

RF Exposure evaluation

Product Description: Bluetooth FM Transmitter

Model Number: BH194A

FCC ID: 2AIL4-BH194A

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 (Pt) 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 BT Mode:

$$E_{\text{max}} = \underline{92.92} \text{ dBuV/m} = \underline{0.044} \text{ V/m}, d=3\text{m}, g_t=1.32$$

$$P_t = (E \times d)^2 / (30 \times g_t) = (\underline{0.044} \times 3)^2 / (30 \times 1.32) = \underline{0.00044} \text{ W} = \underline{0.44} \text{ mW}$$

The result is rounded to one decimal place for comparison

Worse case is as below: [2480MHz **-0.44mW** output power]

$$(\underline{0.44} \text{ mW} / 5\text{mm}) \cdot [\sqrt{2.480(\text{GHz})}] = \underline{0.139} \text{ mW} < 3.0 \text{ for 1 - g SAR}$$

Then SAR evaluation is not required

For FM Mode:

$$E_{\text{max}} = \underline{46.57} \text{ dBuV/m} = \underline{0.000213} \text{ V/m}, d=3\text{m}, g_t=1.32$$

$$P_t = (E \times d)^2 / (30 \times g_t) = (\underline{0.000213} \times 3)^2 / (30 \times 1.32) = \underline{0.00000001} \text{ W} = \underline{0.01} \text{ mW}$$

The result is rounded to one decimal place for comparison

Worse case is as below: [2480MHz **-0.01mW** output power]

$$(\underline{0.01} \text{ mW} / 5\text{mm}) \cdot [\sqrt{0.0881(\text{GHz})}] = \underline{0.0006} \text{ mW} < 3.0 \text{ for 1 - g SAR}$$

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Then SAR evaluation is not required

Simultaneous transmission between Bluetooth and FM transmitter
[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] • [√ f(GHz)/x] W/kg, for test separation distances ≤ 50 mm;
where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

$$\text{SAR} = (0.139 + 0.0006) / 7.5 = 0.019 \text{ W/kg} < 1.6 \text{ W/kg}$$

So the SAR evaluation is not required.

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

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