Certificate of Test

December 2015

KAGA ELECTRONICS (USA) INC

Product Name : AC Adapter
Model Number : 1)KTPSxx-yyyyyDT-2P- VI (for Desktop Equipment)
2)KTPSxx-yyyyyzz-VI (for Direct Plug-In Equipment)
(xx can be 18 or 24 for output watt; yyyyy can be 05040, 06035, 06040, 07030, 07530, 09025, 12020, 15016 (When xx=24W) and 05030,06025, 06030, 07025, 07525, 09022, 100190, 11016, 12016, 15013, 16012, 18011, 24008.(When xx = 18W). zz can be WA/EU/UK/AU/CN/KR/MP ;WA is US plug, EU is EU plug, UK is UK plug, AU is AU plug. MP is for Snap-fit plug with AU, UK, CN, EU, KR or US plug)
Test Report Number : 1512017E-01
Date of Test : July 07, 2015 – August 20, 2015

This product was tested according to the standards as below at the laboratory of Global EMC Standard Tech. Corp..

In accordance with 2004/108/EC -EMC Directive
Standards:
EN 55022: 2010+AC: 2011 , Class B
EN 55024: 2010, IEC 61000-4 Series
EN 61000-3-2: 2014 &EN 61000-3-3: 2013
AS/NZS CISPR 22: 2009+A1: 2010

http : //www.gestek.com.tw

Sharon Chang, President

GLOBAL EMC STANDARD TECH. CORP.
No.3, Baodoucuokeng, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
TEL:886-2-2603-5321
FAX:886-2-2603-5325

Issue Date: December 29, 2015

Declaration of Conformity

We, Manufacturer/Importer
(full address)

declare that the product
(description of the apparatus, system, installation to which it refers)

EUT: AC Adapter

Model Number: 1)KTPSxx-yyyyyDT-2P- VI (for Desktop Equipment)
2)KTPSxx-yyyyyzz-VI (for Direct Plug-In Equipment)
(xx can be 18 or 24 for output watt; yyyyy can be 05040, 06035, 06040, 07030, 07530, 09025, 12020, 15016 (When xx=24W) and 05030,06025, 06030, 07025, 07525, 09022, 100190, 11016, 12016, 15013, 16012, 18011, 24008.(When xx = 18W). zz can be WA/EU/UK/AU/CN/KR/MP ;WA is US plug, EU is EU plug, UK is UK plug, AU is AU plug. MP is for Snap-fit plug with AU, UK, CN, EU, KR or US plug)

is in conformity with
(reference to the specification under which conformity is declared)
in accordance with 2004/108/EC-EMC Directive

☐ **EN 55011**	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) high frequency equipment	☒ **EN 61000-3-2**	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase
☐ **EN 55013**	Limits and methods of measurement Information Technology of radio disturbance characteristics of broadcast receivers and associated equipment	☒ **EN 61000-3-3**	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection
☒ **EN 55022**	Limits and methods of measurement of radio disturbance characteristics of information technology equipment	☒ **EN 55024**	Information Technology equipment-Immunity characteristics-Limits and methods of measurement
☐ **EN 55014-1**	Limits and methods of measurement of radio disturbance characteristics of household electrical appliances, portable tools and similar electrical apparatus	☐ **EN 61000-6-1**	Generic standards-Immunity for residential, commercial and light-industrial environments
		☐ **EN 61000-6-2**	Generic standards-Immunity for industrial environments
☐ **EN 61000-6-3**	Generic standards-Emission standard for residential, commercial and light-industrial environments	☐ **EN 55014-2**	Immunity requirements for household appliances tools and similar apparatus
☐ **EN 61000-6-4**	Generic standards-Emission standard for industrial environments	☐ **EN 50091- 2**	EMC requirements for uninterruptible power systems (UPS)
☐ **EN 55015**	Limits and methods of measurement of radio disturbance characteristics of fluorescent lamps and luminaries	☐ **EN 55020**	Immunity from radio interference of broadcast receivers and associated equipment
		☐ **EN 61204-3**	Low voltage power supplies, d.c. output - Part 3: Electromagnetic compatibility. (EMC)
☐ **DIN VDE 0855** ☐ **part 10** ☐ **part 12**	Cabled distribution systems; Equipment for receiving and/or distribution from sound and television signals		
☒ **CE marking**	CE (EC conformity marking)		

The manufacturer also declares the conformity of above mentioned product with the actual required safety standards in accordance with LVD 2006/95/EC

☐ **EN 60065**	Safety requirements for mains operated electronic and related apparatus for household and similar general use	☐ **EN 60950**	Safety for information technology equipment including electrical business equipment
☐ **EN 60335**	Safety of household and similar electrical appliances	☐ **EN 50091-1**	General and Safety requirements for uninterruptible power systems (UPS)

Manufacturer/Importer

Signature: _____

(Stamp)

Date:

Name: _____

European Union [EU]
EMC Directive [2004/108/EC, As Amended]

EMC Test Report
For:

KAGA ELECTRONICS (USA) INC

EUT: AC Adapter

Model Number: 1)KTPSxx-yyyyyDT-2P- VI (for Desktop Equipment) 2)KTPSxx-yyyyyzz-VI (for Direct Plug-In Equipment) (xx can be 18 or 24 for output watt; yyyyy can be 05040, 06035, 06040, 07030, 07530, 09025, 12020, 15016 (When xx=24W) and 05030,06025, 06030, 07025, 07525, 09022, 100190, 11016, 12016, 15013, 16012, 18011, 24008.(When xx = 18W). zz can be WA/EU/UK/AU/CN/KR/MP ;WA is US plug, EU is EU plug, UK is UK plug, AU is AU plug. MP is for Snap-fit plug with AU, UK, CN, EU, KR or US plug)

Prepared for:
KAGA ELECTRONICS (USA) INC
780 Montague Expy, Suite 403, San Jose, CA 95131 USA

Report By : Global EMC Standard Tech. Corp.
No.3, Baodoucuokeng, Linkou Dist.,
New Taipei City 244, Taiwan(R.O.C.)
Tel : 886-2-2603-5321
Fax: 886-2-2603-5325

TABLE OF CONTENTS

1. CERTIFICATION

Applicant : KAGA ELECTRONICS (USA) INC
EUT Description : AC Adapter
Model Number : 1)KTPSxx-yyyyyDT-2P- VI (for Desktop Equipment)
2)KTPSxx-yyyyyzz-VI (for Direct Plug-In Equipment)
(xx can be 18 or 24 for output watt; yyyyy can be 05040, 06035, 06040, 07030, 07530, 09025, 12020, 15016 (When xx=24W) and 05030,06025, 06030, 07025, 07525, 09022, 100190, 11016, 12016, 15013, 16012, 18011, 24008.(When xx = 18W). zz can be WA/EU/UK/AU/CN/KR/MP ;WA is US plug, EU is EU plug, UK is UK plug, AU is AU plug. MP is for Snap-fit plug with AU, UK, CN, EU, KR or US plug)
Serial Number : N/A
Brand Name : KAGA

STANDARDS OF TEST METHOD:

EN 55022: 2010+AC: 2011 AND
EN 61000-3-2:2014 & EN 61000-3-3: 2013
EN 55024: 2010 AND EN 61000-4 SERIES REGULATIONS
AS/NZS CISPR 22: 2009+A1: 2010

GENERAL REMARKS:

The tests were performed according to the technical requirement of EUT.

- ☒ Electro-magnetic Radiated Emission Interference Measurement (EN 55022)
- ☒ Electro-magnetic Conducted Emission Interference Measurement (EN 55022)
- ☒ Harmonic Current Emissions (EN 61000-3-2)
- ☒ Voltage Fluctuation and Flicker Measurement (EN 61000-3-3)
- ☒ ESD Immunity Test ((IEC 61000-4-2)
- ☒ RF Field strength Susceptibility Test (IEC 61000-4-3)
- ☒ Electrical Fast Transient/Burst Immunity Test (IEC 61000-4-4)
- ☒ Surge Immunity Test (IEC 61000-4-5)
- ☒ Conducted disturbance Susceptibility Test (IEC 61000-4-6)
- ☒ Power Frequency Magnetic Field Immunity Test (IEC 61000-4-8)
- ☒ Voltage Dips/Short Interruptions Test (IEC 61000-4-11)

☑ AS/NZS CISPR 22 Limits and Methods of Measurement of Radio disturbance characteristics of Information Technology equipment : 2009+A1: 2010

Sample Received Data : June 26, 2015
Date of Test : July 07, 2015 – August 20, 2015
Issue Date : December 29, 2015

In order to ensure the quality and accuracy of this document, the contents have been thoroughly reviewed by the following qualified personnel from Global EMC Standard Tech. Corp. Lab.

Documented By:

Mandy Chen / Report Author

Tested By:

Eric Tsai / eng. Dept. Supervisor

Approved By:

Tony Tsai / Director

2. SUMMARY OF TEST RESULTS

STANDARD	TEST ITEM	TEST RESULT	REMARKS
EN 55022 Class B (1)AS/NZS CISPR 22 (for C-Tick)	Conducted emission (Mode 47)	PASS	The worst emission frequency is 0.1990MHz And minimum passing margin is –4.29dB The measurement uncertainty is 3.88 dB.
	Radiated emission (Mode 47)	PASS	The worst emission frequency is 120.0360 MHz at Vertical. And minimum passing margin is –7.43 dB. Height of antenna is 100cm. Angle of turntable is 239°. The measurement uncertainty is 4.10 dB.
EN 61000-3-2:2014	Harmonic Current Emissions	PASS	Note: EUT power level is below 75 Watts and therefore has no defined limits The measurement uncertainty is 9.23 mA
EN 61000-3-3: 2013	Voltage Fluctuation and Flicker Measurement	PASS	The Value of Pst shall not be greater than 1.0 The measurement uncertainty is 0.02 %
EN 55024 IEC 61000-4-2:2008	Electrostatic Discharge(ESD)	PASS	Contact discharge up to ±4kV . Air discharge up to ±8kV .
EN 55024 IEC 61000-4-3:2006+A1:2007+A2:2010	RF field strength Susceptibility	PASS	80-1000MHz (1kHz sinewave with 80% Amplitude Modulation: 3V/m)
EN 55024 IEC 61000-4-4:2012	Electrical Fast Transients/Burst	PASS	±0.5kV, ±1.0kV (AC Input)
EN 55024 IEC 61000-4-5: 2014	Surge	PASS	±0.5kV, ±1kV, ±2kV ((AC Input)
EN 55024 IEC 61000-4-6:2013	Conducted Disturbance Susceptibility	PASS	0.15-80MHz (1kHz sinewave with 80% Amplitude Modulation: 3V)
EN 55024 IEC 61000-4-8:2009	Magnetic Field Measurement	PASS	1A/m at 50Hz
EN 55024 IEC 61000-4-11: 2004	Voltage short Interruptions	PASS	>95% reduction, 5s at 50/60Hz
	Voltage Dips		>95% reduction, 10 ms at 50Hz >95% reduction, 8.33 ms at 60Hz 30% reduction, 500 ms at 50/60Hz

2.1 UNCERTAINTY DESCRIPTION

According to CISPR 16-4-2,
The measure level is compliance with the limit if

Lm < Llim and Lm + U(Lm)< Llim+Ucispr= Leff

Where,
Ucispr= Uncertainty value specified in Table 1 of CISPR 16-4-2

Measurement		U_{cispr}
Conducted disturbance (mains port)	(150 kHz – 30 MHz)	3.6 dB
Radiated disturbance (OATS or ATS)	(30 MHz – 1000 MHz)	5.2 dB

Lm = Measure value
Llim = Emission limit level
U(Lm) = Uncertainty value of test laboratory
Leff = Effective emission limit level

The above stated condition will be taking as a criterion for pass/fail determination.

3. GENERAL INFORMATION

3.1 PRODUCT DESCRIPTION

Product Name	:	AC Adapter
Model Number	:	1)KTPSxx-yyyyyDT-2P- VI (for Desktop Equipment) 2)KTPSxx-yyyyyzz-VI (for Direct Plug-In Equipment) (xx can be 18 or 24 for output watt; yyyyy can be 05040, 06035, 06040, 07030, 07530, 09025, 12020, 15016 (When xx=24W) and 05030,06025, 06030, 07025, 07525, 09022, 100190, 11016, 12016, 15013, 16012, 18011, 24008.(When xx = 18W). zz can be WA/EU/UK/AU/CN/KR/MP ;WA is US plug, EU is EU plug, UK is UK plug, AU is AU plug. MP is for Snap-fit plug with AU, UK, CN, EU, KR or US plug)
Serial Number	:	N/A
Applicant	:	KAGA ELECTRONICS (USA) INC
Address	:	780 Montague Expy, Suite 403, San Jose, CA 95131 USA
Manufacturer	:	Boayang Electronics Co., Ltd.
Address	:	Di Feng Gong Yu Qu 2 Hao Xiasha Liuwu Village, Shipai Town Dong Guan City P. R. China
Power Supply	:	KTPS18-yyyyyDT-2P- VI and KTPS18-yyyyyzz-VI Input :100-240Vac, 50-60Hz, 0.48A KTPS24-yyyyyDT-2P- VI and KTPS24-yyyyyzz-VI Input :100-240Vac, 50-60Hz, 0.58A

3.2 TEST MODES & EUT COMPONENTS DESCRIPTION

EUT: AC Adapter, M/N: 1)KTPSxx-yyyyyDT-2P- VI (for Desktop Equipment)
2)KTPSxx-yyyyyzz-VI (for Direct Plug-In Equipment)
(xx can be 18 or 24 for output watt; yyyyy can be 05040, 06035, 06040, 07030, 07530, 09025, 12020, 15016 (When xx=24W) and 05030,06025, 06030, 07025, 07525, 09022, 100190, 11016, 12016, 15013, 16012, 18011, 24008.(When xx = 18W). zz can be WA/EU/UK/AU/CN/KR/MP ;WA is US plug, EU is EU plug, UK is UK plug, AU is AU plug. MP is for Snap-fit plug with AU, UK, CN, EU, KR or US plug)

Test Mode	**Mode 1- Full Load (Pre-Scan Mode)**	**Mode 2- Full Load (Pre-Scan Mode)**	**Mode 3- Full Load (Pre-Scan Mode)**
Test Model Number	**KTPS24-05040DT-2P-VI**	**KTPS24-06035DT-2P-VI**	**KTPS24-06040DT-2P-VI**
Test Mode	**Mode 4- Full Load (Pre-Scan Mode)**	**Mode 5- Full Load (Pre-Scan Mode)**	**Mode 6- Full Load (Pre-Scan Mode)**
Test Model Number	**KTPS24-07030DT-2P-VI**	**KTPS24-07530DT-2P-VI**	**KTPS24-09025DT-2P-VI**
Test Mode	**Mode 7- Full Load (Pre-Scan Mode)**	**Mode 8- Full Load (Pre-Scan Mode)**	**Mode 9- Full Load (Worst Case)**
Test Model Number	**KTPS24-12020DT-2P-VI**	**KTPS24-15016DT-2P-VI**	**KTPS24-24010DT-2P-VI**
Test Mode	**Mode 10- Full Load (Pre-Scan Mode)**	**Mode 11- Full Load (Pre-Scan Mode)**	**Mode 12- Full Load (Pre-Scan Mode)**
Test Model Number	**KTPS24-48005DT-2P-VI**	**KTPS18-05030DT-2P-VI**	**KTPS18-06025DT-2P-VI**
Test Mode	**Mode 13- Full Load (Pre-Scan Mode)**	**Mode 14- Full Load (Pre-Scan Mode)**	**Mode 15- Full Load (Pre-Scan Mode)**
Test Model Number	**KTPS18-06030DT-2P-VI**	**KTPS18-07025DT-2P-VI**	**KTPS18-07525DT-2P-VI**
Test Mode	**Mode 17- Full Load (Pre-Scan Mode)**	**Mode 18- Full Load (Pre-Scan Mode)**	
Test Model Number	**KTPS18-09022DT-2P-VI**	**KTPS18-10019DT-2P-VI**	
Test Mode	**Mode 19- Full Load (Pre-Scan Mode)**	**Mode 20- Full Load (Pre-Scan Mode)**	**Mode 21- Full Load (Pre-Scan Mode)**
Test Model Number	**KTPS18-11016DT-2P-VI**	**KTPS18-12016DT-2P-VI**	**KTPS18-15013DT-2P-VI**
Test Mode	**Mode 22- Full Load (Pre-Scan Mode)**	**Mode 23- Full Load (Pre-Scan Mode)**	**Mode 24- Full Load (Worst Case)**
Test Model Number	**KTPS18-16012DT-2P-VI**	**KTPS18-18011DT-2P-VI**	**KTPS18-24008DT-2P-VI**
Test Mode	**Mode 25- Full Load (Pre-Scan Mode)**	**Mode 26- Full Load (Pre-Scan Mode)**	**Mode 27- Full Load (Pre-Scan Mode)**
Test Model Number	**KTPS24-05040WA-VI**	**KTPS24-06035WA-VI**	**KTPS24-06040WA-VI**
Test Mode	**Mode 28- Full Load (Pre-Scan Mode)**	**Mode 29- Full Load (Pre-Scan Mode)**	**Mode 30- Full Load (Pre-Scan Mode)**
Test Model Number	**KTPS24-07030WA-VI**	**KTPS24-07530WA-VI**	**KTPS24-09025WA-VI**
Test Mode	**Mode 31- Full Load (Pre-Scan Mode)**	**Mode 32- Full Load (Pre-Scan Mode)**	**Mode 33- Full Load (Worst Case)**
Test Model Number	**KTPS24-12020WA-VI**	**KTPS24-15016WA-VI**	**KTPS24-24010WA-VI**
Test Mode	**Mode 34- Full Load (Pre-Scan Mode)**	**Mode 35- Full Load (Pre-Scan Mode)**	**Mode 36- Full Load (Worst Case)**
Test Model Number	**KTPS24-48005WA-VI**	**KTPS18-05030WA-VI**	**KTPS18-06025WA-VI**
Test Mode	**Mode 37- Full Load (Pre-Scan Mode)**	**Mode 38- Full Load (Pre-Scan Mode)**	**Mode 39- Full Load (Pre-Scan Mode)**
Test Model Number	**KTPS18-06030WA-VI**	**KTPS18-07025WA-VI**	**KTPS18-07525WA-VI**
Test Mode	**Mode 40- Full Load (Pre-Scan Mode)**	**Mode 41- Full Load (Pre-Scan Mode)**	**Mode 42- Full Load (Pre-Scan Mode)**
Test Model Number	**KTPS18-09022WA-VI**	**KTPS18-10019WA-VI**	**KTPS18-11016WA-VI**
Test Mode	**Mode 43- Full Load (Pre-Scan Mode)**	**Mode 44- Full Load (Pre-Scan Mode)**	**Mode 45- Full Load (Pre-Scan Mode)**
Test Model Number	**KTPS18-12016WA-VI**	**KTPS18-15013WA-VI**	**KTPS18-16012WA-VI**
Test Mode	**Mode 46- Full Load (Pre-Scan Mode)**	**Mode 47- Full Load (Worst Case)**	
Test Model Number	**KTPS18-18011WA-VI**	**KTPS18-24008WA-VI**	

Note:

1. According to pre-scan data, we determine the data (Mode 33, 47) shown in this test report, which reflects the worst-case data for each operation mode.
2. The EUT has serial model numbers for the requirement of marketing.
   The difference of model numbers are shown as below:

Model No	Input Rated	Output Rated	Transformer	PCB
KTPS24-05040DT-2P-VI KTPS24-05040WA-VI	100-240Vac, 50-60Hz, 0.58A	5Vdc, 4.0A, 20W	T1	SR
KTPS24-06035DT-2P-VI KTPS24-06035WA-VI		5.9Vdc, 3.5A, 20.65W		SR
KTPS24-06040DT-2P-VI KTPS24-06040WA-VI		5.9Vdc, 4.0A, 23.6W		SR
KTPS24-07030DT-2P-VI KTPS24-07030WA-VI		7.0Vdc, 3.0A, 21W	T2	SR
KTPS24-07530DT-2P-VI KTPS24-07530WA-VI		7.5Vdc, 3.0A, 22.5W		SR
KTPS24-09025DT-2P-VI KTPS24-09025WA-VI		9.0Vdc, 2.5A, 22.50W	T8	SBD
KTPS24-12020DT-2P-VI KTPS24-12020WA-VI		12Vdc, 2.0A, 24W	T3	SBD
KTPS24-15016DT-2P-VI KTPS24-15016WA-VI		15Vdc, 1.6A, 24W	T4	SBD
KTPS24-24010DT-2P-VI KTPS24-24010WA-VI		24Vdc, 1.0A, 24W	T5	SBD
KTPS24-48005DT-2P-VI KTPS24-48005WA-VI		48Vdc, 0.5A, 24W	T6	SBD
KTPS18-05030DT-2P-VI KTPS18-05030WA-VI	100-240Vac, 50-60Hz, 0.48A	5Vdc, 3.0A, 15W	T7	SBD
KTPS18-06025DT-2P-VI KTPS18-06025WA-VI		5.9Vdc, 2.5A, 14.75W		SBD
KTPS18-06030DT-2P-VI KTPS18-06030WA-VI		5.9Vdc, 3.0A, 17.7W		SBD
KTPS18-07025DT-2P-VI KTPS18-07025WA-VI		7.0Vdc, 2.5A, 17.5W	T8	SBD
KTPS18-07525DT-2P-VI KTPS18-07525WA-VI		7.5Vdc, 2.5A, 18.75W		SBD
KTPS18-09022DT-2P-VI KTPS18-09022WA-VI		9.0Vdc, 2.2A, 19.8W		SBD
KTPS18-10019DT-2P-VI KTPS18-10019WA-VI		10Vdc, 1.9A, 19W	T3	SBD
KTPS18-11016DT-2P-VI KTPS18-11016WA-VI		11Vdc, 1.6A, 17.60W		SBD
KTPS18-12016DT-2P-VI KTPS18-12016WA-VI		12Vdc, 1.6A, 19.2W		SBD

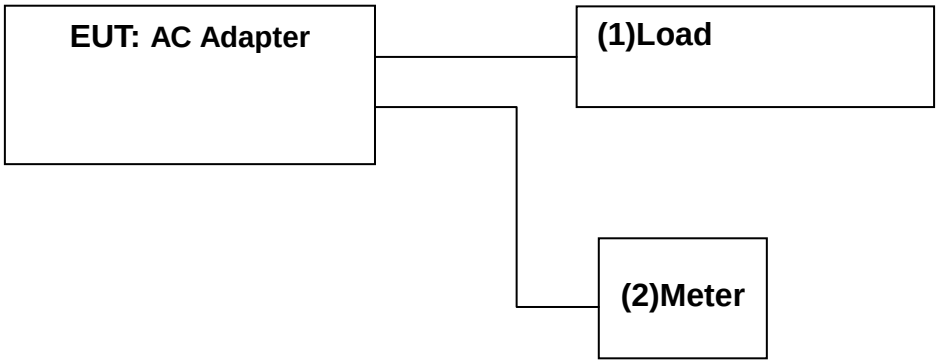
Model No	Input Rated	Output Rated	Transformer	PCB
KTPS18-15013DT-2P-VI KTPS18-15013WA-VI	100-240Vac, 50-60Hz, 0.48A	15Vdc, 1.3A, 19.5W	T4	SBD
KTPS18-16012DT-2P-VI KTPS18-16012WA-VI	100-240Vac, 50-60Hz, 0.48A	16Vdc, 1.2A, 19.2W		SBD
KTPS18-18011DT-2P-VI KTPS18-18011WA-VI	100-240Vac, 50-60Hz, 0.48A	18Vdc, 1.1A, 19.8W		SBD
KTPS18-24008DT-2P-VI KTPS18-24008WA-VI	100-240Vac, 50-60Hz, 0.48A	24Vdc, 0.8A, 19.2W	T5	SBD

3.3 CONFIGURATION OF THE SYSTEM UNDER TEST

Item	Device	No.	Configuration
1	Load	-----	Full Load: 24Ω for Mode 33 Full Load: 30Ω for mode 47
2	Meter	-----	0-5A

Note: All the peripherals above were selected specifically after confirming that there is no impact on test results.

3.4 BLOCK DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS



3.5 LAB AMBIENT

Items	Range Requirement
Temperature (°C)	10-40
Humidity (%RH)	10-90
Barometric pressure (mbar)	860-1060

3.6 TEST FACILITY ACCREDITATION

Global EMC Standard Tech. Corp. is accredited in respect of laboratory and the accreditation criteria is ISO/IEC 17025: 2005.

Site Description : Registration on VCCI effective through July 13, 2018.
VCCI Member No.708

Recognized by the Council of Taiwan Accreditation Foundation
As an accredited laboratory and registration No.:1082.
Registration on TAF effective through September 18, 2018.

Aug. 10, 1995 /Aug. 25, 1998 File on FCC Engineering Laboratory
Federal Communications Commission
Designation Number: TW1031, TW1032

Name of firm : Global EMC Standard Tech. Corp.
Site location : No.3, Baodoucuokeng, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)

4. CONDUCTED EMISSION MEASUREMENT

4.1 TEST EQUIPMENTS

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	TEST RECEIVER	RS	ESCS30	100393	2016.04.16
2	L.I.S.N.(EUT)	RS	ENV216	100108	2016.05.11
3	CABLE	GTK	N/A	GTK-E-A154-01	2016.01.09
4	Software	FARAD	EZ-EMC	2A1.1(USB)	N/A

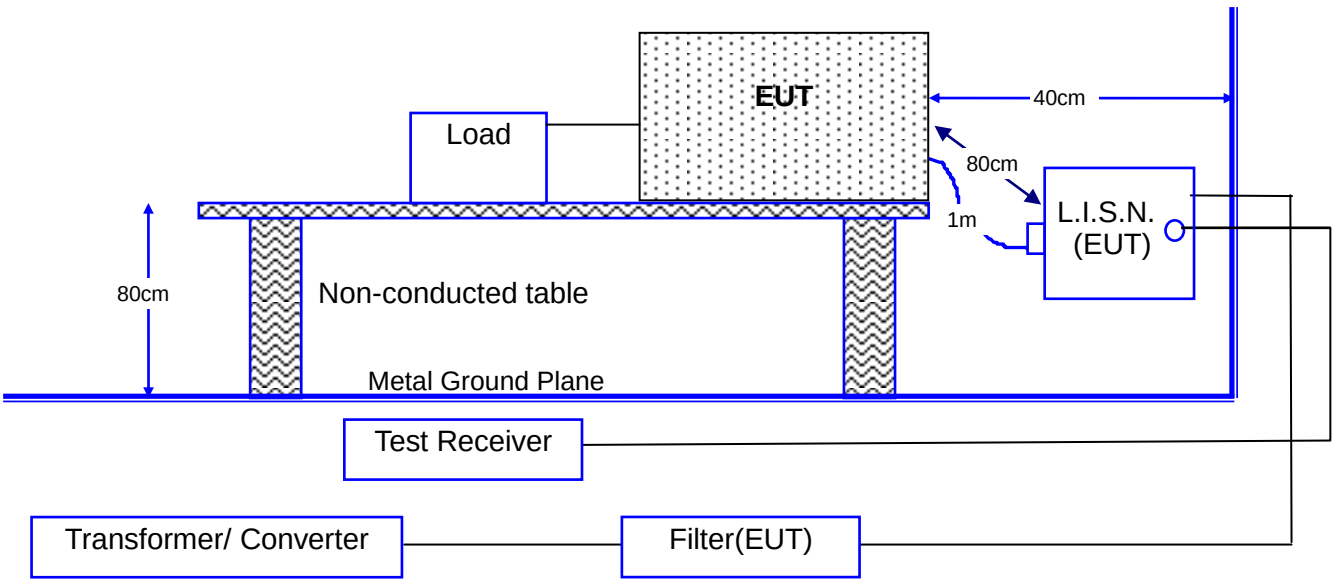
Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.
2. The test was performed at GTK Shielded Room B5.

4.2 TEST METHOD

According to EN 55022: 2010+AC: 2011

4.3 BLOCK DIAGRAM OF TEST SETUP

4.3.1 TEST SETUP FOR EMISSION MEASUREMENT AT MAINS TERMINAL



Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.

4.4 CONDUCTED EMISSION LIMITS

4.4.1 CONDUCTED EMISSION LIMITS (MAINS TERMINAL)

Frequency	Voltage limits dB(μV)	
	Class B	
MHz	QUASI-PEAK	AVERAGE
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5.0	56	46
5.0 to 30	60	50

Remarks: In the Above Table, the tighter limit applies at the band edges.

4.5 TEST CONFIGURATION ON MEASUREMENT

The equipments that are listed in section 4.1 are installed on Conducted Power Line Test in order to meet the requirement of the Commission and operating in a manner, which tends to maximize its emission characteristics in a normal application.

The device under test, installed in a representative system as described in section 4.3, was placed on a non-conductive table whose total height equal to 80cm. Powered from one L.I.S.N. which signal output to receiver, and the other peripherals was powered from another L.I.S.N. which signal output was terminated by 50Ω.

4.6 CONDUCTED EMISSION MEASURED PROCEDURE AND DATA

4.6.1 CONDUCTED EMISSION (MAINS TERMINAL)

The measurement range of conducted emission, which is from 0.15 MHz to 30 MHz, was scan for peak emission curve of all the test modes. The worst mode is then measured using an average and/or quasi peak detector and record at least the disturbance levels and the frequencies of the six highest disturbances. The final measurement value is equal to the receiver reading plus the correction factor. If AMN insertion loss is more than 0.5dB, automatically the receiver will add the correction factor to the reading level.

4.7 OPERATING CONDITIONS OF THE EUT

The exercise program used during conducted emission measurement was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

1. Setup the EUT and simulators as shown on 3.4
2. Turn on the power of all equipments.
3. Start test.

4.8 CONDUCTED EMISSION MEASUREMENT RESULTS

Date of Test	July 07, 2015	**Temperature**	26 ℃
EUT	AC Adapter	**Humidity**	59 %
Test Mode	Mode 33	**Display Pattern**	N/A
Test Power Supply	AC 230V/50Hz		

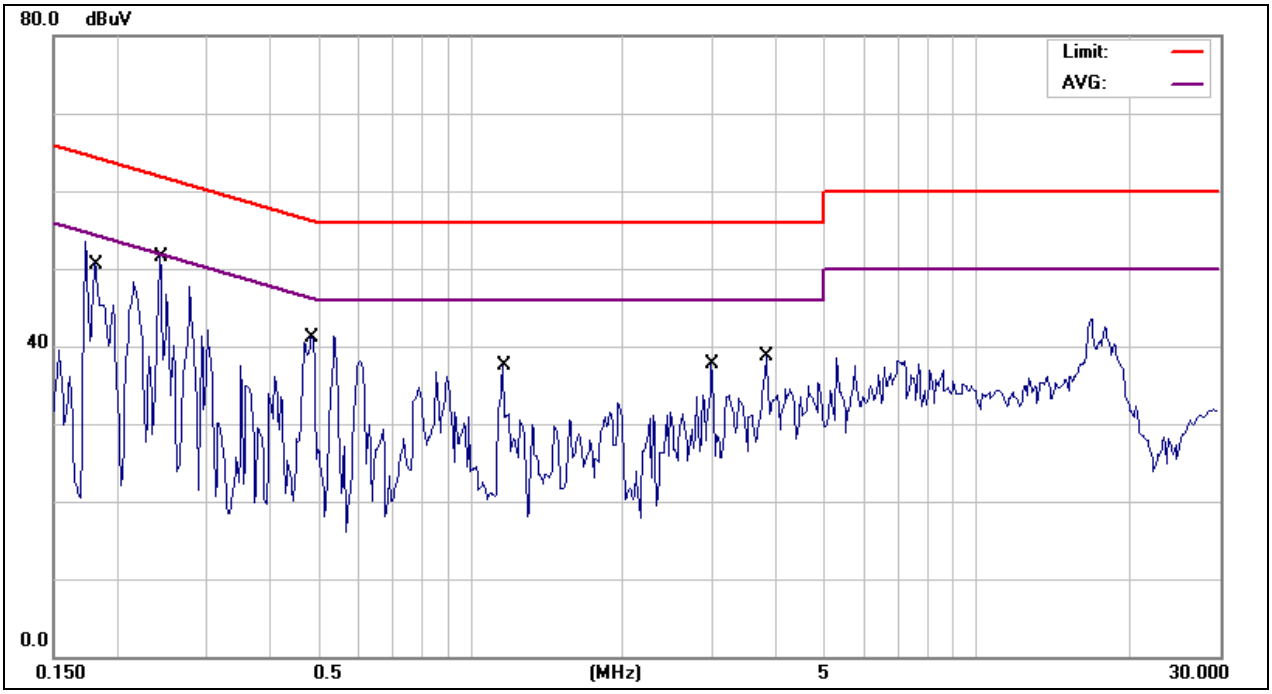
Line

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV	Limit dBµV	Over Limit dB	Detector
1	★0.1823	48.95	9.67	58.62	64.38	-5.76	QP
2	0.1823	36.94	9.67	46.61	54.38	-7.77	AVG
3	0.2435	41.33	9.67	51.00	61.98	-10.98	QP
4	0.2435	31.62	9.67	41.29	51.98	-10.69	AVG
5	0.4859	31.55	9.65	41.20	56.24	-15.04	QP
6	0.4859	25.36	9.65	35.01	46.24	-11.23	AVG
7	1.1656	27.82	9.70	37.52	56.00	-18.48	QP
8	1.1656	24.29	9.70	33.99	46.00	-12.01	AVG
9	3.0055	27.84	9.82	37.66	56.00	-18.34	QP
10	3.0055	22.95	9.82	32.77	46.00	-13.23	AVG
11	3.8531	28.84	9.80	38.64	56.00	-17.36	QP
12	3.8531	23.63	9.80	33.43	46.00	-12.57	AVG

Remarks :

1. All readings are Quasi-peak and Average values.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = L.I.S.N. insertion loss + cable loss
5. " ★ " means that this data is the worse case measurement level.
6. The measurement uncertainty is 3.88 dB.

Line



Remark: 1. The Limit (The red line of the graph indicates the quasi-peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The scan curve indicates peak detector measurement.

Date of Test	July 07, 2015	Temperature	26 ℃
EUT	AC Adapter	Humidity	59 %
Test Mode	Mode 33	Display Pattern	N/A
Test Power Supply	AC 230V/50Hz		

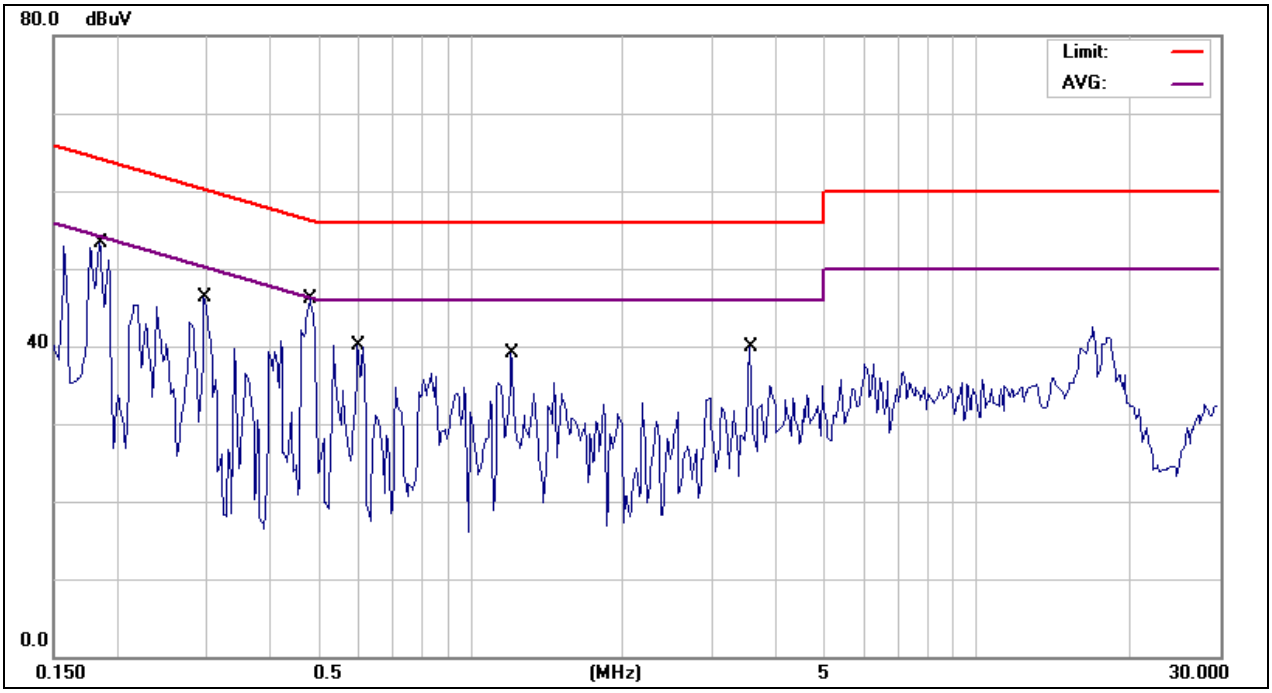
Neutral

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV	Limit dBμV	Over Limit dB	Detector
1	0.1859	46.13	9.69	55.82	64.22	-8.40	QP
2	0.1859	35.79	9.69	45.48	54.22	-8.74	AVG
3	0.2984	36.57	9.69	46.26	60.29	-14.03	QP
4	★0.2984	32.63	9.69	42.32	50.29	-7.97	AVG
5	0.4822	35.44	9.68	45.12	56.30	-11.18	QP
6	0.4822	27.98	9.68	37.66	46.30	-8.64	AVG
7	0.5992	30.32	9.69	40.01	56.00	-15.99	QP
8	0.5992	25.62	9.69	35.31	46.00	-10.69	AVG
9	1.2086	29.35	9.73	39.08	56.00	-16.92	QP
10	1.2086	24.29	9.73	34.02	46.00	-11.98	AVG
11	3.5680	30.02	9.83	39.85	56.00	-16.15	QP
12	3.5680	24.19	9.83	34.02	46.00	-11.98	AVG

Remarks :

1. All readings are Quasi-peak and Average values.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = L.I.S.N. insertion loss + cable loss
5. " ★ " means that this data is the worse case measurement level.
6. The measurement uncertainty is 3.88 dB.

Neutral



Remark: 1. The Limit (The red line of the graph indicates the quasi-peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The scan curve indicates peak detector measurement.

Date of Test	July 15, 2015	Temperature	26 ℃
EUT	AC Adapter	Humidity	59 %
Test Mode	Mode 47	Display Pattern	N/A
Test Power Supply	AC 230V/50Hz		

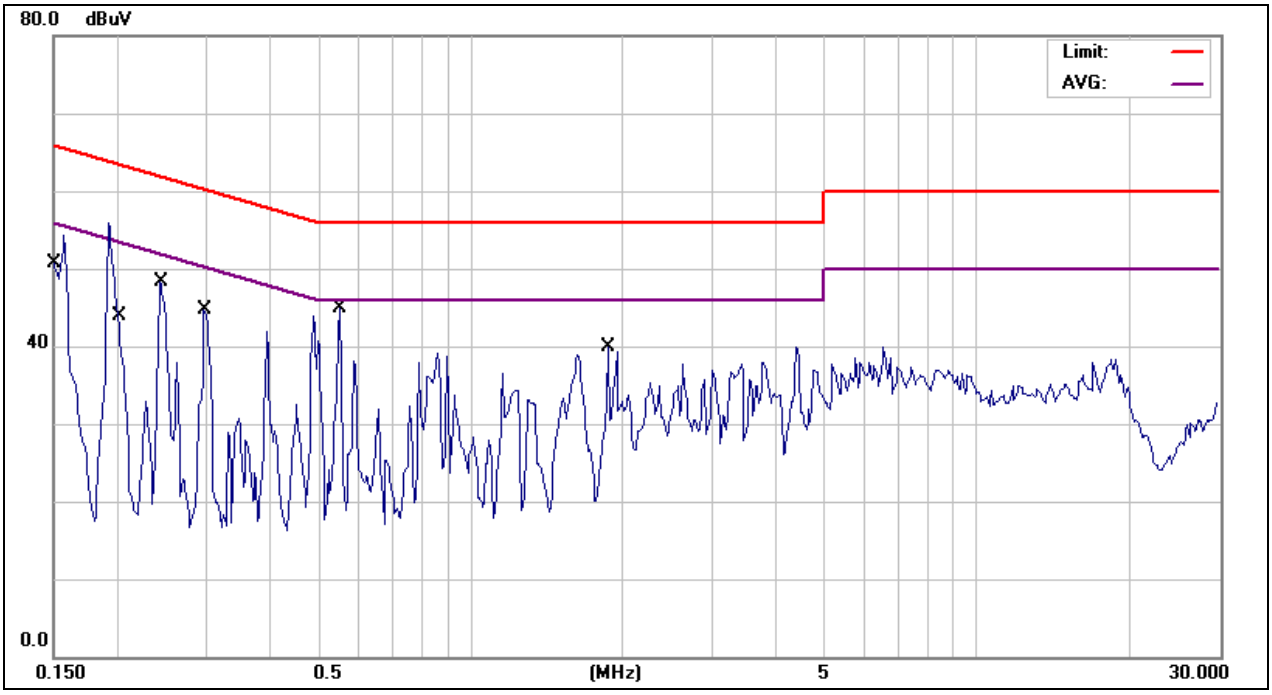
Line

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV	Limit dBµV	Over Limit dB	Detector
1	0.1500	50.63	9.67	60.30	66.00	-5.70	QP
2	★0.1500	41.75	9.67	51.42	56.00	-4.58	AVG
3	0.2029	45.84	9.67	55.51	63.49	-7.98	QP
4	0.2029	37.08	9.67	46.75	53.49	-6.74	AVG
5	0.2437	38.67	9.67	48.34	61.97	-13.63	QP
6	0.2437	32.86	9.67	42.53	51.97	-9.44	AVG
7	0.2984	35.03	9.66	44.69	60.29	-15.60	QP
8	0.2984	30.82	9.66	40.48	50.29	-9.81	AVG
9	0.5503	34.03	9.66	43.69	56.00	-12.31	QP
10	0.5503	28.10	9.66	37.76	46.00	-8.24	AVG
11	1.8766	30.24	9.73	39.97	56.00	-16.03	QP
12	1.8766	26.30	9.73	36.03	46.00	-9.97	AVG

Remarks :

1. All readings are Quasi-peak and Average values.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = L.I.S.N. insertion loss + cable loss
5. " ★ " means that this data is the worse case measurement level.
6. The measurement uncertainty is 3.88 dB.

Line



Remark: 1. The Limit (The red line of the graph indicates the quasi-peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The scan curve indicates peak detector measurement.

Date of Test	July 15, 2015	Temperature	26 ℃
EUT	AC Adapter	Humidity	59 %
Test Mode	Mode 47	Display Pattern	N/A
Test Power Supply	AC 230V/50Hz		

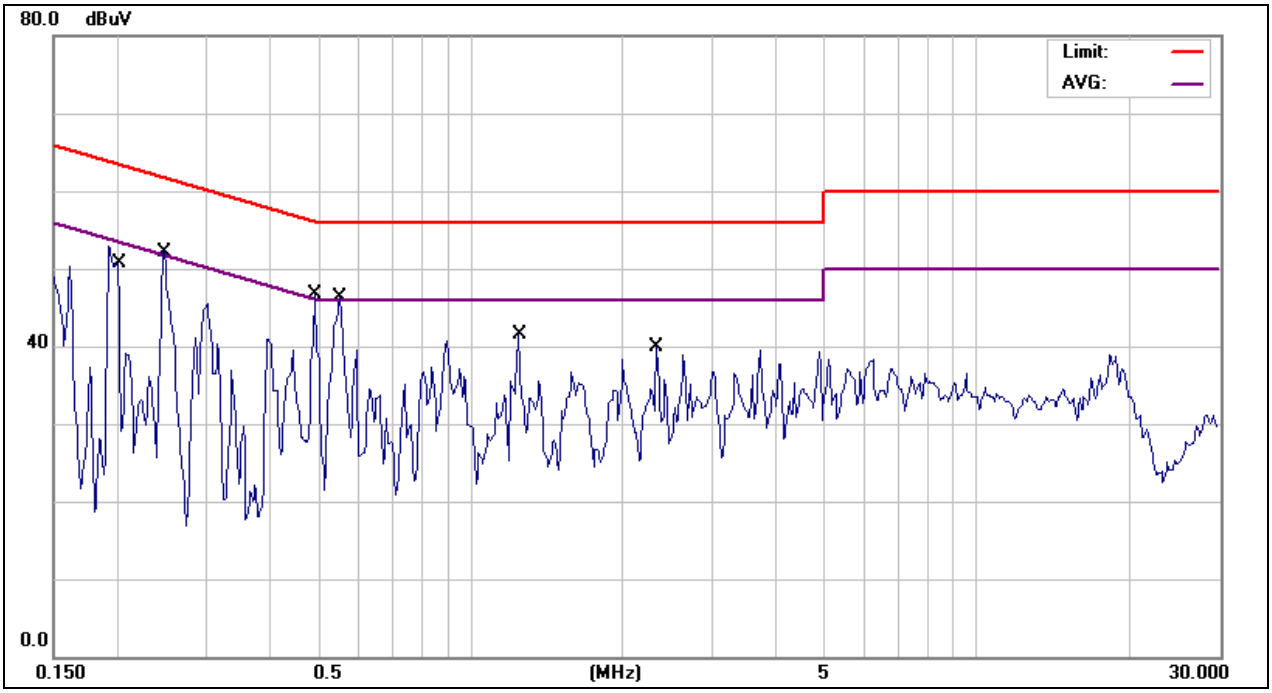
Neutral

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV	Limit dBµV	Over Limit dB	Detector
1	0.1990	45.72	9.69	55.41	63.65	-8.24	QP
2	★0.1990	39.67	9.69	49.36	53.65	-4.29	AVG
3	0.2499	41.31	9.69	51.00	61.76	-10.76	QP
4	0.2499	35.17	9.69	44.86	51.76	-6.90	AVG
5	0.4938	36.96	9.68	46.64	56.10	-9.46	QP
6	0.4938	31.30	9.68	40.98	46.10	-5.12	AVG
7	0.5523	36.71	9.68	46.39	56.00	-9.61	QP
8	0.5523	30.74	9.68	40.42	46.00	-5.58	AVG
9	1.2477	31.81	9.73	41.54	56.00	-14.46	QP
10	1.2477	24.80	9.73	34.53	46.00	-11.47	AVG
11	2.3336	30.14	9.78	39.92	56.00	-16.08	QP
12	2.3336	25.63	9.78	35.41	46.00	-10.59	AVG

Remarks :

1. All readings are Quasi-peak and Average values.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = L.I.S.N. insertion loss + cable loss
5. " ★ " means that this data is the worse case measurement level.
6. The measurement uncertainty is 3.88 dB.

Neutral



Remark: 1. The Limit (The red line of the graph indicates the quasi-peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The scan curve indicates peak detector measurement.

5. RADIATED EMISSION MEASUREMENT

5.1 TEST EQUIPMENT

The following test equipments are used during the radiated emission tests:

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	TEST RECEIVER	RS	ESCS30	849650/023	2016.05.02
2	SPECTRUM	ADVANTEST	R3172	150800149	2016.02.05
3	PRE-AMPLIFIER	HP	8447D	2944A08273	2015.09.30
4	BILOG ANTENNA	SCHAFFNER	CBL6112B	2833	2016.06.30
5	CABLE	PEWC	CFD400-NL	GTK-E-A408-01	2016.02.25
6	Software	FARAD	EZ-EMC	2A1.1(USB)	N/A

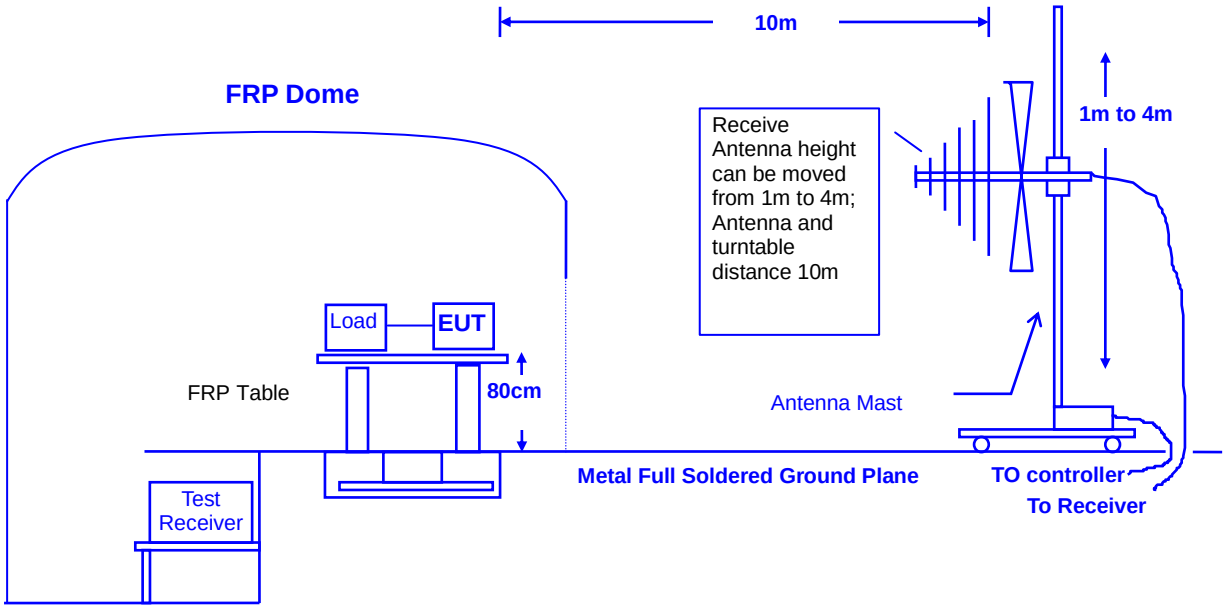
Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Open Site B2.

5.2 TEST METHOD

According to EN 55022: 2010+AC: 2011

5.3 OPEN AREA TEST SITE & SEMI-ANECHOIC CHAMBER SETUP DIAGRAM



Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.

5.4 RADIATED EMISSION LIMITS

Frequency	Class B	
	Distance	Field Strength
MHz	Meter	dB(μV/m)
30 to 230	10	30
230 to 1000	10	37

5.5 TEST CONFIGURATION

The equipments which are listed at 5.1 are installed at the Radiated Emission Test site to meet the Commission requirements and operated in a manner, which tends to maximize its emission characteristics in a normal application.

The EUT, installed in a representative system as described in section 5.3, was placed on a non-conductive table whose total height equaled 80 cm. This table can be rotated 360 degrees.

5.5.1 30 MHz to 1 GHz

The measurement antenna was mounted to a non-conductive mast capable of moving the antenna vertically. Antenna height was varied from 1 m to 4 m and the system under test was rotated from 0 degree through 360 degrees relative to the antenna position and polarization (Horizontal and Vertical). Also the I/O cable positions were investigated to find the maximum emission condition.

5.6 OPERATING CONDITIONS OF THE EUT

Same as conducted emission measurement, which is listed in 4.7

5.7 RADIATED EMISSION DATA

According EN 55022: 2010+AC: 2011 Section 6.2, the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency of the internal sources of the EUT (MHz)	Upper frequency of measurement rang (MHz)
<108	1000
108-500	2000
500-1000	5000
Above 1000	5^{th} harmonic of the highest frequency or 6 GHz, whichever is less

Remark: The highest tested frequency is generated by the **150 kHz**.
At least, the upper frequency of measurement range is **1GHz.**

5.7.1 30 MHz to 1 GHz

The measurement range of radiated emission, which is from **30 MHz to 1 GHz,** was investigated. All readings are quasi-peak values with a resolution bandwidth of 120 kHz. The initial step in collecting radiated emission data is a spectrum analyzer peak scans of the measurement range for all the test modes and then use test receiver for final measurement and record at least the disturbance levels and the frequencies of the six highest disturbances. Then the worst modes were reported the following data pages.

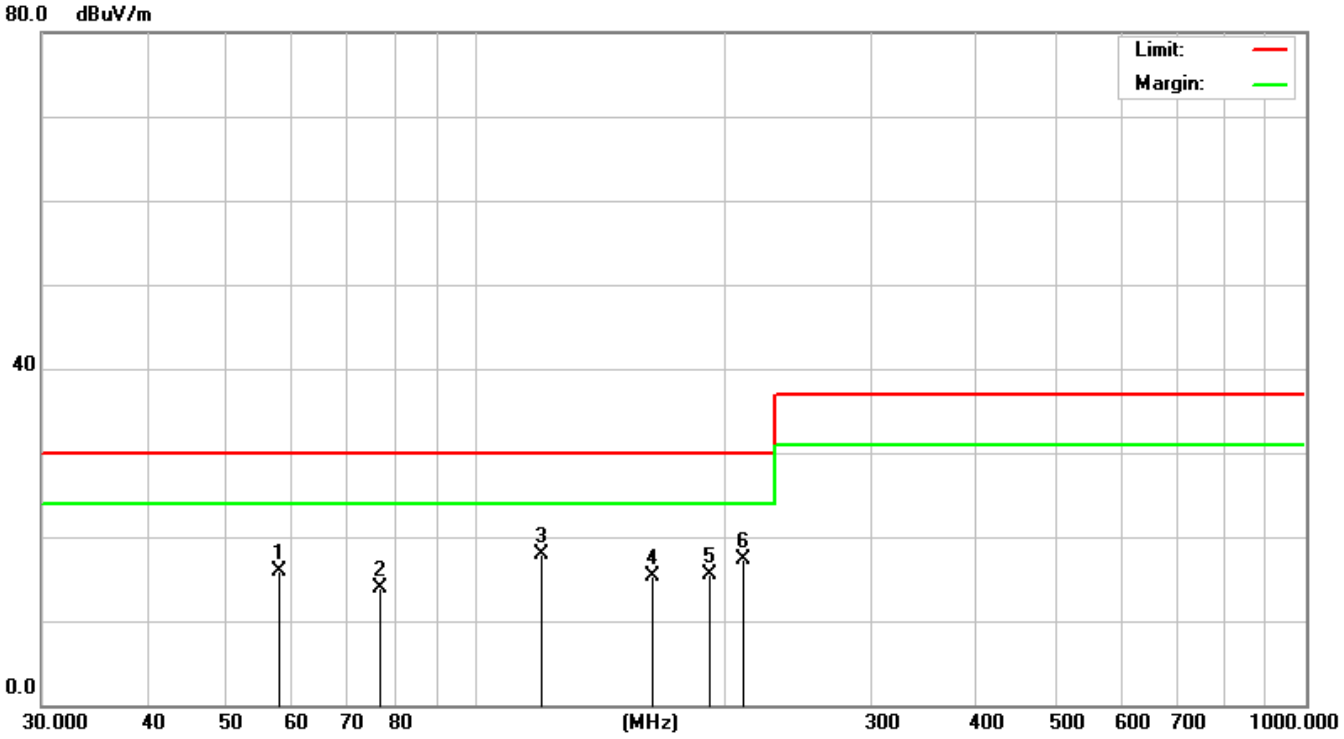
5.8 RADIATED EMISSIONS MEASUREMENT RESULTS

Date of Test	August 14, 2015	**Temperature**	25 deg/C
EUT	AC Adapter	**Humidity**	60 %RH
Working Cond.	Mode 33	**Display Pattern**	N/A
Antenna distance	10m at **Horizontal**	**Test Frequency Range**	30-1000MHz
Test Power Supply	AC 230V/50Hz		

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	57.9100	35.20	-19.39	15.81	30.00	-14.19	QP
2	76.6300	32.63	-18.72	13.91	30.00	-16.09	QP
3	★120.0120	31.20	-13.30	17.90	30.00	-12.10	QP
4	162.6300	29.90	-14.55	15.35	30.00	-14.65	QP
5	192.0230	30.27	-14.85	15.42	30.00	-14.58	QP
6	210.1440	31.29	-13.91	17.38	30.00	-12.62	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
7. The measurement uncertainty is 4.10 dB.



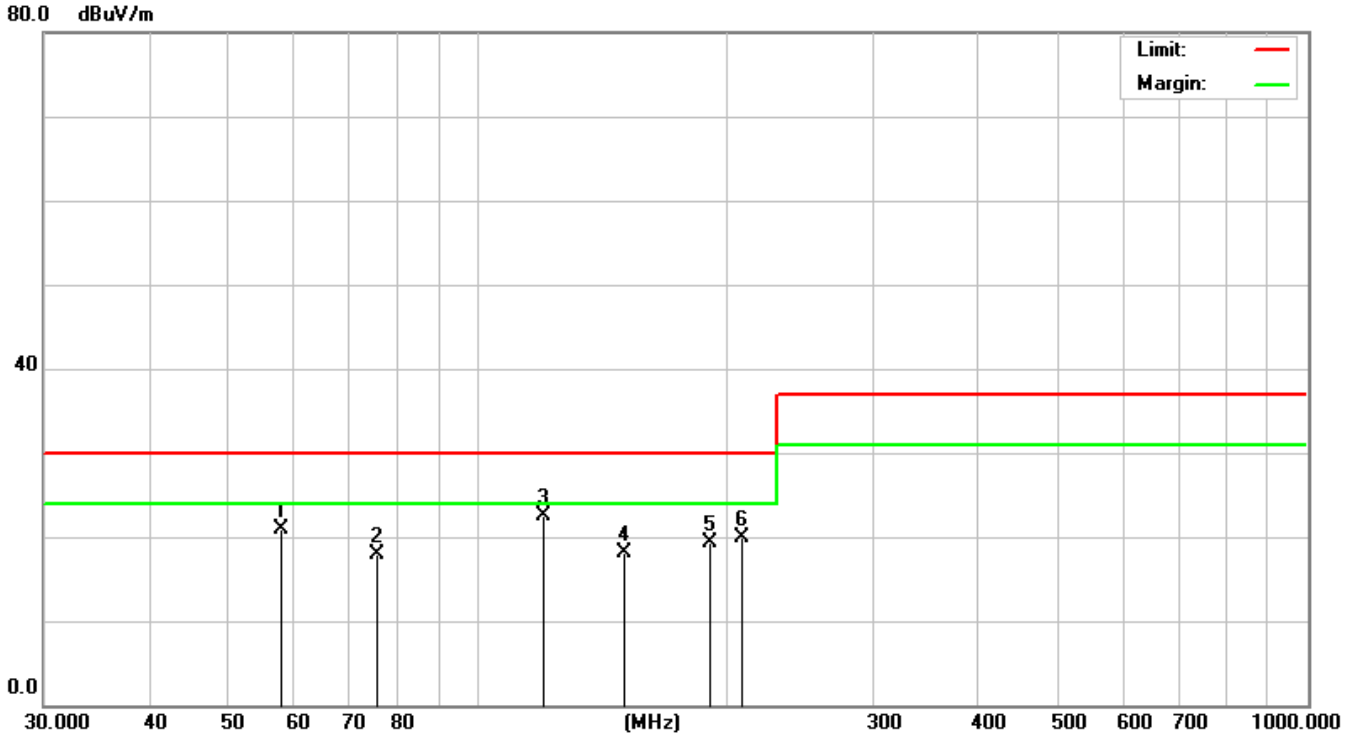
Remark: 1. The Limit (The red line of the graph indicates the quasi -peak measurements).
2. The Margin (The green line of the graph indicates the 6dB margin).

Date of Test	August 14, 2015	**Temperature**	25 deg/C
EUT	AC Adapter	**Humidity**	60 %RH
Working Cond.	Mode 33	**Display Pattern**	N/A
Antenna distance	10m at **Vertical**	**Test Frequency Range**	30-1000MHz
Test Power Supply	AC 230V/50Hz		

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	57.9200	40.26	-19.39	20.87	30.00	-9.13	QP
2	75.6200	36.63	-18.79	17.84	30.00	-12.16	QP
3	★120.0120	35.78	-13.30	22.48	30.00	-7.52	QP
4	150.2360	32.25	-14.08	18.17	30.00	-11.83	QP
5	190.6300	34.25	-14.88	19.37	30.00	-10.63	QP
6	208.9600	33.90	-14.00	19.90	30.00	-10.10	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
7. The measurement uncertainty is 4.10 dB.



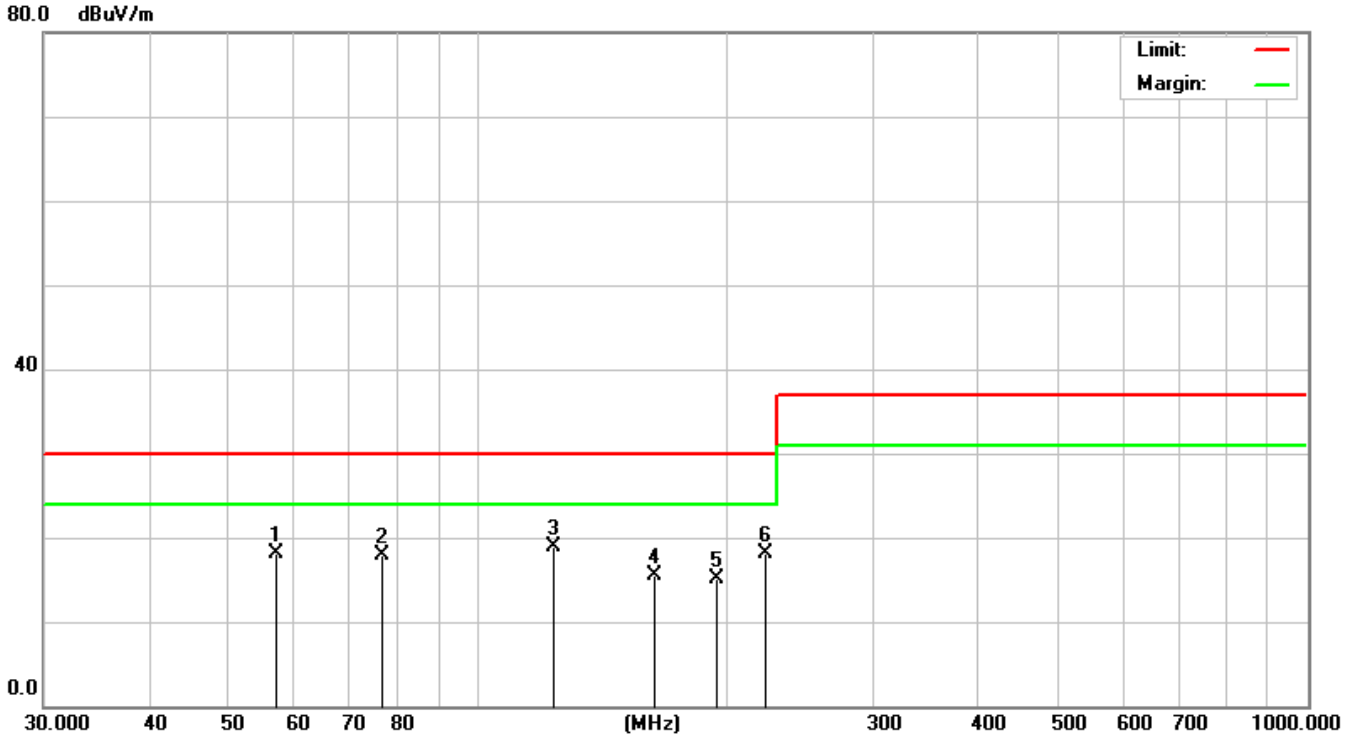
Remark: 1. The Limit (The red line of the graph indicates the quasi -peak measurements).
2. The Margin (The green line of the graph indicates the 6dB margin).

Date of Test	August 14, 2015	**Temperature**	25 deg/C
EUT	AC Adapter	**Humidity**	60 %RH
Working Cond.	Mode 47	**Display Pattern**	N/A
Antenna distance	10m at **Horizontal**	**Test Frequency Range**	30-1000MHz
Test Power Supply	AC 230V/50Hz		

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	56.8100	37.29	-19.28	18.01	30.00	-11.99	QP
2	76.2870	36.62	-18.75	17.87	30.00	-12.13	QP
3	★123.6200	32.32	-13.35	18.97	30.00	-11.03	QP
4	162.8200	30.12	-14.56	15.56	30.00	-14.44	QP
5	194.5200	29.80	-14.79	15.01	30.00	-14.99	QP
6	222.5200	31.10	-12.98	18.12	30.00	-11.88	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
7. The measurement uncertainty is 4.10 dB.



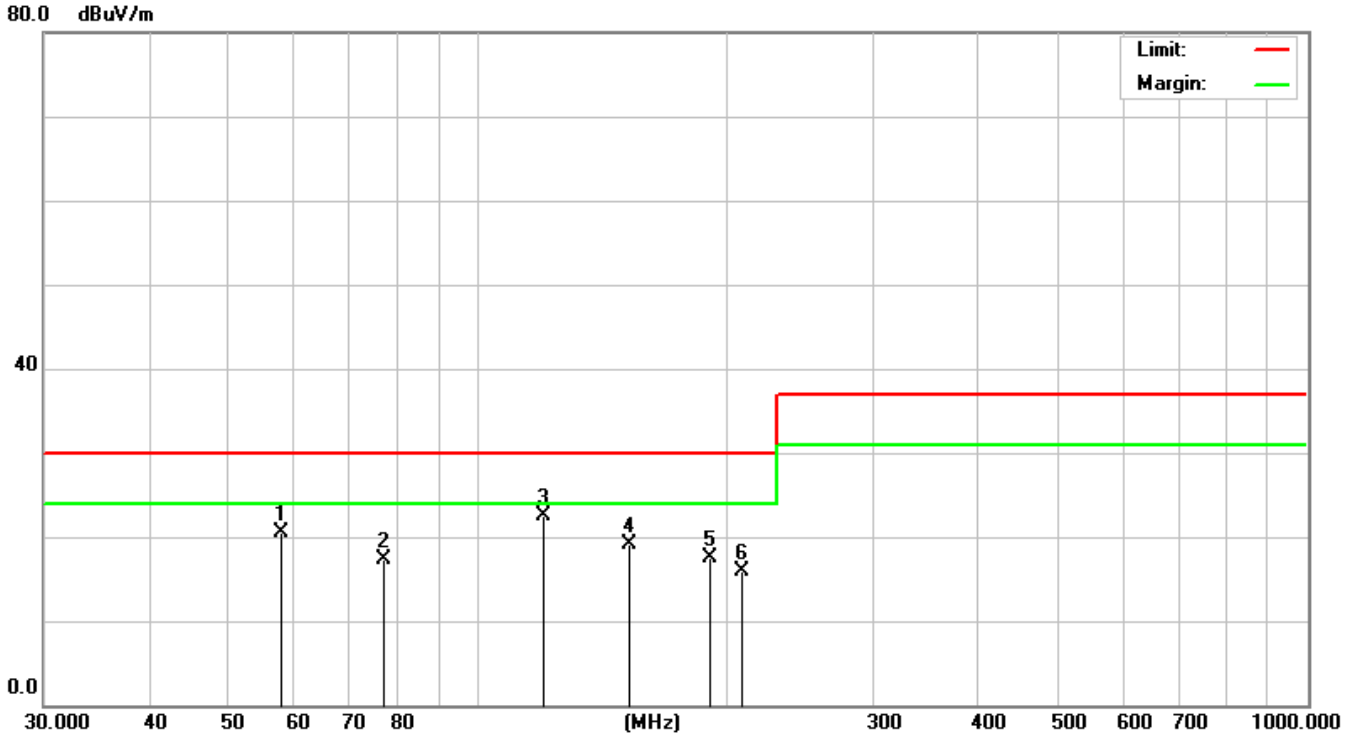
Remark: 1. The Limit (The red line of the graph indicates the quasi -peak measurements).
2. The Margin (The green line of the graph indicates the 6dB margin).

Date of Test	August 14, 2015	**Temperature**	25 deg/C
EUT	AC Adapter	**Humidity**	60 %RH
Working Cond.	Mode 47	**Display Pattern**	N/A
Antenna distance	10m at **Vertical**	**Test Frequency Range**	30-1000MHz
Test Power Supply	AC 230V/50Hz		

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	57.8200	39.96	-19.38	20.58	30.00	-9.42	QP
2	76.9520	35.96	-18.70	17.26	30.00	-12.74	QP
3	★120.0360	35.87	-13.30	22.57	30.00	-7.43	QP
4	152.6300	33.25	-14.17	19.08	30.00	-10.92	QP
5	190.8520	32.30	-14.87	17.43	30.00	-12.57	QP
6	209.3000	29.90	-13.97	15.93	30.00	-14.07	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
7. The measurement uncertainty is 4.10 dB.



Remark: 1. The Limit (The red line of the graph indicates the quasi -peak measurements).
2. The Margin (The green line of the graph indicates the 6dB margin).

6. HARMONIC CURRENT EMISSIONS, VOLTAGE FLUCTUATIONS AND FLICKER MEASUREMENT

6.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Signal Conditioning Unit	SCHAFFNER	CCN1000-1	72282	2016.04.16
2	AC Power Source	PACIFIC	345AMX/UPC32	270	N/A
3	Software	SCHAFFNER	SCHAFFNER	3.2.0.31	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Shielded Room B7.

6.2 TEST METHOD

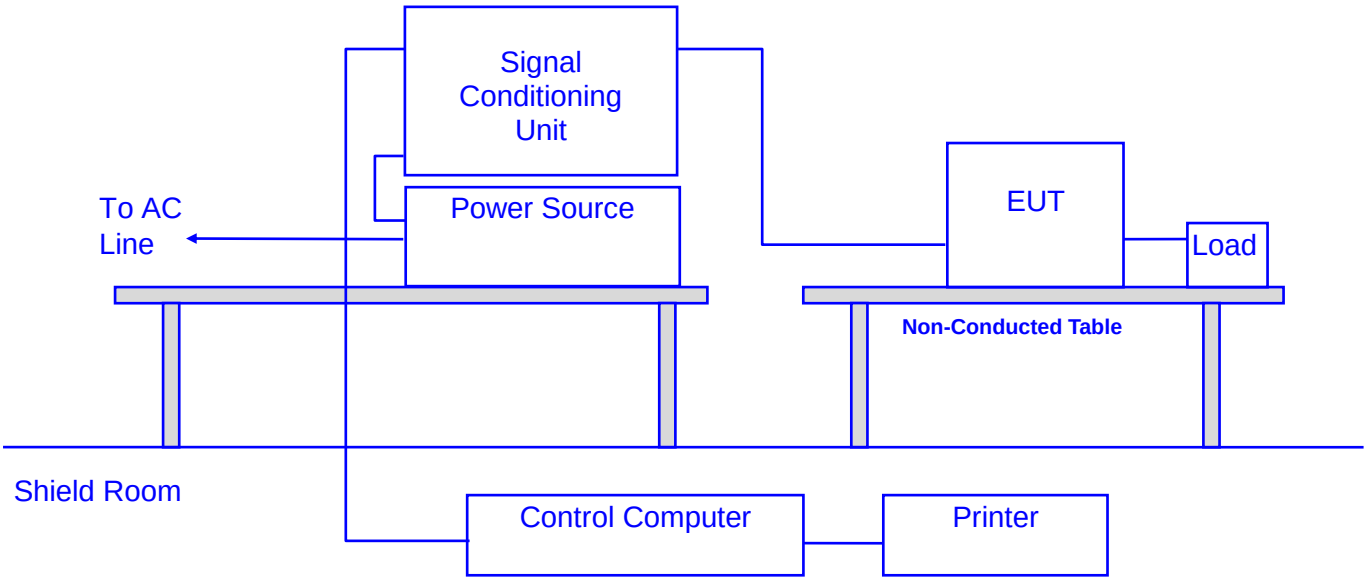
According to EN 61000-3-2:2014

(Note: EUT power level is below 75 Watts and therefore has no defined limits)

EN 61000-3-3: 2013

6.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



6.4 LIMITS OF FLICKER MEASUREMENT

Flicker:

Limits	
P_{st}	1.0
P_{lt}	0.65
d(t)	3.3%
Time(ms)>dt	500ms
d_c	3.3%
d_{max}	4%

6.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 6.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

6.6 TEST PROCEDURE

6.6.1 Flicker:

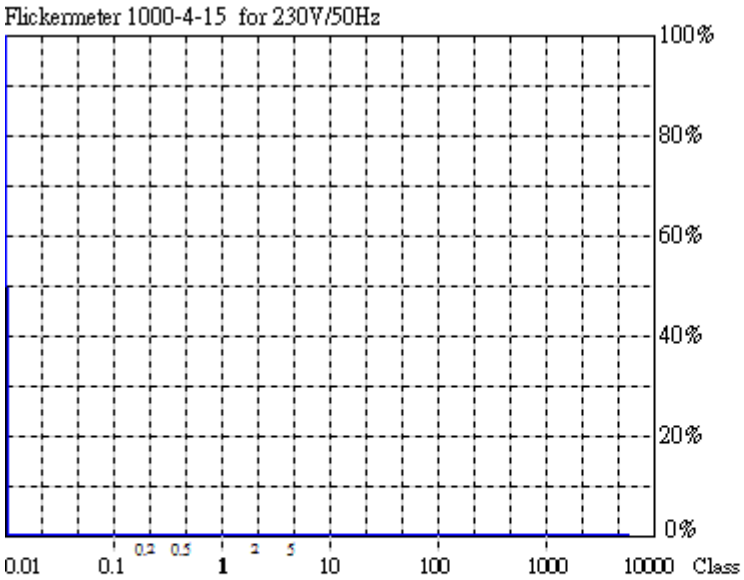
The test voltage supplied the EUT shall be maintained within 230V±2%.
The frequency shall be 50Hz±0.5%.
The observation perid Tp:
-for Pst Tp=10min.
-for Plt Tp=2h.

6.7 TEST RESULT

1. The measurement of the flicker, which test at the extremes of EUT‘s supply range was investigated, and the test result are reported the following data pages. The measurement limits were met, and the EUT passed the test.
2. The Flicker measurement uncertainty is 0.02 %.

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

Comply: EN 61000-3-3: 2013 - IEC 61000-4-15 Ed.2
Operator **Eric**
Unit
Serial Number
Remarks **Mode 33**



Actual Flicker (Fli):	**0.00**
Short-term Flicker (Pst):	**0.07**
Limit (Pst):	1.00
Long-term Flicker (Plt):	**0.07**
Limit (Plt):	0.65
Maximum Relative Volt. Change (dmax):	**0.00%**
Limit (dmax):	4.00%
Relative Steady-state Voltage Change (dc):	**0.02%**
Limit (dc):	3.00%
Maximum Interval exceeding 3.30% (dt):	**0.00ms**
Limit (dt>Lim):	500ms

Flicker Emission - IEC 61000-3-3 , EN 61000-3-3

2015/8/19 PM 05:09:4

Urms =	229.9	V	P =	27.00	W
Irms =	0.269	A	pf =	0.437	

Range:	50 A
V-nom:	230 V
TestTime:	10 min (100%)

Test completed, Result: PASSED

ATS024-W240

HAR-1000 EMC-Partner

Urms = 229.9V Freq = 49.987 Range: 50 A
Irms = 0.269A Ipk = 1.294A cf = 4.818
P = 27.00W S = 61.74VA pf = 0.437

Test - Time : 1 x 10min = 10min (100 %)

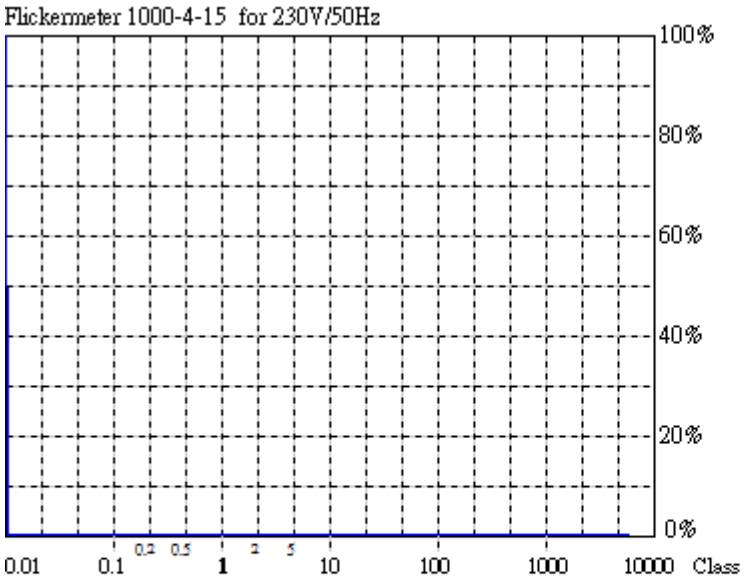
LIN (Line Impedance Network) : L: 0.24ohm +j0.15ohm N: 0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.00 %
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

Flicker Test Summary per EN/IEC61000-3-3 (Run time)

Comply: EN 61000-3-3: 2013 - IEC 61000-4-15 Ed.2
Operator **Eric**
Unit
Serial Number
Remarks **Mode 47**



Actual Flicker (Fli):	**0.00**
Short-term Flicker (Pst):	**0.07**
Limit (Pst):	1.00
Long-term Flicker (Plt):	**0.07**
Limit (Plt):	0.65
Maximum Relative Volt. Change (dmax):	**0.00%**
Limit (dmax):	4.00%
Relative Steady-state Voltage Change (dc):	**0.01%**
Limit (dc):	3.00%
Maximum Interval exceeding 3.30% (dt):	**0.00ms**
Limit (dt>Lim):	500ms

Flicker Emission - IEC 61000-3-3 , EN 61000-3-3

2015/8/19 PM 05:21:4

Urms =	229.9	V	P =	21.40	W
Irms =	0.228	A	pf =	0.409	

Range:	2 A
V-nom:	230 V
TestTime:	10 min (100%)

Test completed, Result: PASSED

ATS024-W240

HAR-1000 EMC-Partner

Urms = 229.9V Freq = 50.000 Range: 2 A
Irms = 0.228A Ipk = 1.053A cf = 4.627
P = 21.40W S = 52.31VA pf = 0.409

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : L: 0.24ohm +j0.15ohm N: 0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.00 %
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

7. ESD IMMUNITY TEST

7.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
1	Electrostatic Discharge Simulator	NoiseKen	ESS-B3011	ESS1367086	2016.06.05

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Shielded Room B4.

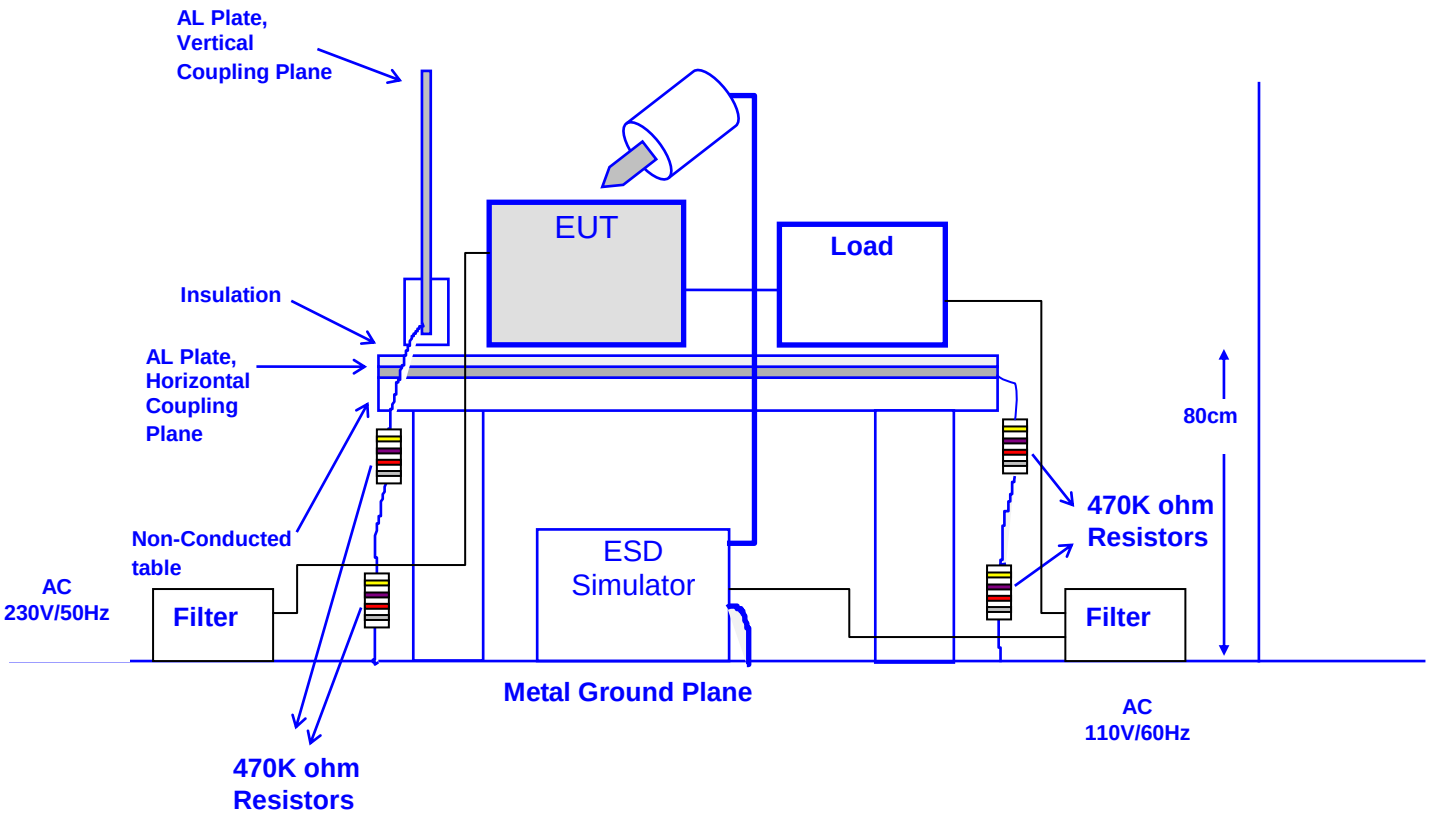
7.2 TEST METHOD

According to EN 55024: 2010

IEC 61000-4-2:2008

7.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



7.4 SEVERITY LEVELS

Required Performance Criteria : B
Level : ±8kV and lower levels (Air Discharge)
±4kV and lower levels (Contact Discharge)

7.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 7.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

7.6 TEST PROCEDURE

Air Discharge: discharge at slots and apertures and insulating surfaces:

This test was performed on non-conductive surfaces in accordance with EN 61000-4-2:2009. The selected test point shall be subjected to at least 10 positive & 10 negative discharges with >1 second interval.

Contact Discharge: discharge 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.

Each one test point shall be subjected to at least 25 positive & 25 negative discharges with >1 second interval.

Horizontal Coupling Plane (HCP) under the EUT & Vertical Coupling Plane (VCP) beside the 4 sides of the EUT, with the sharp discharge electrode touching the coupling plane.

HCP discharge:

ESD was applied to the earth reference plane on each accessible side of the EUT.

VCP discharge:

Vertical Coupling Plane was positioned at a distance of 0.1m from the EUT.

7.7 TEST RESULT

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 33	Humidity	40 %
Test Power Supply	AC 230V/50Hz	Atmospheric Pressure	998 hPa (mbar)

Item	Each Point of Discharge	Voltage	Required Criteria	Complied to Criteria (A, B, C)	Result
Air Direct Discharge	10	☒+2kV ☒+4kV ☒+8kV	B	A	PASS
	10	☒-2kV ☒-4kV ☒-8kV	B	A	PASS
Contact Direct Discharge	25	☒-2kV ☒-4kV	B	A	PASS
Indirect Discharge (HCP)	25	☒+2kV ☒+4kV	B	A	PASS
	25	☒-2kV ☒-4kV	B	A	PASS
Indirect Discharge (VCP) (Front)	25	☒+2kV ☒+4kV	B	A	PASS
	25	☒-2kV ☒-4kV	B	A	PASS
Indirect Discharge (VCP) (Left)	25	☒+2kV ☒+4kV	B	A	PASS
	25	☒-2kV ☒-4kV	B	A	PASS
Indirect Discharge (VCP) (Back)	25	☒+2kV ☒+4kV	B	A	PASS
	25	☒-2kV ☒-4kV	B	A	PASS
Indirect Discharge (VCP) (Right)	25	☒+2kV ☒+4kV	B	A	PASS
	25	☒-2kV ☒-4kV	B	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
☒ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test.
The acceptance criteria were met, and the EUT passed the test.
★The Green tag means the air discharge point . **(see the report page 58)**

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 47	Humidity	40 %
Test Power Supply	AC 230V/50Hz	Atmospheric Pressure	998 hPa (mbar)

Item	Each Point of Discharge	Voltage	Required Criteria	Complied to Criteria (A, B, C)	Result
Air Direct Discharge	10	☒+2kV ☒+4kV ☒+8kV	B	A	PASS
	10	☒-2kV ☒-4kV ☒-8kV	B	A	PASS
Contact Direct Discharge	25	☒-2kV ☒-4kV	B	A	PASS
Indirect Discharge (HCP)	25	☒+2kV ☒+4kV	B	A	PASS
	25	☒-2kV ☒-4kV	B	A	PASS
Indirect Discharge (VCP) (Front)	25	☒+2kV ☒+4kV	B	A	PASS
	25	☒-2kV ☒-4kV	B	A	PASS
Indirect Discharge (VCP) (Left)	25	☒+2kV ☒+4kV	B	A	PASS
	25	☒-2kV ☒-4kV	B	A	PASS
Indirect Discharge (VCP) (Back)	25	☒+2kV ☒+4kV	B	A	PASS
	25	☒-2kV ☒-4kV	B	A	PASS
Indirect Discharge (VCP) (Right)	25	☒+2kV ☒+4kV	B	A	PASS
	25	☒-2kV ☒-4kV	B	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
☒ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.
★The Green tag means the air discharge point . **(see the report page 58)**

8. RF FIELD STRENGTH SUSCEPTIBILITY TEST

8.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	SIGNAL GENERATOR	RS	SMT03	838077/019	2016.04.07
2	Power Amplifier	A & R	250W1000A	313023	N/A
3	Ultra Breitband Antenna	R & S	ULTRALOG HL562	100282	N/A
4	CHAMBER	GTK	N/A	B3	2016.01.01
5	Software	AR	SW1006	1.13	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Chamber B3.

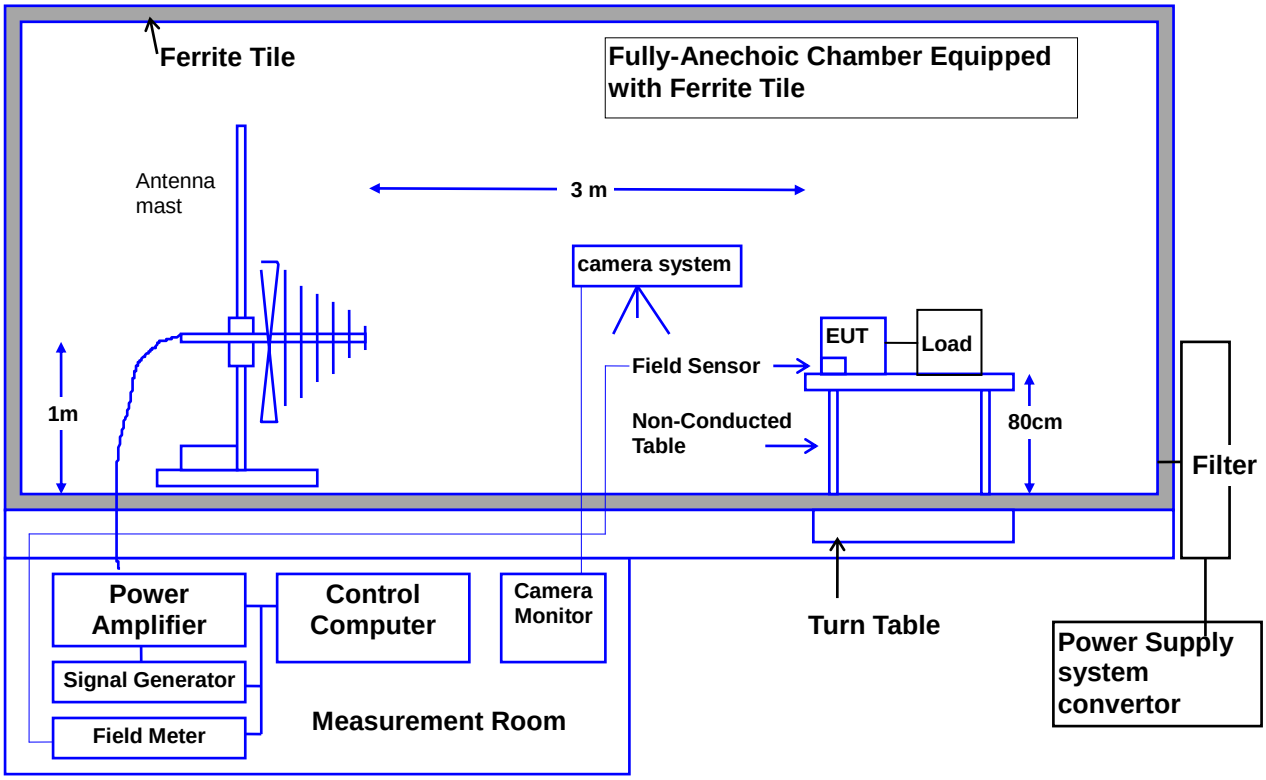
8.2 TEST METHOD

According to EN 55024: 2010

IEC 61000-4-3:2006+A1:2007+A2:2010

8.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



8.4 SEVERITY LEVELS

Required Performance Criteria : A
Level : 80~1000MHz(1kHz sinewave with 80% Amplitude Modulation: 3V/m)

According to EN 55024: 2010, an additional functional test for telecommunications terminal equipment shall be carried out at The following frequencies: 80, 120, 160, 230, 434, 460, 600, 863 and 900(+/- 1%)MHz.

8.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 8.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

8.6 TEST PROCEDURE

The EUT and load were placed on a table, which was 0.8 meters high. The field sensor was also placed on the same table to monitor field strength from transmitting antenna. EUT was set 3 meters away from the transmitting antenna. The transmitting antenna was fixed at 1 meter above ground. Both horizontal and vertical polarizations of the antenna were used during testing. In order to judge the EUT performance, a CCD camera was used to monitor the EUT screen.

All the scanning conditions are as follows:

Condition of Test	Remarks
Field Strength	3V/m
Radiated Signal	80MHz-1000MHz (1kHz sinewave with 80% Amplitude modulation)
Dwell Time	3 Seconds
Frequency step size	1 % of the present frequency

8.7 TEST RESULT

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 33	Humidity	57 %
Test Power Supply	AC 230V/50Hz		

Freq. Range (MHz)	Position (Angle)	Polarity (H or V)	Field Strength (V/m)	Performance Criteria Complied to	Results
☐ 27-80 MHz ☒ 80-1000 MHz ☐ 900 ± 5 MHz	0	H / V	3	A	PASS
	90	H / V	3	A	PASS
	180	H / V	3	A	PASS
	270	H / V	3	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
- ☒ There was no observable degradation in performance.
- ☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 47	Humidity	57 %
Test Power Supply	AC 230V/50Hz		

Freq. Range (MHz)	Position (Angle)	Polarity (H or V)	Field Strength (V/m)	Performance Criteria Complied to	Results
☐ 27-80 MHz ☒ 80-1000 MHz ☐ 900 ± 5 MHz	0	H / V	3	A	PASS
	90	H / V	3	A	PASS
	180	H / V	3	A	PASS
	270	H / V	3	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
- ☒ There was no observable degradation in performance.
- ☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

9. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

9.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Ultra Compact Simulator	EM TEST	UCS 500N5.1	P1310114655	2016.06.03
2	Software	EM TEST	ISMIEC	5.3.0	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Shielded Room B6.

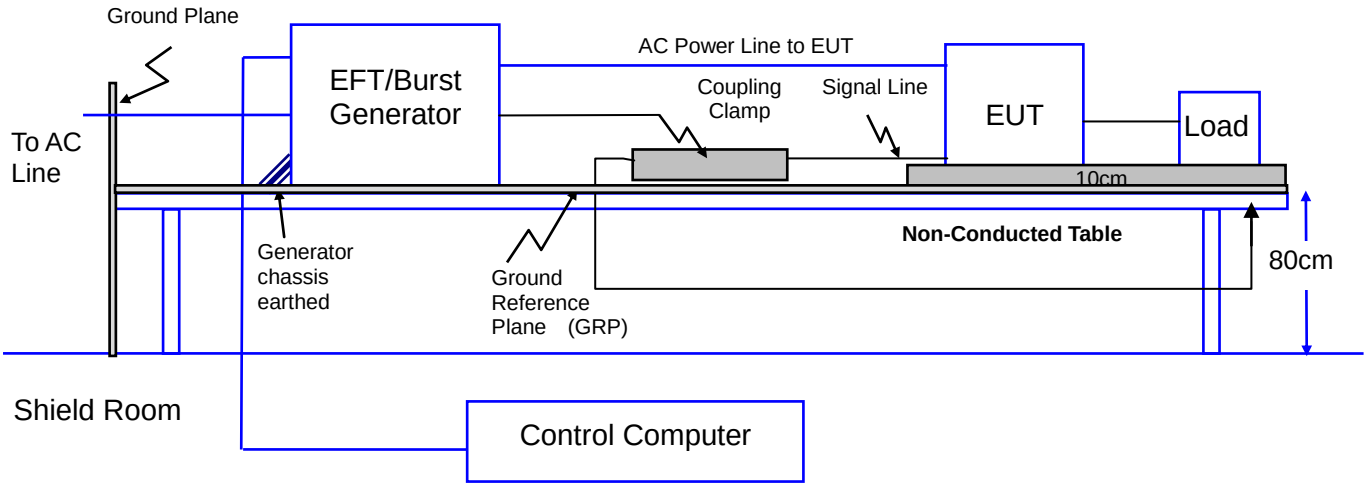
9.2 TEST METHOD

According to EN 55024: 2010

IEC 61000-4-4:2012

9.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



9.4 SEVERITY LEVELS

Required Performance Criteria : B
Level : ±0.5kV, ±1.0kV for Power Lines

9.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 9.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

The EUT and its load were placed on a table which was 0.8 meters above a metal ground plane measuring 2m by 2m and 0.65mm thick min, and projecting beyond the EUT by at least 0.1m on all sides. More then 0.5 meters separated the EUT from the walls of the shielded room.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance.

For AC Power lines test:

The EUT is connected to the power mains through a coupling/decoupling network that directly injected the transient energy. Bursts of pulse trains were injected onto the power line, in both positive and negative polarities. The test level was 0.5kV & 1.0kV. The Line, Neutral, and protective earth conductors were impressed with burst noise for one minute.

9.6 TEST RESULT

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 33	Humidity	57 %
Test Power Supply	AC 230V/50Hz		

Inject Place: Power Supply Line							
Inject Line	**Polarity**	**Voltage kV**	**Inject time (minute)**	**Inject Method**	**Required Criteria**	**Complied to Criteria**	**Result**
L+N+PE	+	☒ 0.5	1	DIRECT	B	A	PASS
		☒ 1.0	1	DIRECT	B	A	PASS
L+N+PE	-	☒ 0.5	1	DIRECT	B	A	PASS
		☒ 1.0	1	DIRECT	B	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
☒ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 47	Humidity	57 %
Test Power Supply	AC 230V/50Hz		

Inject Place: Power Supply Line							
Inject Line	**Polarity**	**Voltage kV**	**Inject time (minute)**	**Inject Method**	**Required Criteria**	**Complied to Criteria**	**Result**
L+N+PE	+	☒ 0.5	1	DIRECT	B	A	PASS
		☒ 1.0	1	DIRECT	B	A	PASS
L+N+PE	-	☒ 0.5	1	DIRECT	B	A	PASS
		☒ 1.0	1	DIRECT	B	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
☒ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

10. SURGE IMMUNITY TEST

10.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Ultra Compact Simulator	EM TEST	UCS 500N5.1	P1310114655	2016.06.03
2	Software	EM TEST	ISMIEC	5.3.0	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Shielded Room B6.

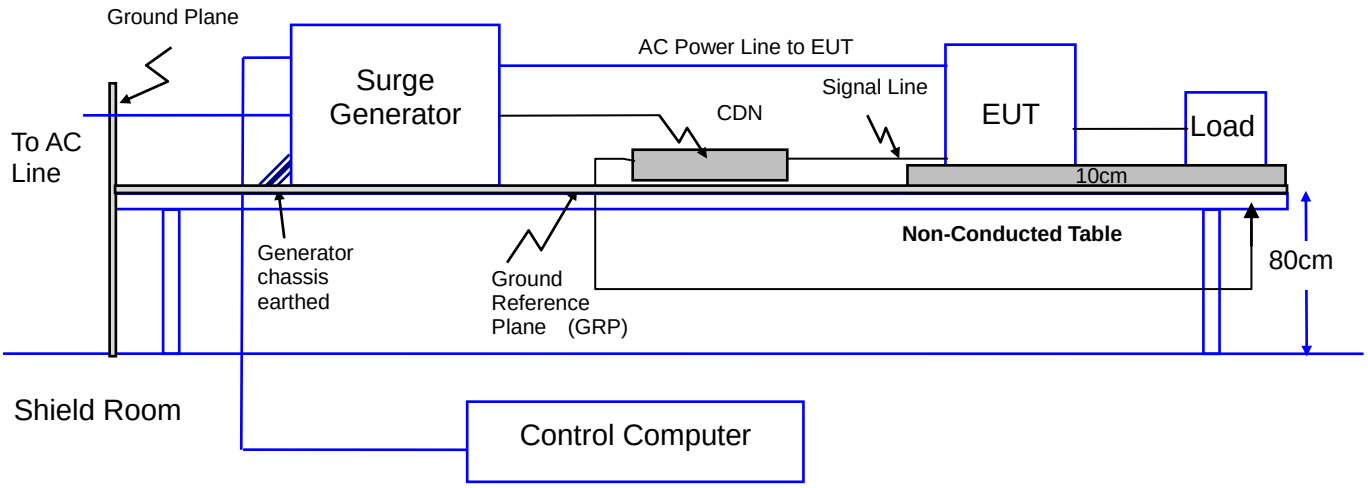
10.2 TEST METHOD

According to EN 55024: 2010

IEC 61000-4-5: 2014

10.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



10.4 SEVERITY LEVELS

Open Circuit Output Test Voltage +/- 10%	
Level	On power supply lines
1	0.5kV
2	1kV
3	2kV
4	4kV
X	Special

10.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 10.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

10.6 TEST PROCEDURE

A “combination wave” as specified in IEC 61000-4-5: 2014 was applied to the EUT. The amplitude was gradually increased using control software. Surges were initiated line synced. One surge per polarity and voltage level was applied in common and differential mode to the EUT at 0, 90, 180, 270, and 0 degree phase angles. The surges were applied at a rate of 1 surge per minute. The EUT was monitored for any degradation of performance. The AC test was conducted for differential mode at 0.5kV &1.0kV and common mode at 0.5kV &1.0kV & 2.0kV. All tests were run in both the positive and negative polarity for differential and common modes.

10.7 TEST RESULT

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 33	Humidity	57 %
Test Power Supply	AC 230V/50Hz		

AC Power line test								
Inject Line	**Voltage kV**	**Repetition Rate (minute)**	**Phase Angle**	**Surge applied Method**	**Number of pulse**	**Required Criteria**	**Complied to Criteria**	**Result**
L-N (Differential mode)	☒+0.5 ☒+1.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS
	☒-0.5 ☒-1.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS
L-PE (Common mode)	☒+0.5 ☒+1.0 ☒+2.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS
	☒-0.5 ☒-1.0 ☒-2.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS
N-PE (Common mode)	☒+0.5 ☒+1.0 ☒+2.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS
	☒-0.5 ☒-1.0 ☒-2.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
☒ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 47	Humidity	57 %
Test Power Supply	AC 230V/50Hz		

AC Power line test

Inject Line	Voltage kV	Repetition Rate (minute)	Phase Angle	Surge applied Method	Number of pulse	Required Criteria	Complied to Criteria	Result
L-N (Differential mode)	☒+0.5 ☒+1.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS
	☒-0.5 ☒-1.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS
L-PE (Common mode)	☒+0.5 ☒+1.0 ☒+2.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS
	☒-0.5 ☒-1.0 ☒-2.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS
N-PE (Common mode)	☒+0.5 ☒+1.0 ☒+2.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS
	☒-0.5 ☒-1.0 ☒-2.0	1	0°	CDN	5	B	A	PASS
		1	90°	CDN	5	B	A	PASS
		1	180°	CDN	5	B	A	PASS
		1	270°	CDN	5	B	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
☒ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

11. CONDUCTED DISTURBANCE SUSCEPTIBILITY TEST

11.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Continuous Wave Simulator	EM TEST	CWS 500 A	1099-01	2016.03.05
2	Dual Directional Couplor	AR	DC-2600	20193	N/A
3	VOLTMETER	BOONTON	9200C	361501AA	2015.11.04
4	Injection Clamp	Liithi	EM101	35260	2016.04.13
5	ATTENUATOR	BNOS	AT50-6-250	521926	N/A
6	CDN(EUT)	LUTHI	CDN L-801 M2/M3	2627	2016.06.04
7	CDN (AE)	Knorr Bremse	M3	12184	N/A
8	SHIELDING ROOM	GTK	N/A	B6	2016.06.04
9	Software	EM TEST	ICD	2.20	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

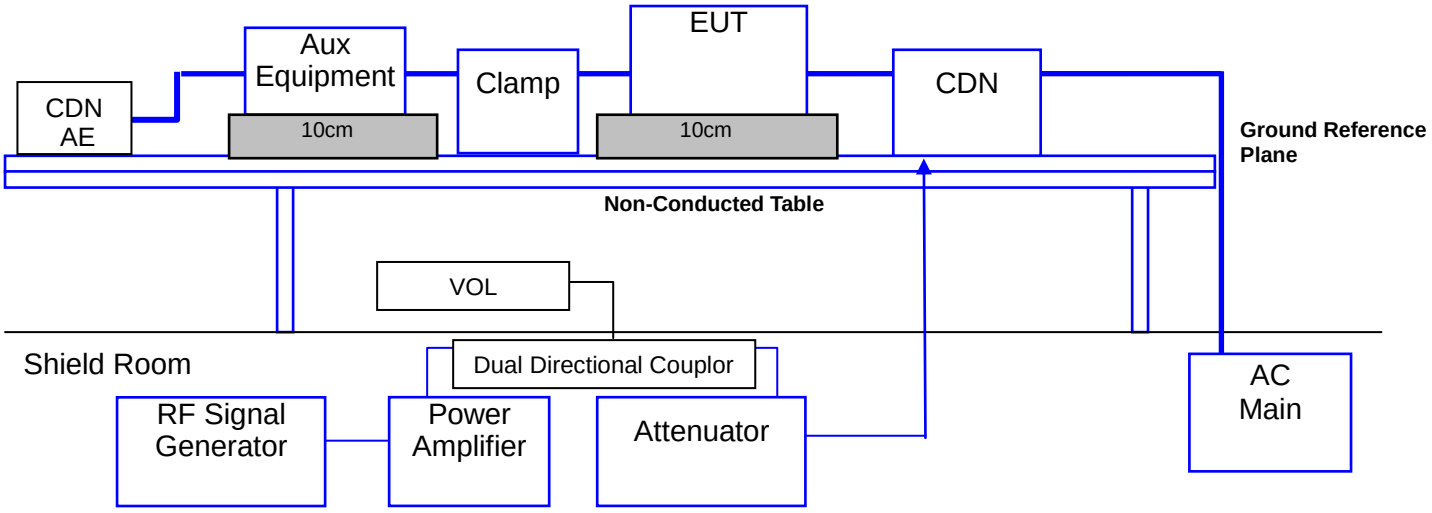
2. The test was performed at GTK Shielded Room B6.

11.2 TEST METHOD

According to EN 55024: 2010
IEC 61000-4-6:2013

11.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



11.4 SEVERITY LEVELS

Test specification
Required Performance Criteria : A
Level : 1kHz sine wave with 80% Amplitude Modulation: 3V
Frequency range : 0.15-80MHz
According to EN 55024:2010, an additional functional test for telecommunications terminal equipment shall be carried out at the following frequencies: 0.2, 1., 7.1, 13.56, 21.0, 27.12 and 40.68MHz. (+/- 1%)

11.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 11.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

11.6 TEST PROCEDURE

The EUT and load were placed on a table, which was 0.1 meters high from a Ground reference plane. Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. Also, prior to the start of the test, clamp injection (RF current probe) calibration measurements were performed as described in IEC 61000-4-6:2013.

For AC Power line test & For Signal Lines and Control Lines test:

The disturbance signal is through a coupling and decoupling networks (CDN) or EM-clamp device couples to the signal and control lines of the EUT.

After completion of the test, a functional test was performed on the EUT to ensure proper operation.

All the scanning conditions are as follows:

Condition of Test	Remarks
Field Strength	3V
Radiated Signal	0.15-80MHz (1kHz sinewave with 80% Amplitude modulation)
Dwell Time	3 Seconds
Frequency step size	1% of the present frequency

11.7 TEST RESULT

Date of Test	August 20, 2015	Temperature	25 ℃
Test Mode	Mode 33	Humidity	59 %
Test Power Supply	AC 230V/50Hz		

Frequency Range (MHz)	Inject Line	Field Strength	Inject Method	Required Criteria	Performance Criteria Complied To	Result
0.15~80	AC Line	3V	CDN	A	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
  ☒ There was no observable degradation in performance.
  ☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	25 ℃
Test Mode	Mode 47	Humidity	59 %
Test Power Supply	AC 230V/50Hz		

Frequency Range (MHz)	Inject Line	Field Strength	Inject Method	Required Criteria	Performance Criteria Complied To	Result
0.15~80	AC Line	3V	CDN	A	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
  ☒ There was no observable degradation in performance.
  ☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

12. MAGNETIC FIELD IMMUNITY MEASUREMENT

12.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	ULTRA COMPACT GENERATOR	EM TEST	UCS 500-M	0500-15	2016.04.15
2	MAGNETIC FIELD ANTENNA	EM TEST	MS100	D3730	2016.06.04
3	Software	EM TEST	ISMIEC	5.3.0	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Shielded Room B6.

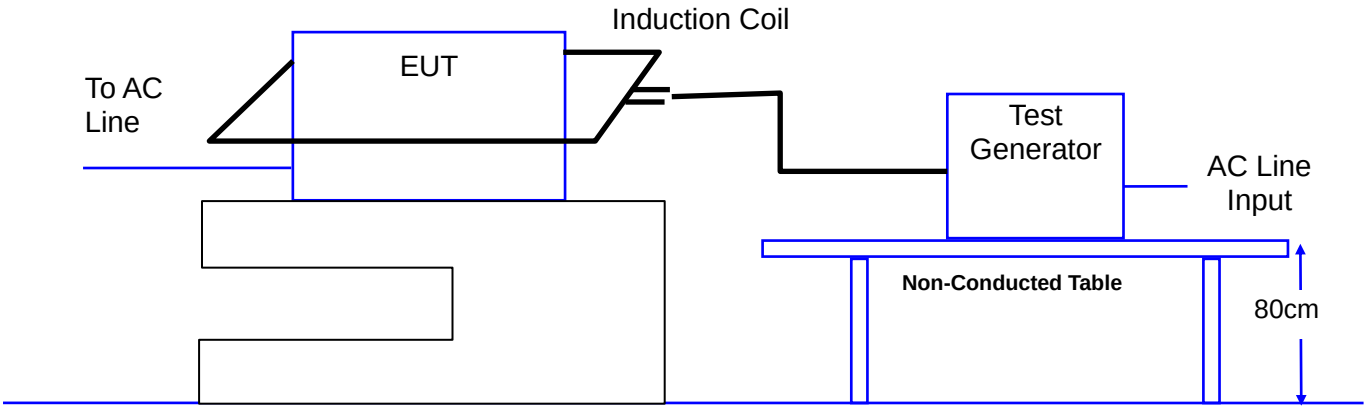
12.2 TEST METHOD

According to EN 55024: 2010

IEC 61000-4-8:2009

12.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



Shield Room

12.4 SEVERITY LEVELS

Test level for continuous field

Level	Magnetic Field Strength A/m
1	1
2	3
3	10
4	30
5	100
X	Special

"X" is an open level.

Test levels for short duration: 1to3s

Level	Magnetic Field Strength A/m
1	n.a.
2	n.a.
3	n.a.
4	300
5	1000
X	Special

"X" is an open level. n.a.= not application

Test level	Required Performance Criteria	Test Duration
1	A	Continued Field

12.5 EUT OPERATION CONDITION

1. Setup the EUT and Test Equipment as shown on 12.3.
2. Power on. Active performance checking program to allow EUT execute its usual operation mode during test.

12.6 TEST PROCEDURE

The EUT and its load are placed on a table which is 0.8 meter above a metal ground plane measured at least 1m*1m min. The test magnetic Field shall be applied by the immersion method to the EUT, previously set-up as specified in 12.3. And 90 shall rotate the induction coil° in order to expose the EUT to the test field with different orientation.

12.7 TEST RESULT

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 33	Humidity	60 %
Test Power Supply	AC 230V/50Hz		

Induction Coil Orientation	Testing Duration	Magnetic Field Strength A/m	Performance Criteria Complied To	Test Result
X	60 sec.	1 A/m, 50Hz	A	PASS
Y	60 sec.	1 A/m, 50Hz	A	PASS
Z	60 sec.	1 A/m, 50Hz	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
☒ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test.
The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 47	Humidity	60 %
Test Power Supply	AC 230V/50Hz		

Induction Coil Orientation	Testing Duration	Magnetic Field Strength A/m	Performance Criteria Complied To	Test Result
X	60 sec.	1 A/m, 50Hz	A	PASS
Y	60 sec.	1 A/m, 50Hz	A	PASS
Z	60 sec.	1 A/m, 50Hz	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☐ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss/Error of function
☒ Additional Information
☒ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test.
The acceptance criteria were met, and the EUT passed the test.

13. VOLTAGE DIPS AND SHORT INTERRUPTIONS TEST

13.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Ultra Compact Simulator	EM TEST	UCS 500N5.1	P1310114655	2016.06.03

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Shielded Room B6.

13.2 TEST METHOD

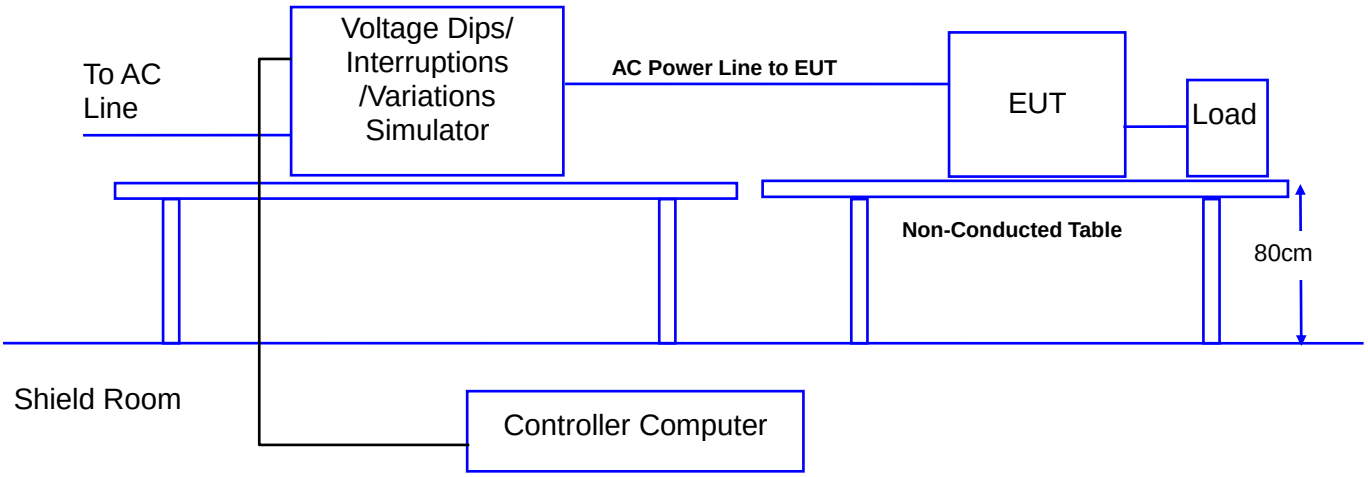
According to EN 55024: 2010

IEC 61000-4-11: 2004

13.3 BLOCK DIAGRAM OF TEST SETUP

Note: This is a representative setup diagram for Table-top EUT.

For Floor-standing EUT, the table will be removed with all others setup condition remain the same.



13.4 SEVERITY LEVELS

For 50Hz

Voltage Dips and Interruption Reduction(%)	Test Duration	Required Performance Criteria
>95	10 ms	B
30	500 ms	C
>95	5s	C

For 60Hz

Voltage Dips and Interruption Reduction(%)	Test Duration	Required Performance Criteria
>95	8.33 ms	B
30	500 ms	C
>95	5s	C

13.5 OPERATING CONDITIONS OF THE EUT

1. Setup the EUT and Test Equipment as shown on 13.3.
2. Power on the EUT. Acting performance checking program to allow EUT executing its usual operation mode during test.

13.6 TEST PROCEDURE

The EUT and its load were placed on a table which was 0.8 meters height.

For AC Power line test (For 50Hz):

The EUT was connected to the power mains through a coupling device that directly couples to the Voltage Dips and Interruption Generator.

Voltage dips of >95% for 10ms and 30% for 500ms were applied to the EUT three times with 10 sec intervals between dips. A power interruption of >95% for 5000ms (5 sec) was applied to the EUT three times with 60-second intervals between interruptions.

For AC Power line test (For 60Hz):

The EUT was connected to the power mains through a coupling device that directly couples to the Voltage Dips and Interruption Generator.

Voltage dips of >95% for 8.33ms and 30% for 500ms were applied to the EUT three times with 10 sec intervals between dips. A power interruption of >95% for 5000ms (5 sec) was applied to the EUT three times with 60-second intervals between interruptions.

13.7 TEST RESULT

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 33	Humidity	52 %
Test Power Supply	AC 100V/50Hz		

Item	Phase Angle	Reduction (%)	Test Duration (ms)	Required Criteria	Complied to Criteria	Result
Voltage Short Interruptions	☒ 0	>95	5000	C	B	PASS
Voltage Dips	☒ 0	>95	10	B	A	PASS
	☒ 0	30	500	C	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☒ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss of function, provided the function is self-recoverable, or can be restored by the operation of the controls
☒ Additional Information
☐ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 33	Humidity	52 %
Test Power Supply	AC 100V/60Hz		

Item	Phase Angle	Reduction (%)	Test Duration (ms)	Required Criteria	Complied to Criteria	Result
Voltage Short Interruptions	☒ 0	>95	5000	C	B	PASS
Voltage Dips	☒ 0	>95	8.33	B	A	PASS
	☒ 0	30	500	C	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☒ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss of function, provided the function is self-recoverable, or can be restored by the operation of the controls
☒ Additional Information
☐ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 33	Humidity	52 %
Test Power Supply	AC 240V/50Hz		

Item	Phase Angle	Reduction (%)	Test Duration (ms)	Required Criteria	Complied to Criteria	Result
Voltage Short Interruptions	☒ 0	>95	5000	C	B	PASS
Voltage Dips	☒ 0	>95	10	B	A	PASS
	☒ 0	30	500	C	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☒ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss of function, provided the function is self-recoverable, or can be restored by the operation of the controls
☒ Additional Information
☐ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 33	Humidity	52 %
Test Power Supply	AC 240V/60Hz		

Item	Phase Angle	Reduction (%)	Test Duration (ms)	Required Criteria	Complied to Criteria	Result
Voltage Short Interruptions	☒ 0	>95	5000	C	B	PASS
Voltage Dips	☒ 0	>95	8.33	B	A	PASS
	☒ 0	30	500	C	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☒ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss of function, provided the function is self-recoverable, or can be restored by the operation of the controls
☒ Additional Information
☐ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 47	Humidity	52 %
Test Power Supply	AC 100V/50Hz		

Item	Phase Angle	Reduction (%)	Test Duration (ms)	Required Criteria	Complied to Criteria	Result
Voltage Short Interruptions	☒ 0	>95	5000	C	B	PASS
Voltage Dips	☒ 0	>95	10	B	A	PASS
	☒ 0	30	500	C	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☒ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss of function, provided the function is self-recoverable, or can be restored by the operation of the controls
☒ Additional Information
☐ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 47	Humidity	52 %
Test Power Supply	AC 100V/60Hz		

Item	Phase Angle	Reduction (%)	Test Duration (ms)	Required Criteria	Complied to Criteria	Result
Voltage Short Interruptions	☒ 0	>95	5000	C	B	PASS
Voltage Dips	☒ 0	>95	8.33	B	A	PASS
	☒ 0	30	500	C	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☒ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss of function, provided the function is self-recoverable, or can be restored by the operation of the controls
☒ Additional Information
☐ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 47	Humidity	52 %
Test Power Supply	AC 240V/50Hz		

Item	Phase Angle	Reduction (%)	Test Duration (ms)	Required Criteria	Complied to Criteria	Result
Voltage Short Interruptions	☒ 0	>95	5000	C	B	PASS
Voltage Dips	☒ 0	>95	10	B	A	PASS
	☒ 0	30	500	C	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☒ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss of function, provided the function is self-recoverable, or can be restored by the operation of the controls
☒ Additional Information
☐ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

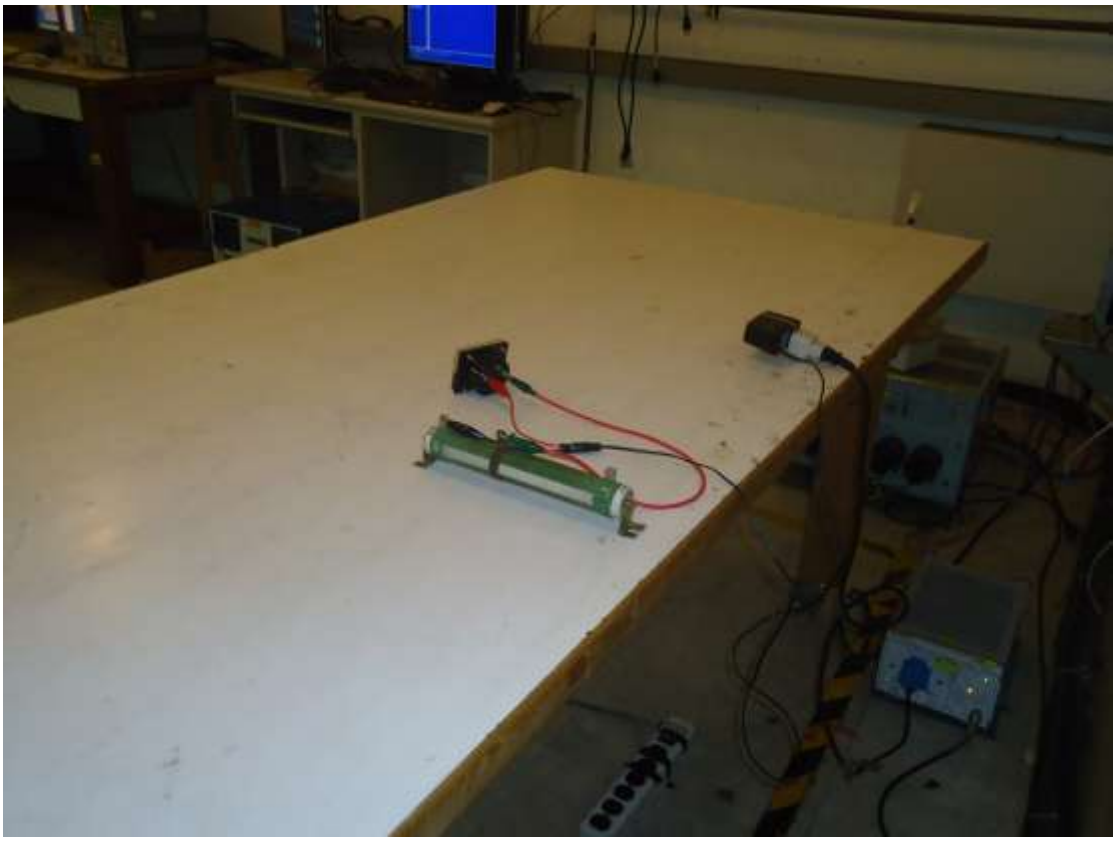
Date of Test	August 20, 2015	Temperature	26 ℃
Test Mode	Mode 47	Humidity	52 %
Test Power Supply	AC 240V/60Hz		

Item	Phase Angle	Reduction (%)	Test Duration (ms)	Required Criteria	Complied to Criteria	Result
Voltage Short Interruptions	☒ 0	>95	5000	C	B	PASS
Voltage Dips	☒ 0	>95	8.33	B	A	PASS
	☒ 0	30	500	C	A	PASS

☒ Meet criteria A: Operate as intended during and after the test
☒ Meet criteria B: Operate as intended after the test
☐ Meet criteria C: Loss of function, provided the function is self-recoverable, or can be restored by the operation of the controls
☒ Additional Information
☐ There was no observable degradation in performance.
☒ No false alarms or other malfunctions were observed during or after the test. The acceptance criteria were met, and the EUT passed the test.

14. PHOTOGRAPHS FOR TEST

14.1 TEST PHOTOGRAPHS FOR CONDUCTION

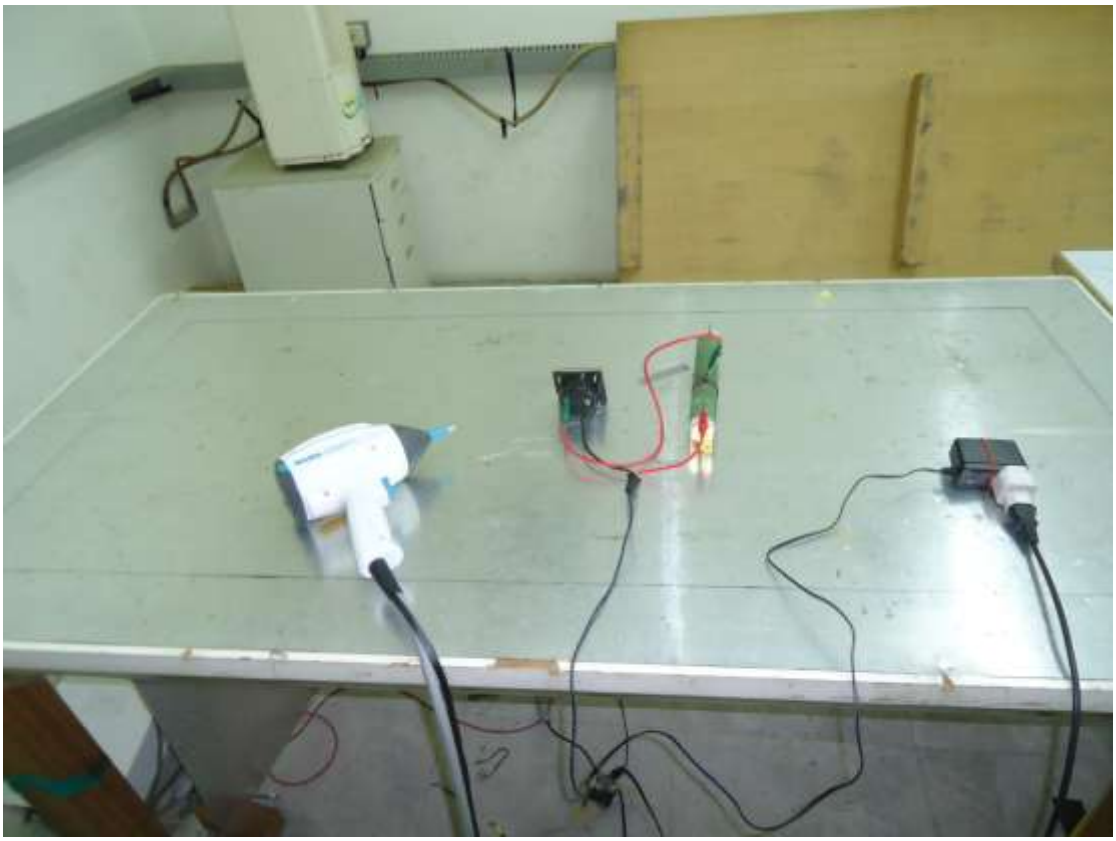


14.2 TEST PHOTOGRAPHS FOR RADIATED

(30 MHz to 1 GHz)

14.3 TEST PHOTOGRAPHS FOR HARMONIC/FLICKER

14.4 TEST PHOTOGRAPHS FOR ESD



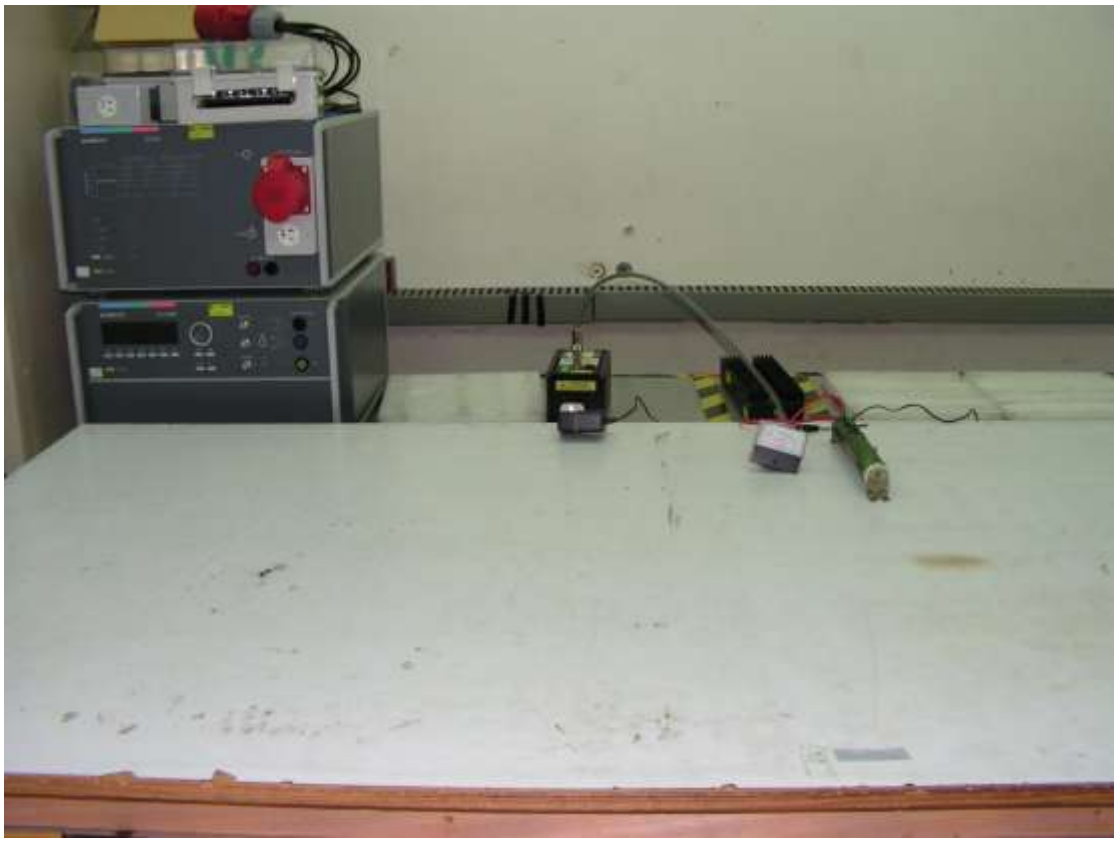
14.5 TEST PHOTOGRAPHS FOR ESD TEST POINTS

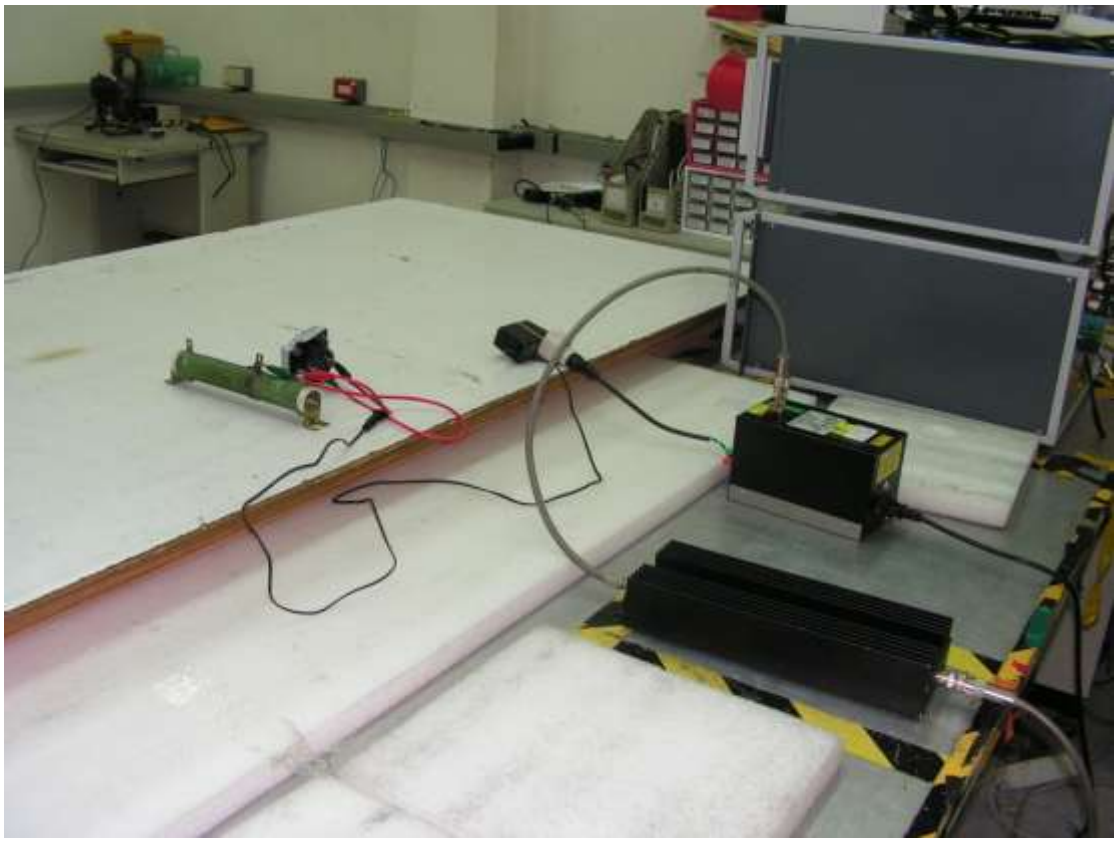
14.6 TEST PHOTOGRAPHS FOR RS

14.7 TEST PHOTOGRAPHS FOR EFT

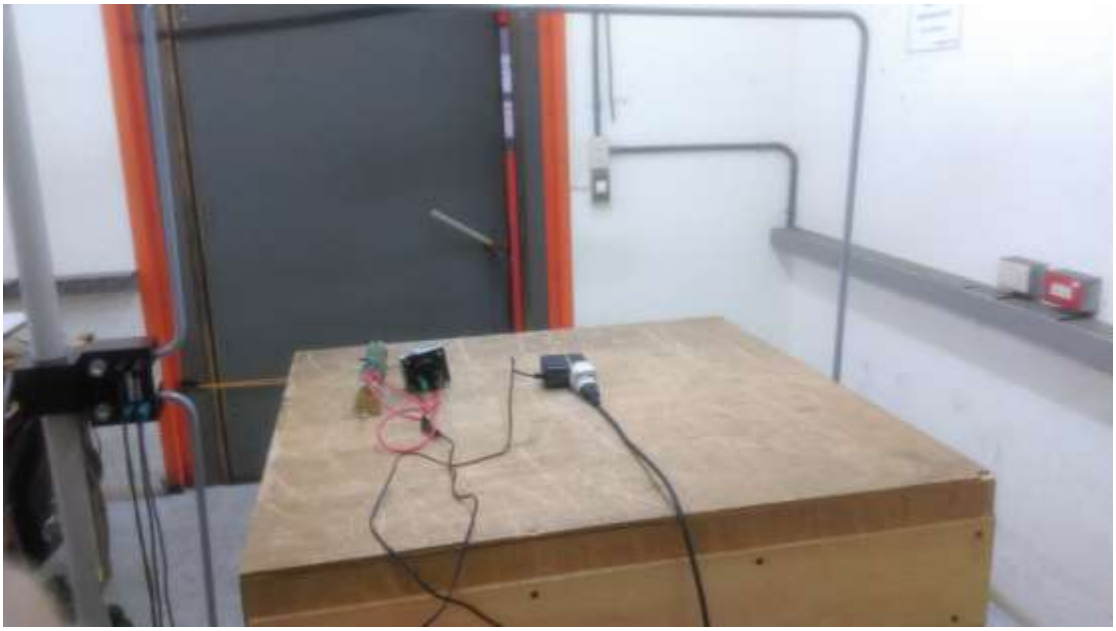
14.8 TEST PHOTOGRAPHS FOR SURGE

14.9 TEST PHOTOGRAPHS FOR CS





14.10 TEST PHOTOGRAPHS FOR MAGNETIC



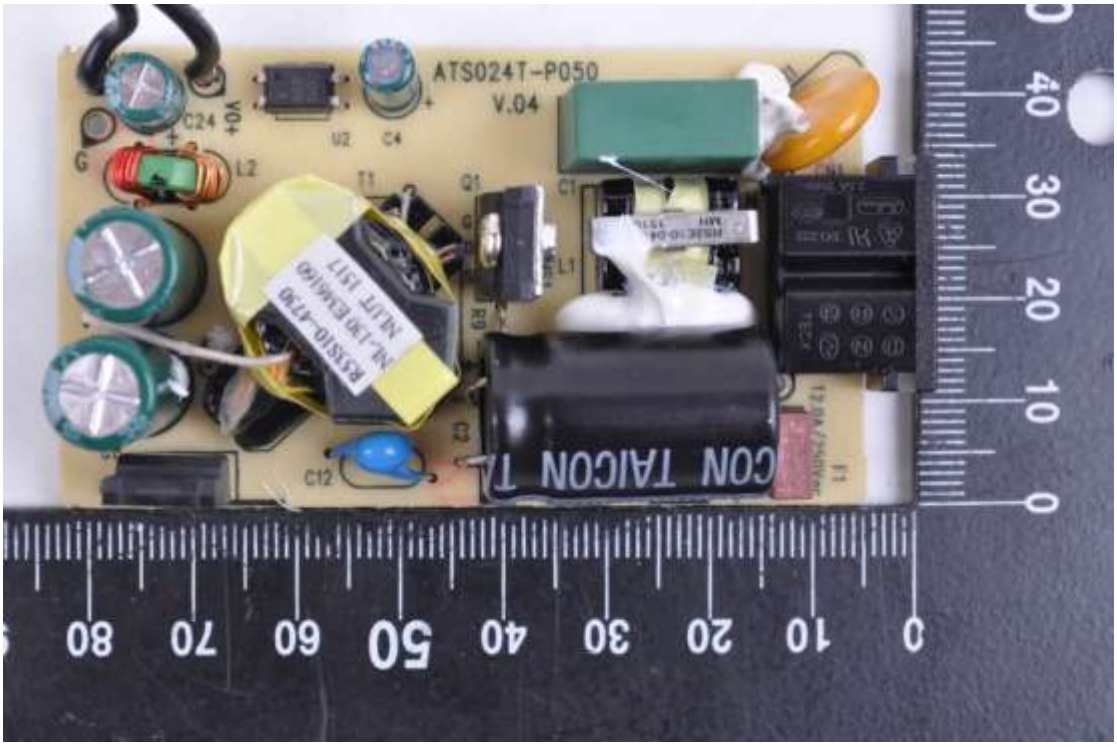
14.11 TEST PHOTOGRAPHS FOR DIPS

15. PHOTOGRAPHS FOR PRODUCT

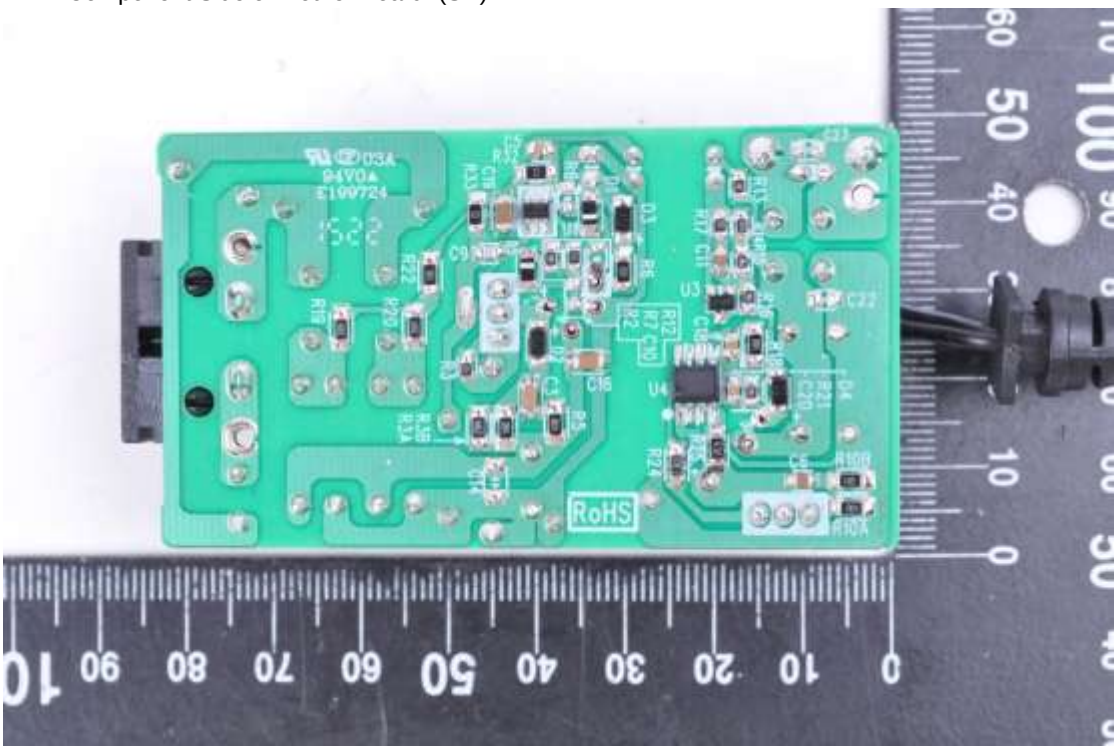
1. Front View of AC Adapter. (Desk Top type)
2. Back View of AC Adapter. (Desk Top type)

3. Component Side of Mother Board. (SR)
4. Component Side of Mother Board. (SR)

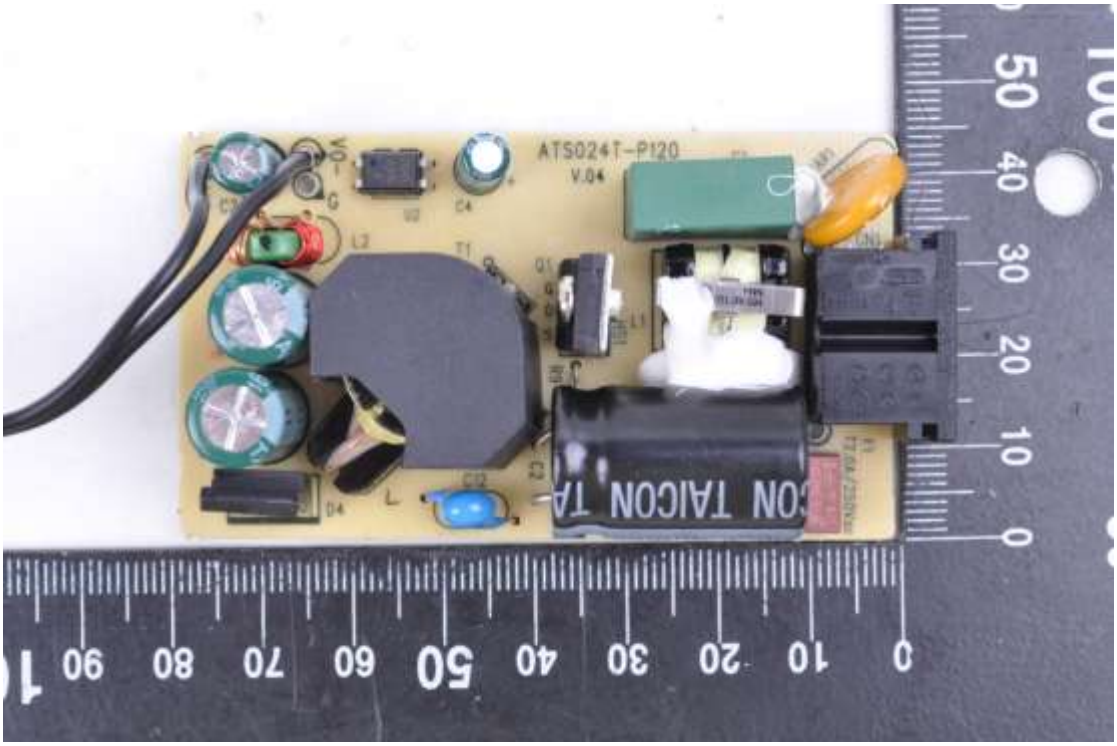
5. Component Side of Mother Board. (SR)
6. Component Side of Mother Board. (SR)



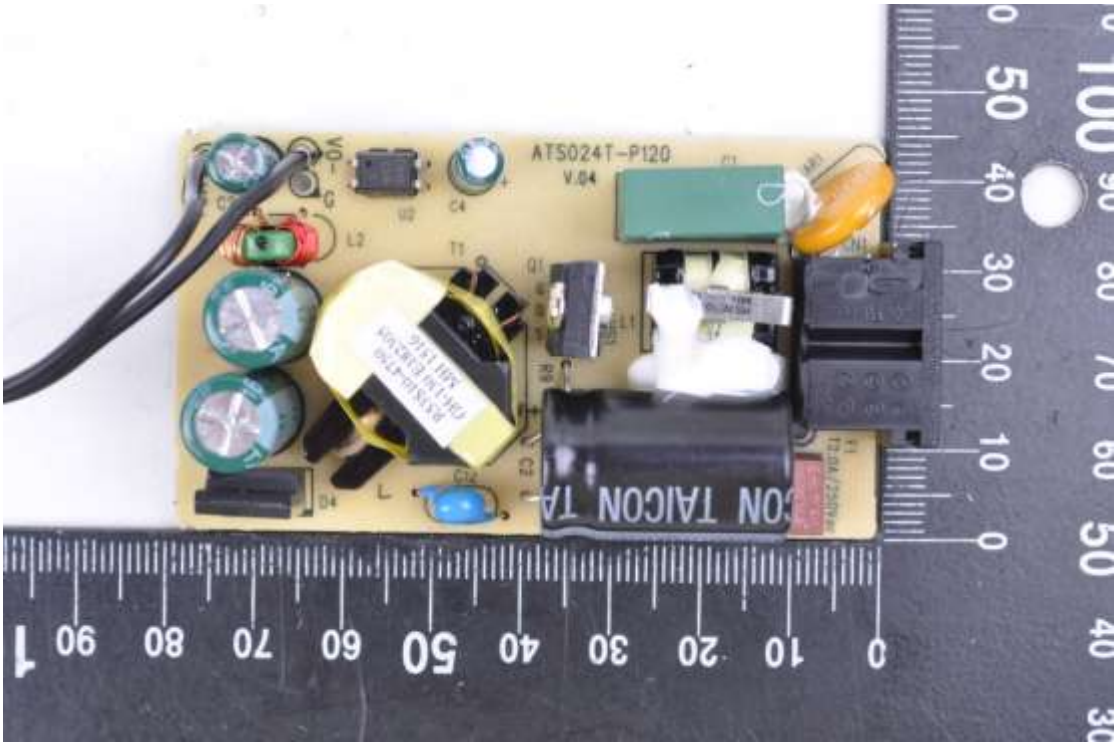
7. Component Side of Mother Board. (SR)



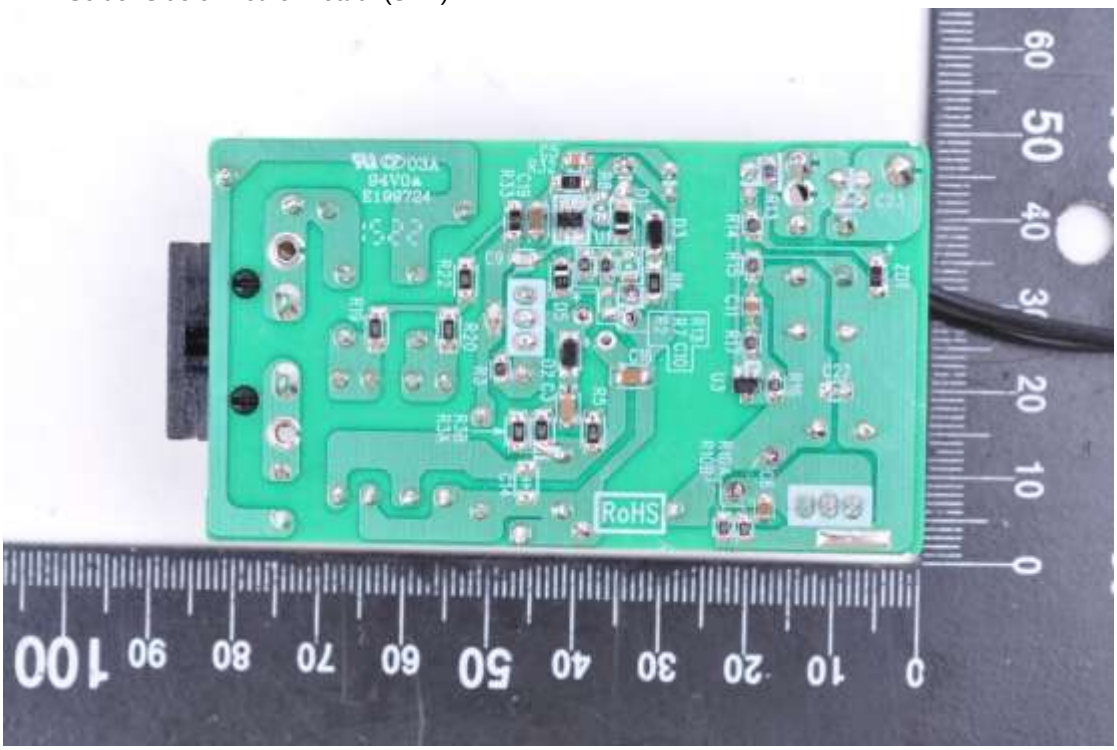
8. Component Side of Mother Board. (SBD)
9. Component Side of Mother Board. (SBD)



10. Component Side of Mother Board. (SBD)
11. Component Side of Mother Board. (SBD)

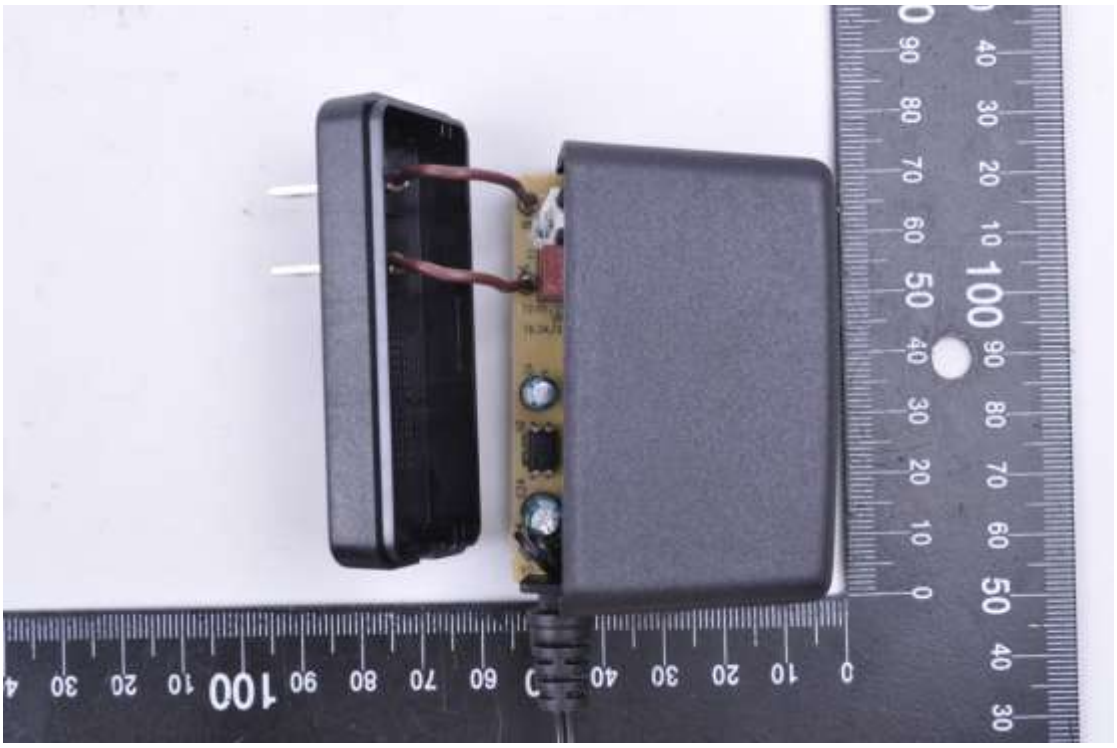


12. Solder Side of Mother Board. (SBD)

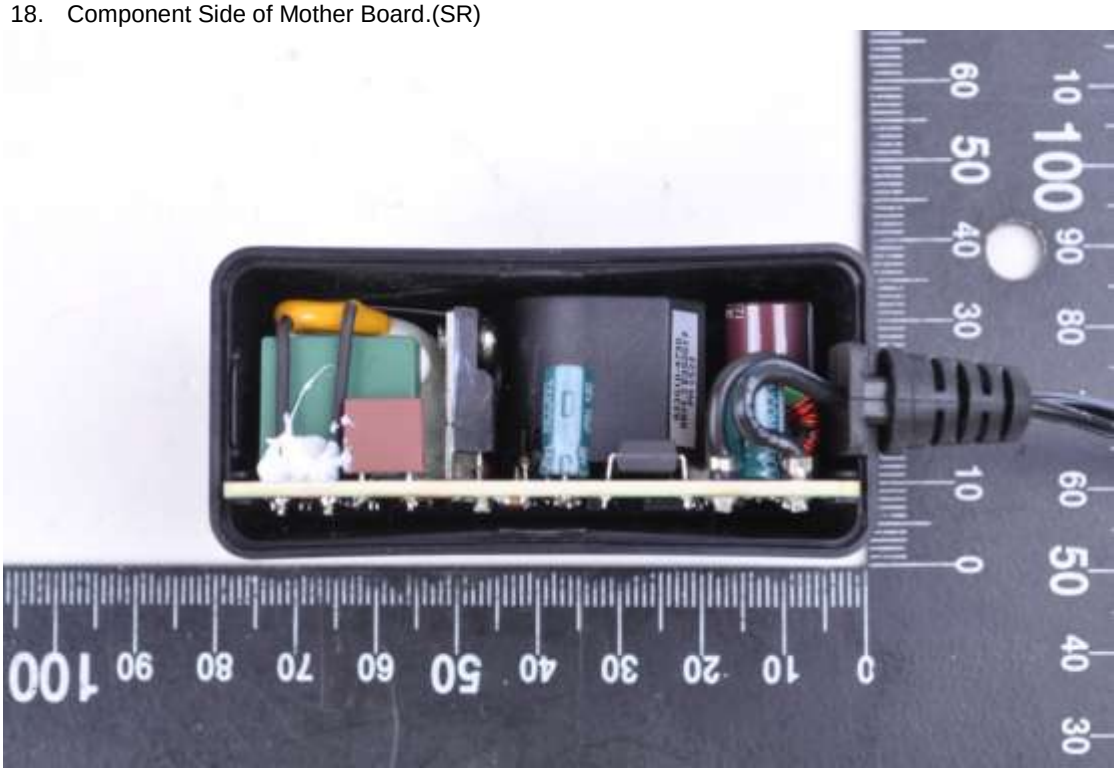


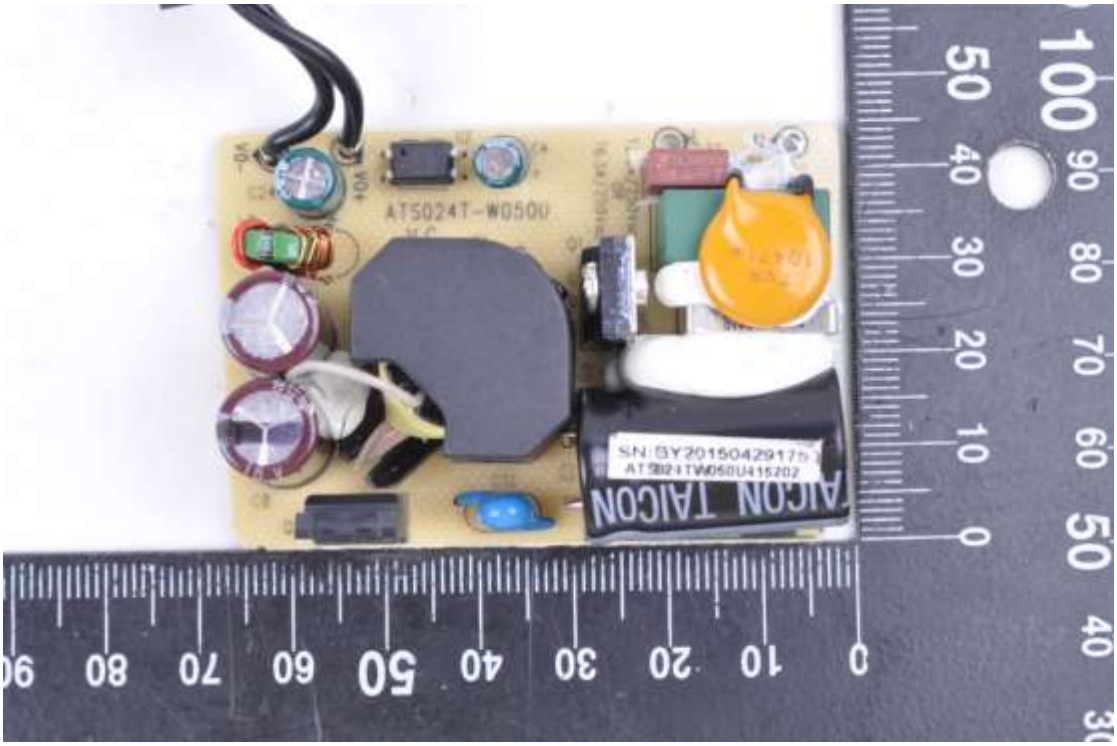
13. Front View of AC Adapter. (Direct Plug In type)
14. Back View of AC Adapter. (Direct Plug In type)

15. Inner.
16. Inner.

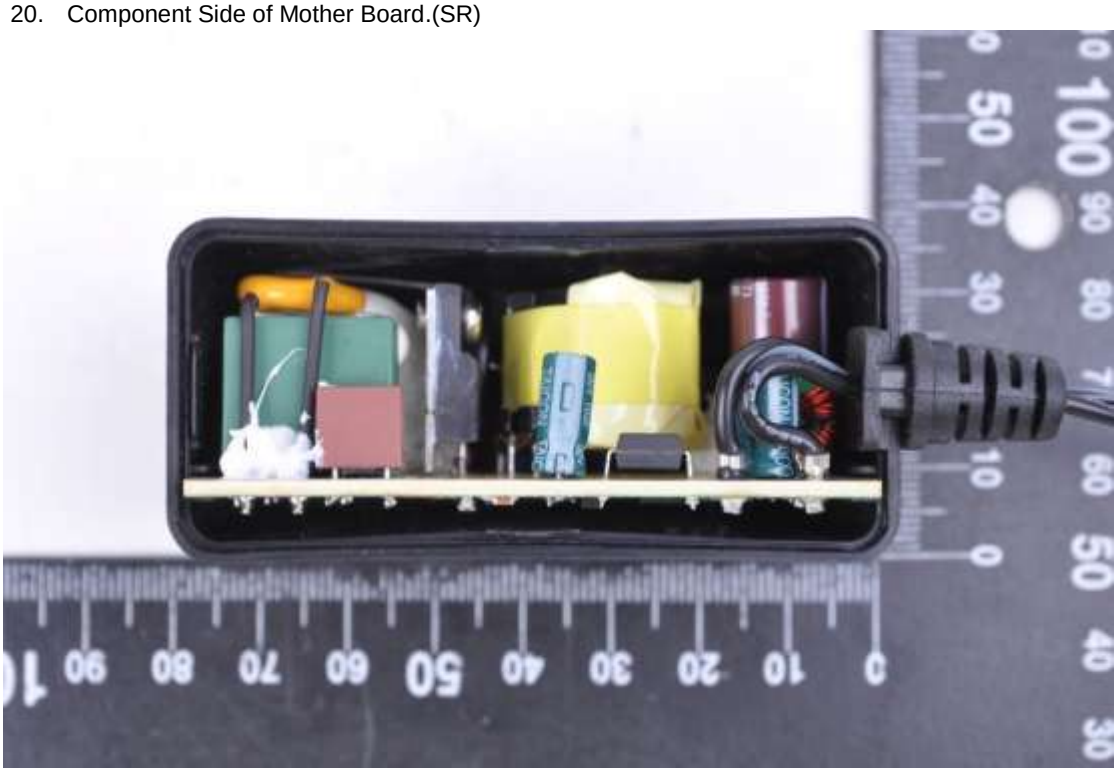


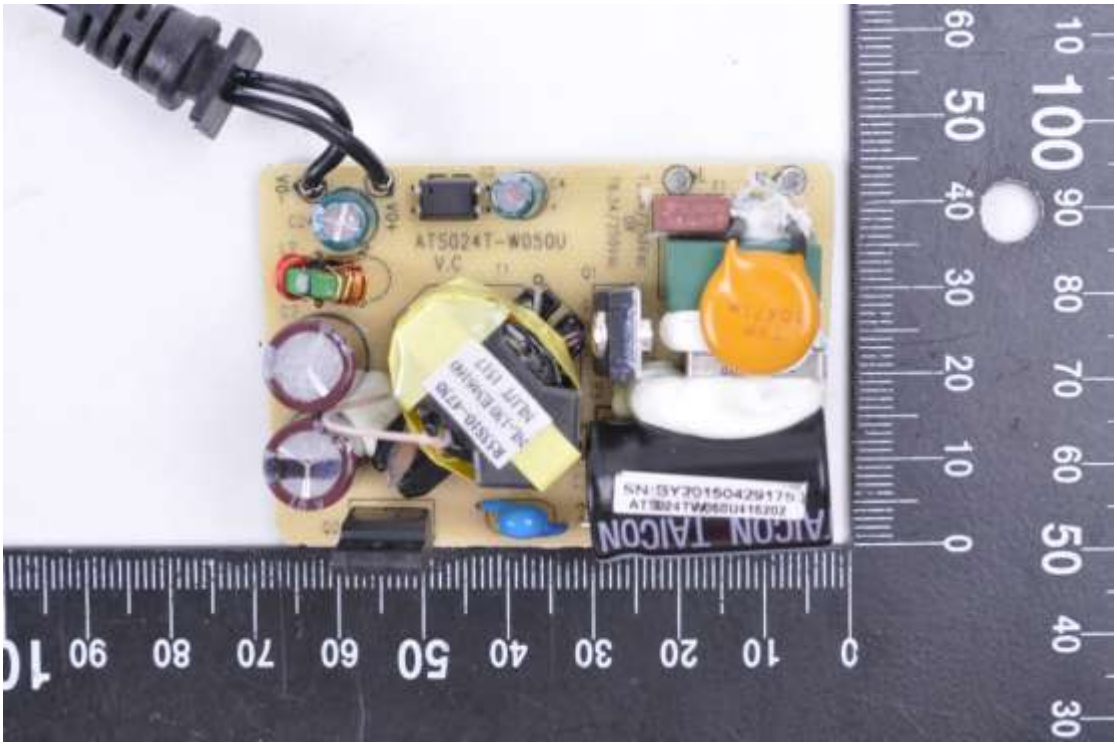
17. Inner.
18. Component Side of Mother Board.(SR)



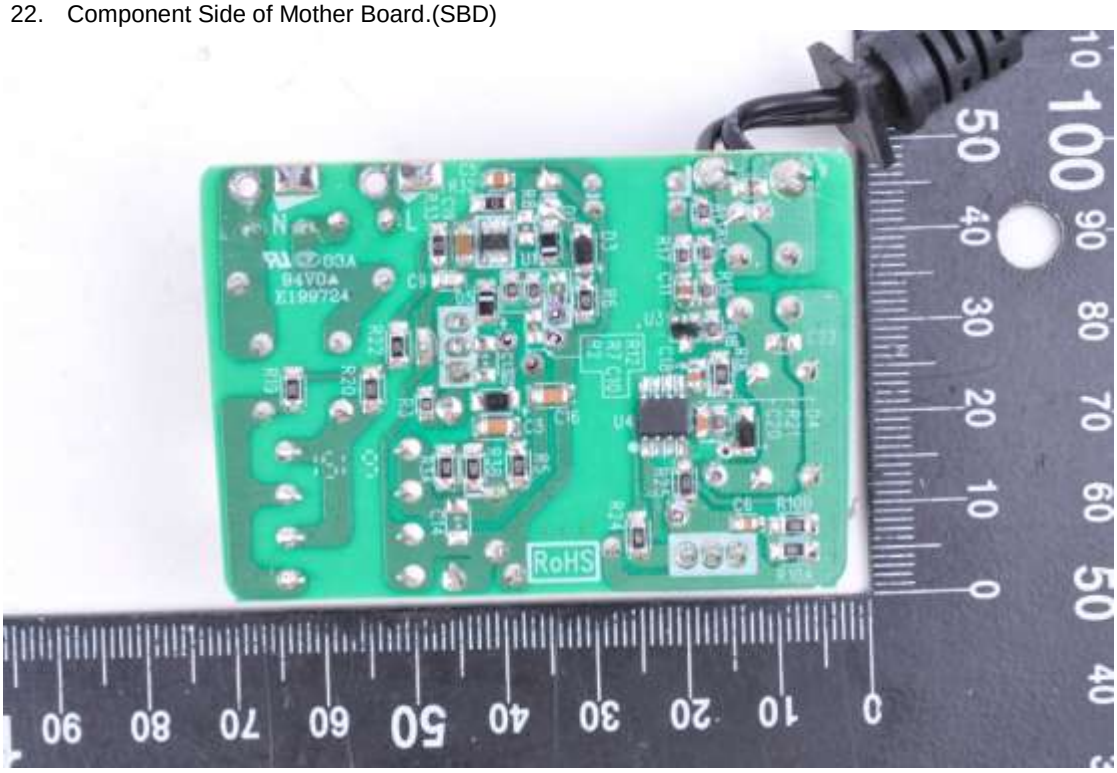


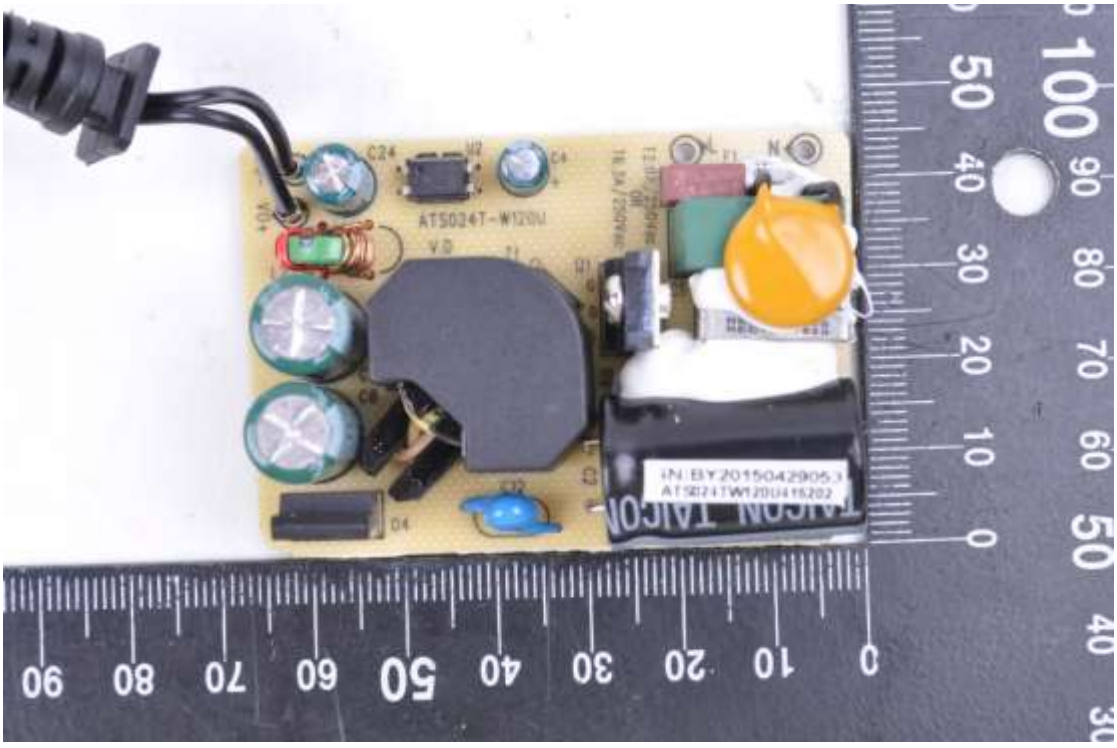
19. Inner.
20. Component Side of Mother Board.(SR)



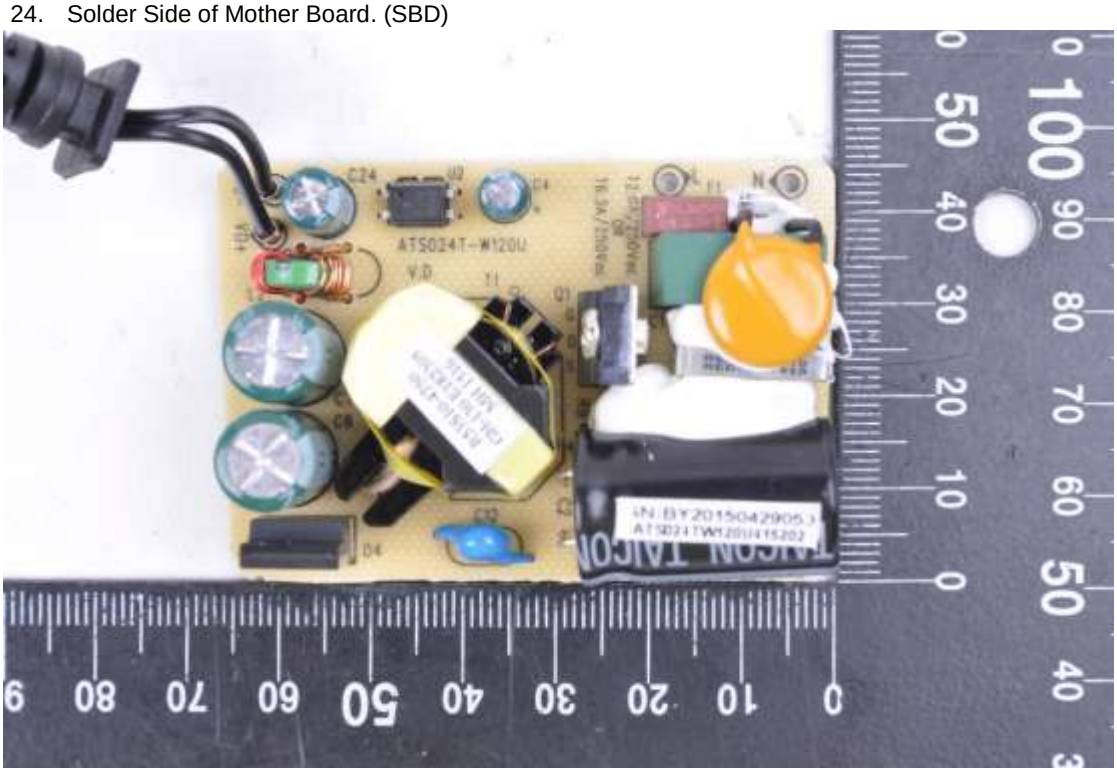


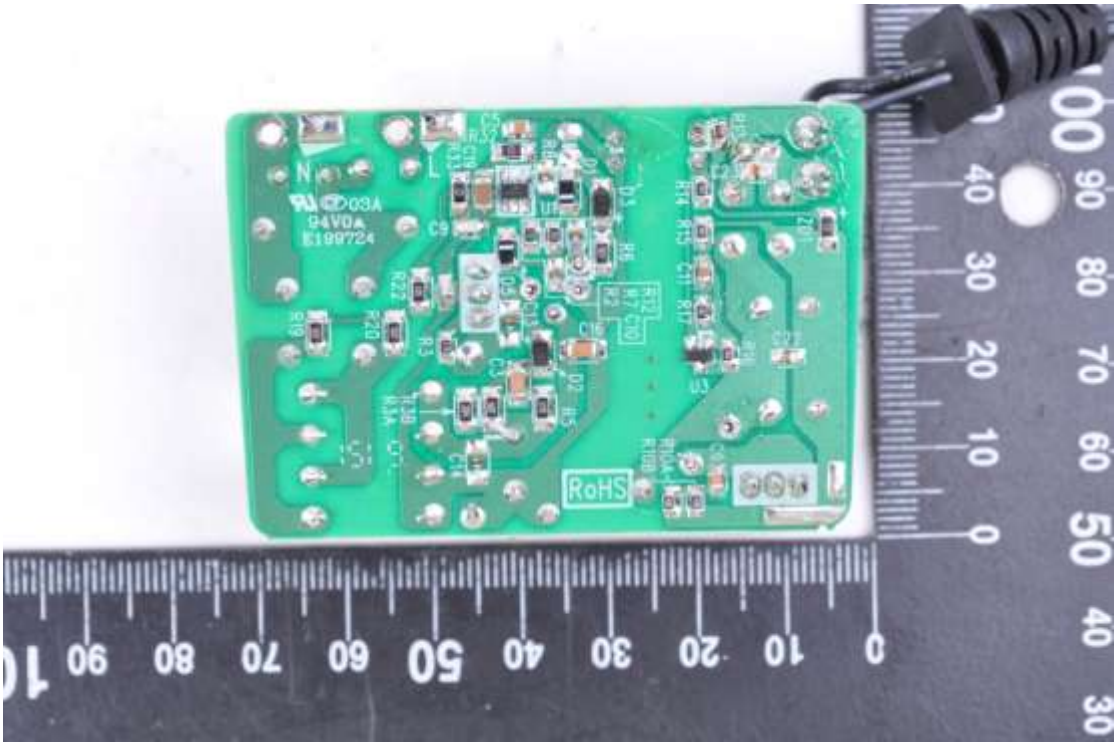
21. Solder Side of Mother Board. (SR)
22. Component Side of Mother Board.(SBD)





23. Component Side of Mother Board.(SBD)
24. Solder Side of Mother Board. (SBD)





25. Front View of AC Adapter. (US plug)
26. Back View of AC Adapter. (US plug)

16. EMI/EMS REDUCTION METHOD DURING COMPLIANCE TESTING

No modification was made during testing.