

Additional FCC Testing

November 5, 1999

After meeting with Greg Czumak at the FCC, the following methods were developed for testing the Watkins-Johnson U-NII transceiver:

Peak Power Spectral Density

Resolution Bandwidth = 1 MHz
Video Bandwidth = 1 MHz
Average = 100 sweeps
Peak Search
Measure Peak

Peak Transmit Power

Resolution Bandwidth ~ 1% Emission Bandwidth
Video Bandwidth = Resolution Bandwidth
Set Channel Bandwidth = Emission Bandwidth
View Trace
Measure Power in Channel Bandwidth

Band Edge

Resolution Bandwidth ~ 1% Emission Bandwidth
Video Bandwidth = Resolution Bandwidth/30
Center Frequency = Band Edge
Set Adjacent Channel Bandwidth = 1 MHz
View Trace
Measure Power in Adjacent Channel Bandwidth

Unit # 20199390001 was measured using the above methods. The input signal was -2 dBm and the cable compensation was set at 12 dB, representing the worse case distortion condition for the unit. The peak transmit power reading on the spectrum analyzer agreed with the RMS power meter within ± 0.2 dB. The data is summarized in Tables 1 and 2. Sample plots are shown in Figures 1-4. The Rhode & Schwarz FSEB-20 spectrum analyzer was used For PSD and Peak Transmit Power measurements. For Bandedge calculations the Rhode & Schwarz FSIQ-7 was utilized. The FSIQ has about 3 dB greater dynamic range than the FSEB. The corresponding difference in Bandedge PSD between the two analyzers was approximately 2 dB for a 6 MHz bandwidth signal.

Table 1. Summary data for a 6 MHz OFDM signal.

Antenna Gain (dBi)	Maximum Allowed PSD (dBm/MHz)	Measured PSD (dBm/MHz)	Maximum Allowed Peak Transmit Power (dBm)	Measured Peak Transmit Power (dBm)	Minimum Allowed Bandedge PSD (dBm/MHz)	Maximum Measured Bandedge PSD (dBm/MHz)
34	6	6	13.8	13.8	-51	-58
26	14	14	21.8	21.8	-43	-48
22	17	17	24.8	24.8	-39	-43

Table 2. Summary data for a 12 MHz OFDM signal.

Antenna Gain (dBi)	Maximum Allowed PSD (dBm/MHz)	Measured PSD (dBm/MHz)	Maximum Allowed Peak Transmit Power (dBm)	Measured Peak Transmit Power (dBm)	Minimum Allowed Bandedge PSD (dBm/MHz)	Maximum Measured Bandedge PSD (dBm/MHz)
34	6	6	16.8	16.8	-51	-58
26	14	14	24.8	24.8	-43	-43
22	17	14	27.8	25.0	-39	-43

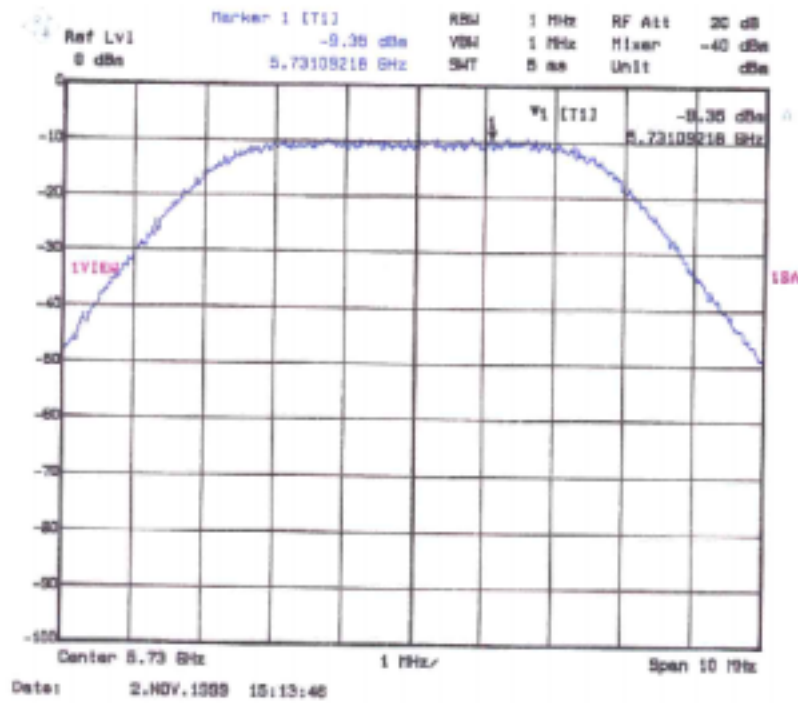


Figure 1. Peak Power Spectral Density (BW = 6 MHz)
 Peak PSD= -9.35 dBm/MHz + 26.3 dB = 17.0 dBm/MHz
 RMS Power Meter Reading 24.8 dBm, Loss= 26.3 dB.

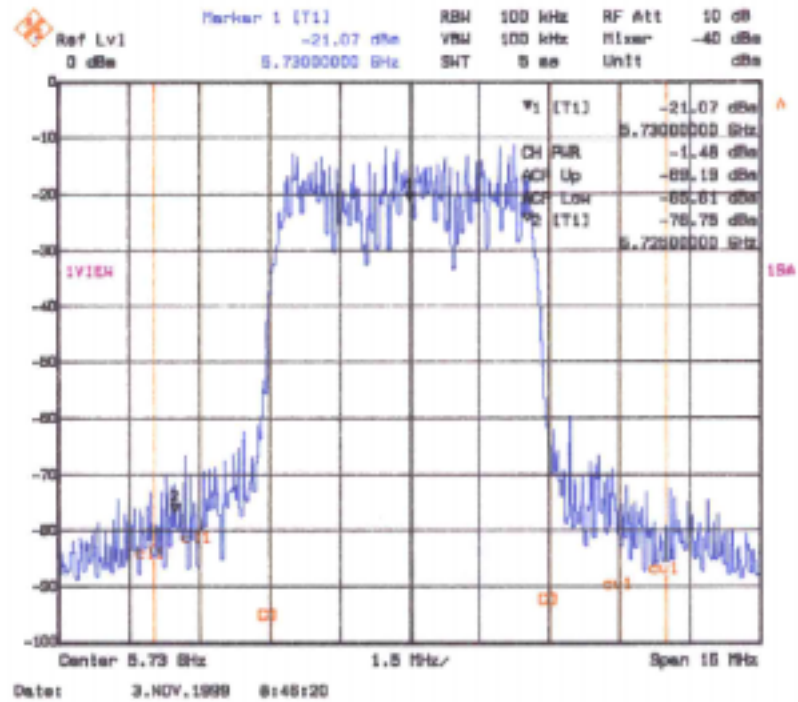


Figure 2. Peak Transmit Power (BW= 6 MHz)
 Peak Transmit Power = -1.5 dBm + 26.3 dB = 24.8 dBm
 RMS Power Meter Reading 24.8 dBm, Loss= 26.3 dB.

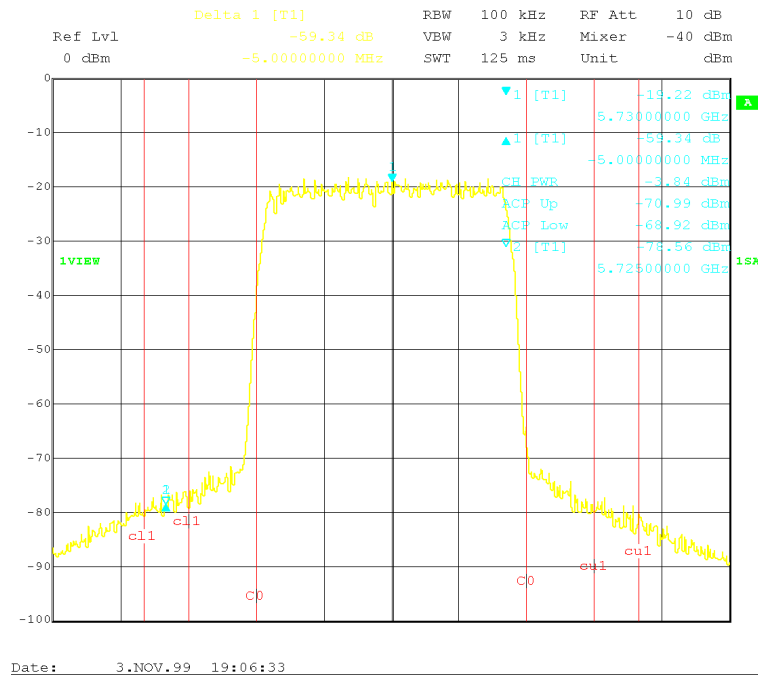


Figure 3. Bandedge (BW = 6 MHz)

Bandedge = $-68.9 \text{ dBm/MHz} + 26.3 \text{ dB} = -42.6 \text{ dBm/MHz}$
 RMS Power Meter Reading 24.8 dBm, Loss= 26.3 dB.

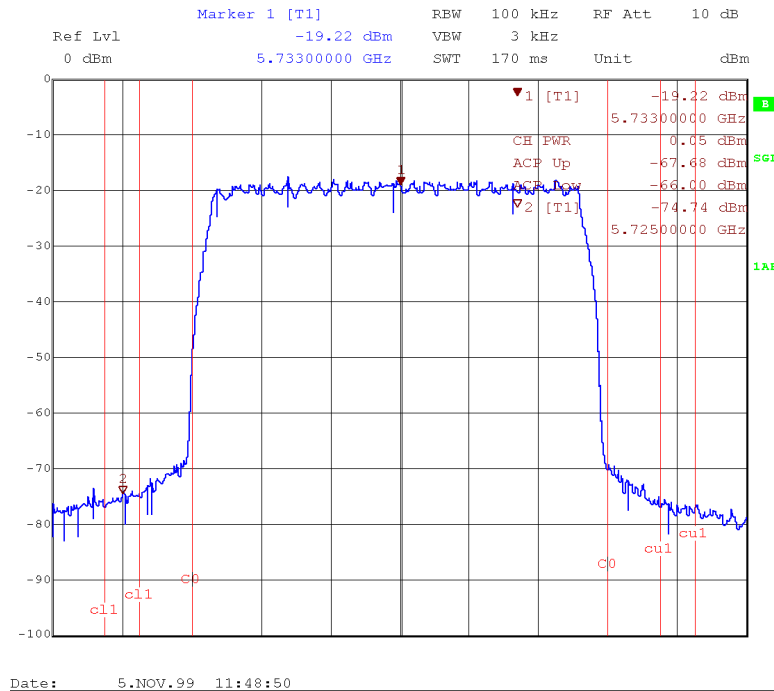


Figure 4. Bandedge (BW = 12 MHz)

Bandedge = $-66.0 \text{ dBm/MHz} + 23.3 \text{ dB} = -42.7 \text{ dBm/MHz}$
 RMS Power Meter Reading 25.0 dBm, Loss= 23.3 dB.