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21st July 2005

Federal Communications Commission
7435 Oakland Mills Road
Columbia
MD 21046

Dear Sir/Madam

**RE: Maximum Permissible Exposure (MPE) for the IPWireless Broadband
         Modem Model No: FD**

The FCC identification number for this device is PKTPCMCIAFD1.

Background

The IPWireless Inc. broadband wireless modem Model No: FD is a PCMCIA based wireless broadband modem. It is intended for connection to a personal computer, typically a laptop.

The modem is capable of using either the integral antenna or an external stick antenna for remote positioning of the antenna for example better reception. This document covers the case of using the modem with the external stick antenna, the alternative situation of using the integral antenna has been subject to SAR evaluation.

The external antenna allows the antenna to be located at distances greater than 20cm from the user, this document is intended to provide information to ensure the device is used in a safe manner, the power density at a distance of 20cm from the radiating structure of the external antenna to the user or any other person has been calculated based on the MPE limits for the general population/uncontrolled exposure category.

The calculations below take into account the worst case normal operation of the device i.e. the user is using the full data bandwidth of the device. The RF interface operates using a time division duplex implementation whereby the modem transmits using 5 out of a total of 15 timeslots in a radio frame. This provides good justification for using source based averaging of the transmitter power as defined in rule 2.1091 section (d) subsection (2).

Applicable Limits to RF Exposure

The RF exposure limits for radio transmitters are established in 47CFR1.1310. These limits are established for different frequency ranges and the type of environment the device is expected to be used in. For the IPWireless Inc. broadband wireless modem Model No. FD, the applicable power density limit is given in Table 1 part (b) as:

1 mW/cm^2 (general population, uncontrolled exposure)

Model FD Device Parameters used in MPE Calculation

The Model FD has a maximum conducted output power to the antenna of +24dBm per 5.5MHz or 11MHz channel, the external stick antenna gain is a maximum of 3dBi, providing a maximum EIRP of +27dBm per 5.5MHz or 11MHz channel.

The maximum EIRP of the modem using the external stick antenna is as follows:

	5.5MHz or 11MHz Channel
Tx Power	+24
Antenna Gain (dBi)	3
EIRP (dBm)	27
EIRP (W)	0.5

Therefore the EIRP complies with the 2.0W limit defined in FCC Part 27.

Distance to Power Density Limit Calculation

For the purpose of calculating the MPE level at a distance of 20cm from the Model FD with external stick antenna, the 0.5W (+27 dBm) EIRP value is used.

The formula used to calculate the exposure level at a distance of 20cm is defined in FCC Bulletin 65.

$$S = \frac{PG}{4\pi R^2} \qquad \text{Equation (1)}$$

Where: S= Power Density Limit of 1mW/cm2

P= Transmitter Power

G= Numerical Antenna Gain

R = Distance from Antenna

The table below shows the calculation of power density at a distance of 20cm from the antenna to demonstrate compliance with the 1mW/cm^2 MPE limit defined for the general population/uncontrolled exposure environment.

MPE distance calculation for PKTPCMCIAFD1		
External Stick Antenna gain	3	dBi
Line loss	0	dB
Effective antenna gain (ratio)	2.0	
Model: FD PA conducted output power	24	dBm
Model: FD maximum EIRP	27	dBm
	501	mW
Model: FD maximum EIRP	0.5	W
Part 27 EIRP limit	2.0	W
MPE limit from 1.1310, MMDS band	**1**	mW/cm^2
(general population, uncontrolled exposure)		
Power Density = (EIRP/(4*pi*distance from antenna))		
Power Density at 20cm from Antenna =	0.099	mW/cm^2
(without source-based averaging)		
Source-based duty cycle adjustment		
Total timeslots in frame	15	
Timeslots used for uplink transmit	5	
Percent of uplink time device is transmitting	100%	
Average attenuation of signal (power control)	0	dB
Power Density at 20cm from Antenna =	0.033	mW/cm^2
(with source-based averaging)		

Conclusion

The table above shows the device meets the 1mW/cm^2 exposure limit at a distance 20cm from the external stick antenna during worst case normal operation. The user guide provides instructions to the user of the modem to ensure operation of the device in a safe manner.

Yours Sincerely,

Peter Warburg
Technical Associate