

**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 = 1MHz  
 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  $\pm 0.2$  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 Bandege 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 Bandege 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

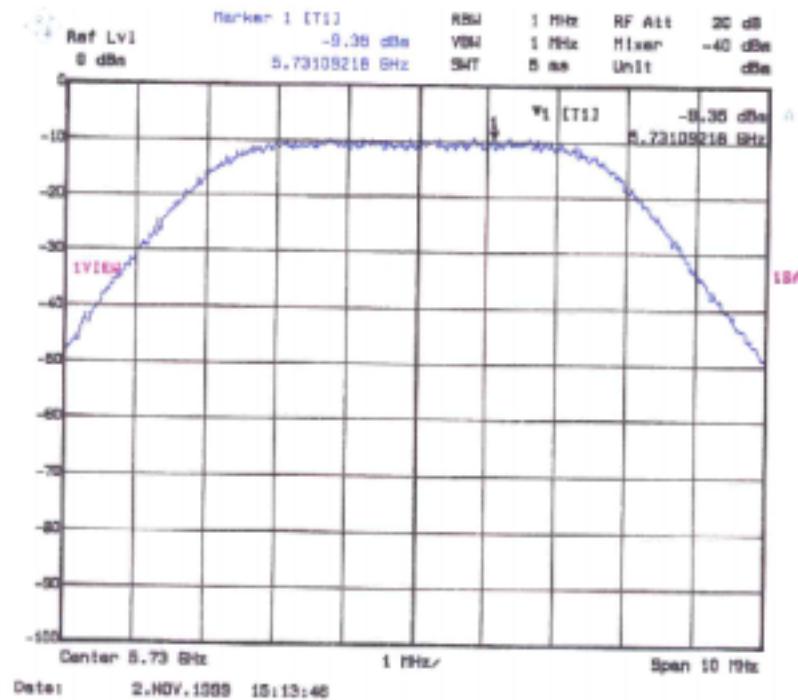


Figure 1. Peak Power Spectral Density (BW = 6 MHz)  
 Peak PSD = -9.35 dBm/MHz + 26.3 dB = 17.0 dBm/MHz  
 RMS Power Meter Reading 24.8 dBm, Loss = 26.3 dB.

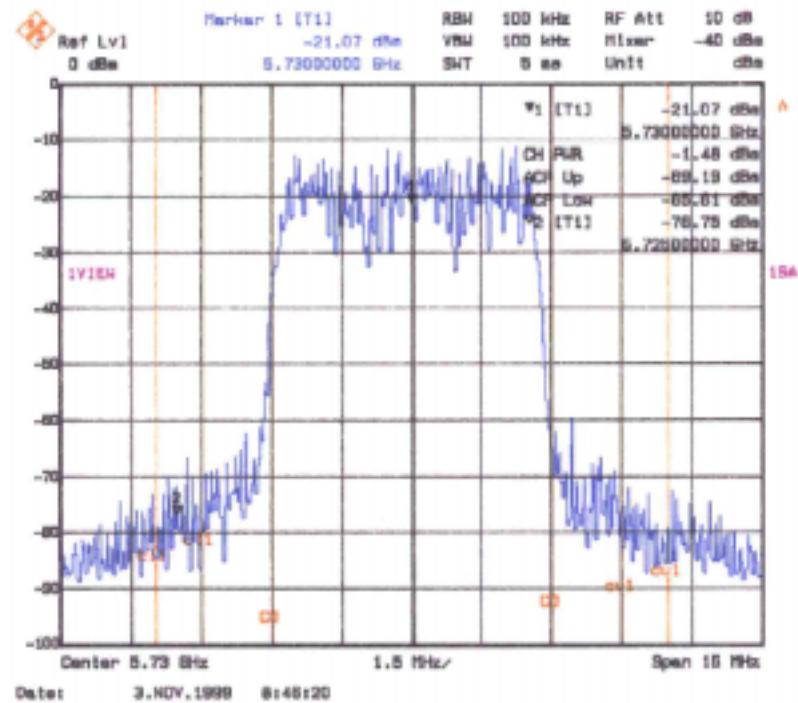


Figure 2. Peak Transmit Power (BW= 6 MHz)  
 Peak Transmit Power = -1.5 dBm + 26.3 dB = 24.8 dBm  
 RMS Power Meter Reading 24.8 dBm, Loss = 26.3 dB.

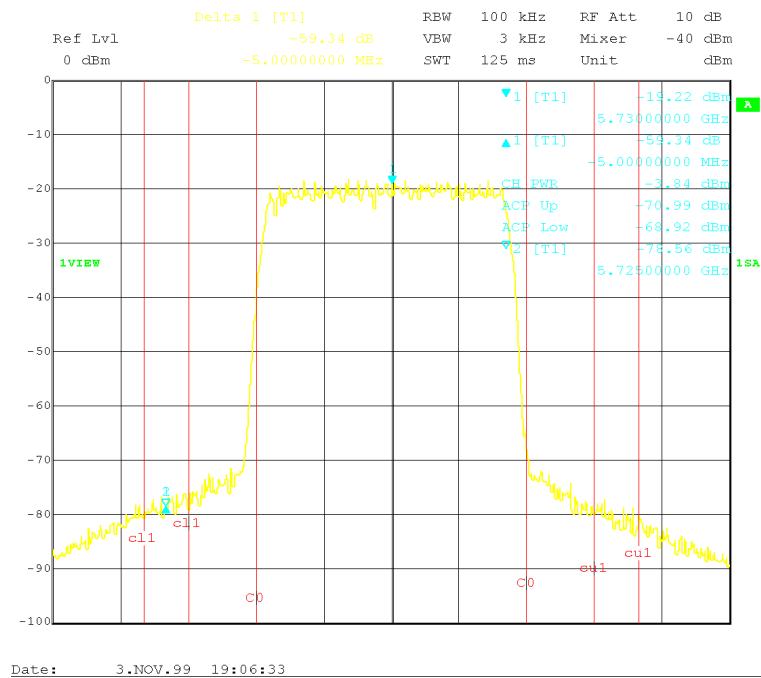


Figure 3. Bandedge (BW = 6 MHz)  
Bandedge = -68.9 dBm/MHz + 26.3 dB = -42.6 dBm/MHz  
RMS Power Meter Reading 24.8 dBm, Loss= 26.3 dB.

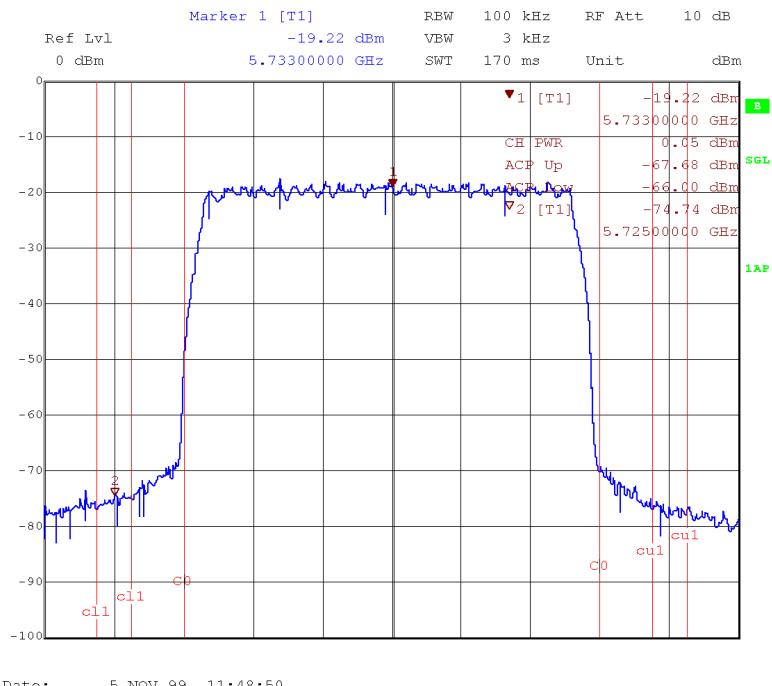


Figure 4. Bandedge (BW = 12 MHz)  
Bandedge = -66.0 dBm/MHz + 23.3 dB = -42.7 dBm/MHz  
RMS Power Meter Reading 25.0 dBm, Loss= 23.3 dB.