

## \* RF Exposure

### 1. Regulation

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

Limits for Maximum Permissible Exposure: RF exposure is calculated.

Frequency Range	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [ $\text{mW}/\text{cm}^2$ ]	Averaging Time [minute]
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 <sup>2</sup> )	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1500	/	/	f/1500	30
1500 ~ 15000	/	/	1.0	30

f=frequency in MHz, \*= plane-wave equivalent power density

#### MPE (Maximum Permissible Exposure) Prediction

Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2 \quad (\Rightarrow R = \sqrt{PG/4\pi S})$$

S=power density [ $\text{mW}/\text{cm}^2$ ]

P=Power input to antenna [mW]

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 [cm]

Mode	Target power [dB]	Tune up tolerance [dB]	Max tune up power [dBm]	Max tune up power [mW]	Ant Gain [dBm]	Ant Gain [mW]	Power Density at 20 cm [ $\text{mW}/\text{cm}^2$ ]
GFSK	2.00	± 1.00	3.00	2.00	3.50	2.24	0.000 89
8DPSK	3.00	± 1.00	4.00	2.51	3.50	2.24	0.001 12

### 2. RF Exposure Compliance Issue

The information should be included in the user's manual:

This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter. A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

### 3. Calculation Result of RF Exposure

#### \* GFSK

Channel	Frequency [MHz]	Ant Gain [dBi]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/cm <sup>2</sup> ]
Lowest	2 402	3.50	2.24	1.84	1.53	0.000 68
Middle	2 441	3.50	2.24	2.64	1.84	0.000 82
Highest	2 480	3.50	2.24	2.47	1.77	0.000 79

#### \* 8DPSK

Channel	Frequency [MHz]	Ant Gain [dBi]	Ant Gain [mW]	power [dBm]	power [mW]	Power Density at 20 cm [mW/cm <sup>2</sup> ]
Lowest	2 402	3.50	2.24	2.95	1.97	0.000 88
Middle	2 441	3.50	2.24	3.75	2.37	0.001 06
Highest	2 480	3.50	2.24	3.38	2.18	0.000 97