

4.8. RF Exposure

Device information:

The device is intended to be mounted on aircraft for satellite communication. It is only intended for professional installation, see user manual and operational description exhibits.

Max radiated power values are taken from Sec. 4.2) of this test report.

The device supports different modulations and frequencies, but simultaneous transmission is not possible.

CFR 47 § 1.1310 Radiofrequency radiation exposure limits

§ 1.1310(d)(3)

At operating frequencies above 6 GHz, the MPE limits listed in Table 1 in paragraph (e)(1) of this section shall be used in all cases to evaluate the environmental impact of human exposure to RF radiation as specified in § 1.1307(b) of this part.

TABLE 1 TO § 1.1310(e)(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)
(i) 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
(ii) 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

*f = frequency in MHz. * = Plane-wave equivalent power density.*

§ 1.1310(d)(4)

Both the MPE limits listed in Table 1 in paragraph (e)(1) of this section and the SAR limits as set forth in paragraphs (a) through (c) of this section are for continuous exposure, that is, for indefinite time periods. Exposure levels higher than the limits are permitted for shorter exposure times, as long as the average exposure over a period not more than the specified averaging time in Table 1 in paragraph (e)(1) is less than (or equal to) the exposure limits. Detailed information on our policies regarding procedures for evaluating compliance with all of these exposure limits can be found in the most recent edition of FCC's OET Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields," and its supplements, all available at the FCC's internet website: <https://www.fcc.gov/general/oet-bulletins-line>, and in the Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB) (<https://www.fcc.gov/kdb>).

OET 65, Edition 97-01; August 1997, Section 2: PREDICTION METHODS

Calculations can be made to predict RF field strength and power density levels around typical RF sources. For example, in the case of a single radiating antenna, a prediction for power density in the far-field of the antenna can be made by use of the general Equations (3) or (4) below [for conversion to electric or magnetic field strength see Equation (1) in Section 1]. These equations are generally accurate in the far-field of an antenna but will over-predict power density in the near field, where they could be used for making a "worst case" or conservative prediction.

Eq. 4.:

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

Rearranging Eq. 4 to obtain the radius R for a given EIRP and power density $R = \sqrt{\frac{EIRP}{4\pi S}}$

Calculations for the device under test:

Max. EIRP of all transmissions from Sec. 4.2) is 80.2 dBm for LSDR.

The manufacturer has declared a max. power considering production tolerance and tune-up procedure of 81.5 dBm EIRP or approx. 141.3 kW EIRP, see operational description exhibit.

Duty cycle was not measured. A worst case duty cycle of 100 % is assumed.

Power density for general population/uncontrolled environment is 1.0 mW/cm² above 1500 MHz.

Resulting in R = 3352.7 cm or 33.5 m minimum separation distance for general population in line-of-sight between the antenna and the satellite.

For occupational/controlled exposure the applicable power density is 5.0 mW/cm², resulting in a separation distance of 1499.4 cm or 15.0 m.