

## FCC §15.247 (i), §2.1091 – RF Exposure

FCC ID: 2BMDI-SP30-PRO-SE

### Applied procedures / limit

According to FCC §15.247(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

### 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 Time  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                                                                |
| 1500-100,000          |                                   |                                   | 5                                        | 6                                                                |

Note: f is frequency in MHz

\* = Power density limit is applicable at frequencies greater than 100 MHz

### 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 Time  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                                                               |
| 1500-100,000          |                                   |                                   | 1.0                                      | 30                                                               |

Note: f = frequency in MHz

\* = Plane-wave equivalent power density

## MPE PREDICTION

Predication of MPE limit at a given distance, Equation from 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, R=20cm

## Test Result of RF Exposure Evaluation

|             | Tune up<br>Produce<br>power | Maximum<br>peak<br>output<br>power<br>(dBm) | Output<br>power<br>to<br>antenna<br>(mW) | Antenna<br>Gain<br>(numeric) | Power<br>Density<br>(S)<br>(mW/<br>cm <sup>2</sup> ) | Limit<br>(mW /<br>cm <sup>2</sup><br>) | Result |
|-------------|-----------------------------|---------------------------------------------|------------------------------------------|------------------------------|------------------------------------------------------|----------------------------------------|--------|
| EDR         | 6±1                         | 7                                           | 5.0119                                   | 1.4322<br>(1.56dBi)          | 0.0014                                               | 1                                      | Pass   |
| BLE         | -1±1                        | 0                                           | 1                                        | 1.4322<br>(1.56dBi)          | 0.0003                                               | 1                                      | Pass   |
| 2.4GWIFI    | 14±1                        | 15                                          | 31.6228                                  | 1.4322<br>(1.56dBi)          | 0.009                                                | 1                                      | Pass   |
| LTE BAND 2  | 23±1                        | 24                                          | 251.188<br>6                             | 1.349<br>(1.3dBi)            | 0.0674                                               | 1                                      | Pass   |
| LTE BAND 4  | 24±1                        | 25                                          | 316.227<br>8                             | 1.2882<br>(1.1dBi)           | 0.081                                                | 1                                      | Pass   |
| LTE BAND 5  | 23±1                        | 24                                          | 251.188<br>6                             | 1.1482<br>(0.6dBi)           | 0.0574                                               | 0.6                                    | Pass   |
| LTE BAND 7  | 23±1                        | 24                                          | 251.188<br>6                             | 1.4454<br>(1.6dBi)           | 0.072                                                | 1                                      | Pass   |
| LTE BAND 25 | 23±1                        | 24                                          | 251.188<br>6                             | 1.349<br>(1.3dBi)            | 0.0674                                               | 1                                      | Pass   |
| LTE BAND 26 | 23±1                        | 24                                          | 251.188<br>6                             | 1.1482<br>(0.6dBi)           | 0.0574                                               | 0.5                                    | Pass   |
| LTE BAND 38 | 23±1                        | 24                                          | 251.188<br>6                             | 1.4125<br>(1.5dBi)           | 0.0706                                               | 1                                      | Pass   |
| LTE BAND 41 | 23±1                        | 24                                          | 251.188<br>6                             | 1.4454<br>(1.6dBi)           | 0.072                                                | 1                                      | Pass   |
| GSM850      | 34±1                        | 35                                          | 3162.27<br>77                            | 1.1482<br>(0.6dBi)           | 0.7227                                               | 0.5                                    | Pass   |

|              |            |    |               |                    |        |     |      |
|--------------|------------|----|---------------|--------------------|--------|-----|------|
| GSM1900      | $30 \pm 1$ | 31 | 1258.92<br>54 | 1.349<br>(1.3dBi)  | 0.338  | 1   | Pass |
| WCDMA Band 5 | $23 \pm 1$ | 24 | 251.188<br>6  | 1.1482<br>(0.6dBi) | 0.0574 | 0.5 | Pass |
| WCDMA Band 4 | $23 \pm 1$ | 24 | 251.188<br>6  | 1.2882<br>(1.1dBi) | 0.0644 | 1   | Pass |
| WCDMA Band 2 | $23 \pm 1$ | 24 | 251.188<br>6  | 1.349<br>(1.3dBi)  | 0.0674 | 1   | Pass |