

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

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

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

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

For Worst case Mode: 433.92MHz.

Field strength =61.62 dBuV/m @3m

Ant gain 3 dBi; so Ant numeric gain=2

$$\text{So pt} = \{ [10^{(61.62/20)}/10^6 \times 3]^2 / (30 \times 2) \} \times 1000 \text{ mW} = 0.0002 \text{ mW}$$

$$\text{So } (0.0002\text{mW}/5\text{mm}) \times \sqrt{0.43392 \text{ GHz}} = 0.00003 < 3.0$$

For Worst case mode: 2.4GHz WLAN

Mode	f (GHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold	SAR Test Exclusion
			dBm	mW		
2.4G WLAN	2.412	5	9.31	8.53	2.67 < 3.0	Yes

433.92MHz and 2.4GHz WLAN can transmit at the same time:

$$\text{so, } 2.67 + 0.00003 = 2.67 < 3.0$$

Then SAR evaluation is not required