

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

FCC ID: 2A9VX-X3

### 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 | Maximu<br>m 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>cm2) | Limit<br>(mW<br>/<br>cm2<br>) | Result |
|------------------------------------|-----------------------------|--|--|------------------------------|---|-------------------------------|--------|
| BLE<br>GFSK& LCH                   | 0±1                         | 1  | 1.2589                                   | 0.6457<br>(-1.9dBi)          | 0.00016                                 | 1                             | Pass   |
| EDR<br>8DPSK &HCH                  | 3±1                         | 4  | 2.5119                                   | 0.6457<br>(-1.9dBi)          | 0.00032                                 | 1                             | Pass   |
| 2.4G<br>WIFI<br>802.11g&2437       | 14±1                        | 15   | 31.6228                                  | 1.0069<br>(0.03dBi)          | 0.00634                                 | 1                             | Pass   |
| 5.2GWIFI<br>802.11n(HT20)&<br>5240 | 14±1                        | 15   | 31.6228                                  | 1.8836<br>(2.75dBi)          | 0.01186                                 | 1                             | Pass   |
| 5.8GWIFI<br>802.11n(HT20)&<br>5825 | 14±1                        | 15   | 31.6228                                  | 0.7674<br>(-1.15dBi)         | 0.00483                                 | 1                             | Pass   |

BT+WIFI supported simultaneous transmission:

EDR+2.4GWIFI MIMO :  $\Sigma$  MPE Ratio =0.00032+0.00634=0.00666 $\leq$ 1, So passed.

EDR+5GWIFI MIMO:  $\Sigma$  MPE Ratio =0.00032+0.01186=0.01218 $\leq$ 1, So passed.