

FCC TEST REPORT
for

TBS Avionics Limited

TBS CROSSFIRE
Model No.: TX 2W

Prepared for : TBS Avionics Limited
Address : Room 1302 13/F CRE Building, 303 Hennessy Road Wan,
Hong Kong, China

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Report Number : R011607172Z
Date of Test : Jul. 18~ Aug. 22, 2016
Date of Report : Aug. 23, 2016

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TEST REPORT

Applicant : TBS Avionics Limited
Manufacturer : TBS Avionics Limited
EUT : TBS CROSSFIRE
Model No. : TX 2W
Serial No. : N.A.
Trade Mark : N.A.
Rating : DC 3.6-12.6V, 700mA

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart B 15.107, 15.109 & FCC / ANSI C63.4-2015

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited To determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B Class B limits both radiated and conducted emissions. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited Is assumed full responsibility for the accuracy and completeness of these measurements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited

Date of Test : Jul. 18~ Aug. 22, 2016

Prepared by : *Baron Wen*
(Engineer/ Baron Wen)

Reviewer : *Amy Ding*
(Project Manager/ Amy Ding)

Approve & Authorized Signer : *Tom Chen*
(Manager/ Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : TBS CROSSFIRE

Model Number : TX 2W

Test Power Supply : DC 7.4V Battery

Frequency : 902.75~927.25MHz

No. of Channels : 50 Channels, 500kHz Spacing

Antenna Specification : External Antenna: 2 dBi

Applicant Address : TBS Avionics Limited
Room 1302 13/F CRE Building, 303 Hennessy Road Wan, Hong Kong, China

Manufacturer Address : TBS Avionics Limited
Room 1302 13/F CRE Building, 303 Hennessy Road Wan, Hong Kong, China

Factory Address : TBS Avionics Limited
Room 1302 13/F CRE Building, 303 Hennessy Road Wan, Hong Kong, China

Date of receipt : Jul. 18, 2016

Date of Test : Jul. 18~ Aug. 22, 2016

Remark : This report is for the receiving function only.

1.2. Auxiliary Equipment Used during Test

N/A

1.3. Description of Test Facility

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

CNAS - LAB Code: L3503

Shenzhen Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021

Shenzhen Anbotek Compliance Laboratory Limited, 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 752021, July 06, 2016

IC-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, June 13, 2016

Test Location

All Emissions tests were performed
Shenzhen Anbotek Compliance Laboratory Limited. at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

1.4. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1dB (Horizontal) Ur = 4.3dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4dB

1.5. Test Summary

For the EUT described above. The standards used were FCC Part 15 Subpart B for Emissions.

Table 1 : Tests Carried Out Under FCC Part 15 Subpart B

Standard	Test Items	Status
FCC Part 15 Subpart B	Power Line Conducted Emission Test (150KHz To 30MHz)	x
FCC Part 15 Subpart B	Radiated Emission Test (30MHz To 1000MHz)	√

- √ Indicates that the test is applicable
- x Indicates that the test is not applicable

2. POWER LINE CONDUCTED MEASUREMENT

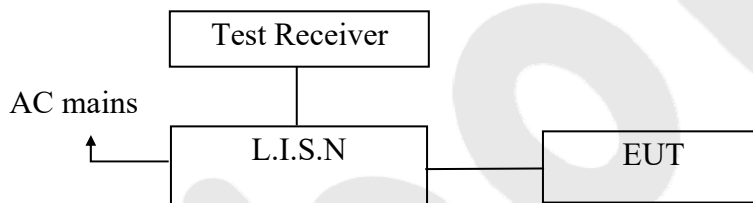
2.1. Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Two-Line V-network	Rohde & Schwarz	ENV216	100055	Apr. 16, 2016	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Apr. 16, 2016	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Apr. 16, 2016	1 Year

2.2. Block Diagram of Test Setup

2.2.1. Block diagram of connection between the EUT and simulators



2.3. Power Line Conducted Emission Measurement Limits (FCC Part 15

Class B)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

2.4. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

2.5. Operating Condition of EUT

- 2.5.1. Setup the EUT and simulator as shown as Section 2.2.
- 2.5.2. Turn on the power of all equipment.
- 2.5.3. Let the EUT work in test mode (RX Mode) and measure it.

2.6. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2015 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test result are reported on Section 2.7.

2.7. Power Line Conducted Emission Measurement Results

Not Applicable.

The EUT is powered by battery, thus there is no need to conduct this test.

3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

The following test equipments are used during the radiated emission measurement:

3.1.1. For Anechoic Chamber

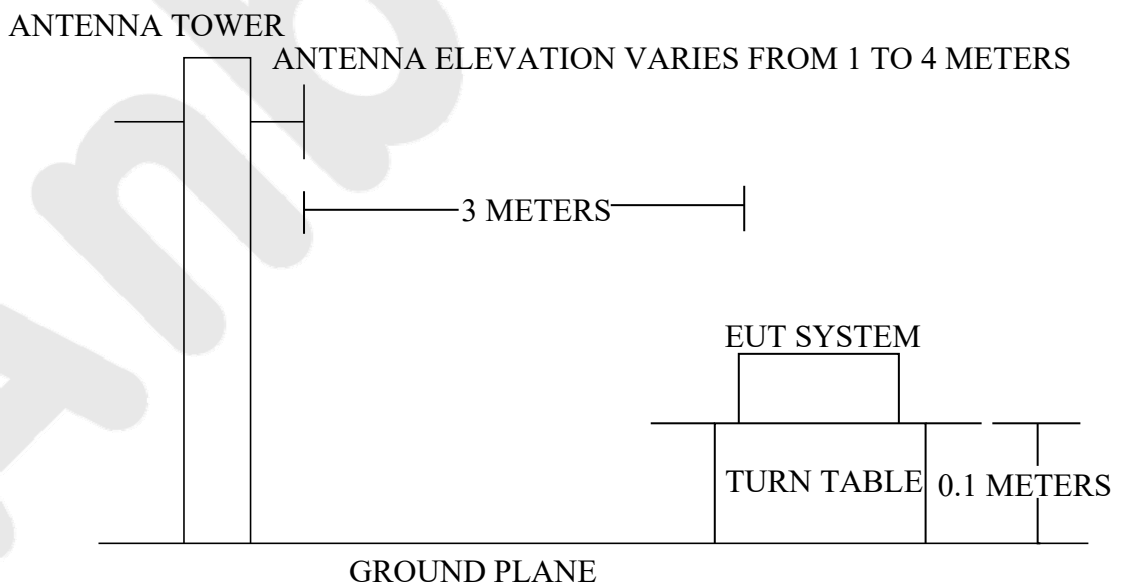
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Apr. 16, 2016	1 Year
2.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Apr. 19, 2016	1 Year
3.	Pre-amplifier	SONOMA	310N	186860	Apr. 16, 2016	1 Year

3.2. Block Diagram of Test Setup

3.2.1. Block diagram of connection between the EUT and simulators



3.2.2. Anechoic Chamber Test Setup Diagram



3.3. Radiated Emission Limit (Subpart B Class B)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0

- Remark:
- (1) Emission level $(\text{dB})\mu\text{V} = 20 \log$ Emission level $\mu\text{V}/\text{m}$
 - (2) The smaller limit shall apply at the cross point between two frequency bands.
 - (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.4. EUT Configuration on Measurement

The following equipments are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.5. Operating Condition of EUT

- 3.5.1. Setup the EUT as shown in Section 3.2.
- 3.5.2. Let the EUT work in test mode (RX Mode) and measure it.

3.6. Test Procedure

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (Trilog Broadband Antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2015 on radiated emission measurement.

The bandwidth of the EMI test receiver (ESCI) is set at 120kHz.
The frequency range from 30MHz to 1000MHz is checked.

The test mode (RX) is tested in chamber and all the test results are listed in Section 3.7.

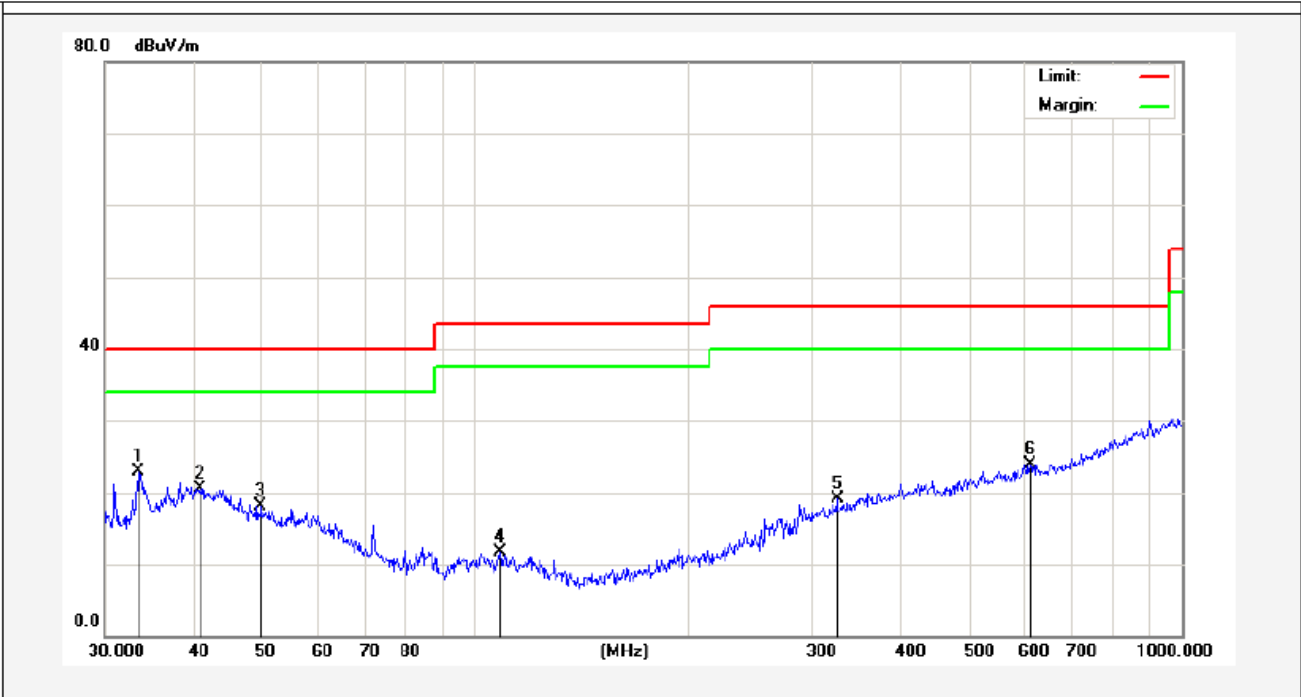
3.7. Radiated Emission Measurement Results

PASS.

The test curves are shown in the following pages.

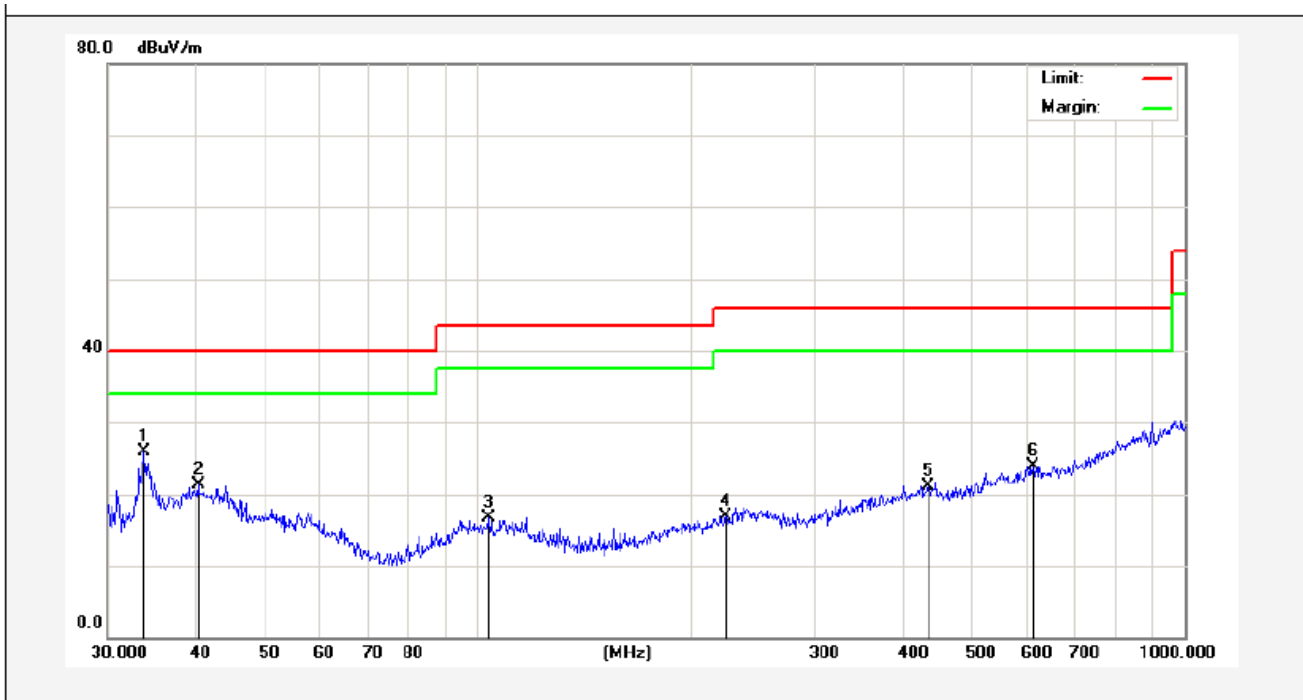
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Job No.:	011607172I	Polarization:	Horizontal
Standard:	(RE)FCC PART15 B_3m	Power Source:	DC 7.4V
Test item:	Radiation Test	Temp.(°C)/Hum.(%RH):	24.3(°C)/55%RH
Mode:	RX Mode	Distance:	3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	33.4448	37.95	-15.12	22.83	40.00	-17.17	peak			
2	40.9881	31.27	-10.77	20.50	40.00	-19.50	peak			
3	49.8813	32.56	-14.51	18.05	40.00	-21.95	peak			
4	108.6470	32.41	-20.64	11.77	43.50	-31.73	peak			
5	325.5957	34.11	-14.99	19.12	46.00	-26.88	peak			
6	609.9215	34.93	-10.97	23.96	46.00	-22.04	peak			

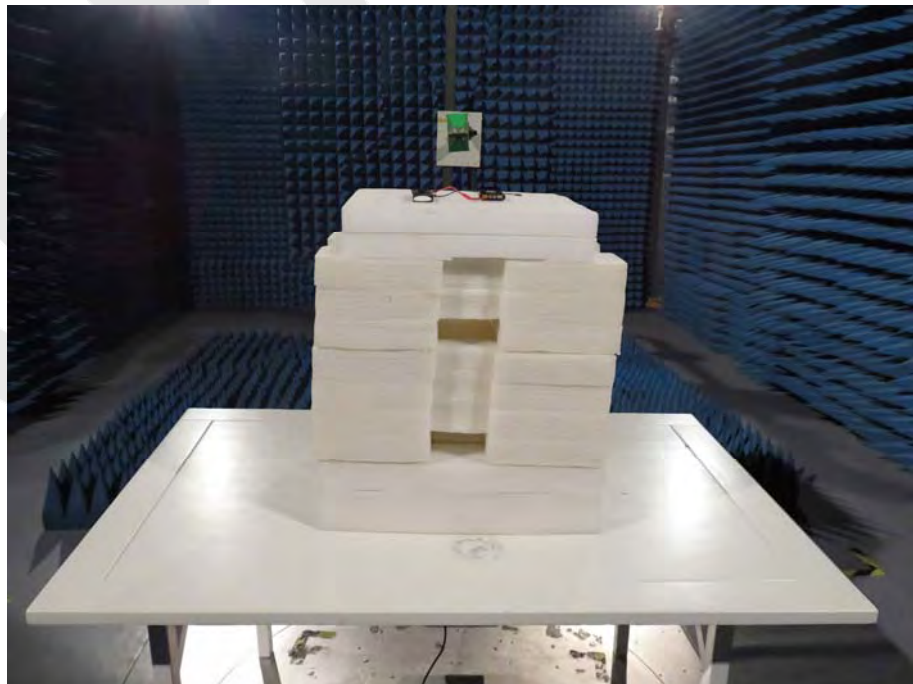
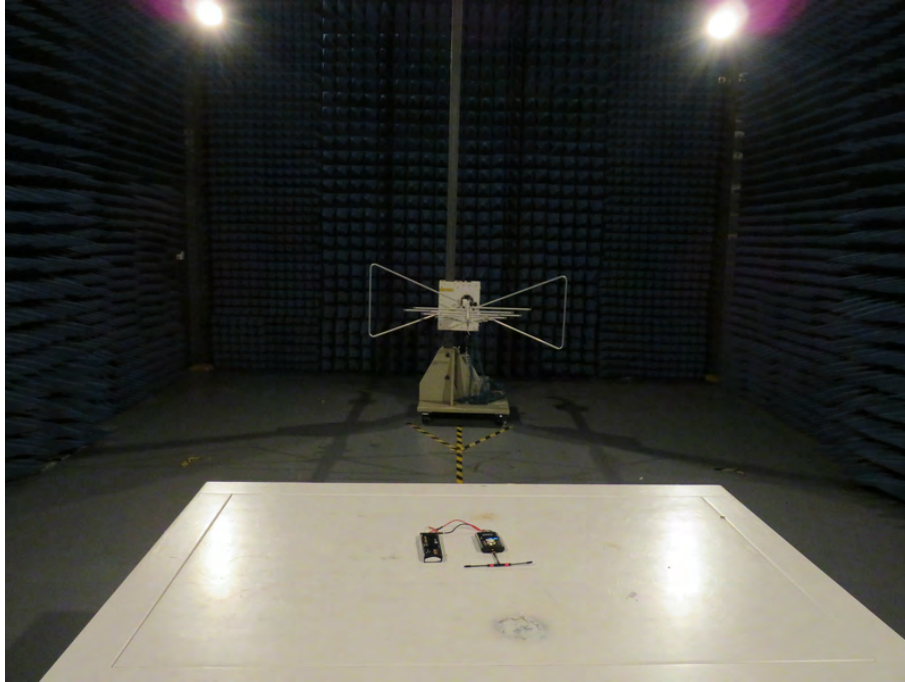
Job No.: 011607172I **Polarization:** Vertical
Standard: (RE)FCC PART15 B_3m **Power Source:** DC 7.4V
Test item: Radiation Test **Temp.(°C)/Hum.(%RH):** 24.3(°C)/55%RH
Mode: RX Mode **Distance:** 3m



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	33.7986	40.88	-14.92	25.96	40.00	-14.04	peak			
2	40.2757	31.73	-10.48	21.25	40.00	-18.75	peak			
3	103.8054	32.38	-15.71	16.67	43.50	-26.83	peak			
4	224.5192	31.80	-14.88	16.92	46.00	-29.08	peak			
5	434.0649	32.42	-11.24	21.18	46.00	-24.82	peak			
6	609.9215	33.12	-9.16	23.96	46.00	-22.04	peak			

4. PHOTOGRAPH

4.1. Photo of Radiated Emission Test



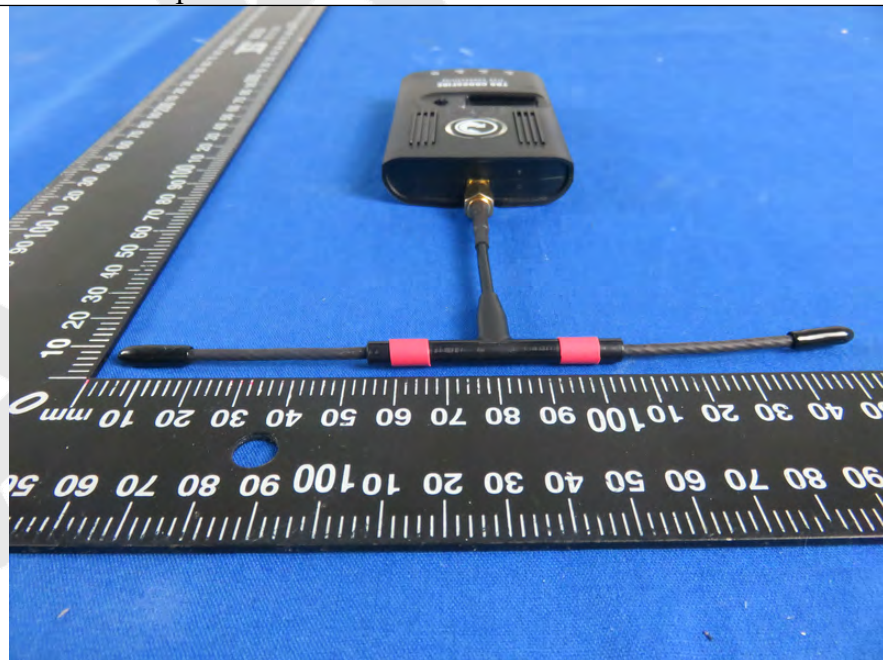
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APPENDIX I (EXTERNAL PHOTOS)

1. Figure
The EUT-Overall View



2. Figure
The EUT-Top View



3. Figure
The EUT-Bottom View



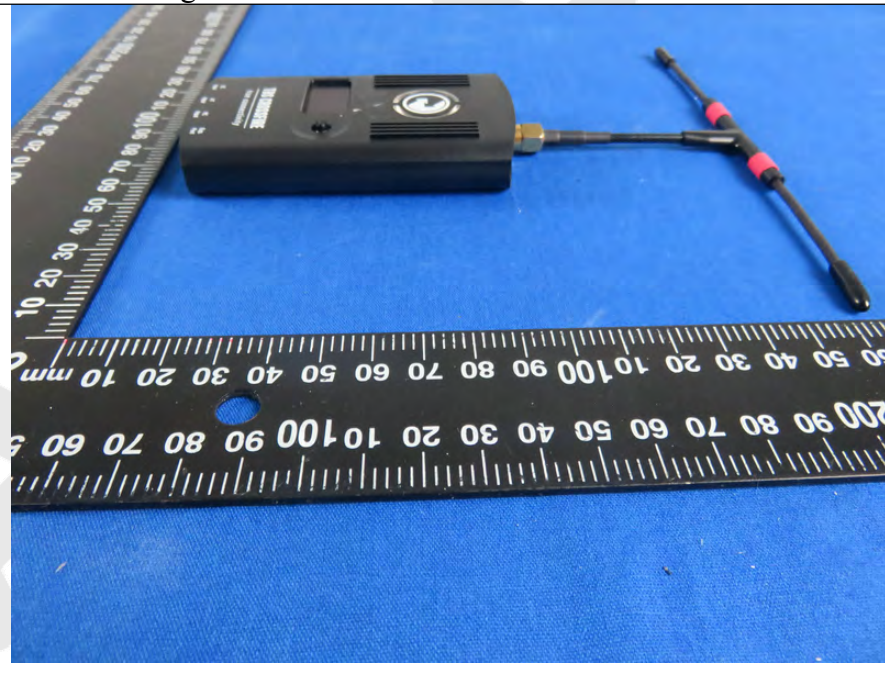
4. Figure
The EUT-Front View



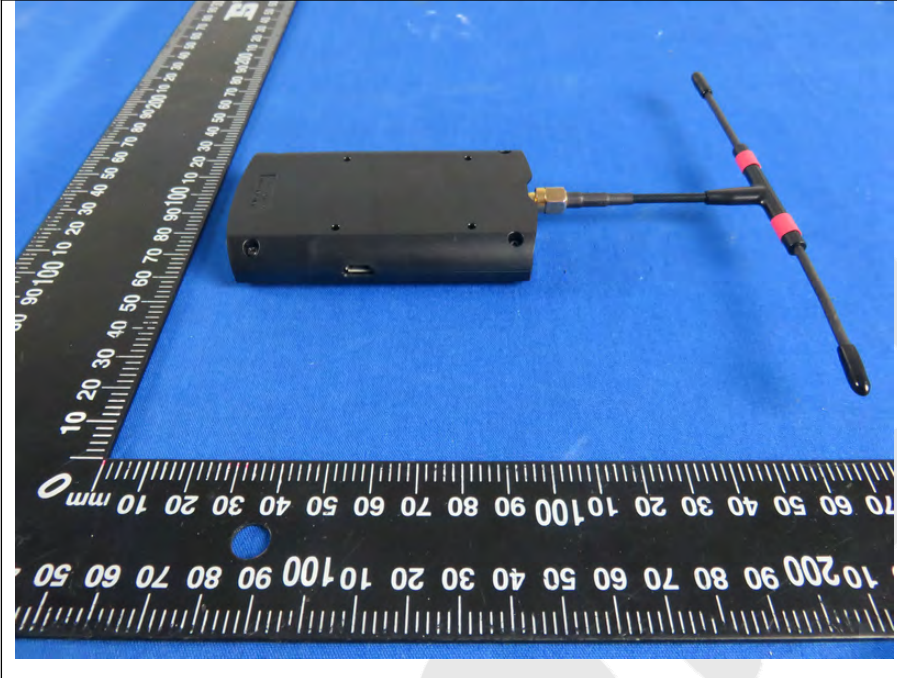
5. Figure
The EUT-Back View



6. Figure
The EUT- Right View

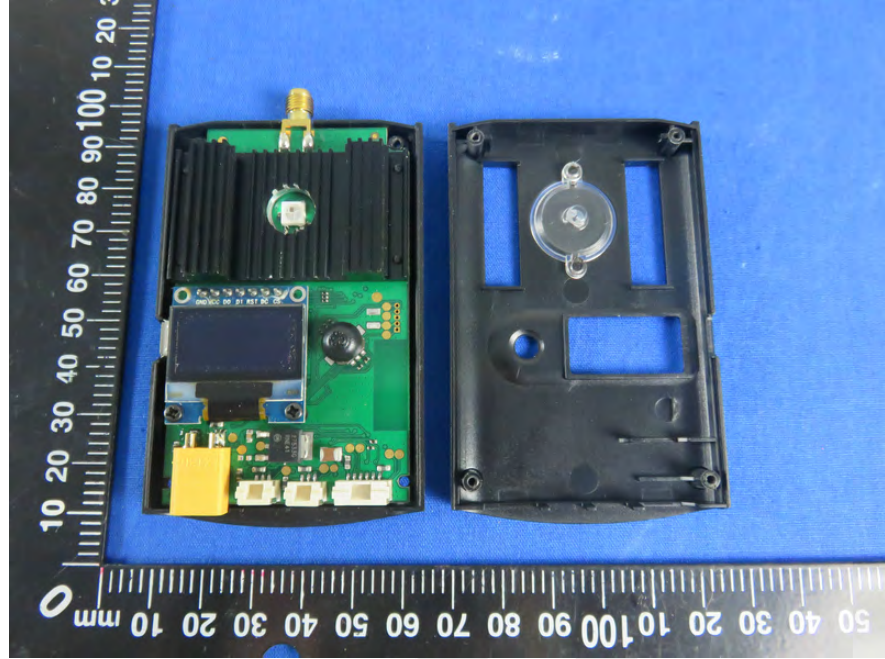


7. Figure
The EUT- Left View

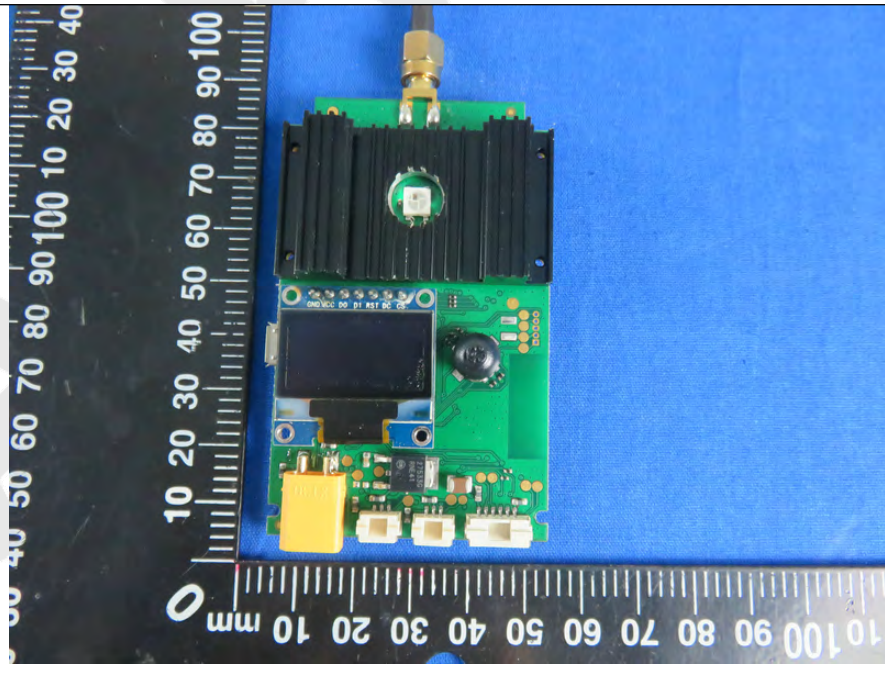


APPENDIX II(INTERNAL PHOTOS)

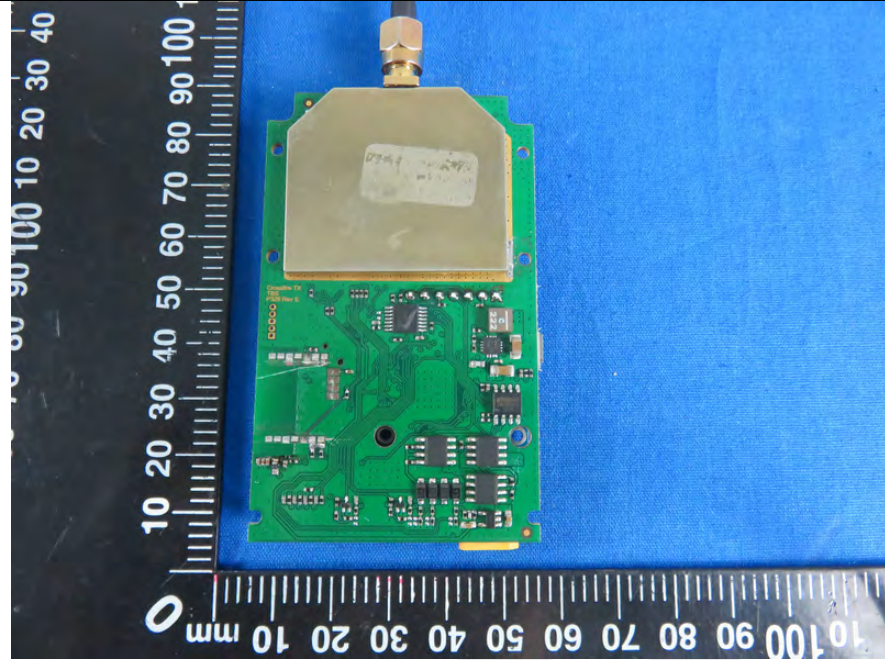
1. Figure
The EUT-Inside View



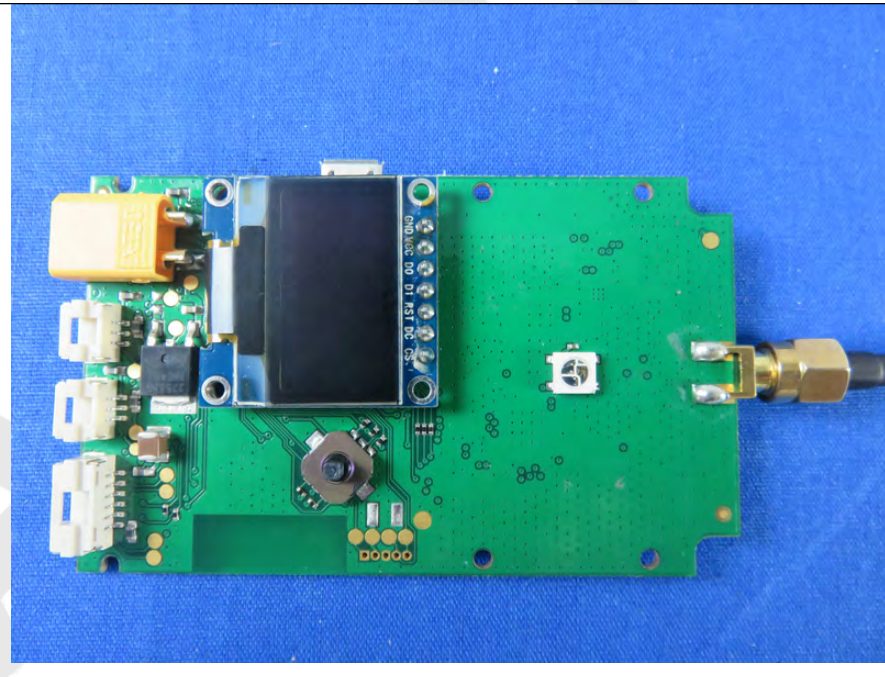
2. Figure
PCB of the EUT-Front View



3. Figure
PCB of the EUT-Back View



4. Figure
PCB of the EUT-Front View



5. Figure
PCB of the EUT-Back View

