



April 29, 2016

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Attention: Director of Certification

**RE: Analysis of RF Exposure for Portable and Mobile use per KDB 447498 D01 Mobile Portable RF Exposure v05r02 and RSS-102 Issue 5 March 2015.**

FCC ID: XM5-SMG2SMT

## 1. Limits

Limits for General Population/Uncontrolled Exposure (Title 47 Subpart J §2.1091 and KDB 447498 D01 referring to limits under §1.1310)

| Frequency Range<br>(MHz) | Electric Field<br>Strength (E)<br>(V/m) | Electric Field<br>Strength (H)<br>(A/m) | Power Density<br>(S)<br>(mW/cm <sup>2</sup> ) | Averaging Time<br>(minutes) |
|--------------------------|---|---|---|-----------------------------|
| 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 - 100,000           | -                                       | -                                       | 1.0   | 30                          |

*f* = frequency in MHz

*\*Plane-wave equivalent power density*



**2. Mobile MPE Calculation Summary using a 20cm separation distance:**

| Mode (Worst Case)        | Output Power | Power Density (mW/cm <sup>2</sup> ) |
|--------------------------|--------------|-------------------------------------|
| Mobile Satellite Service | 2.93 watt    | 0.3696                              |
| WLAN                     | 0.0794 watt  | 0.0354                              |

**3. Simultaneous Transmission MPE:**

| Transmitter type                   | MPE (mW/cm <sup>2</sup> ) | FCC Limit (mW/cm <sup>2</sup> ) | FCC MPE ratio (MPE/Limit) |
|------------------------------------|---------------------------|---------------------------------|---------------------------|
| Mobile Satellite Service           | 0.3696                    | 1                               | 0.3696                    |
| WLAN                               | 0.0354                    | 1                               | 0.0354                    |
| Sum of the ratios (should be <1.0) |                           |                                 | 0.405                     |



#### 4. Mobile MPE Calculation using a 100cm separation distance (Mobile Satellite Service):

Using Power Density formula:

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to isotropic

R = distance to the center of radiation of the antenna

|  |          |                       |
|--|----------|-----------------------|
| Maximum peak output power at antenna input terminal:             | 34.67    | (dBm)                 |
| Maximum peak output power at antenna input terminal:             | 2930.89  | (mW)                  |
| Antenna gain(typical):   | 12       | (dBi)                 |
| Maximum antenna gain:  | 15.849   | (numeric)             |
| Prediction distance:   | 100      | (cm)                  |
| Source Based Time Average Duty Cycle:                            | 100      | (%)                   |
| Prediction frequency:  | 1643.482 | (MHz)                 |
| FCC MPE limit for uncontrolled exposure at prediction frequency: | 1.0      | (mW/cm <sup>2</sup> ) |
| Power density at prediction frequency:                           | 0.3696   | (mW/cm <sup>2</sup> ) |
| Power density at prediction frequency:                           | 3.696    | (W/m <sup>2</sup> )   |
| FCC Margin of Compliance:  | -4.32    | (dB)                  |



**5. Mobile MPE Calculation using a 20cm separation distance (WLAN):**

|  |         |                       |
|--|---------|-----------------------|
| Maximum peak output power at antenna input terminal:             | 19.0    | (dBm)                 |
| Maximum peak output power at antenna input terminal:             | 79.43   | (mW)                  |
| Antenna gain(typical):   | 3.5     | (dBi)                 |
| Maximum antenna gain:  | 2.239   | (numeric)             |
| Prediction distance:   | 20      | (cm)                  |
| Source Based Time Average Duty Cycle:                            | 100     | (%)                   |
| Prediction frequency:  | 2412    | (MHz)                 |
| FCC MPE limit for uncontrolled exposure at prediction frequency: | 1.000   | (mW/cm <sup>2</sup> ) |
| Power density at prediction frequency:                           | 0.03538 | (mW/cm <sup>2</sup> ) |
| Power density at prediction frequency:                           | 0.354   | (W/m <sup>2</sup> )   |
| FCC Margin of Compliance:  | -14.51  | (dB)                  |

Sincerely,

  
Alex Chang

Name

Authorized Signatory

Title: Senior EMC/Wireless Test Engineer