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Report No.: SHEM160400216301

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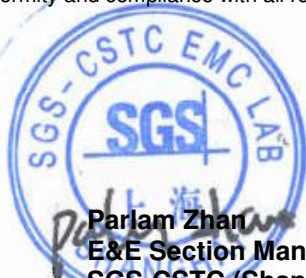
1 Cover Page

TEST REPORT

Application No.:	SHEM1604002163HS
Applicant:	SUZHOU ARMOCON TECHNOLOGY CO., LTD
Equipment under Test (EUT) NOTE: The following sample(s) was/were submitted and identified by the client as.	
Product Name:	Handhold massager
Model No.(EUT):	Nea 2 /Lily2
Trade Mark:	LELO
Standards:	EN 55014-1:2006+A1:2009+A2:2011, EN 55014-2:2015, EN 61000-3-2:2014, EN 61000-3-3:2013.
Date of Receipt:	September 23, 2015
Date of Test:	September 25, 2015 to October 08, 2015
Date of Issue:	May 03, 2016
Test Result:	Pass*

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives.



Parlam Zhan
E&E Section Manager
SGS-CSTC (Shanghai) Co., Ltd.



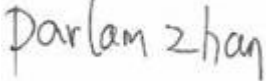
The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00	1, Modified voltage 2, Update Standards and Directive	May 03, 2016		Copy (Base on SHEM150900344101)

Authorized for issue by:			
Engineer		Zenger Zhang _____ Print Name	 _____
Clerk		Susie Liu _____ Print Name	 _____
Reviewer		Parlam Zhan _____ Print Name	 _____

3 Test Summary

ELECTROMAGNETIC INTERFERENCE (EMI)			
Test	Test Requirement	Test Method	Result
Conducted Emission on AC, 150kHz to 30MHz	EN 55014-1:2006+ A1:2009+A2:2011	EN 55014-1:2006+ A1:2009+A2:2011	PASS
Radiated Emission (30MHz to 1GHz)	EN 55014-1:2006+ A1:2009+A2:2011	CISPR 16-2-3: 2010+A1:2010+A2:2014	PASS
Discontinuous Interference on AC 150kHz - 30MHz	EN 55014-1:2006+ A1:2009+A2:2011	EN 55014-1:2006+ A1:2009+A2:2011	N/A*
Harmonic Emission on AC, 100Hz to 2kHz	EN 61000-3-2:2014	EN 61000-3-2:2014	N/A**
Flicker Emission on AC	EN 61000-3-3:2013	EN 61000-3-3:2013	PASS
Electromagnetic Susceptibility(EMS)			
Test	Test Requirement	Test Method	Result
ESD	EN 55014-2:2015	EN 61000-4-2:2009	PASS
Electrical Fast Transients (EFT) on AC	EN 55014-2:2015	EN 61000-4-4:2012	PASS
Surge Immunity on AC	EN 55014-2:2015	EN 61000-4-5:2014	PASS
Injected Currents on AC, 150kHz to 230MHz	EN 55014-2:2015	EN 61000-4-6:2014	PASS
Voltage Dips and Interruptions on AC	EN 55014-2:2015	EN 61000-4-11:2004	PASS
Remark :			
Note1:*Please refer to Section 7.3 for details			
Note2:**Please refer to Section 7.4 for details			

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5 General Information

5.1 Client Information

Applicant: SUZHOU ARMOCON TECHNOLOGY CO., LTD
 Address of Applicant: 3-5/F No 77 SuHong Middle Road SIP Jiangsu China
 Manufacturer: SUZHOU ARMOCON TECHNOLOGY CO., LTD
 Address of Manufacturer: 3-5/F No 77 SuHong Middle Road SIP Jiangsu China
 Factory: SUZHOU ARMOCON TECHNOLOGY CO., LTD
 Address of Factory: 3-5/F No 77 SuHong Middle Road SIP Jiangsu China

5.2 Details of E.U.T.

Power Supply: DC 5V
 Test voltage: DC 5V
 Cable Type: 0.5m Length (2 wires) for DC input cable

5.3 E.U.T Operation Mode

Functions/Modes: Running mode
 Running mode: Keep the internal motor of EUT running continuously.

5.4 E.U.T Operation Environment

Temperature Range: 20-25°C
 Humidity Range: 30-60% RH
 Atmospheric Pressure Range: 100-105kPa

5.5 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
Adaptor	EZVIZ	ADS-10BA-06 05010GPCN
LCD-displaying	DELL	E1909WF

5.6 Deviation from Standards

All Immunity tests to EN 55014-2 were performed in accordance with EN 61000-4-x and not IEC 61000-4-x. (x=2, 4,5,6,11).

5.7 Abnormalities from Standard Conditions

None.

5.8 Modification/Retest Record

None.

5.9 Monitoring of EUT for All Immunity Test

Audio: None
Visual: Working status of the EUT

5.10 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

5.11 Test Facility

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2017-07-14.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2017-09-16.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1. Expiry Date: 2017-06-18.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868,C-4336,T-2221,G-830 respectively. Date of Expiry: 2017-11-16.

5.12 Measurement Uncertainty

According to CISPR 16-4-2.

Test Item	Frequency Range	Measurement Uncertainty	U_{CISPR}
Conducted Emission at mains port using AMN	9kHz-150kHz	3.2 dB	3.8 dB
Conducted Emission at mains port using AMN	150kHz-30MHz	3.0 dB	3.4 dB
Conducted Emission at mains port using VP	9kHz-30MHz	1.9 dB	3.9 dB
Conducted Emission at telecommunication port using AAN	150kHz-30MHz	2.4 dB	5.0 dB
Radiated Emission	30MHz-1000MHz	4.4 dB	6.3 dB
Radiated Emission	1GHz-18GHz	4.6 dB	5.2 dB (1GHz-6GHz)
			5.5 dB (6GHz-18GHz)
Disturbance Power	30MHz-300MHz	3.5 dB	4.5 dB
Remark: AMN – Artificial Mains Network VP – Voltage Probe ANN – Asymmetric Artificial Network			

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

6 Equipment list

Conducted Emission

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2015-01-22	2016-01-21
2	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2015-01-22	2016-01-21
3	Line impedance stabilization network	EMCO	3816/2	00034161	2015-01-22	2016-01-21

Radiated Emission

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1.	EMI test receive	Rohde & Schwarz	ESR7	101391	2015-01-22	2016-01-21
2	CONTROLLER	INNCO	CO200	474	/	/
3	Broadband UHF-VHF ANTENNA	SCHWARZBECK	VULB9168	9168-313	2015-02-07	2016-02-06
4	Double ridged broadband horn ANTENNA	SCHWARZBECK	BBHA9120D	9120D-679	2015-02-07	2016-02-06
5	Amplifier	SCHWARZBECK	SCU-F0118-G40-BZ4-CSS(F)	10001	2015-01-22	2016-01-21
6	Low noise amplifier	TESEQ	LNA6900	71033	2014-12-27	2015-12-26

Flicker

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	Single phase harmonics & flicker analyzer	EM test	DPA500	V0507100125	2015-01-22	2016-01-21
2	AC SOURCE 6KVA	EM test	ACS500	V0507100126	2015-01-22	2016-01-21

Electrostatic Discharge Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	Electrostatic Discharge Simulator	TESEQ	NSG 437	468	2015-08-25	2016-08-24

EFT Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	EMS test machine	EMC Partner	TRA3000 F-S-D-V	1229	2015-01-04	2016-01-03

Surge Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	EMS test machine	EMC Partner	TRA3000 F-S-D-V	1229	2015-01-04	2016-01-03

Conducted Immunity Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	signal generator	Rohde & Schwarz	SMY01	101394	2015-01-22	2016-01-21
2	PAMP Conducted RF test system	HAEFFLY	PAMP250	151708	2015-01-22	2016-01-21
3	CDN impedance and K-factor	LUTHI	L-801 M1	2116	/	/
4	CDN impedance and K-factor	LUTHI	L-801 M2/M3	2117	2015-01-22	2016-01-21

Voltage dips and Interruption Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	EMS test machine	EMC Partner	TRA3000 F-S-D-V	1229	2015-01-04	2016-01-03

General Equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
1	Digital pressure meter	YONGZHI	DYM3-01	101012	2015-04-13	2016-04-12
2	Temperature& humidity recorder	ShangHai weather meter work	ZJ 1-2B	84320600 803136, F3040201 53,20101 201FS10 0A6K,201 106117	2015-08-03	2016-08-02
3	Digital Multimeter	FLUKE	17B	19720439	2015-01-22	2016-01-21
4	Autoformer regulator	Guangzhou bao de	TDGC2-5K VA-	/	/	/
5	CLAMP METER	FLUKE	316	250303097 1	2015-01-22	2016-01-21

7 Electromagnetic Interference Test Results

7.1 Conducted Emissions on Mains Terminals, 150 kHz to 30MHz

Detector: Quasi-Peak and Average at frequency with maximum peak
(9kHz resolution bandwidth)

Limit:

Frequency range MHz	At mains terminals dB (μV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	59 to 46
0.50 to 5	56	46
5 to 30	60	50
Note1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		
Note2: The lower limit is applicable at the transition frequency.		

7.1.1 E.U.T. Operation

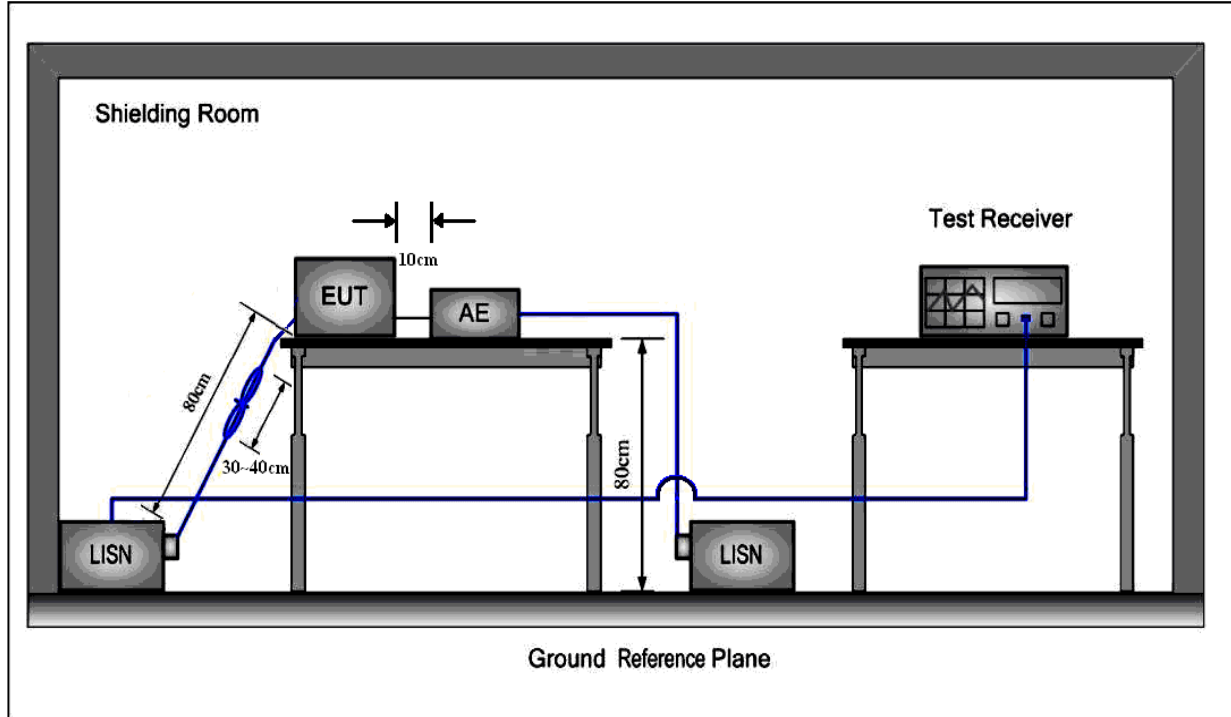
Test mode: Running mode

Note: A pre-test at 160kHz shall be made over a range of 0.9 to 1.1 times the rated voltage in order to check the level of disturbance varies considerably with the supply voltage, compliance test at 230V 50Hz as no worse case was found.

Pre-scan was performed with peak detected on all ports, Quasi-peak & average measurements were performed at the frequencies at which maximum peak emission level were detected.

Please see the attached Quasi-peak and Average test results.

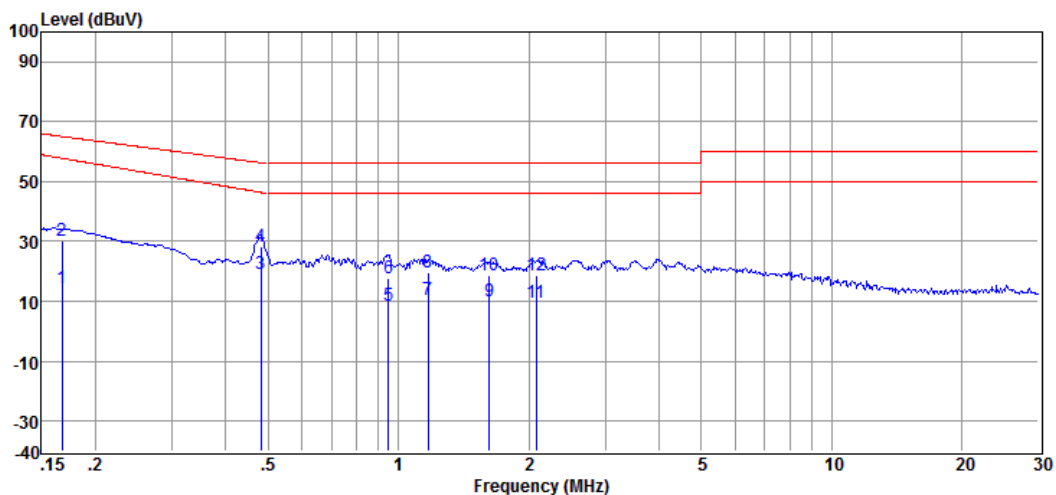
7.1.2 Test Setup and Procedure



1. The mains terminal disturbance voltage was measured with the EUT in a shielded room.
2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN, which was bonded to the ground reference plane in the same way as the LISN for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN was placed 0.8m from the boundary of the unit under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN and the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m. All other units of the EUT and associated equipment were at least 0.8m from the LISN.

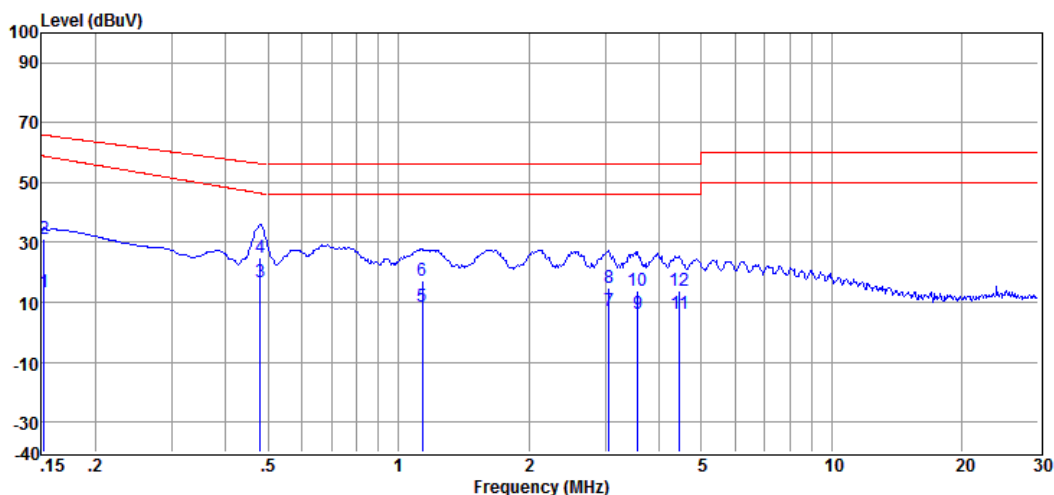
7.1.3 Measurement Data

Live Line:



Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)	
1	0.168	4.10	0.30	9.86	14.26	57.80	-43.54	Average
2	0.168	20.06	0.30	9.86	30.22	65.08	-34.86	QP
3	0.481	9.28	0.25	9.86	19.39	46.41	-27.02	Average
4	0.481	18.39	0.25	9.86	28.50	56.32	-27.82	QP
5	0.948	-1.36	0.18	9.87	8.69	46.00	-37.31	Average
6	0.948	7.75	0.18	9.87	17.80	56.00	-38.20	QP
7	1.172	0.56	0.21	9.87	10.64	46.00	-35.36	Average
8	1.172	9.58	0.21	9.87	19.66	56.00	-36.34	QP
9	1.619	-0.38	0.30	9.87	9.79	46.00	-36.21	Average
10	1.619	8.72	0.30	9.87	18.89	56.00	-37.11	QP
11	2.077	-0.67	0.36	9.87	9.56	46.00	-36.44	Average
12	2.077	8.41	0.36	9.87	18.64	56.00	-37.36	QP

Neutral Line:



Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB)	(dB)	(dBμV)	(dBμV)	(dB)	
1	0.152	3.25	0.34	9.86	13.45	58.83	-45.38	Average
2	0.152	20.77	0.34	9.86	30.97	65.87	-34.90	QP
3	0.479	6.83	0.30	9.86	16.99	46.46	-29.47	Average
4	0.479	14.97	0.30	9.86	25.13	56.35	-31.22	QP
5	1.135	-1.64	0.37	9.87	8.60	46.00	-37.40	Average
6	1.135	7.13	0.37	9.87	17.37	56.00	-38.63	QP
7	3.065	-3.51	0.73	9.87	7.09	46.00	-38.91	Average
8	3.065	4.29	0.73	9.87	14.89	56.00	-41.11	QP
9	3.569	-4.33	0.63	9.88	6.18	46.00	-39.82	Average
10	3.569	3.37	0.63	9.88	13.88	56.00	-42.12	QP
11	4.451	-4.16	0.49	9.89	6.22	46.00	-39.78	Average
12	4.451	3.26	0.49	9.89	13.64	56.00	-42.36	QP

Level = Read Level + LISN/ISN Factor + Cable Loss.

7.2 Radiated Emissions, 30MHz to 1GHz

Detector: Peak for pre-scan (120 kHz resolution bandwidth)
Quasi-Peak for final test (120 kHz resolution bandwidth)

Limit:

For 3m

Frequency range	Quasi-peak limits
MHz	dB (μV/m)
30 to 230	40
230 to 1000	47
At transitional frequencies the lower limit applies.	

Limit:

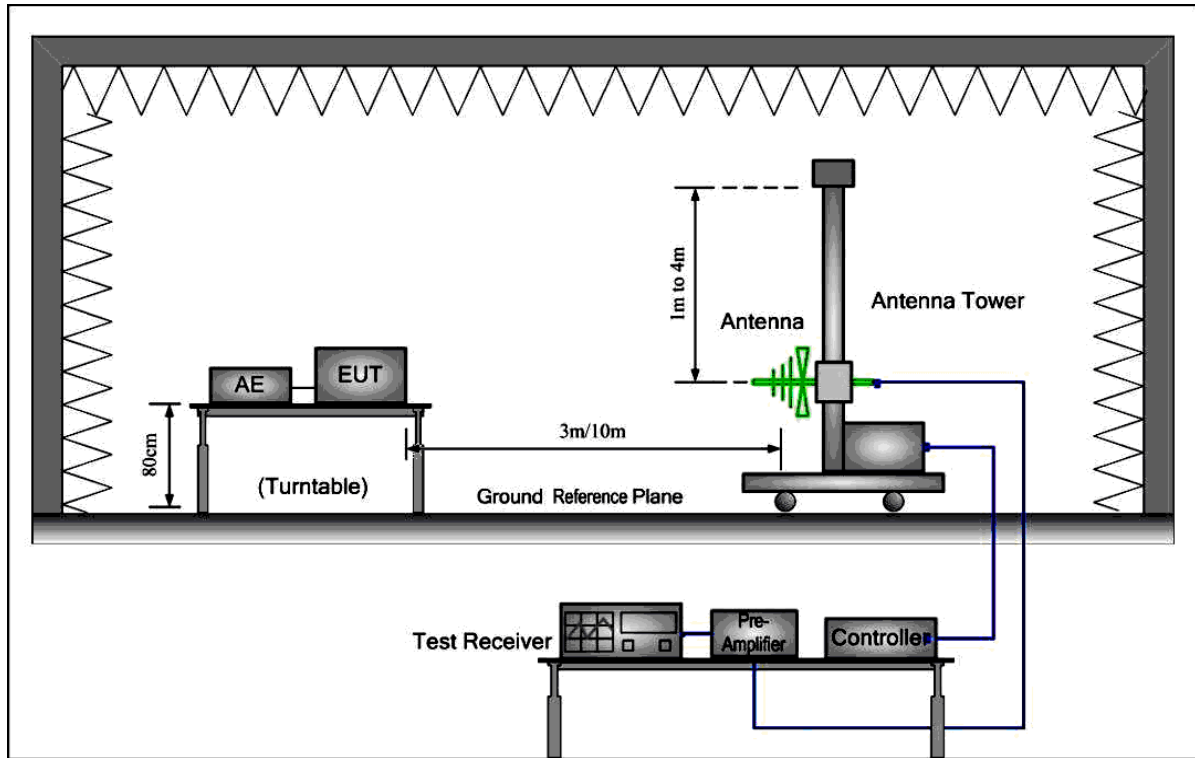
7.2.1 E.U.T. Operation

Test mode: Running mode

Pre-scan was performed with peak detected in the whole frequency range, Quasi-peak measurements was performed at the frequencies at which maximum peak emission level were detected.

Please see the attached Quasi-peak test results.

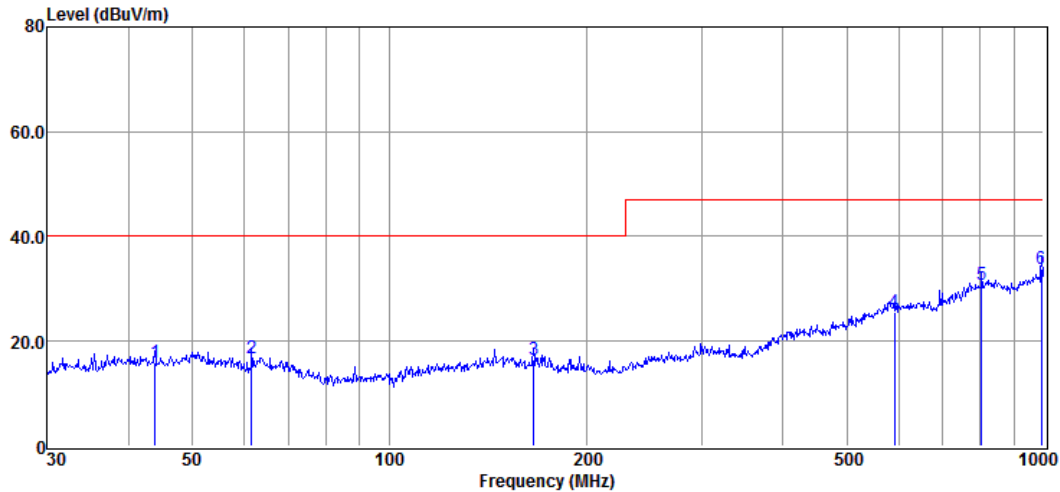
7.2.2 Test Setup and Procedure



1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. The EUT was connected to AC power source through a mains power outlet which was bonded to the ground reference plane; The mains cables shall drape to the ground reference plane.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum signature data plots of the EUT.
5. The frequencies of maximum emission were determined in the final radiated emissions measurement, the physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

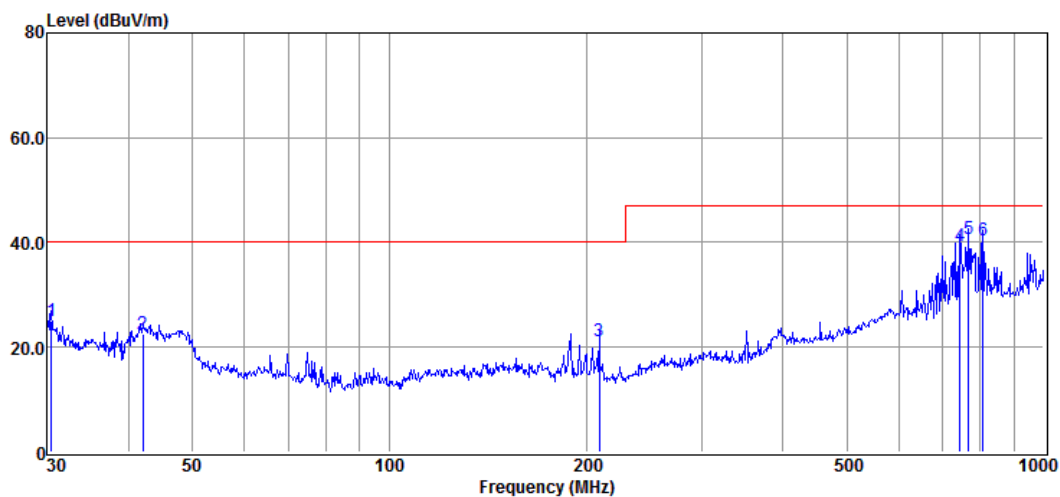
7.2.3 Measurement Data

Vertical:



Item	Freq.	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	43.81	26.65	13.36	24.60	0.64	16.05	40.00	-23.95	QP
2	61.56	28.30	12.29	24.60	0.80	16.79	40.00	-23.21	QP
3	166.07	27.53	12.16	24.50	1.44	16.63	40.00	-23.37	QP
4	590.97	26.28	20.29	24.12	3.01	25.46	47.00	-21.54	QP
5	804.60	27.68	23.55	24.00	3.64	30.87	47.00	-16.13	QP
6	993.01	29.07	24.38	23.73	4.17	33.89	47.00	-13.11	QP

Horizontal:



Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	30.42	36.51	12.54	24.60	0.54	24.99	40.00	-15.01	QP
2	42.01	32.55	13.90	24.60	0.62	22.47	40.00	-17.53	QP
3	209.31	33.75	10.24	24.50	1.68	21.17	40.00	-18.83	QP
4	744.87	38.19	21.80	24.03	3.48	39.44	47.00	-7.56	QP
5	768.75	38.14	22.91	24.02	3.55	40.58	47.00	-6.42	QP
6	807.43	37.07	23.57	23.99	3.65	40.30	47.00	-6.70	QP

Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.

7.3 Discontinuous Interference, 150kHz to 30MHz

Class/Severity: Clause 4.2 of EN 55014-1

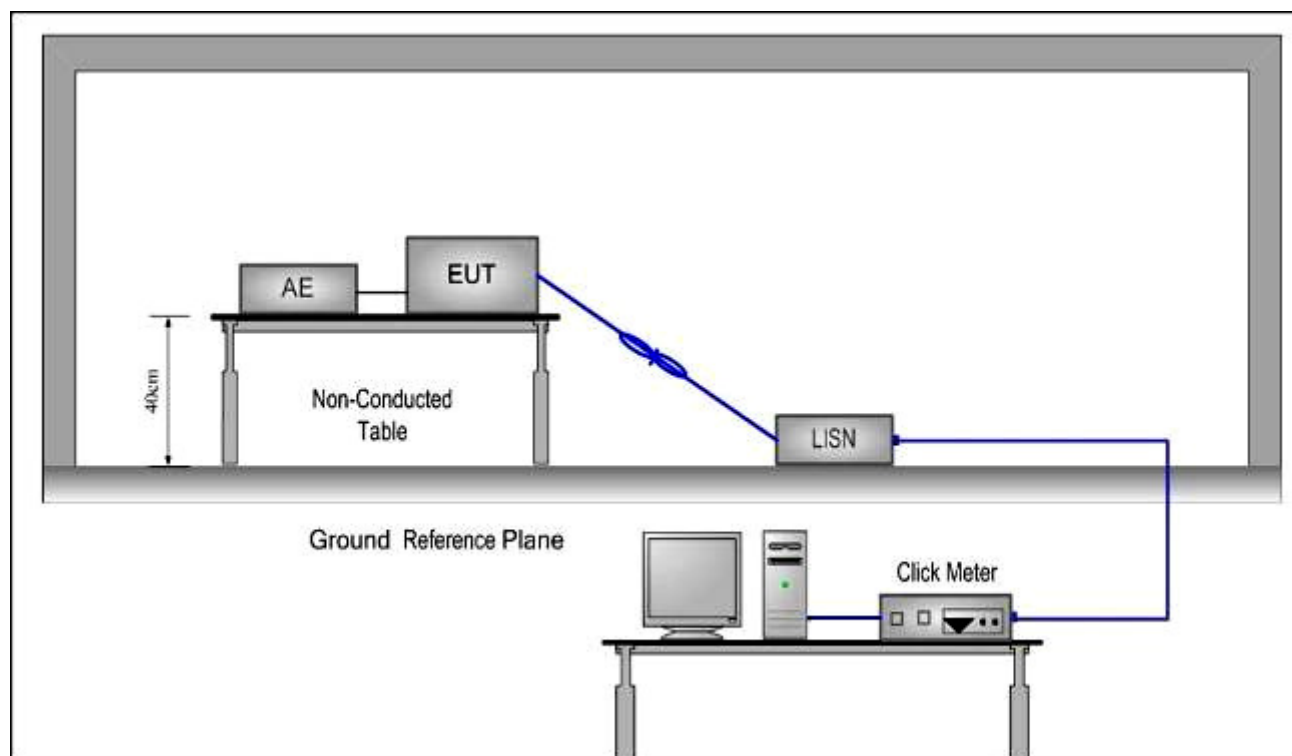
Limit

Frequency range MHz	Limit dB (μV)
0.15	66
0.5	56
1.4	56
30	60

7.3.1 E.U.T. Operation

Test mode: N/A

7.3.2 Test Setup and Procedure



1. The EUT was placed on a 0.4m high non-metallic table in shielded room, the ground of shielded room used as Ground Reference Plane (GRP), and keeps a distance of at least 0.8m from any of the other metallic surface. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
2. The EUT was connected to an artificial mains network and at a distance of 0.8m from it, the excess lead of EUT was bundled with a length of 0.3m to 0.4m parallel to the main lead.
3. The number of counted clicks above the permitted limit for continuous interference and their duration, spacing and rate were measured during the observation time. When relevant, a permitted(relaxed) limit for clicks were calculated and a second measurement was performed. Determination of compliance with the permitted limit according to the upper quartile method.

7.3.3 Measurement Data

Conclusion: The EUT couldn't generate discontinuous disturbance, because it isn't thermostatically controlled appliances, automatic programme controlled machines and other electrically controlled or operated appliances.

7.4 Harmonics Test Result

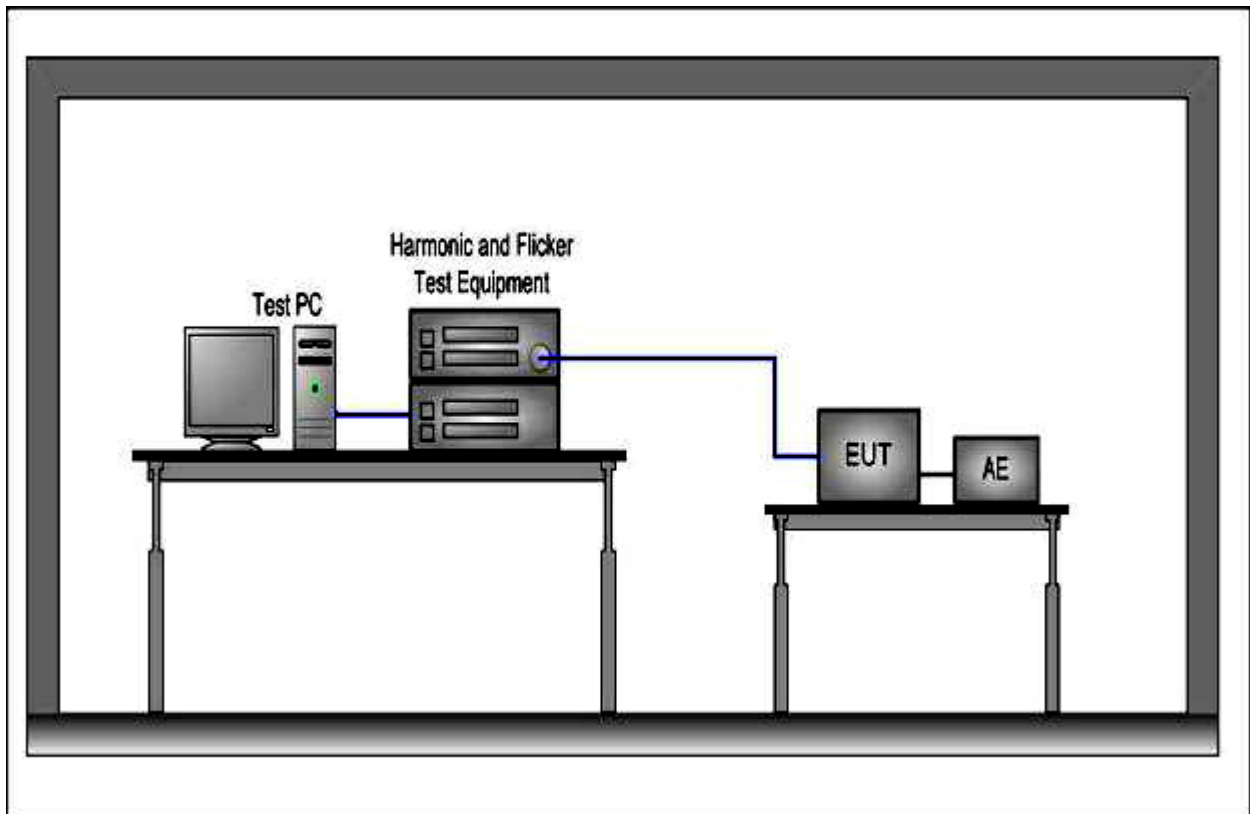
Measurement Time: 2.5mins

Class / Severity: Class A

7.4.1 E.U.T. Operation

Test mode: N/A

7.4.2 Test Setup and Procedure



1. The EUT was tested with the equipment configured to its rated current.
2. The measurements were carried out under steady conditions. When a piece of EUT is brought into operation or is taken out of operation, manually or automatically, harmonic currents and power are not taken into account at first 10s following the switching event. EUT shall not be in standby mode for more than 10% of any observation period.
3. Harmonics of the fundamental current were measured using a digital power meter with an analogue output and frequency analyser which was integrated in the harmonic & flicker test system.
4. For each harmonic order, measure the 1.5 s smoothed r.m.s. harmonic current in each DFT time window and calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period. Each harmonic order, all 1.5 s smoothed r.m.s. harmonic current values and the average values for the individual harmonic currents, taken over the entire test observation period shall be less than or equal to the applicable limits.

7.4.3 Measurement Data

Test Requirement: EN 61000-3-2
Test Method: N/A: See Remark Below
Frequency Range: 100 Hz to 2 kHz

There is no need for Harmonics test to be performed on this product (rated power is less than 75W) in accordance with EN 61000-3-2.

7.5 Flicker Test Result

Measurement Time: 120 mins
Class / Severity: Clause 5 of EN 61000-3-3

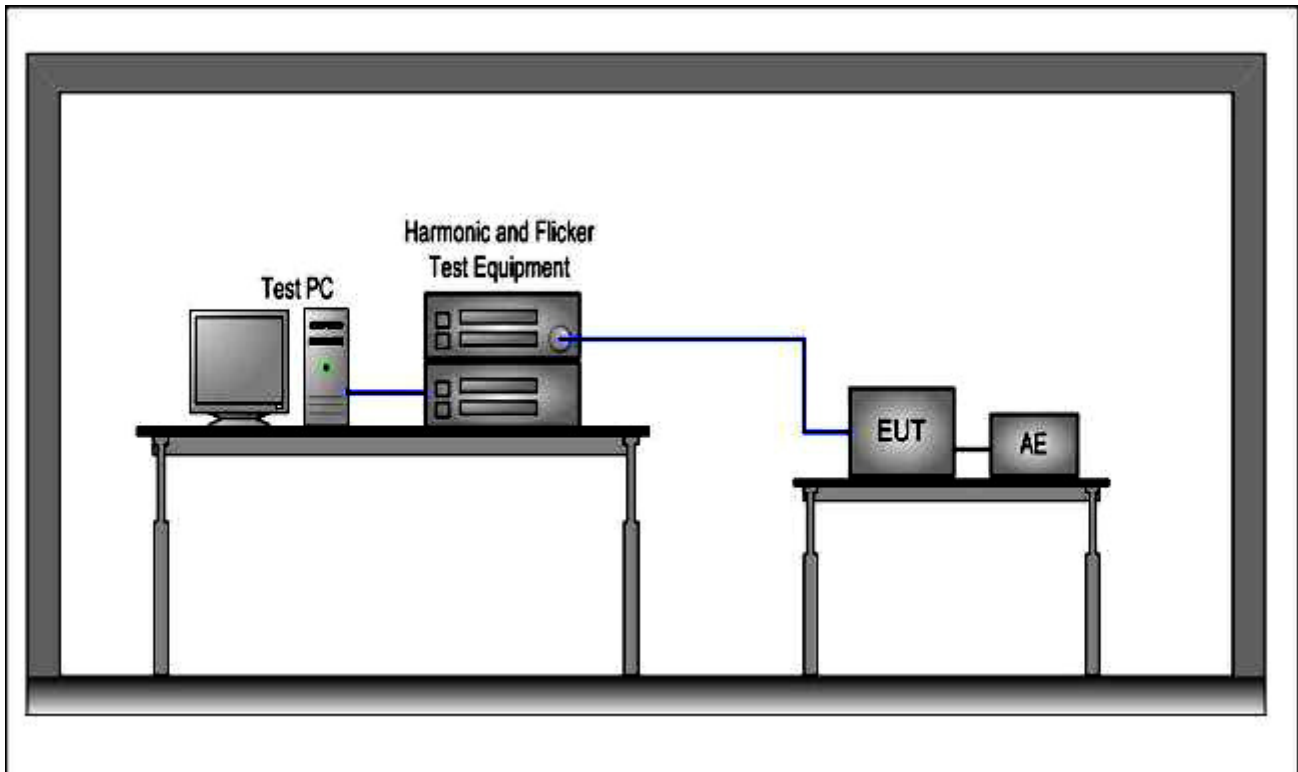
7.5.1 E.U.T. Operation

Test mode: Running mode

Note: "Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions."

Please also refer to Annex A (Application of limits and type test conditions) for details in EN 61000-3-3.

7.5.2 Test Setup and Procedure



1. The test supply voltage (open-circuit voltage) was the rated voltage of the EUT. The test voltage was maintained within $\pm 2\%$ of the nominal value. The frequency was $50 \text{ Hz} \pm 0.5\%$.
2. The voltage fluctuations and flicker were measured at the supply terminals of the EUT.
3. The observation period, T_p , for the assessment of flicker values by flicker measurement, flicker simulation, or analytical method was:
 - for Pst, $T_p = 10 \text{ min}$;
 - for Plt, $T_p = 2 \text{ h}$.

The observation period included that part of the whole operation cycle in which the EUT produces the most unfavorable sequence of voltage changes.

7.5.3 Measurement Data

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.052	4.00	PASS
Tmax [s]	0.000	0.50	PASS

8 Electromagnetic Susceptibility Test Results

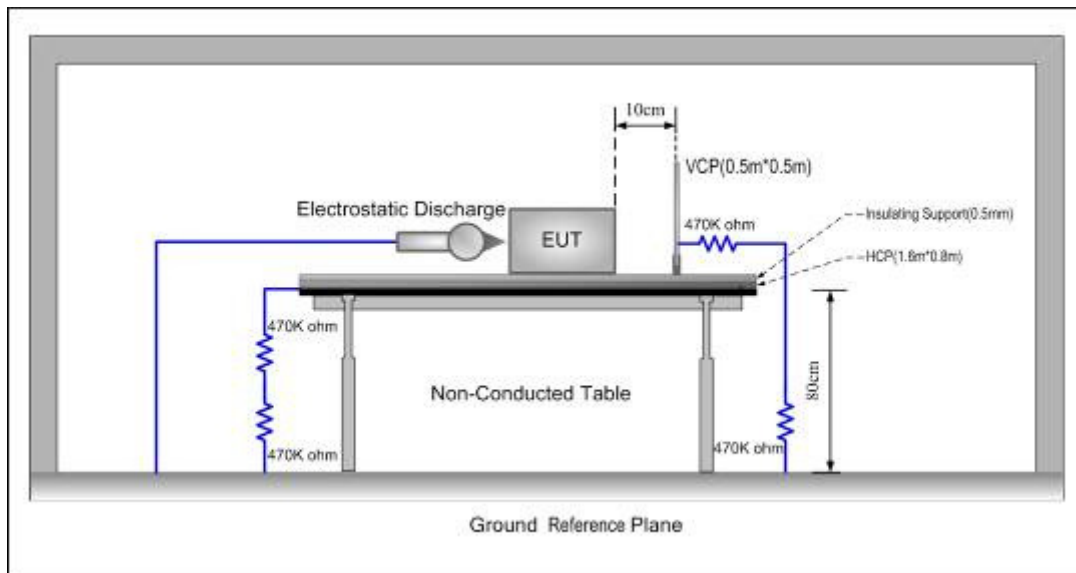
8.1 Performance Criteria Description in Clause 6 of EN 55014-2

Criterion A:	The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. 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 from what the user may reasonably expect from the apparatus if used as intended.
Criterion B:	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however. No change of actual operating state or stored data is allowed. 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 from what the user may reasonably expect from the apparatus if used as intended.
Criterion C:	Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

8.2 ESD

Discharge Voltage:	Air Discharge:	8 kV
	Contact Discharge:	4 kV
	VCP/HCP:	4 kV
Polarity:	Positive & Negative	
Number of Discharge:	Minimum 10 times at each test point	
Discharge Mode:	Single Discharge	
Discharge Period:	1 second minimum	

8.2.1 Test Setup and Procedure



1. Contact discharge was applied only to conductive surfaces of the EUT. Air discharge was applied only to non-conducted surfaces of the EUT.
2. The EUT was put on a 0.8m high wooden table for table-top equipment or 0.1m high for floor standing equipment standing on the ground reference plane (GRP).
3. A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size while HCP were constructed from the same material type and thickness as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end. The distance between EUT and any of the other metallic surface excepted the GRP, HCP and VCP was greater than 1m.
4. During the contact discharges, the tip of the discharge electrode was touch the EUT before the discharge switch is operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.
5. After each discharge, the ESD generator was removed from the EUT, the generator is then retriggered for a new single discharge. For ungrounded product, a discharge cable with two resistances were used after each discharge to remove remnant electrostatic voltage. 10 times of each polarity single discharge were applied to HCP and VCP.

8.2.2 Test Results

Direct Application Test Results

- Observations: Test Point:
1. All insulated enclosure & seams.
 2. All accessible metal parts of the enclosure.

Direct Application		Test Results			
Discharge Level (kV)	Polarity (+/-)	Test Point	Test Mode	Contact Discharge	Air Discharge
8	+/-	1	Running mode	N/A	A
4	+/-	2		A	N/A

Indirect Application Test Results

- Observations: Test Point:
1. All sides.

Indirect Application		Test Results			
Discharge Level (kV)	Polarity (+/-)	Test Point	Test Mode	Horizontal Coupling	Vertical Coupling
4	+/-	1	Running mode	A	A

Results:

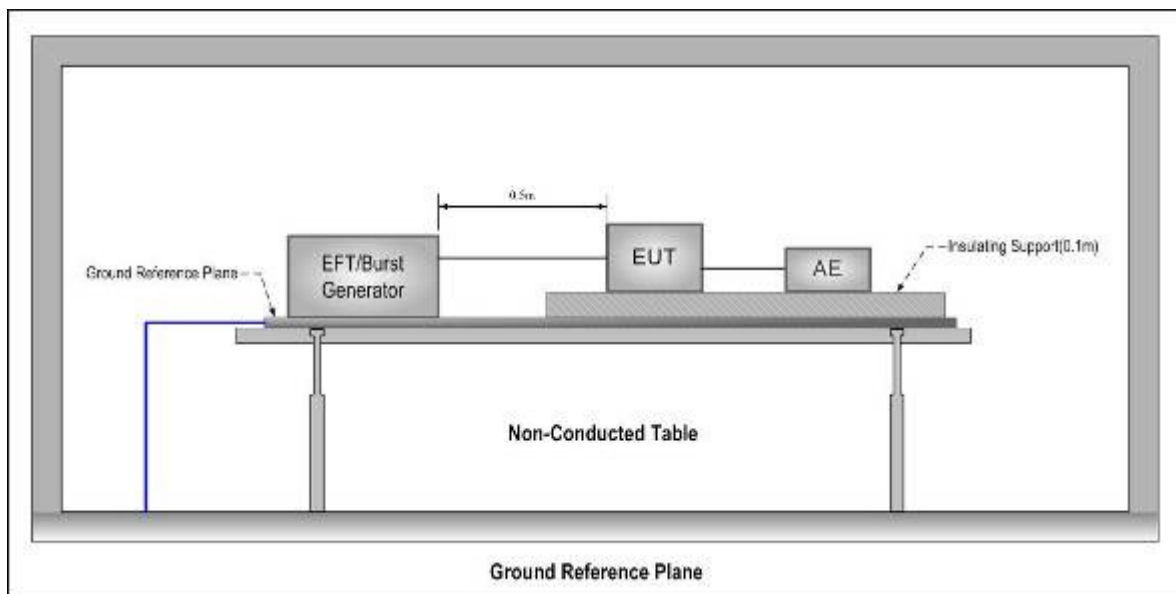
A: During test, no degradation in the performance of the EUT was observed; After test, no degradation in the performance of the EUT was observed.

N/A: Not applicable (floor mounted EUT or not requested by Standard).

8.3 Electrical Fast Transients (EFT)

Test Level:	1.0kV on AC
Polarity:	Positive & Negative
Repetition Frequency:	5kHz
Burst Duration:	300ms
Test Duration:	2 minute per level & polarity

8.3.1 Test Setup and Procedure



1. The EUT was placed on a ground reference plane(GRP) insulated by an insulating support 0,1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The GRP shall project beyond the EUT and the clamp by at least 0.1m on all sides. The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m. All cables to the EUT was placed on the insulation support 0.1m above GRP. Cables not subject to EFT was routed as far as possible from cable under test to minimize the coupling between the cables.
3. The length of signal and power cable between the EUT and EFT generator was 0.5m. If the cable is a non-detachable supply cable more than 0.5m, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0.1m above the GRP.

The EUT was conducted the below specified level voltage test for line to neutral or line to neutral to earth(for clamp coupling is for the signal line), 120 seconds duration. If the equipment contains identical ports, only one was tested; multiconductor cables, such as a 50-pair telecommunication cable, was tested as a single cable. Cables did not be split or divided into groups of conductors for this test; interface ports, which were intended by the manufacturer to be connected to data cables not longer than 3 m, did not be tested.



8.3.2 Test Results On AC Supply

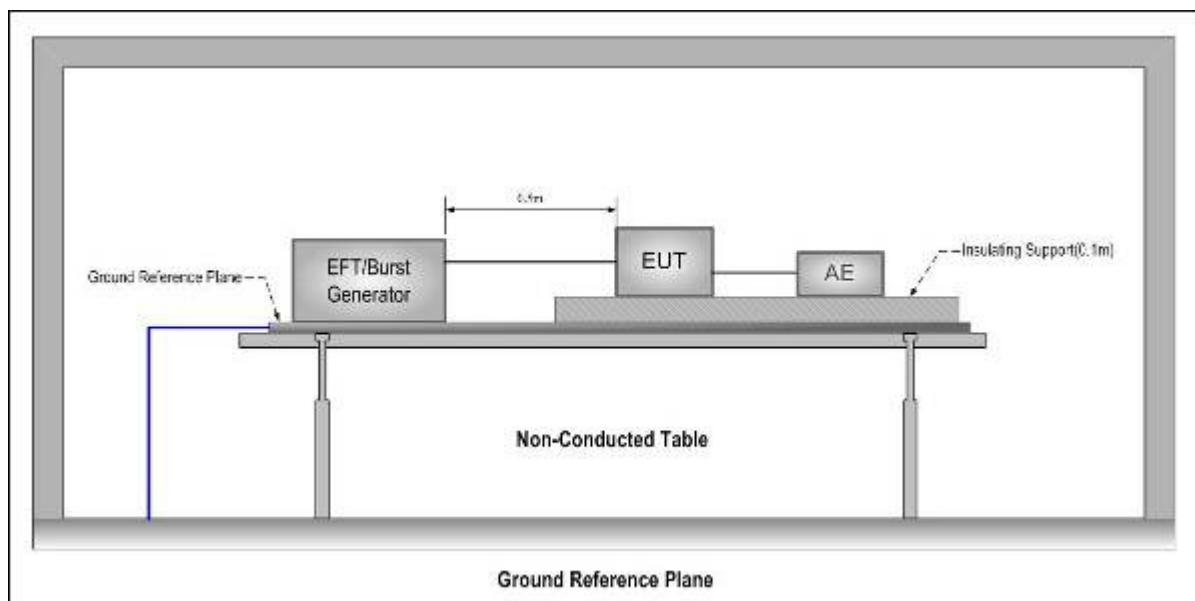
Lead under Test	Level ($\pm$ kV)	Coupling Direct/Clamp	Test mode	Observations (Performance Criterion)
Live + Neutral	± 1.0	Direct	Running mode	(A)

A: During test, no degradation in the performance of the EUT was observed; After test, no degradation in the performance of the EUT was observed.

8.4 Surge

Test Level:	± 1.0 kV Live to Neutral
Polarity:	Positive & Negative
Generator source impedance:	2Ω Line to Neutral
Trigger Mode:	Internal
No. of surges:	5 positive at 90° , 5 negative at 270° .

8.4.1 Test Setup and Procedure



1. The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The 1,2/50 μ s surge was to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks were 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 so that the specified wave may be applied on the lines under test.
3. The power cord between the EUT and the coupling/decoupling network do not exceed 2m in length. The interconnection line between the EUT and the coupling/ decoupling network shall not exceed 2 m in length.
4. The EUT was conducted 1kV Test voltage: for line to line and line to neutral and conducted 2kV Test voltage: for line to earth and neutral to earth, five positive pulses and five negative pulses each at 90° , 270° for AC power ports and five positive pulses and five negative surge pulses for DC power ports. The test levels were applied on the EUT with a 2Ω generator source impedance for power supply terminals and 40Ω output impedance for interconnection lines. The tests were done at repetition rate 1 per minute.

8.4.2 Test Results:

Pulse No	Line-Line	Level (kV)	Surge Interval	Phase (deg)	Test Mode	Observation (Performance Criterion)
1-5	L-N	+1	60s	90°	Running mode	(A)
6-10	L-N	-1	60s	270°		(A)

A: During test, no degradation in the performance of the EUT was observed; After test, no degradation in the performance of the EUT was observed.

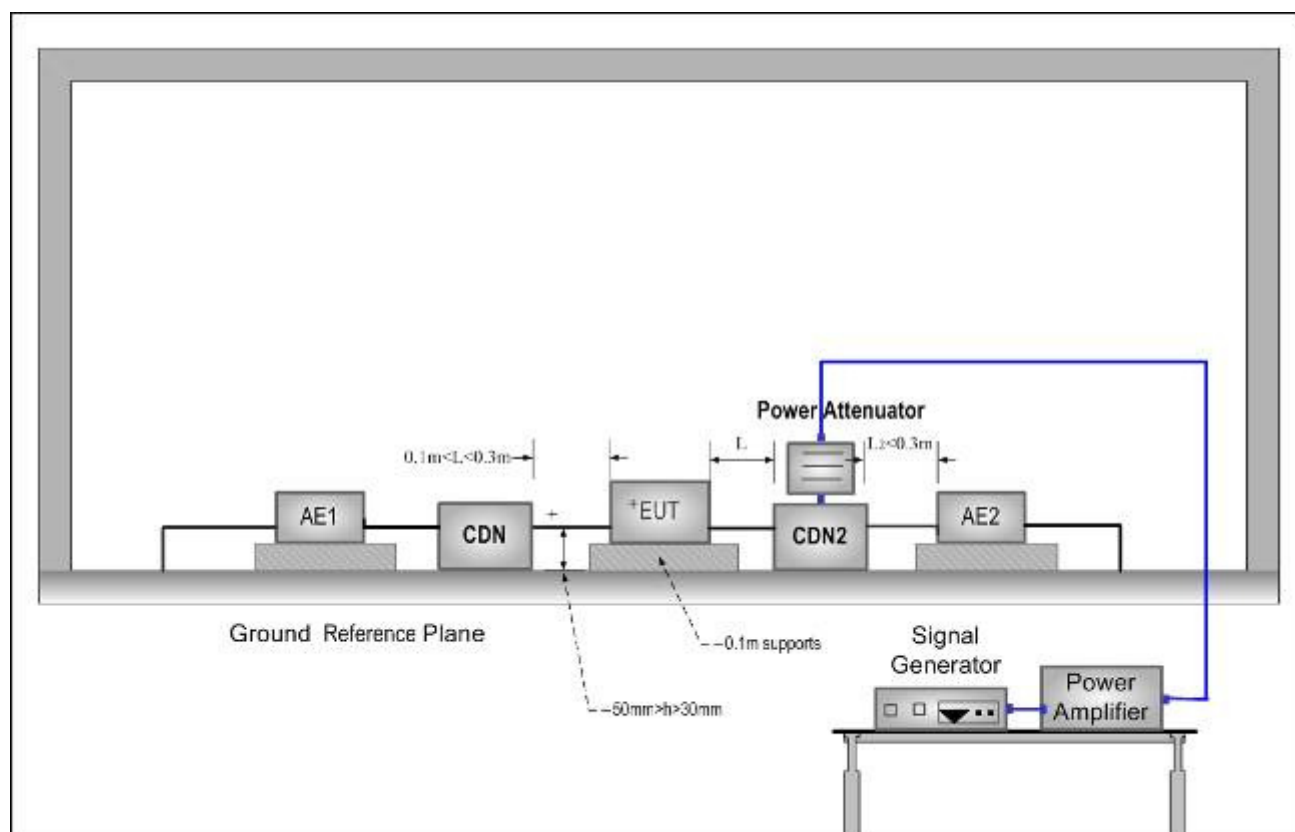
8.5 Conducted Immunity 0.15 MHz to 230 MHz

Test level: 3V r.m.s on AC Ports (unmodulated emf into 150 Ω)

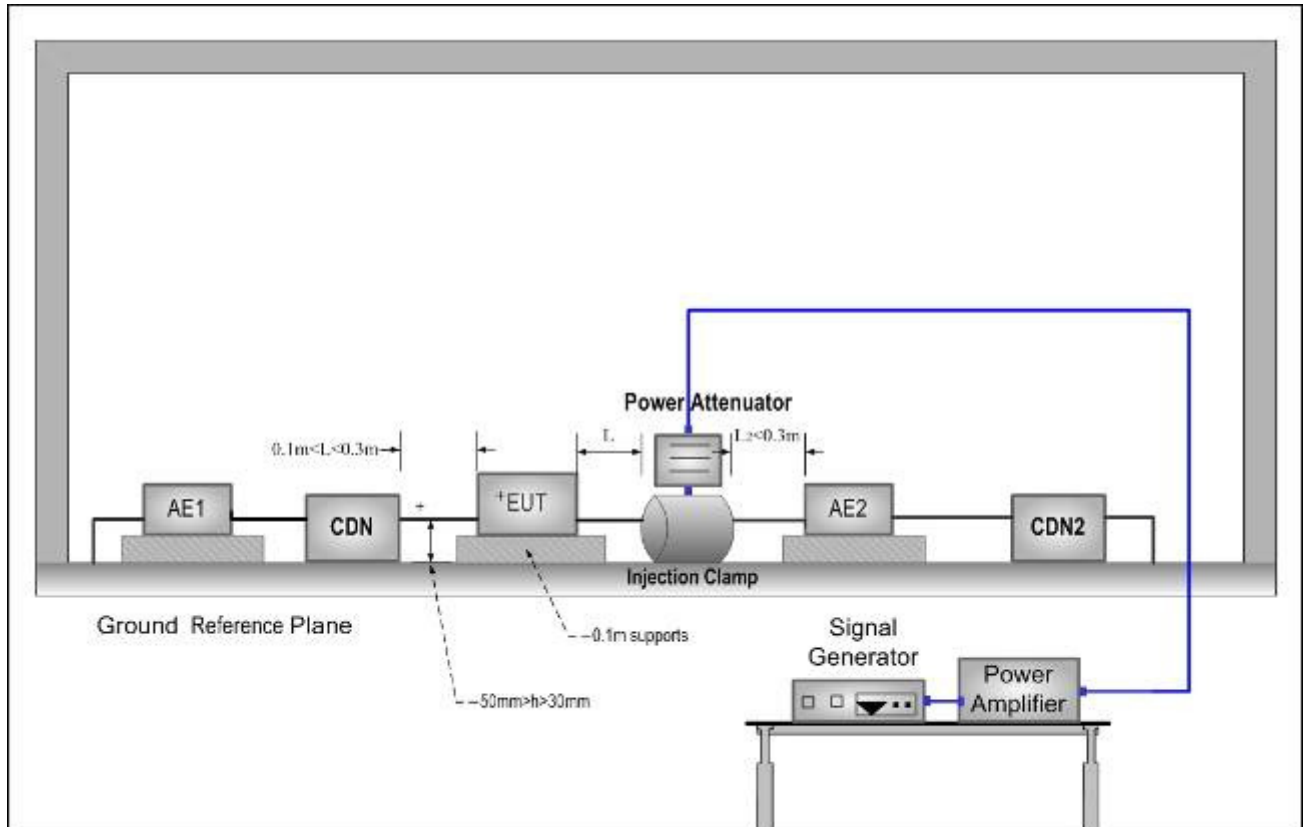
Modulation: 80%, 1kHz Amplitude Modulation

8.5.1 Test Setup and Procedure

For AC port



For Signal port



1. The EUT was placed on an insulating support of 0.1m height above a ground reference Plane, arranged and connected to satisfy its functional requirement. All cables exiting the EUT was supported at a height of at least 30 mm above the ground reference plane.
2. The coupling and decoupling devices were required, they were located between 0,1 m and 0,3 m from the EUT. This distance was to be measured horizontally from the projection of the EUT on to the ground reference plane to the coupling and decoupling device.
3. Each AE, used with clamp injection, shall be placed on an insulating support 0,1 m above the ground reference plane. A decoupling network shall be installed on each cable between the EUT and AE except the cable under test. All cables connected to each AE, other than those being connected to the EUT, shall be provided with decoupling networks. The decoupling networks connected to each AE (except those on cables between the EUT and AE) shall be applied no further than 0,3 m from the AE. The cable(s) between the AE and the decoupling network (s) or in between the AE and the injection clamp shall not be bundled nor wrapped and shall be kept between 30 mm and 50 mm above the ground reference plane.
4. The frequency range was swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or to change coupling devices as necessary. Where the frequency was swept incrementally, the step size do not exceed 1% of the preceding frequency value. The dwell time of the amplitude modulated carrier at each frequency was not less than the time necessary for the EUT to be exercised and to respond, and was not less than 0.5 s.

8.5.2 Test Results:

AC Port:

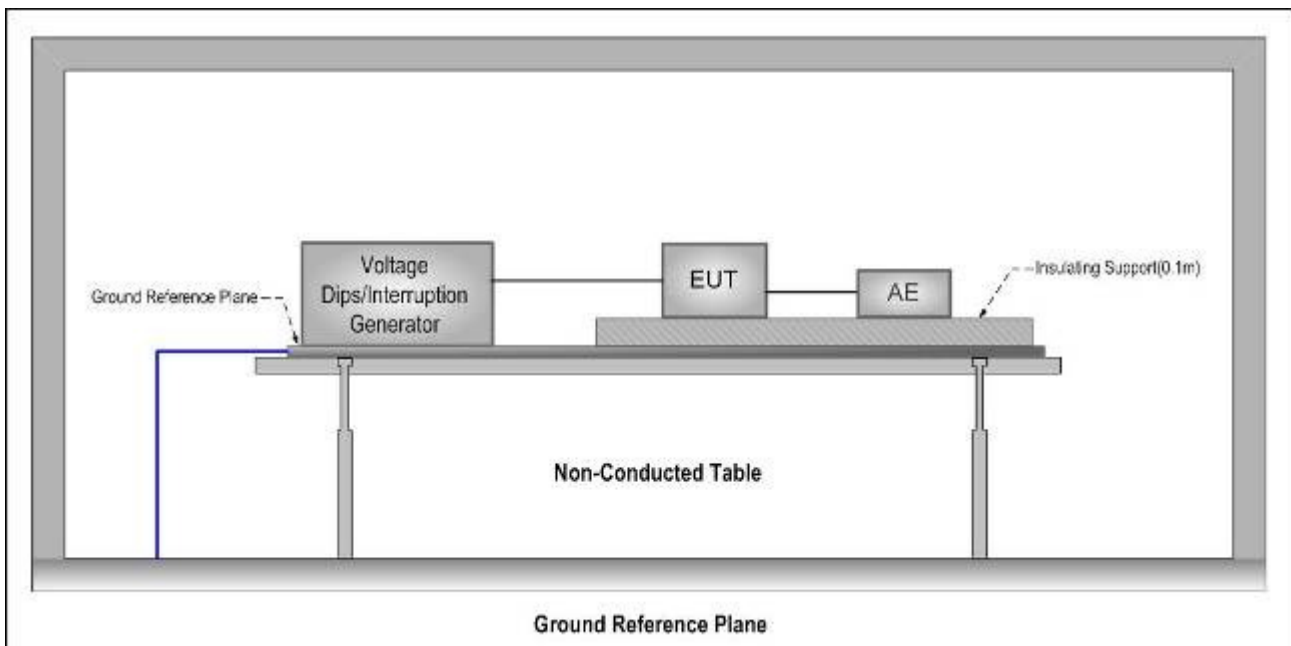
Frequency	Line	Test Level	Modulation	Step Size	Dwell Time	Test Mode	Observation (Performance Criterion)
150 kHz to 230 MHz	2 Wires Supply Cable	3V r.m.s	80%, 1 kHz Amp. Mod.	1%	3s	Running mode	No Loss of Function (A)

A: During test, no degradation in the performance of the EUT was observed; After test, no degradation in the performance of the EUT was observed.

8.6 Voltage Dips and Interruptions

Test voltage:	Refer to UT
Test Level:	For 50Hz 0% of U_T (Supply Voltage) for 0.5 Periods 40 % of U_T (Supply Voltage) for 10 Periods 70 % of U_T (Supply Voltage) for 25 Periods
No. of Dips / Interruptions:	3 per Level

8.6.1 Test Setup and Procedure



1. The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0,1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
2. The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.
3. The EUT was tested for each selected combination of test level and duration with a sequence of three dips /interruptions with intervals of 10 s minimum. Each representative mode of operation was tested.
4. For EUT with more than one power cord, each power cord was tested individually.

8.6.2 Test Results

U_T AC 230V

Test Level % U_T	Phase	Duration of drop out in Periods	No of drop out	Time between drop out	Test Mode	OBSERVATIONS (PERFORMANCE CRITERION)
0	0°,180°	0.5	3	10s	Running mode	(A)
40	0°,180°	10	3	10s		(A)
70	0°,180°	25	3	10s		(A)

Remark:

U_T the nominal supply voltage.

A: During test, no degradation in the performance of the EUT was observed; After test, no degradation in the performance of the EUT was observed

Performance C is within the acceptable criterion for Voltage Dips and Interruption test.

9 Photographs (Test Setup For the EUT)

9.1 Conducted Emissions on Mains Terminals Test Setup



9.2 Radiated Emission Test Setup



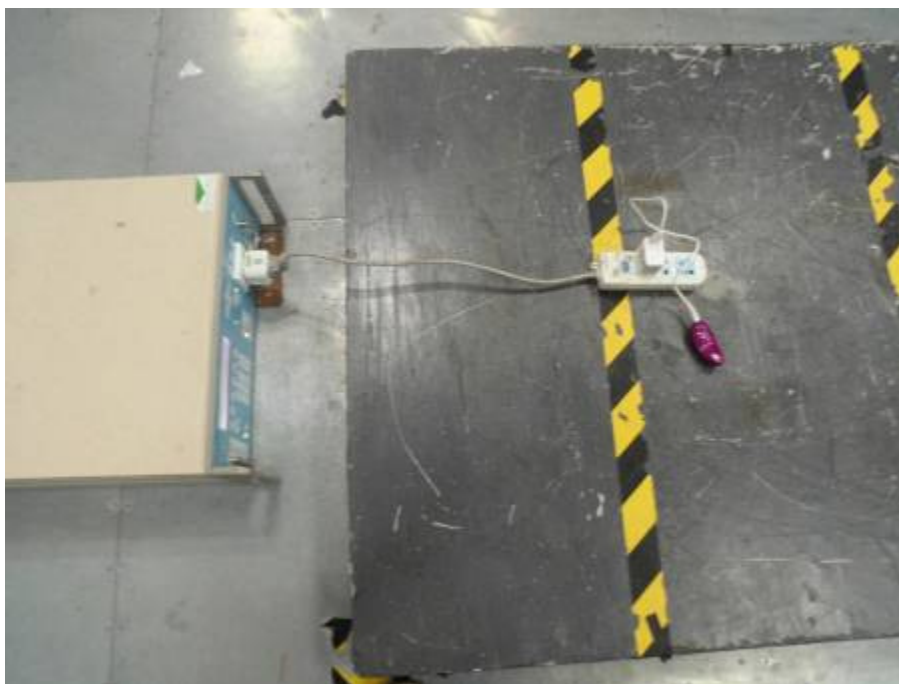
9.3 Flicker Test Setup



9.4 ESD Test Setup



9.5 EFT, Surge, Voltage Dip and Interruptions Test Setup



9.6 Conducted Immunity Test Setup



10 EUT Constructional Details

10.1 Exterior of EUT





10.2 Interior of EUT





--End of the Report--