

RF Exposure Evaluation

Reference: CFR 47 FCC Part 1.1310

Description: Both transmitters in the device have the possibility of transmitting simultaneously. The worst-case exposure for each transmitter was used to calculate the percentage of the allowable limit that each transmitter contributed. All of the percentages were then added together to verify that at the specified operating distance, they were below the allowable limit.

All measurements were peak or RMS power readings taken from test reports from accredited test labs. Antenna gains were taken from the manufacturer's specifications.

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 Evaluation

FCC RF Exposure Calculations:

| Transmitter | Frequency | Antenna Gain | Power | Power +10% for tolerance | Power Density | Limit at specified distance | % of limit | Highest | Total of highest | FCC ID |
|-------------------------|-----------|--------------|-------|--------------------------|---------------|-----------------------------|------------|--------------|------------------|------------------|
| | MHz | numerical | mW | mW | mW/cm^2 | mW/cm^2 | | | | |
| 1 | 904.3 | 3.8 | 475 | 522.5 | 0.3950 | 0.6029 | 65.52% | 1 | 65.52% | 2AOSN-GWLRN1ODC1 |
| (2) 699-849 MHz | 699 | 1.58 | 226 | 248.6 | 0.0781 | 0.4660 | 16.77% | 1 | 16.77% | 2ANPO00NRF9160 |
| (2) 1710-1915 MHz | 1710 | 1.58 | 245 | 269.5 | 0.0847 | 1.0000 | 8.47% | | | 2ANPO00NRF9160 |
| | | | | | | | | TOTAL | 82.29% | Result: exempt |

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

Specified distance = 20 cm

For each radio, the frequency with the lowest limit was used and the highest power of each frequency band to calculate the worse-case RF exposure.

When measurements were performed as EIRP, the antenna gain is listed as 1. In cases where the antenna gain is not listed as 1, the power measurement was performed as conducted and the antenna gain from the manufacturer's datasheet was used.

Transmitter 1 peak antenna gain = 5.8 dBi = 3.8 numeric gain

Transmitter 1 peak antenna gain = 2 dBi = 1.58 numeric gain

Gain values taken from antenna datasheets

The power density is calculated as shown below:

$$S = (P \times G) / (4 \times \pi \times d^2)$$

d = 20 cm - used to calculate exposure at 20 cm

$$1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$$