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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: GY

The FCC identification number for this device is PKTP1CGY.

Background

The IPWireless Inc. broadband wireless modem Model No: GY is intended for connection to a personal computer, this can either be a desktop or laptop computer.

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 device 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 4 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. GY, the applicable power density limit is given in Table 1 part (b) as:

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

IPWireless UK Limited

Model GY Device Parameters used in MPE Calculation

The Model GY has a maximum conducted output power to the antenna of +24dBm, the integral antenna gain is 2 dBi, providing a maximum EIRP of +26dBm. This emission is spread over 12 MHz of channel bandwidth, providing a maximum power level of +23dBm in a 6MHz MMDS channel.

This unit is being qualified under the low power response station rules contained in both 47CFR21.908 (d) and 47CFR74.936 (f), which defines the maximum transmitter power limit of –6dBW EIRP in a 6MHz channel.

This device operates in a 12 MHz channel and as such, the maximum EIRP allowed is –6dBW + 3dB = -3dBW EIRP.

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

EIRP   =   +24dBm + 2dB (ant. gain)

   =   +26dBm

   =   -4dBW

Therefore the EIRP complies with the –3 dBW limit allowed for a 12 MHz bandwidth emission for a low power response station.

Distance to Power Density Limit Calculation

For the purpose of calculating the MPE level at a distance of 20cm from the Model GY integral antenna, the –4 dBW (+26 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 PKTP1CGY		
Integral Antenna gain	2	dBi
line loss	0	dB
Effective antenna gain (ratio)	1.58	
Model GY PA conducted output power	24	dBm
Model GY maximum EIRP	26	dBm
	397	mW
Model GY maximum EIRP	-4	dBW
21.908 (d) EIRP limit in 12 MHz bandwidth	-3	dBW
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 =	0.079	mW/cm^2
(without source-based averaging)		
Source-based duty cycle adjustment		
Total timeslots in frame	15	
Timeslots used for uplink transmit	4	
Percent of uplink time device is transmitting	100%	
Average attenuation of signal (power control)	0	dB
Power Density at 20cm from Antenna =	0.021	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 integral 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