

PINGHU CITY GOLDTIER CHILDREN PRODUCTS MANUFACTURE CO., LTD

TEST REPORT

SCOPE OF WORK:

EMC report

Model:

G29, G30, G05, G08, G09, G10, G11, G26, G28

REPORT NUMBER

SHAH01955147-001

ISSUE DATE

May 14, 2026

DOCUMENT CONTROL NUMBER

TTRF55014-01_V1

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Report no. SHAH01955147-001

Applicant : PINGHU CITY GOLDTIER CHILDREN PRODUCTS MANUFACTURE
CO., LTD
XINMIAO INDUSTRY ZONE XINCANG TOWN, PINGHU CITY,
ZHEJIANG PROVINCE, CHINA

Manufacturer : PINGHU CITY GOLDTIER CHILDREN PRODUCTS MANUFACTURE
CO., LTD
XINMIAO INDUSTRY ZONE XINCANG TOWN, PINGHU CITY,
ZHEJIANG PROVINCE, CHINA

Factory : PINGHU CITY GOLDTIER CHILDREN PRODUCTS MANUFACTURE
CO., LTD
XINMIAO INDUSTRY ZONE XINCANG TOWN, PINGHU CITY,
ZHEJIANG PROVINCE, CHINA

Summary

The equipment complies with the requirements according to the following standard(s) or Specification:

EN IEC 55014-1: 2021: Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus Part 1: Emission

EN IEC 55014-2: 2021: Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus Part 2: Immunity – Product family standard

PREPARED BY:

REVIEWED BY:

Ann Ma
Project Engineer

Ann Ma

Jed Wang
Reviewer

Jed Wang

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Revision History

Report No.	Version	Description	Issued Date
SHAH01955147-001	Rev. 01	Initial issue of report	May 14, 2026

Measurement result summary

TEST ITEM	TEST RESULT	NOTE
Mains terminal continuous disturbance voltage	NA	
Mains terminal discontinuous disturbance voltage/click	NA	
Continuous disturbance power	NA	
Radiated Emission	Pass	
Harmonics	NA	
Voltage fluctuation-Flicker	NA	
Electrostatic Discharge (ESD)	Pass	
Radio frequency electromagnetic fields	Pass	
Fast transients	NA	
Surges	NA	
Injected Current	NA	
Voltage dips	NA	

Notes:

1. NA =Not Applicable
2. Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.
3. Additions, Deviations and Exclusions from Standards: None.

1. GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name : Children Balance Bike, Children Tricycle, Foot-Floor Toy

Type/Model : G29, G30, G05, G08, G09, G10, G11, G26, G28

Description of EUT : The mapping between product name and model is as follows:

Product name	Type/Model
Children Balance Bike	G29, G30
Children Tricycle	G05
Foot-Floor Toy	G08, G09, G10, G11, G26, G28

All models are the same except for appearance.

After technical evaluation, model G29 was selected for testing, and the worst test data is listed in the report as representative.

Rating : DC 3V, AAA 1.5V x 2

Brand name : /

Highest operating frequency : <15MHz

Mains lead : None

Data cable : None

EUT type : ☐ Table-top
☒ Floor standing

Sample received date : April 30, 2026

Sample Identification No. : SHJ1955147

Date of test : May 9, 2026 – May 11, 2026

1.2 Description of Test Facility

Name : Intertek Testing Services Zhejiang Ltd.

Address : Building No. 2, Juanhu Science and Technology Innovation Park,
No. 500 Shuiyueting East Road, Haining City, Zhejiang Province, China

Telephone : +86 573 8713 7201

2. TEST SPECIFICATIONS

2.1 Normative Standards

IEC 61000-4-2:2008: Electromagnetic Compatibility (EMC) – Part 4-2: testing and measurement techniques – electrostatic discharge immunity test

IEC 61000-4-3:2006+A1:2007+A2:2010: Electromagnetic Compatibility (EMC) – Part 4-3: testing and measurement techniques – radiated, radio frequency, electromagnetic field immunity test

IEC 61000-4-4:2012: Electromagnetic Compatibility (EMC) – Part 4-4: testing and measurement techniques – electric fast transient/burst immunity test

IEC 61000-4-5:2014+A1:2017: Electromagnetic Compatibility (EMC) – Part 4-5: testing and measurement techniques – section 5: surge immunity test

IEC 61000-4-6:2013: Electromagnetic Compatibility (EMC) – Part 4-6: testing and measurement techniques – section 6: immunity to conducted disturbance, induced by radio frequency field

IEC 61000-4-11:2020: Electromagnetic Compatibility (EMC) – Part 4-11: testing and measurement techniques –voltage dips, short interruption and voltage variations immunity test

IEC 61000-4-20:2010: Electromagnetic compatibility (EMC) – Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides

IEC 61000-4-22:2010: Electromagnetic compatibility (EMC) – Part 4-22: Testing and measurement techniques – Radiated emissions and immunity measurements in fully anechoic rooms (FARs)

2.2 Mode of operation during the test

Within this test report, EUT was tested under all available operation modes and tested under its rating voltage and frequency. Other voltage and frequency is specified if used.

2.3 Test Peripherals used

Item No	Description	Band and Model	S/No
1	-	-	-

2.4 Record of climatic conditions

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (Kpa)
Mains terminal continuous disturbance voltage	NA	NA	NA
Mains terminal discontinuous disturbance voltage/click	NA	NA	NA
Continuous disturbance power	NA	NA	NA
Radiated Emission	24	49	NA
Harmonics	NA	NA	NA
Voltage fluctuation-Flicker	NA	NA	NA
Electrostatic Discharge (ESD)	23	49	101
RF electromagnetic field susceptibility	24	48	NA
Electric Fast Transient /Burst (EFT/B)	NA	NA	NA
Surge	NA	NA	NA
Injected Current	NA	NA	NA
Voltage dips and interruption	NA	NA	NA

Notes: NA =Not Applicable

2.5 Instrument list

Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
☒	EMI Test Receiver	R&S	ESR7	EZ6331-1	2027-02-08
☒	TRILOG Broadband Antenna	Schwarzbeck	VULB9168	EZ6743	2026-07-08
ESD					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
☒	ESD generator	KIKUSUI	KES4021	EZ6599	2027-03-19
Radiated Immunity					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
☒	Signal Generator	Keysight	N5171B	EZ6332-1	2027-03-17
☒	Power Amplifier	Hanrui Microwave	HRCPA-0008010-54GA	EZ6332-2	2027-02-08
☒	Log-period Antenna	Schwarzbeck	STLP 9129	EZ6332-4	2026-07-06
☒	Power Meter	Keysight	N1914A	EZ6332-5	2027-03-17
☒	Power Sensor	Keysight	E9301A	EZ6332-6	2027-03-17
☒	Power Sensor	Keysight	E9301A	EZ6332-7	2027-03-17
☒	RF Matrix	CTE	CUS2035	EZ6332-9	2027-02-08
Tet Site					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
☒	Shielded Room	SAEMC	PSAC318-M	EZ6442	2027-11-24
☒	Semi-anechoic Chamber	SAEMC	FSAC318	EZ6439	2027-11-24
☒	Fully Anechoic Chamber	SAEMC	PSAC318	EZ6440	2027-11-26
Additional Instrument					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
☒	Digital Therom-Hygrograph	TESTO	175H1	EZ6660	2026-09-16
☒	Digital Therom-Hygrograph	TESTO	175H1	EZ1056	2026-09-16
☒	Digital Therom-Hygrograph	TESTO	175H1	EZ6659	2026-09-16
☒	Pressure Meter	Shanghai Fengyun	FYP-1	EZ6422	2027-04-12

2.6 Measurement Uncertainty

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted emission at mains ports	9kHz ~ 150kHz	3.5 dB
	150kHz ~ 30MHz	3.2 dB
Continuous disturbance voltage at load terminal	150kHz ~ 30MHz	2.6 dB
Continuous disturbance voltage at control terminal	150kHz ~ 30MHz	3.7 dB
Mains terminal discontinuous disturbance voltage/click	-	3.8 dB
Continuous disturbance power	30MHz ~ 300MHz	4.2 dB
Radiated emissions up to 1 GHz	30MHz ~ 1GHz	5.0 dB
Radiated emissions above 1 GHz	1GHz ~ 6GHz	4.4 dB
	6GHz ~ 18GHz	5.2 dB
Harmonic current emission	-	3.1 %
Voltage fluctuations and flicker	-	11.7 %
ESD	-	6.7 %
Radiated susceptibility	80MHz ~ 1GHz	3.2 dB
	1GHz ~ 6GHz	3.3 dB
EFT test at main terminal	-	12.5 %
EFT test at signal/telecom terminal	-	12.5 %
Surge test at main terminal	-	11.6 %
Injected current test at main terminal	-	2.8 dB
Injected current test at unshielded signal terminal	-	2.8 dB
Voltage dips and interruption	-	6.1 %

Emission Test

3. Mains/Load/Control Terminal Continuous Disturbance Voltage

Test result: NA

3.1 Terminal Voltage Limits for the frequency range 9kHz to 30MHz

3.1.1 General limits

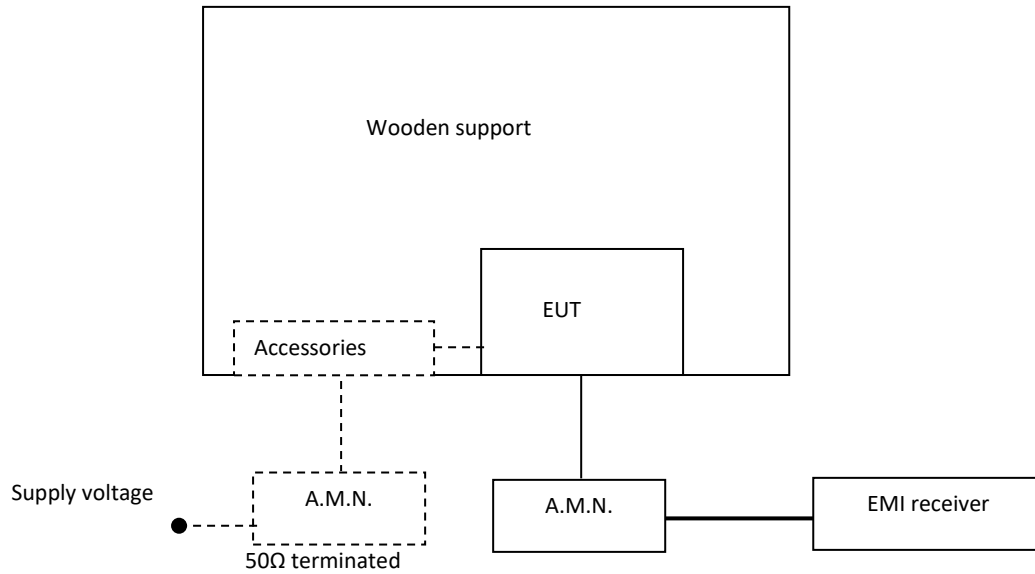
Frequency range (MHz)	Mains ports		Auxiliary ports			
	Disturbance voltage		Disturbance voltage		Disturbance current	
	Limits dB(μV)		Limits dB(μV)		Limits dB(μA)	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	59 ~ 46 *	80	70	40 ~ 30 *	30 ~ 20 *
0.5 ~ 5.0	56	46	74	64	30	20
5.0 ~ 30	60	50	74	64		
Notes:						
1. * means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.						
2. If the quasi-peak measurements meet the average limit, the EUT shall be deemed to meet both limits and the measurements using the average detector need not be carried out.						

3.1.2 Limits for mains port of motor operated tools

Frequency range (MHz)	P ≤ 700 W		700 W < P ≤ 1 000 W		P > 1 000 W	
	Limits dB(μV)		Limits dB(μV)		Limits dB(μV)	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.15-0.35	66-59*	59-49*	70-63*	63-53*	76-69*	69 ~ 59 *
0.35-5	59	49	63	53	69	59
5-30	64	54	68	58	74	64
Notes: 1. * means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.35MHz. 2. If the quasi-peak measurements meet the average limit, the EUT shall be deemed to meet both limits and the measurements using the average detector need not be carried out.						

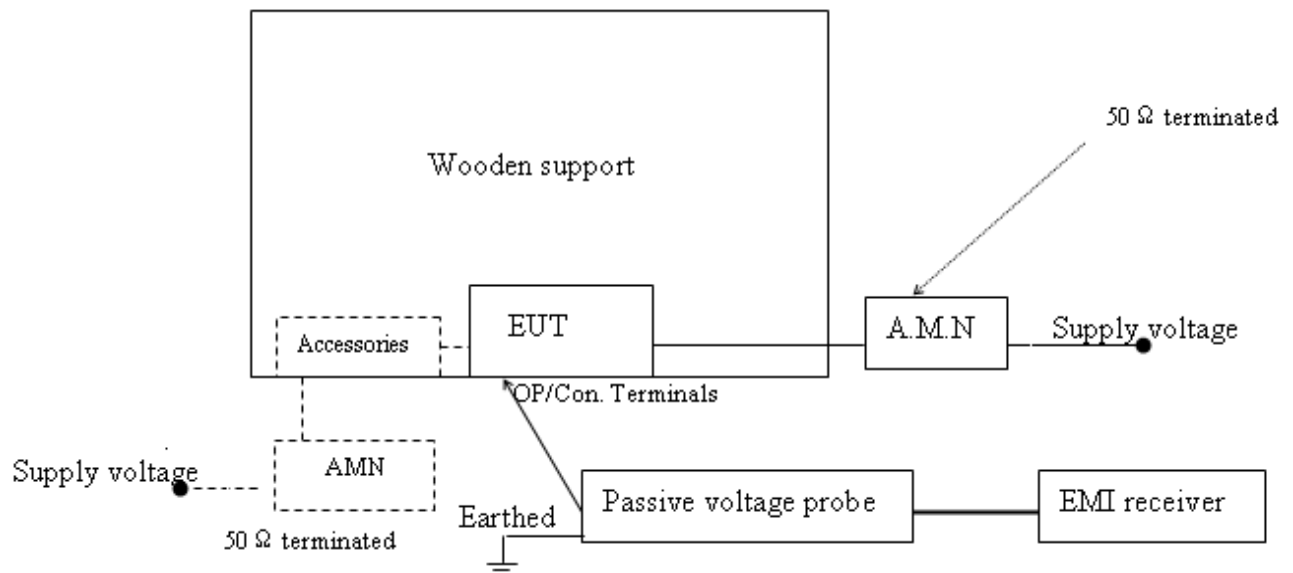
3.2 Block Diagram of Test Setup

☐ At mains terminal



For table top equipment, wooden support is 0.8m height table.
For floor standing equipment, wooden support is 0.1m height rack.

☐ At Associated ports



Note: — : power line
— : signal line
----- : means the test setup while available

3.3 Test Setup and Test Procedure

Measurement was performed in shielded room, and instruments used were according to clause 5.1 of EN 55014-1 if applicable.

Detailed test procedure and arrangement was according to clause 5.2 of EN 55014-1.

Measurement methods was according to clause 5.4 of EN 55014-1.

Operation conditions of EUT was according to clause 6 of EN 55014-1.

Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9kHz.

3.4 Test Protocol

For Mains ports: NA

Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dB μ V)	Limit (dB μ V)	Margin (dB)	Corrected Reading (dB μ V)	Limit (dB μ V)	Margin (dB)
Note: * means the emission level 20dB below the relevant limit.						

For Associated ports: NA

Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBμV)	Limit (dBμV)	Margin (dB)	Corrected Reading (dBμV)	Limit (dBμV)	Margin (dB)
Note: * means the emission level 20dB below the relevant limit.						

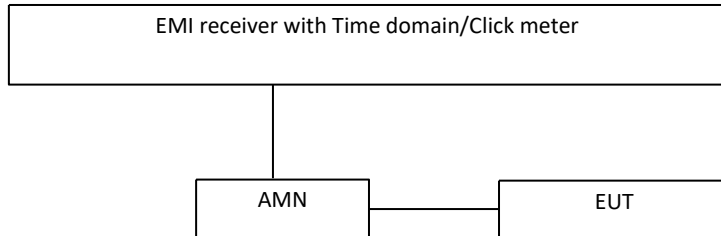
- Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading
 4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming LISN Factor = 10.00dB, Cable Loss = 2.00dB,
 Original Receiver Reading = 10.00dBμV, Limit = 66.00dBμV.
 Then Correct Factor = 10.00 + 2.00 = 12.00dB;
 Corrected Reading = 10dBμV + 12.00dB = 22.00dBμV;
 Margin = 66.00dBμV – 22.00dBμV = 44.00dB.

4. Mains terminal discontinuous disturbance voltage/click

Test result: NA

4.1 Block Diagram of Test Setup



4.2 Test Setup and Test Procedure

Measurement was performed in shielded room, and instruments used were according to clause 5.1 of EN 55014-1 if applicable.

Detailed test procedure and arrangement was according to clause 5.2 of EN 55014-1.

Measurement methods was according to clause 5.4 of EN 55014-1.

Operation conditions of EUT was according to clause 6 of EN 55014-1.

0.15MHz, 0.5MHz, 1.4MHz and 30MHz were spot checked, and upper quartile methods used during measurement.

The final judgment of test result was according to figure 6 of EN 55014-1.

4.3 Test Protocol

Frequency (MHz)	0.15	0.5	1.4	30.0
Permitted limit for continuous interference (dB μ V)	66.0	56.0	56.0	60.0
Counted click/switch operation number	-	-	-	-
Observed time (min)	-	-	-	-
Click duration (ms)	-	-	-	-
Click rate N	-	-	-	-
Factor	-	-	-	-
Permitted limits for clicks (dB μ V)	-	-	-	-
Counted clicks exceeding the limits	-	-	-	-
Test result	-	-	-	-
Any other descriptions:				

5. Continuous disturbance power

Test result: NA

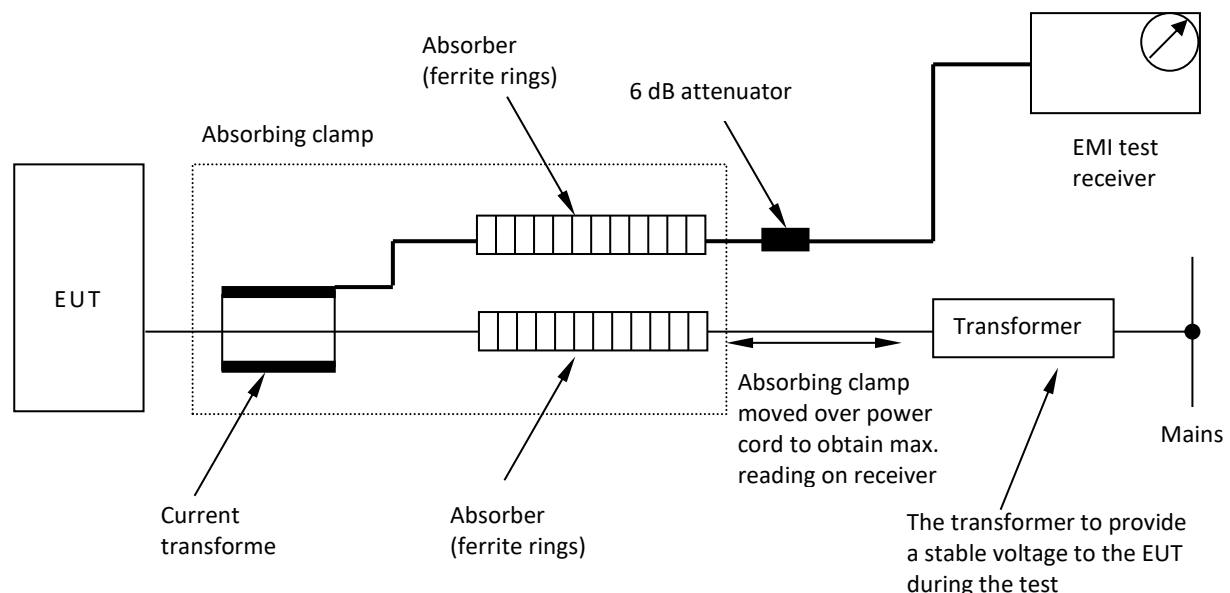
5.1 Continuous disturbance power limit

	General		$P \leq 700 \text{ W}$		$700 \text{ W} < P \leq 1\,000 \text{ W}$		$P > 1\,000 \text{ W}$	
Frequency range (MHz)	Limits dB(pW)		Limits dB(pW)		Limits dB(pW)		Limits dB(pW)	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
30-300	45-55*	35-45*	45-55*	35-45*	49-59*	39-49*	55-65*	45-55*

Notes:

- * means the limit decreasing linearly with the logarithm of the frequency in the range 30MHz to 300MHz.
- If the quasi-peak measurements meet the average limit, the EUT shall be deemed to meet both limits and the measurements using the average detector need not be carried out.

5.2 Block diagram of test set up



5.3 Test Procedure

Measurement was performed in shielded room, and instruments used were according to clause 5.1 of EN 55014-1 if applicable.

Detailed test procedure and arrangement was according to clause 5.3 of EN 55014-1.

Measurement methods was according to clause 5.4 of EN 55014-1.

Operation conditions of EUT was according to clause 6 of EN 55014-1.

Frequency range 30MHz – 300MHz was checked and EMI receiver measurement bandwidth was set to 120kHz.

5.4 Test Protocol

For Mains ports: NA

Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBpW)	Limit (dBpW)	Margin (dB)	Corrected Reading (dBpW)	Limit (dBpW)	Margin (dB)
Note: * means the emission level 20dB below the relevant limit.						

For Associated ports: NA

Frequency (MHz)	Quasi-peak			Average		
	Corrected Reading (dBpW)	Limit (dBpW)	Margin (dB)	Corrected Reading (dBpW)	Limit (dBpW)	Margin (dB)
Note: * means the emission level 20dB below the relevant limit.						

- Remark: 1. Correct Factor = Clamp Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading
 4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Clamp Factor = 10.00dB, Cable Loss = 2.00dB,
 Original Receiver Reading = 10.00dBpW, Limit = 66.00dBpW.
 Then Correct Factor = 10.00 + 2.00 = 12.00dB;
 Corrected Reading = 10dBpW + 12.00dB = 22.00dBpW;
 Margin = 66.00dBpW – 22.00dBpW = 44.00dB.

6. Radiated emission

Test result: **PASS**

6.1 Limit

☒ Radiated emission limit from frequency range 30MHz – 1000MHz

Frequency (MHz)	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 3m	Permitted limit in dB μ V/m (Quasi-peak) of Measurement Distance 10m
30 ~ 230	40	30
230 ~ 1000	47	37
Notes: 1. For the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades. 2. The gray rows are selected items.		

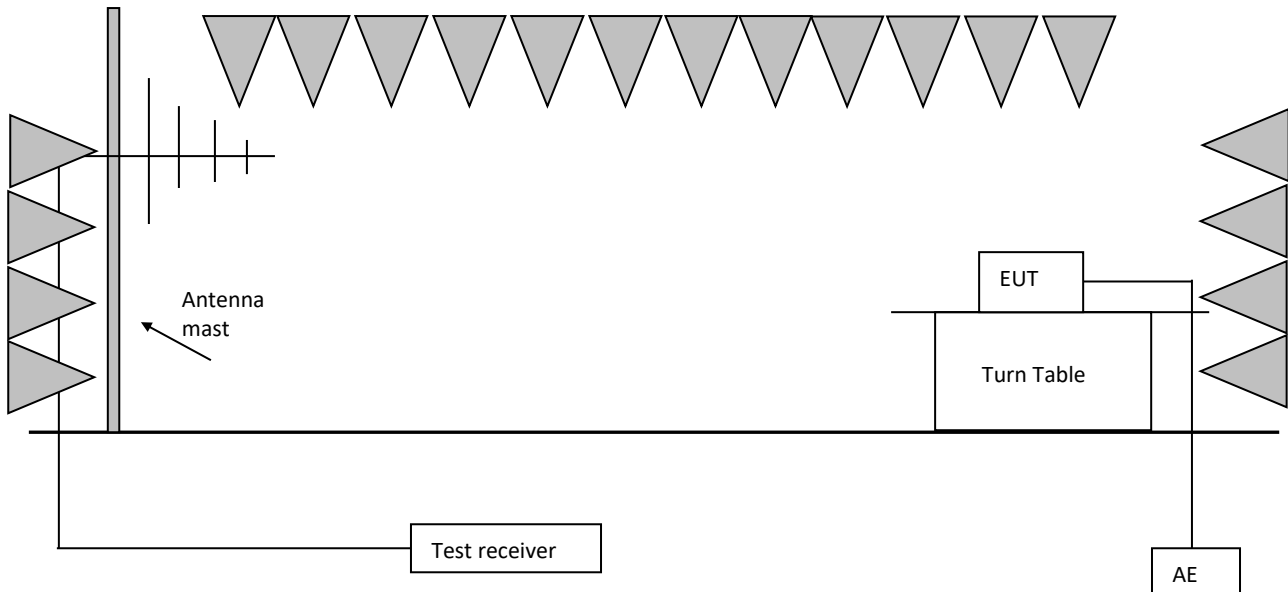
☐ Radiated emission limit from frequency range 1GHz – 6GHz

Frequency (MHz)	Permitted limit in dB μ V/m (Average) of Measurement Distance 3m	Permitted limit in dB μ V/m (Peak) of Measurement Distance 3m
1000 ~ 3000	50	70
3000 ~ 6000	54	74
Notes: 1. For the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades. 2. The gray rows are selected items.		

Required highest frequency for radiated electric field strength measurements

Highest clock frequency (F_x)	Highest measurement frequency
$F_x \leq 108 \text{ MHz}$	1 GHz
$108 \text{ MHz} < F_x \leq 500 \text{ MHz}$	2 GHz
$500 \text{ MHz} < F_x \leq 1 \text{ GHz}$	5 GHz
$F_x > 1 \text{ GHz}$	$5 \times F_x$ up to a maximum of 6 GHz

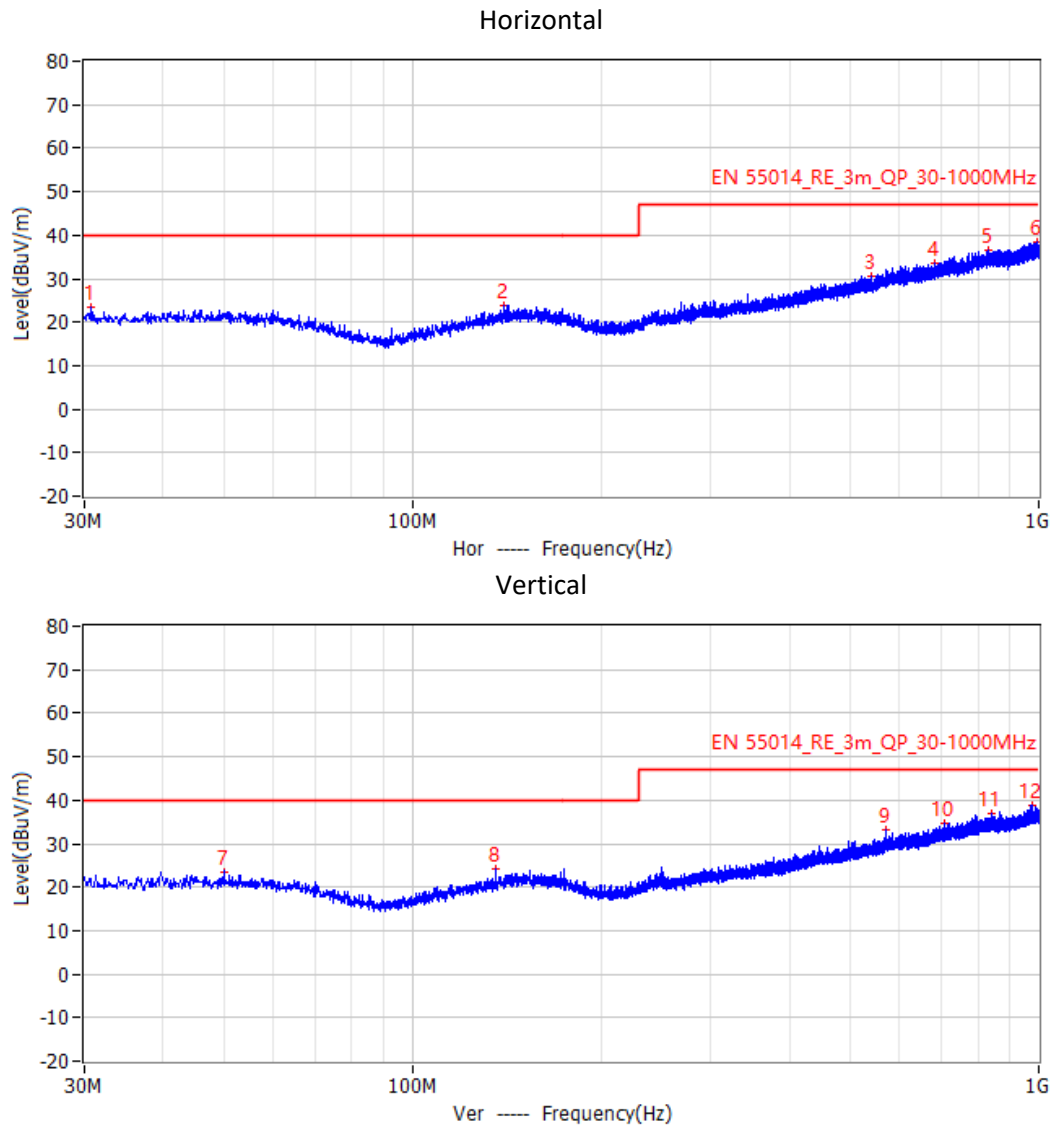
6.2 Block diagram and test set up



The measurement was applied in a semi-anechoic chamber.
Operation conditions of EUT was according to clause 6 of EN 55014-1.
Measurement was performed according to clause 10 of CISPR 32.
Setting of EUT is according to clause 5.3.4.3 of EN 55014-1.
The bandwidth setting on test receiver was 120kHz.
The frequency range from 30MHz to 6GHz was checked.

6.3 Test Protocol

Test Curve:

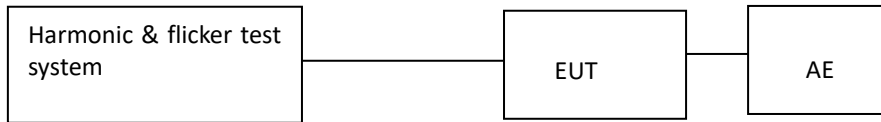


No.	Frequency	Limit dB μ V/m	Level dB μ V/m	Delta dB	Reading dB μ V/m	Factor dB/m	Detector	Polar
1*	30.679MHz	40.00	23.59	-16.41	10.50	13.09	PK	Hor
2*	140.192MHz	40.00	23.97	-16.03	10.06	13.91	PK	Hor
3*	540.317MHz	47.00	30.53	-16.47	10.31	20.22	PK	Hor
4*	683.004MHz	47.00	33.38	-13.62	10.45	22.93	PK	Hor
5*	830.929MHz	47.00	36.48	-10.52	11.10	25.38	PK	Hor
6*	994.180MHz	47.00	38.38	-8.62	11.70	26.68	PK	Hor
7*	50.079MHz	40.00	23.63	-16.37	9.24	14.39	PK	Ver
8*	135.827MHz	40.00	24.30	-15.70	10.74	13.56	PK	Ver
9*	570.193MHz	47.00	33.23	-13.77	12.32	20.91	PK	Ver
10*	708.224MHz	47.00	34.65	-12.35	11.17	23.48	PK	Ver
11*	841.017MHz	47.00	36.83	-10.17	11.52	25.31	PK	Ver
12*	975.847MHz	47.00	38.70	-8.30	11.91	26.79	PK	Ver

7. Harmonics

Test result: NA

7.1 Block Diagram of Test Setup



7.2 Test Setup and Test Procedure

Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyser which was integrated in the harmonic & flicker test system. The measurements were carried out under steady conditions. Measuring instrumentation according to IEC 61000-4-7:2002+A1:2008

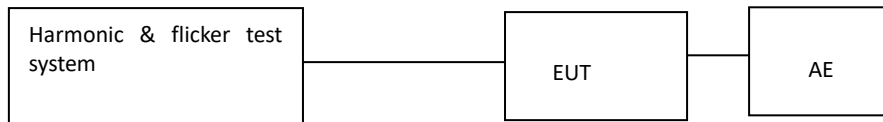
7.3 Test Protocol

- ☐ This product is not defined as lighting equipment, and has rated power less than 75W, therefore, no limit apply according to EN 61000-3-2
- ☐ The EUT is kitchen machines as listed in the scope of IEC 60335-2-14, therefore, is deemed to conform to the harmonic current limits of this standard without further testing.

8. Voltage Fluctuations-Flicker

Test result: NA

8.1 Block Diagram of Test Setup



8.2 Test Setup and Test Procedure

8.2.1 Definition

Flicker: impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time.

Pst: Short-term flicker severity.

Plt: long-term flicker severity.

dc: maximum steady state voltage change during an observation period.

dmax: maximum absolute voltage change during an observation period.

d(t): time function of the relative r.m.s. voltage change evaluated as a single value for each successive half period between zero-crossings of the source voltage, except during time interval in which the voltage is a steady-state condition for at least 1s.

8.2.2 Test condition

The EUT was set to produce the most unfavorable sequence of voltage changes.

8.3 Test Protocol

The tested object operated under the operating condition specified in EN 61000-3-3
The following limits apply

- the value of Pst shall not be greater than 1,0.
- the value of Plt shall not be greater than 0,65.
- Tmax, the accumulated time value of d(t) with a deviation exceeding 3,3 % during a single voltage change at the EUT terminals, shall not exceed 500 ms.
- the maximum relative steady-state voltage change, dc, shall not exceed 3,3 %.
- the maximum relative voltage change dmax, shall not exceed:
 - ☐ 4% without additional conditions.
 - ☐ 6 % for equipment which is:
 - switched manually, or
 - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.
 - ☐ 7 % for equipment which is:
 - attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
 - switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.
 - ☐ for manual switch, dmax is measured in accordance with Annex B of standard, average dmax is calculated from 24 times measurement.
 - ☐ The rate power of the EUT is no greater than 75W, which is unlikely to produce significant voltage fluctuations or flicker by technical analysis and evaluation. So it is deemed to fulfil the requirements without testing.

Immunity Test

Performance criteria

The performance criteria are based on the general criteria of the standard and derived from the product specification

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 to persist after the test. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and 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.

Categories of apparatus

- ☐ **Category I:** equipment containing no electronic control circuitry. (fulfill the relevant immunity requirements without testing)
- ☐ **Category II:** mains operated equipment containing electronic control circuitry with no clock frequency higher than 15 MHz. (Shall fulfill the tests: ESD, EFT, Inject current (150 kHz to 230 MHz), Surge, Voltage dips)
- ☒ **Category III:** battery operated equipment not included in Category I. (Shall fulfill the tests: ESD, EFT, Inject current (150 kHz to 80 MHz), Radio frequency electromagnetic fields (80 MHz to (F) MHz), Surge)
Note: For Category III toys, the radio frequency electromagnetic fields test shall be applicable only for ride on toys.
- ☐ **Category IV:** mains operated equipment containing electronic control circuitry with a highest clock frequency greater than 15 MHz but lower than or equal to 200 MHz. (Shall fulfill the tests: ESD, EFT, Inject current (150 kHz to 80 MHz), Radio frequency electromagnetic fields (80 MHz to 1000 MHz), Surge, Voltage dips)
- ☐ **Category V:** mains operated equipment containing electronic control circuitry with a highest clock frequency greater than 200 MHz. (Shall fulfill the tests: ESD, EFT, Inject current (150 kHz to 80 MHz), Radio frequency electromagnetic fields (80 MHz to 6 GHz), Surge, Voltage dips)

9. Electrostatic Discharge (ESD)

Test result: **PASS**

9.1 Severity Level and Performance Criterion

9.1.1 Test level

1a – Contact discharge		1b – Air discharge	
Level	Test voltage kV	Level	Test voltage kV
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15
X	Special	X	Special
Notes: 1. "X" is an open level. The level has to be specified in the dedicated equipment specification. If higher voltages than those shown are specified, special test equipment may be needed. 2. The gray rows were the selected test level.			

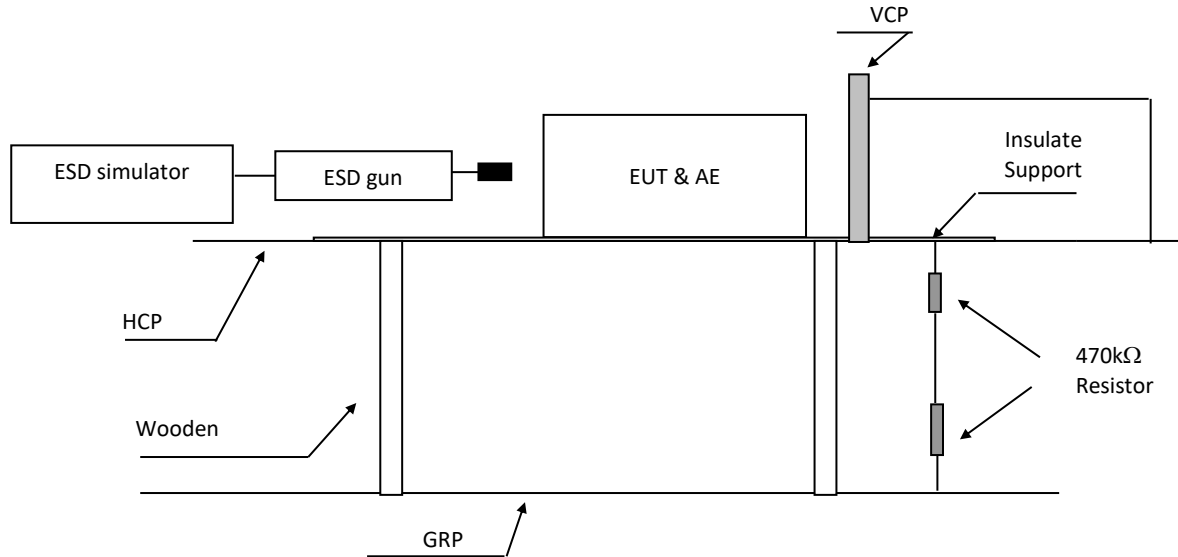
9.1.2 Performance Criterion

Performance criterion: **B/C***

*: Performance criterion C may be applied to toys not using score or data entered by the user (e.g. musical soft toys and sounding toys).

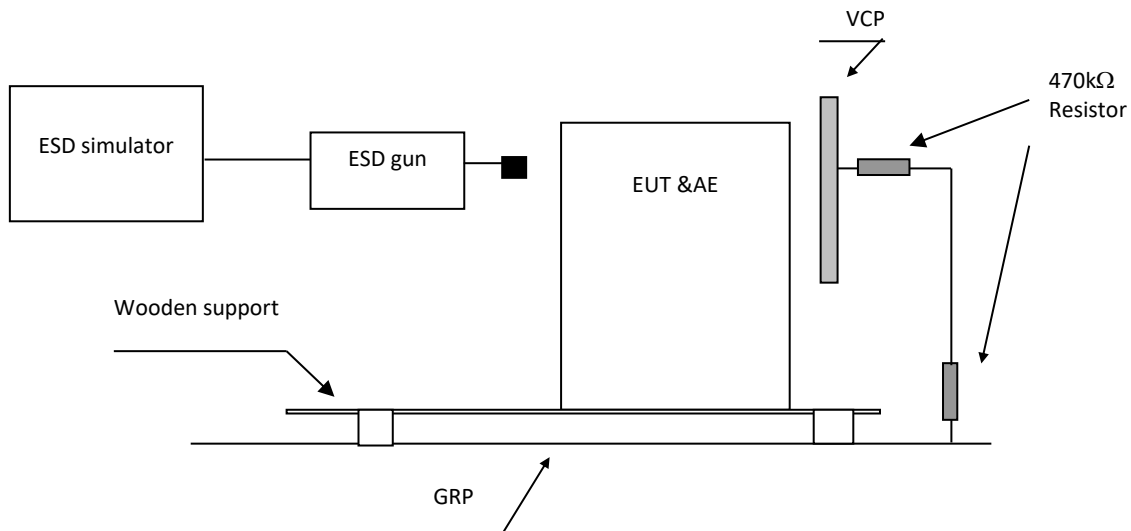
9.2 Block Diagram of Test Setup

For table-top equipment



Note: HCP means Horizontal Coupling Plane
VCP means Vertical Coupling Plane
GRP means Ground Reference Plane
Wooden support is a 0.8m height table

For floor standing equipment



Note: VCP means Vertical Coupling Plane
GRP means Ground Reference Plane
Wooden support is a 0.1m height rack

9.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to IEC 61000-4-2 Clause 7.

The test method and equipment was specified by IEC 61000-4-2 with the modifications by EN 55014-2 clause 5.1.

9.4 Test Protocol

Direct discharges were applied at the following selected points:

Test point #	Test level [kV]	Air/Contact	Polarity (+/-)	Pass/Fail/NA	Comment
A	4	Contact	+/-	Pass	All touchable screws of enclosure
B	4	Contact	+/-	Pass	Accessible metal parts of the EUT
C	8	Air	+/-	Pass	Air gap of the switch, button
D	8	Air	+/-	Pass	The air in-taking opening
E	8	Air	+/-	Pass	Slots around the EUT

Indirect contact discharges were applied to the VCP and the HCP at the following selected points:

Point	Description	Point	Pass/Fail/NA
VCP f	0,1m from the front of the EUT	Edge of centre, corner on VCP	Pass
VCP b	0,1m from the back of the EUT	Edge of centre, corner on VCP	Pass
VCP r	0,1m from the right of the EUT	Edge of centre, corner on VCP	Pass
VCP l	0,1m from the left of the EUT	Edge of centre, corner on VCP	Pass

For table top equipment

Point	Description	Point	Pass/Fail/NA
HCP f	0,1m from the front of the EUT	Edge of centre, corner on HCP	NA
HCP b	0,1m from the back of the EUT	Edge of centre, corner on HCP	NA
HCP r	0,1m from the right side of the EUT	Edge of centre, corner on HCP	NA
HCP l	0,1m from the left side of the EUT	Edge of centre, corner on HCP	NA

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT met the requirements of Performance Criterion B

10. Radio frequency electromagnetic fields

Test result: **PASS**

10.1 Severity Level and Performance Criterion

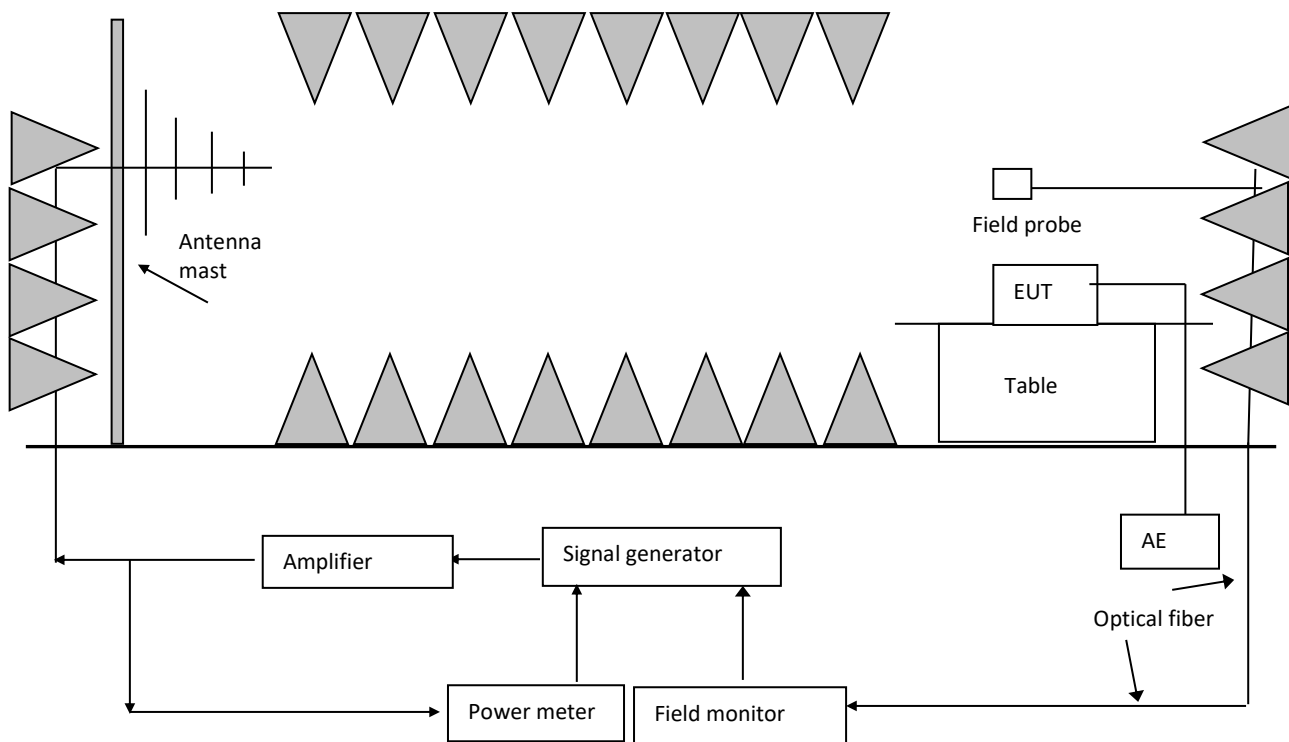
10.1.1 Test level

Level	Test field strength V/m
1	1
2	3
3	10
X	Special
Notes: 1. X is an open test level. This level may be given in the product specification. 2. The gray row is the selected test level.	

10.1.2 Performance Criterion

Performance criterion: **A**

10.2 Block diagram of test setup



10.3 Test Setup and Test Procedure

Measurement was performed in full-anechoic chamber.

Measurement and setting of EUT was applied according to IEC 61000-4-3 clause 7.

The test method and equipment was specified by IEC 61000-4-3 with additions and modifications by EN 55014-2 clause 5.5.

10.4 Test Protocol

Test no.:	Frequency (MHz)	Polarization	Test level V/m	Modulation	Exposed location	Pass/Fail/NA	Comment
1	80-1000	H & V	3	1kHz, 80%, SW, AM, 1% step size	All sides	Pass	-
1	1000-6000	H & V	3	1kHz, 80%, SW, AM, 1% step size	All sides	NA	-

Observation: All the functions were operated as normal during and after test.

Conclusion: The EUT met the requirements of Performance Criterion A

11. Fast transients

Test result: NA

11.1 Severity Level and Performance Criterion

11.1.1 Test level

Open circuit output test voltage ($\pm 10\%$) and repetition rate of the impulses ($\pm 20\%$)				
Level	Input and output AC power ports		Input and output DC power ports Signal ports, control ports and wired network ports	
	Voltage peak kV	Repetition rate kHz	Voltage peak kV	Repetition rate kHz
1	0.5	5	0.25	5
2	1	5	0.5	5
3	2	5	1	5
4	4	5	2	5
X	Special	Special	Special	Special
Notes : 1. "X" is an open level. The level has to be specified in the dedicated equipment specification. 2. The gray rows were the selected test level.				

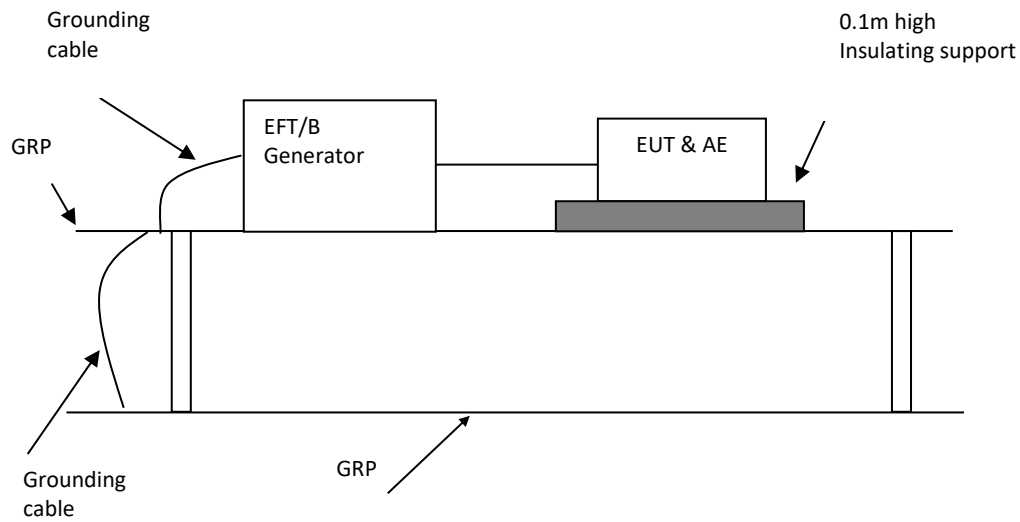
11.1.2 Performance Criterion

Performance criterion B

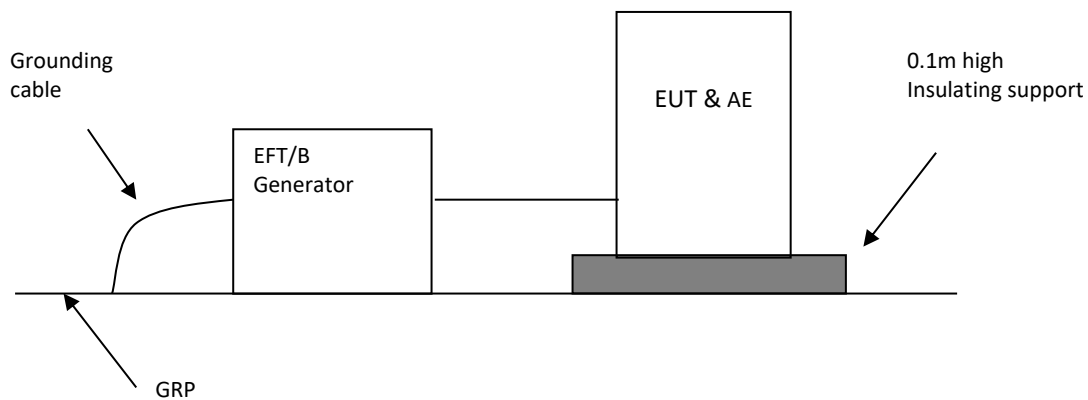
11.2 Block Diagram of Test Setup

11.2.1 Block Diagram for input a.c./d.c. power line

For table-top equipment

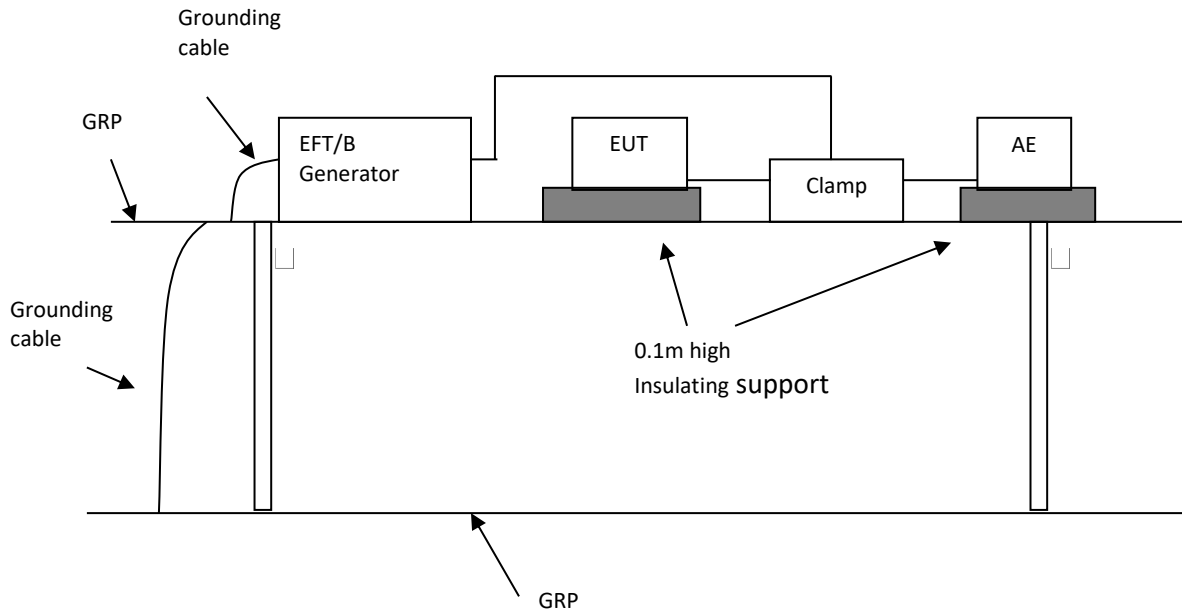


For floor standing equipment

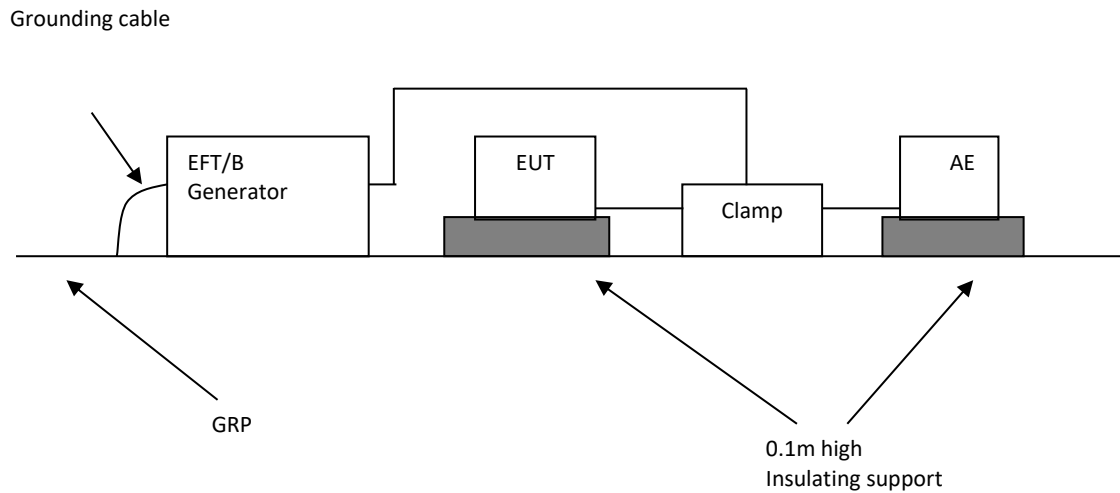


11.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

For table-top equipment



For floor standing equipment



11.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to IEC 61000-4-4 clause 7.

The test method and equipment was specified by IEC 61000-4-4 with additions and modifications by EN 55014-2 clause 5.2.

11.4 Test Protocol

Test No.	Level [kV]	Polarity +/-	Repetition rate kHz	Line for test	Pass/Fail/NA
1	1	+/-	5	Input and output AC power ports	NA
2	0.5	+/-	5	Input and output DC power ports	NA
3	0.5	+/-	5	Signal ports, control ports and wired network ports	NA

Observation:

Conclusion:

12. Surges

Test result: NA

12.1 Severity Level and Performance Criterion

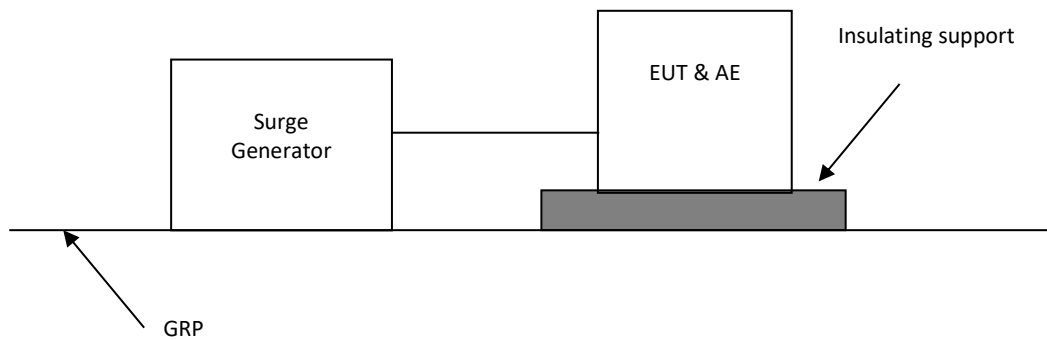
12.1.1 Test level

Level	Open-circuit test voltage $\pm 10\%$ kV
1	0.5
2	1.0
3	2.0
4	4.0
X*	Special
Notes: 1. "X" is an open class. This level can be specified in the product specification 2. The gray rows are the selected level.	

12.1.2 Performance Criterion

Performance criterion **B**

12.2 Block Diagram of Test Setup



12.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to IEC 61000-4-5 clause 7.

The test method and equipment was specified by IEC 61000-4-5 with modifications by EN 55014-2 clause 5.6.

12.4 Test Protocol

Test No.	Level [kV]	Polarity +/-	Angle	Line for test	Pass/Fail/NA
1	1	+ -	90° 270°	Input AC power ports (line to line)	NA
2	2	+ -	90° 270°	Input AC power ports (line to earth)	NA
3	1	+ -	90° 270°	Wired network ports (line-to-earth (unshielded))	NA
4	0.5	+ -	90° 270°	Wired network ports (shield-to-earth (shielded))	NA

Observation:

Conclusion:

13. Injected Current

Test result: NA

13.1 Severity Level and Performance Criterion

13.1.1 Test level

Frequency range 150kHz – 230MHz		
Level	Voltage level (e.m.f.)	
	U_0 [dB(μ V)]	U_0 (V)
1	120	1
2	130	3
3	140	10
X	Special	Special

Notes:

1. "X" is an open level.
2. The gray row is the selected test level.

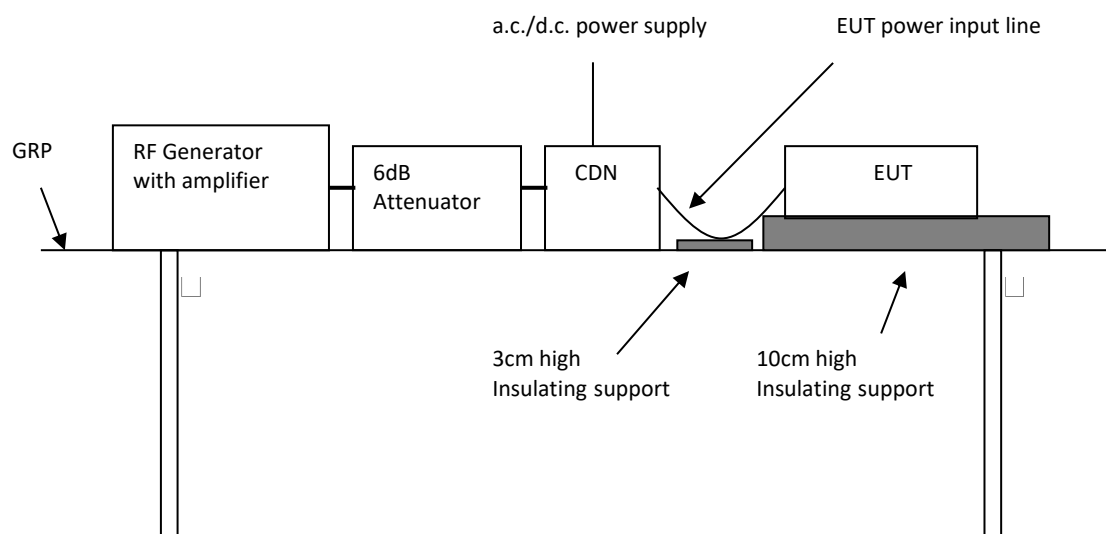
13.1.2 Performance Criterion

Performance criterion: A

13.2 Block Diagram of Test Setup

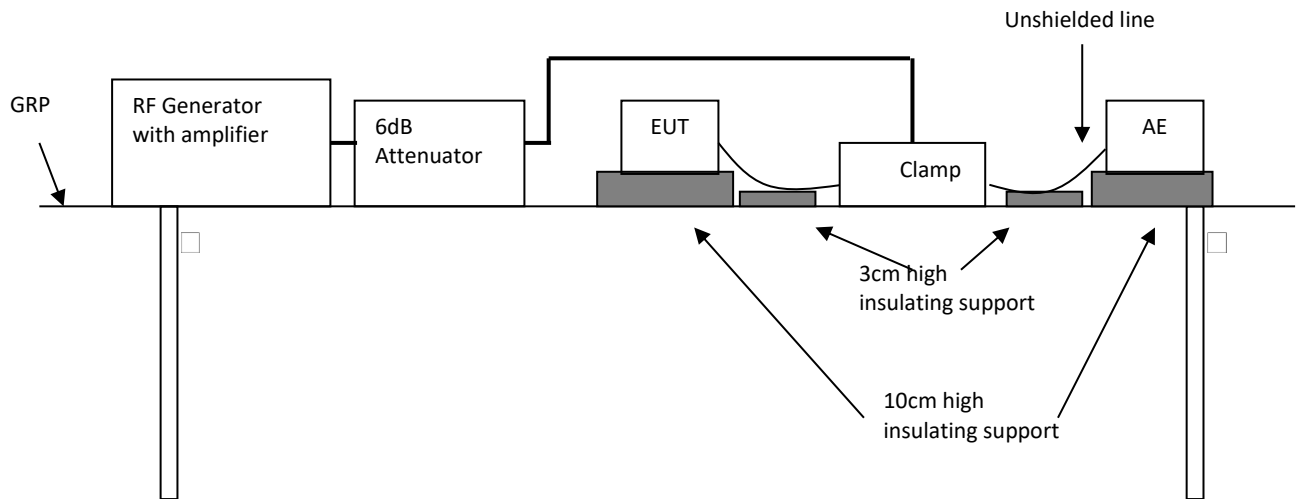
13.2.1 Block Diagram for a.c./d.c input power line

☐ Block Diagram for a.c./d.c input power line

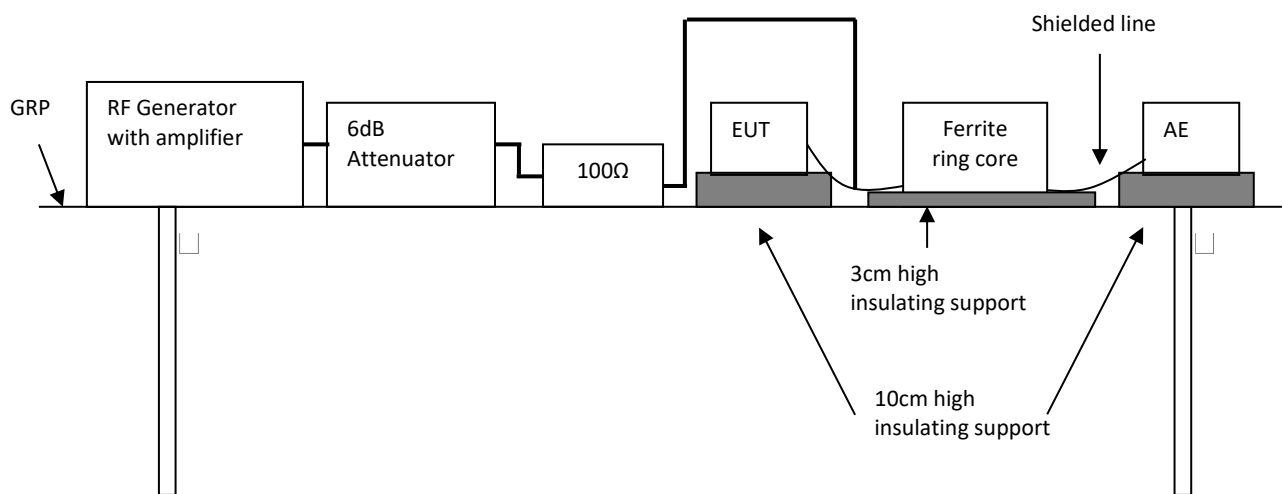


13.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

☐ Unshielded line



☐ Shielded line



13.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to IEC 61000-4-6 clause 7.

The test method and equipment was specified by IEC 61000-4-6 with additions and modifications by EN 55014-2 clause 5.3, 5.4.

13.4 Test Protocol

☐ EUT is not required for Radio frequency electromagnetic fields

Test No.	Frequency (MHz)	Level V (r.m.s.)	Modulation	Injected point	Pass/Fail/NA
1	0.15~230	3	1kHz, 80%, SW, AM, 1% step size	Input and output AC power ports	NA
2	0.15~230	1	1kHz, 80%, SW, AM, 1% step size	Input and output DC power ports	NA
3	0.15~230	1	1kHz, 80%, SW, AM, 1% step size	Signal ports, control ports and wired network ports	NA

☐ For EUT test Radio frequency electromagnetic fields

Test No.	Frequency (MHz)	Level V (r.m.s.)	Modulation	Injected point	Pass/Fail/NA
1	0.15~80	3	1kHz, 80%, SW, AM, 1% step size	Input and output AC power ports	NA
2	0.15~80	1	1kHz, 80%, SW, AM, 1% step size	Input and output DC power ports	NA
3	0.15~80	1	1kHz, 80%, SW, AM, 1% step size	Signal ports, control ports and wired network ports	NA

Observation
Conclusion:

14. Voltage Dips

Test result: NA

14.1 Severity Level and Performance Criterion

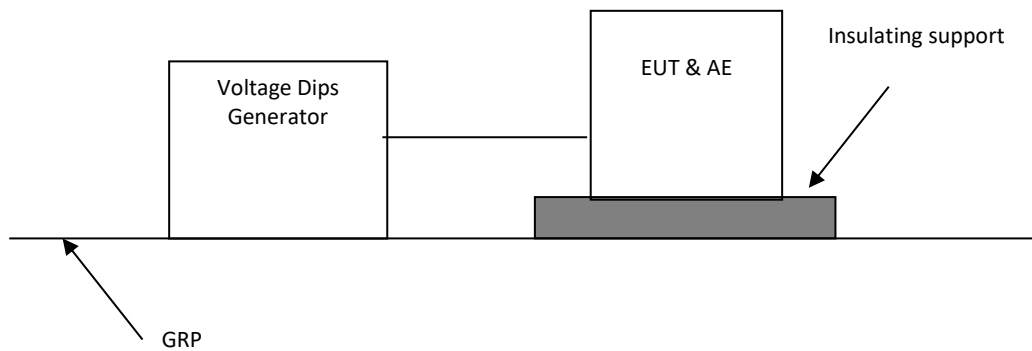
14.1.1 Test level

Test level % U _T	Voltage dip % U _T	Duration (in period)	
		50Hz	60Hz
0	100	0.5 cycle	0.5 cycle
40	60	10 cycles	12 cycles
70	30	25 cycles	30 cycles
Notes: 1. “*” for 0.5 period, the test shall be made in positive and negative polarity, i.e. starting at 0° and 180°, respectively. 2. “**” means “x” is an open duration. This duration can be given in the product specification. Utilities in Europe have measured dips and short interruptions of duration between ½ a period and 3000 periods, but duration less than 50 periods are most common. 3. If the EUT is tested for voltage dips of 100%, it is generally unnecessary to test for other levels for the same durations. However, for some cases (safeguard systems or electro-mechanical devices) it is not true. The product specification or product committee shall give an indication of the applicability of this note. 4. The gray rows are selected test level.			

14.1.2 Performance Criterion

Performance criterion: C

14.2 Block diagram of test setup



14.3 Test Setup and Test Procedure

Measurement was performed in shielded room.

Measurement and setting of EUT was applied according to IEC 61000-4-11 clause 7.

The test method and equipment was specified by IEC 61000-4-11 with additions and modifications by EN 55014-2 clause 5.7.

14.4 Test Protocol

Test no.	% U_T	Voltage dips % U_T	Duration (in periods)	Pass/Fail/NA
1	70	30%	25 cycles at 50Hz	NA
			30 cycles at 60Hz	NA
2	40	60%	10 cycles at 50Hz	NA
			12 cycles at 60Hz	NA
3	0	100%	0.5 cycle at 50Hz	NA
			0.5 cycle at 60Hz	NA

Observation:

Conclusion:

Appendix I: Photograph of equipment under test

Outside



G29



G30



G05



G08



G09



G10



G11



G26



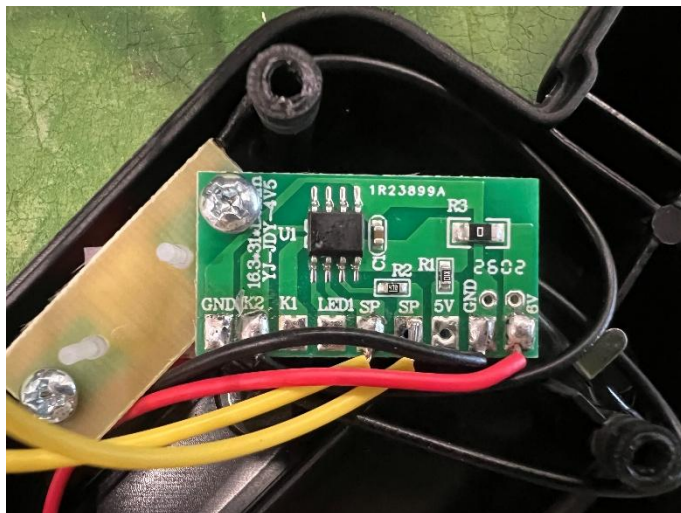
G28

G29:



Inside





END of the report