

# FCC RF Exposure Requirements

## General information:

FCCID: P2S450MC

Device category: Mobile per Part 2.1091

Environment: Uncontrolled\General Population Exposure

Fixed devices that operate under Part 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watts or more. However, compliance with the power density limits of 1.1310 is not required.

## Antenna:

This device has provisions for operation in a fixed location only.

Configuration	Manufacturer	Antenna p/n	Type	Duty cycle	Max. Gain (dBi)
Fixed	Comtelco	BS450XL3-C	Omni	50%	up to5

## Operating configuration and exposure conditions:

The conducted output power is 5 Watts. The maximum duty cycle is set as a function of the hardware. The system is a half duplex type and therefore will never exceed a 50% duty cycle.

## MPE Calculation:

These calculations are based on the following assumptions:

- 1) The exposure environment is Uncontrolled / General Population.
- 2) The frequency range is 300-1500 MHz.

Channel frequency: 450-470 MHz

Conducted power output (W): 5 Watts

Coax loss: 0 dB.

Antenna gain (Ga): 5 dBi

Exposure time (Texp): 15 minutes

Duty Factor (D): 100% or 1 for FM device

Average time (Tavg): 30 minutes

Time compensated power output (Wexp): See calculation below.

Power density (S): See calculation below.

Minimum distance of separation (R): See calculation below.

$$W_{\text{exp}} = (W)(D)(T_{\text{exp}}/T_{\text{avg}}) = (5)(1)(15/30) = 2.5 \text{ watts or } 2500 \text{ mW}$$

$$S = f/1500 \text{ mW/cm}^2 = 450/1500 \text{ mW/cm}^2 = 0.3 \text{ mW/cm}^2$$

$$G_a = 5 \text{ dBi} = 10^{5/10} = 3.16$$

$$R = \sqrt{(W_{\text{exp}} \times G_a) / (4 \times \pi \times S)} = \sqrt{(2500 \times 3.16) / (4 \times \pi \times 0.3)} = 45.78 \text{ cm or } 18.02 \text{ in.}$$

$$E = \sqrt{(30 \times W_{\text{exp}} \times G_a) / (R)} = \sqrt{(30 \times 2.5 \times 3.16) / (0.4578)} = 33.63 \text{ V/m}$$

### **Conclusion:**

The device complies with the MPE requirements by providing a safe separation distance of 46 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%.

#### **Fixed – Antenna Installation:**

- Installation of Antennas is under complete control of the manufacturer and will be performed by professional installers chosen by the manufacturer. Therefore the antenna(s), its performance specifications and location are completely controlled and will not be allowed to violate the MPE requirements.