

May 5th 2025

RF Exposure Considerations for the MRS4 Speaker

FCC ID: 2AD65MRBT4

Analysis for FCC SAR Test Exemption

The FCC requires that the device meet the requirements of KDB 447498 D01 v05r02 Section 4.3.1 to be eligible for SAR test exclusion.

The MRBT speaker operates in the 2400 to 2480MHz operating band. The following FCC Rule Parts and procedures are applicable:

- Part 2.1093 – Radiofrequency radiation exposure evaluation: portable devices
- Part 15.247(b)(3) - For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.
- Part 15.247(b)(4) - The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.
- KDB447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorisation Policies

SAR Exemption Calculation

The following formula as given in KDB 487497 D01 v05r02, section 4.3.1 is used to calculate if the device meets the FCC SAR exemption requirements.

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:

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

- $f(\text{GHz})$ 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

Parameters

Max output conducted power: 13dBm (20.0 mW)

Consider the minimum antenna to person separation distance: ≤ 5 mm {in accordance with KDB 447498 D01 section 4.3.1, point 1)}

Frequency: 2.402 – 2.480GHz

Calculation

At 5mm Separation distance

$$(20.0\text{mw} / 5\text{mm}) \times \sqrt{2.48} \leq 7.5$$

$$4.0 \times 1.55 = 6.2 \text{ (rounded to one decimal place as per KDB requirement)}$$

6.2 is < 7.5 limit for 10-g extremity SAR

Conclusion

Thus for <20cm portable usage, the SAR exclusion condition is fulfilled and SAR evaluation is not required for a separation distance of 5mm or more.