

FCC RF Exposure Requirements

General information:

FCC ID: BGA-WHT24TX

Device category: Mobile per Part 2.1091

Environment: Uncontrolled Exposure

Mobile devices that operate under Part 15.247 of this chapter are subject to environmental evaluation for RF exposure prior to equipment authorization.

Antenna:

The manufacturer does specify an antenna with a gain of 2.15 dBi to be used with this device.

This device has provisions for operation in a vehicle location.

Configuration	Antenna p/n	Type	Freq. Band	Max. Gain (dBi)
Car	Any	omni	2400 MHz	2.15

Operating configuration and exposure conditions:

The conducted output power is 0.05 Watts. Typical use qualifies for a maximum duty cycle factor of <=50%.

MPE Calculation:

The minimum separation distance is calculated as follows:

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

The limit for general uncontrolled exposure environment above 1500 MHz is 1.0 mW/cm² .

Channel frequency: 2440 MHz
 The conducted power output is 0.05 mwatt.
 Antenna gain was taken as 3 dBi
 50% Duty cycle

W := 0.05 power in Watts

D := 1 Duty Factor in decimal % (1=100%)
 1 for FM

E := 15 exposure time in minutes

U := 30 (use 6 for controlled and 30 for uncontrolled)

$$W_{exp} := W \cdot D \cdot \left(\frac{E}{U} \right)$$

$$PC := \left(\frac{E}{U} \right) \cdot 100$$

W_{exp} = 0.025 Watts

PC = 50 % on time

Po := 25 mWatts

f := 2400 Frequency in MHz

dBd := 0 antenna gain in dBd

$$S := \frac{f}{2400} \text{ power density limit for uncontrolled exposure}$$

G1 := dBd + 2.15 gain in dBi

G1 = 2.15 dBi

$$S = 1 \frac{\text{mW}}{\text{cm}^2}$$

CL := 0 dB coax loss

$$G := G1 - CL$$

$$G_n := 10^{\frac{G}{10}} \text{ gain numeric}$$

G_n = 1.641 dB

$$R := \sqrt{\frac{(P_o \cdot G_n)}{(4 \cdot \pi \cdot S)}}$$

R = 1.807 distance in centimeters
 required for compliance

$$\text{inches} := \frac{R}{2.54}$$

inches = 0.711

Conclusion:

The device complies with the MPE requirements by providing a safe separation distance of 3 cm between the antenna, including any radiating structure, and any persons when normally operated.

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

“FCC RF Exposure Requirements:

CAUTION:

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This device is approved with emissions having a source-based time-averaging duty factor not exceeding 50%. The safe operating distance between the general population and the antenna when transmitting is 2.0 cm or 0.8 inches inches.

Failure to observe these restrictions will result in exceeding the FCC RF exposure limits.