

RF Exposure evaluation

FCC ID: **2AAK2-JVASWI00033**

According to 447498 D01 General RF Exposure Guidance v06

4.3. General SAR test exclusion guidance

4.3.1. Standalone SAR test exclusion considerations

- a) For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following: [(max. power of channel, including tune-up tolerance, mW) / (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,³⁰ where

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation³¹
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

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 according to 4.1 f) is applied to determine SAR test exclusion.

³⁰ This is equivalent to the formula written as: [(max. power of channel, including tune-up tolerance, mW)/(60/ $\sqrt{f(\text{GHz})}$ mW)] $\cdot [20 \text{ mm}/(\text{min. test separation distance, mm})] \leq 1.0$ for 1-g SAR; also see Appendix A for approximate exclusion threshold numerical values at selected frequencies and distances.

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

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

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

RF Exposure evaluation

Copied from the FCC test report: clause 9 Maximum Peak Output Power

Test Result:

For EDR:

Mode	Test channel	Peak Output Power (dBm)
GFSK	Lowest	0.025
	Middle	0.671
	Highest	0.922
Pi/4QPSK	Lowest	-0.102
	Middle	0.053
	Highest	0.017
8DPSK	Lowest	-0.314
	Middle	0.216
	Highest	0.192

Then we choose Normal mode channel as the worst case of Maximum Peak Output Power:

Antenna gain:1.05dBi

Mode	Test channel	Peak Output Power (dBm)	EIRP (dBm)	EIRP (mW)
GFSK	Highest	0.922	1.972	1.57
Pi/4QPSK	Middle	0.053	1.103	1.29
8DPSK	Middle	0.216	1.266	1.34

$EIRP / dBm = \text{Conducted Max Output Power} / dBm + \text{Antenna gain} / dBi$.

Since the distance from the internal BT-antenna to the outer is more than 10mm, we choose the min. test separation distance = 5mm

General RF Exposure:

$$(1.57mW / 5.0mm) \times \sqrt{2.480 \text{ GHz}} = 0.49$$

$$(1.29mW / 5.0mm) \times \sqrt{2.441 \text{ GHz}} = 0.40$$

$$(1.34mW / 5.0mm) \times \sqrt{2.441 \text{ GHz}} = 0.42$$

SAR requirement: $S=3.0$

General RF Exposure < 3

Then SAR evaluation is not required