FCC Part 74 Subpart

EMI TEST REPORT

(CLASS II PERMISSIVE CHANGE)

of

E.U.T. : XS WIRELESS
FCC ID. : DMOSKXSW
Model No. : SK-XSW
Working Frequency : 548~572 MHz

for

APPLICANT : Sennheiser Electronic Corp
ADDRESS : 1 Enterprise Drive, Old Lyme, CT 06371, USA

Test Performed by

TAIWAN TESTING AND CERTIFICATION CENTER
NO. 34. LIN 5, DINGFU VIL., LINKOU DIST.,
NEW TAIPEI CITY, TAIWAN, 24442, R.O.C.
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Report Number : 22-12-RBF-009-03

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1.Report Version History：

The following revisions have been made to ETC report No. 16-08-RBF-015-02/18-11-RBF-013-02

Report No.	Date of issue	Description
16-08-RBF-015-02	Sep. 22, 2016	First Version.
18-11-RBF-013-02	Dec.27, 2018	Second Version.
22-12-RBF-009-03	Jul. 03, 2023	1.Reference Test Report (Data from ETC Report No.: 16-08-RBF-015-02/18-11-RBF-013-02) Class II Change description: To change the PIN with the same VCO as following the KDB Publication 178919 D01 (C2PC) which describes general permissive change policies.

2.TEST REPORT CERTIFICATION

Applicant	:	Sennheiser Electronic Corp 1 Enterprise Drive, Old Lyme, CT 06371, USA
Manufacturer	:	Sennheiser electronic GmbH & Co. KG Am Labor 1 30900 Wedemark, Germany
Factory	:	MASCOT ELECTRIC CO., LTD NO. 85, CHANGXING 1ST ST., RENDE DIST., TAINAN CITY 717, TAIWAN
Description of EUT	:	
a) Type of EUT	:	XS WIRELESS
b) Trade Name	:	SENNHEISER
c) Model No.	:	SK-XSW
d) FCC ID	:	DMOSKXSW
e) Working Frequency	:	548~572 MHz
f) Power Supply	:	2x 1.5V AA batteries

Regulation Applied : FCC Rules and Regulations Part 74 Subpart H

I HEREBY CERTIFY THAT; The data shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these data.

Issued Date : Jul. 03, 2023

Test Engineer : Brian Huang
(Brian Huang, Engineer)

Approve & Authorized :

Kevin Lee
Kevin Lee, Section Manager
EMC Dept. II of TAIWAN
TESTING AND CERTIFICATION
CENTER

3. GENERAL INFORMATION

3.1 Product Description

a) Type of EUT	:	XS WIRELESS
b) Trade Name	:	SENNHEISER
c) Model No.	:	SK-XSW
d) FCC ID	:	DMOSKXSW
e) Working Frequency	:	548~572 MHz
f) Power Supply	:	2x 1.5V AA batteries

3.2 Test Methodology

Both conducted and radiated testing were performed according to the procedures in FCC CFR Title 47 Part 74 Subpart H, ANSI C63.26-2015, ANSI C63.10-2013 and ANSI C63.4-2014. Test also follow "TIA-603-E(2016)-Land Mobile FM or PM Communications Equipment Measurement and Performance Standsrds" and section 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, and 2.1055 of FCC Part 2 FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS.

Measueement Software

Software	Version	Note
e3	Version 6.100618f	Radiated Emission Test
e3	Version 6.100421	Conducted Emission Test

3.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at No.34, Lin 5, Dingfu Vil., Linkou Dist., New Taipei City, Taiwan 24442, R.O.C.

Designation Number: TW2628.

4. REQUIREMENTS OF PROVISIONS

4.1 Definition

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

4.2 Frequencies Available

According to sec. 74.802(a)(1) of Part 74, Frequencies within the following bands may be assigned for use by low power auxiliary stations:

Frequencies (MHz)

26.100-26.480	455.000-456.000
54.000-72.000	470.000-488.000
76.000-88.000	488.000-494.000
161.625-161.775	494.000-608.000
174.000-216.000	614.000-806.000
450.000-451.000	944.000-952.000

According to sec. 74.802(a)(2) of Part 74, The 653.000-657.000 MHz segment of the 600 MHz duplex gap may be assigned for use by low power auxiliary service.

4.3 Requirements for Radio Equipment on Certification

(1) RF Output Power
For transmitters, the power output shall be measured at the RF output terminals.

(2) Modulation Characteristics
For Voice Modulated Communication Equipment, a curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted.

(3) Occupied Bandwidth
For radiotelephone transmitter, other than single sideband or indenpent sideband transmitter, when modulateed by a 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.

(4) Spurious Emissions at Antenna Terminals
The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminal when properly loaded with a suitable artificial antenna.

(5) Field Strength of Spurious Emissions

Measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation.

(6) Frequencies Tolerance

a) The frequency stability shall be measured with variation of ambient temperature.
b) The frequency stability shall be measured with variation of primary supply voltage.

4.4 Labeling Requirement

Each equipment for which a type acceptance application is filed on or after May 1,1981, shall bear an identification plate or label pursuant to §2.925（Identification of equipment）and §2.926（FCC identifier）.

4.5 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated fortests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz ~ 30MHz	±3.34dB (Mains)(LISN)
Radiated emissions	9kHz ~ 30MHz	±4.22dB
Radiated emissions / Effective Radiated Power (3m RF Chamber)	30MHz ~ 1GHz	±4.2dB (30MHz≦f≦300MHz)
		±4.44dB (300MHz＜f≦1GHz)
	Above 1GHz	±4.44dB (1GHz≦f≦18GHz)
		±3.02dB (18GHz≦f≦40GHz)
Conducted Measurement	9kHz ~ 40GHz	±0.88dB (9kHz≦f≦30MHz)
		±0.88dB (30MHz＜f≦1GHz)
		±1.04dB (1GHz≦f≦18GHz)
		±1.2dB (18GHz≦f≦40GHz)
Frequencies Tolerance (Ambient temperature & Supply voltage)	9kHz ~ 40GHz	$\pm 4.04 \times 10^{-8}$
Occupied Bandwidth	9kHz ~ 40GHz	±5%
Modulation Characteristics / Frequency deviation	9kHz ~ 1GHz	±1.38%

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
The test result(s) does not consider the uncertainty of measurement when the test standard(s) and/or test method which refer by the labs has the limit or judgments for the test result(s).

5. FIELD STRENGTH OF EMISSION

5.1 Provisions Applicable

According to §2.1053, measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from a halfwave dipole antenna.

According to §74.861(e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the follwing sceedule:

(i) on any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB.

(ii)on any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB.

(iii) on any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth shall be attenuated below the unmodulated carrier by at least 43 plus 10 Log(output power in watts) dB.

5.2 Measurement Procedure

Test Procedure used ANSI C63.26-2015 – Section 5.7

1. Setup the configuration per figure 4 and 5 for frequencies measured below and above 1 GHz respectively.
2. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 5 with search antenna in vertical polarized orientations.
6. Check the three frequencies of highest emission with varying the placement of cables associated with EUT (if any) to obtain the worse case and record the result.

Note:
According to 12.7.2(d)(2) of ANSI C63.10-2013:

$$E[dB\mu V/m] = EIRP[dBm] + 95.2, \text{ for } d = 3 \text{ m}.$$

12.7.2(e) of ANSI C63.10-2013:
For conducted measurements below 1000 MHz, the field strength shall be computed as specified in item d), and then an additional 4.7 dB shall be added as an upper bound on the field strength that would be observed on a test range with a ground plane for frequencies between 30 MHz and 1000 MHz, or an additional 6 dB shall be added for frequencies below 30 MHz.

Figure 4 : Frequencies measured below 1 GHz configuration

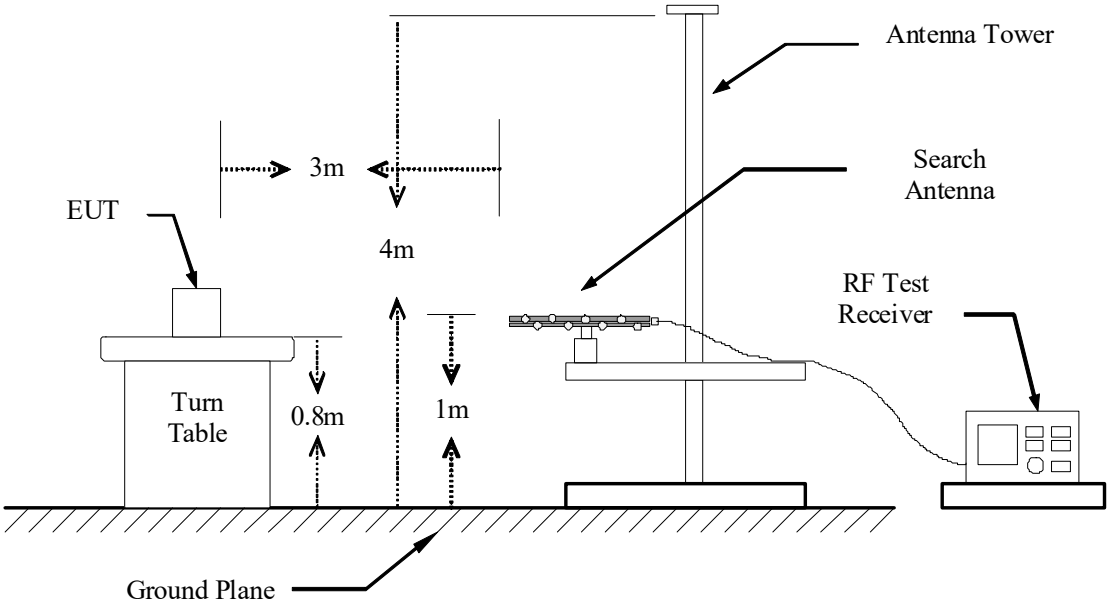
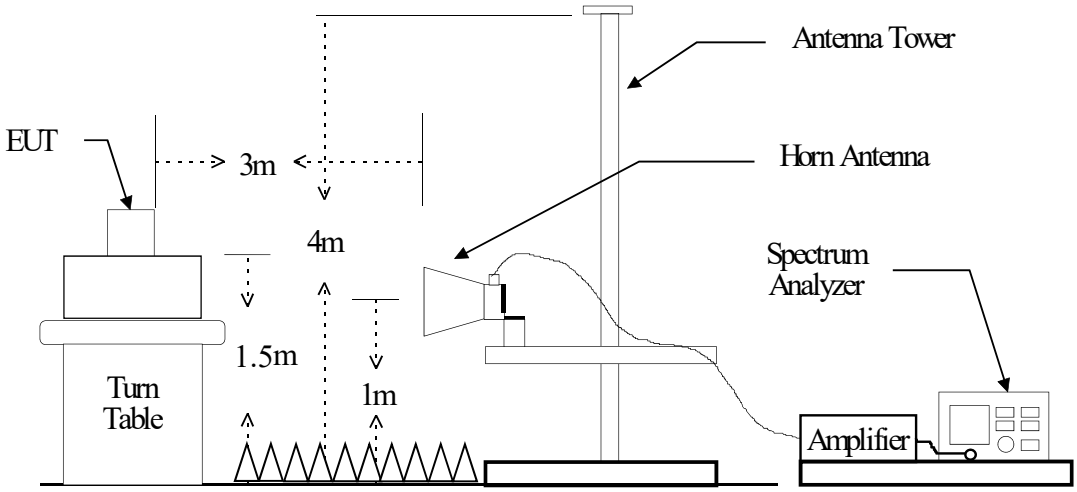


Figure 5 : Frequencies measured above 1 GHz configuration



5.3 Measuring Instrument

Equipment	Manufacturer	Model No.	Assets No.	Calibration Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESU 40	13054416-001	2022/04/21	2023/04/20
Amplifier	HP	8447D	13040711-001	2022/09/06	2023/09/05
Bilog Antenna with 6dB Pad	ETC & JYEBAO	MCTD 2786 & FAT-NM5NF5T3G2W6	13057618-002&RF-002 (BL13J03015&RF-002)	2022/09/20	2023/09/19

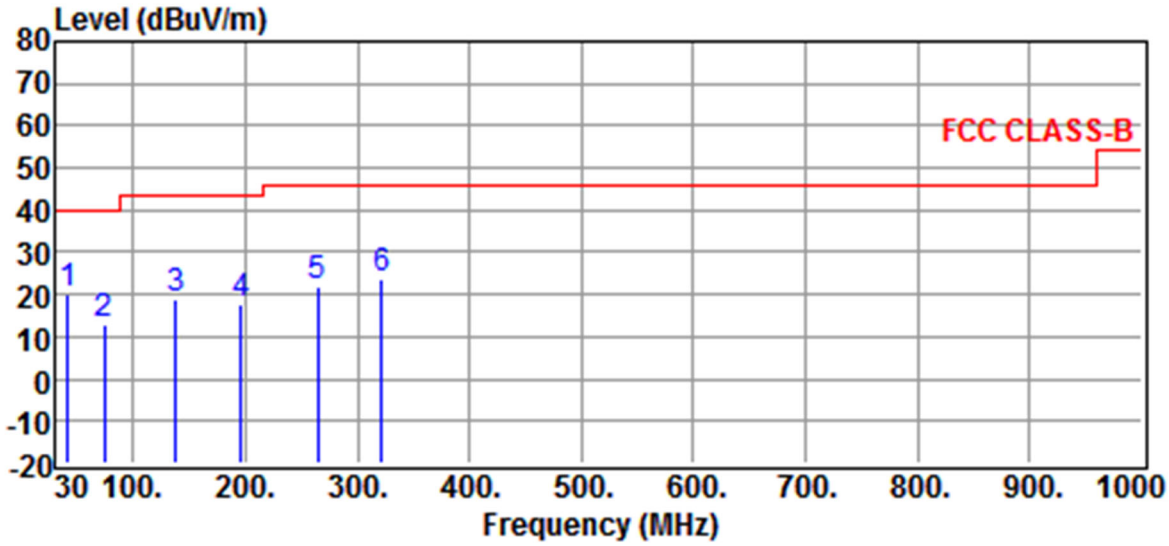
Measuring instrument setup in frequency band measured is as following :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Spectrum Analyzer	Peak	100 kHz	300 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	3 MHz

5.4 Measuring Data

5.4.1 Other Emissions

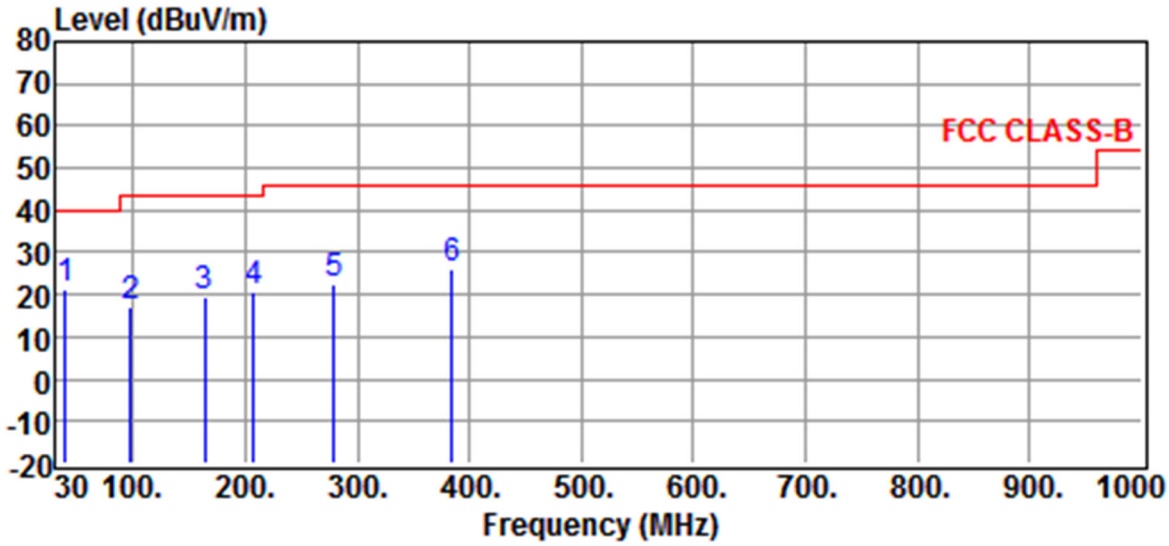
a) Emission frequencies below 1 GHz



Site	:Chamber#2	Date	:2023-03-16
Limit	:FCC CLASS-B	Ant. Pol.	:HORIZONTAL
EUT	: XS WIRELESS	Model	:SK-XSW
Power Rating	:Battery 1.5V *2	Temp.	:22˚C
Engineer	:Brian Huang	Humi.	:60 %
Test Mode	:Operation Mode		

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
*	41.6400	30.46	-10.19	20.27	40.00	-19.73	QP
	74.6200	29.76	-16.63	13.13	40.00	-26.87	QP
	138.6400	30.03	-10.84	19.19	43.50	-24.31	QP
	196.8400	30.36	-12.68	17.68	43.50	-25.82	QP
	264.7400	29.91	-8.17	21.74	46.00	-24.26	QP
	321.9700	30.24	-6.37	23.87	46.00	-22.13	QP

Note :
1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ( )
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. ” * ” mean this data is the worst emission level.



Site	:Chamber#2	Date	:2023-03-16
Limit	:FCC CLASS-B	Ant. Pol.	:VERTICAL
EUT	: XS WIRELESS	Model	:SK-XSW
Power Rating	:Battery 1.5V *2	Temp.	:22˚C
Engineer	:Brian Huang	Humi.	:60 %
Test Mode	:Operation Mode		

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
*	39.7000	30.08	-8.83	21.25	40.00	-18.75	QP
	97.9000	30.37	-13.46	16.91	43.50	-26.59	QP
	163.8600	30.74	-11.41	19.33	43.50	-24.17	QP
	207.5100	31.10	-10.09	21.01	43.50	-22.49	QP
	279.2900	30.34	-7.81	22.53	46.00	-23.47	QP
	384.0500	31.00	-4.90	26.10	46.00	-19.90	QP

Note :
1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ( )
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. ” * ” mean this data is the worst emission level.