Figure 296: 256QAM 10MHz B.W.; 878.0MHz, 15kHz OUTPUT

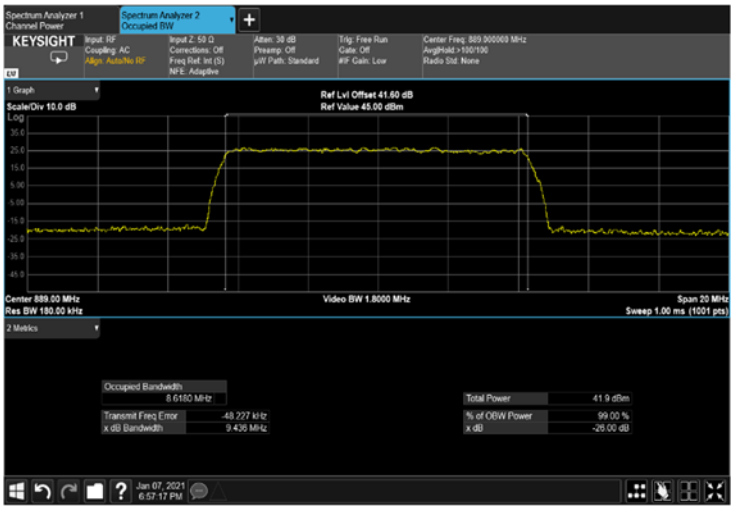

Figure 297: 256QAM 10MHz B.W.; 886.5MHz, 30kHz OUTPUT

Figure 298: 256QAM 15MHz B.W.; 869.5MHz, 15kHz OUTPUT

Figure 299: 256QAM 15MHz B.W.; 878.0MHz, 30kHz OUTPUT

Figure 300: 256QAM 15MHz B.W.; 886.5MHz, 15kHz OUTPUT

Figure 301: 256QAM 15MHz B.W.; 869.5MHz, 30kHz OUTPUT

Figure 302: 256QAM 15MHz B.W.; 878.0MHz, 15kHz OUTPUT

Figure 303: 256QAM 15MHz B.W.; 886.5MHz, 30kHz OUTPUT

Figure 304: QPSK 5MHz B.W.; 864.5MHz, 15kHz OUTPUT

Figure 305: QPSK 5MHz B.W.; 878.0MHz, 30kHz OUTPUT

Figure 306: QPSK 5MHz B.W.; 891.5MHz, 15kHz OUTPUT

Figure 307: QPSK 5MHz B.W.; 864.5MHz, 30kHz OUTPUT

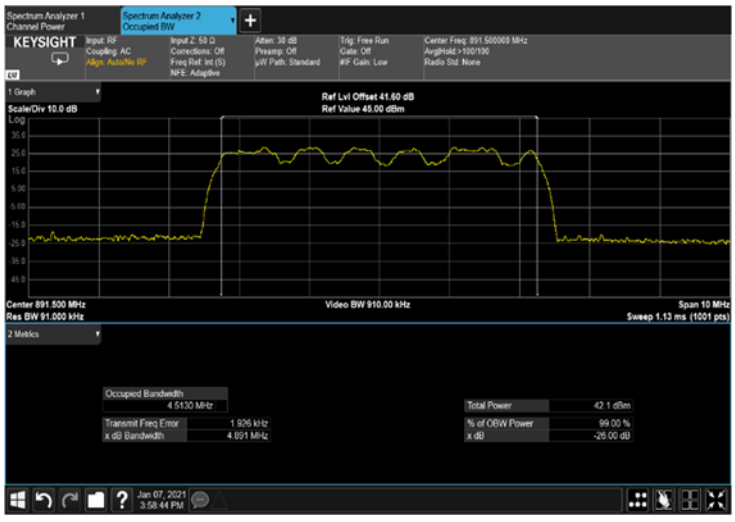

Figure 308: QPSK 5MHz B.W.; 878.0MHz, 15kHz OUTPUT

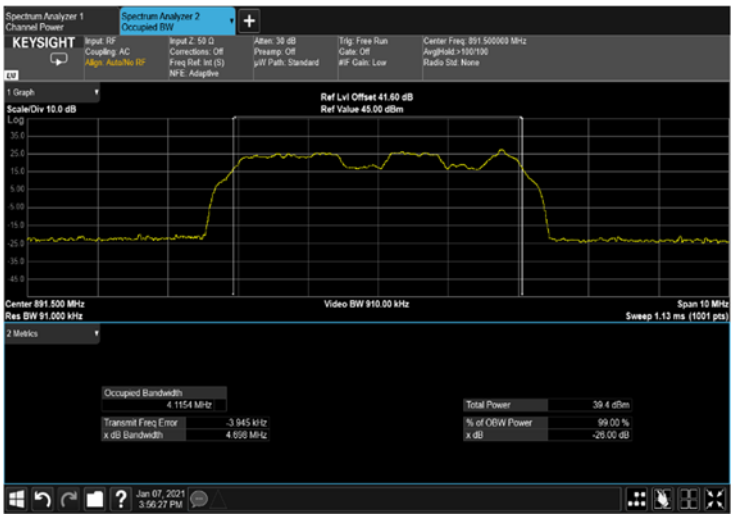

Figure 309: QPSK 5MHz B.W.; 891.5MHz, 30kHz OUTPUT

Figure 310: QPSK 10MHz B.W.; 867.0MHz, 15kHz OUTPUT

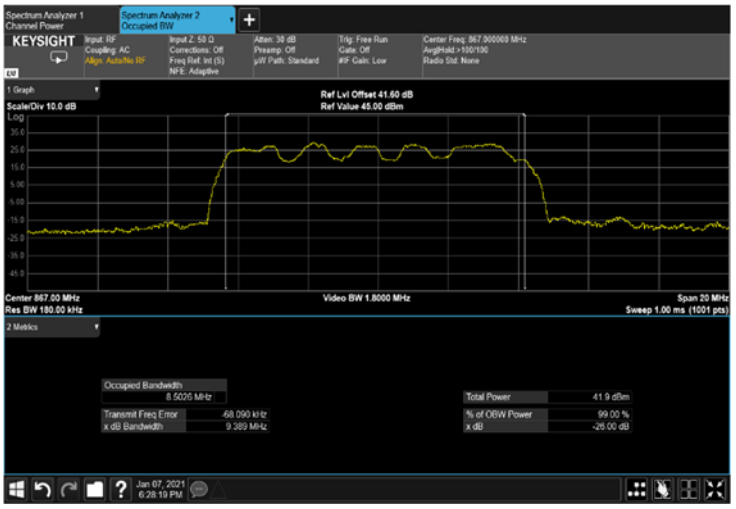

Figure 311: QPSK 10MHz B.W.; 878.0MHz, 30kHz OUTPUT

Figure 312: QPSK 10MHz B.W.; 886.5MHz, 15kHz OUTPUT

Figure 313: QPSK 10MHz B.W.; 867.0MHz, 30kHz OUTPUT

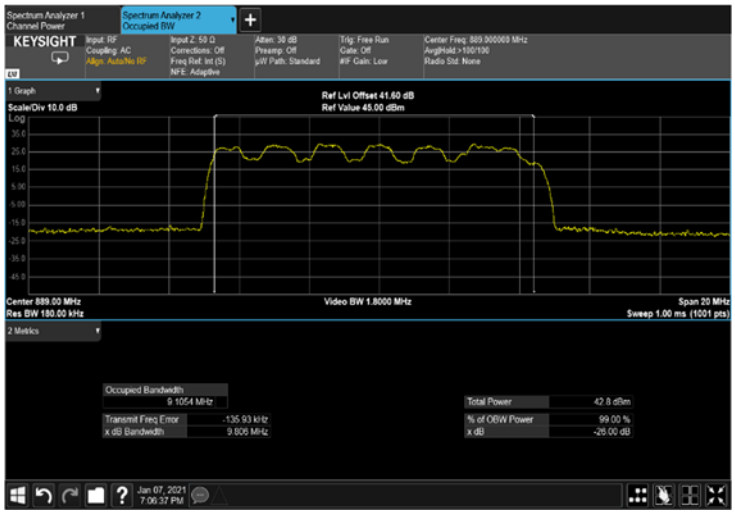

Figure 314: QPSK 10MHz B.W.; 878.0MHz, 15kHz OUTPUT

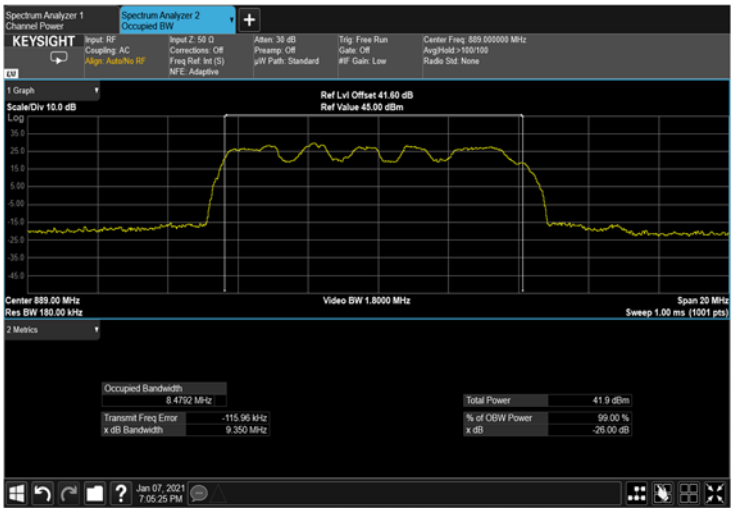

Figure 315: QPSK 10MHz B.W.; 886.0MHz, 30kHz OUTPUT

Figure 316: QPSK 15MHz B.W.; 869.5MHz, 15kHz OUTPUT

Figure 317: QPSK 15MHz B.W.; 878.0MHz, 30kHz OUTPUT

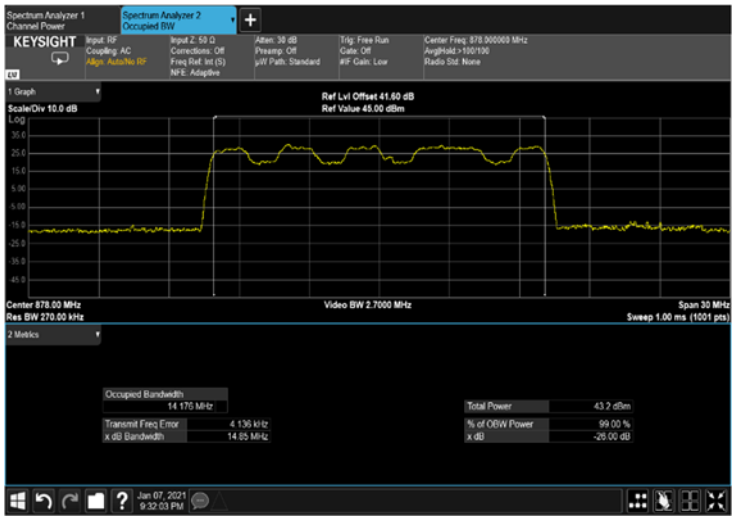

Figure 318: QPSK 15MHz B.W.; 886.5MHz, 15kHz OUTPUT

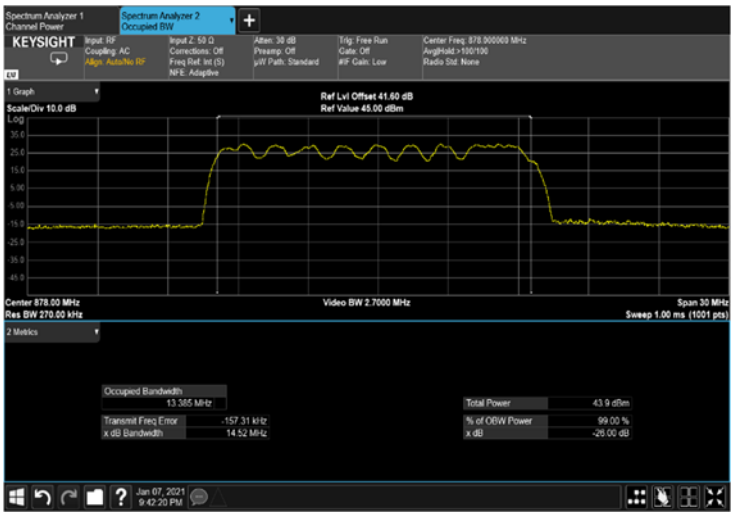

Figure 319: QPSK 15MHz B.W.; 869.5Hz, 30kHz OUTPUT

Figure 320: QPSK 15MHz B.W.; 878.0MHz, 15kHz OUTPUT

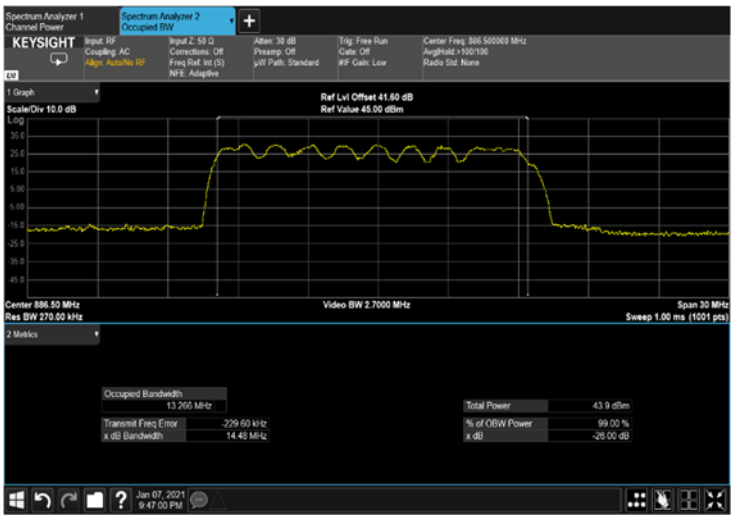

Figure 321: QPSK 15MHz B.W.; 886.5MHz, 30kHz OUTPUT

8.5 Test Equipment Used; Occupied Bandwidth

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 29 Test Equipment Used

9 Occupied Bandwidth – 3G and 4G

9.1 Test Specification

FCC Part 2, Section 1049

9.2 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=39.7 dB). The spectrum analyzer was set to proper resolution B.W.
OBW function (99%) was employed for this evaluation.
Occupied bandwidth measured was repeated in the input terminal of the E.U.T.

9.3 Test Limit

N/A

9.4 Test Results

JUDGEMENT: Passed

See additional information in Table 30 to Table 37 and Figure 322 to Figure 381.

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
WCDMA	5	864.5	4.1636
		878.0	4.1604
		891.5	4.1566

Table 30 Occupied Bandwidth WCDMA Input – 3G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
WCDMA	5	864.5	4.1581
		878.0	4.1644
		891.5	4.1630

Table 31 Occupied Bandwidth WCDMA Output – 3G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
16QAM	5	864.5	4.4710
		878.0	4.4730
		891.5	4.4677
	10	867.0	8.9398
		878.0	8.9402
		886.5	8.9409
	15	869.5	13.395
		878.0	13.400
		886.5	13.395

Table 32 Occupied Bandwidth 16QAM Input - 4G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
16QAM	5	864.5	4.4654
		878.0	4.4707
		891.5	4.4692
	10	867.0	8.9301
		878.0	8.9397
		886.5	8.9328
	15	869.5	13.379
		878.0	13.402
		886.5	13.362

Table 33 Occupied Bandwidth 16QAM Output – 4G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
64QAM	5	864.5	4.4819
		878.0	4.4852
		891.5	4.4844
	10	867.0	8.9445
		878.0	8.9440
		886.5	8.9447
	15	869.5	13.339
		878.0	13.392
		886.5	13.394

Table 34 Occupied Bandwidth 64QAM Input – 4G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
64QAM	5	864.5	4.4795
		878.0	4.4829
		891.5	4.4788
	10	867.0	8.9390
		878.0	8.9482
		886.5	8.9322
	15	869.5	13.383
		878.0	13.393
		886.5	13.370

Table 35 Occupied Bandwidth 64QAM Output – 4G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
QPSK	5	864.5	4.4792
		878.0	4.4789
		891.5	4.4793
	10	867.0	8.9369
		878.0	8.9400
		886.5	8.9251
	15	869.5	13.380
		878.0	13.388
		886.5	13.387

Table 36 Occupied Bandwidth QPSK Input – 4G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
QPSK	5	864.5	4.4774
		878.0	4.4786
		891.5	4.4744
	10	867.0	8.9281
		878.0	8.9340
		886.5	8.9165
	15	869.5	13.379
		878.0	13.377
		886.5	13.348

Table 37 Occupied Bandwidth QPSK Output - 4G

Figure 322 WCDMA 5MHz B.W.; 864.5MHz 3G Input

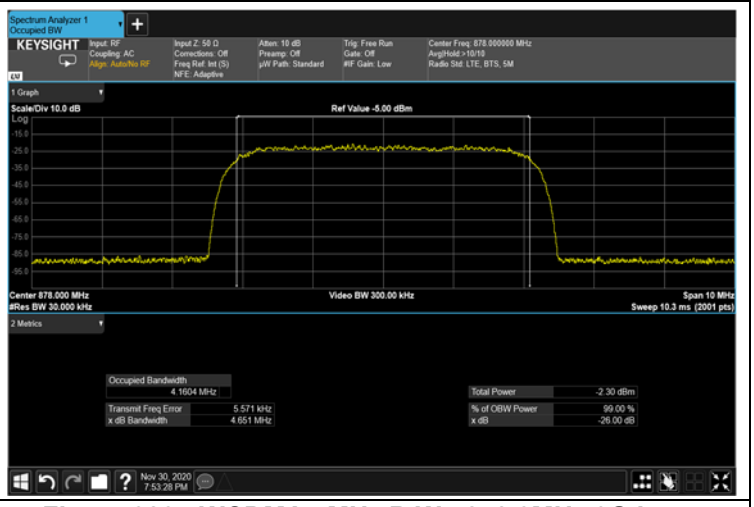

Figure 323: WCDMA 5MHz B.W.; 878.0MHz 3G Input

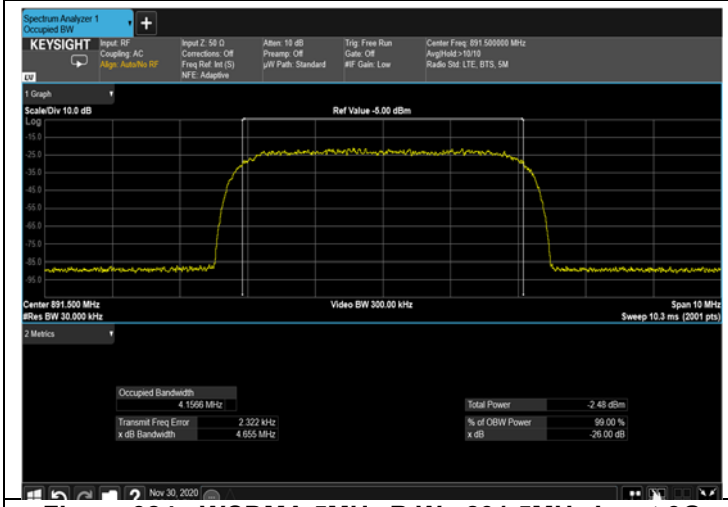

Figure 324: WCDMA 5MHz B.W.; 891.5MHz Input 3G

Figure 325: 16QAM 5MHz B.W.; 864.5MHz Input 4G

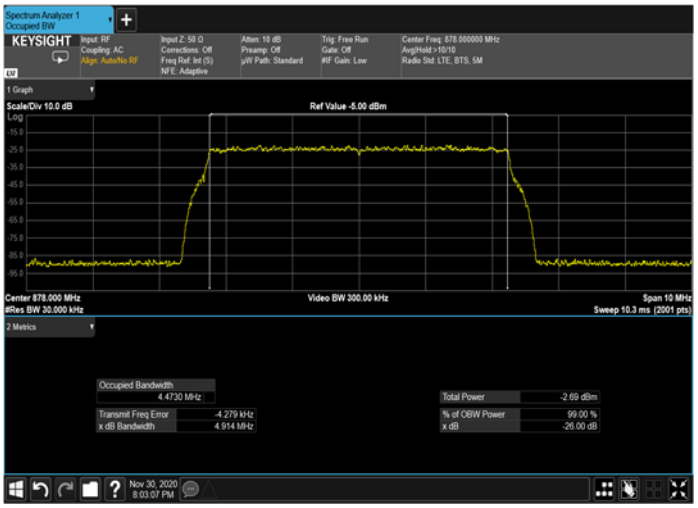

Figure 326: 16QAM 5MHz B.W.; 878.0MHz Input 4G

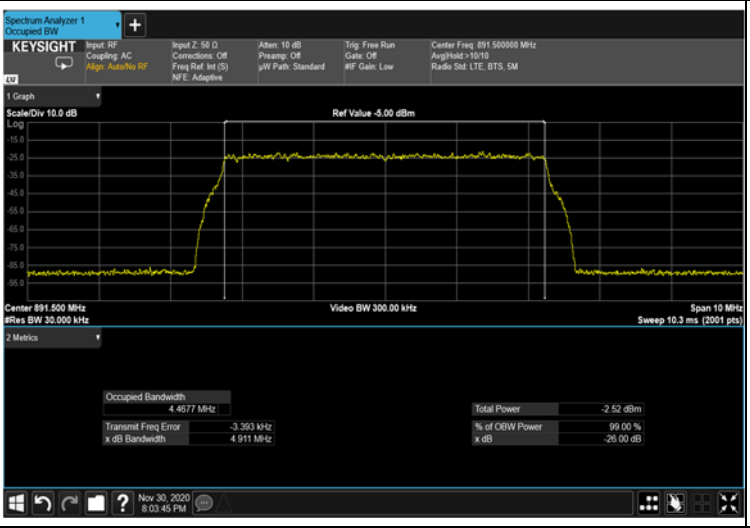

Figure 327: 16QAM 5MHz B.W.; 891.5MHz Input 4G

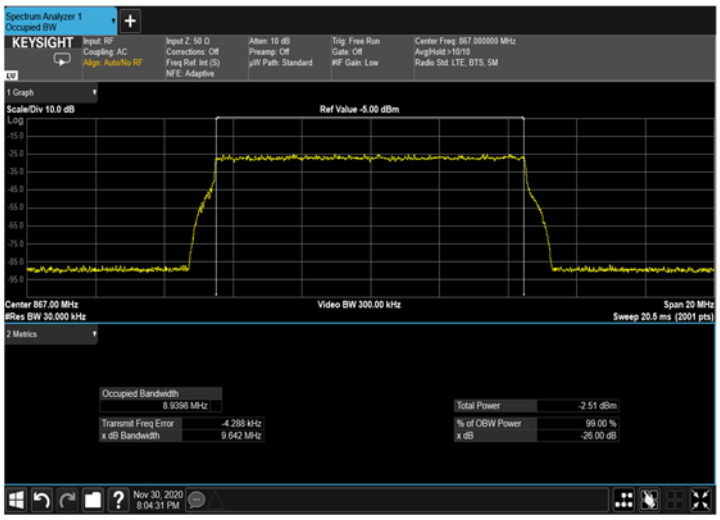

Figure 328: 16QAM 10MHz B.W.; 867.0MHz Input 4G

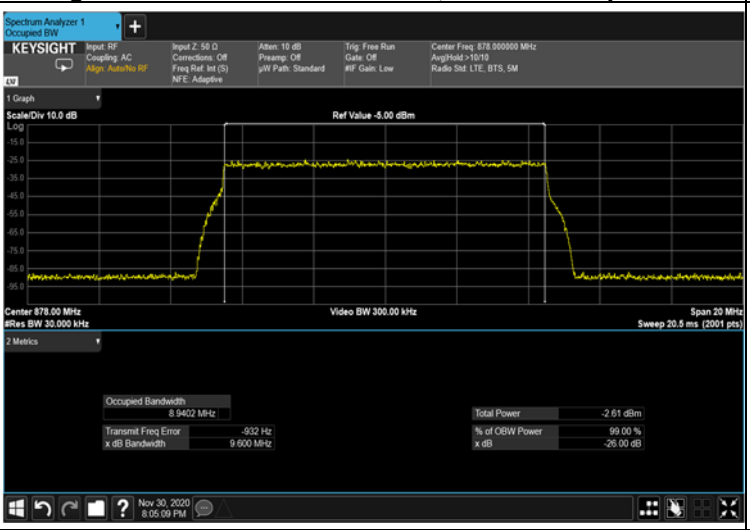

Figure 329: 16QAM 10MHz; 878.0MHz Input 4G

Figure 330: 16QAM 10MHz; 889.0MHz Input 4G

Figure 331: 16QAM 15MHz B.W.; 869.5MHz Input 4G

Figure 332: 16QAM 15MHz B.W.; 878.0MHz Input 4G

Figure 333: 16QAM 15MHz B.W.; 886.5MHz Input 4G

Figure 334: 64QAM 5MHz B.W.; 864.5MHz Input 4G

Figure 335: 64QAM 5MHz B.W.; 878.0MHz Input 4G

Figure 336: 64QAM 5MHz B.W.; 891.5MHz Input 4G

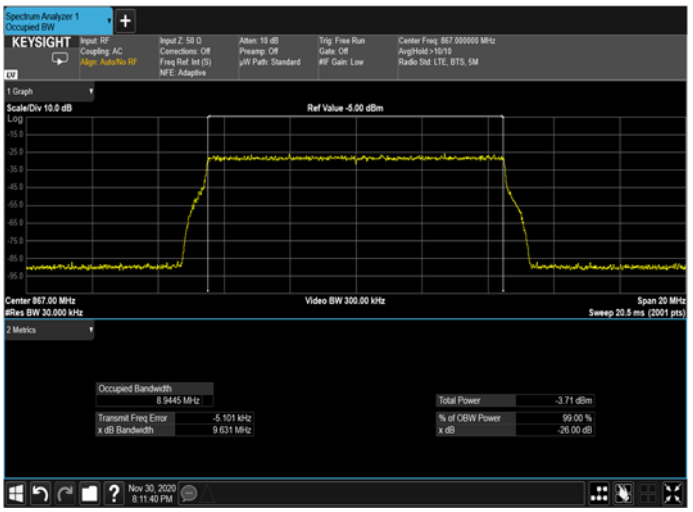

Figure 337: 64QAM 10MHz B.W.; 867.0MHz Input 4G

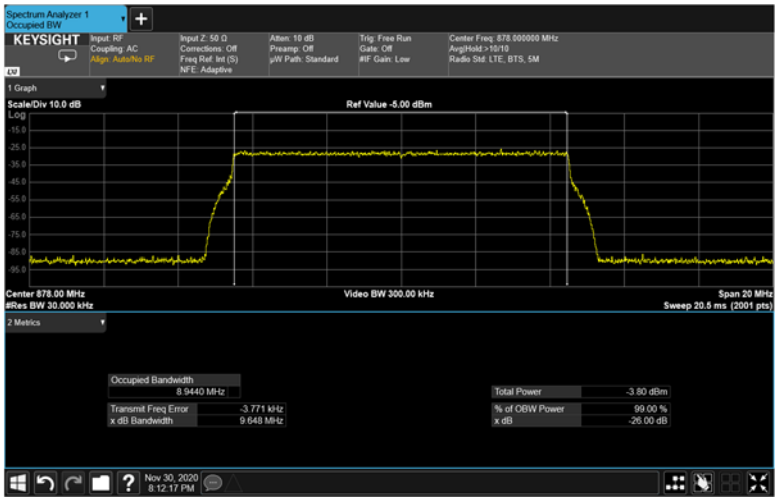

Figure 338: 64QAM 10MHz; 878.0MHz Input 4G

Figure 339: 64QAM 10MHz; 889.0MHz Input 4G

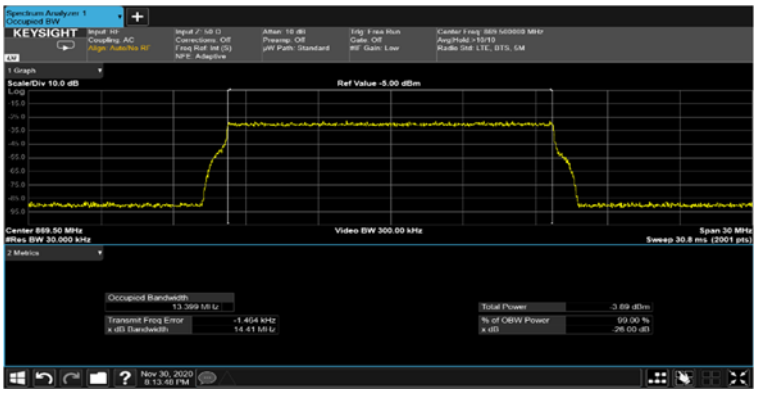

Figure 340: 64QAM 15MHz B.W.; 869.5MHz Input 4G

Figure 341: 64QAM 15MHz B.W.; 878.0MHz Input 4G

Figure 342: 64QAM 64MHz B.W.; 886.5MHz Input 4G

Figure 343: QPSK 5MHz B.W.; 864.5MHz Input 4G

Figure 344: QPSK 5MHz B.W.; 878.0MHz Input 4G

Figure 345: QPSK 5MHz B.W.; 891.5MHz Input 4G

Figure 346: QPSK 10MHz B.W.; 867.0MHz Input 4G

Figure 347: QPSK 10MHz; 878.0MHz Input 4G

Figure 348: QPSK 10MHz; 889.0MHz Input 4G

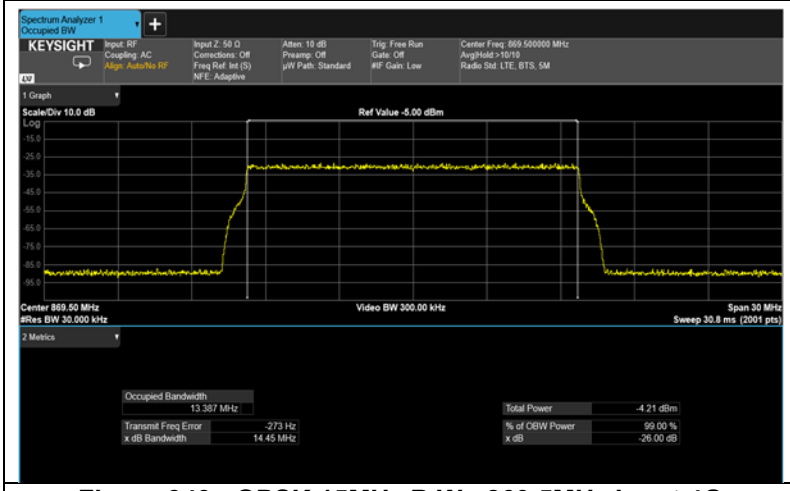

Figure 349: QPSK 15MHz B.W.; 869.5MHz Input 4G

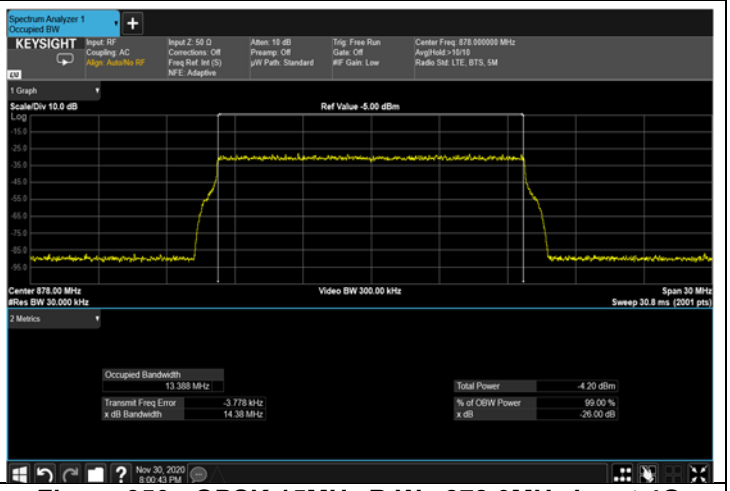

Figure 350: QPSK 15MHz B.W.; 878.0MHz Input 4G

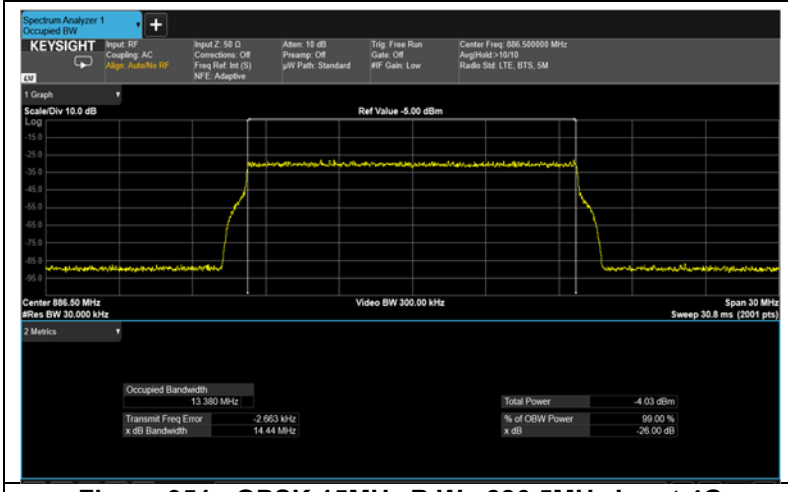

Figure 351: QPSK 15MHz B.W.; 886.5MHz Input 4G

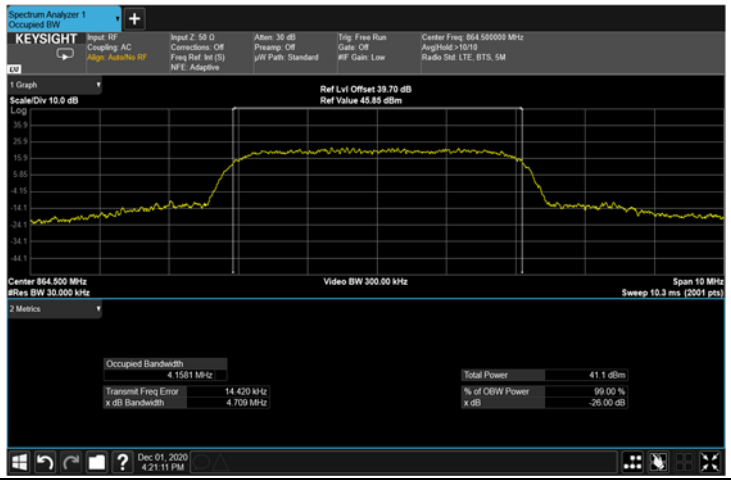

Figure 352 WCDMA 5MHz B.W.; 864.5MHz 3G Output

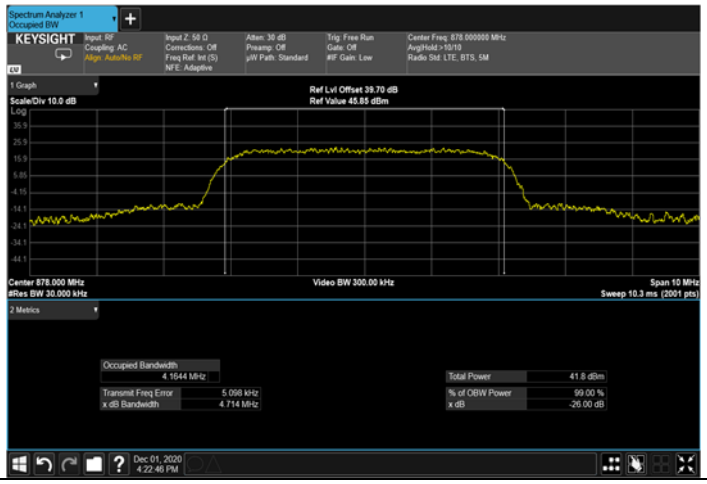

Figure 353: WCDMA 5MHz B.W.; 878.0MHz 3G Output

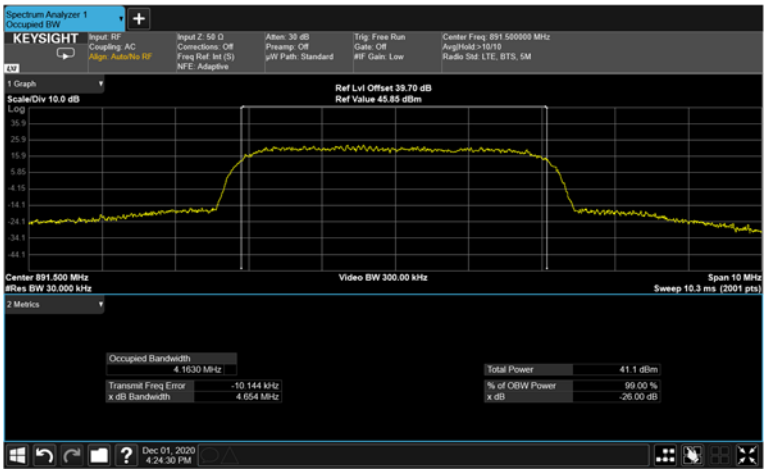

Figure 354: WCDMA 5MHz B.W.; 891.5MHz Output 3G

Figure 355: 16QAM 5MHz B.W.; 864.5MHz Output 4G

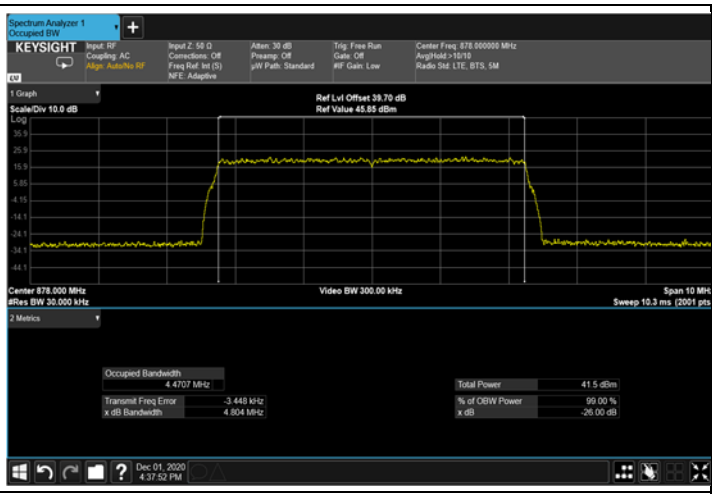

Figure 356: 16QAM 5MHz B.W.; 878.0MHz Output 4G

Figure 357: 16QAM 5MHz B.W.; 891.5MHz Output 4G

Figure 358: 16QAM 10MHz B.W.; 867.0MHz Output 4G

Figure 359: 16QAM 10MHz; 878.0MHz Output 4G

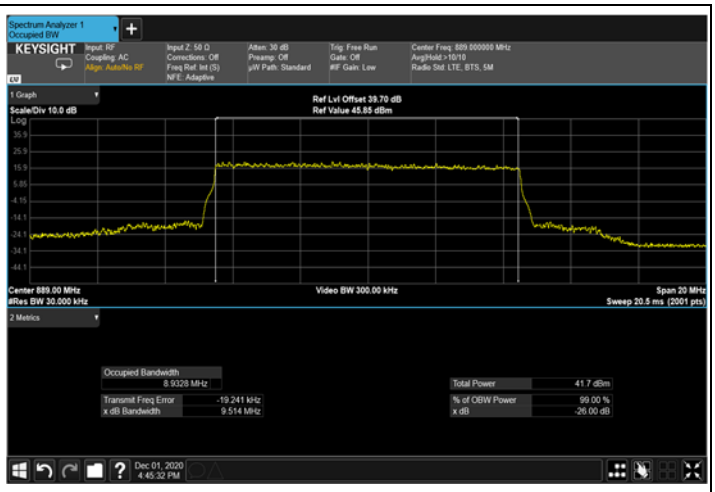

Figure 360: 16QAM 10MHz; 889.0MHz Output 4G

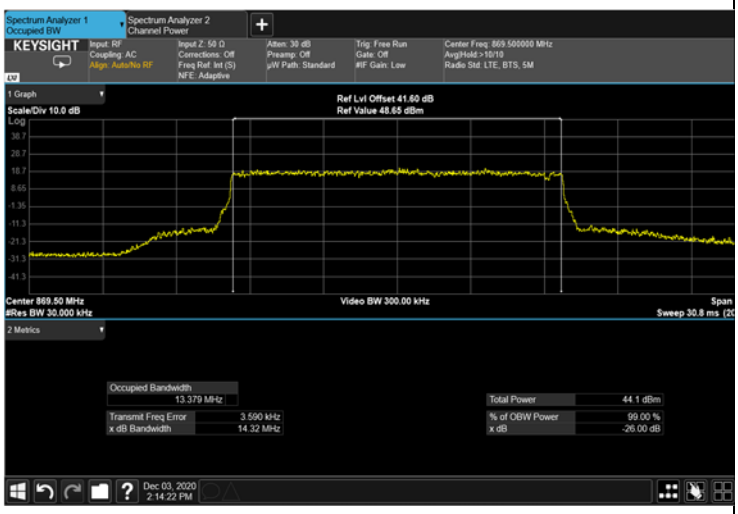

Figure 361: 16QAM 15MHz B.W.; 869.5MHz Output 4G

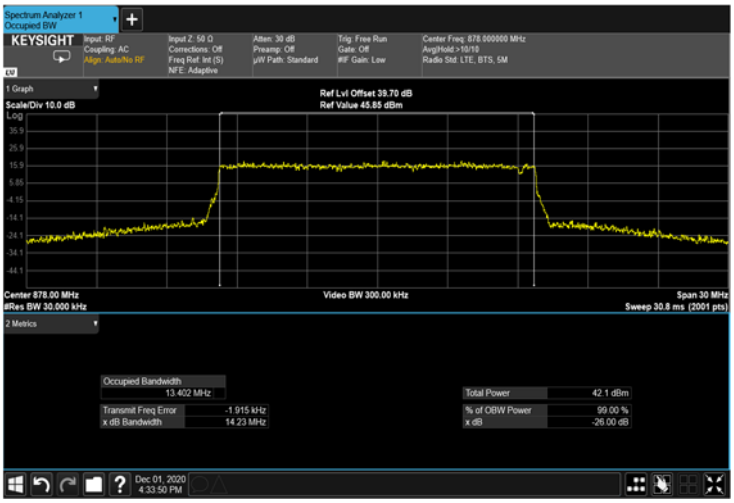

Figure 362: 16QAM 15MHz B.W.; 878.0MHz Output 4G

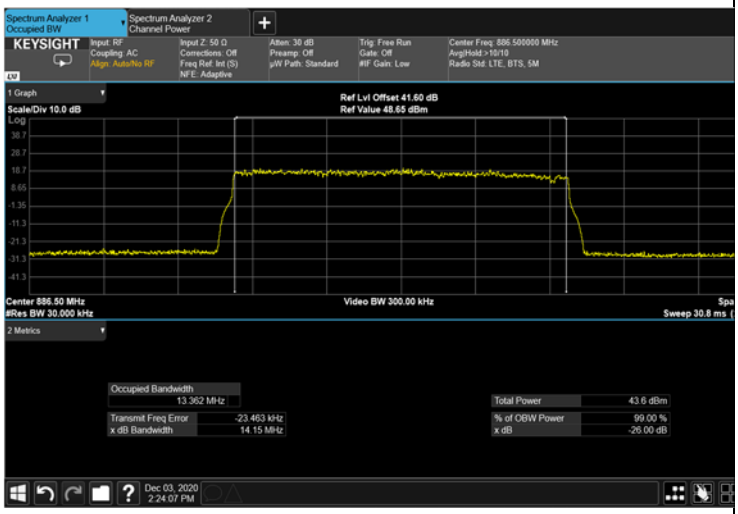

Figure 363: 16QAM 15MHz B.W.; 886.5MHz Output 4G

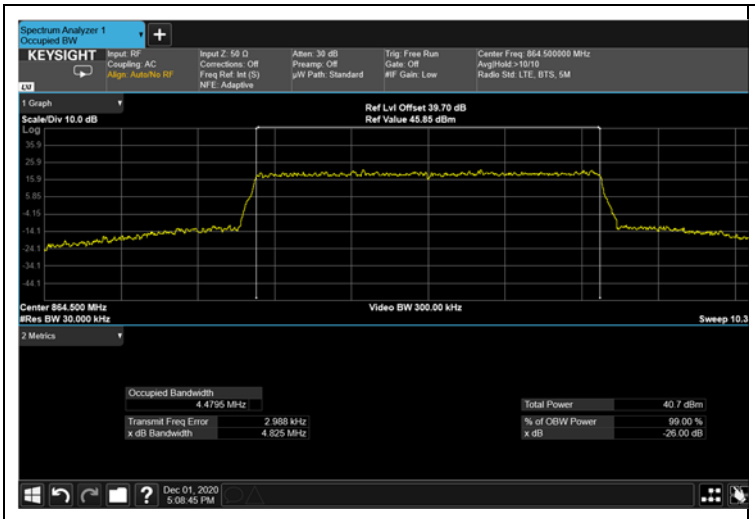

Figure 364: 64QAM 5MHz B.W.; 864.5MHz Output 4G

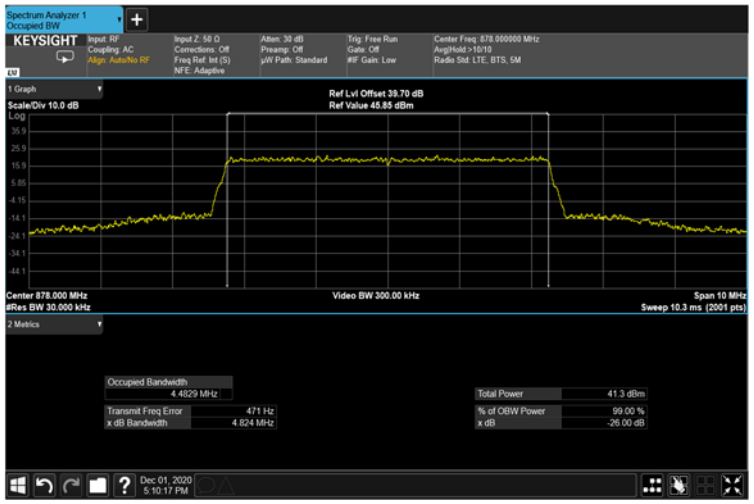

Figure 365: 64QAM 5MHz B.W.; 878.0MHz Output 4G

Figure 366: 64QAM 5MHz B.W.; 891.5MHz Output 4G

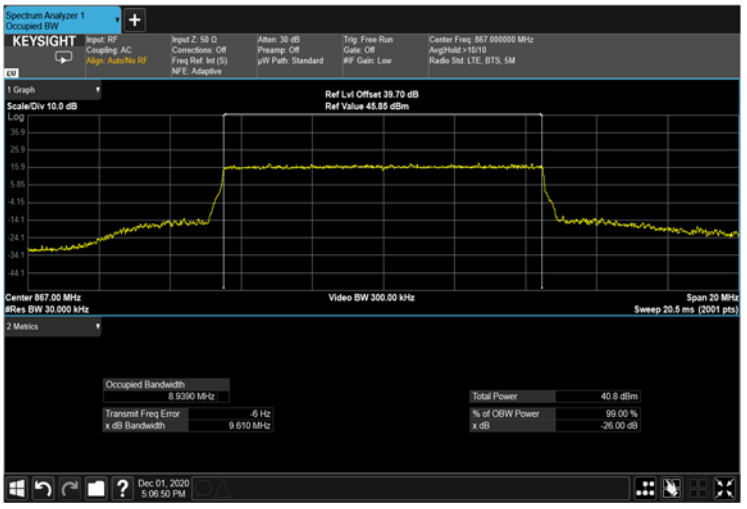

Figure 367: 64QAM 10MHz B.W.; 867.0MHz Output 4G

Figure 368: 64QAM 10MHz; 878.0MHz Output 4G

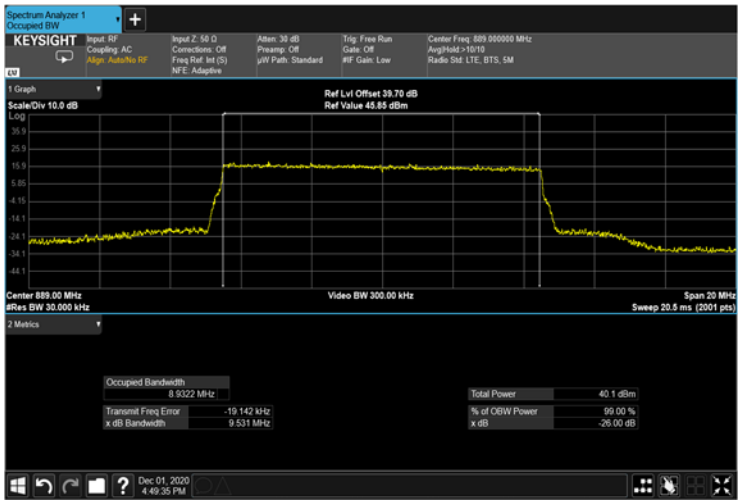

Figure 369: 64QAM 10MHz; 889.0MHz Output 4G

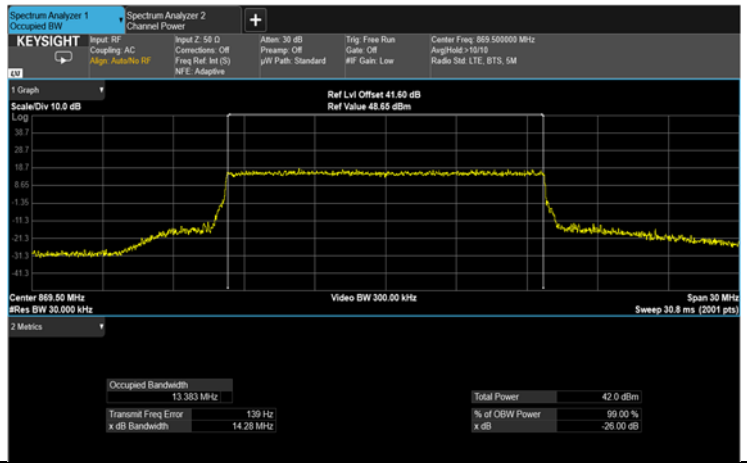

Figure 370: 64QAM 15MHz B.W.; 869.5MHz Output 4G

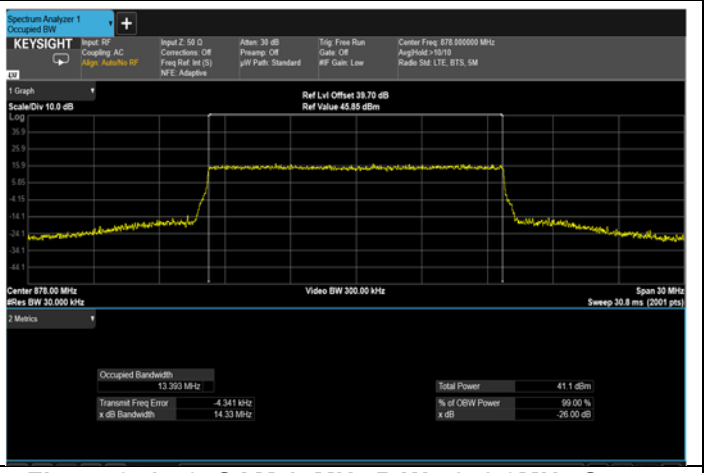

Figure 371: 64QAM 15MHz B.W.; 878.0MHz Output 4G

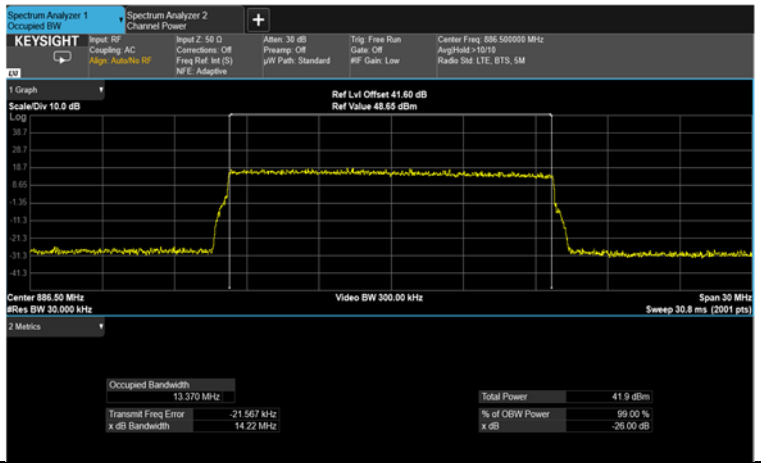

Figure 372: 64QAM 64MHz B.W.; 886.5MHz Output 4G

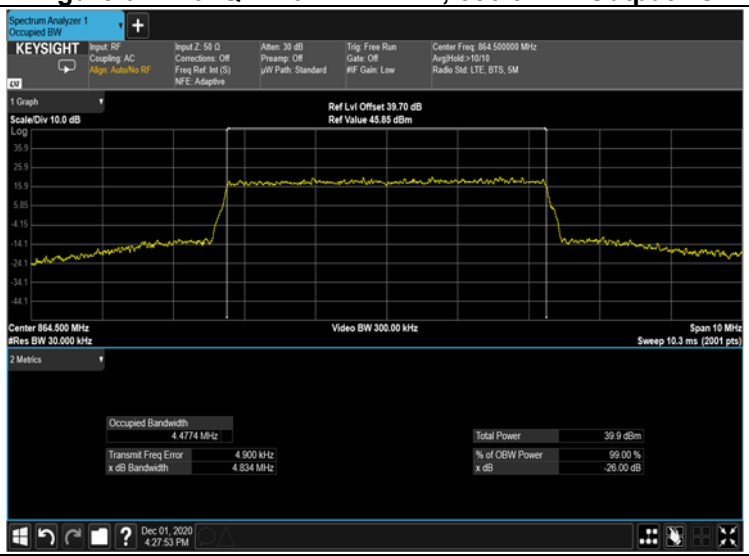

Figure 373: QPSK 5MHz B.W.; 864.5MHz Output 4G

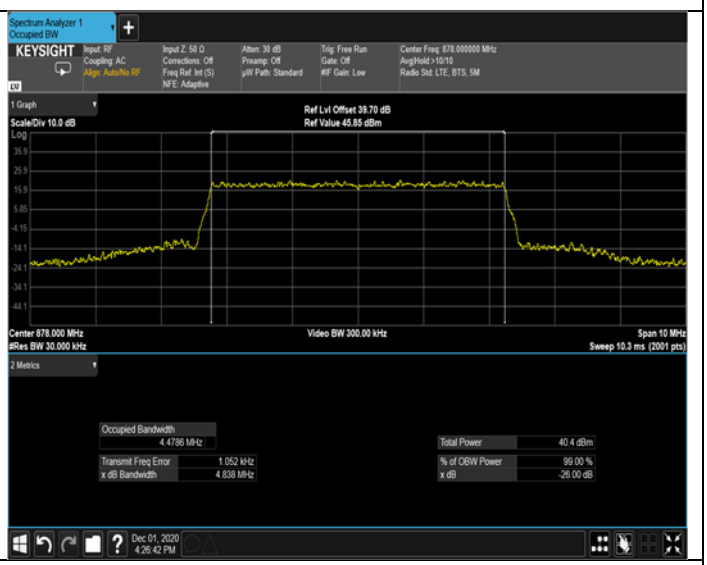

Figure 374: QPSK 5MHz B.W.; 878.0MHz Output 4G

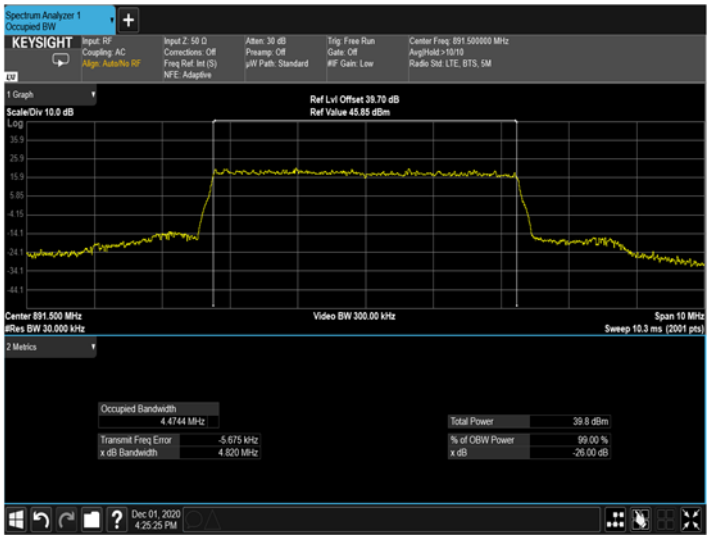

Figure 375: QPSK 5MHz B.W.; 891.5MHz Output 4G

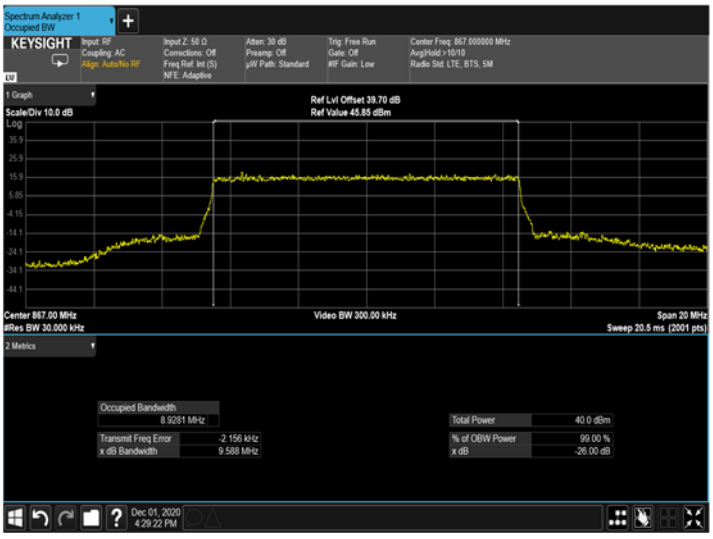

Figure 376: QPSK 10MHz B.W.; 867.0MHz Output 4G

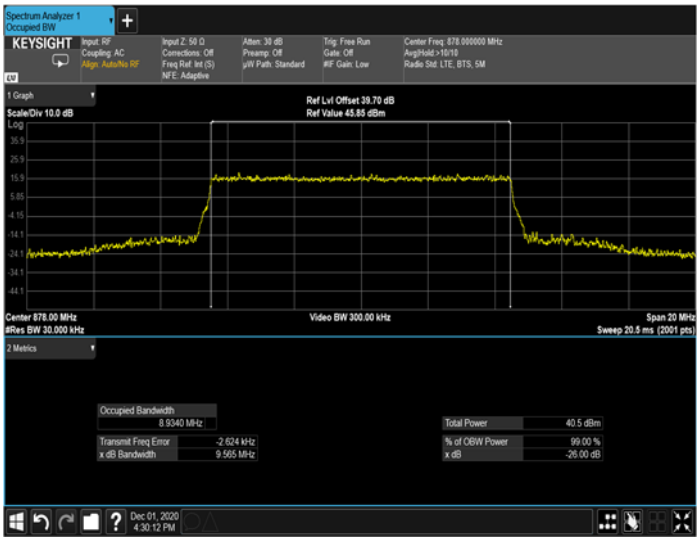

Figure 377: QPSK 10MHz; 878.0MHz Output 4G

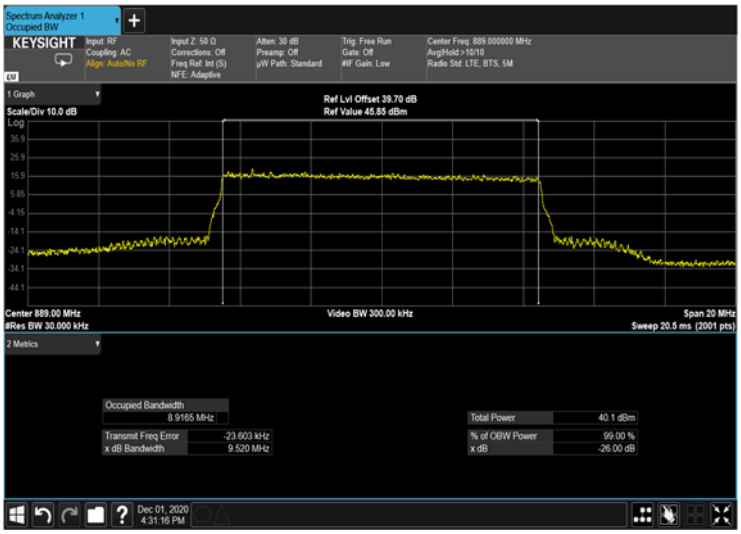

Figure 378: QPSK 10MHz; 889.0MHz Output 4G

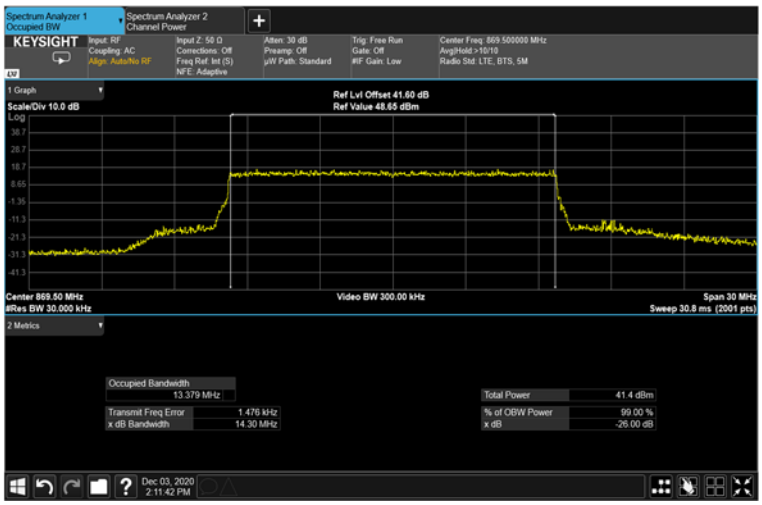

Figure 379: QPSK 15MHz B.W.; 869.5MHz Output 4G

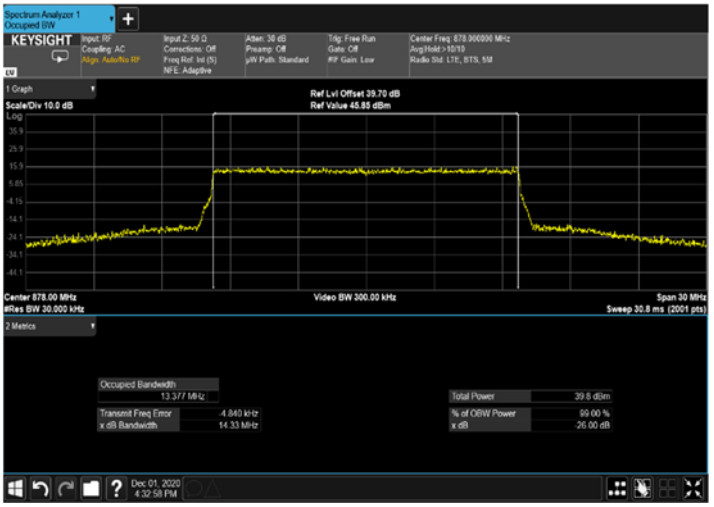

Figure 380: QPSK 15MHz B.W.; 878.0MHz Output 4G

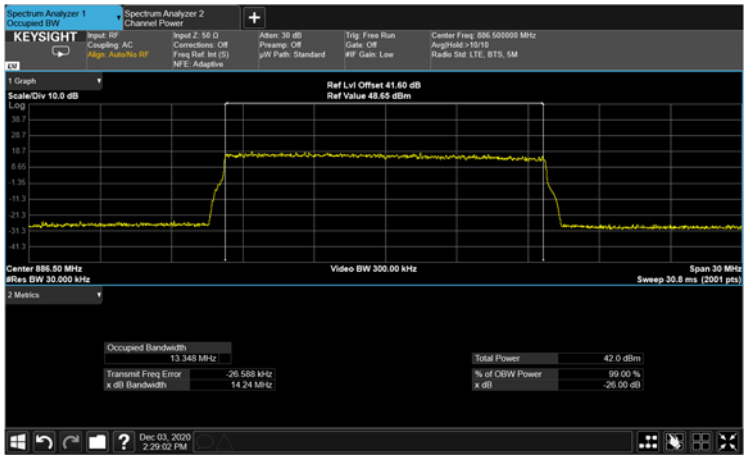

Figure 381: QPSK 15MHz B.W.; 886.5MHz Output 4G

9.5 Test Equipment Used; Occupied Bandwidth

Instrument	Manufacturer	Model	Serial Number	Calibration	
				Last Calibration Date	Next Calibration Due
EXA signal Analyzer	Keysight	UXA N9040B	MY56080119	January 31, 2020	31 January 2022
EXG Vector Signal Generator	Agilent Technologies	N5172B	MY53051952	17 January 2019	17 January 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 38 Test Equipment Used

10 Spurious Emissions at Antenna Terminals - 5G

10.1 Test Specification

FCC Part 27, Subpart C, Sections 27.53(c)(1) (3) 27.53 (g)

10.2 Test Procedure

(Temperature (22°C)/ Humidity (36%RH))

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator and an appropriate coaxial cable (max loss=44dB).

10.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges (862-894MHz) must be attenuated below the transmitting power (P) by a factor of 43+ 10 log (P) dB.

10.4 Test Results

JUDGEMENT: Passed

See additional information in Figure 382 to Figure 453.

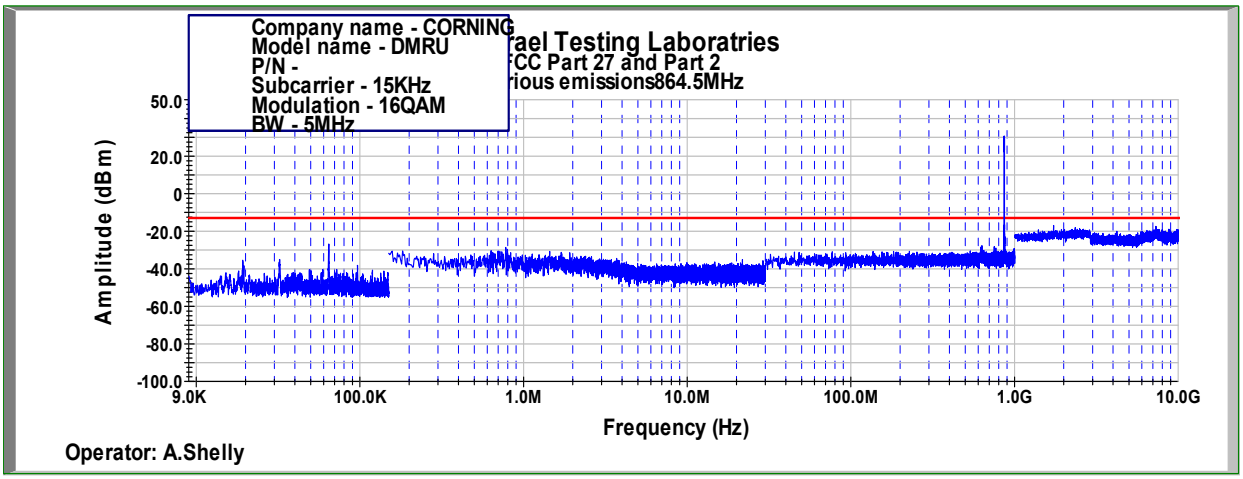

Figure 382: Spurious Emissions at Antenna Terminal 16QAM, 864.5MHz, B.W. 5MHz, Sub Carrier 15kHz

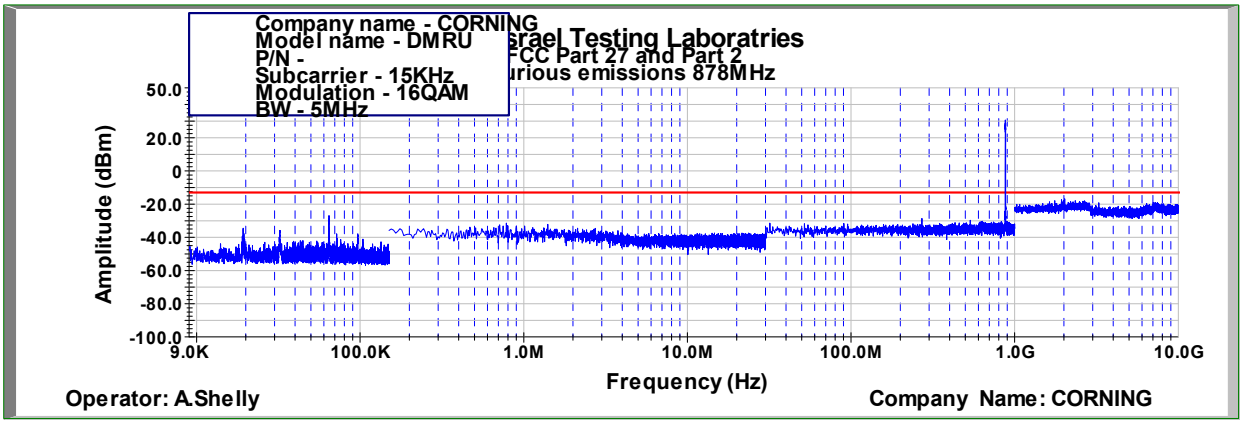

Figure 383: Spurious Emissions at Antenna Terminal 16QAM, 878.0MHz, B.W. 5MHz, Sub Carrier 15kHz

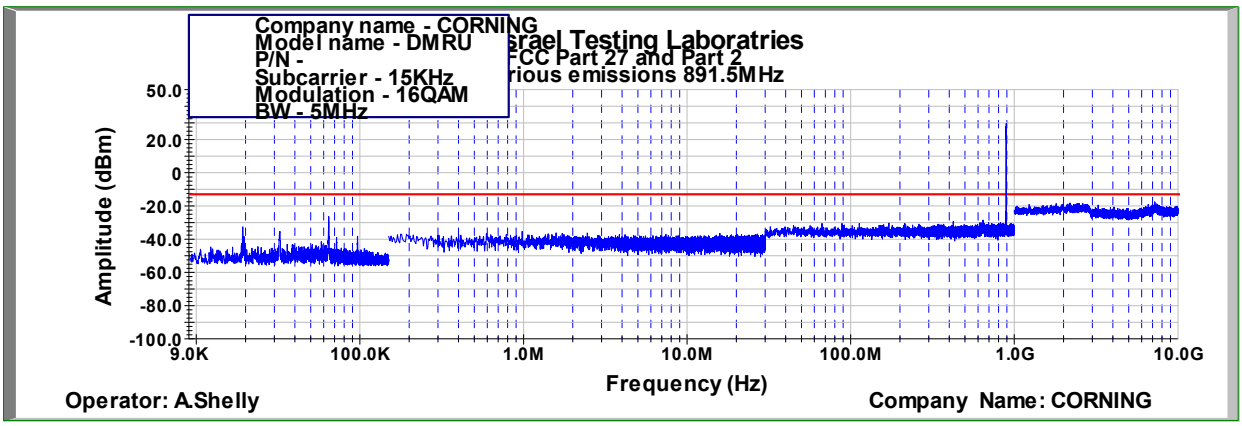

Figure 384: Spurious Emissions at Antenna Terminal 16QAM, 891.5MHz, B.W. 5MHz, Sub Carrier 15kHz

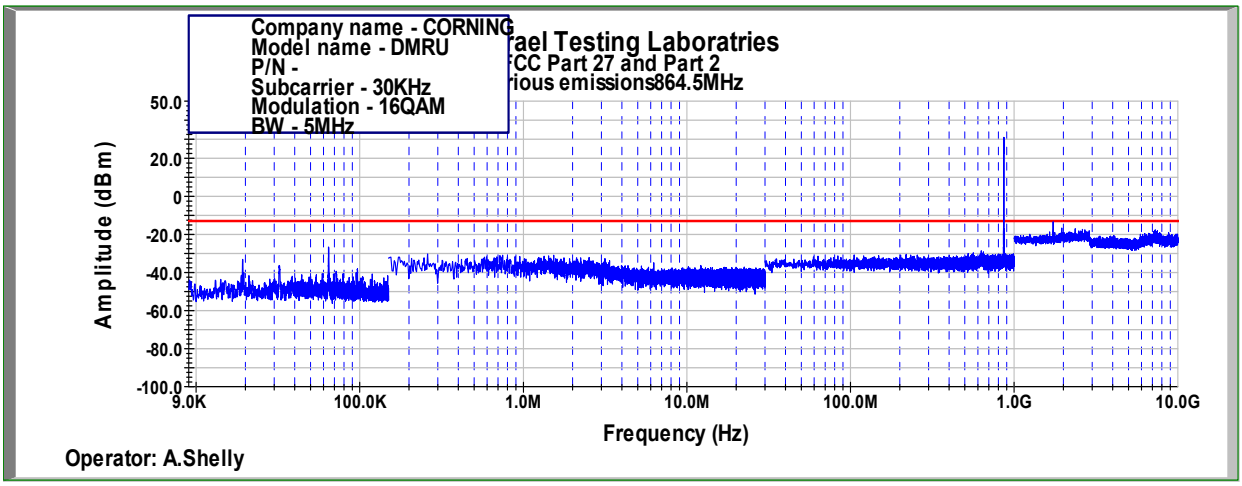

Figure 385: Spurious Emissions at Antenna Terminal 16QAM, 864.5MHz, B.W. 5MHz, Sub Carrier 30kHz

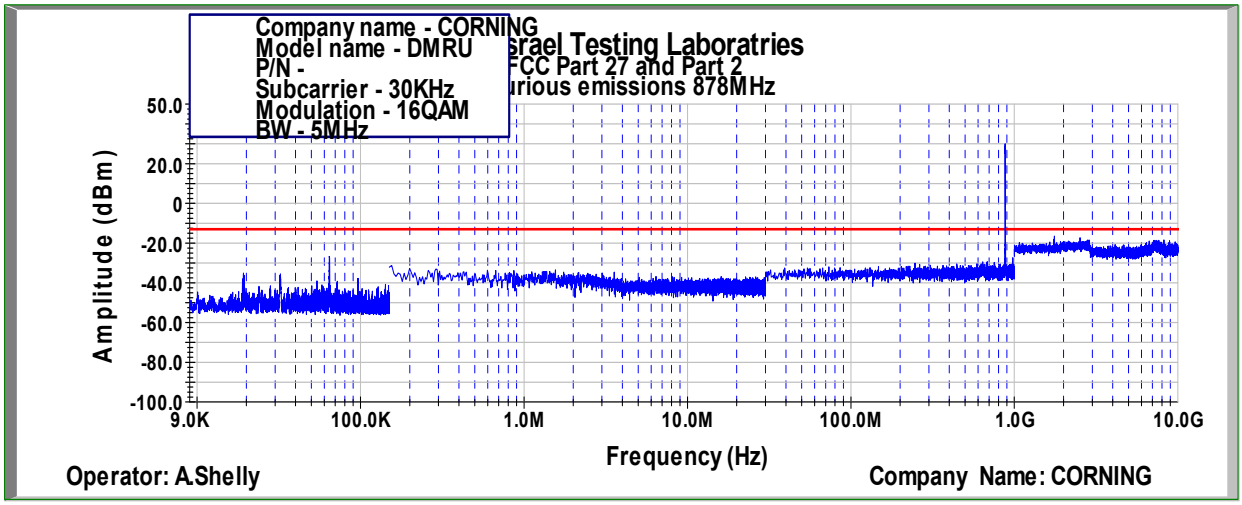

Figure 386: Spurious Emissions at Antenna Terminal 16QAM, 878.0MHz, B.W. 5MHz, Sub Carrier 30kHz

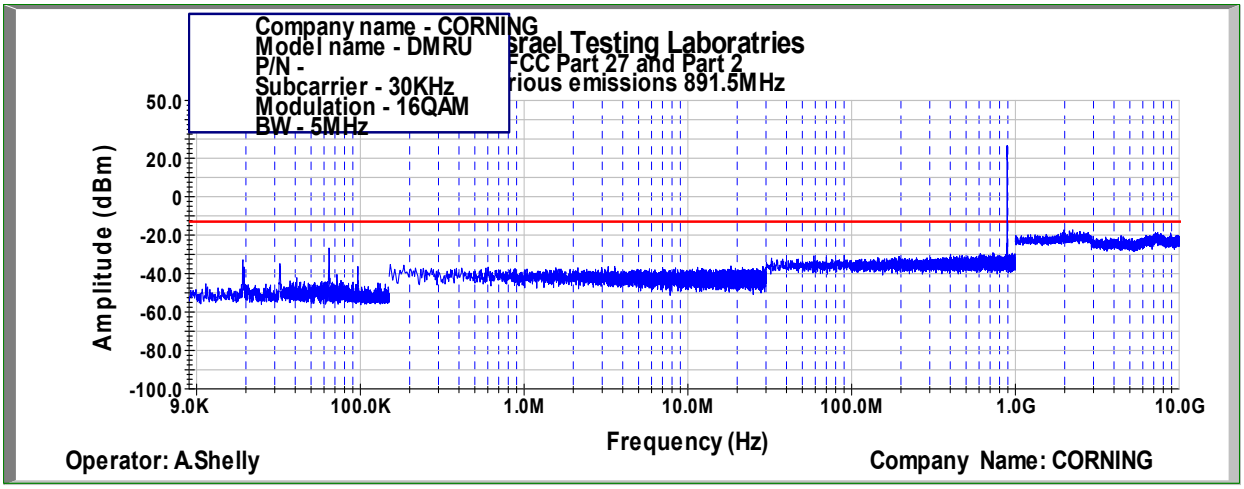

Figure 387: Spurious Emissions at Antenna Terminal 16QAM, 891.5MHz, B.W. 5MHz, Sub Carrier 30kHz

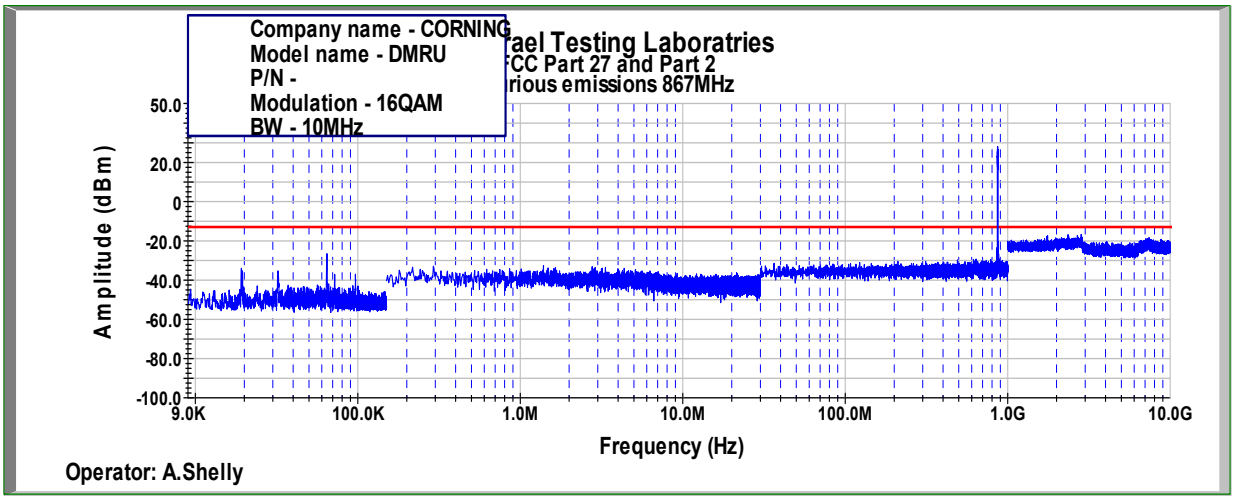

Figure 388: Spurious Emissions at Antenna Terminal 16QAM, 867.0MHz, B.W. 10MHz, Sub Carrier 15kHz

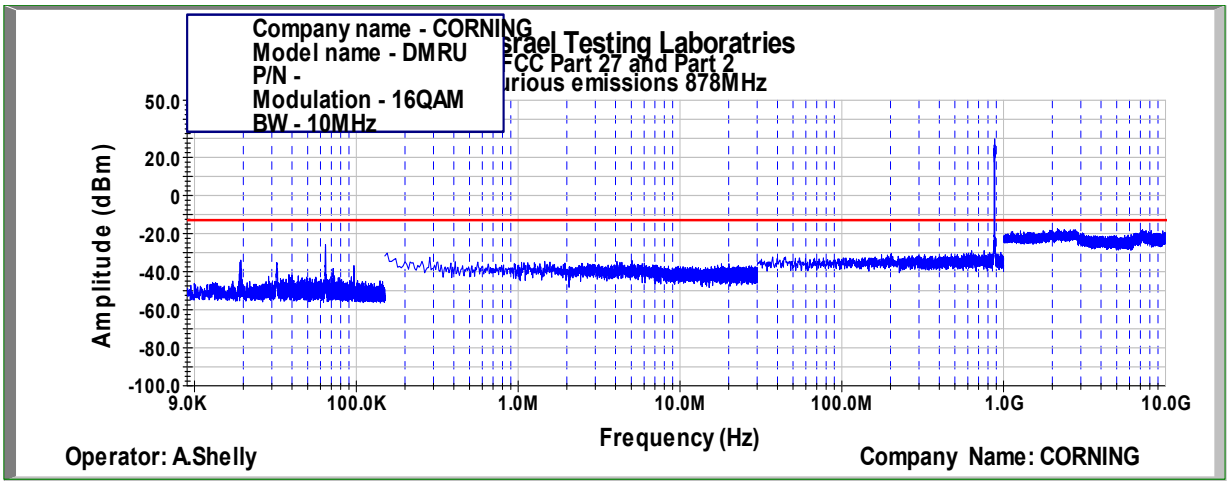

Figure 389: Spurious Emissions at Antenna Terminal 16QAM, 878.0MHz, B.W. 10MHz, Sub Carrier 15kHz

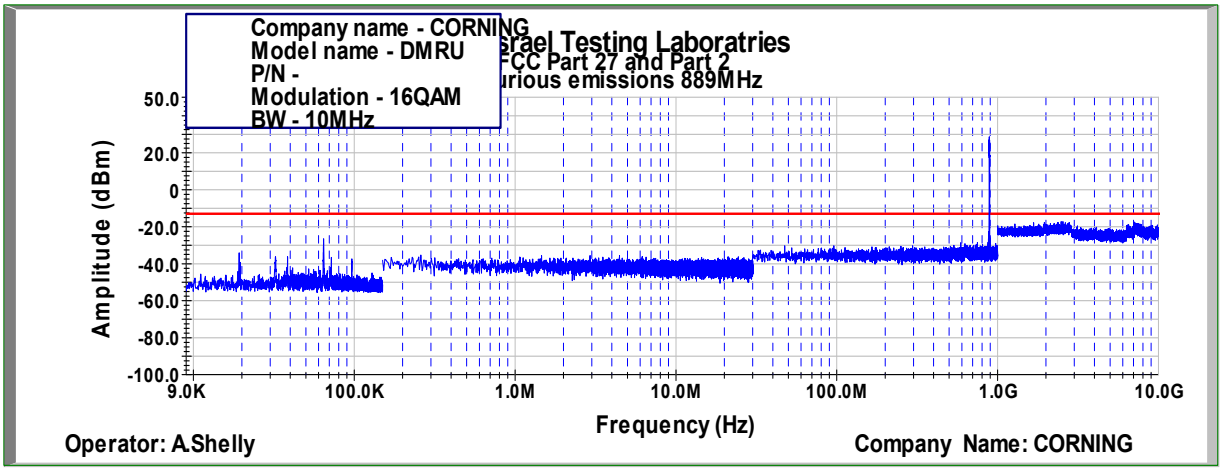

Figure 390: Spurious Emissions at Antenna Terminal 16QAM, 889.0MHz, B.W. 10MHz, Sub Carrier 15kHz