



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 176 to Figure 511.



Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
16QAM	5	15	864.5	4.5	
		30	864.5	4.0	
		15	878.0	4.5	
		30	878.0	4.5	
		15	891.5	4.5	
		30	891.5	4.0	
	10	10	15	867.0	9.3
			30	867.0	8.6
			60	867.0	8.0
			15	878.0	9.3
			30	878.0	8.6
			60	878.0	7.9
			15	889.0	9.3
			30	889.0	9.3
			60	889.0	7.9
	15	15	15	869.0	14.2
			30	869.0	13.8
			60	869.0	13.0
			15	878.0	14.2
			30	878.0	13.8
			60	878.0	13.1
			15	886.5	14.2
			30	886.5	13.7
			60	886.5	13.0
	20	20	15	872.0	19.1
			30	872.0	18.5
			60	872.0	17.4
			15	878.0	19.1
			30	878.0	18.4
			60	878.0	17.4
			15	884.0	19.1
			30	884.0	18.5
			60	884.0	17.3
	25	25	15	874.5	24.0
			30	874.5	23.5
			60	874.5	22.6
			15	878.0	24.0
			30	878.0	23.6
			60	878.0	22.6
			15	881.5	24.0
			30	881.5	23.5
			60	881.5	22.6

Table 6 Occupied Bandwidth 16QAM - Input



Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
64QAM	5	15	864.5	4.5	
		30	864.5	4.0	
		15	878.0	4.5	
		30	878.0	4.0	
		15	891.5	4.5	
		30	891.5	4.0	
	10	10	15	867.0	9.4
			30	867.0	8.6
			60	867.0	8.0
			15	878.0	9.4
			30	878.0	8.6
			60	878.0	8.0
			15	889.0	9.4
			30	889.0	8.6
			60	889.0	8.0
	15	15	15	869.5	14.2
			30	869.5	13.7
			60	869.5	13.0
			15	878.0	14.2
			30	878.0	13.7
			60	878.0	13.0
			15	886.5	14.2
			30	886.5	13.7
			60	886.5	13.0
	20	20	15	872.0	19.1
			30	872.0	18.4
			60	872.0	17.4
			15	878.0	19.1
			30	878.0	18.4
			60	878.0	17.4
			15	884.0	19.1
			30	884.0	18.4
			60	884.0	17.4
	25	25	15	874.5	24.0
			30	874.5	23.5
			60	874.5	17.8
			15	878.5	24.0
			30	878.5	23.5
			60	878.5	17.5
			15	881.5	24.0
			30	881.5	24.0
			60	881.5	17.6

Table 7 Occupied Bandwidth 64QAM - Input



Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
256QAM	5	15	864.5	4.5	
		30	864.5	4.0	
		15	878.0	4.5	
		30	878.0	4.0	
		15	891.5	4.5	
		30	891.5	4.0	
	10	10	15	867.0	9.3
			30	867.0	8.6
			60	867.0	7.9
			15	878.0	9.3
			30	878.0	8.6
			60	878.0	7.9
			15	889.0	9.3
			30	889.0	8.6
			60	889.0	8.0
	15	15	15	869.5	14.2
			30	869.5	13.7
			60	869.5	13.0
			15	878.0	14.2
			30	878.0	13.7
			60	878.0	13.1
			15	886.0	14.3
			30	886.0	13.7
			60	886.0	13.1
	20	20	15	872.0	19.2
			30	872.0	18.4
			60	872.0	17.5
			15	878.0	19.1
			30	878.0	18.5
			60	878.0	17.4
			15	884.0	19.1
			30	884.0	18.4
			60	884.0	17.4
	25	25	15	874.5	24.0
			30	874.5	23.5
			60	874.5	22.5
			15	878.0	24.1
			30	878.0	23.5
			60	878.0	22.4
			15	881.5	24.0
			30	881.5	23.5
			60	881.5	22.4

Table 8 Occupied Bandwidth 256QAM - Input



Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
QPSK	5	15	864.5	4.5	
		30	864.5	4.0	
		15	878.0	4.5	
		30	878.0	4.0	
		15	891.5	4.5	
		30	891.5	4.0	
	10	10	15	867.0	9.3
			30	867.0	8.6
			60	867.0	8.0
			15	878.0	9.3
			30	878.0	8.6
			60	878.0	8.0
			15	889.0	9.3
			30	889.0	8.7
			60	889.0	8.0
	15	15	15	869.5	14.2
			30	869.5	13.8
			60	869.5	13.1
			15	878.0	14.2
			30	878.0	13.8
			60	878.0	13.1
			15	886.5	14.2
			30	886.5	13.8
			60	886.5	13.1
	20	20	15	872.0	19.1
			30	872.0	18.4
			60	872.0	17.4
			15	878.0	19.1
			30	878.0	18.4
			60	878.0	17.4
			15	884.0	19.1
			30	884.0	18.4
			60	884.0	17.4
	25	25	15	874.5	24.0
			30	874.5	23.5
			60	874.5	22.6
			15	878.0	24.0
			30	878.0	23.5
			60	878.0	22.6
			15	881.5	24.1
			30	881.5	23.6
			60	881.5	22.5

Table 9 Occupied Bandwidth QPSK – Input



Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
16QAM	5	15	864.5	4.5	
		30	864.5	3.9	
		15	878.0	4.5	
		30	878.0	3.9	
		15	891.5	4.5	
		30	891.5	3.9	
	10	10	15	867.0	9.2
			30	867.0	8.5
			60	867.0	7.9
			15	878.0	9.3
			30	878.0	8.5
			60	878.0	7.9
			15	889.0	9.2
			30	889.0	8.5
			60	889.0	7.9
	15	15	15	869.0	14.1
			30	869.0	13.7
			60	869.0	12.9
			15	878.0	14.2
			30	878.0	13.7
			60	878.0	12.9
			15	886.5	14.1
			30	886.5	13.7
			60	886.5	12.9
	20	20	15	872.0	19.0
			30	872.0	18.3
			60	872.0	17.1
			15	878.0	19.1
			30	878.0	18.3
			60	878.0	17.2
			15	884.0	19.0
			30	884.0	18.3
			60	884.0	17.1
	25	25	15	874.5	23.8
			30	874.5	23.3
			60	874.5	22.3
			15	878.0	23.9
			30	878.0	23.4
			60	878.0	22.3
			15	881.5	23.9
			30	881.5	23.3
			60	881.5	22.3

Table 10 Occupied Bandwidth 16QAM - Output



Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
64QAM	5	15	864.5	4.5	
		30	864.5	3.9	
		15	878.0	4.5	
		30	878.0	3.9	
		15	891.5	4.5	
		30	891.5	3.9	
	10	10	15	867.0	9.3
			30	867.0	8.6
			60	867.0	7.9
			15	878.0	9.3
			30	878.0	8.6
			60	878.0	7.9
			15	889.0	9.3
			30	889.0	8.6
			60	889.0	7.9
	15	15	15	869.5	14.1
			30	869.5	13.6
			60	869.5	12.9
			15	878.0	14.1
			30	878.0	13.6
			60	878.0	12.9
			15	886.5	14.1
			30	886.5	13.6
			60	886.5	12.9
	20	20	15	872.0	19.0
			30	872.0	18.2
			60	872.0	17.2
			15	878.0	19.0
			30	878.0	18.2
			60	878.0	17.2
			15	884.0	19.0
			30	884.0	18.2
			60	884.0	17.2
	25	25	15	874.5	23.8
			30	874.5	23.2
			60	874.5	22.2
			15	878.5	23.8
			30	878.5	23.3
			60	878.5	22.2
			15	881.5	23.8
			30	881.5	23.2
			60	881.5	22.2

Table 11 Occupied Bandwidth 64QAM - Output



Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
256QAM	5	15	864.5	4.5	
		30	864.5	3.9	
		15	878.0	4.5	
		30	878.0	3.9	
		15	891.5	4.5	
		30	891.5	3.9	
	10	10	15	867.0	9.3
			30	867.0	8.6
			60	867.0	7.9
			15	878.0	9.3
			30	878.0	8.6
			60	878.0	7.9
			15	889.0	9.3
			30	889.0	8.6
			60	889.0	7.9
	15	15	15	869.5	14.13
			30	869.5	13.6
			60	869.5	12.9
			15	878.0	14.2
			30	878.0	13.6
			60	878.0	12.9
			15	886.0	14.1
			30	886.0	13.6
			60	886.0	12.9
	20	20	15	872.0	18.9
			30	872.0	18.2
			60	872.0	17.2
			15	878.0	19.0
			30	878.0	18.3
			60	878.0	17.2
			15	884.0	18.9
			30	884.0	18.3
			60	884.0	17.1
	25	25	15	874.5	23.8
			30	874.5	23.3
			60	874.5	22.2
			15	878.0	23.9
			30	878.0	23.3
			60	878.0	22.2
			15	881.5	23.8
			30	881.5	23.3
			60	881.5	22.2

Table 12 Occupied Bandwidth 256QAM - Output



Modulation	Bandwidth (MHz)	Sub Carrier (kHz)	Operation Frequency (MHz)	Reading (MHz)	
QPSK	5	15	864.5	4.5	
		30	864.5	4.0	
		15	878.0	4.5	
		30	878.0	4.0	
		15	891.5	4.5	
		30	891.5	4.0	
	10	10	15	867.0	9.3
			30	867.0	8.6
			60	867.0	7.9
			15	878.0	9.3
			30	878.0	8.6
			60	878.0	7.9
			15	889.0	9.3
			30	889.0	8.6
			60	889.0	7.9
	15	15	15	869.5	14.1
			30	869.5	13.7
			60	869.5	13.0
			15	878.0	14.1
			30	878.0	13.7
			60	878.0	13.0
			15	886.5	14.1
			30	886.5	13.6
			60	886.5	13.0
	20	20	15	872.0	18.9
			30	872.0	18.2
			60	872.0	17.2
			15	878.0	19.0
			30	878.0	18.2
			60	878.0	17.2
			15	884.0	18.9
			30	884.0	18.2
			60	884.0	17.2
	25	25	15	874.5	23.8
			30	874.5	23.2
			60	874.5	22.2
			15	878.0	23.8
			30	878.0	23.3
			60	878.0	22.2
			15	881.5	23.8
			30	881.5	23.7
			60	881.5	22.2

Table 13 Occupied Bandwidth QPSK – Output

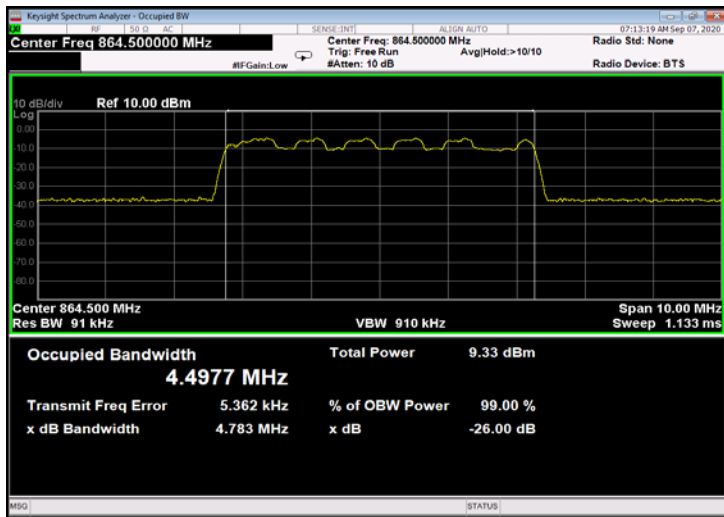


Figure 176: 16QAM 5MHz B.W.; 864.5MHz, 15kHz - Input

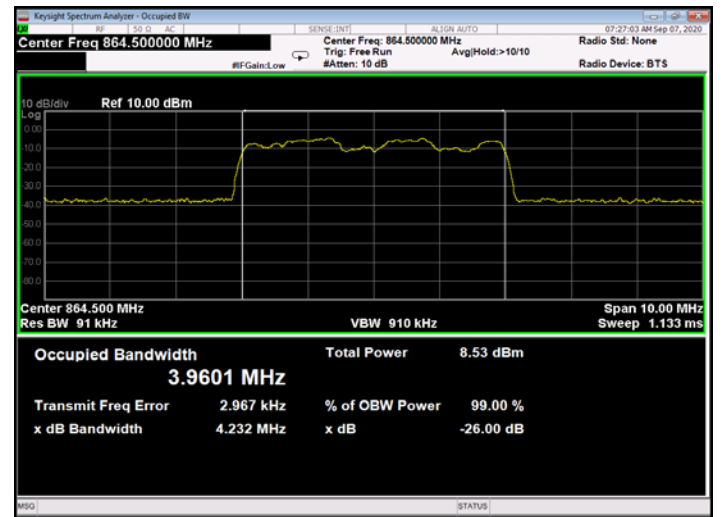


Figure 177: 16QAM 5MHz B.W.; 864.5MHz, 30kHz- Input

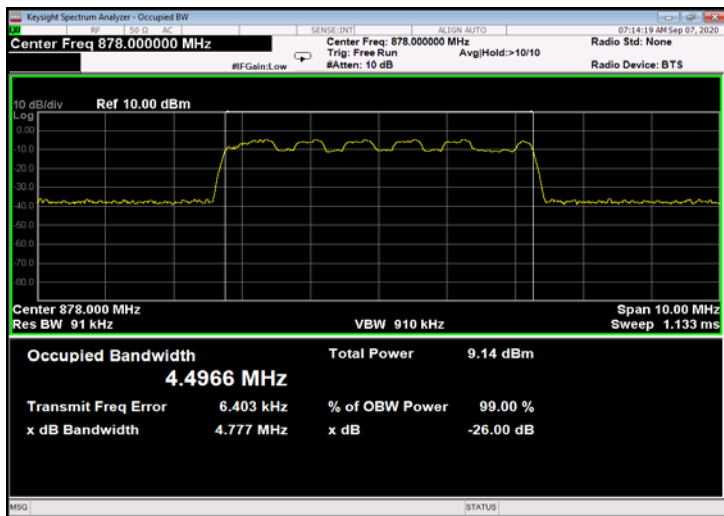


Figure 178: 16QAM 5MHz B.W.; 878.0MHz, 15kHz- Input

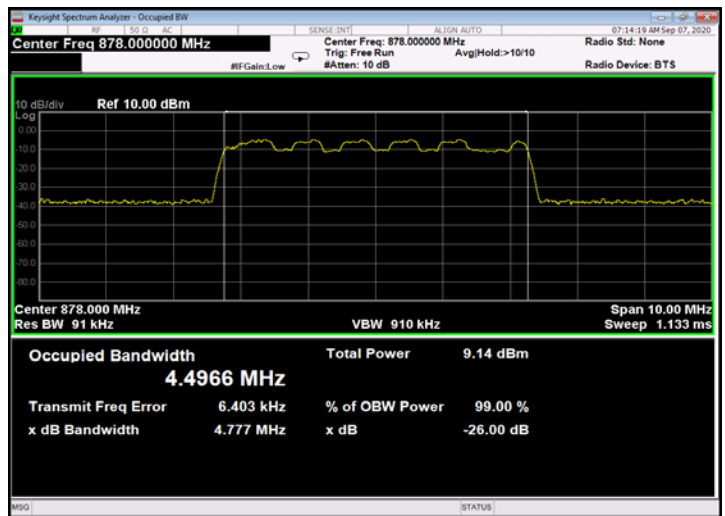


Figure 179: 16QAM 5MHz B.W.; 878.0MHz, 30kHz- Input

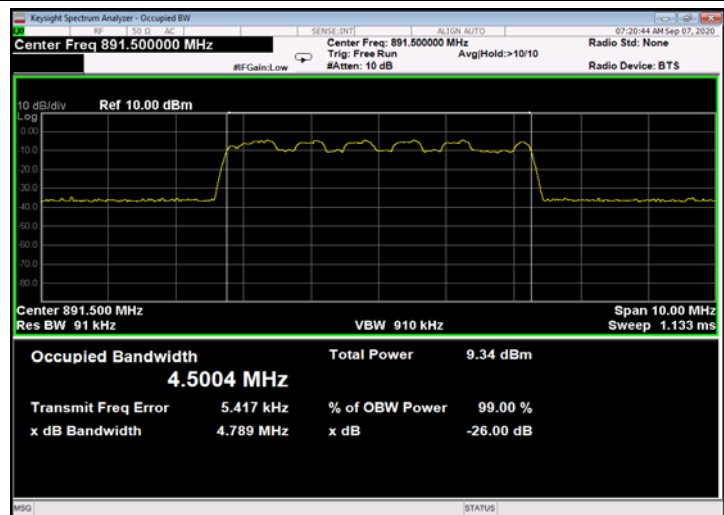


Figure 180: 16QAM 5MHz B.W.; 891.5MHz, 15kHz- Input

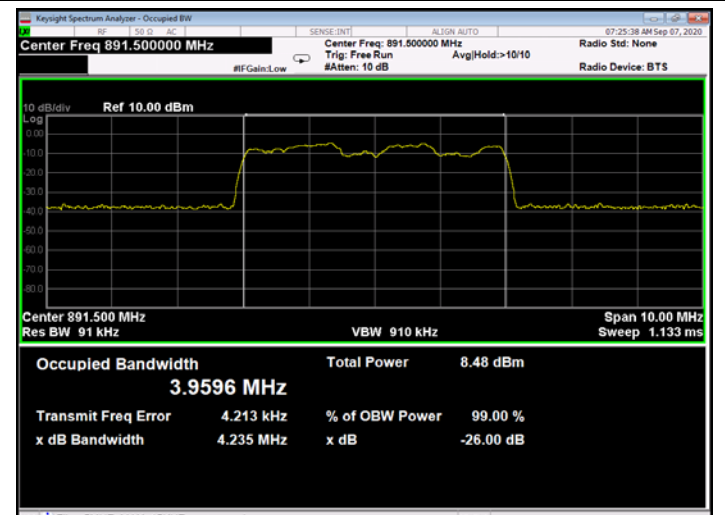


Figure 181: 16QAM 5MHz C.S.; 891.5MHz, 30kHz- Input

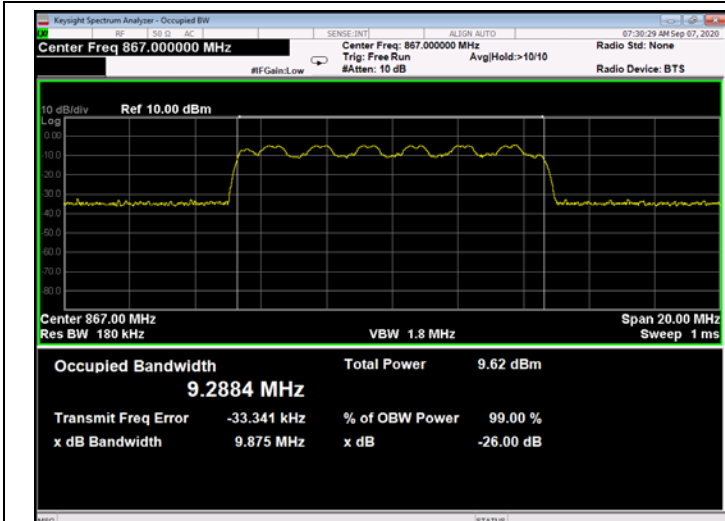


Figure 182: 16QAM 10MHz B.W.; 867.0MHz, 15kHz- Input

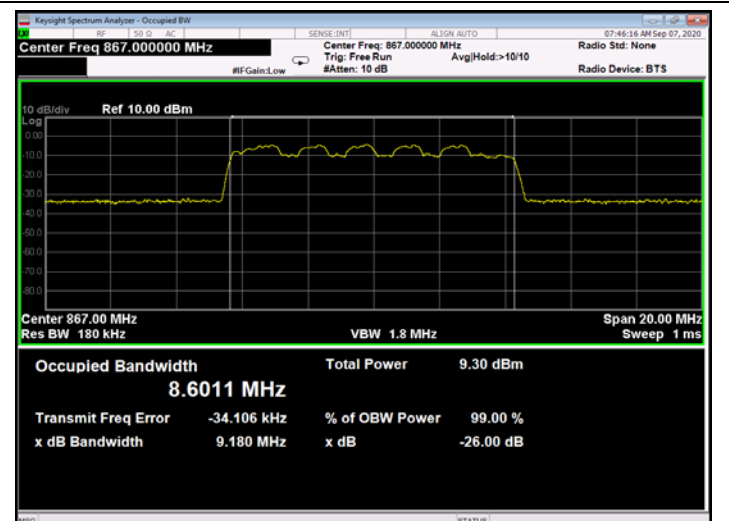


Figure 183: 16QAM 10MHz B.W.; 867.0MHz, 30kHz- Input

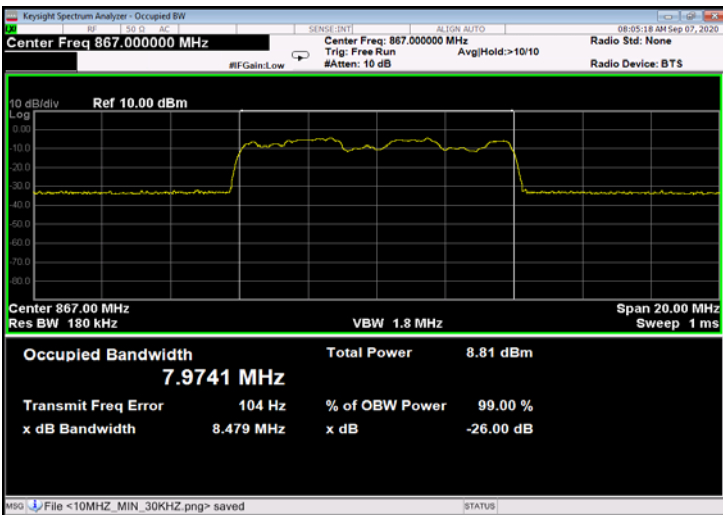


Figure 184: 16QAM 10MHz B.W.; 867.0MHz, 60kHz- Input

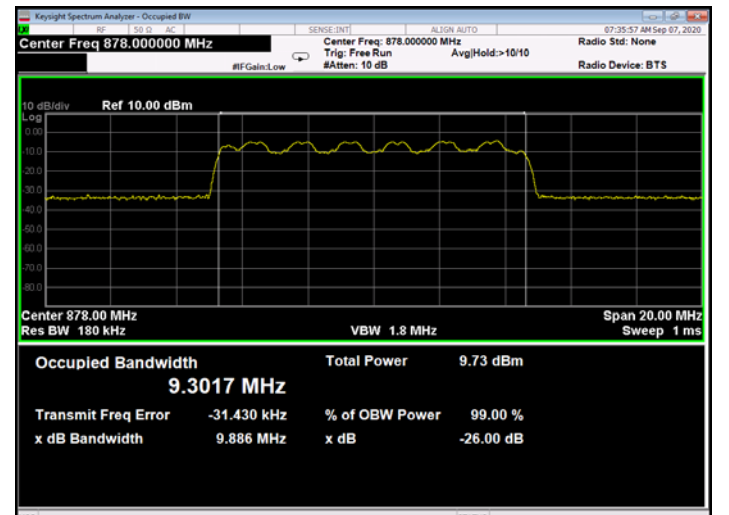


Figure 185: 16QAM 10MHz B.W.; 878.0MHz, 15kHz- Input

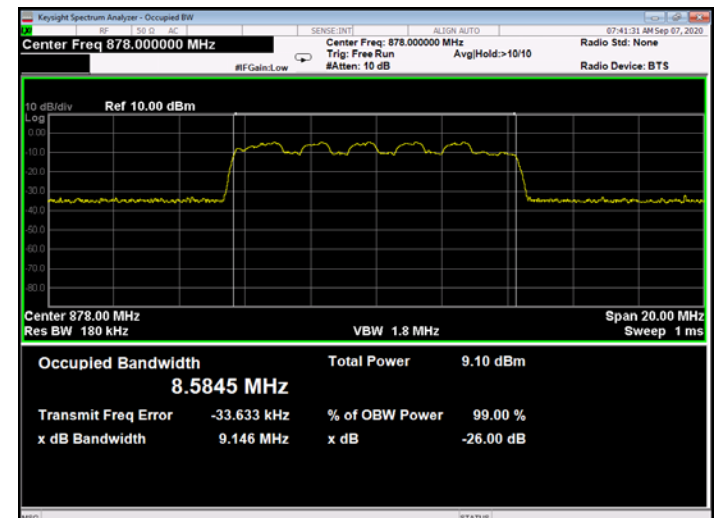


Figure 186: 16QAM 10MHz B.W.; 878.0MHz, 30kHz- Input

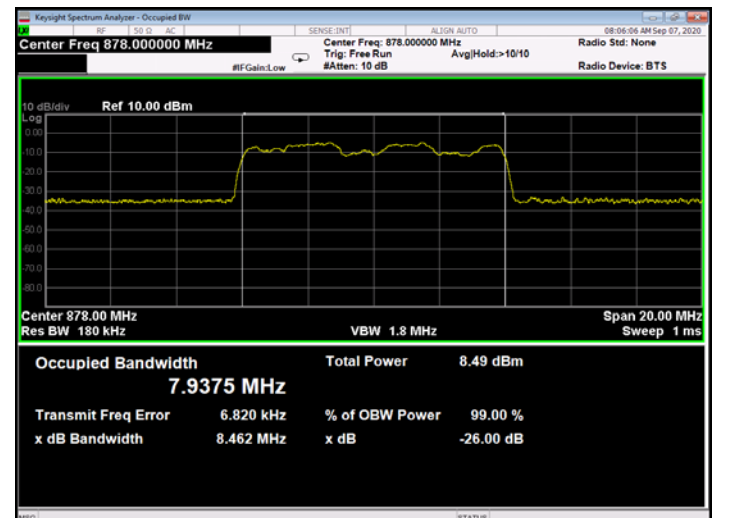


Figure 187: 16QAM 10MHz B.W.; 878.0MHz, 60kHz - Input

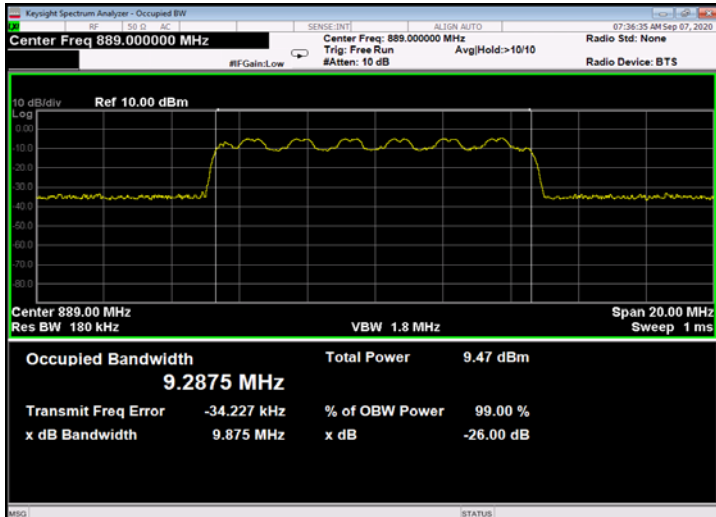


Figure 188: 16QAM 10MHz B.W.; 889.0MHz, 15kHz - Input

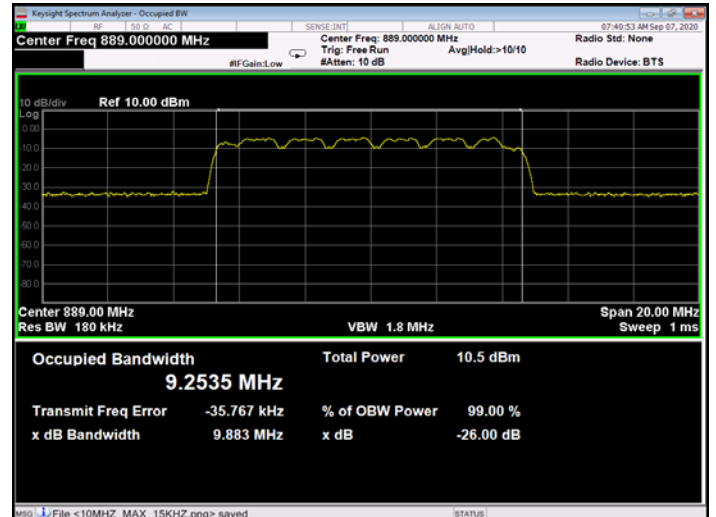


Figure 189: 16QAM 10MHz B.W.; 889.0MHz, 30kHz - Input

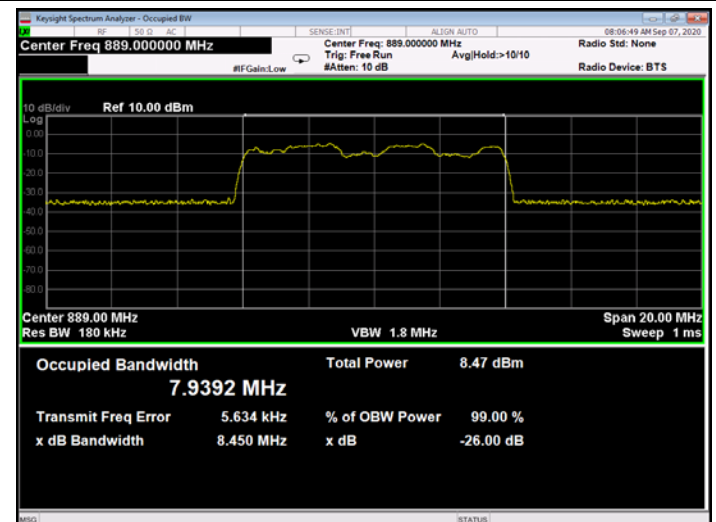


Figure 190: 16QAM 10MHz B.W.; 889.0MHz, 60kHz - Input

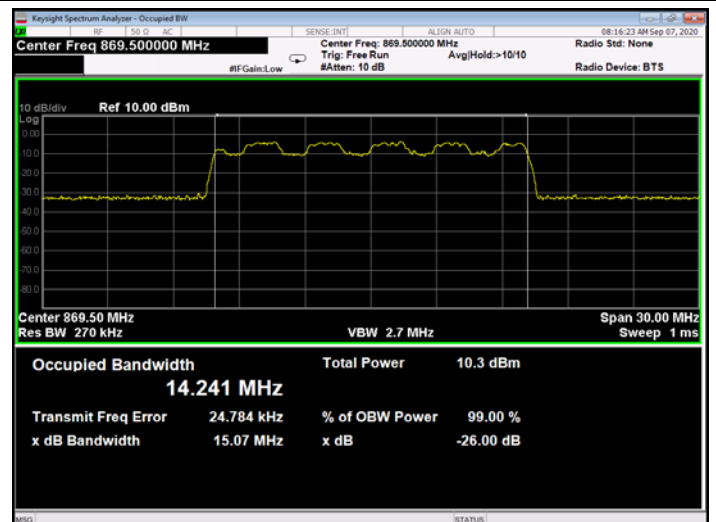


Figure 191: 16QAM 15MHz B.W.; 869.0MHz, 15kHz - Input

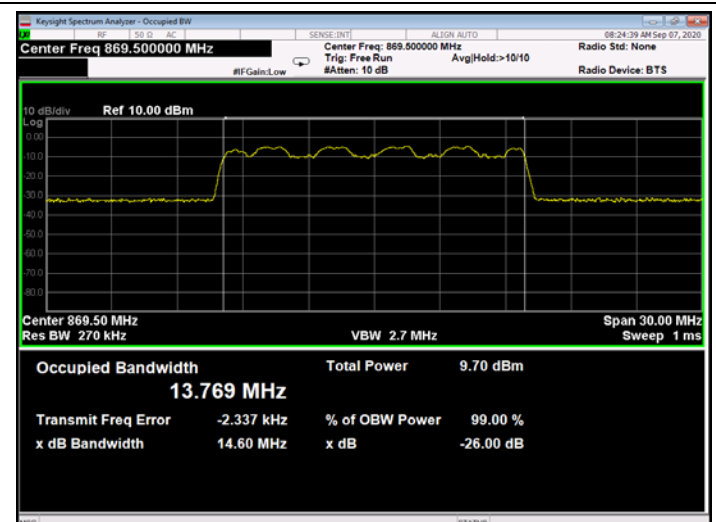


Figure 192: 16QAM 15MHz B.W.; 869.0MHz, 30kHz - Input

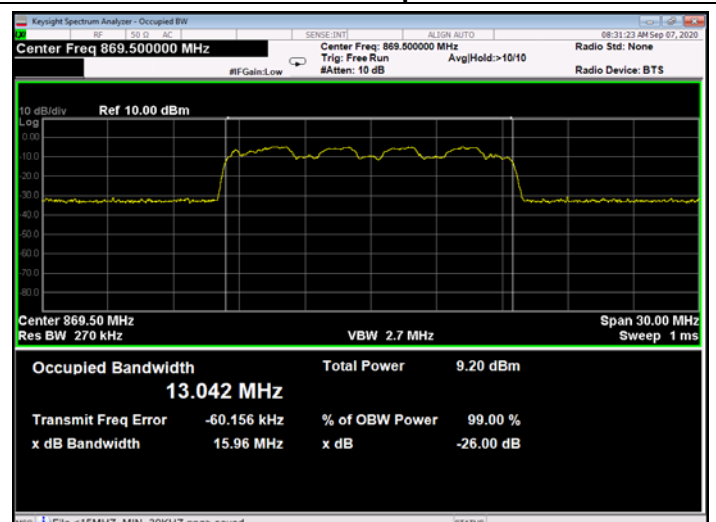


Figure 193: 16QAM 10MHz B.W.; 869.0MHz, 60kHz - Input

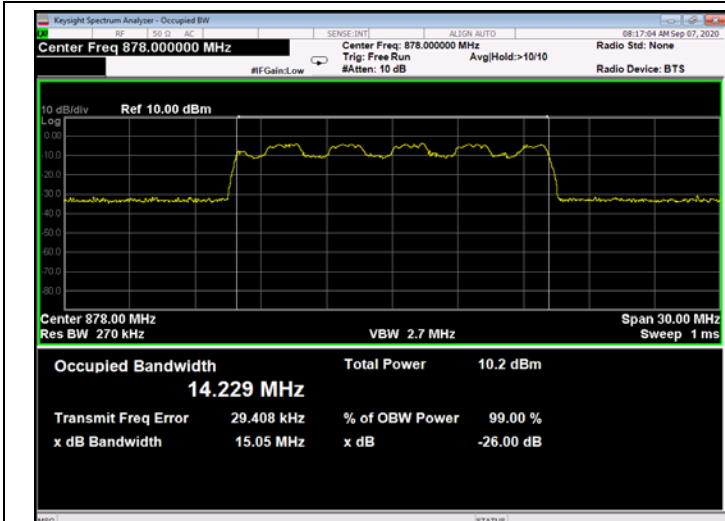


Figure 194: 16QAM 15MHz B.W.; 878.0MHz, 15kHz- Input

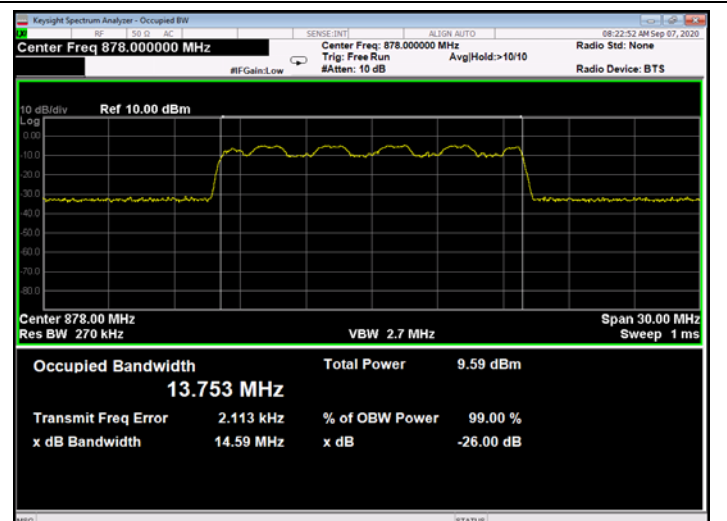


Figure 195: 16QAM 15MHz B.W.; 878.0MHz, 30kHz- Input

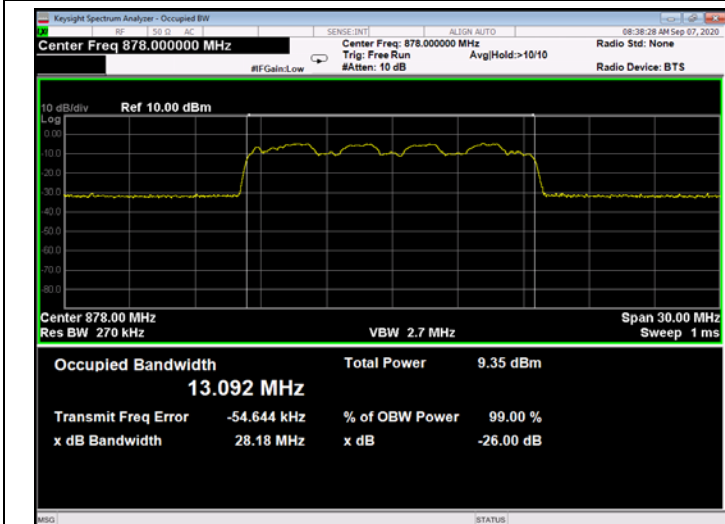


Figure 196: 16QAM 15MHz B.W.; 878.0MHz, 60kHz - Input

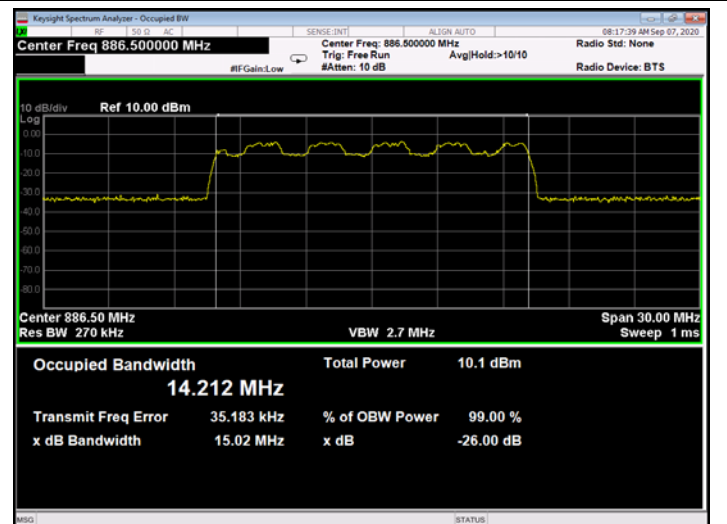


Figure 197: 16QAM 15MHz B.W.; 886.5MHz, 15kHz - Input

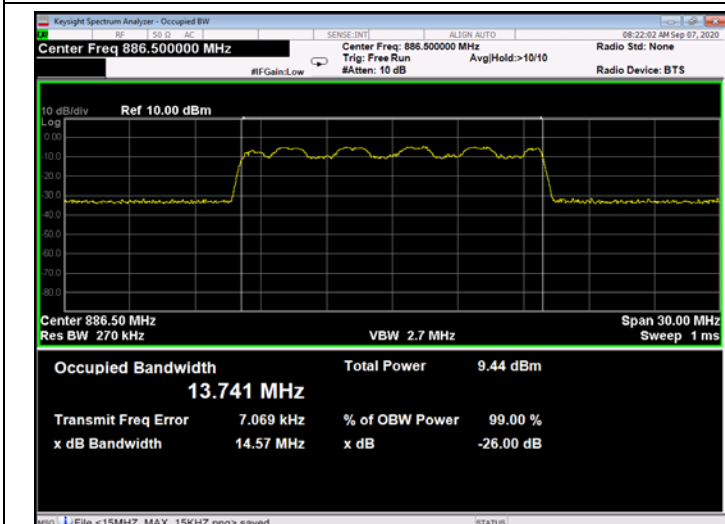


Figure 198: 16QAM 15MHz B.W.; 886.5MHz, 30kHz - Input

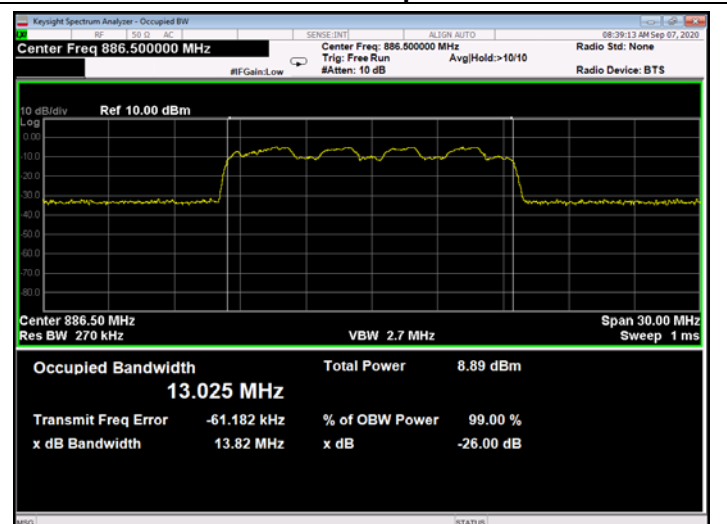


Figure 199: 16QAM 15MHz B.W.; 886.5MHz, 60kHz - Input

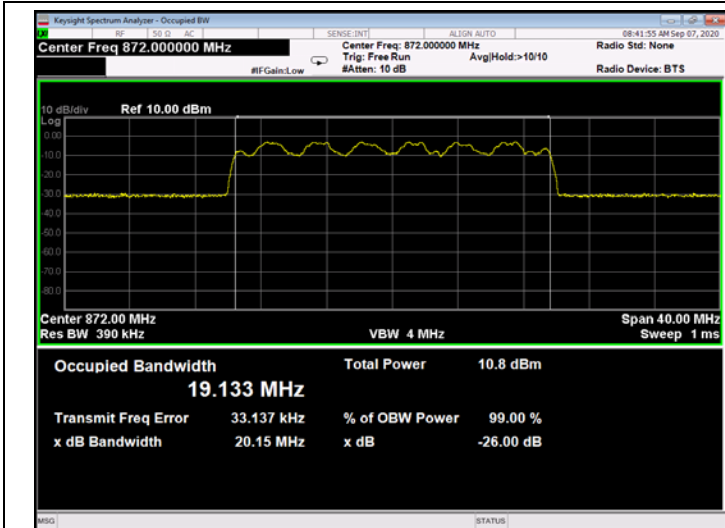


Figure 200: 16QAM 20MHz B.W.; 872.0MHz, 15kHz - Input

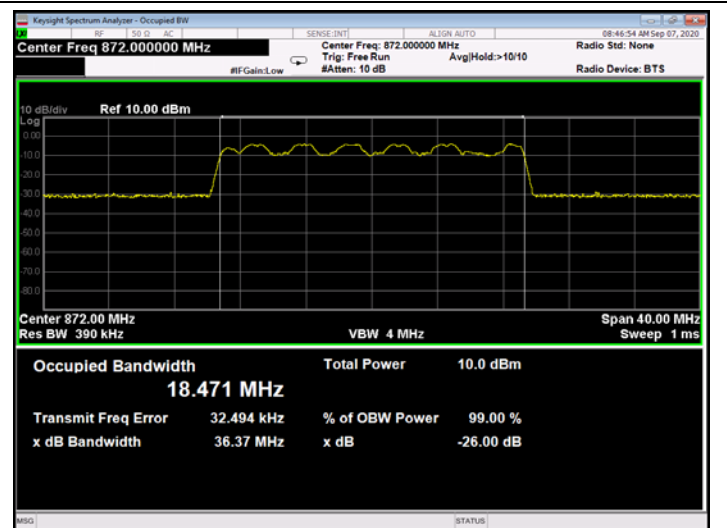


Figure 201: 16QAM 20MHz B.W.; 872.0MHz, 30kHz - Input

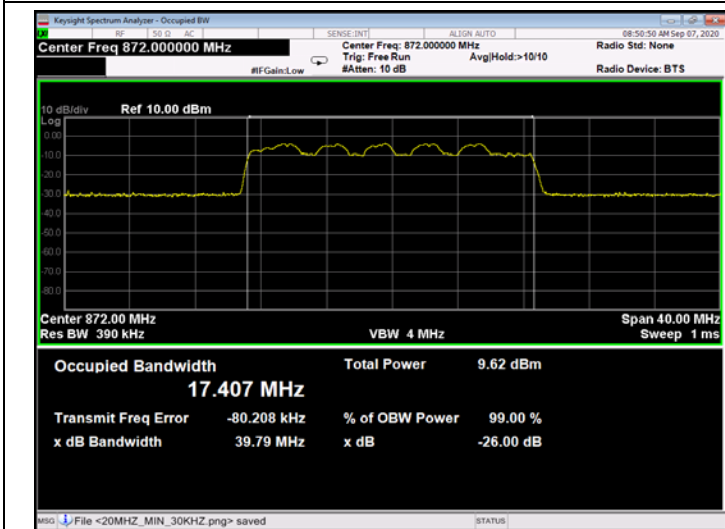


Figure 202: 16QAM 20MHz B.W.; 872.0MHz, 60kHz - Input

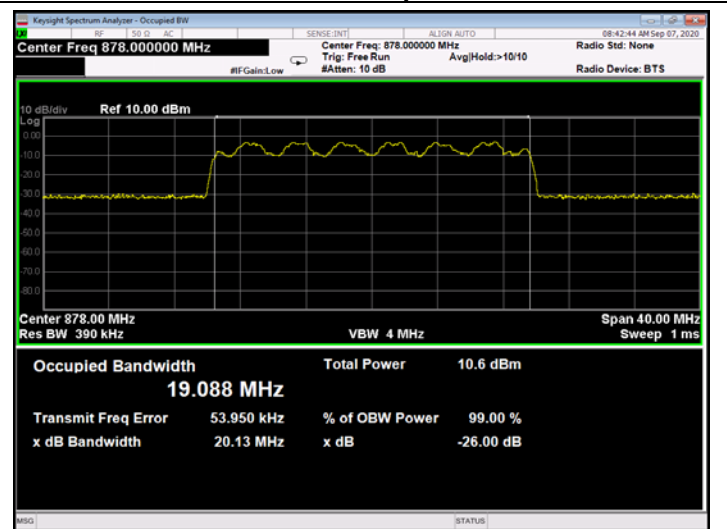


Figure 203: 16QAM 20MHz B.W.; 878.0MHz, 15kHz - Input

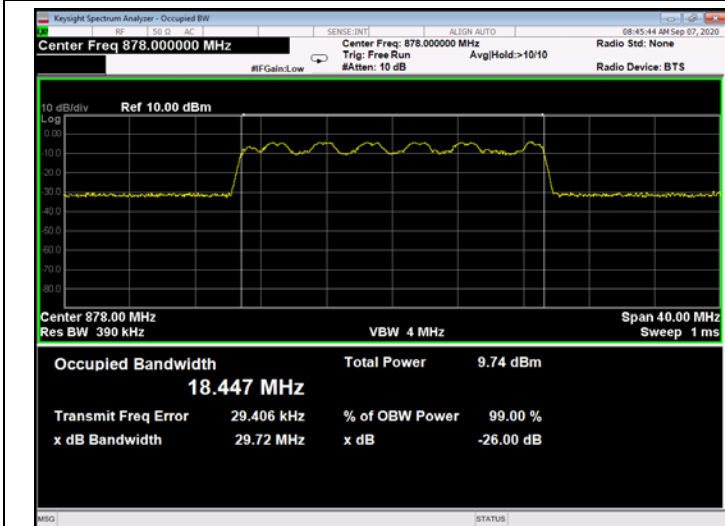


Figure 204: 16QAM 20MHz B.W.; 878.0MHz, 30kHz - Input

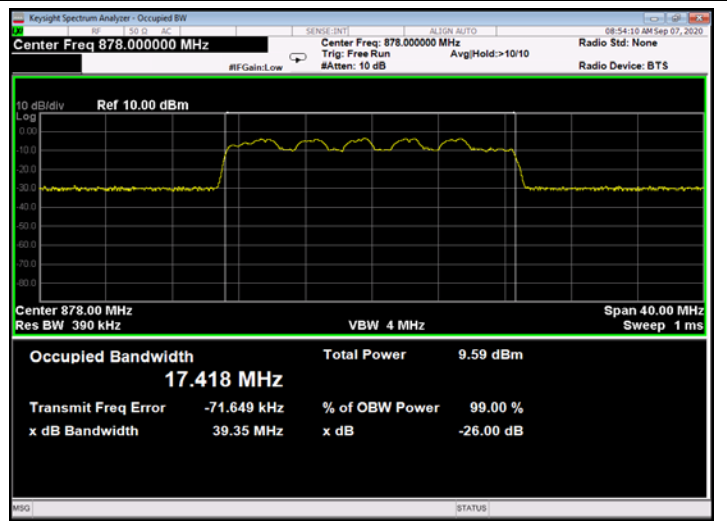


Figure 205: 16QAM 20MHz B.W.; 878.0MHz, 60kHz - Input

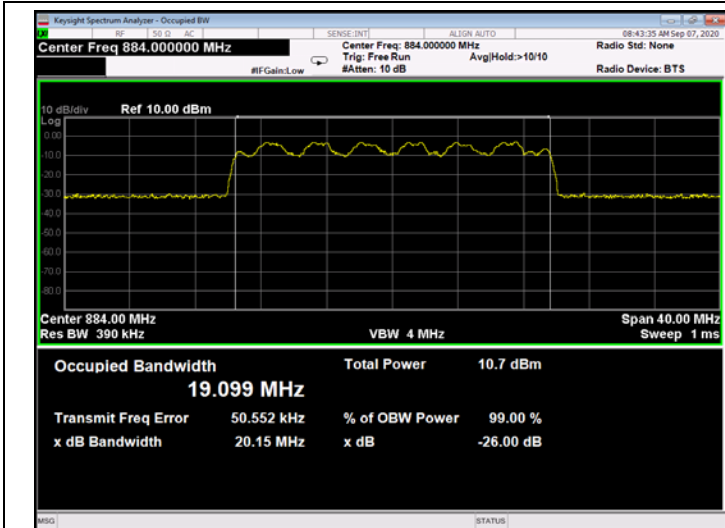


Figure 206: 16QAM 20MHz B.W.; 884.0MHz, 15kHz - Input

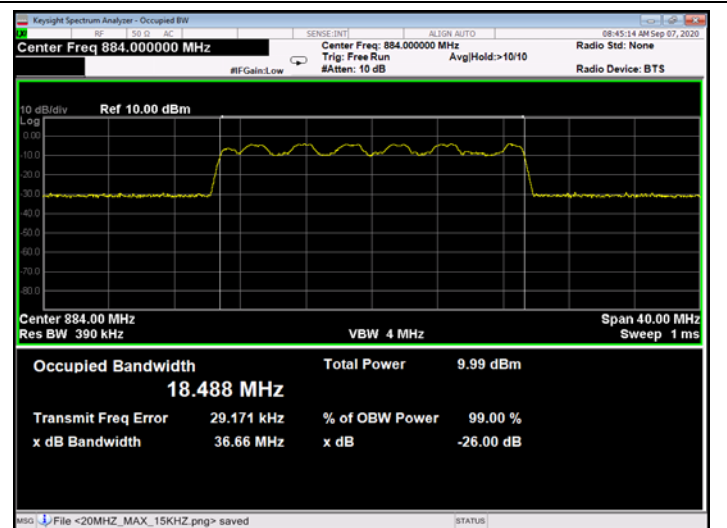


Figure 207: 16QAM 20MHz B.W.; 884.0MHz, 30kHz - Input

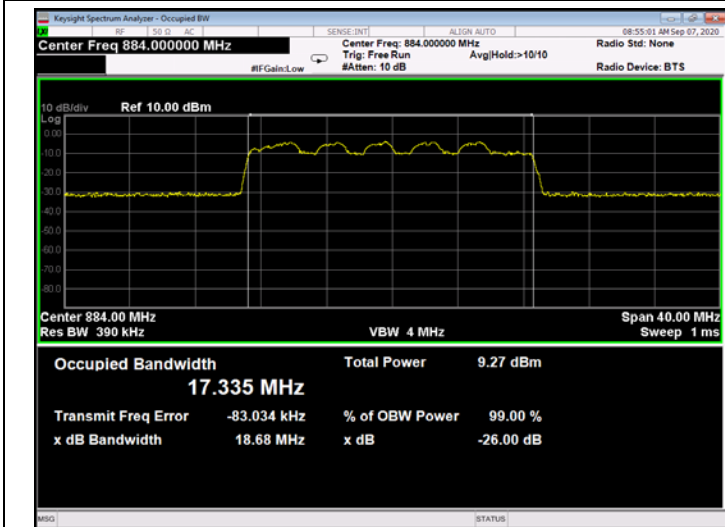


Figure 208: 16QAM 20MHz B.W.; 884.0MHz, 60kHz - Input

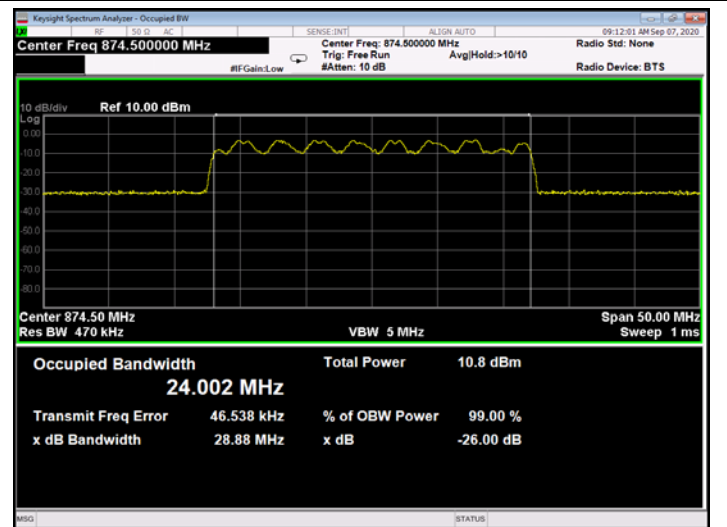


Figure 209: 16QAM 25MHz B.W.; 874.5MHz, 15kHz - Input

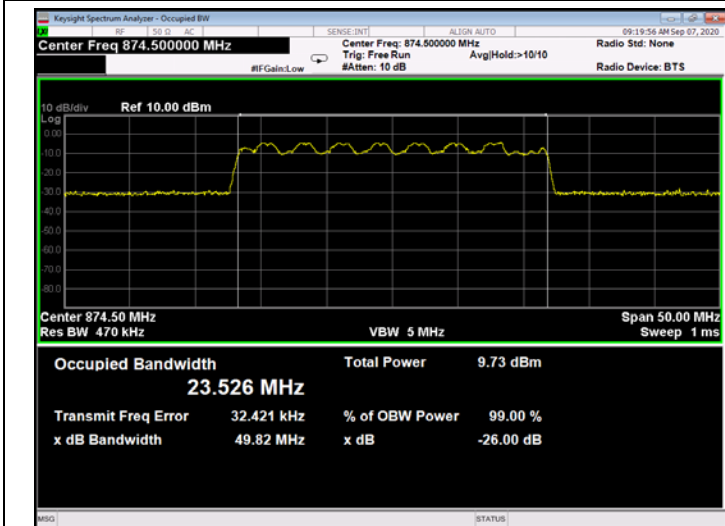


Figure 210: 16QAM 25MHz B.W.; 874.5MHz, 30kHz - Input

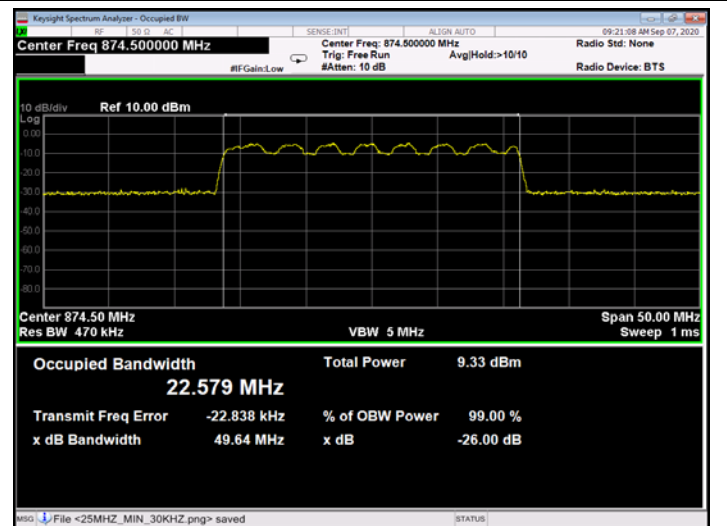


Figure 211: 16QAM 25MHz B.W.; 874.5MHz, 60kHz - Input

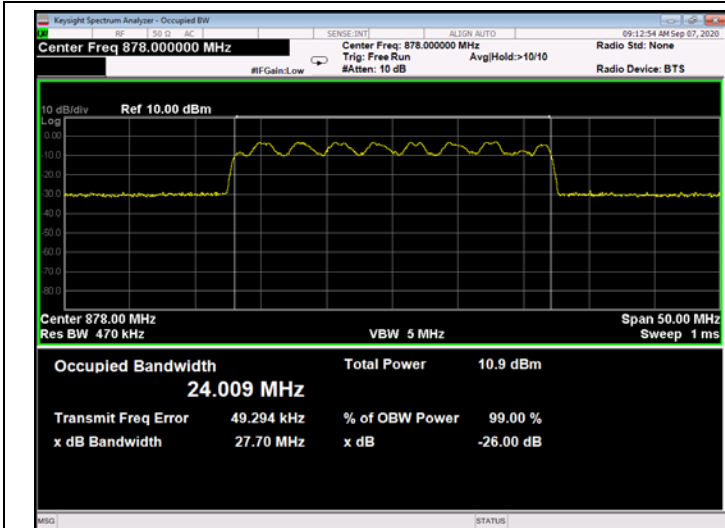


Figure 212: 16QAM 25MHz B.W.; 878.0MHz, 15kHz - Input

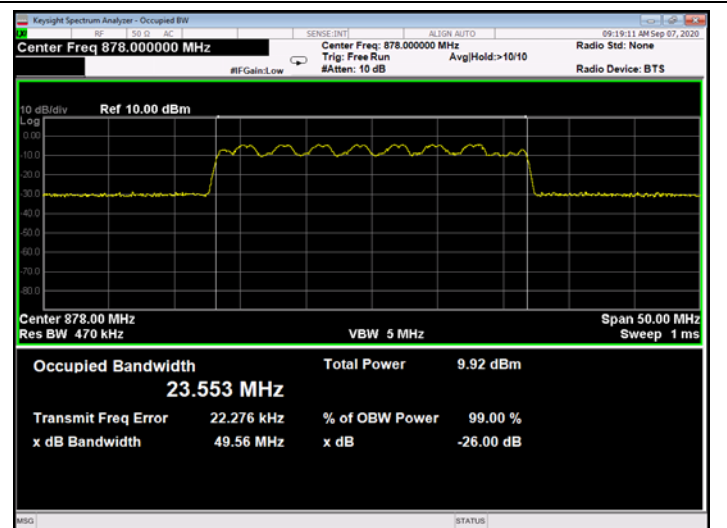


Figure 213: 16QAM 25MHz B.W.; 878.0MHz, 30kHz - Input

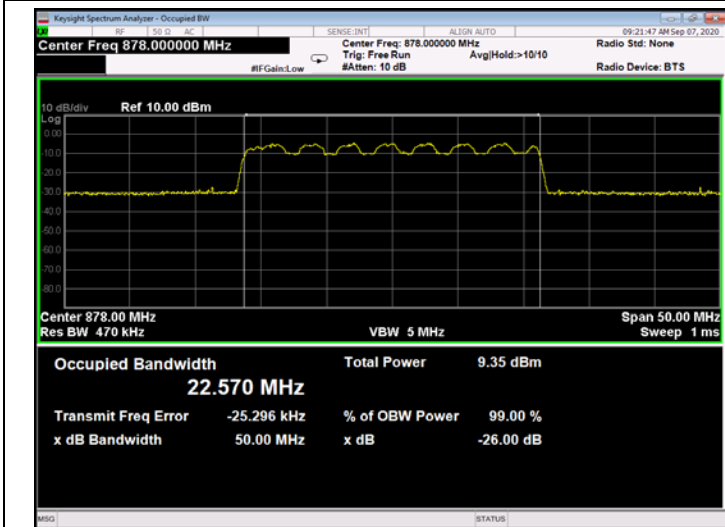


Figure 214: 16QAM 25MHz B.W.; 878.0MHz, 60kHz - Input

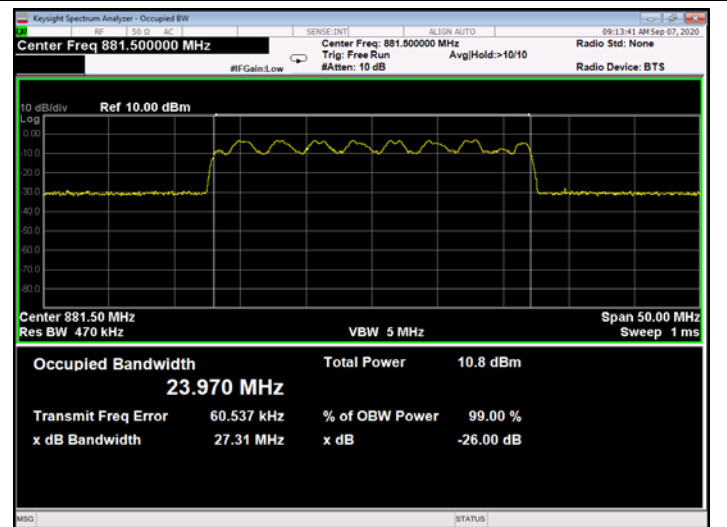


Figure 215: 16QAM 25MHz B.W.; 881.5MHz, 15kHz - Input

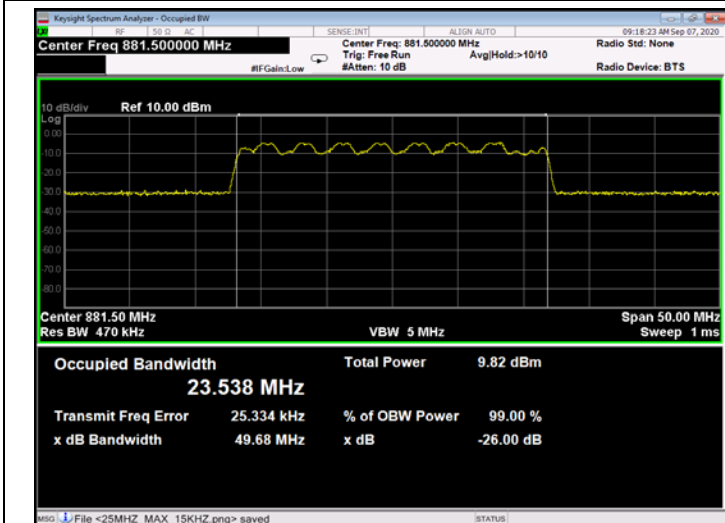


Figure 216: 16QAM 25MHz B.W.; 881.5MHz, 30kHz - Input

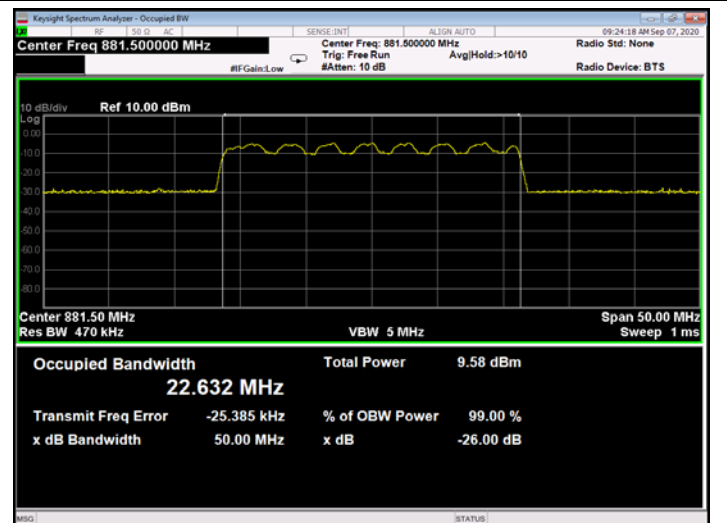


Figure 217: 16QAM 25MHz B.W.; 881.5MHz, 60kHz - Input

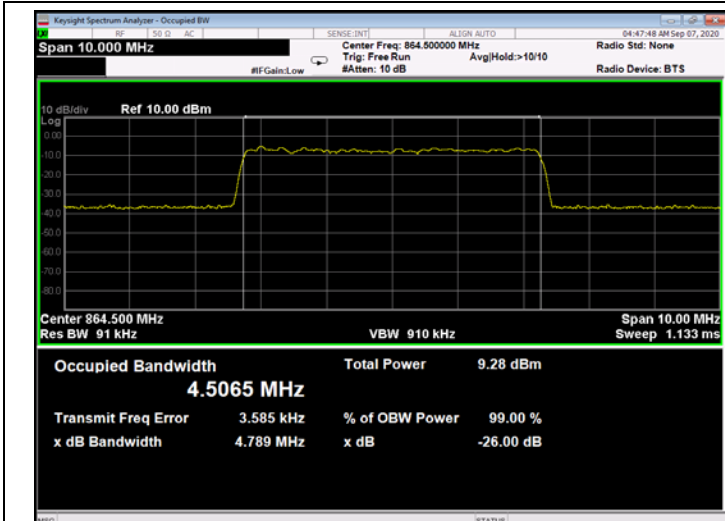


Figure 218: 64QAM 5MHz B.W.; 864.5MHz, 15kHz - Input

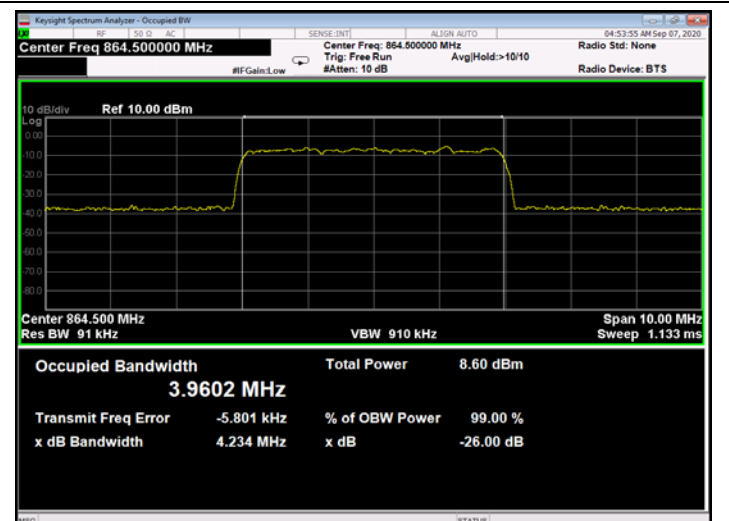


Figure 219: 64QAM 5MHz B.W.; 864.5MHz, 30kHz - Input

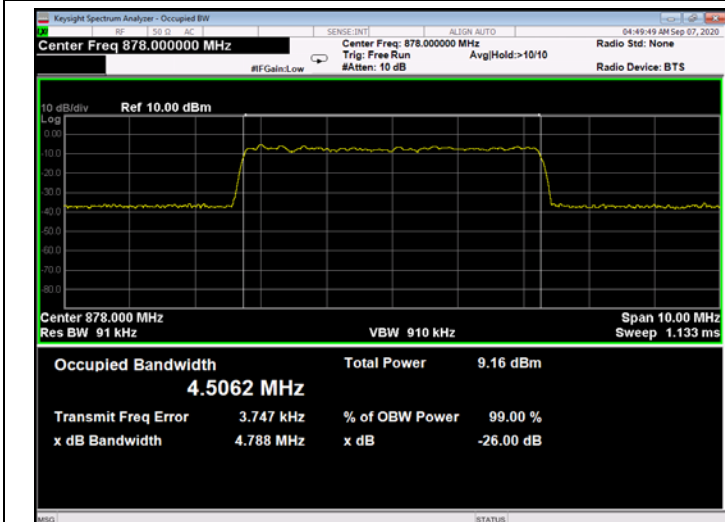


Figure 220: 64QAM 5MHz B.W.; 878.0MHz, 15kHz - Input

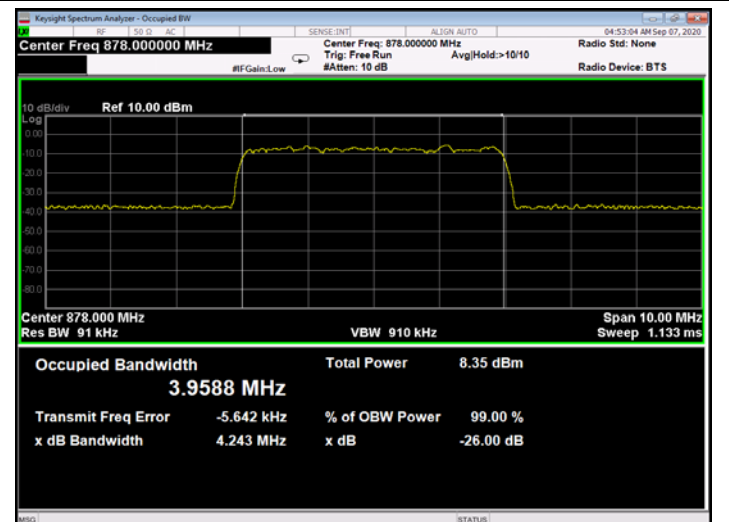


Figure 221: 64QAM 5MHz B.W.; 878.0MHz, 30kHz - Input

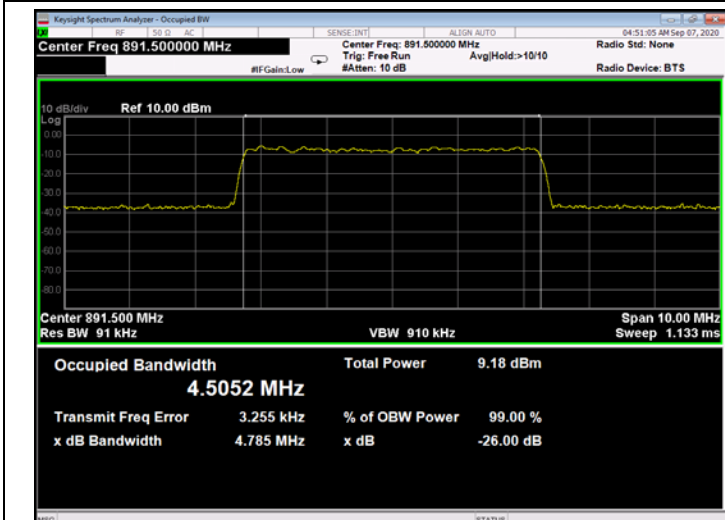


Figure 222: 64QAM 5MHz B.W.; 891.5MHz, 15kHz - Input

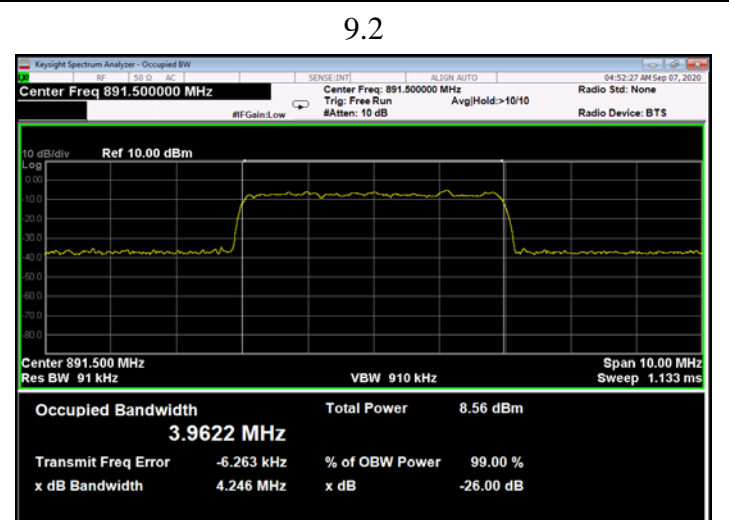


Figure 223: 64QAM 5MHz B.W.; 891.5MHz, 30kHz - Input

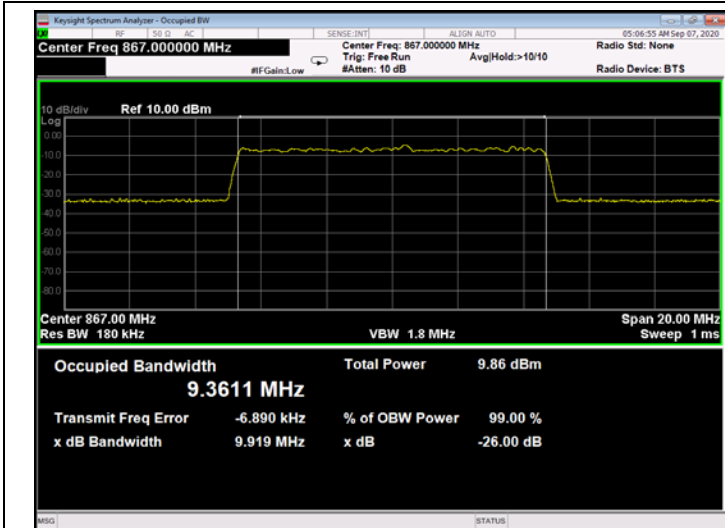


Figure 224: 64QAM 10MHz B.W.; 867.0MHz, 15kHz - Input

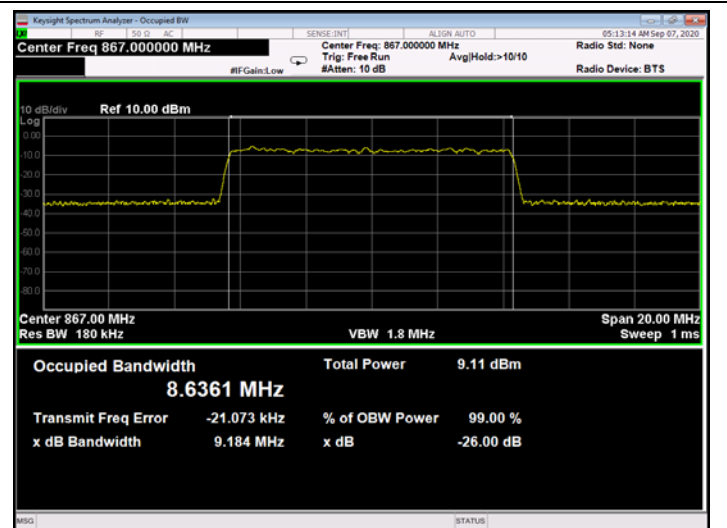


Figure 225: 64QAM 10MHz B.W.; 867.0MHz, 30kHz - Input

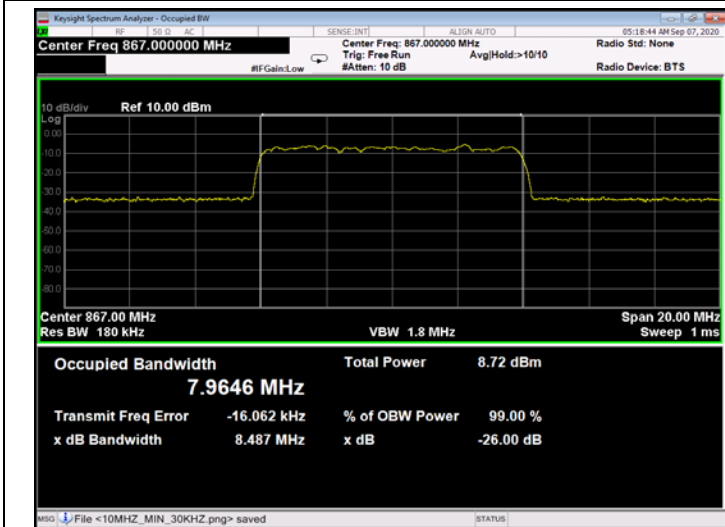


Figure 226: 64QAM 10MHz B.W.; 867.0MHz, 60kHz - Input

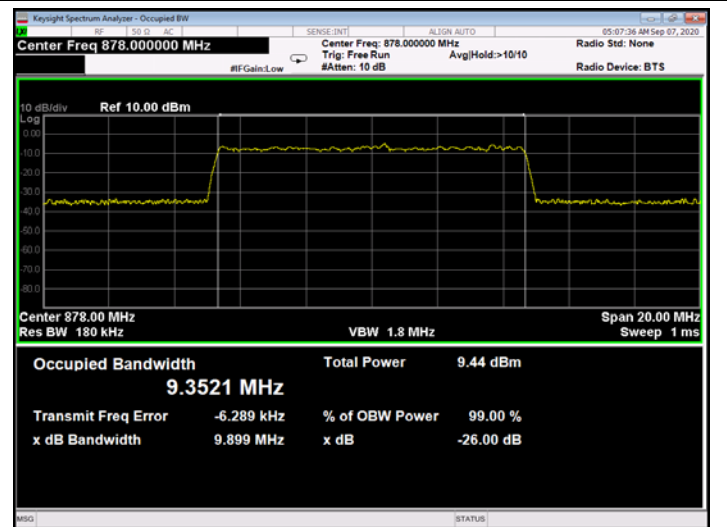


Figure 227: 64QAM 10MHz B.W.; 878.0MHz, 15kHz - Input

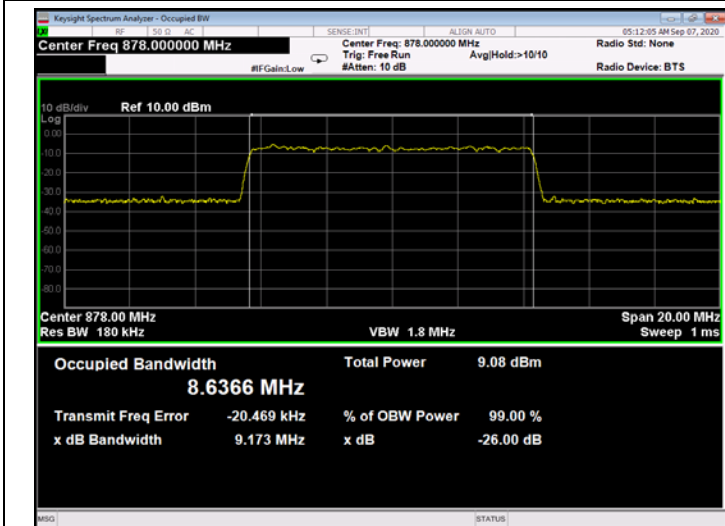


Figure 228: 64QAM 10MHz B.W.; 878.0MHz, 30kHz - Input

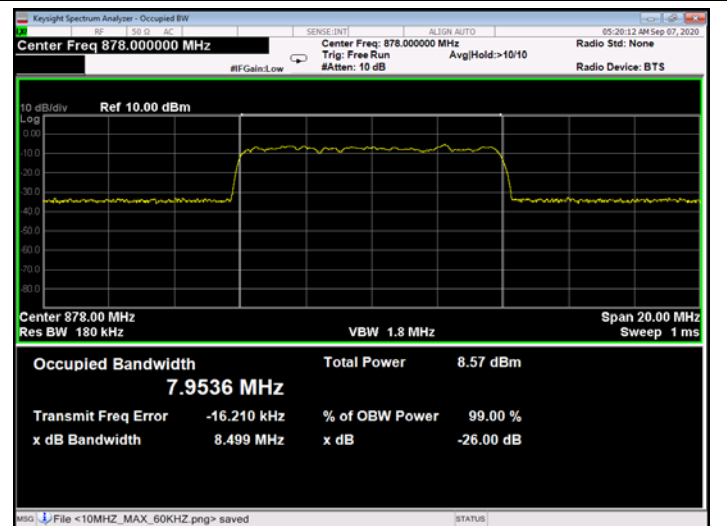


Figure 229: 64QAM 5MHz B.W.; 878.0MHz, 60kHz - Input

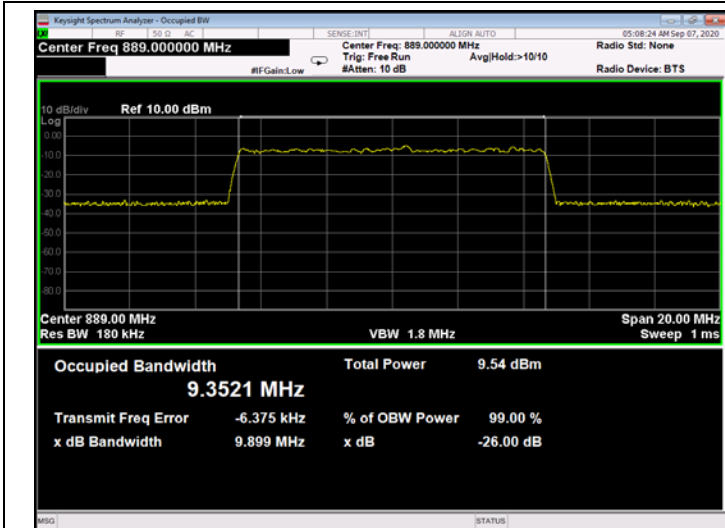


Figure 230: 64QAM 10MHz B.W.; 889.0MHz, 15kHz - Input

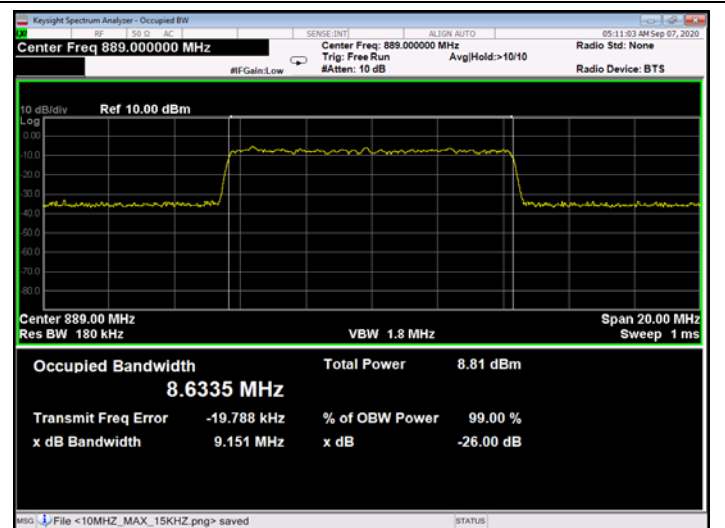


Figure 231: 64QAM 10MHz B.W.; 889.0MHz, 30kHz - Input

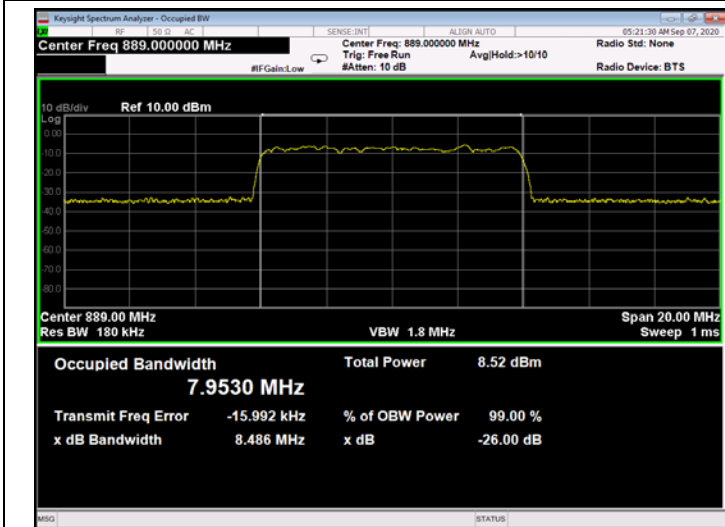


Figure 232: 64QAM 10MHz B.W.; 889.0MHz, 60kHz - Input

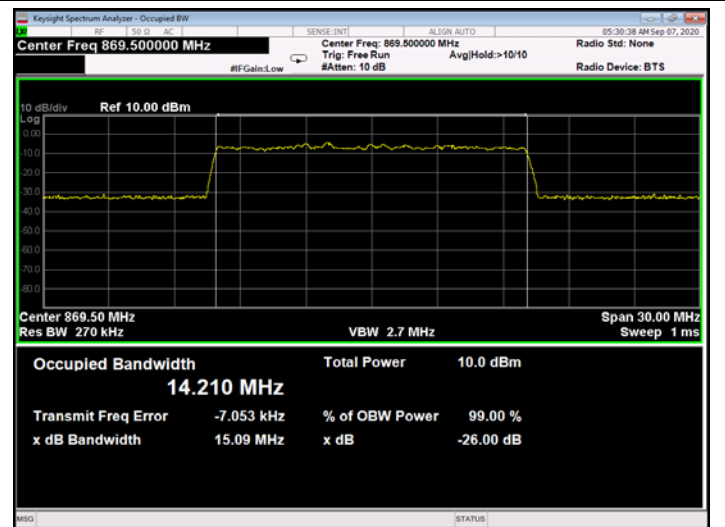


Figure 233: 64QAM 15MHz B.W.; 869.5MHz, 15kHz - Input

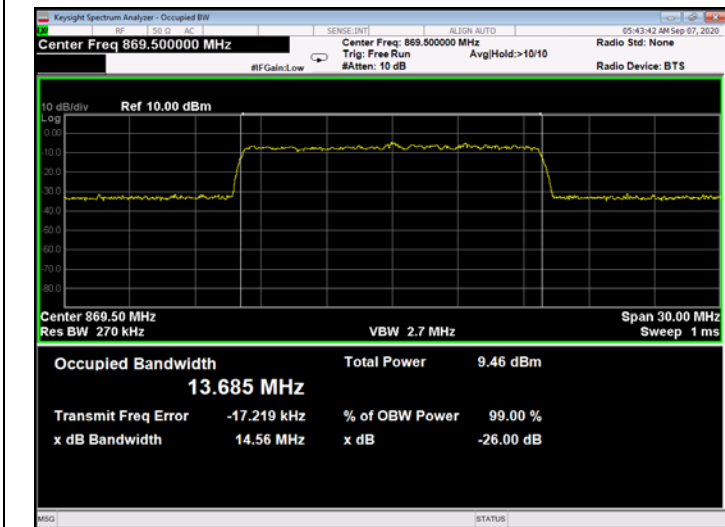


Figure 234: 64QAM 15MHz B.W.; 869.5MHz, 30kHz - Input

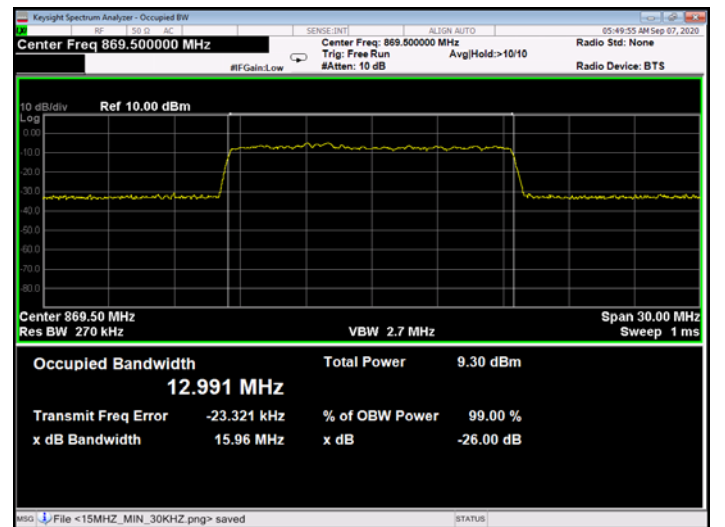


Figure 235: 64QAM 15MHz B.W.; 869.5MHz, 60kHz - Input

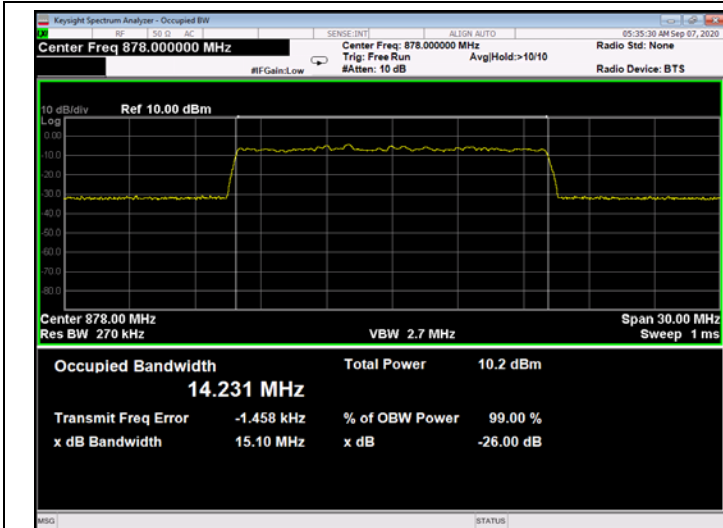


Figure 236: 64QAM 15MHz B.W.; 878.0MHz, 15kHz - Input

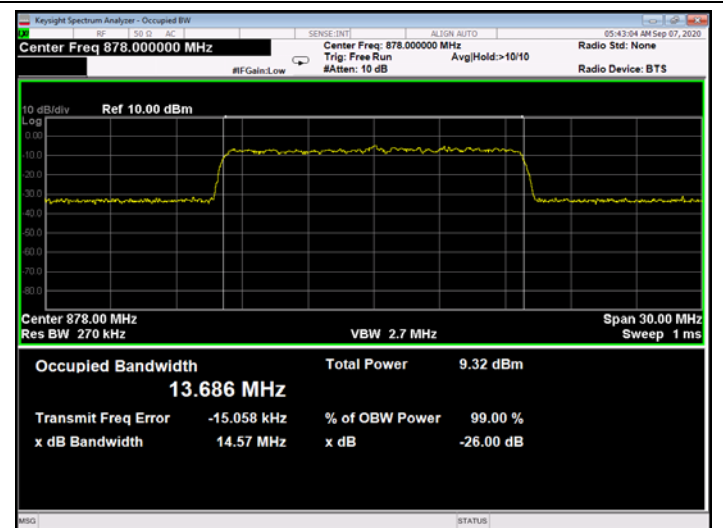


Figure 237: 64QAM 15MHz B.W.; 878.0MHz, 30kHz - Input

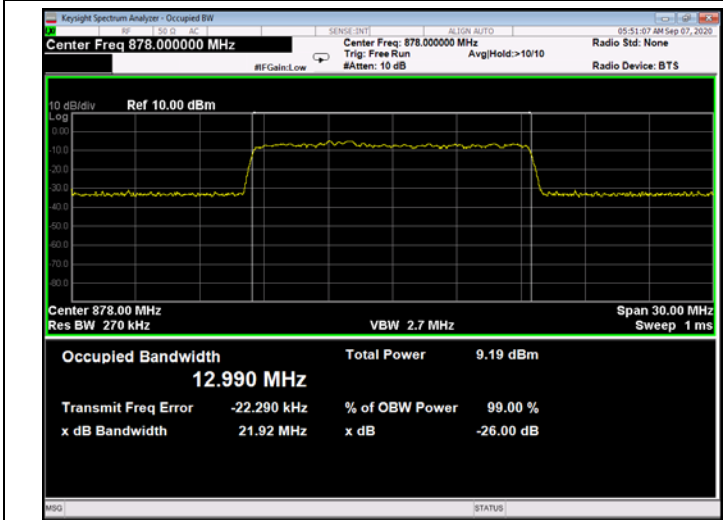


Figure 238: 64QAM 15MHz B.W.; 878.0MHz, 60kHz - Input

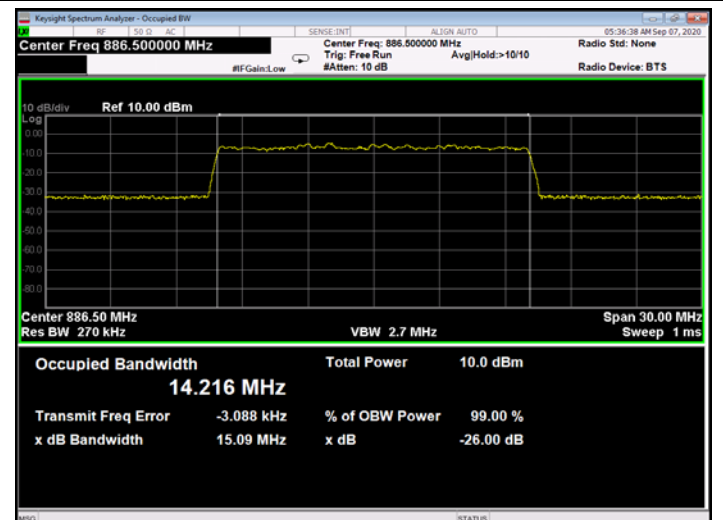


Figure 239: 64QAM 15MHz B.W.; 886.5MHz, 15kHz - Input

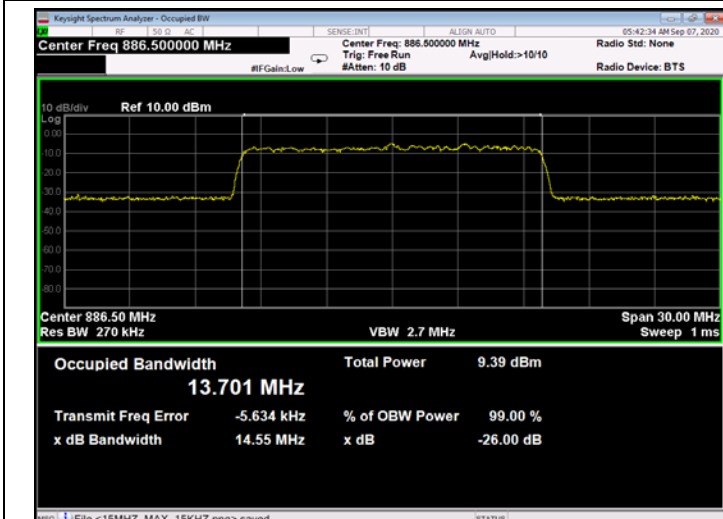


Figure 240: 64QAM 15MHz B.W.; 886.5MHz, 30kHz - Input

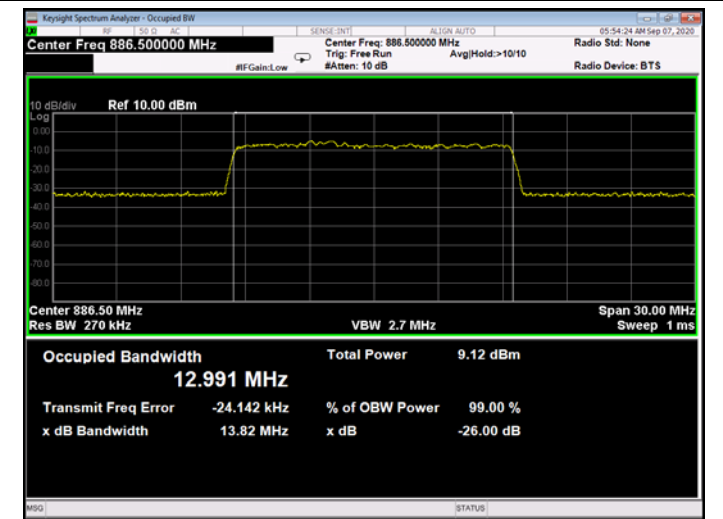


Figure 241: 64QAM 15MHz B.W.; 886.5MHz, 60kHz - Input

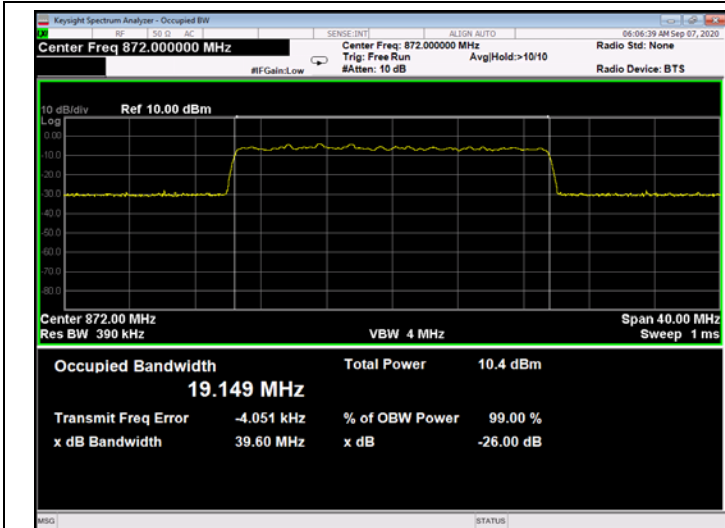


Figure 242: 64QAM 20MHz B.W.; 872.0MHz, 15kHz - Input

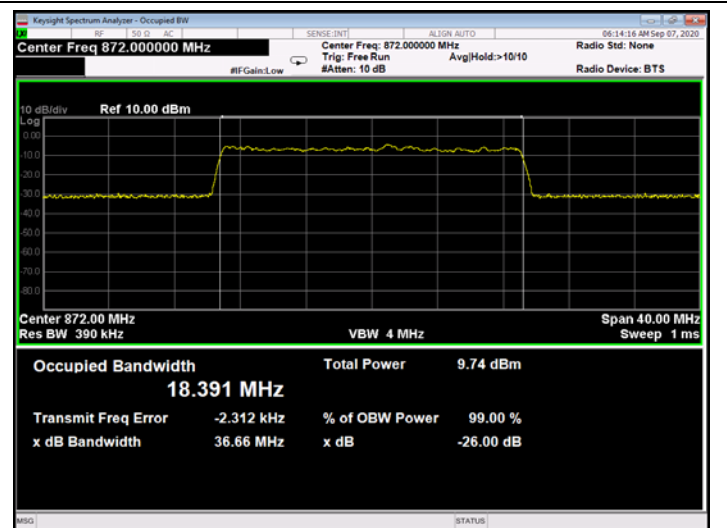


Figure 243: 64QAM 20MHz B.W.; 872.0MHz, 30kHz - Input

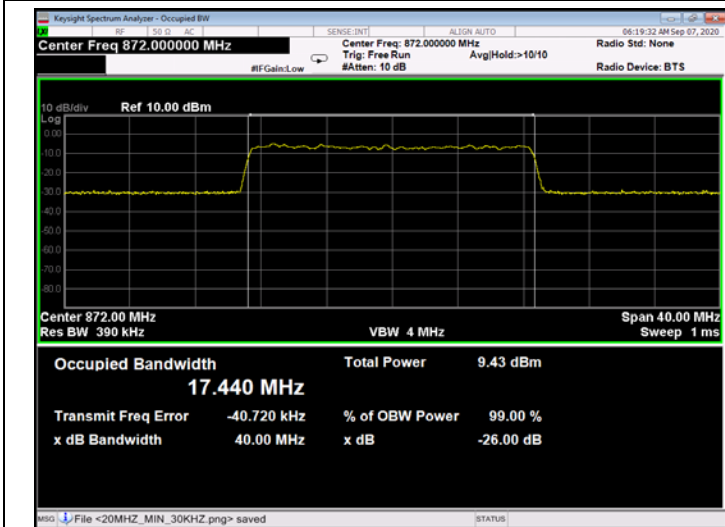


Figure 244: 64QAM 20MHz B.W.; 872.0MHz, 60kHz - Input

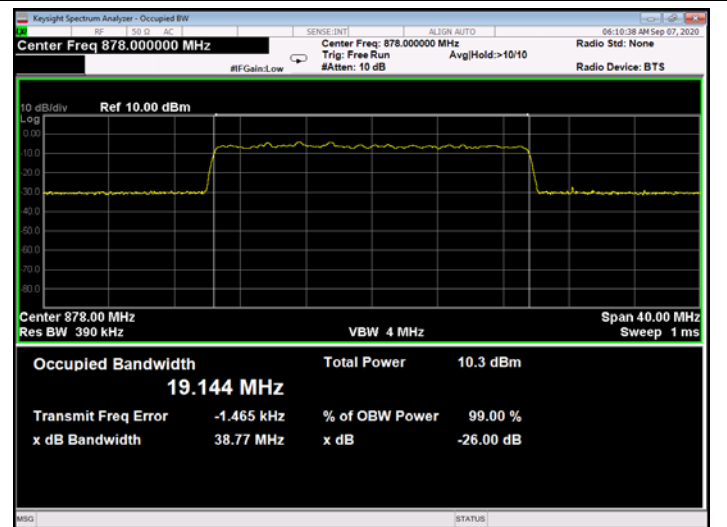


Figure 245: 64QAM 20MHz B.W.; 878.0MHz, 15kHz - Input

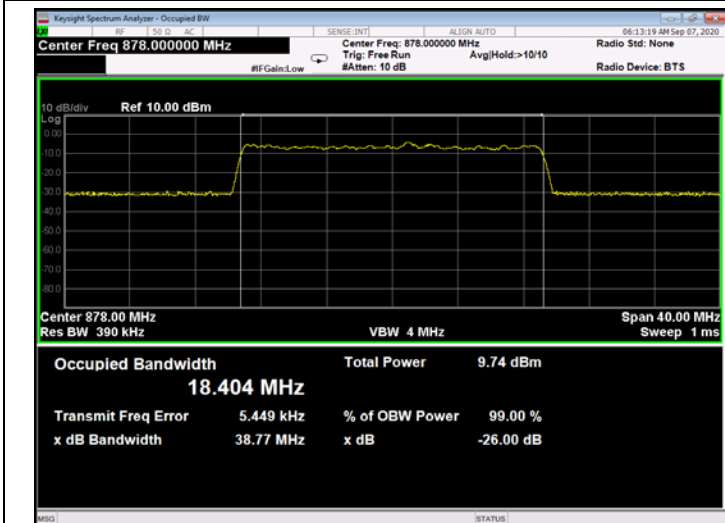


Figure 246: 64QAM 20MHz B.W.; 878.0MHz, 30kHz - Input

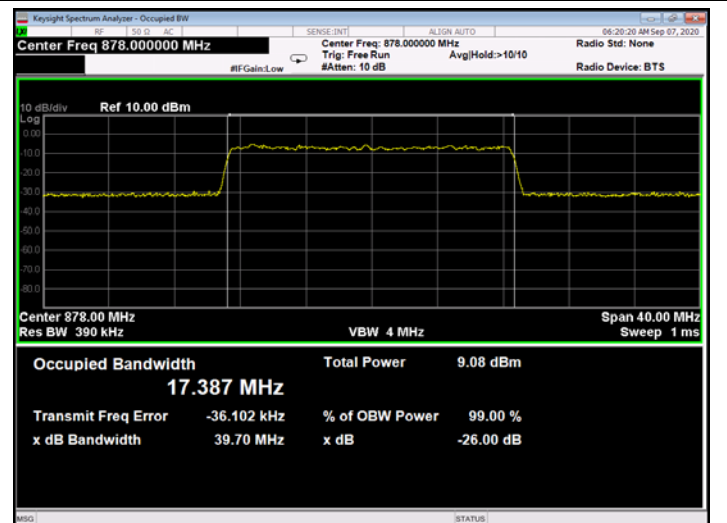


Figure 247: 64QAM 20MHz B.W.; 878.0MHz, 60kHz - Input

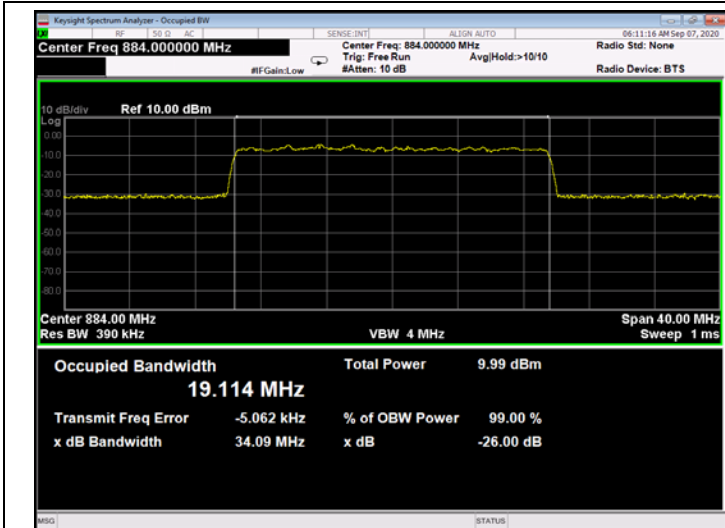


Figure 248: 64QAM 20MHz B.W.; 884.0MHz, 15kHz - Input

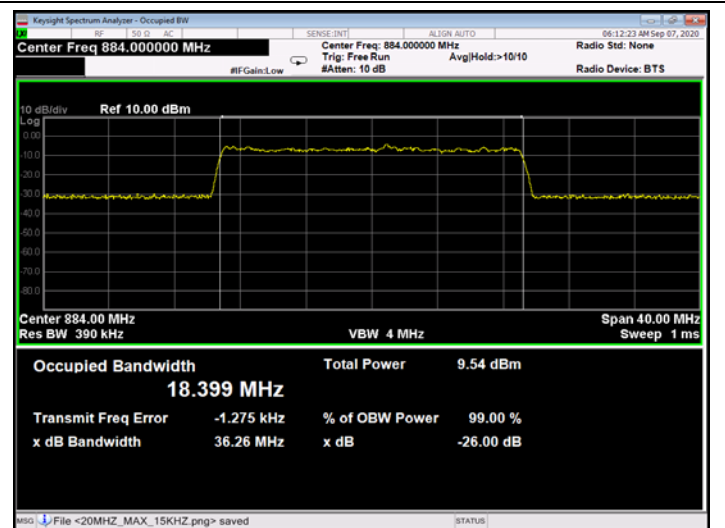


Figure 249: 64QAM 20MHz B.W.; 884.0MHz, 30kHz - Input

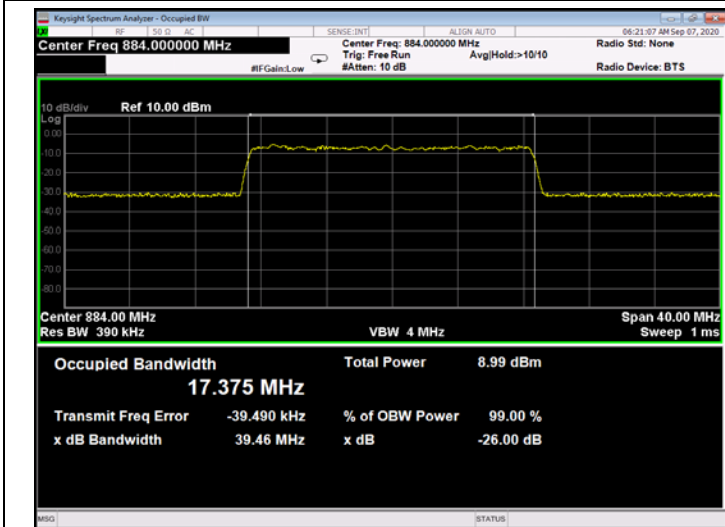


Figure 250: 64QAM 20MHz B.W.; 884.0MHz, 60kHz - Input

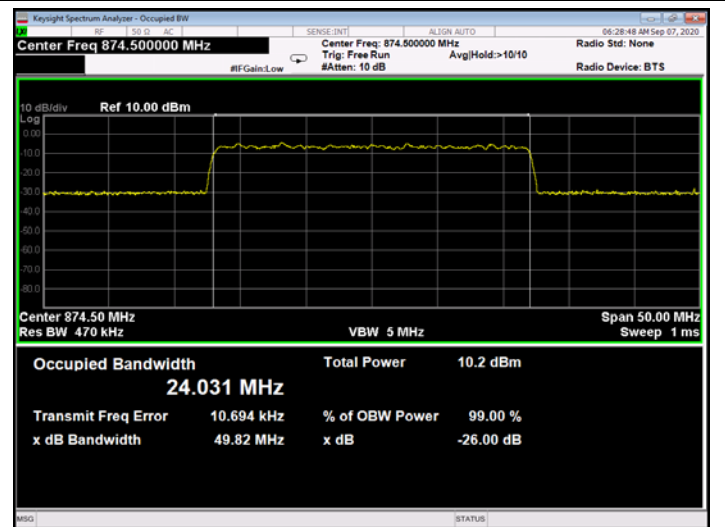


Figure 251: 64QAM 25MHz B.W.; 874.5 MHz, 15kHz - Input

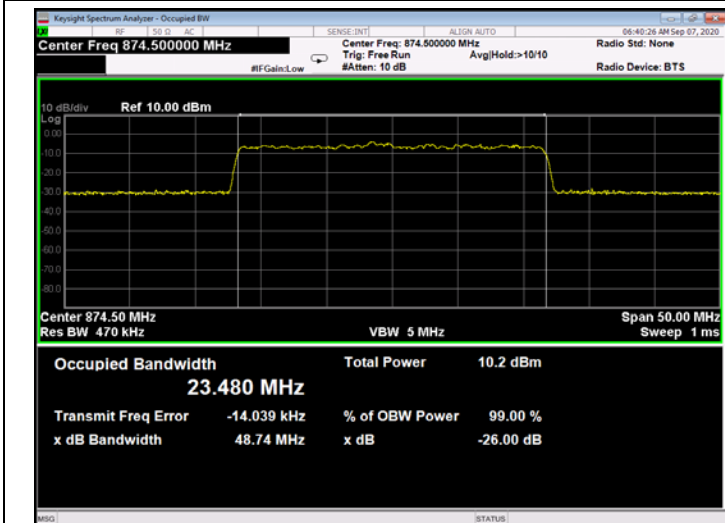


Figure 252: 64QAM 25MHz B.W.; 874.5MHz, 30kHz- Input

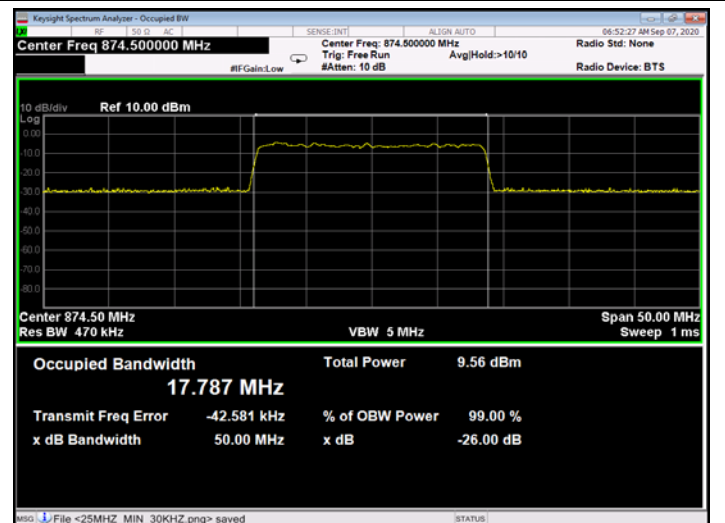


Figure 253: 64QAM 25MHz B.W.; 874.5MHz, 60kHz - Input

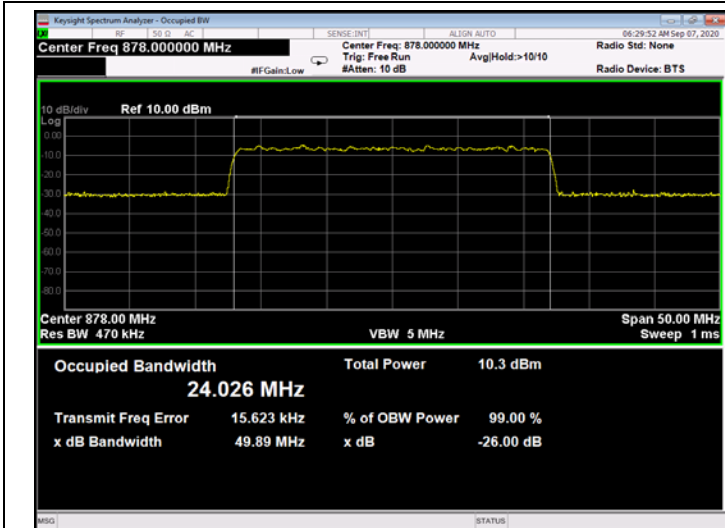


Figure 254: 64QAM 25MHz B.W.; 878.5MHz, 15kHz - Input

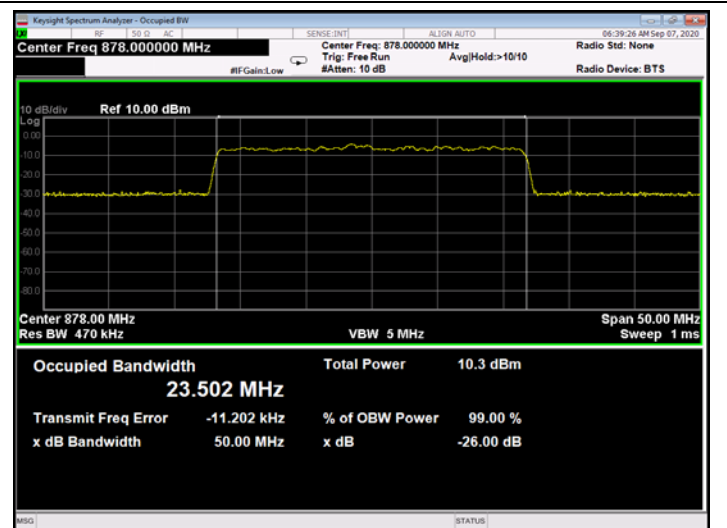


Figure 255: 64QAM 25MHz B.W.; 878.5MHz, 30kHz - Input

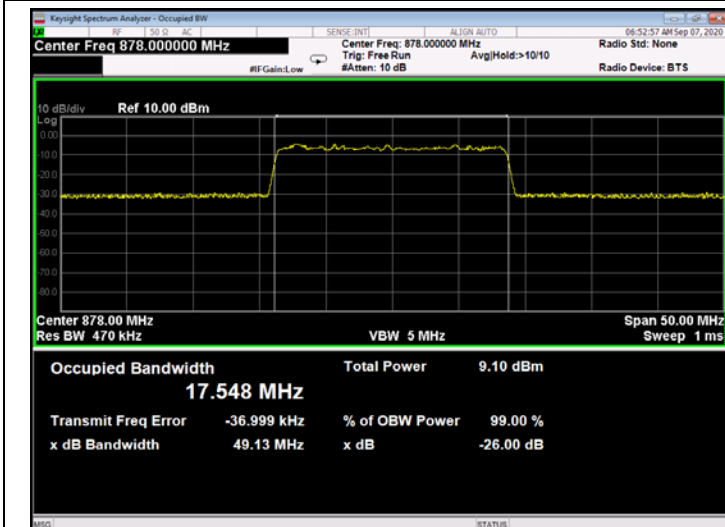


Figure 256: 64QAM 25MHz B.W.; 878.5MHz, 60kHz - Input

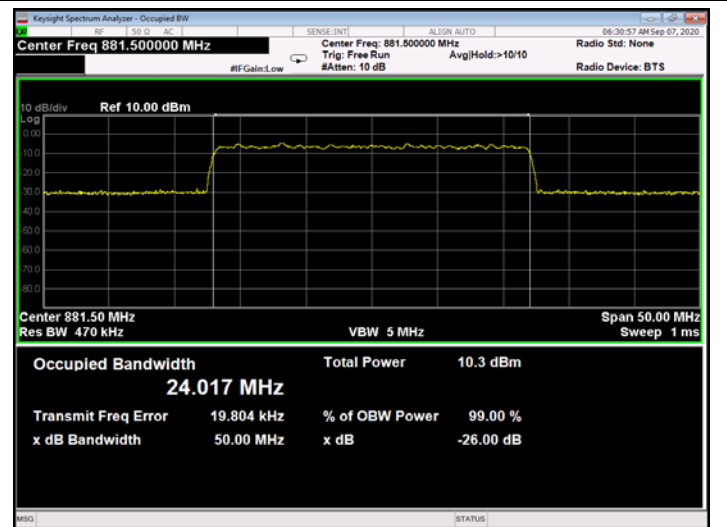


Figure 257: 64QAM 25MHz B.W.; 881.5MHz, 15kHz - Input

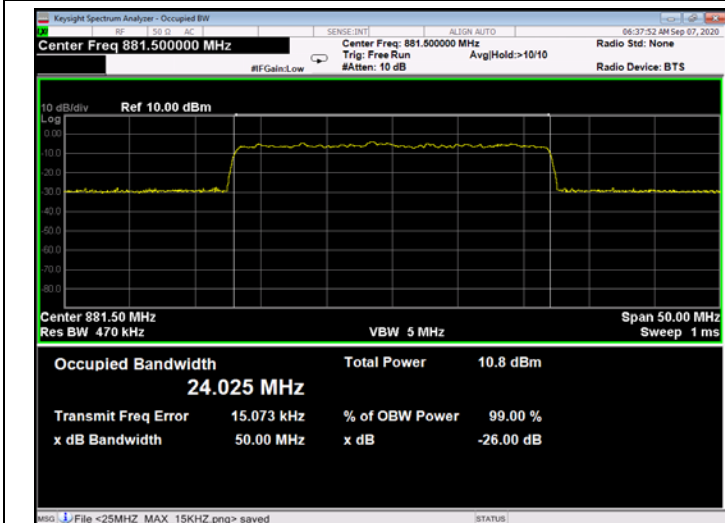


Figure 258: 64QAM 25MHz B.W.; 881.5MHz, 30kHz - Input

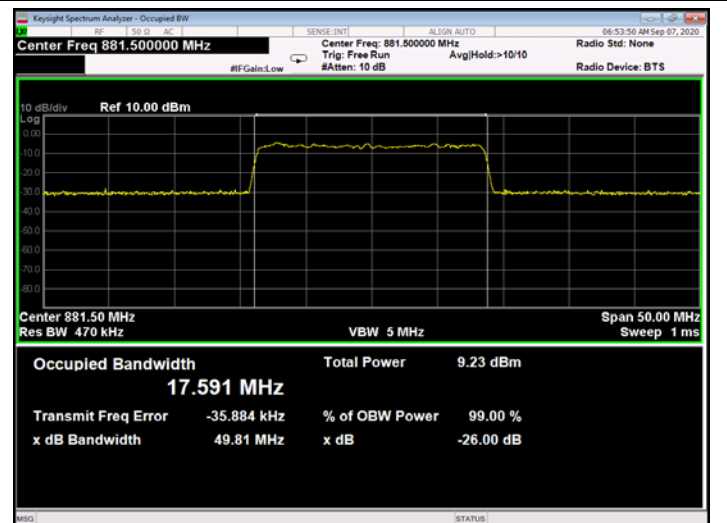


Figure 259: 64QAM 25MHz B.W.; 881.5MHz, 60kHz - Input