R.F Exposure/Safety

The E.U.T. is an RF module operating the 915 MHz frequency band,
FCC ID: 2ATPH-JNET1-915MHZ.
The E.U.T. was placed in a street/road light installed on poles, model Pheonix 1. The minimum height at which the Pheonix 1 is installed is 4 meters above the street/road surface.
The Pheonix 1 also includes the following RF modules transmitting simultaneously with FCC ID: 2ATPH-JNET1-915MHZ:

      FCC ID: TK4WLE1216V220 operating in the 2.4 GHz band.
      FCC ID: TK4WLE1216V520 operating in the 5 GHz band.

Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1310 Requirements

(a) FCC limits for 300MHz-1500MHz is:

$$f/1500 \frac{mW}{cm^2}$$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(b) FCC limits for 1.5GHz-100GHz is:

$$1 \frac{mW}{cm^2}$$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(c) The power density produced by the E.U.T. is

$$S = \frac{P_t G_t}{4\pi R^2}$$

      P_t- Transmitted Peak Power

      G_T- Antenna Gain

      R- Distance from Transmitter (using 35 cm worst case)

For 915 MHz transmitter FCC ID: 2ATPH-JNET1-915MHZ:

FCC Limit for general population is in the frequency range of 300MHz-1500MHz: $f/1500 = 903/1500 = 0.6$ mW/cm^2

Conducted power = 10.45 dBm*

Antenna gain 2.51 dBi *

$P_t = 10.45$ dBm + 2.51 dBi = 12.95 dBm = 19.72 mW*

$S_1 = 19.72$ mW $/4\pi(1225) = 0.0013$ mw/cm^2

S_1 is below the FCC limit.

* See Note on following page.

For 2.4GHz transmitter FCC ID: TK4WLE1216V220:

FCC Limit for general population in the frequency range of 1.5GHz-100GHz is: 1 mW/cm^2

Conducted power = 23.44 dBm*

Antenna gain 11 dBi*

$P_t = 23.44$ dBm + 11 dBi = 34.44 dBm = 2779.71 mW*

$S_2 = 2779.71$ mW $/4\pi(1225) = 0.1806$ mw/cm^2

S_2 is below the FCC limit.

* See Note on below.

For 5 GHz transmitter FCC ID: TK4WLE1216V520:

FCC Limit for general population in the frequency range of 1.5GHz-100GHz is: 1 mW/cm^2

Conducted power = 25.89 dBm*

Antenna gain 10 dBi*

$P_t = 25.89$ dBm + 10 dBi = 35.89 dBm = 3881.50 mW*

$S_3 = 3881.50$ mW $/4\pi(1225) = 0.2521$ mw/cm^2

S_3 is below the FCC limit.

* See Note on below.

Co-located RF exposure

$S_1 + S_2 + S_3 = 0.0013 + 0.1806 + 0.2521 = 0.434$ mw/cm^2

All three RF modules transmitting simultaneously meet both the FCC limit for general population for the frequency range of 300-1500MHz.

All three RF modules transmitting simultaneously meet both the FCC limit for general population for the frequency range of 1.5-100GHz.

Note: All output power and antenna gain were taken from the RF exposure reports submitted for the modules' grants.