RF Exposure Information

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

When all the antennas are at least 20cm away from the user, but individual antennas <u>can not</u> be separated by 20cm from each other.

If

[Pd(1) / LPd(1)] + [Pd(2) / LPd(2)] + ….. + [Pd(n) / LPd(n)] < 1,

then device complies with FCC's RF radiation exposure limit for general population for a mobile device.

Where;

Pd(n) = Power density of nth transmitter at 20cm
LPd(n) = Power density limit for the nth transmitter

Device has 3 transmit chains each with a single carrier at a time where all three can operate under Part 24 or two under Part 24 and one under Part 90.

Configuration 1:

Chain 1:   1xEV-DO 1900MHz band
Chain 2:   1xRTT 1900MHz band
Chain 3:   Beacon in 1900MHz band

Configuration 2:

Chain 1:   1xEV-DO 1900MHz band
Chain 2:   1xRTT 1900MHz band
Chain 3:   Beacon in 800MHz band

For both 1900MHz band and 800MHz band the peak antenna gain is 0dBi.

Power density calculations:

Configuration 1:

Chain 1:   EIRP = 13.9dBm
            Power density = 0.0049mW/cm2 at 20cm   Limit = 1 mW/cm2 at 20cm

Chain 2:   EIRP = 11.5dBm
            Power density = 0.0028 mW/cm2 at 20cm   Limit = 1 mW/cm2 at 20cm

Chain 3:   EIRP = 13.2dBm
            Power density = 0.0042 mW/cm2 at 20cm   Limit = 1 mW/cm2 at 20cm

Configuration 2:

Chain 1:   EIRP = 13.9dBm
            Power density = 0.0049mW/cm2 at 20cm   Limit = 1 mW/cm2 at 20cm

Chain 2:   EIRP = 11.5dBm
            Power density = 0.0028 mW/cm2 at 20cm   Limit = 1 mW/cm2 at 20cm

Chain 3:   ERP = 4.7dBm
            Power density = 0.0010 mW/cm2 at 20cm   Limit = 0.574 mW/cm2 at 20cm

All 3 chains can transmit at the same time.

Combined MPE Calculations

Configuration 1:

(0.0049/1) + (0.0028/1) + (0.0042/1) = 0.0119 < 1

Configuration 2:

(0.0049/1) + (0.0028/1) + (0.0010/0.574) = 0.0094 < 1

Therefore the device complies with FCC's RF radiation exposure limits for general population as a mobile device (d>20cm).