



EMC TEST REPORT

For

Mid Ocean Brands B.V.

Bamboo house weather station

Test Model: MO6468

Prepared for : Mid Ocean Brands B.V.

Address : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan,

Kowloon, Hong Kong

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.

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Industrial Park, Yabianxueziwei, Shajing Street, Bao' an

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Date of receipt of test sample : May 08, 2023

Number of tested samples : 1

Sample No. : A050523010

Date of Test : May 08, 2023 ~ May 09, 2023

Date of Report : May 10, 2023



Report No.: LCSA050523010E



Page 2 of 29 Report No.: LCSA050523010E

EMC TEST REPORT

EN IEC 61000-6-3:2021

Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment

in residential environments

EN IEC 61000-6-1:2019

Electromagnetic Compatibility (EMC) - Part 6 - 1: Genetic Standards- Immunity for resident, commercial

and light- industrial environments

: LCSA050523010E Report Reference No.

Date of Issue..... : May 10, 2023

Testing Laboratory Name..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

: Room 101, 201, Building A and Room 301, Building C, Juji Address.....

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District, Shenzhen, Guangdong, China

: Full application of Harmonised standards Testing Location/ Procedure ...

Partial application of Harmonised standards

Other standard testing method

Applicant's Name..... : Mid Ocean Brands B.V.

Address..... : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan,

Kowloon, Hong Kong

Test Specification

Standard : EN IEC 61000-6-3:2021

EN IEC 61000-6-1:2019

Test Report Form No.....: LCSEMC-1.0

TRF Originator: Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF..... : Dated 2011-03

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Test Item Description..... : Bamboo house weather station

Trade Mark..... : N/A

: MO6468 Test Model

Ratings : Please refer to page 9

Result : Positive

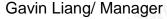
Compiled by:

Supervised by:

Approved by:

Coco Song / File administrators

Baron Wen/Technique principal







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EMC -- TEST REPORT

Test Result Positive

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.



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Revision History

	Revision History			
Revision	Issue Date	Revisions Content	Revised By	
000	May 10, 2023	Initial Issue		

Report No.: LCSA050523010E











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1. TEST STANDARDS

The tests were performed according to following standards:

<u>EN IEC 61000-6-3:2021</u> Electromagnetic Compatibility (EMC) - Part 6 - 3: Generic Standards – Emisson standard for residential, commercial and light – industrial environments.

<u>EN IEC 61000-6-1:2019</u> Electromagnetic Compatibility (EMC) - Part 6 - 1: Genetic Standards-Immunity for resident, commercial and light- industrial environments.

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2.SUMMARY OF STANDARDS AND RESULTS

2.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

	mission (EN IEC 61000-6-3:2	021)		
Description of Test Item	Standard	Limits	Results	
Conducted disturbance at mains terminals	EN IEC 61000-6-3:2021	Class B	N/A	
Conducted disturbance at telecommunication port	EN IEC 61000-6-3:2021	Class B	N/A	
Radiated disturbance	EN IEC 61000-6-3:2021	Class B	PASS	
Harmonic current emissions	EN IEC 61000-3-2: 2019/A1:2021	Class A	N/A	
Voltage fluctuations & flicker	EN 61000-3-3: 2013/A1:2019		N/A	
	nmunity (EN IEC 61000-6-1:20	019)		
Description of Test Item	Basic Standard	Performance Criteria	Results	
Electrostatic Discharge (ESD)	EN 61000-4-2: 2009	В	PASS	
Radio-frequency, Continuous Radiated Disturbance	EN IEC 61000-4-3:2020	A A	PASS	
Electrical Fast Transient (EFT)	EN 61000-4-4: 2012	esting Lab	N/A	
Surge (Input a.c. Power Ports)	EN 61000-4-5: 2014/A1: 2017	В	N/A	
Surge (Telecommunication Ports)	EN 61000-4-5. 2014/A1. 2017	В	N/A	
Conducted disturbances induced by radio-frequency fields	EN 61000-4-6:2014/AC:2015	А	N/A	
Power Frequency Magnetic Field	EN 61000-4-8: 2010	А	N/A	
Voltage Dips, >95% Reduction	C:用检测股份	В	N/A	
Voltage Dips, 30% Reduction	EN IEC 61000-4-11:2020	C	N/A	
Voltage Interruptions		С	N/A	

Test mode:				
Mode Working Record				
***Note: All test modes were tested, but we only recorded the worst case in this report.				



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2.2. Description of Performance Criteria

General Performance Criteria

Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

essential operational modes and states;

2.2.1. Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacture when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deriver from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

2.2.2. Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacture, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

During the test, degradation of performance is allowed. However, no change of operation state or stored data is allowed to persist after the test.

If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be deriver from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

2.2.3. Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacture's instructions.

Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be loss.



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3. GENERAL INFORMATION

3.1. Description of Device (EUT)

EUT : Bamboo house weather station

Trade Mark : N/A

Test Model : MO6468

Power Supply : Input:DC 1.5V, 0.2mA

Highest internal freq. : Fx≤108MHz

Highest internal frequency (Fx)	Highest measured frequency
Fx ≤ 108 MHz	1 GHz
108 MHz < Fx ≤ 500 MHz	2 GHz
500 MHz < Fx ≤ 1 GHz	5 GHz
Fx > 1 GHz	5 × Fx up to a maximum of 6 GHz

NOTE 1 For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies. Where Fx is unknown, the radiated emission measurements shall be performed up to 6 GHz

3.2. Description of Support Device

Name	Manufacturers	M/N	S/N
-	-	-	-

3.3. Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.



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3.4. Statement of The Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

3.5. Measurement Uncertainty

Parameters	Expanded Uncertainty (Ulab)	Expanded Uncertainty (Ucispr)
Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	\pm 3.8 dB \pm 3.4 dB
Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Level accuracy (above 1000MHz)	± 3.90 dB	± 5.2 dB
Voltage	± 0.510%	N/A
Voltage	± 0.510%	N/A
	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz) Level accuracy (30MHz to 1000MHz) Level accuracy (above 1000MHz) Voltage	Level accuracy (9kHz to 150kHz)

¹⁾ Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.



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²⁾ The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.



4. MEASURING DEVICES AND TEST EQUIPMENT

RADIATED DISTURBANCE

				11%		11%
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
11	EMI Test Software	AUDIX	E3	Testing	N/A	N/A
2	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-09-12	2024-09-11
3	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
4	EMI Test Receiver	R&S	ESR3	102311	2022-08-17	2023-08-16
5	Broadband Preamplifier	/	BP-01M18G	P190501	2022-06-16	2023-06-15

ELECTROSTATIC DISCHARGE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	ESD Simulator	SCHLODER	SESD 230	604035	2022-07-18	2023-07-17

RF ELECTROMAGNETIC FIELD

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	MXG Vector Signal Generator	Agilent	E4438C	MY42081396(6G)	2022-06-16	2023-06-15
2	RF POWER AMPLIFIER	SKET	HAP_0306G- 50W	/	2022-06-16	2023-06-15
3	RF POWER AMPLIFIER	OPHIR	5225R	1052	2022-06-16	2023-06-15
4	RF POWER AMPLIFIER	OPHIR	5273F	1019	2022-06-16	2023-06-15
5	Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	NCR	NCR
6	Stacked Mikrowellen LogPer Antenna	SCHWARZBECK	STLP 9149	9149-484	NCR	NCR
7	RS Electric field probe	narda	EP601	611WX80208	2022-06-16	2023-06-15

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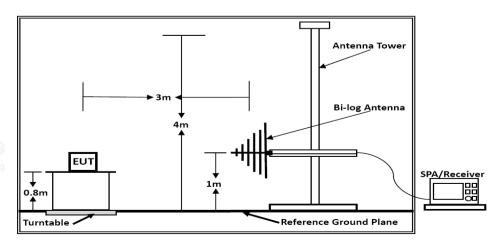




5.TEST RESULTS

5.1. RADIATED EMISSION MEASUREMENT

5.1.1. Block Diagram of Test Setup



Below 1GHz

5.1.2. Test Standard

EN IEC 61000-6-3:2021

5.1.3. Radiated Emission Limits

EN 61000-6-3 Limits:

All emanations from a class B device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

Limits for Radiated Emission Below 1GHz						
Frequency (MHz)	Distance (Meters)	Field Strengths Limit (dBµV/m)				
30 ~ 230	3	40				
230 ~ 1000	3	47				

5.1.4. EUT Configuration on Test

The EN 61000-6-3 regulations test method must be used to find the maximum emission during radiated emission measurement.

5.1.5. Operating Condition of EUT

5.1.5.1. Turn on the power.

5.1.5.2. Let the EUT work in the test mode 1 and measure it.



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⁽¹⁾ The smaller limit shall apply at the combination point between two frequency bands.(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.





5.1.6. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter high above the ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. By-log antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

The bandwidth of the EMI test receiver is set at RBW/VBW=120kHz/300kHz. The frequency range from 30MHz to 1000MHz is checked.

5.1.7. Test Results

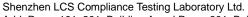
PASS.

Refer to attached Annex B.1



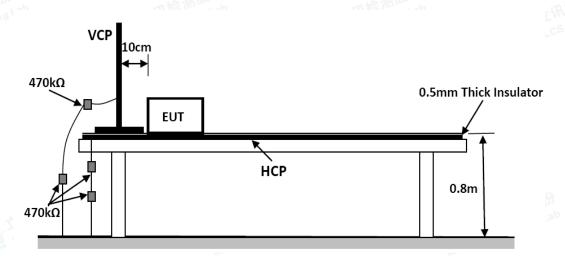
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5.2. ELECTROSTATIC DISCHARGE IMMUNITY TEST

5.2.1. Block Diagram of Test Setup



5.2.2. Test Standard

EN IEC 61000-6-1:2019 (EN 61000-4-2: 2009, Severity Level: 3 / Air Discharge: ±8KV, Level: 2 / Contact Discharge: ±4KV)

5.2.3. Severity Levels and Performance Criterion

5.2.3.1. Severity level

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

5.2.3.2. Performance Criterion

Performance Criterion: B

5.2.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.2.1.

5.2.5. Operating Condition of EUT

Same as radiated emission measurement, which is listed in Section 5.1.4. Except the test set up replaced by Section 5.2.1.



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5.2.6. Test Procedure

5.2.6.1. 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

5.2.6.2. Contact Discharge

All the procedure shall be same as Section 5.2.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

5.2.6.3. 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.

5.2.6.4. Indirect Discharge For Vertical Coupling Plane

At least 10 single discharge (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 completely illuminated.

5.2.7. Test Results

PASS.

Refer to attached Annex B.2

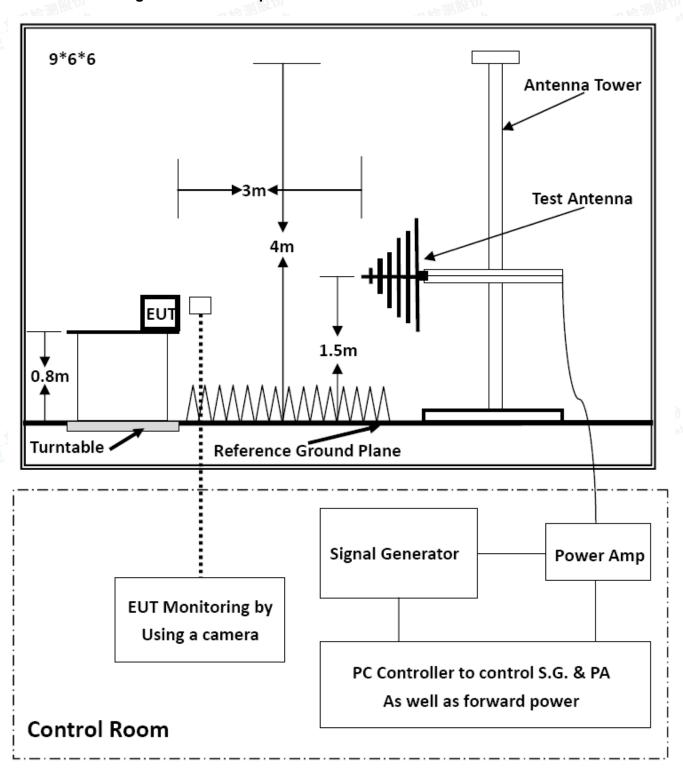






5.3. RF FIELD STRENGTH SUSCEPTIBILITY TEST

5.3.1. Block Diagram of Test Setup



5.3.2. Test Standard

EN IEC 61000-6-1:2019 (EN IEC 61000-4-3:2020 Severity Level 2: 3V/ m; Level 2: 3V/m)



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5.3.3. Severity Levels and Performance Criterion

5.3.3.1. Severity level

Level	Field Strength (V/m)
测度切 1 四检测度	1000 可怜测度7001
sting 2 I M CS Testing	15 CS Testine 3
3	10
X	Special

5.3.3.2. Performance Criterion Performance Criterion: A

5.3.4. EUT Configuration on Test

The configuration of EUT is listed in Section 5.3.1.

5.3.5. Operating Condition of EUT

Same as radiated emission measurement, which is listed in Section 5.1.4, except the test setup replaced as Section 5.3.1.

5.3.6. Test Procedure

The EUT are placed on a table, which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna, which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna is set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD Recording is used to monitor its screen. All the scanning conditions are as following:

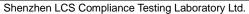
	Condition of Test	Remark	
1.	Fielded Strength	3V/m (Severity Level 2)	
2.	Radiated Signal	Unmodulated	
3.	Scanning Frequency	80-1GHz	
4.	Sweep Time of Radiated	0.0015 Decade/s	
5.	Dwell Time	3 Sec.	
6.	Fielded Strength	3V/m (Severity Level 2)	
7.	Radiated Signal	Unmodulated	
8.	Scanning Frequency	1.4-6.0GHz	
9.	Sweep time of radiated	0.0015 Decade/s	
	Dwell Time	3 Sec.	

5.3.7. Test Results PASS.

Refer to attached Annex B.3

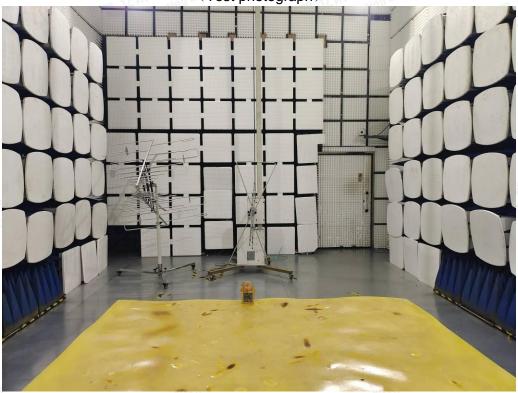


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ANNEX A





Test Setup Photo of Radiated Measurement (30MHz~1GHz)



Test Setup Photo of Electrostatic Discharge Test



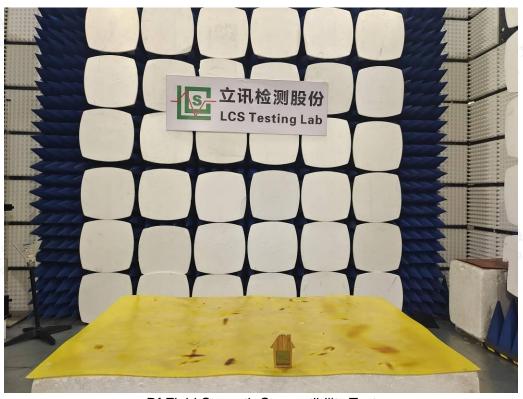
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Rf Field Strength Susceptibility Test











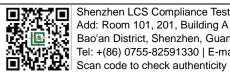












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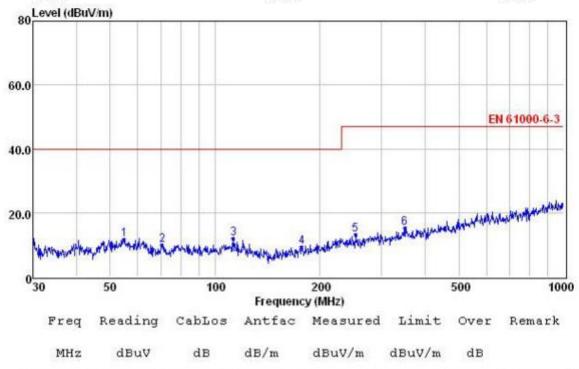
ANNEX B

(Emission and Immunity test results)

B.1 Radiated Disturbance Test Results (30MHz to 1000MHz)

Environmental Conditions:	22.3℃, 53% RH
Test Voltage:	DC
Test Model:	MO6468
Test Mode:	Working
Test Engineer:	Xing Mo
Pol:	Vertical

Detailed results are shown below



	MHZ	abuv	QB	GB/m	abuv/m	abuv/m	ав		
1	54.83	-1.54	0.63	12.55	11.64	40.00	-28.36	QP	-
2	70.58	-0.95	0.70	10.18	9.93	40.00	-30.07	QP	
3	112.92	-0.22	0.87	11.16	11.81	40.00	-28.19	QP	
4	177.51	-1.63	1.13	9.78	9.28	40.00	-30.72	QP	
5	252.95	-0.70	1.27	12.50	13.07	47.00	-33.93	QP	
6	350.48	-1.16	1.36	14.89	15.09	47.00	-31.91	QP	

Note: 1. All readings are Quasi-peak values.

- 2. Measured= Reading + Antenna Factor + Cable Loss
- 3. The emission that are 20db below the official limit are not reported



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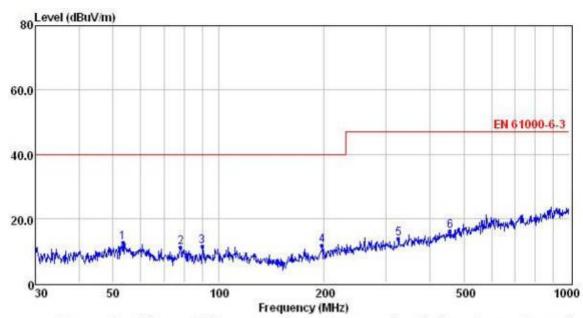
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Detailed results are shown below



			riequency	from 12.)			
Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
53.32	-0.81	0.62	12.56	12.37	40.00	-27.63	QP
77.87	0.48	0.73	9.88	11.09	40.00	-28.91	QP
89.90	0.99	0.77	9.50	11.26	40.00	-28.74	QP
		100	00 L		2020	A2121 1270	829

197.20 -0.29 1.19 10.66 11.56 40.00 -28.44 QP 325.60 -1.33 1.34 13.53 13.54 47.00 -33.46 QP 457.51 -1.28 1.46 15.87 16.05 47.00 -30.95 QP

Note: 1. All readings are Quasi-peak values.

- 2. Measured= Reading + Antenna Factor + Cable Loss
- 3. The emission that are 20db below the official limit are not reported



3



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B.2 ELECTROSTATIC DISCHARGE IMMUNITY TEST

Electrostatic Discharge Test Results				
Standard	□ IEC 61000-4-2 ☑ EN 61000-4-2			
Applicant	Mid Ocean Brands B.V.			
EUT	Bamboo house weather station	Temperature	24.2℃	
M/N	MO6468	Humidity	54.1%	
Criterion	В	Pressure	1021mbar	
Test Mode	Working	Test Engineer	Hy Luo	

		۸i	r Discharge				
		Test Levels	r Discharge		Result	e e	
Test Points	± 2kV	± 4kV	± 8kV	Passed	Fail	Performance	
		I 4KV	IOKV	rasseu	Ган	Criterion	
Front	\boxtimes					□A ⊠B	
Back	\boxtimes	\boxtimes	\boxtimes	\boxtimes		□A ⊠B	
Left	\boxtimes	\boxtimes	\boxtimes	\boxtimes		□A ⊠B	
Right	\boxtimes	\boxtimes	\boxtimes	\boxtimes		□A ⊠B	
Тор	\boxtimes	\boxtimes	\boxtimes	\boxtimes		□A ⊠B	
Bottom	\boxtimes	\boxtimes	\boxtimes	\boxtimes		□A ⊠B	
	•		act Dischar	ge			
		Test Levels			Result		
Test Points	± 2 kV		±4 kV	Passed	Fail	Performance Criterion	
Front	\boxtimes	STesting		\boxtimes		□A ⊠B	
Back						□A ⊠B	
Left	\boxtimes		\boxtimes	\boxtimes		□A ⊠B	
Right	\boxtimes		\boxtimes	\boxtimes		□A ⊠B	
Тор	\boxtimes		\boxtimes	\boxtimes		□A ⊠B	
Bottom	\boxtimes		\boxtimes	\boxtimes		□A ⊠B	
	Disc	harge To H	orizontal Co	upling Plan	е		
		Test Levels		Results			
Side of EUT	± 2 kV		± 4 kV	Passed Fail		Performance Criterion	
Front	Lab X	_ 3		\boxtimes	\ \til	□A ⊠B	
Back	\boxtimes	1/81		\boxtimes	1 ET LC	□A ⊠B	
Left	\boxtimes		\boxtimes	\boxtimes		□A ⊠B	
Right	\boxtimes		\boxtimes	\boxtimes		□A ⊠B	
	Dis		Vertical Cou	pling Plane			
		Test Levels		Results			
Side of EUT	± 2 kV		± 4 kV	Passed	Fail	Performance Criterion	
Front	\boxtimes		\boxtimes	\boxtimes		□A ⊠B	
Back	\boxtimes		\boxtimes	\boxtimes		□A ⊠B	
Left	\boxtimes	(大型) [1]	\boxtimes			□A ⊠B	
Right		f 和 Lab				□A ⊠B	



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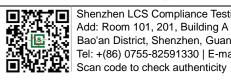


B.3 RF FIELD STRENGTH SUSCEPTIBILITY TEST

RF Field Strength Susceptibility Test Results					
Standard	□ IEC 61000-4-3 ☑ EN 61000-4-3				
Applicant	Mid Ocean Brands B.V.				
EUT	Bamboo house weather station	Temperature	23.6℃		
M/N	MO6468	Humidity	54.2%		
Field Strength	3V/m	Toot Eroguanav	80 MHz to1.0 GHz		
Fleid Strength	3 V/m	Test Frequency	1.4 GHz to6.0 GHz		
Test Mode	Working	Criterion	A		
Test Engineer	Hy Luo				
Modulation	□None □ Pulse	☑ AM 1KHz 80%	6		
Steps	1%				

	Horizontal	Vertical
Front	PASS	PASS
Right	PASS	PASS
Rear	PASS	PASS PASS
Left	PASS	PASS

Note:





ANNEX C

(External and internal photos of the EUT)



Fig. 1

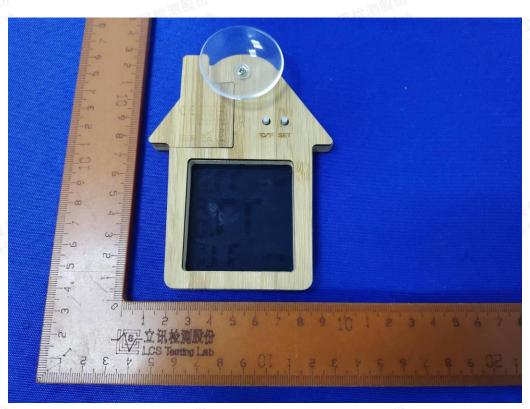


Fig. 2



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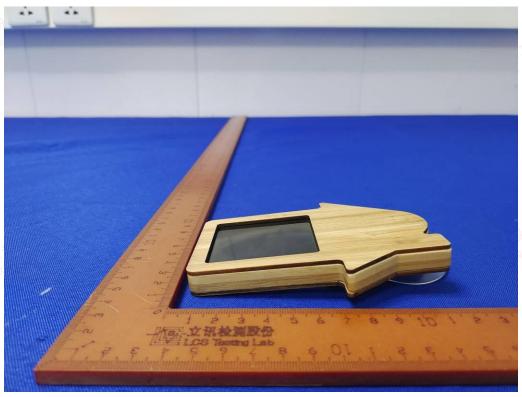
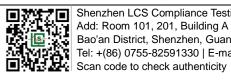


Fig. 3



Fig. 4



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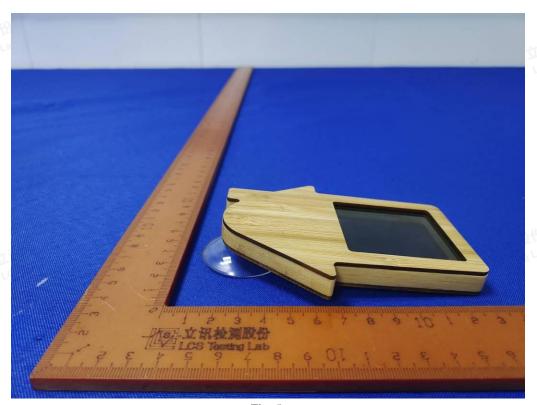


Fig. 5



Fig. 6



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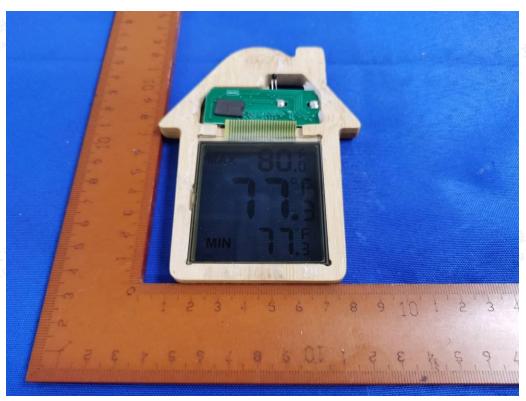


Fig. 7

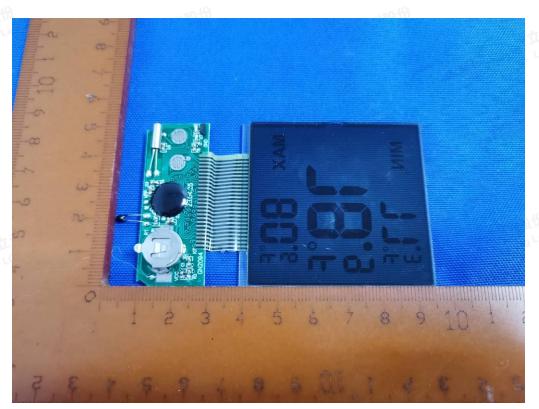
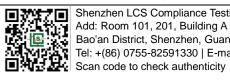


Fig. 8



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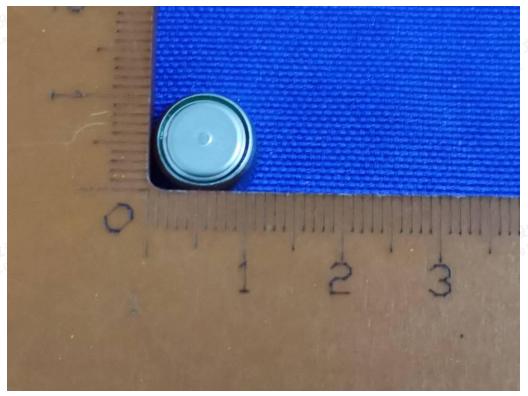


Fig. 9



Fig. 10



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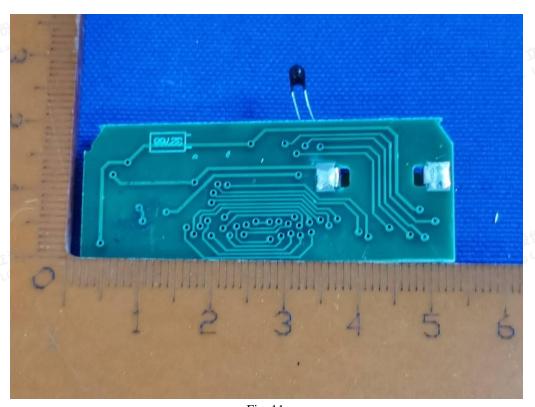


Fig. 11











--- THE END OF TEST REPORT --



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