




## EMC Test Report

**Certificate No.** : TB210628592  
**Applicant** : HENGKO Technology Co., Ltd.  
**Equipment Under Test (EUT)**  
**EUT Name** : Humidity temp dew point calibrator meter  
**Model No.** : HK-J8A100 Series  
**Series Model No.** : HK-J8A102, HK-J8A103  
**Brand Name** : HENGKO  
**Receipt Date** : 2021-05-31  
**Test Date** : 2021-06-01 to 2021-06-04  
**Issue Date** : 2021-06-04  
**Standards** : EN61000-6-4:2007+A1:2011  
EN IEC 61000-6-2:2019  
**Conclusions** : **PASS**

In the configuration tested, the EUT complied with the standards specified above.  
The EUT technically complies with the 2014/30/EU Directive requirements.

**Test/Witness Engineer** :   
**Engineer Supervisor** :   
**Engineer Manager** : 



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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### Revision History

Report No.	Version	Description	Issued Date
TB-EMC180739	Rev.01	Initial issue of report	2021-06-04

# 1. General Information

## 1.1. Client Information

<b>Applicant</b>	:	HENGKO Technology Co., Ltd.
<b>Address</b>	:	No. 51-3, Fuan West Road, Pinghu Street, Longgang District, Shenzhen, Guangdong, 518111 China
<b>Manufacturer</b>	:	HENGKO Technology Co., Ltd.
<b>Address</b>	:	No. 51-3, Fuan West Road, Pinghu Street, Longgang District, Shenzhen, Guangdong, 518111 China

## 1.2. General Description of EUT (Equipment Under Test)

<b>EUT Name</b>	:	Humidity temp dew point calibrator meter
<b>Model(s)</b>	:	HK-J8A100 Series, HK-J8A102, HK-J8A103
<b>Model Difference</b>	:	All above models are identical in schematic, structure and critical components except for different model number, therefore, EMI and EMS testing was performed with HK-J8A100 Series only.
<b>Brand Name</b>	:	HENGKO
<b>Power Supply</b>	:	DC 9V

### 1.3. Description of Operating Mode

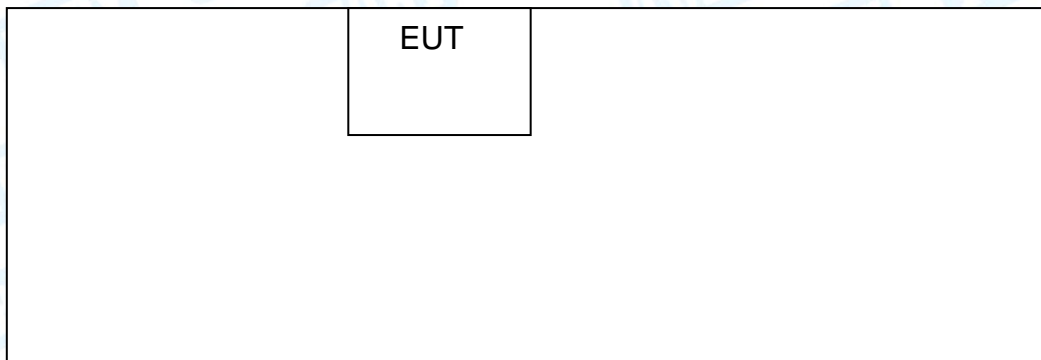
To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Normal Working Mode

The EUT system operated these modes were found to be the worst case during the pre-scanning test as Following:

For EMI Test	
Final Test Mode	Description
Mode 1	Normal Working Mode
For EMS Test	
Final Test Mode	Description
Mode 1	Normal Working Mode

### 1.4. Block Diagram Showing The Configuration of System Tested



### 1.5. Description of Support Units

Equipment Information				
Name	Model	S/N	Manufacturer	Used “√”
----	----	----	----	----
----	----	----	----	----
Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note
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## 1.6. Performance Criterion

**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 manufacturer when the equipment is used as intended.

**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 manufacturer, when the equipment is used as intended.

**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 manufacturer's instructions.

## 1.7. Measurement Uncertainty

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

Test	Parameters	Expanded Uncertainty ( $U_{Lab}$ )	Expanded Uncertainty ( $U_{Cispr}$ )
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	$\pm 3.50$ dB $\pm 3.10$ dB	$\pm 4.0$ dB $\pm 3.6$ dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	$\pm 4.60$ dB	N/A
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	$\pm 4.50$ dB	$\pm 5.2$ dB
Radiated Emission	Level Accuracy: Above 1000MHz	$\pm 4.20$ dB	N/A
Mains Harmonic	Voltage	$\pm 3.11\%$	N/A
Voltage Fluctuations & Flicker	Voltage	$\pm 3.25\%$	N/A

## 1.8. Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at:1A/F., Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China.

At the time of testing, the following bodies accredited the Laboratory:

### **CNAS (L5813)**

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

### **A2LA Certificate No.: 4750.01**

The laboratory has been accredited by American Association for Laboratory Accreditation (A2LA) to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01. FCC Accredited Test Site Number: 854351.

### **IC Registration No.: (11950A)**

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A.

## 2. TEST Results Summary

<b>EMISSION</b>		
<b>Description of test items</b>	<b>Standards</b>	<b>Results</b>
Conducted disturbance at mains terminals	EN 61000-6-4: 2007+A1: 2011	N/A
Radiated Disturbance	EN 61000-6-4: 2007+A1: 2011	Pass
Harmonic current emissions	EN 61000-3-2: 2014	N/A
Voltage fluctuation and flicker	EN 61000-3-3: 2013	N/A
<b>IMMUNITY</b>		
<b>Description of test items</b>	<b>Standards</b>	<b>Results</b>
Electrostatic Discharge (ESD)	EN 61000-4-2: 2009	Pass
Radio-frequency, Continuous radiated disturbance	EN 61000-4-3: 2006 + A1:2008 +A2:2010	Pass
EFT/B Immunity	EN 61000-4-4: 2012	N/A
Surge Immunity	EN 61000-4-5: 2014	N/A
Conducted RF Immunity	EN 61000-4-6: 2014	N/A
Power frequency magnetic field	EN 61000-4-8: 2010	N/A
Voltage dips, >95% reduction	EN 61000-4-11:2004	N/A
Voltage dips, 30% reduction		
Voltage interruptions		
<b>Note:</b> N/A is an abbreviation for Not Applicable.		



### 3. Test Equipment Used

Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 06, 2020	Jul. 05, 2021
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Jul. 06, 2020	Jul. 05, 2021
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 01, 2020	Feb. 28, 2022
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 01, 2020	Feb. 28, 2022
Pre-amplifier	Sonoma	310N	185903	Feb. 25, 2021	Feb. 24, 2022
Pre-amplifier	HP	8449B	3008A00849	Feb. 25, 2021	Feb. 24, 2022
Cable	HUBER+SUHNER	100	SUCOFLEX	Feb. 25, 2021	Feb. 24, 2022
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Discharge Immunity Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
ESD Tester	TESEQ	NSG437	304	Jul. 07, 2020	Jul. 06, 2021
Radiated Immunity Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Vector Signal Generator	Agilent	E4438C	US44271917	Jul. 06, 2020	Jul. 05, 2021
Power meter	Agilent	E4419B	GB40202122	Jul. 06, 2020	Jul. 05, 2021
Power Sensor	Agilent	E9300A	MY41496625	Jul. 06, 2020	Jul. 05, 2021
Power Sensor	Agilent	E9300A	MY41496628	Jul. 06, 2020	Jul. 05, 2021
RF power Amplifier	OPHIR	5225R	1045	Jul. 06, 2020	Jul. 05, 2021
RF power Amplifier	OPHIR	5273R	1018	Jul. 06, 2020	Jul. 05, 2021
RF power Amplifier	SKET	HAP_0306G-50W	SK20140456	Jul. 06, 2020	Jul. 05, 2021
Antenna	SCHWARZBECK	STLP9128E-special	STLP9128Es#139	Jul. 06, 2020	Jul. 05, 2021
Antenna	SCHWARZBECK	STLP 9149	STLP 9149#456	Jul. 06, 2020	Jul. 05, 2021

## 4. Radiated Emission Test

### 4.1. Test Standard and Limit

#### 4.1.1. Test Standard

EN 61000-6-4: 2007+A1: 2011

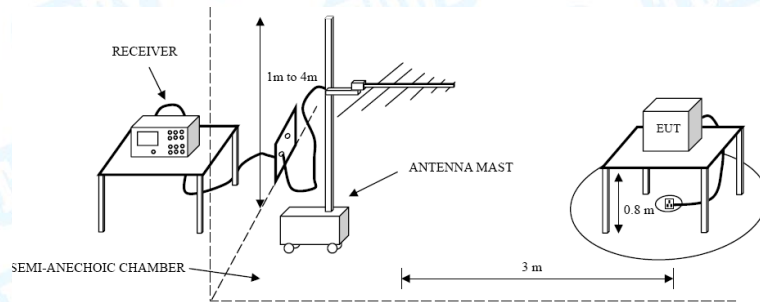
#### 4.1.2. Test Limit

Radiated Disturbance Test Limit

Frequency	Limit (dB $\mu$ V/m)
	Quasi-peak Level
30MHz~230MHz	50
230MHz~1000MHz	57

**Remark:** 1. The lower limit shall apply at the transition frequency.  
2. The test distance is 3m.

### 4.2. Test Setup



### 4.3. Test Procedure

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m. The table was rotated 360 degrees to determine the position of the highest radiation.

The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range.

If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

### 4.4. Deviation From Test Standard

No deviation

### 4.5. Test Data

Please refer to the Attachment A.

## 5. Electrostatic Discharge Immunity Test

### 5.1. Test Requirements

#### 5.1.1. Test Standard

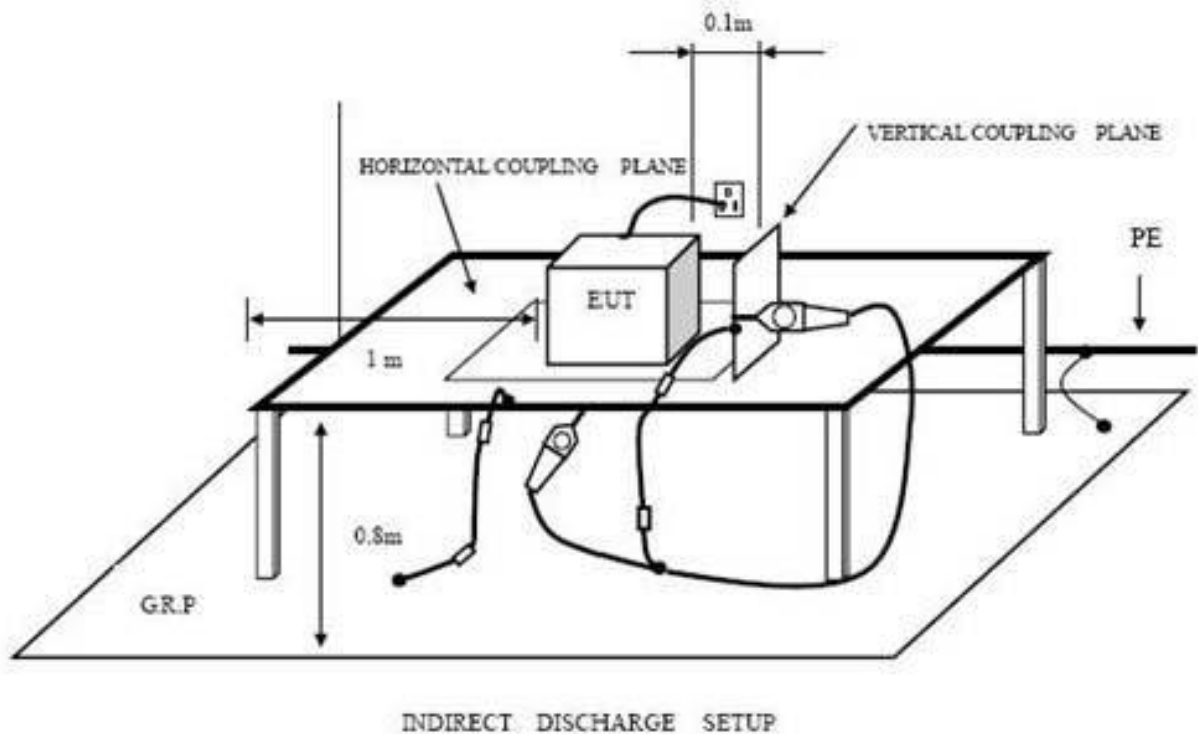
EN IEC 61000-6-2: 2019 (EN 61000-4-2:2009)

#### 5.1.2. Test Level

<b>Discharge Impedance:</b>	330 ohm/ 150pF
<b>Discharge Voltage:</b>	Air Discharge: 2kV/4kV/8kV(Direct) Contact Discharge: 2kV/4kV (Direct /Indirect)
<b>Polarity:</b>	Positive& Negative
<b>Number of Discharge:</b>	Air Discharge: min.20 times at each test point Contact Discharge: min.200 times in total
<b>Discharge Mode:</b>	Single Discharge
<b>Discharge Period:</b>	1 second minimum

#### 5.1.3. Performance criterion: B

### 5.2. Test Setup



### 5.3. Test Procedure

#### 5.3.1. 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.

#### 5.3.2. Contact Discharge:

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

#### 5.3.3. 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.

#### 5.3.4. Indirect discharge for vertical coupling plane

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

### 5.4. Deviation From Test Standard

No deviation

### 5.5. Test Data

Please refer to the Attachment B.

## 6. Radiated Electromagnetic Field Immunity Test

### 6.1. Test Requirements

#### 6.1.1. Test Standard

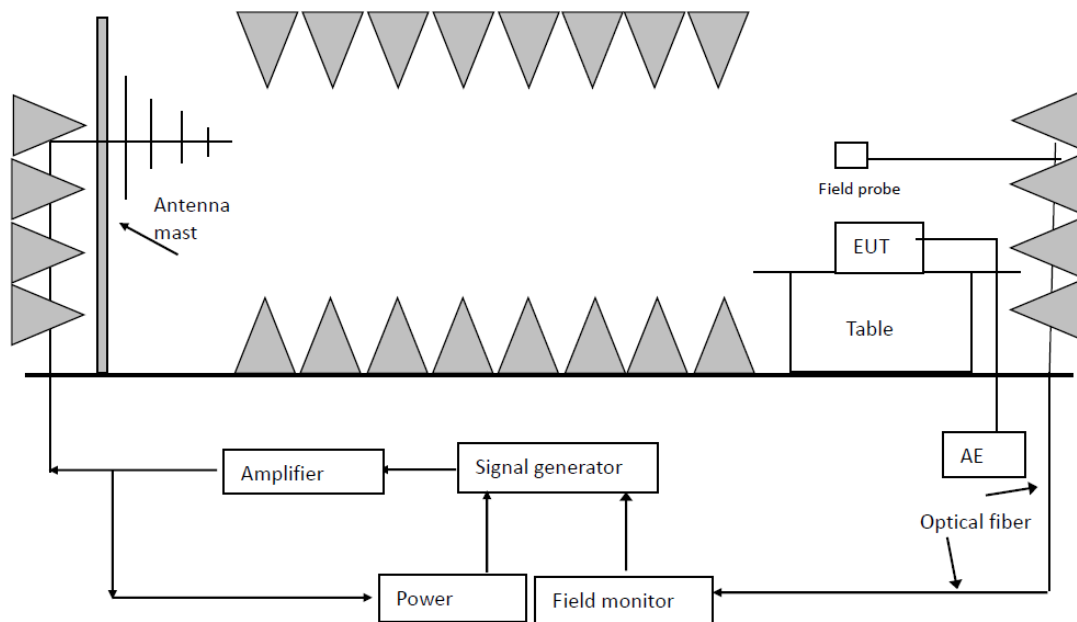
EN IEC 61000-6-2: 2019 (EN 61000-4-3:2006+A1:2008+A2:2010)

#### 6.1.2. Test Level

Port	Test Specification
Enclosure Port	80-1000MHz 10 V/m 80 % AM (1kHz)
	1400-6000MHz 3 V/m 80 % AM (1kHz)
	2000-2700MHz 1 V/m 80 % AM (1kHz)

#### 6.1.3. Performance criterion: A

### 6.2. Test Setup



**6.3. 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 camera is used to monitor its screen.

All the scanning conditions are as following:

Condition of Test	Remark		
	10V/m	3V/m	1V/m
Fielded strength	Modulated	Modulated	Modulated
Radiated signal	80-1000MHz	1400-6000MHz	2000-2700MHz
Scanning frequency	3 Sec.	3 Sec.	3 Sec.
Dwell time			

**6.4. Deviation From Test Standard**

No deviation

**6.5. Test Data**

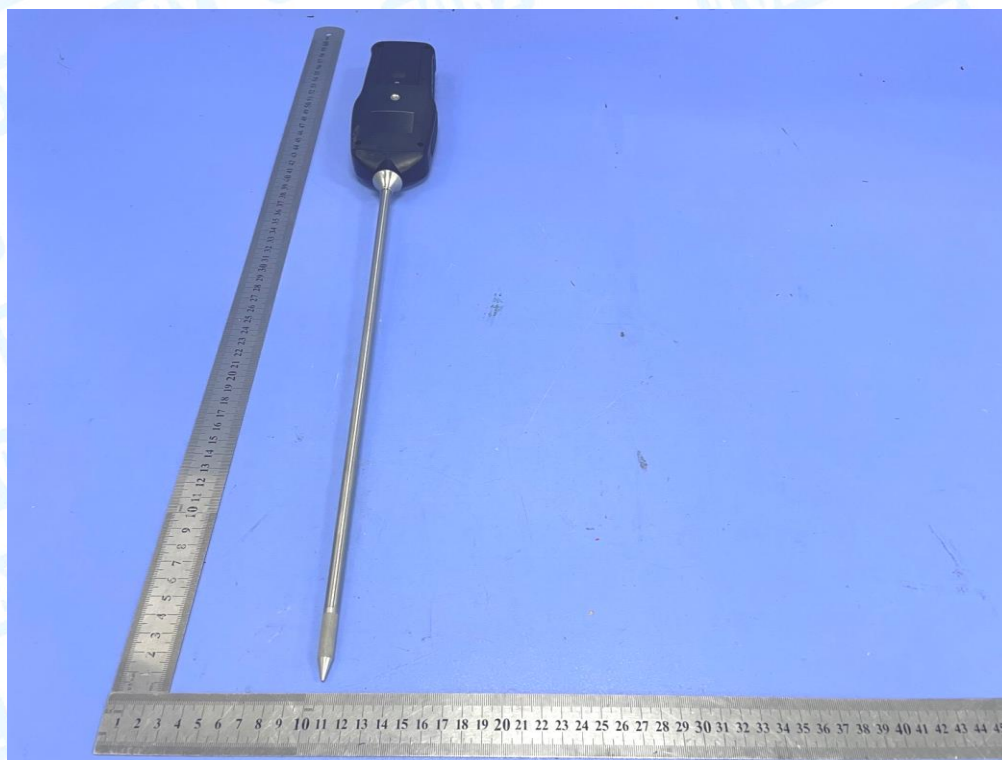
Please refer to the Attachment C.

## 7. Photographs - Constructional Details

Photo 1 Appearance of EUT



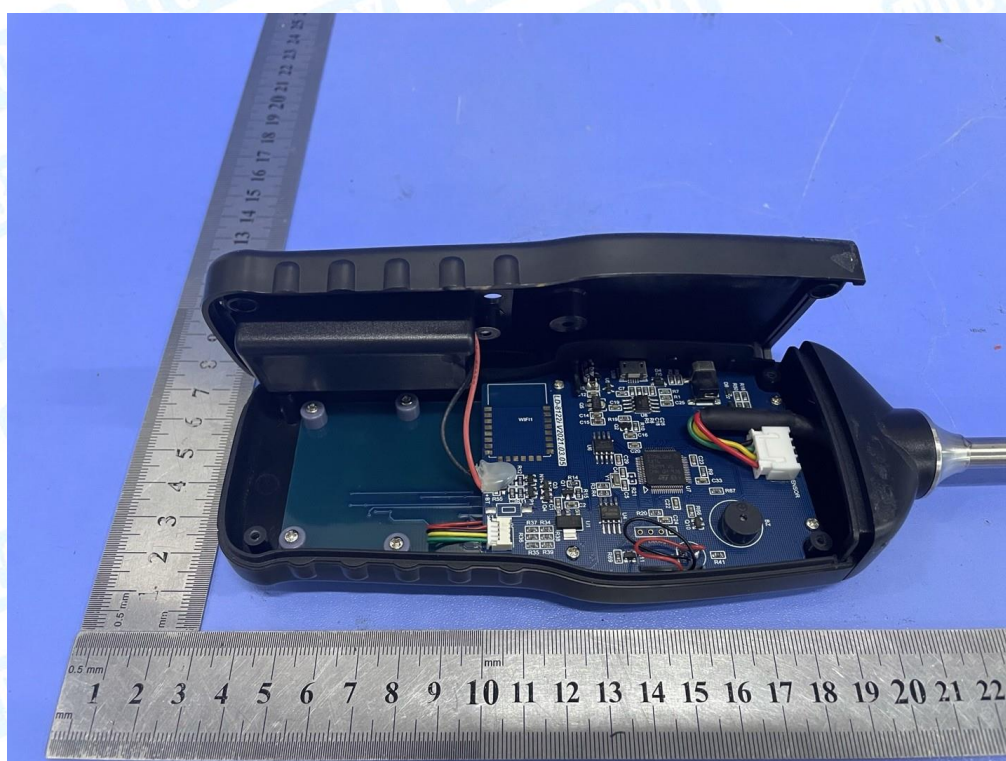
Photo 2 Appearance of EUT



**Photo 3 Appearance of EUT**



**Photo 4 Internal of EUT**





## 8. Photographs - Test Setup

### Radiated Emission Test Setup

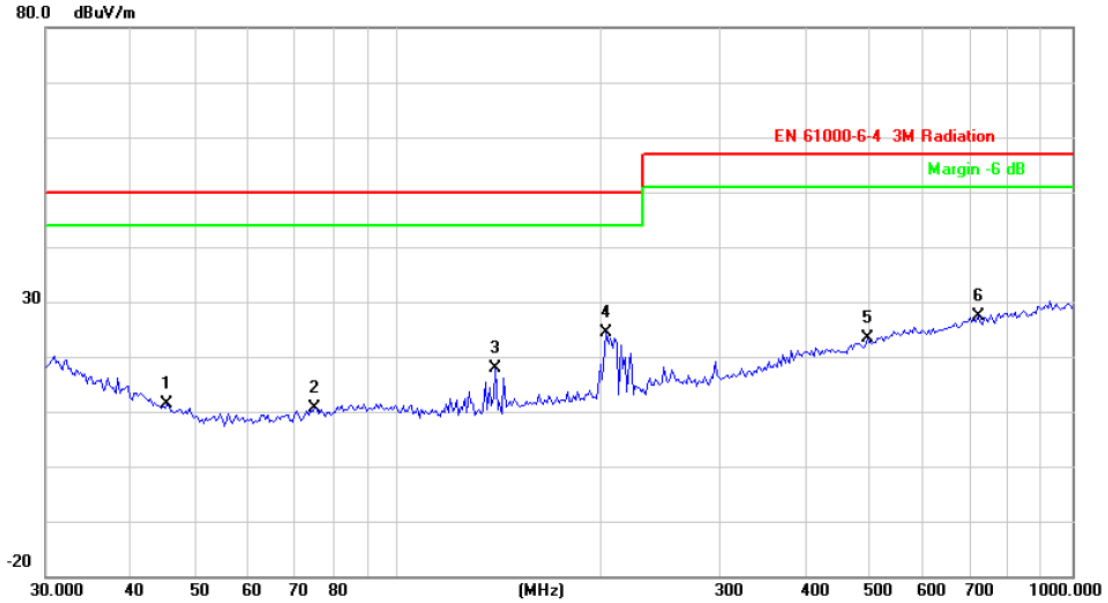


### Electrostatic Discharge Test Setup



## Attachment A--Radiated Emission Test Data (Below 1G)

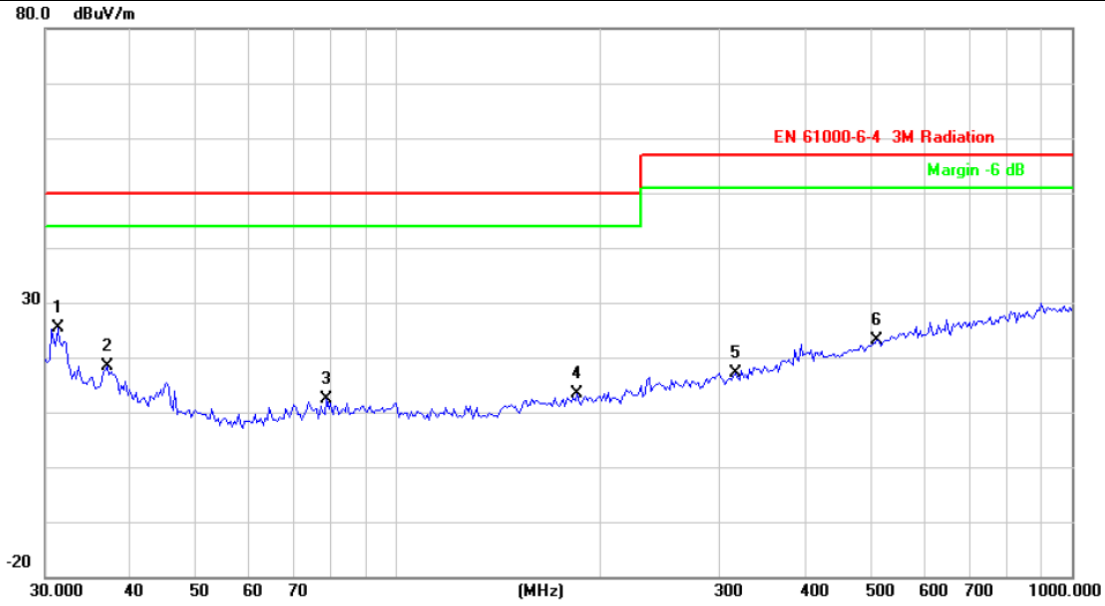
<b>Temperature:</b>	23.9 °C	<b>Relative Humidity:</b>	44%
<b>Pressure:</b>	1010 hPa		
<b>Test Voltage:</b>	DC 9V		
<b>Ant. Pol.</b>	Horizontal		
<b>Test Mode:</b>	Mode 1		
<b>Remark:</b>	Only showed test data of the worst mode.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		45.3755	32.87	-21.54	11.33	50.00	-38.67	peak
2		75.1822	33.55	-22.90	10.65	50.00	-39.35	peak
3		139.3613	40.36	-22.38	17.98	50.00	-32.02	peak
4	*	203.5228	44.17	-19.76	24.41	50.00	-25.59	peak
5		495.9344	34.00	-10.60	23.40	57.00	-33.60	peak
6		724.2611	33.97	-6.68	27.29	57.00	-29.71	peak

Emission Level= Read Level+ Correct Factor

<b>Temperature:</b>	23.9 °C	<b>Relative Humidity:</b>	44%
<b>Pressure:</b>	1010 hPa		
<b>Test Voltage:</b>	DC 9V		
<b>Ant. Pol.</b>	Vertical		
<b>Test Mode:</b>	Mode 1		
<b>Remark:</b>	Only showed test data of the worst mode.		



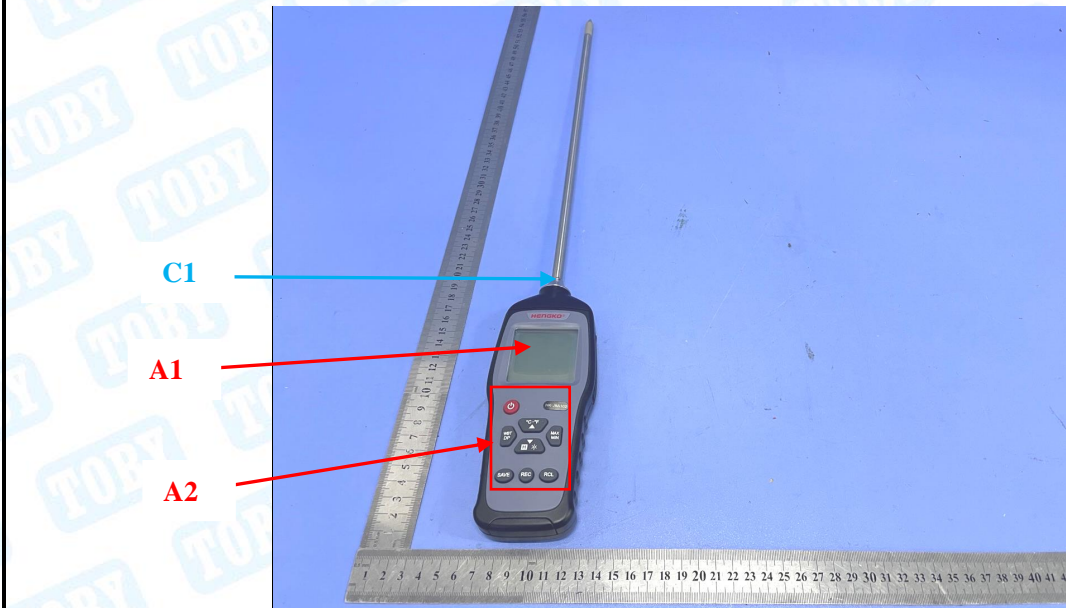
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	31.2893	39.28	-13.91	25.37	50.00	-24.63	peak
2		37.0248	36.00	-17.61	18.39	50.00	-31.61	peak
3		78.4133	35.10	-22.60	12.50	50.00	-37.50	peak
4		184.4898	33.28	-19.98	13.30	50.00	-36.70	peak
5		316.5890	32.93	-15.75	17.18	57.00	-39.82	peak
6		513.6331	33.07	-10.05	23.02	57.00	-33.98	peak

**Emission Level= Read Level+ Correct Factor**

## Attachment B--Electrostatic Discharge Test Data

Temperature : 22.6°C	Humidity : 41%		
Power supply : DC 9V	Test Mode : Mode 1		
<b>Required Performance Criteria: B</b>			
Air Discharge: $\pm 2/\pm 4/\pm 8$ kV    Contact Discharge: $\pm 2/\pm 4$ kV			
Location	Test Level (kV)	Judgment	Result
A1	$\pm 2$ kV $\pm 4$ kV $\pm 8$ kV	A	<b>PASS</b>
A2		A	
C1	$\pm 2$ kV $\pm 4$ kV	A	
HCP	$\pm 4$ kV	A	
VCP	$\pm 4$ kV	A	

## Test Location Photos



## Note:

- 1) Criteria A: There was no change operated with initial operating during the test.
- 2) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 3) Criteria C: The system shut down during the test.

## Attachment C--RF Field Strength Susceptibility Test Data

Temperature : 23.2°C Humidity : 42%

Power supply : DC 9V Test Mode : Mode 1

### Required Performance Criteria: A

Position	Frequency Range 1		Frequency Range 2		Frequency Range 3		Result
	80~1000MHz		1400~2000MHz		2000~2700MHz		
	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	
Front	A	A	A	A	A	A	<b>PASS</b>
Right	A	A	A	A	A	A	
Rear	A	A	A	A	A	A	
Left	A	A	A	A	A	A	

### Remark:

- 1) Criteria A: There was no change operated with initial operating during the test.
- 2) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 3) Criteria C: The system shut down during the test.

-----END OF REPORT-----