

EMC Test Report

Applicant : **EcoFlow Inc.**

Address : **Plant A202, Founder Technology Industrial
Park, Shiyan Sub-district, Bao' an District
Shenzhen, Guangdong 518000 China**

Product Name : **EcoFlow PowerStream Microinverter**

Report Date : **Apr. 14, 2023**

Shenzhen Anbotek Compliance Laboratory Limited



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TEST REPORT

Applicant : EcoFlow Inc.
Manufacturer : EcoFlow Inc.
Product Name : EcoFlow PowerStream Microinverter
Test Model No. : EFWN511
Reference Model No. : EFWN511B

Trade Mark :



Rating(s) : See Chapter 1.9 for Rating(s)

Test Standard(s) : EN IEC 61000-6-3: 2021;
EN IEC 61000-3-2: 2019+A1:2021;
EN 61000-3-3: 2013+A1:2019+A2:2021;
EN IEC 61000-6-1: 2019;
(IEC 61000-4-2; IEC 61000-4-3; IEC 61000-4-4;
IEC 61000-4-5; IEC 61000-4-6; IEC 61000-4-8; IEC 61000-4-11)

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN IEC 61000-6-1, EN IEC 61000-3-2, EN 61000-3-3, EN IEC 61000-6-3 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt: Apr. 04, 2023

Date of Test: Apr. 04~Apr. 13, 2023

Prepared By:

Yee Huang

(Yee Huang)

Approved & Authorized Signer:

KingKong Jin

(KingKong Jin)




1. General Information

1.1. Client Information

Applicant	:	EcoFlow Inc.
Address	:	Plant A202, Founder Technology Industrial Park, Shiyan Sub-district, Bao' an District Shenzhen, Guangdong 518000 China
Manufacturer	:	EcoFlow Inc.
Address	:	Plant A202, Founder Technology Industrial Park, Shiyan Sub-district, Bao' an District Shenzhen, Guangdong 518000 China

1.2. Description of Device (EUT)

Product Name	:	EcoFlow PowerStream Microinverter
Test Model No.	:	EFWN511
Reference Model No.	:	EFWN511B (Note: All samples are the same except the model number & power, so we prepare "EFWN511" for test only.)
Trade Mark	:	
Test Power Supply	:	DC 11-55V / DC 11-15V, 40-59V / AC230V 50Hz
Test Sample No.	:	1-1-1
Product Description	:	N/A
Remark: (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		

1.3. Auxiliary Equipment Used During Test

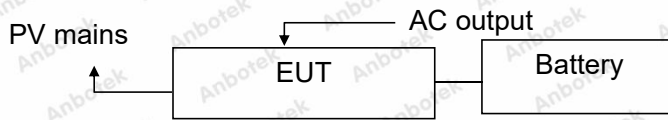
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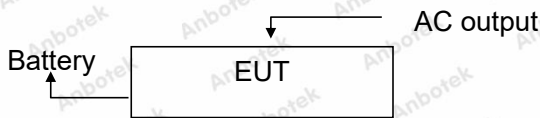
1.4. Description of Test Modes

Pretest Modes	Descriptions
Mode 1	PV Input + BAT Charging + AC output
Mode 2	BAT Discharging + AC output

For Mode 1 Block Diagram of Test Setup



For Mode 2 Block Diagram of Test Setup



1.5. Test Summary

Test Items	Test Modes	Status
Power Line Conducted Emission Test	Mode 1	P
Asymmetric Mode Conducted Emission at Telecom Port	/	N
Radiated Emission Test (Below 1 GHz)	All Mode	P
Radiated Emission Test (Above 1GHz)	Mode 1	P
Harmonic Current Test	/	N
Voltage Fluctuations & Flicker Test	/	N
Electrostatic Discharge Immunity Test	All Mode	P
RF Field Strength Immunity Test	All Mode	P
Electrical Fast Transient/Burst Immunity Test	Mode 1	P
Surge Immunity Test	Mode 1	P
Injected Currents Susceptibility Test	Mode 1	P
Power frequency Magnetic Field Immunity Test	/	N
Voltage Dips and Interruptions Immunity Test	Mode 1	P
P) Indicates "PASS". F) Indicates "Fail". N) Indicates "Not applicable".		



1.6. Test Equipment List

Power Line Conducted Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 23, 2022	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040D T001	Jul. 05, 2022	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 13, 2022	1 Year
4.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 22, 2022	1 Year
5.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A

Asymmetric Mode Conducted Emission at Telecom Port

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ISN	Schwarzbeck	NTFM 8158	#172	Oct. 13, 2022	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 13, 2022	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 22, 2022	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A
5.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040D T001	Jul. 05, 2022	1 Year

Radiated Emission Test (Below 1 GHz)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESPI7	101340	Feb. 22, 2023	1 Year
2.	Pre-amplifier	Emtrace	RP01A	00517	Feb. 22, 2023	1 Year
3.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	01471	Feb. 25, 2023	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A



Radiated Emission Test (Above 1GHz)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESPI7	101340	Feb. 22, 2023	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	01471	Feb. 25, 2023	1 Year
3.	Pre-amplifier	Emtrace	RP06A	01317	Feb. 22, 2023	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A
5.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year

 Harmonic Current and Flicker Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Programmable AC Power source	IVYTECH	APS-5005A	632734	Oct. 23, 2022	1 Year
2.	Harmonic and Flicker Analyzer	EMC-PARTNER	HMONICS 1000-1P	164	Oct. 23, 2022	1 Year
3.	Harmonics-1000	N/A	Ed.3.0+4.0	N.A	N/A	N/A

 Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Simulators	emtest	ESD NX30.1	11936	Mar. 25, 2022	1 Year



RF Field Strength Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Agilent	N5181A	MY5014310 7	Apr. 20, 2022	1 Year
2.	Power Meter	Agilent	E4417A	MY4510138 4	May 14, 2022	1 Year
3.	Amplifier	Micotop	MPA-80-100 0-600	MPA211031 8	Apr. 20, 2022	1 Year
4.	Amplifier	Micotop	MPA-1000-6 000-100	MPA211032 7	Apr. 20, 2022	1 Year
5.	Log.-Per.-Antenna	Schwarzbeck	VULP 9118E	01012	N/A	N/A
6.	Microwave Log.-Per. Antenna	Schwarzbeck	STLP 9149	00788	N/A	N/A
7.	Power Sensor	KEYSIGHT	E9323A	US40410647	Apr. 20, 2022	1 Year
8.	Power Sensor	KEYSIGHT	E9323A	MY5310000 7	Apr. 20, 2022	1 Year
9.	Electric field Probe	Narda S.T.S /PMM	EP 601	811ZX10351	Apr. 29, 2022	1 Year
10.	Software	EMtrace	EM 3	/	N/A	N/A

 Electrical Fast Transient/Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Generator	TESEQ	NSG 3060	1480	Oct. 23, 2022	1 Year
2.	CDN	TESEQ	CDN 3061	1408	Oct. 23, 2022	1 Year
3.	EFT-Clamp	PRIMA	EFT-Clamp	/	Oct. 13, 2022	1 Year

 Surge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Combined Wave Lightning Surge Simulator	3Ctest	CCS600	ES3771702	Jul. 05, 2022	1 Year
2.	Three Phase Power Coupling Network	3Ctest	SEPN69100 T	ES0801757	Jul. 05, 2022	1 Year
3.	Telecom port surge generator	PMI	TW101	190411	May 13, 2022	1 Year



Injected Currents Susceptibility Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	C/S Conducted Immunity Test System	FRANKONIA	CIT-10	126A1196/20 12	Oct. 23, 2022	1 Year
2.	CDN	FRANKONIA	CDN - M2+ M3	A2210178/20 12	Oct. 23, 2022	1 Year
3.	6dB Attenuator	FRANKONIA	DAM 26W	1172202	Oct. 23, 2022	1 Year
4.	CIT-10	FRANKONIA	Version1.1.7	N/A	N/A	N/A
5.	EM-Clamp	FRANKONIA	EMCL-20	18101728-01 03	May 17, 2022	1 Year

 Power frequency Magnetic Field Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8 K	906002	Oct. 23, 2022	1 Year

 Voltage Dips and Interruptions Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	CYCLE SAG Simulator	PRIMA	DRP61011A G	PR12046234	Oct. 23, 2022	1 Year



1.7. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518128



1.8. EMS Performance Criteria

Performance criterion A

The EUT 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 EUT is used as intended. If the performance level is not specified by the manufacturer, this may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Performance criterion B

The EUT 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 EUT is used as intended. The performance level may be replaced by a permissible loss of performance. However, during the test degradation of performance is allowed but no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and what the user may reasonably expect from the equipment if used as intended.

Performance criterion C

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

If, as a result of the application of the tests defined in this standard, the EUT becomes dangerous or unsafe, it shall be deemed to have failed the test.



1.9. Rating(s)

Model/Modell: EFWN511

DC Max. Input Voltage/DC Max. Eingangsspannung: 59V===

DC Output/DC-Ausgang: 30-58V=== 13A Max

DC Input/DC-Eingang: 11-15V, 40-59V=== 13A Max

AC output/AC-Ausgang: 220/230/240V~ 50Hz, 3.6A Max, 800W Max

AC Output Power Factor/AC-Ausgangsleistungsfaktor: $\pm 0.8\sim 1$

PV Input/PV-Eingang(x2): 11-55V=== 13A Max Start-up Voltage/Anfahrspannung: 15V===

Range of Peak Power MPPT Voltage/Bereich der MPPT-Spitzenleistung Spannung: 25-55V===

Max. PV short circuit current (Isc PV)/Max. PV-Kurzschlussstrom (Isc PV)(X2): 14A===

Max. PV input voltage (Vmax PV)/Max. PV-Eingangsspannung (Vmax PV): 55V===

Overvoltage category/Überspannungskategorie: PV/DC: II, AC: III

Protective class/Schutzklasse: Class I

Model/Modell: EFWN511B

DC Max. Input Voltage/DC Max. Eingangsspannung: 59V===

DC Output/DC-Ausgang: 30-58V=== 13A Max

DC Input/DC-Eingang: 11-15V, 40-59V=== 13A Max

AC output/AC-Ausgang: 220/230/240V~ 50Hz, 2.8A Max, 600W Max

AC Output Power Factor/AC-Ausgangsleistungsfaktor: $\pm 0.8\sim 1$

PV Input/PV-Eingang(x2): 11-55V=== 13A Max Start-up Voltage/Anfahrspannung: 15V===

Range of Peak Power MPPT Voltage/Bereich der MPPT-Spitzenleistung Spannung: 25-55V===

Max. PV short circuit current (Isc PV)/Max. PV-Kurzschlussstrom (Isc PV)(X2): 14A===

Max. PV input voltage (Vmax PV)/Max. PV-Eingangsspannung (Vmax PV): 55V===

Overvoltage category/Überspannungskategorie: PV/DC: II, AC: III

Protective class/Schutzklasse: Class I



2. Power Line Conducted Emission Test

2.1. Test Standard and Limit

Test Standard:	EN IEC 61000-6-3
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☒ **Limits for conducted emission at the DC power ports**

Frequency (MHz)	Limits (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0
0.50 ~ 30.00	73.0	60.0

Remark: The lower limit shall apply at the transition frequencies.

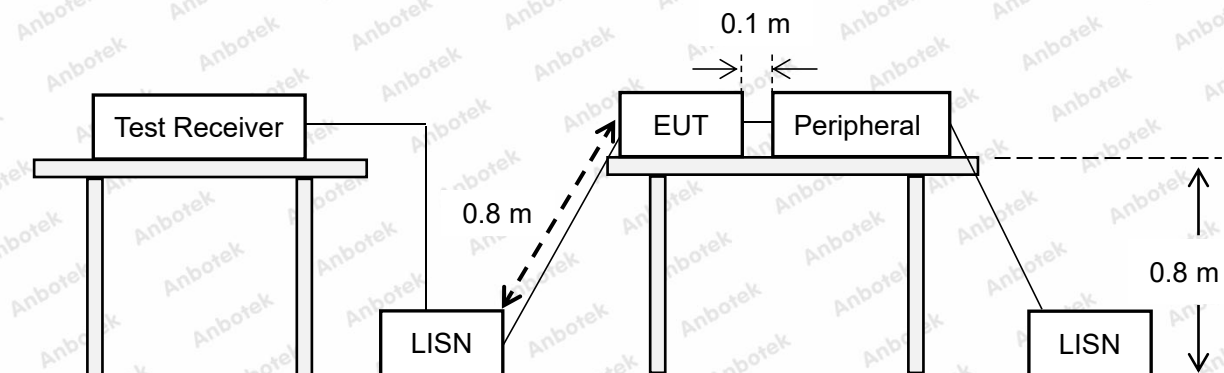
☒ **Limits for conducted emission at the low voltage AC mains power ports**

Frequency (MHz)	Limits (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

Remark:

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

2.2. Test Setup



2.3. Test Procedure

The table-top EUT is placed on a non-conductive table 0.8 m above the horizontal ground reference plane, and the back of the EUT is 0.4 m away from the vertical ground reference plane, and at least 0.8 m from any other metal surface or ground plane. The floor-standing EUT is placed on an insulating support 0.1 m above the horizontal ground reference plate, at least 0.8 m away from other metal objects.

Connect EUT to the power mains through an LISN. Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the center into a bundle no longer than 0.4 m, so that its length is shortened to 1 m. All the peripherals are connecting to the other LISN.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest disturbance with respect to the limit was found by investigating disturbances at a number of significant frequencies. The probable frequency of maximum disturbance had been found and that the associated cable and EUT configuration and mode of operation had been identified.

Set the test-receiver to quasi peak detect function and average detect function, and to measure the conducted emissions values.

2.4. Test Results

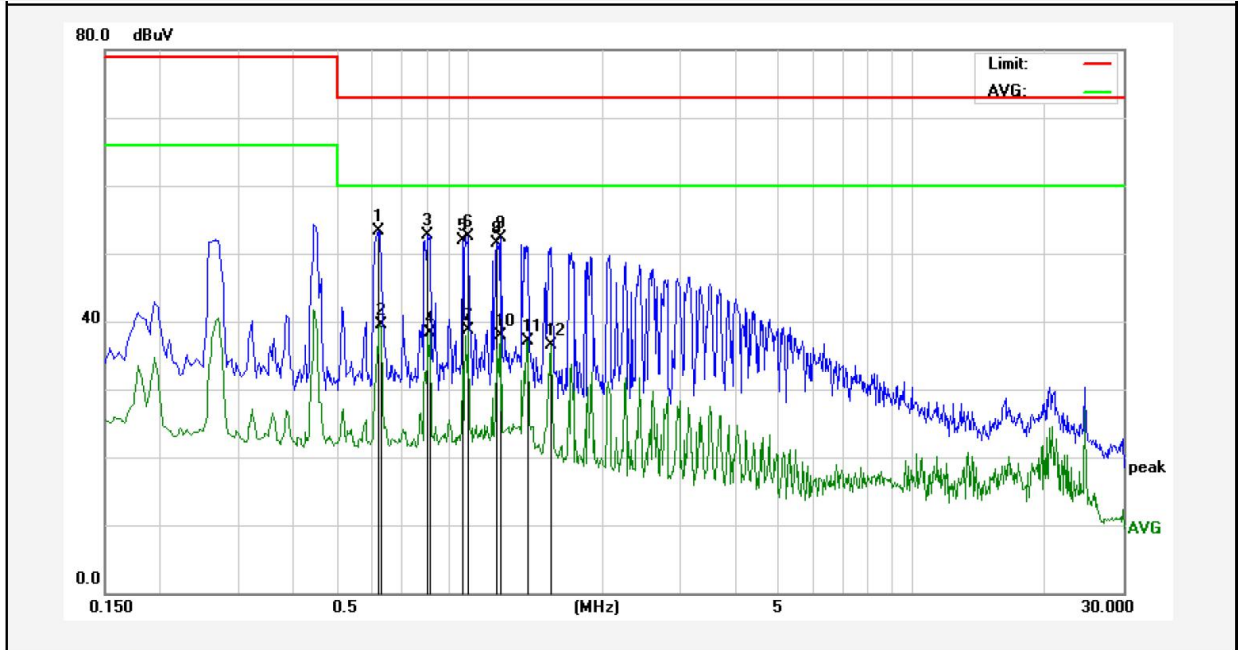
PASS

Remark: The worst cases were listed in test Results.



Power Line Conducted Test Data

Test port: DC input
 Test Site: 1# Shielded Room
 Test Specification: DC 55V
 Comment: +
 Temp.: 28°C Hum.: 51%



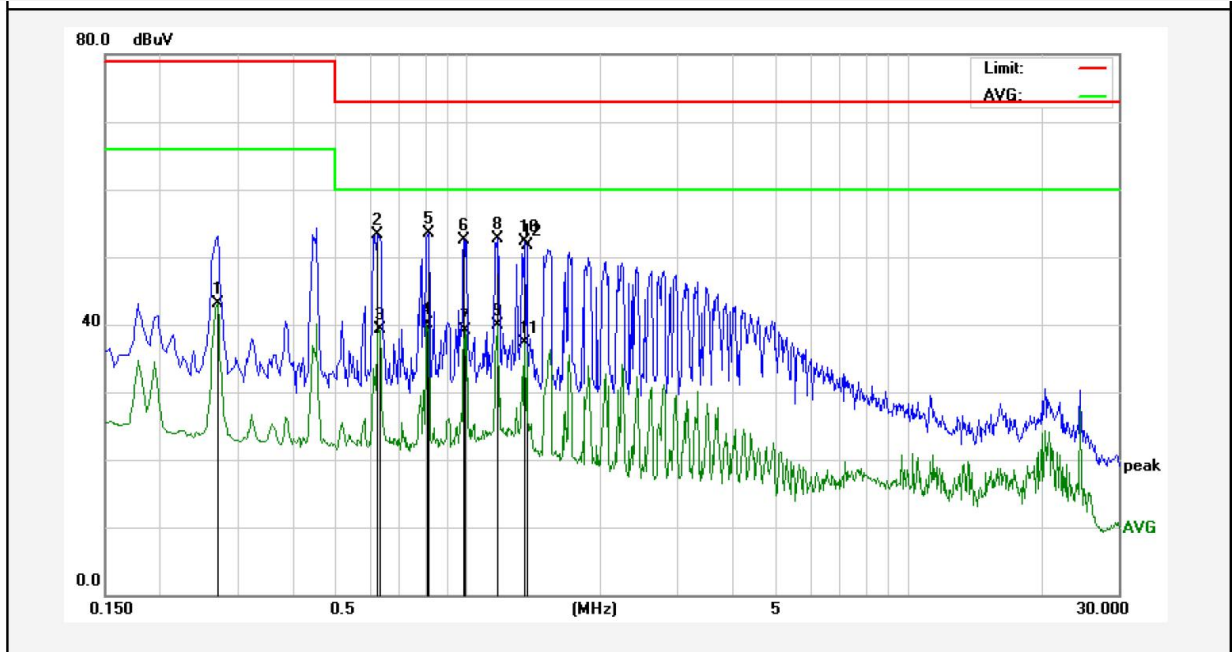
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.6261	43.49	9.86	53.35	73.00	-19.65	QP	
2	0.6301	29.66	9.86	39.52	60.00	-20.48	AVG	
3	0.8061	42.84	9.86	52.70	73.00	-20.30	QP	
4	0.8141	28.48	9.86	38.34	60.00	-21.66	AVG	
5	0.9661	41.99	9.85	51.84	73.00	-21.16	QP	
6	0.9941	42.74	9.85	52.59	73.00	-20.41	QP	
7	0.9941	28.78	9.85	38.63	60.00	-21.37	AVG	
8	1.1541	41.66	9.85	51.51	73.00	-21.49	QP	
9	1.1821	42.53	9.84	52.37	73.00	-20.63	QP	
10	1.1821	28.01	9.84	37.85	60.00	-22.15	AVG	
11	1.3541	27.31	9.84	37.15	60.00	-22.85	AVG	
12	1.5301	26.70	9.84	36.54	60.00	-23.46	AVG	

Note: Result = Reading + Factor Over Limit = Result - Limit



Power Line Conducted Test Data

Test port: DC input
 Test Site: 1# Shielded Room
 Test Specification: DC 55V
 Comment: -
 Temp.: 28°C Hum.: 51%



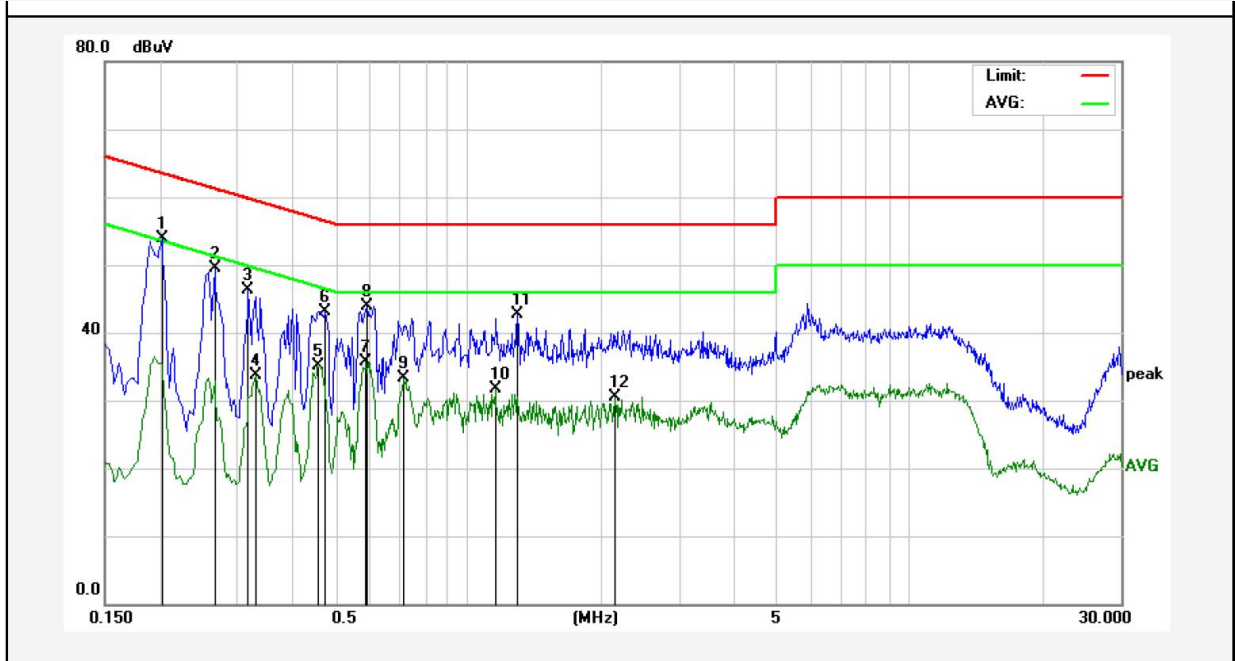
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.2701	33.31	9.83	43.14	66.00	-22.86	AVG	
2	0.6261	43.36	9.86	53.22	73.00	-19.78	QP	
3	0.6301	29.51	9.86	39.37	60.00	-20.63	AVG	
4	0.8061	30.27	9.86	40.13	60.00	-19.87	AVG	
5	0.8141	43.61	9.86	53.47	73.00	-19.53	QP	
6	0.9821	42.73	9.85	52.58	73.00	-20.42	QP	
7	0.9861	29.28	9.85	39.13	60.00	-20.87	AVG	
8	1.1701	42.87	9.84	52.71	73.00	-20.29	QP	
9	1.1701	29.98	9.84	39.82	60.00	-20.18	AVG	
10	1.3461	42.50	9.84	52.34	73.00	-20.66	QP	
11	1.3461	27.40	9.84	37.24	60.00	-22.76	AVG	
12	1.3621	41.94	9.84	51.78	73.00	-21.22	QP	

Note: Result = Reading + Factor Over Limit = Result - Limit



Power Line Conducted Test Data

Test port: AC output
 Test Site: 1# Shielded Room
 Test Specification: AC 230V, 50Hz
 Comment: Live Line
 Temp.: 23.5°C Hum.: 45%



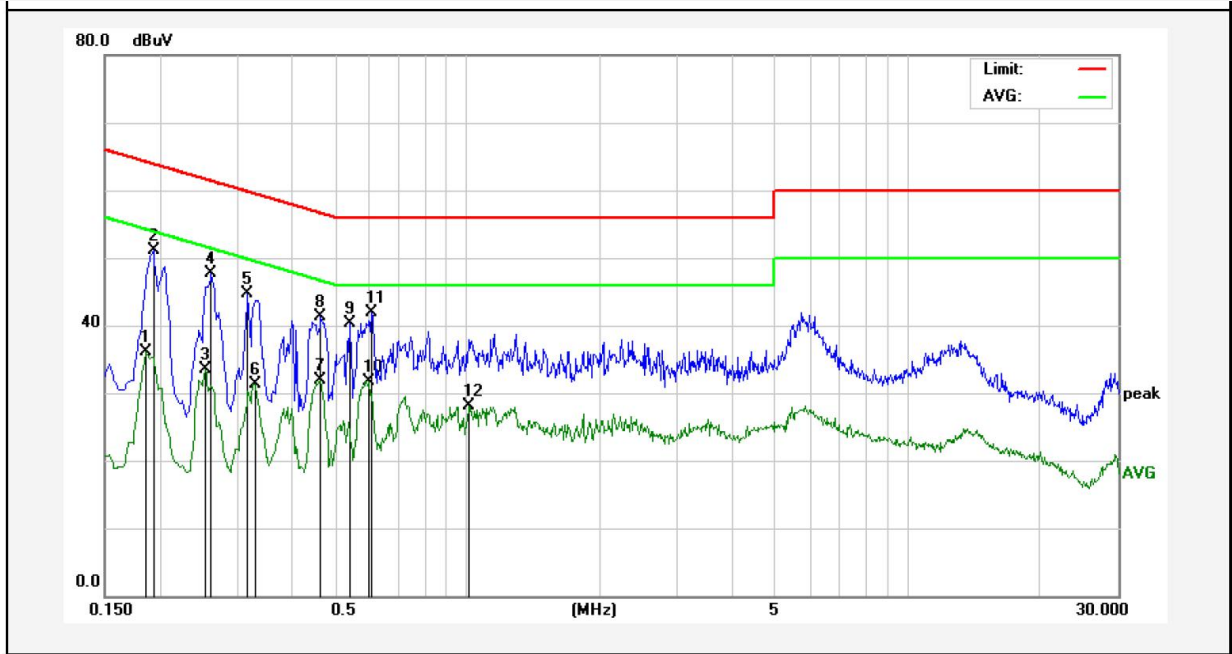
No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.2020	44.25	9.57	53.82	63.52	-9.70	QP	
2	0.2660	39.89	9.69	49.58	61.24	-11.66	QP	
3	0.3180	36.55	9.77	46.32	59.76	-13.44	QP	
4	0.3300	23.89	9.76	33.65	49.45	-15.80	AVG	
5	0.4580	25.39	9.81	35.20	46.73	-11.53	AVG	
6	0.4740	33.22	9.82	43.04	56.44	-13.40	QP	
7	0.5860	25.76	9.85	35.61	46.00	-10.39	AVG	
8	0.5899	34.14	9.85	43.99	56.00	-12.01	QP	
9	0.7140	23.40	9.83	33.23	46.00	-12.77	AVG	
10	1.1500	21.80	9.85	31.65	46.00	-14.35	AVG	
11	1.2900	32.84	9.85	42.69	56.00	-13.31	QP	
12	2.1500	20.72	9.86	30.58	46.00	-15.42	AVG	

Note: Result = Reading + Factor Over Limit = Result - Limit



Power Line Conducted Test Data

Test port: AC output
 Test Site: 1# Shielded Room
 Test Specification: AC 230V, 50Hz
 Comment: Neutral Line
 Temp.: 23.5°C Hum.: 45%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1860	26.46	9.58	36.04	54.21	-18.17	AVG	
2	0.1940	41.44	9.57	51.01	63.86	-12.85	QP	
3	0.2540	23.78	9.67	33.45	51.62	-18.17	AVG	
4	0.2620	37.96	9.68	47.64	61.36	-13.72	QP	
5	0.3180	34.88	9.77	44.65	59.76	-15.11	QP	
6	0.3300	21.64	9.76	31.40	49.45	-18.05	AVG	
7	0.4620	22.10	9.81	31.91	46.66	-14.75	AVG	
8	0.4660	31.58	9.82	41.40	56.58	-15.18	QP	
9	0.5420	30.50	9.84	40.34	56.00	-15.66	QP	
10	0.5980	21.94	9.85	31.79	46.00	-14.21	AVG	
11	0.6060	32.07	9.85	41.92	56.00	-14.08	QP	
12	1.0060	18.16	9.85	28.01	46.00	-17.99	AVG	

Note: Result = Reading + Factor Over Limit = Result - Limit



3. Asymmetric Mode Conducted Emission at Telecom Port

3.1. Test Standard and Limit

Test Standard	EN IEC 61000-6-3
---------------	------------------

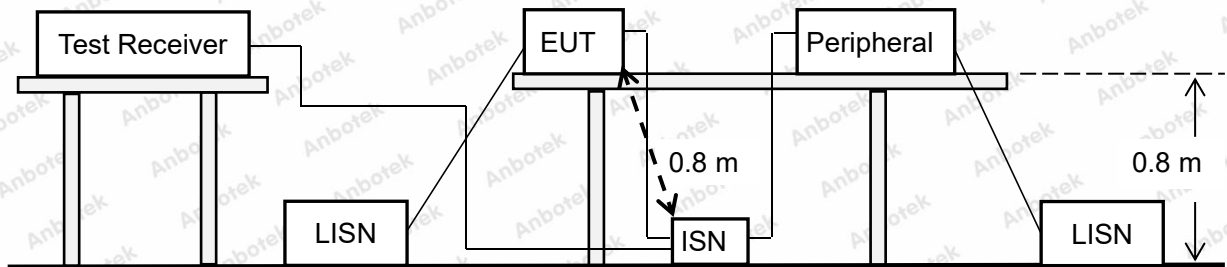
Limits for asymmetric mode conducted emissions

Frequency (MHz)	Limits (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	84.0 ~ 74.0 *	74.0 ~ 64.0 *
0.50 ~ 30.00	74.0	64.0

Remark:

The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.2. Test Setup



3.3. Test Procedure

The table-top EUT is placed on a non-conductive table 0.8 m above the horizontal ground reference plane, and the back of the EUT is 0.4 m away from the vertical ground reference plane, and at least 0.8 m from any other metal surface or ground plane. The floor-standing EUT is placed on an insulating support 0.1 m above the horizontal ground reference plane, at least 0.8 m away from other metal objects.

Connect EUT to the power mains through an LISN. Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the center into a bundle no longer than 0.4 m, so that its length is shortened to 1 m. All the peripherals are connecting to the other LISN.

The EUT was connected to the peripheral equipment through the ISN and linked in normal condition.

Set the test-receiver to quasi peak detect function and average detect function, and to measure the asymmetric mode conducted emission values.

3.4. Test Results

Not applicable.



4. Radiated Emission Test (Below 1 GHz)

4.1. Test Standard and Limit

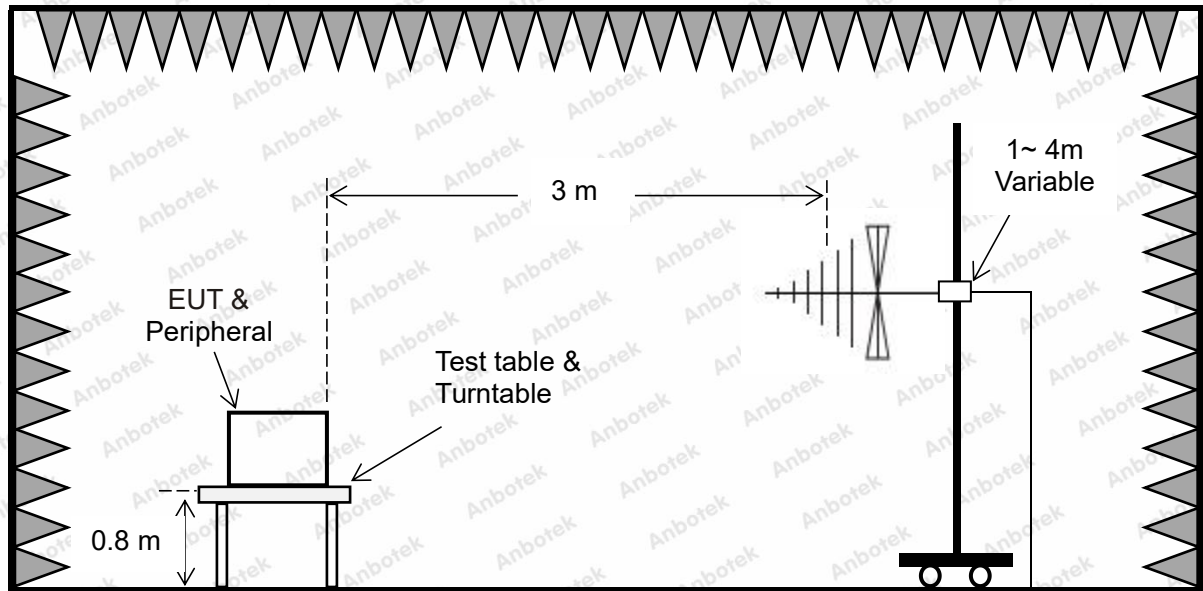
Test Standard	EN IEC 61000-6-3
---------------	------------------

Limit for radiated emissions at frequencies up to 1 GHz

Frequency (MHz)	Distance (Meters)	Field Strengths Limit (dB μ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Remark: The lower limit shall apply at the transition frequencies.

4.2. Test Setup



4.3. Test Procedure

The table-top EUT is placed on a non-conductive table 0.8 m above the horizontal ground reference plane. The floor-standing EUT is placed on an insulating support 0.1 m above the horizontal ground reference plane.

The EUT was set 3 m away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 m to find out the maximum emission level.



The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

The bandwidth of the Receiver is set at 120 kHz.

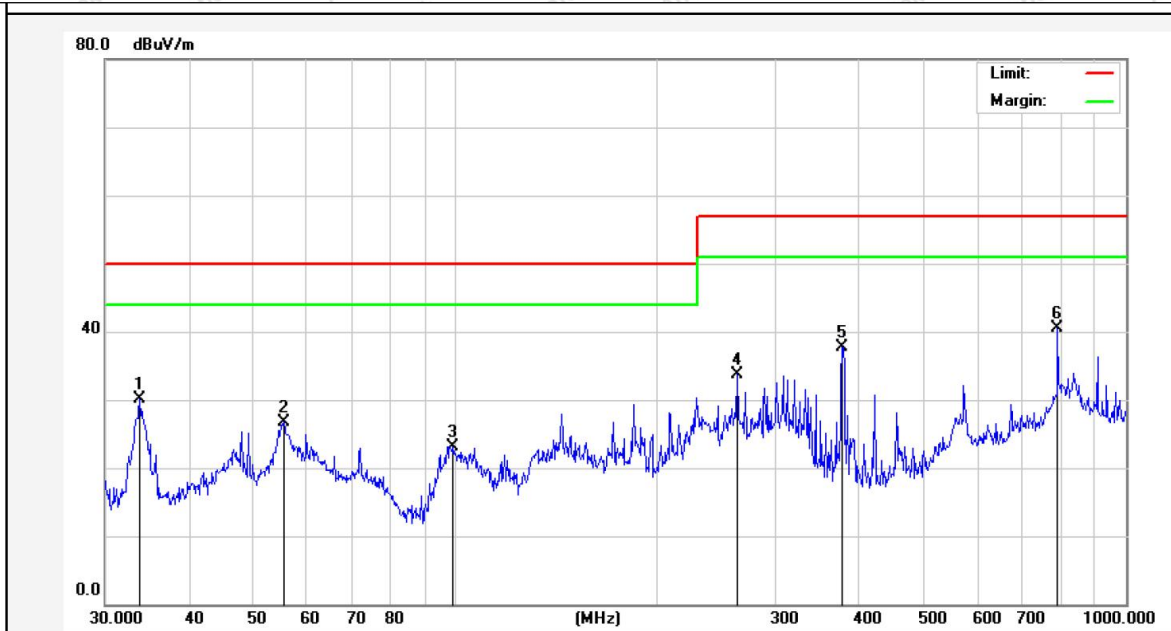
4.4. Test Results

PASS

Remark: The worst cases were listed in test Results.



Test Mode: PV Input + BAT Charging + AC output
 Test item: Radiation Test Polarization: Horizontal
 Standard: (RE)EN IEC 61000-6-3 Power Source: DC 55V
 Frequency Range: 30MHz ~ 1000MHz Temp.(°C)/Hum.(%RH): 22.5(°C)/50%RH
 Distance: 3m

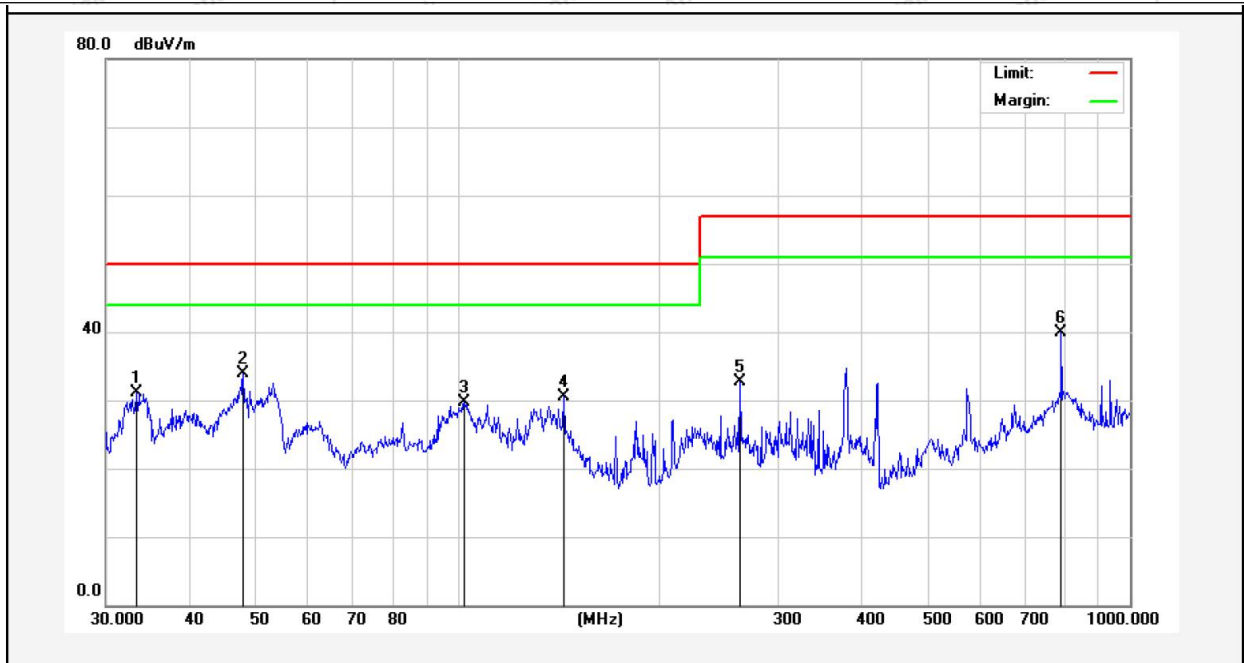


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	33.7986	49.01	-18.88	30.13	50.00	-19.87	QP			
2	55.4147	44.35	-17.62	26.73	50.00	-23.27	QP			
3	99.1797	44.54	-21.34	23.20	50.00	-26.80	QP			
4	262.8955	54.13	-20.38	33.75	57.00	-23.25	QP			
5	377.2591	53.83	-16.08	37.75	57.00	-19.25	QP			
6	790.6188	48.87	-8.44	40.43	57.00	-16.57	QP			

Note: Result= Reading + Factor Over Limit=Result-Limit



Test Mode: PV Input + BAT Charging + AC output
 Test item: Radiation Test Polarization: Vertical
 Standard: (RE)EN IEC 61000-6-3 Power Source: DC 55V
 Frequency Range: 30MHz ~ 1000MHz Temp.(°C)/Hum.(%RH): 22.5(°C)/50%RH
 Distance: 3m



No.	Freq. (MHz)	Reading (dBUV)	Factor (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	33.3279	48.49	-17.42	31.07	50.00	-18.93	QP			
2	47.9940	49.41	-15.48	33.93	50.00	-16.07	QP			
3	102.3597	46.58	-16.95	29.63	50.00	-20.37	QP			
4	143.8295	52.65	-22.15	30.50	50.00	-19.50	QP			
5	262.8955	50.13	-17.51	32.62	57.00	-24.38	QP			
6	790.6188	48.35	-8.44	39.91	57.00	-17.09	QP			

Note: Result= Reading + Factor Over Limit=Result-Limit



5. Radiated Emission Test (Above 1GHz)

5.1. Test Standard and Limit

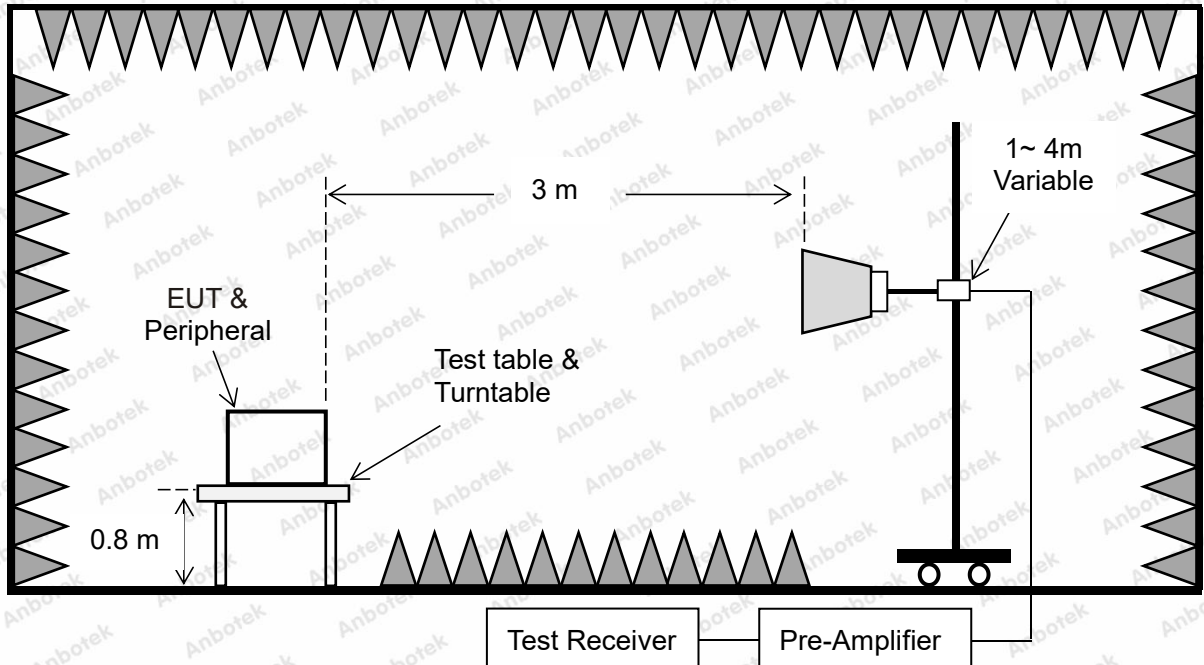
Test Standard	EN IEC 61000-6-3
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Limit for radiated emissions at frequencies above 1 GHz

Frequency (MHz)	Distance (Meters)	Field Strengths Limit (dB μ V/m)	
		Peak	Average
1000 ~ 3000	3	70	50
3000 ~ 6000	3	74	54

Remark: The lower limit shall apply at the transition frequencies.

5.2. Test Setup



5.3. Test Procedure

The table-top EUT is placed on a non-conductive table 0.8 m above the horizontal ground reference plane. The floor-standing EUT is placed on an insulating support 0.1 m above the horizontal ground reference plane.

The EUT was set 3 m away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 m to find out the maximum emission level.



The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

The test receiver is set to peak and average detects function.

The bandwidth of the test receiver is set at 1MHz.

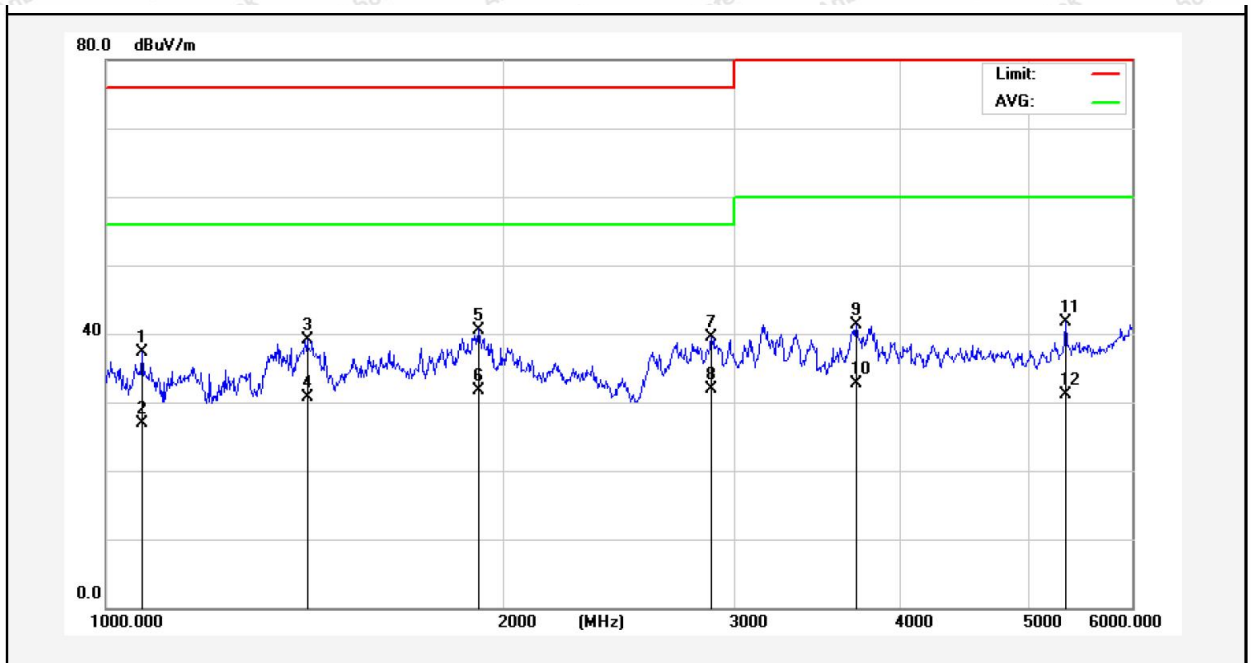
5.4. Test Results

PASS

The test curves are shown in the following pages.



Test Mode: PV Input + BAT Charging + AC output
 Test item: Radiation Test Polarization: Horizontal
 Standard: (RE)EN IEC 61000-6-3 Power Source: DC 55V
 Frequency Range: 1GHz ~ 6GHz Temp.(°C)/Hum.(%RH): 23.5(°C)/50%RH
 Distance: 3m

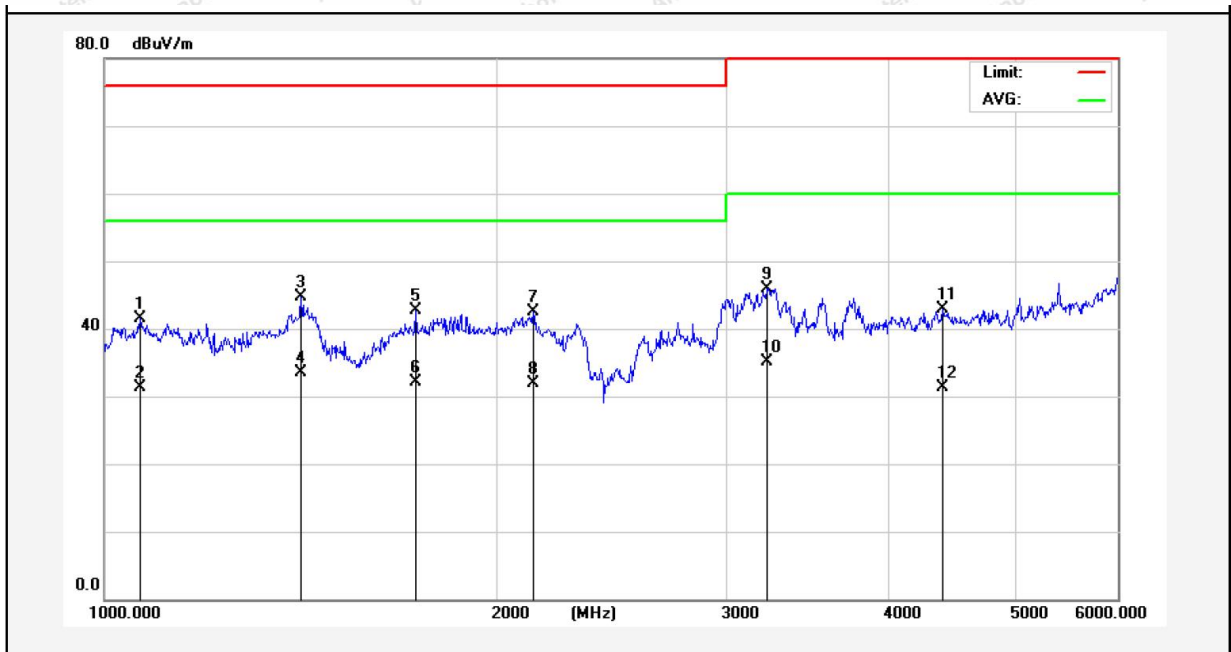


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	1064.720	64.92	-27.69	37.23	76.00	-38.77	peak			
2	1064.720	54.64	-27.69	26.95	56.00	-29.05	AVG			
3	1420.750	66.04	-26.90	39.14	76.00	-36.86	peak			
4	1420.750	57.61	-26.90	30.71	56.00	-25.29	AVG			
5	1916.323	66.16	-25.56	40.60	76.00	-35.40	peak			
6	1916.323	57.18	-25.56	31.62	56.00	-24.38	AVG			
7	2878.122	62.47	-23.05	39.42	76.00	-36.58	peak			
8	2878.122	54.99	-23.05	31.94	56.00	-24.06	AVG			
9	3705.344	62.33	-21.01	41.32	80.00	-38.68	peak			
10	3705.344	53.72	-21.01	32.71	60.00	-27.29	AVG			
11	5340.371	57.93	-16.27	41.66	80.00	-38.34	peak			
12	5340.371	47.35	-16.27	31.08	60.00	-28.92	AVG			

Note: Result=Reading + Factor Over Limit=Result - Limit



Test Mode: PV Input + BAT Charging + AC output
 Test item: Radiation Test Polarization: Vertical
 Standard: (RE)EN IEC 61000-6-3 Power Source: DC 55V
 Frequency Range: 1GHz ~ 6GHz Temp.(°C)/Hum.(%RH): 23.5(°C)/50%RH
 Distance: 3m



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	1064.720	69.26	-27.69	41.57	76.00	-34.43	peak			
2	1064.720	58.95	-27.69	31.26	56.00	-24.74	AVG			
3	1415.668	71.66	-26.90	44.76	76.00	-31.24	peak			
4	1415.668	60.35	-26.90	33.45	56.00	-22.55	AVG			
5	1733.375	69.15	-26.54	42.61	76.00	-33.39	peak			
6	1733.375	58.61	-26.54	32.07	56.00	-23.93	AVG			
7	2133.821	67.33	-24.92	42.41	76.00	-33.59	peak			
8	2133.821	56.86	-24.92	31.94	56.00	-24.06	AVG			
9	3227.832	67.63	-21.71	45.92	80.00	-34.08	peak			
10	3227.832	56.88	-21.71	35.17	60.00	-24.83	AVG			
11	4400.794	61.33	-18.34	42.99	80.00	-37.01	peak			
12	4400.794	49.56	-18.34	31.22	60.00	-28.78	AVG			

Note: Result=Reading + Factor Over Limit=Result - Limit

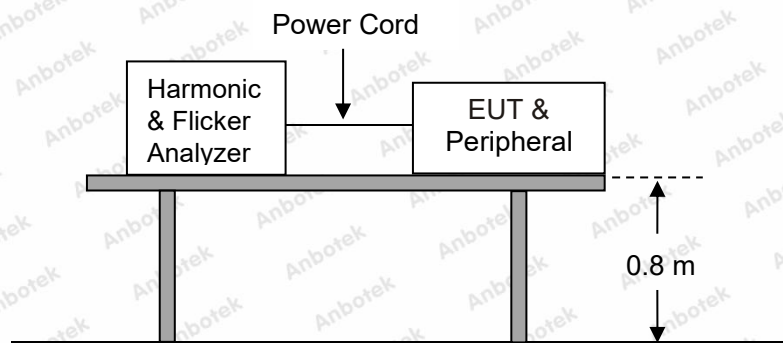


6. Harmonic Current Test

6.1. Test Standard

Test Standard:	EN IEC 61000-3-2
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6.2. Test Setup



6.3. Test Procedure

The table-top EUT is placed on the top of a wooden table 0.8 m above the ground (0.1 m for the floor-standing EUT) and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.

6.4. Test Results

Not applicable.

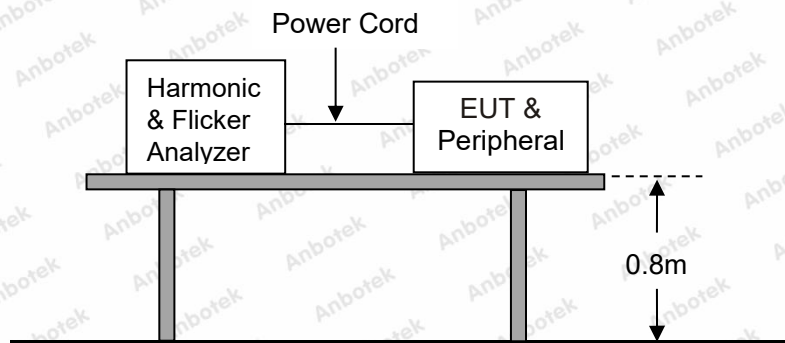


7. Voltage Fluctuations & Flicker Test

7.1. Test Standard

Test Standard:	EN 61000-3-3
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7.2. Test Setup



7.3. Test Procedure

The table-top EUT is placed on the top of a wooden table 0.8 m above the ground (0.1 m for the floor-standing EUT) and operated to produce the most unfavorable sequence of voltage changes under normal conditions during the flicker measurement. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

7.4. Test Results

Not applicable.

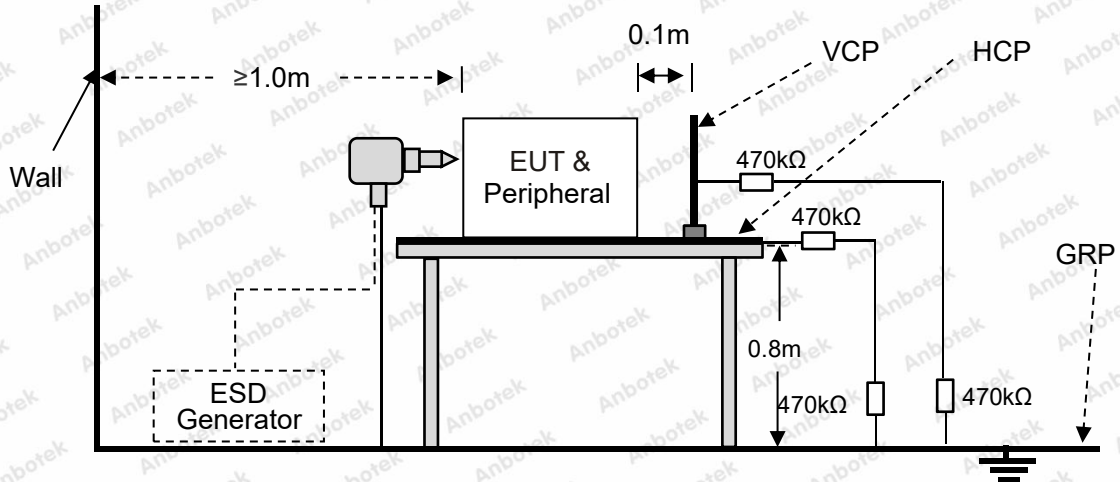


8. Electrostatic Discharge Immunity Test

8.1. Test Specification

Test Standard :	EN IEC 61000-6-1	
Basic standard :	IEC 61000-4-2: 2008	
Performance criteria:	B	
Test Level :	± 8kV (Air Discharge)	± 4kV (Contact Discharge)

8.2. Test Setup



8.3. Test Procedure

a. In the case of air discharge testing, the climatic conditions shall be within the following ranges:

- Ambient temperature: 15°C to 35°C;
- Relative humidity: 30% to 60%;
- Atmospheric pressure: 86 kPa (860 mbar) to 106 kPa (1060 mbar)

b. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

c. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted:

- If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
- Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
- The contact discharge test shall not be applied to such surfaces.



d. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

e. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final test level should not exceed the product specification value in order to avoid damage to the equipment.

f. The test shall be performed with both air discharge and contact discharge. The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied. For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.

g. Ensure that the applied charge on the EUT has been dis-charged before next ESD pulse.

8.4. Test Results

PASS

Please refer to the following page.



Electrostatic Discharge Test Results

Test Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	Temperature:	23.5°C
Power Supply:	DC 55V / DC 59V / AC 230V, 50Hz	Humidity:	48%
Location		Kind A-Air Discharge C-Contact Discharge	Result
Air discharge: ±2.0 kV, ±4.0 kV, ±8.0 kV		Contact discharge: ±4.0 kV	
Screw	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
Slot	4 points	A	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
Port	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
Metal	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
HCP	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
VCP of the front	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
VCP of the rear	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
VCP of the left	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
VCP of the right	4 points	C	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
Note: N/A			

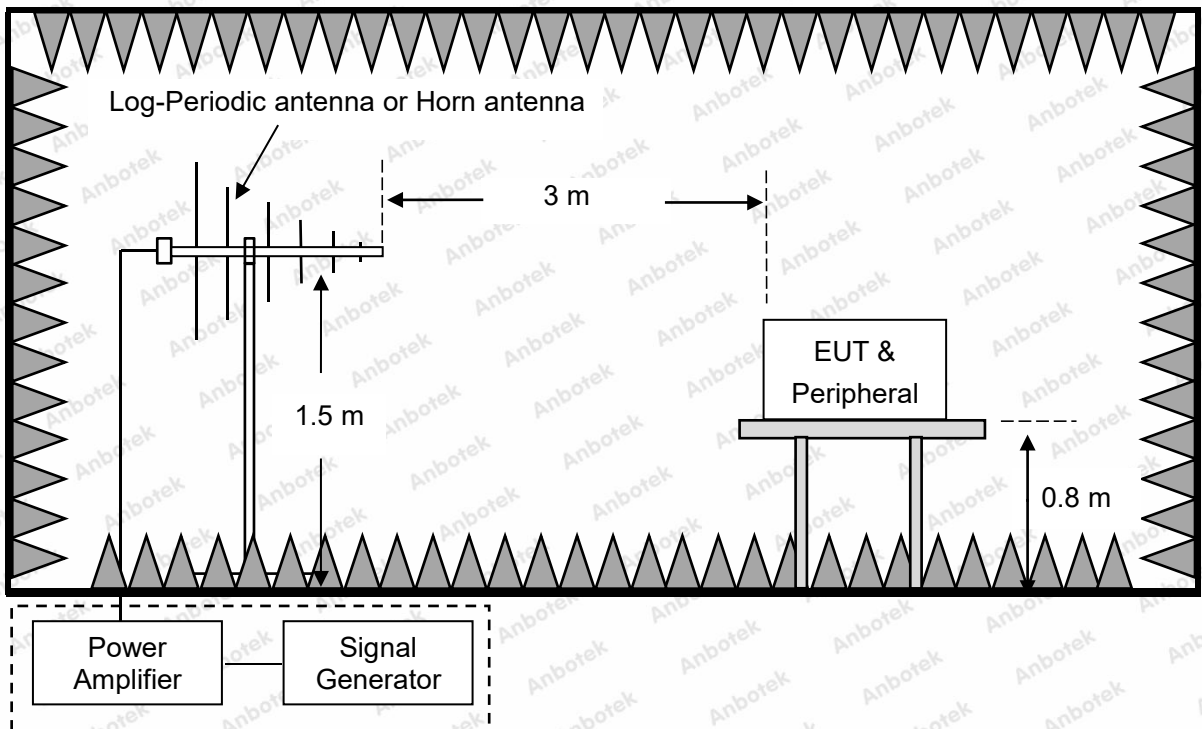


9. RF Field Strength Immunity Test

9.1. Test Specification

Test Standard:	EN IEC 61000-6-1	
Basic standard:	IEC 61000-4-3: 2020	
Performance criteria:	A	A
Frequency Range:	80MHz to 1000MHz	1.4GHz to 6GHz
Test level:	3 V/m	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation	
Frequency Step:	1 % of preceding frequency value	
Polarity of Antenna:	Horizontal and Vertical	
Test Distance:	3 m	
Antenna Height:	1.5 m	
Dwell Time:	at least 0.5s	

9.2. Test Setup



9.3. Test Procedure

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semi-anechoic chamber.

a. The antenna is placed 3 m from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the antenna.

b. The test shall normally be performed with the generating antenna facing each side of the EUT. When equipment can be used in different orientations (i.e. vertical or horizontal) all sides shall be exposed to the field during the test. When technically justified, some EUTs can be tested by exposing fewer faces to the generating antenna. In other cases, as determined for example by the type and size of EUT or the frequencies of test, more than four azimuths may need to be exposed.

c. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.

d. The step size of the frequency is set to 1%. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time should not exceed 5 s at each of the frequencies during the scan.

9.4. Test Results

PASS

Please refer to the following page.



RF Field Strength Susceptibility Test Results

Test Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		Temperature:	24.5°C	
Power Supply:	DC 55V / DC 59V / AC 230V, 50Hz		Humidity:	46%	
Frequency Range	Antenna Polarity	R.F. Field Strength	Dwell Time	Azimuth	Result
80 MHz ~ 1000 MHz	H / V	3 V/m	1s	Front	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
				Rear	
				Left	
				Right	
1.4GHz ~ 6GHz	H / V	3 V/m	1s	Front	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
				Rear	
				Left	
				Right	
Note: N/A					



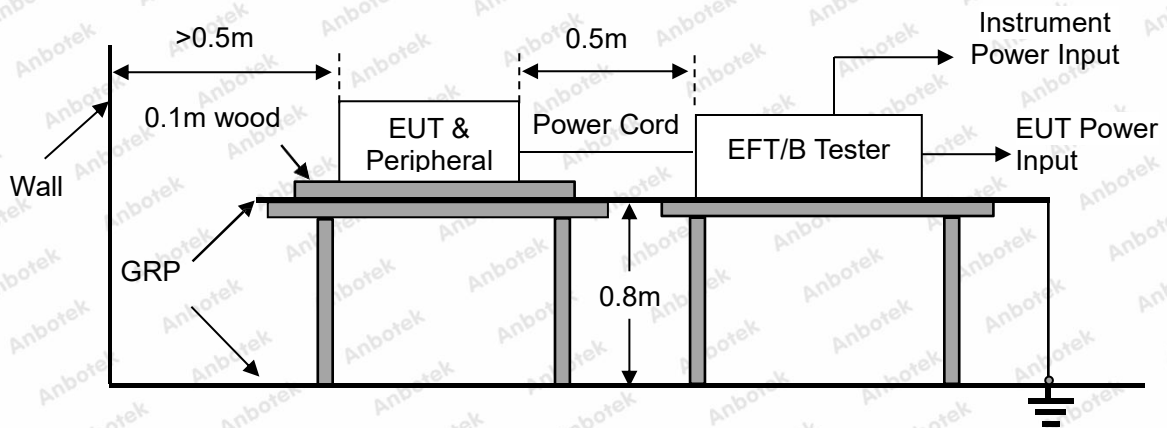
10. Electrical Fast Transient/Burst Immunity Test

10.1. Test Specification

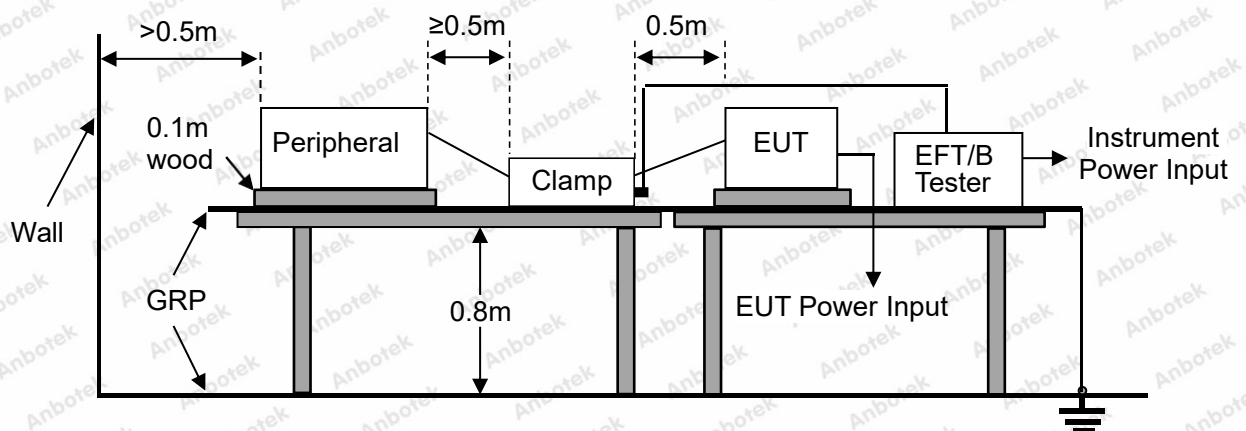
Test Standard:	EN IEC 61000-6-1
Basic standard:	IEC 61000-4-4: 2012
Performance criteria:	B
Test Level:	<input checked="" type="checkbox"/> 1 kV, AC mains power ports
	<input checked="" type="checkbox"/> 0.5 kV, DC network power ports
	<input type="checkbox"/> 0.5 kV, Signal/Control ports

10.2. Test Setup

AC mains power ports and DC network power ports:



Analogue/digital data ports:



10.3. Test Procedure

The table-top EUT is placed on a table that is 0.8 m height, a ground reference plane is placed on the table, and uses 0.1 m insulation between the EUT and ground reference plane. The floor-standing EUT is placed on a ground reference plane and insulated from it by an insulating support with a thickness of 0.1 m. This reference ground plane shall project beyond the EUT by at least 0.1 m 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 0.5 m.

All cables to the EUT shall be placed on the insulation support 0.1 m above the ground reference plane. Cables not subject to electrical fast transients shall be routed as far as possible from the cable under test to minimize the coupling between the cables.

10.4. Test Results

PASS

Please refer to the following page.



Electrical Fast Transient/Burst Test Results

Test Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail			Temperature:	23.5℃
Power Supply:	DC 55V / DC 59V / AC 230V, 50Hz			Humidity:	48%
Ports	Polarity	Inject Time(s)	Repetition Frequency (kHz)	Test Voltage (kV)	Result
<input checked="" type="checkbox"/> AC mains power ports	±	120 s	<input checked="" type="checkbox"/> 5 <input type="checkbox"/> 100	1.0 kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
<input checked="" type="checkbox"/> DC network power ports	±	120 s	<input checked="" type="checkbox"/> 5 <input type="checkbox"/> 100	0.5 kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
<input type="checkbox"/> Signal/Control ports	±	120 s	<input type="checkbox"/> 5 <input type="checkbox"/> 100	0.5 kV	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
Note: N/A					

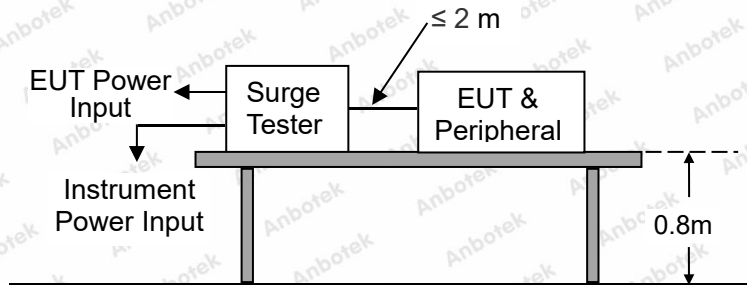


11. Surge Immunity Test

11.1. Test Specification

Test Standard:		EN IEC 61000-6-1
Basic standard:		IEC 61000-4-5: 2014+A1:2017
Test level	AC power port:	<input checked="" type="checkbox"/> 1 kV, Line to Line, Criterion B
		<input checked="" type="checkbox"/> 2 kV, Line to Ground, Criterion B
	DC network power port:	<input checked="" type="checkbox"/> 0.5 kV, Line to Line, Criterion B
		<input type="checkbox"/> 1 kV, Line to Ground, Criterion B
Signal/Control ports:		<input type="checkbox"/> 1 kV, lines to Ground, Criterion B
Number of surges		5 (for each combination of parameters)
Repetition rate		1 minute / time
Polarity:		Positive / Negative
Phase angle:		0°, 90°, 180°, 270° (Only AC mains power ports)

11.2. Test Setup



11.3. Test Procedure

Table-top EUT is placed on a table of 0.8 m heights above a metal ground reference plane. Floor standing EUT is placed on a ground reference plane and insulated from it by an insulating support with a thickness of 0.1 m. The length of the power cord between the EUT and the coupling/decoupling network is not more than 2 m, and the length of the interconnection line between the EUT and the coupling/decoupling network is not more than 2 m. The tests were done at repetition rate 1 per minute.

11.4. Test Results

PASS

Please refer to the following page.



Surge Immunity Test Results

Test Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		Temperature :	23.5°C	
Power Supply :	DC 55V / DC 59V / AC 230V, 50Hz		Humidity :	48%	
Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (kV)	Result
<input checked="" type="checkbox"/> AC power port (Waveform: 1.2 us / 50 us (8 us / 20us))					
L-N	+	<input checked="" type="checkbox"/> 0° <input checked="" type="checkbox"/> 90° <input checked="" type="checkbox"/> 180° <input checked="" type="checkbox"/> 270°	5	1 kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	-	<input checked="" type="checkbox"/> 0° <input checked="" type="checkbox"/> 90° <input checked="" type="checkbox"/> 180° <input checked="" type="checkbox"/> 270°	5	1 kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
L-PE	+	<input checked="" type="checkbox"/> 0° <input checked="" type="checkbox"/> 90° <input checked="" type="checkbox"/> 180° <input checked="" type="checkbox"/> 270°	5	2 kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	-	<input checked="" type="checkbox"/> 0° <input checked="" type="checkbox"/> 90° <input checked="" type="checkbox"/> 180° <input checked="" type="checkbox"/> 270°	5	2 kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
N-PE	+	<input checked="" type="checkbox"/> 0° <input checked="" type="checkbox"/> 90° <input checked="" type="checkbox"/> 180° <input checked="" type="checkbox"/> 270°	5	2 kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	-	<input checked="" type="checkbox"/> 0° <input checked="" type="checkbox"/> 90° <input checked="" type="checkbox"/> 180° <input checked="" type="checkbox"/> 270°	5	2 kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
<input checked="" type="checkbox"/> DC network power ports (Waveform: 1.2 us / 50 us (8 us / 20us))					
P to N	+	/	5	0.5 kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	-	/	5	0.5 kV	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
P to PE	+	/	5	1 kV	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	-	/	5	1 kV	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
N to PE	+	/	5	1 kV	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	-	/	5	1 kV	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
<input type="checkbox"/> Signal/Control ports (Waveform: 1.2 us / 50 us (8 us / 20us))					
Lines to ground	+	/	5	1 kV	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
	-	/	5	1 kV	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
Note: N/A					



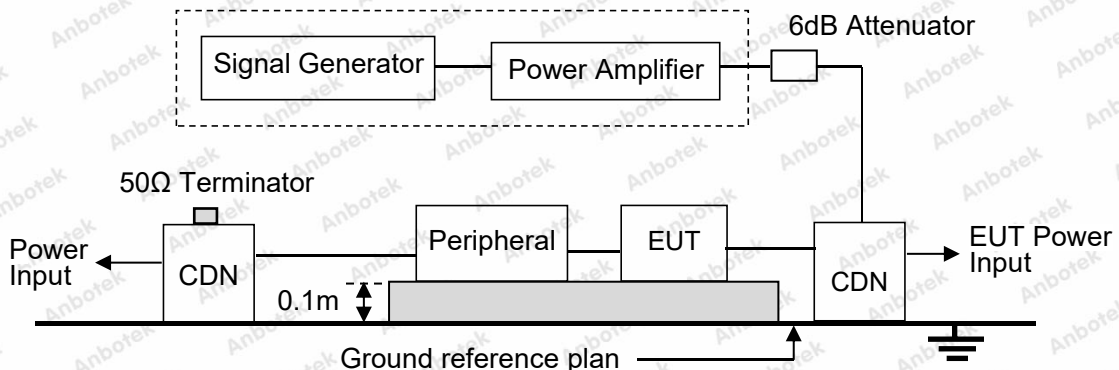
12. Injected Currents Susceptibility Test

12.1. Test Specification

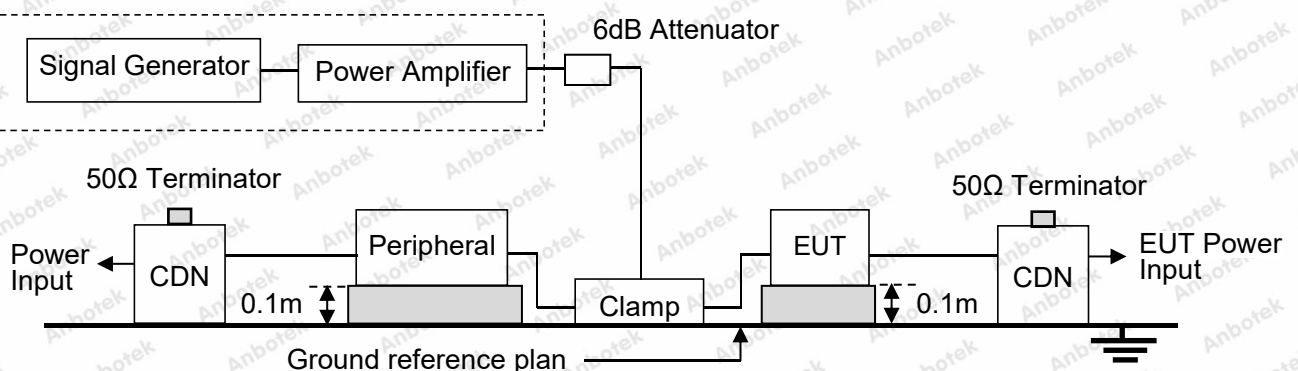
Test Standard:	EN IEC 61000-6-1
Basic standard:	IEC 61000-4-6: 2013
Performance criteria:	A
Frequency range:	0.15MHz to 80MHz
Test level:	3V
Modulation:	AM 80%, 1kHz sine-wave
Frequency Step:	1% of fundamental

12.2. Test Setup

CDN injection:



Clamp injection:



12.3. Test Procedure

- a. The EUT and peripheral are placed on an insulating support of 0.1 m height above a ground reference plan. The distance between EUT and CDN is 0.1 m to 0.3 m. All cables exiting the EUT are supported at a height of at least 30 mm above the ground reference plan.
- b. The frequency range is swept from 150 kHz to 80MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. The frequency range is swept incrementally. The step size was 1% of fundamental from 0.15MHz to 80MHz.
- c. The dwell time at each frequency isn't less than the time necessary for the EUT to be able to respond.

12.4. Test Results

PASS

Please refer to the following page.



Injected Currents Susceptibility Test Results

Test Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	Temperature:	23.5°C
Power Supply:	DC 55V / DC 59V / AC 230V, 50Hz	Humidity:	48%
Frequency Range (MHz)	Injected Position	Strength (Un-modulated)	Result
0.15 ~ 80	<input checked="" type="checkbox"/> AC Mains	3V	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
0.15 ~ 80	<input checked="" type="checkbox"/> DC Line	3V	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
0.15 ~ 80	<input type="checkbox"/> Signal Line	3V	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C
Note: N/A			

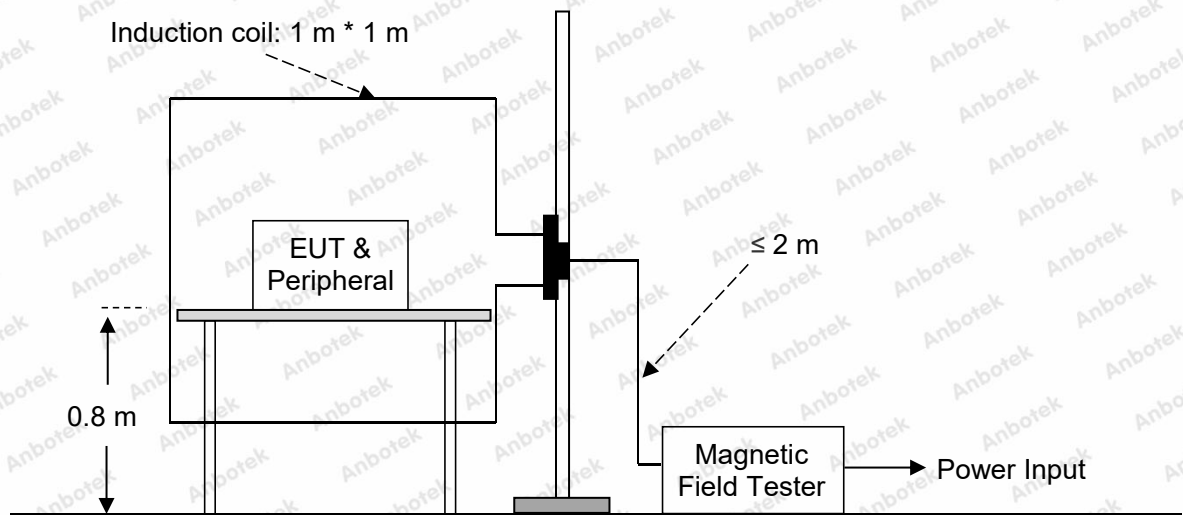


13. Power Frequency Magnetic Field Immunity Test

13.1. Test Specification

Test Standard:	EN IEC 61000-6-1
Basic Standard	IEC 61000-4-8: 2009
Performance criteria	A
Test level	3A/m

13.2. Test Setup



13.3. Test Procedure

Table-top EUT is placed on a table that is 0.8 m height. Floor standing EUT is placed on a ground reference plane and insulated from it by an insulating support with a thickness of 0.1 m.

The EUT is placed in the middle of an induction coil. The proximity method is used when the EUT does not fit into the standard inductive coil

13.4. Test Results

Not applicable.

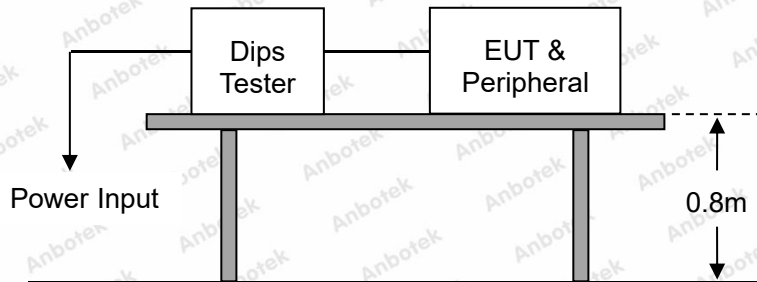


14. Voltage Dips and Interruptions Immunity Test

14.1. Test Specification

Test Standard:		EN IEC 61000-6-1
Basic standard:		IEC 61000-4-11: 2020
Test level:	Voltage Dips	<input checked="" type="checkbox"/> 0%, 0.5 period, Criterion B
		<input checked="" type="checkbox"/> 0%, 1 period, Criteria B
	Voltage interruptions	<input checked="" type="checkbox"/> 70%, 25 periods for 50Hz, Criteria C
		<input type="checkbox"/> 70%, 30 periods for 60Hz, Criteria C
		<input checked="" type="checkbox"/> 0%, 250 periods for 50Hz, Criteria C
		<input type="checkbox"/> 0%, 300 periods for 60Hz, Criteria C

14.2. Test Setup



14.3. Test Procedure

a. Where the equipment has a rated voltage the following shall apply:

- If the voltage range does not exceed 20% of the lower voltage specified for the rated voltage range, a single voltage within that range may be specified as a basis for test level specification.
- In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range.

b. Test Conditions

- Select operated voltage and frequency of EUT - Test of interval: 10 sec.
- Level and duration: Sequence of 3 dips/interrupts.
- Voltage rise (and fall) time: 1.5 μ s.

c. Changes to occur at 0 degree crossover point of the voltage waveform.

14.4. Test Results

PASS

Please refer to the following page.



Voltage Dips and Interruptions Test Results

Test Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	Temperature :	22.5°C
Power Supply :	DC 55V / DC 59V / AC 230V, 50Hz	Humidity :	51.6%
Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result *
0	100	0.5P	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C
0	100	1P	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C
70	30	<input checked="" type="checkbox"/> 25P <input type="checkbox"/> 30P	<input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C
Test Level % UT	Voltage Dips & Short Interruptions % UT	Duration (in periods)	Result
0	100	<input checked="" type="checkbox"/> 250P <input type="checkbox"/> 300P	<input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C
<p>Note: For electronic power converters, the operation of protective devices and the performance criterion C are allowed.</p>			



APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Power Line Conducted Emission Test

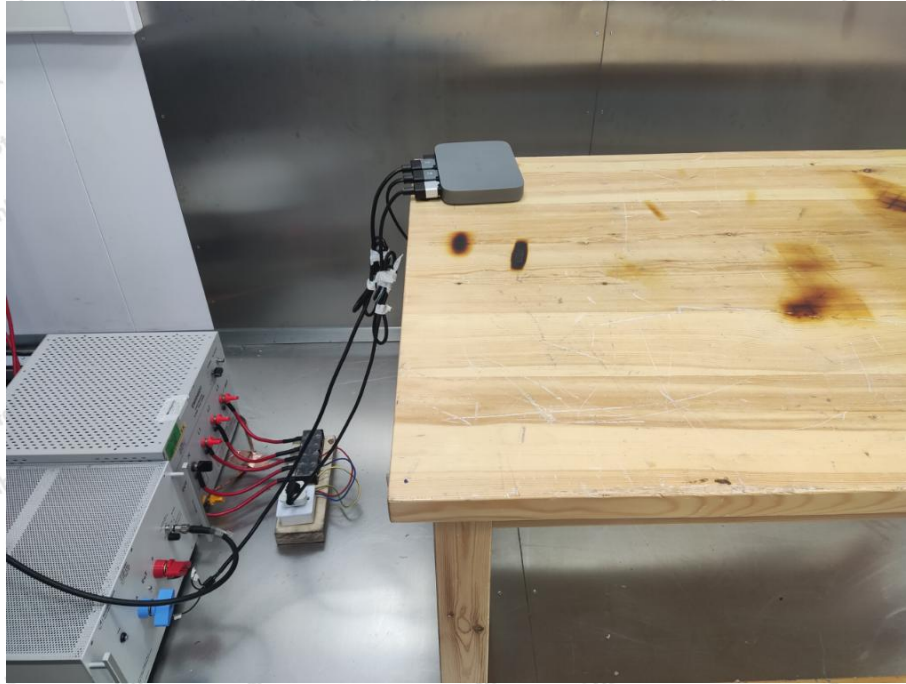


Photo of Radiated Emission Test (Below 1 GHz)

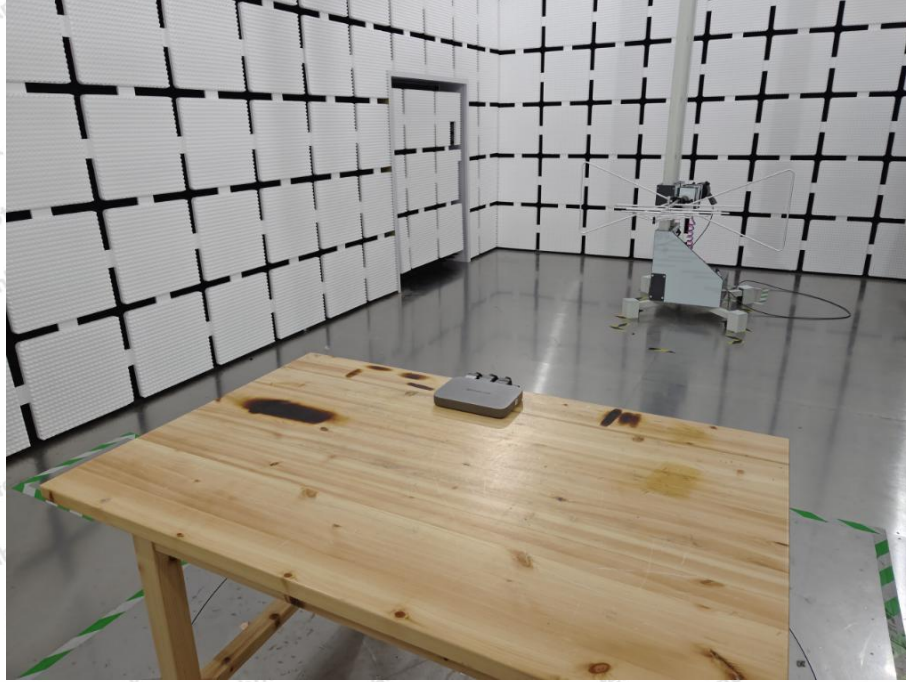


Photo of Radiated Emission Test (Below 1 GHz)



Photo of Electrostatic Discharge Immunity Test



Photo of Electrical Fast Transient/Burst Immunity Test



Photo of RF Field Strength Immunity Test

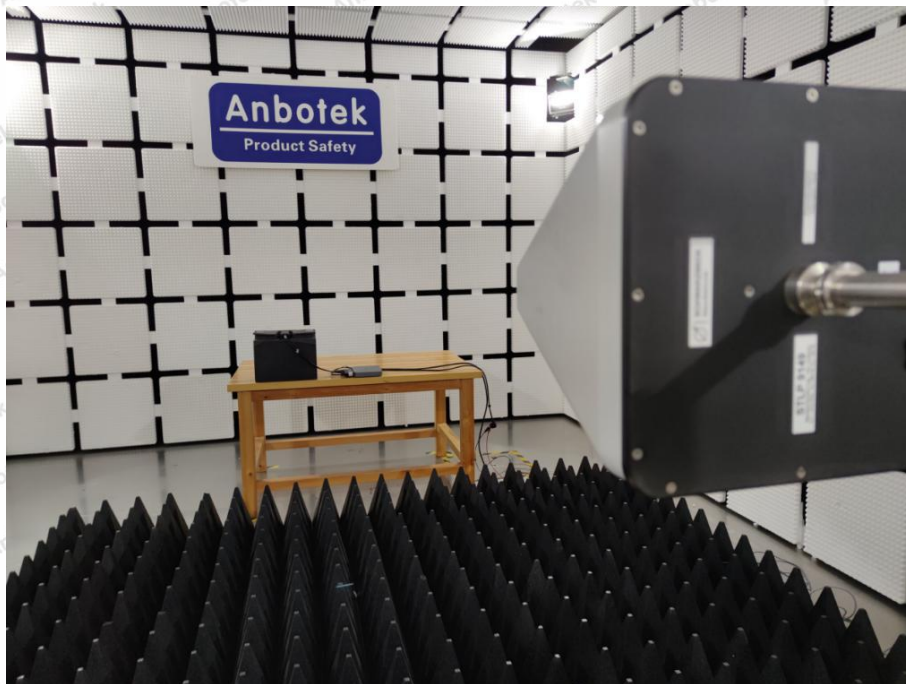


Photo of Surge Immunity Test



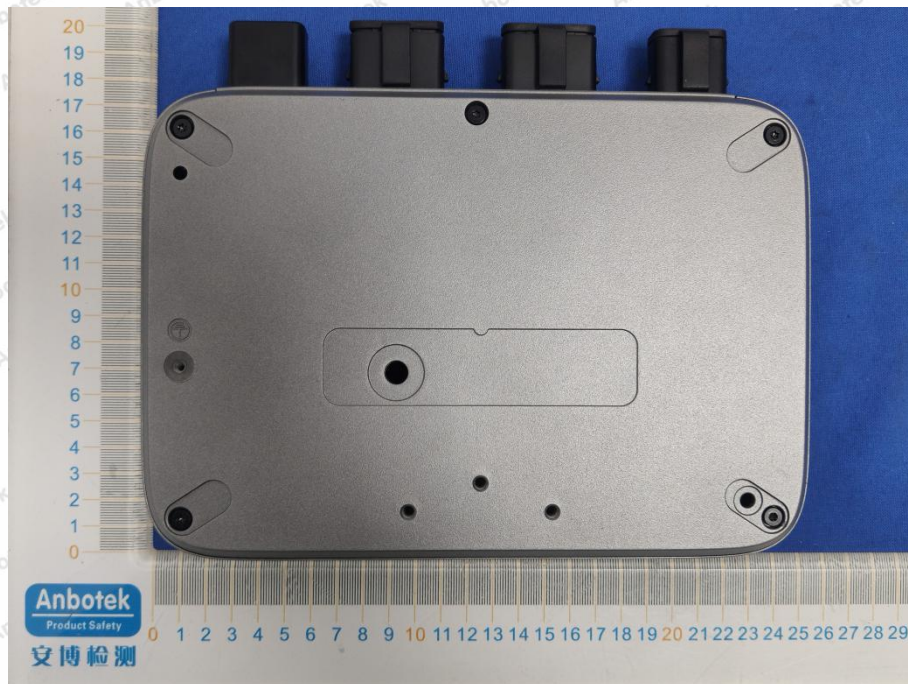
Photo of Injected Currents Susceptibility Test



Photo of Voltage Dips and Interruptions Immunity Test

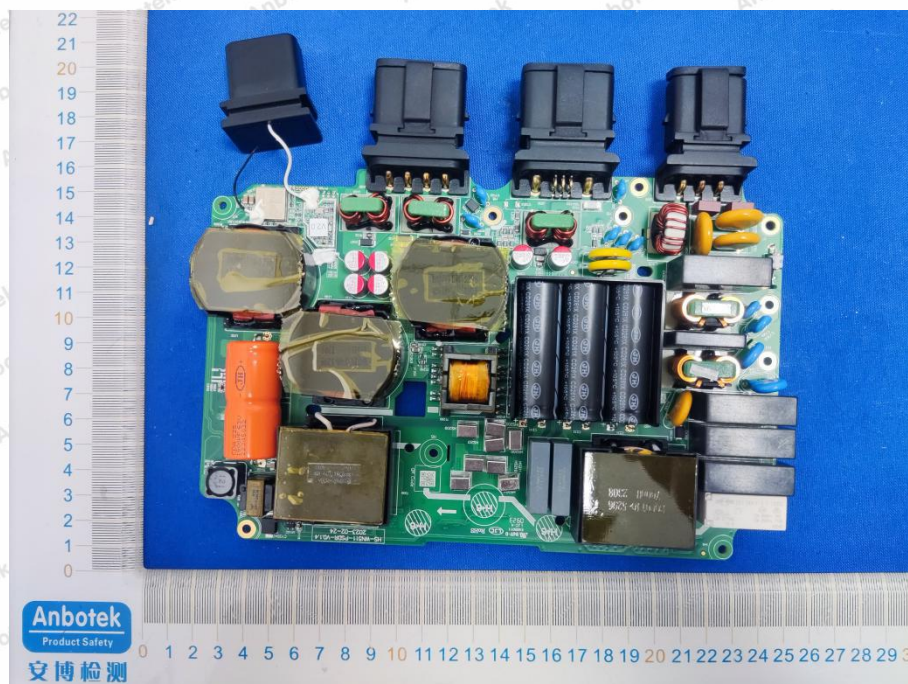
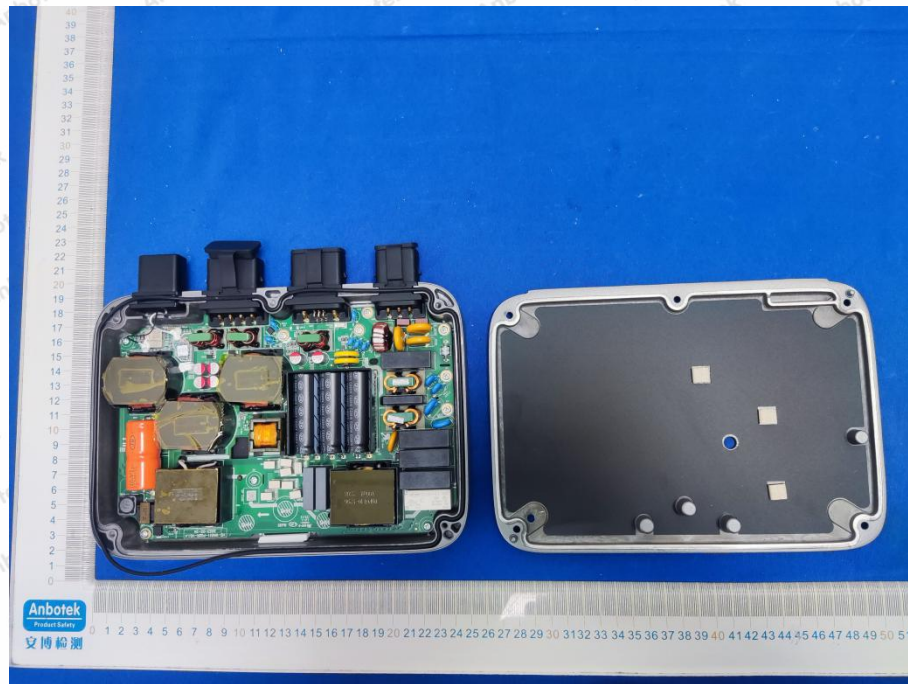


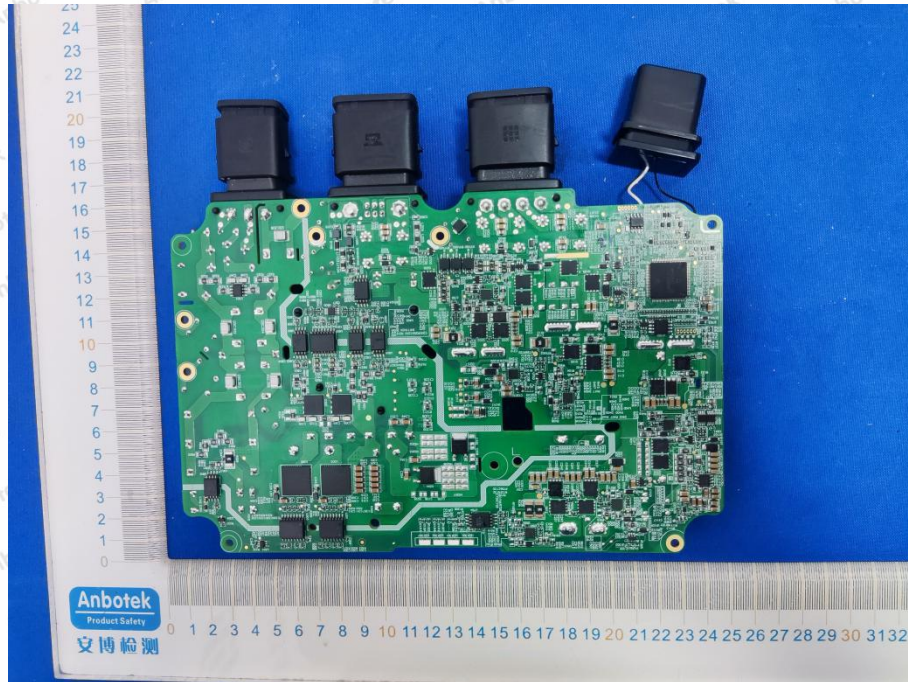
APPENDIX II -- Photo documentation

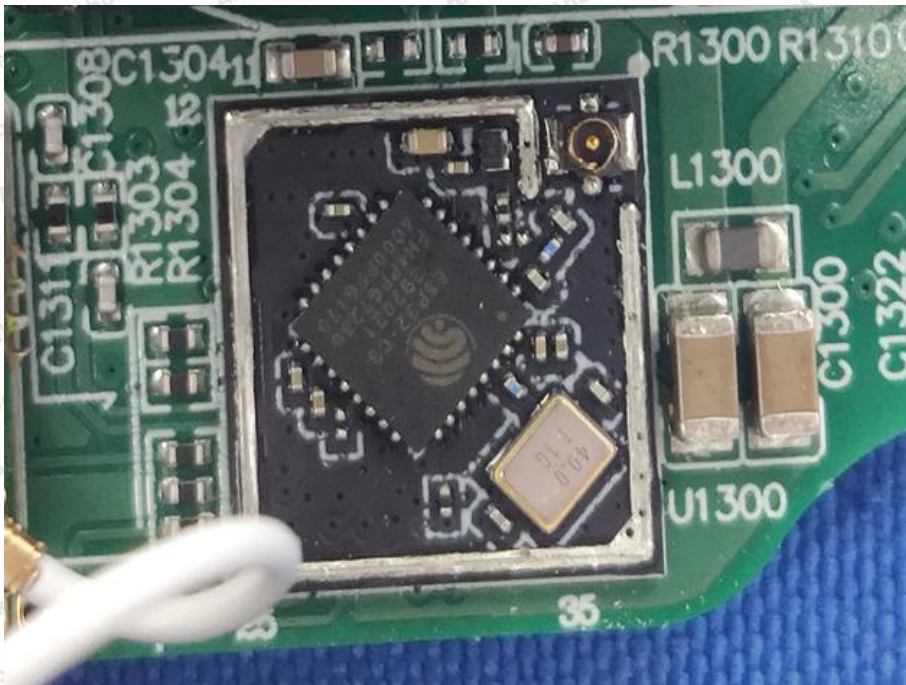
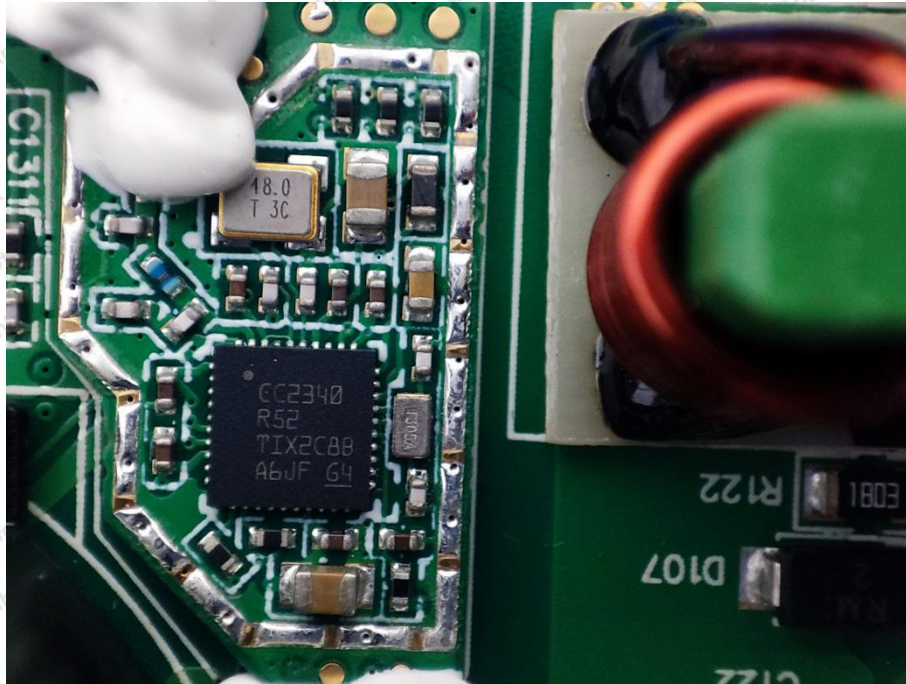














CE Label

1. The CE conformity marking must consist of the initials 'CE' taking the following form:

If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.

2. The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.

3. The CE marking must be affixed to the product or to its data plate. Additionally it must be affixed to the packaging, if any, and to the accompanying documents.

4. The CE marking must be affixed visibly, legibly and indelibly.

It must have the same height as the initials 'CE'.

----- End of Report -----

