CE EMC
UPDATE TEST REPORT

for

Power

Model:

THM 3-0510WI,THM 3-0511WI, THM 3-0512WI,THM 3-0513WI, THM 3-0515WI,THM 3-0521WI,
THM 3-0522WI,THM 3-0523WI, THM 3-2410WI,THM 3-2411WI, THM 3-2412WI,THM 3-2413WI,
THM 3-2415WI,THM 3-2421WI, THM 3-2422WI,THM 3-2423WI, THM 3-4810WI,THM 3-4811WI,
THM 3-4812WI,THM 3-4813WI, THM 3-4815WI,THM 3-4821WI, THM 3-4822WI,THM 3-4823WI,
THM 3-0510WIA,THM 3-0511WIA, THM 3-0512WIA,THM 3-0513WIA, THM 3-0515WIA,THM 3-0521WA
THM 3-0522WIA,THM 3-0523WIA, THM 3-2410WIA,THM 3-2411WIA, THM 3-2412WIA,THM 3-2413WIA,
THM 3-2415WIA,THM 3-2421WIA, THM 3-2422WIA,THM 3-2423WIA, THM 3-4810WIA,THM 3-4811WIA,
THM 3-4812WIA,THM 3-4813WIA, THM 3-4815WIATHM 3-4821WIA, THM 3-4822WIA,THM 3-4823WIA,
THM 3-1210,THM 3-1211, THM 3-1212, THM 3-1213,THM 3-1215,THM 3-1221, THM 3-1222,THM 3-1223,
THM 3-2410, THM 3-2411,THM 3-2412,THM 3-2413, THM 3-2415,THM 3-2421, THM 3-2422,
THM 3-2423,THM 3-4810, THM 3-4811,THM 3-4812,THM 3-4813, THM 3-4815,THM 3-4821,THM 3-4822,
THM 3-4823,THM 3-1210A,THM 3-1211A, THM 3-1212A,THM 3-1213A,THM 3-1215A, THM 3-1221A,
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THM 10-2423A,THM 10-4810A, THM 10-4811A,THM 10-4812ATHM 10-4813A,THM 10-4815A,
THM 10-4821A,THM 10-4822A, THM 10-4823A

Test Report Number:

T161219W04-E

Issued for

TRACO ELECTRONIC AG
SIHLBRUGGSTRASSE 111 CH-6340 BAAR,
SWITZERLAND

Issued By:

Compliance Certification Services Inc.
Wugu Laboratory
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
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Issued Date: December 20, 2016

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		December 20, 2016		Initial Issue	ALL	Angel Cheng

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1 TEST CERTIFICATION

Product:	power
Model:	THM 3-0510WI,THM 3-0511WI, THM 3-0512WI,THM 3-0513WI, THM 3-0515WI, THM 3-0521WI, THM 3-0522WI,THM 3-0523WI, THM 3-2410WI,THM 3-2411WI, THM 3-2412WI,THM 3-2413WI, THM 3-2415WI,THM 3-2421WI, THM 3-2422WI, THM 3-2423WI, THM 3-4810WI,THM 3-4811WI THM 3-4812WI,THM 3-4813WI, THM 3-4815WI,THM 3-4821WI, THM 3-4822WI,THM 3-4823WI, THM 3-0510WIA, THM 3-0511WIA, THM 3-0512WIA,THM 3-0513WIA, THM 3-0515WIA,THM 3-0521WA THM 3-0522WIA,THM 3-0523WIA, THM 3-2410WIA,THM 3-2411WIA, THM 3-2412WIA,THM 3-2413WIA, THM 3-2415WIA,THM 3-2421WIA, THM 3-2422WIA,THM 3-2423WIA, THM 3-4810WIA,THM 3-4811WIA, THM 3-4812WIA,THM 3-4813WIA, THM 3-4815WIATHM 3-4821WIA, THM 3-4822WIA,THM 3-4823WIA, THM 3-1210,THM 3-1211, THM 3-1212, THM 3-1213,THM 3-1215,THM 3-1221, THM 3-1222,THM 3-1223, THM 3-2410, THM 3-2411,THM 3-2412,THM 3-2413, THM 3-2415,THM 3-2421, THM 3-2422, THM 3-2423,THM 3-4810, THM 3-4811,THM 3-4812,THM 3-4813, THM 3-4815, THM 3-4821,THM 3-4822, THM 3-4823,THM 3-1210A,THM 3-1211A, THM 3-1212A,THM 3-1213A,THM 3-1215A, THM 3-1221A,THM 3-1222A,THM 3-1223A, THM 3-2410A,THM 3-2411A,THM 3-2412A, THM 3-2413A,THM 3-2415A,THM 3-2421A, THM 3-2422A,THM 3-2423A,THM 3-4810A, THM 3-4811A,THM 3-4812A,THM 3-4813A, THM 3-4815A,THM 3-4821A,THM 3-4822A, THM 3-4823A,THM 6-0510WI, THM 6-0511WI,THM 6-0512WI, THM 6-0513WI,THM 6-0515WI, THM 6-0521WI, THM 6-0522WI, THM 6-0523WI,THM 6-2410WI, THM 6-2411WI,THM 6-2412WI, THM 6-2413WI,THM 6-2415WI, THM 6-2421WI,THM 6-2422WI, THM 6-2423WI, THM 6-4810WI, THM 6-4811WI,THM 6-4812WI, THM 6-4813WI,THM 6-4815WI, THM 6-4821WI,THM 6-4822WI, THM 6-4823WI,THM 6-0510WIA, THM 6-0511WIA,THM 6-0512WIA, THM 6-0513WIA,THM 6-0515WIA, THM 6-0521WA,THM 6-0522WIA, THM 6-0523WIA,THM 6-2410WIA THM 6-2411WIA,THM 6-2412WIA, THM 6-2413WIA,THM 6-2415WIA, THM 6-2421WIA,THM 6-2422WIA, THM 6-2423WIA,THM 6-4810WIA, THM 6-4811WIA,THM 6-4812WIA, THM 6-4813WIA,THM 6-4815WIA, THM 6-4821WIA,THM 6-4822WIA, THM 6-4823WIA,THM 6-1210,THM 6-1211, THM 6-1212,THM 6-1213,THM 6-1215, THM 6-1221,THM 6-1222,THM 6-1223, THM 6-2410,THM 6-2411,THM 6-2412, THM 6-2413,THM 6-2415,THM 6-2421, THM 6-2422,THM 6-2423,THM 6-4810, THM 6-4811,THM 6-4812,THM 6-4813, THM 6-4815,THM 6-4821,THM 6-4822, THM 6-4823,THM 6-1210A,THM 6-1211A, THM 6-1212A,THM 6-1213A,THM 6-1215A, THM 6-1221A,THM 6-1222A,THM 6-1223A, THM 6-2410A,THM 6-2411A,THM 6-2412A, THM 6-2413A,THM 6-2415A,THM 6-2421A, THM 6-2422A,THM 6-2423A,THM 6-4810A, THM 6-4811A,THM 6-4812A,THM 6-4813A, THM 6-4815A,THM 6-4821A,THM 6-4822A, THM 6-4823A,THM 10-2411WI, THM 10-2412WI,THM 10-2413WI, THM 10-2415WI,THM 10-2421WI, THM 10-2422WI,THM 10-2423WI, THM 10-4810WI,THM 10-4811WI, THM 10-4812WI,THM 10-4813WI, THM 10-4815WI,THM 10-4821WI, THM 10-4822WI,THM 10-4823WI, THM 10-0510WIA,THM 10-0511WIA, THM 10-0512WIA,THM 10-0513WIA, THM 10-0515WIA,THM 10-0521WA, THM 10-0522WIA,THM 10-0523WIA, THM 10-2410WIA,THM 10-2411WIA, THM 10-2412WIA,THM 10-2413WIA, THM 10-2415WIA,THM 10-2421WIA, THM 10-2422WIA,THM 10-2423WIA, THM 10-4810WIA,THM 10-4811WIA, THM 10-4812WIA,THM 10-4813WIA, THM 10-4815WIA,THM 10-4821WIA, THM 10-4822WIA,THM 10-4823WIA, THM 10-2411,THM 10-2412,THM 10-2413, THM 10-2415,THM 10-2421,THM 10-2422, THM 10-2423,THM 10-4810,THM 10-4811, THM 10-4812,THM 10-4813,THM 10-4815, THM 10-4821,THM 10-4822,THM 10-4823, THM10-1210A,THM10-1211A,THM10-1212A, THM 10-1213A,THM 10-1215A, THM 10-1221A,THM 10-1222A, THM 10-1223A,THM 10-2410A, THM 10-2411A, THM 10-2412A, THM 10-2413A,THM 10-2415A, THM 10-2421A,THM 10-2422A, THM 10-2423A,THM 10-4810A, THM 10-4811A,THM 10-4812A, THM 10-4813A,THM 10-4815A, THM 10-4821A,THM 10-4822A, THM 10-4823A

Brand:	TRACO
Applicant:	**TRACO ELECTRONIC AG** SIHLBRUGGSTRASSE 111 CH-6340 BAAR, SWITZERLAND
Manufacturer:	**TRACO ELECTRONIC AG** SIHLBRUGGSTRASSE 111 CH-6340 BAAR, SWITZERLAND
Tested:	April 15, 2013 ~ November 11, 2016
Applicable Standards:	**EN 60601-1-2:2015** **EN 55011: 2009/A1:2010** **CISPR 11: 2009/A1:2010** **IEC 61000-3-2:2005+A1:2008+A2:2009** **IEC 61000-3-3:2013** IEC 61000-4-2:2008 IEC 61000-4-3:2006+A1:2007+A2:2010 IEC 61000-4-4:2012 IEC 61000-4-5:2005 IEC 61000-4-6:2013 IEC 61000-4-8:2009 IEC 61000-4-11:2004

Deviation from Applicable Standard
None

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Tony Hsu
Asst. Manager

Tested by:

Ming Fan
Engineer

2 TEST RESULT SUMMARY

EMISSION			
Standard	**Item**	**Result**	**Remarks**
(Group 1, Class B) EN 55011: 2009/A1:2010 CISPR 11: 2009/A1:2010	Conducted (Power Port)	PASS	Meet Class A & B limit
	Radiated	PASS	Meet Class A & B limit
IEC 61000-3-2:2005+A1:2008+A2:2009	Harmonic current emissions	N/A	Not applicable, because EUT not connect to AC Main Source direct.
IEC 61000-3-3:2013	Voltage fluctuations & flicker	N/A	Not applicable, because EUT not connect to AC Main Source direct.

IMMUNITY			
Standard	**Item**	**Result**	**Remarks**
IEC 61000-4-2:2008	ESD	PASS	See Item 8.3 of this report
IEC 61000-4-3:2006+A1:2007+A2:2010	RS	PASS	See Item 8.4 of this report
IEC 61000-4-4:2012	EFT	PASS	See Item 8.5 of this report
IEC 61000-4-5:2005	Surge	PASS	See Item 8.6 of this report
IEC 61000-4-6:2013	CS	PASS	See Item 8.7 of this report
IEC 61000-4-8:2009	PFMF	PASS	See Item 8.8 of this report
IEC 61000-4-11:2004	Voltage dips & short interruptions	N/A	Not applicable, because EUT not connect to AC Main Source direct.

Note: *1. The statements of test result on the above are decided by the request of test standard only; the measurement uncertainties are not factored into this compliance determination.*
2. The information of measurement uncertainty is available upon the customer's request.

3 EUT DESCRIPTION

Product	power
Brand Name	TRACO
Model	THM 3-0510WI,THM 3-0511WI, THM 3-0512WI,THM 3-0513WI, THM 3-0515WI,THM 3-0521WI, THM 3-0522WI,THM 3-0523WI, THM 3-2410WI,THM 3-2411WI, THM 3-2412WI,THM 3-2413WI, THM 3-2415WI,THM 3-2421WI, THM 3-2422WI,THM 3-2423WI, THM 3-4810WI, THM 3-4811WI THM 3-4812WI,THM 3-4813WI, THM 3-4815WI,THM 3-4821WI, THM 3-4822WI,THM 3-4823WI, THM 3-0510WIA,THM 3-0511WIA, THM 3-0512WIA,THM 3-0513WIA, THM 3-0515WIA,THM 3-0521WA THM 3-0522WIA,THM 3-0523WIA, THM 3-2410WIA,THM 3-2411WIA, THM 3-2412WIA,THM 3-2413WIA, THM 3-2415WIA,THM 3-2421WIA, THM 3-2422WIA,THM 3-2423WIA, THM 3-4810WIA,THM 3-4811WIA, THM 3-4812WIA,THM 3-4813WIA, THM 3-4815WIATHM 3-4821WIA, THM 3-4822WIA,THM 3-4823WIA, THM 3-1210,THM 3-1211, THM 3-1212, THM 3-1213,THM 3-1215,THM 3-1221, THM 3-1222,THM 3-1223, THM 3-2410, THM 3-2411,THM 3-2412,THM 3-2413, THM 3-2415,THM 3-2421, THM 3-2422,THM 3-2423,THM 3-4810, THM 3-4811,THM 3-4812,THM 3-4813, THM 3-4815,THM 3-4821,THM 3-4822, THM 3-4823,THM 3-1210A,THM 3-1211A, THM 3-1212A,THM 3-1213A,THM 3-1215A, THM 3-1221A,THM 3-1222A, THM 3-1223A, THM 3-2410A,THM 3-2411A,THM 3-2412A, THM 3-2413A, THM 3-2415A,THM 3-2421A, THM 3-2422A,THM 3-2423A,THM 3-4810A, THM 3-4811A,THM 3-4812A,THM 3-4813A, THM 3-4815A,THM 3-4821A, THM 3-4822A, THM 3-4823A,THM 6-0510WI, THM 6-0511WI,THM 6-0512WI, THM 6-0513WI,THM 6-0515WI, THM 6-0521WI,THM 6-0522WI, THM 6-0523WI,THM 6-2410WI, THM 6-2411WI,THM 6-2412WI, THM 6-2413WI,THM 6-2415WI, THM 6-2421WI,THM 6-2422WI, THM 6-2423WI,THM 6-4810WI, THM 6-4811WI,THM 6-4812WI, THM 6-4813WI,THM 6-4815WI THM 6-4821WI,THM 6-4822WI, THM 6-4823WI,THM 6-0510WIA, THM 6-0511WIA,THM 6-0512WIA, THM 6-0513WIA,THM 6-0515WIA, THM 6-0521WA,THM 6-0522WIA, THM 6-0523WIA,THM 6-2410WIA, THM 6-2411WIA,THM 6-2412WIA, THM 6-2413WIA,THM 6-2415WIA, THM 6-2421WIA,THM 6-2422WIA, THM 6-2423WIA,THM 6-4810WIA, THM 6-4811WIA,THM 6-4812WIA, THM 6-4813WIA,THM 6-4815WIA, THM 6-4821WIA,THM 6-4822WIA, THM 6-4823WIA,THM 6-1210,THM 6-1211, THM 6-1212,THM 6-1213, THM 6-1215, THM 6-1221,THM 6-1222,THM 6-1223, THM 6-2410, THM 6-2411,THM 6-2412, THM 6-2413,THM 6-2415,THM 6-2421, THM 6-2422,THM 6-2423,THM 6-4810, THM 6-4811,THM 6-4812,THM 6-4813, THM 6-4815,THM 6-4821,THM 6-4822, THM 6-4823,THM 6-1210A,THM 6-1211A, THM 6-1212A,THM 6-1213A,THM 6-1215A, THM 6-1221A,THM 6-1222A, THM 6-1223A, THM 6-2410A,THM 6-2411A,THM 6-2412A, THM 6-2413A, THM 6-2415A,THM 6-2421A, THM 6-2422A,THM 6-2423A,THM 6-4810A, THM 6-4811A,THM 6-4812A,THM 6-4813A, THM 6-4815A,THM 6-4821A, THM 6-4822A, THM 6-4823A,THM 10-2411WI, THM 10-2412WI,THM 10-2413WI, THM 10-2415WI,THM 10-2421WI, THM 10-2422WI,THM 10-2423WI, THM 10-4810WI,THM 10-4811WI, THM 10-4812WI,THM 10-4813WI, THM 10-4815WI,THM 10-4821WI, THM 10-4822WI,THM 10-4823WI, THM 10-0510WIA,THM 10-0511WIA, THM 10-0512WIA,THM 10-0513WIA, THM 10-0515WIA,THM 10-0521WA, THM 10-0522WIA,THM 10-0523WIA, THM 10-2410WIA,THM 10-2411WIA, THM 10-2412WIA,THM 10-2413WIA, THM 10-2415WIA,THM 10-2421WIA, THM 10-2422WIA,THM 10-2423WIA, THM 10-4810WIA,THM 10-4811WIA,THM 10-4812WIA,THM 10-4813WIA, THM 10-4815WIA,THM 10-4821WIA, THM 10-4822WIA,THM 10-4823WIA, THM 10-2411,THM 10-2412,THM 10-2413, THM 10-2415,THM 10-2421, THM 10-2422, THM 10-2423,THM 10-4810,THM 10-4811, THM 10-4812, THM 10-4813,THM 10-4815, THM 10-4821,THM 10-4822,THM 10-4823, THM10-1210A,THM10-1211A,THM10-1212A, THM 10-1213A,THM 10-1215A,

	THM 10-1221A,THM 10-1222A, THM 10-1223A,THM 10-2410A, THM 10-2411A,THM 10-2412A, THM 10-2413A,THM 10-2415A, THM 10-2421A,THM 10-2422A, THM 10-2423A,THM 10-4810A, THM 10-4811A, THM 10-4812A, THM 10-4813A,THM 10-4815A, THM 10-4821A,THM 10-4822A, THM 10-4823A
Applicant	TRACO ELECTRONIC AG
Housing material	N/A
Identify Number	T161219W04
Received Date	December 19, 2016
EUT Power Rating	Power form power supply. (48V)

Remark: *1. Difference of the four model numbers (list on this report) is identical, is just for marketing purpose only.*
2. Client consigns only one sample to test (model number: THM 10-0515WIA). Therefore, the testing Lab. just guarantees the unit, which has been tested.

I/O PORT

I/O PORT TYPES	Q'TY	TESTED WITH
N/A		

4 TEST METHODOLOGY

4.1. DECISION OF FINAL TEST MODE

The EUT was tested together with the above additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The test configuration / modes are as the following:

1. The following test modes were scanned during the preliminary test:

Pre-Test Mode
Mode 1: THM 10-0515WIA (5VDC Full Load)
Mode 2: THM 10-2415WIA (24VDC Full Load)
Mode 3: THM 10-4815WIA (48VDC Full Load)-Class A
Mode 4: THM 10-4815WIA (48VDC Full Load)- -Class B

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode		
Emission	Conducted Emission	**Mode 3 & 4**
	Radiated Emission	**Mode 3 & 4**
Immunity (ESD, RS, EFT, Surge, CS, PFMF)		**Mode 3 & 4**

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

4.2. EUT SYSTEM OPERATION

1. Setup the EUT and simulators as shown on 5.2.
2. Turn on the power of all equipment.
3. Adjust to the test mode, and begin the test.

Note: Test program is self-repeating throughout the test.

5 SETUP OF EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Peripherals Devices:

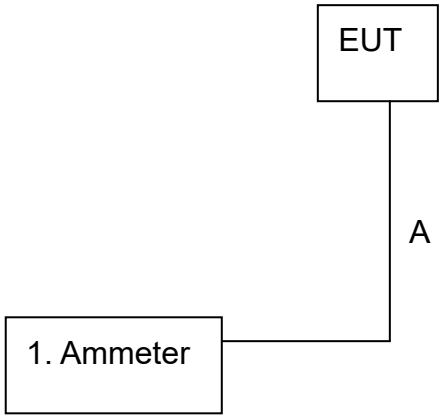
No.	Equipment	Model No.	Serial No.	FCC ID / BSMI ID	Trade Name	Power Cord
1.	Ammeter	HOLA	DM-3000	N/A	N/A	N/A

No.	Cable Name	Unit	Shielded	Length	With Core
(A)	Signal Cable	1	☐Shielded, ■Non	1.8 m	☐With Core× , ■Non

Note:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

5.2. CONFIGURATION OF SYSTEM UNDER TEST



6 FACILITIES AND ACCREDITATIONS

6.1. FACILITIES

All measurement facilities used to collect the measurement data are located at:

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

☒ No.139, Wugong Rd., Wugu Dist., New Taipei City 24886, Taiwan. (R.O.C.)

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN, R.O.C.

☒ NO. 989-1 Wen Shan Rd., Shang Shan Village, Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

***Remark**:*

1. *The radiated emissions test items was tested at Compliance Certification Services Inc. (Hsinchu Lab.) The test equipments were listed in page 15 and the test data, please refer page 18-19.*

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4 and CISPR 16-1-5.

6.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan	TAF (TAF 1309)
USA	A2LA (0824.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada (3M Semi Anechoic Chamber: IC 2324G-1 / IC 2324G-2 / 2324J-1 / 2324J-2 to perform)
Norway	Nemko
Japan	VCCI 966 Chamber C: Radiated emissions: 30 MHz -1000 MHz: R-3282 / Above 1GHz: G-146 10M Chamber: Radiated emissions: 30 MHz -1000 MHz: R-4343 / Above 1GHz: G-945 Conducted Emission A: C-3612 / T-1745 Conducted Emission B: C-3700 / T-1839
USA	FCC (3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements)

Copies of granted accreditation certificates are available for downloading from our web site,

http://www.ccsrf.com

6.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions	0.15MHz ~ 30MHz	N/A
Radiated emissions	30 ~ 1000 MHz	+/- 4.21

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22:2008, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.

7 EMISSION TEST

7.1. CONDUCTED EMISSION MEASUREMENT

7.1.1. LIMITS

CLASS A

FREQUENCY (MHz)	Group 1		Group 2		Group 2*	
	Quasi-peak (dBuV)	Average (dBuV)	Quasi-peak (dBuV)	Average (dBuV)	Quasi-peak (dBuV)	Average (dBuV)
0.15 - 0.5	79	66	100	90	130	120
0.50 - 5.0	73	60	86	76	125	115
5.0 - 30.0	73	60	90-70	80-60	115	105
			Decreasing linearly with logarithm of frequency			

* Mains supply currents in excess of 100 A per phase when using the CISPR voltage probe or a suitable V-network (LISN or AMN).

Note:

1. *The lower limit shall apply at the transition frequency*
2. *Care should be taken to comply with leakage current requirements.*

CLASS B

FREQUENCY (MHz)	Group 1 & 2	
	Quasi-peak (dBuV)	Average (dBuV)
0.15 - 0.5	66-56 Decreasing linearly with logarithm of frequency	56-46 Decreasing linearly with logarithm of frequency
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note:

1. *The lower limit shall apply at the transition frequency*
2. *Care should be taken to comply with leakage current requirements.*

7.1.2. TEST INSTRUMENTS

Conducted Emission Room #B				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI	101073	07/30/2014
LISN	R&S	ENV216	101054	06/05/2014
LISN	EMCO	3825/2	9106-1809	07/02/2014
Capacitive Voltage Probe	FCC	F-CVP-1	100185	03/24/2014
Current Probe	FCC	F-65	256	N.C.R.
Test S/W	CCS-3A1-CE			

Note:

1. *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. *N.C.R = No Calibration Request.*

7.1.3. TEST PROCEDURES (please refer to measurement standard or CCS SOP PA-031)

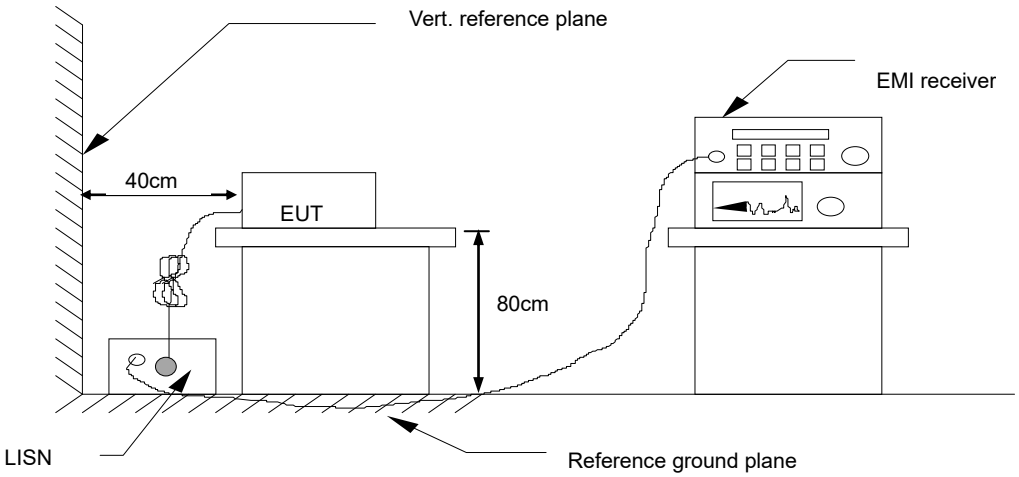
Procedure of Preliminary Test

- The EUT was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per CISPR 11 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per CISPR 11.
- All I/O cables were positioned to simulate typical actual usage as per CISPR 11.
- The test equipment EUT installed received AC power, 230VAC/50Hz, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.
- All support equipment received power from a second LISN.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the Average limit in Q.P. mode, then the emission signal was re-checked using an Average detector.
- The test data of the worst-case condition(s) was recorded.

7.1.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.1.5. DATA SAMPLE

Freq. (MHz)	Read Level (dBuV)	Factor (dB)	Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark (P/Q/A)	Line (L1/L2)
x.xx	42.95	0.55	43.50	56	-12.50	Q	L1

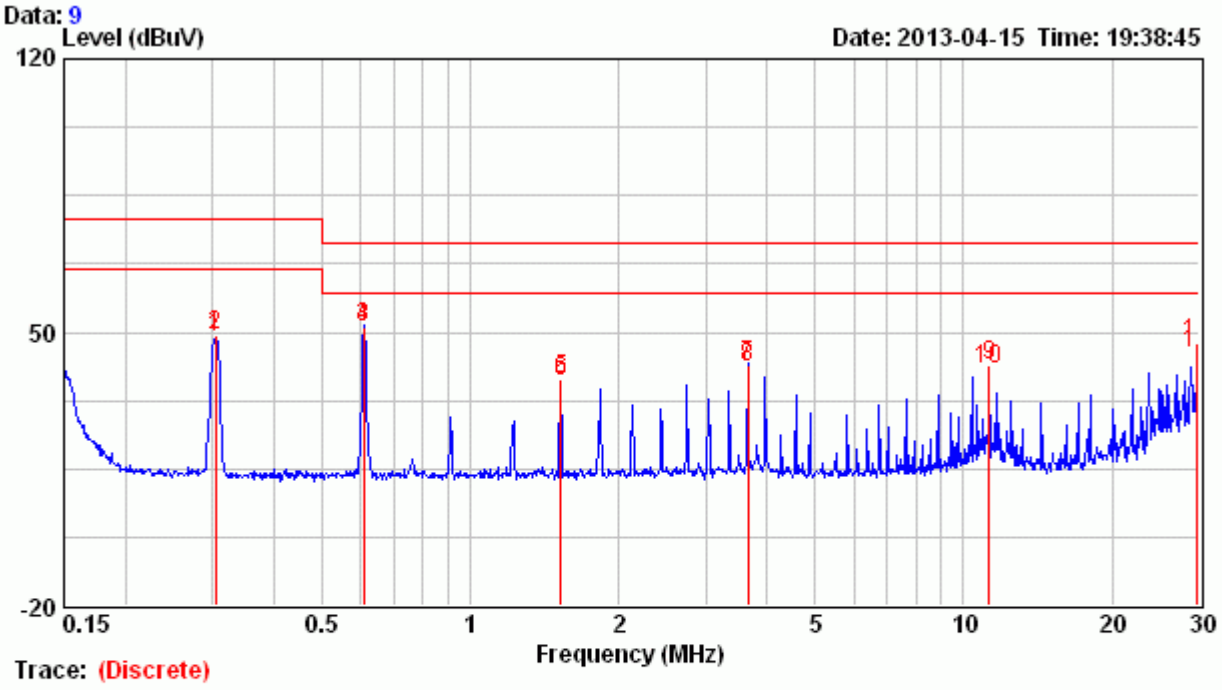
Freq. = Emission frequency in MHz
Read Level = Uncorrected Analyzer/Receiver reading
Factor = Insertion loss of LISN + Cable Loss
Level = Read Level + Factor
Limit Line = Limit stated in standard
Over Limit = Reading in reference to limit
P = Peak Reading
Q = Quasi-peak Reading
A = Average Reading
L1 = Hot side
L2 = Neutral side

Calculation Formula

Over Limit (dB) = Level (dBuV) – Limit Line (dBuV)

7.1.6. TEST RESULTS

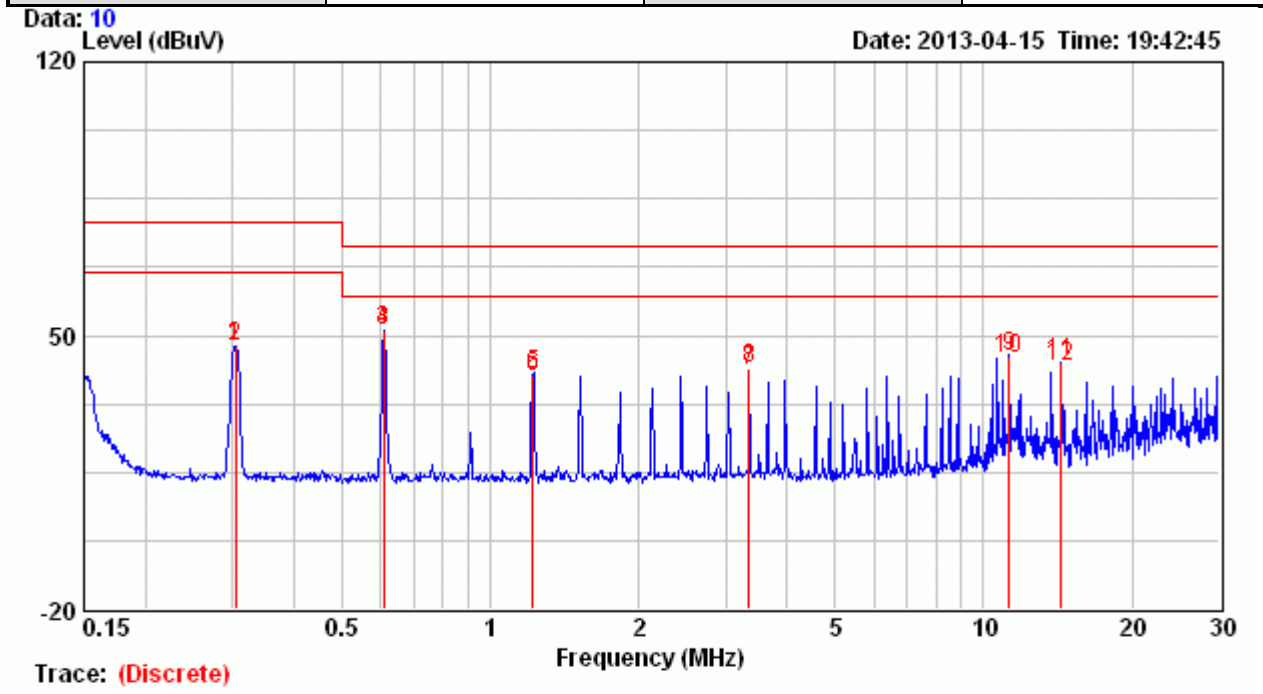
Model No.	THM 10-4815WIA	Line:	L1
Environmental Conditions	26°C, 60% RH	Test Date	2013/04/15
Tested by	Ted Wu	Test Mode	Mode 3



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV AV.	Emission Level dBuV Q.P.	Emission Level dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.305	0.11	49.22	48.78	49.33	48.89	79.00	66.00	-29.67	-17.11
0.608	0.14	51.36	50.91	51.50	51.05	73.00	60.00	-21.50	-8.95
1.524	0.18	37.57	37.16	37.75	37.34	73.00	60.00	-35.25	-22.66
3.656	0.24	41.46	40.99	41.70	41.23	73.00	60.00	-31.30	-18.77
11.274	0.62	40.75	39.98	41.37	40.60	73.00	60.00	-31.63	-19.40
29.859	1.79	45.27	42.59	47.06	44.38	73.00	60.00	-25.94	-15.62

REMARKS: L1 = Line One (Live Line)

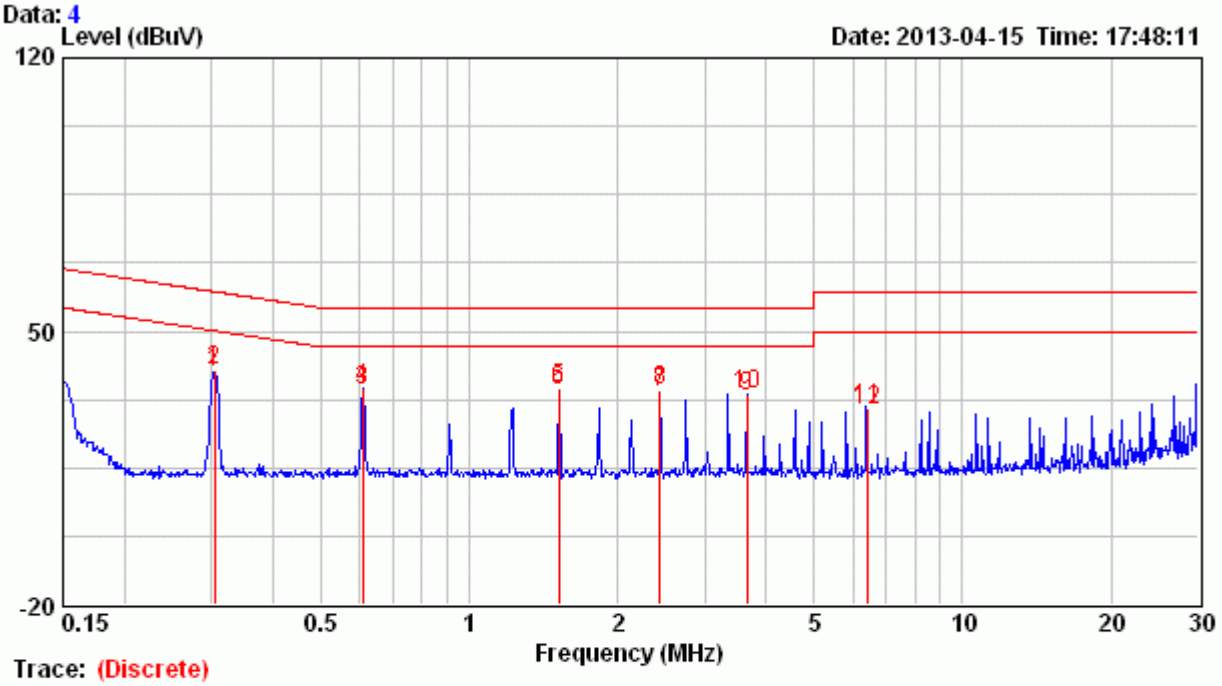
Model No.	THM 10-4815WIA	Line:	L2
Environmental Conditions	26°C, 60% RH	Test Date	2013/04/15
Tested by	Ted Wu	Test Mode	Mode 3



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV AV.	Emission Level dBuV Q.P.	Emission Level dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.305	0.11	47.31	46.90	47.42	47.01	79.00	66.00	-31.58	-18.99
0.609	0.14	51.40	51.00	51.54	51.14	73.00	60.00	-21.46	-8.86
1.218	0.17	39.83	39.26	40.00	39.43	73.00	60.00	-33.00	-20.57
3.350	0.21	41.26	40.92	41.47	41.13	73.00	60.00	-31.53	-18.87
11.267	0.37	44.34	43.72	44.71	44.09	73.00	60.00	-28.29	-15.91
14.311	0.42	42.44	41.67	42.86	42.09	73.00	60.00	-30.14	-17.91

REMARKS: L2 = Line Two (Neutral Line)

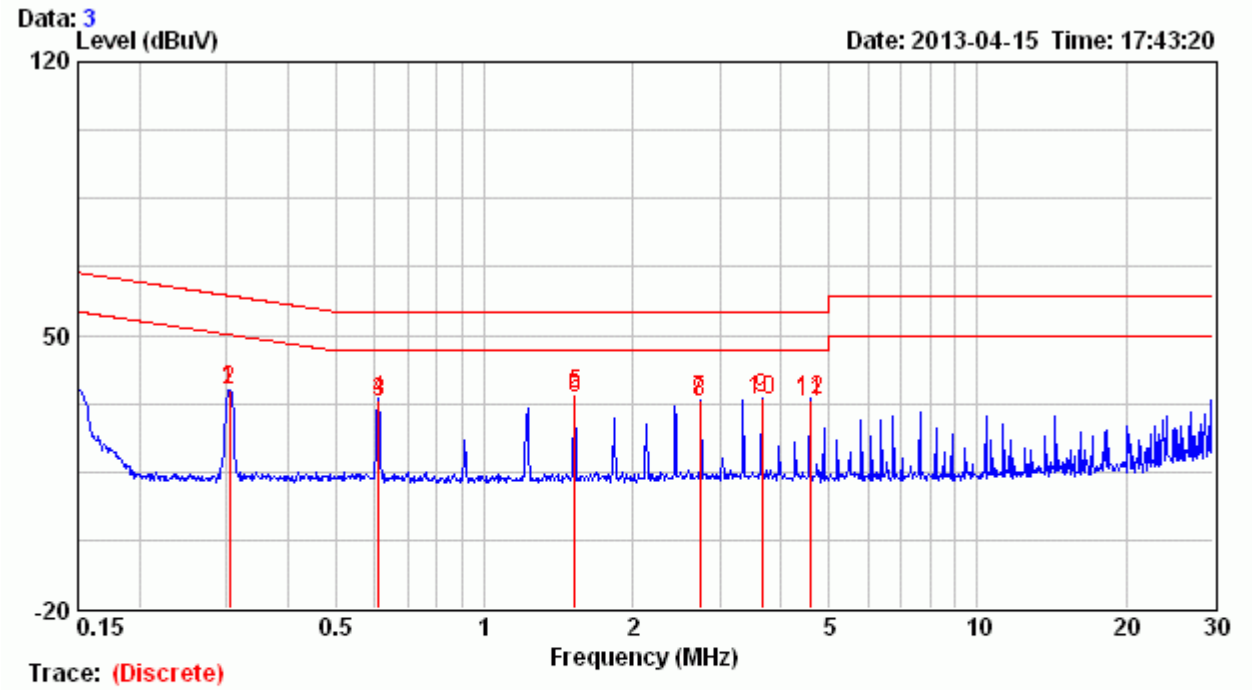
Model No.	THM 10-4815WIA	Line:	L1
Environmental Conditions	26°C, 60% RH	Test Date	2013/04/15
Tested by	Ted Wu	Test Mode	Mode 4



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV AV.	Emission Level dBuV Q.P.	Emission Level dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.305	0.11	39.79	39.34	39.90	39.45	60.10	50.10	-20.20	-10.65
0.609	0.14	35.37	34.90	35.51	35.04	56.00	46.00	-20.49	-10.96
1.522	0.18	35.07	34.59	35.25	34.77	56.00	46.00	-20.75	-11.23
2.435	0.21	34.74	34.19	34.95	34.40	56.00	46.00	-21.05	-11.60
3.654	0.24	33.63	33.14	33.87	33.38	56.00	46.00	-22.13	-12.62
6.392	0.39	30.10	29.58	30.49	29.97	60.00	50.00	-29.51	-20.03

REMARKS: L1 = Line One (Live Line)

Model No.	THM 10-4815WIA	Line:	L2
Environmental Conditions	26°C, 60% RH	Test Date	2013/04/15
Tested by	Ted Wu	Test Mode	Mode 4



Freq. MHz	Corr. Factor dB	Reading Value dBuV Q.P.	Reading Value dBuV AV.	Emission Level dBuV Q.P.	Emission Level dBuV AV.	Limit dBuV Q.P.	Limit dBuV AV.	Margin dB Q.P.	Margin dB AV.
0.305	0.11	36.02	35.55	36.13	35.66	60.10	50.10	-23.97	-14.44
0.611	0.14	33.01	32.54	33.15	32.68	56.00	46.00	-22.85	-13.32
1.523	0.17	34.46	33.85	34.63	34.02	56.00	46.00	-21.37	-11.98
2.742	0.20	32.97	32.52	33.17	32.72	56.00	46.00	-22.83	-13.28
3.656	0.21	33.81	33.30	34.02	33.51	56.00	46.00	-21.98	-12.49
4.570	0.24	33.31	32.72	33.55	32.96	56.00	46.00	-22.45	-13.04

REMARKS: L2 = Line Two (Neutral Line)

7.2. RADIATED EMISSION MEASUREMENT

7.2.1. LIMITS

FREQUENCY (MHz)	Measured on a test site		Measured in situation
	Group 1, class A	Group 1, class B	Group 1, class A Limits with measuring distance 30 m from exterior wall outside the building in which the equipment is situated
	Quasi-peak (dBuV/m)	Quasi-peak (dBuV/m)	Quasi-peak (dBuV/m)
0.15 - 30	Under consideration	Under consideration	Under consideration
30 - 230	40	30	30
230 - 1000	47	37	37

Note:

1. *The lower limit shall apply at the transition frequencies.*
2. *Emission level (dBuV/m) = 20 log Emission level (uV/m).*

7.2.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Bi-log Antenna	SCHAFFER	CBL6112B	2696	10/01/2013
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	101131	01/14/2014

Note:

1. *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*

7.2.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-031)

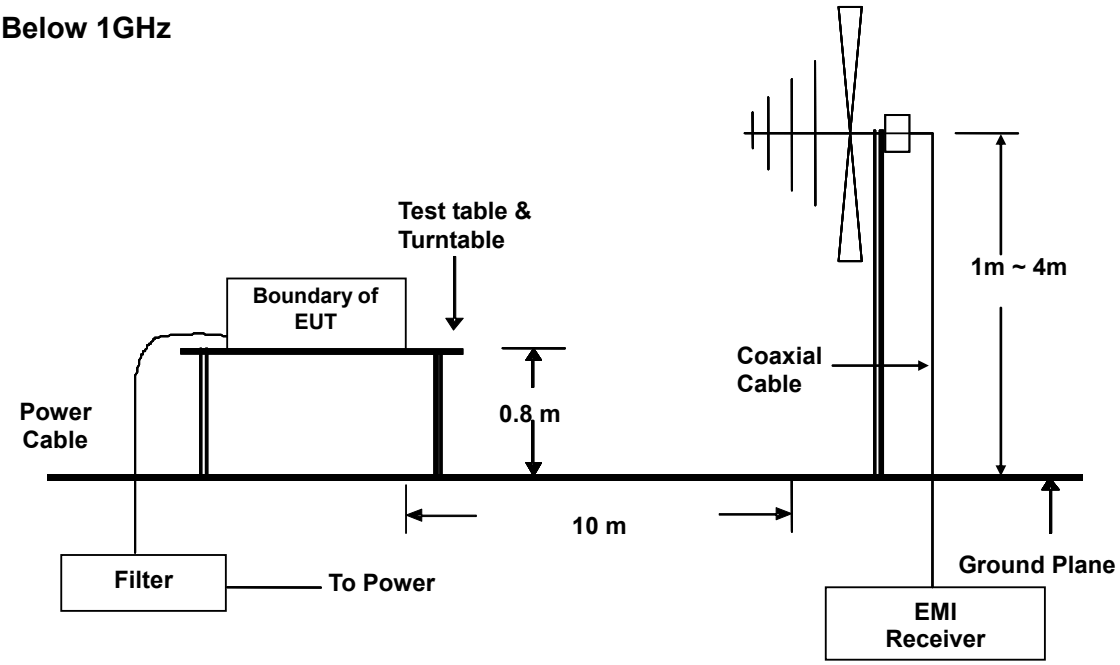
Frequency range 30MHz ~ 1GHz

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position.
2. The EUT was set 10 meters away form the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The height of antenna is varied from one meter to four meter above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was turned to heights for 1 meter to 4 meters and the turn table was turned form 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

NOTE: The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

7.2.4. TEST SETUP

Below 1GHz



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.2.5. DATA SAMPLE

Below 1GHz

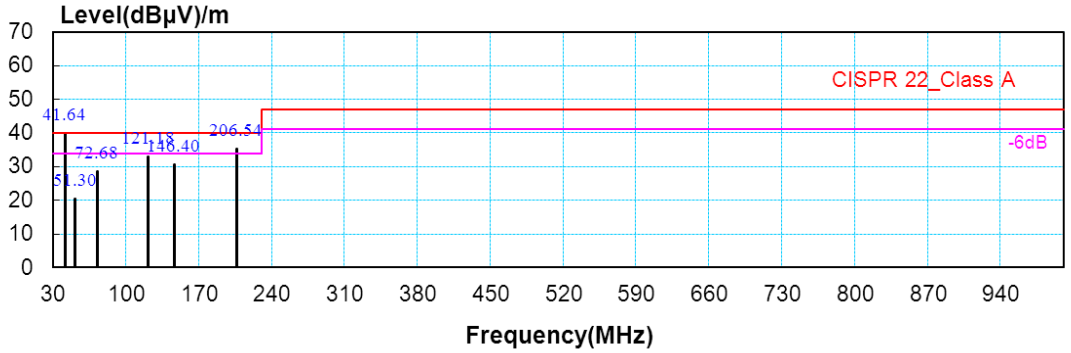
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (◦)	Remark
xx.xx	16.49	9.86	26.35	30.00	-3.65	116.00	101.00	QP

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Q.P. = Quasi-Peak

7.2.6. TEST RESULTS

Below 1GHz

Model No.	THM 10-4815WIA	Test Mode	Mode 3
Environmental Conditions	26°C, 60% RH	Test Date	2013/04/16
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Ted Wu

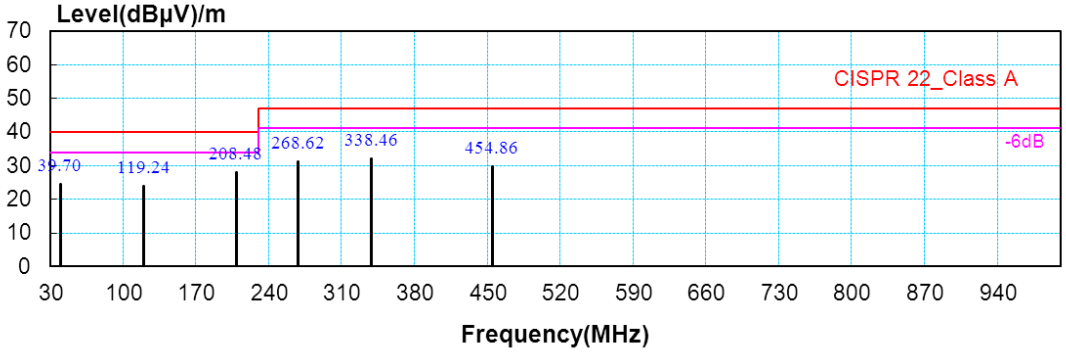


Freq-Uency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Meter Reading at 10 m (dBµV/m)	Limits (Class A) (dBµV/m)	Emission Level at 10 m (dBµV/m)	Margin Value (dB)	Turntable Azimuth (°)	Antenna Height (cm)
41.64	13.20	1.33	25.30	40.00	39.83	-0.17	290	100
51.30	7.68	1.46	11.30	40.00	20.43	-19.57	300	100
72.68	6.56	1.72	20.30	40.00	28.58	-11.42	80	100
121.18	11.99	2.28	18.60	40.00	32.87	-7.13	0	100
146.40	10.93	2.48	17.30	40.00	30.71	-9.29	350	100
206.54	9.32	3.04	22.90	40.00	35.26	-4.74	350	100

Note:

1. *PK= Peak Reading; QP= Quasi-peak Reading.*
2. *The other emission levels were very low against the limit.*

Model No.	THM 10-4815WIA	Test Mode	Mode 3
Environmental Conditions	26°C, 60% RH	Test Date	2013/04/16
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Ted Wu

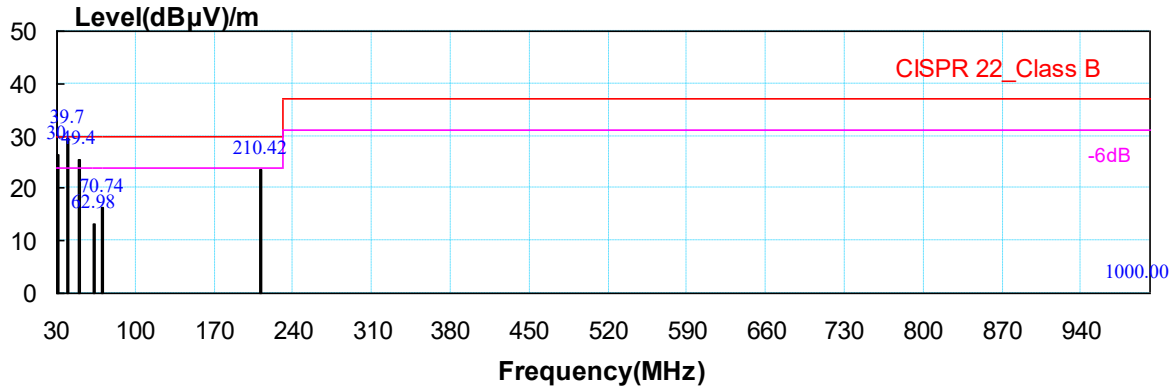


Freq-Uency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Meter Reading at 10 m (dBµV/m)	Limits (Class A) (dBµV/m)	Emission Level at 10 m (dBµV/m)	Margin Value (dB)	Turntable Azimuth (°)	Antenna Height (cm)
39.70	13.98	1.31	9.30	40.00	24.60	-15.40	165	400
119.24	11.98	2.26	9.60	40.00	23.84	-16.16	175	300
208.48	9.32	3.06	15.60	40.00	27.97	-12.03	155	300
268.62	13.52	3.49	14.10	47.00	31.12	-15.88	130	200
338.46	14.17	4.01	13.90	47.00	32.07	-14.93	150	200
454.86	16.80	4.76	8.10	47.00	29.66	-17.34	195	100

Note:

1. *PK= Peak Reading; QP= Quasi-peak Reading.*
2. *The other emission levels were very low against the limit.*

Model No.	THM 10-4815WIA	Test Mode	Mode 4
Environmental Conditions	26°C, 60% RH	Test Date	2013/04/16
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Ted Wu

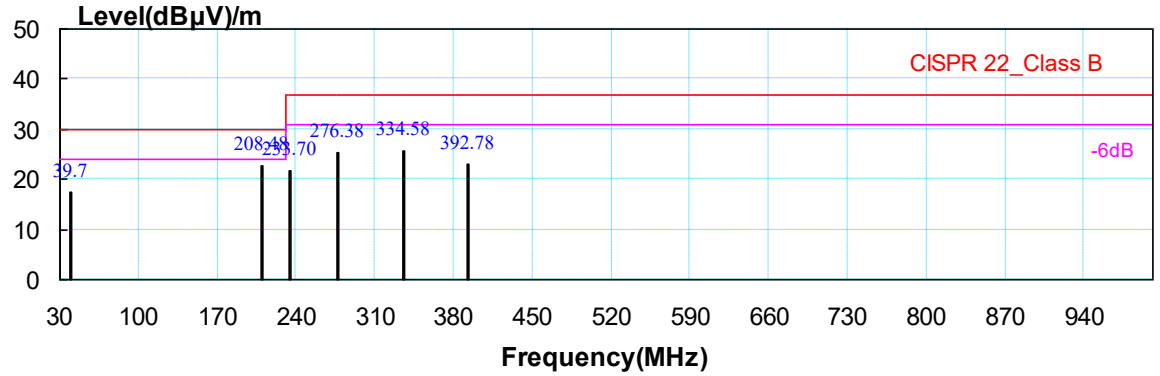


Freq-Uency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Meter Reading at 10 m (dBµV/m)	Limits (Class B) (dBµV/m)	Emission Level at 10 m (dBµV/m)	Margin Value (dB)	Turntable Azimuth (°)	Antenna Height (cm)
30.00	17.81	1.14	7.60	30.00	26.55	-3.45	90	100
39.70	13.98	1.31	14.30	30.00	29.60	-0.40	260	100
49.40	8.38	1.43	15.70	30.00	25.51	-4.49	360	100
62.98	6.17	1.61	5.30	30.00	13.08	-16.92	220	100
70.74	6.39	1.68	8.30	30.00	16.37	-13.63	340	100
210.42	9.32	3.07	11.10	30.00	23.49	-6.51	340	100

Note:

1. *PK= Peak Reading; QP= Quasi-peak Reading.*
2. *The other emission levels were very low against the limit.*

Model No.	THM 10-4815WIA	Test Mode	Mode 4
Environmental Conditions	26°C, 60% RH	Test Date	2013/04/16
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Ted Wu



Freq-Uency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Meter Reading at 10 m (dBµV/m)	Limits (Class B) (dBµV/m)	Emission Level at 10 m (dBµV/m)	Margin Value (dB)	Turntable Azimuth (°)	Antenna Height (cm)
39.70	13.98	1.31	2.30	30.00	17.60	-12.40	170	400
208.48	9.32	3.06	10.30	30.00	22.67	-7.33	200	300
233.70	10.73	3.22	7.60	37.00	21.55	-15.45	160	300
276.38	13.13	3.54	8.60	37.00	25.27	-11.73	120	200
334.58	14.08	3.98	7.50	37.00	25.56	-11.44	130	200
392.78	15.50	4.39	3.11	37.00	23.00	-14.00	210	100

Note:

1. *PK= Peak Reading; QP= Quasi-peak Reading.*
2. *The other emission levels were very low against the limit.*

Above 1GHz

Model No.	N/A	**Test Mode**	N/A
Environmental Conditions	N/A	**6dB Bandwidth**	N/A
Antenna Pole	N/A	**Antenna Distance**	N/A
Highest frequency generated or used	60kHz	**Upper frequency**	1000MHz
Detector Function	N/A	**Tested by**	N/A

Note: *No applicable, when the highest frequency of the internal sources of the EUT is less than 108MHz, the measurement shall only be made up to 1 GHz.*

7.3. HARMONICS CURRENT MEASUREMENT

7.3.1. LIMITS OF HARMONICS CURRENT MEASUREMENT

Limits for Class A equipment	
Harmonics Order n	Max. permissible harmonics current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15<=n<=39	0.15x15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8<=n<=40	0.23x8/n

Limits for Class D equipment		
Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd Harmonics only		
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13	0.30	0.21
15<=n<=39	3.85/n	0.15x15/n

Note:

1. *Class A and Class D are classified according to item 7.4.3.*
2. *According to section 7 of IEC 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.*

7.3.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
N/A				

7.3.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-029)

- 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.
- The classification of EUT is according to section 5 of EN 61000-3-2.
- The EUT is classified as follows:

Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

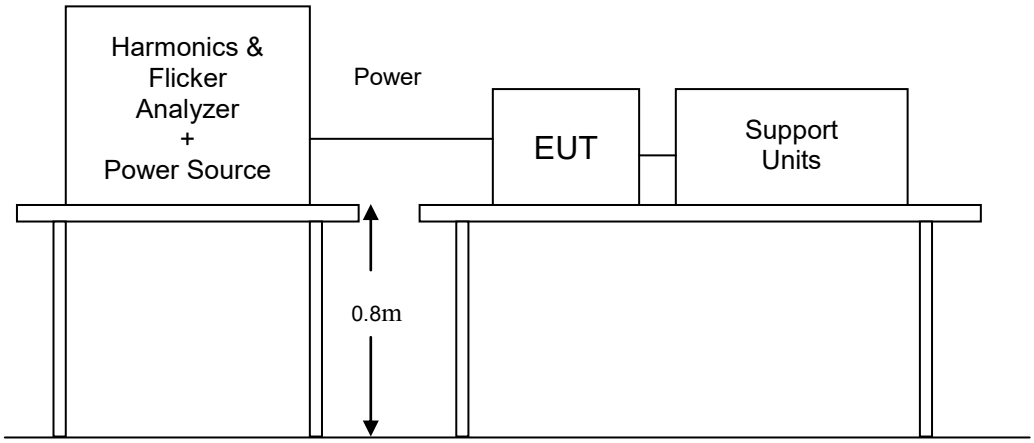
Class B: Portable tools; Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.

- The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

7.3.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.3.5. TEST RESULTS

Not applicable, because EUT not connect to AC Main Source direct.

7.4. VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

7.4.1. LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

TEST ITEM	LIMIT	REMARK
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
T_{dt} (ms)	500	T_{dt} means maximum time that dt exceeds 3.3 %.
d_{max} (%)	4%	d_{max} means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

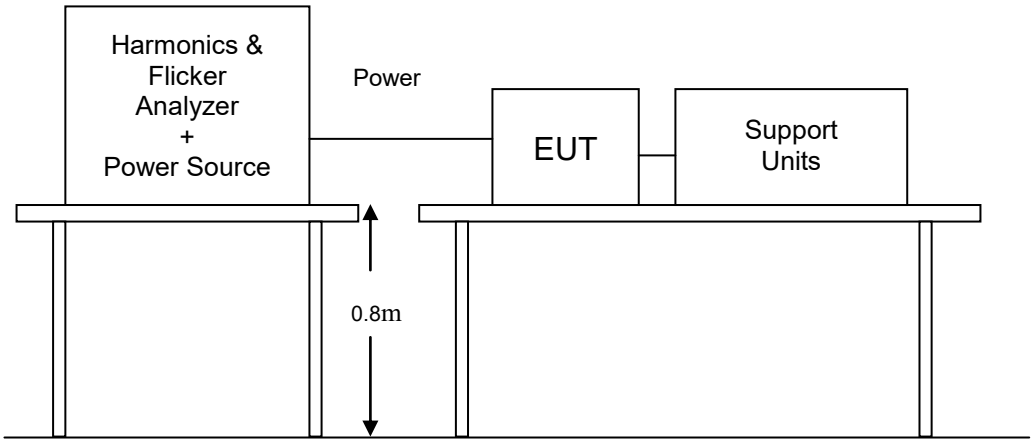
7.4.2. TEST INSTRUMENTS

IMMUNITY SHIELDED ROOM				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
N/A				

7.4.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-030)

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

7.4.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.4.5. TEST RESULTS

Not applicable, because EUT not connect to AC Main Source direct.

8 IMMUNITY TEST

8.1. GENERAL DESCRIPTION

Product Standard	Immunity	
	Test Type	Minimum Requirement
Basic Standard, Specification, and Performance Criterion required	IEC 61000-4-2	Electrostatic Discharge – ESD: 15kV air discharge, 8kV Contact discharge Criterion required please see 8.2
	IEC 61000-4-3	3 V/m at 80 - 2,700MHz, (10V/m Home Healthcare) AM Modulation. And 9-28V/m at 385-6000MHz, Pulse Mode and other Modulation Criterion required please see 8.2
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, AC Power Port: 2kV Signal cable greater than 3 meters: 1kV Criterion required please see 8.2 Interconnect Lines at 100kHz rate
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, AC Power Port ~ line to line: 1kV, line to earth (ground): 2kV Criterion required please see 8.2
	IEC 61000-4-6	3V at 0.15 – 80MHz & 6V at ISM Home Healthcare: Freq 3V at 0.15 – 80MHz, and 6V at ISM & Radio Amateur Freq Criterion required please see 8.2
	IEC 61000-4-8	Power frequency magnetic field immunity test 50 Hz/60Hz, 30A/m Criterion required please see 8.2
	IEC 61000-4-11	Voltage Dips: 0% Ut for 0.5 Cycle 0% Ut for 1 cycle; 70% Ut for 25 cycles Voltage Interruptions: 0% for 5 sec. Criterion required please see 8.2

8.2. GENERAL PERFORMANCE CRITERIA DESCRIPTION

Compliance Criteria:

Under the test conditions specified in 6.2.1.10 of EN 60601-1-2, the ME EQUIPMENT or ME SYSTEM shall be able to provide the BASIC SAFETY and ESSENTIAL PERFORMANCE. The following DEGRADATIONS, if associated with BASIC SAFETY and ESSENTIAL PERFORMANCE, shall not be allowed:

- Component failures
- Changes in programmable parameters
- Reset to factory defaults (manufacturer's presets)
- Chang of operating mode
- False alarms
- Cessation or interruption of any intended operation, even if accompanied by an alarm
- Initiation of any unintended operation, including unintended or uncontrolled motion, even if accompanied by an alarm
- Error of a displayed numerical value sufficiently large to affect diagnosis or treatment
- Noise on a waveform in which the noise would interfere with diagnosis, treatment or monitoring;
- Artefact or distortion in an image in which the artefact would interfere with diagnosis, treatment or monitoring
- Failure of automatic diagnosis or treatment ME EQUIPMENT and ME SYSTEMS to diagnose or treat, even if accompanied by an alarm.

For ME EQUIPMENT and ME SYSTEMS with multiple FUNCTIONS, the criteria apply to each FUNCTION, parameter and channel.

The ME EQUIPMENT or ME SYSTEMS may exhibit DEGRADATION of performance (e.g. deviation from MANUFACTURER'S specifications) that does not affect BASIC SAFETY and ESSENTIAL PERFORMANCE.

8.3. ELECTROSTATIC DISCHARGE (ESD)

8.3.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: 2 ; 4 ; 8 ; 15 kV (Direct) Contact Discharge: 2 ; 4 ; 8kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point
Discharge Mode:	Single Discharge 1 second minimum

8.3.2. TEST INSTRUMENT

IMMUNITY SHIELDED ROOM				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
ESD gun	SCHAFFNER	NSG 438	170	10/14/2017

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*

8.3.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-022)

The discharges shall be applied in two ways:

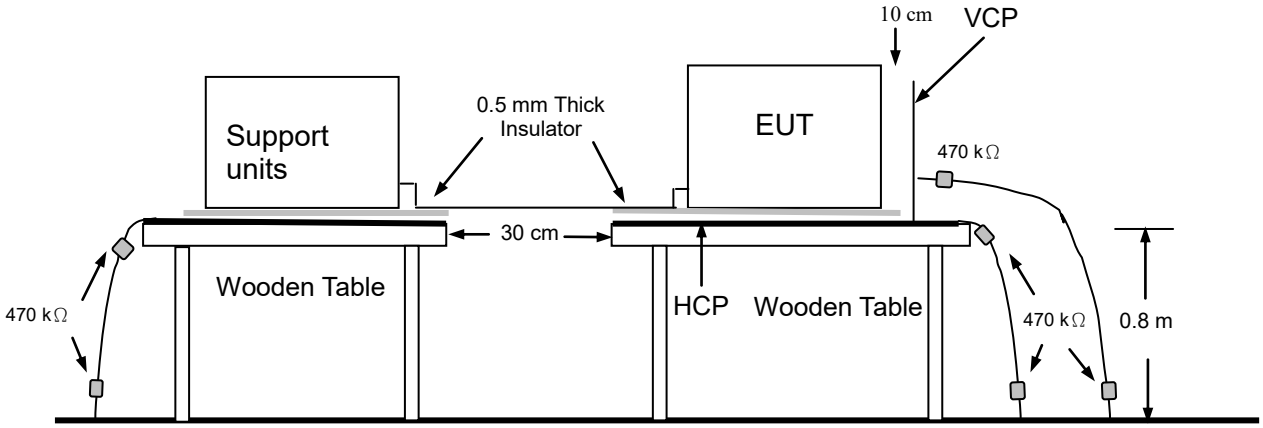
a) Contact discharges to the conductive surfaces and coupling planes:
   The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the **H**orizontal **C**oupling **P**lane (**HCP**). The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

b) Air discharges at slots and apertures and insulating surfaces:
   On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

The basic test procedure was in accordance with IEC 61000-4-2:

a) The EUT was located 0.1 m minimum from all side of the **HCP** (dimensions 1.6m x 0.8m).
b) The support units were located another table 30 cm away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10 cm with EUT.
c) The time interval between two successive single discharges was at least 1 second.
d) Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
e) Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
f) At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each **HCP** opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the **HCP** and perpendicular to its front edge during the discharge.
g) At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **V**ertical **C**oupling **P**lane (**VCP**) in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

8.3.4. TEST SETUP



Ground Reference Plane

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

Note:

TABLETOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **G**round **R**eference **P**lane. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **H**orizontal **C**oupling **P**lane (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

8.3.5. TEST RESULTS

Temperature	25°C	**Humidity**	50% RH
Pressure	1001mbar	**Tested by**	Ming Fan
Test Date	2016/11/11		
Required Passing Performance	The ME Equipment or ME System shall be able to provide the basic safety and essential performance.		

Air Discharge											
Test Points	Test Levels								Results		
	± 2 kV	Performance Criterion		± 4 kV	Performance Criterion		± 8 kV	Performance Criterion		Pass	Fail	Observation
Front	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Back	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Left	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Right	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Top	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Bottom	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Contacts	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2

Air Discharge						
Test Points	Test Levels			Results		
	± 15 kV	Performance Criterion		Pass	Fail	Observation
Front	☒	☐A	☐B	☒	☐	Note 3
Back	☒	☐A	☐B	☒	☐	Note 3
Left	☒	☐A	☐B	☒	☐	Note 3
Right	☒	☐A	☐B	☒	☐	Note 3
Top	☒	☐A	☐B	☒	☐	Note 3
Bottom	☒	☐A	☐B	☒	☐	Note 3

Contact Discharge											
Test Points	Test Levels								Results		
	± 2 kV	Performance Criterion		± 4 kV	Performance Criterion		± 6 kV	Performance Criterion		Pass	Fail	Observation
Front	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Back	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Left	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Right	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Top	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2
Bottom	☒	☐A	☐B	☒	☐A	☐B	☒	☐A	☐B	☒	☐	Note 2

Contact Discharge						
Test Points	Test Levels			Results		
	± 8 kV	Performance Criterion		Pass	Fail	Observation
Front	☒	☐A	☐B	☒	☐	Note 2
Back	☒	☐A	☐B	☒	☐	Note 2
Left	☒	☐A	☐B	☒	☐	Note 2
Right	☒	☐A	☐B	☒	☐	Note 2
Top	☒	☐A	☐B	☒	☐	Note 2
Bottom	☒	☐A	☐B	☒	☐	Note 2

Contact Discharge To Horizontal Coupling Plane									
Side of EUT	Test Levels				Results				
	± 2 kV	± 4 kV	± 6 kV	± 8 kV	Pass	Fail	Performance Criterion		Observation
Front	☒	☒	☒	☒	☒	☐	☒A	☐B	Note 1
Back	☒	☒	☒	☒	☒	☐	☒A	☐B	Note 1
Left	☒	☒	☒	☒	☒	☐	☒A	☐B	Note 1
Right	☒	☒	☒	☒	☒	☐	☒A	☐B	Note 1

Contact Discharge To Vertical Coupling Plane									
Side of EUT	Test Levels				Results				
	± 2 kV	± 4 kV	± 6 kV	± 8 kV	Pass	Fail	Performance Criterion		Observation
Front	☒	☒	☒	☒	☒	☐	☒A	☐B	Note 1
Back	☒	☒	☒	☒	☒	☐	☒A	☐B	Note 1
Left	☒	☒	☒	☒	☒	☐	☒A	☐B	Note 1
Right	☒	☒	☒	☒	☒	☐	☒A	☐B	Note 1

Note:

1. *There was no change compared with initial operation during the test.*
2. *Means that no discharge point had been occurred during that particular coupling method.*
3. *During the test at air 15kV, no discharge point.*

8.4. RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD (RS)

8.4.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-3
Frequency Range:	80 MHz ~2700 MHz, 385 MHz ~ 6GHz
Field Strength:	3 V/m, 9~28 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m

8.4.2. TEST INSTRUMENT

RS Chamber				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
AVG Power Sensor	R&S	NRP-Z21	101860	09/21/2017
AVG Power Sensor	R&S	NRP-Z21	101861	09/21/2017
Rs Probe	narda	NBM-520/EF-1891	D-0924/E-0005	11/19/2016
Signal Generator	R&S	SMJ100A	101258	09/18/2017
Bilog Antenna	AR	ATL80M1G	044851	N.C.R
Dual Directional Coupler	AR	DC6180A	433803	N.C.R
Dual Directional Coupler	RD Microswaves	C1-A47NFNF	31	N.C.R
Horn Antenna	SCHWARZBECK	STLP 9149	9149-261	N.C.R
Power Amplifier	AR	50S1G6M1	0433952	N.C.R
Power Amplifier	AR	250W1000BM1	0579919	N.C.R
RF Test System Controller	AR	SC1000M3	0433953	N.C.R
Test S/W	SW1006 (V1.13)			

Note:

1. *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. *N.C.R.= No Calibration required.*

8.4.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-023)

The test procedure was in accordance with IEC 61000-4-3

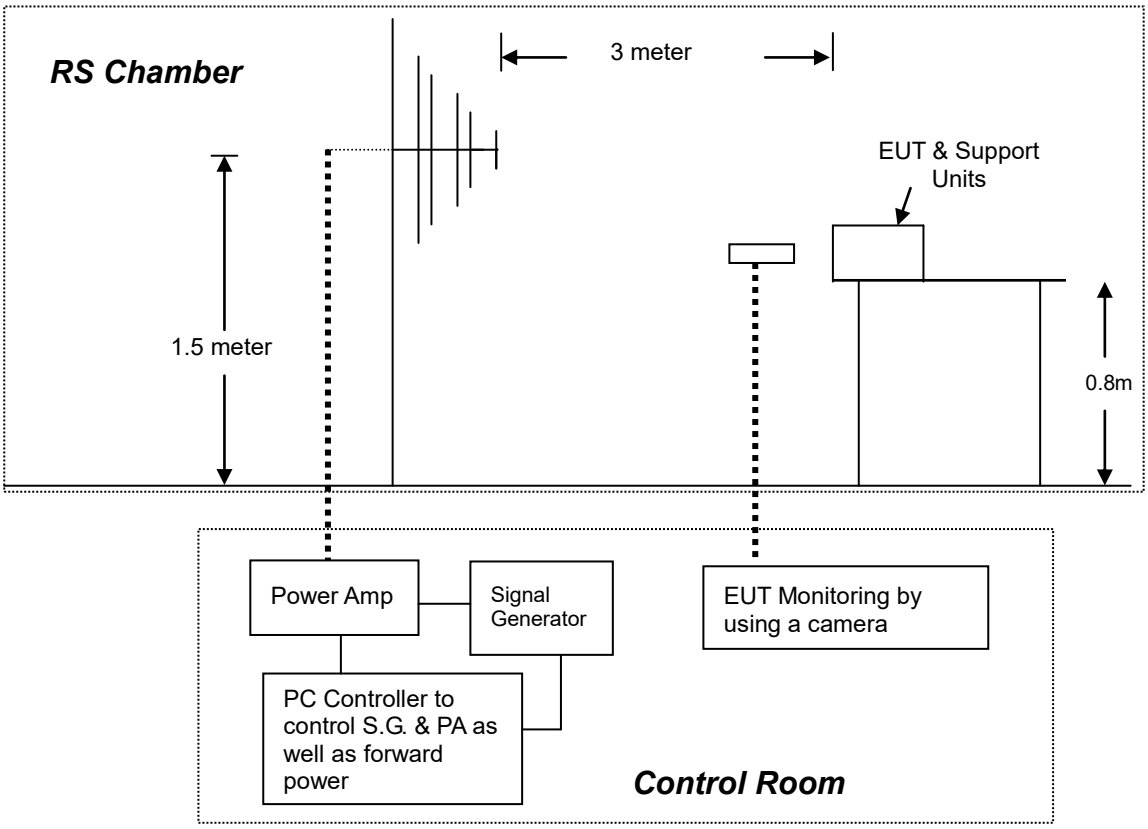
a) The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.

b) The frequency range is swept from 80 MHz to 2700 MHz, with the signal 80% amplitude modulated with a 1kHz sine-wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s, where the frequency range is swept incrementally, the step size was 1% of preceding frequency value.

c) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

e) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

8.4.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

Note:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

8.4.5. TEST RESULTS

Temperature	25°C	**Humidity**	52% RH
Pressure	1001mbar	**Dwell Time**	3 sec.
Tested by	Ming Fan	**Test Date**	2016/11/11
Required Passing Performance	The ME Equipment or ME System shall be able to provide the basic safety and essential performance.		

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Observation	Result
80 ~ 2500	V&H	0	10	Note 1	PASS
80 ~ 2500	V&H	90	10	Note 1	PASS
80 ~ 2500	V&H	180	10	Note 1	PASS
80 ~ 2500	V&H	270	10	Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Temperature	25°C	**Humidity**	52% RH
Pressure	1001mbar	**Dwell Time**	60 sec.
Tested by	Ming Fan	**Test Date**	2016/11/11
Required Passing Performance	The ME Equipment or ME System shall be able to provide the basic safety and essential performance.		

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
385	V&H	0	27	Pulse Modulation 18HZ	Note 1	PASS
385	V&H	90	27		Note 1	PASS
385	V&H	180	27		Note 1	PASS
385	V&H	270	27		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
450	V&H	0	28	FM ±5 kHz deviation 1 kHz sine	Note 1	PASS
450	V&H	90	28		Note 1	PASS
450	V&H	180	28		Note 1	PASS
450	V&H	270	28		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
710	V&H	0	9	Pulse Modulation 217Hz	Note 1	PASS
710	V&H	90	9		Note 1	PASS
710	V&H	180	9		Note 1	PASS
710	V&H	270	9		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
745	V&H	0	9	Pulse Modulation 217Hz	Note 1	PASS
745	V&H	90	9		Note 1	PASS
745	V&H	180	9		Note 1	PASS
745	V&H	270	9		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
780	V&H	0	9	Pulse Modulation 217Hz	Note 1	PASS
780	V&H	90	9		Note 1	PASS
780	V&H	180	9		Note 1	PASS
780	V&H	270	9		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
810	V&H	0	28	Pulse Modulation 18HZ	Note 1	PASS
810	V&H	90	28		Note 1	PASS
810	V&H	180	28		Note 1	PASS
810	V&H	270	28		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
870	V&H	0	28	Pulse Modulation 18HZ	Note 1	PASS
870	V&H	90	28		Note 1	PASS
870	V&H	180	28		Note 1	PASS
870	V&H	270	28		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
930	V&H	0	28	Pulse Modulation 18HZ	Note 1	PASS
930	V&H	90	28		Note 1	PASS
930	V&H	180	28		Note 1	PASS
930	V&H	270	28		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
1720	V&H	0	28	Pulse Modulation 217Hz	Note 1	PASS
1720	V&H	90	28		Note 1	PASS
1720	V&H	180	28		Note 1	PASS
1720	V&H	270	28		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
1845	V&H	0	28	Pulse Modulation 217Hz	Note 1	PASS
1845	V&H	90	28		Note 1	PASS
1845	V&H	180	28		Note 1	PASS
1845	V&H	270	28		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
1970	V&H	0	28	Pulse Modulation 217Hz	Note 1	PASS
1970	V&H	90	28		Note 1	PASS
1970	V&H	180	28		Note 1	PASS
1970	V&H	270	28		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
2450	V&H	0	28	Pulse Modulation 217Hz	Note 1	PASS
2450	V&H	90	28		Note 1	PASS
2450	V&H	180	28		Note 1	PASS
2450	V&H	270	28		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
5240	V&H	0	9	Pulse Modulation 217Hz	Note 1	PASS
5240	V&H	90	9		Note 1	PASS
5240	V&H	180	9		Note 1	PASS
5240	V&H	270	9		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
5500	V&H	0	9	Pulse Modulation 217Hz	Note 1	PASS
5500	V&H	90	9		Note 1	PASS
5500	V&H	180	9		Note 1	PASS
5500	V&H	270	9		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Modulation	Observation	Result
5785	V&H	0	9	Pulse Modulation 217Hz	Note 1	PASS
5785	V&H	90	9		Note 1	PASS
5785	V&H	180	9		Note 1	PASS
5785	V&H	270	9		Note 1	PASS

Note: *There was no change compared with the initial operation during the test.*

8.5. ELECTRICAL FAST TRANSIENT (EFT)

8.5.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-4
Test Voltage:	Power Line: 2 kV Signal/Control Line: 1 kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave-shape:	5/50 ns
Burst Duration:	15 ms
Burst Period:	300ms
Test Duration:	Not less than 1 min.

8.5.2. TEST INSTRUMENT

Immunity Shield Room				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMC Immunity Tester	EMC Partner	TRA2000IN6	1144	01/03/2014
CDN	EMC Partner	CDCN-UTP8	046	01/09/2014
Clamp	EMC Partner	CN-EFT1000	683	N.C.R.
Test S/W	Genecs (3.03)			

Note:

1. *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. *N.C.R.= No Calibration required*

8.5.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-024)

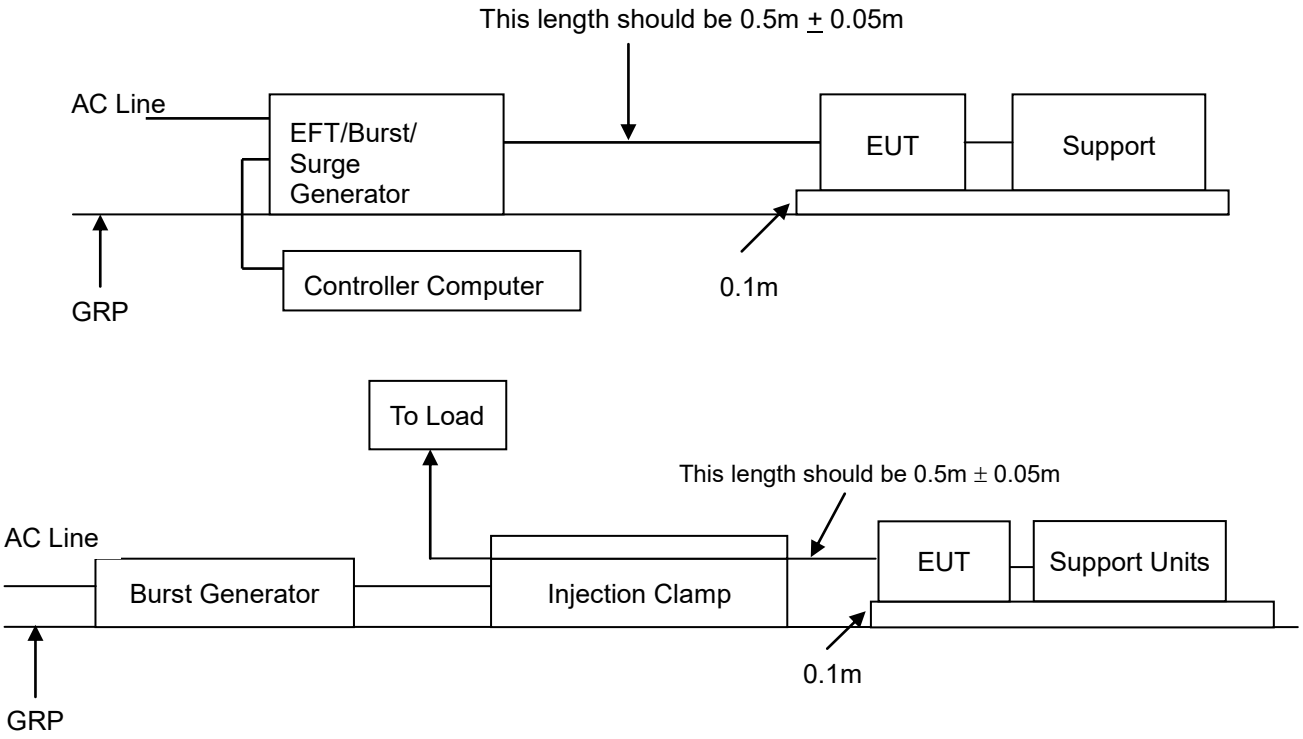
a) Both positive and negative polarity discharges were applied.

b) The length of the "hot wire" from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 0.5 meter.

c) The duration time of each test sequential was 1 minute.

d) The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

8.5.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

Note:

TABLETOP EQUIPMENT

The configuration consisted of a wooden table (0.1m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

8.5.5. TEST RESULTS

Temperature	25°C	**Humidity**	45% RH
Pressure	998mbar	**Tested by**	Michael Chen
Required Passing Performance	The ME Equipment or ME System shall be able to provide the basic safety and essential performance.		

Test Point	Polarity	Test Level (kV)	Inject Method	Observation	Result
L	+/-	2	Direct	Note 1	PASS
N	+/-	2	Direct	Note 1	PASS
L + N	+/-	2	Direct	Note 1	PASS

Note: *There was no change compared with initial operation during the test.*

8.6. SURGE IMMUNITY TEST

8.6.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-5
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8/20 us Short Circuit Current
Test Voltage:	AC Power Port ~ line to line: 1kV, line to earth (ground): 2kV
Surge Input/Output:	AC Power Port: L1-L2 / L1-PE / L2-PE
Generator Source Impedance:	2 ohm between networks 12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0° / 90° / 180° / 270°
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

8.6.2. TEST INSTRUMENT

Immunity Shield Room				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMC Immunity Tester	EMC Partner	TRA2000IN6	1144	01/03/2014
CDN	EMC Partner	CDCN-UTP8	046	01/09/2014
Clamp	EMC Partner	CN-EFT1000	683	N.C.R.
Test S/W	Genecs (3.03)			

Note:

1. *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. *N.C.R.= No Calibration required*

8.6.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-025)

a) For EUT power supply:

The surge is applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

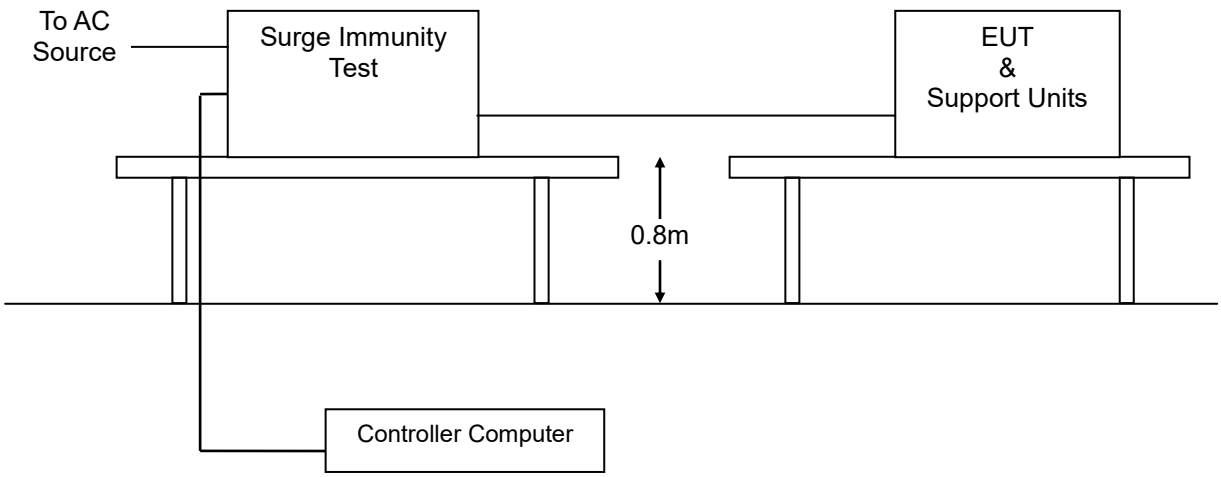
b) For test applied to unshielded un-symmetrically operated interconnection lines of EUT:

The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

c) For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor were not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

8.6.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

8.6.5. TEST RESULTS

Temperature	22°C	**Humidity**	50% RH
Pressure	999mbar	**Tested by**	Moore Cheng
Required Passing Performance	The ME Equipment or ME System shall be able to provide the basic safety and essential performance.		

Test Point	Polarity	Test Level (kV)	Coupling Method	Observation	Result
L – N	+/-	1	Capacitive	Note 1	PASS
L - N	+/-	2	Capacitive	Note 1	PASS

Note:

1. *There was no change compared with initial operation during the test.*

8.7. CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

8.7.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-6
Frequency Range:	0.15 MHz ~ 80 MHz
Field Strength:	3 Vrms 6 Vrms
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Coupled cable:	Power Mains, Unshielded; RJ45 Line, Unshielded
Coupling device:	☒ CDN-M2 (2 wires) ☐ CDN-M3 (3 wires) ☐ CDN-T2 for Line ☐ CDN-T4 for LAN

8.7.2. TEST INSTRUMENT

CS Room				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
CDN	FCC	FCC-801-M2-16A	121695	09/28/2017
CDN	FCC	FCC-801-M3-16A	03027	09/28/2017
CDN	EM TEST	CDN M2/M3	P1325119693	09/28/2017
CDN	EM TEST	CDN T2-3A	P1336124265	09/28/2017
CDN	EM TEST	CDN T4-3A	P1339124699	09/28/2017
CDN	EM TEST	CDN T8 RJ45	P1320118639	09/28/2017
EM Injection Clamp	FCC	F-203I-23mm	421	09/28/2017
S.G.	R&S	SMY02	100094	09/20/2017
CDN	FCC	FCC-801-T8-RJ45	4024	N.C.R
CDN	FCC	FCC-801-T4	3017	N.C.R
CDN	FCC	FCC-801-T2	3016	N.C.R
Clamp	FCC	F-2031-23mm	421	N.C.R
Power Amplifier	AR	150A100B	41657	N.C.R
Test S/W	SW1006 (V1.22)			

Note:

1. *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. *N.C.R.= No Calibration required*

8.7.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-026)

The EUT shall be tested within its intended operating and climatic conditions.

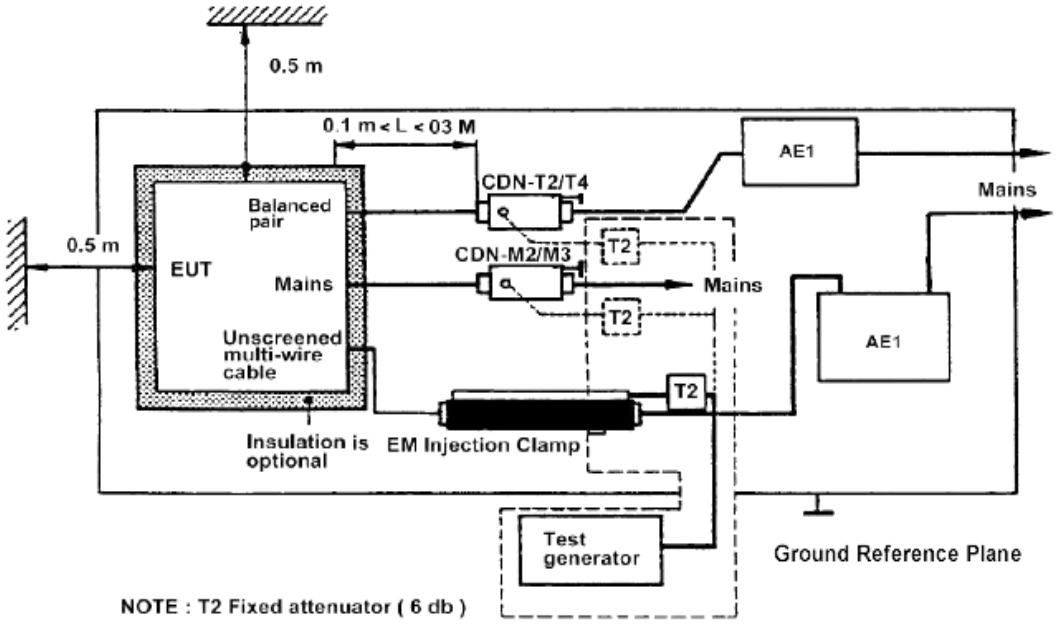
The test shell performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.

The frequency range was swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal was modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate was 1.5×10^{-3} decades/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value from 150 kHz to 80 MHz.

The dwell time at each frequency was less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, was analyzed separately.

Attempts were made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

8.7.4. TEST SETUP



Note:

1. *The EUT is setup 0.1m above Ground Reference Plane*
2. *The CDNs and / or EM clamp used for real test depends on ports and cables configuration of EUT.*

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

Note:

TABLETOP AND FLOOR-STANDING EQUIPMENT

The equipment to be tested was placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

8.7.5. TEST RESULTS

Temperature	25°C	**Humidity**	52% RH
Pressure	1001mbar	**Tested by**	Ming Fan
Test Date	2016/11/11		
Required Passing Performance	The ME Equipment or ME System shall be able to provide the basic safety and essential performance.		

Frequency Band (MHz)	Field Strength (Vrms)	Cable	Injection Method	Observation	Result
0.15 ~ 80	3V & 6V	DC Power Line	CDN-M2	Note 1	PASS

Note: *There was no change compared with initial operation during the test.*

8.8. POWER FREQUENCY MAGNETIC FIELD

8.8.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-8
Frequency Range:	50Hz, 60Hz
Field Strength:	30 A/m
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

8.8.2. TEST INSTRUMENT

Immunity Shield Room				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Triax Elf Magnetic Field Meter	F.W.BELL	4190	0845014	07/10/2017
Magnetic field Tester	HAEFFLY	MAG 100.1	081436-02	N.C.R.
Software	N/A			

Note:

1. *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.*
2. *N.C.R.= No Calibration required.*

8.8.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-027)

a) The equipment is configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1m-thick insulating support.

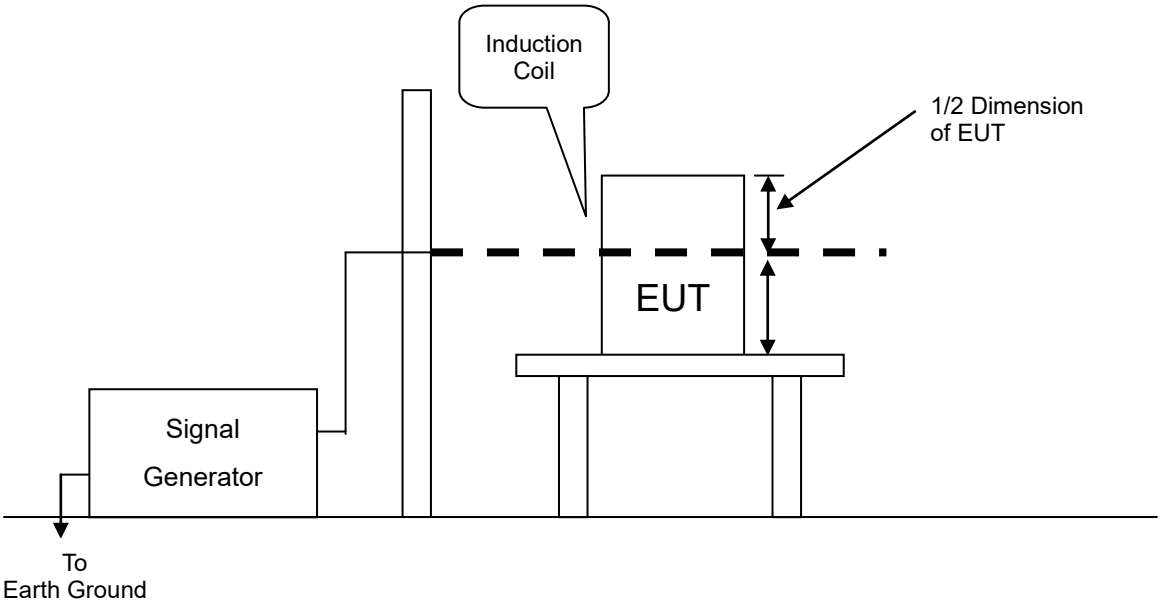
b) The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.

c) The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.

d) The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

8.8.4. TEST SETUP

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



Note:
TABLETOP EQUIPMENT
The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT
The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

8.8.5. TEST RESULTS

Temperature	25°C	**Humidity**	52% RH
Pressure	1001mbar	**Tested by**	Ming Fan
Test Date	2016/11/11		
Required Passing Performance	The ME Equipment or ME System shall be able to provide the basic safety and essential performance.		

Direction	Field Strength (A/m)	Observation	Results
X	30	Note 1	Pass
Y	30	Note 1	Pass
Z	30	Note 1	Pass

Note: *There was no change compared with the initial operation during the test.*

8.9. VOLTAGE DIP & VOLTAGE INTERRUPTIONS

8.9.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-11
Test duration time:	Minimum three test events in sequence
Interval between event:	Voltage Dips: 0% Ut for 0.5 Cycle 0% Ut for 1 cycle 70% Ut for 25 cycles Voltage Interruptions: 0% for 5 sec.
Angle:	0~360 degree
Step:	45 degree

8.9.2. TEST INSTRUMENT

Immunity Shield Room				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
N/A				

8.9.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-028)

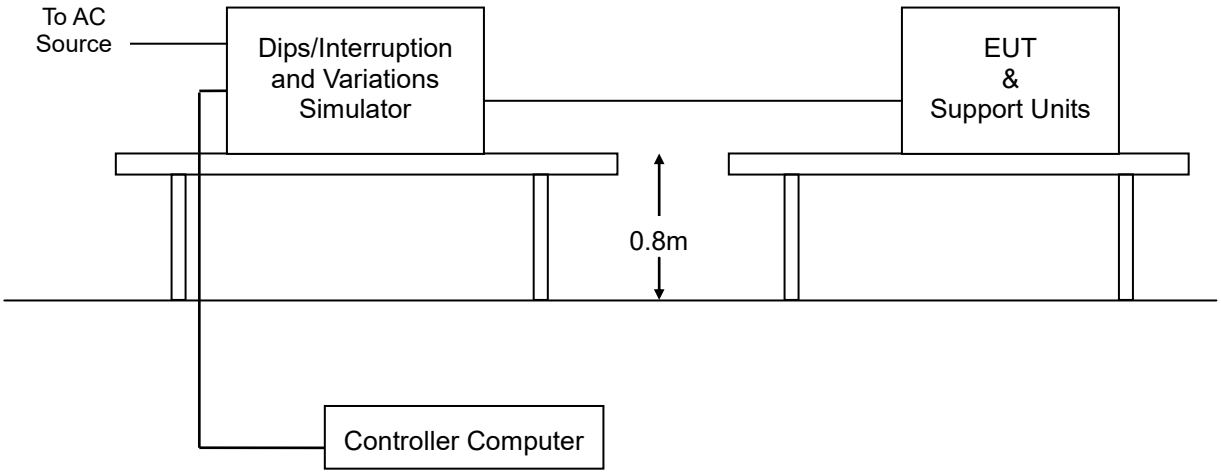
a) The EUT and support units were located on a wooden table, 0.8 m away from ground floor.

b) Setting the parameter of tests and then perform the test software of test simulator.

c) Conditions changes to occur at 0 degree crossover point of the voltage waveform.

d) Recording the test result in test record form.

8.9.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

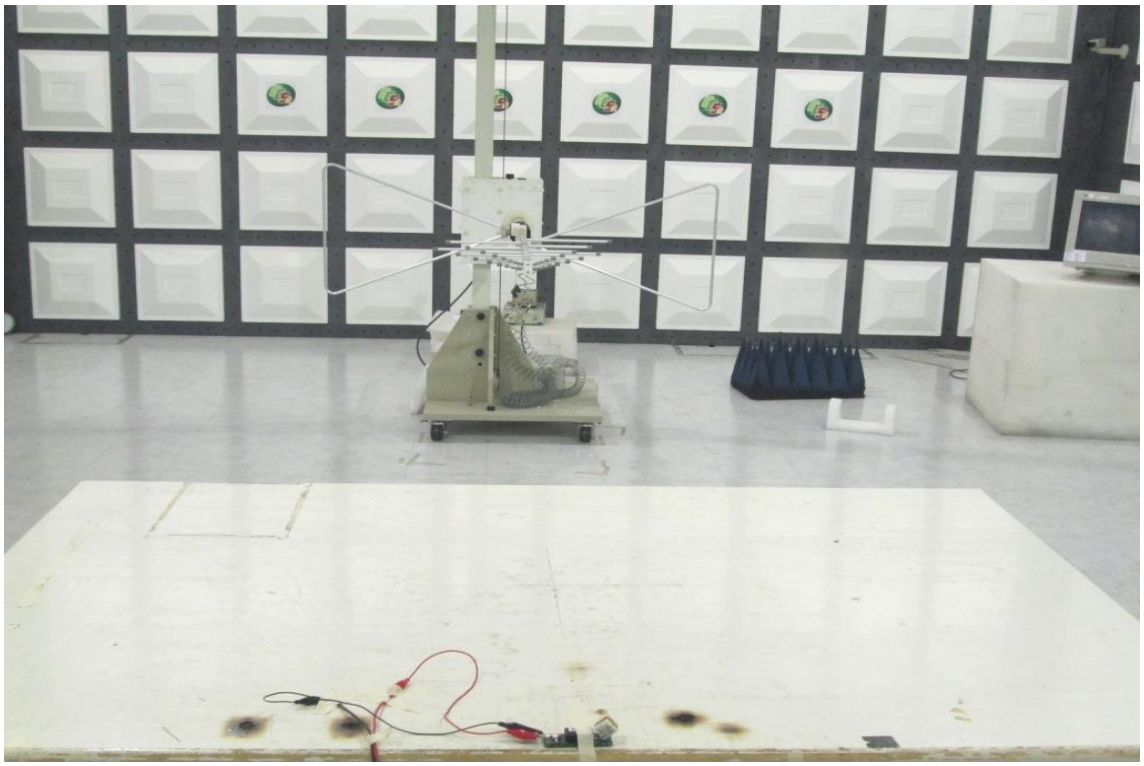
8.9.5. TEST RESULTS

Not applicable, because EUT not connect to AC Main Source direct.

9 PHOTOGRAPHS OF THE TEST CONFIGURATION

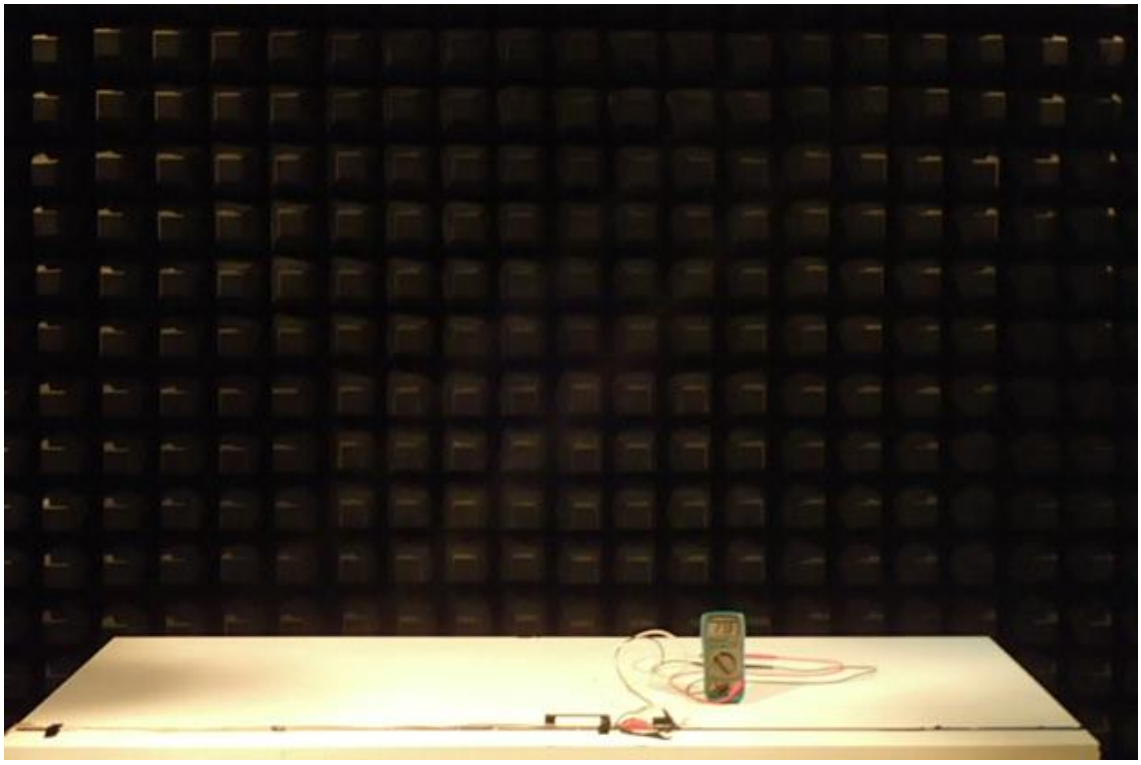
RADIATED EMISSION TEST

Below 1GHz

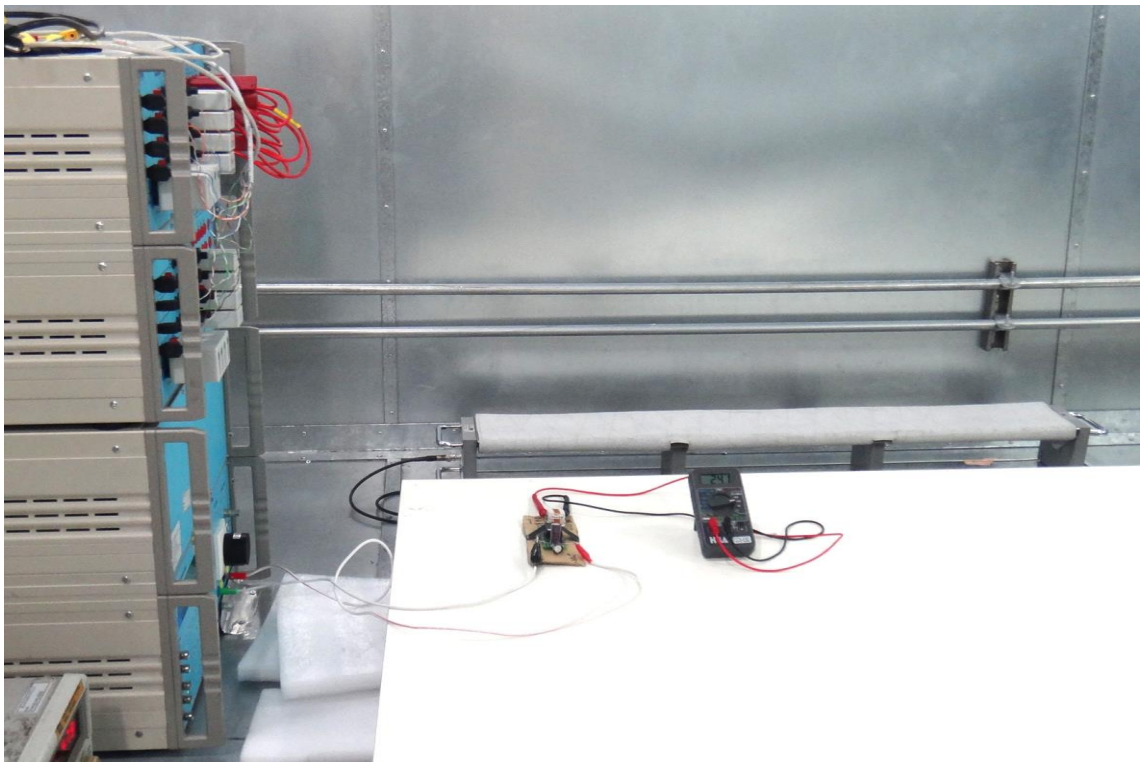


ESD TEST

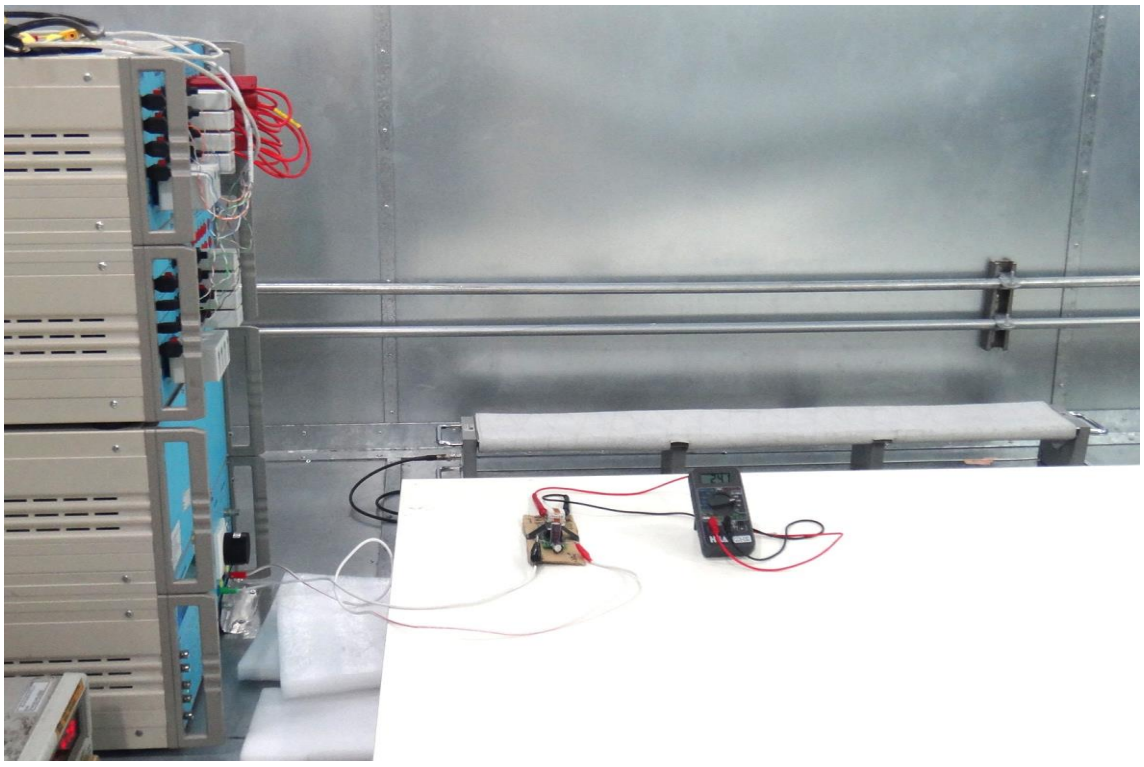
RS TEST



EFT TEST



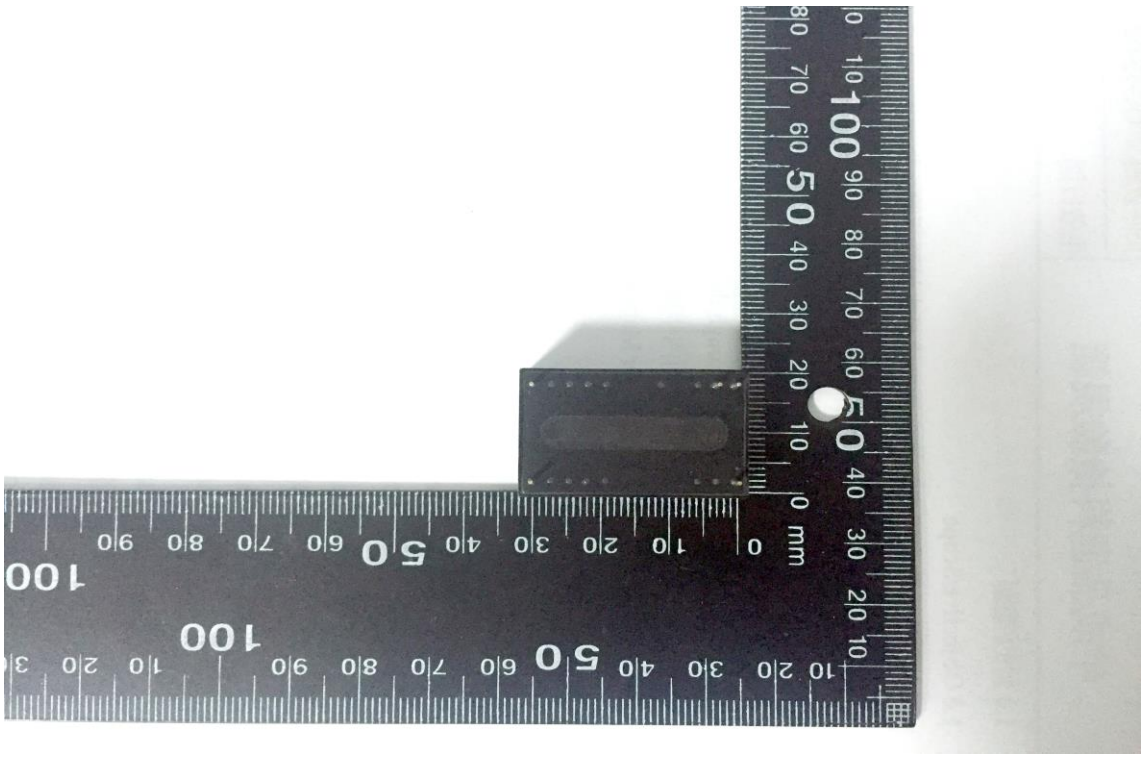
SURGE TEST

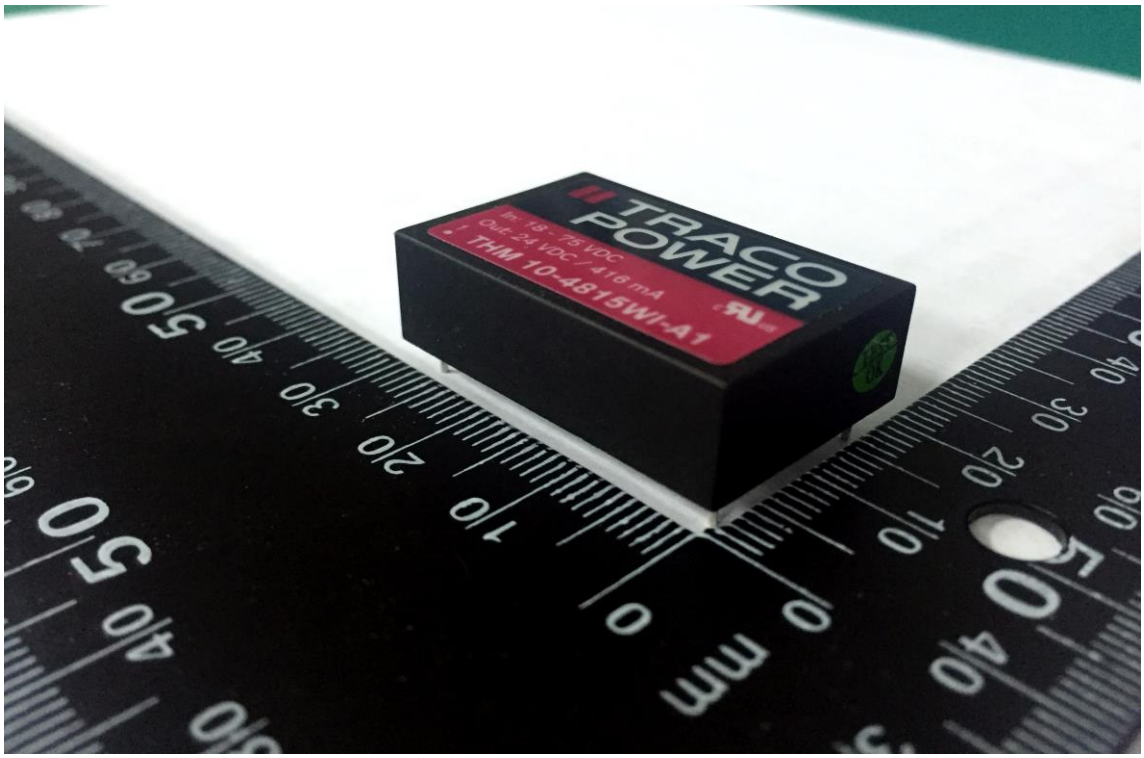


CS TEST

POWER FREQUENCY MAGENTIC FIELD

APPENDIX 1 - PHOTOGRAPHS OF EUT




TRACO POWER
THM 10-4815WI-A1