

## RF EXPOSURE EVALUATION

### EUT Specification

| EUT                        | RF model                                                                                                                                                                                                                                  |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Model Name                 | QB01-433RX-01                                                                                                                                                                                                                             |
| Frequency band (Operating) | <input type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz<br><input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz<br><input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz<br><input checked="" type="checkbox"/> Others(433.92MHz) |
| Device category            | <input checked="" type="checkbox"/> Portable (<20cm separation)<br><input type="checkbox"/> Mobile (>20cm separation)<br><input type="checkbox"/> Others ____                                                                             |
| Antenna diversity          | <input checked="" type="checkbox"/> Single antenna<br><input type="checkbox"/> Multiple antennas<br><input type="checkbox"/> Tx diversity<br><input type="checkbox"/> Rx diversity<br><input type="checkbox"/> Tx/Rx diversity            |
| Max. output power          | 79.86 dBuV/m (-15.398dBm)(0.0289mW)                                                                                                                                                                                                       |
| Antenna gain               | -1 dBi                                                                                                                                                                                                                                    |
| Evaluation applied         | <input type="checkbox"/> MPE Evaluation<br><input checked="" type="checkbox"/> SAR Evaluation                                                                                                                                             |

## Standard Requirement

### Portable Device

According to §15.247(i) and §1.1307b(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 levels in excess of the Commission's guidelines. See KDB 447498 D01 General RF Exposure Guidance V6, section 4.3.1.

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR,<sup>16</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>17</sup>
- The result is rounded to one decimal place for comparison

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 is applied to determine SAR test exclusion.

## Measurement Result

| Channel Frequency (MHz) | Max Output power (dBm) | Max tune-up tolerance Output power (dBm) | Max Output power (mW) | Calculation Value <sup>(Note 1)</sup> | Threshold Value |
|-------------------------|------------------------|------------------------------------------|-----------------------|---------------------------------------|-----------------|
| 433.92                  | -15.398                | -15.398±1                                | 0.0363                | 0.0048                                | 3.0             |

$$E = \text{EIRP} - 20\log D + 104.8$$

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

$$\text{EIRP} = E - 104.8 + 20\log D = 79.86 - 104.8 + 20\log 3 = -15.398\text{dbm}$$

Note 1: Calculation Value = [(max. power of channel, mW)/(min. test separation distance, mm)] • [√f(GHz)].

$$\text{Fox example: } 0.0363/5 \cdot \sqrt{0.43392} = 0.0048 \leq 3.0$$

**According to KDB447498 D01 V6, threshold at which no SAR required is ≤3.0 for 1-g SAR, separation distance is 5mm, and no simultaneous SAR measurement is required.**

### Standard Applicable

According to 2.1093 this is a portable device. According to KDB 447498 D01 V6, Appendix A SAR test exclusion thresholds for below table, the power level 22mW at 5mm.

| MHz  | 5  | 10 | 15  | 20  | 25  | mm                                |
|------|----|----|-----|-----|-----|-----------------------------------|
| 150  | 39 | 77 | 116 | 155 | 194 | SAR Test Exclusion Threshold (mW) |
| 300  | 27 | 55 | 82  | 110 | 137 |                                   |
| 450  | 22 | 45 | 67  | 89  | 112 |                                   |
| 835  | 16 | 33 | 49  | 66  | 82  |                                   |
| 900  | 16 | 32 | 47  | 63  | 79  |                                   |
| 1500 | 12 | 24 | 37  | 49  | 61  |                                   |
| 1900 | 11 | 22 | 33  | 44  | 54  |                                   |
| 2450 | 10 | 19 | 29  | 38  | 48  |                                   |
| 3600 | 8  | 16 | 24  | 32  | 40  |                                   |
| 5200 | 7  | 13 | 20  | 26  | 33  |                                   |
| 5400 | 6  | 13 | 19  | 26  | 32  |                                   |
| 5800 | 6  | 12 | 19  | 25  | 31  |                                   |

### Measurement Result:

This is a portable device and the Max. peak output power is -15.398dBm(0.0289mW) lower than low threshold 22mW at 5mm in general population category;  
The SAR measurement is not necessary.