

# Technical Compliance Statement

## EMC Test Report

**For the following information****Ref. File No.: C1M1901311**

Product : UPS (Uninterruptible Power Supply)  
Model Number : (1)BR900MI (2)BR650MI  
Series Model : BR900MIXXXXXXXXXXX, BR650MIXXXXXXXXXXX  
("X" can be 0-9, A-Z, "-" or blank)  
Brand Name : APC by Schneider-Electric  
Applicant : American Power Conversion Holding Inc.,  
Taiwan Branch  
Manufacturer : American Power Conversion Holding Inc.,  
Taiwan Branch


Standards :

EN 62040-2:2006+ AC:2006 (IEC 62040-2:2005), Category C1  
AS 62040.2:2008  
(CISPR 22: 2008, EN 61000-3-2:2014 Class B,  
IEC 61000-4-2:2008, IEC 61000-4-3:2010,  
IEC 61000-4-4:2012, IEC 61000-4-5:2014 +A1:2017,  
IEC 61000-4-6:2013, IEC 61000-4-8:2009,  
IEC 61000-2-2:2002)

We hereby certify that the above product has been tested by us with the listed standards and found in compliance with the council EMC directive 2014/30/EU.

The test data and results are issued on the EMC test report no. **EM-E190088**.

Signature

  
\_\_\_\_\_  
Alex Deng/Deputy Manager  
Date: 2019. 02. 22

Test Laboratory:

Audix Technology Corporation, EMC Department

TAF Accreditation No.: 1724

Web Site: [www.audixtech.com](http://www.audixtech.com)

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.

## TEST REPORT

UPS (Uninterruptible Power Supply)

Model Number: (1)BR900MI (2)BR650MI

Series Model: BR900MIXXXXXXXXXXX, BR650MIXXXXXXXXXXX  
("X" can be 0-9, A-Z, "-" or blank)

Brand: APC by Schneider-Electric

### Applicant for:

American Power Conversion Holding Inc., Taiwan Branch  
3F., No.205, Sec. 3, Beixin Rd.  
Xindian District, New Taipei City 23143, Taiwan

### Prepared by:

Audix Technology Corporation, EMC Department  
No. 53-11, Dingfu, Linkou Dist.,  
New Taipei City 244, Taiwan



File No. : C1M1901311  
Report No. : EM-E190088  
Date of Report : 2019. 02. 22

The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, TAF or any government agencies.

## Test Report

Applicant : American Power Conversion Holding Inc.,  
Taiwan Branch

Manufacturer : American Power Conversion Holding Inc.,  
Taiwan Branch

EUT Description

(1) Product : UPS (Uninterruptible Power Supply)

(2) Model Number : (1)BR900MI (2)BR650MI

(3) Series Model : BR900MIXXXXXXXXXXX, BR650MIXXXXXXXXXXX  
("X" can be 0-9, A-Z, "-" or blank)

(3) Brand : APC by Schneider-Electric

(4) Power Rating : Input: 220-240Vac, 50/60Hz  
Output: 220-240Vac, 50/60Hz

Applicable Standards:

EN 62040-2:2006+ AC:2006 (IEC 62040-2:2005), Category C1  
AS 62040.2:2008  
(CISPR 22: 2008, EN 61000-3-2:2014 Class B,  
IEC 61000-4-2:2008, IEC 61000-4-3:2010,  
IEC 61000-4-4:2012, IEC 61000-4-5:2014 +A1:2017,  
IEC 61000-4-6:2013, IEC 61000-4-8:2009,  
IEC 61000-2-2:2002)

The device described above was tested by Audix Technology Corporation to determine the maximum emission levels emanating from the device, its ensured severity levels, and performance criterion. All of the tests were requested by the applicant and the results thereof based upon the information that the applicant provided to us. We, Audix Technology Corporation assumes full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT is technically compliance with the requirements of **EN 62040-2 standards**.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Audix Technology Corporation.

Date of Report: 2019. 02. 22

Reviewed by:



(Ariel Chen/Administrator)

Approved by:



(Alex Deng/Deputy Manager)

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APPENDIX I (Photos of EUT)

## 1. Revision of Test Report

Issued Date	Revision Summary	Report Number
2019. 02. 22	Original Report.	EM-E190088

## 2. Summary of Test Result

### 2.1. Test Result

Emission			
Test Item	Referred Standard	Limit	Result
Conducted emissions at AC mains power port	EN 62040-2:2006 + AC:2006 (CISPR 22:2008)	Category C1 UPS	<b>Pass</b>
			Margin 10.64 dB at 0.600 MHz
Conducted emissions at DC mains power port	EN 62040-2:2006 + AC:2006 (CISPR 22:2008)	Category C1 UPS	<b>N/A (Note 5)</b>
Conducted emissions at signal and telecommunication ports	EN 62040-2:2006 + AC:2006 (CISPR 22:2008)	Category C1 UPS	<b>N/A (Note 6)</b>
Radiated emissions (30 – 1000MHz)	EN 62040-2:2006 + AC:2006 (CISPR 22:2008)	Category C1 UPS	<b>Pass</b>
			Margin 7.24 dB at 54.017 MHz
Low-frequency emission Input current harmonic	EN 61000-3-2:2014	Class A	<b>Pass</b>
<p>Note :</p> <ol style="list-style-type: none"> <li>1. N/A is an abbreviation for Not Applicable</li> <li>2. Special measures: None</li> <li>3. Decision and justification not to measure: None</li> <li>4. The EN 62040-2 emission measurement results are deemed satisfactory evidence of compliance with AS 62040.2 regulations.</li> <li>5. According to the manufacturer’s specification may not use the AC output Cable exceed 10m, it’s unnecessary to test for AC output Cable.</li> <li>6. According to the manufacturer’s specification may not use the Signal Cable exceed 10m, it’s unnecessary to test for signal ports.</li> </ol>			



Immunity				
Test Item	Basic Standard	Standard Criteria	EUT Criteria	Result
Electrostatic discharge	EN 62040-2:2006 + AC:2006 (IEC 61000-4-2:2008)	B	A	Pass
Radiated, Radio-frequency, electromagnetic field	EN 62040-2:2006 + AC:2006 (IEC 61000-4-3:2010)	A	A	Pass
Electrical fast transient/burst	EN 62040-2:2006 + AC:2006 (IEC 61000-4-4:2012)	B	A	Pass
Surge at AC power port	EN 62040-2:2006 + AC:2006 (IEC 61000-4-5:2014 +A1:2017)	B	A	Pass
Surge at signal and control ports	EN 62040-2:2006 (IEC 61000-4-5:2014 +A1:2017)	B	N/A	None
Immunity to conducted disturbances, induced by radio-frequency fields	EN 62040-2:2006 + AC:2006 (IEC 61000-4-6:2013)	A	A	Pass
Power frequency magnetic field	EN 62040-2:2006 + AC:2006 (IEC 61000-4-8:2009)	B	A	Pass
Low frequency signals test	EN 62040-2:2006 + AC:2006 (IEC 61000-2-2:2002)	A	A	Pass
<p>Note :</p> <ol style="list-style-type: none"> <li>1. N/A is an abbreviation for Not Applicable</li> <li>2. Special measures: None</li> <li>3. Decision and justification not to measure: None</li> </ol>				

## 2.2. Description of Performance Criteria

The Equipment shall, as a minimum, comply with the immunity limits of 3.2 to 3.6. The performance criteria adequate for U.P.S. is given in the following table.

	<b>Criterion A</b>	<b>Criterion B</b>
Output characteristics	Static tolerances of IEC 62040-3	Dynamic tolerances of IEC 62040-3
External and internal indications and metering	Change only during test	Change only during test
Control signals to external devices	No Change	Change according to the mode of operation
Mode of operation	No Change	Change only temporarily

The test shall be made with the U.P.S. in the following conditions:

- rated input voltage;
- normal mode of operation;
- linear load at rated active output power.

The UPS shall be specified with the proper level in case of different levels of performance criteria.

### 2.3. Description of Test Firm

Name of Test Firm	Audix Technology Corporation / EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : <a href="http://www.audixtech.com">www.audixtech.com</a> Contact e-mail: <a href="mailto:attemc_report@audixtech.com">attemc_report@audixtech.com</a>
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005  (1) NVLAP (USA) NVLAP Lab Code 200077-0  (2) TAF (Taiwan) No. 1724
Test Facilities	(1) No. 3 Shielded Room (2) No. 6 Open Test Site (3) No. 2 EMS Test Room (4) No. 3 EMS Test Room

### 3. General Information

#### 3.1. Description of Application

Applicant	American Power Conversion Holding Inc., Taiwan Branch 3F., No.205, Sec. 3, Beixin Rd. Xindian District, New Taipei City 23143 Taiwan
Manufacturer	American Power Conversion Holding Inc., Taiwan Branch 3F., No.205, Sec. 3, Beixin Rd. Xindian District, New Taipei City 23143 Taiwan
Product	UPS (Uninterruptible Power Supply)
Brand	APC by Schneider-Electric
Model Number	(1)BR900MI (2)BR650MI  The difference between above models please refer to the following table.
Series Model	BR900MIXXXXXXXXXXX, BR650MIXXXXXXXXXXX ("X" can be 0-9, A-Z, "-" or blank)

Table: Model different list

Difference Model No.	Input rating AC 220-240V, 50/60Hz	Output rating
BR900MI, BR900MIXXXXXXXXXXX ("X" can be 0-9, A-Z, "-" or blank)	4.3A	4.1A/540W
BR650MI, BR650MIXXXXXXXXXXX ("X" can be 0-9, A-Z, "-" or blank)	3.2A	2.96A/390W

### 3.2. Description of the EUT

Test Model	BR900MI
Serial Number	N/A
Power Rating	Input: 220-240Vac, 50/60Hz Output: 220-240Vac, 50/60Hz
Firmware Version	N/A
Sample Status	Production
Date of Receipt	2019. 01. 30
Date of Test	2019. 01. 30 ~ 02. 21
I/O Ports List	<ul style="list-style-type: none"> <li>• AC In x1</li> <li>• AC Out x2</li> <li>• Gigabit In x1</li> <li>• Gigabit Out x1</li> <li>• Tel In x1</li> <li>• Tel Out x1</li> <li>• USB Serial x1</li> </ul>
Accessories Supplied	<ul style="list-style-type: none"> <li>• USB Cable</li> <li>• Power Cord</li> </ul>

### 3.3. Highest Frequency within EUT

The highest frequency is 8MHz of EUT.

### 3.4. List of Key Components of EUT

Component	Supplier	Model/Type	Description
Battery Module (DC 12V, 7Ah/7.2Ah) for Model BR650MI, BR650MIXXXXXXXXXXX ("X" can be 0-9, A-Z, "-" or blank)	CSB Battery	GP1272	7.2Ah (Test Used)
	B&B Battery	SH1228W	6.3Ah
	Hitachi Chemical Energy Technol- ogy Co Ltd (CSB Battery Co Ltd)	GP1272 F2	7.2Ah
	Kung Long Batte- ries	WP7-12	7Ah
	Leoch Battery	LP12-7.0	7Ah
Battery Module (2S1P, DC 24V, 9.4Ah) for Model BR900MI, BR900MIXXXXXXXXXXX ("X" can be 0-9, A-Z, "-" or blank)	Hitachi Chemical Energy Technol- ogy Co Ltd (CSB Battery Co Ltd)	UPS12580F2	9.4Ah (Test Used)
	Leoch Battery	LP12-10S	9.4Ah

### 3.5. Determination of Worse Case Operating Modes

None

### 3.6. Final Test Configuration Mode

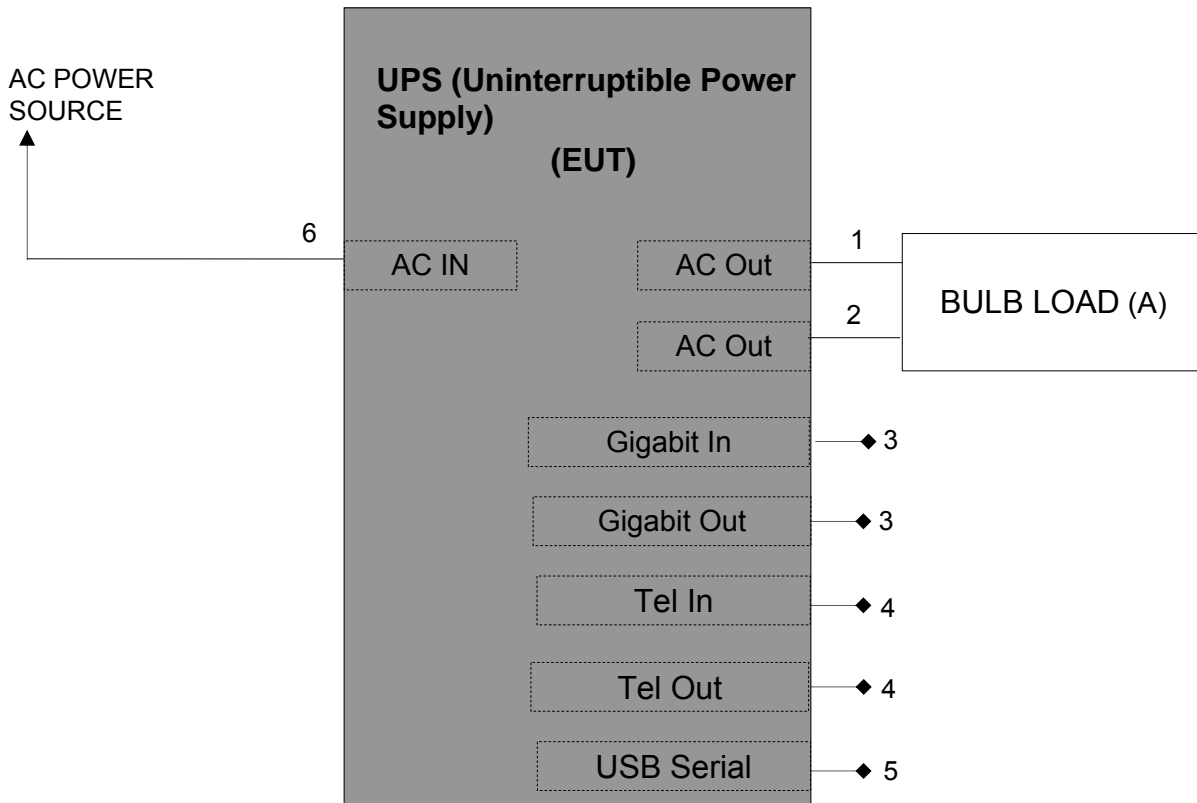
The worst showed as following configuration was tested and recorded in the report.

Test Item	Operating Mode
Conducted emissions at AC mains power port	Line Mode
	Battery Mode
Radiated emission (30 – 1000MHz)	Line Mode
	Battery Mode
Low-frequency emission Input current harmonic	Line Mode
Electrostatic discharge & Radiated, Radio-frequency, electromagnetic field & Power Frequency Mag- netic Field Immunity Test	Line Mod
	Battery Mode
Other Immunity tests	Line Mod

## 4. Measurement Arrangement

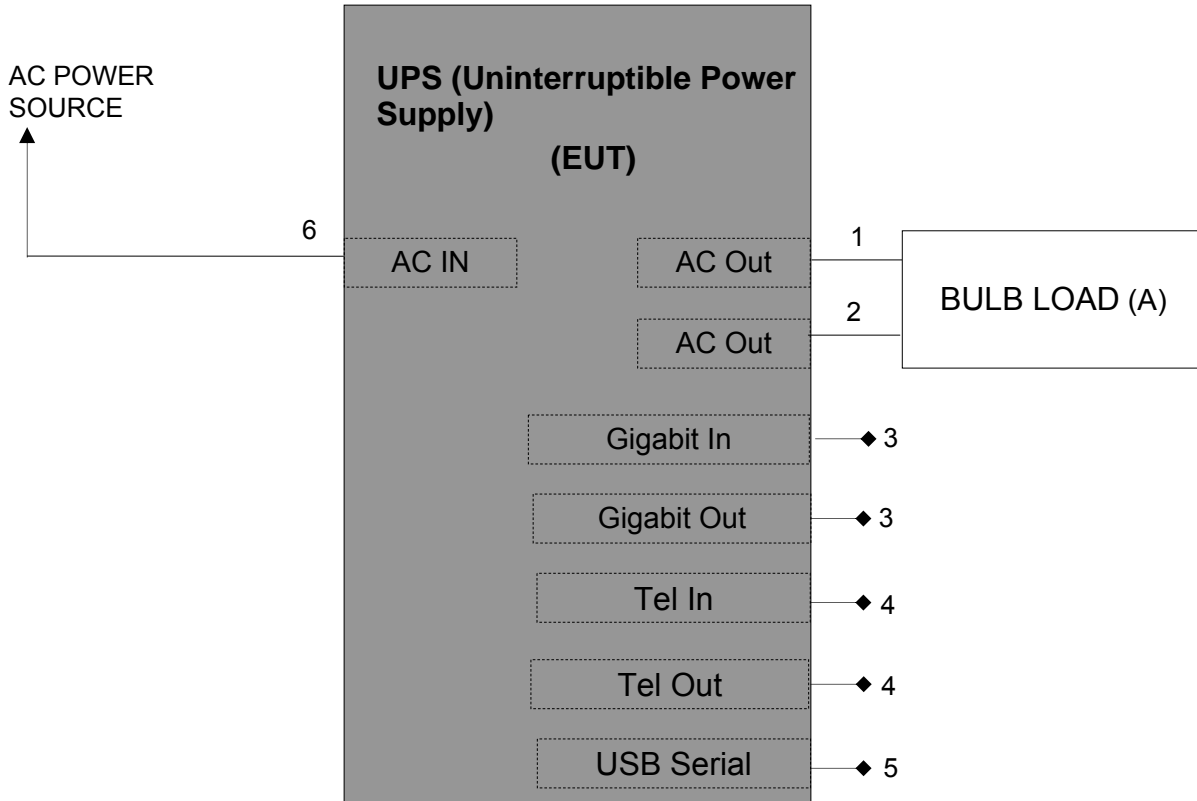
### 4.1. Equipment and cables arrangement

- Connection Diagram of EUT and Peripheral Devices  
For conducted and radiated tests





- Connection Diagram of EUT and Peripheral Devices  
For harmonics, flicker and immunity tests



## 4.2. Method of Exercising EUT

- The methods for exercising the EUT during the emission tests.

1. Turn on the power of all equipments.
2. Setup the notebook pc to drive the EUT through the UPS's software driver.
1. Data was communicated EUT through the USB interface cable. The notebook pc displayed the test software and rating of the EUT by windows XP.
3. Data was communicated between the notebook pc and EUT through the USB interface cable. The notebook pc displayed the test software and rating of the EUT by windows XP.
4. Set EUT under line or battery mode.
5. The AC outputs of EUT was linked to bulb loads with full load (500W).
6. The other peripheral devices were driven and operated in turn during all testing.

- The methods for exercising the EUT during the Harmonics, Flicker and Immunity tests.

2. Turn on the power of all equipments.
3. Setup the notebook pc to drive the EUT through the UPS's software driver.
4. Data was communicated EUT through the USB interface cable. The notebook pc displayed the test software and rating of the EUT by windows XP.
5. Set EUT under line or battery mode.
6. The AC outputs of EUT was linked to bulb loads with full load (500W).
7. The other peripheral devices were driven and operated in turn during all testing.

#### 4.3. List of Supported Units under Test

Item	Product	Brand	Model No.	Serial No.	Approval
<b>For Conducted and Radiated test</b>					
A	Bulb Load (500W)	Audix	N/A	N/A	N/A
<b>For Harmonic, Flicker and Immunity Tests</b>					
A	Bulb Load (500W)	Audix	N/A	N/A	N/A

#### 4.4. List of Used Cables under Test

Item	Type	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remark
<b>For Conducted and Radiated test</b>						
1	Power Cord	1	1.5	No	0	Accessory of EUT
2	Power Cord	1	1.8	No	0	Provided by LAB
3	Gigabit Cable	2	1.5	No	0	Provided by LAB
4	Tel Cable	1	2.0	No	0	Provided by LAB
5	USB Cable	1	2.0	Yes	0	Accessory of EUT
6	AC Power Cord (3C)	1	1.8	No	0	Provided by LAB
7	AC Power Cord	1	1.8	No	0	Provided by LAB for above supported units
<b>For Harmonic, Flicker and Immunity Tests</b>						
1	Power Cord	1	1.5	No	0	Accessory of EUT
2	Power Cord	1	1.8	No	0	Provided by LAB
3	Gigabit Cable	2	1.5	No	0	Provided by LAB
4	Tel Cable	1	2.0	No	0	Provided by LAB
5	USB Cable	1	2.0	Yes	0	Accessory of EUT
6	AC Power Cord (3C)	1	1.8	No	0	Provided by LAB
7	AC Power Cord	1	1.8	No	0	Provided by LAB for above supported units

## 5. Measurement of Conducted Emissions

### 5.1. List of Test Instruments

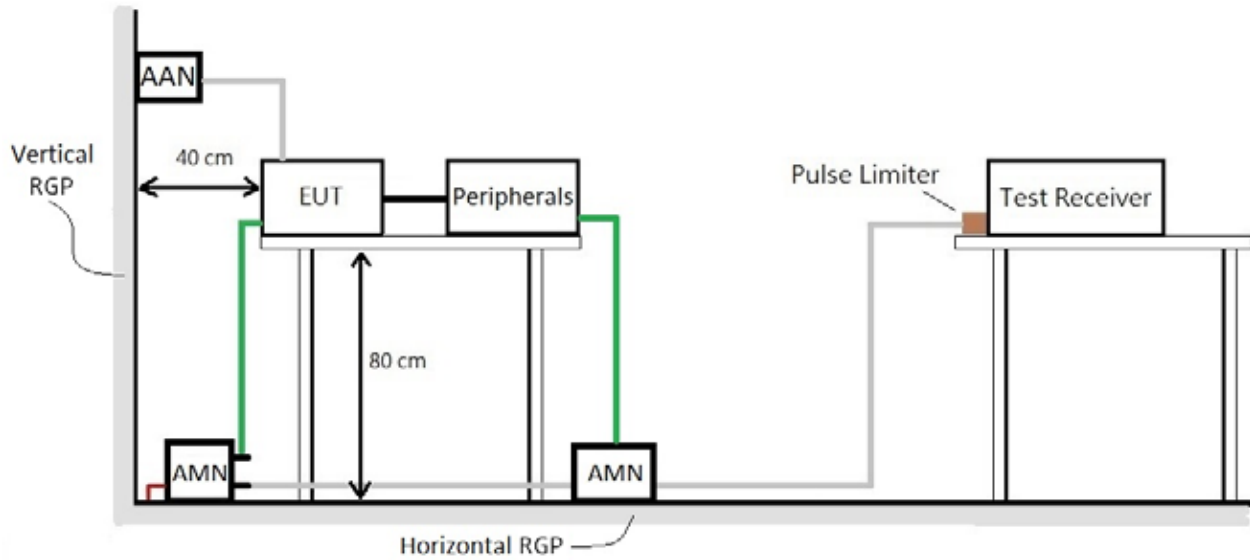
- For AC mains power port use

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Test Receiver	R & S	ESR3	101773	2019. 02. 13	1 Year
2	A.M.N.	R&S	ENV4200	100003	2018. 09. 06	1 Year
3	L.I.S.N.	Kyoritsu	KNW-407	8-1370-9	2019. 01. 30	1 Year
4	Pulse Limiter	R & S	ESH3-Z2	100041	2019. 01. 12	1 Year
5	Signal Cable	CDM Electronics, Inc.	RG-142	CE-02	2019. 01. 31	1 Year
6	Digital Thermo-Hygro Meter	YICHUN	TFC-9606	No.3 S/R	2018. 04. 20	1 Year
7	Test Software	Audix	e3	V.120703a	N.C.R.	N.C.R.

## 5.2. Test Setup

The EUTs and test equipment were configured in accordance with the requirement of EN 62040-2 Annex A.6.4.

- For AC mains power port
- For signal and telecommunication ports



EUT, local AE and associated cabling; and metal surfaces other than the RGP 80cm

### 5.3. Applicable Limits

- Limits of mains terminal interference voltage frequency range 0,15 MHz to 30 MHz for category C1 UPS and category C2 UPS equipment

Frequency Range (MHz)	Limits dB(μV)			
	Category C1 UPS		Category C2 UPS	
	Quasi-peak	Average	Quasi-peak	Average
0.15 – 0.50	66 to 56 <sup>a</sup>	56 to 46 <sup>a</sup>	79	66
0.50 – 5 <sup>b</sup>	56	46	73	60
5 – 30	60	50	73	60

a. The limit decreases linearly with the logarithm of the frequency.  
b. The lower limit shall apply at the transition frequency.

- Limits of mains terminal interference voltage frequency range 0,15 MHz to 30 MHz for Category C3 UPS equipment

UPS rated output current A	Frequency range (MHz)	Limits dB(μV)	
		Category C3 UPS	
		Quasi-peak	Average
>16 – 100	0.15 – 0.50 <sup>b</sup>	100	90
	0.50 – 5.0 <sup>b</sup>	86	76
	5.0 – 30.0	90 to 70 <sup>a</sup>	80 to 60 <sup>a</sup>
>100	0.15 – 0.50 <sup>b</sup>	130	120
	0.50 – 5.0 <sup>b</sup>	125	115
	5.0 – 30.0	115	105

c. The limits decrease linearly with the logarithm of the frequency.  
d. The lower limit shall apply at the transition frequency.

- Limits of a.c. output interference voltage

The limits in Tables 1 and 2 apply. An allowance of +14 dB is permitted for conducted disturbances at the output of the UPS as specified in Tables 1 and 2, except for C3 greater than 100 A where no increase is allowed. These limits only apply to UPS where the output cable, as declared by the manufacturer, in his users' instructions, can exceed 10 m in length.

- Limits of signal and telecommunication ports

For ports intended for connection to the public switched telecommunication network (PSTN), the test methods and limits of CISPR 22 apply.

Port	Frequency range	Limits	Basic standard
Signal, control	0,15 MHz to 0,5 MHz	40-30 dB( $\mu$ A) quasi-peak	CISPR 22 Class B
	Limit decreasing linearly with logarithm frequency	30-20 dB( $\mu$ A) average	
	0,5 MHz to 30 MHz	30 dB( $\mu$ A) quasi-peak 20 dB( $\mu$ A) average	

## 5.4. Measurement Procedure

### For AC mains power port

The method of EN 62040-2 Annex A.6 was used.

- Setup the EUTs and associated equipment described as clause 4.1, and they were located 40cm from the vertical conducting plane.
- Connect the EUT power cord to the main A.M.N and associated equipment to the second A.M.N. All ports of the A.M.N not connecting to the measuring equipment was terminated into 50 ohm resistive load.
- Connect receiver tuner port to an AAN that is bonded to the RGP.
- Setup the resolution bandwidth of the test receiver as section 5.3 defined.
- Operate the EUT system as described in clause 4.2.
- For the exploratory measurement, determine the highest emission amplitude relative to the limit on each of the EUT power cord with the peak detector by each of the EUT operation over the specified frequency range and record it, and then
- For final measurement, select the EUT operation mode that produced the highest amplitude in the exploratory measurement to determine the highest emissions with each specified detector and record it. All of the current-carrying conductors of each of the EUT power cords, except the ground conductor, must be measured over the specified frequency range.
- The measurement result was calculated by following formula :  
Emission Level = Reading (Receiver) + Factor (A.M.N) + Insertion Loss (Pulse Limiter) + Cable Loss
- If the average limit is met when using a Quasi-Peak detector receiver, the EUT is deemed to meet both limits and measurement with the average detector is unnecessary.



**For signal and telecommunication ports**

The method of EN 62040-2 Annex C and CISPR 22 clause 9 were used.

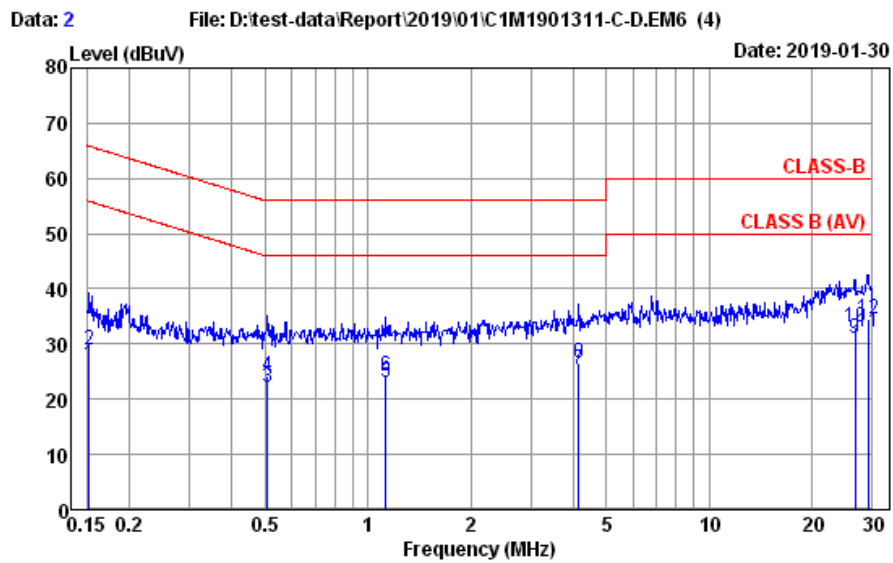
- Setup the EUTs and associated equipment described as clause 4.1, and they were located 40cm from the vertical conducting plane.
- Connect wired network port between EUT and AE through the AAN.
- Setup the resolution bandwidth of the test receiver as section 5.3 defined.
- Operate the EUT system as described in clause 4.2.
- For the exploratory measurement, determine the highest emission amplitude relative to the limit on each of the EUT LAN port with the peak detector by each of the transmission rate over the specified frequency range and record it, and then
- For final measurement, select the worst network port that produced the highest amplitude in the exploratory measurement to determine the highest emissions with each specified detector and record it. All of the transmission rates must be measured over the specified frequency range.
- The measurement result was calculated by following formula :  
Emission Level = Reading (Receiver) + Factor (AAN) + Insertion Loss (Pulse Limiter) + Cable Loss
- If the average limit is met when using a Quasi-Peak detector receiver, the EUT is deemed to meet both limits and measurement with the average detector is unnecessary.

### 5.5. Measurement Result

The following data are the worst emissions based on the prescan measurement result.

- Result for AC Mains Power Port

Test Date	2019. 01. 30	Environment	22°C, 53%
Input Power	AC 230V, 50Hz	Test Phase	Neutral
Tested By	John He	Test Result	Pass
Test Mode	Line Mode		



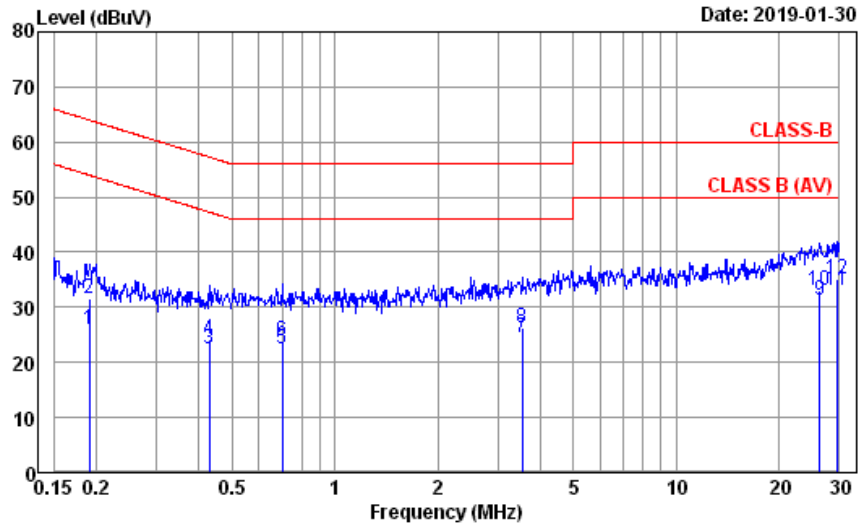
Site no. : No.5 Shielded Room      Data no. : 2  
 Condition : ENV4200 100003      LISN Phase : NEUTRAL  
 Limit : CLASS-B  
 Env. / Ins. : 23°C/53% ESR3 ( 101773 )      Engineer : John He  
 EUT : BR900MI  
 Power Rating : 230Vac/ 50Hz  
 Test Mode : LINE MODE

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.152	10.18	0.03	9.98	6.17	26.36	55.87	29.51	Average
2	0.152	10.18	0.03	9.98	8.84	29.03	65.87	36.84	QP
3	0.507	10.02	0.03	9.99	2.24	22.28	46.00	23.72	Average
4	0.507	10.02	0.03	9.99	4.19	24.23	56.00	31.77	QP
5	1.129	10.01	0.04	9.99	2.92	22.96	46.00	23.04	Average
6	1.129	10.01	0.04	9.99	4.19	24.23	56.00	31.77	QP
7	4.136	10.23	0.09	10.00	5.10	25.42	46.00	20.58	Average
8	4.136	10.23	0.09	10.00	6.37	26.69	56.00	29.31	QP
9	26.699	14.21	0.22	10.08	6.54	31.05	50.00	18.95	Average
10	26.699	14.21	0.22	10.08	8.59	33.10	60.00	26.90	QP
11	29.216	14.59	0.24	10.08	7.17	32.08	50.00	17.92	Average
12	29.216	14.59	0.24	10.08	9.55	34.46	60.00	25.54	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.  
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Test Date	2019. 01. 30	Environment	22°C, 53%
Input Power	AC 230V, 50Hz	Test Phase	Line
Tested By	John He	Test Result	Pass
Test Mode	Line Mode		

Data: 1 File: D:\test-data\Report\2019\01\C1M1901311-C-D.EM6 (4)

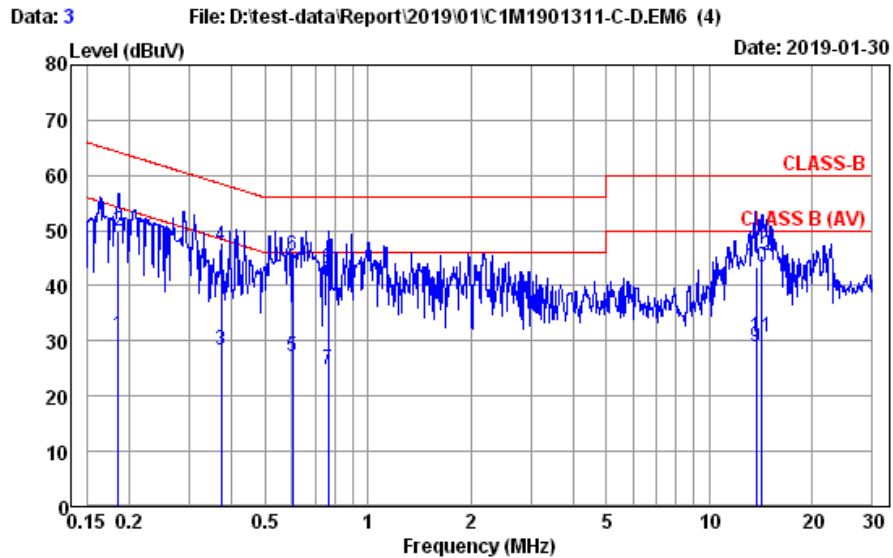


Site no. : No.5 Shielded Room Data no. : 1  
 Condition : ENV4200 100003 LISN Phase : LINE  
 Limit : CLASS-B  
 Env. / Ins. : 23°C/53% ESR3 ( 101773 ) Engineer : John He  
 EUT : BR900MI  
 Power Rating : 230Vac/ 50Hz  
 Test Mode : LINE MODE

	AMN	Cable	Pulse	Emission		Limits	Margin	Remark	
12	Freq. (MHz)	Factor (dB)	Loss (dB)	Att. (dB)	Reading (dBµV)	Level (dBµV)	(dBµV)	(dB)	
1	0.191	10.11	0.03	9.99	5.94	26.07	53.98	27.91	Average
2	0.191	10.11	0.03	9.99	11.38	31.51	63.98	32.47	QP
3	0.428	9.90	0.03	9.99	2.58	22.50	47.29	24.79	Average
4	0.428	9.90	0.03	9.99	4.29	24.21	57.29	33.08	QP
5	0.701	9.87	0.04	9.99	2.62	22.52	46.00	23.48	Average
6	0.701	9.87	0.04	9.99	4.02	23.92	56.00	32.08	QP
7	3.528	10.11	0.08	10.00	4.37	24.56	46.00	21.44	Average
8	3.528	10.11	0.08	10.00	6.01	26.20	56.00	29.80	QP
9	26.278	14.69	0.22	10.08	6.23	31.22	50.00	18.78	Average
10	26.278	14.69	0.22	10.08	8.17	33.16	60.00	26.84	QP
11	29.684	15.17	0.24	10.08	7.44	32.93	50.00	17.07	Average
12	29.684	15.17	0.24	10.08	9.77	35.26	60.00	24.74	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.  
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Test Date	2019. 01. 30	Environment	23°C, 53%
Input Power	AC 230V, 50Hz	Test Phase	Neutral
Tested By	John He	Test Result	Pass
Test Mode	Battery Mode		

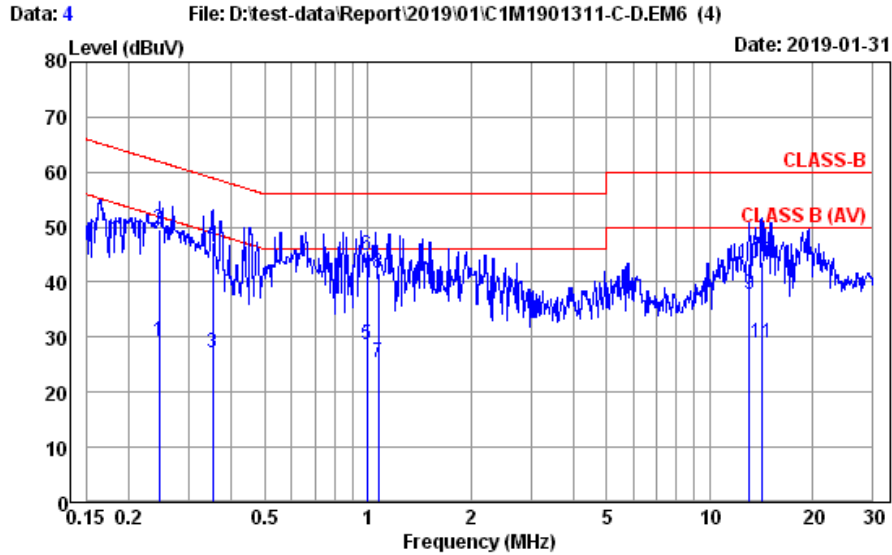


Site no. : No.5 Shielded Room Data no. : 3  
 Condition : ENV4200 100003 LISN Phase : NEUTRAL  
 Limit : CLASS-B  
 Env. / Ins. : 23°C/53% ESR3 ( 101773 ) Engineer : John He  
 EUT : BR900MI  
 Power Rating : 230Vac/ 50Hz  
 Test Mode : BATTERY MODE

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.186	10.15	0.03	9.99	10.68	30.85	54.24	23.39	Average
2	0.186	10.15	0.03	9.99	29.72	49.89	64.24	14.35	QP
3	0.373	10.04	0.03	9.99	8.17	28.23	48.44	20.21	Average
4	0.373	10.04	0.03	9.99	27.04	47.10	58.44	11.34	QP
5	0.600	10.02	0.03	9.99	7.12	27.16	46.00	18.84	Average
6	0.600	10.02	0.03	9.99	25.32	45.36	56.00	10.64	QP
7	0.766	10.01	0.04	9.99	4.83	24.87	46.00	21.13	Average
8	0.766	10.01	0.04	9.99	23.01	43.05	56.00	12.95	QP
9	13.708	11.89	0.16	10.03	6.92	29.00	50.00	21.00	Average
10	13.708	11.89	0.16	10.03	21.22	43.30	60.00	16.70	QP
11	14.213	11.99	0.16	10.04	8.56	30.75	50.00	19.25	Average
12	14.213	11.99	0.16	10.04	23.41	45.60	60.00	14.40	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.  
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Test Date	2019. 01. 30	Environment	23°C, 53%
Input Power	AC 230V, 50Hz	Test Phase	Line
Tested By	John He	Test Result	Pass
Test Mode	Battery Mode		



Site no. : No.5 Shielded Room Data no. : 4  
 Condition : ENV4200 100003 LISN Phase : LINE  
 Limit : CLASS-B  
 Env. / Ins. : 23°C/53% ESR3 ( 101773 ) Engineer : John He  
 EUT : BR900MI  
 Power Rating : 230Vac/ 50Hz  
 Test Mode : BATTERY MODE

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.246	10.03	0.03	9.99	9.20	29.25	51.91	22.66	Average
2	0.246	10.03	0.03	9.99	29.49	49.54	61.91	12.37	QP
3	0.352	9.94	0.03	9.99	7.34	27.30	48.91	21.61	Average
4	0.352	9.94	0.03	9.99	27.14	47.10	58.91	11.81	QP
5	0.993	9.85	0.04	9.99	8.84	28.72	46.00	17.28	Average
6	0.993	9.85	0.04	9.99	25.04	44.92	56.00	11.08	QP
7	1.077	9.86	0.04	9.99	5.36	25.25	46.00	20.75	Average
8	1.077	9.86	0.04	9.99	21.84	41.73	56.00	14.27	QP
9	13.057	12.17	0.15	10.03	15.45	37.80	50.00	12.20	Average
10	13.057	12.17	0.15	10.03	21.10	43.45	60.00	16.55	QP
11	14.206	12.46	0.16	10.04	6.39	29.05	50.00	20.95	Average
12	14.206	12.46	0.16	10.04	21.03	43.69	60.00	16.31	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.  
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

## 6. Measurement of Radiated Emissions

### 6.1. List of Test Instruments

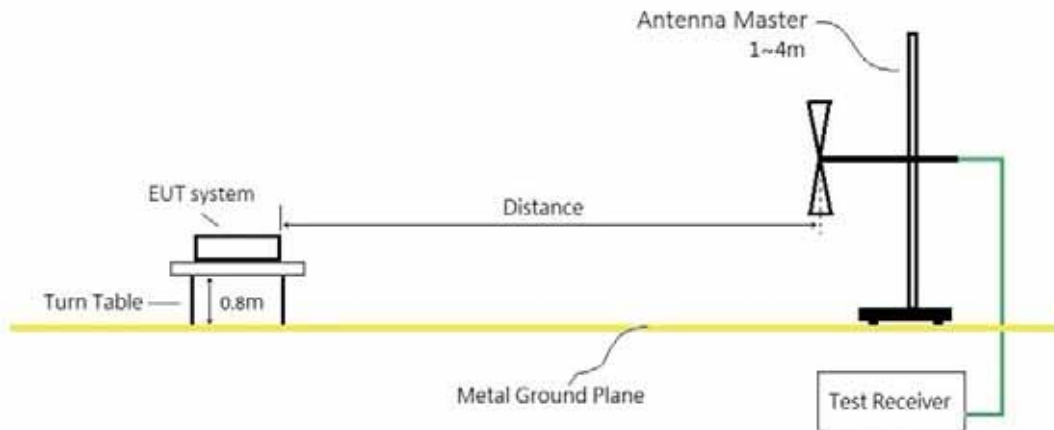
- For measurement of 30 to 1000MHz frequency range

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9010A-526	MY48031076	2018. 09. 21	1 Year
2	Test Receiver	R&S	ESCS30	100339	2018. 05. 07	1 Year
3	Amplifier	HP	8447D	2727A05737	2019. 01. 12	1 Year
4	Bilog Antenna	Schaffner	CBL6112B	2818	2019. 01. 19	1 Year
5	Signal Cable	HUBER+SUHNER	RG217U	RE-07	2019. 02. 01	1 Year
6	Digital Thermo-Hygro Meter	iMax	HTC-1	No.6 O/S	2018. 04. 20	1 Year
7	Test Software	Audix	e3	V.5.04507	N.C.R.	N.C.R.

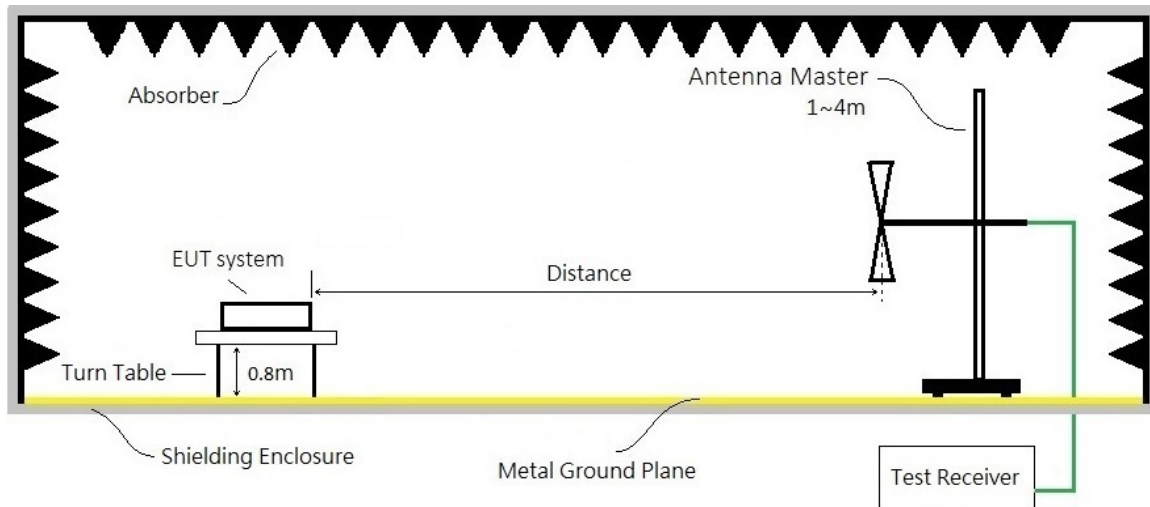
## 6.2. Test Setup

The EUTs and test equipment were configured in accordance with the requirement of EN 62040-2 Annex A.10.

- For frequency range 30 to 1000MHz (at Open Area Test Site)



- For frequency range 30 to 1000MHz (at Semi-Anechoic Chamber)



### 6.3. Applicable Limits

- Limits of radiated emission in the frequency range 30 MHz to 1000 MHz

Frequency Range (MHz)	Quasi-peak limits dB(μV/m)		
	Category C1 UPS	Category C2 UPS	Category C3 UPS
30 – 230	30	40	50
230 – 1000	37	47	60

The lower limit shall apply at the transition frequency.

NOTE 1 The test distance is 10 m. If the emission measurement at 10 m cannot be made because of high ambient noise levels or for other reasons, measurement may be made at a closer distance, for example, 3 m.

NOTE 2 Additional provisions may be required for cases where interference occurs.

### 6.4. Measurement Procedure

The measurement procedure specified in EN 62040-2 Annex A.10 was performed.

- The EUT and peripherals were placed on the rotatable non-conduction table, which is 0.8meters above the ground reference plane at the semi-anechoic chamber or OATS as described in section 4.1 and 6.2.
- The measurement distance is set as specified in section 6.3. The specified distance is between the horizontal projection onto the ground plane of the closest periphery of the EUT and the projection onto the ground plane of the center of the axis of the elements of the receiving antenna.
- The resolution bandwidth of the test receiver was set as section 6.3 defined.
- For the exploratory measurement, determine the highest emission amplitude relative to the limit on each of antenna polarization with the peak detector by each of the EUT operations over the specified frequency range and record it, and then
- For final measurement, select the EUT operation mode that produced the highest amplitude in the exploratory measurement to determine the highest emissions with each specified detector and record it.
- In order to determine the maximum emission level, must rotate the table in 360 degree and move the receiving antenna between 1~4m height above the ground reference plane.
- Both polarizations of receiving antenna were determined.
- The measurement result was calculated by following formulas:  
(30 – 1000MHz)  
Emission Level = Reading (Receiver) + Cable Loss + Antenna Factor

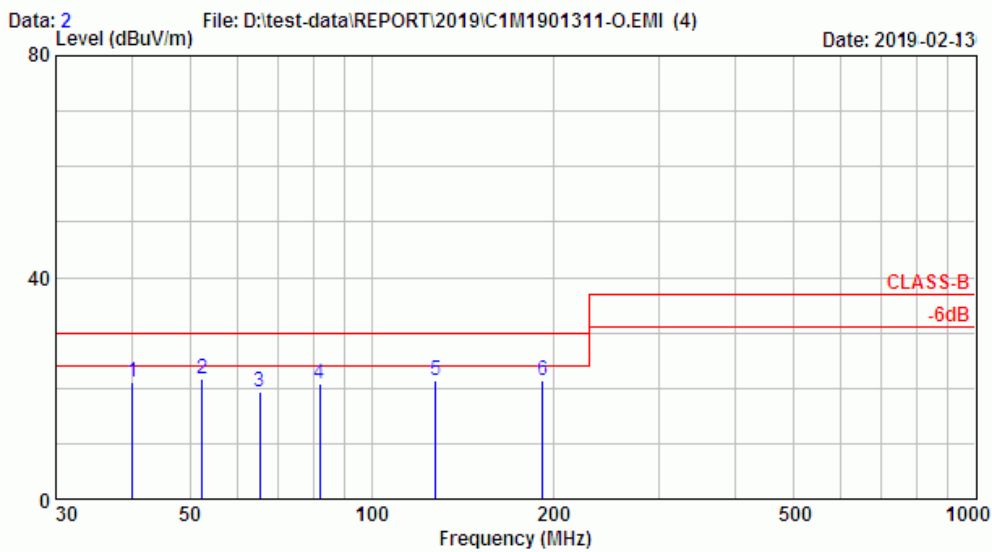


### 6.5. Measurement Result

The following data are the worst emissions based on the prescan measurement result.

- For frequency range 30 – 1000MHz

Test Date	2019. 02. 13	Environment	30°C, 58%
Input Power	AC 230V, 50Hz	Ant. Polarity	Horizontal
Tested By	Ghost	Test Result	Pass
Test Mode	Line Mode		



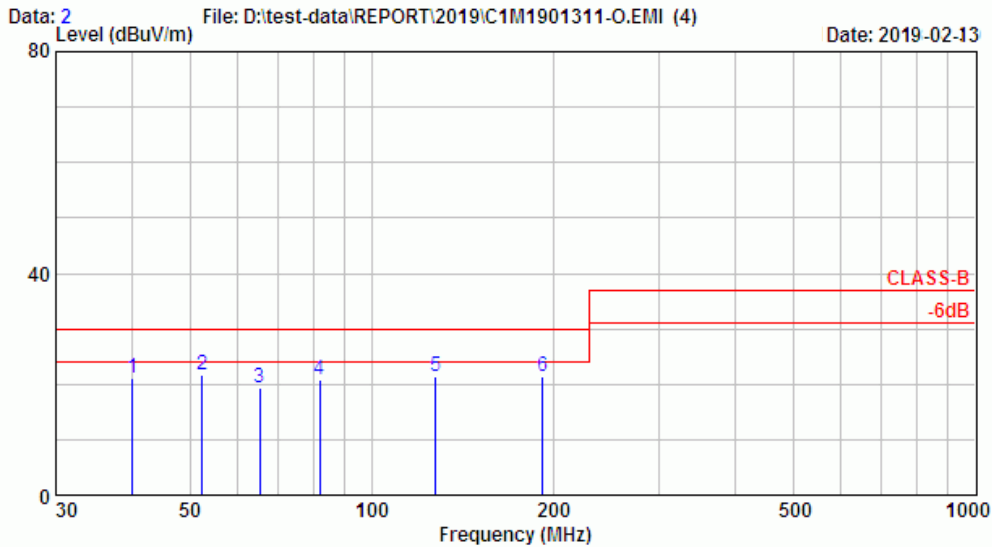
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Site no.      : OATS No. 6           Data no.   : 2
Dis. / Ant.  : 10m CBL6112B 2818 (PAD) Ant. pol.  : HORIZONTAL
Limit       : CLASS-B
Env. / Ins.  : 30°C / 58% ESCS 30 (339) Engineer  : Ghost
EUT M/N     : BR900MI
Power Rating : 230V/50Hz
Test Mode    : LINE Mode
    
```

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	40.200	17.88	0.84	2.30	21.02	30.00	8.98	QP
2	52.465	14.65	0.98	5.95	21.59	30.00	8.41	QP
3	65.197	11.91	1.10	6.32	19.33	30.00	10.67	QP
4	82.098	13.15	1.26	6.30	20.71	30.00	9.29	QP
5	127.565	17.57	1.66	2.29	21.52	30.00	8.48	QP
6	192.000	14.81	2.20	4.30	21.32	30.00	8.68	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emissions not reported are 20 dB lower than the specified limit.

Test Date	2019. 02. 13	Environment	30°C, 58%
Input Power	AC 230V, 50Hz	Ant. Polarity	Vertical
Tested By	Ghost	Test Result	Pass
Test Mode	Line Mode		

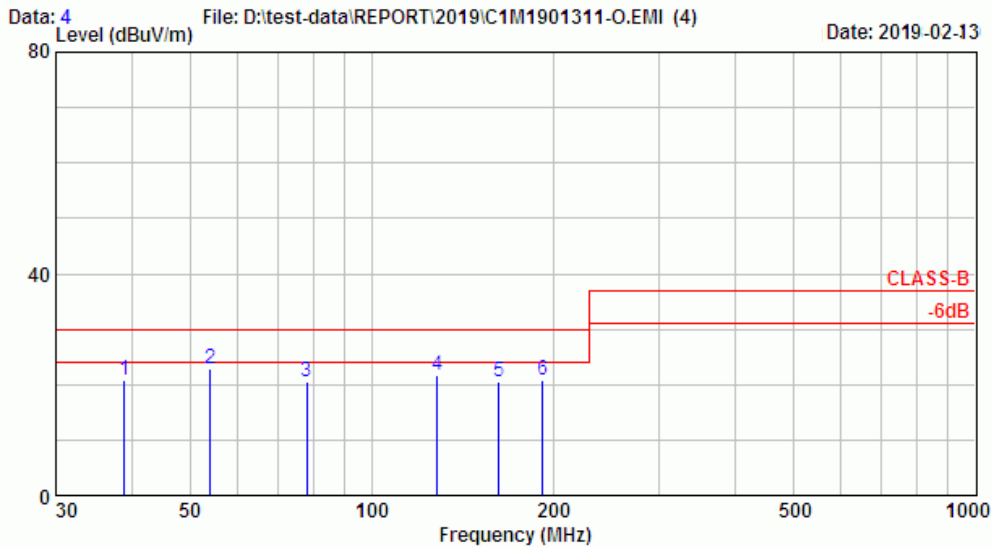


Site no. : OATS No. 6 Data no. : 2  
 Dis. / Ant. : 10m CBL6112B 2818 (PAD) Ant. pol. : HORIZONTAL  
 Limit : CLASS-B  
 Env. / Ins. : 30°C / 58% ESCS 30 (339) Engineer : Ghost  
 EUT M/N : BR900MI  
 Power Rating : 230V/50Hz  
 Test Mode : LINE Mode

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	40.200	17.88	0.84	2.30	21.02	30.00	8.98	QP
2	52.465	14.65	0.98	5.95	21.59	30.00	8.41	QP
3	65.197	11.91	1.10	6.32	19.33	30.00	10.67	QP
4	82.098	13.15	1.26	6.30	20.71	30.00	9.29	QP
5	127.565	17.57	1.66	2.29	21.52	30.00	8.48	QP
6	192.000	14.81	2.20	4.30	21.32	30.00	8.68	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emissions not reported are 20 dB lower than the specified limit.

Test Date	2019. 02. 13	Environment	30°C, 58%
Input Power	AC 230V, 50Hz	Ant. Polarity	Horizontal
Tested By	Ghost	Test Result	Pass
Test Mode	Battery Mode		

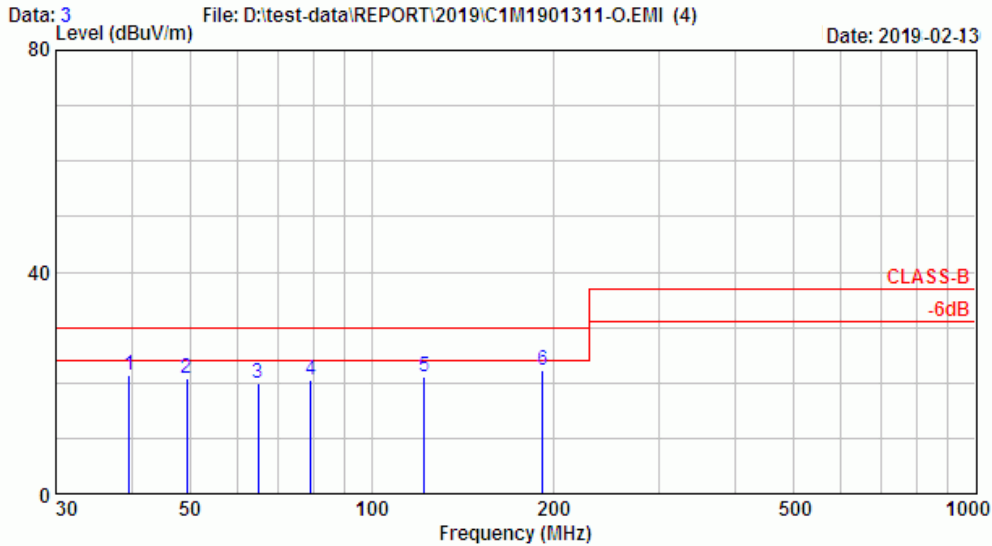


Site no. : OATS No. 6 Data no. : 4  
 Dis. / Ant. : 10m CBL6112B 2818 (PAD) Ant. pol. : HORIZONTAL  
 Limit : CLASS-B  
 Env. / Ins. : 30°C / 58% ESCS 30 (339) Engineer : Ghost  
 EUT M/N : BR900MI  
 Power Rating : 230V/50Hz  
 Test Mode : Battery Mode

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	38.970	18.50	0.83	1.60	20.93	30.00	9.07	QP
2	54.017	14.03	1.00	7.74	22.76	30.00	7.24	QP
3	78.153	12.65	1.22	6.53	20.40	30.00	9.60	QP
4	128.632	17.53	1.67	2.50	21.70	30.00	8.30	QP
5	162.406	15.38	1.97	3.09	20.44	30.00	9.56	QP
6	192.000	14.81	2.20	3.90	20.92	30.00	9.08	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emissions not reported are 20 dB lower than the specified limit.

Test Date	2019. 02. 13	Environment	30°C, 58%
Input Power	AC 230V, 50Hz	Ant. Polarity	Vertical
Tested By	Ghost	Test Result	Pass
Test Mode	Battery Mode		



Site no. : OATS No. 6 Data no. : 3  
 Dis. / Ant. : 10m CBL6112B 2818 (PAD) Ant. pol. : VERTICAL  
 Limit : CLASS-B  
 Env. / Ins. : 30°C / 58% ESCS 30 (339) Engineer : Ghost  
 EUT M/N : BR900MI  
 Power Rating : 230V/50Hz  
 Test Mode : Battery Mode

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	39.700	18.08	0.84	2.50	21.41	30.00	8.59	QP
2	49.460	15.67	0.95	4.29	20.91	30.00	9.09	QP
3	64.884	11.92	1.10	6.98	19.99	30.00	10.01	QP
4	79.431	12.77	1.24	6.64	20.65	30.00	9.35	QP
5	122.414	17.81	1.61	1.72	21.14	30.00	8.86	QP
6	192.000	14.81	2.20	5.20	22.22	30.00	7.78	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emissions not reported are 20 dB lower than the specified limit.

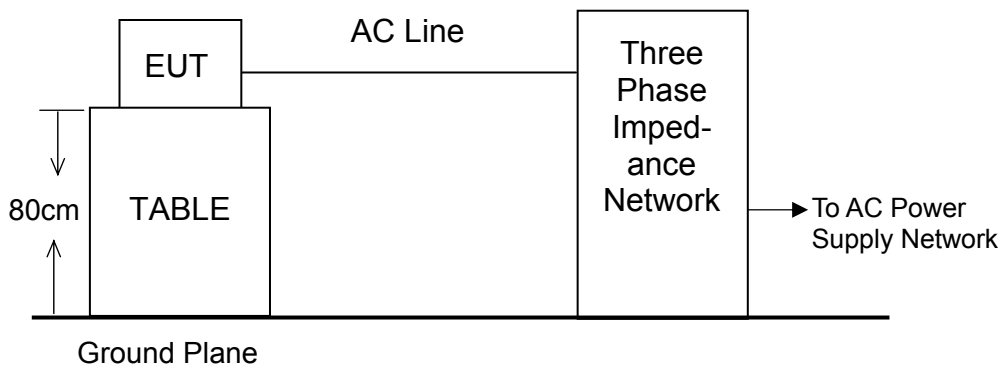
## 7. Measurement of Input Current Harmonics

### 7.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	AC Power Source	TESEQ	NSG 1007-45	1248A04038	2017. 11. 27	2 Years
2	Signal Conditioning Unit	TESEQ	CCN 1000-3	1234A03680	2017. 11. 27	2 Years
3	Three Phase Impedance Network	TESEQ	INA 2197	1234A03681	2017. 11. 27	2 Years
4	Proflin AC Switching Unit	TESEQ	NSG 2200-3	EK 22713	2017. 11. 28	2 Years
5	Digital Thermo-Hygro Meter	iMax	HTC-1	No.2 Harmonics Room	2018. 04. 20	1 Years

### 7.2. Test Setup

The EUT and test equipment were configured in accordance with the requirement of EN 61000-3-2.



### 7.3. Applicable Standard and Limits

#### Limits for Class A Equipment

Class A is classified according to section 5 of EN 61000-3-2

Harmonic order n	Maximum permissible harmonic current A
Odd Harmonics Only	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 \times 15/n$
Even Harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 \times 8/n$

### 7.4. Measurement Procedure

The measurement procedure specified in EN 61000-3-2 clause 6.2 was used.

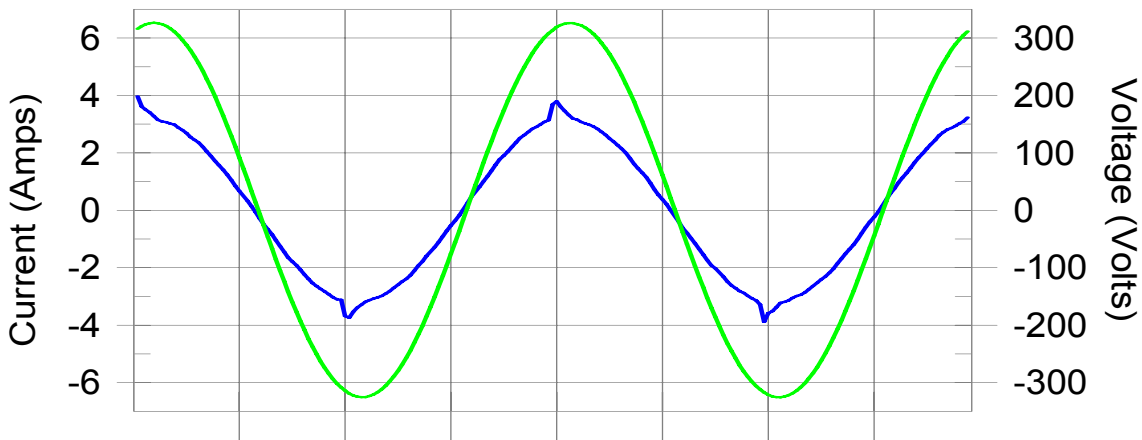
- Setup the EUTs and associated equipment described as clause 4.1.
- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- Apply a 230V/50Hz rated test voltage which shall be maintained within  $\pm 2.0\%$  and the frequency within  $\pm 0.5\%$  of the nominal value to EUT.
- Let EUT work as stated and through three phase impedance network to measure the EUT to get the harmonic current for Odd & Even harmonics up to 40th.

### 7.5. Measurement Result

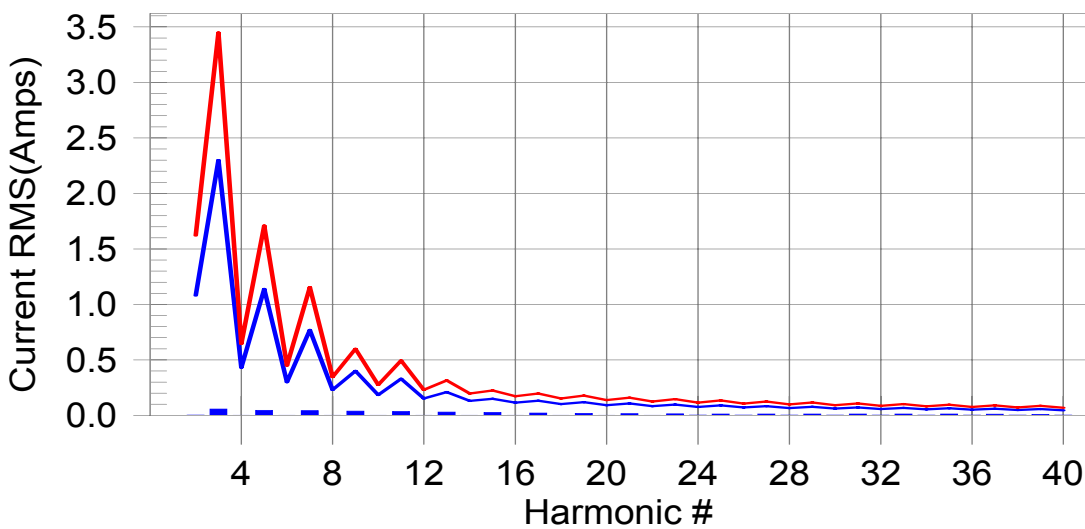
Test Date	2019. 02. 18	Environment	25°C, 55%
Input Power	AC 230V, 50Hz	Test Result	Pass (Class A)
Tested By	MinXiang Yang		
Test Mode	Line Mode		

Test Result: Pass      Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line      European Limits



Test result: Pass      Worst harmonics H35-12.7% of 150% limit, H35-18.3% of 100% limit.

Test Result: Pass                      Source qualification: Normal  
 THC(A): 0.120                      I-THD(%): 5.2                      POHC(A): 0.041                      POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts):	230.367	Frequency(Hz):	50.00
I_Peak (Amps):	4.019	I_RMS (Amps):	2.315
I_Fund (Amps):	2.312	Crest Factor:	1.736
Power (Watts):	531.0	Power Factor:	0.996

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	1.080	N/A	0.003	1.620	N/A	Pass
3	0.058	2.300	2.5	0.058	3.450	1.7	Pass
4	0.002	0.430	N/A	0.002	0.645	N/A	Pass
5	0.046	1.140	4.1	0.047	1.710	2.7	Pass
6	0.002	0.300	N/A	0.002	0.450	N/A	Pass
7	0.043	0.770	5.6	0.043	1.155	3.8	Pass
8	0.002	0.230	N/A	0.002	0.345	N/A	Pass
9	0.039	0.400	9.8	0.039	0.600	6.6	Pass
10	0.002	0.184	N/A	0.002	0.276	N/A	Pass
11	0.036	0.330	10.8	0.036	0.495	7.2	Pass
12	0.002	0.153	N/A	0.002	0.230	N/A	Pass
13	0.030	0.210	14.4	0.031	0.315	9.7	Pass
14	0.002	0.131	N/A	0.002	0.197	N/A	Pass
15	0.027	0.150	17.8	0.027	0.225	12.0	Pass
16	0.002	0.115	N/A	0.002	0.173	N/A	Pass
17	0.022	0.132	16.5	0.022	0.198	11.1	Pass
18	0.002	0.102	N/A	0.002	0.153	N/A	Pass
19	0.019	0.118	15.7	0.019	0.178	10.6	Pass
20	0.002	0.092	N/A	0.002	0.138	N/A	Pass
21	0.016	0.107	14.7	0.016	0.161	10.0	Pass
22	0.002	0.084	N/A	0.002	0.125	N/A	Pass
23	0.014	0.098	14.4	0.014	0.147	9.9	Pass
24	0.002	0.077	N/A	0.002	0.115	N/A	Pass
25	0.013	0.090	15.0	0.014	0.135	10.5	Pass
26	0.002	0.071	N/A	0.003	0.107	N/A	Pass
27	0.013	0.083	15.7	0.013	0.125	10.7	Pass
28	0.002	0.066	N/A	0.003	0.099	N/A	Pass
29	0.013	0.078	16.8	0.013	0.116	11.4	Pass
30	0.002	0.061	N/A	0.002	0.092	N/A	Pass
31	0.013	0.073	17.7	0.013	0.109	12.1	Pass
32	0.002	0.058	N/A	0.002	0.086	N/A	Pass
33	0.012	0.068	18.2	0.013	0.102	12.4	Pass
34	0.002	0.054	N/A	0.003	0.081	N/A	Pass
35	0.012	0.064	18.3	0.012	0.096	12.7	Pass
36	0.002	0.051	N/A	0.002	0.077	N/A	Pass
37	0.011	0.061	18.1	0.011	0.091	12.6	Pass
38	0.002	0.048	N/A	0.003	0.073	N/A	Pass
39	0.010	0.058	17.4	0.010	0.087	12.1	Pass
40	0.002	0.046	N/A	0.003	0.069	N/A	Pass



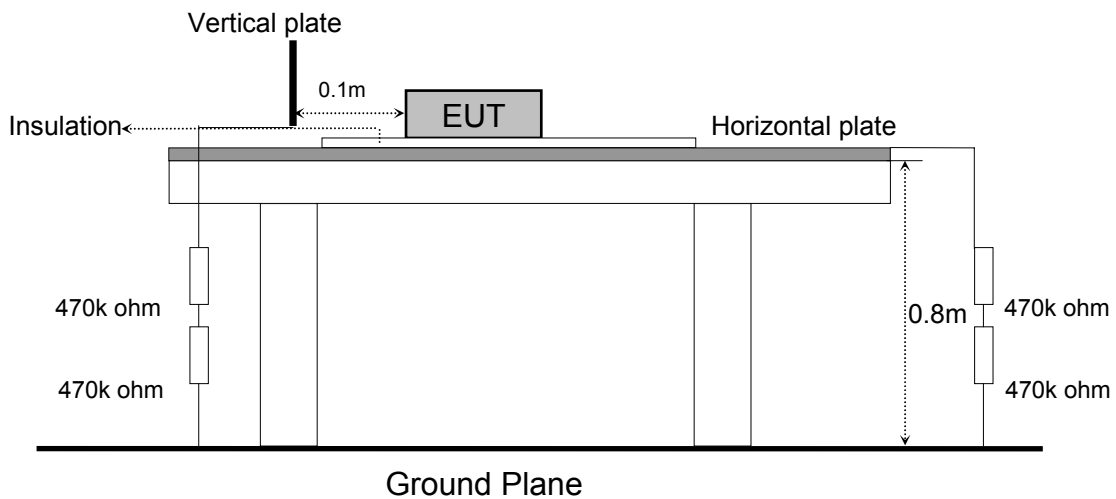
## 8. Electrostatic Discharge Immunity Test

### 8.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	ESD Simulator	TESEQ	NSG 437	1057	2018. 11. 17	1 Year
2	Digital Ther-mo-Hygrometer/P ressure	CUSTOM	WF-301	01780	2018. 10. 19	1 Year

### 8.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-2.



### 8.3. Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN 62040-2 clause 7.3.3
- Test specification is in accordance with EN 62040-2 Table 5, Category C1  
Test specification is in accordance with EN 62040-2 Table 6, Category C2 and C3  
Basic standard is in accordance with IEC 61000-4-2

Test Specification		Performance Criterion
Contact Discharge Voltage	$\pm 2\text{kV}$ and $\pm 4\text{kV}$	B
Air Discharge Voltage	$\pm 2\text{kV}$ , $\pm 4\text{kV}$ and $\pm 8\text{kV}$	

- Deviation from applicable standard  
No deviation

## 8.4. Measurement Procedure

The measurement procedure specified in IEC 61000-4-2 clause 8.3.1 and A.5 was used.

- Setup the EUTs and associated equipment described as clause 4.1.
- Air Discharge

This test is done on a non-conductive surfaces. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the ESD generator discharge electrode shall be removed from the EUT. The generator is then retriggered for a new single discharge and repeated 10 discharges each at positive and negative polarity for each preselected test point. This procedure shall be repeated until all the air discharge completed.
- Contact Discharge

All the procedure is same as foregoing subclause. except that the tip of the discharge electrode shall touch the EUT conductive surfaces & repeated 25 discharges each discharges each at positive and negative polarity for each test point before the discharge switch is operated.
- Indirect discharge for horizontal coupling plane

At least 10 discharges each at positive and negative polarity shall be applied to the horizontal coupling plane, at points on each side of the EUT. The ESD generator positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.
- Indirect discharge for vertical coupling plane

At least 10 discharges each at positive and negative polarity shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.
- For above tests, the voltage was increased from the minimum to the selected test level.

### 8.5. Test Result

Test Date	2019. 02. 20	Environment	22°C, 41%, 99KPa
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Rex Wang		
Test Mode	Line Mode Battery Mode		

Air Discharge	Voltage kV Level / Discharge per polarity 10 / Result										
Test Location	+2	-2	+4	-4	+8	-8					Comments
Button*3(1~3)	ND	ND	ND	ND	ND	ND					
Seam*8(4~11)	ND	ND	ND	ND	ND	ND					
Gigabit*2(12,13)	ND	ND	ND	ND	A	A					
Tel In*1(14)	ND	ND	ND	ND	A	A					
Tel out*1(15)	ND	ND	ND	ND	A	A					
Data port*1(16)	ND	ND	ND	ND	ND	ND					
Battery+Surge*3 (17~19)	ND	ND	ND	ND	ND	ND					
AC IN*1(20)	ND	ND	ND	ND	ND	ND					
Circuit Breaker*1 (21)	ND	ND	ND	ND	ND	ND					
Contact Discharge	Voltage kV Level / Discharge per polarity 10 / Result										
Test Location	+2	-2	+4	-4							Comments
Screws*4(22~25)	ND	ND	ND	ND							
Indirect Contact	Voltage kV Level / Discharge per polarity 10 / Result										
Test Location	+2	-2	+4	-4							Comments
VCP Front	A	A	A	A							
VCP Right	A	A	A	A							
VCP Left	A	A	A	A							
VCP Back	A	A	A	A							
HCP Bottom	A	A	A	A							
<b>Additional Notes</b>											
<b>Measurement Points</b>	Please refer to the Photos of ESD Test Points										
ND = No discharge after test.											

## 9. Radiated, Radio-frequency, Electromagnetic Field Immunity Test

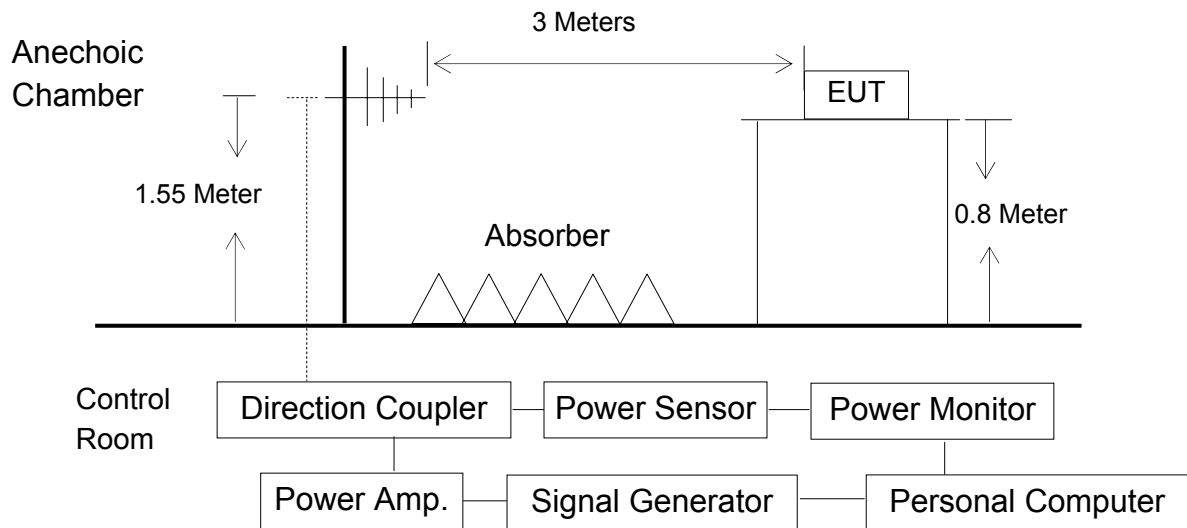
### 9.1. List of Test Instruments

- For 80MHz - 1000MHz frequency range

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Signal Generator	R&S	SML03	103251	2018. 11. 30	1 Year
2	Power Amplifier	A/R	250W1000A	0329092	NCR	NCR
3	Dual channel EPM-P series power meter	Agilent	E4417A	GB41291797	2019. 01. 04	1 Year
4	Power Antenna	A/R	AT1080	13002	NCR	NCR
5	Peak and Average Power Sensor	Keysight	E9327A	MY56140003	2018. 10. 25	1 Year
6	Digital Thermo-Hygro Meter	YICHUN	TFC-9606	RS Room	2018. 04. 20	1 Years

### 9.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-3.



### 9.3. Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN 62040-2 clause 7.3.3
- Test specification is in accordance with EN 62040-2 Table 5, Category 1

Basic standard is in accordance with IEC 61000-4-3

Test Specification (Test Level)		Performance Criteria
Frequency Range	80-1000MHz	A
Field Strength	3V/m	
Modulation & Signal	80%, 1kHz AM	

Test specification is in accordance with EN 62040-2 Table 6, Category C2 and C3  
 Basic standard is in accordance with IEC 61000-4-3

Test Specification (Test Level)		Performance Criteria
Frequency Range	80-1000MHz	A
Field Strength	10V/m	
Modulation & Signal	80%, 1kHz AM	

- Deviation from applicable standard  
 No deviation

### 9.4. Measurement Procedure

The measurement procedure specified in IEC 61000-4-3 clause 8 was used.

- Setup the EUTs and associated equipment described as clause 4.1.
- The EUT was placed on a non-conductive table 0.8 meter above the ground, the EUT and its simulators on the turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1.55 meter height.
- The test was performed with the EUT exposed to both horizontally and vertically polarized fields on each of the four sides.
- All the scanning conditions are as follows:
  - Field Strength: 3 V/m (r.m.s, Unmodulated)
  - Scanning Frequency: 80-1000MHz
  - Amplitude Modulated: AM 1kHz, 80%
  - Step Size: 1% increments
  - The Rate of Sweep: 0.0015 decade/s
  - Dwell Time: 3 sec.
  - Test Position Angle: 0°, 90°, 180° and 270°
  - Polarity of Antenna: H: Horizontal, V: Vertical

### 9.5. Test Result

Test Date	2019. 02. 21	Environment	24°C, 46%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Rex Wang		
Test Mode	Line Mode Battery Mode		

Frequency Range (MHz)	Position Angle (°)	Polarity (H or V)	Field Strength (V/m)	Observation Criterion
80 - 1000	0	H	3V/m +Modulated	A
80 - 1000	90	H	3V/m +Modulated	A
80 - 1000	180	H	3V/m +Modulated	A
80 - 1000	270	H	3V/m +Modulated	A
80 - 1000	0	V	3V/m +Modulated	A
80 - 1000	90	V	3V/m +Modulated	A
80 - 1000	180	V	3V/m +Modulated	A
80 - 1000	270	V	3V/m +Modulated	A

Remark 1: Modulation Signal: 1kHz 80% AM.  
Remark 2: No error occurred.

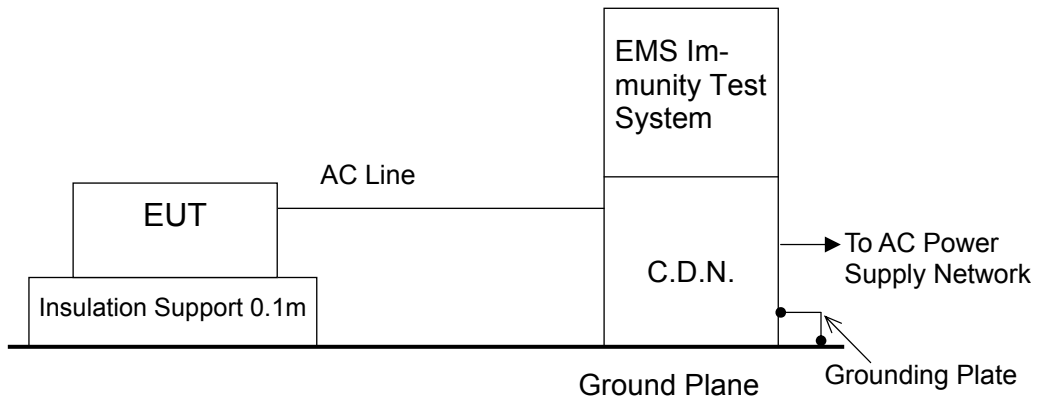
## 10. Electrical fast transient/burst Immunity Test

### 10.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	EMS Immunity Test System	TESEQ	NSG 3060	1519	2018. 07. 26	1 Year
2	C.D.N.	TESEQ	CDN 3063	2074	2018. 07. 26	1 Year
3	Digital Thermo-Hygro Meter	iMax	HTC-1	No.2 EFT/SURGE	2018. 04. 20	1 Years

### 10.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-4.



### 10.3.Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN 62040-2 clause 7.3.3
- Test specification is in accordance with EN 62040-2 Table 5, Category C1

Basic standard is in accordance with IEC 61000-4-4

Test Specification (Test Level)	Performance Criteria
Signal and control ports : $\pm 1\text{kV}$ AC input and output power ports : $\pm 1\text{kV}$	B
Tr/Th : 5/50ns	
Repetition frequency : 5kHz	

Test specification is in accordance with EN 62040-2 Table 6, Category C2 and C3

Basic standard is in accordance with IEC 61000-4-4

Test Specification (Test Level)	Performance Criteria
Signal and control ports : $\pm 2\text{kV}$ AC input and output power ports : $\pm 2\text{kV}$	B
Tr/Th : 5/50ns	
Repetition frequency : 5kHz	

- Deviation from applicable standard  
No deviation



## 10.4.Measurement Procedure

The measurement procedure specified in IEC 61000-4-4 clause 8 was used.

- Setup the EUTs and associated equipment described as clause 4.1.
- The EUT and its simulators was placed 0.1m high above the ground reference plane which was a min. 1m\*1m metallic sheet with 0.65mm minimum thickness.
- This reference ground plane is project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.
- For input and output AC power ports  
The EUT was connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines, and the length of the power line between the coupling device and the EUT shall be 0.5m or less. Both polarities of the test voltage should be applied during compliance test and the duration of the test can't less than 1min.
- For signal lines and control lines ports  
The I/O interface cable of the EUT is connected to its simulator through a capacitive coupling clamp that is 1 meter long. The capacitive coupling clamp is impressed with burst noise for 1min and indirectly couples burst to I/O interface cable.  
[Remark: Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3 m.]
- For DC input and DC output power ports  
The DC power cable of the EUT is connected to the DC power source by using a coupling device which couples the EFT interference signal to DC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test can't less than 2min  
[Remark: Applicable only to DC power ports when the EUT supports this ports.]

### 10.5. Test Result

Test Date	2019. 02. 19	Environment	22°C, 55%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Minxiang Yang		
Test Mode	Line Mode		

Input AC Power Port					
Inject Line	Polarity (+/-)	Test Voltage Peak (kV)	Inject Time (s)	Inject Method	Observation Criterion
L	+	0.5, 1	60	Direct	A
L	-	0.5, 1	60	Direct	A
N	+	0.5, 1	60	Direct	A
N	-	0.5, 1	60	Direct	A
PE	+	0.5, 1	60	Direct	A
PE	-	0.5, 1	60	Direct	A
L, N, PE	+	0.5, 1	60	Direct	A
L, N, PE	-	0.5, 1	60	Direct	A
Remark: No error occurred.					

## 11. Surge Immunity Test

### 11.1. List of Test Instruments

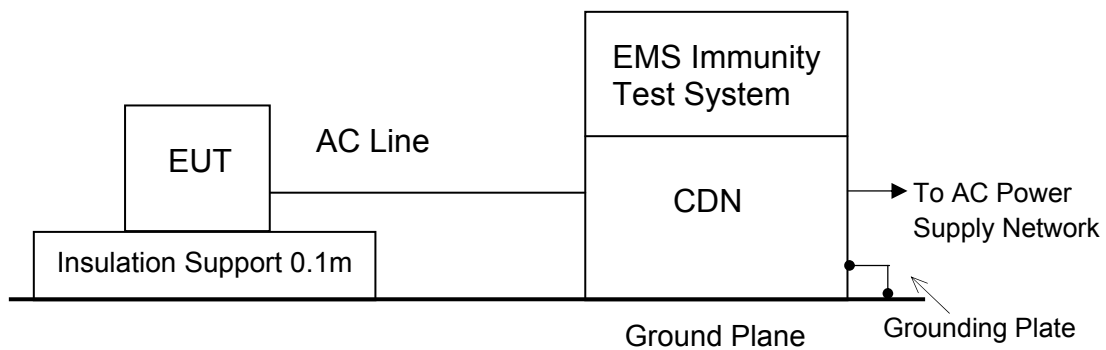
- For AC Input and Output Power Port

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	EMS Immunity Test System	TESEQ	NSG 3060	1519	2018. 07. 26	1 Year
2	CDN	TESEQ	CDN 3063	2074	2018. 07. 26	1 Year
3	Digital Thermo-Hygro Meter	iMax	HTC-1	No.2 EFT/SURGE	2018. 04. 20	1 Years

### 11.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-5.

- For AC Input and Output Power Port



### 11.3.Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN 62040-2 clause 7.3.3
- Test specification is in accordance with EN 62040-2 Table 5, Category C1  
Test specification is in accordance with EN 62040-2 Table 6, Category C2 and C3  
Basic standard is in accordance with IEC 61000-4-5

Test Specification (Test Level)	Performance Criteria
Signal and control ports : $\pm 1kV$	B
AC input and output power ports --line to line : $\pm 1kV$ --line to earth: $\pm 2kV$	B
Power port: 1.2/50 (8/20) Tr/Th $\mu s$ Signal and control ports: 1.2/50 (8/20) Tr/Th $\mu s$	

- Deviation from applicable standard  
No deviation

### 11.4.Measurement Procedure

#### For Input and Output AC Power Port

The measurement procedure specified in IEC 61000-4-5 clause 8 was used.

- Setup the EUTs and associated equipment described as clause 4.1.
- For line to line coupling mode, provided a 0.5/1kV 1.2/50  $\mu s$  current surge (at open-circuit condition) and 8/20  $\mu s$  current surge to EUT selected points.
- At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate.
- Different phase angles (at 0°, 90°, 180° and 270°) were done individually.
- Repeat above procedure except the open-circuit test voltages 0.5kV/1kV/2kV for line to earth coupling mode test.

#### For Telecommunication Port

- Setup the EUTs and associated equipment described as clause 4.1.
- For On Line mode: The waveform is an open-circuit voltage front time of 1.2  $\mu s$ , and an open-circuit voltage time to half value of 50  $\mu s$ .
- In the case of shielded line, the surge is applied to direct application.

## 11.5. Test Result

Test Date	2019. 02. 19	Environment	22°C, 55%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Minxiang Yang		
Test Mode	Line Mode		

Input AC Power Port, Open Circuit Voltage					
Location	Polarity (+/-)	Phase Angle (°)	Test Voltage Peak (kV)	No of Pulse	Observation Criterion
L-N	+	0	0.5, 1	5	A
	+	90	0.5, 1	5	A
	+	180	0.5, 1	5	A
	+	270	0.5, 1	5	A
	-	0	0.5, 1	5	A
	-	90	0.5, 1	5	A
	-	180	0.5, 1	5	A
	-	270	0.5, 1	5	A
L-PE	+	0	0.5, 1, 2	5	A
	+	90	0.5, 1, 2	5	A
	+	180	0.5, 1, 2	5	A
	+	270	0.5, 1, 2	5	A
	-	0	0.5, 1, 2	5	A
	-	90	0.5, 1, 2	5	A
	-	180	0.5, 1, 2	5	A
	-	270	0.5, 1, 2	5	A
N-PE	+	0	0.5, 1, 2	5	A
	+	90	0.5, 1, 2	5	A
	+	180	0.5, 1, 2	5	A
	+	270	0.5, 1, 2	5	A
	-	0	0.5, 1, 2	5	A
	-	90	0.5, 1, 2	5	A
	-	180	0.5, 1, 2	5	A
	-	270	0.5, 1, 2	5	A

Remark: No error occurred.

## 12. Immunity to Conducted Disturbances, Induced by Radio-Frequency Field Immunity Test

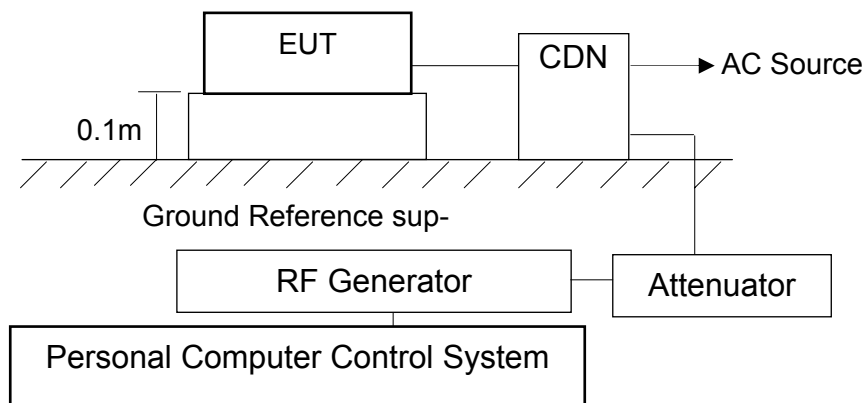
### 12.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	RF Generator	TESEQ	NSG 4070B-30	035076	2018. 08. 15	1 Year
2.	6dB Attenuator	TESEQ	ATN 6050	38424	2018. 03. 08	1 Year
3.	CDN	TESEQ	CDN T800	30897	2018. 07. 03	1 Year
4.	CDN	TESEQ	CDN M016	34607	2018. 12. 24	1 Year
5.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.2 CS Room	2018. 04. 20	1 Year

### 12.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-6.

- Common Mode Test Setup



### 12.3.Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN 62040-2 clause 7.3.3
- Test specification is in accordance with EN 62040-2 Table 5, Category C1

Basic standard is in accordance with IEC 61000-4-6

Test Specification (Test Level)		Performance Criteria
Signal and control ports, AC input and output power ports		
Frequency Range	0.15-80MHz	A
Field Strength	3V (unmodulated, r.m.s)	
Modulation	80% AM (1kHz)	

Test specification is in accordance with EN 62040-2 Table 6, Category C2 and C3

Basic standard is in accordance with IEC 61000-4-6

Test Specification (Test Level)		Performance Criteria
Signal and control ports, AC input and output power ports		
Frequency Range	0.15-80MHz	A
Field Strength	10V (unmodulated, r.m.s)	
Modulation	80% AM (1kHz)	

- Deviation from applicable standard  
No deviation

## 12.4.Measurement Procedure

The measurement procedure specified in IEC 61000-4-6 clause 8 was used.

### **\*\* For AC Input and Output Power Line \*\***

- Setup the EUTs and associated equipment described as clause 4.1.
- The EUT and supporting equipment were placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) was placed on the ground plane making contact with it at about 0.1-0.3m from EUT. Cables between CDN and EUT were as short as possible.
- The disturbance signal described below was injected to EUT through CDN.
- The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- The frequency range was swept from 0.15 to 80MHz using 10V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.
- The rate of sweep shall not exceed  $1.5 \cdot 10^3$  decades/s. Where the frequency was swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

### **\*\* For Signal and Control Ports \*\***

- The EUT and supporting equipment were placed on an insulating support 0.1m high above a ground reference plane. EM Injection Clamp (coupling and decoupling device) was placed on the ground plane making contact with it at about 0.1-0.3m from EUT. Cables between EM Injection Clamp and EUT were as short as possible.
- The CDN was placed on between AE and EUT. The EUT and AE of power through CDN, CDN terminated with  $50\Omega$  at the RF disturbance input port.
- The disturbance signal described below was injected to EUT through EM Injection Clamp.



### 12.5. Test Result

Test Date	2019. 02. 20	Environment	23°C, 46%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	Jacky Chen		
Test Mode	Line Mode		

Frequency Range (MHz)	Injected Position	Voltage Level	Observation Criterion
0.15 - 80MHz	Main (Input AC Power Line)	3V(rms) + Modulated	A

Remark 1: Modulation Signal: 1kHz 80% AM.  
 Remark 2: No error occurred.

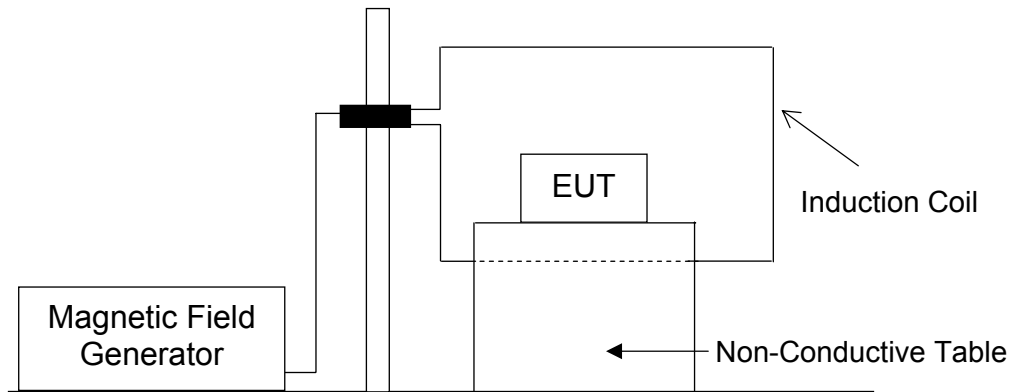
### 13. Power Frequency Magnetic Field Immunity Test

#### 13.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Magnetic Field Generator	Narda S.T.S. / PMM	PMM1008	0100X30101	2018. 10. 01	1 Year
2	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 Magnetic Room	2018. 04. 20	1 Years

#### 13.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-4-8.



#### 13.3. Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN 62040-2 clause 7.5
- Test specification is in accordance with EN 62040-2 clause 7.5, Category C1

Basic standard is in accordance with IEC 61000-4-8

Test Specification (Test Level)		Performance Criteria
Power Frequency	50Hz or 60Hz	B
Magnetic Field Strength	10A/m (rms)	

Test specification is in accordance with EN 62040-2 clause 7.5, Category C2 and C3

Basic standard is in accordance with IEC 61000-4-8

Test Specification (Test Level)		Performance Criteria
Power Frequency	50Hz or 60Hz	B
Magnetic Field Strength	30A/m (rms)	

- Deviation from applicable standard  
No deviation

### 13.4.Measurement Procedure

The measurement procedure specified in IEC 61000-4-8 clause 8 was used.

- Setup the EUTs and associated equipment described as clause 4.1.
- The equipment cabinets which can be earthed shall be connected to the safety earth directly on the GRP or via the earth terminal to PE.
- The EUT was placed on 0.8m high table, and subjected to the test magnetic field by using the induction coil of standard dimensions (1m x 2.6m).
- The induction coil rotated by 90 degrees in order to expose the EUT to the test field with different orientations (at X-axis, Y-axis and X-axis).
- The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- All cables of EUT exposed to magnetic field for 1m of their length.
- The preferential range of test levels, respectively for continuous of the magnetic field, applicable to distribution networks at 50 Hz or 60 Hz.

### 13.5. Test Result

Test Date	2019. 02. 19	Environment	25°C, 49%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	<i>MinXiang Yang</i>		
Test Mode	Line Mode Battery Mode		

Power Frequency	Magnetic Field Strength	Coil Orientation	Testing Duration	Observation Criterion
50Hz	10A/m	X-axis	1 Min	A
50Hz	10A/m	Y-axis	1 Min	A
50Hz	10A/m	Z-axis	1 Min	A
Remark: No error occurred.				

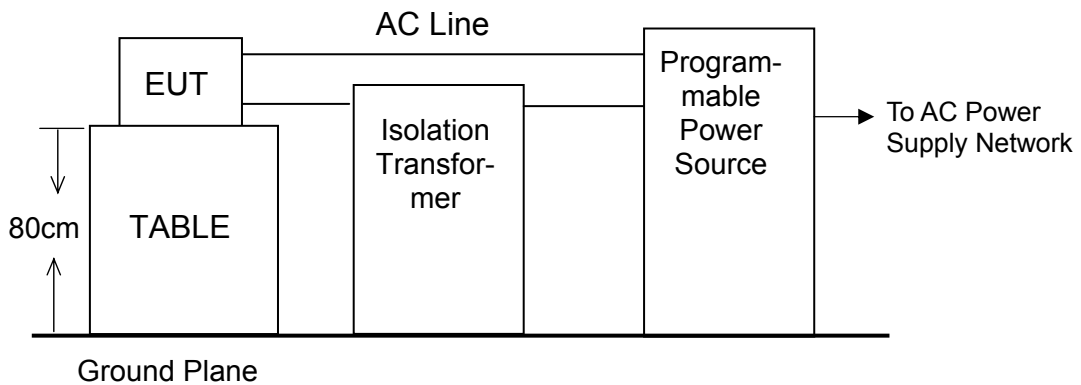
## 14. Low Frequency Signals Immunity Test

### 14.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Programmable Power Source	TESEQ	NSG1007-45	1248A04038	2017. 11. 28	2 Years
2	Isolation Transformer	N/A	N/A	N/A	N/A	N/A
3	Digital Thermo-Hygro Meter	iMax	HTC-1	No.2 Harmonics Room	2018. 04. 22	1 Years

### 14.2. Test Setup

The EUT and test equipment were configured in accordance with the basic standard requirement of IEC 61000-2-2.



### 14.3.Applicable Standard and Test Specification

- Immunity requirement is in accordance with EN 62040-2 clause 7.4  
 Test specification is in accordance with EN 62040-2 Annex D.6.1.1 and D.6.1.2  
 Basic standard is in accordance with IEC 61000-2-2

Test Specification (Test Level)		Performance Criteria
Single-phase equipment	The test as a minimum shall be performed with a single sinusoidal disturbing voltage of 10 V, at a frequency which is slowly varied from 140 Hz to 360 Hz. Use can be made of a series injection circuit where the mains supplies 50/60Hz power and the amplifier delivers only the harmonics.	A
Three-phase equipment	The test set-up and voltage level for each phase is identical to the set-up for single-phase equipment; however, a three-phase variable frequency generator is used (static or rotating). The frequency is slowly varied from 140 Hz to 360 Hz.	

### 14.4.Measurement Procedure

The measurement procedure specified in IEC 61000-2-2 was used.

- Setup the EUTs and associated equipment described as clause 4.1 and 14.2.
- Let U.P.S. to be under charging and line status.
- Adjust programmable AC source to output a 10Vrms (sine wave from 140 to 360Hz) that can be induced 10Vrms to link between AC source and U.P.S. (through the isolation transformer).
- The induced signals shall mixed in normal AC source and U.P.S. shall withstand it and no performances shall be reduced.

### 14.5. Test Result

Test Date	2019. 02. 19	Environment	22°C, 49%
Input Power	AC 230V, 50Hz	Test Result	Pass
Tested By	MinXiang Yang		
Test Mode	Line Mode		

Frequency Range (MHz)	Strength	Performance Criterion
140	10V (rms) Sinusoidal	A
160		A
200		A
240		A
280		A
320		A
360		A

Isolation transformer Primary : Secondary = 1:1

Remark: No error occurred.

## 15. Measurement Uncertainty List

The measurement uncertainty was estimated for test on the EUT according to CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage of K=2.

The uncertainties value is not used in determining the PASS/FAIL results.

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Conducted emissions at AC mains power port	9kHz-150kHz	±3.7dB
	150kHz-30MHz	±3.5dB
Conducted emissions at wired network port	150kHz-30MHz	±3.5dB
Conducted emissions at broadcast receiver tuner port	150kHz-30MHz	±3.5dB
Conducted emissions Power Clamp	30MHz-300MHz	±4.4dB
Radiated electromagnetic	9kHz-30MHz	±0.5dB
Radiated emissions (10m Chamber)	30MHz-200MHz, 3m, Horizontal	±4.3dB
	200MHz-1000MHz, 3m, Horizontal	±4.3dB
	30MHz-200MHz, 3m, Vertical	±4.4dB
	200MHz-1000MHz, 3m, Vertical	±3.9dB
	30MHz-200MHz, 10m, Horizontal	±4.3dB
	200MHz-1000MHz, 10m, Horizontal	±4.1dB
	30MHz-200MHz, 10m, Vertical	±4.3dB
	200MHz-1000MHz, 10m, Vertical	±3.8dB
	1GHz-6GHz, 3m	±5.5dB
	6GHz-18GHz, 3m	±4.8dB
Radiated emissions (No.1 3m Chamber)	30MHz-200MHz, 3m, Horizontal	±3.9dB
	200MHz-1000MHz, 3m, Horizontal	±4.3dB
	30MHz-200MHz, 3m, Vertical	±4.5dB
	200MHz-1000MHz, 3m, Vertical	±4.1dB
	1GHz-6GHz, 3m	±5.1dB
	6GHz-18GHz, 3m	±5.5dB
Radiated emissions (No.2 3m Chamber)	30MHz-200MHz, 3m, Horizontal	±4.3dB
	200MHz-1000MHz, 3m, Horizontal	±4.3dB
	30MHz-200MHz, 3m, Vertical	±4.4dB
	200MHz-1000MHz, 3m, Vertical	±3.9dB
	1GHz-6GHz, 3m	±5.2dB
	6GHz-18GHz, 3m	±5.2dB
Radiated emissions (No.3 3m Chamber)	30MHz-200MHz, 3m, Horizontal	±4.7dB
	200MHz-1000MHz, 3m, Horizontal	±4.5dB
	30MHz-200MHz, 3m, Vertical	±4.3dB
	200MHz-1000MHz, 3m, Vertical	±4.1dB
Radiated emissions (No.4 3m Chamber)	30MHz-200MHz, 3m, Horizontal	±4.1dB
	200MHz-1000MHz, 3m, Horizontal	±4.4dB
	30MHz-200MHz, 3m, Vertical	±4.2dB
	200MHz-1000MHz, 3m, Vertical	±5.0dB
	1GHz-6GHz, 3m	±4.4dB
	6GHz-18GHz, 3m	±4.1dB



Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Radiated emissions (No.3 OATS)	30MHz-200MHz, 3m, Horizontal	±4.5dB
	200MHz-1000MHz, 3m, Horizontal	±4.4dB
	30MHz-200MHz, 3m, Vertical	±4.4dB
	200MHz-1000MHz, 3m, Vertical	±4.0dB
	30MHz-200MHz, 10m, Horizontal	±4.5dB
	200MHz-1000MHz, 10m, Horizontal	±4.2dB
	30MHz-200MHz, 10m, Vertical	±4.3dB
	200MHz-1000MHz, 10m, Vertical	±4.0dB
Radiated emissions (No.5 OATS)	30MHz-200MHz, 3m, Horizontal	±4.2dB
	200MHz-1000MHz, 3m, Horizontal	±4.7dB
	30MHz-200MHz, 3m, Vertical	±4.4dB
	200MHz-1000MHz, 3m, Vertical	±4.4dB
	30MHz-200MHz, 10m, Horizontal	±4.2dB
	200MHz-1000MHz, 10m, Horizontal	±4.6dB
	30MHz-200MHz, 10m, Vertical	±4.4dB
	200MHz-1000MHz, 10m, Vertical	±4.4dB
Radiated emissions (No.6 OATS)	30MHz-200MHz, 3m, Horizontal	±4.3dB
	200MHz-1000MHz, 3m, Horizontal	±4.4dB
	30MHz-200MHz, 3m, Vertical	±4.5dB
	200MHz-1000MHz, 3m, Vertical	±4.1dB
	30MHz-200MHz, 10m, Horizontal	±4.3dB
	200MHz-1000MHz, 10m, Horizontal	±4.2dB
	30MHz-200MHz, 10m, Vertical	±4.4dB
	200MHz-1000MHz, 10m, Vertical	±4.1dB
Radiated emissions (No.7 OATS)	30MHz-200MHz, 3m, Horizontal	±3.9dB
	200MHz-1000MHz, 3m, Horizontal	±4.5dB
	30MHz-200MHz, 3m, Vertical	±4.6dB
	200MHz-1000MHz, 3m, Vertical	±4.5dB
	30MHz-200MHz, 10m, Horizontal	±3.9dB
	200MHz-1000MHz, 10m, Horizontal	±4.3dB
	30MHz-200MHz, 10m, Vertical	±4.6dB
	200MHz-1000MHz, 10m, Vertical	±4.5dB
Radiated emissions (No.8 OATS)	30MHz-200MHz, 3m, Horizontal	±4.5dB
	200MHz-1000MHz, 3m, Horizontal	±4.3dB
	30MHz-200MHz, 3m, Vertical	±4.6dB
	200MHz-1000MHz, 3m, Vertical	±4.1dB
	30MHz-200MHz, 10m, Horizontal	±4.7dB
	200MHz-1000MHz, 10m, Horizontal	±4.2dB
	30MHz-200MHz, 10m, Vertical	±4.6dB
	200MHz-1000MHz, 10m, Vertical	±4.0dB

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Harmonic current	NSG 1007-45	±0.7%
Voltage fluctuations & flicker	NSG 1007-45	±0.2%
Electrostatic discharge (ESD)	NSG 437	Ucurrent= 7.3% Uvoltage= 1.0% Utime = 9.0%
	Ditto	Ucurrent = 4.0% Uvoltage = 2.0% Utime = 3.0%
	MZ-15/EC	Ucurrent = 10.0% Uvoltage = 1.8% Utime = 20.0%
Radio-frequency electromagnetic field, Continuous radiated disturbances (RS)	80MHz-200MHz	±1.7dB
	200MHz-1000MHz	±1.8dB
	1GHz-6GHz	±1.7dB
Electrical fast transient/burst (EFT)	AC power port	Uvoltage = 1.0% Utime = 4.0%
	Signal port	Uvoltage = 4.0% Utime = 3.0%
Surge	Open-circuit output voltage 0.5kV-6kV (1.2us/50us)	Uvoltage = 4.0%
	Open-circuit output voltage 0.5kV-6kV (10us/700us)	Uvoltage = 4.0%
	Rise time (30%-90%) x 1.67: 0.5kV-6kV (1.2us/50us)	Utime = 3.0%
	Rise time (30%-90%) x 1.67: 0.5kV-6kV (10us/700us)	Utime = 3.0%
	Duration time: 0.5kV-6kV (1.2us/50us)	Utime = 3.0%
	Duration time: 0.5kV-6kV (10us/700us)	Utime = 3.0%
	Short-circuit output current 0.25KA-3KA (8us / 20us)	Ucurrent = 3.0%
	Rise time (10%-90%) x 1.25: (8us/20us)	Utime = 3.0%
Duration time: (8us/20us)	Utime = 3.0%	
Radio-frequency, continuous conducted disturbances (CS)	CDN (AC power port)	1.5 dB
	EM-Clamp (Signal port)	3.3 dB
Power-frequency magnetic field (PFMF)	MAG100.1	4%
	PMM1008	2%
Voltage dips	TESEQ	Uvoltage = 0.1% Ucurrent = 0.2%

## 16. Photographs

### 16.1. Conducted Emissions Measurement

- For AC Mains Power Port



Front View of Conducted Measurement



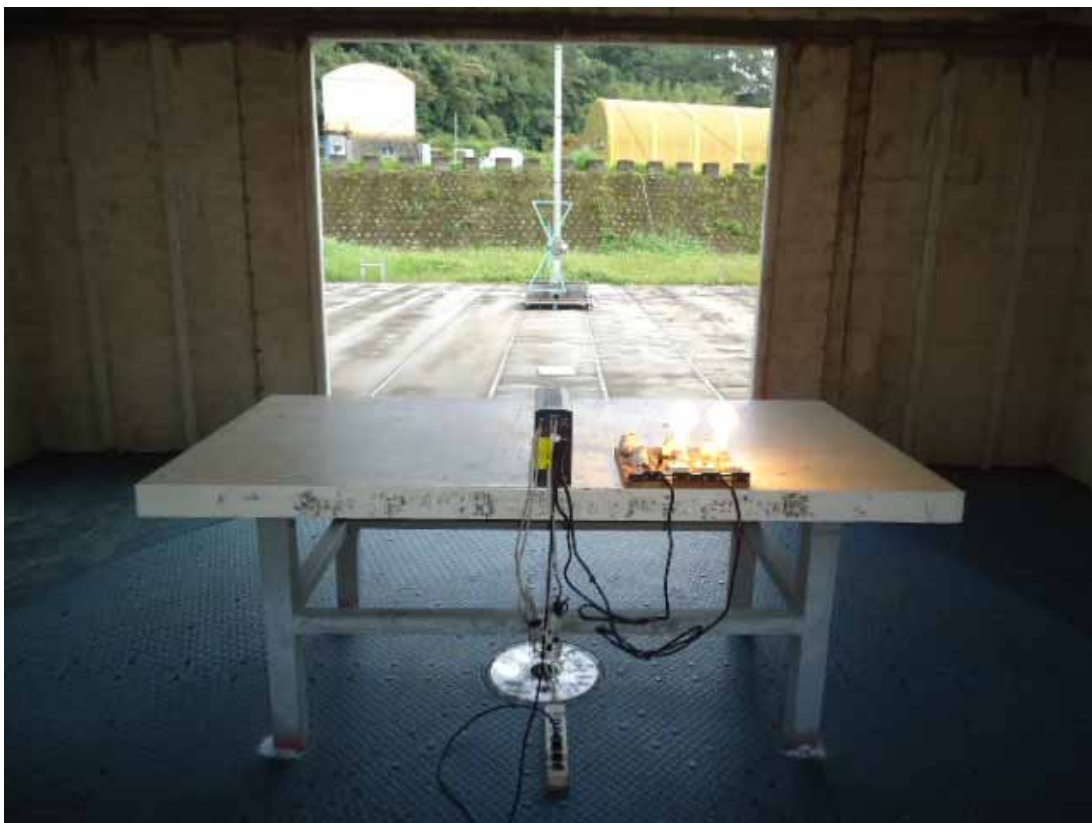
Back View of Conducted Measurement

## 16.2. Radiated Emissions Measurement

- For Frequency Range 30 – 1000MHz



Front View of Radiated Measurement



Back View of Radiated Measurement

### 16.3. Input Current Harmonics Measurement



### 16.4. Electrostatic Discharge Immunity Test

- Air & Contact Discharge



- HCP & VCP



- ESD Test Points





- ESD Test Points

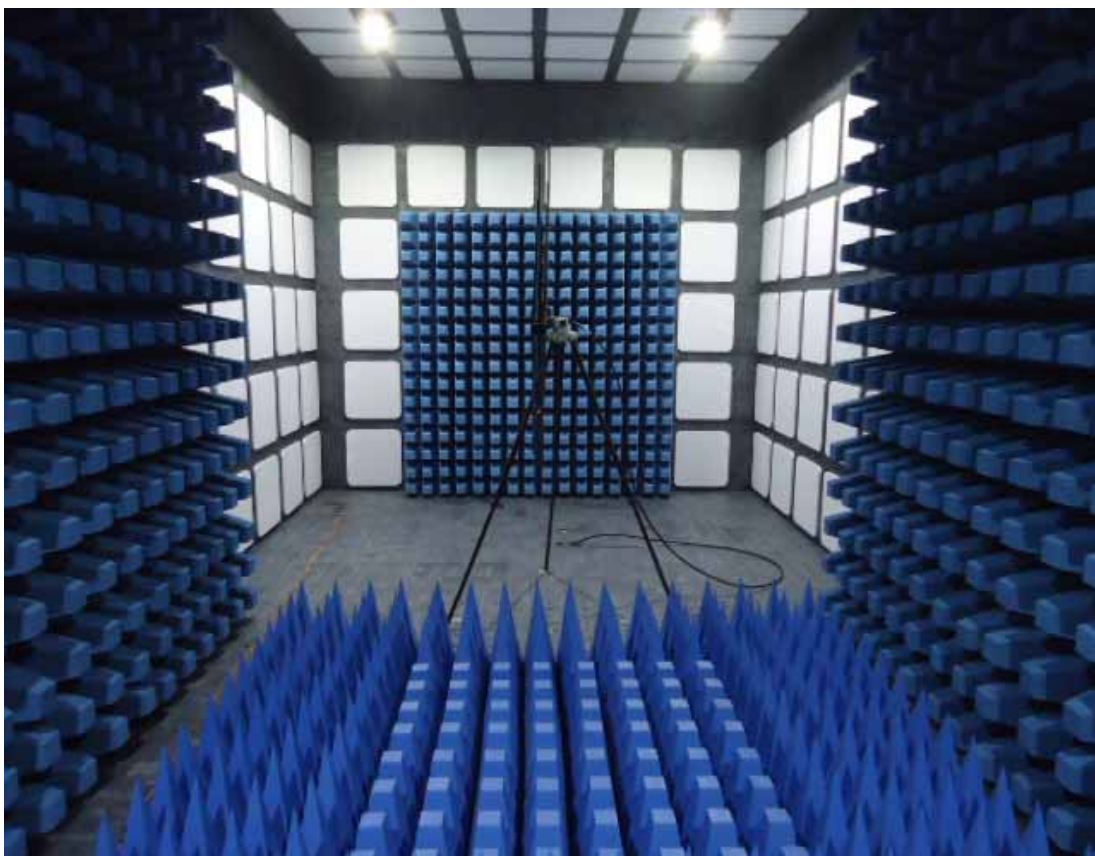




- ESD Test Points



16.5. Radiated, Radio-Frequency, Electromagnetic Field Immunity Test



## 16.6. Electrical Fast Transient/Burst Immunity Test

- Injection Position: AC Power Line



## 16.7. Surge Immunity Test

- For AC Input and Output Power Ports

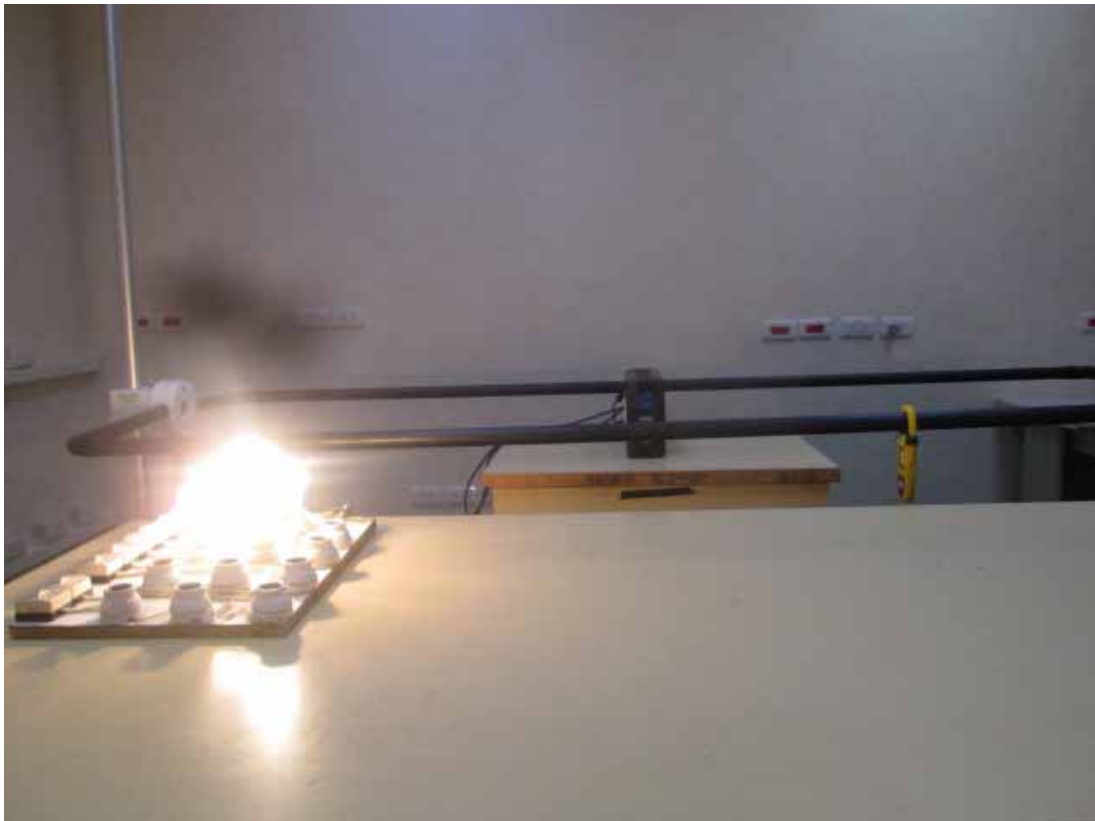


## 16.8. Immunity to Conducted Disturbances Induced by RF Fields

- Injection Position: AC Power Line



## 16.9. Power Frequency Magnetic Field Immunity Test



16.10.Low Frequency Signals Immunity Test



# APPENDIX I

## (Photos of EUT)



Figure 1  
General Appearance (Front & Side View)



Figure 2  
General Appearance (Back & Side View)



Figure 3  
Appearance (I/O View)



Figure 4  
Appearance (I/O View)





Figure 5  
Appearance (I/O View)



Figure 6  
Internal View



Figure 7  
Battery View



Figure 8  
Battery View



Figure 9  
Internal View

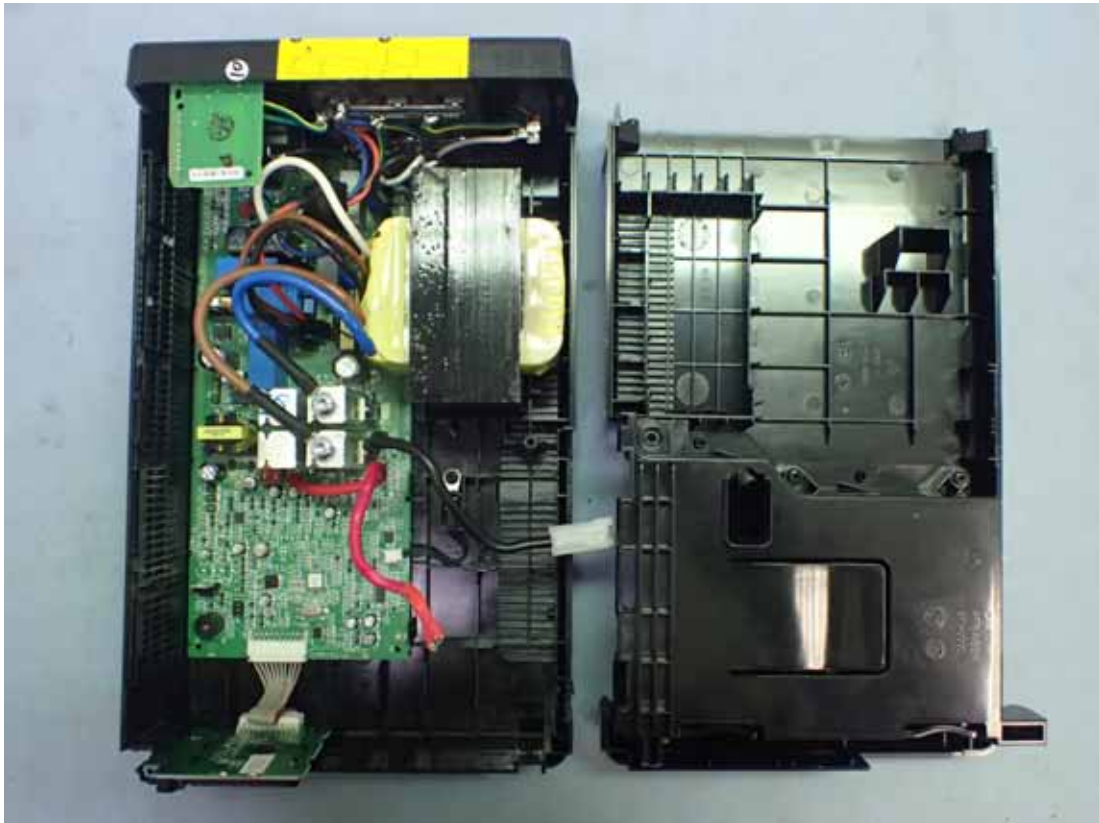


Figure 10  
Internal View

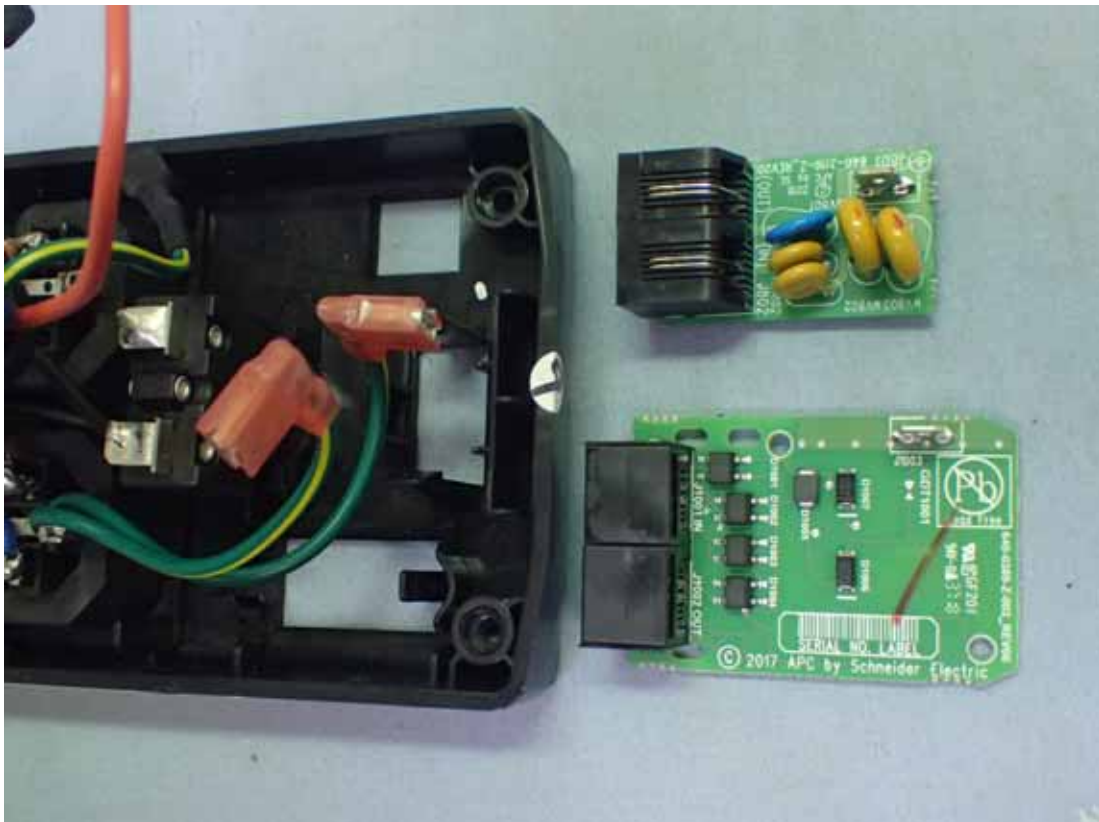




Figure 11  
Internal View (Internal Board, Front View)

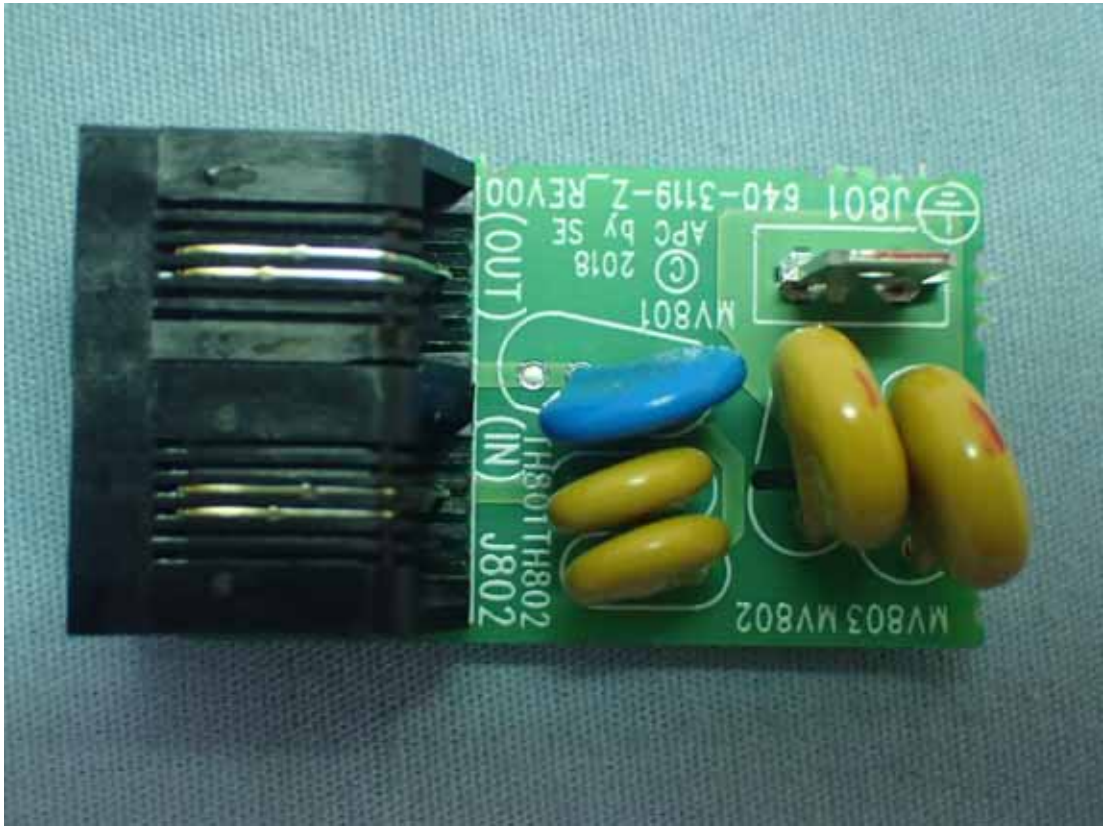


Figure 12  
Internal View (Internal Board, Back View)

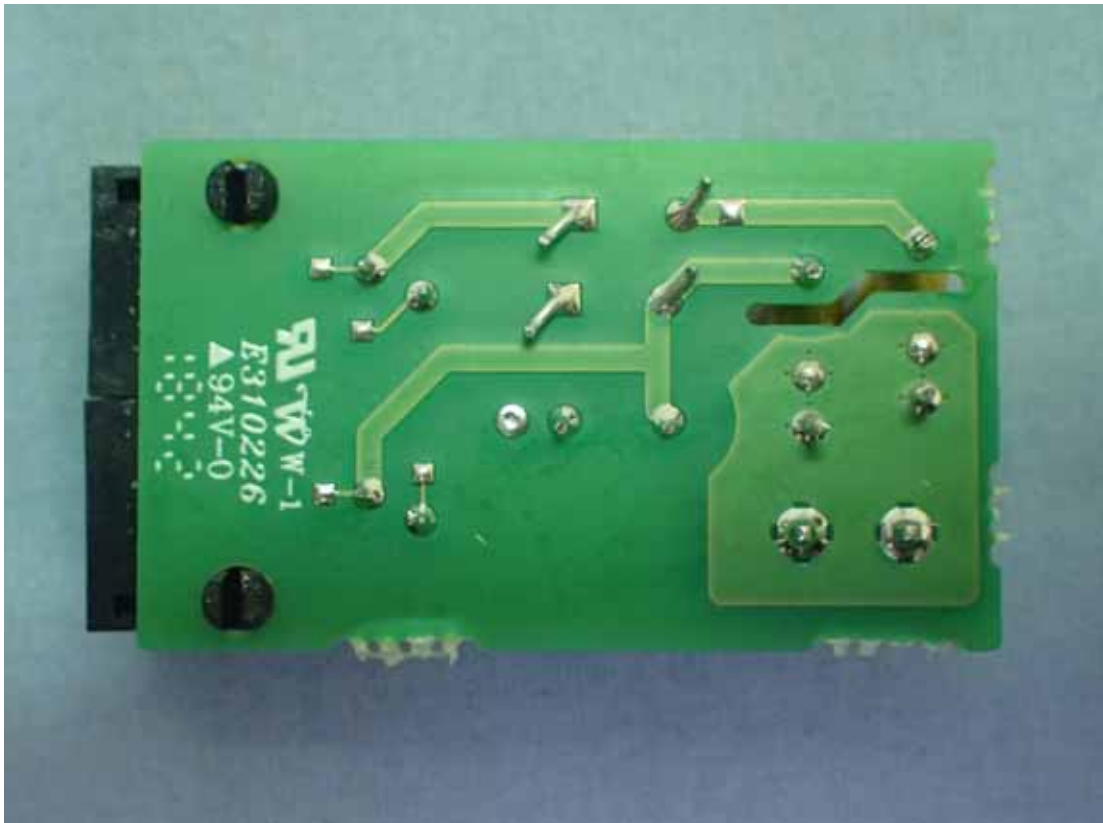


Figure 13  
Internal View (Internal Board, Front View)

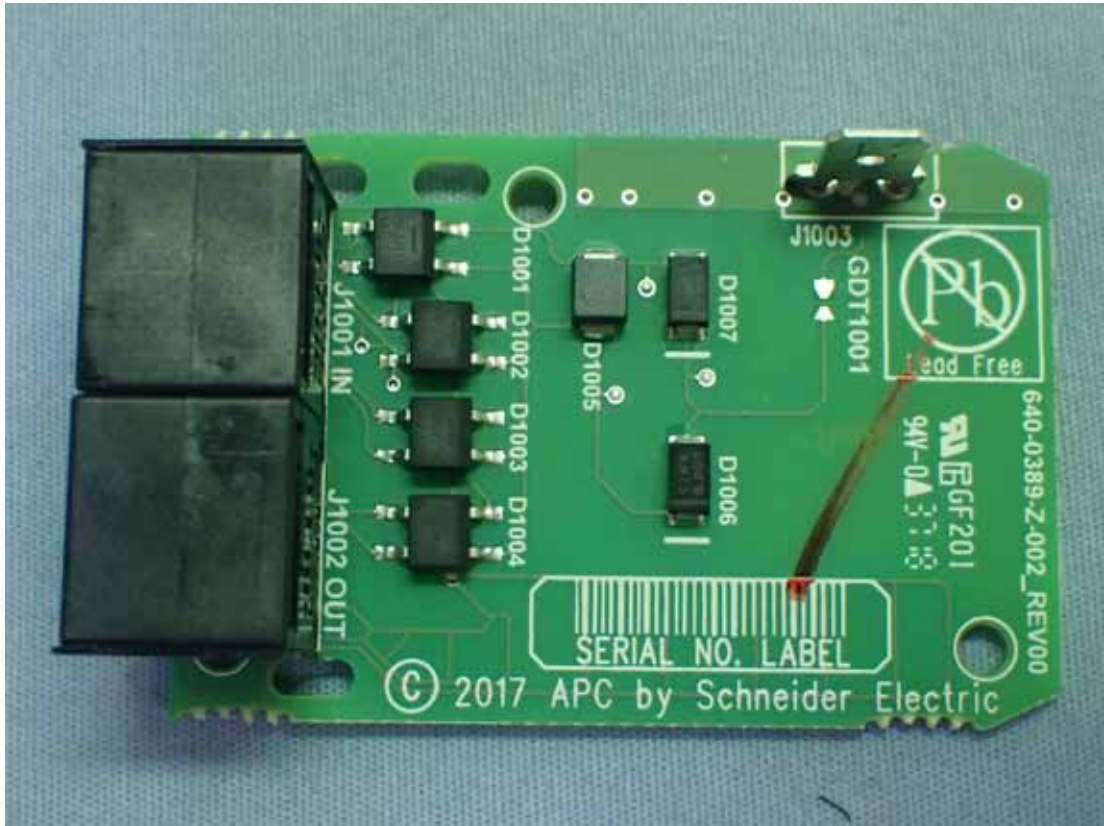


Figure 14  
Internal View (Internal Board, Back View)

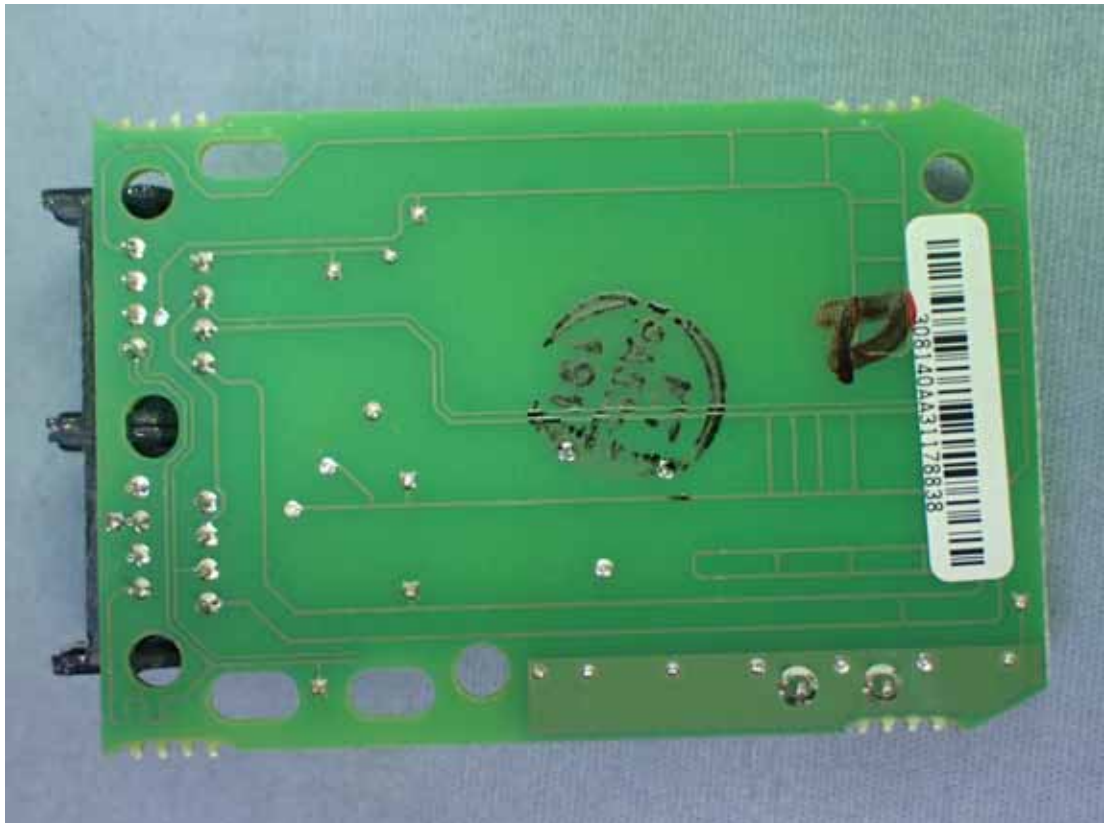


Figure 15  
Internal View (Main Board, Front View)

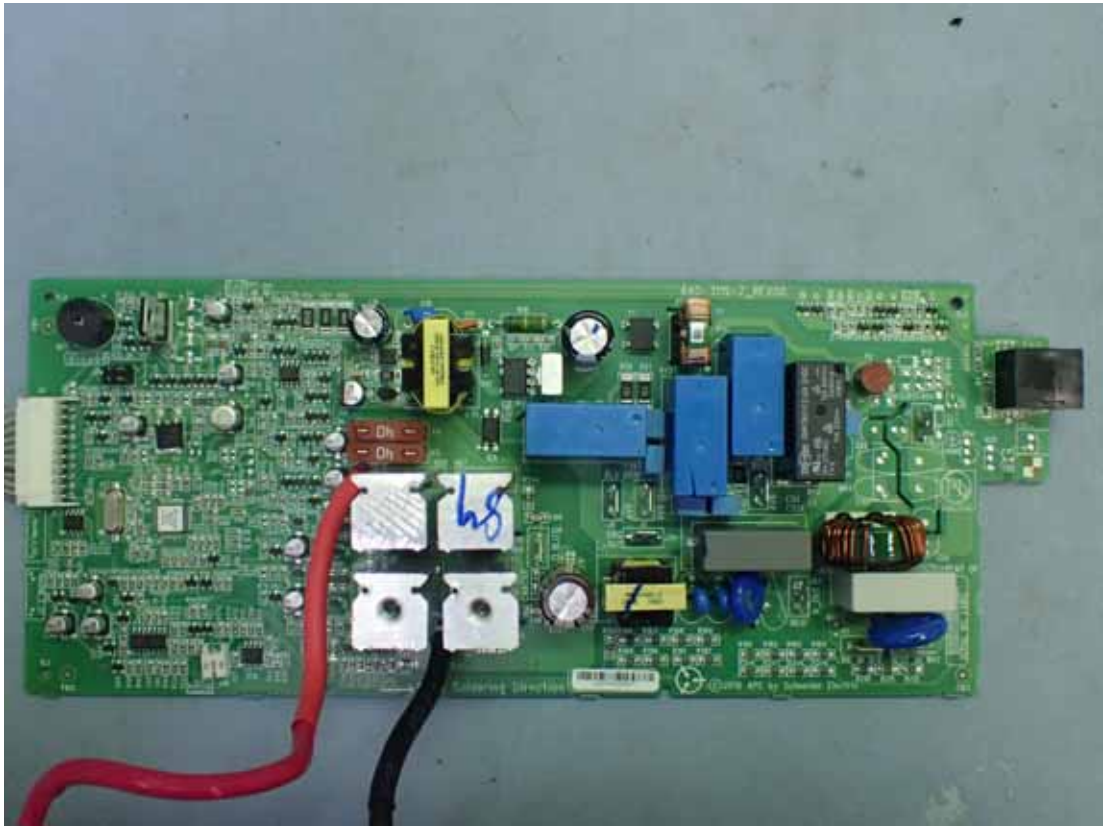


Figure 16  
Internal View (Main Board, Back View)

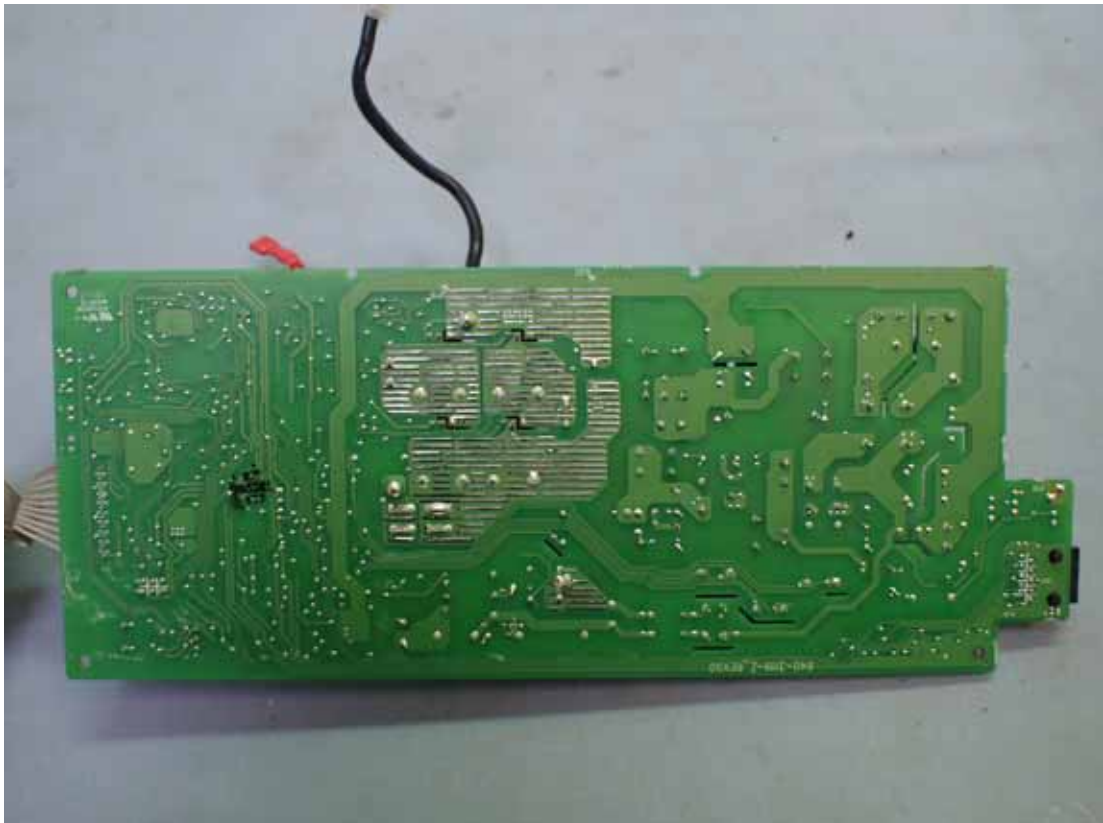




Figure 17  
Internal View (Internal Board, Front View)



Figure 18  
Internal View (Internal Board, Back View)

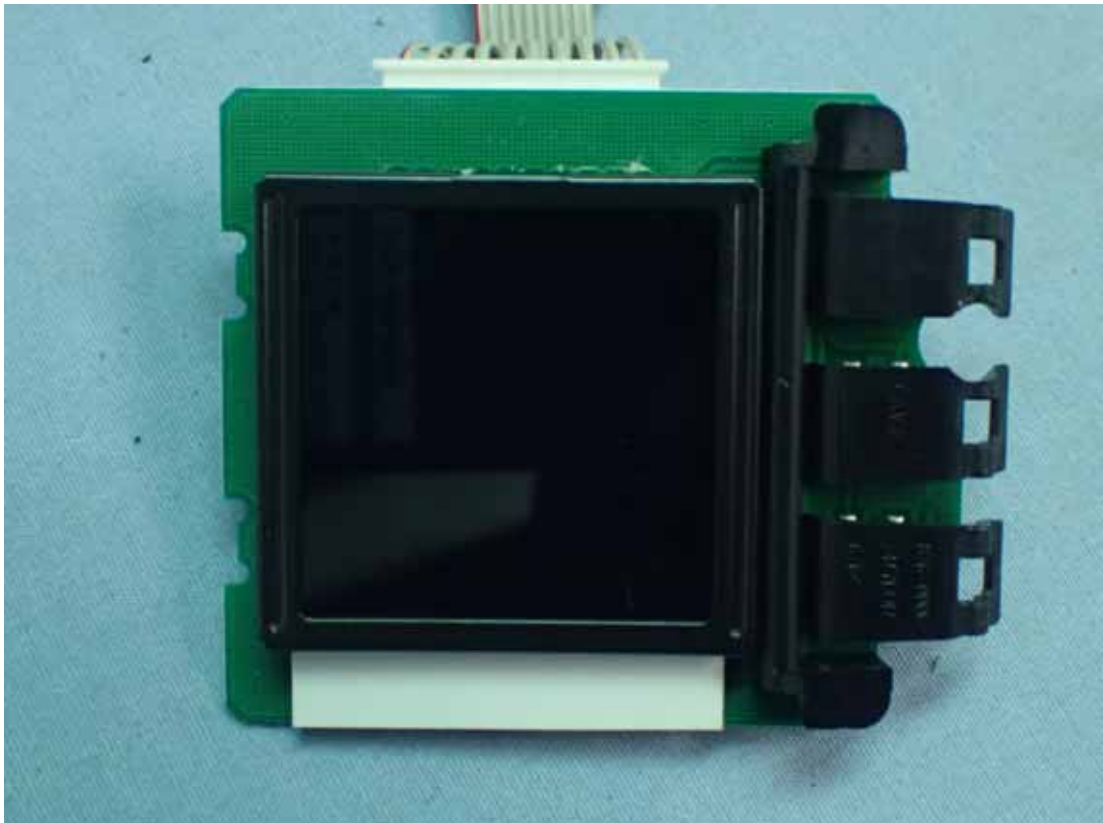


Figure 19  
Internal View



Figure 20  
USB Cable





Figure 21  
Power Cord

