# Exhibit 6. Measured Data ----- 47 CFR. 2.1033(c) 14

## 6.1. **RF Power Output Data** -- Pursuant 47 CFR 2.1046(a), 2.1033(c)(6), 2.1033(c)(7) and 2.1033(c)(8)

The RF power output was measured with the indicated voltage applied to and current into the final RF amplifying device (U503). The power and current given represents a transmit slot and are not averaged.

**At maximum output power setting:**

| | | | |
|---|---|---|---|
| Output RF power | 1.25 | Watts | (Pulse average) |
| DC Voltage | 4.8 | Volts | (Pulse average) |
| DC Current | 1272 | mA | (Pulse average) |
| RF PA Input Power | 6.3 | milliWatts | (Pulse average) |

**At the minimum power setting:**

| | | | |
|---|---|---|---|
| Output RF power | 0.24 | milliWatts | (Pulse average) |
| DC Voltage | 4.8 | Volts | (Pulse average) |
| DC Current | 488 | mA | (Pulse average) |
| RF PA Input Power | 1 | microWatts | (Pulse average) |

## 6.2. **Modulation Characteristics Data --** Pursuant 47 CFR 2.1047 and 2.1033(c)(13)

Digitally encoded speech or digital data is transmitted in 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. Figure 6-2 illustrates symbol mapping to one of the four QPSK sub-channels constellations. Figure 6-3 illustrates symbol mapping to one of the four 16QAM sub-channels constellation. Figure 6-4 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. After conversion by the D/A converters in U401 (see Figure 4-3 in Exhibit 4), 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, the necessary bandwidth of the composite 4 sub-channel symbol streams is 4.8 + (3 x 4.5) = 18.3 kHz.

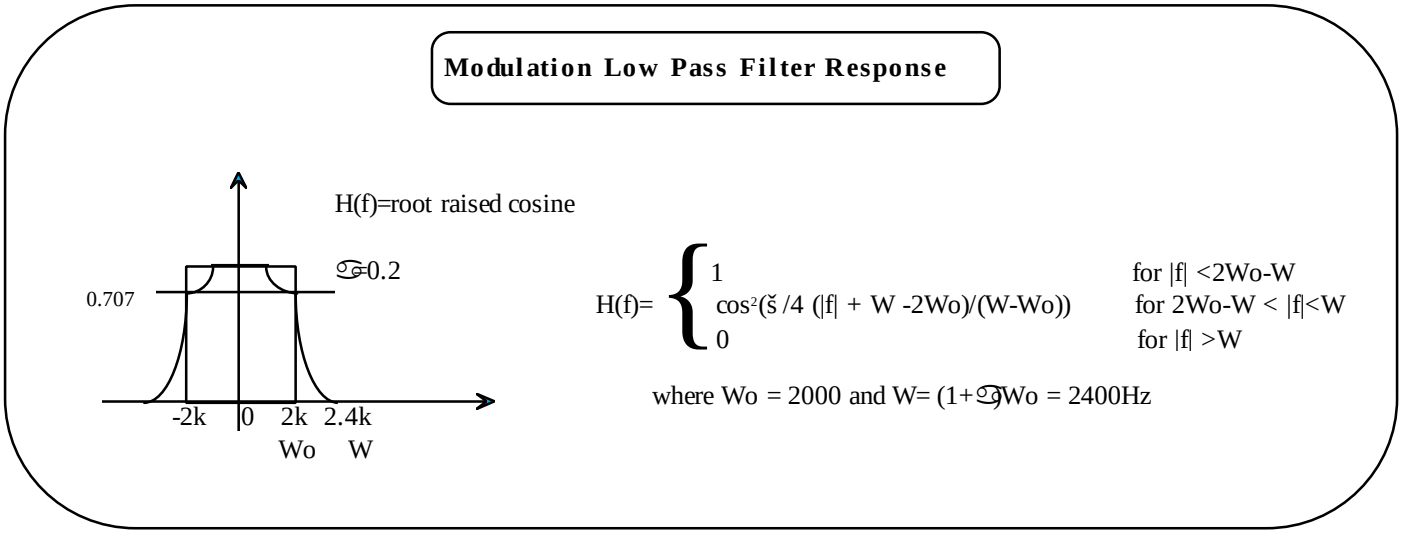


**Figure 6-1: Modulation Low Pass Filter Response**

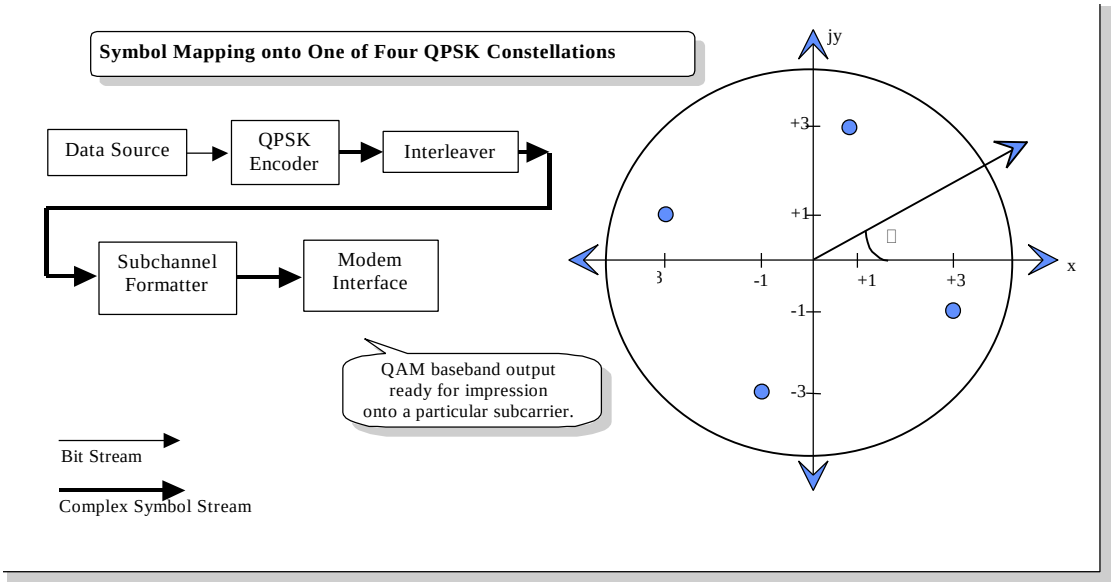


**Figure 6-2: Symbol Mapping onto One of Four QPSK Constellations**

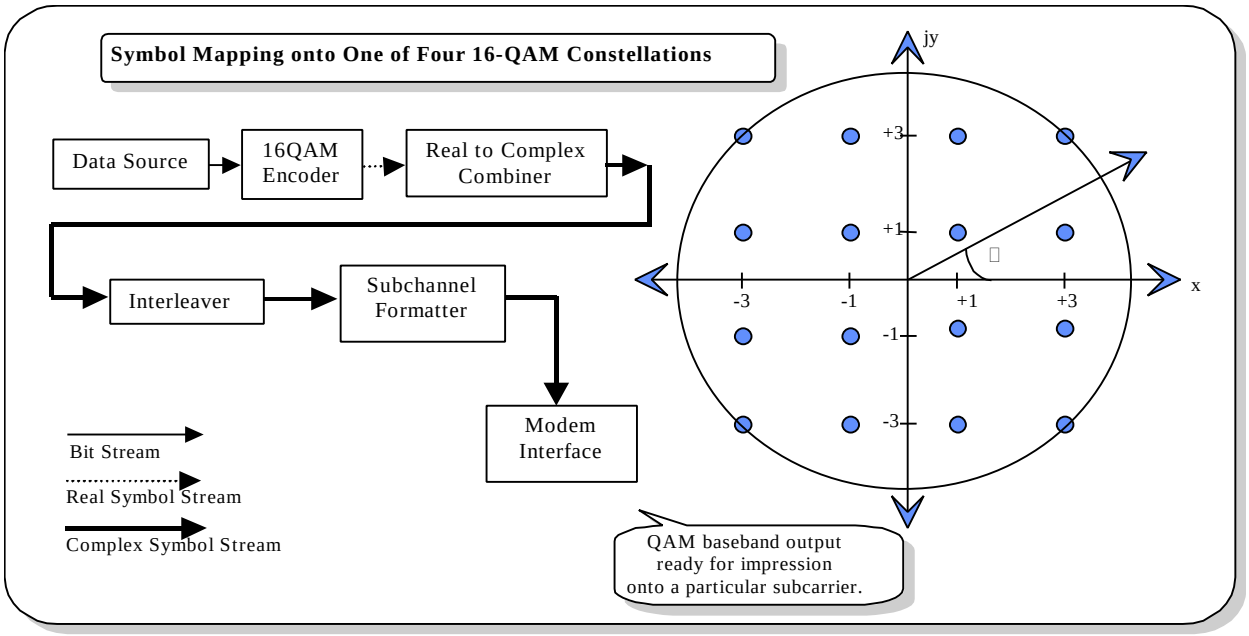


**Figure 6-3: Symbol Mapping onto One of Four 16-QAM Constellations**

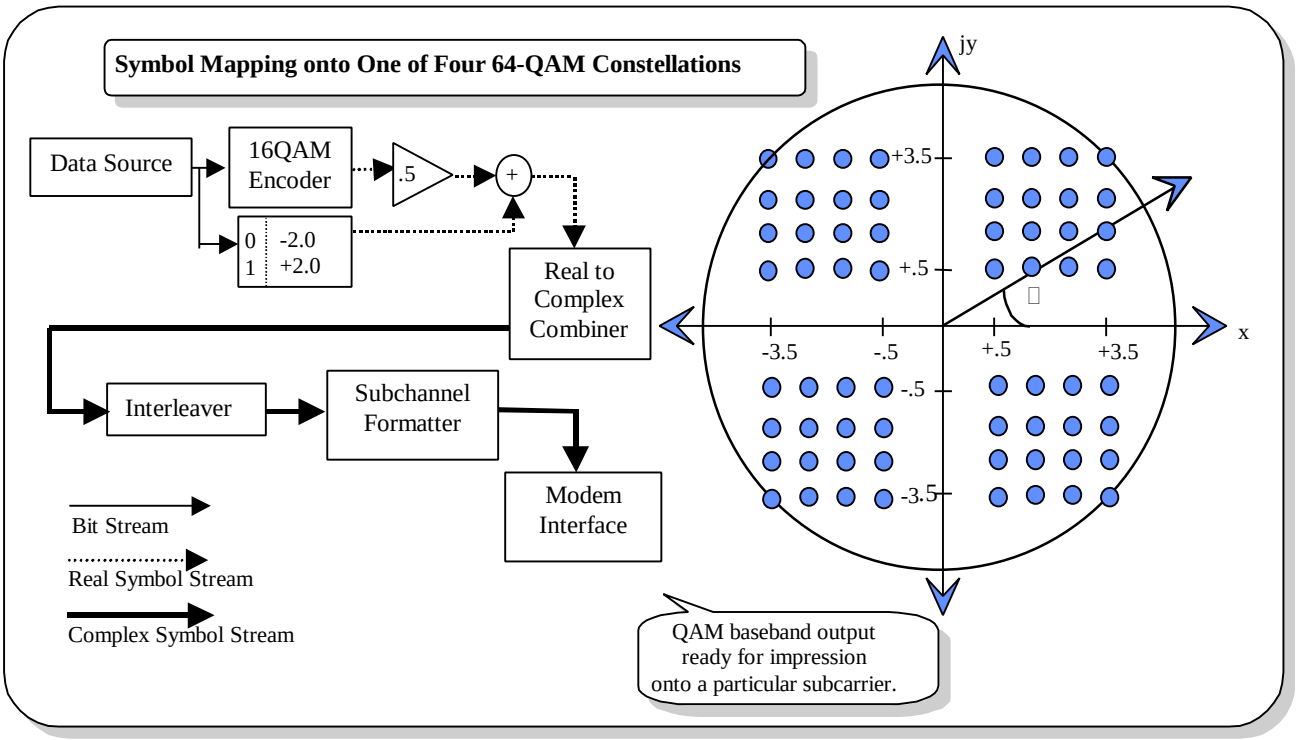


**Figure 6-4: Symbol Mapping onto One of Four 64-QAM Constellations**

## *6.3.* **Occupied Bandwidth Data** -- Pursuant 47 CFR 2.1049, 90.210(g) and 90.691

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

For Quad-QPSK Modulation:
32K Bits Per Second Pseudo-Random Digital Modulation.
Vertical division: 10 dB/div.
Carrier Reference: Carrier Reference 0 dB corresponds to maximum and minimum output power.

For Quad-16QAM Modulation:
64K Bits Per Second Pseudo-Random Digital Modulation
Vertical: 10 dB/div
Carrier Reference: Carrier Reference 0 dB corresponds to maximum and minimum output power.

For Quad-64QAM Modulation:
96K Bits Per Second Pseudo-Random Digital Modulation
Vertical: 10 dB/div
Carrier Reference: Carrier Reference 0 dB corresponds to maximum and minimum output power.

In Figures 6-5 through Figure 6-16, trace 2 (transmitter performance) was measured using a resolution bandwidth of 300 Hz, while trace 1 (reference level) was obtained using a resolution bandwidth of 100 kHz. Trace 3 is the applicable emission mask.

Mask 47 CFR 90.210(g) Measured Data

Refer to Figures 6-5 and 6-6 for Quad-QPSK Modulation performance.
Refer to Figures 6-7 and 6-8 for Quad-16QAM Modulation performance.
Refer to Figures 6-9 and 6-10 for Quad-64QAM Modulation performance.

Mask 47 CFR 90.691(a) Measured Data

Refer to Figures 6-11and 6-12 for Quad-QPSK Modulation performance.
Refer to Figures 6-13 and 6-14 for Quad-16QAM Modulation performance.
Refer to Figures 6-15 and 6-16 for Quad-64QAM Modulation performance.

FCC Limits

Per 47CFR 90.210(g)

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 5 kHz up to and including 10 kHz:

At least 83 $\log_{10}$(fd/5) decibels.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 10 kHz up to and including 250 percent of the authorized bandwidth:

At least 116 $\log_{10}$ (fd/6.1) decibels or 50 plus 10 $\log_{10}$ (Unmodulated Carrier Power) decibels or 70 decibels, whichever is lesser attenuation.

(3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth:

At least 43 plus 10 $\log_{10}$ (Output Power in Watts) decibels or 80 decibels, whichever is lesser attenuation.
Per EA SMR Emission Mask, 47 CFR 90.691(a):
Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees.

(1) For any frequency removed from the EA licensee’s frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 $\log_{10}$(f/6.1) decibels or 50 + 10 $\log_{10}$(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center channel of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee’s frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) decibels (i.e. -13 dBm) or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

## Mask 47 CFR 90.210(g) Measured Data

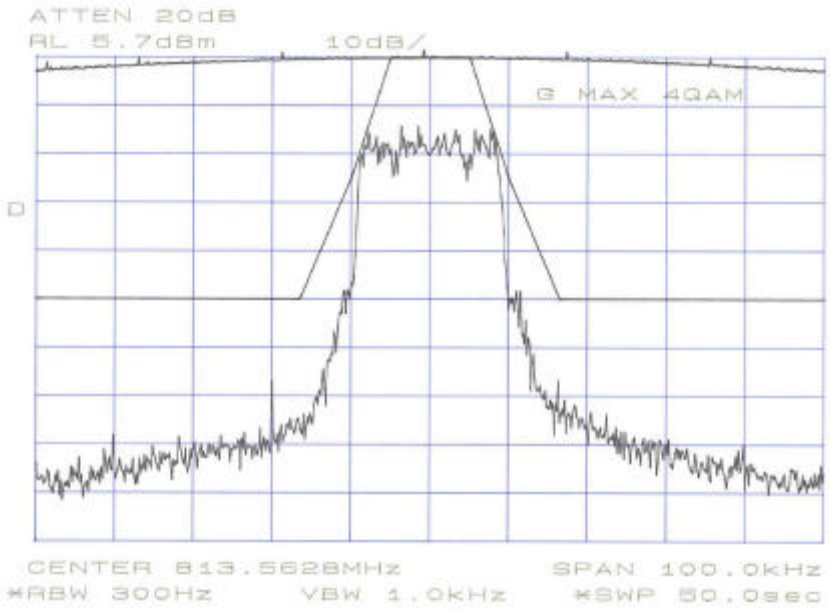


**Figure 6-5: Quad-QPSK Modulation Performance at Maximum Output Power Setting**

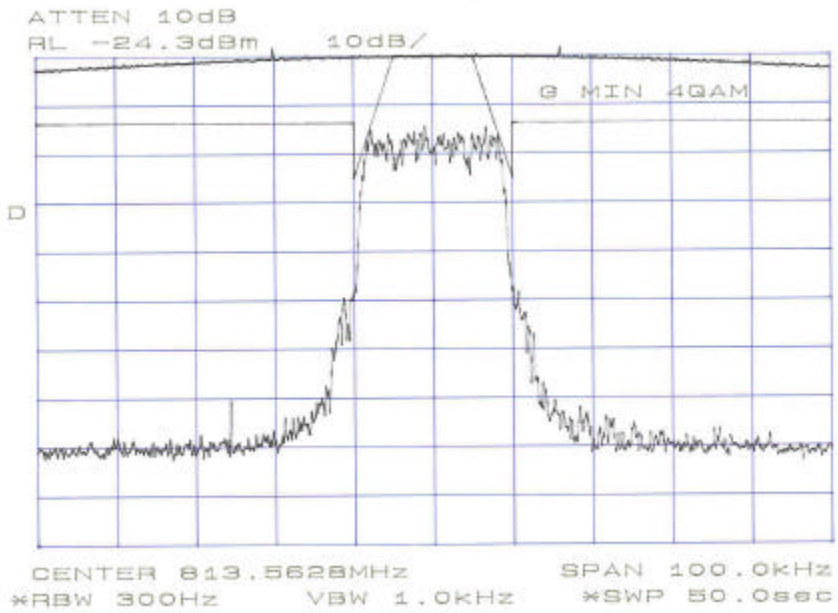


**Figure 6-6: Quad-QPSK Modulation Performance at Minimum Output Power Setting**

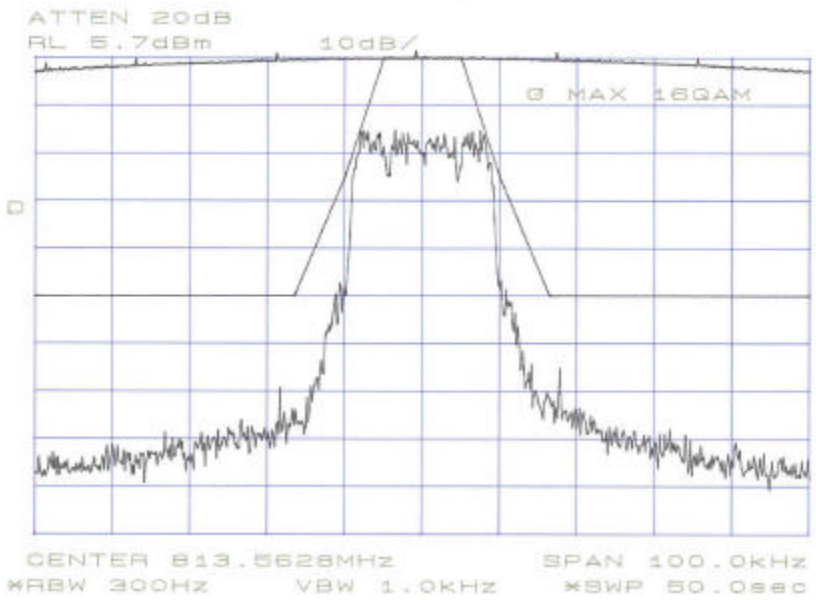


**Figure 6-7: Quad-16QAM Modulation Performance at Maximum Output Power Setting**

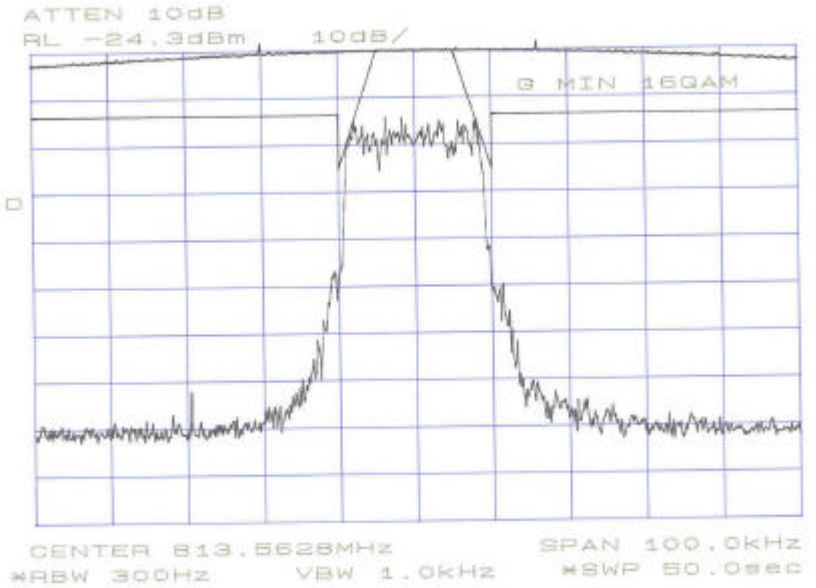


**Figure 6-8: Quad-16QAM Modulation Performance at Minimum Output Power Setting**

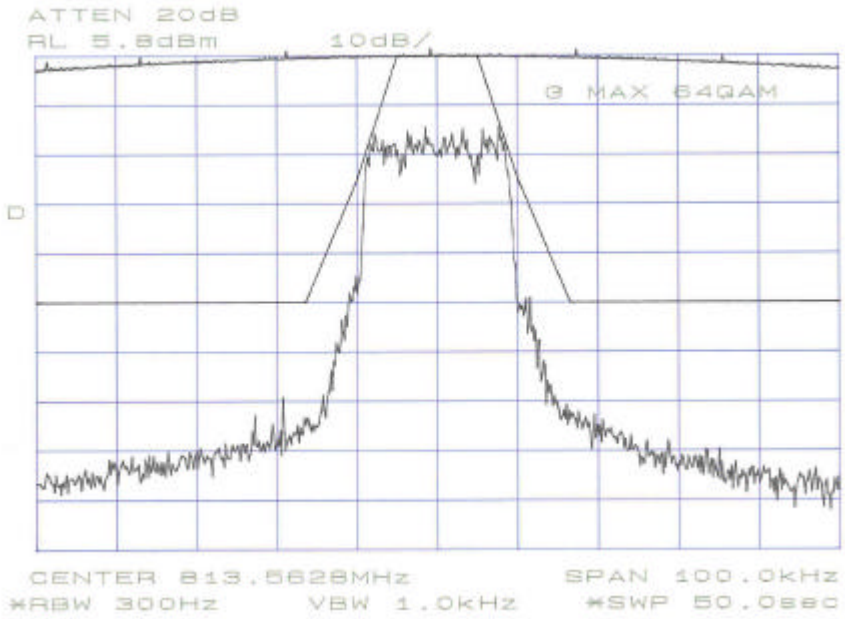


**Figure 6-9: Quad-64QAM Modulation Performance at Maximum Output Power Setting**

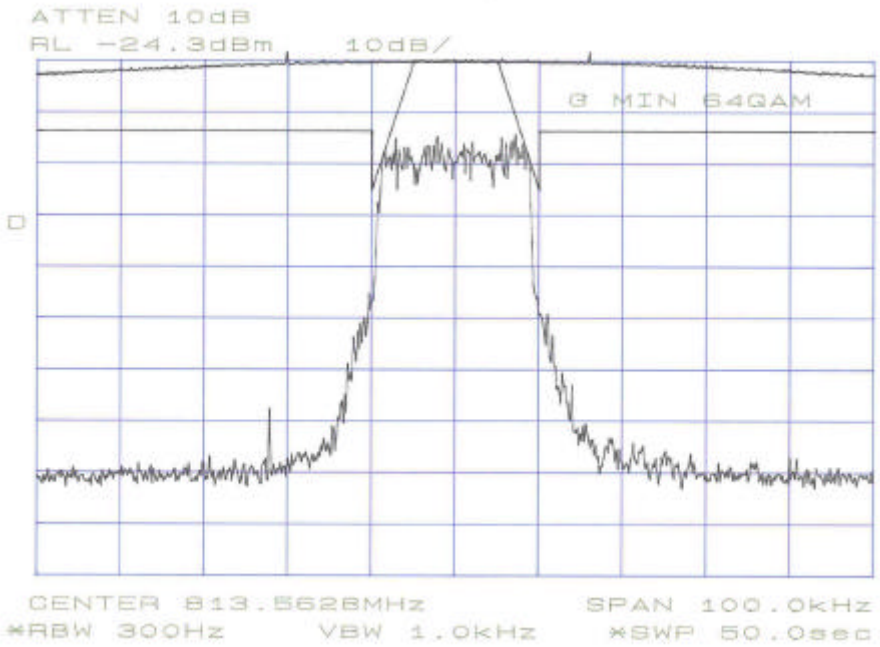


**Figure 6-10: Quad-64QAM Modulation Performance at Minimum Output Power Setting**

## Mask 47 CFR 90-691(a) Measured Data

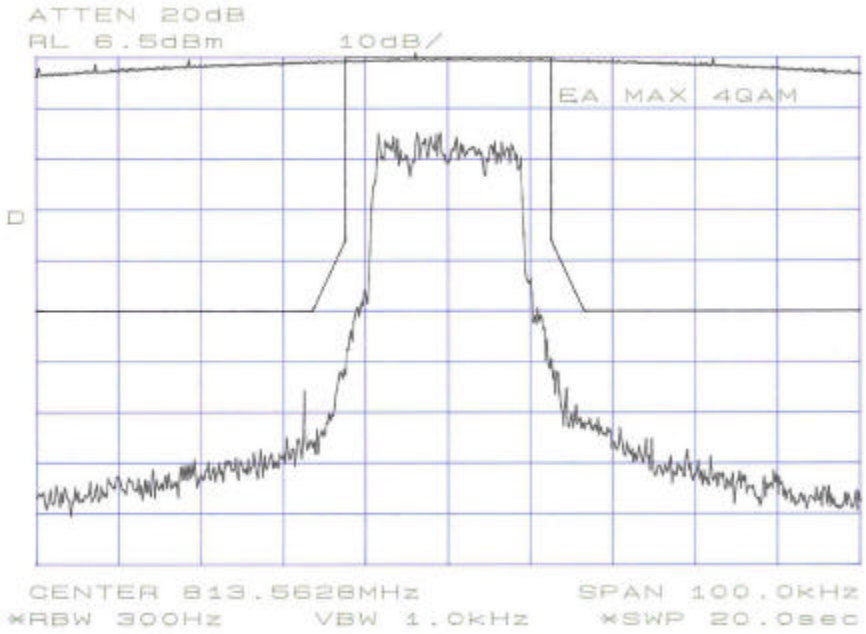


**Figure 6-11: Quad-QPSK Modulation Performance at Maximum Output Power Setting**

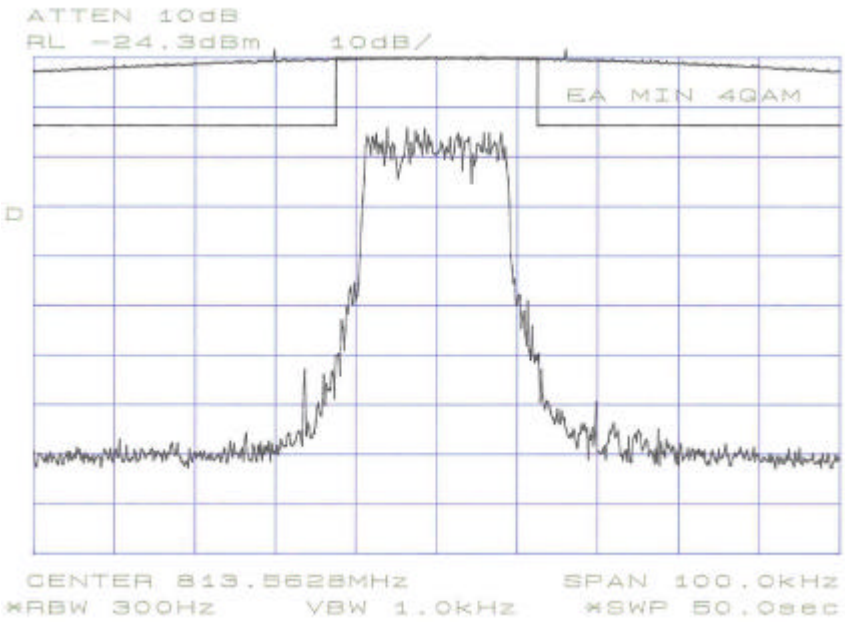


**Figure 6-12: Quad-QPSK Modulation Performance at Minimum Output Power Setting**

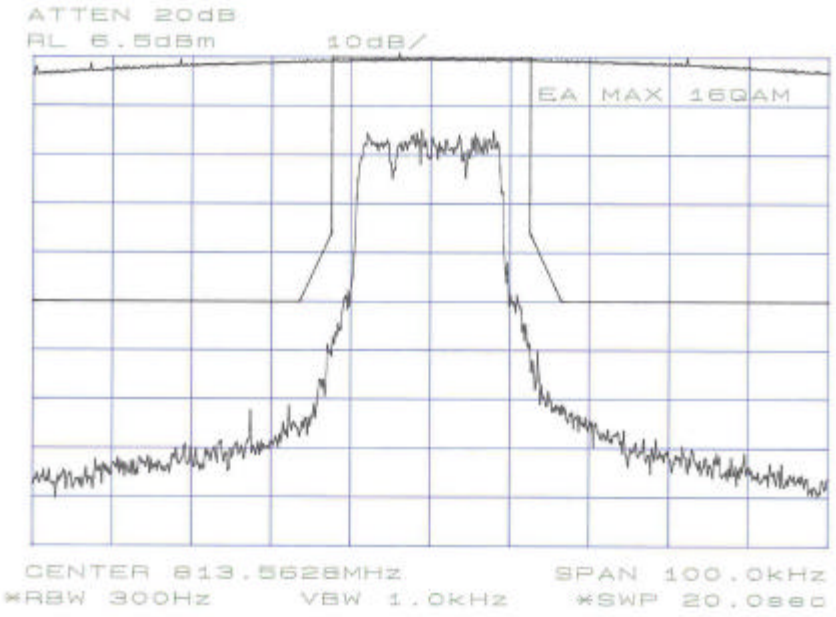


**Figure 6-13: Quad-16QAM Modulation Performance at Maximum Output Power Setting**

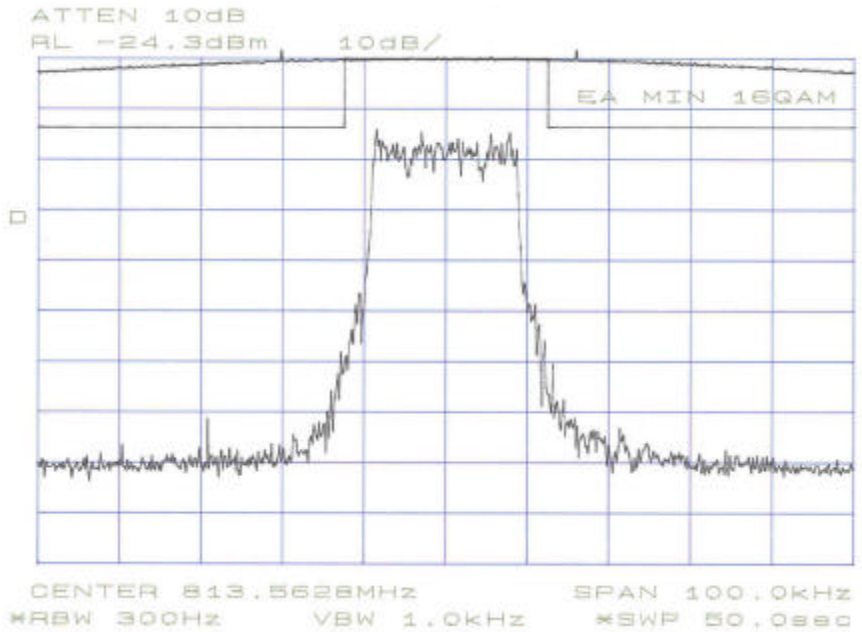


**Figure 6-14: Quad-16QAM Modulation Performance at Minimum Output Power Setting**

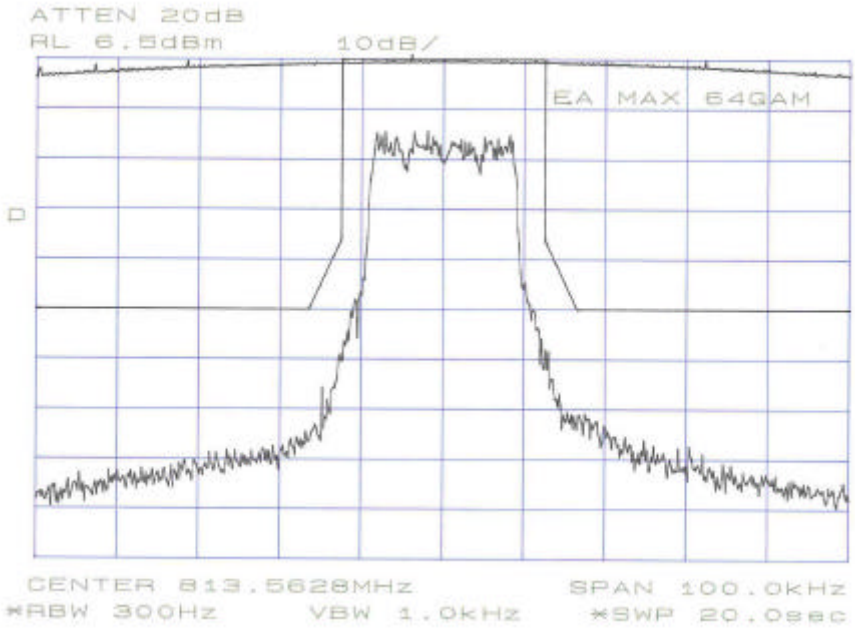


**Figure 6-15: Quad-64QAM Modulation Performance at Maximum Output Power Setting**

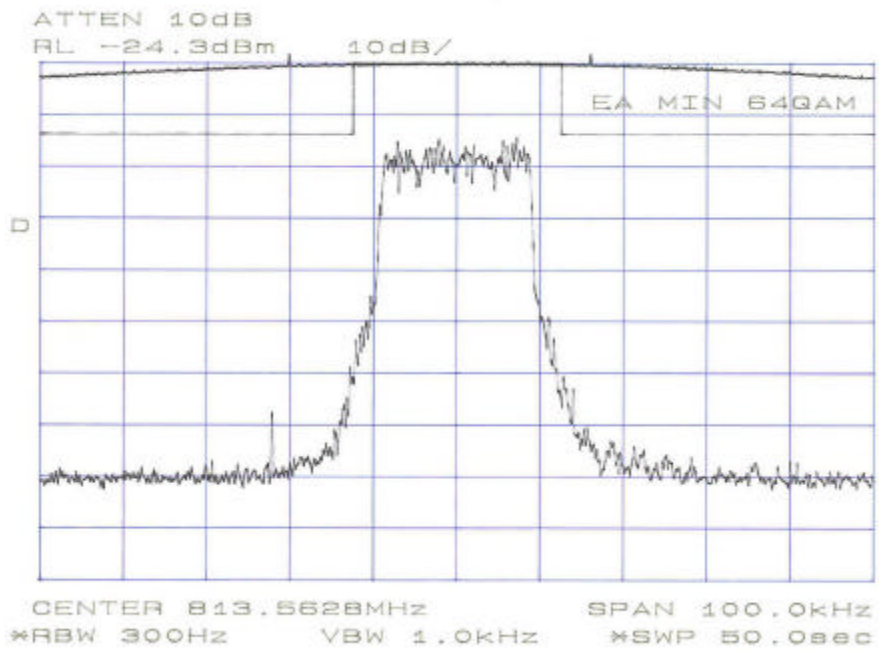


**Figure 6-16: Quad-64QAM Modulation Performance at Minimum Output Power Setting**