FCC TEST REPORT

On Behalf of

RTSCAN TECHNOLOGY LIMITED

OEM BARCODE SCANNER

Model No.: RT218, RT218A, RT218B, RT218C

Prepared for	:	RTSCAN TECHNOLOGY LIMITED
Address	:	553-555, Dongming Building, Minzhi Street, Longhua District, Shenzhen 518109, China

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

Report Number	:	A2209257-C01-R02
Date of Receipt	:	October 9, 2022
Date of Test	:	October 9-10, 2022
Date of Report	:	October 11, 2022
Version Number	:	V0

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TEST REPORT DECLARATION

Applicant	:	RTSCAN TECHNOLOGY LIMITED
Address	:	553-555, Dongming Building, Minzhi Street, Longhua District, Shenzhen 518109, China
Manufacturer	:	RTSCAN TECHNOLOGY LIMITED
Address	:	553-555, Dongming Building, Minzhi Street, Longhua District, Shenzhen 518109, China
EUT Description	:	OEM BARCODE SCANNER
	(A) Model No.	: RT218, RT218A, RT218B, RT218C
	(B) Trademark	: RTscan

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart B Class B, ANSI C63.4:2014

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part15 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

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Tested by (name + signature).....:	Ben Sun Project Engineer	
Approved by (name + signature).....:	Eric Huang Project Manager	
Date of issue.....:	October 11, 2022	

SHENZHEN ALPHA PRODUCT TESTING CO.,LTD. ALPHA PRODUCT TESTING

Revision History

Revision	Issue Date	Revisions	Revised By
V0	October 11, 2022	Initial released Issue	Ben Sun

1. General Information

1.1. Description of Device (EUT)

Product Name	:	OEM BARCODE SCANNER
Model Number	:	RT218, RT218A, RT218B, RT218C
Diff	:	There is no difference except the name of the model. All tests are made with the RT218 model.
Test Voltage	:	Power from PC
EUT information	:	Input : Power from PC
Highest Frequency	:	More than 108MHz
Trademark	:	RTscan
Software version	:	N/A
Hardware version	:	N/A

1.2. Accessories of Device (EUT)

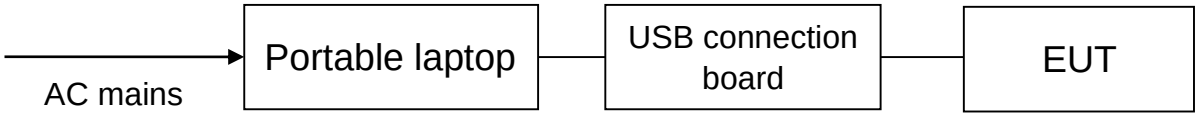
Power Source	:	/

1.3. Tested Supporting System Details.

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1.	Portable laptop	Lenovo	ThinkPad E14	PF-29216Q	N/A
2.	USB connection board	/	/	/	/

1.4. Block Diagram of connection between EUT and simulators

For tests



Signal Cable Description of the above Support Units

No.	Port Name	Cable	Length	Shielded (Yes or No)	Detachable (Yes or No)
/	/	/	/	/	/
/	/	/	/	/	/

2. Summary Of Standards And Results

2.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

EMISSION			
Description of Test Item	**Standard**	**Limits**	**Results**
Power Line Conducted Emission Test	FCC Part 15 ANSI C63.4:2014	Class B	**P**
Radiated Emission Test	FCC Part 15 ANSI C63.4:2014	Class B	**P**

Note: 1. P is an abbreviation for Pass.

2. F is an abbreviation for Fail.

3. N/A is an abbreviation for Not Applicable.

4. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

2.2. Test Mode Description

For Power Line Conducted Emission Test		
Mode No.	Test Mode	Test Voltage
Mode 1	Scanning	Power from PC

2.3. Test Equipment List

For Power Line Conducted Emission Test Equipment:

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal.Interval
1.	Test Receiver	Rohde&Schwarz	ESCI	101165	4.42 SP1	2022.08.22	1 Year
2.	L.I.S.N.#1	Schwarz beck	NSLK8126	8126-466	/	2022.08.22	1 Year
3.	L.I.S.N.#2	Rohde&Schwarz	ENV216	101043	/	2022.08.22	1 Year
4.	Pulse Limiter	Schwarz beck	9516F	9618	/	2022.08.22	1 Year

For Frequency Range 30MHz~1GHz Radiated Emission Test Equipment:							
Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal. Interval
1	Test Receiver	Rohde&Schwarz	ESR	1316.3003K03-102082-Wa	2.28 SP1	2022.08.22	1 Yea r
3	Bilog Antenna	Schwarz beck	VULB 9168	VULB 9168#627	/	2021.08.30	2 Year

For Frequency Range above 1GHz Radiated Emission Test Equipment:							
Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Rohde&Schwarz	FSU	200002	4.71.SP5	2022.08.22	1 Year
2	Horn Antenna	Schwarz beck	BBHA 9120 D	02106	/	2022.08.22	2 Year
3	Amplifier	Agilent	8449B	3008A02664	/	2022.08.22	1 Yea

ForTest Software Information			
Item	Software Name	Manufacturer	Version
RE	EZ-EMC	Farad	Alpha-3A1
CE	EZ-EMC	Farad	Alpha-3A1

2.4. Test Facility

Shenzhen Alpha Product Testing Co., Ltd.

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

2.5. Measurement Uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	1.63dB
Uncertainty for Radiation Emission test (<1G)	3.74 dB (Distance: 3m Polarize: V)
	3.76 dB (Distance: 3m Polarize: H)
Uncertainty for Radiation Emission test (>1G)	3.77 dB (Distance: 3m Polarize: V)
	3.80 dB (Distance: 3m Polarize: H)
(95% confidence levels, k=2)	

3. Power Line Conducted Emission Test

3.1. Test Limits

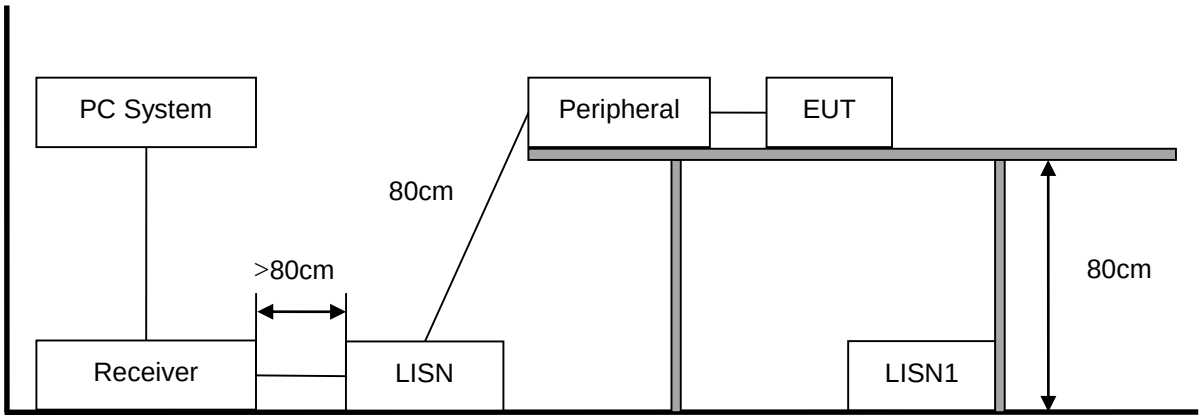
Frequency			Maximum RF Line Voltage	
			Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz	~	500kHz	66 ~ 56*	56 ~ 46*
500kHz	~	5MHz	56	46
5MHz	~	30MHz	60	50

Notes: 1. Emission level=Read level + LISN factor-Preamp factor + Cable loss

2. * Decreasing linearly with logarithm of frequency.

3. The lower limit shall apply at the transition frequencies.

3.2. Block Diagram of Test Setup



3.3. Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4. Operating Condition of EUT

（1） Setup the EUT as shown as Section 3.2.

（2） Turn on the power of all equipment.

（3） Let the EUT work in test mode and 15 minutes before taking the test.

3.5. Test Procedure

（1） The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014 on conducted Emission test.

（2） The frequency range from 150kHz to 30MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESCI) is set at 9kHz.

3.6. Test Results

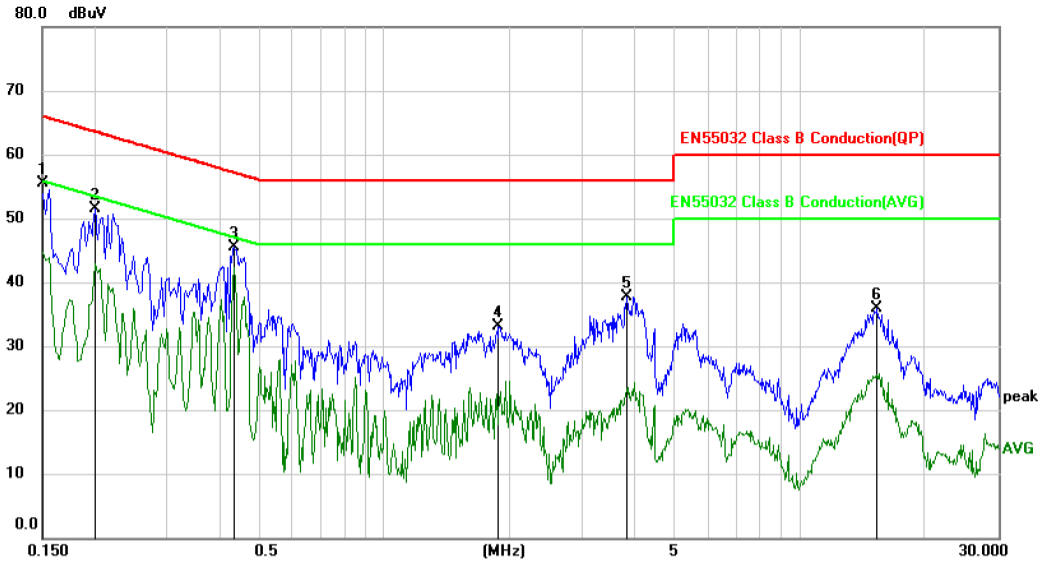
Test Date	:	2022.10.10	Temperature	:	24℃
Test Engineer	:	Ben Sun	Humidity	:	56%
Test Mode	:	Scanning			
Test Results	:	**PASS**			

Note: 1. The test results are listed in next pages.

2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.

3. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.

Polarization: Line

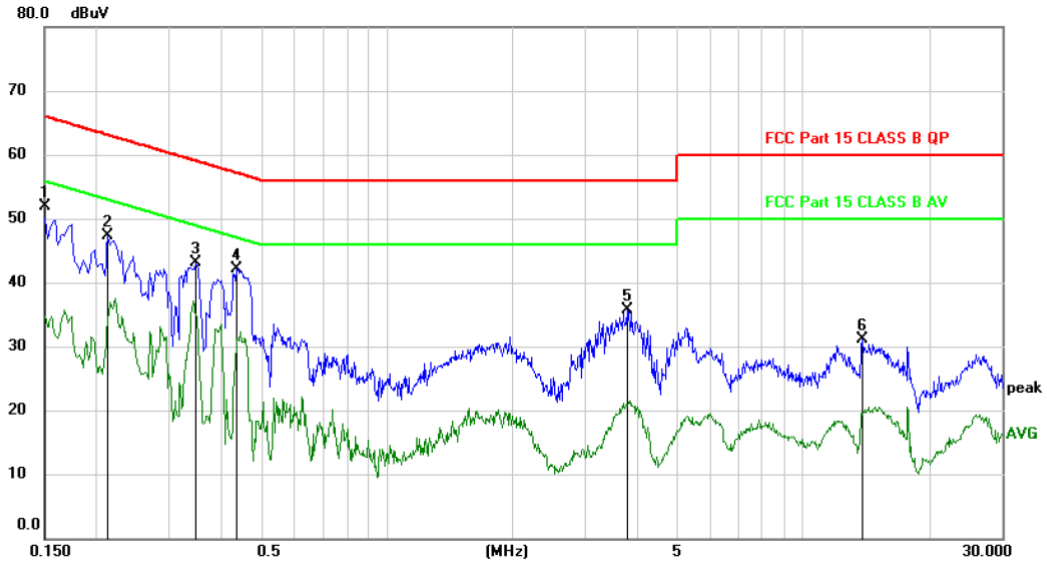


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1500	45.65	9.94	55.59	66.00	-10.41	peak	
2		0.2010	41.52	9.92	51.44	63.57	-12.13	peak	
3		0.4350	35.61	9.95	45.56	57.16	-11.60	peak	
4		1.8810	23.29	9.88	33.17	56.00	-22.83	peak	
5		3.8340	27.80	9.96	37.76	56.00	-18.24	peak	
6		15.3270	25.53	10.34	35.87	60.00	-24.13	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Polarization: Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1500	41.92	9.94	51.86	66.00	-14.14	peak	
2		0.2130	37.28	9.93	47.21	63.09	-15.88	peak	
3		0.3480	33.17	9.95	43.12	59.01	-15.89	peak	
4		0.4350	32.14	9.95	42.09	57.16	-15.07	peak	
5		3.7710	25.76	9.96	35.72	56.00	-20.28	peak	
6		13.9080	20.86	10.30	31.16	60.00	-28.84	peak	

*:Maximum data x:Over limit !:over margin 〈Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

4. Radiated Emission Test

4.1. Test Limit

Frequency MHz			Distance (Meters)	Field Strengths Limits dB(μV)/m
30	~	88	3	40.0
88	~	216	3	43.5
216	~	960	3	46.0
960	~	1000	3	54.0
Above 1GHz			3	74(Peak) 54(Average)

Notes: 1. The smaller limit shall apply at the cross point between two frequency bands.

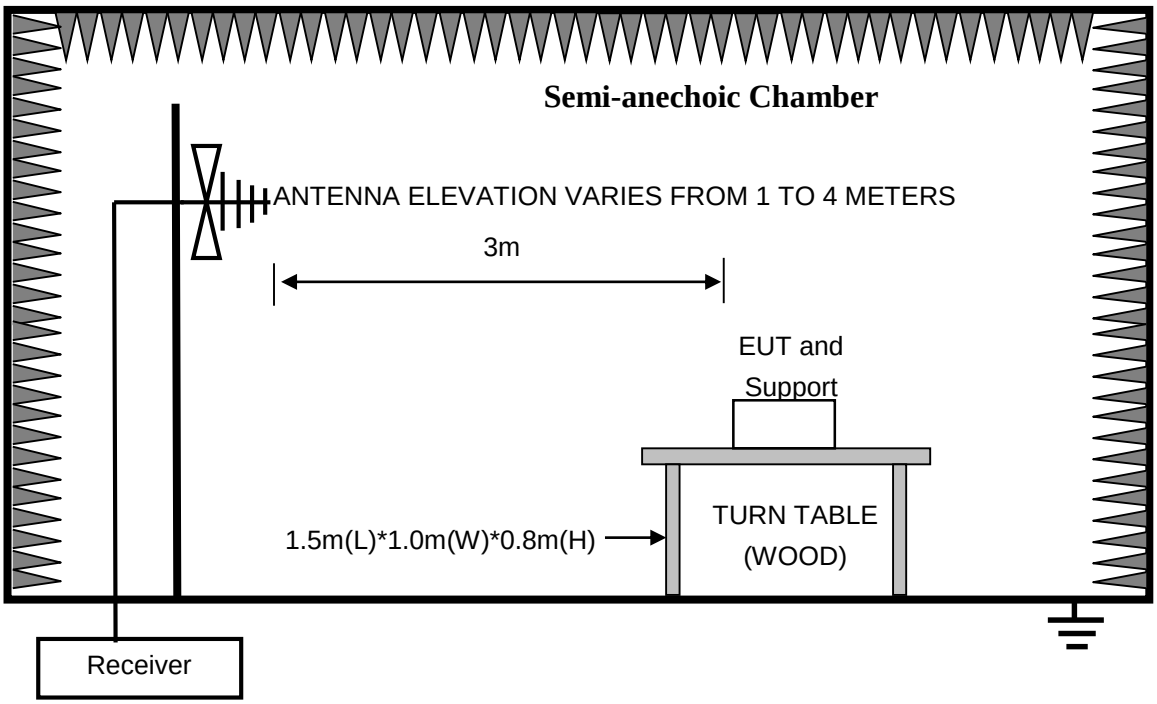
2. Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3. Frequency range of radiated measurements:

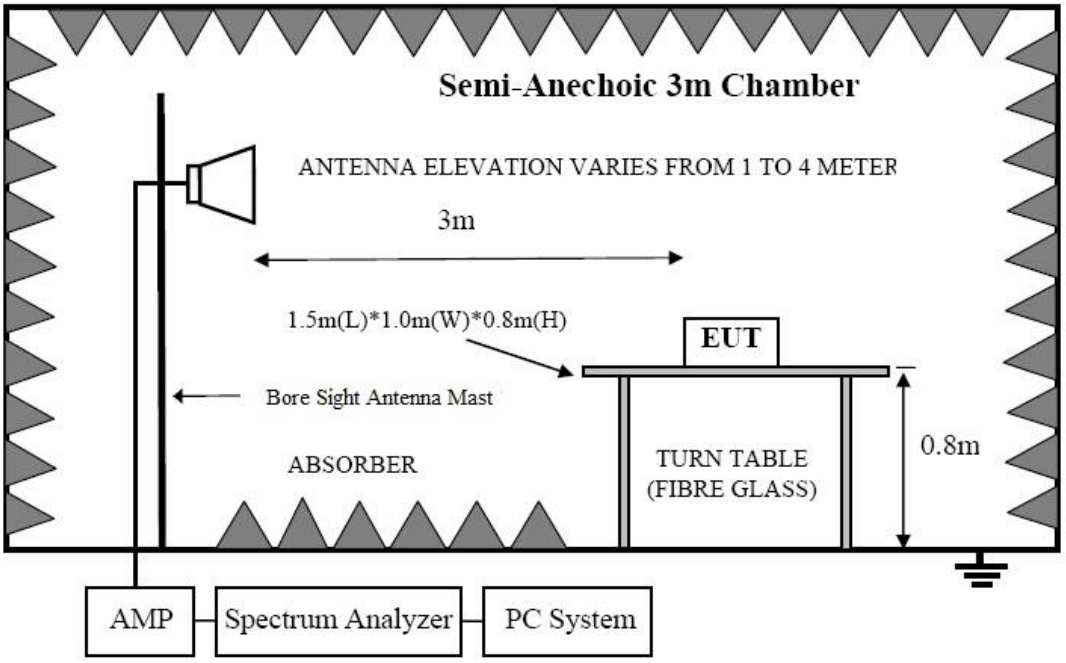
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

4.2. Block Diagram of Test Setup

In Semi Anechoic Chamber (3m) Test Setup Diagram for 30MHz~1000MHz



In Semi Anechoic Chamber (3m) Test Setup Diagram for Above 1GHz



4.3. Configuration of EUT on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

4.4. Operating Condition of EUT

（1） Setup the EUT as shown as Section 4.2.

（2） Turn on the power of all equipment.

（3） Let the EUT work in test mode and 15 minutes before taking the test.

4.5. Test Procedure

（1） The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014 on Radiated Emission test.

（2） For the radiated emission test above 1GHz:

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.

（3） The frequency range from 30MHz to 1000MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESR) is set at 120kHz.

（4） The frequency range from above 1GHz is checked, the bandwidth of spectrum analyzer (Spectrum Analyzer FSV40-N) is set at 1MHz.

（5） The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector and all final readings of measurement from Test Receiver are Quasi-Peak values, the frequency range from 1GHz to 6GHz was pre-scanned with a peak detector and all final readings of measurement from Spectrum Analyzer are peak and average values checked, all measurement distance is 3m in 3m semi anechoic chamber.

（6） The test results are reported on Section 4.7.

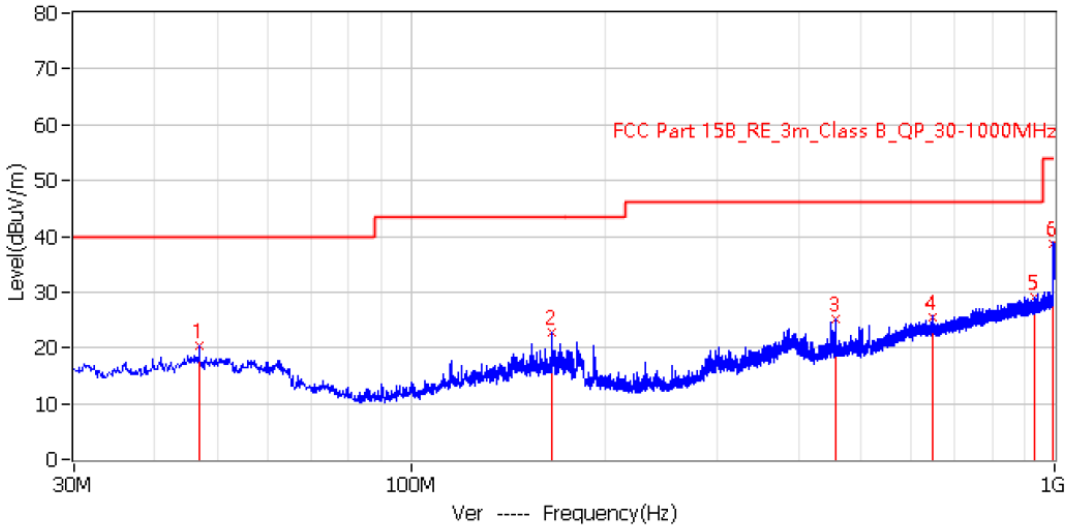
4.6. Test Results

Frequency Range	:	**30MHz~1000MHz**			
Test Date	:	2022.10.9	Temperature	:	24℃
Test Engineer	:	Ben Sun	Humidity	:	56%
Test Mode	:	Scanning			
Test Results	:	**PASS**			

Note: 1. The test results are listed in next pages.

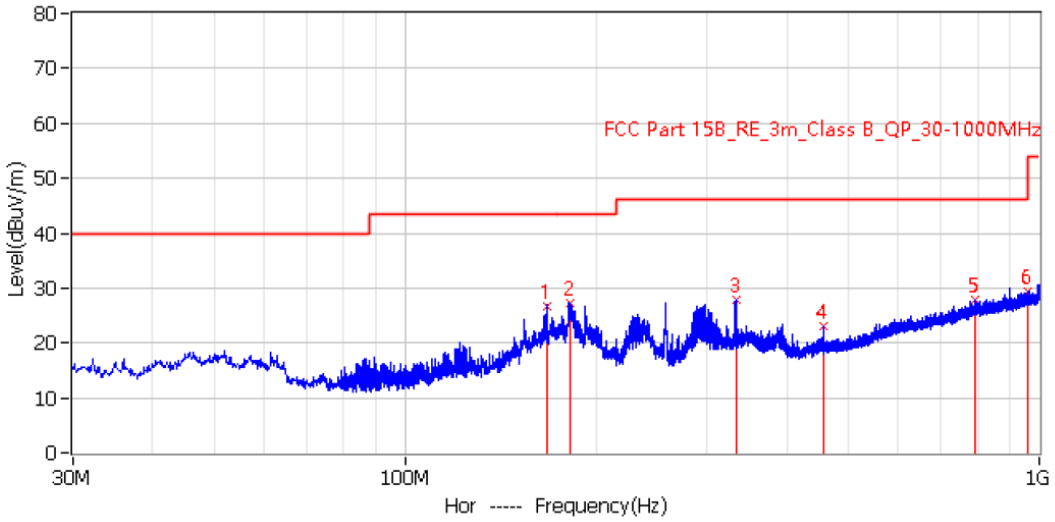
2. If the limits for the measurement with the quasi-peak detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet limits and the measurement with the quasi-peak detector need not be carried out.

Antenna Polarity: Vertical



No.	Frequency	Level dBuV/m	Factor dB/m	Limit dBuV/m	Margin dB	Detector	Height cm	Height cm	Angle deg
1*	46.975MHz	20.3	18.4	40.0	-19.7	PK	Ver	100.0	88.0
2*	165.921MHz	22.7	15.8	43.5	-20.8	PK	Ver	100.0	301.0
3*	455.951MHz	25.2	19.3	46.0	-20.8	PK	Ver	100.0	116.0
4*	648.011MHz	25.6	23.2	46.0	-20.4	PK	Ver	100.0	191.0
5*	929.311MHz	29.2	26.9	46.0	-16.8	PK	Ver	100.0	183.0
6*	995.878MHz	38.8	27.4	54.0	-15.2	PK	Ver	100.0	0.0

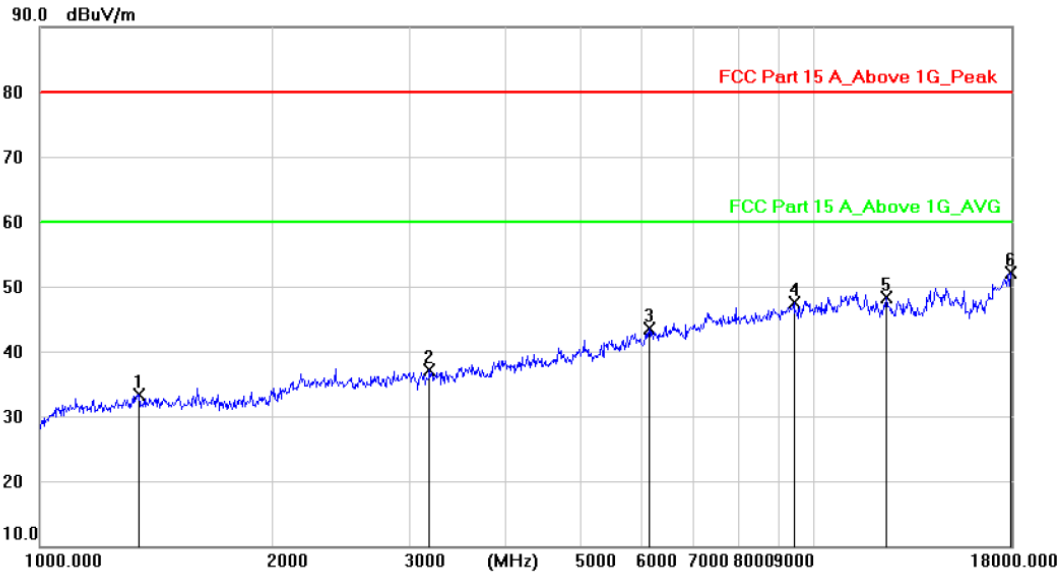
Antenna Polarity: Horizontal



No.	Frequency	Level dBuV/m	Factor dB/m	Limit dBuV/m	Margin dB	Detector	Height cm	Height cm	Angle deg
1*	167.983MHz	26.8	15.7	43.5	-16.7	PK	Hor	200.0	222.0
2*	181.684MHz	27.2	14.0	43.5	-16.3	PK	Hor	200.0	222.0
3*	333.004MHz	28.0	16.5	46.0	-18.0	PK	Hor	100.0	113.0
4*	455.951MHz	23.0	19.3	46.0	-23.0	PK	Hor	200.0	331.0
5*	792.663MHz	27.9	25.5	46.0	-18.1	PK	Hor	100.0	113.0
6*	959.139MHz	29.5	27.4	46.0	-16.5	PK	Hor	100.0	29.0

Frequency Range	:	**Above 1GHz**			
Test Date	:	2022.10.9	Temperature	:	24℃
Test Engineer	:	Ben Sun	Humidity	:	56%
Test Mode	:	Scanning			
Test Results	:	**PASS**			
Note:	1. The test results are listed in next pages.				
	2. If the limits for the measurement with the quasi-peak detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet limits and the measurement with the quasi-peak detector need not be carried out.				

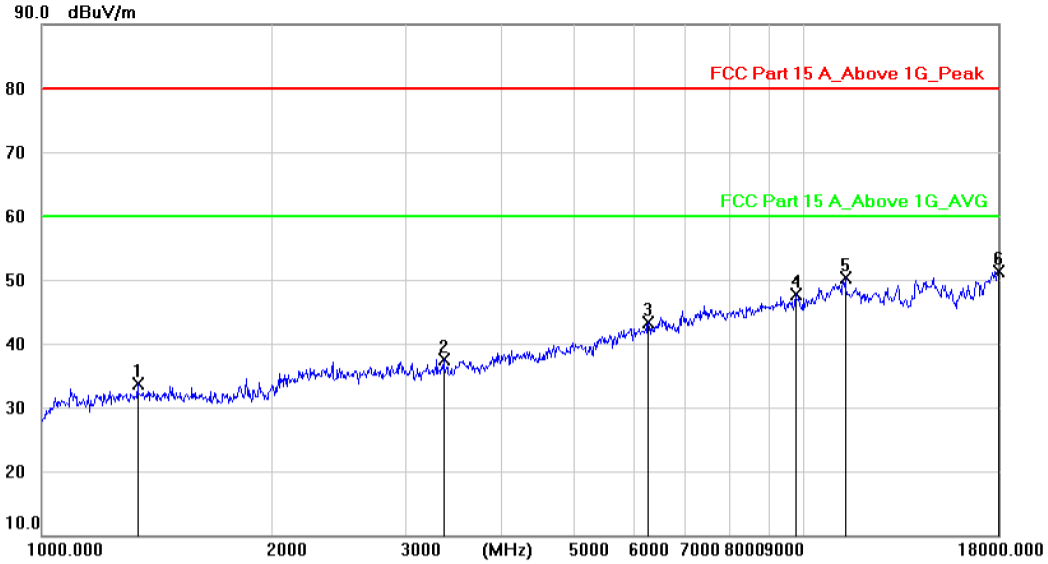
Antenna Polarity: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1343.658	52.59	-19.31	33.28	80.00	-46.72	peak			
2		3194.247	50.98	-13.95	37.03	80.00	-42.97	peak			
3		6136.695	47.76	-4.18	43.58	80.00	-36.42	peak			
4		9442.689	47.66	-0.12	47.54	80.00	-32.46	peak			
5		12401.31	45.21	3.14	48.35	80.00	-31.65	peak			
6	*	17994.79	38.76	13.33	52.09	80.00	-27.91	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Antenna Polarity: Horizontal



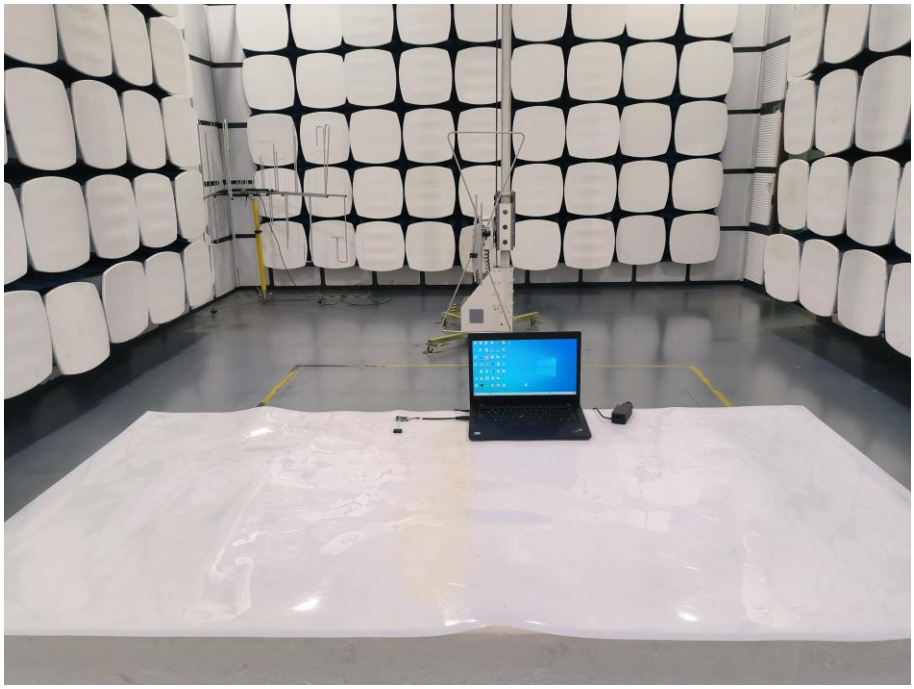
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1338.619	53.08	-19.33	33.75	80.00	-46.25	peak			
2		3371.647	51.53	-14.00	37.53	80.00	-42.47	peak			
3		6251.270	47.24	-3.90	43.34	80.00	-36.66	peak			
4		9759.011	47.57	0.12	47.69	80.00	-32.31	peak			
5		11341.74	47.73	2.63	50.36	80.00	-29.64	peak			
6	*	18000.00	37.96	13.36	51.32	80.00	-28.68	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

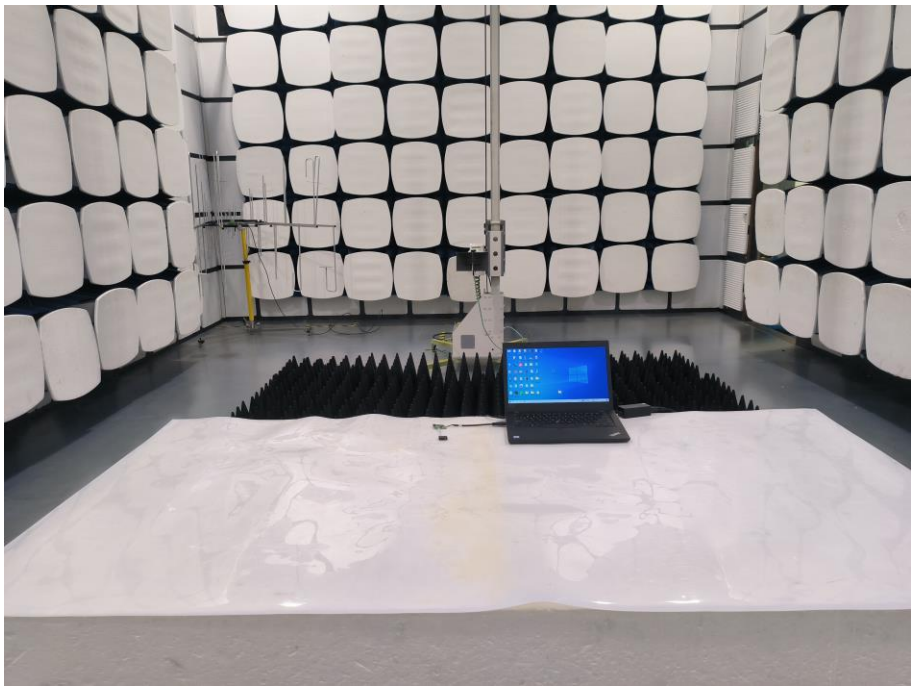
5. Test Setup Photo

5.1. Photo of Radiated Emission Test (In Semi Anechoic Chamber)

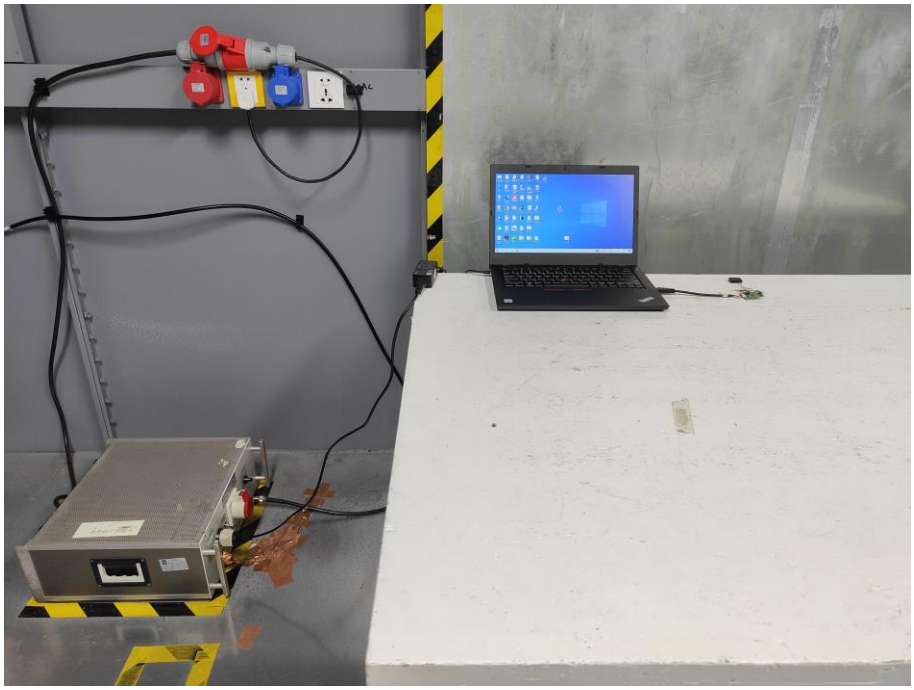
30-1000MHz



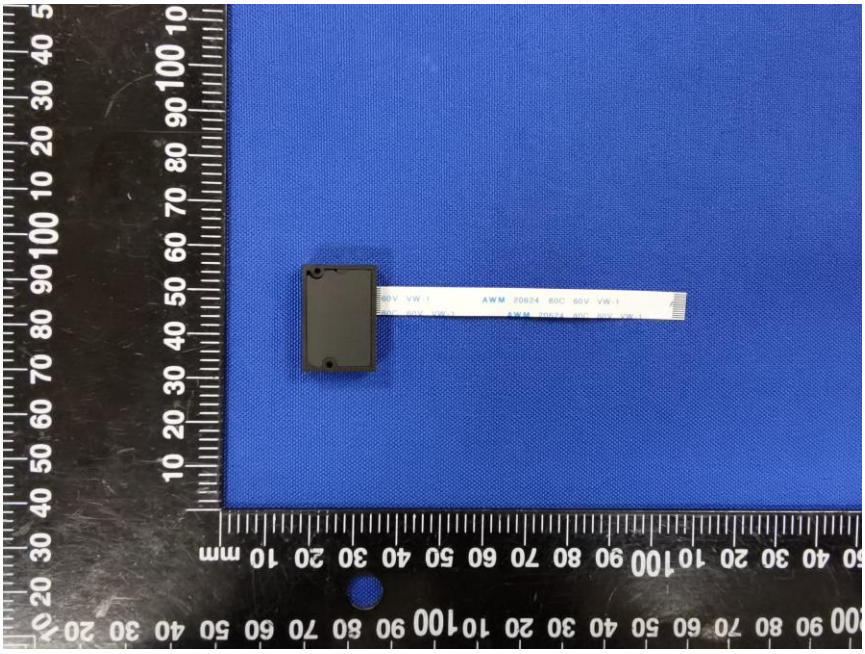
Above 1GHz



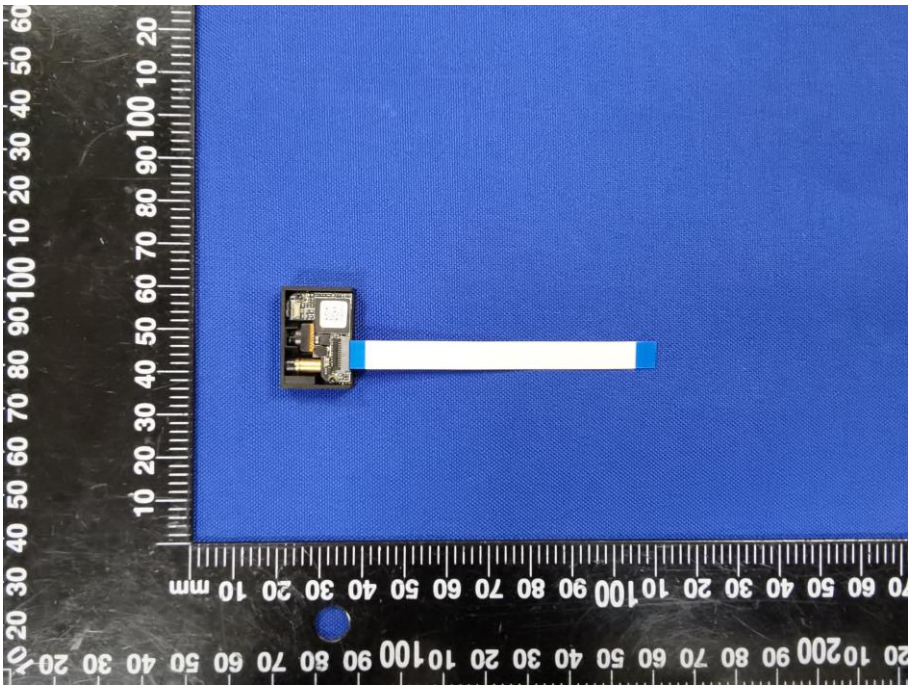
5.2. Photo of Power Line Conducted Emission Test



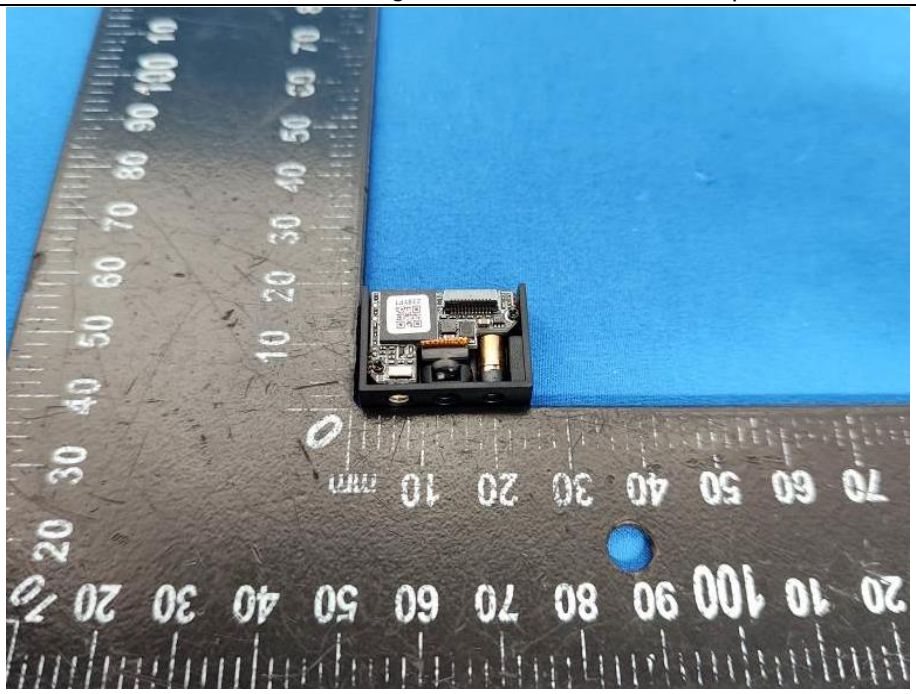
6. Photos Of The EUT



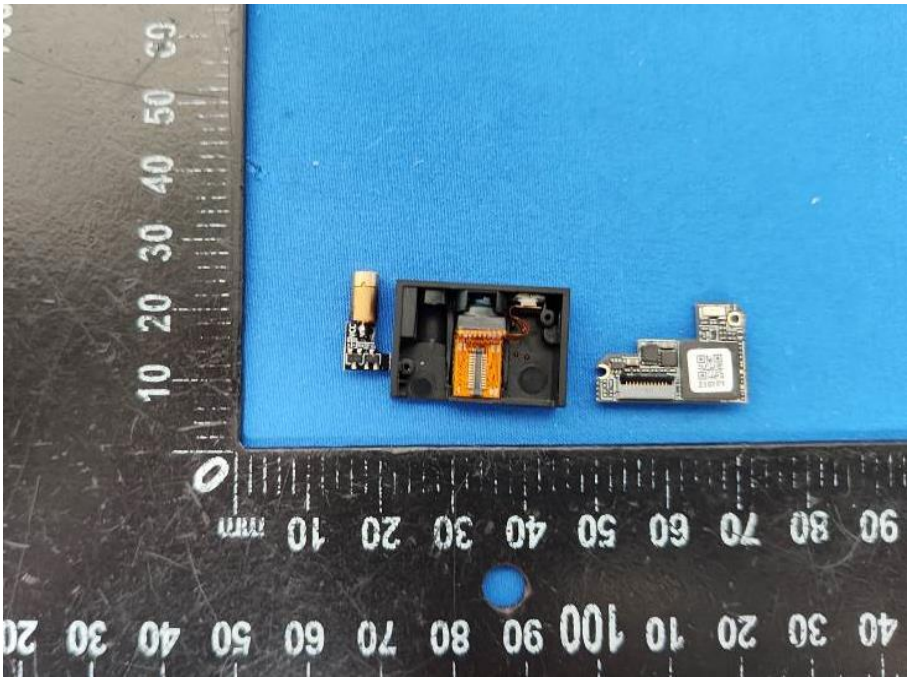
EUT View



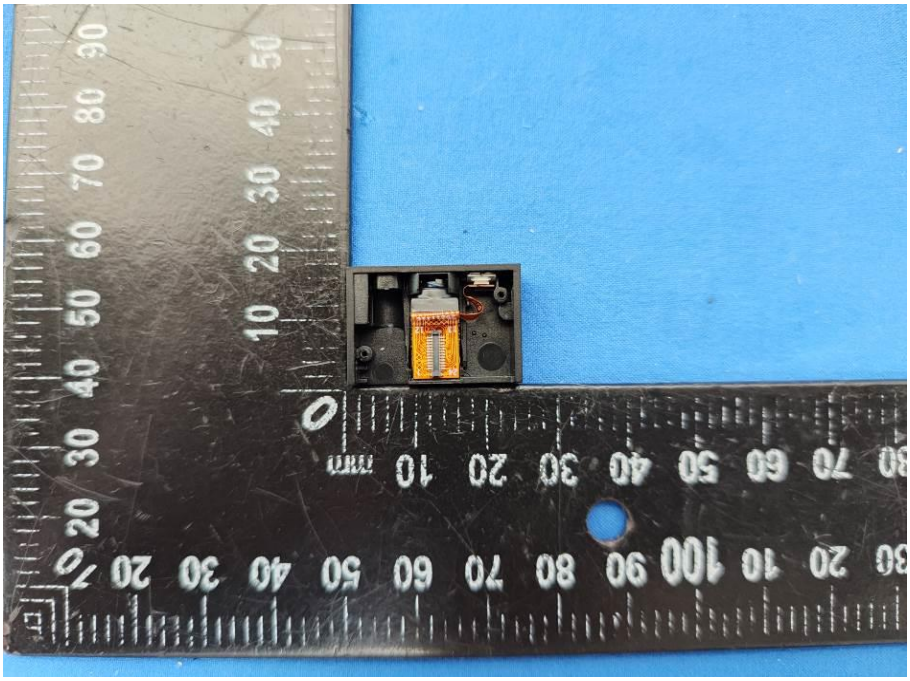
EUT View



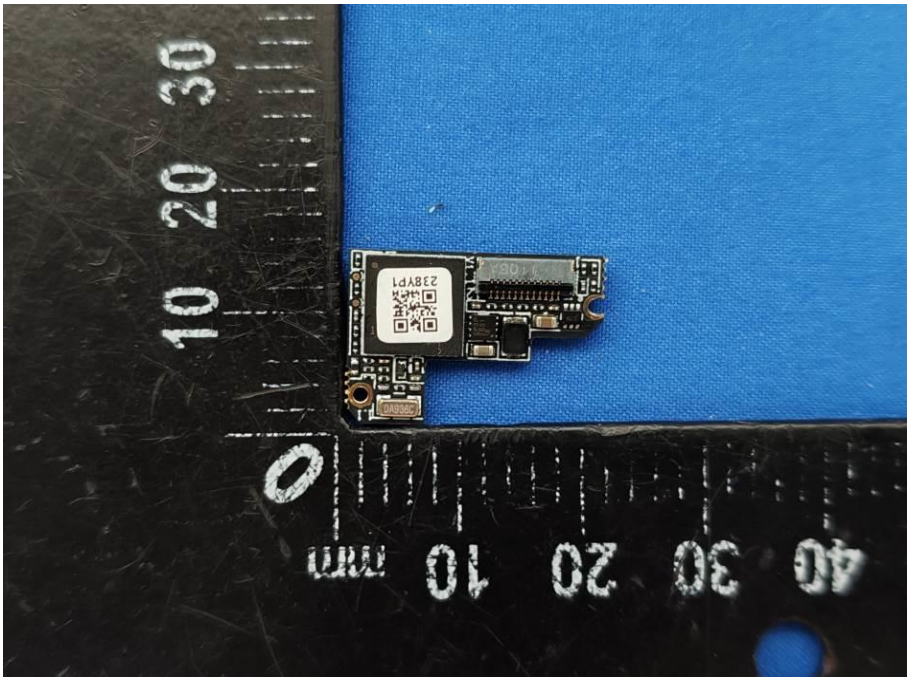
EUT View



EUT View



EUT View



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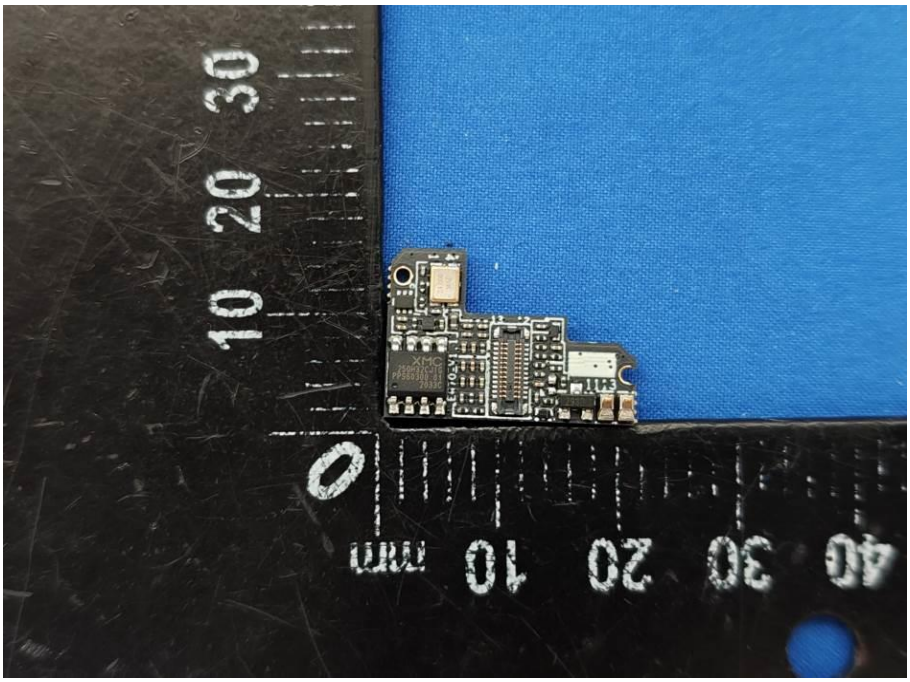

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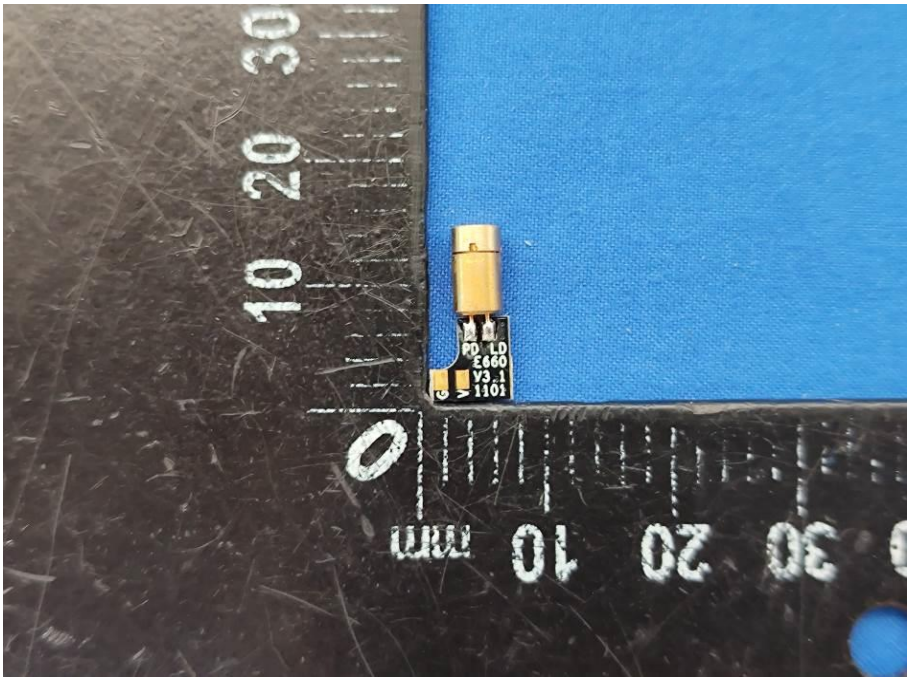
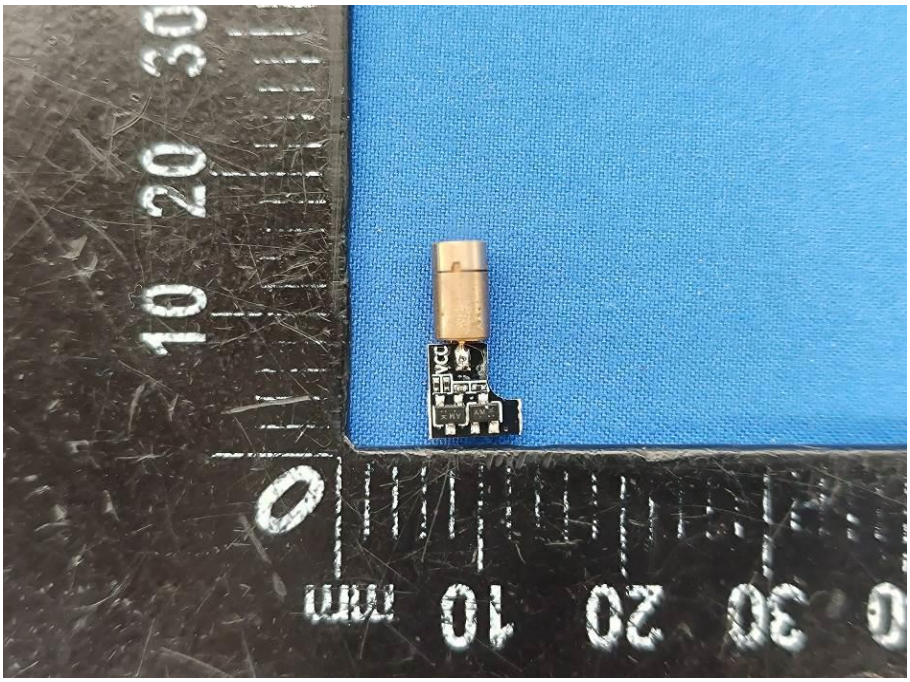


EUT View



EUT View

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