



## MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

### Limits for Maximum Permissive Exposure (MPE)

| Frequency Range<br>(MHz)                            | Electric Field<br>Strength (V/m) | Magnetic Field<br>Strength (A/m) | Power Density<br>(mW/cm <sup>2</sup> ) | Averaging Time<br>(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 equipment power density

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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## Maximum Permissible Exposure (MPE) Evaluation

BLE mode:

| CH | Frequency (MHz) | Peak Power Output (dBm) | Required Limit  |
|----|-----------------|-------------------------|-----------------|
| 0  | 2402            | -0.65                   | 1 Watt = 30 dBm |
| 20 | 2442            | -0.77                   | 1 Watt = 30 dBm |
| 39 | 2480            | -1.32                   | 1 Watt = 30 dBm |

BLE mode:

| CH | Frequency (MHz) | Avg. Power Output (dBm) | Required Limit  |
|----|-----------------|-------------------------|-----------------|
| 0  | 2402            | -2.79                   | 1 Watt = 30 dBm |
| 20 | 2442            | -2.91                   | 1 Watt = 30 dBm |
| 39 | 2480            | -3.33                   | 1 Watt = 30 dBm |

## MPE Prediction

Prediction of MPE limit at a given distance

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

$$S = PG / 4\pi R^2$$

Where: S = Power density    P = Power input to antenna

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

|                                                   |           |                       |
|---------------------------------------------------|-----------|-----------------------|
| Max. output power including tune-up tolerancel:   | -2.79     | (dBm)                 |
| Max. output power including tune-up tolerancel:   | 0.5260173 | (mW)                  |
| Duty cycle:                                       | 63.17     | (%)                   |
| Maximum Pav :                                     | 0.3322851 | (mW)                  |
| Peak Antenna gain (Maximum):                      | 3         | (dBi)                 |
| Peak Antenna gain (linear):                       | 1.9952623 | (numeric)             |
| Prediction distance:                              | 20        | (cm)                  |
| Prediction frequency:                             | 2402      | (MHz)                 |
| MPE limit for uncontrolled exposure at prediction | 1         | (mW/cm <sup>2</sup> ) |
| Power density at predication frequency at 20 (cm) | 0.000     | (mW/cm <sup>2</sup> ) |

## Measurement Result

The predicted power density level at 20 cm is 0 mW/cm<sup>2</sup>.

This is below the uncontrolled exposure limit of 1 mW/cm<sup>2</sup> at 2402MHz.

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