Modulation	Bandwidth	Sub Carrier	Operation Frequency	0.1% PAPR	Limit
	(MHz)	(kHz)	(MHz)	(dB)	(dB)
16QAM	5	15	730.5	11.63	13.0
		30		8.54	
		15	751.5	10.14	
		30		8.34	
		15	765.5	10.32	
		30		8.49	
	10	15	733.0	12.99	
		30		11.64	
		15	751.5	11.87	
		30		11.07	
		15	763.0	9.29	
		30		8.68	
	15	15	735.5	10.65	
		30		11.03	

Table 19 Test Results Peak to Average Power Ratio 16 QAM

Modulation	Bandwidth	Sub Carrier	Operation Frequency	0.1% PAPR	Limit
	(MHz)	(kHz)	(MHz)	(dB)	(dB)
64QAM	5	15	730.5	8.50	13.0
		30		8.23	
		15	751.5	8.14	
		30		8.40	
		15	765.5	8.30	
		30		7.99	
	10	15	733.0	8.41	
		30		8.39	
		15	751.5	8.26	
		30		8.45	
		15	763.0	8.43	
		30		8.90	
	15	15	735.5	8.68	
		30		9.22	

Table 20 Test Results Peak to Average Power Ratio 64 QAM

Modulation	Bandwidth	Sub Carrier	Operation Frequency	0.1% PAPR	Limit
	(MHz)	(kHz)	(MHz)	(dB)	(dB)
256QAM	5	15	730.5	8.92	13.0
		30		8.60	
		15	751.5	8.28	
		30		8.20	
		15	765.5	8.38	
		30		8.40	
	10	15	733.0	8.57	
		30		9.16	
		15	751.5	8.60	
		30		8.44	
		15	763.0	9.70	
		30		9.64	
	15	15	735.5	10.14	
		30		10.84	

Table 21 Test Results Peak to Average Power Ratio 256 QAM

Modulation	Bandwidth	Sub Carrier	Operation Frequency	0.1% PAPR	Limit
	(MHz)	(kHz)	(MHz)	(dB)	(dB)
QPSK	5	15	730.5	9.25	13.0
		30		9.32	
		15	751.5	8.71	
		30		8.68	
		15	765.5	9.32	
		30		8.85	
	10	15	733.0	8.78	
		30		8.86	
		15	751.5	8.71	
		30		8.99	
		15	763.0	8.46	
		30		8.35	
	15	15	735.5	10.72	
		30		11.29	

Table 22 Test Results Peak to Average Power Ratio QPSK

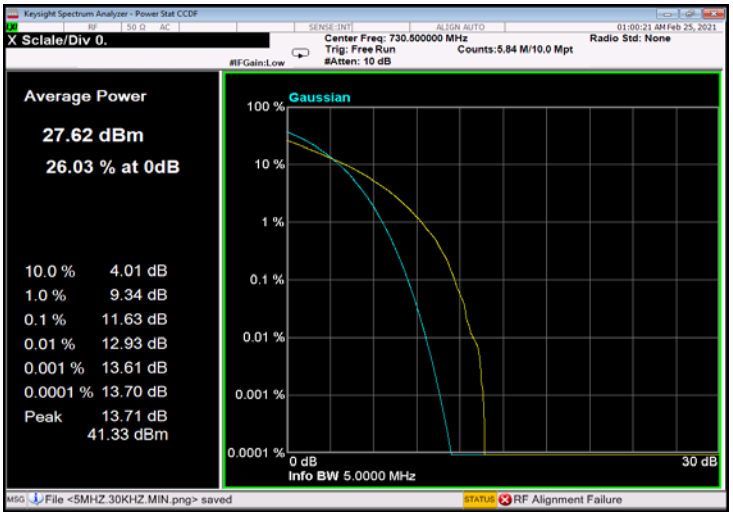

Figure 140: 16QAM 5MHz B.W; 730.5MHz, 15kHz

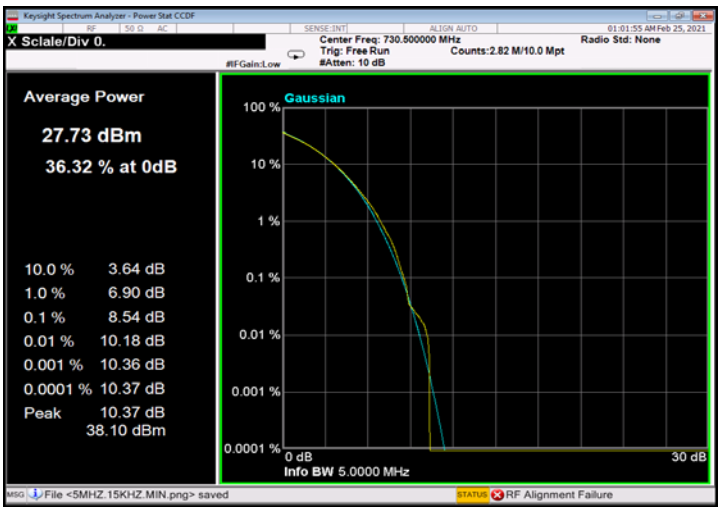

Figure 141: 16QAM 5MHz B.W; 730.5MHz, 30kHz

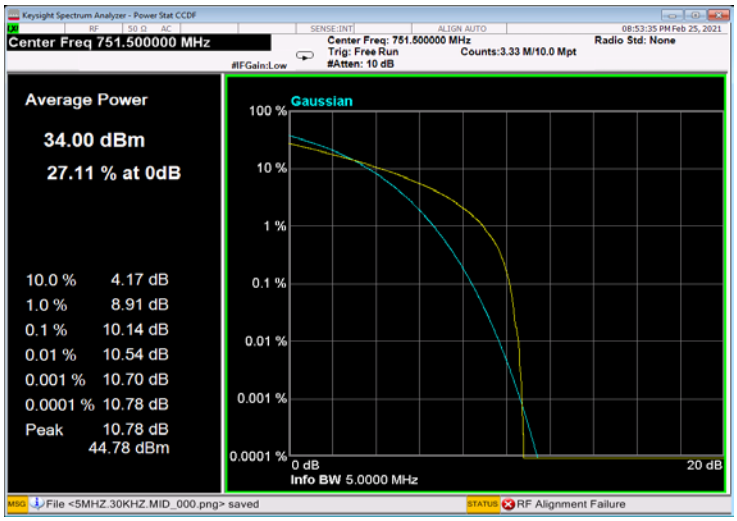

Figure 142: 16QAM 5MHz B.W; 751.5MHz, 15kHz

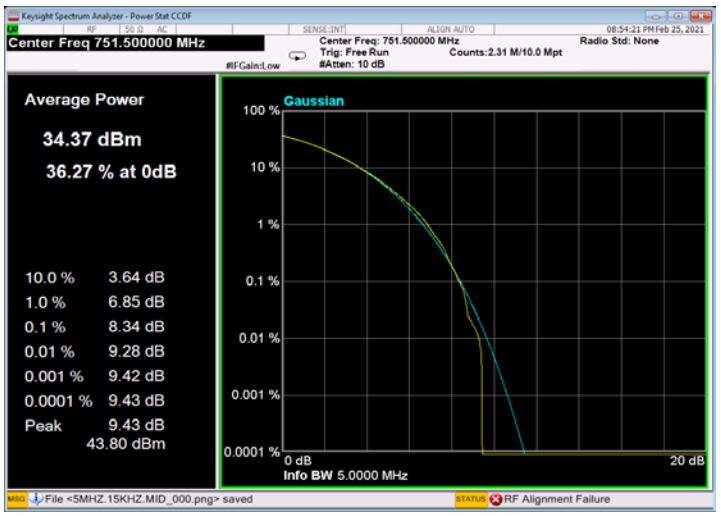

Figure 143: 16QAM 5MHz B.W; 751.5MHz, 30kHz

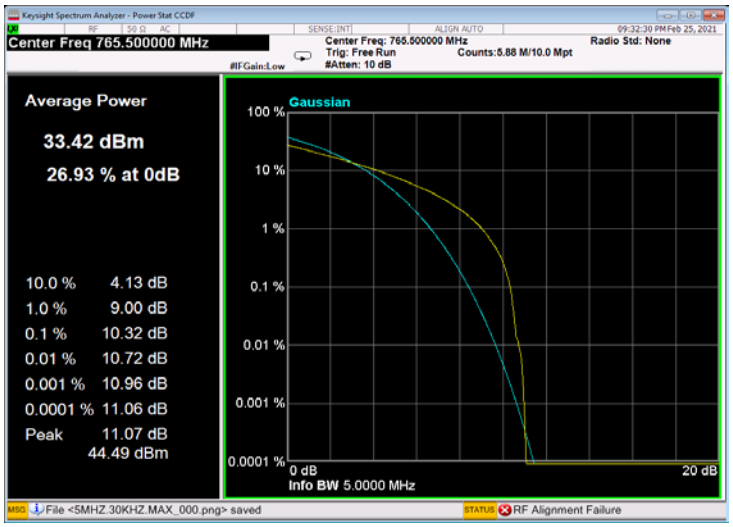

Figure 144: 16QAM 5MHz; 765.5MHz, 15kHz

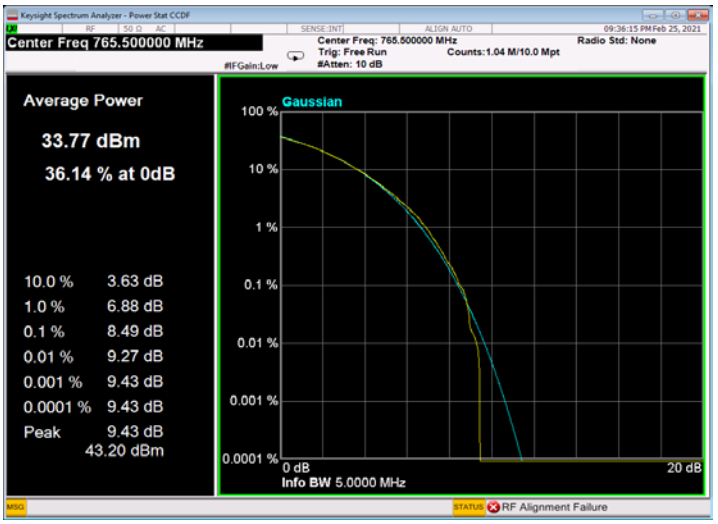

Figure 145: 16QAM 5MHz; 765.5MHz, 30kHz

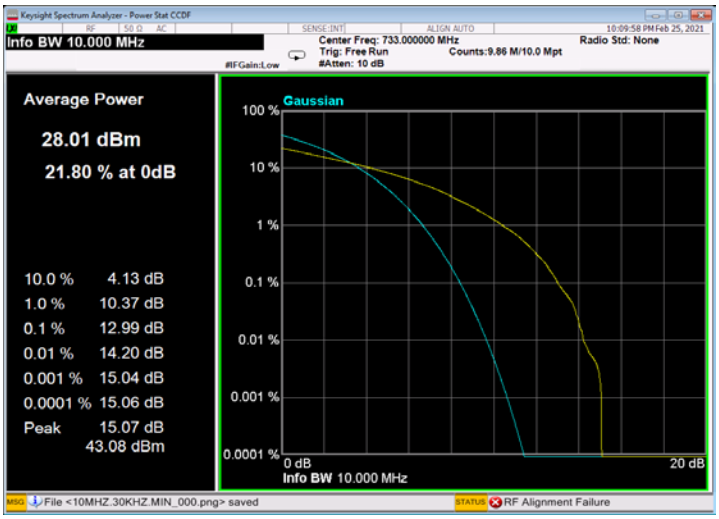

Figure 146: 16QAM 10MHz B.W; 733MHz, 15kHz

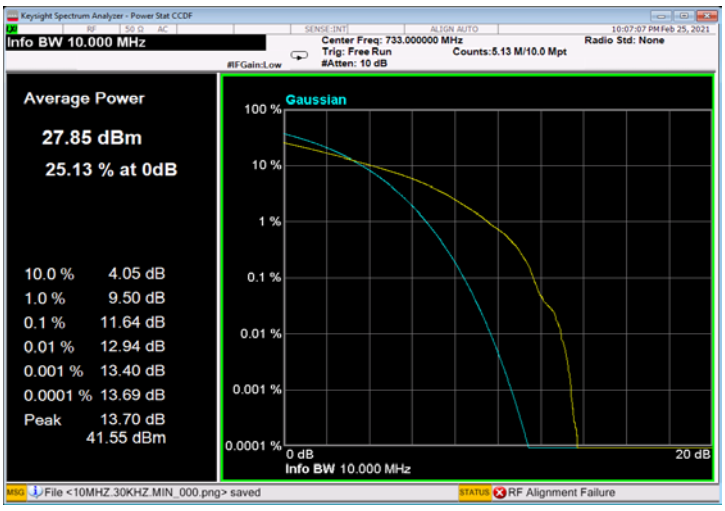

Figure 147: 16QAM 10MHz B.W; 733MHz, 30kHz

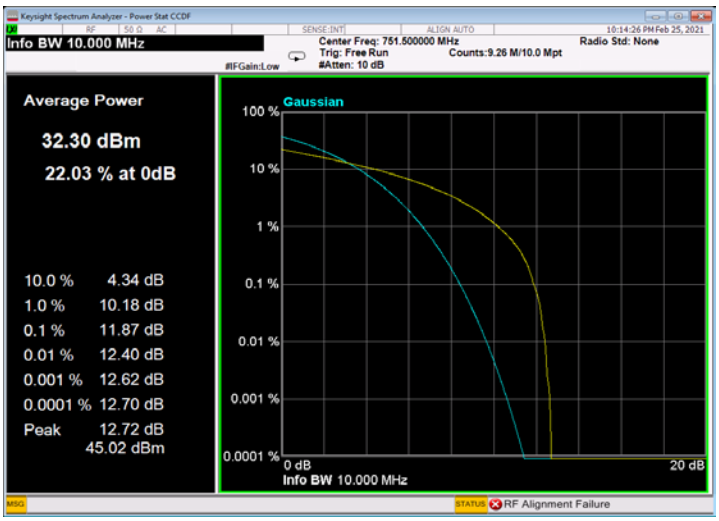

Figure 148: 16QAM 10MHz B.W; 751.5MHz, 15kHz

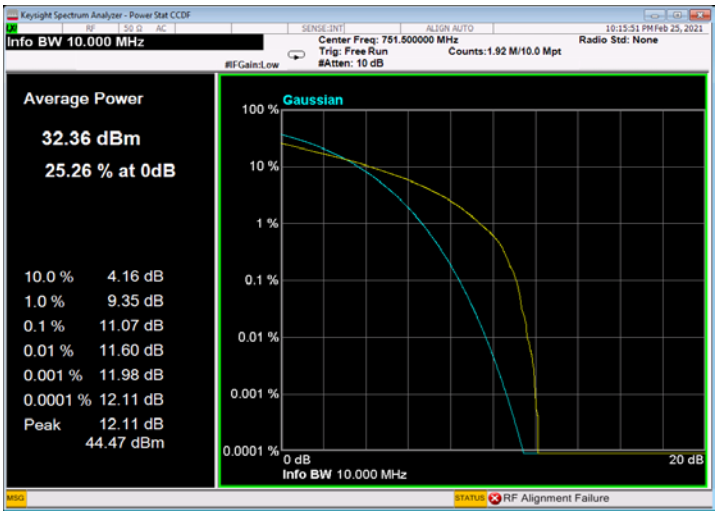

Figure 149: 16QAM 10MHz B.W; 751.5MHz, 30kHz

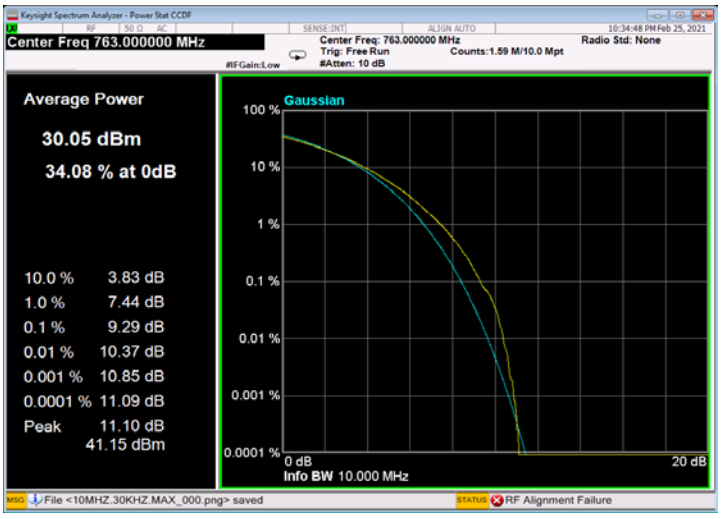

Figure 150: 16QAM 10MHz B.W; 763MHz, 15kHz

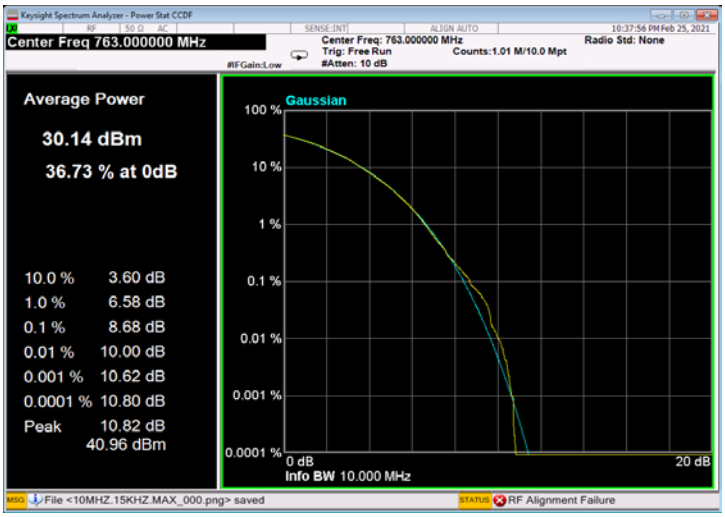

Figure 151: 16QAM 10MHz B.W; 763MHz, 30kHz

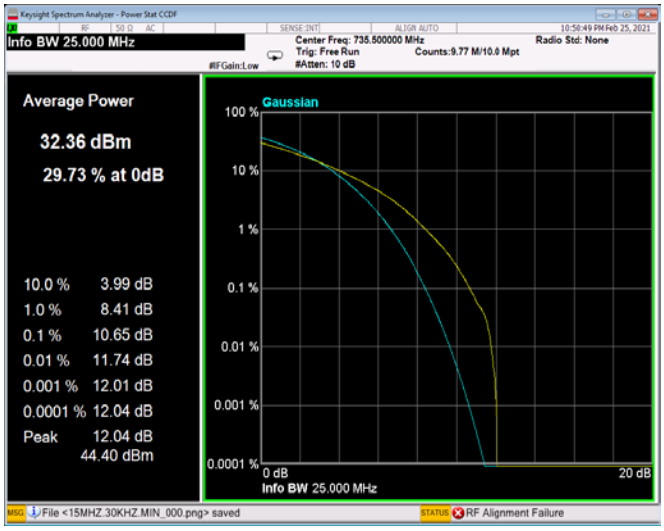

Figure 152: 16QAM 15MHz B.W; 735.5MHz, 15kHz

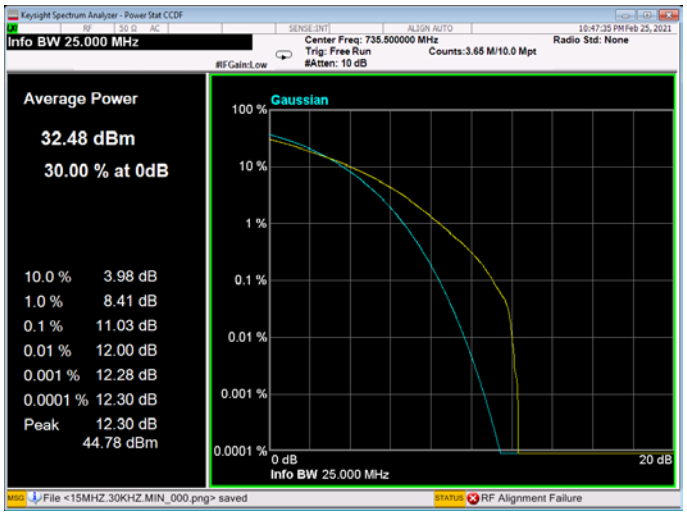

Figure 153: 16QAM 15MHz B.W; 735.5MHz, 30kHz

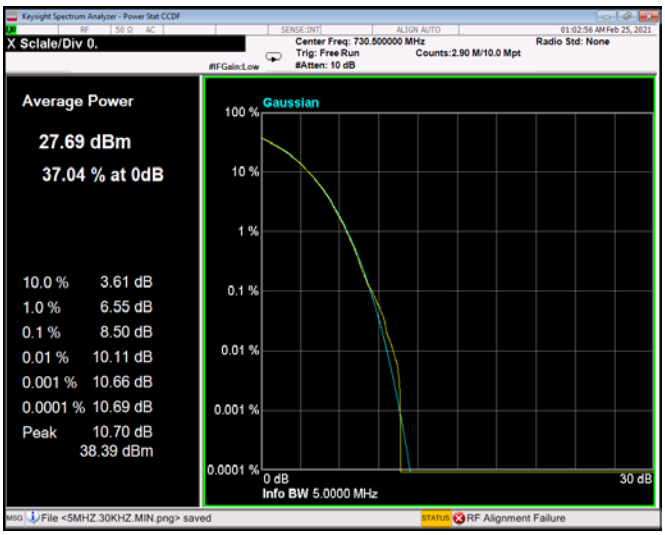

Figure 154: 64QAM 5MHz B.W; 730.5MHz, 15kHz

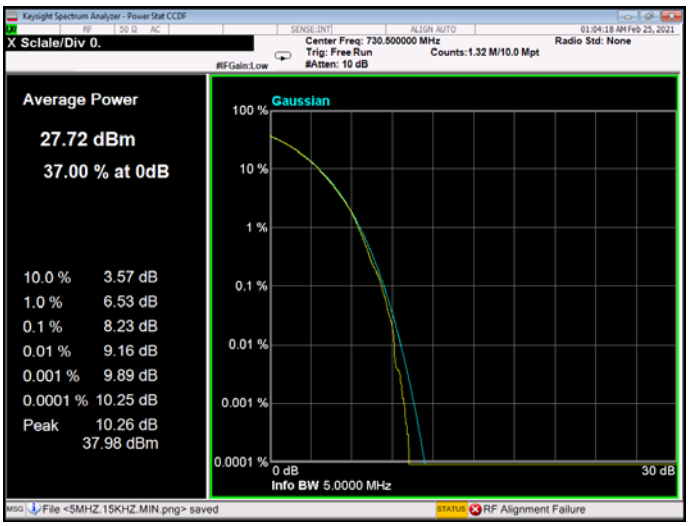

Figure 155: 64QAM 5MHz B.W; 730.5MHz, 30kHz

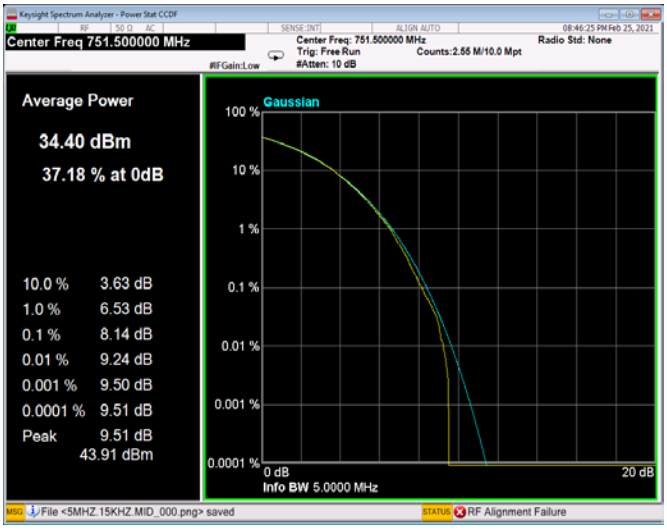

Figure 156: 64QAM 5MHz B.W; 751.5MHz, 15kHz

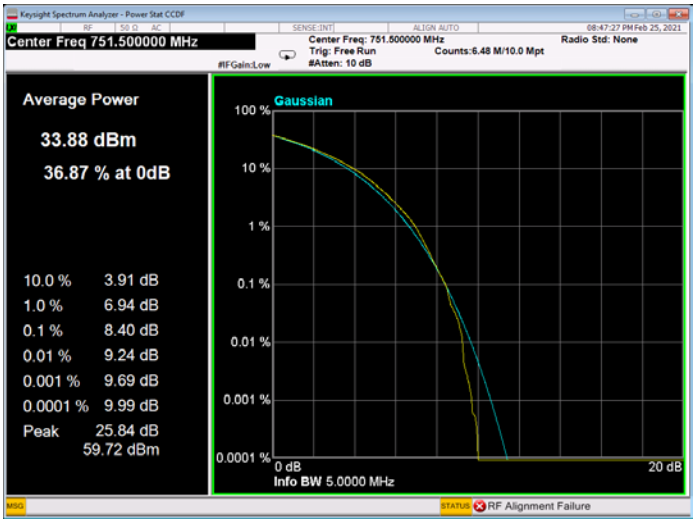

Figure 157: 64QAM 5MHz B.W; 751.5MHz, 30kHz

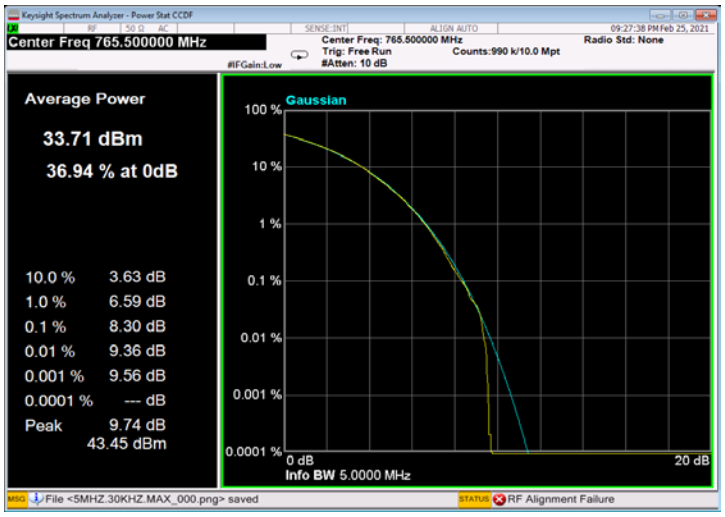

Figure 158: 64QAM 5MHz; 765.5MHz, 15kHz

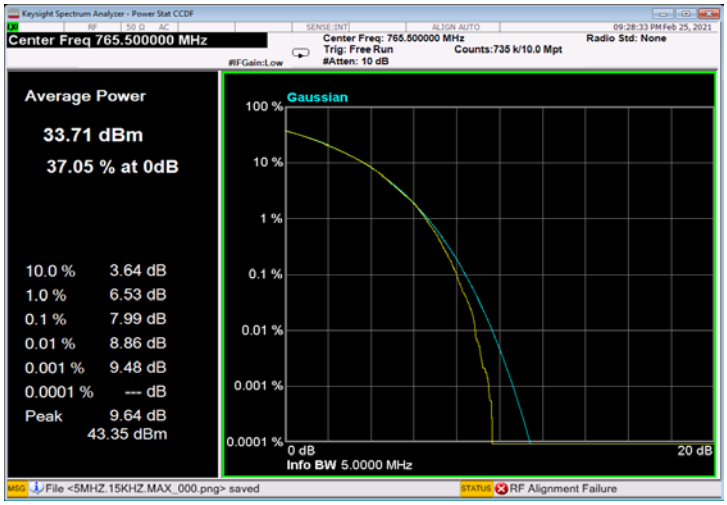

Figure 159: 64QAM 5MHz; 765.5MHz, 30kHz

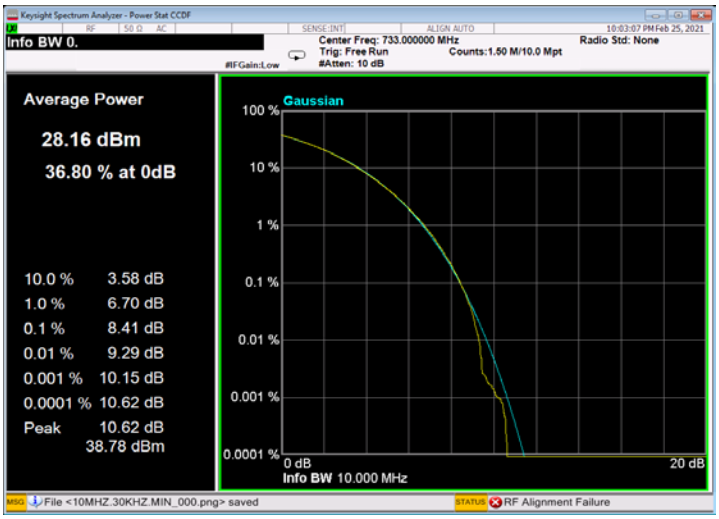

Figure 160: 64QAM 10MHz B.W; 733MHz, 15kHz

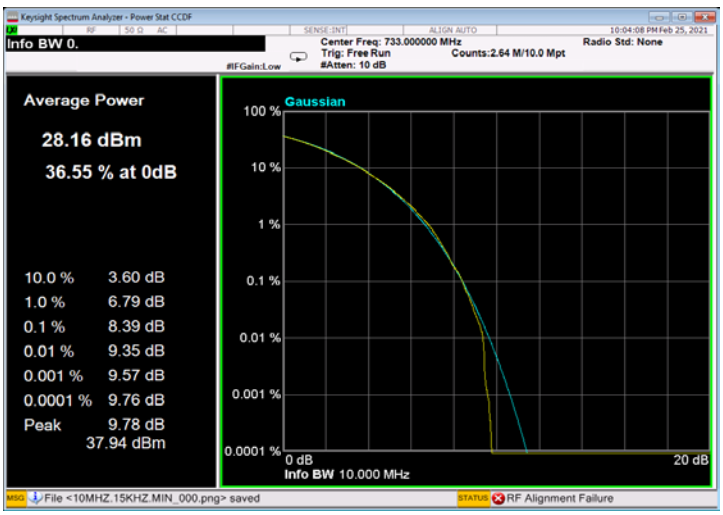

Figure 161: 64QAM 10MHz B.W; 733MHz, 30kHz

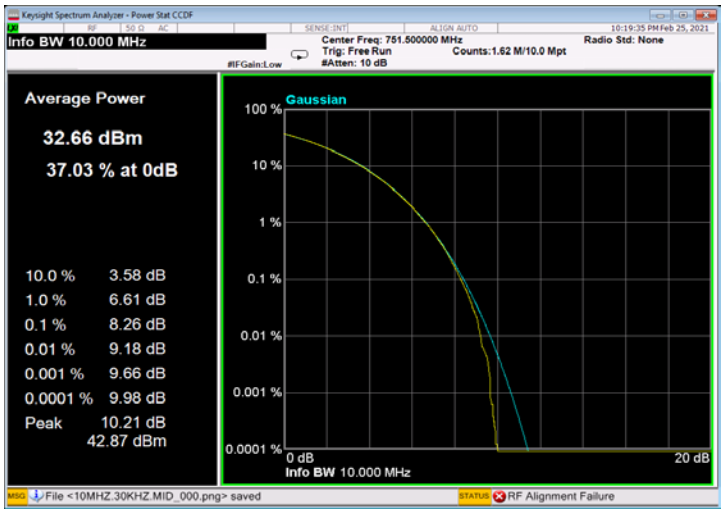

Figure 162: 64QAM 10MHz B.W; 751.5MHz, 15kHz

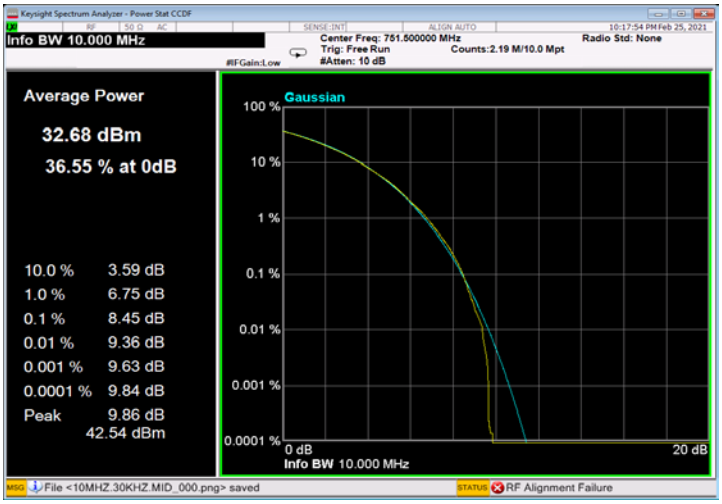

Figure 163: 64QAM 10MHz B.W; 751.5MHz, 30kHz

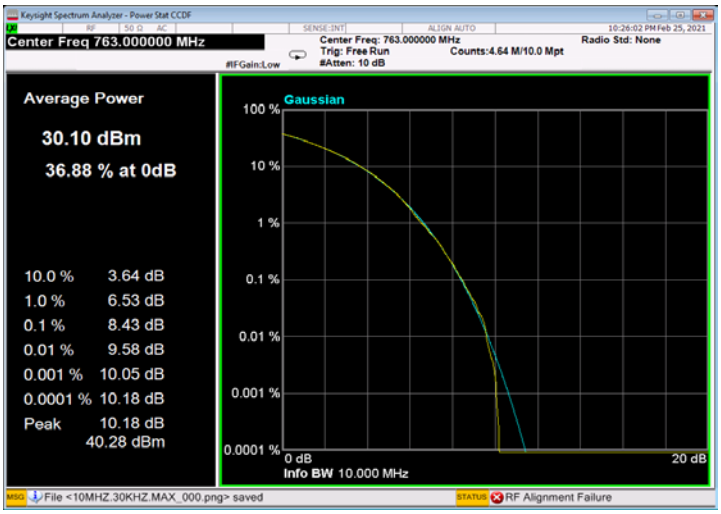

Figure 164: 64QAM 10MHz B.W; 763MHz, 15kHz

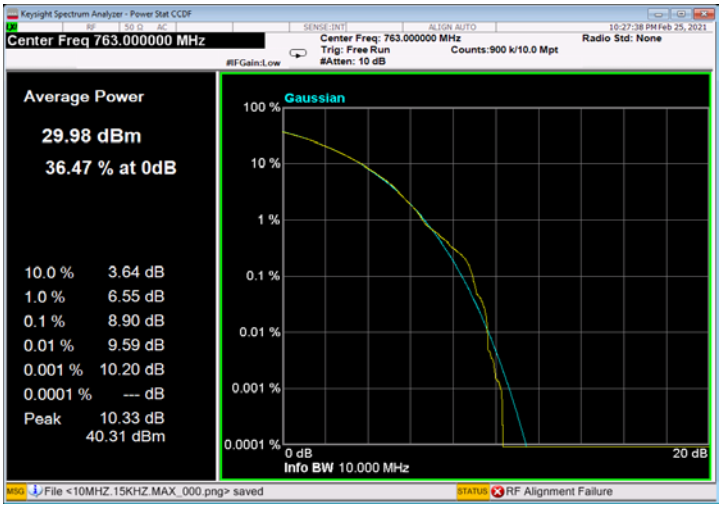

Figure 165: 64QAM 10MHz B.W; 763MHz, 30kHz

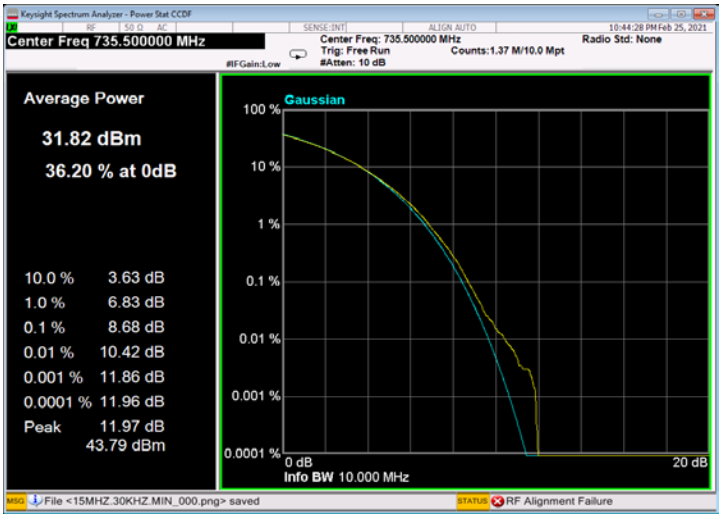

Figure 166: 64QAM 15MHz B.W; 735.5MHz, 15kHz

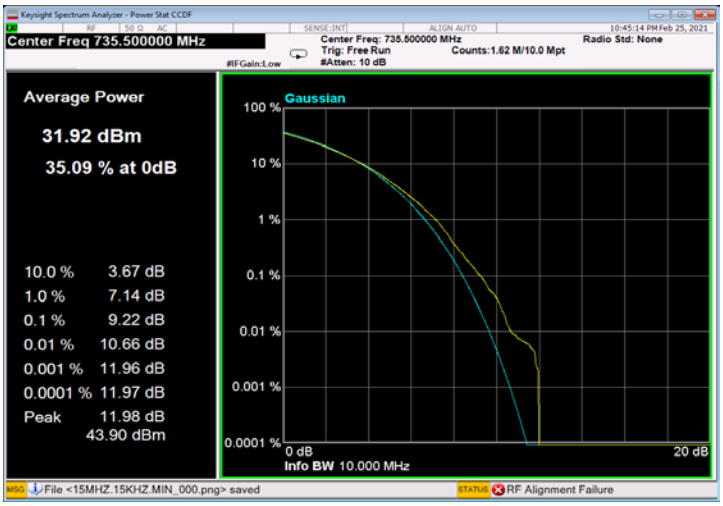

Figure 167: 64QAM 15MHz B.W; 735.5MHz, 30kHz

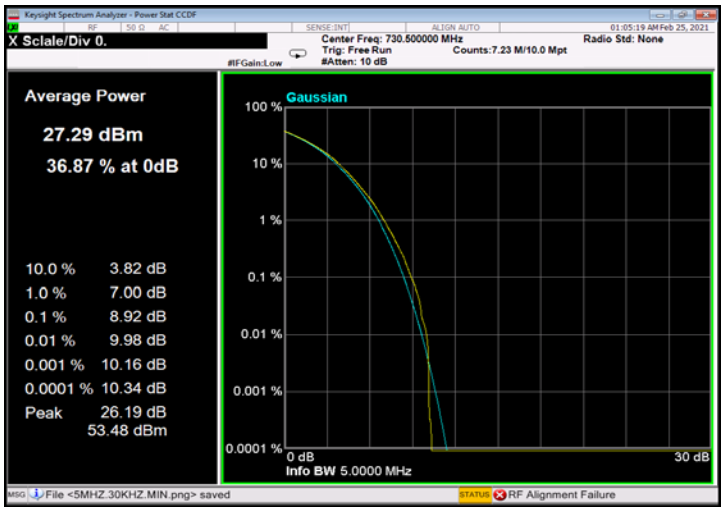

Figure 168: 256QAM 5MHz B.W; 730.5MHz, 15kHz

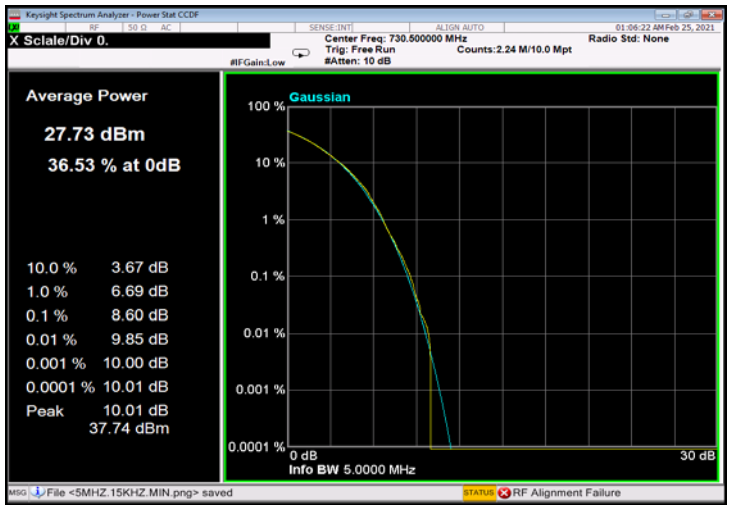

Figure 169: 256QAM 5MHz B.W; 730.5MHz, 30kHz

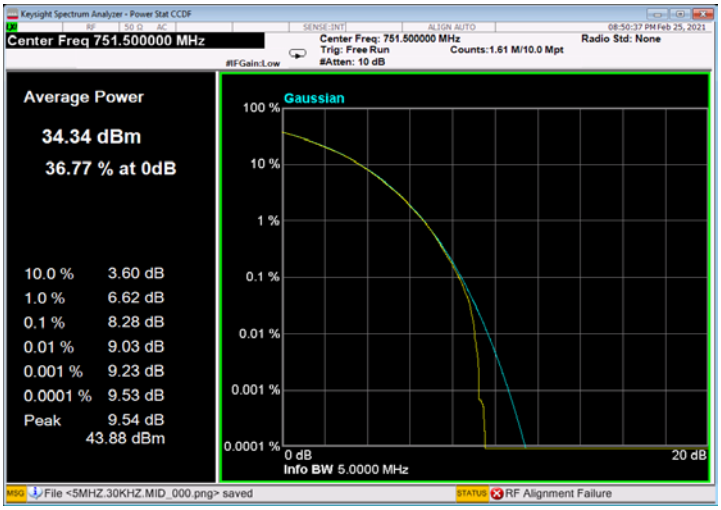

Figure 170: 256QAM 5MHz; 751.5MHz B.W, 15kHz

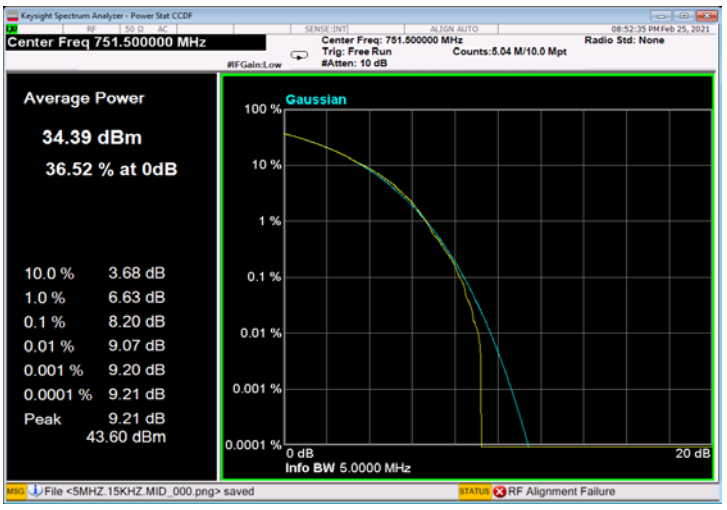

Figure 171: 256QAM 5MHz; 751.5MHz B.W, 30kHz

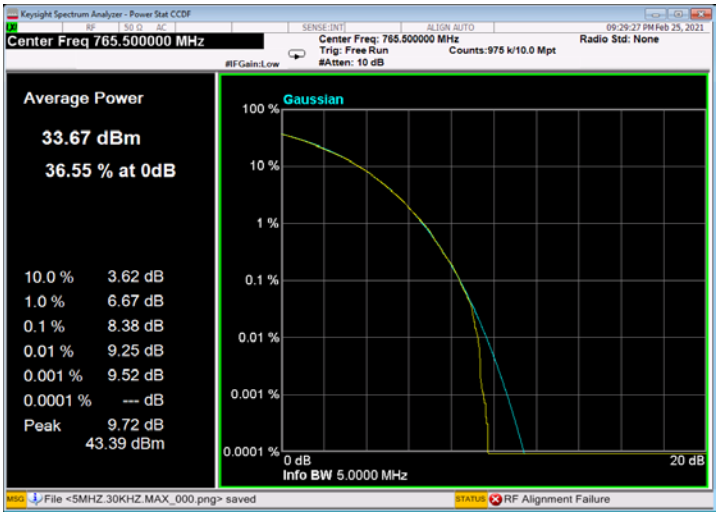

Figure 172: 256QAM 5MHz B.W; 765.5MHz, 15kHz

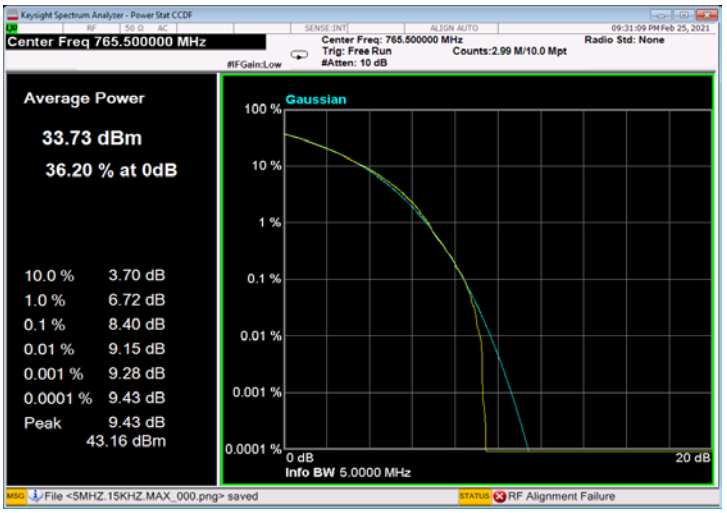

Figure 173: 256QAM 5MHz B.W; 765.5MHz, 30kHz

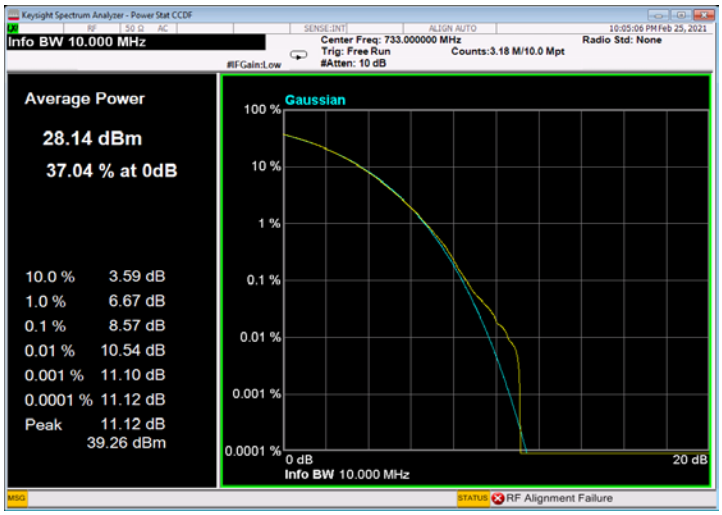

Figure 174: 256QAM 10MHz B.W; 733MHz, 15kHz

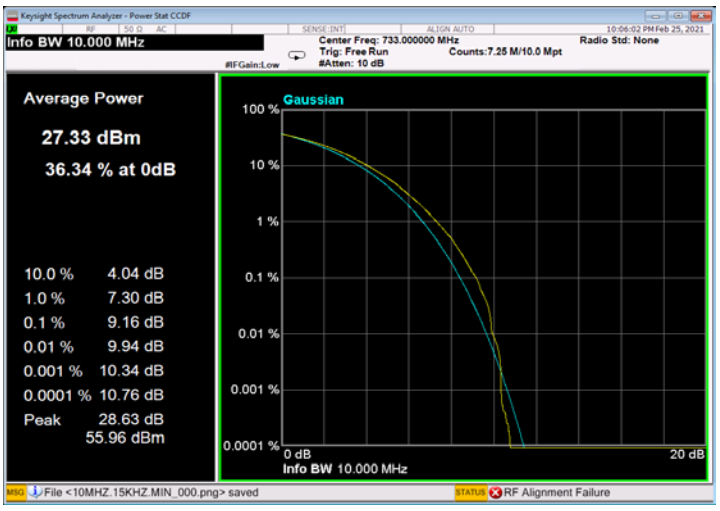

Figure 175: 256QAM 10MHz B.W; 733MHz, 30kHz

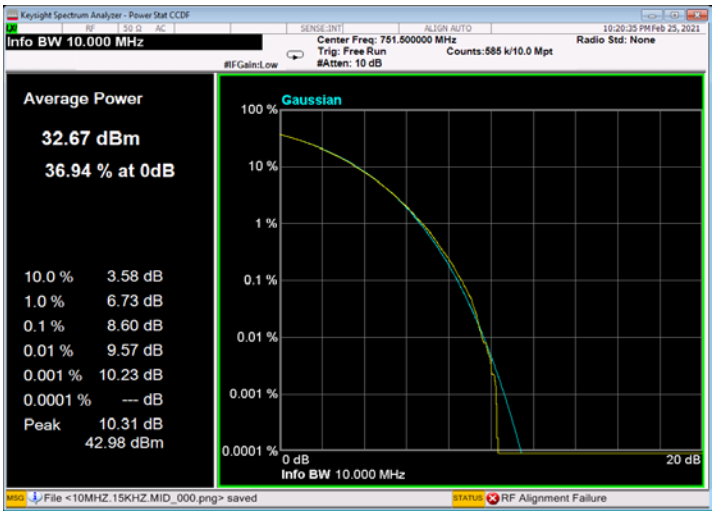

Figure 176: 256QAM 10MHz B.W; 751.5MHz, 15kHz

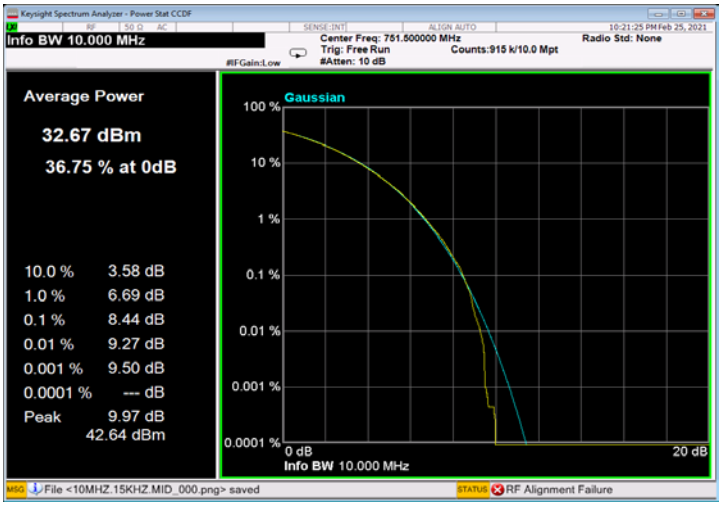

Figure 177: 256QAM 10MHz B.W; 751.5MHz, 30kHz

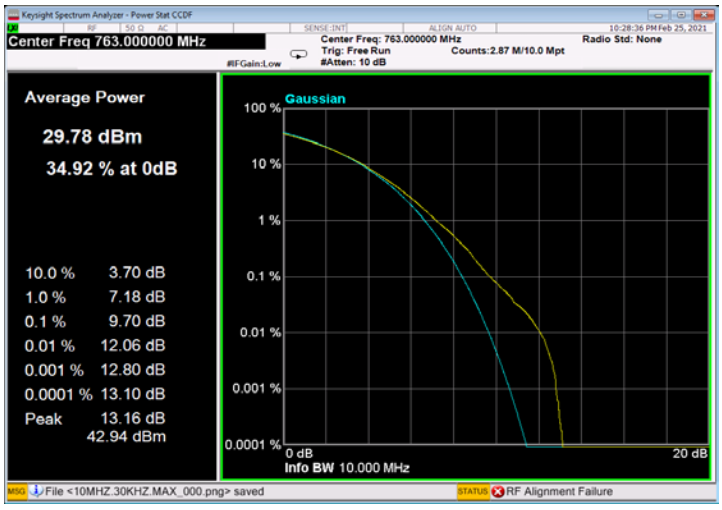

Figure 178: 256QAM 10MHz B.W; 763MHz, 15kHz

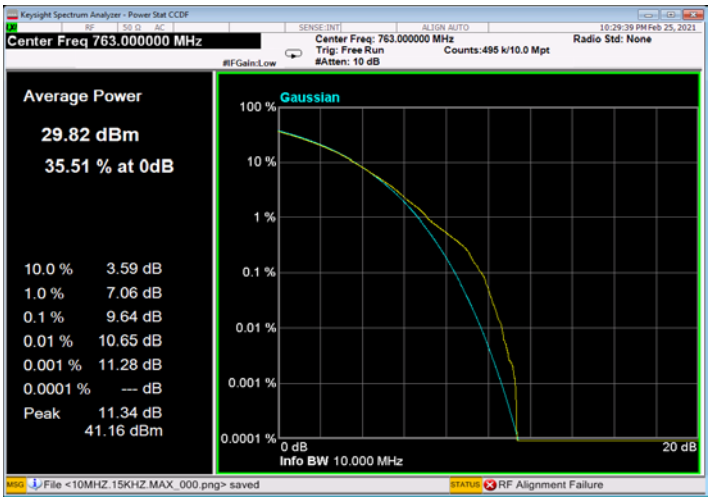

Figure 179: 256QAM 10MHz B.W; 763MHz, 30kHz

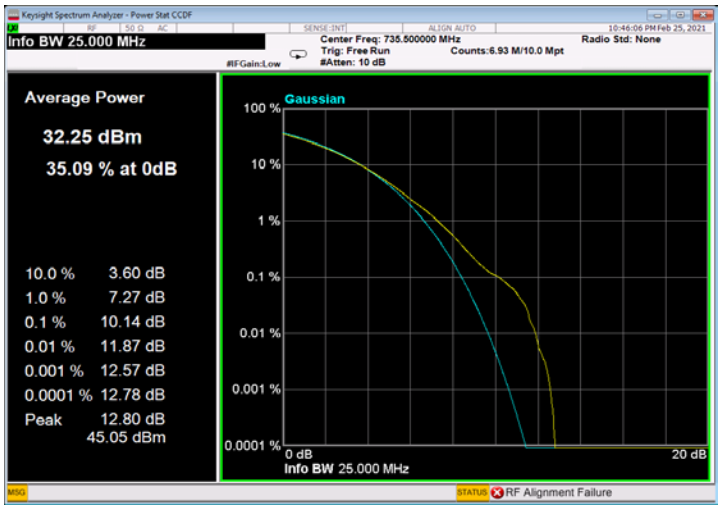

Figure 180: 256QAM 15MHz B.W; 735.5MHz, 15kHz

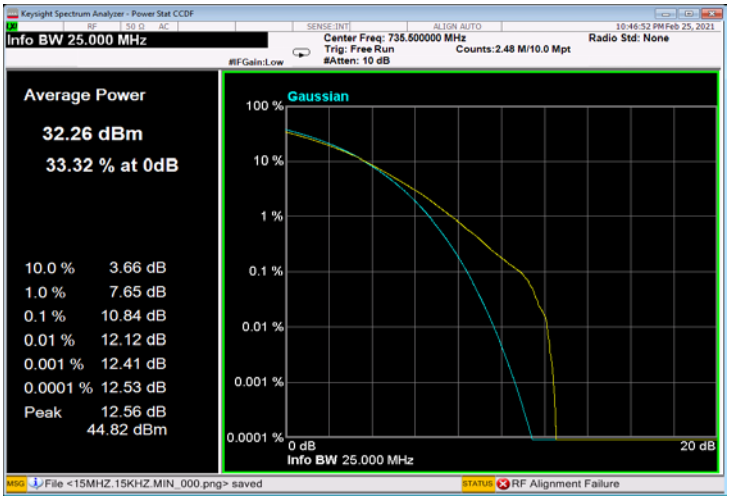

Figure 181: 256QAM 15MHz B.W; 735.5MHz, 30kHz

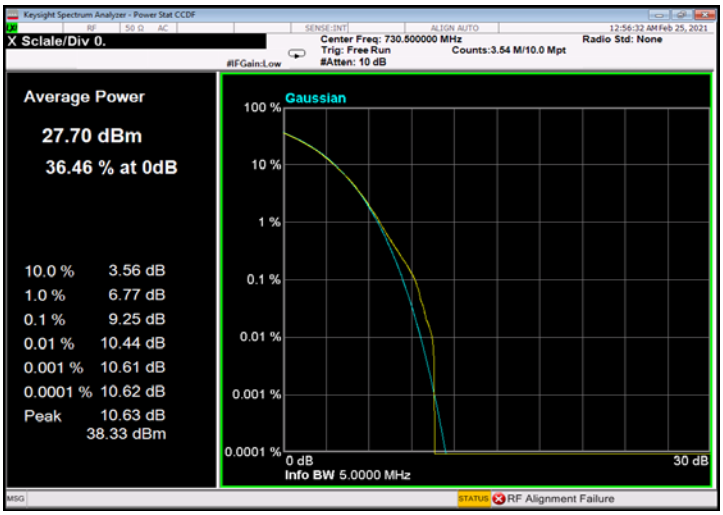

Figure 182: QPSK 5MHz B.W; 730.5MHz, 15kHz

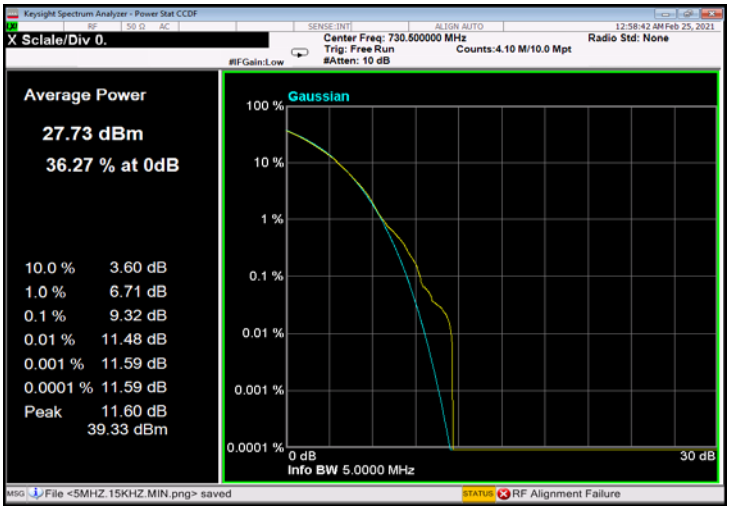

Figure 183: QPSK 5MHz B.W; 730.5MHz, 30kHz

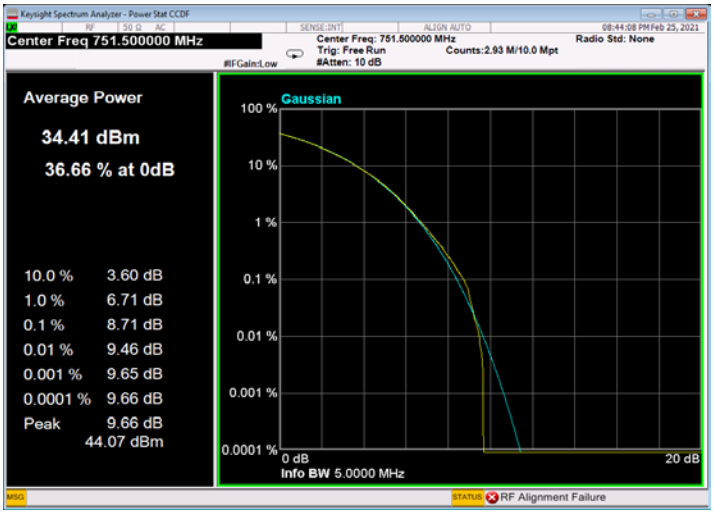

Figure 184: QPSK 5MHz B.W; 751.5MHz, 15kHz

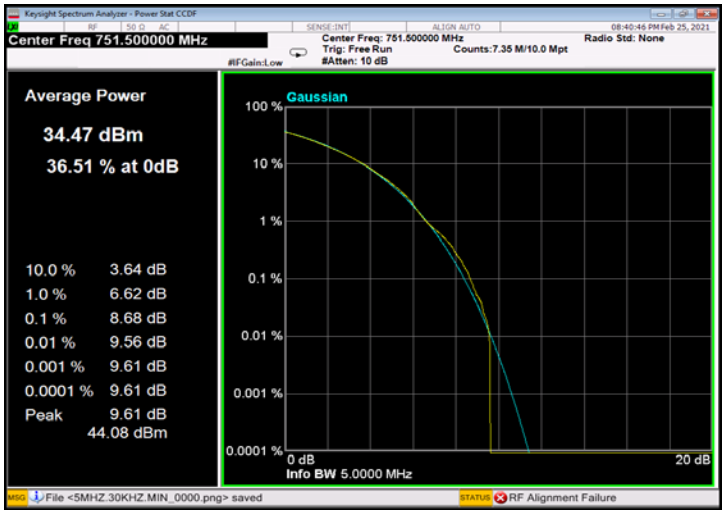

Figure 185: QPSK 5MHz B.W; 751.5MHz, 30kHz

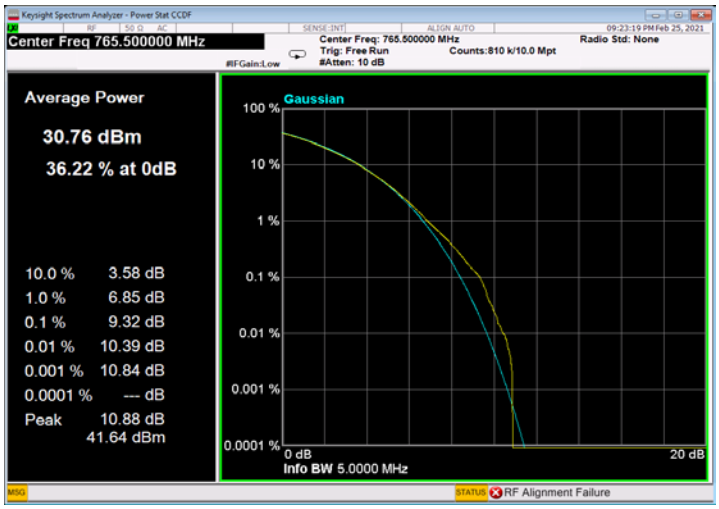

Figure 186: QPSK 5MHz B.W; 765.5MHz, 15kHz

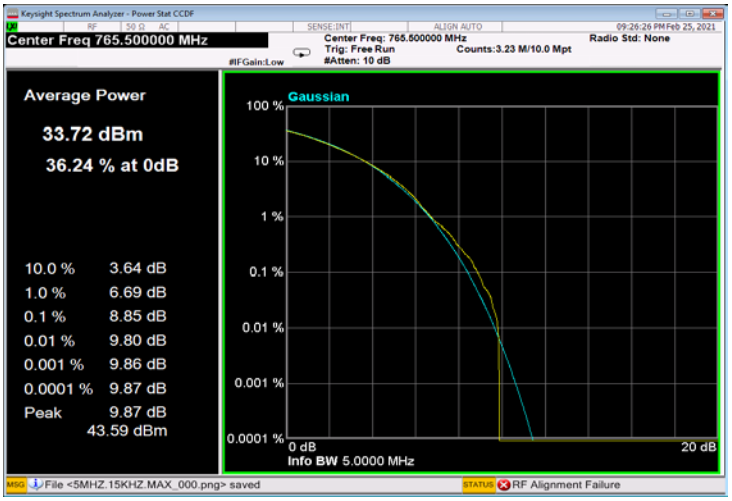

Figure 187: QPSK 5MHz B.W; 765.5MHz, 30kHz

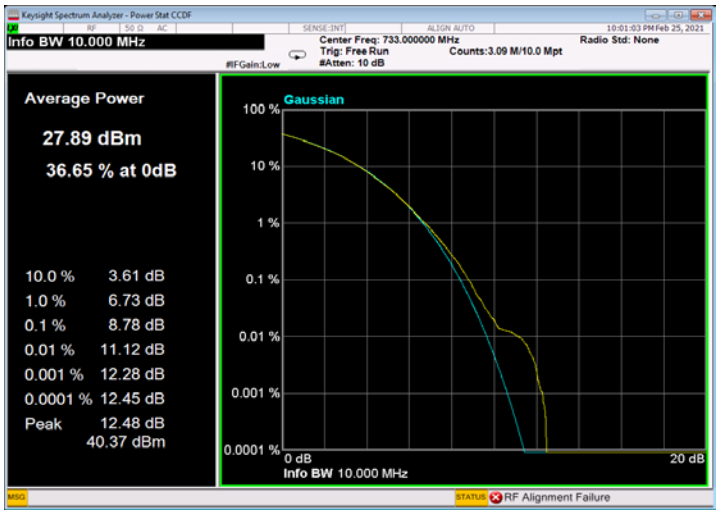

Figure 188: QPSK 10MHz B.W; 733MHz, 15kHz

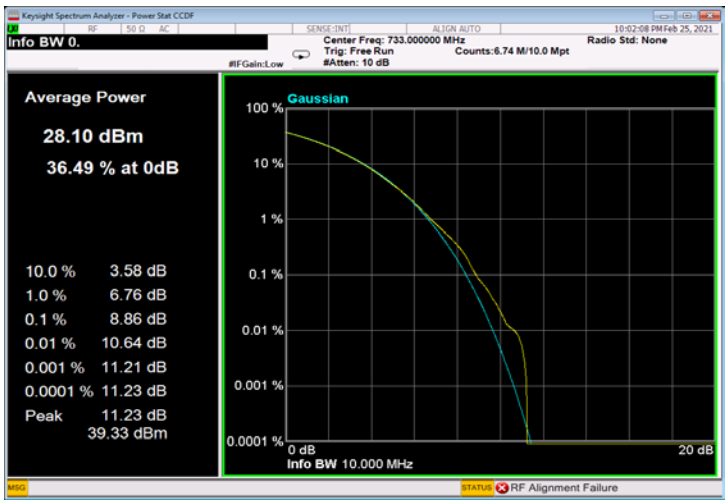

Figure 189: QPSK 10MHz B.W; 733MHz, 30kHz

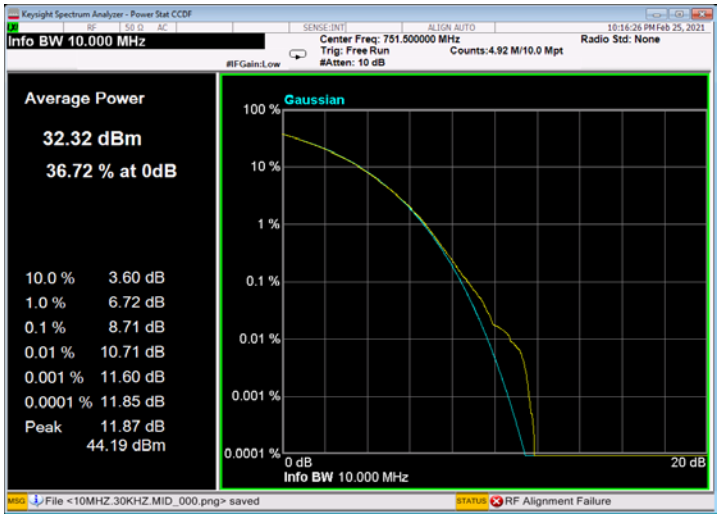

Figure 190: QPSK 10MHz B.W; 751.5MHz, 15kHz

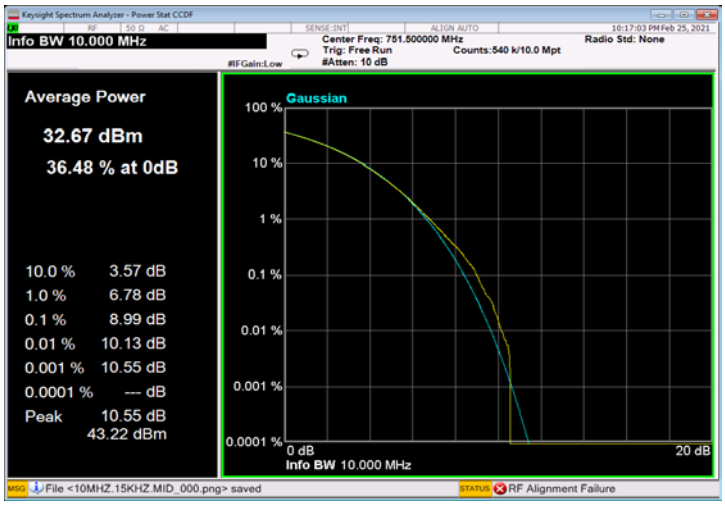

Figure 191: QPSK 10MHz B.W; 751.5MHz, 30kHz

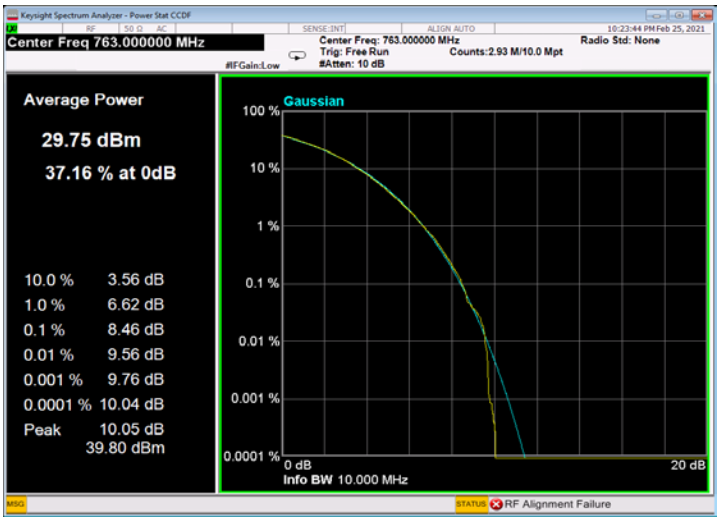

Figure 192: QPSK 10MHz B.W; 763MHz, 15kHz

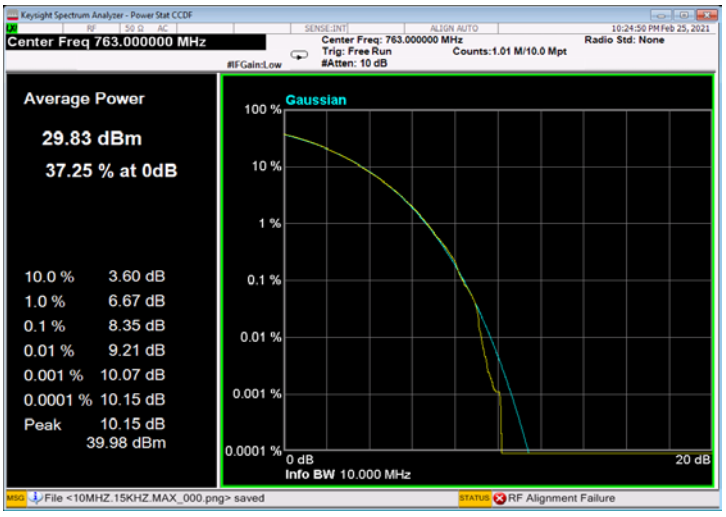

Figure 193: QPSK 10MHz B.W; 763MHz, 30kHz

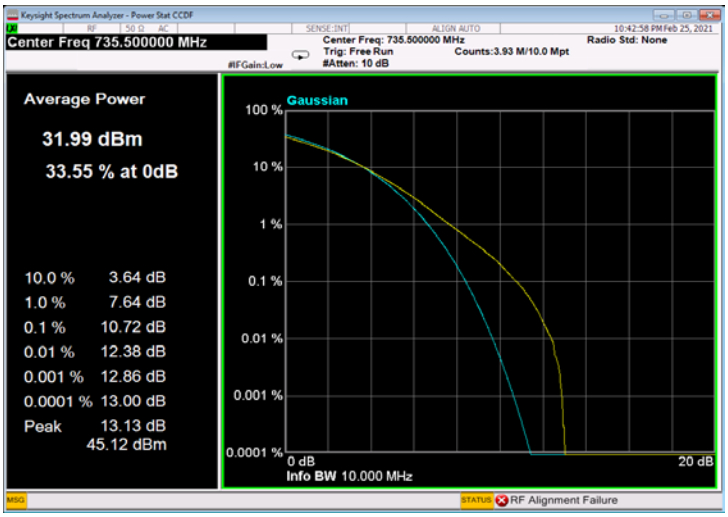

Figure 194: QPSK 15MHz B.W; 735.5MHz, 15kHz

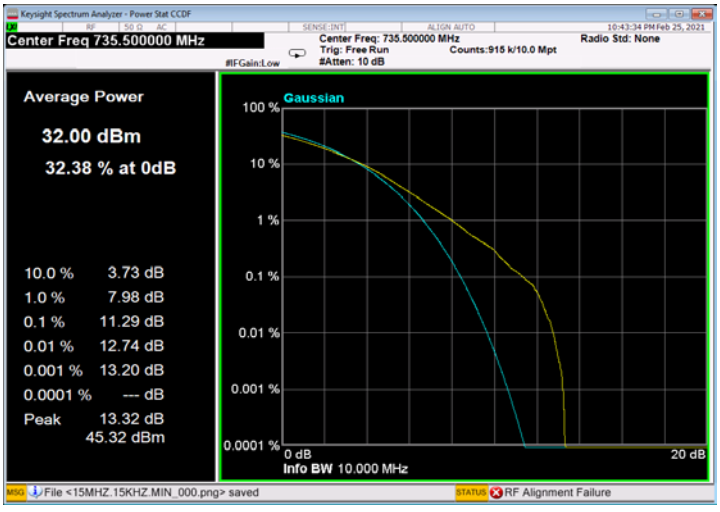

Figure 195: QPSK 15MHz B.W; 735.5MHz, 30kHz

8.5 Test Equipment Used; 0.1% PAPR

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EXA signal Analyzer	Keysight	UXA N9040B	MY56080119	January 31, 2020	January 31, 2022
EXG Vector Signal Generator	Agilent Technologies	N5172B	MY53051952	January 17, 2019	January 17, 2022
40 dB Attenuator	Weinschel Associates	WA 39-40-33	-	November 1, 2020	November 1, 2021
RF Coaxial Cable	Huber-Suner	SLLS210B	-	November 1, 2020	November 1, 2021

Table 23 Test Equipment Used

9 Peak to Average Power Ratio - 4G

9.1 Test Specification

FCC Part 27, Subpart C, Section Part 27.50

9.2 Test Procedure

(Temperature (22°C)/ Humidity (40%RH))
The method used is detailed in FCC KDB 971168 D03 v01

Measurements was using CCDF function for each modulation.

9.3 Test Limit

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

9.4 Test Results

JUDGEMENT: Passed

For additional information see Table 24 to Table 26 and Figure 196 to Figure 216.

	Bandwidth	Operation Frequency	0.1% PAPR	Limit
	(MHz)	(MHz)	(dB)	(dB)
Modulation 16QAM	5	730.5	8.05	*13*
		751.5	8.48	
		765.5	8.27	
	10	733	8.27	
		751.5	8.08	
		763	8.25	
	15	735.5	8.29	

Table 24 Test Results Peak to Average Power Ratio 16 QAM

	Bandwidth	Operation Frequency	0.1% PAPR	Limit
	(MHz)	(MHz)	(dB)	(dB)
Modulation 64QAM	5	730.5	8.01	*13*
		751.5	8.42	
		765.5	8.10	
	10	733	8.10	
		751.5	8.11	
		763	8.26	
	15	735.5	8.26	

Table 25 Test Results Peak to Average Power Ratio 64QAM

	Bandwidth	Operation Frequency	0.1% PAPR	Limit
	(MHz)	(MHz)	(dB)	(dB)
Modulation QPSK	5	730.5	8.05	*13*
		751.5	8.49	
		765.5	8.18	
	10	733	9.12	
		751.5	8.14	
		763	8.31	
	15	735.5	8.27	

Table 26 Test Results Peak to Average Power Ratio QPSK

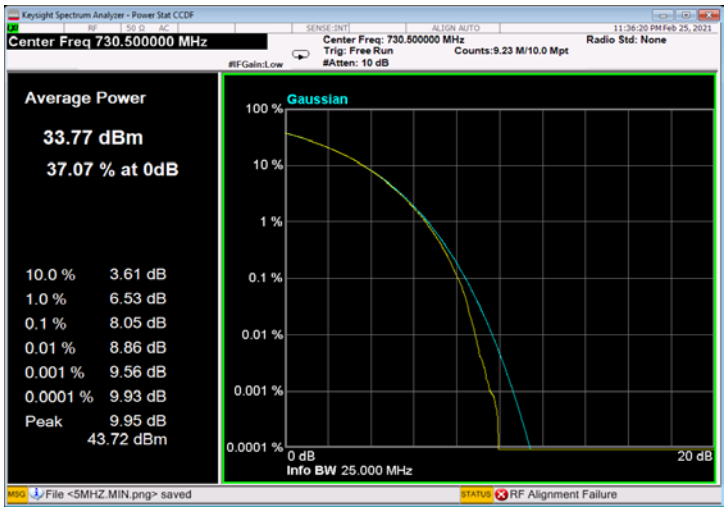

Figure 196: 16QAM 5MHz B.W; 730.5MHz – 4G

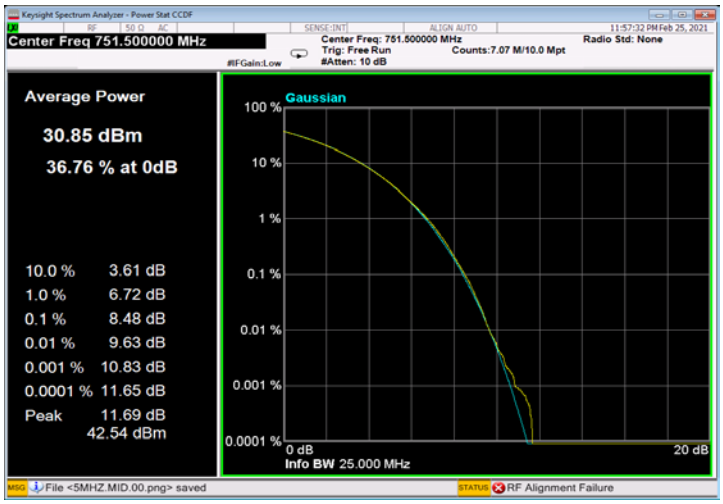

Figure 197: 16QAM 5MHz B.W; 751.5MHz – 4G

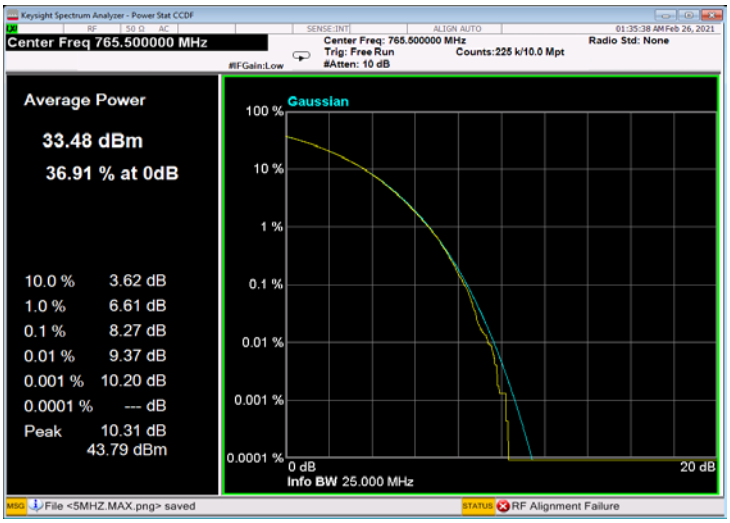

Figure 198: 16QAM 5MHz B.W; 765.5MHz – 4G

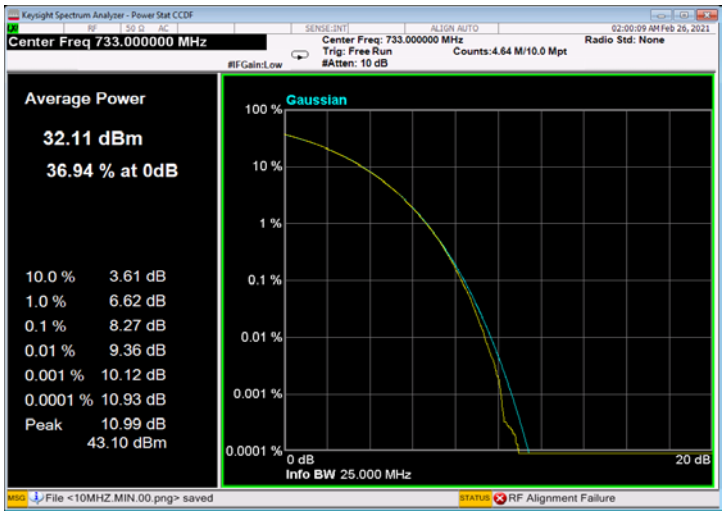

Figure 199: 16QAM 10MHz B.W; 733.0MHz – 4G

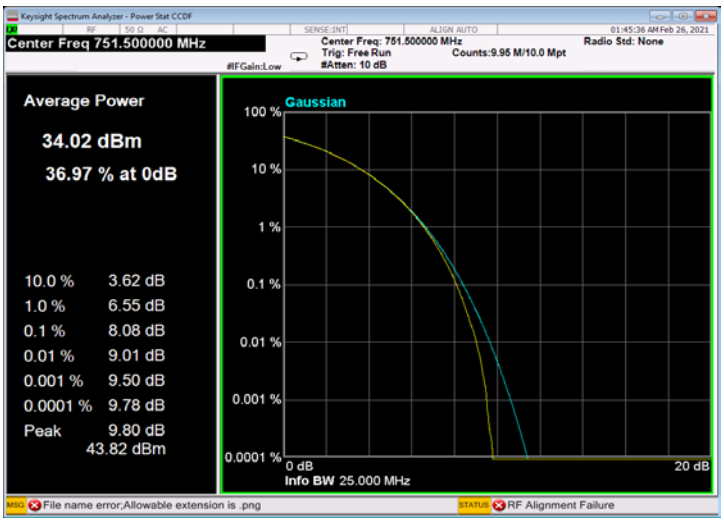

Figure 200: 16QAM 10MHz B.W; 751.5MHz – 4G

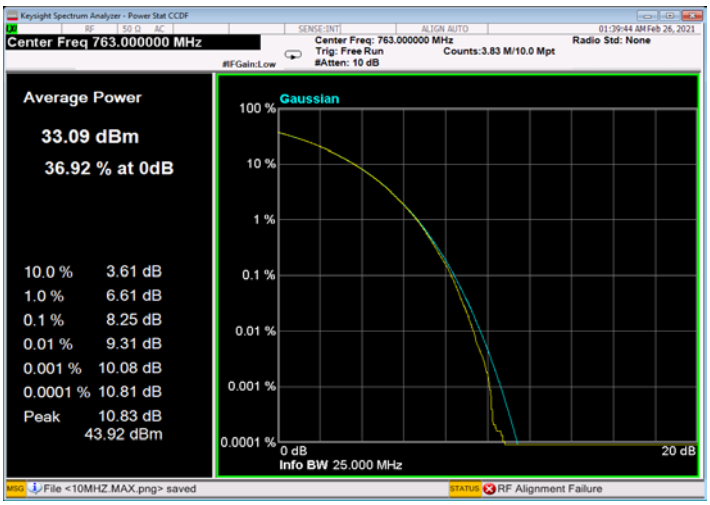

Figure 201: 16QAM 10MHz B.W; 763.0MHz – 4G

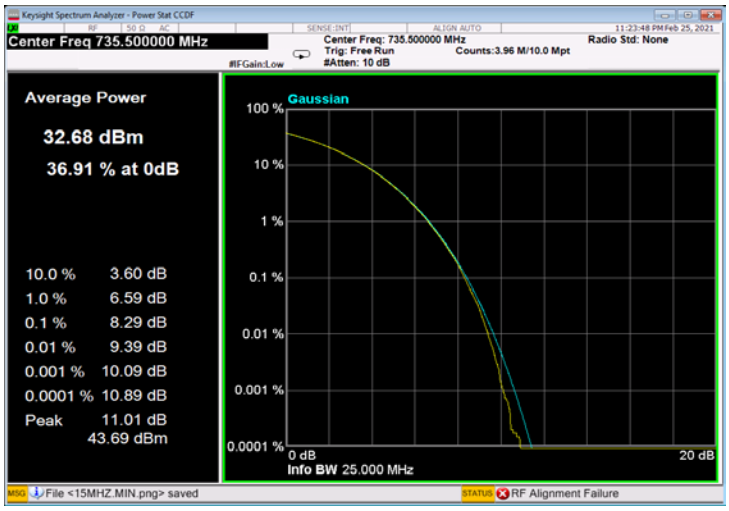

Figure 202: 16QAM 15MHz B.W; 735.5MHz – 4G

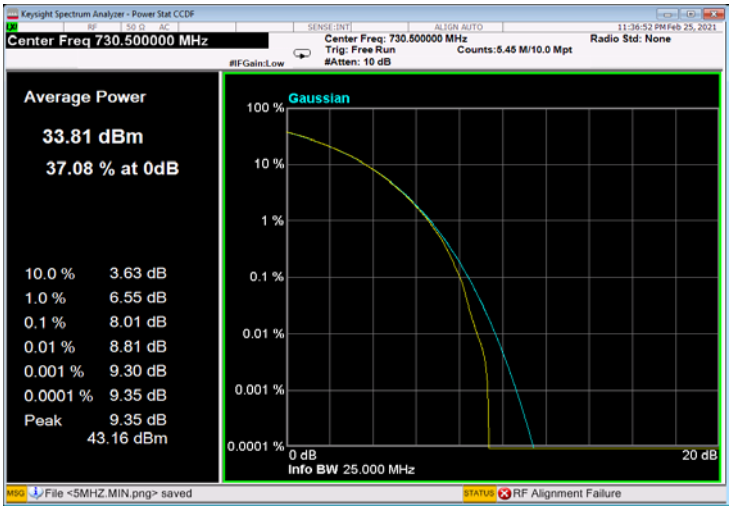

Figure 203: 64QAM 5MHz B.W; 730.5MHz – 4G

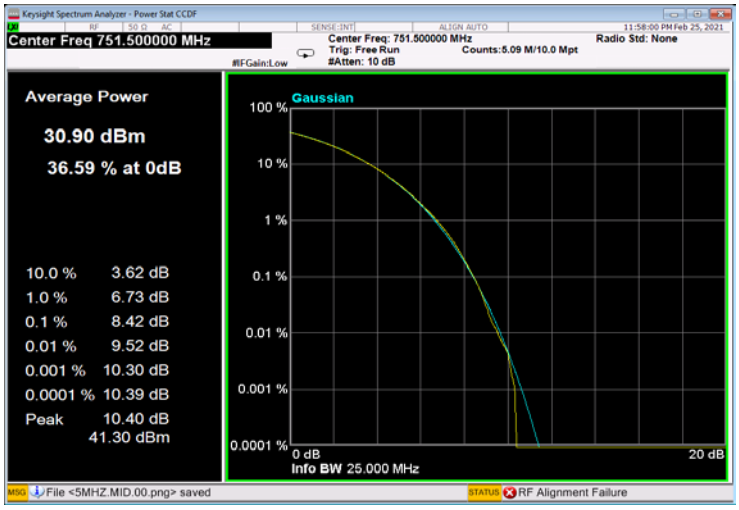

Figure 204: 64QAM 5MHz B.W; 751.5MHz – 4G

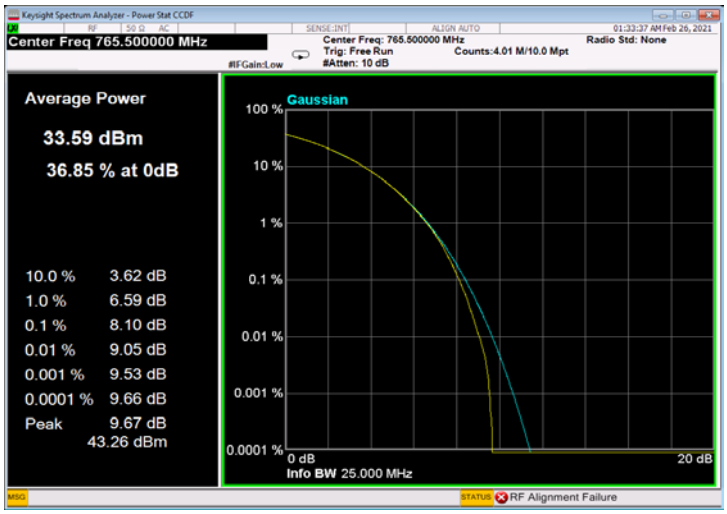

Figure 205: 64QAM 5MHz B.W; 765.5MHz – 4G

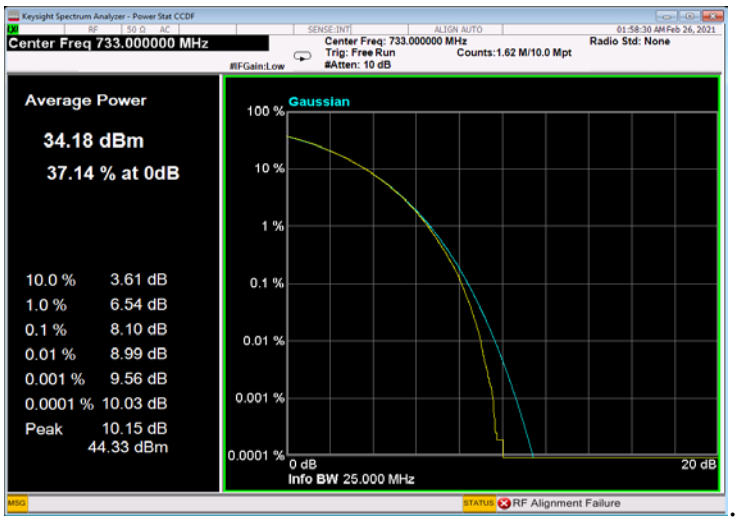

Figure 206: 64QAM 10MHz B.W; 733.0MHz – 4G

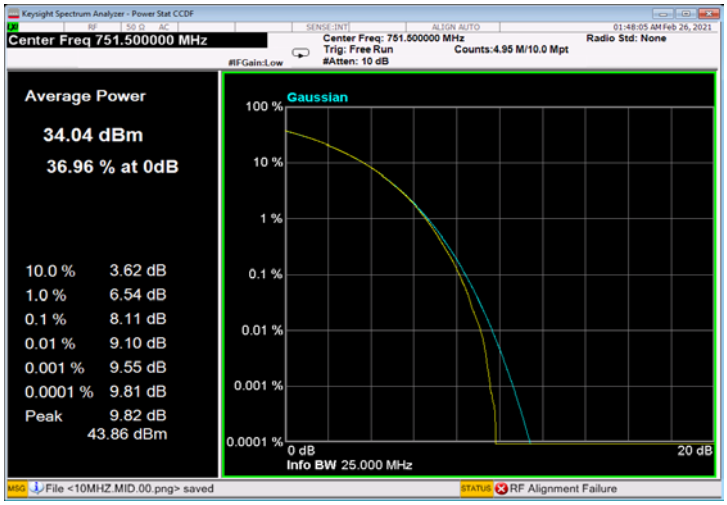

Figure 207: 64QAM 10MHz B.W; 751.5MHz – 4G

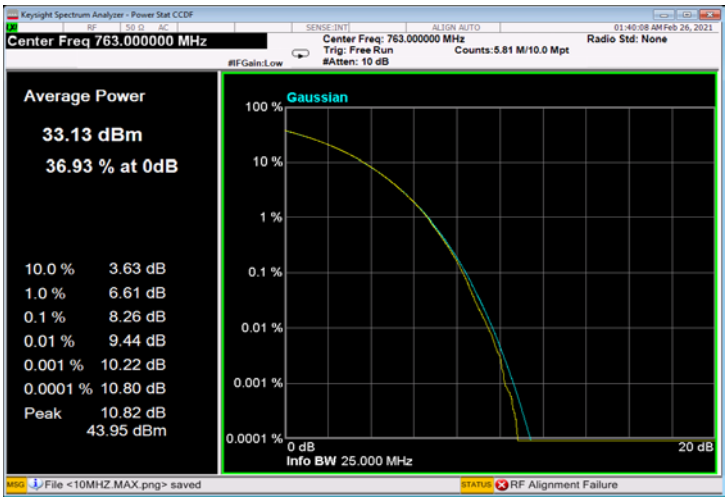

Figure 208: 64QAM 10MHz B.W; 763.0MHz – 4G

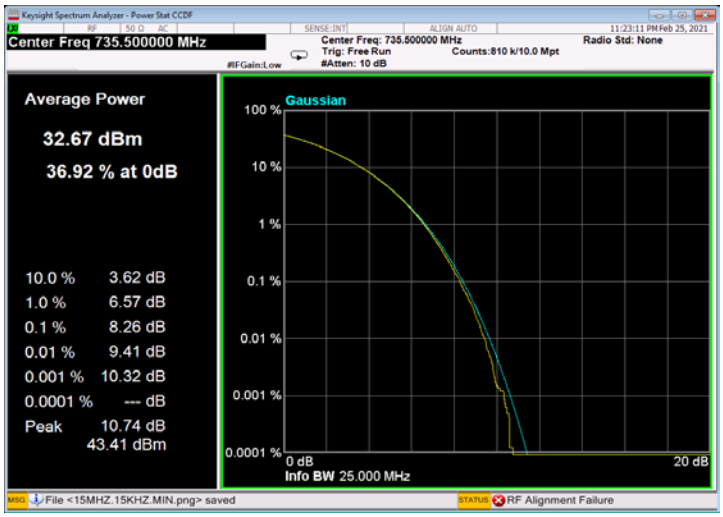

Figure 209: 64QAM 15MHz B.W; 735.5MHz – 4G

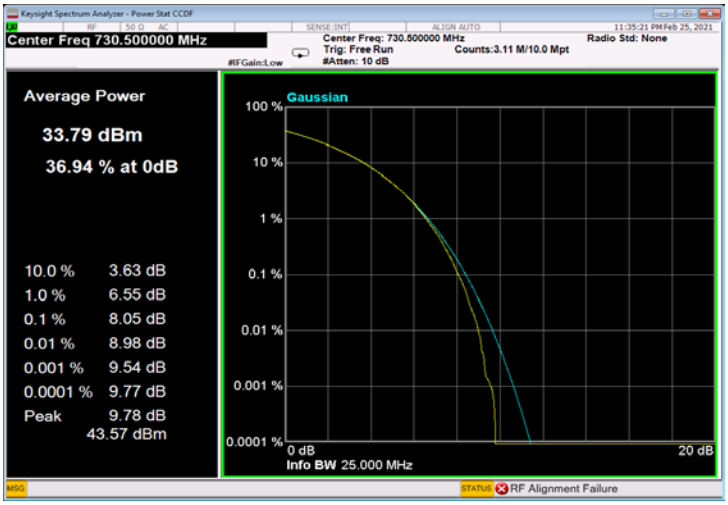

Figure 210: QPSK 5MHz B.W; 730.5MHz – 4G

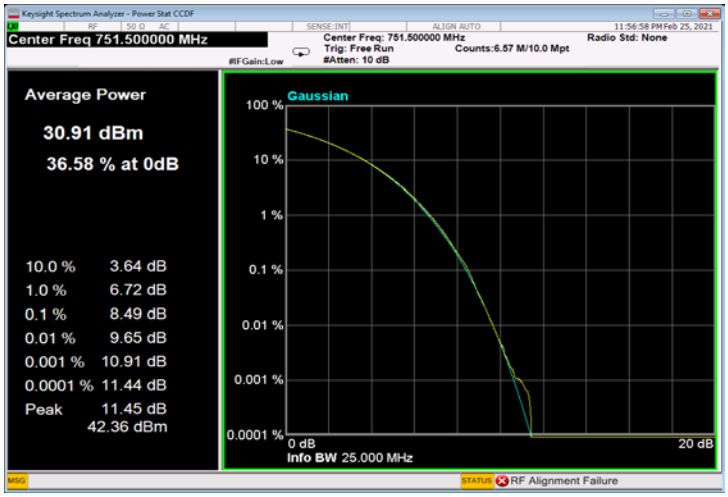

Figure 211: QPSK 5MHz B.W; 751.5MHz – 4G

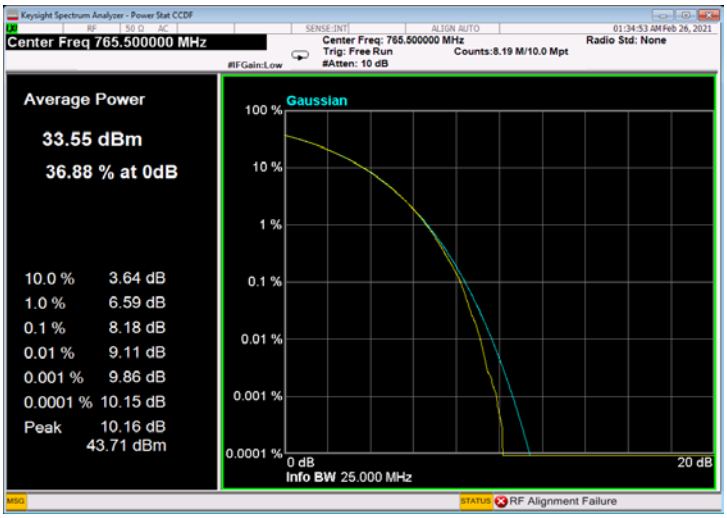

Figure 212: QPSK 5MHz B.W; 765.5MHz – 4G

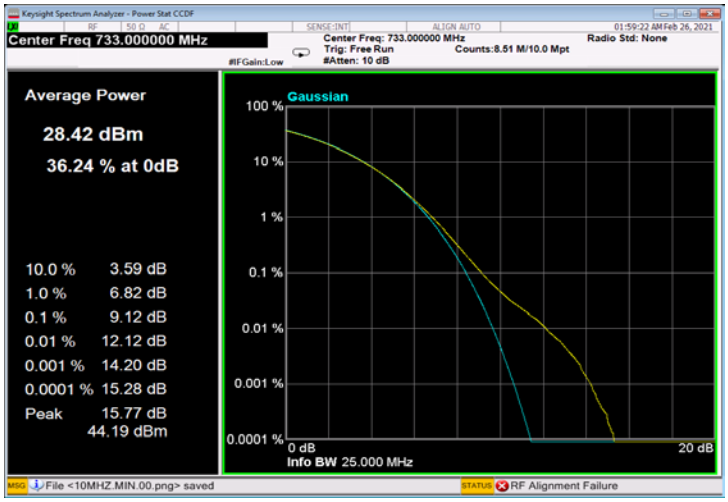

Figure 213: QPSK 10MHz B.W; 733.0MHz – 4G

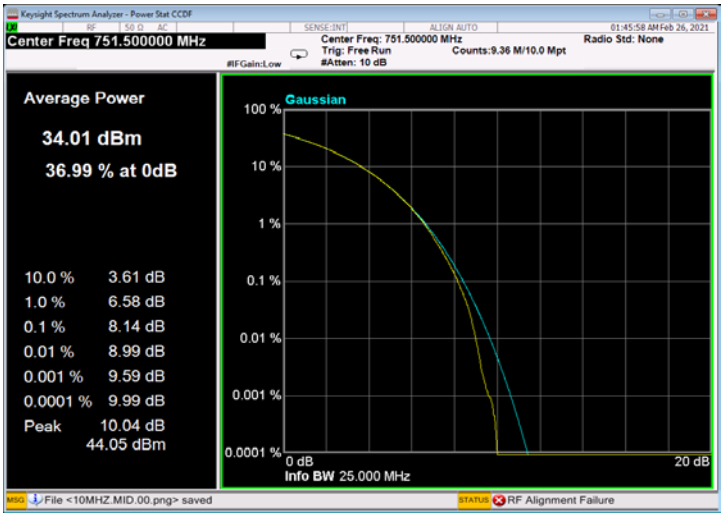

Figure 214: QPSK 10MHz; 751.5MHz – 4G

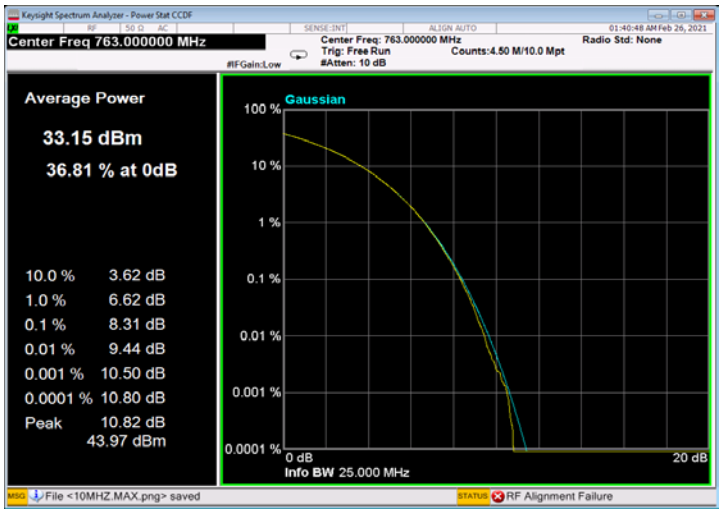

Figure 215: QPSK 10MHz; 763.0MHz – 4G

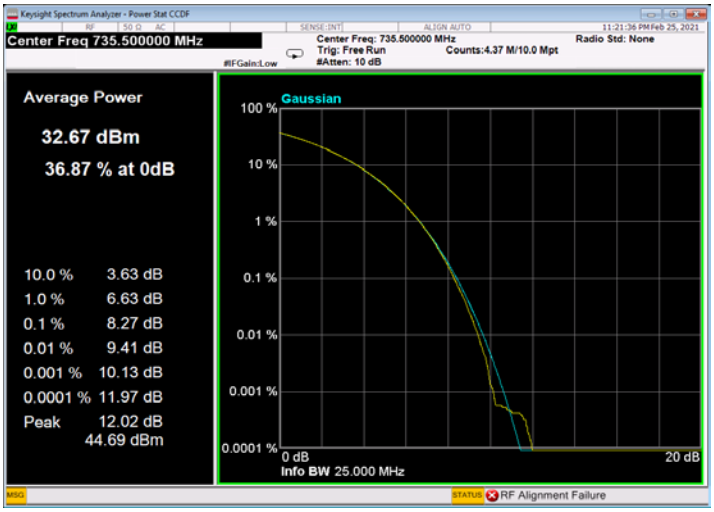

Figure 216: QPSK 15MHz B.W; 735.5MHz – 4G

9.5 Test Equipment Used; 0.1% PAPR

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EXA signal Analyzer	Keysight	UXA N9040B	MY56080119	January 31, 2020	January 31, 2022
EXG Vector Signal Generator	Agilent Technologies	N5172B	MY53051952	January 17, 2019	January 17, 2022
40 dB Attenuator	Weinschel Associates	WA 39-40-33	-	November 1, 2020	November 1, 2021
RF Coaxial Cable	Huber-Suner	SLLS210B	-	November 1, 2020	November 1, 2021

Table 27 Test Equipment Used

10 Occupied Bandwidth – 5G

10.1 Test Specification

FCC Part 2, Section 1049

10.2 Test Procedure

(Temperature (20°C)/ Humidity (47%RH))
The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (loss=40.7 dB). The spectrum analyzer was set to proper RBW
OBW function (99%) was employed for this evaluation.
Occupied bandwidth measured was repeated in the input terminal of the E.U.T.

10.3 Test Limit

N/A

10.4 Test Results

JUDGEMENT: Passed

See additional information in Table 28 to Table 35 and Figure 217 to Figure 328.

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
16QAM	5	15	730.5	4.5286
		30		4.0543
		15	751.5	4.5257
		30		4.0633
		15	765.5	4.5243
		30		4.0619
	10	15	733.0	9.2482
		30		8.6003
		15	751.5	9.2545
		30		8.5816
		15	763.0	9.2448
		30		8.5966
	15	15	735.5	14.180
		30		13.546

Table 28 Occupied Bandwidth 16 QAM Input - 5G

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
16QAM	5	15	730.5	4.5273
		30		4.0527
		15	751.5	4.5241
		30		4.0592
		15	765.5	4.5177
		30		4.0588
	10	15	733.0	9.2341
		30		8.5970
		15	751.5	9.2350
		30		8.5872
		15	763.0	9.2204
		30		8.5751
	15	15	735.5	14.164
		30		13.530

Table 29 Occupied Bandwidth 16QAM Output - 5G

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
64QAM	5	15	730.5	4.4932
		30		3.9986
		15	751.5	4.4940
		30		3.9986
		15	765.5	4.4924
		30		4.0012
	10	15	733.0	9.3343
		30		8.6430
		15	751.5	9.3350
		30		8.6440
		15	763.0	9.3356
		30		8.6393
	15	15	735.5	14.138
		30		13.662

Table 30 Occupied Bandwidth 64QAM Input - 5G

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
64QAM	5	15	730.5	4.4859
		30		3.9932
		15	751.5	4.4901
		30		3.9963
		15	765.5	4.4874
		30		3.9966
	10	15	733.0	9.3194
		30		8.6217
		15	751.5	9.3247
		30		8.6309
		15	763.0	9.3195
		30		8.6255
	15	15	735.5	14.108
		30		13.617

Table 31 Occupied Bandwidth 64QAM Output - 5G

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
256QAM	5	15	730.5	4.4923
		30		4.0229
		15	751.5	4.4869
		30		4.0219
		15	765.5	4.4912
		30		4.0218
	10	15	733.0	9.3227
		30		8.6241
		15	751.5	9.3234
		30		8.6501
		15	763.0	9.3232
		30		8.6493
	15	15	735.5	14.148
		30		13.598

Table 32 Occupied Bandwidth 256QAM Input - 5G

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
256QAM	5	15	730.5	4.4838
		30		4.0136
		15	751.5	4.4873
		30		4.0229
		15	765.5	4.4830
		30		4.0244
	10	15	733	9.2977
		30		8.6218
		15	751.5	9.3115
		30		8.6232
		15	763	9.2917
		30		8.6244
	15	15	735.5	14.124
		30		13.570

Table 33 Occupied Bandwidth 256QAM Output - 5G

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
QPSK	5	15	730.5	4.5229
		30		4.1093
		15	751.5	4.5227
		30		4.1115
		15	765.5	4.5220
		30		4.1204
	10	15	733	9.1709
		30		8.5246
		15	751.5	9.1673
		30		8.5281
		15	763	9.1655
		30		8.5307
	15	15	735.5	14.187
		30		13.394

Table 34 Occupied Bandwidth QPSK Input - 5G

Modulation	Bandwidth	Sub Carrier	Operation Frequency	Reading
	(MHz)	(kHz)	(MHz)	(MHz)
QPSK	5	15	730.5	4.5161
		30		4.1081
		15	751.5	4.5265
		30		4.0623
		15	765.5	4.5137
		30		4.1150
	10	15	733	9.1598
		30		8.5118
		15	751.5	9.1518
		30		8.5169
		15	763	9.1110
		30		8.4918
	15	15	735.5	14.160
		30		13.363

Table 35 Occupied Bandwidth QPSK Output - 5G

Figure 217: 16QAM 5MHz B.W; 730.5MHz, 15kHz INPUT

Figure 218: 16QAM 5MHz B.W; 730.5MHz, 30kHz INPUT

Figure 219: 16QAM 5MHz B.W; 751.5MHz, 15kHz INPUT

Figure 220: 16QAM 5MHz B.W; 751.5MHz, 30kHz INPUT

Figure 221: 16QAM 5MHz B.W; 765.5MHz, 15kHz INPUT

Figure 222: 16QAM 5MHz B.W; 765.5MHz, 30kHz INPUT

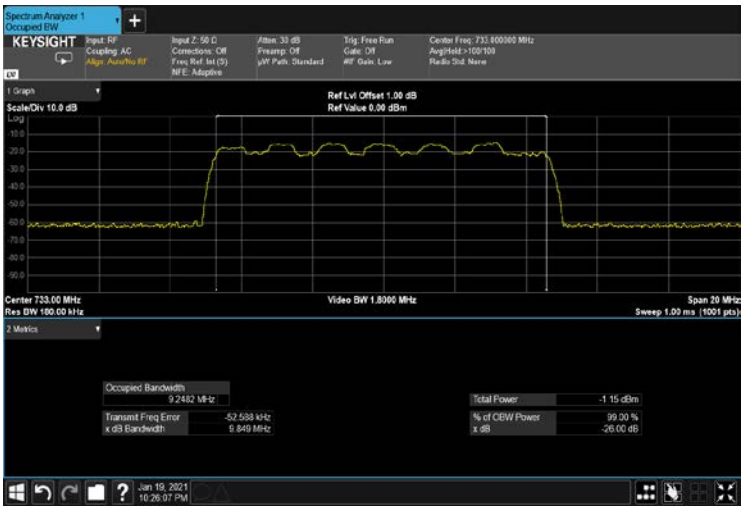

Figure 223: 16QAM 10MHz B.W; 733.0MHz, 15kHz INPUT

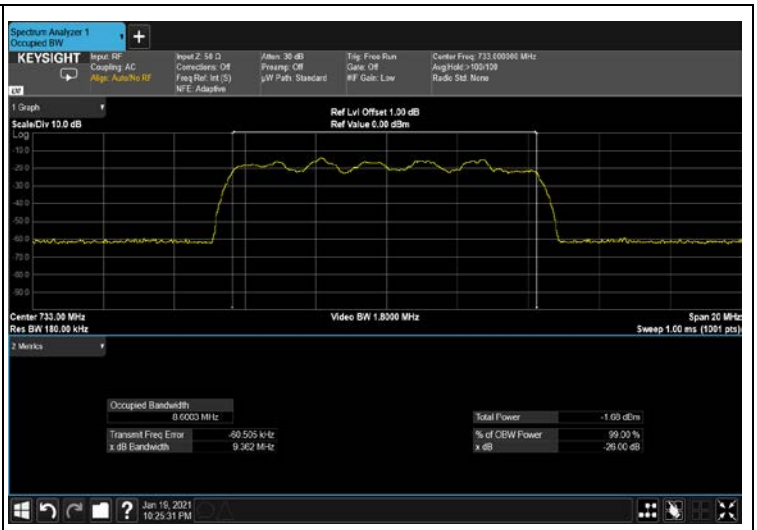

Figure 224: 16QAM 10MHz B.W; 733.0MHz, 30kHz INPUT

Figure 225: 16QAM 10MHz B.W; 751.5MHz, 15kHz INPUT

Figure 226: 16QAM 10MHz B.W; 751.5MHz, 30kHz INPUT

Figure 227: 16QAM 10MHz B.W; 763.0MHz, 15kHz INPUT

Figure 228: 16QAM 10MHz B.W; 763MHz, 30kHz INPUT

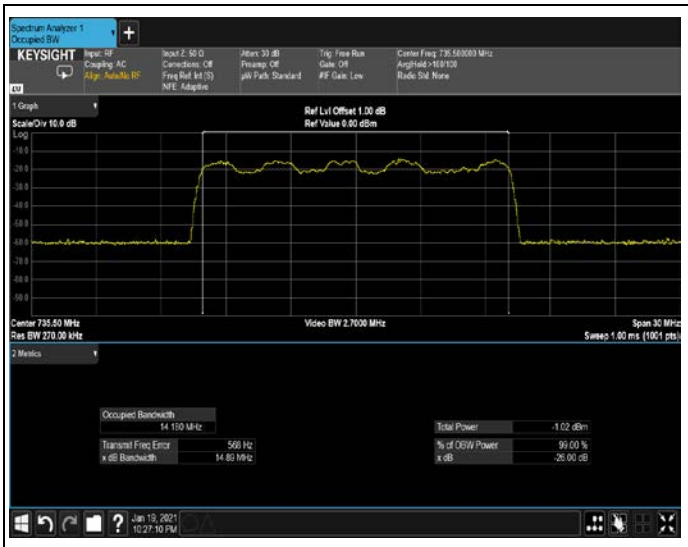

Figure 229: 16QAM 15MHz B.W; 735.5MHz,15kHz INPUT

Figure 230: 16QAM 15MHz B.W; 735.5MHz, 30kHz INPUT

Figure 231: 64QAM 5MHz B.W; 730.5MHz, 15kHz INPUT

Figure 232: 64QAM 5MHz B.W; 730.5MHz, 30kHz INPUT

Figure 233: 64QAM 5MHz B.W; 751.5MHz, 15kHz INPUT

Figure 234: 64QAM 5MHz B.W; 751.5MHz, 30kHz INPUT

Figure 235: 64QAM 5MHz B.W; 765.0MHz, 15kHz INPUT

Figure 236: 64QAM 5MHz B.W; 765.5MHz, 30kHz INPUT

Figure 237: 64QAM 10MHz B.W; 733MHz, 15kHz INPUT

Figure 238: 64QAM 10MHz B.W; 733.0MHz, 30kHz INPUT

Figure 239: 64QAM 10MHz B.W; 751.5MHz, 15kHz INPUT

Figure 240: 64QAM 10MHz B.W; 751.5MHz, 30kHz INPUT

Figure 241: 64QAM 10MHz B.W; 763.0MHz, 15kHz INPUT

Figure 242: 64QAM 10MHz B.W; 763MHz, 30kHz INPUT

Figure 243: 64QAM 15MHz B.W; 735.5MHz, 15kHz INPUT

Figure 244: 64QAM 15MHz B.W; 735.5MHz, 30kHz INPUT