

CTS (NINGBO) TESTING SERVICE TECHNOLOGY INTERNATIONAL

OPERATE ACCORDING TO ISO/IEC 17025

EMC TEST REPORT

TEST REPORT NUMBER: CNB3171011-00926-E





CTS (Ningbo) Testing Service Technology Co., Ltd.

Fl.1 & 8 West, Bldg. B, No. 66, Qingyi Rd., Hi-Tech Zone, Ningbo, Zhejiang, China





TEST REPORT EN 61000-6-3:2007+A1:2011+AC:2012

Electromagnetic compatibility (EMC) —Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments

EN 61000-6-1:2007

Electromagnetic compatibility (EMC) —Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments

Report Reference No. CNB3171011-00926-E

Date of issue 16 October 2017

Testing Laboratory Name...... CTS (Ningbo) Testing Service Technology Co., Ltd.

Guangzhou, Guangdong, China.

Testing location/ procedure..... Full application of Harmonised standards ■

Partial application of Harmonised standards \square

Other standard testing method \square

Applicant's name Shanghai Ninetian Automation Equipment Co., Ltd.

Address Room 212, No. 999, Sunqiao Rd., Pudong New District, Shanghai,

China (Mainland)

Test specification:

Standard...... EN 61000-6-3:2007+A1:2011+AC:2012, EN 61000-6-1:2007

Test Report Form No. CTSEMC-1.0

TRF Originator CTS (Ningbo) Testing Service Technology Co., Ltd.

Master TRF Dated 2009-01

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Test item description...... Thermometer

Trade Mark.....FLYB

Manufacturer Shanghai Ninetian Automation Equipment Co., Ltd.

Model/Type reference ET925

Ratings Battery 1.5V*2

ResultPASSED

Compiled by:

Supervised by:

Approved by:

Kate zhang / File administrators

Duke yang / Technique principal

Vincent yao / Manager

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EMC -- TEST REPORT

Test Report No. : CNB3171011-00926-E

16 October 2017
Date of issue

ET925
Thermometer
Shanghai Ninetian Automation Equipment Co., Ltd.
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Mr. Allen Wang

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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1 TEST STANDARDS

The tests were performed according to following standards:

EN 61000-6-3:2007+A1:2011+AC:2012 Electromagnetic compatibility (EMC) —Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments

EN 61000-6-1:2007 Electromagnetic compatibility (EMC) —Part 6-1: Generic standards — Immunity for residential, commercial and light-industrial environments

2 SUMMARY

2.1 GENERAL REMARKS

Date of receipt of test sample	13 October 2017
Testing commenced on	13~16 October 2017
Testing concluded on	16 October 2017

2.2 FINAL ASSESSMENT

TI	requirements		- 41	4	-4				
me	reduirements	репаниот) IIIe	Technicai	Siandards	and lested	oberanon	modes	are

fulfilled.

□ - **not** fulfilled.

The equipment under test

fulfils the EMC requirements cited on page 1.

- does not fulfil the EMC requirements cited on page 1.

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3 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage: ■ Battery 1.5V*2

☐ Other (Specified blank below)

3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: Serial number: Prototype

3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

Normal

Operating Mode:	Normal
Fusionismo tonto	According to EN 04000 C 2 according for the high act distrubures
Emissions tests	: According to EN 61000-6-3, searching for the highest disturbance.
Immunity tests	: According to EN 61000-6-1, searching for the highest susceptivity.

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3.4 EUT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement:

Not Applicable

3.5 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

3.6 Definition related to the performance level

- based on the used product standard
- ☐ based on the declaration of the manufacturer, requestor or purchaser

Criterion A:

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

Criterion B:

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

Criterion C:

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

Criterion D:

Definition: loss of function or degradation of performance, which is not recoverable, owing to damage to hardware or software, or loss of data:

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4 TEST ENVIRONMENT

4.1 Address of the test laboratory

GZ test site: A101, No.65, Zhuji Road, Tianhe District, Guangzhou, Guangdong, China

Tel: +86-20-85543113 (32 lines) Fax: +86-20-38780406

4.2 Test facility

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

CNAS-Lab Code: L3394

CTS (Ningbo) Testing Service Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

IC-Registration No.: 8374A

The 3m Alternate Test Site of CTS (Ningbo) Testing Service Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374A on May 22, 2014.

FCC-Registration No.: 971995

CTS (Ningbo) Testing Service Technology 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 No.971995, July 13, 2012.

4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 ° C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

4.4 Definitions of symbols used in this test report

- The black square indicates that the listed condition, standard or equipment is applicable for this report.
- The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

4.5 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 CTS 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.

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4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	±1.22dB	(1)
Power disturbance	30MHz~300MHz	±1.38dB	(1)
Dediction emission (2m)	30MHz~300MHz	±3.14dB	(1)
Radiation emission (3m)	300MHz~1000MHz	±3.18dB	(1)

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

4.7 Test Description

4.7.1 Description of Standards and Results

EMISSION (EN 61000-6-3:2007+A1:2011+AC:2012)						
Description of Test Item		Standard			Results	
Conducted disturbance at mains terminals	EN 610	000-6-3:2007+A1:2011+AC:20)12		N/A	
Conducted disturbance at telecommunication port	EN 610	000-6-3:2007+A1:2011+AC:20)12		N/A	
Radiated disturbance	EN 610	00-6-3:2007+A1:2011+AC:20)12		PASS	
Harmonic current emissions		EN 61000-3-2:2014		Class A	N/A	
Voltage fluctuations & flicker		EN 61000-3-3:2013			N/A	
	IMMUNITY (EN 61000-6-1:2007)					
Description of Test Ite	em	Basic Standard		formance Criteria	Results	
Electrostatic discharge (ESD)		IEC 61000-4-2: 2008		В	PASS	
Radio-frequency, Continuous radiated disturbance		IEC 61000-4-3:2006 +A1:2007+A2:2010		Α	PASS	
Electrical fast transient (EFT)		IEC 61000-4-4:2012		В	N/A	
Surge (Input a.c. power ports)	ı	IEC 61000-4-5: 2014		В	N/A	
Radio-frequency, Continuous conducted disturbance		IEC 61000-4-6: 2013		Α	N/A	
Power frequency magnetic field		IEC 61000-4-8: 2009		Α	PASS	
Voltage dips, >95% reduction				В	N/A	
Voltage dips, 30% reduction		IEC 61000-4-11: 2004		В	N/A	
Voltage interruptions				С	N/A	
N/A is an abbreviation for No	N/A is an abbreviation for Not Applicable.					

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⁽²⁾ The actual EUT tested items in this test report, only applies to this "measurement uncertainty" in part / all of the corresponding data.





5 TEST CONDITIONS AND RESULTS

5.1 Radiated disturbance (electric field)

For test instruments and accessories used see section 6 part 6.1.

5.1.1 Description of the test location

Test location : Semi-Anechoic chamber

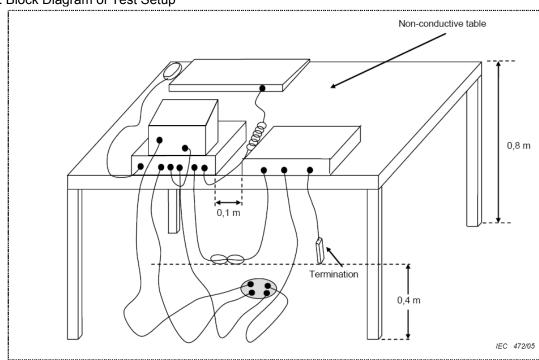
Test disturbance: 3 Meter

5.1.2 Description of the test set-up

5.1.2.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.1.2.2 Block Diagram of Test Setup



5.1.3 Limits of disturbance

Frequency (MHz)				
30 ~ 230	3	3 40		
230 ~ 1000	3	47		

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

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5.1.4 Test result

The requirements are	Fulfilled
Band width	120kHz
Frequency range	30 MHz - 1000 MHz
Min. limit margin	>18.45 dB at 30 - 1000 MHz

Remarks: The limits are kept. For detailed results, please see the following page(s).

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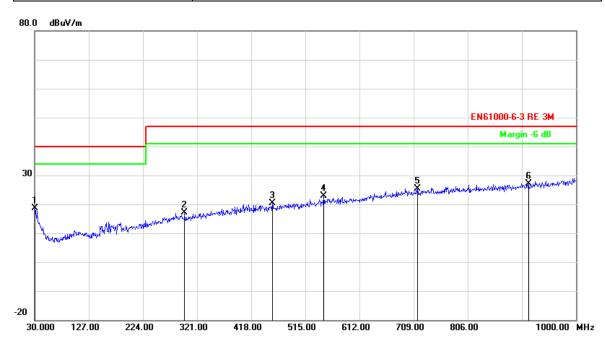
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5.1.5 Test protocol

Test point:	Horizontal	Result:	- passed
Operation mode	Normal		□ - not passed
Remarks:			

EUT	Thermometer		
Operating Condition	Battery 1.5V*2		
Test Condition	Ambient Temperature: 24°C Humidity: 56%		
Operator	Andy		
MODEL NO.	ET925		



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	30.0000	-10.67	29.29	18.62	40.00	-21.38	QP
2	298.6900	-12.87	29.97	17.10	47.00	-29.90	QP
3	455.8300	-8.71	29.13	20.42	47.00	-26.58	QP
4	547.9800	-6.85	29.67	22.82	47.00	-24.18	QP
5	715.7900	-3.22	28.52	25.30	47.00	-21.70	QP
6	914.6400	-0.86	28.06	27.20	47.00	-19.80	QP

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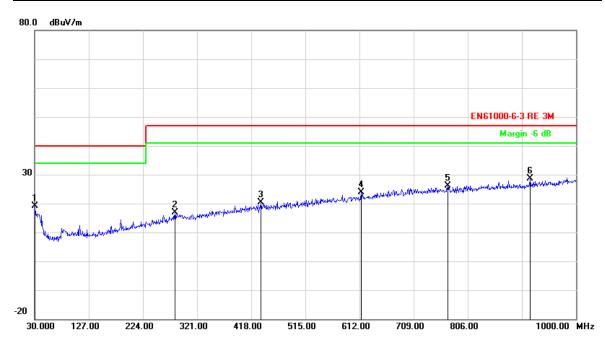
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Test point:	Vertical	Result:	■ - passed
Operation mode	Normal		☐ - not passed
Remarks:			'

EUT	Thermometer
MODEL NO.	ET925
Operating Condition	Battery 1.5V*2
Test Condition	Ambient Temperature: 24°C Humidity: 56%
Operator	Andy



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	30.0000	-10.67	29.76	19.09	40.00	-20.91	QP
2	281.2300	-13.08	29.84	16.76	47.00	-30.24	QP
3	435.4600	-9.09	29.55	20.46	47.00	-26.54	QP
4	614.9099	-5.47	29.23	23.76	47.00	-23.24	QP
5	770.1100	-2.54	28.70	26.16	47.00	-20.84	QP
6	917.5500	-0.80	29.35	28.55	47.00	-18.45	QP

Note:Level=Reading+Factor. Margin= Limit-Level

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5.2 Electrostatic discharge

For test instruments and accessories used see section 6 part 6.2.

5.2.1 Description of the test location

Test location:	Test location no. 2
Power supply:	Battery 1.5V*2
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	13~16 October 2017
Operator :	Andy

5.2.2 Severity of levels electrostatic discharge

5.2.2.1 Severity level: Contact discharge at \pm 4KV air discharge at \pm 8KV

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

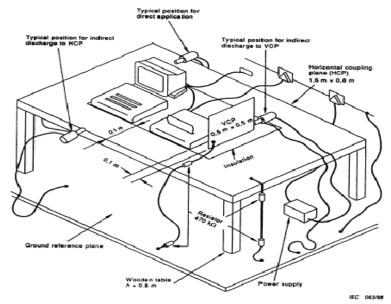
5.2.2.2 Performance criterion: B

5.2.3 Description of the test set-up

5.2.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.2.3.2 Block Diagram of Test Setup



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5.2.4 Test specification:

Contact discharge voltage:	■ 2 kV ■ 4 kV		
Air discharge voltage:	■ 2 kV ■ 4 kV ■ 8 kV		
Discharge impedance:	■ 330 Ω / 150 pF		
Discharge factor:	■ ≥ 1 sec.		
Number of discharges:	■ ≥ 10		
Type of discharge:	Direct discharge ■ Air discharge		
	■ Contact discharge Indirect discharge ■ Contact discharge		
Polarity:	■ Positive ■ Negative		
Discharge location:	■see photo documentation of the test set-up		
	■all external locations accessible by hand		
	■horizontal plate (HCP)		
	■vertical coupling plate (VCP)		

5.2.5 Test result

The requirements are **Fulfilled** Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

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5.3 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 6 part 6.3.

5.3.1 Description of the test location

Test location:	Test location no. 2
Power supply:	Battery 1.5V*2
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	13~16 October 2017
Operator :	Andy

5.3.2 Severity levels of radiated, Radio-frequency, electromagnetic field

5.3.2.1 Severity level: 3V/m and 1V/m

Level	Field strenght(V/m)
1	1
2	3
3	10
X	Special

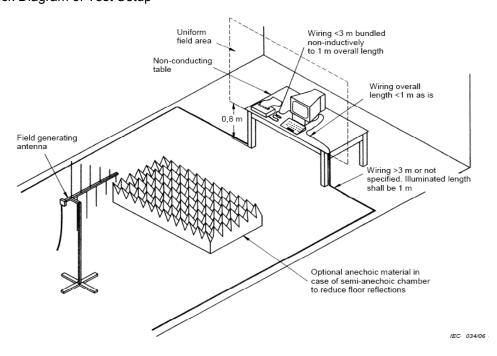
5.3.2.2 Performance criterion: A

5.3.3 Description of the test set-up

5.3.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.3.3.2 Block Diagram of Test Setup



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5.3.4 Test specification:

Test specification:			
Frequency range:	■ 80 MHz to 1000 MHz		
Field strength:	■ 3 V/m		
EUT - antenna separation:	■ 3 m		
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz		
Frequency step:	■ 1 % with 3 s dwell time		
Antenna polarisation:	■ horizontal ■ vertical		
Frequency range:	■ 1400 MHz to 2000 MHz		
Field strength:	■ 3 V/m		
EUT - antenna separation:	■ 3 m		
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz		
Frequency step:	■ 1 % with 3 s dwell time		
Antenna polarisation:	■ horizontal ■ vertical		
Frequency range:	■ 2000 MHz to 2700 MHz		
Field strength:	■ 1 V/m		
EUT - antenna separation:	■ 3 m		
Modulation:	■ AM: 80 % ■ sinusoidal 1000Hz		
Frequency step:	■ 1 % with 3 s dwell time		

5.3.5 Test result

The requirements are **Fulfilled** Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

horizontal

vertical

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Antenna polarisation:

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5.4 Power frequency magnetic field

For test instruments and accessories used see section 6 part 6.4.

5.4.1 Description of the test location

Test location:	Test location no. 2
Power supply:	Battery 1.5V*2
Test condition:	Ambient Temperature: 24℃, Humidity:56%
Date of test :	13~16 October 2017
Operator :	Andy

5.4.2 Severity levels of magnetic field immunity

5.4.2.1 Severity Level: 3A/m

Level	Magnetic Field Strength (A/m)
1	1
2	3
3	10
4	30
5	100
X	Special

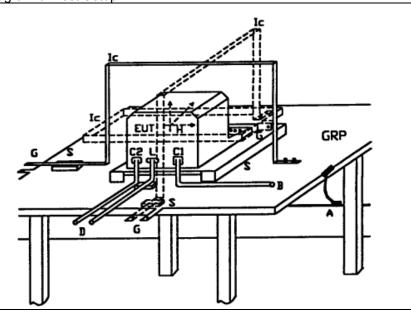
5.4.2.2 Performance Criterion: A

5.4.3 Description of the test set-up

5.4.3.1 Operating Condition

The EUT is normal during the test, and the results of the maximum emanation are recorded

5.4.3.2 Block Diagram of Test Setup



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5.4.4 Test specification:

Test frequency:	■ 50 Hz
Continuous field:	■ 3 A/m
Continuous neid.	3 7 7 111
Duration (Continuous field):	■ 60 s each Axis
Short duration (1-3s):	■ 3S
Axis:	■ x-axis ■ y-axis ■ z-axis

5.4.5 Test result

The requirements are **Fulfilled** Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

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6 USED TEST EQUIPMENT

6.1

•••					
Radiated Emission(Electric field)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal analyzer	ROHDE & SCHWARZ	FSIQ26	100311	2017/04/26
2	EMI Test Receiver	ROHDE & SCHWARZ	ESVS 10	842885/001	2016/10/24
3	Log per Antenna	ETS	3142C	00060447	2017/03/29
4	Pre-Amplifier	EMC	EMC330	980113	2017/04/26
5	Pre-Amplifier	EMC	EMC012645	980114	2017/04/26
6	EMI Test Software	Farad	EZ-EMC	N/A	N/A

6.2

Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	Schlöder	SESD 230	106003	2017/01/06

6.3

RF Field Strength Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Signal Generator	ROHDE & SCHWARZ	ROHDE & SCHWARZ SMY 01 843215/0		2016/10/24
2	Signal Generator	ROHDE & SCHWARZ	SML03	102986	2016/10/24
3	Amplifier	KALMUS	713FC	7385-1	2016/10/24
4	Power Meter	ROHDE & SCHWARZ	NRVS	842856/049	2016/10/24
5	Field Probe	ETS	HI-6005	00075047	2016/10/24
6	RS Test Software	Farad	EZ-RS	N/A	N/A

6.4

Power Frequency Magnetic Field Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	
1	Power frequency mag-field generator System	EM TEST	EMS61000-8K	409001	2016/10/24	

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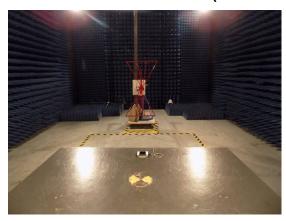
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7 TEST PHOTOGRAPHS

7.1. Photo of radiated emission measurement (R.E. Electric field)



7.2. Photo of electrostatic discharge Immunity measurement (E.S.D.)



7.3. Photo of RF field strength Immunity measurement (R.S.)



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7.4. Photo of PFM field immunity measurement (P.F.M.F.)



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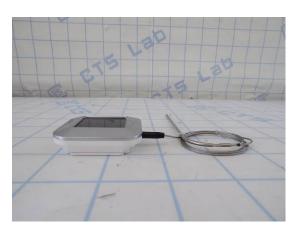




8 EXTERNAL AND INTERNAL PHOTOS OF THE EUT



External view 1



External view 2



External view 3

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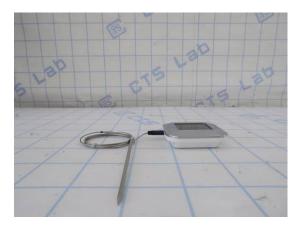
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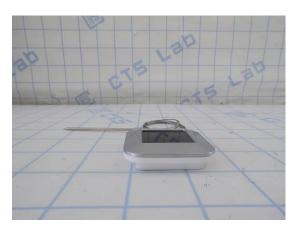
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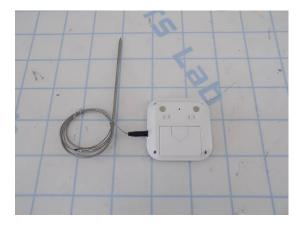




External view 4



External view 5



External view 6

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Internal view 1



Internal view 2



PCB view 1

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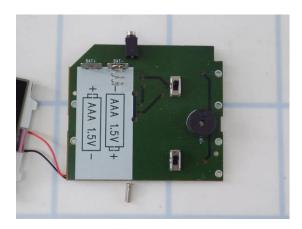
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PCB view 2

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9 Manufacturer/ Approval holder Declaration

The following identical model(s):

ET922, ET923, ET924, ET926, ET927, ET928, ET929, ET930, HTC-1, HTC-2, TP-101, WSK

Belong to the tested device:

Product description: **Thermometer**Model name: **ET925**

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