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Report Template Version: V05

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# **Test Report**

**Report No.:** CQASZ20230300347E-01

Applicant: Shenzhen Hollyland Technology Co., Ltd

Address of Applicant: 8F, Building 5D, Skyworth Innovation Valley, Tangtou Road. Shiyan Street,

Baoan District, Shenzhen, China.

**Equipment Under Test (EUT):** 

**Product:** Wireless microphone

Model No.:

LARK MAX

LARK MAX

LARK MAX

HOLLYLAND

FCC ID:

LARK MAX

LARK MAX

LARK MAX

Standards: 47 CFR Part 15, Subpart C

**Date of Receipt:** 2023-03-16

**Date of Test**: 2023-03-16 to 2023-04-13

Date of Issue: 2023-04-23
Test Result: PASS\*

\*In the configuration tested, the EUT complied with the standards specified above.

Tested By:

Reviewed By:

(Timo Lei)

Approved By: Jack Ai)





Report No.: CQASZ20230300347E-01

# 1 Version

# **Revision History Of Report**

Report No.	Version	Description	Issue Date
CQASZ20230300347E-01	Rev.01	Initial report	2023-04-23





# 2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(1)	ANSI C63.10 2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	ANSI C63.10 2013	PASS
Power Spectral Density	47 CFR Part 15, Subpart C Section 15.247 (e)	ANSI C63.10 2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS



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# 4 General Information

# 4.1 Client Information

Applicant:	Shenzhen Hollyland Technology Co., Ltd
Address of Applicant:	8F, Building 5D, Skyworth Innovation Valley, Tangtou Road. Shiyan Street, Baoan District, Shenzhen, China.
Manufacturer:	Shenzhen Hollyland Technology Co., Ltd
Address of Manufacturer:	8F, Building 5D, Skyworth Innovation Valley, Tangtou Road. Shiyan Street, Baoan District, Shenzhen, China.
Factory:	Shenzhen Hollyland Technology Co., Ltd
Address of Factory:	8F, Building 5D, Skyworth Innovation Valley, Tangtou Road. Shiyan Street, Baoan District, Shenzhen, China.

# 4.2 General Description of EUT

T.Z Ochleral Descrip	
Product Name:	Wireless microphone
Model No.:	LARK MAX
Test Model No.:	LARK MAX
Trade Mark:	HOLLYLAND
Software Version:	V1.0.2.2
Hardware Version:	V38
Operation Frequency:	2404MHz~2480MHz
Modulation Type:	GFSK
Transfer Rate:	1Mbps
Number of Channel:	32
Product Type:	☐ Mobile   ☐ Portable   ☐ Fix Location
Test Software of EUT:	DUT
Antenna Type:	Chip antenna
Antenna Gain:	5.05 dBi
EUT Power Supply:	microphone: Li-ion battery: DC 3.87V 300mAh, Charge by DC 3.7V for
	Charging box
Simultaneous Transmission	☐ Simultaneous TX is supported and evaluated in this report.
	⊠ Simultaneous TX is not supported.



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Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2404MHz	11	2430MHz	21	2450MHz	31	2478MHz
2	2406MHz	12	2432MHz	22	2454MHz	32	2480MHz
3	2408MHz	13	2434MHz	23	2458MHz	/	1
4	2410MHz	14	2436MHz	24	2462MHz	/	1
5	2412MHz	15	2438MHz	25	2464MHz	/	1
6	2414MHz	16	2440MHz	26	2466MHz	/	1
7	2416MHz	17	2442MHz	27	2468MHz	/	1
8	2418MHz	18	2444MHz	28	2470MHz	/	1
9	2420MHz	19	2446MHz	29	2472MHz	/	1
10	2422MHz	20	2448MHz	30	2474MHz	/	1

#### Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel (CH1)	2404MHz
The middle channel (CH16)	2440MHz
The highest channel (CH32)	2480MHz



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# 4.3 Additional Instructions

EUT Test Software Settings:						
Mode:	⊠ Special software is used.					
	☐ Through engineering command into the engineering mode. engineering command: *#*#3646633#*#*					
EUT Power level:	Class2 (Power level is built-in set para selected)	Class2 (Power level is built-in set parameters and cannot be changed and selected)				
Use test software to set the low	Use test software to set the lowest frequency, the middle frequency and the highest frequency keep					
transmitting of the EUT.						
Mode	Channel	Frequency(MHz)				
	CH1 2404					
GFSK	GFSK CH16 2440					
	CH32	2480				

#### **Run Software:**





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# 4.4 Test Environment

Operating Environment:	Operating Environment:			
Temperature:	24.5°C			
Humidity:	59% RH			
Atmospheric Pressure:	1009mbar			
Test Mode:	Use test software to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT.			

# 4.5 Description of Support Units

The EUT has been tested with associated equipment below.

1) Support equipment

Description	Manufacturer	Model No. Certification		Model No. Certification		Supplied by
Adapter	MI	/	1	CQA		
2) Cable						
Cable No.	Description	Manufacturer	Cable Type/Length	Supplied by		
1	,	1	,	1		





### 4.6 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** guality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CQA laboratory is reported:

No.	Item	Uncertainty
1	Radiated Emission (Below 1GHz)	5.12dB
2	Radiated Emission (Above 1GHz)	4.60dB
3	Conducted Disturbance (0.15~30MHz)	3.34dB
4	Radio Frequency	3×10 <sup>-8</sup>
5	Duty cycle	0.6 %
6	Occupied Bandwidth	1.1%
7	RF conducted power	0.86dB
8	RF power density	0.74
9	Conducted Spurious emissions	0.86dB
10	Temperature test	0.8℃
11	Humidity test	2.0%
12	Supply voltages	0.5 %
13	Frequency Error	5.5 Hz



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#### 4.7 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

### 4.8 Test Facility

#### • A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

#### • FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

#### 4.9 Deviation from Standards

None.

# 4.10 Other Information Requested by the Customer

None.





# 4.11 Equipment List

			1	0-1:14:	0-1:1
Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2022/09/09	2023/09/08
Spectrum analyzer	R&S	FSU26	CQA-038	2022/09/09	2023/09/08
Spectrum analyzer	R&S	FSU40	CQA-075	2022/09/09	2023/09/08
Preamplifier	MITEQ	AFS4-00010300-18- 10P-4	CQA-035	2022/09/09	2023/09/08
Preamplifier	MITEQ	AMF-6D-02001800- 29-20P	CQA-036	2022/09/09	2023/09/08
Preamplifier	EMCI	EMC184055SE	CQA-089	2022/09/09	2023/09/08
Loop antenna	Schwarzbeck	FMZB1516	CQA-060	2021/09/16	2024/09/15
Bilog Antenna	R&S	HL562	CQA-011	2021/09/16	2024/09/15
Horn Antenna	R&S	HF906	CQA-012	2021/09/16	2024/09/15
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2021/09/16	2024/09/15
Coaxial Cable (Above 1GHz)	CQA	N/A	C007	2022/09/09	2023/09/08
Coaxial Cable (Below 1GHz)	CQA	N/A	C013	2022/09/09	2023/09/08
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2022/09/09	2023/09/08
Antenna Connector	CQA	RFC-01	CQA-080	2022/09/09	2023/09/08
Power Sensor	KEYSIGHT	U2021XA	CQA-30	2022/09/09	2023/09/08
N1918A Power Analysis Manager Power Panel	Agilent	N1918A	CQA-074	2022/09/09	2023/09/08
Power meter	R&S	NRVD	CQA-029	2022/09/09	2023/09/08
Power divider	MIDWEST	PWD-2533-02-SMA- 79	CQA-067	2022/09/09	2023/09/08
EMI Test Receiver	R&S	ESR7	CQA-005	2022/09/09	2023/09/08
LISN	R&S	ENV216	CQA-003	2022/09/09	2023/09/08
Coaxial cable	CQA	N/A	CQA-C009	2022/09/09	2023/09/08
DC power	KEYSIGHT	E3631A	CQA-028	2022/09/09	2023/09/08

#### Note:

The temporary antenna connector is soldered on the pcb board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.





### 5 Test results and Measurement Data

### 5.1 Antenna Requirement

**Standard requirement:** 47 CFR Part 15C Section 15.203 /247(c)

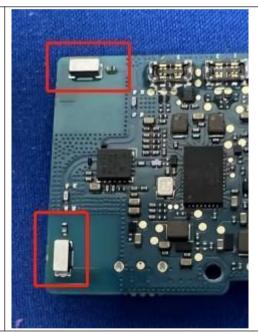
15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **EUT Antenna:**



The antenna is Chip antenna.

The connection/connection type between the antenna to the EUT's antenna port is: permanently attachment

This is either permanently attachment or a unique coupling that satisfies the requirement.

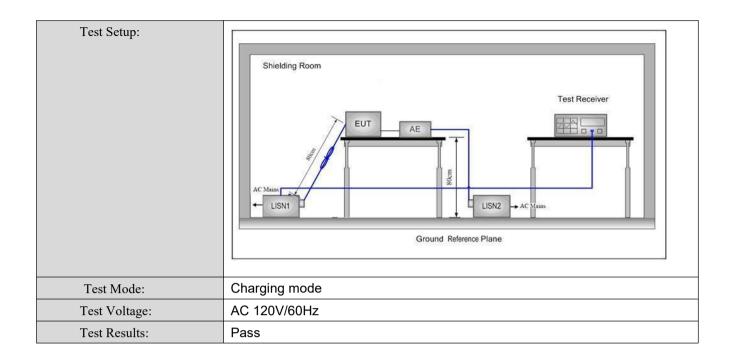


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# 5.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207					
Test Method:	ANSI C63.10: 2013					
Test Frequency Range:	150kHz to 30MHz					
Limit:	E (MIL)	Limit (d	lBuV)			
	Frequency range (MHz)	Quasi-peak	Average			
	0.15-0.5	66 to 56*	56 to 46*			
	0.5-5	56	46			
	5-30	60	50			
	* Decreases with the logarithm o	f the frequency.		•		
Test Procedure:	The mains terminal disturl room.	bance voltage test was	s conducted in a shie	elded		
	<ol> <li>The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</li> <li>The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was</li> </ol>					
	placed on the horizontal gr	•				
	4) The test was performed wi	•	•			
	of the EUT shall be 0.4 m to vertical ground reference p	•	•	ie		
			•	he		
	reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was					
	between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.					
	5) In order to find the maximu		•			
	equipment and all of the in		changed according	to		
	ANSI C63.10: 2013 on con	iducted measurement.				

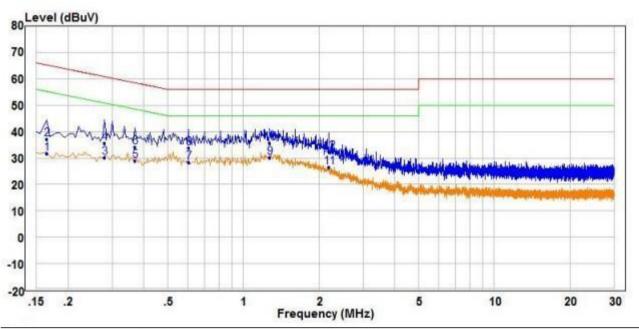






#### **Measurement Data**

Live line:



		Read			Limit	Over		
	Freq	Level	Factor	Level	Line	Limit	Remark	Pol/Phase
-	MHZ	dBuV	dB	dBuV	dBuV	dB		
1	0.165	22.10	9.67	31.77	55.21	-23.44	Average	Line
2	0.165	27.62	9.67	37.29	65.21	-27.92	QP	Line
3	0.280	20.74	9.51	30.25	50.82	-20.57	Average	Line
4	0.280	26.13	9.51	35.64	60.82	-25.18	QP	Line
5	0.370	19.48	9.58	29.06	48.50	-19.44	Average	Line
6	0.370	24.68	9.58	34.26	58.50	-24.24	QP	Line
7	0.605	18.58	9.81	28.39	46.00	-17.61	Average	Line
8	0.605	23.99	9.81	33.80	56.00	-22.20	QP	Line
9 PP	1.275	19.84	10.38	30.22	46.00	-15.78	Average	Line
10 QP	1.275	25.21	10.38	35.59	56.00	-20.41	QP	Line
11	2.195	15.07	11.45	26.52	46.00	-19.48	Average	Line
12	2.195	20.77	11.45	32.22	56.00	-23.78	OP	Line

#### Remark:

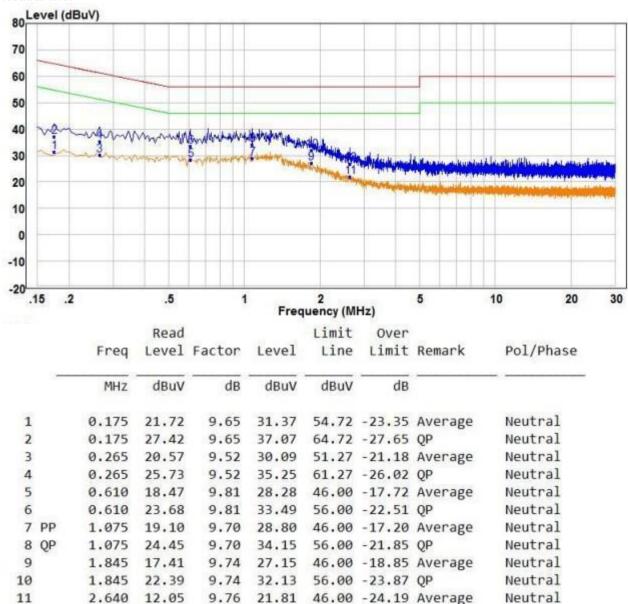
- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
- 3. If the Peak value under Average limit, the Average value is not recorded in the report.





Neutral

#### Neutral line:



9.76 26.93 56.00 -29.07 QP

#### Remark:

12

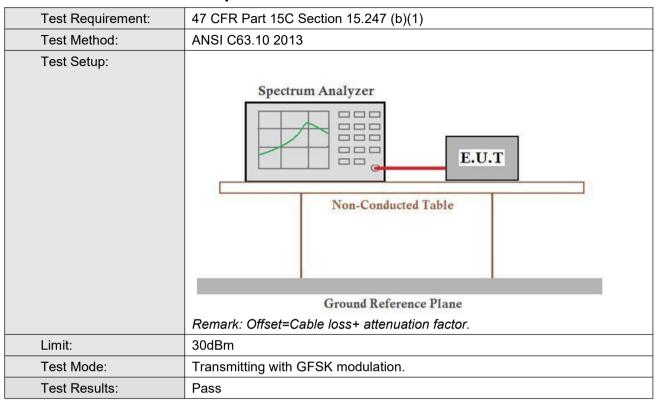
- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

2.640 17.17

3. If the Peak value under Average limit, the Average value is not recorded in the report.



# 5.3 Conducted Peak Output Power



#### **Measurement Data**

#### ANT1

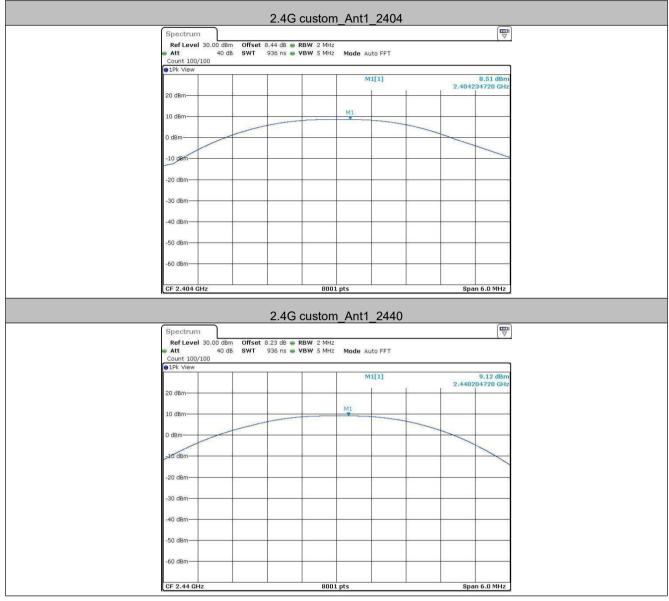
GFSK mode (1Mbps)						
Test channel Peak Output Power (dBm) Limit (dBm) Result						
Lowest 8.51		30.00	Pass			
Middle	9.12	30.00	Pass			
Highest	10.12	30.00	Pass			

#### ANT2

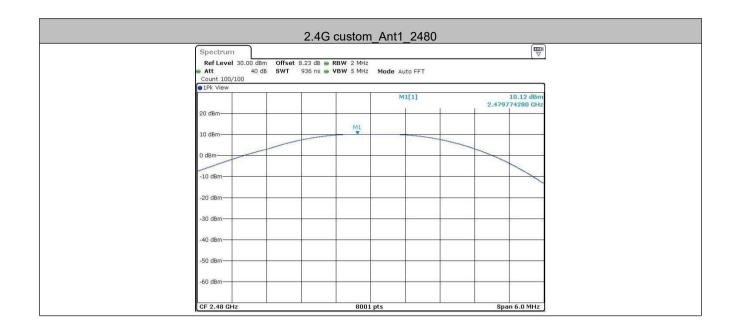
GFSK mode (1Mbps)						
Test channel Peak Output Power (dBm) Limit (dBm)						
Lowest 8.37		30.00	Pass			
Middle	8.9	30.00	Pass			
Highest	10.16	30.00	Pass			





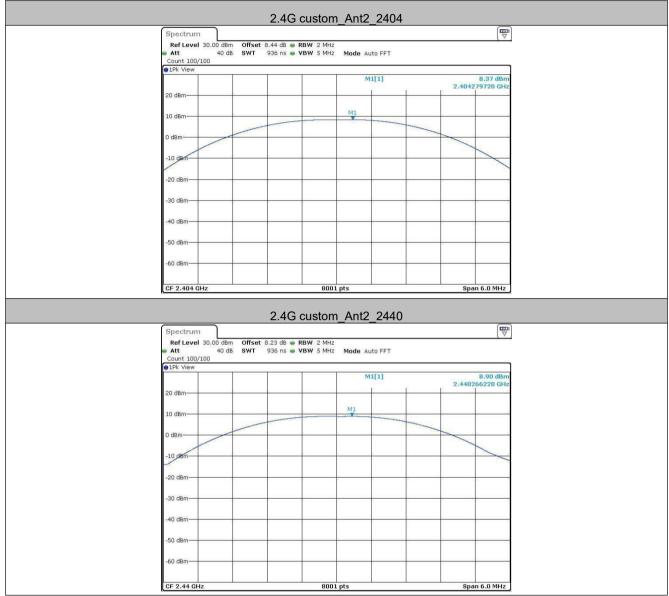




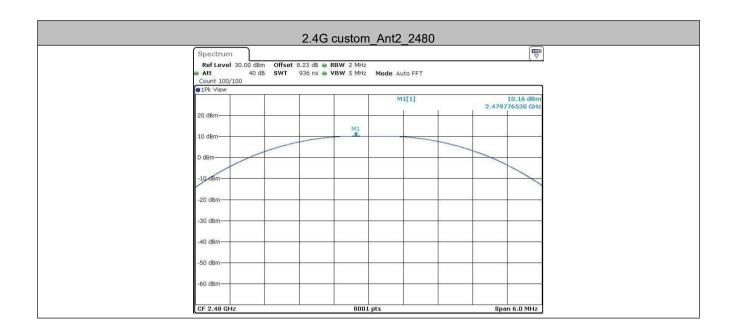






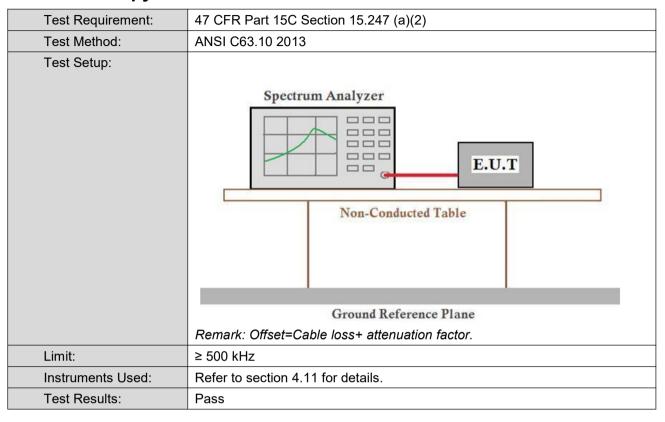








# 5.4 6dB Occupy Bandwidth



#### **Measurement Data**

#### ANT1:

ANTI:						
GFSK mode (1Mbps)						
Test channel 6dB Occupy Bandwidth (MHz) Limit (kHz) Result						
Lowest 0.68		≥500	Pass			
Middle	0.68	≥500	Pass			
Highest	0.68	≥500	Pass			

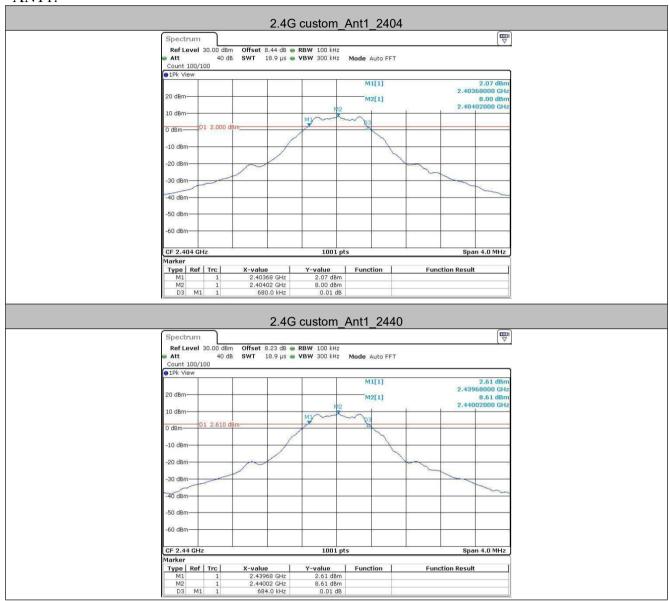
#### ANT2:

GFSK mode (1Mbps)						
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result			
Lowest 0.68		≥500	Pass			
Middle	0.69	≥500	Pass			
Highest	0.68	≥500	Pass			

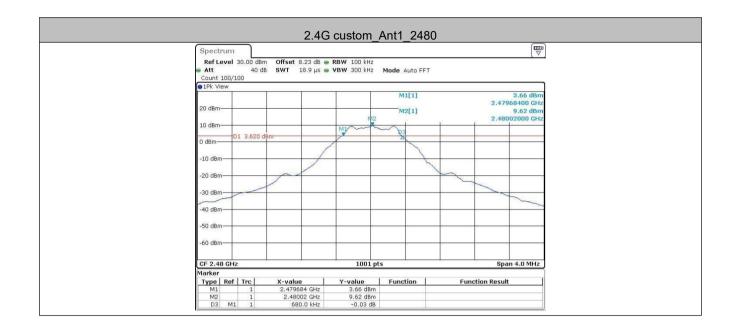


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#### ANT1:



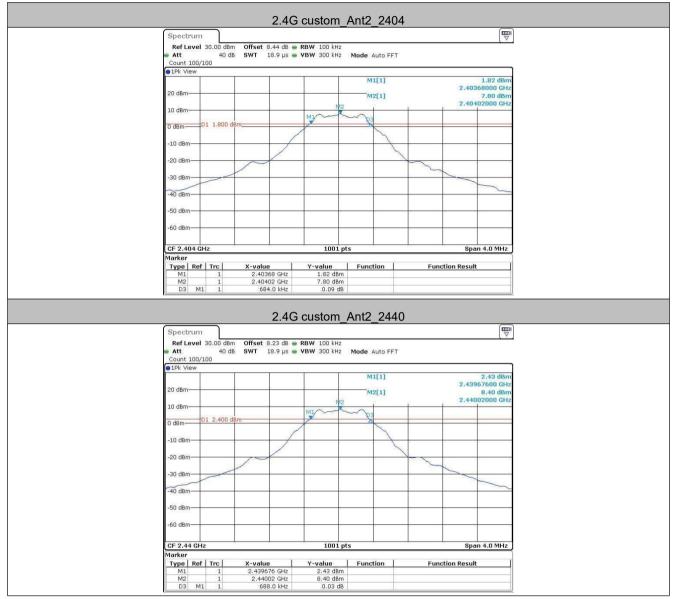




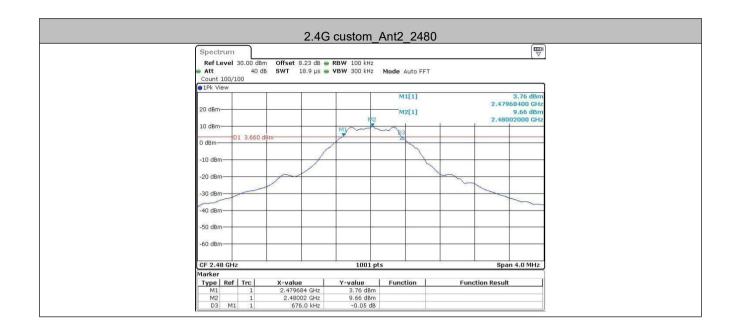


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#### ANT2:

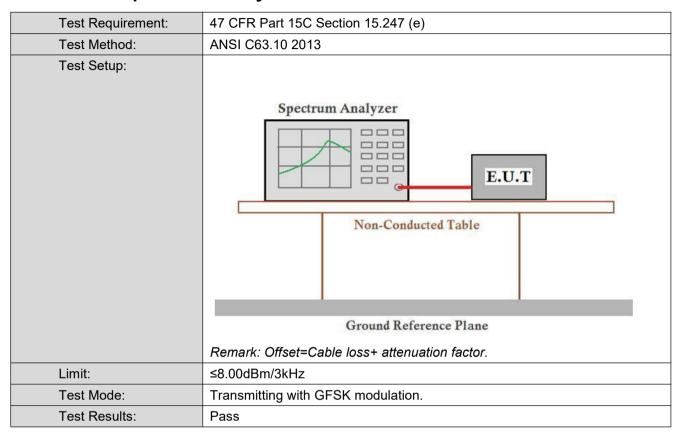








# 5.5 Power Spectral Density



#### **Measurement Data**

#### ANT1:

GFSK mode (1Mbps)								
Test channel Power Spectral Density (dBm/3kHz) Limit (dBm/3kHz) Re								
Lowest	-6.15	≤8.00	Pass					
Middle	-5.42	≤8.00	Pass					
Highest	-4.47	≤8.00	Pass					

#### ANT2:

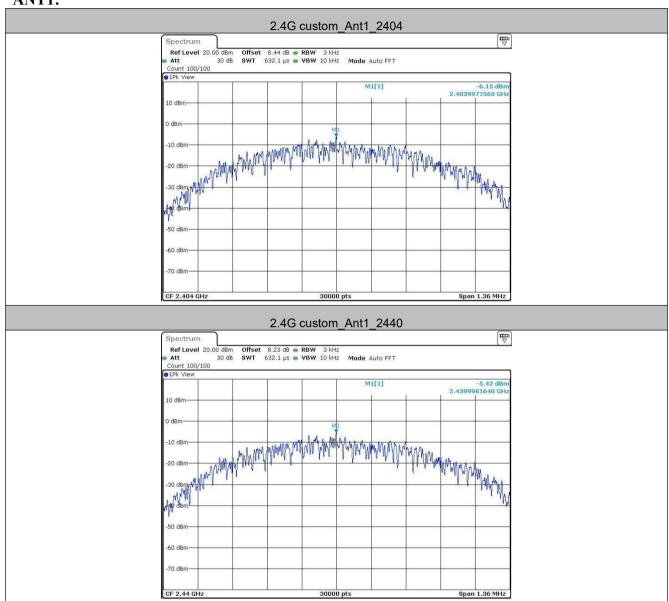
GFSK mode (1Mbps)						
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result			
Lowest -6.29		≤8.00	Pass			
Middle	-5.61	≤8.00	Pass			
Highest	-4.5	≤8.00	Pass			



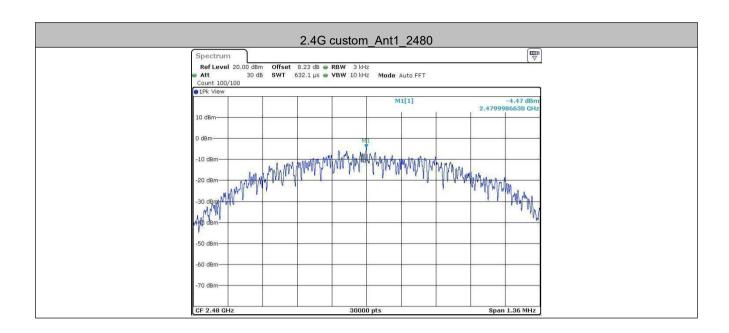
Report No.: CQASZ20230300347E-01

#### Test plot as follows:

### ANT1:



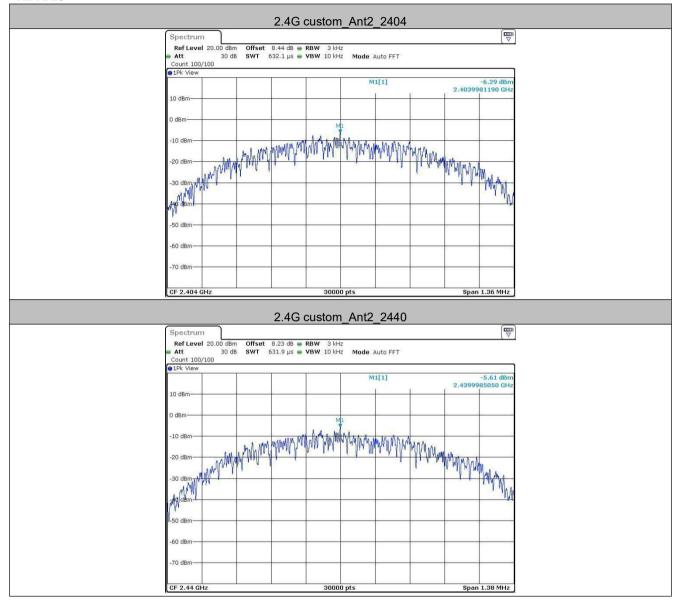




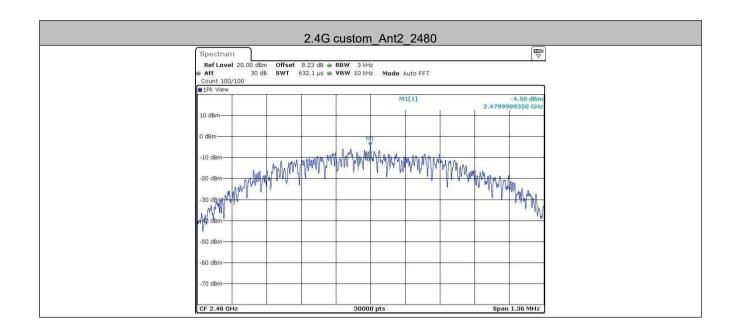


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### ANT2:



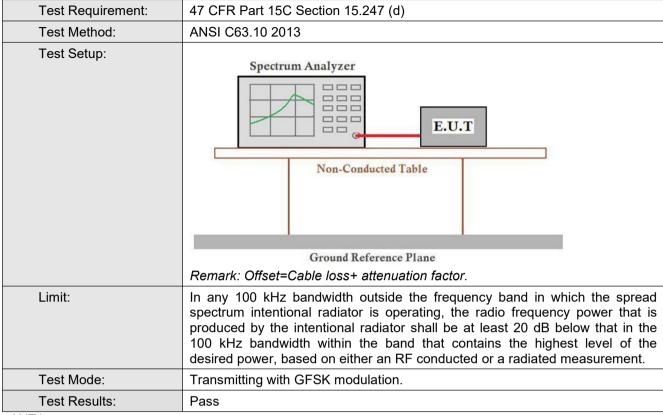






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# 5.6 Band-edge for RF Conducted Emissions



#### ANT1:

TestMode	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
2.4G	Low	2404	8.07	-36.95	≤-11.93	PASS
custom	High	2480	9.60	-35.24	≤-10.4	PASS

#### ANT2:

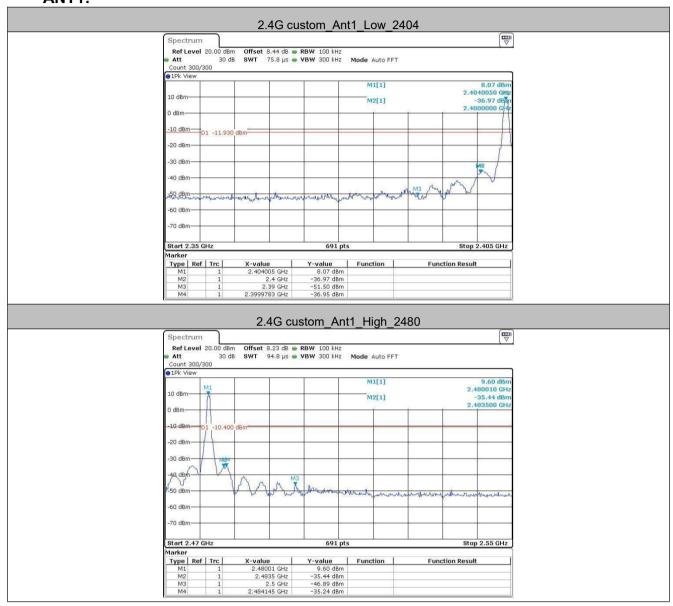
TestMode	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
2.4G	Low	2404	7.84	-37.56	≤-12.16	PASS
custom	High	2480	9.67	-35.48	≤-10.33	PASS



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#### Test plot as follows:

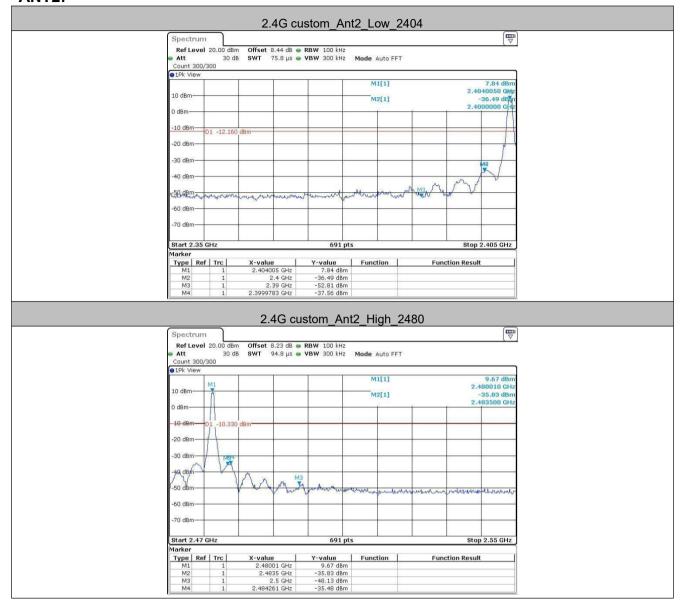
#### ANT1:





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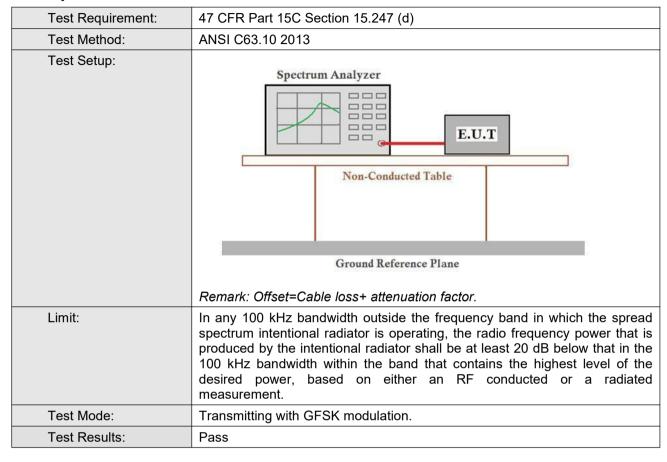
### ANT2:







# 5.7 Spurious RF Conducted Emissions





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#### Test plot as follows:

#### ANT1:

