



# TEST REPORT

**Report Reference No.**..... : **TRE17080049R2** R/C.....: 68097  
**FCC ID**..... : **2AMXI-WT-1002**  
**Applicant's name**..... : **Ningbo Zhonghai Electrical Appliances Co.,Ltd**  
**Address**..... : JISHAN INDUSTRIAL DISTRICT, NINGBO, ZHEJIANG, CHINA  
**Manufacturer**..... : Ningbo Zhonghai Electrical Co.,Ltd  
**Address**..... : Jishan Industrial District, Xidian Town, Ninghai City, Ningbo, Zhejiang, China  
**Test item description** ..... : **Walkie Talkies**  
**Trade Mark** ..... : -  
**Model/Type reference**..... : WT-1002  
**Listed Model(s)** ..... : -  
**Standard** ..... : **FCC Part 95**  
**Date of receipt of test sample**..... : Jul. 27, 2018  
**Date of testing**..... : Jul. 27, 2018 – Aug. 01, 2018  
**Date of issue**..... : Aug. 01, 2018  
**Result**..... : **PASS**

Compiled by  
( position+printed name+signature)...: File administrators Fanghui Zhu

Fanghui Zhu

Supervised by  
( position+printed name+signature)...: Project Engineer Jerry Wang

Jerry Wang

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

**Shenzhen Huatongwei International Inspection Co., Ltd. All rights reserved.**

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Huatongwei International Inspection Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Huatongwei International Inspection Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

## Contents

<b>1.</b>	<b><u>TEST STANDARDS AND REPORT VERSION</u></b>	<b>3</b>
1.1.	Test Standards	3
1.2.	Report version	3
<b>2.</b>	<b><u>TEST DESCRIPTION</u></b>	<b>4</b>
<b>3.</b>	<b><u>SUMMARY</u></b>	<b>5</b>
3.1.	Client Information	5
3.2.	Product Description	5
3.3.	Test frequency list	6
3.4.	EUT operation mode	6
3.5.	EUT configuration	6
<b>4.</b>	<b><u>TEST ENVIRONMENT</u></b>	<b>7</b>
4.1.	Address of the test laboratory	7
4.2.	Test Facility	7
4.3.	Environmental conditions	8
4.4.	Statement of the measurement uncertainty	8
4.5.	Equipments Used during the Test	9
<b>5.</b>	<b><u>TEST CONDITIONS AND RESULTS</u></b>	<b>11</b>
5.1.	Transmitter Radiated Spurious Emission	11
<b>6.</b>	<b><u>TEST SETUP PHOTOS OF THE EUT</u></b>	<b>16</b>
<b>7.</b>	<b><u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT</u></b>	<b>17</b>

## 1. TEST STANDARDS AND REPORT VERSION

### 1.1. Test Standards

The tests were performed according to following standards:

[FCC Rules Part 95](#) PERSONAL RADIO SERVICES

[TIA/EIA-603-E-2016](#) Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[ANSI C63.26](#) American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

[FCC Part 2](#) Frequency allocations and radio treaty matters, general rules and regulations.

### 1.2. Report version

Version No.	Date of issue	Description
00	Aug. 22, 2017	Original
01	Dec. 01, 2017	Only change the capacitance of the oscillation circuit into a diode, issued based on TRE17080049. Added the test data of "Transmitter Radiated Spurious Emission". Other data were the same as original. Delete the GMRS description.
R2	Aug.01, 2018	Cancels the C27, D4, R15, R23, R16 components; the Q8 high-frequency power amplification is changed to the WNM050 tube, the push level Q10 is canceled. Retested Transmitter Radiated Spurious Emission. Other data were the same as original.

## 2. Test Description

Transmitter Requirement			
Test item	Standards requirement	Result	
		Pass	N/A
Maximum Transmitter Power	FCC Part 95.567	<input checked="" type="checkbox"/>	
Modulation Limit	FCC Part 95.575	<input checked="" type="checkbox"/>	
Emission Bandwidth	FCC Part 95.573	<input checked="" type="checkbox"/>	
Emission Mask	FCC Part 95.579	<input checked="" type="checkbox"/>	
Transmitter Radiated Spurious Emission	FCC Part 95.579	<input checked="" type="checkbox"/>	
Spurious Emission On Antenna Port	FCC Part 95.579		<input checked="" type="checkbox"/>
Frequency Stability	FCC Part 95.565	<input checked="" type="checkbox"/>	

**Note:**

The test measurements were made in accordance with the above-mentioned departmental standard(s), and the equipment identified in this application has been subject to all the applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

### 3. SUMMARY

#### 3.1. Client Information

Applicant:	Ningbo Zhonghai Electrical Appliances Co.,Ltd
Address:	JISHAN INDUSTRIAL DISTRICT, NINGBO, ZHEJIANG, CHINA
Manufacturer:	Ningbo Zhonghai Electrical Co.,Ltd
Address:	Jishan Industrial District, Xidian Town, Ninghai City, Ningbo, Zhejiang, China

#### 3.2. Product Description

Name of EUT:	Walkie Talkies	
Trade mark:	-	
Model/Type reference:	WT-1002	
Listed model(s):	-	
Power supply:	DC 6V	
Battery information:	-	
Charger information:	-	
Adapter information:	-	
Operation Frequency Range:	FRS:	462.5500MHz~462.7250MHz 467.5625MHz~467.7125MHz
Rated Output Power:	FRS:	0.5W(27dBm)
Modulation Type:	FRS:	FM
Channel Separation:	FRS:	12.5kHz
Emission Designator:	FRS:	5K20F3E
Maximum Transmitter Power (ERP):	FRS:	24.98dBm
Antenna Type:	Integral	

Note:

1. The device only supports voice communication.
2. The device has no gain and vertically polarized antenna.

### 3.3. Test frequency list

Operation Mode	Modulation	Channel Separation (kHz)	Operation Frequency Range (MHz)	Test Channel	Test Frequency (MHz)
FRS	FM	12.5	462.5500~462.7250 467.5625~467.7125	CH <sub>M1</sub>	462.6375(CH4)
				CH <sub>M2</sub>	467.6375(CH11)
				CH <sub>M3</sub>	462.6500(CH19)

The Product channel frequency table:

Channel	Frequency	Description	Channel	Frequency	Description
1	462.5625	FRS	12	467.6625	FRS
2	462.5875	FRS	13	467.6875	FRS
3	462.6125	FRS	14	467.7125	FRS
4	462.6375	FRS	15	462.5500	FRS
5	462.6625	FRS	16	462.5750	FRS
6	462.6875	FRS	17	462.6000	FRS
7	462.7125	FRS	18	462.6250	FRS
8	467.5625	FRS	19	462.6500	FRS
9	467.5875	FRS	20	462.6750	FRS
10	467.6125	FRS	21	462.7000	FRS
11	467.6375	FRS	22	462.7250	FRS

### 3.4. EUT operation mode

Test mode	Transmitting	FRS
TX1	√	√

√: is operation mode.

### 3.5. 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 :	Unshielded
		Detachable :	Undetachable
○	Multimeter	Manufacturer :	-
		Model No. :	-

## **4. TEST ENVIRONMENT**

### **4.1. 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

### **4.2. 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.

#### **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.

#### **FCC-Registration No.: 762235**

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 762235.

#### **IC-Registration No.: 5377B-1**

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-1.

#### **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.

### 4.3. Environmental conditions

Normal Conditon	
Relative humidity:	20 % to 75 %.
Air Pressure:	950~1050mba
Voltage:	DC 6.0V

### 4.4. 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 Items	Measurement Uncertainty	Notes
Frequency stability	25 Hz	(1)
Transmitter power Radiated	2.20 dB	(1)
Radiated Emission 30~1000MHz	4.65 dB	(1)
Occupied Bandwidth	35 Hz	(1)
FM deviation	25 Hz	(1)
Audio level	0.62 dB	(1)
Low Pass Filter Response	0.76 dB	(1)
Modulation Limiting	0.42 %	(1)

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



#### 4.5. Equipments Used during the Test

RF Conducted Test						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	Analog communication tester	HP	8920A	3813A10206	11/11/2017	11/10/2018
2	Digital communication tester	Aeroflex	3920B	1001682041	11/11/2017	11/10/2018
3	Spectrum Analyzer	R&S	FSW26	103440	11/11/2017	11/10/2018
4	Signal Generator	R&S	SML02	100507	11/11/2017	11/10/2018
5	Signal Generator	IFR	2032	203002\100	11/11/2017	11/10/2018
6	RF Cable	Chengdu E-Microwave	----	----	11/11/2017	11/10/2018
7	Attenuator	Chengdu E-Microwave	EMCAXX-10RNZ-3	----	11/11/2017	11/10/2018
8	High-Pass Filter	OCEN	OSP-HPF26300P20-LC	----	11/11/2017	11/10/2018
9	High-Pass Filter	OCEN	OSP-HPF60300P20-LC	----	11/11/2017	11/10/2018
10	RF Control Unit	Tonscend	JS0806-2	N/A	11/11/2017	11/10/2018
11	Climate Chamber	ESPEC	GPL-2	----	11/10/2017	11/09/2018
12	Variable Power Supply	GW INSTRON	GPS-3030D	012578	11/11/2017	11/10/2018

Radiated Emissions						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal. (mm-dd-yy)	Next Cal. (mm-dd-yy)
1	EMI Test Receiver	R&S	ESCI	101247	11/11/2017	11/10/2018
2	Loop Antenna	R&S	HFH2-Z2	100020	11/20/2017	11/19/2018
3	Ultra-Broadband Antenna	SCHWARZBECK	VULB9163	538	04/05/2017	04/04/2020
4	Preamplifier	SCHWARZBECK	BBV 9743	9743-0022	10/18/2017	10/17/2018
5	RF Connection Cable	HUBER+SUHNER	RE-7-FL	N/A	11/21/2017	11/20/2018
6	EMI Test Software	R&S	ESK1	N/A	N/A	N/A
7	Spectrum Analyzer	R&S	FSP40	100597	11/11/2017	11/10/2018
8	Horn Antenna	SCHWARZBECK	9120D	1011	03/27/2017	03/26/2020
9	Horn Antenna	SCHWARZBECK	BBHA9170	25841	03/27/2017	03/26/2020
10	Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-248	10/18/2017	10/17/2018
11	RF Connection Cable	HUBER+SUHNER	RE-7-FH	N/A	11/21/2017	11/20/2018
12	Signal Generator	Rohde&Schwarz	SMB100A	114360	11/21/2017	11/20/2018
13	High-Pass Filter	OCEN	OSP-HPF26300P20-LC	----	11/11/2017	11/10/2018
14	High-Pass Filter	OCEN	OSP-HPF60300P20-LC	----	11/11/2017	11/10/2018
15	EMI Test Software	Audix	E3	N/A	N/A	N/A
16	Turntable	MATURO	TT2.0	/	N/A	N/A
17	Antenna Mast	MATURO	TAM-4.0-P	/	N/A	N/A

## 5. TEST CONDITIONS AND RESULTS

### 5.1. Transmitter Radiated Spurious Emission

Radiated spurious emissions are emissions from the equipment when transmitting into a nonradiating load on a frequency or frequencies that are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

#### LIMIT

FCC Part 95.579:

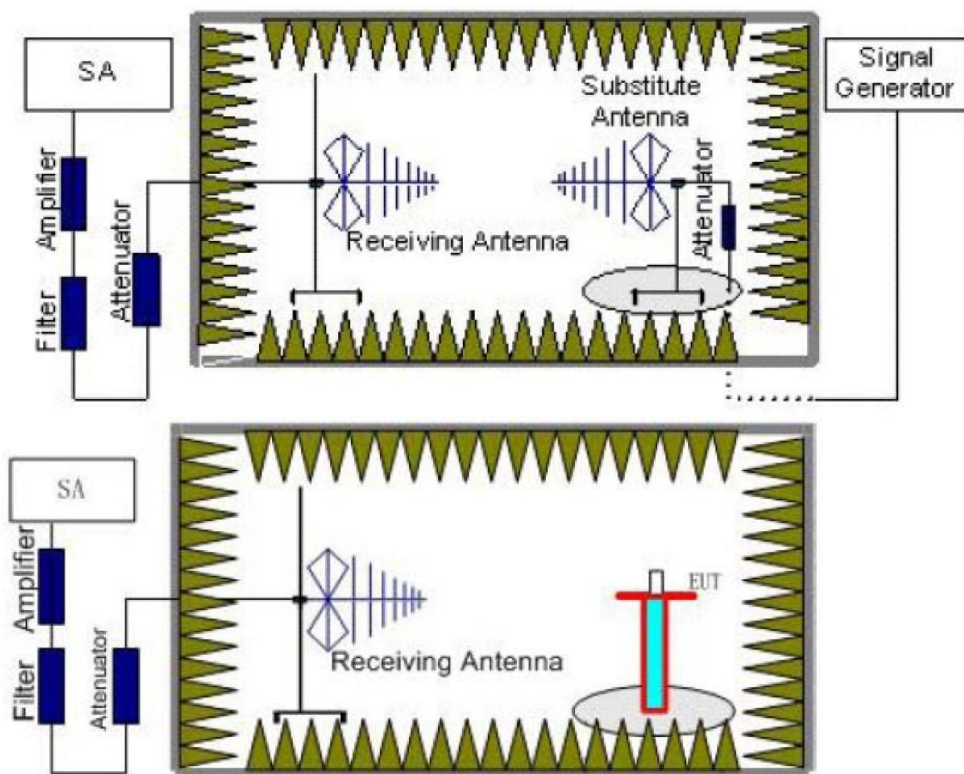
$43 + 10 \log (P_{\text{watts}})$

Calculation: Limit (dBm) = EL - 43 - 10 log<sub>10</sub> (TP)

Notes: EL is the emission level of the Output Power expressed in dBm,  
In this application, the EL is P (dBm).

Limit (dBm) = P (dBm) - 43 - 10 log (Pwatts) = -13 dBm

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.0 m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in six channels were measured with peak detector.
2. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
3. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz for above 1GHz and RBW=100kHz, VBW=300kHz for 30MHz to 1GHz, And the maximum value of the receiver should be recorded as (P<sub>r</sub>).
4. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed

to not interfere with the radiation pattern of the antenna. A power ( $P_{Mea}$ ) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded ( $P_r$ ). The power of signal source ( $P_{Mea}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

5. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss ( $P_{cl}$ ), the Substitution Antenna Gain ( $G_a$ ) and the Amplifier Gain ( $P_{Ag}$ ) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power(EIRP)} = P_{Mea} - P_{Ag} - P_{cl} - G_a$$

We used SMF100A microwave signal generator which signal level can up to 33dBm, so we not used power Amplifier for substitution test; The measurement results are amend as described below:

$$\text{Power(EIRP)} = P_{Mea} - P_{cl} - G_a$$

6. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
7. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dBi}$ .

### **TEST MODE:**

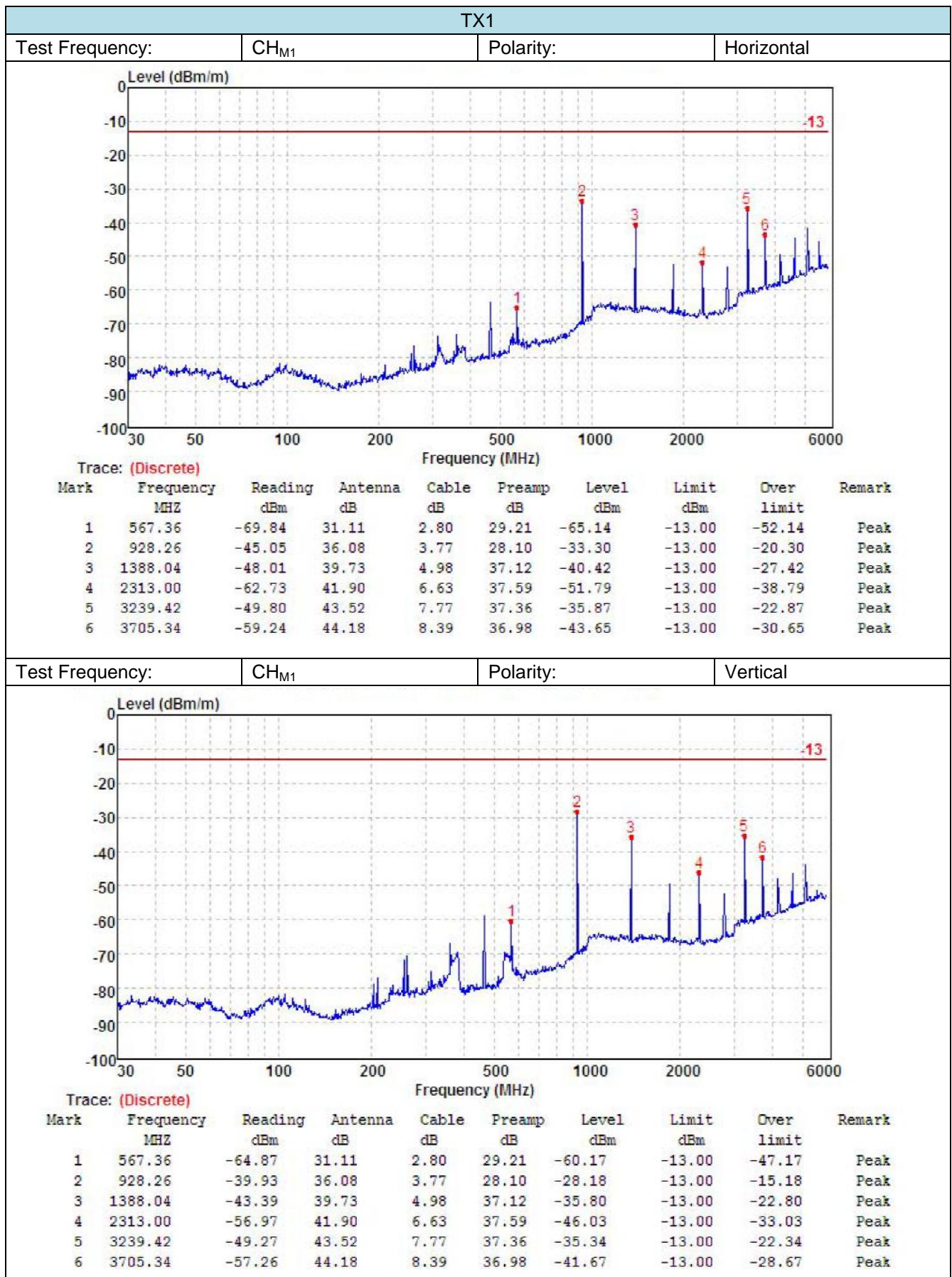
Please reference to the section 3.4

### **TEST RESULTS**

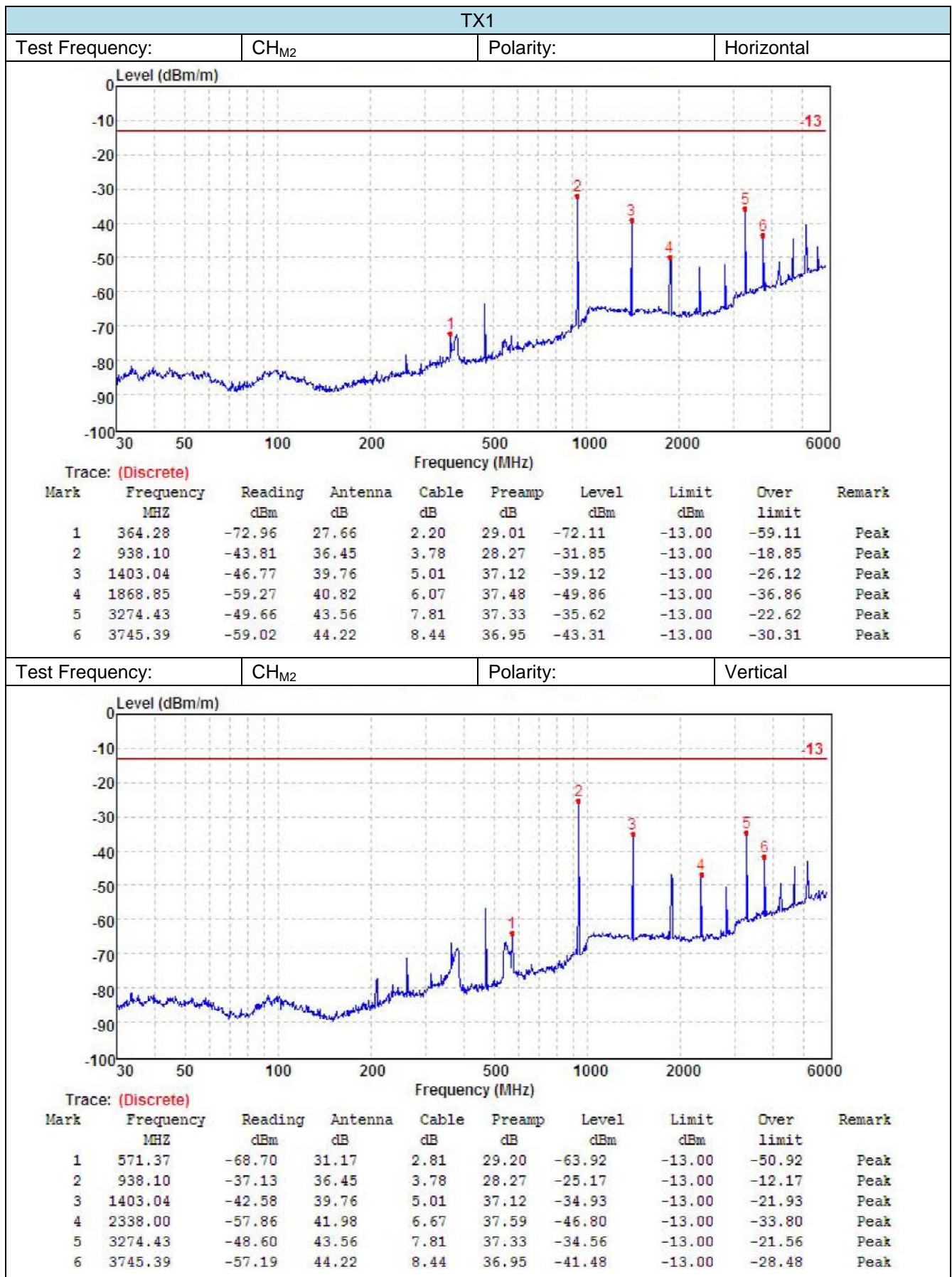
☒ **Passed**      ☐ **Not Applicable**

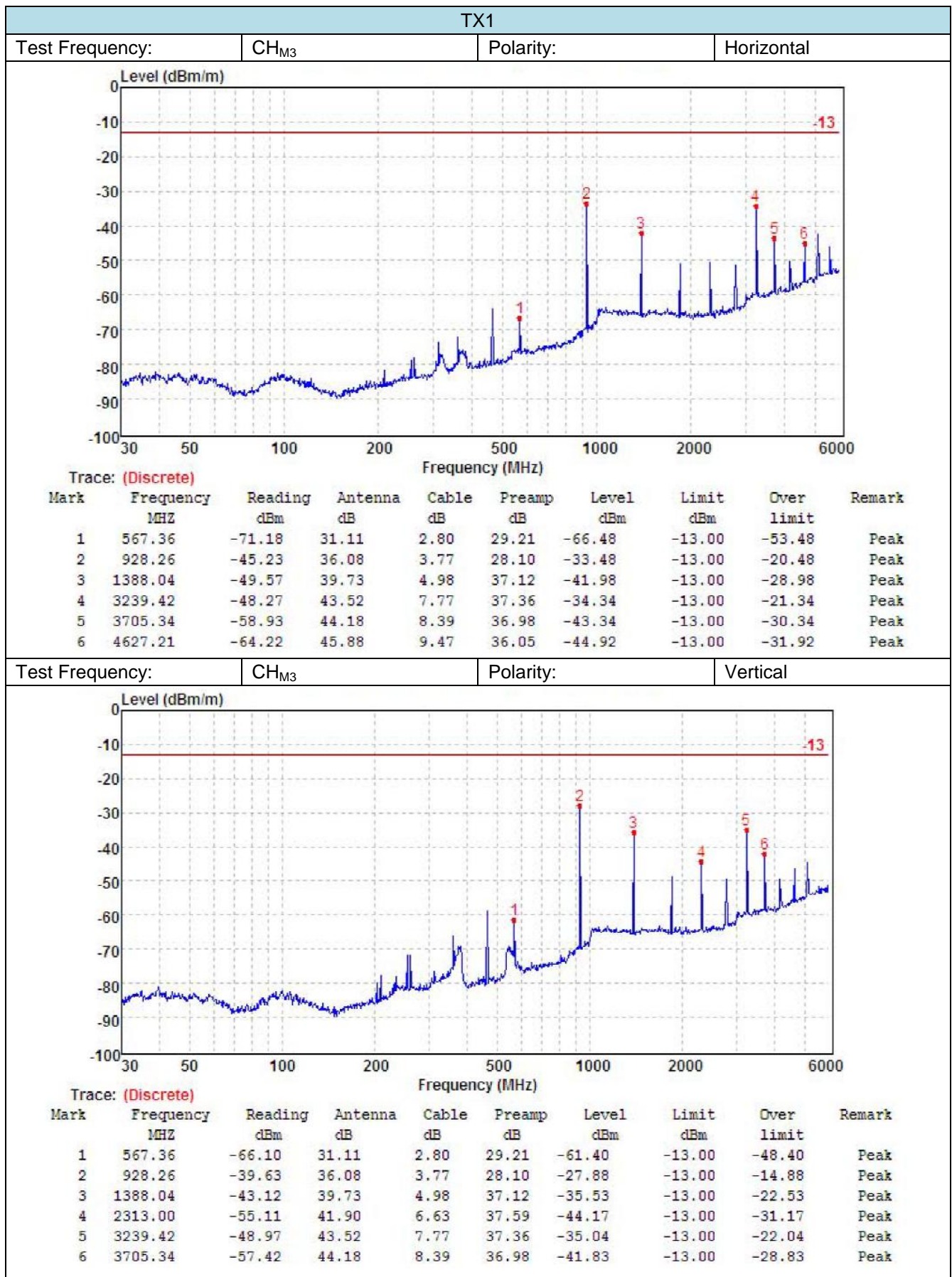
#### **Note:**

1. In general, the worse case attenuation requirement shown above was applied.
2. The measurement frequency range from 30 MHz to 5 GHz.
3. Absolute Level=SG Level-Cable loss+Antenna Gain, Margin=Limit-Absolute Level



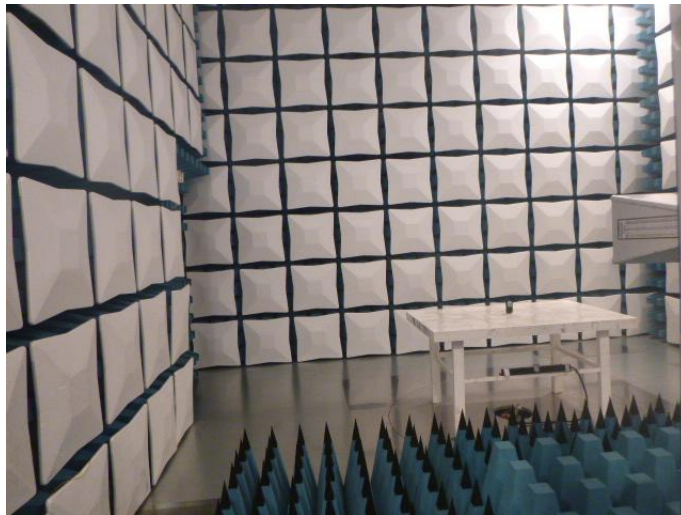






## 6. Test Setup Photos of the EUT

Transmitter Radiated Spurious Emission:





## 7. External and Internal Photos of the EUT

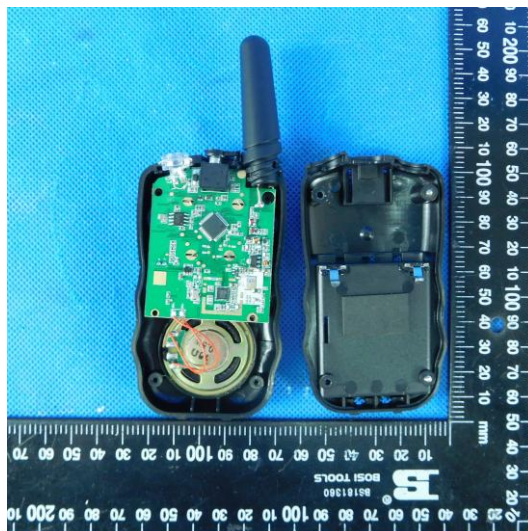
### External photos of the EUT

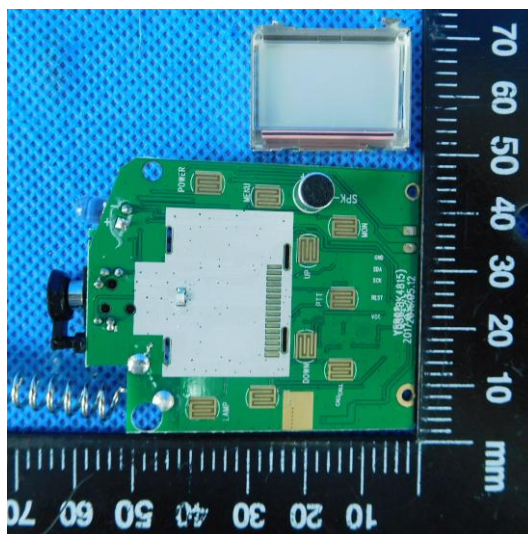
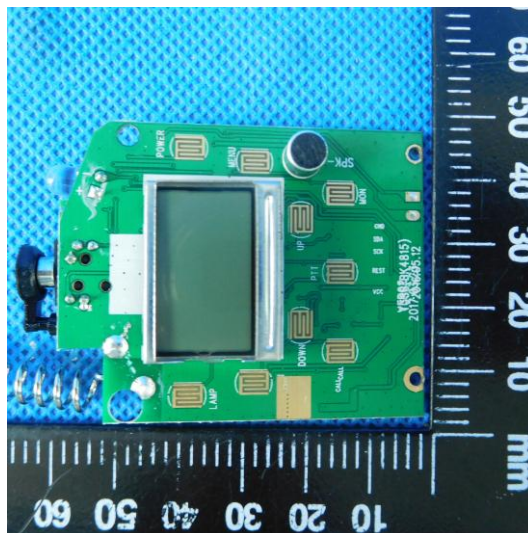
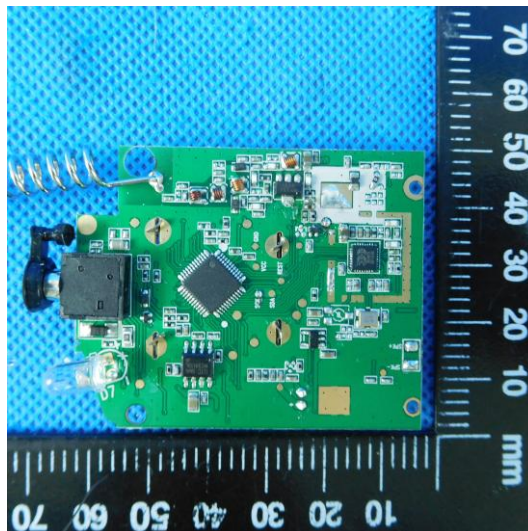






### Internal photos of the EUT





-----End of Report-----