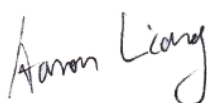
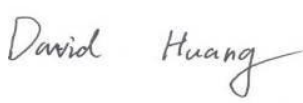


RF TEST REPORT



Report No.: 18070146-FCC-R

Supersede Report No.: N/A

Applicant	PHIPOL POWER CO LTD.	
Product Name	RF Remote Control used for Christmas trees,wreaths or garlands	
Model No.	GBFDC001-1A	
Serial Model No.	GBFDC001-2A	
Test Standard	FCC 15.231:2017, ANSI C63.10:2013	
Test Date	February 01 to March 11, 2018	
Issue Date	March 12, 2018	
Test Result	☒ Pass ☐ Fail	
Equipment complied with the specification ☒		
Equipment did not comply with the specification ☐		
		
Aaron Liang Test Engineer	David Huang Checked By	
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only		

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park

South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108

Phone: +86 0755 2601 4629801 Email: China@siemic.com.cn

Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

Test Report No.	18070146-FCC-R
Page	3 of 39

This page has been left blank intentionally.

CONTENTS

1. REPORT REVISION HISTORY	5
2. CUSTOMER INFORMATION	5
3. TEST SITE INFORMATION	5
4. EQUIPMENT UNDER TEST (EUT) INFORMATION	6
5. TEST SUMMARY	7
6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS	8
6.1 ANTENNA REQUIREMENT	8
6.2 CONDUCTED EMISSIONS VOLTAGE	9
6.3 20DB OCCUPIED BANDWIDTH	10
6.4 RADIATED FUNDAMENTAL AND SPURIOUS EMISSION	11
6.5 DEACTIVATION	16
ANNEX A. TEST INSTRUMENT	17
ANNEX B. EUT AND TEST SETUP PHOTOGRAPHS	18
ANNEX C. TEST SETUP AND SUPPORTING EQUIPMENT	35
ANNEX D. USER MANUAL / BLOCK DIAGRAM / SCHEMATICS / PARTLIST	38
ANNEX E. DECLARATION OF SIMILARITY	39

1. Report Revision History

Report No.	Report Version	Description	Issue Date
18070146-FCC-R	NONE	Original	March 12, 2018

2. Customer information

Applicant Name	PHIPOL POWER CO LTD.
Applicant Add	FLAT/RM 704,7/F,BRIGHT WAY TOWER,NO.33 MONG KOK ROAD,KOWLOON,HK
Manufacturer	PHIPOL POWER CO.,LTD.
Manufacturer Add	2 Floor,NO 85 Qinlin east RD,Danling Village,Humen Town, Dongguan, Guangdong, China.

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	535293
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

4. Equipment under Test (EUT) Information

Description of EUT:	RF Remote Control used for Christmas trees,wreaths or garlands
Main Model:	GBFDC001-1A
Serial Model:	GBFDC001-2A
Date EUT received:	January 31, 2018
Test Date(s):	February 01 to March 11, 2018
RF Operating Frequency (ies):	433.92MHz(TX/RX)
Number of Channels :	1CH
Equipment Category:	DSC
Antenna Gain:	-1.5Bi
Input Power:	Adapter: Model: DWPADP1201000U INPUT: AC100-240V, 0.5A OUTPUT: DC 12V, 1.0A
Trade Name :	N/A
FCC ID:	2AOVW-GBFDC001
Port:	Pls refer to user' s manual
Type of Modulation:	FSK

5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

Test Results Summary

Test Standard	Description	Pass / Fail
CFR 47 Part 15.231: 2014		
15.203	Antenna Requirement	Pass
15.207	Conducted Emissions Voltage	N/A
15.231(e)	Fundamental & Radiated Spurious Emission	Pass
15.231(c)	20dB Bandwidth	Pass
15.231(e)	Deactivation	Pass
ANSI C63.10:2013		
PS: All measurement uncertainties are not taken into consideration for all presented test result.		

6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

6.1 Antenna Requirement

Requirement(s): 47 CFR §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna requirement must meet at least one of the following:

- a) Antenna must be permanently attached to the device.
- b) Antenna must use a unique type of connector to attach to the device.
- c) Device must be professionally installed. Installer shall be responsible for ensuring that the correct antenna is employed with the device.

Test result: Pass

The antenna is permanently attached to the device which meets the requirement.

6.2 Conducted Emissions Voltage

Temperature	24°C
Relative Humidity	62%
Atmospheric Pressure	1012mbar
Test date :	-----
Tested By :	Aaron Liang

Requirement:

Frequency of emission (MHz)	Conducted limit (dBμ V)	
	Quasi-peak	Average
0.15– 0.5	66 to 56*	56 to 46*
0.5– 5	56	46
5– 30	60	50

*Decreases with the logarithm of the frequency.

Procedures:

1. All possible modes of operation were investigated. Only the 6 worst case emissions measured, using the correct CISPR and Average detectors, are reported. All other emissions were relatively insignificant.
2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.
3. Conducted Emissions Measurement Uncertainty
All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 9kHz – 30MHz (Average & Quasi-peak) is ±3.5dB.

Test result: N/A (Batteries operated)

6.3 20dB Occupied Bandwidth

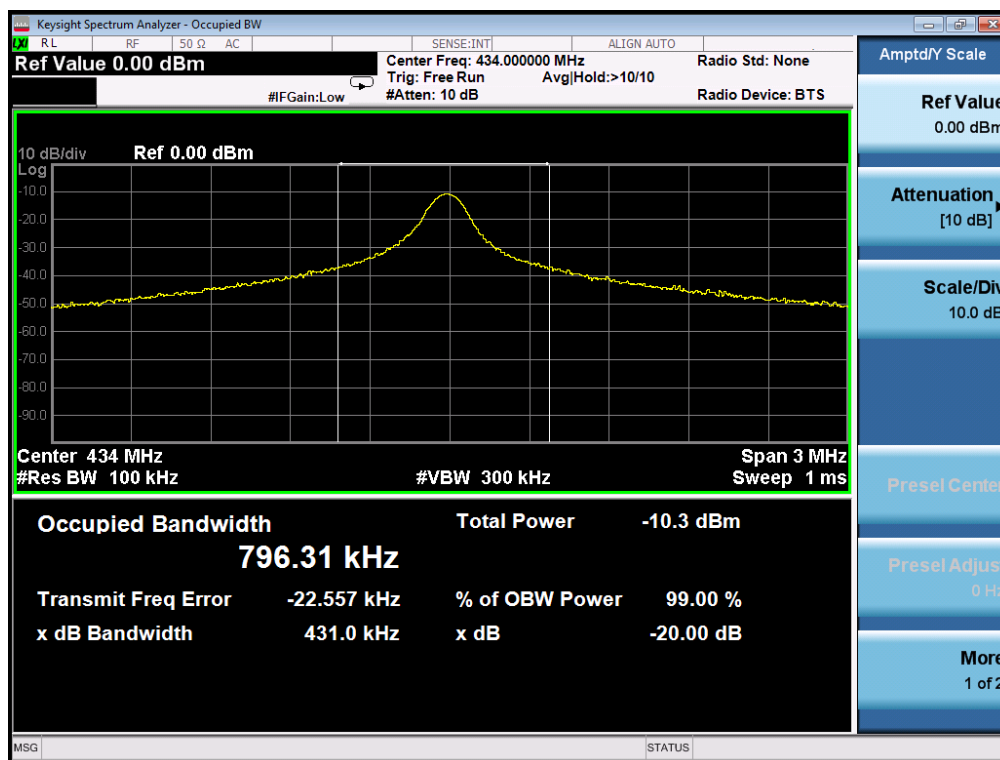
Temperature	25°C
Relative Humidity	55%
Atmospheric Pressure	1012mbar
Test date :	March 09, 2018
Tested By :	Aaron Liang

20dB bandwidth was measured by conducted method using a spectrum analyzer.

Test Result:

Fundamental Frequency (MHz)	Measured 20dB Bandwidth (kHz)	FCC 15.231 Limit (kHz)	Result
434	431.0	1084.80	Pass

434 MHz



6.4 Radiated Fundamental and Spurious Emission

Temperature	25°C
Relative Humidity	55%
Atmospheric Pressure	1012mbar
Test date :	March 09, 2018
Tested By :	Aaron Liang

1. Radiated emissions were measured according to ANSI C63.4. The EUT was set 3 meter away from the measuring antenna. The loop antenna was positioned 1meter above the ground from the center of the loop. The measuring bandwidth was set to 10kHz. All possible modes of operation were investigated. Only the worst case emissions measured, All other emissions were relatively insignificant.

2. A "-ve" margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency.

3. Sample Calculation: Corrected Amplitude=Raw Amplitude(dBuV/m)+ACF(dB)+Cable Loss(dB)-Distance Correction Factor.

Sample Calculation:

1) Corrected Amplitude= Raw Amplitude(dBuV/m)+ACF(dB)+Cable Loss(dB)-Distance Correction Factor

2) Average = peak reading + 20log(duty cycle)

4. Radiated Emissions Measurement Uncertainty

All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 1GHz(QP only3m & 10m) is +5.6/-4.5dB(for EUTs<0.5m×0.5m×0.5m).In range of 1-40GHz) is ±3.6dB.

Standard Requirement:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

Test Result: Pass

Test Result:

Test Mode:	Transmitting Mode
------------	-------------------

Frequency range: 9KHz - 30MHz

Freq. (MHz)	Detection value	Factor (dB/m)	Reading (dBuV/m)	Result (dBuV/m)	Limit@3m (dBuV/m)	Margin (dB)
--	--	--	--	--	--	>20
--	--	--	--	--	--	>20

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

433.92 MHz

Frequency	Average Factor	Polarity	Field Strength (PK)	Field Strength (AV)	Limits (PK)	Limits (AV)	Margin (PK)	Margin (AV)
(MHz)	(dB)	(H/V)	(dBuV/m)	(dBuV/m)	(dBμ V/m)	(dBμ V/m)	(dB)	(dB)
433.92	-3.64	H	78.49	74.85	100.80	80.80	-22.31	-5.95
867.84	-3.64	H	58.64	55.00	80.80	60.80	-22.16	-5.80
1301.76	-3.64	H	44.54	40.90	80.80	60.80	-36.26	-19.90
1735.68	-3.64	H	43.87	40.23	80.80	60.80	-36.93	-20.57
2169.60	-3.64	H	40.32	36.68	80.80	60.80	-40.48	-24.12
2603.52	-3.64	H	41.26	37.62	80.80	60.80	-39.54	-23.18
3037.44	-3.64	H	47.25	43.61	80.80	60.80	-33.55	-17.19
4415.15	-3.64	H	43.56	39.92	74.00	54.00	-30.44	-14.08
433.92	-3.64	V	77.45	73.81	100.80	80.80	-23.35	-6.99
867.84	-3.64	V	56.38	52.74	80.80	60.80	-24.42	-8.06
1301.76	-3.64	V	49.15	45.51	80.80	60.80	-31.65	-15.29
1735.68	-3.64	V	42.58	38.94	80.80	60.80	-38.22	-21.86
2169.60	-3.64	V	40.19	36.55	80.80	60.80	-40.61	-24.25
2603.52	-3.64	V	41.19	37.55	80.80	60.80	-39.61	-23.25
3037.44	-3.64	V	47.69	44.05	80.80	60.80	-33.11	-16.75
4415.15	-3.64	V	50.85	47.21	74.00	54.00	-23.15	-6.79

Notes:

- Duty cycle is 65.8%, $20\log(\text{duty cycle}) = -3.64\text{dB}$ correction was used to determine the average level from the peak
- reading. Average = peak reading + $20\log(\text{duty cycle})$, Final Average= peak reading -3.64
- All the data measurement of peak values.
FCC Limit for Average Measurement= $3,750 + (12,500 - 3,750) / (470 - 260) * (433.92 - 260) \mu\text{ V/m}$
=80.83dBμ V/m
- Average pulsed signal over one complete pulse train or 100 ms time frame if pulse train exceeds 100 ms
- Maximum average in 100 ms
- Calculate duty cycle for pulse train or 100 ms
- Duty cycle = $(t_1 + t_2 + t_3 + \dots t_n) / T$ where t_n = pulse width, T = pulse train length or 100 ms
- Pulse width (PW) = 65.8ms

Test Report No.	18070146-FCC-R
Page	14 of 39

$$2/PW = 2/65.8\text{ms} = 0.03 \text{ kHz}$$

$$RBW > 2/PW (65.8\text{kHz})$$

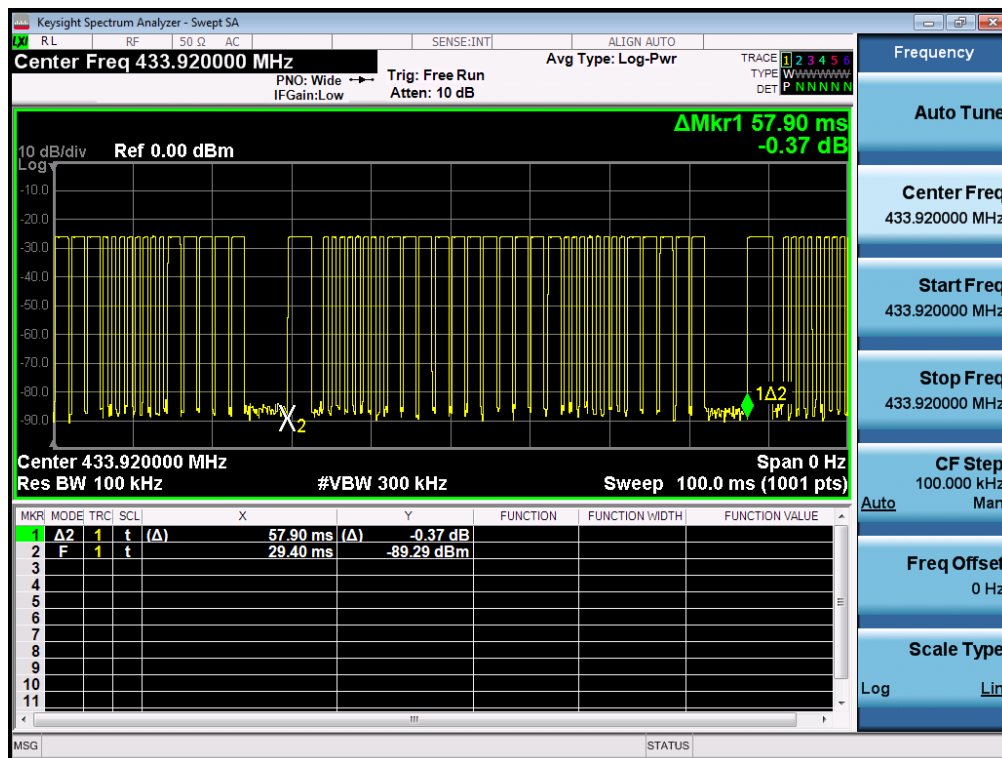
Therefore PDCF is not needed.

Pulse Duty Cycle:

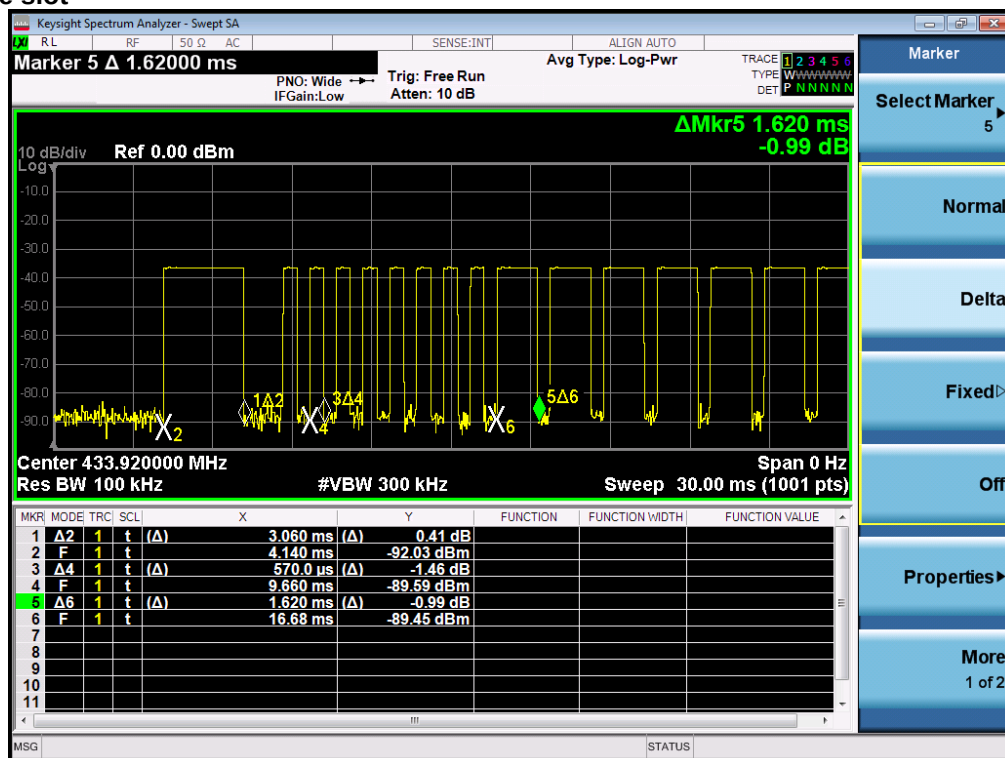
$$\text{Duty cycle} = (3.06 + 16 \cdot 0.57 + 16 \cdot 1.62) / 57.9 = 38.1 / 57.9 = 65.8\%$$

$$\text{Average Duty Factor: } 20 \cdot \log(\text{Duty Cycle}) = -3.64\text{dB}$$

Duty Cycle T Period



T on time slot



6.5 Deactivation

Temperature	25°C
Relative Humidity	55%
Atmospheric Pressure	1012mbar
Test date :	March 09, 2018
Tested By :	Aaron Liang

Deactivation was measured by conducted method using a spectrum analyzer.

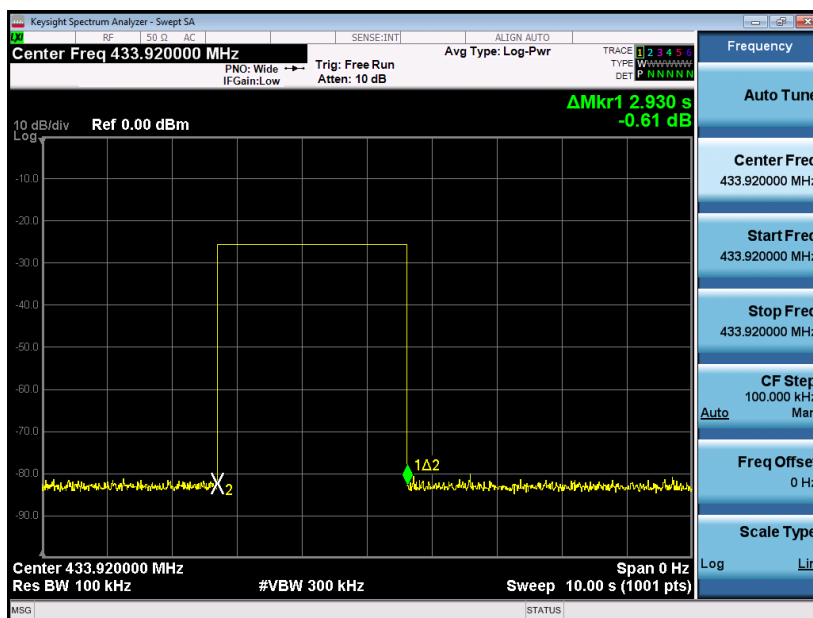
Standard requirement: 47 CFR §15.231 (a)

A transmitter activated automatically shall cease transmission within 5 seconds after activation

Test Result: Pass

Frequency (MHz)	The duration of transmission(s)	Limit (s)	Verdict (Pass)
434	2.93	<=5	Pass

The duration of transmission



Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted					
EMI test receiver	ESCS30	8471241027	09/15/2017	09/14/2018	☒
Line Impedance	LI-125A	191106	09/23/2017	09/22/2018	☒
Line Impedance	LI-125A	191107	09/23/2017	09/22/2018	☒
ISN	ISN T800	34373	09/23/2017	09/22/2018	☐
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/22/2017	09/21/2018	☒
Transient Limiter	LIT-153	531118	08/30/2017	08/29/2018	☒
RF conducted test					
Agilent ESA-E SERIES	E4407B	MY45108319	09/15/2017	09/14/2018	☒
Power Splitter	1#	1#	08/30/2017	08/29/2018	☒
DC Power Supply	E3640A	MY40004013	09/15/2017	09/14/2018	☒
Radiated Emissions					
EMI test receiver	ESL6	100262	09/15/2017	09/14/2018	☒
Positioning Controller	UC3000	MF780208282	11/17/2017	11/16/2018	☒
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/30/2017	08/29/2018	☒
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/23/2017	03/22/2018	☒
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/19/2017	09/18/2018	☒
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/22/2017	09/21/2018	☒
Universal Radio Communication Tester	CMU200	121393	09/23/2017	09/22/2018	☒

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

Note: The Christmas tree has a variety of model, as following:

Christmas tree model: DWPADP1201000U, W14N0051, W14N0072, W14X0402, 1900266, W14N0056, 151-7106, 151-7107, W14N0074, W14N0083, W14N0084, W14N0076, W14N0077, W14N0075, W14N0080, W14N0081, W14N0086, W14N0087, W14N0073, W14N0066, W14N0067, W14N0069, W14N0091, W14N0092, W14N0065, W14N0093.

TME7.5-7(1.4), TMP7.5-7(1.4), TMH7.5-7(1.4).

TME7.5-7N(1.4), TMP7.5-7N(1.4), TMH7.5-7N(1.4).

TME9-7(1.4), TMP9-7(1.4), TMH9-7(1.4).

TME9-7N(1.4), TMP9-7N(1.4), TMH9-7N(1.4).

TME12-7(1.4), TMP12-7(1.4), TMH12-7(1.4).

TME12-7N(1.4), TMP12-7N(1.4), TMH12-7N(1.4);

TME7.5-7(0.5), TMP7.5-7(0.5), TMH7.5-7(0.5).

TME7.5-7N(0.5), TMP7.5-7N(0.5), TMH7.5-7N(0.5).

TME9-7(0.5), TMP9-7(0.5), TMH9-7(0.5).

TME9-7N(0.5), TMP9-7N(0.5), TMH9-7N(0.5).

TME12-7(0.5), TMP12-7(0.5), TMH12-7(0.5).

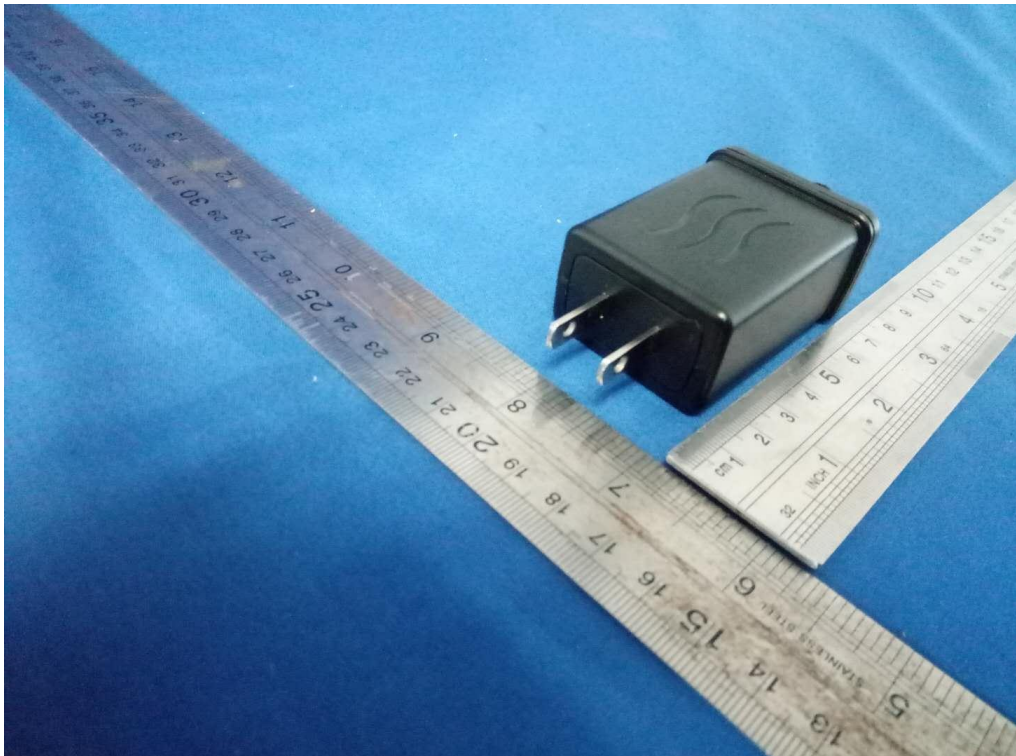
TME12-7N(0.5), TMP12-7N(0.5), TMH12-7N(0.5)

(It's all the same except for the christmas tree shape).

Whole Package View



Adapter LableView



EUT – View 1(RX)



EUT – View 2(RX)



EUT – View 3(RX)



EUT – View 4(RX)



EUT – View 5(RX)



EUT – View 6(RX)



EUT – View 7(RX)



EUT – View 8(RX)



EUT – View 9(RX)



EUT – View 10(RX)



EUT – View 11(RX)



EUT – View 12(RX)



EUT – View 13(RX)



EUT – View 14 (RX)



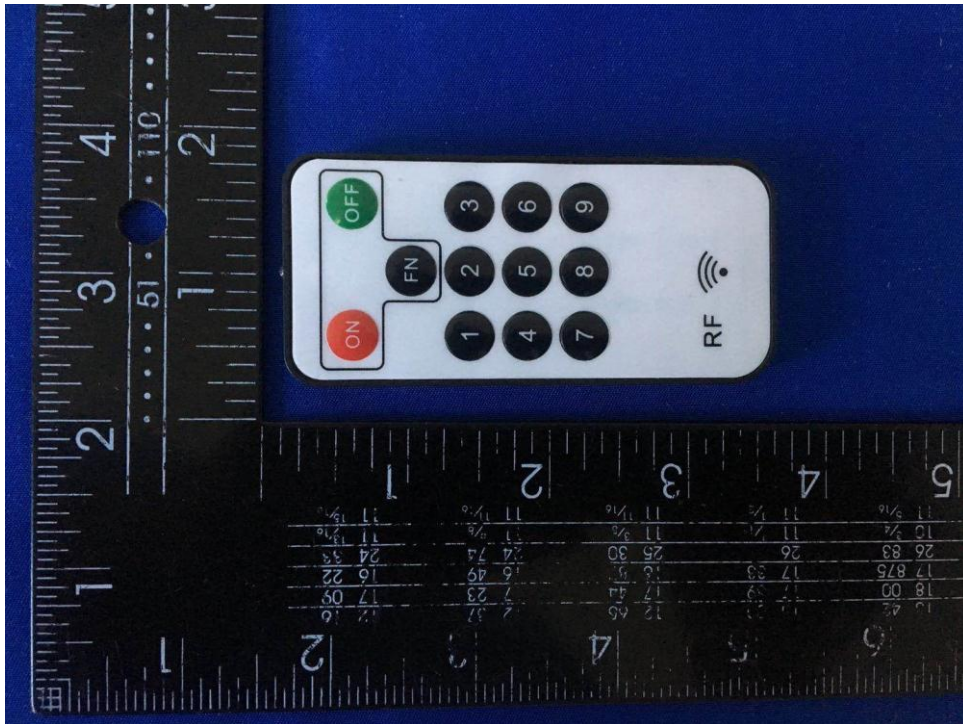
EUT – View 15(RX)



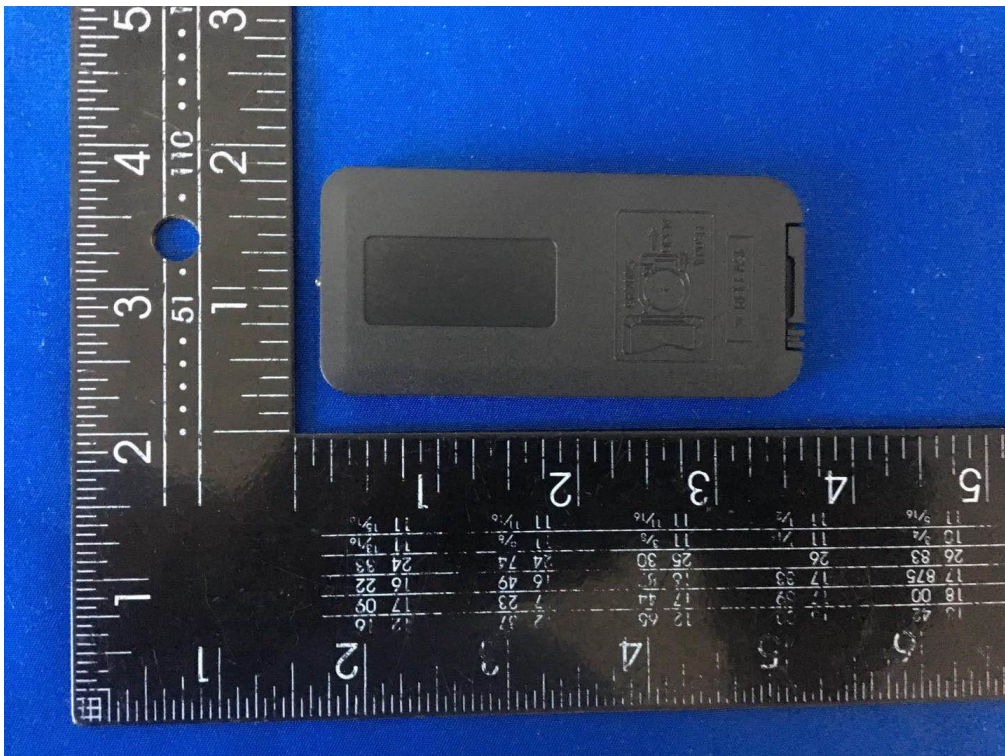
EUT – View 16(RX)



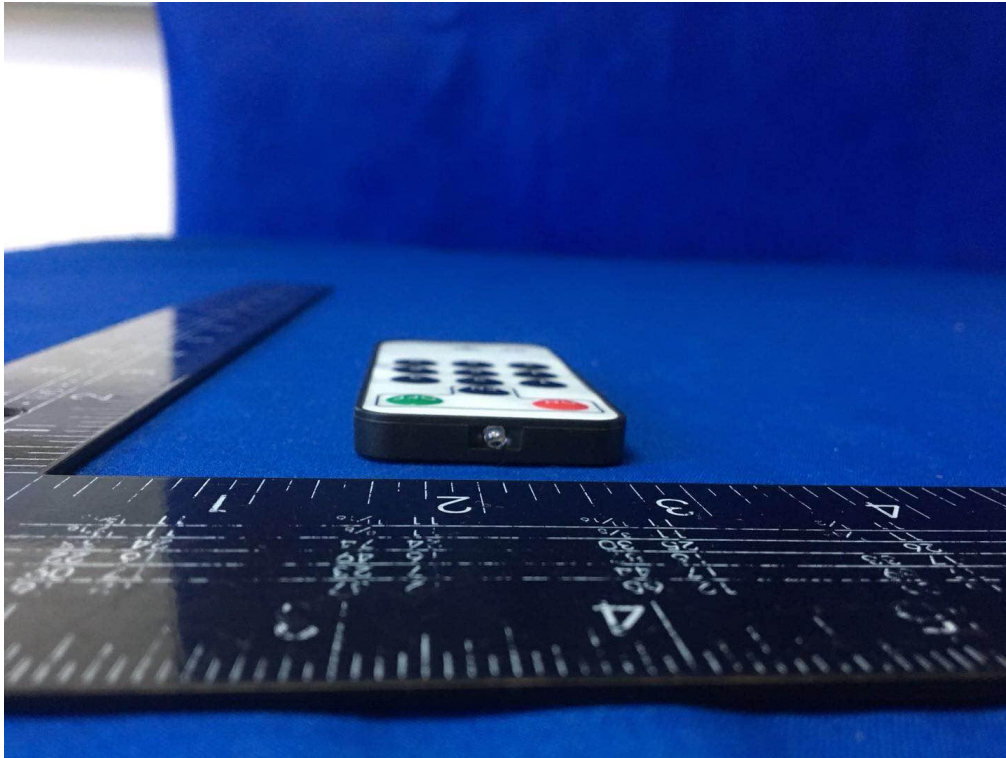
EUT - Front View(TX)



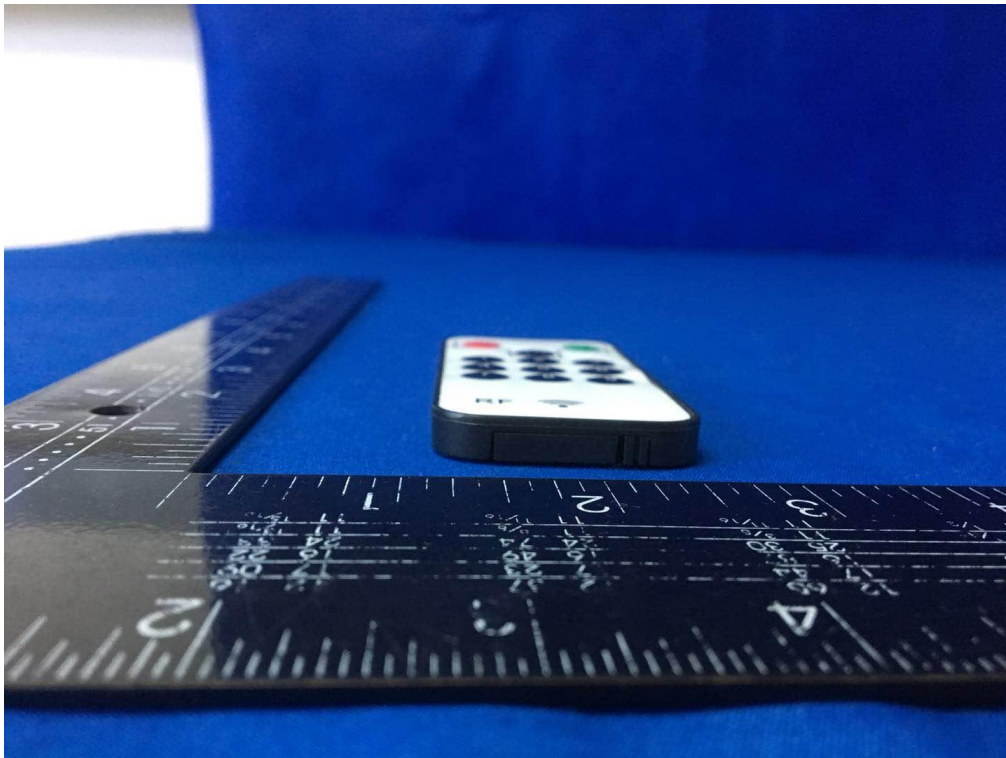
EUT - Rear View(TX)



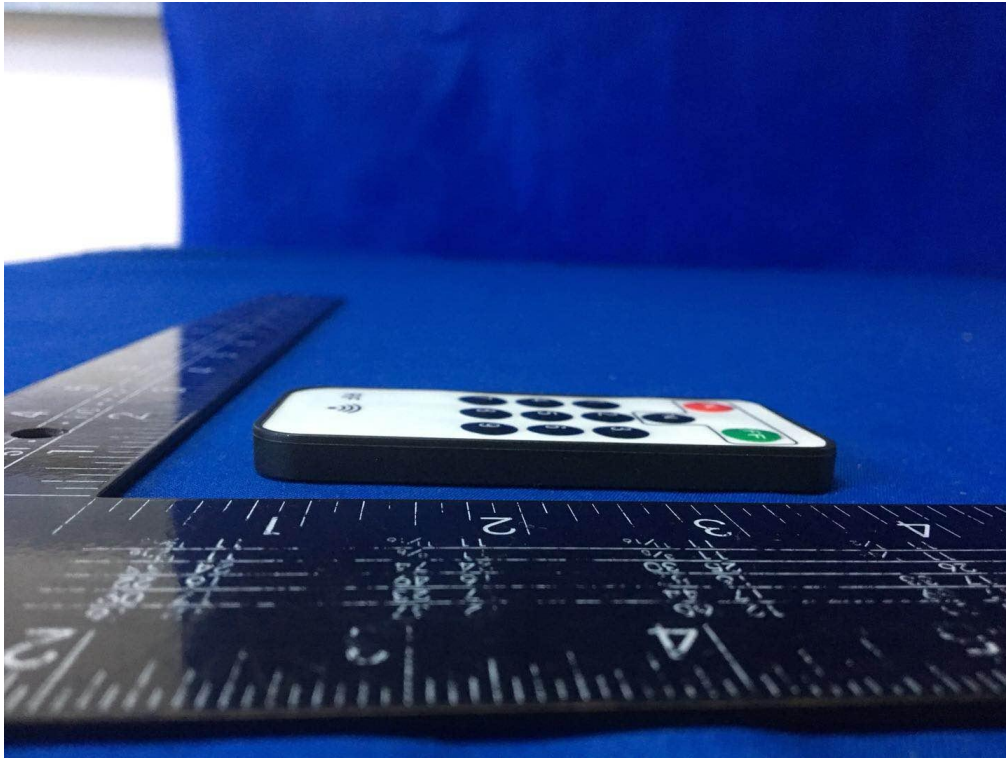
EUT - Top View(TX)



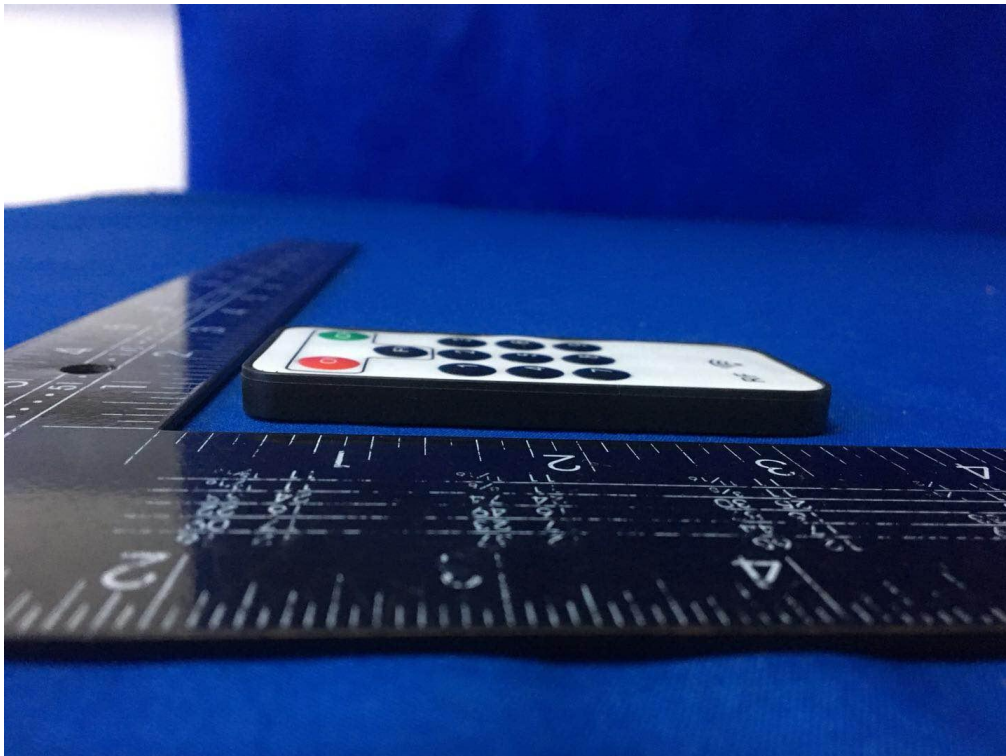
EUT - Bottom View(TX)



EUT - Left View(TX)

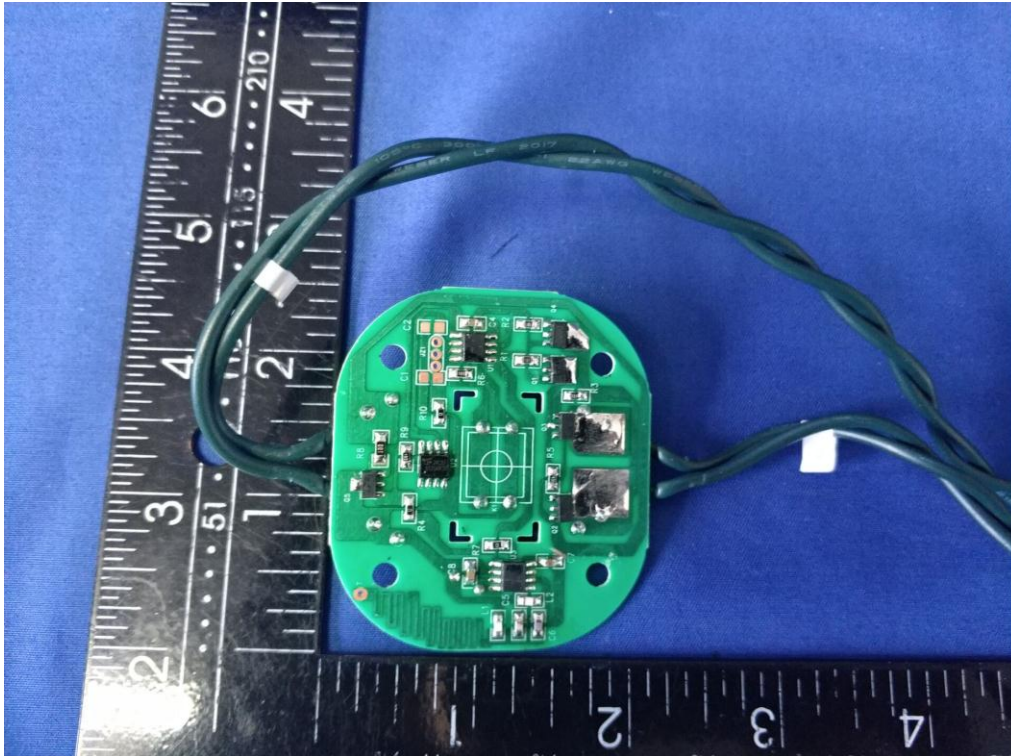


EUT - Right View(TX)

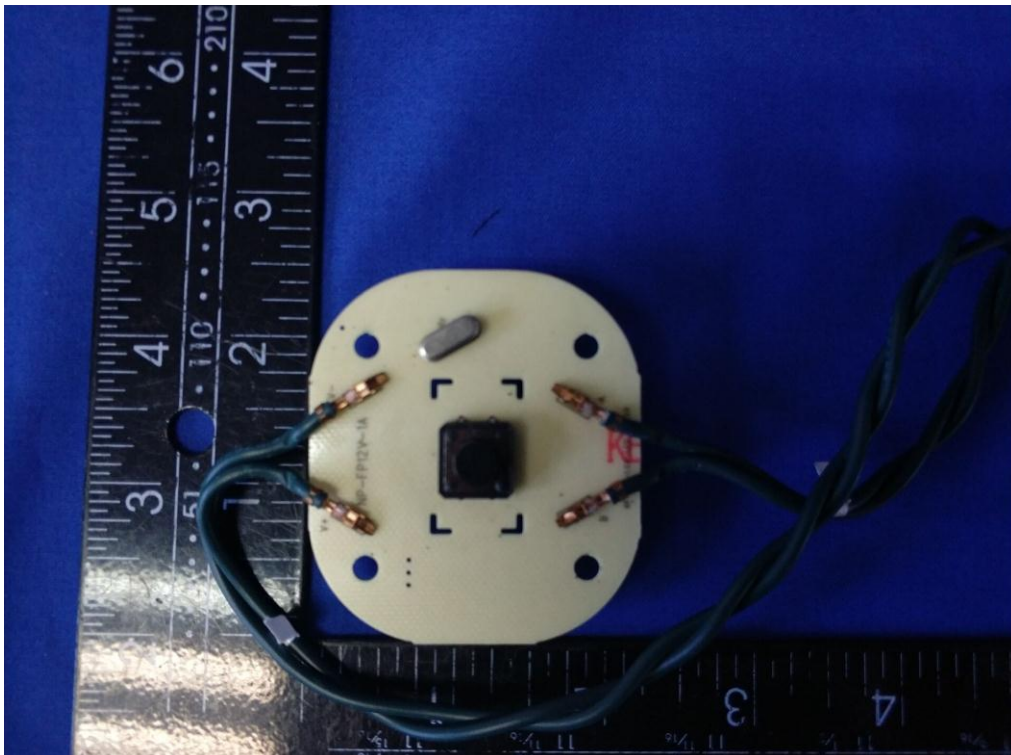


Annex B.ii. Photograph: EUT Internal Photo

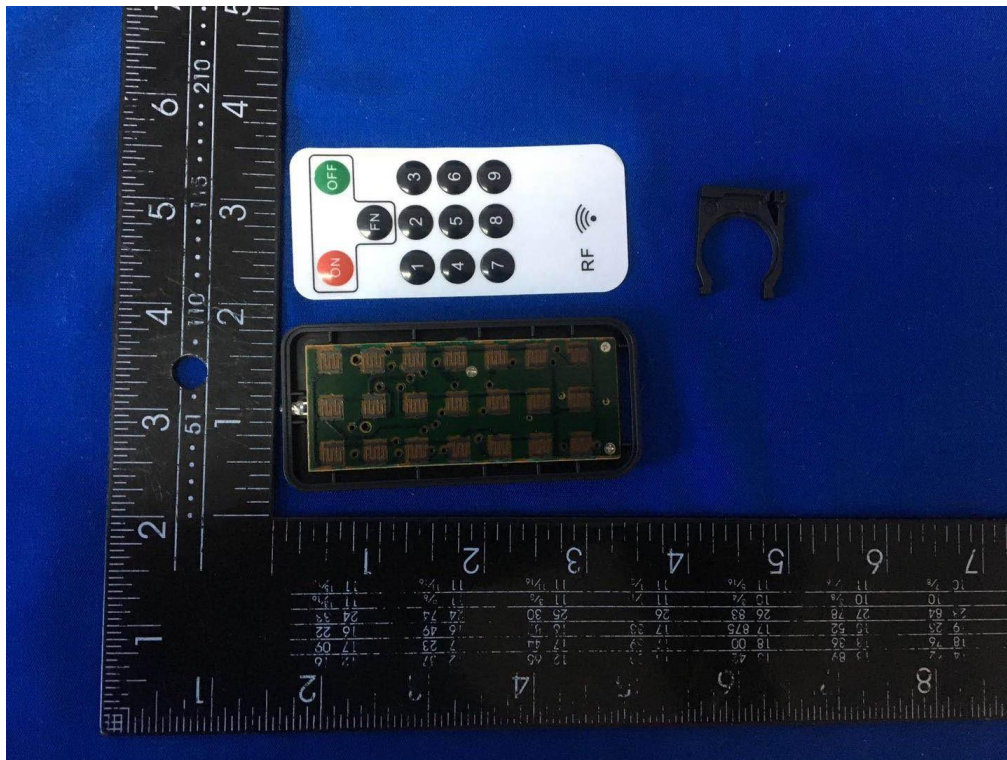
Mainboard – Front View (RX)



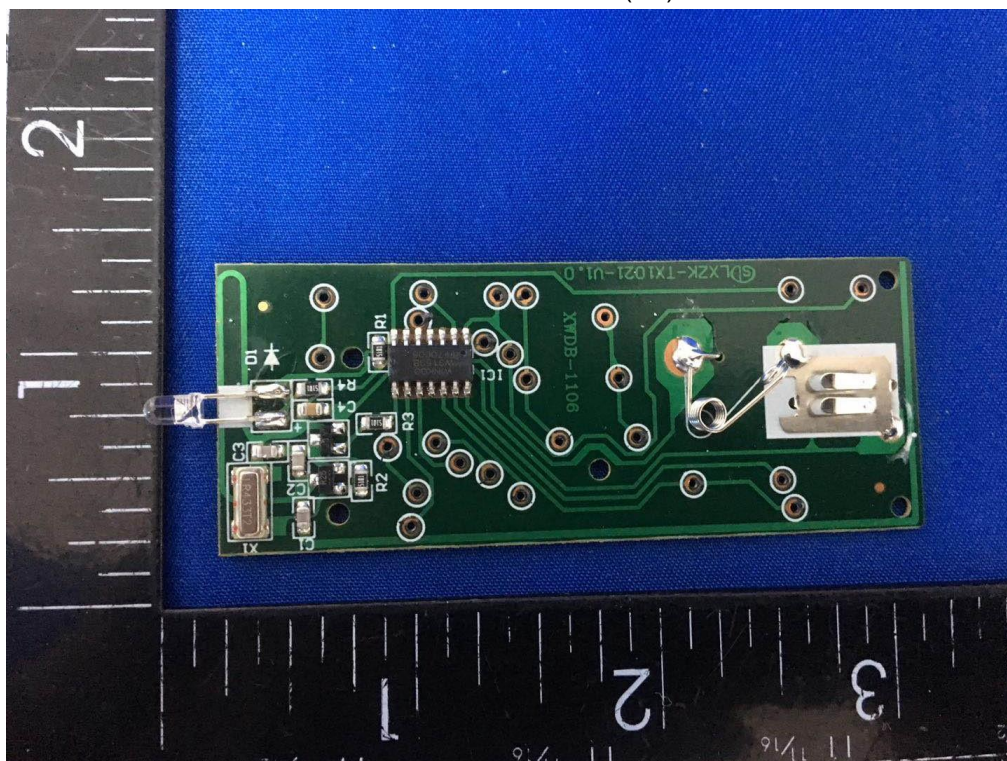
Mainboard – Rear View(RX)



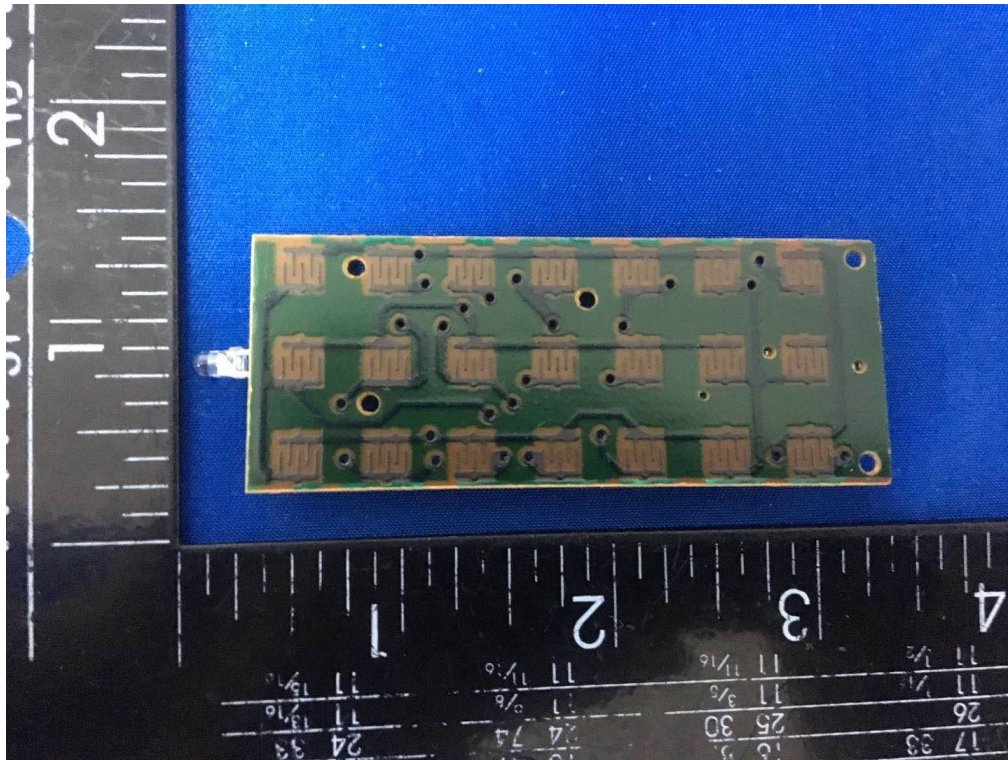
Cover Off - Top View (TX)



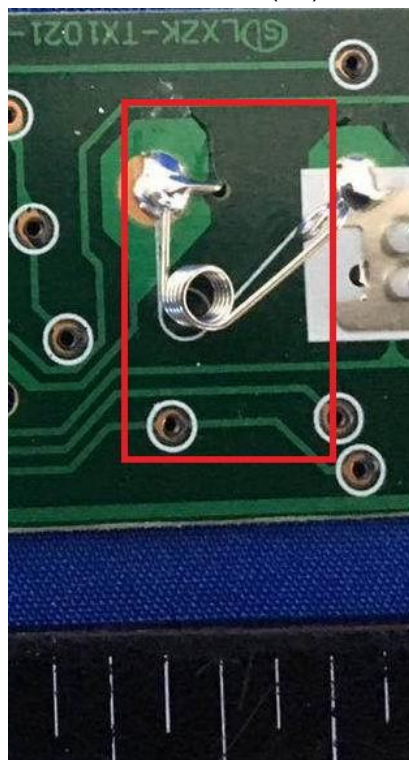
Mainboard - Front View(TX)



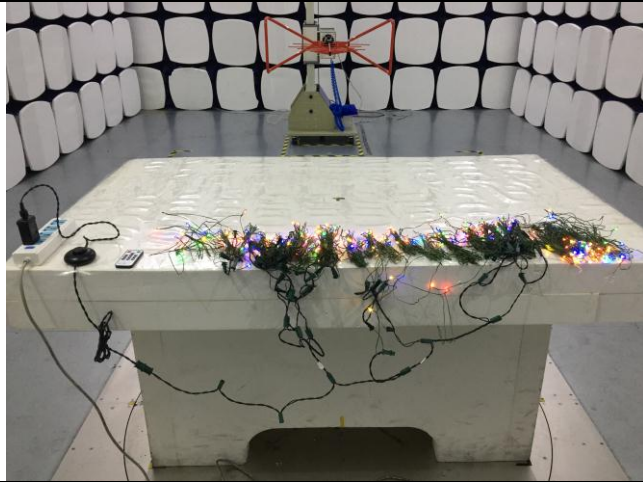
Mainboard – Rear View(TX)



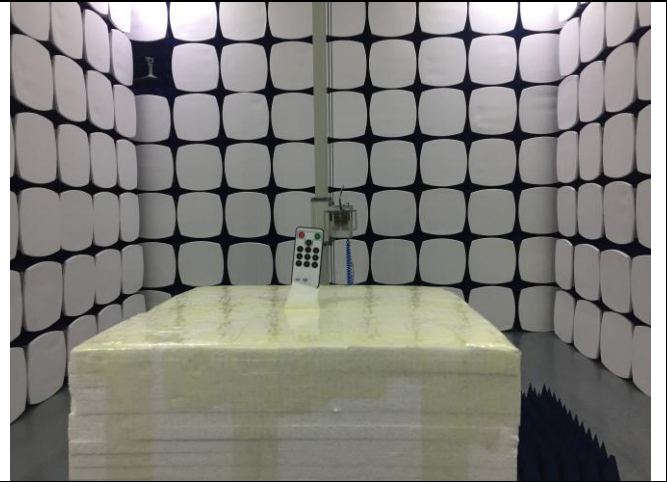
Antenna View(TX)



Annex B.iii. Photograph: Test Setup Photo



Radiated Spurious Emissions Test Setup Below 1GHz

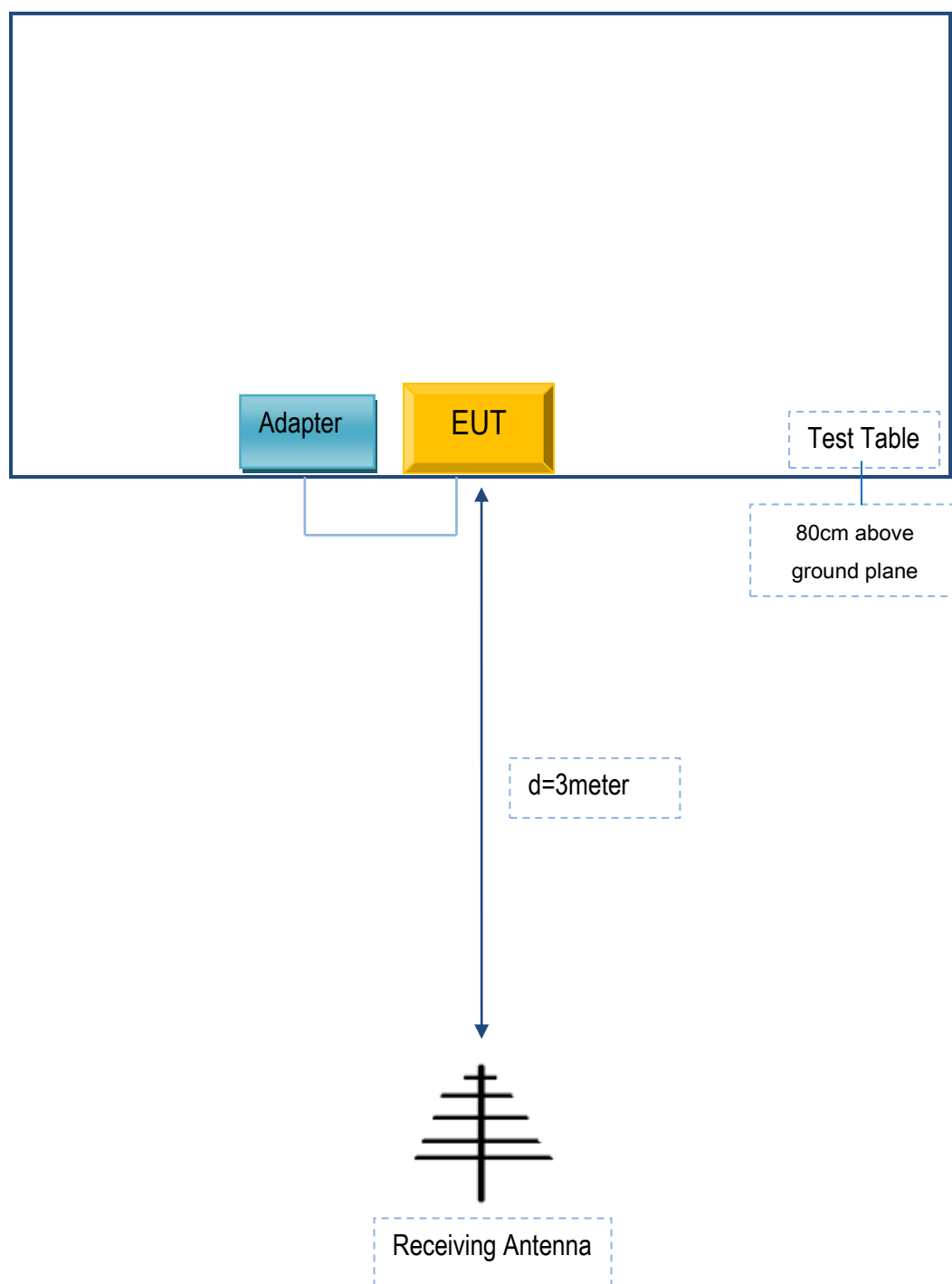


Radiated Spurious Emissions Test Setup Above
1GHz

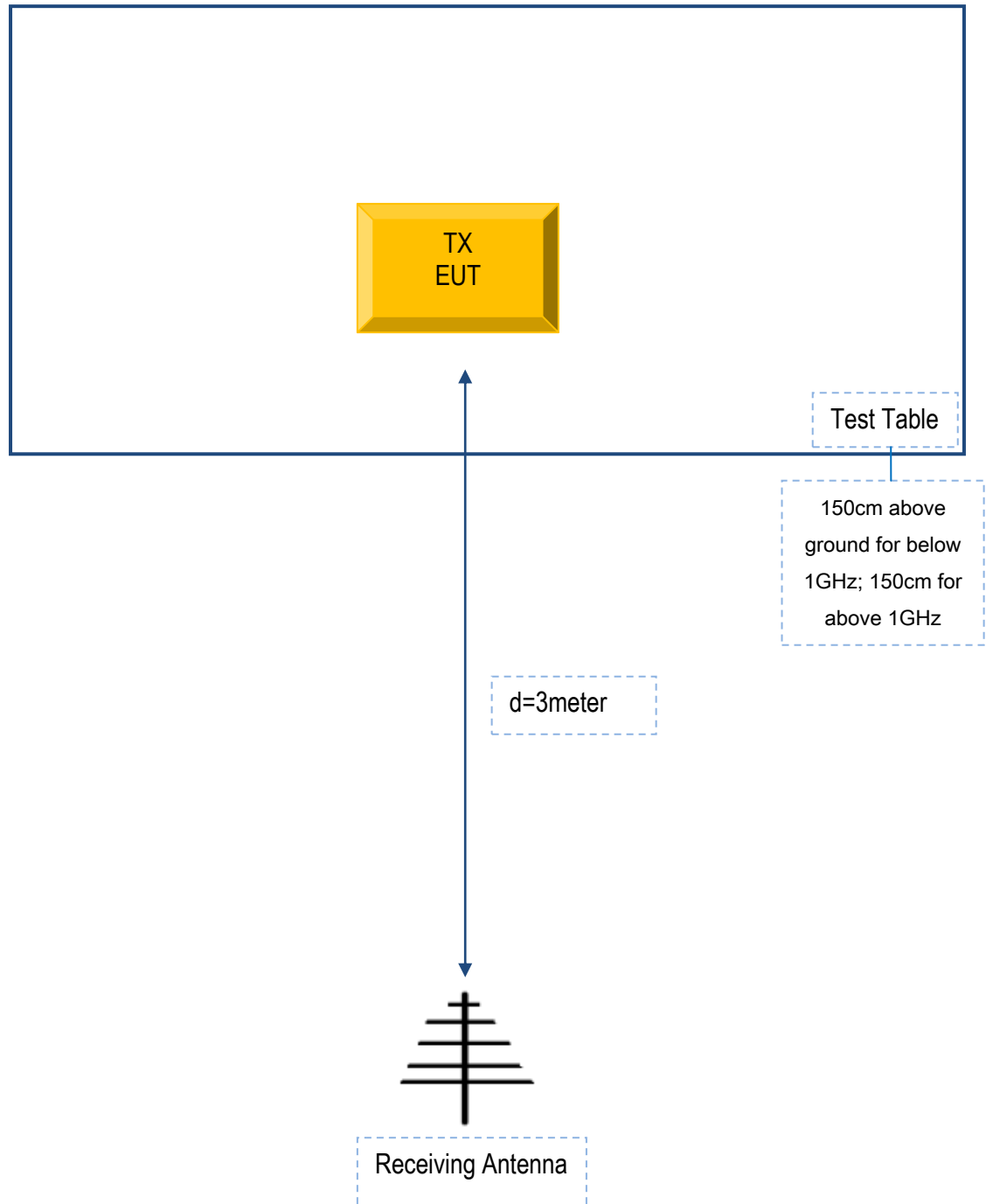
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Radiated Emissions (Below 1GHz) .



Block Configuration Diagram for Radiated Emissions (Above 1GHz)



Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
PHIPOL POWER CO LTD.	Adapter	DWPADP1201000U	N/A

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
Power Cables	Un-shielding	No	0.8m	N/A

Test Report No.	18070146-FCC-R
Page	38 of 39

Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment

Test Report No.	18070146-FCC-R
Page	39 of 39

Annex E. DECLARATION OF SIMILARITY

N/A