

FCC SAR Exclusion Report

Report No. : SF200618C02
Applicant : Sennheiser electronic GmbH & Co. KG
Address : Am Labor 1, D-30900 Wedemark, Germany
Product Name : HD 250BT Wireless
Brand Name : SENNHEISER
FCC ID : DMOHD250BT
Model No. : HD 250BT
Standards : FCC 47 CFR Part 2 (2.1093), IEEE C95.1:1992, IEEE Std 1528:2013
KDB 865664 D01 v01r04, KDB 865664 D02 v01r02, KDB 447498 D01 v06
Sample Received Date : Jun. 18, 2020
Date of Evaluation : Jun. 18, 2020
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.

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1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest Reported SAR _{1g} (W/kg)
DSS	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	On-ear headphones
Product Name	HD 250BT Wireless
Model No.	HD 250BT
FCC ID	DMOHD250BT
Brand Name	SENNHEISER
Status of EUT	Engineering Sample
Power Ratings	5Vdc, 120 mA (from Type-C USB interface) 3.7Vdc, 190mAh (from battery)
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 5.0: 2Mbps
Maximum Tune-up Conducted Power (Unit: dBm)	Please refer to section 3.1.1 of this report
Antenna Type	PCB Antenna
Antenna Gain	1.43 dBi
HW Version	V3.0
SW Version	V2.4.3
Cable supplied	0.5m shielded USB 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

The maximum conducted average power (Unit: dBm) including tune-up tolerance please refer to Appendix B 錯誤! 找不到參照來源。.

3.1.2 Measured Conducted Power Result

The measuring conducted power (Unit: dBm) please refer to Appendix C.

3.2 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.

1. For the test separation distance ≤ 50 mm

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

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

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

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

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

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

Mode	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	From of the Antenna to body		
			Ant. to Surface (mm)	Calculated Result	Require SAR Testing?
BT LE 5.0	4.0	2.51	26.5	0.15	No

Note:

- When separation distance ≤ 50 mm and the calculated result shown in above table is ≤ 3.0 , the SAR testing exclusion is applied.
- When separation distance > 50 mm and the device output power is less than the calculated result (power threshold, mW) shown in above table, 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 (200618C02 (EUT Photo)_Ext. and 200618C02 (EUT Photo)_Int.).

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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Appendix A. Photographs of EUT and Antenna Location

Appendix B. Maximum Target Conducted Power

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

Bluetooth			
Mode	Channel	Frequency	Max Tune-up Power
BR / EDR	0	2402	4.0
	39	2441	4.0
	78	2480	4.0
LE 4.0 / LE 5.0	0	2402	4.0
	19	2440	4.0
	39	2480	4.0

Appendix C. Measured Conducted Power

The measuring conducted power (Unit: dBm) are shown as below.

Bluetooth			
Mode	Channel	Frequency	Average Power
BR / EDR	0	2402	3.36
	39	2441	3.69
	78	2480	3.86
LE 4.0 / LE 5.0	0	2402	3.40
	19	2440	3.70
	39	2480	3.88