MPE Calculations

The device is not a portable device (i.e. intended to be worn on the body or be hand-held), so it is classified as being either a mobile device or a fixed mounted device. The user's manual specifies a minimum separation distance of at least 20cm, consistent with this classification. As shown in the calculations below, the power density 20cm from the device is below the maximum permitted level for uncontrolled exposure with one or both radios active.

FCC part 1.1310, Table 1 limits the power density for uncontrolled exposure. The power density, P_d (mW/cm^2) calculated from the maximum EIRP, P_t (mW) and the distance, d (m), between the transmitting antenna and the closest person, can be calculated using:

$$P_d = P_t/(4 \pi d^2)$$

Frequency	MPE Limit (mW/cm^2)	Output Power (mW)	Max. Antenna Gain (dBi)	EIRP (mW)	Pd at 20cm (mW/cm^2)	Distance where Pd = limit (cm)
2412 to 2462 MHz	1.00	91.2	3.2	190.5	**0.04**	3.9
5745 to 5825 MHz	1.00	20.9	5.0	66.1	0.01	2.3
5180 to 5320 MHz	1.00	27.5	5.0	87.1	0.02	2.6
5500 to 5700 MHz	1.00	53.7	5.0	169.8	0.03	3.7

Note that the antenna gain in the table above is for the highest gain antenna in each band (see highlighted entries in the table below).

Antenna Name and model	Type	Antenna Gain				Comments
		2.4GHz	5.2GHz	5.5GHz	5.7GHz	
Ethertronics MPCI-8	Magnetic Dipole	3.0	**5.0**	**5.0**	**5.0**	Original Antenna
Universe Technology PIFA	PIFA	**3.24**	3.73	4.77	**4.97**	Original Antenna
WNC 81.EBC15.102 Vader T-Type	PIFA	2.93	4.7	4.69	2.68	Proposed antenna

As the new PIFA antenna has lower gain in each band than the original antennas, the MPE calculation remains unchanged form the calculation provided in the original filing.

MPE Calculations Original

The device is not a portable device (i.e. intended to be worn on the body or be hand-held), so it is classified as being either a mobile device or a fixed mounted device. The user's manual specifies a minimum separation distance of at least 20cm, consistent with this classification. As shown in the calculations below, the power density 20cm from the device is below the maximum permitted level for uncontrolled exposure with one or both radios active.

FCC part 1.1310, Table 1 limits the power density for uncontrolled exposure. The power density, P_d (mW/cm^2) calculated from the maximum EIRP, P_t (mW) and the distance, d (m), between the transmitting antenna and the closest person, can be calculated using:

$$P_d = P_t/(4 \pi d^2)$$

Frequency	MPE Limit (mW/cm^2)	Output Power (mW)	Max. Antenna Gain (dBi)[1]	EIRP (mW)	Pd at 20cm (mW/cm^2)	Distance where Pd = limit (cm)
2412 to 2462 MHz	1.00	91.2	3.2	190.5	**0.04**	3.9
5745 to 5825 MHz	1.00	20.9	5.0	66.1	0.01	2.3
5180 to 5320 MHz	1.00	27.5	5.0	87.1	0.02	2.6
5500 to 5700 MHz	1.00	53.7	5.0	169.8	0.03	3.7

[1] Antenna gain for the 2.4GHz band is the gain of the Universe antenna. For the 5Ghz bands the 5dBi gain is the gain of the Ethertronics antenna.