



EMC TEST REPORT

For

BIRD REPELLER

Model No.: FR-868

Prepared for : NINGBO RABBIT ELECTRICAL APPLIANCE CO.,LTD.
Address : NO.22 XINGYE ROAD,INDUSTRIAL AREA , YANGMING YUYAO,ZHEJIANG

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Test Result Certification

Applicant's name: NINGBO RABBIT ELECTRICAL APPLIANCE CO.,LTD.

Address: NO.22 XINGYE ROAD,INDUSTRIAL AREA , YANGMING YUYAO,ZHEJIANG

Manufacture's Name: NINGBO RABBIT ELECTRICAL APPLIANCE CO.,LTD.

Address: NO.22 XINGYE ROAD,INDUSTRIAL AREA , YANGMING YUYAO,ZHEJIANG

Product name: BIRD REPELLER

Model name: FR-868

Trademark: N/A

Standards: EN IEC 55014-1:2021
EN IEC 55014-2:2021
EN IEC 61000-3-2:2019+A2:2024
EN 61000-3-3:2013+A1:2019+A2:2021

This device described above has been tested by Guangdong KAIXU Testing Technology Co., Ltd.. and the test results show that the equipment under test (EUT) is in compliance with the EMC requirements. And it is applicable only to the tested sample identified in the report.

Tested by: Kevin Yang
Kevin Yang Oct. 14, 2025

Reviewed by: Terry Huang
Terry Huang Oct. 14, 2025

Approved by: Store Chu
Store Chu Oct. 14, 2025

1 General Description

1.1 Description of EUT

Product name:	BIRD REPELLER
Model name:	FR-868
Series Model:	/
Different of series model:	/
Power supply:	Battery: DC 4.8V, 300mAh
Adapter information:	N/A

1.2 Test mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test mode	Description
Mode 1	Working
Mode 2	/
Mode 3	/

Note: The test modes were carried out for all operation modes. The final test mode of the EUT was the worst test mode for EMI, and its test data is showed.

1.3 Test setup

See photographs of the test setup in the report for the actual setup and connections between EUT and support equipment.

1.4 Ancillary equipment

Equipment	Model	S/N	Manufacturer
Adapter	/	/	/

2 Summary of Test Result

No.	Test Standard	Description of Test	Result	Remark
Emission				
1	EN IEC 55014-1:2021	Conducted emission	N/A	
2		Radiated emission	Pass	
3	EN IEC 61000-3-2:2019+A2:2024	Harmonic current emission	N/A	
4	EN 61000-3-3:2013+A1:2019+A2:2021	Voltage fluctuations & flicker	N/A	
Immunity				
1	EN IEC 55014-2:2021	Electrostatic discharges (ESD)	Pass	
2		Radiated electromagnetic field disturbances (RS)	Pass	
3		Conducted disturbances (CS)	N/A	
4		Power frequency magnetic field	N/A	
5		Electrical fast transients/burst (EFT/S)	N/A	
6		Surges	N/A	
7		Voltage dips and interruptions	N/A	
N/A: Mean not applicable.				

3 Test Facilities and Accreditations

3.1 Test laboratory

Test Site	Guangdong KAIKU Testing Technology Co., Ltd.
Test Site Location	Room 215, Building 2, No. 123, Dongcheng Section, Guanlong Road, Dongcheng Street, Dongguan City, Guangdong Province, China
Telephone:	(86-755)-85254458
Fax:	(86-755)-85254458
CNAS Registration No.:	/

3.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	20°C~30°C
Humidity	30%~70% (30%~60% for ESD)
Atmospheric pressure	98kPa~101kPa

3.3 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2xUc(y)$

Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	±1 degree
Humidity	± 5 %

3.4 Test software

Software name	Manufacturer	Model	Version
EMI Measurement Software	Farad	EZ-EMC	V1.1.4.2
Conducted immunity test system	Scholder	EN61000-4-6.exe	V1.3.0
Harmonics and flicker test system	TTI	HA-PC Link	V2.02
DIPS Test Firmware	Prima	DRP61011AG	V4.1.2
EFT Test Firmware	HTEC	HCOMPACT	V1.0.1
Surge Test Firmware	HTEC+	HCOMPACT	V1.0.1

4 List of test equipment

For conducted emission at the mains terminals test

Name of Equipment	Manufacturer	Model	Equipment	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCI	KTi-EL-203	1166.5950.03-101142	Mar. 03, 2025	1 Year
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	KTi-EL-201	0357.8810.54-101857-hz	Mar. 03, 2025	1 Year
LISN	Rohde&Schwarz	ENV216	KTi-EL-202	3560.6550.12-103020-YU	Mar. 03, 2025	1 Year
Test software	Tonscend	JS32-CE Version 5.0.0				

For radiated emission test (30MHz-1GHz)

Name of Equipment	Manufacturer	Model	Equipment	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCI7	KTi-EL-205	1166.5950.03-100633	Mar. 03, 2025	1 Year
Logarithmic periodic antenna	Schwarzbeck	VULB9168	KTi-EL-209	01145	Mar. 06, 2025	3 Year
Preamplifier	HP	8447F	KTi-EL-210	1-18-53G22	Mar. 03, 2025	1 Year
3m Anechoic Chamber	Taihe MaoRui	9*6*6	KTi-EL-234	/	Oct. 09, 2024	5 Year
Test software	Tonscend	JS32-RE Version 5.0.0				

For radiated emission test (1GHz above)

Name of Equipment	Manufacturer	Model	Equipment	Serial No.	Last Cal.	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCI 7	KTi-EL-205	1166.5950.03-100633	Mar. 03, 2025	1 Year
Horn antenna	Schwarzbeck	BBHA9120D	KTi-EL-239	03083	Mar. 06, 2025	3 Year
Preamplifier	/	1-18-53G22	KTi-EL-240	2501020026	Mar. 03, 2025	1 Year
Test software	Tonscend	JS32-RE Version 5.0.0				

For harmonic current emissions and voltage fluctuations/flicker test

Name of Equipment	Manufacturer	Model	Equipment	Serial No.	Last Cal.	Cal. Interval
AC Power Source	California instruments	5001i-400	KTi-EL-248	55979	May 17, 2025	1 Year
Harmonic and Flicker Analyzer	California instruments	PACS-1	KTi-EL-249	72145	May 17, 2025	1 Year
Test software	California Instruments	CTS 4 Version 4.32.0				

For electrostatic discharge immunity test

Name of Equipment	Manufacturer	Model	Equipment	Serial No.	Last Cal.	Cal. Interval
ESD Tester	PRIMA	ESD61002TB	KTi-EL-215	PR9240625796	Mar. 05, 2025	1 Year

For radio frequency electromagnetic field immunity (R/S) test

Name of Equipment	Manufacturer	Model	Equipment	Serial No.	Last Cal.	Cal. Interval
Amplifier	Micotop	MPA-80-1000-250	KTi-EL-258	MAP2503096	May 17, 2025	1 Year
Amplifier	Micotop	MPA-1000-6000-100	KTi-EL-259	MPA2503098	May 19, 2025	1 Year
Power Meter	Agilent	E4417A	KTi-EL-260	GB41293356	May 17, 2025	1 Year
Power Sensor	Agilent	E9304A	KTi-EL-261	MY55200008	May 17, 2025	1 Year
Power Sensor	Agilent	E9304A	KTi-EL-262	MY55200004	May 17, 2025	1 Year
Signal Generator	ROHDE&SCHWARZ	SMB100A	KTi-EL-263	102913	May 17, 2025	1 Year
Log-Per-Broadband Antenna	SKET	STLP 9129 PLUS	KTi-EL-264	/	May 19, 2025	3 Year
Audio Analyzer	ROHDE&SCHWARZ	UPP200	KTi-EL-267	120175	May 17, 2025	1 Year

For electrical fast transient/burst immunity test

Name of Equipment	Manufacturer	Model	Equipment	Serial No.	Last Cal.	Cal. Interval
Fast Transient Burst Simulator	PRIMA	EFT61004TA	KTi-EL-218	PR9240743972	Mar. 03, 2025	1 Year
Clamp	PRIMA	PEFT-C105	KTi-EL-219	PEFT-1170	Mar. 03, 2025	1 Year

For surge immunity test

Name of Equipment	Manufacturer	Model	Equipment	Serial No.	Last Cal.	Cal. Interval
Lighting Surge Generator	PRIMA	SUG61005TB-2216	KTi-EL-217	PR200854619	Mar. 03, 2025	1 Year
Coupling/Decoupling Network	PRIMA	SUG-CDN-108	KTi-EL-216	PR924105429	Mar. 03, 2025	1 Year

For injected currents susceptibility test

Name of Equipment	Manufacturer	Model	Equipment	Serial No.	Last Cal.	Cal. Interval
CS Test system	TESEQ	NSG4070	KTi-EL-255	30608	May 17, 2025	1 Year
6dB Attenuator	TESEQ	ATN6075	KTi-EL-256	30783	May 17, 2025	1 Year
CDN	TESEQ	CDN M016	KTi-EL-254	33518	May 17, 2025	1 Year
EM-Clamp	TESEQ	KEMZ 801A	KTi-EL-257	33425	May 17, 2025	1 Year

For power frequency magnetic field immunity test

Equipment	Manufacturer	Model	Equipment No.	Serial No.	Last Cal.	Cal.Interval
POWER FREQUENCY MAGNETIC FIELD GENERATION	EVERFINE	EMS61000-8K	KTi-EL-273	608002	May 16, 2025	1 Year

For voltage dips and short interruptions immunity test

Name of Equipment	Manufacturer	Model	Equipment	Serial No.	Last Cal.	Cal. Interval
Cycle Sag Simulator	PRIMA	DRP61011TB	KTi-EL-220	PR924086817	Mar. 03, 2025	1 Year

5 Emission test

5.1 Conducted emission

5.1.1 Limits

Frequency (MHz)	Class A (dB μ V)		Class B (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79	66	66 - 56 *	59 - 46 *
0.5 -5	73	60	56	46
5 -30	73	60	60	50

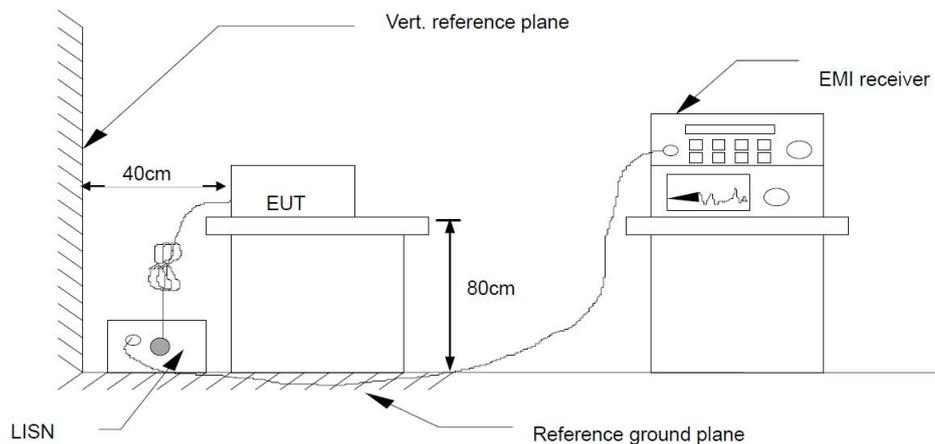
Note 1: the tighter limit applies at the band edges.

*Note 2: the limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.*

5.1.2 Test Procedures

- a) The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d) LISN is at least 80 cm from nearest part of EUT chassis.
- e) For the actual test configuration, please refer to the related Item – photographs of the test setup.

5.1.3 Test setup



5.1.4 Test Result

N/A

5.2 Radiated emission

5.2.1 Limits

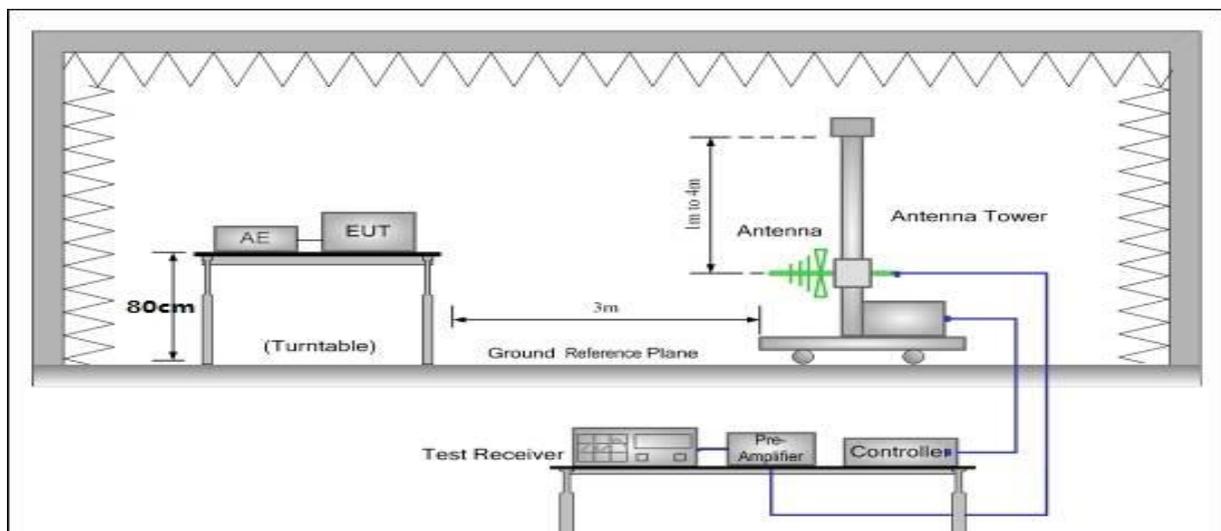
Frequency (MHz)	Class A (at 3m) dB μ V/m		Class B (at 3m) dB μ V/m	
	Quasi-peak		Quasi-peak	
30-230	50		40	
230-1000	57		47	
/	Peak	Average	Peak	Average
1000-3000	76	56	70	50
3000-6000	80	60	74	54

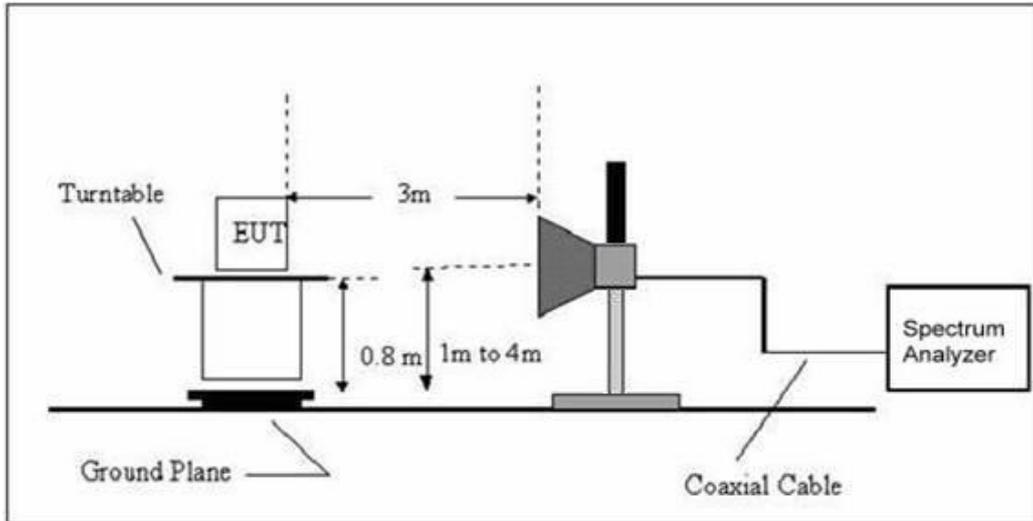
5.2.2 Test Procedures

- The radiated emission tests were performed in the 3 meters.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the test antenna shall vary between 1m to 4m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- If the peak mode measured value compliance with and lower than quasi peak mode limit, the EUT shall be deemed to meet QP limits and then no additional QP mode measurement performed.
- If the peak mode measured value compliance with and lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.
- For the actual test configuration, please refer to the related item – EUT test photos.

5.2.3 Test Setup

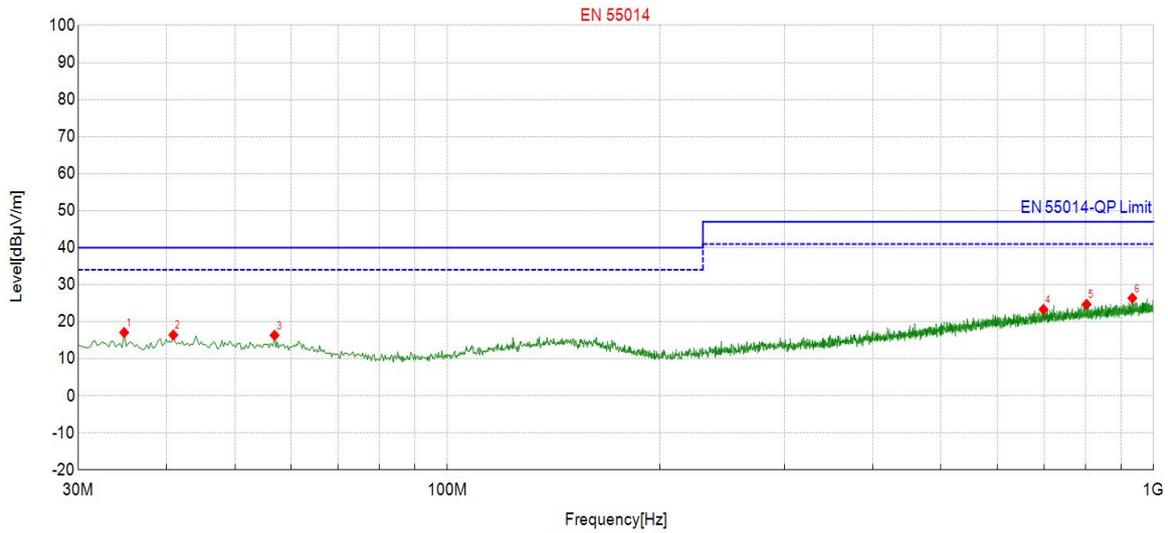
Radiated emission test-up frequency for 30MHz - 1GHz



Radiated emission test-up frequency for above 1GHz**5.2.4 Test Result**

Note: the highest working frequency of EUT is below 108MHz.

EUT:	BIRD REPELLER	Model Number:	FR-868
Test voltage:	DC 4.8V	Test mode:	Mode 1
Pressure:	101kPa	Polarization:	Horizontal
Temperature:	24°C	Relative Humidity:	53%



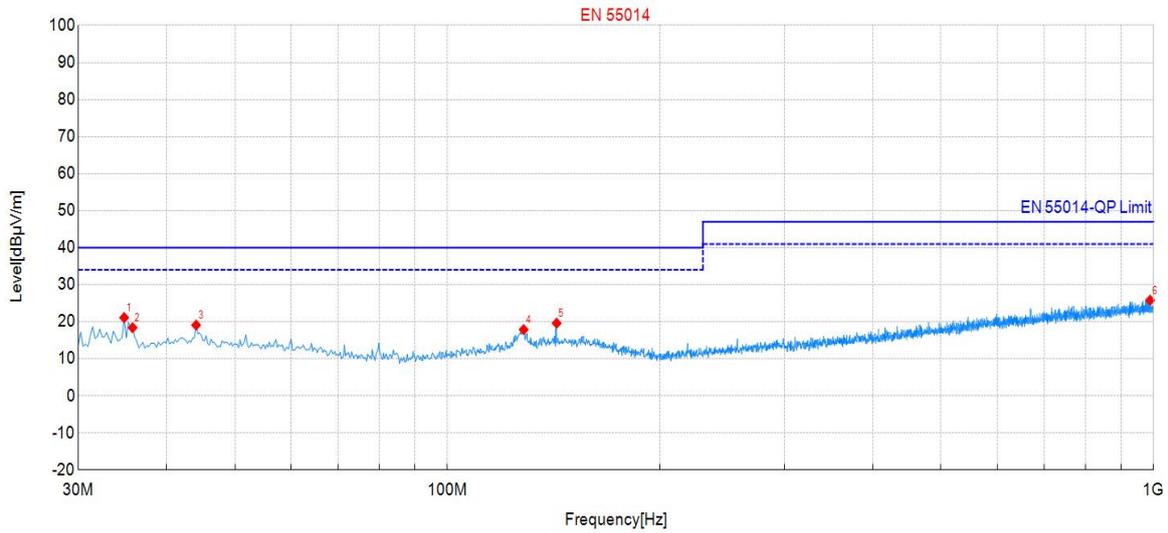
Suspected Data List

NO.	Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	34.85	34.60	17.09	-17.51	40.00	22.91	100	24	PK	Hori	PASS
2	40.91	33.46	16.43	-17.03	40.00	23.57	100	314	PK	Hori	PASS
3	56.92	34.13	16.35	-17.78	40.00	23.65	100	285	PK	Hori	PASS
4	698.33	32.16	23.34	-8.82	47.00	23.66	100	156	PK	Hori	PASS
5	803.58	32.59	24.70	-7.89	47.00	22.30	100	359	PK	Hori	PASS
6	932.83	33.31	26.37	-6.94	47.00	20.63	100	1	PK	Hori	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

EUT:	BIRD REPELLER	Model Number:	FR-868
Test voltage:	DC 4.8V	Test mode:	Mode 1
Pressure:	101kPa	Polarization:	Vertical
Temperature:	24°C	Relative Humidity:	53%



Suspected Data List

NO.	Frequency [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Det	Pol	Verdict
1	34.85	38.63	21.12	-17.51	40.00	18.88	100	1	PK	Vert	PASS
2	35.82	35.81	18.40	-17.41	40.00	21.60	100	317	PK	Vert	PASS
3	44.07	36.20	19.11	-17.09	40.00	20.89	100	354	PK	Vert	PASS
4	128.21	35.09	17.88	-17.21	40.00	22.12	100	299	PK	Vert	PASS
5	142.76	35.93	19.62	-16.31	40.00	20.38	100	360	PK	Vert	PASS
6	988.36	32.33	25.81	-6.52	47.00	21.19	100	120	PK	Vert	PASS

Note:(1)Level=Reading+Factor

(2)Margin=Limit-Level

5.3 Harmonic current emission

5.3.1 Limits

Limits for Class A equipment

Harmonics Order n	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current A
Odd harmonics		Even harmonics	
3	2.30	2	1.08
5	1.14	4	0.43
7	0.77	6	0.30
9	0.40	8 ≤ n ≤ 40	0.23x8/n
11	0.33		
13	0.21		
15 ≤ n ≤ 39	0.15x15/n		

(b) Limits for Class B equipment

For Class B equipment, the harmonics of the input current shall not exceed the values given in Table that is the limit of Class A multiplied by a factor of 1,5.

(c) Limits for Class C equipment

Harmonics Order n	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda^*$
5	10
7	7
9	5
11 < n < 39 (odd harmonics only)	3

* λ is the circuit power factor

(d) Limits for Class D equipment

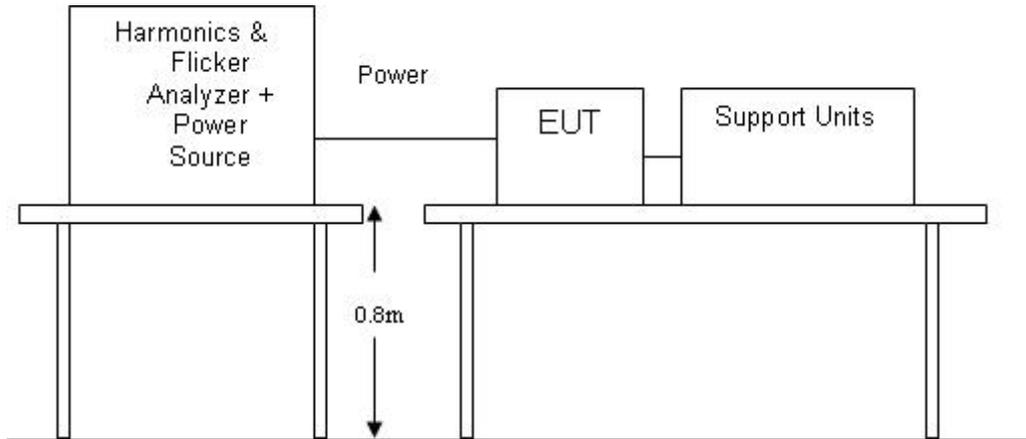
Harmonics Order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
11 < n < 39 (odd harmonics only)	3.85/n	See limit of Class A

NOTE: According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

5.3.2 Test Procedures

- a) The EUT was installed and placed on a non-conductive table and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- b) The correspondent test program of test instrument to measure the current harmonics / voltage fluctuations & flicker emanated from EUT. The measure time shall be not less than the time necessary for the EUT to be exercised.

5.3.3 Test Setup



5.3.4 Test Result

Harmonic current emission:

N/A

5.4 Voltage fluctuations & flicker

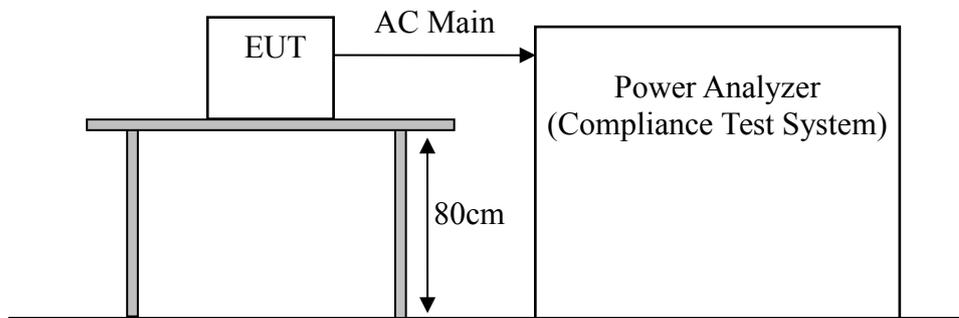
5.4.1 Limits

Test Item	Limit	Note
Pst	1.0	Pst means Short-term flicker indicator
Plt	0.65	Plt means long-term flicker indicator
Tdt	0.2	Tdt means maximum time that dt exceeds 3%
dmax(%)	4%	dmax means maximum relative voltage change.
dc(%)	3%	dc means relative steady-state voltage change.

5.4.2 Test Procedures

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal conditions. During the flick measurement, the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

5.4.3 Test Setup



5.4.4 Test Result and data

Voltage fluctuations & flicker
N/A

6 Immunity test

6.1 Performance criteria

<p>A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report, based on the following criteria.</p>	
Performance criterion	Description
A	<p>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.</p>
B	<p>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.</p>
C	<p>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.</p>
<p>Particular performance criteria:</p> <p>The selection, the specification of functions, and the permissible degradation is left to the responsibility of the manufacturer.</p>	

6.2 Electrostatic discharge (ESD)

6.2.1. Test Procedures

a) The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

Contact discharge was applied to conductive surfaces and coupling planes of the EUT. During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second.

b) Vertical Coupling Plane (VCP):

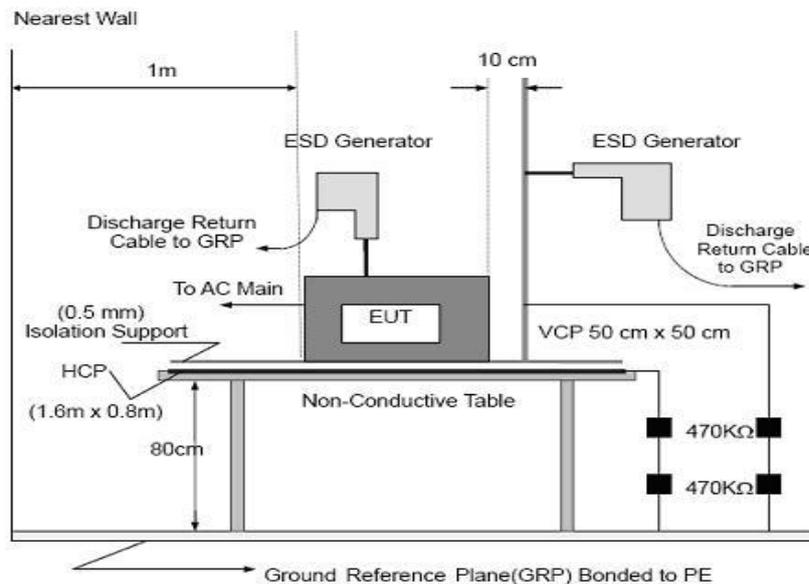
The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

c) Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane. The four faces of the EUT will be performed with electrostatic discharge.

Air discharges at insulation surfaces of the EUT. It was at least ten single discharges with positive and negative at the same selected point. For the actual test configuration, please refer to the related Item –EUT Test Photos.

6.2.2. Test Setup



6.2.3. Test levels

Environmental phenomenon	Test specification	Test set-up
Electrostatic discharge	8 kV air discharge 4 kV contact discharge	IEC 61000-4-2

6.2.4. Test Result

Indirect discharge

EUT:	BIRD REPELLER	Model Name:	FR-868
Temperature:	24°C	Relative Humidity:	52%
Pressure:	101kPa	Test mode:	All mode

No.	Test Point	Contact discharge level (kV)	Number and polarity	Criterion met	Criterion Required	Result
1	VCP-Front side	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 <input type="checkbox"/> ..6 <input type="checkbox"/> ..8	10 (+)	A	B	Compliance
			10 (-)	A		
2	VCP-Rear side	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 <input type="checkbox"/> ..6 <input type="checkbox"/> ..8	10 (+)	A		
			10 (-)	A		
3	VCP-Left side	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 <input type="checkbox"/> ..6 <input type="checkbox"/> ..8	10 (+)	A		
			10 (-)	A		
4	VCP-Right side	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 <input type="checkbox"/> ..6 <input type="checkbox"/> ..8	10 (+)	A		
			10 (-)	A		
5	HCP	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 <input type="checkbox"/> ..6 <input type="checkbox"/> ..8	10 (+)	A		
			10 (-)	A		

Direct discharge

No.	Test Point	Contact discharge level (kV)	Air discharge level (kV)	Number and polarity	Criterion met	Criterion Required	Result
1	Each non-conductive location touchable	<input type="checkbox"/> ..2 <input type="checkbox"/> ..4 <input type="checkbox"/> ..6 <input type="checkbox"/> ..8	<input type="checkbox"/> ..2 <input type="checkbox"/> ..4 <input type="checkbox"/> ..6 <input checked="" type="checkbox"/> ..8	10 (+)	B	B	Compliance
				10 (-)	B		
2	Each conductive location touchable	<input type="checkbox"/> ..2 <input checked="" type="checkbox"/> ..4 <input type="checkbox"/> ..6 <input type="checkbox"/> ..8	<input type="checkbox"/> ..2 <input type="checkbox"/> ..4 <input type="checkbox"/> ..6 <input type="checkbox"/> ..8	10 (+)	B		
				10 (-)	B		

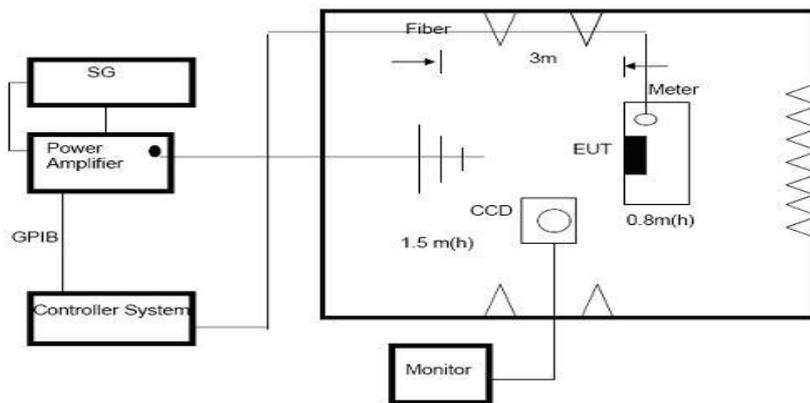
Note1: Please see the photographs blew about the details of test points.

6.3 Radiated electromagnetic field immunity (RS)

6.3.1. Test Procedures

- a) The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.
- b) The testing distance from antenna to the EUT was 3 meters.
- c) The other condition as following manner:
 - i. The field strength level was 3V/m.
 - ii. The frequency range is swept from 80 MHz to 1000 MHz with the signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- d) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- e) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
- f) For the actual test configuration, please refer to the related Item –EUT Test Photos.

6.3.2. Test setup



6.3.3. Test levels

Environmental phenomenon	Test specifications	Test set-up
Radio-frequency electromagnetic field, 1 kHz, 80% AM	80 MHz to 1 000 MHz 3 V/m (r.m.s.) (unmodulated)	IEC 61000-4-3 or IEC 61000-4-22

6.3.4. Test Result

EUT:	BIRD REPELLER	Model Name:	FR-868
Temperature:	24°C	Relative Humidity:	52%
Pressure:	101kPa	Test mode:	All Mode

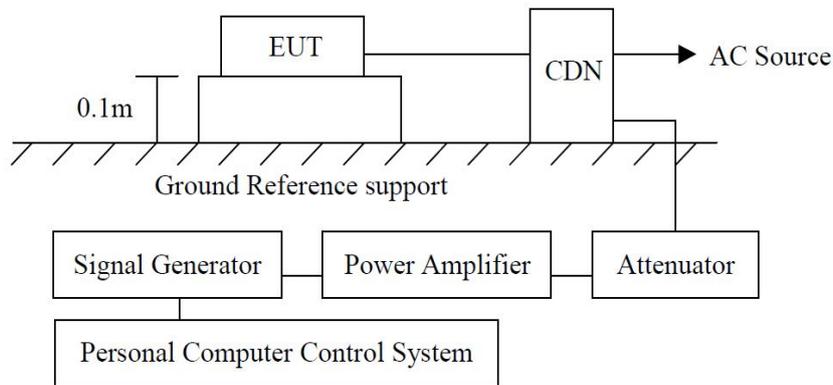
Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Measurement	Result
80- 1000	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	Compliance
			Rear			
			Left			
			Right			

6.4 Conducted disturbances (CS)

6.4.1. Test Procedures

- a) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- b) The disturbance signal described below is injected to EUT through CDN.
- c) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- d) The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
- e) The rate of sweep shall not exceed 1.5*10⁻³decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- f) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

6.4.2. Test Setup



6.4.3. Test level

Table 8 – Ports for signal lines and control lines

Environmental phenomenon	Test specifications	Test set-up
RF current common mode 1 kHz, 80 % AM	0,15 MHz to 80 MHz 1 V (r.m.s.) (unmodulated) 150 Ω source impedance	IEC 61000-4-6
Applicable only to ports interfacing with cables whose total length can exceed 3 m according to the manufacturer's functional specification.		

Table 9 – Input and output d.c. power ports

Environmental phenomenon	Test specifications	Test set-up
RF current common mode 1 kHz, 80 % AM	0,15 MHz to 80 MHz 1 V (r.m.s.) (unmodulated) 150 Ω source impedance	IEC 61000-4-6
Not applicable to battery operated appliances that cannot be connected to the mains while in use. Not applicable to input ports intended for connection to a battery or a rechargeable battery which shall be removed or disconnected from the apparatus for recharging. Apparatus with a d.c. power input port intended for use with an a.c. - d.c. power adaptor shall be tested on the a.c. power input of the a.c. - d.c. power adaptor specified by the manufacturer or, where none is so specified, using a typical a.c. - d.c. power adaptor. For d.c. input and output power ports intended to be connected permanently, the test is not applicable provided the instructions require external cables not to be longer than 3 m.		

Table 10 – Input and output a.c. power ports

Environmental phenomenon	Test specifications	Test set-up
RF current common mode 1 kHz, 80 % AM	0,15 MHz to 80 MHz 3 V (r.m.s.) (unmodulated) 150 Ω source impedance	IEC 61000-4-6
For extra low voltage a.c ports and output a.c. ports, this testing is only applicable to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.		

6.4.4. Test Result

N/A

6.5 Electrical fast transients/burst (EFT/S)

6.5.1. Test Procedures

a) The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

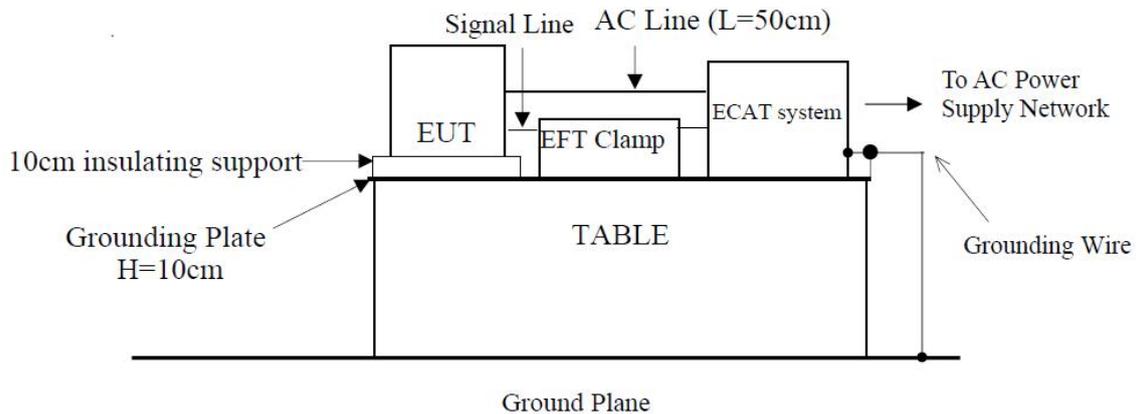
b) For input and AC power ports:

The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 1min.

c) For signal lines and control lines ports:

Ports which are intended to be connected to telecommunication networks (e.g. public switched telecommunication networks, integrated services digital networks, local area networks and similar networks.)

6.5.2. Test Setup



6.5.3. Test level

Environmental phenomenon	Test specifications	Test set-up
Fast transients common mode	1 kV (peak) 5/50 ns T_r/T_d 5 kHz repetition frequency	IEC 61000-4-4
For extra low voltage a.c. ports and output a.c. ports, this testing is only applicable to ports interfacing with cables whose total length may exceed 3 m according to the manufacturer's functional specification.		

6.5.4. Test Result

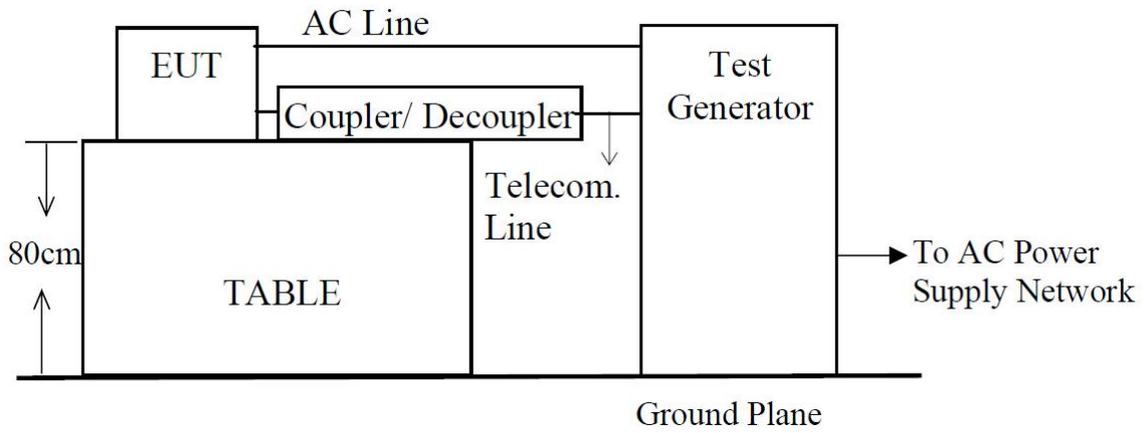
N/A

6.6 Surges

6.6.1. Test Procedures

- a) For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.
- b) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.
- c) Different phase angles are done individually.
- d) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

6.6.2. Test Setup



6.6.3 Test level

Environmental phenomenon	Test specifications	Test set-up
Surge	1,2/50 (8/20) μ s T_r/T_d 2 kV line-to-earth with 12 Ω Impedance 1 kV line-to-line with 2 Ω Impedance	IEC 61000-4-5

Five positive and five negative pulses shall be applied as far as applicable, successively:

- between phase and phase: 1 kV;
- between phase and neutral: 1 kV;
- between phase and earth: 2 kV;
- and between neutral and earth: 2 kV.

The positive pulses are applied 90° relative to the phase angle of the a.c. line voltage to the equipment under test, and the negative pulses are applied 270° relative to the phase angle of the a.c. line voltage to the equipment under test. Tests with other (lower) voltages than those given in Table 12 are not required.

6.6.4. Test Result

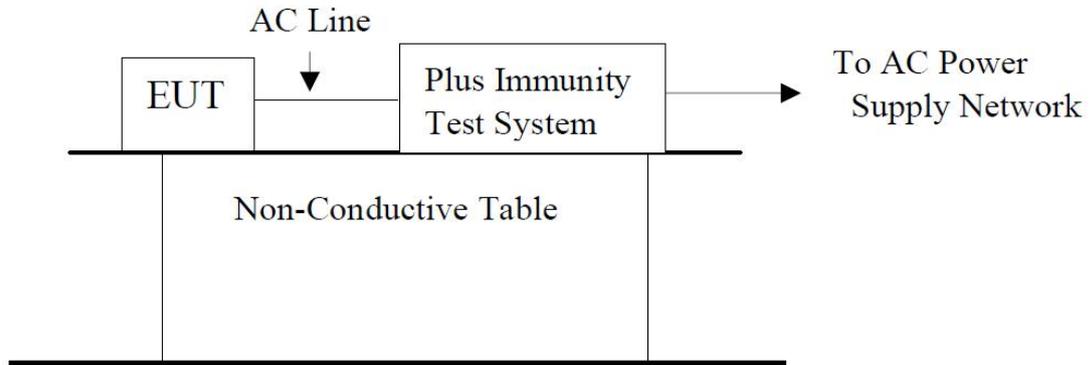
N/A

6.7 Voltage dips and interruptions

6.7.1. Test procedures

- a) The interruptions are introduced at selected phase angles with specified duration.
- b) Record any degradation of performance

6.7.2. Test setup



6.7.3. Test level

Environmental phenomena		Test level in % U_T	Durations for voltage dips		Test set-up
			50 Hz	60 Hz	
Voltage dips in % U_T	100	0	0,5 cycle	0,5 cycle	IEC 61000-4-11 Voltage change shall occur at zero crossing
	60	40	10 cycles	12 cycles	
	30	70	25 cycles	30 cycles	

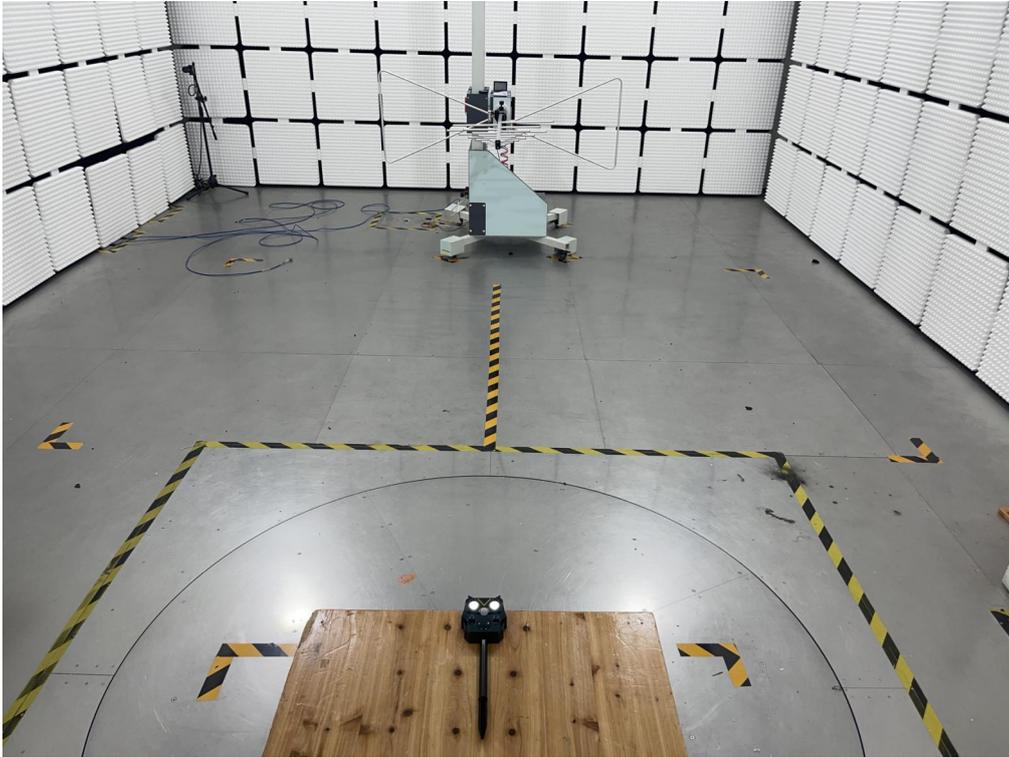
U_T is the rated voltage of the equipment under test.

6.7.4. Test result

N/A

Test photographs of the EUT

Radiated emission

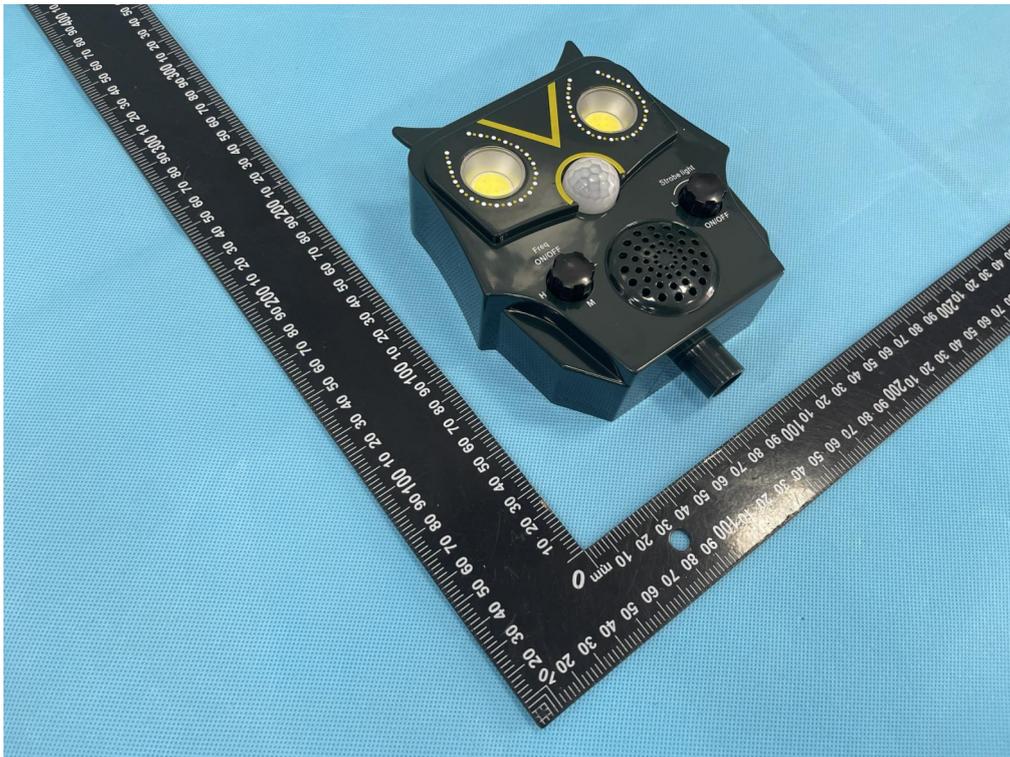


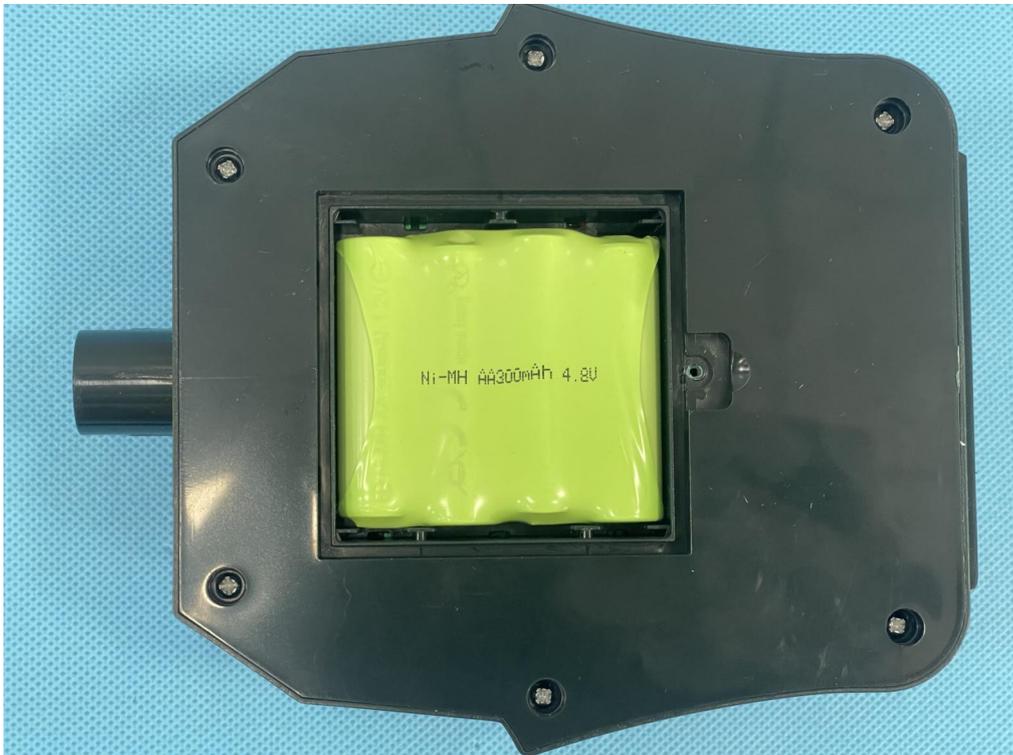
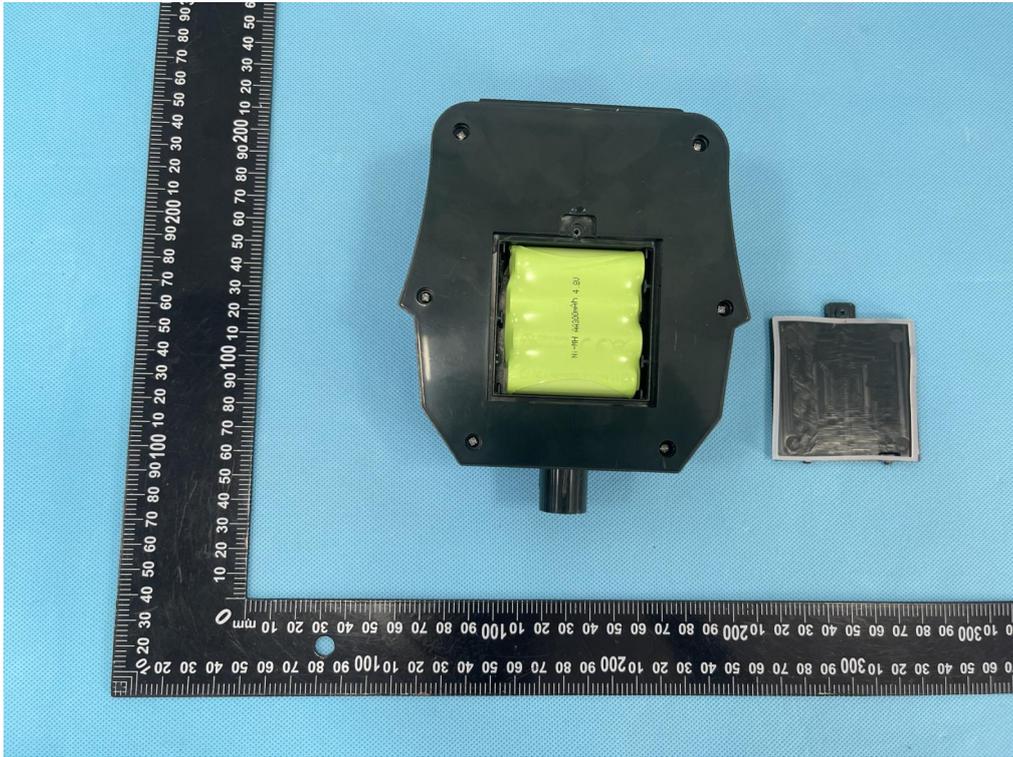
ESD test



Photographs of the EUT







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