




Prüfbericht-Nr.: <i>Test Report No.:</i>	50140633 001	Auftrags-Nr.: <i>Order No.:</i>	1140041784		
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	24.04.2018		
Auftraggeber: <i>Client:</i>	Foshan Viomi Electrical Technology Co., Ltd. 4F, Building 7 & 2F, Building 1, No.2, North of Xinxi Forth Street, Xiashi Village Committee of Lunjiao Sub-district Office, Shunde District, Foshan City, Guangdong Province, China				
Prüfgegenstand: <i>Test item:</i>	Mi Electric Kettle				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	MJDSH01YM				
Auftrags-Inhalt: <i>Order content:</i>	CE EMC				
Prüfgrundlage: <i>Test specification:</i>	EN 55014-1:2017, EN 55014-2:2015, EN 55014-1:2006+A1:2009+A2:2011, EN 55014-2:1997+A1:2001+A2:2008 EN 61000-3-2:2014, EN 61000-3-3:2013				
Wareneingangsdatum: <i>Date of receipt:</i>	24.04.2018				
Prüfmuster-Nr.: <i>Test sample No.:</i>	Engineering sample				
Prüfzeitraum: <i>Testing period:</i>	11.05.2018 to 15.05.2018				
Ort der Prüfung: <i>Place of testing:</i>	Refer to section 1.1				
Prüflaboratorium: <i>Testing laboratory:</i>	Refer to section 1.1				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von / tested by:	kontrolliert von / reviewed by:				
23.05.2018 Gao , Shuying /PE		23.05.2018 Wang , Gang /Reviewer			
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other: Manufacturer or/and his importer shall ensure product bears label requirements in article 7 and article 9 of the 2014/30/EU relate to name, batch number, post address prior place the product into EU market.					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested					
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>					

TEST SUMMARY

4.1.1 HARMONICS ON AC MAINS

Result:

Pass

4.1.2 VOLTAGE CHANGES, VOLTAGE FLUCTUATIONS AND FLICKER ON AC MAINS

Result:

Pass

4.1.3 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE

Result:

Pass

4.1.4 DISCONTINUOUS INTERFERENCE ON AC MAINS

Result:

Pass

4.2.1 RADIATED EMISSION

Result:

Pass

5.1.1 ELECTROSTATIC DISCHARGE

Result:

Pass

5.1.2 FAST TRANSIENTS ON AC POWER LINE

Result:

Pass

5.1.3 SURGES TO AC POWER LINE

Result:

Pass

5.1.4 INJECTED CURRENT INTO AC POWER LINE

Result:

Pass

5.1.5 VOLTAGE DIPS AND INTERRUPTIONS

Result:

Pass

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1 Test Sites

1.1 Test Facilities

Laboratory 1: CHEARI (Beijing) Certification & Testing Co., Ltd.
Address: No.3, Boxing Balu, Beijing Economic and Technological Development Area, Beijing, China

Laboratory 2: TÜV Rheinland (China) Ltd.
Address: Room 303, 1st Area, Chuang Xin Building No.B, No.12, Hong Da Road (north), Economic Technological Development Area, Beijing 100176, P.R. China

The used test equipment is in accordance with CISPR 16-1 for measurement of radio interference.

1.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Lab 1: (Radiated emission and RF electromagnetic field immunity, Discontinuous Interference on AC Mains)

No.	Equipment	Manufacturer	Model	Serial no. / Inventory no.	Cal. due date
1	EMI Receiver	R&S	ESCI7 (9kHz-7GHz)	0304826-03	2018-10-31
2	Bi-log Antenna	R&S	HL562 (30MHz-3GHz)	0304826-06	2018-11-07
5	Semi anechoic chamber	R&S	SAC3 plus (9mx6mx6m)	0304728	2022-02-23
6	Signal generator	R&S	SMB100A	0304827-02	2018-11-03
7	Power meter	R&S	NRP2	0304827-03	2018-11-03
8	Bi-con antenna	R&S	HL046E(80MHz-3GHz)	0304807-06	2018-11-03
9	Horn antenna	R&S	SWB-STLP9149 ((0,6) 0,7 – 9 (10,5) GHz)	0304827-07	2018-11-08
10	Power amplifier	Bonn	BLWA 0810-160/100D	0304828	2018-10-31
11	Power amplifier	Bonn	BLMA 1060-100/50D	0304828-01	2018-10-31
10	Clicks analyzer	SCHAFFNER	DIA1512D	0311051	2018-10-10

Table 2: List of Test and Measurement Equipment

Lab 2: (Mains Terminal Continuous Disturbance Voltage, Electrostatic Discharge, Fast Transients on AC Power Lines, Surges to AC Power Port, Voltage dips and interruptions to AC Power Port, Harmonics on AC Mains, Voltage changes, voltage fluctuations and flicker on AC mains, Injected Current into AC Power Port)

No.	Equipment	Manufacturer	Model	Serial no. / Inventory no.	Cal. due date
1	Harmonic tester	California Instrument	NSG 1007	56623	2019-03-05
2	5kV AC Power Source	California Instrument	CCN 1000-1	72399	2019-03-05
3	Ultra Compact Simulator	EM TEST AG	UCS 500 M4	V0702102131	2018-06-25
4	ESD Simulator	EM TEST AG	Dito	V0702102130	2018-11-17
5	EMI Signal Analyzer	Narda S.T.S./PMM	PMM 9010	143WJ70608	2019-03-05
6	Artificial Mains Network	R&S	ENV216	3560.6550.15	2018-06-11
7	Test system for conducted immunity	TESEQ	NSG 4070	28169	2018-06-13
8	CDN	TESEQ	CDN M016	27465	2018-06-13
9	Attenuator	Bird	75-A-MFN-06	0037	2019-06-26

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2 General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is a Mi Electric Kettle. For the further information, refer to the user's manual.

2.2 Ratings and System Details

Type	:	MJDSH01YM
Rated Voltage	:	AC 220V-240V
Frequency	:	50/60Hz
Rated power	:	1800W

2.3 Independent Operation Modes

The basic operation modes are: "On" and "Off".

2.4 Noise Generating and Noise Suppressing Parts

Refer to the circuit diagram for further information.

2.5 Submitted Documents

User's manual, Nameplate, PCB, BOM.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

Immunity: The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

3.2 Physical Configuration for Testing

The test was performed at the status of AC230V; 50Hz for voltage and frequency, which was the nominal voltage for EU.

3.3 Test Operation and Test Software

Refer to the related paragraph of this report. No software was used.

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to achieve EMC Compliance

None.

4 Electromagnetic emission measurement results

4.1 Emission in the Frequency Range up to 30 MHz

4.1.1 Harmonics on AC Mains

Result:	Pass
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Date of testing : 11.05.2018
Test procedure : EN 61000-3-2:2014
Test duration : 2.5min
Harmonic order : 2 – 40th

Following are the measurement results, which were obtained via an automatic measurement system.

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Table 3: Harmonic currents measurement result

Equipment category: Class B; Test voltage: 230.08V, 50Hz

Fundamental current I: 7.727A; Power factor: 1.000; Active input power: 1777.6W

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.005	1.620	N/A	0.008	2.430	N/A	Pass
3	0.017	3.450	N/A	0.025	5.175	N/A	Pass
4	0.004	0.645	N/A	0.005	0.968	N/A	Pass
5	0.010	1.710	N/A	0.012	2.565	N/A	Pass
6	0.004	0.450	N/A	0.005	0.675	N/A	Pass
7	0.004	1.155	N/A	0.005	1.733	N/A	Pass
8	0.002	0.345	N/A	0.002	0.518	N/A	Pass
9	0.002	0.600	N/A	0.003	0.900	N/A	Pass
10	0.002	0.276	N/A	0.002	0.414	N/A	Pass
11	0.002	0.495	N/A	0.002	0.743	N/A	Pass
12	0.001	0.230	N/A	0.001	0.345	N/A	Pass
13	0.002	0.315	N/A	0.002	0.473	N/A	Pass
14	0.001	0.197	N/A	0.001	0.295	N/A	Pass
15	0.001	0.225	N/A	0.001	0.338	N/A	Pass
16	0.001	0.173	N/A	0.001	0.260	N/A	Pass
17	0.001	0.199	N/A	0.001	0.299	N/A	Pass
18	0.001	0.153	N/A	0.001	0.230	N/A	Pass
19	0.001	0.178	N/A	0.001	0.267	N/A	Pass
20	0.001	0.138	N/A	0.001	0.207	N/A	Pass
21	0.001	0.161	N/A	0.001	0.241	N/A	Pass
22	0.001	0.125	N/A	0.001	0.188	N/A	Pass
23	0.001	0.147	N/A	0.001	0.221	N/A	Pass
24	0.000	0.115	N/A	0.001	0.173	N/A	Pass
25	0.001	0.135	N/A	0.001	0.203	N/A	Pass
26	0.000	0.106	N/A	0.001	0.159	N/A	Pass
27	0.000	0.125	N/A	0.001	0.188	N/A	Pass
28	0.000	0.099	N/A	0.001	0.149	N/A	Pass
29	0.000	0.116	N/A	0.001	0.174	N/A	Pass
30	0.001	0.092	N/A	0.001	0.138	N/A	Pass
31	0.000	0.110	N/A	0.001	0.164	N/A	Pass
32	0.001	0.086	N/A	0.001	0.129	N/A	Pass
33	0.000	0.102	N/A	0.001	0.153	N/A	Pass
34	0.000	0.081	N/A	0.001	0.122	N/A	Pass
35	0.000	0.096	N/A	0.000	0.144	N/A	Pass
36	0.000	0.077	N/A	0.000	0.116	N/A	Pass
37	0.000	0.092	N/A	0.000	0.137	N/A	Pass
38	0.000	0.073	N/A	0.000	0.110	N/A	Pass
39	0.000	0.087	N/A	0.000	0.131	N/A	Pass
40	0.000	0.069	N/A	0.001	0.104	N/A	Pass

4.1.2 Voltage Changes, Voltage Fluctuations and Flicker on AC mains

Result:

Pass

Date of testing : 11.05.2018
Test procedure : EN 61000-3-3:2013

According to the characteristics of the sample, as specified by clause 5 of the basic standard, following limits apply:

- the value of Pst should not be greater than 1.0;
- the value of Plt should not be greater than 0.65;
- the value of $d(t)$ during a voltage change shall not exceed 3.3% for more than 500ms;
- the relative steady-state voltage change, d_c , shall not exceed 3.3%;
- the maximum relative voltage change d_{max} , shall not exceed 4%.

Following are the measurement results obtained via an automatic testing system.

Table 4: Voltage fluctuations and flicker measurement results

	d_c	d_{max}	$d(t)$	Pst	Plt
Limits	3.3%	4%	3.3%/500ms	1.0	0.65
Result	0.00%	-0.20%	0.00%/0ms	0.200	0.087

Note:

For Plt assessment, the cycle of operation shall not be repeated, unless stated otherwise in Annex A, when testing equipment with a cycle of operation of less than 2 h and which is not normally used continuously.

The flicker test during 10minutes, because the MJDSH01YM cycle of operation is less than 10 minutes, so this test has cover the normal range of the product operate.

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4.1.3 Mains Terminal Continuous Disturbance Voltage

Result:	Pass
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Date of testing : 11.05.2018
Test procedure : EN 55014-1:2006+A1+A2 and CISPR 16-1 series standards
Frequency range : 0.15-30MHz
Limits : Quasi-peak: 0.15-0.5MHz, 66dB μ V-56dB μ V;
0.5-5MHz, 56dB μ V; 5-30MHz, 60dB μ V
Average: 0.15-0.5MHz, 59dB μ V-46 dB μ V;
0.5-5MHz, 46dB μ V; 5-30MHz, 50dB μ V
Kind of test site : shielded room

Test Setup

Input voltage : AC 230V; 50Hz
Operation mode : On
Artificial hand : N/A
Earthing : applied

Measuring configuration and description

The measurement setup was made according to EN 55014-1:2006+A1+A2 in a shielded room.

The measurement equipment like test receivers, quasi-peak detector and Artificial Mains Network (AMN) are in compliance with CISPR 16-1 series standards. The tested object was operated under its rated voltage and its rated frequency.

The tested object was set-up on a wooden table. The EUT was set 0.8m away from the AMN. The cord longer than necessary to be connected to the AMN was folded forth and back parallel so as to form a bundle with a length between 0.3m and 0.4m.

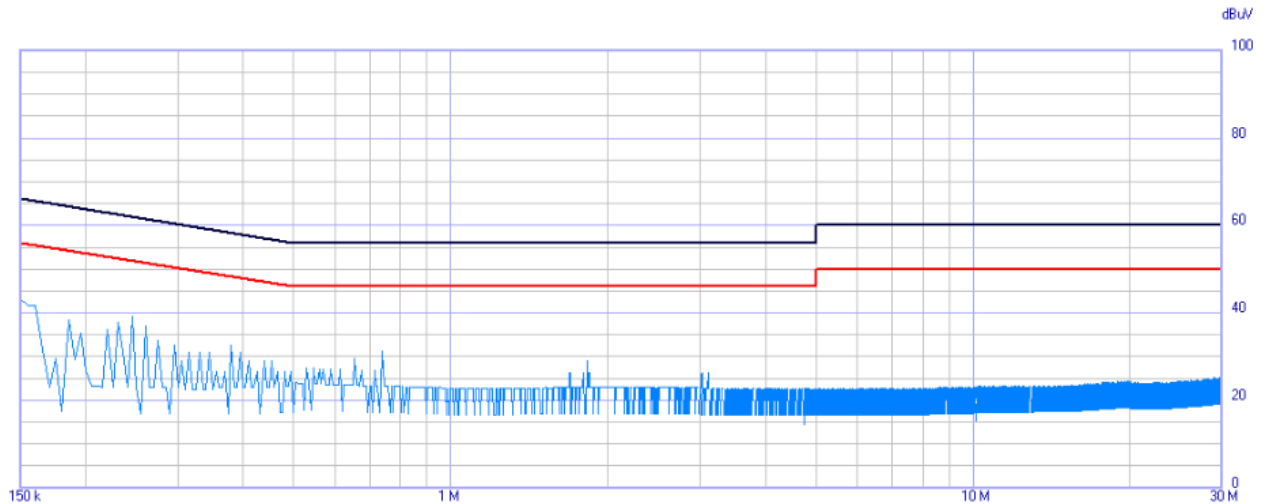
The Interference Voltage was determined according to clause 5 of EN 55014-1:2006+A1+A2 while measuring the line and neutral conductor by turns.

A test at about 160 kHz was made over a range of 0.9 to 1.1 times the rated voltage in order to check whether the level of disturbance varies considerably with the supply voltage and the measurements are to be made at the voltage that causes maximum disturbance.

The following figures and tables were those measured by an automatic measuring system. Both quasi-peak and average values were measured. Quasi-peak and average value were measured and listed respectively where they had a maximum in previous scanning survey. The test was carried out from 220V to 240V and frequency 50Hz and 60Hz for the max measurement results

Figure 1: Spectral diagrams and measurement results of conducted emission, L

Level in dB μ V

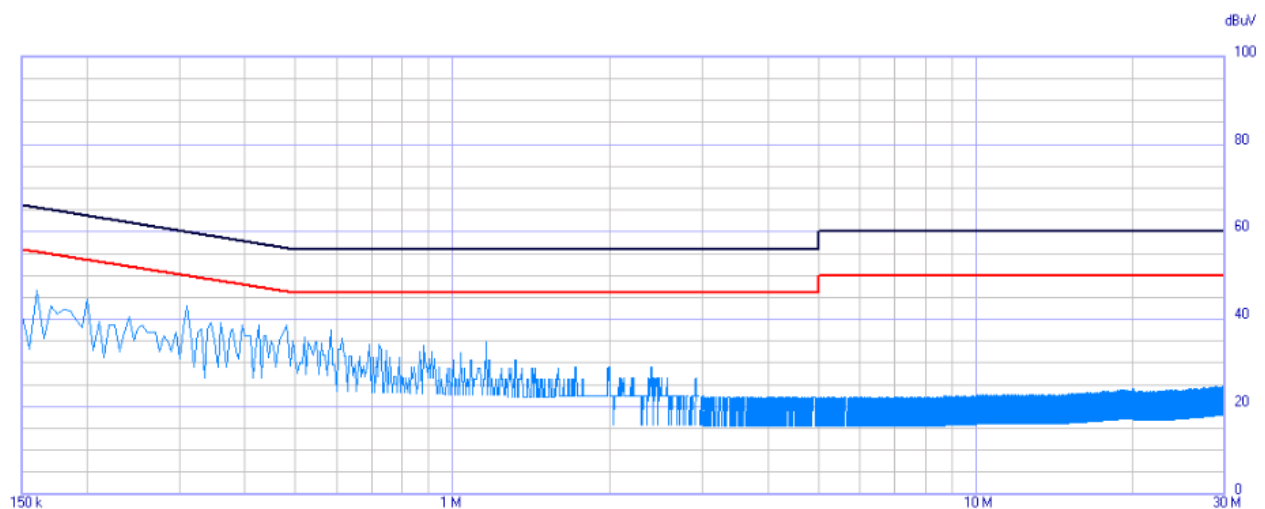


Final measurement results:

There is no suspect points were found in the diagram therefore the final test is not needed.

Figure 2: Spectral diagrams and measurement results of conducted emission, N

Level in dB μ V



Final measurement results:

There is no suspect points were found in the diagram therefore the final test is not needed.

4.1.4 Discontinuous Interference on AC Mains

Result:

Pass

Date of testing : 11.05.2018
 Test procedure : EN 55014-1:2017 and CISPR 16-1 series standards
 Kind of test site : Shielded room
 Port : Mains
 Basic standard : EN 55014-1:2017
 Frequency range : 0.15 – 30MHz
 Limit : EN 55014-1:2017 clause 4.2 (Household Appliance)
 Operating condition : EN 55014-1:2017 clause 3.3
 Ambient condition : Temperature: 20.1°C; Relative humidity: 31%

The discontinuous interference on AC mains in the frequency range from 0.15 to 30MHz was measured in accordance to EN 55014-1:2017.

The measurement setup was made according to EN 55014-1:2017 clause 4.2 in a shielded room. The used measurement equipment was in accordance to CISPR 16-1 series standards.

The EUT was operated in a manner specified by clause 3.3,

“The electric kettle shall be operated half-filled with water and without lid. Immersion heaters shall be operated fully submerged. The click rate N, if any, shall be determined with a medium setting (60 °C) of a variable control device having a range between 20 °C and 100 °C or with the fixed setting of a fixed control device.”

Table 5: Result of Discontinuous Interference

The 1st measurement result:

Measured Frequency (MHz)	0.15	0.5	1.4	30
Continuous disturbance limit (dB μ V)	66.0	56.0	56.0	60.0
Last Time T (min.)	1 hours			
Total Click Number n	40	40	40	40
Click Rated $N=n/T$	0.66		0.66	

The 2nd measurement result:

Measured Frequency (MHz)	0.15	0.5	1.4	30
Continuous disturbance limit (dB μ V)	96.0	86.0	96.0	86.0
Last Time T (min.)	1 hours			
Total Click Number n	0	0	0	0

According to the Figure 6 Upper quartile method of the 55014-1:2017. The EUT is deemed to comply with the $\leq 25\%$ exceed the limits.

4.2 Emission in the Frequency Range above 30 MHz

4.2.1 Radiated emission

Result:	Pass
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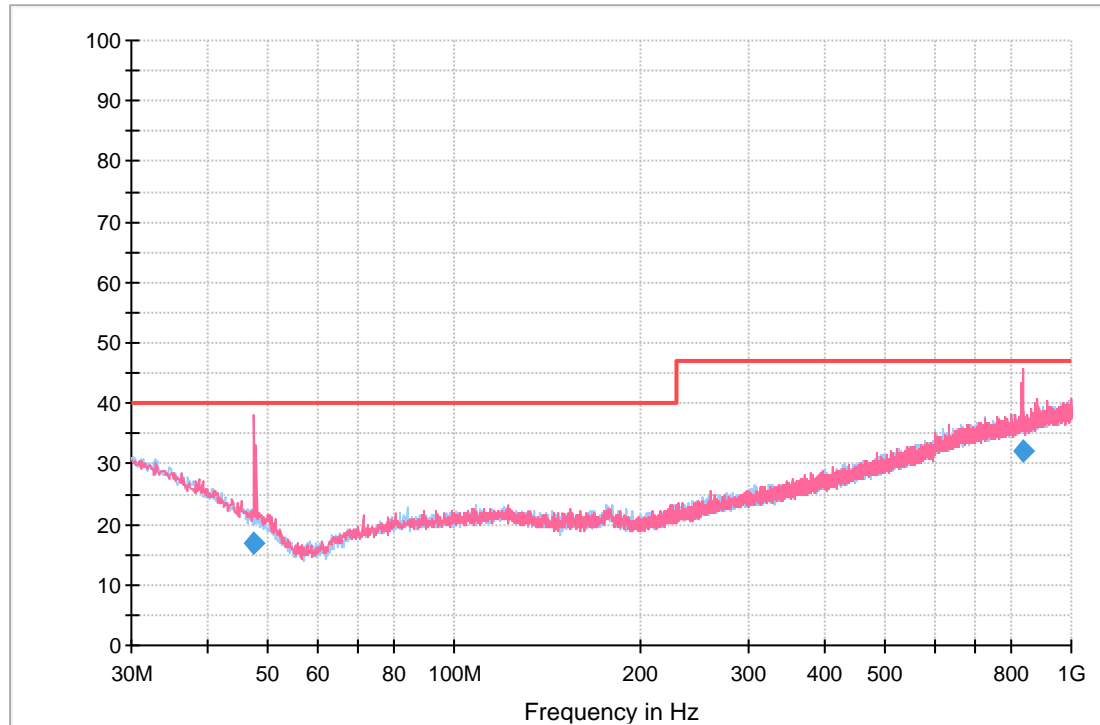
Date of testing : 12.05.2018
Test procedure : EN 55014-1:2017
Test port : Enclosure
Frequency range : 30 - 1000MHz

The radiated disturbance test was carried out in a 3m semi-anechoic chamber with a test distance of 3m. The normalized site attenuation of the semi-anechoic chamber is regularly calibrated to ensure the radiated disturbance test results are valid. During the test, the EUT was set-up on a wooden table. The sample was rotated 360° around and the antenna was varied from 1m to 4m to find the maximum disturbance. The test was performed with the antenna both in its horizontal and vertical polarizations.

The following is the most critical test result for all the test modes.

A preview test was firstly performed with peak detector. The final test was performed with quasi-peak detector at those critical frequencies found during the preview test. In the following figures, the vertical results are marked with red, and the horizontal ones are marked with blue.

Figure 3: Spectral diagram and measurement results of radiated disturbance, vertical and horizontal polarization

 Level in dB μ V/m


Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
47.501550	17.0	1000.0	120.000	100.4	V	66.0	10.1	23.0	40.0
833.680250	32.3	1000.0	120.000	200.0	V	122.0	24.2	14.7	47.0

5 Test Results Immunity

During the immunity tests, the EUT was operated under conditions specified by clause 2.3 of this report.

Performance criterion A: The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

Due to category II equipment, Electrostatic Discharge, Electrical fast transients/burst immunity test, Surge immunity test, Voltage dips and interruptions were performed on the EUT. Radiated Radio-frequency Electromagnetic Field (RS) is not needed.

5.1 Enclosure

5.1.1 Electrostatic Discharge

Result:

Pass

During the test, the EUT was placed on a 0.5mm high insulating support above the ground plane. The minimum distance between the EUT and all other conductive structures except the ground plane beneath the EUT is more than 0.5m. The size of the reference ground plane is more than 2m by 2m.

A horizontal coupling plane (HCP), sized 1.6m x 0.8m, and vertical coupling plane (VCP), size 0.5m x 0.5m were placed on the wooden table and an insulating plate was placed beneath the EUT to isolate the EUT from the horizontal ground plane.

Date of testing : 12.05.2018
 Basic standard : IEC 61000-4-2:2008
 Test level : $\pm 4.0\text{kV}$ (contact discharge),
 $\pm 2.0\text{kV}$, $\pm 4.0\text{kV}$, $\pm 8.0\text{kV}$ (air discharge)
 Polarity : Positive / negative
 Number of discharges : 10
 Performance criteria : B
 Ambient conditions : Temperature: 23°C; Relative humidity: 47%

Table 6: Electrostatic discharge immunity test results

Position	Kind of Discharge	Result	Remarks
Nonmetallic part	Air discharge $\pm 2.0\text{kV}$, $\pm 4.0\text{kV}$, $\pm 8.0\text{kV}$	Pass	During the test, the EUT can operate as intended.
Power line	Air discharge $\pm 2.0\text{kV}$, $\pm 4.0\text{kV}$, $\pm 8.0\text{kV}$	Pass	During the test, the EUT can operate as intended.
VCP and HCP	Indirect Contact $\pm 4.0\text{kV}$	Pass	During the test, the EUT can operate as intended.

5.1.2 Fast Transients on AC Power Line

Result:

Pass

During the test, the EUT was placed on a 0.1m high insulating support above the reference ground plane. The minimum distance between the EUT and all other conductive structures except the reference ground plane beneath the EUT is more than 0.5m.

The length between the coupling device and the EUT is less than 1m. The excessive part of the power cord longer than 1m was folded forth and back parallel so as to form a bundle with a length between 0.3m and 0.4m.

Date of testing : 12.05.2018
 Test procedure : IEC 61000-4-4:2012
 Test level : ±1kV, 5kHz, for power line
 Polarity : Positive / negative
 Coupling duration : 1min/polarity
 Performance criteria : B
 Ambient condition : Temperature: 23°C, Relative humidity: 47%

Table 7: EFT/Burst immunity test results for power line

Line	Result	Remarks
L+N+PE	Pass	During the test, the sample can meet the requirements of performance criterion B as described in clause 5.

5.1.3 Surges to AC Power Line

Result:	Pass
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The immunity against surges to AC power port was tested in accordance to IEC 61000-4-5:2005. Test setup and the Combination Wave Generator (CWG) were according to IEC 61000-4-5:2005 which is specified by EN 55014-2:1997+A1+A2.

During the test, the EUT was placed on a 0.1m high wooden support.

Date of testing	: 12.05.2018
Test procedure	: IEC 61000-4-5:2014
Test level	: ±0.5kV, ±1kV (Phase to Neutral) ±0.5kV, ±1kV, ±2kV (Phase, Neutral to earth)
T_r/T_n	: 1.2/50µs (open-circuit voltage) 8/20µs (short-circuit current)
Polarity	: Positive / Negative
Pulse number	: 5 pulses for each polarity
Coupling phase	: 0°, 90°, 180° and 270°
Repetition rate	: 1 pulse/min
Performance criteria	: B
Ambient conditions	: Temperature: 23°C; Relative humidity: 47%

Table 8: Surge immunity test result

Line	Result	Remarks
Phase to neutral	Pass	During the test, the sample can meet the requirements of performance criterion B as described in clause 5.
Phase neutral to PE	Pass	During the test, the sample can meet the requirements of performance criterion B as described in clause 5.

5.1.4 Injected Current into AC Power Line

Result:	Pass
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During the test, the sample was placed on a 0.1m wooden support above the reference ground plane. The minimum distance between the sample and all other conductive structures except the reference ground plane beneath the EUT is more than 0.5m.

A CDN was used to couple the disturbing signal onto the power input port of the sample. The distance between the EUT and the CDN is within 0.1-0.3m. The cable between the EUT and CDN is placed about 50mm above the reference ground plane.

Date of testing	:	12.05.2018
Basic standard	:	IEC 61000-4-6:2013
Test level	:	3V, for power line
Frequency range	:	0.15–230MHz
Modulation	:	80%AM, 1kHz
Frequency scan speed	:	Frequency step: 1%; Dwell time: 1s
Performance criteria	:	A
Ambient conditions	:	Temperature: 23°C; Relative humidity: 47%

Table 9: Injected current test result for power line

Port	Result	Remarks
AC Input port	Pass	During the test, the sample can meet the requirements of performance criterion A as described in clause 5.

5.1.5 Voltage Dips and Interruptions

Result:

Pass

The immunity against voltage dips and interruptions to AC power port was tested in accordance to IEC 61000-4-11:2004. Test setup and the test generator were according to IEC 61000-4-11:2004 which is specified by EN 55014-2:1997+A1+A2.

Date of testing : 12.05.2018
 Basic standard : IEC 61000-4-11:2004
 Test level (in % U_T) and duration (in periods of the rated frequency) : 0 0.5 periods
 40 10 periods
 70 25 periods
 Performance criteria : C
 Ambient conditions : Temperature: 24°C; Relative humidity: 44%

Table 10: Test condition and Test Result for Voltage dips

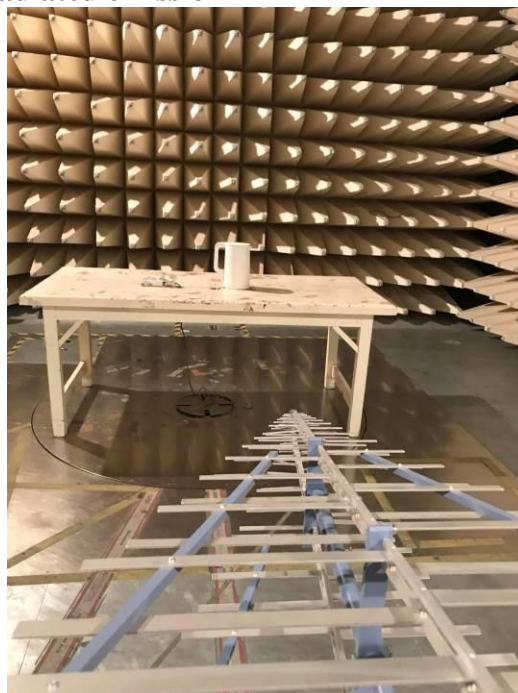
Test level (in % U_T)	Duration	Result	Remarks
0	0.5 (10ms)	Pass	During the test, the sample can meet the requirements of performance criterion C as described in clause 5.
40	10 (200ms)	Pass	During the test, the sample can meet the requirements of performance criterion C as described in clause 5.
70	25 (0.5s)	Pass	During the test, the sample can meet the requirements of performance criterion C as described in clause 5.

6 Photographs of the Test Set-Up

Photograph 1: Set-up for Mains Terminal Continuous Disturbance Voltage



Photograph 2: Set-up for Radiated emission



Photograph 3: Set-up for immunity test of electrostatic discharge



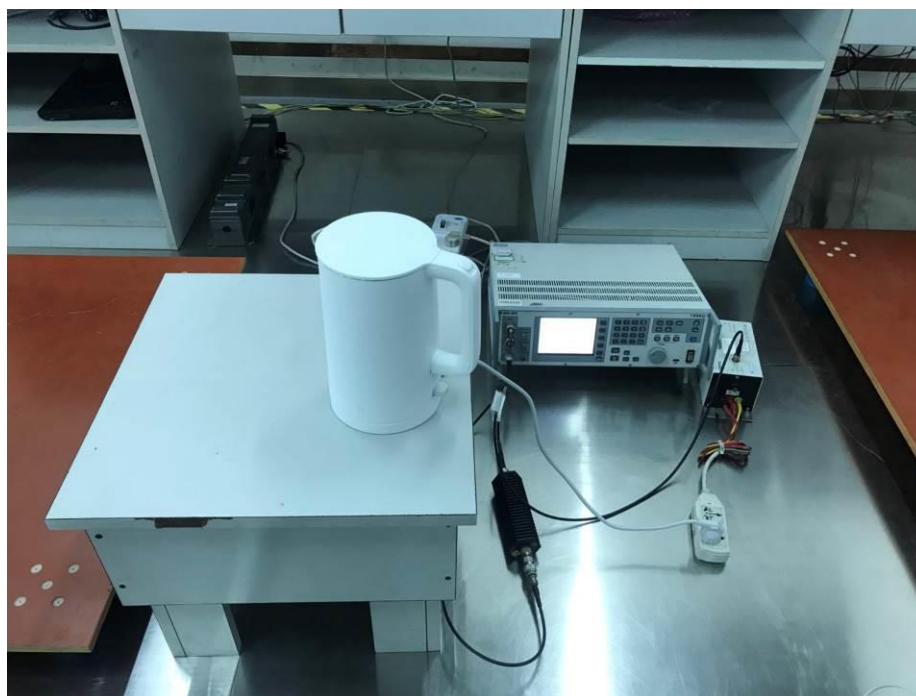
Photograph 4: Set-up for immunity test of fast transient/burst



Photograph 5: Set-up for immunity test of surge



Photograph 6: Set-up for immunity test of injected current, AC power line



Photograph 7: Set-up for immunity test of Voltage dips and interruptions



Photograph 8: Set-up for immunity test of harmonic currents and voltage fluctuations and flicker



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Photograph 9: Set-up for measurement of discontinuous interference



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Appendix 1

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Measurement Uncertainties

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Table 1: Measurement Uncertainty levels

Test	Parameters	Expanded uncertainty (U_{lab})	Expanded uncertainty (U_{cispr})
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 3.1 dB ± 3.1 dB	± 4.0 dB ± 3.6 dB
Power disturbance	Level accuracy (30MHz to 300MHz)	± 4.24 dB	± 4.5 dB
Electromagnetic Radiated Emission (3-loop)	Level accuracy (9kHz to 30MHz)	± 2.5 dB	N/A
Radiated Emission	Level accuracy (9kHz to 30MHz)	N/A	N/A
Radiated Emission	Level accuracy (30MHz to 200MHz) (200MHz to 1000MHz)	± 4.66 dB ± 4.66 dB	± 5.2 dB ± 5.2 dB
Radiated Emission	Level accuracy (1 to 6GHz) (6 to 18GHz)	± 4.42 dB	N/A
Insertion Loss	Level accuracy (150kHz to 1605kHz)	N/A	N/A
Mains Harmonic	Voltage	N/A	N/A
Voltage Fluctuations & Flicker	Voltage	N/A	N/A

As U_{lab} in all applicable tests listed above are less than U_{cispr} according to CISPR 16-4-2:2003,

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.