Figure 245: 256QAM 5MHz B.W; 730.5MHz, 15kHz INPUT

Figure 246: 256QAM 5MHz B.W; 730.5MHz, 30kHz INPUT

Figure 247: 256QAM 5MHz; 751.5MHz B.W, 15kHz INPUT

Figure 248: 256QAM 5MHz; 751.5MHz B.W, 30kHz INPUT

Figure 249: 256QAM 5MHz B.W; 765.5MHz, 15kHz INPUT

Figure 250: 256QAM 5MHz B.W; 765.5MHz, 30kHz INPUT

Figure 251: 256QAM 10MHz B.W; 733.0MHz, 15kHz INPUT

Figure 252: 256QAM 10MHz B.W; 733.0MHz, 30kHz INPUT

Figure 253: 256QAM 10MHz B.W; 751.5MHz, 15kHz INPUT

Figure 254: 256QAM 10MHz B.W; 751.5MHz, 30kHz INPUT

Figure 255: 256QAM 10MHz B.W; 763.0MHz, 15kHz INPUT

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

Figure 257: 256QAM 15MHz B.W; 735.5MHz, 15kHz INPUT

Figure 258: 256QAM 15MHz B.W; 735.5MHz, 30kHz INPUT

Figure 259: QPSK 5MHz B.W; 730.5MHz, 15kHz INPUT

Figure 260: QPSK 5MHz B.W; 730.5MHz, 30kHz INPUT

Figure 261: QPSK 5MHz B.W; 751.5MHz, 15kHz INPUT

Figure 262: QPSK 5MHz B.W; 751.5MHz, 30kHz INPUT

Figure 263: QPSK 5MHz B.W; 765.5MHz, 15kHz INPUT

Figure 264: QPSK 5MHz B.W; 765.5MHz, 30kHz INPUT

Figure 265: QPSK 10MHz B.W; 733.0MHz, 15kHz INPUT

Figure 266: QPSK 10MHz B.W; 733.0MHz, 30kHz INPUT

Figure 267: QPSK 10MHz B.W; 751.5MHz, 15kHz INPUT

Figure 268: QPSK 10MHz B.W; 751.5MHz, 30kHz INPUT

Figure 269: QPSK 10MHz B.W; 763.0MHz, 15kHz INPUT

Figure 270: QPSK 10MHz B.W; 763.0MHz, 30kHz INPUT

Figure 271: QPSK 15MHz B.W; 735.5MHz, 15kHz INPUT

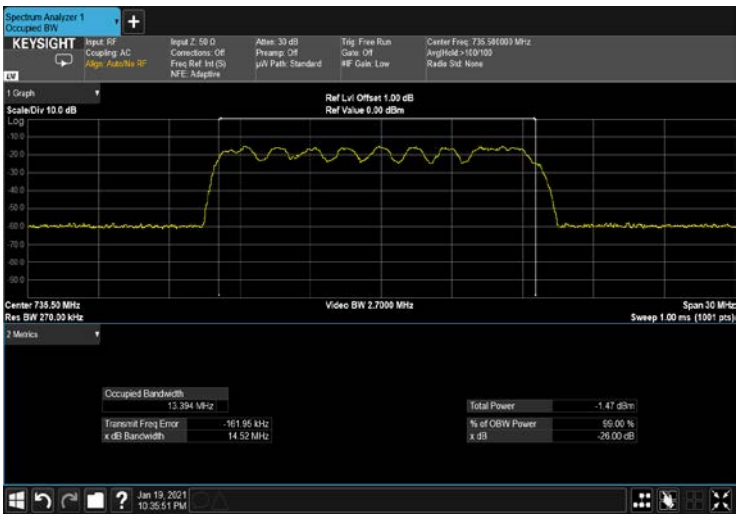

Figure 272: QPSK 15MHz B.W; 735.5MHz, 30kHz INPUT

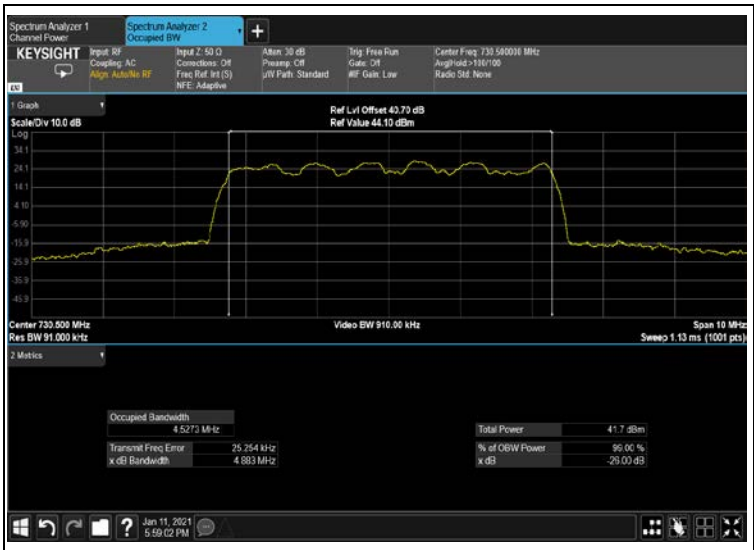

Figure 273: 16QAM 5MHz B.W; 730.5MHz, 15kHz OUTPUT

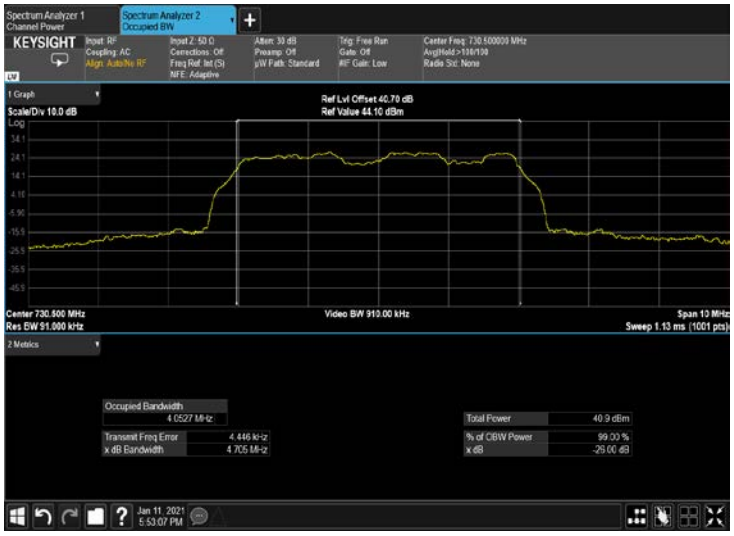

Figure 274: 16QAM 5MHz B.W; 730.5MHz, 30kHz OUTPUT

Figure 275: 16QAM 5MHz B.W; 751.5MHz, 15kHz OUTPUT

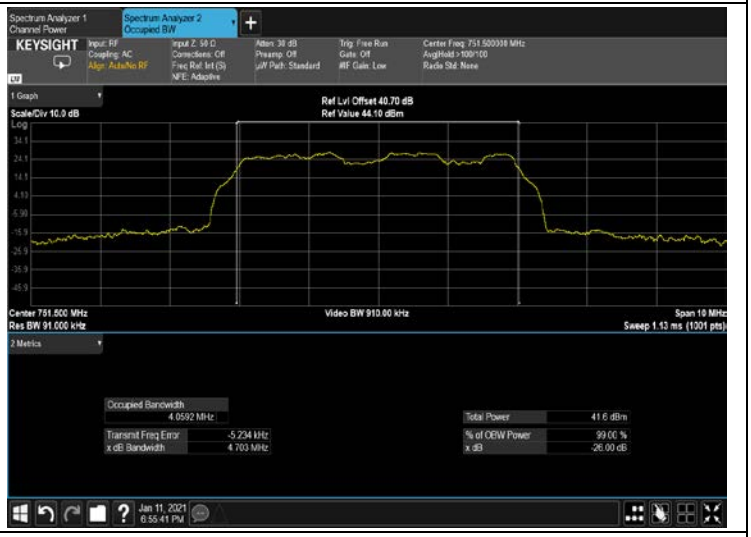

Figure 276: 16QAM 5MHz B.W; 751.5MHz, 30kHz OUTPUT

Figure 277: 16QAM 5MHz B.W; 765.5MHz, 15kHz OUTPUT

Figure 278: 16QAM 5MHz B.W; 765.5MHz, 30kHz OUTPUT

Figure 279: 16QAM 10MHz B.W; 733MHz, 15kHz OUTPUT

Figure 280: 16QAM 10MHz B.W; 733.0MHz, 30kHz OUTPUT

Figure 281: 16QAM 10MHz B.W; 751.5MHz, 15kHz OUTPUT

Figure 282: 16QAM 10MHz B.W; 751.1MHz, 30kHz OUTPUT

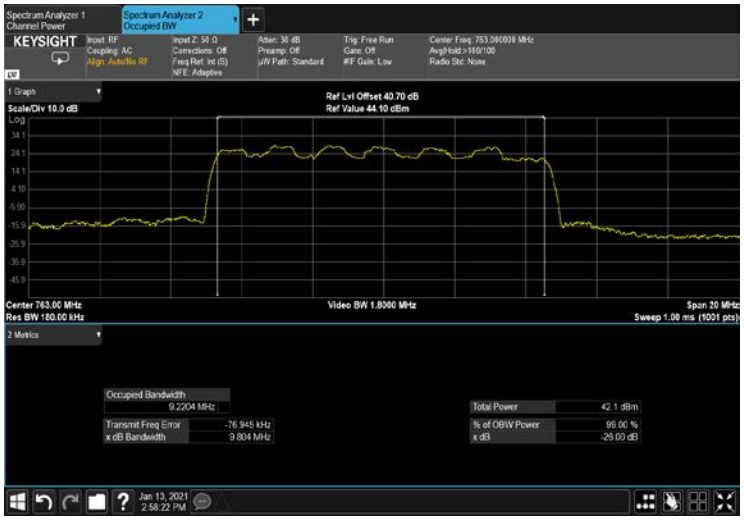

Figure 283: 16QAM 10MHz B.W; 763.0MHz, 15kHz OUTPUT

Figure 284: 16QAM 10MHz B.W; 763.0MHz, 30kHz OUTPUT

Figure 285: 16QAM 15MHz B.W; 735.5MHz, 15kHz OUTPUT

Figure 286: 16QAM 15MHz B.W; 735.5MHz, 30kHz OUTPUT

Figure 287: 64QAM 5MHz B.W; 730.5MHz, 15kHz OUTPUT

Figure 288: 64QAM 5MHz B.W; 730.5MHz, 30kHz OUTPUT

Figure 289: 64QAM 5MHz B.W; 751.5MHz, 15kHz OUTPUT

Figure 290: 64QAM 5MHz B.W; 751.5MHz, 30kHz OUTPUT

Figure 291: 64QAM 5MHz B.W; 765.5MHz, 15kHz OUTPUT

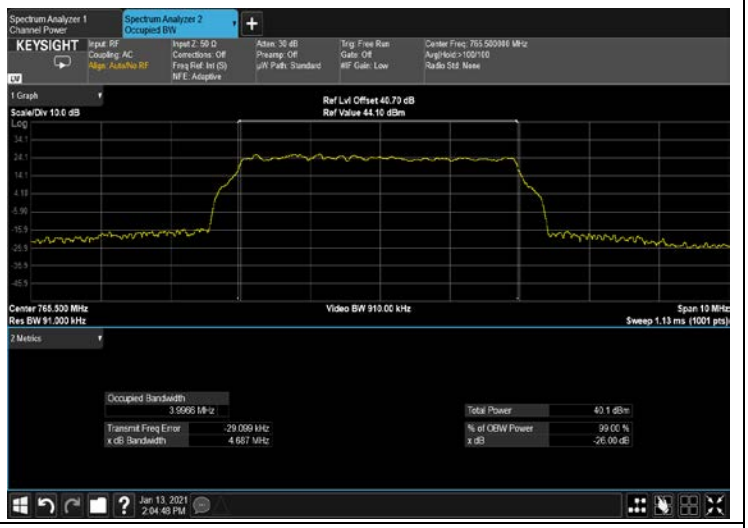

Figure 292: 64QAM 5MHz B.W; 765.5MHz, 30kHz OUTPUT

Figure 293: 64QAM 10MHz B.W; 733.0MHz, 15kHz OUTPUT

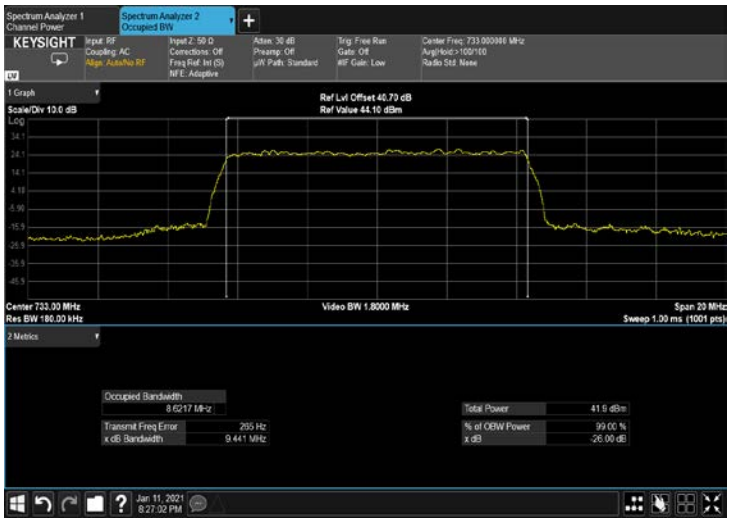

Figure 294: 64QAM 10MHz B.W; 733.0MHz, 30kHz OUTPUT

Figure 295: 64QAM 10MHz B.W; 751.5MHz, 15kHz OUTPUT

Figure 296: 64QAM 10MHz B.W; 751.5MHz, 30kHz OUTPUT

Figure 297: 64QAM 10MHz B.W; 763.0MHz, 15kHz OUTPUT

Figure 298: 64QAM 10MHz B.W; 763.0MHz, 30kHz OUTPUT

Figure 299: 64QAM 15MHz B.W; 735.5MHz, 15kHz OUTPUT

Figure 300: 64QAM 15MHz B.W; 735.5MHz, 30kHz OUTPUT

Figure 301: 256QAM 5MHz B.W; 730.5MHz, 15kHz OUTPUT

Figure 302: 256QAM 5MHz B.W; 730.5MHz, 30kHz OUTPUT

Figure 303: 256QAM 5MHz; 751.5MHz B.W, 15kHz OUTPUT

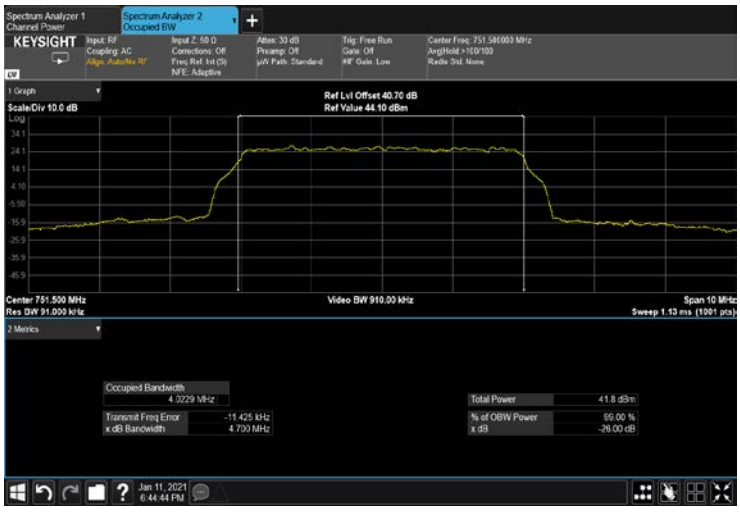

Figure 304: 256QAM 5MHz; 751.5MHz B.W, 30kHz OUTPUT

Figure 305: 256QAM 5MHz B.W; 765.5MHz, 15kHz OUTPUT

Figure 306: 256QAM 5MHz B.W; 765.5MHz, 30kHz OUTPUT

Figure 307: 256QAM 10MHz B.W; 733MHz, 15kHz OUTPUT

Figure 308: 256QAM 10MHz B.W; 733.0MHz, 30kHz OUTPUT

Figure 309: 256QAM 10MHz B.W; 751.5MHz, 15kHz OUTPUT

Figure 310: 256QAM 10MHz B.W; 751.0MHz, 30kHz OUTPUT

Figure 311: 256QAM 10MHz B.W; 763.0MHz, 15kHz OUTPUT

Figure 312: 256QAM 10MHz B.W; 763.0MHz, 30kHz OUTPUT

Figure 313: 256QAM 15MHz B.W; 735.5MHz, 15kHz OUTPUT

Figure 314: 256QAM 15MHz B.W; 735.5MHz, 30kHz OUTPUT

Figure 315: QPSK 5MHz B.W; 730.5MHz, 15kHz OUTPUT

Figure 316: QPSK 5MHz B.W; 730.5MHz, 30kHz OUTPUT

Figure 317: QPSK 5MHz B.W; 751.5MHz, 15kHz OUTPUT

Figure 318: QPSK 5MHz B.W; 751.5MHz, 30kHz OUTPUT

Figure 319: QPSK 5MHz B.W; 765.5MHz, 15kHz OUTPUT

Figure 320: QPSK 5MHz B.W; 765.5MHz, 30kHz OUTPUT

Figure 321: QPSK 10MHz B.W; 733.0MHz, 15kHz OUTPUT

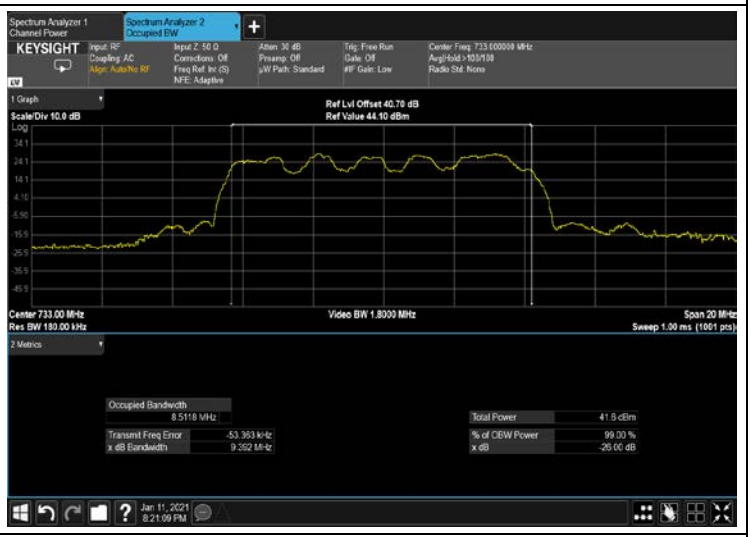

Figure 322: QPSK 10MHz B.W; 733.0MHz, 30kHz OUTPUT

Figure 323: QPSK 10MHz B.W; 751.5MHz, 15kHz OUTPUT

Figure 324: QPSK 10MHz B.W; 751.5MHz, 30kHz OUTPUT

Figure 325: QPSK 10MHz B.W; 763.0MHz, 15kHz OUTPUT

Figure 326: QPSK 10MHz B.W; 763.0MHz, 30kHz OUTPUT

Figure 327: QPSK 15MHz B.W; 735.5MHz, 15kHz OUTPUT

Figure 328: QPSK 15MHz B.W; 735.5MHz, 30kHz OUTPUT

10.5 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 36 Test Equipment Used

11 Occupied Bandwidth – 4G

11.1 Test Specification

FCC Part 2, Section 1049

11.2 Test Procedure

(Temperature (20°C)/ Humidity (48%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.

11.3 Test Limit

N/A

11.4 Test Results

JUDGEMENT: Passed

See additional information in Table 37 to Table 42 and Figure 329 to Figure 370.

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(dBm)
16QAM	5	730.5	4.4725
		751.5	4.4721
		765.5	4.4716
	10	733	8.9943
		751.5	8.9446
		763	8.9449
	15	735.5	13.394

Table 37 Occupied Bandwidth 16QAM Input - 4G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
16QAM	5	730.5	4.4665
		751.5	4.4703
		765.5	4.4685
	10	733	8.9253
		751.5	8.9364
		763	8.9305
	15	735.5	18.381

Table 38 Occupied Bandwidth 16QAM Output – 4G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
64QAM	5	730.5	4.4847
		751.5	4.4840
		765.5	4.4861
	10	733	8.9449
		751.5	8.9460
		763	8.9459
	15	735.5	13.394

Table 39 Occupied Bandwidth 64QAM Input – 4G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
64QAM	5	730.5	4.4769
		751.5	4.4797
		765.5	4.4755
	10	733	8.9343
		751.5	8.9279
		763	8.9353
	15	735.5	13.382

Table 40 Occupied Bandwidth 64QAM Output – 4G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
QPSK	5	730.5	4.4772
		751.5	4.4783
		765.5	4.4843
	10	733	8.9358
		751.5	8.9456
		763	8.9303
	15	735.5	13.382

Table 41 Occupied Bandwidth QPSK Input – 4G

Modulation	Bandwidth	Operation Frequency	Reading
	(MHz)	(MHz)	(MHz)
QPSK	5	730.5	4.4731
		751.5	4.4756
		765.5	4.4726
	10	733	8.9209
		751.5	8.9282
		763	8.9209
	15	735.5	13.370

Table 42 Occupied Bandwidth QPSK Output - 4G

Figure 329: 16QAM 5MHz B.W; 730.5MHz Input 4G

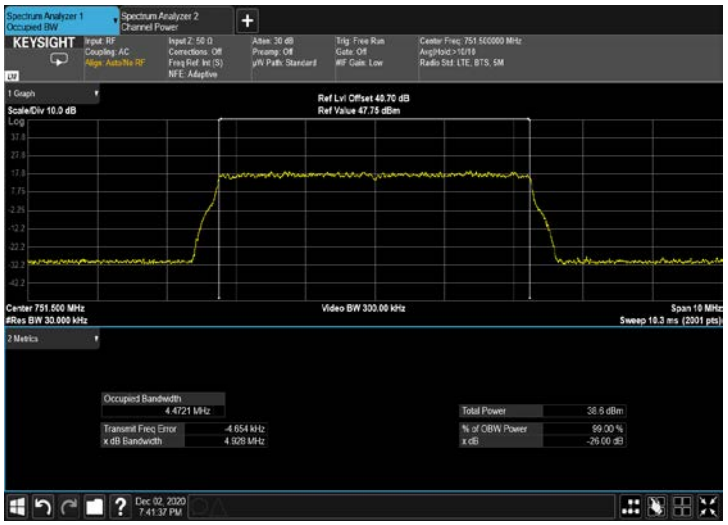

Figure 330: 16QAM 5MHz B.W; 751.5MHz Input 4G

Figure 331: 16QAM 5MHz B.W; 765.5MHz Input 4G

Figure 332: 16QAM 10MHz B.W; 733.0MHz Input 4G

Figure 333: 16QAM 10MHz; 751.5MHz Input 4G

Figure 334: 16QAM 10MHz; 763.0MHz Input 4G

Figure 335: 16QAM 15MHz B.W; 735.5MHz Input 4G

Figure 336: 64QAM 5MHz B.W; 730.5MHz Input 4G

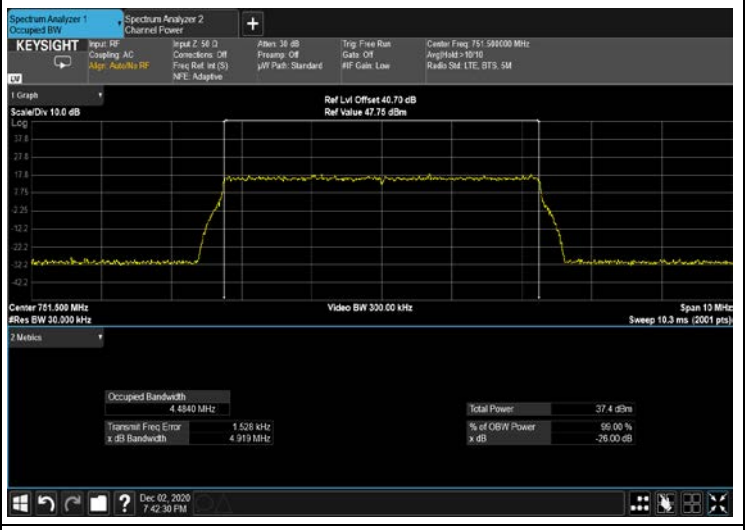

Figure 337: 64QAM 5MHz B.W; 751.5MHz Input 4G

Figure 338: 64QAM 5MHz B.W; 765.5MHz Input 4G

Figure 339: 64QAM 10MHz B.W; 733MHz Input 4G

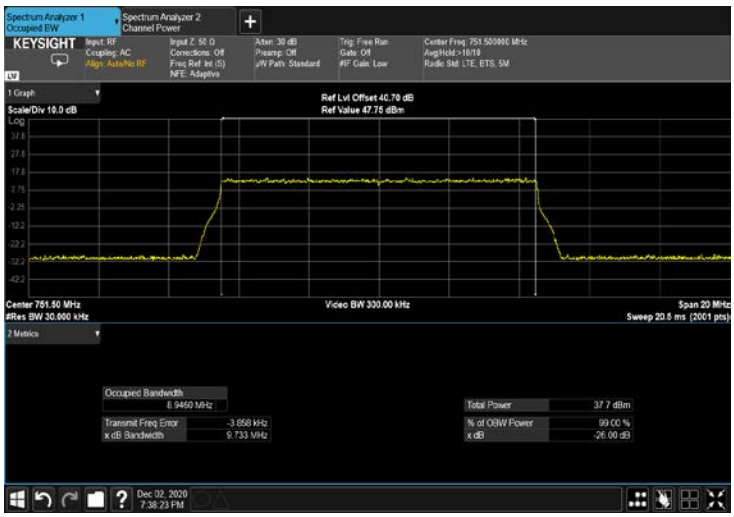

Figure 340: 64QAM 10MHz; 751.5MHz Input 4G

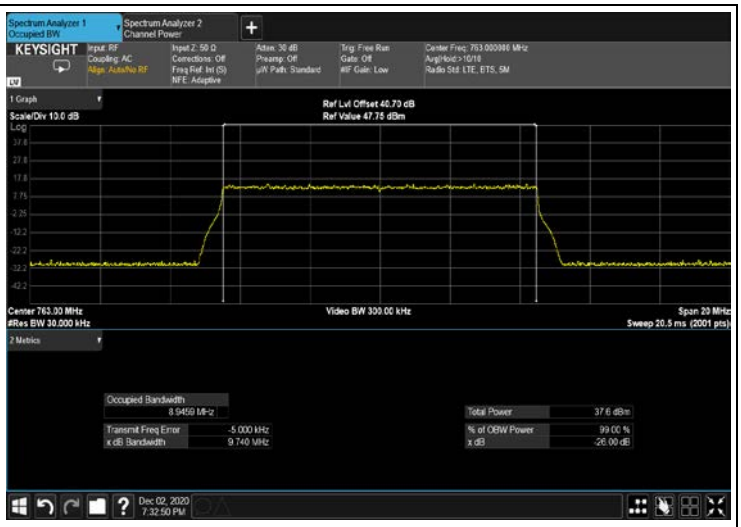

Figure 341: 64QAM 10MHz; 763MHz Input 4G

Figure 342: 64QAM 15MHz B.W; 735.5MHz Input 4G

Figure 343: QPSK 5MHz B.W; 730.5MHz Input 4G

Figure 344: QPSK 5MHz B.W; 751.5MHz Input 4G

Figure 345: QPSK 5MHz B.W; 765.5MHz Input 4G

Figure 346: QPSK 10MHz B.W; 733.0MHz Input 4G

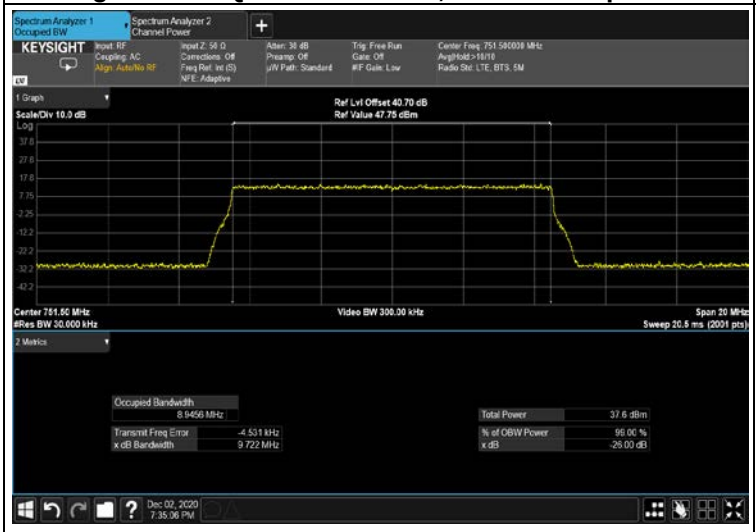

Figure 347: QPSK 10MHz ; 751.5MHz Input 4G

Figure 348: QPSK 10MHz; 763.0MHz Input 4G

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

Figure 350: 16QAM 5MHz B.W; 730.5MHz output 4G

Figure 351: 16QAM 5MHz B.W; 751.5MHz output 4G

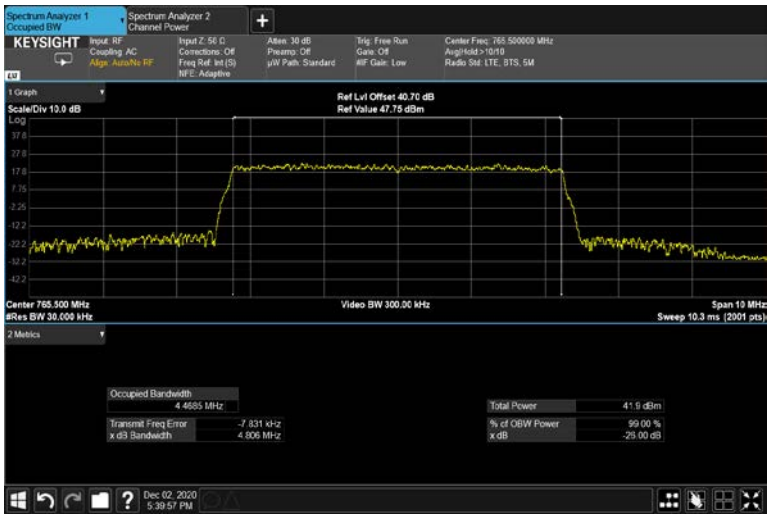

Figure 352: 16QAM 5MHz B.W; 765.5MHz output 4G

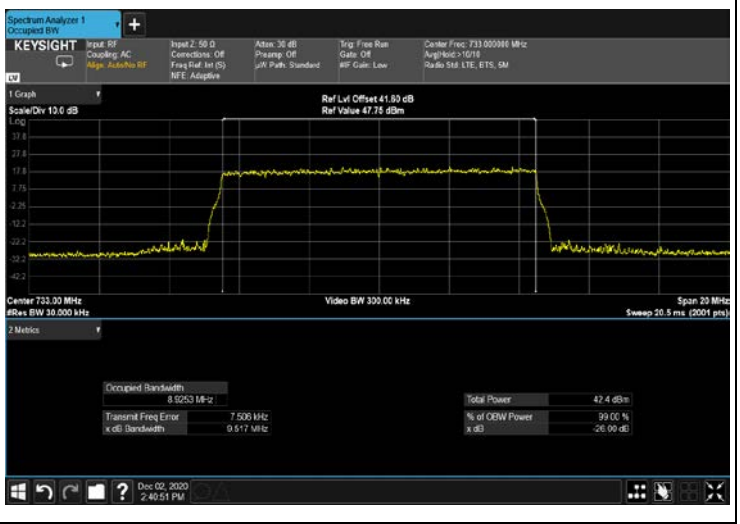

Figure 353: 16QAM 10MHz B.W; 733MHz output 4G

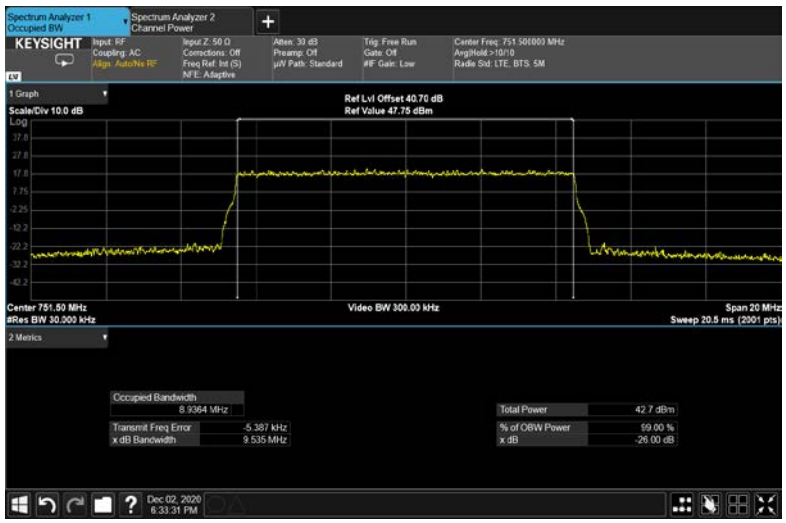

Figure 354: 16QAM 10MHz; 751.5MHz output 4G

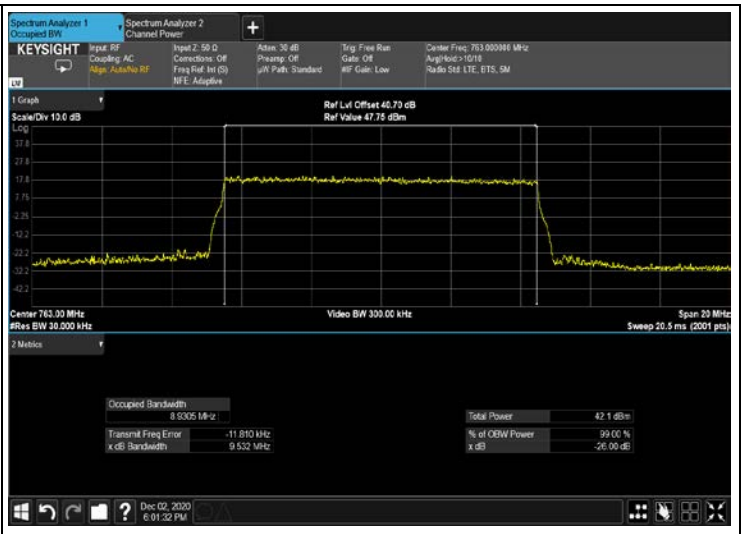

Figure 355: 16QAM 10MHz; 763.0MHz output 4G

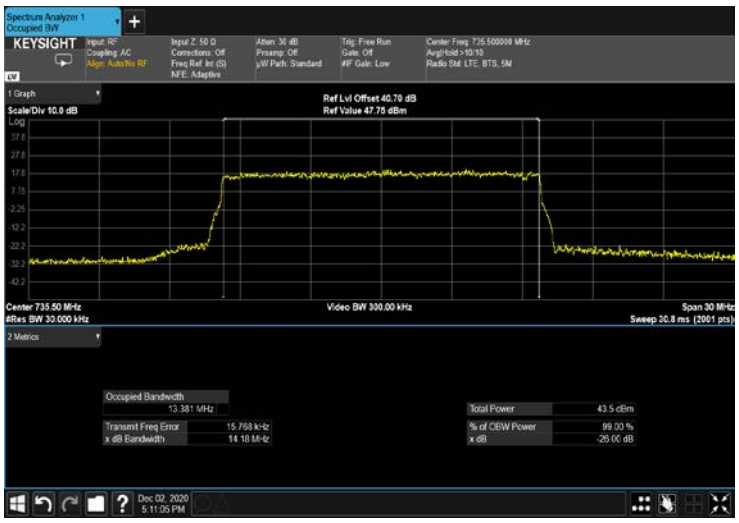

Figure 356: 16QAM 15MHz B.W; 735.5MHz output 4G

Figure 357: 64QAM 5MHz B.W; 730.5MHz output 4G

Figure 358: 64QAM 5MHz B.W; 751.5MHz output 4G

Figure 359: 64QAM 5MHz B.W; 765.5MHz output 4G

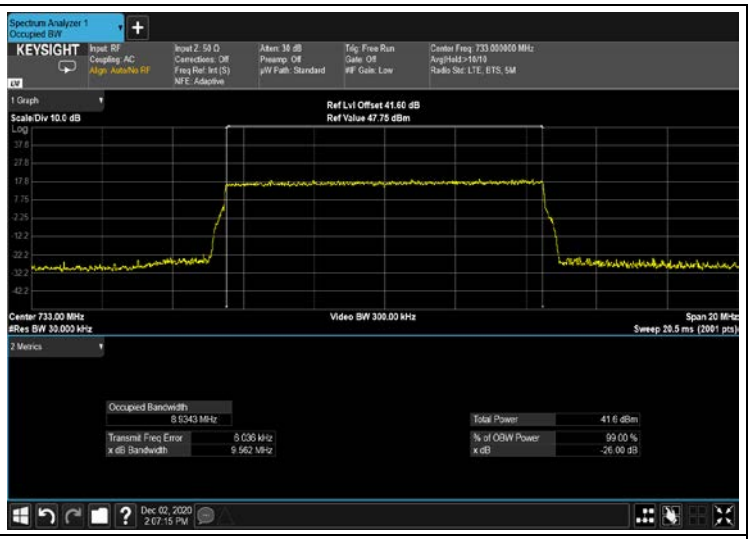

Figure 360: 64QAM 10MHz B.W; 733.0MHz output 4G

Figure 361: 64QAM 10MHz; 751.5MHz output 4G

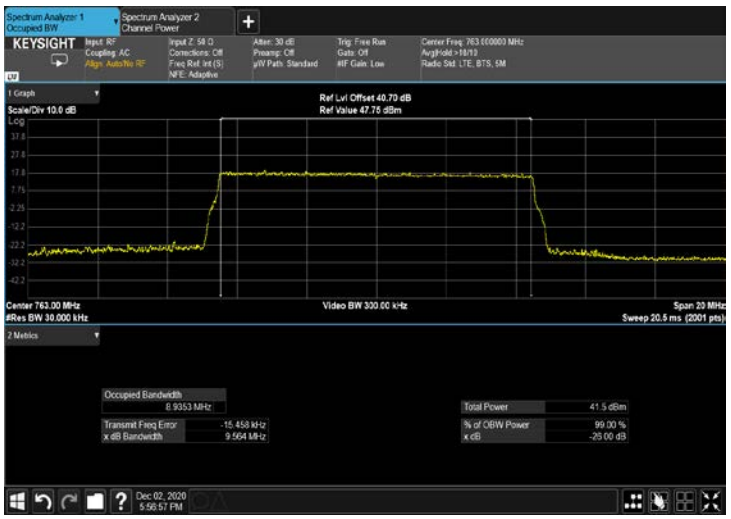

Figure 362: 64QAM 10MHz; 763MHz output 4G

Figure 363: 64QAM 15MHz B.W; 735.5MHz output 4G

Figure 364: QPSK 5MHz B.W; 730.5MHz output 4G

Figure 365: QPSK 5MHz B.W; 751.5MHz output 4G

Figure 366: QPSK 5MHz B.W; 765.5MHz output 4G

Figure 367: QPSK 10MHz B.W; 733MHz output 4G

Figure 368: QPSK 10MHz ; 751.5MHz output 4G

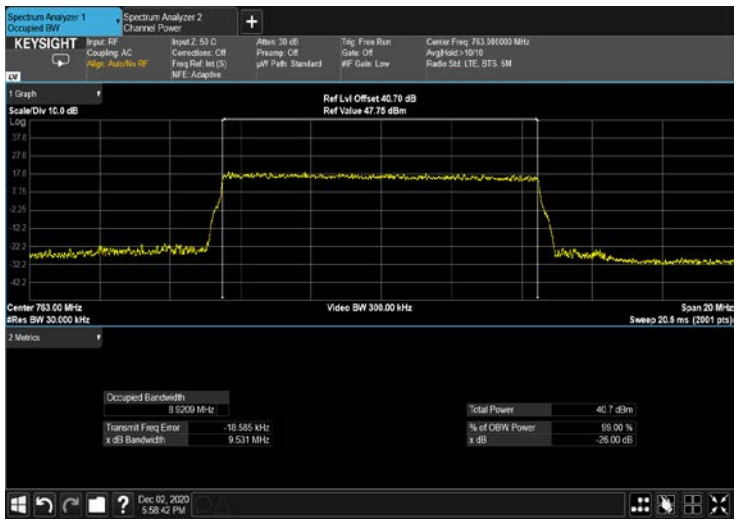

Figure 369: QPSK 10MHz ; 763.0MHz output 4G

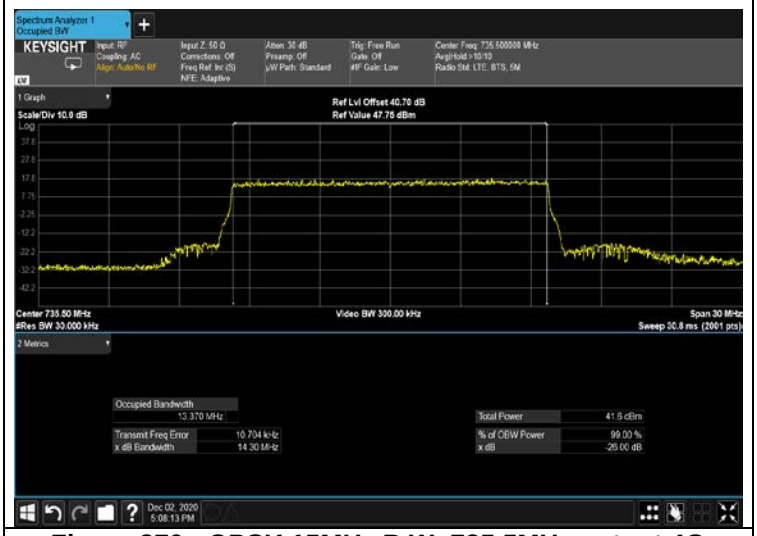

Figure 370: QPSK 15MHz B.W; 735.5MHz output 4G

11.5 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 43 Test Equipment Used

12 Spurious Emissions at Antenna Terminals - 5G

12.1 Test Specification

FCC Part 27, Subpart C, Sections 27.53

12.2 Test Procedure

(Temperature (20°C)/ Humidity (48%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).

12.3 Test Limit

The power of any emission outside of the authorized operating frequency ranges (728 -768MHz) must be attenuated below the transmitting power (P) by a factor of 43+ 10 log (P) dB.

12.4 Test Results

JUDGEMENT: Passed

See additional information in Figure 371 to Figure 426.

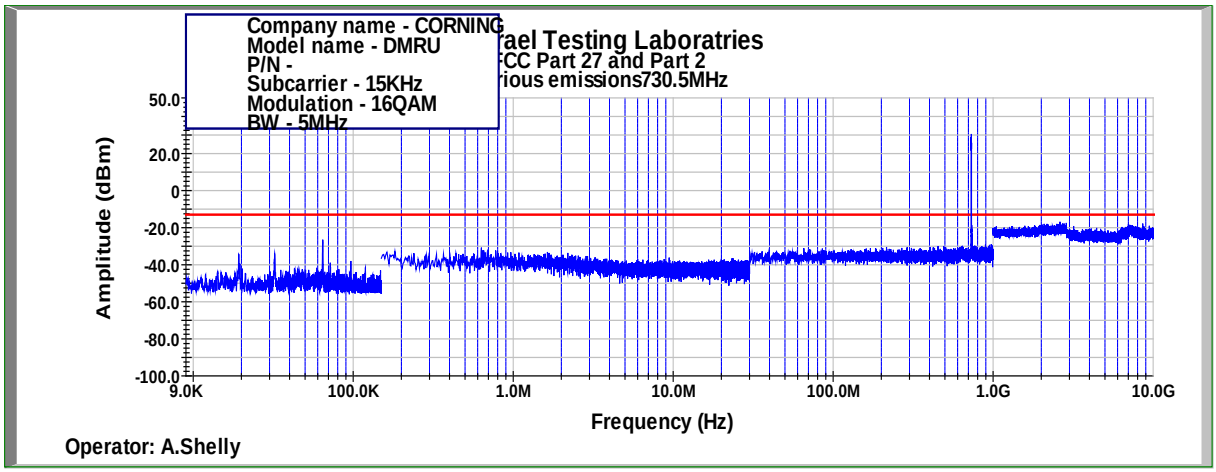

Figure 371: Spurious Emissions at Antenna Terminal 16QAM, 730.5MHz, B.W. 5MHz, Sub Carrier 15kHz

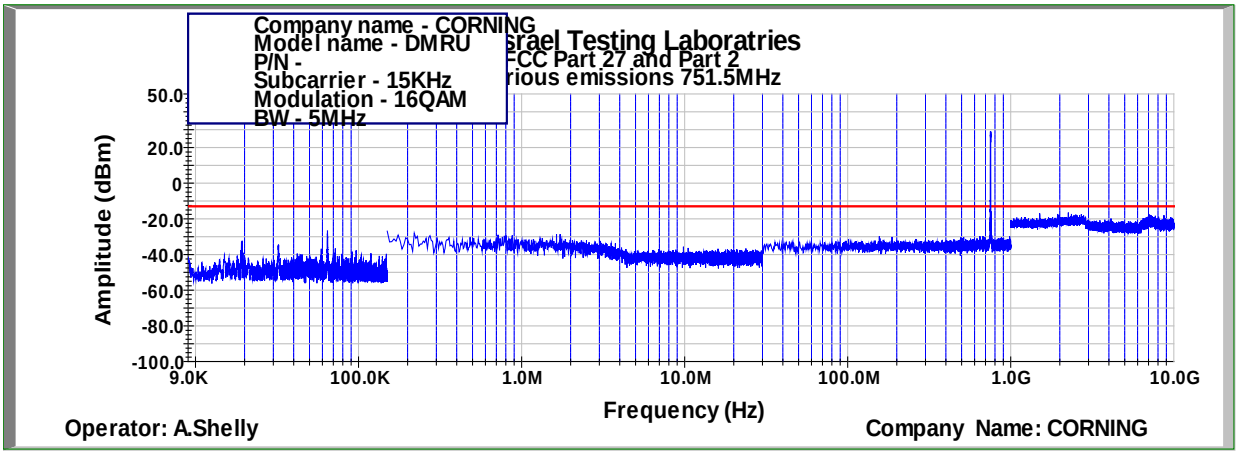

Figure 372: Spurious Emissions at Antenna Terminal 16QAM, 751.5MHz, B.W. 5MHz, Sub Carrier 15kHz

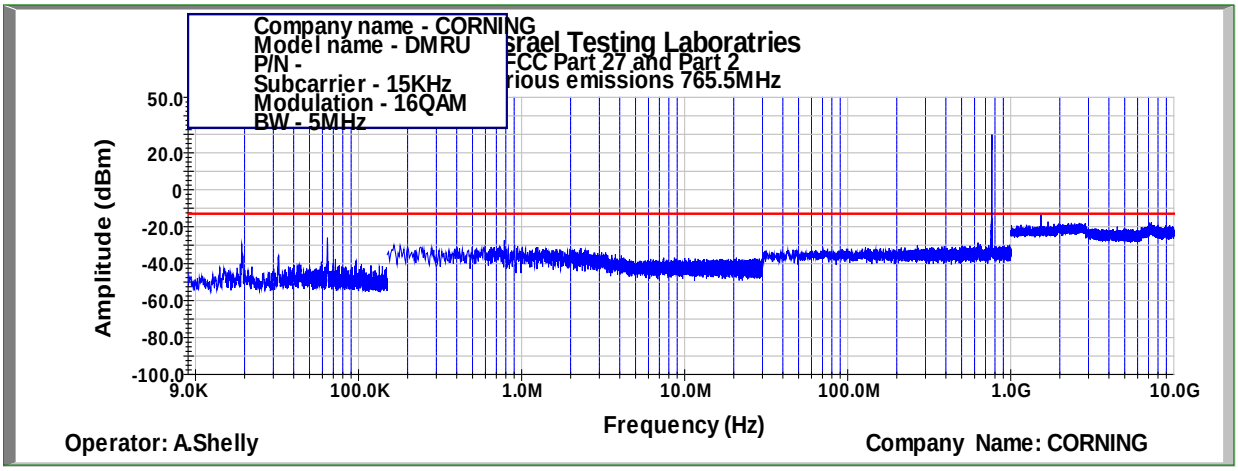

Figure 373: Spurious Emissions at Antenna Terminal 16QAM, 765.5MHz, B.W. 5MHz, Sub Carrier 15kHz

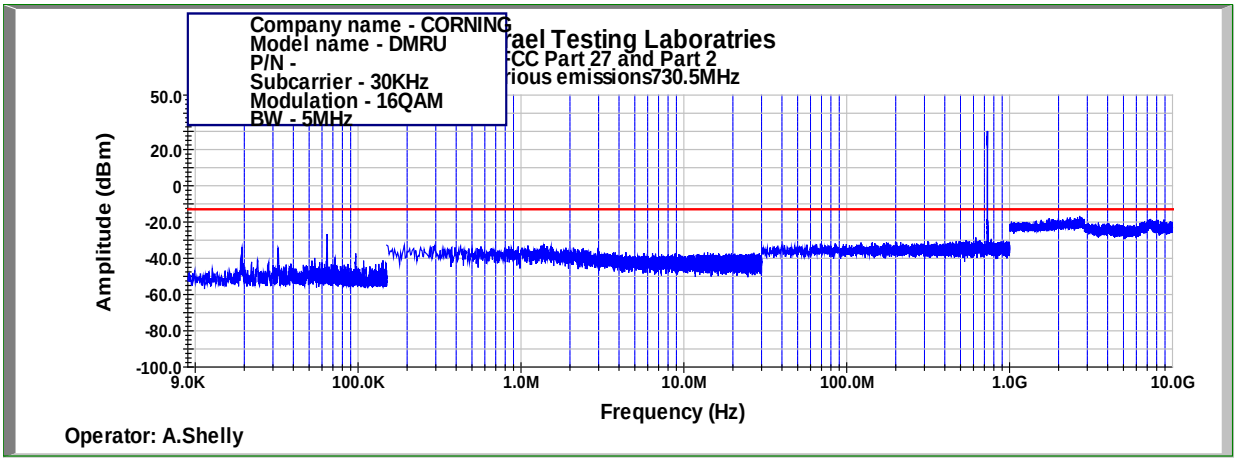

Figure 374: Spurious Emissions at Antenna Terminal 16QAM, 730.5MHz, B.W. 5MHz, Sub Carrier 30kHz

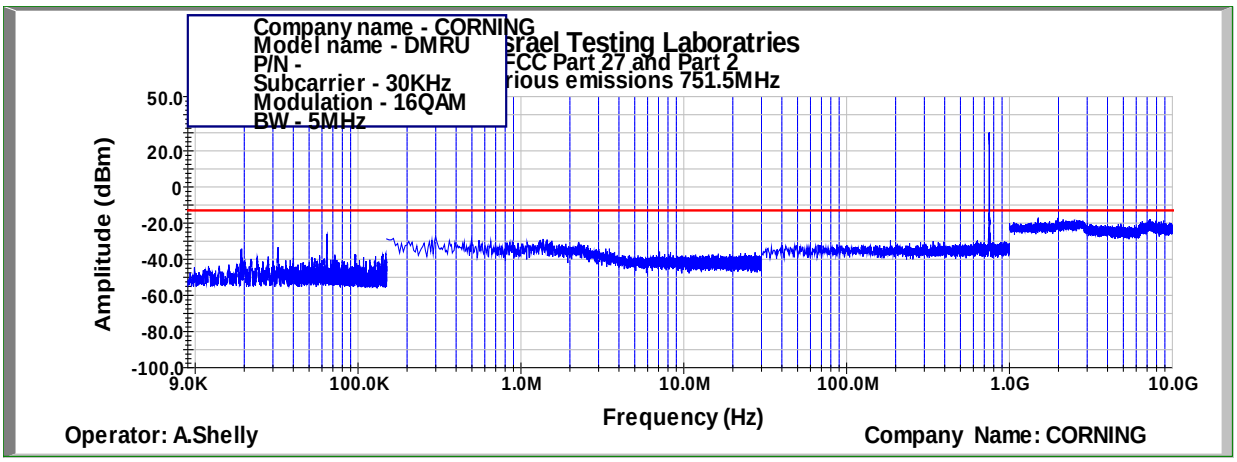

Figure 375: Spurious Emissions at Antenna Terminal 16QAM, 751.5MHz, B.W. 5MHz, Sub Carrier 30kHz

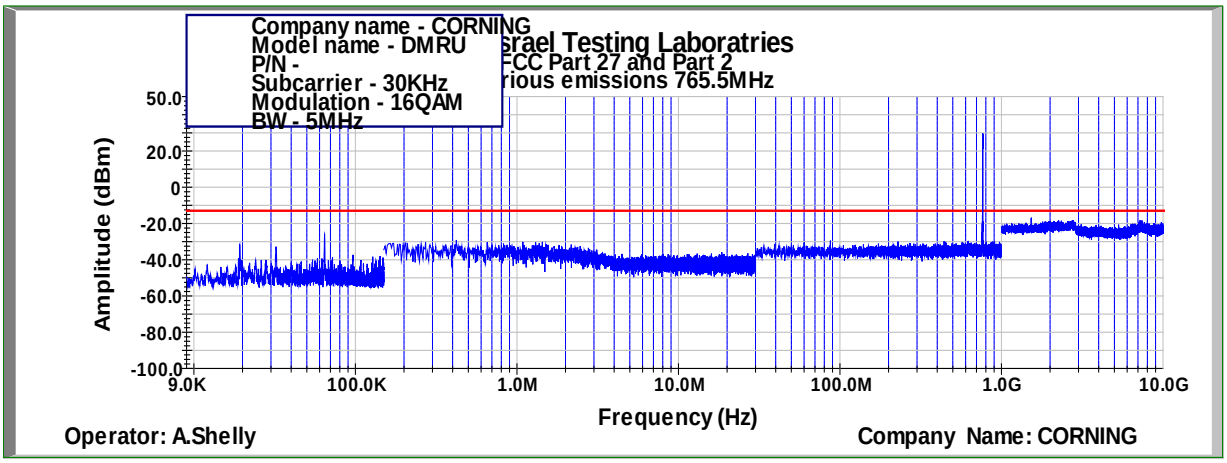

Figure 376: Spurious Emissions at Antenna Terminal 16QAM, 765.5MHz, B.W. 5MHz, Sub Carrier 30kHz

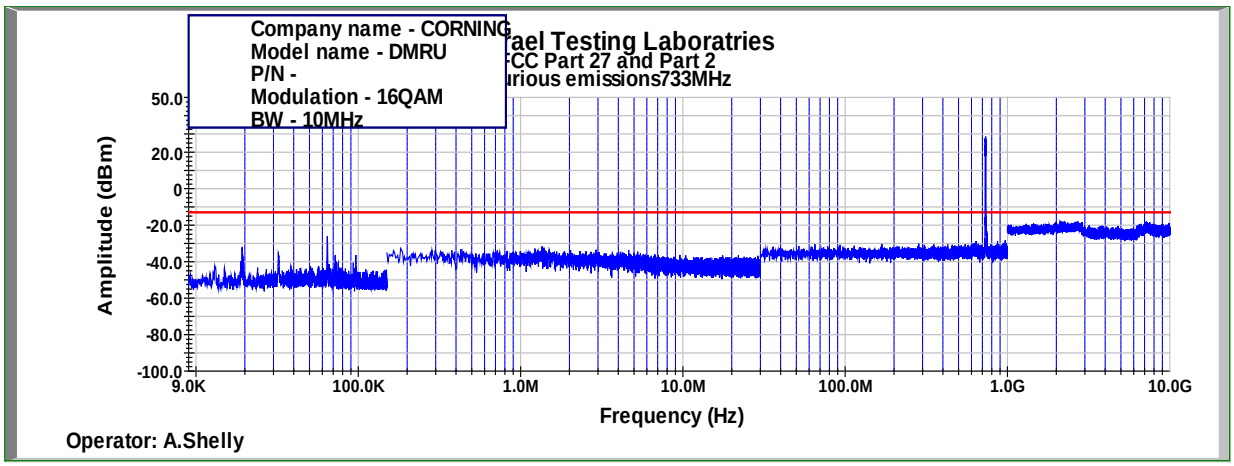

Figure 377: Spurious Emissions at Antenna Terminal 16QAM, 733MHz, B.W. 10MHz, Sub Carrier 15kHz

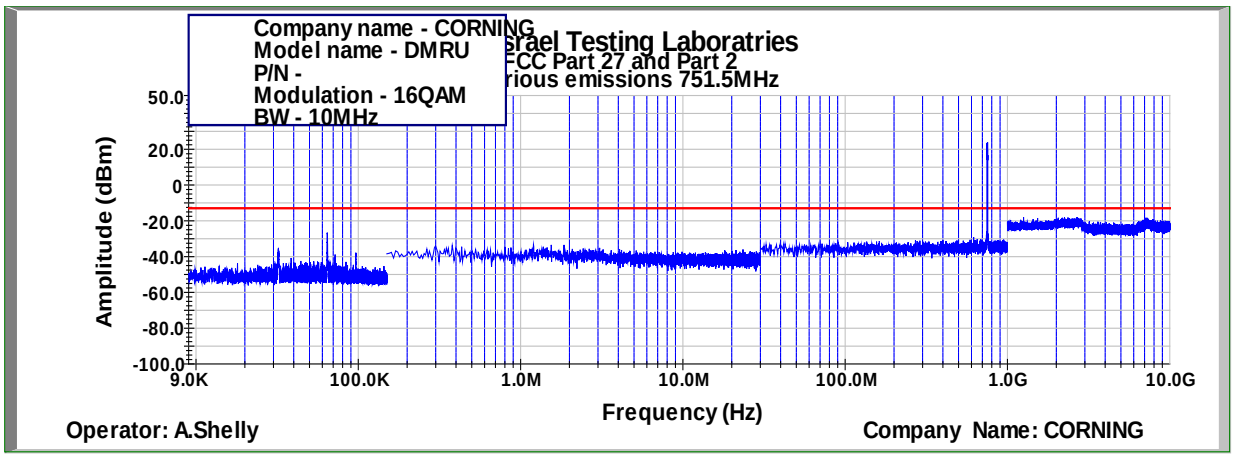

Figure 378: Spurious Emissions at Antenna Terminal 16QAM, 751.5MHz, B.W. 10MHz, Sub Carrier 15kHz

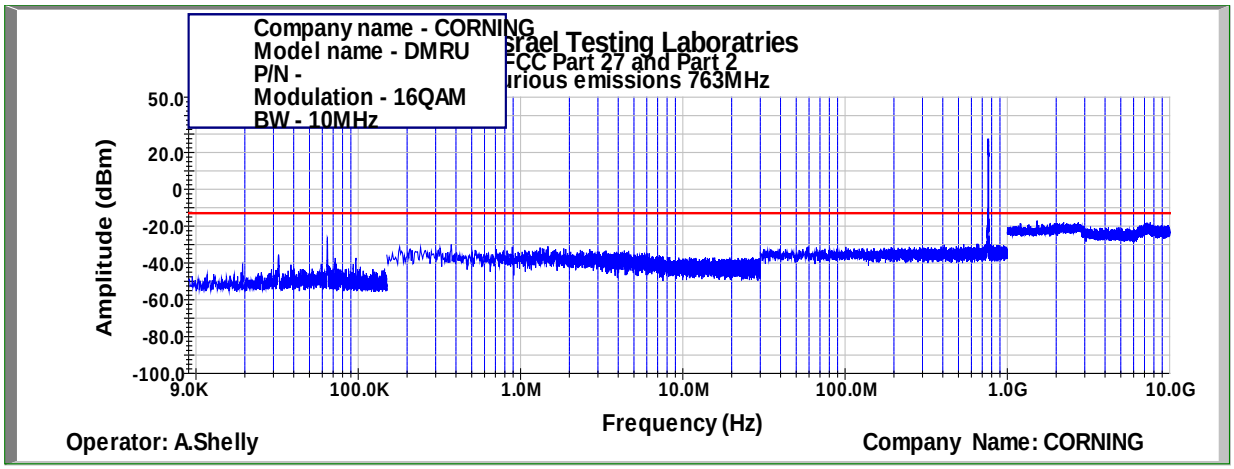

Figure 379: Spurious Emissions at Antenna Terminal 16QAM, 763MHz, B.W. 10MHz, Sub Carrier 15kHz

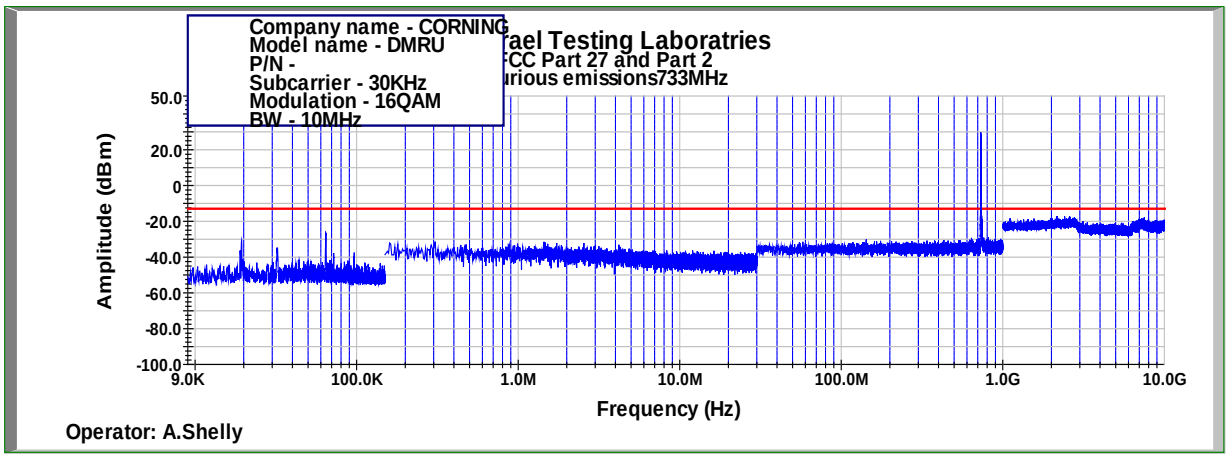

Figure 380: Spurious Emissions at Antenna Terminal 16QAM, 733MHz, B.W. 10MHz, Sub Carrier 30kHz

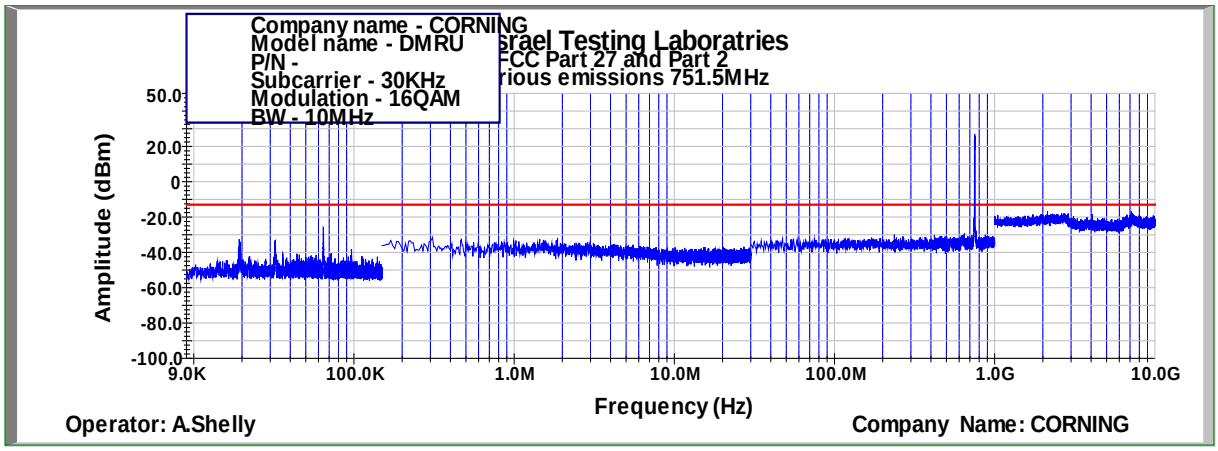

Figure 381: Spurious Emissions at Antenna Terminal 16QAM, 751.5MHz, B.W. 10MHz, Sub Carrier 30kHz

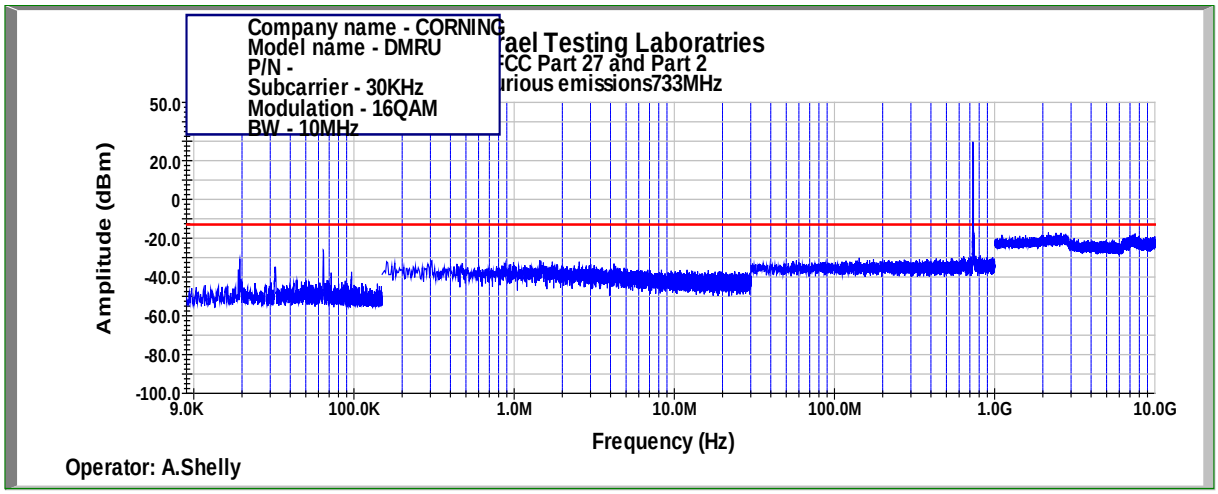

Figure 382: Spurious Emissions at Antenna Terminal 16QAM, 733MHz, B.W. 10MHz, Sub Carrier 30kHz

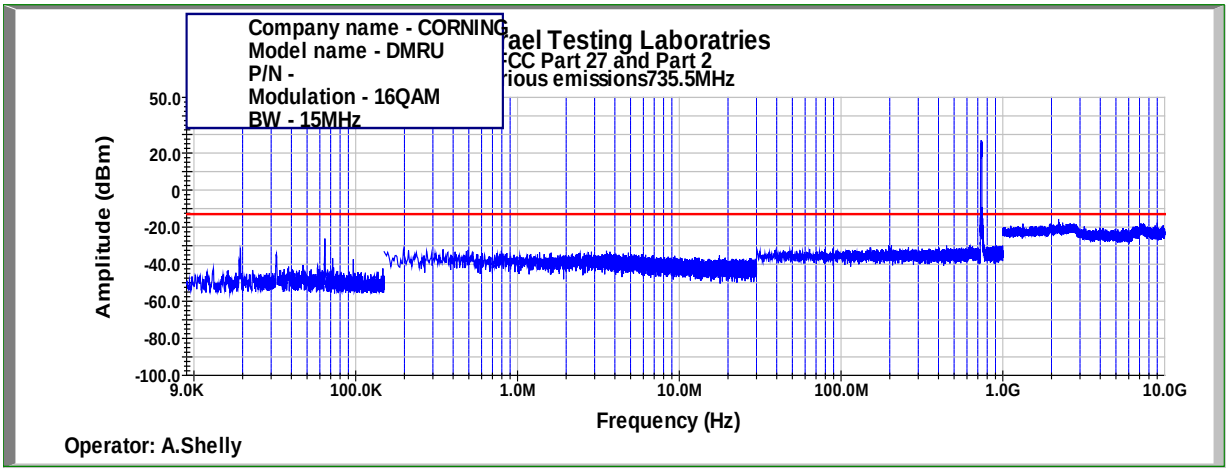

Figure 383: Spurious Emissions at Antenna Terminal 16QAM, 735.5MHz, B.W. 15MHz, Sub Carrier 15kHz

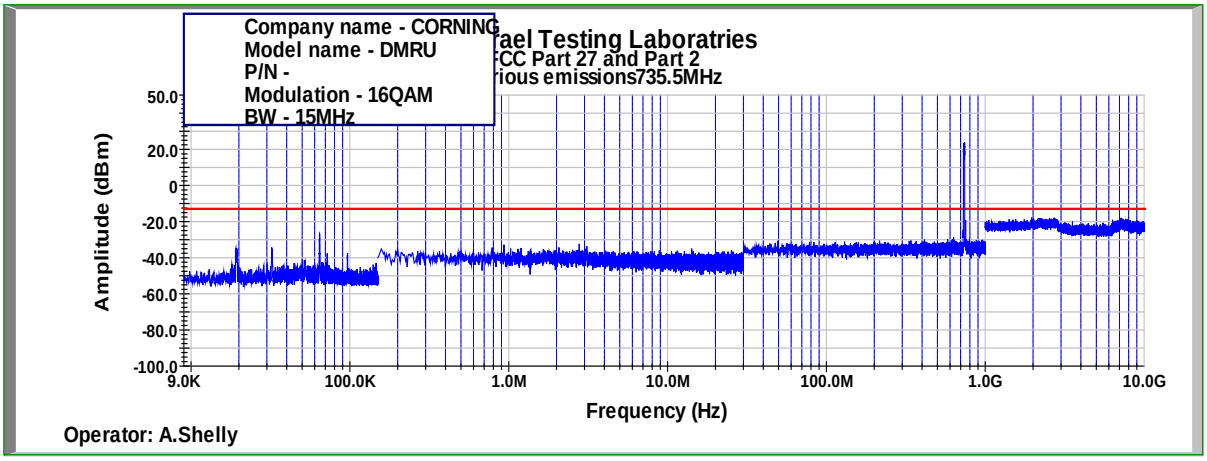

Figure 384: Spurious Emissions at Antenna Terminal 16QAM, 735.5MHz, B.W. 15MHz, Sub Carrier 30kHz

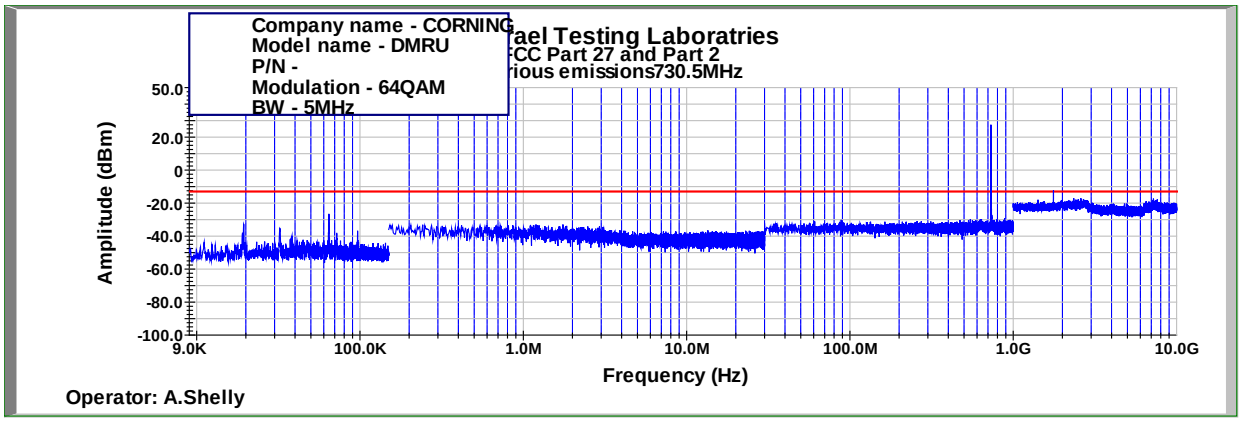

Figure 385: Spurious Emissions at Antenna Terminal 64QAM, 730.5MHz, B.W. 5MHz, Sub Carrier 15kHz

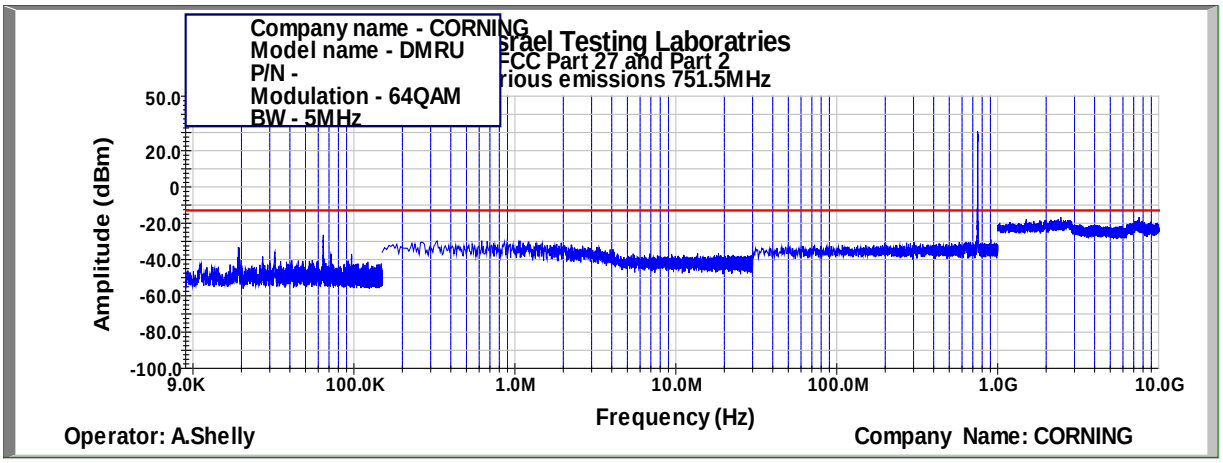

Figure 386: Spurious Emissions at Antenna Terminal 64QAM, 751.5MHz, B.W. 5MHz, Sub Carrier 15kHz

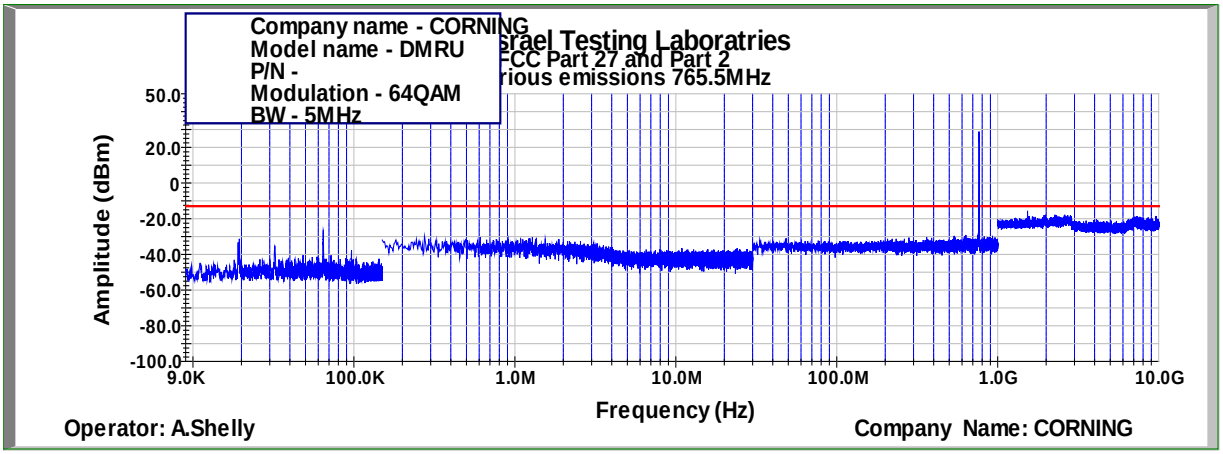

Figure 387: Spurious Emissions at Antenna Terminal 64QAM, 765.5MHz, B.W. 5MHz, Sub Carrier 15kHz

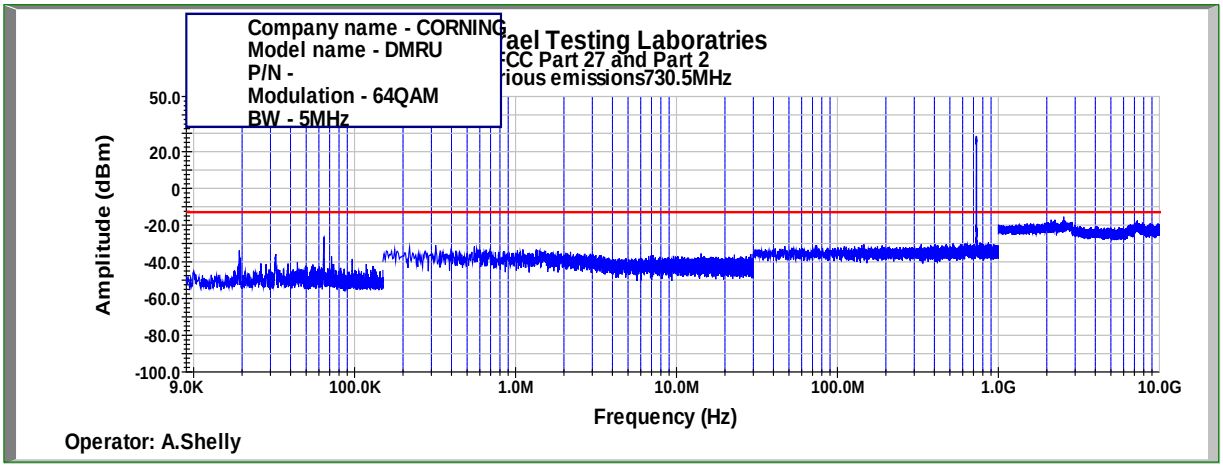

Figure 388: Spurious Emissions at Antenna Terminal 64QAM, 730.5MHz, B.W. 5MHz, Sub Carrier 30kHz