

FCC RF Exposure

FCC ID: 2AMSPDTC338

Applicant: Carl Zeiss AG

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Portable Device

Refer Standard: KDB 447498 D01 General RF Exposure Guidance v06

FCC Part 2 §2.1093

Evaluation method

According to KDB 447498 D01 General RF Exposure Guidance v06 Section 4.3.1 Standalone SAR test exclusion considerations: "Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition(s), listed below, is (are) satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.²⁸ The minimum test separation distance defined in 4.1 f) is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander. To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified, typically in the SAR measurement or SAR analysis report, by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting are required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops and tablets, etc.²⁹ 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: $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [f(\text{GHz})] \leq 3.0$ 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.

Conducted Power Results

Bluetooth		
Mode	Test Frequency	Power(dBm)
GFSK	2402	0.167
GFSK	2441	0.564
GFSK	2480	0.611

Manufacturing tolerance

Bluetooth			
Channel	GFSK Channel 0	GFSK Channel 39	GFSK Channel 78
Target (dBm)	1	1	1
Tolerance ±(dB)	1	1	1

Evaluation Results

Bluetooth					
Channel	Antenna Distance (mm)	RF output power (including tune-up tolerance)		SAR Test Exclusion Threshold	SAR Test Exclusion
		(Max) dBm	mW		
0	5	2	1.58	2.5<3.0	Yes

Conclusion

The measurement results comply with the FCC Limit per 47CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB447498D01V06