EMC Test Report

Report No.: AGC04667170401EE01

PRODUCT DESIGNATION	:	Nylon shoelaces with light
BRAND NAME	:	N/A
MODEL NAME	:	MO9097
CLIENT	:	Mid Ocean Brands B.V.
DATE OF ISSUE	:	May.08, 2017
STANDARD(S)	:	EN 61000-6-3:2007/A1:2011/AC:2012 EN 61000-6-1:2007
REPORT VERSION	:	V1.0

Attestation of ***G***lobal ***C***ompliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May.08, 2017	Valid	Original Report

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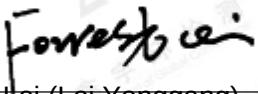
1. VERIFICATION OF CONFORMITY

Manufacturer	Mid Ocean Brands B.V.
Address	Hermesweg 9 3771 ND Barneveld The Netherlands
Factory	
Address	
Product Designation	Nylon shoelaces with light
Brand Name	N/A
Test Model	MO9097
Date of test	May.04, 2017 to May.07, 2017
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-EC-61000/DC(2013-03-01)

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.
The test results of this report relate only to the tested sample identified in this report.

Tested By 
Erik Yang(Yang Jianmin) May.08, 2017

Reviewed By 
Stone Zhou(Zhou Dong) May.08, 2017

Approved By 
Forrest Lei (Lei Yonggang) May.08, 2017
Authorized Officer

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2. SYSTEM DESCRIPTION

TEST MODE DESCRIPTION		
NO.	**TEST MODE DESCRIPTION**	**WORST**
1	Lighting	V
2	Flicker	--

Note:
1. V means EMI worst mode.
2. Only the data of the worst mode would be recorded in this report.

3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by ISO.

- Uncertainty of Radiated Emission, Uc = ±3.2 dB

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4. PRODUCT INFORMATION

Housing Type	Plastic and metal
EUT Input Rating	DC 6V by battery

I/O Port Information (☐Applicable ☒Not Applicable)

I/O Port of EUT			
I/O Port Type	**Number**	**Cable Description**	**Tested With**
--	--	--	--

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5. SUPPORT EQUIPMENT

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
--	--	--	--	--	--

Note:

1 "-- "means no any support device during testing

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6. TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	B112-B113, Building 12, Baoan Building Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen, Guangdong, P.R.China

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	2016.07.02	2017.07.01
ANTENNA	SCHWARZBECK	VULB9168	494	2016.03.01	2018.02.28

TEST EQUIPMENT OF ESD TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
ESD Simulator	Schaffner	NSG 438	782	2016.10.10	2017.10.09

TEST EQUIPMENT OF RS IMMUNITY TEST

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
SIGNAL GENERATOR	R&S	E4421B	102525	2016.07.02	2017.07.01
ANTENNA	SCHWARZBECK	VULB9168	494	2016.03.01	2018.02.28
POWER SENSOR	R&S	URV5-Z4	100124	2016.07.04	2017.07.03
POWER METER	R&S	NRVD	832378/027	2016.07.04	2017.07.03
POWER AMPLIFIER	KALMUS	7100C	N/A	2016.07.02	2017.07.01
RF AMPLIFIER	Milmega	AS01004-5555	1004793	2016.07.02	2017.07.01
HORN ANTENNA	ETS LINDGREN	3117	N/A	2016.03.01	2018.02.28

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7. TEST ITEMS AND THE RESULTS

Test item	Test Requirement	Test Method	Class/Severity	Result
CONDUCTED EMISSION	EN 61000-6-3	EN 61000-6-3	Class B	N/A
RADIATED EMISSION	EN 61000-6-3	EN 61000-6-3	Class B	Pass
Harmonic current emission	EN 61000-3-2	EN 61000-3-2	Class A	N/A
Voltage fluctuations & flicker	EN 61000-3-3	EN 61000-3-3	§5 of EN 61000-3-3	N/A
Electrostatic Discharge Immunity	EN61000-6-1	EN 61000-4-2	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)	Pass
Radiated RF Electromagnetic	EN61000-6-1	EN 61000-4-3	3V/m with 80% AM. 1kHz Modulation at 80-1000MHz 3V/m with 80% AM. 1kHz Modulation at 1400-2000MHz 1V/m with 80% AM. 1kHz Modulation at 2000-2700MHz	Pass
Electrical fast transient/burst Immunity	EN61000-6-1	EN 61000-4-4	+/- 1kV for Power Supply Lines	N/A
SURGE IMMUNITY	EN61000-6-1	EN 61000-4-5	+/- 1kV (Line to Line) +/- 2kV (Line to Ground)	N/A
Immunity to Conducted Disturbances Induced by RF fields	EN61000-6-1	EN 61000-4-6	3V with 80% AM. 1 kHz Modulation	N/A
Power frequency magnetic field	EN61000-6-1	EN61000-4-8	50/60Hz 3A/m	N/A
Voltage dips and short interruptions immunity	EN61000-6-1	EN 61000-4-11	PHASE ANGLE 0 degrees	N/A

Note：N/A means not applicable.

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8. EN 61000-6-3 RADIATED EMISSION TEST

8.1. LIMITS OF RADIATED DISTURBANCES

AT 10M DISTANCES

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m Q.P.)
30-230	10	30.00
230-1000	10	37.00

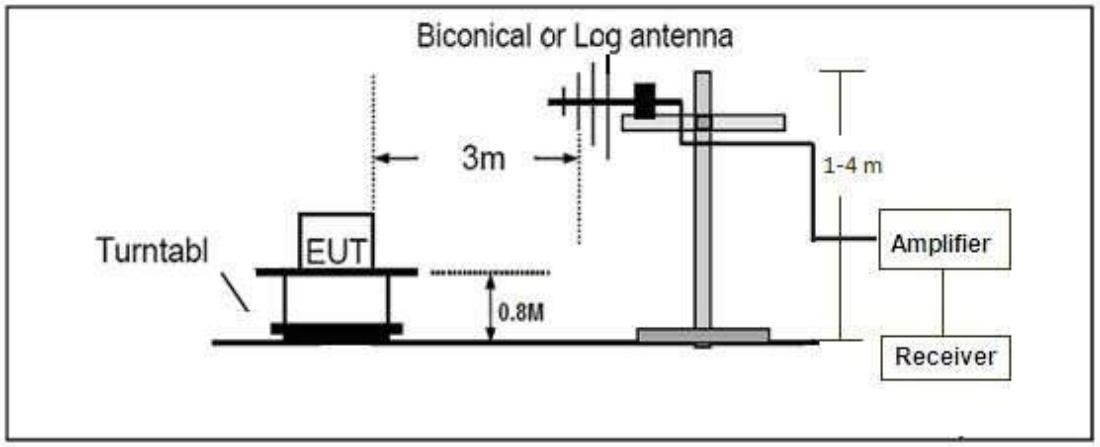
AT 3M DISTANCES

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m Q.P.)
30-230	3	40.00
230-1000	3	47.00

Note: The lower limit shall apply at the transition frequency.

8.2. BLOCK DIAGRAM OF TEST SETUP

System Diagram of Connections between EUT and Simulators

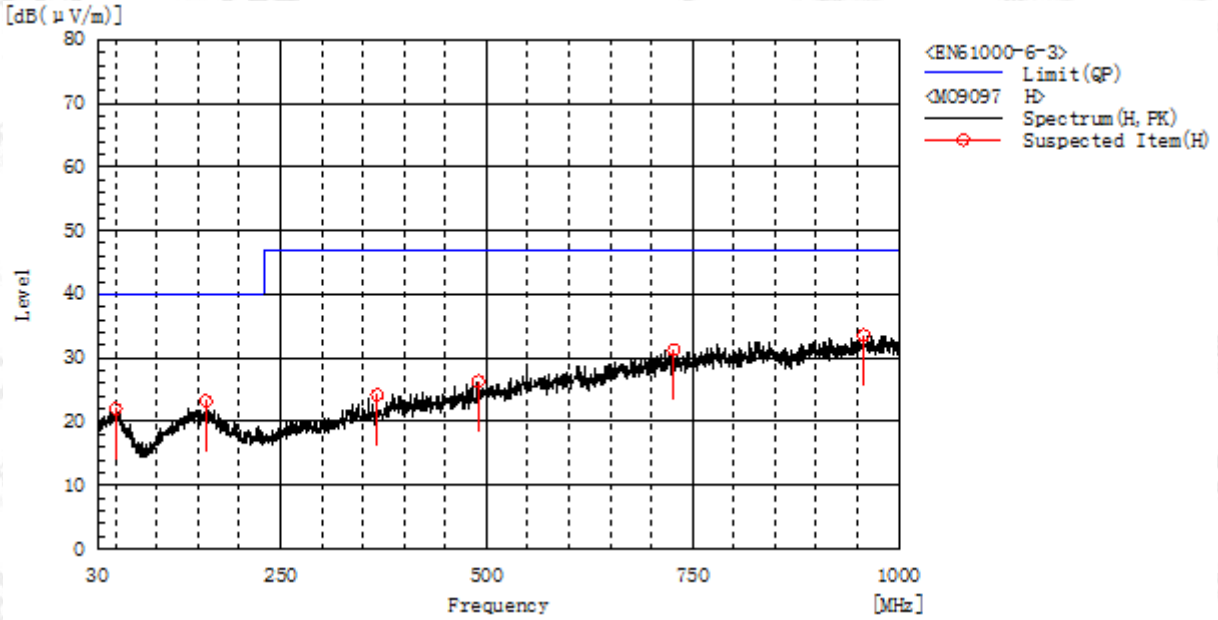


8.3. PROCEDURE OF RADIATED EMISSION TEST

(1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 61000-6-3 (see Test Facility for the dimensions of the ground plane used).When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
(2) Support equipment, if needed, was placed as per EN 61000-6-3.
(3) All I/O cables were positioned to simulate typical actual usage as per EN 61000-6-3.
(4) The EUT was turned on.
(5) The antenna was placed at 3 meter away from the EUT as stated in EN 61000-6-3. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
(6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
(7) The test mode(s) were scanned during the test.
(8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

8.4. TEST RESULT OF RADIATED EMISSION TEST

Radiated Emission Test at 3m Distance-Horizontal



Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
50.370	H	5.4	16.6	22.0	40.0	18.0	Pass	200.0	159.0
159.980	H	6.1	17.1	23.2	40.0	16.8	Pass	100.0	177.6
957.320	H	5.5	28.1	33.6	47.0	13.4	Pass	150.0	73.1
490.265	H	5.7	20.6	26.3	47.0	20.7	Pass	200.0	268.1
726.945	H	5.8	25.5	31.3	47.0	15.7	Pass	150.0	323.4
367.560	H	6.4	17.8	24.2	47.0	22.8	Pass	200.0	268.1

RESULT: PASS

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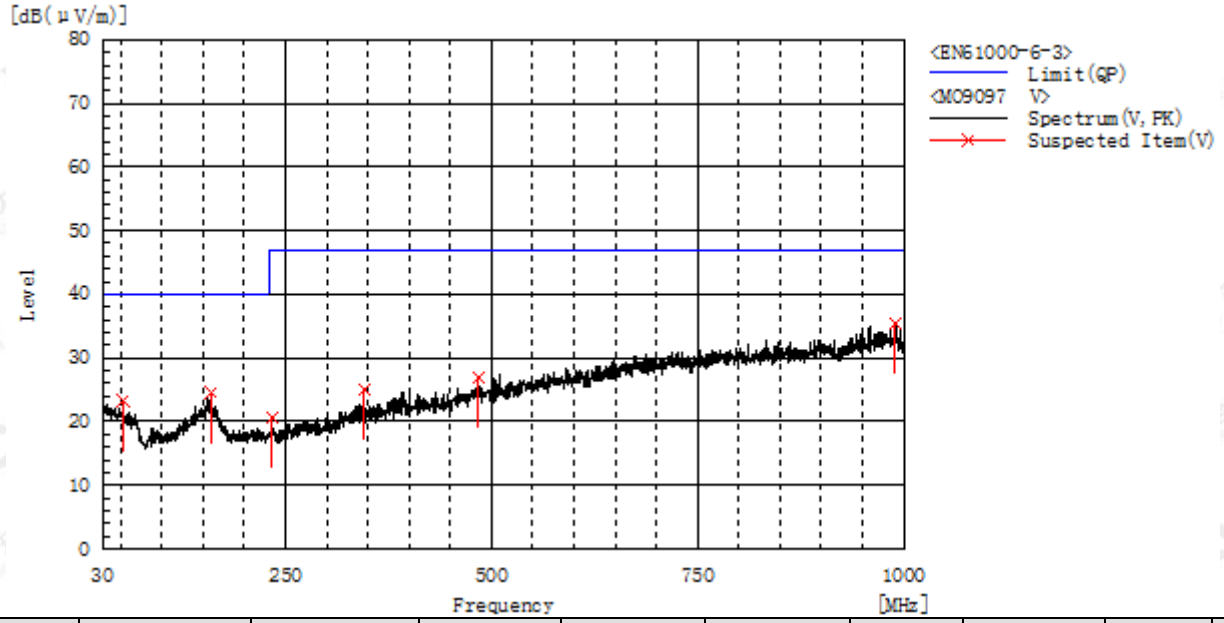
Radiated Emission Test at 3m Distance-Vertical



Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
53.280	V	6.8	16.4	23.2	40.0	16.8	Pass	150.0	326.9
159.980	V	6.1	18.4	24.5	40.0	15.5	Pass	100.0	163.5
233.700	V	6.3	14.3	20.6	47.0	26.4	Pass	200.0	108.6
345.250	V	7.5	17.5	25.0	47.0	22.0	Pass	100.0	271.7
483.960	V	6.3	20.6	26.9	47.0	20.1	Pass	150.0	72.7
989.815	V	6.7	28.8	35.5	47.0	11.5	Pass	100.0	200.1

RESULT: PASS

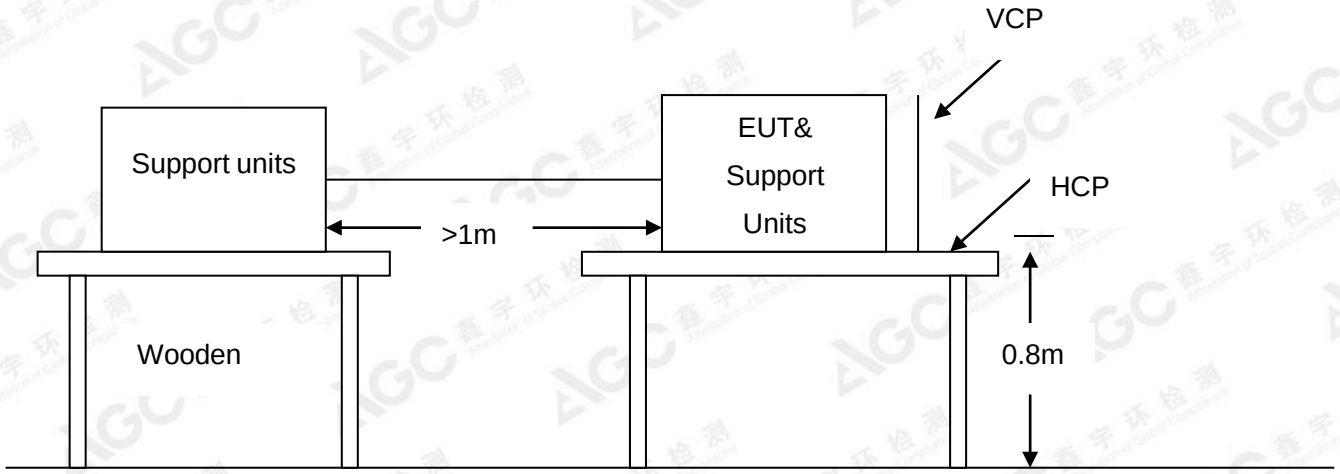
9. EN 61000-4-2 ESD IMMUNITY TEST

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-2
Test Level	± 8.0 kV (Air Discharge) ± 4.0 kV (Contact Discharge) ± 4.0 kV (Indirect Discharge)
Standard require	B
Tester	Erik
Temperature	20°C
Humidity	50%

9.1. BLOCK DIAGRAM OF TEST SETUP

(The 470 k ohm resistors are installed per standard requirement)



Ground Reference Plane

9.2. TEST PROCEDURE

The EUT was located 0.1 m minimum from all side of the HCP.
The support units were located 1 m minimum away from the EUT.
EUT worked with resistance load, and make sure EUT worked normally.
Active the communication function if the EUT with such port(s).
As per the requirement of EN 61000-4-2; applying direct contact discharge at the sides other than front of EUT at minimum 20 discharges (10 positive and 10 negative) if applicable, can't be applied direct contact discharge side of EUT then the indirect discharge shall be applied. One of the test points shall be subjected to at least 50 indirect discharge (contact) to the front edge of horizontal coupling plane.
Other parts of EUT where it is not possible to perform contact discharge then selecting appropriate points of EUT for air discharge, a minimum of 10 single air discharges shall be applied.
The application of ESD to the contact of open connectors is not required.
Putting a mark on EUT to show tested points. The following test condition was followed during the tests.
Note: As per the A2 to EN 61000-4-2, a bleed resistor cable is connected between the EUT and HCP during the test.
The electrostatic discharges were applied as follows:

Voltage	Coupling	Test Performance	Result
±4kV	Contact Discharge	No function loss	A
±4kV	Indirect Discharge HCP (Front)	No function loss	A
±4kV	Indirect Discharge HCP (Back)	No function loss	A
±4kV	Indirect Discharge HCP (Left)	No function loss	A
±4kV	Indirect Discharge HCP (Right)	No function loss	A
±4kV	Indirect Discharge VCP (Front)	No function loss	A
±4kV	Indirect Discharge VCP (Back)	No function loss	A
±4kV	Indirect Discharge VCP (Left)	No function loss	A
±4kV	Indirect Discharge VCP (Right)	No function loss	A
±8kV	Air Discharge	No function loss	A

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9.3. PERFORMANCE & RESULT

Criteria A:	The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
Criteria B:	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒***PASS*** ☐***FAIL***

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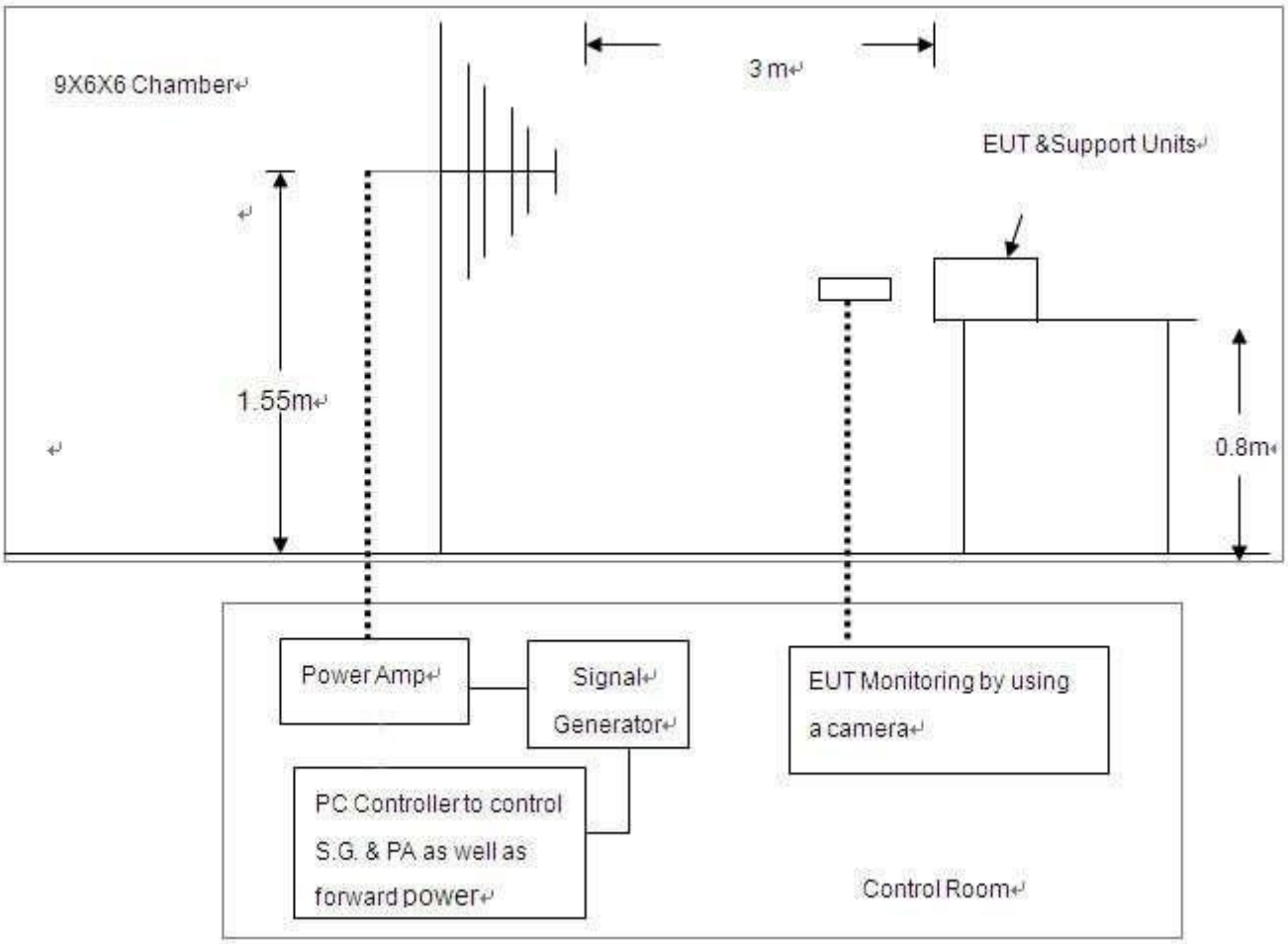
10. EN 61000-4-3 RS IMMUNITY TEST

RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	Enclosure
Basic Standard	EN 61000-4-3
Test Level	3V/m with 80% AM. 1kHz Modulation at 80-1000MHz 3V/m with 80% AM. 1kHz Modulation at 1400-2000MHz 1V/m with 80% AM. 1kHz Modulation at 2000-2700MHz
Standard require	A
Tester	Erik
Temperature	25°C
Humidity	55%

10.1. BLOCK DIAGRAM OF TEST SETUP



10.2. TEST PROCEDURE

The EUT was located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity. The support units were located outside of the uniformity area, but the cable(s) connected with EUT were exposed to the calibrated field as per EN 61000-4-3.

EUT worked with resistance load, and make sure EUT worked normally.

Setting the testing parameters of RS test software per EN 61000-4-3.

Performing each side with specified level at 1% steps.

Recording the test result in following table.

Test Conditions:

Test level: 3V/m

Steps: 1 % of fundamental

Dwell Time: 1 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result
80-1000	3V/m	AM	H	Front	A
80-1000	3V/m	AM	H	Left	A
80-1000	3V/m	AM	H	Back	A
80-1000	3V/m	AM	H	Right	A
80-1000	3V/m	AM	V	Front	A
80-1000	3V/m	AM	V	Left	A
80-1000	3V/m	AM	V	Back	A
80-1000	3V/m	AM	V	Right	A

Test level: 3V/m

Steps: 1 % of fundamental

Dwell Time: 1 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result
1400-2000	3V/m	AM	H	Front	A
1400-2000	3V/m	AM	H	Left	A
1400-2000	3V/m	AM	H	Back	A
1400-2000	3V/m	AM	H	Right	A
1400-2000	3V/m	AM	V	Front	A
1400-2000	3V/m	AM	V	Left	A
1400-2000	3V/m	AM	V	Back	A
1400-2000	3V/m	AM	V	Right	A

Test level: 1V/m

Steps: 1 % of fundamental

Dwell Time: 1 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result
2000-2700	1V/m	AM	H	Front	A
2000-2700	1V/m	AM	H	Left	A
2000-2700	1V/m	AM	H	Back	A
2000-2700	1V/m	AM	H	Right	A
2000-2700	1V/m	AM	V	Front	A
2000-2700	1V/m	AM	V	Left	A
2000-2700	1V/m	AM	V	Back	A
2000-2700	1V/m	AM	V	Right	A

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10.3. PERFORMANCE & RESULT

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Criteria B:	The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
Criteria C:	Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒***PASS*** ☐***FAIL***

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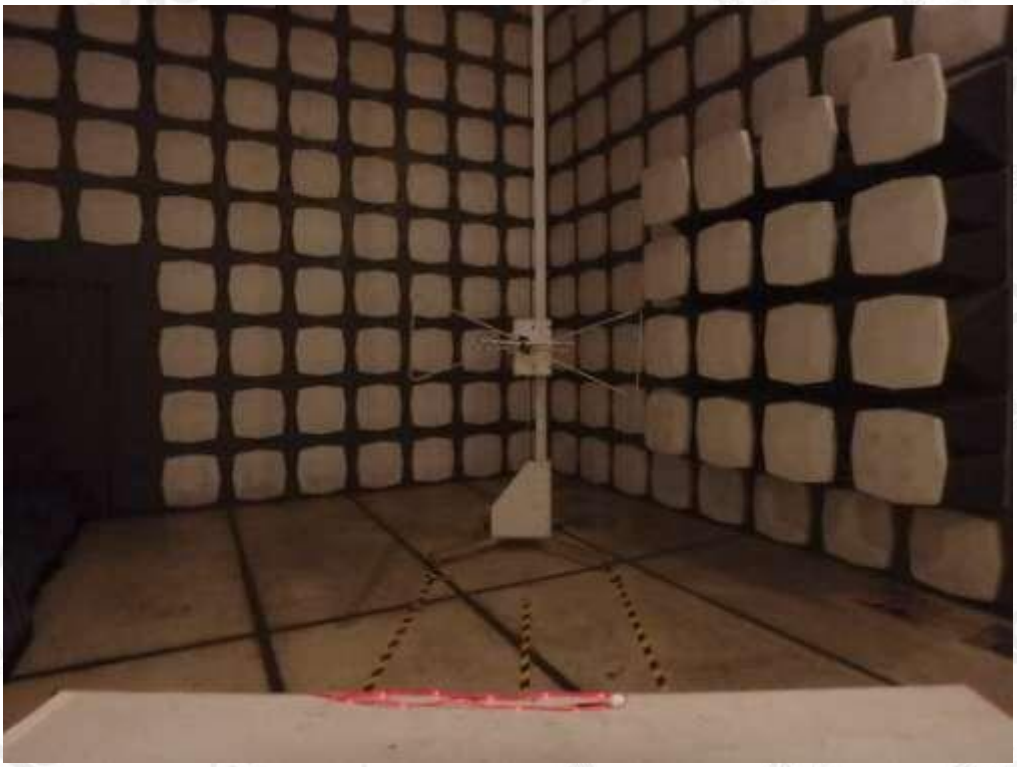
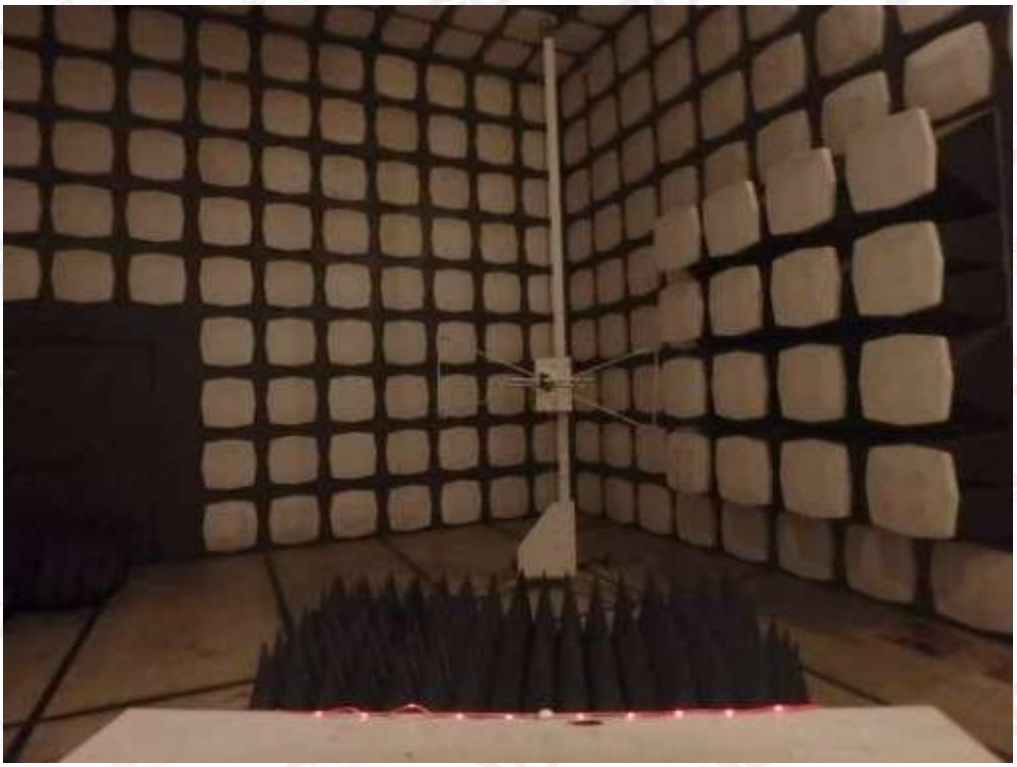
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

EN 61000-6-3 RADIATED EMISSION TEST SETUP



EN 61000-4-2 ESD IMMUNITY TEST SETUP

EN 61000-4-3 RS IMMUNITY TEST SETUP



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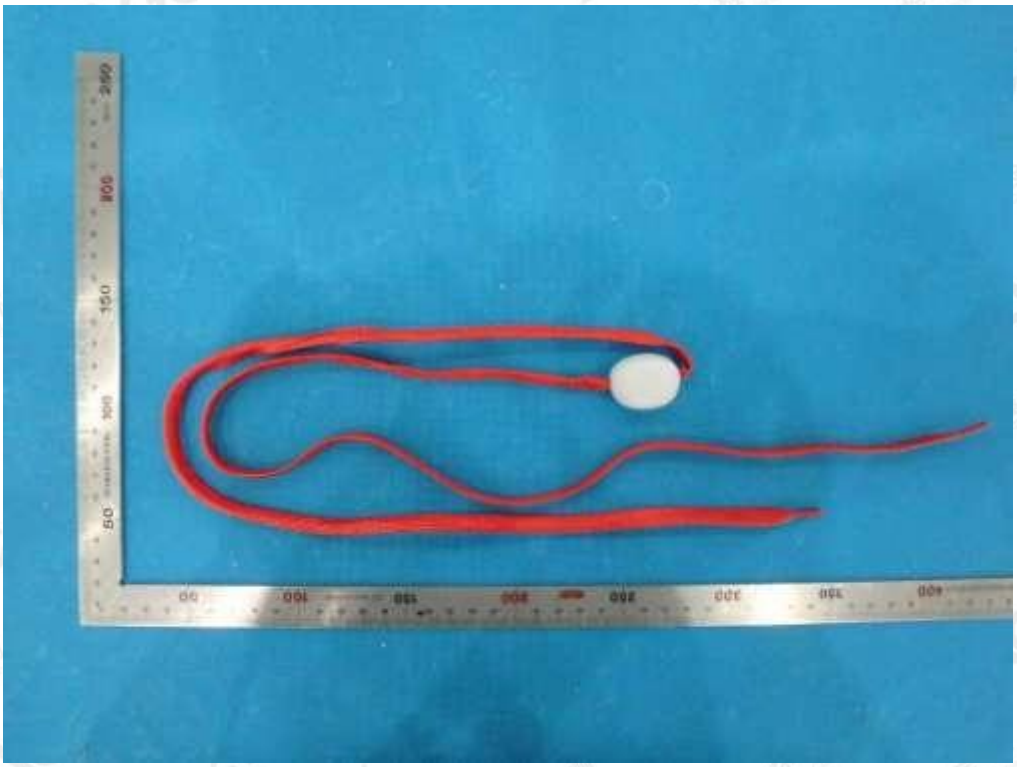
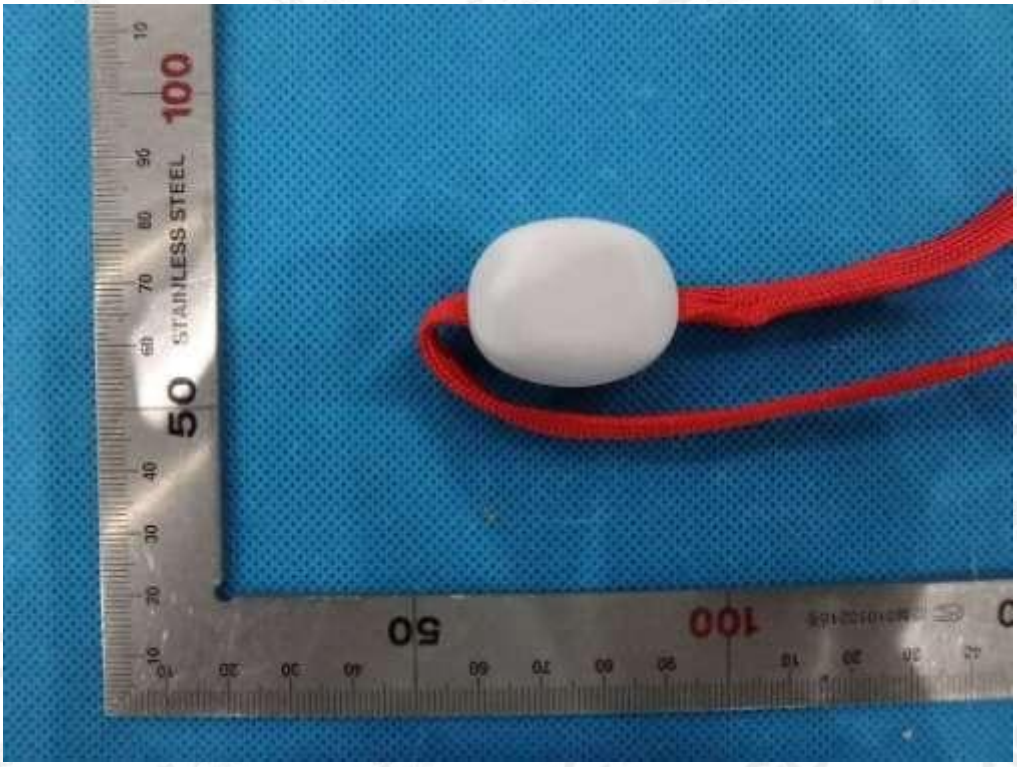
APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT



TOP VIEW OF EUT



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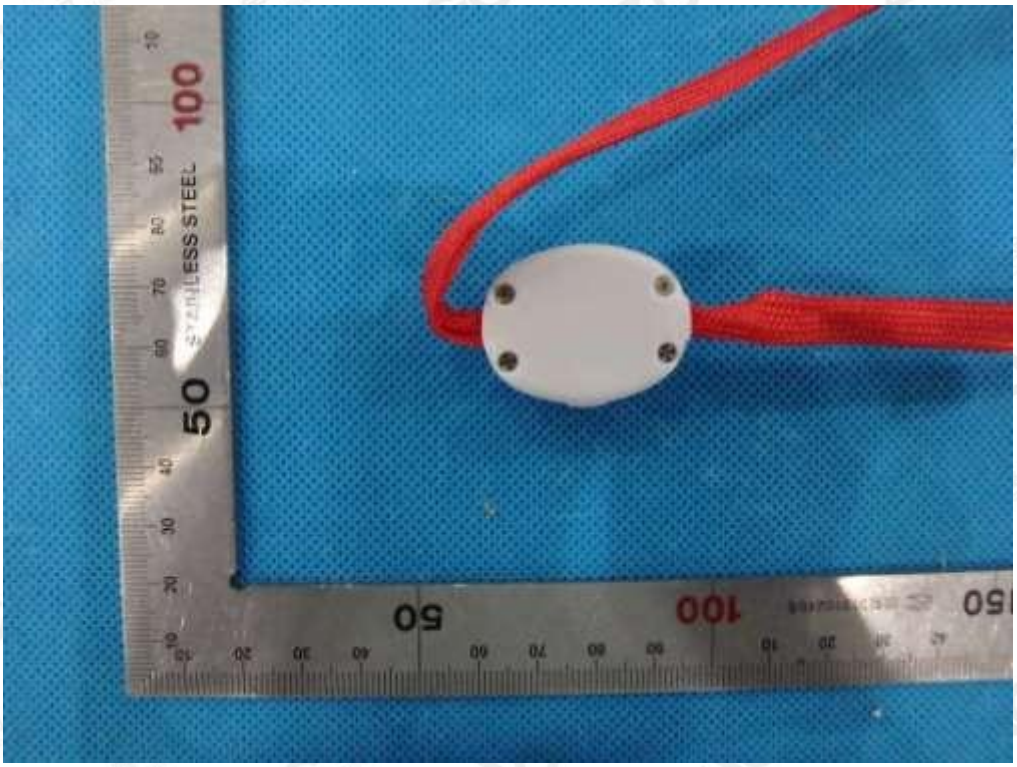
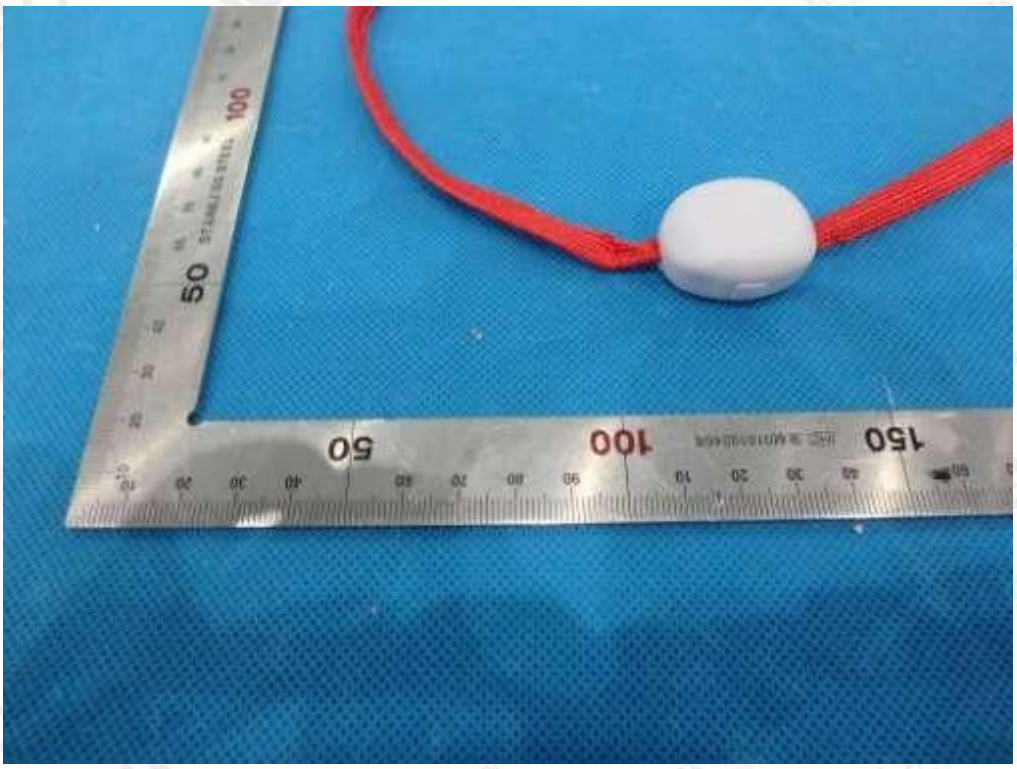
BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



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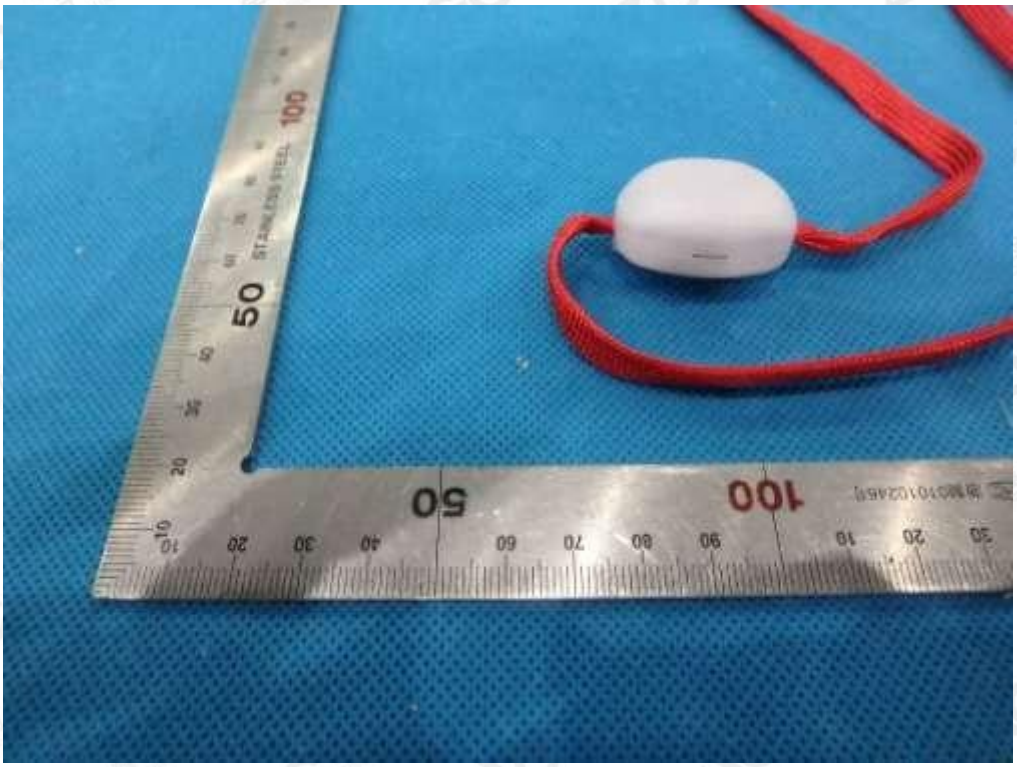
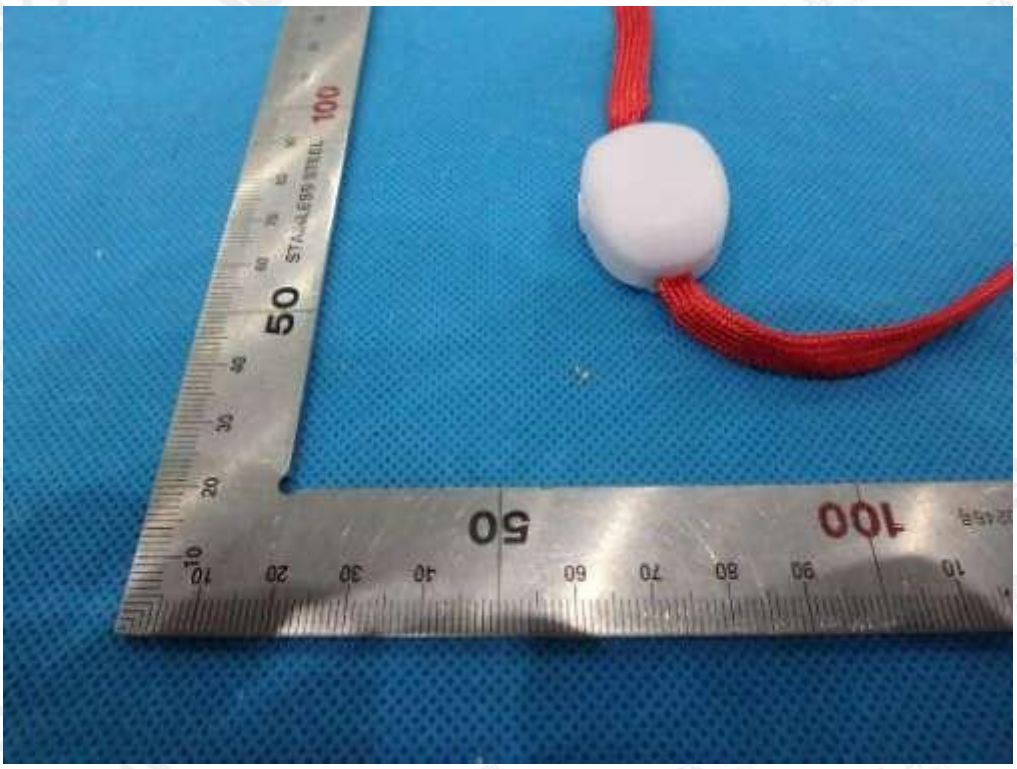
Add: 2F. , Building 2, No.1-4,Chaxi Sanwei Technical Industrial Park,Gushu, Xixiang, Baoan District, Shenzhen, Guangdong China

BACK VIEW OF EUT



LEFT VIEW OF EUT



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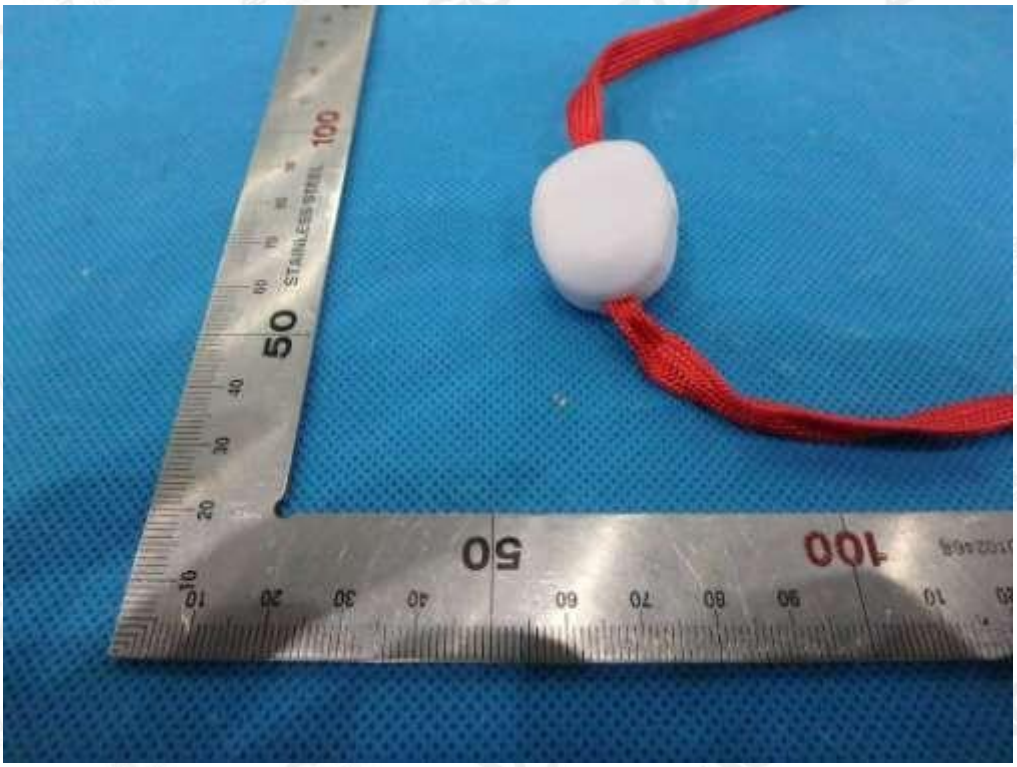
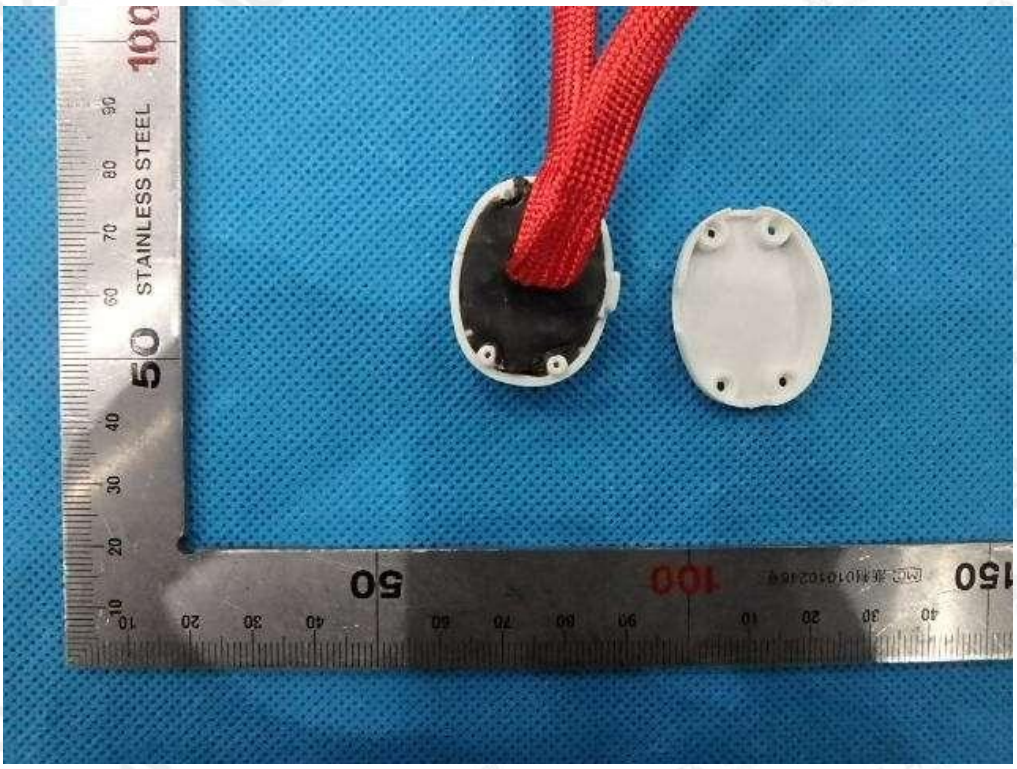
RIGHT VIEW OF EUT



OPEN VIEW OF EUT



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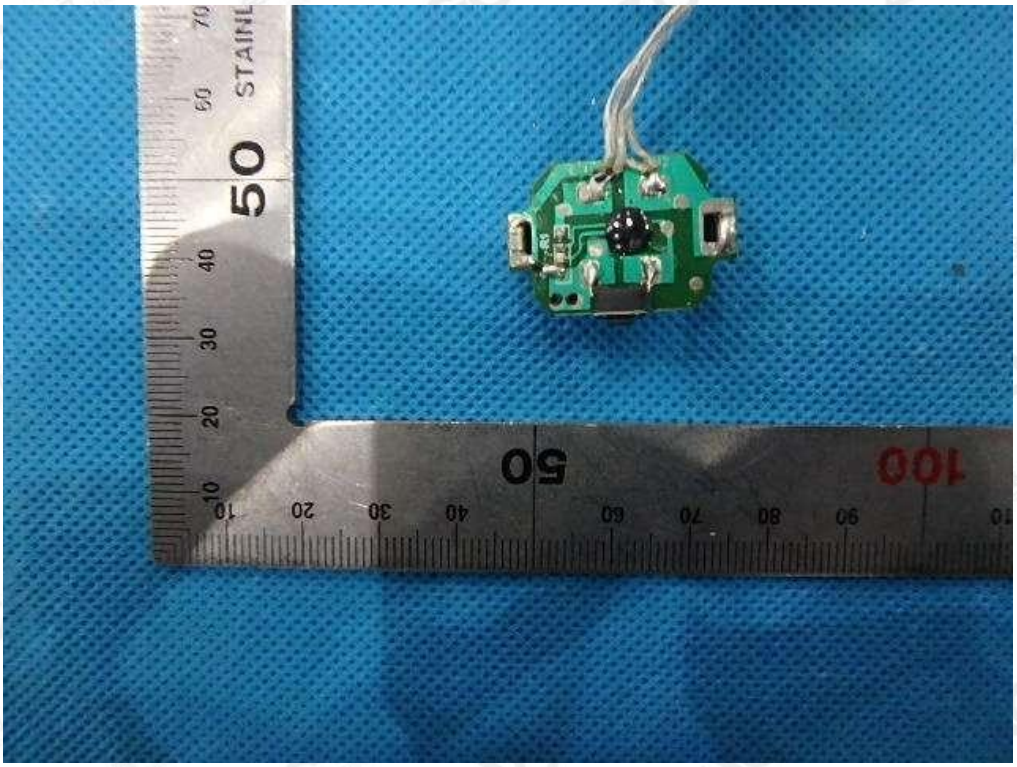
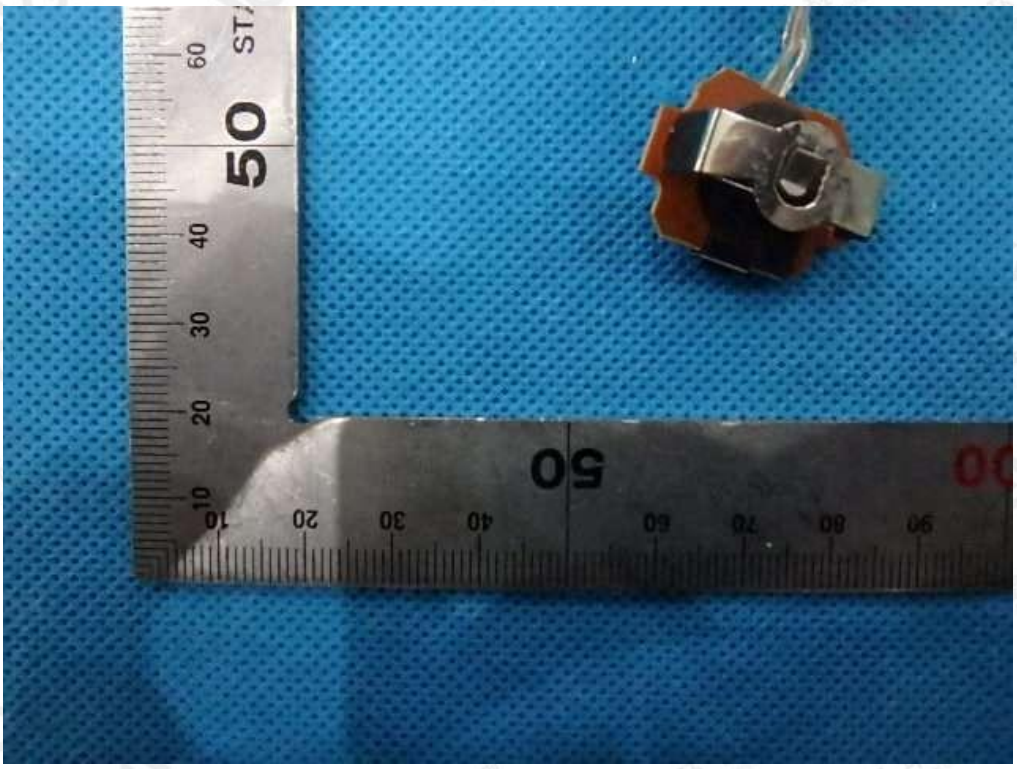
INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



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