

SAR test exclusion

According to KDB 447498 D01 General RF Exposure Guidance v05, section 4.3.1

At 100 MHz to 6 GHz and for test separation distances ≤ 50 mm, the SAR test exclusion threshold is determined according to the following;

$$a) \left[\frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \right] \times [\sqrt{f(\text{GHz})}] \leq 3.0$$

1. SAR test exclusion threshold

GFSK

Frequency : 2480 MHz (min. separation distances = 5 mm)

$$\text{SAR test exclusion thresholds}(5 \text{ mm}) = [(0.40 / 5) * \sqrt{2.480}] = 0.1259 \leq 3.0.$$

Mode	Frequency (MHz)	Tune up output Power (dBm)	Measured max output power (dBm)	Separation Distance (mm)	≤ 3.0
Bluetooth	2 402	-8.0 ± 2	-6.4	5	0.0770
Bluetooth	2 441	-7.0 ± 2	-5.82	5	0.1
Bluetooth	2 480	-6.0 ± 2	-4.65	5	0.1259

$$[\text{Tune up power, dBm}] = [9\text{Target power, dBm} \pm \text{tune-up tolerance, dBm}]$$

$$\text{Maximum tuned up power} = (-6.0 \text{ dBm} \pm 2 \text{ dBm}) = -4.0 \text{ dBm} = 0.4 \text{ mW}$$

$$\text{Measured max output power} = -4.65 \text{ dBm}$$

8DPSK

Frequency : 2480 MHz (min. separation distances = 5 mm)

$$\text{SAR test exclusion thresholds}(5 \text{ mm}) = [(0.25 / 5) * \sqrt{2.480}] = 0.0787 \leq 3.0.$$

Mode	Frequency (MHz)	Tune up output Power (dBm)	Measured max output power (dBm)	Separation Distance (mm)	≤ 3.0
Bluetooth	2 402	-9.0 ± 2	-7.94	5	0.0619
Bluetooth	2 441	-9.0 ± 2	-7.28	5	0.0625
Bluetooth	2 480	-8.0 ± 2	-6.2	5	0.0787

$$[\text{Tune up power, dBm}] = [9\text{Target power, dBm} \pm \text{tune-up tolerance, dBm}]$$

$$\text{Maximum tuned up power} = (-8.0 \text{ dBm} \pm 2 \text{ dBm}) = -6.0 \text{ dBm} = 0.25 \text{ mW}$$

$$\text{Measured max output power} = -6.2 \text{ dBm}$$

2. Conclusion : Bluetooth SAR was not required