Shenzhen Huatongwei International Inspection Co., Ltd.
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FCC REPORT

Report Reference No......:	**TRE1604012001**	R/C…….: 22812
FCC ID..... **:**	**N9STY-08P-1**	
Applicant's name..... **:**	**TOYO ELECTRIC MFG. Co., LTD.**	
Address.....:	9TH,FL 30 SEC 3 RENAI RD DAAN DISTRICT, TAIPEI 106 TAIWAN	
Manufacturer.....:	T&Y ELECTRIC(SHENZHEN)Co., LTD.	
Address.....:	ANLIANG INDUSTRIAL ZONE, HENGGANG, LONGGANG DISTRICT,GD,CHINA	
Test item description ..... **:**	**Light Set with 10 to 400 bulbs Operated by 433MHz Module Controller**	
Trade Mark .....:	TOYO	
Model/Type reference.....:	10L ~ 400L With TY- 08P 433MHz Module Controller	
List Model .....:	10L ~ 400L With TYC- 08P 433MHz Module Controller	
Standard ..... **:**	**47 CFR FCC Part 15 Subpart B** **ANSI C63.4: 2009**	
Date of receipt of test sample……..:	Apr 20, 2016	
Date of testing……:	Apr 21, 2016- May 09, 2016	
Date of issue……..:	May 09, 2016	
Result..... **……..:**	**Pass**	

Compiled by (position+printed name+signature)..:	File administrators Shayne Zhu	Shayne Zhu
Supervised by (position+printed name+signature)..:	Project Engineer Jeff Sun	Jeff Sun
Approved by (position+printed name+signature)..:	RF Manager Hans Hu	Hans Hu

Testing Laboratory Name ..... **:**	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address.....:	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Contents

1. TEST STANDARDS AND TEST DESCRIPTION

1.1. Test Standards

The tests were performed according to following standards:

47 CFR FCC Part 15 Subpart B - Unintentional Radiators

ANSI C63.4: 2014 – American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz

1.2. Test Description

Test Item	Section in CFR 47	Result
Conducted Emissions	15.107(a)	Pass
Radiated Emission	15.109(a)	Pass

Remark: The measurement uncertainty is not included in the test result.

2 . SUMMARY

2.1. Client Information

Applicant:	TOYO ELECTRIC MFG. Co., LTD.
Address:	9TH,FL 30 SEC 3 RENAI RD DAAN DISTRICT, TAIPEI 106 TAIWAN
Manufacturer:	T&Y ELECTRIC(SHENZHEN)Co., LTD.
Address:	ANLIANG INDUSTRIAL ZONE, HENGGANG, LONGGANG DISTRICT,GD,CHINA

2.2. Product Description

Name of EUT	Light Set with 10 to 400 bulbs Operated by 433MHz Module Controlle
Trade Mark:	TOYO
Model No.:	10L ~ 400L With TY- 08P 433MHz Module Controller
List Model:	10L ~ 400L With TYC- 08P 433MHz Module Controller
Power supply:	AC 120V/60Hz
Antenna type:	Intergral Antenna

2.3. Operation mode

Receive mode: keep the receiver in receiving mode.

2.4. EUT configuration

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

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.5. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd.
Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

3.2. Test Facility

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

CNAS-Lab Code: L1225
Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

A2LA-Lab Cert. No. 3902.01
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until December 31, 2016.

FCC-Registration No.: 317478
Shenzhen Huatongwei International Inspection 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 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

IC-Registration No.: 5377A&5377B
The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.
Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

ACA
Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI
Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.
Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV
Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

3.3. Equipments Used during the Test

Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	EMI Test Receiver	Rohde & Schwarz	ESCI	101247	2015/11/03
2	Artificial Mains	Rohde & Schwarz	NNLK 8121	573	2015/11/03
3	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	101488	2015/11/03
4	Test Software	Rohde & Schwarz	ES-K1	N/A	N/A

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2015/11/08
2	EMI Test Receiver	Rohde & Schwarz	ESCI	101247	2015/11/03
3	EMI Test Software	Audix	E3	N/A	N/A
4	Turntable	MATURO	TT2.0	----	N/A
5	Antenna Mast	MATURO	TAM-4.0-P-12	----	N/A
6	EMI Test Software	Rohde & Schwarz	ESK1	N/A	N/A
7	Ultra-Broadband Antenna	Rohde&Schwarz	HL562	100015	2015/11/08
8	Amplifer	ShwarzBeck	BBV 9743	9743-0022	2015/11/03
9	TURNTABLE	ETS	2088	2149	N/A
10	HORN ANTENNA	Rohde&Schwarz	HF906	100039	2015/11/08
11	Test cable	Siva Cables Italy	RG 58A/U	W14.02	12/05/2015

The calibration interval was one year.

3.4. Environmental conditions

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

Temperature:	15~35°C
lative Humidity:	30~60 %
Air Pressure:	950~1050mba

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 Huatongwei International Inspection 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 Shenzhen Huatongwei laboratory is reported:

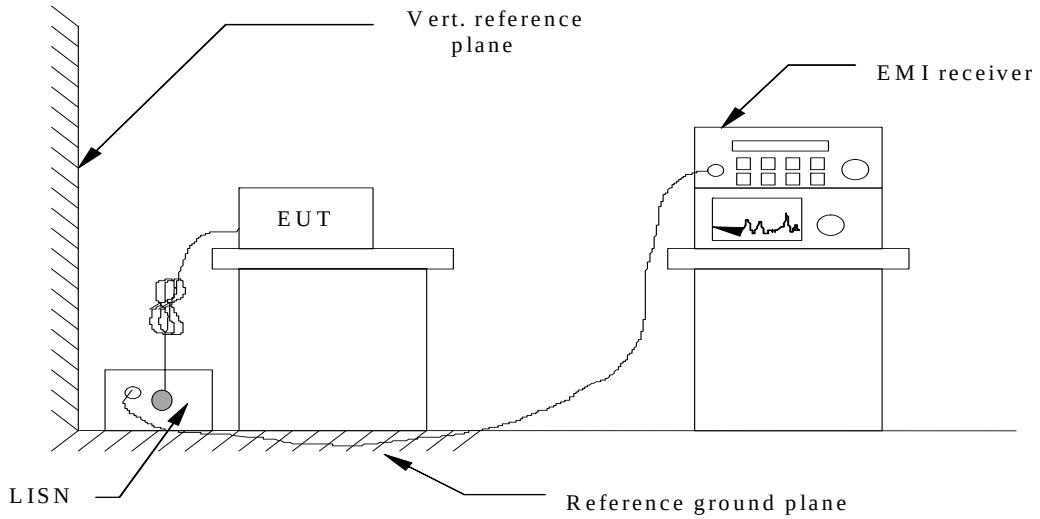
Test Item	Frequency Range	Measurement Uncertainty	Notes
Conducted Emission	0.15~30MHz	3.39 dB	(1)
Radiated Emission	0.09~30MHz	3.85dB	(1)
Radiated Emission	30~1000MHz	4.24dB	(1)
Radiated Emission	1~18GHz	5.16dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4. TEST CONDITIONS AND RESULTS

4.1. Conducted Emissions Test

TEST CONFIGURATION



TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4:2014
2. Support equipment, if needed, was placed as per ANSI C63.4:2014
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4:2014.
4. The EUT received DC 5.0 from USB powered from AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

CONDUCTED POWER LINE EMISSION LIMIT

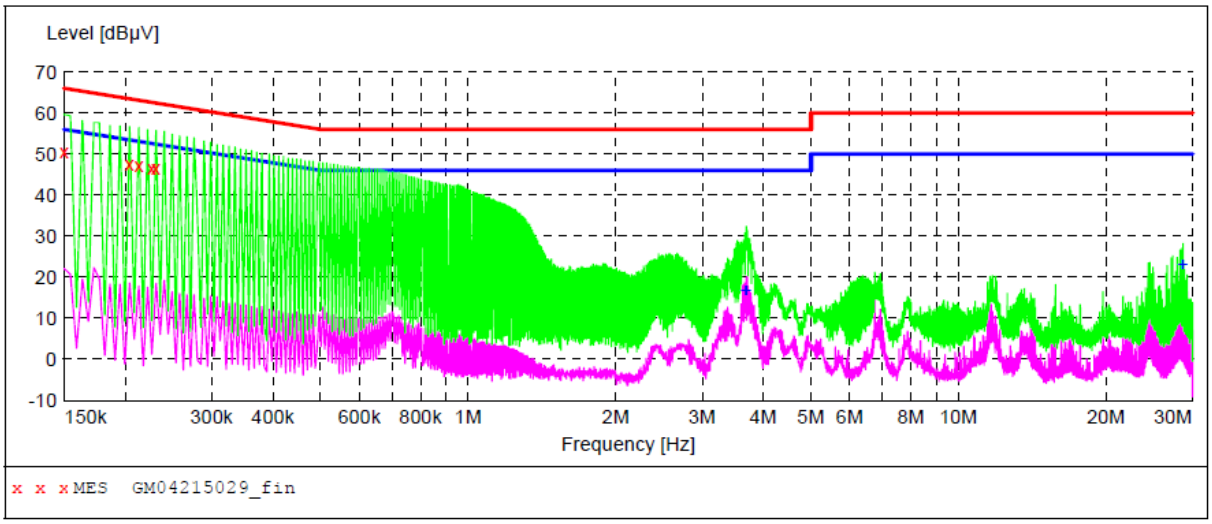
For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following：

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency

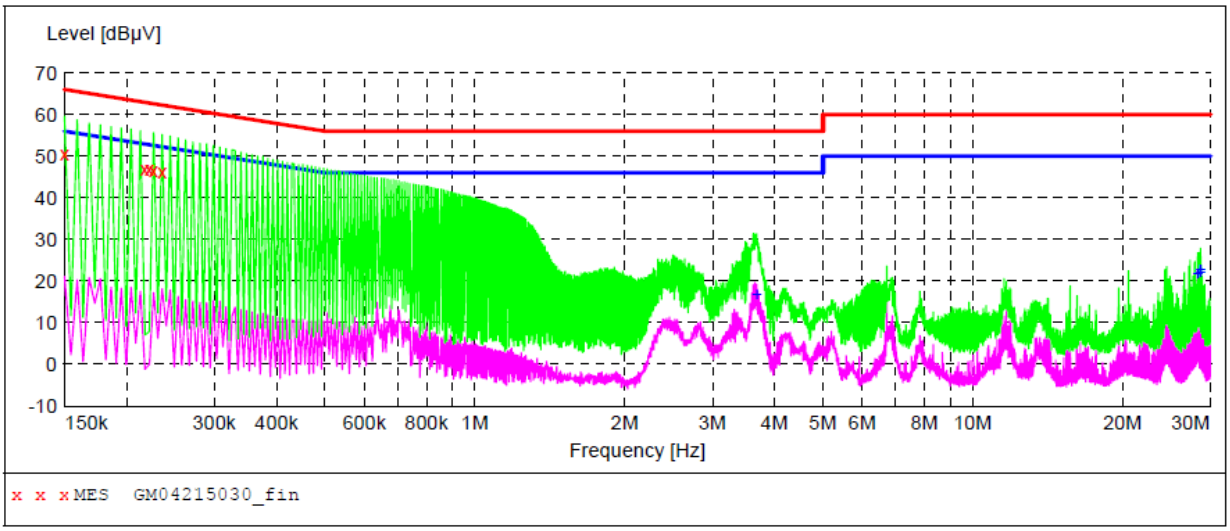
T EST RESULTS

☒ **Passed** ☐ **Not Applicable**



Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	50.50	10.3	66	15.5	QP	N	GND
0.204000	47.40	10.2	63	16.0	QP	N	GND
0.213000	47.20	10.2	63	15.9	QP	N	GND
0.226500	46.60	10.2	63	16.0	QP	N	GND
0.231000	46.50	10.2	62	15.9	QP	N	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
3.678000	16.90	10.3	46	29.1	AV	N	GND
3.682500	17.00	10.3	46	29.0	AV	N	GND
3.687000	16.90	10.3	46	29.1	AV	N	GND
28.689000	23.30	11.1	50	26.7	AV	N	GND



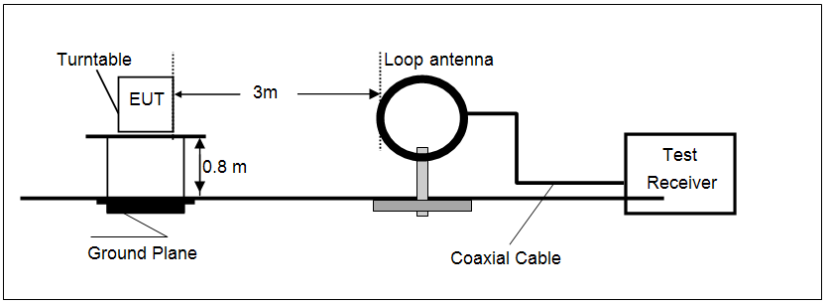
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	50.50	10.3	66	15.5	QP	L1	GND
0.217500	46.90	10.2	63	16.0	QP	L1	GND
0.222000	46.80	10.2	63	15.9	QP	L1	GND
0.226500	46.60	10.2	63	16.0	QP	L1	GND
0.235500	46.20	10.2	62	16.1	QP	L1	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
3.682500	17.00	10.3	46	29.0	AV	L1	GND
28.320000	22.00	11.1	50	28.0	AV	L1	GND
28.684500	22.10	11.1	50	27.9	AV	L1	GND
28.689000	22.80	11.1	50	27.2	AV	L1	GND

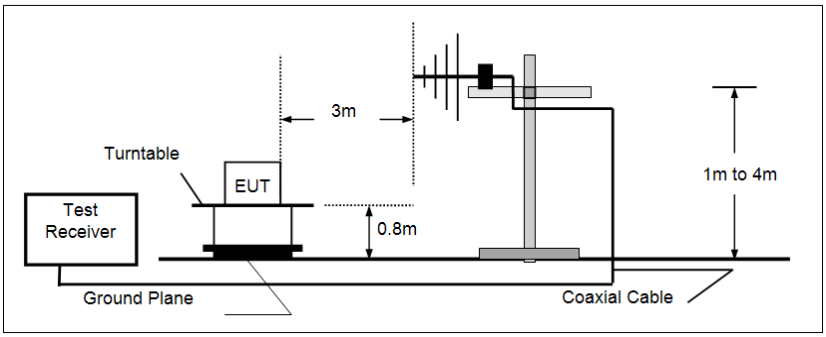
4.2. Radiated Emission Test

TEST CONFIGURATION

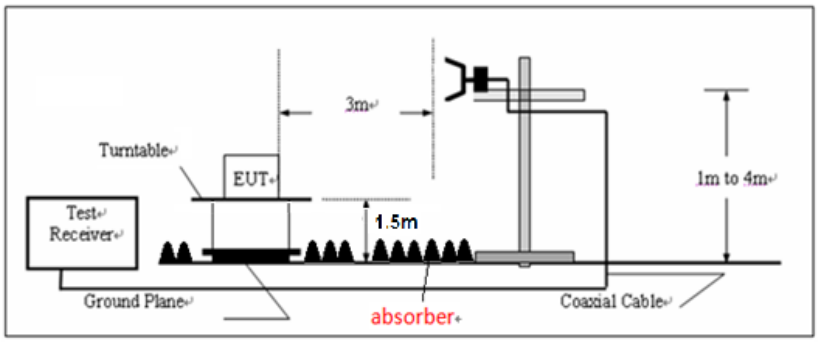
9KHz ~30MHz



30MHz ~ 1GHz



Above 1GHz



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground below 1GHz, 1.5 meters above 1GHz. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Transd (dB)
300.00	40	58.1	12.2	1.6	31.90	-18.1

Transd=AF +CL-AG

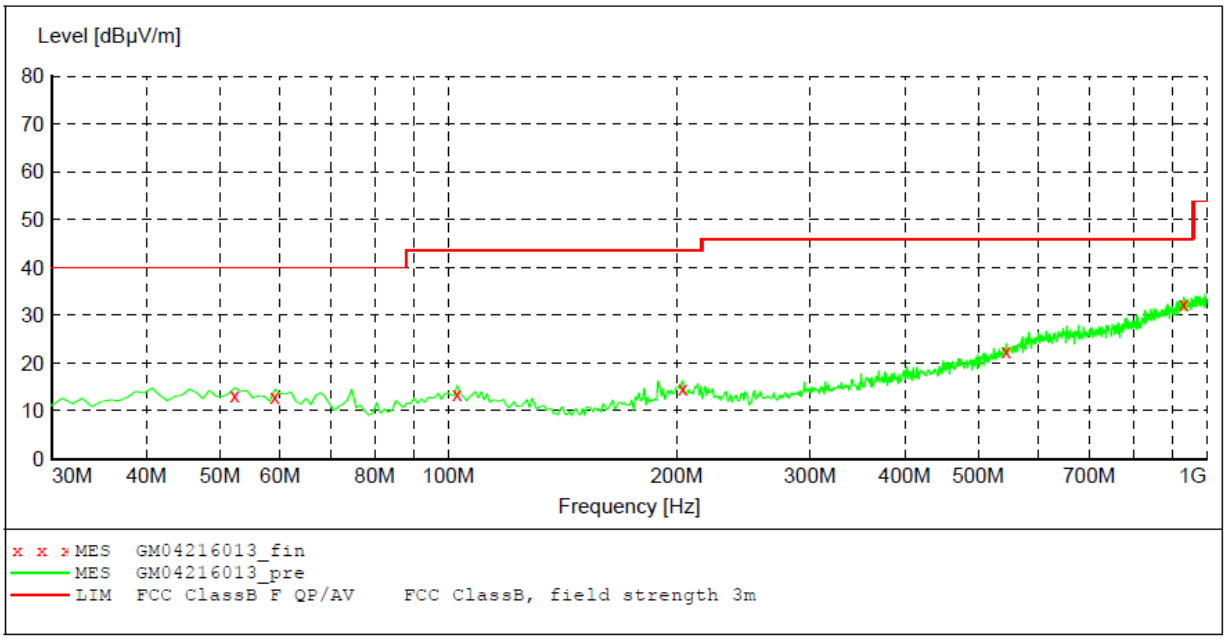
RADIATION LIMIT

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

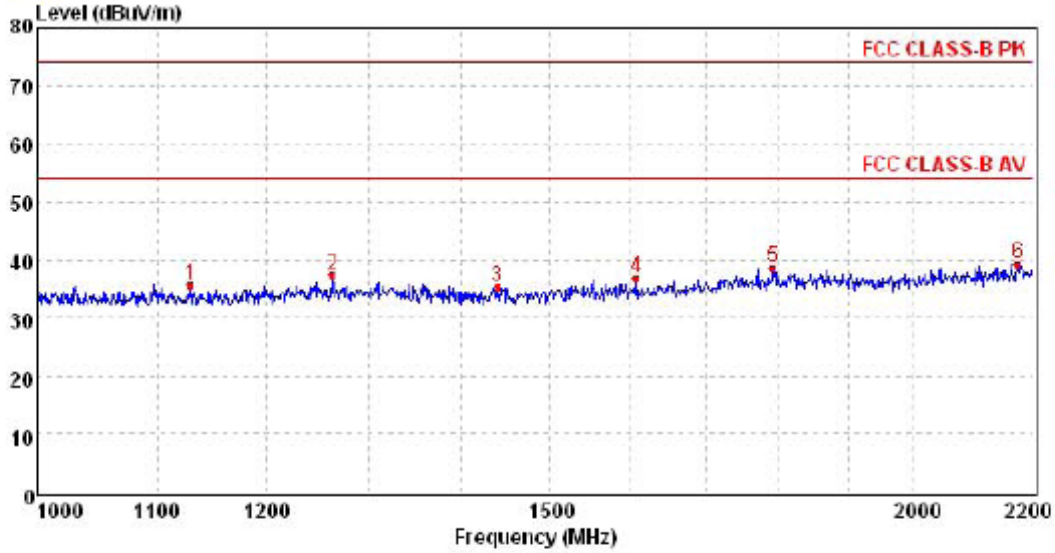
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

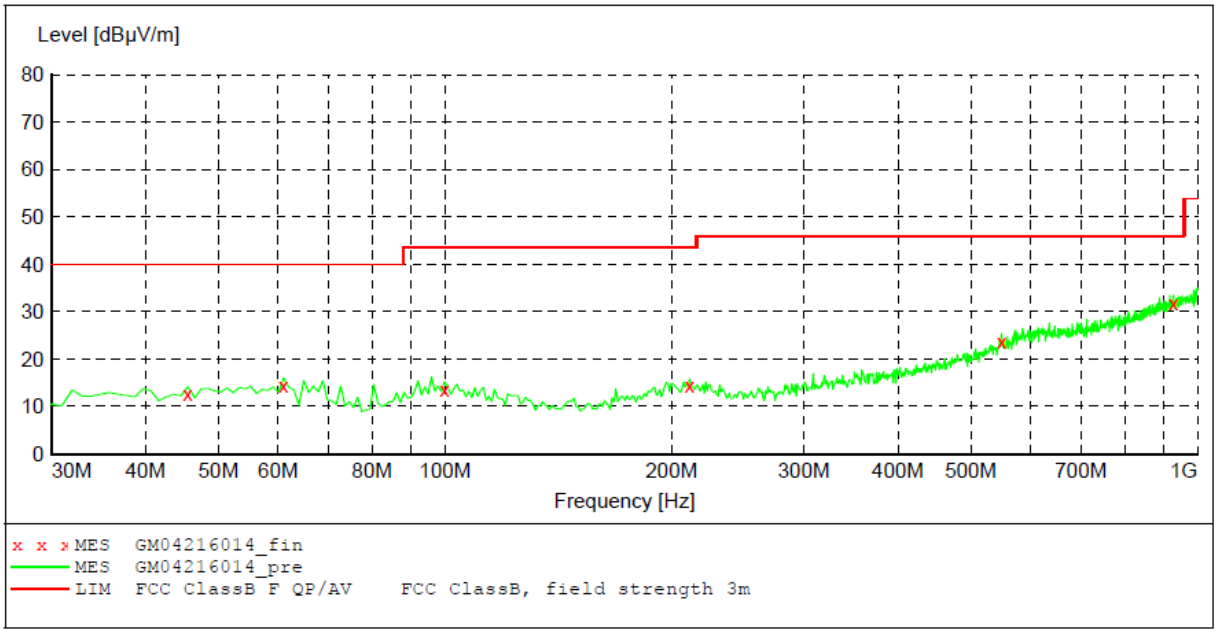
☒ Passed ☐ Not Applicable



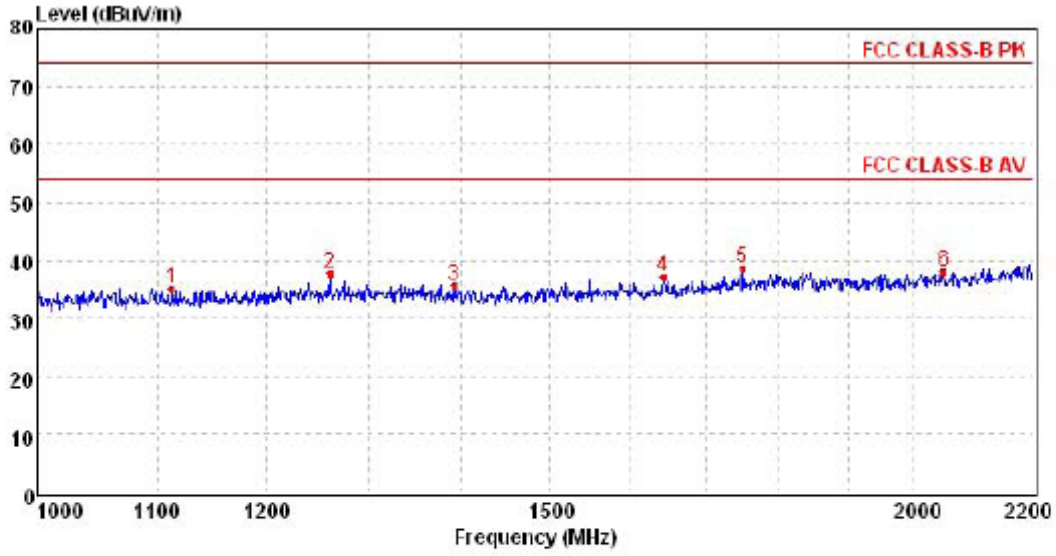
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
52.310000	12.90	-14.4	40.0	27.1	QP	100.0	334.00	HORIZONTAL
59.100000	12.60	-14.8	40.0	27.4	QP	100.0	252.00	HORIZONTAL
102.750000	13.30	-14.5	43.5	30.2	QP	100.0	155.00	HORIZONTAL
203.630000	14.40	-13.7	43.5	29.1	QP	100.0	220.00	HORIZONTAL
544.100000	22.10	-5.1	46.0	23.9	QP	100.0	41.00	HORIZONTAL
933.070000	31.90	3.4	46.0	14.1	QP	100.0	334.00	HORIZONTAL



Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1129.99	43.42	24.35	4.36	36.42	35.71	74.00	-38.29	Peak
2	1263.86	44.96	24.49	4.68	36.59	37.54	74.00	-36.46	Peak
3	1439.46	42.58	24.65	5.06	36.78	35.51	74.00	-38.49	Peak
4	1607.45	43.32	25.04	5.41	36.93	36.84	74.00	-37.16	Peak
5	1790.81	44.32	25.57	5.78	37.09	38.58	74.00	-35.42	Peak
6	2174.13	43.52	26.78	6.46	37.40	39.36	74.00	-34.64	Peak



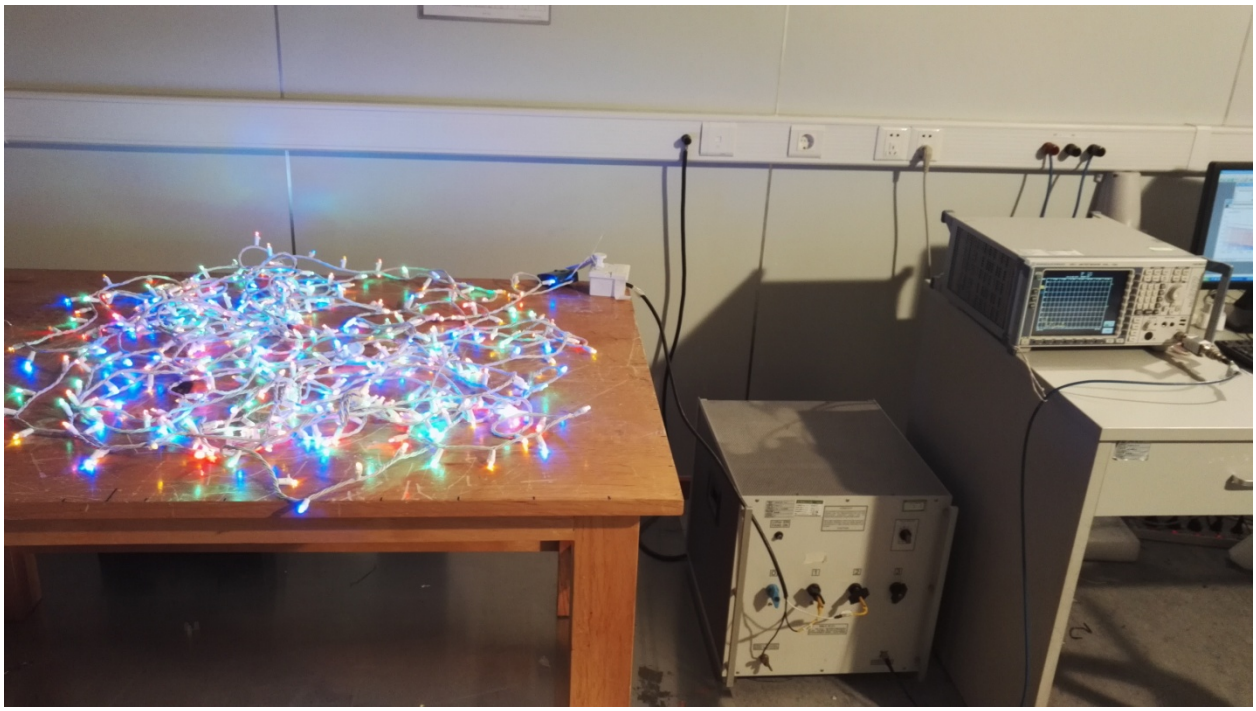
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	12.20	-14.7	40.0	27.8	QP	100.0	82.00	VERTICAL
61.040000	14.00	-15.1	40.0	26.0	QP	100.0	232.00	VERTICAL
99.840000	13.20	-14.3	43.5	30.3	QP	100.0	348.00	VERTICAL
211.390000	13.90	-14.1	43.5	29.6	QP	100.0	249.00	VERTICAL
548.950000	23.40	-4.9	46.0	22.6	QP	100.0	62.00	VERTICAL
929.190000	31.50	3.3	46.0	14.5	QP	100.0	265.00	VERTICAL



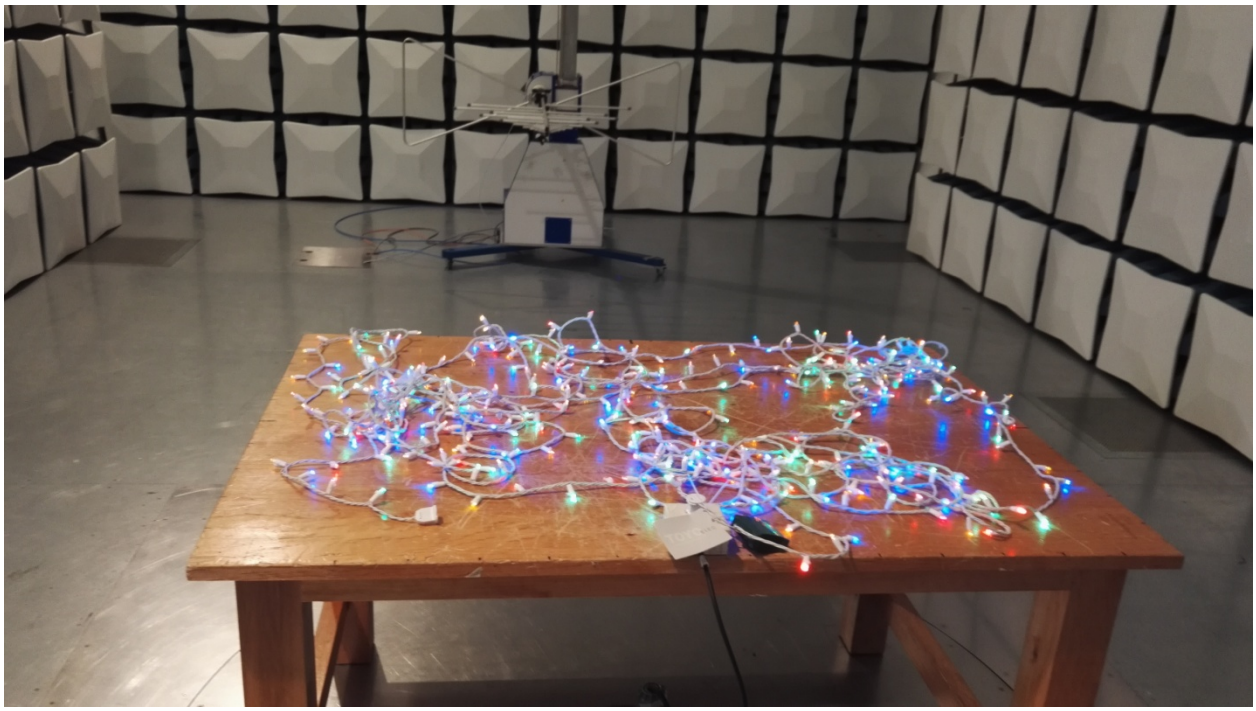
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1113.19	42.94	24.33	4.31	36.40	35.18	74.00	-38.82	Peak
2	1260.88	45.15	24.49	4.67	36.58	37.73	74.00	-36.27	Peak
3	1391.47	42.81	24.61	4.96	36.72	35.66	74.00	-38.34	Peak
4	1642.04	43.42	25.15	5.49	36.97	37.09	74.00	-36.91	Peak
5	1747.57	44.44	25.44	5.69	37.05	38.52	74.00	-35.48	Peak
6	2049.30	42.82	26.29	6.24	37.29	38.06	74.00	-35.94	Peak

5. Test Setup Photos of the EUT

AC Power Line conduction emission

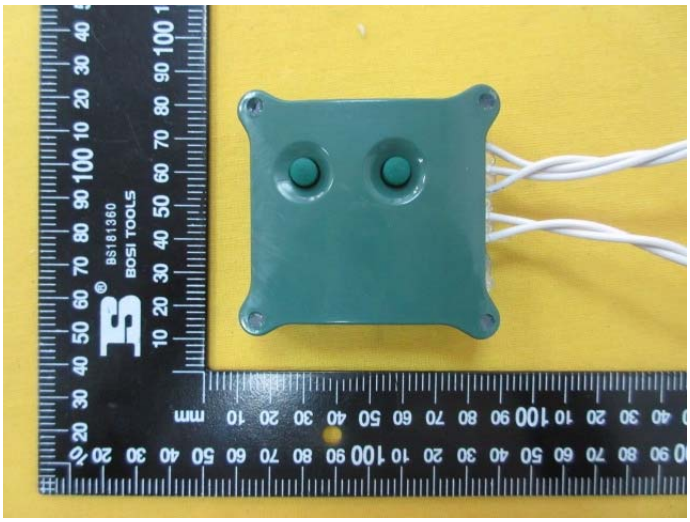


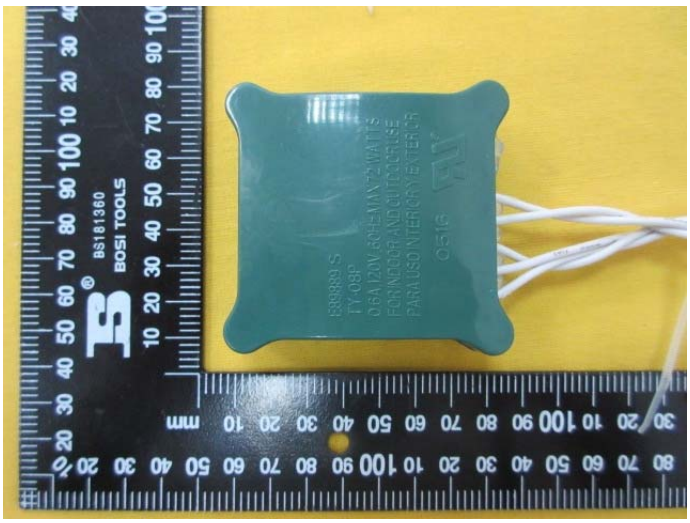
Radiated Emission

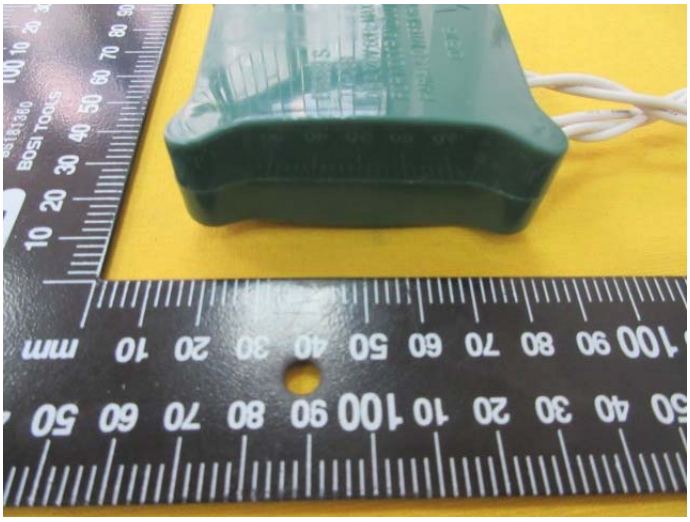


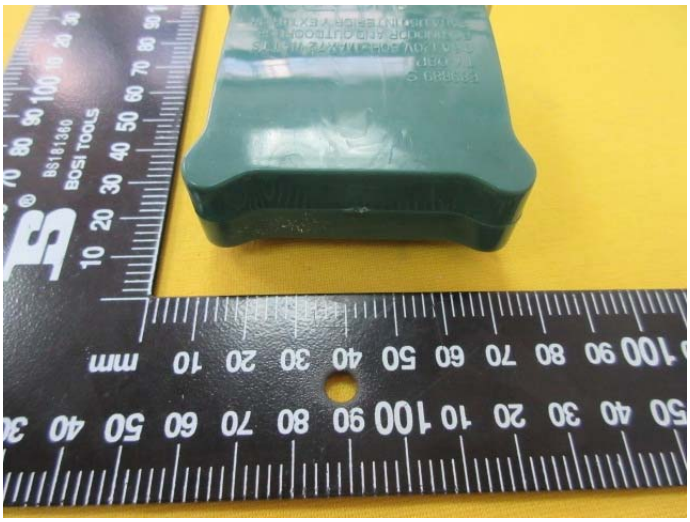
6. External and Internal Photos of the EUT

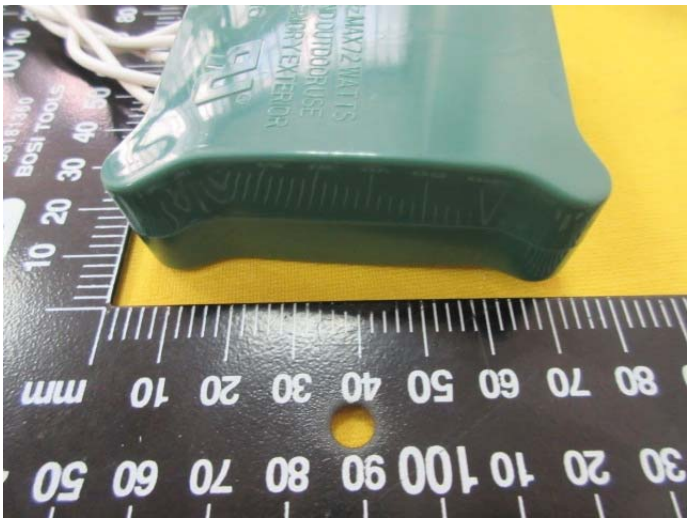
External Photos

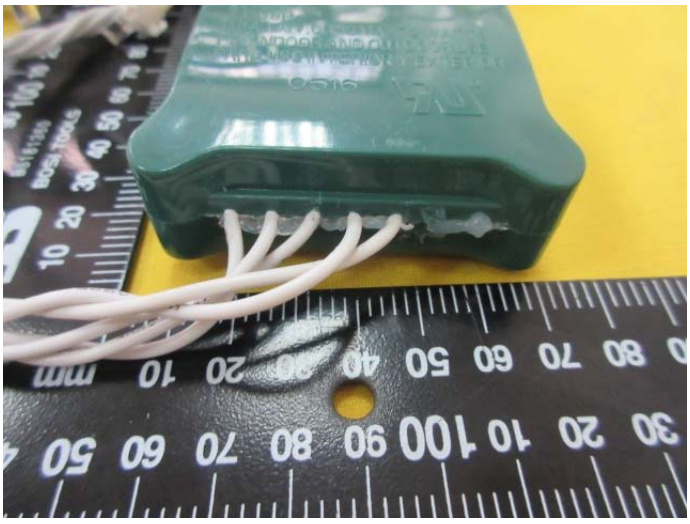




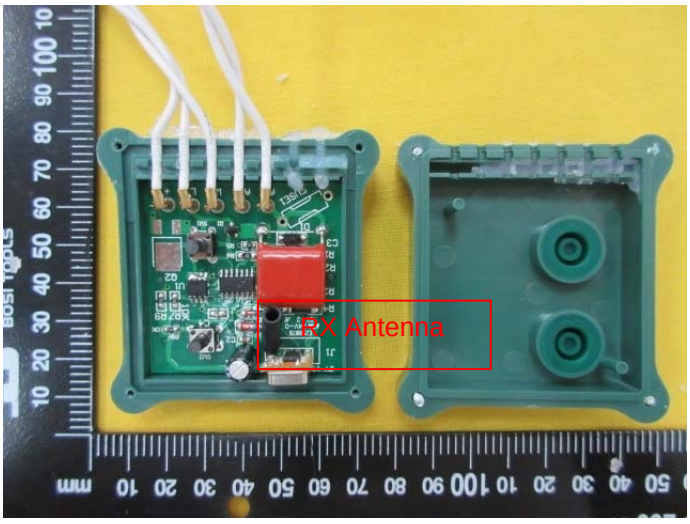


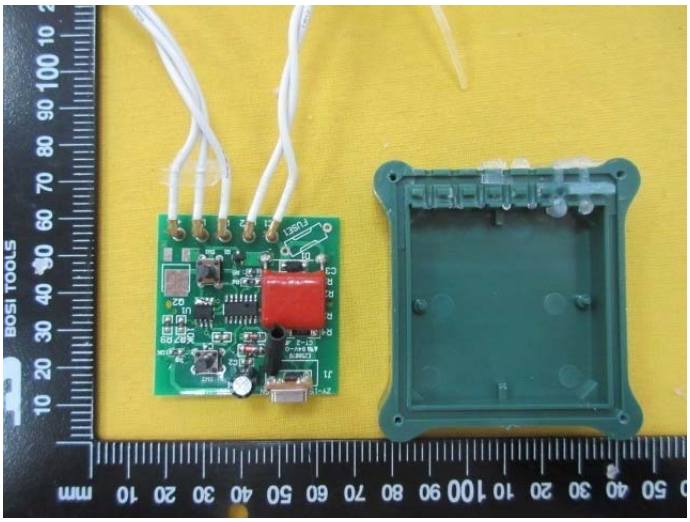


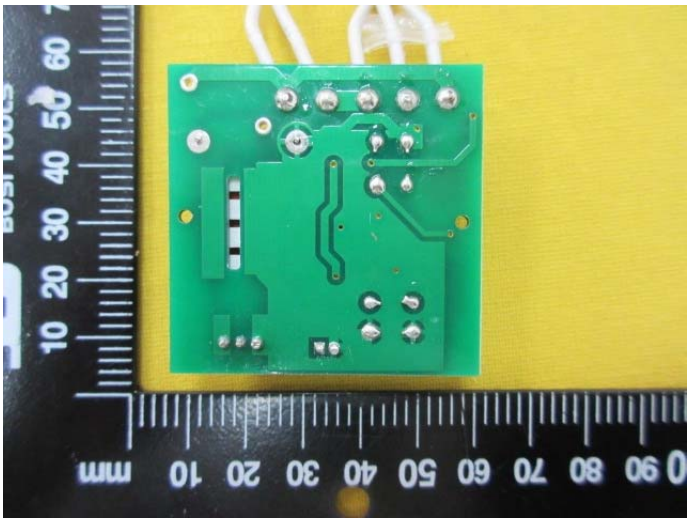


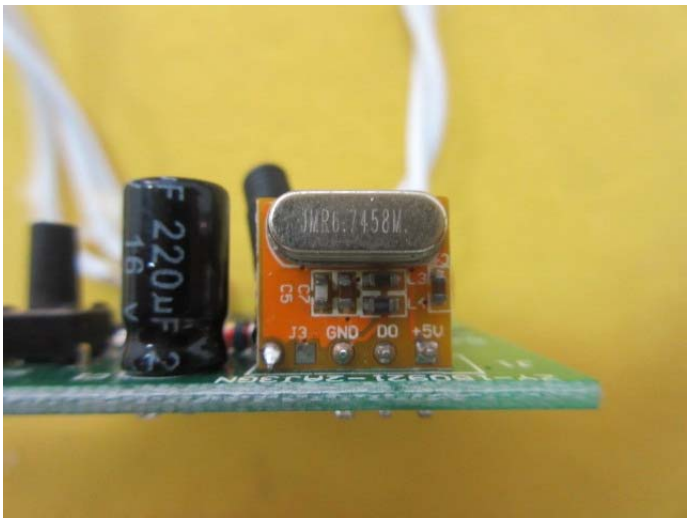


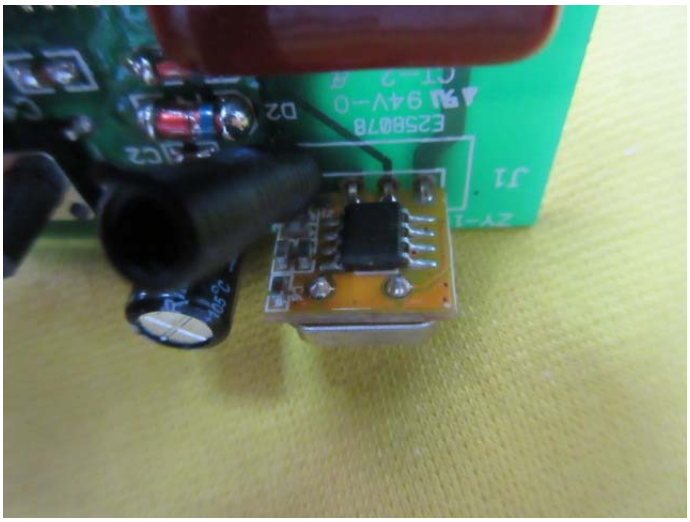
Internal Photos











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