

RF EXPOSURE EVALUATION METHOD**SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm**

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

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

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

2.4GWIFI

frequency	Maximum Peak Conducted Output Power	Max Antenna Gain
GHz	dBm	dBi
2412	8.746	1.0
2437	8.798	1.0
2462	8.530	1.0

5GWIFI

frequency	Maximum Peak Conducted Output Power	Max Antenna Gain
GHz	dBm	dBi
5745	10.01	1.0
5785	10.07	1.0
5825	10.05	1.0

For BT mode

Field strength = 92.90dBuV/m @3m

Ant gain =1.0dBi, so Ant numeric gain=1.26

So $pt = \{ [10^{(92.90/20)} / 10^6 \times 3]^2 / 30 \times 1.26 \} \times 1000 \text{ mW} = 0.737 \text{ mW}$

So $(0.737 \text{ mW} / 5 \text{ mm}) \times \sqrt{2.402} = 0.228 < 3$

For BLE mode

Field strength = 95.36dBuV/m @3m

Ant gain =1.0dBi, so Ant numeric gain=1.26

So $pt = \{ [10^{(95.36/20)} / 10^6 \times 3]^2 / 30 \times 1.26 \} \times 1000 \text{ mW} = 0.831 \text{ mW}$

So $(0.831 \text{ mW} / 5 \text{ mm}) \times \sqrt{2.402} = 0.258 < 3$

IEEE 802.11b

max possible output power (PK,conducted) : $8 \pm 1 \text{ dbm}$

1.0dBi logarithmic terms convert to numeric result is nearly 1.26

9dbm=7.94mW

2412MHz

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation})]$

$$\text{distance,mm})] \cdot [\sqrt{f(\text{GHz})}] = 7.94/5 \cdot \sqrt{2.412} = 2.46 \leq 3.0$$

Threshold at which no SAR required is 10mw and ≤ 3.0 for 1-g SAR, Separation distance is 5mm.

2437MHz

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance,mm})] \cdot [\sqrt{f(\text{GHz})}] = 7.94/5 \cdot \sqrt{2.437} = 2.47 \leq 3.0$$

Threshold at which no SAR required is 10mw and ≤ 3.0 for 1-g SAR, Separation distance is 5mm.

2462MHz

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance,mm})] \cdot [\sqrt{f(\text{GHz})}] = 7.94/5 \cdot \sqrt{2.462} = 2.49 \leq 3.0$$

Threshold at which no SAR required is 10mw and ≤ 3.0 for 1-g SAR, Separation distance is 5mm.

IEEE 802.11a

max possible output power (PK,conducted) : $6 \pm 1\text{dbm}$

1.0dBi logarithmic terms convert to numeric result is nearly 1.26

7dbm=5.01mW

5745MHz

$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance,mm})] \cdot [\sqrt{f(\text{GHz})}]}{5} = \frac{5.01/5 \cdot \sqrt{5.745}}{1} = 2.40 \leq 3.0$$

Threshold at which no SAR required is 10mw and ≤ 3.0 for 1-g SAR, Separation distance is 5mm.

2437MHz

$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance,mm})] \cdot [\sqrt{f(\text{GHz})}]}{5} = \frac{5.01/5 \cdot \sqrt{5.785}}{1} = 2.41 \leq 3.0$$

Threshold at which no SAR required is 10mw and ≤ 3.0 for 1-g SAR, Separation distance is 5mm.

2462MHz

$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance,mm})] \cdot [\sqrt{f(\text{GHz})}]}{5} = \frac{5.01/5 \cdot \sqrt{5.825}}{1} = 2.42 \leq 3.0$$

Threshold at which no SAR required is 10mw and ≤ 3.0 for 1-g SAR, Separation distance is 5mm.

Conclusion: No SAR is required.