



# **FCC 47 CFR PART 15 SUBPART B**

## **TEST REPORT**

*For*

**Applicant: SHENZHEN LI RUI ELECTRONIC CO.,LTD**

**Address: 4F, Block 4, B Area of Yintian Xifa Industrial Zone, Bao An District,  
Shenzhen, China**

**Product Name: MID**

**Model Number: N90, 97D02, 97D01, 97A01**

**Brand Name: N/A**

**FCC ID: Z2Z-97D**

**Report No.: MOST111201F1**

**Date of Issue: December. 13, 2011**

**Issued by: Most Technology Service Co., Ltd.**

**Address: No.5, Langshan 2nd Rd., North Hi-Tech Industrial park, Nanshan,  
Shenzhen, Guangdong, China**

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**1. VERIFICATION OF CONFORMITY**

**Equipment Under Test:** MID

**Brand Name:** N/A

**Model Number:** N90

**Series Number:** 97D02, 97D01, 97A01

**Difference description:** Only the the appearance and model name are different.

**FCC ID:** Z2Z-97D

**Applicant:** SHENZHEN LI RUI ELECTRONIC CO.,LTD  
4F, Block 4, B Area of Yintian Xifa Industrial Zone, Bao An District,

**Manufacturer:** SHENZHEN LI RUI ELECTRONIC CO.,LTD  
4F, Block 4, B Area of Yintian Xifa Industrial Zone, Bao An District,

**Technical Standards:** FCC Part 15 B

**File Number:** MOST111201F1

**Date of test:** December. 1, 2011 - December. 8, 2011

**Deviation:** None

**Condition of Test Sample:** Normal

The above equipment was tested by MOST for compliance with the requirements set forth in FCC Part 15 and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested by (+ signature):



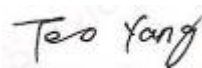
Zhang Ling      December. 13, 2011

Review by (+ signature):



July Wen      December. 13, 2011

Approved by (+ signature):



Terry Yang      December . 13 , 2011

## 2. GENERAL INFORMATION

### 2.1 PRODUCT INFORMATION

<b>Housing Type:</b>	Plastic
<b>EUT Rating Voltage:</b>	DC: 7.4V by Li-ion Battery; AC Adapter-- Model 1 :SAW24-120-2000 (100V-240V 50/60Hz) AC Adapter-- Model 2 :HWT-24W-120200(100V-240V 50/60Hz)
<b>Voltage During Test:</b>	120VAC 60Hz
<b>Model Number:</b>	N90

**NOTE:**

1. Please refer to Appendix 2 for the photographs of the EUT. For a more detailed features description about the EUT, please refer to User's Manual.

### 2.2 OBJECTIVE

Perform FCC Part 15 Subpart B tests for FCC Marking.

### 2.3 TEST STANDARDS AND RESULTS

Test items and the results are as bellow:

EMISSION			
Standard	Item	Result	Remarks
FCC 47 CFR Part 15 Subpart B	Conducted	PASS	Meet Class B limit
	Radiated	PASS	Meet Class B limit

- Note:
1. The test result judgment is decided by the limit of measurement standard
  2. The information of measurement uncertainty is available upon the customer's request.

## 2.4 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

## 2.5 MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in Measurement” (GUM) published by ISO.

- Uncertainty of Conducted Emission,  $U_c = \pm 1.8\text{dB}$
- Uncertainty of Radiated Emission,  $U_c = \pm 3.2\text{dB}$

### 3. TEST METHODOLOGY

#### 3.1 TEST FACILITY

Test Site:	Most Technology Service Co., Ltd.
Location:	No.5, Langshan 2nd Rd, North Hi-Tech Industrial park, Nanshan, Shenzhen, Guangdong, China
Description:	There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009 and CISPR 16 requirements. The FCC Registration Number is <b>490827</b> . The <b>CNAS</b> Registration Number is <b>CNAS L3573</b> .
Site Filing:	The site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.
Instrument Tolerance:	All measuring equipment is in accord with ANSI C63.4:2009 and CISPR 16 requirements that meet industry regulatory agency and accreditation agency requirement.
Ground Plane:	Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

#### 3.2 GENERAL TEST PROCEDURES

##### Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4:2009, Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

### Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4:2009.

### **3.3 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS**

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

## 4 SETUP OF EQUIPMENT UNDER TEST

### 4.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### 4.2 SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
PC	DELL	780MT	43ND8A00DC2	---	1.2M Un-shielding
MONITOR	Philips	220EW8FB/93	CJ2A0727038455	1.6M Un-Shielded	1.8M Un-Shielded
Keyboard	Unis	WN10	WN10200807005590	1.6M Un-Shielded	
Mouse	Lenovo	M-UAE96	E-C011-05-3735(B)	1.6M Un-Shielded	
Hard-disk	HITACHI	HTS541680J9S A00	0A28842DA15870P73	---	
Micro SD CARD	Kingston	1G	0907T139090	N/A	

*Remark:*

*All the equipment/cables were placed in the worst-case [-configuration to maximize the emission during the test.*

*Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*



#### 4. 3 TEST EQUIPMENT LIST

**Instrumentation:** The following list contains equipment used at MOST for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1.0 GHz or above.

No.	Equipment	Manufacturer	Model No.	S/N	Calibration due date
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2012/03/14
2	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2012/03/14
3	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2012/03/14
4	Terminator	Hubersuhner	50Ω	No.1	2012/03/14
5	RF Cable	SchwarzBeck	N/A	No.1	2012/03/14
6	Test Receiver	Rohde & Schwarz	ESPI	101202	2012/03/14
7	Bilog Antenna	Sunol	JB3	A121206	2012/03/14
8	Test Antenna - Horn	Schwarzbeck	BBHA 9120C	--	2012/03/14
9	Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	--	2012/03/14
10	Cable	Resenberger	N/A	NO.1	2012/03/14
11	Cable	SchwarzBeck	N/A	NO.2	2012/03/14
12	Cable	SchwarzBeck	N/A	NO.3	2012/03/14
13	DC Power Filter	DuoJi	DL2×30B	N/A	2012/03/14
14	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2012/03/14
15	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	2012/03/14
16	Test Receiver	Rohde & Schwarz	ESCI	100492	2012/03/14
17	Absorbing Clamp	Luthi	MDS21	3635	2012/03/14
18	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2012/03/14
19	AC Power Source	Kikusui	AC40MA	LM003232	2012/03/14
20	Test Analyzer	Kikusui	KHA1000	LM003720	2012/03/14
21	Line Impedence Network	Kikusui	LIN40MA-PCR-L	LM002352	2012/03/14
22	ESD Tester	Kikusui	KES4021	LM003537	2012/03/14
23	EMC PRO System	EM Test	UCS-500-M4	V0648102026	2012/03/14
24	Signal Generator	IFR	2032	203002/100	2012/03/14
25	Amplifier	A&R	150W1000	301584	2012/03/14
26	CDN	FCC	FCC-801-M2-25	47	2012/03/14
27	CDN	FCC	FCC-801-M3-25	107	2012/03/14
28	EM Injection Clamp	FCC	F-203I-23mm	403	2012/03/14
29	RF Cable	MIYAZAKI	N/A	No.1/No.2	2012/03/14
30	Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	0304789	2012/03/14
31	Telecommunication Antenna	European Antennas	PSA 75301R/170	0304213	2012/03/14

**NOTE:** Equipments listed above have been calibrated and are in the period of validation.

## **5. 47 CFR PART 15B REQUIREMENTS**

### **5.1 GENERAL INFORMATION**

#### **EUT Test Procedure:**

1. Put EUT on the test table.
2. Power on the EUT.
3. Make sure the EUT operates normally during the test.

#### **Mode 1: Standby Mode**

During the measurement, and the EUT was in charging Mode.

#### **Mode 2: Full load Mode**

During the measurement, the lithium battery was installed, and the system of EUT was running continuously.

#### **Mode 3: USB Mode**

During the measurement, the lithium battery was installed and connected with the notebook. And EUT and computer kept for data transmission continuously.

#### **Mode 4: Camera Mode**

During the measurement, the lithium battery was installed, and the MS was playing the camera function continuously.

#### **Mode 5: WiFi Mode**

During the measurement, the lithium battery was installed. A communication link was established between the EUT and a System Simulator.

## 6. LINE CONDUCTED EMISSION TEST

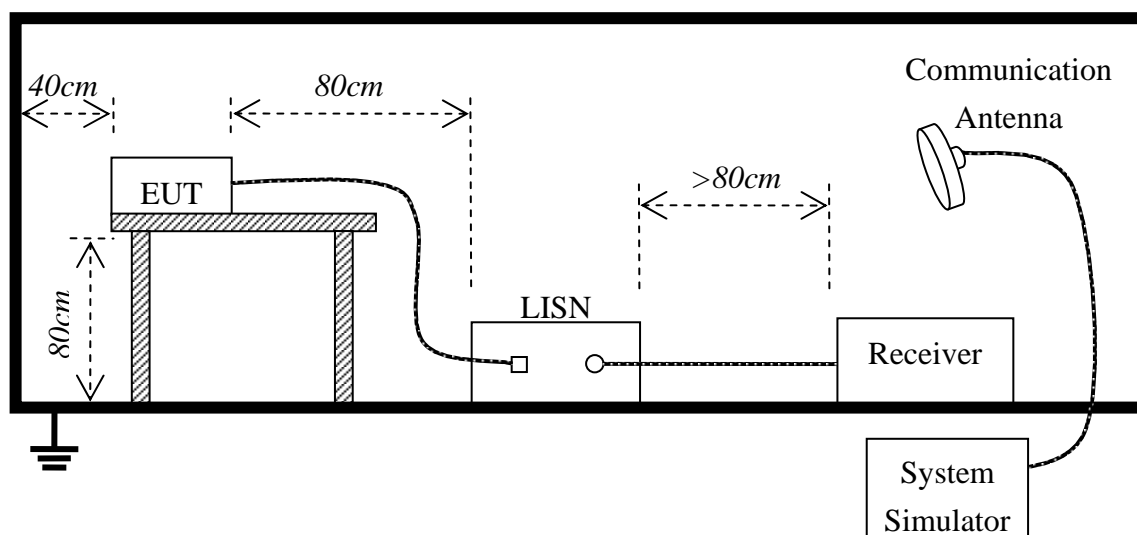
### 6.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.( dBuV)	Average( dBuV)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

**\*\*Note:** 1. the lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz

### 6.2. BLOCK DIAGRAM OF TEST SETUP



### 6.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per FCC Part 15 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per FCC Part 15.
- 3) All I/O cables were positioned to simulate typical actual usage as per FCC Part 15.
- 4) The EUT received DC 7.4V by Li-ion Battery or DC 12V by adapter (AC 120V).
- 5) All support equipments received power from a second LISN supplying power of AC 120V/60Hz, if any.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 150 kHz to 30 MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

Preliminary Conducted Emission Test				
Frequency Range Investigated		150KHz TO 30 MHz		
Mode of operation	Date	Report No.	Data#	Worst Mode
Standby Mode	2011-12-6	MOST111201F1	N90_0_(L, N)	<input type="checkbox"/>
Full Load Mode	2011-12-6	MOST111201F1	N90_1_(L, N)	<input type="checkbox"/>
USB Mode	2011-12-6	MOST111201F1	N90_2_(L, N)	<input type="checkbox"/>
Camera Mode	2011-12-6	MOST111201F1	N90_3_(L, N)	<input type="checkbox"/>
WIFI Mode	2011-12-6	MOST111201F1	N90_4_(L, N)	<input checked="" type="checkbox"/>

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### 6.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

EUT and support equipment was set up on the test bench as per step 9 of the preliminary test.

A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -20dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

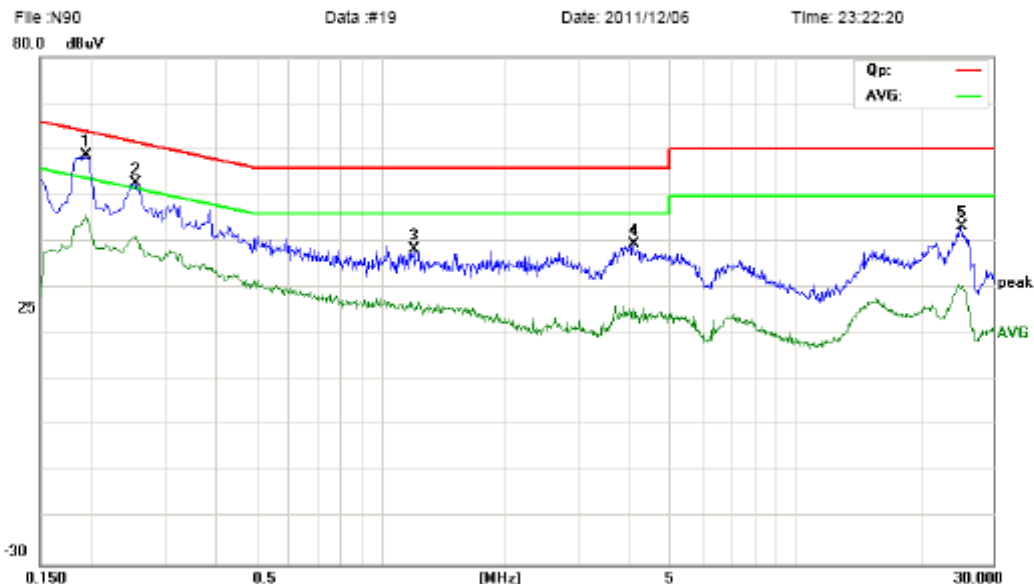
The test data of the worst case condition(s) was reported on the Summary Data page.

## 6.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST



Address: No. 5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
Tel: 0755-86170306 Fax: 0755-86170310

## Conducted Emission Measurement



Site site #1  
Limit: FCC Part15 B Class B QP  
EUT: MID  
MN: N90  
Mode: WIFI  
Note: SAW24-120-2000

Phase: N  
Power: AC 120V/60Hz

Temperature: 26  
Humidity: 60 %

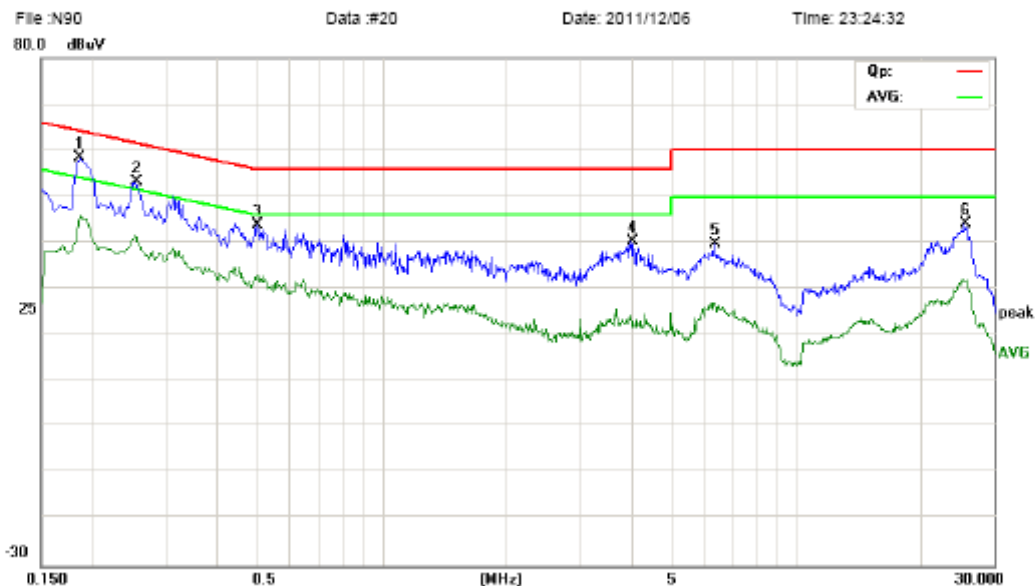
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1940	46.94	11.64	58.58	63.86	-5.28	peak	
2		0.2540	41.05	11.64	52.69	61.63	-8.94	peak	
3		1.2020	28.62	9.80	38.42	56.00	-17.58	peak	
4		4.0620	28.35	11.06	39.41	56.00	-16.59	peak	
5		25.0940	34.36	9.00	43.36	60.00	-16.64	peak	

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



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### Conducted Emission Measurement



Site site #1  
Limit: FCC Part15 B Class B QP  
EUT: MID  
MN: N90  
Mode: WIFI  
Note: SAW24-120-2000

Phase: **L1**  
Power: AC 120V/60Hz

Temperature: 26  
Humidity: 60 %

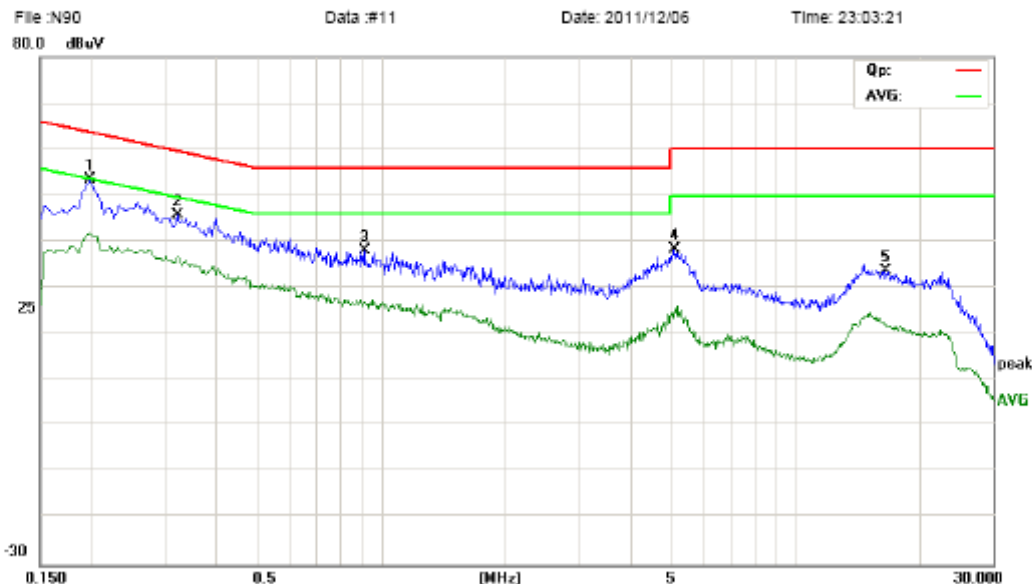
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1860	47.18	11.16	58.34	64.21	-5.87	peak	
2		0.2540	41.57	11.64	53.21	61.63	-8.42	peak	
3		0.4980	33.79	10.01	43.80	56.03	-12.23	peak	
4		4.0020	29.13	11.00	40.13	56.00	-15.87	peak	
5		6.3340	28.39	11.20	39.59	60.00	-20.41	peak	
6		25.5700	35.00	9.00	44.00	60.00	-16.00	peak	

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



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### Conducted Emission Measurement



Site site #1  
Limit: FCC Part15 B Class B QP  
EUT: MID  
MN: N90  
Mode: FULL LOAD  
Note: HWT-24W-120200

Phase: **N**  
Power: AC 120V/60Hz

Temperature: 26  
Humidity: 60 %

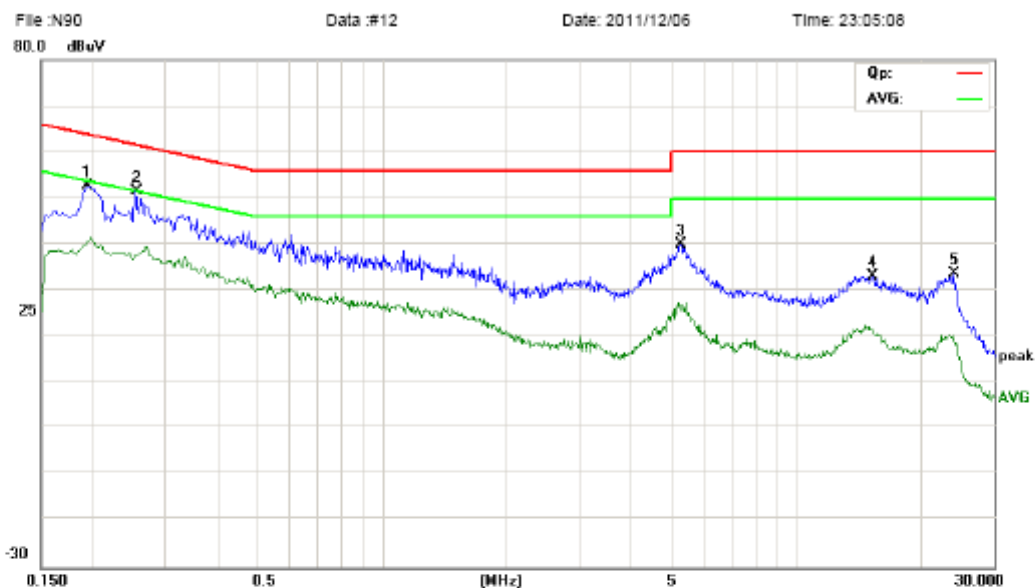
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1980	41.53	11.88	53.41	63.69	-10.28	peak	
2		0.3220	34.63	11.19	45.82	59.66	-13.84	peak	
3		0.9100	28.02	10.00	38.02	56.00	-17.98	peak	
4		5.0860	26.47	11.95	38.42	60.00	-21.58	peak	
5		16.4060	24.67	9.00	33.67	60.00	-26.33	peak	

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



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Tel: 0755-86170306 Fax: 0755-86170310

### Conducted Emission Measurement



Site site #1  
Limit: FCC Part15 B Class B QP  
EUT: MID  
M/N: N90  
Mode: FULL LOAD  
Note: HWT-24W-120200

Phase: **L1**  
Power: AC 120V/60Hz

Temperature: 26  
Humidity: 60 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1940	41.03	11.64	52.67	63.86	-11.19	peak	
2	*	0.2540	39.83	11.64	51.47	61.63	-10.16	peak	
3		5.2380	28.24	11.86	40.10	60.00	-19.90	peak	
4		15.2420	24.15	9.00	33.15	60.00	-26.85	peak	
5		23.9500	24.76	9.00	33.76	60.00	-26.24	peak	

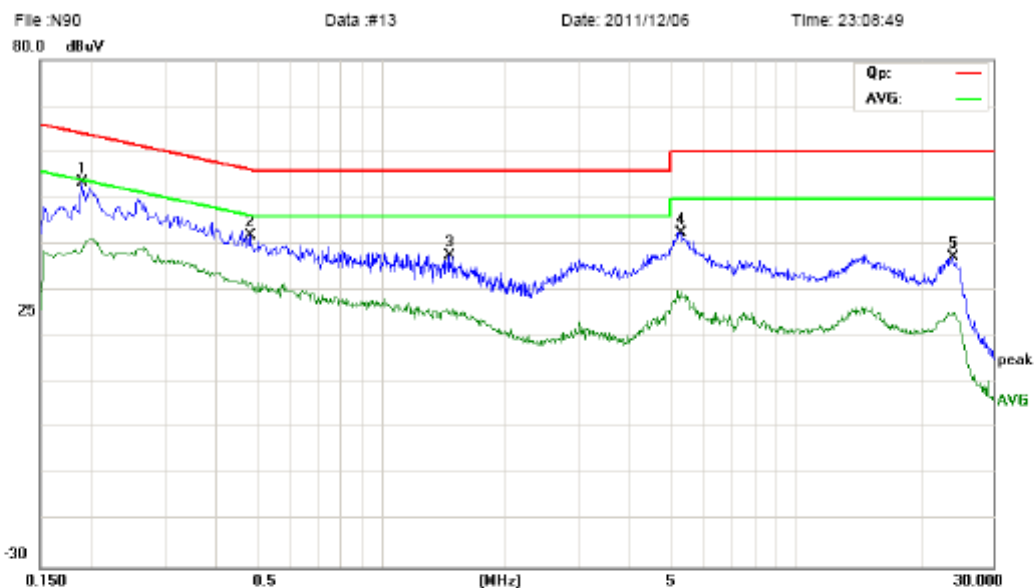
\*:Maximum data x:Over limit !:over margin





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### Conducted Emission Measurement



Site site #1  
Limit: FCC Part15 B Class B QP  
EUT: MID  
M/N: N90  
Mode: WIFI  
Note: HWT-24W-120200

Phase: **L1**  
Power: AC 120V/60Hz

Temperature: 26  
Humidity: 60 %

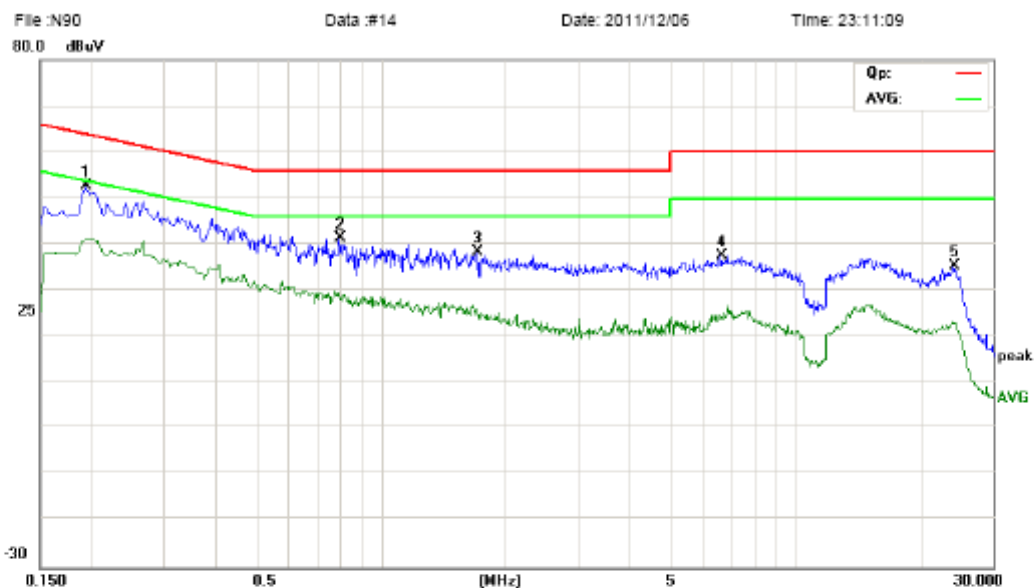
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1900	42.14	11.40	53.54	64.04	-10.50	peak	
2		0.4820	31.84	10.12	41.96	56.30	-14.34	peak	
3		1.4580	27.93	9.54	37.47	56.00	-18.53	peak	
4		5.2580	30.66	11.85	42.51	60.00	-17.49	peak	
5		23.9340	28.11	9.00	37.11	60.00	-22.89	peak	

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



Address: No. 5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
Tel: 0755-86170306 Fax: 0755-86170310

### Conducted Emission Measurement



Site site #1  
Limit: FCC Part15 B Class B QP  
EUT: MID  
M/N: N90  
Mode: WIFI  
Note: HWT-24W-120200

Phase: **N**  
Power: AC 120V/60Hz

Temperature: 26  
Humidity: 60 %

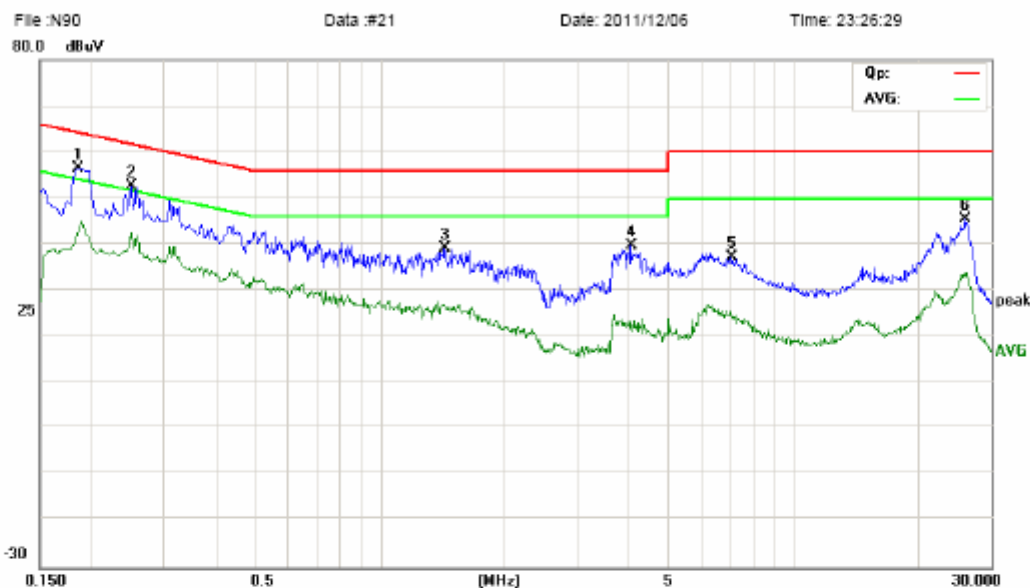
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1940	40.98	11.64	52.62	63.86	-11.24	peak	
2		0.7940	31.28	10.00	41.28	56.00	-14.72	peak	
3		1.7060	29.13	9.29	38.42	56.00	-17.58	peak	
4		6.6060	26.48	11.04	37.52	60.00	-22.48	peak	
5		24.0460	26.42	9.00	35.42	60.00	-24.58	peak	

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



Address: No. 5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
Tel: 0755-86170306 Fax: 0755-86170310

### Conducted Emission Measurement



Site site #1

Phase: **L1**

Temperature: 26

Limit: FCC Part15 B Class B QP

Power: AC 120V/60Hz

Humidity: 60 %

EUT: MID

M/N: N90

Mode: CAMERA

Note: SAW24-120-2000

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1860	45.33	11.16	56.49	64.21	-7.72	peak	
2		0.2500	41.00	11.67	52.67	61.76	-9.09	peak	
3		1.4300	29.48	9.57	39.05	56.00	-16.95	peak	
4		4.0300	28.64	11.03	39.67	56.00	-16.33	peak	
5		7.0580	26.45	10.77	37.22	60.00	-22.78	peak	
6		25.8740	36.45	9.00	45.45	60.00	-14.55	peak	

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



Address: No. 5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
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### Conducted Emission Measurement



Site site #1  
Limit: FCC Part15 B Class B QP  
EUT: MID  
M/N: N90  
Mode: CAMERA  
Note: SAW24-120-2000

Phase: **N**  
Power: AC 120V/60Hz

Temperature: 26  
Humidity: 60 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1860	44.53	11.16	55.69	64.21	-8.52	peak	
2		0.9060	27.25	10.00	37.25	56.00	-18.75	peak	
3		2.5580	27.59	9.56	37.15	56.00	-18.85	peak	
4		3.9820	28.38	10.98	39.36	56.00	-16.64	peak	
5		26.3380	37.49	9.00	46.49	60.00	-13.51	peak	

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

## 7. RADIATED EMISSION TEST

### 7.1. LIMITS OF RADIATED DISTURBANCES AT 3M DISTANCES FOR CLASS B

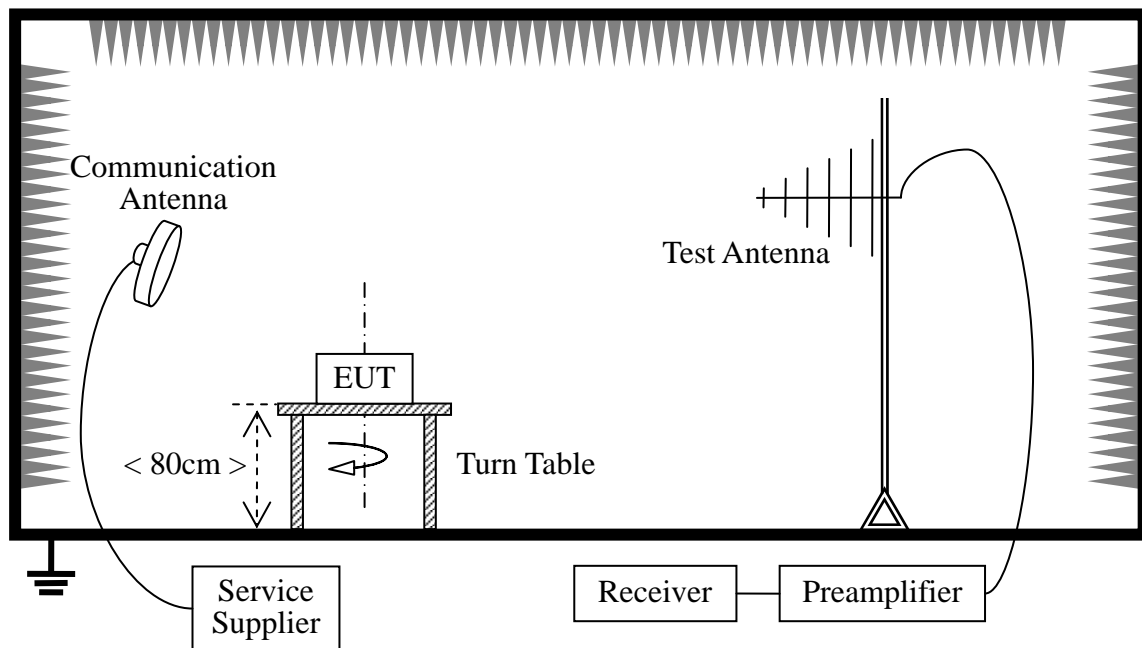
According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement Distance (m)
0.009 - 0.490	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

As shown in FCC section 15.35( b), for frequencies above 1000MHz, the field strength limits are based on average detector. When average radiated emission measurements are specified in this part, including emission measurements below 1000MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

## 7.2 TEST DESCRIPTION

### Test Setup:



The EUT received AC 120V/60Hz. The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the EUT is activated and transmitting with the other WIFI device (Supply by the Applicant) during the test.

For the Test Antenna:

- In the frequency range of 9 kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

Preliminary Radiated Emission Test				
Frequency Range Investigated			30 MHz TO 1000 MHz	
Mode of operation	Date	Report No.	Data#	Worst Mode
Standby Mode	2011-12-1	MOST111201F1	N90_0_(H, V)	<input type="checkbox"/>
Full Load Mode	2011-12-1	MOST111201F1	N90_1_(H, V)	<input type="checkbox"/>
USB Mode	2011-12-1	MOST111201F1	N90_2_(H, V)	<input type="checkbox"/>
Camera Mode	2011-12-1	MOST111201F1	N90_3_(H, V)	<input checked="" type="checkbox"/>
WIFI Mode	2011-12-1	MOST111201F1	N90_4_(H, V)	<input type="checkbox"/>

## 7.3 TEST RESULT



Address: No. 5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
Tel: 0755-86170306 Fax: 0755-86170310

## Radiated Emission Measurement

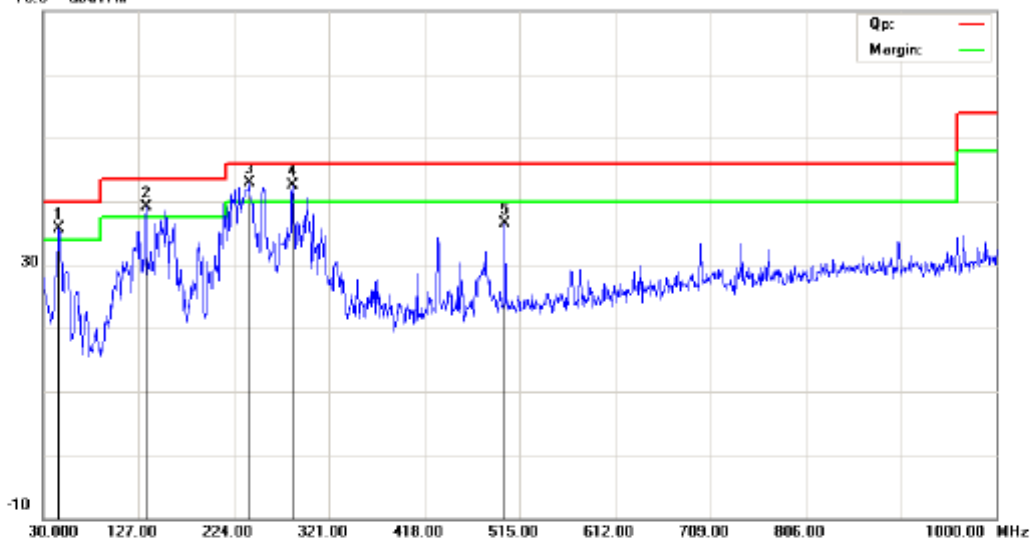
File: N90

Data #11

Date: 2011-12-8

Time: 20:25:29

70.0 dBuV/m



Site site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Part15 B 3M Radiation

Power: DC 5V From PC Input AC120V/60Hz

Humidity: 61 %

EUT: MID

Distance:

MN: N90

Mode: USB

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1	!	46.4900	22.79	12.91	35.70	40.00	-4.30	peak		0	
2	!	134.7600	21.59	17.46	39.05	43.50	-4.45	peak		0	
3	*	239.5200	25.76	17.17	42.93	46.00	-3.07	peak		0	
4	!	284.1400	23.10	19.44	42.54	46.00	-3.46	peak		0	
5		500.4500	15.07	21.40	36.47	46.00	-9.53	peak		0	

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



Address: No. 5, Langshan 2nd Rd., North Hi-Tech Industrial park  
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Tel: 0755-86170306 Fax: 0755-86170310

### Radiated Emission Measurement

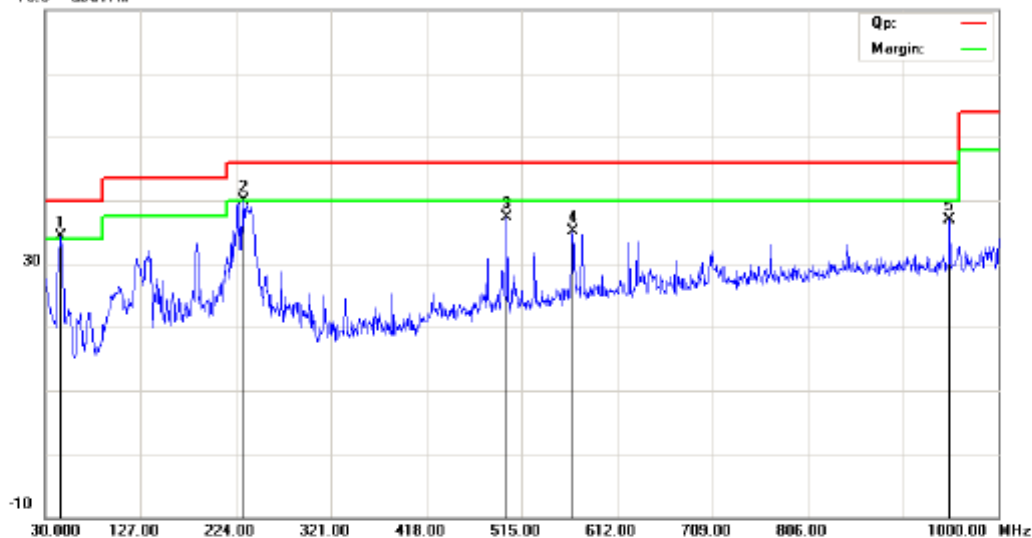
File: N90

Data #12

Date: 2011-12-8

Time: 20:27:09

70.0 dBuV/m



Site site #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC Part15 B 3M Radiation

Power: DC 5V From PC Input AC120V/60Hz

Humidity: 61 %

EUT: MID

Distance:

MN: N90

Mode: USB

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	46.4900	21.31	12.91	34.22	40.00	-5.78	peak		0
2		231.7600	23.20	16.63	39.83	46.00	-6.17	peak		0
3		500.4500	15.86	21.40	37.26	46.00	-8.74	peak		0
4		567.3800	12.32	22.82	35.14	46.00	-10.86	peak		0
5		950.5300	8.94	27.92	36.86	46.00	-9.14	peak		0

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





Address: No.5, Langshan 2nd Rd., North Hi-Tech Industrial park  
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### Radiated Emission Measurement

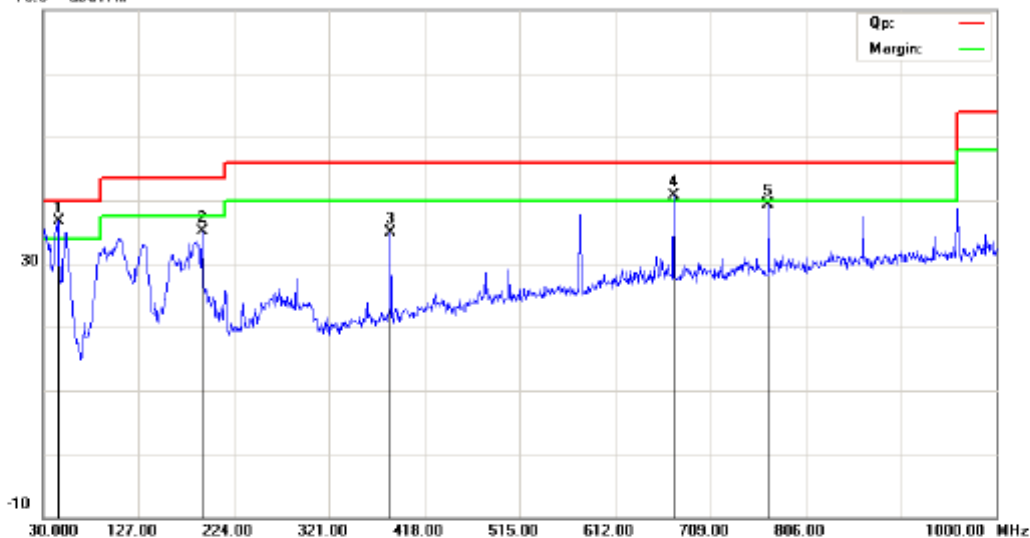
File: N90

Data #13

Date: 2011-12-8

Time: 20:33:25

70.0 dBuV/m



Site site #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC Part15 B 3M Radiation

Power: AC 120V/60Hz

Humidity: 61 %

EUT: MID

Distance:

MN: N90

Mode: CAMERA

Note: HWT-24W-120200

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	45.5200	23.44	13.36	36.80	40.00	-3.20	peak	0	
2		191.9900	18.38	16.70	35.08	43.50	-8.42	peak	0	
3		384.0500	16.66	18.18	34.84	46.00	-11.16	peak	0	
4	!	672.1400	16.23	24.52	40.75	46.00	-5.25	peak	0	
5		768.1700	13.44	25.86	39.30	46.00	-6.70	peak	0	

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



Address: No. 5, Langshan 2nd Rd., North Hi-Tech Industrial park  
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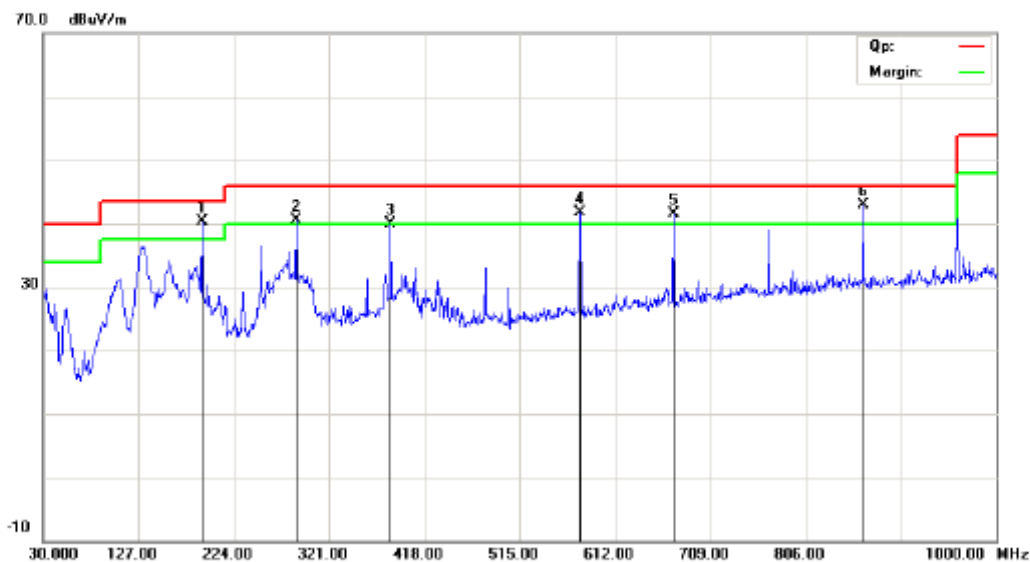
### Radiated Emission Measurement

File: N90

Data: #14

Date: 2011-12-8

Time: 20:34:42



Site site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Part15 B 3M Radiation

Power: AC 120V/60Hz

Humidity: 61 %

EUT: MID

Distance:

MN: N90

Mode: CAMERA

Note: HWT-24W-120200

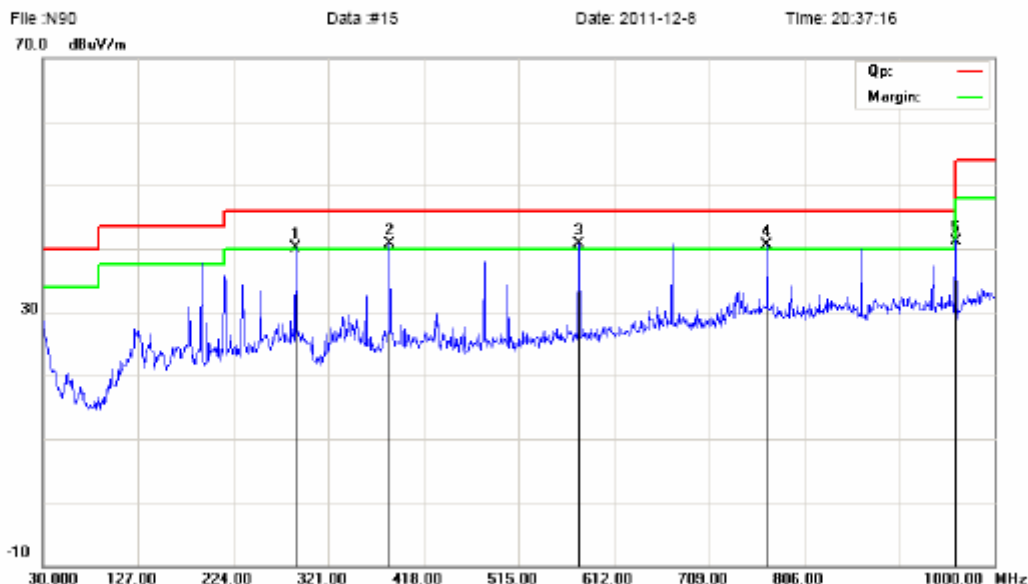
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1	!	191.9900	23.55	16.70	40.25	43.50	-3.25	peak		0	
2	!	288.0200	21.13	19.42	40.55	46.00	-5.45	peak		0	
3		384.0500	21.79	18.18	39.97	46.00	-6.03	peak		0	
4	!	576.1100	18.93	22.82	41.75	46.00	-4.25	peak		0	
5	!	672.1400	17.01	24.52	41.53	46.00	-4.47	peak		0	
6	*	864.2000	15.91	27.04	42.95	46.00	-3.05	peak		0	

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



Address: No.5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
Tel: 0755-86170306 Fax: 0755-86170310

### Radiated Emission Measurement



Site site #1 Polarization: *Horizontal* Temperature: 26  
Limit: FCC Part15 B 3M Radiation Power: AC 120V/60Hz Humidity: 61 %  
EUT: MID Distance:  
MN: N90  
Mode: CAMERA  
Note: SAW24-120-2000

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1	!	288.0200	20.64	19.42	40.06	46.00	-5.94	peak		0	
2	*	384.0500	22.61	18.18	40.79	46.00	-5.21	peak		0	
3	!	576.1100	17.79	22.82	40.61	46.00	-5.39	peak		0	
4	!	768.1700	14.62	25.86	40.48	46.00	-5.52	peak		0	
5		960.2300	13.20	28.00	41.20	54.00	-12.80	peak		0	

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



Address: No. 5, Langshan 2nd Rd., North Hi-Tech Industrial park  
Guangdong, China  
Tel: 0755-86170306 Fax: 0755-86170310

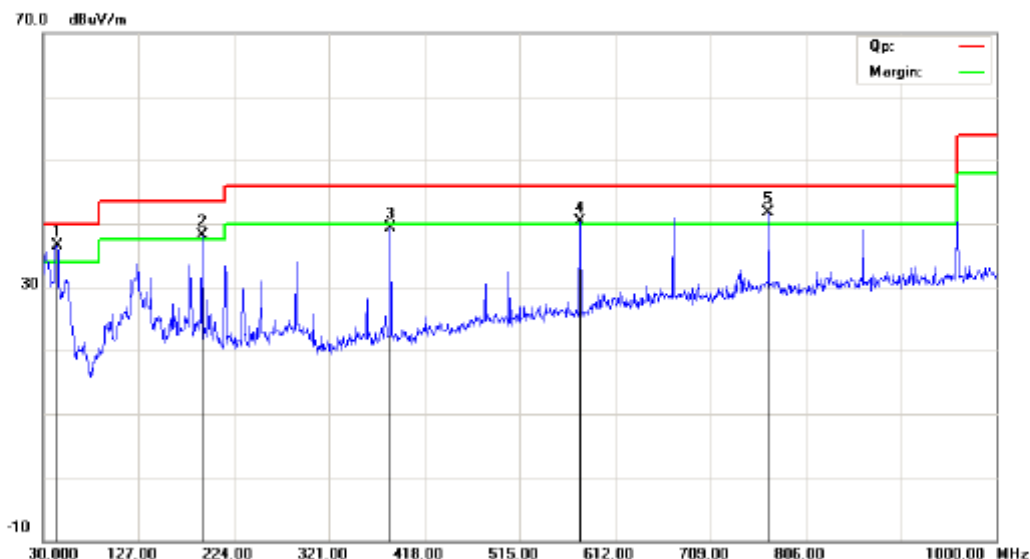
### Radiated Emission Measurement

File: N90

Data: #16

Date: 2011-12-8

Time: 20:38:31



Site site #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC Part15 B 3M Radiation

Power: AC 120V/60Hz

Humidity: 61 %

EUT: MID

Distance:

MN: N90

Mode: CAMERA

Note: SAW24-120-2000

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	Comment
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1	*	44.5500	22.64	13.89	36.53	40.00	-3.47	peak	0	
2	!	191.9900	21.40	16.70	38.10	43.50	-5.40	peak	0	
3		384.0500	21.12	18.18	39.30	46.00	-6.70	peak	0	
4	!	576.1100	17.46	22.82	40.28	46.00	-5.72	peak	0	
5	!	768.1700	15.92	25.86	41.78	46.00	-4.22	peak	0	

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

**Above 1 GHz****Operation Mode:** Full Load Mode**Test Date:** December. 1, 2011**Temperature:** 24°C**Tested by:** Habby Guo**Humidity:** 70 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Peak Margin (dB)	AV Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)				
N/A										>20
N/A										>20

**Notes:**

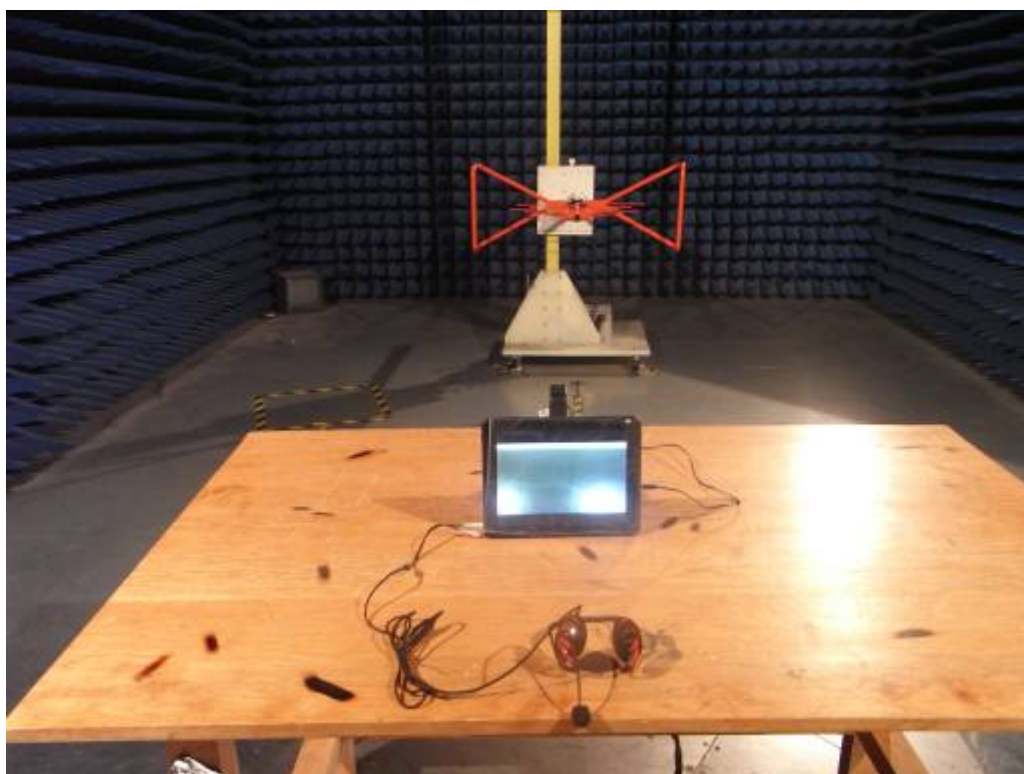
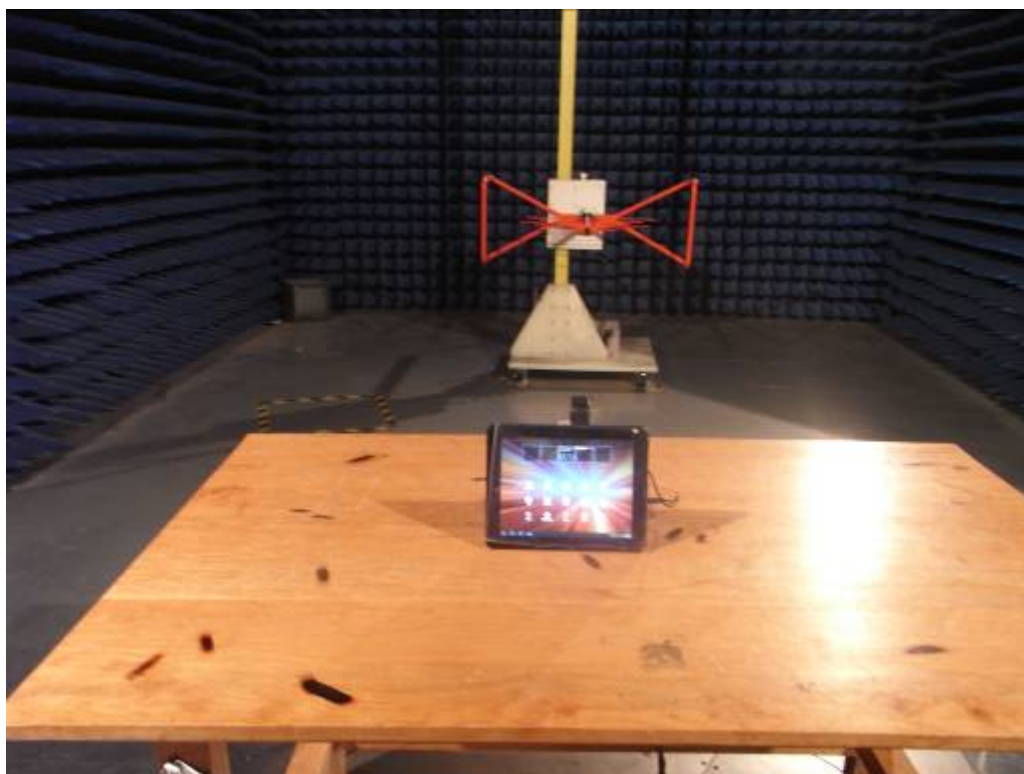
1. Measuring frequencies from 1 GHz to 6GHz.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
3. The frequency that above 3GHz is mainly from the environment noise.

**APPENDIX 1**  
**PHOTOGRAPHS OF TEST SETUP**

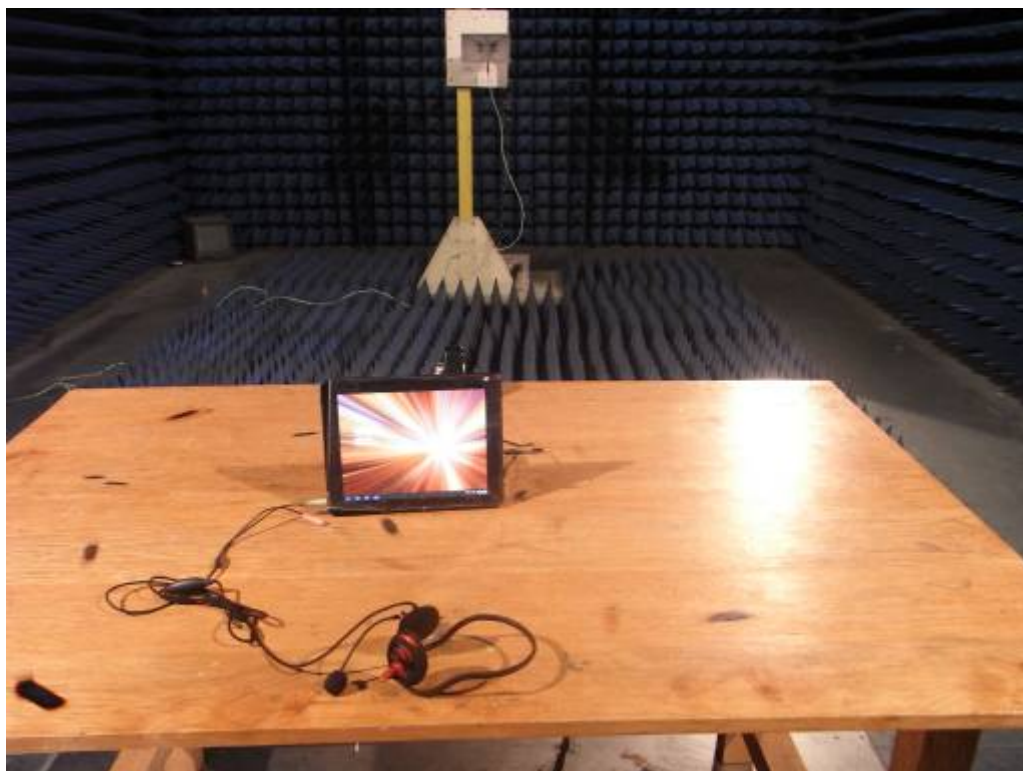
CE TEST SETUP



RE TEST SETUP





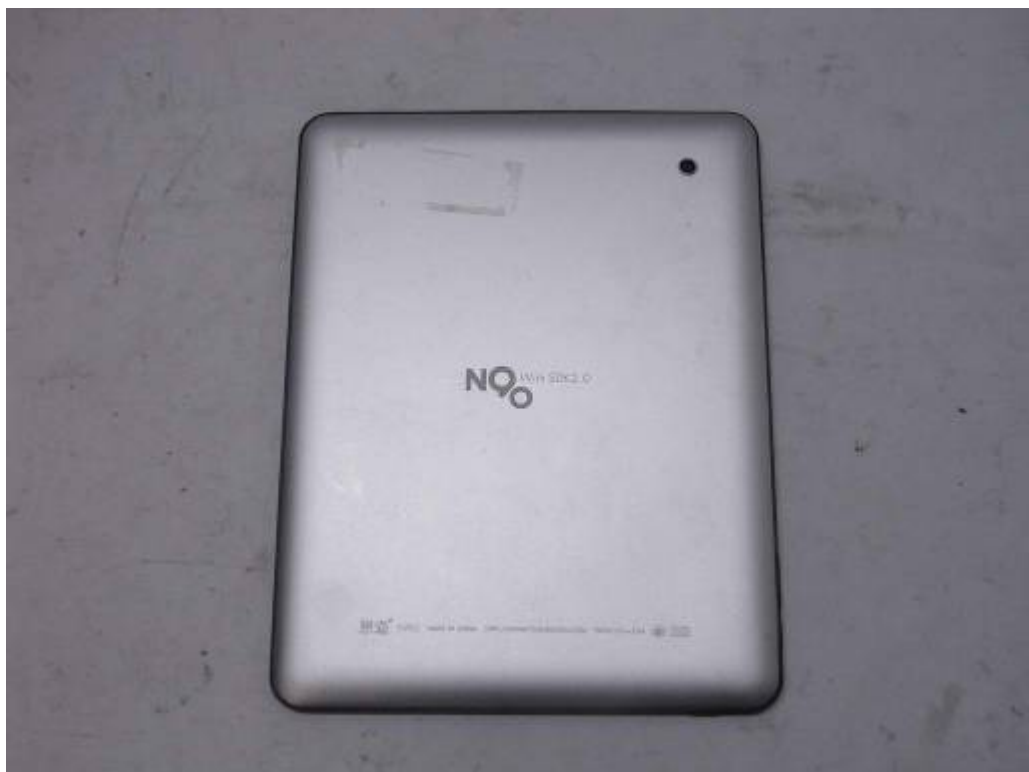


**APPENDIX 2**  
**PHOTOGRAPHS OF EUT**

FRONT VIEW OF SAMPLE



BACK VIEW OF SAMPLE



LEFT VIEW OF SAMPLE



RIGHT VIEW OF SAMPLE



TOP VIEW OF SAMPLE



BOTTOM VIEW OF SAMPLE



PHOTO OF POWER SUPPLY -MODEL 1



PHOTO OF POWER SUPPLY -MODEL 2



PHOTO OF THE ENTIRE SAMPLE



PHOTO OF BATTERY

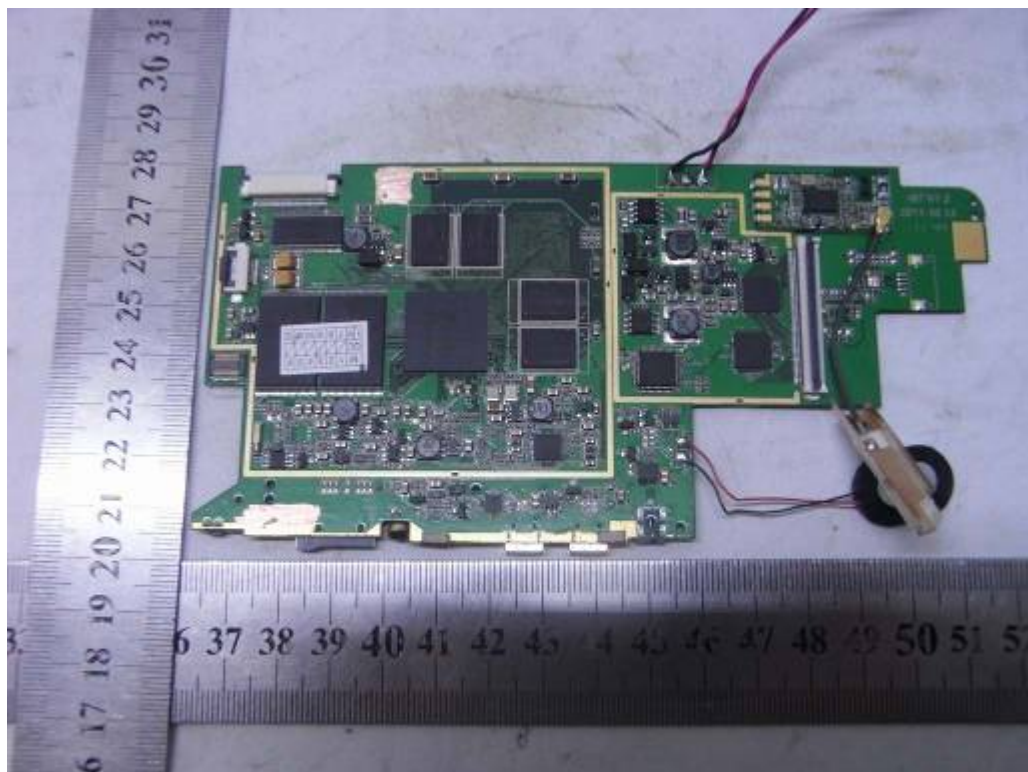




INTERNAL PHOTO OF SAMPLE – 1

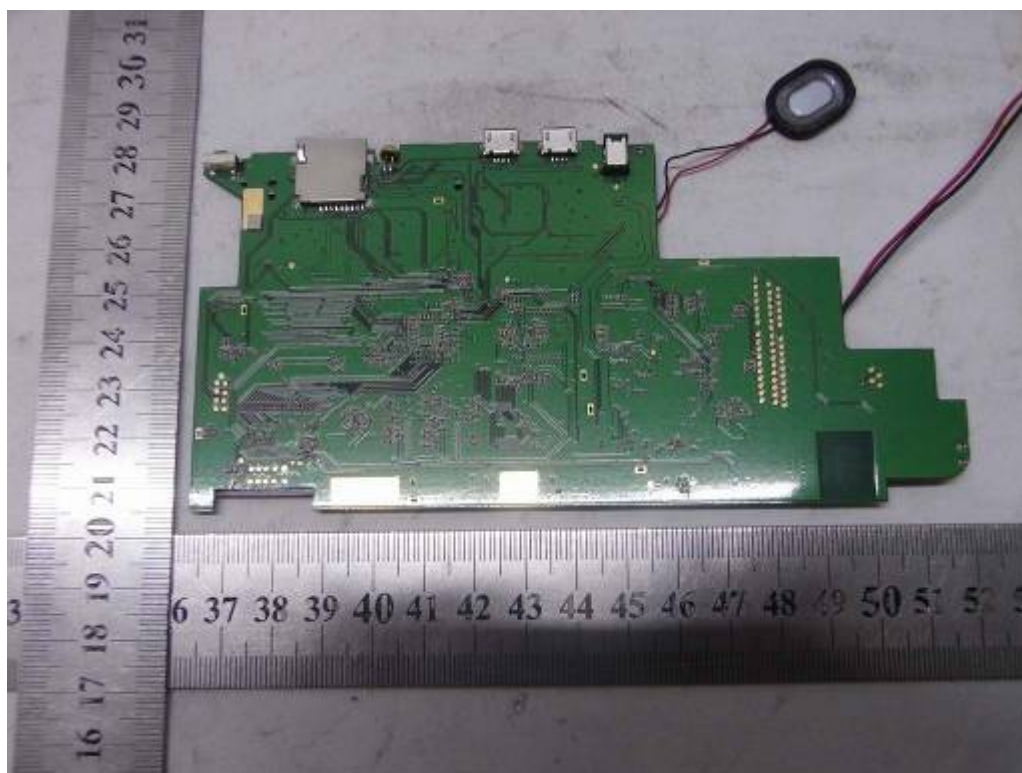


INTERNAL PHOTO OF SAMPLE -2

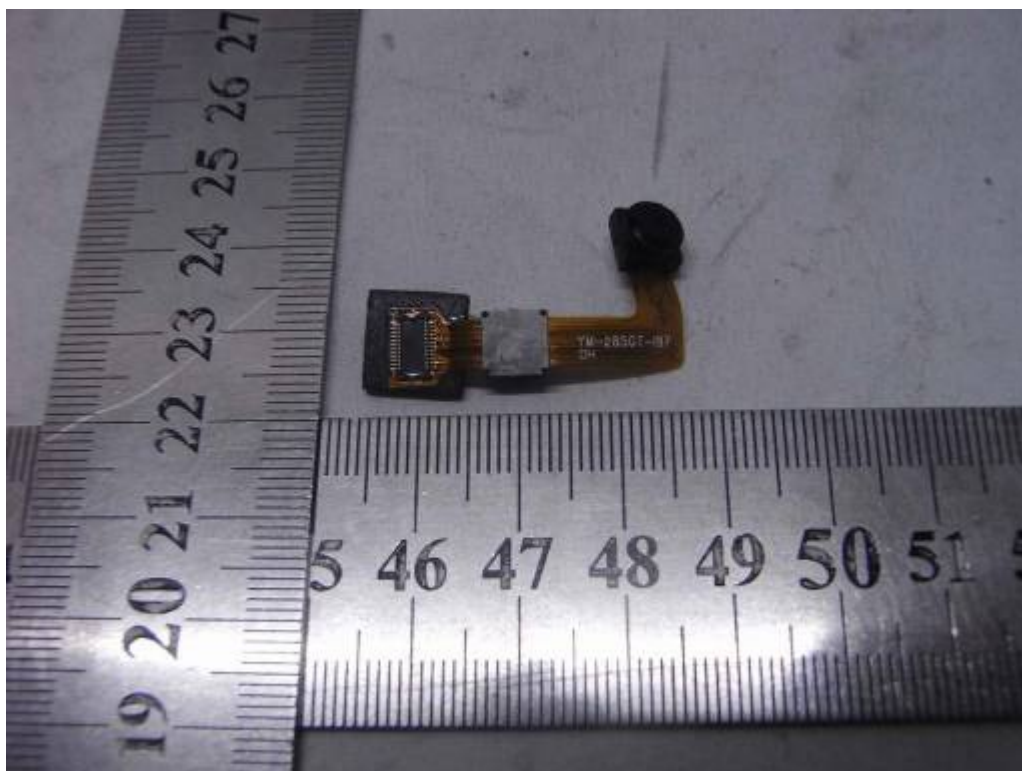




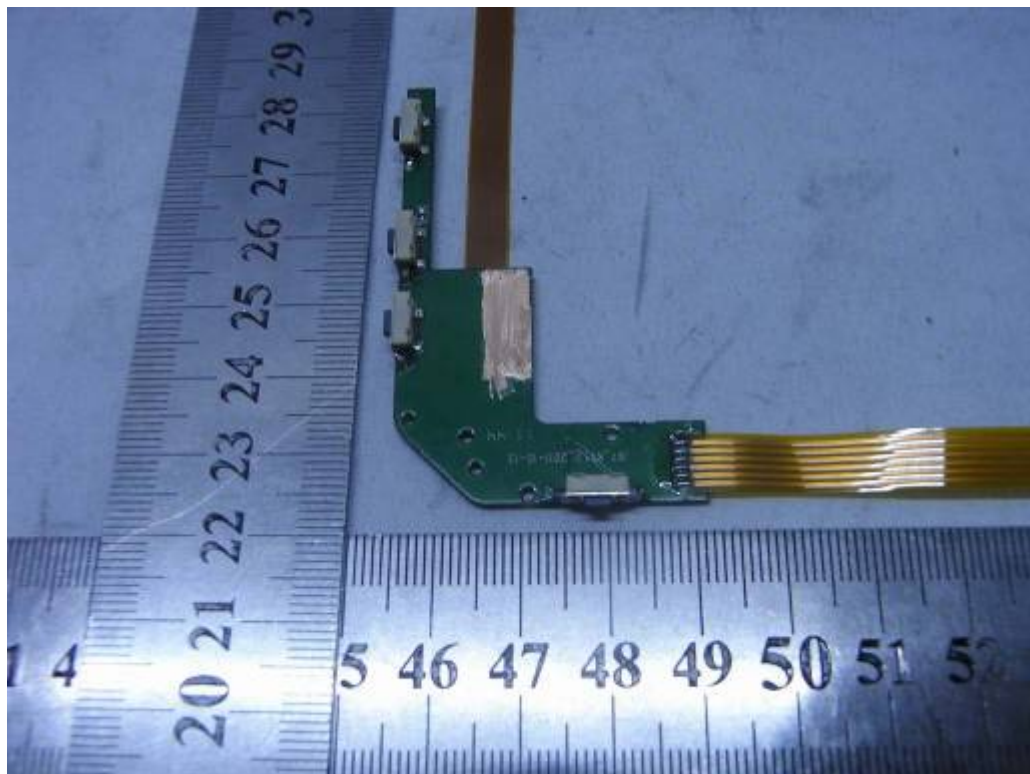
INTERNAL PHOTO OF SAMPLE -3



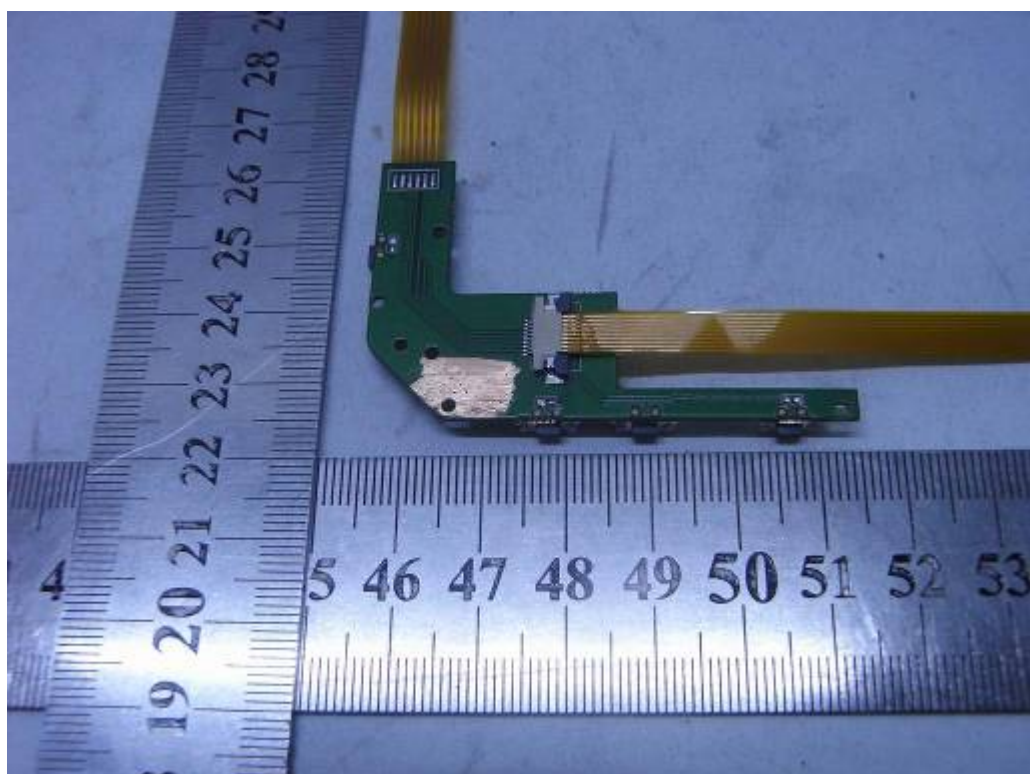
INTERNAL PHOTO OF SAMPLE -4



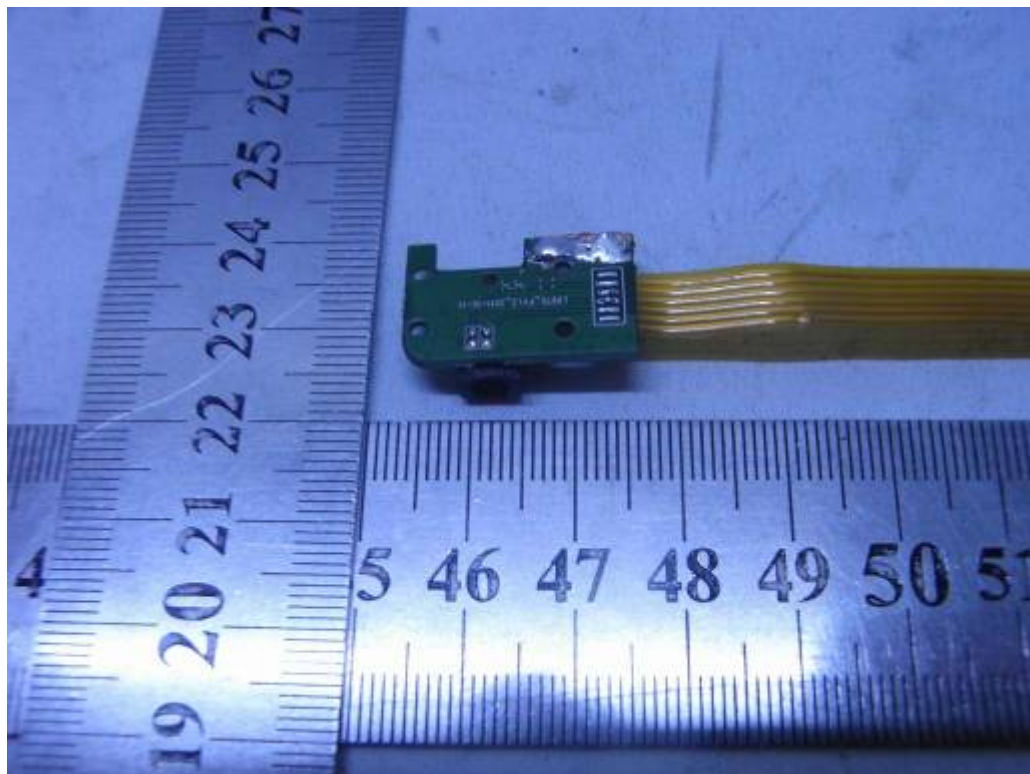
INTERNAL PHOTO OF SAMPLE -5



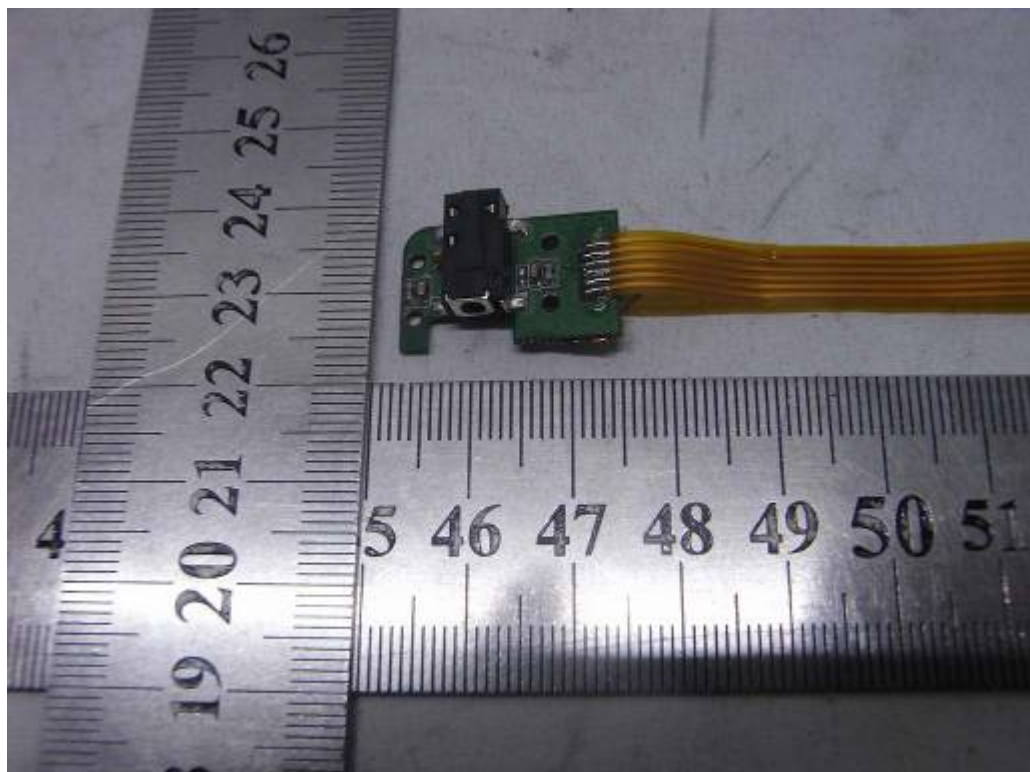
INTERNAL PHOTO OF SAMPLE -6



INTERNAL PHOTO OF SAMPLE -7

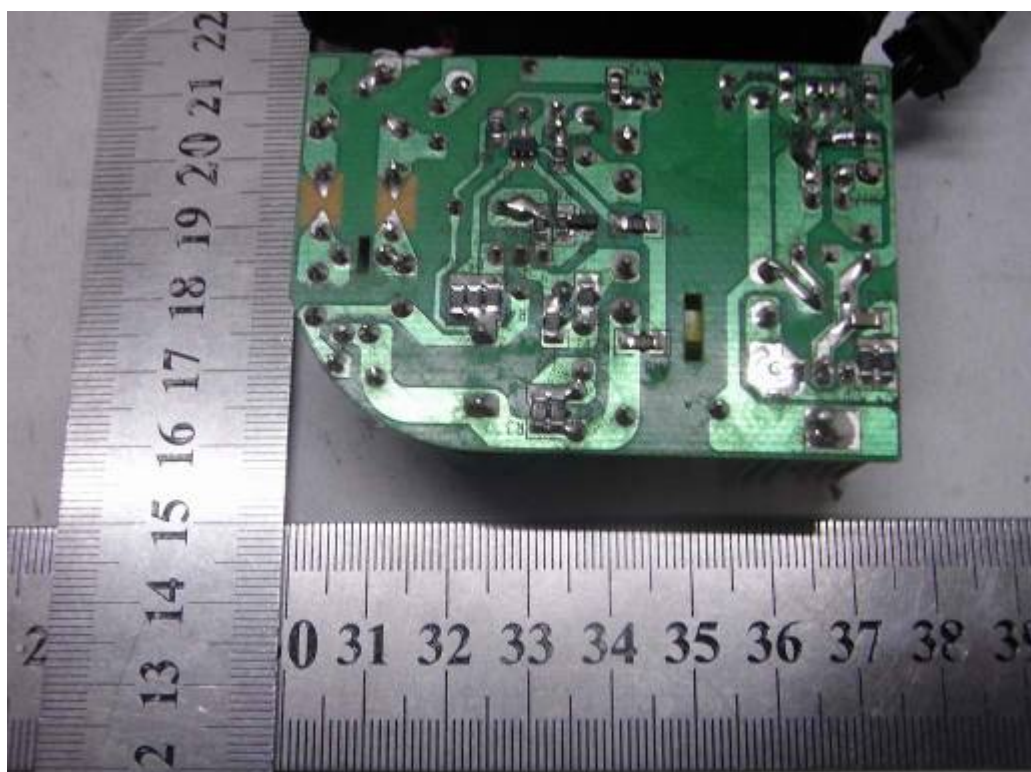
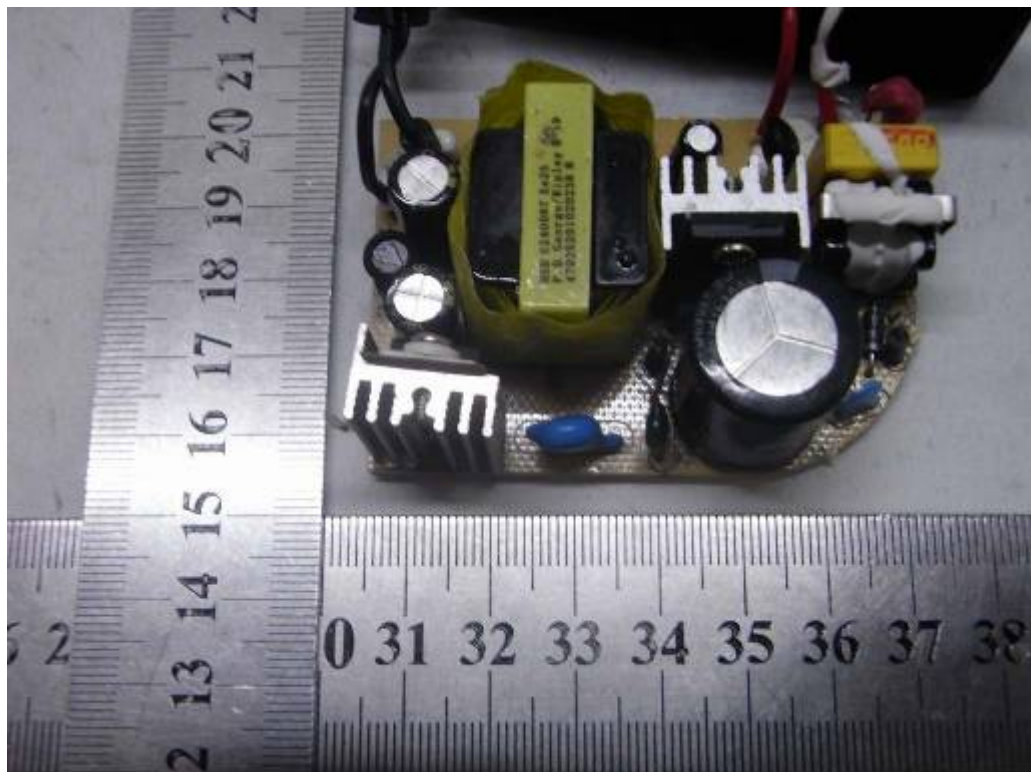


INTERNAL PHOTO OF SAMPLE -8

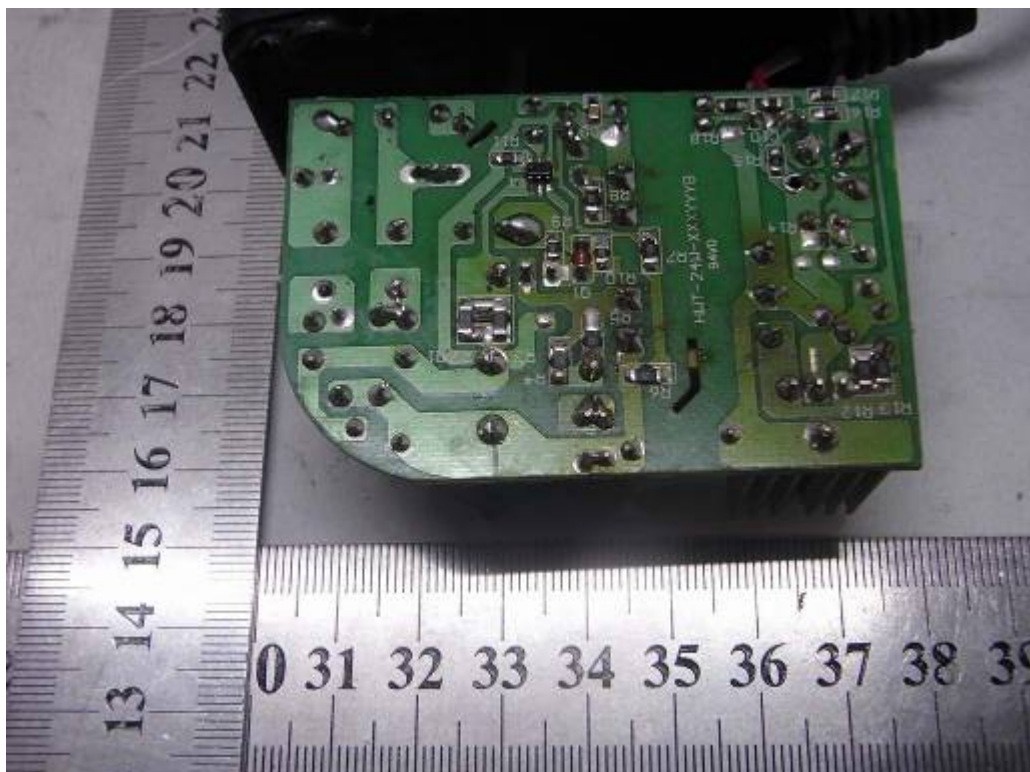
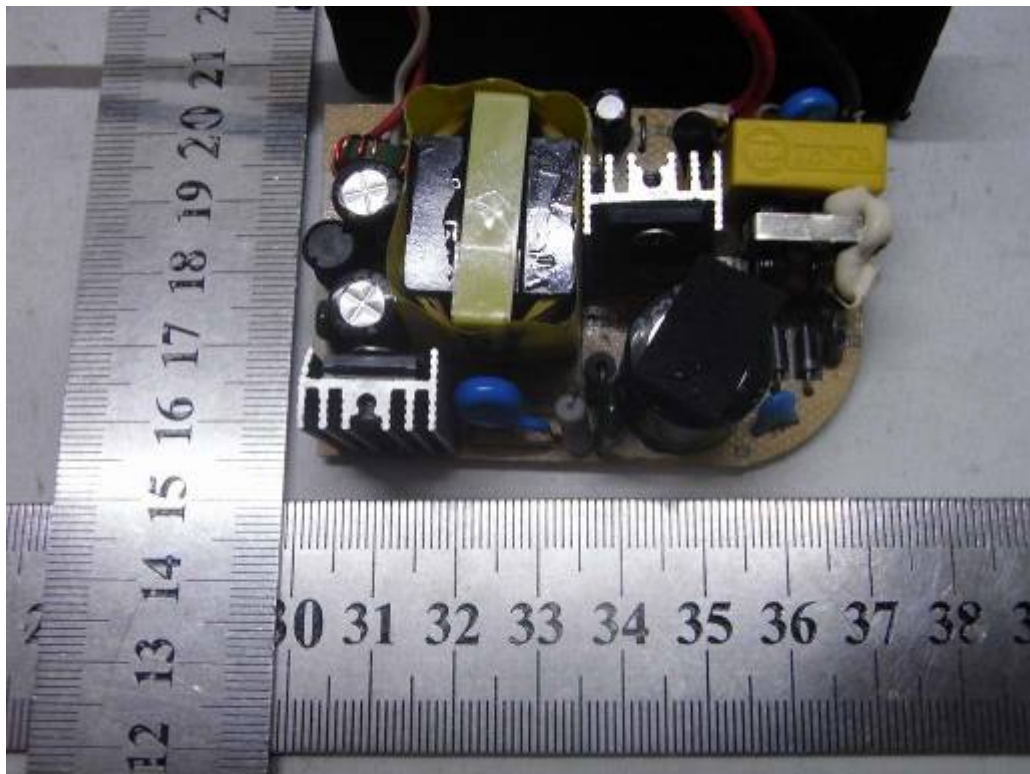




INTERNAL PHOTO OF POWER SUPPLY-1



INTERNAL PHOTO OF POWER SUPPLY-2



-----END OF REPORT-----