

Global United Technology Services Co., Ltd.

Report No.: GTS2023030327F01

TEST REPORT

Applicant: Arashi Vision Inc.

Address of Applicant: 11th Floor, Building 2, Jinlitong Financial Center, Bao'an

District, Shenzhen, Guangdong, China

Manufacturer/Factory: Arashi Vision Inc.

Address of 11th Floor, Building 2, Jinlitong Financial Center, Bao'an

Manufacturer/Factory: District, Shenzhen, Guangdong, China

Equipment Under Test (EUT)

Product Name: Remote

Model No.: CINSAAVG, CINSAAVY(where Y would be any English

letters or blank, different packing method, model designations

on the marking plate for different commercial purpose)

Trade Mark: Insta360

FCC ID: 2AWWH-CINSAAVG

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: March 22, 2023

Date of Test: March 22-31, 2023

Date of report issued: March 31, 2023

Test Result: PASS *

Authorized Signature:

Robinson Luo Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

^{*} In the configuration tested, the EUT complied with the standards specified above.



2 Version

Version No.	Date	Description
00	March 31, 2023	Original

Prepared By:	Project Engineer	Date:	March 31, 2023
Check By:	Reviewer	Date:	March 31, 2023

GTS

Report No.: GTS2023030327F01

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Output Power	15.247 (b)(3)	Pass
Channel Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

Remarks:

1. Pass: The EUT complies with the essential requirements in the standard.

2. Test according to ANSI C63.10

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz-30MHz 3.1dB		(1)
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz 4.29dB		(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement unce	ertainty is for coverage factor of k	=2 and a level of confidence of 9	95%.



5 General Information

5.1 General Description of EUT

Product Name:	Remote
Model No.:	CINSAAVG, CINSAAVY(where Y would be any English letters or blank, different packing method, model designations on the marking plate for different commercial purpose)
Test Model No.:	CINSAAVG
Remark: All above models are The only difference is model n	identical in the same PCB layout, interior structure and electrical circuits. ame for commercial purpose.
Test sample(s) ID:	GTS2023030327-1
Sample(s) Status:	Engineer sample
S/N:	S08JS239200047
Operation Frequency:	2402MHz~2480MHz
Channel Numbers:	40
Channel Separation:	2MHz
Data Rate:	1Mb/s, 2Mb/s
Modulation Type:	GFSK
Antenna Type:	PIFA Antenna
Antenna Gain:	1.35dBi
Power Supply:	DC 4.45V/3.87V, 950mAh, 3.677Wh Li-ion battery
	The battery is charged via USB DC5V



Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402 MHz	11	2422 MHz	21	2442 MHz	31	2462 MHz
2	2404 MHz	12	2424 MHz	22	2444 MHz	32	2464 MHz
3	2406 MHz	13	2426 MHz	23	2446 MHz	33	2466 MHz
4	2408 MHz	14	2428 MHz	24	2448 MHz	34	2468 MHz
5	2410 MHz	15	2430 MHz	25	2450 MHz	35	2470 MHz
6	2412 MHz	16	2432 MHz	26	2452 MHz	36	2472 MHz
7	2414 MHz	17	2434 MHz	27	2454 MHz	37	2474 MHz
8	2416 MHz	18	2436 MHz	28	2456 MHz	38	2476 MHz
9	2418 MHz	19	2438 MHz	29	2458 MHz	39	2478 MHz
10	2420 MHz	20	2440 MHz	30	2460 MHz	40	2480 MHz

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	2402MHz
The middle channel	2440MHz
The Highest channel	2480MHz

Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Telephone: +86 (0) 755 2779 8480 Fax: +86 (0) 755 2779 8960



5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.

5.3 Description of Support Units

Manufacture	Description	Model	SN.
XIAOMI	USB Charger	MDY-10-EH	N/A

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• FCC—Registration No.: 381383

Designation Number: CN5029

Global United Technology Services 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 files.

• IC —Registration No.: 9079A

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

• NVLAP (LAB CODE:600179-0)

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480 Fax: 0755-27798960

5.8 Additional Instructions

Test Software	Special test software provided by manufacturer	
Power level setup	Default	



6 Test Instruments list

Rad	Radiated Emission:							
Item	Test Equipment	est Equipment Manufacturer		Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July 02, 2020	July 01, 2025		
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A		
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 22, 2022	April 21, 2023		
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 20, 2023	March 19, 2025		
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June 12, 2022	June 11, 2023		
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 23, 2022	June 22, 2023		
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A		
8	Coaxial Cable	GTS	N/A	GTS213	April 22, 2022	April 21, 2023		
9	Coaxial Cable	GTS	N/A	GTS211	April 22, 2022	April 21, 2023		
10	Coaxial cable	GTS	N/A	GTS210	April 22, 2022	April 21, 2023		
11	Coaxial Cable	GTS	N/A	GTS212	April 22, 2022	April 21, 2023		
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	April 22, 2022	April 21, 2023		
13	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 23, 2022	June 22, 2023		
14	Band filter	Amindeon	82346	GTS219	June 23, 2022	June 22, 2023		
15	Power Meter	Anritsu	ML2495A	GTS540	June 23, 2022	June 22, 2023		
16	Power Sensor	Anritsu	MA2411B	GTS541	June 23, 2022	June 22, 2023		
17	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 22, 2022	April 21, 2023		
18	Splitter	Agilent	11636B	GTS237	June 23, 2022	June 22, 2023		
19	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 29, 2022	Nov. 28, 2023		
20	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 22, 2022	April 21, 2023		
21	Breitband hornantenna	SCHWARZBECK	BBHA 9170	GTS579	Oct. 16, 2022	Oct. 15, 2023		
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 16, 2022	Oct. 15, 2023		
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 16, 2022	Oct. 15, 2023		
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June 23, 2022	June 22, 2023		
25	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 22, 2022	April 21, 2023		



Con	Conducted Emission							
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May 14, 2022	May 13, 2025		
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 24, 2022	April 23, 2023		
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 23, 2022	June 22, 2023		
4	ENV216 2-L-V- NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	April 22, 2022	April 21, 2023		
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A		
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A		
7	Thermo meter	JINCHUANG	GSP-8A	GTS639	April 28, 2022	April 27, 2023		
8	Absorbing clamp	Elektronik- Feinmechanik	MDS21	GTS229	April 15, 2022	April 14, 2023		
9	ISN	SCHWARZBECK	NTFM 8158	GTS565	April 22, 2022	April 21, 2023		
10	High voltage probe	SCHWARZBECK	TK9420	GTS537	April 22, 2022	April 21, 2023		

RF C	RF Conducted Test:							
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	April 22, 2022	April 21, 2023		
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 22, 2022	April 21, 2023		
3	Spectrum Analyzer	Agilent	E4440A	GTS536	April 22, 2022	April 21, 2023		
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 22, 2022	April 21, 2023		
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 22, 2022	April 21, 2023		
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 22, 2022	April 21, 2023		
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 22, 2022	April 21, 2023		
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 22, 2022	April 21, 2023		
9	EXA Signal Analyzer	Keysight	N9010B	MY60241168	2022-11-04	2023-11-03		

Ger	General used equipment:							
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)		
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	April 25, 2022	April 24, 2023		
2	Barometer	KUMAO	SF132	GTS647	July 26, 2022	July 25, 2023		



7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement: FCC Part15 C 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(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

E.U.T Antenna:

The antenna is PIFA antenna, reference to the appendix II for details



7.2 Conducted Emissions

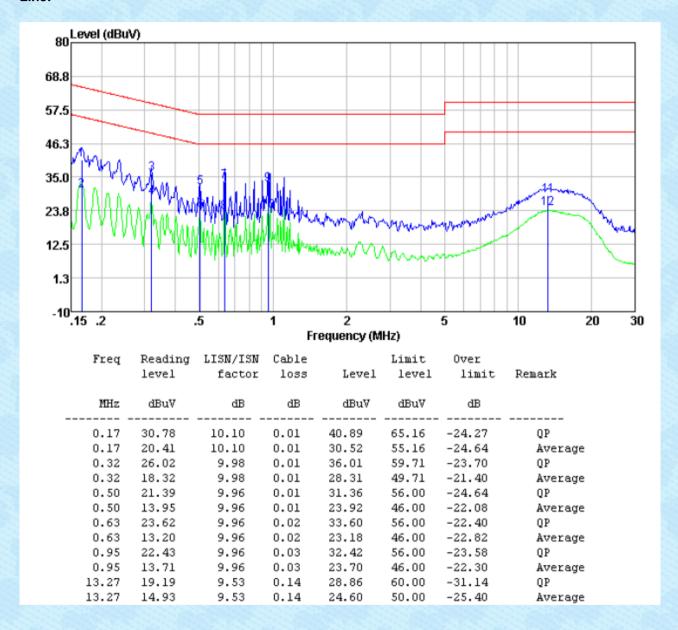
Test Requirement:	FCC Part15 C Section 15.207						
Test Method:	ANSI C63.10	ANSI C63.10					
Test Frequency Range:	150KHz to 30MHz						
Class / Severity:	Class B	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, S	Sweep time=auto					
Limit:	S - S S S S S S S S S S S S S S S S S S	Limit	(dBuV)				
	Frequency range (MHz)	Quasi-peak		rage			
	0.15-0.5	66 to 56* 56		o 46*			
	0.5-5		16				
	* Decreases with the logarith	m of the frequency		50			
Test setup:							
Test procedure:	Reference Plane LISN 40cm 80cm Filter AC power Equipment Test table/Insulation plane Remark: E.U.T. Equipment Under Test LISN. Line Impedence Stabilization Network Test table height=0.8m						
rest procedure.	 The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2009 on conducted measurement. 						
Test Instruments:	Refer to section 6.0 for detail	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for detail	S					
Test environment:	Temp.: 25 °C Hu	mid.: 52%	Press.:	1012mbar			
Test voltage:	DC 120V						
Test results:	Pass						
100110001101	1. 300						



Measurement data

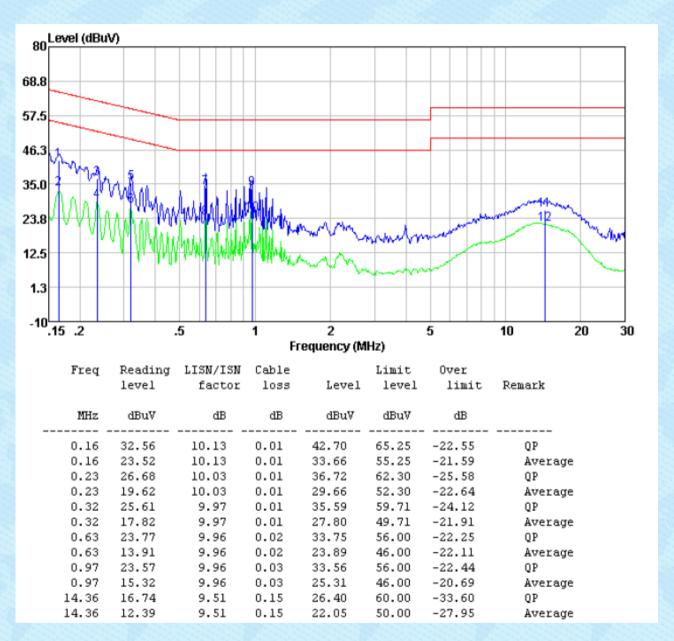
Pre-scan all test modes, found worst case at 2480MHz@2M, and so only show the test result of 2480MHz@2M

Line:





Neutral:



Notes:

- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level = Receiver Read level + LISN Factor + Cable Loss
- 4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

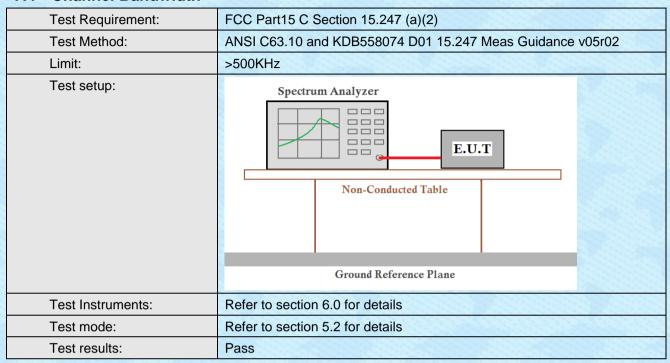


7.3 Conducted Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)				
Test Method:	ANSI C63.10 and KDB558074 D01 15.247 Meas Guidance v05r02				
Limit:	30dBm				
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test results:	Pass				



7.4 Channel Bandwidth





7.5 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e)				
Test Method:	ANSI C63.10 and KDB558074 D01 15.247 Meas Guidance v05r02				
Limit:	8dBm/3kHz				
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test results:	Pass				



7.6 Spurious Emission in Non-restricted & restricted Bands

7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)				
Test Method:	ANSI C63.10 and KDB558074 D01 15.247 Meas Guidance v05r02				
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.				
Test setup:	Spectrum Analyzer Non-Conducted Table Ground Reference Plane				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test results:	Pass				

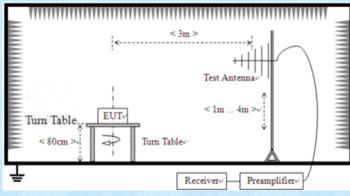


7.6.2 Radiated Emission Method

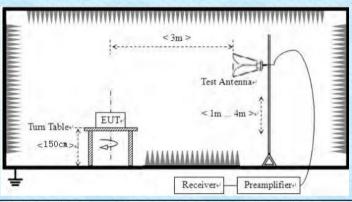
7.6.2 Radiated Emission Meth	iou						
Test Requirement:	FCC Part15 C Section 15.209						
Test Method:	ANSI C63.10						
Test Frequency Range:	9kHz to 25GHz						
Test site:	Measurement Distance: 3m						
Receiver setup:	Frequency	Detector	RBW	VBW	Value		
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak		
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak		
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak		
	Above 1GHz	Peak	1MHz	3MHz	Peak		
	Above 1G112	Peak	1MHz	10Hz	Average		
	Note: For Duty cyc cycle < 98%, average						
Limit:	Frequency Limit (uV/m) Value Measurement Distance						
	0.009MHz-0.490M	IHz 2400/F(F	(Hz) QI	P/PK/AV	300m		
	0.490MHz-1.705M	IHz 24000/F(24000/F(KHz)		30m		
	1.705MHz-30MH	lz 30	30		30m		
	30MHz-88MHz	100		QP			
	88MHz-216MHz	z 150		QP			
	216MHz-960MH	z 200		QP	3m		
	960MHz-1GHz	500		QP	OIII		
	Above 1GHz	500	Average				
		5000)	Peak			
Test setup:	For radiated emiss	sions from 9kH	z to 30MH	z			
	Tum Table EUT Im Capture Im Receiver.						



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:

- 1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.



Report	No .	GT	520	າວຊຕ	ነገር	327F01

Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 10				1012mbar
Test voltage:	DC 3.87V				
Test results:	Pass	Pass			

Measurement data:

Remark:

Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

■ 9kHz~30MHz

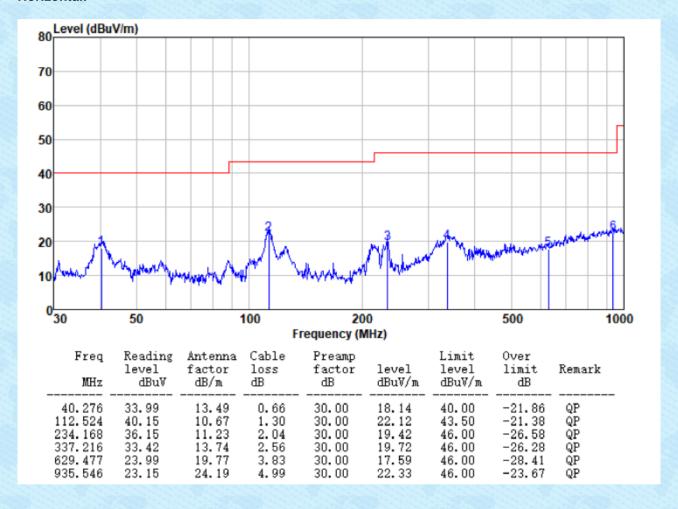
The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.



■ Below 1GHz

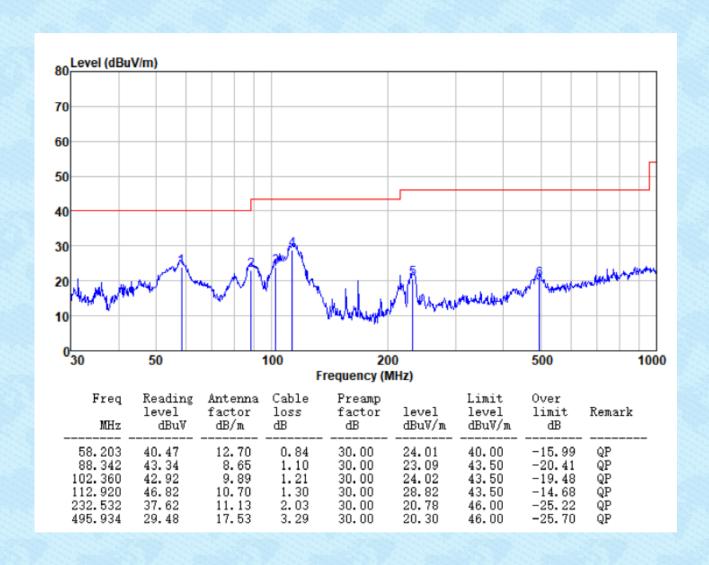
Pre-scan all test modes, found worst case at 2480MHz@2M, and so only show the test result of 2480MHz@2M

Horizontal:





Vertical:

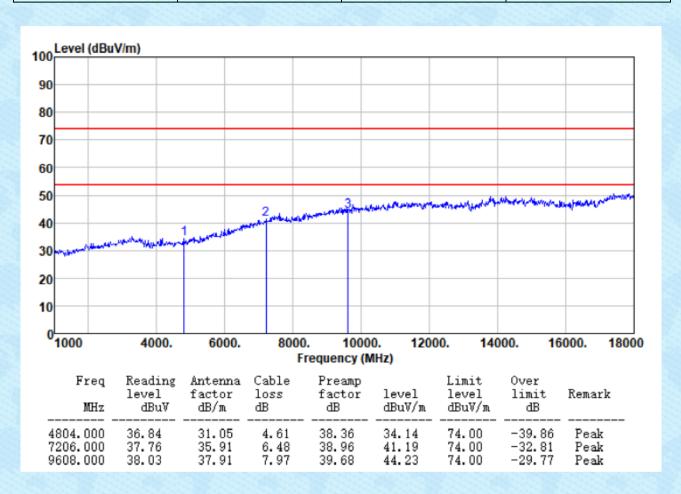




■ Above 1GHz

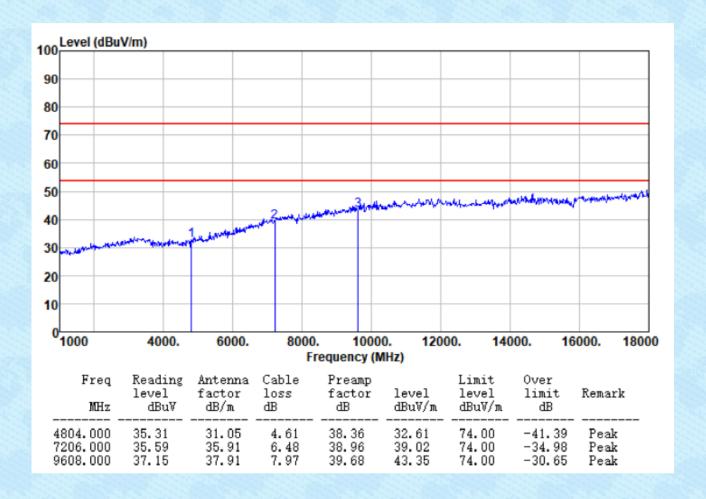
Unwanted Emissions in Restricted Frequency Bands

Test channel:	Lowest	Polarization:	Horizontal
i est charinet.	LOWEST	i dianzadon.	Honzontai



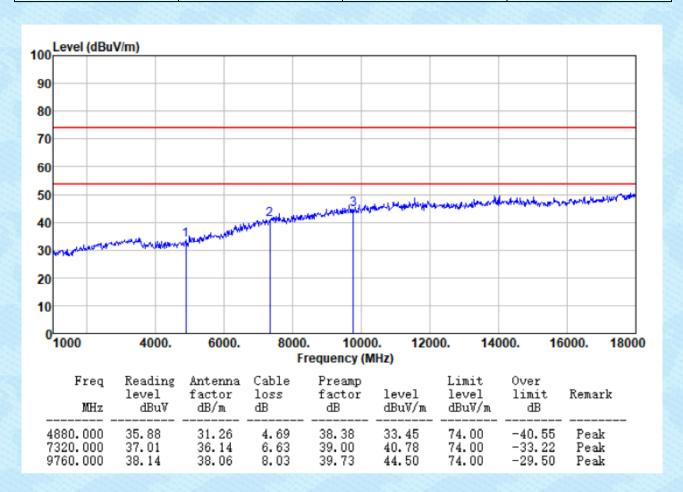


Test channel:	Lowest	Polarization:	Vertical
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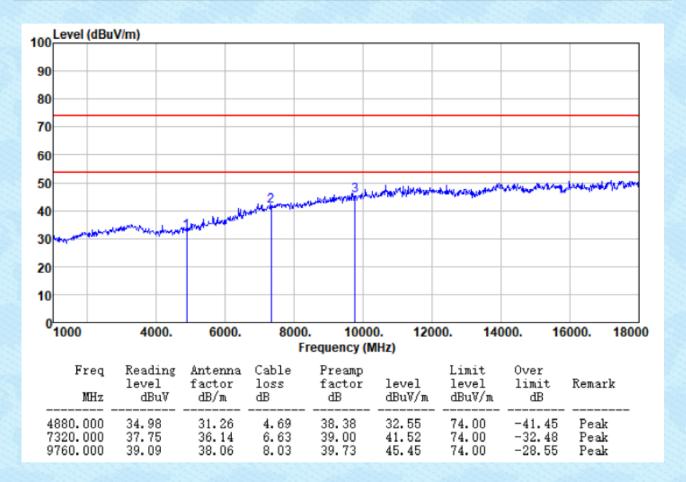


Polarization: Horizontal	Test channel: Middle
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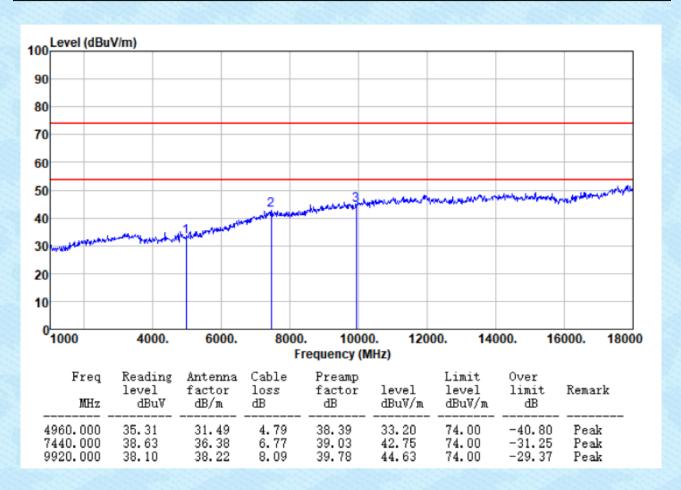


Test channel:	Middle	Polarization:	Vertical
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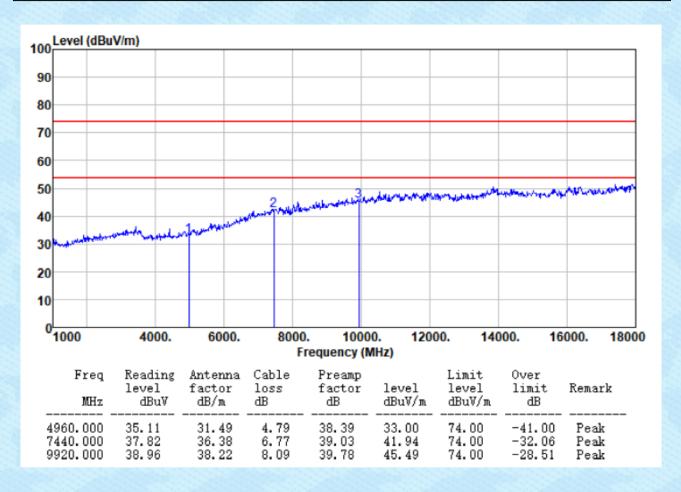


Test channel: High	est Polarizatio	n: Horizontal
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Test channel: Highest Polarization: Vertical	Test channel:	Highest	Polarization:	Vertical
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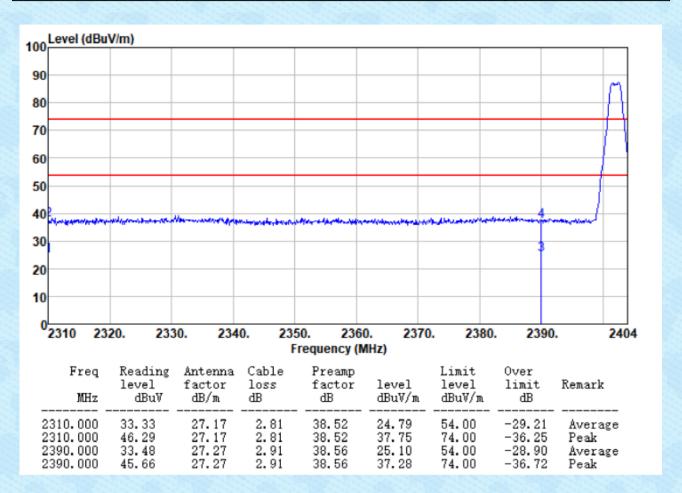
Remarks:

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- 2. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3. Both 1MHz and 2MHz bandwidth were tested and passed, only report the worst condition (GFSK_2MHz)



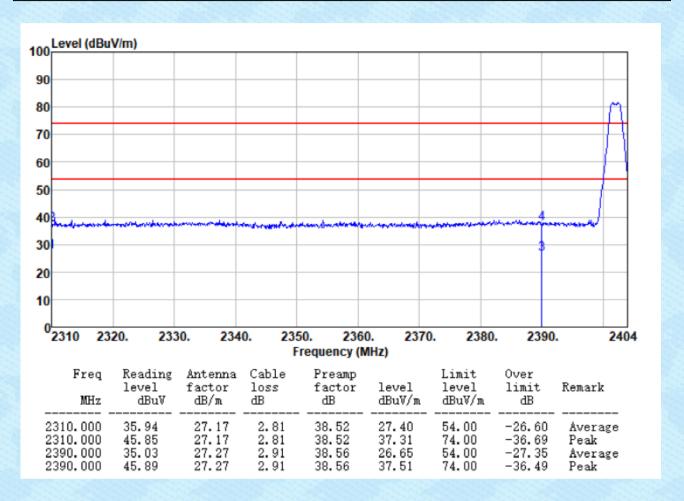
Unwanted Emissions in Non-restricted Frequency Bands

Test channel:	Lowest	Polarization:	Horizontal
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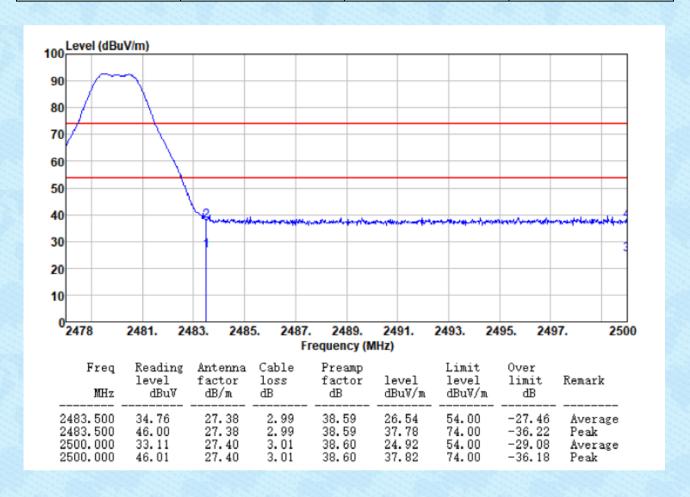


Polarization: Vertical	Test channel: Lowest
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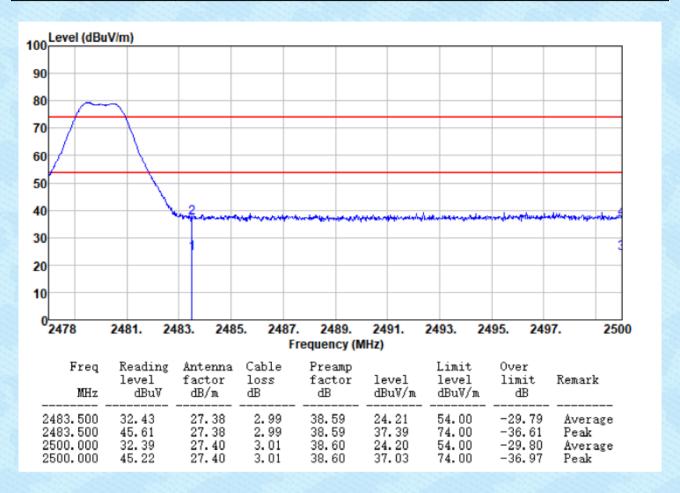


Test channel: Highest	Polarization:	Horizontal	
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Test channel: Highest Polarization: Vertical
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Remarks:

- 1. Final Level =Receiver Read level + Antenna Factor + Cable Loss Preamplifier Factor
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3. Both 1MHz and 2MHz bandwidth were tested and passed, only report the worst condition (GFSK_2MHz)



8 Test Setup Photo

Reference to the appendix I for details.

9 EUT Constructional Details

Reference to the appendix II for details.

-----End-----