

SAR Considerations

Date: 06.Nov.2020
 Company: MED-EL
 Model: AudioStream (Ma070401)
 FCC-ID: VNP-AS
 IC: 11986A-AS

Purpose

This rationale demonstrates that the AudioStream is exempt from SAR Evaluation according to 47 CFR §2.1093, KDB 447498 D01 and RSS-102.

47 CFR § 2.1093 & KDB 447498 D01 Compliance

The AudioStream is a portable device as defined in 47 CFR § 2.1093. According to 47 CFR § 2.1093(c)(2) it is categorically excluded from routine environmental evaluation for RF exposure. KDB 447498 D01, section 4.3.1, defines the SAR Test Exclusion Threshold conditions.

Requirements:

Applicable exemption limits are defined in KDB 447498 D01: For 100 MHz to 6 GHz, and test separation distances ≤ 50 mm, the 1-g test exclusion threshold is determined by the following:

$$\frac{\text{max. power of channel, including tune – up tolerance (mW)}}{\text{min. test separation distance (mm)}} * \sqrt{f(\text{GHz})} \leq 3.0$$

Maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance shall be used.

Calculation:

Parameter	Value in dB	Value in dBm	Value in mW	Rounded to the nearest mW
measured max. output power (e.i.r.p)	0.6 dBm <small>Note 1</small>	2.1 dBm	1.62 mW	2 mW
max. tune-up tolerance	1.5 dB			
Parameter	Value in mm	Rounded to the nearest mm		
separation distance	≤ 5 <small>Note 2</small>	5 mm		
Parameter	Value in GHz	Value in GHz		
(highest) frequency	2.48	2.48		

the formula above results in (rounded to one decimal place)

$$\frac{2 \text{ mW}}{5 \text{ mm}} * \sqrt{2.48 \text{ GHz}} = 0.6 \leq 3.0$$

Result:

This calculation shows that the calculated value of 0.6 satisfies the SAR Test Exclusion Threshold condition of being smaller than the exemption limit of 3.0 and the AudioStream is therefore exempt from SAR Evaluation according to KDB 447498 D01

RSS-102 Compliance

This section demonstrates that the AudioStream is exempt from routine SAR and RF exposure evaluation as the AudioStream complies with the requirements stated in RSS-102, 2.5.1

Requirements:

- The applicable exemption limit according to RSS-102, 2.5.1 is as follows:

Frequency (MHz)	Exemption Limits (mW) for the output power
	At separation distance of ≤ 5 mm
2450	4 mW

- This exemption limit can be used for devices that operate at a distance of equal or less than 20 cm from the radiating element to the user
- The output power shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p) source-based, time-averaged output power and adjusted for tune-up tolerance

Calculation:

The calculation is done with the following values:

Parameter	Value in dB	Value in dBm	Value in mW
Measured max. output power (e.i.r.p)	0.6 dBm	2.1 dBm	1.62 mW
max. tune-up tolerance	1.5 dB		

Result:

The calculation shows that the calculated value of 1.62 mW is below the exemption limit of 4.0 mW and the AudioStream is therefore exempt from SAR Evaluation according to RSS-102.

Conclusion

It was demonstrated that the AudioStream is exempt from SAR Evaluation and complies with the SAR Test Exclusion Threshold stated in KDB 447498 D01 and RSS-102

Note 1: A duty cycle of 100% is assumed, thus the measured EIRP is equivalent to the average EIRP

Note 2: According to KDB 447498 D01, 4.3.1, for separation distances ≤ 5 mm, a test distance of 5 mm shall be used