

# RF EXPOSURE

FCC ID : 2BLHGNPKDT241  
IC : 33139-NPKDT241

## 1. Regulation

The SAR exclusion table from RSS-102 issue 6 is reproduced below:

Table 11: Power limits for exemption from routine SAR evaluation based on the separation distance

| Frequency<br>(MHz) | Exemption Limits |               |               |               |               |
|--------------------|------------------|---------------|---------------|---------------|---------------|
|                    | ≤ 5 mm<br>(mW)   | 10 mm<br>(mW) | 15 mm<br>(mW) | 20 mm<br>(mW) | 25 mm<br>(mW) |
| ≤300               | 45               | 116           | 139           | 163           | 189           |
| 450                | 32               | 71            | 87            | 104           | 124           |
| 835                | 21               | 32            | 41            | 54            | 72            |
| 1900               | 6                | 10            | 18            | 33            | 57            |
| 2450               | 3                | 7             | 16            | 32            | 56            |
| 3500               | 2                | 6             | 15            | 29            | 50            |
| 5800               | 1                | 5             | 13            | 23            | 32            |

| Frequency<br>(MHz) | Exemption Limits |               |               |               |                 |
|--------------------|------------------|---------------|---------------|---------------|-----------------|
|                    | 30 mm<br>(mW)    | 35 mm<br>(mW) | 40 mm<br>(mW) | 45 mm<br>(mW) | > 50 mm<br>(mW) |
| ≤300               | 216              | 246           | 280           | 319           | 362             |
| 450                | 147              | 175           | 208           | 248           | 296             |
| 835                | 96               | 129           | 172           | 228           | 298             |
| 1900               | 92               | 138           | 194           | 257           | 323             |
| 2450               | 89               | 128           | 170           | 209           | 245             |
| 3500               | 72               | 94            | 114           | 134           | 158             |
| 5800               | 41               | 54            | 74            | 102           | 128             |

## RF EXPOSURE

KDB447498 was used as the guidance.

### SAR test exclusion considerations

**Step.1 For 100 MHz to 6 GHz and test separation distances  $\leq 50$  mm, the 1-g and 10-g SAR test exclusion threshold are determined by the following :**

**$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})]}{\sqrt{f(\text{GHz})}} \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR}$$**

**Step.2** For 100 MHz to 6 GHz and test separation distances  $> 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following

**Step.2-1**  $\{[\text{Power allowed at numeric threshold for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot (f(\text{MHz})/150)]\}$  mW, for 100 MHz to 1500 MHz

**Step.2-2**  $\{[\text{Power allowed at numeric threshold for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \cdot 10]\}$  mW, for  $> 1500$  MHz and  $\leq 6$  GHz

where

$f(\text{GHz})$  is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

The result is rounded to one decimal place for comparison

The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

## SAR test exclusion considerations : Bluetooth LE

- Frequency Range : 2 402 MHz ~ 2 480 MHz
- Measured RF Maximum Output Power : -7.65 dBm
- Target Power & Tolerance -8.50 dBm &  $\pm$  1.00 dB  
( Maximum : -7.50 dBm & Minimum : -9.50 dBm )
- Maximum Output Power for the Calculation : -7.50 dBm

The EUT will only be used with a separation of 5 millimeters between the antenna and the body of the The MPE calculation for this exposure is shown below.

|                                                                                                              |                                                                                     |
|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| - EIRP = P + G<br><br>= <u>-7.50</u> dBm + <u>2.50</u> dBi<br><br>= <u>-5.00</u> dBm<br><br>= <u>0.32</u> mW | - NOTE<br><br>P : Max tuneup Power (dBm)<br><br>G : Maximum Peak Antenna Gain (dBi) |
|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|

|                                                |                                          |
|------------------------------------------------|------------------------------------------|
| - P = <u>-7.50</u> dBm<br><br>= <u>0.18</u> mW | - NOTE<br><br>P : Max tuneup Power (dBm) |
|------------------------------------------------|------------------------------------------|

### Power Density at the specific separation

|                                                                                                                                            |                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| - S = $[(P(\text{mW}) / R)] \times [\sqrt{f(\text{GHz})}]$<br><br>= $[( 0.18 / 5.00 )] \times [ \sqrt{( 2.48 )} ]$<br><br>= 0.056 01 < 3.0 | - NOTE<br><br>S : Maximum Estimated SAR<br><br>P(mW) : Max tuneup Power (mW)<br><br>R : Distance to the center of the radiation of the antenna ( <u>5.00</u> mm )<br><br>f(GHz) : the RF channel transmit frequency in GHz |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|