

RF Exposure evaluation

According to 447498 D01 General RF Exposure Guidance v06

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

The result is rounded to one decimal place for comparison

$$\text{eirp} = \text{pt} \times \text{gt} = (\text{E} \times \text{d})^2 / 30$$

where:

pt = transmitter output power in watts,

gt = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, --- $10^{((\text{dBuV/m})/20)}/10^6$

d = measurement distance in meters (m)---3m

$$\text{So pt} = (\text{E} \times \text{d})^2 / (30 \times \text{gt})$$

Worse case is as below:

Bluetooth:

Field strength = 94.93 dBuV/m @3m

Ant gain 1 dBi; so Ant numeric gain=1.26

$$\text{So pt} = \{ [10^{(94.93/20)} / 10^6 \times 3]^2 / (30 \times 1.26) \} \times 1000 \text{mW} = 0.74 \text{mW}$$

$$\text{So } (0.74 \text{mW} / 5 \text{mm}) \times \sqrt{2.480 \text{GHz}} = 0.233 < 3.0 \text{ for 1-g SAR}$$

WiFi:

[2462 MHz 7.93dBm (6.21 mW) output power]

$$(6.21 \text{mW} / 5 \text{mm}) \cdot [\sqrt{2.462 \text{GHz}}] = 2.0 < 3.0 \text{ for 1-g SAR}$$

Bluetooth and WiFi cannot transmit at the same time.

Then SAR evaluation is not required.