



中国认可
国际互认
检测
TESTING
CNAS L6478



TEST REPORT

Reference No...... : WTF26F07215577E
Applicant..... : Mid Ocean Brands B.V.
Address..... : Unit 711-716, 7/F., Tower A, 83 King Lam Street, Cheung Sha Wan,
Kowloon, Hong Kong.
Manufacturer : 118966
Address..... : ---
Product Name..... : 5 panel LED cotton cap
Model No...... : MO2439
Test specification..... : EN IEC 55015:2019+A11:2020
EN IEC 61547:2023
Date of Receipt sample : 2026-07-28
Date of Test : 2026-07-28 to 2026-07-29
Date of Issue..... : 2026-08-14
Test Report Form No...... : WEL-55015A-02B
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 approver.

Prepared By:

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1 Test Summary

EMISSION				
Test Item	Test Standard		Class / Severity	Result
Radiated Electromagnetic Disturbance, 9kHz to 30MHz	EN IEC 55015:2019+A11:2020		Clause 4.5.2	Pass
Radiated Disturbance, 30MHz to 1000MHz	EN IEC 55015:2019+A11:2020		Clause 4.5.3	Pass
IMMUNITY (EN IEC 61547:2023)				
Test Item	Test Method	Class / Severity	Performance Criteria	Result
Electrostatic Discharge(ESD)	IEC 61000-4-2:2008	±4 kV Contact ±8 kV Air	B	Pass
Radio-Frequency Electromagnetic Fields (80MHz to 1GHz)	IEC 61000-4-3: 2006+A1+A2	3V/m, 80%, 1kHz, Amp. Mod.	A	Pass

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
A.M Amplitude Modulation

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3 General Information

3.1 General Description of E.U.T.

Product Name : 5 panel LED cotton cap

Model No. : MO2439

Remark : ---

3.2 Details of E.U.T.

Technical Data..... : Battery 6V (2 pcs CR2032 battery)

3.3 Description of Support Units

The EUT has been tested as an independent unit. MO2439 is the test sample. All tests were performed in the condition of Battery 6V.

3.4 Standards Applicable for Testing

The tests were performed according to following standards:

EN IEC 55015:2019+A11:2020 Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

EN IEC 61547:2023 Equipment for general lighting purposes — EMC immunity requirements



3.5 Test Facility

The test facility has a test site registered with the following organizations:

- **ISED – Registration No.: 21895**

Waltek Testing Group (Foshan) Co., Ltd. has been registered and fully described in a report filed with the Innovation, Science and Economic Development Canada (ISED). The acceptance letter from the ISED is maintained in our files. Registration ISED number: 21895, March 12, 2019

- **FCC – Registration No.: 820106**

Waltek Testing Group (Foshan) Co., Ltd. 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 820106, August 16, 2018

- **NVLAP – Lab Code: 600191-0**

Waltek Testing Group (Foshan) Co., Ltd. EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 600191-0.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

3.6 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: ---

Lab information: ---

3.7 Abnormalities from Standard Conditions

None.



4 Equipment Used during Test

☒ Radiated Electromagnetic Disturbance (9kHz to 30MHz) 1#					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESCI	101178	Valid
2.	Three Loops Antenna	SCHWARZBECK	HXYZ9170	000222	Valid
☐ Radiated Electromagnetic Disturbance (9kHz to 30MHz) 2#					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	EMI Test Receiver	R&S	ESR3	102842	Valid
2.	Three Loops Antenna	SCHWARZBECK	HXYZ 9170	9170-367	Valid
☒ Radiated Disturbance (30MHz to 1GHz) 1#					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	3m Semi-anechoic Chamber	CHANGCHUANG	9m×6m×6m	---	Valid
2.	EMI Test Receiver	R&S	ESR7	101566	Valid
3.	Trilog Broadband Antenna	SCHWARZBECK	VULB 9162	9162-117	Valid
4.	Cable 20	Times Microwave Systems	RG223-NMNM-10M	---	Valid
5.	Cable 21	Times Microwave Systems	RG223-NMNM-3M	---	Valid
6.	CDNE	SCHWARZBECK	CDNE M3	00083	Valid
7.	CDNE	SCHWARZBECK	CDNE M2	00092	Valid
☐ Radiated Disturbance (30MHz to 1GHz) 2#					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	3m Semi-anechoic Chamber	YIHENG	9m×6m×6m	YH2021071801	Valid
2.	EMI Test Receiver	R&S	ESR7	102454	Valid
3.	Trilog Broadband Antenna	SCHWARZBECK	VULB 9163	01418	Valid
4.	Cable 14	YIHENG	LMR240UF-NMSM-7.5	---	Valid
5.	CDNE	SCHWARZBECK	CDNE M3	00083	Valid
6.	CDNE	SCHWARZBECK	CDNE M2	00092	Valid
☒ ESD					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	ESD Simulator	TESEQ	NSG437	521	Valid
☒ Radio-frequency Electromagnetic Fields					
Item	Equipment	Manufacturer	Model No.	Serial No.	Calibration Status
1.	RF Power Amplifier	MICOTOP	MPA-80-1000-250	MPA2405139	Valid
2.	RF Power Amplifier	MICOTOP	MPA-1000-6000-100	MPA2405140	Valid
3.	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP9128E-SPECIAL	142	Valid



4.	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP 9149	476	Valid
5.	Analog signal generator	Agilent	N5181A	MY46240792	Valid
6.	Power meter	RS	NRP6A	101133	Valid

☐: Not Used

☒: Used

4.1 Software List

Description	Manufacturer	Model	Version
EMI Test Software (LOOP 1#)	FARATRONIC	EZ-CON	FARAD-3A1.1+
EMI Test Software (LOOP 2#)	FARATRONIC	EZ-EMC	EMC-CON 3A1.1+
EMI Test Software (Radiated Disturbance 1#)	FARATRONIC	EZ-EMC	RA-03A1-2
EMI Test Software (Radiated Disturbance 2#)	FARATRONIC	EZ-EMC	RA-03A1-2
Radiated Immunity Test Software	Chinese EMC	EMS	V1.0.0.0

4.2 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Radiated Electromagnetic Disturbance	9kHz~30MHz	±3.0dB	(1)
Radiated Disturbance	30MHz~1GHz	±4.5dB	(1)

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



4.3 Special Accessories and Auxiliary Equipment

Item	Equipment	Technical Data	Manufacturer	Model No.	Serial No.
1.	/	/	/	/	/

4.4 Decision Rule

Compliance or non-compliance with a disturbance limit shall be determined in the following manner.

If U_{LAB} is less than or equal to U_{cispr} , then

- Compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{LAB} is greater than U_{cispr} , then

- Compliance is deemed to occur if no measured disturbance level, increased by $(U_{LAB} - U_{cispr})$, exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{LAB} - U_{cispr})$, exceeds the disturbance limit.

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5 Emission Test Results

5.1 Radiated Electromagnetic Disturbance, 9kHz to 30MHz

Test Requirement	: EN IEC 55015 Clause 4.5.2
Test Method	: EN IEC 55015 Clause 9.3.2
Test Result	: Pass
Frequency Range	: 9kHz to 30MHz
Class/Severity	: Table 8 of EN IEC 55015

5.1.1 E.U.T. Operation

Operating Environment:

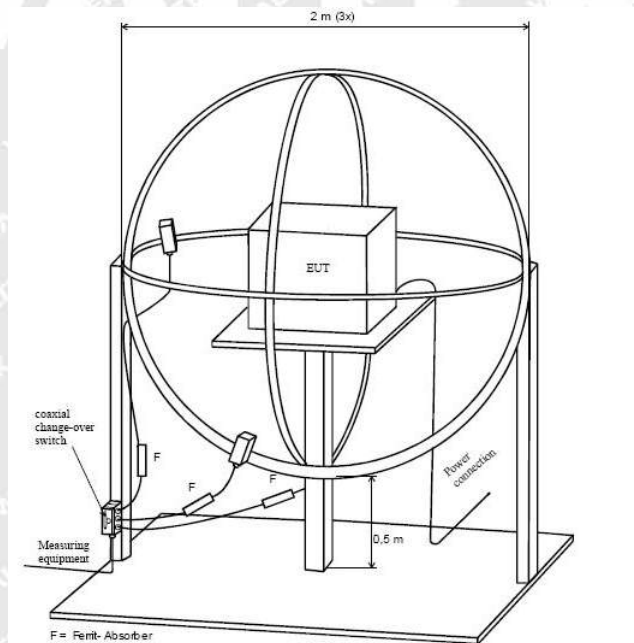
Temperature	: 20.8°C
Humidity	: 49.3%RH
Barometric Pressure	: 101.2kPa

EUT Operation:

Input Voltage	: Battery 6V
Operating Mode	: Lighting mode

5.1.2 Block Diagram of Test Setup

The Radiated Electromagnetic Disturbance (9kHz to 30MHz) test was performed in accordance with the EN IEC 55015.



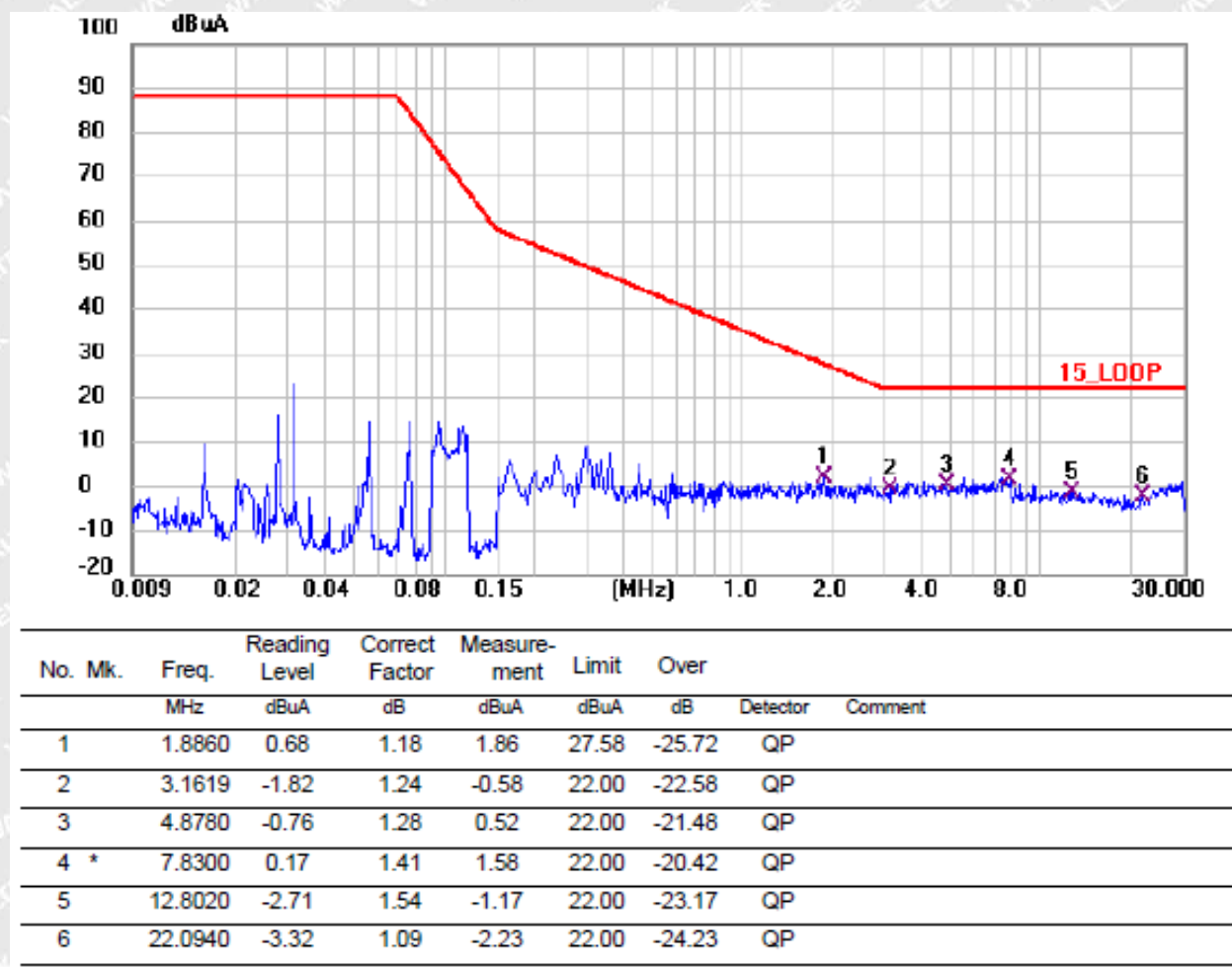
5.1.3 Measurement Data

According to the data in section 5.1.4, the EUT complied with the EN IEC 55015 standards.



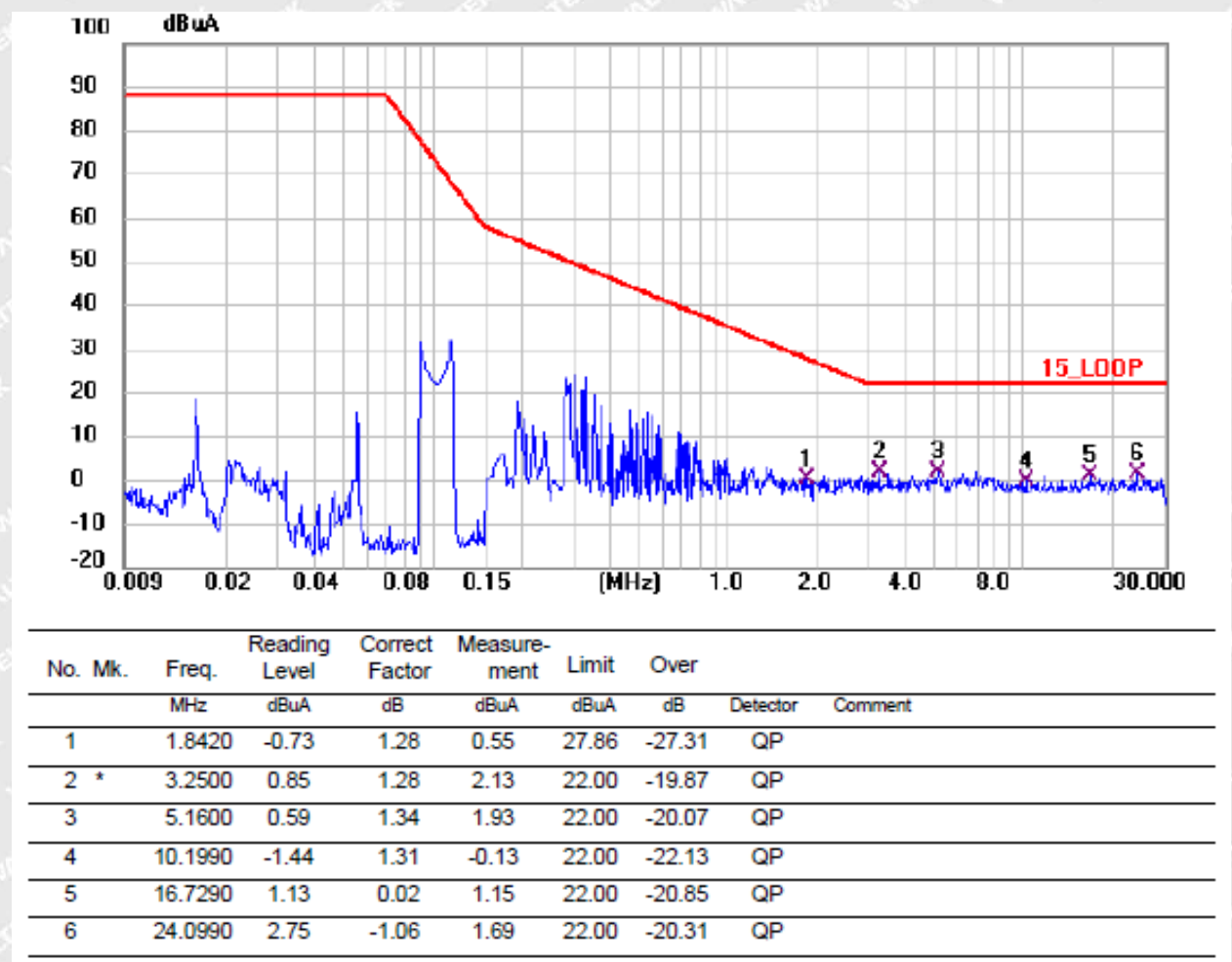
5.1.4 Radiated Electromagnetic Disturbance Test Data, 9kHz to 30MHz

Loop X



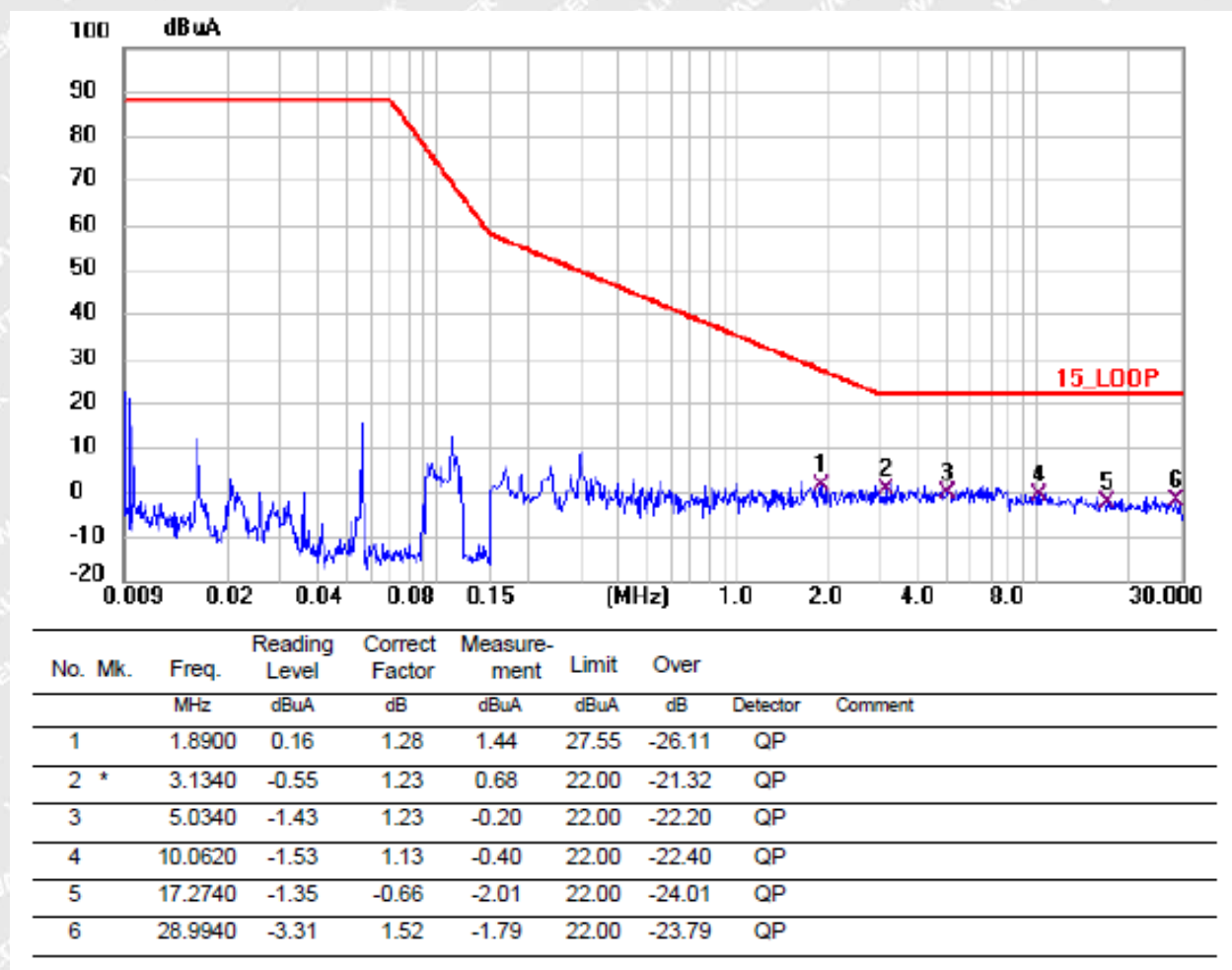


Loop Y





Loop Z





5.2 Radiated Disturbance, 30MHz to 1000MHz

Test Requirement	: EN IEC 55015 Clause 4.5.3
Test Method	: EN IEC 55015 Clause 9.3
Test Result	: Pass
Frequency Range	: 30MHz to 1000MHz
Class/Severity	: Table 10 of EN IEC 55015

5.2.1 E.U.T. Operation

Operating Environment:

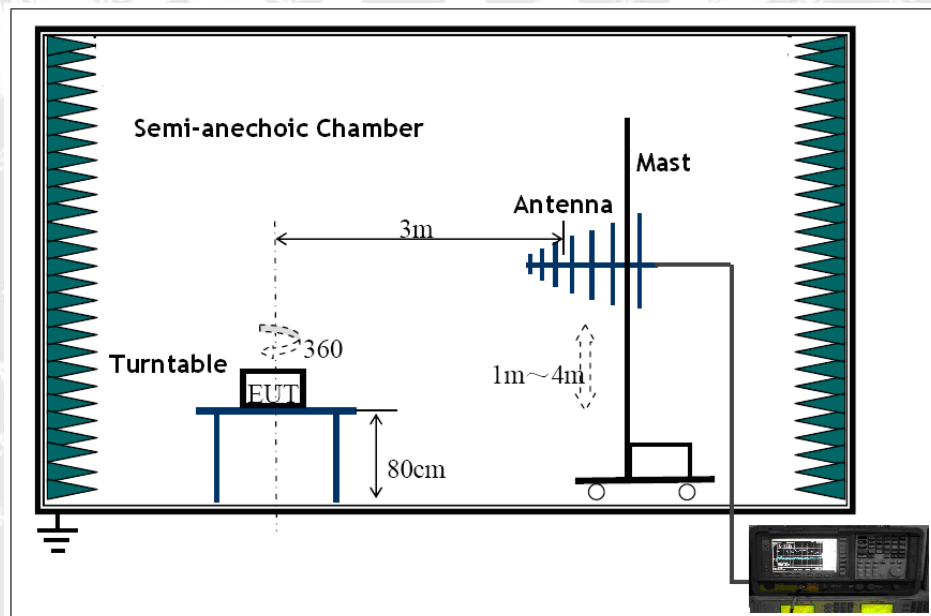
Temperature	: 22.4°C
Humidity	: 51.3%RH
Atmospheric Pressure	: 101.2kPa

EUT Operation :

Input Voltage	: Battery 6V
Operating Mode	: Lighting mode

5.2.2 Block Diagram of Setup

The Radiated Disturbance test was performed in the 3m Semi- Anechoic Chamber test site and accordance with CISPR16-2-3.



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.



5.2.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Corr. Factor}$$

$$\text{Corr. Factor} = \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

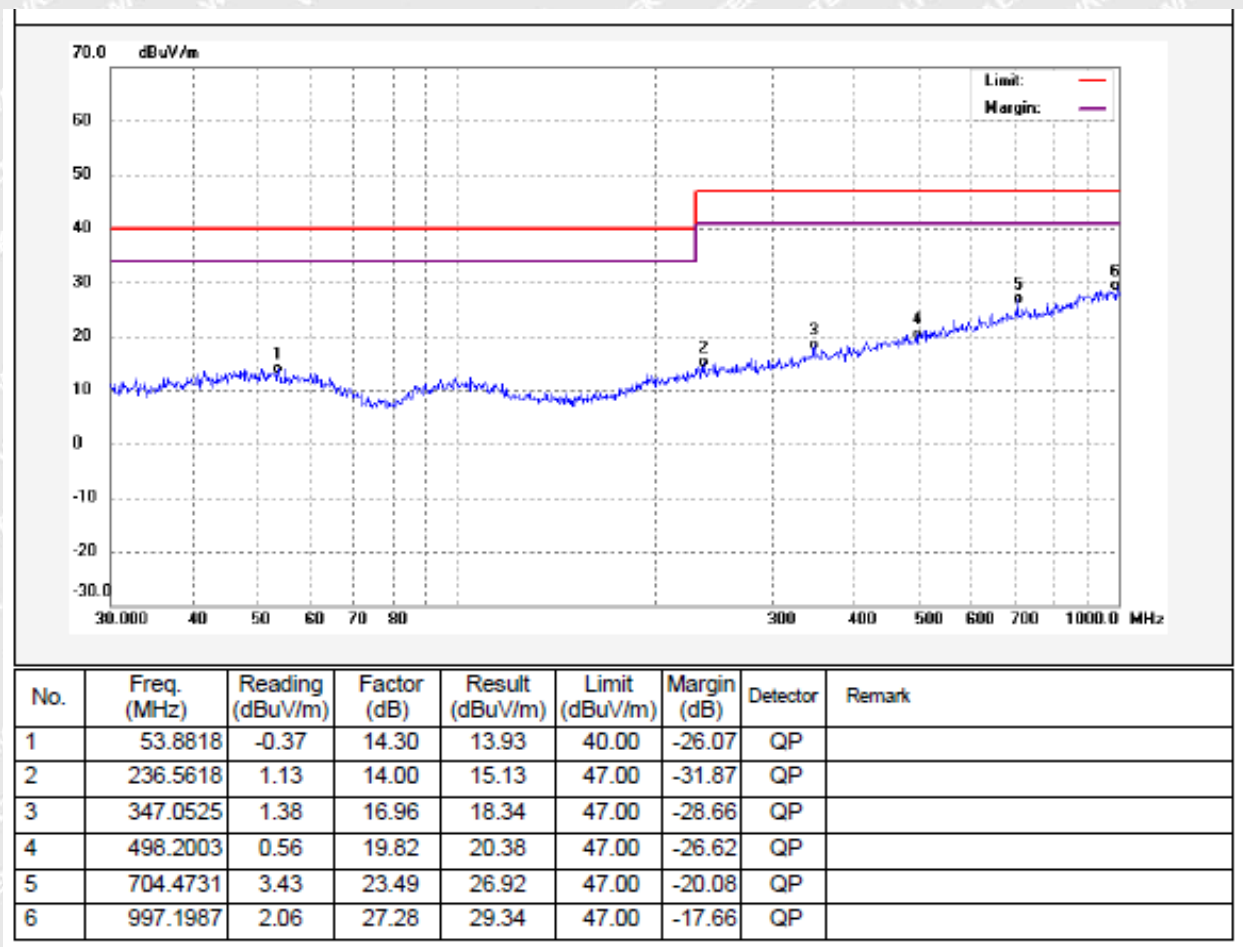
The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit.

The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

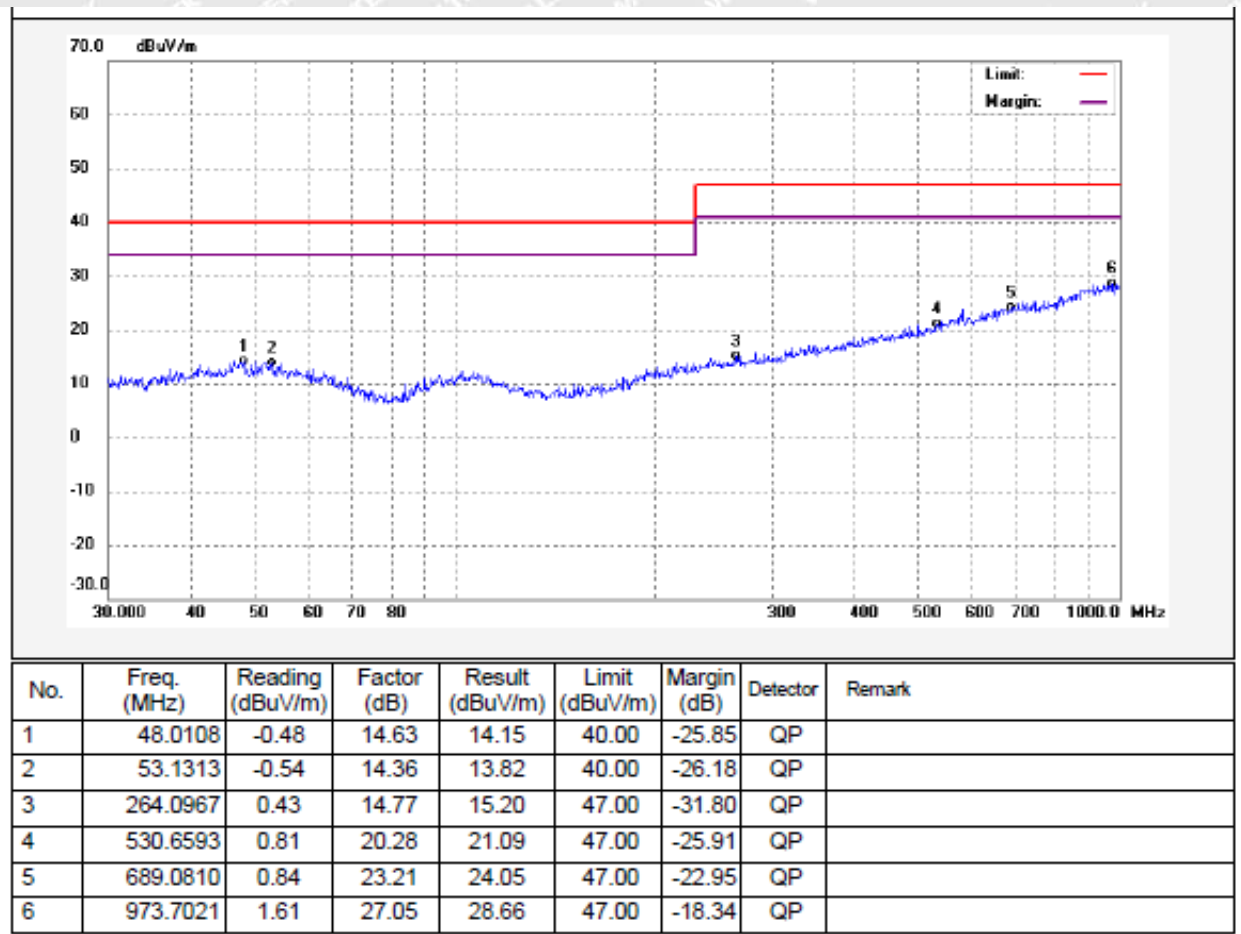
5.2.5 Radiated Disturbance Test Data

Vertical Polarization





Horizontal Polarization





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.

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6.2 Electrostatic Discharge (ESD)

Test Requirement.....	:	EN IEC 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:

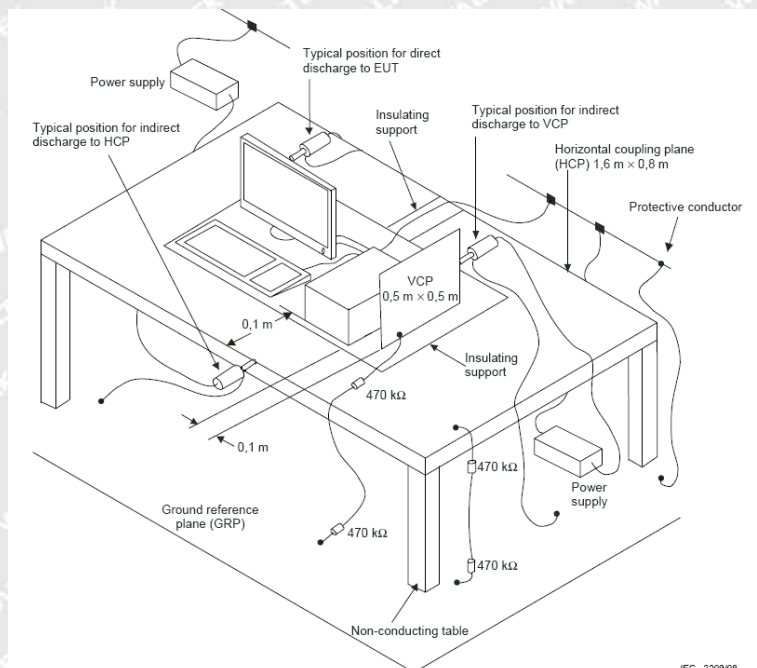
Temperature.....	:	24.1°C
Humidity.....	:	54.0%RH
Barometric Pressure.....	:	101.0kPa

EUT Operation:

Input Voltage.....	:	Battery 6V
Operating Mode.....	:	On 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 IEC 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
Test Distance	: 3m

6.3.1 E.U.T. Operation

Operating Environment:

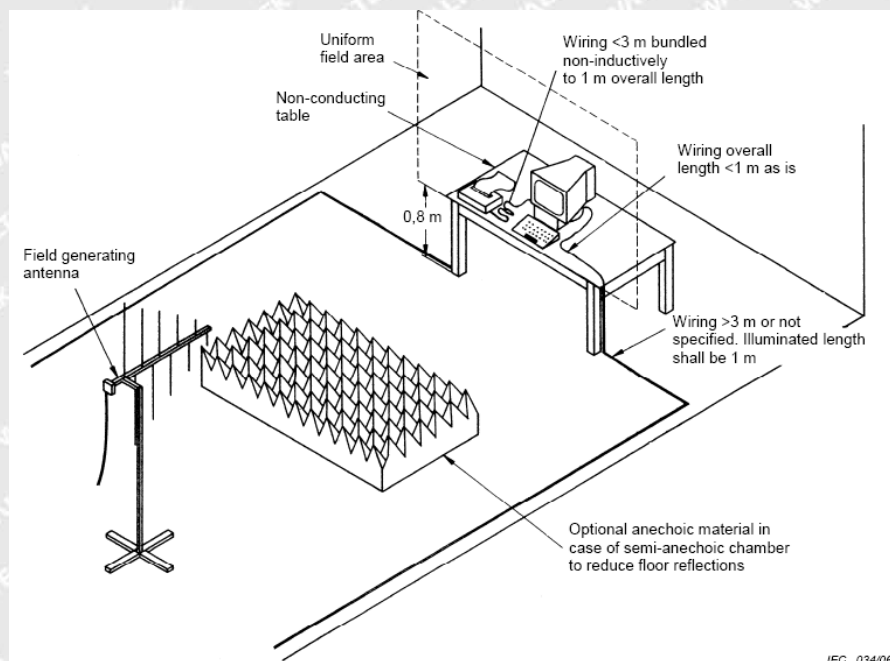
Temperature	: 22.4°C
Humidity	: 51.3%RH
Barometric Pressure.....	: 101.4kPa

EUT Operation:

Input Voltage	: Battery 6V
Operating Mode	: On 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.





6.3.3Test 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%	1s	A	Pass*
80 to 1000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*

Remark:

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

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7 Photographs – Test Setup

7.1 Photograph – Radiated Electromagnetic Disturbance Test Setup



7.2 Photograph – Radiated Disturbance Test Setup, 30MHz to 1000MHz





7.3 Photograph – ESD Immunity Test Setup



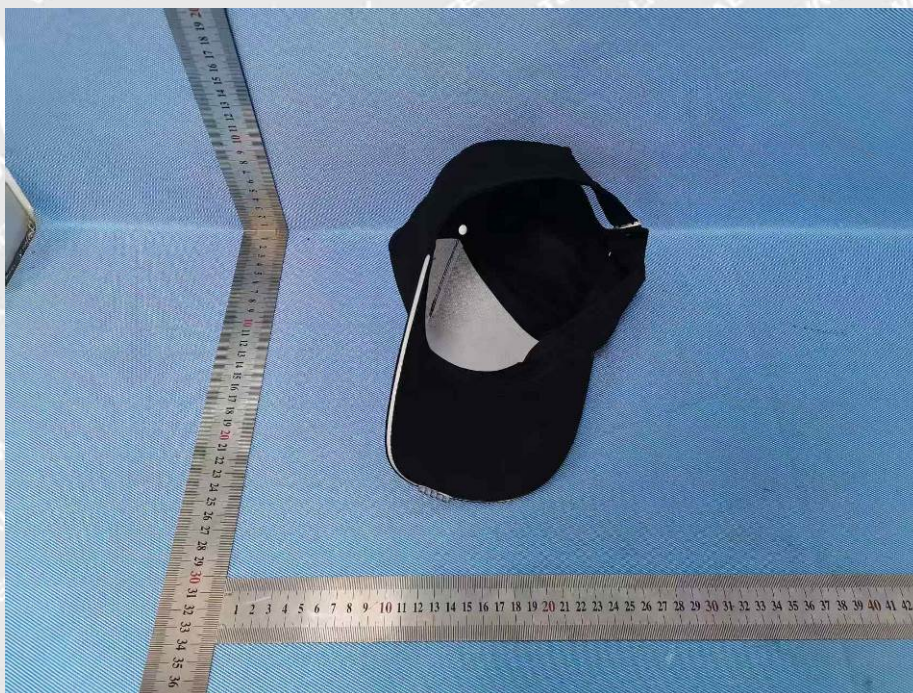
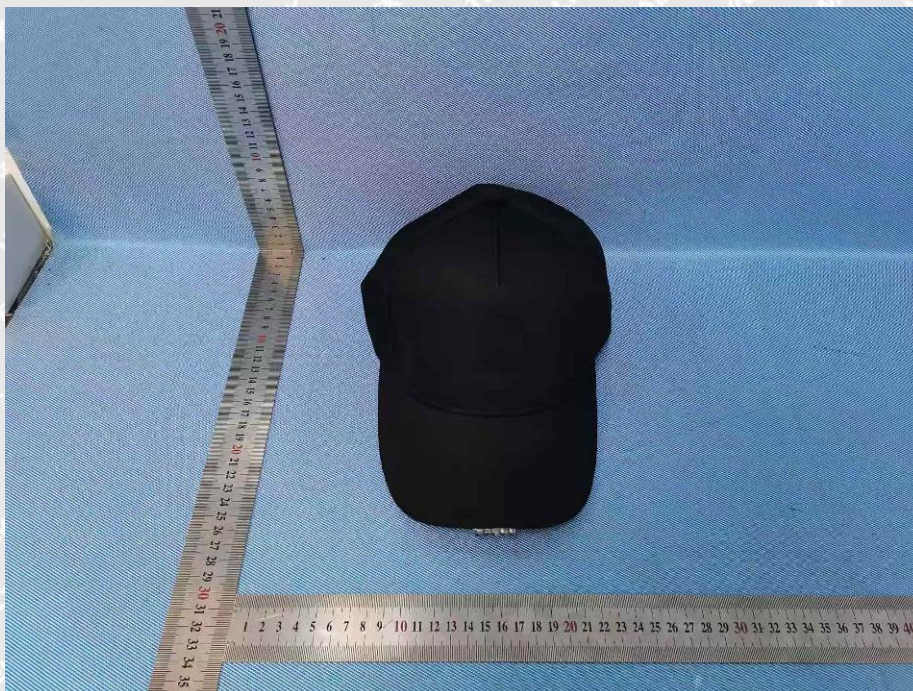
7.4 Photograph – Radio-Frequency Electromagnetic Fields Immunity Test Setup





8 Photographs – Constructional Details

8.1 EUT – External View



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