

## RF Exposure evaluation

### FCC ID: 2ASIQ-BONELF-X

According to 447498 D01 General RF Exposure Guidance v06

#### 4.3. General SAR test exclusion guidance

##### 4.3.1. Standalone SAR test exclusion considerations

- a) For 100 MHz to 6 GHz and test separation distances  $\leq 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following: [(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)]  $\cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR, and  $\leq 7.5$  for 10-g extremity SAR,<sup>30</sup> 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<sup>31</sup>
- 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.

<sup>30</sup> This is equivalent to the formula written as: [(max. power of channel, including tune-up tolerance, mW)/(60/ $\sqrt{f(\text{GHz})}$  mW)]  $\cdot [20 \text{ mm}/(\text{min. test separation distance, mm})] \leq 1.0$  for 1-g SAR; also see Appendix A for approximate exclusion threshold numerical values at selected frequencies and distances.

$$\text{eirp} = \text{pt} \times \text{gt} = (\text{EXd})^2/30$$

where:

pt = transmitter output power in watts,

gt = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, ---  $10((\text{dBuV/m})/20)/10^6$

d = measurement distance in meters (m)---3m

So  $\text{pt} = (\text{EXd})^2/30 \times \text{gt}$

## RF Exposure evaluation

Copied from the FCC test report: clause 9.4 Maximum Peak Output Power

### Test Result:

For BLE:

| Test Mode | Frequency<br>MHz | Reading<br>dBm | Output Power<br>mW | Limit<br>mW |
|-----------|------------------|----------------|--------------------|-------------|
| GFSK(BLE) | 2402             | -4.43          | 0.36               | 1000        |
|           | 2442             | -2.30          | 0.59               | 1000        |
|           | 2480             | -1.83          | 0.66               | 1000        |

*Note: the antenna gain of 0.6dB less than 6dBi maximum permission antenna gain value based on 1 watt peak output power limit.*

Then we choose Normal mode channel as the worst case of Maximum Peak Output Power:

| Test Mode | Frequency<br>MHz | Reading<br>dBm | Output Power<br>mW | Limit<br>mW |
|-----------|------------------|----------------|--------------------|-------------|
| GFSK(BLE) | 2402             | -4.43          | 0.36               | 1000        |
|           | 2442             | -2.30          | 0.59               | 1000        |
|           | 2480             | -1.83          | 0.66               | 1000        |

$EIRP/ \text{dBm} = \text{Conducted Max Output Power/ dBm} + \text{Antenna gain /dBi}.$

General RF Exposure:

$(0.41\text{mW}) / 5.0\text{mm} \times \sqrt{2.402 \text{ GHz}} = 0.13$

$(0.68\text{mW}) / 5.0\text{mm} \times \sqrt{2.442 \text{ GHz}} = 0.21$

$(0.75\text{mW}) / 5.0\text{mm} \times \sqrt{2.480 \text{ GHz}} = 0.24$

SAR requirement:  $S=3.0$

General RF Exposure  $< 3$

Then SAR evaluation is not required