

Prüfbericht-Nr.: Test report no.:	CN25GK1L 001	Auftrags-Nr.: Order no.:	168538513	Page 1 of 24 Seite 1 von 24	
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		RSS-247 Issue 3 August 2023		
	CFR47 FCC Part 15: Subpart C Section 15.209		RSS-Gen Issue 5 March 2019		
Wareneingangsdatum: Date of sample receipt:	2025-02-11	Refer to photos document			
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				
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	
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.					

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Remarks
Anmerkungen

<p>1</p>	<p>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.</p> <p><i>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.</i></p>
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<p>3</p>	<p>Test clauses with remark of * are subcontracted to qualified subcontractors and described 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.</p> <p><i>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.</i></p>
<p>4</p>	<p>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.</p> <p><i>Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen 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 bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.</i></p>

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Test Summary

5.1.1 ANTENNA REQUIREMENT*RESULT: Pass***5.1.2 MAXIMUM CONDUCTED OUTPUT POWER***RESULT: Pass***5.1.3 99% BANDWIDTH***RESULT: Pass***5.1.4 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHz BANDWIDTH***RESULT: Pass***5.1.5 RADIATED SPURIOUS EMISSION***RESULT: Pass***5.1.6 20dB BANDWIDTH***RESULT: Pass***5.1.7 CARRIER FREQUENCY SEPARATION***RESULT: Pass***5.1.8 FREQUENCY STABILITY***RESULT: Pass***5.1.9 NUMBER OF HOPPING FREQUENCY***RESULT: Pass***5.1.10 TIME OF OCCUPANCY***RESULT: Pass*

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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 Classical Bluetooth (Left earbud).

Appendix C: Test Results of Classical Bluetooth (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.

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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	Y LX23JMF	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

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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 basis 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.

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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, Technical Description 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	0°C to +45°C
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, $\pi/4$ DQPSK, 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 -1.21dBi for right earbud (Provided by the Client)

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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
 - 1. Bluetooth transmitting mode (BR & EDR mode)
 - a) Low Channel
 - b) Middle Channel
 - c) High Channel
- B. On, Transmitting on Hopping channel
- 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
- Schematics
- Technical Description
- FCC/IC Label and Location Info
- Photo Document
- User Manual

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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)

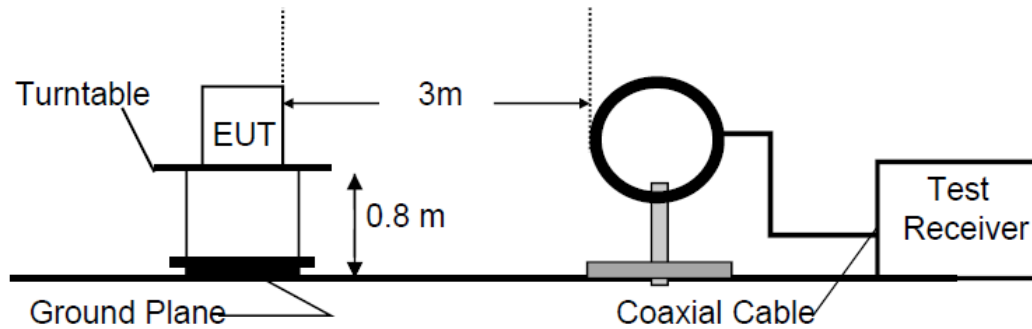


Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

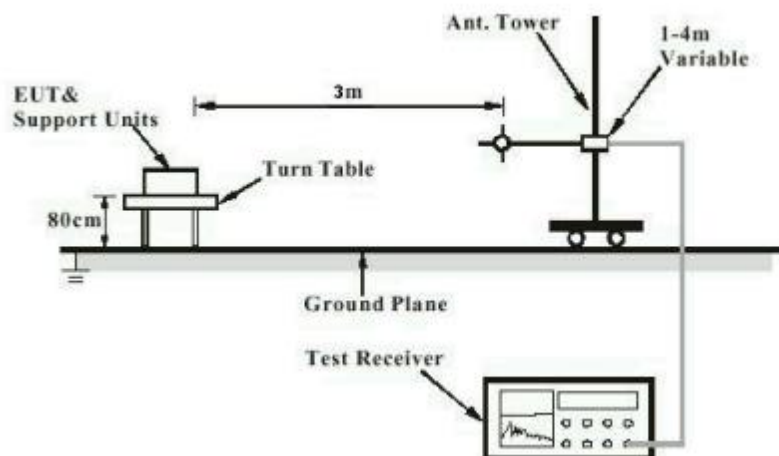
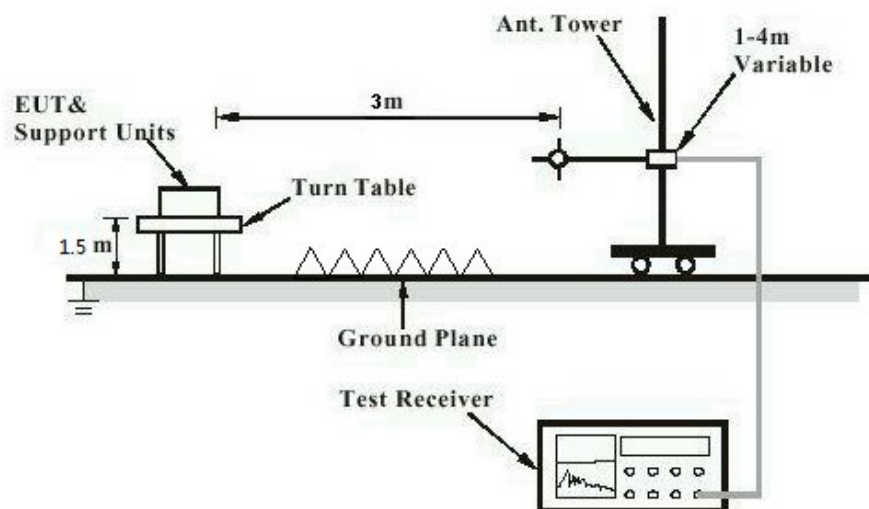


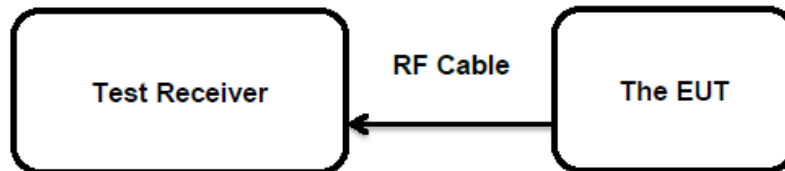
Diagram of Measurement Configuration for Radiation Test (Above 1GHz)



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Diagram of Measurement Configuration for Conducted Transmitter Measurement



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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 8.3

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.

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5.1.2 Maximum Conducted Output Power

RESULT: **Pass**
Test Specification

Test standard	FCC Part 15.247(b)(1) RSS-247 Clause 5.4(b)
Basic standard	ANSI C63.10: 2013
Limits	FHSS<0.125W(Maximum peak conducted output power) < 4 W (e.i.r.p.)
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.1
Test channel	Low / Middle / High
Ambient temperature	24.8 °C
Relative humidity	55 %
Atmospheric pressure	101 kPa

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

Test Mode	Channel Frequency (MHz)	Measured Peak Output Power		Limit (W)
		(dBm)	(W)	
BR	2402	9.65	0.00923	< 0.125
	2441	9.49	0.00889	
	2480	9.31	0.00853	
EDR	2402	9.52	0.00895	
	2441	9.44	0.00879	
	2480	9.24	0.00839	
Maximum Measured Value		9.65	0.00923	

Note: The cable loss is taken into account in results and the maximum e.i.r.p. is 8.0dBm less than 4W(36dBm).

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

Test Mode	Channel Frequency (MHz)	Measured Peak Output Power		Limit (W)
		(dBm)	(W)	
BR	2402	9.13	0.00818	< 0.125
	2441	8.97	0.00789	
	2480	8.65	0.00733	
EDR	2402	9.09	0.00811	
	2441	8.88	0.00773	
	2480	8.51	0.00710	
Maximum Measured Value		9.13	0.00818	

Note: The cable loss is taken into account in results and the maximum e.i.r.p. is 7.92dBm less than 4W(36dBm).

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5.1.3 99% 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.1
 Test channel : Low / Middle / High
 Ambient temperature : 24.8 °C
 Relative humidity : 55 %
 Atmospheric pressure : 101 kPa

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

Table 8: Test Result of 99% Bandwidth, Left earbud

Test Mode	Channel Frequency (MHz)	Measured 99% Bandwidth	Limit
		(MHz)	
BR	2402	0.88995	/
	2441	0.88237	
	2480	0.88281	
EDR	2402	1.1723	/
	2441	1.1772	
	2480	1.1919	

Table 9: Test Result of 99% Bandwidth, Right earbud

Test Mode	Channel Frequency (MHz)	Measured 99% Bandwidth	Limit
		(MHz)	
BR	2402	0.87812	/
	2441	0.87866	
	2480	0.88196	
EDR	2402	1.1928	/
	2441	1.1937	
	2480	1.1765	

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

Prüfbericht-Nr.: CN25GK1L 001
Test report no.:Seite 17 von 24
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5.1.4 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);

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.1

Test channel : Low / Middle / High

Ambient temperature : 24.8 °C

Relative humidity : 55 %

Atmospheric pressure : 101 kPa

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

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

Prüfbericht-Nr.: CN25GK1L 001
Test report no.:Seite 18 von 24
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5.1.5 Radiated Spurious Emission

RESULT:**Pass****Test Specification**

Test standard : FCC Part 15.247(d) & FCC Part 15.205
RSS-247 Clause 3.3

Basic standard : ANSI C63.10: 2013

Limits : Refer to 15.209(a) of FCC part 15.247(d)
RSS-Gen Table 6 & Table 7

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.1

Test channel : Low / Middle / High

Ambient temperature : Refer to test result

Relative humidity : Refer to test result

Atmospheric pressure : 101 kPa

Remark:

During the pretest the EUT was rotated through three orthogonal axes to determine the attitude that maximizes the emissions. After that the EUT was manually handled to find the orientation that has the maximum emission, which is the orientation shown in the test set-up photos.

Testing was carried out within frequency range 9kHz to the tenth harmonics.

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

Prüfbericht-Nr.: CN25GK1L 001
Test report no.:

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5.1.7 Carrier Frequency Separation

RESULT: **Pass**
Test Specification

Test standard : FCC Part 15.247(a)(1)
 : RSS-247 Clause 5.1(b)
 Basic standard : ANSI C63.10: 2013
 Limits : $\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth, whichever is greater
 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
 Test channel : Low / Middle / High
 Ambient temperature : 24.8 °C
 Relative humidity : 55 %
 Atmospheric pressure : 101 kPa

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

Table 12: Test Result of Carrier Frequency Separation, Left earbud

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.894	≥ 0.636	PASS
3DH5	Ant1	Hop	1.004	≥ 0.848	PASS

Table 13: Test Result of Carrier Frequency Separation, Right earbud

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.108	≥ 0.951	PASS
3DH5	Ant1	Hop	0.984	≥ 0.866	PASS

Prüfbericht-Nr.: CN25GK1L 001
Test report no.:Seite 21 von 24
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5.1.8 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 °C
Relative humidity : 55 %
Atmospheric pressure : 101 kPa

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

Prüfbericht-Nr.: CN25GK1L 001
Test report no.:

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5.1.9 Number of Hopping Frequency

RESULT: **Pass**
Test Specification

Test standard : FCC part 15.247(a)(1)(iii)
 : RSS-247 Clause 5.1(d)
 Basic standard : ANSI C63.10: 2013
 Limits : ≥ 15 non-overlapping channels
 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 °C
 Relative humidity : 55 %
 Atmospheric pressure : 101 kPa

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

Table 14: Test Result of Number of Hopping Frequency, Left earbud

TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥ 15	PASS
3DH5	Ant1	Hop	79	≥ 15	PASS

Table 15: Test Result of Number of Hopping Frequency, Right earbud

TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥ 15	PASS
3DH5	Ant1	Hop	79	≥ 15	PASS

Prüfbericht-Nr.: CN25GK1L 001
Test report no.:Seite 23 von 24
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5.1.10 Time of Occupancy

RESULT:

Pass

Test Specification

Test standard : FCC part 15.247(a)(1)(iii)
RSS-247 Clause 5.1(d)

Basic standard : ANSI C63.10: 2013

Limits : < 0.4s

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

Test channel : Low / Middle / High

Ambient temperature : 24.8 °C

Relative humidity : 55 %

Atmospheric pressure : 101 kPa

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.

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Appendix B: Test Results of Classical Bluetooth (Left earbud)

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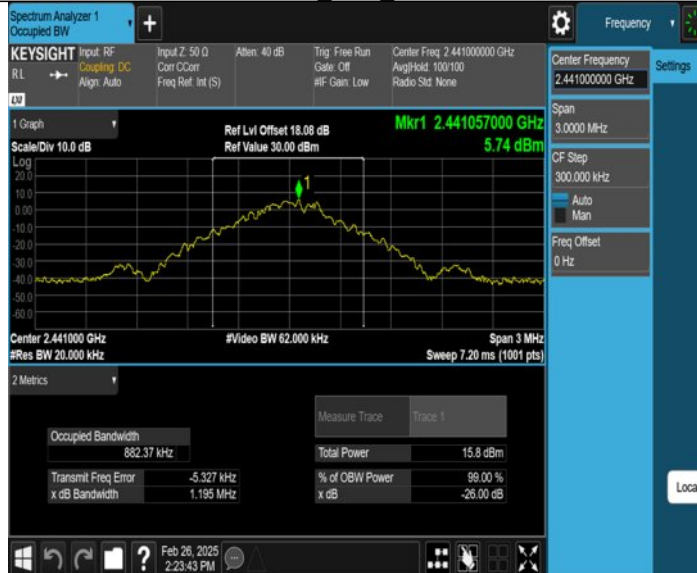
Appendix B.1: Test Results of 99% Bandwidth

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.88995	2401.5528	2402.4427	---	---
		2441	0.88237	2440.5535	2441.4359	---	---
		2480	0.88281	2479.5545	2480.4374	---	---
3DH5	Ant1	2402	1.1723	2401.4070	2402.5793	---	---
		2441	1.1772	2440.4044	2441.5816	---	---
		2480	1.1919	2479.3940	2480.5859	---	---

DH5 Ant1 2402



DH5 Ant1 2441



DH5_Ant1_2480



3DH5_Ant1_2402



3DH5_Ant1_2441





Appendix B.2: Test Results of 20dB Bandwidth

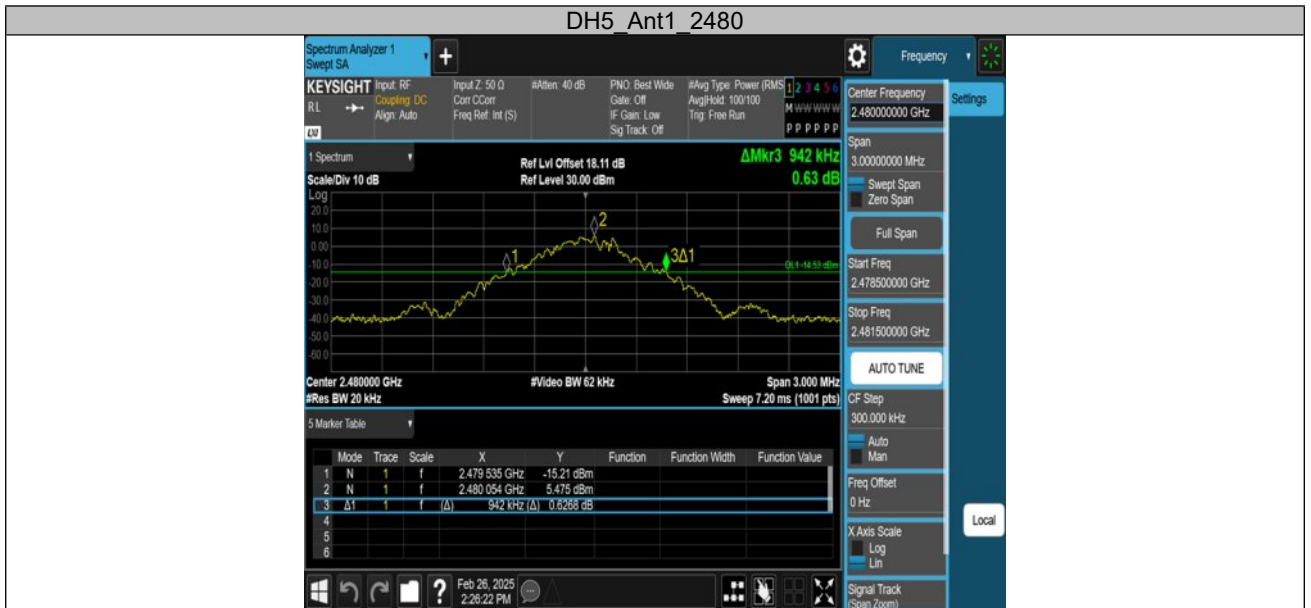
TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.939	2401.538	2402.477	---	---
		2441	0.954	2440.529	2441.483	---	---
		2480	0.942	2479.535	2480.477	---	---
3DH5	Ant1	2402	1.272	2401.352	2402.624	---	---
		2441	1.263	2440.352	2441.615	---	---
		2480	1.266	2479.349	2480.615	---	---

DH5 Ant1 2402



DH5 Ant1 2441







Appendix B.3: 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 (°C)	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)	2441
--------------------	------

Test result of frequency tolerance of voltage variation

Voltage	Test result (MHz)	Deviation Frequency (KHz)	Test result (ppm)	Limit (ppm)
DC 3.85V	2441.0025	2.5	1.02	10
DC 3.465V	2441.0024	2.4	0.98	
DC 4.235V	2441.0025	2.5	1.02	

Test result of frequency tolerance of temperature variation

Temperature (°C)	Test result (MHz)	Deviation Frequency (KHz)	Test result (ppm)	Limit (ppm)
-30	2441.0027	2.7	1.11	10
-20	2441.0027	2.7	1.11	
-10	2441.0027	2.7	1.11	
0	2441.0026	2.6	1.07	
10	2441.0027	2.7	1.11	
20	2441.0025	2.5	1.02	
30	2441.0027	2.7	1.11	
40	2441.0027	2.7	1.11	
50	2441.0027	2.7	1.11	
55	2441.0027	2.7	1.11	

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 (°C)	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	

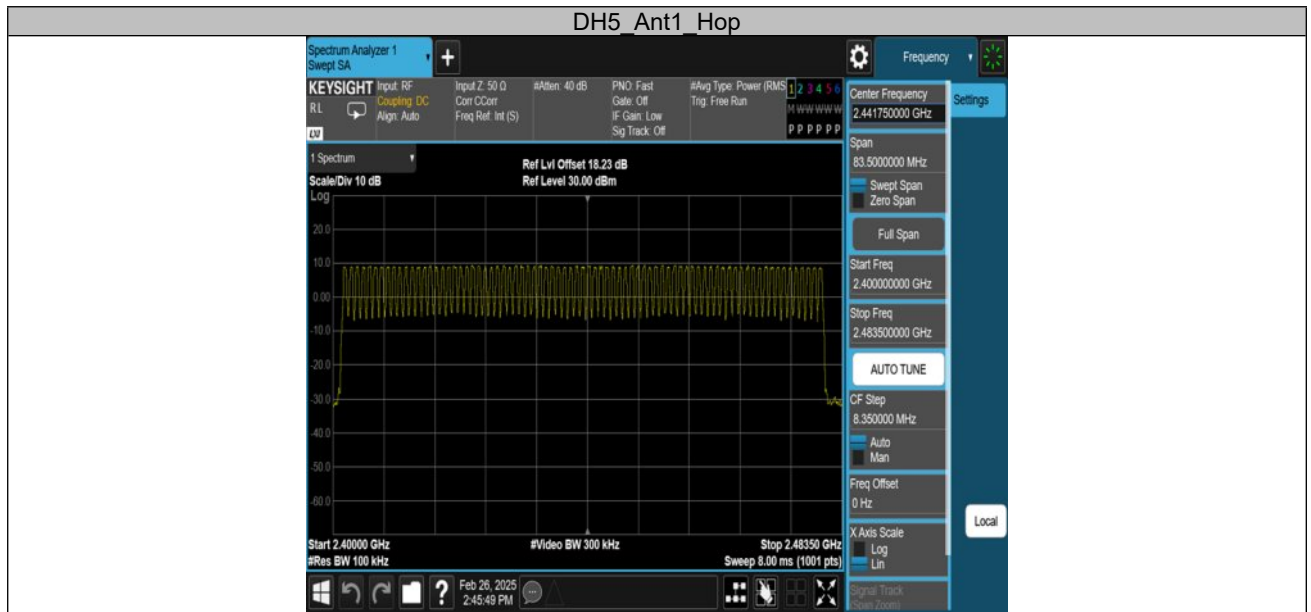
Appendix B.4: Test Results of Carrier Frequency Separation

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.894	≥0.636	PASS
3DH5	Ant1	Hop	1.004	≥0.848	PASS



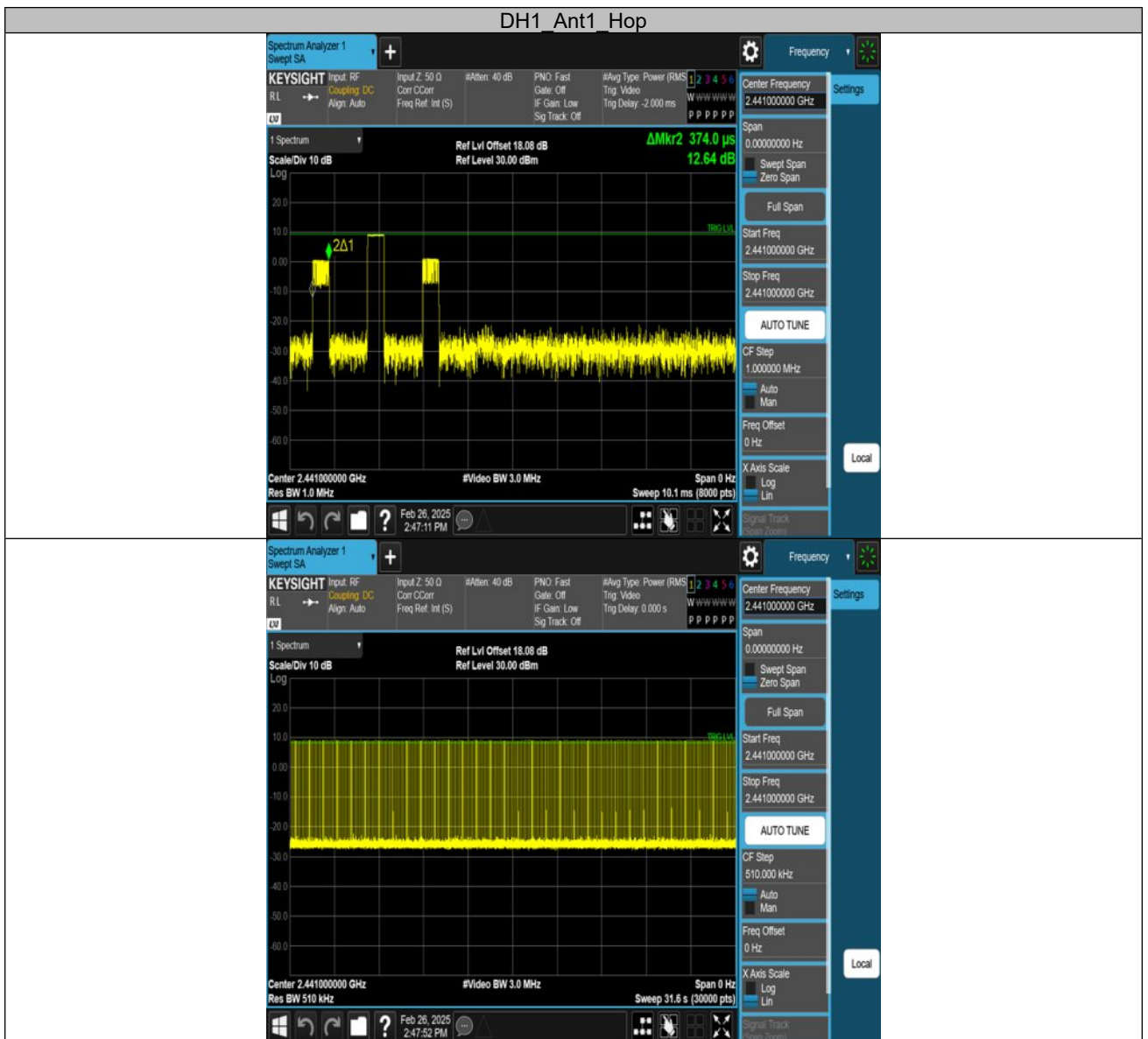
Appendix B.5: Test Results of Number of Hopping Frequency

TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS



Appendix B.6: Test Results of Time of Occupancy

TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.374	319	0.119	≤0.4	PASS
DH3	Ant1	Hop	1.630	159	0.259	≤0.4	PASS
DH5	Ant1	Hop	2.879	107	0.308	≤0.4	PASS
3DH1	Ant1	Hop	0.379	319	0.121	≤0.4	PASS
3DH3	Ant1	Hop	1.631	159	0.259	≤0.4	PASS
3DH5	Ant1	Hop	2.882	107	0.308	≤0.4	PASS



DH3 Ant1 Hop



DH5 Ant1 Hop





3DH1 Ant1 Hop







Appendix B.7: 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
DH5	Ant1	2402	Reference	8.81	8.81	---	PASS
			30~1000	8.81	-41.58	≤-11.19	PASS
			1000~26500	8.81	-32.45	≤-11.19	PASS
		2441	Reference	8.97	8.97	---	PASS
			30~1000	8.97	-41.76	≤-11.03	PASS
			1000~26500	8.97	-31.72	≤-11.03	PASS
		2480	Reference	8.45	8.45	---	PASS
			30~1000	8.45	-41.48	≤-11.55	PASS
			1000~26500	8.45	-32.41	≤-11.55	PASS
3DH5	Ant1	2402	Reference	6.25	6.25	---	PASS
			30~1000	6.25	-41.57	≤-13.75	PASS
			1000~26500	6.25	-32.85	≤-13.75	PASS
		2441	Reference	8.30	8.30	---	PASS
			30~1000	8.30	-41.97	≤-11.7	PASS
			1000~26500	8.30	-32.79	≤-11.7	PASS
		2480	Reference	4.58	4.58	---	PASS
			30~1000	4.58	-41.59	≤-15.42	PASS
			1000~26500	4.58	-33.03	≤-15.42	PASS



DH5_Ant1_2402_30~1000

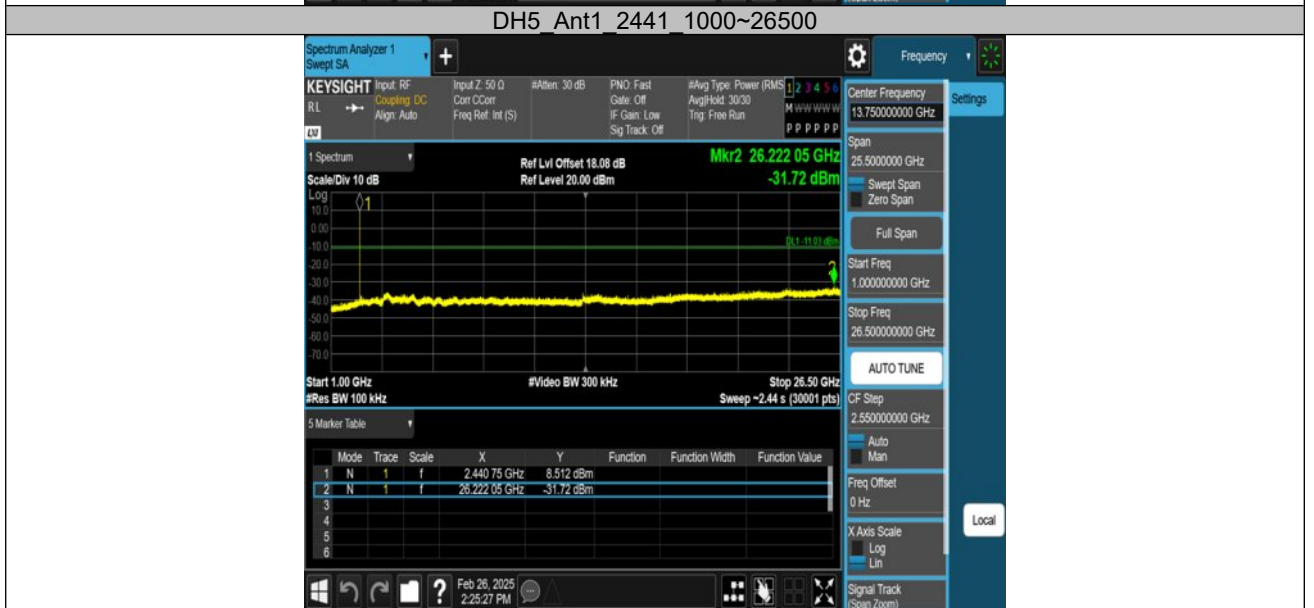
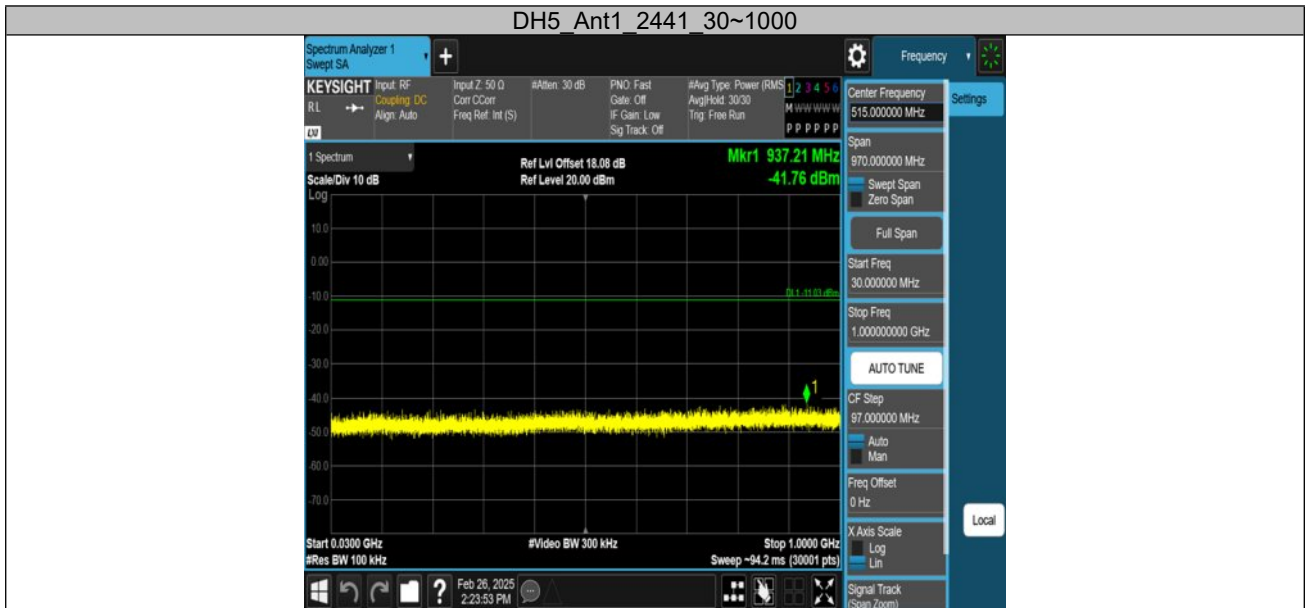


DH5_Ant1_2402_1000~26500



DH5_Ant1_2441_0~Reference





DH5_Ant1_2480_30~1000

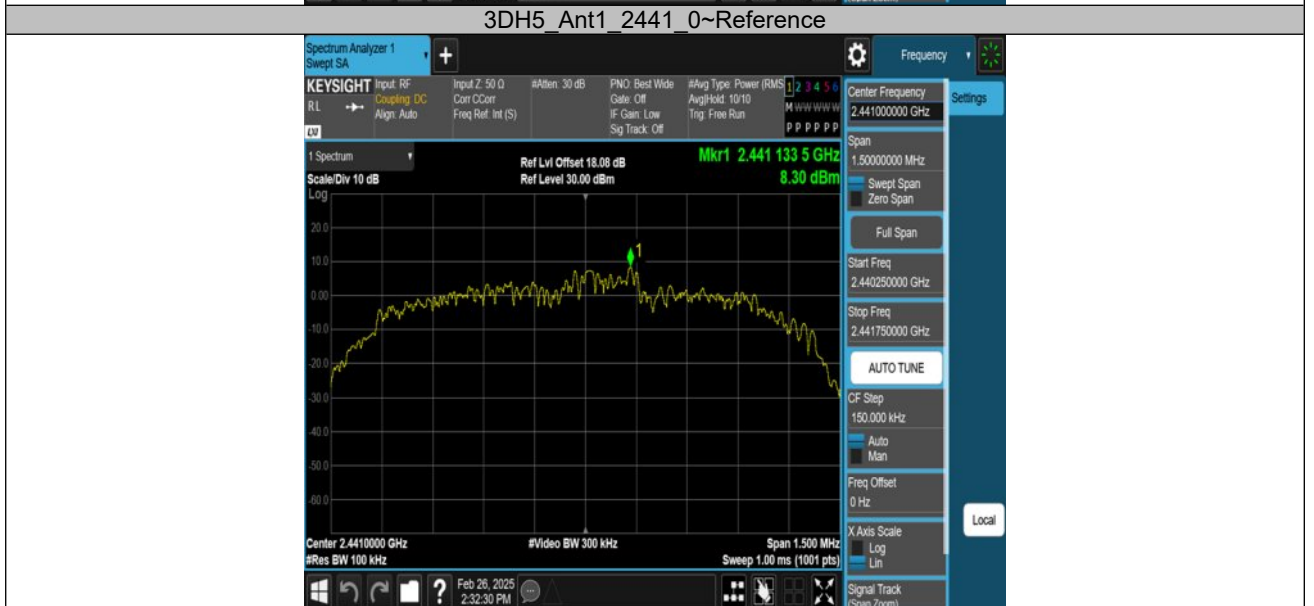
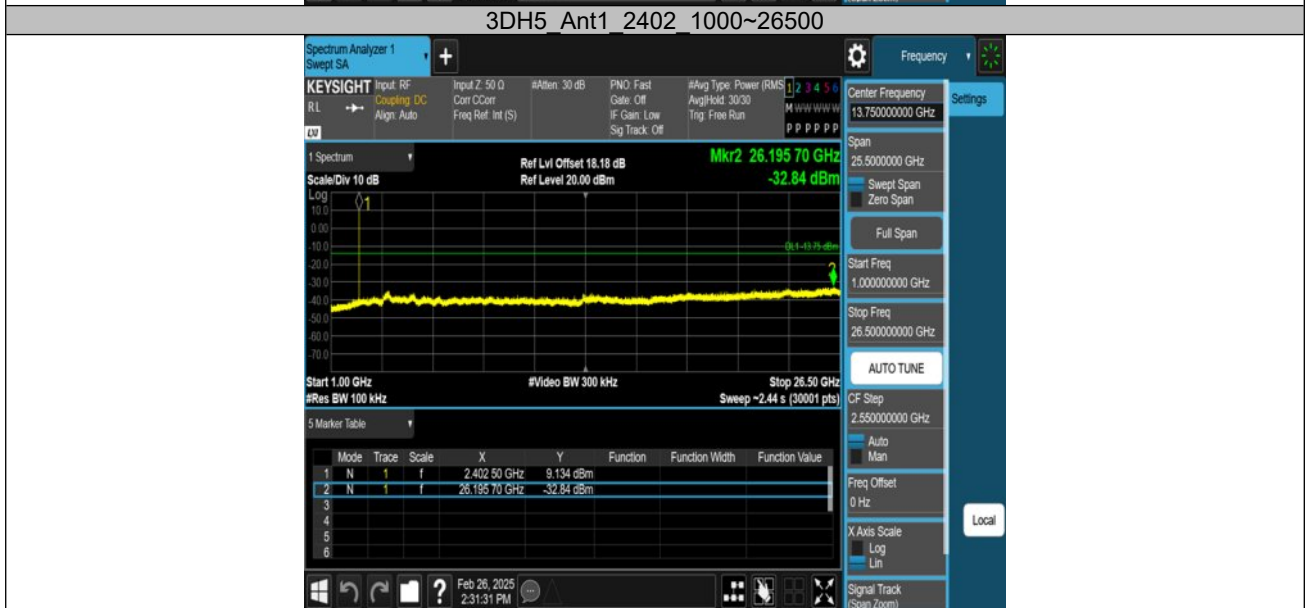


DH5_Ant1_2480_1000~26500



3DH5_Ant1_2402_0~Reference





3DH5_Ant1_2441_30~1000



3DH5_Ant1_2441_1000~26500



3DH5_Ant1_2480_0~Reference



3DH5_Ant1_2480_30~1000



3DH5_Ant1_2480_1000~26500



Band edge measurements.

TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	9.12	-43.77	≤-10.88	PASS
		High	2480	8.79	-44.12	≤-11.21	PASS
3DH5	Ant1	Low	2402	9.11	-42.98	≤-10.89	PASS
		High	2480	8.79	-43.87	≤-11.21	PASS
DH5	Ant1	Hopping	2402	8.28	-43.75	≤-11.72	PASS
		Hopping	2480	8.00	-43.98	≤-12.00	PASS
3DH5	Ant1	Hopping	2402	5.42	-43.30	≤-14.59	PASS
		Hopping	2480	2.22	-43.07	≤-17.78	PASS

DH5 Ant1 Low 2402



DH5 Ant1 High 2480



3DH5 Ant1 Low 2402



3DH5 Ant1 High 2480



DH5 Ant1 Hopping 2402



DH5 Ant1 Hopping 2480



3DH5 Ant1 Hopping 2402



3DH5 Ant1 Hopping 2480



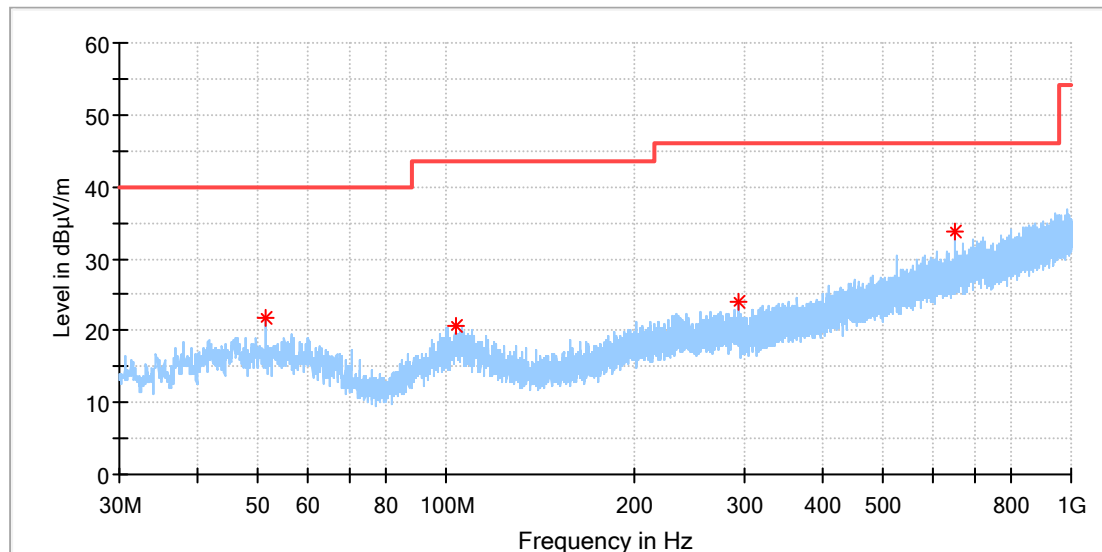
Appendix B.8: Test Results of Radiated Spurious Emissions

Note: 1. 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. 2. This testing was carried out on different modulations, but only the worst case (GFSK) was presented in this report.

30MHz - 1GHz

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BR_DH5_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

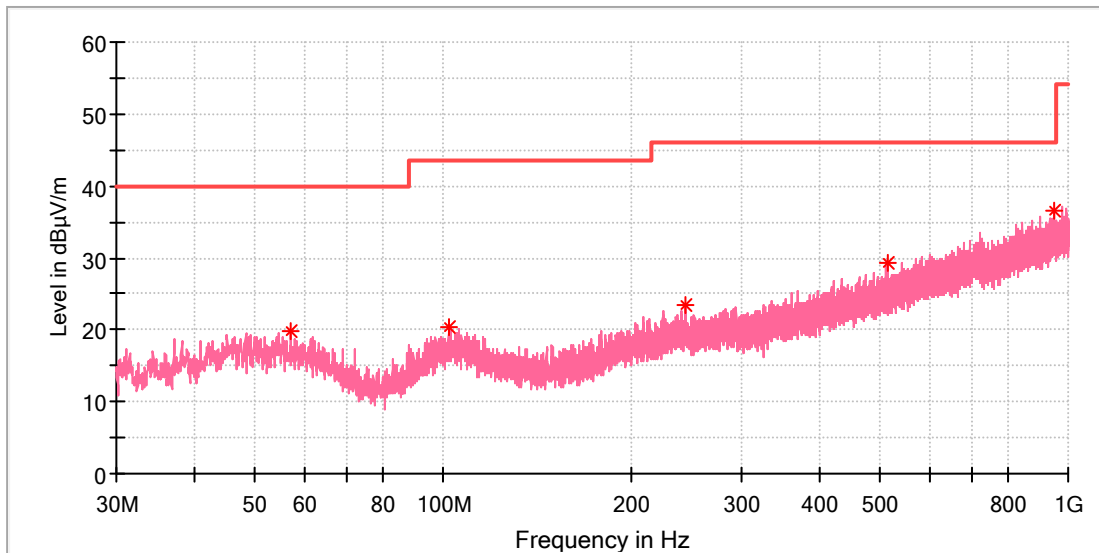


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
51.377308	21.64	40.00	18.36	100.0	H	66.0	-18.4
103.757308	20.53	43.50	22.97	100.0	H	96.0	-19.0
293.578846	24.09	46.00	21.91	100.0	H	289.0	-16.4
650.576154	33.85	46.00	12.15	100.0	H	127.0	-8.8

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BR_DH5_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

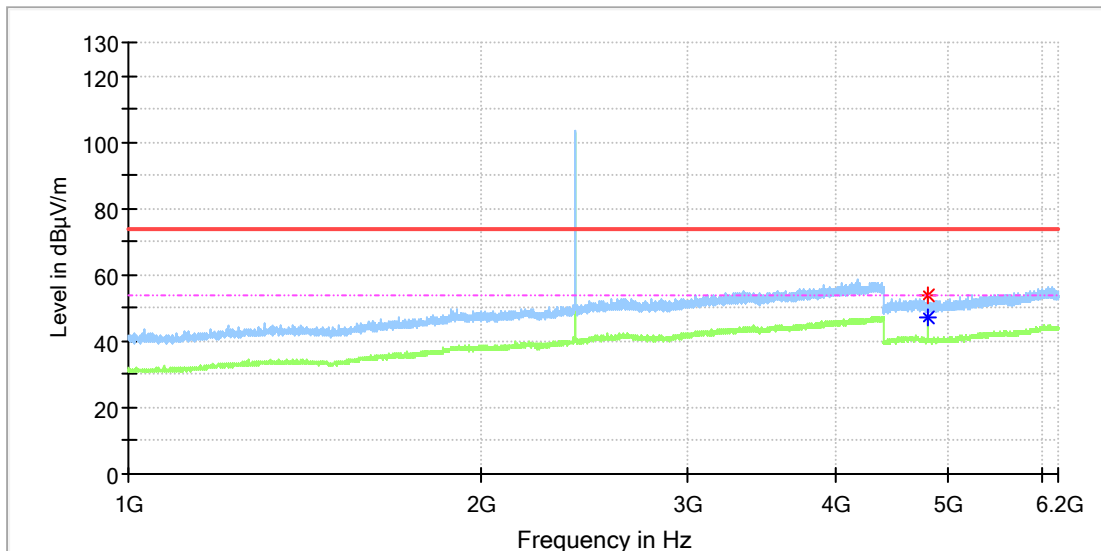
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
57.010769	19.91	40.00	20.09	100.0	V	195.0	-18.8
102.376923	20.48	43.50	23.02	100.0	V	161.0	-19.0
244.034231	23.52	46.00	22.48	100.0	V	245.0	-17.6
514.626923	29.23	46.00	16.77	100.0	V	305.0	-11.6
948.813846	36.61	46.00	9.39	100.0	V	79.0	-4.3

1GHz - 18GHz

Note: The highest waveform in the figure is Bluetooth Fundamental.

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BR_DH5_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

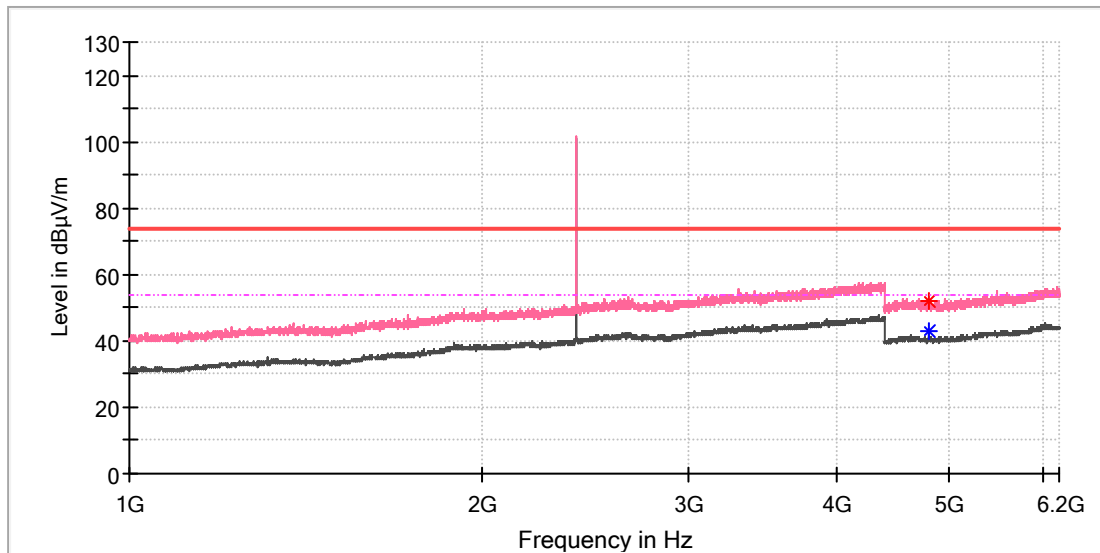


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4803.500000	53.88	---	74.00	20.12	150.0	H	18.0	13.3
4804.000000	---	46.96	54.00	7.04	150.0	H	221.0	13.3

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BR_DH5_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

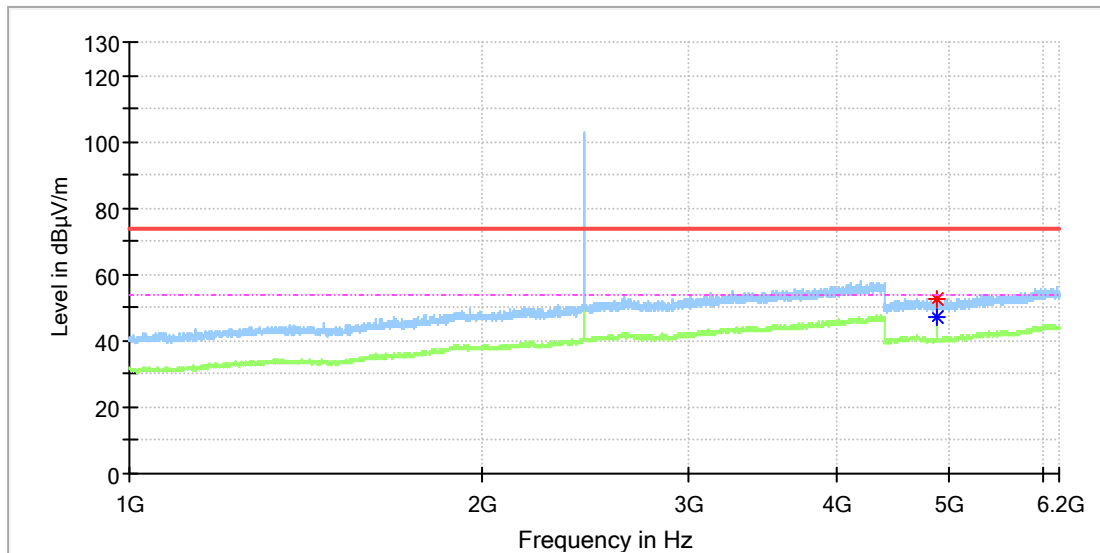


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4803.500000	52.22	---	74.00	21.78	150.0	V	240.0	13.3
4803.500000	---	43.16	54.00	10.84	150.0	V	240.0	13.3

EUT Information

EUT Name:	Bluetooth Headset
Model:	Endurance Zone
Test Mode:	BR_DH5_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

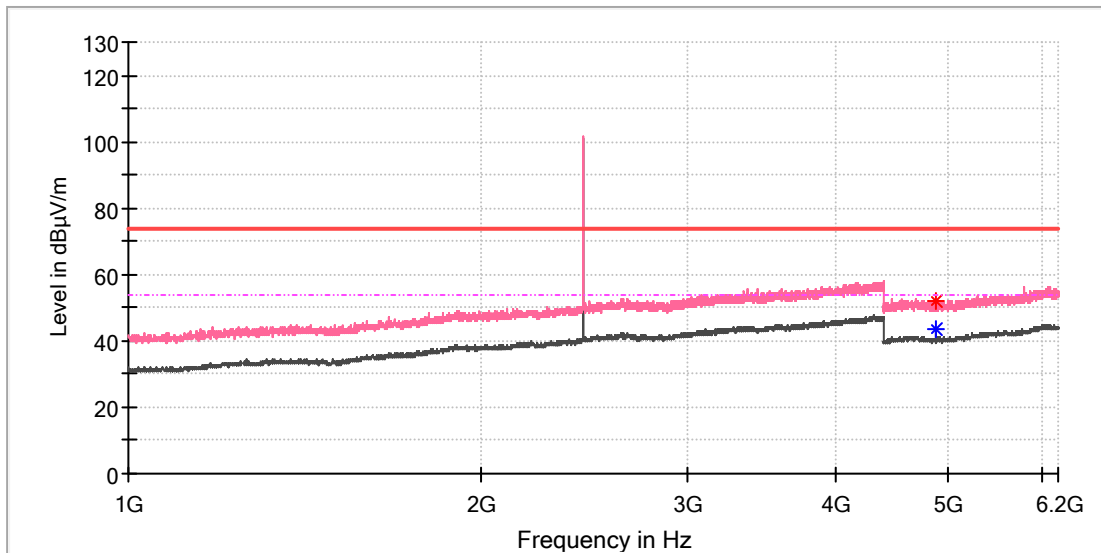


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4882.000000	52.40	---	74.00	21.60	150.0	H	24.0	13.3
4882.000000	---	46.89	54.00	7.11	150.0	H	24.0	13.3

EUT Information

EUT Name: Bluetooth Headset
 Model: Endurance Zone
 Test Mode: BR_DH5_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)
4871.000000	51.74	---	74.00	22.26	150.0	V	198.0	13.3
4882.000000	---	43.36	54.00	10.64	150.0	V	235.0	13.3