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RF Exposure Evaluation Report

Report No.: CQASZ20201201466E-02
Applicant: TECH-AUDIO CO., LTD
Address of Applicant: NO.3, TungShih li, Ping Cheng Tao Yuan, Taiwan.
Equipment Under Test (EUT):
Product: Weather Speakers
Model No.: AW-WS100, AW-WS200, AW-WS300
Test Model No.: AW-WS300
Brand Name: N/A
FCC ID: 2AABM-AWWS
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2020-12-09
Date of Test: 2020-12-09 to 2020-12-28
Date of Issue: 2020-12-28
Test Result : **PASS***

*In the configuration tested, the EUT complied with the standards specified above

Tested By: *Martin Lee*
(Martin Lee)
Reviewed By: *Ares Liu*
(Ares Liu)
Approved By: *Sheek Luo*
(Sheek Luo)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20201201466E-02	Rev.01	Initial report	2020-12-28

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3 General Information

3.1 Client Information

Applicant:	TECH-AUDIO CO., LTD
Address of Applicant:	NO.3, TungShih li, Ping Cheng Tao Yuan, Taiwan.
Manufacturer:	Atlantic Technology
Address of Manufacturer:	343 Vanderbilt Avenue, Norwood, MA 02062-5060
Factory:	Xiamen Tech-Sound CO.,Ltd
Address of Factory:	NO.170, Ji Yin Road, Tong An District , Xiamen , China.

3.2 General Description of EUT

Product Name:	Weather Speakers
Model No.:	AW-WS100, AW-WS200, AW-WS300
Test Model No.:	AW-WS300
Trade Mark:	N/A
Hardware Version:	REV1.0
Software Version:	skaa-rx-Tech_Audio_JE0685/JE0686/JE0687-develop-v2.5.0-74-gb9c45343- untested.tcf
Test sample No:	CQASZ20201201466E#3
Operation Frequency:	2403.5MHz~2477.3MHz
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	FSK
Transfer Rate:	1Mbps
BW:	2.5MHz
Number of Channel:	49
Hopping Channel Type:	Adaptive Frequency Hopping systems
Sample Type:	<input type="checkbox"/> Mobile <input type="checkbox"/> Portable <input checked="" type="checkbox"/> Fix Location
Test Software of EUT:	SKAA (manufacturer declare)
Antenna Type:	PCB antenna
Antenna Gain:	3.3dBi
Power Supply:	Adapter: 15VDC For AW-WS100, 19VDC For AW-WS200, 24VDC For AW-WS300.

4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 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.

4.1.2 Test Procedure

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

4.2 1.1.3 EUT RF Exposure Evaluation

1) For SKAA

Antenna Gain: 3.3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.14 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

FSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2403.5MHz)	15.560	15.0±1.0	16.0	39.811
Middle(2440.4MHz)	16.410	15.5±1.0	16.5	44.668
Highest(2477.3MHz)	16.870	16.0±1.0	17.0	50.119

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
50.119	3.3	0.0213	1.0	PASS

Note: 1) Refer to report No. CQASZ20201201466E-01 for EUT test Max Conducted Peak Output Power value.

$$2) P_d = (P_{out} * G) / (4 * \pi * R^2) = (50.119 * 2.14) / (4 * 3.1416 * 20^2) = 0.0213$$