

# FCC Test Report

Report No.: AGC05177230201FE02

FCC ID	: 2ALHZNB-1090B
APPLICATION PURPOSE	: Original Equipment
PRODUCT DESIGNATION	: Bluetooth headphones
BRAND NAME	: N/A
MODEL NAME	<ul> <li>MZX870, MZX770-BLK, MZX770-WHT, MZX870-BLK, MZX870-WHT, NB-1100F, NB-1100, NB-1100FS, NB-1100BF, NB-1300B, NB-1300BF, NB-1300, NB-1050,</li> <li>NB-1060, NB-1069, NB-1090, NB-1090P, NB-1070, NB-1070S, NB-1094, NB-1093, NB-1700, NB-1600, NB-2030, NB-2040, NB-2050, NB-2060, NB-1092, NB-1093, NB-1095, NB-1090B, NB-2020, NB-1701</li> </ul>
APPLICANT	: KO-STAR DEVELOPMENT CO., LTD
DATE OF ISSUE	: Feb. 27, 2023
STANDARD(S)	: FCC Part 15.24%
REPORT VERSION	The second secon

# Attestation of Global Compliance (Shenzhen) Co., Ltd





#### **REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Feb. 27, 2023	Valid	Initial Release



# TABLE OF CONTENTS

1. VERIFICATION OF COMPLIANCE	5
2. GENERAL INFORMATION	6
2.1. PRODUCT DESCRIPTION 2.2. TABLE OF CARRIER FREQUENCYS 2.3. RELATED SUBMITTAL(S)/GRANT(S)	
<ul> <li>2.4. TEST METHODOLOGY</li> <li>2.5. SPECIAL ACCESSORIES</li> <li>2.6. EQUIPMENT MODIFICATIONS</li> <li>2.7. ANTENNA REQUIREMENT</li> </ul>	
3. MEASUREMENT UNCERTAINTY	8
4. DESCRIPTION OF TEST MODES	9
5. SYSTEM TEST CONFIGURATION	
5.1. CONFIGURATION OF TESTED SYSTEM 5.2. EQUIPMENT USED IN TESTED SYSTEM 5.3. SUMMARY OF TEST RESULTS	
6. TEST FACILITY	11
7. PEAK OUTPUT POWER	
7.1. MEASUREMENT PROCEDURE 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 7.3. LIMITS AND MEASUREMENT RESULT	
8. BANDWIDTH	
8.1. MEASUREMENT PROCEDURE 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	
9. CONDUCTED SPURIOUS EMISSION	
9.1. MEASUREMENT PROCEDURE 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 9.3. MEASUREMENT EQUIPMENT USED 9.4. LIMITS AND MEASUREMENT RESULT	
10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY	
10.1. MEASUREMENT PROCEDURE 10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) 10.3. MEASUREMENT EQUIPMENT USED 10.4. LIMITS AND MEASUREMENT RESULT	
11. RADIATED EMISSION	
11.1. MEASUREMENT PROCEDURE	
11.2. TEST SETUP 11.3. LIMITS AND MEASUREMENT RESULT 11.4. TEST RESULT	
12. LINE CONDUCTED EMISSION TEST	
12.1. LIMITS OF LINE CONDUCTED EMISSION TEST	



12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST	
12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST	
12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST	60
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	
APPENDIX B: PHOTOGRAPHS OF EUT	



# **1. VERIFICATION OF COMPLIANCE**

Applicant	KO-STAR DEVELOPMENT CO., LTD	
Address	No.3, Yicun Industrial Area, Xikeng, Henggang Town, Longgang District	
	Shenzhen, China	
Manufacturer	SHENZHEN BASSWORLD TECHNOLOGY CO., LTD	
Address	No.3, Yicun Industrial Area, Xikeng, Henggang Town, Longgang District	
Address	Shenzhen, China	
Factory	SHENZHEN BASSWORLD TECHNOLOGY CO., LTD	
Address	No.3, Yicun Industrial Area, Xikeng, Henggang Town, Longgang District	
Address	Shenzhen, China	
Product Designation	Bluetooth headphones	
Brand Name	N/A	
Test Model	MZX870	
	MZX770-BLK/MZX770-WHT/MZX870-BLK/MZX870-WHT/NB-1100F, NB-1100,	
	NB-1100FS, NB-1100BF, NB-1300B, NB-1300BF, NB-1300, NB-1050,	
Series Model	NB-1060, NB-1069, NB-1090, NB-1090P, NB-1070, NB-1070S, NB-1094,	
	NB-1093, NB-1700, NB-1600, NB-2030, NB-2040, NB-2050, NB-2060,	
	NB-1092, NB-1093, NB-1095, NB-1090B, NB-2020, NB-1701	
Declaration of Difference	All the same except for the model name.	
Date of receipt of test item	Feb. 21, 2023	
Date of test	Feb. 21, 2023 to Feb. 27, 2023	
Deviation	No any deviation from the test method	
Condition of Test Sample	Normal	
Test Result	Pass	
Report Template	AGCRT-US-BLE/RF	

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC part 15.247.

Thea Yuang Prepared By Thea Huang Feb. 27, 2023 (Project Engineer) **Reviewed By** Calvin Liu Feb. 27, 2023 (Reviewer) Approved By Max Zhang Feb. 27, 2023 (Authorized Officer)



# 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

The EUT is designed as a "Bluetooth headphones". It is designed by way of utilizing the GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
RF Output Power	BLE GFSK 1Mbps: -1.709dBm (Max); BLE GFSK 2Mbps: -1.935dBm (Max)
Bluetooth Version	V5.0
Modulation	BR □GFSK, EDR □π /4-DQPSK, □8DPSK BLE ⊠GFSK 1Mbps ⊠GFSK 2Mbps
Number of channels	40 Channels
Antenna Designation	PCB Antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	0dBi
Hardware Version	V1.3
Software Version	V1.1
Power Supply	DC 3.7V by battery or DC 5V by adapter

# 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
2400~2483.5MHz	0	2402 MHz
	1	2404 MHz
	:	:
	38	2478 MHz
	39	2480 MHz



#### 2.3. RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for FCC ID: 2ALHZNB-1090B filing to comply with the FCC Part 15.247 requirements.

#### 2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

#### **2.5. SPECIAL ACCESSORIES**

Refer to section 5.2.

#### 2.6. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

#### 2.7. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device. For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.



# **3. MEASUREMENT UNCERTAINTY**

The reported uncertainty of measurement y  $\pm U$ , where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 3.1 \text{ dB}$
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 4.0 \text{ dB}$
Uncertainty of Radiated Emission above 1GHz	$U_c = \pm 4.8 \text{ dB}$
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$
Uncertainty of spurious emissions, conducted	$U_{c} = \pm 2.7 \%$
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2 \%$



# **4. DESCRIPTION OF TEST MODES**

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX

Note:

- 1. Only the result of the worst case was recorded in the report, if no other cases.
- 2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
- 3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

# Software Setting

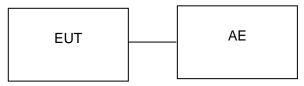
CACTIONS BT FCC	Tool V2.24	? ×	:
SOLUTION ATS301X	COM COM4 - 115200 -	BQB Mod	le
RF Channel 0 🗸	Hopping Mode 🔜 Normal_F 🗸	fixed	7
Packet Type BLE_2M 🗸	Payload Type PRB	S9 🔻	
TX Gain Index 0 🗸	RX Gain Index 0	-	
Access Code Ox AbDdE341	AGC Mode		
Stop Single	Tone Packet TX Packet RX Hopp	ing TX	
1结束ContinueTX测试,持续2.0秒 1开始ContinueTX测试(Chan:0 Pe 1结束ContinueTX测试(Chan:0 Pe 1结束ContinueTX测试(Chan:19 F 1结束ContinueTX测试(Chan:19 F 1结束ContinueTX测试(Chan:39 F 1结束ContinueTX测试,持续120.	ncket:BLE_1M Payload:PRBS9 TxGain:0) 2월 'acket:BLE_1M Payload:PRBS9 TxGain:0) 2월 'acket:BLE_1M Payload:PRBS9 TxGain:0)		



# **5. SYSTEM TEST CONFIGURATION**

#### **5.1. CONFIGURATION OF TESTED SYSTEM**

Radiated Emission Configure:



Conducted Emission Configure:

EUT	AE

#### 5.2. EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Bluetooth headphones	MZX870	2ALHZNB-1090B	EUT
2	Control Box	USB-TTL	N/A	AE
3	Adapter	HUAWEI	HW-050200C01	AE

#### 5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(3)	Peak Output Power	Compliant
15.247 (a)(2)	6 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.247 (e)	Maximum Conducted Output Power Density	Compliant
15.209	Radiated Emission	Compliant
15.207	Conducted Emission	Compliant



# 6. TEST FACILITY

Test software

Test Site	Attestation of C	Attestation of Global Compliance (Shenzhen) Co., Ltd					
Location		1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China					
Designation Number	CN1259						
FCC Test Firm Registration Number	975832	975832					
A2LA Cert. No.	5054.02	5054.02					
Description	Attestation of C	Attestation of Global Compliance (Shenzhen) Co., Ltd is accredited by A2LA					
TEST EQUIPMENT OI	TEST EQUIPMENT OF CONDUCTED EMISSION TEST						
Equipment	Manufacturer	Manufacturer Model S/N Cal. Date Cal. Due					
TEST RECEIVER	R&S	ESPI	101206	Mar. 28, 2022	Mar. 27, 2023		
LISN	R&S	R&S ESH2-Z5 100086 Jun. 08, 2022 Jun. 07, 2					

ES-K1(Ver.V1.71)

N/A

N/A

N/A

#### TEST EQUIPMENT OF RADIATED EMISSION TEST

R&S

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Mar. 28, 2022	Mar. 27, 2023
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Aug. 04, 2022	Aug. 03, 2023
2.4GHz Filter	EM Electronics	2400-2500	N/A	Mar. 22, 2022	Mar. 21, 2024
Attenuator	ZHINAN	E-002	N/A	Aug. 04, 2022	Aug. 03, 2024
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Oct. 31, 2021	Oct. 30, 2023
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Mar. 12, 2022	Mar. 11, 2024
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	Apr. 23, 2021	Apr. 22, 2023
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 02, 2022	Sep. 01, 2024
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 05, 2023	Jan. 04, 2025
Test software	Tonscend	JS32-RE (Ver.2.5)	N/A	N/A	N/A



# 7. PEAK OUTPUT POWER

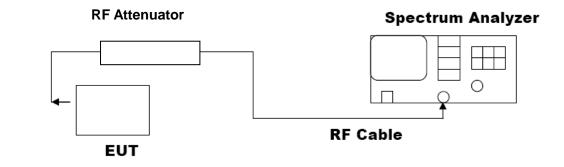
#### 7.1. MEASUREMENT PROCEDURE

For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. RBW≥DTS bandwidth
- 3. VBW≥3\*RBW.
- 4. SPAN≥VBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: Max hold.

Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

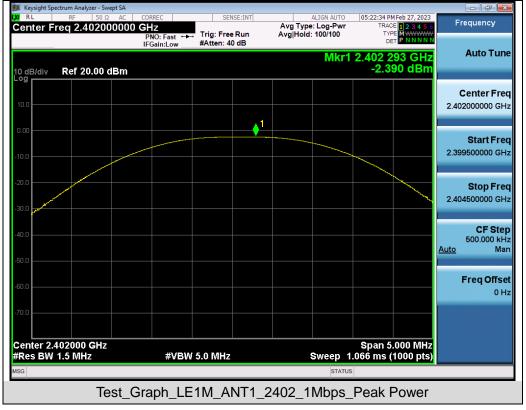
#### 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) PEAK POWER TEST SETUP





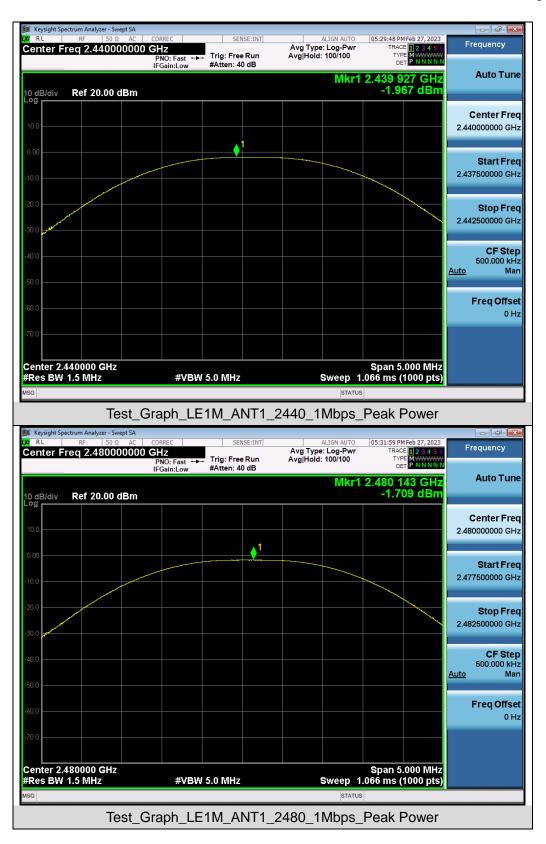
#### 7.3. LIMITS AND MEASUREMENT RESULT

Test Data of Conducted Output Power					
Test ModeTest Channel (MHz)Peak Power (dBm)Limits (dBm)Pass or Fail					
	2402	-2.390	≪30	Pass	
GFSK 1M	2440	-1.967	≪30	Pass	
	2480	-1.709	≤30	Pass	



#### **Test Graphs of Conducted Output Power**





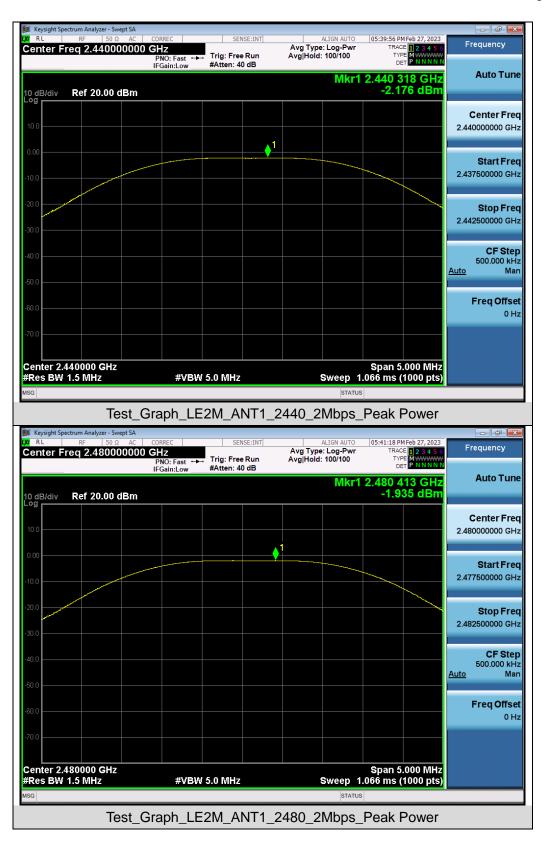


Test Data of Conducted Output Power					
Test ModeTest Channel (MHz)Peak Power (dBm)Limits (dBm)Pass or Fail					
	2402	-2.546	≪30	Pass	
GFSK 2M	2440	-2.176	≪30	Pass	
	2480	-1.935	≪30	Pass	

#### **Test Graphs of Conducted Output Power**









# 8. BANDWIDTH

#### **8.1. MEASUREMENT PROCEDURE**

6dB bandwidth:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 kHz, VBW $\ge$ 3×RBW.
- 4. Set SPA Trace 1 Max hold, then View.

Occupied bandwidth:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hoping channel The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak

4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

#### 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

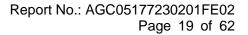
#### **8.3. LIMITS AND MEASUREMENT RESULTS**

Test Data of Occupied Bandwidth and DTS Bandwidth						
Test ModeTest Channel (MHz)99% Occupied Bandwidth (MHz)-6dB Bandwidth (MHz)Limits (MHz)Pass or Fail						
	2402	1.058	0.672	≥0.5	Pass	
GFSK 1M	2440	1.057	0.672	≥0.5	Pass	
	2480	1.056	0.673	≥0.5	Pass	





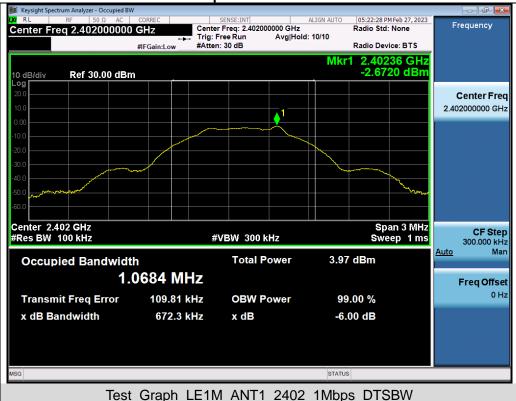
#### Test Graphs of Occupied Bandwidth







Test\_Graph\_LE1M\_ANT1\_2480\_1Mbps\_OBW



Test Graphs of DTS Bandwidth





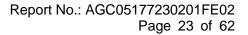


Test Data of Occupied Bandwidth and DTS Bandwidth						
Test ModeTest Channel (MHz)99% Occupied Bandwidth (MHz)-6dB Bandwidth (MHz)Limits (MHz)Pass or Fail						
GFSK 2M	2402	2.074	1.247	≥0.5	Pass	
	2440	2.074	1.194	≥0.5	Pass	
	2480	2.072	1.246	≥0.5	Pass	





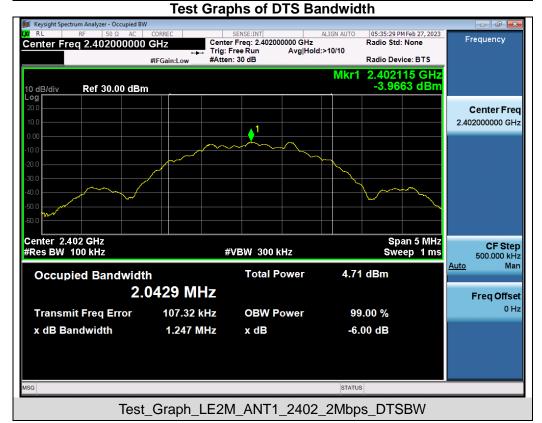
### **Test Graphs of Occupied Bandwidth**







Test\_Graph\_LE2M\_ANT1\_2480\_2Mbps\_OBW









# 9. CONDUCTED SPURIOUS EMISSION

#### 9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

#### 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

#### 9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.

#### 9.4. LIMITS AND MEASUREMENT RESULT

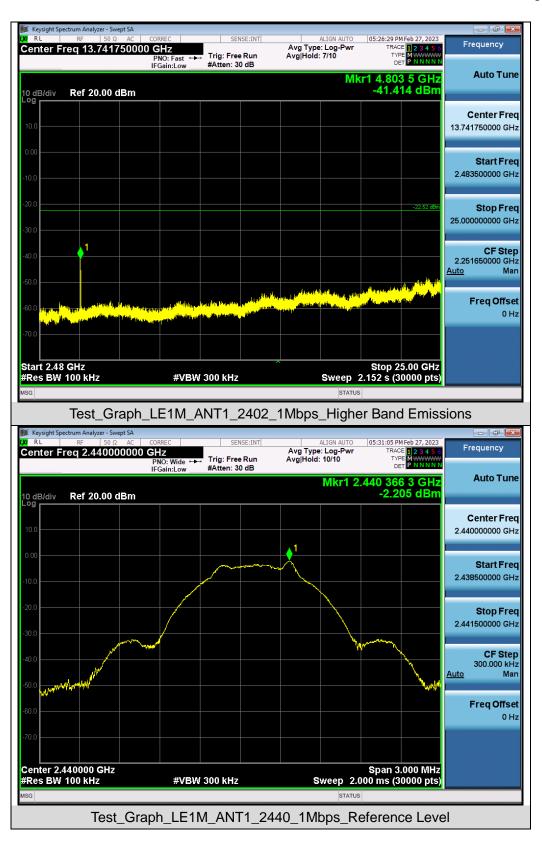
LIMITS AND MEASUREMENT RESULT					
Angliaghta Limite	Measurement Result				
Applicable Limits	Test Data	Criteria			
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the reference level	PASS			



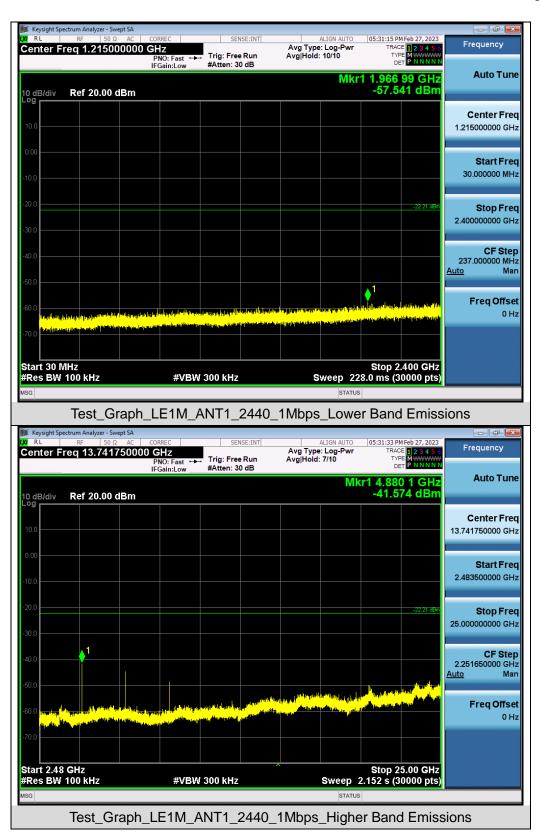


# Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands

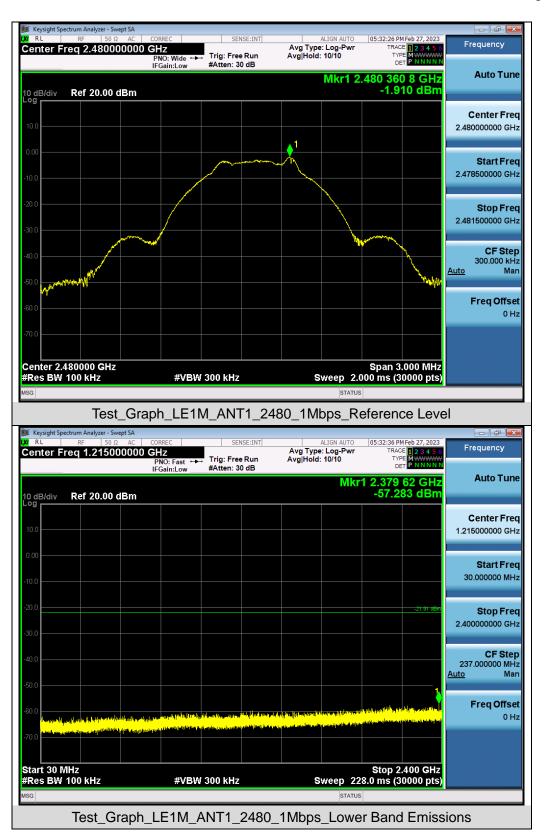




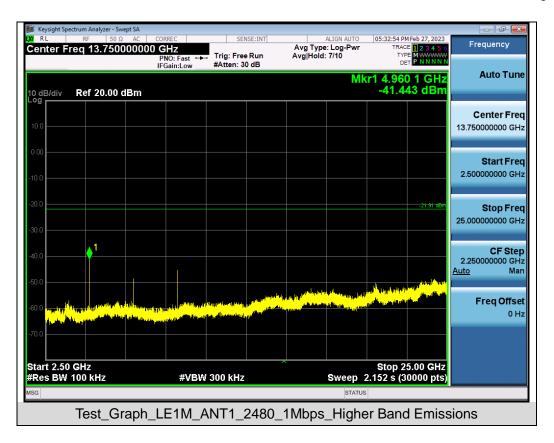










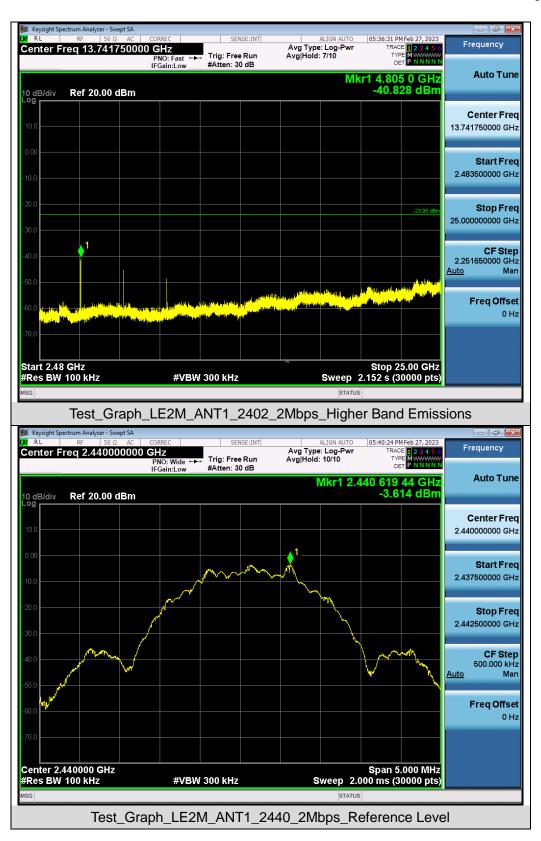




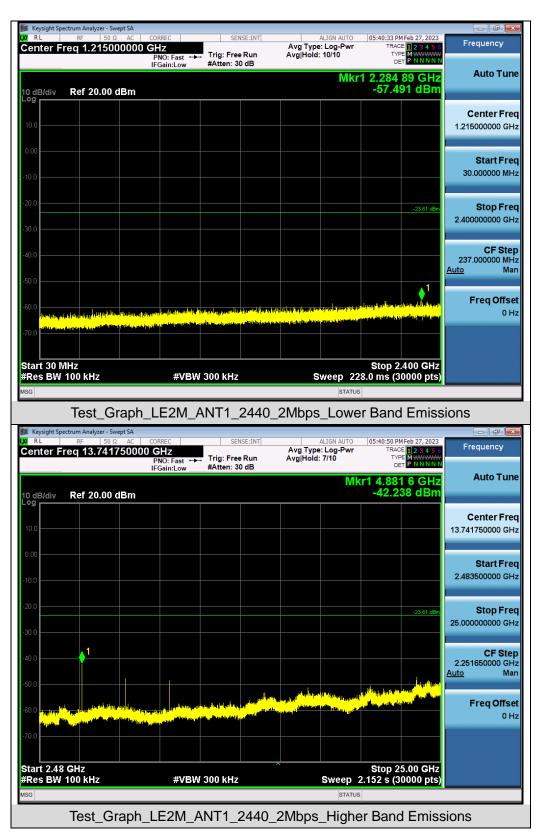


### Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands





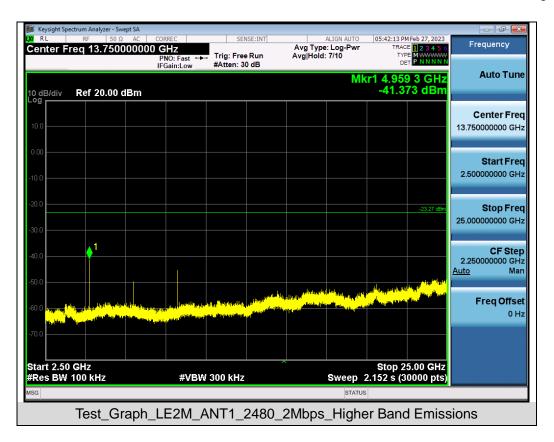




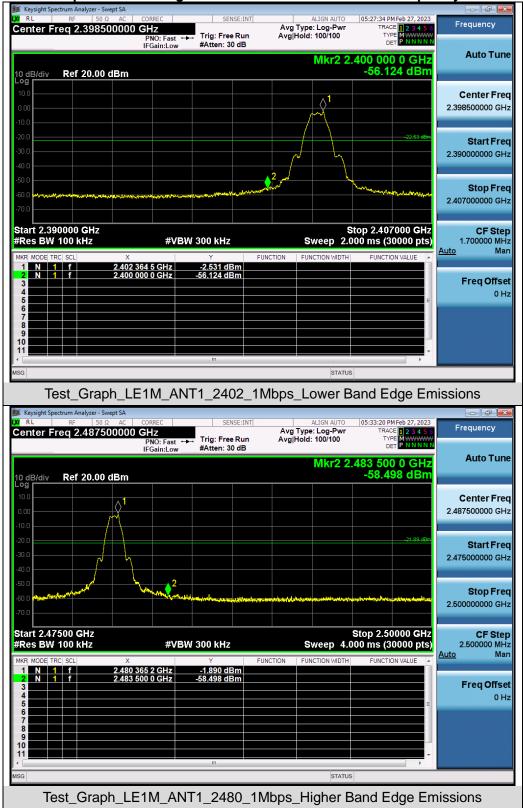












#### Test Graphs of Band Edge Emissions in Non-Restricted Frequency Bands





## Test Graphs of Band Edge Emissions in Non-Restricted Frequency Bands



# **10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY**

## **10.1. MEASUREMENT PROCEDURE**

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set the SPA Trace 1 Max hold, then View.

Note: The method of PKPSD in the KDB 558074 item 8.4 was used in this testing.

## **10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)**

Refer to Section 7.2.

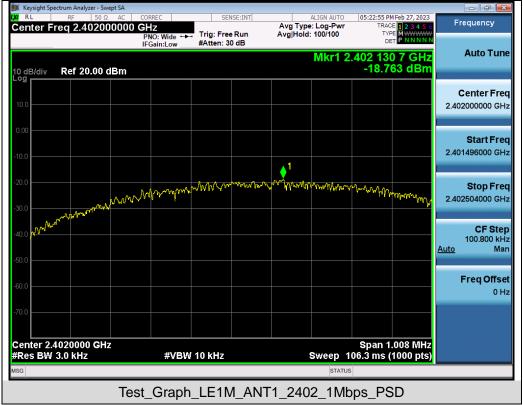
## **10.3. MEASUREMENT EQUIPMENT USED**

Refer to Section 6.

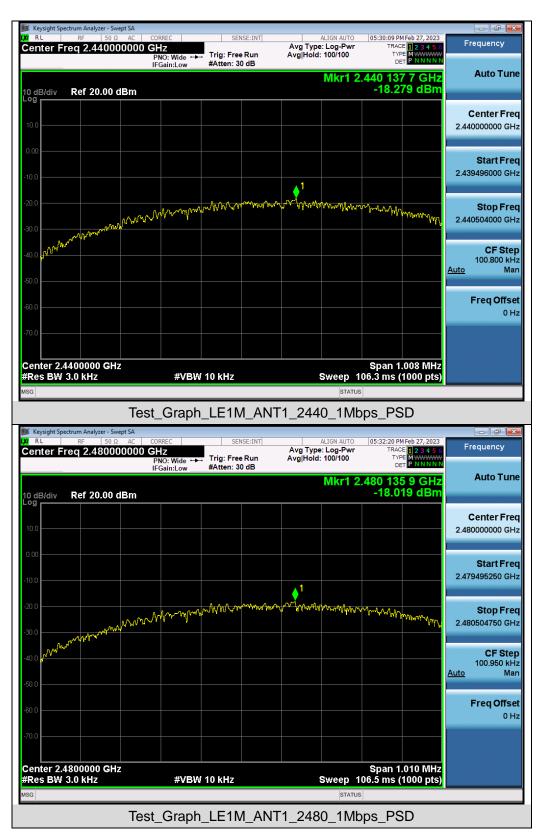
## **10.4. LIMITS AND MEASUREMENT RESULT**

Test Data of Conducted Output Power Spectral Density							
Test Mode	Test Channel (MHz)	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail			
	2402	-18.763	<b>≤8</b>	Pass			
GFSK 1M	2440	-18.279	<b>≤8</b>	Pass			
	2480	-18.019	≪8	Pass			

## Test Graphs of Conducted Output Power Spectral Density







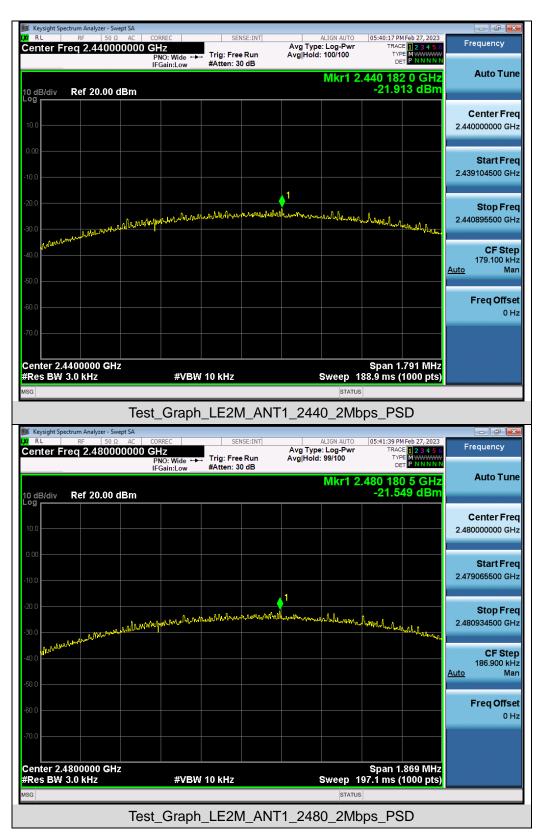


Test Data of Conducted Output Power Spectral Density							
Test Mode	Test Channel (MHz)	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Pass or Fail			
	2402	-22.268	≪8	Pass			
GFSK 2M	2440	-21.913	≪8	Pass			
	2480	-21.549	≪8	Pass			

## Test Graphs of Conducted Output Power Spectral Density

🎉 Keysight Spectrum Analyzer - Swep					
LXI RL RF 50 Ω	AC CORREC	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	05:35:56 PM Feb 27, 2023	Frequency
Center Freq 2.40200	PNO: Wide ↔→ IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold: 99/100	TRACE 1 2 3 4 5 6 Type Mwwww Det P NNNNN	
10 dB/div Ref 20.00 dl	Bm		Mkr1 2.	402 176 9 GHz -22.268 dBm	Auto Tune
					Center Free
10.0					2.402000000 GHz
0.00					Start Free
-10.0					2.401064750 GH
-20.0			1		<b>2</b> 4 <b>-</b> -
	a la mala population Ma	unternormania	moundablem	Wind and an a	<b>Stop Fre</b> 2.402935250 GH
-30.0				Will with all who and	05.04
-40.0					CF Stej 187.050 kH Auto Mai
-50.0					<u>Auto</u> Ma
-60.0					Freq Offse 0 H
-70.0					
Center 2.4020000 GHz #Res BW 3.0 kHz	#VBW	10 kHz	Sweep 1	Span 1.871 MHz 97.3 ms (1000 pts)	
MSG			STATUS		
	Test_Graph_	_LE2M_ANT	1_2402_2Mb	ps_PSD	







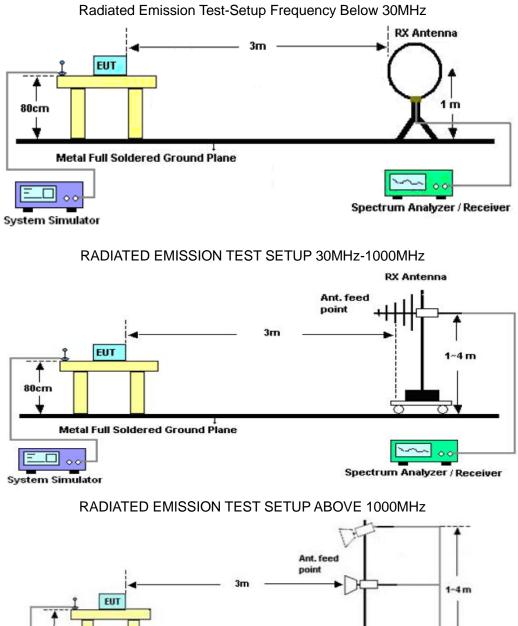
# **11. RADIATED EMISSION**

## **11.1. MEASUREMENT PROCEDURE**

- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8.If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.



## 11.2. TEST SETUP



Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.

Spectrum Analyzer / Receiver

Metal Full Soldered Ground Plane

1.5m

System Simulator



## **11.3. LIMITS AND MEASUREMENT RESULT**

15.209 Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

# 11.4. TEST RESULT

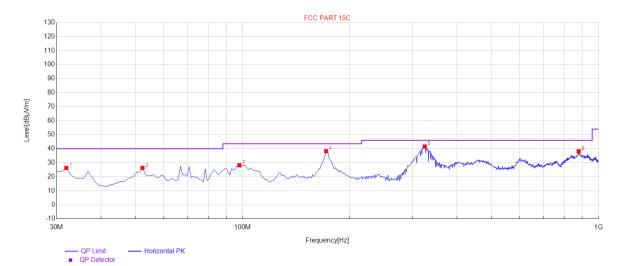
## Radiated emission below 30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.



EUT	Bluetooth headphones	Model Name	MZX870			
Temperature	25° C	Relative Humidity	55.4%			
Pressure	960hPa	Test Voltage	Normal Voltage			
Test Mode	Mode 3	Antenna	Horizontal			

#### Radiated emission from 30MHz to 1000MHz

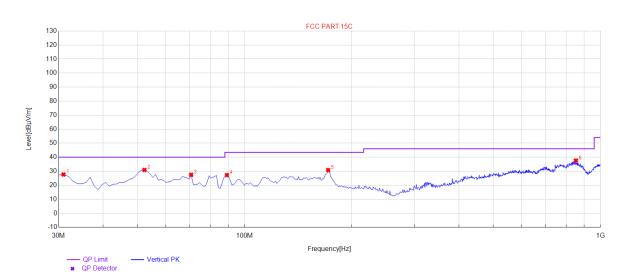


NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.94	26.27	12.14	40.00	13.73	100	135	Horizontal
2	52.31	26.26	11.50	40.00	13.74	100	140	Horizontal
3	97.9	28.24	20.24	43.50	15.26	100	293	Horizontal
4	171.62	38.29	13.38	43.50	5.21	100	188	Horizontal
5	324.88	41.64	21.21	46.00	4.36	100	288	Horizontal
6	879.72	38.21	33.24	46.00	7.79	100	2	Horizontal

## **RESULT: PASS**



EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.97	27.68	10.03	40.00	12.32	100	1	Vertical
2	52.31	30.91	13.69	40.00	9.09	100	28	Vertical
3	70.74	27.44	13.42	40.00	12.56	100	166	Vertical
4	89.17	27.27	12.49	43.50	16.23	100	87	Vertical
5	171.62	30.84	17.89	43.50	12.66	100	283	Vertical
6	852.56	37.62	32.21	46.00	8.38	100	150	Vertical

# RESULT: PASS Note:

1. Factor=Antenna Factor + Cable loss, Over=Measurement-Limit.

2. All test modes had been tested. The BLE GFSK 1Mbps mode 3 is the worst case and recorded in the report.



## Radiated emission above 1GHz

EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.000	43.58	0.08	43.66	74	-30.34	peak
4804.000	35.49	0.08	35.57	54	-18.43	AVG
7206.000	38.62	2.21	40.83	74	-33.17	peak
7206.000	31.35	2.21	33.56	54	-20.44	AVG
Remark:						
actor = Anter	nna Factor + Cable	e Loss – Pre-	amplifier.			

EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.000	44.47	0.08	44.55	74	-29.45	peak
4804.000	34.28	0.08	34.36	54	-19.64	AVG
7206.000	38.63	2.21	40.84	74	-33.16	peak
7206.000	30.59	2.21	32.8	54	-21.2	AVG
emark <sup>.</sup>						
emark: actor = Anten	na Factor + Cable	l oss – Pre-	amplifier			



EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4880.000	44.78	0.14	44.92	74	-29.08	peak
4880.000	35.59	0.14	35.73	54	-18.27	AVG
7320.000	39.41	2.36	41.77	74	-32.23	peak
7320.000	31.36	2.36	33.72	54	-20.28	AVG
Remark:						
actor = Anter	nna Factor + Cabl	e Loss – Pre-a	amplifier.			

EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
45.45	0.14	45.59	74	-28.41	peak
38.23	0.14	38.37	54	-15.63	AVG
40.69	2.36	43.05	74	-30.95	peak
32.58	2.36	34.94	54	-19.06	AVG
	(dBµV) 45.45 38.23 40.69	(dBµV)         (dB)           45.45         0.14           38.23         0.14           40.69         2.36	(dBµV)         (dB)         (dBµV/m)           45.45         0.14         45.59           38.23         0.14         38.37           40.69         2.36         43.05	(dBµV)         (dB)         (dBµV/m)         (dBµV/m)           45.45         0.14         45.59         74           38.23         0.14         38.37         54           40.69         2.36         43.05         74	(dBµV)         (dB)         (dBµV/m)         (dBµV/m)         (dB)           45.45         0.14         45.59         74         -28.41           38.23         0.14         38.37         54         -15.63           40.69         2.36         43.05         74         -30.95



EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4960.000	44.78	0.22	45	74	-29	peak
4960.000	35.69	0.22	35.91	54	-18.09	AVG
7440.000	38.54	2.64	41.18	74	-32.82	peak
7440.000	29.48	2.64	32.12	54	-21.88	AVG
Remark:						
actor = Anter	na Factor + Cabl	e Loss – Pre-	amplifier			

EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4960.000	42.58	0.22	42.8	74	-31.2	peak
4960.000	34.47	0.22	34.69	54	-19.31	AVG
7440.000	38.63	2.64	41.27	74	-32.73	peak
7440.000	29.52	2.64	32.16	54	-21.84	AVG
Remark:						
actor = Anter	nna Factor + Cabl	e Loss – Pre-	amplifier.			

#### **RESULT: PASS**

#### Note:

The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin=Level-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

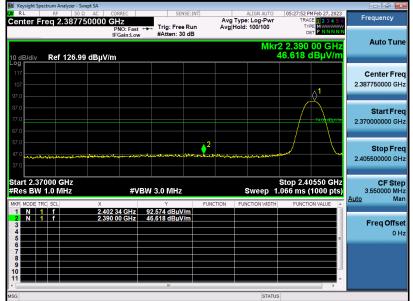


## BLE GFSK 1Mbps:

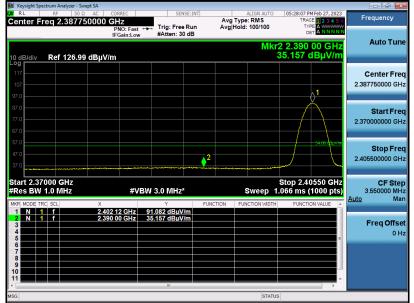
#### Test result for band edge emission at restricted bands

EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

#### Test Graph for Peak Measurement



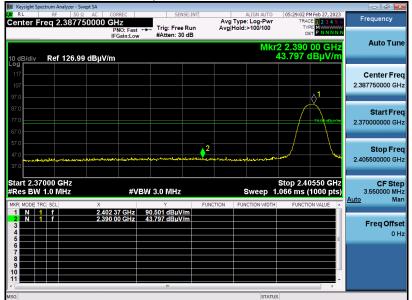
Test Graph for Average Measurement



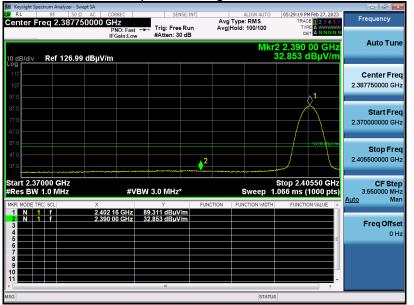
## **RESULT: PASS**



EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical



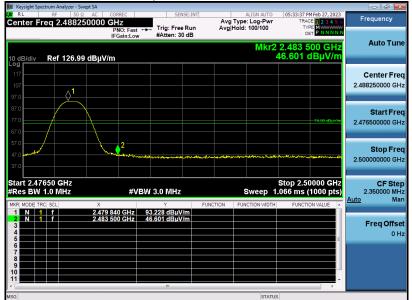
Test Graph for Average Measurement



#### **RESULT: PASS**



EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal



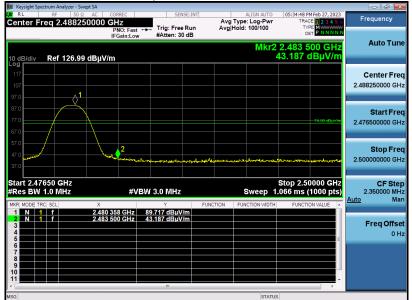
Test Graph for Average Measurement



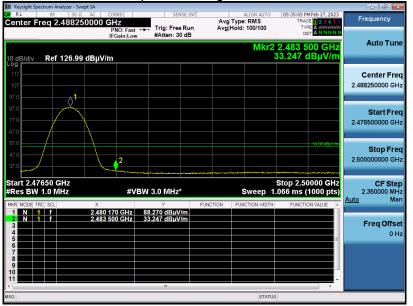
#### **RESULT: PASS**



EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical



Test Graph for Average Measurement



#### **RESULT: PASS**

Note: The factor had been edited in the "Input Correction" of the Spectrum Analyzer.

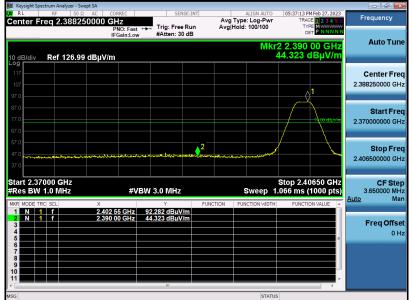


#### BLE GFSK 2Mbps:

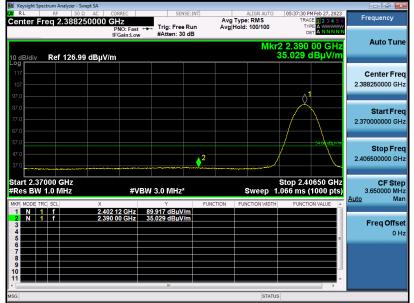
#### Test result for band edge emission at restricted bands

EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

#### Test Graph for Peak Measurement



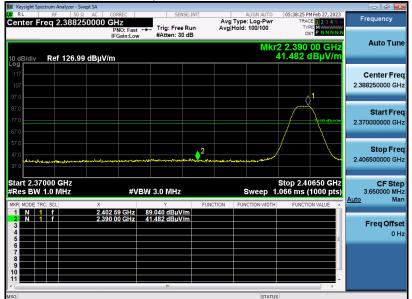
Test Graph for Average Measurement



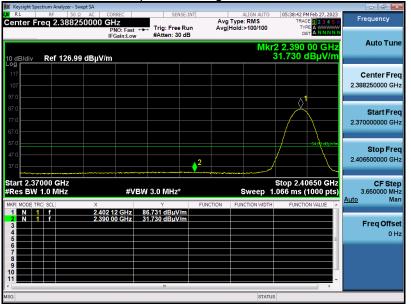
## **RESULT: PASS**



EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical



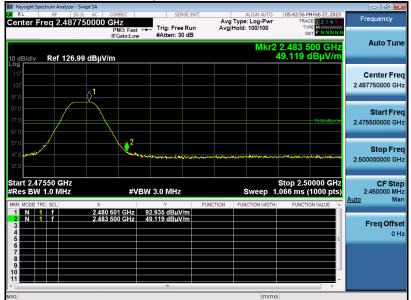
Test Graph for Average Measurement



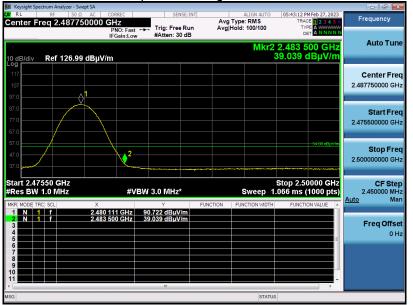
#### **RESULT: PASS**



EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal



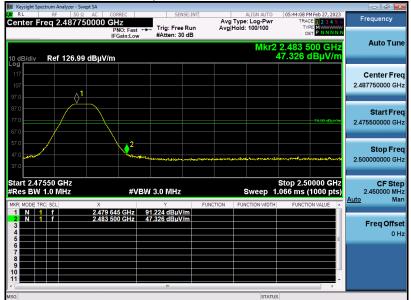
Test Graph for Average Measurement



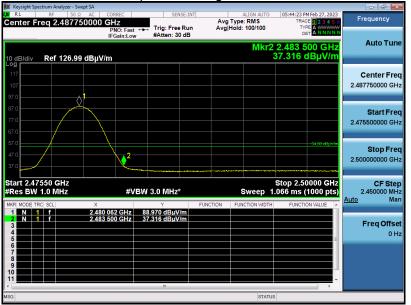
#### **RESULT: PASS**



EUT	Bluetooth headphones	Model Name	MZX870
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical



Test Graph for Average Measurement



#### **RESULT: PASS**

Note: The factor had been edited in the "Input Correction" of the Spectrum Analyzer.



# **12. LINE CONDUCTED EMISSION TEST**

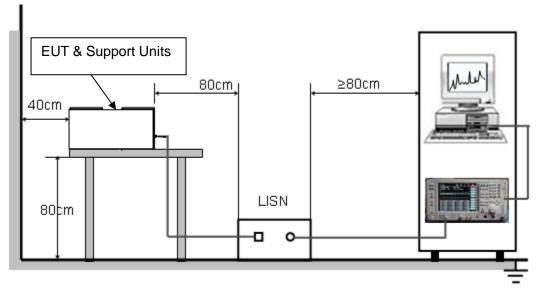
## **12.1. LIMITS OF LINE CONDUCTED EMISSION TEST**

Frequency	Maximum RF Line Voltage				
Frequency	Q.P.( dBuV)	Average( dBuV)			
150kHz~500kHz	66-56	56-46			
500kHz~5MHz	56	46			
5MHz~30MHz	60	50			

Note:

- 1. The lower limit shall apply at the transition frequency.
- 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

## 12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST





# 12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipment received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

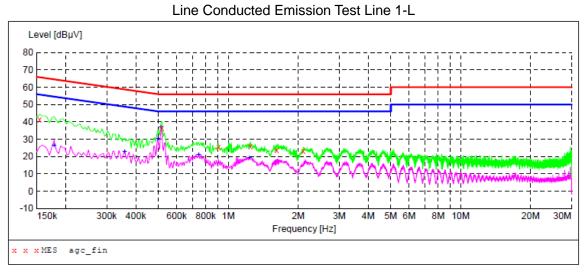
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

## 12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.



## 12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST



## MEASUREMENT RESULT: "agc fin"

2023/2/21 17:43

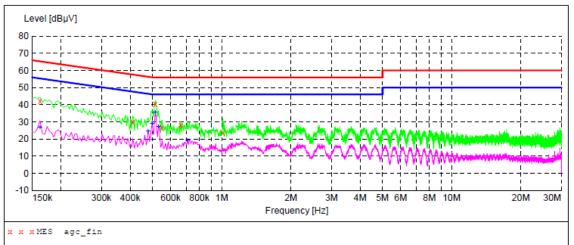
Frequency MHz	Level dBµV		Limit dBµV	Margin dB	Detector	Line	PE
0.154000	41.30	6.9	66	24.5	QP	L1	GND
0.518000	36.60	5.4	56	19.4	QP	ь1	GND
0.906000	25.50	5.4	56	30.5	QP	ь1	GND
1.246000	26.00	5.8	56	30.0	QP	L1	GND
1.618000	23.80	6.2	56	32.2	QP	ь1	GND
2.102000	23.30	6.5	56	32.7	QP	ь1	GND

#### MEASUREMENT RESULT: "agc fin2"

2023/2/21 17	:42						
Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
MHz	dBµV	dB	dBµV	dB			
0.178000	26.40	6.7	55	28.2	AV	L1	GND
0.358000	22.70	5.8	49	26.1	AV	ь1	GND
0.498000	30.50	5.4	46	15.5	AV	ь1	GND
0.514000	36.80	5.4	46	9.2	AV	ь1	GND
0.746000	21.00	5.4	46	25.0	AV	L1	GND
1.234000	19.30	5.7	46	26.7	AV	L1	GND







## MEASUREMENT RESULT: "agc fin"

2023/2/21 17:39

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.162000 0.410000 0.514000 0.550000 0.662000 1.010000	42.20 29.80 40.60 26.90 28.00 23.50	6.8 5.7 5.4 5.4 5.4 5.4	65 58 56 56 56	15.4 29.1 28.0	QP QP QP QP	N N N N N	GND GND GND GND GND GND

#### MEASUREMENT RESULT: "agc fin2"

2023/2/21 17	:39						
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.162000	26.70	6.8	55	28.7	AV	N	GND
0.478000	24.50	5.5	46	21.9	AV	Ν	GND
0.498000	28.80	5.4	46	17.2	AV	Ν	GND
0.514000	35.60	5.4	46	10.4	AV	Ν	GND
0.530000	27.20	5.4	46	18.8	AV	N	GND
0.710000	19.10	5.4	46	26.9	AV	N	GND

#### **RESULT: PASS**

Note: All the test modes had been tested, the BLE GFSK 1Mbps mode 3 was the worst case. Only the data of the worst case would be record in this test report.



# **APPENDIX A: PHOTOGRAPHS OF TEST SETUP**

Refer to the Report No.: AGC05177230201AP01

APPENDIX B: PHOTOGRAPHS OF EUT Refer to the Report No.: AGC05177230201AP02

----END OF REPORT----



# Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.