Before the
Federal Communications Commission
Washington DC 20554

In the Matter of	)	
	)	ET Docket No. 03-104
Carrier Current Systems, Including	)	
Broadband over Power Line Systems	)	
	)	
Amendment of Part 15 Regarding New	)	ET Docket No. 04-37
Requirements and Measurement Guidelines	)	
for Access Broadband	)	
over Power Line Systems	)	
	)	

To: The Commission
August 5, 2004

ADDENDUM

This addendum is an addition to the Technical Appendix of my earlier filing. A reviewer of that submission asked for values calculated in the section on Interference Potential to be expressed in terms he more readily recognized.

The field strength of interest is the 30µV/m Part 15 limit. The power density of this signal is:

$$P = \frac{E^2}{120\pi}$$

or 2.4 E-12 watts/m^2.
The effective area of an antenna is:

$$A_{eff} = \frac{g \cdot \lambda^2}{4\pi}$$

For a simple dipole the numeric gain, g, is 1.64. At 14 MHz, λ is 21.4 meters or A_{eff} = 59.9 m^2, so the power intercepted by the antenna is 143 pW. The voltage at the receiver input is then:

$$Erx = \sqrt{P \cdot 50}$$

or 84 µV. This is 4.5 dB above S-9, a very loud signal. At 100 meters this signal would be 20.9 dB weaker or 7.6 µV, a level between S-3 and S-4 and one that increases the naturally occurring noise level by 5 dB. At 10 meters this signal is 15.7 dB above the 30-meter case or approximately 20 dB above S-9, an exceedingly loud signal.

The level of the interference will increase at lower frequencies as the effective area of antennas increases, and will decrease at higher frequencies as the effective area decreases. However, the naturally occurring noise changes faster than the effective area, so the overall effect will be for signal-to-noise ratio to decrease with increasing frequency. This is why the European proposals (like NB30) allow less interference with increasing frequency.