

SAR Exclusion Report

Report No. : SFCFQC-WTW-P23070144

Applicant : Sonova Consumer Hearing GmbH

Address : Am Labor 1, 30900 Wedemark, Germany

Product : MOMENTUM Sport

Brand : SENNHEISER

FCC ID : 2A3ULMSPORT1

Model No. : MSPORT1 (refer to item 2 for more details)

FCC Rule Part : CFR §2.1093

Standards : IEEE Std 1528:2013, KDB 865664 D01 v01r04, KDB 865664 D02 v01r02, KDB 447498 D01 v06

Sample Received Date : Jul. 06, 2023

Date of Evaluation : Aug. 21, 2023

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

FCC Accredited No. : TW0003

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.

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Release Control Record

Issue No.	Reason for Change	Date Issued
SFCFQC-WTW-P23070144	Initial release	Nov. 17, 2023

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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.

Test Reference Guidance: FCC-19-126

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2. Description of Equipment Under Test

Test item Description	True Wireless Earphones
Product Name	MOMENTUM Sport
Brand Name	SENNHEISER
FCC ID	2A3ULMSPORT1
Model No.	MSPORT1 (refer to note for more details)
Sample Status	Engineering Sample
Power Ratings	Left earbud & Right earbud: 3.66Vdc, 75mAh (from battery) or 3.8Vdc, 72mAh (from battery) Charging Case: 5Vdc, 1A (from Type-C USB interface) 3.6Vdc, 820 mAh (from battery) or 3.6Vdc, 900 mAh (from battery)
Power Supply (Nominal & Testing)	5Vdc, 1A (from Type-C USB interface)
Nominal Testing Voltage (Vnom)	3.66Vdc - 3.8Vdc
Operating Temperature range	0~45°C
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8DPSK
Transmission Technology	FHSS, DSSS
Technology	Bluetooth
Operating Frequency	2402~2480MHz (for Frequency band 2400-2483.5MHz)
No. of channels	BDR & EDR: 79 Bluetooth LE 5.2: 40
Channel Spacing	BDR & EDR: 1MHz Bluetooth LE 5.2: 2MHz
Channel Bandwidth	BDR & EDR: 79MHz Bluetooth LE 5.2: 80MHz
Data Transfer Rate	Bluetooth BDR: 1Mbps Bluetooth EDR: 2Mbps/3Mbps Bluetooth LE 5.2: 1Mbps/2Mbps
Maximum Tune-Up Conducted Power (Unit: dBm)	Refer to section 3.1 of this report
Antenna Type	PIFA Antenna
Antenna Gain	Left Earbud: -0.07dBi Right Earbud: -1.02dBi
HW Version	Earbuds: BHC212-R-MAIN-R3 Charging Case: ACP212-Main-R4
SW Version	Earbuds: FW3.10.10 Charging Case: BTL V0.4.0 + FW V0.14.0
Cable supplied	0.4m shielded USB cable without core

Note:

- 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.
- The EUT system model no. MSPORT1 contains the following devices. The enclosure of earbuds includes 1 color, and 2 colors for charging case.

Device Name	Brand Name	Device Model No.
Right Earbud	SENNHEISER	MSPORT1 R
Left Earbud	SENNHEISER	MSPORT1 L
Charging Case	SENNHEISER	MSPORT1 C

* MSPORT1 R and MSPORT1 L with BT, BT LE function.

*Charging case is solely used for charging MSPORT1 R and MSPORT1 L only.

3. SAR Measurement Evaluation

3.1 Maximum Output Power

The maximum conducted power (Unit: dBm) including tune-up tolerance is shown as below.

Left Earbud Bluetooth			
Mode	Channel	Frequency (MHz)	Max. Tune-up
BR / EDR	0	2402	11.25
	39	2441	11.25
	78	2480	11.25

Right Earbud Bluetooth			
Mode	Channel	Frequency (MHz)	Max. Tune-up
BR / EDR	0	2402	11.25
	39	2441	11.25
	78	2480	11.25

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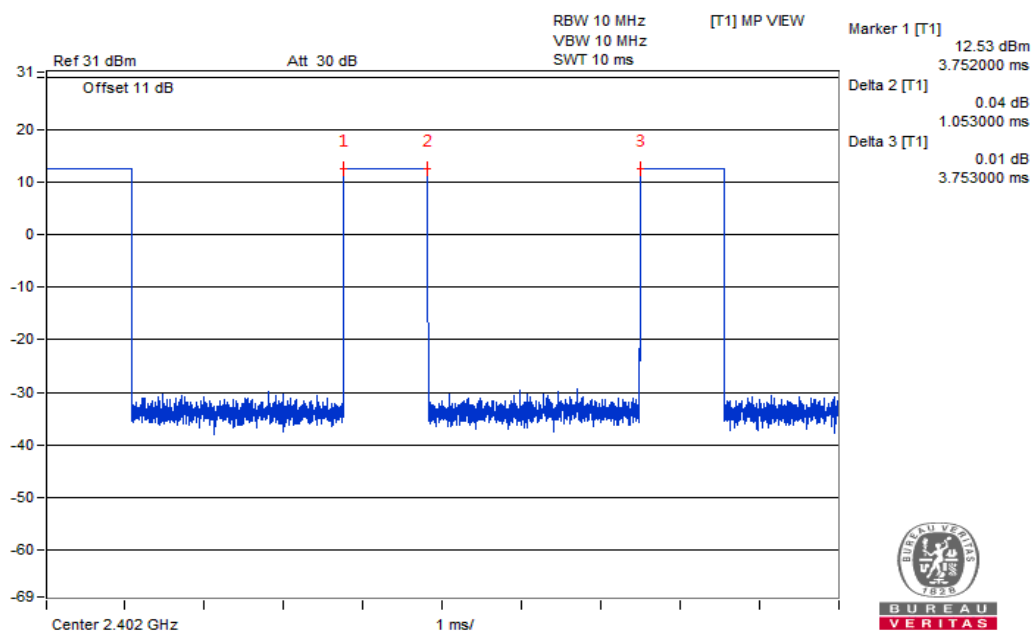
3.2 Time-Avg. Power calculation.

<Considerations Related to Bluetooth for Setup and Testing>

This device has installed Bluetooth engineering testing software which can provide continuous transmitting RF signal. During Bluetooth SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

The EUT was set to LE mode at the maximum output power. Its duty factor was calculated as below, it specified and designed from manufacturer when devices operate at normal usage condition.

<Left Earbud>



Time-domain plot for Bluetooth transmission signal

The duty factor of Bluetooth signal has been calculated as following.

$$\text{Duty Factor} = \text{Pulse Width} / \text{Total Period} = 1.053 / 3.753 = 28.06\%$$

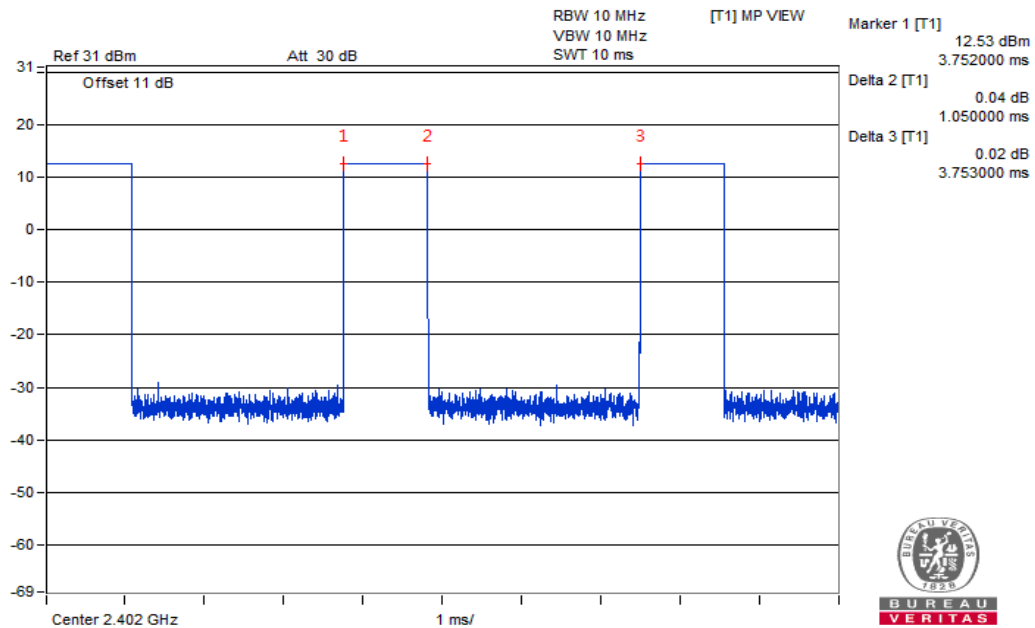
The calculation of time-averaged power with duty cycle are performed as below.

<The calculation of time-averaged power with duty cycle>

Mode	Max. Tune-up (dBm)	Max. Tune-up (mW)	Duty Cycle (%)	Calculated Max. Time-Avg. power (Include Duty Cycle) (dBm)
BR / EDR	11.25	13.34	28.06	3.80

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<Right Earbud>



Time-domain plot for Bluetooth transmission signal

The duty factor of Bluetooth signal has been calculated as following.

$$\text{Duty Factor} = \text{Pulse Width} / \text{Total Period} = 1.05 / 3.753 = 27.98\%$$

The calculation of time-averaged power with duty cycle are performed as below.

<The calculation of time-averaged power with duty cycle>

Mode	Max. Tune-up (dBm)	Max. Tune-up (mW)	Duty Cycle (%)	Calculated Max. Time-Avg. power (Include Duty Cycle) (dBm)
BR / EDR	11.25	13.34	27.98	3.80

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3.3 SAR Testing Exclusions

According to KDB 447498 D01, the SAR test exclusion condition is based on source-based time-averaged maximum conducted output power, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The SAR exclusion threshold is determined by the following formula.

- For the test separation distance ≤ 50 mm

$$\frac{\text{Max. Tune up Power}_{(\text{mW})}}{\text{Min. Test Separation Distance}_{(\text{mm})}} \times \sqrt{f_{(\text{GHz})}} \leq 3.0$$

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

- For the test separation distance > 50 mm, and the frequency at 100 MHz to 1500 MHz

$$\left[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50 \text{ mm}) \times \left(\frac{f_{(\text{MHz})}}{150} \right) \right]_{(\text{mW})}$$

- For the test separation distance > 50 mm, and the frequency at > 1500 MHz to 6 GHz

$$[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50 \text{ mm}) \times 10]_{(\text{mW})}$$

Mode	Frequency (GHz)	Calculated Max. Time-Avg. power (Include Duty Cycle) (dBm)	Exclusion Level < 3	Require SAR Testing?
BT (Left Earbud)	2.48	3.80	$1.2 < 3$	No
BT (Right Earbud)	2.48	3.80	$1.2 < 3$	No

Note:

- When separation distance ≤ 50 mm and the calculated result shown in above table is ≤ 3.0 , the SAR testing exclusion is applied.

Summary:

Since the SAR testing for all device orientations apply SAR test exclusion per KDB 447498, SAR testing for this device is not required.

4. Construction Photos of EUT

Please refer to the attached file (CFQC-WTW-P23070144 (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:

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

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