

## **MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

## **FCC 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 §2.1091 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

| Frequency Range                                     | Electric Field | Magnetic Field | Power Density          | Averaging Time |  |  |  |
|---|----------------|----------------|------------------------|----------------|--|--|--|
| (MHz)   | Strength (V/m) | Strength (A/m) | (mW/cm <sup>2</sup> )  | (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  | 300-1500 /     |                | f/1500                 | 30             |  |  |  |
| 1500-15000  | 1500-15000 /   |                | 1.0                    | 30             |  |  |  |

f = frequency in MHz

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<sup>\* =</sup> Plane-wave equipment power density



## **ISED Standard Applicable**

This submittal(s) (test report) is intended to comply with RSS-102 issue 5 Radio frequency Radiation Exposure requirement.

This is a Mobile device, the MPE is required.

Limits for Maximum Permissive Exposure (MPE)

| Frequency<br>Range<br>(MHz) | Electric Field<br>(V/m rms)   | Magnetic Field<br>Strength<br>(A/m rms) | Power Density<br>(W/m²) | Reference Period (minutes) |  |
|-----------------------------|-------------------------------|---|-------------------------|----------------------------|--|
| 0.003-10                    | 83                            | 90                                      | -                       | Instantaneous*             |  |
| 0.1-10                      | -                             | 0.73/ f                                 | -                       | 6**                        |  |
| 1.1-10                      | 87/ f <sup>0.5</sup>          | -                                       | 1                       | 6**                        |  |
| 10-20                       | 27.46                         | 0.0728                                  | 2                       | 6                          |  |
| 20-48                       | 58.07/ f <sup>0.25</sup>      | 0.1540/ f <sup>0.25</sup>               | 8.944/ f <sup>0.5</sup> | 6                          |  |
| 48-300                      | 22.06                         | 0.05852                                 | 1.291                   | 6                          |  |
| 300-6000                    | 3.142 f <sup>0.3417</sup>     | $0.008335 f^{0.3417}$                   | $0.02619f^{0.6834}$     | 6                          |  |
| 6000-15000                  | 61.4                          | 0.163                                   | 10                      | 6                          |  |
| 15000-150000                | 61.4                          | 0.163                                   | 10                      | 616000/ f <sup>1.2</sup>   |  |
| 150000-300000               | 0.158 <i>f</i> <sup>0.5</sup> | 4.21 x 10-4 f <sup>0.5</sup>            | 6.67 x 10-5 <i>f</i>    | 616000/ f <sup>1.2</sup>   |  |

F = frequency in MHz

Maximum Permissible Exposure (MPE) Evaluation

Prediction of MPE limit at a given distance

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

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

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<sup>\* =</sup> Based on nerve stimulation (NS).

<sup>\*\* =</sup> Based on specific absorption rate (SAR)



## **Power Density Calculation (Worst Case)**

| FCC       |                                  |    |       |                                 |       | ISED              |                |                             |               |                |
|-----------|----------------------------------|----|-------|---------------------------------|-------|-------------------|----------------|-----------------------------|---------------|----------------|
| Uneration | Evaluation<br>Frequency<br>(MHz) | •  | POWER | Output<br>Power<br>EIRP<br>(mW) | Power | Limit<br>(mW/cm2) | Pass /<br>Fail | Power<br>Density<br>(W/cm2) | 1/ \/\//cm^2\ | Pass<br>/ Fail |
| BT        | 2480.00                          | 20 | 6.11  | 4.08                            | 0.001 | 1.000             | Pass           | 0.008                       | 5.469         | Pass           |

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