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Report No.: AOCE2609151462-E

TEST REPORT

Applicant	:	Jiangmen Qichen Lighting Co., Ltd.
Address	:	2nd Floor, Building 1, Modern Industrial Park, No.152 Linjiang Road, Jiangmen, Guangdong, China
Manufacturer	:	Jiangmen Qichen Lighting Co., Ltd.
Address	:	2nd Floor, Building 1, Modern Industrial Park, No.152 Linjiang Road, Jiangmen, Guangdong, China
Test Report Form No.	:	TRF.EN IEC 55015_D
TRF Originator	:	AOCE
Master TRF	:	Dated 2026-06
Product Name	:	LED SOLAR LIGHT
Model Number	:	QC-WL001-10
Trademark	:	N/A
Date of Receipt	:	2026-09-13
Test Date	:	2026-09-13 to 2026-09-18
Date of Report	:	2026-09-18
Test Result	:	The equipment under test was found to be compliance with the requirements of the standards applied.

Test Procedure Used:

Standards : EN IEC 55015:2019+A11:2020
EN IEC 61000-3-2:2019+A1:2021+A2:2024
EN 61000-3-3:2013+A1:2019+A2:2021
EN IEC 61547:2023

Prepared by(Test Engineer): Calu

Approved(Manager): Alex Lin

Approved(Manager): Sanji Guan

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History of this test report

Report No.	Version	Description	Issued Date
AOCE2609151462-E	V1.0	Initial Issued Report	2026-09-18

Software version

Test item	Version
Conducted Disturbance	ES-K1 V1.71
Radiated Emission	ES-K1 V1.71
Magnetic Field Emission	ES-K1 V1.71
Harmonic Current	CTS4 V4.26.0
Voltage Fluctuation and Flicker	CTS4 V4.26.0
Electrical Fast Transient/Burst Test	HEFT 51 V1.3.2
Surge Test	HCOMPACT V1.0.1
Injected Current	EN61000-4-6
Voltage Dips and Interruptions Test	HPFS161P V1.0.1
Electrostatic Discharge	ONYX30 V1.21

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1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	LED SOLAR LIGHT
Trademark	:	N/A
Model Number	:	QC-WL001-10
Listed Models	:	QC-WL001-20, QC-WL001-30, QC-WL001-40, QC-WL001-50, QC-SL002-100W, QC-SL002-200W, QC-SL002-300W, QC-SL002-400W, QC-SL002-500W, QC-SL50S, QC-SL100S, QC-SL200S, QC-SL300S, QC-SL400S, QC-SL500S, QC-FL100S, QC-FL200S, QC-FL300S, QC-FL400S, QC-FL500S
Model Difference	:	The product is different for model name and power.
Power Supply	:	3.7V ⎓, 2W
Work Frequency	:	Below 108MHz

Note:
1) EUT: Equipment under test
2) QC-WL001-10 was selected as the test model and the datas have been recorded in this report.

1.2. Independent Operation Lighting modes

Test Voltage: 3.7V ⎓

Test Mode A: Lighting mode

Remark: The test data of the worst case condition(s) was reported on the following page.

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1.3. TEST SUMMARY

Test Procedures According To The Technical Standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN IEC 55015: 2019+A11:2020	Conducted Disturbance	Table 1	Pass	
	Network Mode Conducted Emissions	Table 2	N/A	
	Magnetic Field Emission	Table 8	Pass	
	Radiated Emission	Table 10	Pass	
EN IEC 61000-3-2:2019+A1:2021+A2:2024	Harmonic Current Emission	Class C NOTE (2)	N/A	
EN 61000-3-3:2013+A1:2019+A2:2021	Voltage Fluctuations & Flicker	------	N/A	
EMC Immunity				
Standard EN IEC 61547:2023	Test Item	Performance Criteria	Judgment	Remark
EN IEC 61000-4-2: 2025	Electrostatic Discharge	B	Pass	
EN IEC 61000-4-3:2020	RF electromagnetic field	A	N/A	
EN 61000-4-4:2012	Fast transients	B	N/A	
EN 61000-4-5:2014+ A1:2017	Surges	C	N/A	
EN IEC 61000-4-6:2023	Injected Current	A	N/A	
EN 61000-4-8:2010	Power Frequency Magnetic Field	A	N/A	Note(3)
EN IEC 61000-4-11:2020+ COR1:2022	Voltage dips and interruptions test	B / B NOTE (4)	N/A	

NOTE:
(1) "N/A" denotes test is not applicable in this Test Report
(2) The power consumption of EUT is less than 5W and no limits apply.
(3) The EUT don't containing magnetic field sensitive components.
(4) Voltage dip: Test Level(%Ut) 70% – Performance Criteria B
Voltage Interruption: Test Level(%Ut) 0% – Performance Criteria B

1.4. Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
/	/	/	/

1.5. Test Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

A. Conducted Measurement :

Method	Measurement Frequency Range	U,(dB)	NOTE
CISPR 16-4-2:2018	9KHz ~ 30MHz	±3.78dB	/

B. Electromagnetic Radiated Emission :

Method	Measurement Frequency Range	U,(dB)	NOTE
CISPR 16-4-2:2018	9KHz ~ 30MHz	±3.06dB	/

C. Radiated Emission :

Method	Measurement Frequency Range	U,(dB)	NOTE
CISPR 16-4-2:2018	30MHz ~ 300MHz	±3.46dB	/

1.6. Test Facility

Site Description

Name of Firm : Zhongshan AOCE Testing Technology Co., Ltd.

Site Location : 5/F, Building A, No.5 Jingdi Road, Henglan, Zhongshan, Guangdong, China.

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2. TEST INSTRUMENT USED

2.1 Conducted Emission

No	Equipment	Model No.	Calibration certificate number	Equipment number	Last Cal.	Cal.Due
1	EMI Test Receiver	ESPI	D26AX002891232	AOCE-E-001	2026/04/11	2027/04/10
2	LISN	NSLK 8127	ZS26040665D088	AOCE-E-017	2026/04/21	2027/04/20
3	10dB Limiter	11947A	ZS26040665D079	AOCE-E-002	2026/04/19	2027/04/18
4	Shield Room	7.3x4.4x3.2	ZS26040665D089	AOCE-E-018	2026/04/11	2027/04/10

2.2 Magnetic Field Emission

No	Equipment	Model No.	Calibration certificate number	Equipment number	Last Cal.	Cal.Due
1	EMI Test Receiver	ESPI	D26AX002891232	AOCE-E-001	2026/04/11	2027/04/10
2	Triple-Loop Antenna	ZN30401	D26AX002891233	AOCE-E-003	2026/04/11	2027/04/10
3	Shield Room	7.3x4.4x3.2	ZS26040665D089	AOCE-E-018	2026/04/11	2027/04/10

2.3 Radiated Emission

No	Equipment	Model No.	Calibration certificate number	Equipment number	Last Cal.	Cal.Due
1	EMI Test Receiver	ESPI	D26AX002891232	AOCE-E-001	2026/04/11	2027/04/10
2	CDNE	CDNE-M3	D26AX002891240	AOCE-E-029	2026/04/10	2027/04/09
3	Shield Room	7.3x4.4x3.2	ZS26040665D089	AOCE-E-018	2026/04/11	2027/04/10

2.4 Harmonic Current/ Voltage Fluctuation and Flicker

No	Equipment	Model No.	Calibration certificate number	Equipment number	Last Cal.	Cal.Due
1	Purified Power Source	5000IX-CTS-400	ZS26040665D093	AOCE-S-028	2026/04/12	2027/04/11
2	Harmonic And Flicker Analyzer	CTS PACS-1	ZS26040665D092	AOCE-S-027	2026/04/12	2027/04/11

2.5 Electrostatic Discharge

No	Equipment	Model No.	Calibration certificate number	Equipment number	Last Cal.	Cal.Due
1	ESD Simulator	ONYX	D26AX002891235	AOCE-E-013	2026/04/11	2027/04/10

2.6 RS

No	Equipment	Model No.	Calibration certificate number	Equipment number	Last Cal.	Cal.Due
1	Signal Generator	SMT 06	D26AX002891257	AOCE-E-036	2026/04/11	2027/04/10
2	Log-Bicon Antenna	VULB9161	D26AX002891249	AOCE-E-037	2026/04/11	2027/04/10
3	Power Amplifier	150W1000M1	D26AX002891259	AOCE-E-038	2026/04/11	2027/04/10
4	Microwave Horn Antenna	AT4002A	D26AX002891252	AOCE-E-039	2026/04/11	2027/04/10
5	Power Amplifier	25S1G4A	D26AX002891258	AOCE-E-040	2026/04/11	2027/04/10

2.7 Electrical Fast Transient

No	Equipment	Model No.	Calibration certificate number	Equipment number	Last Cal.	Cal.Due
1	Electrical Fast Transient test system	HEFT 51	D26AX002891234	AOCE-E-009	2026/04/15	2027/04/14

2.8 Surge

No	Equipment	Model No.	Calibration certificate number	Equipment number	Last Cal.	Cal.Due
1	Surge test system	HCWG 51	ZS26040665D148	AOCE-E-007	2026/04/15	2027/04/14

2.9 Voltage dips and interruptions test

No	Equipment	Model No.	Calibration certificate number	Equipment number	Last Cal.	Cal.Due
1	Voltage Dips test system	HPFS 161P	ZS26040665D082	AOCE-E-008	2026/04/15	2027/04/14

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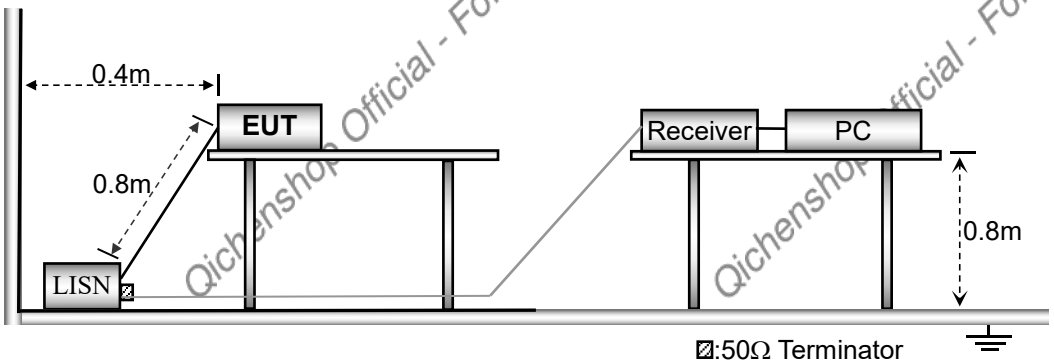
2.10 Injected Current

No	Equipment	Model No.	Calibration certificate number	Equipment number	Last Cal.	Cal.Due
1	Conducted Disturbances test system	CDG 6000	D26AX009662126	AOCE-S-014	2026/04/11	2027/04/10
2	Attenuator	CDG 60100	ZS26040665D124	AOCE-S-015	2026/04/21	2027/04/20
3	CDN	CDN M2+M3	D26AX002891259	AOCE-S-016	2026/04/11	2027/04/10

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3. CONDUCTED EMISSION AT THE MAINS TERMINALS TEST

3. Block Diagram Of Test Setup



3.1. Test Standard

EN IEC 55015:2019+A11:2020

3.2. Power Line Conducted Emission Limit

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.009 ~ 0.05	110	-
0.05 ~ 0.15	90~ 80*	-
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.3. EUT Configuration on Test

The following equipments are installed on conducted emission test to meet EN IEC 55015 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.4. Operating Condition of EUT

3.5.1 Setup the EUT and simulators as shown in Section 3.1.
3.5.2 Turn on the power of all equipments.
3.5.3 Let the EUT work in test modes and test it.

3.5. Test Procedure

The EUT is put on the ground and connected to the AC mains through a Artificial Mains Network (AMN). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission levels according to the EN IEC 55015 regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESPI) is set at 9KHz.

The frequency range from 9 KHz to 30 MHz is investigated.

3.6. Test Result

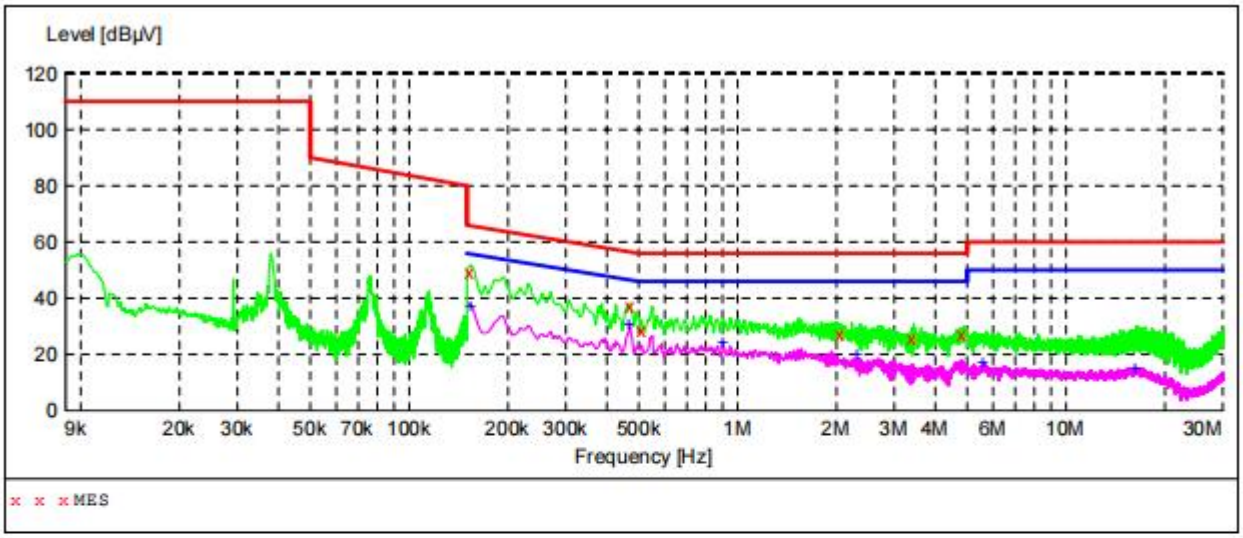
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Conducted Emission At The Mains Terminals Test Data			
Temperature:	24.6 ℃	Relative Humidity:	49.6%
Pressure:	1010hPa	Phase :	L
Test Voltage :	3.7Vdc	Test Mode:	Lighting mode

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 9K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154000	49.40	10.1	66	16.4	QP	L1	GND
0.474000	36.90	10.1	56	19.5	QP	L1	GND
0.510000	28.90	10.1	56	27.1	QP	L1	GND
2.058000	27.40	10.1	56	28.6	QP	L1	GND
3.394000	26.00	10.1	56	30.0	QP	L1	GND
4.874000	26.80	10.1	56	29.2	QP	L1	GND

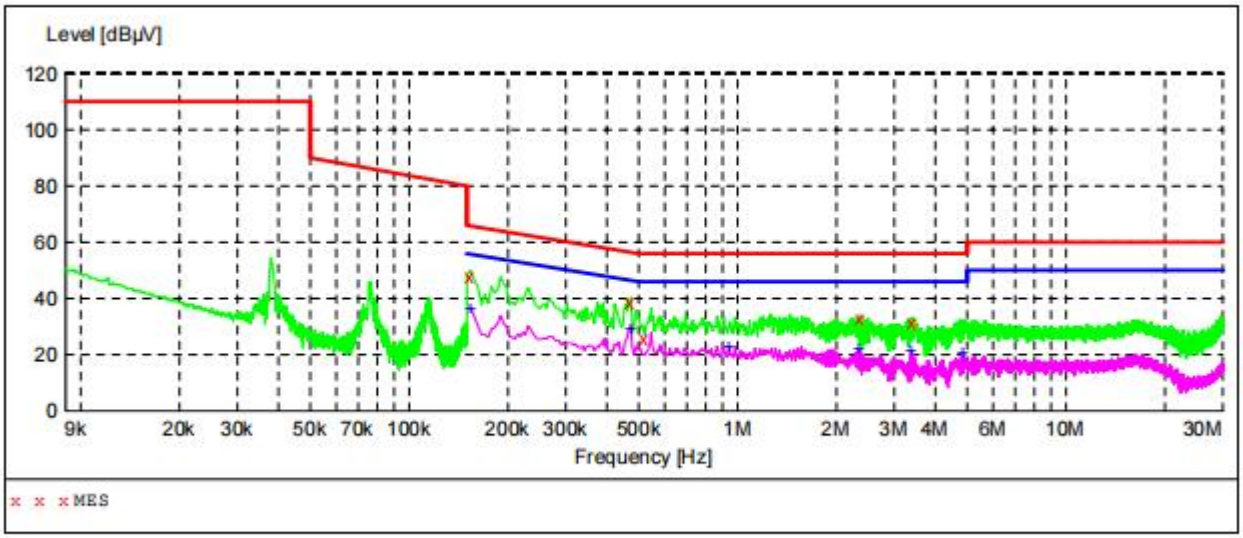
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154000	37.30	10.1	56	18.5	AV	L1	GND
0.470000	31.00	10.1	47	15.5	AV	L1	GND
0.906000	23.90	10.1	46	22.1	AV	L1	GND
2.326000	19.70	10.1	46	26.3	AV	L1	GND
5.642000	17.30	10.1	50	32.7	AV	L1	GND
16.274000	15.00	10.2	50	35.0	AV	L1	GND

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Conducted Emission At The Mains Terminals Test Data			
Temperature:	24.6 ℃	Relative Humidity:	49.6%
Pressure:	1010hPa	Phase :	N
Test Voltage :	3.7Vdc	Test Mode:	Lighting mode

SCAN TABLE: "Voltage (9K-30M)FIN"
Short Description: 9K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154000	47.70	10.1	66	18.1	QP	N	GND
0.470000	38.80	10.1	57	17.7	QP	N	GND
0.518000	25.40	10.1	56	30.6	QP	N	GND
2.362000	32.50	10.1	56	23.5	QP	N	GND
3.422000	31.60	10.1	56	24.4	QP	N	GND

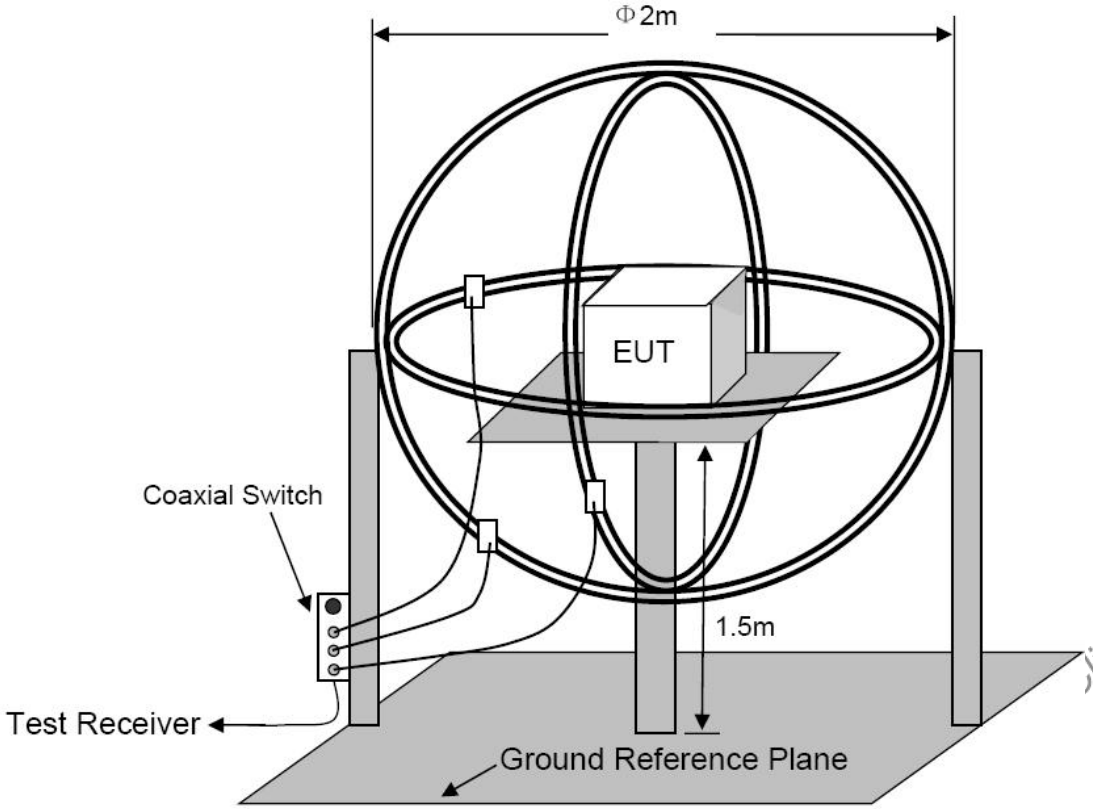
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154000	36.10	10.1	56	19.7	AV	N	GND
0.474000	29.10	10.1	46	17.3	AV	N	GND
0.946000	23.00	10.1	46	23.0	AV	N	GND
2.362000	22.20	10.1	46	23.8	AV	N	GND
3.382000	21.50	10.1	46	24.5	AV	N	GND
4.838000	20.60	10.1	46	25.4	AV	N	GND

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4. MAGNETIC FIELD EMISSION TEST

4. Block Diagram Of Test Setup



4.1. Test Standard

EN IEC 55015:2019+A11:2020

4.2. Power Line Conducted Emission Limit

Frequency MHz	Limits dB(μA)
	Quasi-peak Level
0.009 ~ 0.07	88
0.07 ~ 0.15	88 ~ 58*
0.15 ~ 3.00	58 ~ 22*
3.00 ~ 30.0	22

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

4.3. EUT Configuration on Test

The following equipments are installed on conducted emission test to meet EN IEC 55015 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

4.4. Operating Condition of EUT

4.5.1 Setup the EUT and simulators as shown in Section 4.1.
4.5.2 Turn on the power of all equipments.
4.5.3 Let the EUT work in test modes and test it.

4.5. Test Procedure

The EUT is placed on a wood table in the center of a loop antenna. The induced current in the loop antenna is measured by means of a current probe and the test receiver. Three field components is checked by means of a coax switch.

The frequency range from 9KHz to 30MHz is investigated. The receiver is measured with the quasi-peak detector. For frequency band 9KHz to 150KHz, the bandwidth of the field strength meter (R&S Test Receiver ESPI) is set at 200Hz. For frequency band 150KHz to 30MHz , the bandwidth is set at 10KHz.

4.6. Test Result

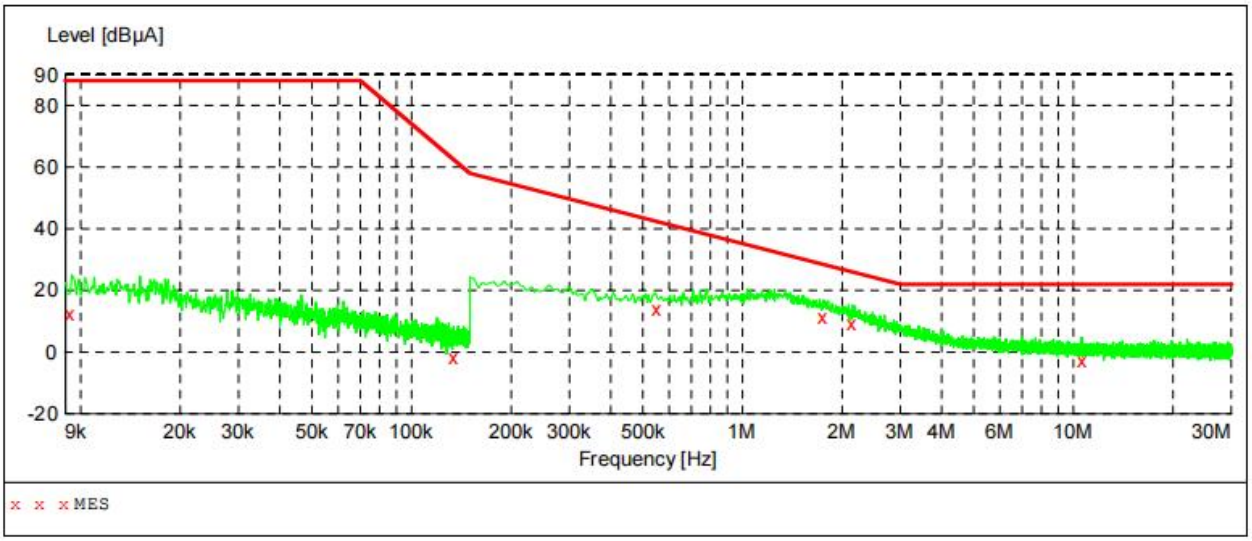
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Magnetic Field Emission Test Data			
Temperature:	24.6℃	Relative Humidity:	49.6%
Pressure:	1010hPa	Ant. Polarity	X
Test Voltage :	3.7Vdc	Test Mode:	Lighting mode

SCAN TABLE: "Magnetic test fin"
Short Description: EN55015 Triple Loop



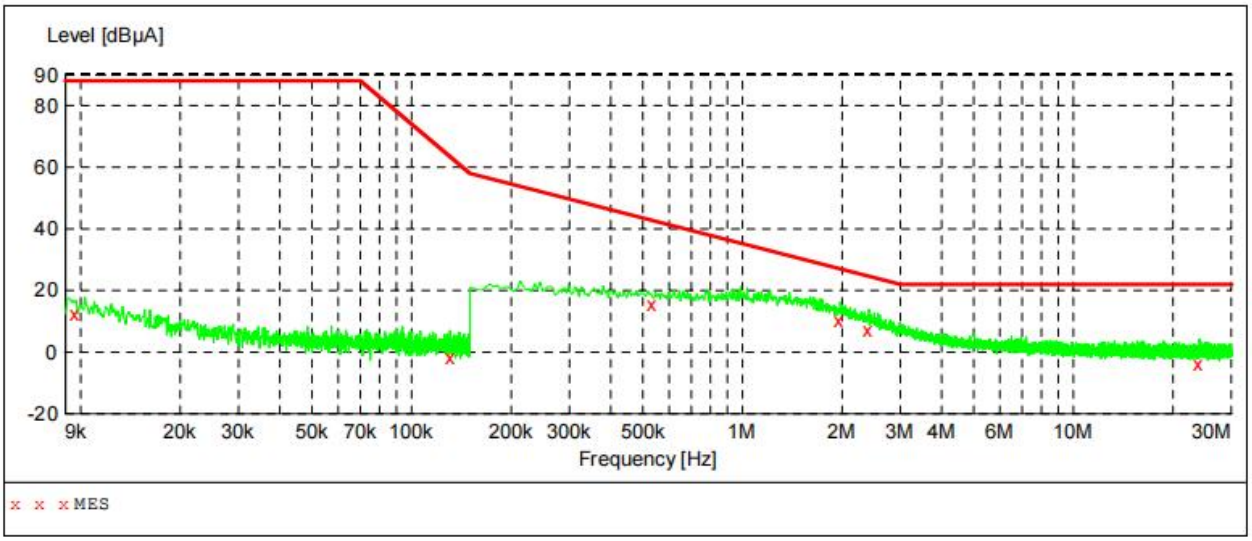
MEASUREMENT RESULT:

Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Det.	Loop	Azimuth deg
0.009300	12.60	0.0	88	75.4	QP	X	0.00
0.133600	-1.60	0.0	63	64.2	QP	X	0.00
0.550500	14.20	0.1	42	28.2	QP	X	0.00
1.756500	11.50	0.1	28	16.9	QP	X	0.00
2.152500	9.20	0.1	26	16.8	QP	X	0.00
10.689000	-2.80	0.2	22	24.8	QP	X	0.00

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Magnetic Field Emission Test Data			
Temperature:	24.6℃	Relative Humidity:	49.6%
Pressure:	1010hPa	Ant. Polarity	Y
Test Voltage :	3.7Vdc	Test Mode:	Lighting mode

SCAN TABLE: "Magnetic test fin"
Short Description: EN55015 Triple Loop



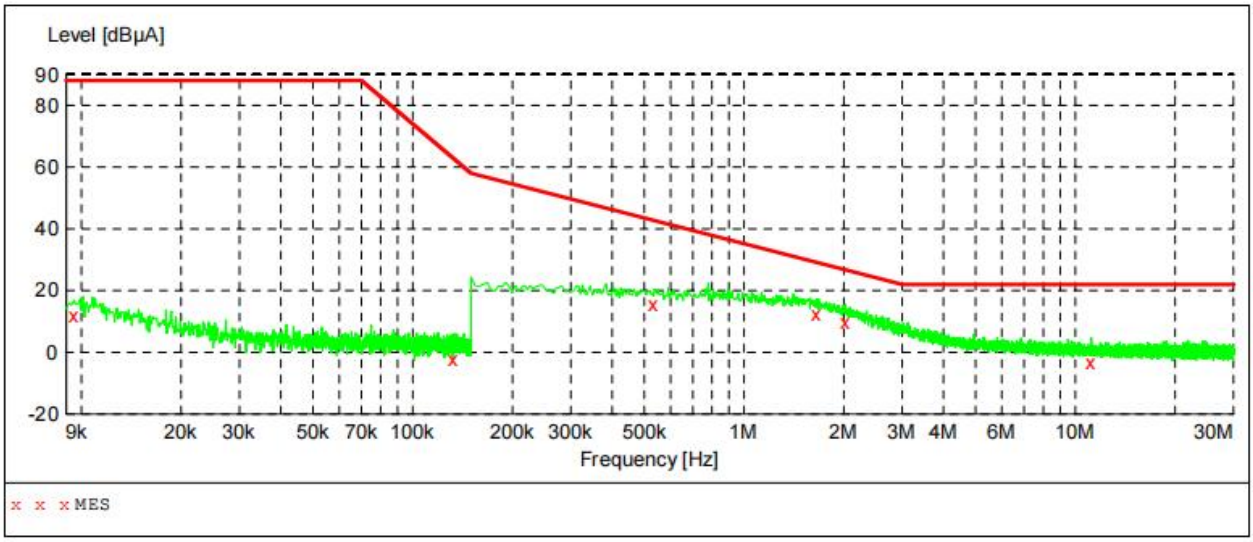
MEASUREMENT RESULT:

Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Det.	Loop	Azimuth deg
0.009600	12.50	0.0	88	75.5	QP	Y	0.00
0.131900	-1.80	0.0	63	64.9	QP	Y	0.00
0.532500	15.30	0.1	43	27.5	QP	Y	0.00
1.954500	10.10	0.1	27	17.0	QP	Y	0.00
2.400000	7.20	0.1	25	17.5	QP	Y	0.00
23.865000	-3.70	0.2	22	25.7	QP	Y	0.00

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Magnetic Field Emission Test Data			
Temperature:	24.6℃	Relative Humidity:	49.6%
Pressure:	1010hPa	Ant. Polarity	Z
Test Voltage :	3.7Vdc	Test Mode:	Lighting mode

SCAN TABLE: "Magnetic test fin"
Short Description: EN55015 Triple Loop



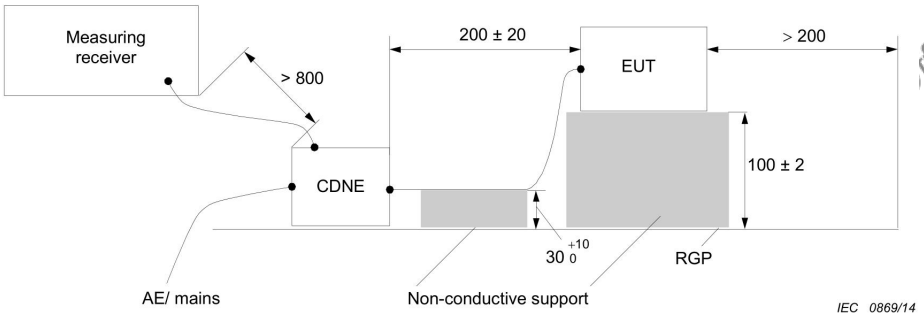
MEASUREMENT RESULT:

Frequency MHz	Level dBµA	Transd dB	Limit dBµA	Margin dB	Det.	Loop	Azimuth deg
0.009500	12.10	0.0	88	75.9	QP	Z	0.00
0.132900	-2.20	0.0	63	65.0	QP	Z	0.00
0.532500	15.60	0.1	43	27.2	QP	Z	0.00
1.648500	12.40	0.1	29	16.8	QP	Z	0.00
2.026500	10.00	0.1	27	16.7	QP	Z	0.00
11.166000	-3.20	0.2	22	25.2	QP	Z	0.00

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5. RADIATION EMISSION TEST

5.1. Block Diagram of Test Setup



5.2. Test Standard

EN IEC 55015:2019+A11:2020

5.3. Radiation Limit

Frequency MHz	Limits (dBμV) Quasl-Peak
30 ～ 100	64 ~ 54
100 ～ 200	54
200 ～ 300	54 ~51

Remark:

(1) At the transition frequency, the lower limit applies.

(2) Increasing linearly with the logarithm of the frequency.

5.4. EUT Configuration on Test

The EN IEC 55015 regulations test method must be used to find the maximum emission during radiated emission test.
The configuration of EUT is the same as used in conducted emission test. Please refer to Section 3.4.

5.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 3.5 except the test set up replaced as Section 5.1.

5.6. Test Procedure

The EUT is positioned 100 mm ± 2 mm above the RGP and supported by non-conductive material that has relative permittivity ε_r less than 1,05 (e.g. polystyrene foam). The edge of the RGP shall be at least 200 mm beyond the perimeter of the EUT.
A distance of 200 mm ± 20 mm shall be maintained between the CDNE

and EUT. The CDNE shall be positioned on the side of the EUT at which the cable under test is connected, to minimize the cable length. The cable shall not be meandered or bundled.
The cable connected to the EUT shall run down vertically from the EUT for a distance of about 30 mm to the RGP, and horizontally to the EUT port of the CDNE.

5.7. Test Result

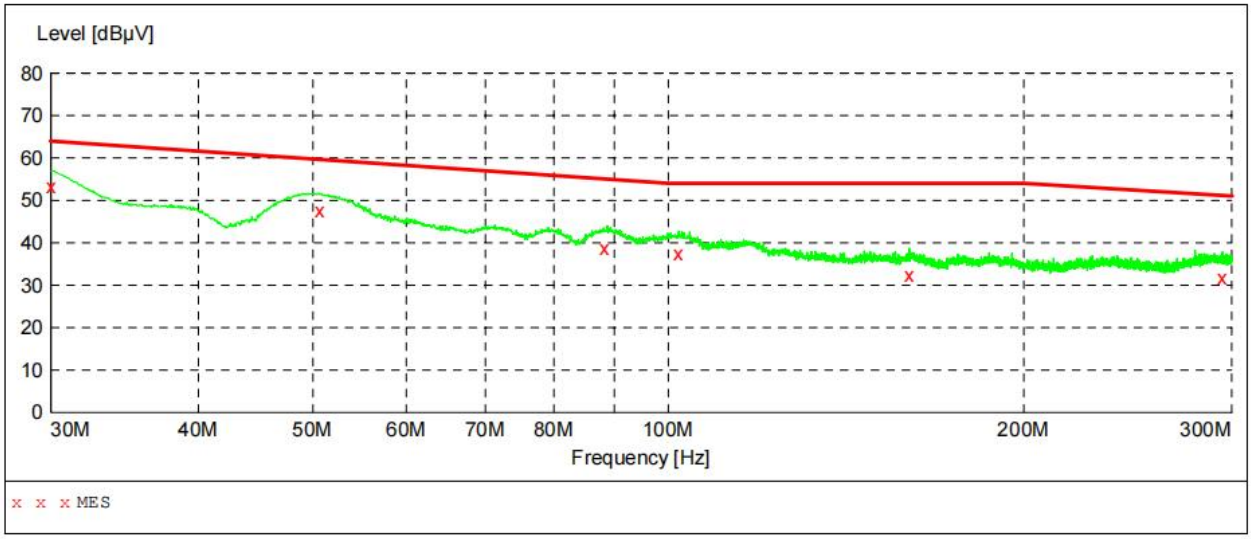
Pass

Please refer to the following page.

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Radiation Emission Test Data			
Temperature:	24.6 ℃	Relative Humidity:	49.6%
Pressure:	1010hPa	Phase :	/
Test Voltage :	3.7Vdc	Test Mode:	Lighting mode

SCAN TABLE: "CDNE-SC(30M-300M)FIN"
Short Description: 30 - 300 MHz CDNE



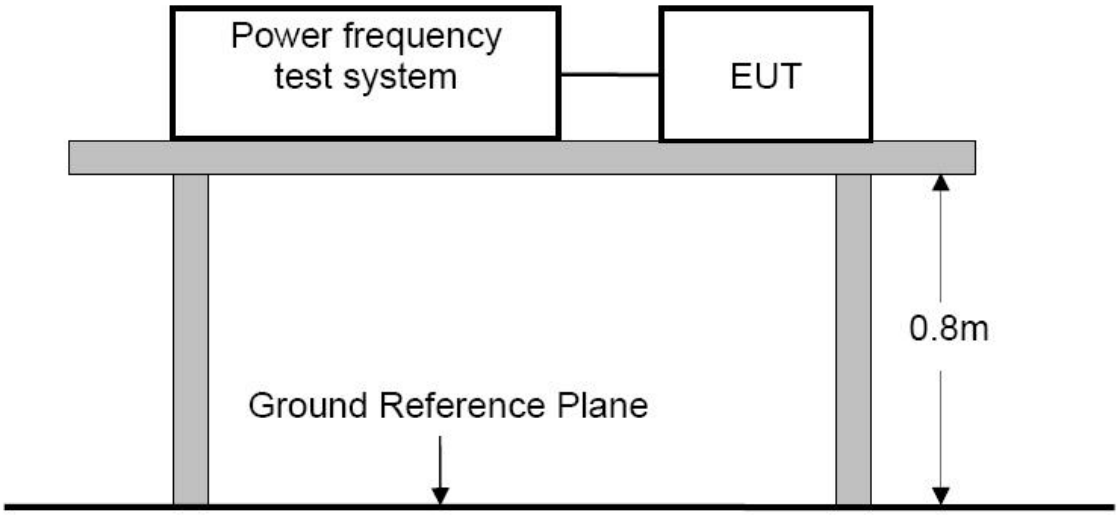
MEASUREMENT RESULT:

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
30.060000	53.20	20.1	64	10.8	QP	---	---
50.760000	47.70	19.9	60	11.9	QP	---	---
88.260000	38.90	19.8	55	16.1	QP	---	---
102.000000	37.40	19.7	54	16.6	QP	---	---
160.140000	32.40	19.6	54	21.6	QP	---	---
294.480000	31.70	19.9	51	19.4	QP	---	---

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6. HARMONIC CURRENT EMISSION TEST

6.1. Block Diagram of Test Setup



6.2. Test Standard

EN IEC 61000-3-2:2019+A1:2021+A2:2024

6.3. Operating Condition of EUT

6.1.1 Setup the EUT as shown in Section 6.1.

6.1.2 Turn on the power of all equipments.

6.1.3 Let the EUT work in test mode and test it.

6.4. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

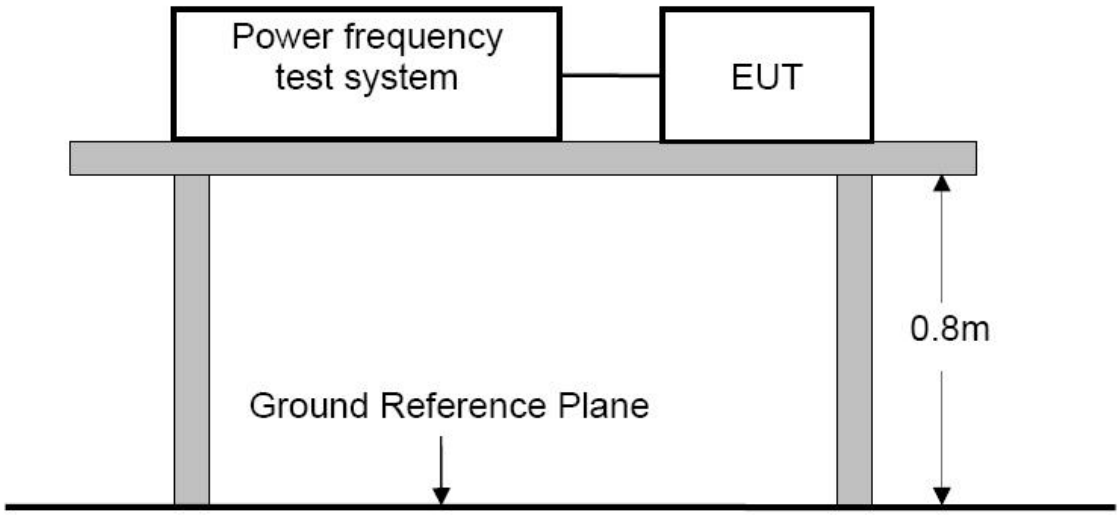
6.5. Test Results

N/A

The test is not applicable.

7. VOLTAGE FLUCTUATIONS & FLICKER TEST

7.1. Block Diagram of Test Setup



7.2. Test Standard

EN 61000-3-3:2013+A2:2021

7.3. Operating Condition of EUT

Same as Section 6.3. The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

Flicker Test Limit

Test items	Limits
Pst	1.0
dc	3.3%
dmax	4.0%
dt	Not exceed 3.3% for 500ms

7.4. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

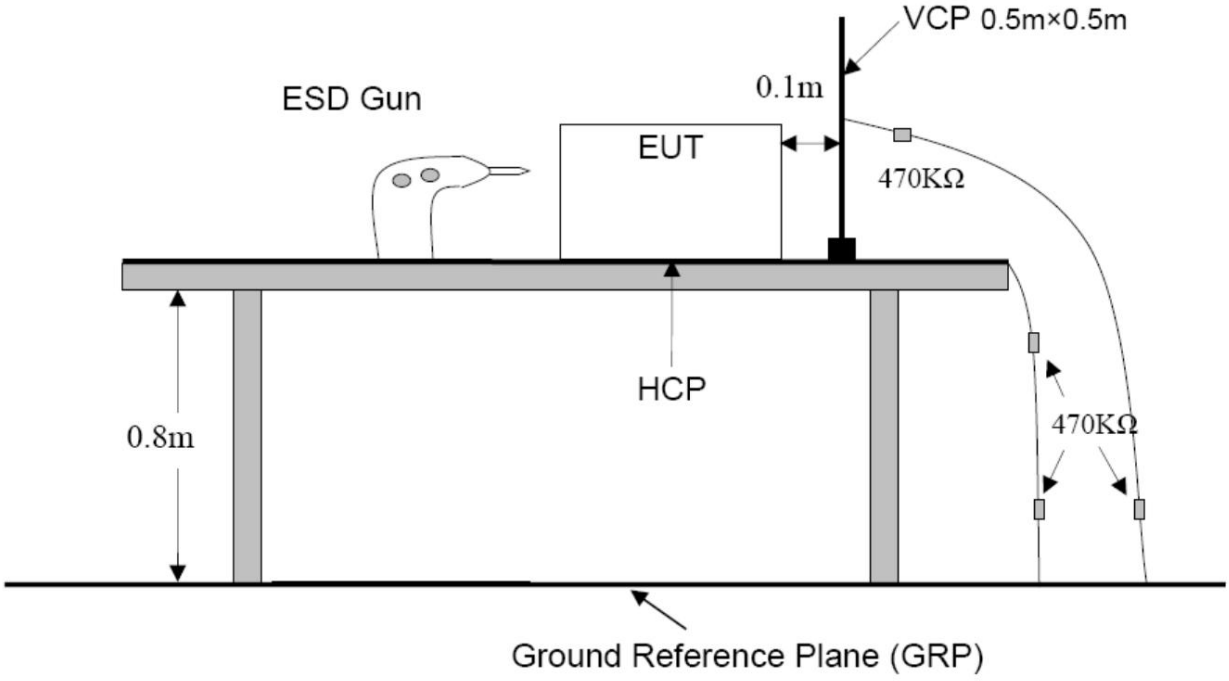
7.5. Test Results

N/A

The test is not applicable.

8. ELECTROSTATIC DISCHARGE IMMUNITY TEST

8.1. Block Diagram of Test Setup



8.2. Test Standard

EN IEC 61547:2023, EN IEC 61000-4-2: 2025

Severity Level: 3 / Air Discharge: ±8KV
Level: 2 / Contact Discharge: ±4KV

8.3. Severity Levels and Performance Criterion

8.3.1 Severity level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±15
X	Special	Special

8.3.2 Performance criterion : B

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.

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 specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

8.4. EUT Configuration

The following equipments are installed on Electrostatic Discharge Immunity test to meet EN IEC 61547:2023, EN IEC 61000-4-2: 2025, requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. The configuration of EUT is the same as used in conducted emission test.
Please refer to Section 3.4.

8.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 3.5 except the test setup replaced by Section 8.1.

8.6. Test Procedure

8.6.1 Air Discharge**:**

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

8.6.2 Contact Discharge**:**

All the procedure shall be same as Section 8.6.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

8.6.3 Indirect discharge for horizontal coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if

applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

8.6.4 Indirect discharge for vertical coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are complete illuminated.

8.7. Test Results

Pass

Please refer to the following page.

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ESD Test Data			
Temperature:	24.6℃	Humidity:	49.8%
Air pressure（hPa）	1008	Remark	/
Power Supply :	3.7Vdc	Test Mode:	Lighting mode

Air Discharge: ± 8 kV
Contact Discharge: ± 4 kV
For each point positive 10 times and negative 10 times discharge

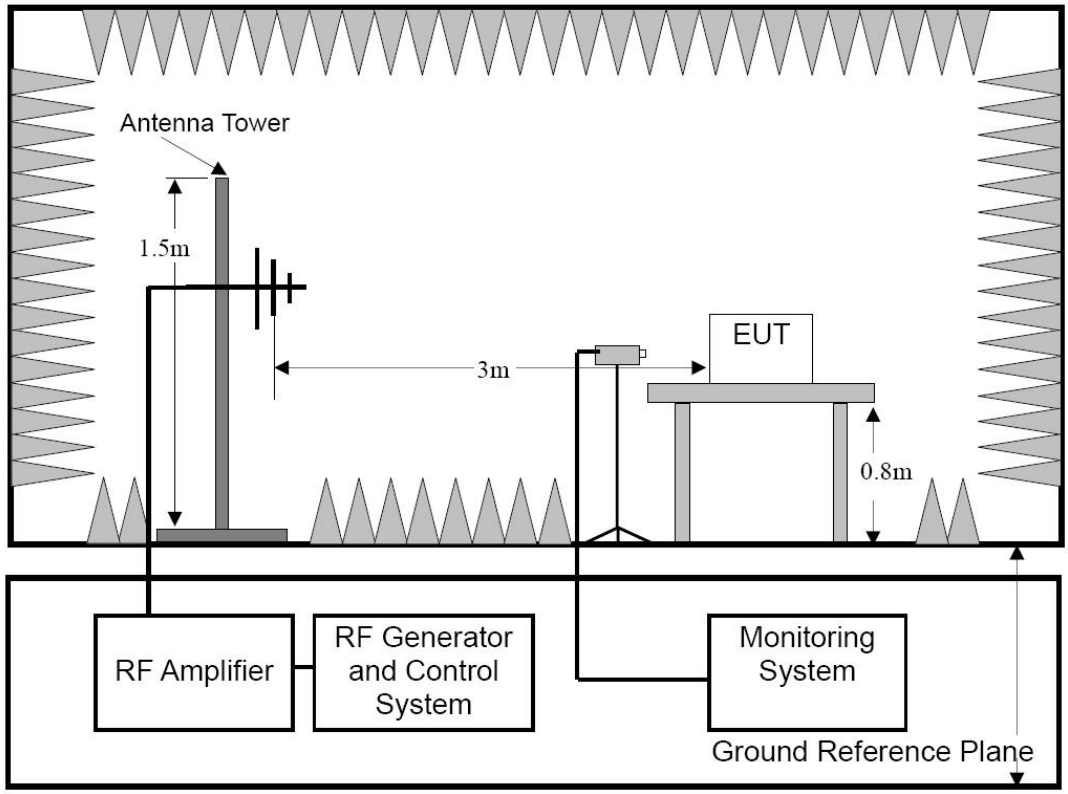
Test Points	Air Discharge	Contact Discharge	Performance Criterion	Result
Non-conductive enclosure	±2 KV	N/A	B	PASS
Non-conductive enclosure	±4 KV	N/A	B	PASS
Non-conductive enclosure	±8 KV	N/A	B	PASS
Slit	±2 KV	N/A	B	PASS
Slit	±4 KV	N/A	B	PASS
Slit	±8 KV	N/A	B	PASS
VCP	N/A	±2 KV	B	PASS
VCP	N/A	±4 KV	B	PASS
HCP	N/A	±2 KV	B	PASS
HCP	N/A	±4 KV	B	PASS
Conductive enclosure	N/A	±2 KV	B	PASS
Conductive enclosure	N/A	±4 KV	B	PASS

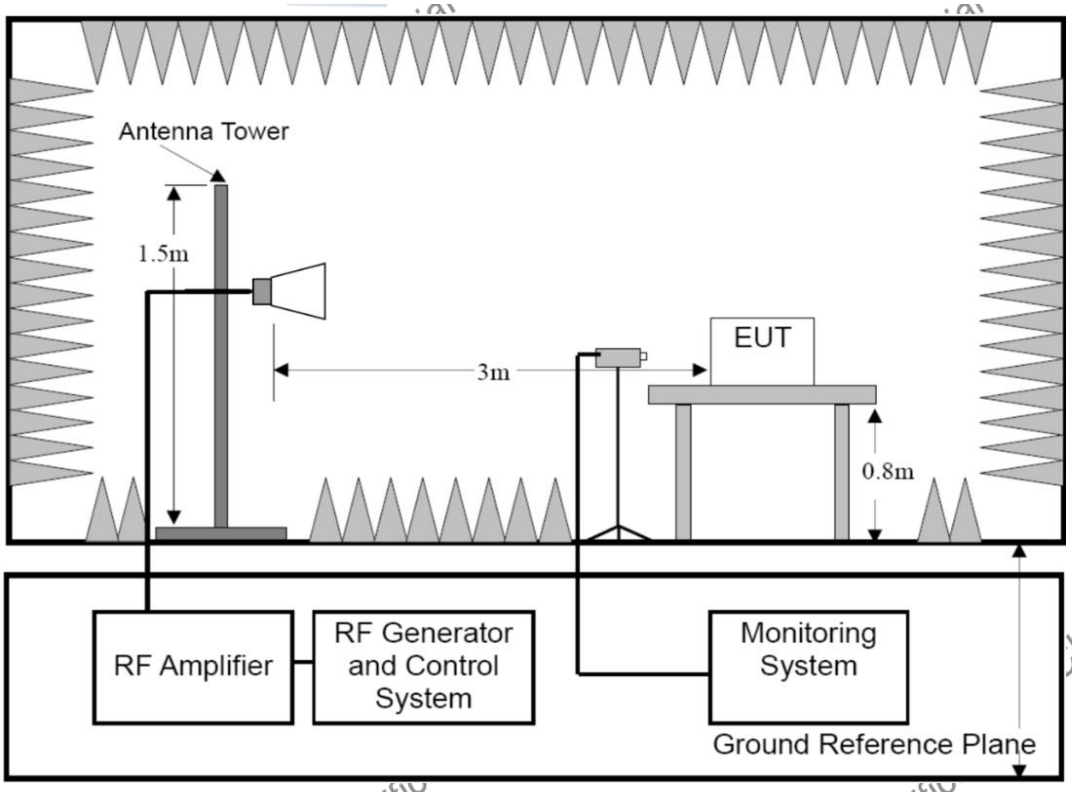
Note: N/A

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9. RF ELECTROMAGNETIC FIELD TEST

9.1.Block Diagram of Test Setup





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9.2. Test Standard

EN IEC 61547:2023, EN IEC 61000-4-3:2020
Severity Level 2, 3V / m

9.3. Severity Levels and Performance Criterion

8.3.1. Severity level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

8.3.2. **Performance criterion: A**

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.

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 specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C、 Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

9.4. EUT Configuration on Test

The following equipments are installed on Electrical Fast Transient/Burst Immunity test to meet EN IEC 61000-4-3:2020, requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. The configuration of EUT is the same as used in conducted emission test.Please refer to Section 3.4.

9.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.5 except the test setup replaced by Section 9.1.

9.6. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.

All the scanning conditions are as follows **:**

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 – 6000Mhz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	1 Sec.

9.7. Test Results

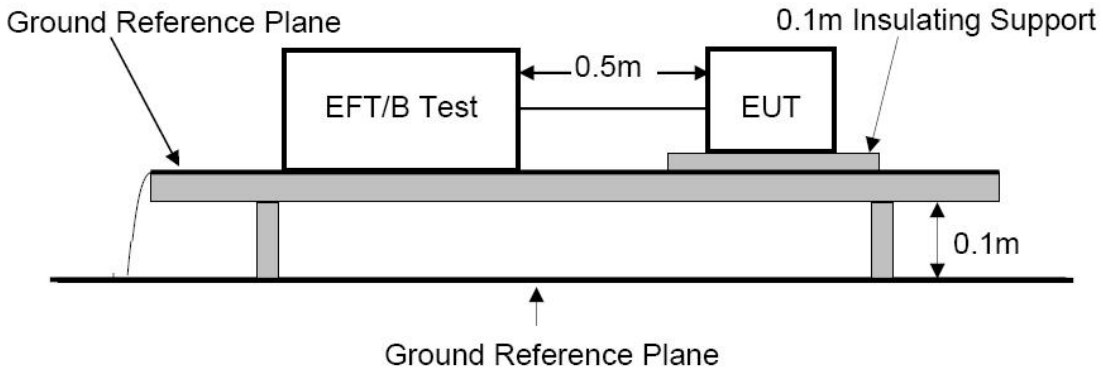
N/A

The test is not applicable.

R/S Test Data			
Temperature : 24.6℃		Humidity : 49.6%	
Air pressure: 1010hPa		Remark:/	
Field Strength: 3 V/m		Criterion: A	
Power Supply: 3.7Vdc		Frequency Range: 80 MHz to 1000 MHz	
Modulation: AM 1 KHz 80%			
Test Mode **:** Lighting mode			
	Frequency Range : 80-1000MHz		
Steps	1 %		
	Horizontal	Vertical	Result
Front	N/A	N/A	N/A
Right	N/A	N/A	N/A
Rear	N/A	N/A	N/A
Left	N/A	N/A	N/A
Note: N/A			

10. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

10.1. Block Diagram of EUT Test Setup



10.2. Test Standard

EN IEC 61547:2023, EN 61000-4-4:2012

10.3. Severity Levels and Performance Criterion

Severity Level 2 at 1KV, Pulse Rise time & Duration: 5 nS / 50 nS
Severity Level:

Open Circuit Output Test Voltage ±10%		
Level	On power ports	On I/O(Input/Output) Signal data and control ports
1.	0.5KV	0.25KV
2.	1KV	0.5KV
3.	2KV	1KV
4.	4KV	2KV
X.	Special	Special

Performance criterion: B

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.

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 specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

10.4. EUT Configuration on Test

The following equipments are installed on Electrical Fast Transient/Burst

Immunity test to meet EN IEC 61547:2023, EN 61000-4-4:2012, requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. The configuration of EUT is the same as used in conducted emission test.
Please refer to Section 3.4.

10.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 3.5 except the test setup replaced by Section 10.1.

10.6. Test Procedure

EUT shall be placed 0.8m high above the ground reference plane which is a min.1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m

9.6.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

10.7. Test Results

N/A
The test is not applicable.

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EFT Test Data			
Temperature:	24.6℃	Humidity:	49.8%
Air pressure	1008hPa	Remark	/
Power Supply：	3.7Vdc	Test Mode:	Lighting mode

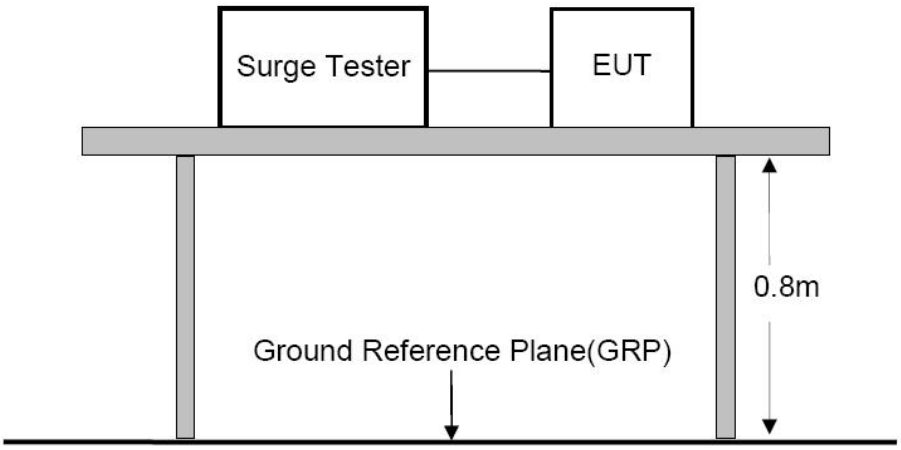
Coupling Line	Test Voltage		Performance Criterion	Result
	Test voltage(kV)	Time (s)		
L	1	120	B	N/A
N	1	120	B	N/A
PE	1	120	B	N/A
L-N	1	120	B	N/A
L-PE	1	120	B	N/A
N-PE	1	120	B	N/A
L-N-PE	1	120	B	N/A

Note: ‘*’ Applicable only to cables which according to the manufacturer’s specification supports communication on cable lengths greater than 3 m.

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11. SURGE TEST

11.1. Block Diagram of EUT Test Setup



11.2. Test Standard

EN IEC 61547:2023, EN 61000-4-5:2014+A1:2017

11.3. Severity Levels and Performance Criterion

Severity Level: Line to Line, Level 2 at 1KV;
Severity Level: Line to Earth, Level 3 at 2KV.

Severity Level	Open-Circuit Test Voltage (KV)
1.	0.5
2.	1.0
3.	2.0
4.	4.0
X.	Special

Performance criterion: C

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.

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 specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

11.4. EUT Configuration on Test

The following equipments are installed on Electrical Fast Transient/Burst

Immunity test to meet EN IEC 61547:2023, EN 61000-4-5:2014+A1:2017 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application

The configuration of EUT is the same as used in conducted emission test. Please refer to Section 3.4.

11.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 3.5 except the test setup replaced by Section 11.1

11.6. Test Procedure

1) Set up the EUT and test generator as shown on section 11.1
2) For line to line coupling mode, provide a 0.5/1KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
4) Different phase angles are done individually.
5) Repeat procedure 2) to 4) except the open-circuit test voltage change from 1KV to 2KV for line to earth coupling mode test.
6) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

11.7. Test Result

N/A

The test is not applicable.

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Surge Test Data			
Temperature:	24.6℃	Humidity:	49.8%
Air pressure	1008hPa	Remark	/
Power Supply：	3.7Vdc	Test Mode:	Lighting mode

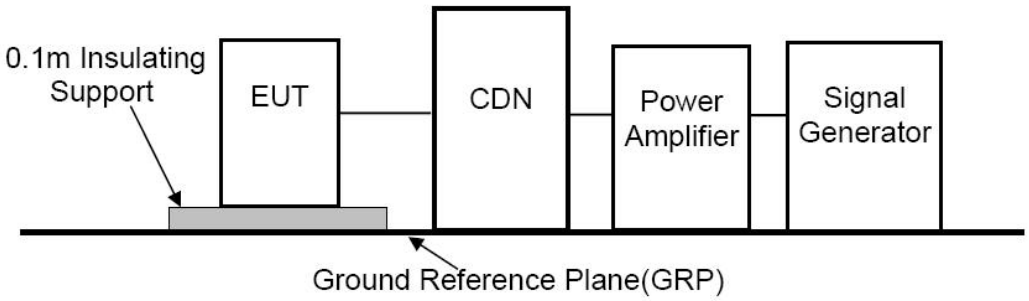
Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage (KV)	Performance Criterion	Result
L-N	+	90	5	1	C	N/A
L-N	-	270	5	1	C	N/A
L-PE	+	90	5	2	C	N/A
L-PE	-	270	5	2	C	N/A
N-PE	+	90	5	2	C	N/A
N-PE	-	270	5	2	C	N/A

Note: '*' Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3 m.

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12. INJECTED CURRENTS SUSCEPTIBILITY TEST

12.1. Block Diagram of EUT Test Setup



12.2. Test Standard

EN IEC 61547:2023, EN IEC 61000-4-6:2023

12.3. Severity Levels and Performance Criterion

Severity Level 2: 3V(rms), 150KHz ～ 80MHz
Severity Level:

Level	Field Strength V
1.	1
2.	3
3.	10
X.	Special

Performance criterion: A

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.

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 specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

12.4. EUT Configuration on Test

The configuration of EUT is the same as used in conducted emission test. Please refer to Section 3.4.

12.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 3.5 except the test set up replaced as Section 12.1.

12.6. Test Procedure

1) Set up the EUT, CDN and test generator as shown on section 12.1

2) Let EUT work in test mode and measure.

3) The EUT and supporting equipments are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane at above 0.1-0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

4) The disturbance signal described below is injected to EUT through CDN.

5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.

6) The frequency range is swept from 150KHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave

7) The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

8) Recording the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

12.7. Test Result

N/A

The test is not applicable.

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CS Test Data			
Temperature:	24.6℃	Humidity:	49.6%
Air pressure:	1008hPa	Remark:	/
Power Supply :	3.7Vdc	Test Mode:	Lighting mode

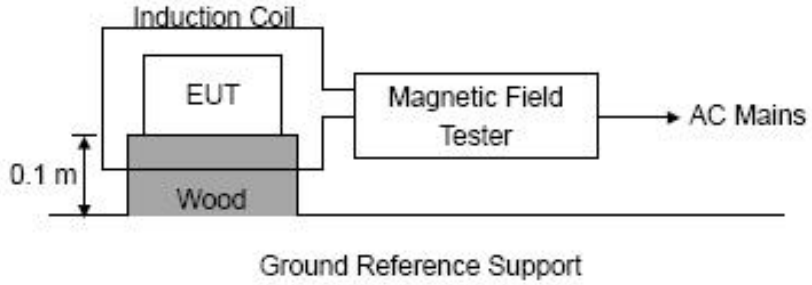
Frequency Range(MHz)	Injected Position	Strength	Modulation Signal	Freq. Step	Performance Criterion	Result
150KHz ～ 80MHz	AC Line	3V(rms), Unmodulated	AM 80%, 1kHz sine wave	1%	A	N/A

NOTE: Only applicable to ports interfacing with cables whose total length, according to the manufacturer's specification, may exceed 3 m.

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13. MAGNETIC FIELD IMMUNITY TEST

13.1. Block Diagram of Test Setup



13.2. Test Standard

EN IEC 61547:2023, EN 61000-4-8:2010
Severity Level 1 at 1A/m

13.3. Severity Levels and Performance Criterion

13.3.1 Severity level

Level	Magnetic Field Strength A/m
1.	1
2.	3
3.	10
4.	30
5.	100
X.	Special

13.3.2 Performance criterion**:** B

A. The apparatus shall continue to operate as intended during and after the test.
B. 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.
C. 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 specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
D. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

13.4. EUT Configuration on Test

The configuration of EUT is listed in Section 3.4.

13.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 3.5 except the test set up replaced as Section 13.1

13.6. Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 13.1. The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

13.7. Test Results

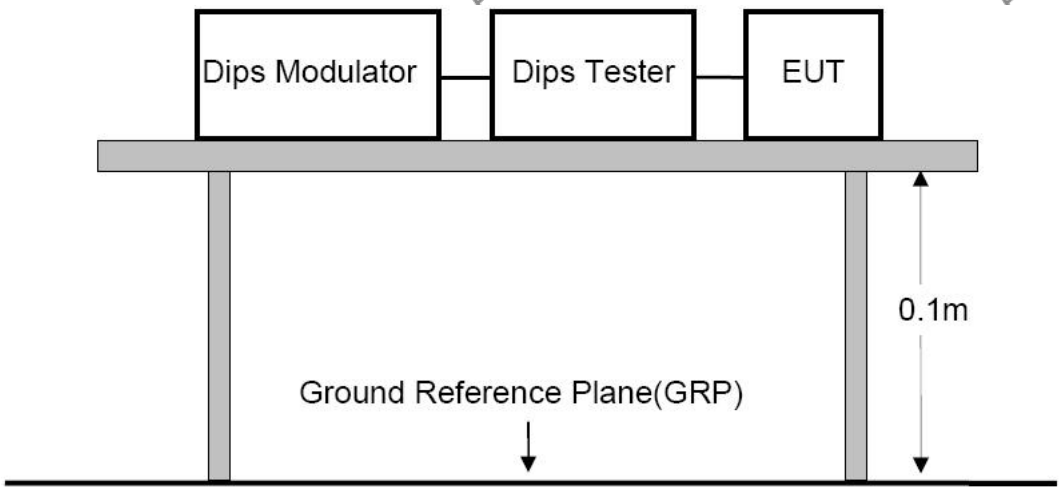
N/A

The test is not applicable.

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14. VOLTAGE DIPS AND INTERRUPTIONS TEST

14.1. Block Diagram of EUT Test Setup



14.2. Test Standard

EN IEC 61547:2023, EN IEC 61000-4-11:2020+COR1:2022

14.3. Severity Levels and Performance Criterion

Severity Level:

Input and Output AC Power Ports.

☑ Voltage Dips.

☑ Voltage Interruptions.

Environmental Phenomena	Test Specification	Units	Performance Criterion
Voltage Dips	70 10	Test Level(%Ut) period	B
Voltage Interruptions	0 0.5	Test Level(%Ut) period	B

Performance criterion: B, B

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.

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 specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

14.4. EUT Configuration on Test

The configuration of EUT is the same as used in conducted emission test. Please refer to Section 3.4.

14.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 3.5 except the test set up replaced as Section 14.1.

14.6. Test Procedure

1) Set up the EUT and test generator as shown on section 14.1.
2) The interruption is introduced at selected phase angles with specified duration. There is a 3mins minimum interval between each test event.
3) After each test a full functional check is performed before the next test.
4) Repeat procedures 2 & 3 for voltage dips, only the level and duration is changed.
5) Record any degradation of performance.

14.7. Test Result

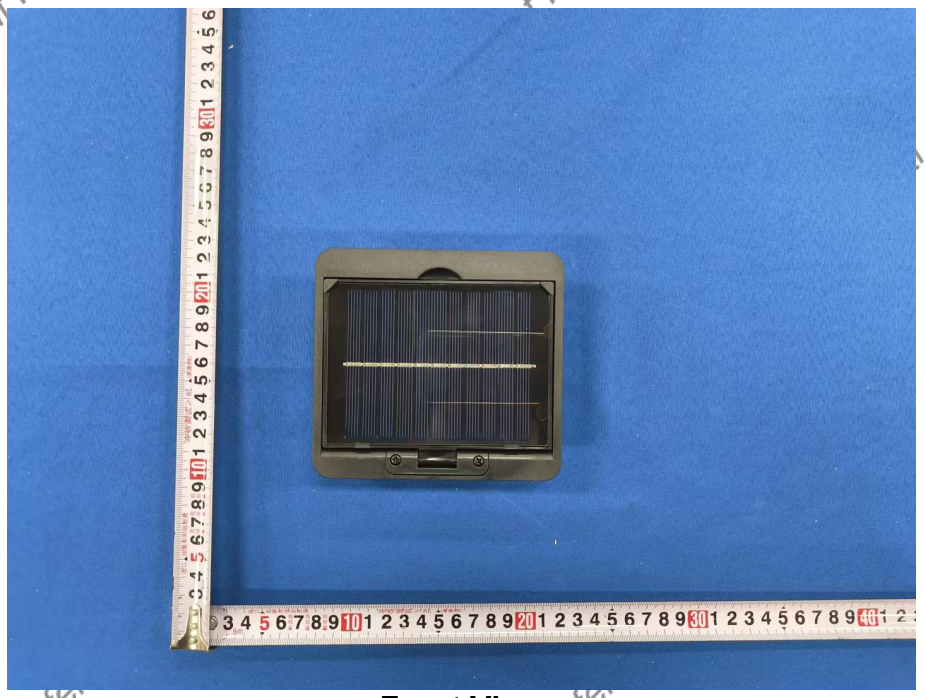
Pass

Please refer to the following page.

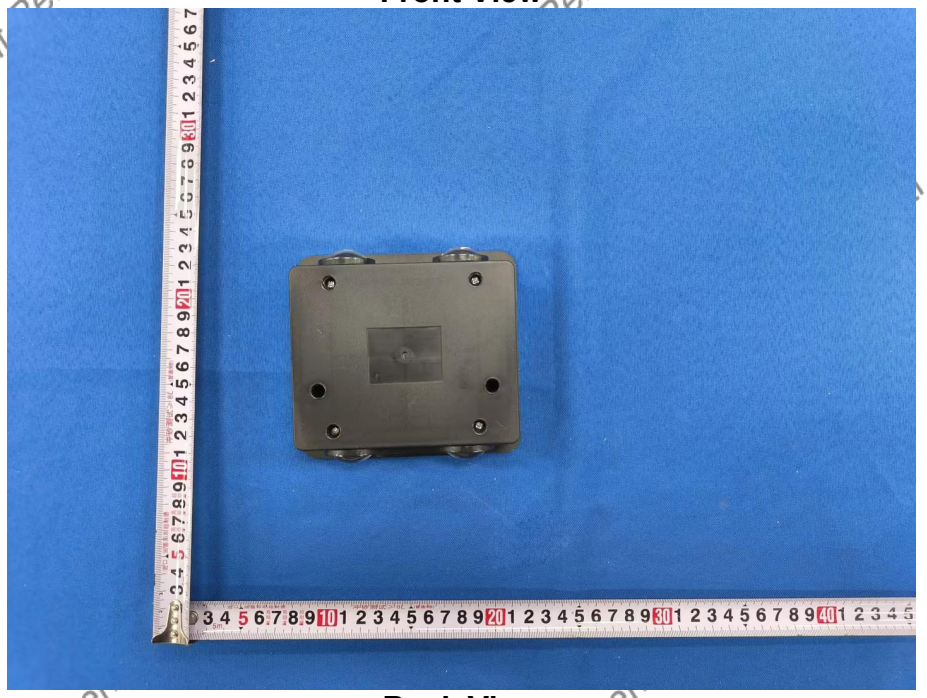
DIPS Test Data			
Temperature:	24.6℃	Humidity:	49.8%
Air pressure:	1008hPa	Remark:	/
Power Supply：	3.7Vdc	Test Mode:	Lighting mode
Environmental Phenomena	Test Specification	Units	Performance Criterion
Interruptions	0 0.5	Test Level(%Ut) period	N/A
Voltage Dips	70 10	Test Level(%Ut) period	N/A

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15. PHOTOGRAPHS



Front View



Back View

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STATEMENT

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

If you have any objection to this report, please submit it to the test unit within 15 days from the date of receipt of the report.

Test Laboratory: Zhongshan AOCE Testing Technology Co., Ltd.

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