

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:

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

$f(\text{GHz})$ 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.

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

where:

p_t = transmitter output power in watts,

g_t = 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.

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

Worse case is as below:

Field strength = 72.99 dBuV/m @3m

Ant gain 1.98 dBi; so Ant numeric gain=1.58

$$\text{So } p_t = \{ [10^{(72.99/20)/10^6} \times 3]^2 / (30 \times 1.58) \} \times 1000 \text{ mW} = \underline{0.004 \text{ mW}}$$

$$\text{So } (0.004 \text{ mW} / 5 \text{ mm}) \times \sqrt{2.482 \text{ GHz}} = \underline{0.001} < 3.0 \text{ for 1-g SAR}$$

Then SAR evaluation is not required.