

# TEST REPORT

FCC Part 95/RSS 210 Issue 8

Report Reference No. .... : LCS170831042AE9

Date of Issue..... : Nov. 11, 2017

Testing Laboratory Name ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Address..... : 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China

Applicant's Name..... : Shenzhen Linda Technology Co., LTD

Address..... : Room201, #1 1st Qianwan Road, Qianhai Shenzhen and Hongkong Corporation District, Shenzhen City, Guangdong Province, China

### Test Specification

Standard..... : FCC Part 95  
RSS 210 Issue 8

Test Report Form No. .... : LCSEMC-1.0

TRF Originator ..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF ..... : Dated 2011-03

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Test Item Description. .... : Walkie Talkie

Trade Mark..... : **Q NIGLO**

Model/Type reference. .... : Q-168

Listed Models..... : N/A

Modulation Type ..... : FM

Ratings..... : DC 6V

Hardware version..... : V1.0

Software version..... : V1.0

Date of Test..... : Oct. 21, 2017–Nov. 10, 2017

Result ..... : Pass

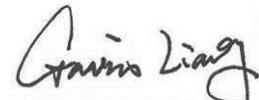
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Gavin Liang/ Manager

# TEST REPORT

<b>Test Report No. :</b>	<b>LCS170831042AE9</b>	Nov. 11, 2017
		Date of issue

Equipment under Test : Walkie Talkie

Model /Type : Q-168

Listed Models : N/A

**Applicant** : **Shenzhen Linda Technology Co., LTD**

Address : Room201, #1 1st Qianwan Road, Qianhai Shenzhen and Hongkong Corporation District, Shenzhen City, Guangdong Province, China

**Manufacturer** : **Shenzhen Linda Technology Co., LTD**

Address : Room201, #1 1st Qianwan Road, Qianhai Shenzhen and Hongkong Corporation District, Shenzhen City, Guangdong Province, China

<b>Test result</b>	<b>Pass *</b>
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\* In the configuration tested, the EUT complied with the standards specified page 5.

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

**Revision History**

Revision	Issue Date	Revisions	Revised By
00	Nov. 11, 2017	Initial Issue	Gavin Liang

# Contents

<b>1</b>	<b>SUMMARY.....</b>	<b>5</b>
1.1	TEST STANDARDS .....	5
1.2	TEST DESCRIPTION.....	5
1.3	TEST FACILITY .....	6
1.4	STATEMENT OF THE MEASUREMENT UNCERTAINTY.....	6
<b>2</b>	<b>GENERAL INFORMATION .....</b>	<b>7</b>
2.1	ENVIRONMENTAL CONDITIONS.....	7
2.2	GENERAL DESCRIPTION OF EUT.....	7
2.3	DESCRIPTION OF TEST MODES AND TEST FREQUENCY.....	7
2.4	EQUIPMENTS USED DURING THE TEST .....	8
2.5	RELATED SUBMITTAL(S) / GRANT (S).....	8
2.6	MODIFICATIONS.....	8
<b>3</b>	<b>TEST CONDITIONS AND RESULTS .....</b>	<b>9</b>
3.1	MAXIMUM TRANSMITTER POWER .....	9
3.2	OCCUPIED BANDWIDTH AND EMISSION MASK .....	12
3.3	MODULATION CHARACTERISTIC .....	14
3.4	FREQUENCY STABILITY .....	17
3.5	TRANSMITTER RADIATED SPURIOUS EMISSION.....	19
<b>4</b>	<b>TEST SETUP PHOTOS OF THE EUT .....</b>	<b>22</b>
<b>5</b>	<b>EXTERNAL AND INTERNAL PHOTOS OF THE EUT.....</b>	<b>23</b>

# 1 SUMMARY

## 1.1 TEST STANDARDS

The tests were performed according to following standards:

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

[TIA/EIA 603 D:June 2010](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[FCC Part 2](#): FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

[RSS-Gen Issue 4](#): General Requirements for Compliance of Radio Apparatus

[RSS-210 Issue 8](#): Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

[ANSI C63.10:2013](#) : American National Standard for Testing Unlicensed Wireless Devices

[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

Description of Test Item	Standard clause	Verdict
Maximum Transmitter Power	FCC Part §95.567 RSS-210 A6.2.4	PASS
Modulation Characteristic	FCC Part 2.1047 FCC Part §95.575 RSS-210 A6.2.2	PASS
Occupied Bandwidth and Emission Mask	FCC Part 2.1049 FCC Part §95.573 FCC Part §95.579 RSS-210 A6.2.3 RSS-210 A6.2.5	PASS
Radiated Spurious Emission	FCC Part §95.579 RSS-201 A6.2.5	PASS
Frequency Stability	FCC Part 2.1055 FCC Part §95.565 FCC Part 95.626 RSS-201 A6.2.6	PASS

### 1.3 Test Facility

#### 1.3.1 Address of the test laboratory

Shenzhen LCS Compliance Testing Laboratory Ltd.  
 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China

There is one 3m semi-anechoic chamber fulfils CISPR 16-1-4 according to ANSI C63.10:2013 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

#### 1.3.2 Laboratory accreditation

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

- CNAS Registration Number. is L4595.
- FCC Designation Number. is CN5024.
- Industry Canada Registration Number. is 9642A-1.
- ESMD Registration Number. is ARCB0108.
- UL Registration Number. is 100571-492.
- TUV SUD Registration Number. is SCN1081.
- TUV RH Registration Number. is UA 50296516-001

### 1.4 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 CTL Testing Technology 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 CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.10 dB	(1)
Radiated Emission	1~18GHz	3.80 dB	(1)
Radiated Emission	18-40GHz	3.90 dB	(1)
Conducted Disturbance	0.15~30MHz	1.63 dB	(1)
Conducted Power	9KHz~18GHz	0.61 dB	(1)
Spurious RF Conducted Emission	9KHz~40GHz	1.22 dB	(1)
Band Edge Compliance of RF Emission	9KHz~40GHz	1.22 dB	(1)
Occupied Bandwidth	9KHz~40GHz	-	(1)

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

## 2 GENERAL INFORMATION

### 2.1 Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

### 2.2 General Description of EUT

Name of EUT	Walkie Talkie
Model Number	Q-168
Power Supply	DC 6.0V from battery
Frequency Range	462.5625MHz
Rate Power	0.5W
Modulation Type	FM
Channel Separation	12.5KHz
Antenna Type	Integral antenna
Antennal Gain	2.0dBi

Note: For more details, refer to the user's manual of the EUT.

### 2.3 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. As, test modes selected as below by the technical parameters of the EUT:

Operation Mode No.	Modulation	Channel Separation	Condition	
	FM	12.5KHz	TX	RX
1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

#### Frequency list

Channel	Frequency(MHz)	Type
1	462.5625	FRS

## 2.4 Equipments Used during the Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	EMC Receiver	R&S	ESCS 30	100174	2017-06-18	2018-06-17
2	Signal analyzer	Agilent	E4448A(External mixers to 40GHz)	US44300469	2017-07-16	2018-06-17
3	Spectrum Analyzer	Agilent	N9020A	MY50510140	2017-10-27	2018-10-26
4	LISN	MESS Tec	NNB-2/16Z	99079	2017-06-18	2018-06-17
5	LISN	EMCO	3819/2NM	9703-1839	2017-06-18	2018-06-17
6	RF Cable-CON	UTIFLEX	3102-26886-4	CB049	2017-06-18	2018-06-17
7	ISN	SCHAFFNER	ISN ST08	21653	2017-06-18	2018-06-17
8	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2017-06-18	2018-06-17
9	Amplifier	SCHAFFNER	COA9231A	18667	2017-06-18	2018-06-17
10	Amplifier	Agilent	8449B	3008A02120	2017-06-16	2018-06-15
11	Amplifier	MITEQ	AMF-6F-260400	9121372	2017-06-16	2018-06-15
12	Loop Antenna	R&S	HFH2-Z2	860004/001	2017-06-18	2018-06-17
13	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2017-06-10	2018-06-09
14	Horn Antenna	EMCO	3115	6741	2017-06-10	2018-06-09
15	Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	2017-06-10	2018-06-09
16	RF Cable-R03m	Jye Bao	RG142	CB021	2017-06-18	2018-06-17
17	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2017-06-18	2018-06-17
18	Power Sensor	R&S	NRV-Z81	100458	2017-06-18	2018-06-17
19	Power Sensor	R&S	NRV-Z32	10057	2017-06-18	2018-06-17
20	Power Meter	R&S	NRVS	100444	2017-06-18	2018-06-17
21	Radio Communication Tester	HP	8920A	116250	2017-06-18	2018-06-17
22	Storage Oscilloscope	Tektronix	TDS3054B	B033027	2017-06-18	2018-06-17

## 2.5 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with FCC Part 95 Rules.

## 2.6 Modifications

No modifications were implemented to meet testing criteria.

### 3 TEST CONDITIONS AND RESULTS

#### 3.1 Maximum Transmitter Power

##### LIMITS

**According to FCC Part 95.567:**

Each FRS transmitter type must be designed such that the effective radiated power (ERP) on channels 8 through 14 does not exceed 0.5 Watts and the ERP on channels 1 through 7 and 15 through 22 does not exceed 2.0 Watts.

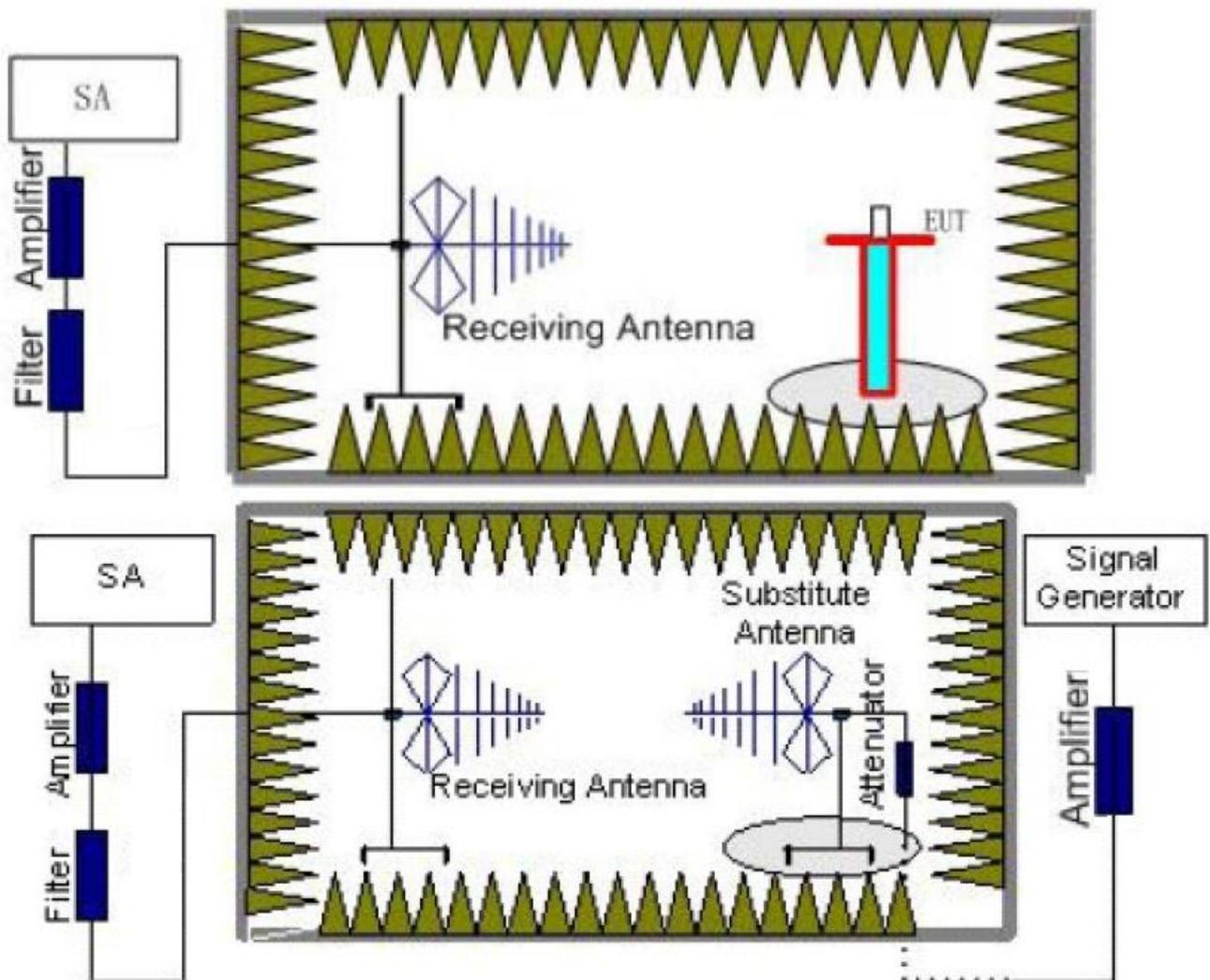
**According to RSS-210 A6.1.4:**

For FRS transmitter the maximum permissible transmitter output power under any operating conditions is 0.5 W effective radiated power(e.r.p.). The radio shall be equipped with an integral antenna.

**According to RSS-210 A6.2.4:**

A GMRS transmitter may transmit with a maximum power of 2 W e.r.p.

##### TEST CONFIGURATION



## Measurement Procedure

1. EUT was placed on a 0.8 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 1.0m. 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 test transmit frequencies 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, And the maximum value of the receiver should be recorded as ( $P_r$ ).
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. An amplifier may 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:  
$$\text{Power(EIRP)} = P_{Mea} + P_{Ag} - P_{cl} + G_a$$
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 RESULTS**

Remark;

The field strength of radiation emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The data show in this report only with the worst case setup. After exploratory measurement the worst case of Z axis and receiver antenna at vertical polarization was reported.

Test Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	G <sub>a</sub> Antenna Gain(dBi)	Correction (dB)	P <sub>Ag</sub> (dB)	ERP (dBm)	ERP (W)	Limit (W)	Polarization
462.5625	-11.70	2.08	7.69	2.15	34.59	26.35	0.4315	0.5W	V

Remark:

1.  $EIRP = P_{Mea}(dBm) + P_{Ag}(dB) - P_{cl}(dB) + G_a(dBi)$
2.  $ERP = EIRP - 2.15dBi$  as  $EIRP$  by subtracting the gain of the dipole.

## 3.2 Occupied Bandwidth and Emission Mask

### LIMITS

#### According to FCC 95.571 and 95.573 & RSS-210 A6.1.3, A6.2.3:

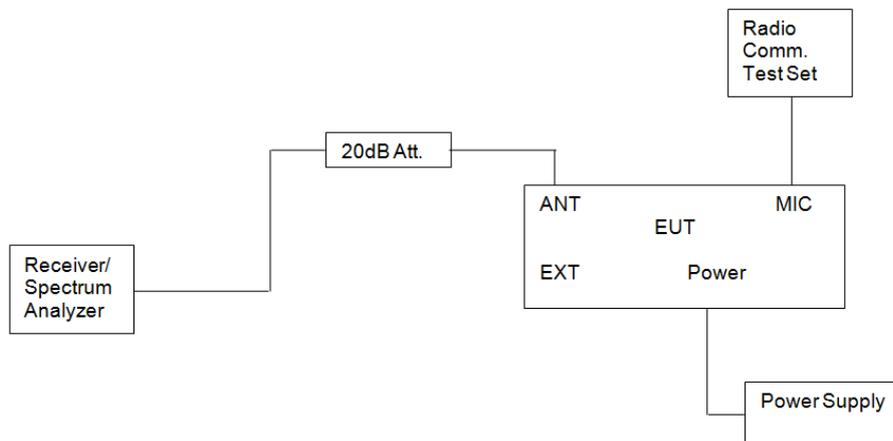
Each FRS transmitter type must be designed such that the occupied bandwidth does not exceed 12.5 kHz. Each FRS transmitter type must be designed such that it can transmit only the following emission types: F3E, G3E, F2D, and G2D

#### According to FCC 95.579 & RSS-210 A6.1.5, A6.2.5:

(a) Attenuation requirements. The power of unwanted emissions must be attenuated below the carrier power output in Watts (P) by at least:

- (1) 25 dB (decibels) in the frequency band 6.25 kHz to 12.5 kHz removed from the channel center frequency.
- (2) 35 dB in the frequency band 12.5 kHz to 31.25 kHz removed from the channel center frequency.
- (3)  $43 + 10 \log (P)$  dB in any frequency band removed from the channel center frequency by more than 31.25 kHz.

### TEST CONFIGURATION



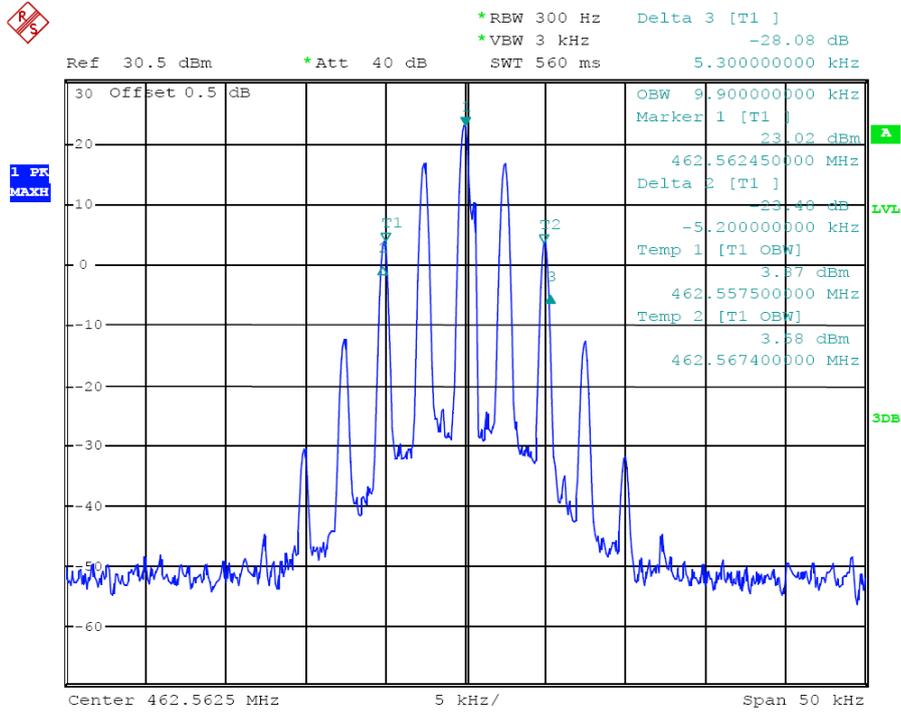
### TEST PROCEDURE

- 1 The EUT was modulated by 2.5 KHz Sine wave audio signal; the level of the audio signal employed is 16 dB greater than that necessary to produce 50% of rated system deviation. Rated system deviation is 2.5 kHz (12.5 kHz channel spacing) and 5 kHz (25 kHz channel spacing).
- 2 Set SPA Center Frequency = fundamental frequency, RBW=300Hz, VBW= 3 KHz, span =50 KHz.
- 3 Set SPA Max hold. Mark peak, Set 99% Occupied Bandwidth and 26dB Occupied Bandwidth.

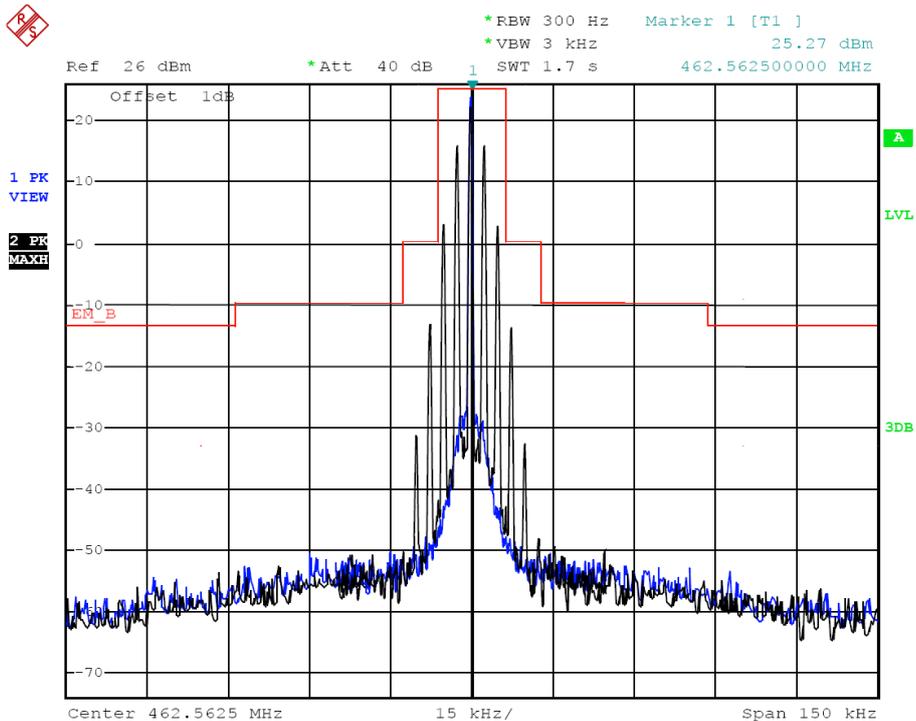
**TEST RESULTS**

**Occupied Bandwidth:**

Modulation	Frequency (MHz)	99% OBW (kHz)	26dB bandwidth (kHz)	Limit (KHz)	Result
FM	462.5625	9.90	10.50	12.5	Pass



**Emission Mask:**



### 3.3 Modulation Characteristic

#### LIMITS

##### According to FCC 95.575

Each FRS transmitter type must be designed such that the peak frequency deviation does not exceed 2.5 kHz, and the highest audio frequency contributing substantially to modulation must not exceed 3.125 kHz.

#### TEST PROCEDURE

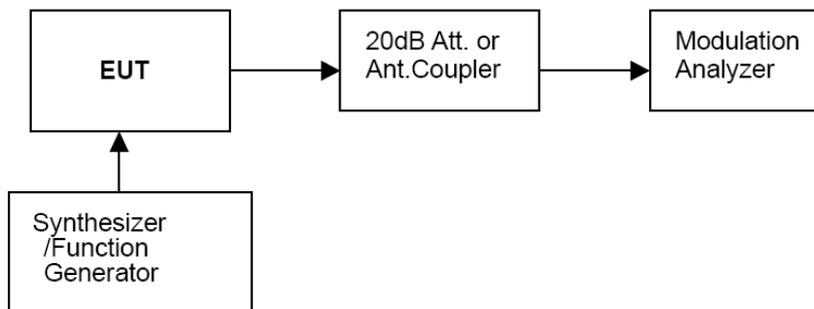
##### Modulation Limit

- 1 Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1 KHz using this level as a reference (0dB) and vary the input level from -20 to +20dB. Record the frequency deviation obtained as a function of the input level.
- 2 Repeat step 1 with input frequency changing to 300, 1004, 1500 and 2500Hz in sequence.

##### Audio Frequency Response

- 1 Configure the EUT as shown in figure 1.
- 2 Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0dB).
- 3 Vary the Audio frequency from 100 Hz to 3 KHz and record the frequency deviation.
- 4 Audio Frequency Response =  $20\log_{10}$  (Deviation of test frequency/Deviation of 1 KHz reference).

#### TEST CONFIGURATION

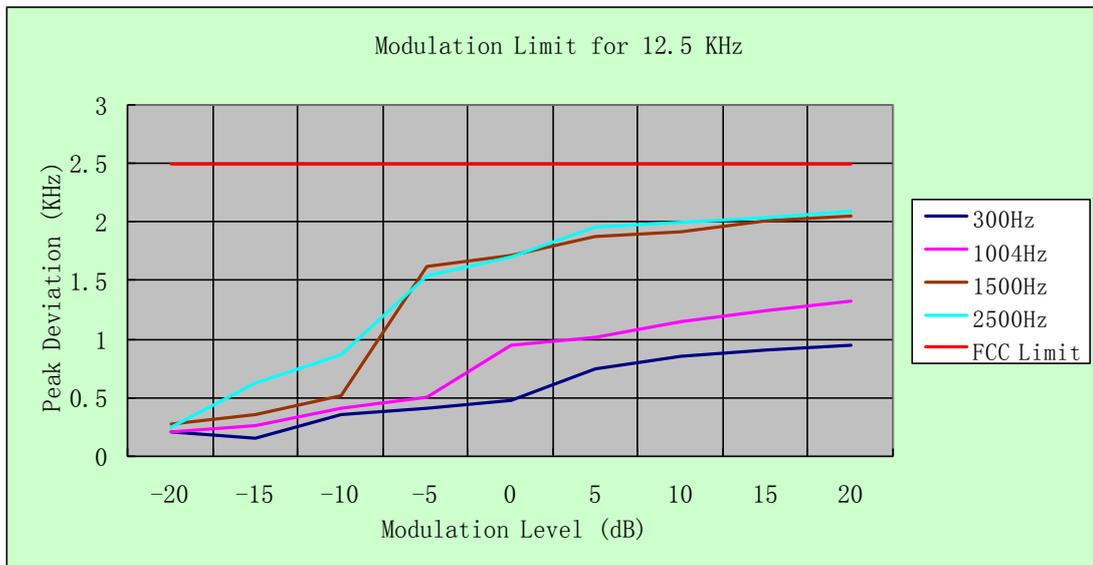


#### TEST RESULTS

##### Modulation Limit:

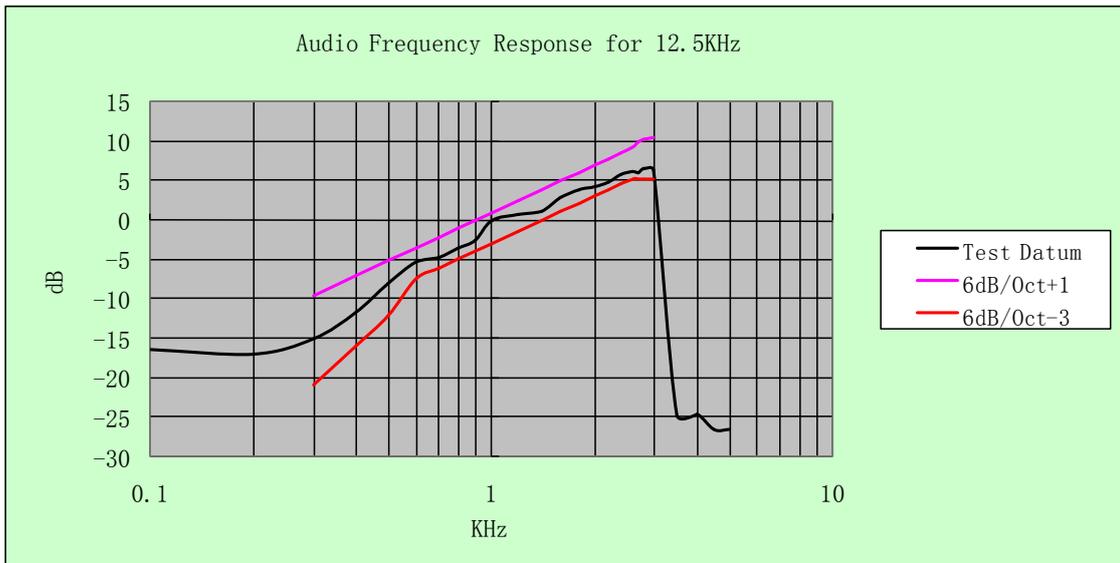
Modulation Level(dB)	Peak Freq. Deviation At 300 Hz(KHz)	Peak Freq. Deviation At 1004 Hz(KHz)	Peak Freq. Deviation At 1500 Hz(KHz)	Peak Freq. Deviation At 2500 Hz(KHz)
-20	0.20	0.20	0.27	0.25
-15	0.15	0.25	0.35	0.63
-10	0.35	0.41	0.51	0.87
-5	0.41	0.50	1.62	1.54
0	0.48	0.95	1.71	1.71
+5	0.75	1.02	1.87	1.96

+10	0.85	1.15	1.92	2.01
+15	0.91	1.25	2.01	2.04
+20	0.95	1.33	2.05	2.10



**Audio Frequency Response:**

Frequency (KHz)	Frequency Deviation (KHz)	1KHz Reference Deviation (KHz)	Audio Frequency Response (dB)
0.1	0.13	0.85	-16.31
0.2	0.12	0.85	-17.00
0.3	0.15	0.85	-15.07
0.4	0.22	0.85	-11.74
0.5	0.34	0.85	-7.96
0.6	0.46	0.85	-5.33
0.7	0.50	0.85	-4.61
0.8	0.57	0.85	-3.47
0.9	0.64	0.85	-2.46
1.0	0.85	0.85	0.00
1.2	0.92	0.85	0.69
1.4	0.98	0.85	1.24
1.6	1.18	0.85	2.85
1.8	1.34	0.85	3.95
2.0	1.39	0.85	4.27
2.2	1.49	0.85	4.88
2.4	1.67	0.85	5.87
2.6	1.74	0.85	6.22
2.7	1.72	0.85	6.12
2.8	1.81	0.85	6.57
3.0	1.78	0.85	6.42
3.5	0.05	0.85	-24.61
4.0	0.05	0.85	-24.61
4.5	0.04	0.85	-26.55
5.0	0.04	0.85	-26.55



### 3.4 Frequency Stability

#### LIMITS

##### **According to FCC 95.565**

Each FRS transmitter type must be designed such that the carrier frequencies remain within  $\pm 2.5$  parts-per-million of the channel center frequencies specified in §95.563 during normal operating conditions.

##### **According to FCC 95.627(b)**

Each FRS unit must be maintained within a frequency tolerance of 0.00025%.

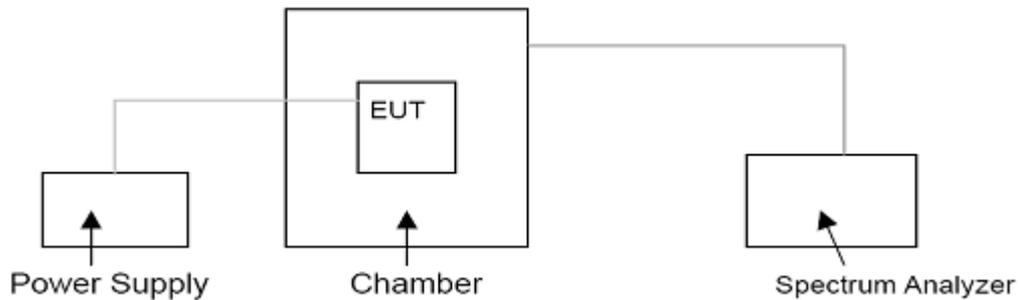
##### **According to RSS-210 A6.1.6**

FRS Devices: Carrier frequency tolerance shall be better than  $\pm 5$  ppm

##### **According to RSS-210 A6.2.6**

GMRS Devices: Carrier frequency tolerance shall be better than  $\pm 5$  ppm

#### TEST CONFIGURATION



#### TEST PROCEDURE

The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to Spectrum Analyzer. The coupling loss of the additional cables was recorded and taken in account for all the measurements. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. For Frequency stability Vs. Voltage the EUT was connected to a DC power supply and the voltage was adjusted in the required ranges. The result was recorded.

**TEST RESULTS**

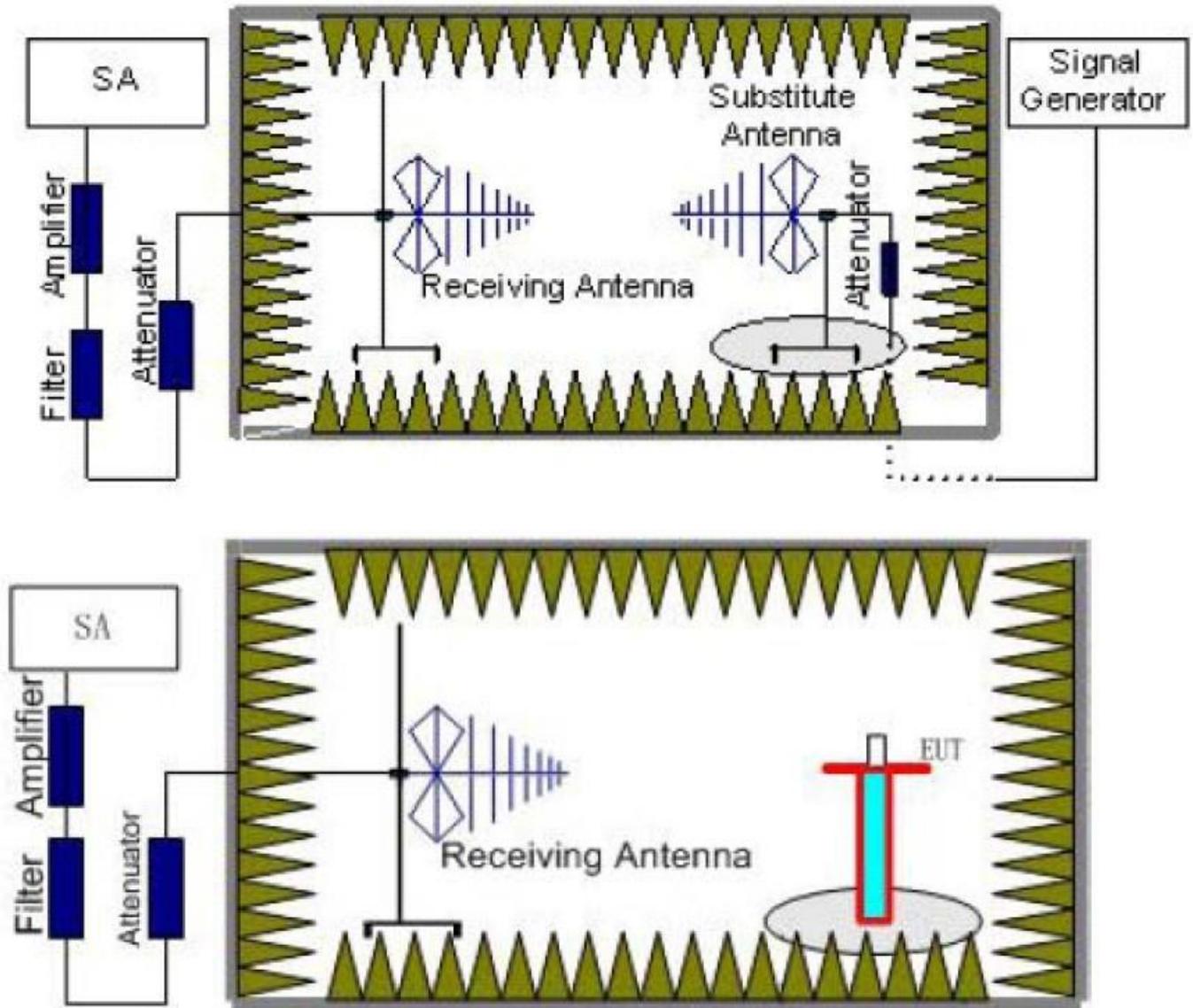
Reference Frequency: 462.5625MHz					
Voltage ( V )	Temperature (°C)	Frequency error (Hz)	Frequency Tolerance (ppm)	Limit (ppm)	Result
6.00	-30	585	1.3	±2.5	Pass
	-20	474	1.0		
	-10	526	1.1		
	0	555	1.2		
	10	541	1.2		
	20	425	0.9		
	30	586	1.3		
	40	554	1.2		
	50	525	1.1		
6.90	25	622	1.3		
5.10	25	562	1.2		

### 3.5 Transmitter Radiated Spurious Emission

#### Limit

43 + 10 log (P) dB in any frequency band removed from the channel center frequency by more than 31.25 kHz.

#### TEST CONFIGURATION



## **TEST PROCEDURE**

- a. EUT was placed on a 0.8 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 1.0m. 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 test transmit frequencies were measured with peak detector.
- b. 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.
- c. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum 100 kHz below 1GHz and 1MHz above 1GHz, Sweep from 30MHz to the 10th harmonic of the fundamental frequency; and recorded the level of the concerned spurious emission point as ( $P_r$ ).
- d. The EUT then 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.

The measurement results are obtained as described below:

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

Where;

- $P_{Mea}$  is the recorded signal generator level
- $P_{cl}$  is the cable loss connect between instruments
- $G_a$  Substitution Antenna Gain

- e. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
- f. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dBi}$ .
- g. Test site anechoic chamber refer to ANSI C63.

**TEST RESULTS**

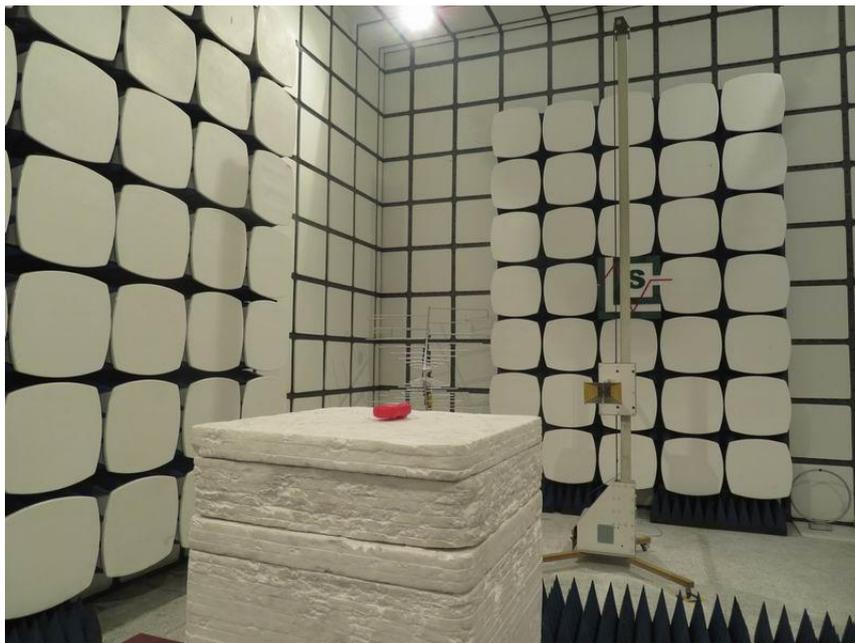
Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency; and worst spurious emissions recorded as below:

Test Frequency (MHz)	Frequency (MHz)	P <sub>Mea</sub> (dBm)	P <sub>cl</sub> (dB)	Distance (m)	G <sub>a</sub> Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Pol.
462.5625	925.1250	-30.58	3.54	3.00	12.87	-21.25	-13.00	8.25	V
	1387.6875	-33.68	4.21	3.00	15.48	-22.41	-13.00	9.41	V
	1850.2500	-39.09	4.52	3.00	17.32	-26.29	-13.00	13.29	V
	2312.8125	-42.43	5.24	3.00	18.76	-28.91	-13.00	15.91	V
	--	--	--	--	--	--	--	--	--

Remark:

1.  $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + G_a(dBi)$
2. -- Means other points for values lower than limits and not recorded.
3.  $Margin = Limit - EIRP$

## 4 Test Setup Photos of the EUT



## 5 External and Internal Photos of the EUT

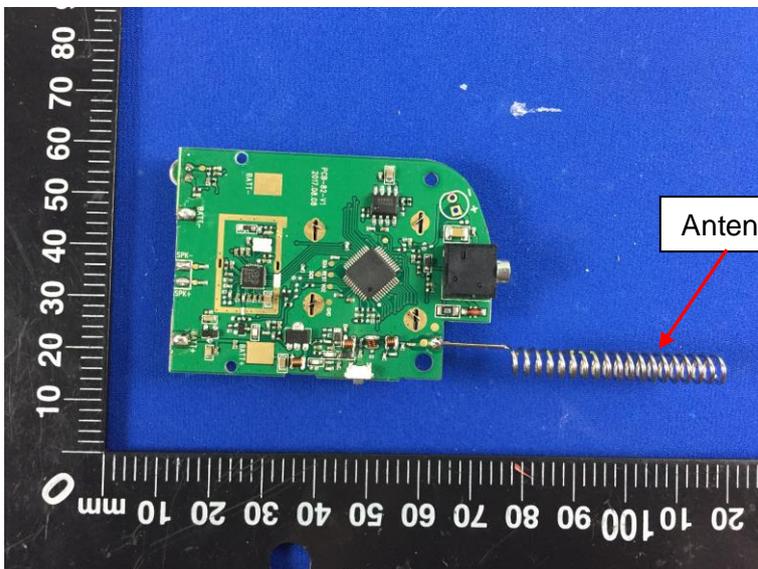
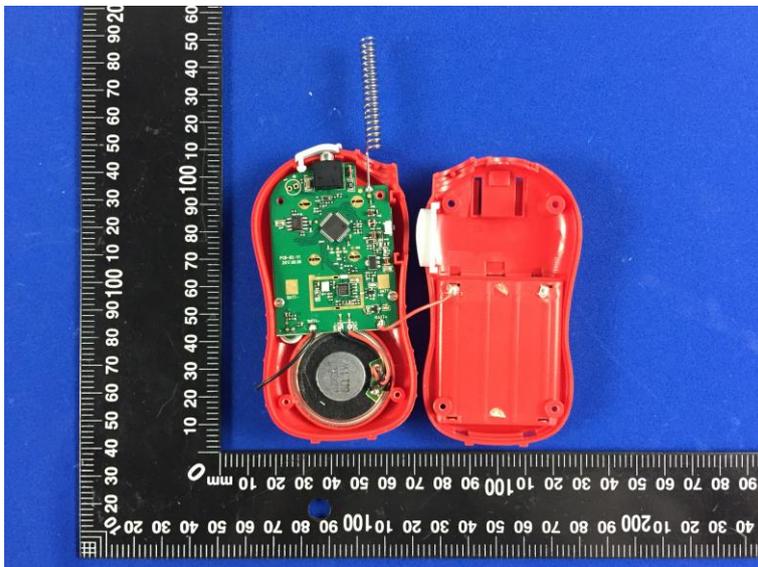
### External Photos of EUT

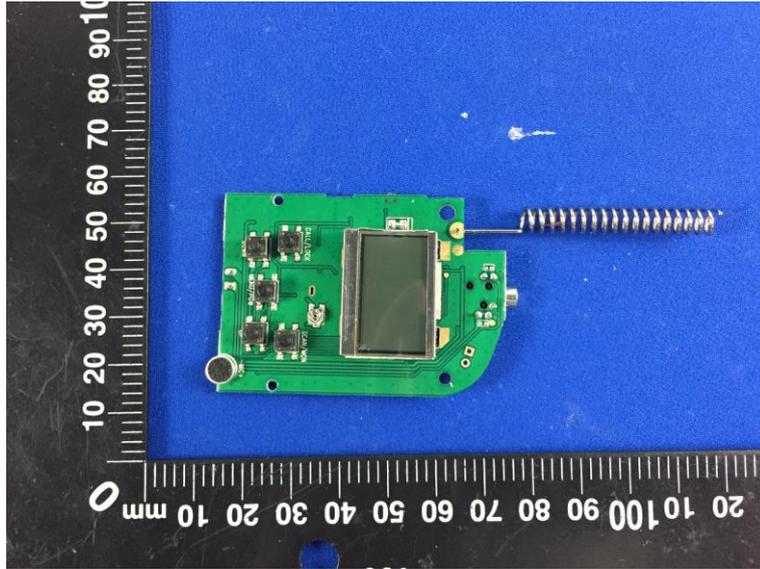






### Internal Photos of EUT





\*\*\*\*\* End of Report \*\*\*\*\*