

# **FCC Test Report**

Report No.: AGC01110230768FR02

**FCC ID** : 2AOKB-A3872R

**APPLICATION PURPOSE**: Original Equipment

**PRODUCT DESIGNATION**: Wireless Headphone

**BRAND NAME** : soundcore

MODEL NAME : A3872R

**APPLICANT**: Anker Innovations Limited

**DATE OF ISSUE** : Aug. 24, 2023

**STANDARD(S)** : FCC Part 15 Subpart C §15.247

**REPORT VERSION**: V1.0

Attestation of Global Congliance (Shenzhen) Co., Ltd



Page 2 of 81

## REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Aug. 24, 2023	Valid	Initial Release



# **TABLE OF CONTENTS**

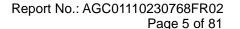
1.	VERIFICATION OF CONFORMITY	. 5
2.	GENERAL INFORMATION	. 6
	2.1. PRODUCT DESCRIPTION	. 6
	2.2. TABLE OF CARRIER FREQUENCYS	. 7
	2.3. RECEIVER INPUT BANDWIDTH	. 7
	2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE	. 7
	2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR	. 8
	2.6. RELATED SUBMITTAL(S) / GRANT (S)	. 8
	2.7. TEST METHODOLOGY	. 8
	2.8. SPECIAL ACCESSORIES	. 8
	2.9. EQUIPMENT MODIFICATIONS	. 8
	2.10. ANTENNA REQUIREMENT	. 9
3.	MEASUREMENT UNCERTAINTY	10
4.	DESCRIPTION OF TEST MODES	11
5.	SYSTEM TEST CONFIGURATION	12
	5.1. CONFIGURATION OF EUT SYSTEM	12
	5.2. EQUIPMENT USED IN TESTED SYSTEM	12
	5.3. SUMMARY OF TEST RESULTS	12
6.	TEST FACILITY	13
7.	PEAK OUTPUT POWER	14
	7.1. MEASUREMENT PROCEDURE	14
	7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	14
	7.3. LIMITS AND MEASUREMENT RESULT	15
8.	20DB BANDWIDTH	25
	8.1. MEASUREMENT PROCEDURE	25
	8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	25
	8.3. LIMITS AND MEASUREMENT RESULTS	26
9.	CONDUCTED SPURIOUS EMISSION	31
Sta	9.1. MEASUREMENT PROCEDURE  report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection mp" 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 resented 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 is not permitted to AGC within 15days after the issuance of the test report apply only to the tested sample.	n sults

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Further enquiry of validity or verification of the test report should be addressed to AGC by agc01@agccert.com.



9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	31
9.3. MEASUREMENT EQUIPMENT USED	
9.4. LIMITS AND MEASUREMENT RESULT	31
10. RADIATED EMISSION	52
10.1. MEASUREMENT PROCEDURE	52
10.2. TEST SETUP	54
10.3. LIMITS AND MEASUREMENT RESULT	55
10.4. TEST RESULT	55
11. NUMBER OF HOPPING FREQUENCY	73
11.1. MEASUREMENT PROCEDURE	73
11.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	73
11.3. MEASUREMENT EQUIPMENT USED	73
11.4. LIMITS AND MEASUREMENT RESULT	73
12. TIME OF OCCUPANCY (DWELL TIME)	74
12.1. MEASUREMENT PROCEDURE	74
12.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	74
12.3. MEASUREMENT EQUIPMENT USED	74
12.4. LIMITS AND MEASUREMENT RESULT	74
13. FREQUENCY SEPARATION	78
13.1. MEASUREMENT PROCEDURE	78
13.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)	78
13.3. MEASUREMENT EQUIPMENT USED	78
13.4. LIMITS AND MEASUREMENT RESULT	78
14. LINE CONDUCTED EMISSION TEST	79
14.1. LIMITS OF LINE CONDUCTED EMISSION TEST	79
14.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST	79
14.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST	80
14.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST	80
14.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST	80
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	81
APPENDIX B: PHOTOGRAPHS OF EUT	81





## 1. VERIFICATION OF CONFORMITY

Applicant	Anker Innovations Limited
Address	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hongkong
Manufacturer	Anker Innovations Limited
Address	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hongkong
Factory	N/A
Address	N/A
Product Designation	Wireless Headphone
Brand Name	soundcore
Test Model	A3872R
Date of receipt of test item	Aug. 10, 2023
Date of test	Aug. 11, 2023 to Aug. 24, 2023
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BR/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.

Prepared By	Cool cheny	
	Cool Cheng (Project Engineer)	Aug. 24, 2023
Reviewed By	Calin Lin	
	Calvin Liu (Reviewer)	Aug. 24, 2023
Approved By	Max Zhang	
	Max Zhang (Authorized Officer)	Aug. 24, 2023



Page 6 of 81

## 2. GENERAL INFORMATION

## 2.1. PRODUCT DESCRIPTION

The EUT is designed as "Wireless Headphone". It is designed by way of utilizing the GFSK, Pi/4 DQPSK and 8DPSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480 GHz
RF Output Power	With battery M76230: 10.422dBm (Max) With battery HT76230VS: 9.916dBm (Max)
Bluetooth Version	V5.3
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK 1Mbps □GFSK 2Mbps
Number of channels	79
Hardware Version	V2.0
Software Version	V01.26
Antenna Designation	PIFA Antenna (Comply with requirements of the FCC part 15.203)
Antenna Gain	-0.12dBi
Power Supply	DC 3.72V by battery
Battery	Battery 1: Model: M76230 voltage and capacity: 3.72V, 85mAh Battery 2: Model: HT76230VS voltage and capacity: 3.72V, 85mAh

Note: The battery 1 and battery 2 all the same except for the model names and manufacturer. The RF output power of each battery had been tested and recorded in the report. For the other test items, the battery 1 had been tested and recorded in this report.



Report No.: AGC01110230768FR02 Page 7 of 81

## 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	0	2402 MHz
	1	2403 MHz
	÷	:
	38	2440 MHz
2402~2480MHz	39	2441 MHz
	40	2442 MHz
	••	:
	77	2479 MHz
	78	2480 MHz

#### 2.3. RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 1.3MHz, in every connection one Bluetooth device is the master and the other one is slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally, the type of connection (e.g. single of multi slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also, the slave of the connection will use these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.

## 2.4. EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a hopping sequence in data mode:

40, 21, 44, 23, 04, 15, 66, 56, 19, 78, 07, 28, 69, 55,

36, 45, 05, 13, 43, 74, 57, 35, 67, 76, 02, 34, 54, 63,

42, 11, 30, 06, 64, 25, 75, 48, 17, 33, 58, 01, 29, 14,

51, 72, 03, 31, 50, 61, 77, 18, 10, 47, 12, 68, 08, 49,

20, 00, 73, 09, 16, 60, 71, 41, 24, 53, 38, 26, 46, 37,

65, 32, 70, 52, 27, 59, 22, 62, 39



Report No.: AGC01110230768FR02 Page 8 of 81

## 2.5. EQUALLY AVERAGE USE OF FREQUENCIES AND BEHAVIOUR

The generation of the hopping sequence in connection mode depends essentially on two input values:

- 1. LAP/UAP of the master of the connection.
- 2. Internal master clock.

The LAP (lower address part) are the 24 LSB's of the 48 BD\_ADDRESS. The BD\_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24MSB's of the 48BD\_ADDRESS

The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For behavior action with other units only offset is used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5us. The clock has a cycle of about one day(23h30). In most case it is implemented as 28 bits counter. For the deriving of the hopping sequence the entire. LAP (24 bits),4LSB's(4bits) (Input 1) and the 27MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the Sequence. This will be done at the beginning of every new transmission.

Regarding short transmissions the Bluetooth system has the following behavior:

The first connection between the two devices is established, a hopping sequence was generated. For Transmitting the wanted data the complete hopping sequence was not used. The connection ended. The second connection will be established. A new hopping sequence is generated. Due to the fact the Bluetooth clock has a different value, because the period between the two transmission is longer (and it Cannot be shorter) than the minimum resolution of the clock(312.5us). The hopping sequence will always differ from the first one.

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

This submittal(s) (test report) is intended for **FCC ID: 2AOKB-A3872R** filing to comply with the FCC PART 15.247 requirements.

#### 2.7. 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.

#### 2.8. SPECIAL ACCESSORIES

Refer to section 5.2.

## 2.9. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.



Page 9 of 81

## 2.10. 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.



Page 10 of 81

## 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±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 <sub>c</sub> = ±2.7 %	
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2 \%$	



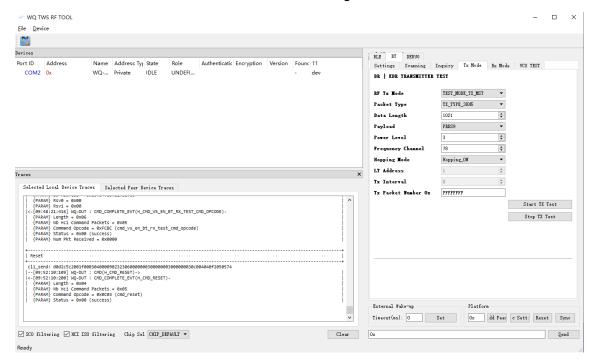
## 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK
4	Low channel π/4-DQPSK
5	Middle channel π/4-DQPSK
6	High channel π/4-DQPSK
7	Low channel 8DPSK
8	Middle channel 8DPSK
9	High channel 8DPSK
10	Hopping mode GFSK
11	Hopping mode π/4-DQPSK
12	Hopping mode 8DPSK

#### 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





Page 12 of 81

## 5. SYSTEM TEST CONFIGURATION

## **5.1. CONFIGURATION OF EUT SYSTEM**

Radiated Emission Configure:

EUT	

#### **5.2. EQUIPMENT USED IN TESTED SYSTEM**

Item	Equipment	Model No.	ID or Specification	Remark
1	Wireless Headphone	A3872R	2AOKB-A3872R	EUT
2	Control Box	N/A	USB-TTL	AE

#### 5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(1)	Peak Output Power	Compliant
15.247 (a)(1)	20 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.209	Radiated Emission	Compliant
15.247 (a)(1)(iii)	Number of Hopping Frequency	Compliant
15.247 (a)(1)(iii)	Time of Occupancy	Compliant
15.247 (a)(1)	Frequency Separation	Compliant
15.207	Conducted Emission	Not applicable

Note: The BT function cannot transmit when charging.



Page 13 of 81

## 6. TEST FACILITY

Test Site	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
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance (Shenzhen) Co., Ltd is accredited by A2LA

# TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun. 03, 2023	Jun. 02, 2024
LISN	R&S	ESH2-Z5	100086	Jun. 03, 2023	Jun. 02, 2024
Test software	R&S	Ver.V1.71	N/A	N/A	N/A

## **TEST EQUIPMENT OF RADIATED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Jun. 01, 2023	May 31, 2024
2.4GHz Filter	EM Electronics	2400-2500MHz	N/A	Mar. 22, 2022	Mar. 21, 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	Mar. 23, 2023	Mar. 22, 2024
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	Ver.2.5	N/A	N/A	N/A



Page 14 of 81

## 7. PEAK OUTPUT POWER

## 7.1. MEASUREMENT PROCEDURE

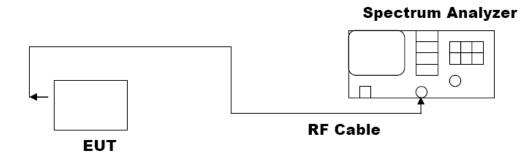
For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer.
- 2. Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
- 3. RBW > 20 dB bandwidth of the emission being measured.
- 4. VBW ≥RBW.
- 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 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 with battery M76230					
Test Mode	Test Channel (MHz)	Peak Power (dBm)	Limits (dBm)	Pass or Fail	
	2402	10.255	<b></b> \$21	Pass	
GFSK	2441	10.422	<b>⊴</b> 21	Pass	
	2480	10.394	<b></b> 21	Pass	
	2402	9.992	<b></b> \$21	Pass	
π /4-DQPSK	2441	10.276	<b>⊴</b> 21	Pass	
	2480	10.252	<b></b> 21	Pass	
	2402	5.959	<b></b> \$21	Pass	
8DPSK	2441	6.678	<b>⊴</b> 21	Pass	
	2480	6.573	<b></b> \$21	Pass	

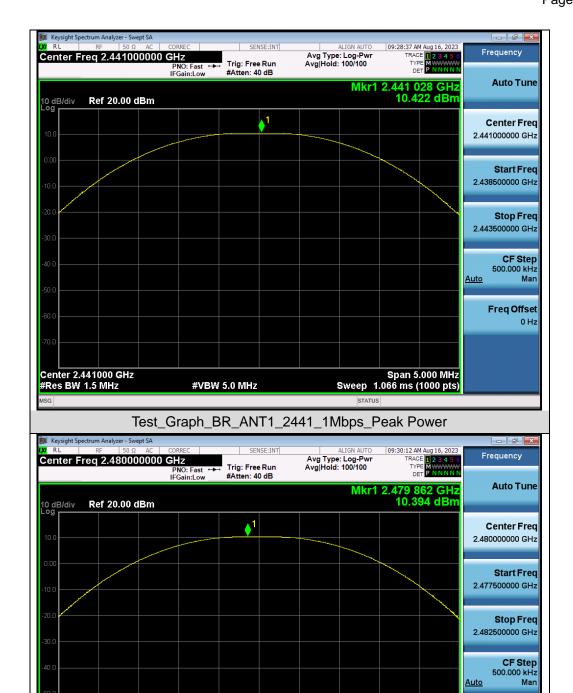
# **Test Graphs of Conducted Output Power**



Freq Offset

Span 5.000 MHz Sweep 1.066 ms (1000 pts)





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Test\_Graph\_BR\_ANT1\_2480\_1Mbps\_Peak Power

#VBW 5.0 MHz

Center 2.480000 GHz #Res BW 1.5 MHz

500.000 kHz

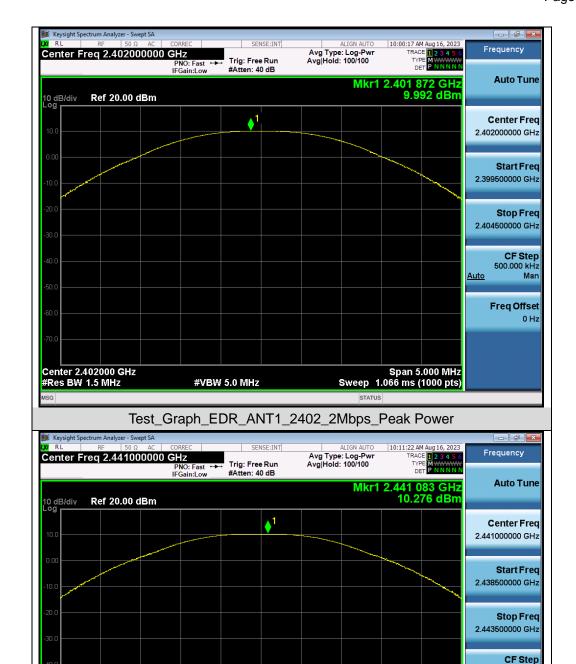
Freq Offset

Mar

<u>Auto</u>

Span 5.000 MHz Sweep 1.066 ms (1000 pts)





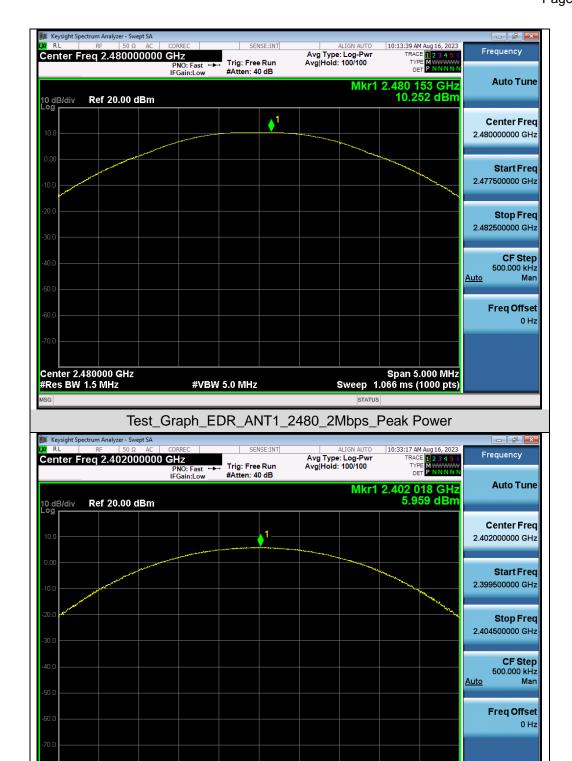
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the 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.

Test\_Graph\_EDR\_ANT1\_2441\_2Mbps\_Peak Power

#VBW 5.0 MHz

Center 2.441000 GHz #Res BW 1.5 MHz





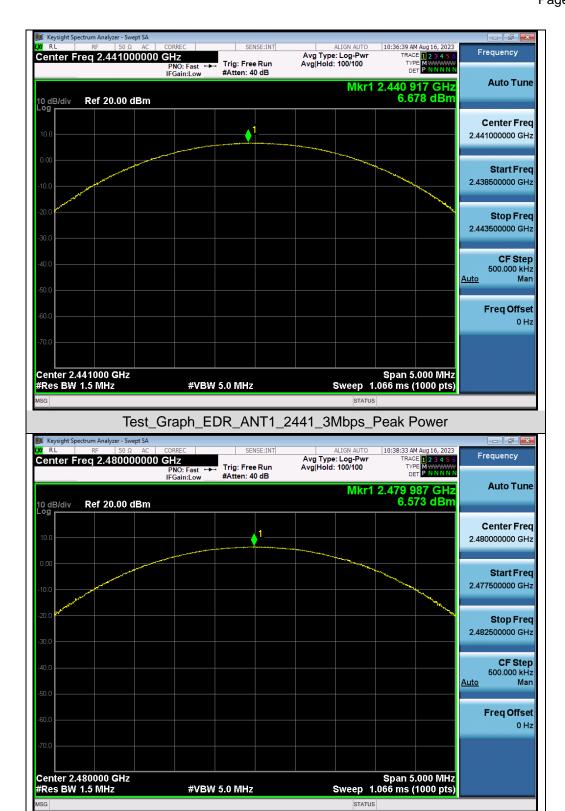
Test\_Graph\_EDR\_ANT1\_2402\_3Mbps\_Peak Power

#VBW 5.0 MHz

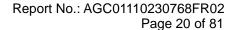
Span 5.000 MHz Sweep 1.066 ms (1000 pts)

Center 2.402000 GHz #Res BW 1.5 MHz





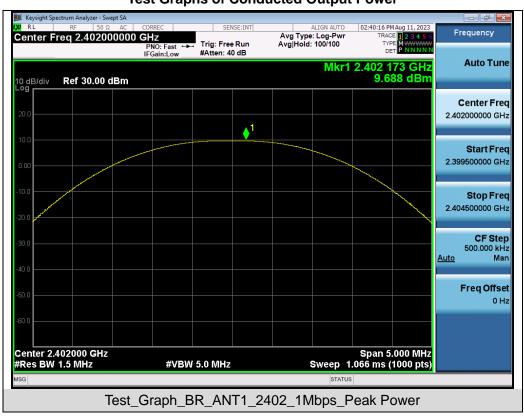
Test\_Graph\_EDR\_ANT1\_2480\_3Mbps\_Peak Power



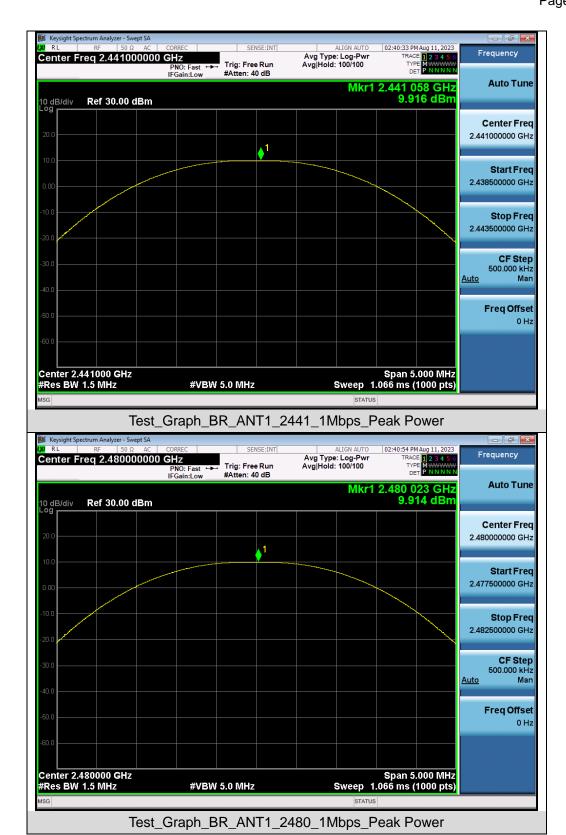


Test Data of Conducted Output Power with battery HT76230VS					
Test Mode	Test Channel (MHz)	Peak Power (dBm)	Limits (dBm)	Pass or Fail	
	2402	9.688	<b>≨</b> 1	Pass	
GFSK	2441	9.916	<b>₹</b> 1	Pass	
	2480	9.914	<b>≨</b> 1	Pass	
	2402	9.437	<b>≨</b> 1	Pass	
π /4-DQPSK	2441	5.465	<b>₹</b> 1	Pass	
	2480	9.703	<b>≨</b> 1	Pass	
8DPSK	2402	6.274	<b>≨</b> 1	Pass	
	2441	9.703	<b>⊴</b> 21	Pass	
	2480	6.043	<b>≨</b> 1	Pass	

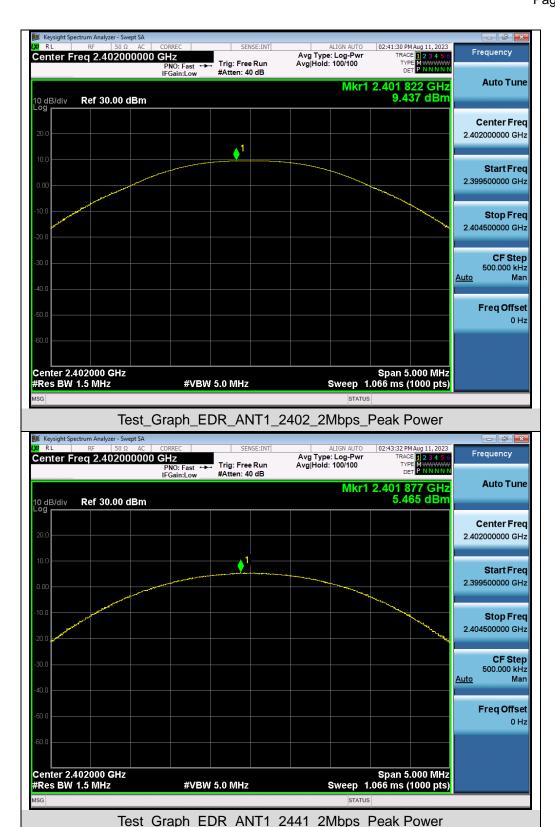
## **Test Graphs of Conducted Output Power**



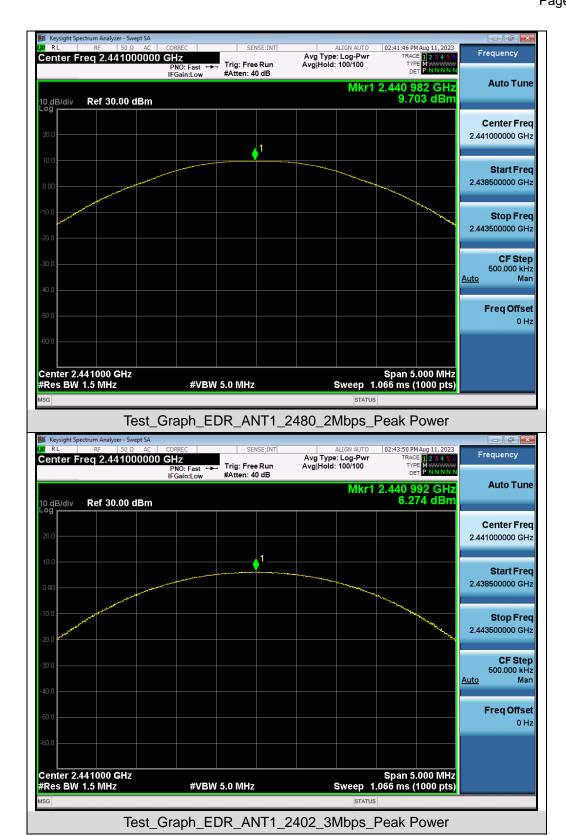




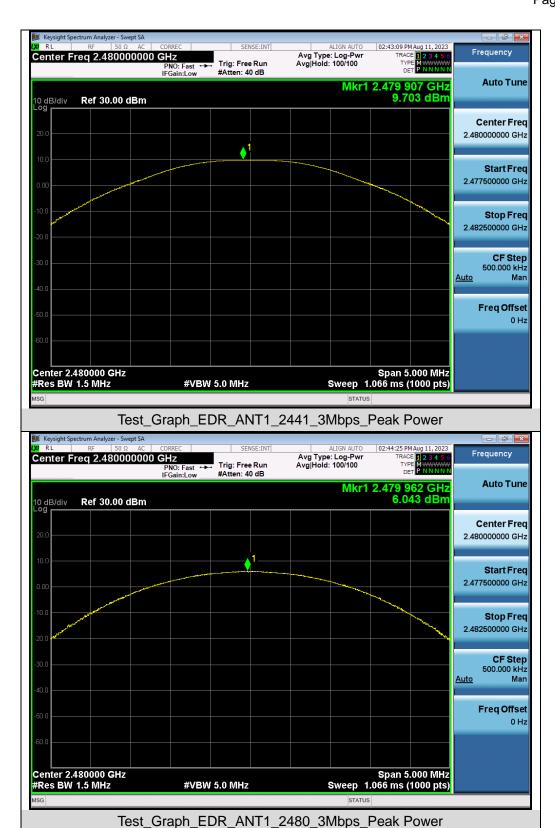














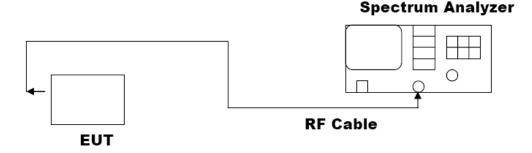
Page 25 of 81

## 8. 20DB BANDWIDTH

## **8.1. MEASUREMENT PROCEDURE**

- 1. Connect EUT RF output port to the Spectrum Analyzer.
- 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.

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

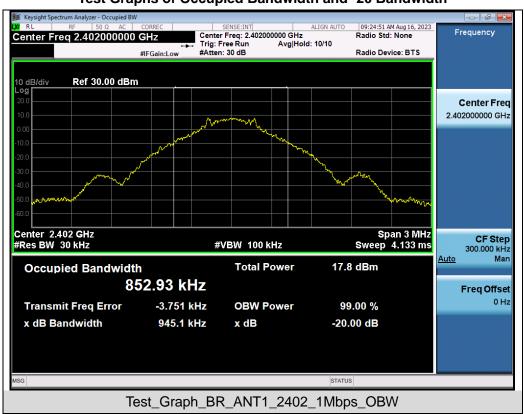




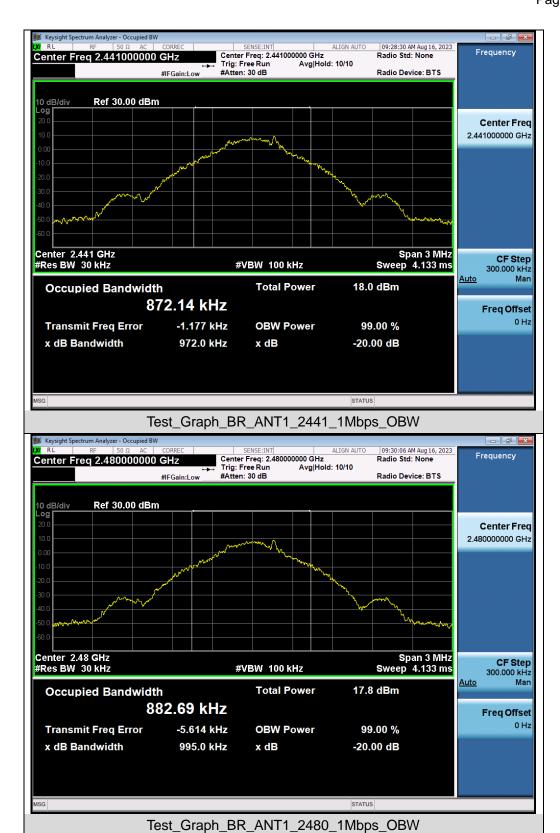
#### 8.3. LIMITS AND MEASUREMENT RESULTS

Test Data of Occupied Bandwidth and -20dB Bandwidth					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	-20dB Bandwidth (MHz)	Limits	Pass or Fail
	2402	0.853	0.945	N/A	Pass
GFSK	2441	0.872	0.972	N/A	Pass
	2480	0.883	0.995	N/A	Pass
	2402	1.160	1.280	N/A	Pass
π /4-DQPSK	2441	1.188	1.280	N/A	Pass
	2480	1.172	1.260	N/A	Pass
8DPSK	2402	1.169	1.293	N/A	Pass
	2441	1.166	1.256	N/A	Pass
	2480	1.172	1.275	N/A	Pass

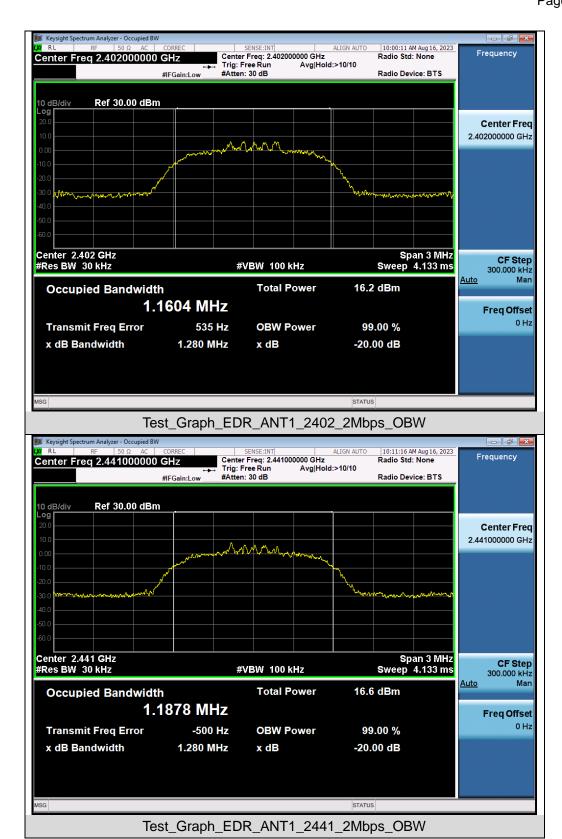
# Test Graphs of Occupied Bandwidth and -20 Bandwidth



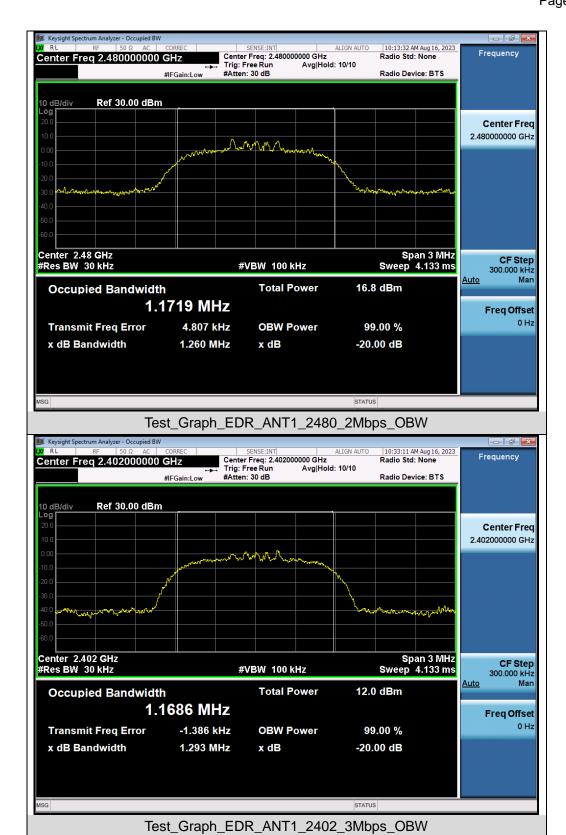




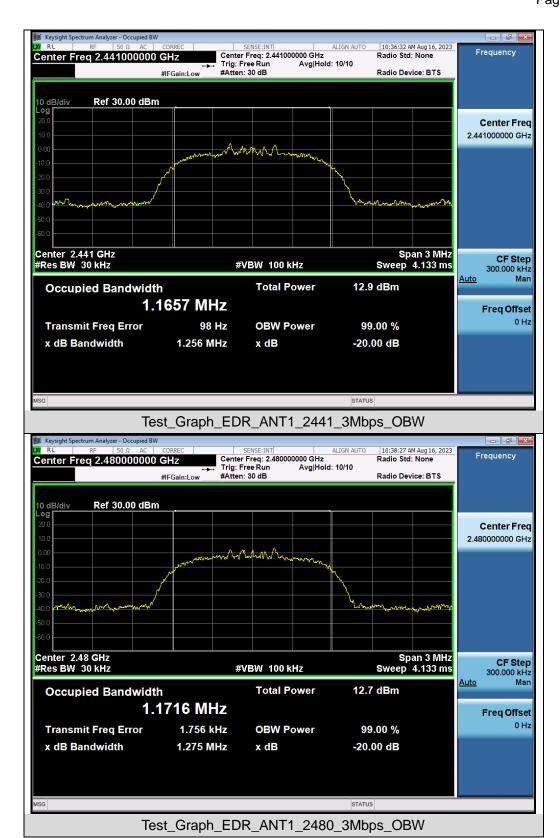














Page 31 of 81

## 9. CONDUCTED SPURIOUS EMISSION

# 9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer.
- 2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
- 3. Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
  - RBW = 100 kHz; VBW= 300 kHz; Sweep = auto; Detector function = peak.
- 4. Set SPA Trace 1 Max hold, then View.

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

The same as described in section 8.2

#### 9.3. MEASUREMENT EQUIPMENT USED

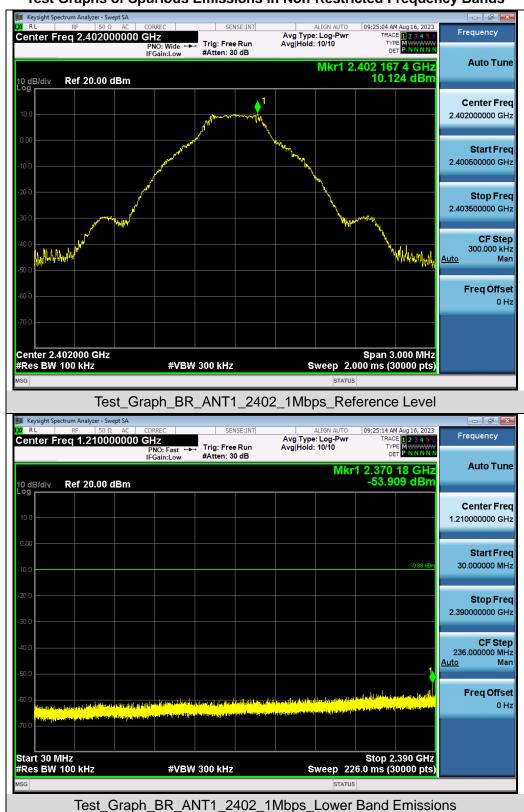
The same as described in section 6

# 9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT				
Amplicable Limite	Measurement Result			
Applicable Limits	Test Data	Criteria		
In any 100 kHz Bandwidth Outside the	At least -20dBc than the limit			
frequency band in which the spread spectrum	Specified on the BOTTOM	PASS		
intentional radiator is operating, the radio frequency	Channel			
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 limit	PASS		
In addition, radiation emissions which fall in the	Specified on the TOP Channel	PASS		
restricted bands, as defined in §15.205(a), must also				
comply with the radiated emission limits specified				
in§15.209(a))				

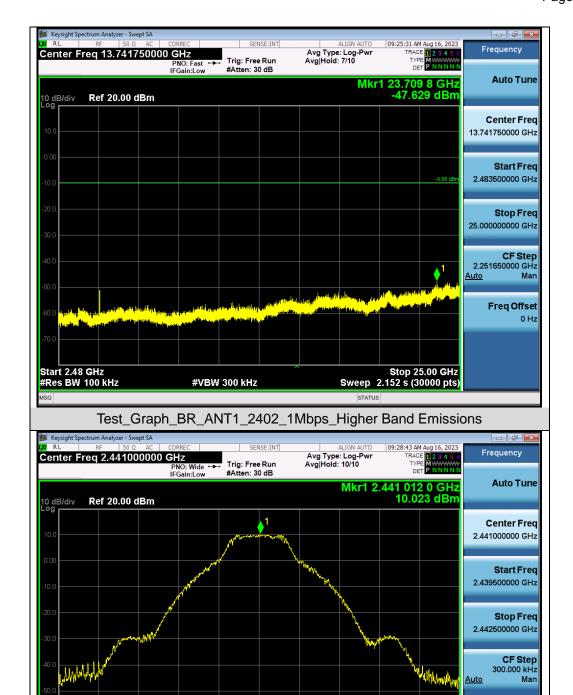


## Test Graphs of Spurious Emissions in Non-Restricted Frequency Bands



Freq Offset





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Test\_Graph\_BR\_ANT1\_2441\_1Mbps\_Reference Level

#VBW 300 kHz

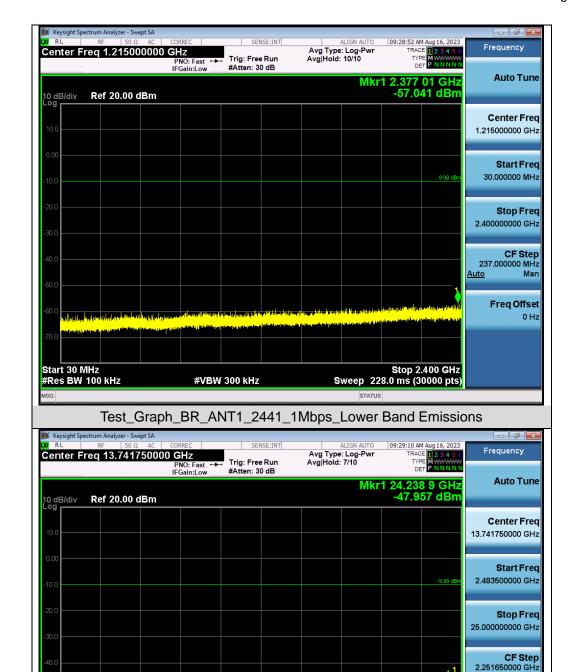
Span 3.000 MHz Sweep 2.000 ms (30000 pts)

Center 2.441000 GHz #Res BW 100 kHz

<u>Auto</u>

Stop 25.00 GHz Sweep 2.152 s (30000 pts) Freq Offset





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Test\_Graph\_BR\_ANT1\_2441\_1Mbps\_Higher Band Emissions

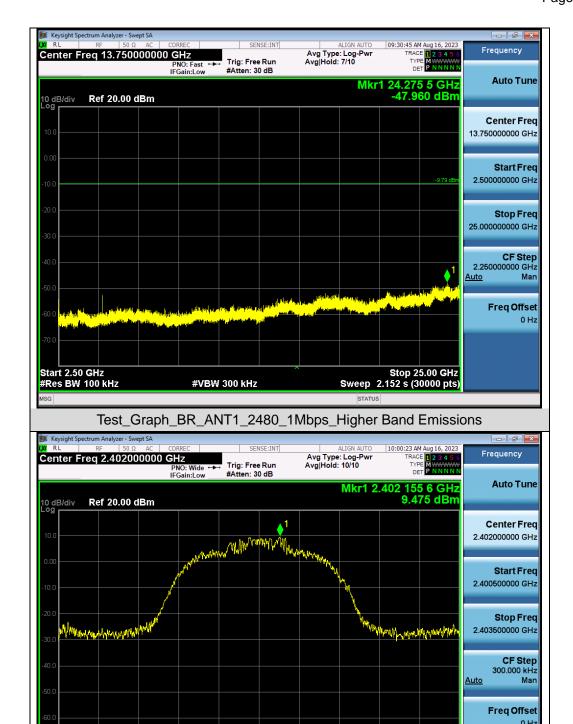
#VBW 300 kHz

Start 2.48 GHz #Res BW 100 kHz









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Test\_Graph\_EDR\_ANT1\_2402\_2Mbps\_Reference Level

#VBW 300 kHz

Span 3.000 MHz Sweep 2.000 ms (30000 pts)

Center 2.402000 GHz #Res BW 100 kHz

25.000000000 GHz

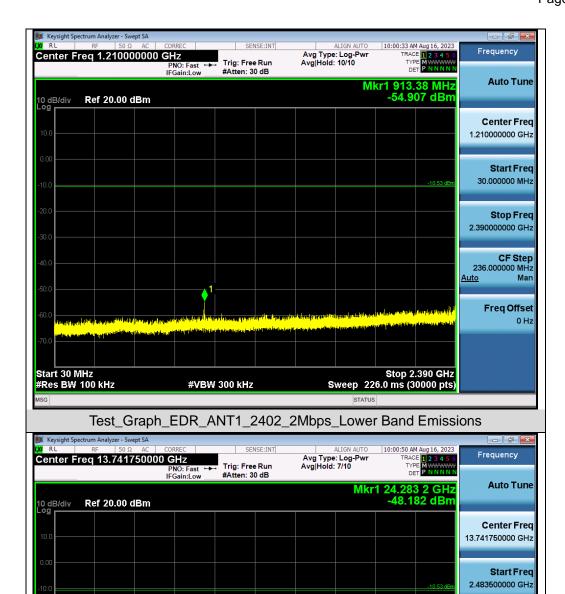
<u>Auto</u>

Stop 25.00 GHz Sweep 2.152 s (30000 pts) **CF Step** 2.251650000 GHz

Freq Offset 0 Hz

Mar





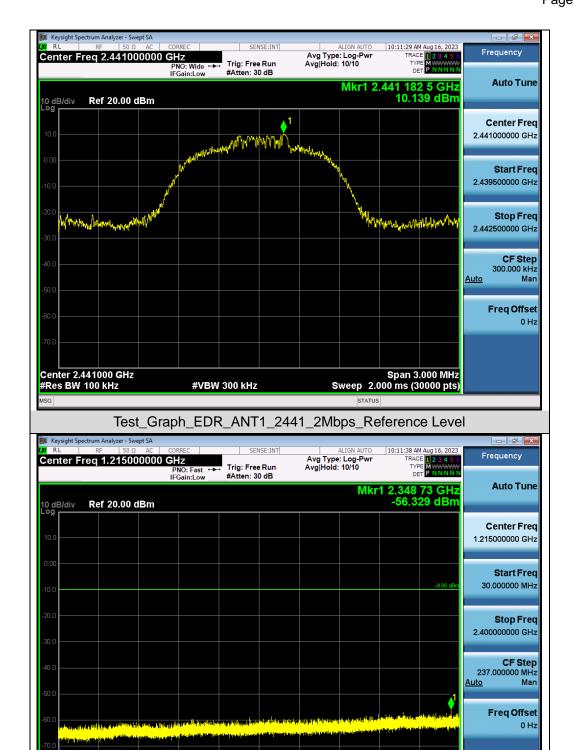
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the 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.

Test\_Graph\_EDR\_ANT1\_2402\_2Mbps\_Higher Band Emissions

#VBW 300 kHz

Start 2.48 GHz #Res BW 100 kHz





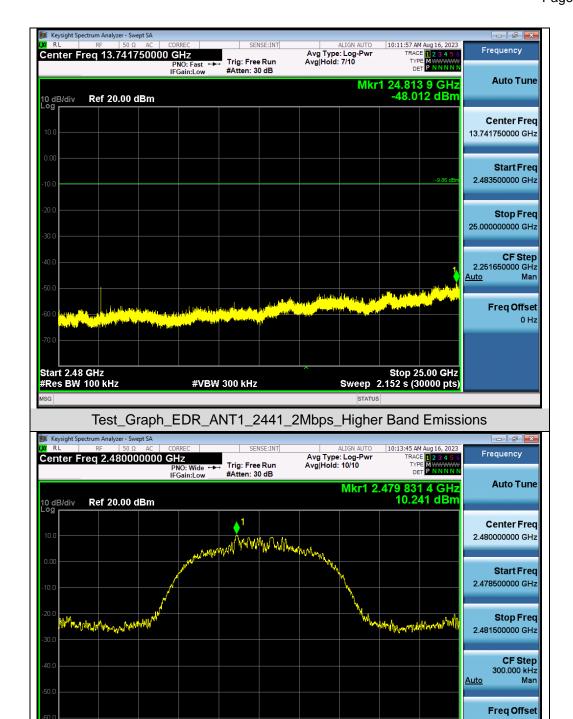
Test\_Graph\_EDR\_ANT1\_2441\_2Mbps\_Lower Band Emissions

#VBW 300 kHz

Stop 2.400 GHz Sweep 228.0 ms (30000 pts)

Start 30 MHz #Res BW 100 kHz





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Test\_Graph\_EDR\_ANT1\_2480\_2Mbps\_Reference Level

#VBW 300 kHz

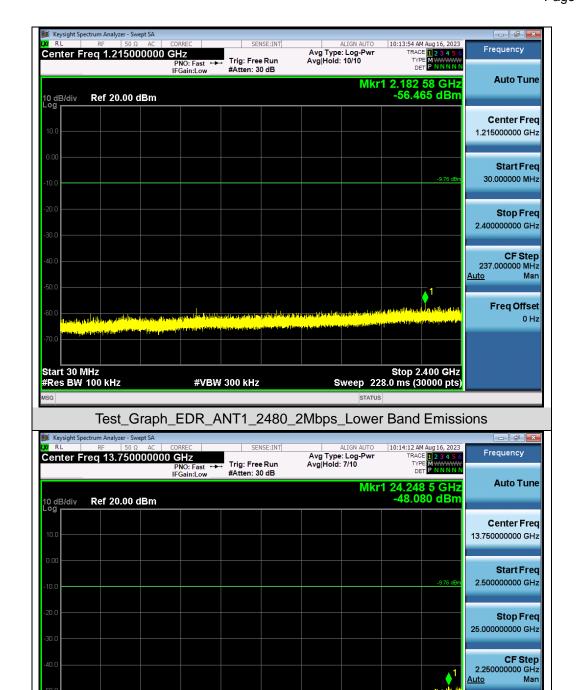
Span 3.000 MHz Sweep 2.000 ms (30000 pts)

Center 2.480000 GHz #Res BW 100 kHz

Freq Offset 0 Hz

Stop 25.00 GHz Sweep 2.152 s (30000 pts)





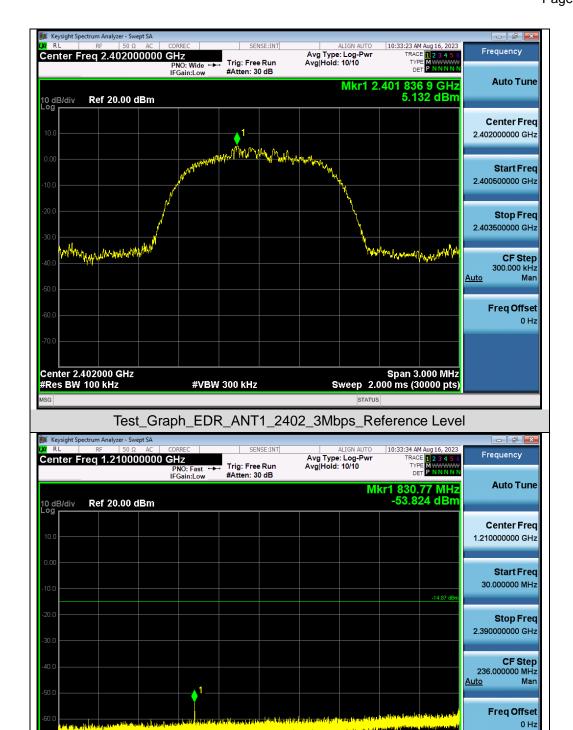
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the 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.

Test\_Graph\_EDR\_ANT1\_2480\_2Mbps\_Higher Band Emissions

#VBW 300 kHz

Start 2.50 GHz #Res BW 100 kHz





Test\_Graph\_EDR\_ANT1\_2402\_3Mbps\_Lower Band Emissions

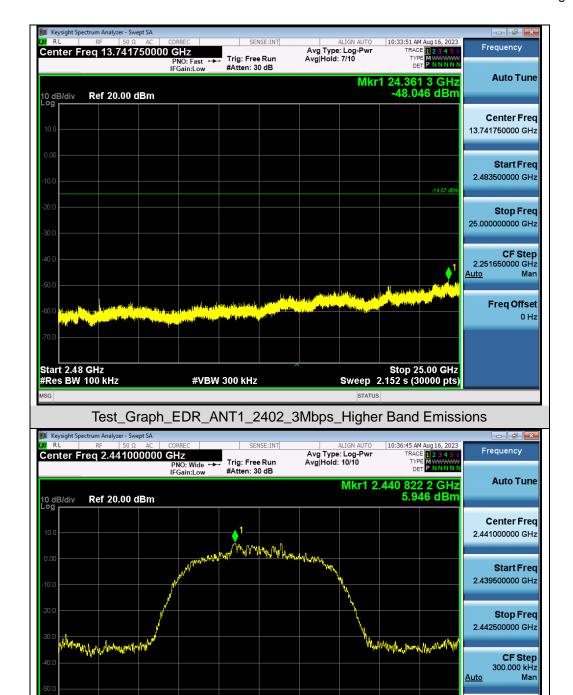
#VBW 300 kHz

Stop 2.390 GHz Sweep 226.0 ms (30000 pts)

Start 30 MHz #Res BW 100 kHz

Freq Offset





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Test\_Graph\_EDR\_ANT1\_2441\_3Mbps\_Reference Level

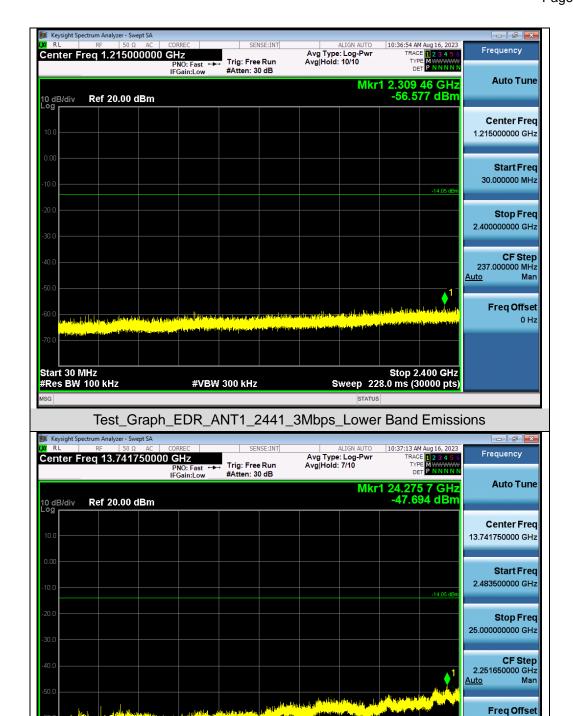
#VBW 300 kHz

Span 3.000 MHz Sweep 2.000 ms (30000 pts)

Center 2.441000 GHz #Res BW 100 kHz

0 Hz





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Test\_Graph\_EDR\_ANT1\_2441\_3Mbps\_Higher Band Emissions

#VBW 300 kHz

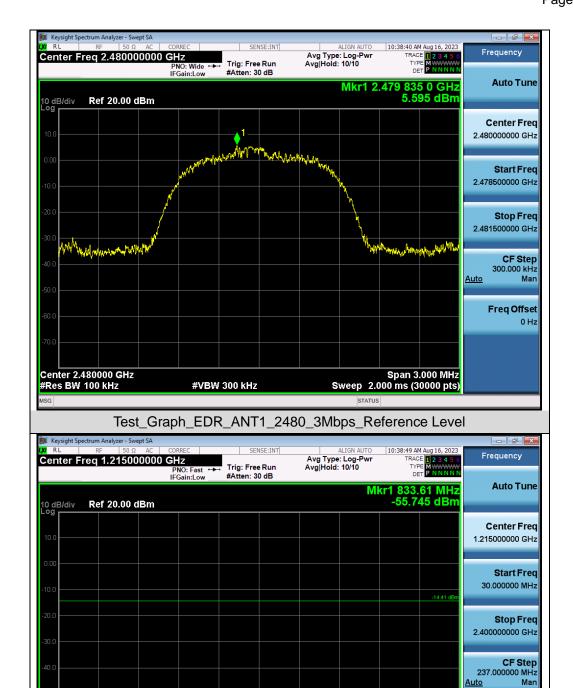
Stop 25.00 GHz Sweep 2.152 s (30000 pts)

Start 2.48 GHz #Res BW 100 kHz

Freq Offset

Stop 2.400 GHz Sweep 228.0 ms (30000 pts)





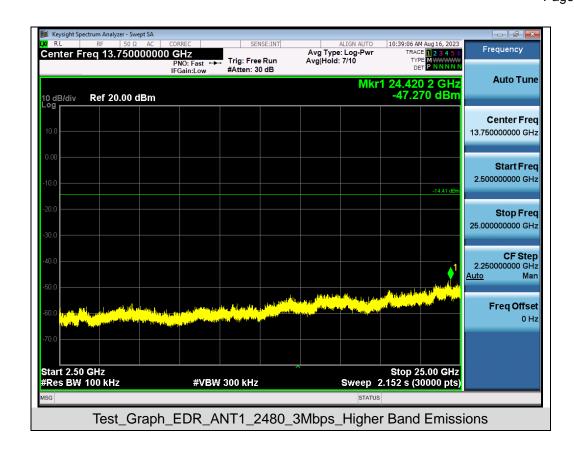
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the 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.

Test\_Graph\_EDR\_ANT1\_2480\_3Mbps\_Lower Band Emissions

#VBW 300 kHz

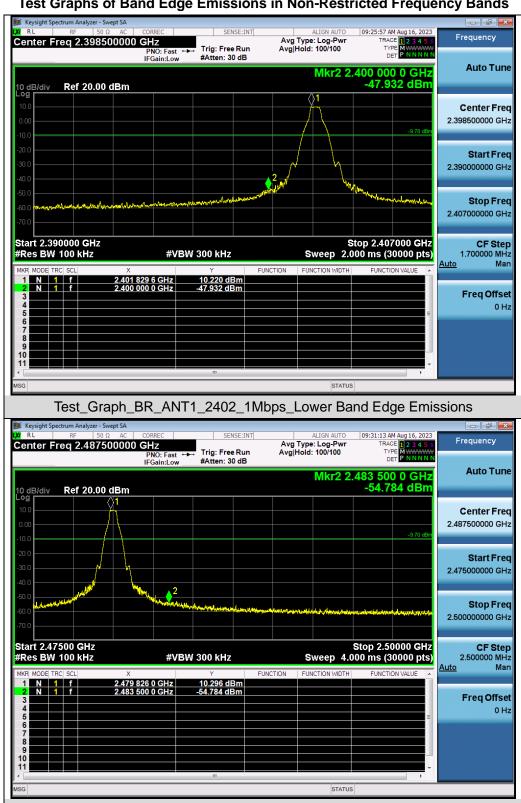
Start 30 MHz #Res BW 100 kHz







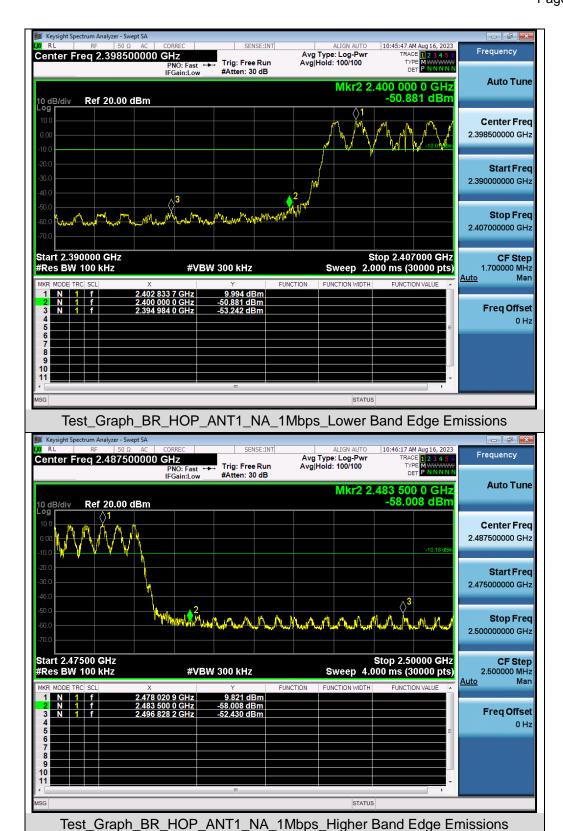
# Test Graphs of Band Edge Emissions in Non-Restricted Frequency Bands



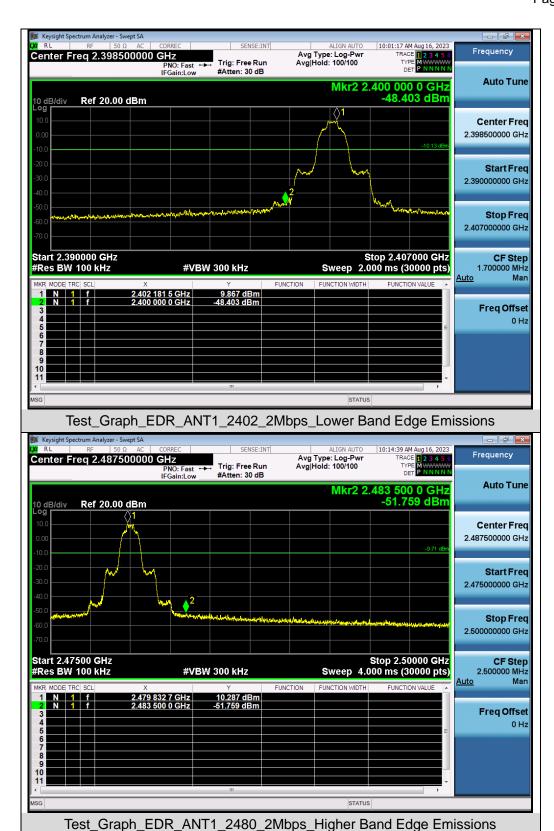
Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the 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.

Test\_Graph\_BR\_ANT1\_2480\_1Mbps\_Higher Band Edge Emissions



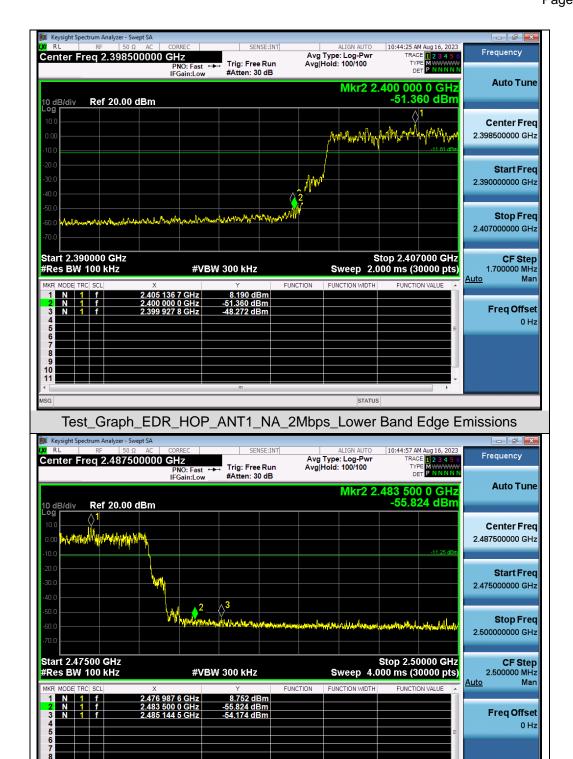






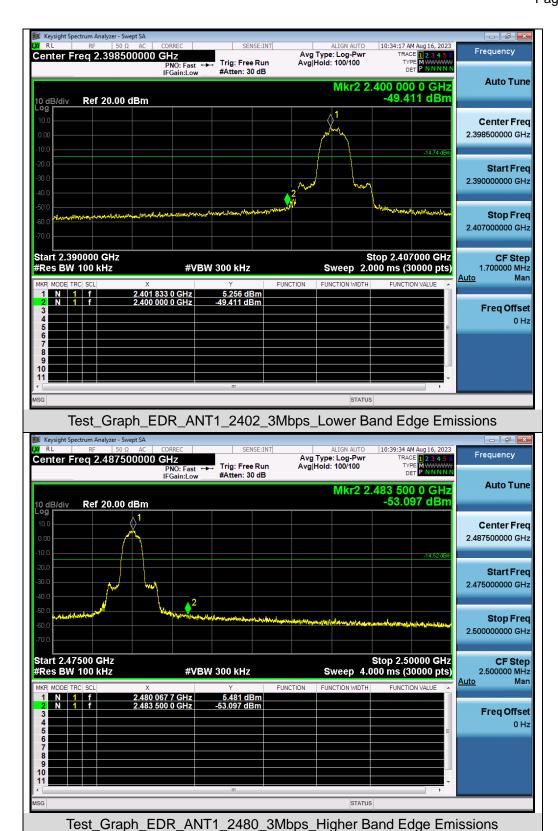
Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: http://www.agccert.com/





Test\_Graph\_EDR\_HOP\_ANT1\_NA\_2Mbps\_Higher Band Edge Emissions









Test\_Graph\_EDR\_HOP\_ANT1\_NA\_3Mbps\_Higher Band Edge Emissions



Page 52 of 81

### 10. RADIATED EMISSION

## 10.1. 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.



Page 53 of 81

# The following table is the setting of spectrum analyzer and receiver.

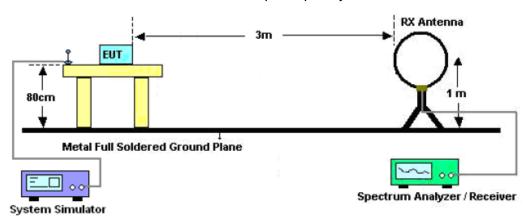
Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz
Start ~Stop Frequency	1MHz/3MHz for Peak, 1MHz/3MHz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

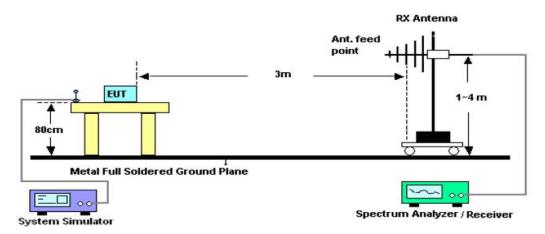


### 10.2. TEST SETUP

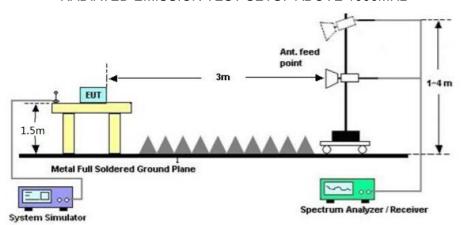
## Radiated Emission Test-Setup Frequency Below 30MHz



### RADIATED EMISSION TEST SETUP 30MHz-1000MHz



## RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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Page 55 of 81

## 10.3. 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.

## 10.4. TEST RESULT

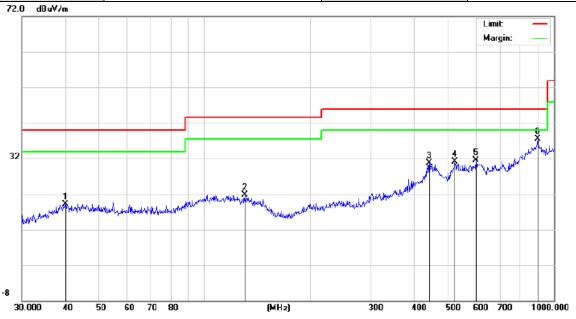
#### Radiated emission below 30MHz

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



## Radiated emission from 30MHz to 1000MHz

EUT	Wireless Headphone	Model Name	A3872R
Temperature	23.4° C	Relative Humidity	60.1%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

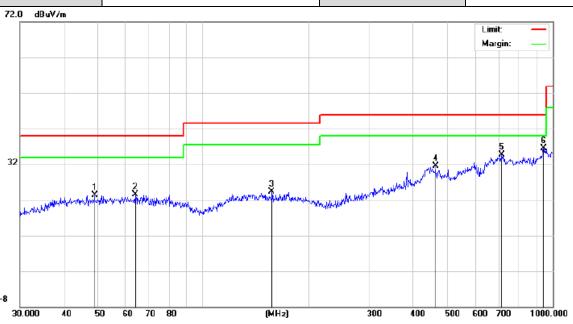


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		39.9941	5.24	13.90	19.14	40.00	-20.86	peak
2		130.3788	5.84	15.78	21.62	43.50	-21.88	peak
3	4	440.1963	5.53	25.09	30.62	46.00	-15.38	peak
4	ļ	520.8881	5.98	25.14	31.12	46.00	-14.88	peak
5	į	599.3212	6.41	25.07	31.48	46.00	-14.52	peak
6	* (	900.1473	5.63	31.78	37.41	46.00	-8.59	peak

## **RESULT: PASS**



EUT	Wireless Headphone	Model Name	A3872R
Temperature	23.4° C	Relative Humidity	60.1%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		49.0145	6.39	16.99	23.38	40.00	-16.62	peak
2		63.9828	6.44	17.06	23.50	40.00	-16.50	peak
3	1	157.5588	6.08	18.20	24.28	43.50	-19.22	peak
4	4	162.3455	6.39	25.04	31.43	46.00	-14.57	peak
5	7	714.1734	6.08	28.60	34.68	46.00	-11.32	peak
6	* (	942.1305	5.67	30.91	36.58	46.00	-9.42	peak

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. All test modes had been pre-tested. The mode 3 is the worst case and recorded in the report.



Page 58 of 81

## Radiated emission above 1GHz

EUT	Wireless Headphone	Model Name	A3872R
Temperature	23.4° C	Relative Humidity	60.1%
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	47.26	0.08	47.34	74	-26.66	peak	
4804.000	38.54	0.08	38.62	54	-15.38	AVG	
7206.000	42.15	2.21	44.36	74	-29.64	peak	
7206.000	32.49	2.21	34.7	54	-19.3	AVG	
Remark:							

EUT	Wireless Headphone	Model Name	A3872R
Temperature	23.4° C	Relative Humidity	60.1%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Tree
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4804.000	46.38	0.08	46.46	74	-27.54	peak
4804.000	36.27	0.08	36.35	54	-17.65	AVG
7206.000	41.05	2.21	43.26	74	-30.74	peak
7206.000	32.49	2.21	34.7	54	-19.3	AVG

Factor = Antenna Factor + Cable Loss - Pre-amplifier.



Page 59 of 81

EUT	Wireless Headphone	Model Name	A3872R
Temperature	23.4° C	Relative Humidity	60.1%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Time
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4882.000	46.94	0.14	47.08	74	-26.92	peak
4882.000	37.54	0.14	37.68	54	-16.32	AVG
7323.000	41.05	2.36	43.41	74	-30.59	peak
7323.000	32.46	2.36	34.82	54	-19.18	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT	Wireless Headphone	Model Name	A3872R
Temperature	23.4° C	Relative Humidity	60.1%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4882.000	46.29	0.14	46.43	74	-27.57	peak
4882.000	37.54	0.14	37.68	54	-16.32	AVG
7323.000	41.05	2.36	43.41	74	-30.59	peak
7323.000	32.49	2.36	34.85	54	-19.15	AVG

Remark:

Factor = Antenna Factor + Cable Loss - Pre-amplifier.



Page 60 of 81

EUT	Wireless Headphone	Model Name	A3872R
Temperature	23.4° C	Relative Humidity	60.1%
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	46.28	0.22	46.5	74	-27.5	peak
4960.000	35.28	0.22	35.5	54	-18.5	AVG
7440.000	40.26	2.64	42.9	74	-31.1	peak
7440.000	31.47	2.64	34.11	54	-19.89	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT	Wireless Headphone	Model Name	A3872R
Temperature	23.4° C	Relative Humidity	60.1%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	\/alua Tiraa
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	- Value Type
4960.000	46.28	0.22	46.5	74	-27.5	peak
4960.000	37.54	0.22	37.76	54	-16.24	AVG
7440.000	40.26	2.64	42.9	74	-31.1	peak
7440.000	31.94	2.64	34.58	54	-19.42	AVG
Remark:						
Factor = Anter	Factor = Antenna Factor + Cable 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, Over=Measure-Limit.

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

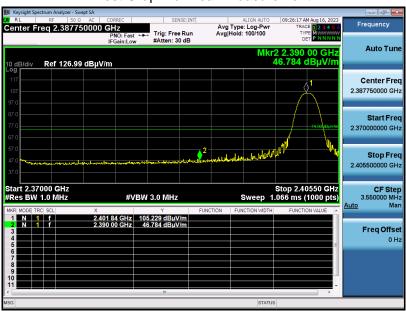
All test modes had been tested. The GFSK modulation is the worst case and recorded in the report.



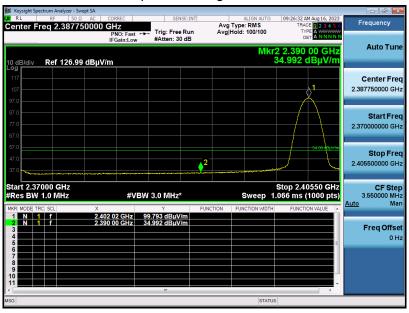
# Test result for band edge emission at restricted bands

EUT	Wireless Headphone	Model Name	A3872R
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**

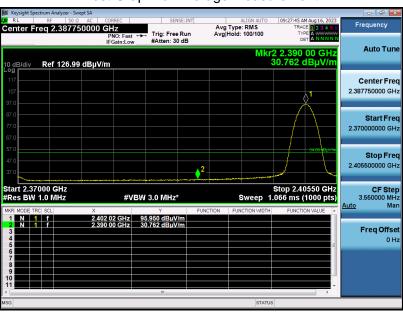


EUT	Wireless Headphone	Model Name	A3872R
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Test Graph for Peak Measurement



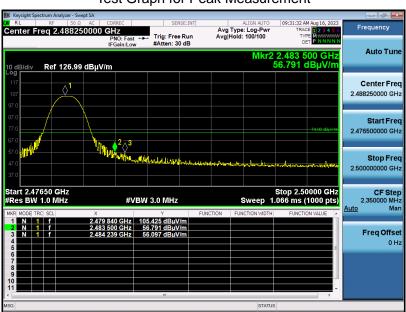
Test Graph for Average Measurement



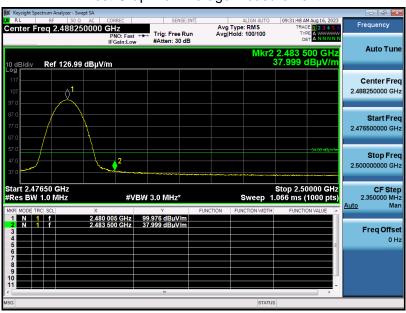


EUT	Wireless Headphone	Model Name	A3872R
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Test Graph for Peak Measurement



Test Graph for Average Measurement



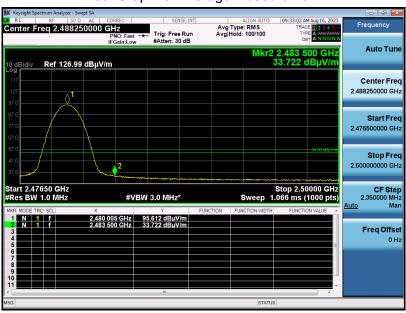


EUT	Wireless Headphone	Model Name	A3872R
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Test Graph for Peak Measurement



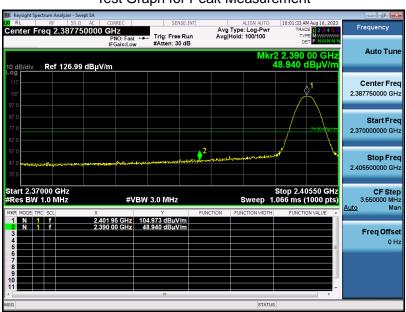
Test Graph for Average Measurement



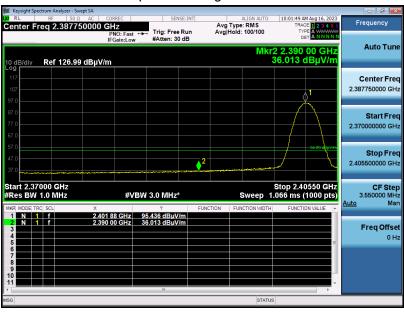


EUT	Wireless Headphone	Model Name	A3872R
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna	Horizontal

Test Graph for Peak Measurement



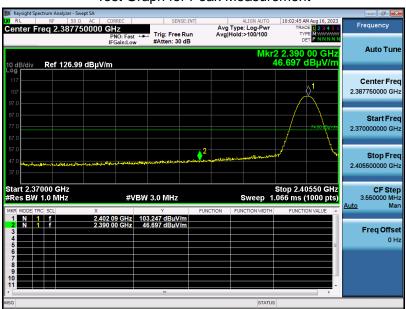
Test Graph for Average Measurement



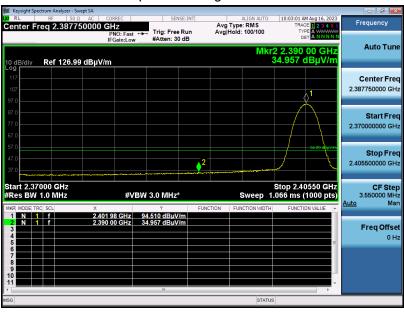


EUT	Wireless Headphone	Model Name	A3872R
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 4	Antenna	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



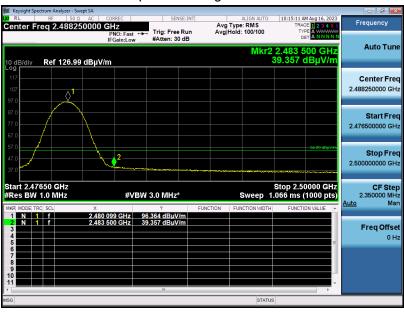


EUT	Wireless Headphone	Model Name	A3872R
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 6	Antenna	Horizontal

Test Graph for Peak Measurement



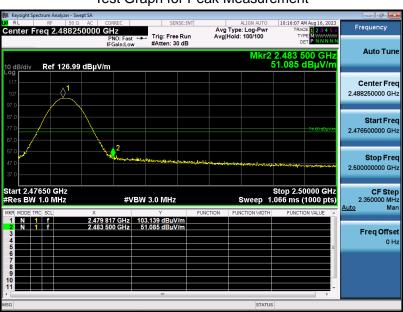
Test Graph for Average Measurement





EUT	Wireless Headphone	Model Name	A3872R
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 6	Antenna	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement

