CE EMC Test Report

Report No.: GT1605200538

Test Model: GT-46200-2005-T2, GT-46200-2006-T2

Received Date: Jan. 21, 2015

Test Date: Jan. 22 ~ 27, 2015 & Jan. 23 ~ 24, 2017

Issued Date: Jan. 26, 2017

Applicant: GLOBTEK, INC.

Address: 186 Veterans Drive Northvale, NJ 07647 USA, Phone 1.201.784.1000, Fax 1.201.784.0111

Issued By: GLOBTEK, INC.

Lab Address: 186 Veterans Drive Northvale, NJ 07647 USA, Phone 1.201.784.1000, Fax 1.201.784.0111

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Release Control Record

Issue No.	Description	Date Issued
GT1605200538	Original release.	Jan. 26, 2017

1 Certificate of Conformity

Product:	Switching-Mode Power Supply	
Brand:	GLOBTEK	
Test Model:	GT-46200-2005-T2, GT-46200-2006-T2	
Sample Status:	Engineering sample	
Applicant:	GLOBTEK, INC.	
Test Date:	Jan. 22 ~ 27, 2015 & Jan. 23 ~ 24, 2017	
Standards:	**EN 61204-3:2000, Class B**	**EN 55032:2012 +AC:2013, Class B**
	Emission:	**CISPR 32:2012+Cor 2, Class B**
	CISPR 22:2008, Class B	**AS/NZS CISPR 32:2013, Class B**
	IEC 61000-3-2:2014 ED. 4.0	**EN 61000-3-2:2014**
	IEC 61000-3-3:2013 ED. 3.0	**EN 61000-3-3:2013**
		EN 55024:2010
	Immunity:	IEC 61000-4-2:2008 ED. 2.0
	IEC 61000-4-2:2008 ED. 2.0	IEC 61000-4-3:2010 ED. 3.2
	IEC 61000-4-3:2010 ED. 3.2	IEC 61000-4-4:2012 ED. 3.0
	IEC 61000-4-4:2012 ED. 3.0	IEC 61000-4-5:2014 ED. 3.0
	IEC 61000-4-5:2014 ED. 3.0	IEC 61000-4-6:2013 ED. 4.0
	IEC 61000-4-6:2013 ED. 4.0	IEC 61000-4-8:2009 ED. 2.0
	IEC 61000-4-11:2004 ED. 2.0	IEC 61000-4-11:2004 ED. 2.0

The above equipment has been tested by **GLOBTEK, INC.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Jessica Cheng , **Date:** Jan. 26, 2017

Jessica Cheng / Specialist

Approved by : Hans Moritz , **Date:** Jan. 26, 2017

Hans Moritz / QA Manager

2 Summary of Test Results

Emission (EN 61204-3: 2000)			
Standard	Test Item	Result/Remarks	Verdict
CISPR 22:2008	Mains terminal disturbance voltage	Minimum passing Class B margin is -6.94 dB at 0.19297 MHz	Pass
	Conducted common mode (asymmetric mode) disturbance at telecommunication ports	Without telecom port of the EUT	N/A
	Radiated disturbance 30-1000 MHz	Minimum passing Class B margin is -5.05 dB at 119.00 MHz	Pass
	Radiated disturbance above 1GHz	EUT's highest frequency is below 108MHz	N/A
IEC 61000-3-2:2014 ED. 4.0	Harmonic current emissions	The power consumption of EUT is less than 75W and no limits apply.	Pass
IEC 61000-3-3:2013 ED. 3.0	Voltage fluctuations and flicker	$P_{st} \leqq 1.0$ $d_{max} \leqq 4\%$ $P_{lt} \leqq 0.65$ $d_c \leqq 3.3\%$ $T_{max} \leqq 500ms$	Pass

Emission (EN 55032: 2012)			
Standard	Test Item	Result/Remarks	Verdict
EN 55032:2012 +AC:2013 CISPR 32:2012 +Cor 2 AS/NZS CISPR 32:2013	Conducted emission from the AC mains power port	Minimum passing Class B margin is -5.39 dB at 0.18906 MHz	Pass
	Asymmetric mode conducted emission at telecommunication ports	Without telecom port of the EUT	N/A
	Radiated emission 30-1000 MHz	Minimum passing Class B margin is -4.20 dB at 81.04 MHz	Pass
	Radiated emission above 1GHz	EUT's highest frequency is below 108 MHz	Pass
EN 61000-3-2:2014	Harmonic current emissions	The power consumption of EUT is less than 75W and no limits apply.	Pass
EN 61000-3-3:2013	Voltage fluctuations and flicker	$P_{st} \leqq 1.0$ $d_{max} \leqq 4\%$ $P_{lt} \leqq 0.65$ $d_c \leqq 3.3\%$ $T_{max} \leqq 500ms$	Pass

Immunity (EN 61204-3: 2000) & (EN 55024: 2010)			
Basic standard	Test Item	Result/Remarks	Verdict
IEC 61000-4-2:2008 ED. 2.0	Electrostatic discharges (ESD)	Performance Criterion A	Pass
IEC 61000-4-3:2010 ED. 3.2	Continuous radiated disturbances (RS)	Performance Criterion A	Pass
IEC 61000-4-4:2012 ED. 3.0	Electrical fast transients (EFT)	Performance Criterion B	Pass
IEC 61000-4-5:2014 ED. 3.0	Surges	Performance Criterion A	Pass
IEC 61000-4-6:2013 ED. 4.0	Continuous conducted disturbances (CS)	Performance Criterion A	Pass
IEC 61000-4-8:2009 ED. 2.0 ***(for EN 55024 only)***	Power-frequency magnetic fields (PFMF)	Performance Criterion A	Pass
IEC 61000-4-11:2004 ED. 2.0 ***(for EN 61204-3)***	Voltage dips and interruptions	Meets the requirements of **Voltage Dips:** i).30% reduction - Performance Criterion A ii).60% reduction – Performance Criterion B **Voltage Interruptions:** i).>95% reduction – Performance Criterion B	Pass
IEC 61000-4-11:2004 ED. 2.0 ***(for EN 55024)***	Voltage dips and interruptions	Meets the requirements of **Voltage Dips:** i). >95% reduction - Performance Criterion A ii). 30% reduction – Performance Criterion A **Voltage Interruptions:** i). >95% reduction – Performance Criterion B	Pass

Note: 1. The above IEC basic standards are applied with latest version if customer has no special requirement.
2. There is no deviation to the applied test methods and requirements covered by the scope of this report.
3. N/A: Not Applicable

2.1 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:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expended Uncertainty (k=2) (±)	Maximum allowable uncertainty (±)
Conducted disturbance at mains port using AMN, 150kHz ~ 30MHz	2.77 dB	3.4 dB (U_{cispr})
Radiated disturbance, 30MHz ~ 1GHz <EN 61204-3>	4.26 dB	6.3 dB (U_{cispr})
Radiated disturbance, 30MHz ~ 1GHz <EN 55032>	4.09 dB	6.3 dB (U_{cispr})

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 Features of EUT

The tests reported herein were performed according to the method specified by GLOBTEK, INC., for detailed feature description, please refer to the manufacturer's specifications or user's manual.

3.2 General Description of EUT

Product	Switching-Mode Power Supply
Brand	GLOBTEK
Test Model	GT-46200-2005-T2, GT-46200-2006-T2
Model Difference	Refer to note as below
Sample Status	Engineering sample
Operating Software	N/A
Power Supply Rating	Switching Rating: refer to Note below Power Cord: Non-shielded DC (1.0 m) with one ferrite core
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT is a Switching Power Supply (AC 2-pin) and it has several models, which are identical to each other except for the rating differences only, as the following:

Model	Rating
GT-46200-2005-T2	AC I/P: 100-240V, 50-60Hz, 0.5A DC O/P: 5V, 4.0A
GT-46200-2006-T2	AC I/P: 100-240V, 50-60Hz, 0.5A DC O/P: 5.95V, 3.0A

3.3 Operating Modes of EUT and Determination of Worst Case Operating Mode

1. The EUT was pre-tested under operating and standby condition and the worst emission level was found under **operating condition**.
2. The EUT is designed with AC power supply of 100-240Vac, 50-60Hz.
   For radiated emission evaluation, 230Vac/50Hz (for EN 61204-3 & EN 55032) & 110Vac/60Hz (EN 55032) had been covered during the pre-test. The worst radiated emission data was founded under the following.

<EN 61204-3>	Worst Emission of Power Input
	230Vac/50Hz
<EN 55032>	**Worst Emission of Power Input**
	110Vac/ 60Hz

3. Above two models have been pre-tested, and test **model no.: 6A-201DA05** was the worst case. Therefore test modes are presented in the report as below.

Test Mode	Model No.	Test Condition	
		Test Condition	Input Power
Conducted emission test <EN 61204-3>			
1	GT-46200-2005-T2	Full load	230Vac/ 50Hz
2	GT-46200-2006-T2		
Conducted emission test <EN 55032>			
1	GT-46200-2005-T2	Full load	230Vac/ 50Hz & 110Vac/ 60Hz
2	GT-46200-2006-T2		
Radiated emission test <EN 61204-3>			
1	GT-46200-2005-T2	Full load	230Vac/ 50Hz
Radiated emission test <EN 55032>			
1	GT-46200-2005-T2	Full load	110Vac/ 60Hz
Harmonic, Flicker & Immunity tests			
1	GT-46200-2005-T2	Full load	230Vac/ 50Hz

3.4 Test Program Used and Operation Descriptions

♦ **For Conducted & Radiated test:**

Set the EUT under full resistor load.

♦ **For Harmonics, Flicker tests:**

Connected a resistor load to DC output port of EUT to make EUT have maximum power consumption.

♦ **For Immunity tests:**

Connected a resistor load to DC output port of EUT to make EUT have maximum power consumption and a multimeter was used to monitor voltage of output.

3.5 Primary Clock Frequencies of Internal Source

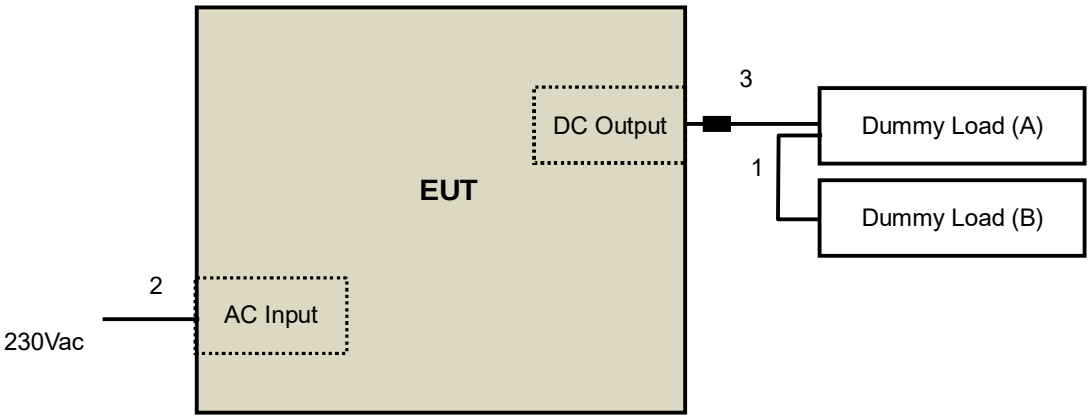
The highest frequency generated or used within the EUT or on which the EUT operates or tunes below 108MHz, provided by GLOBTEK, INC., for detailed internal source, please refer to the manufacturer's specifications.

4 Configuration and Connections with EUT

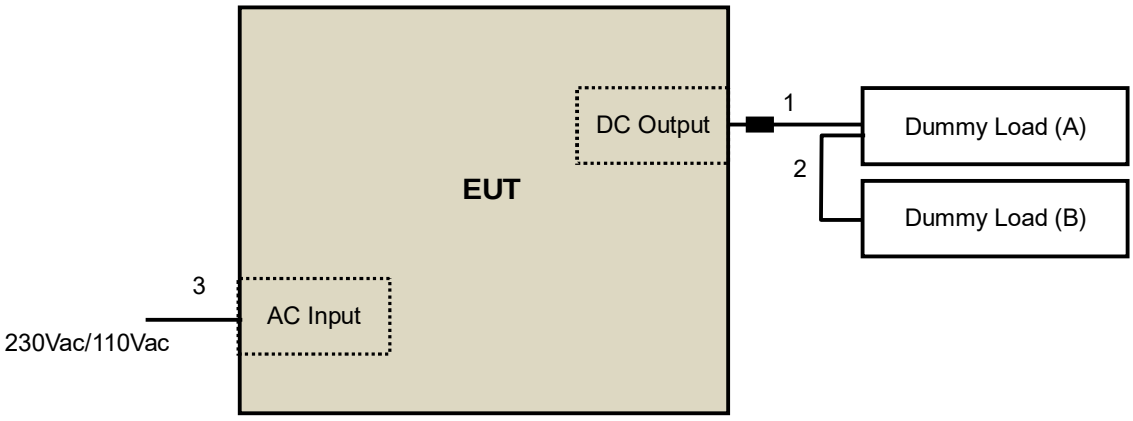
4.1 Connection Diagram of EUT and Peripheral Devices

Emission tests (Harmonics & Flicker excluded):

Test Configuration- For EN 61204-3

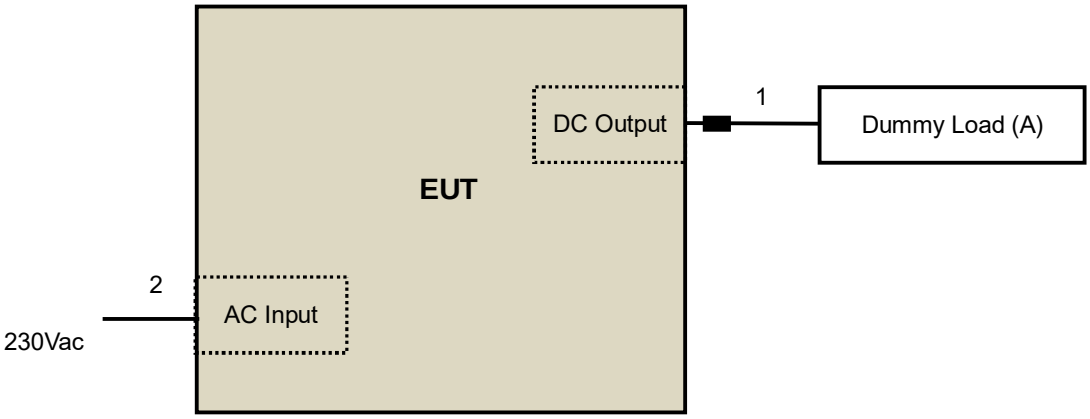


Test Configuration- For EN 55032

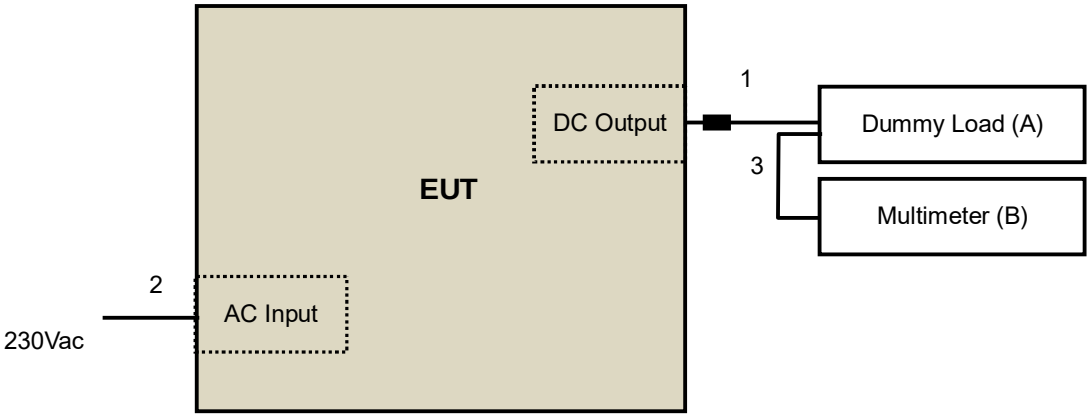


Harmonics, Flicker tests:

Test Configuration- Harmonic & Flicker Test



Test Configuration- Immunity Test



4.2 Configuration of Peripheral Devices and Cable Connections

Emission tests (Harmonics & Flicker excluded):

For EN 61204-3

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	DUMMY LOAD	ADT	L19A	L2-010011	N/A	Provided by Lab
B.	DUMMY LOAD	ADT	L19A	L2-010006	N/A	Provided by Lab

Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	0.5	N	0	Provided by Lab
2.	AC power cord	1	1.8	N	0	Provided by Lab
3.	DC cable	1	1.0	N	1	Supplied by client

Note: The core(s) is(are) originally attached to the cable(s).

For EN 55032

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	DUMMY LOAD	BVADT	L19B	L2-010026	N/A	Provided by Lab
B.	DUMMY LOAD	ADT	L19A	L2-010007	N/A	Provided by Lab

Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	1.0	N	1	Supplied by client
2.	DC cable	2	0.4	N	0	Provided by Lab
3.	AC power cord	1	1.8	N	0	Provided by Lab

Note: The core(s) is(are) originally attached to the cable(s).

Harmonics, Flicker, Immunity tests:

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	DUMMY LOAD	N/A	N/A	N/A	N/A	Provided by Lab
B.	Multimeter	YFE	YF-370A	N/A	N/A	Provided by Lab

Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	1.0	N	1	Supplied by client
2.	AC power cord	1	1.8	N	0	Provided by Lab
3.	Data cable	1	0.6	N	0	Provided by Lab

Note: The core(s) is(are) originally attached to the cable(s).

5 Conducted Disturbance at Mains Ports <EN 61204-3>

5.1 Limits

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Notes: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

5.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100292	Dec. 18, 2014	Dec. 17, 2015
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 04, 2014	Dec. 03, 2015
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 04, 2014	Dec. 03, 2015
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Oct. 21, 2014	Oct. 20, 2015
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 08, 2014	May 07, 2015
Software	ADT_Cond_V7.3.7	NA	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C09.01	Feb. 20, 2014	Feb. 19, 2015
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 20, 2014	May 19, 2015
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 20, 2014	Nov. 19, 2015
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 20, 2014	Nov. 19, 2015

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 9.
3. The VCCI Site Registration No. C-1312.
4. Tested Date: Jan. 22 ~ 27, 2015.

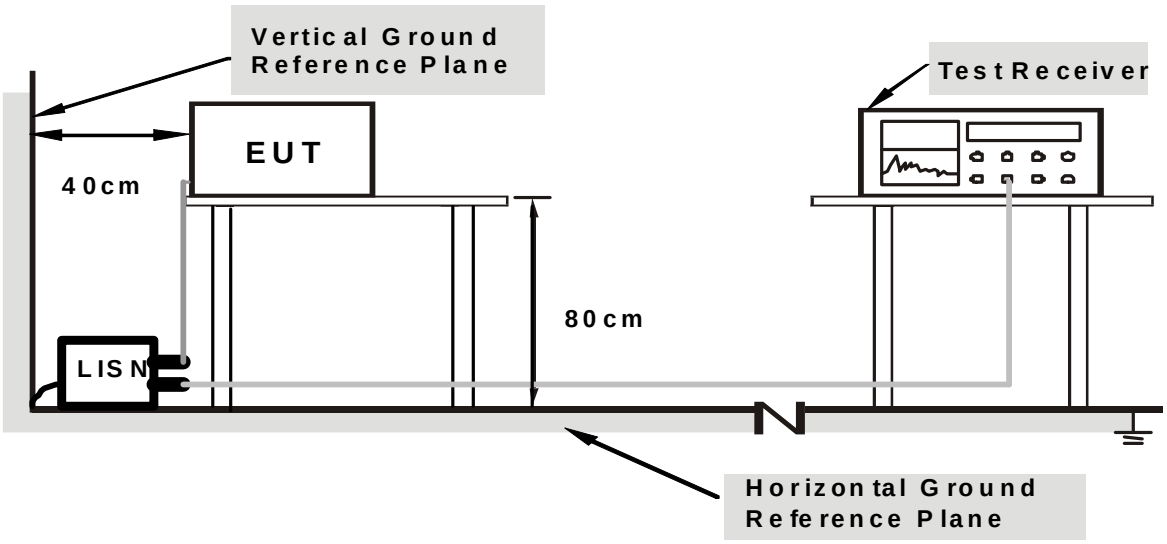
5.3 Test Arrangement

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.



Note: Support units were connected to second LISN.

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

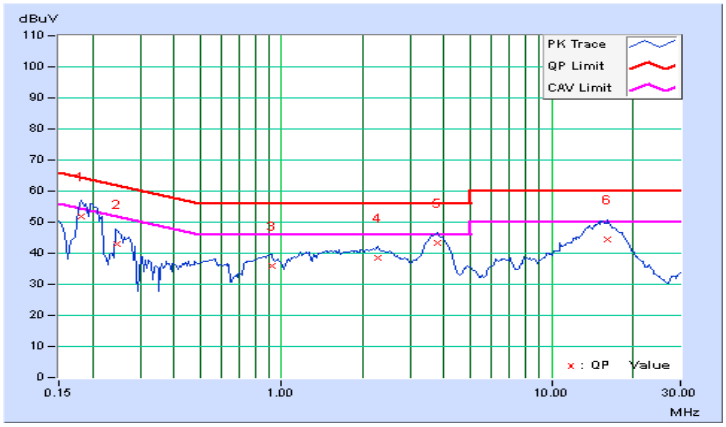
5.4 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	Environmental Conditions	20℃, 70%RH
Tested by	Jessica Cheng		
Test Mode	Mode 1		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18125	0.21	51.57	32.67	51.78	32.88	64.43	54.43	-12.65	-21.55
2	0.24766	0.22	42.78	27.20	43.00	27.42	61.84	51.84	-18.84	-24.42
3	0.91953	0.31	35.69	21.89	36.00	22.20	56.00	46.00	-20.00	-23.80
4	2.27734	0.40	38.11	27.44	38.51	27.84	56.00	46.00	-17.49	-18.16
5	3.75781	0.45	42.83	36.22	43.28	36.67	56.00	46.00	-12.72	-9.33
6	16.13281	0.91	43.40	38.11	44.31	39.02	60.00	50.00	-15.69	-10.98

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

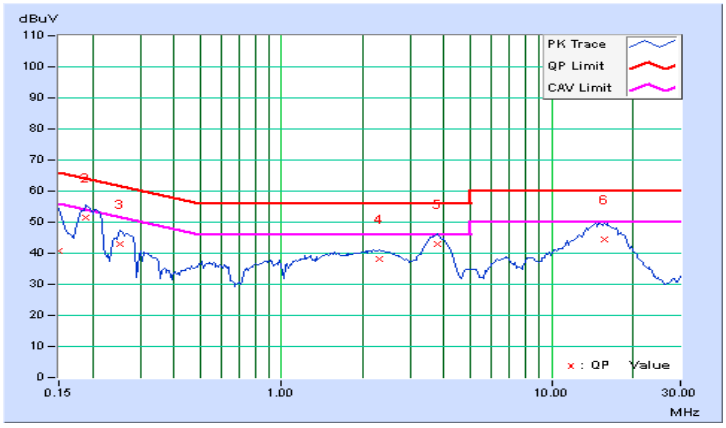


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	20℃, 70%RH
Tested by	Jessica Cheng		
Test Mode	Mode 1		

Phase Of Power : Neutral (N)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15000	0.20	40.40	16.55	40.60	16.75	66.00	56.00	-25.40	-39.25
2	0.18906	0.22	51.44	34.63	51.66	34.85	64.08	54.08	-12.42	-19.23
3	0.25156	0.23	42.65	24.56	42.88	24.79	61.71	51.71	-18.83	-26.92
4	2.29688	0.41	37.59	27.32	38.00	27.73	56.00	46.00	-18.00	-18.27
5	3.75781	0.46	42.63	36.16	43.09	36.62	56.00	46.00	-12.91	-9.38
6	15.72656	0.77	43.52	37.91	44.29	38.68	60.00	50.00	-15.71	-11.32

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

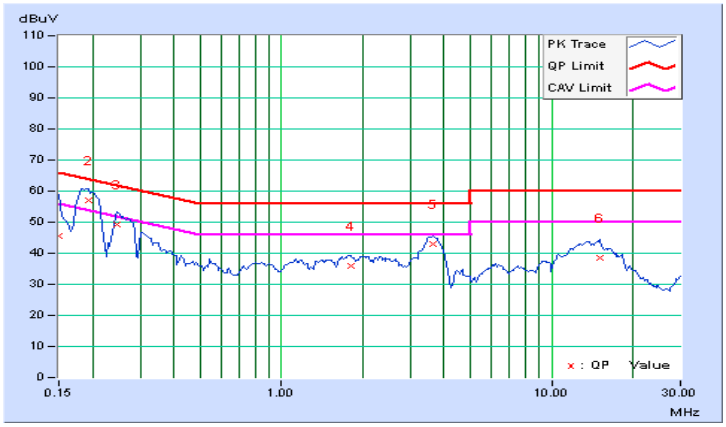


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	20℃, 70%RH
Tested by	Jessica Cheng		
Test Mode	Mode 2		

Phase Of Power : Line (L)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15000	0.20	45.50	20.09	45.70	20.29	66.00	56.00	-20.30	-35.71
2	**0.19297**	**0.21**	**56.76**	**38.58**	**56.97**	**38.79**	**63.91**	**53.91**	**-6.94**	**-15.12**
3	0.24766	0.22	49.00	29.09	49.22	29.31	61.84	51.84	-12.62	-22.53
4	1.80469	0.38	35.59	23.91	35.97	24.29	56.00	46.00	-20.03	-21.71
5	3.61719	0.45	42.33	34.94	42.78	35.39	56.00	46.00	-13.22	-10.61
6	15.10156	0.86	37.68	31.58	38.54	32.44	60.00	50.00	-21.46	-17.56

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

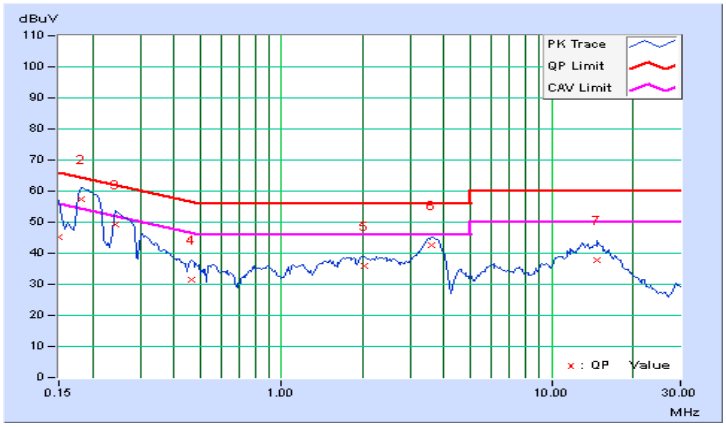


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	20℃, 70%RH
Tested by	Jessica Cheng		
Test Mode	Mode 2		

Phase Of Power : Neutral (N)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15000	0.20	45.05	19.68	45.25	19.88	66.00	56.00	-20.75	-36.12
2	0.18125	0.21	57.06	34.82	57.27	35.03	64.43	54.43	-7.16	-19.40
3	0.24375	0.23	49.03	26.84	49.26	27.07	61.97	51.97	-12.71	-24.90
4	0.46250	0.27	31.10	14.84	31.37	15.11	56.65	46.65	-25.28	-31.54
5	2.01953	0.40	35.37	24.49	35.77	24.89	56.00	46.00	-20.23	-21.11
6	3.59375	0.46	42.13	34.66	42.59	35.12	56.00	46.00	-13.41	-10.88
7	14.73438	0.75	36.96	31.12	37.71	31.87	60.00	50.00	-22.29	-18.13

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



6 Radiated Disturbance up to 1 GHz <EN 61204-3>

6.1 Limits

Frequency (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

Notes: 1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

6.2 Test Instruments

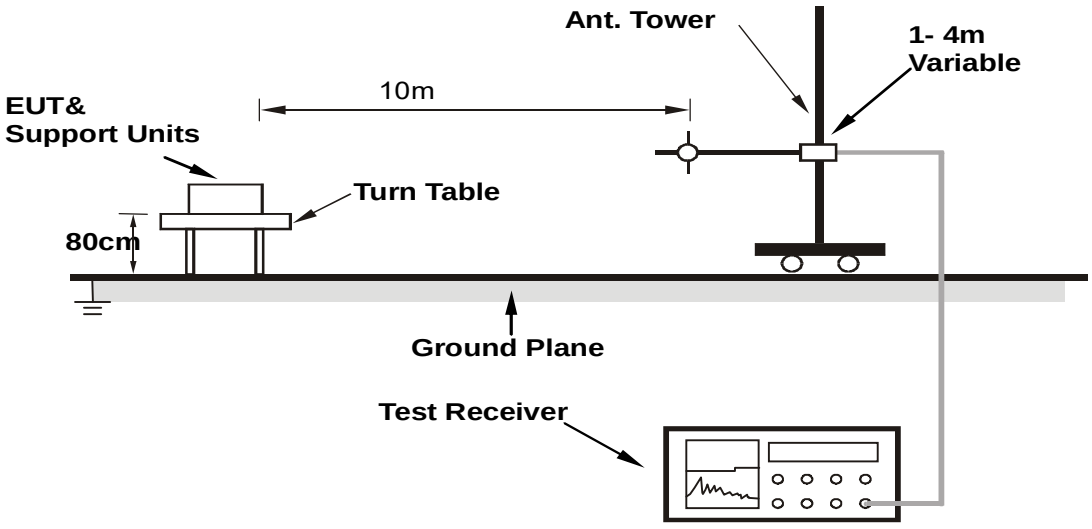
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Agilent Preamplifier	8447D	2944A11062	Feb. 27, 2014	Feb. 26, 2015
Agilent Preamplifier	8447D	2944A11064	Feb. 27, 2014	Feb. 26, 2015
Agilent Test Receiver	N9038A	MY50010158	Jul. 22, 2014	Jul. 21, 2015
Agilent Test Receiver	N9038A	MY51210114	Dec. 09, 2014	Dec. 08, 2015
Schwarzbeck Antenna	VULB9168	9168-316	Feb. 27, 2014	Feb. 26, 2015
Schwarzbeck Antenna	VULB9168	9168-317	Feb. 27, 2014	Feb. 26, 2015
Max Full. Turn Table & Tower	MF7802	MF7802121	NA	NA
Max Full. Tower	MF7802	MF780208105	NA	NA
Software	ADT_Radiated_V8.7.07	NA	NA	NA
WOKEN RF cable	8D	CABLE-CH8-01.V	Dec. 17, 2014	Dec. 16, 2015
JYE BAO RF cable	8D	CABLE-CH8-02.H	Dec. 17, 2014	Dec. 16, 2015
JYE BAO RF cable	8D	CABLE-CH8-03.3M	Dec. 17, 2014	Dec. 16, 2015

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Chamber No. 8.
3. The Industry Canada Reference No. IC 7450E-8.
4. The VCCI Site Registration No. R-2946.
5. The FCC Site Registration No. 493821.
6. Tested Date: Jan. 22 ~ 27, 2015.

6.3 Test Arrangement

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna is a broadband antenna, and its height is varied from one meter to four meters 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.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is up to 1 GHz.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.



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

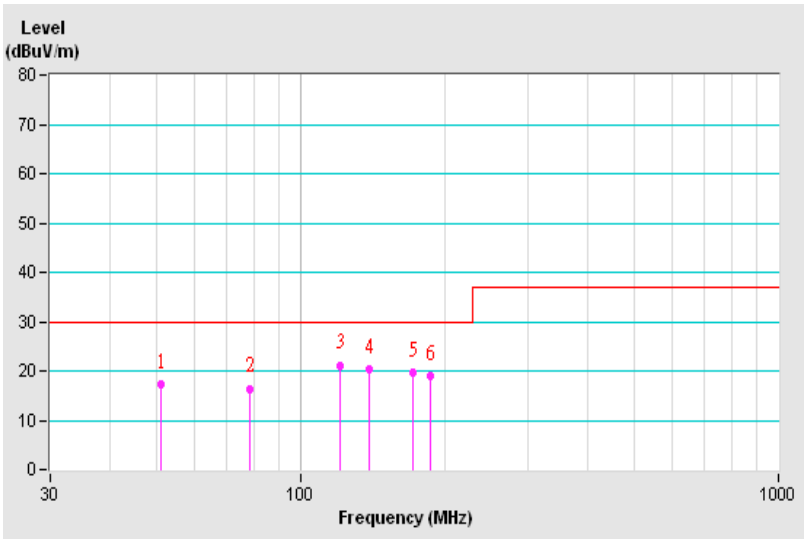
6.4 Test Results

Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
Tested by	Jessica Cheng	Environmental Conditions	20℃, 70%RH
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Horizontal at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	51.10	17.19 QP	30.00	-12.81	4.00 H	238	30.36	-13.17
2	78.55	16.25 QP	30.00	-13.75	4.00 H	74	33.13	-16.88
3	121.47	21.05 QP	30.00	-8.95	4.00 H	108	35.21	-14.16
4	139.22	20.21 QP	30.00	-9.79	4.00 H	86	32.67	-12.46
5	172.15	19.51 QP	30.00	-10.49	4.00 H	95	31.67	-12.16
6	187.38	18.86 QP	30.00	-11.14	4.00 H	21	32.73	-13.87

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
   – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

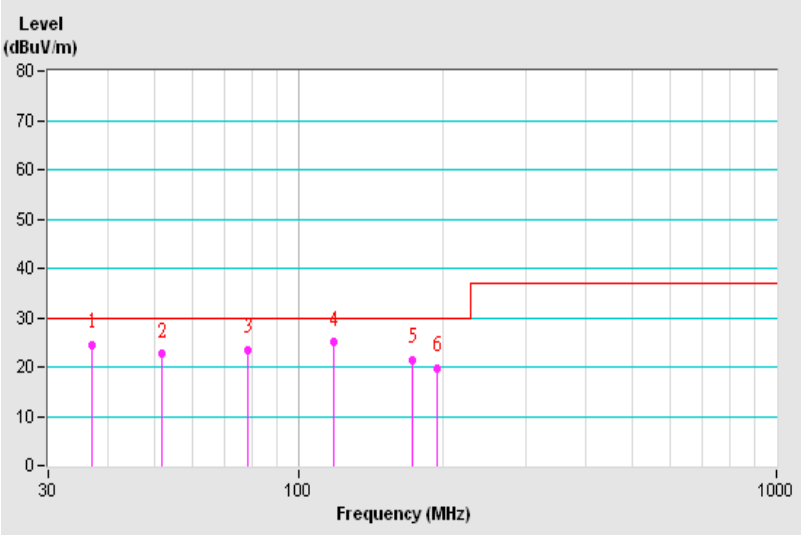


Frequency Range	30MHz ~ 1GHz	**Detector Function & Bandwidth**	Quasi-Peak (QP), 120kHz
Tested by	Jessica Cheng	**Environmental Conditions**	20℃, 70%RH
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Vertical at 10 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	37.08	24.54 QP	30.00	-5.46	1.00 V	160	38.24	-13.70
2	51.83	22.61 QP	30.00	-7.39	1.00 V	83	35.28	-12.67
3	78.45	23.35 QP	30.00	-6.65	1.64 V	62	39.84	-16.49
4	**119.00**	**24.95 QP**	**30.00**	**-5.05**	**1.00 V**	**157**	**38.88**	**-13.93**
5	173.17	21.28 QP	30.00	-8.72	1.00 V	104	32.98	-11.70
6	195.09	19.74 QP	30.00	-10.26	1.00 V	232	33.79	-14.05

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



7 Conducted Emission from the AC Mains Power Port <EN 55032>

7.1 Limits

EN 55032 Table clause	Frequency range (MHz)	Coupling device	Detector type / bandwidth	Class A limits (dBuV)
A8.1	0.15 - 0.5	AMN	Quasi-peak / 9kHz	79
	0.5 - 30.0			73
A8.2	0.15 - 0.5		Average / 9kHz	66
	0.5 - 30.0			60

EN 55032 Table clause	Frequency range (MHz)	Coupling device	Detector type / bandwidth	Class B limits (dBuV)
A9.1	0.15 - 0.5	AMN	Quasi-peak / 9kHz	66 - 56
	0.5 - 5			56
	5 - 30.0			60
A9.2	0.15 - 0.5		Average / 9kHz	56 - 46
	0.5 - 5			46
	5 - 30.0			50

7.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100276	Apr. 12, 2016	Apr. 11, 2017
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ENV216	101197	May 04, 2016	May 03, 2017
LISN With Adapter (for EUT)	AD10	C10Ada-002	May 04, 2016	May 03, 2017
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100218	Nov. 23, 2016	Nov. 22, 2017
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 04, 2016	May 03, 2017
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C10.01	Feb. 15, 2016	Feb. 14, 2017
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-011484	May 12, 2016	May 11, 2017
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 08, 2016	Nov. 07, 2017
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 08, 2016	Nov. 07, 2017

Notes:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 10.
3. The VCCI Site Registration No. C-1852.
4. Tested Date: Jan. 23, 2017.

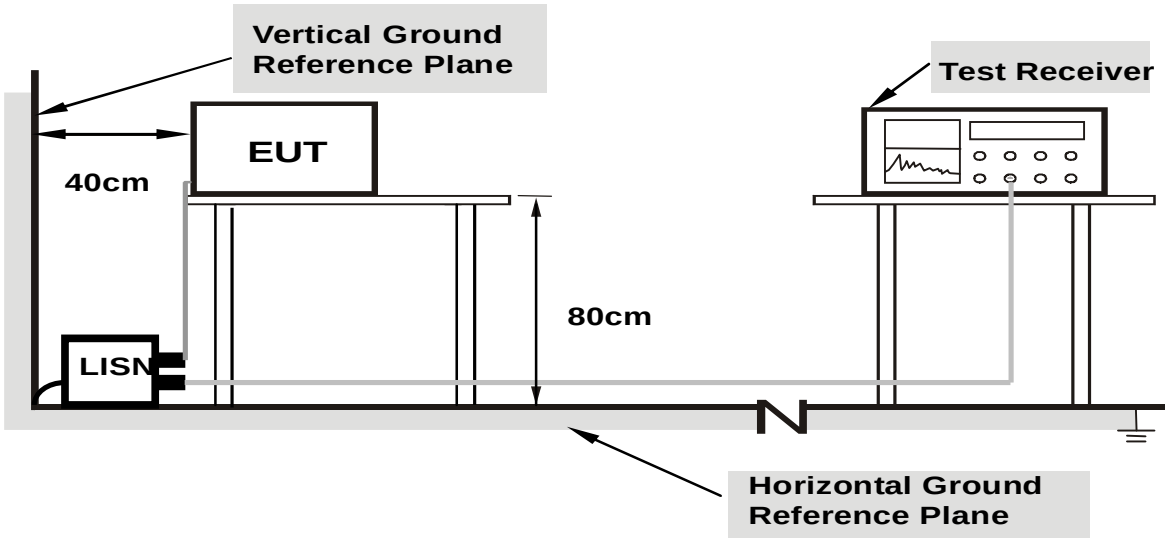
7.3 Test Arrangement

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.



Note: 1. Support units were connected to second LISN.
2. The distance specified between EUT/AE and other metallic objects is ≥ 0.8 m in the measurement arrangement for table-top EUT.

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

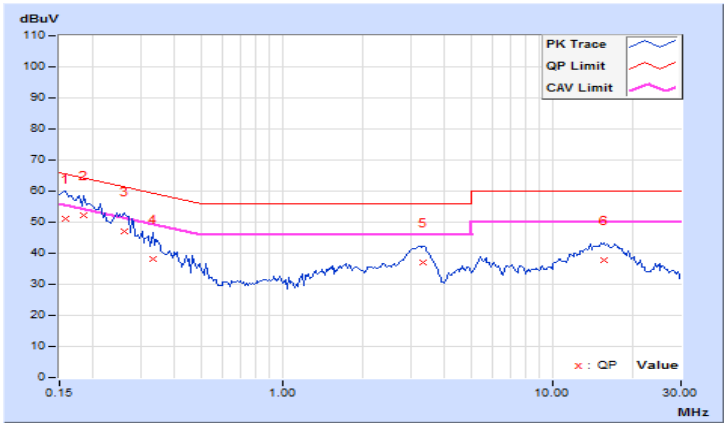
7.4 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	110Vac, 60Hz	Environmental Conditions	20℃, 63%RH, 1018mbar
Tested by	Jessica Cheng		
Test Mode	Mode 1		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.14	41.08	12.81	51.22	22.95	65.58	55.58	-14.36	-32.63
2	0.18516	10.17	42.02	21.10	52.19	31.27	64.25	54.25	-12.06	-22.98
3	0.25938	10.19	36.83	20.27	47.02	30.46	61.45	51.45	-14.43	-20.99
4	0.33359	10.21	27.82	11.71	38.03	21.92	59.36	49.36	-21.33	-27.44
5	3.33984	10.52	26.61	16.84	37.13	27.36	56.00	46.00	-18.87	-18.64
6	15.57422	10.91	26.76	22.40	37.67	33.31	60.00	50.00	-22.33	-16.69

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

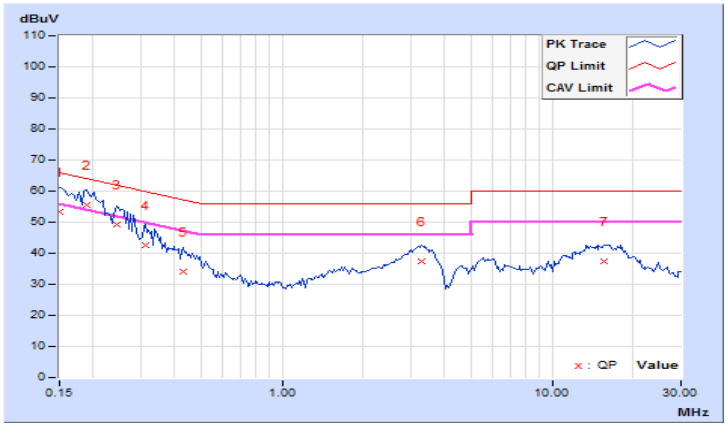


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	110Vac, 60Hz	**Environmental Conditions**	20℃, 63%RH, 1018mbar
Tested by	Jessica Cheng		
Test Mode	Mode 1		

Phase Of Power : Neutral (N)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15000	10.15	43.04	18.25	53.19	28.40	66.00	56.00	-12.81	-27.60
2	0.18906	10.12	45.44	25.90	55.56	36.02	64.08	54.08	-8.52	-18.06
3	0.24375	10.13	39.19	17.81	49.32	27.94	61.97	51.97	-12.65	-24.03
4	0.31406	10.16	32.26	12.43	42.42	22.59	59.86	49.86	-17.44	-27.27
5	0.43125	10.20	23.70	12.45	33.90	22.65	57.23	47.23	-23.33	-24.58
6	3.29688	10.44	27.11	17.79	37.55	28.23	56.00	46.00	-18.45	-17.77
7	15.65234	10.75	26.64	22.23	37.39	32.98	60.00	50.00	-22.61	-17.02

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

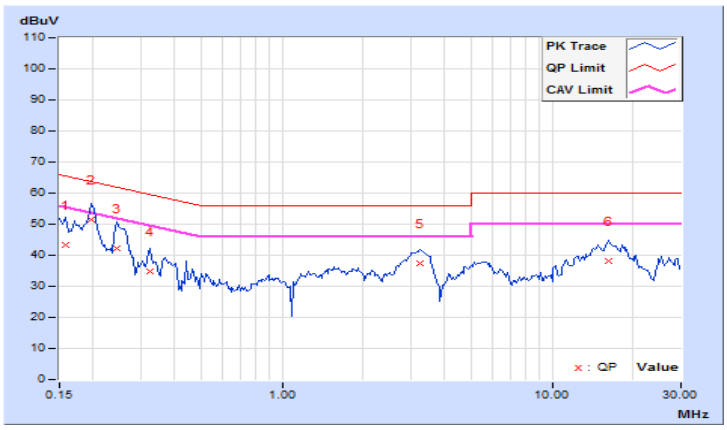


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	20℃, 63%RH, 1018mbar
Tested by	Jessica Cheng		
Test Mode	Mode 1		

Phase Of Power : Line (L)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15781	10.14	33.02	5.00	43.16	15.14	65.58	55.58	-22.42	-40.44
2	0.19687	10.18	41.32	31.72	51.50	41.90	63.74	53.74	-12.24	-11.84
3	0.24375	10.19	31.94	16.98	42.13	27.17	61.97	51.97	-19.84	-24.80
4	0.32578	10.21	24.52	10.62	34.73	20.83	59.56	49.56	-24.83	-28.73
5	3.25391	10.51	27.02	16.35	37.53	26.86	56.00	46.00	-18.47	-19.14
6	16.14844	10.93	27.04	21.17	37.97	32.10	60.00	50.00	-22.03	-17.90

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

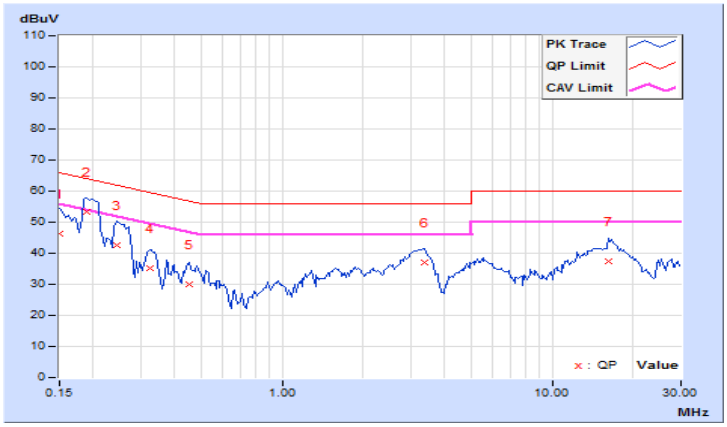


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	20℃, 63%RH, 1018mbar
Tested by	Jessica Cheng		
Test Mode	Mode 1		

Phase Of Power : Neutral (N)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15000	10.15	36.29	7.00	46.44	17.15	66.00	56.00	-19.56	-38.85
2	0.18906	10.12	43.10	31.23	53.22	41.35	64.08	54.08	-10.86	-12.73
3	0.24375	10.13	32.30	16.61	42.43	26.74	61.97	51.97	-19.54	-25.23
4	0.32578	10.16	24.95	10.92	35.11	21.08	59.56	49.56	-24.45	-28.48
5	0.45078	10.21	19.63	12.05	29.84	22.26	56.86	46.86	-27.02	-24.60
6	3.35938	10.44	26.47	15.85	36.91	26.29	56.00	46.00	-19.09	-19.71
7	16.17578	10.76	26.55	20.61	37.31	31.37	60.00	50.00	-22.69	-18.63

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

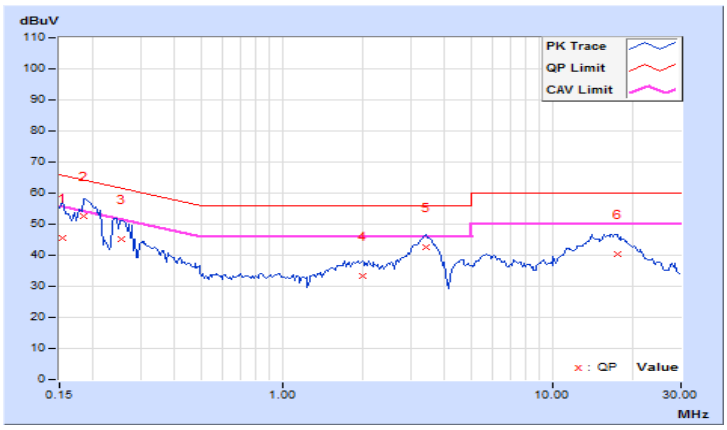


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	110Vac, 60Hz	**Environmental Conditions**	20℃, 63%RH, 1018mbar
Tested by	Jessica Cheng		
Test Mode	Mode 2		

Phase Of Power : Line (L)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15391	10.13	35.39	9.75	45.52	19.88	65.79	55.79	-20.27	-35.91
2	0.18516	10.17	42.60	22.25	52.77	32.42	64.25	54.25	-11.48	-21.83
3	0.25547	10.19	34.99	16.81	45.18	27.00	61.58	51.58	-16.40	-24.58
4	1.98438	10.43	22.91	11.27	33.34	21.70	56.00	46.00	-22.66	-24.30
5	3.41797	10.52	32.08	22.51	42.60	33.03	56.00	46.00	-13.40	-12.97
6	17.41016	10.99	29.48	25.26	40.47	36.25	60.00	50.00	-19.53	-13.75

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

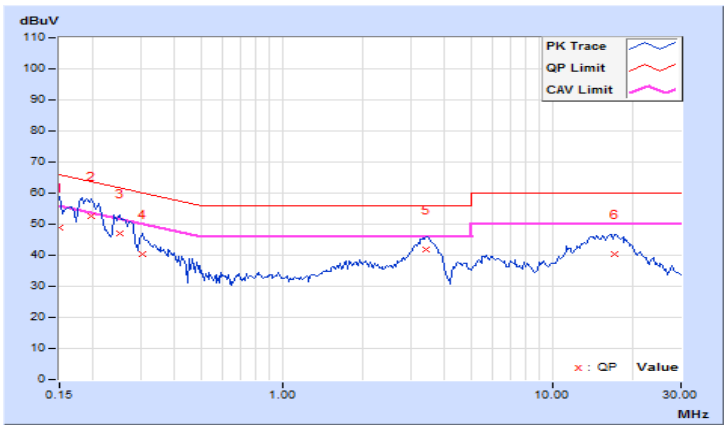


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	110Vac, 60Hz	**Environmental Conditions**	20℃, 63%RH, 1018mbar
Tested by	Jessica Cheng		
Test Mode	Mode 2		

Phase Of Power : Neutral (N)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15000	10.15	38.83	12.89	48.98	23.04	66.00	56.00	-17.02	-32.96
2	0.19687	10.11	42.38	23.20	52.49	33.31	63.74	53.74	-11.25	-20.43
3	0.25156	10.13	37.00	18.17	47.13	28.30	61.71	51.71	-14.58	-23.41
4	0.30234	10.15	30.33	9.23	40.48	19.38	60.18	50.18	-19.70	-30.80
5	3.42969	10.45	31.27	22.13	41.72	32.58	56.00	46.00	-14.28	-13.42
6	17.11719	10.78	29.48	25.38	40.26	36.16	60.00	50.00	-19.74	-13.84

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

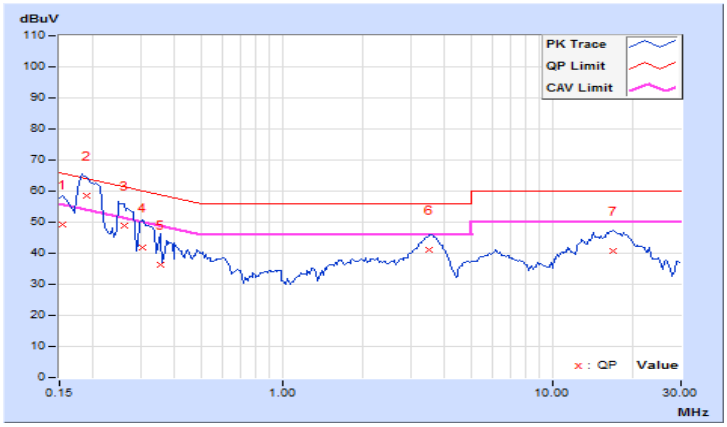


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	20℃, 63%RH, 1018mbar
Tested by	Jessica Cheng		
Test Mode	Mode 2		

Phase Of Power : Line (L)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15391	10.13	39.26	10.63	49.39	20.76	65.79	55.79	-16.40	-35.03
2	**0.18906**	**10.17**	**48.52**	**29.06**	**58.69**	**39.23**	**64.08**	**54.08**	**-5.39**	**-14.85**
3	0.25938	10.19	38.62	17.59	48.81	27.78	61.45	51.45	-12.64	-23.67
4	0.30234	10.20	31.75	10.72	41.95	20.92	60.18	50.18	-18.23	-29.26
5	0.35313	10.21	25.91	8.48	36.12	18.69	58.89	48.89	-22.77	-30.20
6	3.51172	10.53	30.70	21.20	41.23	31.73	56.00	46.00	-14.77	-14.27
7	16.77344	10.96	29.88	25.02	40.84	35.98	60.00	50.00	-19.16	-14.02

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

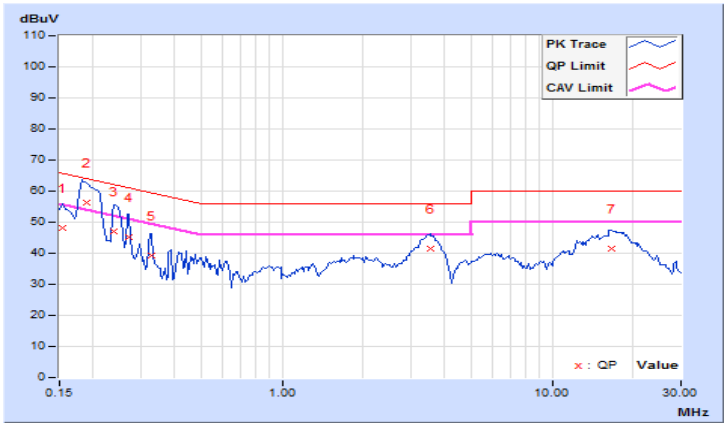


Frequency Range	150kHz ~ 30MHz	**Detector Function & Bandwidth**	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	**Environmental Conditions**	20℃, 63%RH, 1018mbar
Tested by	Jessica Cheng		
Test Mode	Mode 2		

Phase Of Power : Neutral (N)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	0.15391	10.15	37.95	9.79	48.10	19.94	65.79	55.79	-17.69	-35.85
2	0.18906	10.12	46.18	27.81	56.30	37.93	64.08	54.08	-7.78	-16.15
3	0.23984	10.13	36.88	15.63	47.01	25.76	62.10	52.10	-15.09	-26.34
4	0.27109	10.14	35.17	15.13	45.31	25.27	61.08	51.08	-15.77	-25.81
5	0.32969	10.16	29.11	11.67	39.27	21.83	59.46	49.46	-20.19	-27.63
6	3.54297	10.46	31.15	21.53	41.61	31.99	56.00	46.00	-14.39	-14.01
7	16.68750	10.77	30.75	25.88	41.52	36.65	60.00	50.00	-18.48	-13.35

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



8 Radiated Emission at Frequencies up to 1GHz <EN 55032>

8.1 Limits

For Class A Equipment

EN 55032 Table clause	Frequency range (MHz)	Distance (m)	Limits (dBuV/m)
A2.1	30 - 230	10	40
	230 - 1000		47
A2.2	30 - 230	3	50
	230 - 1000		57

For Class B Equipment

EN 55032 Table clause	Frequency range (MHz)	Distance (m)	Limits (dBuV/m)
A4.1	30 - 230	10	30
	230 - 1000		37
A4.2	30 - 230	3	40

8.2 Test Instruments

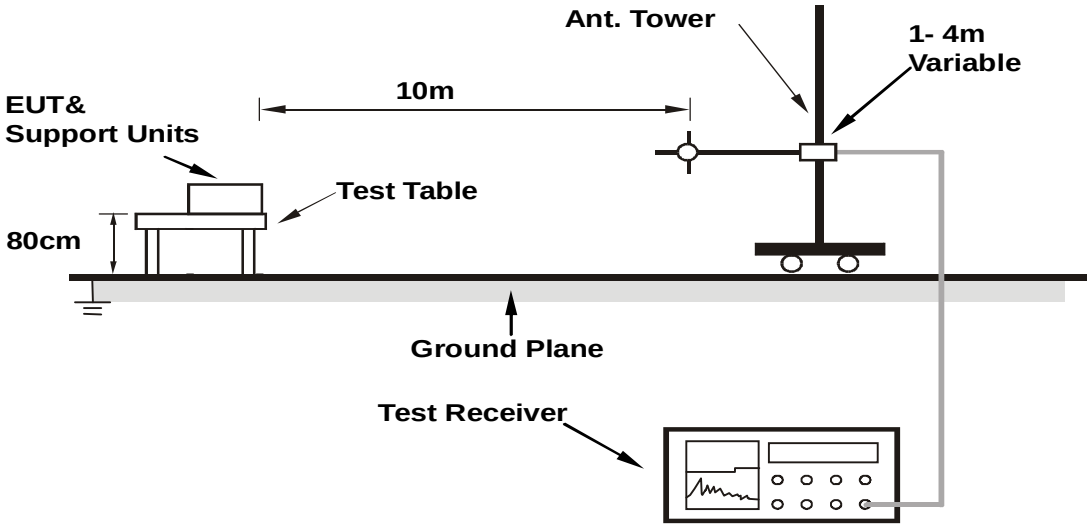
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCI	100744	Apr. 28, 2016	Apr. 27, 2017
Schaffner BILOG Antenna	CBL6111D	22270	Dec. 28, 2016	Dec. 27, 2017
EMCI Preamplifier	EMC9135	980326	Mar. 01, 2016	Feb. 28, 2017
CT Turn Table	TT100	CT-080	NA	NA
CT Tower	AT100	CT-080	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
ANRITSU RF Switches	MP59B	N/A	Mar. 11, 2016	Mar. 10, 2017
WOKEN RF cable With 5dB PAD	8D	CABLE-ST3-01	Mar. 11, 2016	Mar. 10, 2017

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Open Site No. 3.
3. The VCCI Site Registration No. is R-269.
4. The FCC Site Registration No. 90424.
5. Tested Date: Jan. 24, 2017.

8.3 Test Arrangement

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna is a broadband antenna, and its height is varied from one meter to four meters 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.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is up to 1 GHz.

Note:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.
2. The measurement distance is the shortest horizontal distance between an imaginary circular periphery just encompassing this arrangement and the calibration point of the antenna.



Note: Cable on the RGP must to be insulated.

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

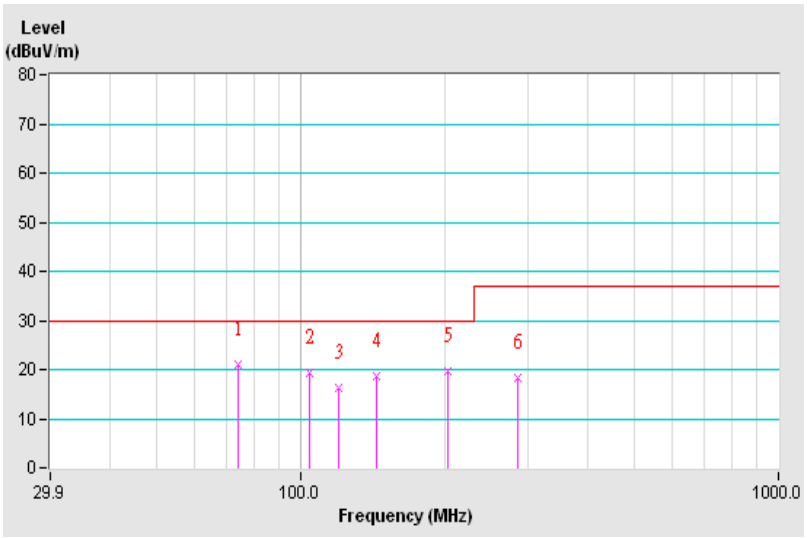
8.4 Test Results

Frequency Range	30MHz ~ 1GHz	Detector Function & Bandwidth	Quasi-Peak (QP), 120kHz
Tested by	Jessica Cheng	Environmental Conditions	22℃, 78%RH, 1017mbar
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Horizontal at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	73.94	20.96 QP	30.00	-9.04	4.00 H	317	45.18	-24.22
2	104.55	19.29 QP	30.00	-10.71	4.00 H	228	39.23	-19.94
3	120.12	16.33 QP	30.00	-13.67	4.00 H	58	34.78	-18.45
4	143.89	18.75 QP	30.00	-11.25	4.00 H	133	37.26	-18.51
5	203.54	19.77 QP	30.00	-10.23	4.00 H	208	40.06	-20.29
6	285.51	18.41 QP	37.00	-18.59	4.00 H	133	34.38	-15.97

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
   – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

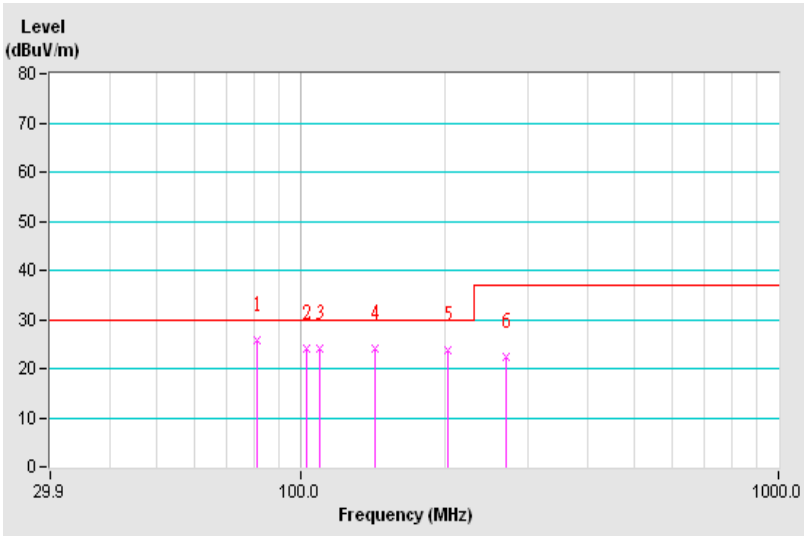


Frequency Range	30MHz ~ 1GHz	**Detector Function & Bandwidth**	Quasi-Peak (QP), 120kHz
Tested by	Jessica Cheng	**Environmental Conditions**	22℃, 78%RH, 1017mbar
Test Mode	Mode 1		

Antenna Polarity & Test Distance : Vertical at 10 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	**81.04**	**25.80 QP**	**30.00**	**-4.20**	**1.00 V**	**158**	**49.33**	**-23.53**
2	102.75	24.13 QP	30.00	-5.87	1.00 V	109	44.30	-20.17
3	109.94	23.91 QP	30.00	-6.09	1.00 V	194	43.41	-19.50
4	143.41	23.96 QP	30.00	-6.04	1.00 V	243	42.46	-18.50
5	203.06	23.67 QP	30.00	-6.33	1.00 V	103	43.98	-20.31
6	268.54	22.48 QP	37.00	-14.52	1.00 V	313	38.83	-16.35

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



9 Harmonics Current Measurement

9.1 Limits

Limits for Class A equipment	
Harmonic 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	0.15 x 15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8≦n≦40	0.23 x 8/n

Limits for Class D equipment		
Harmonic 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	0.15 x 15/n

Notes: 1. Class A and Class D are classified according to section 5 of IEC /EN 61000-3-2.
2. According to section 7 of IEC /EN 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.

9.2 Classification of Equipment

Class A	Class B	Class C	Class D
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.	Portable tools.; Arc welding equipment which is not professional equipment	Lighting equipment.	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. Refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).

9.3 Test Instruments

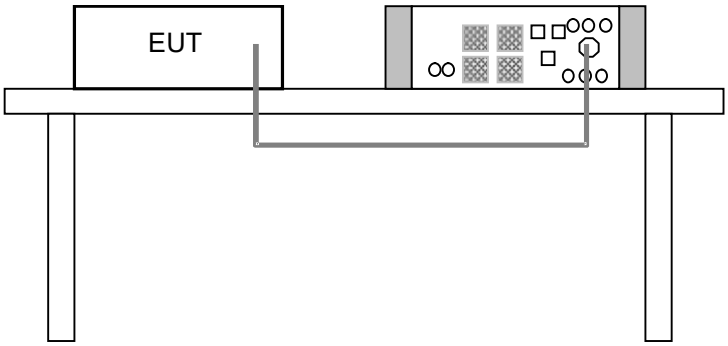
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
EMC PARTNER EMC Emission Tester	HAR1000-1P	084	Apr. 16, 2014	Apr. 15, 2015
Software	HARCS	NA	NA	NA

Notes:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS Room No. 1.
3. According to IEC 61000-4-7: 2002, the time window shall be synchronized with each group of 10 or 12 cycles (200 ms)for power frequency of 50 or 60Hz.
4. Tested Date: Jan. 26, 2015

9.4 Test Arrangement

a. 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.

b. 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.



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

9.5 Test Results

TEST MODE	Mode 1		
FUNDAMENTAL VOLTAGE/AMPERE	229.7Vrms/ 0.209Arms	POWER FREQUENCY	49.987Hz
POWER CONSUMPTION	19.44W	POWER FACTOR	0.405
ENVIRONMENTAL CONDITIONS	21deg. C, 62% RH	TESTED BY: Jessica Cheng	

Note: 1. Limits are not specified for equipment with a rated power of 75W or less (other than lighting equipment).
2. According to EN 61000-3-2 the manufacturer shall specify the power of the apparatus. This value shall be used for establishing limits. The specified power shall be within +/-10% of the measured power.

10 Voltage Fluctuations and Flicker Measurement

10.1 Limits

Test item	Limit	Note
P_{st}	1.0	P_{st}: short-term flicker severity.
P_{lt}	0.65	P_{lt}: long-term flicker severity.
T_{max} (ms)	500	T_{max}: maximum time duration during the observation period that the voltage deviation d(t) exceeds the limit for d_c .
d_{max} (%)	4	d_{max}: maximum absolute voltage change during an observation period.
d_c (%)	3.3	d_c: maximum steady state voltage change during an observation period.

10.2 Test Instruments

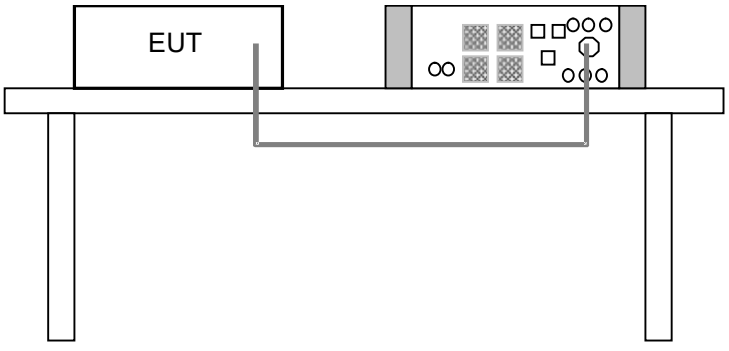
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
EMC PARTNER EMC Emission Tester	HAR1000-1P	084	Apr. 16, 2014	Apr. 15, 2015
Software	HARCS	NA	NA	NA

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS Room No. 1.
3. Tested Date: Jan. 26, 2015

10.3 Test Arrangement

a. 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.

b. 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.



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

10.4 Test Results

Observation (T_p)	10 min.	Power Frequency	49.987Hz
Fundamental Voltage/Ampere	229.7Vrms/ 0.209Arms	Power Factor	0.405
Environmental Conditions	21deg. C, 62% RH	Tested by	Jessica Cheng
Test Mode	Mode 1		

Test Parameter	Measurement Value	Limit	Remarks
P_{st}	0.072	1.0	Pass
P_{lt}	0.072	0.65	Pass
T_{max} (ms)	0	3.3	Pass
d_{max} (%)	0.040	4	Pass
d_c (%)	0.010	3.3	Pass

Note: (1) P_{st} means short-term flicker indicator.
(2) P_{lt} means long-term flicker indicator.
(3) T_{max} means accumulated time value of d(t) with a deviation exceeding 3.3 %.
(4) d_{max} means maximum relative voltage change.
(5) d_c means maximum relative steady-state voltage change.

11 General Immunity Requirements

Product Standard:	**EN 61204-3: 2000**	
Basic Standard, specification requirement, and Performance Criteria:	IEC 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Amplitude modulated – RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion B
		Radio-Frequency Electromagnetic Field, Keyed carrier: 900+/-5 MHz, 3V/m, 50 % duty cycle, Rep. Frequency 200 Hz, Performance Criterion B
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, Power line: 1kV, Signal line: 0.5kV, Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8 /20 us Short Circuit Current, line to line: 1kV, line to earth: 2kV, Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15-80 MHz, 3Vrms, 80% AM, 1kHz, Performance Criterion B
	IEC 61000-4-11	Voltage Dips: i) 30% reduction – 10ms, Performance Criterion B ii) 60% reduction – 100ms, Performance Criterion C Voltage Interruptions: i) >95% reduction – 5000ms, Performance Criterion C

Product Standard:	EN 55024:2010	
Basic Standard, specification requirement, and Performance Criteria:	IEC 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-1000 MHz, 3V/m, 80% AM (1kHz), Performance Criterion A
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT AC Power line: 1kV, DC Power line: 0.5kV Signal line: 0.5kV Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: AC Power Line: line to line 1 kV, line to earth 2kV DC Power Line: Line to earth 0.5kV Performance Criterion B Outdoor Signal line: i) 1 kV without primary protectors, Performance Criteria C ii) 4 kV with primary protectors, Performance Criterion C
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15-80 MHz, 3V, 80% AM, 1kHz, Performance Criterion A
	IEC 61000-4-8	Power Frequency Magnetic Field Test, 50 Hz, 1A/m, Performance Criterion A
	IEC 61000-4-11	Voltage Dips: i) >95% reduction -0.5 period, Performance Criterion B ii) 30% reduction – 25 period, Performance Criterion C Voltage Interruptions: i). >95% reduction – 250 period, Performance Criterion C

11.1 Performance Criteria

General Performance Criteria- EN 61204-3

According to Clause 6.1 of EN 61204-3: 2000 standard, the following describes the general performance criteria.

Performance Criteria	Basic specifications	Remarks
A	No loss of function or performance during the test	Operating as intended within specified tolerance
B	Temporary loss of function or performance during the test Self recoverable	Degradation of performance shall be specified by the manufacturer PSU shall continue to operate as intended after the test
C	Loss of function or performance Not self-recoverable Not damaged	Any re-settable condition allowed including shut-down

General Performance Criteria- EN 55024

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Product Specific Performance Criteria

The particular performance criteria which are specified in the normative annexes of EN 55024 take precedence over the corresponding parts of the general performance criteria.

Where particular performance criteria for specific functions are not given, then the general performance criteria shall apply.

12 Electrostatic Discharge Immunity Test (ESD)

12.1 Test Specification

Basic Standard:	IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: ±2, ±4, ±8kV (Direct) Contact Discharge: ±2, ±4kV (Indirect)
Number of Discharge: **For EN 55024**	Air – Direct: 10 discharges per location (each polarity) Contact – Direct & Indirect: 25 discharges per location (each polarity) and min. 200 times in total
Number of Discharge: **For EN 61204-3**	20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1-second minimum

12.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
KeyTek, ESD Simulator	MZ-15/EC	0504259	Oct. 17, 2014	Oct. 16, 2015

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in ESD Room No. 1.
3. Tested Date: Jan. 26, 2015.

12.3 Test Arrangement

The discharges shall be applied in two ways: <For EN 55024>

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 horizontal coupling plane. 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. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.

b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.

c. The time interval between two successive single discharges was at least 1 second.

d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.

e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

f. 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.

g. At least ten single discharges (in the most sensitive polarity) were applied to the **H**orizontal **C**oupling **P**lane at points on each side of the EUT. The ESD generator was positioned at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP.**

h. 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 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.

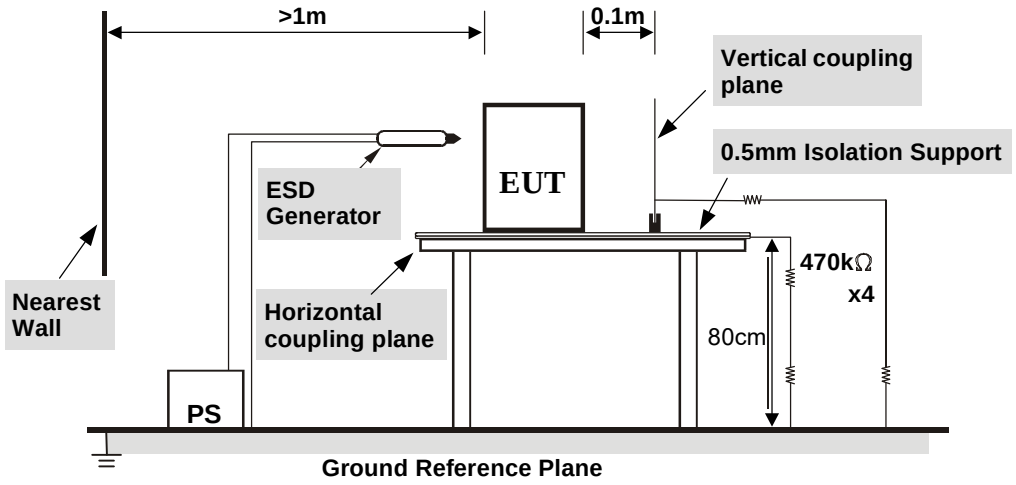


TABLE-TOP EQUIPMENT

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 940kΩ 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.

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

12.4 Test Results

Input Power	230 Vac, 50 Hz	Tested by	Jessica Cheng
Environmental Conditions	24 deg. C, 46 % RH, 1010 mbar	Test Mode	Mode 1

Test Results of Direct Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4, 8	+/-	1-5	NA	Note	A

Description of test points of direct application: Please refer to following page for representative mark only.

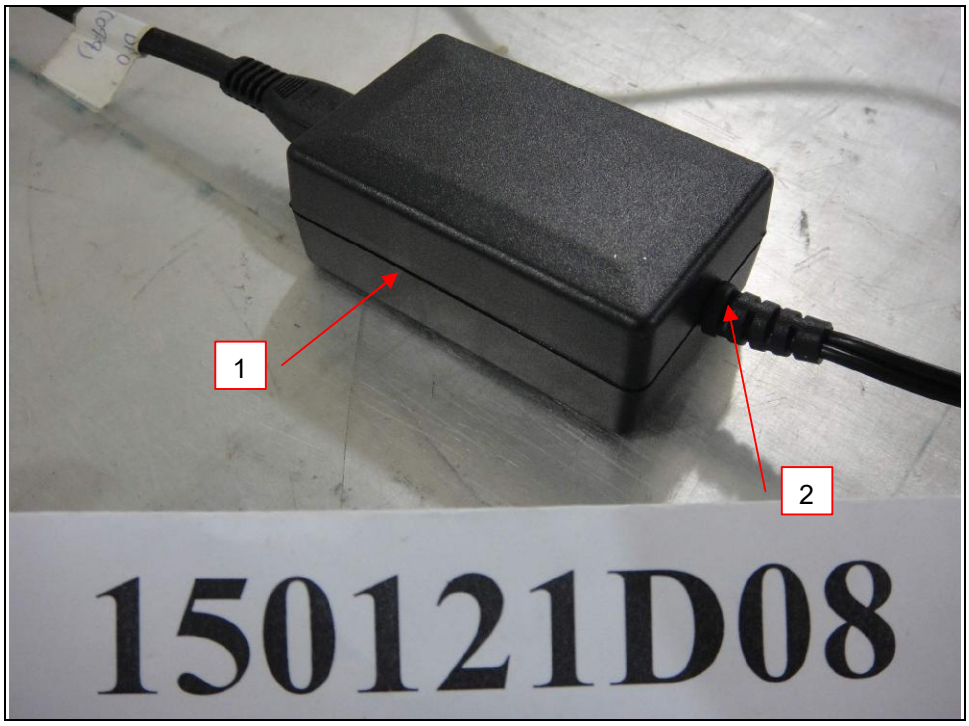
Test Results of Indirect Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	Four Sides	Note	Note	A

Description of test points of indirect application:

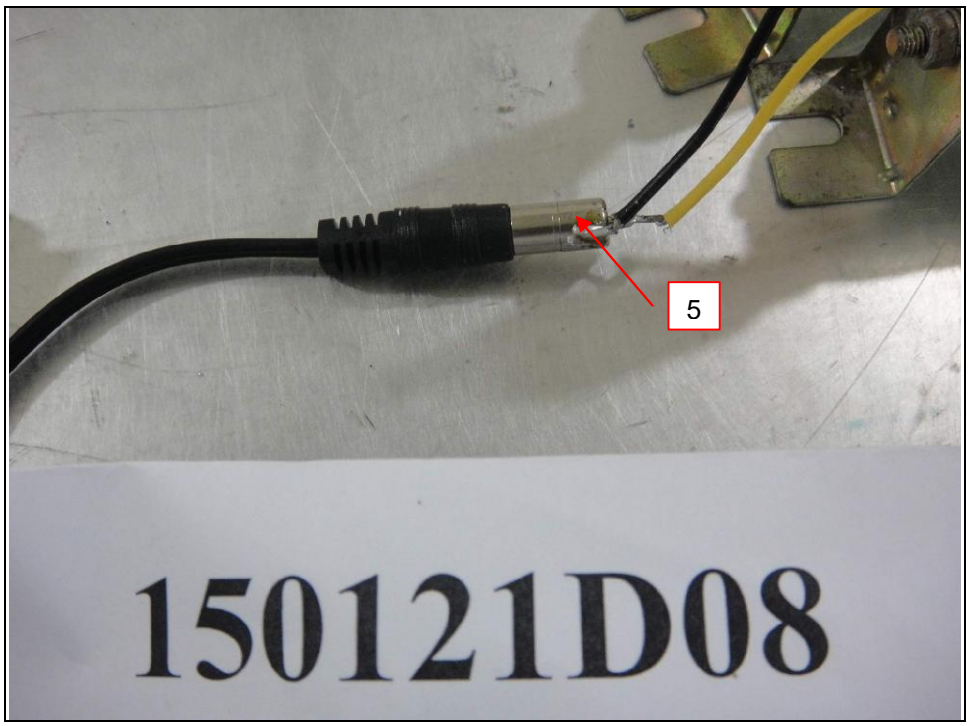
1. Front side 2. Rear side 3. Right side 4. Left side

Note: The EUT function was correct during the test.

Description of Test Points



ESD TEST POINT



13 Radiated, Radio-frequency, Electromagnetic Field Immunity Test (RS)

13.1 Test Specification

Basic Standard:	IEC 61000-4-3
Frequency Range:	80 MHz - 1000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5m
Dwell Time:	3 seconds

13.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Agilent Signal Generator	E8257D	MY48050465	Jul. 18, 2014	Jul. 17, 2015
PRANA RF Amplifier	AP32DP280	0811-894	NA	NA
AR RF Amplifier	150W1000M3	306601	NA	NA
AR RF Amplifier	35S4G8AM4	0326094	NA	NA
AR RF Amplifier	100S1G4M3	0329249	NA	NA
AR Controller	SC1000M3	305910	NA	NA
Radisense Electric Field Sensor	CTR1002A	08D00057SNO-07	Oct. 13, 2014	Oct. 12, 2015
BOONTON RF Voltage Meter	4232A	10180	Jun. 04, 2014	Jun. 03, 2015
BOONTON Power Sensor	51011-EMC	34152	Jun. 05, 2014	Jun. 04, 2015
BOONTON Power Sensor	51011-EMC	34153	Jun. 05, 2014	Jun. 04, 2015
AR Log-Periodic Antenna	AT6080	0329465	NA	NA
EMCO BiconiLog Antenna	3141	1001	NA	NA
AR High Gain Antenna	AT4002A	306533	NA	NA
AR High Gain Horn Antenna	AT4010	0329800	NA	NA
CHANCE MOST Full Anechoic Chamber (9x5x3m)	Chance Most	RS-002	Feb. 06, 2014	Feb. 05, 2015
Software	ADT_RS_V7.6	NA	NA	NA

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in RS Room No.2.
3. Tested Date: Jan. 26, 2015

13.3 Test Arrangement

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

a. The testing was performed in a modified semi-anechoic chamber.

b. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave.

c. The field strength level was 3 V/m.

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

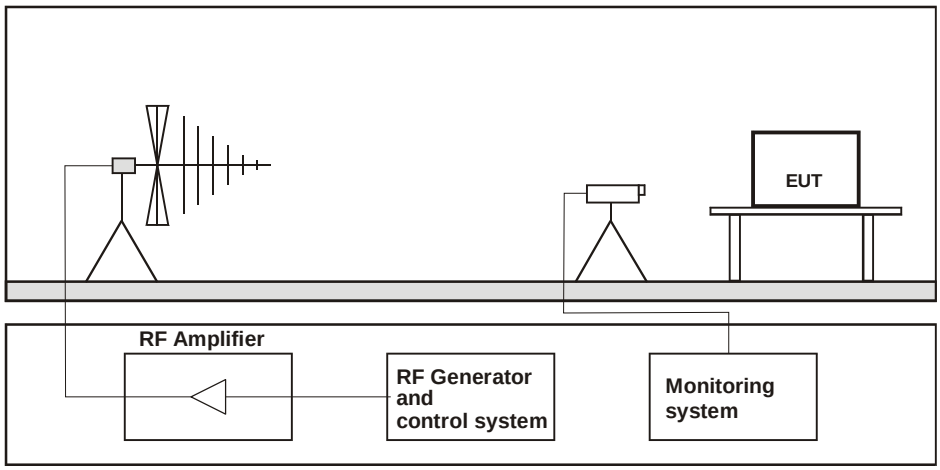


Table-top Equipment

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.

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

13.4 Test Results

Input Power	230 Vac, 50 Hz	Tested by	Jessica Cheng
Environmental Conditions	24 deg. C, 53% RH	Test Mode	Mode 1

Frequency (MHz)	Polarity	Azimuth(°)	Applied Field Strength		Observation	Performance Criterion
			(V/m)	Modulation		
80 -1000	V&H	0	3	80% AM (1kHz)	Note	A
80 -1000	V&H	90	3	80% AM (1kHz)	Note	A
80 -1000	V&H	180	3	80% AM (1kHz)	Note	A
80 -1000	V&H	270	3	80% AM (1kHz)	Note	A

Note: The EUT function was correct during the test.

14 Radio-frequency Electromagnetic Field – KEYED CARRIER Test

14.1 Test Specification

Basic Standard:	IEC 61000-4-3
Frequency Range:	895 MHz - 905 MHz
Field Strength:	3 V/m
Modulation:	Pulse 200 Hz, 50% Duty Cycle
Frequency Step:	1 MHz
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.5 m
Dwell Time:	3 seconds

14.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Agilent Signal Generator	E8257D	MY48050465	Jul. 18, 2014	Jul. 17, 2015
PRANA RF Amplifier	AP32DP280	0811-894	NA	NA
AR RF Amplifier	150W1000M3	306601	NA	NA
AR RF Amplifier	35S4G8AM4	0326094	NA	NA
AR RF Amplifier	100S1G4M3	0329249	NA	NA
AR Controller	SC1000M3	305910	NA	NA
Radisense Electric Field Sensor	CTR1002A	08D00057SNO-07	Oct. 13, 2014	Oct. 12, 2015
BOONTON RF Voltage Meter	4232A	10180	Jun. 04, 2014	Jun. 03, 2015
BOONTON Power Sensor	51011-EMC	34152	Jun. 05, 2014	Jun. 04, 2015
BOONTON Power Sensor	51011-EMC	34153	Jun. 05, 2014	Jun. 04, 2015
AR Log-Periodic Antenna	AT6080	0329465	NA	NA
EMCO BiconiLog Antenna	3141	1001	NA	NA
AR High Gain Antenna	AT4002A	306533	NA	NA
AR High Gain Horn Antenna	AT4010	0329800	NA	NA
CHANCE MOST Full Anechoic Chamber (9x5x3m)	Chance Most	RS-002	Feb. 06, 2014	Feb. 05, 2015
Software	ADT_RS_V7.6	NA	NA	NA

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in RS Room No.2.
3. Tested Date: Jan. 26, 2015

14.3 Test Procedure

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

a. The testing was performed in a fully-anechoic chamber.

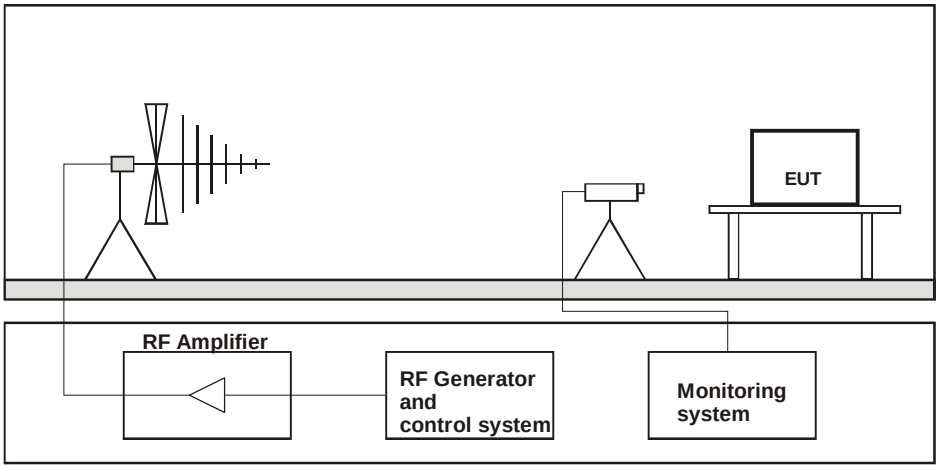
b. The frequency range was from 895 MHz to 905 MHz. The test spot frequencies with keying capability were at 200 Hz, 50 % duty cycle.

c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond, but shall in no case be less than 0,5s.

d. The field strength level was 3V/m.

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

14.4 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.

14.5 Test Results

Input Power	230 Vac, 50 Hz	Tested by	Jessica Cheng
Environmental Conditions	24 deg. C, 53% RH	Test Mode	Mode 1

Frequency (MHz)	Polarity	Azimuth(°)	Applied Field Strength		Observation	Performance Criterion
			(V/m)	Modulation		
895 -905	V&H	0	3	Pulse 200 Hz, 50% Duty Cycle	Note	A
895 -905	V&H	90	3	Pulse 200 Hz, 50% Duty Cycle	Note	A
895 -905	V&H	180	3	Pulse 200 Hz, 50% Duty Cycle	Note	A
895 -905	V&H	270	3	Pulse 200 Hz, 50% Duty Cycle	Note	A

Note: The EUT function was correct during the test.

15 Electrical Fast Transient/Burst Immunity Test (EFT)

15.1 Test Specification

Basic Standard:	IEC 61000-4-4
Test Voltage:	Signal / telecommunication port: N/A Input DC power port: N/A Input AC power port: ±1kV
Impulse Repetition Frequency:	xDSL telecommunication port: 100kHz others: 5kHz
Impulse Wave Shape:	5/50 ns
Burst Duration:	0.75 ms for 100kHz Repetition Frequency 15 ms for 5kHz Repetition Frequency
Burst Period:	300 ms
Test Duration:	1 min.

15.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Haefely, EFT Generator	PEFT 4010	154954	Apr. 16, 2014	Apr. 15, 2015
Haefely,Capacitive Clamp	IP4A	155173	Apr. 16, 2014	Apr. 15, 2015

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EFT Room.
3. Tested Date: Jan. 26, 2015

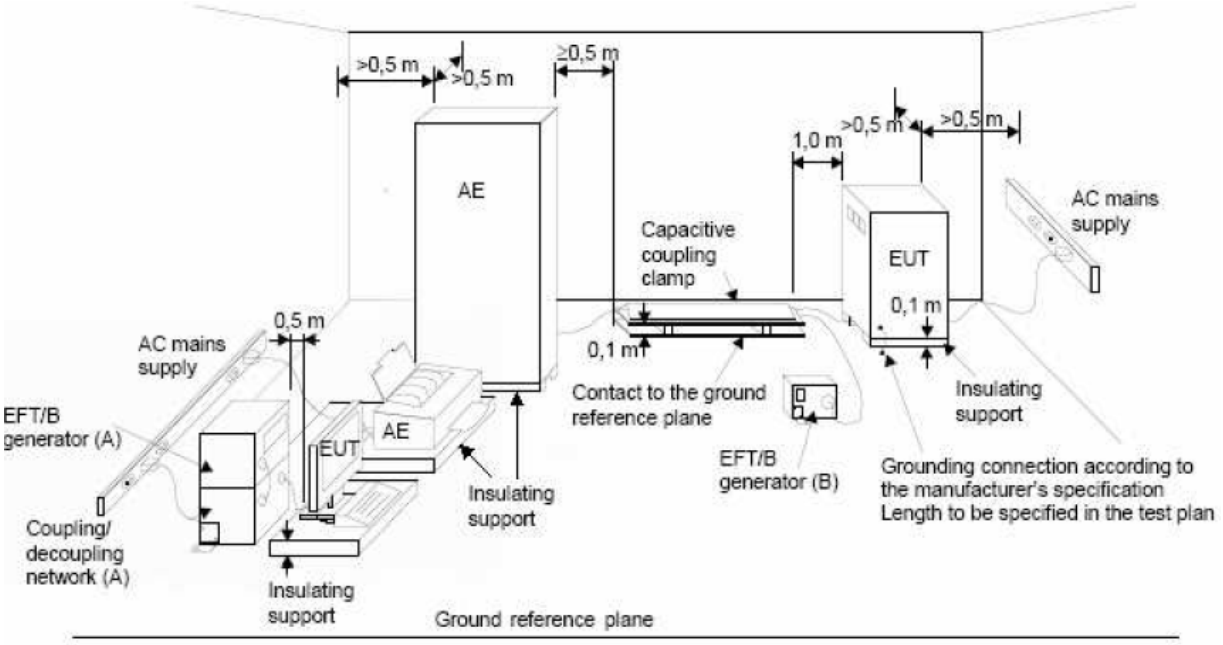
15.3 Test Arrangement

a. Both positive and negative polarity discharges were applied.

b. The distance between any coupling devices and the EUT should be 0.5 m for table-top equipment testing, and 1.0 m for floor standing equipment.

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

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



NOTE:
(A) location for supply line coupling
(B) location for signal lines coupling

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

15.4 Test Results

Input Power	230 Vac, 50 Hz	Tested by	Jessica Cheng
Environmental Conditions	24 deg. C, 55% RH	Test Mode	Mode 1

Input AC power port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
1	L1	+/-	Note	B
1	L2	+/-	Note	B
1	L1-L2	+/-	Note	B

Note: The EUT happens output voltage flicker 1%-2%, but can be self-recoverable after the test.

16 Surge Immunity Test

16.1 Test Specification

Basic Standard:	IEC 61000-4-5
Wave-Shape:	Signal / telecommunication port (direct to outdoor cables*): 10/700 µs Open Circuit Voltage 5/320 µs Short Circuit Current
	Input DC power port (direct to outdoor cables*): 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current
	Input AC power port: 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current
Test Voltage:	Signal and telecommunication ports**: w/o primary protectors: N/A with primary protectors fitted: N/A
	Input DC power port: N/A
	Input AC power ports: Line to line: ±0.5, ±1kV Line to earth or ground: N/A
AC Phase Angle (degree):	0°, 90°, 180°, 270°
Pulse Repetition Rate:	1 time / 20 sec.
Number of Tests:	5 positive and 5 negative at selected points

* This test is only applicable only to ports, which according to the manufacturer's specification, may connect directly to outdoor cables.

** For ports where primary protection is intended, surges are applied at voltages up to 4 kV with the primary protectors fitted. Otherwise the 1 kV test level is applied without primary protection in place.

16.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
KeyTek, Surge Simulator	EMC Pro	9902207	Apr. 29, 2014	Apr. 28, 2015
Coupling Decoupling Network	CDN-UTP8	028	Aug. 18, 2014	Aug. 17, 2015
Software	CEWare32	NA	NA	NA

Notes:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Surge Room.
3. Tested Date: Jan. 26, 2015.

16.3 Test Arrangement

a. Input AC/DC Power ports:

The surge is to be 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 shall be 2 meters in length (or shorter).

For double-insulated products without PE or external earth connections, the test shall be done in a similar way as for grounded products but without adding any additional external grounded connections. If there are no other possible connections to earth, line-to-ground tests may be omitted.

b. Signal and telecommunication ports,

- Unshielded unsymmetrical interconnection lines:

The surge is applied to the lines via the capacitive coupling. The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length.

- Unshielded symmetrical interconnections communication lines:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length.

- High speed communications lines

Prior to the test, the correct operation of the port shall be verified; the external connection shall then be removed and the surge applied directly to the port's terminals with no coupling /decoupling network. After the surge, the correct operation of the port shall again be verified.

- Shielded lines:

- Direct application,

The EUT is isolated from ground and the surge is applied to its metallic enclosure; the termination (or auxiliary equipment) at the port(s) under test is grounded. This test applies to equipment with single or multiple shielded cables.

Rules for application of the surge to shielded lines:

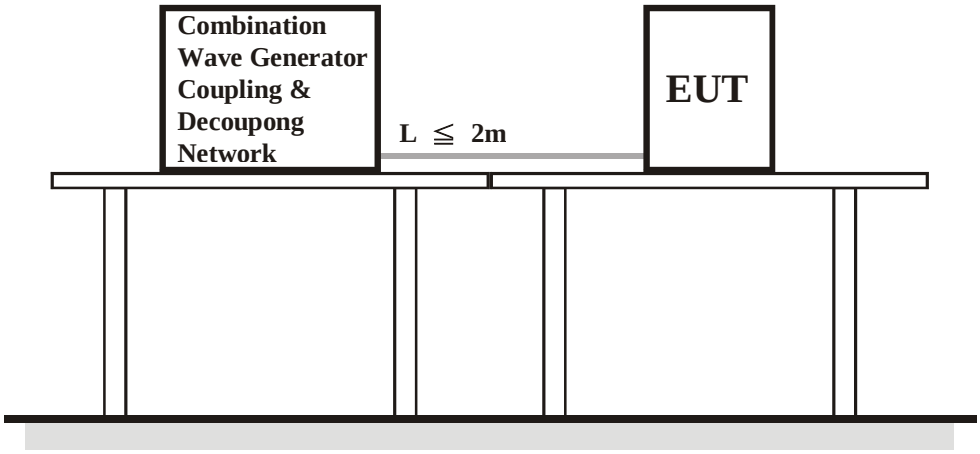
a) Shields grounded at both ends
   - The surge injection on the shield.

b) Shields grounded at one end
   - If in the installation the shield is connected only at the auxiliary equipment, test shall be done in that configuration but with the generator still connected to the EUT side. If cable lengths allow, the cables shall be on insulated supports 0,1 m above the ground plane or cable tray.

For products which do not have metallic enclosures, the surge is applied directly to the shielded cable.

- Alternative coupling method for testing single cables in a multi-shield configuration,

Surges are applied in close proximity to the interconnection cable under test by a wire. The length of the cable between the port(s) under test and the device attached to the other end of the cable shall be the lesser of: the maximum length permitted by the EUT's specification, or 20 m. Where the length exceeds 1 m, excess lengths of cables shall be bundled at the approximate centre of the cables with the bundles 30 cm to 40 cm in length.



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

16.4 Test Results

Input Power	230 Vac, 50 Hz	Tested by	Jessica Cheng
Environmental Conditions	25 deg. C, 56% RH	Test Mode	Mode 1

Input AC power port

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5, 1	L1-L2	+/-	Note	A

Note: The EUT function was correct during the test.

17 Immunity to Conducted Disturbances Induced by RF Fields (CS)

17.1 Test Specification

Basic Standard:	IEC 61000-4-6
Frequency Range:	0.15 MHz - 80 MHz
Voltage Level:	3 V
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Dwell Time	3 seconds

17.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ Signal Generator	SML03	101801	Jan. 05, 2015	Jan. 04, 2016
Digital Sweep Function Generator	8120	984801	NA	NA
AR Power Amplifier	75A250AM1	312196	NA	NA
FCC Coupling Decoupling Network	FCC-801-M3-25A	48	Jun. 23, 2014	Jun. 22, 2015
FCC Coupling Decoupling Network	FCC-801-M3-25A	01022	Jun. 23, 2014	Jun. 22, 2015
FCC Coupling Decoupling Network	FCC-801-M2-16A	01047	Jun. 23, 2014	Jun. 22, 2015
FISCHER CUSTOM COMMUNICATIONS EM Injection Clamp	FCC-203I	50	NA	NA
FISCHER CUSTOM COMMUNICATIONS Current Injection Clamp	F-120-9A	361	NA	NA
EM TEST Coupling Decoupling Network	CDN M1/32A	306508	Jun. 23, 2014	Jun. 22, 2015
TESEQ Coupling Decoupling Network	CDN T800	34428	Jun. 23, 2014	Jun. 22, 2015
FCC Coupling Decoupling Network	FCC-801-T4	02031	Jun. 23, 2014	Jun. 22, 2015
FCC Coupling Decoupling Network	FCC-801-T2	02021	Jun. 23, 2014	Jun. 22, 2015
R&S Power Sensor	NRV-Z5	837878/039	Oct. 28, 2014	Oct. 27, 2015
R&S Power Meter	NRVD	837794/040	Oct. 28, 2014	Oct. 27, 2015
Software	ADT_CS_V7.4.2	NA	NA	NA

Notes:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in CS Room No. 1.
3. Tested Date: Jan. 27, 2015

17.3 Test Arrangement

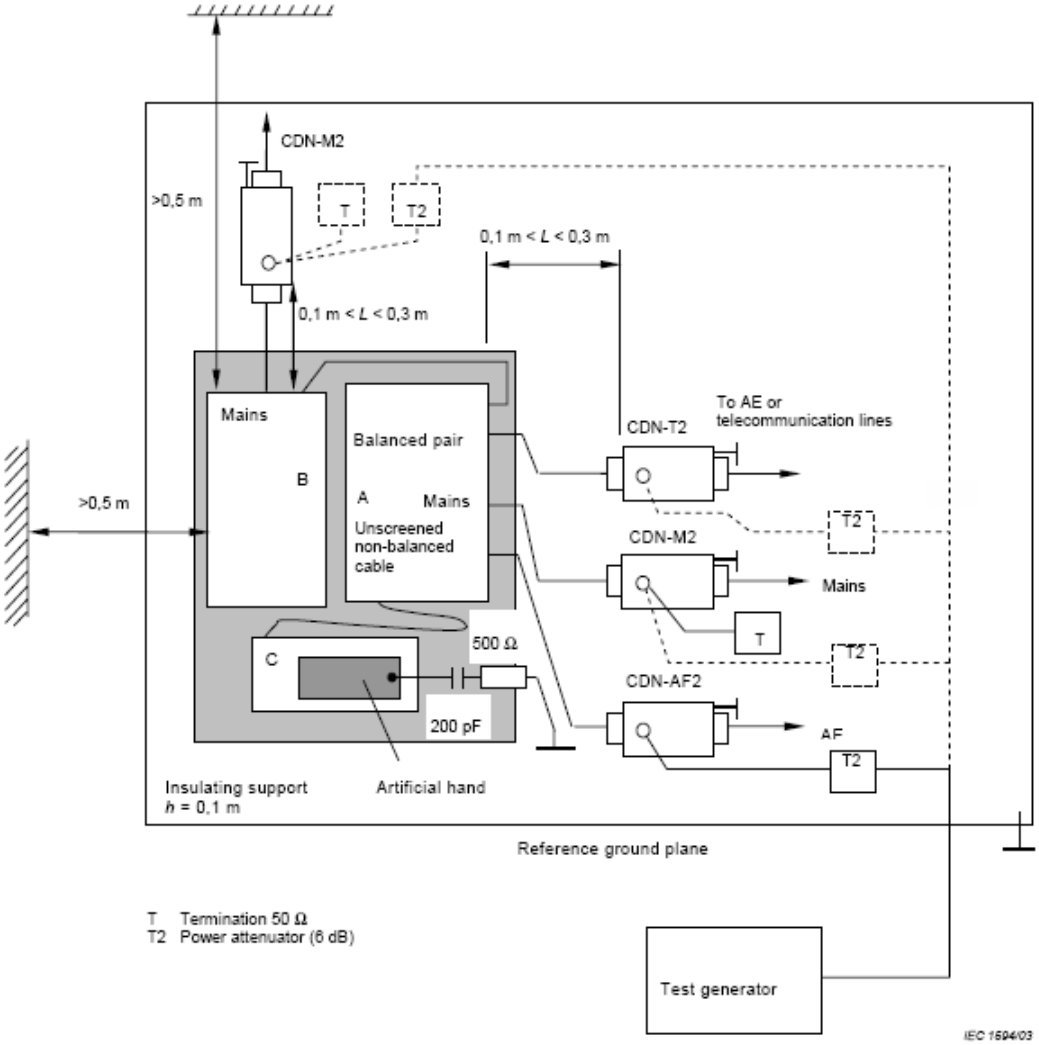
a. The EUT shall be tested within its intended operating and climatic conditions.

b. An artificial hand was placed on the hand-held accessory and connected to the ground reference plane.

c. One of the CDNs not used for injection was terminated with 50 ohm, providing only one return path. All other CDNs were coupled as decoupling networks.

d. The frequency range is 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 is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value.

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



Note: 1.The EUT clearance from any metallic obstacles shall be at least 0,5 m.
2. Interconnecting cables (≦1 m) belonging to the EUT shall remain on the insulating support.
3. The equipment to be tested is 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.

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

17.4 Test Results

Input Power	230 Vac, 50 Hz	Tested by	Jessica Cheng
Environmental Conditions	25 deg. C, 55% RH	Test Mode	Mode 1

Frequency (MHz)	Level (Vrms)	Tested Line	Injection Method	Return Path	Observation	Performance Criterion
0.15 – 80	3	Power	CDN-M2	N/A	Note	A

Note: The EUT function was correct during the test.

18 Power Frequency Magnetic Field Immunity Test

18.1 Test Specification

For EN 55024 only

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

18.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
HAEFELY Magnetic Field Tester	MAG 100	083794-06	NA	NA
COMBINOVA Magnetic Field Meter	MFM10	224	Apr. 28, 2014	Apr. 27, 2015

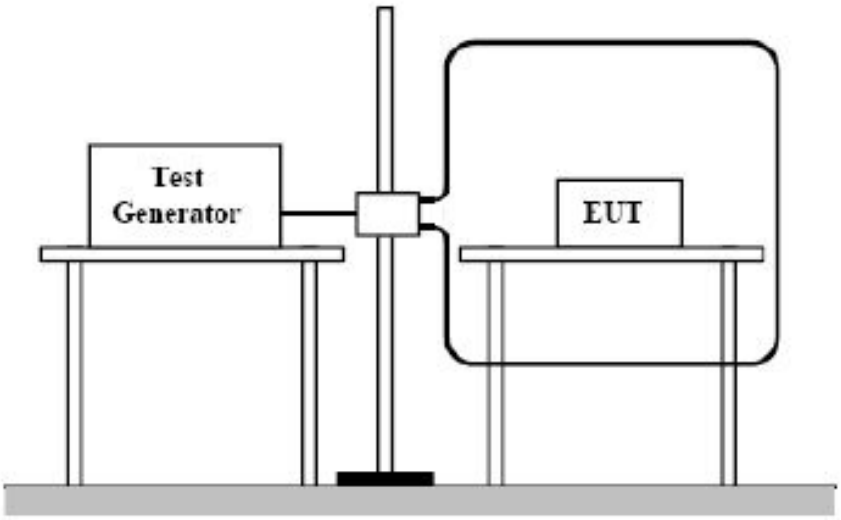
Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS Room No. 1
3. Tested Date: Jan. 26, 2015

18.3 Test Arrangement

a. The equipment is configured and connected to satisfy its functional requirements.

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

c. 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.



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.

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

18.4 Test Results

Input Power	230 Vac, 50 Hz	Tested by	Jessica Cheng
Environmental Conditions	26 deg. C, 54% RH	Test Mode	Mode 1

Application	Frequency (Hz)	Field Strength (A/m)	Observation	Performance Criterion
X - Axis	50	1	Note	A
Y - Axis	50	1	Note	A
Z - Axis	50	1	Note	A

Note: The EUT function was correct during the test.

19 Voltage Dips and Interruptions

19.1 Test Specification

Basic Standard:	IEC 61000-4-11
Test levels: **For EN 61204-3**	Voltage Dips: 30% reduction –10ms 60% reduction –100ms Voltage Interruptions: >95% reduction –5000ms
Test levels: **For EN 55024**	Voltage Dips: >95% reduction – 0.5 period 30% reduction – 25 periods Voltage Interruptions: >95% reduction – 250 periods
Interval between Event:	Minimum ten seconds
Sync Angle (degrees):	0° / 180°
Test Cycle:	3 times

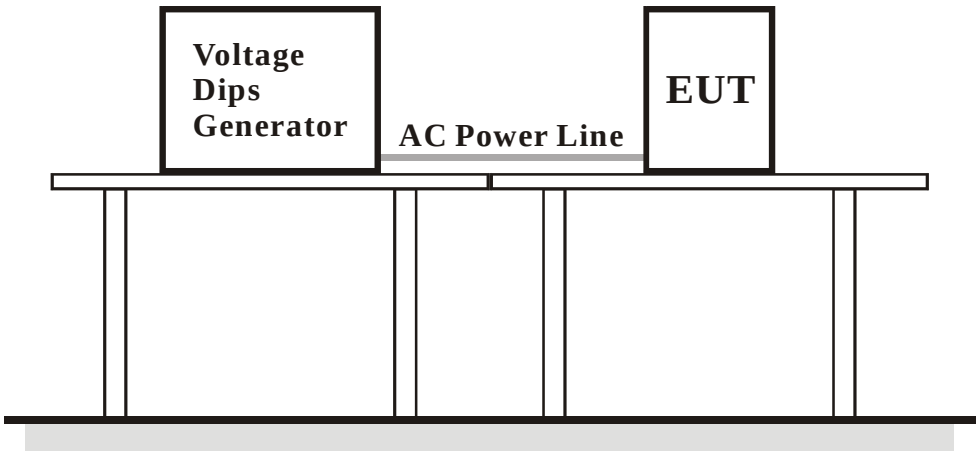
19.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
KeyTek, PQF Generator	EMC Pro	9902207	May. 15, 2014	May. 14, 2015

Notes: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in EMS Room No. 1.
3. Tested Date: Jan. 26, 2015

19.3 Test Arrangement

The EUT shall be tested for each selected combination of test levels and duration with a sequence of 3 dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at 0 dregee crossover point of the voltage waveform.



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

19.4 Test Results

For EN 61204-3

Input Power	100 Vac, 50 Hz, 230 Vac, 50 Hz, 240 Vac, 50 Hz	Tested by	Jessica Cheng
Environmental Conditions	24 deg. C, 53% RH	Test Mode	Mode 1

Input Power for testing: 100 Vac, 50 Hz (Minimum rated input voltage)					
Voltage Reduction (%)	Duration (ms)	Interval (sec)	Times	Observation	Performance Criterion
30	10	10	3	Note 1	A
60	100	10	3	Note 2	B
>95	5000	10	3	Note 2	B

Input Power for testing: 230 Vac, 50 Hz (Nominal input Voltage)					
Voltage Reduction (%)	Duration (ms)	Interval (sec)	Times	Observation	Performance Criterion
30	10	10	3	Note 1	A
60	100	10	3	Note 1	A
>95	5000	10	3	Note 2	B

Input Power for testing: 240 Vac, 50 Hz (Maximum rated input voltage)					
Voltage Reduction (%)	Duration (ms)	Interval (sec)	Times	Observation	Performance Criterion
30	10	10	3	Note 1	A
60	100	10	3	Note 1	A
>95	5000	10	3	Note 2	B

Note: 1. The EUT function was correct during the test.
2. The EUT reset during the test.
.

For EN 55024

Input Power	100 Vac, 50 Hz, 230 Vac, 50 Hz, 240 Vac, 50 Hz	Tested by	Jessica Cheng
Environmental Conditions	24 deg. C, 53% RH	Test Mode	Mode 1

Input Power for testing: 100 Vac, 50 Hz (Minimum rated input voltage)					
Voltage Reduction (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
>95	0.5	10	3	Note 1	A
30	25	10	3	Note 1	A
>95	250	10	3	Note 2	B

Input Power for testing: 230 Vac, 50 Hz (Nominal input Voltage)					
Voltage Reduction (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
>95	0.5	10	3	Note 1	A
30	25	10	3	Note 1	A
>95	250	10	3	Note 2	B

Input Power for testing: 240 Vac, 50 Hz (Maximum rated input voltage)					
Voltage Reduction (%)	Duration (ms)	Interval (sec)	Times	Observation	Performance Criterion
30	10	10	3	Note 1	A
60	100	10	3	Note 1	A
>95	5000	10	3	Note 2	B

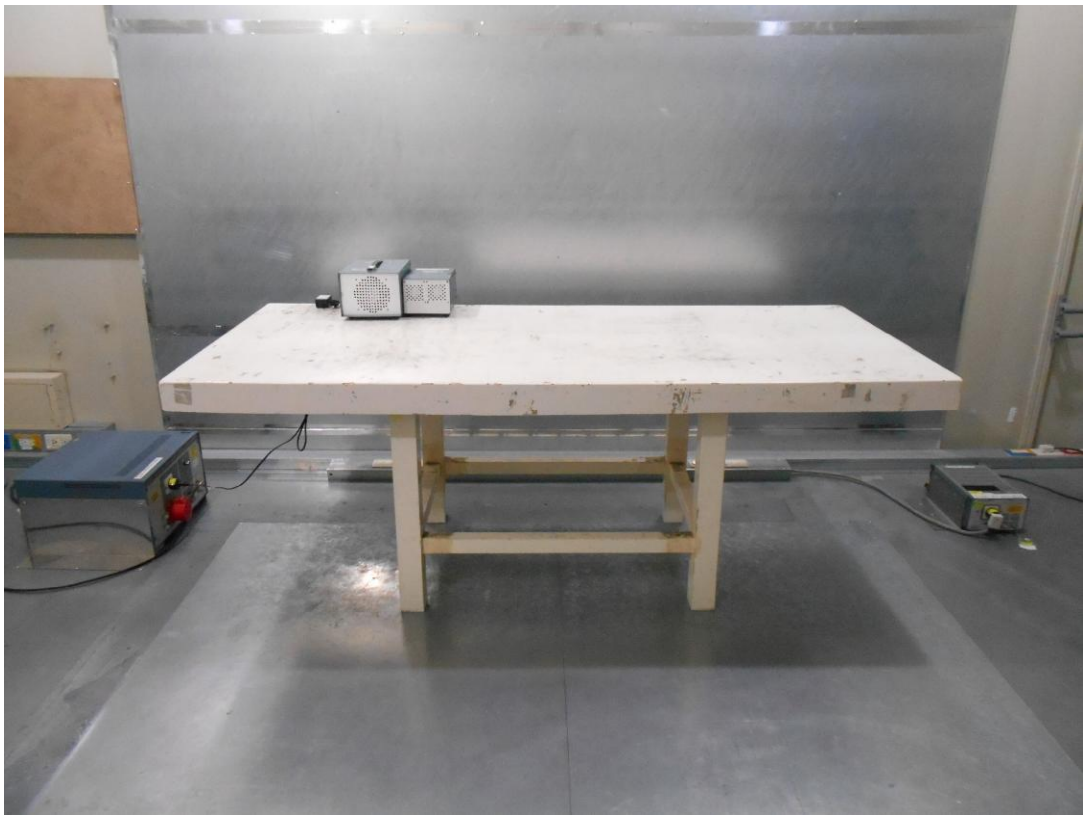
Note: 1. The EUT function was correct during the test.
2. The EUT reset during the test.

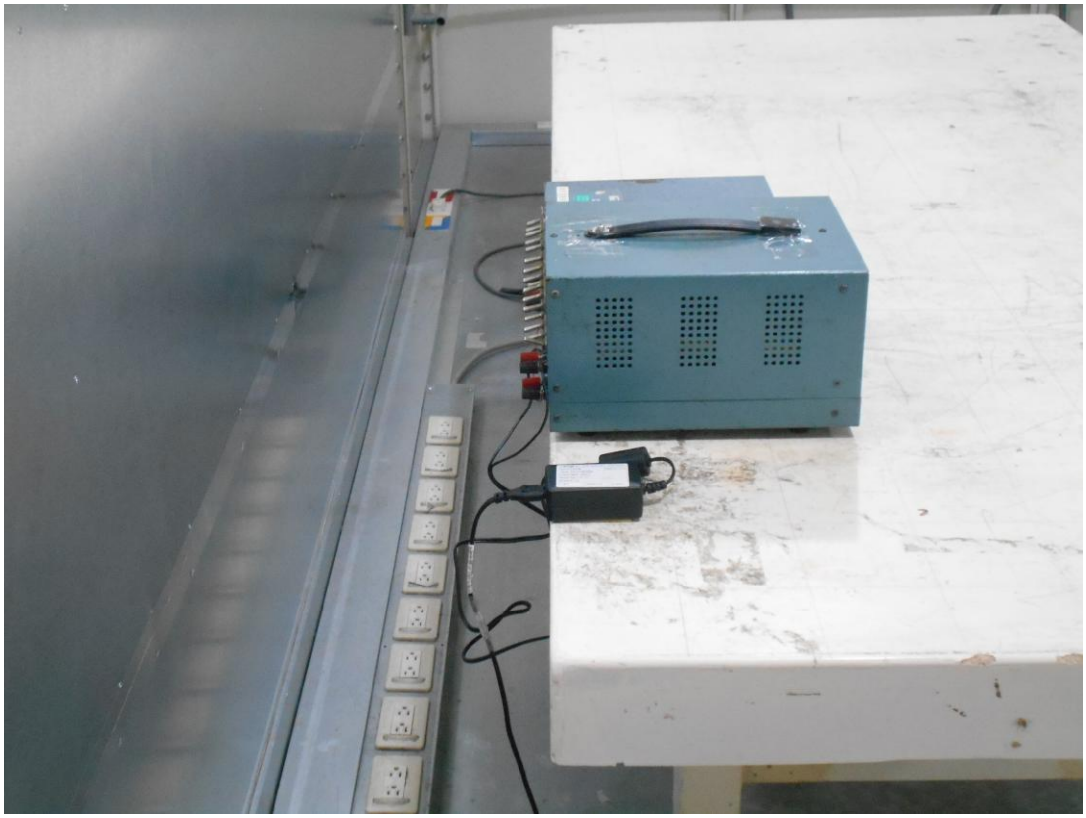
20 Pictures of Test Arrangements

20.1 Conducted Disturbance at Mains Ports <EN 61204-3>

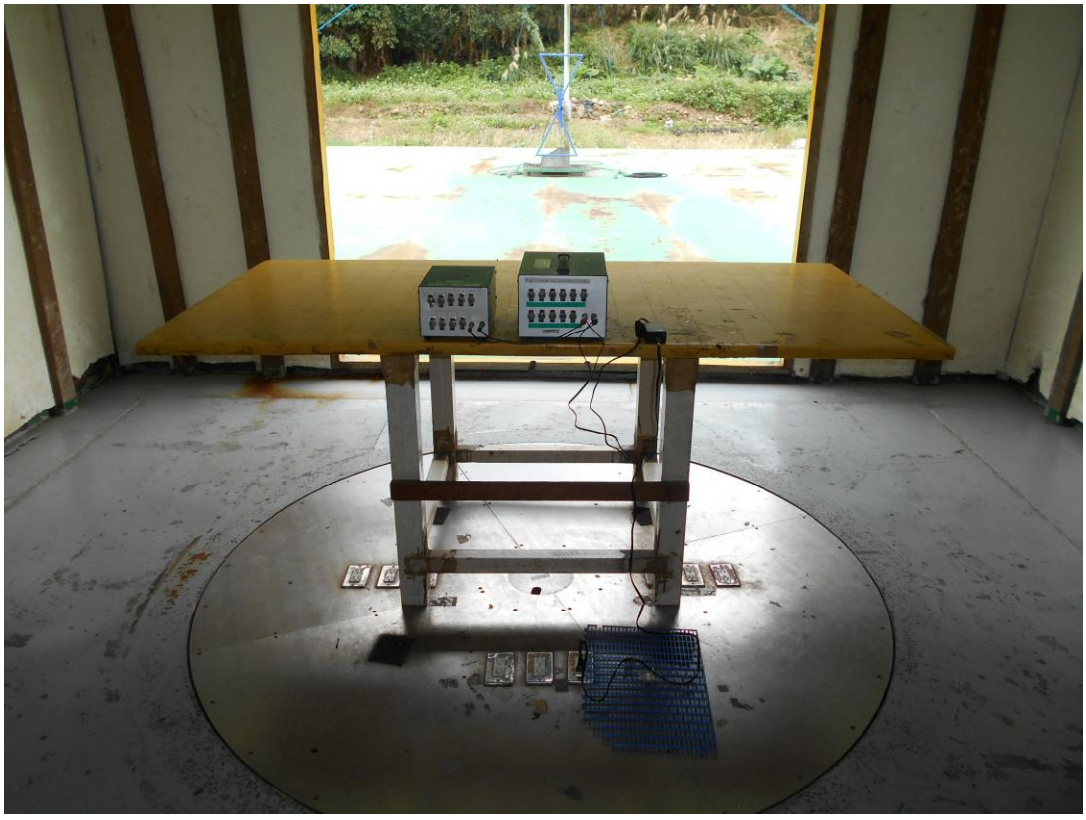
20.2 Radiated Disturbance up to 1 GHz <EN 61204-3>

20.3 Conducted Emission from the AC Mains Power Port <EN 55032>





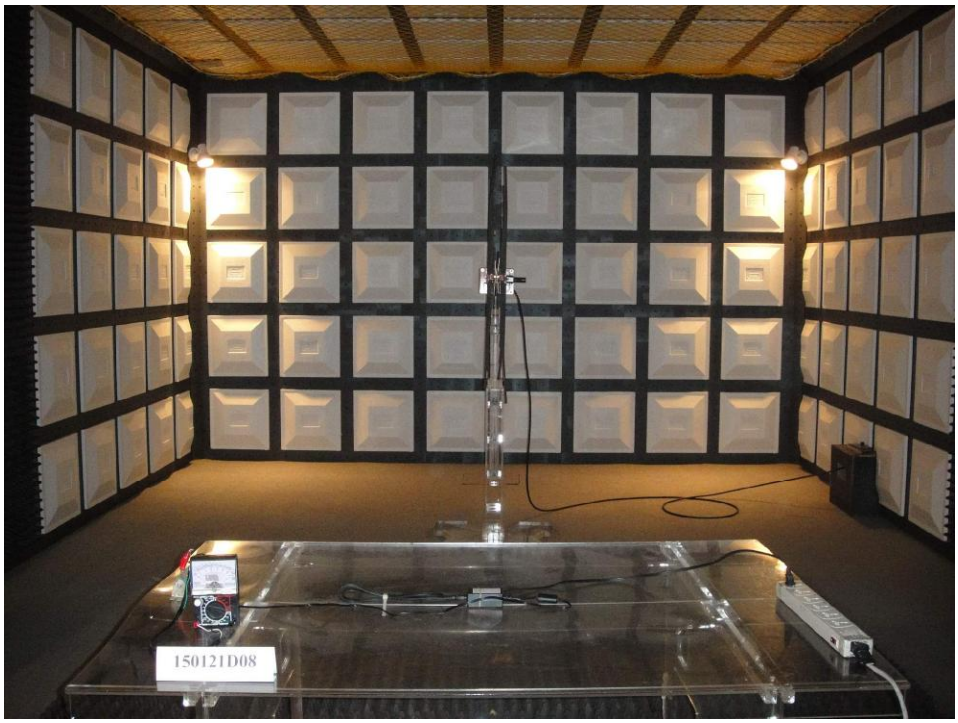
20.4 Radiated Emission at Frequencies up to 1GHz <EN 55032>

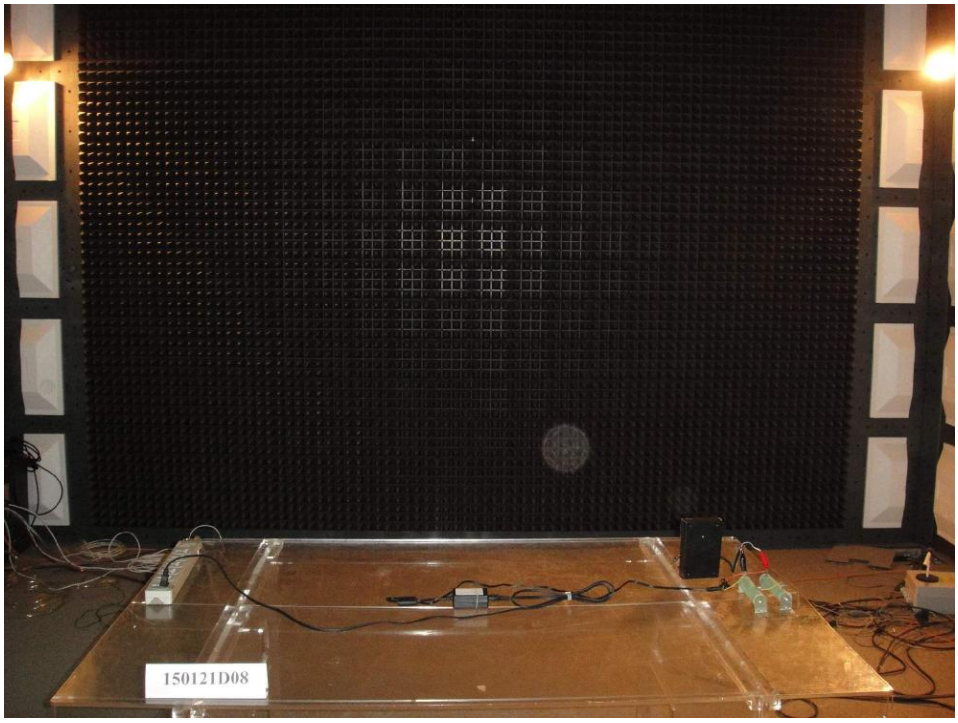


20.5 Harmonics Current, Voltage Fluctuations and Flicker Measurement

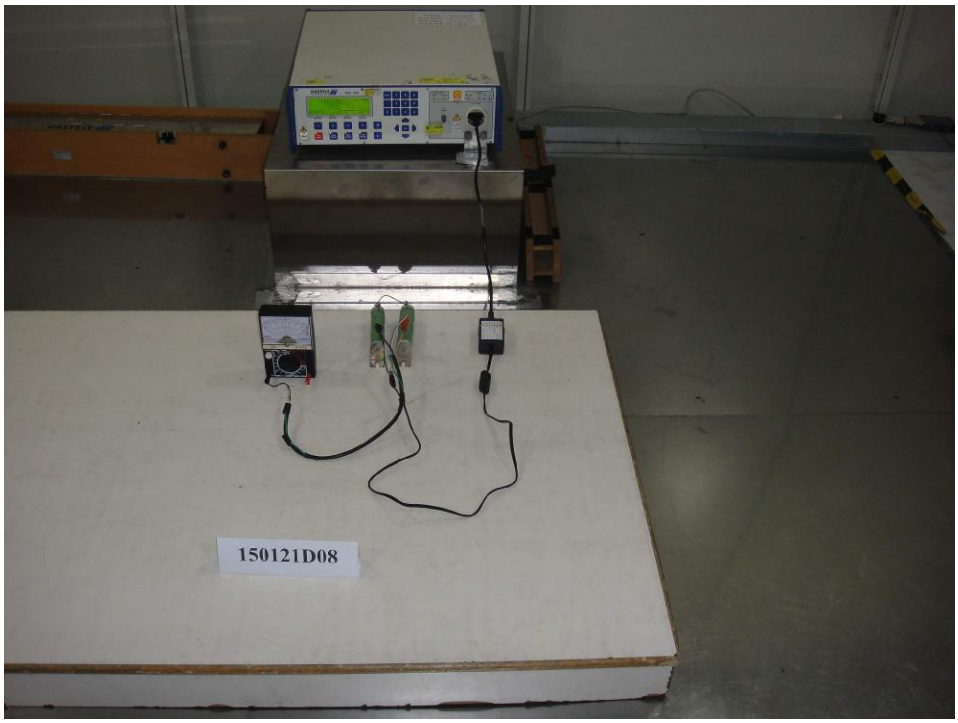
20.6 Electrostatic Discharge Immunity Test (ESD)

20.7 Radio-frequency, Electromagnetic Field Immunity Test (RS)

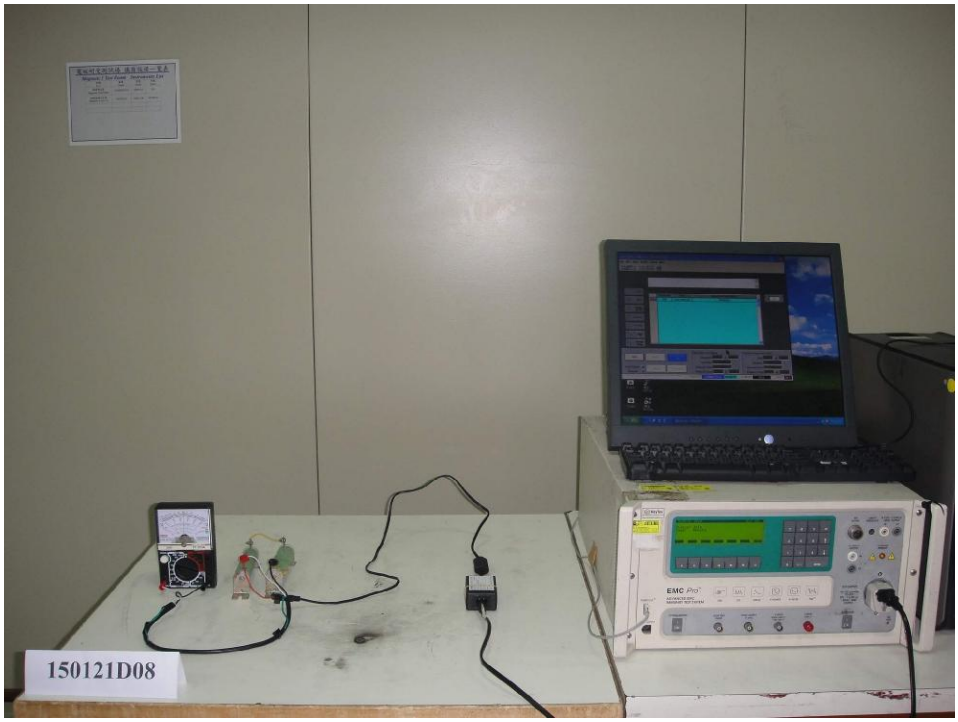




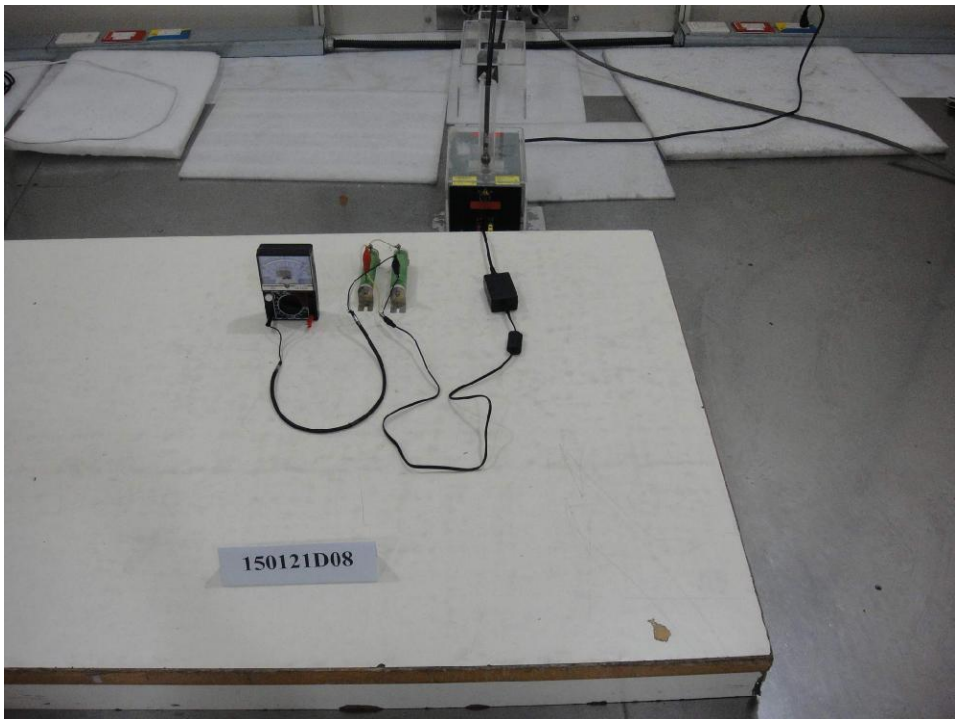
20.8 Electrical Fast Transient/Burst Immunity Test (EFT)



20.9 Surge Immunity Test

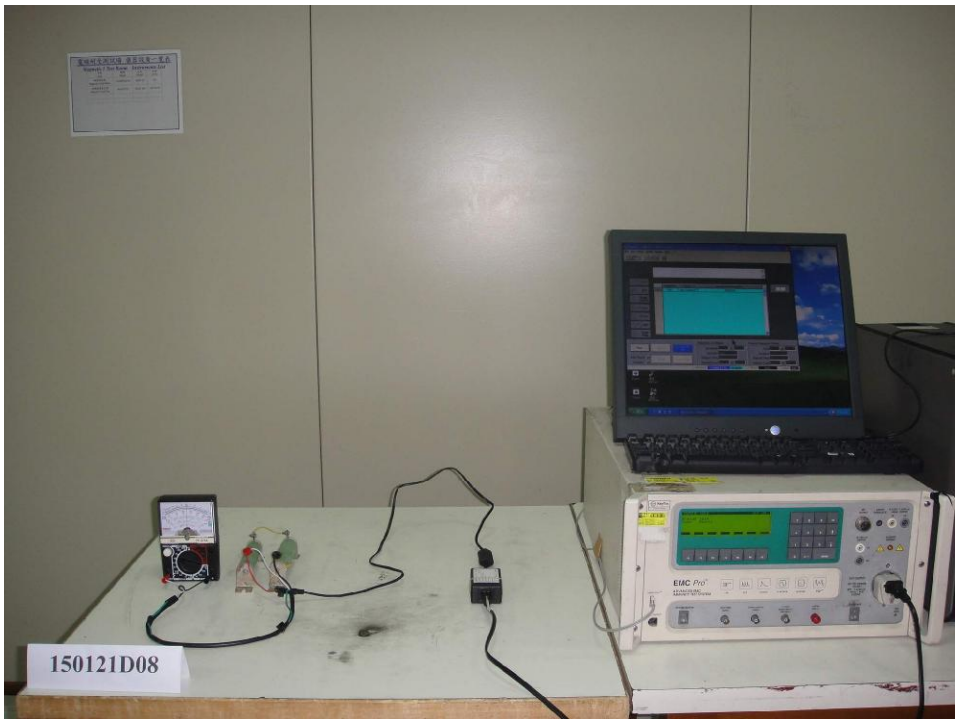


20.10 Conducted Disturbances Induced by RF Fields (CS)



20.11 Power Frequency Magnetic Field Immunity Test (PFMF) - For EN 55024 only

20.12 Voltage Dips and Interruptions



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