

FCC TEST REPORT

Product : Cactus Wireless Flash Transceiver V6 II
Trade mark : Cactus
Model/Type reference : V6 II
Serial Number : N/A
Report Number : EED32I000694
FCC ID : VAAWFTV6II
Date of Issue : Apr. 27, 2016
Test Standards : 47 CFR Part 15 Subpart C (2015)
Test result : PASS

Prepared for:

Harvest One Ltd

**11D, Block 2, Koon Wah Mirror Factory(6th) Industrial Building,
7-9 Ho Tin Street, Tuen Mun, Hong Kong**

Prepared by:

**Centre Testing International Group Co., Ltd.
Hongwei Industrial Zone, Bao'an 70 District,
Shenzhen, Guangdong, China**

TEL: +86-755-3368 3668

FAX: +86-755-3368 3385

Compiled by:

Kevin Lan

Reviewed by:

Jon King

Approved by:

Sheek, Luo

Date:

Apr. 27, 2016

Sheek Luo

Lab supervisor

Check No.: 1022560535



2 Version

Version No.	Date	Description
00	Apr. 27, 2016	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
Field Strength of the Fundamental Signal	47 CFR Part 15 Subpart C Section 15.249 (a)	ANSI C63.10-2013	PASS
Spurious Emissions	47 CFR Part 15 Subpart C Section 15.249 (a)/15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15 Subpart C Section 15.249(a)/15.205	ANSI C63.10-2013	PASS
20dB Occupied Bandwidth	47 CFR Part 15 Subpart C Section 15.215 (c)	ANSI C63.10-2013	PASS

Remark:

The tested sample and the sample information are provided by the client.

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

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5 General Information

5.1 Client Information

Applicant:	Harvest One Ltd
Address of Applicant:	11D, Block 2, Koon Wah Mirror Factory(6th) Industrial Building, 7-9 Ho Tin Street, Tuen Mun, Hong Kong
Manufacturer:	Harvest One Ltd
Address of Manufacturer:	11D, Block 2, Koon Wah Mirror Factory(6th) Industrial Building, 7-9 Ho Tin Street, Tuen Mun, Hong Kong
Factory:	Harvest One Ltd
Address of Factory:	11D, Block 2, Koon Wah Mirror Factory(6th) Industrial Building, 7-9 Ho Tin Street, Tuen Mun, Hong Kong

5.2 General Description of EUT

Product Name:	Cactus Wireless Flash Transceiver V6 II
Mode No.(EUT):	V6 II
Trade Mark:	Cactus
EUT Supports Radios application:	2445.80MHz-2480.99MHz
Power Supply:	2xAA alkaline battery=3V
USB cable:	50cm(Unshielded)
Adapter power line:	258cm(Unshielded)

5.3 Product Specification subjective to this standard

Frequency Range:	2445.80MHz-2480.99MHz
Modulation Type:	MSK
EUT Function:	Wireless Flash Transceiver
Sample Type:	Portable production
Hardware Version:	PCB-V6HA-A03(manufacturer declare)
Software Version:	1.0. 050(manufacturer declare)
Antenna Type:	Internal
Antenna Gain:	2.14dBi
Test voltage:	2xAA alkaline battery=3V
Sample Received Date:	Apr. 05, 2016
Sample tested Date:	Apr. 05, 2016 to Apr. 27, 2016

5.4 Test Environment and Mode

Operating Environment:	
Temperature:	24°C
Humidity:	50% RH
Atmospheric Pressure:	1010mbar
Test mode:	
Transmitting mode:	Keep the EUT transmitted the continuous modulation test signal at the specific channel(s)

5.5 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Certification	Supplied by
Laptop	DELL	V3400D-326	DOC	CTI
Mouse	DELL	M-UARDEL7	DOC	CTI

5.6 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China 518101

Telephone: +86 (0) 755 3368 3668 Fax: +86 (0) 755 3368 3385

No tests were sub-contracted.

5.7 Test Facility

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

CNAS-Lab Code: L1910

Centre Testing International Group Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories..

A2LA-Lab Cert. No. 3061.01

Centre Testing International Group Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 565659

Centre Testing International Group Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 565659.

IC-Registration No.: 7408A

The 3m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A .

IC-Registration No.: 7408B

The 10m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B.

NEMKO-Aut. No.: ELA503

Centre Testing International Group Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

VCCI

The Radiation 3 & 10 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096. Main Ports Conducted Interference Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.

The Radiation 3 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-758

5.8 Deviation from Standards

None.

5.9 Abnormalities from Standard Conditions

None.

5.10 Other Information Requested by the Customer

None.

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

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9×10^{-8}
2	RF power, conducted	0.31dB (30MHz-1GHz)
		0.57dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-12.75GHz)
4	Conduction emission	3.6dB (9kHz to 150kHz)
		3.2dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	2.8%
7	DC power voltages	0.025%

6 Equipment List

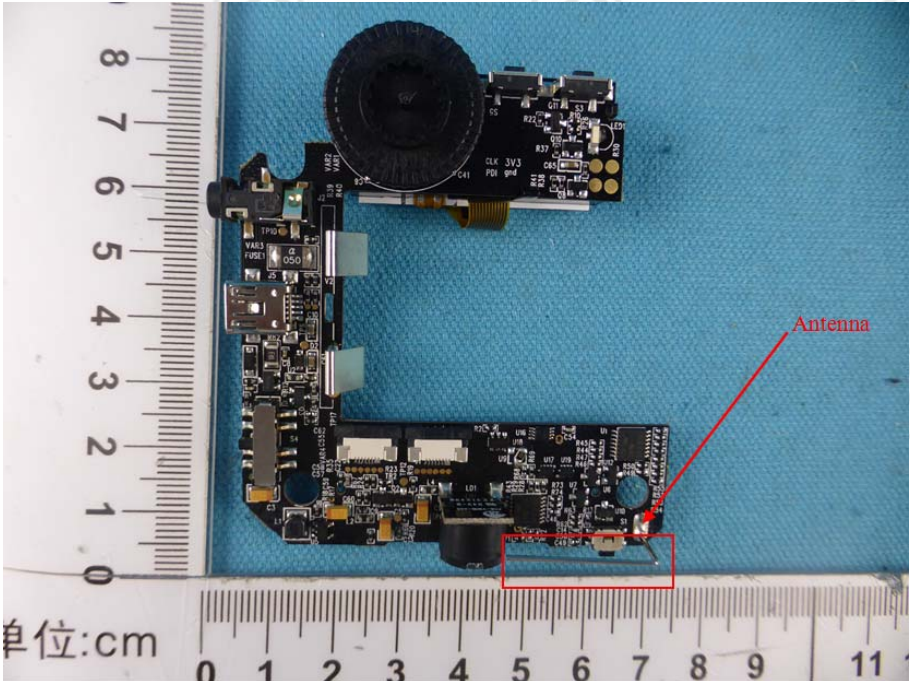
3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-02-2013	06-01-2016
TRILOG Broadband Antenna	SCHWARZBECK	VULB9163	9163-484	05-25-2015	05-23-2016
Microwave Preamplifier	Agilent	8449B	3008A02425	02-04-2016	02-03-2017
Horn Antenna	ETS-LINDGREN	3117	00057410	06-30-2015	06-28-2018
Loop Antenna	ETS	6502	00071730	07-30-2015	07-28-2017
Spectrum Analyzer	R&S	FSP40	100416	06-30-2015	06-28-2016
Receiver	R&S	ESCI	100435	06-30-2015	06-28-2016
Multi device Controller	matur	NCD/070/10711112	---	01-12-2016	01-11-2017
LISN	schwarzbeck	NNBM8125	81251547	06-30-2015	06-28-2016
LISN	schwarzbeck	NNBM8125	81251548	06-30-2015	06-28-2016
Signal Generator	Agilent	E4438C	MY45095744	04-01-2016	03-31-2017
Signal Generator	Keysight	E8257D	MY53401106	04-01-2016	03-31-2017
Temperature/ Humidity Indicator	TAYLOR	1451	1905	07- 08-2015	07-06-2016
Communication test set	Agilent	E5515C	GB47050534	04-01-2016	03-31-2017
Cable line	Fulai(7M)	SF106	5219/6A	01-12-2016	01-11-2017
Cable line	Fulai(6M)	SF106	5220/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5216/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5217/6A	01-12-2016	01-11-2017
Communication test set	R&S	CMW500	152394	04-01-2016	03-31-2017
High-pass filter(3-18GHz)	Sinoscite	FL3CX03WG18NM12-0398-002	---	01-12-2016	01-11-2017
High-pass filter(6-18GHz)	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA09CL12-0395-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA08CL12-0393-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA04CL12-0396-002	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA03CL12-0394-001	---	01-12-2016	01-11-2017

Conducted disturbance Test					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Receiver	R&S	ESCI	100009	06-30-2015	06-28-2016
Temperature/ Humidity Indicator	Belida	TT-512	101	07-09-2015	07-07-2016
Communication test set	Agilent	E5515C	GB47050534	04-01-2016	03-31-2017
Communication test set	R&S	CMW500	152394	04-01-2016	03-31-2017
LISN	R&S	ENV216	100098	06-30-2015	06-28-2016
LISN	schwarzbeck	NNLK8121	8121-529	06-30-2015	06-28-2016
Voltage Probe	R&S	ESH2-Z3	100042	07-09-2014	07-08-2017
Current Probe	R&S	EZ17	100106	07-09-2014	07-08-2017
ISN	TESEQ GmbH	ISN T800	30297	01-29-2015	01-27-2017

RF Conducted test					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Spectrum Analyzer	R&S	FSP40	100416	06-30-2015	06-28-2016
Receiver	R&S	ESCI	100435	06-30-2015	06-28-2016
Signal Generator	Agilent	E4438C	MY45095744	04-01-2016	03-31-2017
Signal Generator	Keysight	E8257D	MY53401106	04-01-2016	03-31-2017
High-pass filter (3-18GHz)	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-12-2016	01-11-2017
High-pass filter (6-18GHz)	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA09C L12-0395-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA08C L12-0393-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA04C L12-0396-002	---	01-12-2016	01-11-2017

7 Test results and Measurement Data

7.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203
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.	
EUT Antenna:	
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.14dBi.	
	

7.2 Conducted Emissions

Test Requirement: 47 CFR Part 15C Section 15.207
Test Method: ANSI C63.10
Test Frequency Range: 150kHz to 30MHz

Limit:

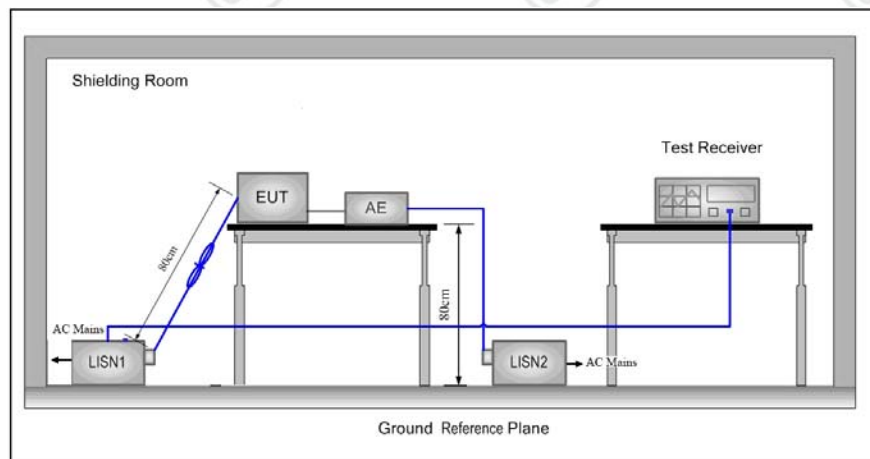
Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Procedure:

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.

Test Setup:



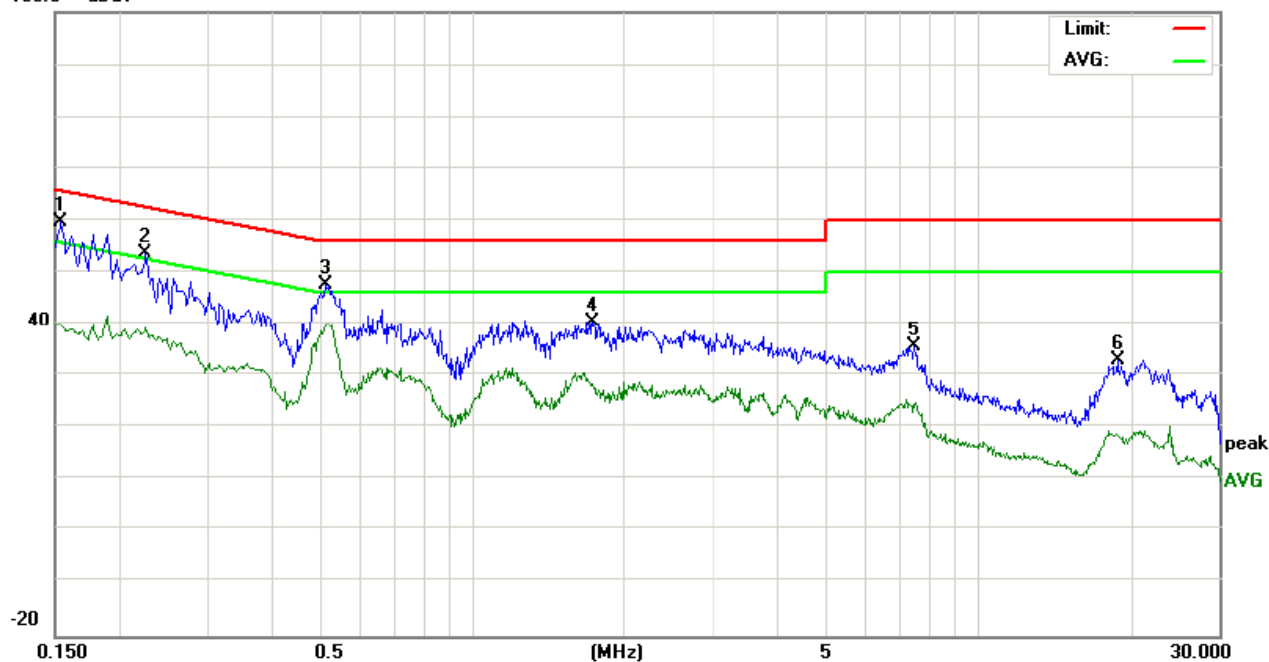
Test Mode: Transmitting mode
Instruments Used: Refer to section 6 for details
Test Results: Pass
Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

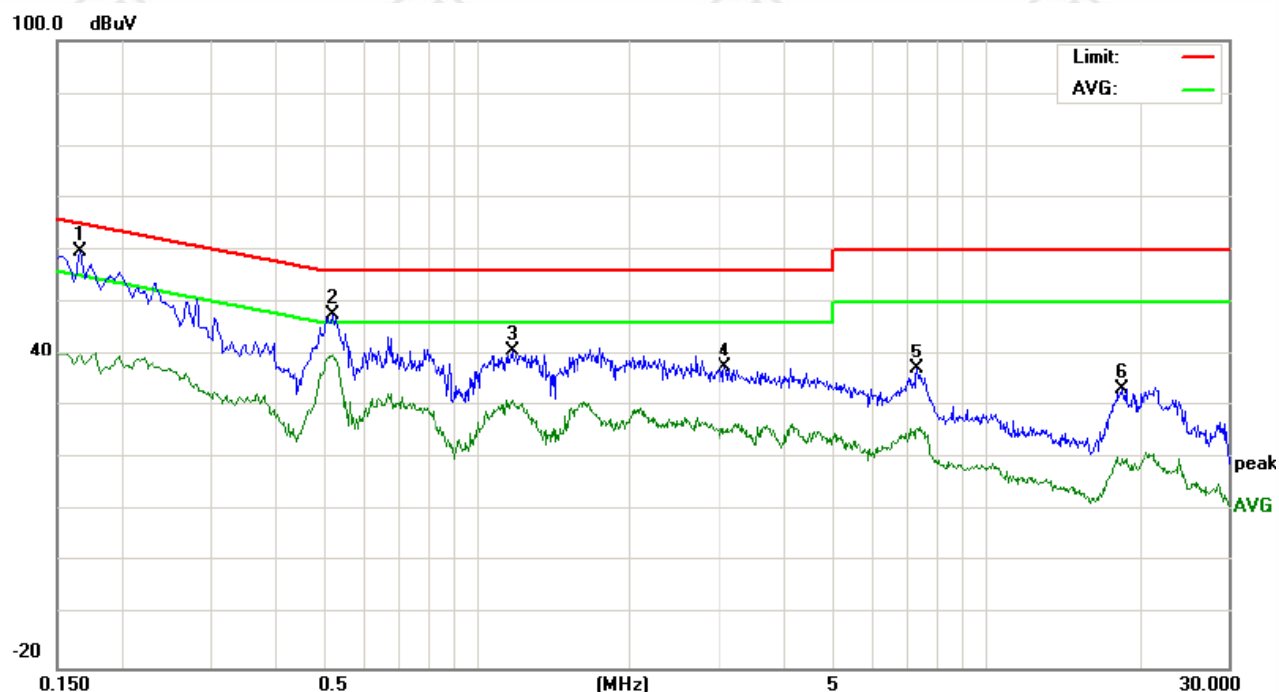
Live Line:

100.0 dBuV



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1539	49.90	44.84	29.72	9.80	59.70	54.64	39.52	65.78	55.78	-11.14	-16.26	P	
2	0.2260	43.92	37.78	27.84	9.80	53.72	47.58	37.64	62.59	52.59	-15.01	-14.95	P	
3	0.5140	37.72	34.87	29.25	9.90	47.62	44.77	39.15	56.00	46.00	-11.23	-6.85	P	
4	1.7380	30.59	25.65	17.83	10.00	40.59	35.65	27.83	56.00	46.00	-20.35	-18.17	P	
5	7.5140	25.56	19.09	12.47	10.00	35.56	29.09	22.47	60.00	50.00	-30.91	-27.53	P	
6	18.8980	22.40	13.41	6.32	10.41	32.81	23.82	16.73	60.00	50.00	-36.18	-33.27	P	

Neutral Line:



No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1660	49.98	43.65	28.72	9.80	59.78	53.45	38.52	65.15	55.15	-11.70	-16.63	P	
2	0.5220	37.65	34.77	29.80	9.90	47.55	44.67	39.70	56.00	46.00	-11.33	-6.30	P	
3	1.1780	30.72	25.90	20.47	10.00	40.72	35.90	30.47	56.00	46.00	-20.10	-15.53	P	
4	3.0900	27.46	22.62	15.13	10.00	37.46	32.62	25.13	56.00	46.00	-23.38	-20.87	P	
5	7.3500	27.04	19.58	13.14	10.00	37.04	29.58	23.14	60.00	50.00	-30.42	-26.86	P	
6	18.6220	22.90	14.87	7.19	10.39	33.29	25.26	17.58	60.00	50.00	-34.74	-32.42	P	

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

7.3 Radiated Spurious Emission

Test Requirement: 47 CFR Part 15C Section 15.249 and 15.209

Test Method: ANSI C63.10

Test Site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30KHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30KHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30KHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30KHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30KHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Test Setup:

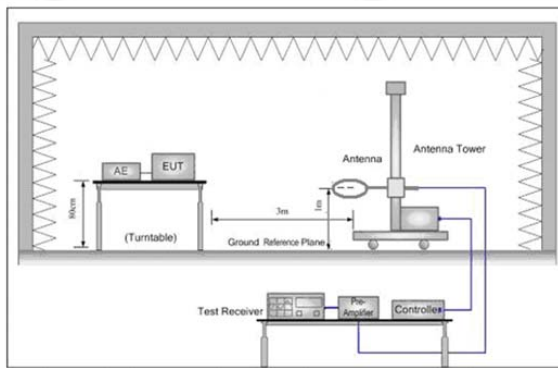


Figure 1. Below 30MHz

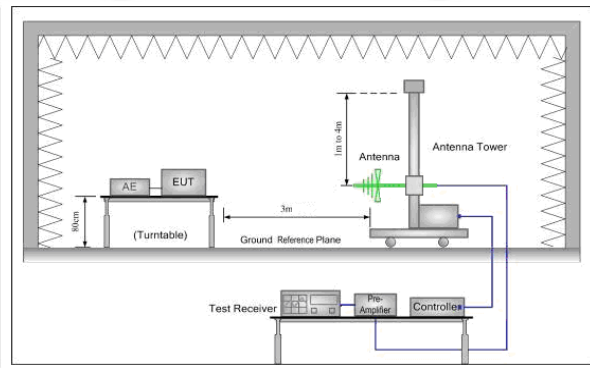


Figure 2. 30MHz to 1GHz

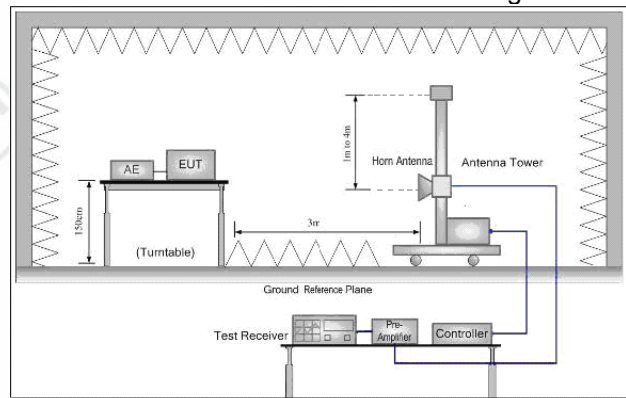


Figure 3. Above 1GHz

Test Procedure:

Below 1GHz test procedure as below:

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.

The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

If the emission level of the EUT in peak mode was 10dB lower than the limit specified,

then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).

Test the EUT in the lowest channel ,middle channel, the Highest channel

The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.

Repeat above procedures until all frequencies measured was complete.

Limit:
(Spurious
Emissions)

Frequency	Field strength (microvolt/meter)	Limit (dB μ V/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-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 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.

Limit:
(Field strength of
the fundamental
signal)

Frequency	Limit (dB μ V/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value
	114.0	Peak Value

Test Mode: Transmitting mode

Instruments Used: Refer to section 6 for details

Test Results: Pass

Measurement Data

Field Strength Of The Fundamental Signal

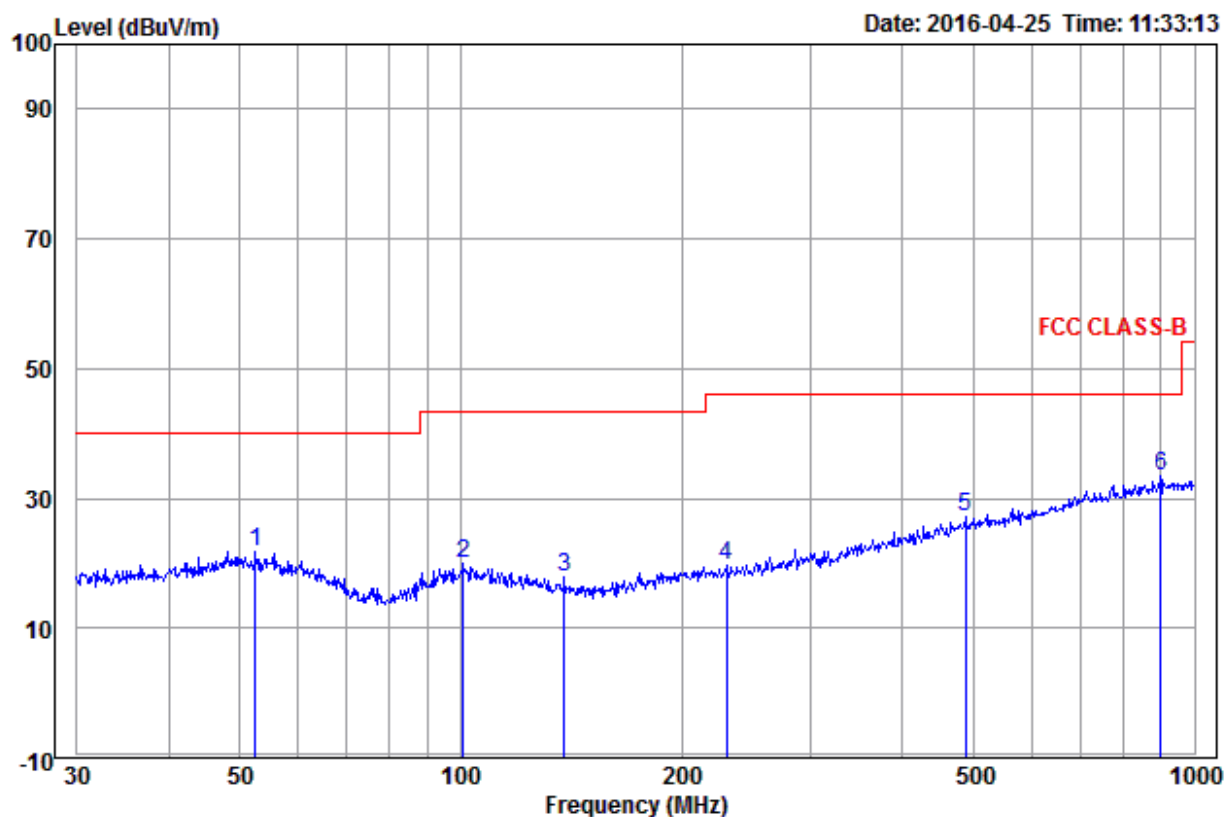
Peak value:

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
2445.797	32.64	4.42	34.40	90.11	92.77	94	-1.23	Pass	H
2445.797	32.64	4.42	34.40	89.09	91.75	94	-2.25	Pass	V
2461.793	32.67	4.45	34.40	84.85	87.57	94	-6.43	Pass	H
2461.793	32.67	4.45	34.40	86.02	88.74	94	-5.26	Pass	V
2480.988	32.71	4.50	34.41	84.02	86.82	94	-7.18	Pass	H
2480.988	32.71	4.50	34.41	82.43	85.23	94	-8.77	Pass	V

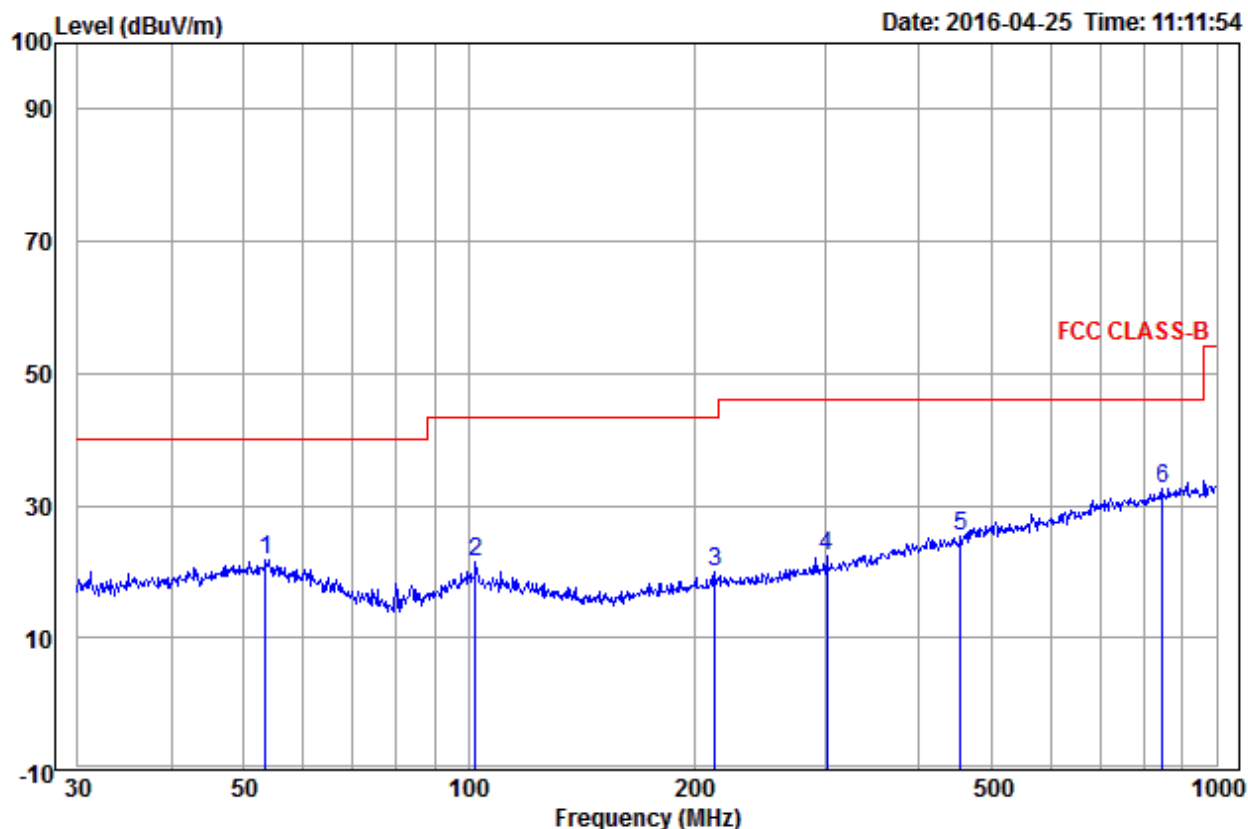
Remark: As shown in this section, for field strength of the fundamental signal measurements, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above. So, only the peak measurements were shown in the report.

Spurious Emissions

30MHz~1GHz



	Ant Freq	Factor	Cable Loss	Read Level	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		
1	52.575	14.74	1.41	5.57	21.72	40.00	-18.28	Horizontal	
2	100.934	13.12	1.57	5.41	20.10	43.50	-23.40	Horizontal	
3	138.387	10.40	1.58	5.97	17.95	43.50	-25.55	Horizontal	
4	230.099	12.10	2.30	5.22	19.62	46.00	-26.38	Horizontal	
5	487.315	18.08	3.10	6.13	27.31	46.00	-18.69	Horizontal	
6 pp	900.147	22.40	4.34	6.79	33.53	46.00	-12.47	Horizontal	



		Ant	Cable	Read	Limit	Over		
	Freq	Factor	Loss	Level	Line	Limit	Pol/Phase	Remark
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	53.505	14.62	1.41	5.79	21.82	40.00	-18.18	Vertical
2	102.001	13.03	1.57	6.86	21.46	43.50	-22.04	Vertical
3	213.763	11.84	2.25	6.00	20.09	43.50	-23.41	Vertical
4	301.422	13.54	2.39	6.37	22.30	46.00	-23.70	Vertical
5	454.310	17.22	3.00	5.28	25.50	46.00	-20.50	Vertical
6 pp	848.056	21.89	4.17	6.53	32.59	46.00	-13.41	Vertical

Above 1GHz Peak value:									
Test mode:		Transmitting		Test channel:		Lowest			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1273.572	30.40	2.60	34.89	47.40	45.51	74	-28.49	Pass	H
1597.401	31.05	2.92	34.59	46.02	45.40	74	-28.60	Pass	H
3824.757	32.92	5.47	34.58	46.17	49.98	74	-24.02	Pass	H
4891.593	34.87	5.08	34.33	42.04	47.66	74	-26.34	Pass	H
7337.390	36.44	6.78	34.90	40.13	48.45	74	-25.55	Pass	H
9783.187	38.07	7.58	35.04	38.96	49.57	74	-24.43	Pass	H
1241.562	30.32	2.56	34.92	46.80	44.76	74	-29.24	Pass	V
1518.111	30.90	2.84	34.66	46.39	45.47	74	-28.53	Pass	V
4096.875	33.05	5.40	34.57	45.12	49.00	74	-25.00	Pass	V
4891.593	34.87	5.08	34.33	42.01	47.63	74	-26.37	Pass	V
7337.390	36.44	6.78	34.90	40.93	49.25	74	-24.75	Pass	V
9783.187	38.07	7.58	35.04	37.89	48.50	74	-25.50	Pass	V

Test mode:		Transmitting		Test channel:		Middle			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1257.465	30.36	2.58	34.90	47.00	45.04	74	-28.96	Pass	H
1795.839	31.39	3.08	34.44	45.79	45.82	74	-28.18	Pass	H
3700.260	33.02	5.49	34.57	46.27	50.21	74	-23.79	Pass	H
4923.585	34.94	5.07	34.32	41.81	47.50	74	-26.50	Pass	H
7385.378	36.44	6.83	34.90	38.17	46.54	74	-27.46	Pass	H
9847.171	38.14	7.53	35.03	38.67	49.31	74	-24.69	Pass	H
1518.111	30.90	2.84	34.66	45.98	45.06	74	-28.94	Pass	V
3766.785	32.97	5.48	34.58	45.30	49.17	74	-24.83	Pass	V
4923.585	34.94	5.07	34.32	41.78	47.47	74	-26.53	Pass	V
5732.974	35.70	6.83	34.30	42.16	50.39	74	-23.61	Pass	V
7385.378	36.44	6.83	34.90	40.76	49.13	74	-24.87	Pass	V
9847.171	38.14	7.53	35.03	37.70	48.34	74	-25.66	Pass	V

Test mode:		Transmitting		Test channel:		Highest			
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Result	Antenna Polaxis
1402.920	30.68	2.73	34.76	47.24	45.89	74	-28.11	Pass	H
3719.146	33.00	5.49	34.57	46.59	50.51	74	-23.49	Pass	H
4961.976	35.02	5.05	34.31	41.74	47.50	74	-26.50	Pass	H
5747.586	35.71	6.87	34.30	42.51	50.79	74	-23.21	Pass	H
7442.964	36.45	6.88	34.90	40.13	48.56	74	-25.44	Pass	H
9923.952	38.22	7.47	35.01	40.01	50.69	74	-23.31	Pass	H
1238.405	30.32	2.56	34.92	47.63	45.59	74	-28.41	Pass	V
1759.638	31.33	3.05	34.47	46.27	46.18	74	-27.82	Pass	V
3644.175	33.06	5.50	34.57	46.09	50.08	74	-23.92	Pass	V
4961.976	35.02	5.05	34.31	41.49	47.25	74	-26.75	Pass	V
7442.964	36.45	6.88	34.90	37.92	46.35	74	-27.65	Pass	V
9923.952	38.22	7.47	35.01	38.94	49.62	74	-24.38	Pass	V

Remark:

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
 Final Test Level = Receiver Reading - Correct Factor
 Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor
 Scan from the test data, The average value is lower than limit, and The below the limit need not be reported, so only the peak value had been displayed.

7.4 Restricted bands around fundamental frequency

Test Requirement: 47 CFR Part 15C Section 15.209 and 15.205

Test Method: ANSI C63.10

Test Site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Limit(Band Edge): Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Frequency	Limit (dB μ V/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test Setup:

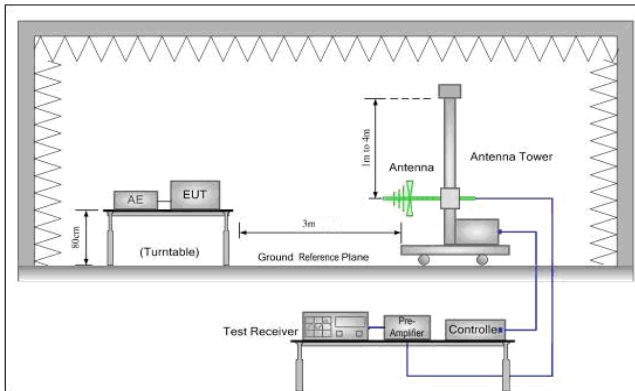


Figure 1. 30MHz to 1GHz

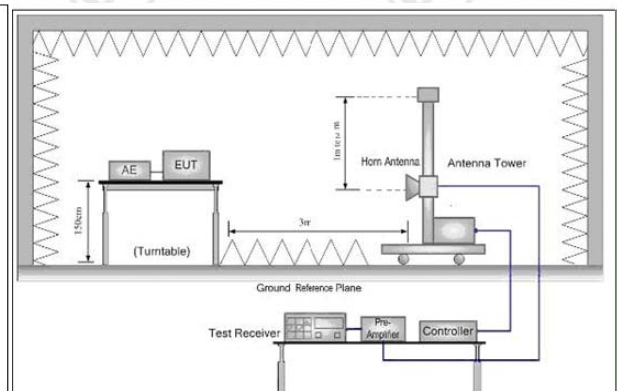


Figure 2. Above 1 GHz

Test Procedure:

Below 1GHz test procedure as below:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
- Test the EUT in the lowest channel , the Highest channel
- The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
- Repeat above procedures until all frequencies measured was complete.

Instruments Used: Refer to section 6 for details

Test Mode: Transmitting mode

Test Results: Pass

Test plot as follows:

Frequency (MHz)	Read Level (dBμV)	Level (dBμV/m)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Limit (dBμV/m)	Over Limit (dB)	Antenna Polaxis	Remark	Test channel
2390.00	45.03	47.45	32.53	4.28	34.39	74	-26.55	H	PK	Lowest
2400.00	45.10	47.56	32.55	4.30	34.39	74	-26.44	H	PK	Lowest
2390.00	45.12	47.54	32.53	4.28	34.39	74	-26.46	V	PK	Lowest
2400.00	44.67	47.13	32.55	4.30	34.39	74	-26.87	V	PK	Lowest
2483.50	49.34	52.15	32.71	4.51	34.41	74	-21.85	H	PK	Highest
2483.50	35.27	38.08	32.71	4.51	34.41	54	-15.92	H	AV	Highest
2483.50	49.27	52.08	32.71	4.51	34.41	74	-21.92	V	PK	Highest
2483.50	35.55	38.36	32.71	4.51	34.41	54	-15.64	V	AV	Highest

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

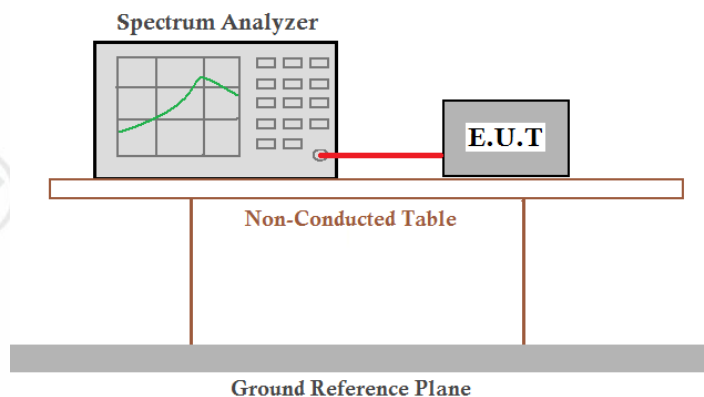
Final Test Level = Receiver Reading - Correct Factor

Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor

Scan from the test data, The average value is lower than limit, and The below the limit need not be reported, so only the peak value had been displayed.

7.5 20dB Bandwidth

Test Requirement: 47 CFR Part 15C Section 15.215
Test Method: ANSI C63.10
Test Setup:



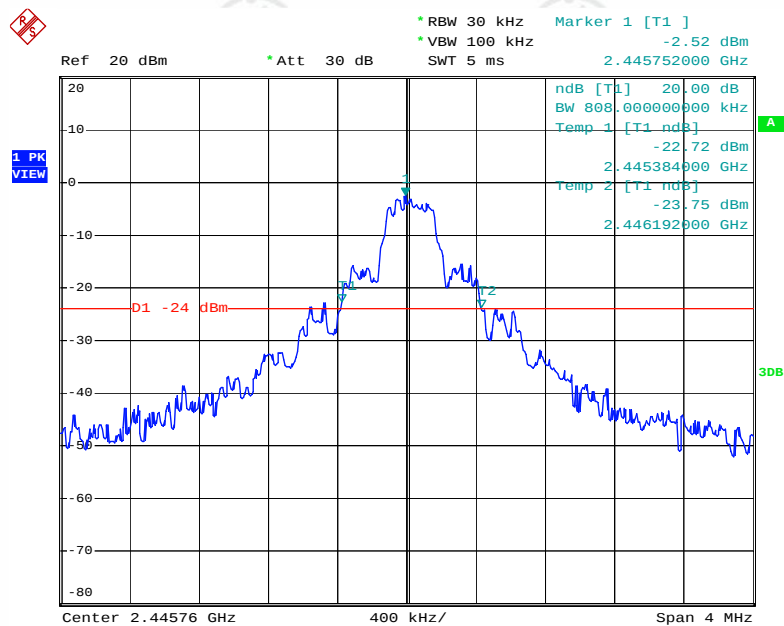
Test Mode: Transmitter mode
Limit: N/A
Instruments Used: Refer to section 6 for details
Test Results: Pass

Measurement Data

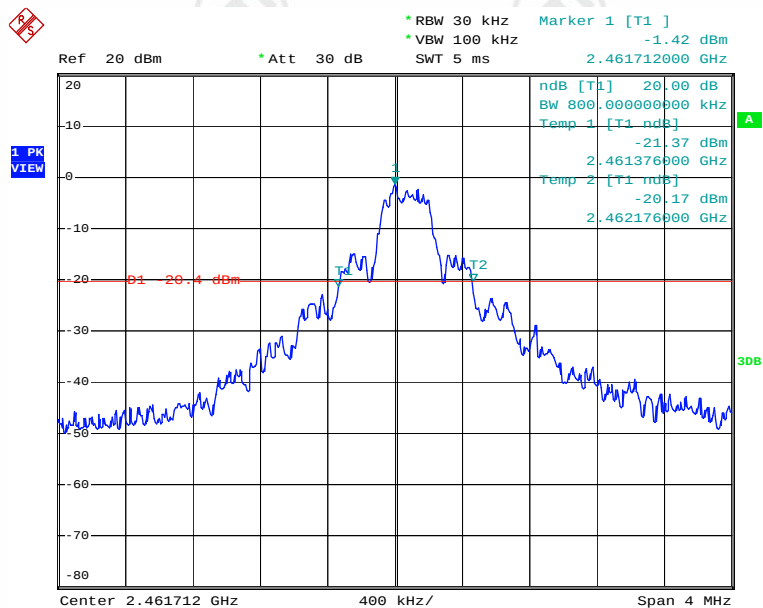
Test Channel	20dB bandwidth (kHz)	Results
Lowest	808	Pass
Middle	800	Pass
Highest	792	Pass

Test plot as follows:

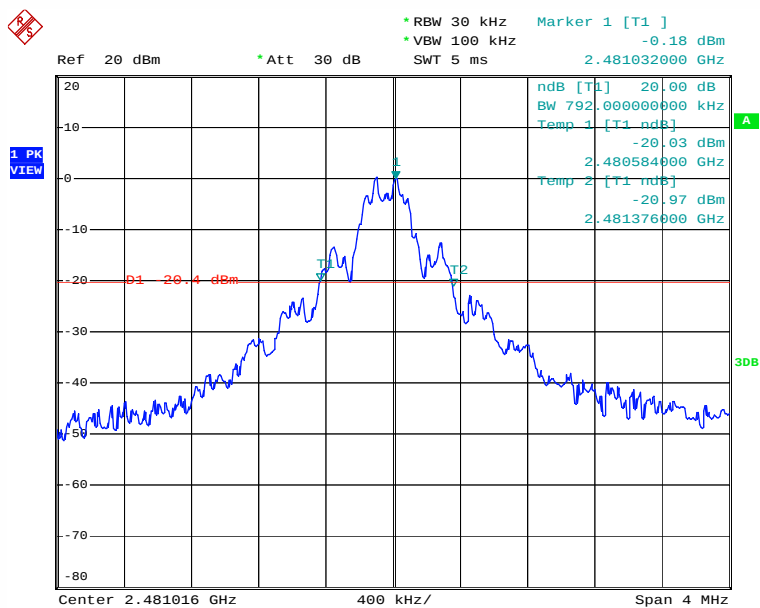
2445.80Mz



2461.79MHz

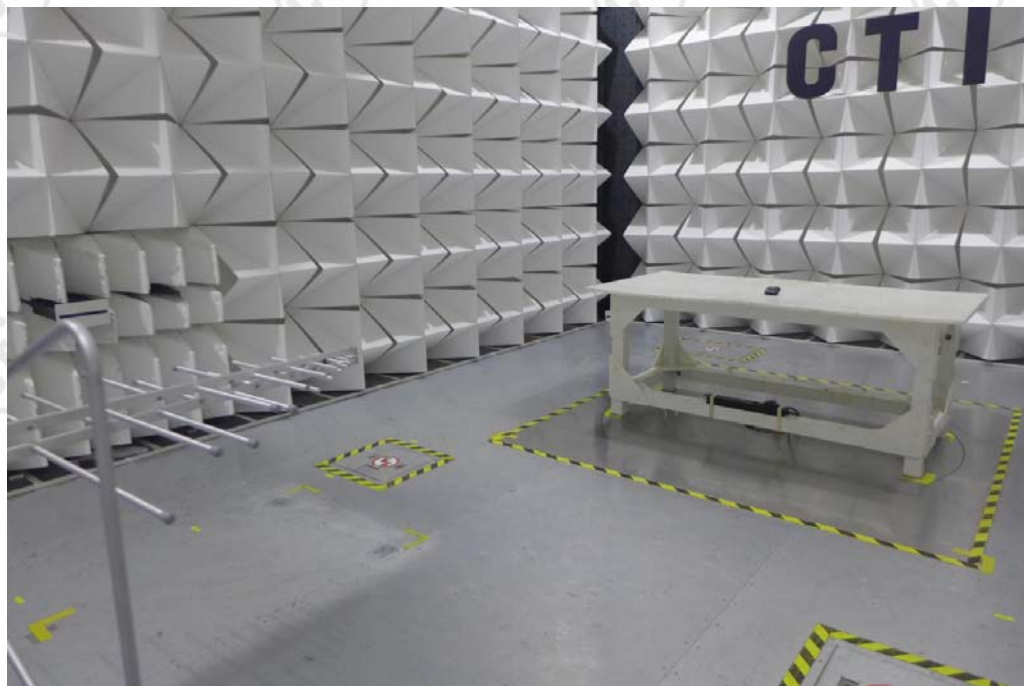


2480.99MHz

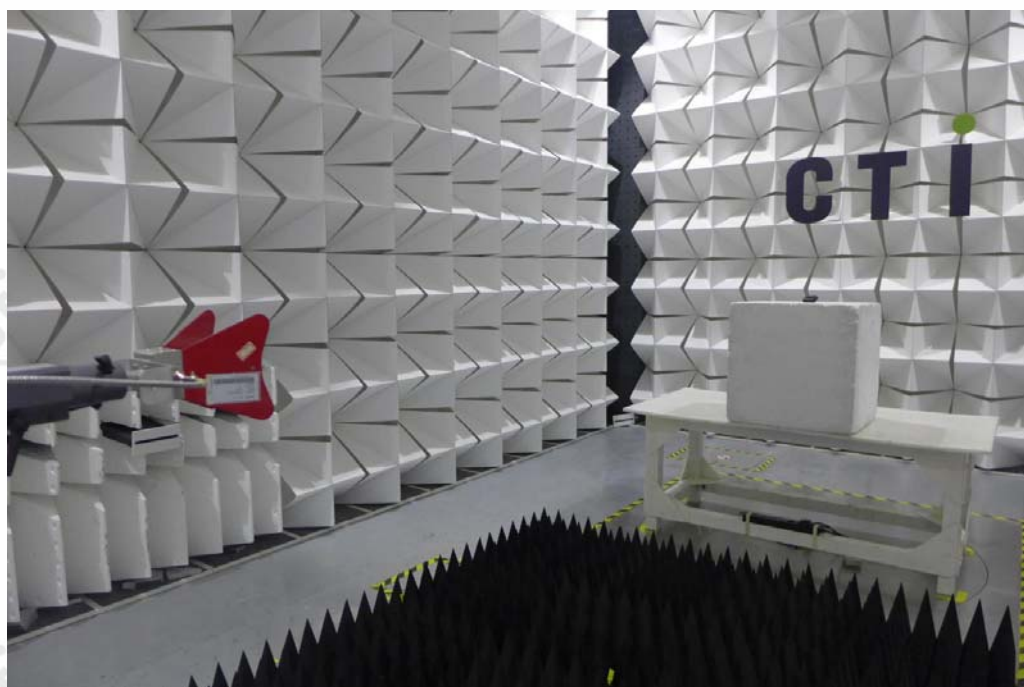


APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test Model No.: V6 II



Radiated emission Test Setup-1(Below 1GHz)



Radiated spurious emission Test Setup-3(Above 1GHz)



Conducted Emissions

APPENDIX 2 PHOTOGRAPHS OF EUT

Test mode No.: V6 II



View of Product-1



View of Product-2



View of Product-3



View of Product-4



View of Product-5



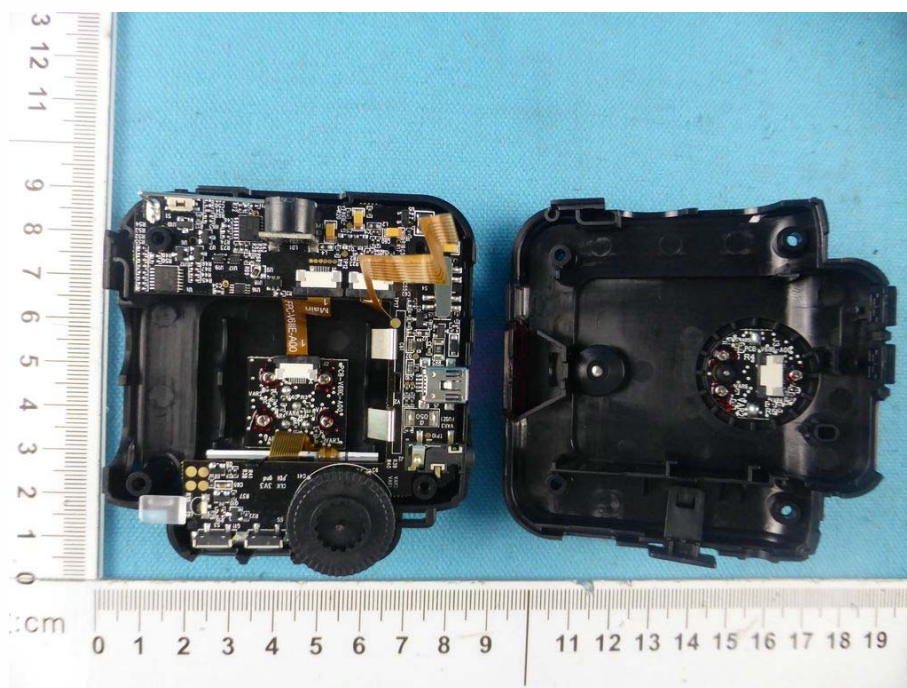
View of Product-6



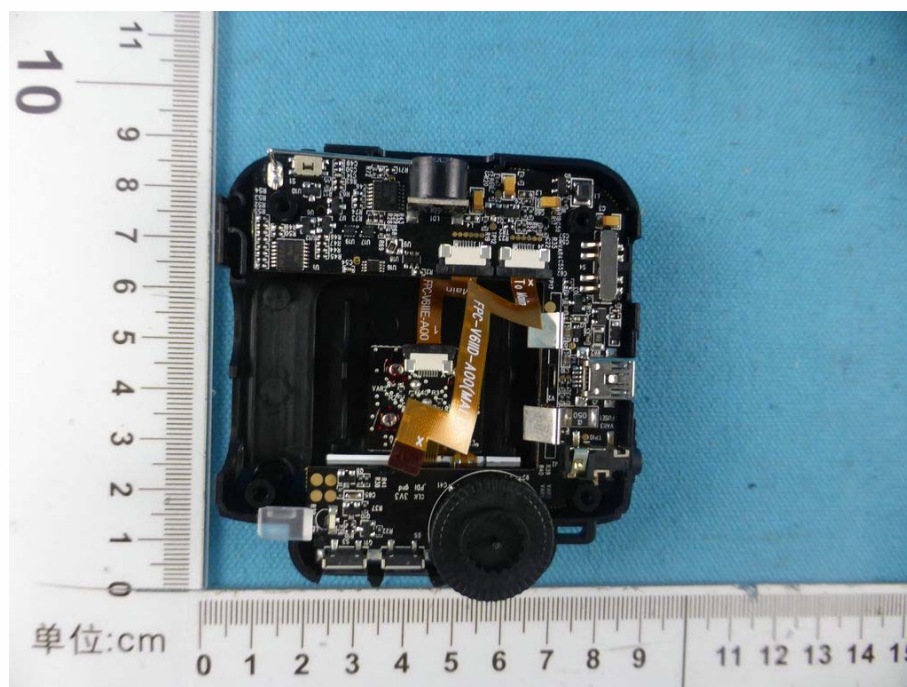
View of Product-7



View of Product-8



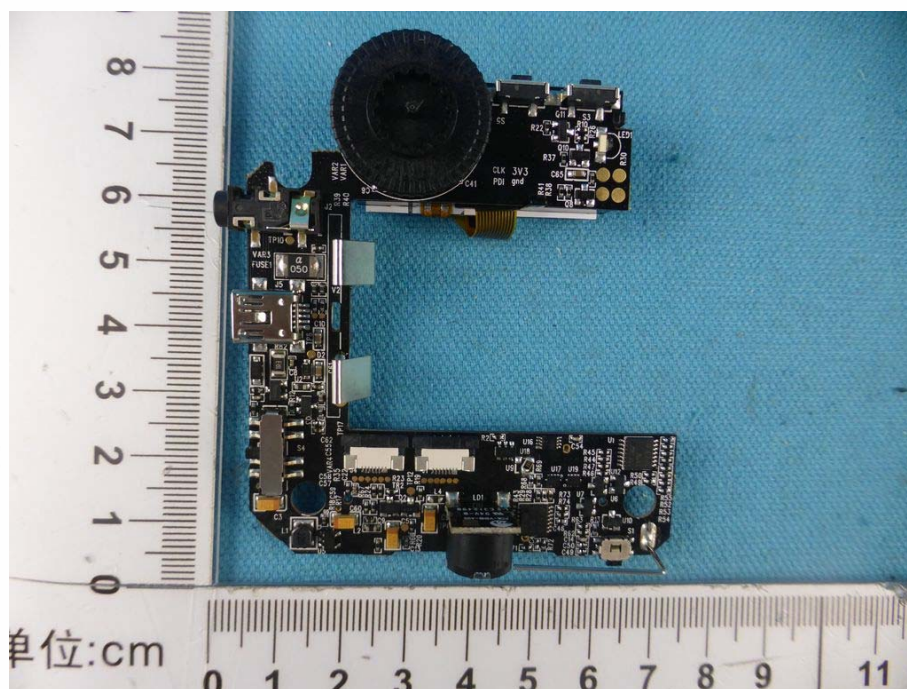
View of Product-9



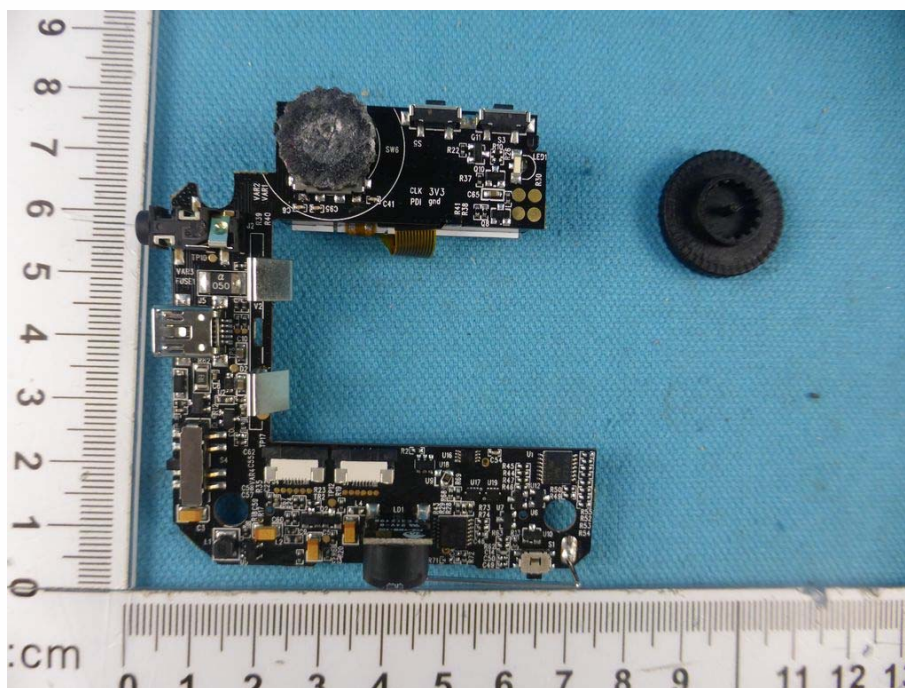
View of Product-10



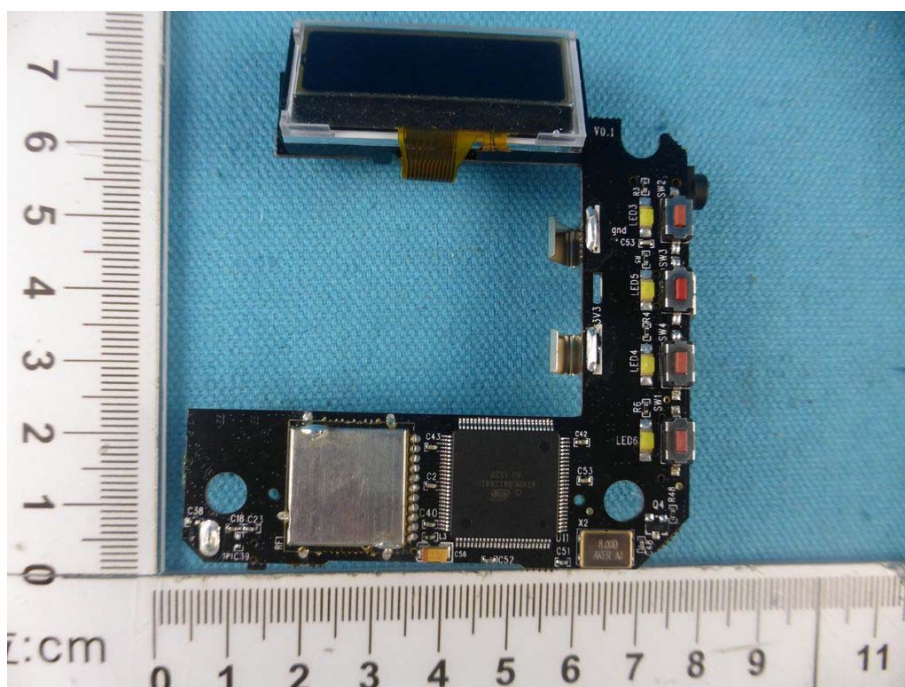
View of Product-11



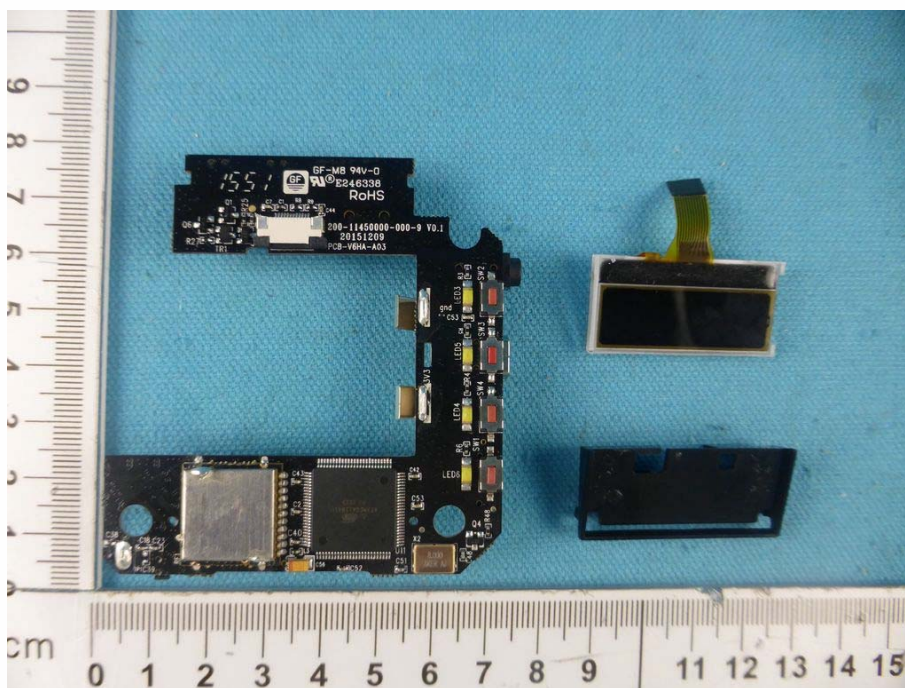
View of Product-12



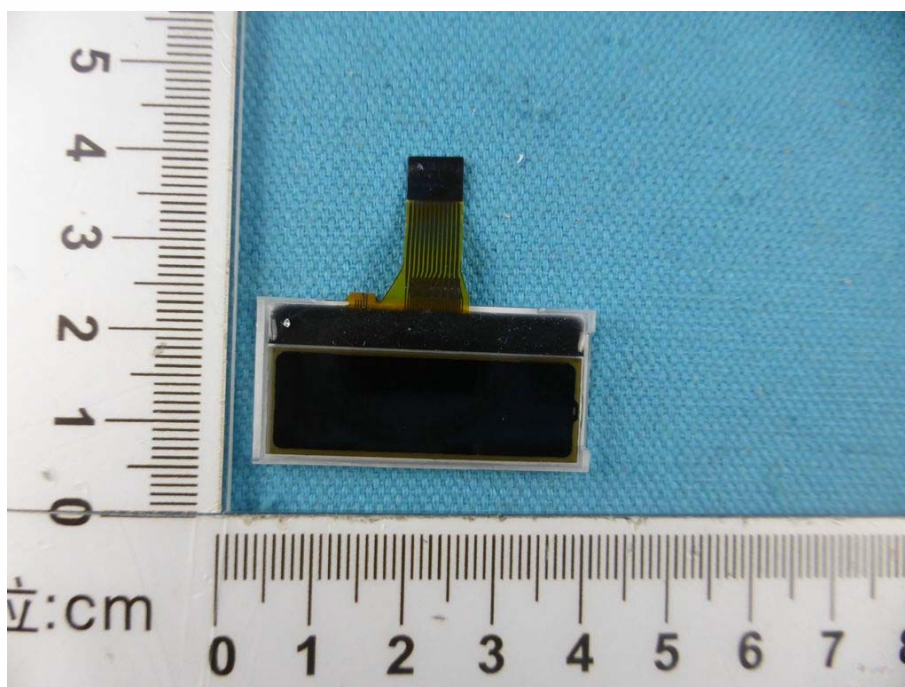
View of Product-13



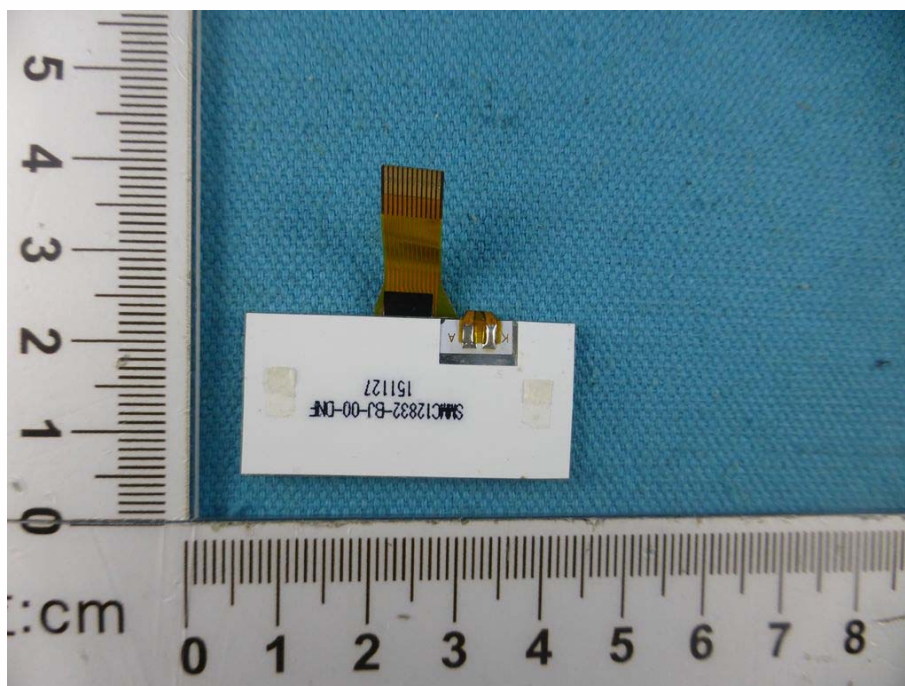
View of Product-14



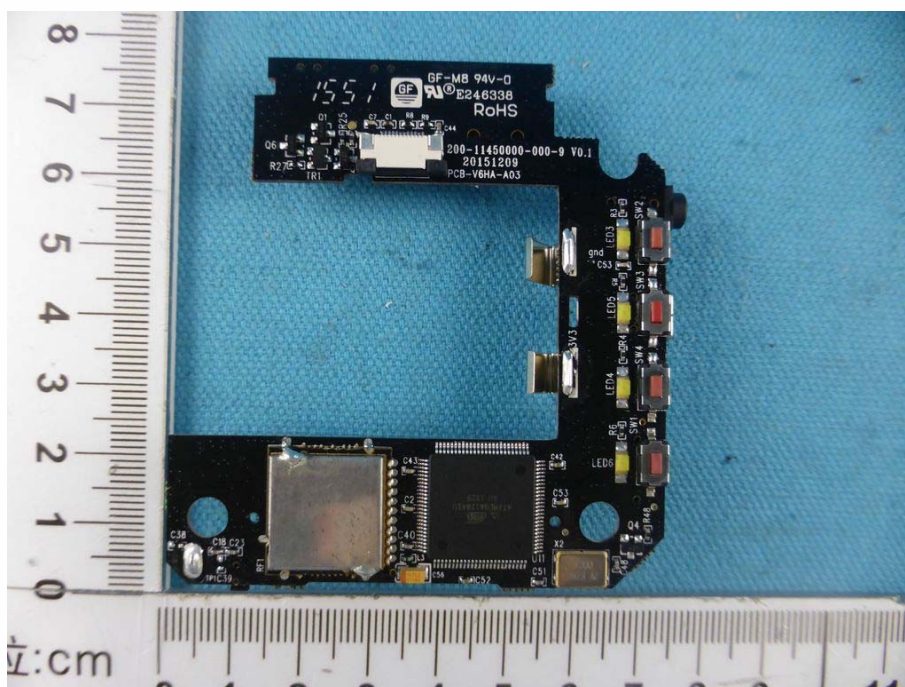
View of Product-15



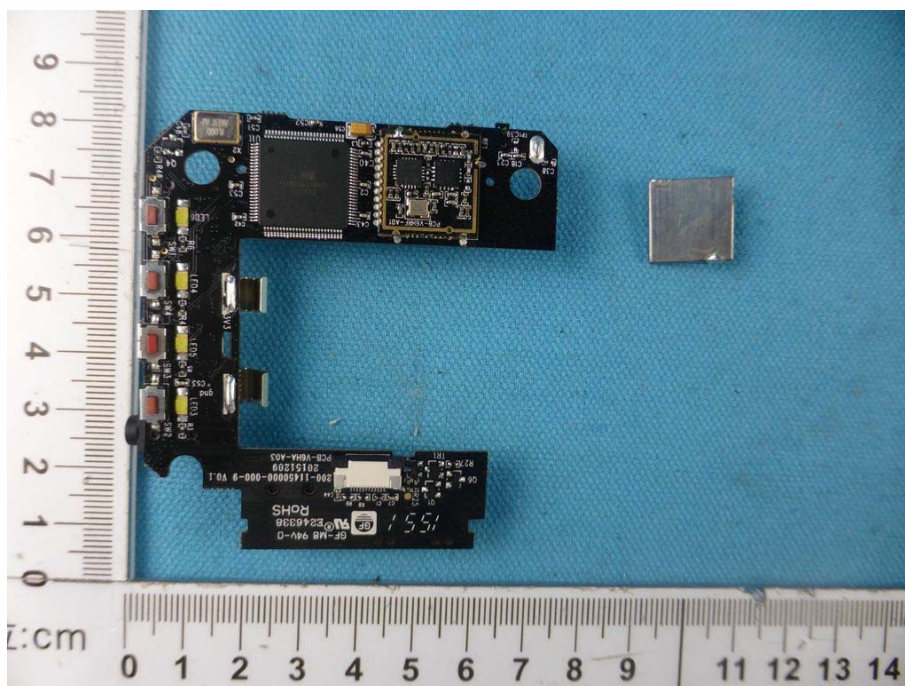
View of Product-16



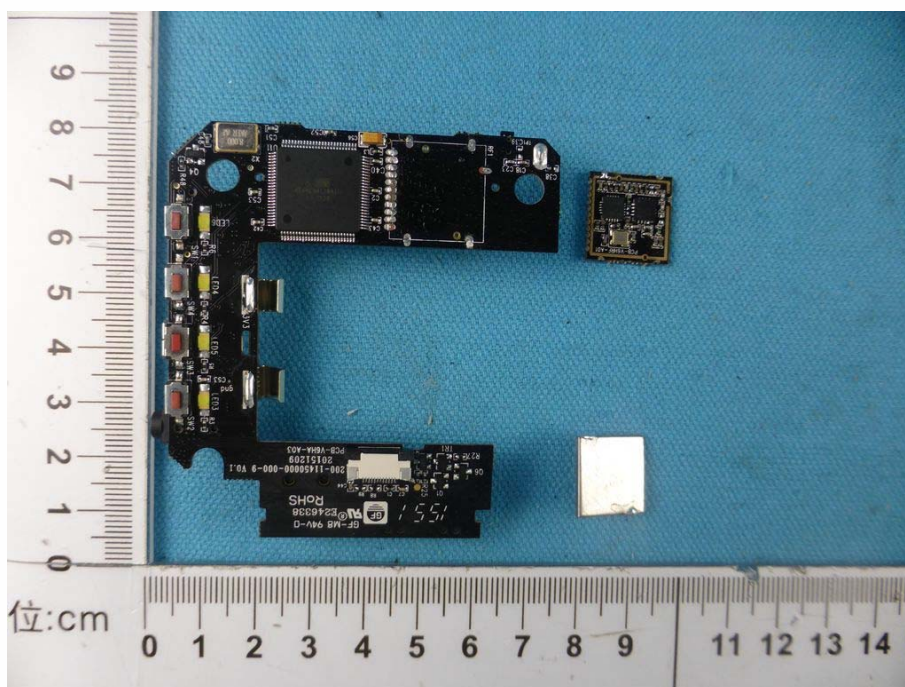
View of Product-17



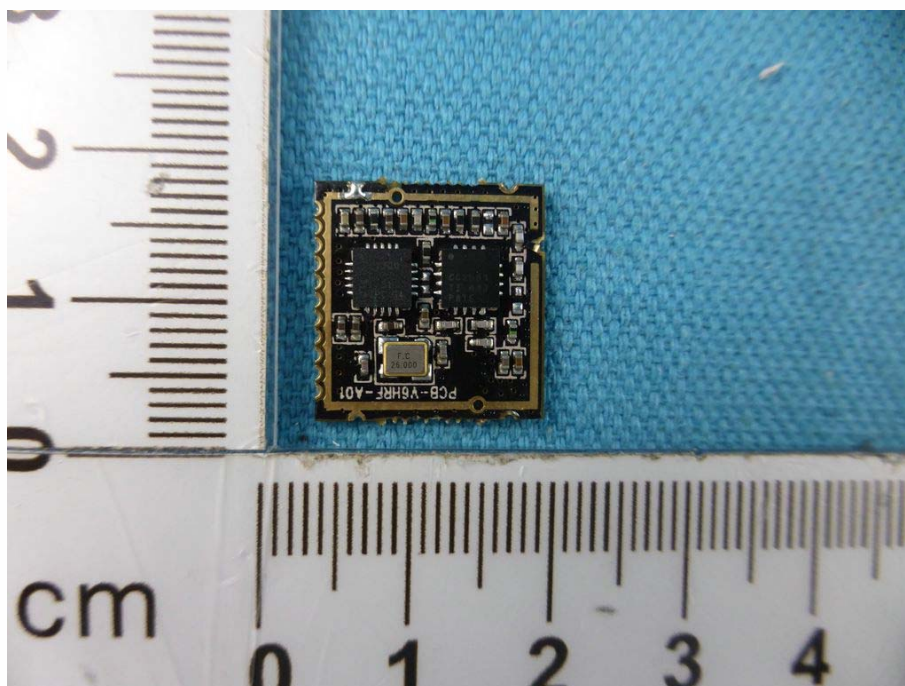
View of Product-18



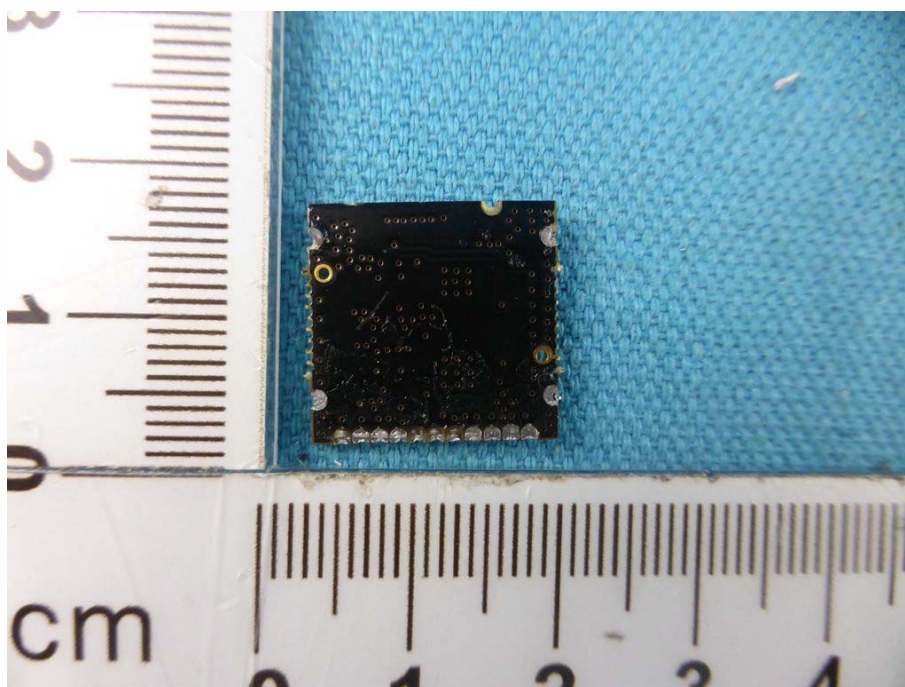
View of Product-19



View of Product-20



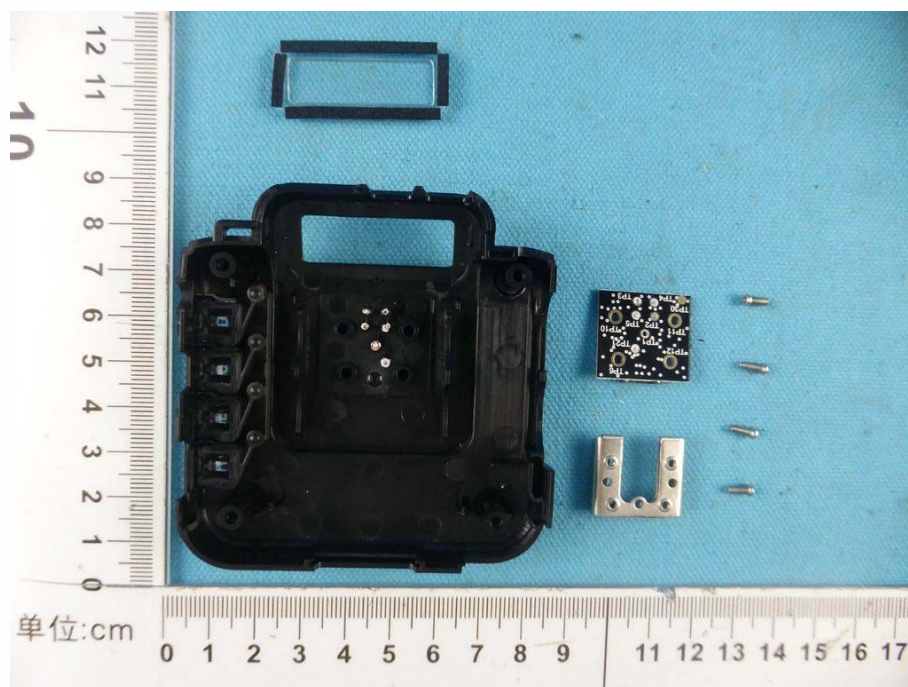
View of Product-21



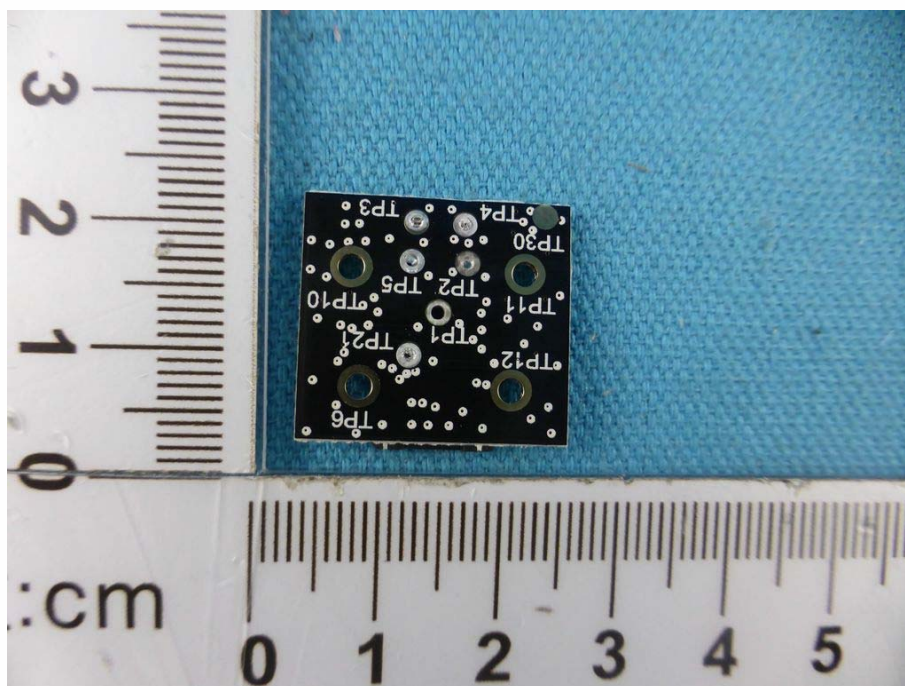
View of Product-22



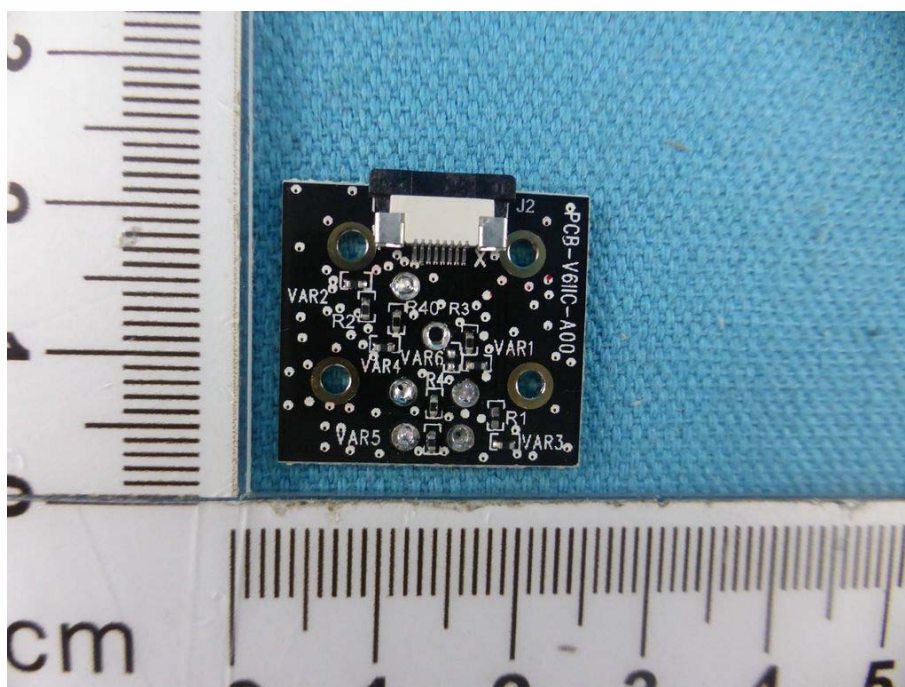
View of Product-23



View of Product-24



View of Product-25

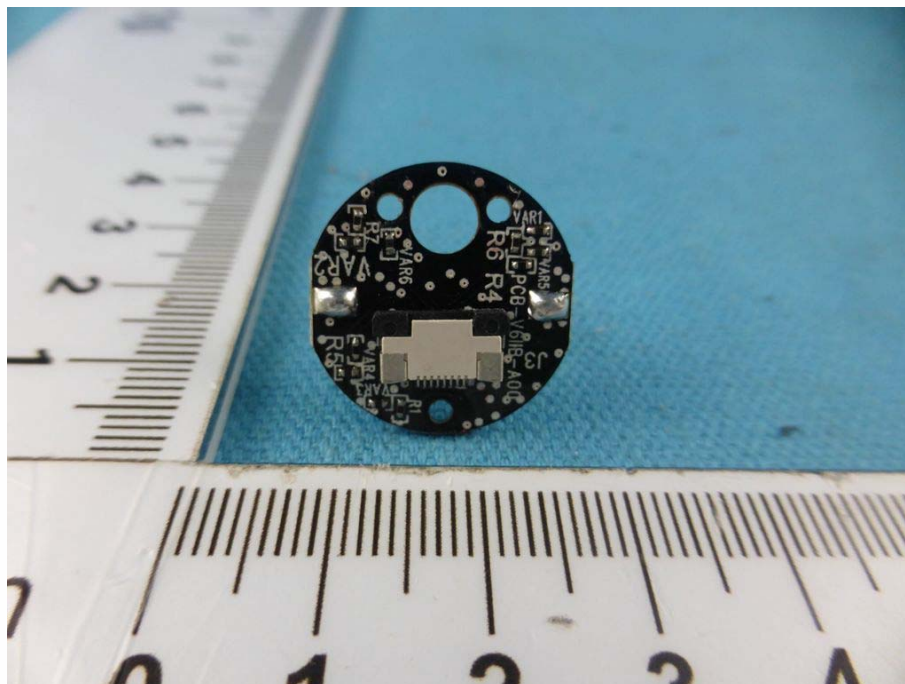




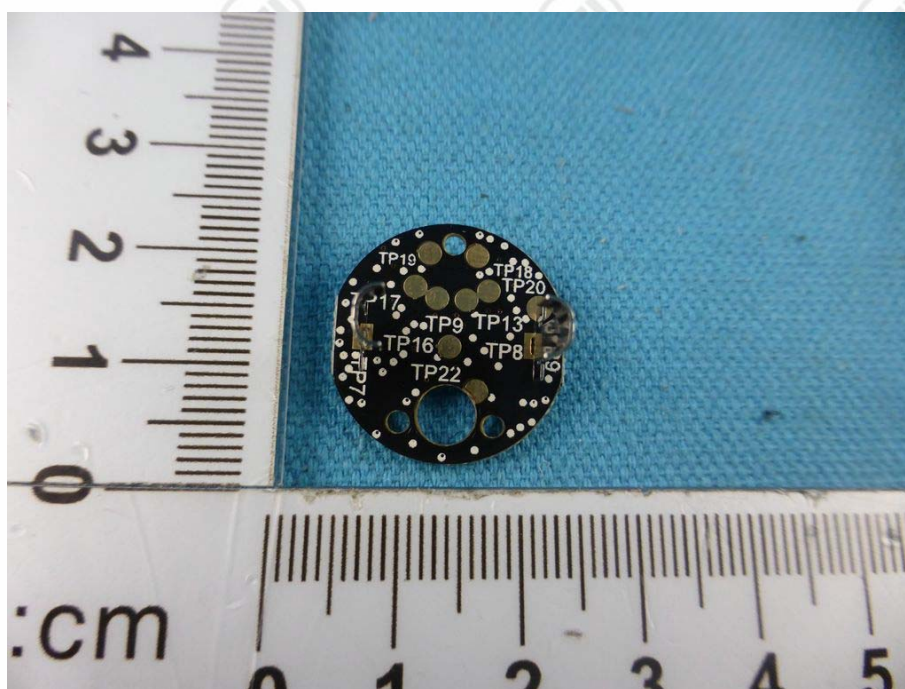
View of Product-27



View of Product-28



View of Product-29



View of Product-30

*** End of Report ***

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