Zhengzhou Sun & Favor Co., Ltd.

TEST REPORT

SCOPE OF WORK
EMC TESTING–SEE PAGE 2

REPORT NUMBER
250813170GZU-001

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03-September-2025 [----------]

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DOCUMENT CONTROL NUMBER
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TEST REPORT

Applicant Name & Address	:	Zhengzhou Sun & Favor Co., Ltd. No. 102 Hongqi Rd., Jinshui Distr., Zhengzhou, China
Manufacturing Site	:	Same as applicant
Intertek Report No:		250813170GZU-001

Test standards

EN 50270:2015
EN IEC 61000-6-3:2021

Sample Description

Product	:	Gas Detector and Gas Valve
Model No.	:	MTGA12V, MTV01
Electrical Rating	:	220VAC ±25%, 50Hz
Serial No.		Not Labeled
Date Received	:	13 August 2025
Date Test Conducted	:	13 August 2025-29 August 2025

Prepared and Checked By

Victor Hua

Victor Hua

Project Engineer

Approved By:

Sky Zhu

Sky Zhu

Supervisor

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CONTENT

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1. TEST RESULTS SUMMARY

The product belongs to type 1 apparatus

Test Item	Standard	Result
Continuous conducted disturbance voltage	EN IEC 61000-6-3:2021 Reference: EN 55016-2-1:2014	Pass
Discontinuous conducted disturbance voltage	EN IEC 61000-6-3:2021 Reference: EN 55014-1:2017+A11:2020	Pass
Emission at Telecommunications / network Ports	EN IEC 61000-6-3:2021 Reference: EN 55032 :2015+A11 :2020	N/A
Radiated emission (30 MHz–1000 MHz)	EN IEC 61000-6-3:2021 Reference: EN 55016-2-3:2017	Pass
Radiated emission (1 GHz–6 GHz)	EN IEC 61000-6-3:2021 Reference: EN 55016-2-3:2017	N/A
Harmonic of current	EN IEC 61000-6-3:2021 Reference: EN IEC 61000-3-2 :2019	Pass
Flicker	EN IEC 61000-6-3:2021 Reference: EN 61000-3-3:2013+A1:2019	Pass
Electrostatic discharge	EN 50270:2015 Reference: EN 61000-4-2:2009	Pass
Radio-frequency electromagnetic field.	EN 50270:2015 Reference: EN 61000-4-3:2006+A1: 2008+A2: 2010	Pass
Electrical Fast transients/bursts	EN 50270:2015 Reference: EN 61000-4-4:2012	Pass
Surges	EN 50270:2015 Reference: EN 61000-4-5:2006	Pass
Radio-frequency common mode	EN 50270:2015 Reference: EN 61000-4-6: 2009	Pass
Power-frequency magnetic field	EN 50270:2015 Reference: EN 61000-4-8:2010	N/A
Voltage dips and interruption	EN 50270: 2015 Reference: EN 61000-4-11:2004	Pass

Remark:
1. The symbol “N/A” in above table means Not Applicable.
2. When determining the test results, measurement uncertainty of tests has been considered.

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2. EMC RESULTS CONCLUSION

RE: EMC Testing Pursuant to EMC Directive 2014/30/EU performed on the Gas Detector and Gas Valve, Models: MTGA12V, MTV01.

General product information

The product is composed of a gas valve and a gas detector. Model MTGA12V is the detector, Model MTV01 is the Gas Valve. When the detector triggers the alarm, it will output a 12V DC power supply to start the gas valve.

We tested the Gas Detector and Gas Valve, Model: MTGA12V with gas valve MTV01, to determine if it was in compliance with the relevant EN standards as marked on the Test Results Summary. We found that the unit met the requirement of EN IEC 61000-6-3, EN 50270 standards when tested as received. The worst case's test data was presented in this test report.

The production units are required to conform to the initial sample as received when the units are placed on the market.

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3. LABORATORY MEASUREMENTS

Configuration Information

Support Equipment: N/A

Rated Voltage and frequency under test: 230 V~; 50 Hz
Condition of Environment: Temperature: 22~28°C
Relative Humidity:35~60%
Atmosphere Pressure:86~106kPa

Notes:
1. The EMI measurements had been made in the operating mode produced the largest emission in the frequency band being investigated consistent with normal applications. An attempt had been made to maximize the emission by varying the configuration of the EUT.

2. The EMS measurements had been made in the frequency bands being investigated, with the EUT in the most susceptible operating mode consistent with normal applications. The configuration of the test sample had been varied to achieve maximum susceptibility.

3. Test Location:
Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
All tests were performed at:
Room101/301/401/102/202/302/402/502/602/702/802, No. 7-2, Caipin Road, Huangpu District, Guangzhou, Guangdong, China
Except Radiated Disturbance and Radiated Susceptibility were performed at:
Room 102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China

4. Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conducted Emission (9 kHz-150 kHz)	2.80 dB
2	Conducted Emission (150 kHz-30 MHz)	2.23 dB
3	Conducted Emission with VP	1.77 dB
4	Conducted Emission with AAN	4.18 dB
5	Conducted Emission with CVP and CP	3.77 dB
6	Conducted Emission with CP	2.36 dB
7	Disturbance Power (30 MHz-300 MHz)	3.17 dB
8	Radiated Emission with CDNE	1.86 dB
9	Radiated Emission (9 kHz-150 kHz) LLAS	3.48 dB
10	Radiated Emission (150 kHz -30 MHz) LLAS	3.09 dB
11	Radiated Emission (9 kHz-30 MHz) Loop	3.64 dB
12	Radiated Emission (30 MHz-1 GHz)	4.26 dB
13	Radiated Emission (1 GHz-6 GHz)	4.46 dB
14	Radiated Emission (6 GHz-18 GHz)	4.96 dB
15	Radiated Emission (18 GHz-26.5 GHz)	5.16 dB
16	Radiated Emission (26.5 GHz-40 GHz)	5.16 dB

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The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.
Measurement uncertainty is calculated in accordance with CISPR16-4-2:2011+A1:2014 +A2:2018.
The measurement uncertainty is given with a confidence of 95%, k=2.
Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

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4. EQUIPMENT USED DURING TEST

Conducted Disturbance-Mains Terminal(2)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Last calibration date (DD-MM-YYYY)
EM031-04	EMI receiver	ESR3	R&S	05/01/2026	06/01/2025
EM006-06	LISN	ENV216	R&S	01/09/2025	02/09/2024
SA047-111	Digital Temperature-Humidity Recorder	RS210	YIJIE	20/10/2025	21/10/2024
EM004-03	EMC shield Room	8m×4m×3m	Zhongyu	05/01/2026	06/01/2025
EM031-04-01	EMC32 software (CE)	V10.01.00	R&S	N/A	N/A

Radiated Disturbance（30 MHz-1 GHz）

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Last calibration date (DD-MM-YYYY)
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m3	ETS-LINDGREN	08/04/2026	09/04/2025
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	10/11/2025	11/11/2024
EM033-01	TRILOG Super Broadband test Antenna (30MHz-3GHz)	VULB 9163	SCHWARZBECK	08/12/2025	09/12/2024
EM031-02-01	Coaxial cable	/	R&S	09/04/2026	10/04/2025
EM036-01	Common-mode absorbing clamp	CMAD 20B	TESEQ	09/07/2026	10/07/2025
SA047-118	Digital Temperature-Humidity Recorder	RS210	YIJIE	14/07/2026	15/07/2025
EM031-04-01	EMC32 software (RE/RS)	V10.01.00	R&S	N/A	N/A

Electrostatic Discharge

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Last calibration date (DD-MM-YYYY)
EM077-04	ESD Simulator	NSG437	TESEQ	19/08/2026	20/08/2025
SA047-176	Digital Temperature-Humidity Recorder	RS210	YIJIE	06/01/2026	07/01/2025

Electrical Fast Transient/Burst(1)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Last calibration date (DD-MM-YYYY)
EM005-12	EFT Generator	NX5 b-1-300-16	EM TEST	09/04/2026	10/04/2025
EM005-12-01	iec.control	Version 7.1.4	EM TEST	N/A	N/A

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SA047-102	Digital Temperature-Humidity Recorder	RS210	YIJIE	14/07/2026	15/07/2025

Surge(2)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Last calibration date (DD-MM-YYYY)
EM005-09	Surge/DIP Generator	NSG3040	TESEQ	04/06/2026	05/06/2025
EM005-09-02	WIN3000	Version 1.3.2	TESEQ	N/A	N/A
SA047-102	Digital Temperature-Humidity Recorder	RS210	YIJIE	14/07/2026	15/07/2025

Conducted Susceptibility(2)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Last calibration date (DD-MM-YYYY)
EM019-01	Conducted Immunity Testing System	NSG4070-75	Teseq GmbH	04/06/2026	05/06/2025
EM019-01-01	Current Electromagnetic injection clamp	KEMZ801S	Teseq GmbH	01/09/2025	02/09/2024
EM019-01-02	Coupling&Decoupling Network	CDNM016	Teseq GmbH	01/09/2025	02/09/2024
EM019-01-03	6dB Attenuator	ATN6075	Teseq GmbH	01/09/2025	02/09/2024
EM019-03	Current Clamp	CIP 9136A	Teseq GmbH	08/07/2026	09/07/2025
EM019-01-07	NSG4070 Control program	Version 1.2.0	Teseq GmbH	N/A	N/A
SA047-102	Digital Temperature-Humidity Recorder	RS210	YIJIE	14/07/2026	15/07/2025

Voltage Dips and Interruptions(1)

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Last calibration date (DD-MM-YYYY)
EM005-09	Surge/DIP Generator	NSG3040	TESEQ	04/06/2026	05/06/2025
EM005-09-01	Voltage Regulator	INA6501	TESEQ	04/06/2026	05/06/2025
EM005-09-02	WIN3000	Version 1.3.2	TESEQ	N/A	N/A
SA047-102	Digital Temperature-Humidity Recorder	RS210	YIJIE	14/07/2026	15/07/2025

Radiated Susceptibility

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Last calibration date (DD-MM-YYYY)
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m^3	ETS LINDGREN	08/04/2026	09/04/2025
EM031-01	Signal generator	SMB100A	R&S	28/10/2025	29/10/2024

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EM086-11	Power meter	NRP2	R&S	10/11/2025	11/11/2024
EM086-11-01	Power sensor	NRP-Z91	R&S	10/11/2025	11/11/2024
EM046-01	Power Amplifier	80RF1000-300	MILMEGA	04/03/2026	05/03/2025
EM046-03	Power Amplifier	AS0860-75-45	MILMEGA	02/09/2025	03/09/2024
EM061-05	Log. - Per. Broadband Antenna	VULP 9118 E	SCHWARZBECK	09/10/2025	10/10/2023
EM061-07	Stacked Log.-Per. Broadband Antenna	STLP 9149	SCHWARZBECK	09/10/2025	10/10/2023
EM034-01	Open Switch and Control Platform	OSP120/1505.3009K12	R&S	/	/
EM031-04-01	EMC32 software (RE/RS)	V10.01.00	R&S	/	/
SA047-118	Digital Temperature-Humidity Recorder	RS210	YIJIE	14/07/2026	15/07/2025

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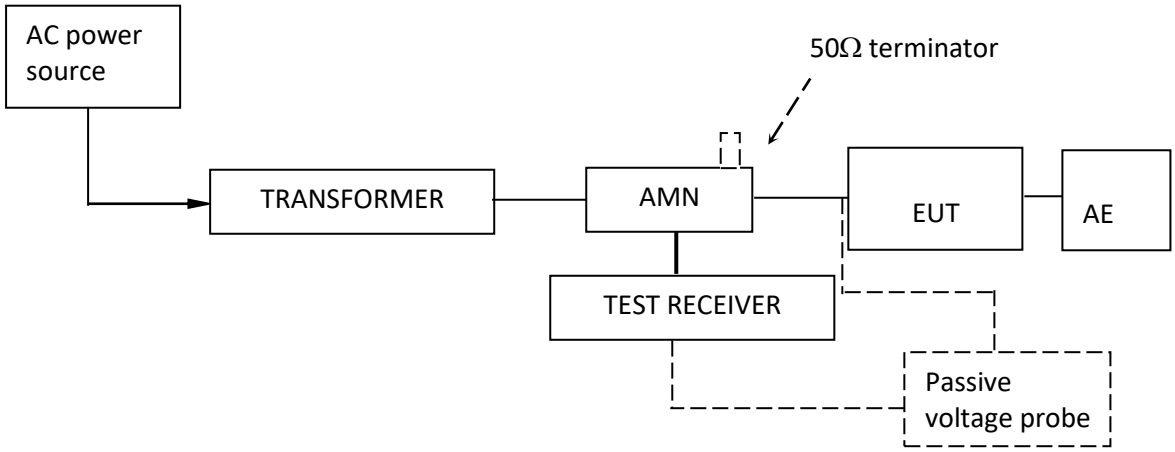
5. EMI TEST

5.1 EN IEC 61000-6-3 Continuous Conducted Disturbance Voltage Test

Test Result: Pass

5.1.1 Block Diagram of Test Setup



5.1.2 Test Setup and Procedure

The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a 50Ω linear impedance artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane (Ground Reference Plane).And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The EUT keeps a distance of at least 0.4m from a vertical metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30 MHz was checked.

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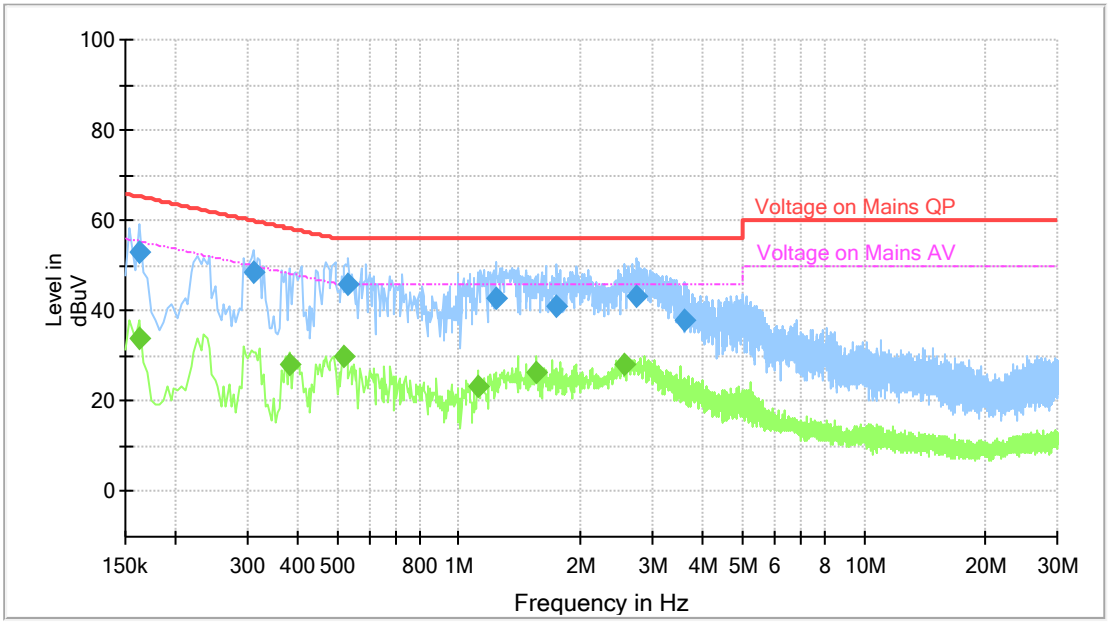
5.1.3 Test Data and curve

At mains terminal:
Tested Wire: Live **Operation Mode: Measuring**

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.162000	---	34.02	55.36	21.35	1000.0	9.000	L1	ON	9.7
0.162000	53.19	---	65.36	12.17	1000.0	9.000	L1	ON	9.7
0.310000	48.60	---	59.97	11.37	1000.0	9.000	L1	ON	9.7
0.382000	---	28.19	48.24	20.04	1000.0	9.000	L1	ON	9.7
0.522000	---	29.95	46.00	16.05	1000.0	9.000	L1	ON	9.7
0.534000	45.78	---	56.00	10.22	1000.0	9.000	L1	ON	9.7
1.110000	---	23.47	46.00	22.53	1000.0	9.000	L1	ON	9.7
1.234000	42.77	---	56.00	13.23	1000.0	9.000	L1	ON	9.7
1.546000	---	26.58	46.00	19.42	1000.0	9.000	L1	ON	9.7
1.746000	41.11	---	56.00	14.89	1000.0	9.000	L1	ON	9.7
2.566000	---	28.07	46.00	17.93	1000.0	9.000	L1	ON	9.7
2.754000	43.19	---	56.00	12.81	1000.0	9.000	L1	ON	9.7
3.622000	37.79	---	56.00	18.21	1000.0	9.000	L1	ON	9.7

Remark:
1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. QuasiPeak or CAverage (dBµV) = Corr. (dB) + Read Level (dBµV)
3. Margin (dB) = Limit (dBµV) - QuasiPeak or CAverage (dBµV)

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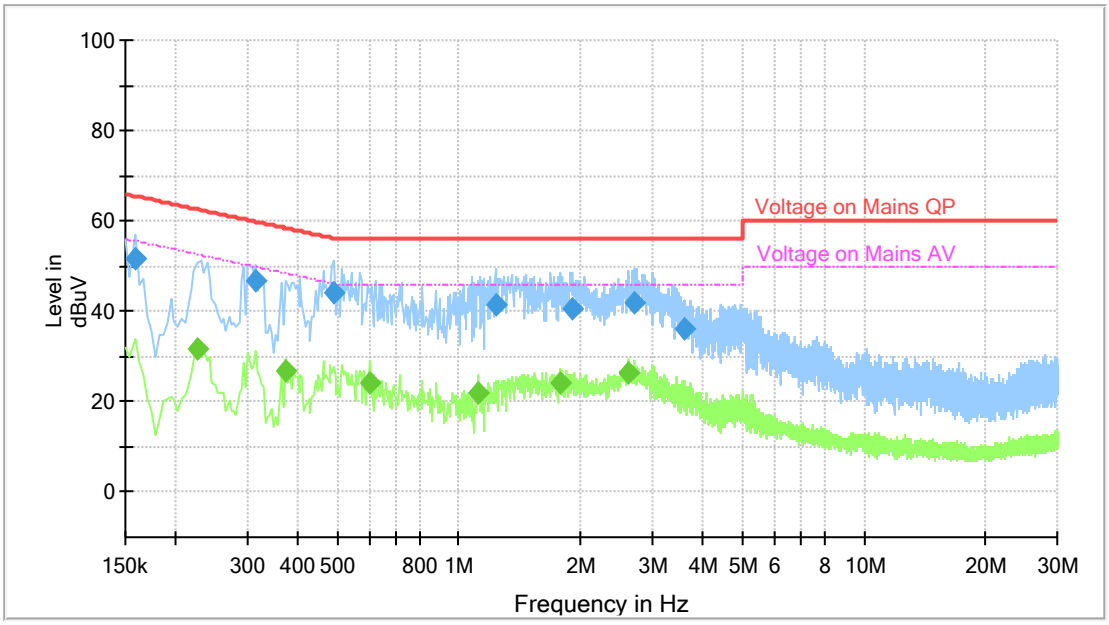
Tested Wire: Neutral **Operation Mode: Measuring**

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.158000	51.78	---	65.57	13.79	1000.0	9.000	N	ON	9.7
0.226000	---	31.54	52.60	21.06	1000.0	9.000	N	ON	9.7
0.314000	46.78	---	59.86	13.09	1000.0	9.000	N	ON	9.7
0.374000	---	26.80	48.41	21.61	1000.0	9.000	N	ON	9.7
0.490000	44.01	---	56.17	12.16	1000.0	9.000	N	ON	9.7
0.602000	---	24.12	46.00	21.88	1000.0	9.000	N	ON	9.7
1.118000	---	21.85	46.00	24.15	1000.0	9.000	N	ON	9.7
1.230000	41.44	---	56.00	14.56	1000.0	9.000	N	ON	9.7
1.782000	---	24.34	46.00	21.66	1000.0	9.000	N	ON	9.7
1.910000	40.34	---	56.00	15.66	1000.0	9.000	N	ON	9.7
2.634000	---	26.44	46.00	19.56	1000.0	9.000	N	ON	9.7
2.698000	42.04	---	56.00	13.96	1000.0	9.000	N	ON	9.7
3.614000	36.03	---	56.00	19.97	1000.0	9.000	N	ON	9.7

5.2 EN IEC 61000-6-3 Discontinuous Conducted Disturbance Voltage

Test Result: Pass

Remark: The product meet the definition of individual switching operation, any disturbance caused by individual switching operations shall be disregarded.

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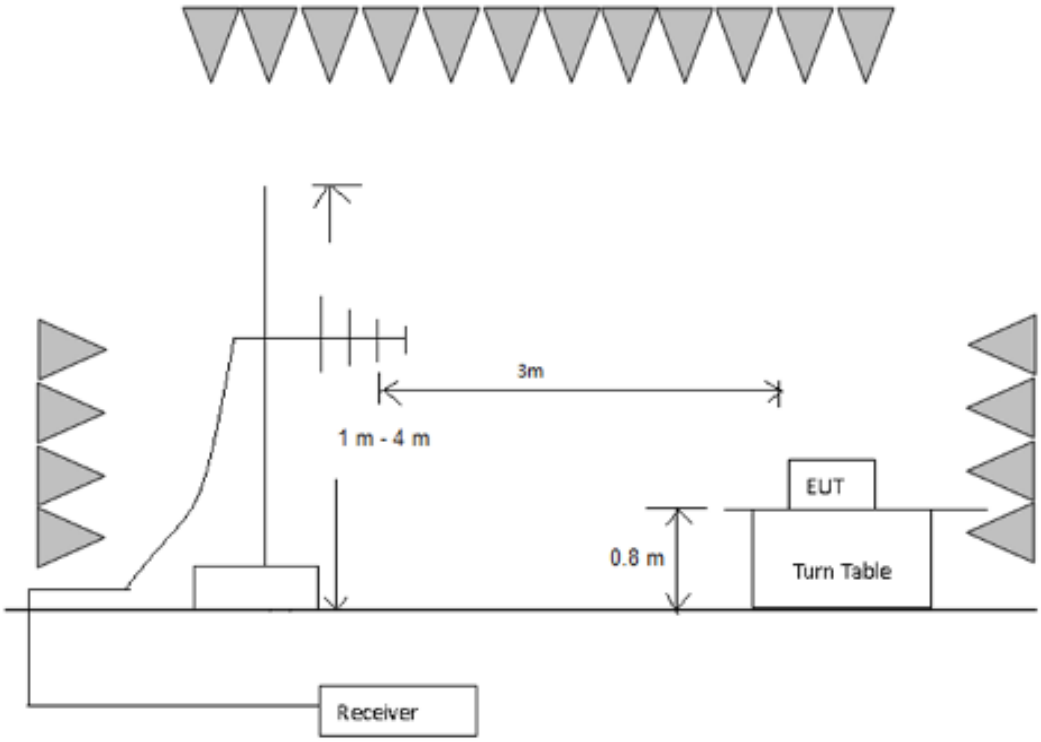
5.3 EN IEC 61000-6-3 Emission at Telecommunications/network Ports

Test Result: Not Applicable
Remark: The test only apply to balanced telecommunication ports intended for connection to unscreened balanced pairs

5.4 EN IEC 61000-6-3 Radiated Emission below 1 GHz

Test Result: Pass

5.4.1 Block Diagram of Test Setup



5.4.2 Test Setup and Procedure

The measurement was applied in a semi-anechoic chamber. The EUT and simulators were placed on a 0.8m high foamed table above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mask. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

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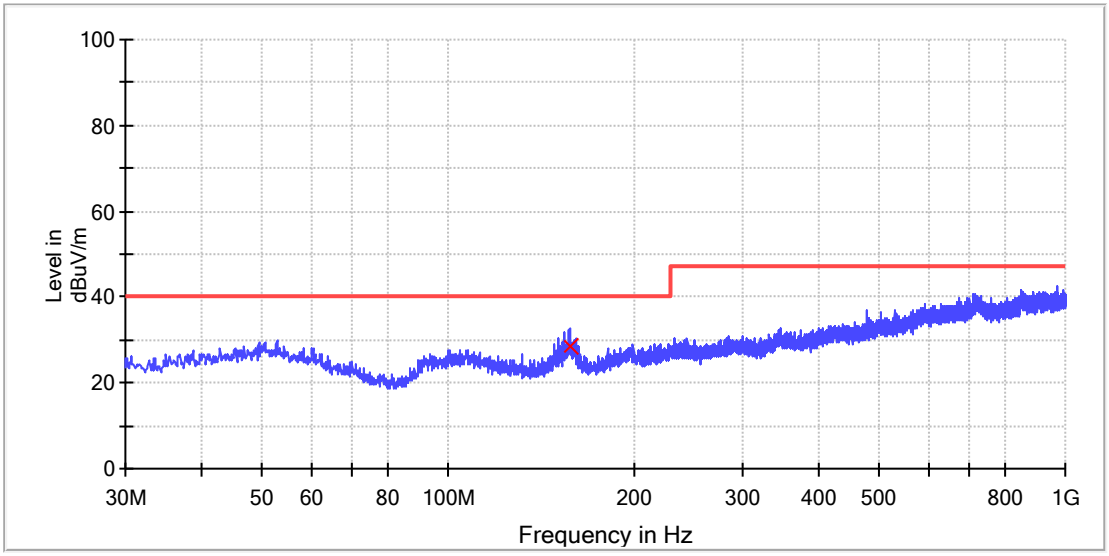
Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to EN55032 requirement during radiated test.
The bandwidth setting on R&S Test Receiver was 120 kHz.
The frequency range from 30MHz to 1000MHz was checked

TEST REPORT

5.4.3 Test Data and Curve

Operation Mode: Measuring

Horizontal



QP

Frequency (MHz)	Quasi Peak (dBuV/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
157.360000	28.4	120.000	H	17.0	11.7	40.0

Remark:
1. Corr. (dB) = Antenna Factor (dB) + Cable Loss (dB)
2. Quasi Peak (dBµV/m) = Corr. (dB) + Read Level (dBµV)
3. Margin (dB) = Limit QPK (dBµV/m) –Quasi Peak (dBµV/m)

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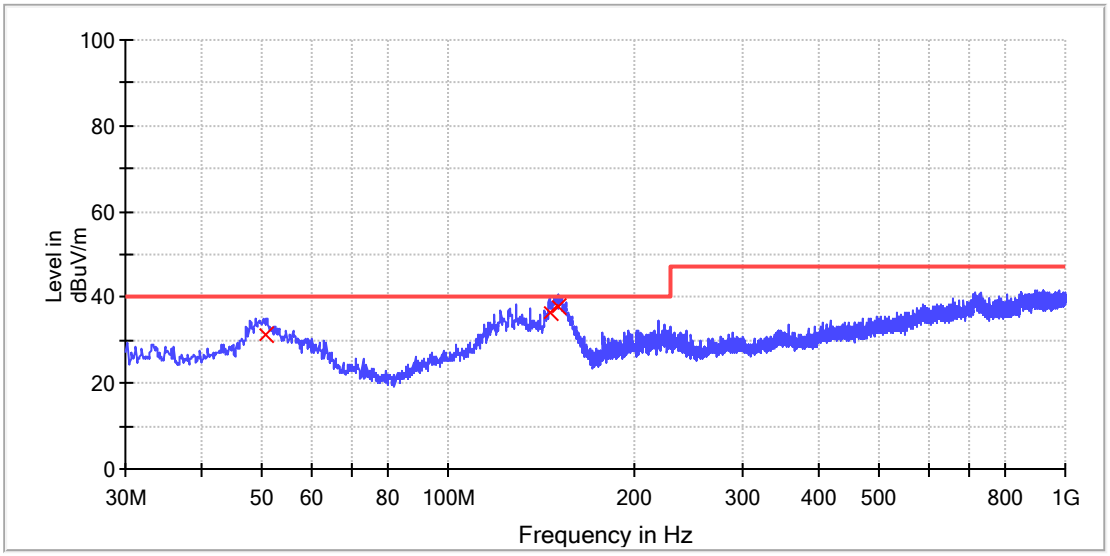
Vertical



QP

Frequency (MHz)	Quasi Peak (dBuV/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
50.760000	31.2	120.000	V	22.6	8.8	40.0
146.200000	36.5	120.000	V	16.7	3.5	40.0
151.160000	37.7	120.000	V	16.7	2.3	40.0

5.5 EN IEC 61000-6-3 Radiated Emission above 1 GHz

Test Result: Not Applicable
Remark:
The highest internal source of the EUT is not more than 108 MHz, so the measurement above 1000 MHz is not applicable.

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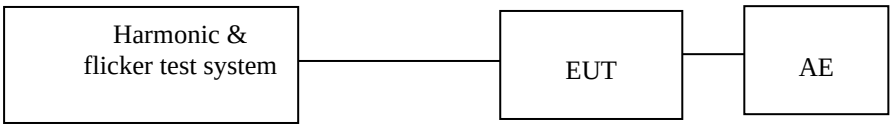
6. Harmonics of current

Test Result: Pass

6.1 Block Diagram of Test Setup



6.2 Test Setup and Procedure

Harmonics of the fundamental current were measured up to 40 order harmonics using a digital power meter with an analogue output and frequency analyzer which was integrated in the harmonic & flicker test system. The measurements were carried out under steady conditions.

Remarks: 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.

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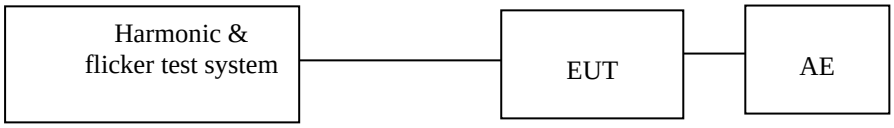
7. Flicker

Test Result: Pass

7.1 Block Diagram of Test Setup



7.2 Test Setup and Procedure

7.2.1 Definition

Flicker:	impression of unsteadiness of visual sensation induced by a lighting stimulus whose luminance or spectral distribution fluctuates with time.
Pst:	Short-term flicker indicator The flicker severity evaluated over a short period (in minutes); Pst=1 is the conventional threshold of irritability
Plt:	long-term flicker indicator; the flicker severity evaluated over a long period (a few hous). Using successive Pst valuse.
dc:	the relative steady-state voltage change
dmax:	the maximum relative voltage change
d(t):	the value during a voltage change

7.2.2 Test condition

Remarks: This apparatus is unlikely to produce significant voltage fluctuations and flicker by examination of the circuit diagram and specification of it. Therefore, it is deemed to fulfill the relevant standard without testing according to clause 6.1 of EN 61000-3-3.

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8. EMS TEST

Performance Criteria:

Criterion A:	The apparatus shall continue to operate as intended both during and after the test. For those functions specified by the manufacturer as being safety functions, when the apparatus is used as intended no loss of function is allowed and the performance requirements given in Table 5 shall be complied with
Criterion B:	During the test Degradation of performance is allowed but the performance requirements given in table 5 shall not be exceeded by more than a factor of 2, or The apparatus shall show a specified fault indication and/or output. After the test any degradation in performance shall be self-recoverable and the apparatus shall continue to operate as intended. No permanent change of actual operating state or stored data or continuous deactivation of alarm is allowed.
Criterion C:	Temporary loss of function is allowed during the test, provided the loss of function is self-recoverable or can be easily restored by the operation of the controls. The apparatus shall operate as intended after the test. No change of stored data is allowed.

Operation mode of EMS test:

Test Item	Operation mode
Electrostatic discharge	Alarm mode
Radio-frequency electromagnetic field.	Alarm mode
Electrical Fast transients/bursts	Alarm mode
Surges	Alarm mode
Radio-frequency common mode	Alarm mode
Power-frequency magnetic field	N/A
Voltage dips and interruption	Alarm mode

Note: "N/A" means Not Applicable in below text.

8.1 EN 61000-4-2(Pursuant to EN 50270) Electrostatic Discharge

Performance criterion: B

Test Result: Pass

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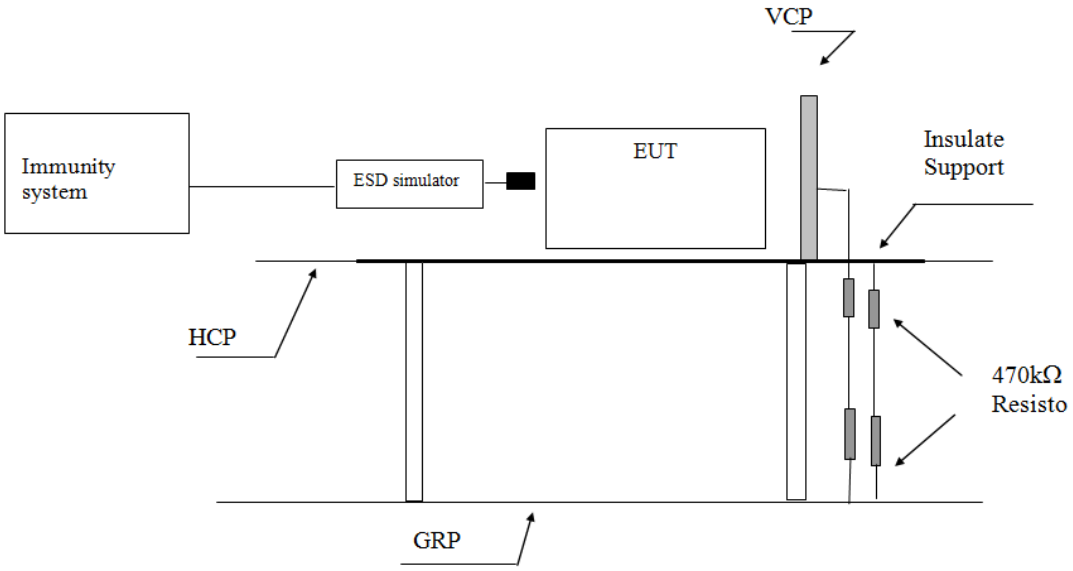
8.1.1 Block Diagram of Test Setup



Note: HCP means Horizontal Coupling Plane,

VCP means Vertical Coupling Plane

GRP means Ground Reference Plane

8.1.2 Test Setup and Procedure

The EUT was put on a 0.8m high wooden table 0.1m high for floor standing equipment standing on the ground reference plane (GRP) 3m by 2m in size, made by iron 1.0 mm thick.

A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size & HCP were constructed from the same material type & thickness as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end.

The distance between EUT and any of the other metallic surface excepted the GRP, HCP & VCP was greater than 1m.

The EUT was arranged and connected according to its functional requirements.

Direct static electricity discharges were applied only to those points and surface which were accessible to personnel during normal usage.

TEST REPORT

On each preselected points 10 times of each polarity single discharge were applied. The time interval between successive single discharges was at least 1s.

The ESD generator was held perpendicular to the surface to which the discharge was applied. The discharge return cable of the generator was kept at a distance of 0.2m whilst the discharge was being applied. During the contact discharges, the tip of the discharge electrode was touched the EUT before the discharge switch was operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.

Indirect discharge was conducted to objects placed near the EUT, simulated by applying the discharges of the ESD generator to a coupling plane, in the contact discharge mode.

After each discharge, the ESD generator was removed from the EUT, the generator was then retriggered for a new single discharge. For ungrounded product, a grounded carbon fibre brush with bleeder resistors (2×470 kΩ) in the grounding cable was used after each discharge to remove remnant electrostatic voltage.

For air discharge, a minimum of 10 single air discharges were applied to the selected test point for each such area.

8.1.3 Test Result

Direct Application of ESD

Direct Contact Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Points
4	20	Pass	Accessible metal parts of the EUT Conductive substrate with coating which is not declared to be insulating

Direct Air Discharge

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Points
2, 4, 8	20	Pass	All accessible points where contact discharge cannot be applied such as Displays, Indicators light, Keyboard, Button, Switch, Knob, Air gap, Slots, Hole and so on

TEST REPORT

Indirect Application of ESD

Horizontal Coupling Plane under the EUT

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Point
4	20	Pass	At the front edge of each HCP opposite the centre point of each unit of the EUT

Vertical Coupling Plane beside the EUT

Applied Voltage (kV)	No. of Discharge for each point	Result	Discharged Point
4	20	Pass	The centre of the vertical edge of the coupling plane

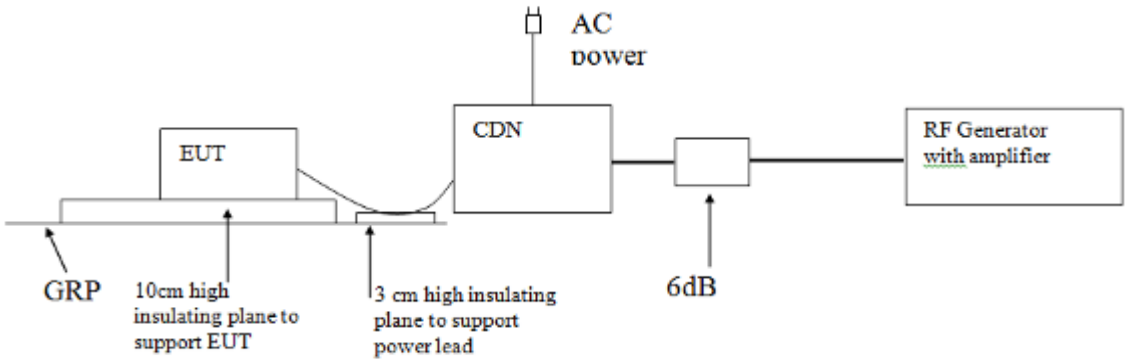
8.2 EN 61000-4-6(Pursuant to EN 50270) Radio-frequency common mode

Tested Port: ☒ AC power ☐ DC power ☐Signal/Control

Performance criterion: A

Test Result: Pass

8.2.1 Block Diagram of Test Setup



8.2.2 Test Setup and Procedure

The EUT was placed on an insulating support of 0.1m height above a ground reference Plane, arranged and connected to satisfy its functional requirement.
All relevant cables were provided with the appropriate coupling and decoupling devices at a distance between 0.1m and 0.3m from the projected geometry of the EUT on an insulating support of 0.03m height above the ground reference plane.
Test voltage was verified before each testing though power meter combined in the RF generator with AMP.

TEST REPORT

Dwell time was set to 3s and step was set as 1% to keep sufficient response time for EUT.
The frequency from 0.15MHz to 80MHz was checked.
The dwell time of the pulse modulated carrier at each frequency is 3 complete cycles. The pulse modulation test shall be synchronized such that only full pulses occur in order to avoid unintended transient responses at the beginning and end of each dwell time.

8.2.3 Test Result

Port	Frequency (MHz)	Level	Result
A.C. Power Lines	0.15 to 80	3V (r.m.s.)	Pass
D.C. Power Lines	0.15 to 80	3V (r.m.s.)	N/A
Signal Lines	0.15 to 80	3V (r.m.s.)	N/A

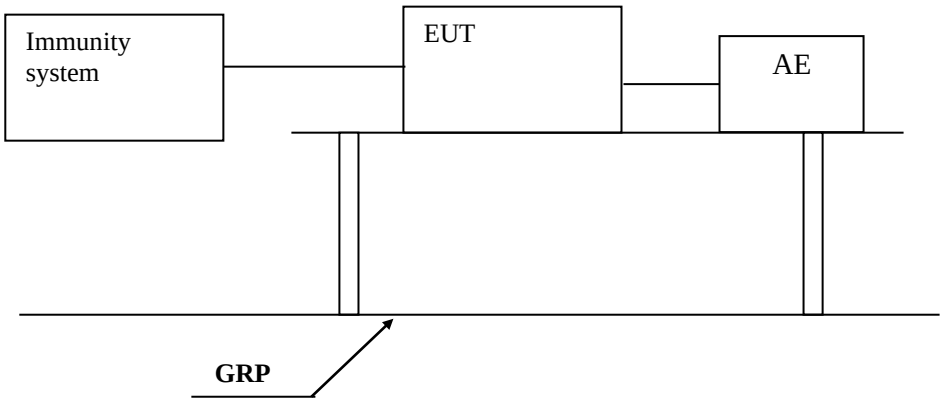
8.3 EN 61000-4-4(Pursuant to EN 50270) Electrical Fast Transients/Bursts

Tested Port: ☒ AC power ☐ DC power ☐Signal/Control

Performance criterion: B

Test Result: Pass

8.3.1 Block Diagram of Test Setup



8.3.2 Test Setup and Procedure

The EUT was placed on a 0.1m high wooden table, standing on the ground reference plane 3m by 2m in size, made by steel 1mm thick.

The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m.

The mains lead excess than 0.5m was folded to avoid a flat coil and situated at a distance of 0.1m above the ground reference plane to insure the distance between the coupling device and the EUT was 0.5m.

TEST REPORT

The EUT was arranged and connected to satisfy its functional requirement and supplied by the coupling-decoupling network. Repetition Frequency was 5 kHz.

8.3.3 Test Result

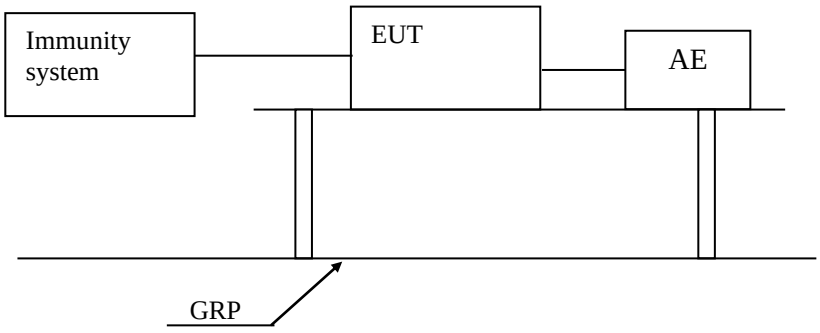
Level	Polarity	A.C. Power supply line and functional earth terminal	D.C. Power Lines, Signal Line & Control Line
0.5 kV	+	N/A	N/A
0.5 kV	-	N/A	N/A
1 kV	+	Pass	N/A
1 kV	-	Pass	N/A

8.4 EN 61000-4-5(Pursuant to EN 50270) Surges

Tested Port: ☒ AC power ☐ DC power ☐Signal/Control

Performance criterion: B
Test Result: Pass

8.4.1 Block Diagram of Test Setup



8.4.2 Test Setup and Procedure

The surge was applied to the EUT power supply terminals via the capacitive coupling network.

Decoupling networks were required in order to avoid possible adverse effects on equipment not under test that might be powered by the same lines and to provide sufficient decoupling impedance to the surge wave so that the specified wave might be developed on the lines under test.

The EUT was arranged and connected according to its functional requirements.

The EUT was placed on a 0.1m high wooden support above the GRP), supplied by the coupling-decoupling network, and arranged and connected to satisfy its functional

requirement. The power cord between the EUT and the coupling/decoupling network was less than 2 meters.

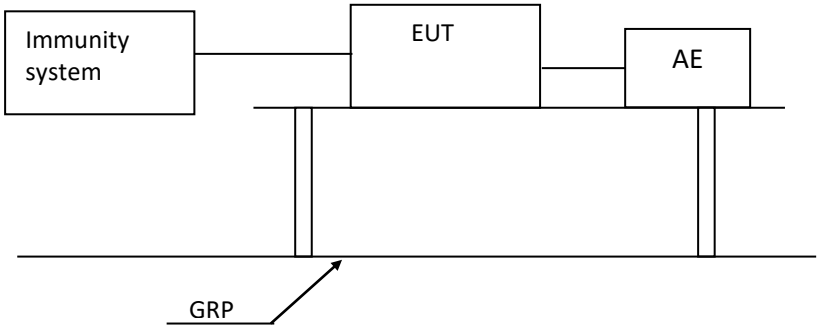
8.4.3 Test Result

Tested Port	Level	Result
AC power	Line to line±0.5kV, ±1kV	Pass
AC power	Line to earth ±0.5kV, ±1kV,±2kV	N/A
Signal/control	Line to earth ±0.5kV, ±1kV	N/A
DC power	Line to earth ±0.5kV, ±1kV	N/A

8.5 EN 61000-4-11(Pursuant to EN 50270) Voltage Dips and Interruptions

Tested Port: ☒ AC power ☐ DC power
Performance criterion: B (only for test level of 70%Ut with 0.5 cycle), C
Test Result: Pass

8.5.1 Block Diagram of Test Setup



TEST REPORT

8.5.2 Test Setup and Procedure

The EUT was placed on an insulating support of 0.8m height, standing on a ground reference plane, and arranged and connected to satisfy its functional requirement

The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.

The EUT was tested for each selected combination of test level and duration with a sequence of three dips/interruptions with intervals of 10 s minimum. Each representative mode of operation was tested.

Abrupt changes in supply voltage occurred at zero crossings of the voltage.

8.5.3 Test Result

AC power port

Test condition				
Test Level in %U_T	50 Hz		60 Hz	
	Duration	Result	Duration	Result
0	1	Pass	1	N/A
40	10	Pass	12	N/A
70	25	Pass	30	N/A
0	250	Pass	300	N/A

Remark: UT is the rated voltage for the equipment.

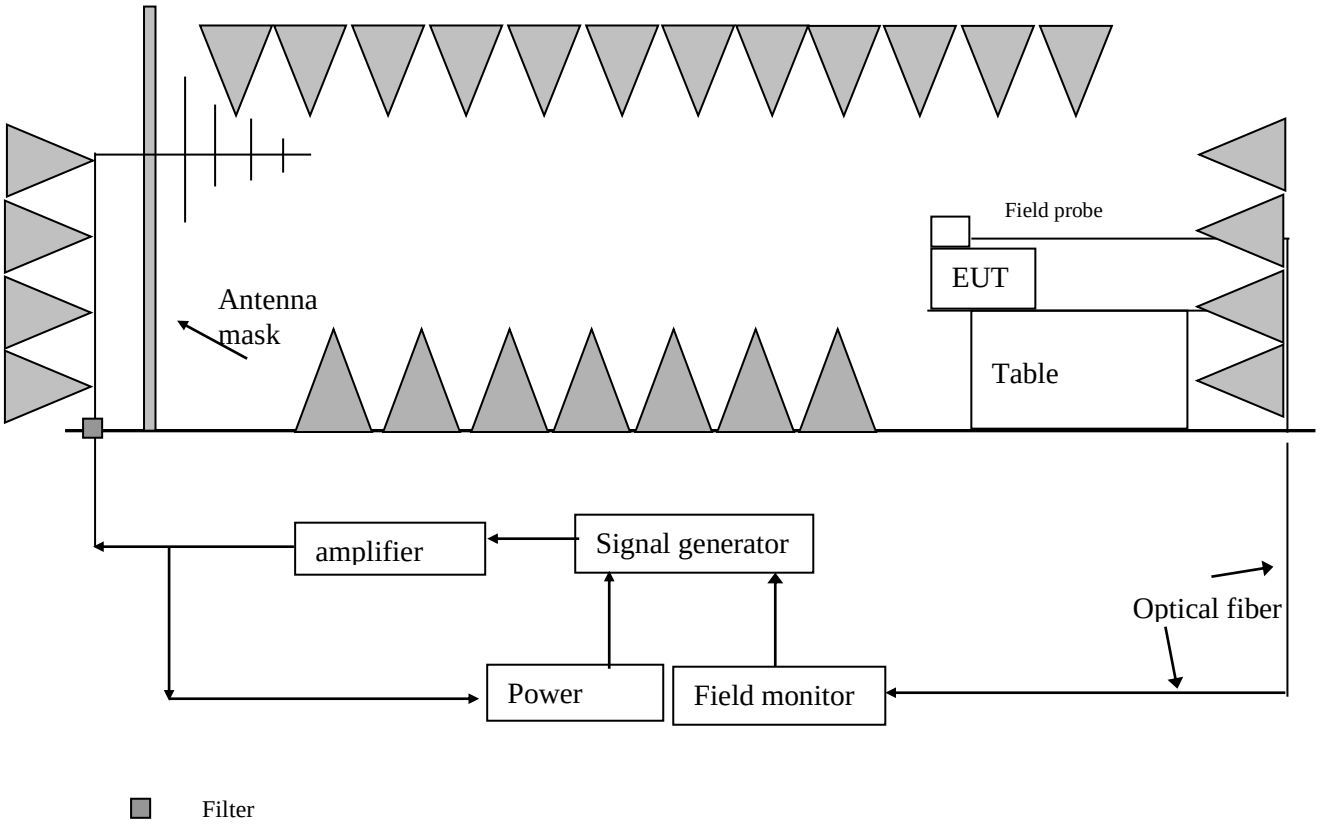
DC power port

Test condition		
Test Level in %U_T	Duration (ms)	Result
0	1000	N/A
40	1000	N/A
0	20	N/A

8.6 EN 61000-4-3(Pursuant to EN 50270) Radio-frequency electromagnetic field

Performance criterion: A
Test Result: Pass

8.6.1 Block Diagram of Test Setup



TEST REPORT

8.6.2 Test Setup and Procedure

The test was conducted in a fully anechoic chamber to maintain a uniform field of sufficient dimensions with respect to the EUT, and also in order to comply with various national and international laws prohibiting interference to radio communications.

The equipment was placed in the test facility on a non-conducting table 0.8m high (for floor standing EUT, is placed on a non-conducting support 0.1m height).

The EUT was placed on the uniform calibrated plane which is 3V/m and 1V/m EM field.

For all ports connected to EUT, manufacturer specified cable type and length was used, for those cables no specification, unshielded cable applied. Wire was left exposed to the electromagnetic field for a distance of 1 m from the EUT.

The EUT was arranged and connected according to its functional requirements

Before testing, the intensity of the established field strength had been checked by placing the field sensor at a calibration grid point, and with the field generating antenna and cables in the same positions as used for the calibration, the forward power needed to give the calibrated field strength was measured. Spot checks was made at a number of calibration grid points over the frequency range 80 to 1000 MHz and 1.4 to 2.7 GHz, both polarizations was checked. After calibration, the EUT was initially placed with one face coincident with the calibration plane.

The frequency range was swept from 80 to 1000MHz and 1.4 to 2.7 GH, with the signal 80% amplitude modulated with a 1 kHz sinewave, pausing to adjust the r.f. signal level.
The dwell time at each frequency was 3s so as that the EUT to be exercised and be able to respond.

The step size was 1% of the fundamental with linear interpolation between calibrated points.
Test was performed with the generating antenna facing each of the four sides of the EUT.

8.6.3 Test Result

Frequency (MHz)	Exposed Side	Field Strength (V/m)	Result
80 to 1000	Front	3 V/m (r.m.s.)	Pass
80 to 1000	Left	3 V/m (r.m.s.)	Pass
80 to 1000	Rear	3 V/m (r.m.s.)	Pass
80 to 1000	Right	3 V/m (r.m.s.)	Pass

TEST REPORT

Frequency (GHz)	Exposed Side	Field Strength (V/m)	Result
1.4 to 2.0	Front	3 V/m (r.m.s.)	Pass
1.4 to 2.0	Left	3 V/m (r.m.s.)	Pass
1.4 to 2.0	Rear	3 V/m (r.m.s.)	Pass
1.4 to 2.0	Right	3 V/m (r.m.s.)	Pass

Frequency (GHz)	Exposed Side	Field Strength (V/m)	Result
2.0 to 2.7	Front	1 V/m (r.m.s.)	Pass
2.0 to 2.7	Left	1 V/m (r.m.s.)	Pass
2.0 to 2.7	Rear	1 V/m (r.m.s.)	Pass
2.0 to 2.7	Right	1 V/m (r.m.s.)	Pass

8.7 EN 61000-4-8(Pursuant to EN 50270) Power Frequency Magnetic Field

Tested Port: Enclosure
Performance criterion: A
Test Result: Not Applicable
Remark: Equipment containing no Hall elements or magnetic field sensors is not susceptible to magnetic field. Hence, this equipment is deemed to fulfil the magnetic field test.

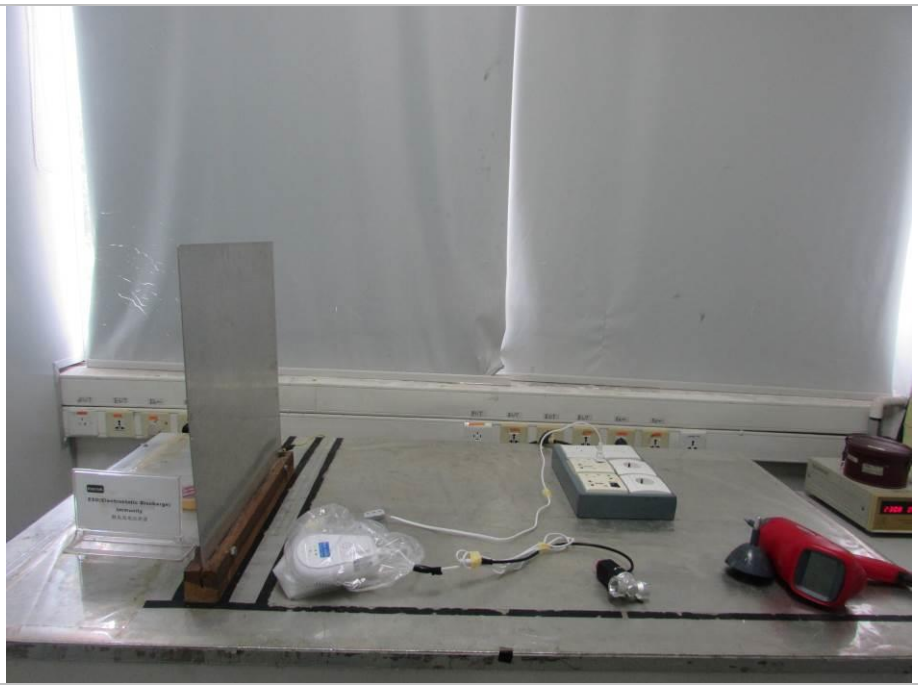
TEST REPORT

9. APPENDIX I - PHOTOS OF TEST SETUP

Conducted disturbance voltage at mains ports

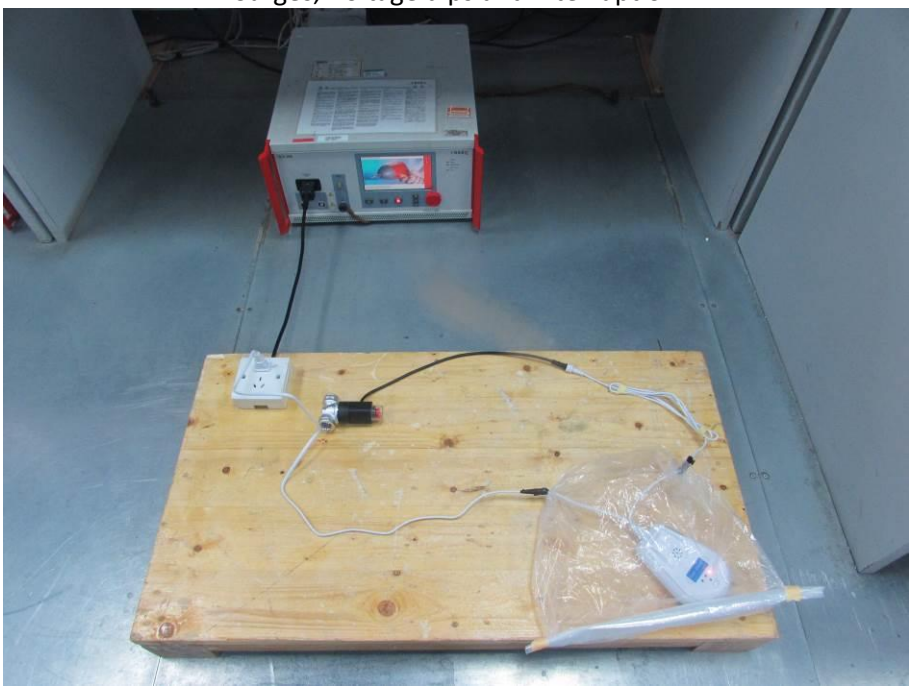
Radiated emission (30 MHz–1000 MHz)

TEST REPORT

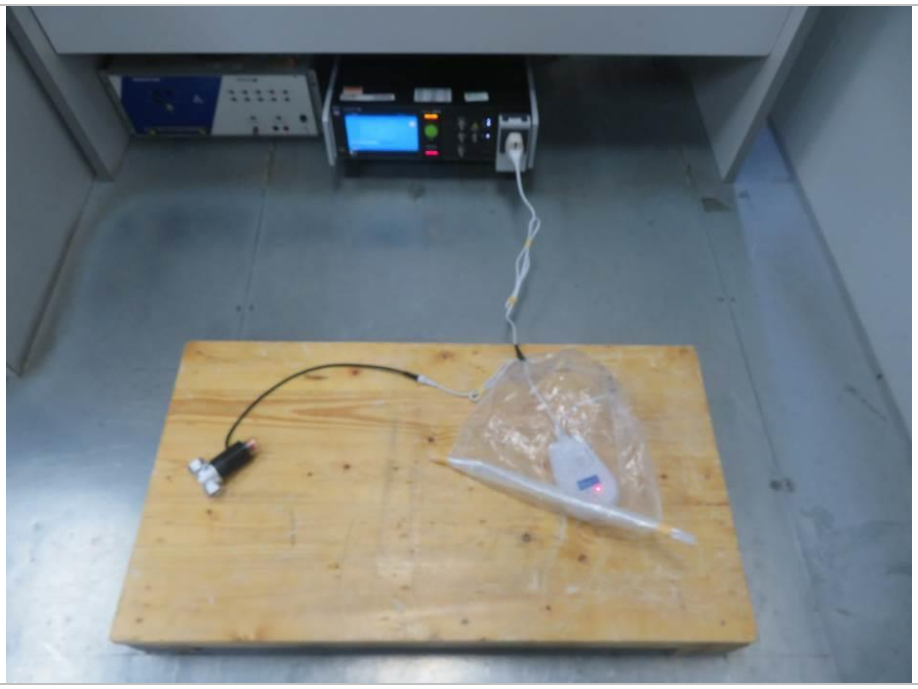
Electrostatic discharge

Radio-frequency electromagnetic field


TEST REPORT

Surges, Voltage dips and interruption



Electrical Fast transients/bursts



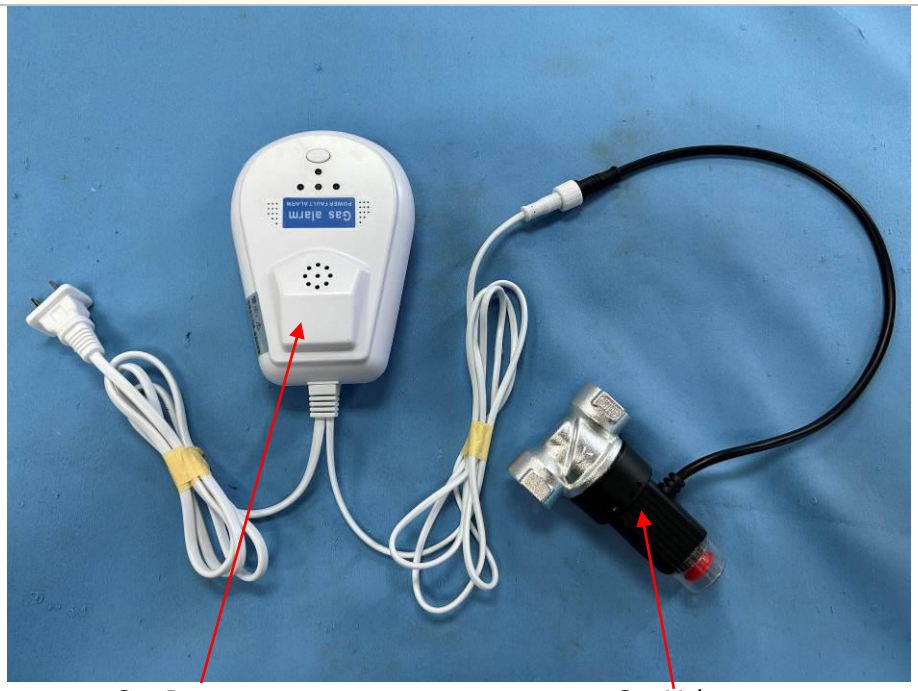
TEST REPORT

Radio-frequency common mode

TEST REPORT

10. APPENDIX II – PHOTOS OF EUT

General view

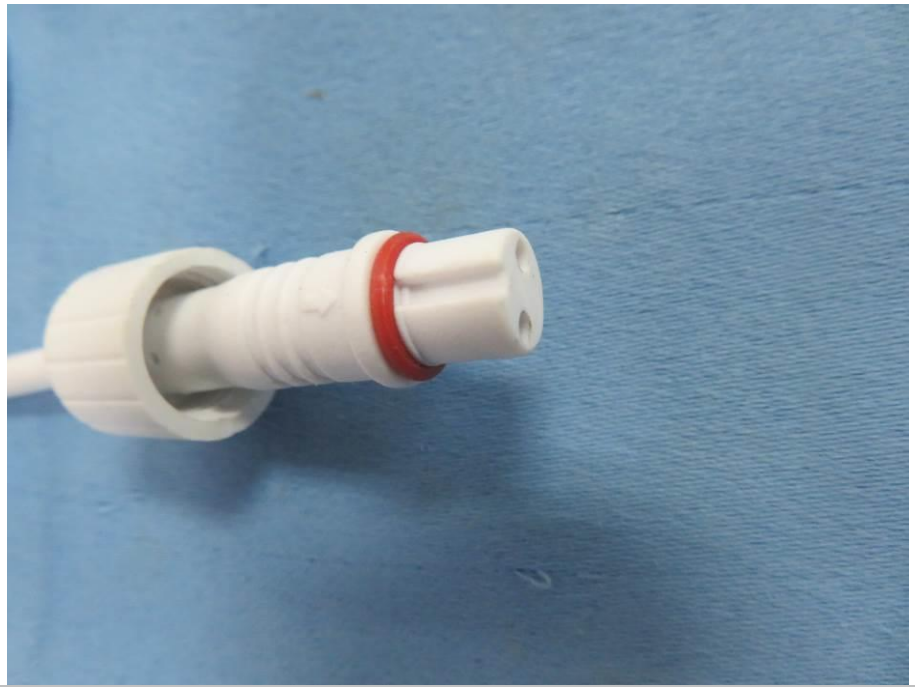


External view

TEST REPORT

Connector view

Connector view



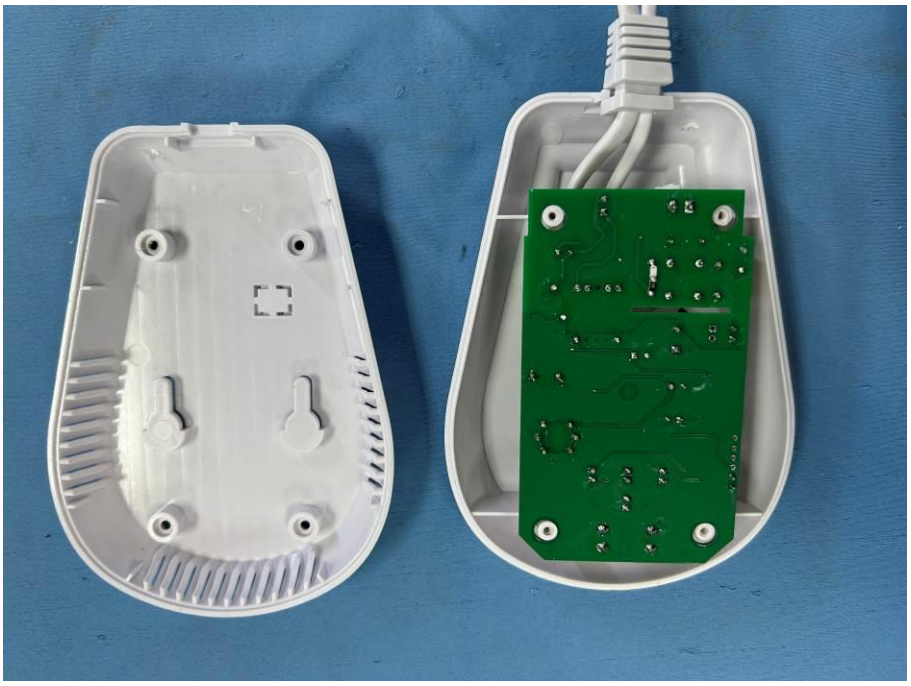
TEST REPORT

External view

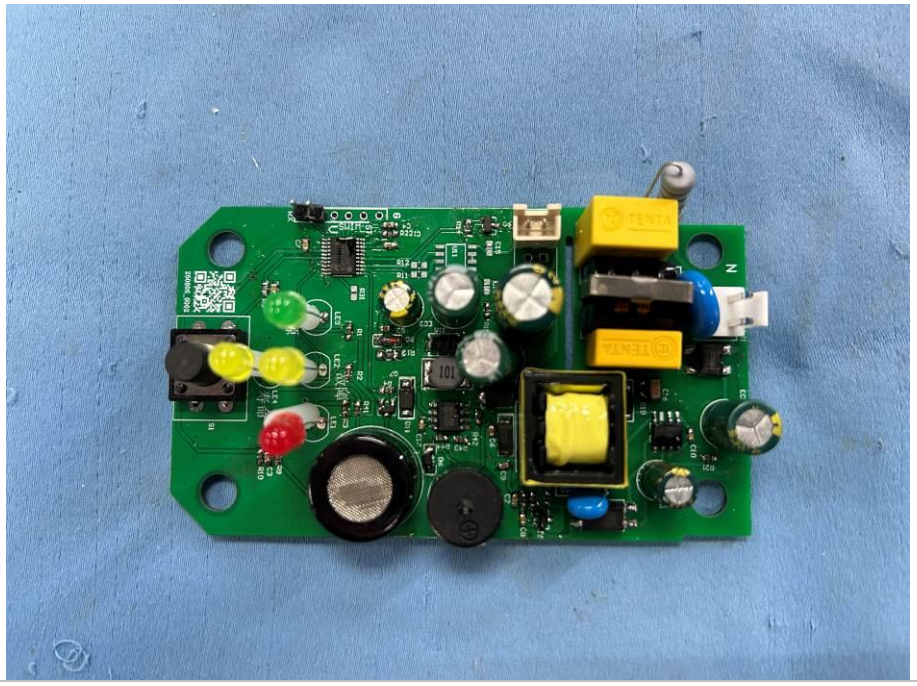
External view

TEST REPORT

Internal view for detector



Main PCB view for detector



**********End of Report**********