

RF Exposure Requirements

Product Description: Bluetooth / NFC Reader

Model No.: BTH122-8K, REAKBLENFVCV2-LB-SG, REABLENFVCV2-LB-SG, BTH122-8N, BTH122-9N, BTH122-9K

FCC ID: 2ASPO-BTH122-8K

According to the KDB 447498 D01 v06 section 4.3.1 a), 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:

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

- $f(\text{GHz})$ 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

According to the KDB 447498 D01 V06, 4.3.1 c), for frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):

- 1) For test separation distances > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by $[1 + \log(100/f(\text{MHz}))]$
 - 2) For test separation distances ≤ 50 mm, the power threshold determined by the equation in c)
 - 1) for 50 mm and 100 MHz is multiplied by 1/2
 - 3) SAR measurement procedures are not established below 100MHz.
- Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison

Calculation Result:

Bluetooth

Tx frequency range: 2402-2480MHz

Min. test separation distance: 5mm

Maximum Conducted Output Power: 3.44dBm

Tune-Up output power: 4.0dBm

RF channel transmit frequency: 2402MHz

Result: 0.0195

Limit: 3.0

NFC

Tx frequency range: 13.56MHz

Min. test separation distance: 5mm

Max. Field Strength: 62.16dBuV/m @3m

$EIRP = E - 104.8 + 20 \log D = 62.16 - 104.8 + 20 \log 3 = -33.09 \text{ dBm}$

Maximum Conducted Output Power: -33.09 dBm

Tune-Up output power: -33.0dBm

RF channel transmit frequency: 13.56MHz

Max. Power (mW): 0.0005

Limit(mW): 237

SRD

Tx frequency range: 125kHz

Min. test separation distance: 5mm

Max. Field Strength: 82.58dBuV/m @3m

$EIRP = E - 104.8 + 20 \log D = 82.58 - 104.8 + 20 \log 3 = -12.68 \text{ dBm}$

Maximum Conducted Output Power: -12.68 dBm

Tune-Up output power: -12.0dBm

RF channel transmit frequency: 125kHz

Max. Power (mW): 0.0540

Limit(mW): 474

Mode for Simultaneous Multi-band Transmission

The worst case is Bluetooth + NFC + SRD

Evaluation Result: $0.0195/3 + 0.0005/237 + 0.0540/474 = 0.0066$

Limit: 1

Result: Pass

So the transmitter complies with the RF exposure requirements and the SAR is not required.