FCC TEST REPORT

For

Shenzhen Huaxiao technology co., Ltd.

Wind and Solar Hybrid Charge Controller

Model No.: SUSIE4

Prepared For	:	Shenzhen Huaxiao technology co., Ltd.
Address	:	620-623, Bldg.C, Qinghu Industrial Park, Qingxiang Road, Longhua District, Shenzhen.

Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
Address	:	1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102 Tel: (86) 755-26066544 Fax: (86) 755-26014772

Report Number	:	SZAWW171207002-02
Date of Test	:	Dec. 07,2017~Jan. 04, 2018
Date of Report	:	Jan. 04, 2018

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TEST REPORT

Applicant	:	Shenzhen Huaxiao technology co., Ltd.
Manufacturer	:	Shenzhen Huaxiao technology co., Ltd.
Product Name	:	Wind and Solar Hybrid Charge Controller
Model No.	:	SUSIE4
Trade Mark	:	N/A
Rating(s)	:	Battery Voltage: DC 12V/24V, wind Input: 1500W, Max voltage 200V Solar Input: 500W, Max voltage 60V Output: DC 12/24V, Load 500W

Test Standard(s)	**:**	**FCC Part15 Subpart C, Paragraph 15.249**
Test Method(s)	**:**	**ANSI C63.10: 2013**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : : Dec. 07~Jan. 04, 2018

Prepared by : : Winkey Wang

(Test Engineer /Winkey Wang)

Reviewer : : Tangcy. T.

(Project Manager / Tangcy. T)

Approved & Authorized Signer : : Tom Chen

(Manager / Tom Chen)

1. General Information

1.1. Client Information

Applicant	:	Shenzhen Huaxiao technology co., Ltd.
Address	:	620-623, Bldg.C, Qinghu Industrial Park, Qingxiang Road, Longhua District, Shenzhen.
Manufacturer	:	Shenzhen Huaxiao technology co., Ltd.
Address	:	620-623, Bldg.C, Qinghu Industrial Park, Qingxiang Road, Longhua District, Shenzhen.

1.2. Description of Device (EUT)

Product Name	:	Wind and Solar Hybrid Charge Controller	
Model No.	:	SUSIE4	
Trade Mark	:	N/A	
Test Power Supply	:	DC 24V from lead acid battery	
Product Description	:	Operation Frequency:	2405MHz~2480MHz
		Number of Channel:	16 Channels
		Modulation Type:	QPSK
		Antenna Type:	Columnar antenna
		Antenna Gain(Peak):	3 dBi
Remark: 1)For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2)This report is for Zigbee.			

1.3. Auxiliary Equipment Used During Test

N/A		

1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	CH01
Mode 2	CH08
Mode 3	CH16
Mode 4	Zigbee Mode

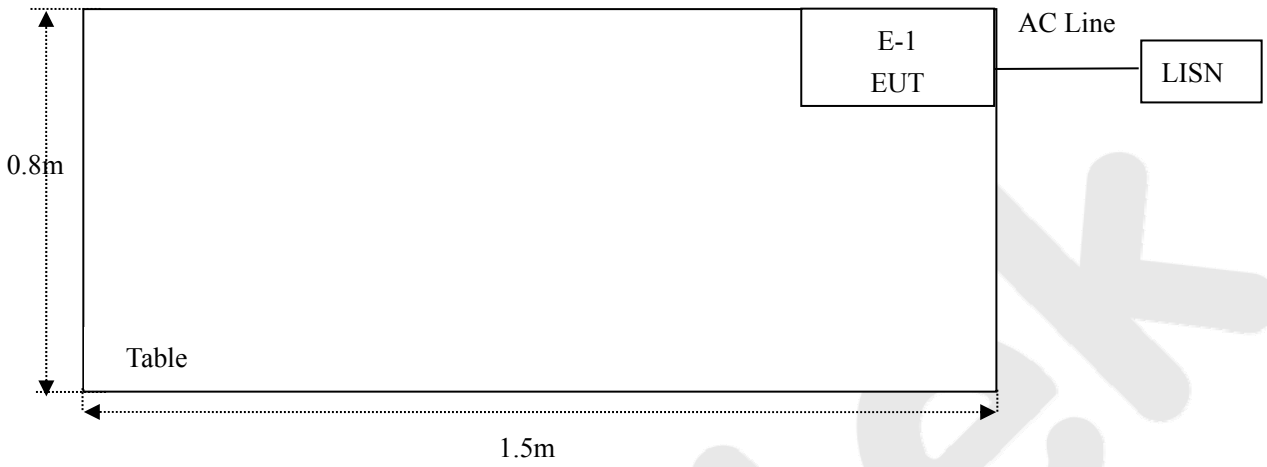
For Radiated Emission	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH08
Mode 3	CH16

1.5. List of Channels

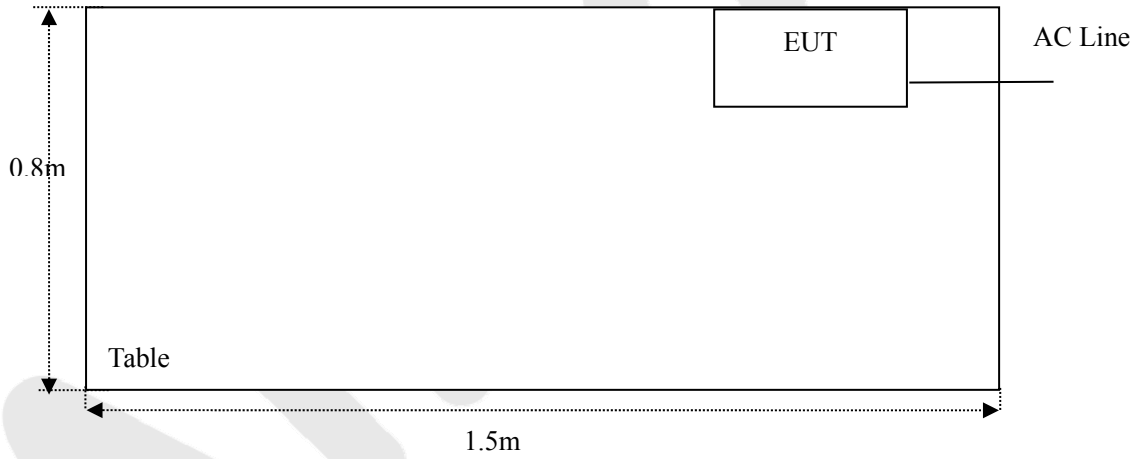
Channel	Frequency	Channel	Frequency
01	2405 MHz	09	2445 MHz
02	2410 MHz	10	2450 MHz
03	2415 MHz	11	2455 MHz
04	2420 MHz	12	2460 MHz
05	2425 MHz	13	2465 MHz
06	2430 MHz	14	2470 MHz
07	2435 MHz	15	2475 MHz
08	2440 MHz	16	2480 MHz

1.6. Description of Test Setup

CE



RE



1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	May 27, 2017	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	May 27, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	May 27, 2017	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	May 27, 2017	1 Year
5.	Spectrum Analysis	Agilent	N9038A	MY53227295	May 27, 2017	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	May 27, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	May 27, 2017	1 Year
8.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	May 31, 2017	1 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	May 31, 2017	1 Year
10.	Loop Antenna	Schwarzbeck	HFH2-Z2	100047	Apr. 03, 2018	1 Year
11.	Horn Antenna	Schewarzbeck	BBHA9170	9170-375	May 27, 2017	1 Year
12.	Pre-amplifier	SONOMA	310N	186860	May 27, 2017	1 Year
13.	Pre-amplifier	SKET Electronic	BK1G40G50 A	KD25352	May 27, 2017	1 Year
14.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
15.	Power Sensor	DAER	RPR3006W	15I00041SN045	May 27, 2017	1 Year
16.	Power Sensor	DAER	RPR3006W	15I00041SN046	May 27, 2017	1 Year
17.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	May 27, 2017	1 Year
18.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	May 27, 2017	1 Year
19.	Signal Generator	Agilent	E4421B	MY41000743	May 27, 2017	1 Year
20.	DC Power supply	IVYTECH	IV6003	1601D6030007	May 26, 2017	1 Year
21.	TEMP&HUMI PROGRAMMABLE CHAMBER	Sertep	ZJ-HWHS80 B	ZJ-17042804	Mar. 03, 2017	1 Year

1.8. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1 dB (Horizontal)
		Ur = 4.3 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4dB

1.9. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed 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. 184111, July 31, 2017.

ISED-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A-1, June 13, 2016.

Test Location

All Emissions tests were performed at

Shenzhen Anbotek Compliance Laboratory Limited. at 1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

2. Summary of Test Results

Standard Section	Test Item	Result
15.203	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.249	Spurious Emission	PASS
15.215(c)	20dB Bandwidth	PASS
15.249(c)	Band Edge	PASS
Remark: "N/A" is an abbreviation for Not Applicable.		

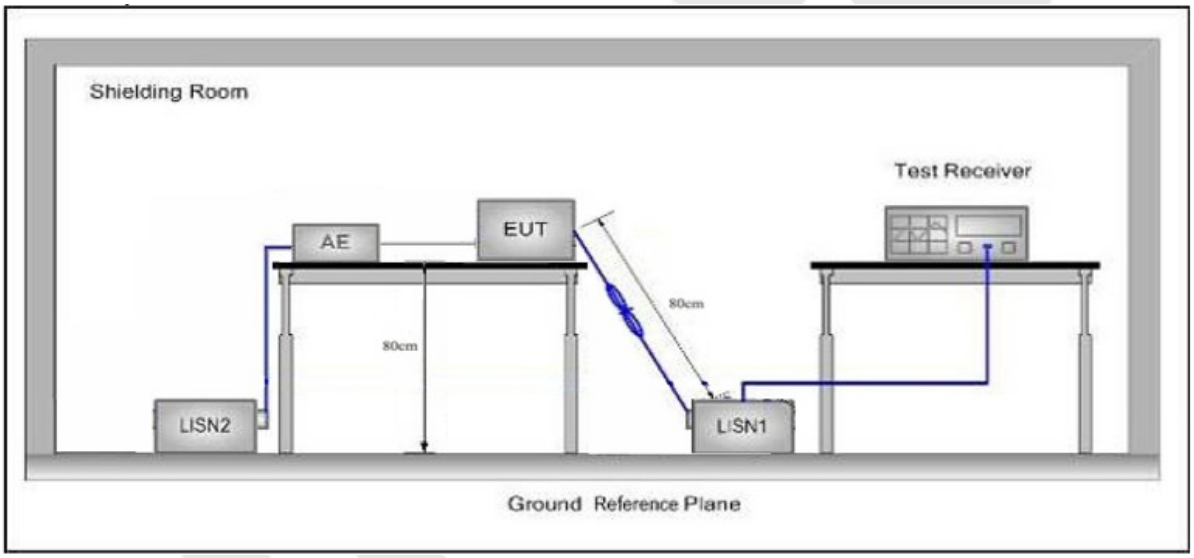
3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50

Remark: (1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequency.

3.2. Test Setup



3.3. Test Procedure

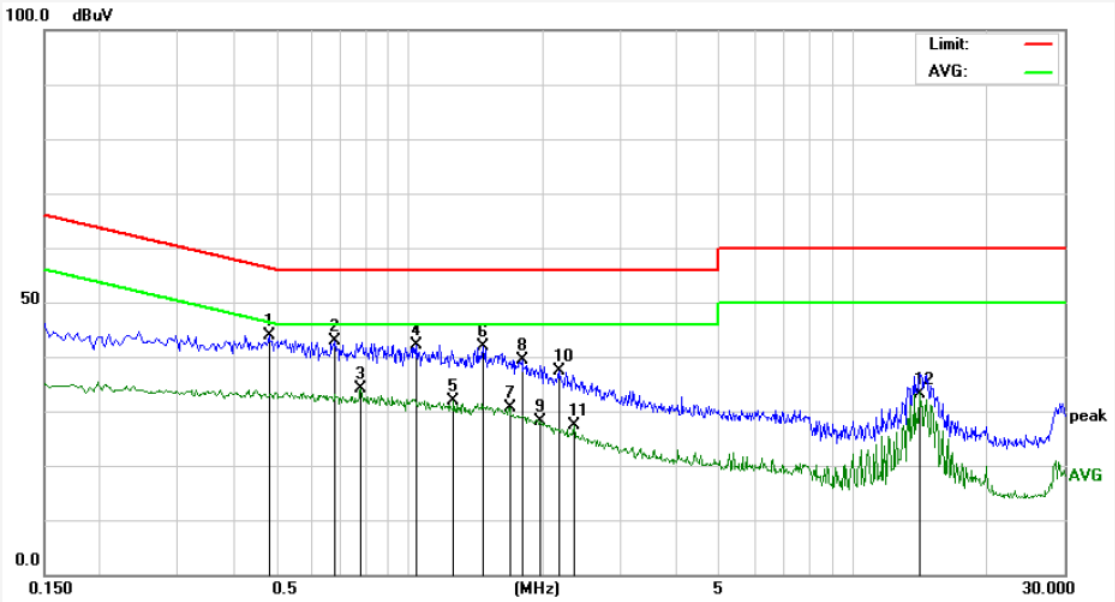
The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2013 on Conducted Emission Measurement.
The bandwidth of test receiver (ESCI) set at 9kHz.
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages

Conducted Emission Test Data

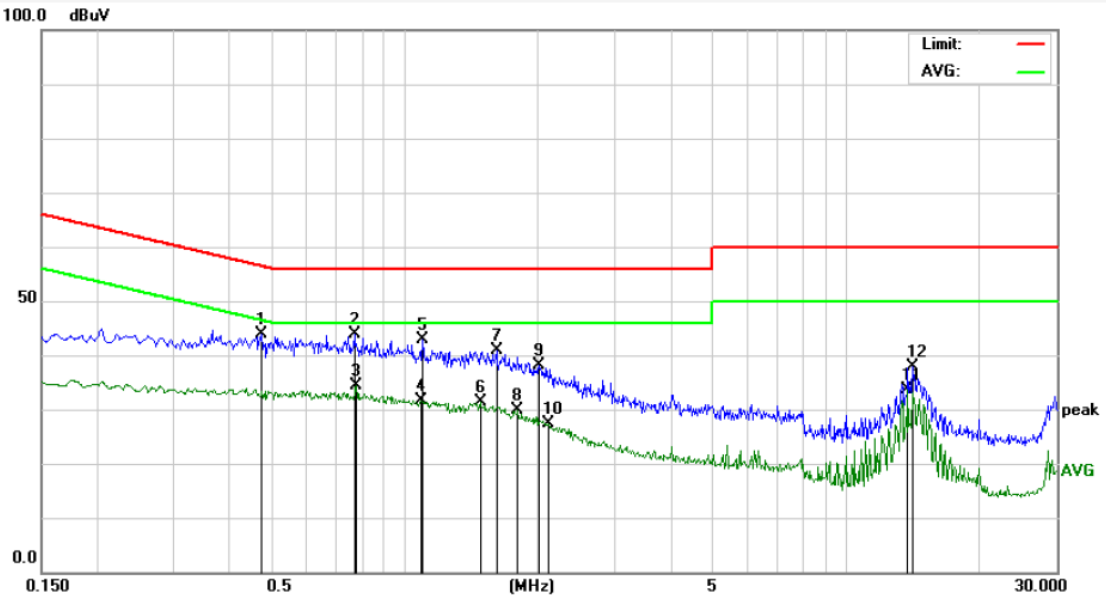
Test Site: 1# Shielded Room
Operating Condition: Mode 4
Test Specification: DC 24V
Comment: Live Line
Tem.:25℃ Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.4820	23.96	19.97	43.93	56.30	-12.37	QP	
2	0.6820	22.86	20.03	42.89	56.00	-13.11	QP	
3	0.7780	14.14	20.06	34.20	46.00	-11.80	AVG	
4	1.0420	22.09	20.12	42.21	56.00	-13.79	QP	
5	1.2579	11.66	20.13	31.79	46.00	-14.21	AVG	
6	1.4660	21.65	20.13	41.78	56.00	-14.22	QP	
7	1.6740	10.51	20.13	30.64	46.00	-15.36	AVG	
8	1.7940	19.28	20.14	39.42	56.00	-16.58	QP	
9	1.9780	7.99	20.14	28.13	46.00	-17.87	AVG	
10	2.1700	17.13	20.14	37.27	56.00	-18.73	QP	
11	2.3500	7.16	20.15	27.31	46.00	-18.69	AVG	
12	14.1820	12.98	20.27	33.25	50.00	-16.75	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Mode 4
Test Specification: DC 24V
Comment: Neutral Line
Tem.:25℃ Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.4740	24.03	19.97	44.00	56.44	-12.44	QP	
2	0.7700	23.77	20.06	43.83	56.00	-12.17	QP	
3	0.7780	14.39	20.06	34.45	46.00	-11.55	AVG	
4	1.0900	11.56	20.12	31.68	46.00	-14.32	AVG	
5	1.0980	22.73	20.12	42.85	56.00	-13.15	QP	
6	1.4819	11.29	20.13	31.42	46.00	-14.58	AVG	
7	1.6180	20.85	20.13	40.98	56.00	-15.02	QP	
8	1.8020	9.76	20.14	29.90	46.00	-16.10	AVG	
9	2.0180	18.02	20.14	38.16	56.00	-17.84	QP	
10	2.1140	7.20	20.14	27.34	46.00	-18.66	AVG	
11	13.8020	13.42	20.28	33.70	50.00	-16.30	AVG	
12	14.1820	17.60	20.27	37.87	60.00	-22.13	QP	

4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209 and 15.205				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3

Remark:

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Standard	FCC Part15 C Section 15.249					
Test Limit	Frequency (MHz)	Field Strength of fundamental ((millivolts /meter)	Field Strength of Harmonics (microvolts/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	2400~2483.5	50	-	114.0	Peak	3
	2400~2483.5	50	-	94.0	Average	3
	2400~2483.5	-	500	74.0	Peak	3
	2400~2483.5	-	500	54.0	Average	3

Remark:

(1) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

4.2. Test Setup

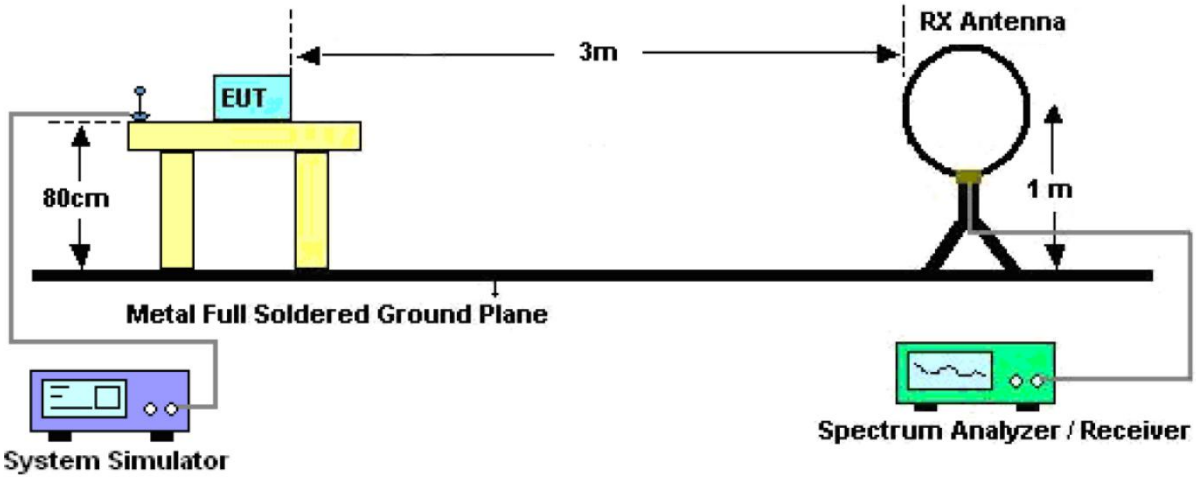


Figure 1. Below 30MHz

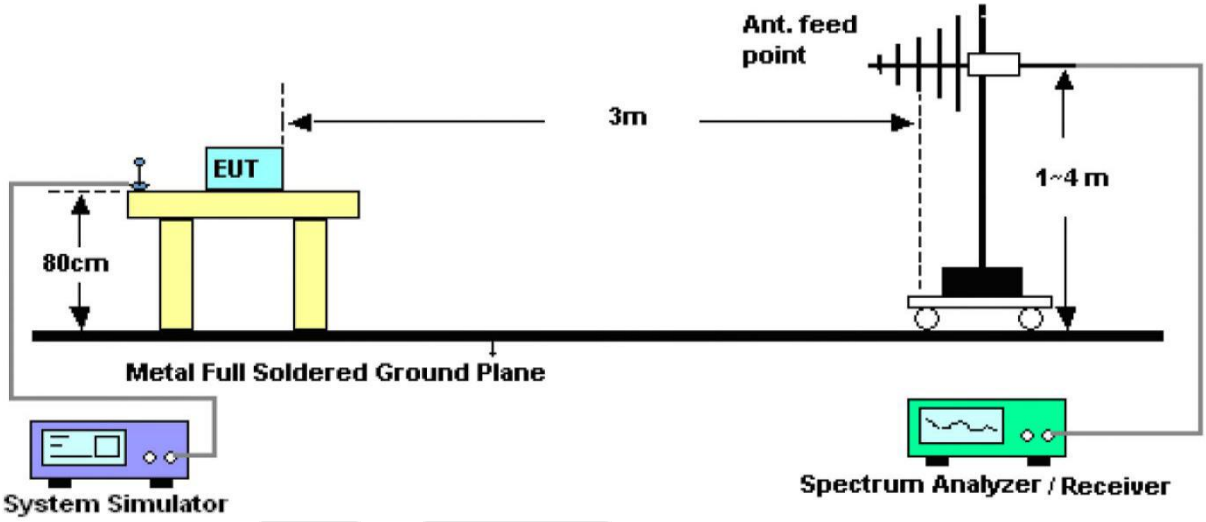


Figure 2. 30MHz to 1GHz

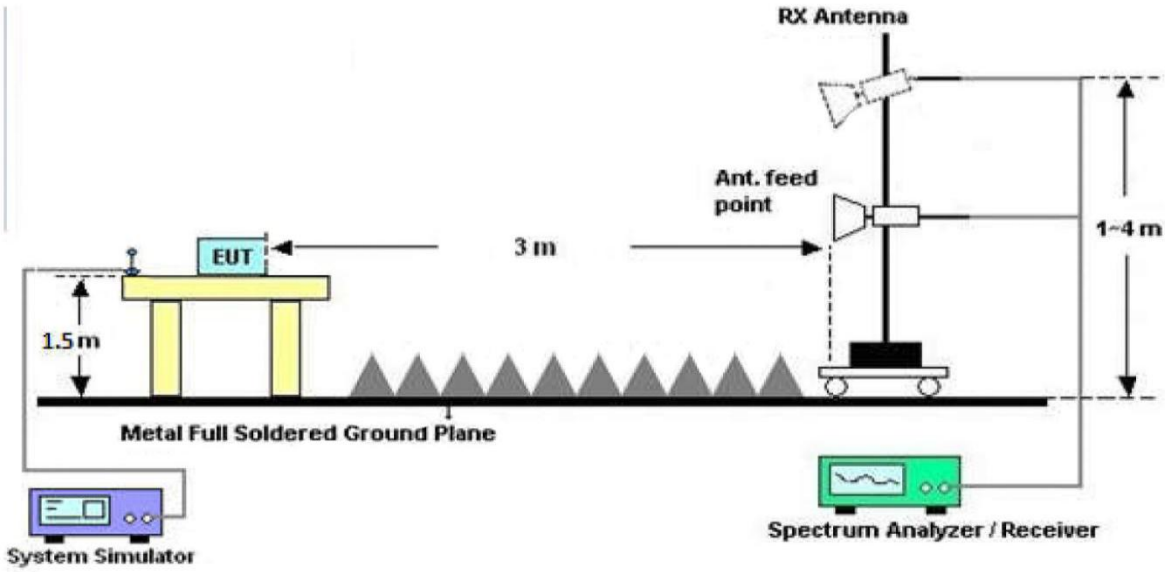


Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.
For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.
The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For 9kHz to 150kHz, Set the spectrum analyzer as:
RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:
RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:
RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.
.
For above 1GHz,Set the spectrum analyzer as:
RBW =1MHz, VBW =10Hz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

4.4. Test Data

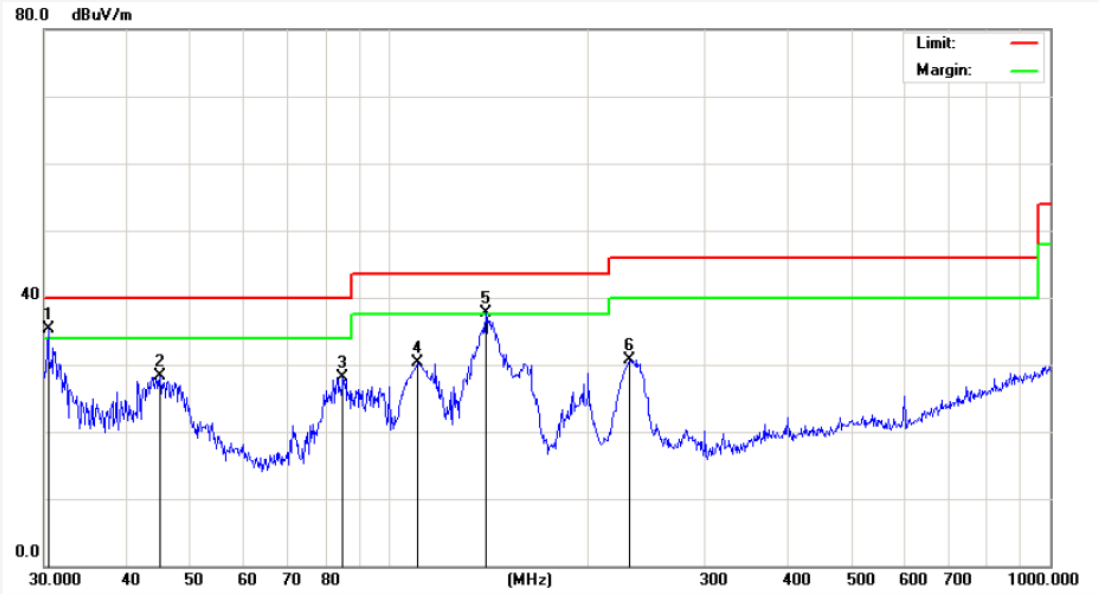
PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

The test results of 9kHz-30MHz and above 18000MHz are attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Results (30~1000MHz)

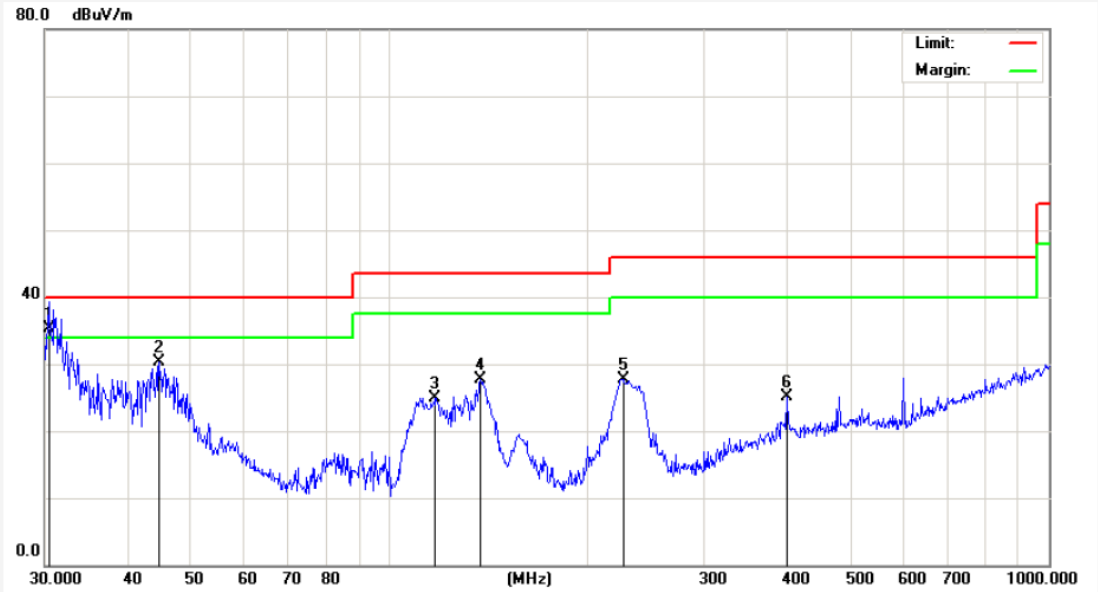
Job No.:	SZAWW171207002-02	Temp.(℃)/Hum.(%RH):	24.3℃/55%RH
Standard:	FCC PART 15C	Power Source:	AC120V/60Hz
Test Mode:	Zigbee Mode	Polarization:	Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.4238	53.65	-18.42	35.23	40.00	-4.77	QP	300	13	
2	44.9006	43.66	-15.31	28.35	40.00	-11.65	QP	300	66	
3	84.9995	49.12	-20.95	28.17	40.00	-11.83	QP	300	124	
4	110.1816	50.99	-20.63	30.36	43.50	-13.14	QP	300	252	
5	139.8508	59.12	-21.48	37.64	43.50	-5.86	QP	300	263	
6	230.9068	49.08	-18.32	30.76	46.00	-15.24	QP	300	320	

Test Results (30~1000MHz)

Job No.:	SZAWW171207002-02	Temp.(℃)/Hum.(%RH):	24.3℃/55%RH
Standard:	FCC PART 15C	Power Source:	AC120V/60HZ
Test Mode:	Zigbee Mode	Polarization:	Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.4238	52.68	-17.42	35.26	40.00	-4.74	QP	300	15	
2	44.7433	44.65	-14.28	30.37	40.00	-9.63	QP	300	66	
3	117.3603	40.12	-15.14	24.98	43.50	-18.52	QP	300	112	
4	137.4202	45.10	-17.31	27.79	43.50	-15.71	QP	300	142	
5	226.0994	41.73	-14.06	27.67	46.00	-18.33	QP	300	210	
6	400.4318	36.98	-11.86	25.12	46.00	-20.88	QP	300	253	

Test Results (Above 1000MHz)

Horizontal
CH Low (2405MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2405.000	2.17	31.21	35.30	83.11	81.19	114	-32.81	Peak
2405.000	2.17	31.21	35.30	78.63	76.71	94	-17.29	AV
4810.240	2.56	34.01	34.71	42.36	44.22	74	-29.78	Peak
4810.240	2.56	34.01	34.71	31.02	32.88	54	-21.12	AV
7215.510	2.98	36.16	35.15	40.36	44.35	74	-29.65	Peak
7215.510	2.98	36.16	35.15	30.13	34.12	54	-19.88	AV
9620.000	---	---	---	---	---	---	---	---
12035.00	---	---	---	---	---	---	---	---
14440.00	---	---	---	---	---	---	---	---
16845.00 ---	---	---	---	---	---	---	---	---

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Vertical
CH Low (2405MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2405.000	2.17	31.21	35.30	85.35	83.43	114	-30.57	Peak
2405.000	2.17	31.21	35.30	80.68	78.76	94	-15.24	AV
4810.240	2.56	34.01	34.71	43.31	45.17	74	-28.83	Peak
4810.240	2.56	34.01	34.71	32.08	33.94	54	-20.06	AV
7215.510	2.98	36.16	35.15	40.36	44.35	74	-29.65	Peak
7215.510	2.98	36.16	35.15	30.19	34.18	54	-19.82	AV
9620.000	---	---	---	---	---	---	---	---
12035.00	---	---	---	---	---	---	---	---
14440.00	---	---	---	---	---	---	---	---
16845.00 ---	---	---	---	---	---	---	---	---

Test Results (Above 1000MHz)

Horizontal

CH Middle (2440MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2440.000	2.19	31.22	34.60	83.97	82.78	114	-31.22	Peak
2440.000	2.19	31.22	34.60	79.41	78.22	94	-15.78	AV
4880.730	2.57	35.00	34.58	40.32	43.31	74	-30.69	Peak
4880.730	2.57	35.00	34.58	31.54	34.53	54	-19.47	AV
7320.270	3.00	36.17	35.14	39.24	43.27	74	-30.73	Peak
7320.270	3.00	36.17	35.14	30.05	34.08	54	-19.92	AV
9760.000	---	---	---	---	---	---	---	---
12200.00	---	---	---	---	---	---	---	---
14640.00	---	---	---	---	---	---	---	---
17080.00	---	---	---	---	---	---	---	---

Vertical

CH Middle (2440MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2440.000	2.19	31.22	34.60	84.67	83.48	114	-30.52	Peak
2440.000	2.19	31.22	34.60	79.81	78.62	94	-15.38	AV
4880.390	2.57	35.00	34.58	40.64	43.63	74	-30.37	Peak
4880.390	2.57	35.00	34.58	31.13	34.12	54	-19.88	AV
7320.660	3.00	36.17	35.14	39.29	43.32	74	-30.68	Peak
7320.660	3.00	36.17	35.14	30.25	34.28	54	-19.72	AV
9760.000	---	---	---	---	---	---	---	---
12200.00	---	---	---	---	---	---	---	---
14640.00	---	---	---	---	---	---	---	---
17080.00	---	---	---	---	---	---	---	---

Test Results (Above 1000MHz)

Horizontal

CH High (2480MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2480.000	2.20	31.65	36.00	85.32	83.17	114	-30.83	Peak
2480.000	2.20	31.65	36.00	80.16	78.01	94	-15.99	AV
4960.430	2.58	35.06	34.79	40.69	43.54	74	-30.46	Peak
4960.430	2.58	35.06	34.79	32.34	35.19	54	-18.81	AV
7440.860	3.02	36.19	34.90	38.78	43.09	74	-30.91	Peak
7440.860	3.02	36.20	35.20	30.13	34.15	54	-19.85	AV
9920.00	---	---	---	---	---	---	---	---
12400.00	---	---	---	---	---	---	---	---
14480.00	---	---	---	---	---	---	---	---
17360.00	---	---	---	---	---	---	---	---

Vertical

CH High (2480MHz)

Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2480.000	2.20	31.65	36.00	86.57	84.42	114	-29.58	Peak
2480.000	2.20	31.65	36.00	80.64	78.49	94	-15.51	AV
4960.430	2.58	35.06	34.79	40.62	43.47	74	-30.53	Peak
4960.430	2.58	35.06	34.79	31.63	34.48	54	-19.52	AV
7440.860	3.02	36.19	34.90	37.68	41.99	74	-32.01	Peak
7440.860	3.02	36.20	35.20	29.13	33.15	54	-20.85	AV
9920.00	---	---	---	---	---	---	---	---
12400.00	---	---	---	---	---	---	---	---
14480.00	---	---	---	---	---	---	---	---
17360.00	---	---	---	---	---	---	---	---

NOTE: " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The results of different modulations are the same.

Radiated Band Edge:

Test Mode: CH01 Mode					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	55.21	29.15	3.41	34.01	53.76	74.00	-20.24	H
2400.00	60.10	29.16	3.43	34.01	58.68	74.00	-15.32	H
2390.00	54.20	29.15	3.41	34.01	52.75	74.00	-21.25	V
2400.00	63.12	29.16	3.43	34.01	61.70	74.00	-12.30	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	41.63	29.15	3.41	34.01	40.18	54.00	-13.82	H
2400.00	45.21	29.16	3.43	34.01	43.79	54.00	-10.21	H
2390.00	41.22	29.15	3.41	34.01	39.77	54.00	-14.23	V
2400.00	44.96	29.16	3.43	34.01	43.54	54.00	-10.46	V

Test Mode: CH16 Mode					Test channel: Highest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	51.22	29.28	3.53	34.03	50.00	74.00	-24.00	H
2500.00	47.26	29.30	3.56	34.03	46.09	74.00	-27.91	H
2483.50	50.23	29.28	3.53	34.03	49.01	74.00	-24.99	V
2500.00	48.22	29.30	3.56	34.03	47.05	74.00	-26.95	V
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	42.36	29.28	3.53	34.03	41.14	54.00	-12.86	H
2500.00	36.55	29.30	3.56	34.03	35.38	54.00	-18.62	H
2483.50	44.21	29.28	3.53	34.03	42.99	54.00	-11.01	V
2500.00	36.99	29.30	3.56	34.03	35.82	54.00	-18.18	V

Remark:

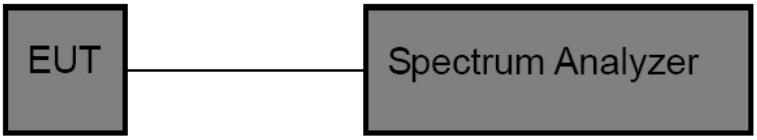
1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

5. 20dB Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.249

5.2. Test Setup



5.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:

RBW = 100kHz, VBW⩾3*RBW =300kHz,

Detector= Peak

Trace mode= Max hold.

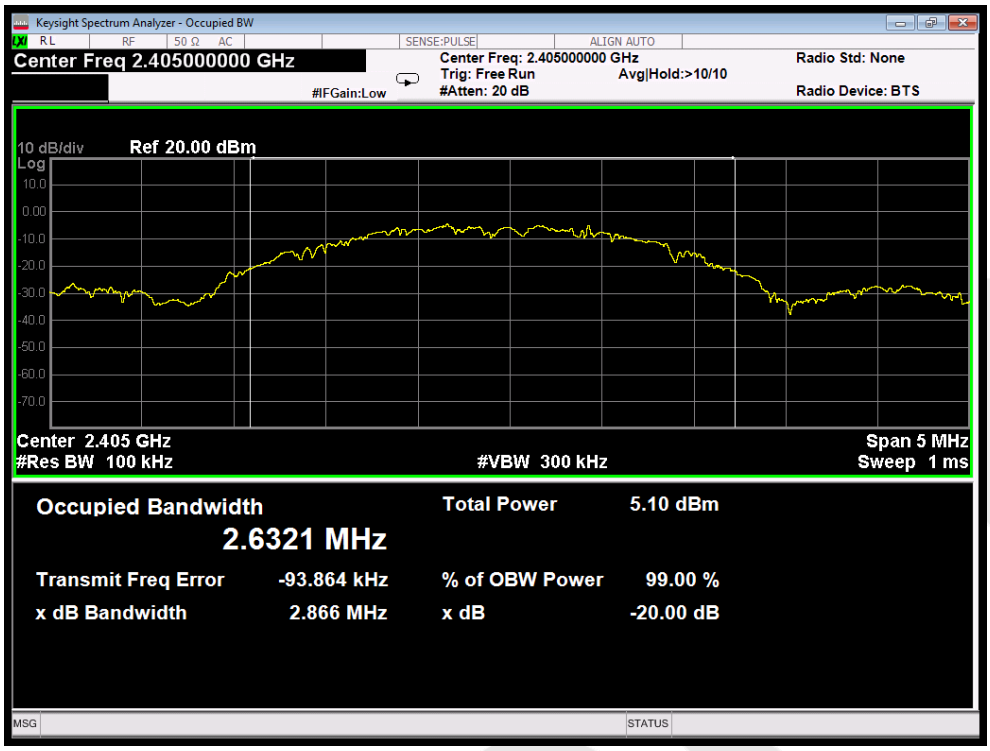
Sweep- auto couple.

4. Mark the peak frequency and –20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

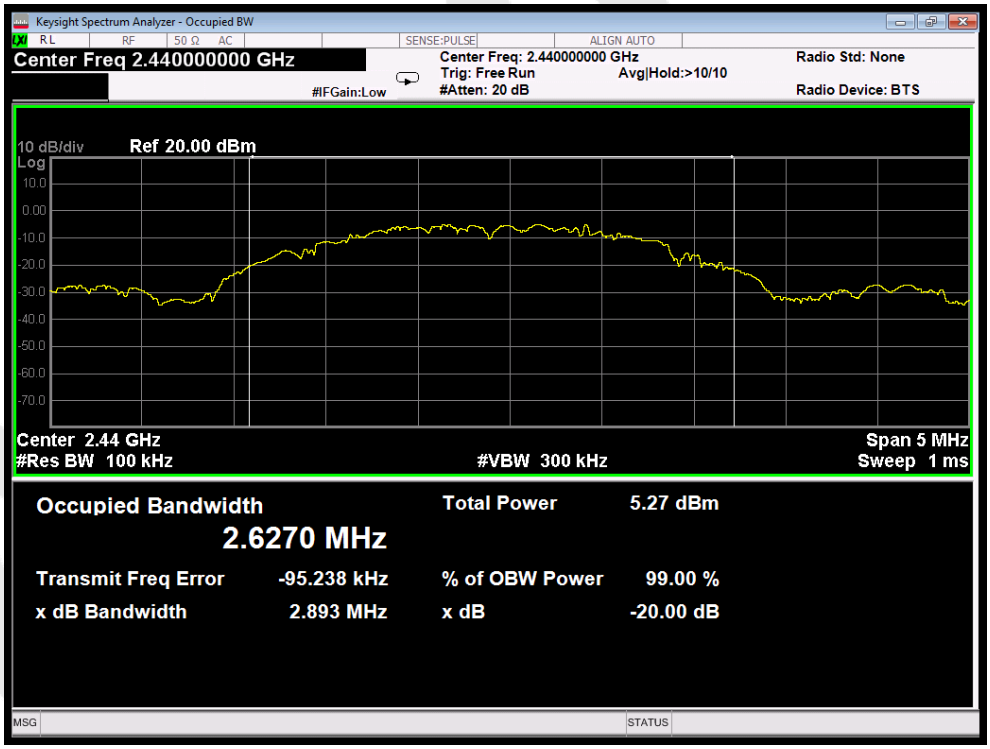
5.4. Test Data

Test Item	:	20dB Bandwidth	Test Mode	:	Mode 4
Test Voltage	:	DC 24V	Temperature	:	24℃
Test Result	:	PASS	Humidity	:	55%RH

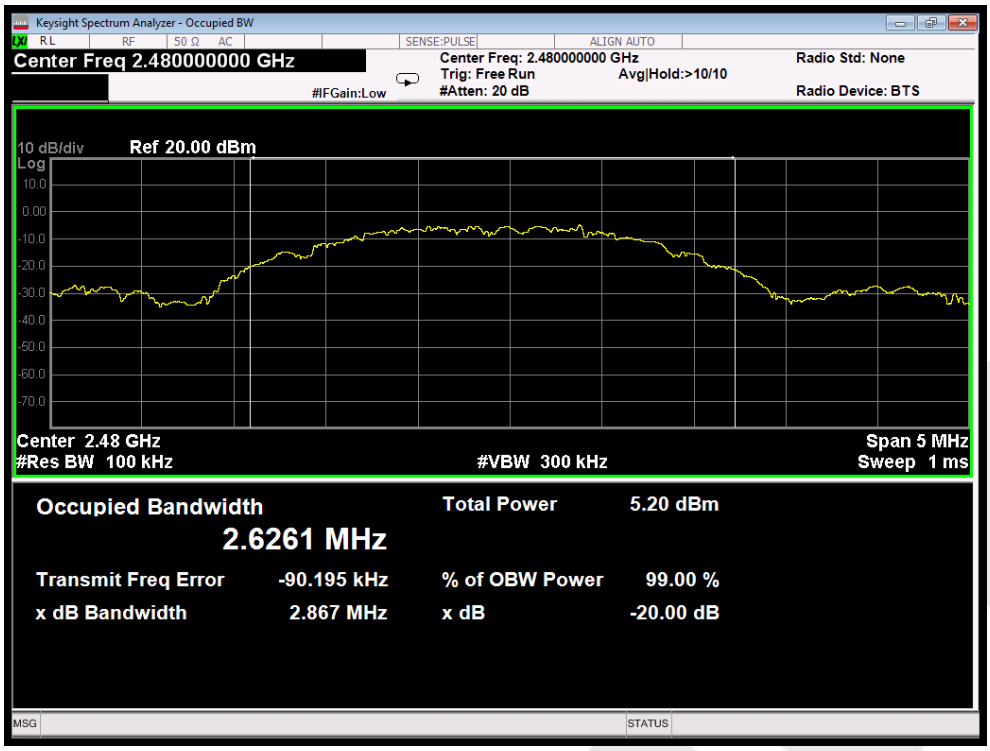
Frequency (MHz)	Bandwidth (kHz)	Result
2405MHZ	2866.0	PASS
2440MHZ	2893.0	PASS
2480MHZ	2867.0	PASS



Test Mode: Low



Test Mode: Middle



Test Mode: High

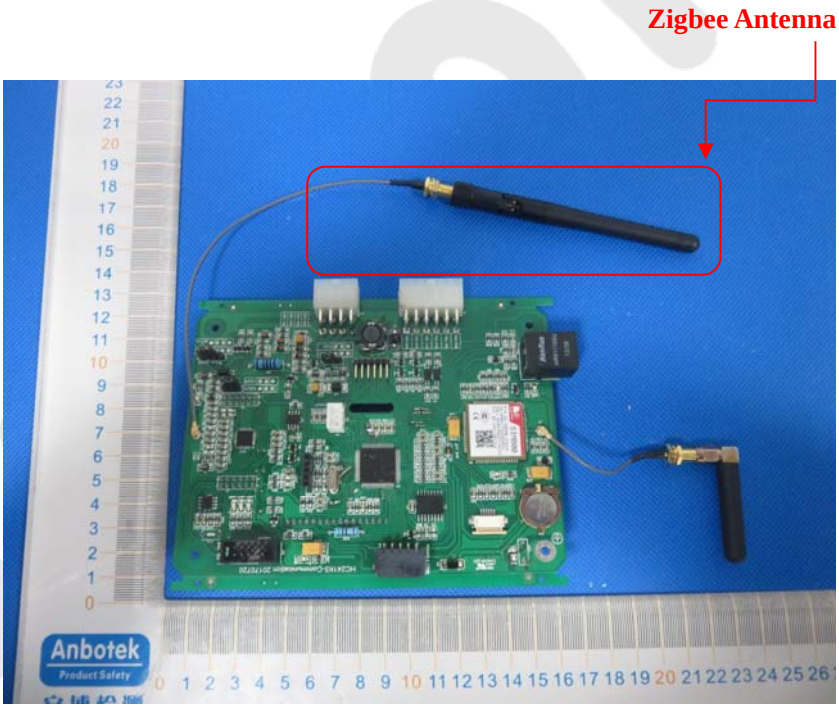
6. Antenna Requirement

6.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	1) 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.

6.2. Antenna Connected Construction

The antenna is a Columnar antenna which permanently attached, and the best case gain of the antenna is 3 dBi. It complies with the standard requirement.



APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Measurement

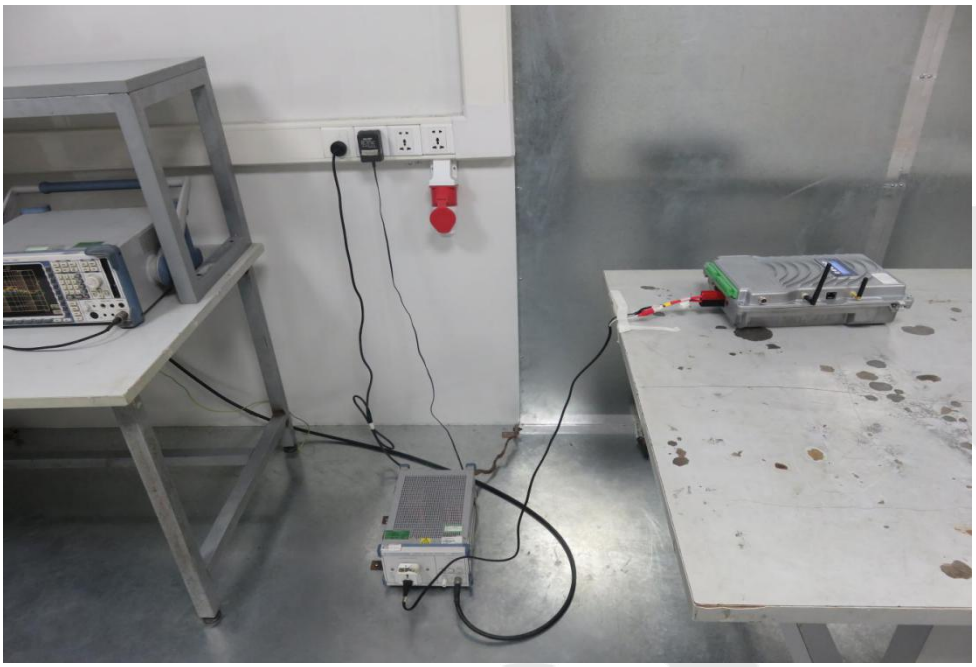
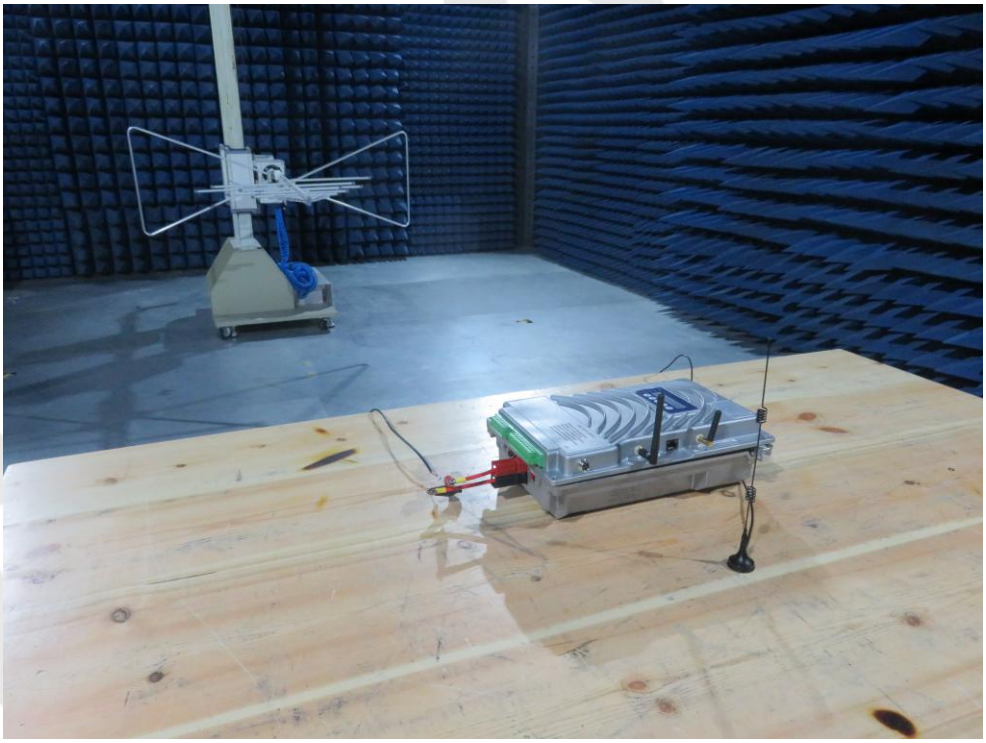
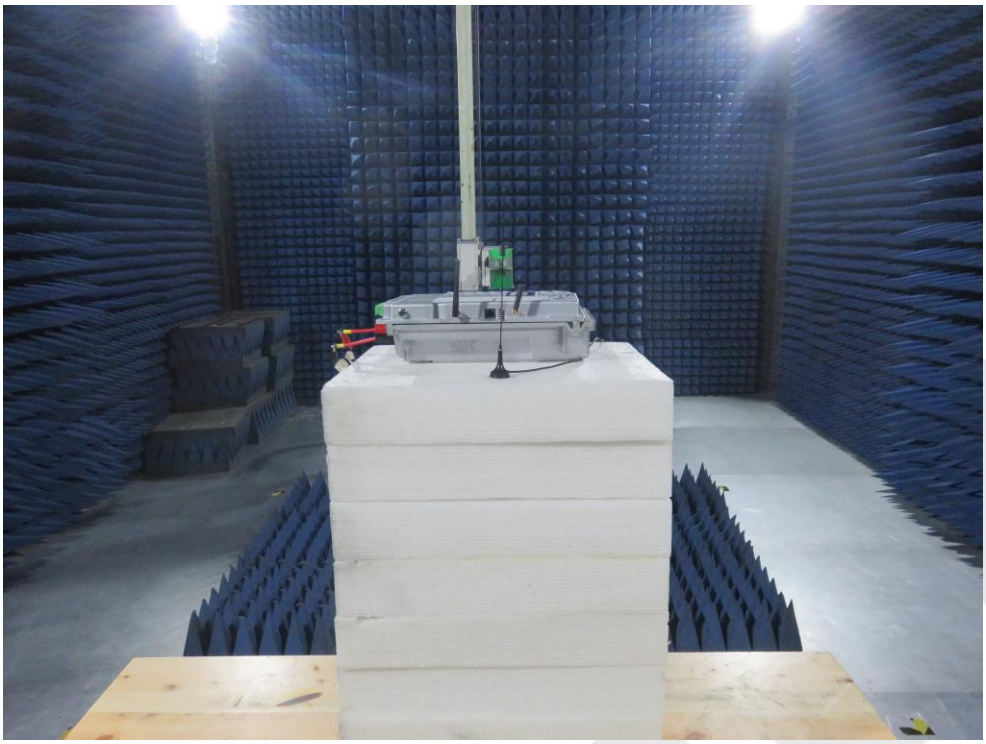
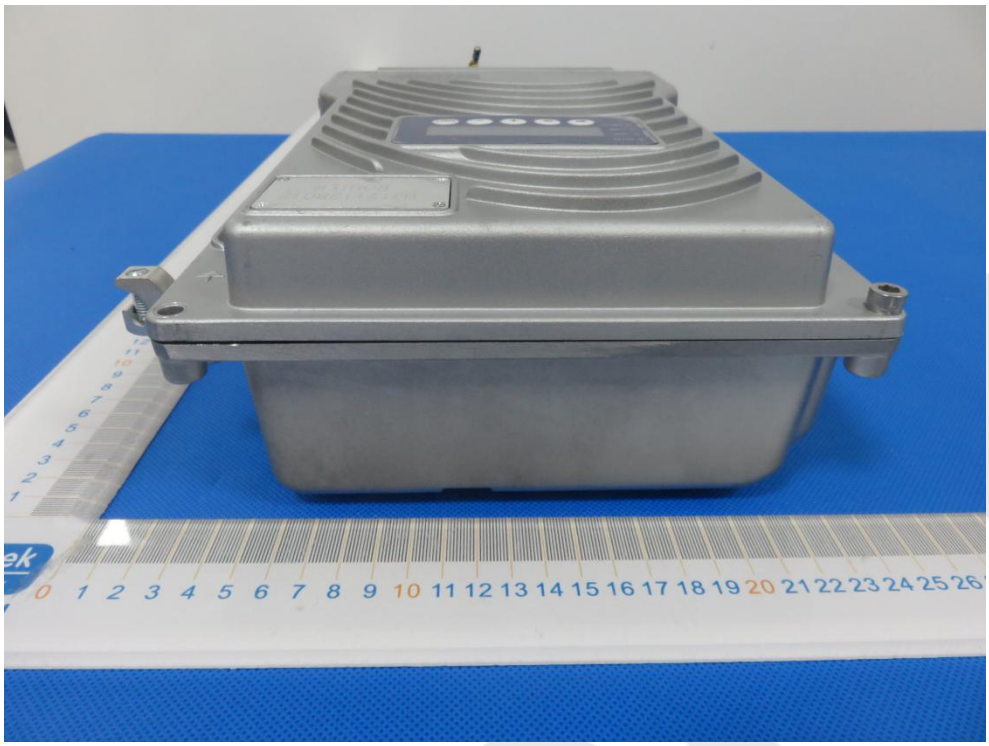


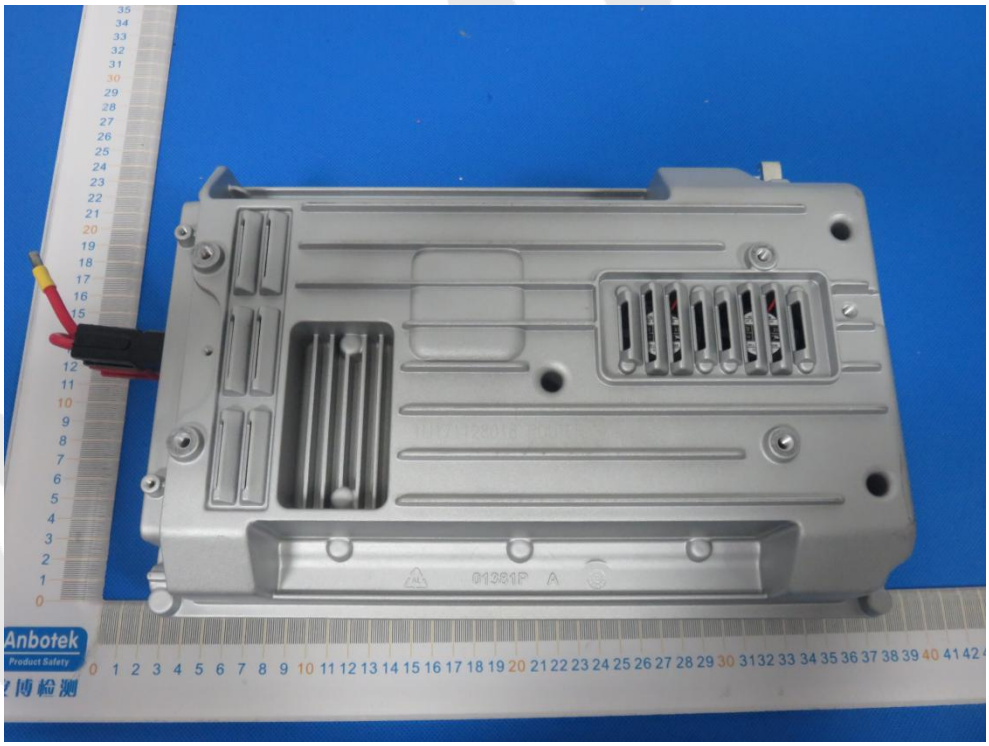
Photo of Radiation Emission Test



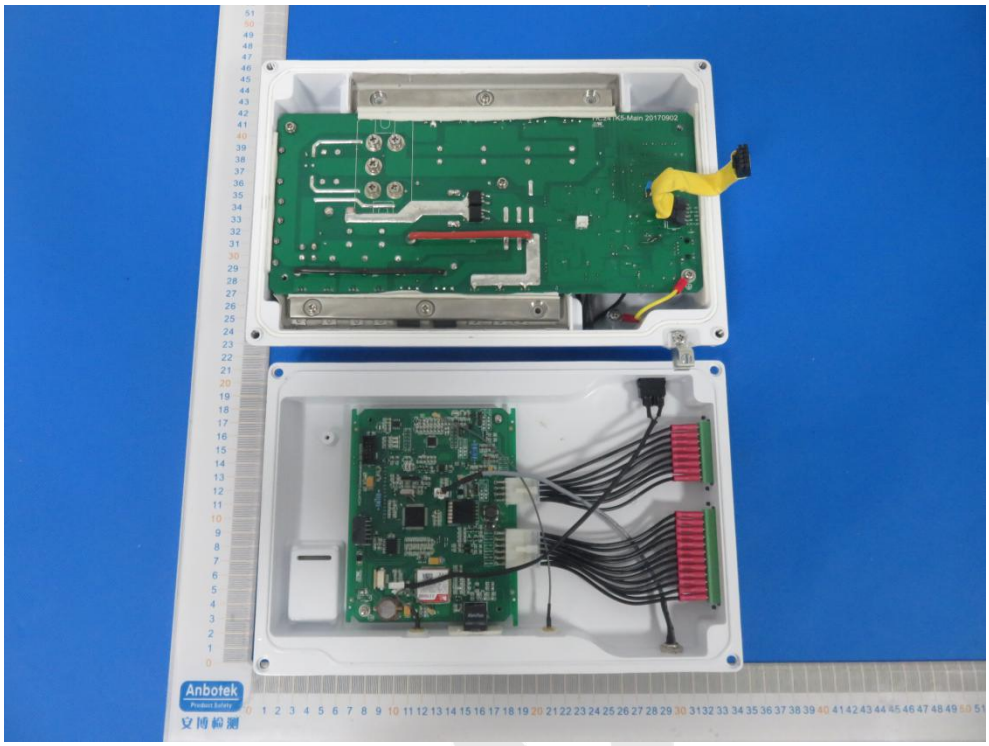


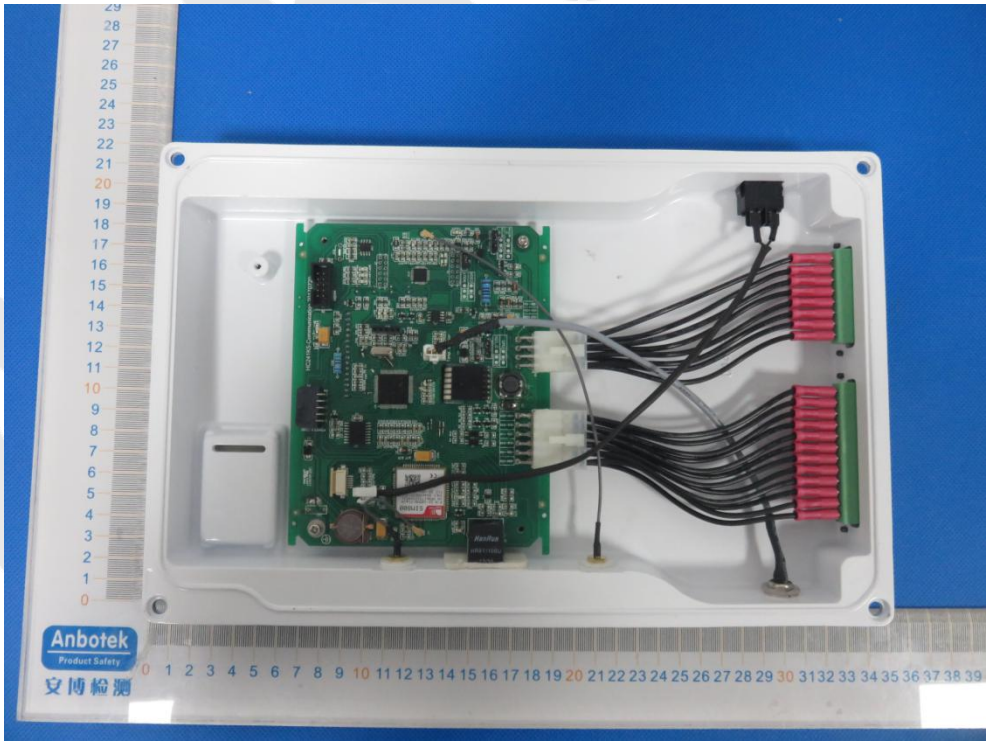
APPENDIX II -- PHOTOGRAPH

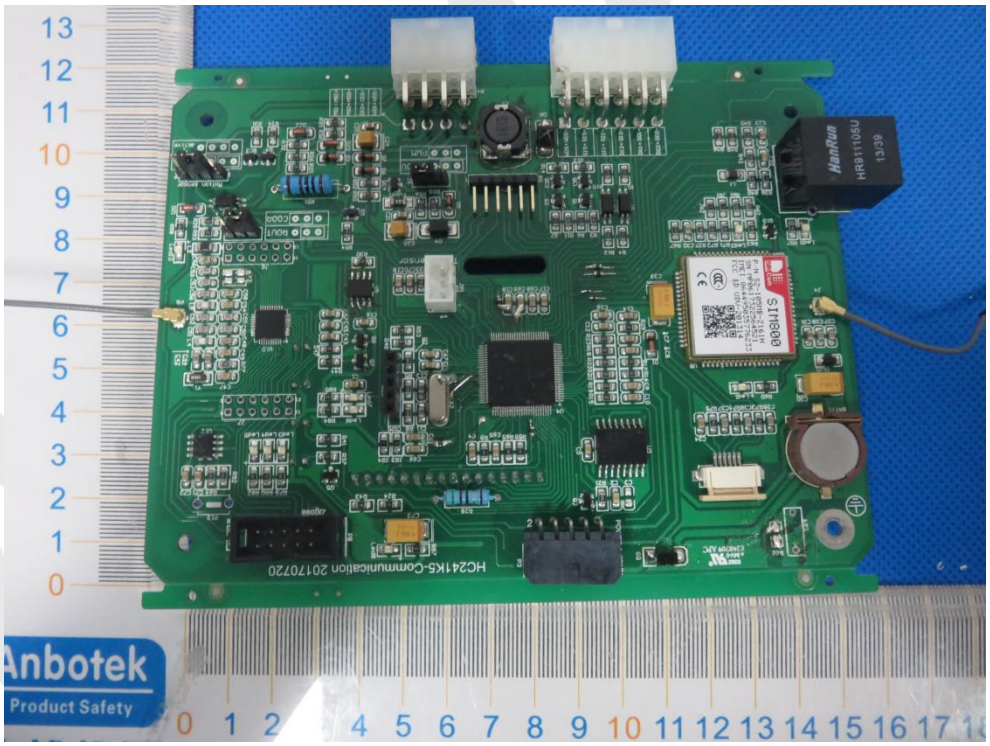


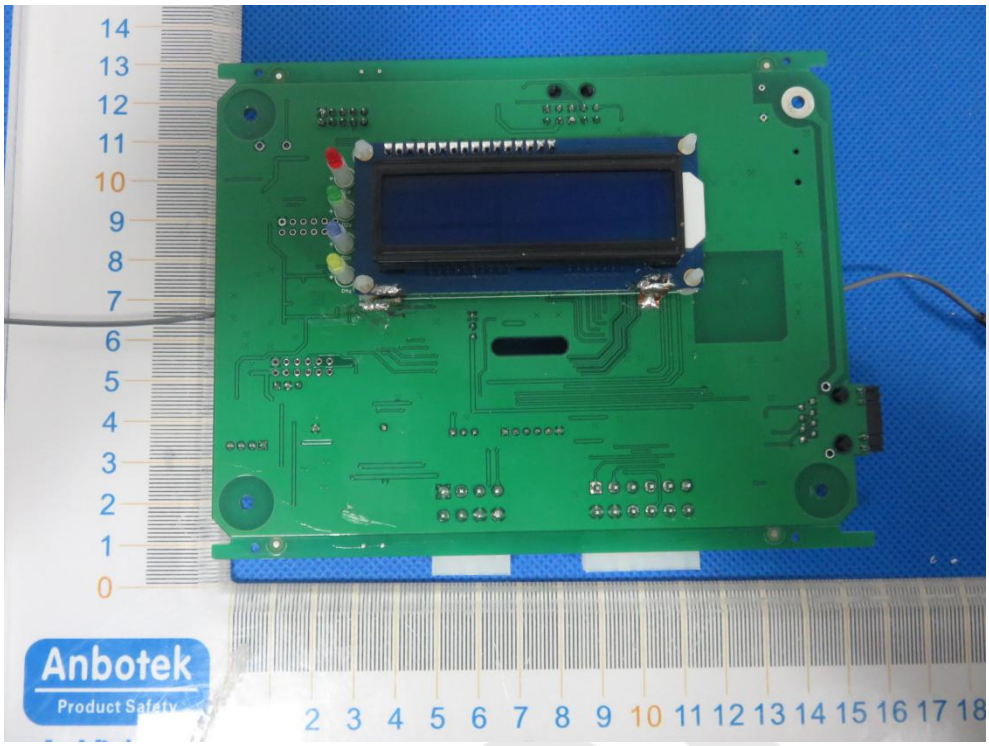


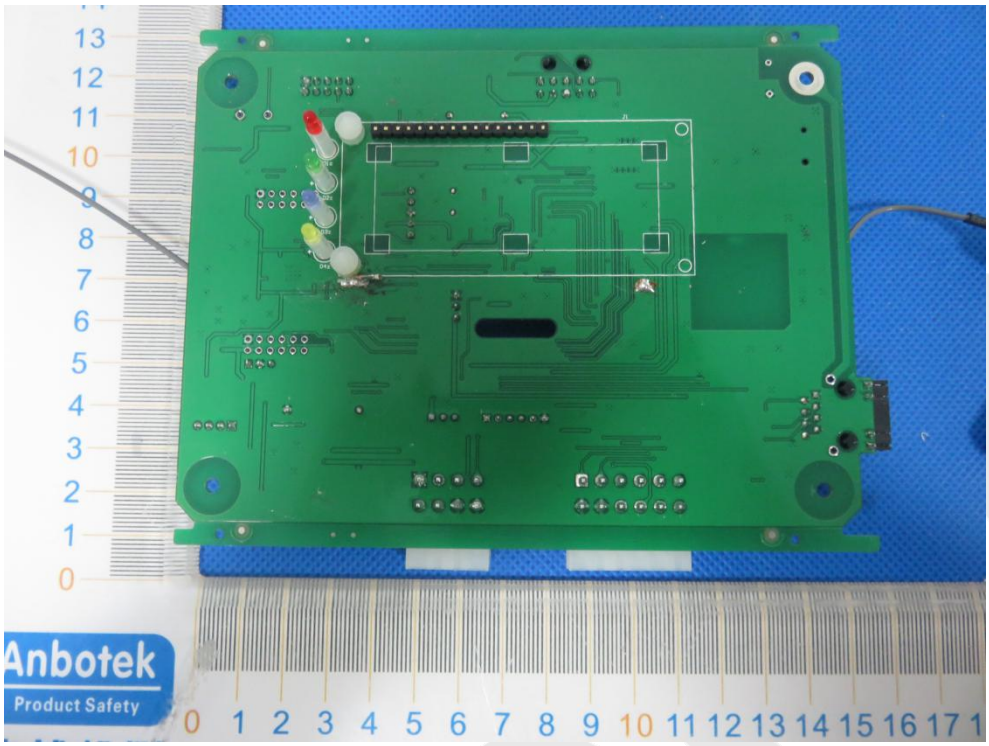
APPENDIX III -- INTERNAL PHOTOGRAPH

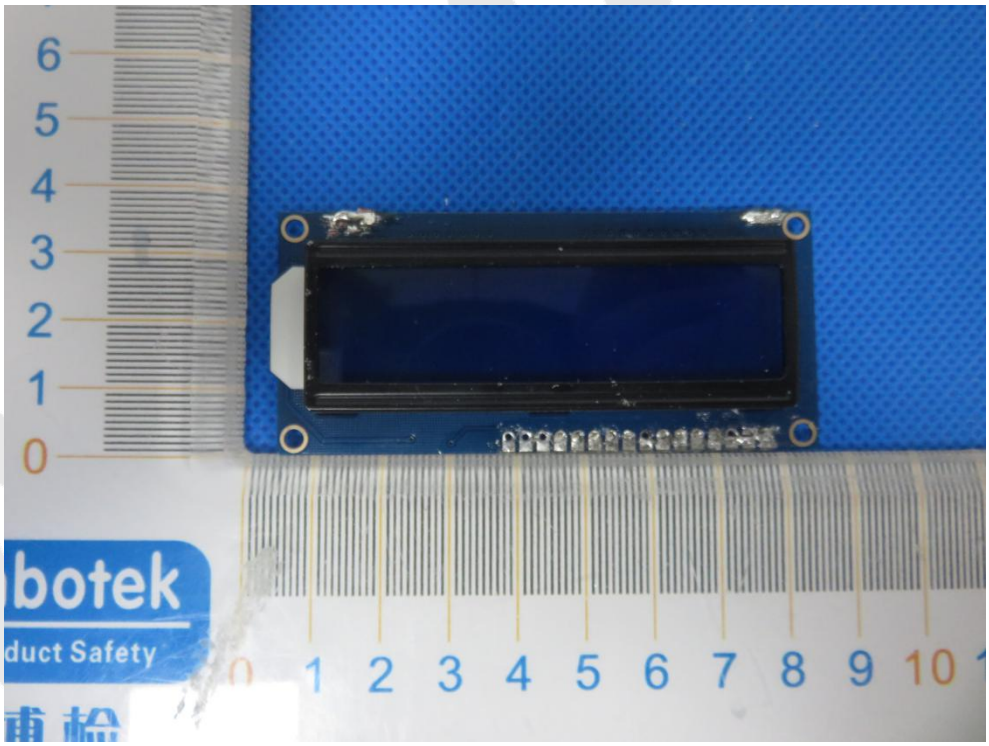


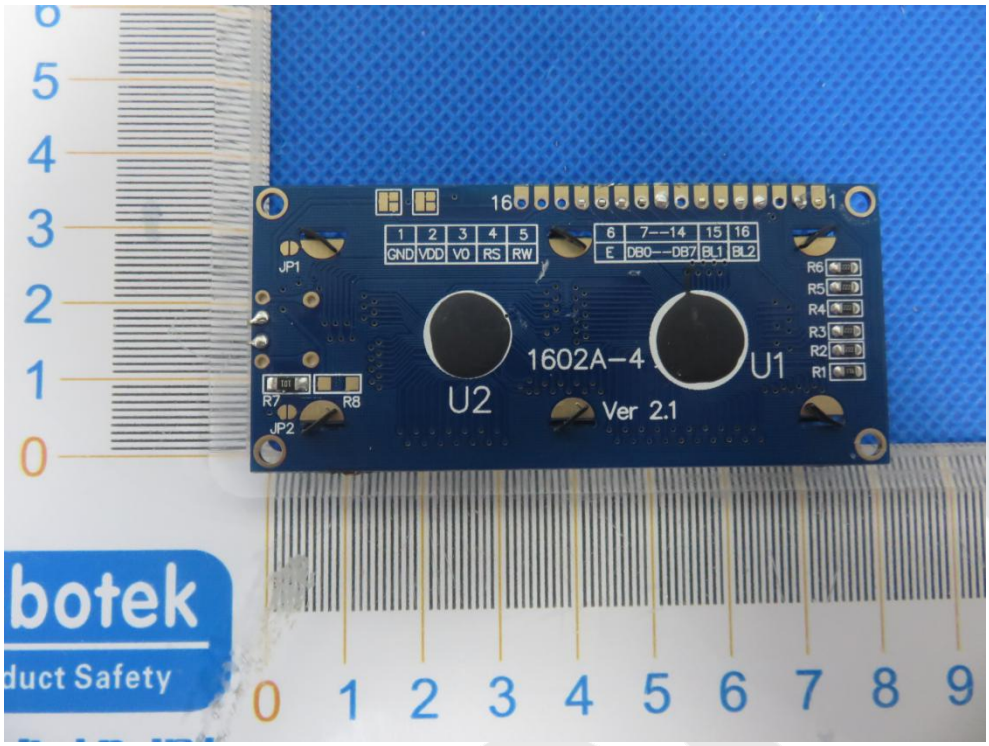








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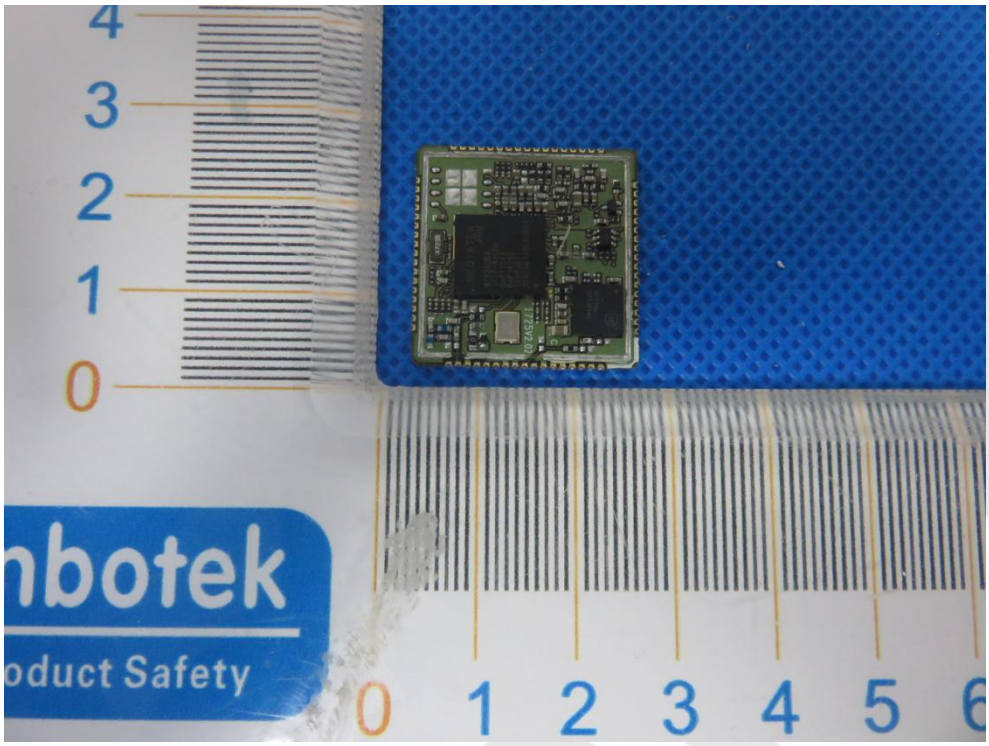
GND VDD V0 RS RW
6 7--14 15 16
E DB0--DB7 BL1 BL2
JP1
R6
R5
R4
R3
R2
R1
1602A-4
U2
U1
Ver 2.1
R7
R8
JP2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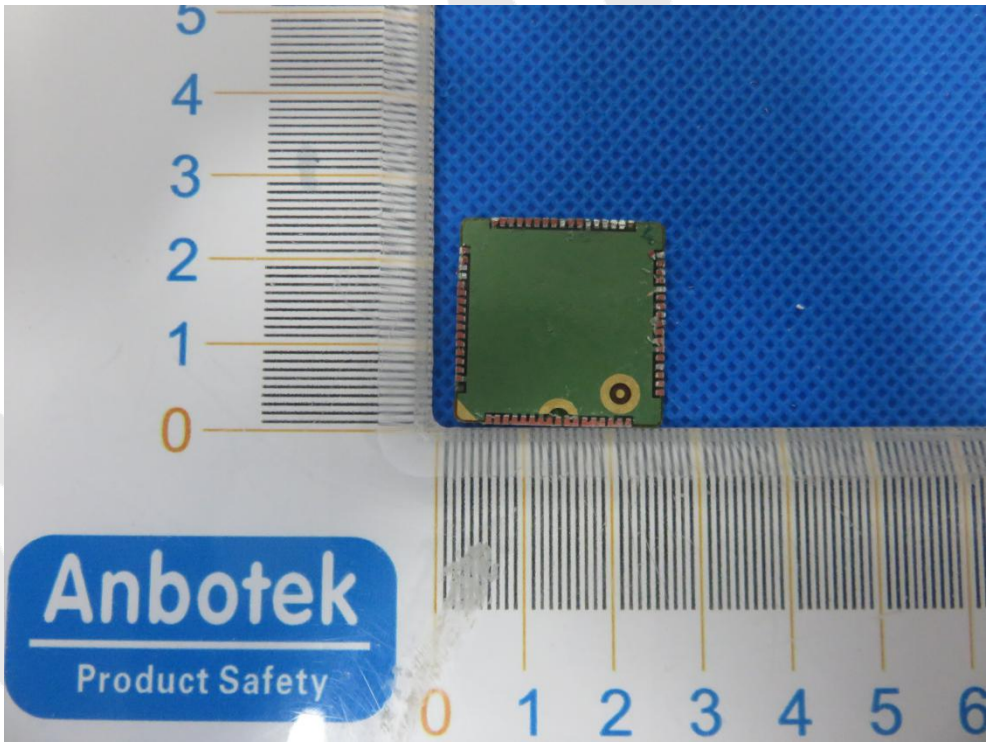
oduct Safety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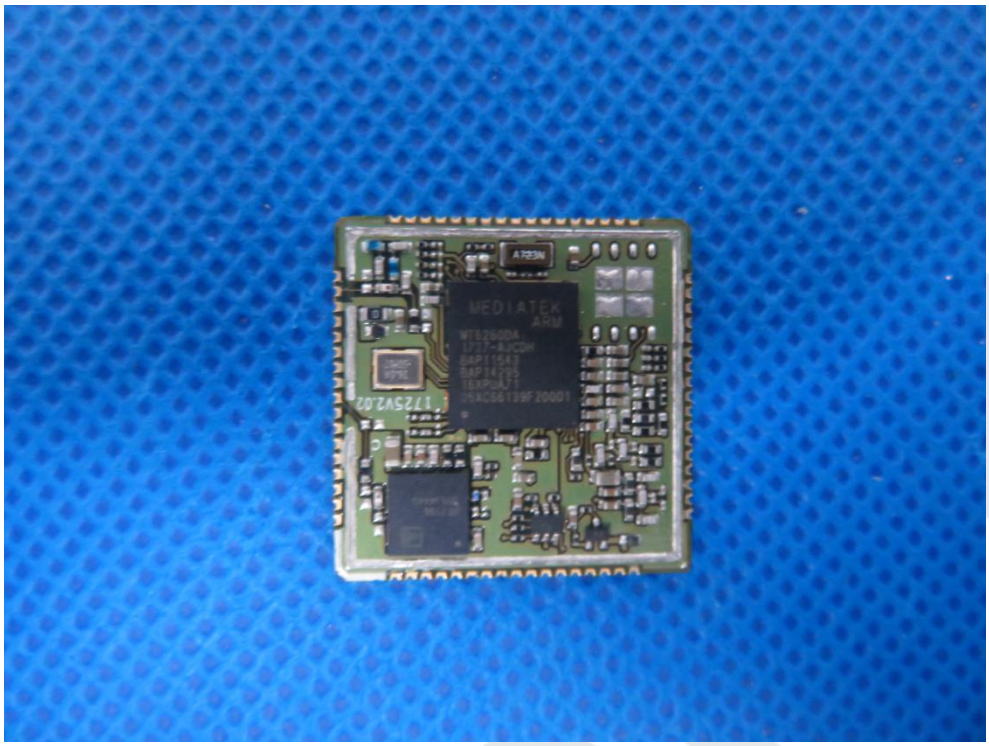
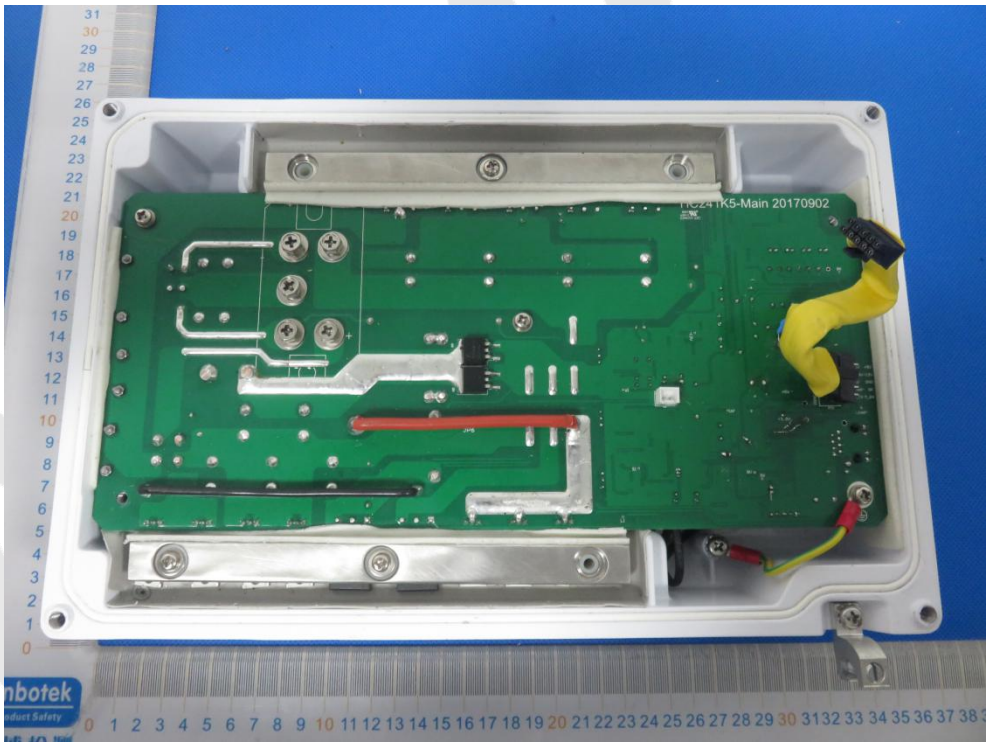
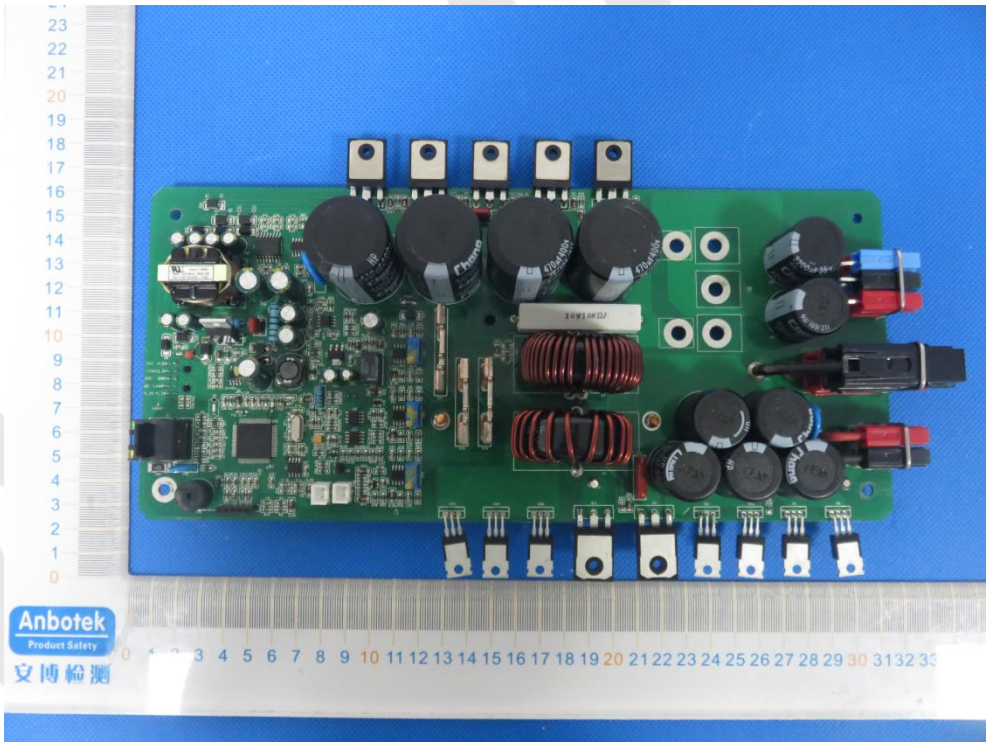
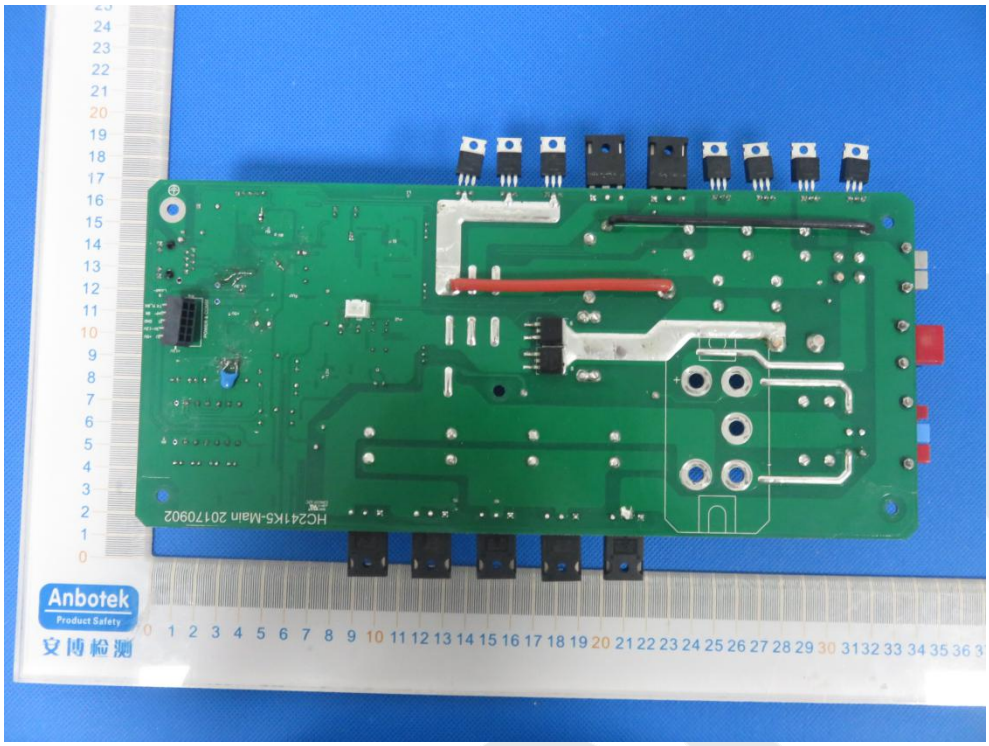

MEDIATEK
ARM







End of Report