

# 1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

---

## 1.1 Standard Applicable

According to § 1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

### (a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

### (b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz; \* = Plane-wave equivalent power density

## 1.2 MPE Calculation Method

$$S = (30 * P * G) / (377 * R^2)$$

S = power density (in appropriate units, e.g., mw/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

### 1.3 MPE Calculation Result

Model No.: ATM2000

FCC ID: VUJATM2000S1

Device category: Mobile or Fixed device

With Antenna 1:

Maximum peak output power: 26.75 (dBm)

Maximum peak output power at antenna input terminal: 473.15(mW)

Prediction distance: >20(cm)

Prediction frequency: 902.75 (MHz)

Antenna gain: 1 (dBi)

Directional gain: 1.26 (numeric)

The worst case is power density at prediction frequency at 20cm: 0.12(mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.60 (mw/cm<sup>2</sup>)

$$0.12(\text{mw}/\text{cm}^2) < 0.60 (\text{mw}/\text{cm}^2)$$

With Antenna 2:

Maximum peak output power: 26.75 (dBm)

Maximum peak output power at antenna input terminal: 473.15(mW)

Prediction distance: >20(cm)

Prediction frequency: 902.75 (MHz)

Antenna gain: -1 (dBi)

Directional gain: 0.79 (numeric)

The worst case is power density at prediction frequency at 20cm: 0.07(mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.60 (mw/cm<sup>2</sup>)

$$0.07(\text{mw}/\text{cm}^2) < 0.60 (\text{mw}/\text{cm}^2)$$

So the transmitter complies with the RF exposure requirements and the SAR is not required.