

## Prediction of MPE at a given distance

### 1. Limits

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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

### 2. Test Procedure

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the centre of radiation of the antenna

### 3. Result

Worse case is as below:

| Mode | Frequency (MHz) | Prediction distance (cm) | RF output power |            | MPE (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | SAR Test Exclusion |
|------|-----------------|--------------------------|-----------------|------------|---------------------------|-----------------------------|--------------------|
|      |                 |                          | dBm             | mW         |                           |                             |                    |
| EDR  | 2402            | 200                      | 5.86            | 3.855      | 0.00002                   | 1                           | Yes                |
| UHF  | 410.050         | 200                      | 45.31           | 33962.5273 | 0.23973                   | 0.27335                     | Yes                |

*Use distance is 200cm, Maximum Simultaneous transmission MPE Ratios for EDR+UHF:*

| Max MPE ratio EDR/Limit | Max MPE ratio UHF/Limit | ΣMPE ratios | Limit | Result |
|-------------------------|-------------------------|-------------|-------|--------|
| 0.00002                 | 0.87701                 | 0.87703     | 1     | PASS   |

EDR Antenna Gain: 1.58dBi, 1.44(numeric)

UHF Antenna Gain: 5.5dBi, 3.55(numeric)

Meet MPE requirements, then SAR evaluation is not required.