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**EMC Test report for Plug-in adaptor**

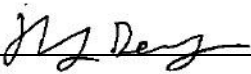
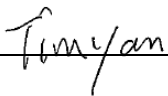
**Models PM1W-IT, PM1WU2-IT, PM1W-GR, PM1W-SP,  
PM1W-RS, PM1WB-RS, PM1WU2-GR, PM1WU2-SP,  
PM1WU2-RS, PM1WBU2-RS, PM1W-UK, PM1WU2-UK,  
PM1W-FR, PM1WU2-FR**

Guangzhou, date of issue: 2015-07-27

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By order of American Power Conversion Holdings Inc. at New Taipei City, Taiwan

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Pages : 27 pages Annex : NIL

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## 1 CONCLUSION

The equipment under test (EUT) does meet the essential requirements of the EMC Directive 2004/108/EC.

The test results in this report belong to model PM1WU2-GR, and the results are also representative for other models.

The conclusion and results stated in this test report are based on a non-recurrent examination of sample(s) provided by the applicant.

## 1.1 Model description

The apparatus as supplied for the test is plug-in adaptor, model PM1WU2-GR intended for residential use, the product contains electronic control circuit and with earth connection.

Base on client's declaration, all models are with similar electronic circuitry but with different type of plug. Models PM1WU2-IT, PM1WU2-GR, PM1WU2-SP, PM1WBU2-RS, PM1WU2-RS, PM1WU2-UK, PM1WU2-FR are with USB output port and the other models without.

Hence, model PM1WU2-GR was chosen for full test, and the corresponding data are representative of the other models as well.



Figure 1 model PM1WU2-GR

The Operating Modes as stated in the User Manual are on mode and off mode.

## 1.2 Environment

The requirements and standards apply to equipment intended for use in:

√	Residential (domestic) environment
√	Commercial and light-industrial environment
	Industrial environment
	Medical environment

## 1.3 Classification

For the equipment under test the following classification is applicable.

	<p><b>EN 55022</b> <b>Class A</b></p>	<p>All ITE equipment that satisfies Class A limits but not Class B limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instruction for use.</p> <p><b>Warning</b> - This is a class A product. In a domestic environment this product may cause interference in which case the user may be required to take adequate measures.</p>
√	<p><b>EN 55022</b> <b>Class B</b></p>	<p>Equipment intended primarily for use in the domestic environment and may include portable equipment, telecom terminal equipment powered by a telecom network and personal computers and auxiliary connected equipment.</p>

## 2 SUMMARY

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

### 2.1 Applied standards

Standard	Year	Title
EN 55022	2010	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
EN 55024	2010	Information technology equipment - Immunity characteristics - Limits and methods of measurement
EN 61000-3-2	2014	Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase)
EN 61000-3-3	2013	Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16$ A per phase and not subject to conditional connection

### 2.2 Overview of results

Emission tests	Result
Mains conducted disturbance voltage	<b>PASS</b>
Radiated Emission	<b>PASS</b>
Harmonic current emission	<b>PASS</b>
Limitation of voltage fluctuations (flicker)	<b>PASS</b>

Immunity tests	Result
Electrostatic Discharges (ESD)	<b>PASS</b>
Radiated EM Field	<b>PASS</b>
Electrical fast transient (EFT) / Burst transients	<b>PASS</b>
Surge transients	<b>PASS</b>
Conducted RF disturbances	<b>PASS</b>
Power supply voltage interruptions & dips	<b>PASS</b>

### 3 GENERAL INFORMATION

#### 3.1 Product Information

Equipment under test	Plug-in adaptor
Trade mark	APC by Schneider Electric
Tested Type	PM1WU2-GR
Represented type(s)	PM1W-IT, PM1WU2-IT, PM1W-GR, PM1W-SP, PM1W-RS, PM1WB-RS, PM1WU2-SP, PM1WBU2-RS, PM1WU2-RS, PM1W-UK, PM1WU2-UK, PM1W-FR, PM1WU2-FR
Input	250 Vac, 50 Hz, PM1W-IT, PM1WU2-IT: Max. 10A; PM1W-UK, PM1WU2-UK: Max. 13A; The other models: Max. 16A
Output	5 Vdc, 2,4 A (PM1WU2-IT, PM1WU2-GR, PM1WU2-SP, PM1WU2-RS, PM1WBU2-RS, PM1WU2-UK, PM1WU2-FR)
The highest frequency of the internal sources	Less than 108 MHz

#### 3.2 Customer Information

Applicant	American Power Conversion Holdings Inc.
Contact person	Mr. Ken Hsieh
Telephone	+886-2-8313-1368
Telefax	+886-2-8913-1357
Address	3F, No. 205, sec. 3, Beixin Rd., Xindian Dist., New Taipei City, Taiwan

Manufacturer/Factory	Dongguan Quan Sheng Electric Co., Ltd.
Contact person	Mr Daniel Yeh
Telephone	+86 769 85825371
Telefax	+86 769 85825370
Address	Ju-Tang 2 <sup>nd</sup> Industrial Park, 523963 Dongguan, Guangdong, China

### 3.3 Test data

Location	DEKRA Testing and Certification (Shanghai) Ltd. Guangzhou Branch
Address	Building A3, No.3 Qiyun Road, Science City, Guangzhou Hi-Tech Industrial Development Zone, Guangzhou, P.R. China
Location	Guangzhou Electrical Safety Testing Institute (CEST)
Address	No.6, Haichengdong Street, Xingangdong Road, Haizhu District, Guangzhou, 510330, P. R. China
Date	2015-05-13 to 2015-07-02
Supervised by	Harry Deng

### 3.4 Environmental conditions

Tests have been performed in a controlled laboratory environment, where the environmental conditions are maintained within the applicable ranges.

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%



## 4 EMISSION TEST RESULTS

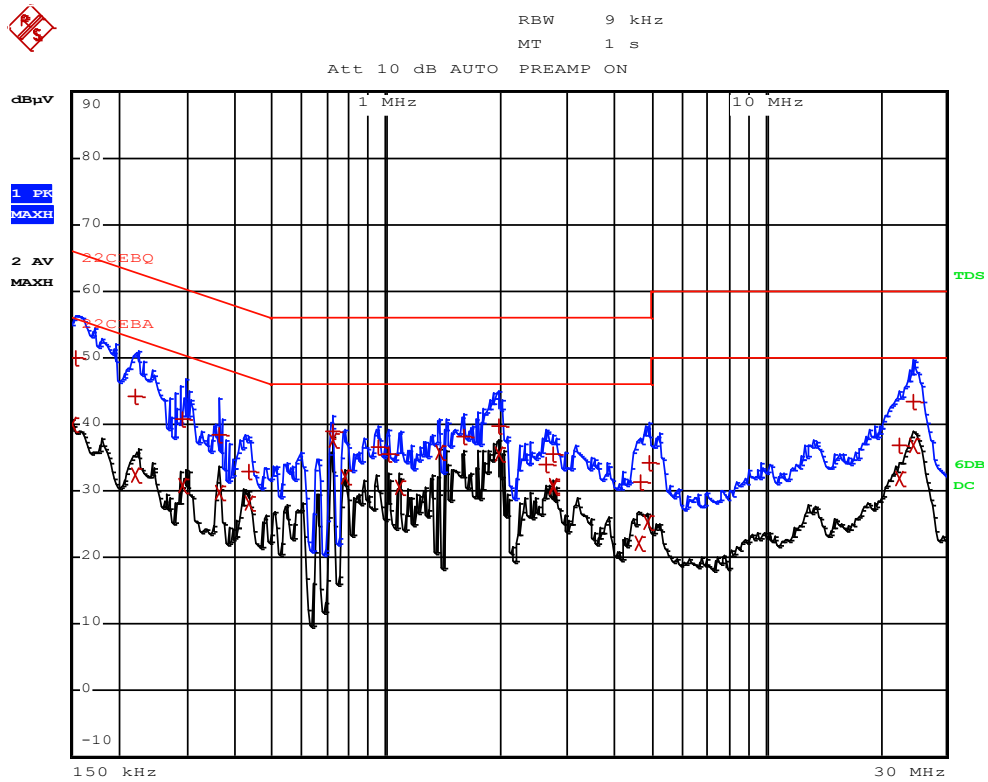
### 4.1 Mains conducted disturbance voltage

Standard	EN 55022 / Class B					
Frequency [MHz]	Limits					
	QP [dB(μV)]			AV [dB(μV)]		
0,15 – 0,50	66 – 56 *)			56 – 46 *)		
0,50 – 5	56			46		
5 – 30	60			50		

\*) Limits decreasing linearly with the logarithm of the frequency

Port	AC mains
Test method	LISN
Worst Mode	Max. load

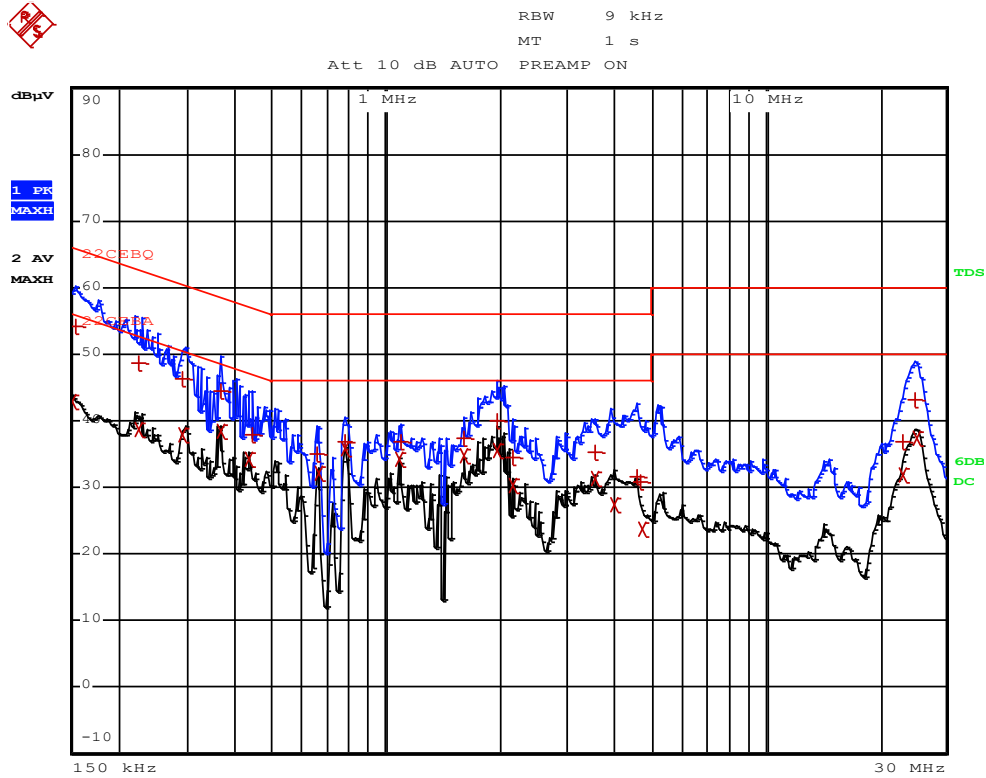
**Results**  
**Live**



EDIT PEAK LIST (Final Measurement Results)			
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
Trace1:	22CEBQ		
Trace2:	22CEBA		
Trace3:	---		
2 Average	722 kHz	37.58	-8.41
2 Average	1.382 MHz	35.73	-10.26
2 Average	1.986 MHz	35.59	-10.40
2 Average	24.586 MHz	36.96	-13.03
2 Average	778 kHz	32.16	-13.83
2 Average	2.766 MHz	30.69	-15.30
2 Average	2.762 MHz	30.52	-15.47
2 Average	1.086 MHz	30.44	-15.55
2 Average	150 kHz	40.08	-15.91
1 Quasi Peak	154 kHz	49.86	-15.91

No other significant emissions were measured at the frequency range of interest employing both the QP and AV detectors.

Natural



EDIT PEAK LIST (Final Measurement Results)			
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
2 Average	366 kHz	38.43	-10.16
2 Average	778 kHz	35.77	-10.22
2 Average	1.97 MHz	35.50	-10.49
2 Average	1.598 MHz	34.67	-11.33
1 Quasi Peak	154 kHz	54.15	-11.62
2 Average	1.086 MHz	34.18	-11.82
2 Average	294 kHz	37.83	-12.57
2 Average	25.038 MHz	37.35	-12.64
2 Average	434 kHz	34.33	-12.84
2 Average	150 kHz	42.97	-13.02

No other significant emissions were measured at the frequency range of interest employing both the QP and AV detectors.

See chapter 6 for a photo of the test setup.

Conclusion:

**PASS**

## 4.2 Radiated EM Field emission

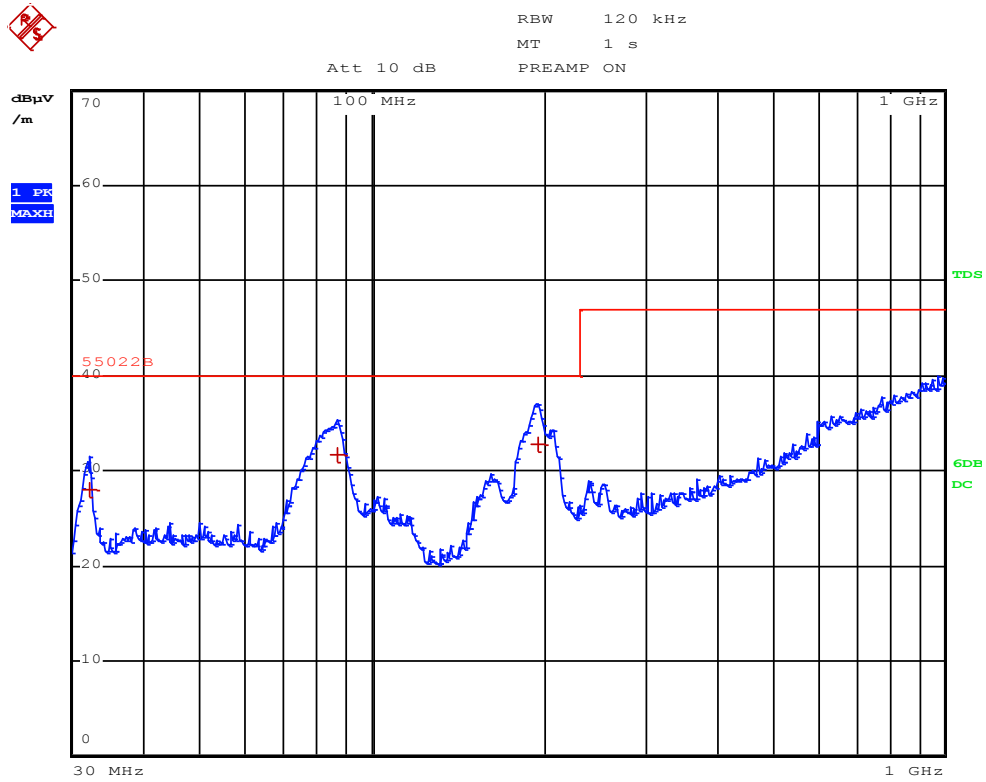
Standard	EN 55022 / Class B
Measuring distance	3 meters

Frequency [MHz]	Limits - QP [dB( $\mu$ V/m)]
30 – 230	40
230 – 1000	47

ITU frequency bands as stated in EN 55011 are excluded from the mentioned limits.

Port	Enclosure with cabling
Set-up	Tab-top, 3 meter chamber
Worst Mode	Max. load

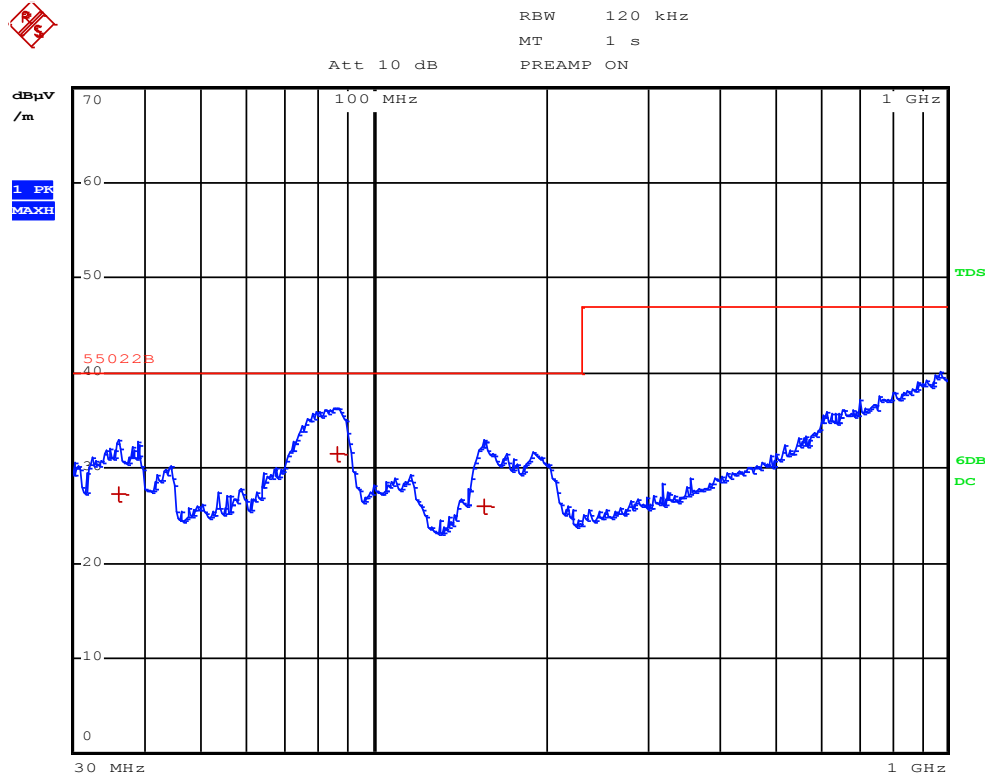
**Results**  
**Horizontal**



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	55022B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	32.04 MHz	28.10	-11.89
1 Quasi Peak	87.28 MHz	31.67	-8.32
1 Quasi Peak	194.68 MHz	32.80	-7.19

No other significant emissions were measured at the frequency range of interest employing the QP detectors.

Vertical



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	55022B		
Trace2:	---		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	36.08 MHz	27.20	-12.80
1 Quasi Peak	86.56 MHz	31.53	-8.46
1 Quasi Peak	156.28 MHz	25.95	-14.04

No other significant emissions were measured at the frequency range of interest employing the QP detectors.

See chapter 6 for a photo of the test setup.

Conclusion:

**PASS**

### 4.3 Harmonic currents

Standard	EN 61000-3-2
Port	AC Mains supply
Mode	On mode

√	Class A	All apparatus not classified as Class B, C or D
	Class B	Portable tools
	Class C	Lighting equipment
	Class D	Personal computers, television receivers

#### Results and limits

This product is not defined as lighting equipment, and rated power is less than 75W, therefore, no limit applies according to EN 61000-3-2.

Conclusion:

**PASS**

#### 4.4 Voltage fluctuations (Flicker)

Standard	EN 61000-3-3
Port	AC Mains supply
Voltage	230 Vac
Mode	On mode

Equipment intended to be connected to 230/400 V, 50 Hz supply systems may not produce voltage fluctuations in the supply systems due to variation of the input current above the limits as stated below.

#### Results

√	Tests are not necessary because the EUT is unlikely to produce significant voltage fluctuations or flicker (clause 6.1)
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Conclusion:

**PASS**



## 5 IMMUNITY TEST RESULTS

### 5.1 Electrostatic discharge immunity

Electrostatic discharges (ESD) are the result of persons or objects that accumulate static electricity due to for instance walking on synthetic carpets. The ESD can influence the operation of equipment or damage its electronics, either by a direct discharge or indirectly by coupling or radiation. Both effects are simulated during the tests.

#### Requirements

Standard	EN 55024
Basic standard	EN 61000-4-2
Port	Enclosure
Performance criterion	B; During the test degradation is allowed. No change of operating state or stored data is allowed.
Air discharges	8 kV
Contact discharges	4 kV
Mode	On mode

#### Performed tests

Air discharges	√	4 kV	√	8 kV		15 kV		xx kV
Contact discharges	√	2 kV	√	4 kV		8 kV		xx kV
Via coupling planes	√	Horizontal			√	Vertical		
Polarity	√	Positive			√	Negative		
Set-up	√	Table-top				Floor standing		
Ambient temperature	20 °C							
Relative Humidity air	50 %							

#### Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

#### Conclusion:

**PASS**

## 5.2 Radiated EM field immunity

During the test it is verified if the equipment under test has sufficient immunity against radiated electromagnetic fields. Walkie-talkies, radio transmitters, television transmitters, and telecommunication equipment including cellular telephones and other emitting devices, like industrial electromagnetic sources can generate these fields.

### Requirements

Standard	EN 55024
Basic standard	EN 61000-4-3
Port	Enclosure
Performance criterion	A; Operation as intended
Frequency range	80 - 1000 MHz
Modulation	1 kHz – 80% AM
Field strength	3 V/m

### Performed tests

Frequency range	80 - 1000 MHz
Tested Field strength	3 V/m
Dwell time	1 second
Test set-up	Full Anechoic Chamber
Mode	On mode

### Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

**Conclusion:**

**PASS**

### 5.3 Electrical Fast Transient immunity

The EFT immunity test simulates disturbances by bursts of very short transients caused for example by switching off loads such as an AC motor or bouncing relay contacts. The transients are likely to disturb electronics but less likely to cause damage.

#### Requirements

Standard	EN 55024		
Basic standard	EN 61000-4-4		
Performance criterion	B; During the test degradation is allowed. No change of operating state or stored data is allowed.		
Pulse characteristics	5/50 ns		
Peak Voltage; Port	1 kV; AC input power port		
Repetition frequency	√	5 kHz	2,5 kHz

#### Performed tests

Tested Voltage; Port	1 kV; AC input power port		
Mode	On mode		
Injection method	√	CDN	Capacitive clamp
Polarity	√	Positive	√ Negative
Set-up	√	Table-top	Floor standing

#### Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

#### Conclusion:

**PASS**

## 5.4 Surge transient immunity

The surge transient immunity test simulates the surges that are caused by overvoltages due to indirect (induced) lightning transients. The pulse is a slow transient with high-energy contents and due to its long duration may cause damage to an unprotected EUT.

### Requirements

Standard	EN 55024
Basic standard	EN 61000-4-5
Performance criterion	B; During the test degradation is allowed. No change of operating state or stored data is allowed.
Pulse characteristics	1,2/50 $\mu$ s
Peak Voltage; Port	1 kV; AC input power port (line to line) 2 kV; AC input power port (line to earth)

### Performed tests

Tested Voltage; Port	1 kV; AC input power port (line to line) 2 kV; AC input power port (line to earth)		
Mode	On mode		
Polarity	√	Positive	√ Negative

### Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

**Conclusion:**

**PASS**

## 5.5 RF Conducted immunity

During this test the immunity of the equipment for induced or conducted electromagnetic fields is checked. Fields generated by radio and other transmitters cause RF voltages in long cables like the mains network. This test reproduces these induced disturbing voltages by injecting them to the EUT via the cabling.

### Requirements

Standard	EN 55024
Basic standard	EN 61000-4-6
Performance criterion	A; Operation as intended
Frequency range	0,15 – 80 MHz
Modulation	1 kHz – 80% AM
Test level; Port	3 V; AC input output power port

### Performed tests

Tested level; Port	3 V; AC input power port		
Mode	On mode		
Frequency range	0,15 – 80 MHz		
Dwell time	3 seconds		
Injection method	√	CDN-M3	EM clamp

### Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

**Conclusion:**

**PASS**

## 5.6 Power supply interruptions and dips

### Requirements

Basic standard	EN 61000-4-11:
Performance criterion	B; During the test degradation is allowed. No change of operating state or stored data is allowed. C; Temporary, self-recoverable loss of function is allowed.

Standard	EN 55024	
AC input power port	C	$U_{NOM} - 30\%$ (25 periods)
	B	$U_{NOM} - 100\%$ (0,5 period)
	C	$U_{NOM} - 100\%$ (250 periods)

### Performed tests

Tested voltage	AC input power port, 230 Vac	
Mode	On mode	
AC input power port	C	$U_{NOM} - 30\%$ (25 periods)
	B	$U_{NOM} - 100\%$ (0,5 period)
	C	$U_{NOM} - 100\%$ (250 periods)

### Observations

During the test no loss of performance was observed. After the test the EUT functioned as intended. No unacceptable loss of performance or loss of data was observed.

**Conclusion:**

**PASS**

## 6 IDENTIFICATION OF THE EQUIPMENT UNDER TEST

The photograph shows the tested device.

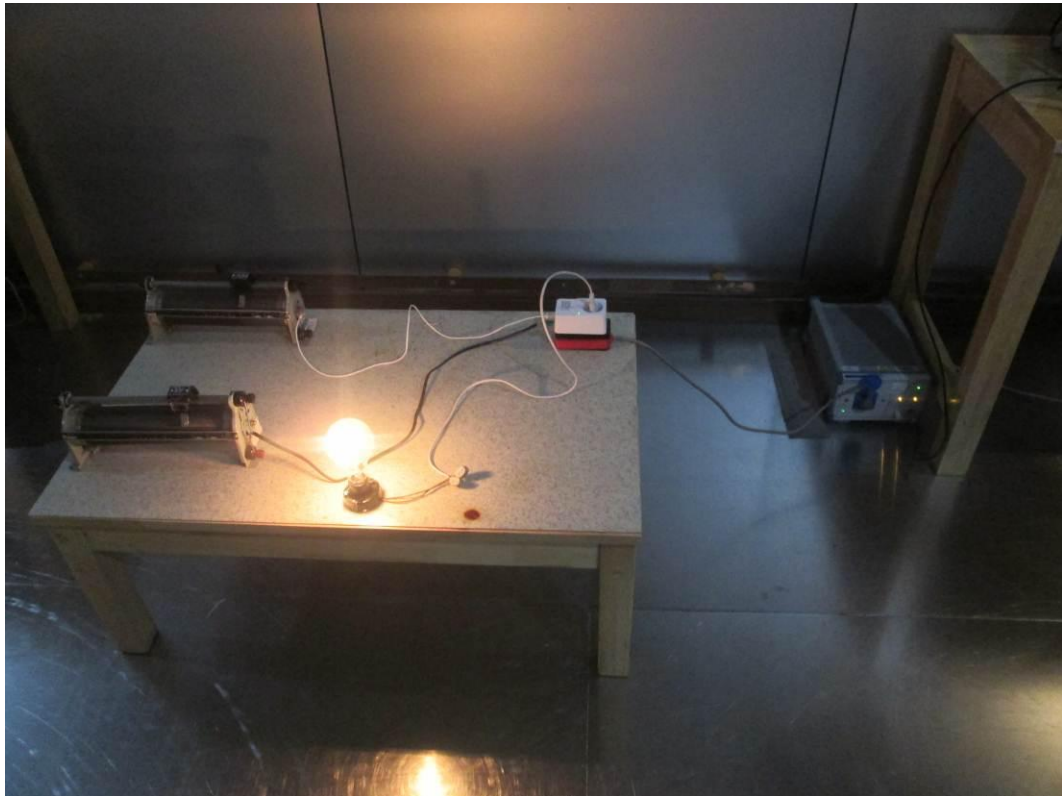


Figure 2 conducted emission test setup

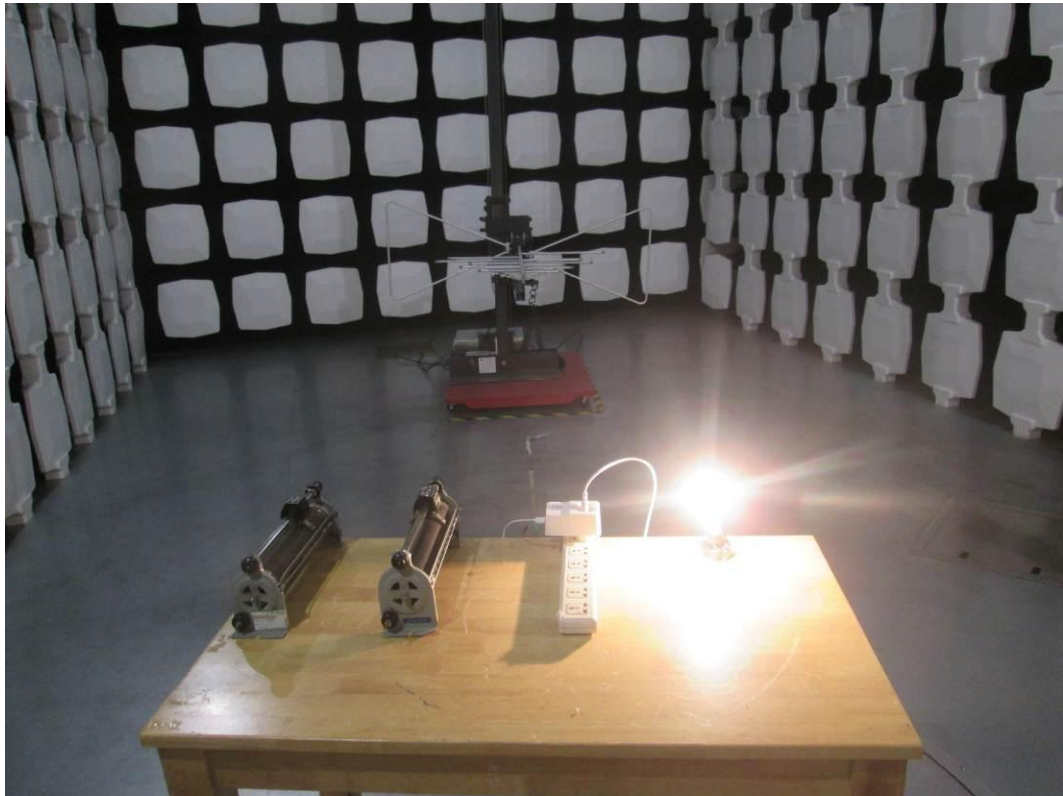


Figure 3 radiated emission test setup



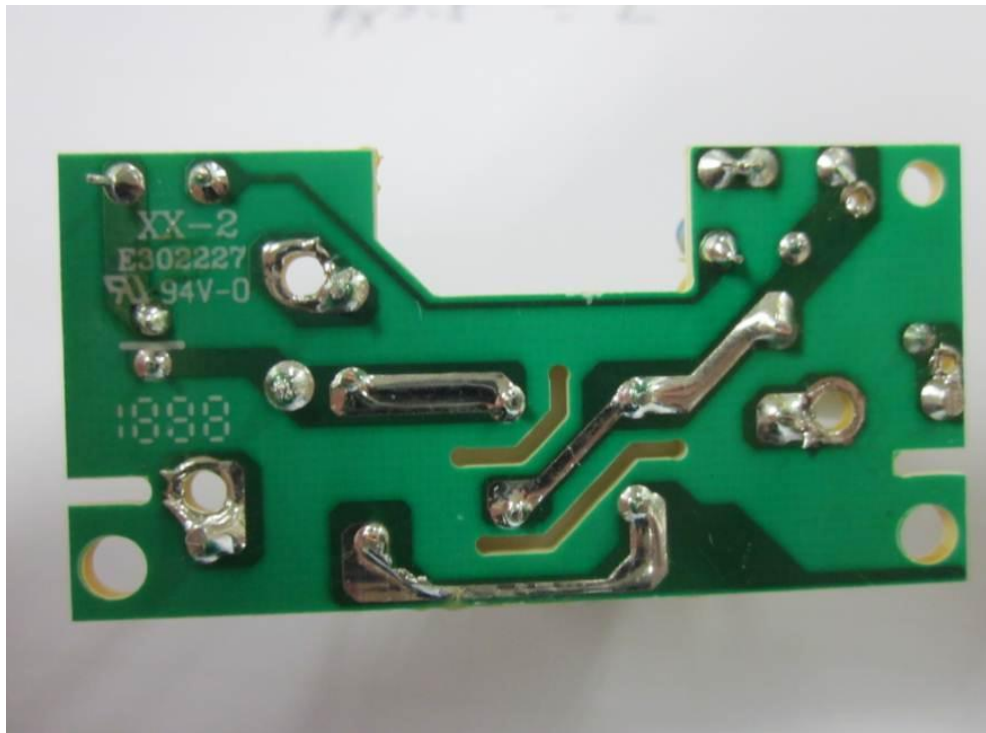
7 **PRODUCT INTERNAL VIEW**



Wiring



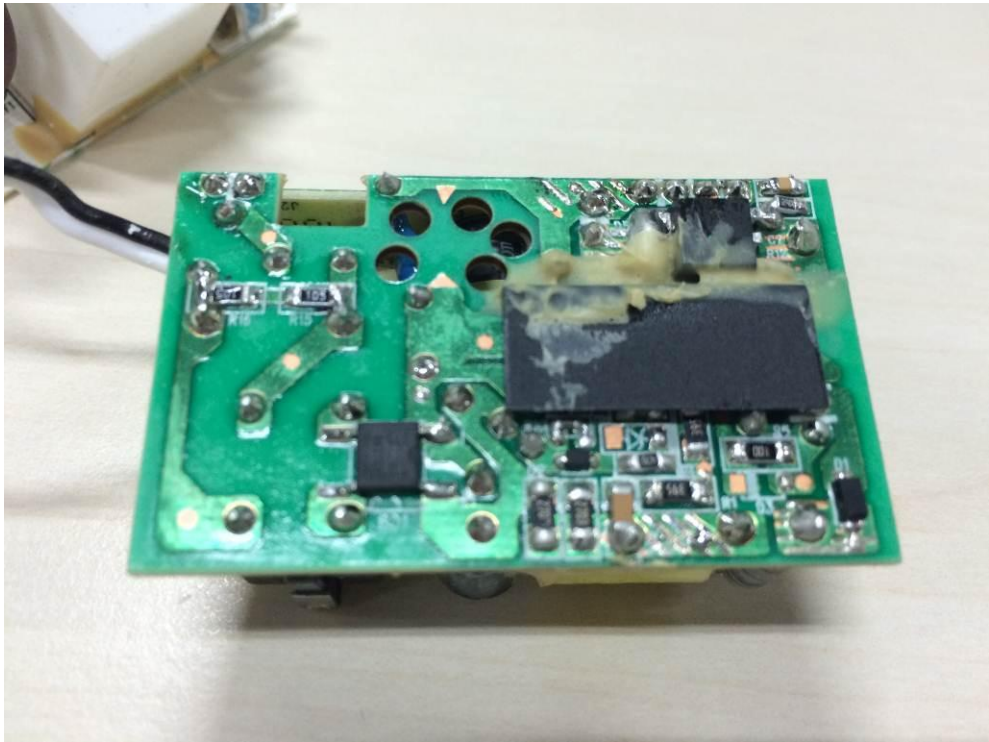
PCB



PCB



PCB



PCB