

RF EXPOSURE REPORT



Applicant: Sonova Consumer Hearing GmbH
Am Labor 1, 30900 Wedemark, Germany.
Manufacturer: Sonova Consumer Hearing GmbH
Am Labor 1, 30900 Wedemark, Germany.
Product Name: ACCENTUM True Wireless (ATW1)
Brand Name: SENNHEISER
Model No.: ATW1 (Refer to item 1 for details)
Report Number: TESA2309000510ES
FCC ID 2A3ULATW1
Date of EUT Received: Sep. 11, 2023
Issue Date: Nov. 14, 2023

Approved By _____

John Yeh

We hereby certify that:

The above equipment was evaluate by SGS Taiwan Ltd. The evaluation in this report is in compliance with FCC Rule Part §1.1307.

The results of this report relate to the specific sample identified in this report.

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Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TESA2309000510ES	00	Original.	Nov. 14, 2023	Cindy Chou	

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SGS Taiwan Ltd. | No.134,Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan/新北市五股區新北產業園區五工路 134 號

1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

1.1 Product Description

Test Item Description	True Wireless Earphones
Product Name:	ACCENTUM True Wireless (ATW1)
Brand Name:	SENNHEISER
Model No.:	ATW1 (Refer to Note for details)
Serial Number / Status of EUT	Engineering sample
Power Ratings	Earbuds: 3.7Vdc, 55mAh or 3.66Vdc, 75mAh (from battery) Charging case: 5Vdc, 500 mA (from Type-C USB interface) 3.7Vdc, 400-420 mAh (from battery)
Power Supply (Nominal & Testing)	5Vdc (from Type-C USB interface) 3.7Vdc (from battery)
Operating Temperature range	0°C - +40°C
Modulation Type	BDR & EDR: GFSK, $\pi/4$ DQPSK, 8DPSK BLE 1M/2M: GFSK
Transmission Technology	BDR & EDR: FHSS BLE 1M/2M: DSSS
Technology	Bluetooth
Operating Frequency	BDR & EDR: 2402 - 2480MHz BLE 1M: 2402 - 2480MHz BLE 2M: 2404 - 2478MHz (excluding 2426MHz) (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, EDR: 2Mbps/3Mbps BLE 4.0: 1Mbps, BLE 5.3: 2Mbps
Antenna Type	Monopole
Antenna Gain	Right earbud: -1.3dBi Left earbud: 0.4dBi
Maximum Transmit Power (Conducted Average)	BDR/EDR: 7.07dBm BLE 1M: 7.90 dBm BLE 2M: 7.82 dBm
HW Version	Earbuds: V04 Charging case: V06
SW Version	Earbuds: V4.5.6 Charging case: V011

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Cable supplied / Device ports	0.4m shielded USB cable without core
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Note: The EUT system ACCENTUM True Wireless (ATW1) contain the following devices:

Item	Brand	Device Model
Right Earbud	SENNHEISER	ATW1 R
Left Earbud	SENNHEISER	ATW1 L
Charging Case	SENNHEISER	ATW1 C

* ATW1 R and ATW1 L with BT & BT LE TX/RX function

* Charging case is solely used for charging ATW1 R and ATW1 L only.

1.2 Evaluation site

Laboratory		Site Address	FCC Designation number
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	<input checked="" type="checkbox"/>	No. 134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, 24803, Taiwan.	TW0027
	<input type="checkbox"/>	No. 2, Keji 1st Rd., Guishan Township, Taoyuan County, 333 Taiwan.	TW0028
	<input type="checkbox"/>	1F, No. 8, Alley 15, Lane 120, Sec. 1, Nei Hu Road, Nei Hu District, Taipei City, 222 Taiwan.	TW0029

1.3 Antenna Information:

Bluetooth

Antenna Type	Freq. (MHz)	Right / Left earbud	Peak Antenna Gain (dBi)
Monopole	2402~2480	Right	-1.3
		Left	0.4

Note: Antenna information is provided by the applicant.

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2 DETERMINATION OF MPE EXEMPTION

2.1 Single RF Source

As per §1.1307(b)(3)(i),

- (A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);
- (B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

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

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);

Note: when 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption thresholds.

- (C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

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**Table 1 to § 1.1307(b)(3)(i)(C) –
Single RF Sources Subject to Routine Environmental Evaluation**

RF Source frequency (MHz)			Minimum Distance			Threshold ERP (W)
fL		fH	$\lambda L / 2\pi$		$\lambda H / 2\pi$	
0.3	-	1.34	159m	-	35.6m	1920 R ²
1.34	-	30	35.6m	-	1.6m	3450 R ² /f ²
30	-	300	1.6m	-	159mm	3.83 R ²
300	-	1500	159mm	-	31.8mm	0.0128 R ² f
1500	-	100000	31.8mm	-	0.5mm	19.2R ²

R= minimum separation distance in meter

f = frequency in MHz

2.2 Multiple RF Sources

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

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2.3 Single RF Source Evaluation Results

Chain 0	Frequency (MHz)	Distance (cm)	Max. tune-up power without duty cycle (dBm)	Duty cycle (%)	Max. tune-up power with duty cycle (mW)	Peak gain (dBi)	ERP (dBm)	ERP (mW)	x	ERP _{20cm} (mW)	P _{th} (mW)	P or ERP /P _{th}
BDR	2480	0.5	8.5	25.67	1.817	0.4	0.843	1.214	1.905	3060.00	2.72	0.668
EDR	2480	0.5	8.5	25.53	1.807	0.4	0.820	1.208	1.905	3060.00	2.72	0.664
BLE1M	2480	0.5	8.5	37.60	2.662	0.4	2.502	1.779	1.905	3060.00	2.72	0.979
BLE2M	2480	0.5	8.5	36.84	2.608	0.4	2.413	1.743	1.905	3060.00	2.72	0.959

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the minimum separation distance of that band. All the single RF source results (P or ERP) are less than their corresponding threshold (P_{th} or ERP_{th}), so they are exempt from RF exposure testing.

~ End of Report ~

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