

Attestation of Conformity

Registration No. AGC-WH00199220716E2

Applicant Yueqing Langir Electric Co., Ltd.

No.10, Longhe East Road, Liushi Town, Yueqing City, Wenzhou, China

Product
Designation Anti Vandal Switch

Brand Name N/A

Model /
Series Models L22/V12, V16, V19, VS19, V22, L12, L16, LS16, L19, L19A, LS19, L19M, L19B, L19Y, L22A,
L22M, L22B, L25, L30B, L28, L30, L35, L40, LF19, L16T, L19T, L22T, L22O, L29S, L22S,
L12U, L16U, L19U, L22U, L25U

Manufacturer Yueqing Langir Electric Co., Ltd.

No.10, Longhe East Road, Liushi Town, Yueqing City, Wenzhou, China

Requirement	Applied Standards	Document Evidence	Result
EMC Directive	EN IEC 61000-6-1:2019 EN IEC 61000-6-3:2021	Test Report: AGC-WH00199220716EE01	Conform



Signed by General Manager(Bram Wu)

Issue Date: August 1, 2022

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Note: This attestation is part of the full test report(s) and should be used in conjunction with it.

Version: 1.0

EMC Test Report

Report No.: AGC-WH00199220716EE01

PRODUCT DESIGNATION : Anti Vandal Switch
BRAND NAME : N/A
MODEL NAME : L22(Series Model Refer to page 3)
CLIENT : Yueqing Langir Electric Co., Ltd.
DATE OF ISSUE : Jul.20, 2022
REPORT VERSION : V1.0

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1. VERIFICATION OF CONFORMITY

Applicant	Yueqing Langir Electric Co., Ltd.
Address	No.10, Longhe East Road, Liushi Town, Yueqing City, Wenzhou, China
Manufacturer	Yueqing Langir Electric Co., Ltd.
Address	No.10, Longhe East Road, Liushi Town, Yueqing City, Wenzhou, China
Factory	Yueqing Langir Electric Co., Ltd.
Address	No.10, Longhe East Road, Liushi Town, Yueqing City, Wenzhou, China
Product Designation	Anti Vandal Switch
Brand Name	N/A
Test Model	L22
Series Model	V12, V16, V19, VS19, V22, L12, L16, LS16, L19, L19A, LS19, L19M, L19B, L19Y, L22A, L22M, L22B, L25, L30B, L28, L30, L35, L40, LF19, L16T, L19T, L22T, L22O, L29S, L22S, L12U, L16U, L19U, L22U, L25U
Difference of Model	All the same except for model name
Receiving Date of Sample	Jul.12, 2022
Date of test	Jul.12, 2022~Jul.16, 2022
Standard(s)	EN IEC 61000-6-1:2019 EN IEC61000-6-3:2021
Deviation	None
Remark	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGC-TRF-EMC-23B

The above equipment was tested by Attestation of Global Compliance(Wuhan) Co., Ltd.for compliance with the requirements set forth in the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

Tested By



Duke Yang(Yang Hongbo)

Jul.20, 2022

Reviewed By



Vincent Yao(Yao Xing)

Jul.20, 2022

Approved By



Bram Wu(Wu Xiaobing)

Jul.20, 2022

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2. SYSTEM DESCRIPTION

TEST MODE DESCRIPTION		
NO.	TEST MODE DESCRIPTION	WORST
1	Normal	V
Note: 1. V means EMI worst mode.		

3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR.

- Uncertainty of Conducted Emission, $U = 2.6\text{dB}$
- Uncertainty of Radiated Emission 30MHz~1GHz, $U = 4.0\text{dB}$

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4. PRODUCT INFORMATION

Housing Type	Plastic+Metal
EUT Input Rating	DC 24V
Adapter Model	/
Adapter Input	/
Adapter Output	/

I/O Port Information (☒ Applicable ☐ Not Applicable)

I/O Port of EUT			
I/O Port Type	Number	Cable Description	Tested With
DC input	1	0.3m unshielded	1
--	--	--	--

Note:

1. All the above "--" means that EUT has no cable.
2. All the cables were provided by AGC Lab.

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5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Battery	VARTA	--	--	--	--
--	--	--	--	--	--

Note:

1 All the above equipment/cables were placed in worse case positions to maximize emission signals during Emission test.

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6. TEST FACILITY

Site	Attestation of Global Compliance (Wuhan) Co., Ltd
Location	Room 102,Floor 1-2 of Building 3,Wuhan Jinneng Windpower Industrial Park,No.9 Zhulin Road,Fozuling Street,East Lake High-tech Development Zone,Wuhan,P.R. China

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	KEYSIGHT	N9020A	MY50142800	Feb.24, 2022	Feb.23, 2023
LISN	R&S	ENV4200	100551	Feb.24, 2022	Feb.23, 2023
LISN	ZHINAN	ZN3770B	14013	Feb.24, 2022	Feb.23, 2023

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Test Receiver	KEYSIGHT	N9038A	MY50142800	Mar.10, 2022	Mar.09, 2023
Spectrum Analyzer	R&S	FSV40-N	102254	Feb.24, 2022	Feb.23, 2023
Wideband Antenna	SCHWARZBECK	VULB9168	00986	Mar.31, 2022	Mar.30, 2023
preamplifier	SCHWARZBECK	BBV 9745	BBV9745#21 2	Feb.24, 2022	Feb.23, 2023

TEST EQUIPMENT OF ESD TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ESD Simulator	LIONCEL	ESD-203B	0180909	Mar.01, 2022	Feb.28, 2023

TEST EQUIPMENT OF EFT TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
EFT Generator	LIONCEL	EFT-405CB	0180403	Feb.24, 2022	Feb.23, 2023
EMS Control system	LIONCEL	SCU-614A	0180503	Feb.24, 2022	Feb.23, 2023
CDN	3Ctest	EFTN 69100TM	ES0291901	Feb.24, 2022	Feb.23, 2023
Coupling Clamp	LIONCEL	EFTC	018071806	Feb.24, 2022	Feb.23, 2023

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TEST EQUIPMENT OF SURGE TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Surge Generator	LIONCEL	LSG-506CT	0180403	Feb.24, 2022	Feb.23, 2023
Surge Generator	LIONCEL	LSG-506CB	0180404	Feb.24, 2022	Feb.23, 2023
EMS test control system	LIONCEL	SCU-614A	0180203	Feb.24, 2022	Feb.23, 2023
Surge three phase coupled network	LIONCEL	CN-533P	0180801	Feb.24, 2022	Feb.23, 2023
Surge three phase coupled network	LIONCEL	DN-533P	0180802	Feb.24, 2022	Feb.23, 2023
Surge high-speed signal line coupling decoupling network	LIONCEL	CDN-508SUS	0200503	Feb.24, 2022	Feb.23, 2023

TEST EQUIPMENT OF CS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
RF Conducted Immunity System	LIONCEL	RIS-6091-85	0181001	Feb.24, 2022	Feb.23, 2023
Electromagnetic injection pliers	LIONCEL	EMCL-20	18101533-0115	Feb.24, 2022	Feb.23, 2023
CDN	LIONCEL	CDN-M2-32	0181101J	Feb.24, 2022	Feb.23, 2023
6dB Attenuator	LIONCEL	--	--	Feb.24, 2022	Feb.23, 2023

TEST EQUIPMENT OF RS IMMUNITY TEST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Power Amplifier	rflight	NTWPA-008 10200E	18123309	Feb.24, 2022	Feb.23, 2023
Power Amplifier	rflight	NTWPA-106 0100E	19013005	Feb.24, 2022	Feb.23, 2023
RF Switch	Tonscend	JS0806s	188060136	Feb.24, 2022	Feb.23, 2023
Power Sensor	ROHDE&SCHW ARZ	U20001H	MY50000146	Feb.24, 2022	Feb.23, 2023
Power Sensor	ROHDE&SCHW ARZ	U20001H	MY50000412	Feb.24, 2022	Feb.23, 2023
Signal Generator	Agilent	N5181A	MY48180027	Feb.24, 2022	Feb.23, 2023
Log Periodic Antenna	SCHWARZBECK	VULP 9118E	01008	Mar.31, 2022	Mar.30, 2023

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Stacked Microwave Log.-Per. Antenna	SCHWARZBECK	STLP9149	00635	Mar.06, 2022	Mar.05, 2023
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TEST EQUIPMENT OF PFMF TEST

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
PFMF Generator	LIONCEL	PMF-801C-T	0180702	Feb.24, 2022	Feb.23, 2023
PFMF Coil	LIONCEL	PMF801C-A	0180902	Feb.24, 2022	Feb.23, 2023
PFMF power supply	LIONCEL	PMF801C-C	0180703	Feb.24, 2022	Feb.23, 2023

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7. TEST ITEMS AND THE RESULTS

Test item	Test Requirement	Test Method	Class/Severity	Result
Conducted Emission	EN 61000-6-3	IEC 61000-6-3	---	Pass
Radiated Emission	EN 61000-6-3	IEC 61000-6-3	---	Pass
Electrostatic Discharge Immunity	EN 61000-6-1	IEC 61000-4-2	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)	Pass
Radiated RF Electromagnetic	EN 61000-6-1	IEC 61000-4-3	80MHz-1GHz, 3V/m/1.0GHz-2.0GHz, 3V/m/2.0GHz-2.7GHz, 1V/m with 80% AM. 1kHz Modulation.	Pass
Electrical fast transient/burst Immunity	EN 61000-6-1	IEC 61000-4-4	± 0.5kV for Power Supply Lines	Pass
Surge Immunity	EN 61000-6-1	IEC 61000-4-5	± 0.5kV for line to line	Pass
Immunity to Conducted Disturbances Induced by RF fields	EN 61000-6-1	IEC 61000-4-6	3V(0.15MHz-100MHz) with 80% AM. 1 kHz Modulation	Pass
Power frequency magnetic field	EN 61000-6-1	IEC 61000-4-8	3A/m	Pass

Note : "—" means not applicable.

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8. LINE CONDUCTED EMISSION TEST

8.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Low Voltage AC Mains Port	
	Q.P.(dB μ V)	Average(dB μ V)
150kHz-500kHz	66-56	56-46
500kHz-5MHz	56	46
5MHz-30MHz	60	50

Frequency	DC Power Port	
	Q.P.(dB μ V)	Average(dB μ V)
150kHz-500kHz	79	66
5MHz-30MHz	73	60

Frequency	Telecommunications / Network Port	
	Q.P.(dB μ V)	Average(dB μ V)
150kHz-500kHz	84-74	74-64
500kHz-30MHz	74	64

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

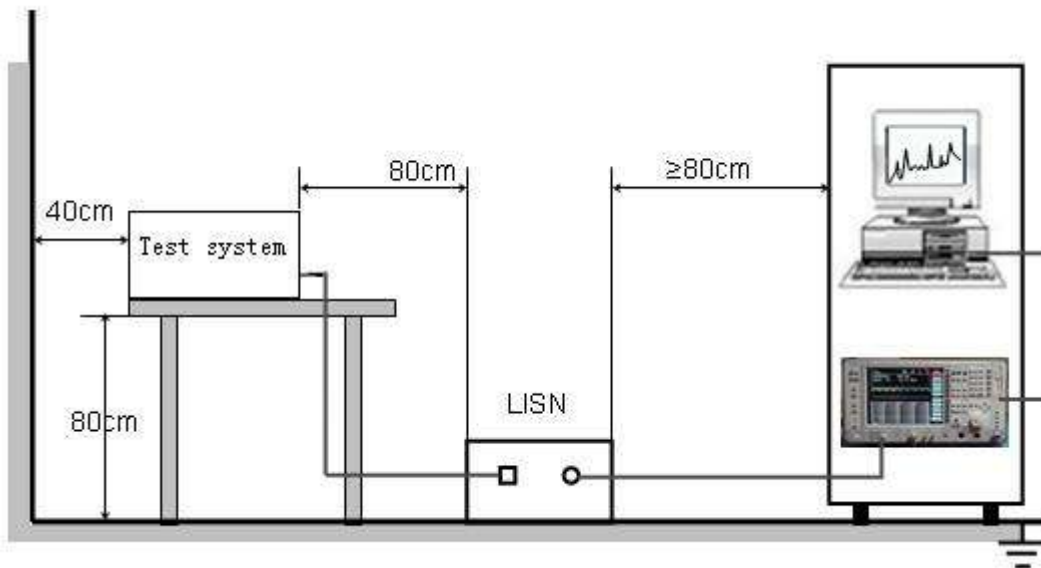
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8.2. BLOCK DIAGRAM OF TEST SETUP

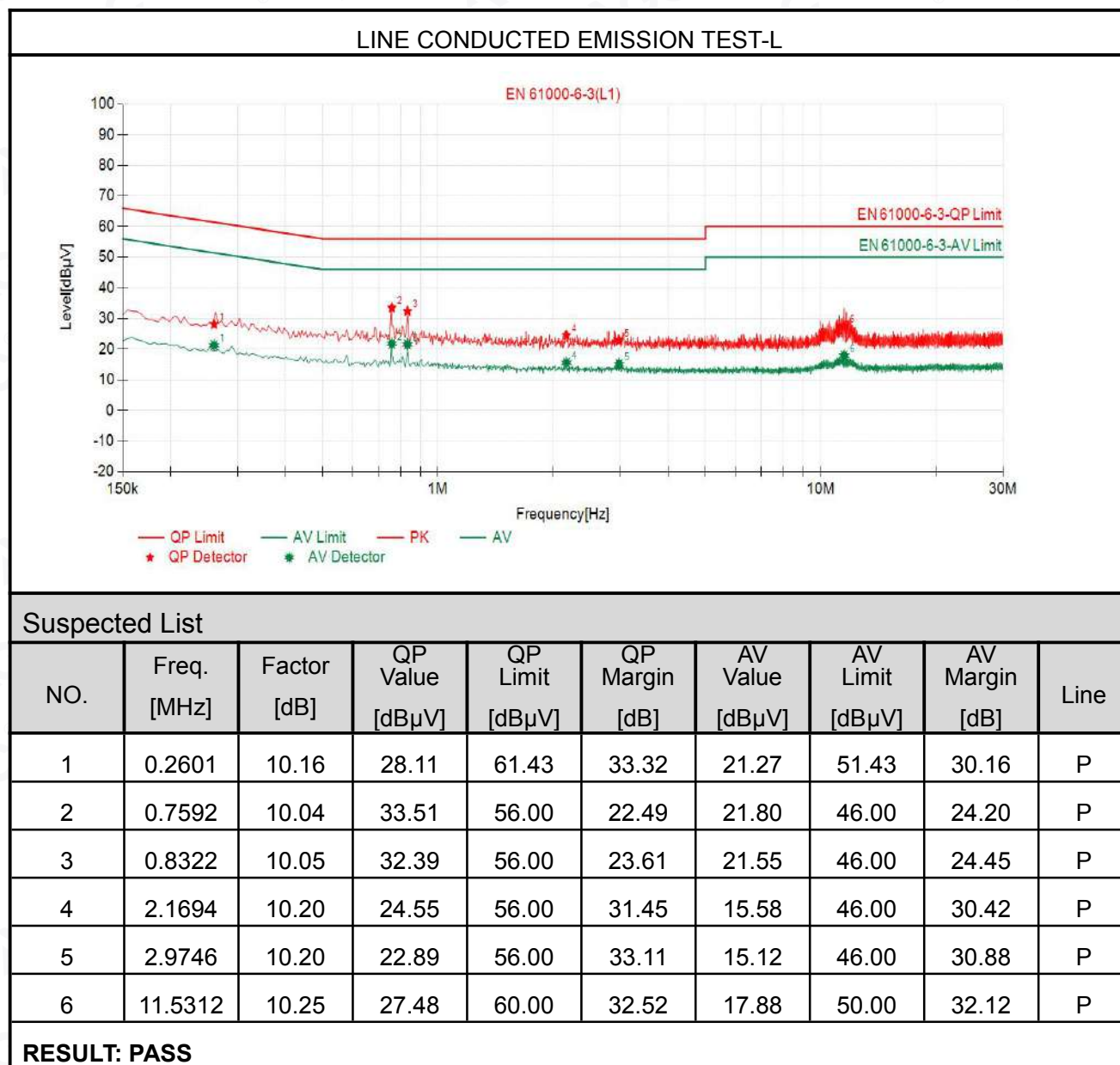


8.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN 61000-6-3 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN 61000-6-3
- (3) All I/O cables were positioned to simulate typical actual usage as per EN 61000-6-3
- (4) The EUT received DC24V power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane. Communicate during the test.
- (5) All support equipments received power from a second LISN supplying power, if any.
- (6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- (7) Analyzer / Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- (8) During the above scans, the emissions were maximized by cable manipulation.
- (9) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
- (10) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

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8.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST



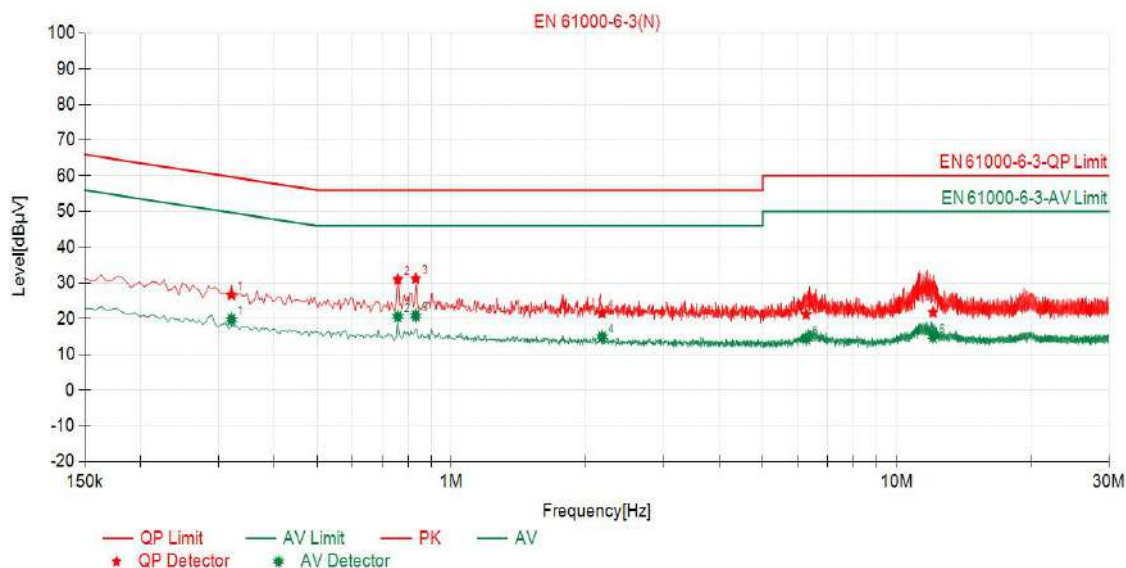
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LINE CONDUCTED EMISSION TEST-N



Suspected List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Line
1	0.3208	10.12	26.73	59.69	32.96	19.81	49.69	29.88	N
2	0.7590	10.04	31.04	56.00	24.96	20.63	46.00	25.37	N
3	0.8308	10.05	31.23	56.00	24.77	20.86	46.00	25.14	N
4	2.1818	10.20	21.61	56.00	34.39	14.87	46.00	31.13	N
5	6.2680	10.26	21.19	60.00	38.81	14.40	50.00	35.60	N
6	12.0764	10.26	21.81	60.00	38.19	14.92	50.00	35.08	N

RESULT: PASS

Note:

QP/AV Value(dBuV/m)=Reading(dBuV)+Factor(dB/m)

Factor(dB/m)= Cable loss(dB)+Attenuation(dB)for Attenuator

QP/AV Margin= QP/AV Limit - QP/AV Value

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9. RADIATED EMISSION TEST

9.1. LIMITS OF RADIATED DISTURBANCES

Limits for radiated disturbance 30MHz to 1 GHz at a measurement distance of 3 m	
Frequency range (MHz)	Quasi peak limits(dB μ V/m)
30 - 230	40
230 - 1000	47

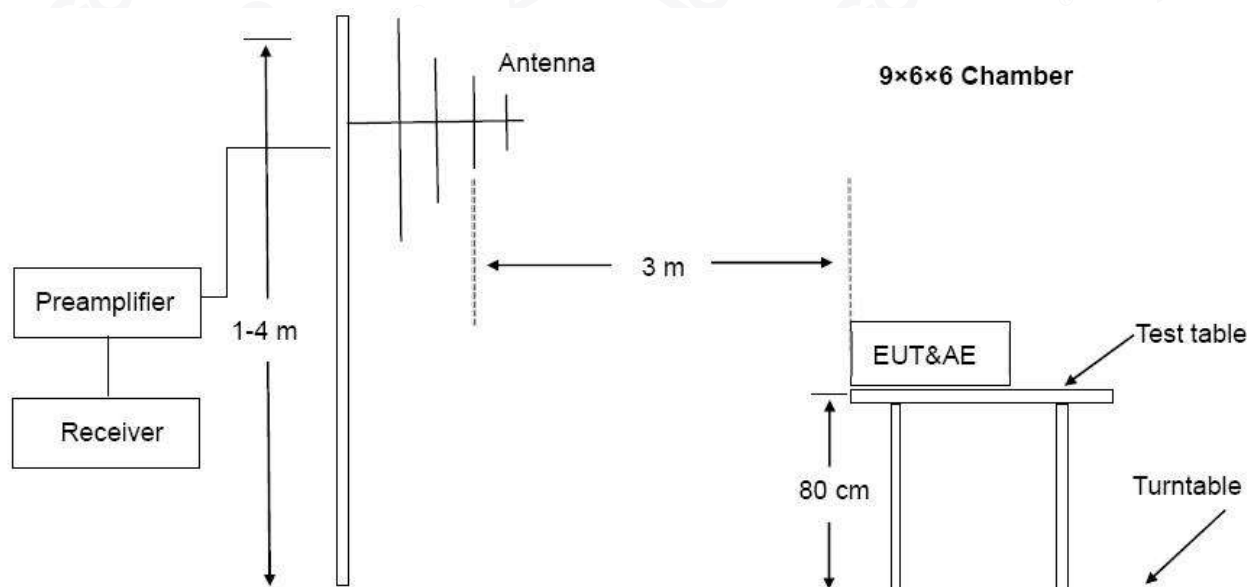
Limits for radiated disturbance 1.0GHz to 6.0GHz at a measurement distance of 3 m		
Frequency range (GHz)	Peak limits(dB μ V/m)	Average limits(dB μ V/m)
1.0 – 3.0	70	50
3.0 – 6.0	74	54

Notes:

1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

9.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators



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9.3. PROCEDURE OF RADIATED EMISSION TEST

- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as EN 61000-6-3 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as EN 61000-6-3.
- (3) All I/O cables were positioned to simulate typical actual usage as EN 61000-6-3.
- (4) The EUT received DC 24V power from socket under the turntable, if any. Communicate during the test.
- (5) The antenna was placed at 3 meter away from the EUT as stated in EN 61000-6-3. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- (6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- (7) The test mode(s) were scanned during the test:
- (8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

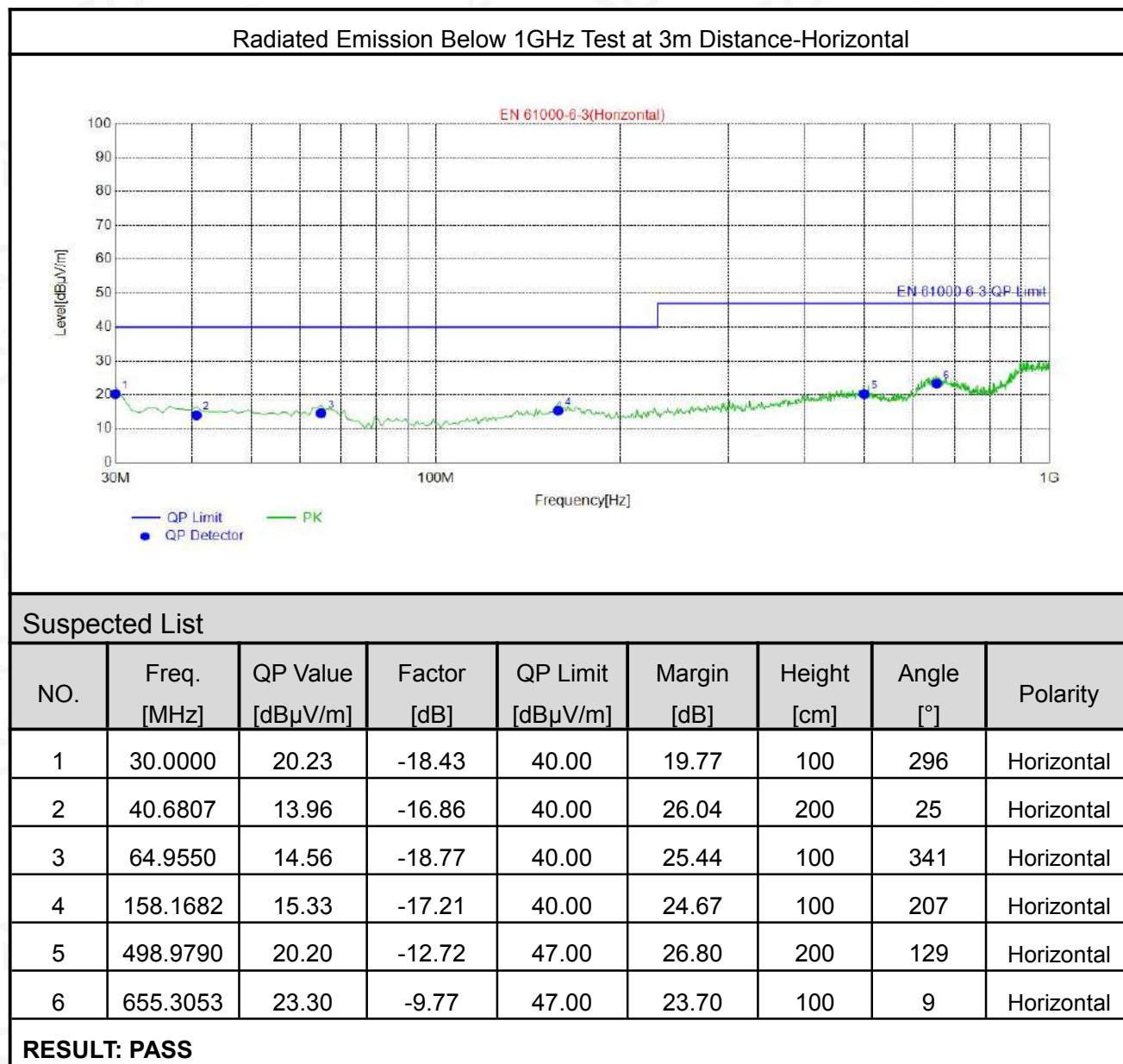
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9.4. TEST RESULT OF RADIATED EMISSION TEST



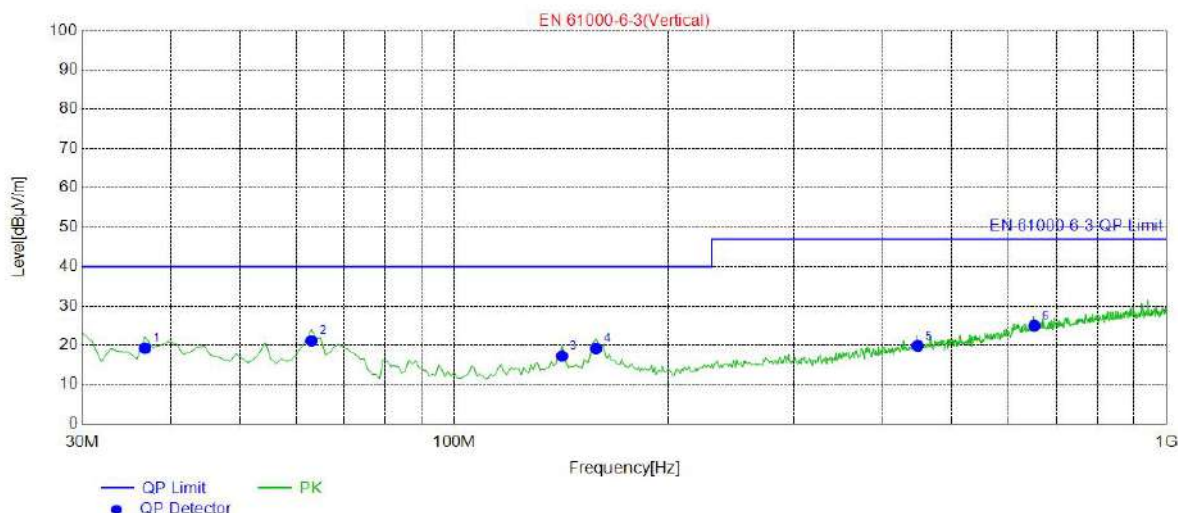
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Radiated Emission Below 1GHz Test at 3m Distance- Vertical



Suspected List

NO.	Freq. [MHz]	QP Value [dBμV/m]	Factor [dB]	QP Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.7968	19.28	-17.31	40.00	20.72	100	118	Vertical
2	63.0130	21.13	-18.57	40.00	18.87	200	55	Vertical
3	141.6617	17.29	-17.61	40.00	22.71	100	14	Vertical
4	158.1682	19.19	-17.21	40.00	20.81	100	243	Vertical
5	447.5175	19.87	-13.58	47.00	27.13	200	168	Vertical
6	652.3924	24.98	-9.60	47.00	22.02	100	204	Vertical

RESULT: PASS

Note:

QP Value(dBuV/m)=Reading(dBuV)+Factor(dB/m)

Factor(dB/m)=Antenna Factor(dB/m)+Cable loss(dB)+Attenuation(dB)for Attenuator

Margin= Limit -Level

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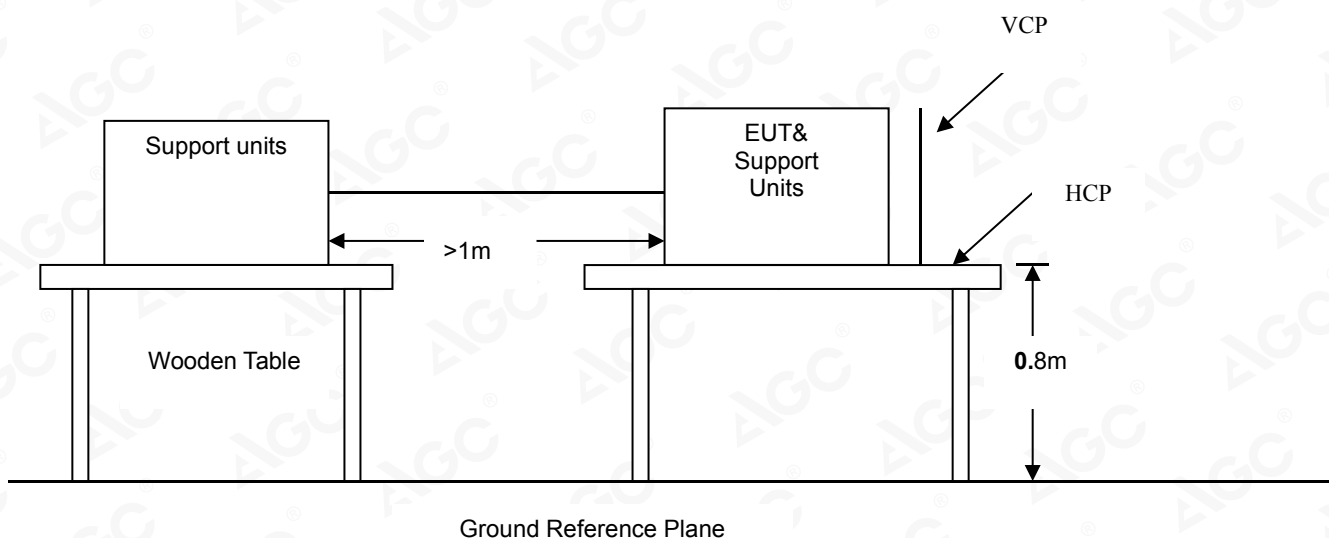
10. ESD EMISSION TEST

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port	Enclosure
Basic Standard	IEC 61000-4-2
Test Level	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)
Standard require	B
Tester	Duke
Temperature	27.3°C
Humidity	46%

10.1. BLOCK DIAGRAM OF TEST SETUP

(The 470 k ohm resistors are installed per standard requirement)



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10.2. TEST PROCEDURE

The test procedure shall be in accordance with IEC 61000-4-2. Electrostatic discharges shall be applied only to points and surfaces of the EUT which are expected to be touched during normal operation, including user access operations specified in the user manual, for example cleaning or adding consumables when the EUT is powered. The application of discharges to the contacts of open connectors is not required.

The number of test points is EUT dependent. Subclause 8.3.1 and Clause A.5 of IEC 61000-4-2 shall be taken into consideration when selecting test points, paying particular attention to keyboards, dialling pads, power switches, mice, drive slots, card slots, the areas around communication ports, etc.

When applying direct discharges to a portable or handheld battery-powered EUT with a display screen, it may not be possible to observe the screen for a given EUT orientation. If observation of the screen is necessary during this test, the EUT may be mounted vertically using non-metallic supports.

Note: As per the A2 to IEC 61000-4-2, a bleed resistor cable is connected between the EUT and HCP during the test.

The electrostatic discharges were applied as follows:

Voltage	Coupling	Test Performance	Result
±4kV	Contact Discharge	No function loss	A
±4kV	Indirect Discharge HCP (Front)	No function loss	A
±4kV	Indirect Discharge HCP (Left)	No function loss	A
±4kV	Indirect Discharge HCP (Back)	No function loss	A
±4kV	Indirect Discharge HCP (Right)	No function loss	A
±4kV	Indirect Discharge VCP (Front)	No function loss	A
±4kV	Indirect Discharge VCP (Left)	No function loss	A
±4kV	Indirect Discharge VCP (Back)	No function loss	A
±4kV	Indirect Discharge VCP (Right)	No function loss	A
±8kV	Air Discharge	No function loss	A

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10.3. PERFORMANCE & RESULT

Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

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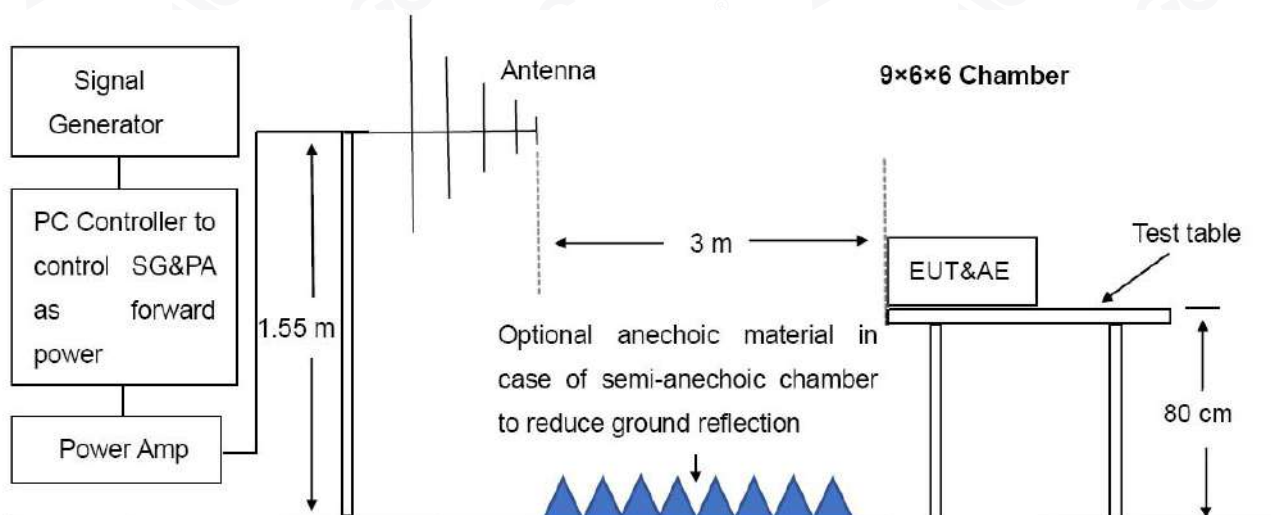


11. RS IMMUNITY TEST

RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	Enclosure
Basic Standard	IEC 61000-4-3
Test Level:	80MHz-1GHz, 3V/m/1.0GHz-2.0GHz, 3V/m/2.0GHz-2.7GHz, 1V/m with 80% AM. 1kHz Modulation.
Standard require	A
Tester	Duke
Temperature	27.3°C
Humidity	48%

11.1. BLOCK DIAGRAM OF TEST SETUP



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11.2. TEST PROCEDURE

The EUT was located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity. The support units were located outside of the uniformity area, but the cable(s) connected with EUT were exposed to the calibrated field as per EN 61000-4-3.

Make sure EUT worked normally.

Setting the testing parameters of RS test software per EN 61000-4-3.

Performing the test at each side of with specified level (3V/m) at 1% steps and test frequency from 80MHz to 1000MHz.

Recording the test result in following table.

EN 61000-4-3 Final test conditions:

Steps: 1 % of fundamental

Dwell Time: 1 sec

Range (MHz)	Field	Modulation	Polarity	Position	Test Performance	Result
80MHz-1000MHz	3V/m	80% AM. 1kHz Modulation.	H/V	Front	No function loss	A
80MHz-1000MH	3V/m	80% AM. 1kHz Modulation.	H/V	Back	No function loss	A
80MHz-1000MH	3V/m	80% AM. 1kHz Modulation.	H/V	Left	No function loss	A
80MHz-1000MH	3V/m	80% AM. 1kHz Modulation.	H/V	Right	No function loss	A
Range (MHz)	Field	Modulation	Polarity	Position	Test Performance	Result
1400MHz-2000M Hz	3V/m	80% AM. 1kHz Modulation.	H/V	Front	No function loss	A
1400MHz-2000M Hz	3V/m	80% AM. 1kHz Modulation.	H/V	Back	No function loss	A
1400MHz-2000M Hz	3V/m	80% AM. 1kHz Modulation.	H/V	Left	No function loss	A
1400MHz-2000M Hz	3V/m	80% AM. 1kHz Modulation.	H/V	Right	No function loss	A
Range (MHz)	Field	Modulation	Polarity	Position	Test Performance	Result
2000MHz-2700M Hz	1V/m	80% AM. 1kHz Modulation.	H/V	Front	No function loss	A
2000MHz-2700M Hz	1V/m	80% AM. 1kHz Modulation.	H/V	Back	No function loss	A
2000MHz-2700M Hz	1V/m	80% AM. 1kHz Modulation.	H/V	Left	No function loss	A
2000MHz-2700M Hz	1V/m	80% AM. 1kHz Modulation.	H/V	Right	No function loss	A

Frequency (± 1 %) for Spot test.

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11.3. PERFORMANCE & RESULT

Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

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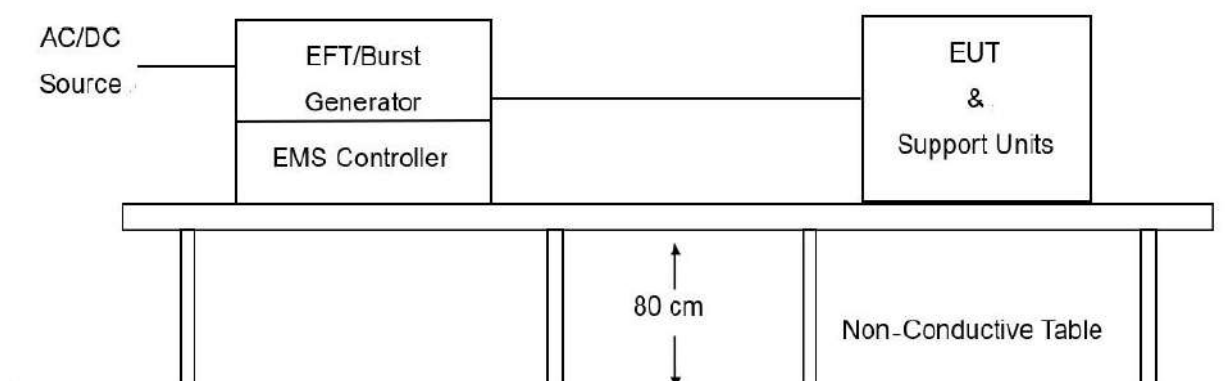


12. EFT IMMUNITY TEST

ELECTRICAL FAST TRANSIENTS/BURST IMMUNITY TEST

Port	On Power Supply port
Basic Standard	IEC 61000-4-4
Test Level	$\pm 0.5\text{kV}$ for Power Supply
Standard require	B
Tester	Duke
Temperature	27.3°C
Humidity	45%

12.1. BLOCK DIAGRAM OF TEST SETUP



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12.2. TEST PROCEDURE

The EUT and support units were located on a wooden table 0.8m away from ground reference plane.

A 1.0 meter long power cord was attached to EUT during the test.

The length of communication cable between communication port and clamp was keeping within 1 meter.

Make sure EUT worked normally.

Related peripherals work during the test.

Recording the test result as shown in following table.

Test conditions:

Impulse Frequency: 5kHz

Tr/Th: 5/50ns

Burst Duration: 15ms

Burst Period: 300ms

Inject Line	Voltage kV	Inject Method	Test Performance	Result
Positive	+/- 0.5	Direct	No function loss	A
Negative	+/- 0.5	Direct	No function loss	A
Positive+Negative	+/- 0.5	Direct	No function loss	A

12.3. PERFORMANCE & RESULT

Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

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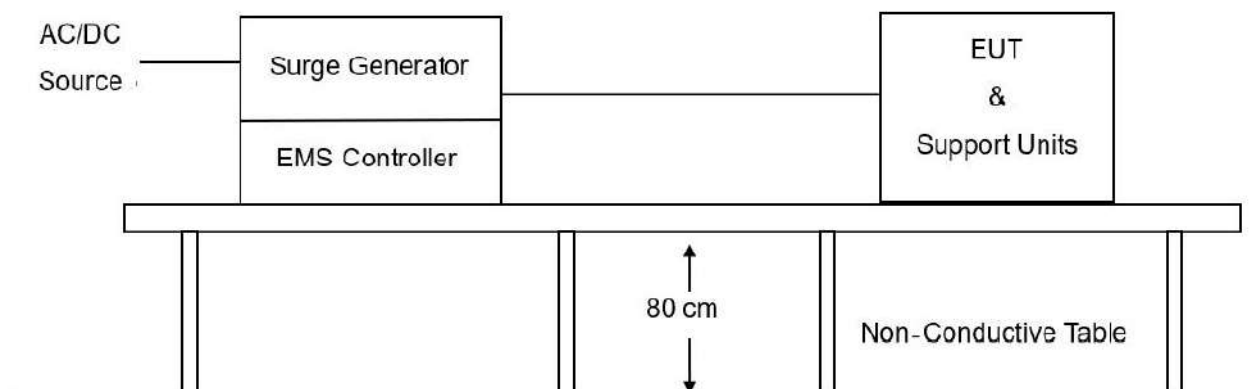


13. SURGE IMMUNITY TEST

SURGE IMMUNITY TEST

Port	On Power Supply port
Basic Standard	IEC 61000-4-5
Requirements	$\pm 0.5\text{kV}$ for Positive to Negative
Standard require	B
Tester	Duke
Temperature	27.3°C
Humidity	45%

13.1. BLOCK DIAGRAM OF TEST SETUP



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13.2. TEST PROCEDURE

The EUT and support units were located on a wooden table 0.8 m away from ground floor.

Make sure EUT worked normally.

Recording the test result as shown in following table.

Test conditions:

Voltage Waveform	1.2 μ s/50 μ s
Current Waveform	8 μ s/20 μ s
Polarity	Positive/Negative
Test Phase	/
Phase angle	None
Number of Test	5

Coupling Line	Voltage (kV)	Polarity	Coupling Method	Test Performance	Result
Positive-Negative	0.5	Positive	Capacitive	No function loss	A
Positive-Negative	0.5	Negative	Capacitive	No function loss	A

13.3. PERFORMANCE & RESULT

Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL
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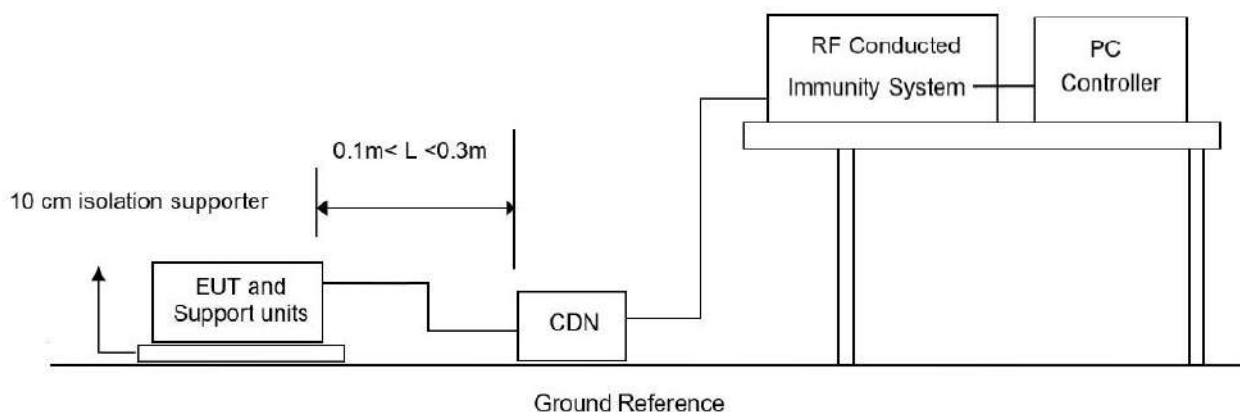
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14. CS IMMUNITY TEST

Port	On Power Supply port
Basic Standard	IEC 61000-4-6
Requirements	3V(0.15MHz-80MHz) with 80% AM. 1 kHz Modulation
Standard require	A
Tester	Duke
Temperature	27.3°C
Humidity	45%

14.1. BLOCK DIAGRAM OF TEST SETUP



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14.2. TEST PROCEDURE

The EUT and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.

Make sure EUT worked normally.

Related peripherals work during the test.

Setting the testing parameters of CS test software per EN 61000-4-6.

Recording the test result in following table.

Test conditions:

Frequency Range	0.15MHz-80MHz
Frequency Step	1% of fundamental
Dwell Time	3 sec

Power supply lines

Range (MHz)	Strength	Modulation	Result
0.15-80	3V	AM	A

14.3. PERFORMANCE & RESULT

Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL
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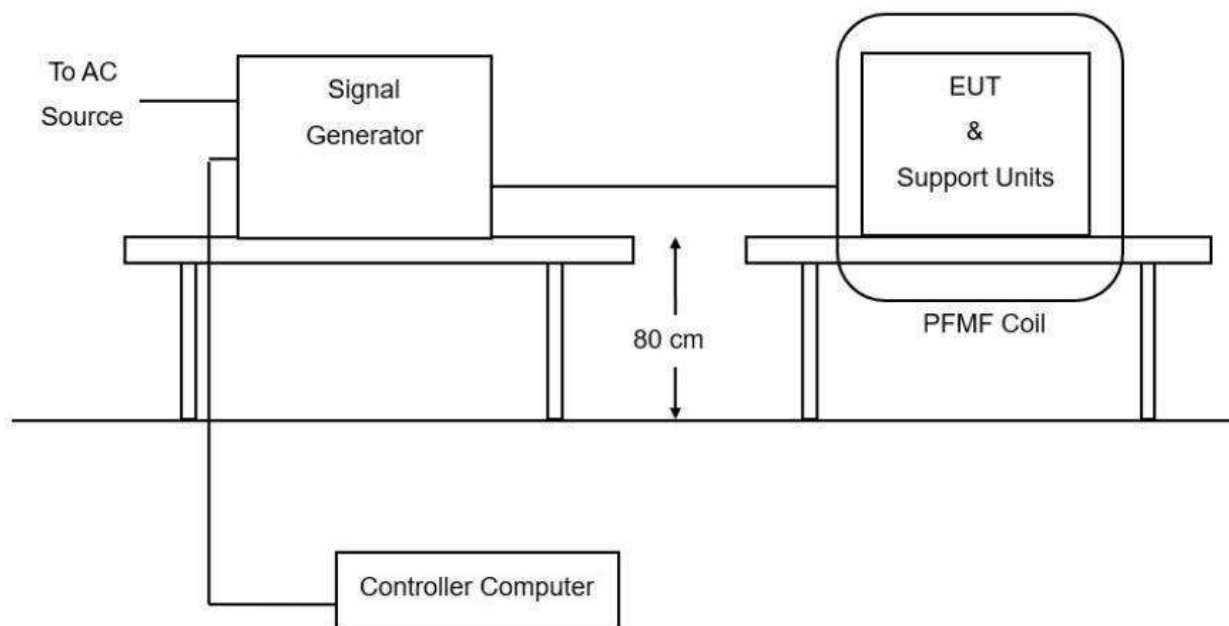


15. PFMF TEST

POWER FREQUENCY MAGNETIC FIELDS IMMUNITY TEST

Port	Enclosure
Basic Standard	IEC 61000-4-8
Requirements	50Hz,60Hz, 3A/m
Standard require	A
Tester	Duke
Temperature	26.1°C
Humidity	56%

15.1. BLOCK DIAGRAM OF TEST SETUP



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15.2. TEST PROCEDURE

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m × 1m). The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

Test Conditions:

Frequency	Polarity	Level	Test Performance	Performance Result
50 Hz,60Hz	X	3 A/m	No function loss	A
50 Hz,60Hz	Y	3 A/m	No function loss	A
50 Hz,60Hz	Z	3 A/m	No function loss	A

15.3. PERFORMANCE & RESULT

Criteria A:	The apparatus continues to operate as intended. 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. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS**
☐ **FAIL**

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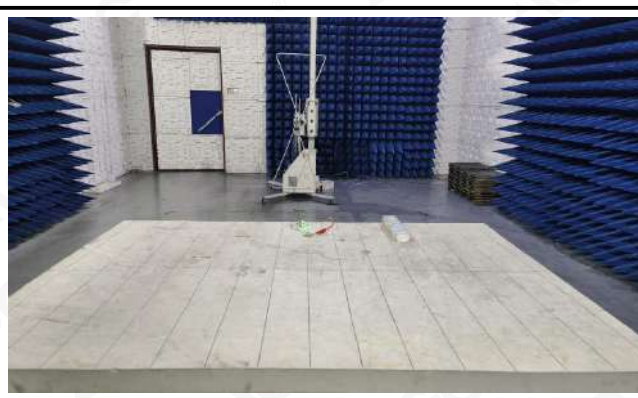
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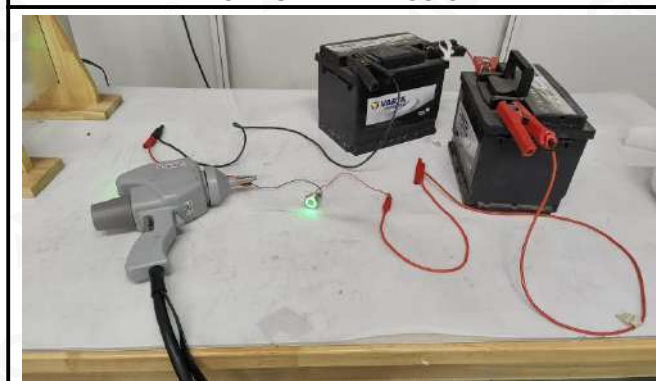
APPENDIX A: PHOTOGRAPHS OF TEST SETUP



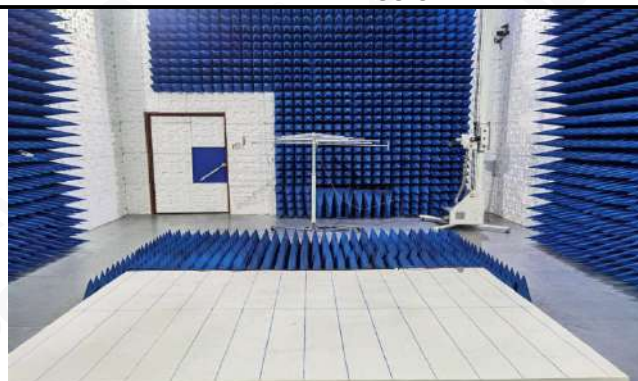
CONDUCTED EMISSION



RADIATED EMISSION



ESD IMMUNITY



RS IMMUNITY



EFT IMMUNITY



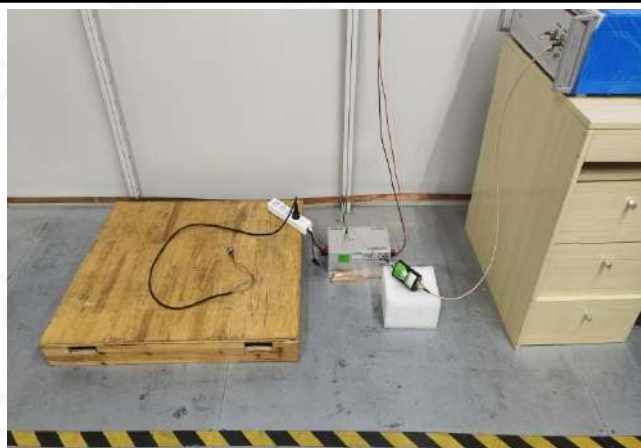
SURGE IMMUNITY

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CS IMMUNITY



PFMF IMMUNITY

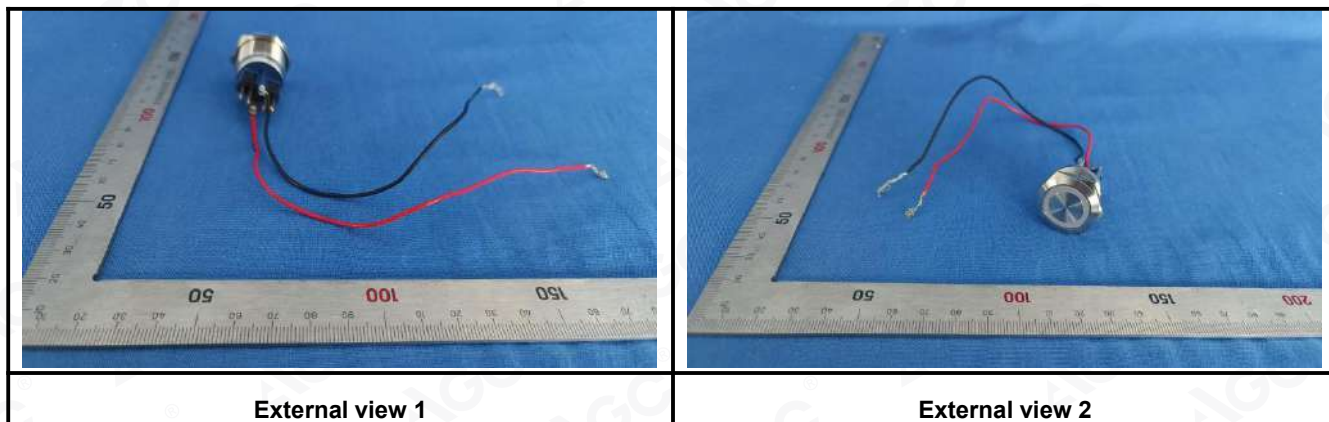
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APPENDIX B: PHOTOGRAPHS OF EUT



----END OF REPORT----

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