EMC TEST REPORT

No. 171100654SHA-001

Applicant	:	ZHE JIANG JIAJIA RIDE-ON CO., LTD Xincang industrial Zone Pinghu City, Zhejiang Province, China
Manufacturer	:	ZHE JIANG JIAJIA RIDE-ON CO., LTD Xincang industrial Zone Pinghu City, Zhejiang Province, China
Product Name	:	Children's Car
Type/Model	:	JT5188,AD17729(EU),AD17730(UK), 925000(EU),925001(UK)
TEST RESULT	**:**	**PASS**

SUMMARY

The equipment comply with the requirements according to the following standards:

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: Limits for harmonic current emissions(equipment input current <=16A per phase)

EN61000-3-3:2013: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current <=16A

Date of issue: December 13, 2017

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1.GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product Name	:	Children's Car
Description of EUT	:	Tested with the battery charger: HKI-D06-1000. The worst data has been listed as representative.
Model number	:	JT5188,AD17729(EU),AD17730(UK), 925000(EU),925001(UK)
Rating	:	Battery charger: Input: 230V~, 50Hz, Output: 6VDC, 1000mA
Mains lead	:	1m
Data cable	:	none
EUT type	:	☐ Table top ☒ Floor standing
☐ EUT is toy, defined as	:	☐ Category A ☐ Category B ☐ Category C ☐ Category D ☐ Category E
Sample received date	:	2017-11-08
Sample Identification No.	:	0171107-63
Date of test	:	2017-11-08

1.2 Description of Client

Applicant	:	ZHE JIANG JIAJIA RIDE-ON CO., LTD Xincang industrial Zone Pinghu City, Zhejiang Province, China
Manufacturer	:	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
Address	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone	86 21 61278200
Telefax	86 21 54262353

Subcontractor :

☐

Name	Shanghai Institute of Measurement Technology
Address	716 Yishan Road, Shanghai 200233, P.R. China
Telephone	86 21 64700066

2.TEST SPECIFICATIONS

2.1 Standards

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: Limits for harmonic current emissions(equipment input current <=16A per phase)

EN 61000-3-3: 2013: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current <=16A

2.2 Mode of operation during the test / Test peripherals used

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

Conducted Emission ./Disturbance Power/Tri-loop Test/CDN method					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☑	Test Receiver	R&S	ESCS 30	EC 2107	2018-09-12
☑	A.M.N.	R&S	ESH2-Z5	EC 3119	2017-12-01
☑	Absorbing clamp	R&S	MDS 21	EC 2108	2018-05-12
Discontinuous Disturbance Voltage					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Click meter	AFJ	DDA55	EC 5320	2018-01-17
☐	A.M.N.	AFJ	LS16C	EC 5220-1	2017-12-01
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☑	Test Receiver	R&S	ESIB 26	EC 3045	2018-09-12
☑	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2018-05-30
Harmonics / Flicker / Low-frequency immunity test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Harmonic-flicker	CI	5001ix-PACS-1	EC 2110	2017-08-23
☐	Three phase Harmonic-flicker system	EM TEST	PFS 503N	EC 5383	2017-12-29
		EM TEST	DPA 503N	EC 5383-1	2018-09-10
ESD					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☑	ESD generator	TESEQ	NSG 437	EC 4792-4	2018-03-06
EFT/Surge Voltage Dips					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☑	Conduct immunity	EM TEST	UCS 500M6B	EC 2958	2018-04-06

	system				
☑	Automatic transformer	EM TEST	MV2616	EC 2957	2018-09-03
Conducted Immunity					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☑	Signal generator	R&S	SML 01	EC 2338	2018-09-10
☑	Power amplifier	AR	75A250	EC 3043-1	2018-07-12
☑	Attenuator	EM TEST	ATT6/75	EC 3043-3	2018-02-08
☑	CDN	Schaffner	CDN M216	EC 2113-2	2018-07-27
Radiated Immunity					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☑	Signal generator	R&S	SMR 20	EC 3044-1	2018-02-09
☑	Power amplifier	AR	250W1000B	EC 5818-2	2018-04-19
☑	Power amplifier	BONN	BLMA1060-100	EC 5818-4	2018-04-19
☑	Log-period antenna	AR	AT 1080	EC 3044-7	2018-08-15
☑	Field meter	AR	FL17000	EC 5818-1	2018-05-19
☑	Power sensor	Keysight	N1914A	EC 5818-3	2018-04-19
Tet Site					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☑	Shielded room	Zhongyu	-	EC 2838	2018-01-08
☑	Shielded room	Zhongyu	-	EC 2839	2018-01-08
☑	Semi-anechoic chamber	Albatross project	-	EC 3048	2018-03-09
☑	Fully-anechoic chamber	Albatross project	-	EC 3047	2018-03-09
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date

☑	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 2323	2018-06-14
☑	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3324	2018-04-09
☑	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3325	2018-03-23
☑	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3326	2018-03-29
☑	Pressure meter	YM3	Shanghai Mengde	EC 3320	2018-06-28

2.4.Test Summary

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.

TEST ITEM	RESULT	NOTE
Mains terminal continuous disturbance voltage *	Pass	
Mains terminal discontinuous disturbance voltage/click	NA	
Continuous disturbance power*	Pass	
Radiated emission	Pass	
Harmonics	Pass	
Voltage fluctuation-Flicker	Pass	
Electrostatic Discharge (ESD)	Pass	
Radiated field susceptibility	Pass	
Electric Fast Transient /Burst (EFT/B)	Pass	
Surge	Pass	
Injected current	Pass	
Voltage dips and interruption	Pass	

Notes: 1: NA =Not Applicable

* : According to clause 7.1.4 of the standard EN55014-1, a test at 160 kHz (conducted emission) and at 50 MHz (disturbance power) was 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.

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	Rated motor power not exceeding 700W		Rated motor power above 700W and not exceeding 1000W		Rated motor power above 1000W	
(MHz)	dB(μV) Quasi-Peak	Average	dB(μV) Quasi-Peak	Average	dB(μV) 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 value decreasing linearly with the logarithm of the frequency.
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.

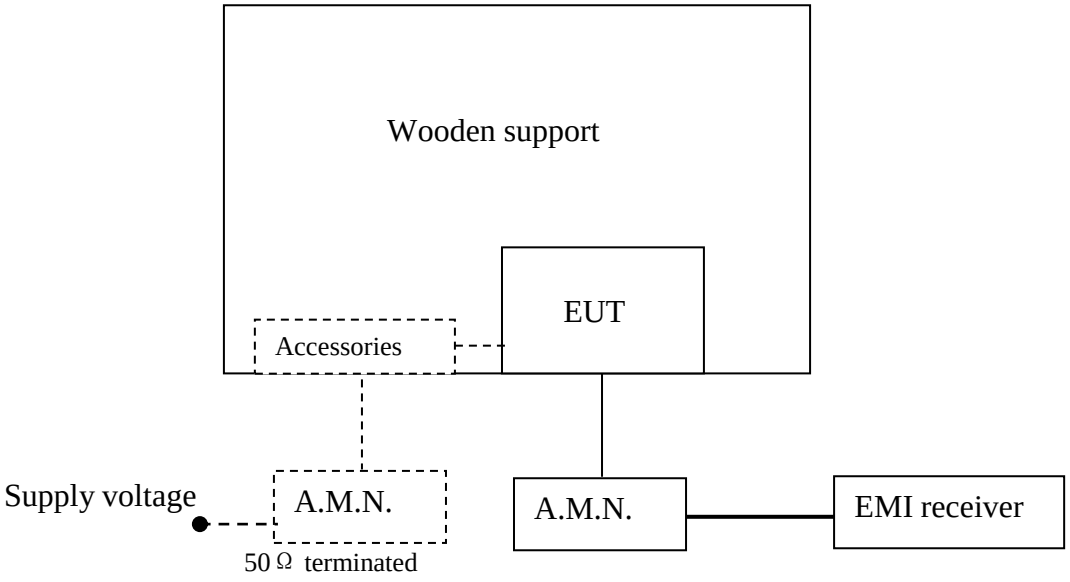
3.1.2 Limits for household appliances and similar devices at additional terminals

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: 1. 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 Test setup

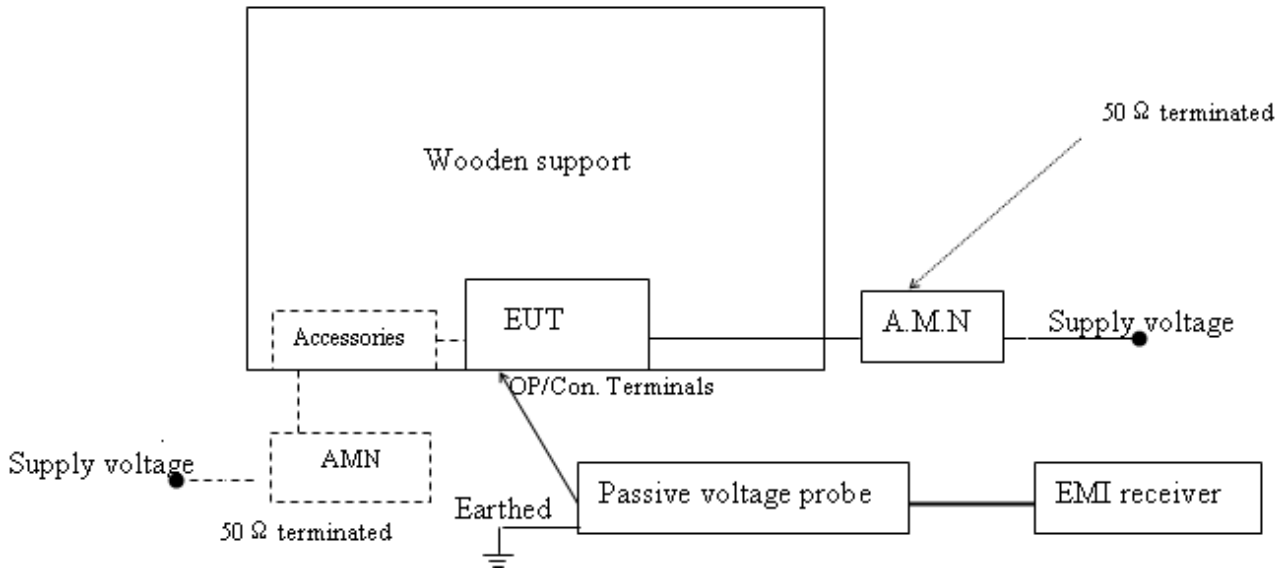
☒ At mains terminal



☐ 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 conditions 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.

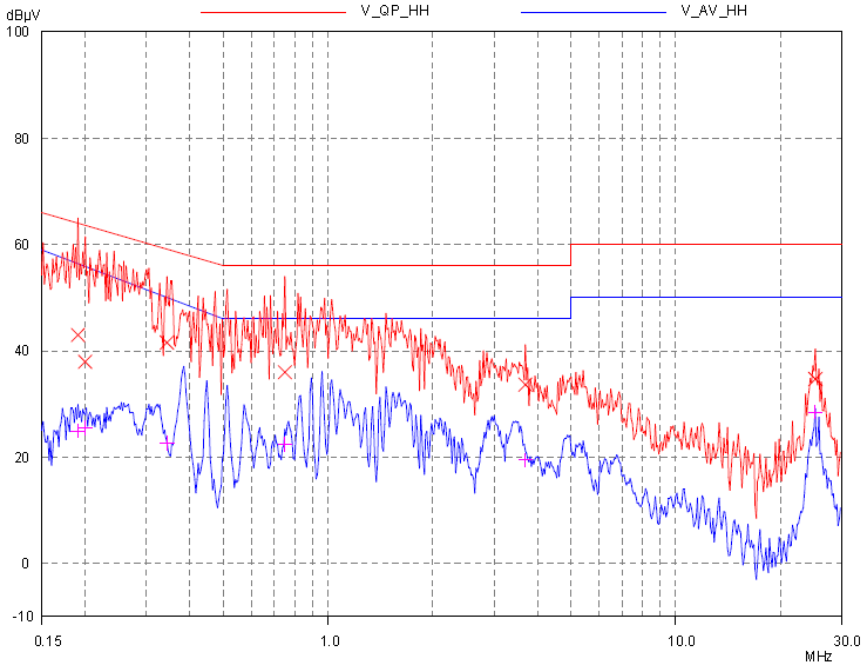
3.4 Test Protocol and Wave Form

Temperature : 24 °C

Relative Humidity: 42 %

At mains terminal: Pass

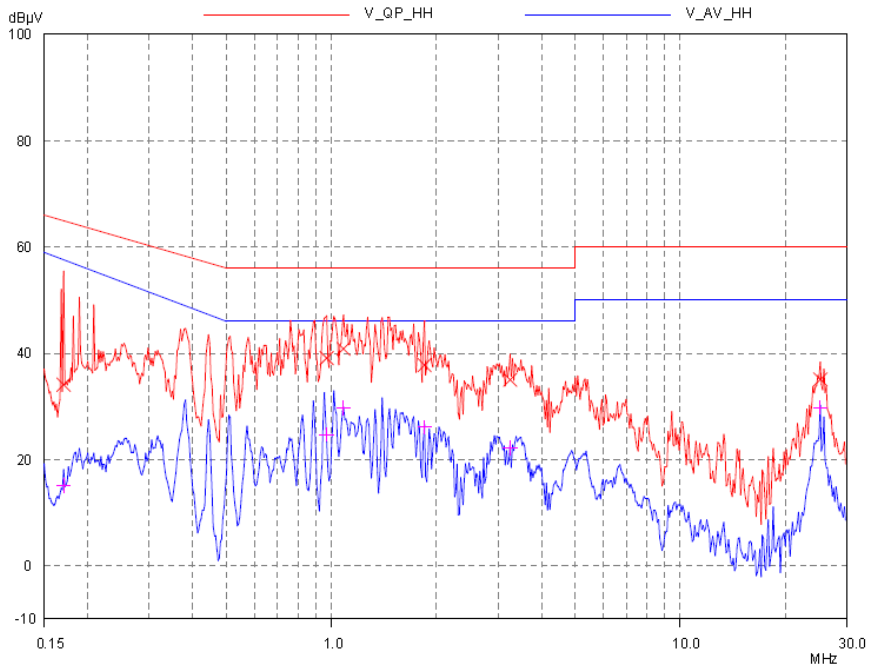
L line:



Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.1905	42.96	64.01	21.05
0.19983	37.93	63.62	25.69
0.34354	41.54	59.12	17.58
0.75009	35.97	56.00	20.03
3.69168	33.64	56.00	22.36
25.18914	34.70	60.00	25.30

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.1905	24.93	56.42	31.49
0.19983	25.55	55.90	30.35
0.34354	22.61	50.05	27.44
0.75009	22.37	46.00	23.63
3.69168	19.45	46.00	26.55
25.18914	28.46	50.00	21.54

N line:



Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.17039	34.08	64.94	30.86
0.96795	39.10	56.00	16.90
1.08218	40.84	56.00	15.16
1.84569	37.77	56.00	18.23
3.2498	34.98	56.00	21.02
25.18914	35.07	60.00	24.93

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.17039	15.05	57.62	42.57
0.96795	24.72	46.00	21.28
1.08218	29.67	46.00	16.33
1.84569	26.08	46.00	19.92
3.2498	22.16	46.00	23.84
25.18914	29.77	50.00	20.23

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
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*

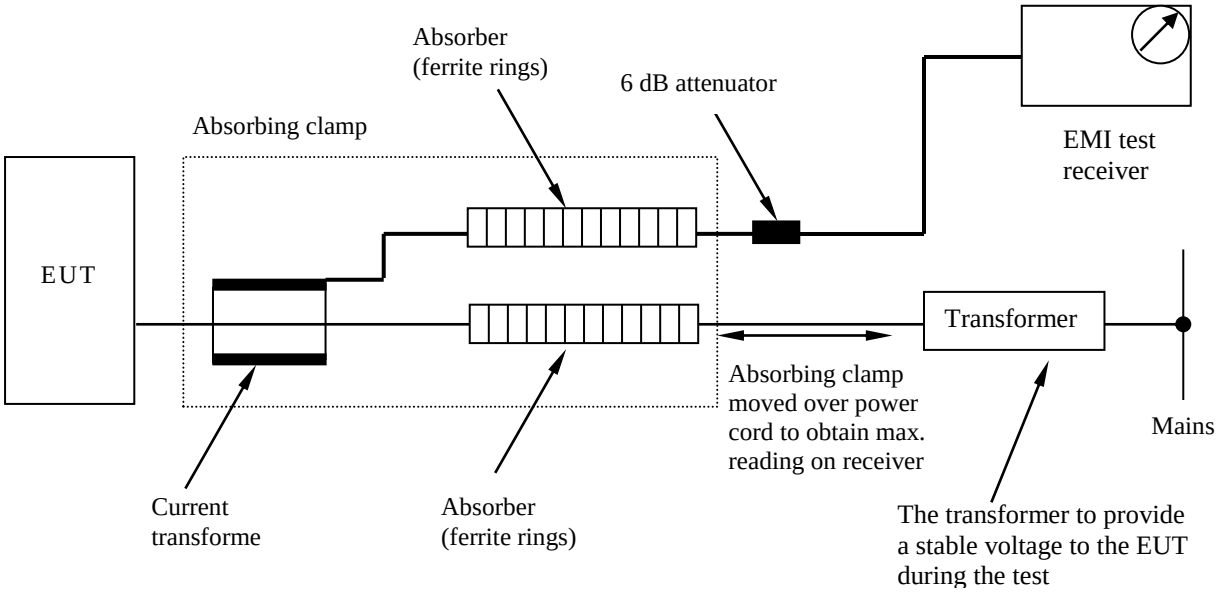
Note: 1. * means the limit increasing linearly with the frequency.
2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement with the receiver with average detector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

4.1.2 Limits for electric tools

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

Notes: 1. * means the limit increasing linearly with the frequency.
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 with the receiver with average detector need not be carried out.

4.2 Block Diagram of Test Setup



4.3 Test Setup and Test Procedure

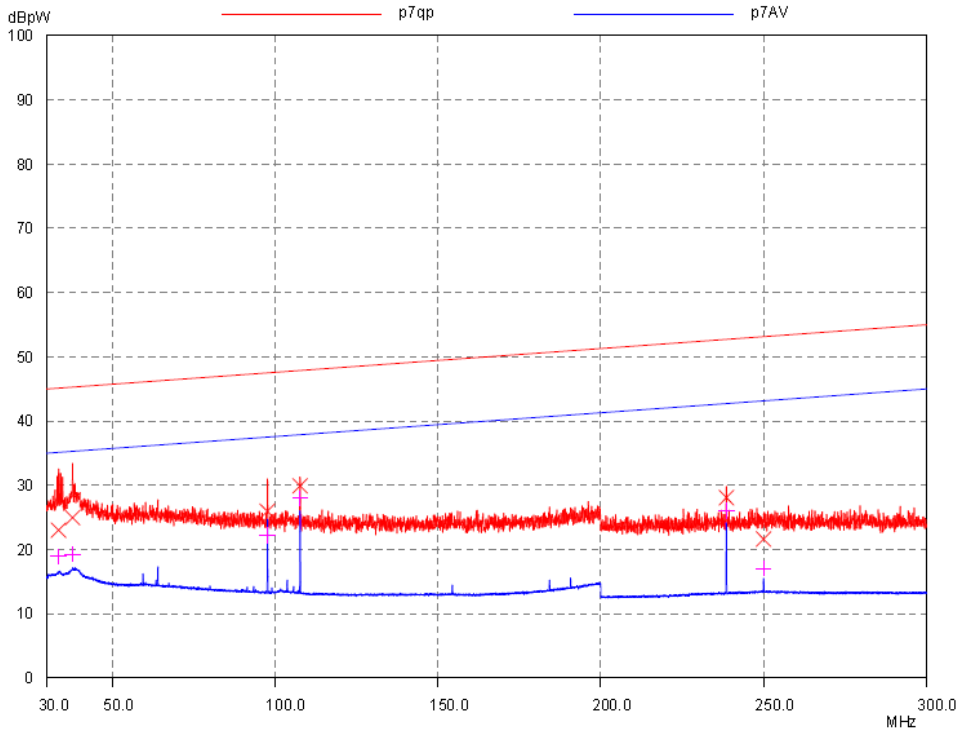
Measurement was performed in shielded room.
Instruments used were follow EN 55014-1 clause 6.1.
Detailed test procedure and arrangement was follow EN 55014-1 clause 6.2 and 6.3.
Operation conditions of EUT were according to EN 55014-1 clause 7.
Frequency range 30MHz – 300MHz was checked and EMI receiver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

4.4 Test Protocol and Wave Form

Temperature : 24 °C

Relative Humidity: 42 %

At mains lead: Pass



Frequency MHz	QP Level dBpW	QP Limit dBpW	QP Delta dB
33.54	23.01	45.13	22.12
37.8	24.98	45.29	20.31
97.68	25.96	47.51	21.55
107.7	29.90	47.88	17.98
238.62	28.10	52.73	24.63
250.02	21.64	53.15	31.51

Frequency MHz	AV Level dBpW	AV Limit dBpW	AV Delta dB
33.54	18.93	35.13	16.20
37.8	19.26	35.29	16.03
97.68	22.17	37.51	15.34
107.7	27.97	37.88	9.91
238.62	26.07	42.73	16.66
250.02	17.09	43.15	26.06

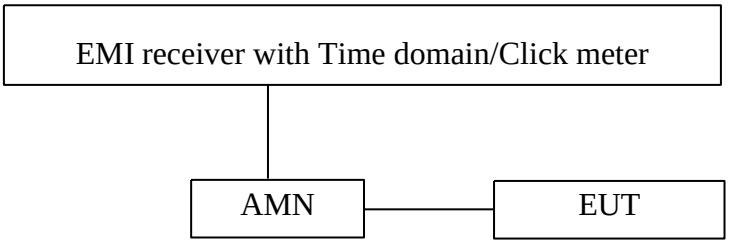
4.5 Measurement Uncertainty

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. Mains Terminal Discontinuous Disturbance Voltage

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 and Wave form

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 emission

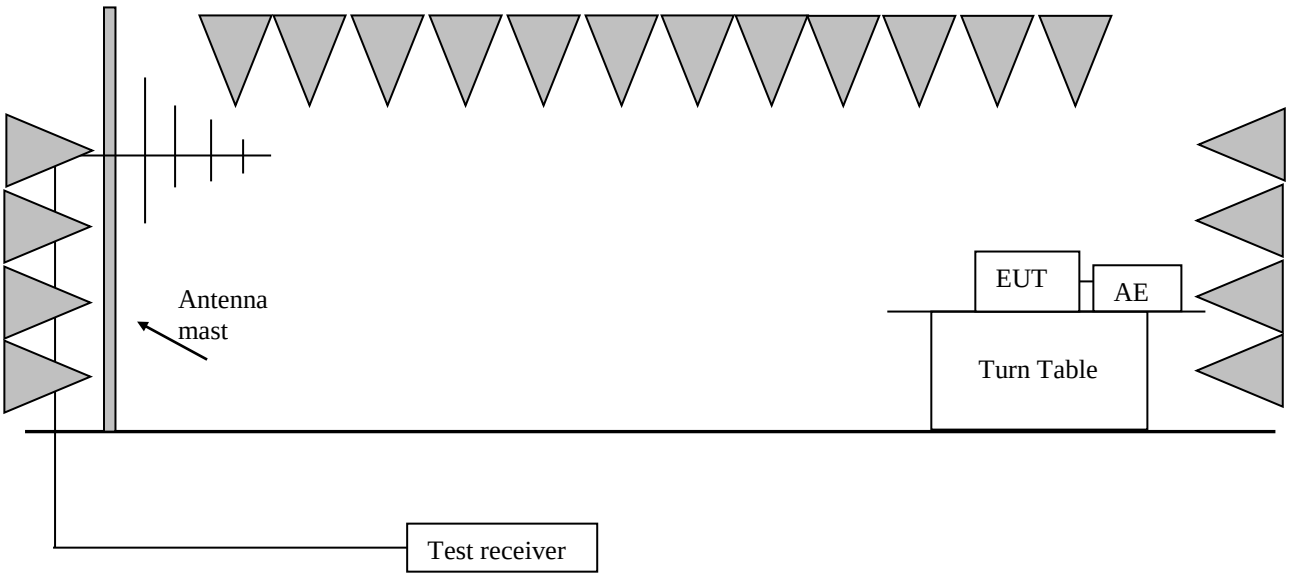
Test result: Pass

☒ 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



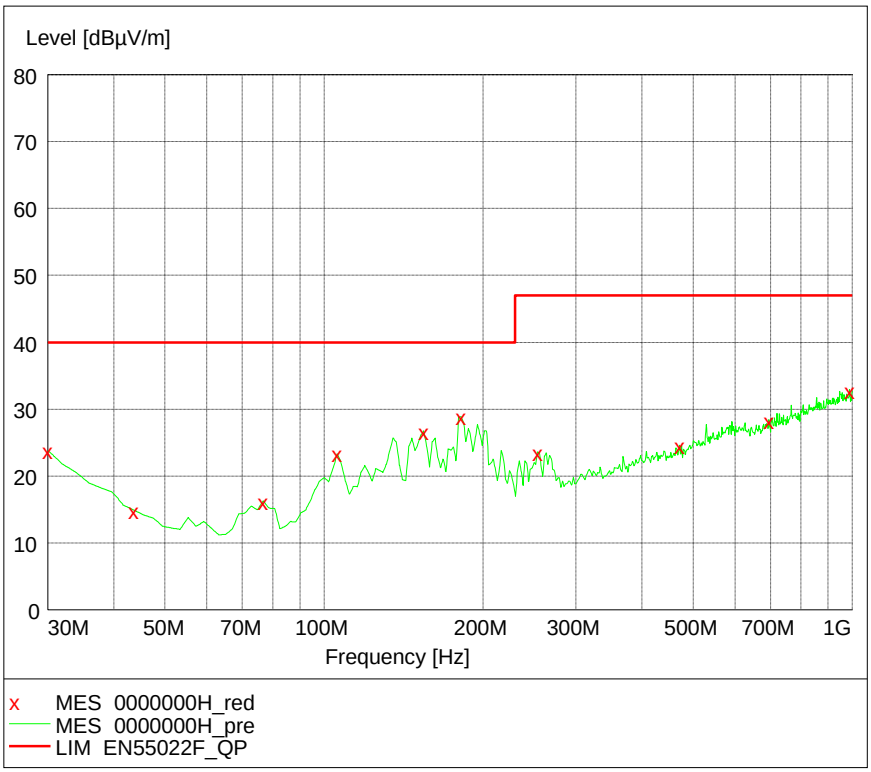
The measurement was applied in a 3 m semi-anechoic chamber.
Measurement was performed according to CISPR 22.
Setting of EUT is according to EN 55014-1 clause 7.3.6.2.3
The bandwidth setting on R&S Test Receiver ESI26 was 120kHz.
The frequency range from 30MHz to 1000MHz was checked.

6.3 Test Protocol and Wave Form

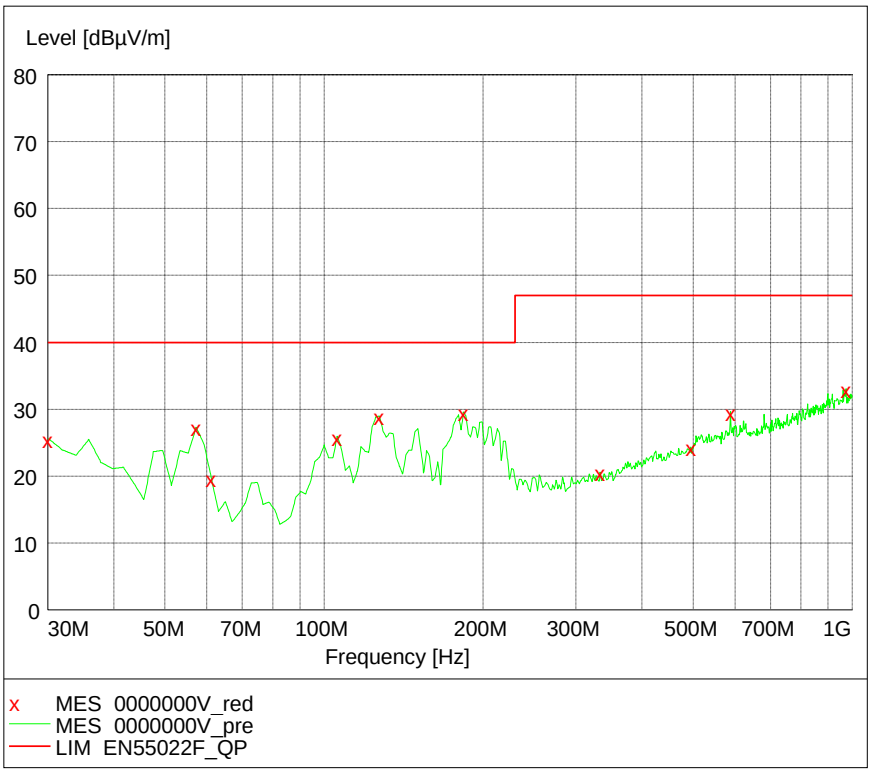
Temperature: 24 °C Relative humidity: 42 %

EUT operating without charging mode:

Horizontal:



Vertical:



Polarization	Frequency (MHz)	Emission level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Horizontal	132.45	*	40	*
	178.91	*	40	*
	188.99	*	40	*
	199.23	*	40	*
	298.31	*	47	*
	332.56	*	47	*
Vertical	52.76	*	40	*
	76.88	*	40	*
	132.45	*	40	*
	276.83	*	47	*
	287.35	*	47	*
	388.22	*	47	*

Note: * means margin >20dB.

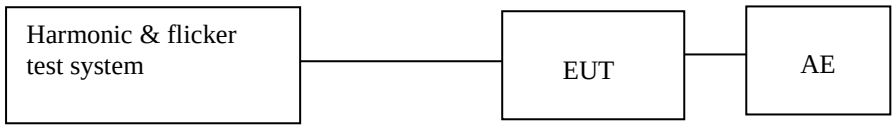
6.4 Measurement uncertainty

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 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

☒ 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.

7.3 Test Protocol and Wave form

Temperature : °C
Relative Humidity: %

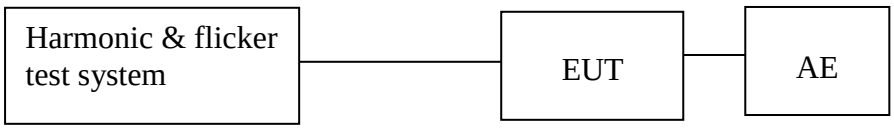
7.4 Measurement Uncertainty

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.
☒ 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.

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

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

Criterion A: Normal Performance within limits specified by the manufacturer, request or purchaser.

Criterion B: Continue to operate as intended after the test .No degradation of performance or loss of function. During the test degradation of performance is allowed, however no change of actual operating state or stored date.

Criterion C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

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

For battery charging mode:

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

For operating without charging mode:

☒ 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

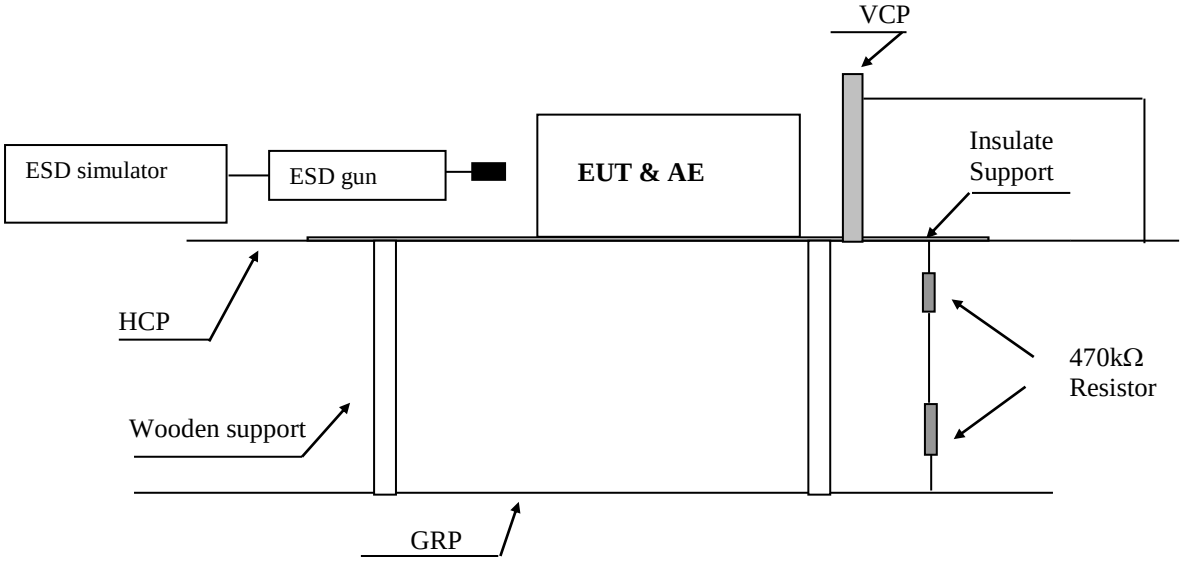
Notes: 1."X" is an open level. The level has to be specified in the dedicated equipment specification. If higher voltages than those shown are specified, special test equipment may be needed.
2. The gray rows were the selected test level.

9.1.2 Performance Criterion

Performance criterion: **C** (Only applied to toys not using score or data entered by the user)
Performance criterion: **B** (Others)

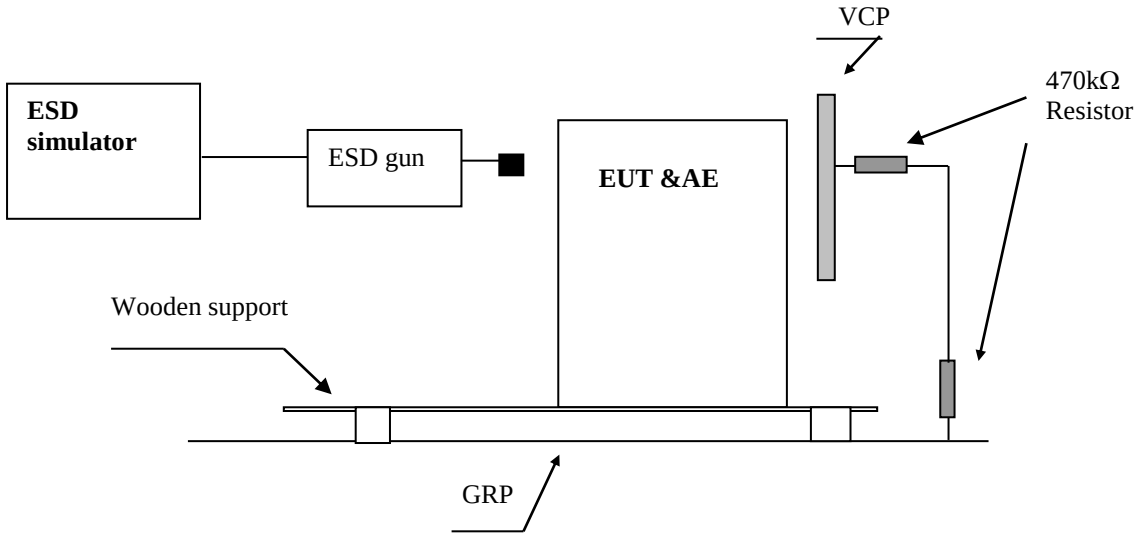
9.2 Block Diagram of Test Setup

☒ 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.
The test method and equipment was specified by IEC61000-4-2 with the modifications by EN55014-2 clause 5.1.

9.4 Test Protocol

Temperature	:	24 °C
Relative Humidity	:	42 %
Air 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,corner on HCP	Pass
HCP b	0,1m from the back of the EUT	Edge of centre,corner on HCP	Pass
HCP r	0,1m from the right side of the EUT	Edge of centre,corner on HCP	Pass
HCP l	0,1m from the left side of the EUT	Edge of centre,corner on HCP	Pass
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 floor standing equipment

Point	Description	Point	Result
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

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

Conclusion: The EUT met the requirements of Performance A

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.

9.6 Additions, Deviations and Exclusions from Standards

None

10. Electromagnetic field susceptibility

Test result **Pass**

This test is only applicable to the EUT operating without charging mode.

10.1 Severity Level and Performance Criterion

10.1.1 Test level

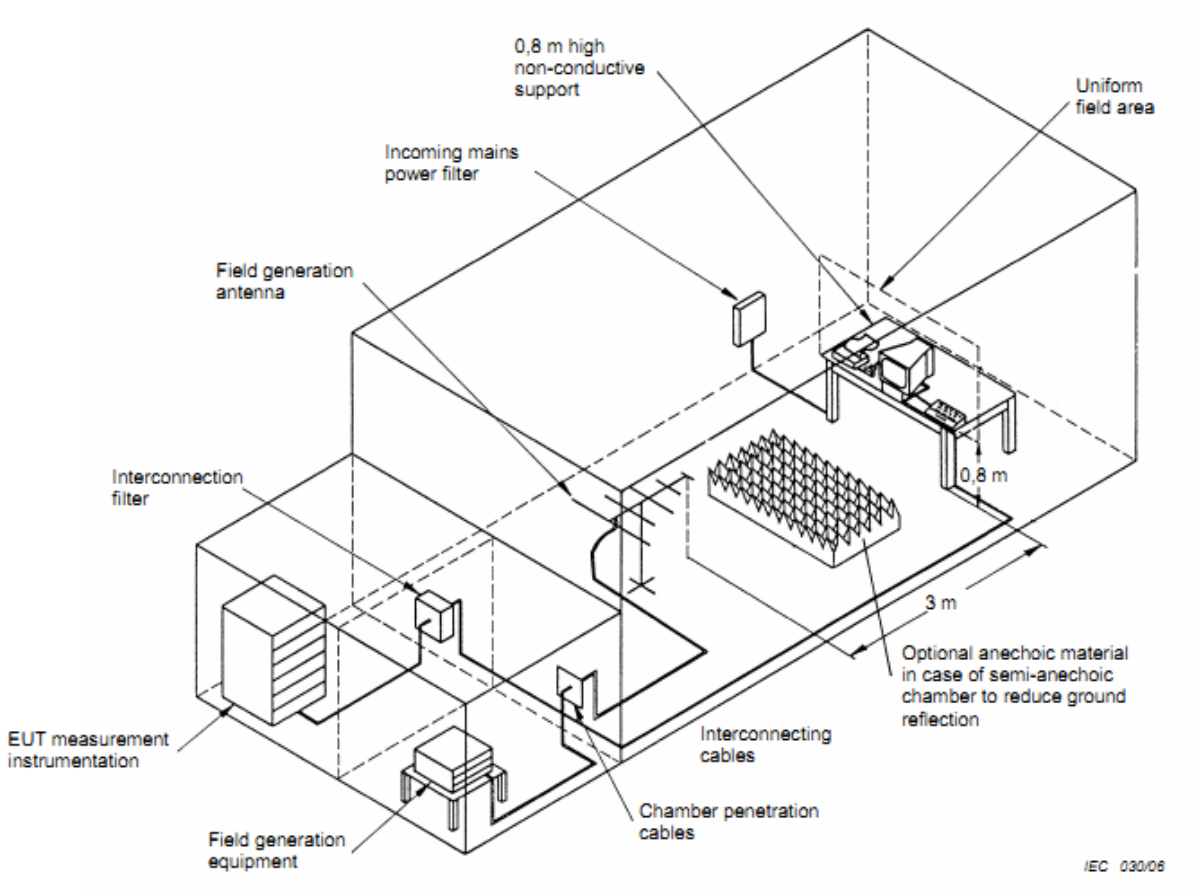
Level	Test field strength V/m
1	1
2	3
3	10
X	Special

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.

The test method and equipment was specified by IEC61000-4-3 with additions and modifications by EN55014-2 clause 5.5.

10.4 Test Protocol

Temperature : 24°C
Relative Humidity: 42%

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

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

Conclusion: The EUT met 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.

10.6 Additions, deviations and exclusions from standards

None

11. Electric Fast Transient/Burst Immunity Test

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 a an open level. The level has to be specified in the dedicated equipment specification.
2. The gray rows were the selected test level.

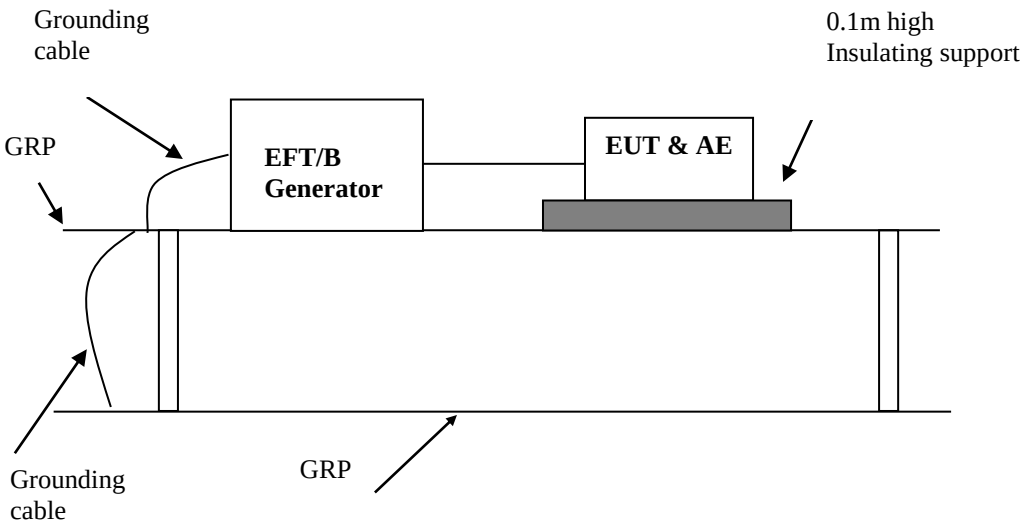
11.1.2 Performance Criterion

Performance criterion **B**

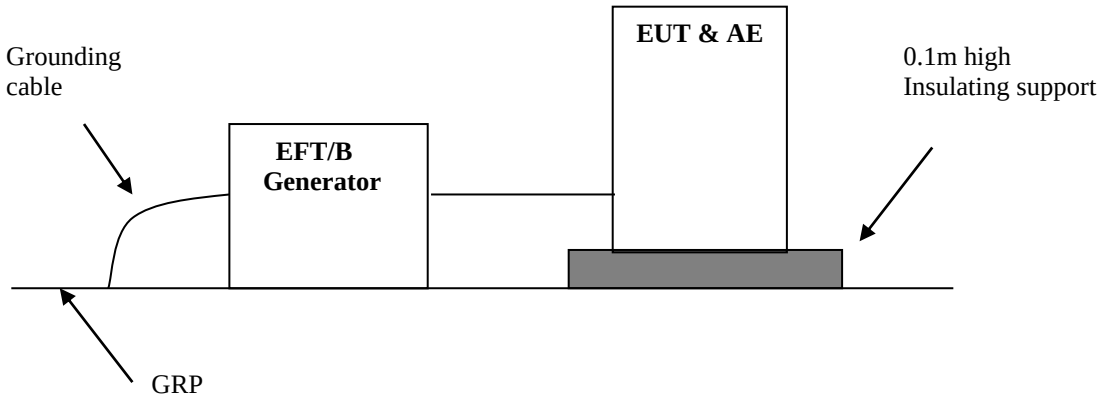
11.2 Block Diagram of Test Setup

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

☒ For table-top equipment

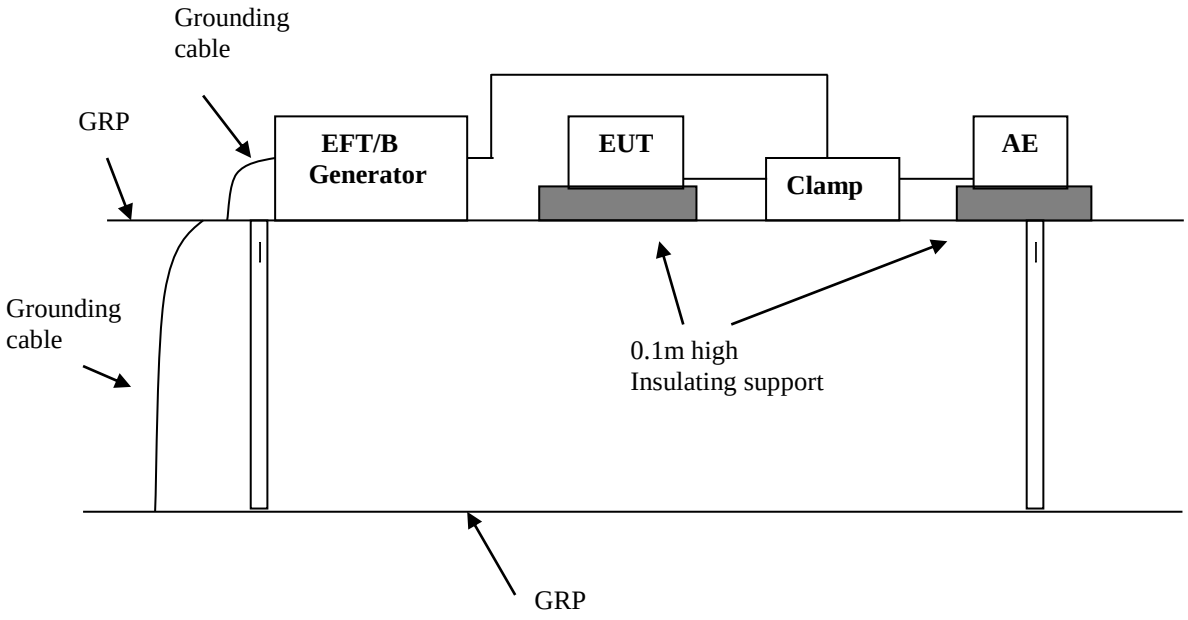


☐ For floor standing equipment

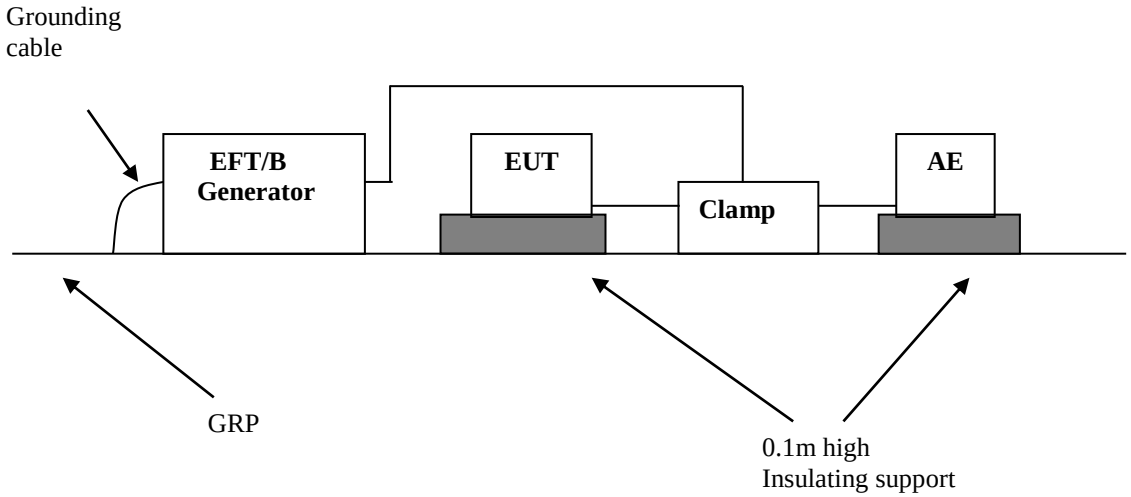


11.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

☐ 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.
The test method and equipment was specified by IEC61000-4-4 with additions and modifications by EN55014-2 clause 5.2.

11.4 Test Protocol

Temperature : 24 °C

Relative Humidity: 42 %

Test No.	Level [kV]	Polarity +/-	Repetition rate kHz	Line for test	Pass/ Fail
1	0.5	+/-	5	Signal lines and control lines	NA
2	0.5	+/-	5	d.c. power ports	NA
3	1	+/-	5	a.c. power ports	Pass
Notes: “NA” means not applicable.					

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

Conclusion: The EUT met the requirements of Performance A

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/telecom terminal 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.

11.6 Additions, Deviations and Exclusions from Standards

None

12. Surge Immunity Test

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

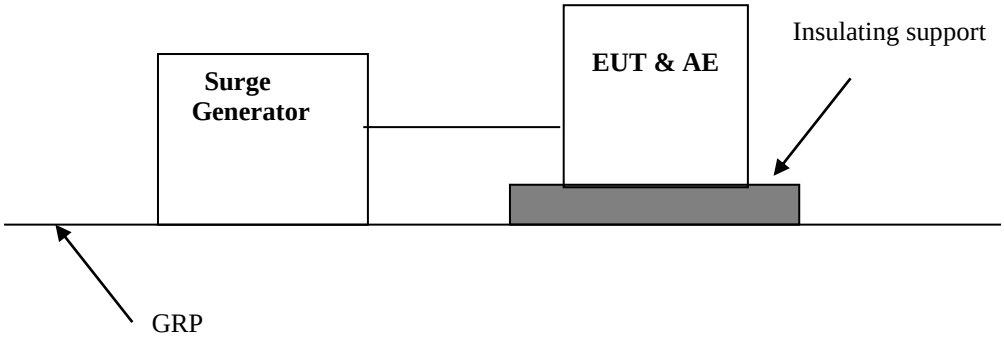
Notes: 1."X" is an open class. This level can be specified in the product Specification
2. The gray rows are the selected level. Class 2 is applied to Phase to Phase (L-N) Class 3 is applied to Phase to PE (L-PE),(N-PE)

12.1.2 Performance Criterion

Performance criterion **B**

12.2 Block Diagram of Test Setup

12.2.1 Block Diagram for input a.c. power line



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.
The test method and equipment was specified by IEC61000-4-5 with modifications by EN55014-2 clause 5.6.

12.4 Test Protocol

Temperature : 24 °C

Relative Humidity: 42 %

Test No.	Level [kV]	Polarity +/-	Angle	Line for test	Pass/ Fail
1	1	+	90º	a.c. Mains (line to line)	Pass
2	1	-	270º	a.c. Mains (line to line)	Pass
3	2	+	90º	a.c. Mains (line to earth)	NA
4	2	-	270º	a.c. Mains (line to earth)	NA
Notes: "NA" means not applicable.					

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

Conclusion: The EUT met the requirements of Performance A

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%
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

12.6 Additions, Deviations and Exclusions from Standards

None

13. Immunity to Conducted Disturbances, Induced by Radio-frequency Fields

Test result **Pass**

13.1 Severity Level and Performance Criterion

13.1.1 Test level

Frequency range 150kHz – 230MHz or150kHz – 80MHz		
Level	Voltage level (e.m.f.) U0 [dB(uV)]	U0 (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.

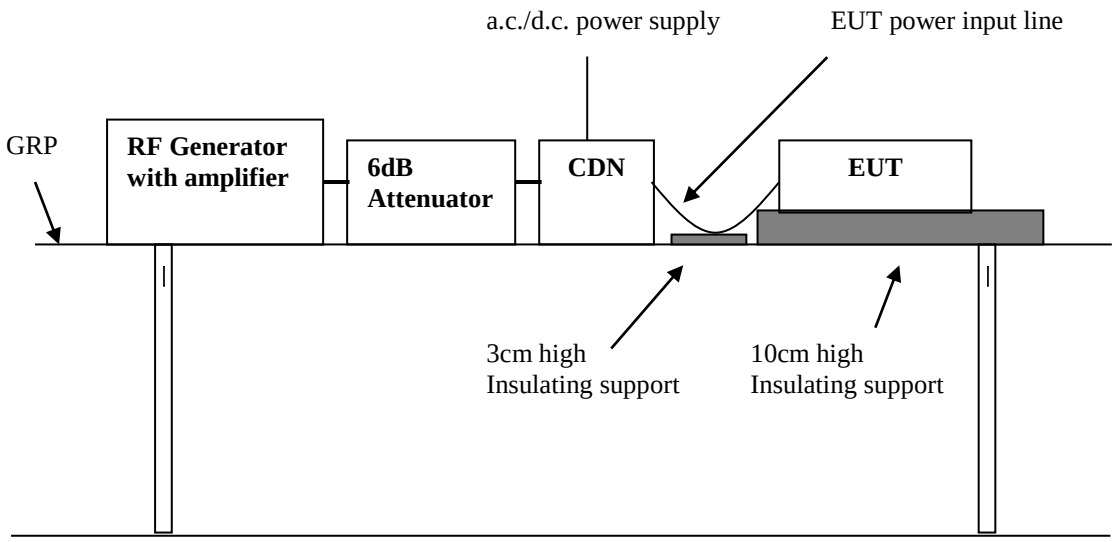
13.1.2 Performance Criterion

Performance criterion **A**

13.2 Block Diagram of Test Setup

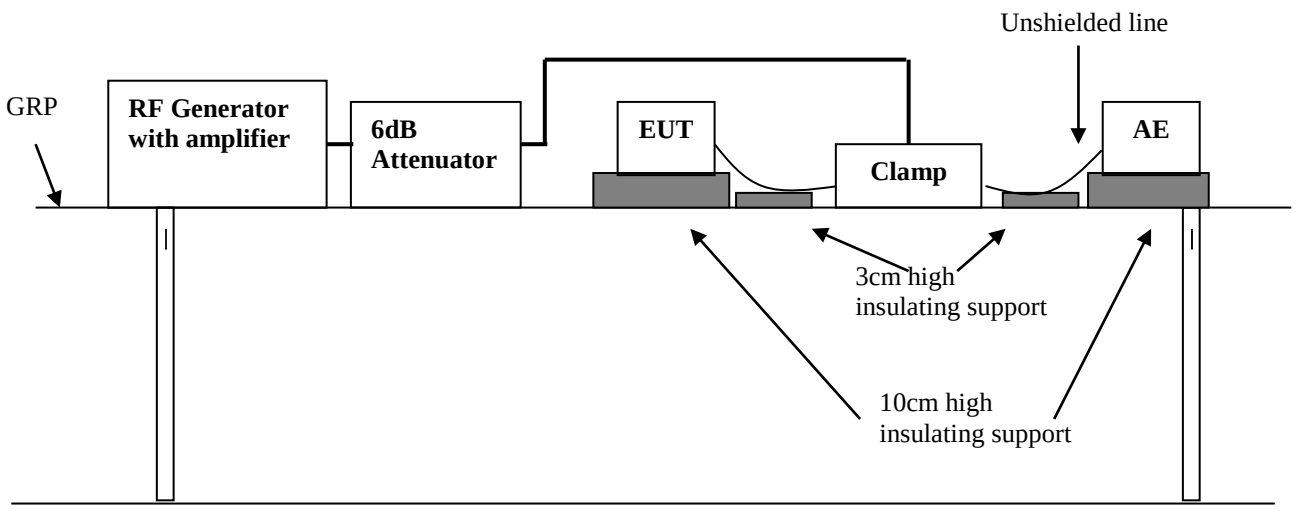
13.2.1 Block Diagram for a.c./d.c input power line

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

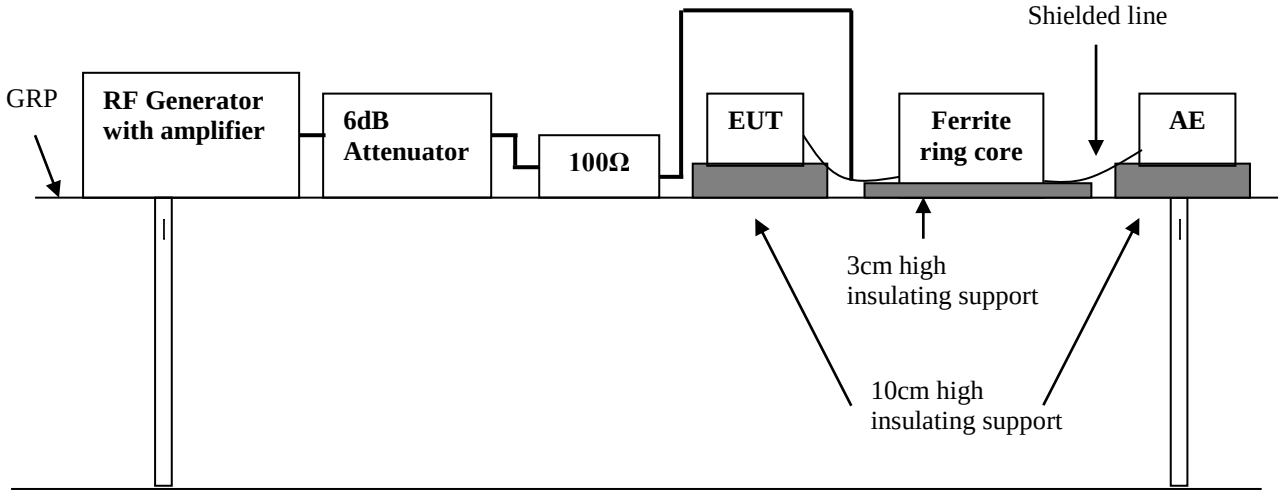


13.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

☐ 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.
The test method and equipment was specified by IEC61000-4-6 with additions and modifications by EN55014-2 clause 5.4.

13.4 Test Protocol

Temperature : 24 °C

Relative Humidity: 42 %

☒ EUT is not required for electromagnetic susceptibility

Test No.	Frequency (MHz)	Level V (r.m.s.)	Modulation	Injected point	Result
1	0.15~230	3	1kHz, 80%, SW, AM, 1% step size	a.c. Mains	Pass
2	0.15~230	1	1kHz, 80%, SW, AM, 1% step size	d.c. power ports	-
3	0.15~230	1	1kHz, 80%, SW, AM, 1% step size	signal lines and control lines	-

☐ For EUT test Electromagnetic field susceptibility

1	0.15~80	3	1kHz, 80%, SW, AM, 1% step size	a.c. Mains	-
2	0.15~80	1	1kHz, 80%, SW, AM, 1% step size	d.c. power ports	-
3	0.15~80	1	1kHz, 80%, SW, AM, 1% step size	signal lines and control lines	-

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

Conclusion: The EUT met 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 terminal
Is: ± 3.41dB.
Measurement uncertainty of injected current test at shielded signal terminal is under consideration.
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable to internal procedure TI-036.

13.6 Additions, Deviations and Exclusions from Standards

None

14. Voltage Dips, Short Interruptions and Voltage Variations Immunity Test

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 EN55014-2 clause 5.7.

14.4 Test Protocol

Temperature : 24 °C

Relative Humidity: 42 %

Test no.	Test level % UT	Voltage dip and short interruptions % UT	Duration (in periods)	Pass/ Fail	Comment
1	70	30%	25 cycles at 50Hz	Pass	-
			30 cycles at 60Hz	Pass	-
2	40	60%	10 cycles at 50Hz	Pass	-
			12 cycles at 60Hz	Pass	-
3	0	100% pos half cycle	0.5 cycle at 50Hz	Pass	-
			0.5 cycle at 60Hz	Pass	-
4	0	100% neg half cycle	0.5 cycle at 50Hz	Pass	-
			0.5 cycle at 60Hz	Pass	-
Note: “NA” means not applicable.					

Observation: At test level of 40% and 70%, the EUT worked unsteadily. Once the interference is removed, it recovered its normal mode at once.

Conclusion: The EUT met the requirements of Performance B

14.5 Measurement Uncertainty

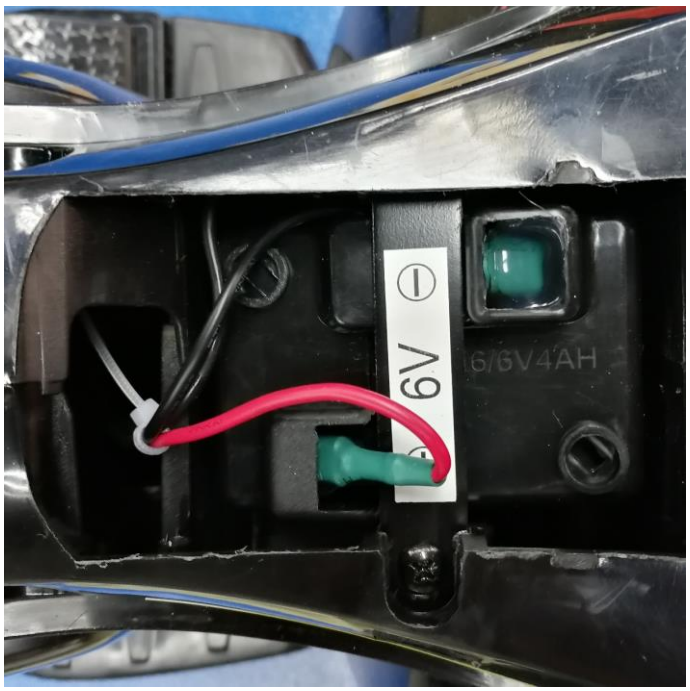
The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty of voltage dips and interruption test is: ± 6.05%
The measurement uncertainty is given with a confidence of 95%, k=2.
The measurement uncertainty is traceable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

14.6 Additions, deviations and exclusions from standards

None

Appendix I Photograph of equipment under test

BMW
S 1000 RR
INPUT


6V
6/6V4AH

DING LI
RS-380-6V
RPM 18000

HKI
AC/DC ADAPTOR
CLASS II TRANSFORMER
MODEL :HKI-D06-1000
INPUT:230V 50Hz
OUTPUT:6V DC 1000mA
POLARITY:
135°C
PINGHU CITY HONGKI
ELECTRIC CO., LTD.