

RF Exposure

Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in the manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Portable device with its physical nature to be used nearby, the distance between radiating structure and human is less than 20cm.

As per KDB 447498 D01 §4.3.1.1, The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm, and ≤ 5 m (not to exceed) are determined by:

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

f (GHz) is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

The operational distance is 10mm with the verification of KDB 447498 D01 can be referred and used to evaluate the most proper way how RF exposure concern shall be met.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Measurement Result:

BR mode (GFSK):

Frequency (MHz)	Output Power (dBm)	Duty Cycle	Output Power (mW)
2402.00	9.05	0.773	6.21126
2441.00	9.49	0.773	6.87352
2480.00	9.60	0.773	7.04984

EDR mode ($\pi/4$ DQPSK):

Frequency (MHz)	Output Power (dBm)	Duty Cycle	Output Power (mW)
2402.00	7.98	0.773	4.85489
2441.00	8.58	0.773	5.57416
2480.00	8.83	0.773	5.90445

EDR mode (8DPSK):

Frequency (MHz)	Output Power (dBm)	Duty Cycle	Output Power (mW)
2402.00	8.01	0.773	4.88854
2441.00	8.59	0.773	5.58701
2480.00	8.81	0.773	5.87732

Step 1: (≤ 5 mm)

This is a portable device and the Max peak output power is (7.05mW) lower than the threshold given and derived as formula given above, where

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Bluetooth 3.0:

Mode	Frequency	Power (avg in dBm)	Power (avg mw)	Distance (mm)	Threshold (<10mm)
GFSK	2480	7.4208	5.521791451	10	0.869572587
π /4DQPSK	2480	6.82559	4.814586569	10	0.758201851
8DPSK	2480	6.81013	4.79747809	10	0.755507605

Conclusion:

As the result of calculation result indicates, the RF exposure generating from given transmitter (transmitter employed digital modulation) can be excluded from SAR measurement, (<0.3), and therefore is deemed compliant with RF exposure as per KDB 447498 D01, FCC.

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Standard Applicable:

As per RSS-102, any transmitter shall be compliant with applicable RF exposure prior to being market. In §2.5.2, while the operative frequency range is “above 2.2 GHz and up to 3 GHz inclusively, and with output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 20 mW for general public use and 100 mW for controlled use”

Measurement Result:

Mode	Power	Gain	Power or Conducted Power (mW)
Bluetooth	7.05	1.33	5.069907083

5.07 mW < 20mW

Therefore, RF exposure generating from Bluetooth transmitter can be excluded based on RSS-102

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