

RF Exposure evaluation

Product Description: Active Subwoofer with Bluetooth

Model Number: SWA8-6BT

FCC ID: WBQ-AQSWA86BT

According to 447498 D01 General RF Exposure Guidance v05 The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 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 ≤ 7.5 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

According to the follow transmitter output power (P_t) formula:

$$P_t = (E \times d)^2 / (30 \times g_t)$$

P_t =transmitter output power in watts

g_t =numeric gain of the transmitting antenna (unitless)

E =electric field strength in V/m

d =measurement distance in meters (m)

According to the formula described above:

For PCB Antenna:

$$E_{\text{max}} = \underline{93.29} \text{ dBuV/m} = \underline{0.046} \text{ V/m}, d=3\text{m}, g_t=1.41$$

$$P_t = (E \times d)^2 / (30 \times g_t) = (0.046 \times 3)^2 / (30 \times 1.41) = \underline{0.00045021 \text{ W}} = \underline{0.45 \text{ mW}}$$

The result is rounded to one decimal place for comparison

Worse case is as below: [2402MHz -0.45mW output power]

$$(0.45 \text{ mW} / 5 \text{ mm}) \cdot [\sqrt{2.402(\text{GHz})}] = \underline{0.14 \text{ mW}} < 3.0 \text{ for 1 - g SAR}$$

Then SAR evaluation is not required

For External Antenna + PCB Antenna:

$$E_{\text{max}} = \underline{93.34} \text{ dBuV/m} = \underline{0.046} \text{ V/m}, d=3\text{m}, g_t=1.41$$

$$P_t = (E \times d)^2 / (30 \times g_t) = (0.046 \times 3)^2 / (30 \times 1.41) = \underline{0.00045021 \text{ W}} = \underline{0.45 \text{ mW}}$$

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NOTE: For the maximum power, you can refer FCC test report.