

## APPENDIX A: FCC PART 1.1307, 1.1310, 2.1091, 2.1093: RF EXPOSURE

FCC ID: O6Y-FSUC800  
 Environment: General Population/Uncontrolled Exposure  
 Device category: Mobile per Part 2.1091  
 Modulation Type/Mode: CDMA

| Antenna    | Type | Gain (dBi) | Numeric Gain |
|------------|------|------------|--------------|
| TQX-800LDI | Whip | 2.0        | 1.58         |

| Frequency Range | Frequency Tolerance (ppm) | Emission Designator |
|-----------------|---------------------------|---------------------|
| 824.7-848.31    | 1.43                      | 1M25F9W             |

| Output Power (Worst Case) | (W)               |
|---------------------------|-------------------|
| EIRP                      | 0.266 (24.25 dBm) |
| Conducted                 | 0.244 (23.9 dBm)  |

### 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:

The limit for this frequency range is  $f/1500$  or  $0.55 \text{ mW/cm}^2$  (824.7 MHz) to  $0.57 \text{ mW/cm}^2$  (848.31 MHz). The electric field generated for a  $0.57 \text{ mW/cm}^2$  exposure (S) is calculated as follows:

$$S = \frac{E^2}{Z}$$

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

$$E(V/m) = \sqrt{S \times Z} \quad 0.57 \text{ mW/cm}^2 = 5.7 \text{ W/m}^2$$

The impedance of free space is 337 ohms, where E and H fields are perpendicular.

Thus:

$$E(V/m) = \sqrt{5.7 \times 377} = 46.4 \text{ V/m}$$

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:

$$E(V/m) = \frac{\sqrt{30 \times P \times G}}{d} \text{ and } d = \frac{\sqrt{30 \times P \times G}}{E(V/m)} \text{ Power density: } P_d(mW/cm^2) = \frac{E^2}{2149}$$

The limit for general population/uncontrolled exposure environment is f/1500 mW/cm<sup>2</sup>, or 0.55 mW/cm<sup>2</sup> (824.7 MHz) to 0.57 mW/cm<sup>2</sup> (848.31 MHz).

SEPARATION DISTANCE:

| Separation Distance <sup>A</sup> | Antenna Gain (dBi) |
|----------------------------------|--------------------|
|                                  | 2                  |
| Power <sup>B</sup> (Watt)        | (cm)               |
| 0.244                            | 8.3                |

Calculations:

$$S = \frac{P \times G}{4 \times \pi \times d^2} \quad 0.083m = \frac{\sqrt{30 \times 0.244 \times 2}}{46.4}$$

Where:

S = Power density      P = Transmitter conducted power in watts  
G = Numeric gain      D = Distance to radiation center

Fundamental Operating Frequency: 824.7 - 848.31 MHz

Measured Conducted Power: 0.244W (23.87 dBm)

Antenna Gain = 2 dBi; Numeric Gain = 1.58

$$S = 244 \times 1.58 / 4 \times \pi \times 20^2 = 0.08 \text{ mW/cm}^2 \text{ at } 20 \text{ cm}$$

| Antenna Gain = 2 dBi<br>Conducted Power (mW) = 244 |                                            |
|----------------------------------------------------|--------------------------------------------|
| Separation Distance                                |                                            |
| Power Density Limit                                | Calculated Power density at 20 cm distance |
| 0.6 mW/cm <sup>2</sup>                             | 0.08 mW/ cm <sup>2</sup>                   |

**CONCLUSION:**

The device complies with the MPE requirements by providing a safe separation distance between the antenna, including any radiating structure, and any persons.

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 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.