EMC TEST REPORT

No. 160602301SHA-001

Applicant	:	ZHE JIANG JIAJIA RIDE-ON CO.,LTD Xincang industrial Zone Pinghu City, Zhejiang Province ,china
Manufacturing site	:	ZHE JIANG JIAJIA RIDE-ON CO.,LTD Xincang industrial Zone Pinghu City, Zhejiang Province ,china
Product Name	:	Children's Car
Type/Model	:	JT528
TEST RESULT	**:**	**PASS**

SUMMARY

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

EN 55014-1:2006/+A1:2009/+A2:2011: Electromagnetic compatibility- Requirements for household appliances, electric tools and similar apparatus Part 1: Emission

EN 55014-2:2015: Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus Part 2: Immunity – Product family standard

EN 61000-3-2:2014: Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).

EN61000-3-3:2013: 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.

Date of issue: July 15, 2016

Prepared by: Reviewed by:

Anthony Shen (Project engineer) Daniel Zhao (Reviewer)

Content

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product Name	:	Children's Car
Type/Model	:	JT528
Description of EUT	:	There is only one model. We tested it and listed the worst Data in this report.
Rating	:	Input:AC230-240V, 50Hz, 25W Output:12.0V⎓ 1.0A
Category of EUT	:	Class B
EUT type	:	☐ Table top ☒ Floor standing
Sample received date	:	June 16, 2016
Date of test	:	June 16, 2016 ~ June 27, 2016

1.2 Description of Client

Applicant	:	ZHE JIANG JIAJIA RIDE-ON CO.,LTD Xincang industrial Zone Pinghu City, Zhejiang Province ,china
Manufacturing site	:	ZHE JIANG JIAJIA RIDE-ON CO.,LTD Xincang industrial Zone Pinghu City, Zhejiang Province ,china

1.3 Description of Test Facility

Name	:	Intertek Testing Service Shanghai
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Telefax	:	86 21 54262353

Subcontractor:

☐

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Telephone	:	86 21 64700066
Telefax	:	86 21 64514252

2 TEST SPECIFICATIONS

2.1 Standards or specification

EN 55014-1:2006/+A1:2009/+A2:2011: Electromagnetic compatibility- Requirements for household appliances, electric tools and similar apparatus Part 1: Emission

EN 55014-2:2015: Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus Part 2: Immunity – Product family standard

EN 61000-3-2:2014: Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).

EN61000-3-3:2013: 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

2.2 Mode of operation during the test / Test peripherals used

2.2.1 Description of operation

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 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESCS 30	R&S	EC 2107	2015-10-20	2016-10-19
Test Receiver	ESIB 26	R&S	EC 3045	2015-10-20	2016-10-19
Test Receiver	ESCI 7	R&S	EC4501	2016-02-24	2017-02-23
Voltage Probe	ESH2-Z3	R&S	EC 3405	2016-01-09	2017-01-08
Voltage Probe	TK9420	Schwarzbeck	EC 4888	2015-11-18	2016-11-17
A.M.N.	ESH2-Z5	R&S	EC 3119	2015-12-16	2016-12-15
A.M.N.	ENV 216	R&S	EC 3393	2015-07-31	2016-07-30
A.M.N.	ENV 216	R&S	EC 3394	2015-07-31	2016-07-30
A.M.N.	ENV4200	R&S	EC3558	2015-07-31	2016-07-30
Click meter	DDA55	AFJ	EC 5320	2015-12-24	2016-12-23
I.S.N.	FCC-TLISN -T2-02	FCC	EC3754	2016-02-16	2017-02-15
I.S.N.	FCC-TLISN -T4-02	FCC	EC3755	2016-02-16	2017-02-15
I.S.N.	FCC-TLISN -T8-02	FCC	EC3756	2016-02-16	2017-02-15
Current probe	EZ-17	R&S	EC 3221	2016-01-09	2017-01-08
Absorbing clamp	MDS 21	R&S	EC 2108	2016-01-09	2017-01-08
Tri-loop	HXYZ 9170	Schwarzbeck	EC 3384	2016-06-03	2017-06-02
Harmnic-fliker	5001ix-PACS-1	CI	EC 2110	2015-08-20	2016-08-19
Conduct immunity system	UCS 500M6B	EM TEST	EC 2958	2016-04-08	2017-04-07
Automatic transformer	MV2616	EM TEST	EC 2957	Not required	Not required
ESD generator	ditto	EM TEST	EC 2956	2016-05-15	2017-05-14
ESD generator	NSG 437	TESEQ	EC 4792-4	2016-03-04	2017-03-03
Surge generator	TSS 500M2F	EM TEST	EC 2960	2015-08-31	2016-08-30
Surge generator	TSS 500M4	EM TEST	EC 2961	2016-01-09	2017-01-08
Surge Coupling network	CNV 504M	EM TEST	EC 2958-2	2016-01-09	2017-01-08
Surge Coupling network	CNV 504S1	EM TEST	EC 2958-1	2016-01-09	2017-01-08
Signal generator	SML 01	R&S	EC 2338	2016-04-17	2017-04-16
Power amplifier	75A250	AR	EC 3043-1	2015-08-15	2016-08-14
CDN	CDN M216	Schaffner	EC 2113-2	2015-07-31	2016-07-30
CDN	CDN M316	Schaffner	EC 2113-1	2015-09-29	2016-09-28
CDN	CDN T2	EM TEST	EC 4970	2015-10-20	2016-10-19
CDN	CDN T4	EM TEST	EC 3043-4	2016-01-09	2017-01-08
CDN	CDN M1/16A	EM TEST	EC 4792-6	2016-02-16	2017-02-15
CDN	CDN M1/16A	EM TEST	EC 4792-7	2016-02-16	2017-02-15
CDN	CDN M1/32A	EM TEST	EC4792-10	2016-01-09	2017-01-08
CDN	CDN M3N/16A	EM TEST	EC 4792-12	2016-02-16	2017-02-15
CDN	CDN M3N/32A	EM TEST	EC 4792-13	2016-02-16	2017-02-15
CDN	CDN T8-RJ45	EM TEST	EC 4792-15	2016-02-16	2017-02-15

EM clamp	EM 101	EM TEST	EC 3043-6	2015-11-23	2016-11-22
Power meter	PM2002	AR	EC3043-7	2015-10-18	2016-10-17
Power sensor	PH2000	AR	EC3043-8	2015-10-18	2016-10-17
Attenuator	ATT6/75	EM TEST	EC 3043-3	2016-01-09	2017-01-08
Attenuator	68-6-44	Weinschel	EC 3043-9	2016-01-09	2017-01-08
DDC	DC 2600	AR	EC 3043-5	2016-01-09	2017-01-08
DDC	DC 6180A	AR	EC 3044-5	2015-07-31	2016-07-30
DDC	DC 7144A	AR	EC 3044-6	2016-01-09	2017-01-08
Ultra-broadband antenna	HL 562	R&S	EC 3046-1	2015-12-18	2016-12-17
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2016-06-01	2017-05-30
Horn antenna	HF 906	R&S	EC 3049	2015-09-12	2016-09-11
Horn antenna	3117	ETS	EC 4792-1	2015-08-18	2016-08-17
Horn antenna	HAP18-26W	TOYO	EC 4792-3	2016-06-12	2017-06-11
Pre-amplifier	Pre-amp 18	R&S	EC 5262	2016-05-25	2017-05-24
Pre-amplifier	Tpa0118-40	R&S	EC 4792-2	2016-04-12	2017-04-11
Log-period antenna	AT 1080	AR	EC 3044-7	2015-06-30	2016-06-29
Biconical antenna	3109PX	ETS	EC3564	2015-08-23	2016-08-22
Horn antenna	AT 4002	AR	EC 3044-8	2015-07-13	2016-07-12
Signal generator	SMR 20	R&S	EC 3044-1	2015-07-31	2016-07-30
Power amplifier	150W1000	AR	EC 3044-2	2016-06-13	2017-06-12
Power amplifier	25S1G4	AR	EC 3044-4	2015-07-31	2016-07-30
Field meter	FM 5004	AR	EC 3044-3	2015-07-31	2016-07-30
Field sensor	FP 6001	AR	EC 3044-9	2015-07-31	2016-07-30
Semi-anechoic chamber	-	Albatross project	EC 3048	2016-05-06	2017-05-05
Fully-anechoic chamber	-	Albatross project	EC 3047	2016-05-06	2017-05-05
Shielded room	-	Zhongyu	EC 2838	2016-01-09	2017-01-08
Shielded room	-	Zhongyu	EC 2839	2016-01-09	2017-01-08
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2016-01-09	2017-01-08
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC4297-2	2016-01-09	2017-01-08
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC4297-3	2016-01-09	2017-01-08
Band Reject Filter	WRCGV 2400/2483-2390/2493-35/10SS	Wainwright	EC4297-4	2016-01-09	2017-01-08
Power sensor / Power meter	N1911A/N1921A	Agilent	EC4318	2016-04-11	2017-04-10
Spectrum analyzer	E7402A	Agilent	EC2254	2015-08-16	2016-08-15
EMF meter	ELT-400	NARDA	EC2928	2015-08-05	2016-08-04
Protection Network	VDHH 9502	Schwarzbeck	EC4631	2016-07-07	2017-07-06

Time relay	-	-	EC4186-1	2016-05-06	2017-05-05
DIPs generator	SKS-1130GT	SANKI	EC 5033	2016-01-09	2017-01-08
Ring wave generator	SKS-1206GB	SANKI	EC 5033-1	2016-01-09	2017-01-08
EFT generator	SKS-0404IB	SANKI	EC 5033-2	2016-01-09	2017-01-08
Surge generator	SKS-0506GB-30	SANKI	EC 5033-3	2016-01-09	2017-01-08
PXA Signal Analyzer	N9030A	Agilent	EC5338	2016-03-04	2017-03-03
Power sensor	U2021XA	Agilent	EC5338-1	2016-03-04	2017-03-03
Vector Signal Generator	N5182B	Agilent	EC5175	2016-03-04	2017-03-03
MXG Analog Signal Generator	N5181A	Agilent	EC5338-2	2016-03-04	2017-03-03
Mobile Test System	Iqxel	Litepoint	EC 5176	2016-01-09	2017-01-08
Spectrum analyzer	E7402A	Agilent	EC2254	2015-08-15	2016-08-14
Three phase Harmonic-flicker system	PFS 503N	EM TEST	EC 5383	2016-03-19	2017-03-18
	DPA 503N	EM TEST	EC 5383-1	2015-12-30	2016-12-29
	NETWAVE30	EM TEST	EC 5383-2	2016-03-19	2017-03-18

2.4 Test Summary

This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai.

TEST ITEM	TEST RESULT	NOTE
Terminal continuous disturbance voltage *	Pass	-
Discontinuous disturbance	NA	-
Continuous disturbance power*	NA	-
Radiated disturbance	Pass	-
Harmonics	Pass	-
Voltage fluctuation-Flicker	Pass	-
Electrostatic Discharge	Pass	-
Radio frequency electromagnetic fields	Pass	-
Fast Transient	Pass	-
Surges	Pass	-
Injected current	Pass	-
Voltage dips and interruption	Pass	-

* : According to clause 7.1.4 of the standard EN55014-1, a test at 160 kHz (conducted emission) and at 50 MHz (disturbance power) is made over a range of 0,9 to 1,1 times the rated voltage, and the worst test data is listed in relevant clause of the report.

Notes: 1: NA =Not Applicable

2: This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Emission Test

3 Mains/Load/Control Terminal Continuous Disturbance Voltage

Test result: Pass

3.1 Terminal Voltage Limits for the frequency range 148.5kHz to 30MHz

3.1.1 Limits for household appliances, electric power tools and similar devices at mains terminals

For household appliance

Frequency range (MHz)	Limits dB(μv) Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	59 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

Note : 1. * means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

For electric power tools

Frequency (MHz)	Rated motor power not exceeding 700W dB(μV)		Rated motor power above 700W and not exceeding 1000W dB(μV)		Rated motor power above 1000W 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

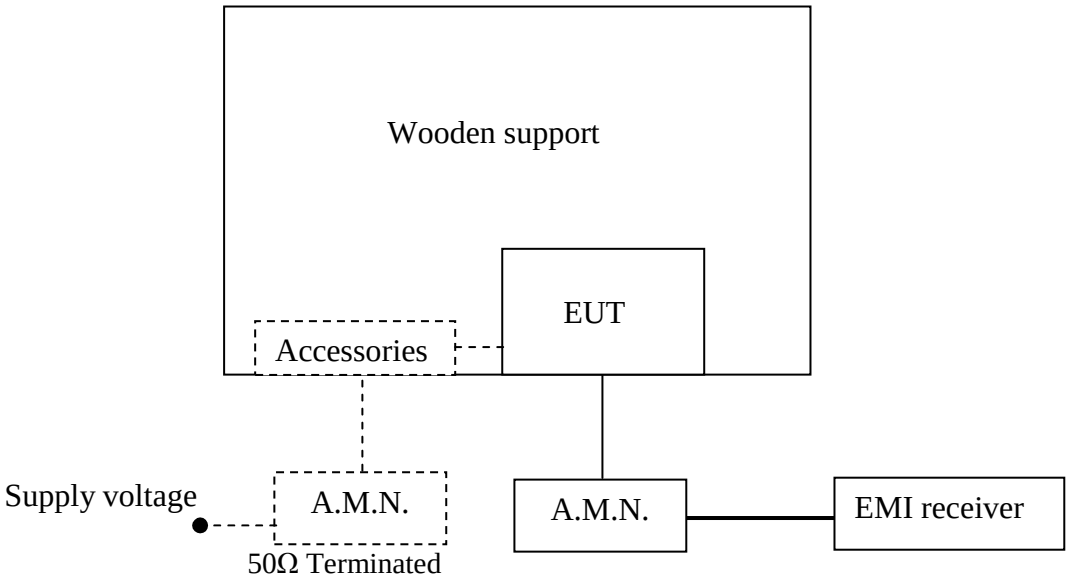
Note : 1. * means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

3.1.2 Limits for household appliances and similar devices at additional terminals

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	80	70
0.5 ~ 5	74	64
5 ~ 30	74	64
Note: If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.		

3.2 Block Diagram of Test Setup

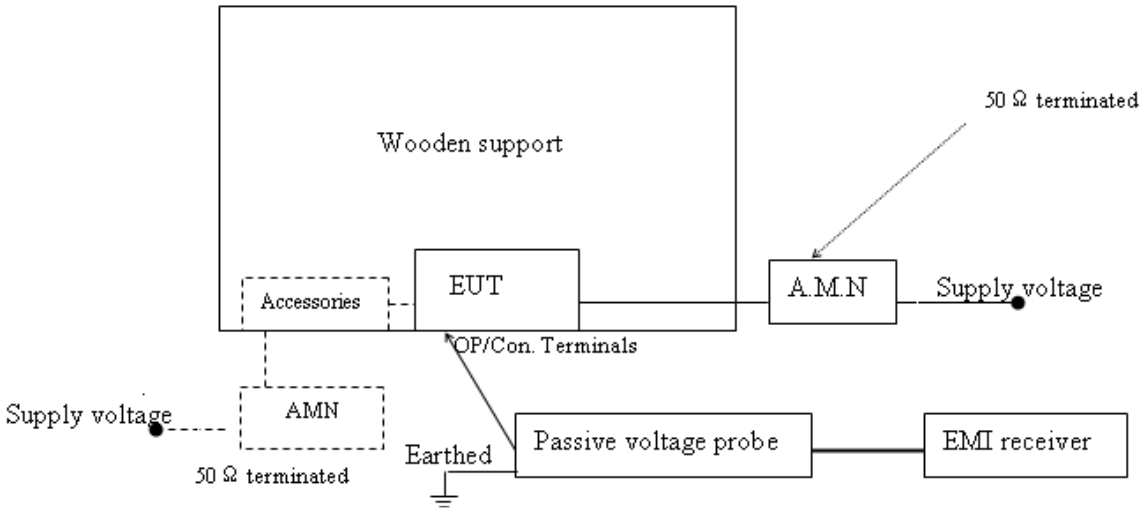
☒ At mains terminal



☐ For table top equipment, wooden support is 0.8m height table

☒ For floor standing equipment, wooden support is 0.1m height rack.

☐ At output and control terminals



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

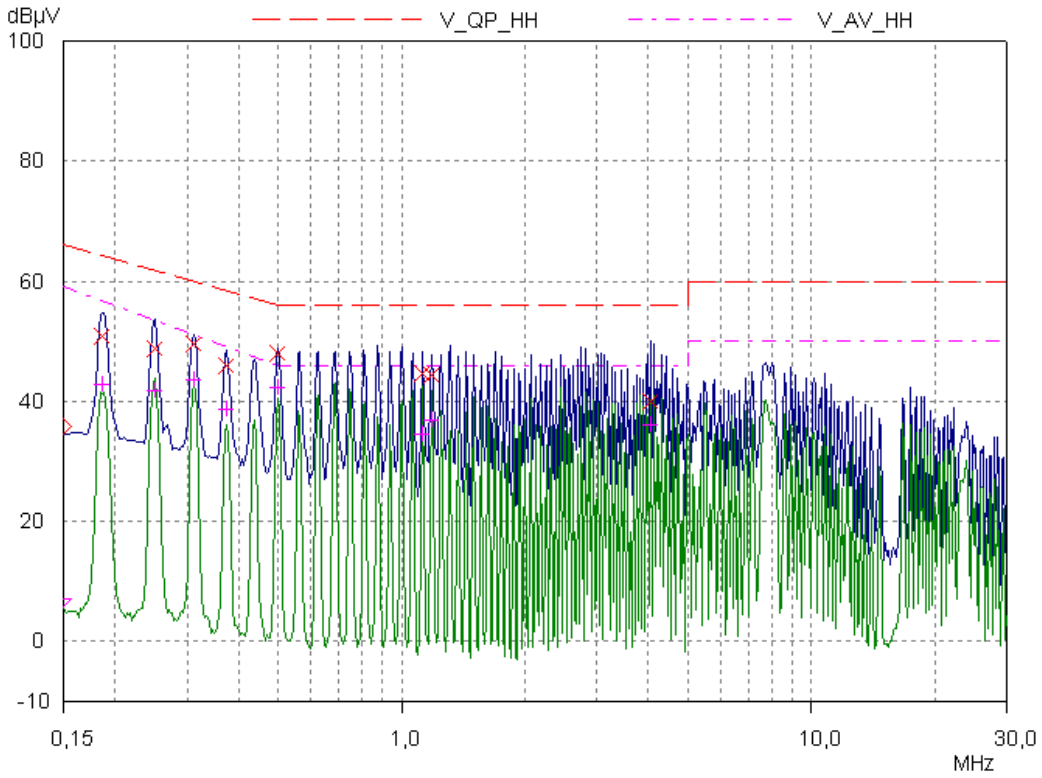
3.3 Test Setup and Test Procedure

Measurement was performed in shielded room, and instruments used were following clause 5.1.1, 5.1.2, 5.1.3, 5.1.4 and 5.1.5 of EN 55014-1 if applicable. Detailed test procedure and arrangement was follow EN 55014-1 clause 5.2. Measurement methods and operation condition of EUT was according to clause 7 of EN 55014-1.Frequency range 150kHz-30MHz was checked and EMI receiver measurement bandwidth was set to 9kHz.

3.4 Test Protocol

Temperature	:	24 °C
Relative Humidity	:	56 %

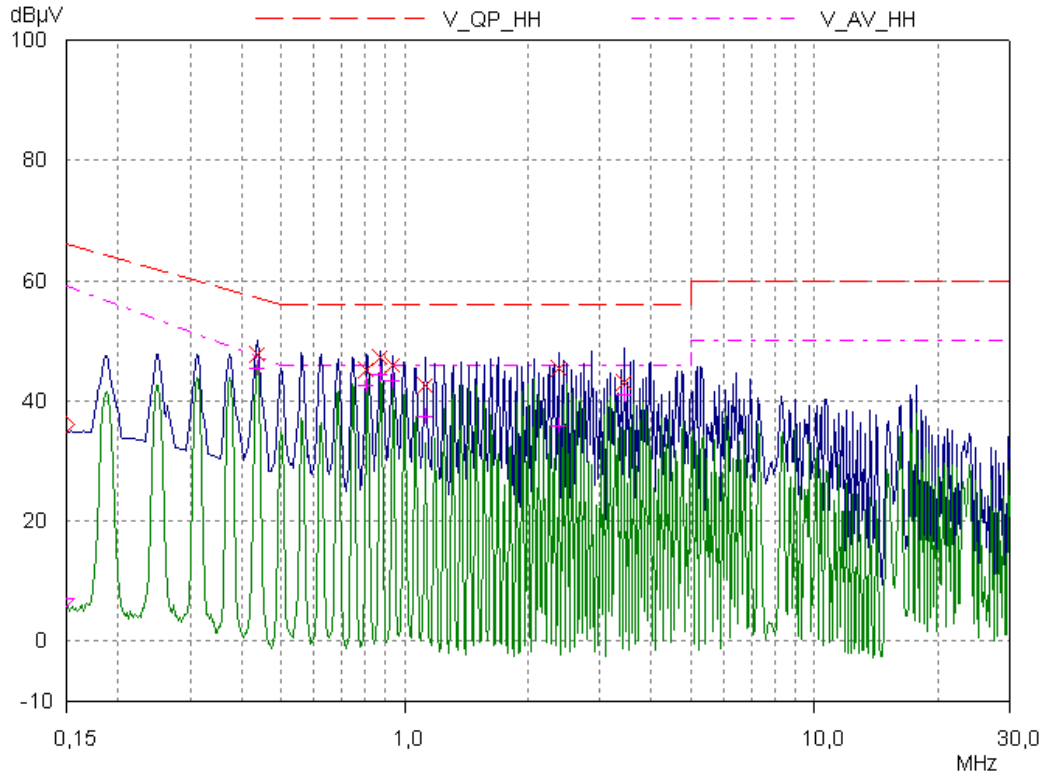
L line:



Test Data:

Frequency MHz	Quasi Pk dBµV	Limit dBµV	Delta dB	Phase /PE	Average dBµV	Limit dBµV	Delta dB
0,18608	50,90	64,21	13,31	N /gnd	42,93	56,67	13,74
0,24904	48,82	61,79	12,97	L1/gnd	41,69	53,53	11,84
0,31018	49,64	59,97	10,33	N /gnd	43,56	51,16	7,60
0,37271	46,00	58,44	12,44	N /gnd	38,65	49,17	10,52
0,49881	47,95	56,02	8,07	N /gnd	42,28	46,03	3,75
1,12171	44,61	56,00	11,39	L1/gnd	34,44	46,00	11,56
1,18146	44,42	56,00	11,58	L1/gnd	36,91	46,00	9,09
4,05637	39,85	56,00	16,15	N /gnd	36,09	46,00	9,91

N line:



Test Data:

Frequency MHz	Quasi Pk dBµV	Limit dBµV	Delta dB	Phase /PE	Average dBµV	Limit dBµV	Delta dB
0,4355	47,84	57,15	9,31	N /gnd	45,40	47,49	2,09
0,80857	45,22	56,00	10,78	N /gnd	42,45	46,00	3,55
0,87228	47,27	56,00	8,73	N /gnd	44,41	46,00	1,59
0,93353	45,98	56,00	10,02	L1/gnd	43,36	46,00	2,64
1,12171	42,58	56,00	13,42	N /gnd	37,46	46,00	8,54
2,36639	45,44	56,00	10,56	L1/gnd	35,72	46,00	10,28
3,43022	43,14	56,00	12,86	N /gnd	40,99	46,00	5,01

3.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty at mains terminal: 3.19dB (0.15-30MHz).
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

4 Continuous Disturbance Power

Test result: Pass

4.1 Disturbance Power Limits for the frequency range 30MHz to 300MHz

4.1.1 Limits for household and similar appliances

Frequency (MHz)	Quasi-peak dB(pW)	Average dB (pW)
30 to 300	45 to 55*	35 to 45*

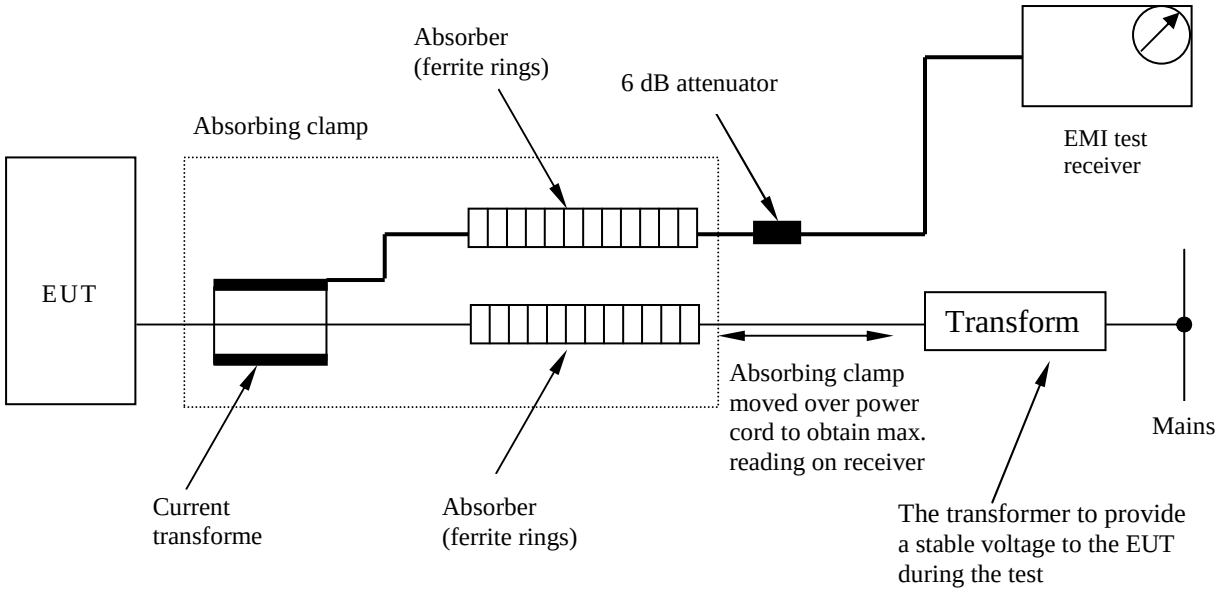
Note : 1. * means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

4.1.2 Limits for electric tools

Frequency (MHz)	Rated motor power not exceeding 700W dB(pW)		Rated motor power above 700W and not exceeding 1000W dB(pW)		Rated motor power above 1000W dB(pW)	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
30-300	45-55*	35-45*	49-59*	39-49*	55-65*	45-55*

Note : 1. * means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

4.2 Block Diagram of Test Setup

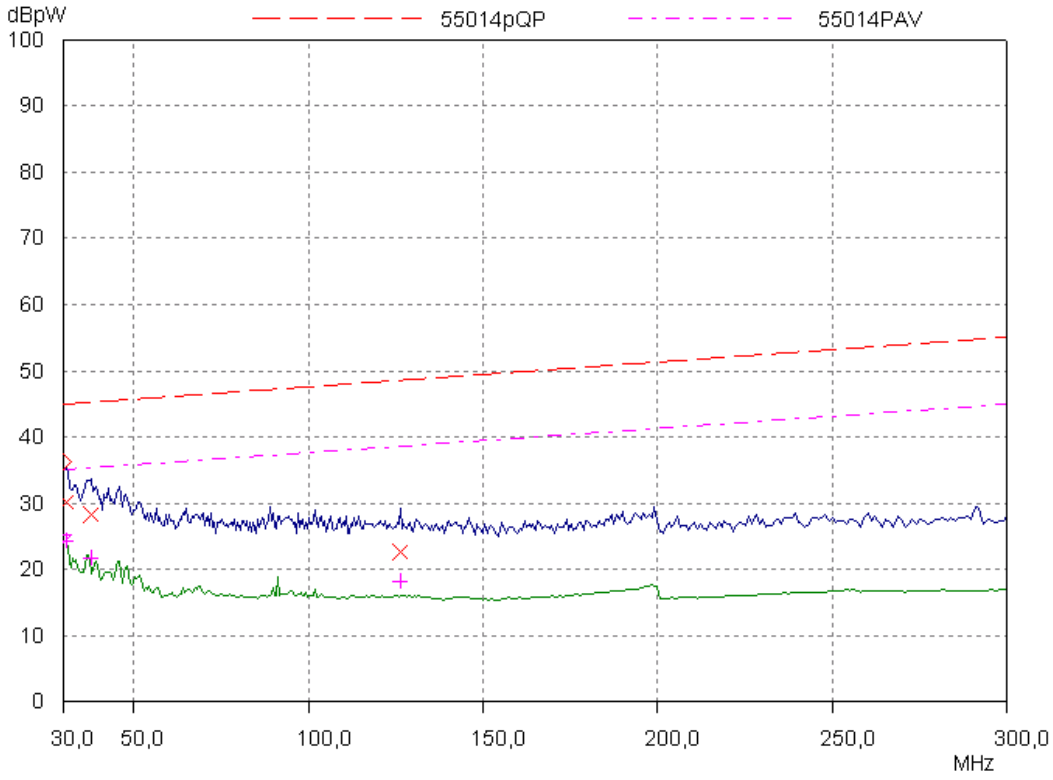


4.3 Test Setup and Test Procedure

Measurement was performed in shielded room.
Instruments used were follow EN 55014-1 clause 6.1.
Detailed test procedure and arrangement was follow EN 55014-1 clause 6.2 and 6.3.
Operation conditions of EUT were according to EN 55014-1 clause 7.
Frequency range 30MHz – 300MHz was checked and EMI receiver measurement bandwidth was set to 120kHz.

4.4 Test Protocol and Wave Form

Temperature	:	23°C
Relative Humidity	:	55%



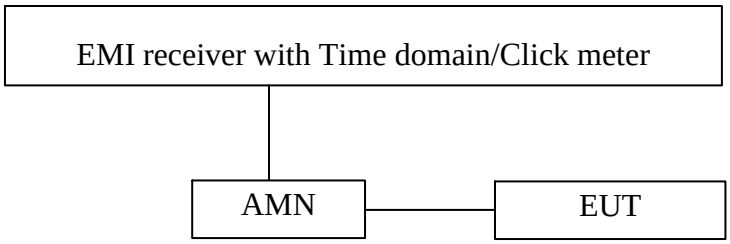
4.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of mains lead and auxiliary lead: ± 4.35dB
The measurement uncertainty is given with a confidence of 95%, k=2
The measurement uncertainty is traceable to internal procedure TI-036.

5 Discontinuous Disturbance

Test result: NA

5.1 Block Diagram of Test Setup



5.2 Test Set-up and Test Procedure

Measurement was performed in shielded room.
EMI receiver compliance to CISPR 16-1-1 with time domain function used during measurement.
EUT arrangement was follow EN 55014-1 clause 5.2.
Operation conditions were follow EN 55014-1 clause 7.
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 9 of EN 55014-1.

5.3 Test Protocol

Temperature : °C
Relative Humidity : %

Frequency (MHz)	0.15	0.5	1.4	30.0
Permitted limit for continuous interference (dBµV)	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 (dBµv)				
Counted clicks exceeding the limits				
Test result				
Any other descriptions:				

5.4 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of mains lead and auxiliary lead: ± 3.76dB
The measurement uncertainty is given with a confidence of 95%, k=2
The measurement uncertainty is traceable to internal procedure TI-036.

6 Radiated Disturbance

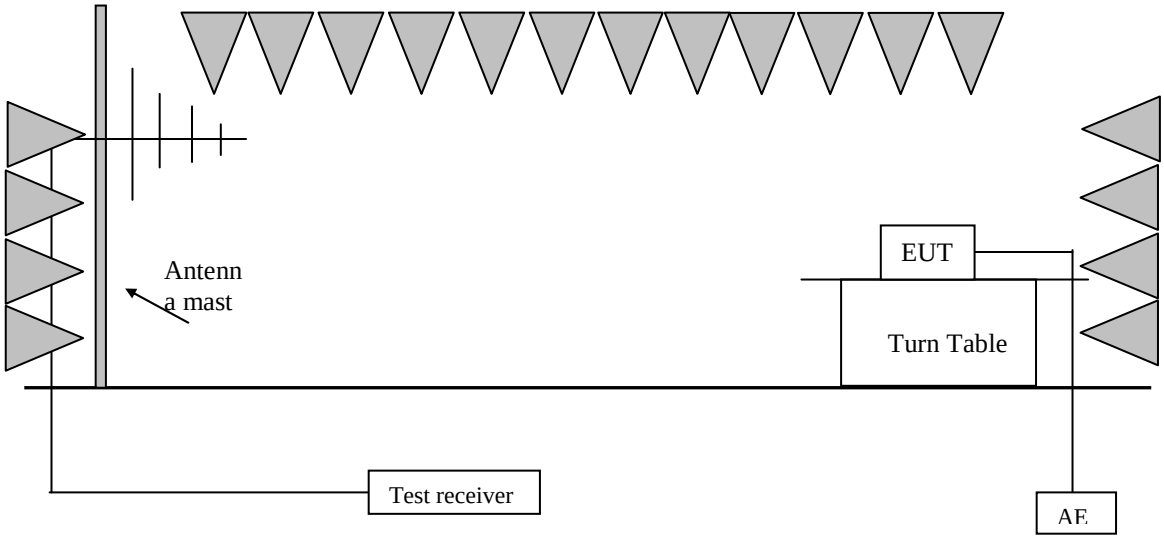
Test result: Pass

☐ As for in the disturbance power test all emission readings from the EUT are lower than the applicable limits(Table 2a) reduced by the margin(Table 2b) and the maximum clock frequency is less than 30MHz, the EUT is deemed to comply with the Radiated Emission requirement without test.

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

Frequency (MHz)	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 3m	Permitted limit in dBμV/m (Quasi-peak) of Measurement Distance 10M
30-230	40	30
230-1000	47	37
Note: for the measurement distance other than 3m and 10m, the limit is varied according to 20dB/10 decades.		

6.2 Block diagram and test set up

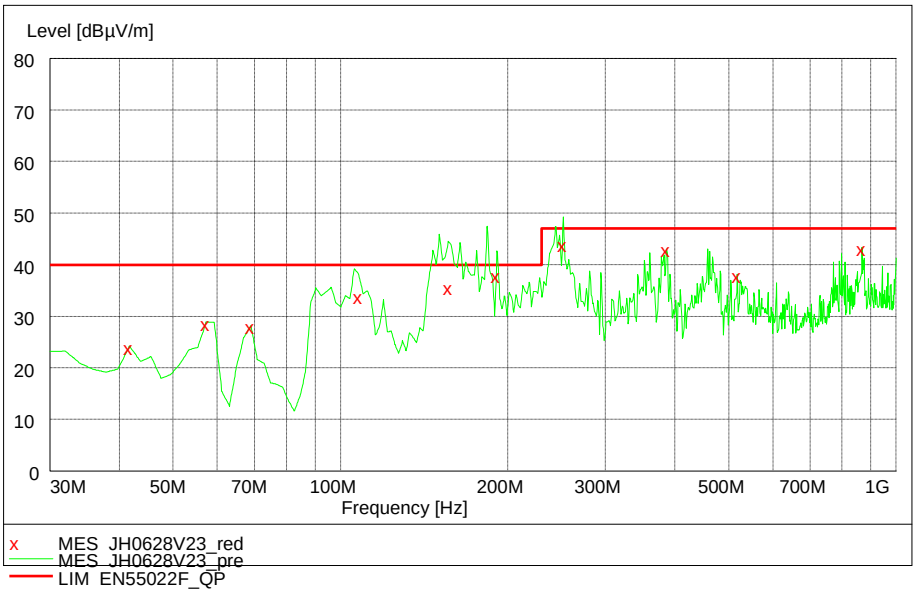


The measurement was applied in a 3 m semi-anechoic chamber.
Measurement was performed according to CISPR 22.
Setting of EUT is according to EN 55014-1 clause 7.3.6.2.3
The bandwidth setting on R&S Test Receiver ESI26 was 120kHz.
The frequency range from 30MHz to 1000MHz was checked.

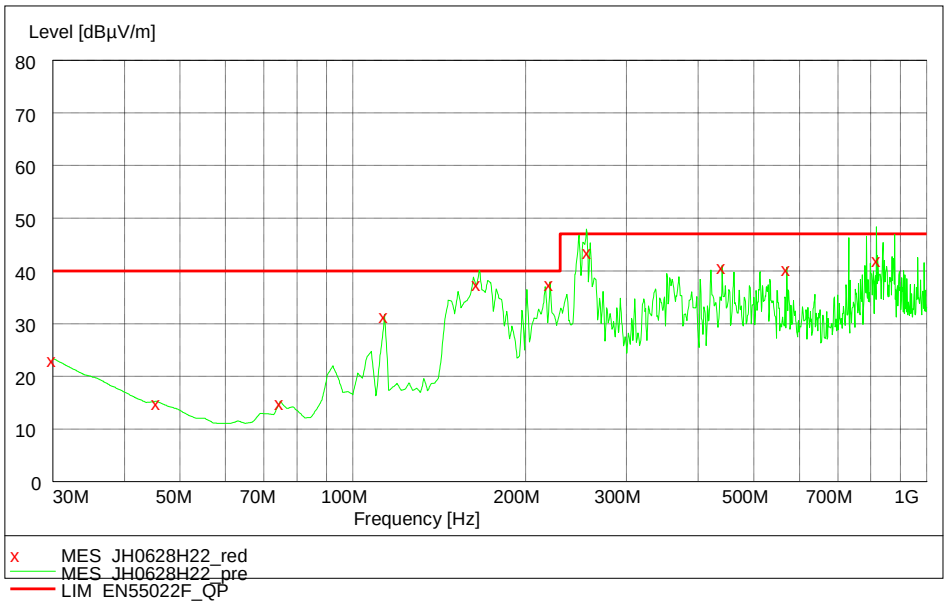
6.3 Test Protocol and Wave Form

Temperature : 23 °C
Relative Humidity : 55 %

Running mode:
Vertical:



Running mode:
Horizontal:



Test data:

Detector	Frequency (MHz)	Emission level (dBμV/m)	Limits (dBμV/m)	Margin (dBμV/m)	Polarization
Quasi-peak	41.66	*	40.00	*	V
	57.21	*	40.00	*	V
	150.52	38.19	40.00	1.81	V
	183.56	36.30	40.00	3.70	V
	251.60	45.60	47.00	1.40	V
	861.44	*	47.00	*	V
	113.58	31.70	40.00	8.30	H
	166.07	38.02	40.00	1.98	H
	255.49	45.08	47.00	1.92	H
	817.24	43.11	47.00	3.89	H
	414.88	*	47.00	*	H
	930.02	*	47.00	*	H
Note: * means margin >20dB.					

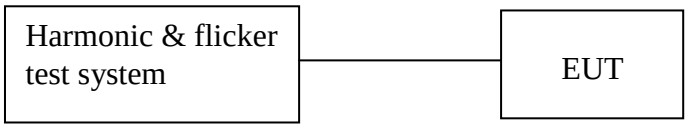
6.4 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of radiated emission is: ± 4.90dB(30-1000MHz)
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

7 Harmonics

Test result: **Pass**

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 analyzer 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

☒ 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 an LED lamp, and the active input power is less than 5W. Therefore, no limits are defined according to EN61000-3-2 on the EUT.

☐ The lighting EUT has active power < 25 W, and cannot be classified as discharge lighting equipments after control method checking, therefore no limit is required according to EN 61000-3-2. They are deemed to comply with the standard and are not required to be tested according to CTL decision sheet DSH617.

7.3 Test Protocol

Temperature	:	°C
Relative Humidity	:	%

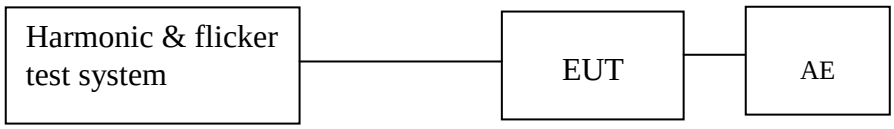
7.4 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of harmonic test is: ± 3.90 %
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

8 Voltage Fluctuations-Flicker

Test result: Pass

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 lighting stimulus whose luminance or spectral distribution fluctuates with time.

Pst: Short-term flicker indicator The flicker severity evaluated over a short period (in minutes); Pst=1 is the conventional threshold of irritability

Plt: long-term flicker indicator; the flicker severity evaluated over a long period (a few hours)Using successive Pst values.

dc: the relative steady-state voltage change

dmax: the maximum relative voltage change

d(t): the value during a voltage change

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

-- “Plt” shall not exceed 0.65.
-- “Pst” shall not exceed 1.0.
-- “dc” shall not exceed 3.3%.
-- “d(t)” shall not exceed 3.3% for more than 500ms.
-- “dmax” shall not exceed:

☐ 4% without additional conditions,
☐ 6% switched manually or automatically more than twice per day
☐ 7% attended whilst in use or switched automatically for no more than twice per day or attended while in use
☐ For manual switch, dmax is measured in accordance with Annex B of standard, average dmax is calculated from 24 times measurement.
☒According to EN 61000-3-3 clause 6.1 & A.2 (See paragraph below), the EUT is either unlikely to produce significant voltage fluctuations/flicker or no limit and test were required by technical analysis and sample evaluation on the product.

“For voltage changes caused by manual switching, equipment is deemed to comply without further testing if the maximum r.m.s. input current (including inrush current) evaluated over each 10 ms half-period between zero-crossings does not exceed 20 A, and the supply current after inrush is within a variation band of 1,5 A.”

Temperature	:	°C
Relative Humidity	:	%

8.4 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of voltage fluctuation and flicker is: ± 10.34%
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

Immunity Test

Performance criteria

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report, based on the following criteria.

Performance 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.

Performance 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.

Performance 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.

Basic EMC standard for immunity test

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

IEC61000-4-4:2012: Electromagnetic Compatibility (EMC) – Part 4- 4: testing and measurement techniques – electric fast transient/burst immunity test

IEC 61000-4-5:2014: 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

IEC61000-4-11:2004: Electromagnetic Compatibility (EMC) – Part 4- 11: testing and measurement techniques – section 11: voltage dips, short interruption and voltage variations immunity test

Categories of apparatus

☒ Category II (Shall fulfill the tests: ESD, EFT, Inject current, Surge, Dips)

☒ Category III (Shall fulfill the tests: ESD, EM fields*)

☐ Category IV (Shall fulfill the tests: ESD, EFT, Inject current, Surge, Dips, EM fields)

Note: * For toys, the radio frequency electromagnetic fields test is only applicable for ride on toys.

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

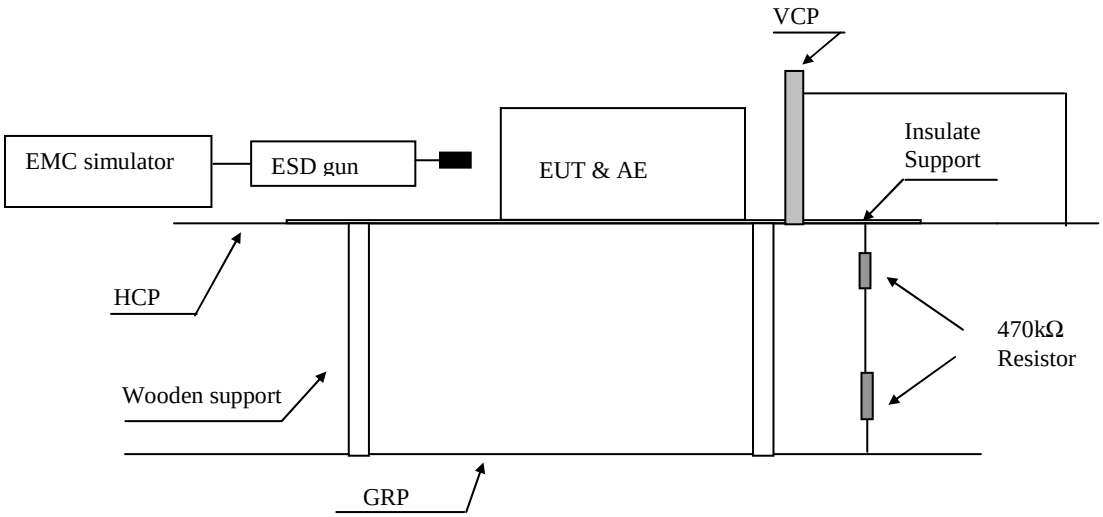
Notes: 1."X" is an open level. The level has to be specified in the dedicated equipment specification. If higher voltages than those shown are specified, special test equipment may be needed.
2. The gray rows were the selected test level.

9.1.2 Performance Criterion

Performance Criterion B

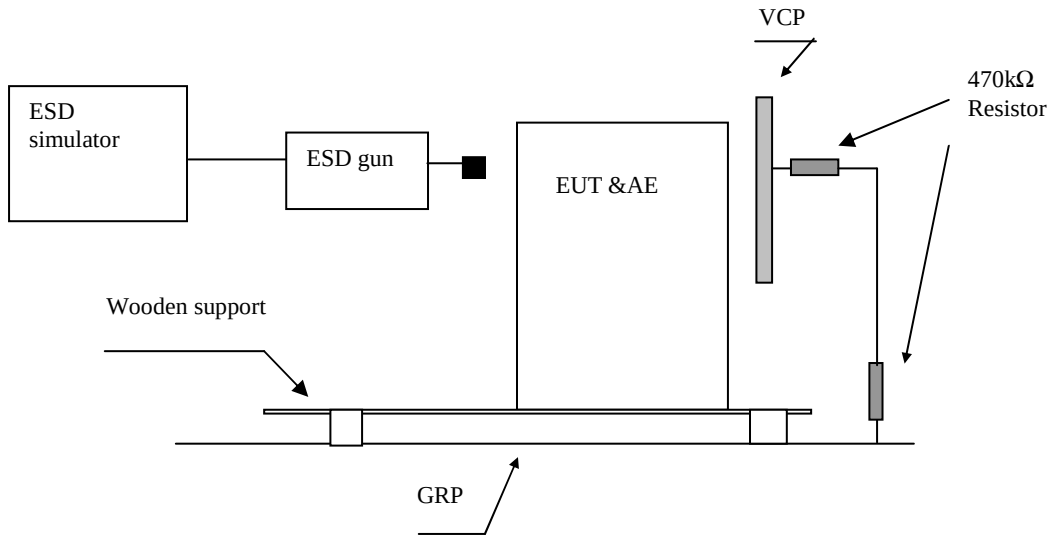
9.2 Block Diagram of Test Setup

☐ 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 IEC61000-4-2 clause 7.1.

9.4 Test Protocol

Temperature : 24 °C
Relative Humidity : 55 %
Atmospheric Pressure : 101 kPa

Direct discharges were applied at the following selected points:

Test point	Test level [kV]	Air/ Contact	Polarity (+/-)	Pass/ Fail	Comment
A	2/4	Contact	+/-	Pass	All touchable screws of enclosure
B	2/4	Contact	+/-	Pass	Accessible metal parts of the EUT
C	2/4/8	Air	+/-	Pass	Air gap of the switch, button
D	2/4/8	Air	+/-	Pass	The air in-taking opening
E	2/4/8	Air	+/-	Pass	Slots around the EUT

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

☐ For table top equipment

Point	Description	Point	Result
HCP f	0,1m from the front of the EUT	Edge of centre on HCP	-
HCP b	0,1m from the back of the EUT	Edge of centre on HCP	-
HCP r	0,1m from the right side of the EUT	Edge of centre on HCP	-
HCP l	0,1m from the left side of the EUT	Edge of centre on HCP	-
VCP f	0,1m from the front of the EUT	Edge of centre on VCP	-
VCP b	0,1m from the back of the EUT	Edge of centre on VCP	-
VCP r	0,1m from the right of the EUT	Edge of centre on VCP	-
VCP l	0,1m from the left of the EUT	Edge of centre on VCP	-

☒ For floor standing equipment

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

Observation: All the functions were operated as normal after the test.
Conclusion: The EUT can meet the requirements of Performance B.

9.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of ESD test is: ± 6.65 %
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

10 Radio frequency electromagnetic fields

Test result: Pass

10.1 Severity Level and Performance Criterion

10.1.1 Test level

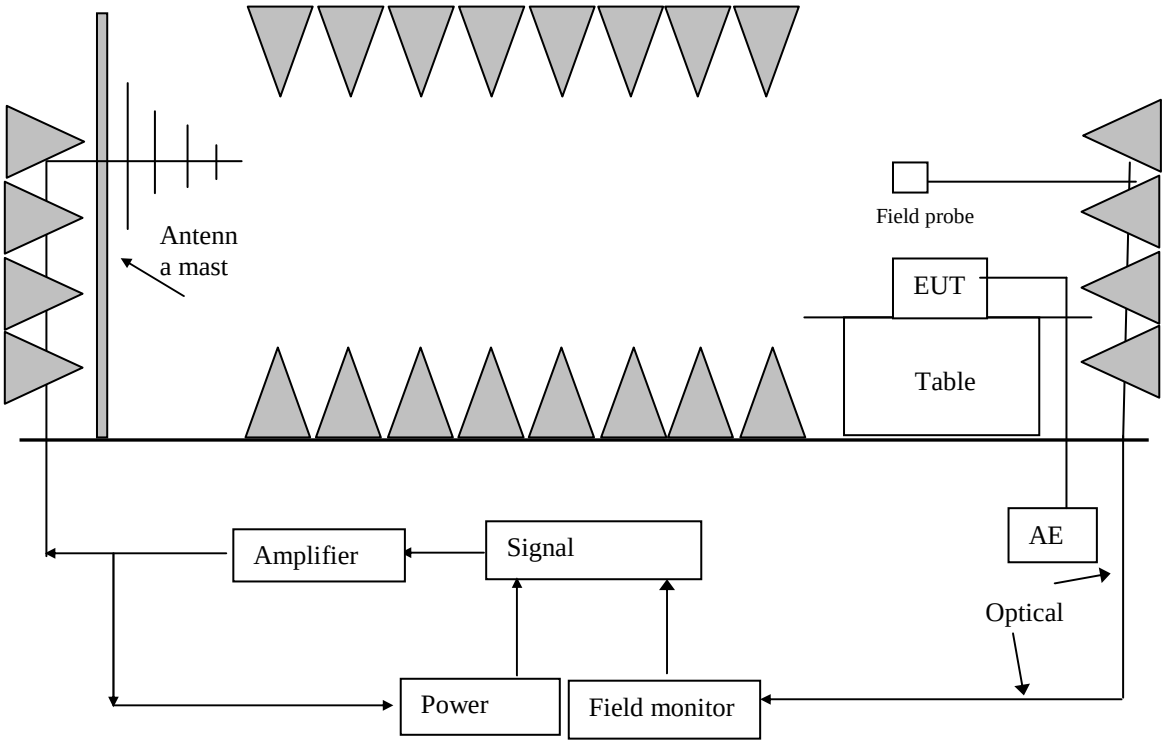
Level	Test field strength V/m
1	1
2	3
3	10
X	Special

Note: 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 IEC61000-4-3 clause 7.

10.4 Test Protocol

Temperature : 24 °C
Relative Humidity : 55 %

Test no.	Frequency (MHz)	Polarization	Test level (V/m)	Modulation	Exposed location	Result
1	80-1000	H & V	3	1kHz, 80%, SW, AM, 1% step size	Front	Pass
2	80-1000	H & V	3	1kHz, 80%, SW, AM, 1% step size	Back	Pass
3	80-1000	H & V	3	1kHz, 80%, SW, AM, 1% step size	Right	Pass
4	80-1000	H & V	3	1kHz, 80%, SW, AM, 1% step size	Left	Pass

Observation: All the functions were operated as normal during and after the test.
Conclusion: The EUT can meet the requirements of Performance A.

10.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of radiated susceptibility test is: ± 2.38dB
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

11 Fast transients

Test result: Pass

11.1 Severity Level and Performance Criterion

11.1.1 Test level

Open circuit output test voltage (+/-10%) and repetition rate of the impulses (+/- 20%)				
Level	On power supply ports PE		On I/O (input & output) signal, data and control 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	2.5	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.				

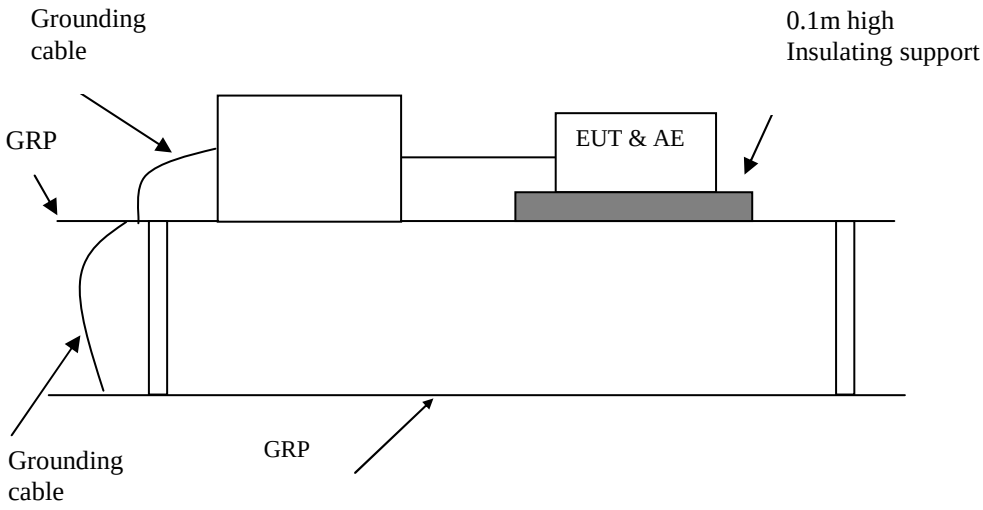
11.1.2 Performance Criterion

Performance Criterion B

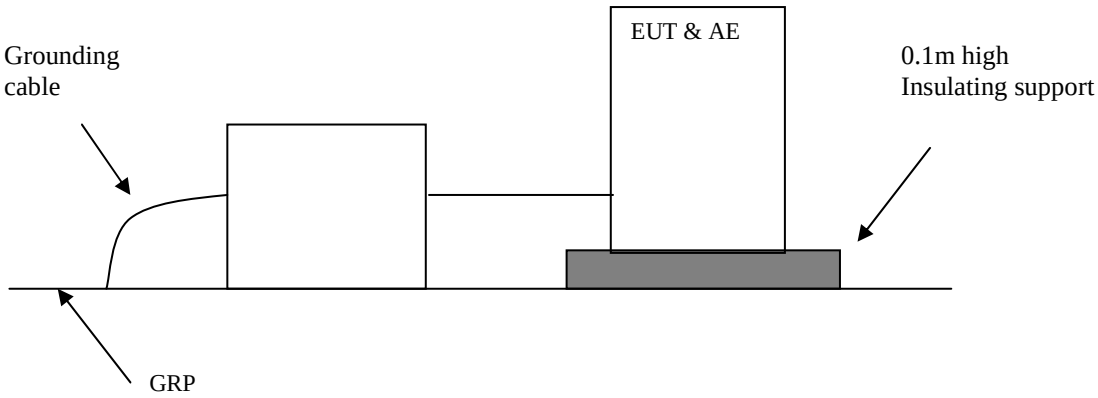
11.2 Block Diagram of Test Setup

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

☐ For table-top equipment

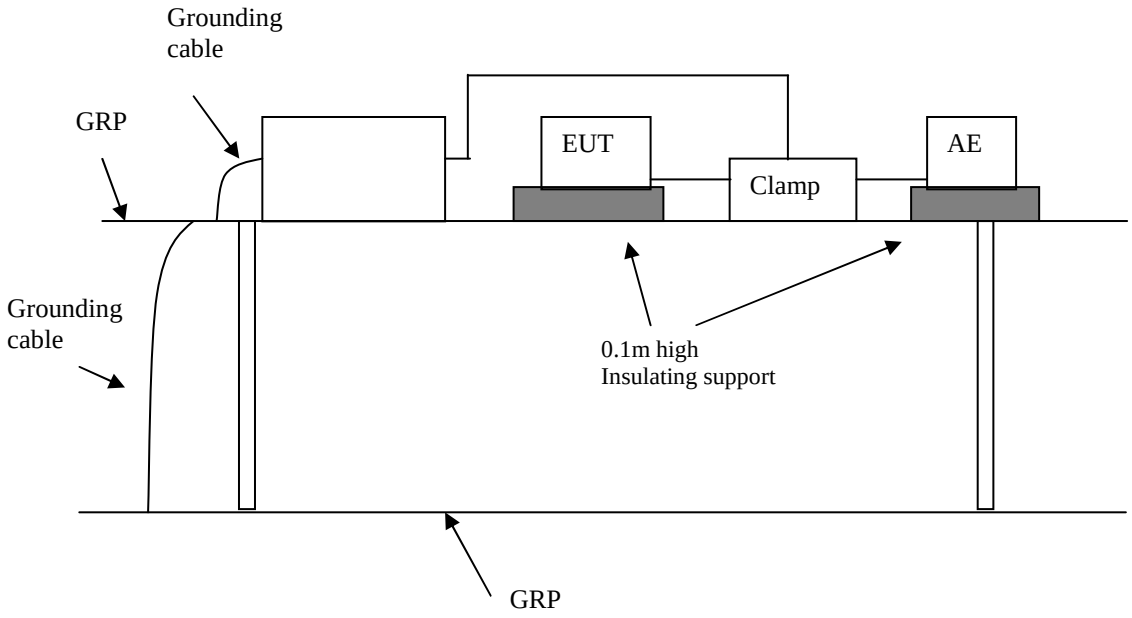


☒ For floor standing equipment

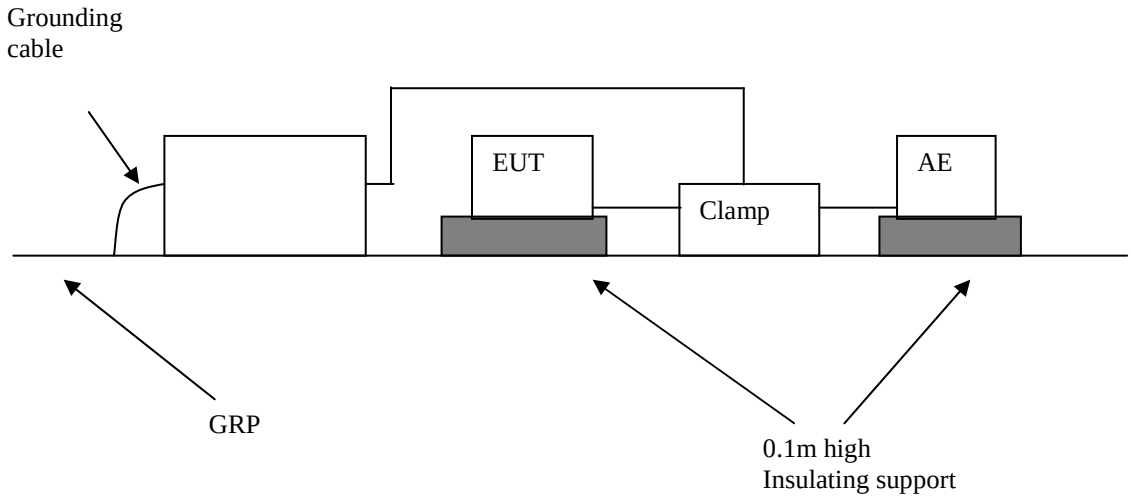


11.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

☐ 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 IEC61000-4-4 clause 7.2.

11.4 Test Protocol

Temperature : 24 °C
Relative Humidity : 55 %

Test No. #	Level [kV]	Polarity +/-	Line for test	Pass/ Fail
1	1	+/-	Power Line	Pass
2	0.5	+/-	Signal Line	NA

Observation: All the functions were operated as normal after the test.
Conclusion: The EUT can meet the requirements of Performance B.

11.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of EFT test at main terminal is: ± 11.57%
Measurement uncertainty of EFT test at signal line is: ± 11.62%
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

12 Surges

Test result: Pass

12.1 Severity Level and Performance Criterion

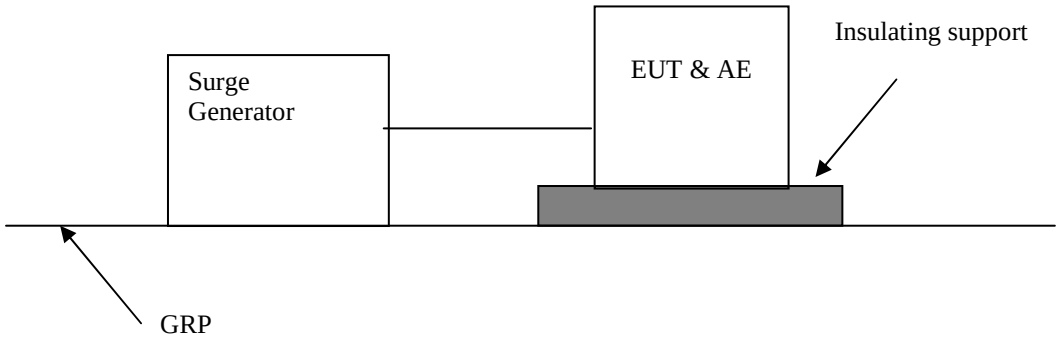
12.1.1 Test level

Level	Open-sircuit test voltage +/-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 IEC61000-4-5 clause 7.

12.4 Test Protocol

Temperature : 24 °C
Relative Humidity : 55 %

Test No. #	Level [kV]	Polarity +/-	Line for test	Pass/ Fail
1	0.5/1	+/-	a.c. mains (line to line)	Pass
2	0.5/1/2	+/-	a.c. mains (line to earth)	NA
3	0.5	+/-	Signal line	NA

Observation: All the functions were operated as normal after the test.
Conclusion: The EUT can meet the requirements of Performance B.

12.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of surge test at main terminal is: ± 11.57%
Measurement uncertainty of surge test at signal line is: ± 11.89%
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

13 Injected current

Test result: Pass

13.1 Severity Level and Performance Criterion

13.1.1 Test level

Frequency range 150kHz – 80MHz		
Level	Voltage level (e.m.f.) U_0 [dB(uV)]	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.		

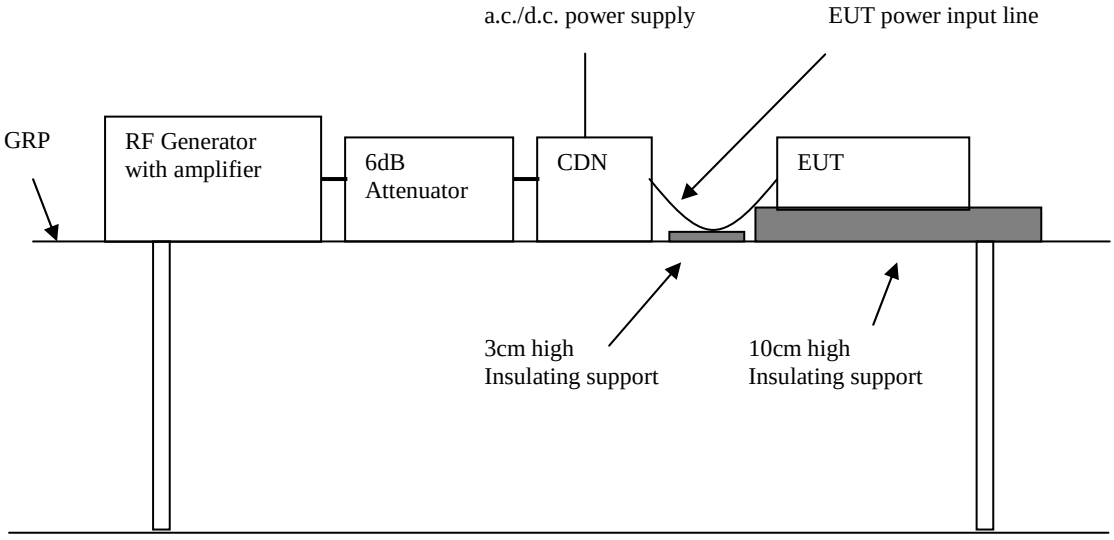
13.1.2 Performance Criterion

Performance Criterion A

13.2 Block Diagram of Test Setup

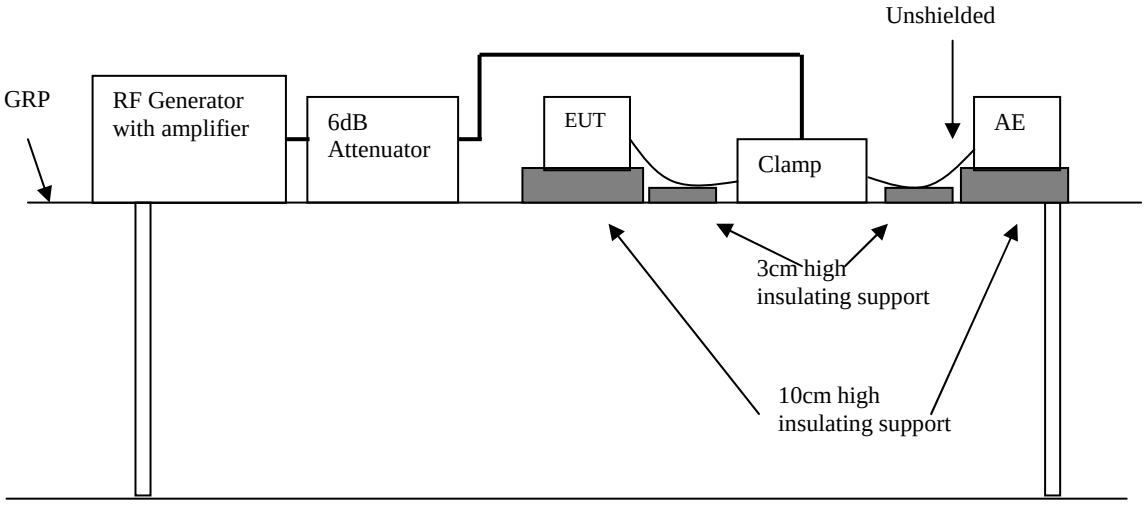
13.2.1 Block Diagram for a.c./d.c input power line

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

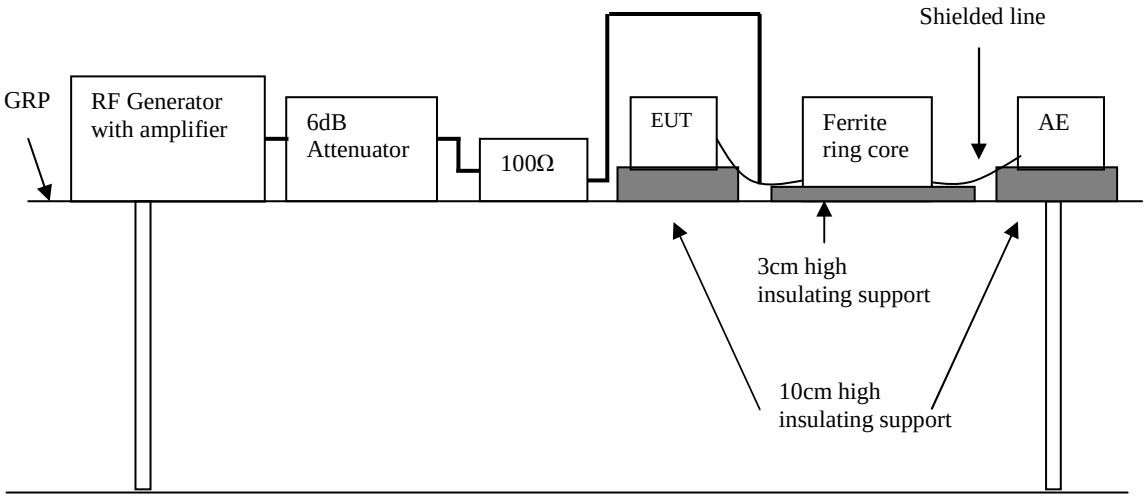


13.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

☐ 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 IEC61000-4-6 clause 7.

13.4 Test Protocol

Temperature : 24 °C
Relative Humidity : 56 %

Test No.	Frequency (MHz)	Level V (r.m.s.)	Modulation	Injected point	Result
1	0.15~80	3	1kHz, 80%, SW, AM, 1% step size	a.c. Mains	Pass
2	0.15~80	3	1kHz, 80%, SW, AM, 1% step size	d.c. power ports	NA
3	0.15~80	3	1kHz, 80%, SW, AM, 1% step size	signal lines and control lines	NA

Observation: All the functions were operated as normal during and after the test.
Conclusion: The EUT can meet the requirements of Performance A.

13.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of injected current test at main terminal is ± 1.88dB.
Measurement uncertainty of injected current test at unshielded signal line is ± 3.41dB.
Measurement uncertainty of injected current test at shielded signal line is ± 3.30dB.
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

14 Voltage dips and interruption

Test result: Pass

14.1 Severity Level and Performance Criterion

14.1.1 Test level

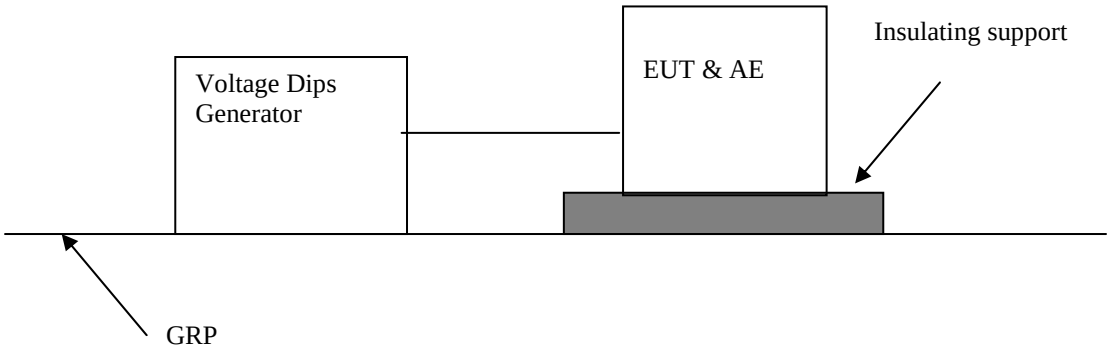
Test level (% $U_{T)}$	Voltage dip and short interruptions (% $U_{T)}$	Duration (in period)	
		50Hz	60Hz
0	100	0.5 cycle	0.5 cycle
40	60	10 cycles	12 cycles
70	30	25 cycles	30 cycles

Notes:
1. Voltage change shall occur at zero crossing.
2. U_T is the rated voltage of the equipment under test.
2. The gray rows are selected test level.

14.1.2 Performance Criterion

Performance **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 IEC61000-4-11 clause 7.
The test method and equipment was specified by IEC61000-4-11 with additions and modifications by EN61547 clause 5.8.

14.4 Test Protocol

Temperature : 24 °C
Relative Humidity : 55 %

Test no.	Test level (% $U_{T)}$	Voltage dip and short interruptions (% $U_{T)}$	Duration (in periods)	Result	Comment
1	70	30	25/30	Pass	-
2	40	60	10/12	Pass	-
3	0	100	0.5	Pass	-

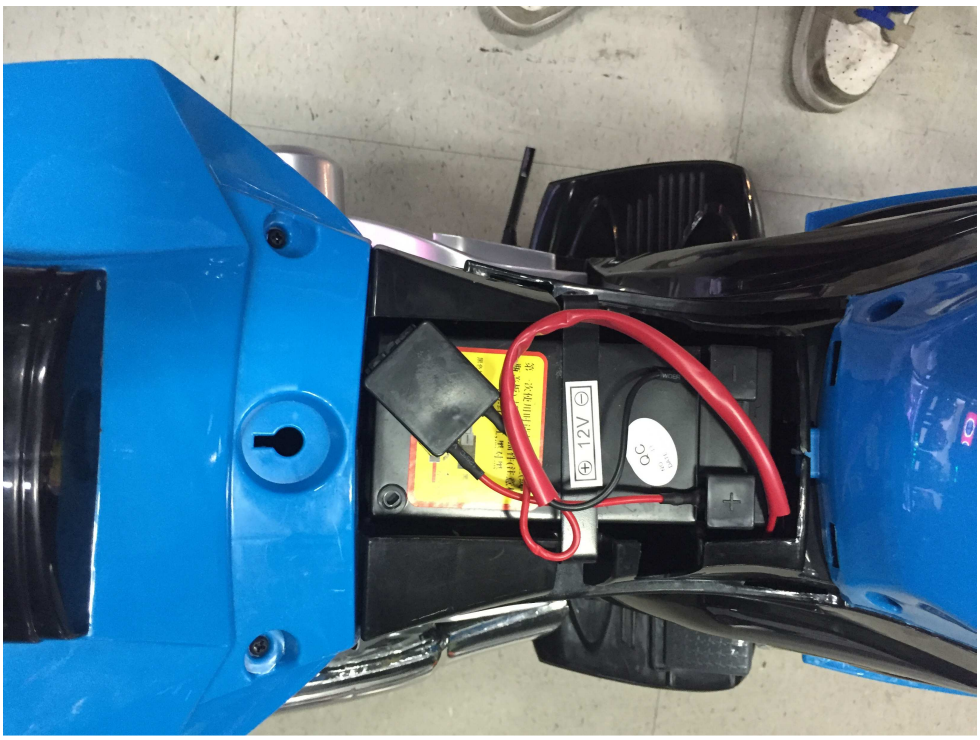
Observation: At test level of 70%, the battery charger worked unsteadily. Once the interference is removed, it recovered its normal mode at once.

Conclusion: The EUT can meet the requirements of the standard.

14.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of voltage dips and interruption test is: ± 6.05%
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

Appendix I: Photograph of equipment under test


12V


Battery Charger
Model :LK-D120100
Input :230-240VAC 50Hz 25W
Output : 12VDC 1000mA
130°C
For indoor use only!
Changzhou Linke Electrical Equipment Co.,Ltd.


CAUTION