

SHAOXING SHANGYU NORTH ELECTRON MANUFACTURE CO., LTD

TEST REPORT

SCOPE OF WORK:

EMC report

Model:

CB22C

REPORT NUMBER

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Report no. 230100362HAN-001

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PROVINCE, P.R.CHINA.

Manufacturer : Same as applicant

Factory : Same as applicant

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

EN IEC 61000-3-2:2019+A1:2021: Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current $\leq 16A$ per phase)

EN 61000-3-3:2013+A1:2019+A2:2021: 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 $\leq 16A$ per phase and not subject to conditional connection

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Revision History

Report No.	Version	Description	Issued Date
230100362HAN-001	Rev. 01	Initial issue of report	November 25, 2023

Measurement result summary

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

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	: Ice maker
Type/Model	: CB22C
Description of EUT	: The EUT covered in the report is compressor type automatic ice maker for household use. The appliance is filled with potable water and has a safety isolating transformer. The product has three configurations of condenser fan motor and main PCBs: <ol style="list-style-type: none">1. FY-YT2-ZBJ-P & YD1225MS2. LS2301 & PY-1225H12S3. SY-ZBJ-CB22C & XH-12025S Therefore, the test was performed on this model with three configurations.
Rating	: 220-240V, 50Hz, 125W, 0,8A, R600a/30g, Climate: N/SN, Class I, insulation blowing gas: C ₅ H ₁₀
Brand name	: /
Highest operating frequency	: <15Mhz
Mains lead	: 1.2 m, (un)shielded, (non)detachable
Data cable	: None
EUT type	: <input checked="" type="checkbox"/> Table-top <input type="checkbox"/> Floor standing
Sample received date	: January 28, 2023
Sample Identification No.	: /
Date of test	: February 8, 2023 ~ July 6, 2023

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

The test facility is : CNAS Accreditation Lab
recognized, certified, Registration No. CNAS L13980
or accredited by these
organizations

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 – surge immunity test

IEC 61000-4-6:2013: Electromagnetic Compatibility (EMC) – Part 4-6: testing and measurement techniques – 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	25	44	NA
Mains terminal discontinuous disturbance voltage/click	25	44	NA
Continuous disturbance power	25	44	NA
Radiated Emission	NA	NA	NA
Harmonics	25	44	NA
Voltage fluctuation-Flicker	25	44	NA
Electrostatic Discharge (ESD)	24	45	101
Radio frequency electromagnetic fields	NA	NA	NA
Fast transients	24	45	NA
Surges	24	45	NA
Injected Current	24	45	NA
Voltage dips	24	45	NA

Notes: NA =Not Applicable

2.5 Instrument list

Conducted Emission / Disturbance Power					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESR7	EZ6547	2024-8-16
<input checked="" type="checkbox"/>	Pulse Limiter	R&S	ESH3-Z2	EZ6379	2024-5-24
<input checked="" type="checkbox"/>	A.M.N.	R&S	ESH2-Z5	EZ6378	2024-5-24
<input checked="" type="checkbox"/>	Absorbing Clamp	Lüthi	MDS 21	EZ6396	2024-6-1
<input checked="" type="checkbox"/>	Attenuator	-	AI-N-6-2W	EZ6397	2024-5-24
Discontinuous Disturbance Voltage					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
<input checked="" type="checkbox"/>	Click Meter	AFJ	DDA55+	EZ6548	2024-8-16
<input checked="" type="checkbox"/>	LISN	AFJ	LS16C	EZ6403-1	2024-5-24
Harmonics / Flicker					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
<input checked="" type="checkbox"/>	Harmonic-flicker System	EM TEST	DPA 500	EZ6404	2024-5-24
		EM TEST	ACS 500	EZ6404-1	2024-5-24
ESD					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
<input checked="" type="checkbox"/>	ESD generator	NoiseKen	ESS-B3011A	EZ6568	2024-9-19
EFT / Surge / Voltage Dips					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
<input checked="" type="checkbox"/>	Compact NX Generator	EM TEST	Compact NX5 bsp-1-300-16	EZ6334-1	2024-2-16
<input checked="" type="checkbox"/>	Automatic Transformer	EM TEST	Variac NX1-260-16	EZ6334-2	2024-2-16
Conducted Immunity					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
<input checked="" type="checkbox"/>	Conducted Disturbance Test System	SCHLÖDER	CDG-7000-75	EZ6333-1	2024-2-16
<input checked="" type="checkbox"/>	CDN	SCHLÖDER	CDN-M2+3	EZ6333-2	2024-2-16
<input checked="" type="checkbox"/>	Attenuator	SCHLÖDER	CDG 6050-100	EZ6333-3	2024-2-16
Tet Site					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
<input checked="" type="checkbox"/>	Shielded Room	SAEMC	MSR953	EZ6441	2027-7-27
<input checked="" type="checkbox"/>	Shielded Room	SAEMC	PSAC318-M	EZ6442	2027-7-27
Additional Instrument					
Used	Equipment	Manufacturer	Type	Internal No.	Due Date
<input checked="" type="checkbox"/>	Digital Therom-Hygrograph	TESTO	175H1	EZ1050	2024-10-6
<input checked="" type="checkbox"/>	Digital Therom-Hygrograph	TESTO	175H1	EZ1056	2024-10-6
<input checked="" type="checkbox"/>	Digital Therom-Hygrograph	TESTO	175H1	EZ1057	2024-10-6

<input checked="" type="checkbox"/>	Pressure Meter	Shanghai Fengyun	FYP-1	EZ6422	2024-4-12
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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: **PASS**

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) Quasi-peak Average		Limits dB(μV) Quasi-peak Average		Limits dB(μA) 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.

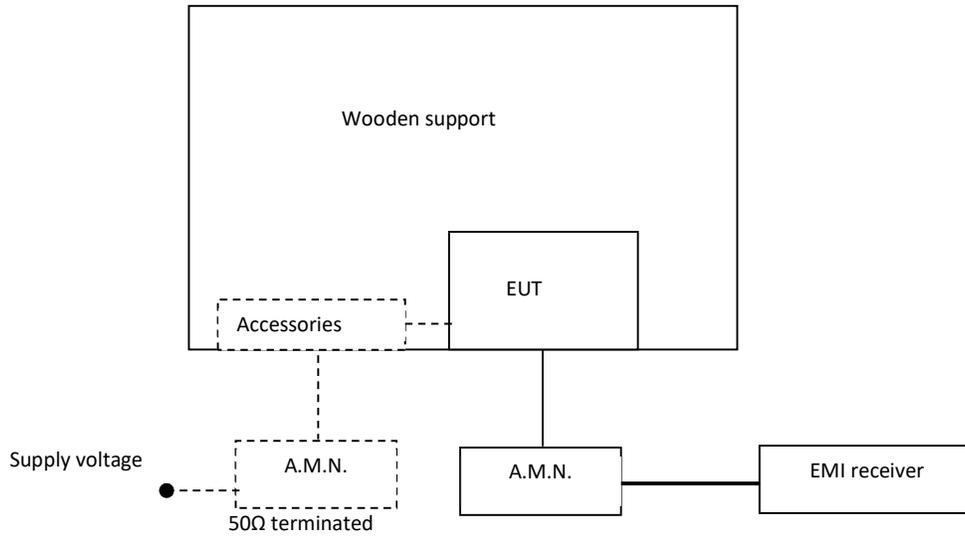
3.1.2 Limits for mains port of motor operated tools

Frequency range (MHz)	P ≤ 700 W		700 W < P ≤ 1 000 W		P > 1 000 W	
	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.

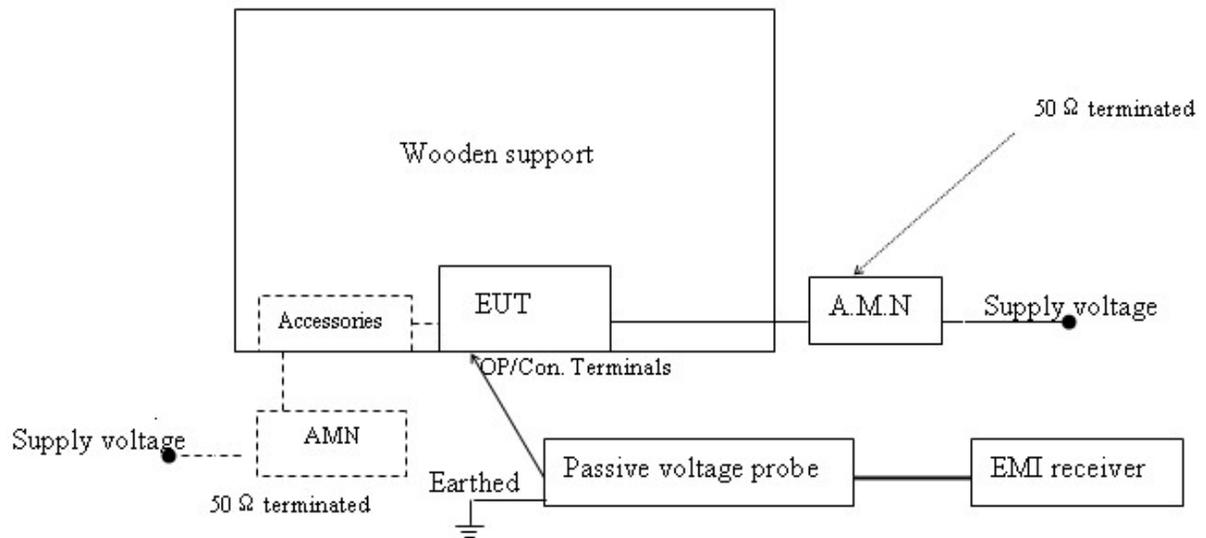
3.2 Block Diagram of Test Setup

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.

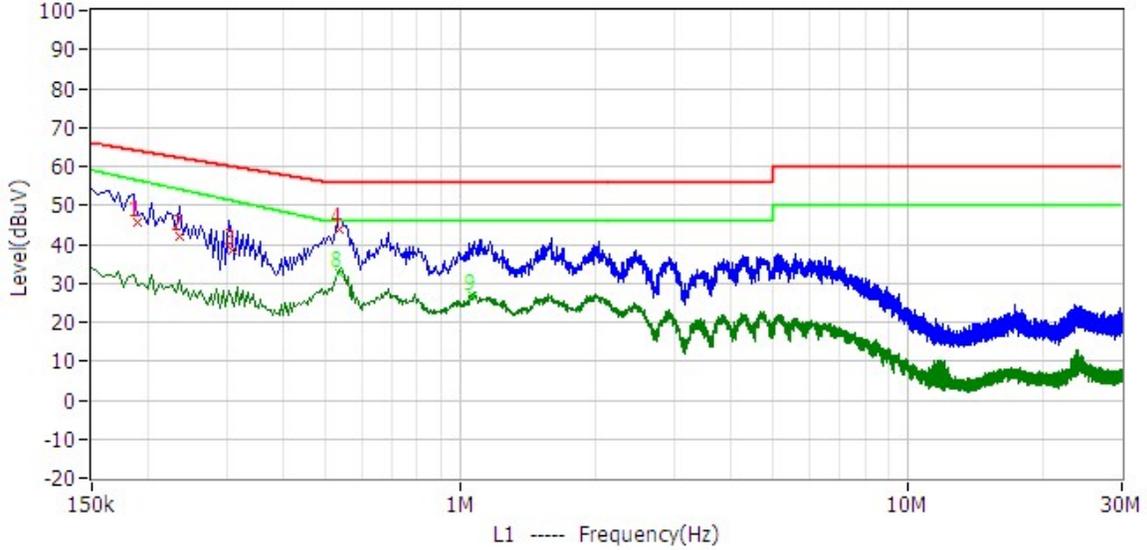
Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9kHz.

3.4 Test Protocol

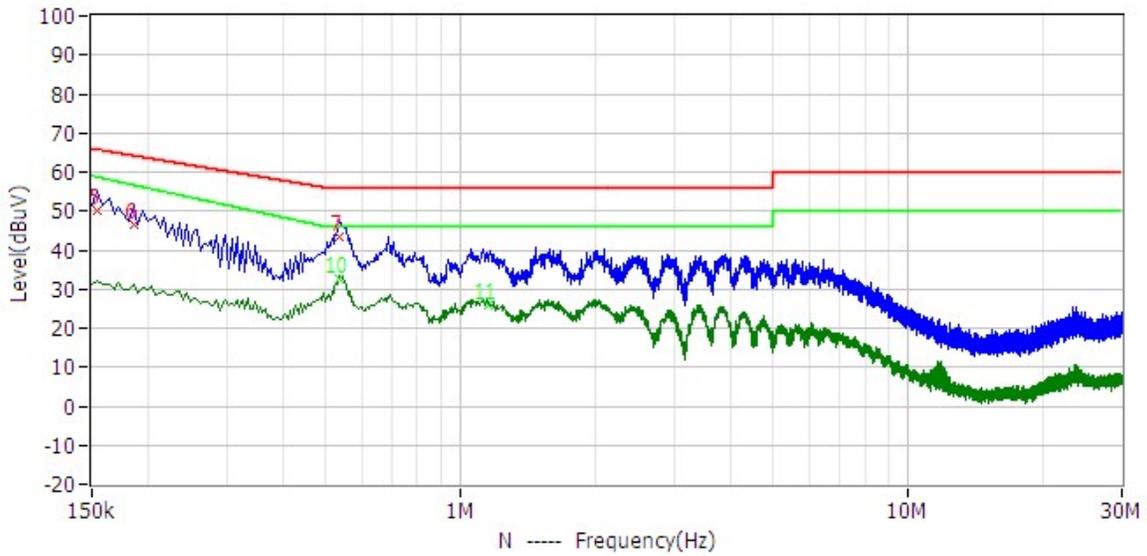
For Mains ports: Pass

Configuration 1

L-Line



N-Line

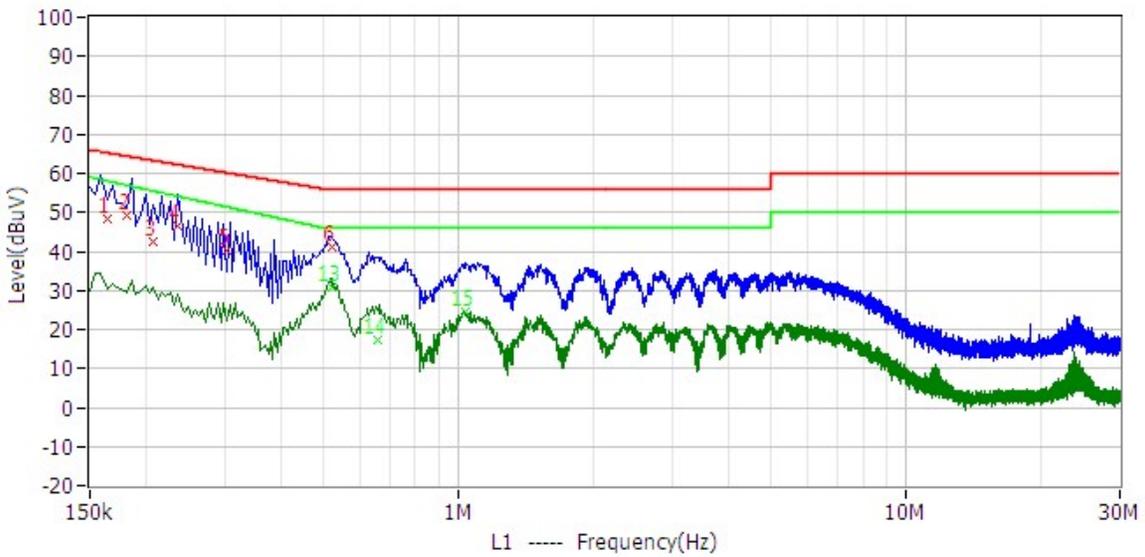


No.	Frequency	Limit dB μ V	Level dB μ V	Delta dB	Factor dB	Detector	Phase
1	190.500kHz	64.0	45.5	-18.5	10.2	QP	L1
2	235.500kHz	62.3	42.0	-20.3	10.2	QP	L1
3	307.500kHz	60.0	38.5	-21.5	10.3	QP	L1
4	537.000kHz	56.0	43.8	-12.2	10.3	QP	L1

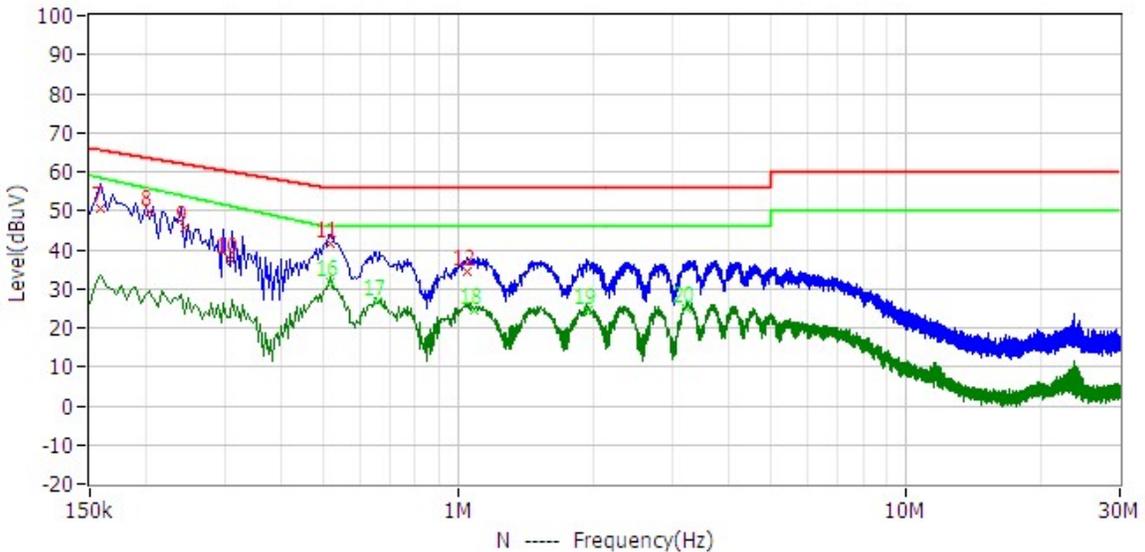
No.	Frequency	Limit dB μ V	Level dB μ V	Delta dB	Factor dB	Detector	Phase
5	154.500kHz	65.8	50.2	-15.6	10.2	QP	N
6	186.000kHz	64.2	46.4	-17.8	10.3	QP	N
7	537.000kHz	56.0	43.3	-12.7	10.3	QP	N
8	537.000kHz	46.0	32.4	-13.6	10.3	CAV	L1
9	1.064MHz	46.0	26.6	-19.4	10.3	CAV	L1
10	537.000kHz	46.0	32.4	-13.6	10.3	CAV	N
11	1.158MHz	46.0	25.8	-20.2	10.3	CAV	N

Configuration 2

L-Line



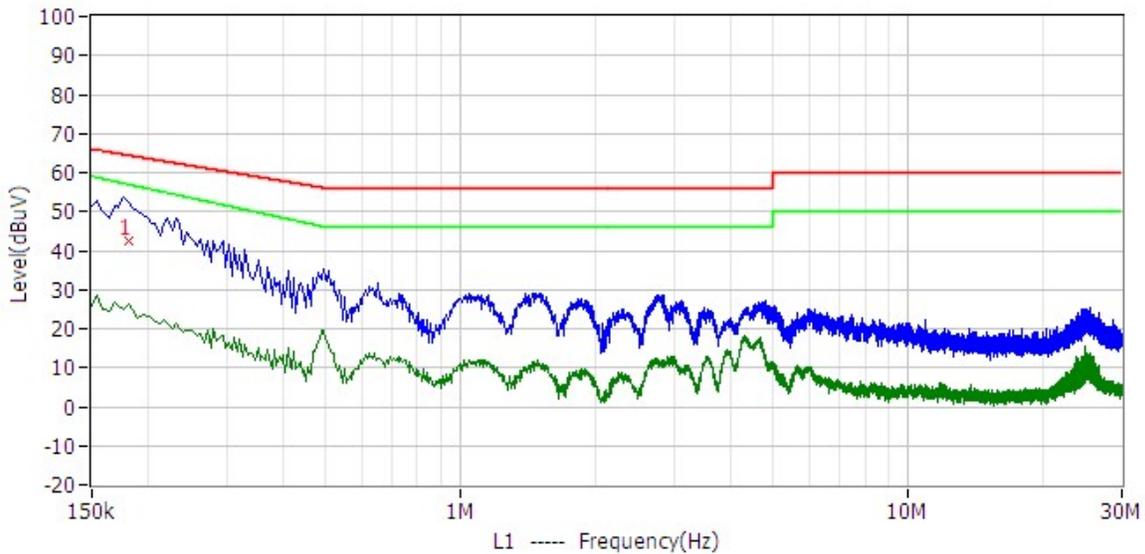
N-Line

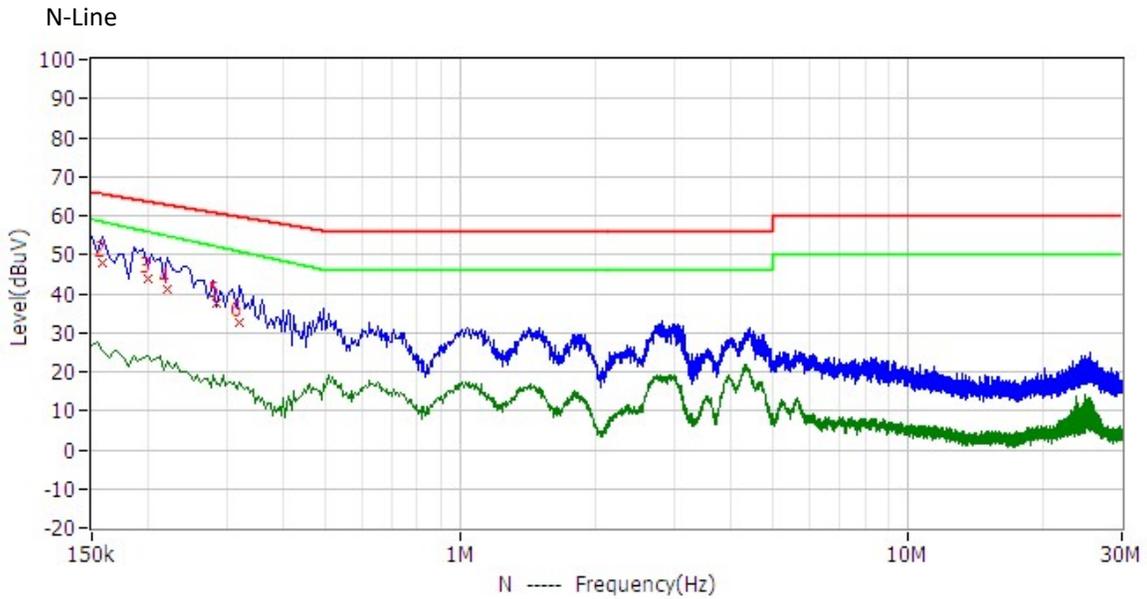


No.	Frequency	Limit dB μ V	Level dB μ V	Delta dB	Factor dB	Detector	Phase
1	163.500kHz	65.3	48.1	-17.2	10.2	QP	L1
2	181.500kHz	64.4	49.4	-15.0	10.2	QP	L1
3	208.500kHz	63.3	42.6	-20.7	10.2	QP	L1
4	235.500kHz	62.3	46.3	-16.0	10.2	QP	L1
5	303.000kHz	60.2	40.4	-19.8	10.3	QP	L1
6	519.000kHz	56.0	40.9	-15.1	10.3	QP	L1
7	159.000kHz	65.5	50.6	-14.9	10.2	QP	N
8	204.000kHz	63.4	49.5	-13.9	10.3	QP	N
9	244.500kHz	61.9	45.6	-16.3	10.3	QP	N
10	307.500kHz	60.0	37.5	-22.5	10.3	QP	N
11	514.500kHz	56.0	41.7	-14.3	10.3	QP	N
12	1.046MHz	56.0	34.4	-21.6	10.3	QP	N
13	519.000kHz	46.0	31.0	-15.0	10.3	CAV	L1
14	658.500kHz	46.0	17.1	-28.9	10.3	CAV	L1
15	1.032MHz	46.0	24.5	-21.5	10.3	CAV	L1
16	514.500kHz	46.0	31.9	-14.1	10.3	CAV	N
17	658.500kHz	46.0	26.9	-19.1	10.3	CAV	N
18	1.082MHz	46.0	24.6	-21.4	10.3	CAV	N
19	1.955MHz	46.0	24.4	-21.6	10.4	CAV	N
20	3.224MHz	46.0	25.1	-20.9	10.4	CAV	N

Configuration 3

L-Line





No.	Frequency	Limit dB μ V	Level dB μ V	Delta dB	Factor dB	Detector	Phase
1	181.500kHz	64.4	42.4	-22.0	10.2	QP	L1
2	159.000kHz	65.5	47.9	-17.6	10.2	QP	N
3	199.500kHz	63.6	43.8	-19.8	10.3	QP	N
4	222.000kHz	62.7	41.3	-21.4	10.3	QP	N
5	285.000kHz	60.7	37.7	-23.0	10.3	QP	N
6	321.000kHz	59.7	32.8	-26.9	10.3	QP	N

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.

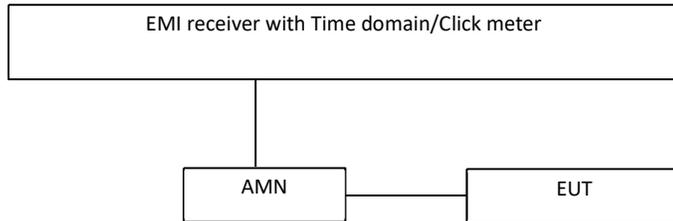
- Remark:
1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading
 4. If the PK Corrected Reading is lower than AV limit, the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

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

Configuration 1

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	0	0	0	0
Observed time (min)	120	120	120	120
Click duration (ms)	-	-	-	-
Click rate N	0	0	0	0
Factor	-	-	-	-
Permitted limits for clicks (dB μ V)	-	-	-	-
Counted clicks exceeding the limits	-	-	-	-
Test result	Pass	Pass	Pass	Pass
Any other descriptions:				

Configuration 2

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	0	0	0	0
Observed time (min)	120	120	120	120
Click duration (ms)	-	-	-	-
Click rate N	0	0	0	0
Factor	-	-	-	-
Permitted limits for clicks (dB μ V)	-	-	-	-
Counted clicks exceeding the limits	-	-	-	-
Test result	Pass	Pass	Pass	Pass
Any other descriptions:				

Configuration 3

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	0	0	0	0
Observed time (min)	120	120	120	120
Click duration (ms)	-	-	-	-
Click rate N	0	0	0	0
Factor	-	-	-	-
Permitted limits for clicks (dB μ V)	-	-	-	-
Counted clicks exceeding the limits	-	-	-	-
Test result	Pass	Pass	Pass	Pass
Any other descriptions:				

5. Continuous disturbance power

Test result: **PASS**

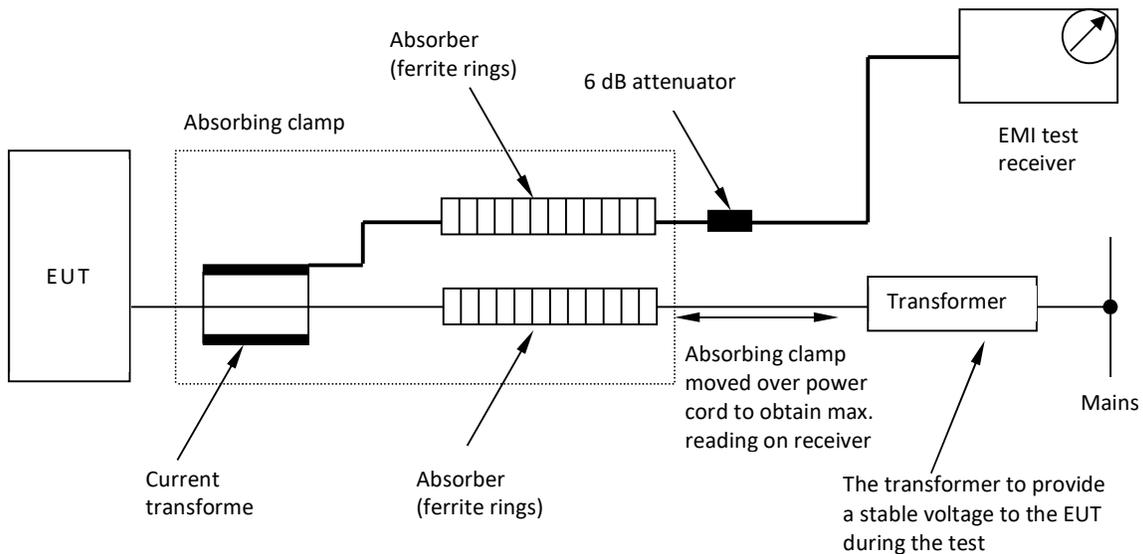
5.1 Continuous disturbance power limit

Frequency range (MHz)	General		$P \leq 700 \text{ W}$		$700 \text{ W} < P \leq 1\,000 \text{ W}$		$P > 1\,000 \text{ W}$	
	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.

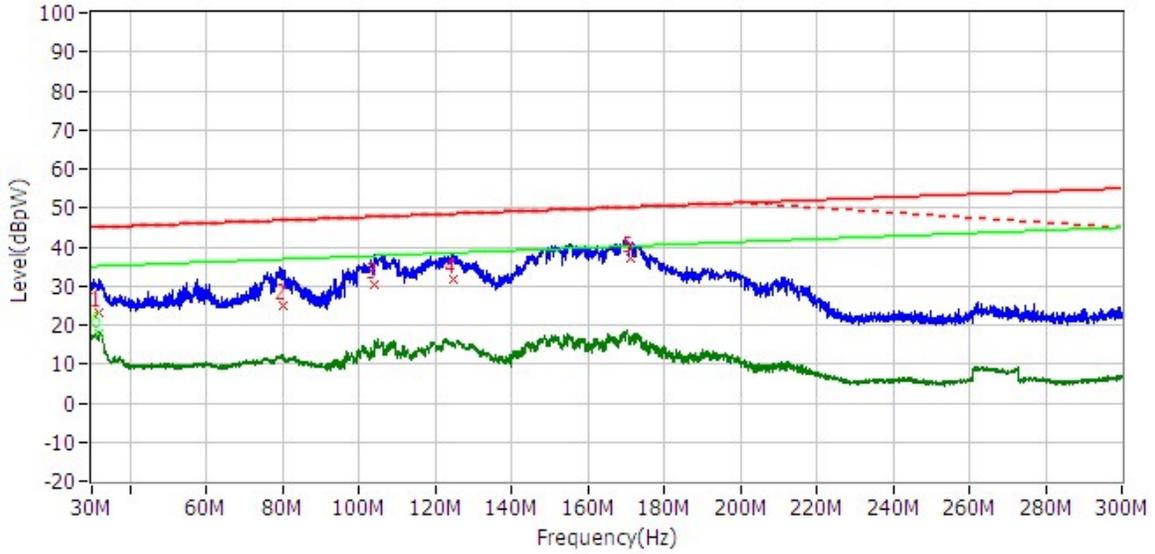
Operation conditions of EUT was according to clause 6 of EN 55014-1.

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

5.4 Test Protocol

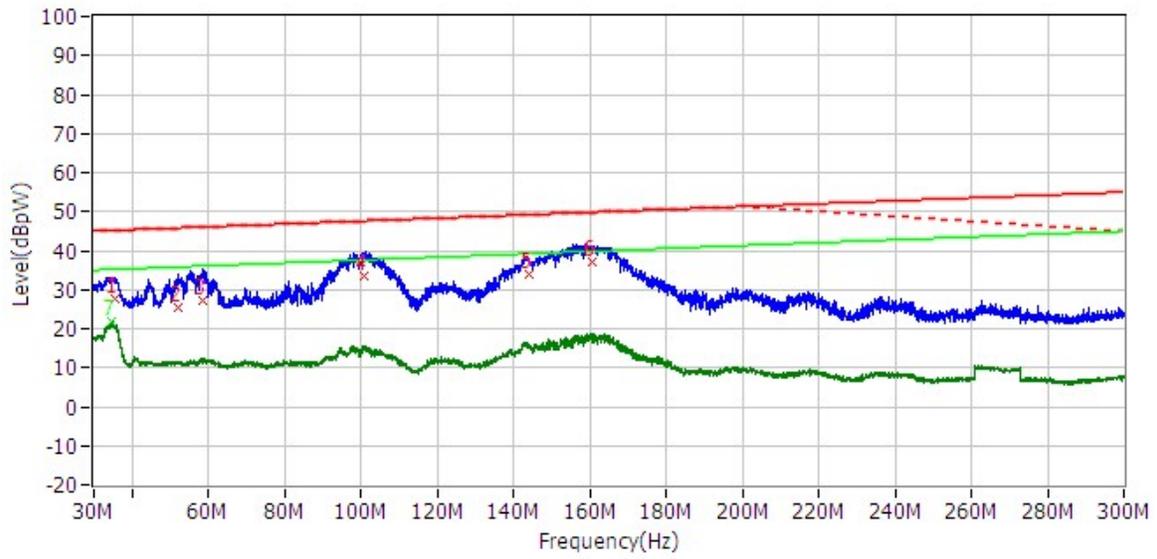
For Mains ports: Pass

Configuration 1



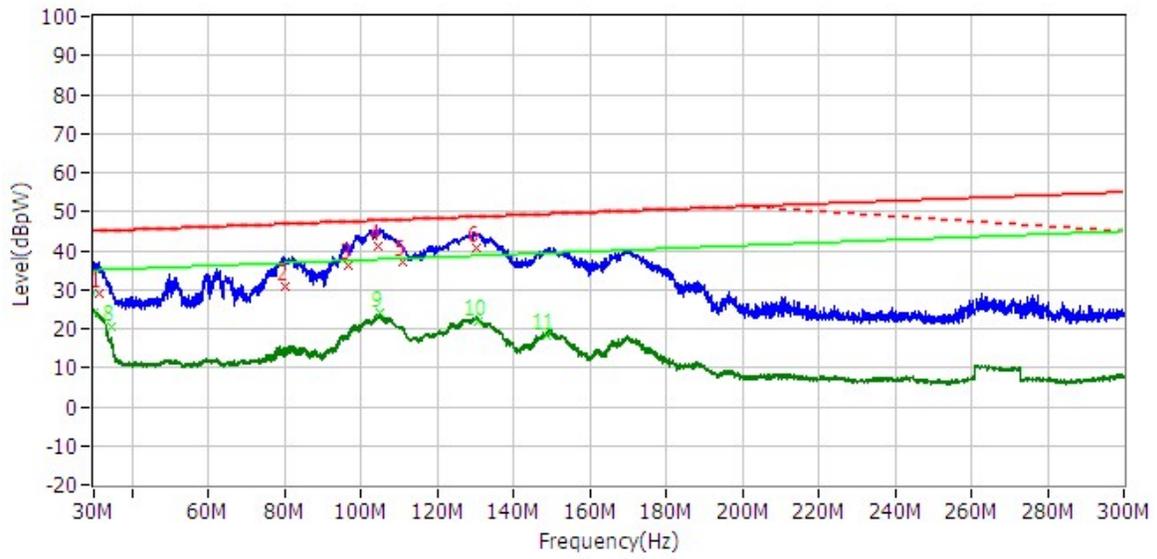
No.	Frequency	Limit dBpW	Level dBpW	Delta dB	Factor dB	Detector
1	31.740MHz	45.1	23.1	-22.0	10.1	QP
2	79.920MHz	46.8	25.1	-21.7	9.9	QP
3	104.100MHz	47.7	30.2	-17.5	8.2	QP
4	124.980MHz	48.5	31.7	-16.8	7.3	QP
5	171.060MHz	50.2	37.1	-13.1	6.4	QP
6	31.980MHz	35.1	17.6	-17.5	10.1	CAV

Configuration 2



No.	Frequency	Limit dBpW	Level dBpW	Delta dB	Factor dB	Detector
1	35.400MHz	45.2	27.5	-17.7	9.9	QP
2	52.200MHz	45.8	25.2	-20.6	10.2	QP
3	58.740MHz	46.1	27.2	-18.9	10.4	QP
4	100.920MHz	47.6	33.3	-14.3	8.3	QP
5	143.940MHz	49.2	34.1	-15.1	6.6	QP
6	160.440MHz	49.8	37.3	-12.5	6.2	QP
7	34.440MHz	35.2	21.8	-13.4	9.9	CAV

Configuration 3



No.	Frequency	Limit dBpW	Level dBpW	Delta dB	Factor dB	Detector
1	31.260MHz	45.0	28.9	-16.1	10.1	QP
2	80.160MHz	46.9	31.0	-15.9	9.9	QP
3	96.780MHz	47.5	36.4	-11.1	8.3	QP
4	104.460MHz	47.8	41.3	-6.5	8.2	QP
5	110.760MHz	48.0	37.2	-10.8	7.6	QP
6	130.080MHz	48.7	40.6	-8.1	7.2	QP
7	30.120MHz	35.0	24.0	-11.0	10.1	CAV
8	34.740MHz	35.2	20.5	-14.7	9.9	CAV
9	105.180MHz	37.8	24.2	-13.6	8.2	CAV
10	130.860MHz	38.7	21.8	-16.9	7.2	CAV
11	148.680MHz	39.4	18.4	-21.0	6.4	CAV

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

- As for in the disturbance power test all emission readings from the EUT are lower than the applicable limits (Table 7) reduced by the margin (Table 8) and the maximum clock frequency is less than 30MHz, the EUT is deemed to comply with the Radiated Emission requirement without test.

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

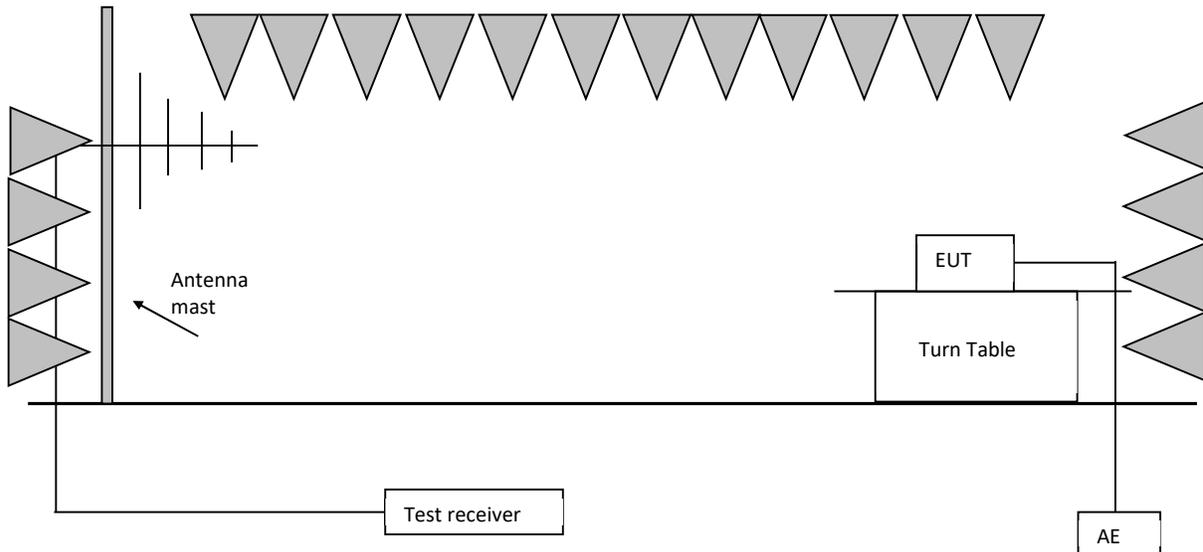
Frequency (MHz)	Permitted limit in dB μ V/m (Average) of Measurement Distance 3m	Permitted limit in dB μ V/m (Peak) of Measurement Distance 3m
1000 ~ 3000	50	70
3000 ~ 6000	54	74

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
$F_x \leq 108$ MHz	1 GHz
108 MHz $< F_x \leq 500$ MHz	2 GHz
500 MHz $< F_x \leq 1$ GHz	5 GHz
$F_x > 1$ GHz	$5 \times F_x$ up to a maximum of 8 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

Horizontal

Vertical

Polarization	Frequency (MHz)	Corrected Reading (dBμV/m)	Corrected Factor (dB/m)	Limits (dBμV/m)	Margin (dBμV/m)
Horizontal					
Vertical					

- Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), 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 Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
 Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00 dBμV,
 Limit = 40.00 dBμV/m.
 Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
 Corrected Reading = 10 dBμV/ + 0.20dB/m = 10.20 dBμV/m;
 Margin = 40.00 dBμV/m - 10.20 dBμV/m = 29.80dB.

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

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.

Configuration 1

Power and THD results

True power P:	96.21W	Apparent power S:	198.9VA
Reactiv power Q:	174.1var	Power factor:	0.484
THD (U):	0.001	THD (I):	0.05
Crest Factor (U):	1.414	Crest Factor (I):	1.371

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	855.009E-3			
2	22.189E-3	2.055	1.08	PASS
3	24.631E-3	1.071	2.30	PASS
4	4.295E-3			PASS
5	9.396E-3	0.824	1.14	PASS
6	1.800E-3			PASS
7	13.988E-3	1.817	770.00E-3	PASS
8	1.178E-3			PASS
9	10.795E-3	2.699	400.00E-3	PASS
10	1.144E-3			PASS
11	9.793E-3	2.968	330.00E-3	PASS

12	924.935E-6			PASS
13	10.387E-3	4.946	210.00E-3	PASS
14	1.066E-3			PASS
15	8.858E-3	5.905	150.00E-3	PASS
16	796.466E-6			PASS
17	7.178E-3	5.424	132.35E-3	PASS
18	1.066E-3			PASS
19	6.236E-3	5.266	118.42E-3	PASS
20	780.779E-6			PASS
21	5.133E-3			PASS
22	805.953E-6			PASS
23	4.498E-3			PASS
24	807.083E-6			PASS
25	3.718E-3			PASS
26	880.442E-6			PASS
27	3.210E-3			PASS
28	1.764E-3			PASS
29	2.885E-3			PASS
30	1.018E-3			PASS
31	2.488E-3			PASS
32	1.120E-3			PASS
33	2.400E-3			PASS
34	816.590E-6			PASS
35	2.372E-3			PASS
36	989.256E-6			PASS
37	2.299E-3			PASS
38	785.640E-6			PASS
39	2.196E-3			PASS
40	777.643E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	860.181E-3			
2	23.184E-3	1.431	1.62	PASS
3	26.042E-3	0.755	3.45	PASS
4	4.933E-3			PASS
5	10.463E-3	0.612	1.71	PASS
6	2.118E-3			PASS
7	14.603E-3	1.264	1.15	PASS
8	1.372E-3			PASS
9	11.329E-3	1.888	600.00E-3	PASS
10	1.298E-3			PASS
11	10.214E-3	2.063	495.00E-3	PASS
12	1.053E-3			PASS
13	10.580E-3	3.359	315.00E-3	PASS
14	1.188E-3			PASS
15	9.058E-3	4.026	225.00E-3	PASS
16	887.303E-6			PASS
17	7.337E-3	3.696	198.52E-3	PASS
18	1.152E-3			PASS
19	6.349E-3	3.574	177.63E-3	PASS
20	878.001E-6			PASS

21	5.291E-3	3.292	160.71E-3	PASS
22	899.750E-6			PASS
23	4.705E-3			PASS
24	919.424E-6			PASS
25	3.905E-3			PASS
26	983.964E-6			PASS
27	3.364E-3			PASS
28	1.959E-3			PASS
29	3.080E-3			PASS
30	1.152E-3			PASS
31	2.640E-3			PASS
32	1.256E-3			PASS
33	2.515E-3			PASS
34	925.823E-6			PASS
35	2.483E-3			PASS
36	1.100E-3			PASS
37	2.418E-3			PASS
38	899.298E-6			PASS
39	2.346E-3			PASS
40	884.990E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Configuration 2

Power and THD results

True power P:	113.4W	Apparent power S:	193.4VA
Reactiv power Q:	156.6var	Power factor:	0.587
THD (U):	0.001	THD (I):	0.061
Crest Factor (U):	1.414	Crest Factor (I):	1.383

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	838.268E-3			
2	16.793E-3	1.555	1.08	PASS
3	31.347E-3	1.363	2.30	PASS
4	5.994E-3	1.394	430.00E-3	PASS
5	15.721E-3	1.379	1.14	PASS
6	2.695E-3			PASS
7	13.631E-3	1.770	770.00E-3	PASS
8	1.762E-3			PASS
9	10.039E-3	2.510	400.00E-3	PASS
10	1.438E-3			PASS
11	11.301E-3	3.425	330.00E-3	PASS
12	1.099E-3			PASS
13	10.101E-3	4.810	210.00E-3	PASS
14	1.210E-3			PASS
15	8.227E-3	5.484	150.00E-3	PASS
16	856.555E-6			PASS
17	6.995E-3	5.285	132.35E-3	PASS
18	1.082E-3			PASS

19	6.061E-3	5.119	118.42E-3	PASS
20	824.813E-6			PASS
21	5.028E-3			PASS
22	826.660E-6			PASS
23	4.546E-3			PASS
24	865.899E-6			PASS
25	3.948E-3			PASS
26	851.125E-6			PASS
27	3.452E-3			PASS
28	1.388E-3			PASS
29	3.107E-3			PASS
30	919.480E-6			PASS
31	3.024E-3			PASS
32	1.016E-3			PASS
33	2.978E-3			PASS
34	824.545E-6			PASS
35	2.864E-3			PASS
36	813.328E-6			PASS
37	2.779E-3			PASS
38	813.515E-6			PASS
39	2.590E-3			PASS
40	812.005E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	916.325E-3			
2	17.736E-3	1.095	1.62	PASS
3	33.516E-3	0.971	3.45	PASS
4	6.686E-3	1.037	645.00E-3	PASS
5	16.820E-3	0.984	1.71	PASS
6	3.207E-3			PASS
7	14.819E-3	1.283	1.15	PASS
8	2.029E-3			PASS
9	10.866E-3	1.811	600.00E-3	PASS
10	1.605E-3			PASS
11	12.207E-3	2.466	495.00E-3	PASS
12	1.220E-3			PASS
13	11.138E-3	3.536	315.00E-3	PASS
14	1.300E-3			PASS
15	9.026E-3	4.012	225.00E-3	PASS
16	938.190E-6			PASS
17	7.618E-3	3.837	198.52E-3	PASS
18	1.201E-3			PASS
19	6.509E-3	3.664	177.63E-3	PASS
20	897.757E-6			PASS
21	5.408E-3			PASS
22	968.569E-6			PASS
23	4.996E-3			PASS
24	984.059E-6			PASS
25	4.244E-3			PASS
26	946.750E-6			PASS
27	3.720E-3			PASS

28	1.508E-3			PASS
29	3.285E-3			PASS
30	1.016E-3			PASS
31	3.280E-3			PASS
32	1.132E-3			PASS
33	3.236E-3			PASS
34	913.793E-6			PASS
35	3.159E-3			PASS
36	911.933E-6			PASS
37	3.030E-3			PASS
38	935.962E-6			PASS
39	2.852E-3			PASS
40	982.243E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Configuration 3

Power and THD results

True power P:	118W	Apparent power S:	190.2VA
Reactiv power Q:	149.1var	Power factor:	0.621
THD (U):	0.001	THD (I):	0.055
Crest Factor (U):	1.414	Crest Factor (I):	1.362

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	821.778E-3			
2	11.095E-3	1.027	1.08	PASS
3	32.510E-3	1.413	2.30	PASS
4	5.931E-3	1.379	430.00E-3	PASS
5	17.744E-3	1.556	1.14	PASS
6	2.783E-3			PASS
7	13.303E-3	1.728	770.00E-3	PASS
8	1.785E-3			PASS
9	10.582E-3	2.646	400.00E-3	PASS
10	1.385E-3			PASS
11	12.172E-3	3.688	330.00E-3	PASS
12	1.123E-3			PASS
13	10.342E-3	4.925	210.00E-3	PASS
14	1.232E-3			PASS
15	8.334E-3	5.556	150.00E-3	PASS
16	857.632E-6			PASS
17	7.135E-3	5.391	132.35E-3	PASS
18	1.072E-3			PASS
19	6.156E-3	5.199	118.42E-3	PASS
20	808.076E-6			PASS
21	5.138E-3	3.197	160.71E-3	PASS
22	821.884E-6			PASS
23	4.680E-3			PASS
24	856.538E-6			PASS
25	4.006E-3			PASS

26	858.051E-6		PASS
27	3.502E-3		PASS
28	1.366E-3		PASS
29	3.281E-3		PASS
30	897.818E-6		PASS
31	3.259E-3		PASS
32	1.007E-3		PASS
33	3.215E-3		PASS
34	806.675E-6		PASS
35	3.068E-3		PASS
36	804.162E-6		PASS
37	2.974E-3		PASS
38	799.404E-6		PASS
39	2.775E-3		PASS
40	805.061E-6		PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	823.234E-3			
2	11.599E-3	0.716	1.62	PASS
3	33.386E-3	0.968	3.45	PASS
4	6.150E-3	0.953	645.00E-3	PASS
5	18.322E-3	1.071	1.71	PASS
6	2.965E-3			PASS
7	13.484E-3	1.167	1.15	PASS
8	1.955E-3			PASS
9	10.716E-3	1.786	600.00E-3	PASS
10	1.504E-3			PASS
11	12.334E-3	2.492	495.00E-3	PASS
12	1.224E-3			PASS
13	10.492E-3	3.331	315.00E-3	PASS
14	1.376E-3			PASS
15	8.499E-3	3.778	225.00E-3	PASS
16	928.927E-6			PASS
17	7.300E-3	3.677	198.52E-3	PASS
18	1.156E-3			PASS
19	6.282E-3	3.536	177.63E-3	PASS
20	913.128E-6			PASS
21	5.254E-3	3.269	160.71E-3	PASS
22	932.011E-6			PASS
23	5.014E-3			PASS
24	970.876E-6			PASS
25	4.127E-3			PASS
26	978.329E-6			PASS
27	3.629E-3			PASS
28	1.490E-3			PASS
29	3.421E-3			PASS
30	1.049E-3			PASS
31	3.448E-3			PASS
32	1.124E-3			PASS
33	3.338E-3			PASS
34	941.723E-6			PASS

Total Quality. Assured.

35	3.241E-3		PASS
36	1.036E-3		PASS
37	3.107E-3		PASS
38	1.017E-3		PASS
39	2.890E-3		PASS
40	1.039E-3		PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

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 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.

Configuration 1

	EUT values	Limit	Result
Pst	0.249	1.00	PASS
Plt	0.198	0.65	PASS
dc [%]	0.196	3.30	PASS
dmax [%]	1.732	4.00	PASS
dt [s]	0.000	0.50	PASS

Configuration 2

	EUT values	Limit	Result
Pst	0.246	1.00	PASS
Plt	0.195	0.65	PASS
dc [%]	0.203	3.30	PASS
dmax [%]	1.731	4.00	PASS
dt [s]	0.000	0.50	PASS

Configuration 3

	EUT values	Limit	Result
Pst	0.264	1.00	PASS
Plt	0.206	0.65	PASS
dc [%]	0.201	3.30	PASS
dmax [%]	1.720	4.00	PASS
dt [s]	0.000	0.50	PASS

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.

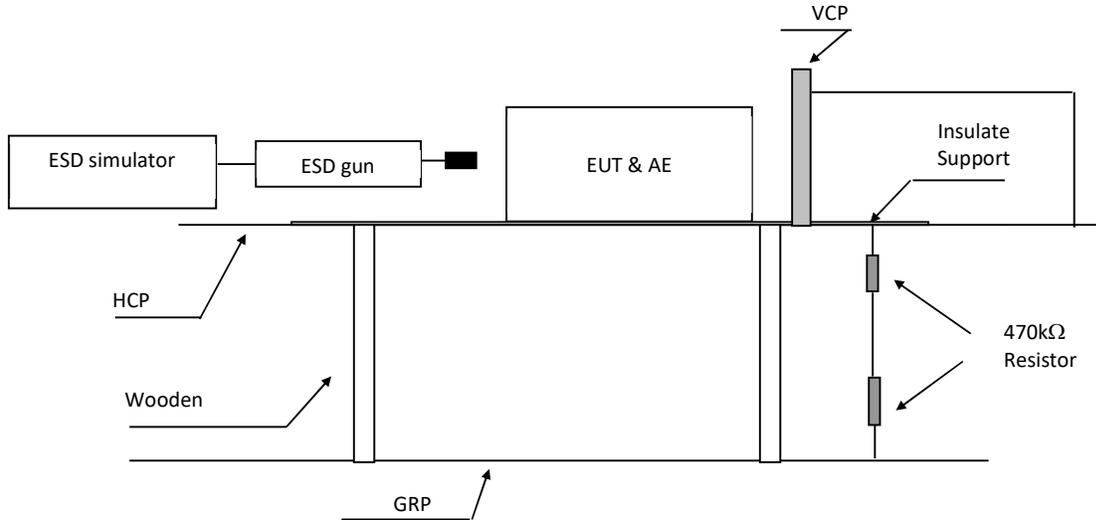
9.1.2 Performance Criterion

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).

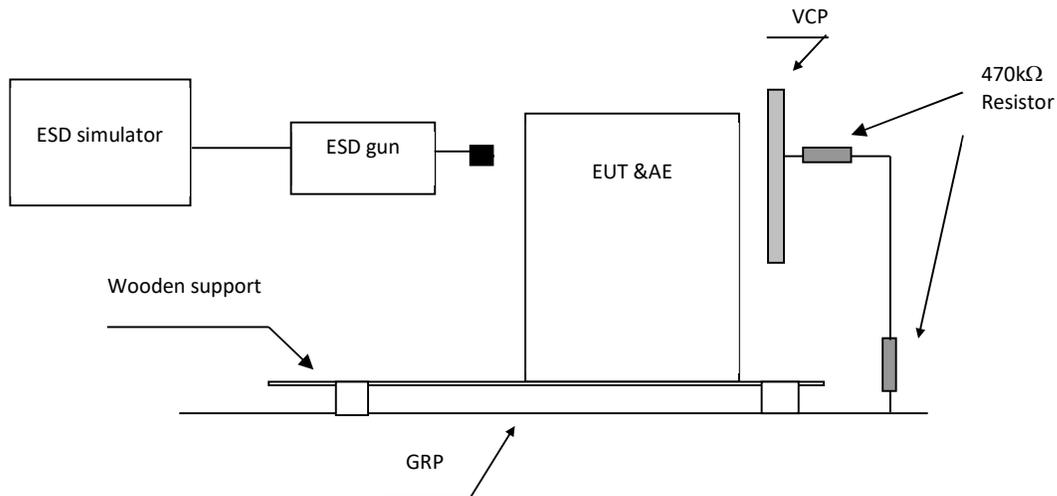
9.2 Block Diagram of Test Setup

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	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

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

Conclusion: The EUT met the requirements.

10. Radio frequency electromagnetic fields

Test result: NA

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

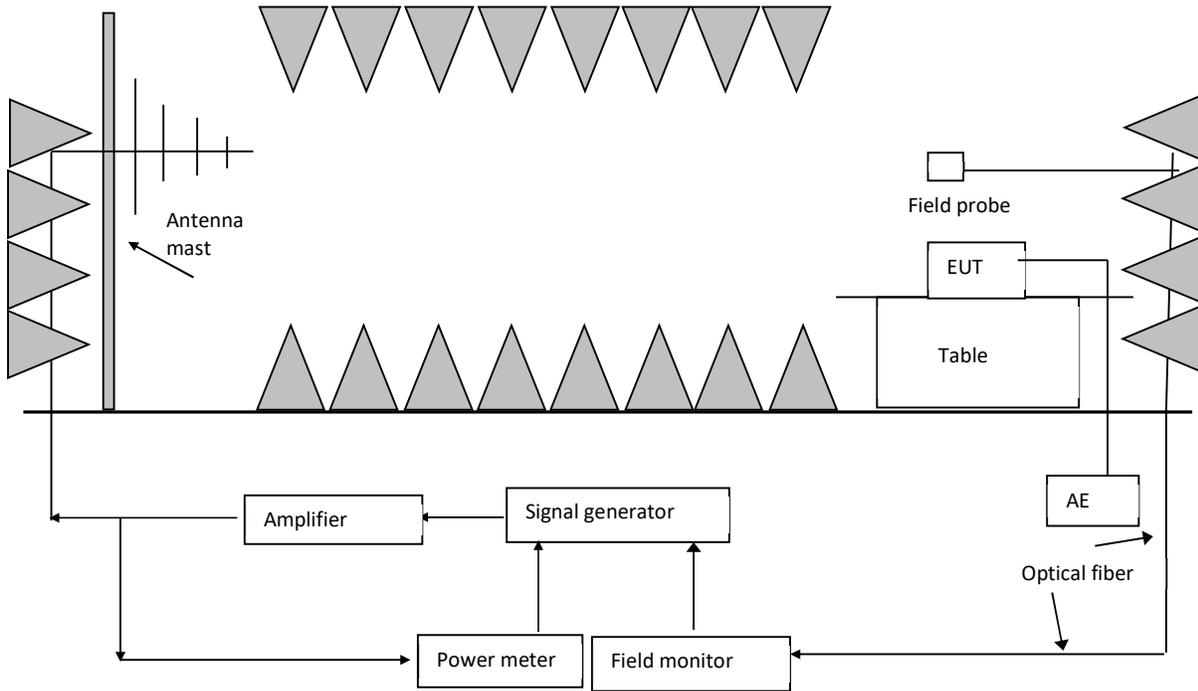
Notes:

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		-
1	1000-6000	H & V	3	1kHz, 80%, SW, AM, 1% step size	All sides		-

Observation:

Conclusion:

11. Fast transients

Test result: **PASS**

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 :

- "X" is an open level. The level has to be specified in the dedicated equipment specification.
- The gray rows were the selected test level.

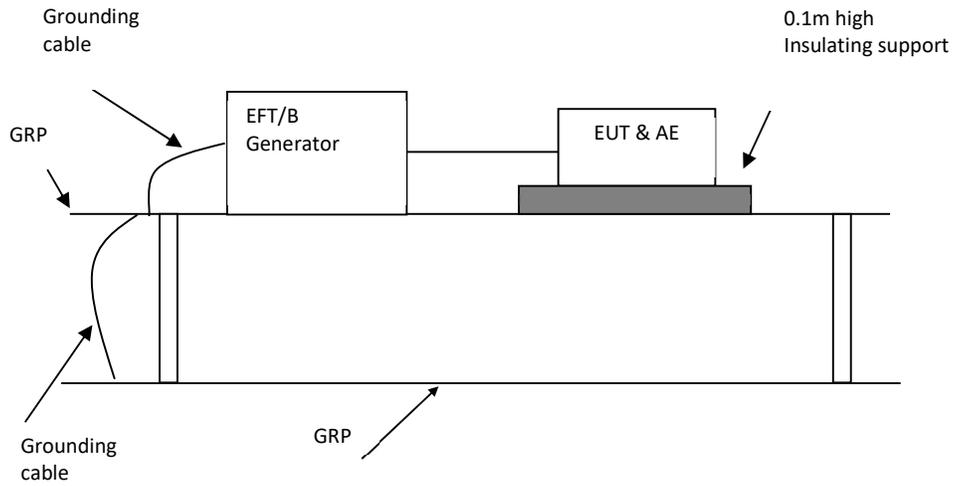
11.1.2 Performance Criterion

Performance criterion **B**

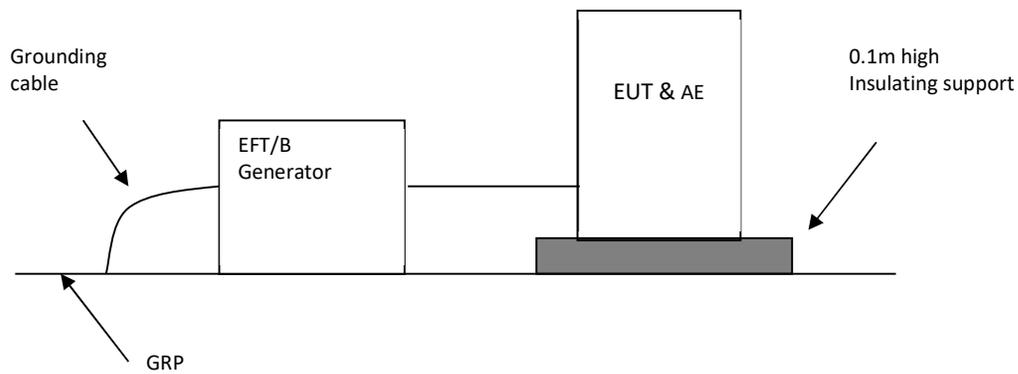
11.2 Block Diagram of Test Setup

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

For table-top equipment

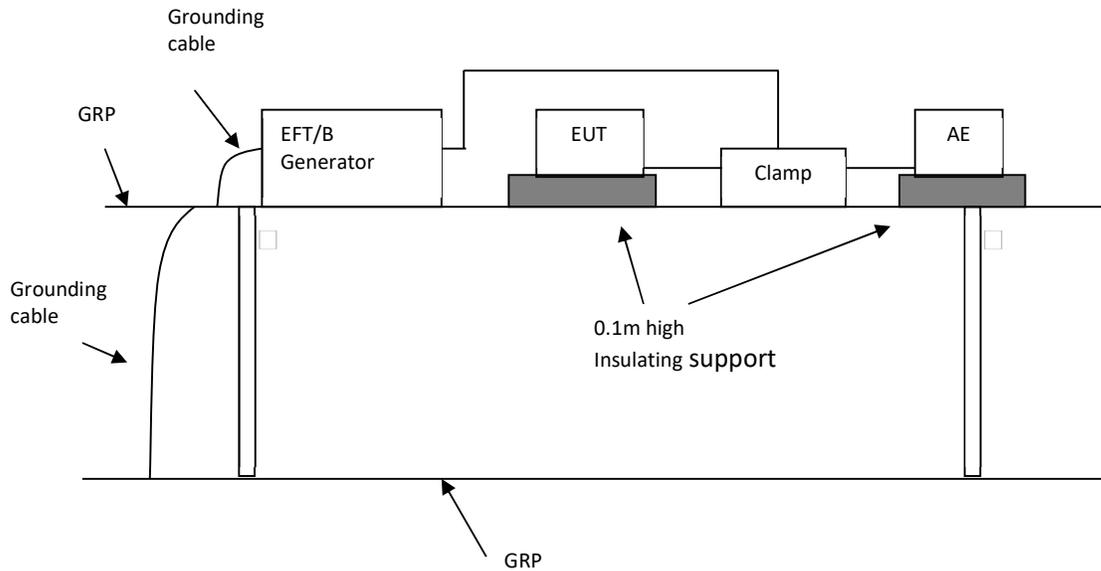


For floor standing equipment

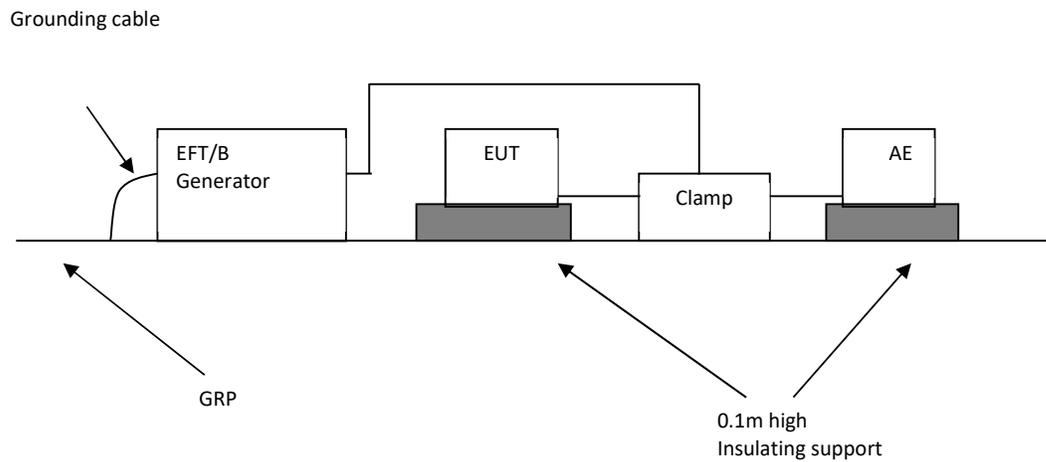


11.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

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

Conclusion: The EUT met the requirements.

12. Surges

Test result: **PASS**

12.1 Severity Level and Performance Criterion

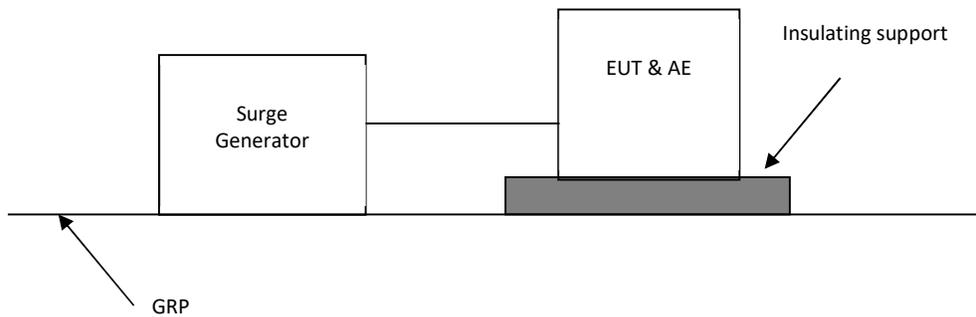
12.1.1 Test level

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 ⁰ 270 ⁰	Input AC power ports (line to line)	Pass
2	2	+ -	90 ⁰ 270 ⁰	Input AC power ports (line to earth)	Pass
3	1	+ -	90 ⁰ 270 ⁰	Wired network ports (line-to-earth (unshielded))	NA
4	0.5	+ -	90 ⁰ 270 ⁰	Wired network ports (shield-to-earth (shielded))	NA

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

Conclusion: The EUT met the requirements.

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(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.

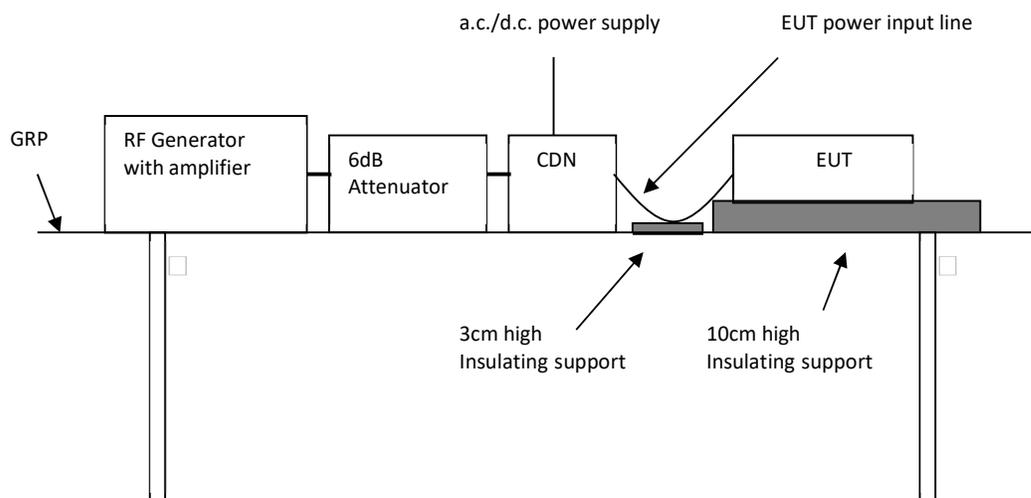
13.1.2 Performance Criterion

Performance criterion: **A**

13.2 Block Diagram of Test Setup

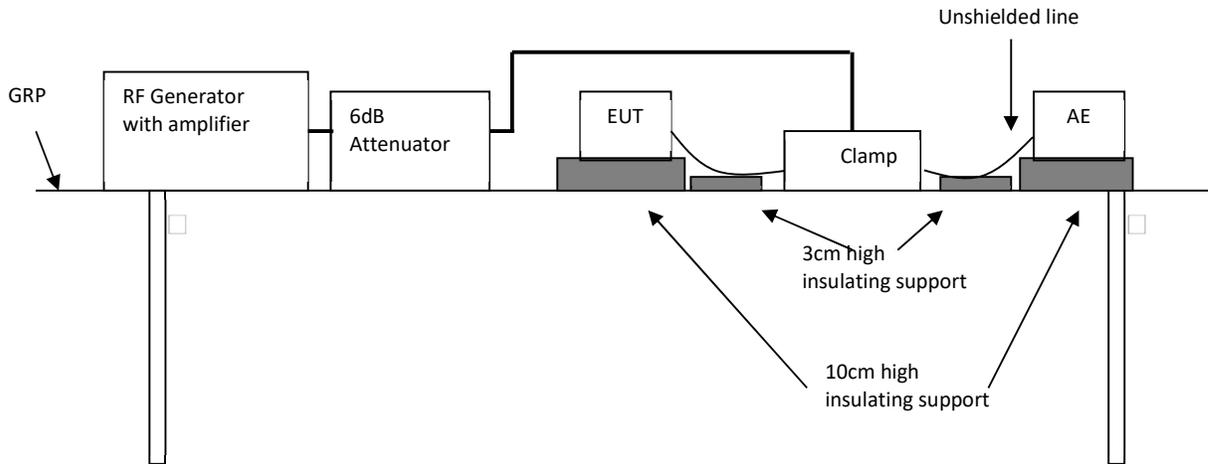
13.2.1 Block Diagram for a.c./d.c input power line

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

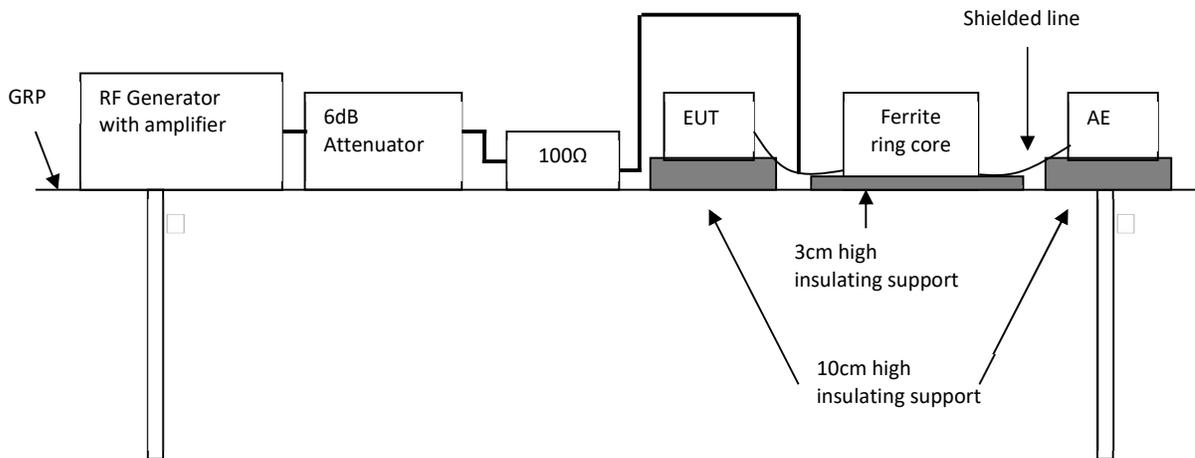


13.2.2 Block Diagram for output a.c./d.c. power line or signal/control lines

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

Conclusion: The EUT met the requirements.

14. Voltage Dips

Test result: PASS

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

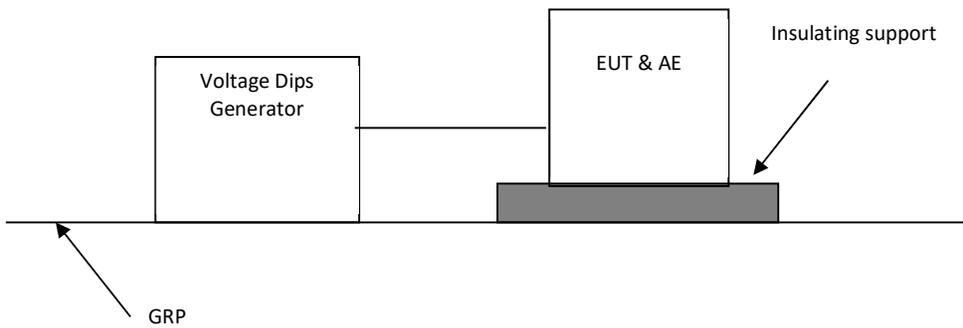
Notes:

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 % UT	Duration (in periods)	Pass/Fail/NA
1	70	30	25 cycles at 50Hz	Pass
			30 cycles at 60Hz	NA
2	40	60	10 cycles at 50Hz	Pass
			12 cycles at 60Hz	NA
3	0	100	0.5 cycle at 50Hz	Pass
			0.5 cycle at 60Hz	NA

Observation: During test, the EUT worked unsteadily. Once the interference is removed, it recovered its normal mode at once

Conclusion: The EUT met the requirements.

Appendix I: Photograph of equipment under test

Photo 1
Description: front view



Photo 2
Description: back view



Photo 3
Description: side view



Photo 4
Description: side view



Photo 5
Description: bottom view

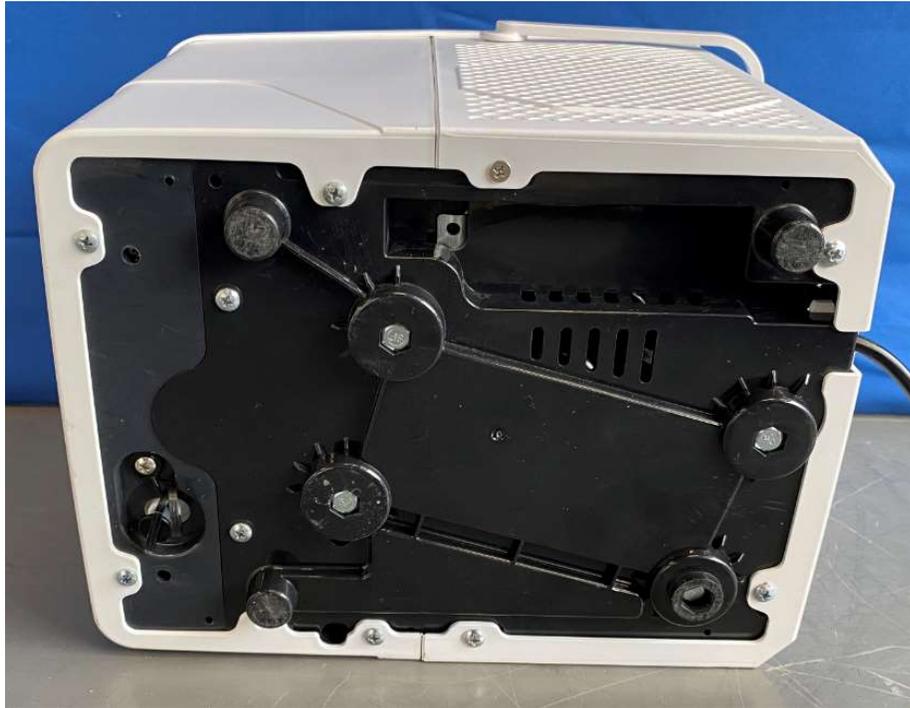


Photo 6
Description: door open view



Photo 7
Description: container view



Photo 8
Description: internal view

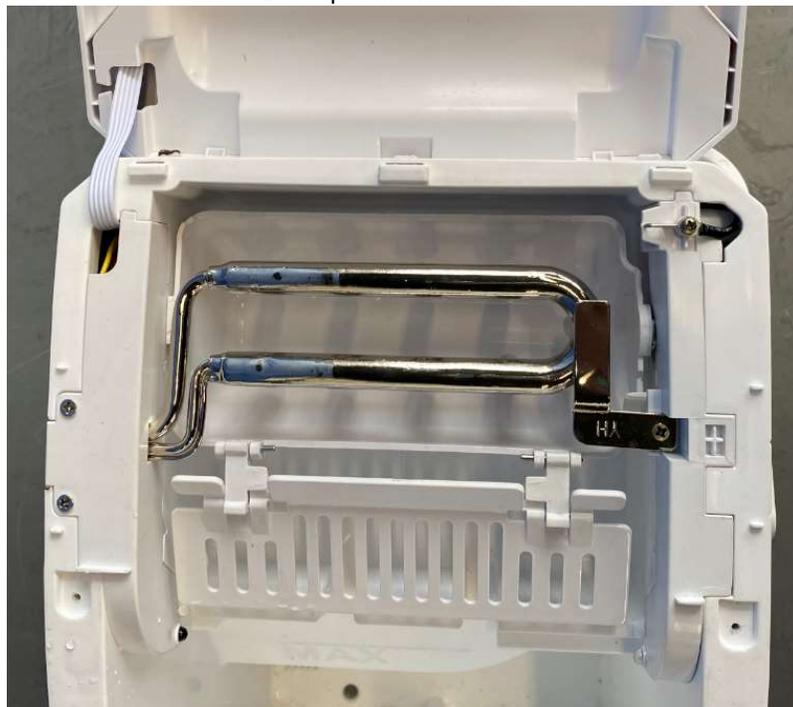


Photo 9
Description: internal view

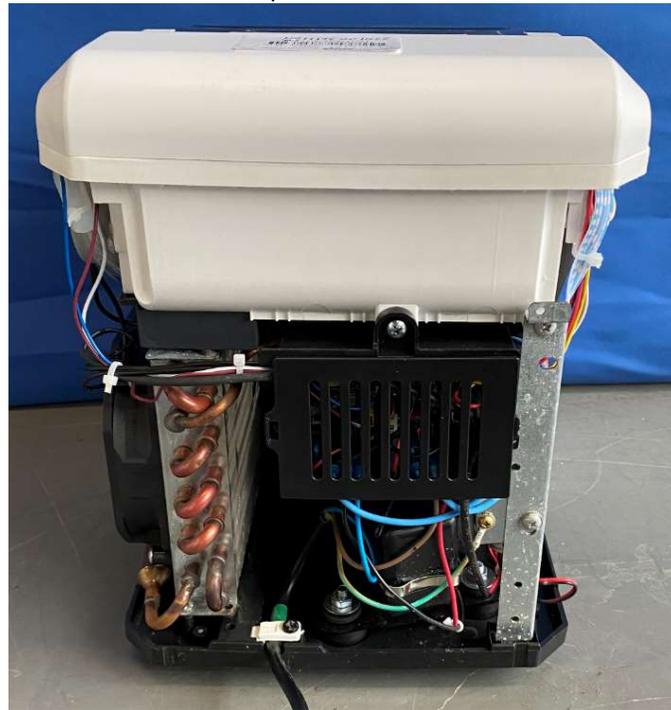


Photo 10
Description: internal view

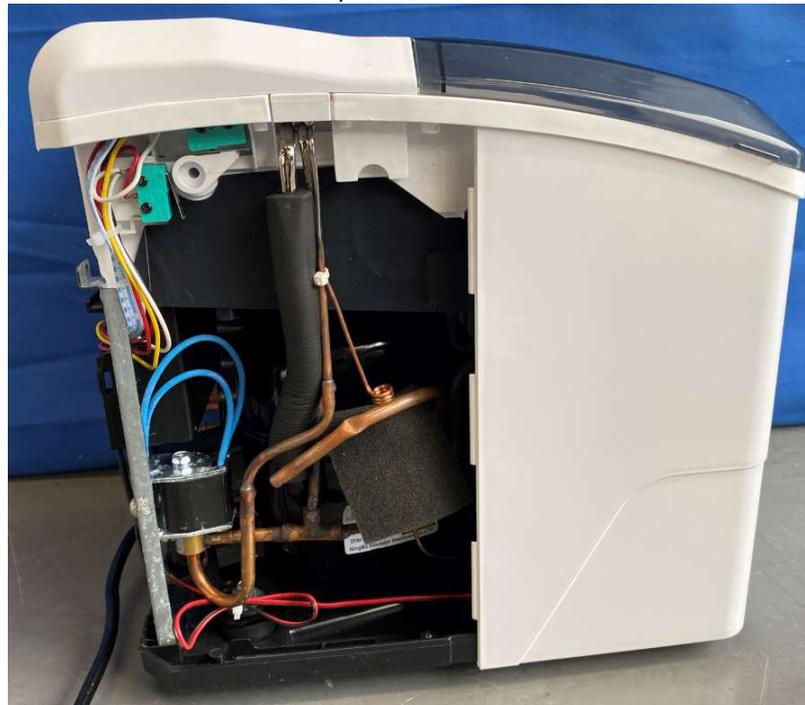


Photo 11
Description: internal view



Photo 12
Description: main PCB view (FY-YT2-ZBJ-P)

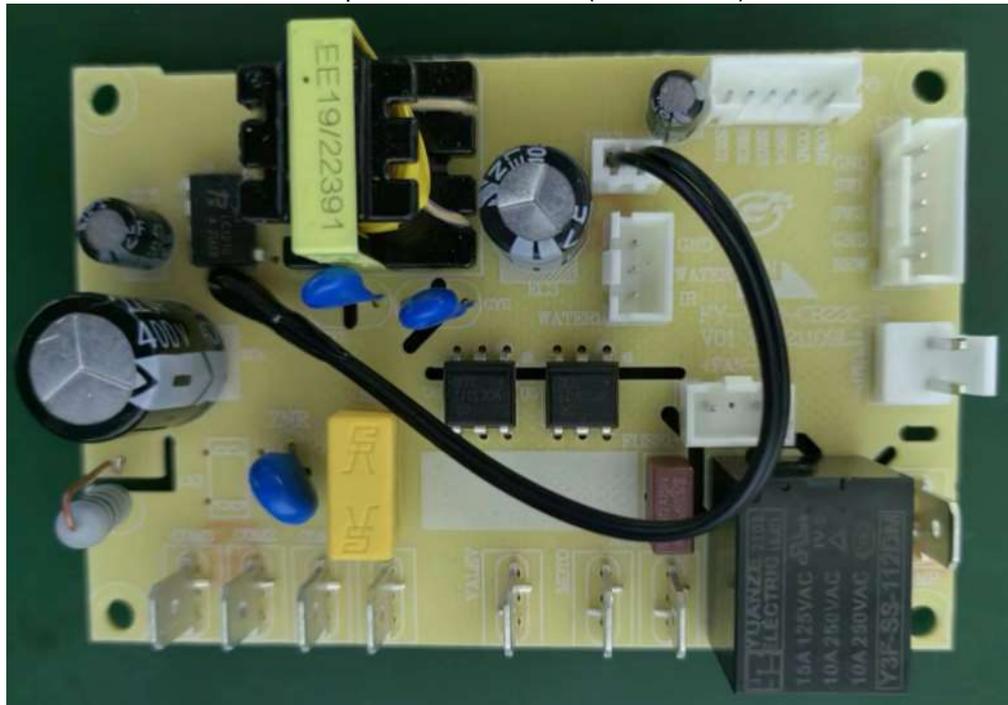


Photo 13
Description: main PCB view (FY-YT2-ZBJ-P)

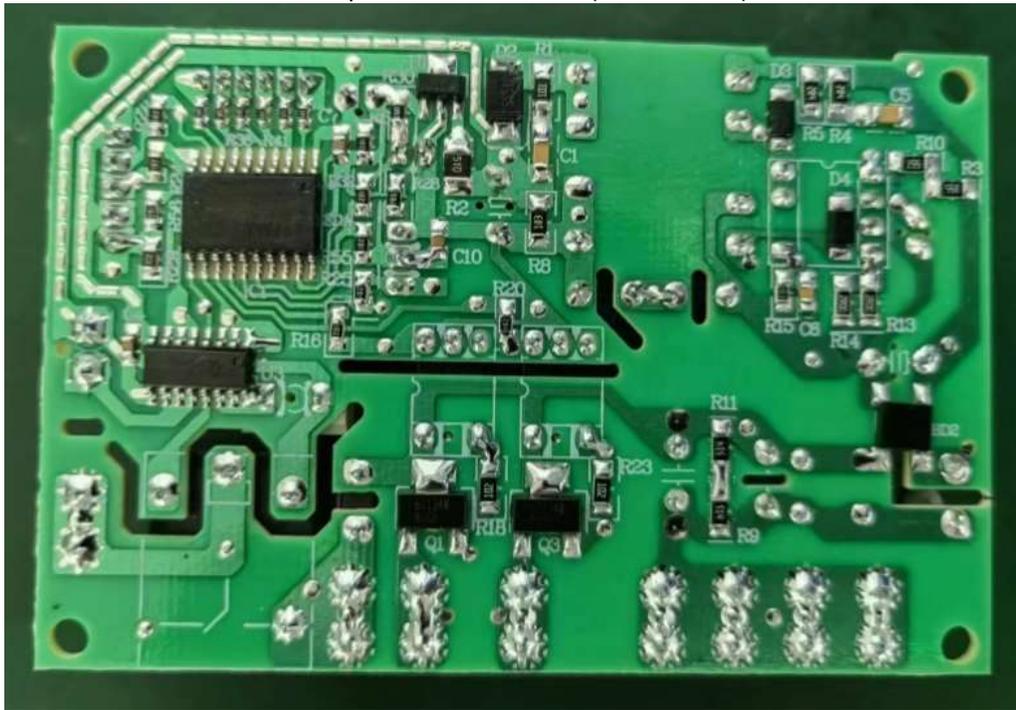


Photo 14
Description: alternative main PCB view (LS2301)

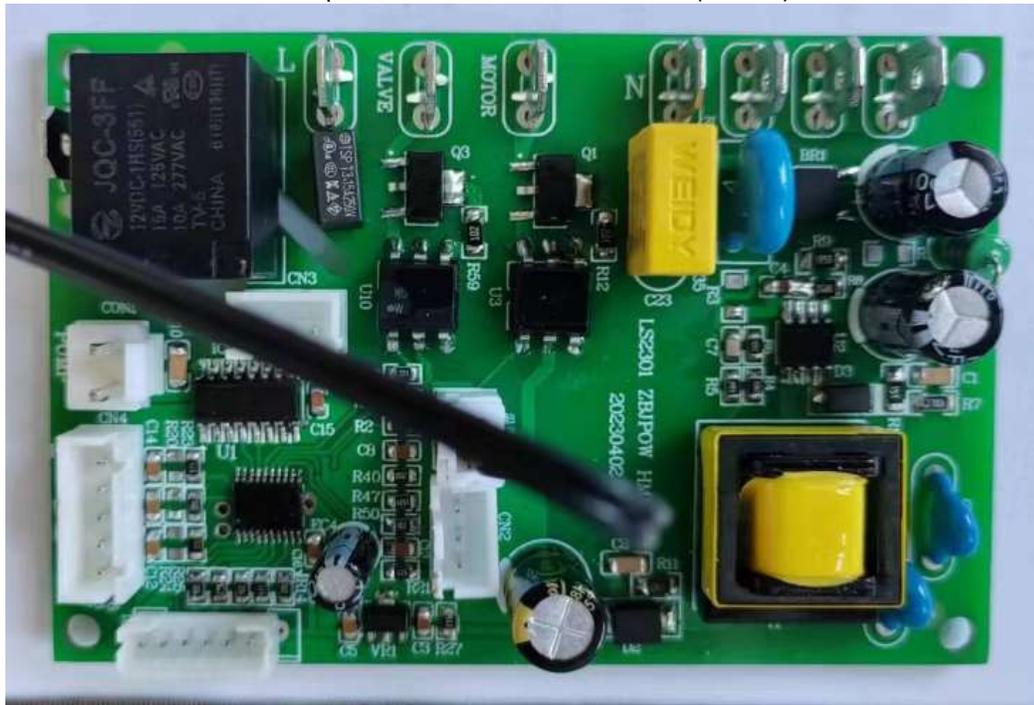


Photo 15

Description: alternative main PCB view (LS2301)

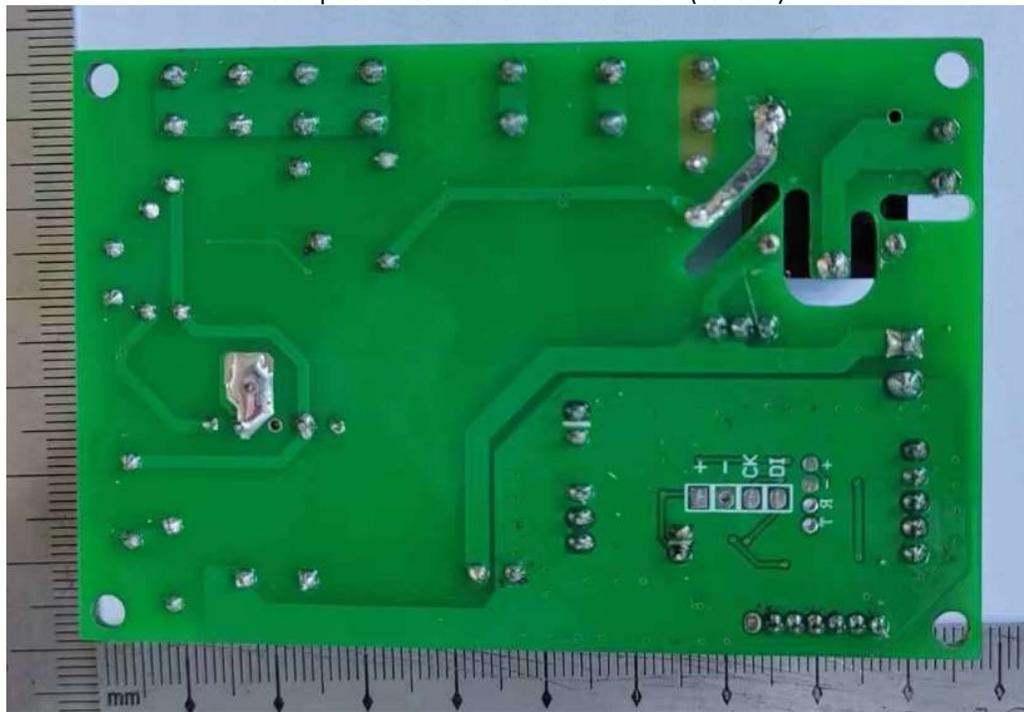


Photo 16

Description: alternative main PCB view (SY-ZBJ-CB22C)

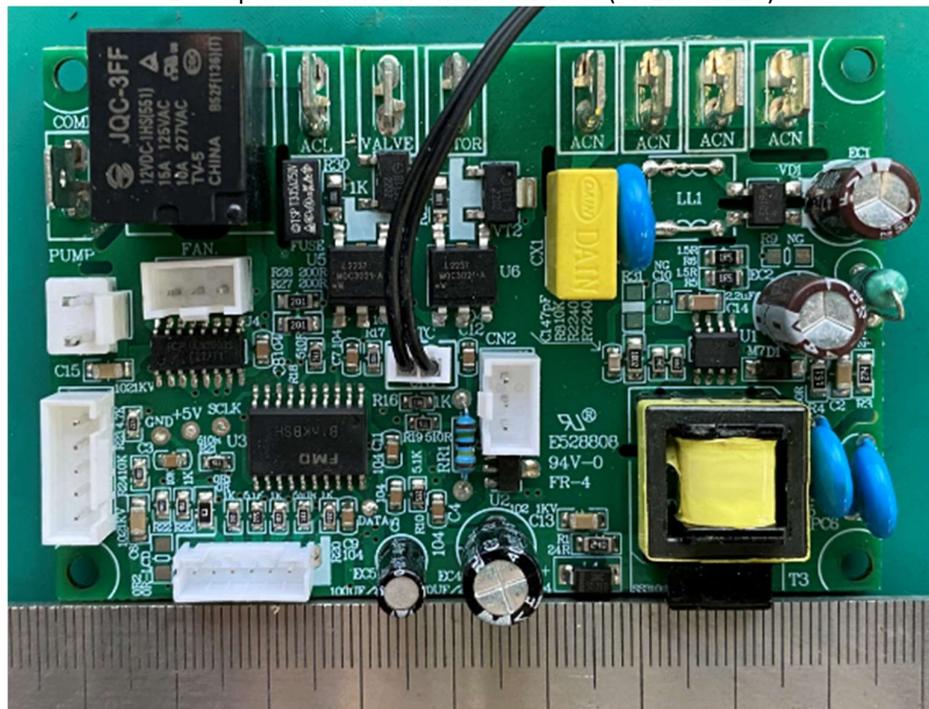


Photo 17

Description: alternative main PCB view (SY-ZBJ-CB22C)

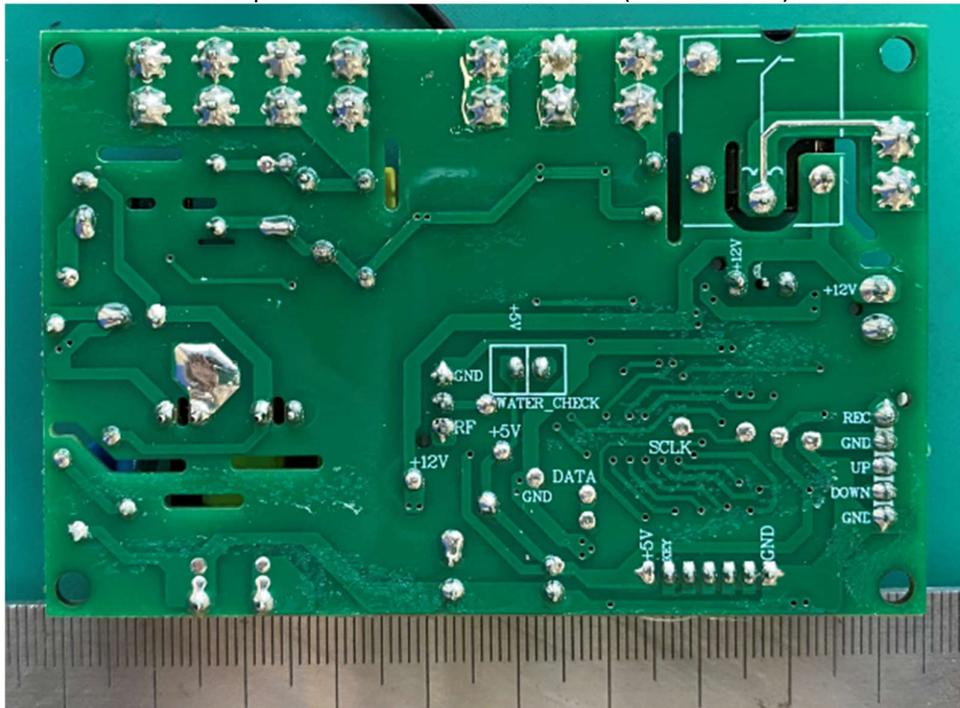


Photo 18

Description: control panel view



Photo 19
Description: control PCB view



Photo 20
Description: control PCB view



Photo 21
Description: alternative control panel view



Photo 22

Description: alternative control PCB view



Photo 23

Description: alternative control PCB view



Photo 24

Description: alternative control PCB view

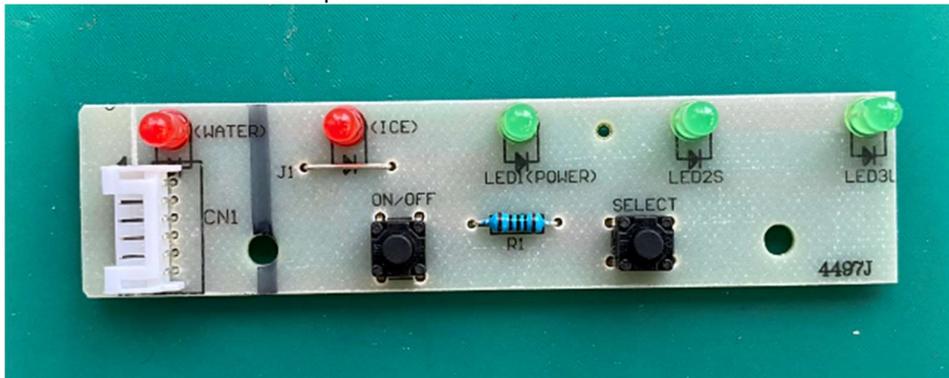


Photo 25

Description: alternative control PCB view



Photo 26

Description: earthing view



END of the report