SHENZHEN LIOWN ELECTRONICS CO., LTD

TEST REPORT

SCOPE OF WORK
EMC TESTING–LU5074
ADDITIONAL MODELS: LU5076, 994442, LU5674T-L, 994440, 994441, 994448, 994449, 994450, 1600-115, 1601-115, 1602-115

REPORT NUMBER
SZHH01587799-002

ISSUE DATE
8 AUG 2022

PAGES
23

DOCUMENT CONTROL NUMBER
EN55015/EN 61547_d

West Side of 1/F and 3,4,5/F of Bldg. 1, 1-5/F of Bldg. 3,
Yuanzheng Science and Technology Industrial Park, No.4012,
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TEST REPORT

EMC VERIFICATION SUMMARY

Intertek Report No.: SZHH01587799-002

☑ Lighting

Model: LU5074 Additional Models: LU5076, 994442, LU5674T-L, 994440, 994441, 994448, 994449, 994450, 1600-115, 1601-115, 1602-115 Product Description: 2AA Battery Operated Moving Flame Candle Sample Receipt Date: 25 Jun 2021	Applicant: SHENZHEN LIOWN ELECTRONICS CO., LTD 13F, FINANCE CENTRE BUILDING, NO. 22, TAIZI ROAD, SHEKOU, NANSHAN DISTRICT, SHENZHEN, GUANGDONG, CHINA 518067 Test Conducted Date: 25 Jun 2021 to 11 Jul 2021
☒ 1st TEST ☐ 2nd TEST	ALL TESTS WERE CONDUCTED IN ACCORDANCE WITH: *EN IEC 55015: 2019 + A11: 2020 *EN 61547: 2009
Test Site and Location:	Intertek Testing Services Shenzhen Ltd. Longhua Branch (CNAS L0327) 1-2/F, Building B, Qiao'an Scientific Technology Park, Shangkeng Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China/518110 Sub-contracting Lab: Shenzhen EMTEK Co., Ltd. Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China, 518052

Test Result	OK	Not OK	Remark
*EN IEC 55015: 2019 + A11: 2020	☒	☐	☐
*EN 61547: 2009	☒	☐	☐
When determining the test conclusion, the Measurement Uncertainty of test has been considered.			

Remark 1: Partial test was witnessed in Sub-contracting Lab.
Remark 2: This report based on previous report with report No. SZHH01587799-001 dated 11 Jul 2021. Only add UKCA report, don't test after engineer evaluate

Prepared and Checked By:

Sign on File
Tom Li
Senior Engineer

Approved By:

Digitally signed by Jimmy Wen
Location: Intertek Testing Services

Signature

Jimmy Wen
Manager
8 Aug 2022 ***Date***

EMC Results Conclusion
(with Justification)

RE: EMC Testing Pursuant to Electromagnetic Compatibility Regulations 2016
Performed On the 2AA Battery Operated Moving Flame Candle,
Models: LU5074

We tested the 2AA Battery Operated Moving Flame Candle, Model: LU5074, to determine if it was in compliance with the relevant EN standards as marked on the EMC Verification Summary. We found that the unit met the requirement of EN 55015, EN61547 standards when tested as received.

The Models: LU5076, 994442, LU5674T-L, 994440, 994441, 994448, 994449, 994450, 1600-115, 1601-115, 1602-115 are the same as the Model: LU5074 in hardware aspect. The difference in model number serves as marketing strategy.

The production units are required to conform to the initial sample as received when the units are placed on the market.

LABORATORY MEASUREMENTS

Configuration Information

Equipment Under Test (EUT):	2AA Battery Operated Moving Flame Candle
Model:	LU5074
Serial No.:	Not Labelled
Support Equipment:	N/A
Cables:	N/A
Adaptor:	N/A
Rating:	TX: DC 3.0V (1 x 3.0V CR2025 battery) RX: DC 3.0V (2 x 1.5V AA batteries) & DC 3.0V (1 x 3.0V CR2450 battery)

PERFORMANCE CRITERIA FOR IMMUNITY

The performance criteria are referred to the test standard: EN 61547

Performance criteria A

During the test no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

Performance criteria B

During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min.

Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.

Performance criteria C

During and after the test any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control.

Additional requirement for lighting equipment incorporating a starting device:

After the test the lighting equipment is switched off. After half an hour it is switched on again. The lighting equipment shall start and operate as intended.

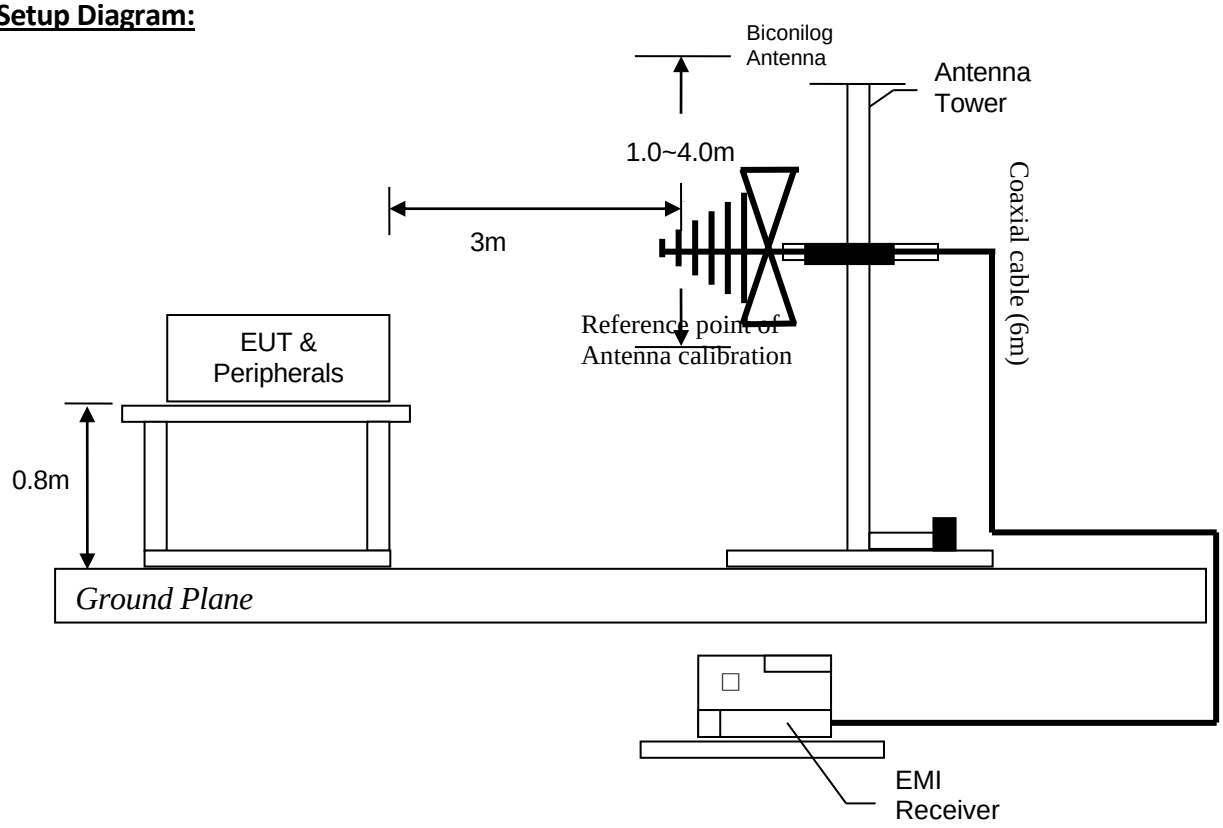
RADIATED DISTURBANCE PURSUANT TO EN 55015: EMISSIONS REQUIREMENT

Used Test Equipment

Equip No.	Description	Manufacturer	Model No.	Cal. Date	Due Date
SZ185-01	EMI Receiver	R & S	ESCI	22 Dec 2020	22 Dec 2021
SZ061-03	Biconilog Antenna	ETS	3142E	24 May 2019	24 May 2022
SZ188-01	Anechoic Chamber	ETS	FACT 3-2.0	15 Dec 2018	15 Dec 2021

Notes:
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Frequency range scanned: 30MHz to 1000MHz.
3. Only emissions significantly above equipment noise floor are reported.
4. Uncertainty: ±4.8dB at a level of confidence of 95%.

Test Setup Diagram:

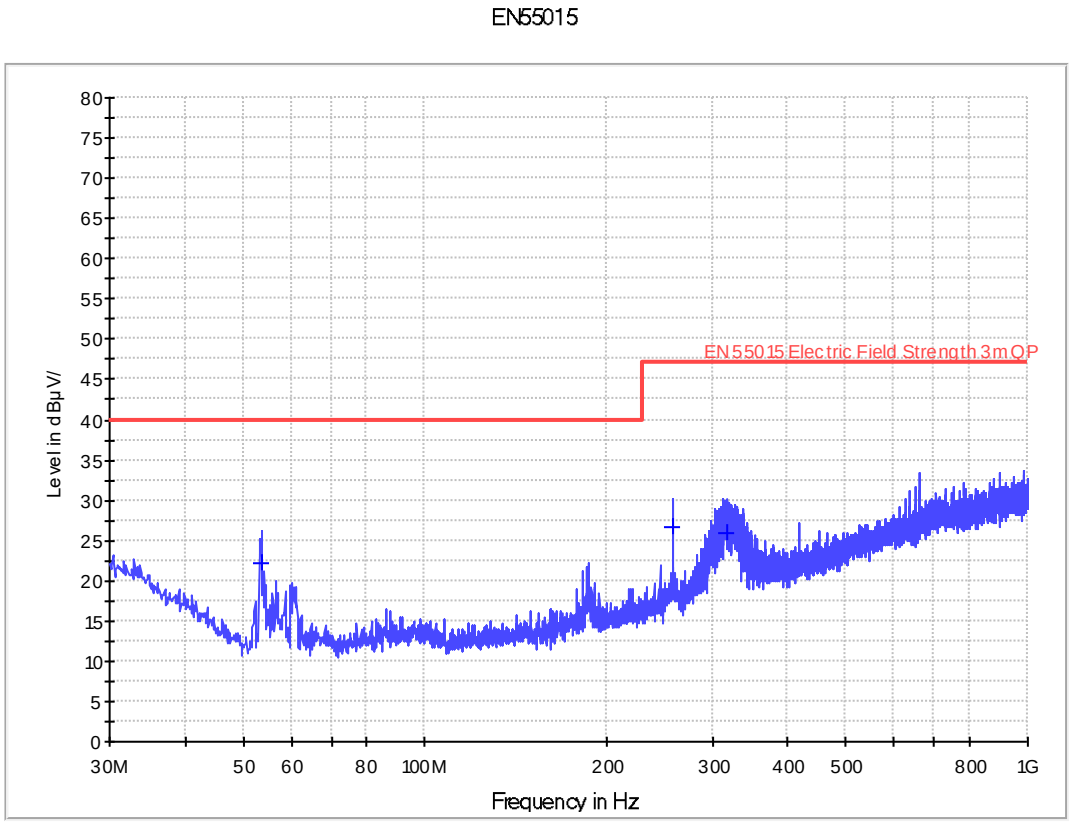


(Radiated Emission Measurements Test Setup)

Model: LU5074
Worst Case Operating Mode: Lighting

Test Data
Radiated Disturbance
Pursuant to EN55015: Emissions Requirement

Horizontal



Limit and Margin

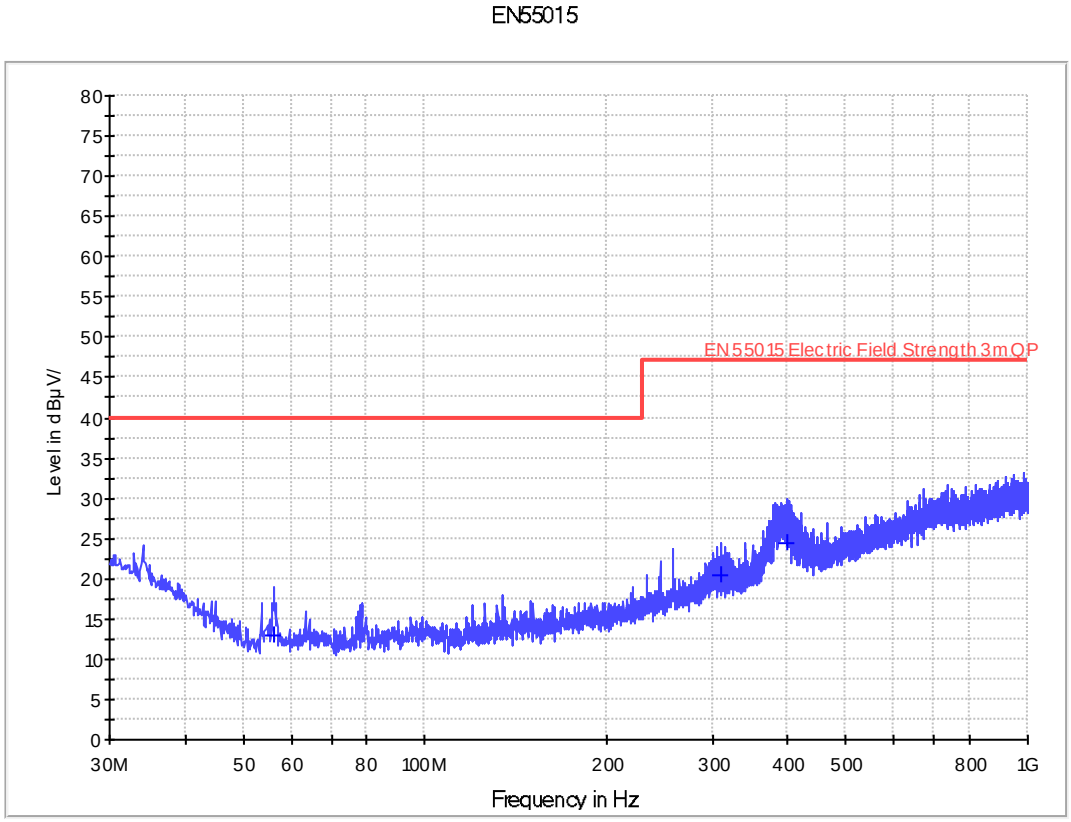
Frequency (MHz)	QuasiPeak (dB¦ìV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB¦ìV/m)
53.765000	22.3	1000.0	120.000	0.0	H	7.7	17.7	40.0
257.707500	26.7	1000.0	120.000	0.0	H	14.2	20.3	47.0
316.028750	25.9	1000.0	120.000	0.0	H	16.3	21.1	47.0

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
3. Margin (dB) = Limit QPK(dBµV/m) – QuasiPeak (dBµV/m)

Model: LU5074
Worst Case Operating Mode: Lighting

Test Data
Radiated Disturbance
Pursuant to EN55015: Emissions Requirement

Vertical



Limit and Margin

Frequency (MHz)	QuasiPeak (dB¦ìV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB¦ìV/m)
56.190000	12.9	1000.0	120.000	0.0	V	7.7	27.1	40.0
309.117500	20.5	1000.0	120.000	0.0	V	16.1	26.5	47.0
398.357500	24.5	1000.0	120.000	0.0	V	18.6	22.5	47.0

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
3. Margin (dB) = Limit QPK(dBµV/m) – QuasiPeak (dBµV/m)

EN 55015
RADIATED ELECTROMAGNETIC DISTURBANCES TEST

Used Test Equipment

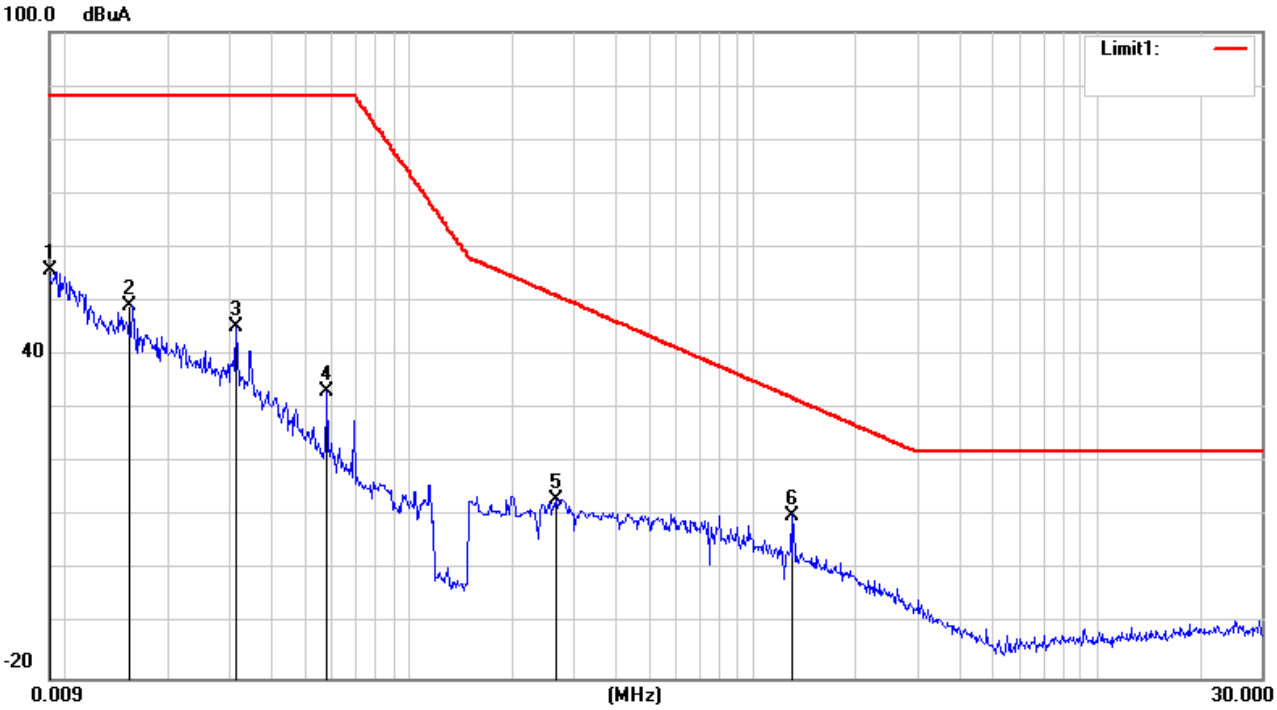
Equip No.	Description	Manufacturer	Model No.	Cal. Date	Due Date
EE144	Test Receiver	Rohde & Schwarz	ESCI	20 May 2021	20 May 2022
EE011-2	Loop Antenna	Laplace Instrument Ltd	RF300	21 May 2021	21 May 2022
EE041	50Ω Coaxial Switch	Anritsu	MP59B	21 May 2021	21 May 2022

Notes:
1. Peak detector quick scan are showed on the graph and final quasi-peak detector data are measured, the worst-case is recorded in the following graph and table.
2. Frequency range scanned: 9kHz to 30MHz.
3. Only emissions significantly above equipment noise floor are reported.
4. Uncertainty: ±2.5dB at a level of confidence of 95%.
5. This test was subcontracted in EMTEK（Shenzhen) Co., Ltd.

Model: LU5074
Worst Case Operating Mode: Lighting
Phase: LOOP A

Test Data

Radiated Electromagnetic Disturbances Test
Pursuant to EN 55015: Emissions Requirement



Test Data

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuA	dB	dBuA	dBuA	dB	Detector
1		0.0090	-31.38	87.02	55.64	88.00	-32.36	QP
2		0.0154	-30.36	79.66	49.30	88.00	-38.70	QP
3		0.0313	-22.47	67.64	45.17	88.00	-42.83	QP
4		0.0577	-23.01	56.23	33.22	88.00	-54.78	QP
5		0.2671	-18.46	31.59	13.13	51.07	-37.94	QP
6	*	1.2900	-6.90	17.20	10.30	32.14	-21.84	QP

Remark:
1. Over = Reading Level (dBuA) – Limit (dBuA)
2. "-" means blow the limit
3. Remark: The emissions were very low against the limit.

EN 61000-4-2
Electrostatic Discharge

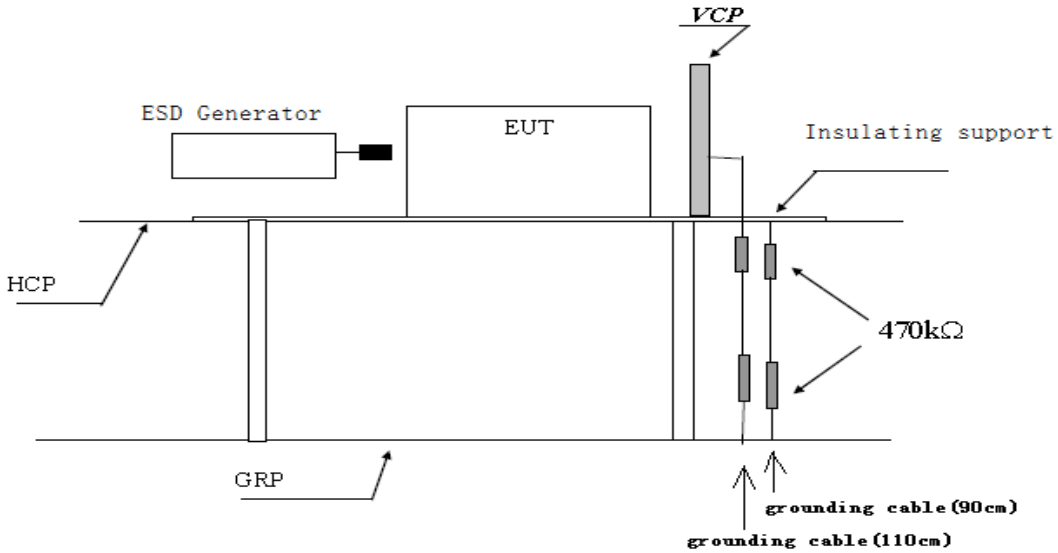
Test Summary (Pursuant to EN 61547)

Basic Standard:	EN 61000-4-2
Port:	Enclosure
Required Performance Criterion:	B
Limit:	±8.0kV (Air Discharge)
	±4.0kV (Contact Discharge)
	±4.0kV (Indirect Contact Discharge)
Temperature:	25.0°C
Relative Humidity:	50.0%
Test Mode:	Lighting
Test Setup:	Table-top
Test of Post-Installation:	N/A
Time Between Each Discharge:	1 second

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ189-01	ESD Simulator	KIKUSUI	KES4021	11 Nov 2020	11 Nov 2021

Test Setup Diagram



Test set-up of electrostatic discharge

Test Results

EN 61000-4-2
Electrostatic Discharge

Discharge Type	Applied Voltage	Result (Pursuant to EN 61547 criterion B)
Contact Discharge	±4kV	OK
Air Discharge	±8kV	OK
Indirect HCP Discharge	±4kV	OK
Indirect VCP Discharge	±4kV	OK

- **No. of discharge: 10 discharge for +ve and 10 discharge for –ve.**
- **Time between each discharge: at least 1 second.**

☒ Additional Information

☒ No observable change.

EN 61000-4-3
RADIATED IMMUNITY

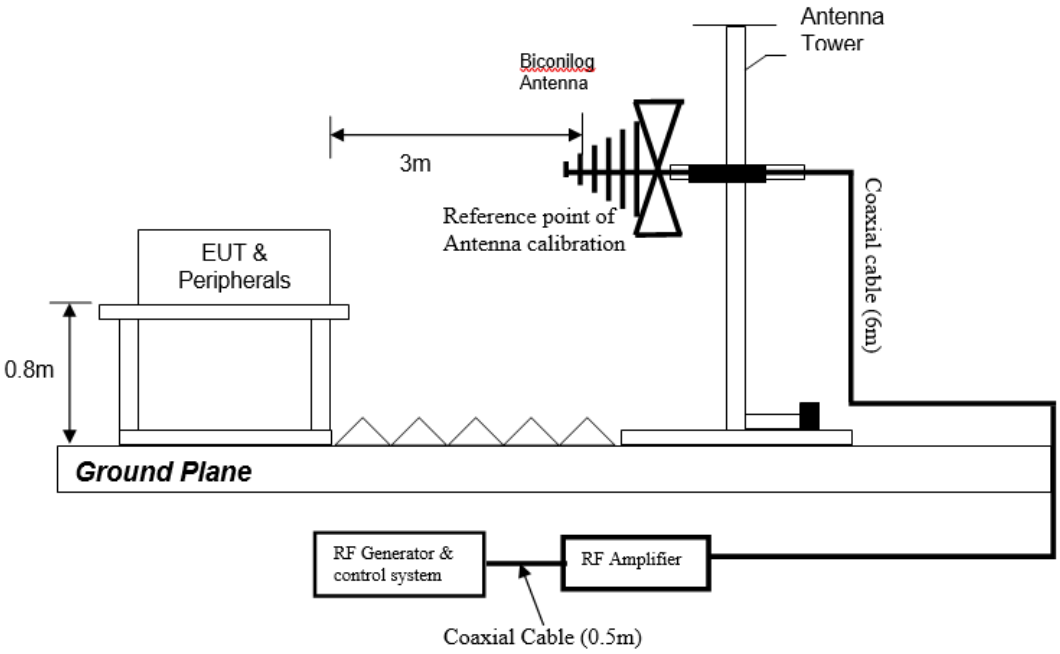
Test Summary (Pursuant to EN 61547)

Basic Standard:	IEC 61000-4-3
Port:	Enclosure
Required Performance Criterion:	A
Limit:	3.0V/m (rms)
Test Modulation:	1kHz, 80% AM
Frequency:	80MHz to 1000MHz
Dwell Time:	1s
Frequency Step:	1%
Temperature:	21.7°C
Relative Humidity:	53.2%
Test Facility:	Full Anechoic Chamber
Antenna Polarization:	Horizontal and Vertical
Type of Antenna:	Log-periodic
Test Distance:	3 meters
Test Mode:	Lighting
Test Setup:	Table-top

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ061-03	BiConiLog Antenna	ETS	3142C	24 May 2019	24 May 2022
SZ180-02	Signal Generator	Aeroflex	2023A	5 Jan 2021	5 Jan 2022
SZ181-01	Amplifier	PRANA	AP32 MT215	5 Jan 2021	5 Jan 2022
SZ188-02	Anechoic Chamber	ETS	RFD-F/A-100	15 Dec 2018	15 Dec 2021

Test Setup Diagram



Test set-up of Immunity to Radiated Electric Fields

Test Results

EN 61000-4-3
Radiated Immunity

Frequency (MHz)	Exposed Side	Field Strength V/m (rms)	Result (Pursuant to EN 61547, Criterion A)
80 to 1000	Front	3	OK
80 to 1000	Left	3	OK
80 to 1000	Rear	3	OK
80 to 1000	Right	3	OK

☒ Additional Information

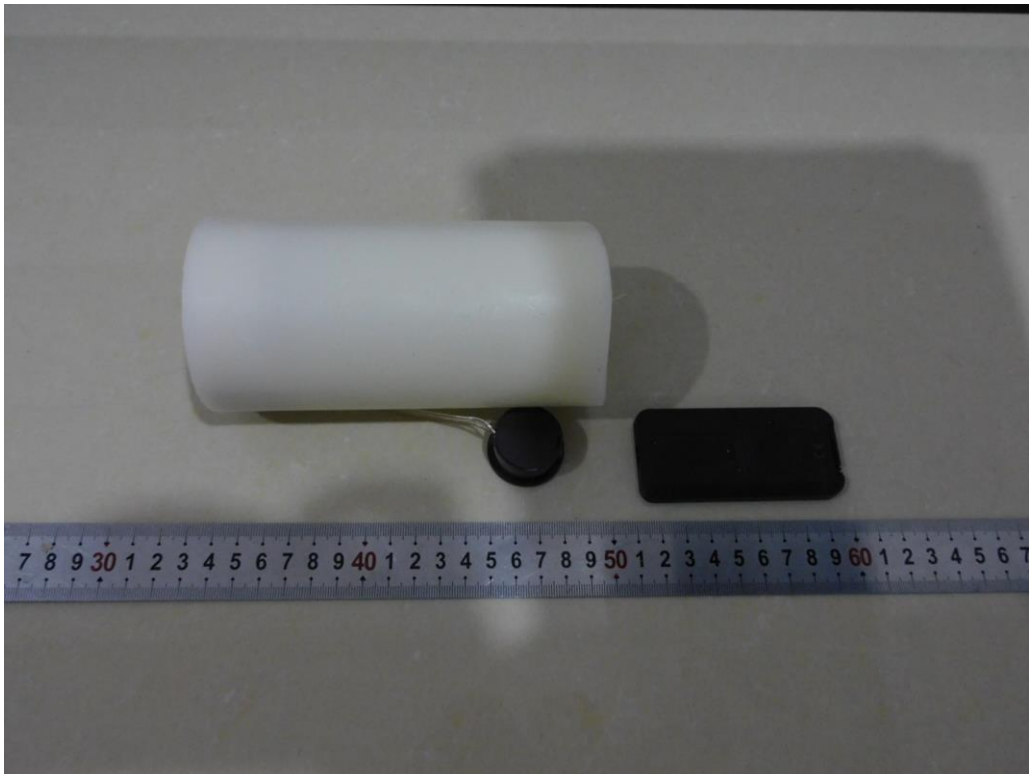
☒ No observable change

Photos of EUT

External Photo

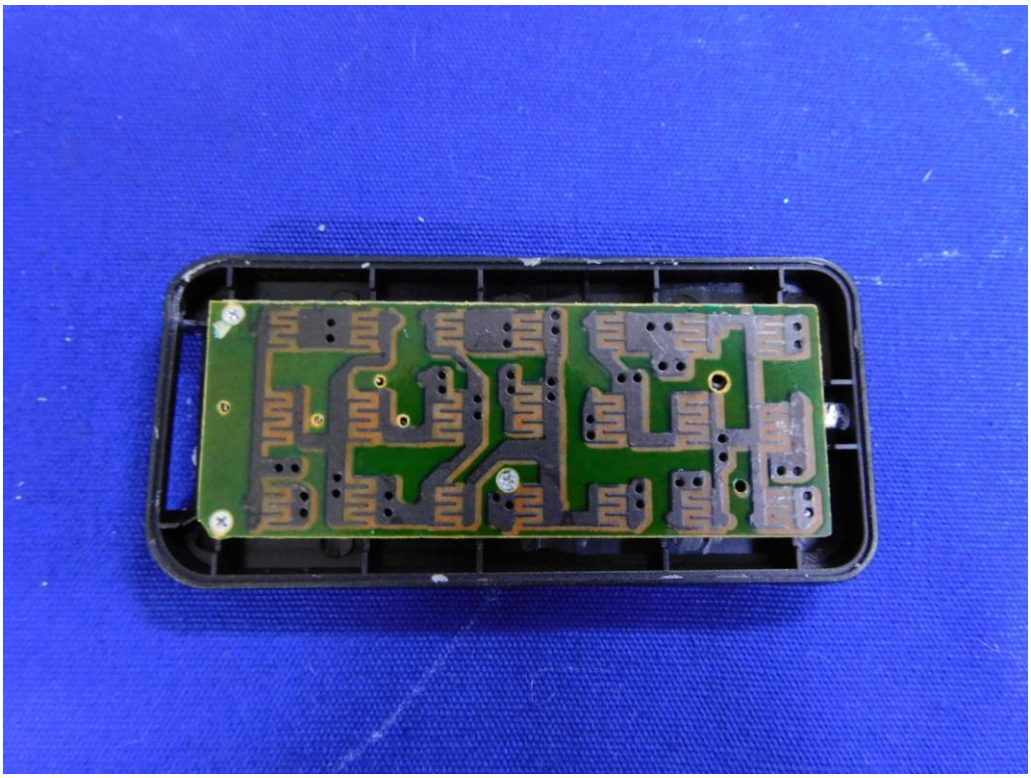
External Photo

External Photo



Internal Photo (TX)

Internal Photo (TX)



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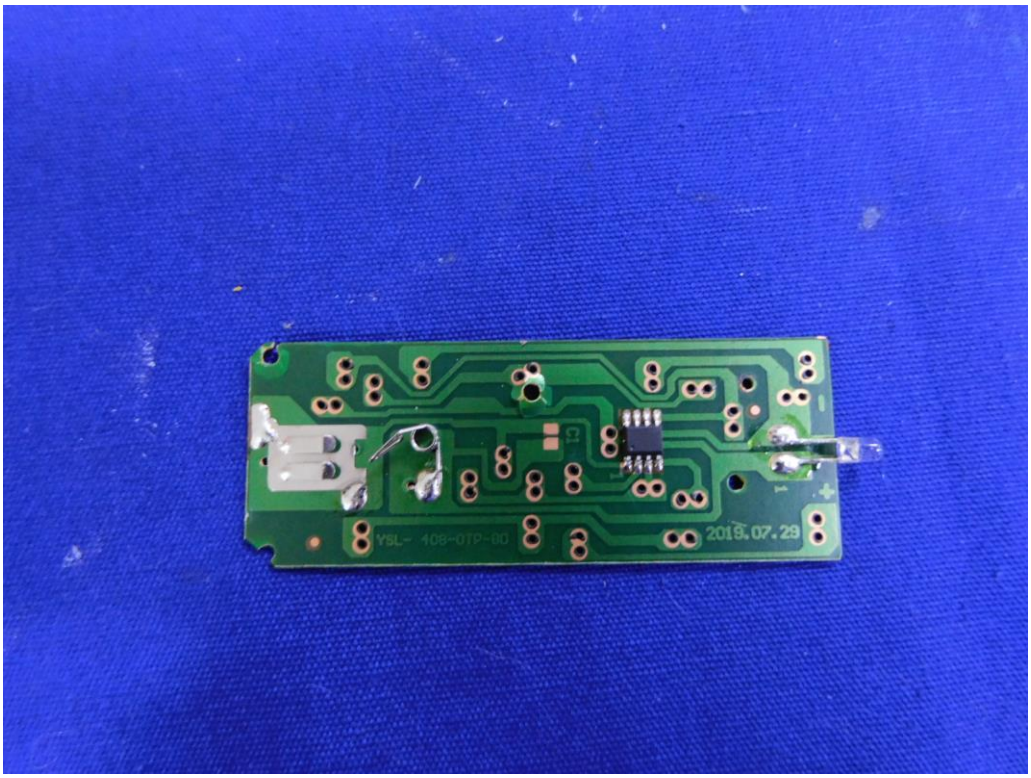
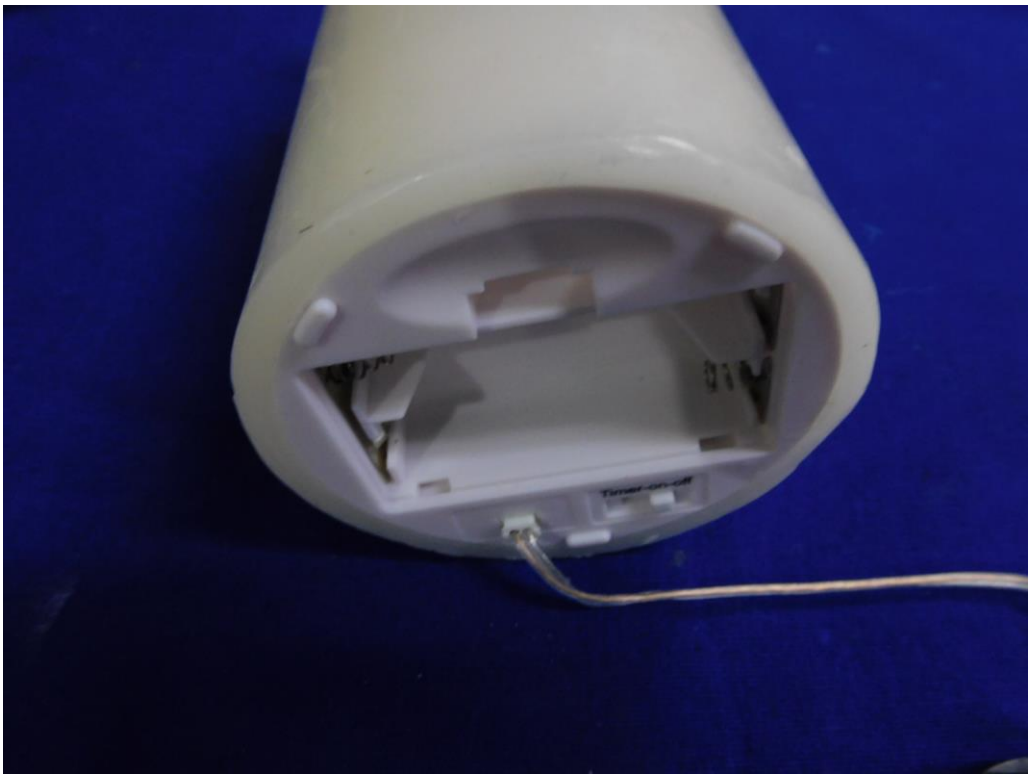


Internal Photo (RX)



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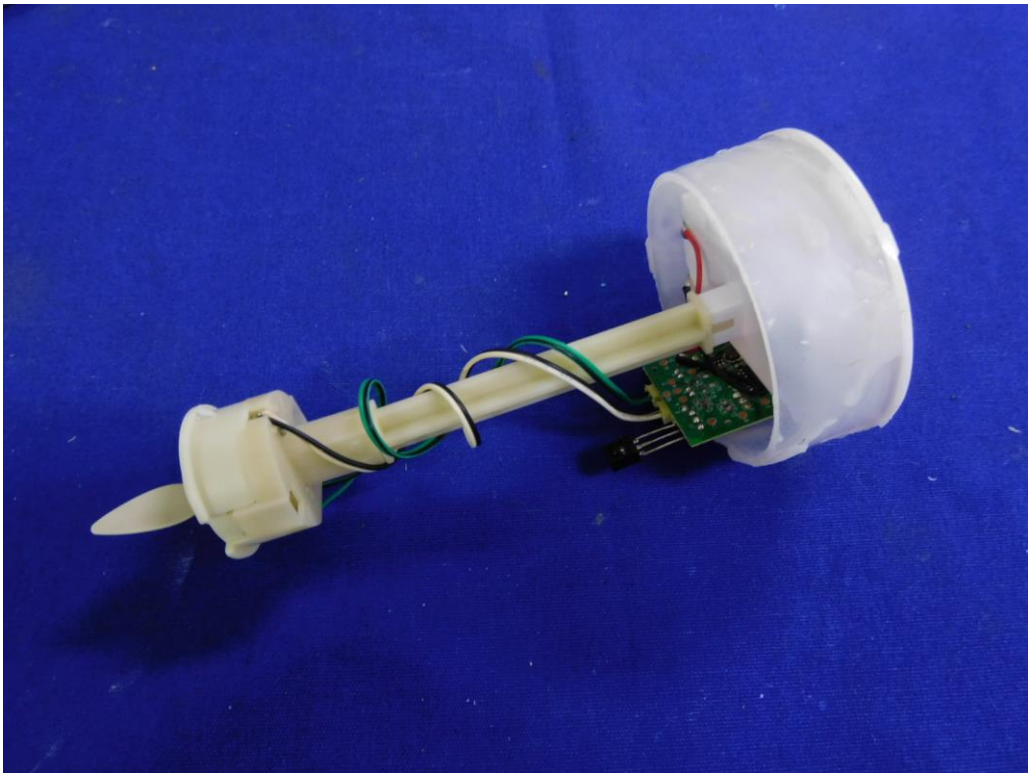

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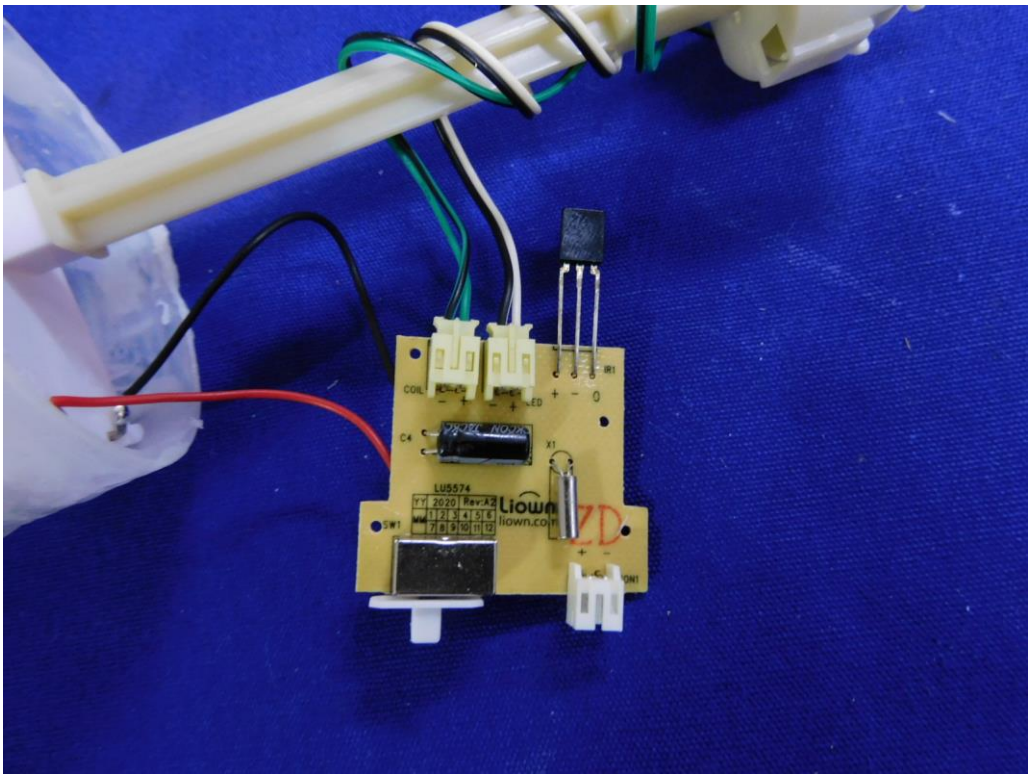

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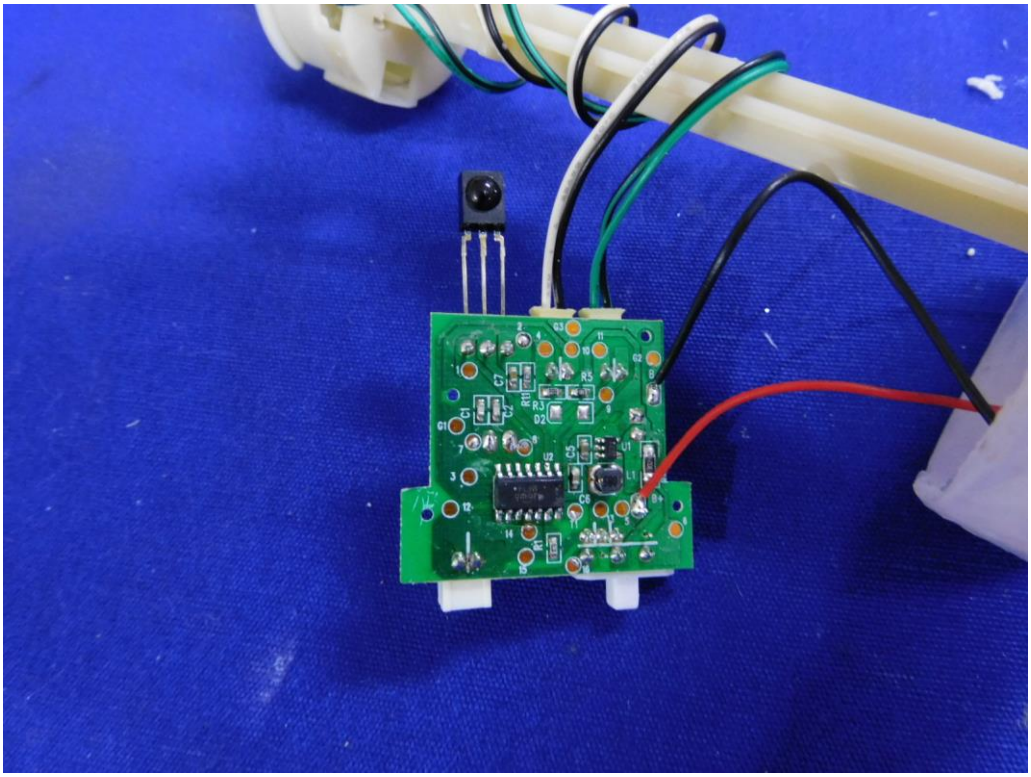

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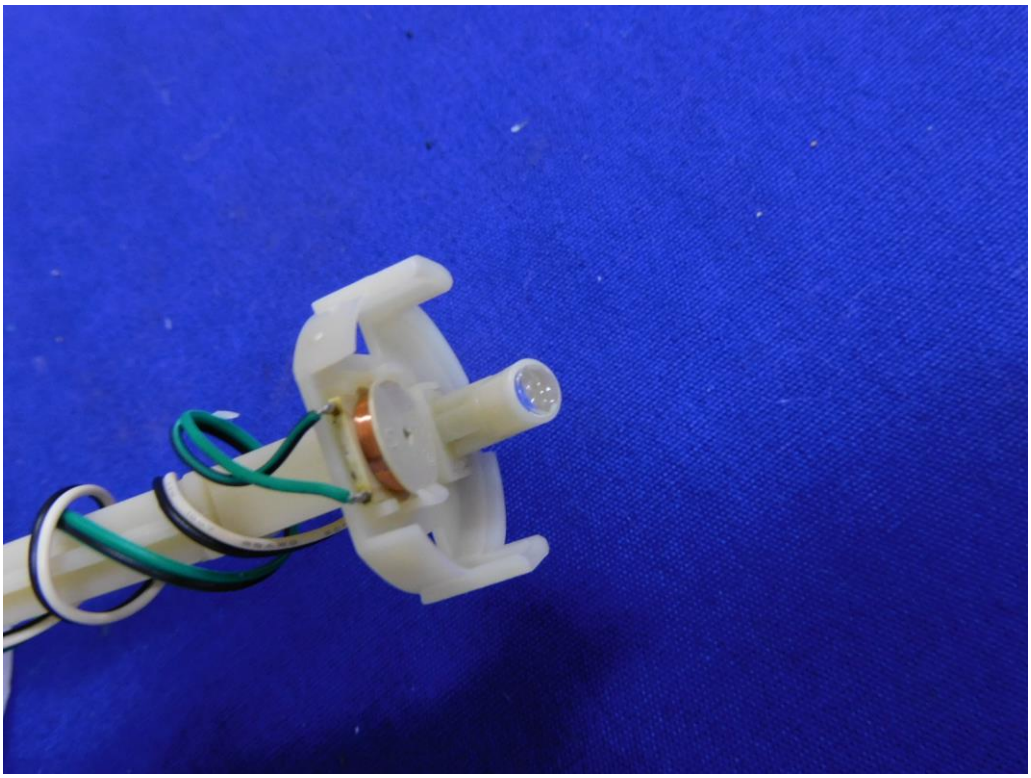

Internal Photo (RX)

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