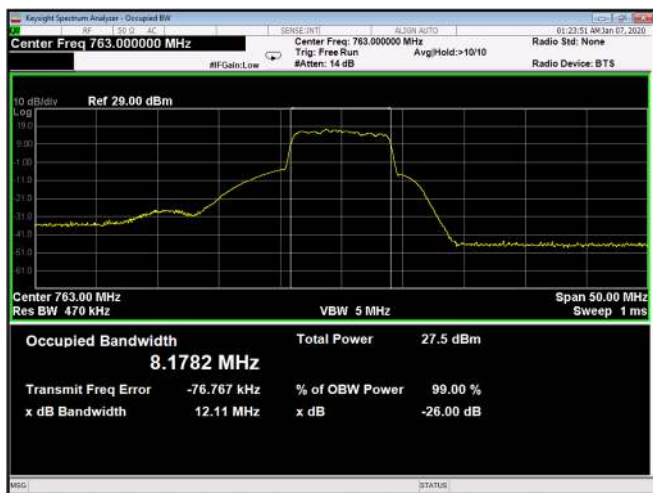


Figure 199: 256QAM 10MHz B.W.; 763.0MHz, 60kHz Output

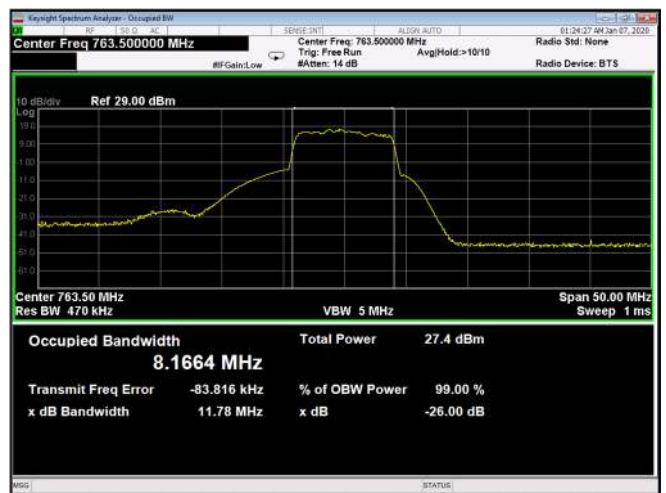


Figure 200: 256QAM 10MHz B.W.; 763.5MHz, 60kHz Output



Figure 201: 256QAM 10MHz B.W.; 764.0MHz, 60kHz Output



Figure 202: QPSK 5MHz B.W.; 760.5MHz, 15kHz Output



Figure 203: QPSK 5MHz B.W.; 763.5MHz, 15kHz Output



Figure 204: QPSK 5MHz B.W.; 766.5MHz, 15kHz Output

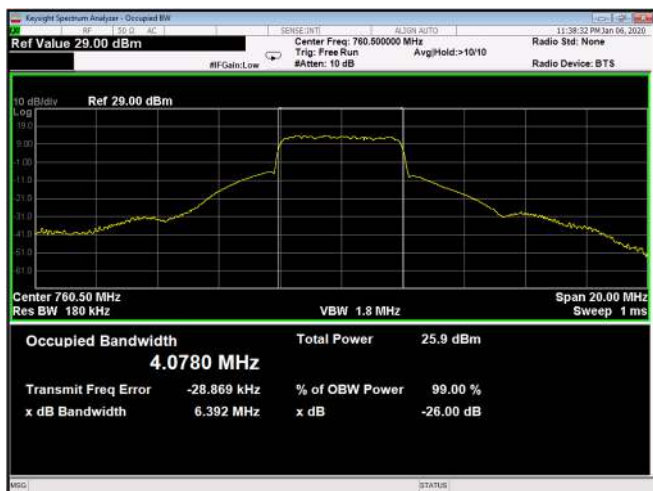


Figure 205: QPSK 5MHz B.W.; 730.5MHz, 30kHz Output

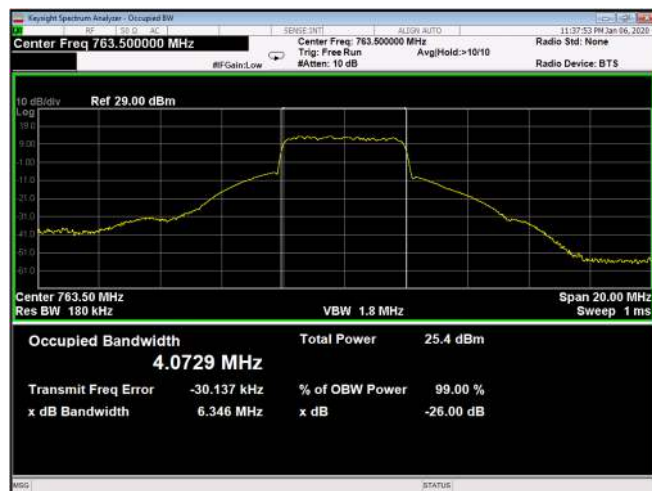


Figure 206: QPSK 5MHz B.W.; 763.5MHz, 30kHz Output

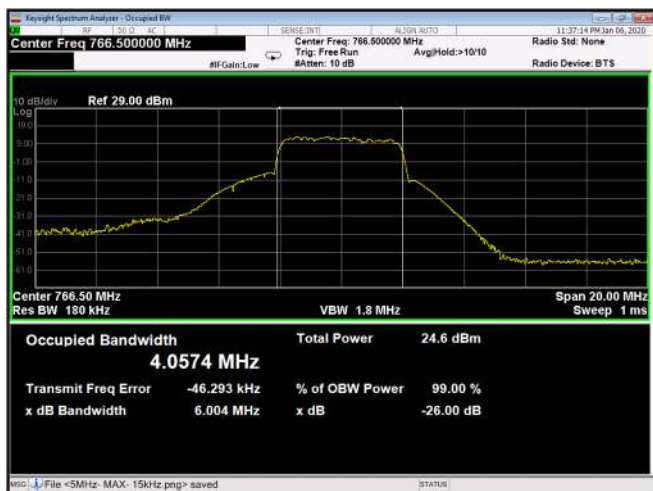


Figure 207: QPSK 5MHz B.W.; 766.5MHz, 30kHz Output

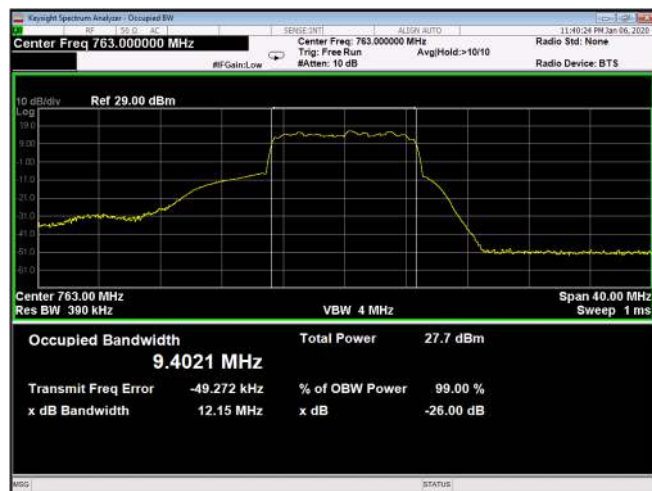


Figure 208: QPSK 10MHz B.W.; 763.0MHz, 15kHz Output

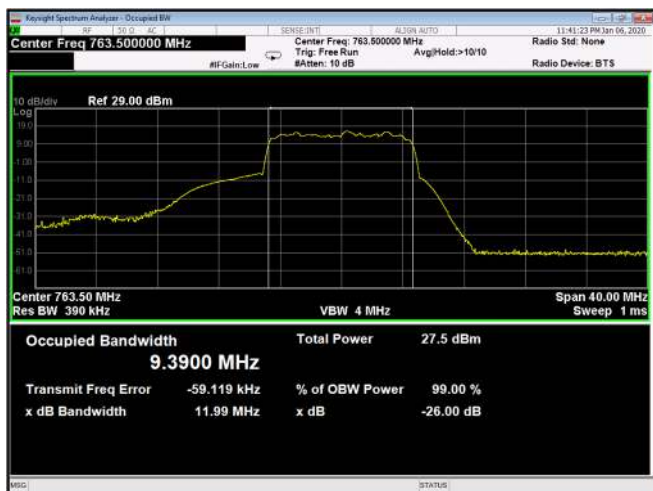


Figure 209: QPSK 10MHz B.W.; 763.5MHz, 15kHz Output

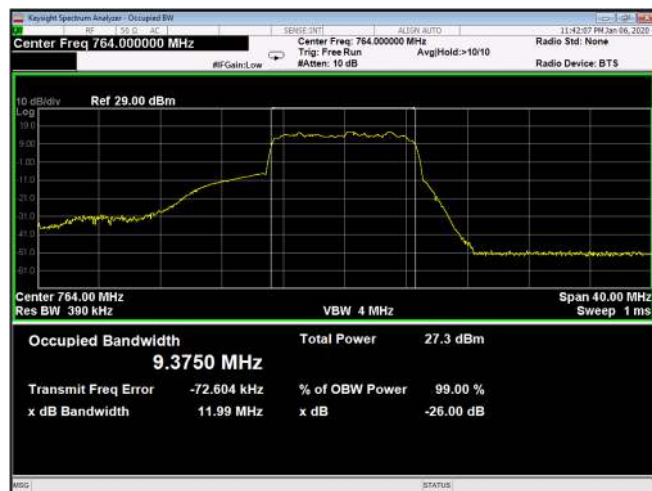


Figure 210: QPSK 10MHz B.W.; 764.0MHz, 15kHz Output



Figure 211: QPSK 10MHz B.W.; 763.0MHz, 30kHz Output



Figure 212: QPSK 10MHz B.W.; 763.5MHz, 30kHz Output



Figure 213: QPSK 10MHz B.W.; 764.0MHz, 30kHz Output



Figure 214: QPSK 10MHz B.W.; 763.0MHz, 60kHz Output



Figure 215: QPSK 10MHz B.W.; 763.5MHz, 60kHz Output

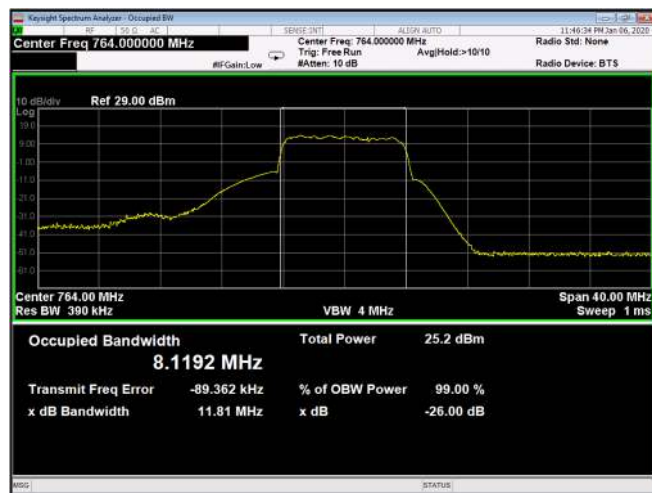


Figure 216: QPSK 10MHz B.W.; 764.0MHz, 60kHz Output

6.5 Test Equipment Used; Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EXA signal Analyzer	Agilent Technologies	N9010A	MY52220686	28 November 2018	28 November 2020
EXG Vector Signal Generator	Agilent Technologies	N5172B	MY51350437	03 December 2018	03 December 2020
20 dB Attenuator	Bird	8304-N20DB	-	24 December 2019	24 December 2020

Table 19 Test Equipment Used