



Report No.: HA160144-FD

## FCC COMPLIANCE TEST REPORT

## Technical Statement of Conformity

#### in accordance with FCC Part 15 Subpart B

#### The Product

**Equipment Under Test**: Uninterruptible Power System

Model Number : BE850M2

: BE850XXXXXXXXX ("X" can be

0-9, A-Z, "-" or blank)

Report Number : HA160144-FD

Issue Date : 10-MAR-2016

Test Result : Compliance

#### is produced by

American Power Conversion Holding Inc. Taiwan Branch 3F., No. 205, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan R.O.C.



# HongAn TECHNOLOGY CO., LTD.

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BSMI Registration No.: SL2-IN-E-0023, SL2-A1-E-0023, FCC Designation No.: TW1071, TW1163

SL2-IS-E-0023, SL2-R1-E-0023, TAF Accreditation No.: 1163

SL2-R2-E-0023, SL2-L1-E-0023 **VCCI Registration No.:** R-2156, C-2329, T-219, G-696

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## **Verification**

Report No.: HA160144-FD

Applicant: American Power Conversion Holding Inc. Taiwan Branch

**Manufacturer:** American Power Conversion Holding Inc. Taiwan Branch

Equipment Under Test: Uninterruptible Power System

Model Number: BE850M2

**Product Series :** BE850XXXXXXXXXX ("X" can be 0-9, A-Z, "-" or blank)

Sample Received Date: 02-MAR-2016

Test Standards: 

☐ FCC Part 15 Subpart B and CISPR 22 Class B

#### Remark

This report details the results of the test carried out on one sample. The test results are contained in this test report and HongAn Technology Co., Ltd. assumes full responsibility for the accuracy and completeness of these tests. This report shows the EUT is technically compliant with FCC Part 15 Subpart B and CISPR 22 Class B official requirements. This report applies to the above sample only and shall not be reproduced in part without written approval of HongAn Technology Co., Ltd..

Cherry Chī	Date:	10-MAR-2016
Cherry Chi / ADM. Dept. Staff		
Andrew Lin	Date:	10-MAR-2016
Andrew Lin / ENG. Dept. Staff		
Adam Jang.	Date:	10-MAR-2016
	Cherry Chi / ADM. Dept. Staff  Andrew Lin / ENG. Dept. Staff	Cherry Chi / ADM. Dept. Staff  Andrew Lin / ENG. Dept. Staff  Adam Jang.

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Adam Yang / SEC. Manager



## **Summary of Test Result**

Report No.: HA160144-FD

Emission							
Test Standard	Test Item	Test Result	Remark				
			Highest Emission (LINE Mode)				
FCC Part15			L: 0.20MHz, A.V. 49.91dBuV, Margin -3.76dBuV				
Subpart B	Conducted	Pass	N: 0.18MHz, A.V. 51.05dBuV, Margin -3.63dBuV				
CISPR22	Emission	F a 5 5	Highest Emission (Battery Mode)				
Class B			L: 1.48MHz, A.V. 38.34dBuV, Margin -7.66dBuV				
			N: 0.16MHz, Q.P. 60.92dBuV, Margin -4.46dBuV				
			Highest Emission (LINE Mode)				
			H: 191.75MHz, 25.57dBuV, Margin -4.43dB				
			Antenna Height 395cm, Turntable Angle 250°				
FCC Part15	Radiated		V: 46.83MHz, 24.22dBuV, Margin -5.78dB				
Subpart B	Emission	Pass	Antenna Height 110cm, Turntable Angle 180°				
CISPR22	(Below 1GHz)	F a 5 5	Highest Emission (Battery Mode)				
Class B	(Below 1GHZ)		H: 157.56MHz, 24.72dBuV, Margin -5.28dB				
			Antenna Height 388cm, Turntable Angle 240°				
			V: 124.57MHz, 24.75BuV, Margin -5.25dB				
			Antenna Height 125cm, Turntable Angle 220°				
FCC Part15	Radiated		The highest frequency of the internal sources of the				
Subpart B	Emission	N/A	EUT is less than 108MHz, the measurement shall only				
CISPR22		IN/A	be made up to 1GHz. Hence, the test item is not				
Class B	(1 to 6 GHz)		required.				

## **Measurement Uncertainty – Emission**

The following measurement uncertainty has been calculated for Emission Tests performed on the EUT as specified in CISPR 16-4-2:

Test Iter	Uncertainty		
Conducted En	± 4.34dB		
Radiated Emission	Below 1GHz	± 5.87dB	
Radiated Ellission	Above 1GHz	± 4.03dB	

This reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k = 2, providing a level of confidence of approximately 95%.

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## 1 General Description

## 1.1 Description of Equipment Under Test

Equipment Under Test	:	Uninterruptible Power System
Model Number	<u>:</u>	BE850M2
Product Series	:	BE850XXXXXXXXXX ("X" can be 0-9, A-Z, "-" or blank)
Applicant	:	American Power Conversion Holding Inc. Taiwan Branch
Address of Applicant	:	3F., No. 205, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan R.O.C.
Manufacturer	:	American Power Conversion Holding Inc. Taiwan Branch
Address of Manufacturer	:	3F., No. 205, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan R.O.C.
Power Supply	:	Input: AC 120V, 12A, 50/60Hz, 1 $\phi$ Battery backup outlets:  AC 120V, 7.1A, 50/60Hz, 850VA, 450W, 1 $\phi$ Total outlet current: 12A  USB Output: DC 5V, 2.4A  □Shielded □Non-Shielded □Detachable □Un-Detachable, 1.4m □w Ferrite Core □w/o Ferrite Core
I/O Port		USB*3, Power*9
Data Cable	:	N/A
Description of EUT	:	Dimensions: 31 cm (L) X 10 cm (W) X 13.5 cm (H)  Highest Frequency of the Internal Source: <108MHz  Position: ☑Table-top / ☐Floor-standing  Intended Function: The EUT is a UPS.  Product Variance: The manufacturer declares that the product series is identical to the EUT. Different model numbers are adopted to distinguish the distributing markets (countries). The EUT is the most advanced model within the series. HongAn is only responsible for the test result of the main test sample.

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## 1.2 Test Facility

All the Conducted and Radiated Emission Tests are performed at No. 15-1, Cweishuh Keng, Cweipin Village, Linkou, New Taipei City, Taiwan, R.O.C.

#### 1.3 Test Instruments

Instruments Used for Emission Measurement

Instrument Name	Manufacture Mode	Model Number	Serial Number	Last Cal. Date	Next Cal. Date
LISN	EMCO	3810/2NM	9702-1819	27-Jul-2015	27-Jul-2016
LISN	Rolf Heine Hochfrequenzt echnik	NNB-4/32T	00001	18-Mar-2015	18-Mar-2016
RF Current Probe	FCC	F-33-4	53	29-May-2015	29-May-2016
Impedance Stabilization Network (ISN)	TESEQ	ISN T800	30838	14-Aug-2015	14-Aug-2016
EMI Receiver	R&S	ESCI	100931	25-Jul-2015	25-Jul-2016
Spectrum Analyzer	ADVANTEST	R3172	101202158	21-Aug-2015	21-Aug-2016
Preamplifier	CHASE	CPA 9231A	0405	24-Aug-2015	24-Aug-2016
Preamplifier	HD	HD17187	004	01-Jun-2015	01-Jun-2016
Bilog Antenna	TESEQ	CBL6111D	25769	22-Feb-2016	22-Feb-2017
Bilog Antenna	TESEQ	CBL6111D	38521	11-Nov-2015	11-Nov-2016
Double-Ridged Waveguide Horn	EMCO	3115	9912-5992	01-Jun-2015	01-Jun-2016

The test equipments used are calibrated and can be traced to National ITRI and International Standards.

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### 1.4 Test Methodology

All Conducted and Radiated Emission Tests were performed according to the procedures stated in FCC Part 15 Subpart B Sec. 15.31.

## 1.5 Auxiliary Equipments

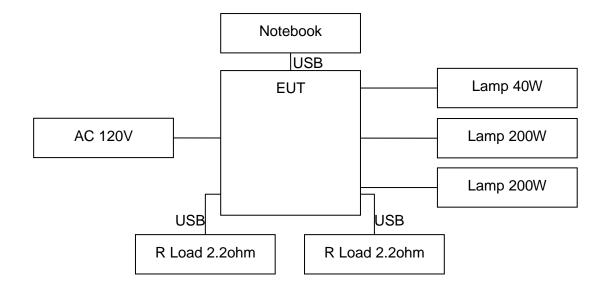
1.5.1 Provided by HongAn Technology Co., Ltd. for Emission Test.

No.	Equipment	Model No.	Serial No.	EMC Approved	Brand	Description		
140.	Equipment	Wodel No.	Serial No.	Elvic Approved	Branu	Data Cable	Power Cable	
							AC to Adapter	
							Unshielded	
				CE Mark,	Hewlett		*1.8m	
1	Notebook	PP2090	CNU3480M1R	FCC DoC,	Packard	N/A	Adapter to	
				BSMI ID R33001	raokara		Notebook	
							Unshielded	
							*1.8m	
2	LAMP*2	200W	N/A	N/A	N/A	N/A	N/A	
3	LAMP	40W	N/A	N/A	N/A	N/A	N/A	
4	R Load*2	2.2ohm	N/A	N/A	N/A	N/A	N/A	
						Non-shielded,		
5	USB Cable*3	N/A	N/A	N/A	N/A	Detachable, 1.2,	N/A	
						W/O core		

#### 1.5.2 Provided by the Manufacturer

N/A

### 1.6 Block Diagram



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### 1.7 Identifying the Final Test Mode

- 1. Line mode.
- 2. Battery mode.

#### Note:

1. After pre-test, we identified that the Line mode was most likely to cause maximum disturbance at Conducted Emission. Therefore, the Final EMC Assessment was performed for the worst case.

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2. After pre-test, we identified that the Line mode was most likely to cause maximum disturbance at Radiated Emission. Therefore, the Final EMC Assessment was performed for the worst case.

#### 1.8 Final Test Mode

- 1. Line mode.
- 2. Battery mode.

### 1.9 Condition of Power Supply

AC 120V, 60Hz

## 1.10 EUT Configuration

- 1. Setup the EUT and peripheral as shown in Section 1.6.
- 2. Turn on the power of all equipments.
- 3. Activate the selected Final Test Mode shown in Sec. 1.8.

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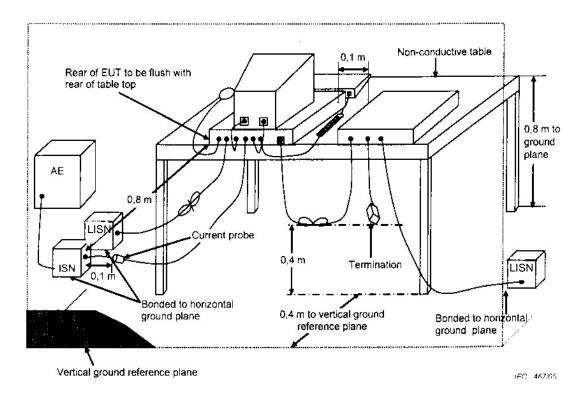


#### 2 Conducted Emission Test

#### 2.1 Test Instruments

Refer to Sec. 1.3 Test Instruments.

#### 2.2 Test Configuration and Procedure



### **Table-top Equipment**

- The EUT was placed on a non-conductive table which was 80 cm above the horizontal coupling plane. The rear of the EUT was 40 cm from the vertical coupling plane.
- The excess interface cables were folded at the cable center into a bundle no longer than 40 cm, so that the bundles were on the table.
- The EUT was connected to the main power through a L.I.S.N. This set up provided 50 ohm / 50 μH coupling impedance for the measuring equipment.
- All auxiliary equipment received power from a second L.I.S.N.
- The conducted emissions were measured between the Line Phase and the PE ground and between the Neutral Phase and the PE ground using an EMI Receiver.
- The values were recorded.

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#### 2.3 Conducted Limit

## 

Frequency (MHz)	☐ Cla	ass A				
	Q.P. (Quasi-Peak)	A.V. (Average)	Q.P. (Quasi-Peak)	A.V. (Average)		
0.15 to 0.50	0.15 to 0.50 79		66 to 56	56 to 46		
0.50 to 5.0	0.50 to 5.0 73		0.50 to 5.0 73 60		56	46
5.0 to 30 73		60	60	50		

#### 2.4 Test Result

#### **PASS**

The final tests data are shown on the following page(s).

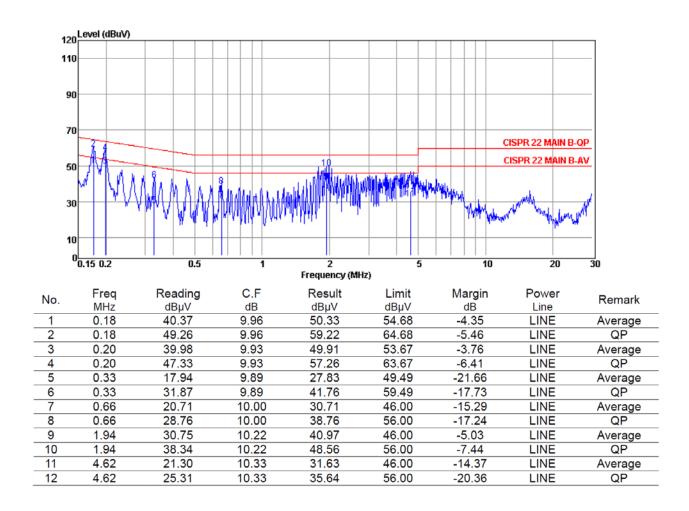
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#### **Conducted Emission Test Data-Line mode**

Test Date : 09-MAR-2016 Power Line : Line

Temperature :  $19.4^{\circ}$ C Humidity : 53%



Remark: All readings are Quasi-Peak and Average values.

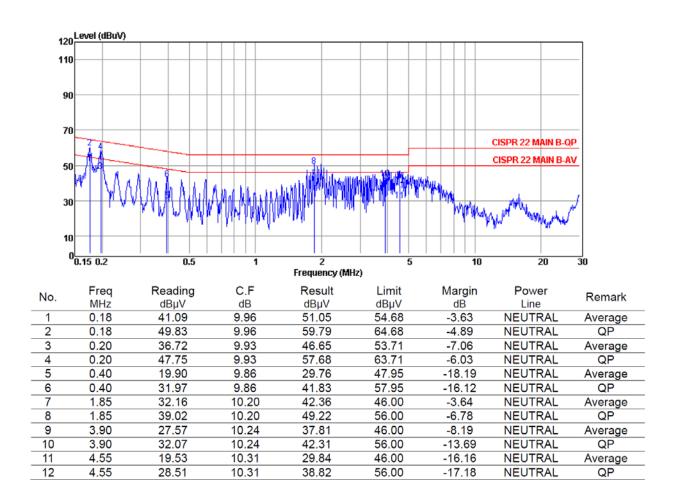
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#### **Conducted Emission Test Data-Line mode**

Test Date : 09-MAR-2016 Power Line : Neutral

Temperature :  $19.4^{\circ}$ C Humidity : 53%



Remark: All readings are Quasi-Peak and Average values.

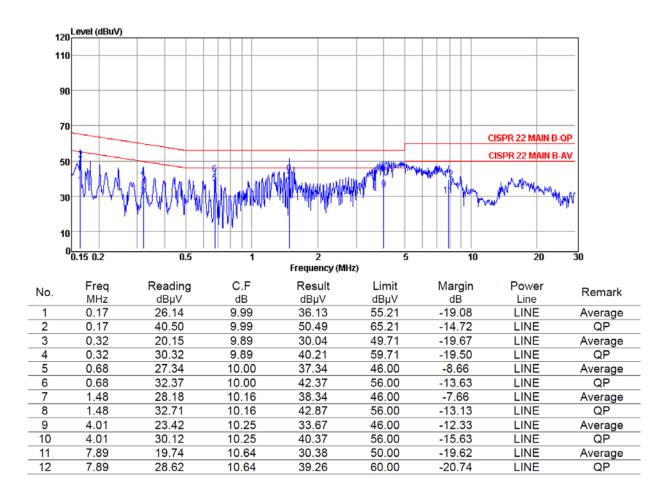
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#### **Conducted Emission Test Data-Battery mode**

 Test Date
 : 09-MAR-2016
 Power Line
 : Line

 Temperature
 : 19.4°C
 Humidity
 : 53%



Remark: All readings are Quasi-Peak and Average values.

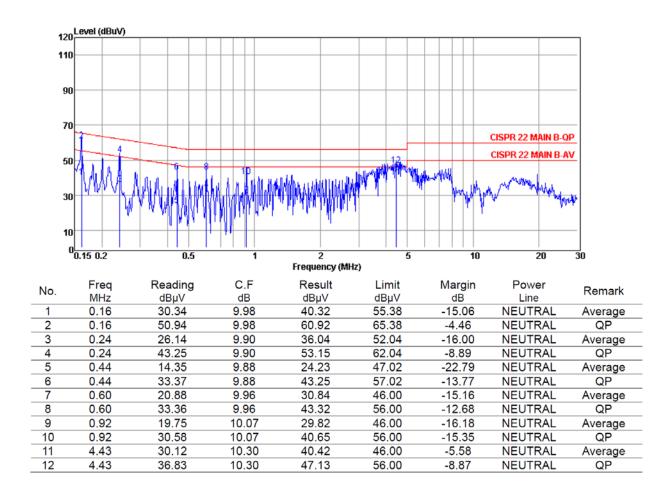
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#### **Conducted Emission Test Data-Battery mode**

Test Date : 09-MAR-2016 Power Line : Neutral

Temperature :  $19.4^{\circ}$ C Humidity : 53%



Remark: All readings are Quasi-Peak and Average values.

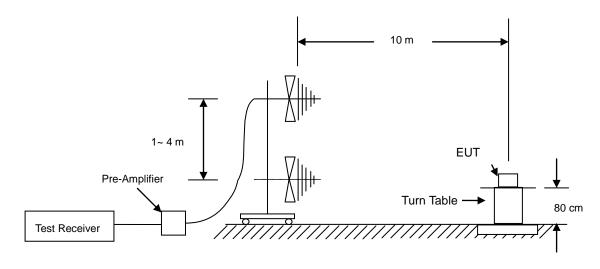
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### 3 Radiated Emission Test – Below 1 GHz

#### 3.1 Test Instruments

Refer to Sec. 1.3 Test Instruments.

#### 3.2 Test Configuration and Procedure



#### **Table-top Equipment**

- The EUT was place on a non-conductive turntable which was 80cm above the horizontal ground plane. The EUT was set 10m away from the receiving antenna that was mounted on a non-conductive mast.
- Main cables draped to the ground plane and were routed to the mains power outlet. The
  mains power outlet was bonded to and did not protrude above the ground plane.
- The antenna was adjusted between 1m and 4m in height above the ground plane and the Antenna-to-EUT azimuth was also varied during the measurements to find the top 6 maximum meter readings within the frequency range limit as indicated in Sec 3.3.
- The radiated emissions were measured when the Antenna-to-EUT polarization was set horizontally and vertically.
- The values were recorded.

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#### 3.3 Radiated Limit

☐ FCC Part 15 B

	☐ Class	s A (10m)	☐ Class B (3m)		
Frequency	Field Strength Quasi-Peak		Field Strength	Quasi-Peak	
(MHz)	(μV/m) (dBμV/m)		(μV/m)	(dBμV/m)	
30 to 88	90	39.08	100	40.00	
88 to 216	150	43.52	150	43.52	
216 to 960	210	46.44	200	46.02	

Emission Level (dB $\mu$ V/m)=20 Log Emission Level ( $\mu$ V/m)

## ☑ CISPR 22

	☐ Class A (10m)	☐ Class B (10m)
Frequency (MHz)	Quasi-Peak (dBμV/m)	Quasi-Peak (dBμV/m)
30 to 230	40.0	30.0
230 to 1000	47.0	37.0

#### 3.4 Test Result

#### **PASS**

The final tests data are shown on the following page(s).

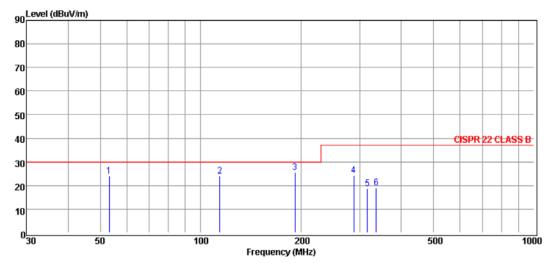
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## A Hong

#### **Radiated Emission Test Data-Line mode**

Test Date : 09-MAR-2016 Polarization : Horizontal

Temperature :  $20^{\circ}$ C Humidity : 56%



No.	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Antenna	Remark
140. –	MHz	dΒμV	dB	dBµV/m	dBµV/m	dB	cm	deg	Pol.	Kemark
1	53.13	40.46	-16.37	24.09	30.00	-5.91	388	200	HORIZONTAL	QP
2	114.11	36.62	-12.67	23.95	30.00	-6.05	375	220	HORIZONTAL	QP
3	191.75	40.45	-14.88	25.57	30.00	-4.43	395	250	HORIZONTAL	QP
4	287.99	34.41	-10.20	24.21	37.00	-12.79	380	210	HORIZONTAL	QP
5	316.59	28.22	-9.51	18.71	37.00	-18.29	390	230	HORIZONTAL	QP
6	336.04	28.07	-8.93	19.14	37.00	-17.86	370	240	HORIZONTAL	QP

Remark: All readings are Quasi-Peak values.

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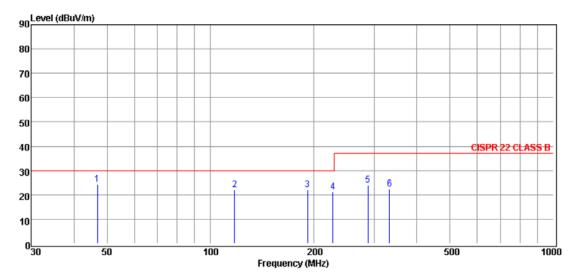


#### **Radiated Emission Test Data-Line mode**

Report No.: HA160144-FD

Test Date : 09-MAR-2016 Polarization : Vertical

Temperature :  $20^{\circ}$ C Humidity : 56%



No.	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Antenna	Remark
NO.	MHz	dΒμV	dB	dBµV/m	dBµV/m	dB	cm	deg	Pol.	Remain
1	46.83	38.17	-13.95	24.22	30.00	-5.78	110	180	VERTICAL	QP
2	117.77	34.48	-12.44	22.04	30.00	-7.96	105	190	VERTICAL	QP
3	191.75	36.90	-14.88	22.02	30.00	-7.98	120	220	VERTICAL	QP
4	227.69	34.46	-13.38	21.08	30.00	-8.92	115	210	VERTICAL	QP
5	287.99	34.30	-10.20	24.10	37.00	-12.90	125	200	VERTICAL	QP
6	332.52	31.44	<b>-</b> 9.05	22.39	37.00	-14.61	130	230	VERTICAL	QP

Remark: All readings are Quasi-Peak values.

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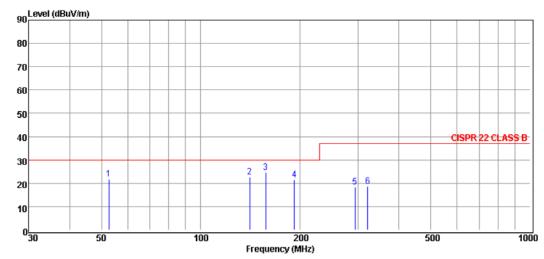


## **Radiated Emission Test Data-Battery mode**

Report No.: HA160144-FD

Test Date : 09-MAR-2016 Polarization : Horizontal

Temperature :  $20^{\circ}$ C Humidity : 56%



No.	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Antenna	Remark
NO.	MHz	dBµV	dB	dBµV/m	dBµV/m	dB	cm	deg	Pol.	Kemark
1	52.58	38.10	-16.23	21.87	30.00	-8.13	390	215	HORIZONTAL	QP
2	140.84	34.96	-12.33	22.63	30.00	-7.37	380	230	HORIZONTAL	QP
3	157.56	37.79	-13.07	24.72	30.00	-5.28	388	240	HORIZONTAL	QP
4	192.42	36.26	-14.87	21.39	30.00	-8.61	385	200	HORIZONTAL	QP
5	294.11	28.38	-10.10	18.28	37.00	-18.72	395	190	HORIZONTAL	QP
6	321.06	28.07	-9.39	18.68	37.00	-18.32	375	220	HORIZONTAL	QP

Remark: All readings are Quasi-Peak values.

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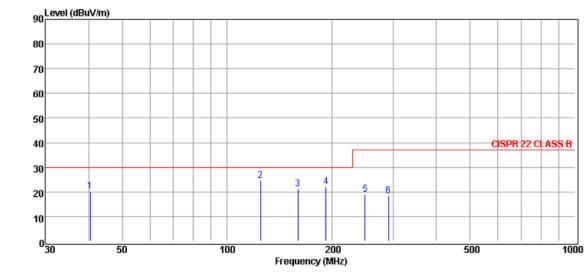


## Radiated Emission Test Data-Battery mode

Report No.: HA160144-FD

Test Date : 09-MAR-2016 Polarization : Vertical

Temperature :  $20^{\circ}$ C Humidity : 56%



No	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Antenna	Remark
	MHz	dΒμV	dB	dBµV/m	dBµV/m	dB	cm	deg	Pol.	Remark
1	40.42	30.56	-10.39	20.17	30.00	-9.83	118	195	VERTICAL	Peak
2	124.57	36.95	-12.20	24.75	30.00	-5.25	125	220	VERTICAL	Peak
3	159.78	34.20	-13.16	21.04	30.00	-8.96	110	230	VERTICAL	Peak
4	192.42	37.13	-14.87	22.26	30.00	-7.74	135	215	VERTICAL	Peak
5	249.43	29.92	-10.84	19.08	37.00	-17.92	130	200	VERTICAL	Peak
6	291.04	28.55	-10.14	18.41	37.00	-18.59	120	210	VERTICAL	Peak

Remark: All readings are Quasi-Peak values.

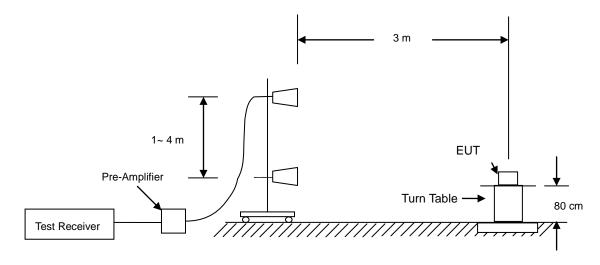
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#### 4 Radiated Emission Test – 1 to 6 GHz

#### 4.1 Test Instruments

Refer to Sec. 1.3 Test Instruments.

#### 4.2 Test Configuration and Procedure



## **Table-top Equipment**

- The EUT was place on a non-conductive turntable which was 80cm above the horizontal ground plane. The EUT was set 3m away from the receiving antenna that was mounted on a non-conductive mast.
- Main cables draped to the ground plane and were routed to the mains power outlet. The
  mains power outlet was bonded to and did not protrude above the ground plane.
- The antenna was adjusted between 1m and 4m in height above the ground plane and the Antenna-to-EUT azimuth was also varied during the measurements to find the top 6 maximum meter readings within the frequency range limit as indicated in Sec 4.3.
- The radiated emissions were measured when the Antenna-to-EUT polarization was set horizontally and vertically.
- The values were recorded.

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#### 4.3 Test Limit

## ☐ CISPR22 Class A ITE at a measurement distance of 3m

Frequency	Average limit	Peak limit				
GHz	dB(μV/m)	dB(μV/m)				
1 to 3	56	76				
3 to 6	60	80				
NOTE The lower limit applies at the transition frequency.						

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## ☐ CISPR22 Class B ITE at a measurement distance of 3m

Frequency	Average limit	Peak limit				
GHz	dB(μV/m)	dB(μV/m)				
1 to 3 50		70				
3 to 6 54		74				
NOTE The lower limit applies at the transition frequency.						

#### 4.4 Test Result

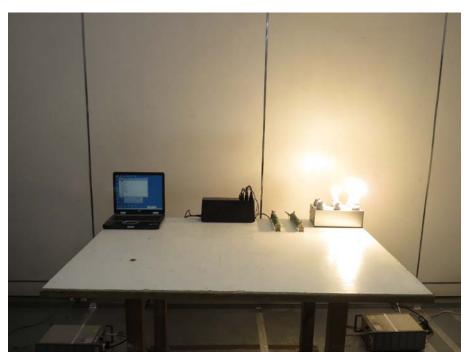
## Not applicable

\*The highest frequency of the internal sources of the EUT is less than 108MHz. Hence, above 1GHz Radiated Measurement shall not be made.

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## 5 Photographs of Test

## 5.1 Conducted Emission Test



Front View



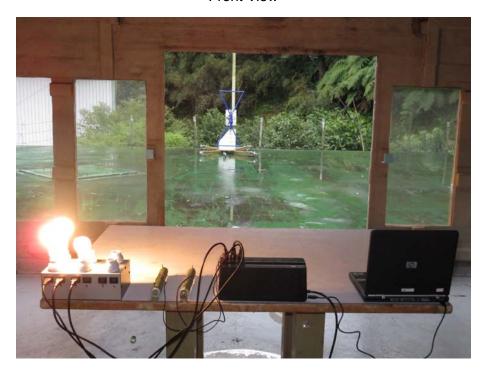
Rear View

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## 5.2 Radiated Emission Test – Below 1 GHz



Front View



Rear View

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## 6 Photographs of EUT



View of the EUT 1



View of the EUT 2

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View of the EUT 3



View of the EUT 4

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View of the EUT 5

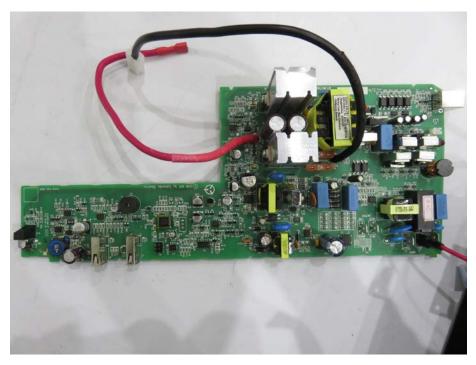


View of the EUT I/O Port

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Inside View of EUT

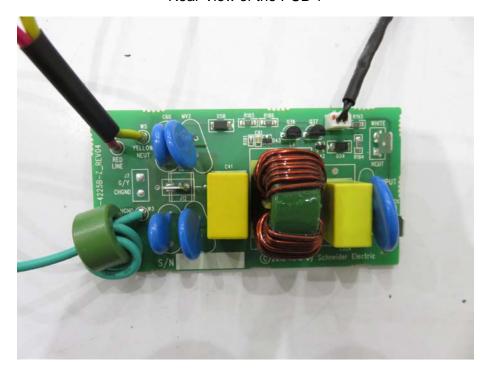


Front View of the PCB 1

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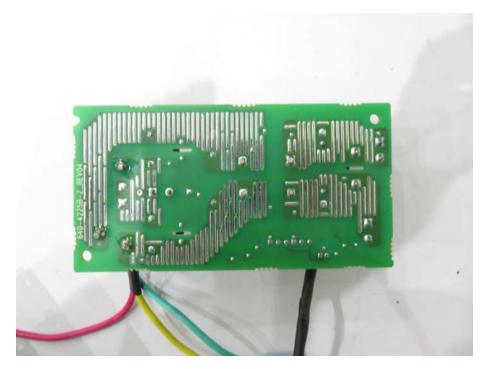


Rear View of the PCB 1



Front View of the PCB 2

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Rear View of the PCB 2



View of the Battery

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View of the Label

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