

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:

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

$f(\text{GHz})$ 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

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

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

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

Worse case is as below:

[2402MHz: -9.278dBm(0.118mW) output power]

$$(0.118\text{mW} / 5\text{mm}) \cdot [\sqrt{2.402 \text{ (GHz)}}] = 0.037 < 3.0 \text{ for 1-g SAR}$$

For Worst case Mode: 107.9MHz

Field strength =41.96dBuV/m @3m

Ant gain 0 dBi; so Ant numeric gain=1

$$\text{So pt} = \{ [10^{(41.96/20)}/10^6 \times 3]^2 / 30 \times 1 \} \times 1000 \text{ mW} = 0.0000047 \text{ mW}$$

$$\text{So } (0.0000047 \text{ mW}/5\text{mm}) \times \sqrt{0.1079 \text{ GHz}} = 0.0000096 < 3$$

Bluetooth and FM can transmit at the same time:

$$0.037 + 0.0000096 = 0.0370096 < 3$$

Then SAR evaluation is not required