APPENDIX C: RF EXPOSURE INFORMATION

This spread spectrum device, which can be used in portable hosts, has a conducted output power of 0.8 mW. This level is well below the RF exposure limit of 1.6W/kg. Therefore, this device meets the FCC requirements for RF exposure.

Frequency (MHz)	Channel	Peak Power Conducted Output (dBm)	Peak Power Conducted Output (mW)
2402	2	-3.68	0.4
2440	40	-1.17	0.8
2480	80	-0.99	0.8

FCC RULES AND REGULATIONS PART 1.1307, 1.1310, 2.1091, 2.1093: RF EXPOSURE COMPLIANCE

Antenna Type(s):

Assembly Description	Assembly Type Designation	Manufacturer's Declared Maximum Gains (dBi)	Manufacturer's Declared Average Gains (dBi)
Cameo 2	Dipole	8.7	0.3
Cameo 3	Dipole	8.6	0.6
Cameo 3 SC	Dipole	6.3	-2.3
ZPR Pod	Dipole	7.5	0.6
QL-320	Dipole	3.5	-6.6
QL-220	Dipole	3.5	-6.6

Test signal, Time-averaging, Max. Measured Output Power:
Modulation Type/Modes: FHSS

Frequency Range
2402-2480 MHz

Output Power (Watt/dBm)	High (Watt)	High (dBm)	Time averaging (_0._% Duty Cycle)
Conducted	.0008	-0.99	

From FCC 1.1310 Table 1A, the maximum permissible RF exposure for an uncontrolled environment is 1 mW/cm^2. The Electric field generated for a 1mW/cm^2 exposure (S) is calculated as follows:

$S = E^2/Z$

where:
S = Power density
E = Electric field
Z = Impedance.

$$E = \sqrt{S \cdot Z}$$

1 mW/cm^2 = 10 W/m^2

The impedance of free space is 377 ohms, where E and H fields are perpendicular.

Thus:

$E = \sqrt{10 \cdot 377}$ = 46.4 V/m which is equivalent to 0.57mW/cm^2

Using the relationship between Electric field E, Power in watts P, and distance in meters d, the corresponding Antenna numeric gain G and the transmitter output power:

$$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power density: } P_d(mW/cm^2) = \frac{E^2}{3770}$$

MPE Calculation:

The maximum distance from the antenna at which MPE is met or exceeded is calculated from the equation relating field strength E in V/m, transmit power P in Watts, transmit antenna numeric gain G, and separation distance in meters above, and solving for d below:

$$d = \frac{\sqrt{30 \times P \times G}}{E} \qquad 0.009m = \frac{\sqrt{30 \times 0.0008 \times 7.4}}{46.4}$$

SEPARATION DISTANCE:

Highest Antenna Gain = 7.4 **Power[B] (Watt) = 0.0008**	
Separation Distance	
(in)	(m)
0.35	0.009

Notes:
[B] = Conducted power without Duty Cycle (worst case)