



5 Occupied Bandwidth

5.1 *Test Specification*

FCC Part 2, Section 1049

5.2 *Test Procedure*

(Temperature (24°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. 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 8 to Table 10 and Figure 205 to Figure 302.

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
16QAM	5	15	2112.5	4.5483
		30	2112.5	4.0374
		15	2155.0	4.5479
		30	2155.0	4.0375
		15	2197.5	4.5453
		30	2197.5	4.0372
	10	15	2115.0	9.2511
		30	2115.0	8.6124
		60	2115.0	8.1202
		15	2155.0	9.2512
		30	2155.0	8.6233
		60	2155.0	8.1212
		15	2195.0	9.2397
		30	2195.0	8.6169
		60	2195.0	8.1206
	15	15	2117.5	14.335
		30	2117.5	13.651
		60	2117.5	12.836
		15	2155.0	14.341
		30	2155.0	13.652
		60	2155.0	12.835
		15	2192.5	14.342
		30	2192.5	13.636
		60	2192.5	19.139
	20	15	2120.0	19.139
		30	2120.0	18.620
		60	2120.0	17.433
		15	2155.0	19.145
		30	2155.0	18.613
		60	2155.0	17.423
		15	2190.0	19.113
		30	2190.0	18.568
		60	2190.0	17.386

Table 8 Occupied Bandwidth 16QAM Output

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
64QAM	5	15	2112.5	4.5151
		30	2112.5	4.0080
		15	2155.0	4.5157
		30	2155.0	4.00075
		15	2197.5	4.5112
		30	2197.5	4.0071
	10	15	2115.0	9.3636
		30	2115.0	8.7161
		60	2115.0	8.0522
		15	2155.0	9.3643
		30	2155.0	8.7153
		60	2155.0	8.0508
		15	2195.0	9.3576
		30	2195.0	8.7039
		60	2195.0	8.0485
	15	15	2117.5	14.247
		30	2117.5	13.752
		60	2117.5	12.990
		15	2155.0	14.248
		30	2155.0	13.743
		60	2155.0	12.986
		15	2192.5	14.248
		30	2192.5	13.740
		60	2192.5	12.986
	20	15	2120.0	19.154
		30	2120.0	18.445
		60	2120.0	17.661
		15	2155.0	19.146
		30	2155.0	18.451
		60	2155.0	17.649
		15	2190.0	19.125
		30	2190.0	18.449
		60	2190.0	17.571

Table 9 Occupied Bandwidth 64QAM Output

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
256QAM	5	15	2112.5	4.5093
		30	2112.5	4.0297
		15	2155.0	4.5077
		30	2155.0	4.0283
		15	2197.5	4.5062
		30	2197.5	4.0325
	10	15	2115.0	9.3413
		30	2115.0	8.6326
		60	2115.0	8.0789
		15	2155.0	9.3379
		30	2155.0	8.6301
		60	2155.0	8.0620
		15	2195.0	9.3398
		30	2195.0	8.6316
		60	2195.0	8.0621
	15	15	2117.5	14.268
		30	2117.5	13.673
		60	2117.5	12.938
		15	2155.0	14.256
		30	2155.0	13.683
		60	2155.0	12.934
		15	2192.5	14.242
		30	2192.5	13.691
		60	2192.5	12.935
	20	15	2120.0	19.104
		30	2120.0	18.400
		60	2120.0	17.411
		15	2155.0	19.094
		30	2155.0	18.396
		60	2155.0	17.408
		15	2190.0	19.076
		30	2190.0	18.400
		60	2190.0	17.397

Table 10 Occupied Bandwidth 256QAM Output

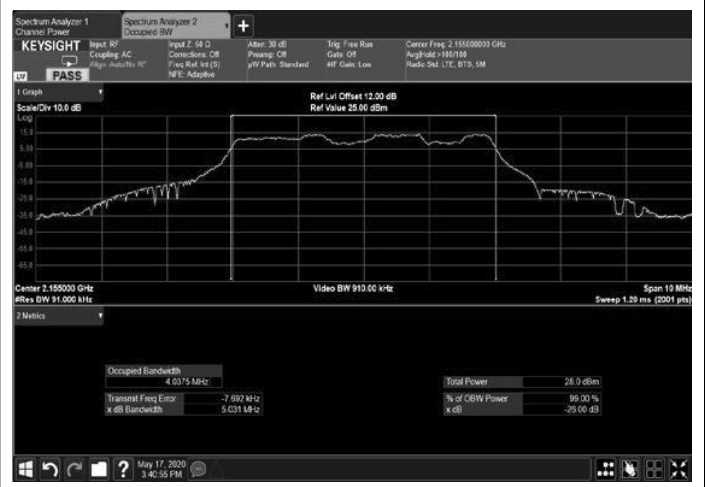




Figure 211: 16QAM 10MHz B.W.; 2115.0MHz,
15kHz Output



Figure 212: 16QAM 10MHz B.W.; 2115.0MHz,
30kHz Output



Figure 213: 16QAM 10MHz B.W.; 2115.0MHz,
60kHz Output



Figure 214: 16QAM 10MHz B.W.; 2155.0MHz,
15kHz Output



Figure 215: 16QAM 10MHz B.W.; 2155.0MHz,
30kHz Output



Figure 216: 16QAM 10MHz B.W.; 2155.0MHz,
60kHz Output



Figure 217: 16QAM 10MHz B.W.; 2195.0MHz,
15kHz Output



Figure 218: 16QAM 10MHz B.W.; 2195.0MHz,
30kHz Output



Figure 219: 16QAM 10MHz B.W.; 2195.0MHz,
60kHz Output



Figure 220: 16QAM 15MHz B.W.; 2117.5MHz,
15kHz Output



Figure 221: 16QAM 15MHz B.W.; 2117.5MHz,
30kHz Output



Figure 222: 16QAM 15MHz B.W.; 2117.5MHz,
60kHz Output



Figure 223: 16QAM 15MHz B.W.; 2155.0MHz, 15kHz Output



Figure 224: 16QAM 15MHz B.W.; 2155.0MHz, 30kHz Output



Figure 225: 16QAM 15MHz B.W.; 2155.0MHz, 60kHz Output



Figure 226: 16QAM 15MHz B.W.; 2192.5MHz, 15kHz Output



Figure 227: 16QAM 15MHz B.W.; 2192.5MHz, 30kHz Output



Figure 228: 16QAM 20MHz B.W.; 2120.0MHz, 15kHz Output



Figure 229: 16QAM 20MHz B.W.; 2120.0MHz, 30kHz Output

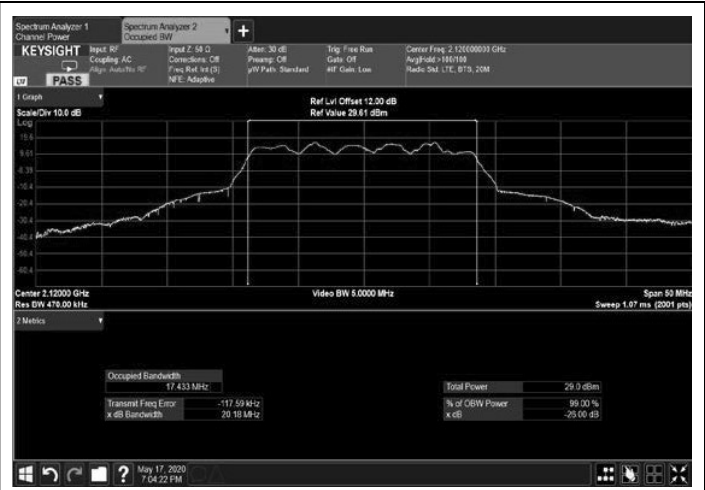


Figure 230: 16QAM 20MHz B.W.; 2120.0MHz, 60kHz Output



Figure 231: 16QAM 20MHz B.W.; 2155.0MHz, 15kHz Output



Figure 232: 16QAM 20MHz B.W.; 2155.0MHz, 30kHz Output



Figure 233: 16QAM 20MHz B.W.; 2155.0MHz, 60kHz Output



Figure 234: 16QAM 20MHz B.W.; 2190.0MHz, 15kHz Output

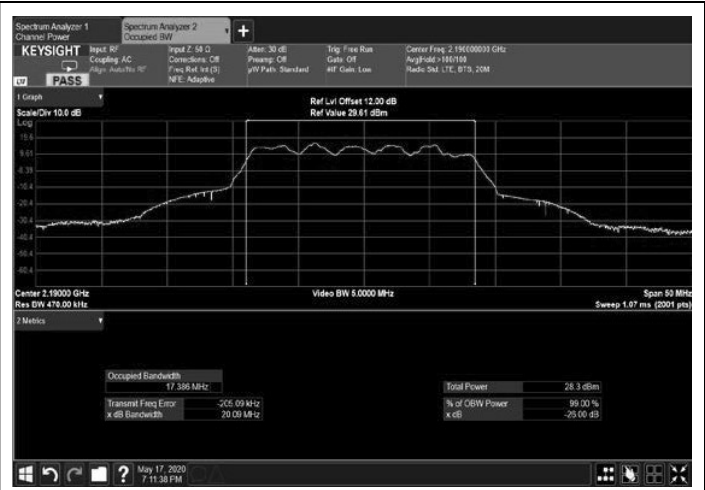




Figure 241: 64QAM 5MHz B.W.; 2197.5MHz,
15kHz Output



Figure 242: 64QAM 5MHz B.W.; 2197.5MHz,
15kHz Output



Figure 243: 64QAM 10MHz B.W.; 2115.0MHz,
15kHz Output



Figure 244: 64QAM 10MHz B.W.; 2115.0MHz,
30kHz Output



Figure 245: 64QAM 10MHz B.W.; 2115.0MHz,
60kHz Output

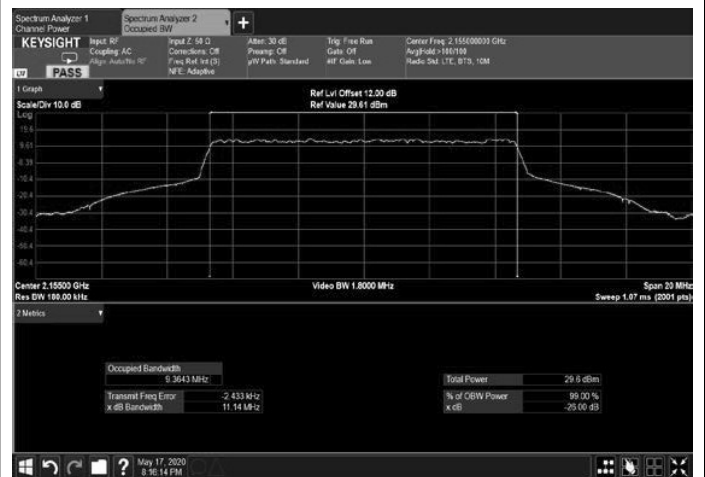


Figure 246: 64QAM 10MHz B.W.; 2155.0MHz,
15kHz Output

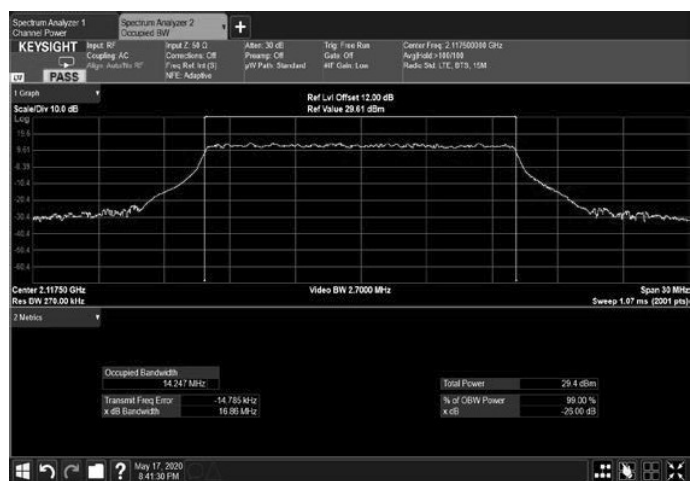
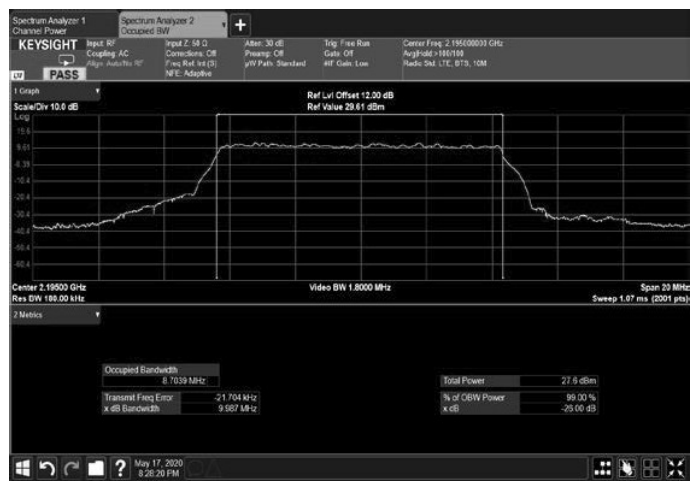




Figure 253: 64QAM 15MHz B.W.; 2117.5MHz,
30kHz Output

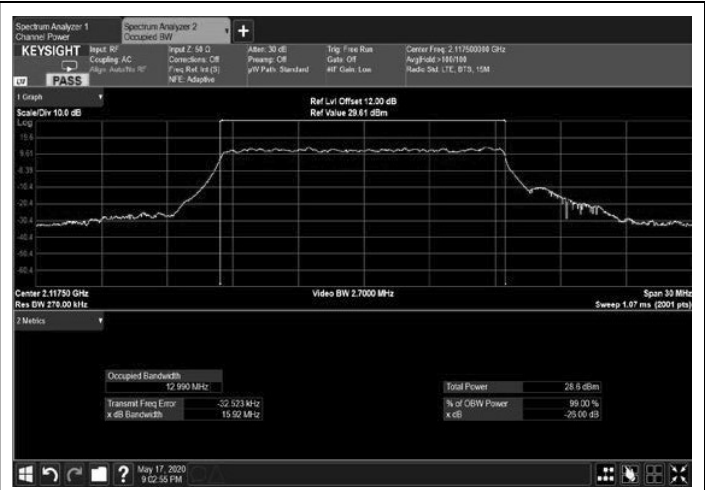


Figure 254: 64QAM 15MHz B.W.; 2117.5MHz,
60kHz Output

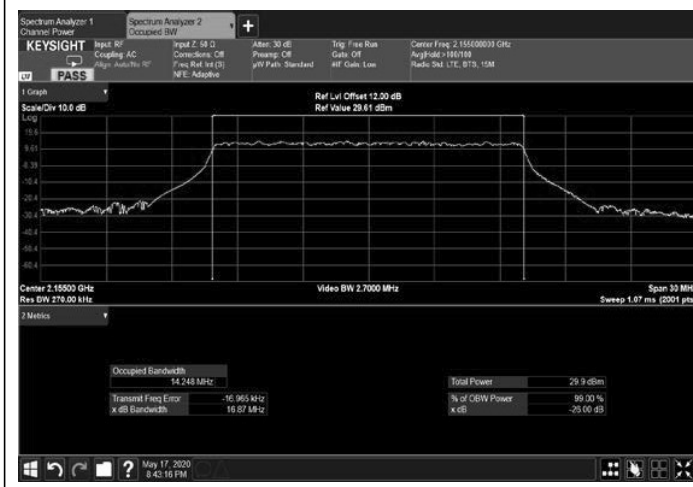


Figure 255: 64QAM 15MHz B.W.; 2155.0MHz,
15kHz Output

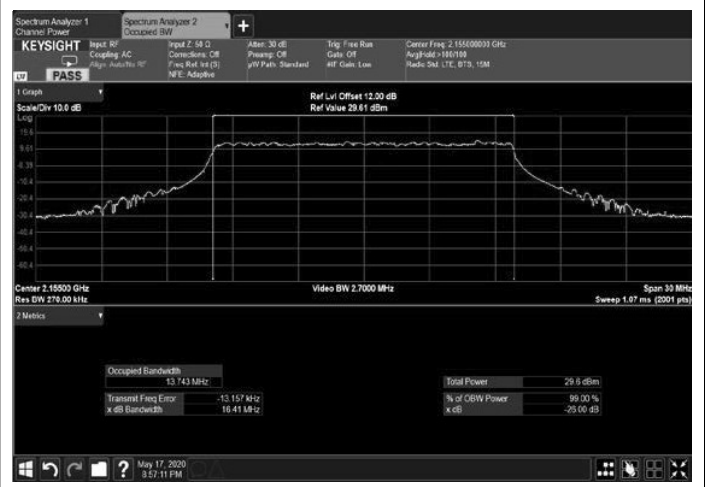


Figure 256: 64QAM 15MHz B.W.; 2155.0MHz,
30kHz Output



Figure 257: 64QAM 15MHz B.W.; 2155.0MHz,
60kHz Output

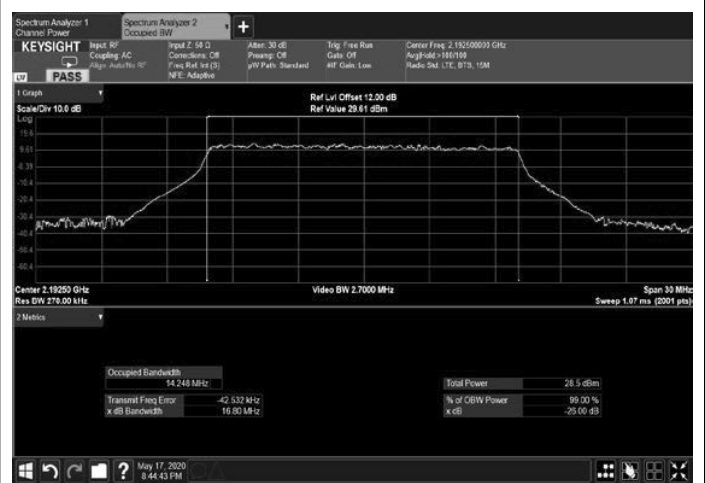
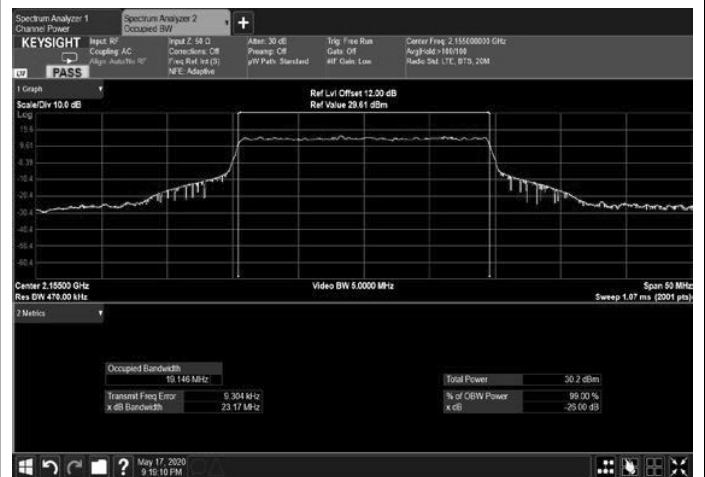
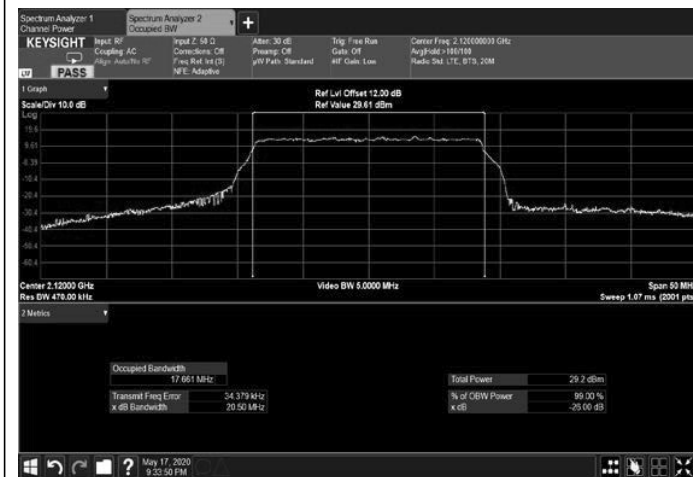
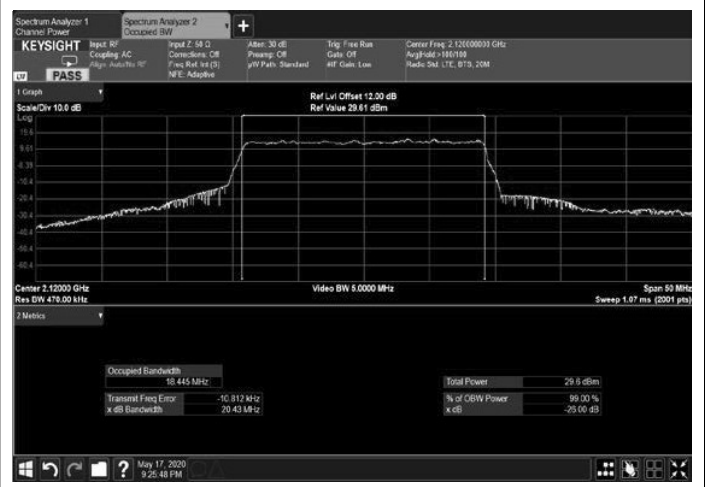
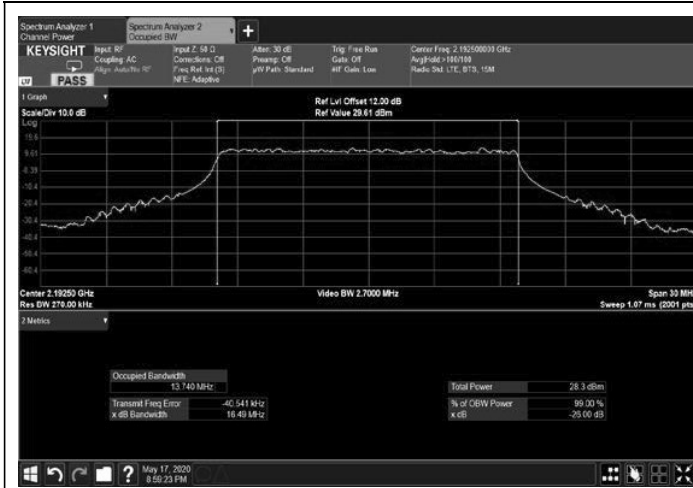


Figure 258: 64QAM 15MHz B.W.; 2192.5MHz,
15kHz Output



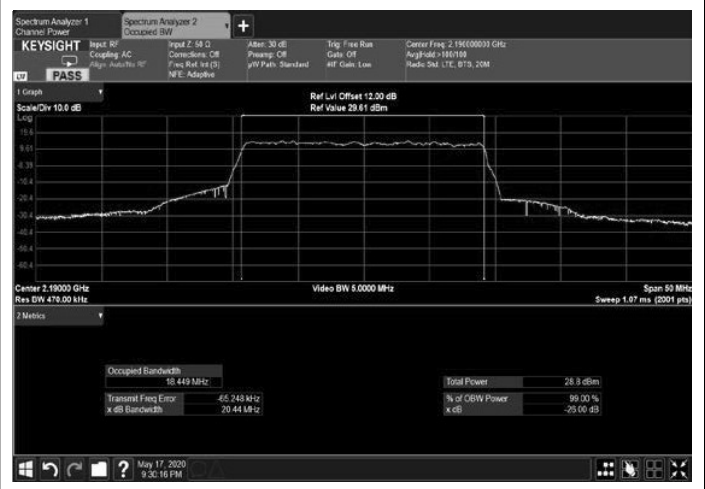






Figure 277: 256QAM 10MHz B.W.; 2115.0MHz, 30kHz Output



Figure 278: 256QAM 10MHz B.W.; 2115.0MHz, 60kHz Output



Figure 279: 256QAM 10MHz B.W.; 2155.0MHz, 15kHz Output



Figure 280: 256QAM 10MHz B.W.; 2155.0MHz, 30kHz Output



Figure 281: 256QAM 10MHz B.W.; 2155.0MHz, 60kHz Output



Figure 282: 256QAM 10MHz B.W.; 2195.0MHz, 15kHz Output



Figure 283: 256QAM 10MHz B.W.; 2195.0MHz, 30kHz Output



Figure 284: 256QAM 10MHz B.W.; 2195.0MHz, 60kHz Output



Figure 285: 256QAM 15MHz B.W.; 2117.5MHz, 15kHz Output

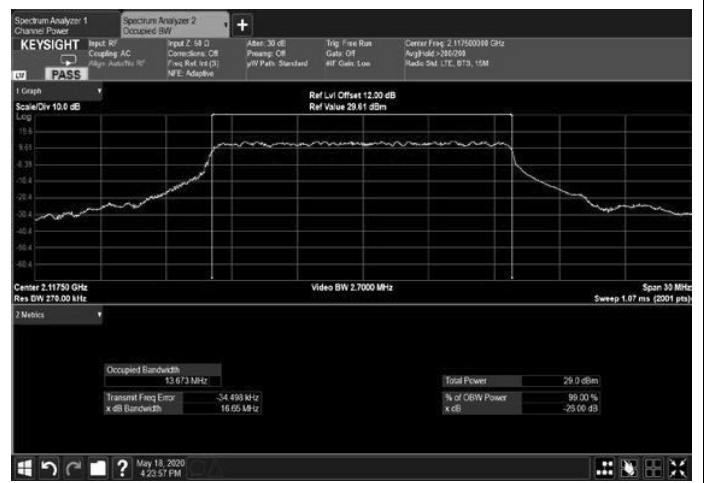


Figure 286: 256QAM 15MHz B.W.; 2117.5MHz, 30kHz Output



Figure 287: 256QAM 15MHz B.W.; 2117.5MHz, 60kHz Output

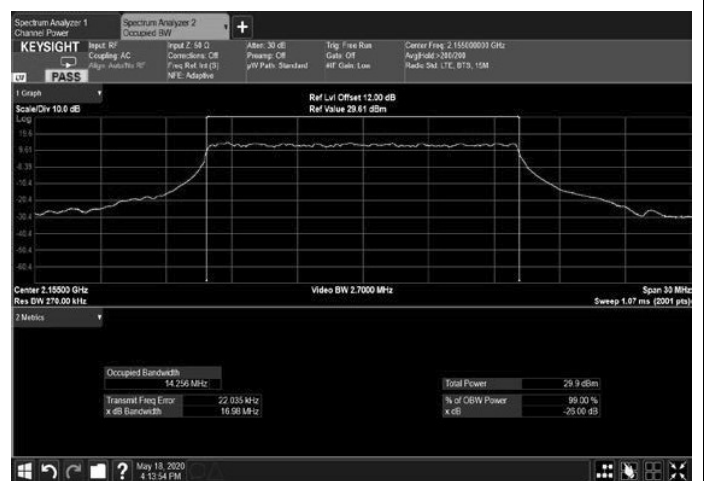


Figure 288: 256QAM 15MHz B.W.; 2155.0MHz, 15kHz Output



Figure 289: 256QAM 15MHz B.W.; 2155.0MHz, 30kHz Output



Figure 290: 256QAM 15MHz B.W.; 2155.0MHz, 60kHz Output

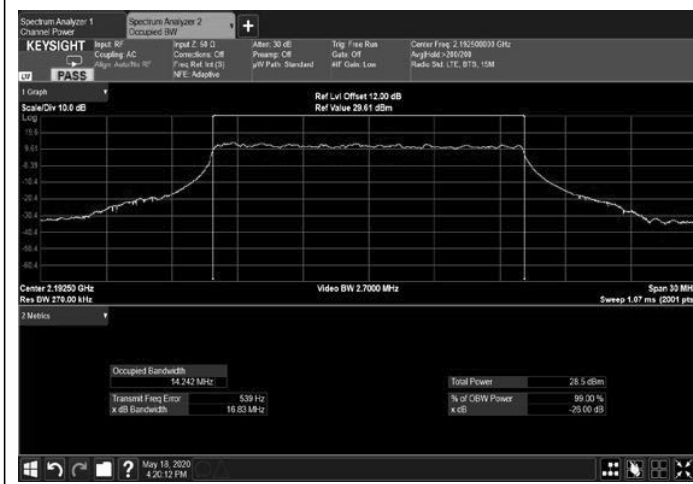


Figure 291: 256QAM 15MHz B.W.; 2192.5MHz, 15kHz Output

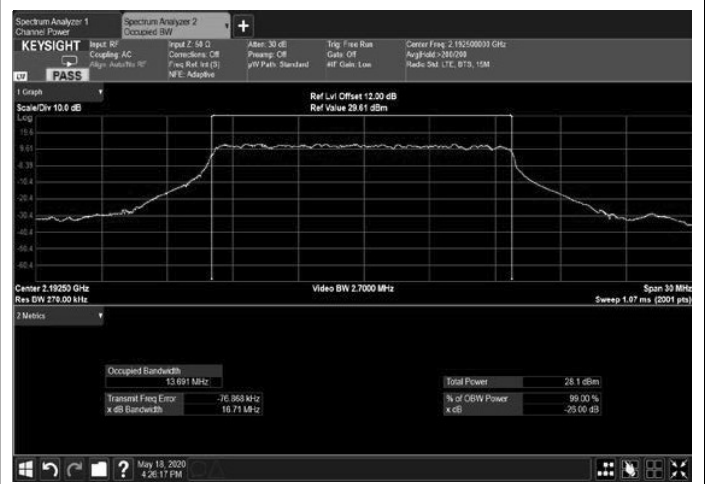


Figure 292: 256QAM 15MHz B.W.; 2192.5MHz, 30kHz Output



Figure 293: 256QAM 15MHz B.W.; 2192.5MHz, 60kHz Output



Figure 294: 256QAM 20MHz B.W.; 2120.0MHz, 15kHz Output



Figure 295: 256QAM 20MHz B.W.; 2120.0MHz, 30kHz Output



Figure 296: 256QAM 20MHz B.W.; 2120.0MHz, 60kHz Output



Figure 297: 256QAM 20MHz B.W.; 2155.0MHz, 15kHz Output



Figure 298: 256QAM 20MHz B.W.; 2155.0MHz, 30kHz Output



Figure 299: 256QAM 20MHz B.W.; 2155.0MHz, 60kHz Output



Figure 300: 256QAM 20MHz B.W.; 2190.0MHz, 15kHz Output



Figure 301: 256QAM 20MHz B.W.; 2190.0MHz, 30kHz Output



Figure 302: 256QAM 20MHz B.W.; 2190.0MHz, 60kHz Output



5.5 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
Sarokal Signal Generator	Mentor® (A Siemens Business)	X-Step-V	1904008	*	*
30 dB Attenuator	MCL	BW-S30W5	533	24 December 2019	24 December 2020

Table 11 Test Equipment Used

* New test equipment, purchased during January 2020.