Exhibit 6: Measured Data -- Pursuant 47 CFR. 2.1041

6.1 Transmitter Power

The transmitter is a variable power type used in a SMR trunking system. Output power (as defined in 47 CFR 90.7) is dynamically controlled as described in Exhibit 12.

6.1.1 Maximum Output Power Rating -- Pursuant 47 CFR 2.1033(c) 7 and 90.635(d))

Maximum output power rating: 700 milliwatts (28.45 dBm), pulse average power

Note 1: Nominal output power rating: 600 milliwatts (27.78 dBm) (Pulse average power).
Note 2: These ratings are compliant with the FCC maximum of 100 watts (50 dBm) for Mobile stations
Note 3: The term pulse average power is used to specify the power that would be measured during the intervals of recurrent TDM transmission pulses by an average responding RF power meter. Power expressed in this manner is independent of the TDM duty cycle, and facilitates RF system coverage analysis.

6.1.2 Operating output power range -- Pursuant 47 CFR 2.1033(c) 6)

Maximum tuned output power will vary over a range of 500 to 700 milliwatts (maximum pulse average power) to a minimum power of 39 dB below maximum tuned output power.

6.1.3 DC power used by final amplifier device -- Pursuant 47 CFR 2.1033(c) 8)

In order to prevent the malfunctions that can occur due to directly measuring the DC characteristics of the final RF amplifying stage, data was obtained by measuring the entire radio DC current and is reported herein for the entire radio.

The DC current and the RF output power was measured with a special RF/DC test fixture set to supply the radio with the nominal supply voltage of 4.0 V. The characteristics were measured during a transmission pulse and are listed in the Table 6-1.

Characteristics	800 MHz band		900 MHz band	
	At the maximum power setting	At the minimum power setting	At the maximum power setting	At the minimum power setting
DC Voltage (Volts)	4.0	4.0	4.0	4.0
DC Current (A)	1.15	0.61	1.1	0.60
Output Power (mW)	603	0.0857	605	0.0862

Table 6-1 Characteristics for 800 and 900 MHz bands

6.2 Modulation Characteristics and Necessary Bandwidth -- Pursuant 47 CFR 2.1033(c) 13, 2.1047(d) & 2.202

Digitally encoded digital data is transmitted in groups of four sub-channels at a 4 kHz rate using M-ary symbols mapped to predetermined fixed magnitude and phase components within 1 of 3 constellations associated with a particular modulation scheme. One to four groups of four sub-channel streams are combined using frequency division multiplexing to form the modulated waveform. Figure 6-3 illustrates symbol mapping to one of the four QPSK sub-channels constellations. Figure 6-4 illustrates symbol mapping to one of the four 16QAM sub-channels constellation. Figure 6-4a illustrates symbol mapping to one of the four 64QAM sub-channels constellation. For Quad-QPSK modulation, this mapping adjusts the amplitude and phase variations of the baseband signal to one of 4 points on the constellation. For Quad-16QAM modulation, this mapping adjusts the amplitude and phase variations of the baseband signal to one of 16 points on the constellation. For Quad-64 modulation, this mapping adjusts the amplitude and phase variations of the baseband signal to one of 64 points on the constellation. The bandwidth of the modulating signals is limited by the pair of modulation limiting low pass filters within the modem block function of U801 (see Figure 4-2 in Exhibit 4.3). These filters serve to limit out-of-band and spurious emissions due to modulation. The necessary bandwidth of the sub-channels is limited to 4.8 kHz by the pair of modulation limiting low pass filters. The transfer response of these filters is depicted in Figure 6-1 where the filter excess bandwidth coefficient of 0.2 is shown. This excess bandwidth leads to the necessary bandwidth calculation of (1 + 0.2) x (4 kHz) = 4.8 kHz. Since the sub-channels are spaced 4.5 kHz apart, and the groups that each contain 4 sub-channels are spaced apart in integer multiples of 25 kHz, the necessary bandwidth of the composite 4 sub-channel symbol streams (single group) is 4.8 + (3 x 4.5) = 18.3 kHz and the necessary bandwidth of the entire waveform depends on the number and combination of groups transmitted. Figure 6-2 illustrates all group combinations and corresponding bandwidths.

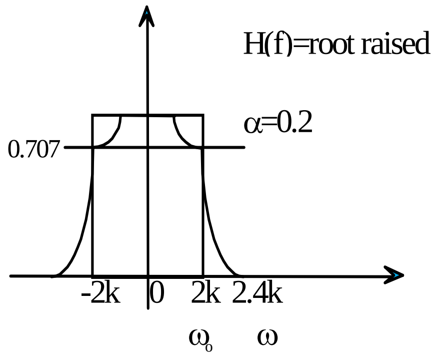
Below in Table 6-2 is a description of each waveform case.

Case	Description (Figure)	Number of Groups	Number Of Sub-channels	Emission Designator	Mask Figure
1	When Transmitting Voice, data or fax on one 25kHz channel (6.2.1)	1	4	18K3D7W	6-5 to 6-16
2	When Transmitting data on 2 adjacent 25kHz channels (6-2 (Adjacent))	2	8	43K3D7D	6-17 to 6-22
3	When Transmitting data on 3 adjacent 25kHz channels (6-3)	3	12	68K3D7D	6-23 to 6-28
4	When Transmitting data on the 2 outer 25kHz channels of 4 25kHz channels (6-2(outer))	2	8	93K3D7D	6-35 to 6-40
	When Transmitting data on 4 adjacent 25kHz channels (6-4)	4	16	93K3D7D	6-29 to 6-34

Table 6-2: Waveform Description of all transmitted cases.

The designator for emissions in case 2 and 3 is determined by adding N x 25 to the first 2 digits, when N = the number of channels. The designator for case 4 is determined by adding 3 x 25 to the fist 2 digits because the outer channels are 3 channels apart. D is used for the last character when only data is transmitted, not telephony.

Modulation Low Pass Filter Response



$$H(f)=\begin{cases} 1 & \text{for } |f| < 2\omega_o-\omega \\ \cos^2(\pi/4\,(|f| + \omega - 2\omega_o)/(\omega-\omega_o)) & \text{for } 2\omega_o-\omega < |f| < \omega \\ 0 & \text{for } |f| > \omega \end{cases}$$

where $\omega_o = 2000$ and $\omega = (1+\alpha)\omega_o = 2400\text{Hz}$

Figure 6-1: Modulation Low Pass Filter Response

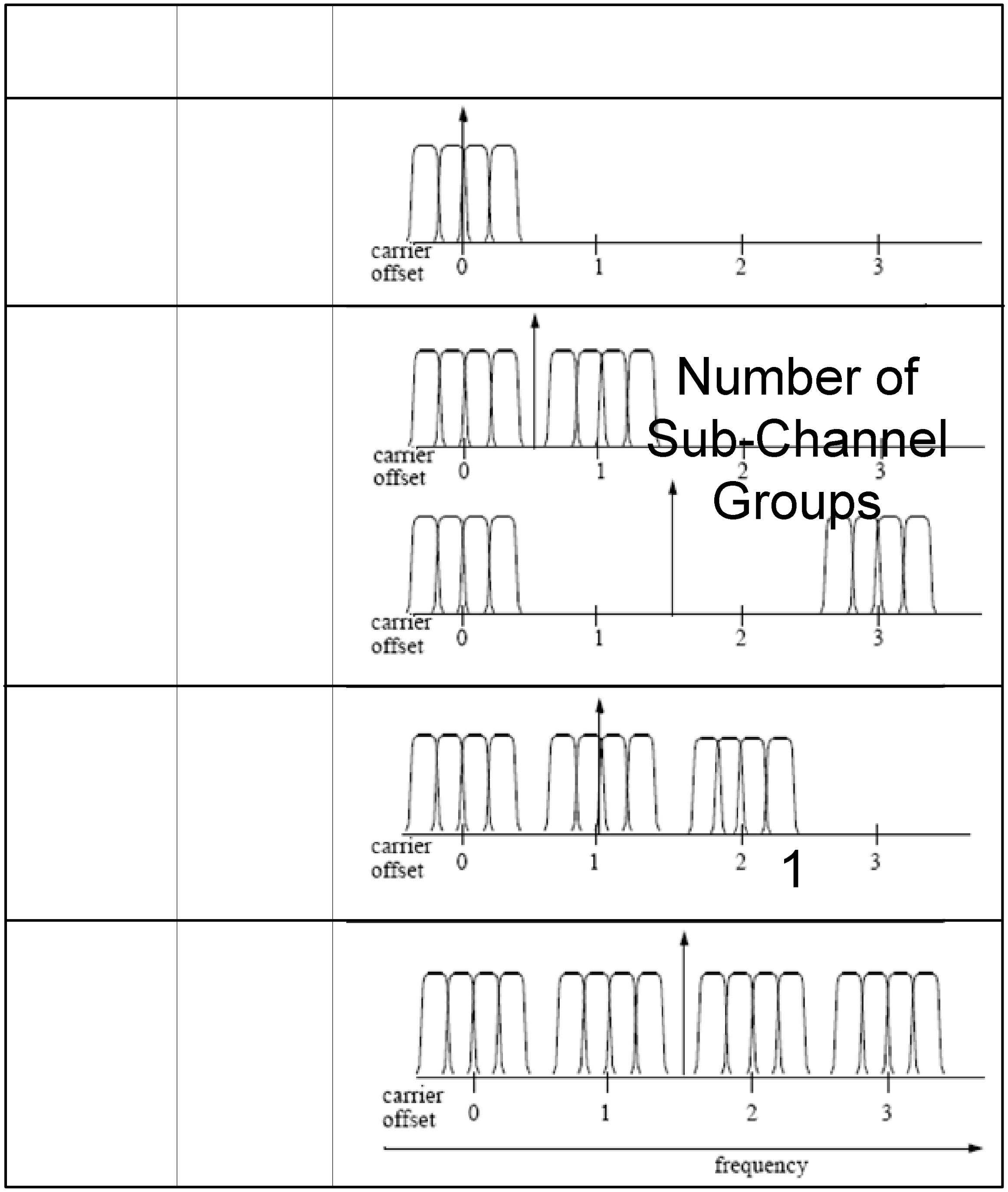


Figure 6-2: Sub-Channel Group Combination Bandwidths

2 (adjacent)

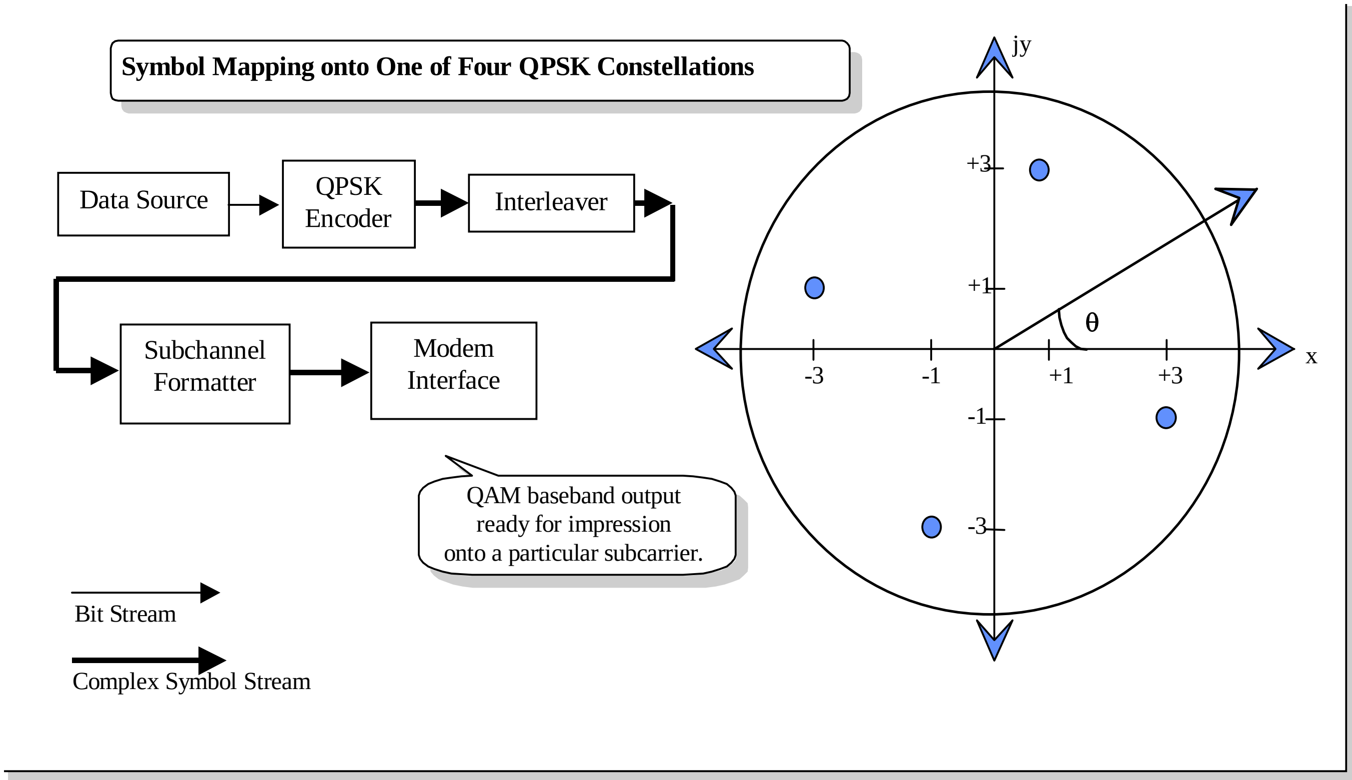


Figure 6-3: Symbol Mapping onto One of Four QPSK Constellations

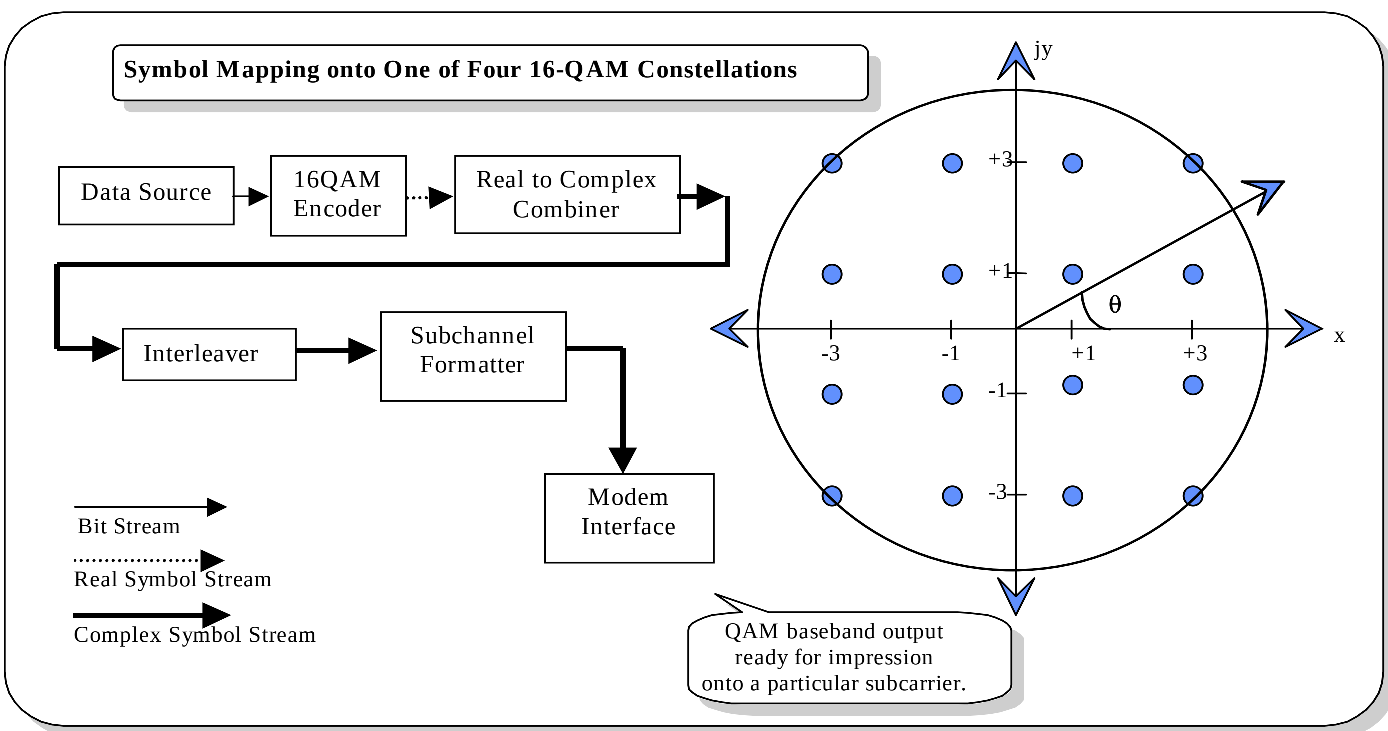


Figure 6-4: Symbol Mapping onto One of Four 16-QAM Constellations

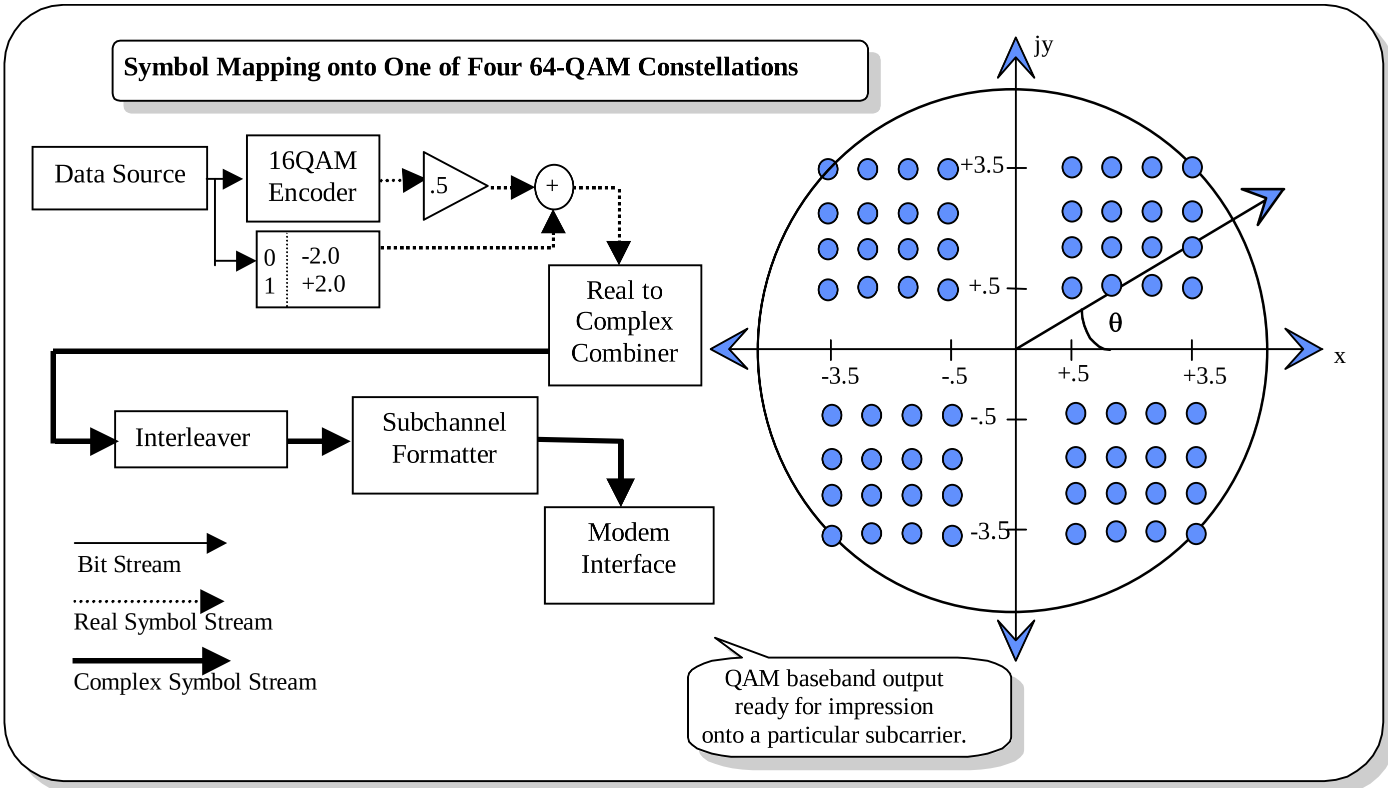


Figure 6-4a: Symbol Mapping onto One of Four 64-QAM Constellations

6.2.1 Emission Mask -- Pursuant 47 CFR 2.1049(h) & 90.210(m)

The method described in paragraph 7.2 was employed with the following conditions:

For Quad-QPSK Modulation:

32K Bits Per Second Per Channel (1-4) Pseudo-Random Digital Modulation.
Vertical division: 10 dB/div.
Carrier Reference: Carrier Reference 0 dB corresponds to maximum and minimum peak output power settings, respectively.

For Quad-16QAM Modulation:

64K Bits Per Second Per Channel (1-4) Pseudo-Random Digital Modulation
Vertical: 10 dB/div
Carrier Reference: Carrier Reference 0 dB corresponds to maximum and minimum peak output power settings, respectively.

For Quad-64QAM Modulation:

96K Bits Per Second Per Channel (1-4) Pseudo-Random Digital Modulation
Vertical: 10 dB/div
Carrier Reference: Carrier Reference 0 dB corresponds to maximum and minimum peak output power settings, respectively.

In all Figures, one trace was used to capture transmitter performance, measured using a resolution bandwidth of 300 Hz, while the reference level was obtained by another trace, using a resolution bandwidth of 30 kHz for one channel, 75kHz for two adjacent channels, 100kHz for three adjacent channels and 200kHz for four adjacent channels or two outer channels as shown in Figure 6-2. A third trace shows the applicable emission mask.

6.3.1 800 MHz Band Operation Measured Data

FCC Limits

- Per 47CFR90.210(g)
- Per EA SMR GMASK Emission Mask, 47CFR90.691(a)

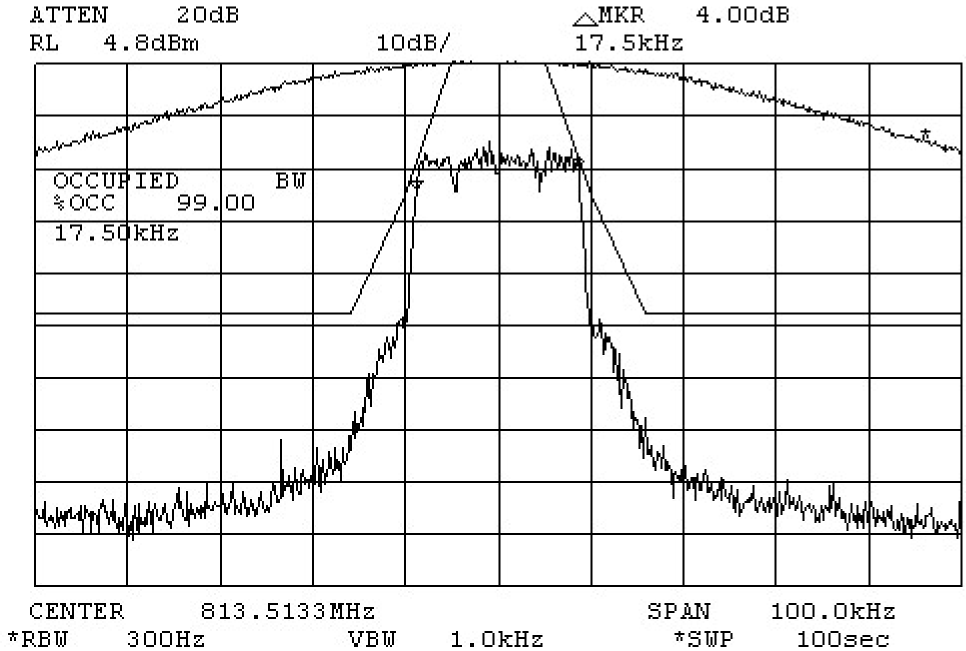


Figure 6-5: Quad-QPSK Modulation performance relative to GMASK 47 CFR 90.210(g) (MAXIMUM POWER SETTING)

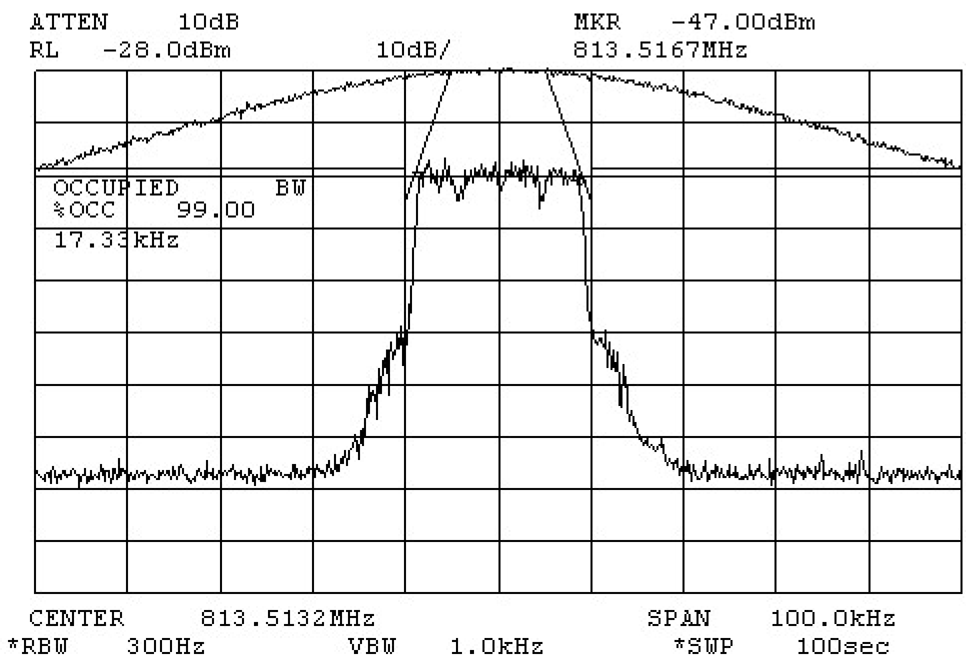


Figure 6-6: Quad-QPSK Modulation performance relative to GMASK 47 CFR 90.210(g) (MINIMUM POWER SETTING)

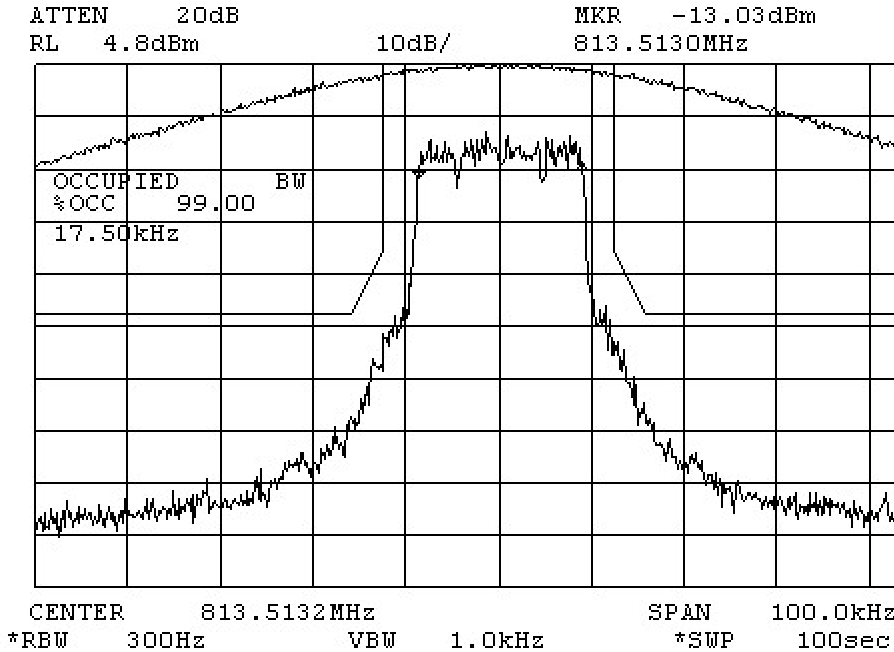


Figure 6-7: Quad-QPSK Modulation performance relative to EA-mask 47 CFR 90.691. (MAXIMUM POWER SETTING)

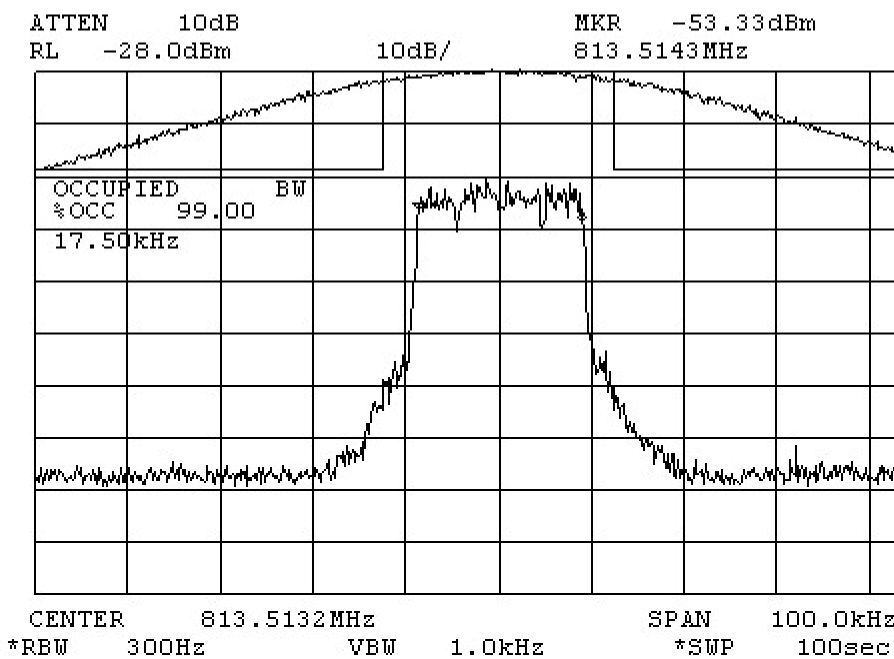


Figure 6-8: Quad-QPSK Modulation performance relative to EA-mask 47 CFR 90.691. (MINIMUM POWER SETTING)

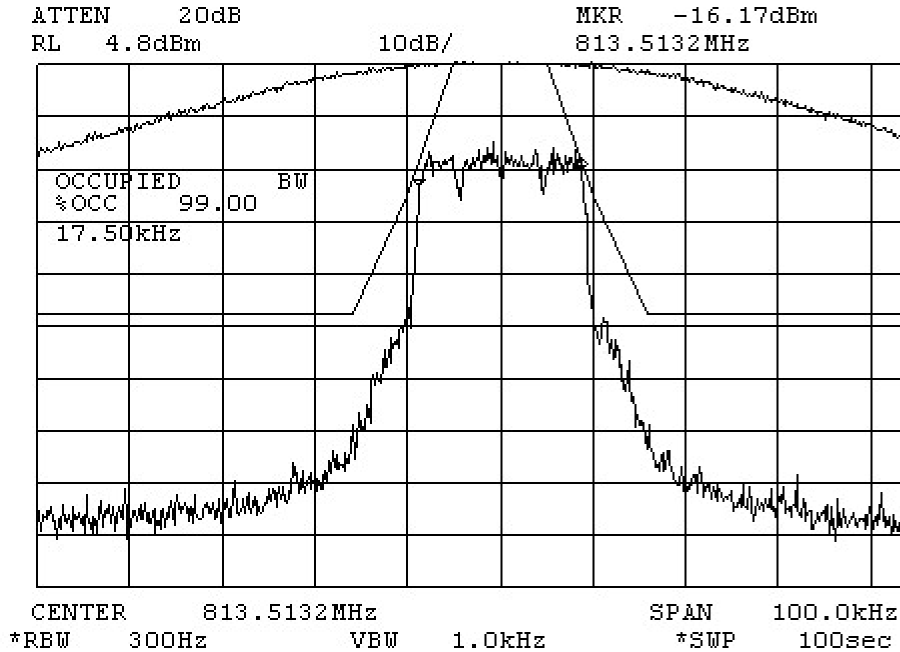


Figure 6-9a: Quad-16QAM Modulation performance relative to G-Mask 47 CFR 90.210(g) (MAXIMUM POWER SETTING)

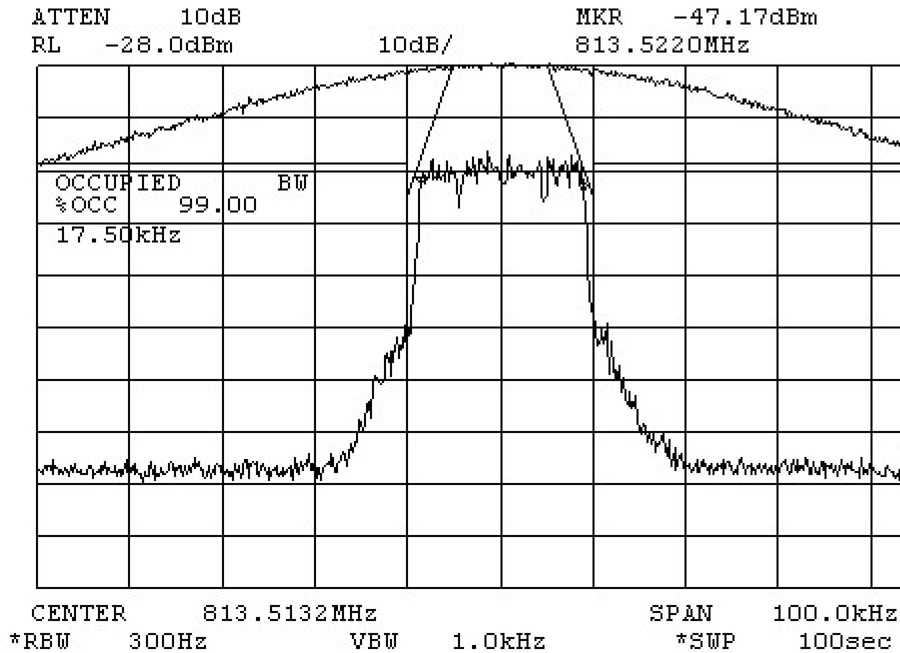


Figure 6-10a: Quad-16QAM Modulation performance relative to G-Mask 47 CFR 90.210(g) (MINIMUM POWER SETTING)

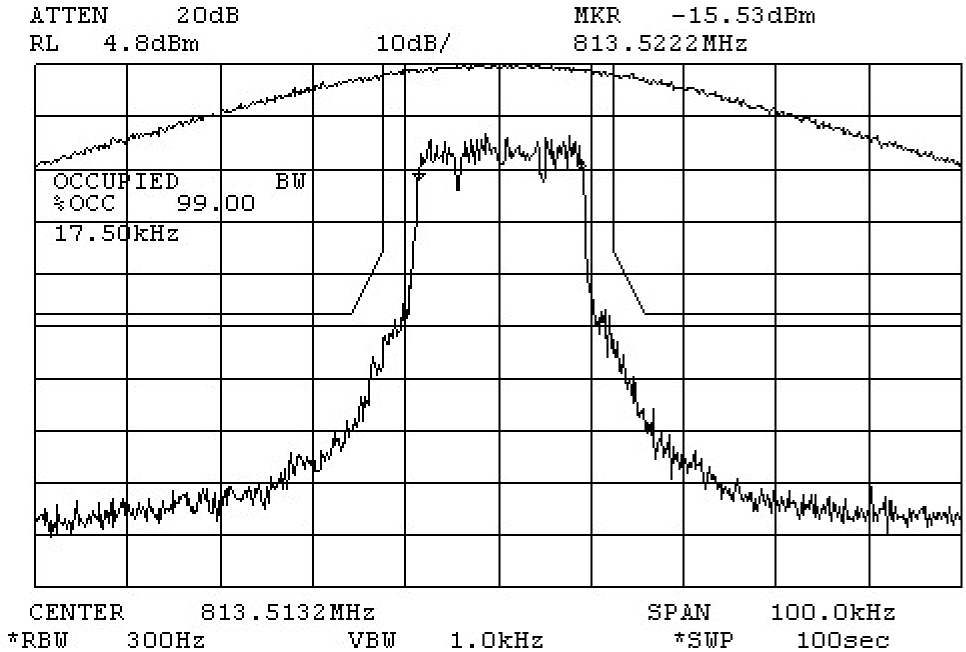


Figure 6-11a: Quad-16QAM Modulation performance relative to EA-mask 47 CFR 90.691. (MAXIMUM POWER SETTING)

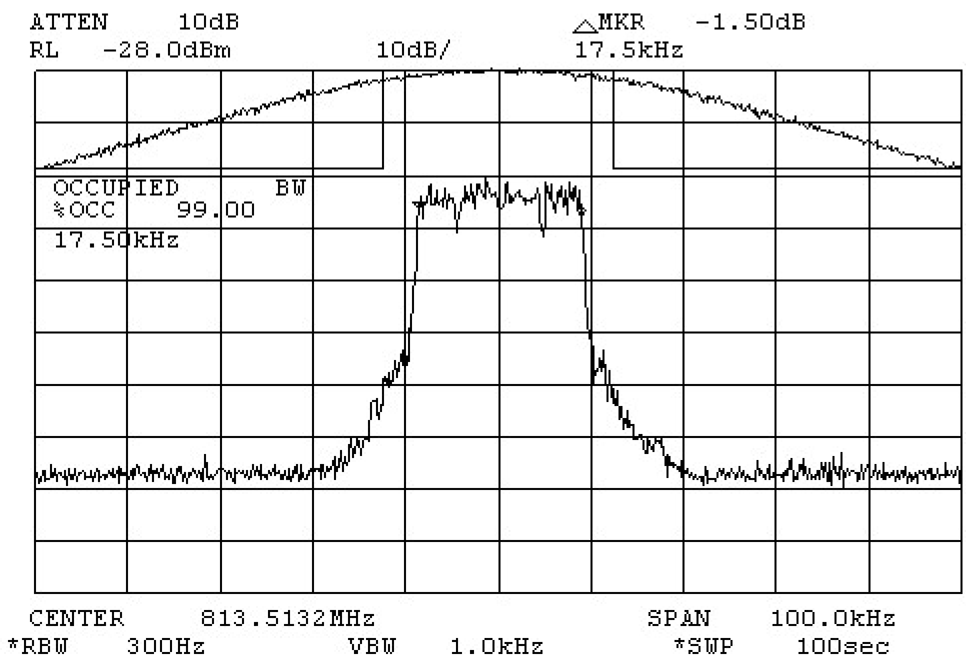


Figure 6-12a: Quad-16QAM Modulation performance relative to EA-mask 47 CFR 90.691. (MINIMUM POWER SETTING)

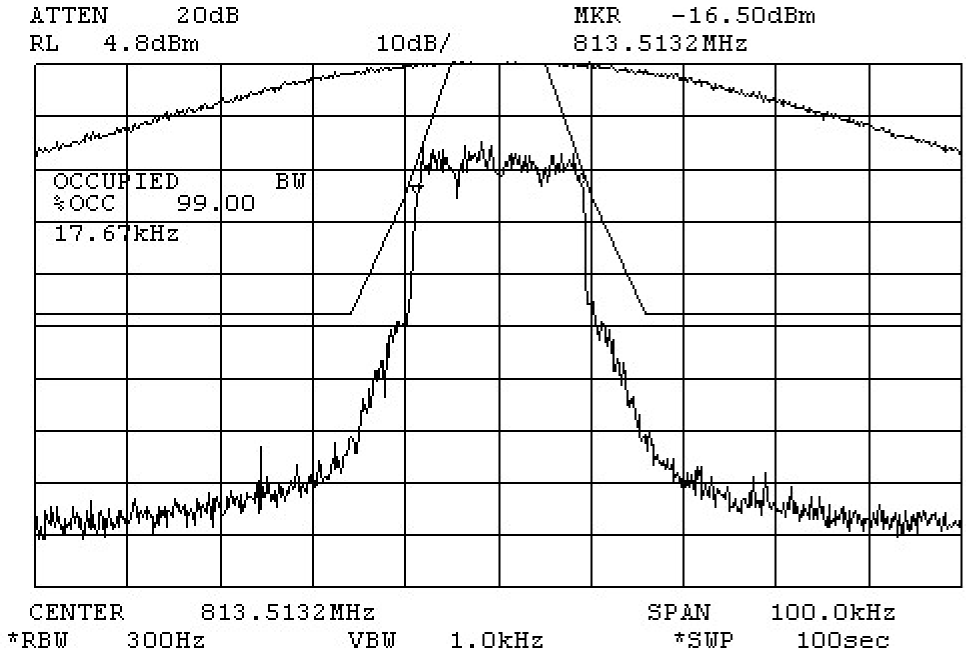


Figure 6-13: Quad-64QAM Modulation performance relative to G-mask 47 CFR 90.210(g) (MAXIMUM POWER SETTING)

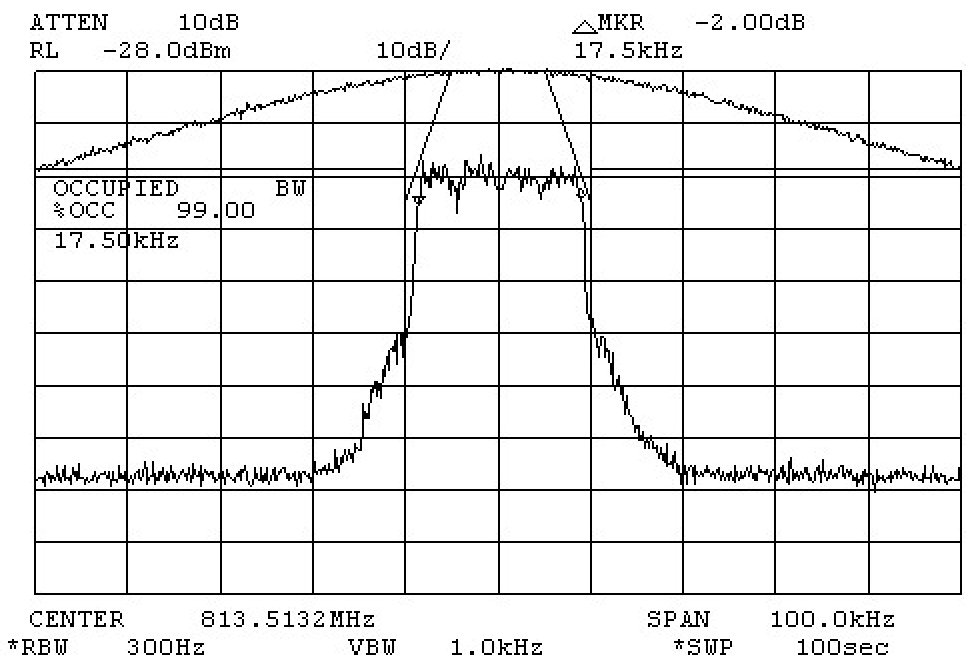


Figure 6-14: Quad-64QAM Modulation performance relative to G-mask 47 CFR 90.210(g) (MINIMUM POWER SETTING)

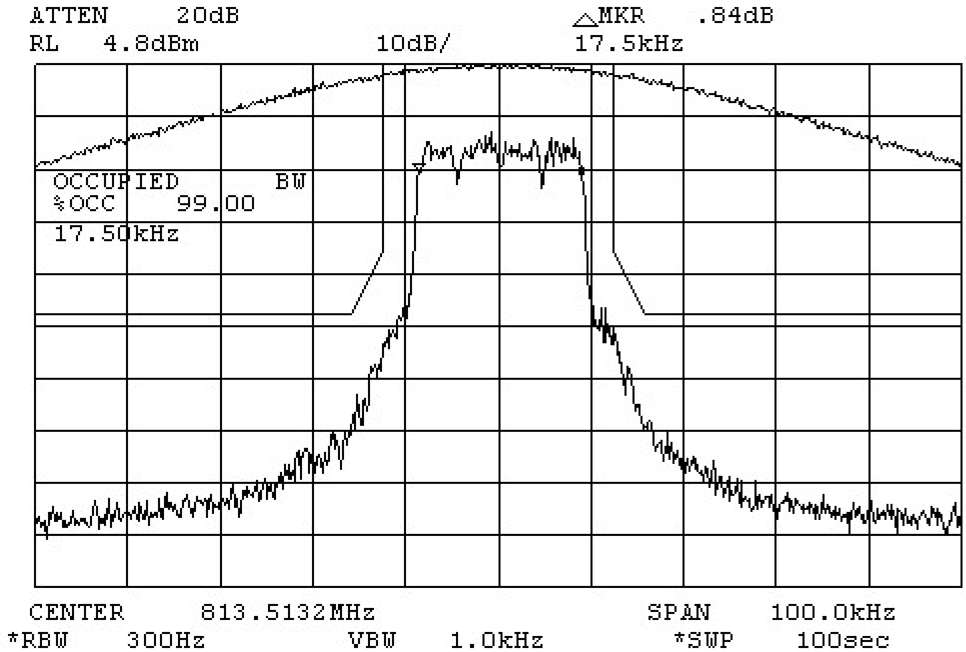


Figure 6-15: Quad-64QAM Modulation performance relative to EA-mask 47 CFR 90.691. (MAXIMUM POWER SETTING)

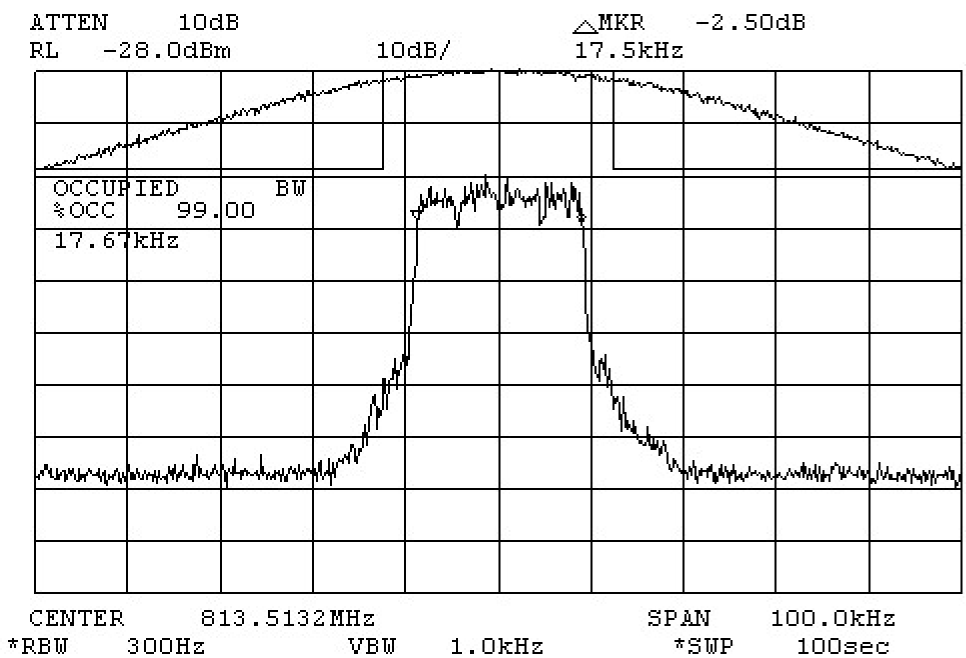


Figure 6-16: Quad-64QAM Modulation performance relative to EA-mask 47 CFR 90.691. (MINIMUM POWER SETTING)

6.3.2. 900 MHz Band Operation Measured Data

<u>FCC Limits</u>

- Per 47 CFR 90.669(a)

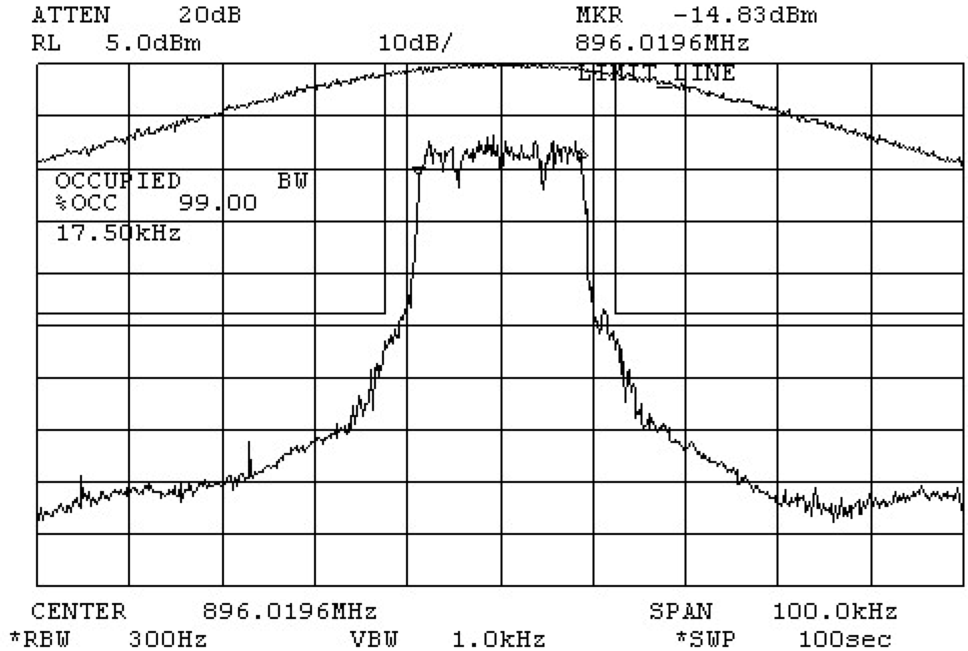


Figure 6-17: Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

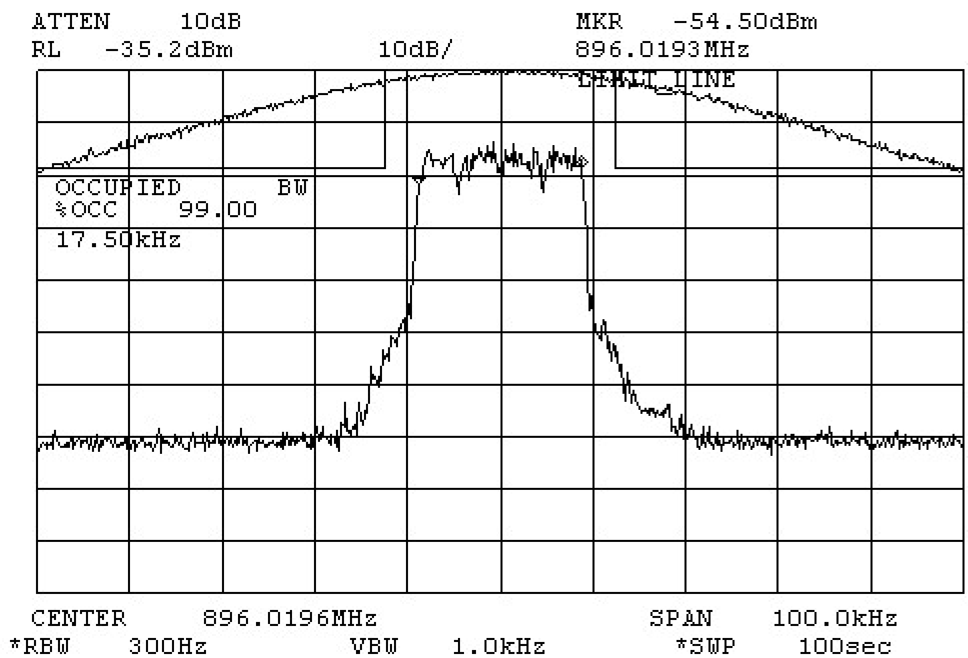


Figure 6-18: Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

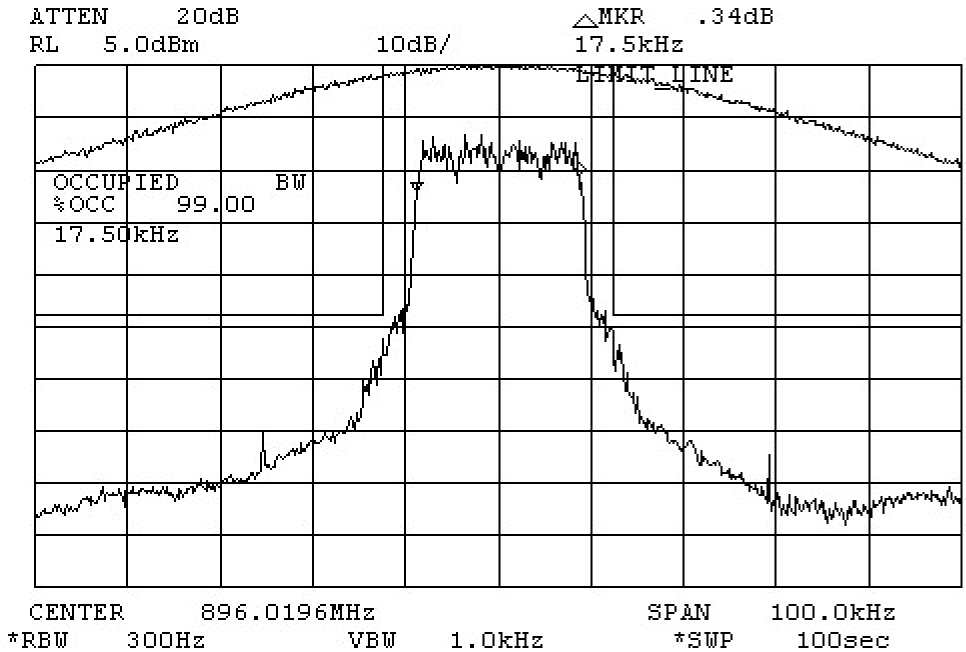


Figure 6-19a: Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

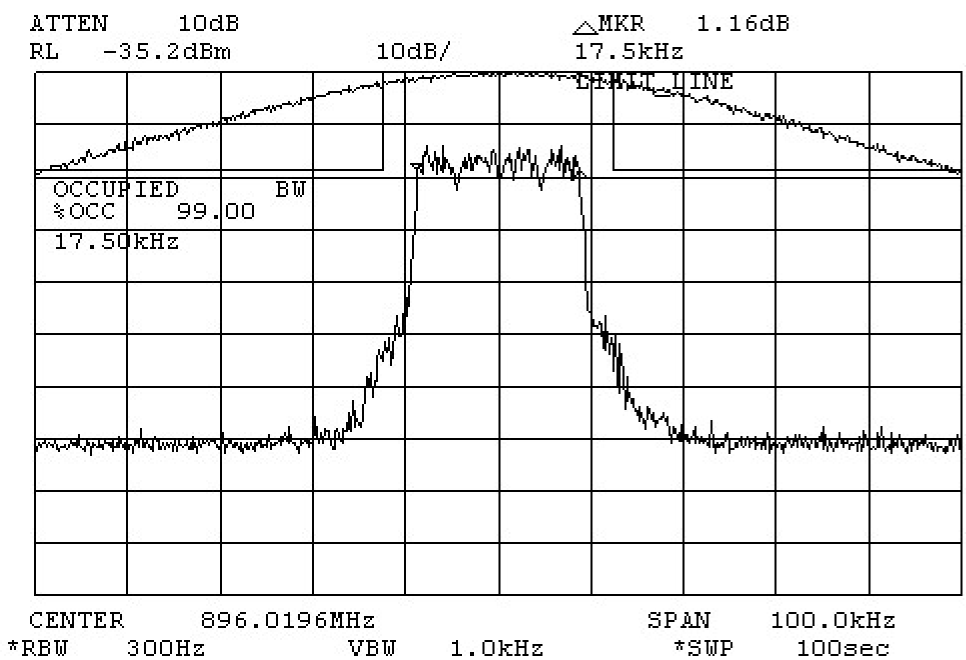


Figure 6-20a: Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

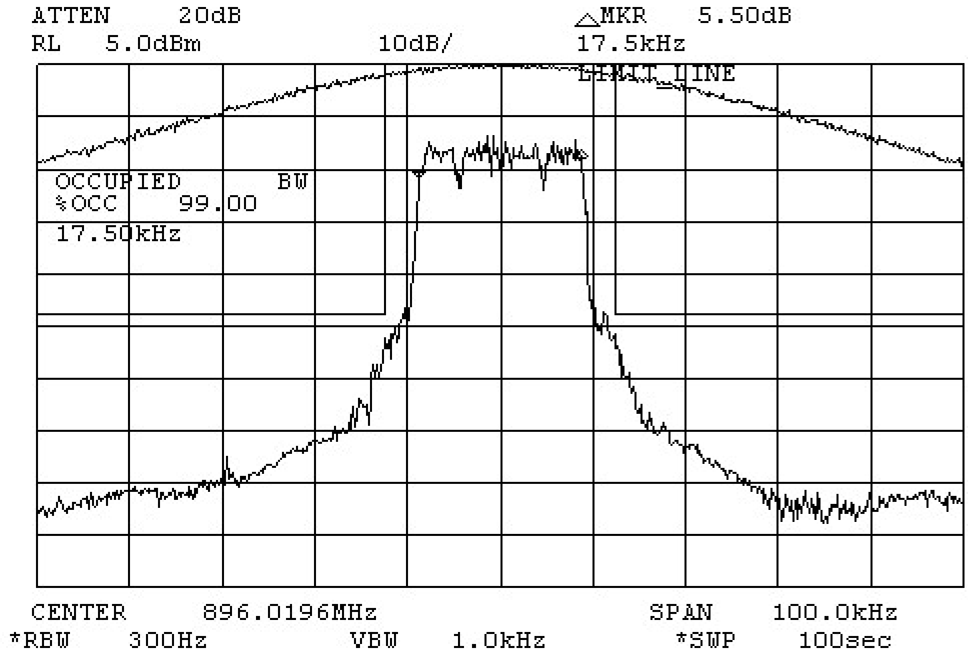


Figure 6-21: Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

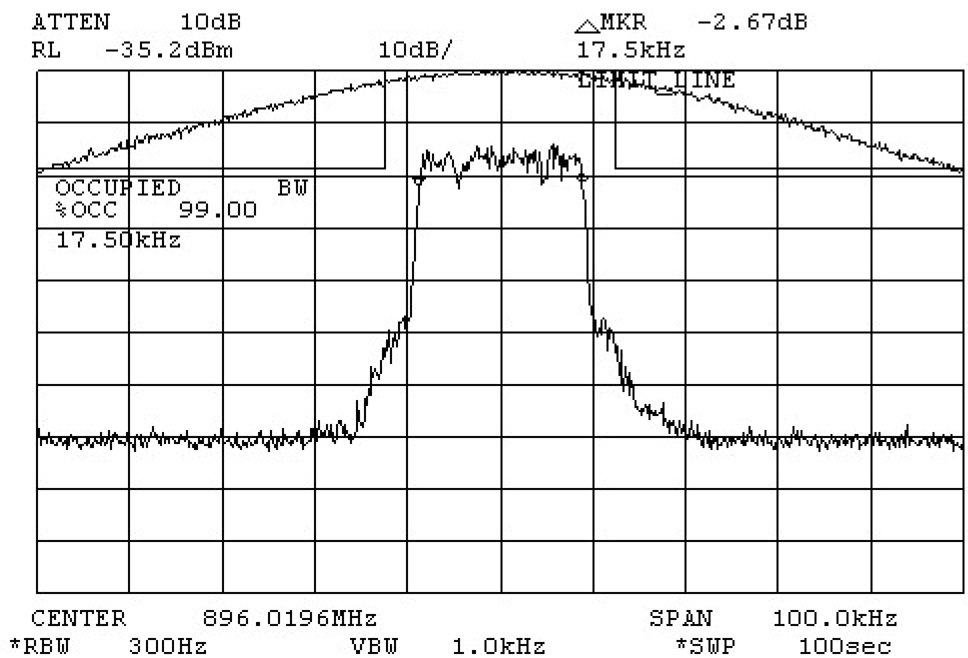


Figure 6-22: Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

6.3.2 800 MHz Band WiDEN25 Operation Measured Data

FCC Limits

- Per 47CFR 90.210(g)
- Per EA SMR Emission Mask, 47 CFR 90.691(a)

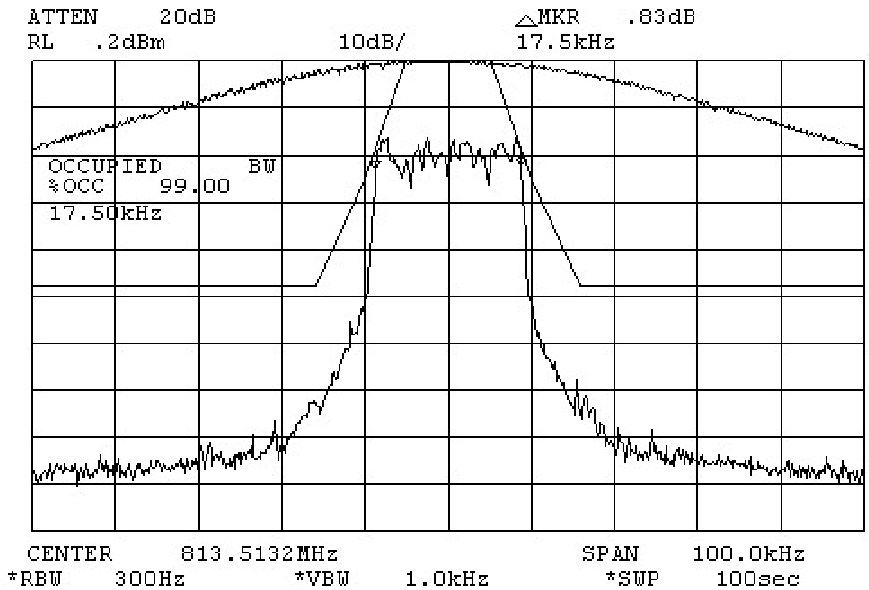


Figure 6-23: WiDEN25 Quad-QPSK Modulation performance relative to mask 47 CFR 90.210(g) (MAXIMUM POWER SETTING)

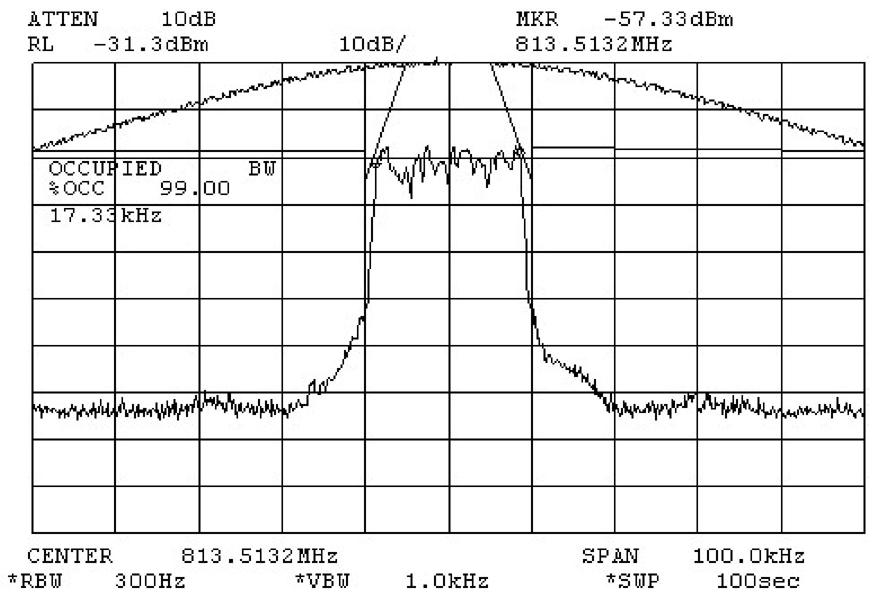


Figure 6-24: WiDEN25 Quad-QPSK Modulation performance relative to mask 47 CFR 90.210(g) (MINIMUM POWER SETTING)

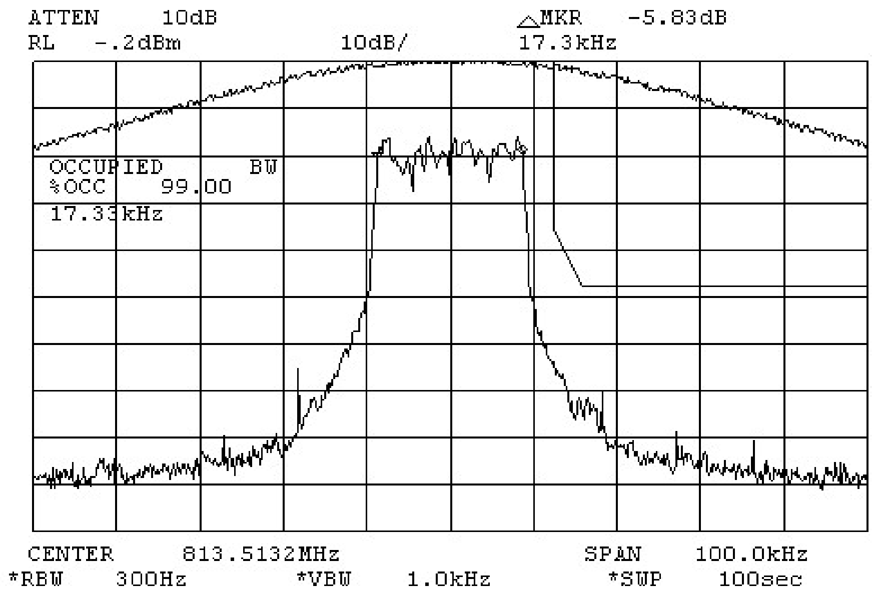


Figure 6-25: WIDEN25 Quad-QPSK Modulation performance relative to mask 47 CFR 90.691. (MAXIMUM POWER SETTING)

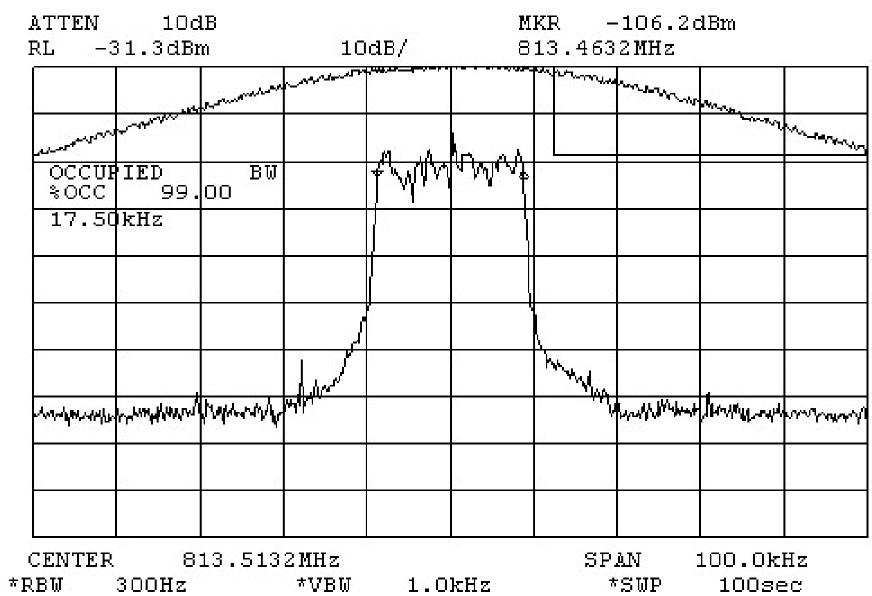


Figure 6-26: WiDEN25 Quad-QPSK Modulation performance relative to mask 47 CFR 90.691. (MINIMUM POWER SETTING)

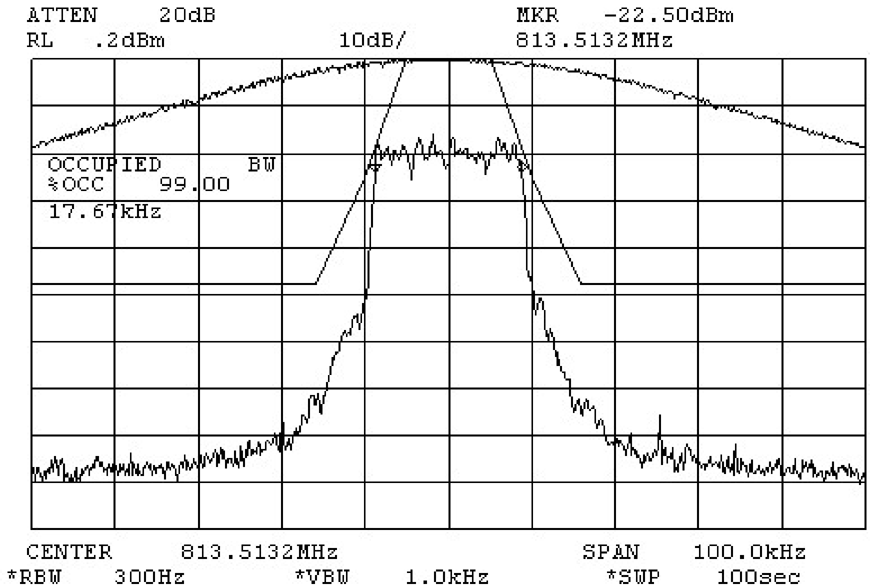


Figure 6-27: WiDEN25 Quad-16QAM Modulation performance relative to mask 47 CFR 90.210(g) (MAXIMUM POWER SETTING)

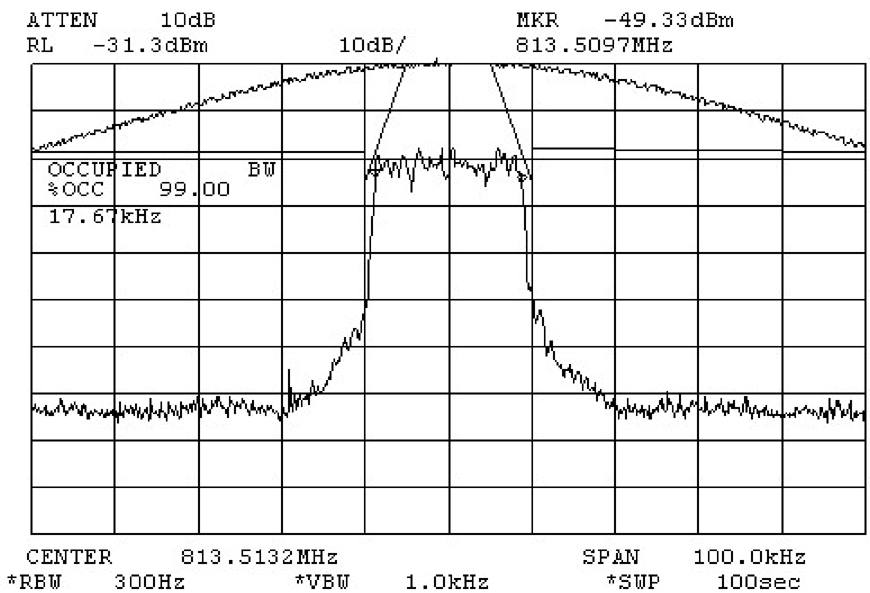


Figure 6-28: WiDEN25 Quad-16QAM Modulation performance relative to mask 47 CFR 90.210(g) (MAXIMUM POWER SETTING)

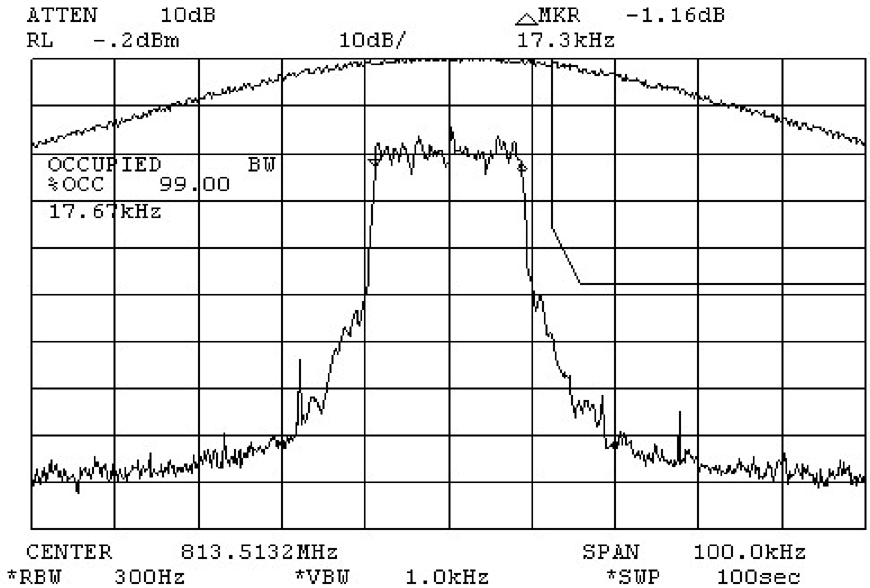


Figure 6-29: WiDEN25 Quad-16QAM Modulation performance relative to mask 47 CFR 90.691. (MAXIMUM POWER SETTING)

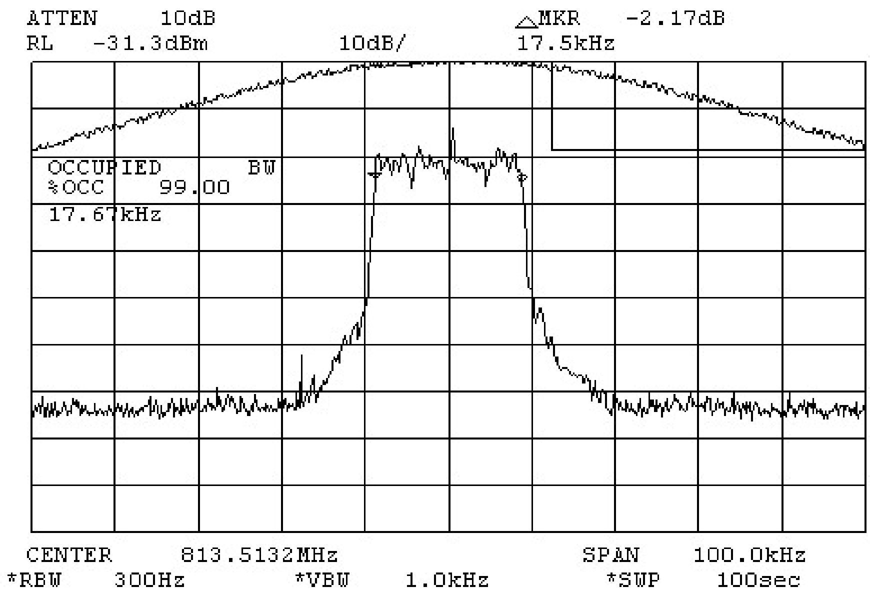


Figure 6-30: WiDEN25 Quad-16QAM Modulation performance relative to mask 47 CFR 90.691. (MINIMUM POWER SETTING)

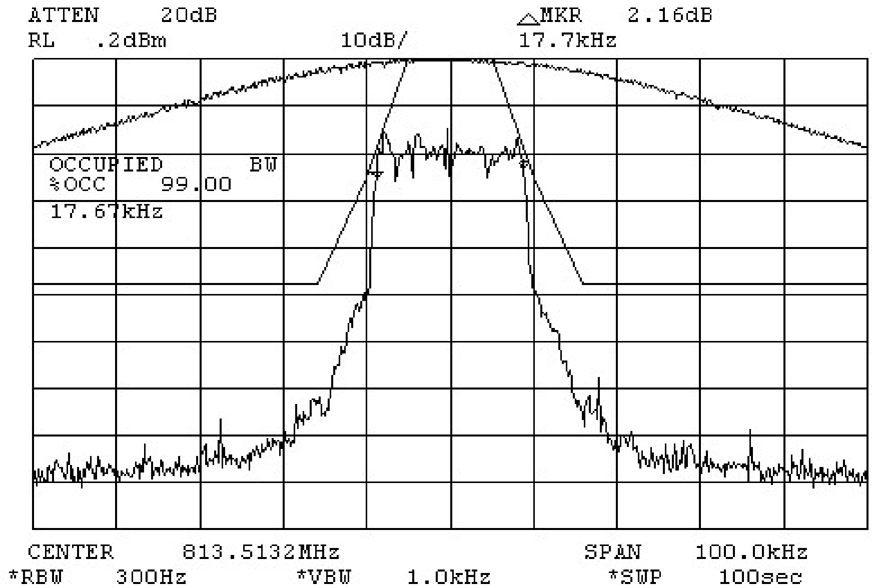


Figure 6-31: WiDEN25 Quad-64QAM Modulation performance relative to mask 47 CFR 90.210(g)
(MAXIMUM POWER SETTING)

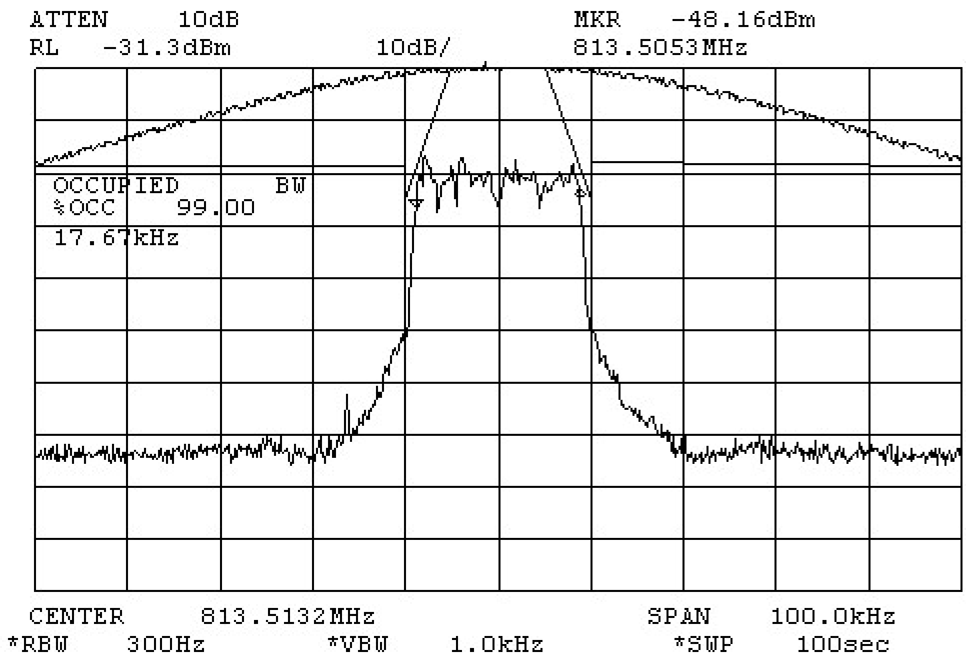


Figure 6-32: WiDEN25 Quad-64QAM Modulation performance relative to mask 47 CFR 90.210(g)
(MINIMUM POWER SETTING)

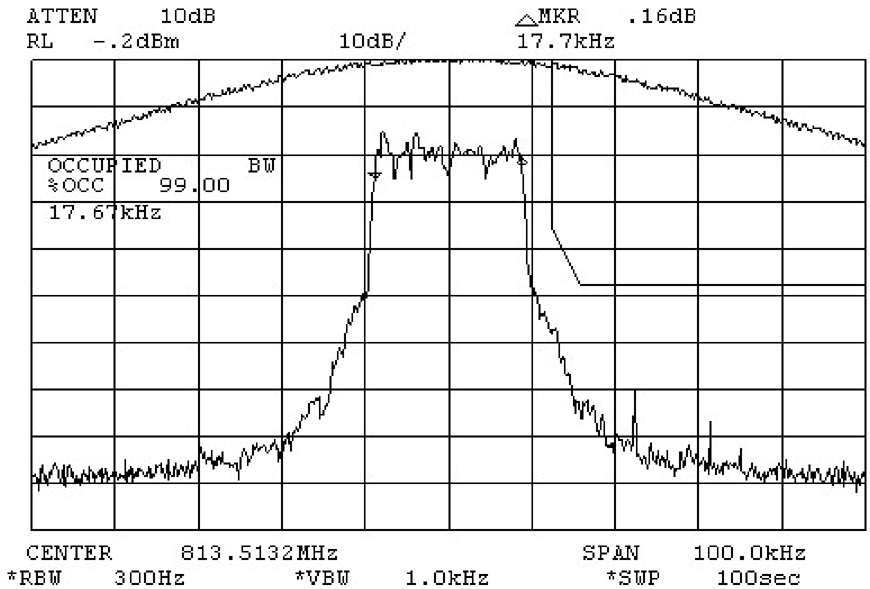


Figure 6-33: WiDEN25 Quad-64QAM Modulation performance relative to mask 47 CFR 90.691.
(MAXIMUM POWER SETTING)

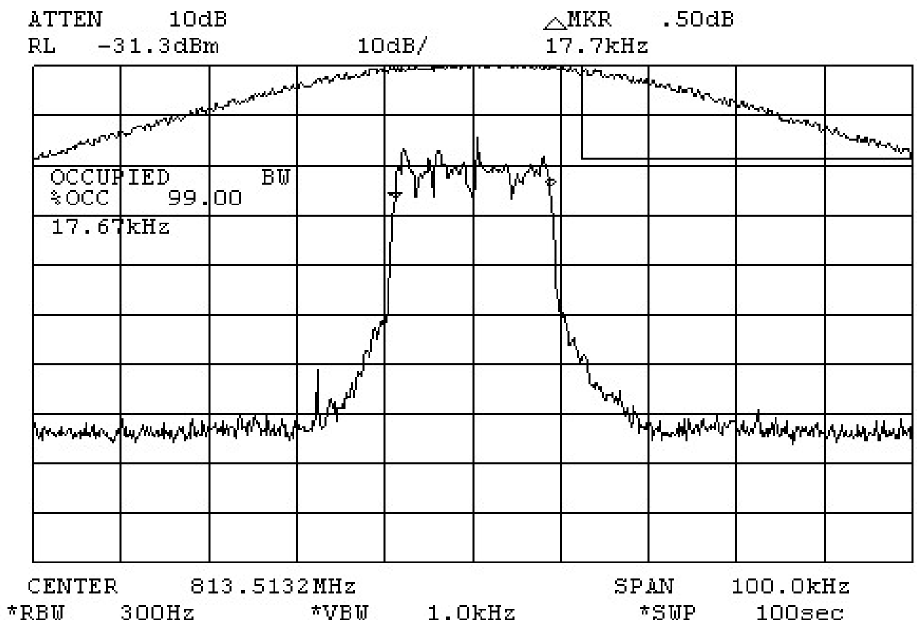


Figure 6-34: WiDEN 25 Quad-64QAM Modulation performance relative to mask 47 CFR 90.691.
(MINIMUM POWER SETTING)

6.3.3 800 MHz Band Operation Measured Data – Emission Designator 43K3D7D

FCC Limits
- Per EA SMR Emission Mask, 47 CFR 90.691(a)

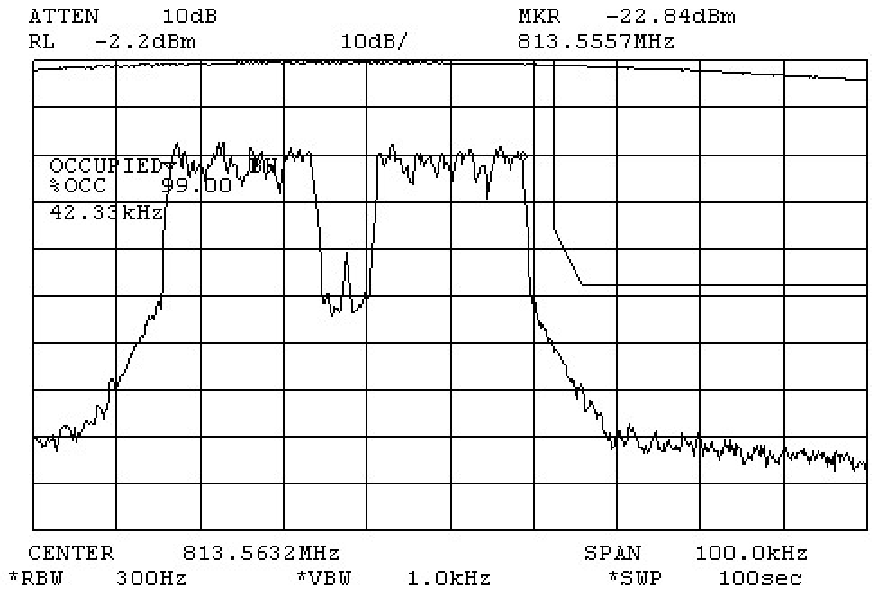


Figure 6-35: WIDEN50 Adjacent Quad-QPSK Modulation performance relative to mask 47 CFR 90.691. (MAXIMUM POWER SETTING)

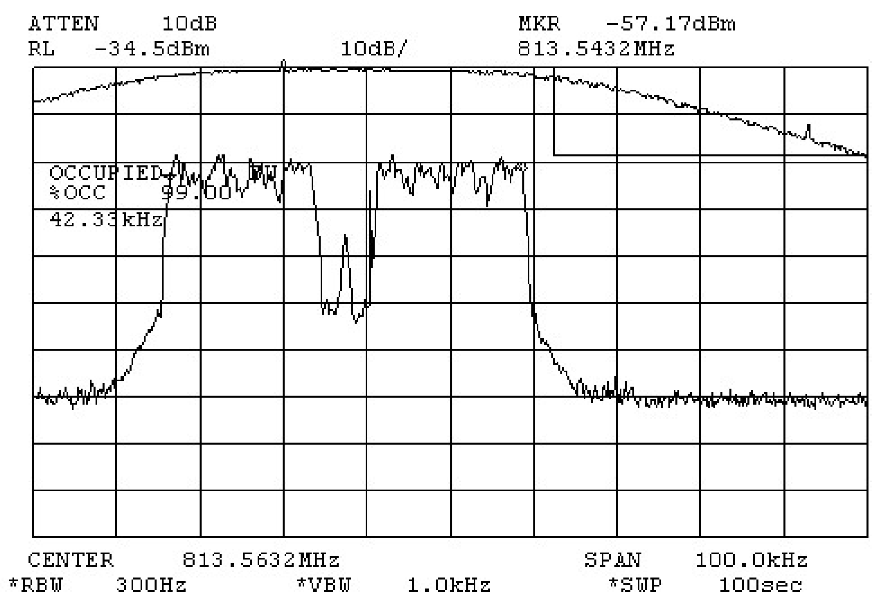


Figure 6-36: WiDEN50 Adjacent Quad-QPSK Modulation performance relative to mask 47 CFR 90.691. (MINIMUM POWER SETTING)

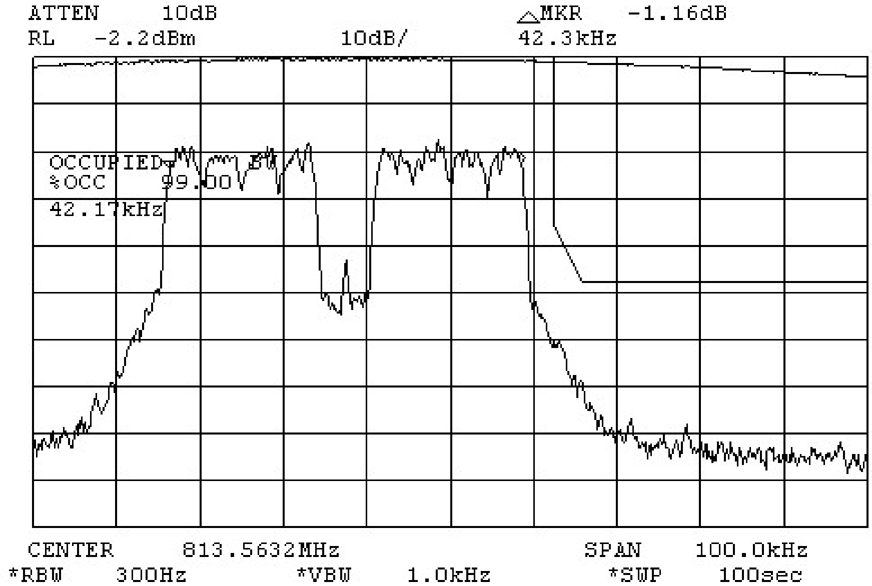


Figure 6-37: WiDEN50 Adjacent Quad-16QAM Modulation performance relative to mask 47 CFR 90.691 (MAXIMUM POWER SETTING)

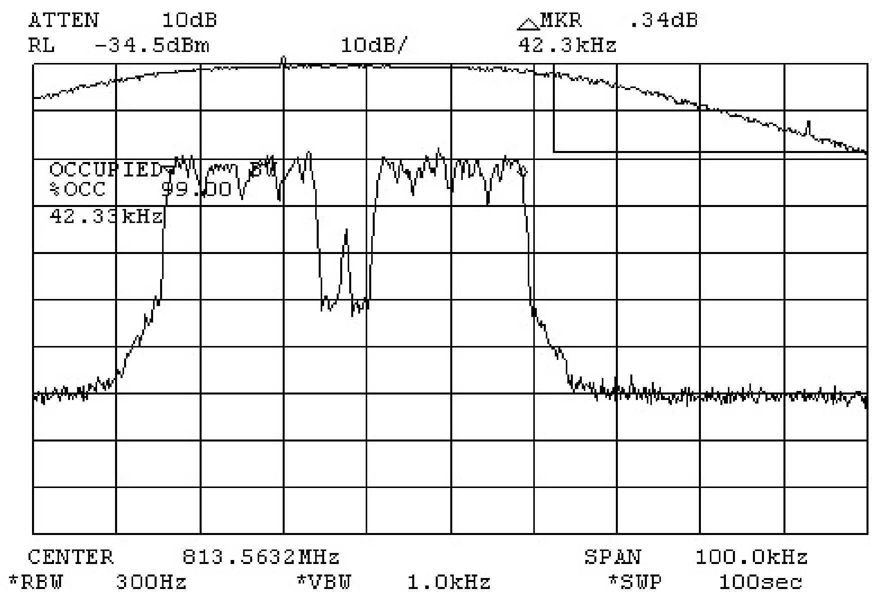


Figure 6-38: WiDEN50 Adjacent Quad-16QAM Modulation performance relative to mask 47 CFR 90.691 (MINIMUM POWER SETTING)

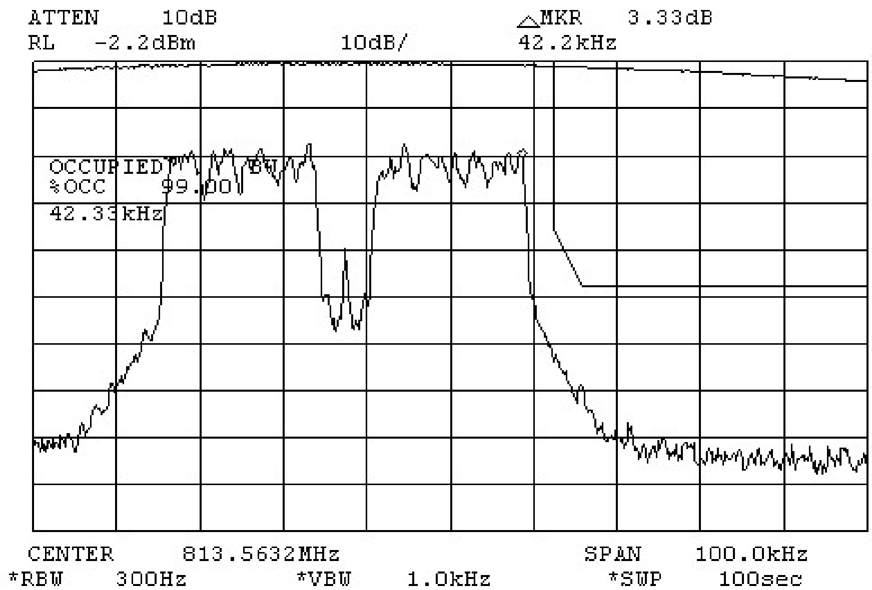


Figure 6-39: WiDEN50 Adjacent Quad-64QAM Modulation performance relative to mask 47 CFR 90.691 (MAXIMUM POWER SETTING)

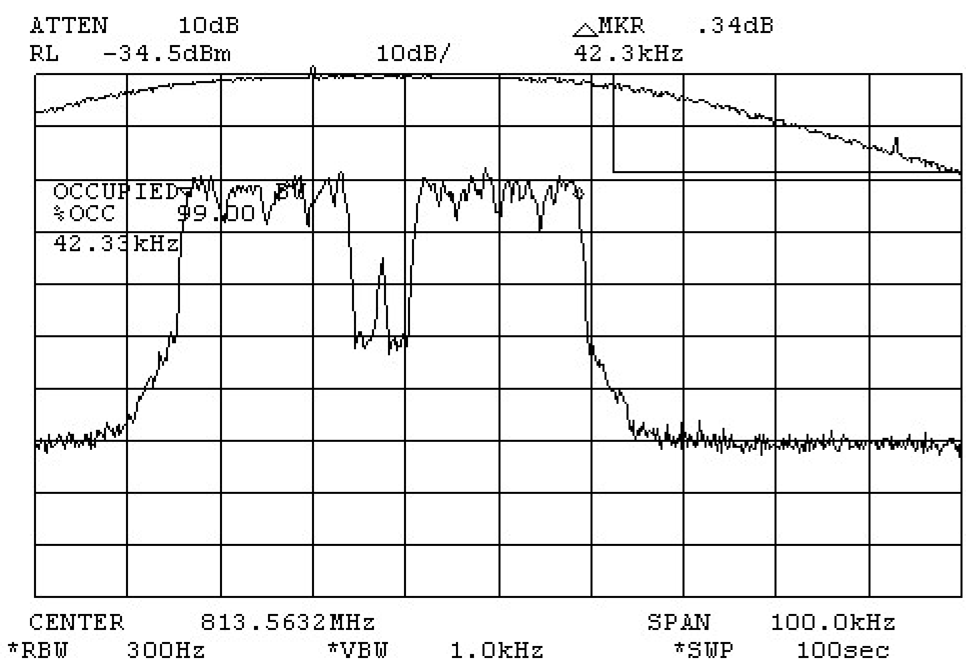


Figure 6-40: WiDEN 50 Adjacent Quad-64QAM Modulation performance relative to mask 47 CFR 90.691 (MINIMUM POWER SETTING)

6.3.4 800 MHz Band Operation Measured Data – Emission Designator 68K3D7D

<u>FCC Limits</u>
- Per EA SMR Emission Mask, 47 CFR 90.691(a)

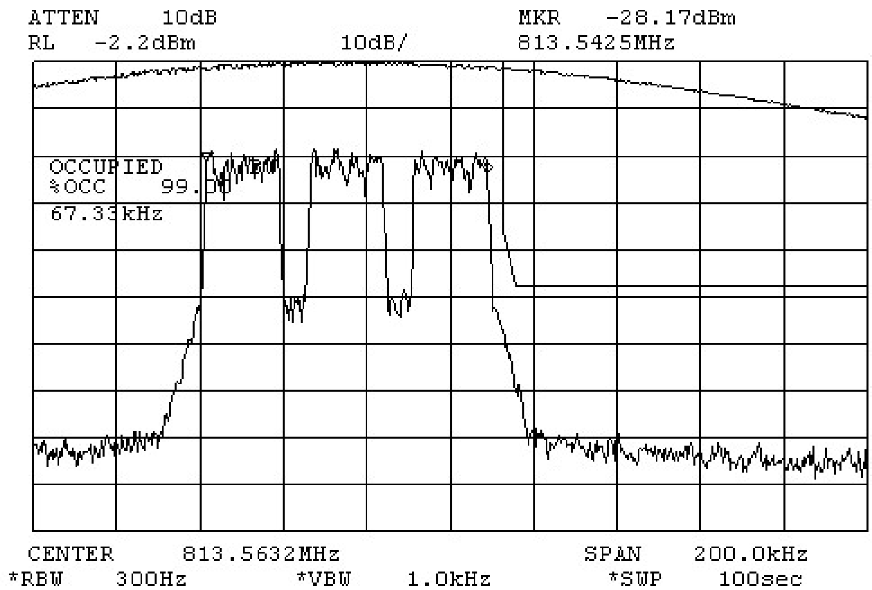


Figure 6-41: WIDEN75 Quad-QPSK Modulation performance relative to mask 47 CFR 90.691 (MAXIMUM POWER SETTING)

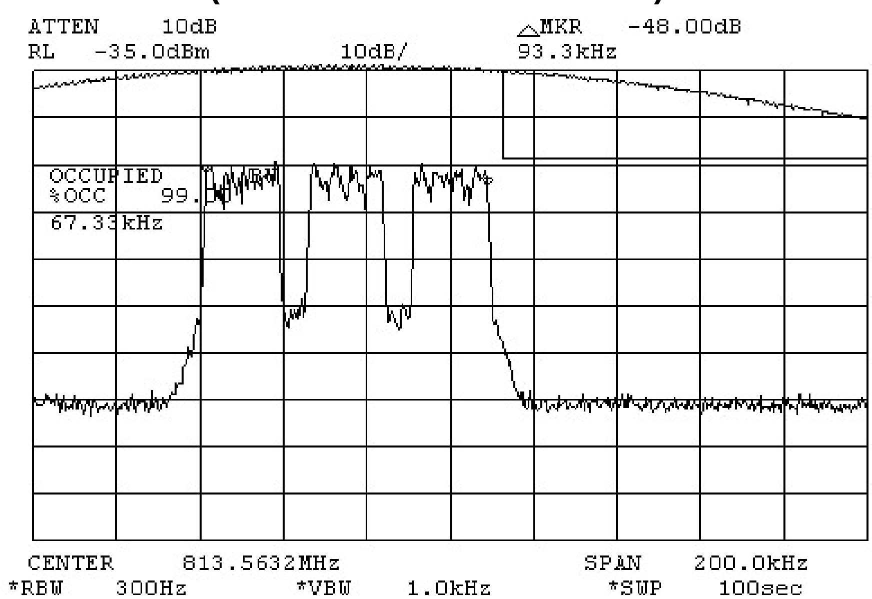


Figure 6-42: WiDEN75 Quad-QPSK Modulation performance relative to mask 47 CFR 90.691 (MINIMUM POWER SETTING)

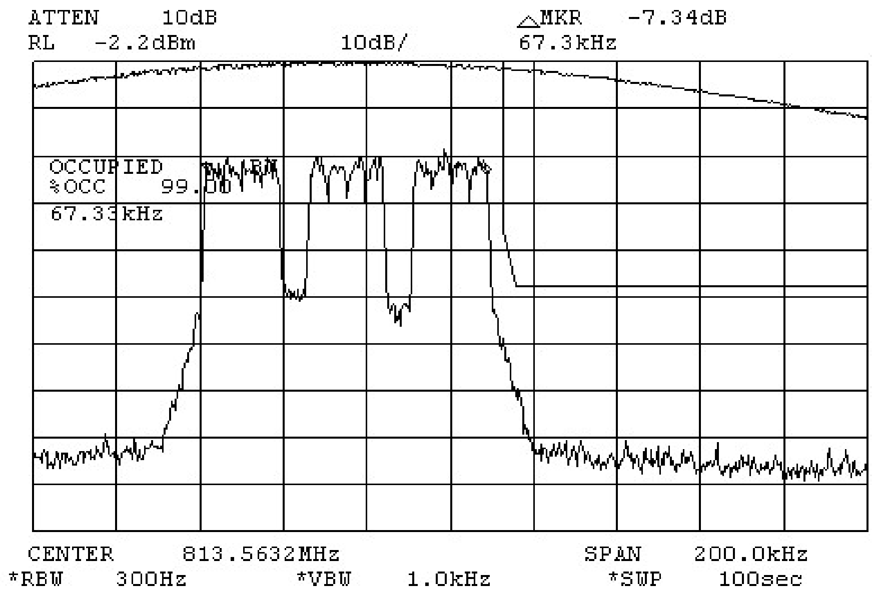


Figure 6-43: WiDEN75 Quad-16QAM Modulation performance relative to mask 47 CFR 90.691 (MAXIMUM POWER SETTING)

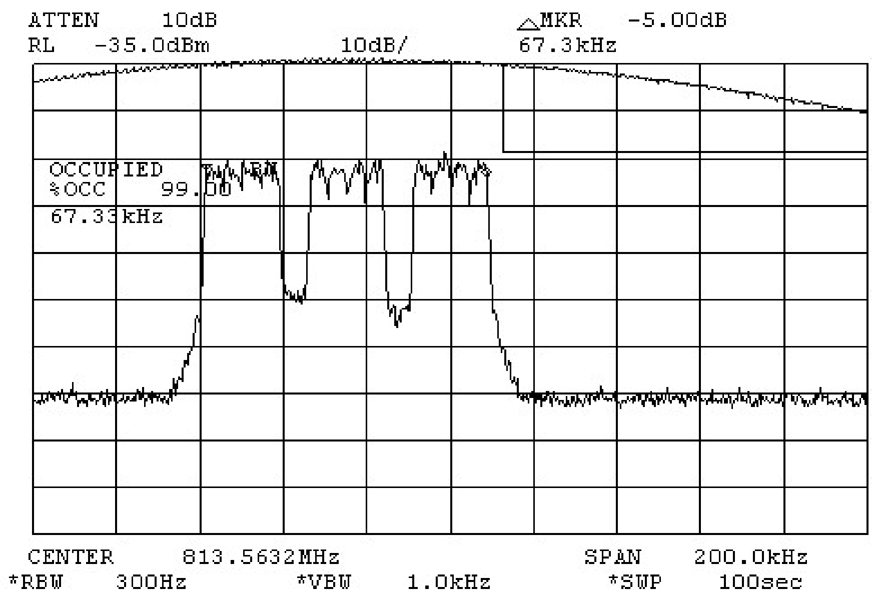


Figure 6-44: WiDEN75 Quad-16QAM Modulation performance relative to mask 47 CFR 90.691 (MINIMUM POWER SETTING)

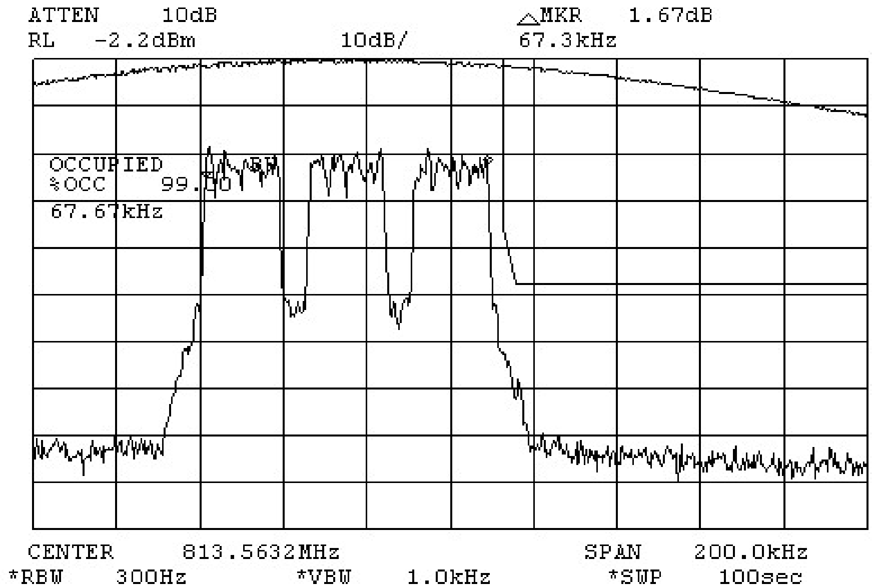


Figure 6-45: WiDEN75 Quad-64QAM Modulation performance relative to mask 47 CFR 90.691 (MAXIMUM POWER SETTING)

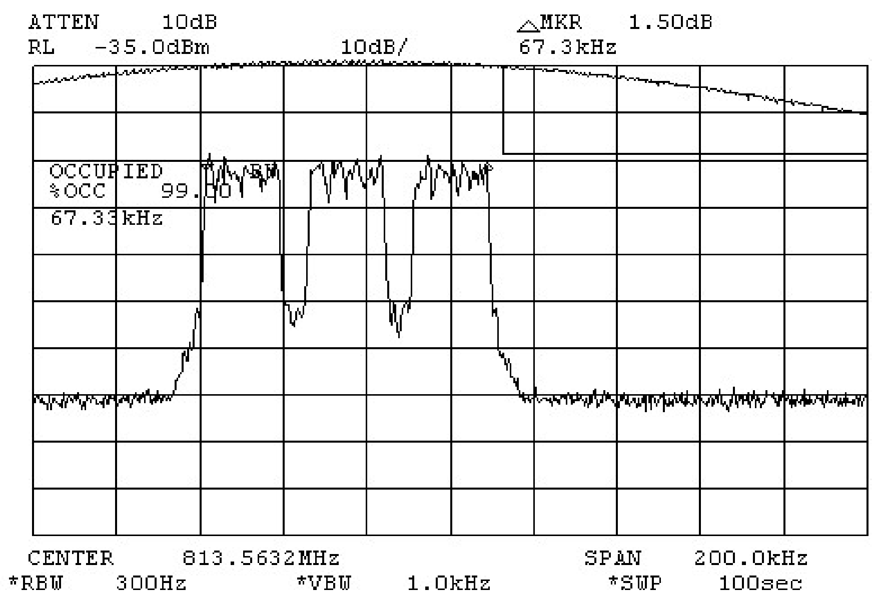


Figure 6-46: WiDEN75 Quad-64QAM Modulation performance relative to mask 47 CFR 90.691 (MINIMUM POWER SETTING)

6.3.5 800 MHz Band Operation Measured Data – Emission Designator 93K3D7D

<u>FCC Limits</u>

- Per EA SMR Emission Mask, 47 CFR 90.691(a)

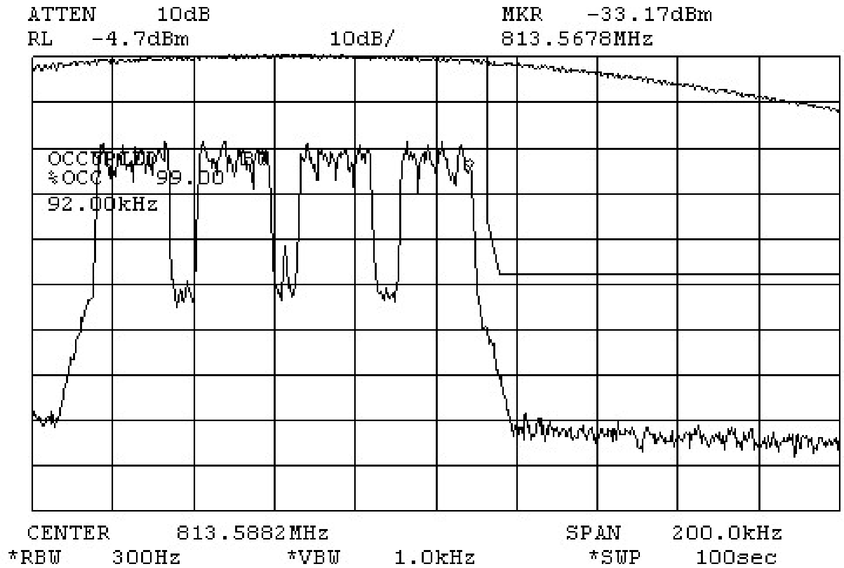


Figure 6-47: WIDEN100 Quad-QPSK Modulation performance relative to mask 47 CFR 90.691 (MAXIMUM POWER SETTING)

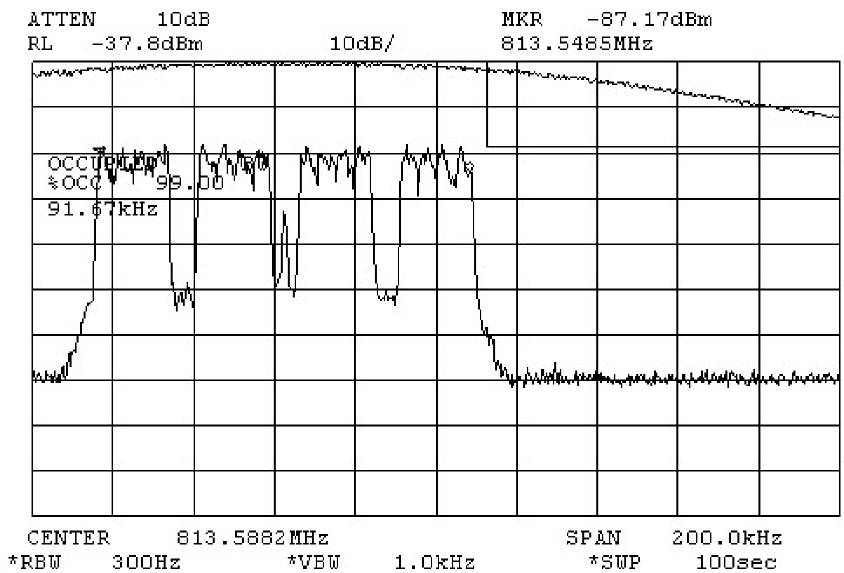


Figure 6-48: WiDEN100 Continuous Quad-QPSK Modulation performance relative to mask 47 CFR 90.691 (MINIMUM POWER SETTING)

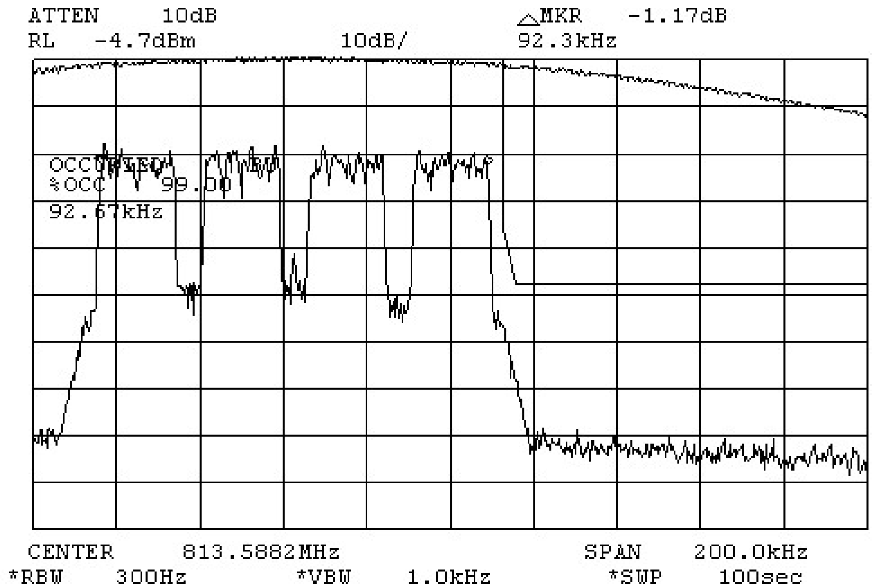


Figure 6-49: WiDEN100 Quad-16QAM Modulation performance relative to mask 47 CFR 90.691
(MAXIMUM POWER SETTING)

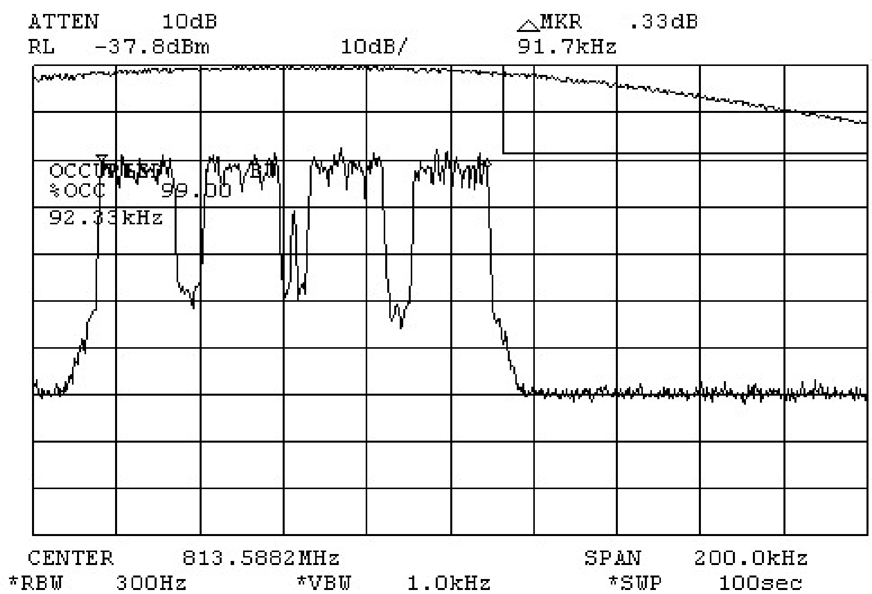


Figure 6-50: WiDEN100 Quad-16QAM Modulation performance relative to mask 47 CFR 90.691
(MINIMUM POWER SETTING)

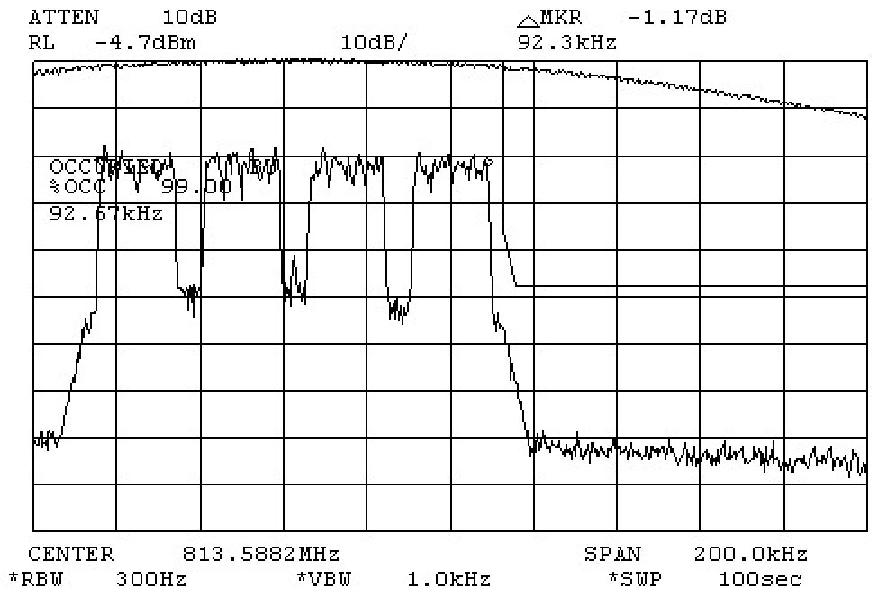


Figure 6-51: WiDEN100 Quad-64QAM Modulation performance relative to mask 47 CFR 90.691 (MAXIMUM POWER SETTING)

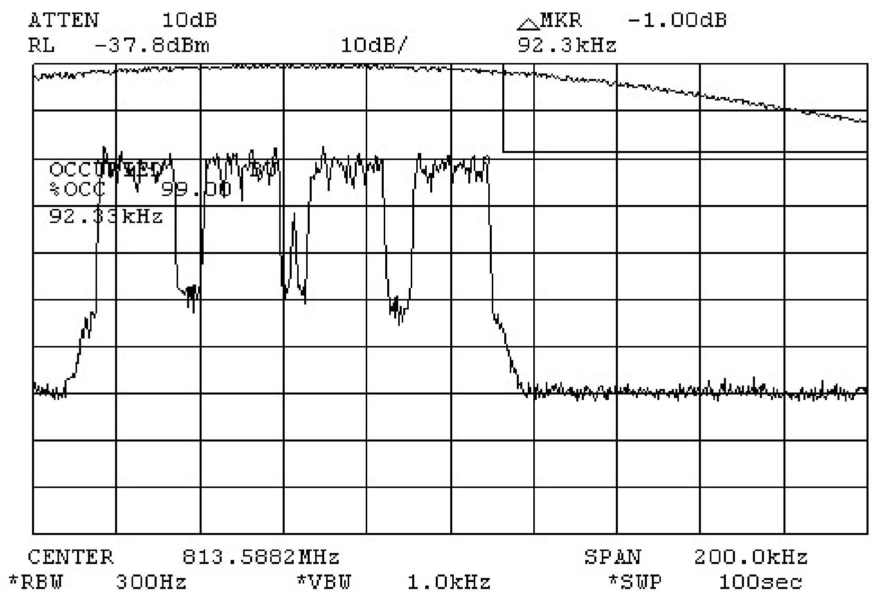


Figure 6-52: WiDEN 100 Quad-64QAM Modulation performance relative to mask 47 CFR 90.691 (MINIMUM POWER SETTING)

6.3.6 800 MHz Band WiDEN50 Split Operation Measured Data

<u>FCC Limits</u>

- Per EA SMR Emission Mask, 47 CFR 90.691(a)

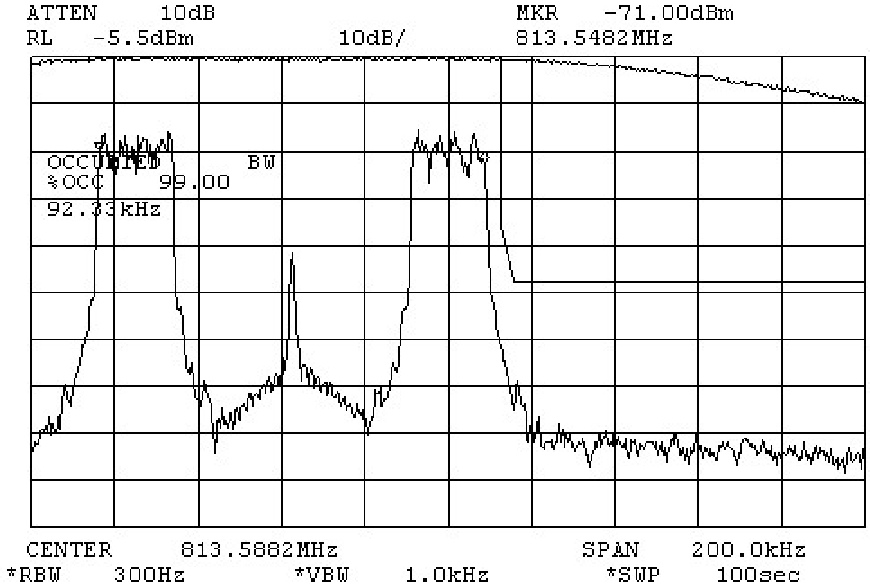


Figure 6-53: WIDEN50 Split Quad-QPSK Modulation performance relative to mask 47 CFR 90.691. (MAXIMUM POWER SETTING)

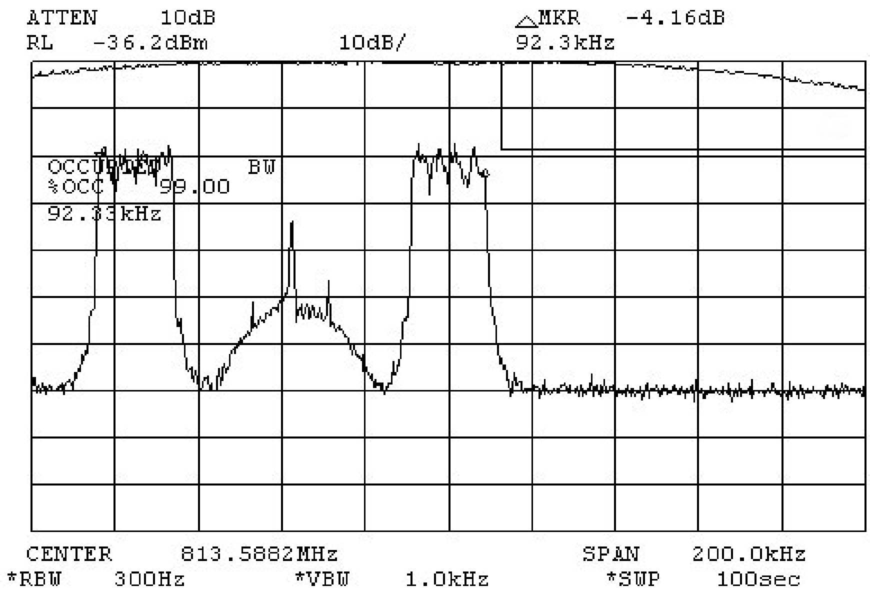


Figure 6-54: WiDEN50 Split Quad-QPSK Modulation performance relative to mask 47 CFR 90.691. (MINIMUM POWER SETTING)

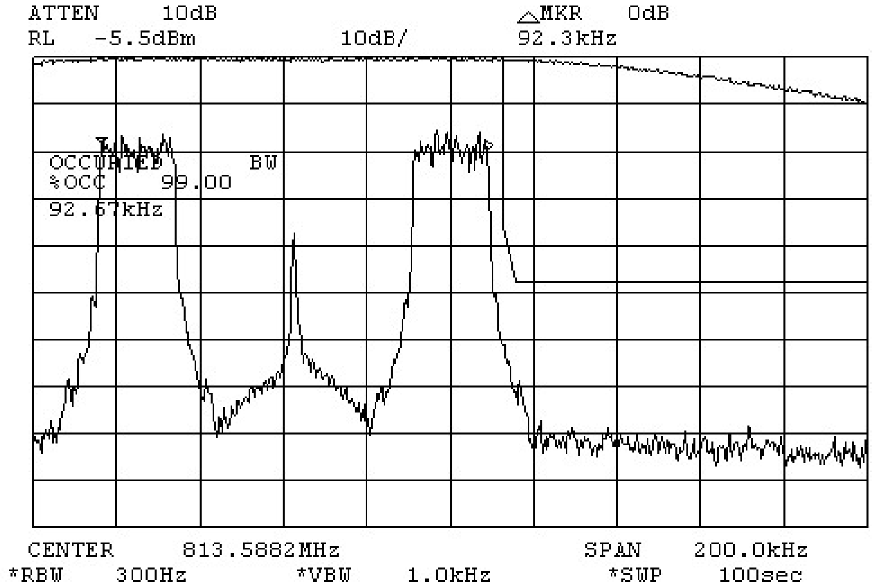


Figure 6-55: WiDEN50 Split Quad-16QAM Modulation performance relative to mask 47 CFR 90.691. (MAXIMUM POWER SETTING)

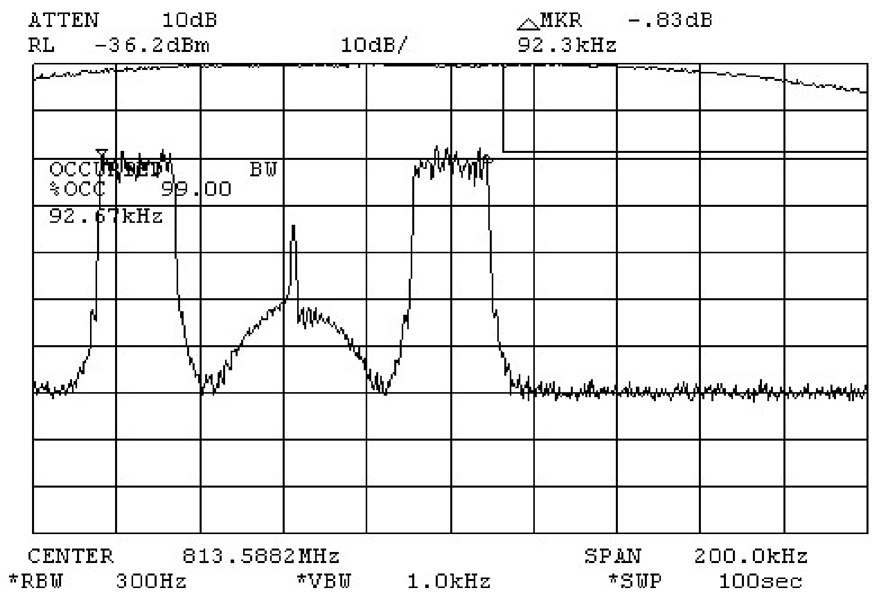


Figure 6-56: WiDEN50 Split Quad-16QAM Modulation performance relative to mask 47 CFR 90.691. (MINIMUM POWER SETTING)

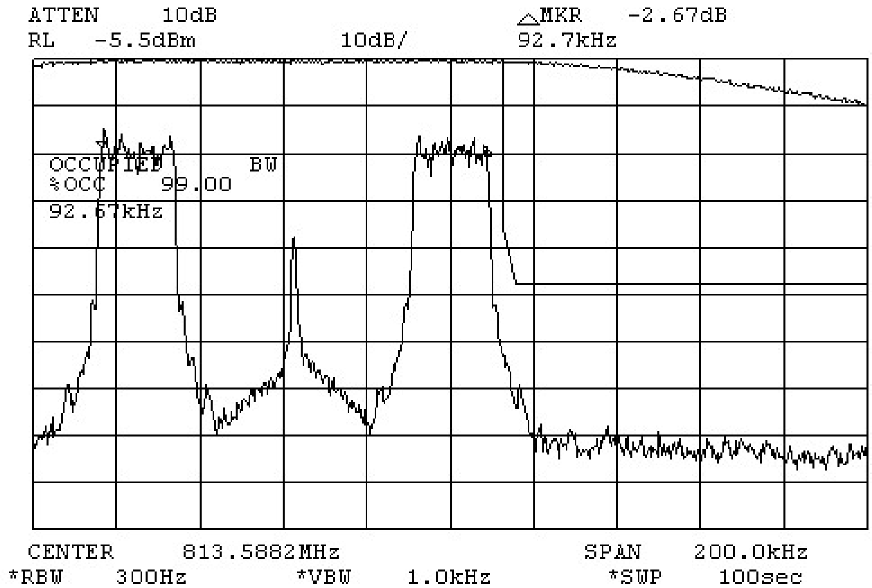


Figure 6-57: WiDEN50 Split Quad-64QAM Modulation performance relative to mask 47 CFR 90.691.
(MAXIMUM POWER SETTING)

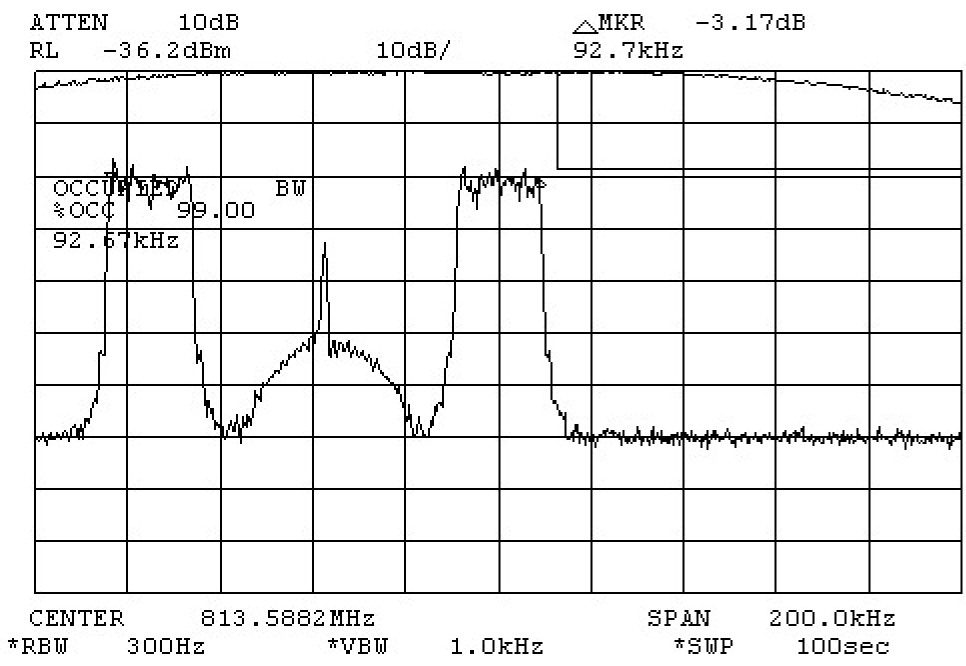


Figure 6-58: WiDEN 50 Split Quad-64QAM Modulation performances relative to mask 47 CFR 90.691.
(MINIMUM POWER SETTING)

6.3.2 900 MHz Band WiDEN25 Operation Measured Data

FCC Limits

- Per 47 CFR 90.669(a)

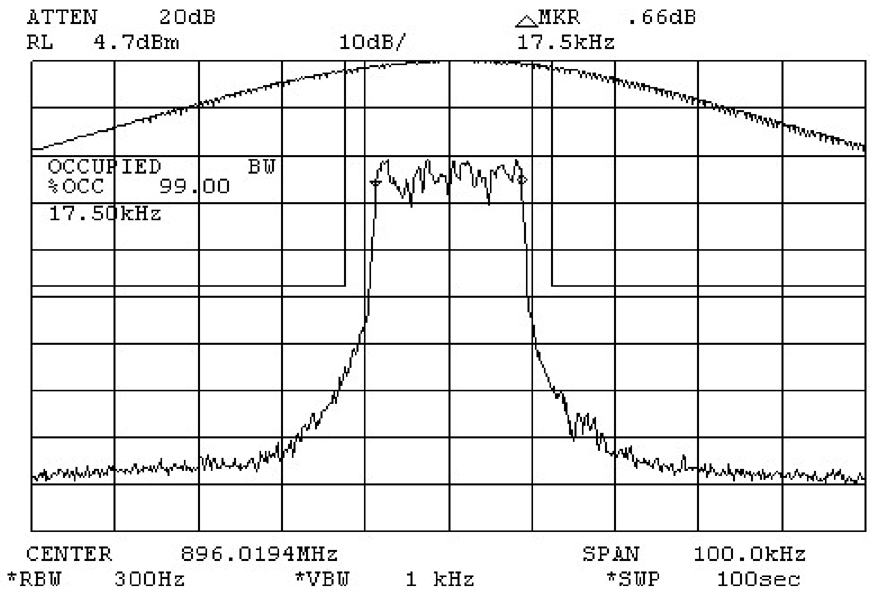


Figure 6-59: WiDEN25 Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

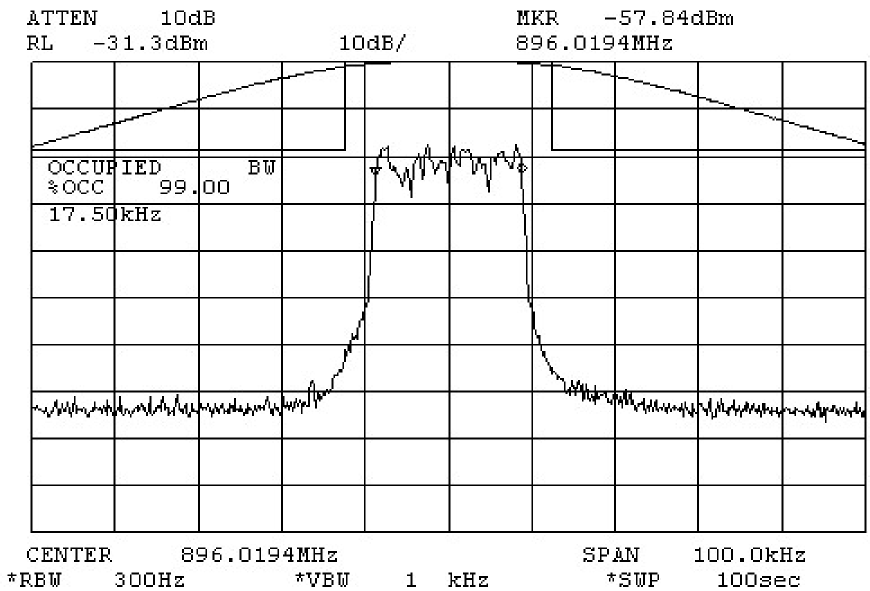


Figure 6-60: WiDEN25 Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

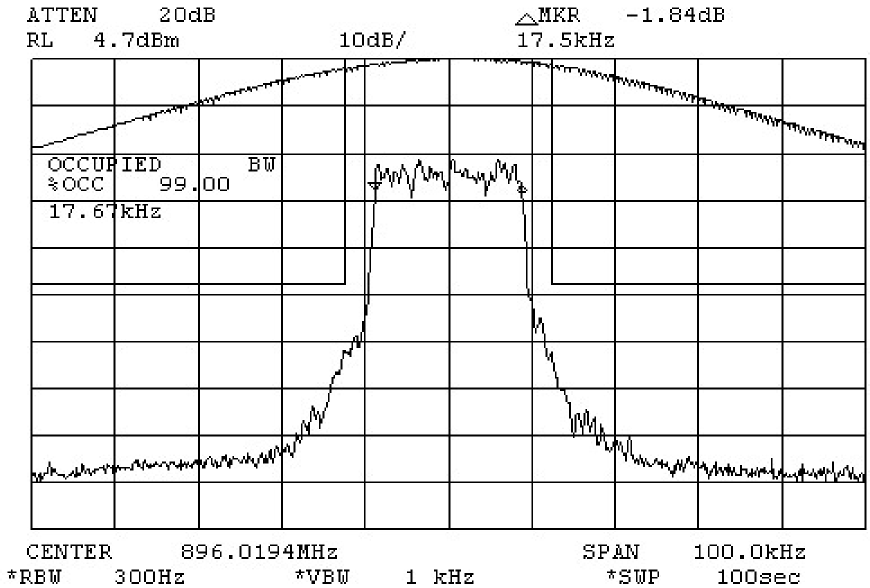


Figure 6-61: WiDEN25 Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

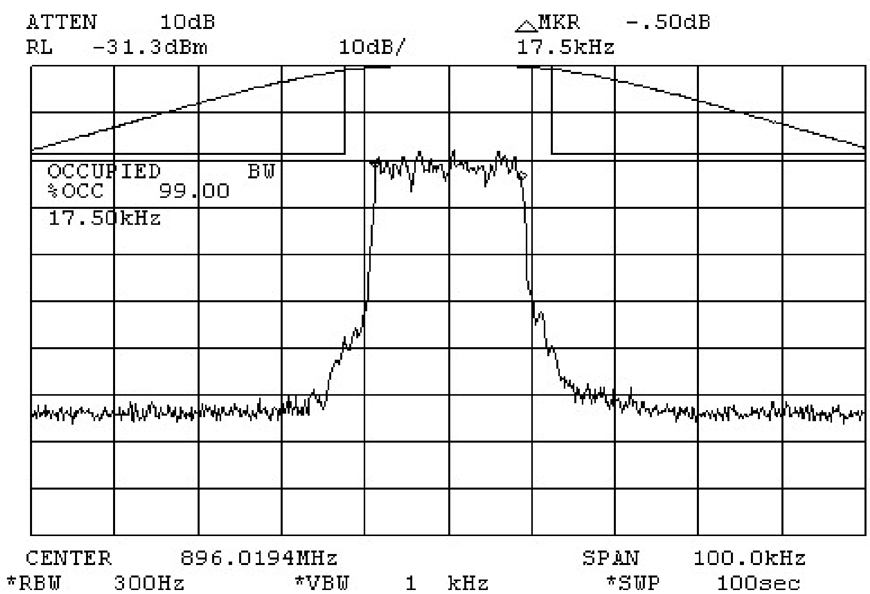


Figure 6-62: WiDEN25 Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

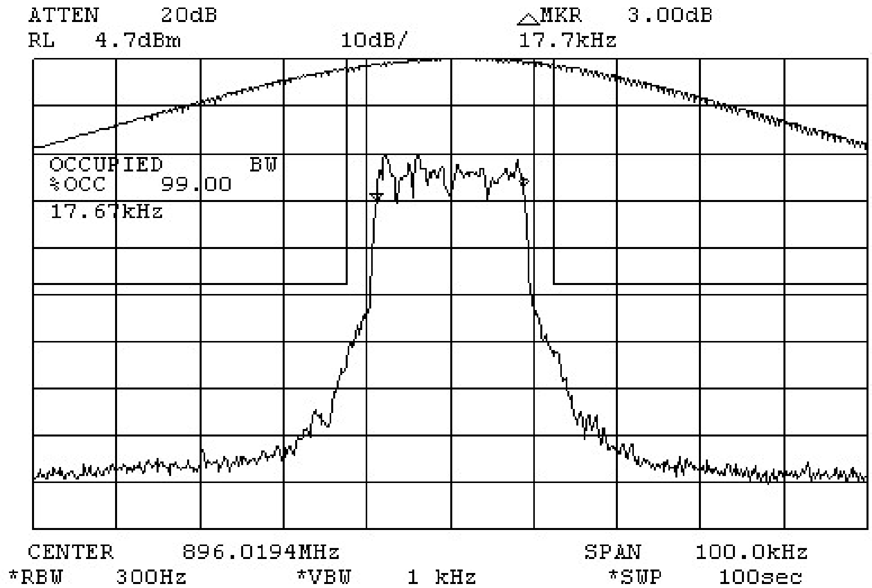


Figure 6-63: WiDEN25 Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

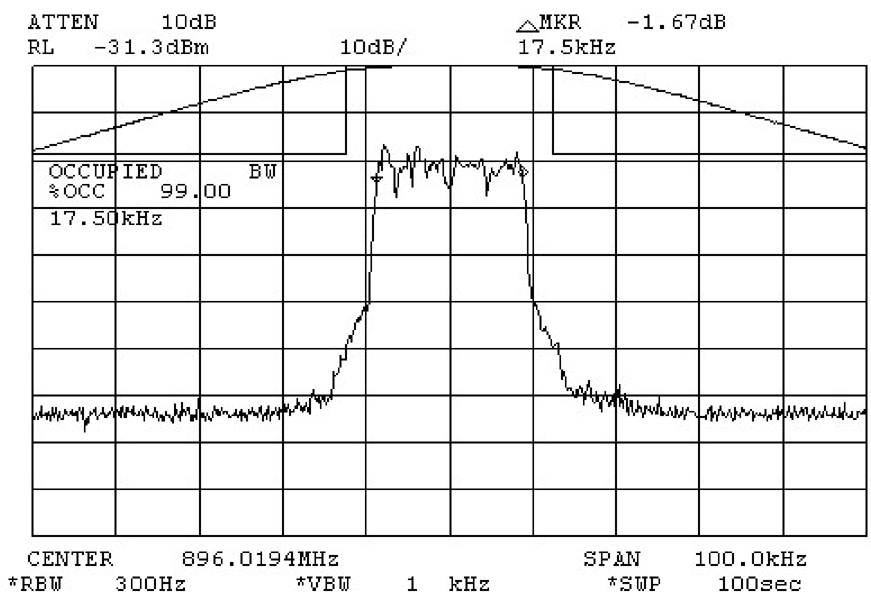


Figure 6-64: WiDEN25 Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

6.3.3 900 MHz Band Operation Measured Data – Emission Designator 43K3D7D

FCC Limits
- Per 47 CFR 90.669(a)

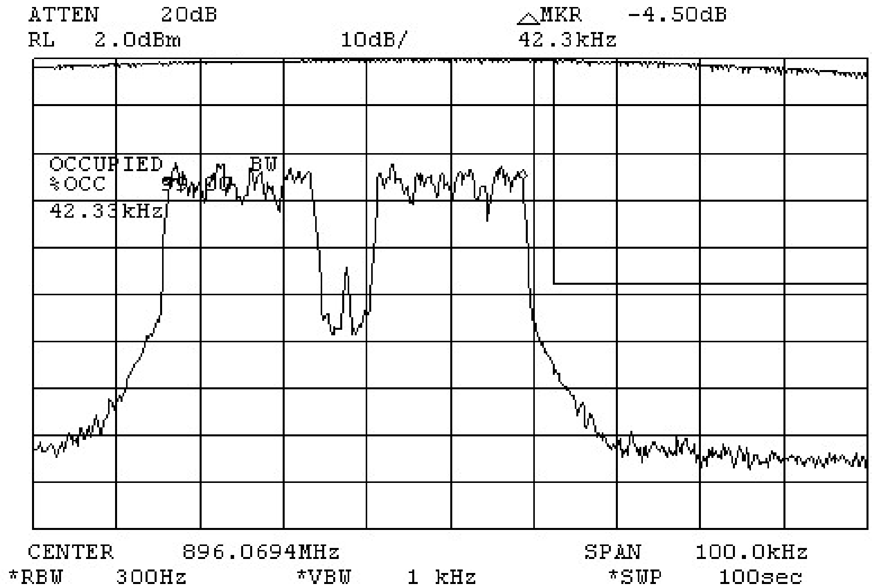


Figure 6-65: WIDEN50 Adjacent Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

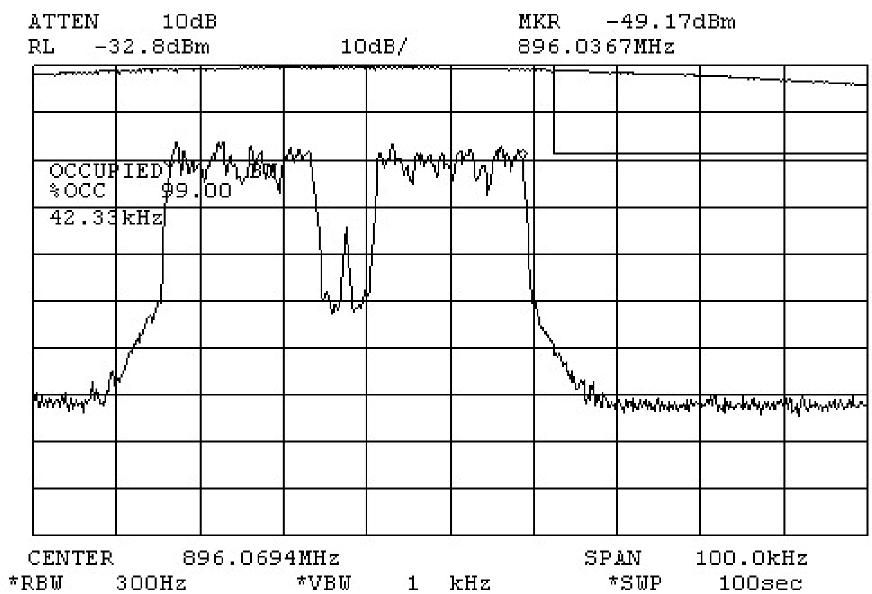


Figure 6-66: WiDEN50 Adjacent Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

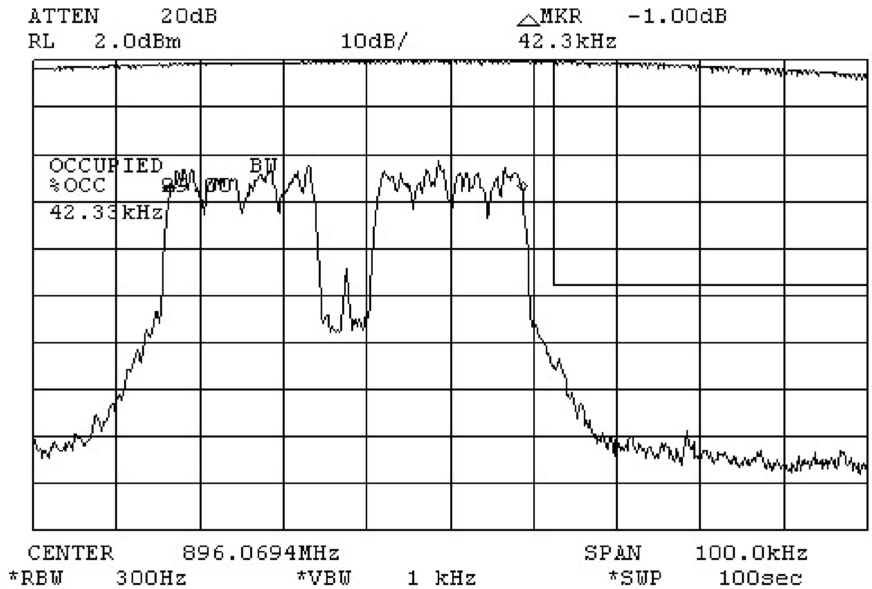


Figure 6-67: WiDEN50 Adjacent Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a)
(MAXIMUM POWER SETTING)

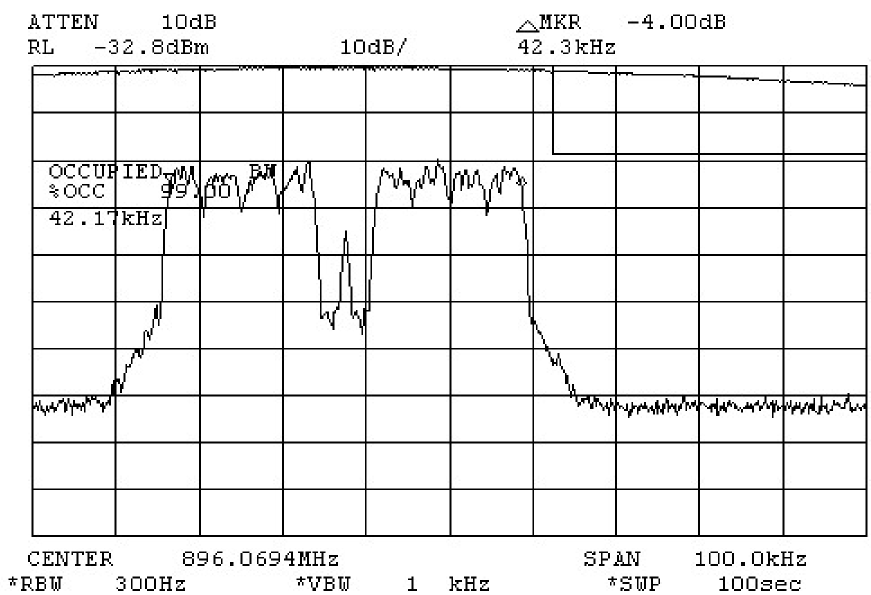


Figure 6-68: WiDEN50 Adjacent Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a)
(MINIMUM POWER SETTING)

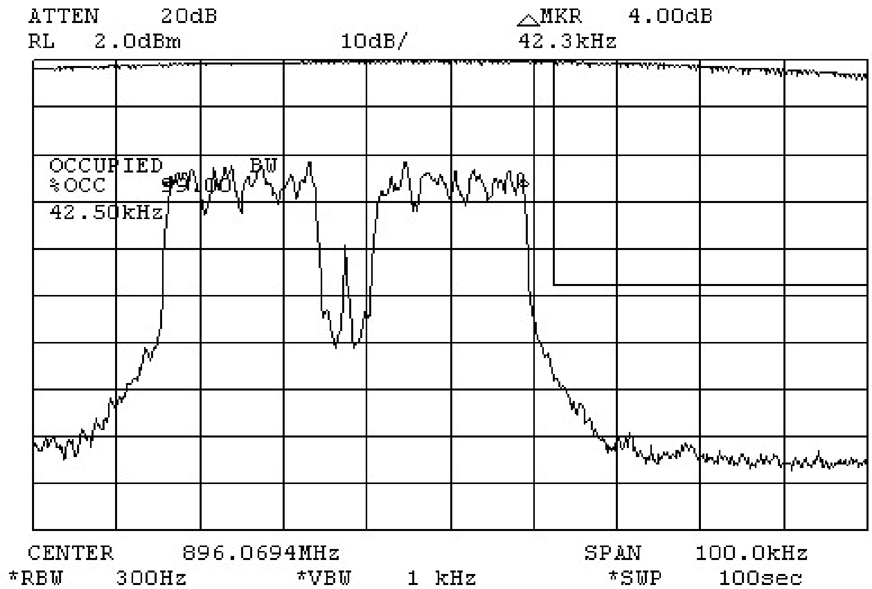


Figure 6-69: WiDEN50 Adjacent Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

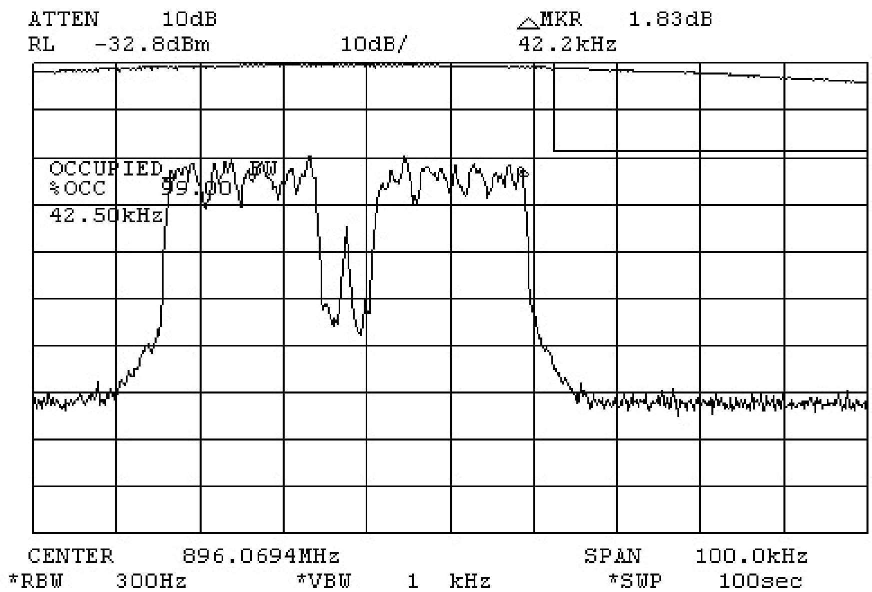


Figure 6-70: WiDEN 50 Adjacent Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

6.3.4 900 MHz Band Operation Measured Data – Emission Designator 68K3D7D

<u>FCC Limits</u>
- Per 47 CFR 90.669(a)

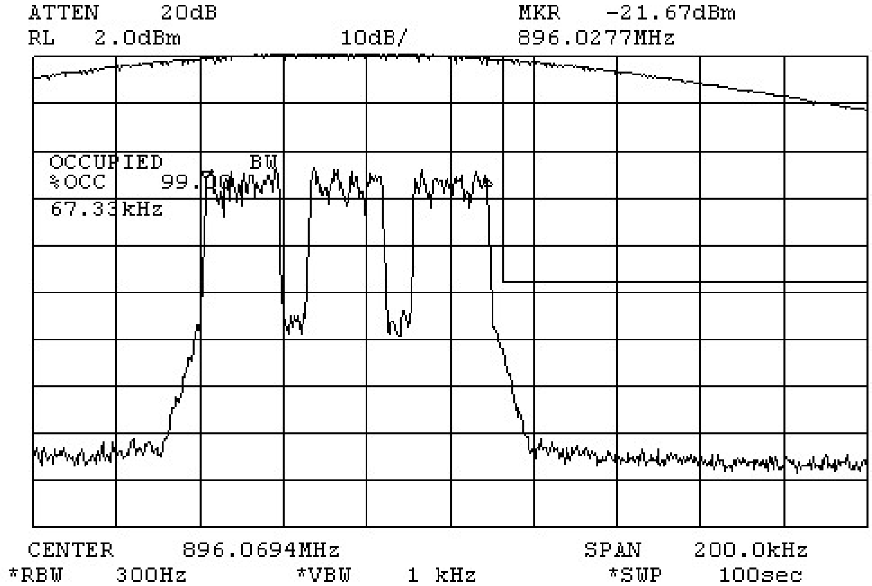


Figure 6-71: WIDEN75 Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a)
(MAXIMUM POWER SETTING)

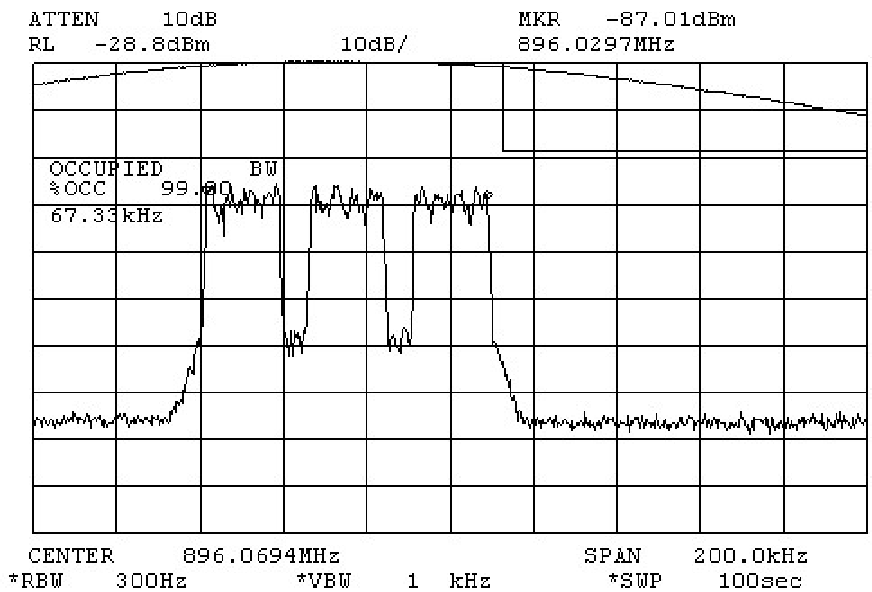


Figure 6-72: WiDEN75 Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a)
(MINIMUM POWER SETTING)

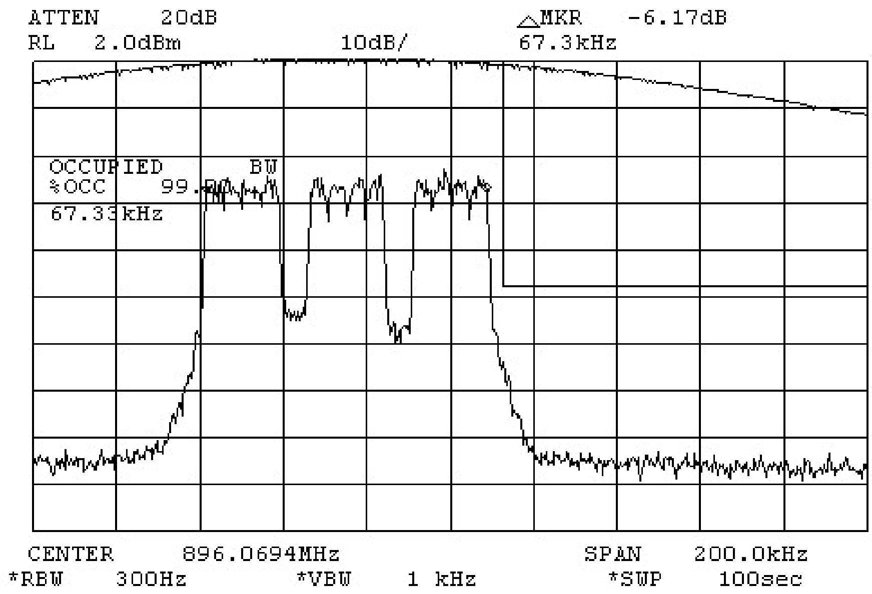


Figure 6-73: WiDEN75 Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a)
(MAXIMUM POWER SETTING)

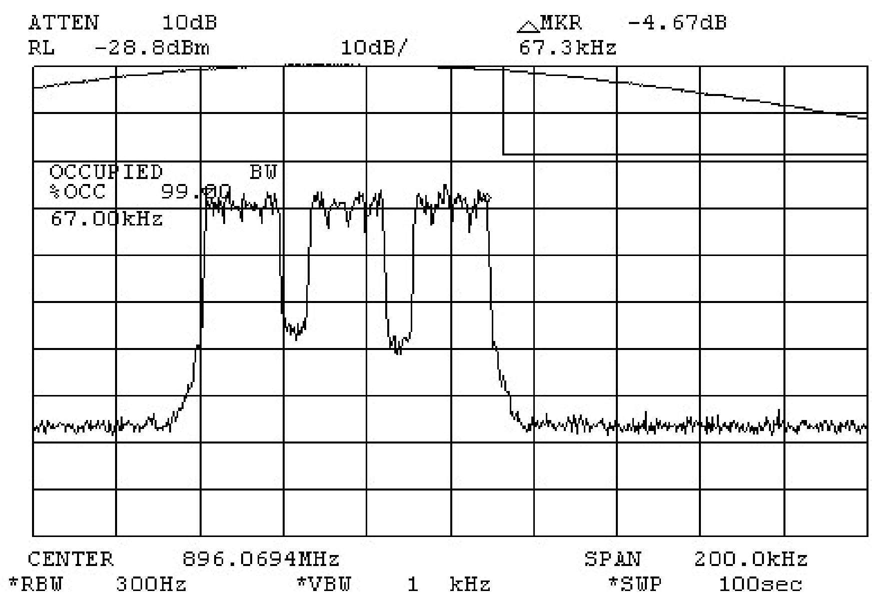


Figure 6-74: WiDEN75 Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a)
(MINIMUM POWER SETTING)

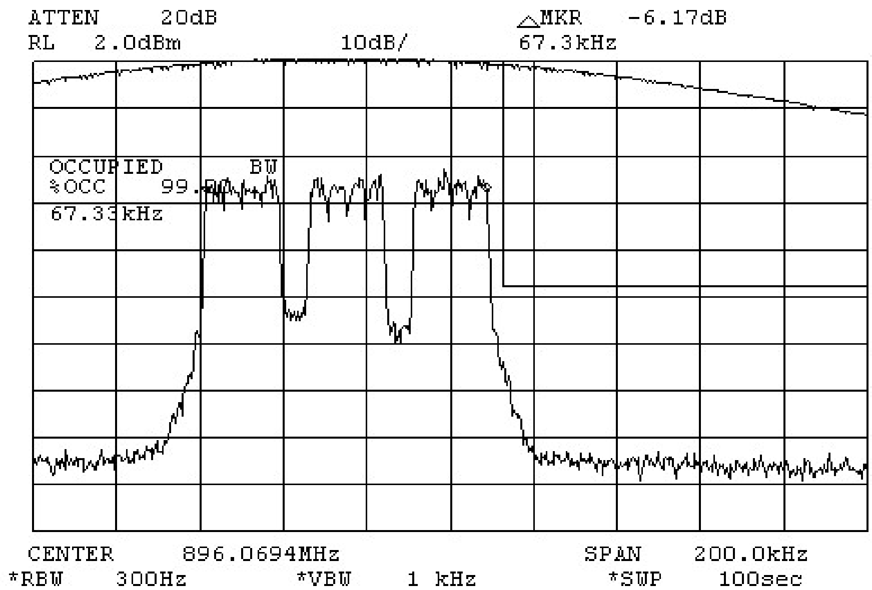


Figure 6-75: WiDEN75 Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

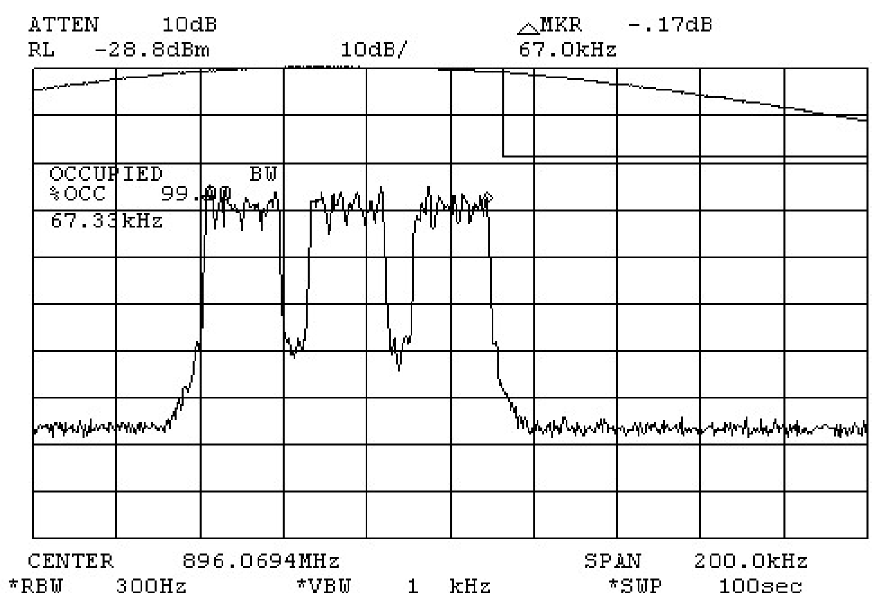


Figure 6-76: WiDEN75 Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

6.3.5 900 MHz Band Operation Measured Data – Emission Designator 93K3D7D

FCC Limits

- Per 47 CFR 90.669(a)

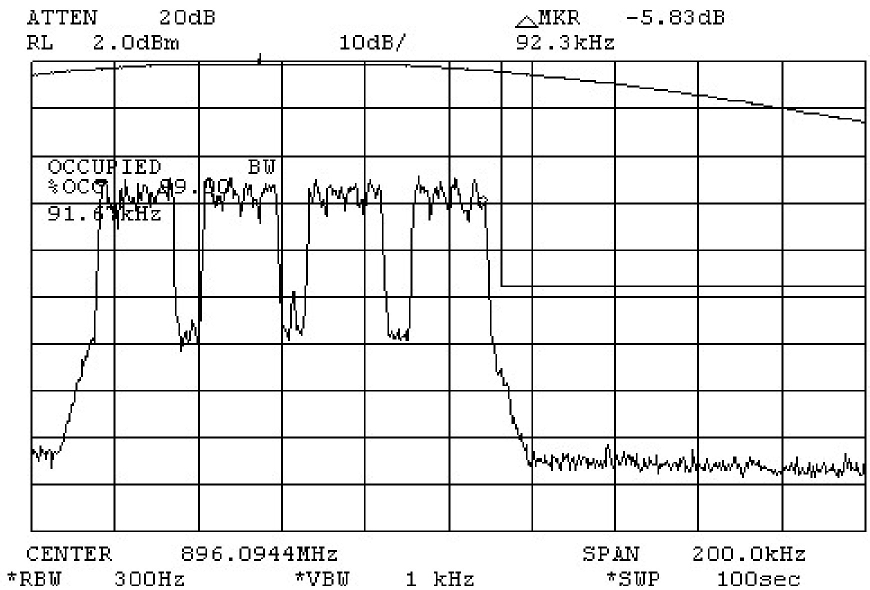


Figure 6-77: WIDEN100 Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a)
(MAXIMUM POWER SETTING)

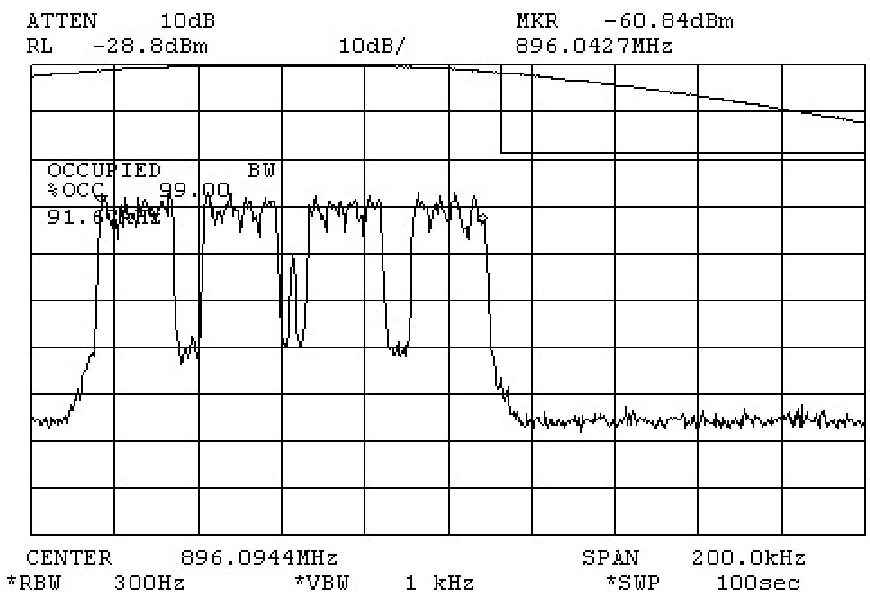


Figure 6-78: WiDEN100 Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a)
(MINIMUM POWER SETTING)

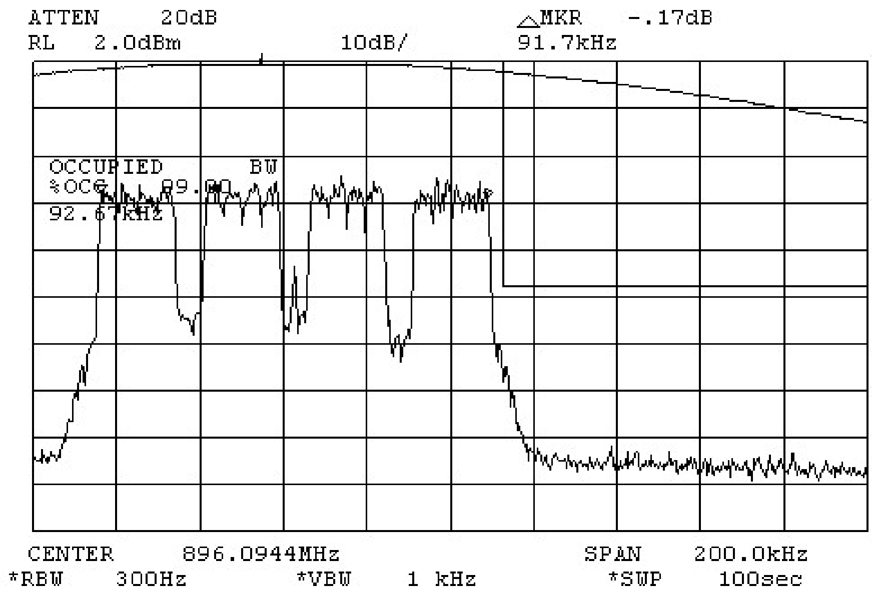


Figure 6-79: WiDEN100 Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

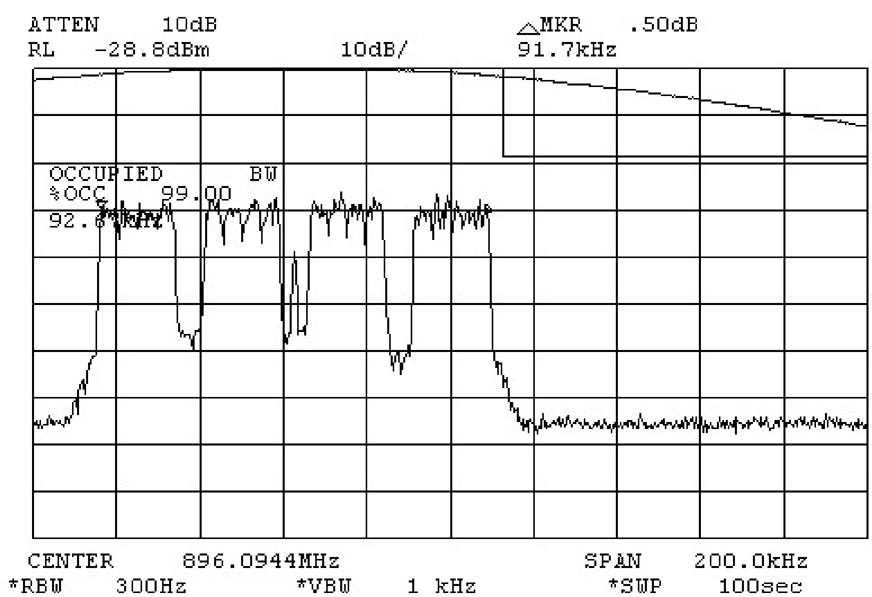


Figure 6-80: WiDEN100 Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

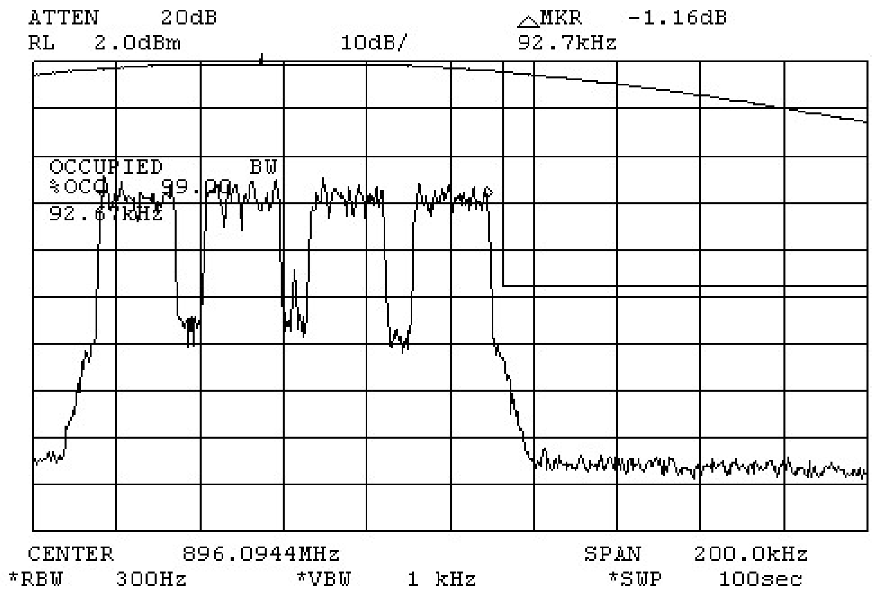


Figure 6-81: WiDEN100 Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

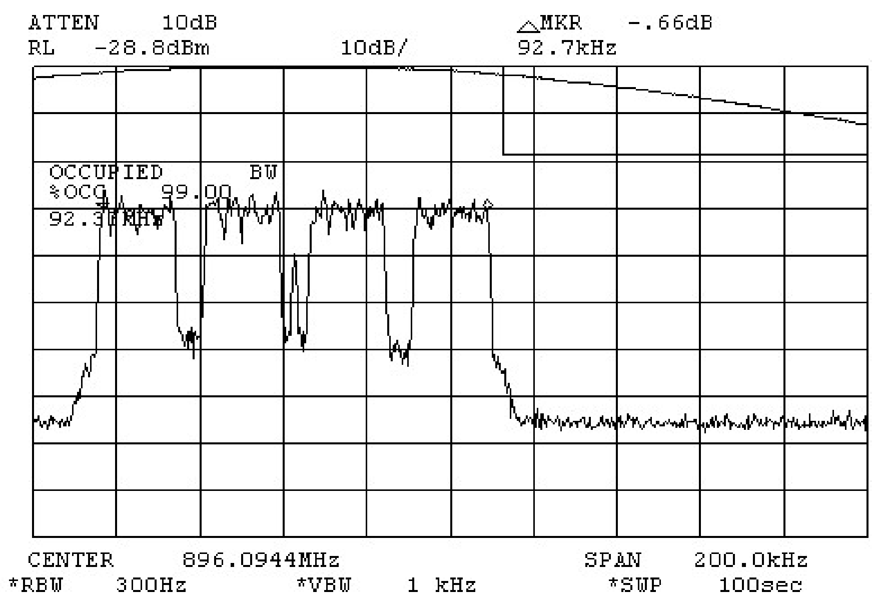


Figure 6-82: WiDEN 100 Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

6.3.6 900 MHz Band WiDEN50 Split Operation Measured Data

FCC Limits

- Per 47 CFR 90.669(a)

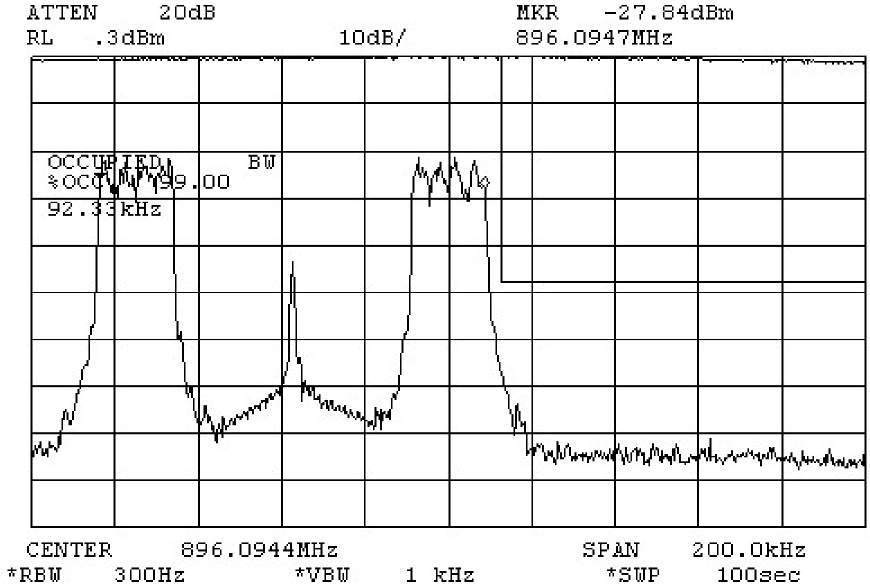


Figure 6-83: WIDEN50 Split Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

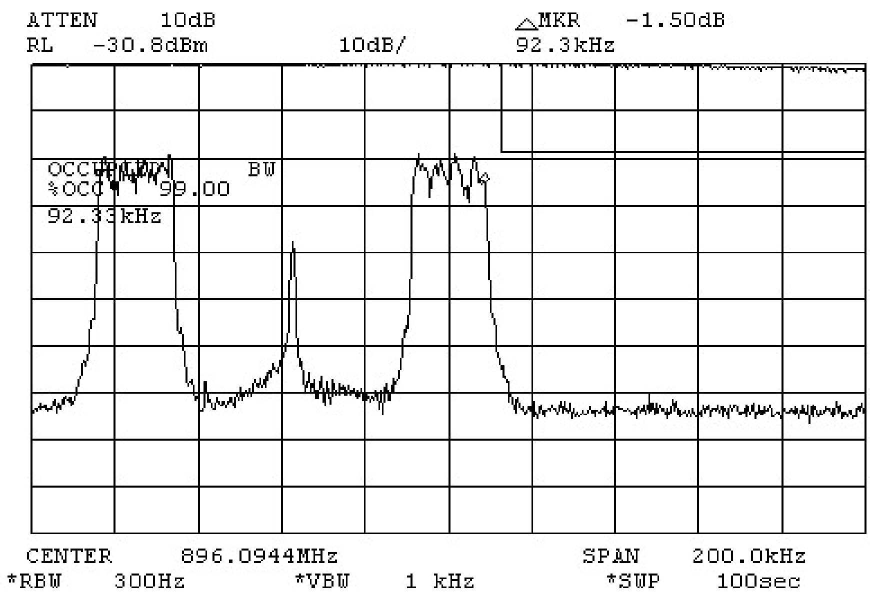


Figure 6-84: WiDEN50 Split Quad-QPSK Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

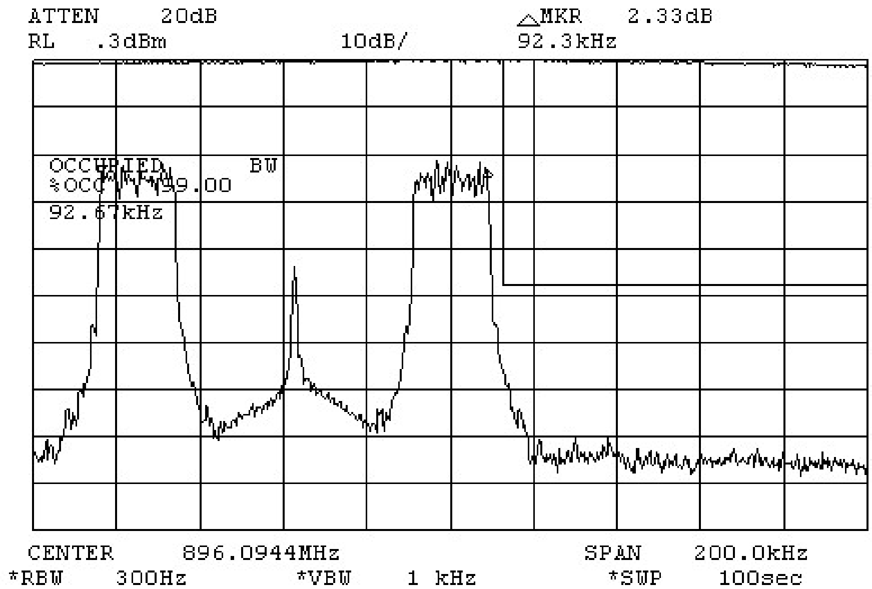


Figure 6-85: WiDEN50 Split Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

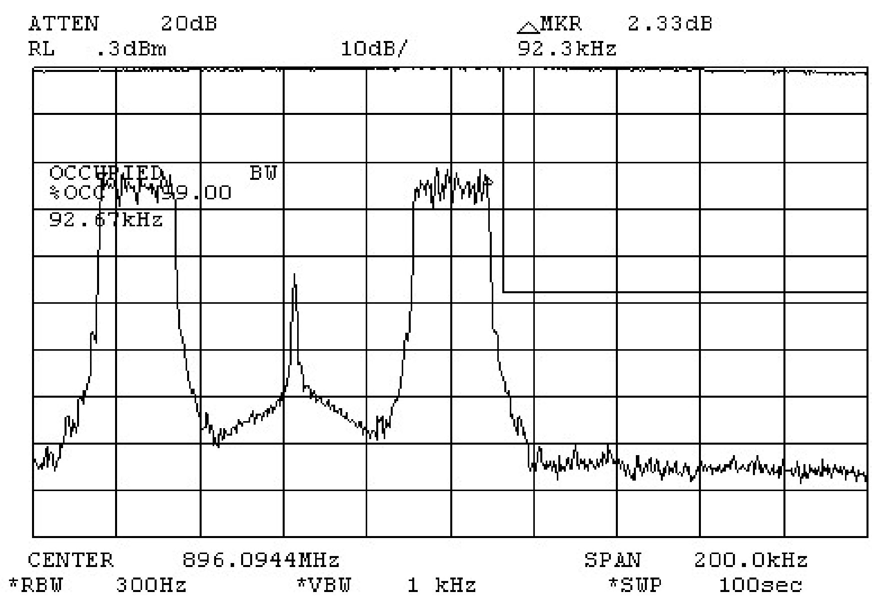


Figure 6-86: WiDEN50 Split Quad-16QAM Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

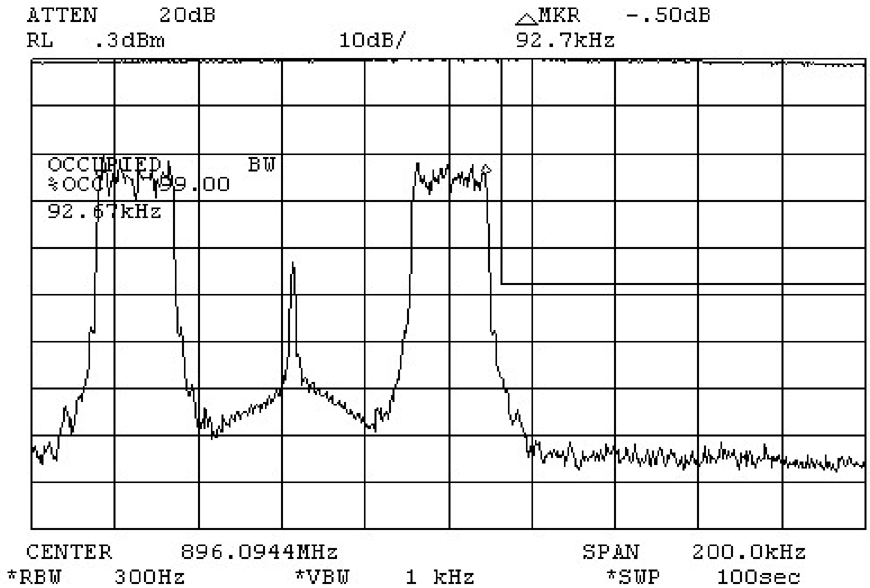


Figure 6-87: WiDEN50 Split Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MAXIMUM POWER SETTING)

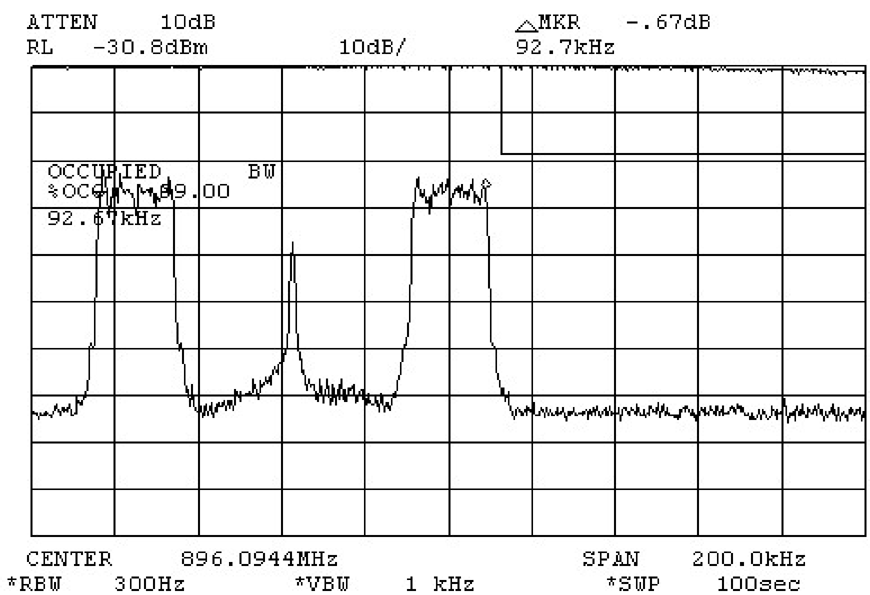


Figure 6-88: WiDEN 50 Split Quad-64QAM Modulation performance relative to mask 47 CFR 90.669(a) (MINIMUM POWER SETTING)

6.3 Radiated Spurious Emissions -- Pursuant 47 CFR 2.1053, 2.1057, 90.210(g)(3), 90.691(a)(2)

FCC Limits

-Per 90.210(g)(3) and 90.691(a)(2), radiated spurious emissions shall be attenuated below the maximum level of emission of the carrier frequency in accordance with the following formula:

Spurious attenuation in dB = 43 + 10 $\log_{10}$ (P)
(Thus the effective limit is -13 dBm for any transmitter power level).

NOTE: An asterisk (*) in the data indicates the spurious emission was less than -33 dB or could not be detected due to noise limitations or ambients.

Assigned frequency range: 806 – 825MHz,896 - 901MHz
Test distance: 3m
Test site: OATS
Investigating frequency range: 0.009 –10000 MHz
Detector used: Peak
Test antenna type: Active Loop (9 kHz- 30 MHz)
Biconical (30MHz – 200MHz)
Log periodic (200MHz – 1000MHz)
Biconilog (30MHz – 1000MHz)
Double ridged guide (above 1000MHz)

-The worst test results (lowest margins) are record in following tables:

Spurious emission field strength test results

Frequency (MHz)	Field strength (dBuV/m)	Power (dBm)	Limit (dBm)	Margin (dB*)
806.0125				
1612.012	71.5	-25.87	-13	12.87
2417.906	72.5	-24.87	-13	11.87
3224.06	56.67	-40.7	-13	>20
4030.0625	*	*	-13	>20
4836.112	53.83	-43.54	-13	>20
5642.0875	*	*	-13	>20
6448.1	*	*	-13	>20
7254.1125	*	*	-13	>20
8060.125	*	*	-13	>20

Table 6- 3.1: Transmitter Radiated Spurious Emissions Data.

Maximum Output Power Setting, Fundamental Frequency 806.0125 MHz

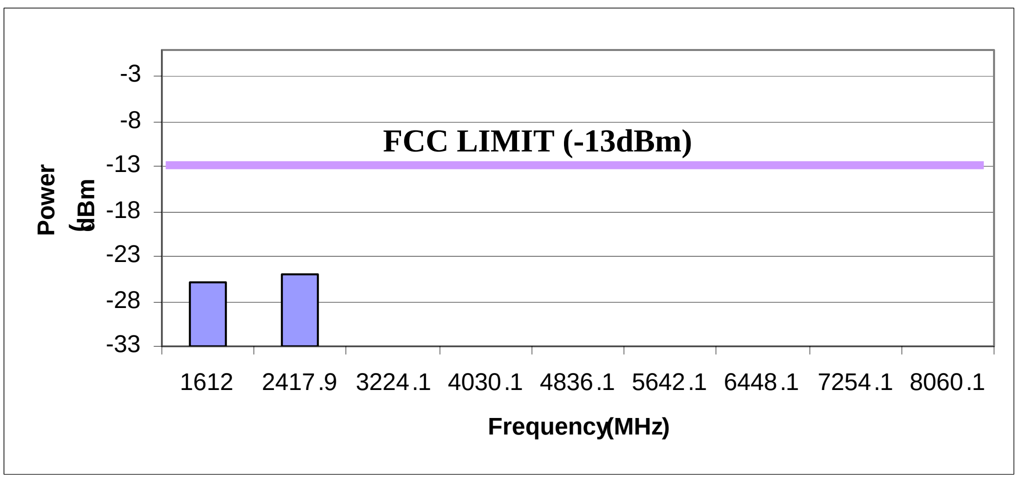


Table 6- 3.1: Transmitter Radiated Spurious Emissions Data.

Maximum Output Power Setting, Fundamental Frequency 806.0125 MHz

Frequency (MHz)	Field strength (dBuV/m)	Power (dBm)	Limit (dBm)	Margin (dB*)
815.5125				
1630.963	70.33	-27.04	-13	14.04
2446.554	77.17	-20.2	-13	7.2
3262.064	56.17	-41.2	-13	>20
4077.567	50.33	-47.04	-13	>20
4893.182	54.83	-42.54	-13	>20
5708.5875	*	*	-13	>20
6524.1	*	*	-13	>20
7339.6125	*	*	-13	>20
8155.125	*	*	-13	>20

Table 6- 3.2: Transmitter Radiated Spurious Emissions Data.

Maximum Output Power Setting, Fundamental Frequency 815.5125MHz

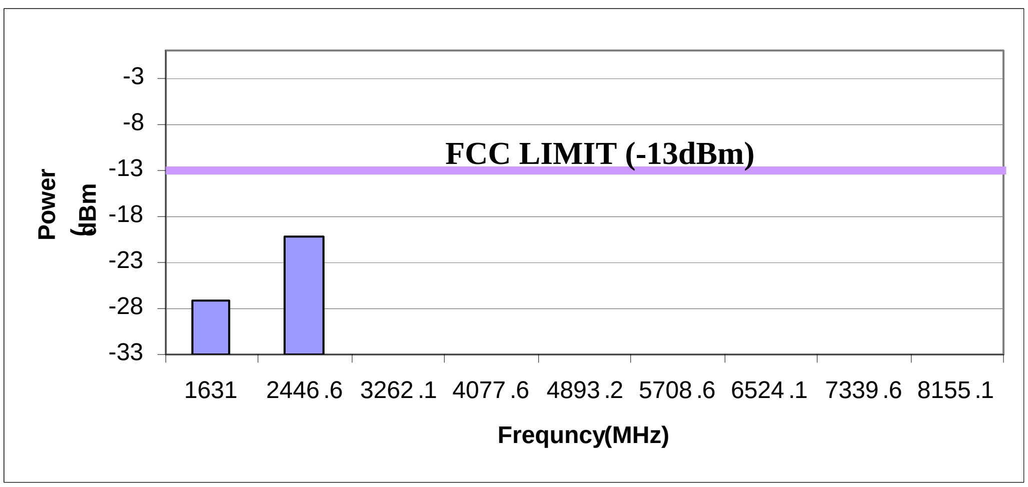


Figure 6- 3.2: Transmitter Radiated Spurious Emissions Plot.

Maximum Output Power Setting, Fundamental Frequency 815.5125 MHz

Frequency (MHz)	Field strength (dBuV/m)	Power (dBm)	Limit (dBm)	Margin (dB*)
824.9875				
1649.834	68.83	-28.54	-13	15.54
2474.944	78.33	-19.04	-13	6.04
3299.825	54.5	-42.87	-13	>20
4124.89	49.67	-47.7	-13	>20
4949.773	53.5	-43.87	-13	>20
5774.9125	*	*	-13	>20
6599.9	*	*	-13	>20
7424.8875	*	*	-13	>20
8249.875	*	*	-13	>20

Table 6- 3.3: Transmitter Radiated Spurious Emissions Data.

Maximum Output Power Setting, Fundamental Frequency 824.9875MHz

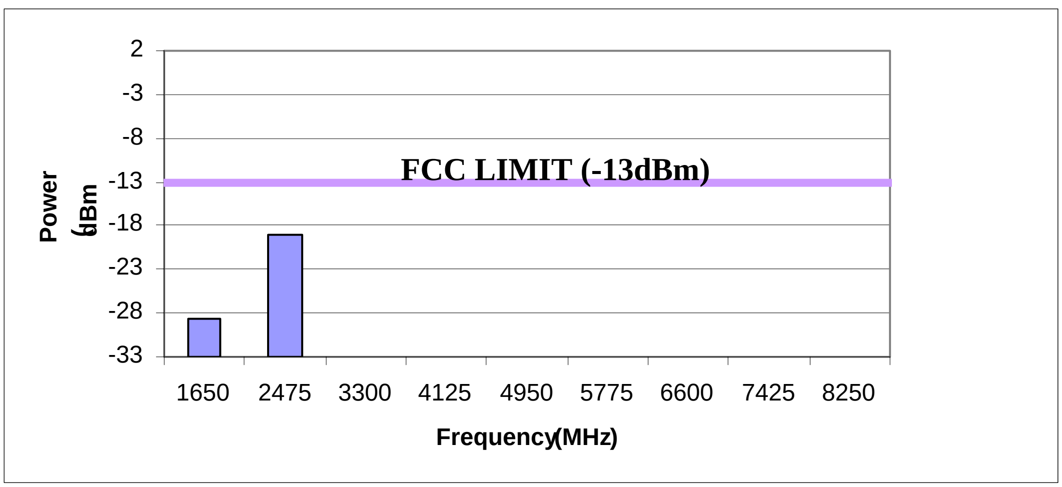


Figure 6- 3.3: Transmitter Radiated Spurious Emissions Plot.

Maximum Output Power Setting, Fundamental Frequency 824.9875MHz

Frequency (MHz)	Field strength (dBuV/m)	Power (dBm)	Limit (dBm)	Margin (dB*)
896.01875				
1792.061	59.17	-38.2	-13	>20
2688.011	71.5	-25.87	-13	12.87
3584.094	51.83	-45.54	-13	>20
4479.999	56.67	-40.7	-13	>20
5376.042	53.5	-43.87	-13	>20
6272.13125	*	*	-13	>20
7168.15	*	*	-13	>20
8064.16875	*	*	-13	>20
8960.1875	*	*	-13	>20

Table 6- 3.4: Transmitter Radiated Spurious Emissions Data.

Maximum Output Power Setting, Fundamental Frequency 896.01875MHz

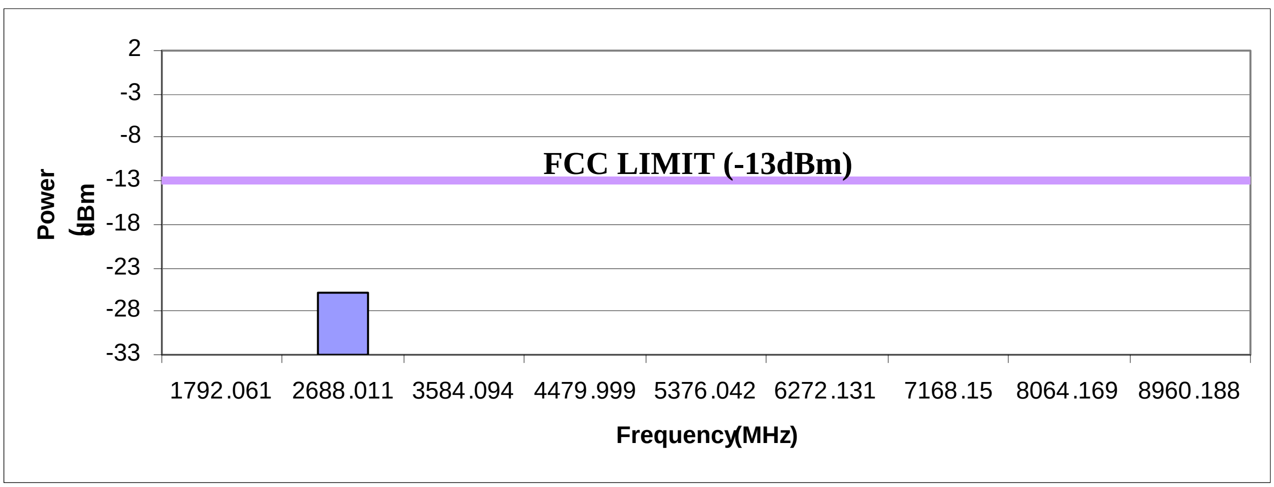


Figure 6- 3.4: Transmitter Radiated Spurious Emissions Plot.

Maximum Output Power Setting, Fundamental Frequency 896.01875MHz

Frequency (MHz)	Field strength (dBuV/m)	Power (dBm)	Limit (dBm)	Margin (dB*)
899.01875				
1798.05	58.33	-39.04	-13	>20
2696.931	67.67	-29.7	-13	16.7
3596.225	51.5	-45.87	-13	>20
4495.072	57.83	-39.54	-13	>20
5394.141	53	-44.37	-13	>20
6293.13125	*	*	-13	>20
7192.15	*	*	-13	>20
8091.16875	*	*	-13	>20
8990.1875	*	*	-13	>20

Table 6- 3.5: Transmitter Radiated Spurious Emissions Data.

Maximum Output Power Setting, Fundamental Frequency 899.01875MHz

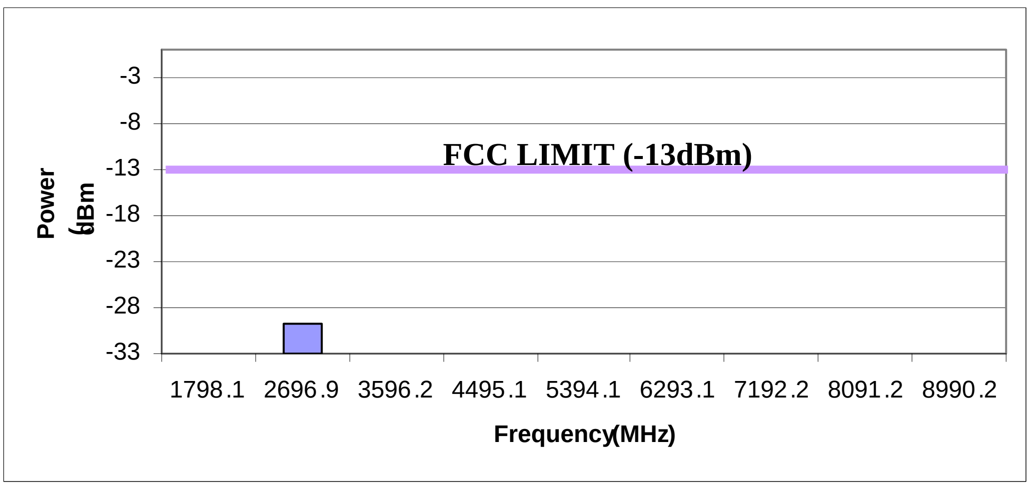


Figure 6- 3.5: Transmitter Radiated Spurious Emissions Plot.

Maximum Output Power Setting, Fundamental Frequency 899.01875MHz

Frequency (MHz)	Field strength (dBuV/m)	Power (dBm)	Limit (dBm)	Margin (dB*)
900.98125				
1801.906	58.33	-39.04	-13	>20
2702.918	67.67	-29.7	-13	16.7
3603.943	51	-46.37	-13	>20
4504.784	54	-43.37	-13	>20
5405.897	54.5	-42.87	-13	>20
6306.86875	*	*	-13	>20
7207.85	*	*	-13	>20
8108.83125	*	*	-13	>20
9009.8125	*	*	-13	>20

Table 6- 3.6: Transmitter Radiated Spurious Emissions Data.

Maximum Output Power Setting, Fundamental Frequency 900.98125MHz

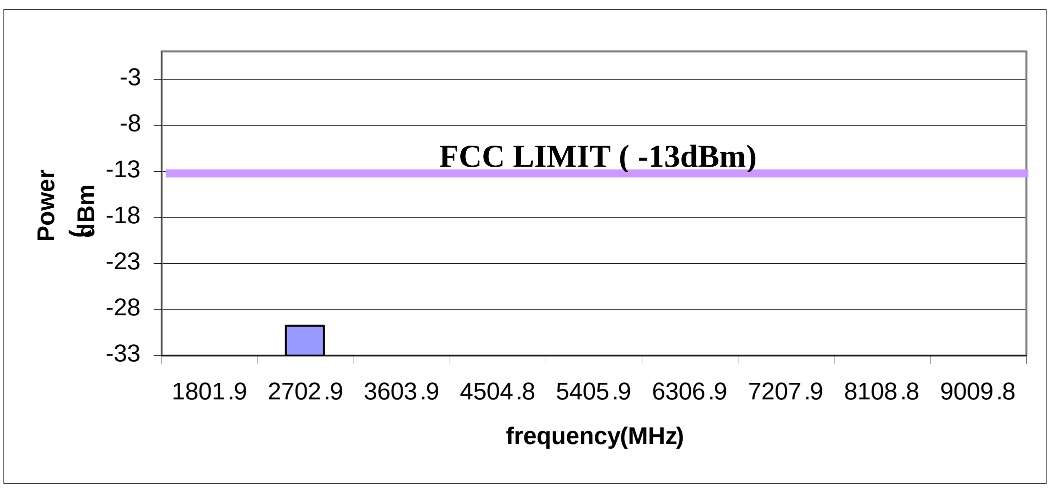


Figure 6- 3.6: Transmitter Radiated Spurious Emissions Plot.

Maximum Output Power Setting, Fundamental Frequency 900.98125MHz

6.4 Conducted Spurious Emissions Data -- Pursuant 47 CFR 2.1051, 2.1057, 90.210 (g) and 90.691.

FCC Emission Limit: less than -13 dBm

Maximum Output Power Setting

Fundamental Frequency - 806.0125 MHz

Description	Frequency (MHz)	Measured Power (dBm)	Margin to FCC Spec (dB)
2 X Fund	1612.025	-31.9	18.9
3 X Fund	2418.0375	<-33	>20
4 X Fund	3224.05	<-33	>20
5 X Fund	4030.0625	<-33	>20
6 X Fund	4836.075	<-33	>20
7 X Fund	5642.0875	<-33	>20
8 X Fund	6448.1	<-33	>20
9 X Fund	7254.1125	<-33	>20
10 X Fund	8060.125	<-33	>20

Table 6- 4.1: Transmitter Conducted Spurious Emissions Data.

Fundamental Frequency - 815.5125 MHz

Description	Frequency (MHz)	Measured Power (dBm)	Margin to FCC Spec (dB)
2 X Fund	1631.025	-31.5	18.5
3 X Fund	2446.5375	<-33	>20
4 X Fund	3262.05	<-33	>20
5 X Fund	4077.5625	<-33	>20
6 X Fund	4893.075	<-33	>20
7 X Fund	5708.5875	<-33	>20
8 X Fund	6524.1	<-33	>20
9 X Fund	7339.6125	<-33	>20
10 X Fund	8155.125	<-33	>20

Table 6- 4.2: Transmitter Conducted Spurious Emissions Data.

Fundamental Frequency – 824.9875 MHz

Description	Frequency (MHz)	Measured Power (dBm)	Margin to FCC Spec (dB)
2 X Fund	1649.975	-31.7	18.7
3 X Fund	2474.9625	<-33	>20
4 X Fund	3299.95	<-33	>20
5 X Fund	4124.9375	<-33	>20
6 X Fund	4949.925	<-33	>20
7 X Fund	5774.9125	<-33	>20
8 X Fund	6599.9	<-33	>20
9 X Fund	7424.8875	<-33	>20
10 X Fund	8249.875	<-33	>20

Table 6- 4.3: Transmitter Conducted Spurious Emissions Data.

Fundamental Frequency – 896.01875 MHz

Description	Frequency (MHz)	Measured Power (dBm)	Margin to FCC Spec (dB)
2 X Fund	1792.0375	-30.9	17.9
3 X Fund	2688.05625	<-33	>20
4 X Fund	3584.075	<-33	>20
5 X Fund	4480.09375	<-33	>20
6 X Fund	5376.1125	<-33	>20
7 X Fund	6272.13125	<-33	>20
8 X Fund	7168.15	<-33	>20
9 X Fund	8064.16875	<-33	>20
10 X Fund	8960.1875	<-33	>20

Table 6- 4.4: Transmitter Conducted Spurious Emissions Data.

Fundamental Frequency – 899.01875 MHz

Description	Frequency (MHz)	Measured Power (dBm)	Margin to FCC Spec (dB)
2 X Fund	1798.0375	-30.7	17.7
3 X Fund	2697.05625	<-33	>20
4 X Fund	3596.075	<-33	>20
5 X Fund	4495.09375	<-33	>20
6 X Fund	5394.1125	<-33	>20
7 X Fund	6293.13125	<-33	>20
8 X Fund	7192.15	<-33	>20
9 X Fund	8091.16875	<-33	>20
10 X Fund	8990.1875	<-33	>20

Table 6- 4.5: Transmitter Conducted Spurious Emissions Data.

Fundamental Frequency – 900.98125 MHz

Description	Frequency (MHz)	Measured Power (dBm)	Margin to FCC Spec (dB)
2 X Fund	1801.9625	-30.9	17.9
3 X Fund	2702.94375	<-33	>20
4 X Fund	3603.925	<-33	>20
5 X Fund	4504.90625	<-33	>20
6 X Fund	5405.8875	<-33	>20
7 X Fund	6306.86875	<-33	>20
8 X Fund	7207.85	<-33	>20
9 X Fund	8108.83125	<-33	>20
10 X Fund	8990.1875	<-33	>20

Table 6- 4.6: Transmitter Conducted Spurious Emissions Data.

Minimum Output Power Setting:

At minimum power settings, Conducted emissions were at least 20 dB below FCC limit, at all frequencies.

6.5 Frequency Stability Data -- Pursuant 47 CFR 2.1055a (1), 2.1055(d)2

Measurements were made per method described in paragraph 7.4. Because of the transmitter's dependence on the stability of the base station oscillator, it is not possible to provide stability data for this transmitter as is commonly supplied for certification per 47 CFR 2.1055 for a radio with a locally stabilized oscillator.

The following information is provided to clarify how the transmitter attains the necessary accuracy of 2.5 PPM or better (806-825MHz), and 1.5 PPM or better (896-901MHz). The transmitter's suppressed carrier emission is produced by mixing of a modulated intermediate frequency with a higher, digitally synthesized injection frequency with a resolution of 12.5 kHz. Both of these frequencies are derived from a temperature compensated crystal oscillator (Y300 in Figure 4-1). Transmission frequency accuracy is enhanced by the radio receiver circuitry, which causes the radio operating frequency to become locked to within 0.4 PPM of the base station once it has acquired the primary control channel.

The AFC routine and frequency locking mechanism are implemented using both hardware and software. The hardware and software combined provide an automatic frequency control function, which locks the receiver to within 0.4 PPM of the control channel oscillator. Since the base station stability is FCC regulated to be 1.5 PPM or better in the 800 MHz band and 0.1 PPM or better in the 900 MHz band, the absolute accuracy of the transmitter is inherently better than 1.9 PPM in the 800 MHz band and better than 0.5 PPM in the 900 MHz band. This is accomplished by programming U601 while the radio is in operation.

Transmitter frequency stability is guaranteed over all specified environmental operating conditions (battery voltage, temperature, humidity, etc.) because of the nature of the base station frequency locking mechanism. The frequency stability of the transmitter is maintained until the battery voltage drops below 3.2 volts. Any voltage below 3.2 volts is outside the specified operating range of the transmitter and linearity is degraded. For this reason, the radio shuts down (while in transmit mode) when the voltage drops below 3.2 volts.

Note:

Frequency stability is independent of modulation scheme (Quad –QPSK, Quad-16QAM, Quad-64QAM). The data shown in following tables was taken with the radio set to transmit a Quad-16QAM signal at 810.9875 MHz and 900.9937 MHz while locked to a R2660C service monitor.

Temperature [degC]	Frequency Error [Hz]	Frequency Error [ppm]
-25	-15	-0.018
-20	-13	-0.016
-15	-17	-0.021
-10	-15	-0.018
-5	-17	-0.021
0	-15	-0.018
5	-13	-0.016
10	-13	-0.016
15	-11	-0.014
20	-12	-0.015
25	-12	-0.015
30	-12	-0.015
35	-12	-0.015
40	-13	-0.016
45	-10	-0.012
50	-7	-0.009
55	-5	-0.006
60	5	0.006

Table 6- 5.1: Transmitter Frequency Stability Data- 810.9875 MHz Frequency vs. Temperature

Supply Voltage (Volt)	Frequency Error [Hz]	Frequency Error [ppm]
3.2	-12	-0.013
3.3	-12	-0.013
3.4	-13	-0.014
3.5	-14	-0.016
3.6	-14	-0.016
3.7	-19	-0.021
3.8	-18	-0.020
3.9	-17	-0.019
4.0	-17	-0.019

Table 6- 5.2: Transmitter Frequency Stability Data – 810.9875 MHz

Frequency vs. Voltage

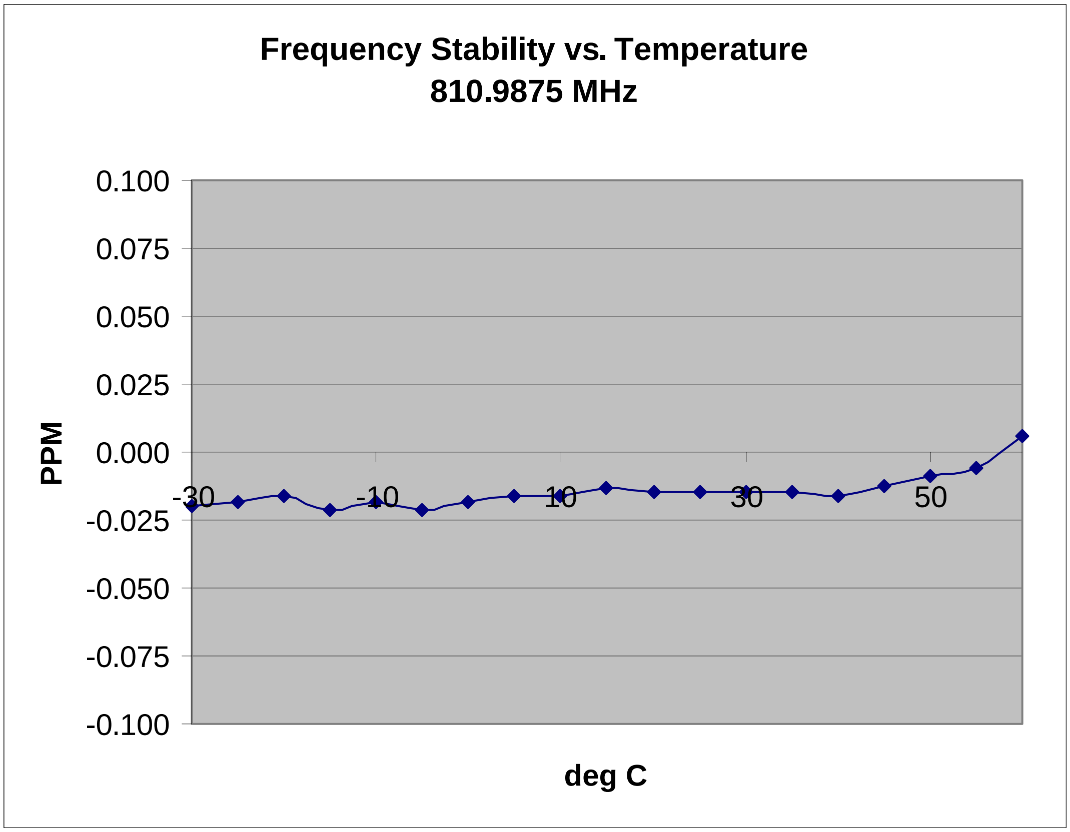


Figure 6-5.1: Frequency Stability vs. Temperature

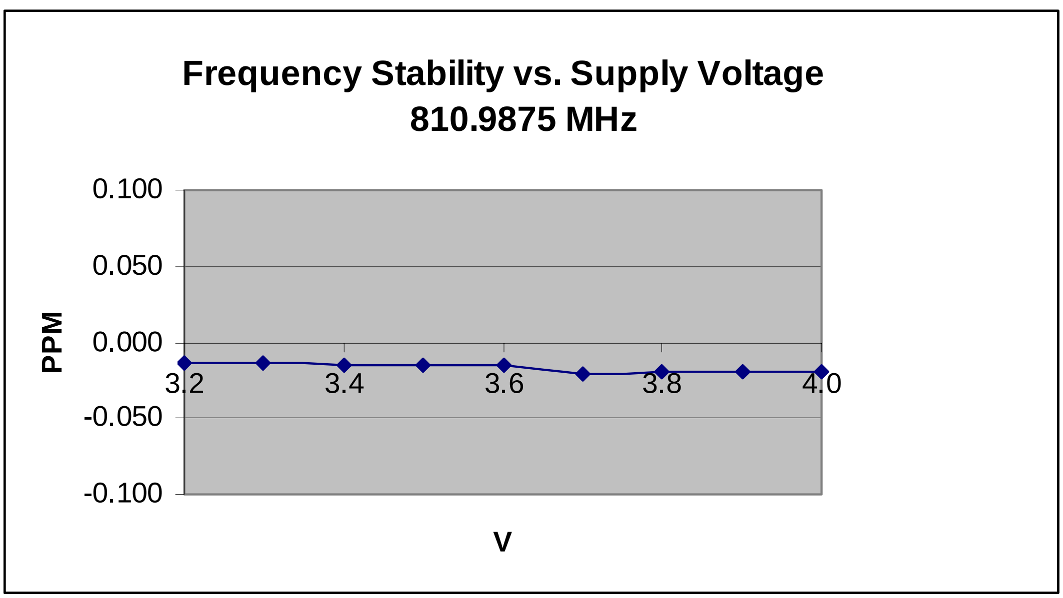


Figure 6- 5.2: Frequency Stability vs. Voltage

Temperature [degC]	Frequency Error [Hz]	Frequency Error [ppm]
-25	-21	-0.023
-20	-23	-0.026
-15	-26	-0.029
-10	-23	-0.026
-5	-27	-0.030
0	-25	-0.028
5	-23	-0.026
10	-21	-0.023
15	-27	-0.030
20	-26	-0.029
25	-25	-0.028
30	-22	-0.024
35	-25	-0.028
40	-28	-0.031
45	-24	-0.027
50	-27	-0.030
55	-19	-0.021
60	-14	-0.016

**Table 6- 5.3: Transmitter Frequency Stability Data - 900.9937 MHz
Frequency vs. Temperature**

Supply Voltage (Volt)	Frequency Error [Hz]	Frequency Error [ppm]
3.2	-28	-0.031
3.3	-26	-0.029
3.4	-27	-0.030
3.5	-27	-0.030
3.6	-26	-0.029
3.7	-27	-0.030
3.8	-26	-0.029
3.9	-27	-0.030
4	-27	-0.030

Table 6- 5.4: Transmitter Frequency Stability Data – 900.9937 MHz

Frequency vs. Voltage

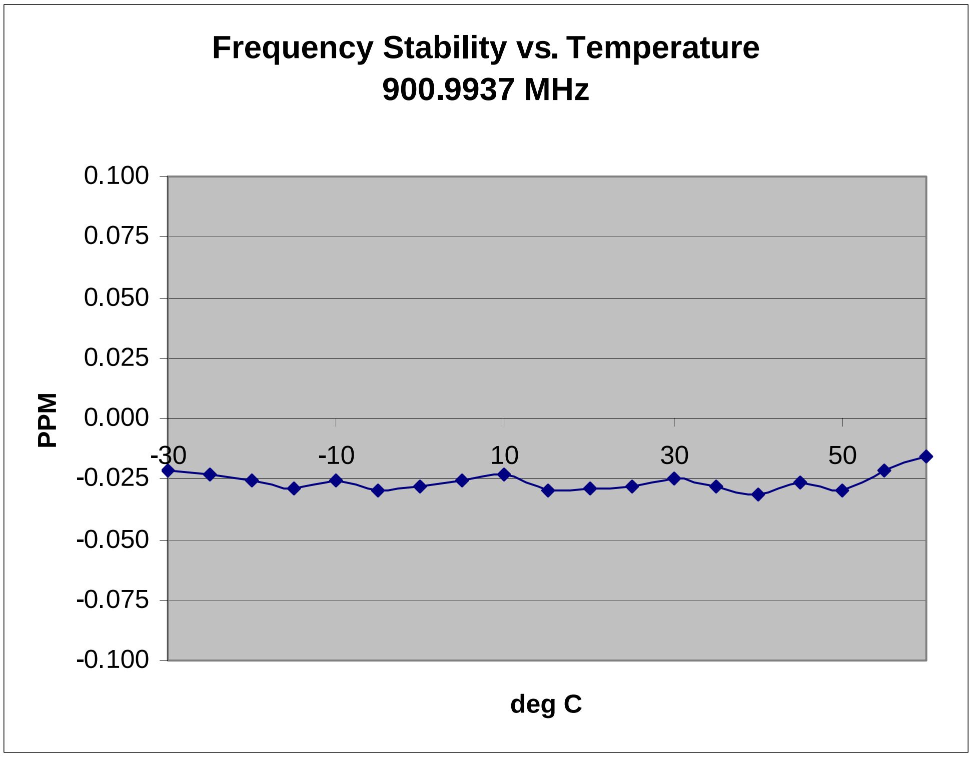


Figure 6- 5.3: Frequency Stability vs. Temperature

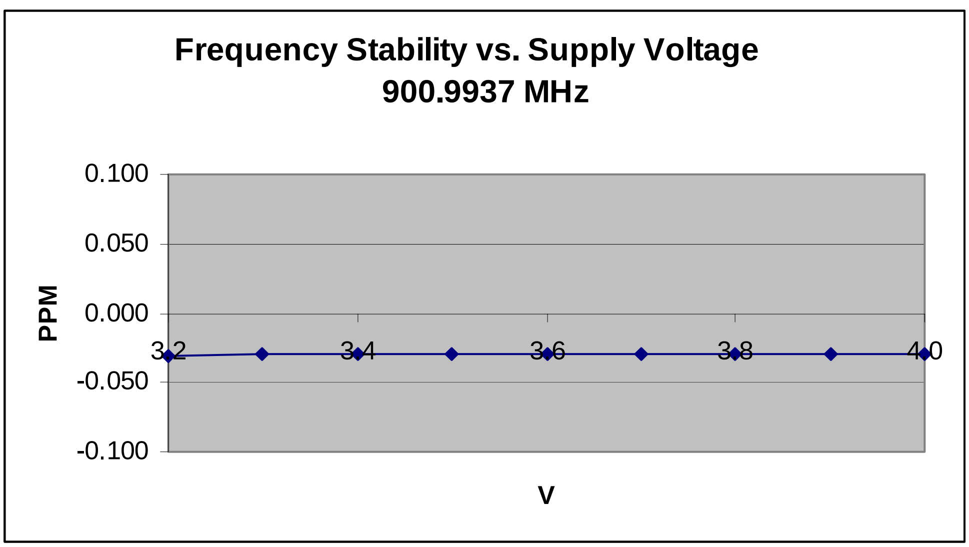


Figure 6- 5.4: Frequency Stability vs. Voltage

6.6 Effective Radiated Power (ERP)

The method described in Exhibit 7 was employed.
Prior to measuring ERP, the output power of the transmitter was adjusted to the maximum power setting.

The maximum ERP results for both bands (800 and 900MHz) are summarized in Tables 6.6.1 below.

Frequency (MHz)	Polarization	Signal Generator (dBm)	Cable loss (dB)	Reference Antenna gain (dBi)	Ideal dipole gain (dBi)	ERP Peak (dBm)	ERP Peak (Watt)	ERP* Pulse average (Watt)
815.5175	Vertical	35.7	2.9	1	2.15	31.65	1.46	0.4
899.0133	Vertical	35.7	2.94	0.62	2.15	31.23	1.32	0.36

Table 6-6.1: ERP result for IO200 with evaluation board **antenna NAF5037

* The IDEN modulation is characterized by a peak to average power ratio of 5.6dB. The measurement was done with peak detector at maximum hold condition. In order to calculate the maximum pulse-averaged transmitted ERP, the peak to average ratio of 5.6dB was subtracted from the result.

** This antenna is used for testing and evaluation only, the IO200 is supplied without an antenna, only an antenna connector.

Based on the above results, the Pulse average ERP is 0.4 Watt.

Exhibit 7: Measurement Procedures -- 47 CFR. 2.947

This exhibit presents a brief summary of how the measurements were made. This module is intended to be integrated into another device, which provides the module with the DC power supply, data and RF connections. In order to enable the measurement, the module was connected to evaluation board, item 15 in the equipment lists (7.6).

7.1. RF Power -- Pursuant to 47 CFR 2.947(c)

(a) Method of Output Power Measurement: Adaptation of TIA/EIA-603 clause 2.2.1 for Pulsed Measurements

The RF output power is not adjustable by the user. The output power is controlled by the module in response to the received signal strength or by or special module service software. To obtain RF output power data the module was programmed to utilize the maximum and minimum RF output power setting. A special adapter cable was used in order to obtain connection to the Hirose U.FL-R-SMT(10) connector on the module board and measure the output. This cable was then connected through a 30 dB attenuator to an RF power sensor. To correct the average reading power meter, a setting of the duty cycle on the RF power meter was set to 16.667% for herein reported 6:1 TDM test signals.

(b) Method of Measurement for Effective Radiated Power: Proprietary

Test Site:

The test site is: Hermon Labs, located in Binyamina Israel. Hermon Labs is listed with FCC and Industry Canada as follows:

1. FCC OATS registration number is: 90624
2. FCC Anechoic chamber registration number is: 90623
3. Industry Canada OATS registration number is: IC 2186-1
4. Industry Canada anechoic chamber registration number is: IC 2186-2
5. Accredited by A2LA. Certificate number: 0839-01

Site address: Rakevet Ind. Zone, PO Box 23, Binyamina 30550, Israel.

The maximum effective radiated power (ERP) of the transmitter was measured in an open-air test site. For this measurement, the module was connected to evaluation board, which supplies the DC power to the module). The method of measurement is described below:

a) The unit-under-test was placed on the rotating table.
b) The transmitter was turned on.
c) The table was rotated until maximum power was obtained at the OATS receiving antenna.
d) The OATS receiving antenna height was varied between 1 and 4 meters until maximum power was observed.
e) Steps c) and d) were repeated for both polarizations.

f) The measured field strength measured at the OATS receiving antenna was recorded as a reference.
g) The unit-under-test was replaced with a test antenna of known gain (item 14).
h) A calibrated RF signal generator was set to the same frequency as the transmitter, and was fed through a directional coupler to the test antenna via a cable of known loss, and the coupled port of the directional coupler was connected to a calibrated spectrum analyzer. This setup is shown in Figure 7.1.

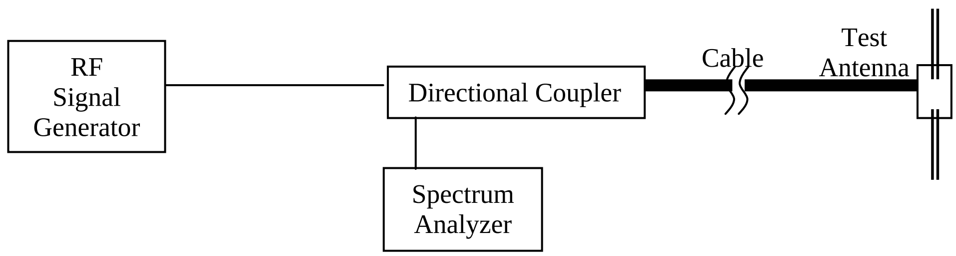


Figure 7.1: ERP measurement setup

i) The RF signal generator's output level was varied until the field strength measured at the OATS receiving antenna was the same as the reference recorded in step (e).
j) The incident power at the cable leading to the test antenna was recorded (Pinc).
k) The ERP (Effective Radiated Power) was calculated as follows:

ERP (dBm) = Pinc (dBm) – Cable_Loss (dB) + Test_Ant_Gain (dBd)

l) Finally, the ERP in watts were calculated as follows:

ERP (W) = 10^[ERP (dBm) – 30)/10]

7.2. Occupied Bandwidth -- Pursuant to 47 CFR 2.947(b)

Method of Measurement: Per TIA/EIA-603-1 clause 2.2.11

1.) Set the module for measurement of RF output power using the power test procedure in the service manual which employs a pseudo random data sequence per part 2.1049(h), and attach it to a spectrum analyzer through a 30 dB attenuator. The analyzer is to be set for peak detection with a video bandwidth of 3 times the resolution bandwidth setting, a span of 100 kHz, and a sweep period of at least 20 seconds.

2.) Using a 300 kHz resolution bandwidth to assure that essentially all of the transmitted energy is measured, obtain a “rainbow” curve and adjust the analyzer setting so that the crest of the curve lies at the 0 dB reference location. This is portrayed as trace 1 on the analyzer display.

3.) Reduce the resolution bandwidth to 300 Hz to characterize the transmitter emission on-channel and adjacent channels spectral performance characteristic. This is portrayed as trace 2 on the analyzer display of Figures 6-5 to 6-88.

4.) Overlay the applicable emission mask on the analyzer display as trace 3.

5) Compare traces 2 and 3 to ensure that trace 2 never exceeds trace 3.

7.3. Radiated Spurious Emissions -- Pursuant to 47 CFR 2.947(b)

Test Site:

The test site is: Hermon Labs, located in Binyamina Israel. Hermon Labs is listed with FCC and Industry Canada as follows:

6. FCC OATS registration number is: 90624
7. FCC Anechoic chamber registration number is: 90623
8. Industry Canada OATS registration number is: IC 2186-1
9. Industry Canada anechoic chamber registration number is: IC 2186-2
10. Accredited by A2LA. Certificate number: 0839-01

Site address: Rakevet Ind. Zone, PO Box 23, Binyamina 30550, Israel.
This region is reasonably free from RF interference. The radiated emission testing was performed for minimum and maximum powers in transmit mode.

Method of Measurement: EIA/TIA-603-1 clauses 2.2.12 and 5.2.12

The equipment is placed at side orientation on the turntable, connected to a dummy RF 50 Ohm load. The module was operated in test mode and configured to transmit repeatedly at one of the following frequencies: 806.0125, 815.5125, 824.9875 MHz, 896.01875MHz, 899.01875MHz , 901.98125MHz.
A broadband receiving antenna located 3 meters from the transmitter receives any signal radiated from the transmitter. The antenna is adjustable in height and can be rotated for horizontal or vertical polarization. A spectrum analyzer covering the necessary frequency range is used to detect and measure any radiation received by the antenna.

The transmitter's modulated pseudo random digital signal is monitored and adjusted to obtain peak reading of received signals wherever they occur in the spectrum by:

1. Rotating the transmitter under test.

2. Adjusting the antenna height.

The testing procedure is repeated for both horizontal and vertical polarization of the receiving antenna. Relative signal strength is indicated on the spectrum analyzer connected to this antenna. The spectrum analyzer resolution bandwidth was set to 10 kHz for emissions below 1 GHz, and 1 MHz for higher frequency emissions. To obtain actual radiated signal strength for each spurious and harmonic frequency observed, a standard signal generator with calibrated output is connected to an antenna adjusted to that particular frequency. This antenna is substituted for the transmitter under test. The signal generator output level is adjusted until a reading identical to that obtained with the actual transmitter is observed on the spectrum analyzer. Signal strength is then derived from the generator and appropriate cable losses due to set up. Measured emissions for both maximum and minimum transmit power levels are recorded in tables in exhibit 6C.

7.4. **Conducted Spurious Emissions** -- Pursuant to FCC Rule 2.1051

Method of Measurement: ANSI/TIA/EIA-603-1992 clauses 2.2.13

To obtain conducted spurious emissions data the equipment is connected to a notch filter, which suppress the fundamental frequency. The radio is interfaced with a spectrum analyzer with sufficient dynamic range to permit the spurious emission level relative to the carrier level to be measured directly. Measurements at maximum and minimum output power settings are made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, or as high as the state of the art permits, except for that region within 50 kHz of the carrier. The spectrum analyzer is set to use a resolution bandwidth of 10 kHz for spurious emissions below 1 GHz, and 1 MHz for higher frequency spurious emissions. The video bandwidth is set to three times the resolution bandwidth for both cases.

7.5. Frequency Stability -- Pursuant to 47 CFR 2.947(c)

Measuring the frequency accuracy of the iDEN time division multiplexed (TDM) transmitter needs special procedures for 3 reasons. First is the short (15 ms.) nature of its TDM pulses, which preclude the use of an ordinary CW type digital frequency counter. Second, software in the module prevents the module from transmitting its TDM pulses unless it is receiving a signal on the trunking system control channel. Third, to maintain the very high stability (greater than that required by part 90 rules) needed for system operation, the module transmitter frequency is controlled by an automatic frequency control loop in the module's receiver which locks onto the system forward control channel produced by a compatible FCC certified part 90 base station. This process results in electronically adjusting the initial frequency of the reference oscillator in the synthesizer section of the radio, which is used for both transmission and reception.

As a result, unlike traditional transceivers which do not frequency lock to a remote base station reference frequency, the transmitter frequency accuracy is essentially independent of the Voltage and temperature induced variations of the subject transceiver’s frequency reference oscillator. Rather, the transceiver frequency stability is that of the remote base station, but degraded by any inaccuracy in the transceiver frequency locking process. This inaccuracy is primarily attributed to reference oscillator AFC resolution.

By locking onto a base station meeting the requirements of 47 CFR 90.213, which is necessary for the transceiver to function, the transceiver transmitter inherits the inherent 1.5 PPM or better stability of the compatible base station. To assure attainment of the 2.5 PPM (800MHz Band), 1.5PPM(900MHz Band) accuracy requirement of part 90.213 for this transceiver, the frequency error is measured when locked to a base station simulator.

Method of Measurement: (Proprietary)

Since the transmitter frequency is locked to the frequency of the compatible base station via the receiver in this transceiver, frequency accuracy data was measured with the transceiver locked onto a base station transmitter emulated by Motorola R2660C Service Monitor as shown in Figure 7-2. This was done using the QUAD-16QAM time division duplex (TDD) characteristic of the transceiver wherein it was placed into a TDD mode of transmission as normally used to make a call to a landline modem.

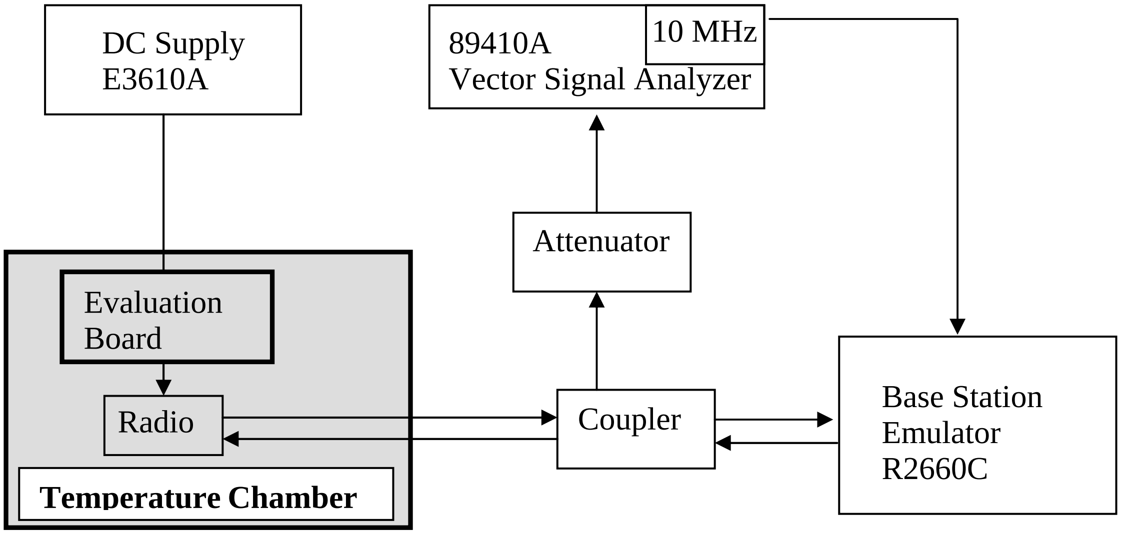


Figure 7-2: Frequency stability Measurement Setup

During the test the transceiver was receiving a very high accuracy forward control channel frequency signal from the compatible base station emulator and TDD transmitting a signal on the reverse control channel at a frequency 45 MHz (for 800 band) and 39 MHz (for 900 band) lower corresponding to the normally assigned frequency separation. The frequency of the transceiver was measured as operating voltage or temperature was varied, and compared to the frequency of the assigned channel.

7.6. Measurement Equipment List ----- 47 CFR. 2.948

1) Computer: IBM Pentium 4 PC, Windows 2000.
2) Spectrum Analyzer: HP 8563E, 9 kHz-26.5 GHz Spectrum Analyzer.
3) Communications System Analyzer: Motorola R2660C
4) RF Signal Generator: HP 8657B, 0.1 - 2060 MHz RF Signal Generator.
5) Power Meter: Giga-tronics 8541C. Sensor 80401A
6) Multimeter: H.P 34401A.
7) Directional Coupler: HP 778D, Dual Directional Coupler.
8) RF Amplifier: JCA 110-213, 1 - 10 GHz, 20 dB Gain Amplifier.
9) Temperature Chamber: Themotron, model 2800.
10) Monopole whip antenna Kit No. FAF5055A
11) Termination 50-Ohm: Lynics model NPT-10
12) 30 dB attenuator: Narda, model 768-30
13) Standard dipole: Electro-metrics, Serial No: 334, model No: TDS-30-2
14) Evaluation board: Motorola, 8488528V01.
15) Vector Signal Analyzer HP 89410A

Measurement Equipment Used By Hermon Laboratories Test House

1. Antenna mast, 1-4m, Hermon Labs, Model no. AM-F1
2. Turntable, motorized diameter2 m(OATS), Hermon Labs, Model No. TMD-2
3. Spectrum Analyzer with RF filter section, 9 KHz – 2.9GHz, HP, Model No. 8546A.
4. Antenna, Log Periodic, 200-1000MHz,Electro-Metrics, Model No. LPA 25/30.
5. Cable Coaxial, GORE A2P01POL118, 2.3m, Hermon Labs, Model No. GORE-3.
6. Turn Table for anechoic chamber flush mount d=1.2 m Pneumatic, Hermon Labs, Model No. TT-WDC1.
7. Antenna, Biconical, 20-200MHz, Electro-Metrics, Model No. BIA 25/30.
8. Antenna biconilog, Log-Periodic/T Bow-Tie, 26MHz – 2 GHz, EMCO, Model No. 3141.
9. Antenna X-WING BILOG 20MHz-2GHz,Schaffner-Chase EMC, Model No.CBL6140A.
10. Cable coaxial, RG –214, 12m, N-type connectors, Hermon Labs, Model No. C214-12.
11. Cable coaxial, ANDREW PSWJ4, 6m, Hermon Labs, Model No. ANDREW-6.
12. Spectrum Analyzer, 30Hz-40GHz, Agilent Tech (HP), Model No. 8564C.
13. EMI Receiver, 9KHz – 2.9GHz, Agilent Tech (HP), Model No. 8542E.
14. Cable RF, 8m,Alpha wire, Model No. RG-214.
15. Cable RF, 3.5m,Alpha wire, Model No. RG-214.
16. Cable RF, 2m, Huber-Suhner, Model No. Sucoflex 104PE.
17. Cable 18GHZ, 4 m, Rhophase Microwave LTD, Model No. SPS-1803A-4000-NPS.
18. Double ridge Antenna waveguide horn, 1-18GHZ, 300 Watt, N-type, EMC Test System, Model No. 3115.
19. Low-Noise Amplifier 2-20GHz, Sophia Wireless, Model No. LNA0220-C.