

RF Exposure Evaluation Report

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Tested device:	Caspian 4G Streaming Amplifier / Caspian 4G Integrated Amplifier		
Related reports:	-		
Testing has been carried out in accordance with:	47CFR §2.1091 Radiofrequency Radiation Exposure Evaluation: Mobile Devices FCC published RF exposure KDB procedures 447498 D04 Interim General RF Exposure Guidance v01		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory		
Test Results:	The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document		
Date and signatures:	25.11.2025  Laboratory Manager		

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1. EVALUATION SUMMARY

1.1 Test Details

Device under Test (DUT):

Product:	Caspian 4G Streaming Amplifier / Caspian 4G Integrated Amplifier
Manufacturer:	Monitor Audio
Model:	Streaming Amplifier / Integrated Amplifier
Hardware Version:	V0.5.145
FCC ID:	Contains FCC ID: O7VMA104210 Contains FCC ID: FCC ID: 2AC7Z-ESPWROOM32UE Contains FCC ID: 2AATL-8223A-SR
Mobile/Portable device:	Mobile
FCC Test Firm Designation Number:	FI0005
Document ID:	FCC_RF Exposure Evaluation_Caspian 4G Amplifier_ID7678_25112025.docx
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1.2 Evaluation Results

1.2.1 Standalone Exposure

The device conforms to the requirements of the standards when the maximum ERP is less than or equal to the Test Exclusion Threshold Limit.

Mode of Operation	Maximum ERP [mW]	Separation Distance [mm]	MPE-Based Exemption threshold [mW]	Evaluation Result
Bluetooth, Module 1	8.91	200	768	PASS
Bluetooth Low Energy, Module 2	4.47	200	768	PASS
WLAN 2.4 GHz, Module 2	55.21	200	768	PASS
WLAN 2.4 GHz, Module 3	76.21	200	768	PASS
WLAN 5 GHz, Module 3	66.07	200	768	PASS

1.2.2 Simultaneous Transmission Exposure

Highest Simultaneous Transmission SAR	$\sum \text{ERP}_j / \text{ERP}_{\text{th},j}$	Limit	Evaluation Result
Bluetooth, Module 1 + BLE, Module 2 + 2.4 GHz WLAN, Module 3	0.12	1	PASS

2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

The DUT is a Stereo Audio Amplifier that supports 2.4 GHz and 5 GHz WLAN, Bluetooth LE and Bluetooth Classic wireless technologies.

DUT contains three different modules that are used as follows:

- Module 1: Module with FCC ID "O7VMA104210" is used for Bluetooth.
- Module 2: Module with FCC ID "2AC7Z-ESPWROOM32UE" is used for Bluetooth LE and WLAN 2.4 GHz that is used for firmware updates only. WLAN 2.4 GHz of this module is not used simultaneously with other technologies.
- Module 3: Module with FCC ID "2AATL-8223A-SR" is used for WLAN 2.4 GHz and WLAN 5 GHz.

Other technologies in the modules are disabled.



Figure 1. Overview of the DUT

Antenna gains for all radios are tested in Kiwa test report number 10-14745-22-25 Issue 01.

Exposure Environment	General population, uncontrolled
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2.1 Supported Frequency Bands and Operational Modes

TX Frequency bands	Modes of Operation	Transmitter Frequency Range [MHz]	Maximum Specified Output Power [dBm]
	Bluetooth, Module 1	2402 – 2480	8
	Bluetooth Low Energy, Module 2	2402 – 2480	5
	WLAN 2.4 GHz, Module 2	2412 – 2462	15.92
	WLAN 2.4 GHz, Module 3	2412 – 2462	21.87
	WLAN 5 GHz, Module 3	5150 – 5850	19.80

3. TEST EXCLUSIONS

FCC MPE-based Exemption thresholds in 447498 D04 Interim General RF Exposure Guidance v01 are shown in a table below.

TABLE B.1—THRESHOLDS FOR SINGLE RF SOURCES
SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	1,920 R ²
1.34	–	30	35.6 m	–	1.6 m	3,450 R ² /f ²
30	–	300	1.6 m	–	159 mm	3.83 R ²
300	–	1,500	159 mm	–	31.8 mm	0.0128 R ² f
1,500	–	100,000	31.8 mm	–	0.5 mm	19.2R ²
Subscripts L and H are low and high; λ is wavelength. From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.						

According to Table B.1 in 447498 D04 Interim General RF Exposure Guidance v01, FCC MPE-based Exemption threshold can be calculated according to formula:

$$1500\text{-}100\,000\text{ MHz: } 19.2R^2$$

where:

R = Separation distance (m)

f = Frequency (MHz)

Modes of Operation	Frequency [MHz]	Separation Distance [mm]	P _{th} [mW]
Bluetooth	2402	200	768
WLAN 2.4 GHz	2412	200	768
WLAN 5 GHz	5150	200	768
Bluetooth Low Energy	2402	200	768

4. RESULTS

4.1 Standalone Exposure

Modes of Operation	Frequency [MHz]	Distance, R [mm]	Maximum Input Power to Antenna, P [dBm]	Time Averaging Factor	Time-Averaged Input Power to Antenna, P [mW]	Time-Averaged Input Power to Antenna, P [dBm]	Power Gain of Antenna, G [dBi]	Time-Averaged ERP [dBm]	Time-Averaged ERP [mW]	P _{th} [mW]
Bluetooth, Module 1	2402	200	8	1	6.31	8	3.65	9.50	8.91	768
Bluetooth Low Energy, Module 2	2402	200	5	1	3.16	5	3.65	6.50	4.47	768
WLAN 2.4 GHz, Module 2	2412	200	15.92	1	39.08	15.92	3.65	17.42	55.21	768
WLAN 2.4 GHz, Module 3	2412	200	21.87	1	153.82	21.87	-0.90	18.82	76.21	768
WLAN 5 GHz, Module 3	5150	200	19.80	1	95.50	19.80	0.55	18.20	66.07	768

The ERP of the DUT is below the test exclusion threshold.

4.2 Simultaneous Transmission Analysis

The simultaneous transmission compliance is determined by sum of the ratios that can be transmitting simultaneously using formula C.1 from 447498 D04 Interim General RF Exposure Guidance v01.

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

where

ERP_j = the available maximum time-averaged power or the ERP, whichever is greater, of fixed, mobile, or portable RF source j.

ERP_{th,j} = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least $\lambda/2\pi$, according to the applicable § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.

Following simultaneous transmission combinations are supported:

- Bluetooth, Module 1 + BLE, Module 2 + 2.4 GHz WLAN, Module 3
- Bluetooth, Module 1 + BLE, Module 2 + 5 GHz WLAN, Module 3
- Bluetooth, Module 1 + BLE, Module 2

Modes of Operation	ERP _j / ERP _{th,j}
Bluetooth, Module 1	0.012
Bluetooth Low Energy, Module 2	0.0058
WLAN 2.4 GHz, Module 3	0.099
WLAN 5 GHz, Module 3	0.086
Maximum Bluetooth, Module 1	0.012
Maximum BLE, Module 2	0.0058
Maximum WLAN, Module 3	0.099
Maximum Simultaneous Compliance Ratio	0.12

The sum of simultaneously transmitting radios is below 1 thus the result **PASS**.