APPENDIX A: RF EXPOSURE; FCC RULES AND REGULATIONS PART 1.1307, 1.1310, 2.1091, 2.1093

1. General Information: FCCID: G8JHHI01
Environment: General Population/Uncontrolled Exposure Device category: Mobile per Part 2.1091

2. Antenna Data:

Antenna	Type	Gain (dBi)	Numeric Gain	Frequency Used (MHz)
Whip	Omni	3.2	2.1	451.355

3. MPE Calculation:

The limit for general population/uncontrolled exposure environment is f/1500 mW/cm^2, or $0.3\,mW/cm^2$.
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. The Electric field generated for a 1mW/cm^2 exposure (S) is calculated as follows:

$S = \frac{E^2}{Z}$ *where*: S = Power density; E = Electric field; and Z = Impedance

or $E(V/m) = \sqrt{S \times Z}$ and 0.3 mW/cm^2 = 3 W/m^2 and the impedance of free space is 337 ohms, where E and H fields are perpendicular. Thus: $E(V/m) = \sqrt{3 \times 377}$ = 33.63 V/m

from the formula $P = \frac{E(V/m)^2 \times d^2}{30 \times G}$ or $d = \frac{\sqrt{30 \times P \times G}}{E(V/m)}$

Substitution yields: $0.24m = \frac{\sqrt{30 \times 1 \times 2.1}}{33.63}$

Separation Distance	
Power (Watt)	(cm)
1	24

$S = \frac{P \times G}{4 \times p \times d^2}$ *Where:* S = power density; P = power (W); G = numeric gain; d = distance to radiation center

Substitution yields:

$$S = \frac{1000 \times 3.2}{4 \times p \times 20^2} = 0.64 mW/cm^2$$

Power Density Limit	Calculated Power density at 20 cm distance
0.3 mW/cm ^{2}	0.64 mW/ cm ^{2}

CONCLUSION: To insure the device complies with the MPE requirements by providing a safe separation distance between the antenna, including any radiating structure, and any persons, the separation distance should be 24 cm.

Proposed RF exposure safety information to include in User's Manual:

CAUTION: Antenna Installation Requirement
The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 24 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.