

RF Exposure evaluation

Product Description: Open-Source Sensor Beacon

Model Number: RuuviTag

FCC ID: AKDDRUIVITAG

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:

$$E_{\text{max}} = 97.38 \text{ m} = 0.074 \text{ V/m}, d = 3 \text{ m}, g_t = 1$$

$$P_t = (E \times d)^2 / (30 \times g_t) = (0.074 \times 3)^2 / (30 \times 1) = 0.0016428 \text{ W} = 1.64 \text{ mW}$$

The result is rounded to one decimal place for comparison

Worse case is as below: [2480MHz -1.64mW output power]

$$(1.64 \text{ mW} / 5 \text{ mm}) \cdot [\sqrt{2.480(\text{GHz})}] = 0.52 \text{ mW} < 3.0 \text{ for } 1 - \text{g SAR}$$

Then SAR evaluation is not required

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