



FCC TEST REPORT

On Behalf of

Shanghai Anviz Technology Co.,Ltd.

FCC ID: 2ARXG-M5

Outdoor Fingerprint RFID Access Controller

Model No.: M5

Prepared for : Shanghai Anviz Technology Co.,Ltd.
Address : 3rd Floor, 3669 Jindu Road, Shanghai, 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

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TEST REPORT DECLARATION

Applicant : Shanghai Anviz Technology Co.,Ltd.
Address : 3rd Floor, 3669 Jindu Road, Shanghai, China
Manufacturer : Shanghai Anviz Technology Co.,Ltd.
Address : 3rd Floor, 3669 Jindu Road, Shanghai, China
EUT Description : Outdoor Fingerprint RFID Access Controller
(A) Model No. : M5
(B) Trademark : 

Measurement Standard Used:

FCC CFR 47 PART 15 C

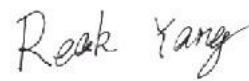
ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the Part 15B limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests. After the test, our opinion is that EUT compliance with the requirement of the above standards.

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.

Tested by (name + signature).....:

Reak Yang
Project Engineer



Approved by (name + signature).....:

Simple Guan
Project Manager



Date of issue.....

November 28, 2018

Revision History

Revision	Issue Date	Revisions	Revised By
00	November 28, 2018	Initial released Issue	Simple Guan

1. General Information

1.1. Description of Device (EUT)

Model Name : Outdoor Fingerprint RFID Access Controller

Model No. : M5
DIFF : N/A

Trade mark : 

Power supply : DC 12V from DC Power

Radio Technology : RF ID

Operation frequency : 125KHz

Modulation Technology : ASK

Channel No. : 1 Channel

Antenna Type : Loop Antenna

Software Version : V1.0
Hardware Version : V1.0

1.2. Accessories of Device (EUT)

Accessories1 : N/A
Manufacturer : N/A
Model : N/A
Input : N/A
Output : N/A

1.3. Ancillary Equipment Details

No.	Description	Manufacturer	Model	Serial Number	Certification or sDOC
1	DC Power	Junke	JK12010S	20140927-6	N/A

1.4. Test Lab Information

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

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961
Designation Number: CN1236

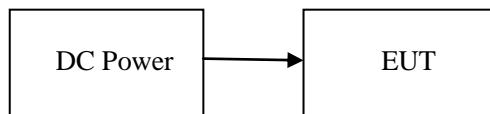
July 25, 2017 Certificated by IC
Registration Number: 12135A

2. Summary of test

2.1. Summary of test result

Description of Test Item	Standard	Results
99% and 20dB Bandwidth	§15.215 (c)	PASS
Radiated Emission (9KHz-1GHz)	§15.209(a)(f)	PASS
Power Line Conducted Emissions (150KHz-30MHz)	§ 15.207(a)	PASS
Antenna Requirement	§ 15.203	PASS

2.2. Block Diagram



2.3. Test mode

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (KHz)
1	CH1	125KHz

2.4. Test Conditions

Temperature range	21-25°C
Humidity range	40-75%
Pressure range	86-106kPa

2.5. Measurement Uncertainty (95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.16dB(Polarize: H)
	4.13dB(Polarize: V)
Uncertainty for radio frequency	5.4×10^{-8}
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2 °C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.6. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last cal.	Cal. Due day
Filter	KANGMAI	ZLPF-LDC-10 00- 1959	1209002075	2018.09.21	2019.09.20
RF Cable	Resenberger	Cable 4	N/A	2018.09.21	2019.09.20
Signal Analyzer	Agilent	N9020A	MY499100060	2018.09.11	2019.09.10
Amplifier	HP	HP8347A	2834A00455	2018.09.21	2019.09.20
Filter	WAINWRIGHT	WHKX1.0G/1 5G- 10SS	SN40	2018.09.21	2019.09.20
Test Receiver	ROHDE&SCHWA RZ	ESR	1316.3003K03- 102082-Wa	2018.09.21	2019.09.20
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-438	2018.04.13	2020.04.12
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2016.07.21	2020.07.20
RF Cable	Resenberger	Cable 1	N/A	2018.09.21	2019.09.20
RF Cable	Resenberger	Cable 2	N/A	2018.09.21	2019.09.20
RF Cable	Resenberger	Cable 3	N/A	2018.09.21	2019.09.20
Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2018.09.26	2020.09.25
Attenuator	HP	8494B	DC-18G	2018.09.21	2019.09.20
20dB Attenuator	ICPROBING	IATS1	82347	2018.09.21	2019.09.20
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2018.09.21	2019.09.20
L.I.S.N.#2	ROHDE&SCHWA RZ	ENV216	101043	2018.09.21	2019.09.20

3. Occupied bandwidth and 20dB Bandwidth

3.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.215, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

3.2. Test Procedure

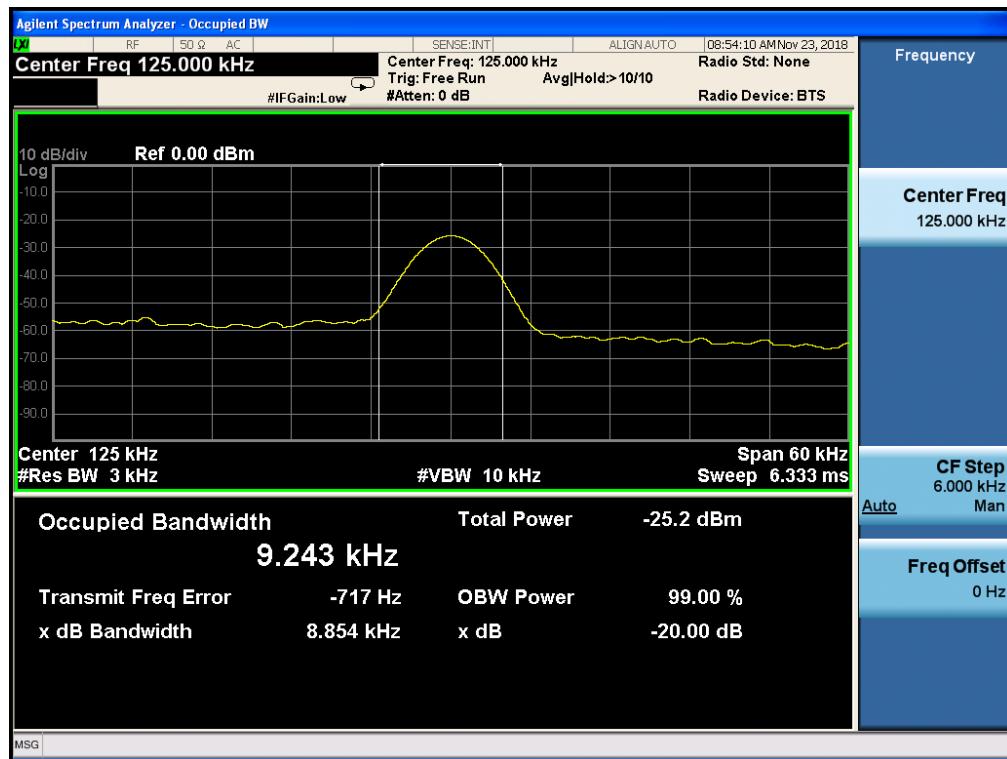
The transmitter output was directly connected to a spectrum analyzer with a 50Ω cable. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3KHz RBW and 10kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

3.3. Test Setup



3.4. Test Result

Mode	Freq (KHz)	20dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)	Limit (kHz)	Conclusion
Tx Mode	125KHz	8.854	9.243	/	PASS



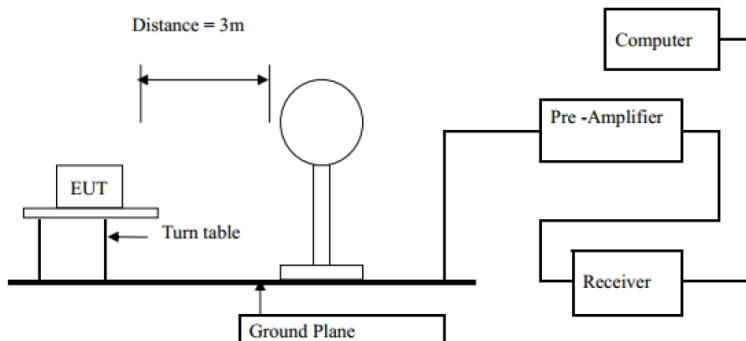
4. Radiated emissions

4.1. Limit

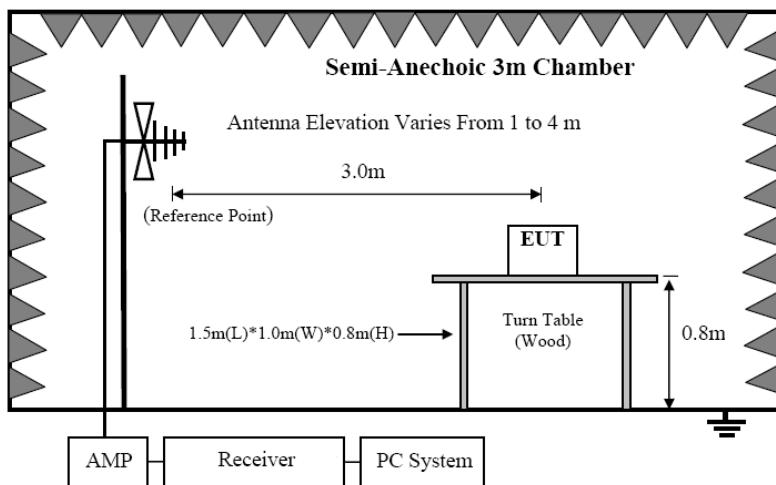
Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/F(KHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

4.2. Block Diagram of Test setup

In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



In 3m Anechoic Chamber Test Setup Diagram for frequency 30MHz-1GHz



4.3. Test Procedure

Procedure of Preliminary Test

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.

Mains cables, telephone lines or other connections to auxiliary equipment located outside the test are shall drape to the floor, be fitted with ferrite clamps or ferrite tubes placed on the floor at the point where the cable reaches the floor and then routed to the place where they leave the turntable. No extension cords shall be used to mains receptacle.

The antenna was placed at 3 meter away from the EUT as stated in ANSI C63.10:2013. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The Receiver quickly scanned from 9KHz to 30MHz and 30MHz to 1GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

The test mode(s) described in clause 2.4 were scanned during the preliminary test:

After the preliminary scan, we found the test mode producing the highest emission level. The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.

The Receiver scanned from 9KHz to 30MHz and 30MHz to 1GHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 200Hz for 9 KHz to 150 KHz measure, 10 KHz for 150 KHz to 30MHz measure and 120 KHz for 30 MHz to 1GHz measure .

4.4. Test Result

PASS. (See below detailed test result)

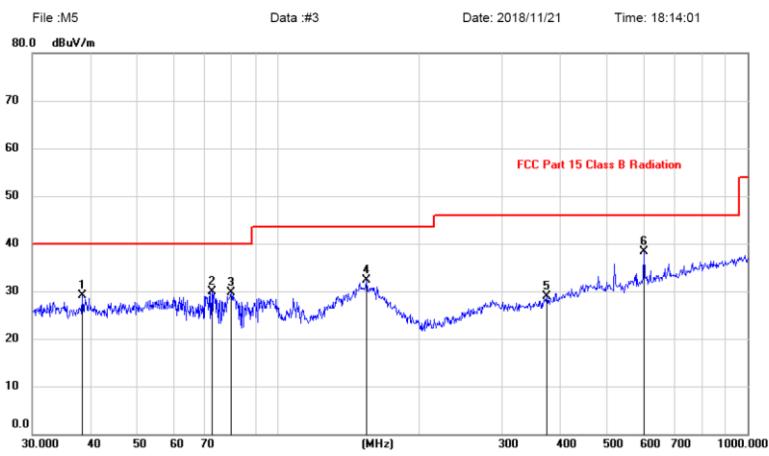
Detailed information please see the following page.

Frequency Range	:	9KHz~30MHz
Test Mode	:	TX 125.0KHz
Test Results	:	PASS
Note: 1. The test results are listed in next pages. 2. This mode is worst case mode, so this report only reflected the worst mode. 3. 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 quasi-peak detector need not be carried out.		

Freq.	Readin g	Antenna Factor	Cable loss	Amp Factor	Result	Limit	Margin	Detector	State
(MHz)	(dBuV/ m)	dB/m	dB	dB	(dBuV/m)	(dBuV/m) at 3 m	(dB)		
0.11	45.89	48.34	0.16	29.87	64.52	126.77	-62.25	PK	PASS
0.11	45.06	48.34	0.16	29.87	63.69	106.77	-43.08	AV	PASS
0.125	81.98	48.34	0.16	29.87	100.61	122.95	-22.34	PK	PASS
0.125	69.71	48.34	0.16	29.87	88.34	102.95	-14.61	AV	PASS
0.21	47.85	48.38	0.17	29.89	66.51	120.76	-54.25	PK	PASS
0.21	46.76	48.38	0.17	29.89	65.42	100.76	-35.34	AV	PASS
0.35	45.81	48.44	0.19	29.89	64.55	117.78	-53.23	PK	PASS
0.35	44.53	48.44	0.19	29.89	63.27	97.78	-34.51	AV	PASS
0.45	48.13	48.47	0.19	29.89	66.90	115.35	-48.45	PK	PASS
0.45	44.37	48.47	0.19	29.89	63.14	95.35	-32.21	AV	PASS
1.928	26.74	49.12	0.2	29.94	46.12	70	-23.88	QP	PASS
1.920	25.54	49.12	0.2	29.94	44.92	50	-5.08	AV	PASS

Vertical:

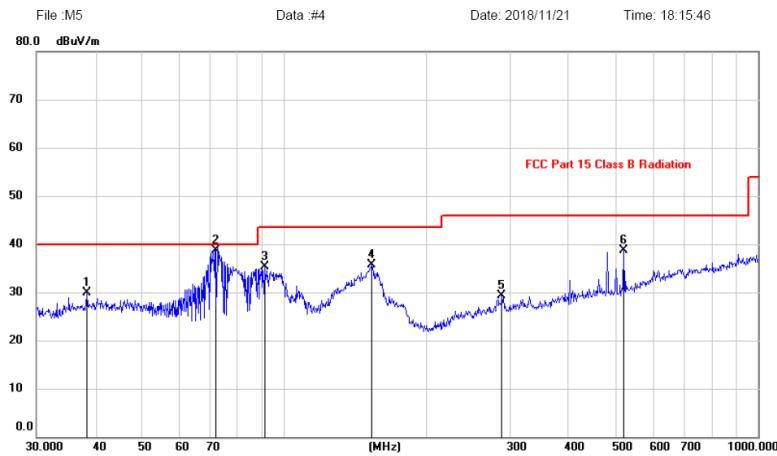
Radiated Emission Measurement



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
			Level	Factor	ment	dBuV/m	dBuV/m			Degree
		MHz	dBuV	dB				cm	degree	Comment
1		38.3462	15.08	13.95	29.03	40.00	-10.97	peak		
2		72.5914	19.44	10.53	29.97	40.00	-10.03	peak		
3		79.5207	20.14	9.47	29.61	40.00	-10.39	peak		
4		154.2786	17.74	14.56	32.30	43.50	-11.20	peak		
5		373.3110	13.56	15.26	28.82	46.00	-17.18	peak		
6	*	601.4265	18.86	19.41	38.27	46.00	-7.73	peak		

Horizontal :

Radiated Emission Measurement



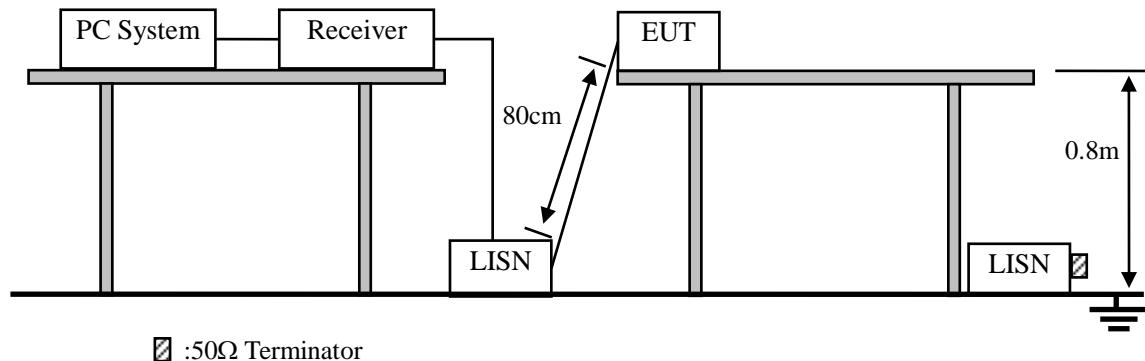
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Antenna	Table	
			Level	Factor	ment	dBuV/m	dBuV/m			Degree
		MHz	dBuV	dB				cm	degree	Comment
1		38.3462	15.94	13.95	29.89	40.00	-10.11	peak		
2	*	71.9053	28.01	10.70	38.71	40.00	-1.29	QP	200	0
3		90.8554	25.38	9.88	35.26	43.50	-8.24	peak		
4		152.6639	21.17	14.55	35.72	43.50	-7.78	peak		
5		287.9904	16.21	13.09	29.30	46.00	-16.70	peak		
6		520.8881	20.88	17.92	38.80	46.00	-7.20	peak		

Note:1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

5. Power Line Conducted Emissions

5.1. Block Diagram of Test Setup



5.2. Limit

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

Notes: 1. * Decreasing linearly with logarithm of frequency.

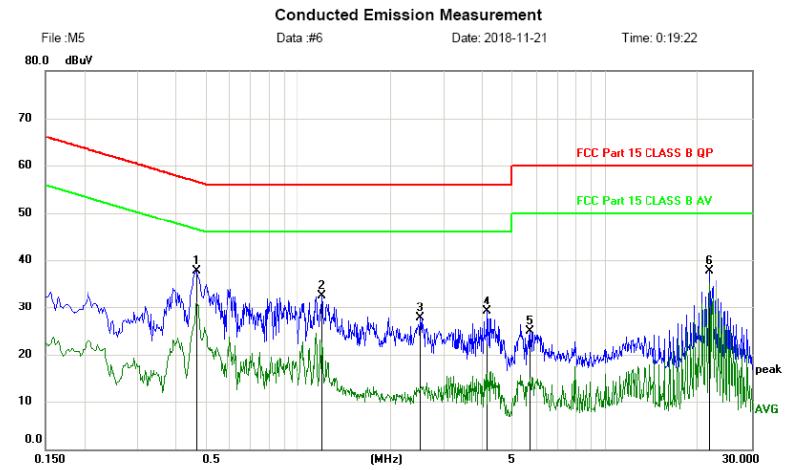
2. The lower limit shall apply at the transition frequencies.

5.3. Test Procedure

- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N1), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). 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 C63.10:2013 on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

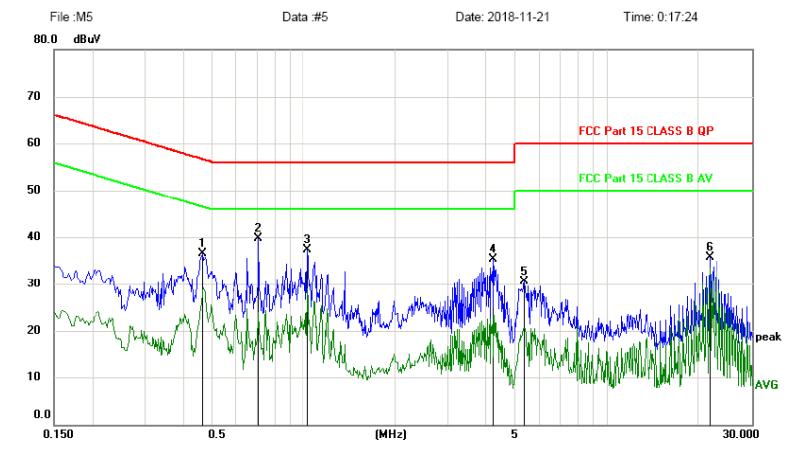
5.4. Test Result

N



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.4680	37.47	0.20	37.67	56.55	-18.88	peak	
2		1.1969	32.35	0.20	32.55	56.00	-23.45	peak	
3		2.4929	27.40	0.22	27.62	56.00	-28.38	peak	
4		4.1310	28.81	0.26	29.07	56.00	-26.93	peak	
5		5.7060	24.70	0.28	24.98	60.00	-35.02	peak	
6		21.7409	36.94	0.76	37.70	60.00	-22.30	peak	

L



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.4650	36.21	0.20	36.41	56.60	-20.19	peak	
2	*	0.7109	39.56	0.20	39.76	56.00	-16.24	peak	
3		1.0319	37.03	0.20	37.23	56.00	-18.77	peak	
4		4.1879	35.02	0.26	35.28	56.00	-20.72	peak	
5		5.3339	30.22	0.26	30.48	60.00	-29.52	peak	
6		21.7439	35.03	0.76	35.79	60.00	-24.21	peak	

*:Maximum data x:Over limit !:over margin

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

Remark: All modes and channels have been tested and only listed RF mode that is worst data(AC 120V/60Hz)

6. Antenna Requirements

6.1. Limit

For intentional device, according to RSS-Gen Section 6.8 and FCC 47 CFR Section 15.203, 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. And according to FCC 47 CFR Section 15.209, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

6.2. Antenna Connected Construction

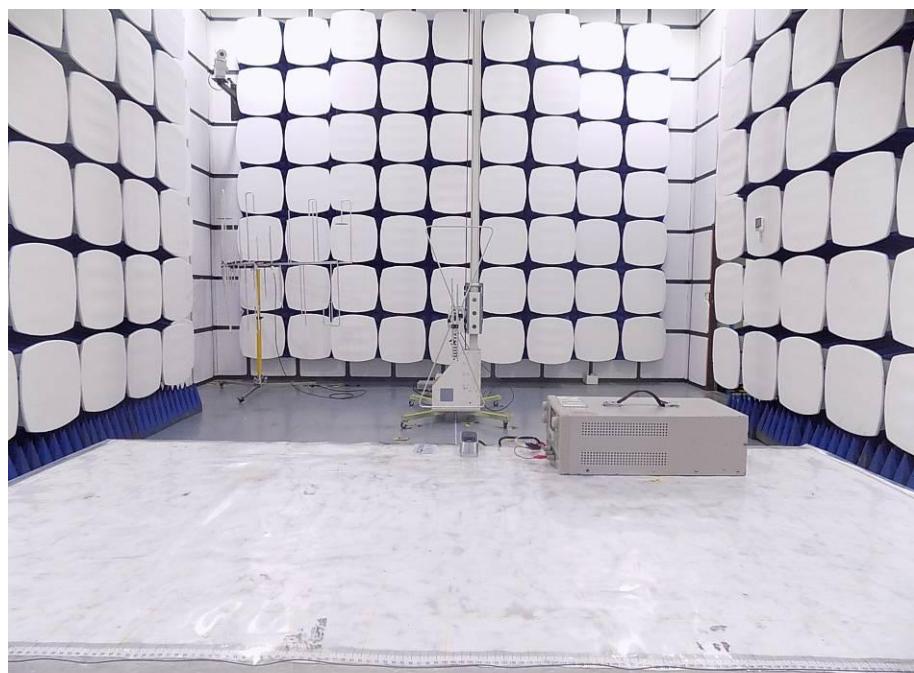
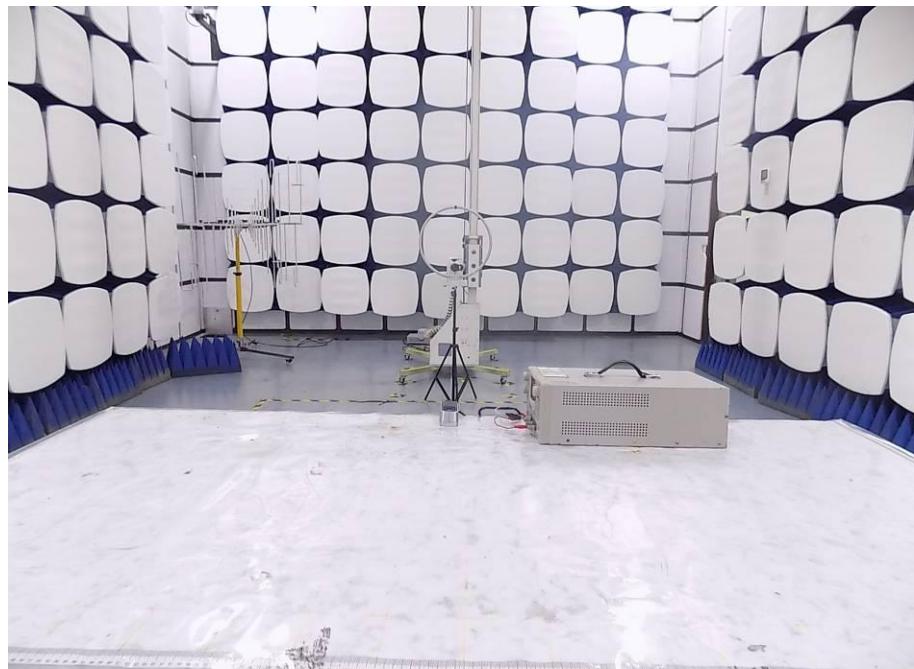
The antenna is Loop Antenna and no consideration of replacement. Please see EUT photo for details.

6.3. Results

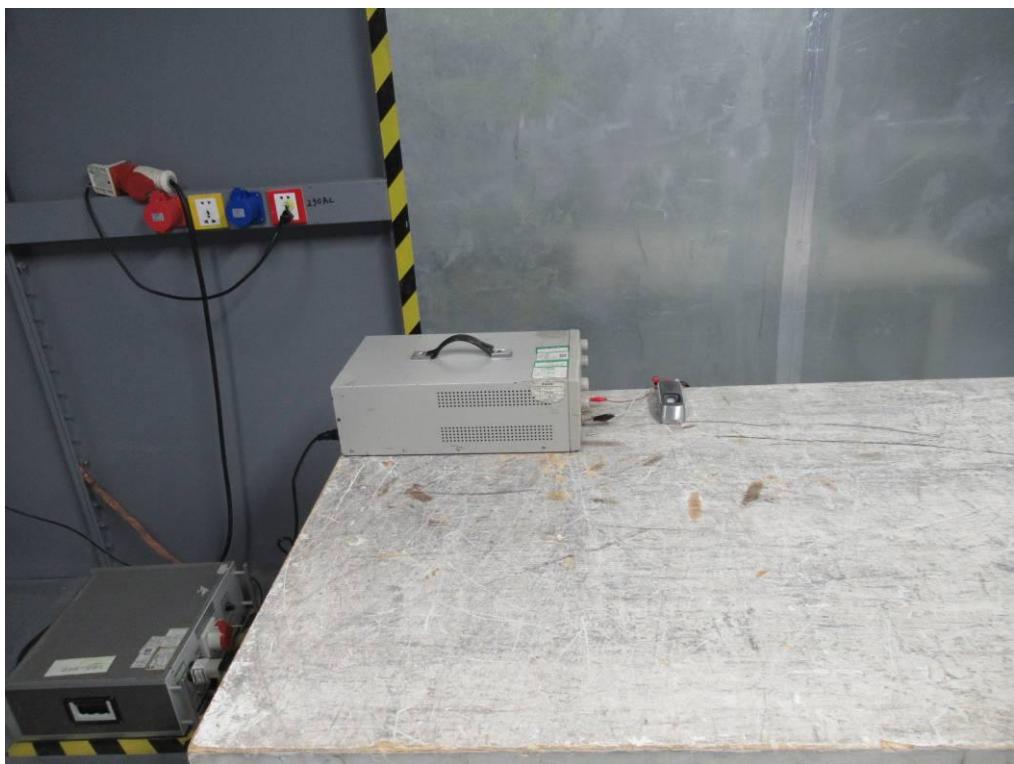
The EUT antenna is Loop Antenna. It complies with the standard requirement.

7. Test setup photo

7.1. Photos of Radiated emission



7.2. Photos of Conducted Emission test



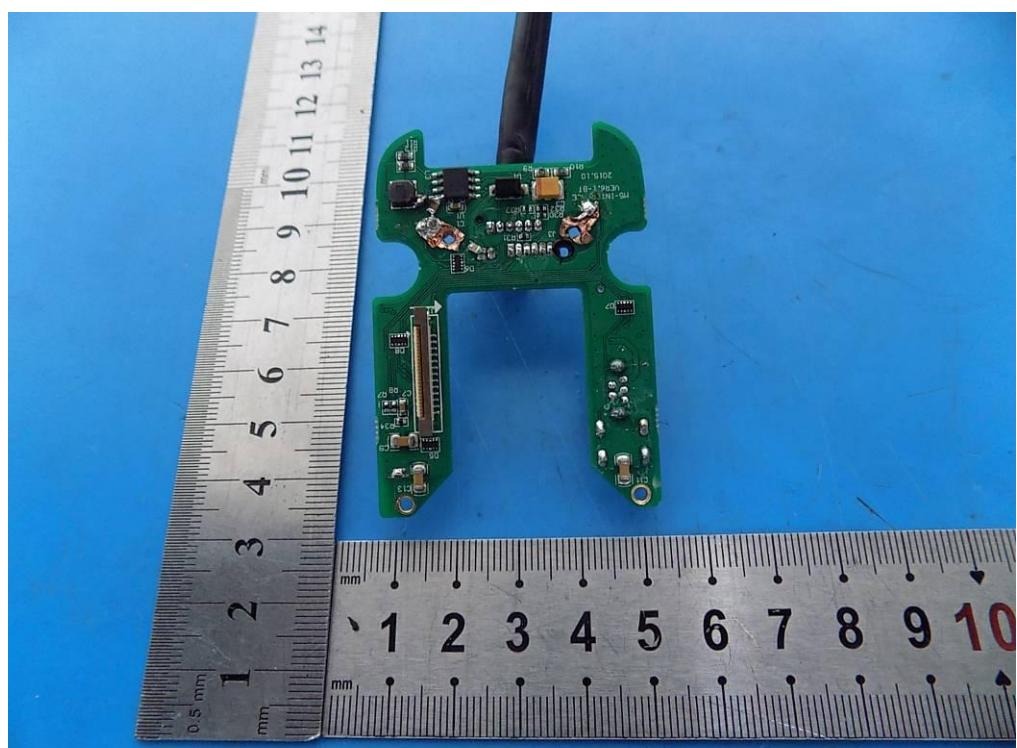
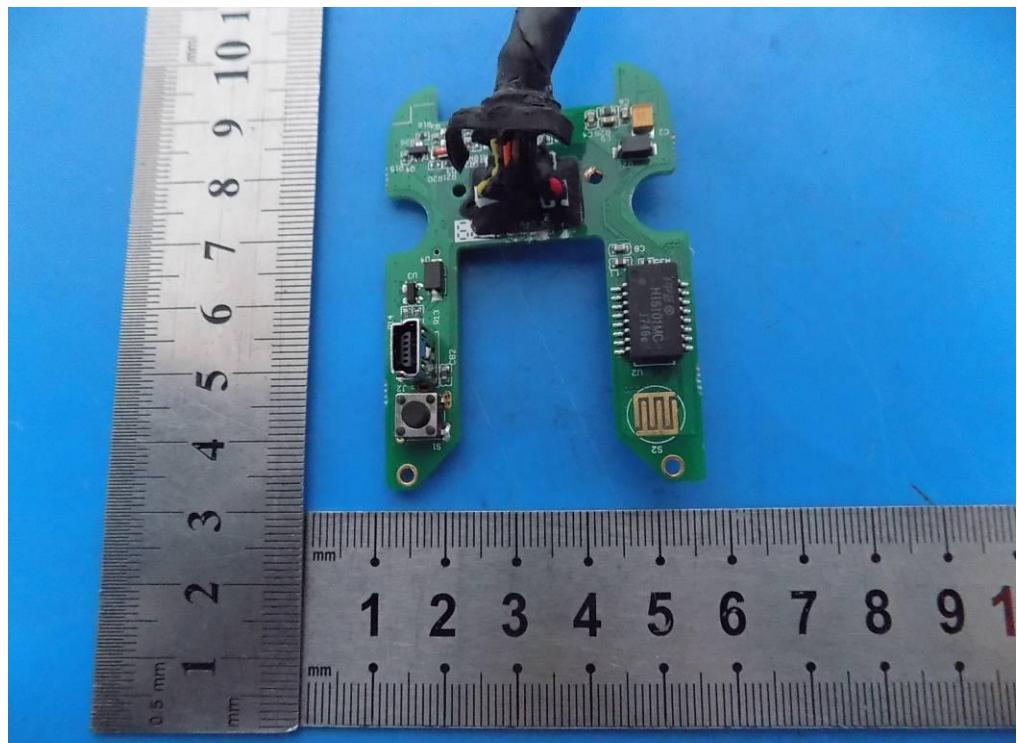
8. Photos of EUT

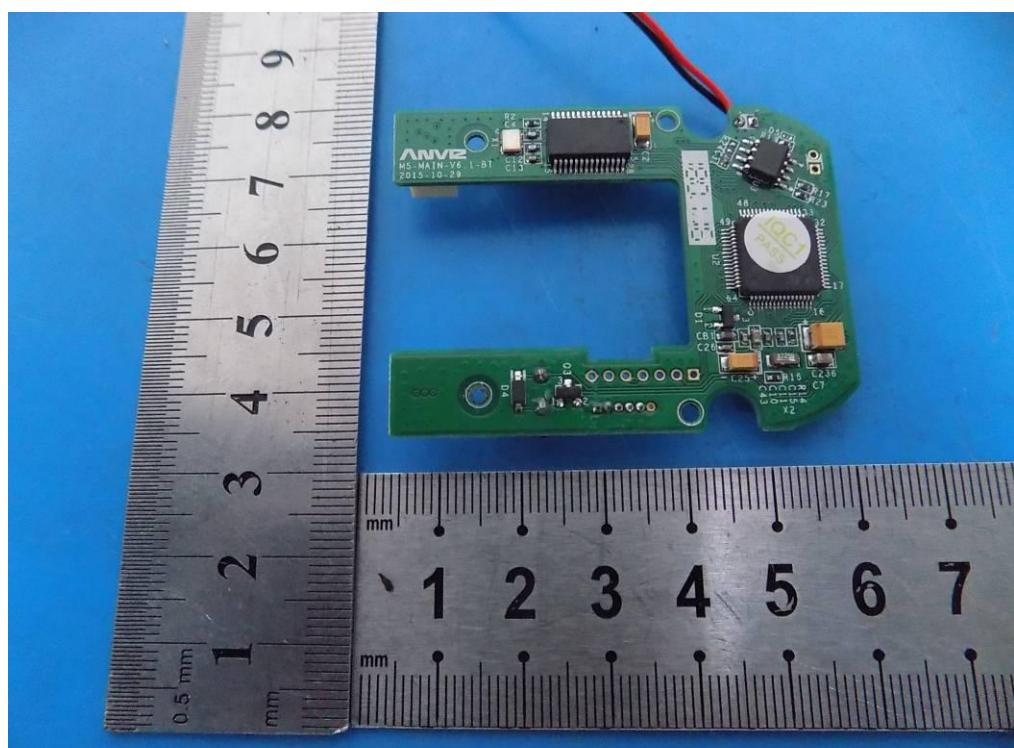
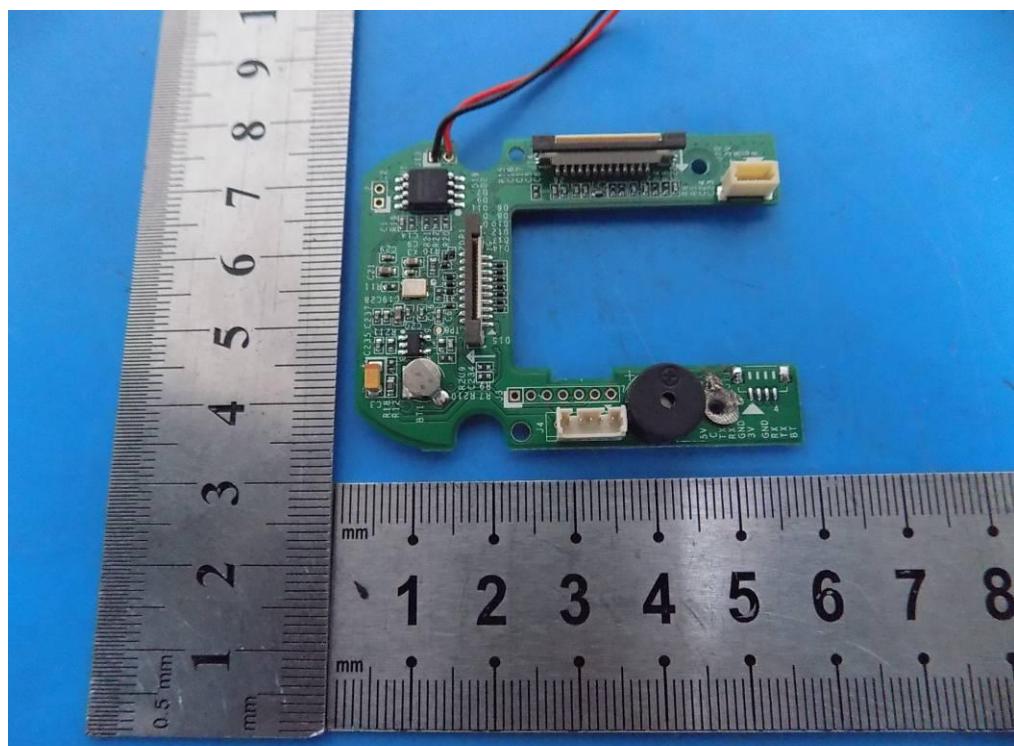


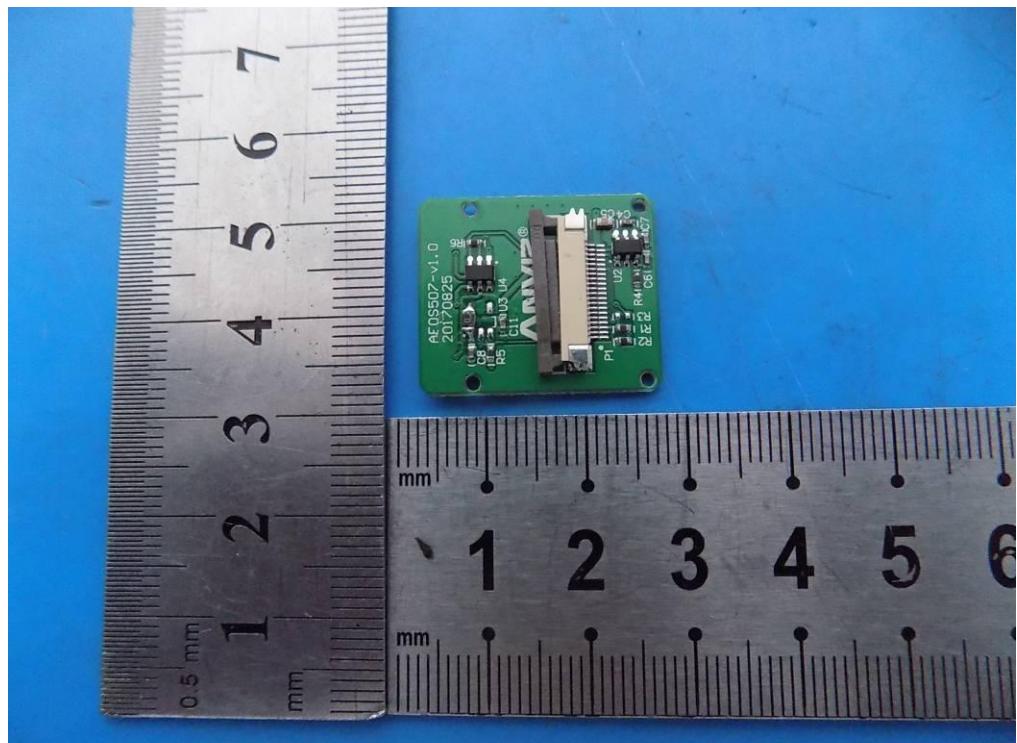


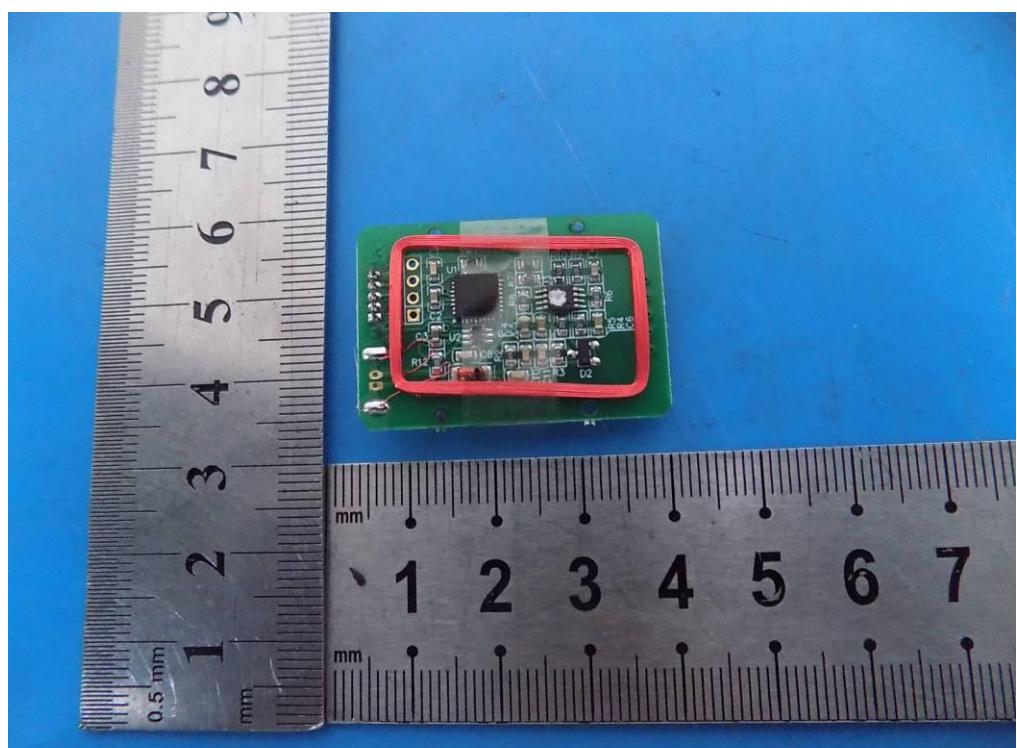
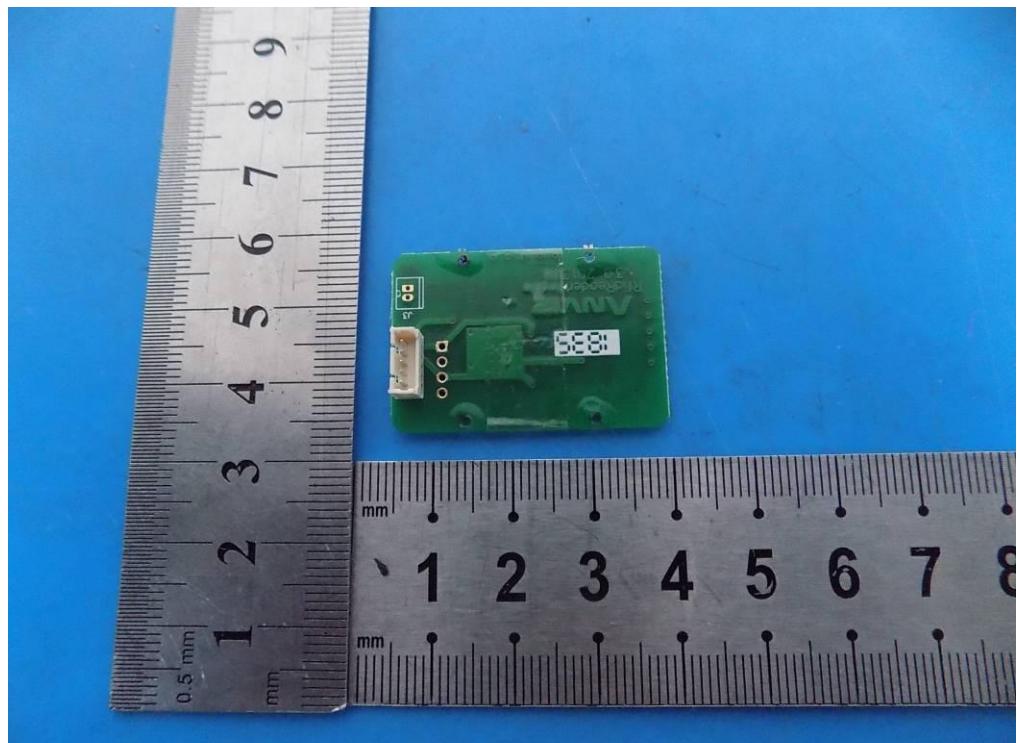


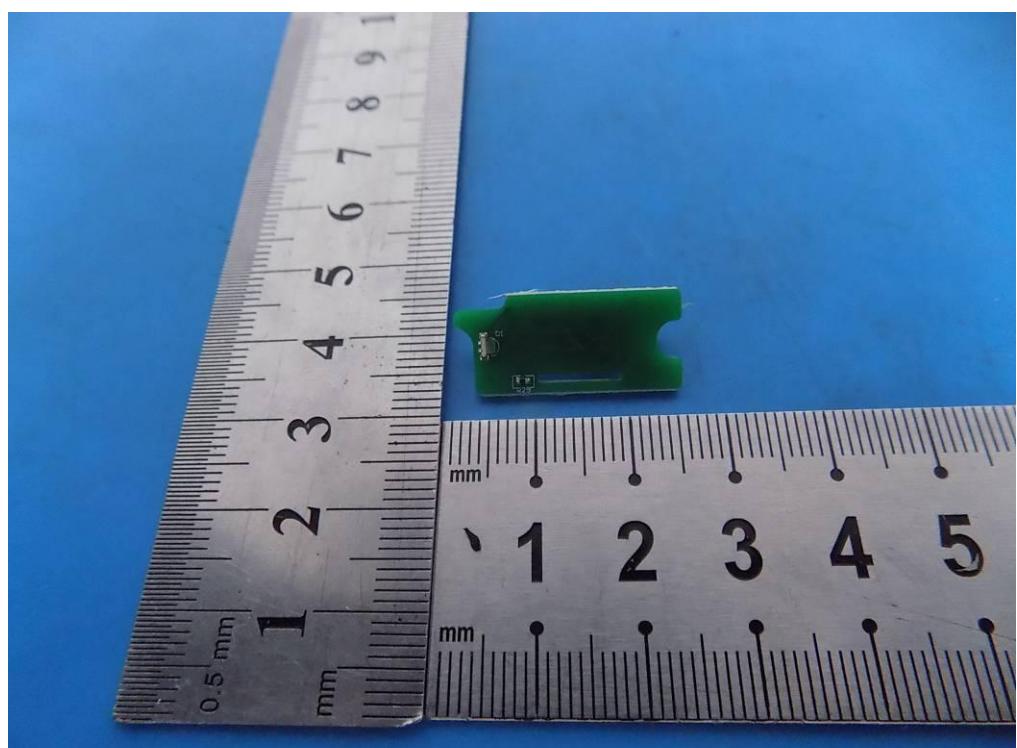
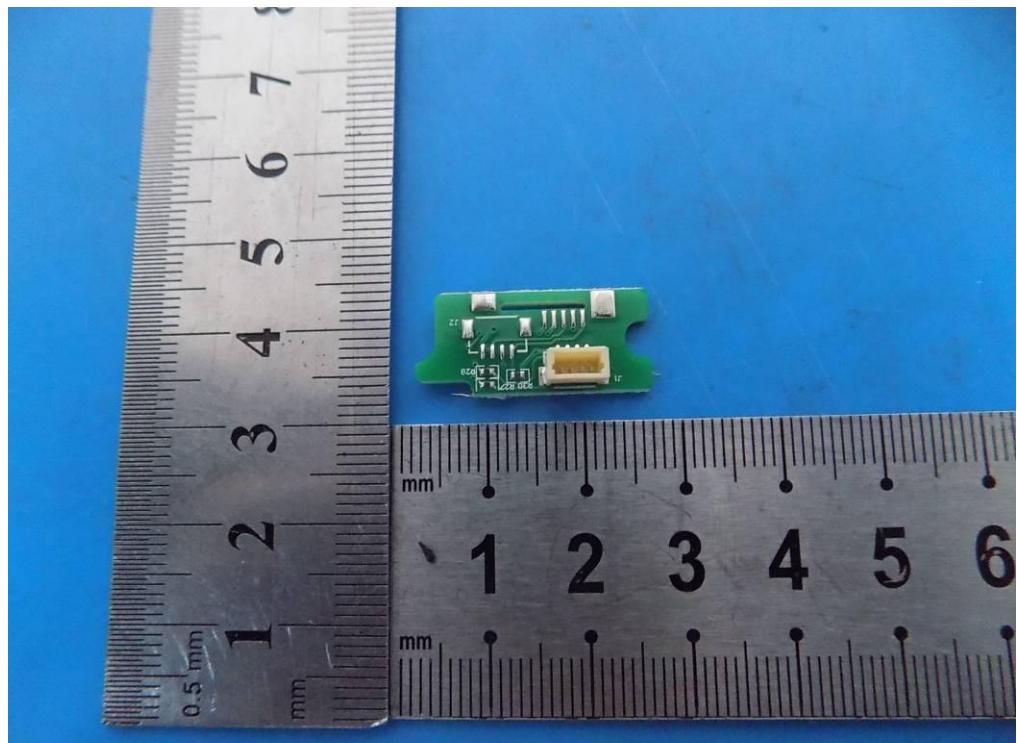












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