



## RF Exposure Evaluation for FCC:

## SAR Test Exclusion Calculations

## FCC: According to 447498 D04 Interim General RF Exposure Guidance v01.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold  $P_{th}$  (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{th}$  is given by Formula (B.2).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B.2})$$

where

$$x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and  $f$  is in GHz,  $d$  is the separation distance (cm), and  $ERP_{20 \text{ cm}}$  is per Formula (B.1).

The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

| Frequency (MHz) | Distance (mm) |    |    |     |     |     |     |     |     |     |
|-----------------|---------------|----|----|-----|-----|-----|-----|-----|-----|-----|
|                 | 5             | 10 | 15 | 20  | 25  | 30  | 35  | 40  | 45  | 50  |
| 300             | 39            | 65 | 88 | 110 | 129 | 148 | 166 | 184 | 201 | 217 |
| 450             | 22            | 44 | 67 | 89  | 112 | 135 | 158 | 180 | 203 | 226 |
| 835             | 9             | 25 | 44 | 66  | 90  | 116 | 145 | 175 | 207 | 240 |
| 1900            | 3             | 12 | 26 | 44  | 66  | 92  | 122 | 157 | 195 | 236 |
| 2450            | 3             | 10 | 22 | 38  | 59  | 83  | 111 | 143 | 179 | 219 |
| 3600            | 2             | 8  | 18 | 32  | 49  | 71  | 96  | 125 | 158 | 195 |
| 5800            | 1             | 6  | 14 | 25  | 40  | 58  | 80  | 106 | 136 | 169 |





For BLE

| Bluetooth LE (1Mbps)                                                                                                                                                     |                             |                          |         |                                    |                                                  |                                              |                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------|---------|------------------------------------|--------------------------------------------------|----------------------------------------------|-------------------------------|
| Frequency<br>(GHz)                                                                                                                                                       | Conducted<br>Power<br>(dBm) | Antenna<br>gain<br>(dBi) | E.I.R.P | Turn-up Power<br>Tolerance<br>(dB) | Max<br>power of<br>tune up<br>tolerance<br>(dBm) | Max power of<br>tune up<br>tolerance<br>(mW) | Limit<br>P <sub>th</sub> (mW) |
| 2402                                                                                                                                                                     | 3.13                        | 0                        | 3.13    | 3±1                                | 4                                                | 2.512                                        | 3                             |
| 2440                                                                                                                                                                     | -0.79                       | 0                        | -0.79   | 0±1                                | 1                                                | 1.259                                        | 3                             |
| 2480                                                                                                                                                                     | 0.2                         | 0                        | 0.2     | 0±1                                | 1                                                | 1.259                                        | 3                             |
| The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 D04, No SAR is required. |                             |                          |         |                                    |                                                  |                                              |                               |