

## RF Exposure Considerations for Itron 900 MHz FHSS Radio Module

The following radio modules will be used in product that will result in co-location of the antennas for the modules:

Company	FCC ID	Description	Pout Max dBm	Antenna Gain Max dBi
Tropos Networks	P9J-2411	2.4 GHz module	28.5	7.4
Tropos Networks	P9J-5805	5.8 GHz module	26.4	19
Itron Electricity Meters	SK9ITR900-1	902 MHz module	26.2	3

### RFx CALCULATION FOR MULTIPLE CO-LOCATED TX SOURCES

The following relationships between power density (S), distance from antenna (d meters), transmitter field strength ( E v/m), transmitter power (P, watts) and antenna gain (G, numeric) are used to determine MPE for each transmitter:

$$E^2/3770 = S, \text{ mW/cm}^2$$

$$E, \text{ V/m} = (\text{Pwatts} * \text{Ggain} * 30)^{.5} / d, \text{ meters}$$

$$\text{MPE } d, \text{m} = ((\text{Pwatts} * \text{G} * 30) / 3770 * S)^{.5}$$

$$\text{Pwatts} * \text{Ggain} = 10^{(\text{PdBm} - 30 + \text{GdBi}) / 10}$$

$$S @ \text{dist2} = S @ \text{dist1} * (\text{dist1} / \text{dist2})^2$$

Per OET 65, the allowed cumulative exposure limit at a given point from three transmitters operating at different frequencies is

$$S_{f1} / S_{f1 \text{ limit}} + S_{f2} / S_{f2 \text{ limit}} + S_{f3} / S_{f3 \text{ limit}} < 1, \text{ where}$$

$S_{f1}$  = power density at a given point for transmitter operating at F1 MHz

$S_{f2}$  = power density at a given point for transmitter operating at F2 MHz

$S_{f3}$  = power density at a given point for transmitter operating at F3 MHz

$S_{f1 \text{ limit}}$  = power density limit at frequency F1 (from Table 1 in Appendix A of OET 65)

$S_{f2 \text{ limit}}$  = power density limit at frequency F2 (from Table 1 in Appendix A of OET 65)

$S_{f3 \text{ limit}}$  = power density limit at frequency F3 (from Table 1 in Appendix A of OET 65)

At a distance of 56.4 cm, the weighted cumulative RF exposure is 99.9% of the allowed maximum.

The MPE distance that will be reported in final product manuals that use the above listed combination of radios and maximum antenna gains will be 57 cm.

The spreadsheet with the calculations is attached.

