Prüfbericht-Nr.: *Test report no.*:	**CN25GK1L 002**	**Auftrags-Nr.:** *Order no.*:	168538513	**Page 1 of 23** *Seite 1 von 23*
Kunden-Referenz-Nr.: *Client reference no.*:	N/A	**Auftragsdatum:** *Order date:*	2025-02-10	
Auftraggeber: *Client*:	**Harman International Industries, Inc** 8500 Balboa Blvd, Northridge, California, 91329, United States			
Prüfgegenstand: *Test item*:	BLUETOOTH HEADSET			
Bezeichnung / Typ-Nr.: *Identification / Type no.*:	ENDURANCE ZONE (Trademark: JBL)			
Auftrags-Inhalt: *Order content*:	Type test			
Prüfgrundlage: *Test specification*:	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.209		RSS-247 Issue 3 August 2023 RSS-Gen Issue 5 March 2019	

Wareneingangsdatum: *Date of sample receipt*:	2025-02-11
Prüfmuster-Nr.: *Test sample no:*	A003922401
Prüfzeitraum: *Testing period*:	2025-02-11 – 2025-03-05
Ort der Prüfung: *Place of testing*:	TÜV Rheinland (Shenzhen) Co., Ltd.
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.
Prüfergebnis*: *Test result**:	Pass

Refer to photos document

geprüft von: tested by:	X Signed by: Harry W. C. Wu	**genehmigt von:** *authorized by*:	X Signed by: Alex Lan
Datum: *Date:* 2025-03-14		**Ausstellungsdatum:** *Issue date:* 2025-03-14	
Stellung / Position:	Project Manager	**Stellung** / Position:	Authorizer

Sonstiges / *Other*: FCC ID: APIENDURANCEZE
IC: 6132A-ENDURANCEZE HVIN: ENDURANCE ZONE

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery*: Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*P(ass) = passed a.m. test specification(s)*	*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Remarks
Anmerkungen

1	The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request. *Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.* *Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.*
2	As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. *Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben.*
3	Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report. *Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.*
4	The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the “Zero Guard Band Rule” and “Simple Acceptance” in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019. *Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnisen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezueglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.*

Test Summary

5.1.1 ANTENNA REQUIREMENT
RESULT: Pass

5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER
RESULT: Pass

5.1.3 CONDUCTED POWER SPECTRAL DENSITY
RESULT: Pass

5.1.4 99%DB BANDWIDTH
RESULT: Pass

5.1.5 6DB BANDWIDTH
RESULT: Pass

5.1.6 FREQUENCY STABILITY
RESULT: Pass

5.1.7 DUTY CYCLE
RESULT: Pass

5.1.8 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH
RESULT: Pass

5.1.9 RADIATED SPURIOUS EMISSION
RESULT: Pass

Contents

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results of Bluetooth Low Energy (Left earbud).

Appendix C: Test Results of Bluetooth Low Energy (Right earbud).

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China

FCC Registration No.: 694916

IC Registration No.: 25069 and the CAB identifier is CN0078.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY60241175	25.09.2025
MXG X-Series RF Vector Signal Generator	Keysight	N5182B	MY61250137	25.09.2025
EXG X-Series Microwave Analog Signal Generator	Keysight	N5173B	MY61250141	25.09.2025
DC Power Supply	Keysight	E3642A	MY61276100	25.09.2025
Wireless Connectivity Tester	R&S	CMW270	102505	25.09.2025
Power Control Unit	Tonscend	JS0806-4ADC	N/A	25.09.2025
Automation Control Unit	Tonscend	JS0806-2	21C8060396	25.09.2025
Humid & Temp Programmable Tester	BOST	NTH090-60	19040801	24.02.2026
Cable 1	Calibration frequency range: 9 kHz~1.0 GHz			20.12.2025
Cable 2	Calibration frequency range: 9 kHz~18 GHz			20.12.2025
Cable 3	Calibration frequency range: 1 GHz~40 GHz			20.12.2025
Test Software	Tonscend	JS1120-3	N/A	N/A
Control PC	Lenovo	TianYi510S-071MB	YLX23JMF	N/A
Unwanted Emission Testing				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EMI Test Receiver	R&S	ESR 7	102021	28.09.2025
Signal Analyzer	R&S	FSV 40	101439	28.09.2025
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	28.09.2025
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	28.09.2025
Amplifier	R&S	SCU-18F	180070	28.09.2025
Amplifier	R&S	SCU40A	100475	28.09.2025
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	27.09.2026
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	27.09.2026
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	27.09.2026
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	27.09.2026
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	13.09.2027
Above 1G cable #1 i	Calibration frequency range: 9 kHz~6 GHz			20.12.2025
Above 1G cable #2	Calibration frequency range: 1 GHz~18 GHz			20.12.2025
Antenna-Preamplifier 40GHz cable	Calibration frequency range: 1 GHz~40 GHz			20.12.2025

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Parameter	Uncertainty (k=2)
Occupied Channel Bandwidth	± 2.08 %
RF output power, conducted	± 0.99 dB
RF power density, conducted	± 0.99 dB
Unwanted Emissions, conducted	± 0.89 dB
All emissions, radiated	± 4.17 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B & C of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at 362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a Bluetooth headset, which consist of a left earbud, a right earbud and a charging case, the left & right earbuds supports Bluetooth dual mode technology.
The left earbud is differences with right earbud in PCB layout and antenna.
The Classical Bluetooth and Bluetooth low energy can't transmit at the same time.

For details refer to the User Manual and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	BLUETOOTH HEADSET
Type Designation	ENDURANCE ZONE
Trademark	JBL
FCC ID	APIENDURANCEZE
IC	6132A-ENDURANCEZE
HVIN	ENDURANCE ZONE
Extreme Temperature Range	0ºC to +45ºC
Operating Voltage	For charging case: Input: DC 5V, 1A via Type C interface or DC 3.8V, 520mAh via built-in Li-ion battery Output: DC 5V, 200mA * 2 For left & right earbuds: DC 3.85V, 58mAh via built-in lithium-ion battery DC 5V, 0.2A*2 via charging case
Technical Specification of Classical Bluetooth	
Bluetooth Core Version	Bluetooth 5.3
Operating Frequency band	2402 ~ 2480 MHz
Channel Number	79 channels
Channel separation	1MHz
Modulation	GFSK, π/4DQPSK, 8DPSK
Antenna Type	FPC antenna
Antenna Gain	-1.65 dBi for left earbud -1.21dBi for right earbud (Provided by the Client)
Technical Specification of Bluetooth Low Energy	
Bluetooth Core Version	Bluetooth 5.3
Operating Frequency band	2402 – 2480 MHz
Channel Number	40 channels
Channel separation	2MHz
Data rate	1Mbps, 2Mbps
Modulation	GFSK
Antenna Type	FPC antenna
Antenna Gain	-1.65 dBi for left earbud -1.21 dBi for right earbud (Provided by the Client)

Table 3: RF Channel and Frequency of Classic Bluetooth

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
00	**2402.00**	20	2422.00	40	2442.00	60	2462.00
01	2403.00	21	2423.00	41	2443.00	61	2463.00
02	2404.00	22	2424.00	42	2444.00	62	2464.00
03	2405.00	23	2425.00	43	2445.00	63	2465.00
04	2406.00	24	2426.00	44	2446.00	64	2466.00
05	2407.00	25	2427.00	45	2447.00	65	2467.00
06	2408.00	26	2428.00	46	2448.00	66	2468.00
07	2409.00	27	2429.00	47	2449.00	67	2469.00
08	2410.00	28	2430.00	48	2450.00	68	2470.00
09	2411.00	29	2431.00	49	2451.00	69	2471.00
10	2412.00	30	2432.00	50	2452.00	70	2472.00
11	2413.00	31	2433.00	51	2453.00	71	2473.00
12	2414.00	32	2434.00	52	2454.00	72	2474.00
13	2415.00	33	2435.00	53	2455.00	73	2475.00
14	2416.00	34	2436.00	54	2456.00	74	2476.00
15	2417.00	35	2437.00	55	2457.00	75	2477.00
16	2418.00	36	2438.00	56	2458.00	76	2478.00
17	2419.00	37	2439.00	57	2459.00	77	2479.00
18	2420.00	38	2440.00	58	2460.00	**78**	**2480.00**
19	2421.00	**39**	**2441.00**	59	2461.00	--	--

Table 4: RF Channel and Frequency of Bluetooth Low Energy

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
00	**2402.00**	10	2422.00	20	2442.00	30	2462.00
01	2404.00	11	2424.00	21	2444.00	31	2464.00
02	2406.00	12	2426.00	22	2446.00	32	2466.00
03	2408.00	13	2428.00	23	2448.00	33	2468.00
04	2410.00	14	2430.00	24	2450.00	34	2470.00
05	2412.00	15	2432.00	25	2452.00	35	2472.00
06	2414.00	16	2434.00	26	2454.00	36	2474.00
07	2416.00	17	2436.00	27	2456.00	37	2476.00
08	2418.00	18	2438.00	28	2458.00	38	2478.00
09	2420.00	**19**	**2440.00**	29	2460.00	**39**	**2480.00**

3.3 Independent Operation Modes

The basic operation modes are:

A. On, Bluetooth LE transmitting mode
    1. Low channel
    2. Middle channel
    3. High channel

B. On, Bluetooth connecting mode

C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- Block Diagram
- FCC/IC Label and Location Info
- Operation Description
- Photo Document
- Schematics
- User Manual

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

4.3 Special Accessories and Auxiliary Equipment

Table 5: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N or Rating
Laptop	Lenovo	T480	PF-16A6N8
AC/DC Adapter	SAMSUNG	EP-T6530	Input: 100-240V, 50/60Hz, 1.7A Output: DC 5V, 3A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 30MHz)

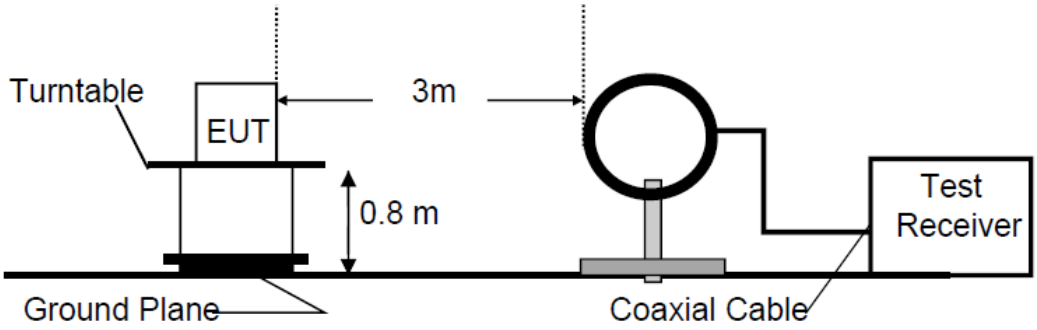


Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

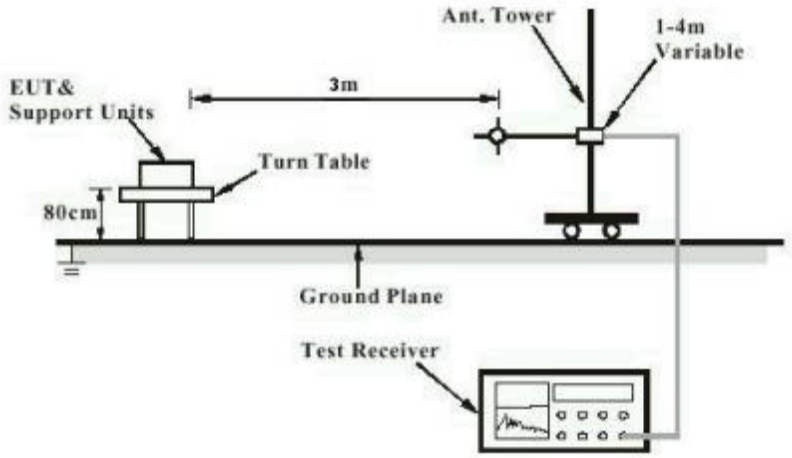


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

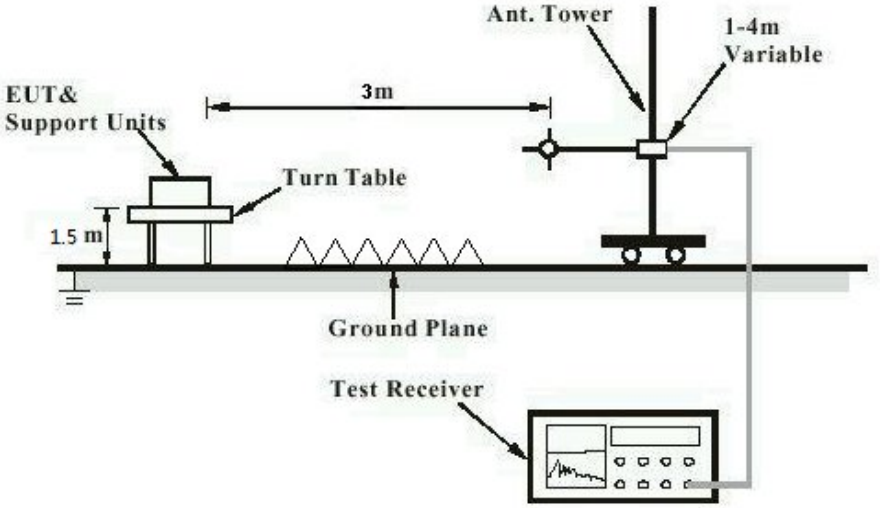
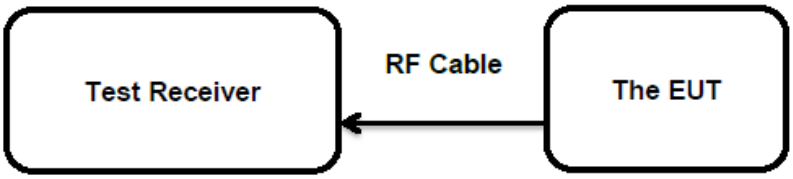


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(b)(4) and Part 15.203 RSS-Gen Clause 6.7
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declared, the EUT has one FPC antenna, the directional gain of antennas is -1.65 dBi for left earbud and -1.21dBi for right earbud, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Peak Conducted Output Power

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(b)(3) RSS-247 Clause 5.4(d)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 1 Watt (Maximum Conducted Peak Power) e.i.r.p. <4W
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2025-02-11 to 2025-03-05
Input voltage	:	DC 3.85V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

For details refer to following test result.

Table 6: Test Result of Maximum Peak Conducted Output Power, Left earbud

Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
1 Mbps	2402	6.60	0.00457	< 1.0
	2440	6.54	0.00451	
	2480	6.54	0.00451	
2 Mbps	2402	9.51	0.00893	
	2440	9.40	0.00871	
	2480	9.18	0.00828	
Maximum Measured Value		9.51	0.00893	

Note: The cable loss is taken into account in results and the maximum e.i.r.p. is 7.86 dBm less than 4W (36 dBm).

Table 7: Test Result of Maximum Peak Conducted Output Power, Right earbud

Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
1 Mbps	2402	6.32	0.00429	< 1.0
	2440	6.20	0.00417	
	2480	5.93	0.00392	
2 Mbps	2402	8.96	0.00787	
	2440	8.88	0.00773	
	2480	8.48	0.00705	
Maximum Measured Value		8.96	0.00787	

Note: The cable loss is taken into account in results and the maximum e.i.r.p. is 7.75 dBm less than 4W (36 dBm).

5.1.3 Conducted Power Spectral Density

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(e) RSS-247 Clause 5.2(b)
Basic standard	:	ANSI C63.10: 2013
Limits	:	8 dBm / 3kHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2025-02-11 to 2025-03-05
Input voltage	:	DC 3.85V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B & C.

Table 8: Test Result of Conducted Power Spectral Density, Left earbud

Data Rate	Channel Frequency (MHz)	Measured Conducted Power Spectral Density (dBm / 3kHz)	Limit
1 Mbps	2402	-9.22	8 dBm / 3kHz
	2440	-9.19	
	2480	-9.27	
2 Mbps	2402	-8.39	8 dBm / 3kHz
	2440	-8.32	
	2480	-8.67	

Table 9: Test Result of Conducted Power Spectral Density, Right earbud

Data Rate	Channel Frequency (MHz)	Measured Conducted Power Spectral Density (dBm / 3kHz)	Limit
1 Mbps	2402	-9.58	8 dBm / 3kHz
	2440	-9.58	
	2480	-10.04	
2 Mbps	2402	-9.01	8 dBm / 3kHz
	2440	-8.93	
	2480	-9.44	

5.1.4 99%dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	RSS-Gen clause 6.7
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2025-02-11 to 2025-03-05
Input voltage	:	DC 3.85V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B & C.

Table 10: Test Result of 99% Bandwidth, Left earbud

Data Rate	Channel Frequency (MHz)	Measured 99% Bandwidth (MHz)	Limit
1 Mbps	2402	1.0489	/
	2440	1.0460	
	2480	1.0444	
2 Mbps	2402	2.0700	/
	2440	2.0799	
	2480	2.0787	

Table 11: Test Result of 99% Bandwidth, Right earbud

Data Rate	Channel Frequency (MHz)	Measured 99% Bandwidth (MHz)	Limit
1 Mbps	2402	1.0459	/
	2440	1.0480	
	2480	1.0544	
2 Mbps	2402	2.0846	/
	2440	2.0982	
	2480	2.0969	

Note: The fundamental emissions stay within the allocated band 2400-2483.5MHz.

5.1.5 6dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(2) RSS-247 Clause 5.2(a)
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2025-02-11 to 2025-03-05
Input voltage	:	DC 3.85V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B & C.

Table 12: Test Result of 6dB Bandwidth, Left earbud

Data Rate	Channel Frequency (MHz)	Measured 6dB Bandwidth (MHz)	Limit
1 Mbps	2402	0.684	>500kHz
	2440	0.700	
	2480	0.688	
2 Mbps	2402	1.188	>500kHz
	2440	1.312	
	2480	1.368	

Table 13: Test Result of 6dB Bandwidth, Right earbud

Data Rate	Channel Frequency (MHz)	Measured 6dB Bandwidth (MHz)	Limit
1 Mbps	2402	0.680	>500kHz
	2440	0.688	
	2480	0.700	
2 Mbps	2402	1.224	>500kHz
	2440	1.188	
	2480	1.132	

5.1.6 Frequency stability

RESULT: **Pass**

Test Specification

Test standard	:	RSS-247 Clause 8.11
Basic standard	:	ANSI C63.10: 2013
Limits	:	within at least the central 80% of its permitted operating frequency band (2400-2483.5MHz)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2025-02-11 to 2025-03-05
Input voltage	:	DC 3.85V
Operation mode	:	B
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B & C.

5.1.7 Duty Cycle

RESULT: **Pass**

Test Specification

Test standard	:	FCC KDB 558074 D001
Basic standard	:	ANSI C63.10: 2013
Limits	:	N/A
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2025-02-11 to 2025-03-05
Input voltage	:	DC 3.85V
Operation mode	:	B
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B & C.

5.1.8 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) RSS-247 Clause 5.5
Basic standard	:	ANSI C63.10: 2013
Limits	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2025-02-11 to 2025-03-05
Input voltage	:	DC 3.85V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.8 ℃
Relative humidity	:	55 %
Atmospheric pressure	:	101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix B & C.

5.1.9 Radiated Spurious Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3 & 5.5
Basic standard	:	ANSI C63.10: 2013
Limits	:	Refer to 15.209(a) of FCC part 15.247(d) RSS-Gen Table 4 & Table 5
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	2025-02-11 to 2025-03-05
Input voltage	:	DC 3.85V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	Refer to test result
Relative humidity	:	Refer to test result
Atmospheric pressure	:	101 kPa

Remark:
Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix B & C.

6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

7 List of Tables

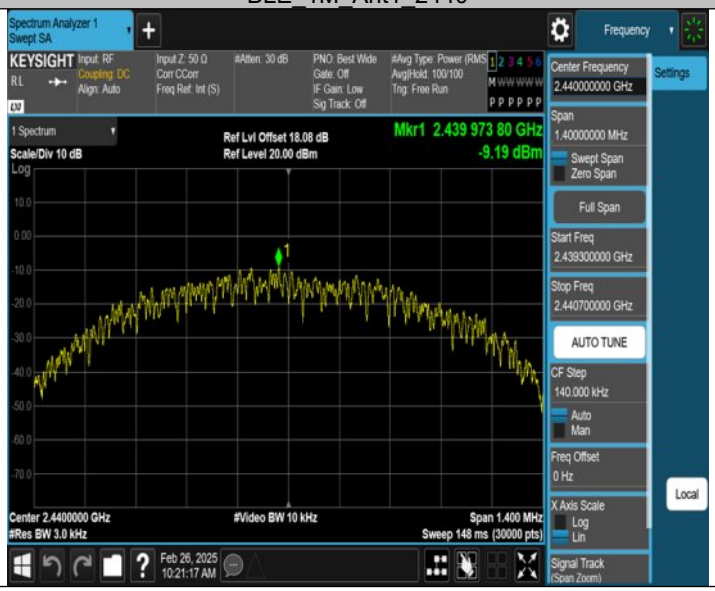
Appendix B: Test Results of Bluetooth Low Energy (Left earbud)

Appendix B.1: Test Results of Conducted Power Spectral Density

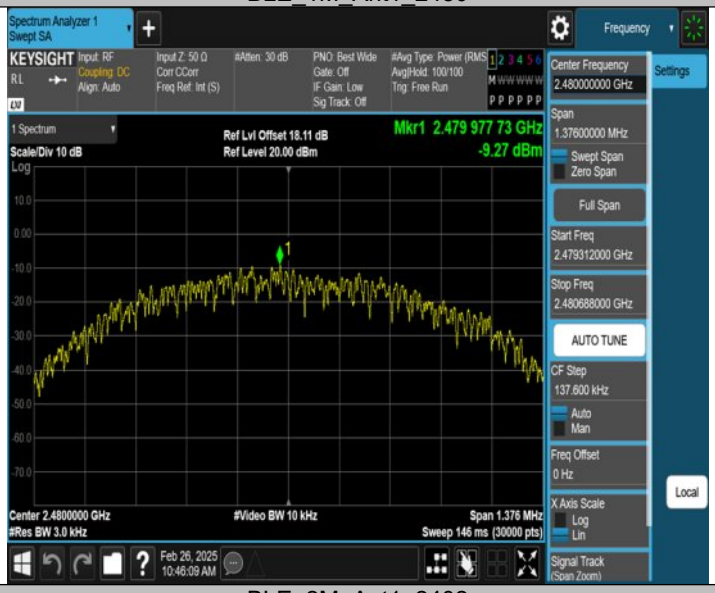
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-9.22	≤8.00	PASS
		2440	-9.19	≤8.00	PASS
		2480	-9.27	≤8.00	PASS
BLE_2M	Ant1	2402	-8.39	≤8.00	PASS
		2440	-8.32	≤8.00	PASS
		2480	-8.67	≤8.00	PASS

BLE_1M_Ant1_2402

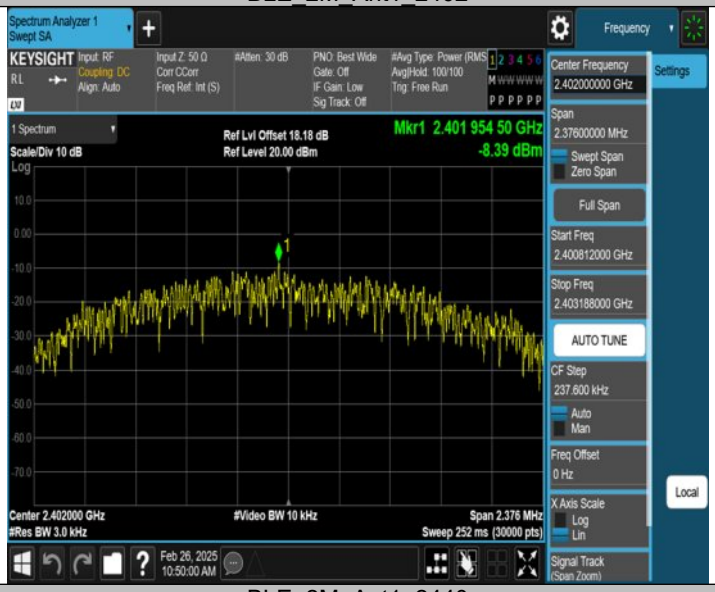
BLE_1M_Ant1_2440



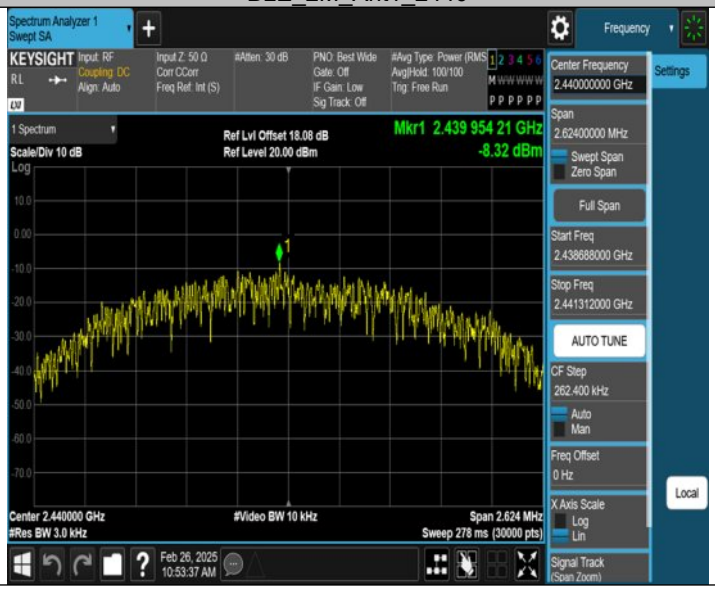
BLE_1M_Ant1_2480

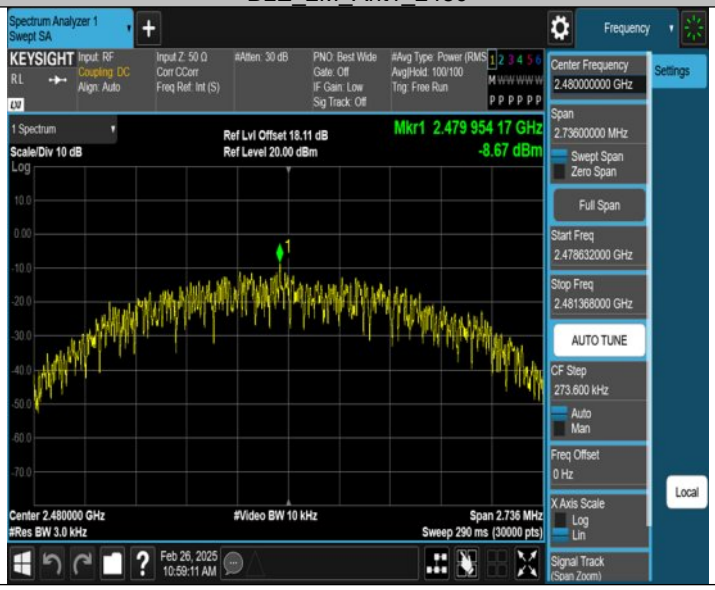


BLE_2M_Ant1_2402



BLE_2M_Ant1_2440



BLE_2M_Ant1_2480


Appendix B.2: Test Results of 6dB Bandwidth

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.684	2401.648	2402.332	0.5	PASS
		2440	0.700	2439.644	2440.344	0.5	PASS
		2480	0.688	2479.656	2480.344	0.5	PASS
BLE_2M	Ant1	2402	1.188	2401.396	2402.584	0.5	PASS
		2440	1.312	2439.336	2440.648	0.5	PASS
		2480	1.368	2479.312	2480.680	0.5	PASS

BLE_1M_Ant1_2402

BLE_1M_Ant1_2440

BLE_1M_Ant1_2480

BLE_2M_Ant1_2402

BLE_2M_Ant1_2440

BLE_2M_Ant1_2480


Appendix B.3: Test Results of 99% Bandwidth

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0489	2401.4825	2402.5314	---	---
		2440	1.0460	2439.4843	2440.5303	---	---
		2480	1.0444	2479.4811	2480.5255	---	---
BLE_2M	Ant1	2402	2.0700	2400.9797	2403.0497	---	---
		2440	2.0799	2438.9725	2441.0524	---	---
		2480	2.0787	2478.9785	2481.0572	---	---

BLE_1M_Ant1_2402

BLE_1M_Ant1_2440

BLE_1M_Ant1_2480

BLE_2M_Ant1_2402

BLE_2M_Ant1_2440

BLE_2M_Ant1_2480

Appendix B.4: Test Results of Frequency stability

Test Channel (MHz)	2402

Test result of frequency tolerance of voltage variation

Voltage	Test result (MHz)	Deviation Frequency (KHz)	Test result (ppm)	Limit (ppm)
DC 3.85V	2402.0027	2.7	1.12	10
DC 3.465V	2402.0024	2.4	1.00	
DC 4.235V	2402.0027	2.7	1.12	

Test result of frequency tolerance of temperature variation

Temperature (℃)	Test result (MHz)	Deviation Frequency (KHz)	Test result (ppm)	Limit (ppm)
-30	2402.0027	2.7	1.12	10
-20	2402.0026	2.6	1.08	
-10	2402.0025	2.5	1.04	
0	2402.0025	2.5	1.04	
10	2402.0026	2.6	1.08	
20	2402.0026	2.6	1.08	
30	2402.0027	2.7	1.12	
40	2402.0027	2.7	1.12	
50	2402.0027	2.7	1.12	
55	2402.0028	2.8	1.17	

Test Channel (MHz)	2440

Test result of frequency tolerance of voltage variation

Voltage	Test result (MHz)	Deviation Frequency (KHz)	Test result (ppm)	Limit (ppm)
DC 3.85V	2440.0029	2.9	1.19	10
DC 3.465V	2440.0029	2.9	1.19	
DC 4.235V	2440.0027	2.7	1.11	

Test result of frequency tolerance of temperature variation

Temperature (℃)	Test result (MHz)	Deviation Frequency (KHz)	Test result (ppm)	Limit (ppm)
-30	2440.0029	2.9	1.19	10
-20	2440.0028	2.8	1.15	
-10	2440.0028	2.8	1.15	
0	2440.0027	2.7	1.11	
10	2440.0026	2.6	1.07	
20	2440.0025	2.5	1.02	
30	2440.0026	2.6	1.07	
40	2440.0028	2.8	1.15	
50	2440.0029	2.9	1.19	
55	2440.0029	2.9	1.19	

Test Channel (MHz)	2480

Test result of frequency tolerance of voltage variation

Voltage	Test result (MHz)	Deviation Frequency (KHz)	Test result (ppm)	Limit (ppm)
DC 3.85V	2480.0028	2.8	1.13	10
DC 3.465V	2480.0027	2.7	1.09	
DC 4.235V	2480.0028	2.8	1.13	

Test result of frequency tolerance of temperature variation

Temperature (℃)	Test result (MHz)	Deviation Frequency (KHz)	Test result (ppm)	Limit (ppm)
-30	2480.0028	2.8	1.13	10
-20	2480.0027	2.7	1.09	
-10	2480.0028	2.8	1.13	
0	2480.0028	2.8	1.13	
10	2480.0025	2.5	1.01	
20	2480.0026	2.6	1.05	
30	2480.0027	2.7	1.09	
40	2480.0028	2.8	1.13	
50	2480.0028	2.8	1.13	
55	2480.0028	2.8	1.13	

Appendix B.5: Test Results of Duty Cycle

TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	DC [%]	xFactor	Limit	Verdict
BLE_1M	Ant1	2402	0.38	0.63	60.32	2.20	---	---
		2440	0.38	0.63	60.32	2.20	---	---
		2480	0.38	0.63	60.32	2.20	---	---
BLE_2M	Ant1	2402	0.20	0.63	31.75	4.98	---	---
		2440	0.20	0.63	31.75	4.98	---	---
		2480	0.20	0.63	31.75	4.98	---	---

BLE_1M_Ant1_2402

BLE_1M_Ant1_2440

BLE_1M_Ant1_2480

BLE_2M_Ant1_2402

BLE_2M_Ant1_2440

BLE_2M_Ant1_2480


Appendix B.6: Test Results of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Conducted Spurious Emission

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	5.11	5.11	---	PASS
			30~1000	5.11	-41.65	≤-14.89	PASS
			1000~26500	5.11	-32.2	≤-14.89	PASS
		2440	Reference	5.20	5.20	---	PASS
			30~1000	5.20	-41.58	≤-14.8	PASS
			1000~26500	5.20	-32.86	≤-14.8	PASS
		2480	Reference	5.10	5.10	---	PASS
			30~1000	5.10	-42.18	≤-14.9	PASS
			1000~26500	5.10	-32.39	≤-14.9	PASS
BLE_2M	Ant1	2402	Reference	7.94	7.94	---	PASS
			30~1000	7.94	-41.89	≤-12.06	PASS
			1000~26500	7.94	-32.61	≤-12.06	PASS
		2440	Reference	7.86	7.86	---	PASS
			30~1000	7.86	-42.09	≤-12.14	PASS
			1000~26500	7.86	-32.43	≤-12.14	PASS
		2480	Reference	7.44	7.44	---	PASS
			30~1000	7.44	-41.06	≤-12.56	PASS
			1000~26500	7.44	-32.5	≤-12.56	PASS

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

BLE_1M_Ant1_2402_1000~26500

BLE_1M_Ant1_2440_0~Reference

BLE_1M_Ant1_2440_30~1000

BLE_1M_Ant1_2440_1000~26500

BLE_1M_Ant1_2480_0~Reference

BLE_1M_Ant1_2480_30~1000

BLE_1M_Ant1_2480_1000~26500

BLE_2M_Ant1_2402_0~Reference

BLE_2M_Ant1_2402_30~1000

BLE_2M_Ant1_2402_1000~26500

BLE_2M_Ant1_2440_0~Reference

BLE_2M_Ant1_2440_30~1000

BLE_2M_Ant1_2440_1000~26500

BLE_2M_Ant1_2480_0~Reference

BLE_2M_Ant1_2480_30~1000

BLE_2M_Ant1_2480_1000~26500


Band edge measurements

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	5.01	-44.69	≤-14.99	PASS
		High	2480	5.13	-44.31	≤-14.87	PASS
BLE_2M	Ant1	Low	2402	7.49	-23.58	≤-12.51	PASS
		High	2480	7.22	-46.09	≤-12.78	PASS

BLE_1M_Ant1_Low_2402

BLE_1M_Ant1_High_2480

BLE_2M_Ant1_Low_2402

BLE_2M_Ant1_High_2480

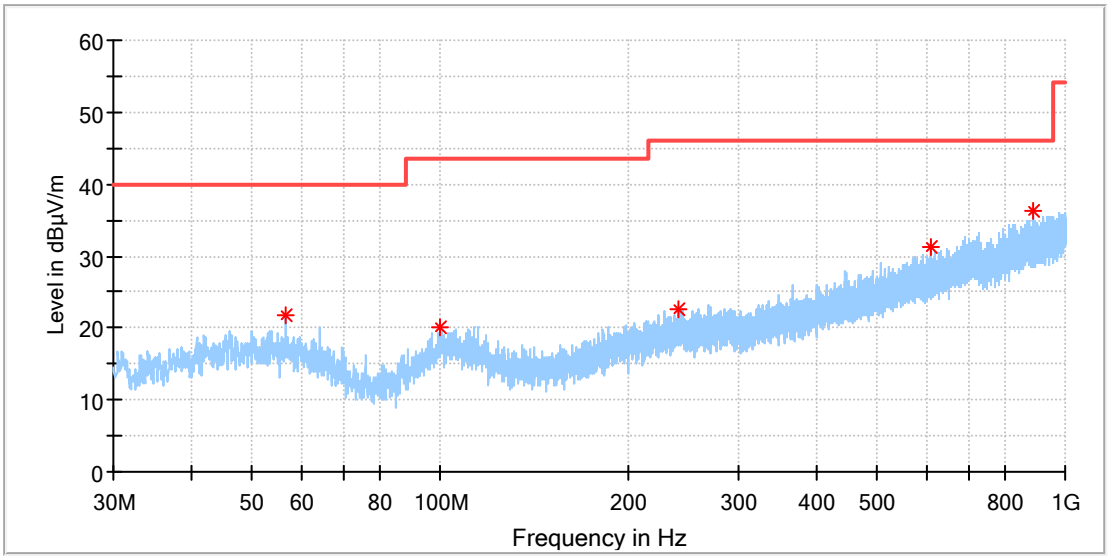
Appendix B.7: Test Results of Radiated Spurious Emissions

Note:
1) This testing was carried out on different modulations, but only the worst case was presented in this report.
2) Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

30 MHz - 1GHz

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168538513/A003918286-054
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

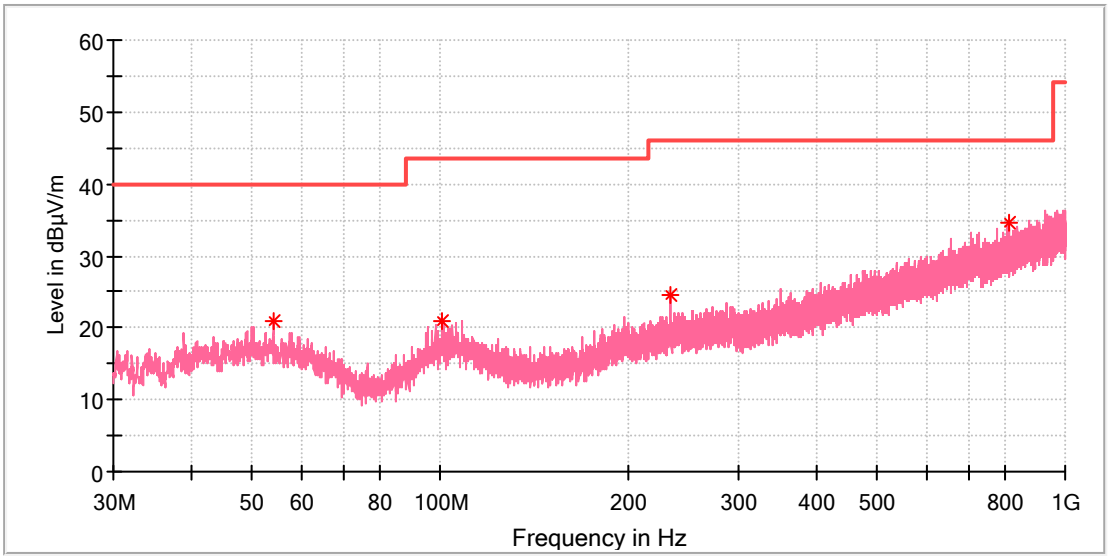


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
56.675000	21.87	40.00	18.13	100.0	H	0.0	-18.7
99.951923	20.16	43.50	23.34	100.0	H	250.0	-19.1
241.310769	22.56	46.00	23.44	100.0	H	313.0	-17.7
609.761539	31.29	46.00	14.71	100.0	H	225.0	-9.5
885.390769	36.32	46.00	9.68	100.0	H	63.0	-5.0

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168538513/A003918286-054
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



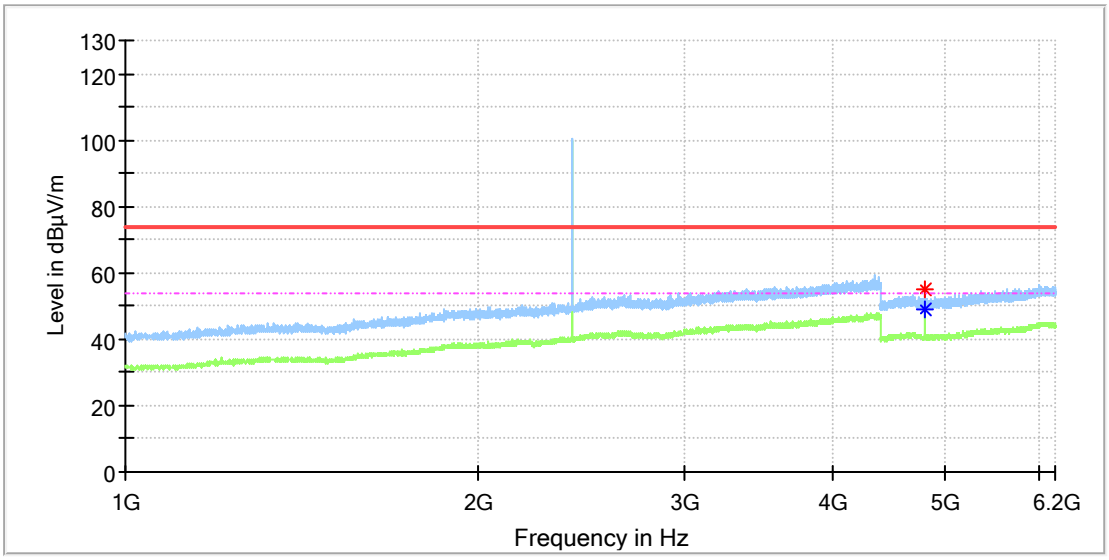
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
53.988846	21.02	40.00	18.98	100.0	V	179.0	-18.5
100.623462	20.90	43.50	22.60	100.0	V	105.0	-19.1
233.289615	24.66	46.00	21.34	100.0	V	324.0	-18.0
811.446923	34.70	46.00	11.30	100.0	V	72.0	-6.0

1GHz - 18GHz
Note: The highest waveform in the figure is Bluetooth Fundamental.

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BLE 1M_Low channel
Order No/Sample No:	168538513/A003918286-054
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

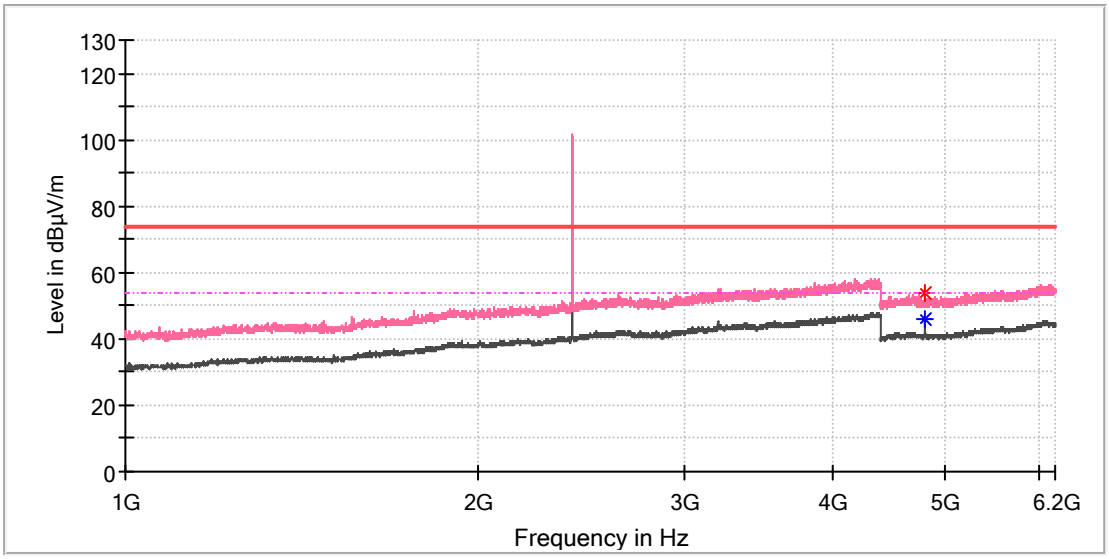


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4804.000000	54.87	---	74.00	19.13	150.0	H	42.0	13.3
4804.000000	---	48.88	54.00	5.12	150.0	H	42.0	13.3

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BLE 1M_Low channel
Order No/Sample No:	168538513/A003918286-054
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

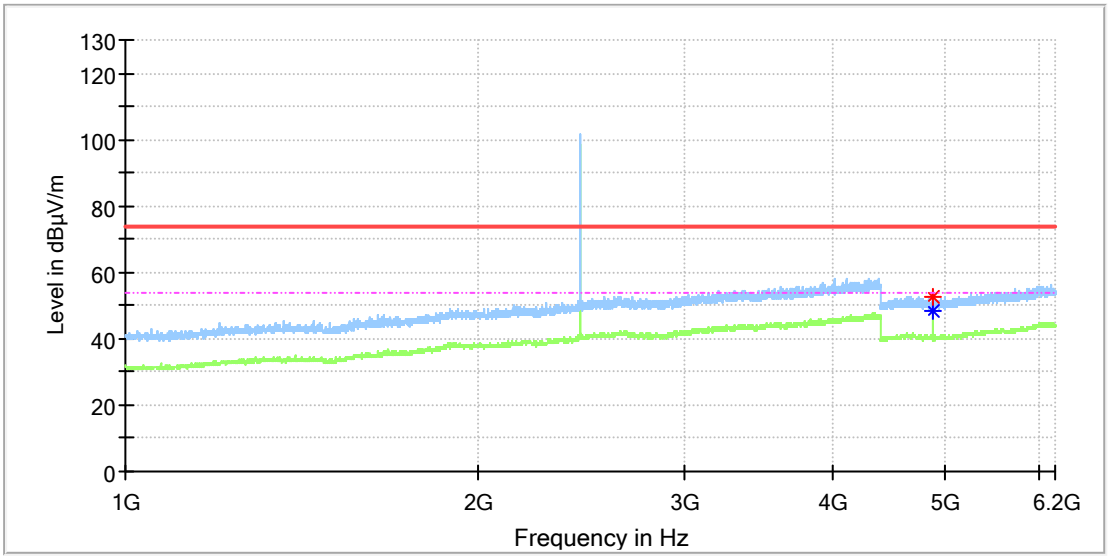


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4803.500000	53.95	---	74.00	20.05	150.0	V	270.0	13.3
4804.000000	---	46.17	54.00	7.83	150.0	V	264.0	13.3

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168538513/A003918286-054
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

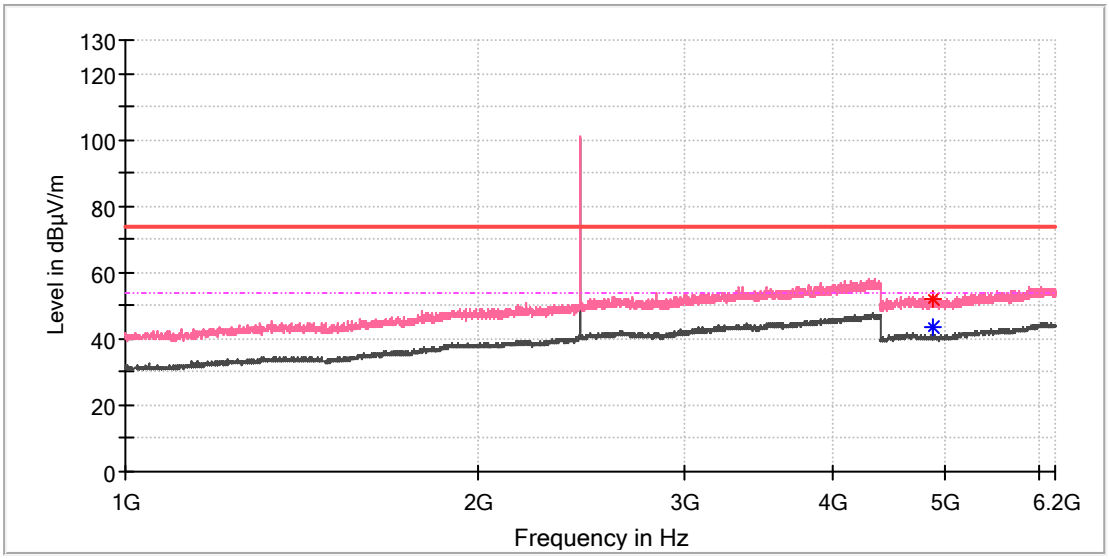


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4880.000000	---	48.23	54.00	5.77	150.0	H	23.0	13.3
4880.500000	52.81	---	74.00	21.19	150.0	H	28.0	13.3

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168538513/A003918286-054
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

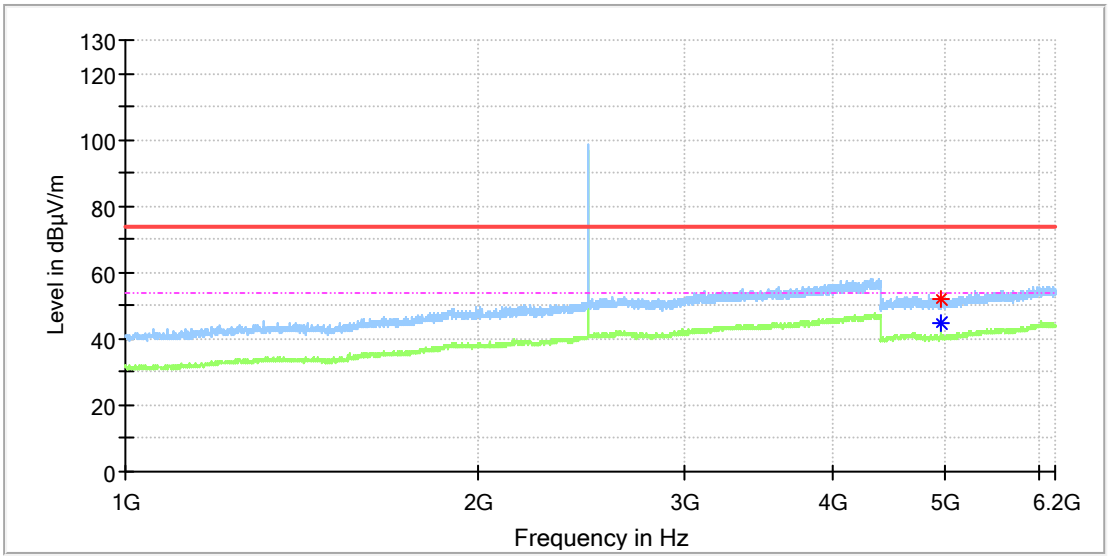


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4879.500000	52.11	---	74.00	21.89	150.0	V	244.0	13.3
4880.000000	---	43.48	54.00	10.52	150.0	V	244.0	13.3

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BLE 1M_High channel
Order No/Sample No:	168538513/A003918286-054
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

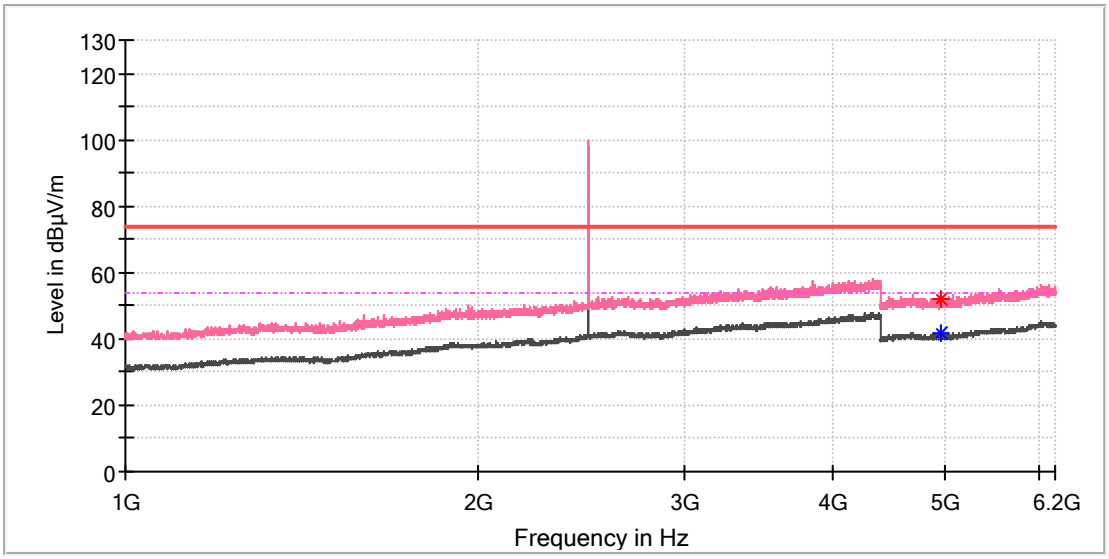


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4959.500000	51.81	---	74.00	22.19	150.0	H	190.0	13.3
4960.000000	---	44.69	54.00	9.31	150.0	H	210.0	13.3

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BLE 1M_High channel
Order No/Sample No:	168538513/A003918286-054
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

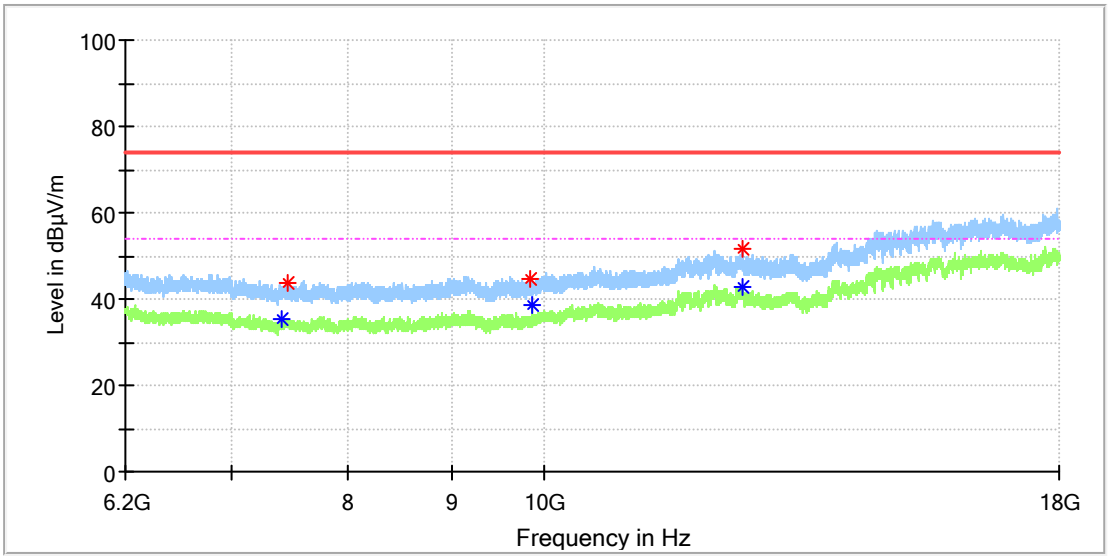


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4951.000000	52.20	---	74.00	21.80	150.0	V	304.0	13.3
4959.500000	---	41.66	54.00	12.34	150.0	V	257.0	13.3

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BLE 1M_Low channel
Order No/Sample No:	168538513/A003918286-054
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

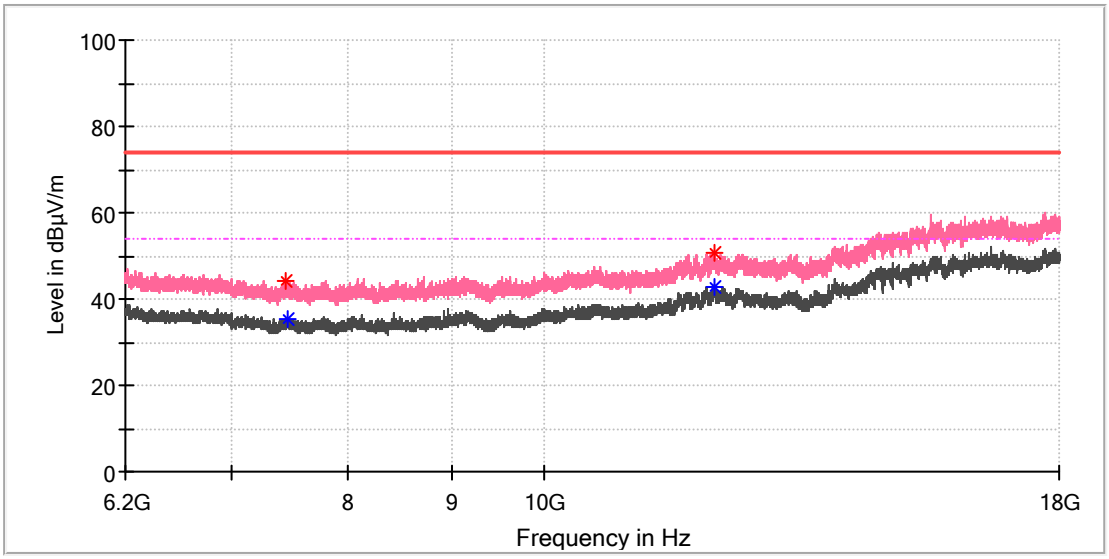


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7410.483333	---	35.25	54.00	18.75	150.0	H	0.0	8.3
7461.616667	43.91	---	74.00	30.09	150.0	H	0.0	8.6
9852.100000	44.72	---	74.00	29.28	150.0	H	293.0	10.6
9873.241667	---	38.65	54.00	15.35	150.0	H	183.0	10.7
12530.700000	---	42.76	54.00	11.24	150.0	H	69.0	16.3
12538.566667	51.54	---	74.00	22.46	150.0	H	238.0	16.4

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BLE 1M_Low channel
Order No/Sample No:	168538513/A003918286-054
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7446.866667	44.19	---	74.00	29.81	150.0	V	49.0	8.5
7456.700000	---	35.38	54.00	18.62	150.0	V	82.0	8.5
12146.708333	---	42.95	54.00	11.05	150.0	V	132.0	16.6
12148.183333	50.72	---	74.00	23.28	150.0	V	104.0	16.7