

FCC TEST REPORT

Product : INNO LUMI LED Remote
Trade mark : N/A
Model/Type reference : LUMI-R2
Serial Number : N/A
Report Number : EED32J00107901
FCC ID : 2AMKD-LUMI-R2
Date of Issue : Jul. 03, 2017
Test Standards : 47 CFR Part 15 Subpart B (2015)
Test result : PASS

Prepared for:

Shenzhen Dr. Kon Tech. Co., Ltd
Rm606 6/F, Yafangting Centre, Majialong Industrial Zone,
Nanshan Dist. Shenzhen, Province Guangdong CHINA

Prepared by:

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Sheek Luo (Lab supervisor)

Date:

Jul. 03, 2017

Check No.: 2447608080



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2 Version

Version No.	Date	Description
00	Jul. 03, 2017	Original

3 Test Summary

Test Item	Test Requirement	Test method	Result
Radiated Emission	47 CFR Part 15B	ANSI C63.4-2014	PASS
Conducted Emission (150KHz to 30MHz)	47 CFR Part 15B	ANSI C63.4-2014	PASS

Remark:

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

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5 General Information

5.1 Client Information

Applicant:	Shenzhen Dr. Kon Tech. Co., Ltd
Address of Applicant:	Rm 606 6/F, Yafangting Centre, Majialong Industrial Zone, Nanshan Dist. Shenzhen, Province Guangdong CHINA
Manufacturer:	Shenzhen Dr. Kon Tech. Co., Ltd
Address of Manufacturer:	Rm 606 6/F, Yafangting Centre, Majialong Industrial Zone, Nanshan Dist. Shenzhen, Province Guangdong CHINA

5.2 General Description of EUT

Product Name:	INNO LUMI LED Remote
Model No.(EUT):	LUMI-R2
Trade Mark:	N/A
EUT Supports Radios application	2.401GHz; 2.441GHz; 2.481GHz
Number of Channel:	3
Power Supply:	450mAh 3.7V (lithium battery)

5.3 Product Specification subjective to this standard

Frequency Range:	2.401GHz; 2.441GHz; 2.481GHz
Test voltage:	AC 120V, 60Hz
Sample Received Date:	Jun. 02, 2017
Sample tested Date:	Jun. 02, 2017 to Jul. 03, 2017

5.4 Test Environment and Mode

Operating Environment:	
Temperature:	22°C
Humidity:	53% RH
Atmospheric Pressure:	1010mbar
Test mode:	
USB playing mode:	Connect the EUT to Laptop by USB cable and exchanging data.

5.5 Description of Support Units

The EUT has been tested with associated equipment below.

Associated equipment name	Manufacture	model	Serial number	Supplied by
AE1	aigo	A6-501000	ZFCA00753104460	CTI
AE2	Lenovo	E49	WB12903656	CTI
AE3	L.Selectron	OP-308	F0729003225KOSG	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.: 886427

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 886427.

IC-Registration No.: 7408A-2

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-2 .

IC-Registration No.: 7408B-1

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-1.

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	Radiated Spurious emission	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-12.75GHz)
3	Conduction emission	3.6dB (9kHz to 150kHz)
		3.2dB (150kHz to 30MHz)
4	Temperature	0.64°C
5	Humidity	2.8%
6	DC power voltages	0.025%

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6 Equipment List

Conducted disturbance Test					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Receiver	R&S	ESCI	100009	06-14-2017	06-13-2018
Temperature/ Humidity Indicator	TAYLOR	1451	1905	05-08-2017	05-07-2018
LISN	R&S	ENV216	100098	06-13-2017	06-12-2018
LISN	schwarzbeck	NNLK8121	8121-529	06-13-2017	06-12-2018
Voltage Probe	R&S	ESH2-Z3	--	07-09-2014	07-07-2017
Current Probe	R&S	EZ17	100106	06-13-2017	06-12-2018
ISN	TESEQ GmbH	ISN T800	30297	02-23-2017	02-22-2018

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-05-2016	06-05-2019
TRILOG Broadband Antenna	SCHWARZBECK	VULB9163	9163-484	06-09-2017	06-08-2018
Microwave Preamplifier	Agilent	8449B	3008A02425	02-16-2017	02-15-2018
Horn Antenna	ETS-LINDGREN	3117	00057407	07-20-2015	07-18-2018
Loop Antenna	ETS	6502	00071730	07-30-2015	07-28-2017
Spectrum Analyzer	R&S	FSP40	100416	06-13-2017	06-12-2018
Receiver	R&S	ESCI	100435	06-14-2017	06-13-2018
Multi device Controller	maturo	NCD/070/10711 112	---	01-11-2017	01-10-2018
LISN	schwarzbeck	NNBM8125	81251547	06-13-2017	06-12-2018
LISN	schwarzbeck	NNBM8125	81251548	06-13-2017	06-12-2018
Signal Generator	Agilent	E4438C	MY45095744	03-14-2017	03-13-2018
Signal Generator	Keysight	E8257D	MY53401106	03-14-2017	03-13-2018
Temperature/ Humidity Indicator	TAYLOR	1451	1905	05-08-2017	05-07-2018
Cable line	Fulai(7M)	SF106	5219/6A	01-11-2017	01-10-2018
Cable line	Fulai(6M)	SF106	5220/6A	01-11-2017	01-10-2018
Cable line	Fulai(3M)	SF106	5216/6A	01-11-2017	01-10-2018
Cable line	Fulai(3M)	SF106	5217/6A	01-11-2017	01-10-2018
High-pass filter	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-11-2017	01-10-2018
High-pass filter	MICRO-TRONICS	SPA-F-63029-4	---	01-11-2017	01-10-2018
band rejection filter	Sinoscite	FL5CX01CA09C L12-0395-001	---	01-11-2017	01-10-2018
band rejection filter	Sinoscite	FL5CX01CA08C L12-0393-001	---	01-11-2017	01-10-2018
band rejection filter	Sinoscite	FL5CX02CA04C L12-0396-002	---	01-11-2017	01-10-2018
band rejection filter	Sinoscite	FL5CX02CA03C L12-0394-001	---	01-11-2017	01-10-2018

7 Test results and Measurement Data

7.1 Conducted Emissions

Test Requirement: 47 CFR Part 15B

Test Method: ANSI C63.4

Test frequency range: 150kHz to 30MHz

Limit:

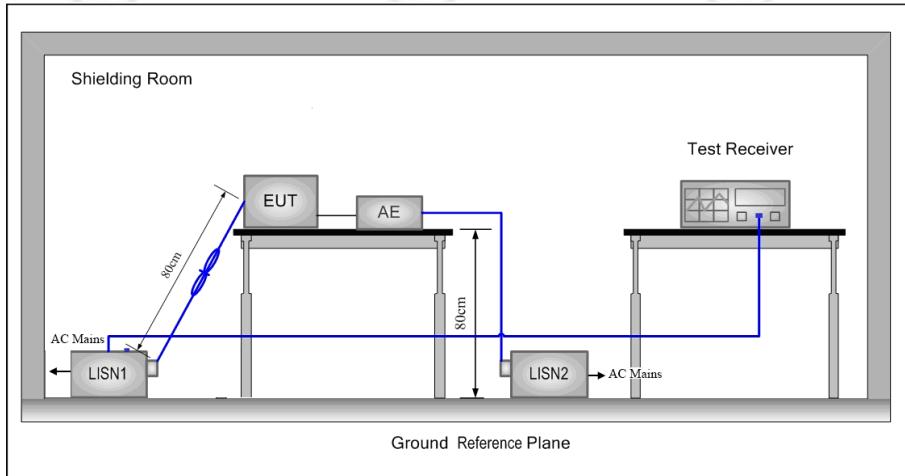
Frequency range (MHz)	Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* 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 LISN 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.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement.

Test Setup:



Instruments Used:

Refer to section 6 for details

Test Results:

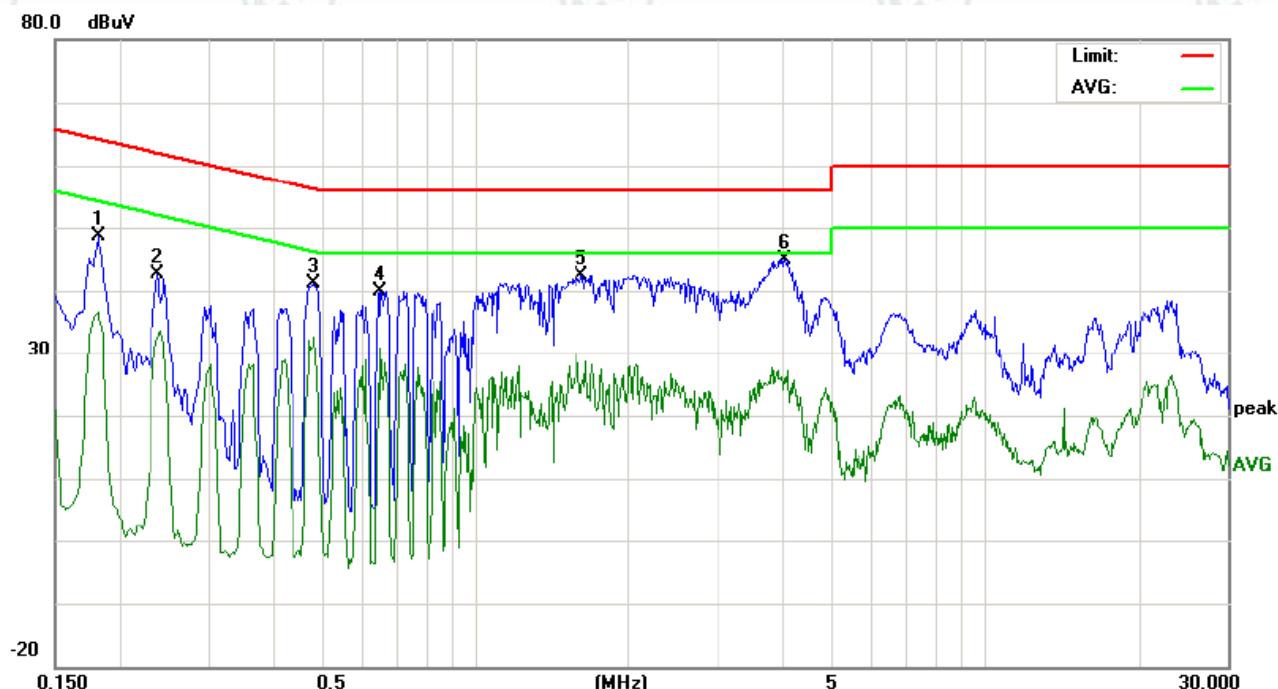
Pass

Measurement Data

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

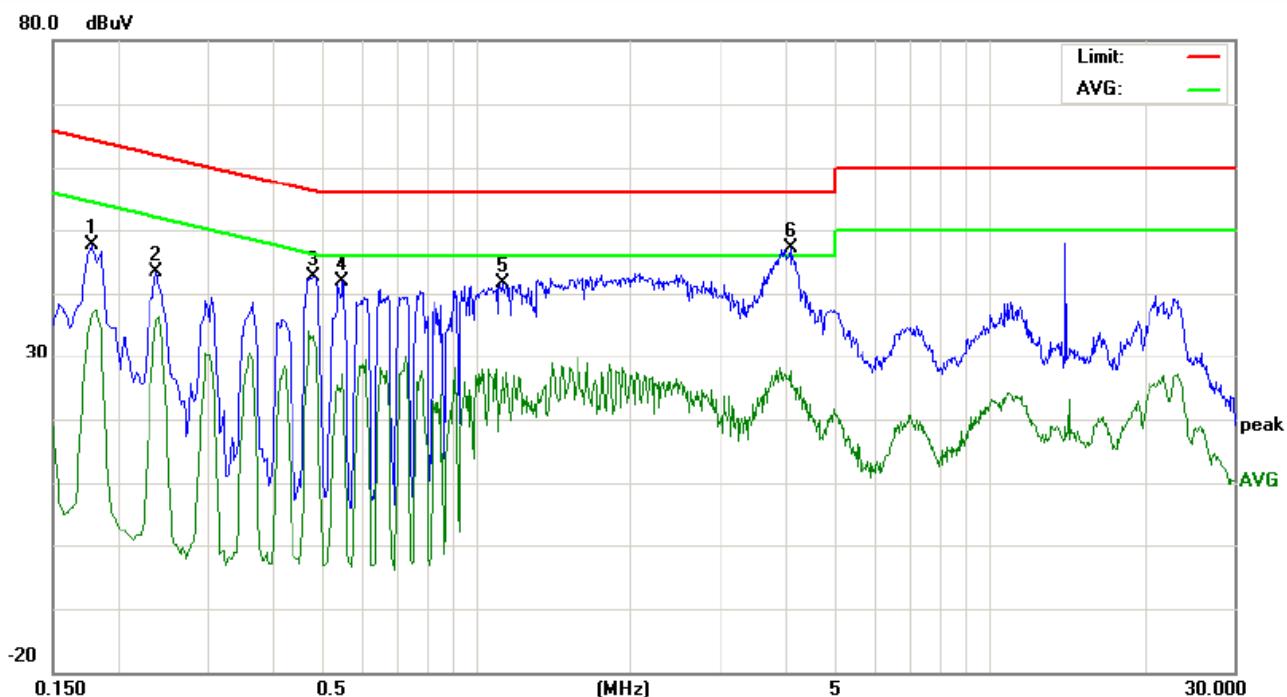
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:



No.	Freq.	Reading_Level (dBuV)			Correct Factor			Measurement (dBuV)			Limit (dBuV)			Margin (dB)		
		MHz	Peak	QP	Avg	dB	peak	QP	Avg	QP	Avg	QP	Avg	P/F	Comment	
1	0.1819	38.89	38.31	27.47	9.73	48.62	48.04	37.20	64.39	54.39	-16.35	-17.19	P			
2	0.2380	32.86	31.32	23.65	9.74	42.60	41.06	33.39	62.16	52.16	-21.10	-18.77	P			
3	0.4820	31.37	30.27	22.52	9.72	41.09	39.99	32.24	56.30	46.30	-16.31	-14.06	P			
4	0.6540	30.14	27.90	16.59	9.75	39.89	37.65	26.34	56.00	46.00	-18.35	-19.66	P			
5	1.6260	32.68	29.59	12.04	9.68	42.36	39.27	21.72	56.00	46.00	-16.73	-24.28	P			
6	4.0660	35.35	30.94	13.60	9.65	45.00	40.59	23.25	56.00	46.00	-15.41	-22.75	P			

Neutral Line:



No.	Freq.	Reading_Level (dBuV)			Correct Factor		Measurement (dBuV)			Limit (dBuV)		Margin (dB)		
		MHz	Peak	QP	AVG	dB	peak	QP	AVG	QP	Avg	QP	Avg	P/F
1	0.1780	37.93	37.82	28.46	9.73	47.66	47.55	38.19	64.57	54.57	-17.02	-16.38	P	
2	0.2380	33.55	31.25	25.59	9.74	43.29	40.99	35.33	62.16	52.16	-21.17	-16.83	P	
3	0.4860	32.94	31.58	23.40	9.72	42.66	41.30	33.12	56.24	46.24	-14.94	-13.12	P	
4	0.5500	32.17	29.93	14.78	9.73	41.90	39.66	24.51	56.00	46.00	-16.34	-21.49	P	
5	1.1260	31.90	30.14	15.63	9.63	41.53	39.77	25.26	56.00	46.00	-16.23	-20.74	P	
6	4.1020	37.46	31.07	14.02	9.65	47.11	40.72	23.67	56.00	46.00	-15.28	-22.33	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.

7.2 Radiated Emission

Test Requirement: 47 CFR Part 15B

Test Method: ANSI C63.4

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

Receiver setup:

Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value

Limit:

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 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 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 (Above 18GHz the distance is 1 meter).
- 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.

Test Setup:

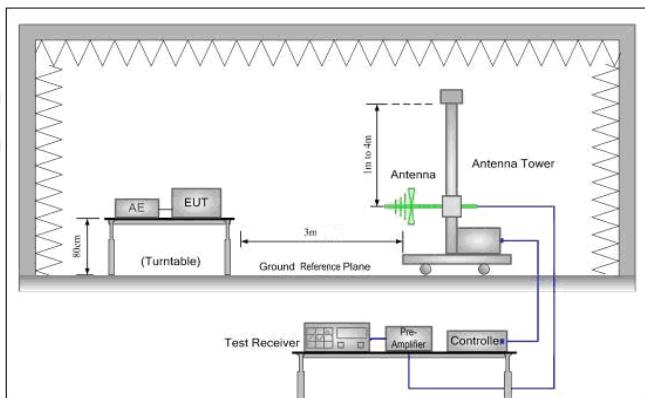


Figure 1. 30MHz to 1GHz

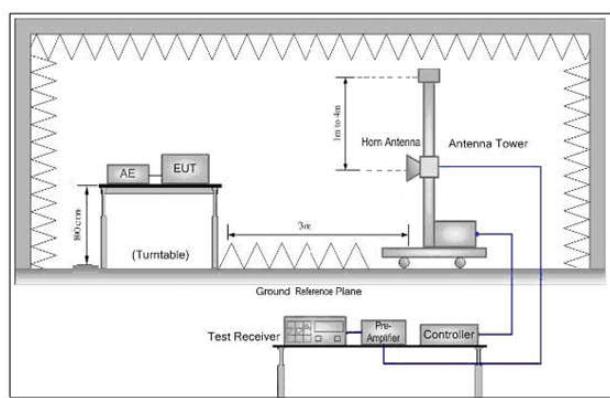


Figure 2. Above 1 GHz

Instruments Used:

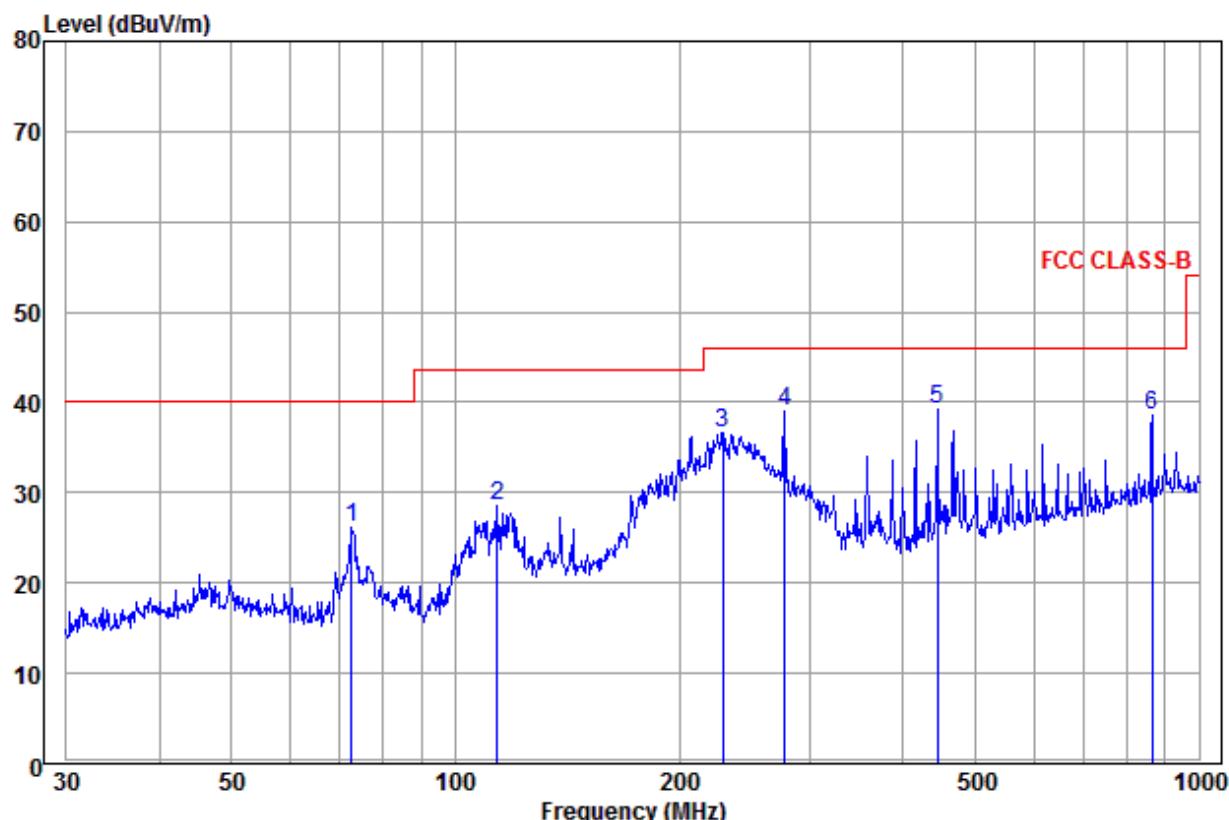
Refer to section 6 for details

Test Results:

Pass

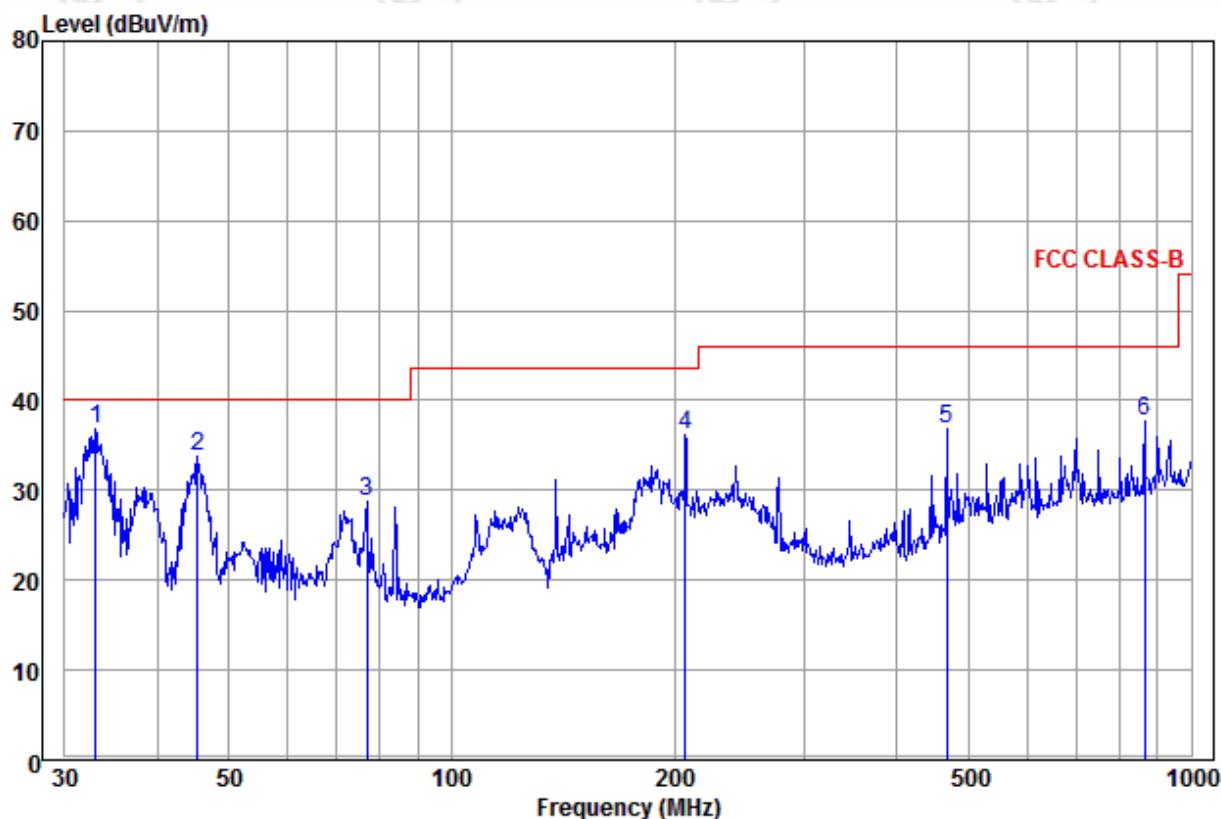
Below 1GHz

Horizontal



	Ant Freq	Cable Factor	Read Level	Limit Line	Over Limit		Over Limit Pol/Phase	Remark				
					MHz	dB/m	dB	dBuV	dB _{uV/m}	dB _{uV/m}	dB	dB
1	72.592	8.60	0.30	17.22	26.12	40.00	-13.88	17.22	26.12	40.00	-13.88	Horizontal
2	113.714	10.05	0.60	17.86	28.51	43.50	-14.99	17.86	28.51	43.50	-14.99	Horizontal
3	229.293	11.61	1.25	23.85	36.71	46.00	-9.29	23.85	36.71	46.00	-9.29	Horizontal
4	277.094	12.85	1.19	24.89	38.93	46.00	-7.07	24.89	38.93	46.00	-7.07	Horizontal
5 pp	444.851	16.22	1.46	21.51	39.19	46.00	-6.81	21.51	39.19	46.00	-6.81	Horizontal
6	866.088	21.40	2.46	14.64	38.50	46.00	-7.50	14.64	38.50	46.00	-7.50	Horizontal

Vertical



	Ant Freq	Cable Loss	Read Level	Limit Line	Over Limit		Remark
					Pol	Phase	
	MHz	dB/m	dB	dBuV	dBuV/m	dBuV/m	
1	pp	32.979	11.19	0.08	25.56	36.83	40.00 -3.17 Vertical
2		45.375	12.91	0.08	20.80	33.79	40.00 -6.21 Vertical
3		76.781	7.68	0.37	20.70	28.75	40.00 -11.25 Vertical
4		207.123	11.16	1.14	23.80	36.10	43.50 -7.40 Vertical
5		467.235	16.62	1.49	18.81	36.92	46.00 -9.08 Vertical
6		866.088	21.40	2.46	13.85	37.71	46.00 -8.29 Vertical

Above 1GHz

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dB μ V)	Level (dB μ V/m)	Limit (dB μ V/m)	Over Limit (dB)	Result	Antenna Polaxis
1446.436	30.77	44.06	2.78	44.97	34.46	74.00	-39.54	Pass	H
1912.893	31.57	43.58	3.17	46.49	37.65	74.00	-36.35	Pass	H
2380.264	32.52	44.02	4.26	47.32	40.08	74.00	-33.92	Pass	H
3262.720	33.37	44.67	5.57	46.19	40.46	74.00	-33.54	Pass	H
5254.943	35.32	44.57	5.69	45.99	42.43	74.00	-31.57	Pass	H
5716.644	35.69	44.53	6.80	44.49	42.45	74.00	-31.55	Pass	H
1080.091	29.92	44.57	2.37	46.02	33.74	74.00	-40.26	Pass	V
1336.782	30.54	44.20	2.67	41.21	30.22	74.00	-43.78	Pass	V
2951.232	33.52	44.65	5.52	37.72	32.11	74.00	-41.89	Pass	V
3745.394	32.98	44.62	5.48	36.32	30.16	74.00	-43.84	Pass	V
5236.146	35.30	44.57	5.64	34.51	30.88	74.00	-43.12	Pass	V
5706.411	35.68	44.53	6.77	34.44	32.36	74.00	-41.64	Pass	V

Remark:

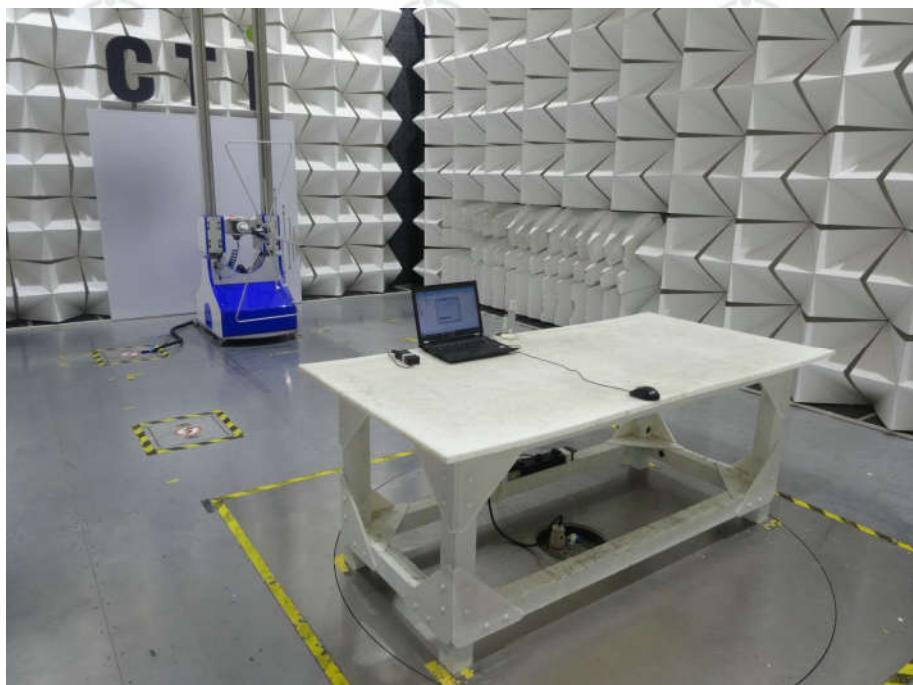
- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} - \text{Correct Factor}$$

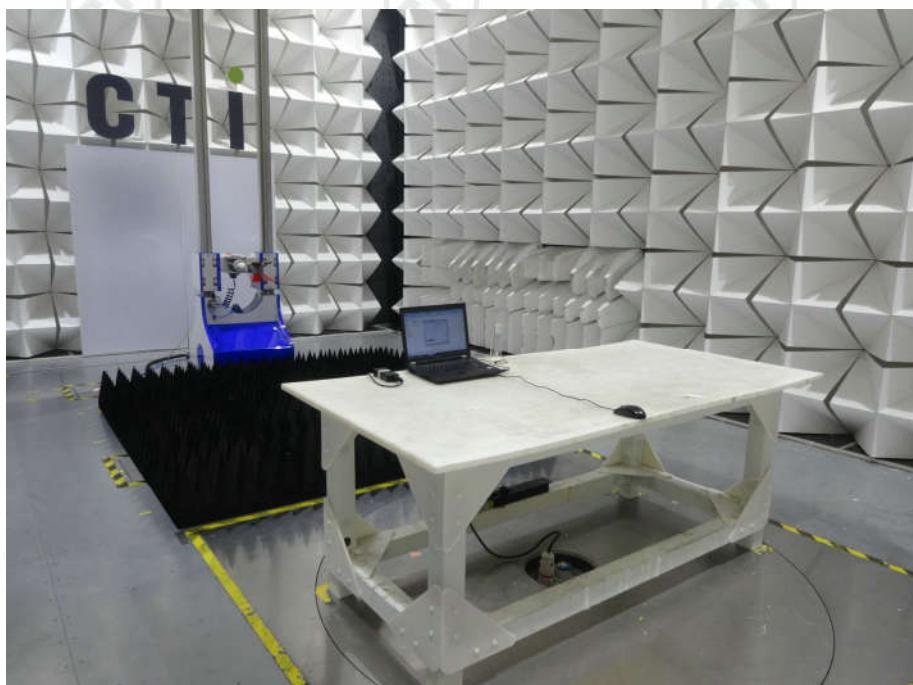
$$\text{Correct Factor} = \text{Preamplifier Factor} - \text{Antenna Factor} - \text{Cable Factor}$$

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Test Model No.: LUMI-R2



Radiated emission Test Setup-1 (30MHz~1GHz)



Radiated spurious emission Test Setup-2(Above 1GHz)

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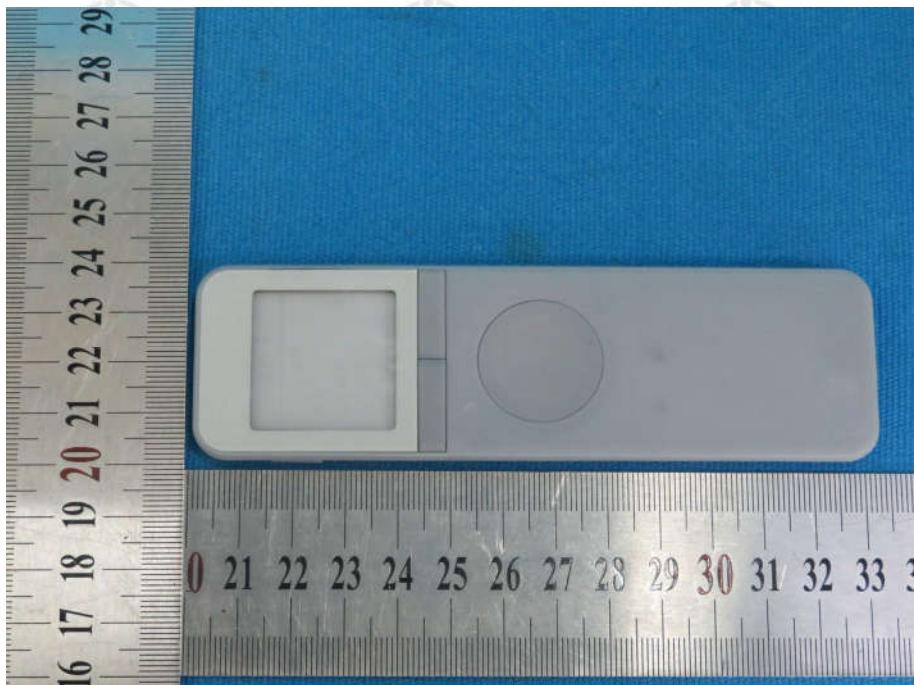
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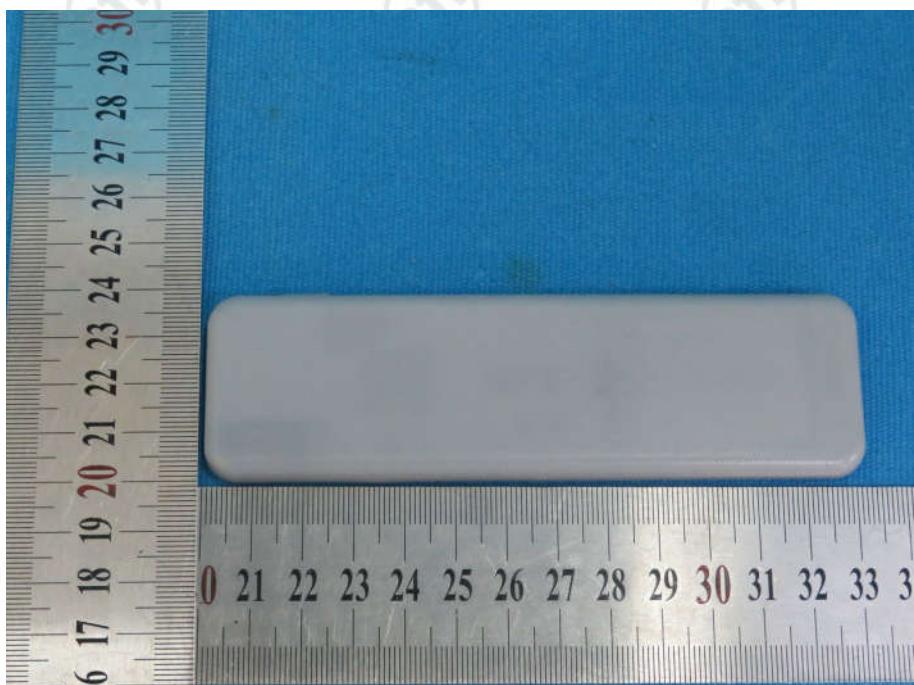
Conducted Emissions

APPENDIX 2 PHOTOGRAPHS OF EUT

Test model No.: LUMI-R2



View of Product-1



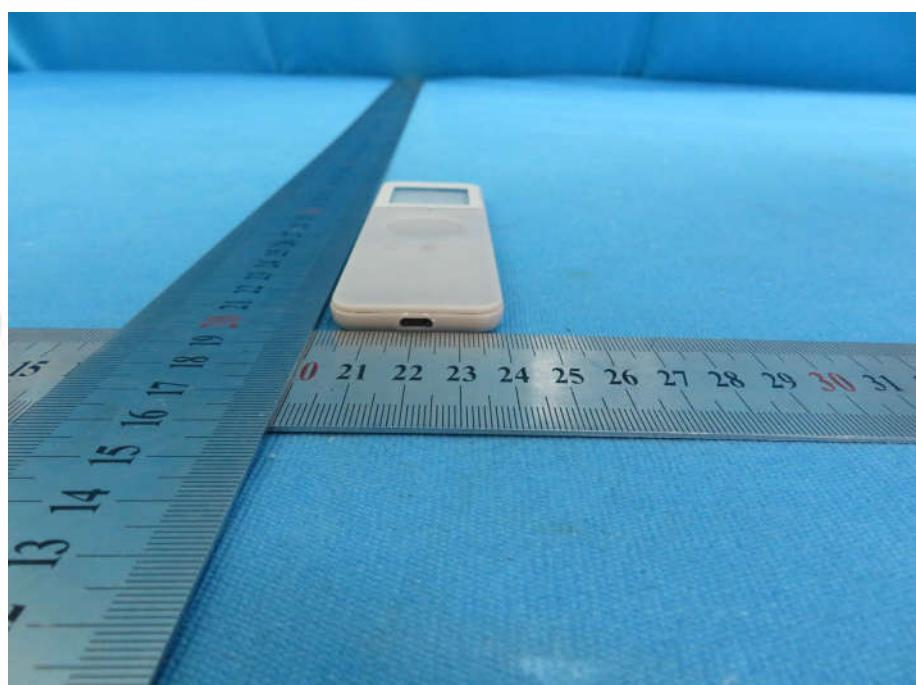
View of Product-2

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View of Product-3



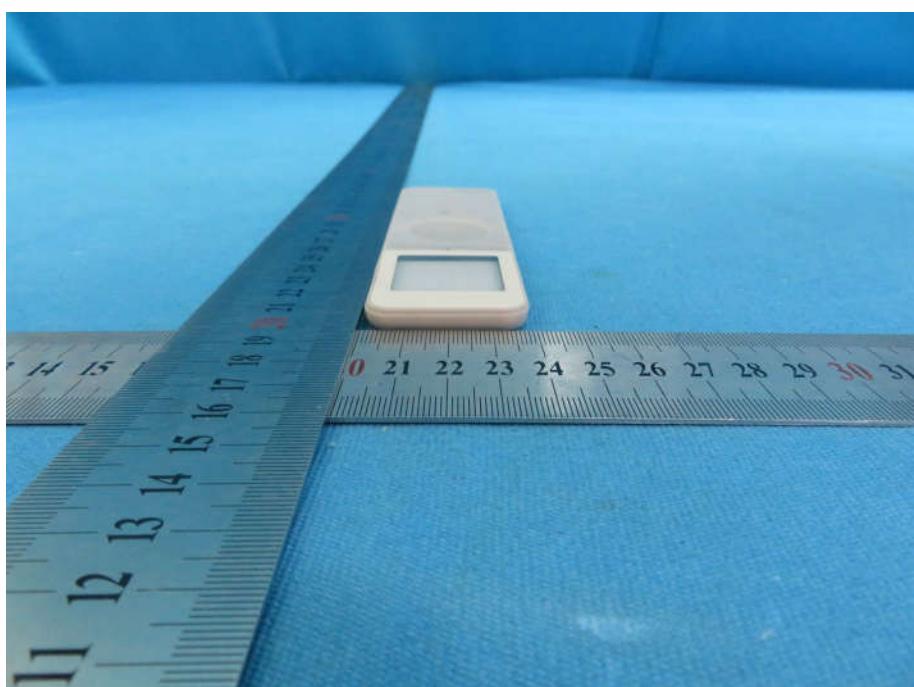
View of Product-4

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View of Product-5



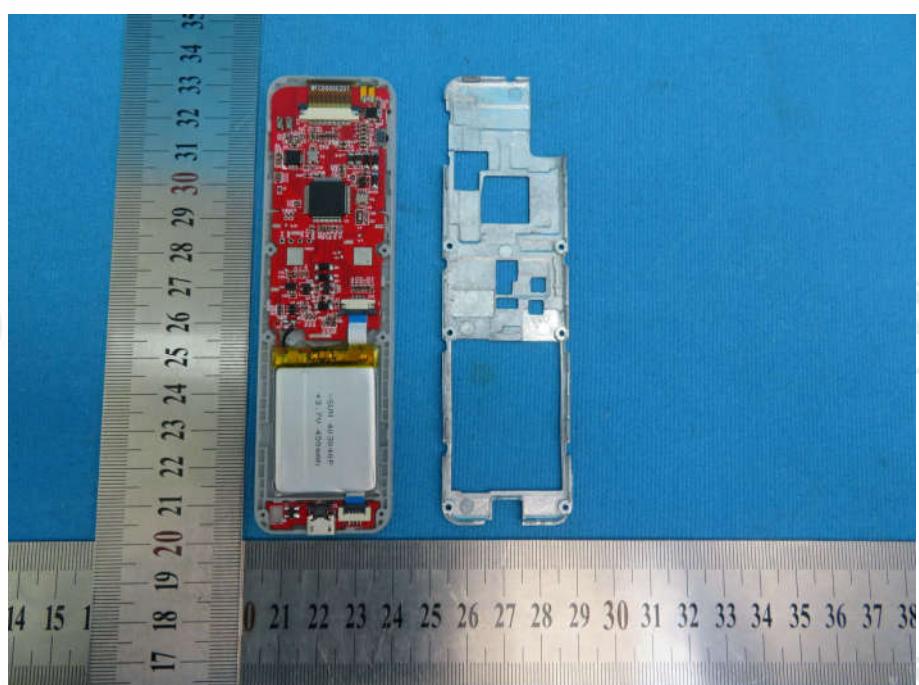
View of Product-6

Report No. : EED32J00107901

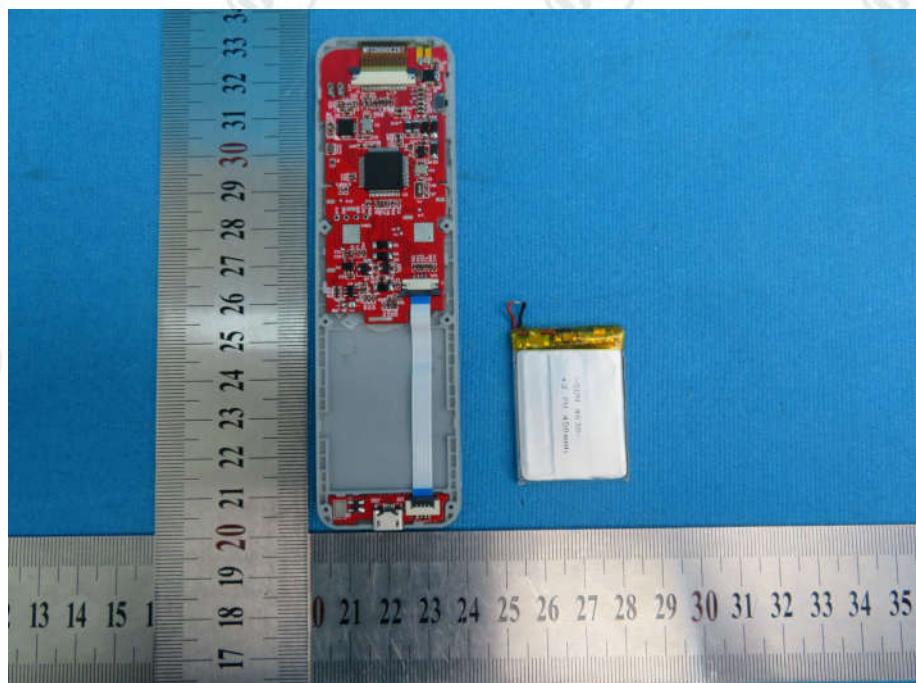
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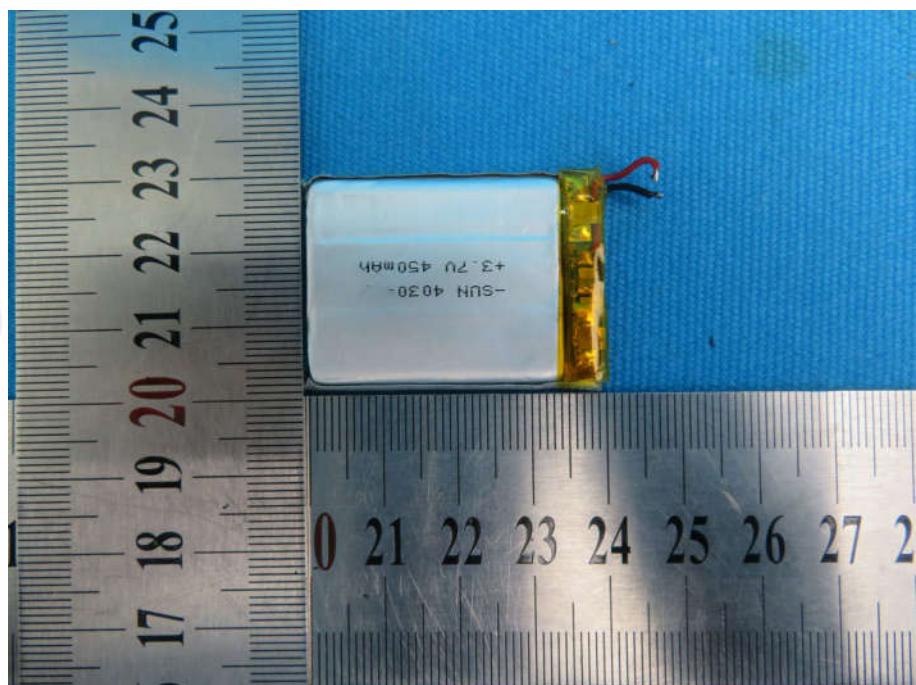
View of Product-7



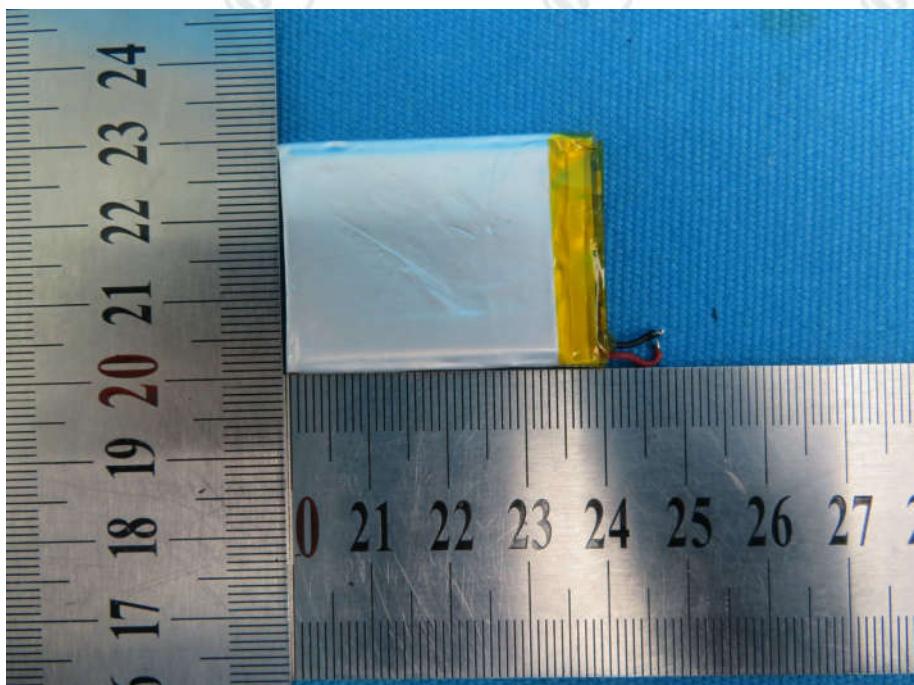
View of Product-8



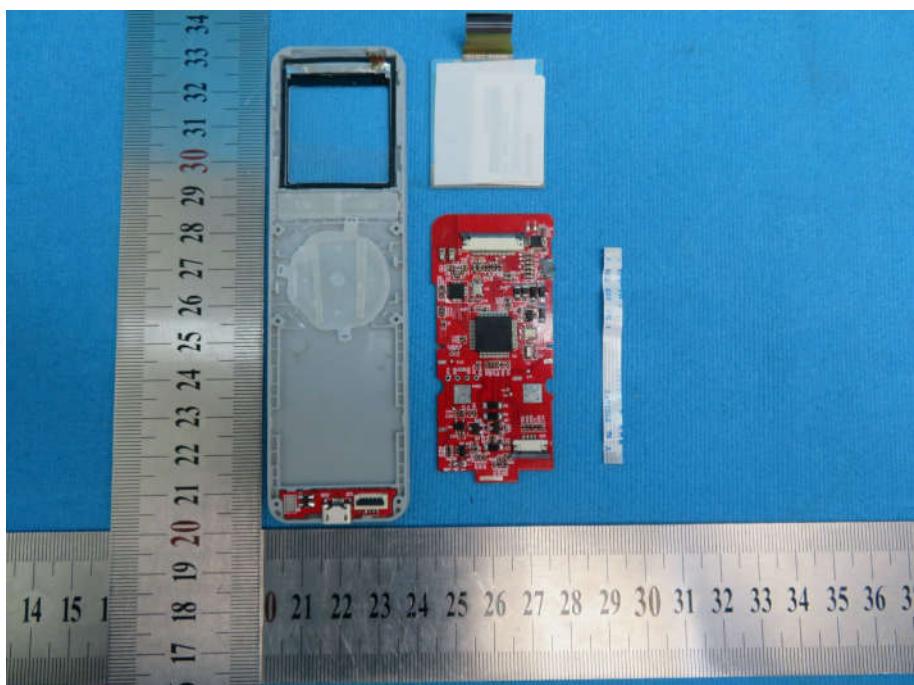
View of Product-9



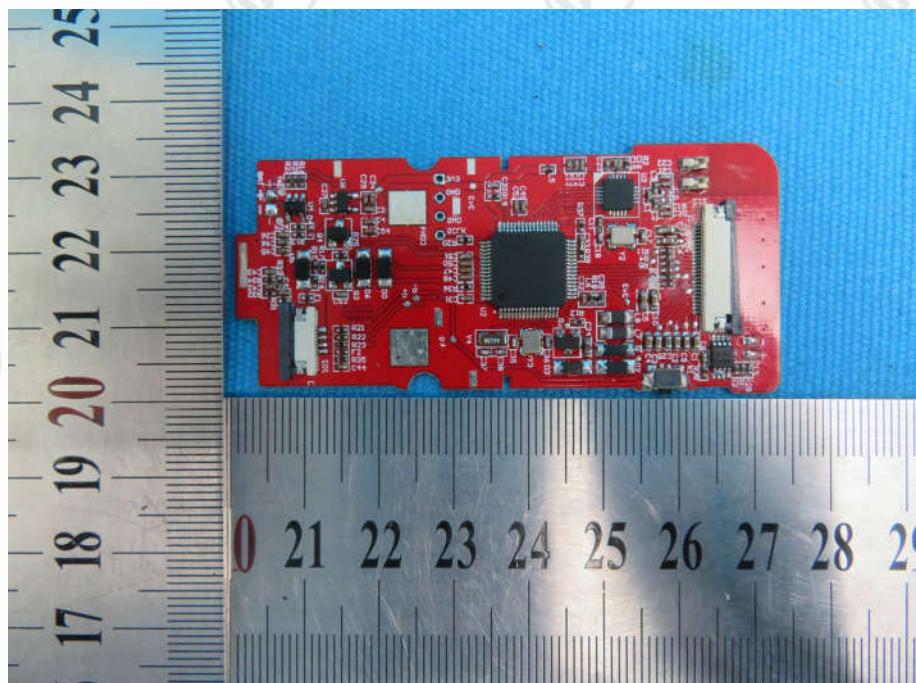
View of Product-10



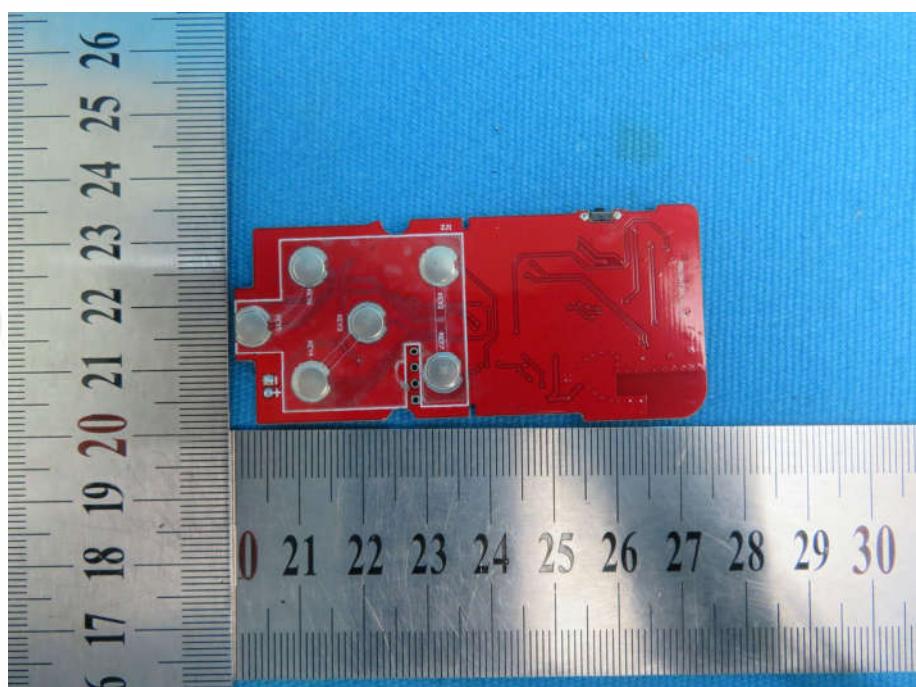
View of Product-11



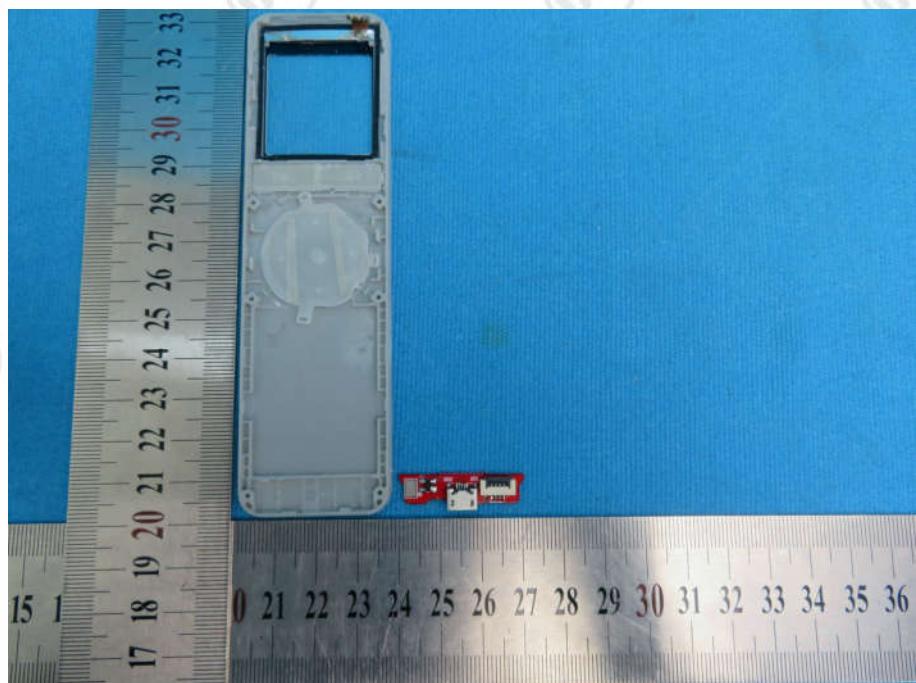
View of Product-12



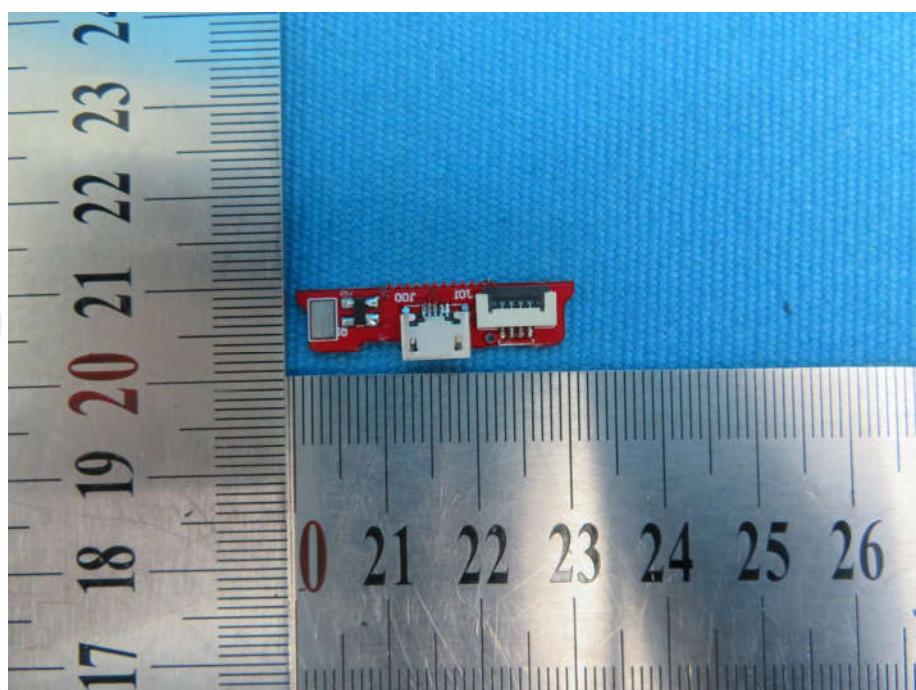
View of Product-13



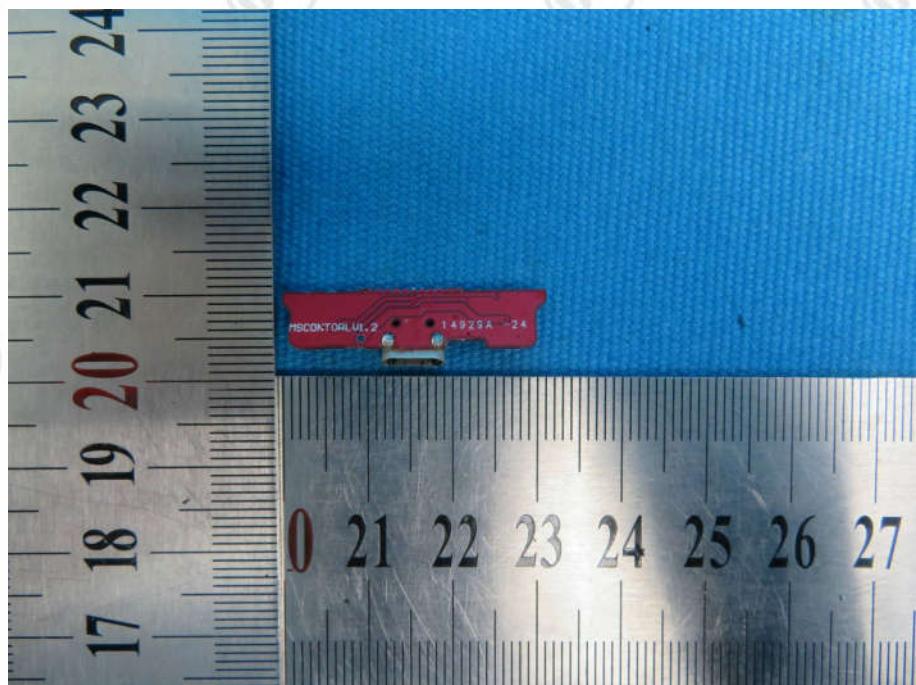
View of Product-14



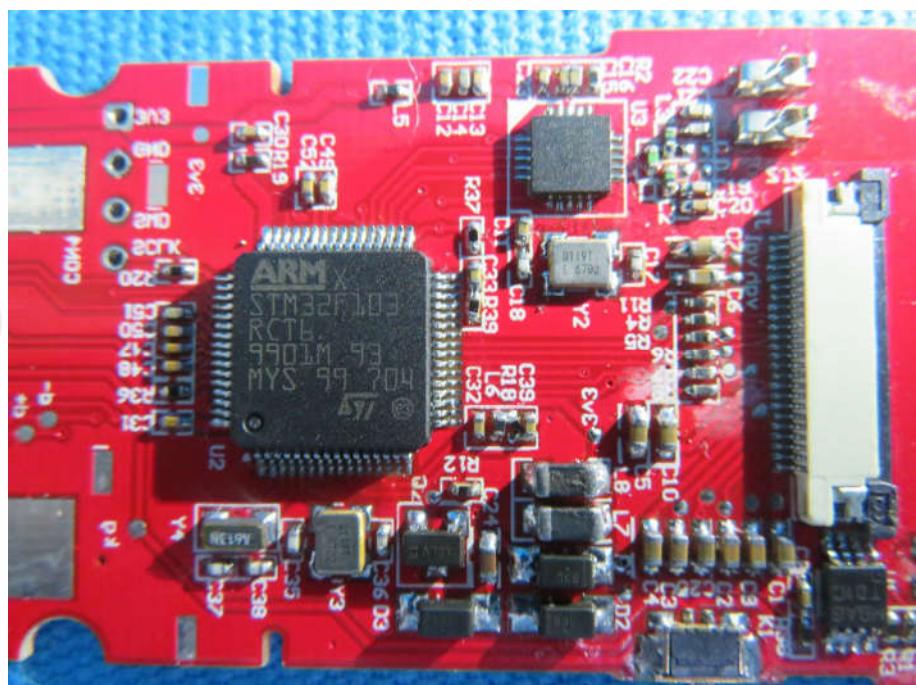
View of Product-15



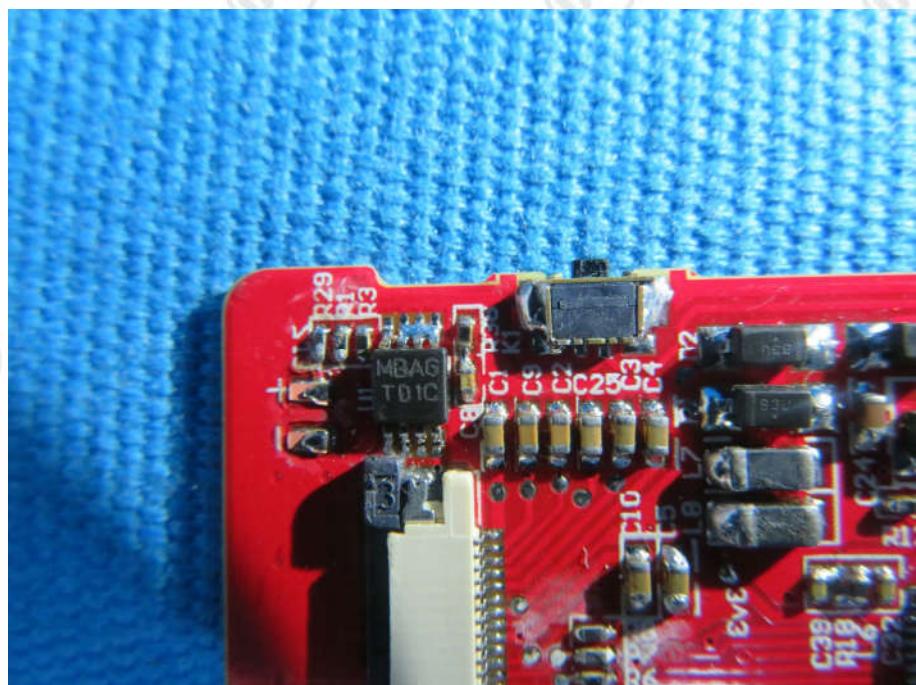
View of Product-16



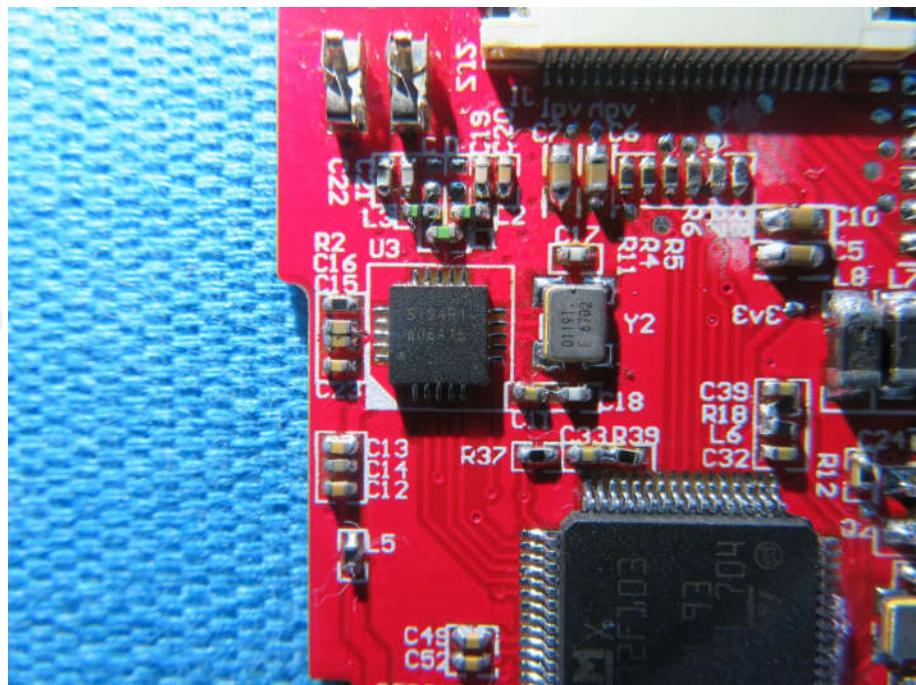
View of Product-17



View of Product-18



View of Product-19



View of Product-20

*** End of Report ***

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