



Shenzhen CTL Testing Technology Co., Ltd.
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TEST REPORT

EN 61000-6-4

Generic standards - Emission standard for industrial environments

EN 61000-6-2

Generic standards - Immunity for industrial environments

Report Reference No.....: CTL1910119011-E

Compiled by

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Date of issue.....: Oct. 16, 2019

Testing Laboratory Name: Shenzhen CTL Testing Technology Co., Ltd.

Address.....: Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road,
Nanshan District, Shenzhen, China 518055

Testing location/ procedure: Full application of Harmonised standards
Partial application of Harmonised standards
Other standard testing methods

Applicant's name.....: Dandong Top Electronics Instrument (Group)Co.,Ltd

Address.....: 10 huanghai street, dandong city

Test specification:

Standard: EN 61000-6-4:2007+A1: 2011
EN 61000-6-2:2005

Non-standard test method.....: /

TRF Originator.....: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF.....: Dated 2011-01

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Test item description: VARIABLE AREA FLOWMETER (ROTAMETER)

Trade Mark: /

Test voltage: DC 24V

Result.....: Pass



EMC -- TEST REPORT

Test Report No. :	CTL1910119011-E	Oct. 16, 2019 Date of issue
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Equipment under Test : VARIABLE AREA FLOWMETER (ROTAMETER)

Model /Type : MTF

Listed Models : /

Applicant : **Dandong Top Electronics Instrument (Group)Co.,Ltd**

Address : 10 huanghai street, dandong city

Manufacturer : **Dandong Top Electronics Instrument (Group)Co.,Ltd**

Address : 10 huanghai street, dandong city

Test Result	Pass
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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.

History of this test report

Report No.	Version	Description	Issued Date
CTL1910119011-E	V1.0	Initial Issued Report	Oct. 16, 2019

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1 TEST STANDARDS

The tests were performed according to following standards:

[EN 61000-6-4:2007+A1: 2011](#) Electromagnetic compatibility (EMC) -- Part 6-4: Generic standards - Emission standard for industrial environments -- Part 1: Emission

[EN 61000-6-2:2005](#) Electromagnetic compatibility (EMC) -- Part 6-2: Generic standards - Immunity for industrial environments -- Part 2: Immunity

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample : Oct. 14, 2019

Testing commenced on : Oct. 14, 2019

Testing concluded on : Oct. 16, 2019

2.2 Equipment Under Test

Power supply system utilised

Power supply voltage : o 230V / 50 Hz o 115V / 60Hz
 o 5 V DC ■ 24 V DC
 o Other (specified in blank below)

_____ / _____

2.3 Short description of the Equipment under Test (EUT)

The EUT is a VARIABLE AREA FLOWMETER (ROTAMETER).

EUT operation mode

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

Test program (customer specific)

Emissions tests.....: According to EN 61000-6-4, searching for the highest disturbance.

Immunity tests: According to EN 61000-6-2, searching for the highest susceptibility.

EUT configuration

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

- - supplied by the manufacturer
- - supplied by the lab

	/
	/
	/
/	/
	/

2.4 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.

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:

The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

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:

The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Criterion C:

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

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shaheji Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.4 and CISPR 22/EN 55022 requirements.

3.2 Test Facility

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

IC Registration No.: 9618B

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

FCC-Registration No.: 399832

Shenzhen CTL Testing 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 399832, December 08, 2017.

Certificated by A2LA, USA

Registration No.:4343.01

Date of registration: December 27, 2017

3.3 Environmental conditions

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

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

3.4 Test Description

Emission Measurement		
Radiated Emission	EN 61000-6-4:2007+A1: 2011	PASS
Immunity Measurement		
Electrostatic Discharge	EN 61000-6-2:2005 IEC 61000-4-2: 2008	PASS
RF Field Strength Susceptibility	EN 61000-6-4:2007+A1: 2011 IEC 61000-4-3: 2010	PASS
Power Frequency Magnetic Field Susceptibility Test	EN 61000-6-4:2007+A1: 2011 IEC 61000-4-8: 2009	PASS

Remark:

1. The test result PASS and /or FAIL has no relationship with the measurement uncertainty.

3.5 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 Shenzhen CTL Testing Technology Co., Ltd. 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.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission(chamber 1)	30~1000MHz	±3.20dB	(1)
Radiated Emission(chamber 2)	30~1000MHz	±3.53dB	(1)
Radiated Emission	Above 1GHz	±4.32dB	(1)
Conducted Emission	0.15~30MHz	±2.66dB	(1)
Disturbance Power	30~300MHz	±2.90dB	(1)

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

3.6 Equipments Used during the Test

Radiated Emission(chamber 1)						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	ULTRA-BROADBAND ANTENNA	Sunol Sciences Corp.	JB1 Antenna	A061713	2019/05/23	2020/05/22
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2019/05/21	2020/05/20
3	Horn Antenna	Sunol Sciences Corp	DRH-118	A062013	2019/05/23	2020/05/22

Electrostatic Discharge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	ESD Simulator	TESEQ AG	NSG 437	1058	2019/09/24	2020/09/23

Power Frequency Magnetic Field Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	MAGNETIC COIL	HTEC Instruments Ltd.	HPFMF	154402	2019/05/23	2020/05/22

RF Field Strength Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	SIGNAL GENERATOR	Agilent	N5182A	MY50142850	2019/05/20	2020/05/19
2	Power Amplifier	AR	150W1000M3	117	2019/09/23	2020/09/22
3	Power Amplifier	Mico Top	MPA-1000-6000-100	MPA1906286	2019/09/23	2020/09/22
4	Power Meter	Agilent	E4419B	GB43317877	2019/09/23	2020/09/22
5	Power transmitter	Agilent	E9301A	MQ/2217182-2	2019/09/23	2020/09/22
6	Test Antenna-Bi-Log	Schwarzbeck	VULB 9118 E	N/A	2019/09/26	2020/09/25
7	Power transmitter	HP	8481A	2349A43969	2019/09/23	2020/09/22
8	Directional Coupler	AR	DC6180A	N/A	2019/09/23	2020/09/22
9	Hom Antenna	Sunol Sciences Corp	DRH-118	A062013	2019/09/23	2020/09/22

4 TEST CONDITIONS AND RESULTS

4.1 Radiated Emission

For test instruments and accessories used see section 3.6.

4.1.1 Description of the test location

Test location: Radiation Lab

4.1.2 Limits of disturbance

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 230	3	50
230 ~ 1000	3	57

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.

4.1.3 Description of the test set-up

4.1.3.1 Operating Condition

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

4.1.3.2 Test Configuration and Procedure

EUT is tested in Semi-Anechoic Chamber. EUT is placed on a nonmetal table which is 0.8 meter above a grounded turntable. The turntable can rotate 360 degrees to determine the azimuth of the maximum emission level. EUT is set 3 meters away from the center of receiving antenna. The antenna can move up and down from 1 to 4 meter to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna are set on the test.

4.1.4 Test result

The requirements are **Fulfilled**

Band Width: 120 KHz

Frequency Range: 30 MHz to 1000 MHz

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

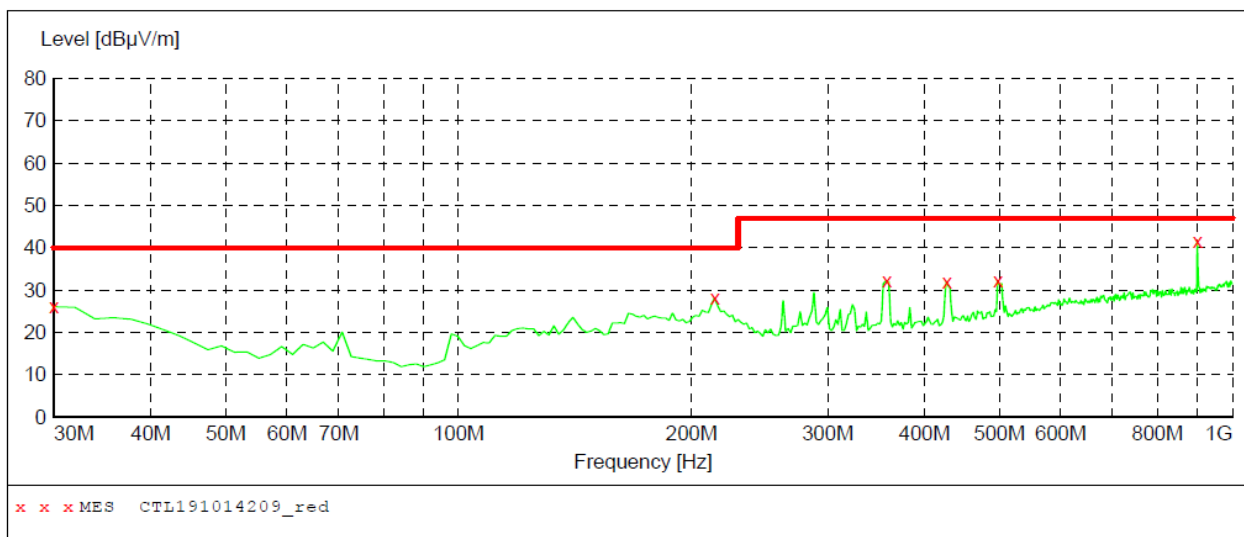
Shenzhen CTL Testing Technology Co.,Ltd

Radiation Emission Test EN 61000-6-4

EUT: MTF
 Manufacturer: Dandong Top Electronics Instrument (Group)Co.,Ltd
 Operating Condition: WORKING
 Test Site: Chamber1
 Operator: ZGS
 Test Specification: DC 24V
 Comment:
 Start of Test: 2019-10-14 / 23:27:31

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength				
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer	
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	100 kHz	JB1	



MEASUREMENT RESULT: "CTL191014209_red"

2019-10-14 23:28

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	26.10	22.2	40.0	13.9	---	0.0	0.00	VERTICAL
214.300000	28.10	14.4	40.0	11.9	---	0.0	0.00	VERTICAL
357.860000	32.10	17.4	47.0	14.9	---	0.0	0.00	VERTICAL
427.700000	32.00	18.9	47.0	15.0	---	0.0	0.00	VERTICAL
497.540000	32.30	20.5	47.0	14.7	---	0.0	0.00	VERTICAL
901.060000	41.60	26.3	47.0	5.4	---	0.0	0.00	VERTICAL

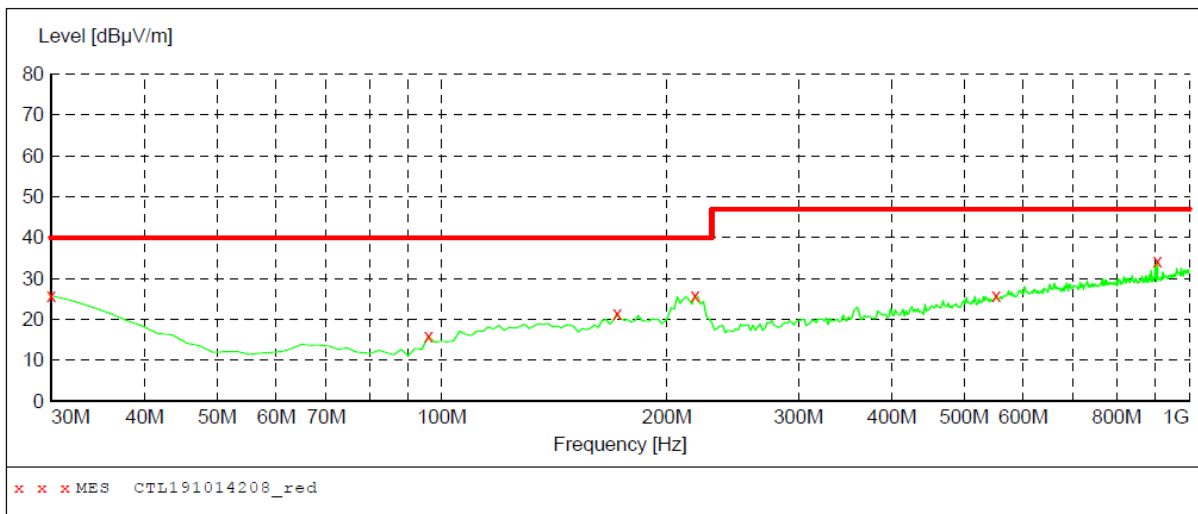
Shenzhen CTL Testing Technology Co.,Ltd

Radiation Emission Test EN 61000-6-4

EUT: MTF
 Manufacturer: Dandong Top Electronics Instrument (Group)Co.,Ltd
 Operating Condition: WORKING
 Test Site: Chamber1
 Operator: ZGS
 Test Specification: DC 24V
 Comment:
 Start of Test: 2019-10-14 / 23:24:38

SWEEP TABLE: "test (30M-1G)"

Short Description:		Field Strength			
Start	Stop	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	MaxPeak	300.0 ms	100 kHz	JB1
30.0 MHz	1.0 GHz				



MEASUREMENT RESULT: "CTL191014208_red"

2019-10-14 23:26

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	25.80	22.2	40.0	14.2	---	0.0	0.00	HORIZONTAL
95.960000	15.90	10.3	40.0	24.1	---	0.0	0.00	HORIZONTAL
171.620000	21.50	14.5	40.0	18.5	---	0.0	0.00	HORIZONTAL
218.180000	25.90	14.4	40.0	14.1	---	0.0	0.00	HORIZONTAL
551.860000	25.70	21.9	47.0	21.3	---	0.0	0.00	HORIZONTAL
906.880000	34.40	26.4	47.0	12.6	---	0.0	0.00	HORIZONTAL

4.2 Electrostatic discharge

For test instruments and accessories used see section 3.6.

4.2.1 Description of the test location and date

Test location: 1# EMC Test Room

Date of test: Oct. 15, 2019

Operator: Pan

4.2.2 Severity levels of electrostatic discharge

4.2.2.1 Severity level: Contact Discharge at $\pm 4\text{KV}$ Air Discharge at $\pm 8\text{KV}$

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

4.2.2.2 Performance criterion: **B**

4.2.3 Description of the test set-up

4.2.3.1 Operating Condition

The EUT is Charging during the test, and the results of the maximum susceptibility are recorded.

4.2.3.2 Test Configuration and Procedure:

Air Discharge:

- This test is done on a non-conductive surfaces. The round discharge tip of the Electrostatic Discharge simulator shall be approached as fast as possible then to touch the EUT. After each discharge, the simulator shall be removed from the EUT. The simulator 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

Contact Discharge:

- All the procedure shall be same as air discharge, except using the acute discharge tip. The top end of the Electrostatic Discharge simulator is touch the EUT all the time when the simulator is re-triggered for a new single discharge and repeated 10 times for each pre-selected test point.

Indirect Discharge:

- The vertical coupling plane(VCP) is placed 0.1m away from EUT. The top end of Electrostatic Discharge simulator should aim at the center of one border of the VCP for at least 10 times discharge.
- The top end of Electrostatic Discharge simulator should place at the point 0.1m away from EUT on the horizontal coupling plane(HCP). At least 10 times discharge should be done for every pre-selected point around EUT.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.2.4 Test specification:Contact discharge voltage:

- 2 kV
- 4 kV

Air discharge voltage:

- 2 kV
- 4 kV
- 8 kV

Events(every polarity) /per point:

- 10

Time between events:

- 1 s

Type of discharge:

Direct discharge

- Air discharge

Indirect discharge

- Contact discharge

- Positive

- Contact discharge

- Negative

Discharge location:

- all external locations accessible by hand
- horizontal coupling plane (HCP)
- vertical coupling plane (VCP)

4.2.5 Test resultThe requirements are **Fulfilled**Performance Criterion: **B****Remarks:** During the test no deviation was detected to the selected operation mode(s).

4.3 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 3.6.

4.3.1 Description of the test location and date

Test location: EMC Test Room

Date of test: Oct. 15, 2019

Operator: Pan

4.3.2 Severity levels of radiated, radio-frequency, electromagnetic field

4.3.2.1 Severity level: 10 V/m

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

4.3.2.2 Performance criterion: A

4.3.3 Description of the test set-up

4.3.3.1 Operating Condition

The EUT is put on the test table, and the results of the maximum susceptible results are recorded.

4.3.3.2 Test Configuration and Procedure

EUT and its auxiliary instrument are placed on a turntable which is 0.8 meter above ground. The center of the transmitting antenna mounted on an antenna mast is set 3 meter away from the EUT. During the test, each of the four sides of EUT will face the transmitting antenna with the turntable cycled. Both horizontal and vertical polarization of the antenna are set on test and measured individually.

In order to judge the performance of the EUT, a set of monitor system is used.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.3.4 Test specification:

Frequency range:

- 80 MHz to 1 GHz
- 1.4 GHz to 2 GHz
- 2.0 GHz to 2.7 GHz

Field strength:

- 10 V/m
- 3 V/m
- 1 V/m

EUT - antenna separation:

- 3 m

Modulation:

- AM: 80 %
- sinusoidal 1000Hz

Frequency step:

- 1 % with 3 s dwell time

Antenna polarisation:

- horizontal
- vertical

4.3.5 Test result

The requirements are **Fulfilled**

Performance Criterion: **A**

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

4.4 Magnetic Field Immunity

For test instruments and accessories used see section 3.6.

4.4.1 Description of the test location and date

Test location: EMC Test Room

Date of test: Oct. 15, 2019

Operator: Pan

4.4.2 Severity levels of magnetic field immunity

4.10.2.1 Severity Level: 30 A/m

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

4.10.2.2 Performance criterion: **A**

4.4.3 Description of the test set-up

4.4.3.1 Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

4.4.3.2 Test Configuration and Procedure:

EUT is placed on an insulating support of 0.1m high above a table of 0.8m high. There is a minimum 1m*1m ground metallic plane put on this table. EUT is put in the center of the magnetic coil then two orientations of the magnetic coil, horizontal and vertical, shall be rotated in order to expose the EUT to the difference polarization magnetic field.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

4.4.4 Test specification:

Test frequency: 50 Hz

Continuous field: 30 A/m

Test duration: 5 m

Antenna factor: 0.917 A/m

Axis: x-axis y-axis z-axis

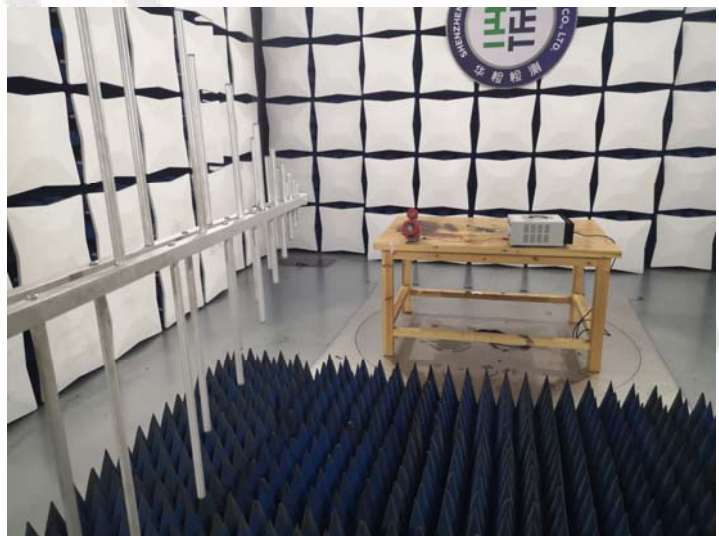
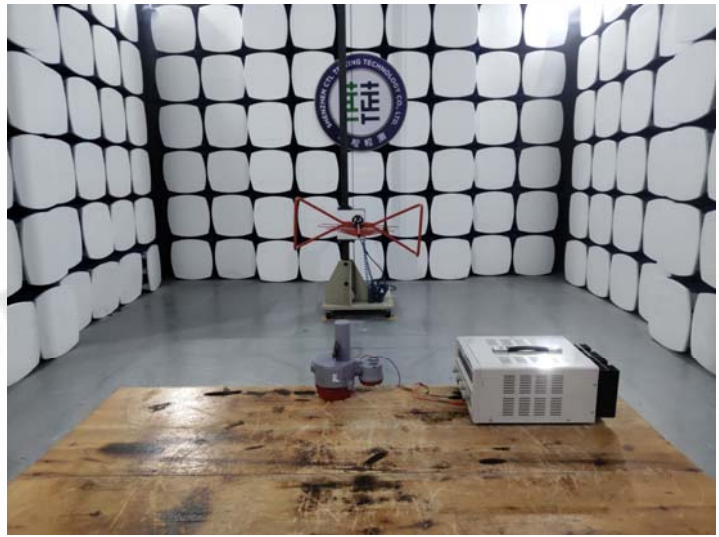
4.4.5 Test result

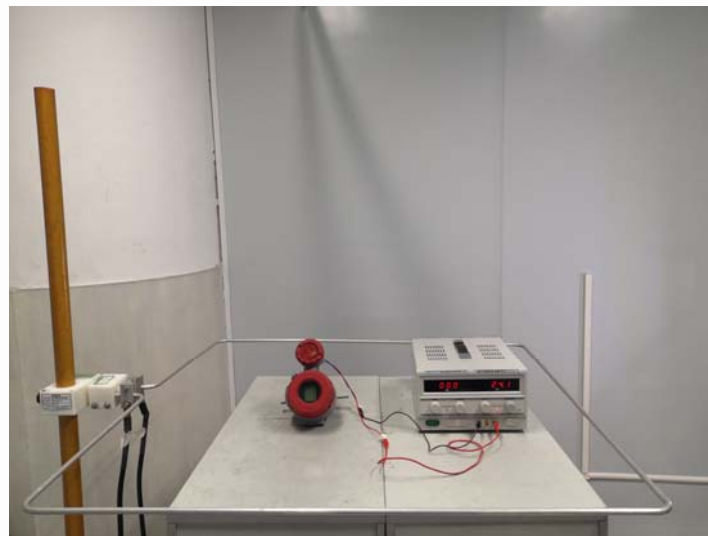
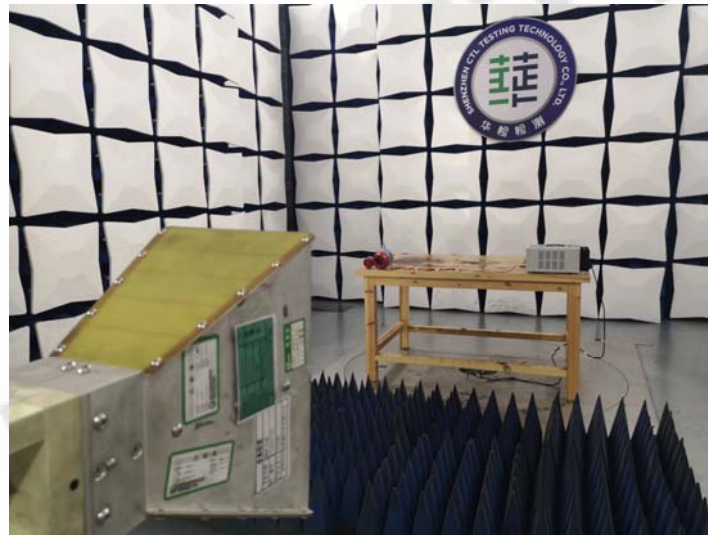
The requirements are **Fulfilled**

Performance Criterion: **A**

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

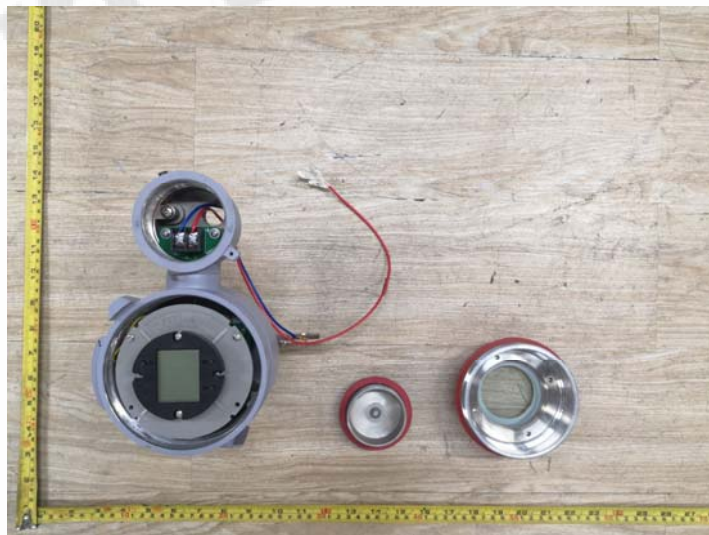
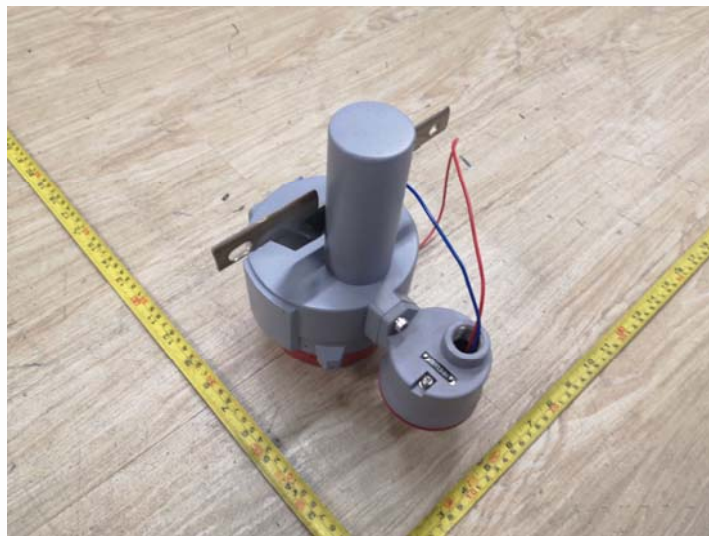
5 Test Setup Photos of the EUT

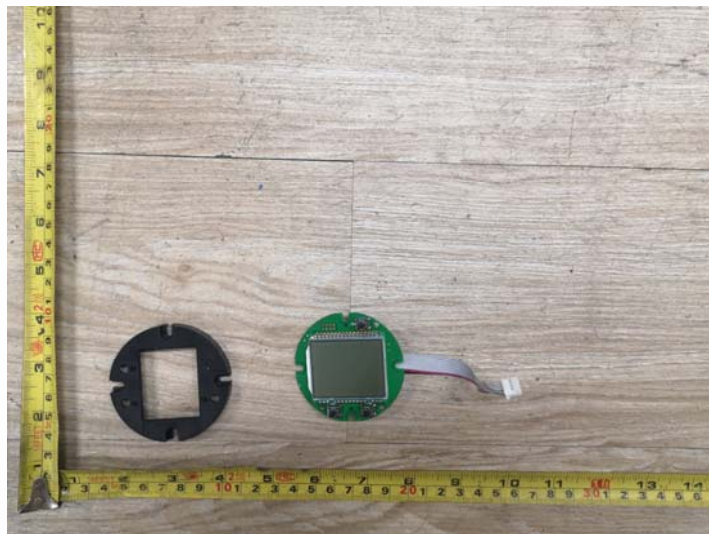
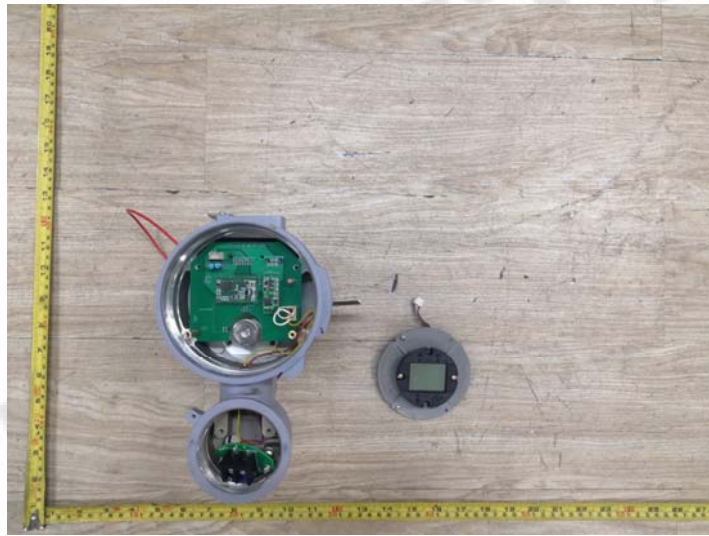


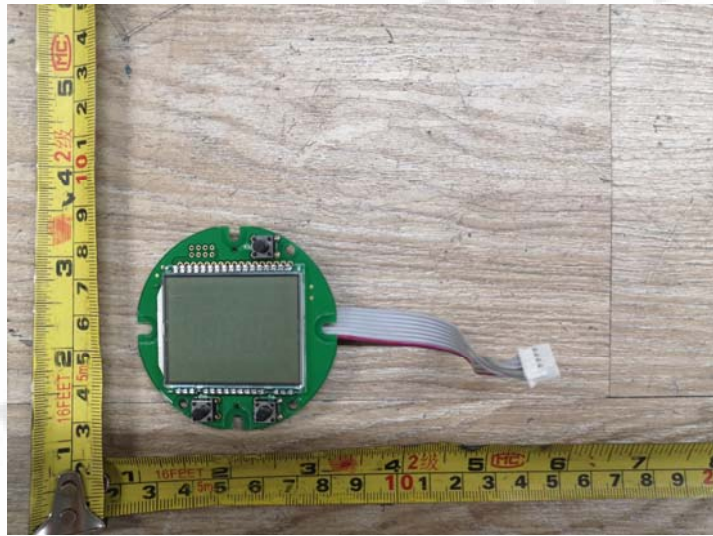


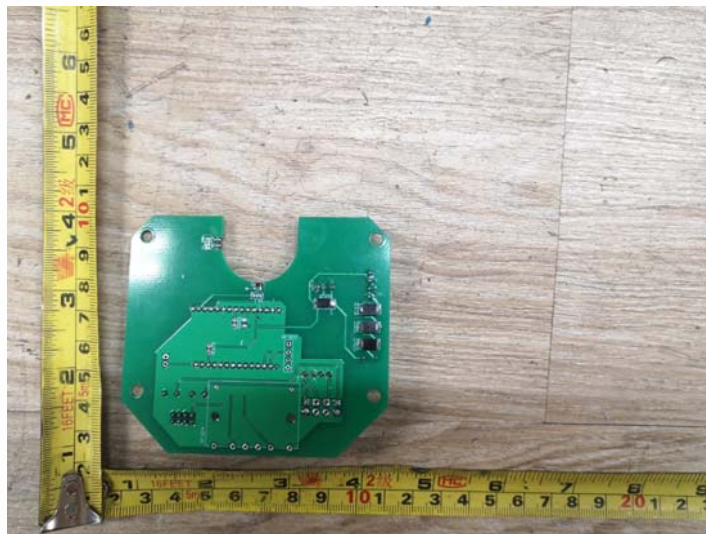
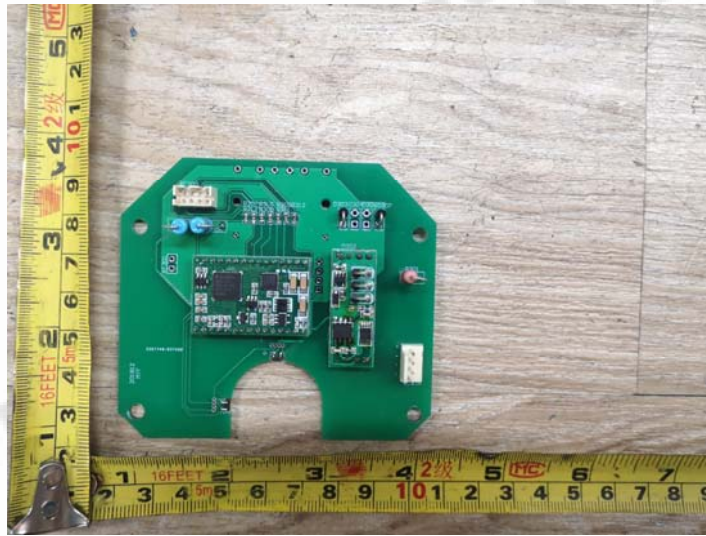
6 Photos of the EUT











.....End of Report.....