Certificate # 1514.1

Test Type:	Emissions
Product Type:	*Wireless Earbud*
Product Name/Number:	*Model 408R and 408L*
FCC ID: IC:	*A94408R and A94408L* *3232A-408R and 3232A-408L*
Prepared For:	*Product Assurance Engineering Department, Bose Corporation*
Name of manufacturing agency applying for equipment type approval	Bose Corporation
Postal Address of manufacturing Agency	The Mountain Framingham MA 01701 USA
Test Results:	Pass
Applicable Standards:	*FCC 47 CFR PART 15 SUBPART C* *ISED RSS-247 ISSUE 2* *ISED RSS-GEN ISSUE 5*
Report Number:	*EMC.441408.23.167.7*

General Comments/Special Test Conditions:
This report relates only to the items tested. This report covers EMC marking requirements for
Enter product and any special modifications or test conditions.

	Print Name	Signature	Date
Prepared By:	Bryan Cerqua	Bryan H Cerqua	8/14/2023
Electrical Engineer Review* By:	Kenneth Lee		8/14/2023

* Since every test result is separately reviewed after its completion, the electrical engineer review indicated above represents a higher-level review to ensure this report lists and contains all applicable and appropriate requirements.

Certificate # 1514.1

If the report carries the “accredited” logo, the reviewer must verify all the tests in this report are covered under the current ISO17025 accreditation. The A2LA-accredited logo must be removed if any of the tests in the report are not performed under the current scope of accreditation. It is the responsibility or the reviewer to ensure the A2LA advertising policy is followed.

Table of Contents

Tests Performed (Table of Contents):

Test Report Summary

Product Information:

Description

Truly Wireless In Ear (TWIE) earbud. The bud uses Bluetooth classic (BT) Bluetooth Low Energy (BLE), and Qualcomm High Speed (QHS). The QHS is used for bud-to-bud communications. The role of master/puppet can be changed to best meet radio link conditions during operation. The unit is not supplied with an AC to USB adapter. The antenna is an inverted F with a maximum gain of 0.58 dBi (Left Earbud) and 0.86 dBi (Right Earbud) formed by Laser Direct Sequence on the inside of the top cover of the earbud.

AC mains conducted emissions test performed with earbuds placed in charging case with charging case powered by USB supply plugged into 120VAC 60 Hz. Power supply used is shown on page 6.

EUT Condition

Product was as built in the factory. For the conducted measurements the antenna was removed, and coaxial cable was installed in its place. Where necessary USB debug wires were added to allow control of the Radio.

Scope:

This report covers EMC requirements. *FCC or ISED, FHSS low power transceiver.*

Test Objective:

Verify product meets all applicable EMC requirements.

Results:

Product complies with all applicable EMC requirements. All final results represent worst-case emissions and/or immunity.

Conclusions:

The device under test (D.U.T.):
[**X**] meets all test standards on page 1 of this report.

Test Results Summary

TEST NAME	TEST RESULT PASS or N/A	COMMENT(S)
RF Conducted Emissions – AC Mains	Pass	

Environmental Conditions

Ambient:

Temperature:	22±4°C
Humidity:	30-60%RH
Mains Voltage:	120VAC, 5VDC USB

FCC Test Site Accreditation:

Firm Name	Location	Expiration Date	Accreditation	MRA	Designation Number	Contact	Contact Title	Address	PO Box	Mail Stop	City	State	Zip Code	Country	Email	Phone	Fax
Bose Corporation	1 New York Avenue, Framingham, MA	07/31/2024	American Association for Laboratory Accreditation	N/A	US1088	Mr. Cable Best	Quality Manager	Mail Stop 450 The Mountain	N/A	450	Framingham	Massachusetts	01701	United States	Cable_Best@bose.com	1 508 766 6137	508 766 1145

Canadian Test Site Registration:

BOSE CORPORATION 1 New York Avenue Framingham, MA 01701 UNITED STATES **Company Number: 3232A** Contact: Mario Espinal mario_espinal@bose.com	US0210	RSS-GEN (2019-02-11) RSS-210 (2019-02-11) RSS-247 (2019-02-11) RSS-248 (2021-11-19)	**RECOGNIZED UNTIL:** **2024-07-31** A2LA ISO/IEC 17025:2017 Expires: 2024-07-31

RF Conducted Emissions – AC Main.

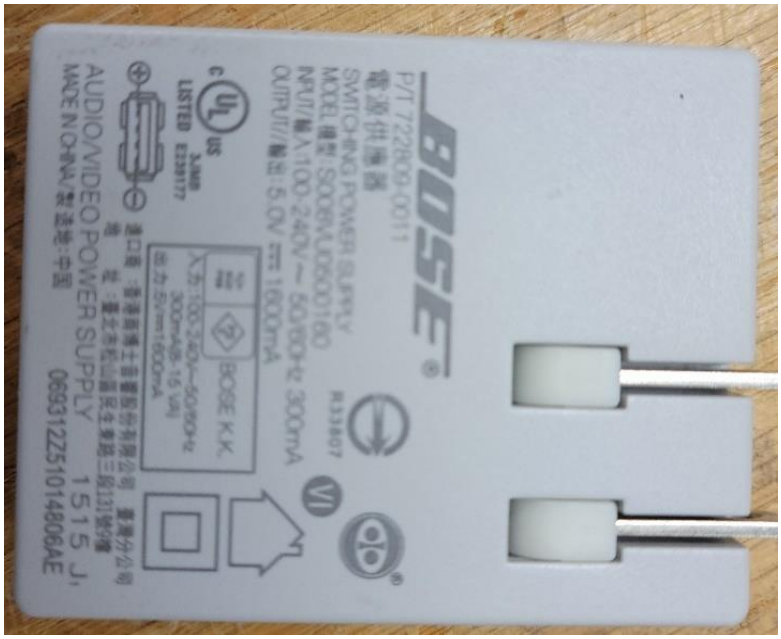
Test information:

Project number (Integrity):	442343	**Build Phase:**	C1.5		
Tested by:	Michael Mehrmann		**Date:**	June 8 and 9, 2023	
Requirements Standard(s):	FCC Part15B, EN55032, EN301489, EN55011		**Referenced Standard(s):**	EN60610-1-2	
EUT powered with:	120VAC 60Hz	**Temp / Humidity:**	N/A	**Test location:**	Henry
Test equipment used TN's:	2247,2236,1380				
EUT Serial number(s):	Case: 08463M314V005A1 Right Bud: 084808M3086B014A1 Left Bud: 084808M3086B015A1				
EUT Software installed:	1.4.24FW				
EUT Modification(s):	C1.5 case, locked, with TVS devices added to D+ and D- USB lines near MCU.				

Objective/Summary/Conclusion:

Passed with margin.

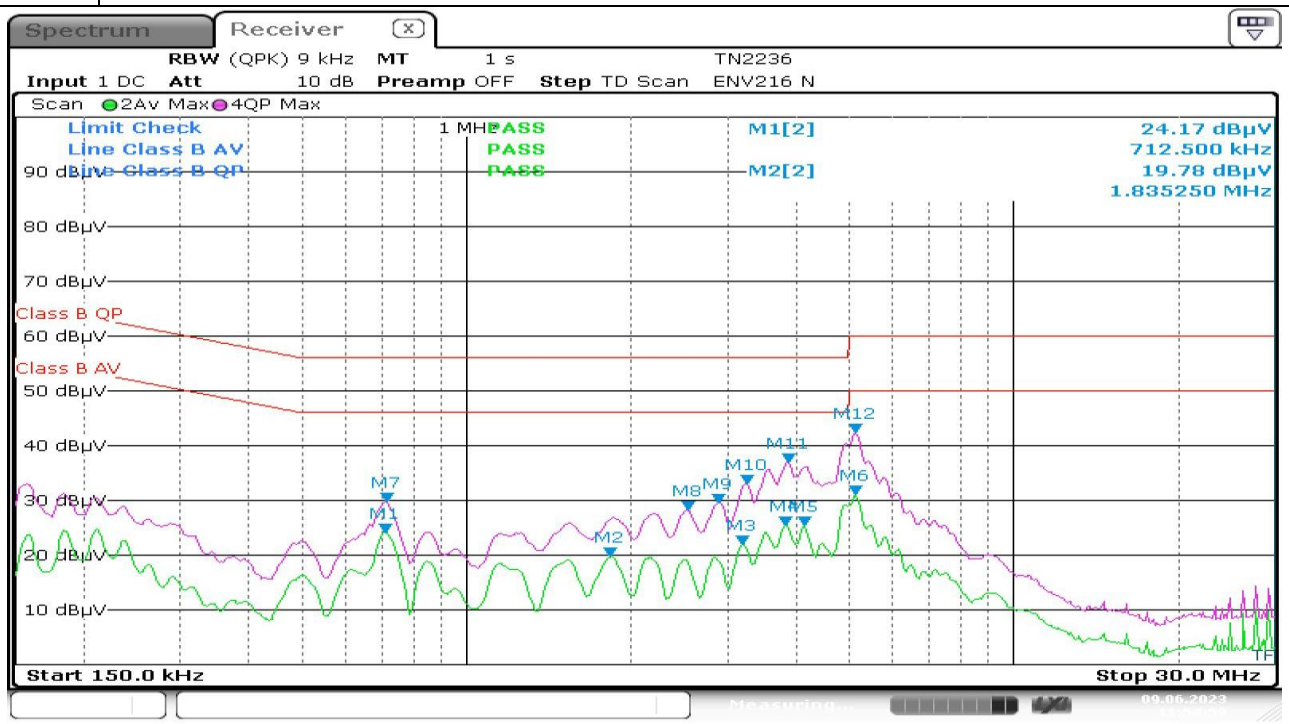
USB 5V charging power supply:



USB charger used to test RF Conducted emissions on mains.

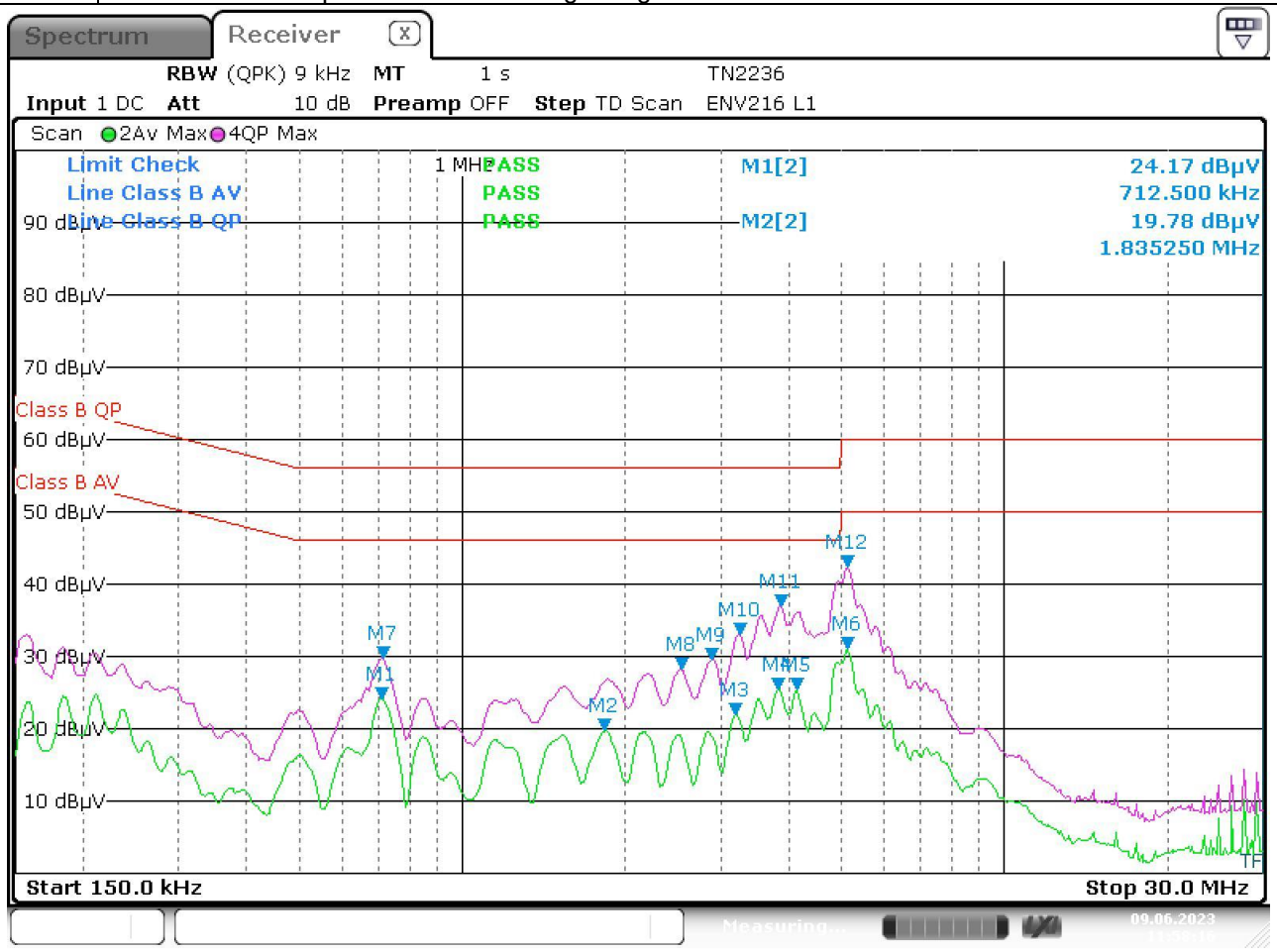
Data Collection:

EUT S/N:		☐L1 ☒Neutral	☒120V 60Hz ☐230V 50Hz	☐GNDED ☐UN-GNDED
EUT Setup:	Case Charging docked Buds			
EUT Mods:	C1.5 case, locked, with TVS devices added to D+ and D- USB lines near MCU.			
Comments:	Earbuds are not operational while being charged.			



FCC 15B and CISPR 32 Class B Product								
Mk	Frequency	MEASURED		LIMIT		MARGIN		
#	MHz	dBµV QP	dBµV AVG	dBµV QP	dBµV AVG	dB QP	dB AVG	Notes
1	5.1428	42.30	31.10	60.0	50.0	17.7	18.9	
2	5.1293	42.30	31.10	60.0	50.0	17.7	18.9	
3	3.8850	37.00	25.00	56.0	46.0	19.0	21.0	
4	3.8288	36.60	25.50	56.0	46.0	19.4	20.5	
5	4.1528	36.10	25.40	56.0	46.0	19.9	20.6	
6	0.7125	29.70	24.20	56.0	46.0	26.3	21.8	
7	0.7170	29.70	24.00	56.0	46.0	26.3	22.0	
8	3.2483	33.00	21.70	56.0	46.0	23.0	24.3	
9	3.1965	32.40	21.90	56.0	46.0	23.6	24.1	
10	1.8353	26.80	19.80	56.0	46.0	29.2	26.2	
11	2.8883	29.60	19.30	56.0	46.0	26.4	26.7	
12	2.5395	28.30	19.00	56.0	46.0	27.7	27.0	

EUT S/N:		☒L1 ☐Neutral	☒120V 60Hz ☐230V 50Hz	☐GNDED ☐UN-GNDED
EUT Setup:	Case Charging Docked Buds			
EUT Mods:	C1.5 case, locked, with TVS devices added to D+ and D- USB lines near MCU.			
Comments:	Earbuds are not operational while being charged.			



Date: 9.JUN.2023 11:58:17

FCC 15B and CISPR 32 Class B Product								
Mk	Frequency	MEASURED		LIMIT		MARGIN		
#	MHz	dBµV QP	dBµV AVG	dBµV QP	dBµV AVG	dB QP	dB AVG	Notes
1	5.1428	42.30	31.10	60.0	50.0	17.7	18.9	
2	5.1293	42.30	31.10	60.0	50.0	17.7	18.9	
3	3.8850	37.00	25.00	56.0	46.0	19.0	21.0	
4	3.8288	36.60	25.50	56.0	46.0	19.4	20.5	
5	4.1528	36.10	25.40	56.0	46.0	19.9	20.6	
6	0.7125	29.70	24.20	56.0	46.0	26.3	21.8	
7	0.7170	29.70	24.00	56.0	46.0	26.3	22.0	
8	3.2483	33.00	21.70	56.0	46.0	23.0	24.3	
9	3.1965	32.40	21.90	56.0	46.0	23.6	24.1	
10	1.8353	26.80	19.80	56.0	46.0	29.2	26.2	
11	2.8883	29.60	19.30	56.0	46.0	26.4	26.7	
12	2.5395	28.30	19.00	56.0	46.0	27.7	27.0	

Limits:

AC MAINS PORTS

Standard	Class	Freq Range (MHz)	Limits (dBµV)		Comments
			QP	AVG	
FCC 15B/ CISPR32 based/CISPR11 Class B only	A	0.15 - 0.5	79	66	-Ensure bandwidth set to 9 kHz. -EUT must pass both QP and AVG limits. [1] These limits decrease linearly with the log of the frequency. CISPR32 based standards: EN55032, AS/NZS CISPR32
		0.5 - 30	73	60	
	B	0.15 - 0.5	66-56[1]	56-46[1]	
		0.5 - 5	56	46	
		5 - 30	60	50	

Equipment Used:

TN	Description	Model	S/N	Manufacturer	Most Recent Calibration	Calibration Due Date	Most Recent Verification	Verification Due Date
2247	EMI Test Receiver, 7GHZ	ESR7	101263	Rohde & Schwarz	21-Mar-2023	20-Mar-2024		
2236	2-LINE V-NETWORK	ENV216	101193	Rohde & Schwarz	29-Mar-2022	28-Mar-2024		
1380	Conducted Comb Generator	CGC-510	311559	Com-Power Corporation			11-Jul-2023	10-Jul-2024
3724	Cable 16’	RG 223	N/A	Pasternack			6-JUL-2022	6-JUL-2023
2114	Henry screen room	N/A	1698C	Panashield			7-OCT-2022	7-OCT-2023

Uncertainty:

Uncertainty Budget (AC mains measurements)				
Title:	Conducted RF Emissions (Mains)			
Source of Uncertainty	Value units:± dB	Distribution	Divisor	Uncertainty (± dB)
Receiver - absolute level	0.3	Rect.	1.73	0.17
Receiver - frequency response	1.0	Rect	1.73	0.58
Receiver - attenuator switching	0.2	Rect.	1.73	0.12
Receiver - bandwidth switching	0.2	Rect.	1.73	0.12
Receiver - display	0.5	Rect.	1.73	0.29
LISN impedance	2.6	Triang.	2.45	1.06
LISN insertion loss	0.6	Norm.	2.00	0.30
Cable correction factor	0.1	Norm.	2.00	0.05
			Combined uncertainty (RSS):	1.30
			Coverage factor (2 sigma):	2.00
			Extended uncertainty (95% confidence):	**2.60**

End of report