

FCC SAR Exclusion Report

Report No. : SFBCEE-WTW-P22010433

Applicant : Sonova Consumer Hearing GmbH

Address : Am Labor 1, 30900 Wedemark, Germany

Product Name : MOMENTUM 4

Brand Name : SENNHEISER

FCC ID : 2A3UL-M4AEBT

Model No. : M4AEBT

Standards : FCC 47 CFR Part 2 (2.1093), IEEE C95.1:1992, IEEE Std 1528:2013
KDB 865664 D01 v01r04, KDB 865664 D02 v01r02, FCC-19-126
KDB 447498 D01 v06

Sample Received Date : Jan. 13, 2022

Date of Evaluation : May 05, 2022

Lab Address : No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location : No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City, Taiwan

CERTIFICATION: The above equipment have been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch – Lin Kou Laboratories**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by TAF or any government agencies.

Prepared By : 
Vera Huang / Specialist

Approved By : 
Gordon Lin / Manager



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Annex A. Maximum Target Conducted Power

FCC SAR Exclusion Report

1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest Reported SAR _{1g} (W/kg)
DSS & DTS	Bluetooth	Not Required

Note:

1. The SAR limit (**Head & Body: SAR_{1g} 1.6 W/kg**) for general population / uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

2. Description of Equipment Under Test

Test item Description	Wireless Headphones
Product Name	MOMENTUM 4
FCC ID	2A3UL-M4AEBT
Brand Name	SENNHEISER
Model No.	M4AEBT
Status of EUT	Engineering Sample
Power Ratings	5Vdc, 750mA (from Type-C USB interface) 3.7Vdc, 700mAh (from battery)
Power Supply (Nominal & Testing)	5Vdc, 750mA (from Type-C USB interface)
Operating Temperature range	0°C ~ 40°C
Modulation Type	BDR & EDR: GFSK, $\pi/4$ DQPSK, 8DPSK BLE: GFSK
Transmission Technology	BDR & EDR: FHSS BLE: DSSS
Technology	Bluetooth
Operating Frequency	2402 - 2480MHz (for Frequency Band: 2400-2483.5MHz)
No. of channels	BDR & EDR: 79 BLE: 40
Channel Spacing	BDR & EDR: 1MHz BLE: 2MHz
Channel Bandwidth	BDR & EDR: 79MHz BLE: 80MHz
Data Transfer Rate	BDR: 1Mbps and EDR: 2Mbps/3Mbps LE 4.0: 1Mbps and LE 5.2: 2Mbps
Maximum Tune-up Conducted Power (Unit: dBm)	Please refer to Annex A
Antenna Type	FPC Antenna
Antenna Gain	3.89 dBi
HW Version	V01
SW Version	V2.2.14
Cable supplied	(a) 1.2m shielded USB cable (without core) (b) 1.2m unshielded audio cable (without core)

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.

3. SAR Measurement Evaluation

3.1 Maximum Output Power

3.1.1 Maximum Target Conducted Power

Refer to Annex A.

3.2 SAR Testing Exclusions

According to FCC-19-126, the SAR-based thresholds are derived based on the frequency, power, and separation distance of the RF source. The formula below is defined the thresholds in general for either available maximum time-averaged power or maximum time-averaged (ERP), whichever is greater. The SAR exclusion threshold is determined by the following formula.

1. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequency from 0.3 GHz to 6 GHz (inclusive).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz};$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Mode	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Max. Tune-up Effective Radiated Power (dBm)	Rear Face		
				Ant. to Surface (mm)	Calculated Result (dBm)	Require SAR Testing?
Bluetooth	5	3.16	6.74	27	18.29	No

Note:

1. When the device output power is less than the power threshold shown in above table, the SAR testing exclusion is applied.
2. Units for d are cm and units for f are GHz.
3. The Calculated Result is scaling x2.5 for head exclusion threshold.

Summary:

Since the SAR testing for all device orientations apply SAR test exclusion per FCC-19-126, SAR testing for this device is not required.

4. Construction Photos of EUT

Please refer to the attached file (BCEE-WTW-P22010433 (EUT photo)).

5. Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Taiwan Huaya Lab:

Add: No. 19, Huaya 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan

Tel: +886-(0)3-318-3232

Fax: +886-(0)3-211-5834

Taiwan Linkou Lab:

Add: No. 47-2, Baodoucuokeng, Linkou Dist., New Taipei City 244, Taiwan

Tel: +886-(0)2-2605-2180

Fax: +886-(0)2-2605-2943

Taiwan Hsinchu Lab1:

Add: E-2, No. 1, Lixing 1st Rd., East Dist., Hsinchu City 300, Taiwan

Tel: +886-(0)3-666-8565

Fax: +886-(0)3-666-8323

Taiwan Hsinchu Lab2:

Add: No. 49, Ln. 206, Wende Rd., Qionglin Township, Hsinchu County 307, Taiwan

Tel: +886-(0)3-512-0595

Fax: +886-(0)3-512-0568

Taiwan Xindian Lab:

Add: B2F., No. 215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan

Tel: +886-(0)2-8914-5882

Fax: +886-(0)2-8914-5840

Email: service.adt@tw.bureauveritas.com

Web Site: <https://ee.bureauveritas.com.tw/BVInternet/Default>

The road map of all our labs can be found in our web site also.

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