

TEST REPORT

Reference No. : WTN20N05028352E
Applicant..... : Ningbo Changrong Lighting&Electronics Technology Co.,Ltd
Address : NO.72, WUSHI ROAD, XIDIAN TOWN, NINGHAI NINGBO 315600
CHINA
Manufacturer : Ningbo Changrong Lighting&Electronics Technology Co.,Ltd
Address : NO.72, WUSHI ROAD, XIDIAN TOWN, NINGHAI NINGBO 315600
CHINA
Product Name..... : Portable UV Sterilizer
Model No..... : UV-007
Standards..... : EN 55015:2013+A1:2015
EN 61547:2009
Date of Receipt sample..... : 2020-05-19
Date of Test..... : 2020-05-26 to 2020-05-28
Date of Issue..... : 2020-05-29
Test Report Form No. : WEL-55015A-01A
Test Result..... : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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A handwritten signature in blue ink, reading 'Shouyin Wang'.

Shouyin Wang / Project Engineer

Approved by:



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1 Test Summary

EMISSION			
Test Item	Test Standard	Class / Severity	Result
Mains Terminal Disturbance Voltage, 9kHz to 30MHz	EN 55015:2013+A1:2015	Clause 4.3.1	N/A
Radiated electromagnetic disturbance, 9kHz to 30MHz	EN 55015:2013+A1:2015	Clause 4.4.1	Pass
Radiated Emission, 30MHz to 300MHz	EN 55015:2013+A1:2015	Clause 4.4.2	Pass
IMMUNITY (EN 61547:2009)			
Test Item	Test Method	Performance Criteria	Result
Electrostatic Discharge(ESD)	IEC 61000-4-2:2008	B	Pass
Radio-frequency electromagnetic fields (80MHz to 1GHz)	IEC 61000-4-3:2006+A1:2007+A2:2010	A	Pass
Fast Transients (EFT)	IEC 61000-4-4:2012	B	N/A
Surges	IEC 61000-4-5:2014+A1:2017	C	N/A
Injected Currents, 0.15MHz to 80MHz	IEC 61000-4-6:2013	A	N/A
Power-frequency magnetic field	IEC 61000-4-8:2009	A	N/A
Voltage Dips	IEC 61000-4-11:2020	C	N/A
Voltage short interruptions		B	N/A

Remark:

Pass	Test item meets the requirement
Fail	Test item does not meet the requirement
N/A	Test case does not apply to the test object

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3 General Information

3.1 General Description of E.U.T.

Product Name : Portable UV Sterilizer

Model No. : UV-007

Protection Class : Class III

Remark..... : 1. The EUT (equipment under test) is an ordinary Portable UV Sterilizer for Lighting and similar use. For the further information, refer to the user's manual.
2. For details information, refer to the section 3.2.
3. For the test results, the EUT had been tested in the all conditions of rated input. But only the worst case was shown in test report.

3.2 Details of E.U.T.

Technical Data :

No.	Model	Rated Voltage	Rated Power	Note
1	UV-007	6Vd.c.	3W	

3.3 Description of Support Units

The EUT has been tested as an independent unit. UV-007 is the tested sample. All tests were performed in the condition of 6Vd.c..

3.4 Standards Applicable for Testing

The tests were performed according to following standards:

EN 55015:2013+A1:2015	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 61547:2009	Equipment for general lighting purposes — EMC immunity requirements

3.5 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☒ Yes ☐ No

If Yes, list the related test items and lab information:

Test items: Radio-frequency electromagnetic fields (80MHz to 1GHz)

Lab information: Waltek Services (Foshan) Co., Ltd.

3.6 Abnormalities from Standard Conditions

None.

4 Equipment Used during Test

Radiated electromagnetic disturbance(9kHz to 30MHz)					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1	EMI Test Receiver	R&S	ESCI	101406	Valid
2	3-dimensional large loop antenna	SCHWARZBECK	HXYZ9170	256	Valid
3m Semi-anechoic Chamber for Radiated Emission					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1	EMI Test Receiver	R&S	ESR7	101777	Valid
2	TRILOG Biconic logarithmic periodic broadband antenna	SCHWARZBECK	VULB9163	01025	Valid
ESD					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1	electrostatic discharge generator	TESEQ	NSG437	699	Valid
Radio-frequency electromagnetic fields					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1	RF Power Amplifier	OPHIR	5225R	1051/1712	Valid
2	RF Power Amplifier	OPHIR	5293RE	1051/171	Valid
3	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP9128E-SPECIAL	142	Valid
4	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP 9149	476	Valid
5	RF signal generator	Agilent	N5181A	MY48080720	Valid
6	Power meter	RS	NRP6A	101133	Valid
7	Power meter	RS	NRP6A	101134	Valid
8	Electric field probe	Narda	EP 601	611WX70311	Valid

4.1 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Radiated electromagnetic disturbance	9kHz~30MHz	±3.00dB	(1)
Radiated Emission	30MHz~300MHz	±5.03dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5 Emission Test Results

5.1 Radiated Electromagnetic Disturbance, 9kHz to 30MHz

Test Requirement..... : EN 55015
Test Method..... : EN 55015
Test Result..... : Pass
Frequency Range..... : 9kHz to 30MHz
Class/Severity..... : Table 3a of EN 55015

5.1.1 E.U.T. Operation

Operating Environment:

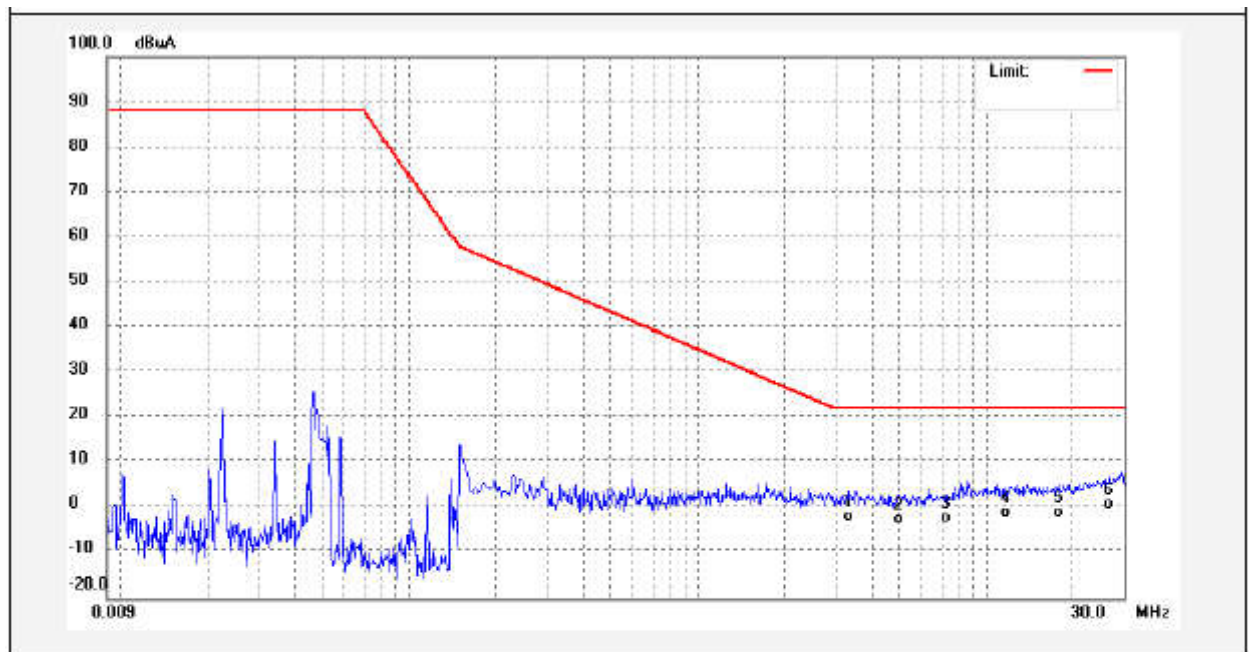
Temperature : 22.5°C
Humidity..... : 51%RH

EUT Operation:

Input Voltage : 6Vd.c. from battery
Operating Mode..... : Discharging mode

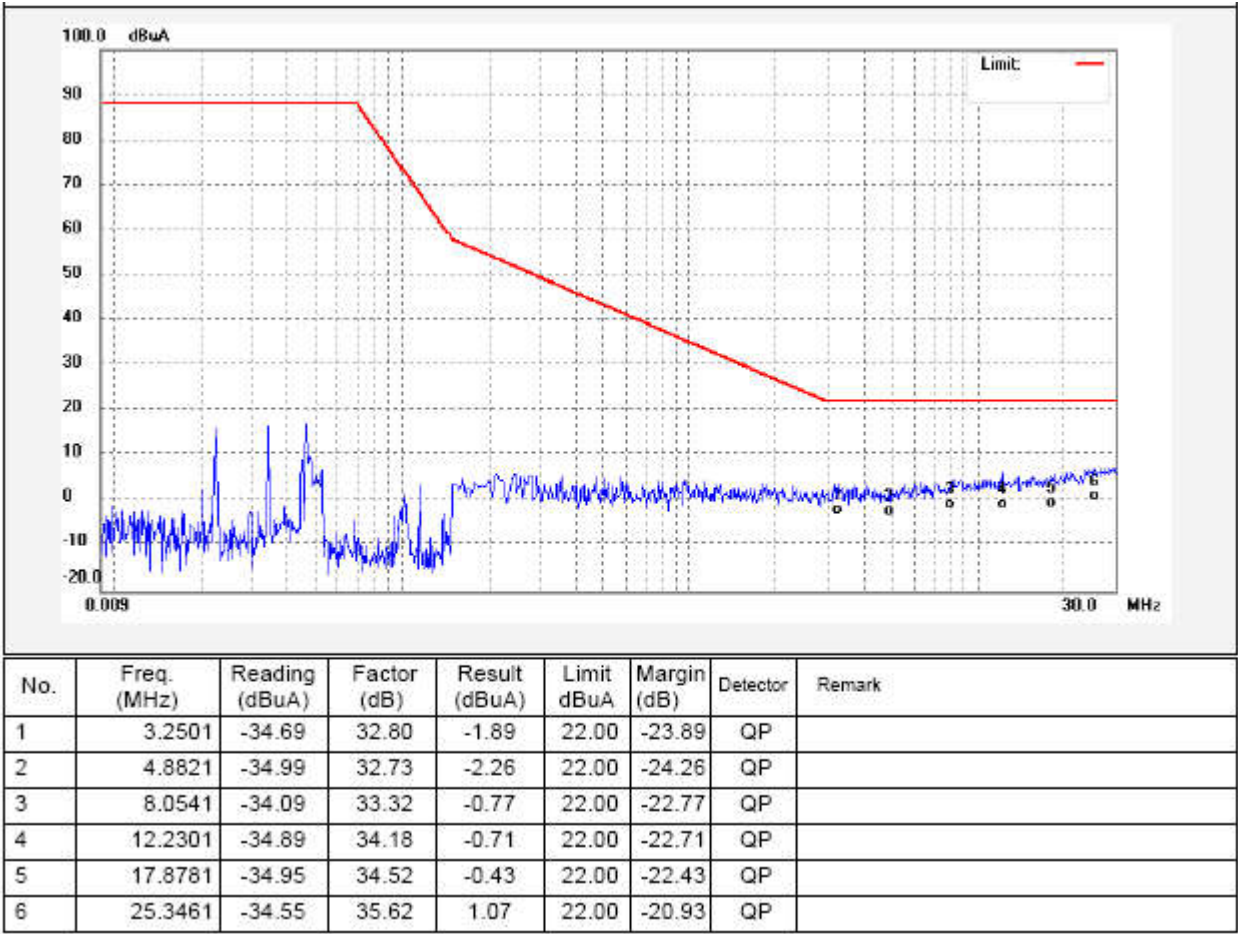
5.1.4 Radiated Electromagnetic Disturbance test data, 9kHz to 30MHz

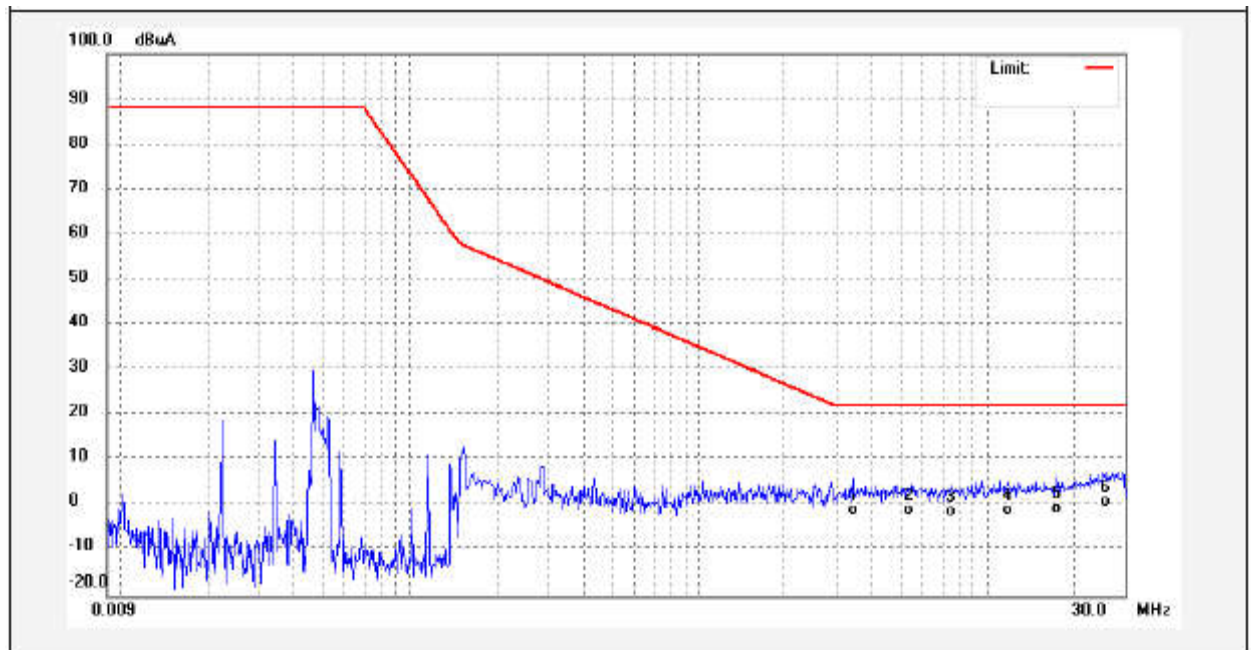
Loop X



No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.3501	-34.65	32.89	-1.76	22.00	-23.76	QP	
2	4.9901	-34.94	32.52	-2.42	22.00	-24.42	QP	
3	7.2701	-34.64	32.49	-2.15	22.00	-24.15	QP	
4	11.6340	-34.61	33.75	-0.86	22.00	-22.86	QP	
5	17.8181	-34.77	33.74	-1.03	22.00	-23.03	QP	
6	26.7101	-34.37	35.32	0.95	22.00	-21.05	QP	

Loop Y



Loop Z

No.	Freq. (MHz)	Reading (dBuA)	Factor (dB)	Result (dBuA)	Limit dBuA	Margin (dB)	Detector	Remark
1	3.4381	-34.81	33.94	-0.87	22.00	-22.87	QP	
2	5.3501	-35.04	34.24	-0.80	22.00	-22.80	QP	
3	7.4901	-34.26	32.99	-1.27	22.00	-23.27	QP	
4	11.8901	-34.83	33.87	-0.96	22.00	-22.96	QP	
5	17.4701	-34.72	34.19	-0.53	22.00	-22.53	QP	
6	25.6221	-34.57	35.54	0.97	22.00	-21.03	QP	

5.2 Radiated Emission, 30MHz to 300MHz

Test Requirement..... : EN 55015
Test Method..... : CISPR 32
Test Result..... : Pass
Frequency Range..... : 30MHz to 300MHz
Class/Severity..... : Table 3b of EN 55015

5.2.1 E.U.T. Operation

Operating Environment:

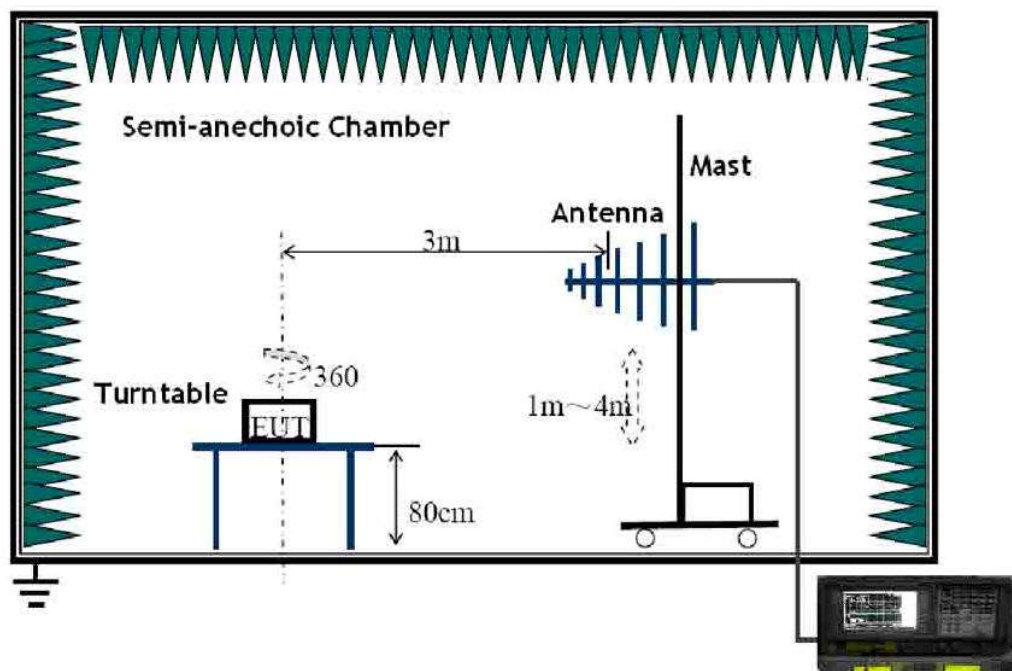
Temperature..... : 21.6°C
Humidity..... : 53%RH

EUT Operation :

Input Voltage..... : 6Vd.c. from battery
Operating Mode..... : Discharging mode

5.2.2 Block Diagram of Setup

The Radiated Emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the CISPR 32.

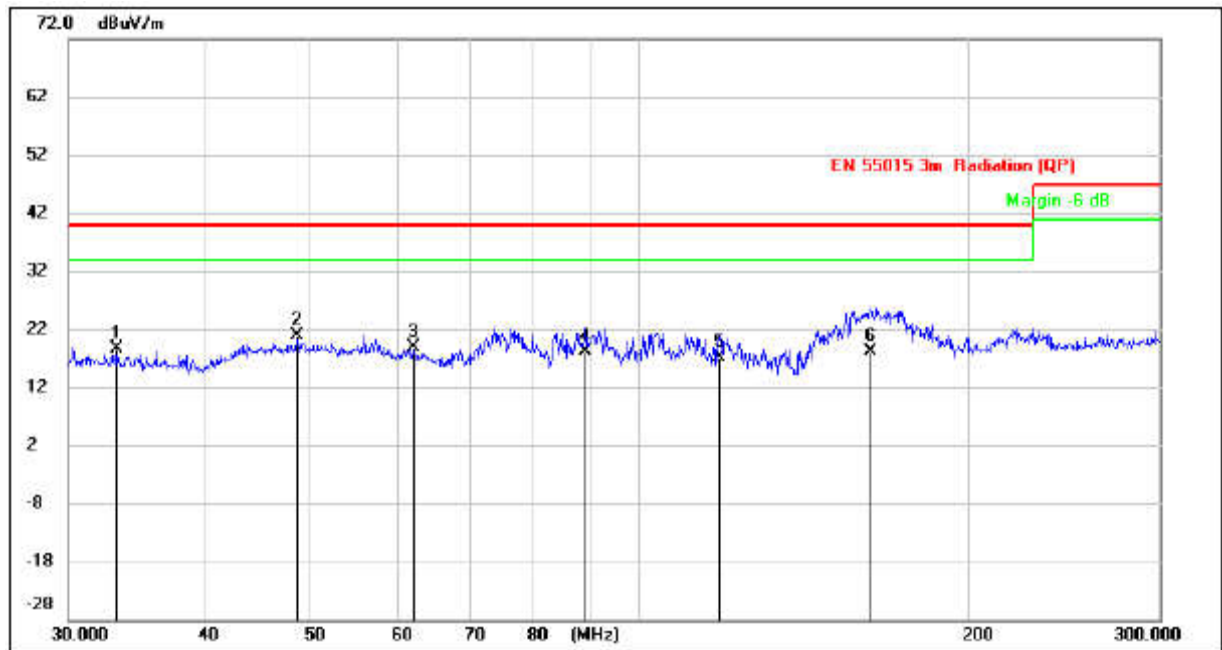


5.2.3 Measurement Data

The maximised peak emissions from the EUT was scanned and measured for Horizontal & Vertical polarisation. Quasi-peak measurements were performed if peak emissions were within 6dB of the limit line. According to the data in section 5.2.4, the EUT complied with the EN 55015 standards.

5.2.4 Radiated Emission test data, 30MHz to 300MHz

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	33.2752	6.19	12.43	18.62	40.00	-21.38	QP
2	48.6543	5.72	15.12	20.84	40.00	-19.16	QP
3	62.2474	5.95	12.97	18.92	40.00	-21.08	QP
4	89.3554	6.86	11.31	18.17	40.00	-21.83	QP
5	118.3372	5.45	11.67	17.12	40.00	-22.88	QP
6	162.9751	7.77	10.46	18.23	40.00	-21.77	QP

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	33.9720	5.35	12.94	18.29	40.00	-21.71	QP
2	44.5780	2.78	15.51	18.29	40.00	-21.71	QP
3	65.4818	4.55	13.43	17.98	40.00	-22.02	QP
4	100.9535	3.97	14.46	18.43	40.00	-21.57	QP
5	149.3211	5.03	10.60	15.63	40.00	-24.37	QP
6	217.8317	6.25	13.77	20.02	40.00	-19.98	QP

6 Immunity Test Results

6.1 Performance Criteria

Performance criterion A: During the test, no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

Performance criterion B: During the test, the luminous intensity may change to any value. After the test, the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test, the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Performance criterion C: During and after the test, any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal, if necessary by temporary interruption of the mains supply and/or operating the regulating control.

6.2 Electrostatic Discharge (ESD)

Test Requirement.....	:	EN 61547
Test Method.....	:	IEC 61000-4-2
Test Result.....	:	Pass
Discharge Impedance	:	330Ω / 150pF
Discharge Voltage.....	:	Air Discharge: ±8kV Contact Discharge: ±4kV HCP & VCP: ±4kV
Polarity	:	Positive & Negative
Number of Discharge.....	:	Minimum 10 times at each test point
Discharge Mode	:	Single Discharge
Discharge Period.....	:	1 second minimum

6.2.1 E.U.T. Operation

Operating Environment:

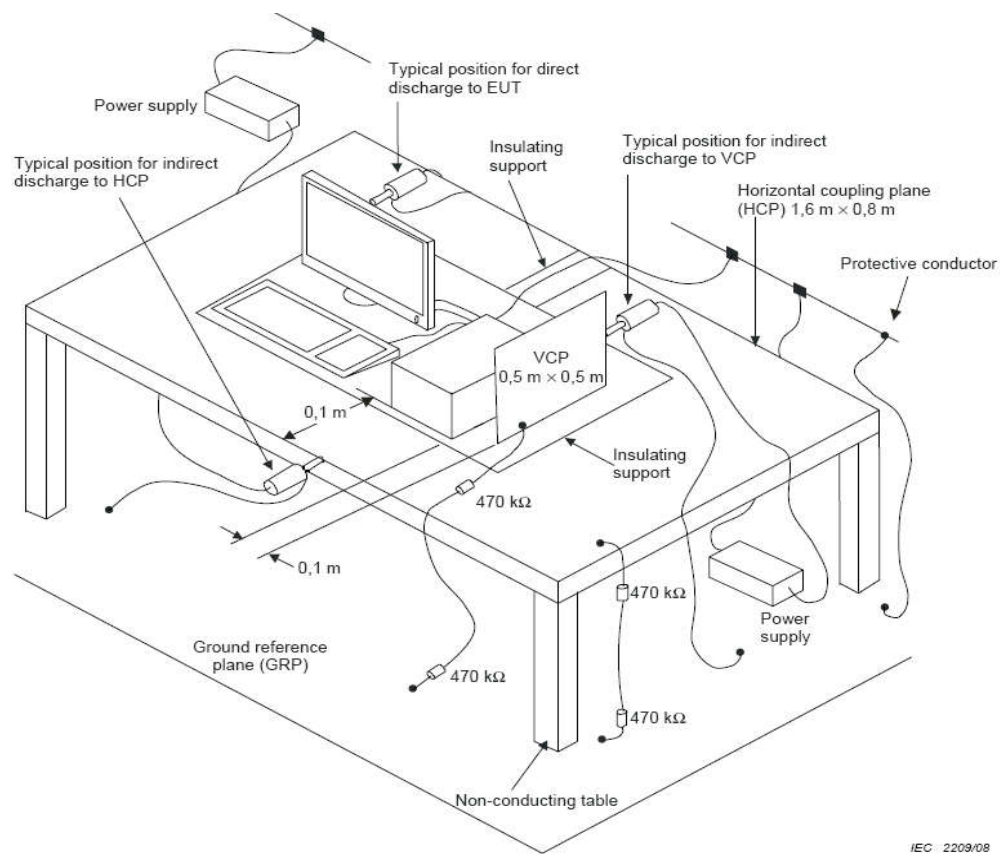
Temperature	:	22.7°C
Humidity	:	51.6%RH
Barometric Pressure	:	101.7kPa

EUT Operation:

Input Voltage	:	6Vd.c. from battery
Operating Mode	:	Discharging mode

6.2.2 Block Diagram of Setup

The ESD test was performed in accordance with the IEC 61000-4-2.



6.2.3 Direct Discharge Test Results

Observations:

Test points:

1. All Exposed Surface & Seams;
2. All metallic part

Direct Discharge			Test Results	
Applied Voltage (kV)	Performance Criterion	Test Point	Contact Discharge	Air Discharge
±8	B	1	N/A	Pass*
±4	B	2	Pass*	N/A

Remark:

- * During the test no deviation was detected to the selected operation mode(s)

6.2.4 Indirect Discharge Test Results

Observations:

Test points: 1. All sides.

Indirect Discharge			Test Results	
Applied Voltage (kV)	Performance Criterion	Test Point	Horizontal Coupling	Vertical Coupling
±4	B	1	Pass*	Pass*

Remark:

* During the test no deviation was detected to the selected operation mode(s)

6.3 Radio-frequency electromagnetic fields, 80MHz to 1GHz

Test Requirement : EN 61547
Test Method : IEC 61000-4-3
Test Result : Pass
Frequency Range : 80MHz to 1GHz
Test level : 3V/m
Modulation : 80%, 1kHz Amplitude Modulation.
Face of EUT : Front, Back, Left, Right
Antenna polarisation : Horizontal& Vertical

6.3.1E.U.T. Operation

Operating Environment:

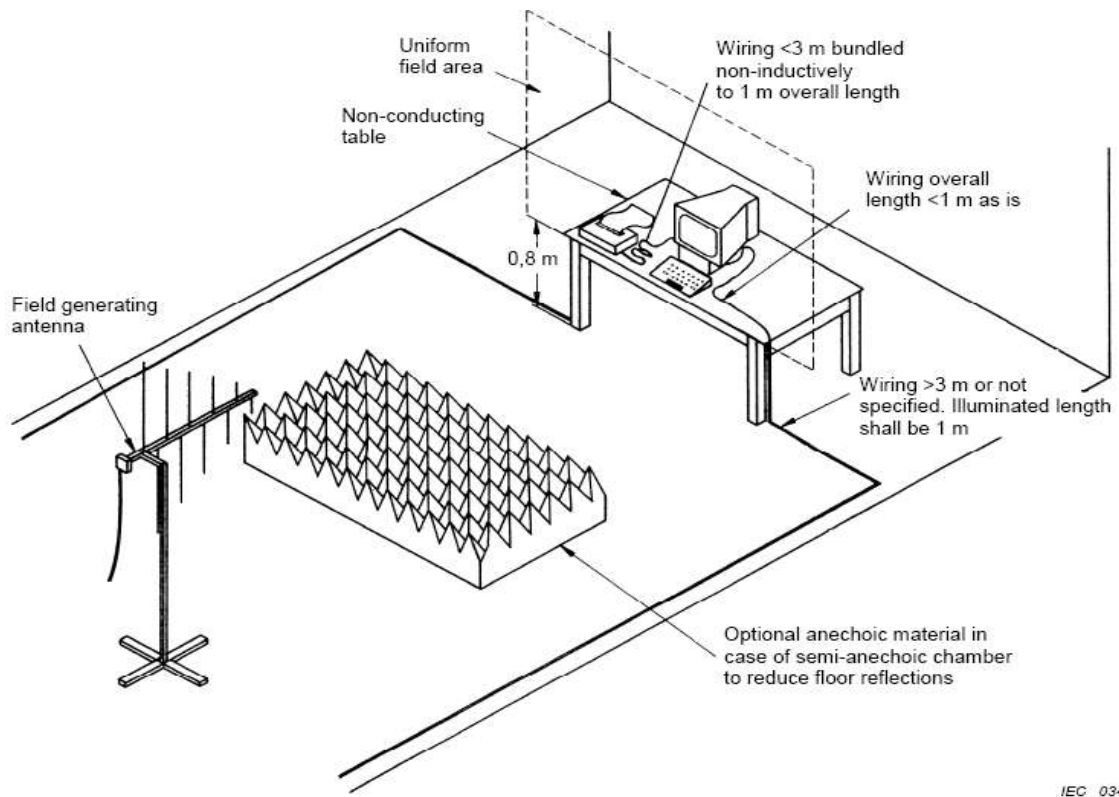
Temperature : 22.4°C
Humidity : 51.6%RH

EUT Operation:

Input Voltage : 6Vd.c. from battery
Operating Mode : Discharging mode

6.3.2 Block Diagram of Setup

The Radio-frequency electromagnetic fields Immunity test was performed in accordance with the IEC 61000-4-3.



IEC 034/06

6.3.3 Test Results

Frequency	Face of EUT	Antenna polarisation	Test Level	Step Size	Dwell Time	Performance Criterion	Result
80 to 1000MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	3s	A	Pass*
80 to 1000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	3s	A	Pass*

Remark:

- * During the test no deviation was detected to the selected operation mode(s)

7 Photographs – Test Setup

7.1 Photograph – Radiated electromagnetic disturbance Test Setup, 9kHz to 30MHz



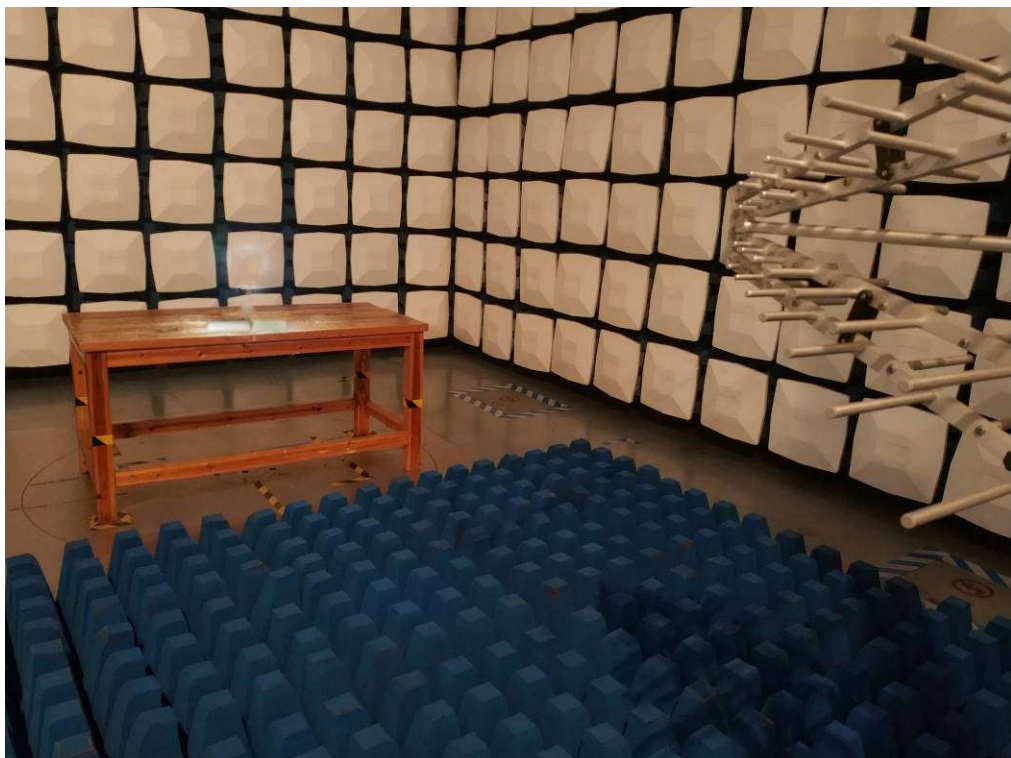
7.2 Photograph – Radiated Emission Test Setup, 30MHz to 300MHz



7.3 Photograph –ESD Immunity Test Setup

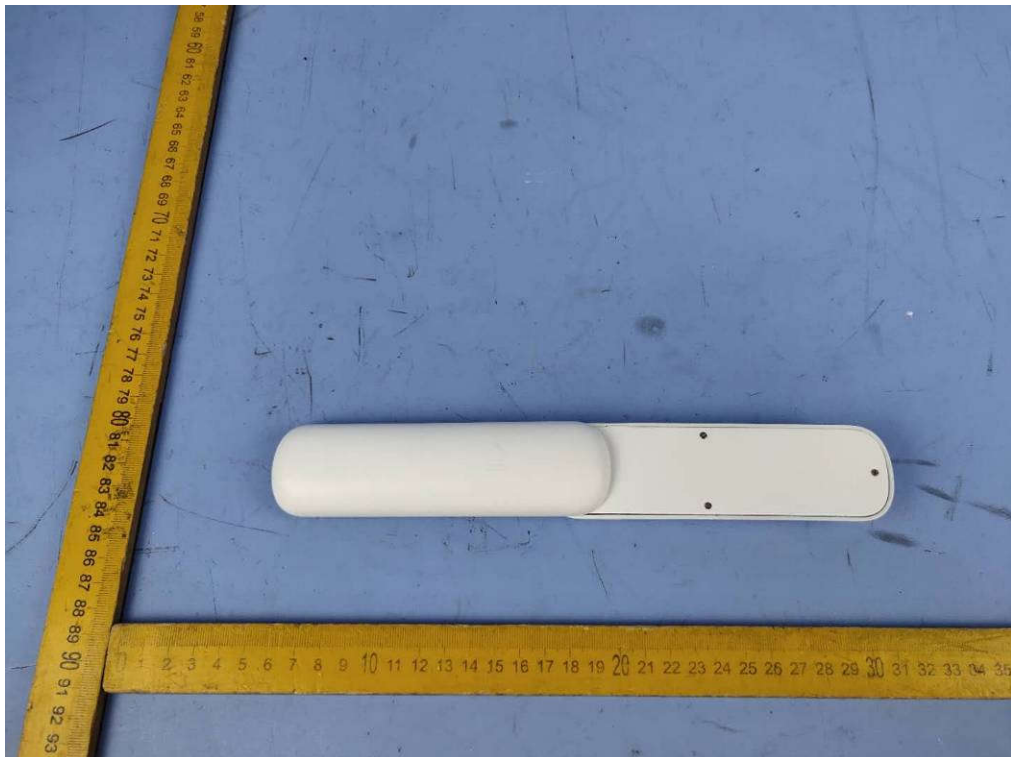


7.4 Photograph – Radio-frequency electromagnetic fields Immunity Test Setup



8 Photographs – Constructional Details

8.1 EUT – Front View



8.2 EUT –Back View



===== End of Report =====