

1 Cover Page

RF Exposure Evaluation Report

Application No.: GZCR2111021353AT
FCC ID: DMOXSWIEMSR
Applicant: Sennheiser Electronic Corp
Address of Applicant: 1 Enterprise Drive, Old Lyme, Connecticut 06371 United States
Manufacturer: Sennheiser electronic GmbH & Co.KG
Address of Manufacturer: Am Labor 1,30900 Wedemark, Germany
Factory: Pasgao Electronics Co. Ltd
Address of Factory: V1 2nd District, Industrial Transfer Park, Enping City, Guangdong, China 529400
Equipment Under Test (EUT):
EUT Name: XS Wireless
Model No.: XSW IEM SR
Trade mark: SENNHEISER
Standard(s) : 47 CFR Part 1.1307
 47 CFR Part 1.1310
 47 CFR Part 2.1091
Date of Receipt: 2022-02-17
Date of Evaluation: 2022-02-17 to 2022-02-25
Date of Issue: 2022-02-25

Evaluation Result:	Pass*
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* In the configuration evaluated, the EUT complied with the standards specified above.

Eric Lin
EMC Lab Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2022-02-25		Original

Authorized for issue by:				
		<i>Tommie Tang</i>		
		_____ Tommie_tang/Project Engineer		
		<i>Eric Lin</i>		
		_____ Eric Lin/Reviewer		



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2 Evaluation Summary

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.



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4 General Information

4.1 Details of E.U.T.

Stereo Transmitter & Power Supply Stereo Transmitter: XSW IEM SR
 Power Supply : SSC-5WVI-12 120050
 Input: AC 120-240V 50/60Hz 0.2A
 Output: DC 12V 0.5A 6W
 DC cable:187cm unshielded

Frequency Range: 476-500MHz
 572-596MHz

Modulation: FM

Number of Channel: 10

Sample Type: Mobile device

Antenna Type: Omni Antenna

Antenna Gain: -1.5 dBi

Hardware Version: XSW-IEM-TX-MB-V7.5
 XSW-IEM-TX V9.3

Software version: 2.1

476-500MHz

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	476.2MHz	4	478.9MHz	7	486.7MHz	10	499.9MHz
2	476.8MHz	5	480.7MHz	8	491.8MHz		
3	477.7MHz	6	483.1MHz	9	495.1MHz		

Test Channel:

Channel	Frequency
The lowest channel (CH1)	476.2MHz
The middle channel (CH7)	486.7MHz
The highest channel (CH10)	499.9MHz



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572-596MHz

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	572.2MHz	4	574.9MHz	7	582.7MHz	10	595.9MHz
2	572.8MHz	5	576.7MHz	8	587.8MHz		
3	573.7MHz	6	579.1MHz	9	591.1MHz		

Test Channel:

Channel	Frequency
The lowest channel (CH1)	572.2MHz
The middle channel (CH7)	582.7MHz
The highest channel (CH10)	595.9MHz



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4.2 Evaluating Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

4.3 Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC (Designation Number: CN1172)**

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

- **ISED (CAB identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

CAB Identifier: CN0072.

- **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1600, C-1707, T-1499, G-10216 respectively.

4.4 Deviation from Standards

None

4.5 Abnormalities from Standard Conditions

None



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5 Radio Spectrum Technical Requirement

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



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5.1.3 EUT RF Exposure Evaluation

476-500MHz:

Antenna Gain: Antenna :-1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.71 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Remark:

Limit selection is more stringent with 1 than with 476-500 MHz calculation, so the report chooses a more stringent limit.

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
476.2	14.551	28.52	0.00403	0.317	PASS

572-596MHz:

Antenna Gain: Antenna :-1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.71 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Remark:

Limit selection is more stringent with 1 than with 572-596MHz MHz calculation, so the report chooses a more stringent limit.

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
595.9	13.71	23.5	0.00332	0.397	PASS

Note: Refer to report No. KSCR220200021301 and KSCR220200021302 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

- End of the Report -



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