**RF EXPOSURE**

Reference:     CFR 47 FCC Part 1.1310
                    RSS-102. Issue 5

Limits:        Maximum exposure limits from CFR 47, FCC Part 1.1310:

### Table 1 - Limits for Maximum Permissible Exposure (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm$^2$) | Averaging time (minutes) |
|---|---|---|---|---|
| (A) Limits for Occupational/Controlled Exposure | | | | |
| 0.3-3.0 | 614 | 1.63 | *100 | 6 |
| 3.0-30 | 1842/f | 4.89/f | *900/f$^2$ | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1,500 | | | f/300 | 6 |
| 1,500-100,000 | | | 5 | 6 |
| (B) Limits for General Population/Uncontrolled Exposure | | | | |
| 0.3-1.34 | 614 | 1.63 | *100 | 30 |
| 1.34-30 | 824/f | 2.19/f | *180/f$^2$ | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1,500 | | | f/1500 | 30 |
| 1,500-100,000 | | | 1.0 | 30 |

**RF EXPOSURE**

Calculations:

**Table 2 - Calculations according to CFR 47, Part 1.1310, Table 1(B)**

| Occupational/Controlled | 0 |
|---|---|
| General Population/uncontrolled | 1 |

| Transmitter | Frequency | Antenna Gain | Power (conducted) | Power (conducted) +10% for tolerance | Power Density | Limit at specified distance | % of limit | Highest | Total |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | numerical | mW | mW | mW/cm^2 | mW/cm^2 | | | |
| 1 | 2407 | 1.58 | 0.78 | 0.86 | 0.00027 | 1.00 | 0.03% | | |
| 1 | 2440 | 1.58 | 0.82 | 0.90 | 0.00028 | 1.00 | 0.03% | | |
| 1 | 2480 | 1.58 | 0.85 | 0.93 | 0.00029 | 1.00 | 0.03% | 1 | 0.03% |
| | | | | | | | | **TOTAL** | **0.03%** |

| **Distance** | 20 | **cm** |
|---|---|---|

| **PASS?** | **YES** |
|---|---|

Antenna gain was taken from manufacturer's data sheet.  Stated to be 2 dBi peak.  2 dBi = 1.58 numeric

**RF EXPOSURE**

**Table 3 - From Table 4 of RSS-102 Issue 5**

| Frequency Range (MHz) | Electric Field (V/m rms) | Magnetic Field (A/m rms) | Power Density (W/m²) | Reference Period (minutes) |
|---|---|---|---|---|
| $0.003-10^{21}$ | 83 | 90 | - | Instantaneous* |
| 0.1-10 | - | $0.73/f$ | - | 6** |
| 1.1-10 | $87/f^{0.5}$ | - | - | 6** |
| 10-20 | 27.46 | 0.0728 | 2 | 6 |
| 20-48 | $58.07/f^{0.25}$ | $0.1540/f^{0.25}$ | $8.944/f^{0.5}$ | 6 |
| 48-300 | 22.06 | 0.05852 | 1.291 | 6 |
| 300-6000 | $3.142\,f^{0.3417}$ | $0.008335\,f^{0.3417}$ | $0.02619f^{0.6834}$ | 6 |
| 6000-15000 | 61.4 | 0.163 | 10 | 6 |
| 15000-150000 | 61.4 | 0.163 | 10 | $616000/f^{1.2}$ |
| 150000-300000 | $0.158\,f^{0.5}$ | $4.21 \times 10^{-4}\,f^{0.5}$ | $6.67 \times 10^{-5}\,f$ | $616000/f^{1.2}$ |

Note: $f$ is frequency in MHz.
*Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

**RF EXPOSURE**

**Table 4 - Calculation according to Industry Canada RSS-102, Table 6**

| Occupational/Controlled | |
|---|---|
| General Population/uncontrolled | 1 |

| Transmitter | Frequency | Antenna Gain | Power (conducted) | Power (conducted) +10% for tolerance | Power Density | Limit at specified distance | % of limit | Highest | Total |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | numerical | mW | mW | mW/cm^2 | mW/cm^2 | | | |
| 1 | 2407 | 1.58 | 0.78 | 0.858 | 0.000245 | 0.535814 | 0.05% | | |
| 1 | 2440 | 1.58 | 0.82 | 0.9042 | 0.000259 | 0.540851 | 0.05% | | |
| 1 | 2480 | 1.58 | 0.85 | 0.9317 | 0.000266 | 0.546895 | 0.05% | 1 | 0.05% |
| | | | | | | | | TOTAL | 0.05% |

| Distance | 20 | cm |
|---|---|---|

| PASS? | YES |
|---|---|

Notes: The minimum separation distance was defined as the closest point from the transmitting antenna to any part of the body or extremity of a user or bystander.

The limit was converted from W/cm^2 to mW/m^2 by dividing by 10
$(W{\rightarrow}mW = .001) \times ( /cm^2{\rightarrow}/m^2 = 100) = 0.1 = /10$
The power density is calculated as shown below:

$S = (P \times G)/(4 \times \pi \times d^2)$ – *used to calculate exposure at 20 cm*

$d = \sqrt{(S/(P \times G) \times 4 \times \pi)}$ – *used to calculate minimum distance to meet limits*

*1 mW/cm^2 = 10 W/m^2*

S= power density
P = transmitter conducted power (in mW)
G = antenna numeric gain
D = distance to radiation center

Antenna gain was taken from manufacturer's data sheet. Stated to be 2 dBi peak. 2 dBi = 1.58 numeric