

## 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 1.1310(e)

| 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            | 50                       | 9.029           | 7.9965    | 0.00025                   | 1                           | Yes                |
| 2.4G WIFI  | 2437            | 50                       | 16.82           | 48.0839   | 0.00153                   | 1                           | Yes                |
| 5G WIFI B1 | 5210            | 50                       | 15.051          | 31.9963   | 0.00102                   | 1                           | Yes                |
| 5G WIFI B2 | 5775            | 50                       | 11.821          | 15.2090   | 0.00048                   | 1                           | Yes                |
| UHF        | 410.050         | 50                       | 30.827          | 1209.7622 | 0.06103                   | 0.2733                      | Yes                |

*Maximum Simultaneous transmission MPE Ratios for EDR+2.4G WIFI + UHF:*

| Max MPE ratio<br>BT4.1/Limit | Max MPE ratio<br>2.4G WIFI/Limit | Max MPE ratio<br>UHF/Limit | ΣMPE ratios | Limit | Result |
|------------------------------|----------------------------------|----------------------------|-------------|-------|--------|
| 0.00025                      | 0.00153                          | 0.2233                     | 0.22508     | 1     | PASS   |

BT&WIFI Antenna Gain: 0dBi, 1 (numeric)

UHF Antenna Gain: 2dBi, 1.58(numeric)

Then SAR evaluation is not required.