FCC TEST REPORT

Part 15 subpart C

Client Information:

Applicant: Shenzhen Zhong An Security Tech Co.,Ltd

Applicant add.: 601D, 6/F, Unit B, Productivity Building, No. 5 High-tech Middle 2nd Road, NanshanScience park, Shenzhen, Guangdong Province, China

Product Information:

Product Name: ESA

Model No.: CG6,CG7,CG8,CG9,CG10,CG11,CG12,CG13,CG14,CG15

Brand Name: --

FCC ID: 2AM2T-CG6

Standards: CFR 47 PART 15 Subpart C: 2016

Test procedure used: ANSI C63.10-2013

Prepared By:

Shenzhen ZCT Technology Co.,Ltd

Add. : 3/F., Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China.

Date of Receipt: June 20, 2017 Date of Test: June 21~ June 23, 2017

Date of Issue: June. 25, 2016 Test Result: Pass

This device described above has been tested by Shenzhen ZCT Technology Co.,Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

*This test report must not be used by the client to claim product endorsement by any agency of the U.S. government.

Reviewed by: Anna Lv **Approved by:**

1 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2016-08-05		

2 Contents

1 VERSION **2**

2 CONTENTS **3**

3 TEST SUMMARY **4**

3.1 MEASUREMENT UNCERTAINTY 4

4 TEST FACILITY **5**

4.1 DEVIATION FROM STANDARD 5
4.2 ABNORMALITIES FROM STANDARD CONDITIONS 5

5 GENERAL INFORMATION **6**

5.1 GENERAL DESCRIPTION OF EUT 6
5.2 TEST LOCATION 6
5.3 TEST PERIPHERAL LIST 7

6 EQUIPMENT USED DURING TEST **8**

7 TEST RESULTS **9**

7.1 E.U.T. TEST CONDITIONS 9
7.2 ANTENNA REQUIREMENT 10

8 CONDUCTION EMISSIONS MEASUREMENT **11**

8.1 APPLIED PROCEDURES / LIMIT 11
8.2 TEST PROCEDURE 11
8.3 TEST SETUP 11
8.4 TEST RESULTS 12

9 RADIATED EMISSIONS **14**

10 BANDWIDTH TEST **20**

11 PHOTOGRAPHS **22**

11.1 RADIATED EMISSION (30MHZ-1GHZ) 22
11.2 CONDUCTION EMISSIONS 22
11.3 PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS 23

3 Test Summary

TEST	TEST REQUIREMENT	TEST METHOD	RESULT
Conduction Emissions	FCC PART 15 C: 15.207	ANSI C 63.10: Clasue 6.2	PASS
Radiated Emission	FCC PART 15 C: 15.209 (a)	ANSI C 63.10: Clasue 6.4, 6.5	PASS
Antenna Requirement	FCC PART 15 C: 15.203	FCC PART 15 C: 15.203	PASS
occupied bandwidth(99%)	FCC PART 2.1049	FCC PART 2.1049	PASS

Remark:
N/A: not applicable. Refer to the relative section for the details.
Tx: In this whole report Tx (or tx) means Transmitter.
Rx: In this whole report Rx (or rx) means Receiver.
RF: In this whole report RF means Radio Frequency.

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, the maximum value of the uncertainty as below:

No.	Item	Uncertainty
1	Conducted Emission Test	1.20dB
2	Radiated Emission Test	3.30dB
3	RF power,conducted	0.16dB
4	RF power density,conducted	0.24dB
5	Spurious emissions,conducted	0.21dB
6	All emissions,radiated(<1G)	4.68dB
7	All emissions,radiated(>1G)	4.89dB

4 Test Facility

All tests were performed at:
Dongguan Yaxu (AiT) Technology Limited
No.22, Jinqianling Third Street, Jitigang, Huangjiang,Dongguan, Guangdong, China
Tel.: +86.769.82020499 Fax.: +86.769.82020495
The FCC Registration No. of Dongguan Yaxu (AiT) Technology Limited is 248337.

4.1 Deviation from standard

None

4.2 Abnormalities from standard conditions

None

5 General Information

5.1 General Description of EUT

Manufacturer:	Shenzhen Zhong An Security Tech Co.,Ltd
Manufacturer Address:	601D, 6/F, Unit B, Productivity Building, No. 5 High-tech Middle 2nd Road, NanshanScience park, Shenzhen, Guangdong Province, China
EUT Name:	ESA
Model No.:	CG6
Derivative model No.:	CG7，CG8，CG9，CG10，CG11，CG12，CG13，CG14，CG15
Antenna Type:	integral Antenna
Frequency Range:	58KHz
Modulation type:	ASK
HW version:	V1.0.1A
SW version:	V1.0
Power Supply Range:	AC 120V 60Hz
Power Supply:	The same as above.
Power Cord:	1.5m , unshielding
Signal Cable:	N/A

5.2 Test Location

All tests were performed at:

Dongguan Yaxu (AiT) Technology Limited

No.22, Jinqianling Third Street, Jitigang, Huangjiang,Dongguan, Guangdong, China

Tel.: +86.769.82020499 Fax.: +86.769.82020495

5.3 Test Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	signal cable
1	PC power	Seventeam	N/A	ST-750PHS	N/A	N/A	N/A
2	Cell phone	VIZIO	N/A	XR6M	N/A	N/A	N/A

6 Equipment Used during Test

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	SIGNAL Analyzer	R&S	FSV40	101470	2016.06.29	2017.06.28
2	EMI Measuring Receiver	R&S	ESR	101660	2016.06.29	2017.06.28
3	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2016.06.29	2017.06.28
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2016.06.29	2017.06.28
5	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2016.06.29	2017.06.28
6	Loop Antenna	ETS	6512	00165355	2016.12.24	2017.12.23
7	Radiated Cable 1#（30MHz-1GHz）	FUJIKURA	5D-2W	01	2016.12.24	2017.12.23
8	Radiated Cable 2#（1GHz -25GHz）	FUJIKURA	10D2W	02	2016.12.24	2017.12.23
9	Conducted Cable 1#(9KHz-30MHz)	FUJIKURA	1D-2W	01	2016.12.24	2017.12.23
10.	EMI Test Receiver	R&S	ESCI	100124	2016.06.29	2017.06.28
11.	LISN	Kyoritsu	KNW-242	8-837-4	2016.06.29	2017.06.28
12.	LISN	Kyoritsu	KNW-407	8-1789-3	2016.06.29	2017.06.28
13.	SMA Antenna connector	Dosin	Dosin-SMA	N/A	N/A	N/A
Note: The SMA antenna connector is soldered on the PCB board in order to perform conducted tests and this SMA antenna connector is listed in the equipment list.						

7 Test Results

7.1 E.U.T. test conditions

Test Voltage: AC 120V/60Hz

Requirements: **15.31(e)**: For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Operating Environment:
Temperature: 22-25.0 °C
Humidity: 48-55% RH
Atmospheric Pressure: 1001-1010 mbar

Test frequencies and frequency range: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

Description of test mode

Mode 1	TX mode

Remark:
1. Pretest low/middle/high frequency(Controlled by the test software), find the worst case is the middle frequency is 136.0kHz and record max. load data in this report

7.2 Antenna Requirement

Standard requirement

15.203 requirement:

For intentional device. According to 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.

EUT Antenna

The antenna is an integral Antenna integrated and no consideration of replacement.

Test result: The unit does meet the FCC requirements.

8 Conduction Emissions Measurement

8.1 Applied procedures / Limit

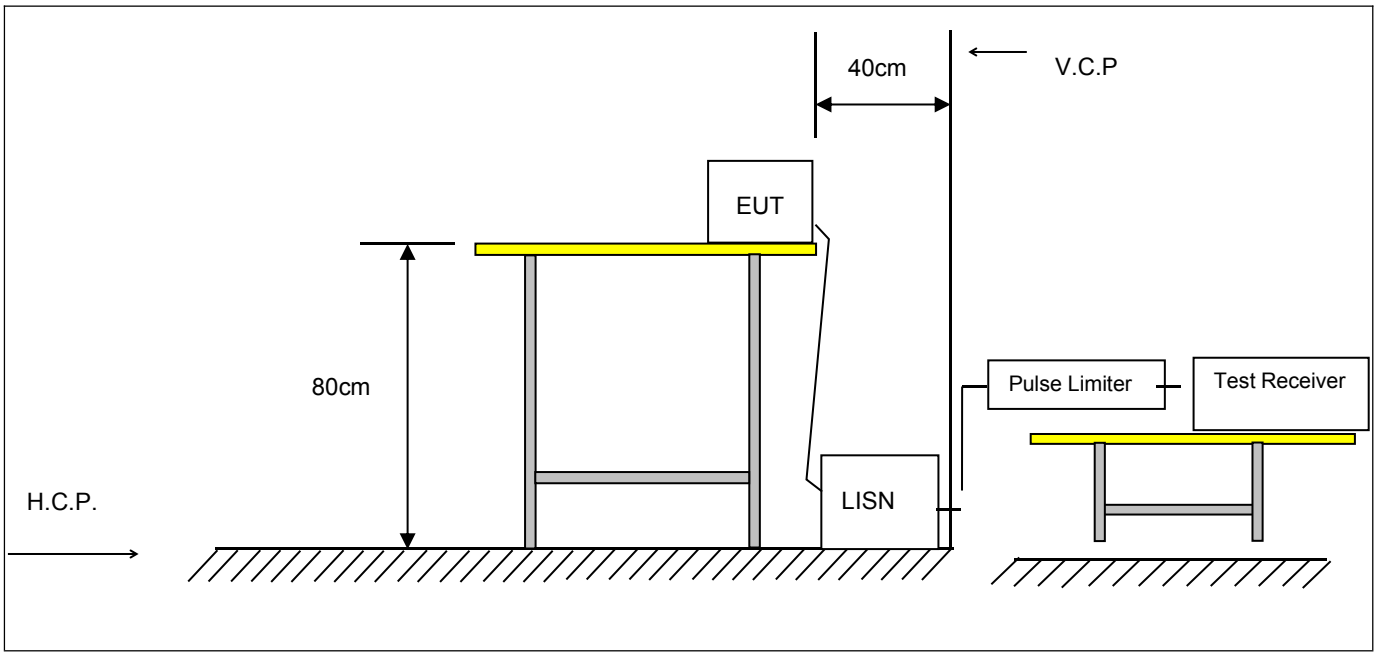
Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5 0.5-5 5-30	66 to 56 * 56 60	56 to 46 * 46 50

Note: Decreases with the logarithm of the frequency.

8.2 Test procedure

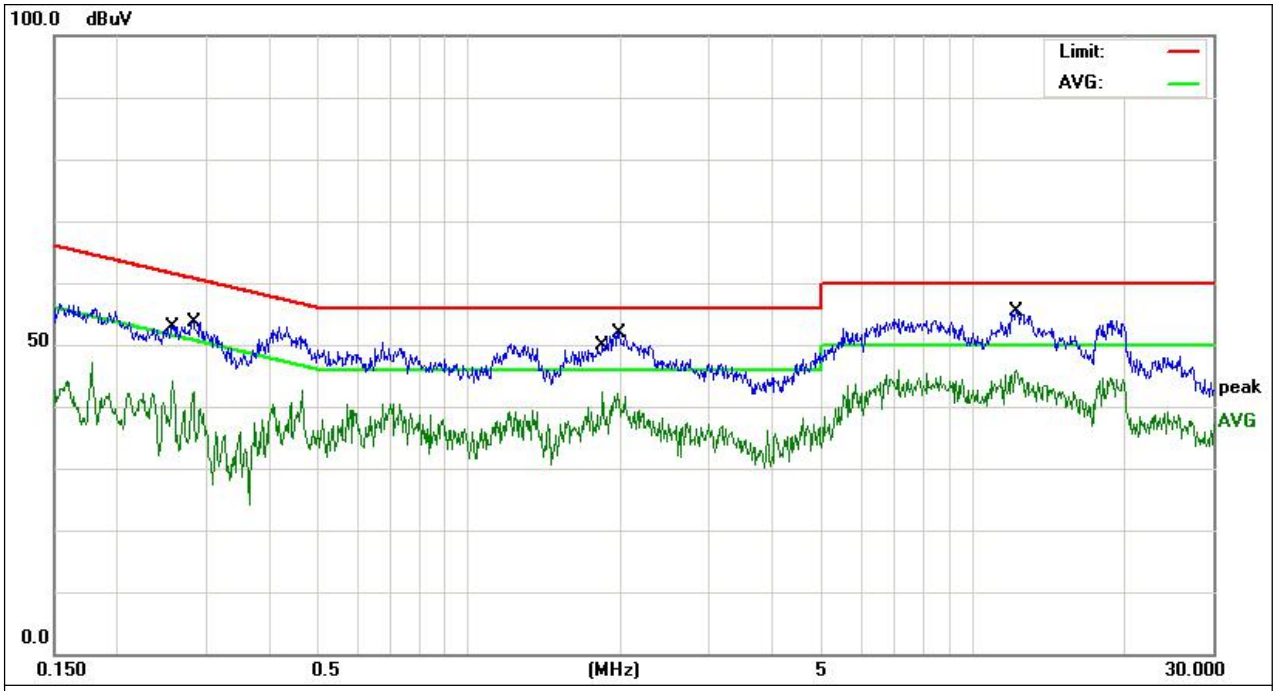
EUT was placed upon a wooden test table 0.8m above the horizontal metal reference plane and 0.4m from the vertical ground plane, and it was connected to an AMN. The closest distance between the boundary of the EUT and the surface of the AMN is 0.8m. All peripherals were connected to another AMN, and placed at a distance of 10cm from each other. A spectrum and receiver was connected to the RF output port of the AMN. Both average and quasi-peak value were detected.

8.3 Test setup



8.4 Test results

EUT：	ESA	Model Name. ：	CG6
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Test Date :	2017-06-23
Test Mode：	Mode 1	Phase :	L
Test Voltage ：	AC 120V/60Hz		



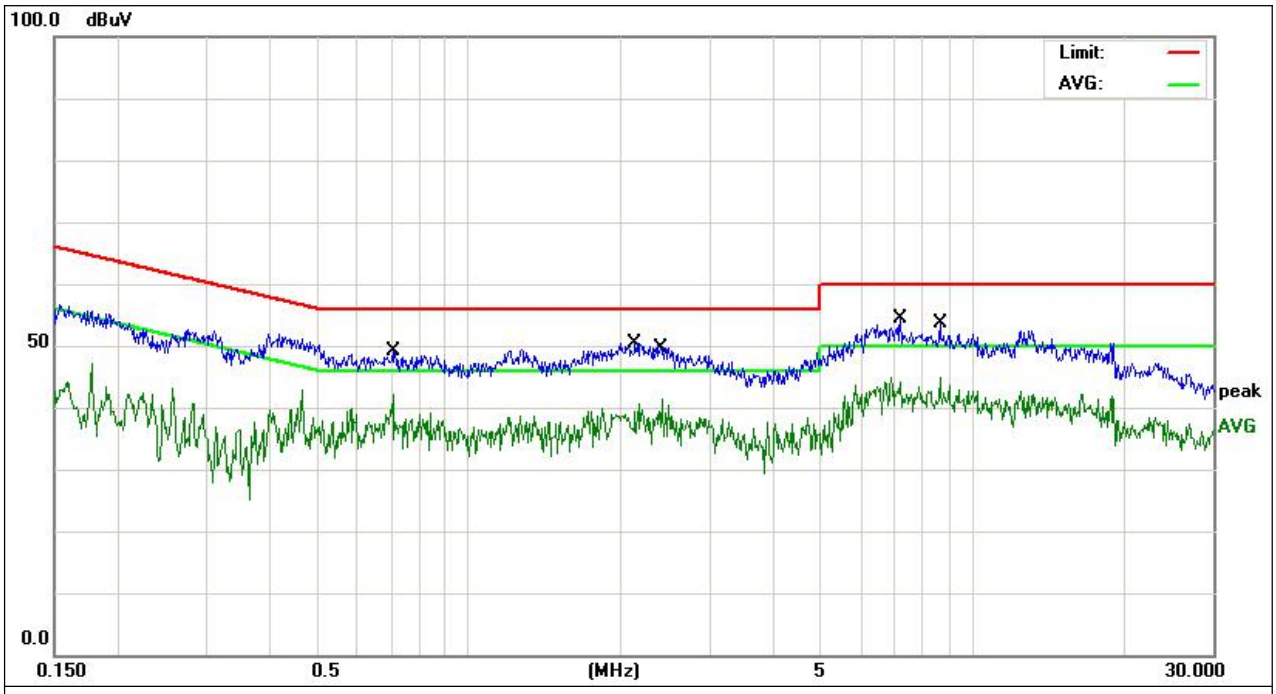
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2580	42.34	1.84	44.18	51.49	-7.31	AVG
2		0.2832	51.97	1.68	53.65	60.72	-7.07	QP
3	*	1.8460	41.42	0.87	42.29	46.00	-3.71	AVG
4		1.9739	51.13	0.87	52.00	56.00	-4.00	QP
5		12.2418	45.16	10.34	55.50	60.00	-4.50	QP
6		12.2418	35.51	10.34	45.85	50.00	-4.15	AVG

Remark:

1. All readings are Quasi-Peak and Average values.

2. Factor = LISN factor + Cable Loss + Pulse limiter.

EUT：	ESA	Model Name. ：	CG6
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Test Date :	2017-06-23
Test Mode：	Mode 1	Phase :	N
Test Voltage ：	AC 120V/60Hz		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.7056	48.26	0.89	49.15	56.00	-6.85	QP
2	*	0.7056	41.32	0.89	42.21	46.00	-3.79	AVG
3		2.1339	49.62	0.88	50.50	56.00	-5.50	QP
4		2.4140	40.52	0.89	41.41	46.00	-4.59	AVG
5		7.1977	44.33	10.17	54.50	60.00	-5.50	QP
6		8.6019	34.63	10.19	44.82	50.00	-5.18	AVG

Remark:

1. All readings are Quasi-Peak and Average values.

2. Factor = LISN factor + Cable Loss + Pulse limiter.

9 Radiated Emissions

Test Requirement: FCC Part 15 C

Test Method: ANSI C63.10: Clause 6.4, 6.5 and 6.6

Measurement Distance: 3 m (Semi-Anechoic Chamber)

Test Status: Test in transmitting mode.

Requirements:

the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

15.227(a):The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

15.227(b) :The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

Out of band emissions shall not exceed:

Frequency range(MHz)	**Quasi-peak limits** dB (μV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960	54
At transitional frequencies the lower limit applies.	

Test Procedure:

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna. The center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specied distance from the EUT.During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30 MHz to 1 GHz emissions:

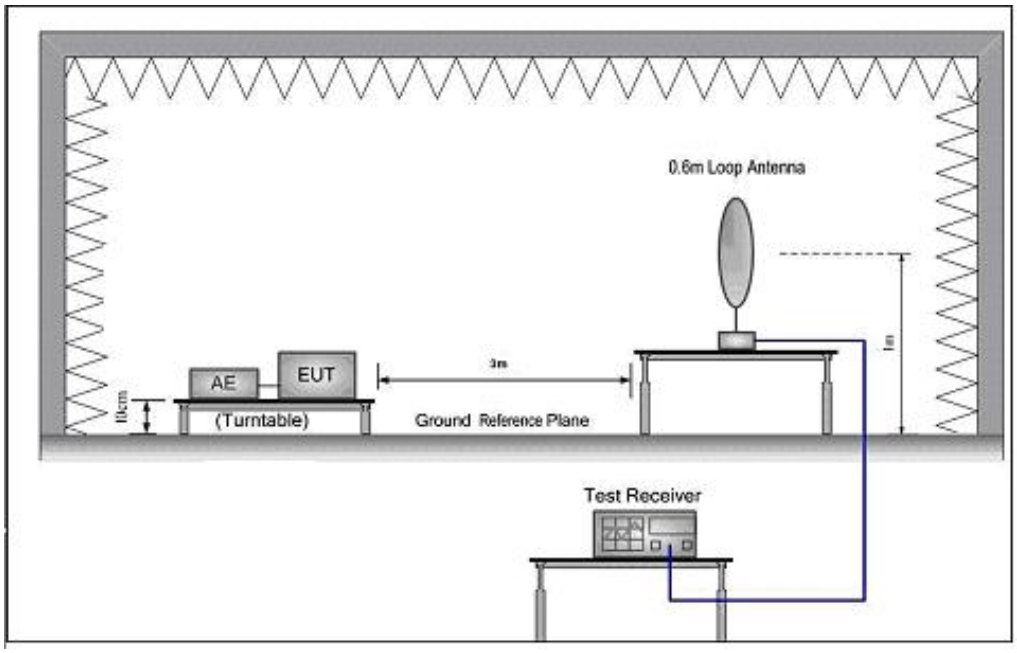
For testing perfomed with the bi-log type antenna. The measurement is performed with the EUT rotated 360º, the antenna height scaned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

Detector:

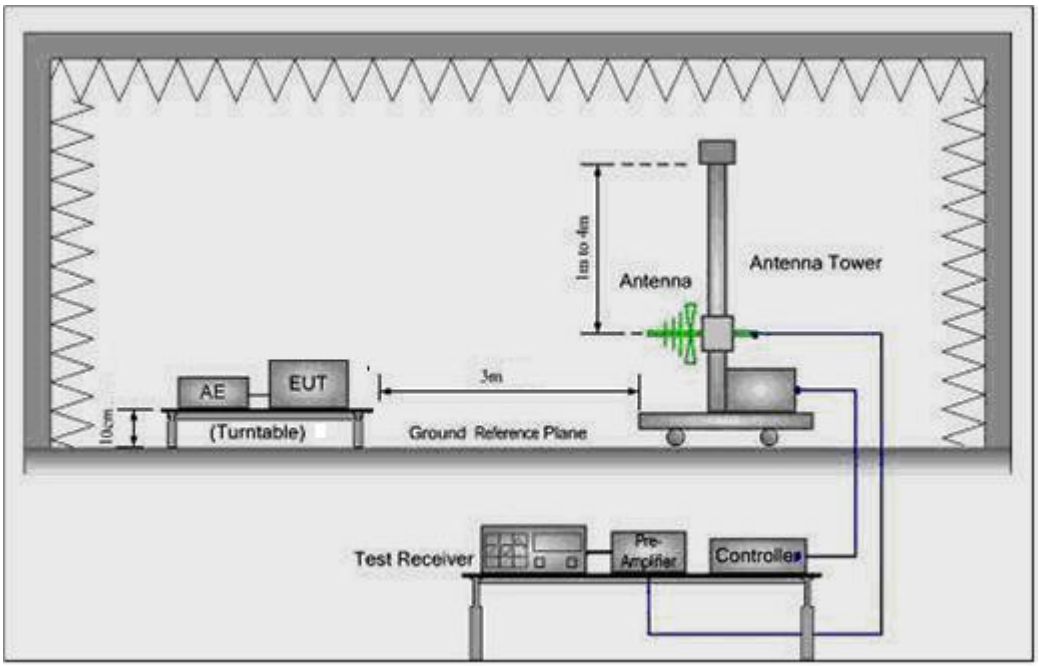
Test Receiver test setup	Detector	
	Peak	Average
RBW	120 kHz for f < 1 GHz	120 kHz for f < 1 GHz
VBW	≥ RBW	≥ RBW
Sweep	auto	auto
Detector function	peak	AV
Trace	max hold	max hold

Test Configuration:

1) 9 kHz to 30 MHz emissions:



2) 30 MHz to 1 GHz emissions:



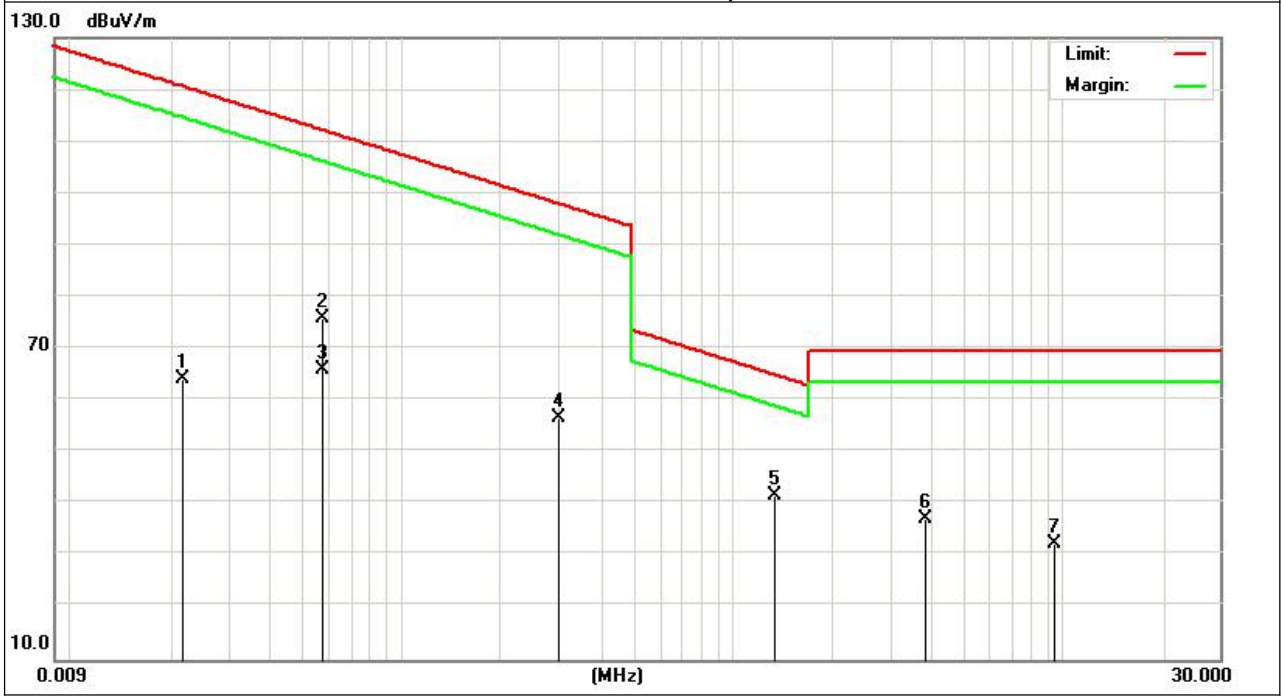
9 kHz~30 MHz Field Strength of Unwanted Emissions Measurement

EUT：	ESA	Model Name ：	CG6
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2017-06-23
Test Mode ：	Mode 1	Polarization :	Horizontal
Test Power ：	AC 120V/60Hz		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
0.0580	**49.74**	**25.96**	**75.70**	**112.22**	**-36.52**	**Peak**
0.0580	**39.85**	**25.96**	**65.81**	**112.20**	**-46.41**	**Average**
0.0217	32.08	32.02	64.10	120.71	-56.61	Quasi-Peak
0.3004	50.41	6.29	56.70	98.02	-41.32	Quasi-Peak
1.3478	46.66	-4.86	41.80	65.01	-23.21	Quasi-Peak
3.8690	50.06	-12.86	37.20	69.50	-32.30	Quasi-Peak
9.4428	48.62	-16.22	32.40	69.50	-37.10	Quasi-Peak
0.0580	49.74	25.96	75.70	112.22	-36.52	Quasi-Peak

Remark:

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

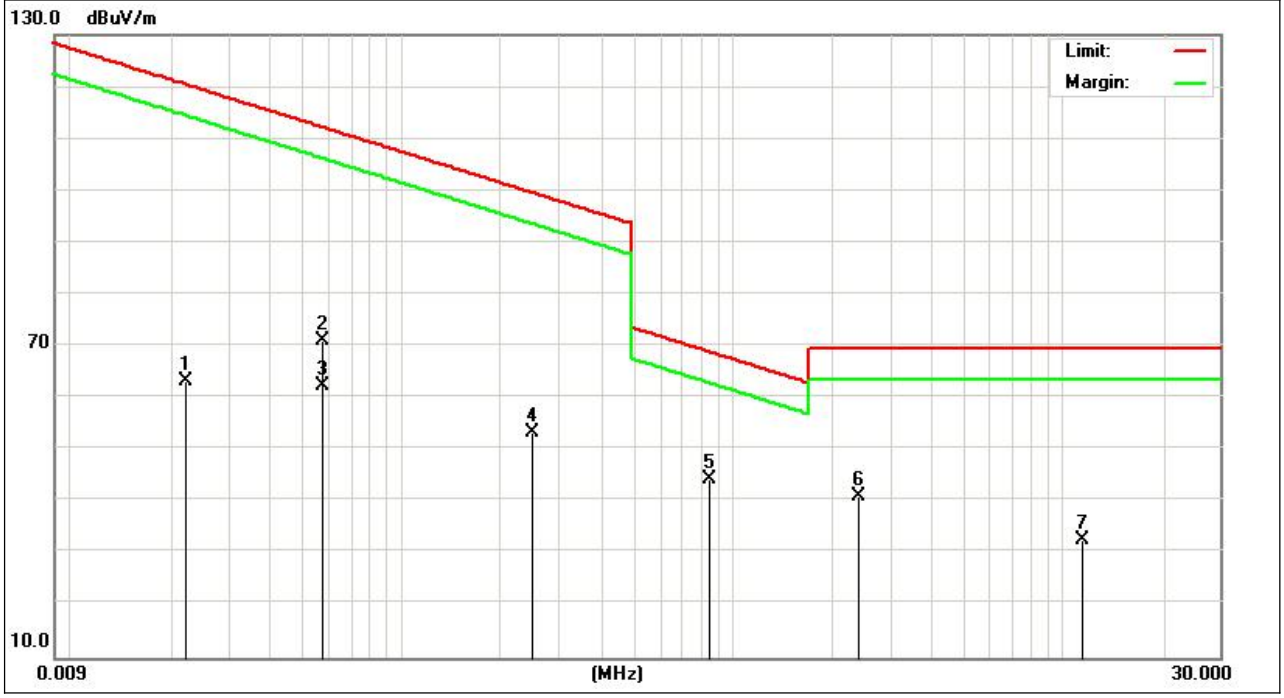


EUT：	ESA	Model Name ：	CG6
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2017-06-23
Test Mode ：	Mode 1	Polarization :	Vertical
Test Power ：	AC 120V/60Hz		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
0.0580	**45.14**	**25.96**	**71.10**	**112.22**	**-41.12**	**Peak**
0.0580	**36.53**	**25.96**	**62.49**	**112.20**	**-49.73**	**Average**
0.0218	31.23	31.97	63.20	120.67	-57.47	Quasi-Peak
0.2504	44.65	8.55	53.20	99.59	-46.39	Quasi-Peak
0.8627	46.22	-1.92	44.30	68.89	-24.59	Quasi-Peak
2.4267	50.48	-9.38	41.10	69.50	-28.40	Quasi-Peak
11.5659	48.96	-16.36	32.60	69.50	-36.90	Quasi-Peak
0.0580	45.14	25.96	71.10	112.22	-41.12	Quasi-Peak

Remark:

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



30 MHz~1 GHz Field Strength of Unwanted Emissions.Quasi-Peak Measurement

EUT：	ESA	Model Name ：	CG6
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2017-06-23
Test Mode ：	Mode 1	Polarization :	Horizontal
Test Power ：	AC 120V/60Hz		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
40.8445	51.08	-14.58	36.50	40.00	-3.50	Quasi-Peak
60.0690	53.06	-18.68	34.38	40.00	-5.62	Quasi-Peak
77.5927	55.24	-18.84	36.40	40.00	-3.60	Quasi-Peak
130.3788	50.61	-14.92	35.69	43.50	-7.81	Quasi-Peak
210.0482	57.06	-16.66	40.40	43.50	-3.10	Quasi-Peak
234.9909	56.55	-14.55	42.00	46.00	-4.00	Quasi-Peak

Remark:

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

EUT：	ESA	Model Name ：	CG6
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Date :	2017-06-23
Test Mode ：	Mode 1	Polarization :	Vertical
Test Power ：	AC 120V/60Hz		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
38.2120	52.08	-16.68	35.40	40.00	-4.60	Quasi-Peak
54.0711	55.55	-19.88	35.67	40.00	-4.33	Quasi-Peak
82.6482	55.54	-18.84	36.70	40.00	-3.30	Quasi-Peak
104.5361	53.81	-13.59	40.22	43.50	-3.28	Quasi-Peak
225.3079	57.67	-15.87	41.80	46.00	-4.20	Quasi-Peak
416.1791	49.19	-6.63	42.56	46.00	-3.44	Quasi-Peak

Remark:

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

Remark:

According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.

10 BANDWIDTH TEST

10.1.1 Applied procedures / Limit

FCC part 2.1049, only applicable to report.

10.1.2 Test procedure

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW $\geq$ 1% of the 20 dB bandwidth, VBW $\geq$ RBW, Sweep = auto, Detector function = peak
Trace = max hold

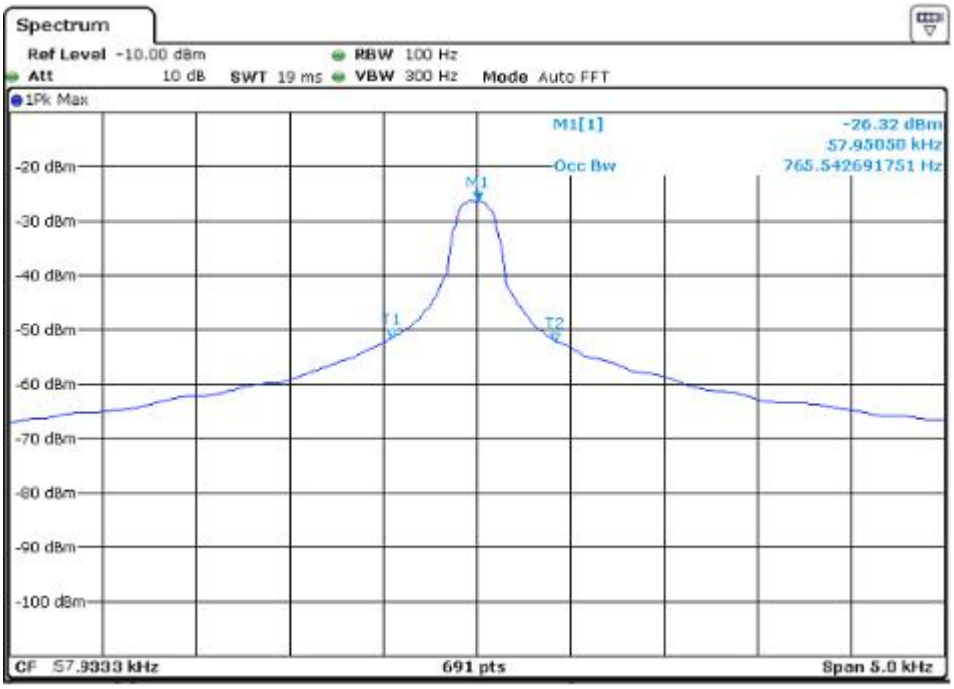
10.1.3 Deviation from standard

No deviation.

10.1.4 Test setup

10.1.5 Test results

Channel frenqucy (KHz)	Occupied bandwidth(99%) (Hz)
58	765.54

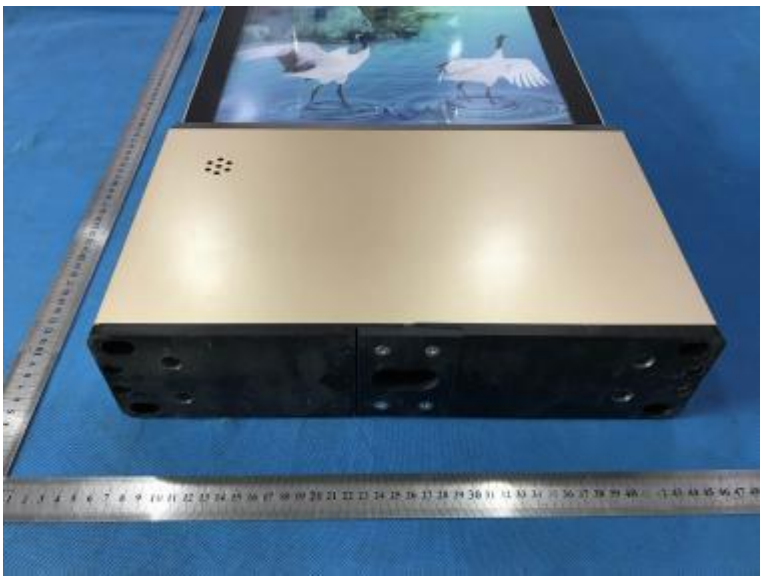


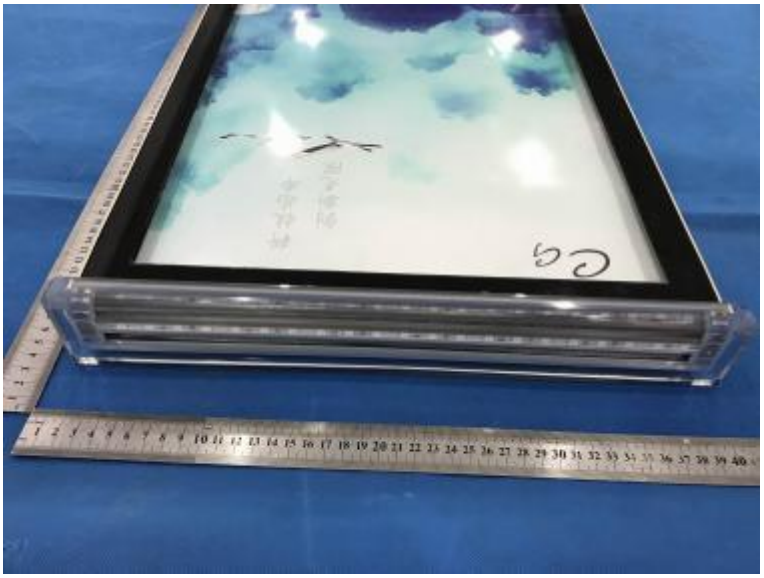
11 Photographs

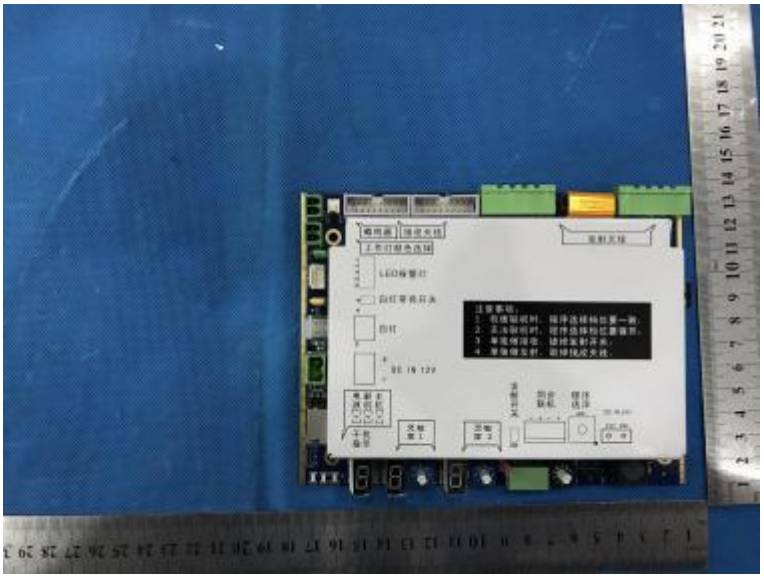
11.1 Radiated Emission (30MHz-1GHz)

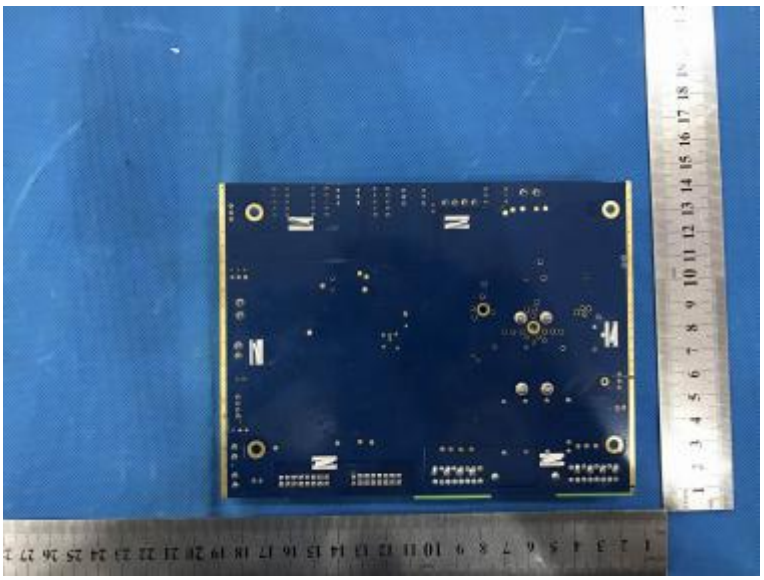
11.2 Conduction Emissions

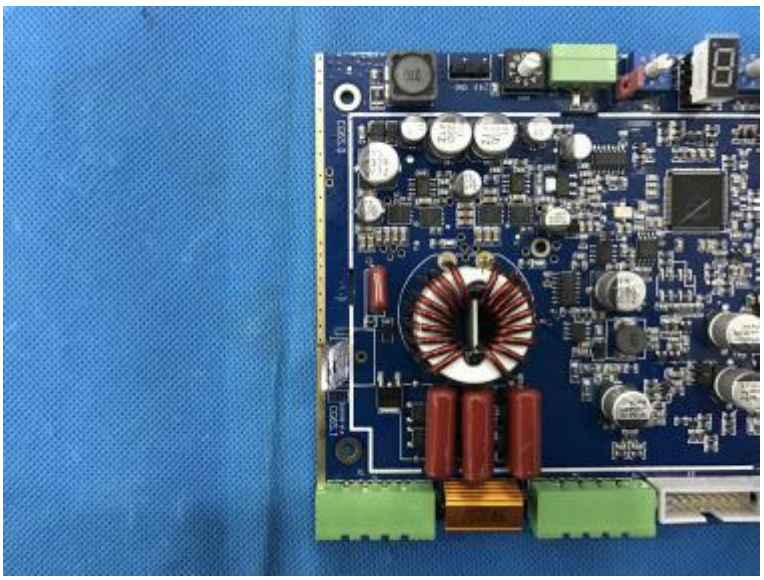
11.3 Photographs of EUT Constructional Details

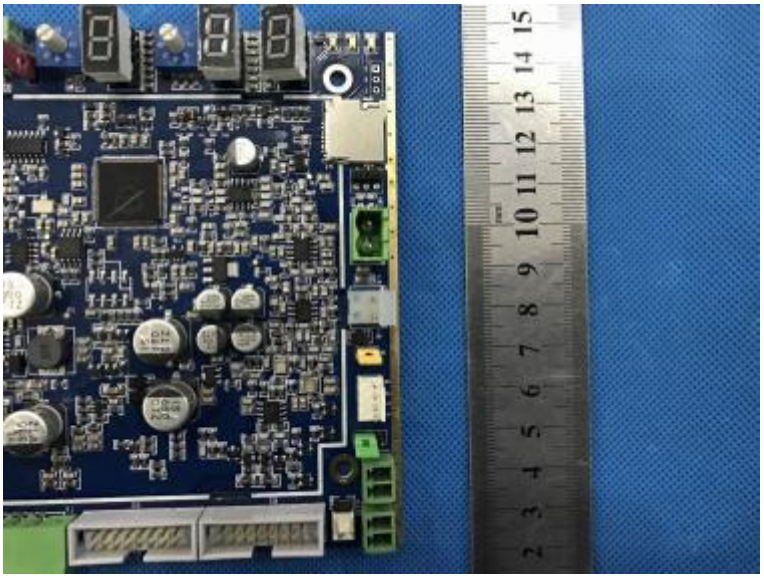


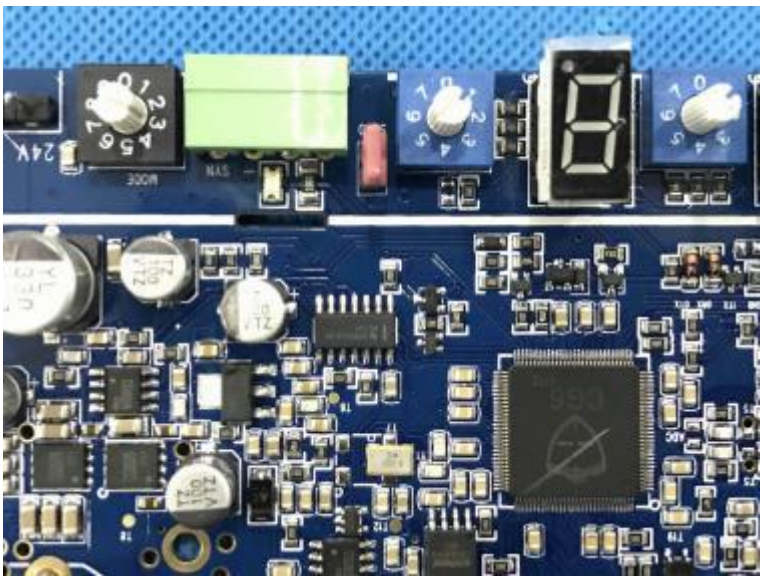


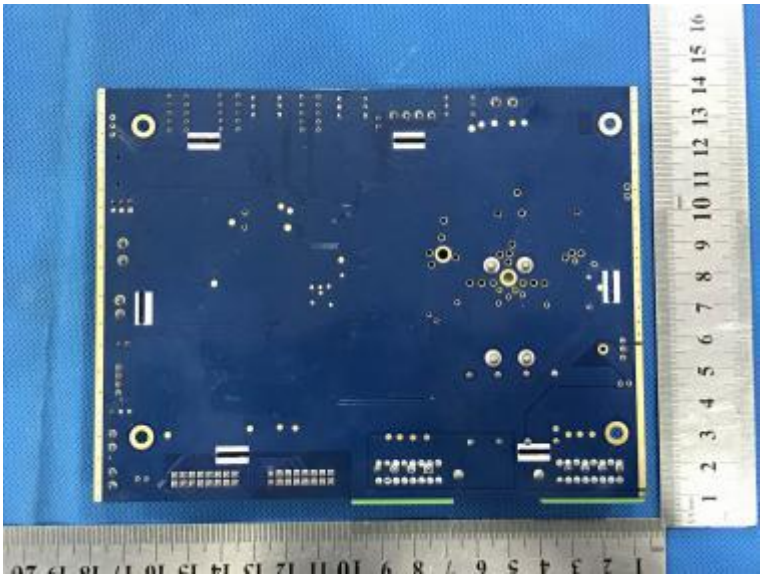












--The End of Report--