



# FCC Test Report

## Part 15 subpart C

### Client Information:

Applicant: MING JI TOYS FACTORY

Applicant add.: CHENGHAI DISTRICT, SHANTOU CITY, GUANGDONG PROVINCE, CHINA

### Product Information:

Product Name: flying saucer series

Model No.: 100

Derivative model No.: Please refer to Page 5 for details

Brand Name: N/A

FCC ID: NWB13829417168

Standards: CFR 47 FCC PART 15 SUBPART C:2013 section 15.249

### Prepared By:

#### UL-CCIC Company Limited

Add.: Electronic Building, Parage Electronic Industrial Park, No. 8 Nanyun Er Road,  
Guangzhou Science Park, Guangzhou, 510663 China

Date of Receipt: July 09, 2015

Date of Test: July 10~ July 13, 2015

Date of Issue: July 14, 2015

Test Result: Pass

This device described above has been tested by Dongguan Yaxu (AiT) Technology Limited, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

\*This test report must not be used by the client to claim product endorsement by any agency of the U.S. government.

Reviewed by:

Approved by:



# 1 Contents

	Page
<b>COVER PAGE</b>	
<b>1 CONTENTS.....</b>	<b>2</b>
<b>2 TEST SUMMARY.....</b>	<b>3</b>
2.1 COMPLIANCE WITH FCC PART 15 SUBPART C .....	3
2.2 MEASUREMENT UNCERTAINTY .....	3
<b>3 TEST FACILITY .....</b>	<b>4</b>
3.1 DEVIATION FROM STANDARD .....	4
3.2 ABNORMALITIES FROM STANDARD CONDITIONS .....	4
<b>4 GENERAL INFORMATION .....</b>	<b>5</b>
4.1 GENERAL DESCRIPTION OF EUT .....	5
4.2 TEST LOCATION .....	5
<b>5 DESCRIPTION OF TEST CONDITIONS.....</b>	<b>7</b>
5.1 E.U.T. OPERATION.....	7
5.2 EUT PERIPHERAL LIST .....	8
5.3 TEST PERIPHERAL LIST .....	8
<b>6 EQUIPMENTS LIST FOR ALL TEST ITEMS.....</b>	<b>9</b>
<b>7 TEST RESULT .....</b>	<b>10</b>
7.1 ANTENNA REQUIREMENT .....	10
7.2 FIELD STRENGTH OF FUNDAMENTAL& FIELD STRENGTH OF UNWANTED EMISSIONS& BAND EDGE .....	11
7.2.1 Duty cycle measurement: .....	17
7.2.2 Radiated Emissions Test Data .....	18
7.3 OCCUPIED BANDWIDTH.....	25
7.4 CONDUCTED EMISSIONS AT MAINS TERMINALS 150 KHZ TO 30 MHZ .....	27
7.2.3 Measurement Data .....	28
<b>8 PHOTOGRAPHS .....</b>	<b>29</b>
8.1 RADIATED EMISSION TEST SETUP .....	29
8.2 EUT CONSTRUCTIONAL DETAILS .....	30



## 2 Test Summary

### 2.1 Compliance with FCC Part 15 subpart C

Test	Test Requirement	Standard Paragraph	Result
Field Strength of Fundamental	FCC PART 15 C section 15.249 (a)	ANSI C63.10: Clause 6.6	PASS
Field Strength of Unwanted Emissions	FCC PART 15 C section 15.249 (a) section 15.249 (d)	ANSI C63.10: Clause 6.4, 6.6 and 6.7	PASS
Band Edges	FCC PART 15 C section 15.249 (d)	ANSI C63.10: Clause 6.9.2	PASS
Occupied Bandwidth	FCC PART 15 C section 15.215(c)	ANSI C63.10: Clause 6.9.1	PASS
Conducted Emissions at Mains Terminals	FCC PART 15 C section 15.207	ANSI C63.10: Clause 6.2	N/A

**Remark:**

EUT: In this whole report EUT means Equipment Under Test.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radio Frequency.

ANSI C63.10: the detail version is ANSI C63.10:2009 in the whole report.

### 2.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, the maximum value of the uncertainty as below:

No.	Item	Uncertainty
1	Conducted Emission Test	1.20dB
2	Radiated Emission Test	3.30dB
3	RF power,conducted	0.16dB
4	RF power density,conducted	0.24dB
5	Spurious emissions,conducted	0.21dB
6	All emissions,radiated(<1G)	4.68dB
7	All emissions,radiated(>1G)	4.89dB



### 3 Test Facility

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

**.CNAS- Registration No: L6177**

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2005 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on Apr. 18, 2013

**.FCC- Registration No: 248337**

The 3m Semi-Anechoic Chamber, 3m/10m Open Area Test Site and Shielding Room of Dongguan Yaxu (AiT) Technology Limited have been registered by Federal Communications Commission (FCC) on Aug.29, 2014.

**.Industry Canada(IC)-Registration No: IC6819A-1**

The 3m Semi-Anechoic Chamber and 3m of Dongguan Yaxu (AiT) Technology Limited have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing on Oct. 01, 2014.

**.VCCI- Registration No: 2705**

The 3m/10m Open Area Test Site, Shielding Room and 3m Chamber of Dongguan Yaxu (AiT) Technology Limited have been registered by Voluntary Control Council for Interference on Nov. 21, 2012. The Telecommunication Ports Conducted Disturbance Measurement of Dongguan Yaxu (AiT) Technology Limited have been registered by Voluntary Control Council for Interference on May. 13, 2013.

#### 3.1 Deviation from standard

None

#### 3.2 Abnormalities from standard conditions

None



## 4 General Information

### 4.1 General Description of EUT

Manufacturer:	MING JI TOYS FACTORY
Manufacturer Address:	CHENGHAI DISTRICT,SHANTOU CITY,GUANGDONG PROVINCE,CHINA
EUT Name:	flying saucer series
Model No.:	100
Operation frequency:	2405 MHz to 2445 MHz
Number of channel:	41 channels
Modulation Type and Antenna Type:	GFSK wire antenna
Data rate:	Only 2Mbps
H/W No.:	1.1
S/W No.:	00
Antenna Gain:	3 dBi
Brand Name:	N/A
Derivative model No.:	100,101,102,103,105,107,108,109,QCL6-4/6452,8801,8802,8803,8806,8808,8809,8810,8811,8812,8813,8816,8818,8819,8820
Power Supply Range:	DC 4.5V(3*1.5V AA battery)
Power Supply:	DC 4.5V from battery
Power Cord:	N/A
Signal Cable:	N/A
Model description:	According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference being the model name. Therefore only one model 100 was tested in this report.

### 4.2 Test Location

All tests were performed at:

Dongguan Yaxu (AiT) Technology Limited  
No. 22, JinQianLing Street 3, JiTiGang Village, HuangJiang Town,DongGuan, GuangDong, China.

Tel.: +86.769.82020499 Fax.: +86.769.82020495



Description of Channel:					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2405	15	2419	29	2433
02	2406	16	2420	30	2434
03	2407	17	2421	31	2435
04	2408	18	2422	32	2436
05	2409	19	2423	33	2437
06	2410	20	2424	34	2438
07	2411	21	2425	35	2439
08	2412	22	2426	36	2440
09	2413	23	2427	37	2441
10	2414	24	2428	38	2442
11	2415	25	2429	39	2443
12	2416	26	2430	40	2444
13	2417	27	2431	41	2445
14	2418	28	2432		



## 5 Description of Test conditions

### 5.1 E.U.T. Operation

**Test Voltage:** DC 4.5V from battery

**Temperature:** 20.0 -25.0 °C

**Humidity:** 38-50 % RH

**Atmospheric Pressure:** 1000 -1010 mbar

**Test frequencies and frequency range:** According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

**Number of fundamental frequencies to be tested in EUT transmit band**

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

**Frequency range of radiated emission measurements**

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified



## 5.2 EUT Peripheral List

No.	Equipment	Manufacturer	Model No.	Serial No.	Power cord	signal cable
1	N/A	N/A	N/A	N/A	N/A	N/A

## 5.3 Test Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	signal cable
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A





## 6 Equipments List for All Test Items

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	ADVANTEST	R3182	150900201	2015.06.20	2016.06.19
2	EMI Measuring Receiver	R&S	ESR	101660	2014.12.12	2015.12.11
3	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2015.06.20	2016.06.19
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2014.12.02	2015.12.01
5	TRILOG Super Broadband test Antenna	SCHWARZBEC K	VULB9160	9160-3206	2014.12.03	2015.12.02
6	Broadband Horn Antenna	SCHWARZBEC K	BBHA9120D	452	2014.12.03	2015.12.02
7	SHF-EHF Horn	SCHWARZBEC K	BBHA9170	BBHA9170367	2014.12.03	2015.12.02
8	Loop Antenna	ARA	PLA-1030/B	1029	2015.03.20	2016.03.19
9	Radiated Cable 1# (30MHz-1GHz)	FUJIKURA	5D-2W	01	2015.01.04	2016.01.03
10	Radiated Cable 2# (1GHz -25GHz)	FUJIKURA	10D2W	02	2014.12.25	2015.12.24
11	Conducted Cable 1#(9KHz-30MHz)	FUJIKURA	1D-2W	01	2015.01.04	2016.01.03
12	SMA Antenna connector	Dosin	Dosin-SMA	N/A	N/A	N/A

Note: The SMA antenna connector is soldered on the PCB board in order to perform conducted tests and this SMA antenna connector is listed in the equipment list.

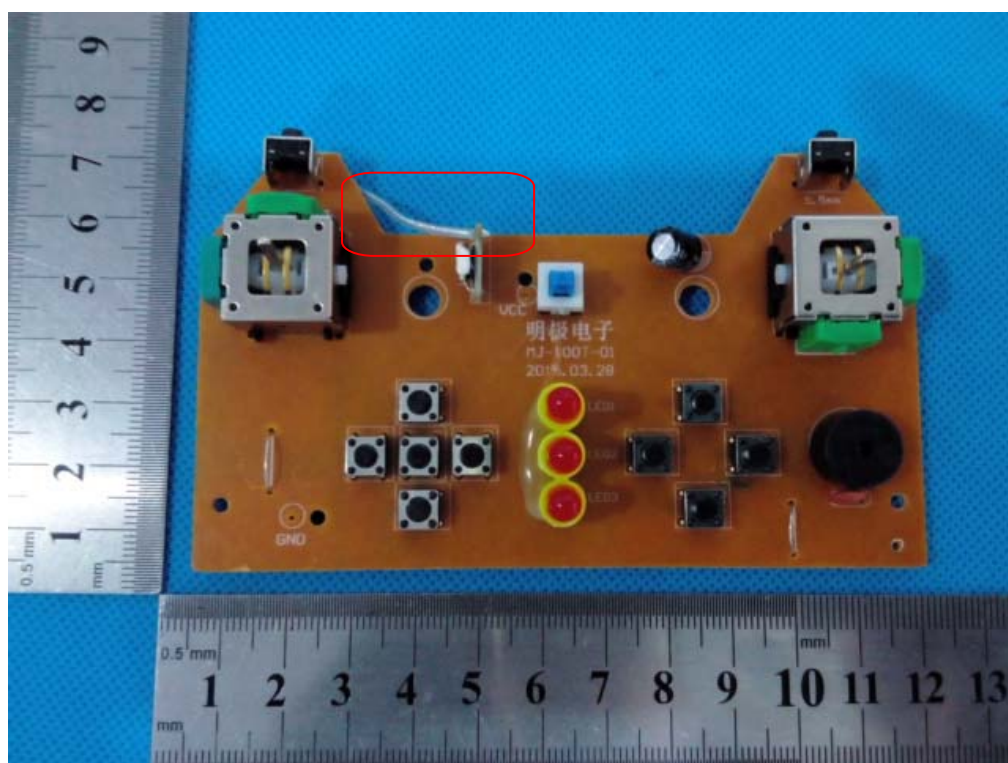
## 7 Test Result

### 7.1 Antenna Requirement

#### Standard requirement

#### EUT Antenna

The antenna is non-removable antenna and no consideration of replacement. The maximum gain of the antenna is 3 dBi.



**Test result:** The unit does meet the FCC requirements.



## 7.2 Field Strength of Fundamental& Field Strength of Unwanted Emissions& Band Edge

Test Requirement: FCC Part15 C section 15.249

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dB $\mu$ V/m @ 3m)	Field Strength of Harmonics (dB $\mu$ V/m @ 3m)
902 to 928	94.0	54.0
2400 to 2483.5	94.0	54.0
5725 to 5875	94.0	54.0
24000 to 24250	108.0	68.0

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Limits: The fundamental frequency rang is in the frequency band of the EUT is 2405 MHz ~ 2435 MHz

The limit for AVG field strength dB $\mu$ V/m for the fundamental frequency = 94.0 dB $\mu$ V/m.

The limit for Peak field strength dB $\mu$ V/m for the fundamental frequency = 114.0 dB $\mu$ V/m.

No fundamental is allowed in the restricted bands.

The limit for AVG field strength dB $\mu$ V/m for the harmonics and other above 1G frequencies = 54.0 dB $\mu$ V/m.

The limit for Peak field strength dB $\mu$ V/m for the harmonics and other above 1G frequencies = 74.0 dB $\mu$ V/m.

Test Method: ANSI C63.10: Clause 6.4, 6.6 and 6.7 for Field Strength of Fundamental& Field Strength of Unwanted Emissions  
ANSI C63.10: Clause 6.9.2 for Band Edge

Status Pre-test the EUT in continuous transmitting mode with setup as stand-alone in X, Y, Z threes axes, found the worst case is X axes and report the data.

Measurement Distance: 3m (Semi-Anechoic Chamber)

Frequency range 9 kHz – 25 GHz for transmitting mode.

Test instrumentation resolution bandwidth

9 kHz (9 kHz - 30 MHz), 120 kHz (30 MHz - 1000 MHz), 1 MHz (1000 MHz – 25 GHz)



Detector:

For PK and QP value:

RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

For AV value:

RBW = 1 MHz for  $f \geq 1$  GHz,

VBW = 10 Hz

Sweep = auto

Detector function = peak

Trace = max hold



---

**Test Procedure:**

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna, testing was performed in accordance to ANSI C63.10. The centre of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30 MHz to 1 GHz emissions:

For testing performed with the bi-log type antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

3) 1 GHz to 25 GHz emissions:

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2007 was used to perform radiated emission test above 1 GHz.

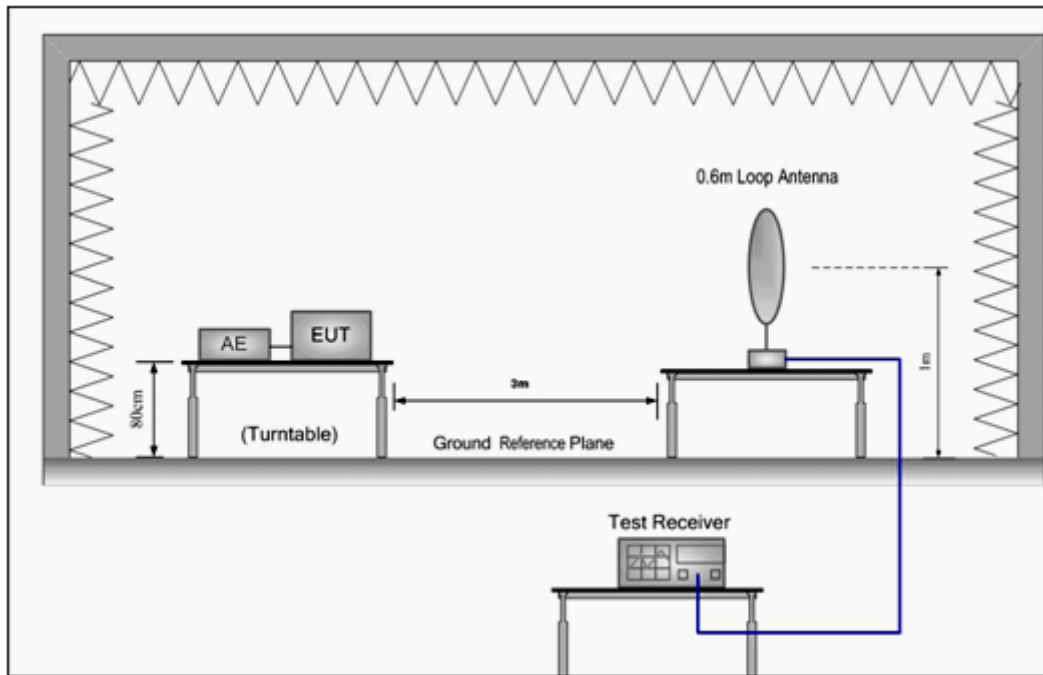
For testing performed with the horn antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360°, the antenna height scan between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

For the radiated emission test above 1GHz:

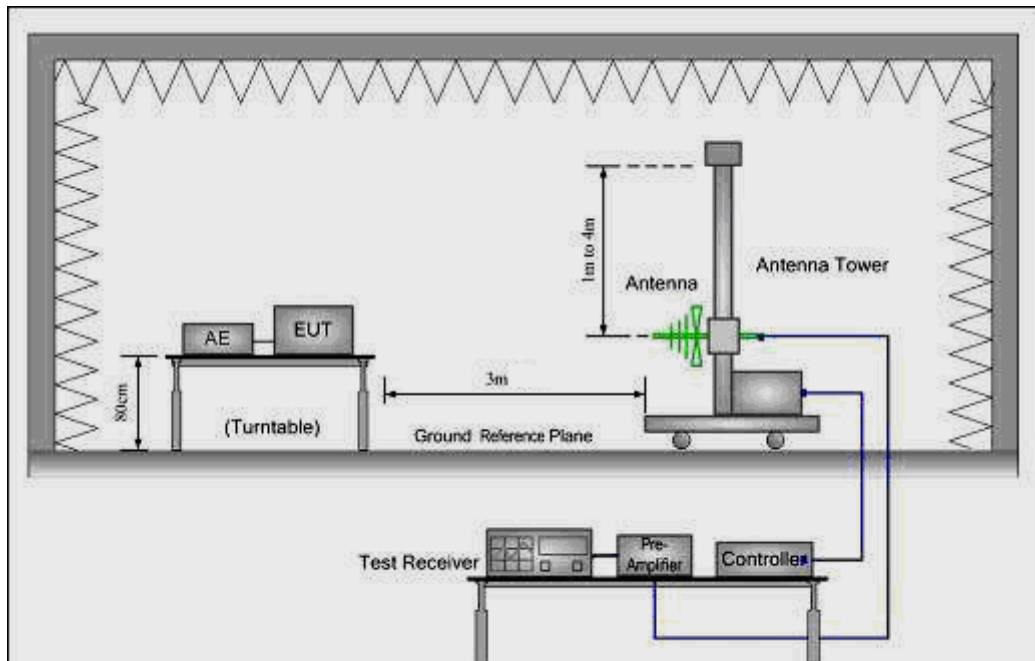
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

### Test Configuration:

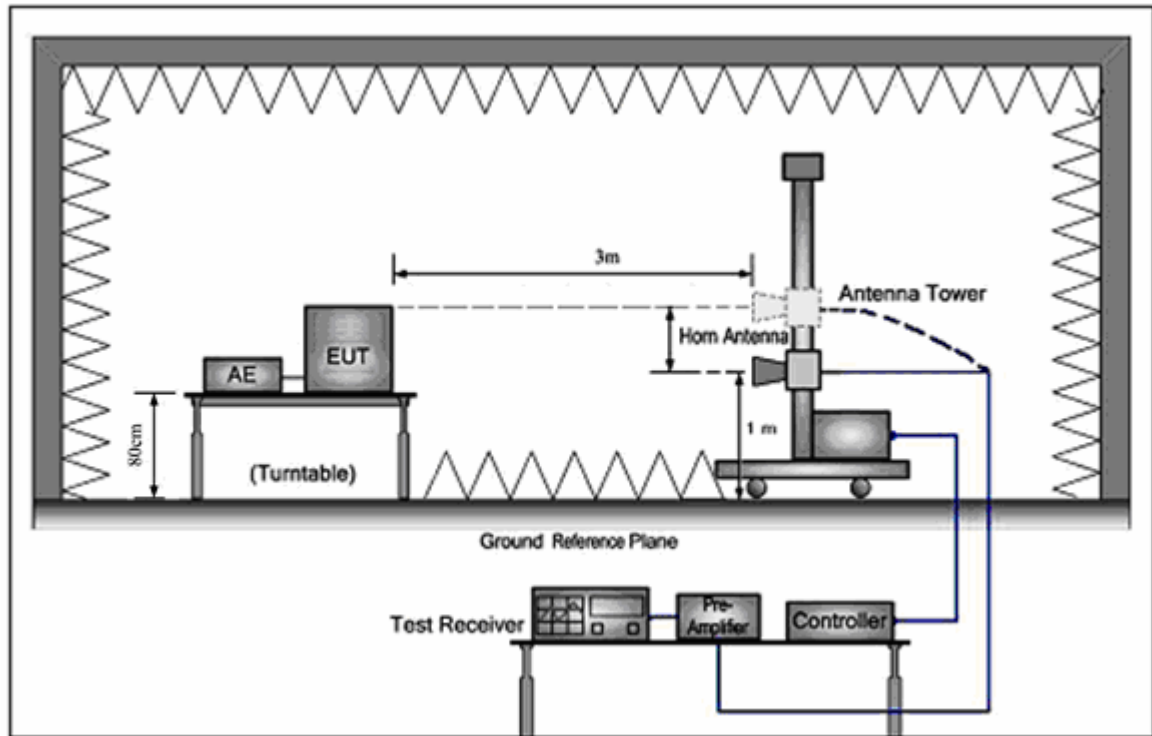
- 1) 9 kHz to 30 MHz emissions:



- 2) 30 MHz to 1 GHz emissions:



### 3) 1 GHz to 25 GHz emissions:



The field strength is calculated by adding the Antenna Factor, Cable Loss & Pre-amplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna, Factor + Cable Loss – Preamplifier Factor



And according 15.35(a)

15.35(a) On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified. The specifications for the measuring instrument using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Interference (CISPR) of the International Electrotechnical Commission. As an alternative to CISPR quasi-peak measurements, the responsible party, at its option, may demonstrate compliance with the emission limits using measuring equipment employing a peak detector function, properly adjusted for such factors as pulse desensitization, as long as the same bandwidths as indicated for CISPR quasi-peak measurements are employed.

Note: For pulse modulated devices with a pulse-repetition frequency of 20 Hz or less and for which CISPR quasi-peak measurements are specified, compliance with the regulations shall be demonstrated using measuring equipment employing a peak detector function, properly adjusted for such factors as pulse desensitization, using the same measurement bandwidths that are indicated for CISPR quasi-peak measurements.

According to 15.35 (b) Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, e.g., see §§ 15.250, 15.252, 15.255, and 15.509-15.519 of this part, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device, e.g., the total peak power level. Note that the use of a pulse desensitization correction factor may be needed to determine the total peak emission level. The instruction manual or application note for the measurement instrument should be consulted for determining pulse desensitization factors, as necessary.

The average correction factor is computed by analyzing the on time in 100ms over one complete pulse train. Analysis of the remote transmitter on time in one complete pulse train, therefore the average value of fundamental frequency is: Average = Peak value + 20log (Duty cycle), where the duty factor is calculated from following formula:

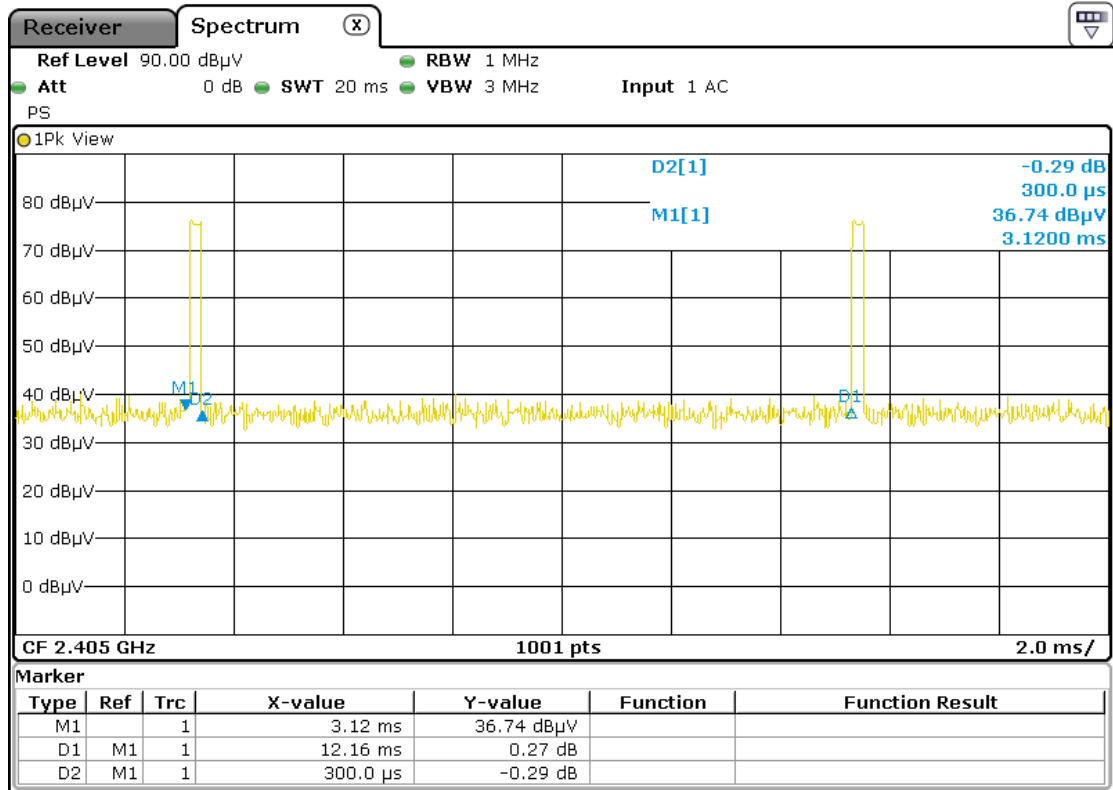
$$20\log(\text{Duty cycle}) = 20\log(0.3/12.16) = 20\log(0.02467105) = -32.15 \text{ dB}$$

Please refer to below plots for more details.





### 7.2.1 Duty cycle measurement:





## 7.2.2 Radiated Emissions Test Data

### 9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

### 30 MHz~1 GHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

EUT:	Flying saucer series	Model Name :	100
Temperature:	25 °C	Test Data	2015-07-11
Pressure:	1010 hPa	Relative Humidity:	50%
Test Mode :	TX mode(worse-case: 2405MHz)	Test Voltage :	DC 4.5V from battery
Measurement Distance	3 m	Frenqucy Range	30MHz to 1GHz
RBW/VBW	100KHz / 300KHz for spectrum, RBW=120KHz for receiver.		

(a) Antenna polarization: Horizontal

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
36.6375	33.25	-16.74	16.51	40.00	-23.49	QUASIPeAK
101.6443	31.19	-13.86	17.33	43.50	-26.17	QUASIPeAK
244.2321	31.00	-11.54	19.46	46.00	-26.54	QUASIPeAK
285.9778	30.56	-10.03	20.53	46.00	-25.47	QUASIPeAK
704.2259	31.55	-0.50	31.05	46.00	-14.95	QUASIPeAK
<b>*801.7862</b>	<b>28.94</b>	<b>3.30</b>	<b>32.24</b>	<b>46.00</b>	<b>-13.76</b>	<b>QUASIPeAK</b>

(b) Antenna polarization: Vertical

Frequency (MHz)	Reading Level (dBuV)	Correct Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
37.9450	30.71	-14.45	16.26	40.00	-23.74	QUASIPeAK
98.4865	31.20	-16.17	15.03	43.50	-28.47	QUASIPeAK
183.8440	31.91	-10.81	21.10	43.50	-22.40	QUASIPeAK
282.9852	30.96	-10.17	20.79	46.00	-25.21	QUASIPeAK
605.6592	30.06	-1.87	28.19	46.00	-17.81	QUASIPeAK
<b>*687.1507</b>	<b>31.14</b>	<b>-0.42</b>	<b>30.72</b>	<b>46.00</b>	<b>-15.28</b>	<b>QUASIPeAK</b>

Note: '\*' means the worst case

Measurement Level = Reading Level + Factor, Factor=Ant Factor + Cable Loss- Pre-amplifier.



**1~25 GHz Field Strength of Fundamental & Field Strength of Unwanted Emissions.  
Peak & Average Measurement.**

EUT:	Flying saucer series	Model Name :	100
Temperature:	25 °C	Test Data	2015-07-11
Pressure:	1010 hPa	Relative Humidity:	50%
Test Mode :	TX mode	Test Voltage :	DC 4.5V from battery
Measurement Distance	3 m	Frenqucy Range	1GHz to 25GHz
RBW/VBW	1MHz/1MHz for Peak, 1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.		

**Test at Low Channel in transmitting status**

Peak Measurement:						
Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Antenna polarization
2405.000	85.22	-5.64	79.58	114.00	-34.42	V
4810.000	55.96	5.07	61.03	74.00	-12.97	V
7215.000	43.26	7.07	50.33	74.00	-23.67	V
9620.000	35.26	10.69	45.95	74.00	-28.05	V
2405.000	83.45	-5.64	77.81	114.00	-36.19	H
4810.000	61.44	5.07	66.51	74.00	-7.49	H
7215.000	41.62	7.07	48.69	74.00	-25.31	H
9620.000	32.62	10.69	43.31	74.00	-30.69	H
Average Measurement:						
Frequency (MHz)	20log (Duty cycle) (dB)	Peak Level (dBμV)	Average Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2405.000	-32.15	79.58	47.43	94.00	-46.57	V
4810.000		61.03	28.88	54.00	-25.12	V
7215.000		50.33	18.18	54.00	-35.82	V
9620.000		45.95	13.80	54.00	-40.20	V
2405.000		77.81	45.66	94.00	-48.34	H
4810.000		66.51	34.36	54.00	-19.64	H
7215.000		48.69	16.54	54.00	-37.46	H
9620.000		43.31	11.16	54.00	-42.84	H

**Band Edge:**

Peak Measurement:						
Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Antenna polarization
2400.00	50.83	-5.79	45.04	74.00	-28.96	V
2483.50	41.06	-4.98	36.08	74.00	-37.92	V
2400.00	46.94	-5.79	41.15	74.00	-32.85	H
2483.50	40.76	-4.98	35.78	74.00	-38.22	H
Average Measurement:						
Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Antenna polarization
2400.00	41.65	-5.79	35.86	54.00	-18.14	V
2483.50	30.43	-4.98	25.45	54.00	-28.55	V
2400.00	35.18	-5.79	29.39	54.00	-24.61	H
2483.50	29.64	-4.98	24.66	54.00	-29.34	H


**Test at middle Channel in transmitting status**

Peak Measurement:						
Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Antenna polarization
2425.000	81.98	-5.05	76.93	114.00	-37.07	V
4850.000	56.08	5.11	61.19	74.00	-12.81	V
7275.000	40.68	7.33	48.01	74.00	-25.99	V
9700.000	31.55	11.07	42.62	74.00	-31.38	V
2425.000	82.74	-5.05	77.69	114.00	-36.31	H
4850.000	57.21	5.11	62.32	74.00	-11.68	H
7275.000	41.41	7.33	48.74	74.00	-25.26	H
9700.000	31.08	11.07	42.15	74.00	-31.85	H
Average Measurement:						
Frequency (MHz)	20log (Duty cycle) (dB)	Peak Level (dB $\mu$ V)	Average Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna polarization
2425.000	-32.15	76.93	44.78	94.00	-49.22	V
4850.000		61.19	29.04	54.00	-24.96	V
7275.000		48.01	15.86	54.00	-38.14	V
9700.000		42.62	10.47	54.00	-43.53	V
2425.000		77.69	45.54	94.00	-48.46	H
4850.000		62.32	30.17	54.00	-23.83	H
7275.000		48.74	16.59	54.00	-37.41	H
9700.000		42.15	10.00	54.00	-44.00	H

**Band Edge:**

<b>Peak Measurement:</b>						
<b>Frequency (MHz)</b>	<b>Reading Level (dB<math>\mu</math>V)</b>	<b>Factor (dB)</b>	<b>Emission Level (dB<math>\mu</math>V/m)</b>	<b>Limits (dB<math>\mu</math>V/m)</b>	<b>Margin (dB)</b>	<b>Antenna polarization</b>
2400.00	42.34	-5.79	36.55	74.00	-37.45	V
2483.50	41.34	-4.98	36.36	74.00	-37.64	V
2400.00	42.99	-5.79	37.20	74.00	-36.80	H
2483.50	42.31	-4.98	37.33	74.00	-36.67	H
<b>Average Measurement:</b>						
<b>Frequency (MHz)</b>	<b>Reading Level (dB<math>\mu</math>V)</b>	<b>Factor (dB)</b>	<b>Emission Level (dB<math>\mu</math>V/m)</b>	<b>Limits (dB<math>\mu</math>V/m)</b>	<b>Margin (dB)</b>	<b>Antenna polarization</b>
2400.00	30.82	-5.79	25.03	54.00	-28.97	V
2483.50	30.49	-4.98	25.51	54.00	-28.49	V
2400.00	30.08	-5.79	24.29	54.00	-29.71	H
2483.50	30.66	-4.98	25.68	54.00	-28.32	H

**Test at High Channel in transmitting status**

<b>Peak Measurement:</b>						
<b>Frequency (MHz)</b>	<b>Reading Level (dB<math>\mu</math>V)</b>	<b>Factor (dB)</b>	<b>Emission Level (dB<math>\mu</math>V/m)</b>	<b>Limits (dB<math>\mu</math>V/m)</b>	<b>Margin (dB)</b>	<b>Antenna polarization</b>
2445.000	82.00	-5.32	76.68	114.00	-37.32	V
4890.000	56.28	5.13	61.41	74.00	-12.59	V
7335.000	42.38	7.47	49.85	74.00	-24.15	V
9780.000	30.89	11.27	42.16	74.00	-31.84	V
2445.000	83.00	-5.32	77.68	114.00	-36.32	H
4890.000	59.64	5.13	64.77	74.00	-9.23	H
7335.000	42.13	7.47	49.60	74.00	-24.40	H
9780.000	31.04	11.27	42.31	74.00	-31.69	H
<b>Average Measurement:</b>						
<b>Frequency (MHz)</b>	<b>20log (Duty cycle) (dB)</b>	<b>Peak Level (dB<math>\mu</math>V)</b>	<b>Average Level (dB<math>\mu</math>V/m)</b>	<b>Limit (dB<math>\mu</math>V/m)</b>	<b>Margin (dB)</b>	<b>Antenna polarization</b>
2445.000	-32.15	76.68	44.53	94.00	-49.47	V
4890.000		61.41	29.26	54.00	-24.74	V
7335.000		49.85	17.70	54.00	-36.30	V
9780.000		42.16	10.01	54.00	-43.99	V
2445.000		77.68	45.53	94.00	-48.47	H
4890.000		64.77	32.62	54.00	-21.38	H
7335.000		49.6	17.45	54.00	-36.55	H
9780.000		42.31	10.16	54.00	-43.84	H

**Band Edge:**

Peak Measurement:						
Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Antenna polarization
2400.00	41.05	-5.79	35.26	74.00	-38.74	V
2483.50	40.60	-4.98	35.62	74.00	-38.38	V
2400.00	42.05	-5.79	36.26	74.00	-37.74	H
2483.50	41.60	-4.98	36.62	74.00	-37.38	H
Average Measurement:						
Frequency (MHz)	Reading Level (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Antenna polarization
2400.00	30.32	-5.79	24.53	54.00	-29.47	V
2483.50	30.08	-4.98	25.10	54.00	-28.90	V
2400.00	31.01	-5.79	25.22	54.00	-28.78	H
2483.50	30.84	-4.98	25.86	54.00	-28.14	H

## Remark:

1). The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Loss – Preamplifier Factor.

2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

4). For Radiated Emissions fall in the restricted bands (2400MHz is worse case than 2390MHz and report it as above), which set out in Section 15.205 Restricted bands.

Also there is not any other emission which falls in restricted bands can be detected and reported.

**Test result: The unit does meet the FCC requirements.**



## 7.3 Occupied Bandwidth

Test Requirement: FCC Part 15 C section 15.215

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Test Method: ANSI C63.10: Clause 6.9.1

Operation within the band 2405 MHz to 2445 MHz

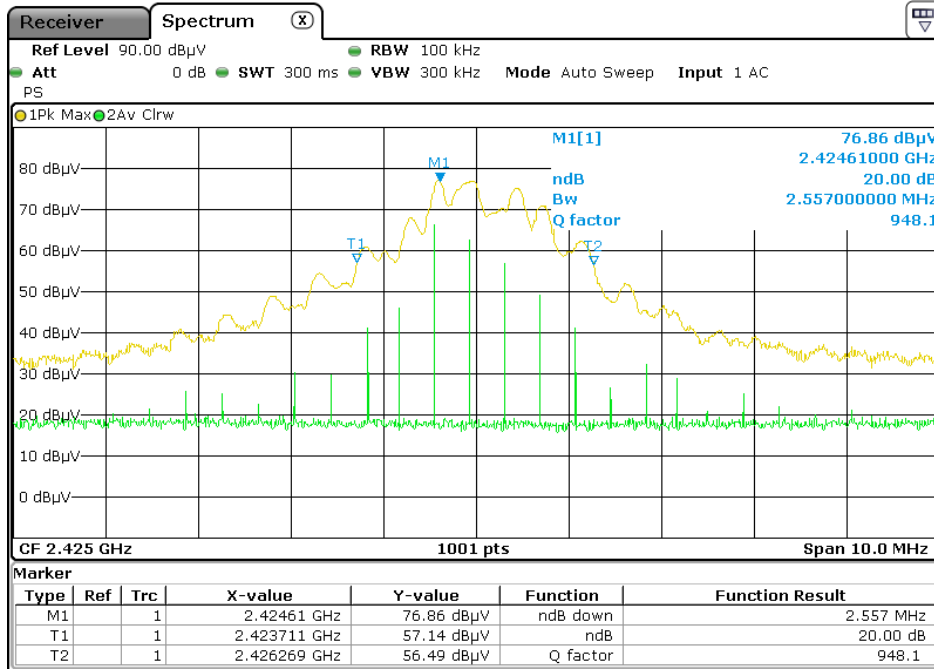
Method of measurement: A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken.

### Test in the frequency 2405MHz (20 dB bandwidth)

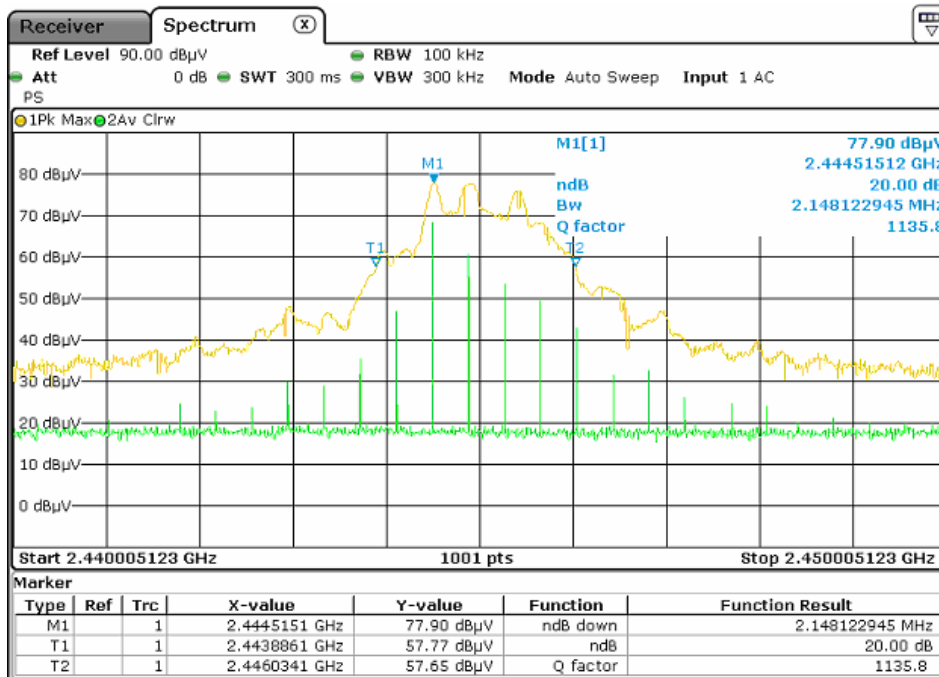




## Test in the frequency 2425MHz (20 dB bandwidth)



## Test in the frequency 2445MHz (20 dB bandwidth)





## 7.4 Conducted Emissions at Mains Terminals 150 kHz to 30 MHz

**Test Requirement:** FCC Part 15 C section 15.207  
**Test Method:** ANSI C63.10: Clause 6.2  
**Frequency Range:** 150 kHz to 30 MHz  
**Detector:** Peak for pre-scan (9 kHz Resolution Bandwidth)  
**Test Limit**

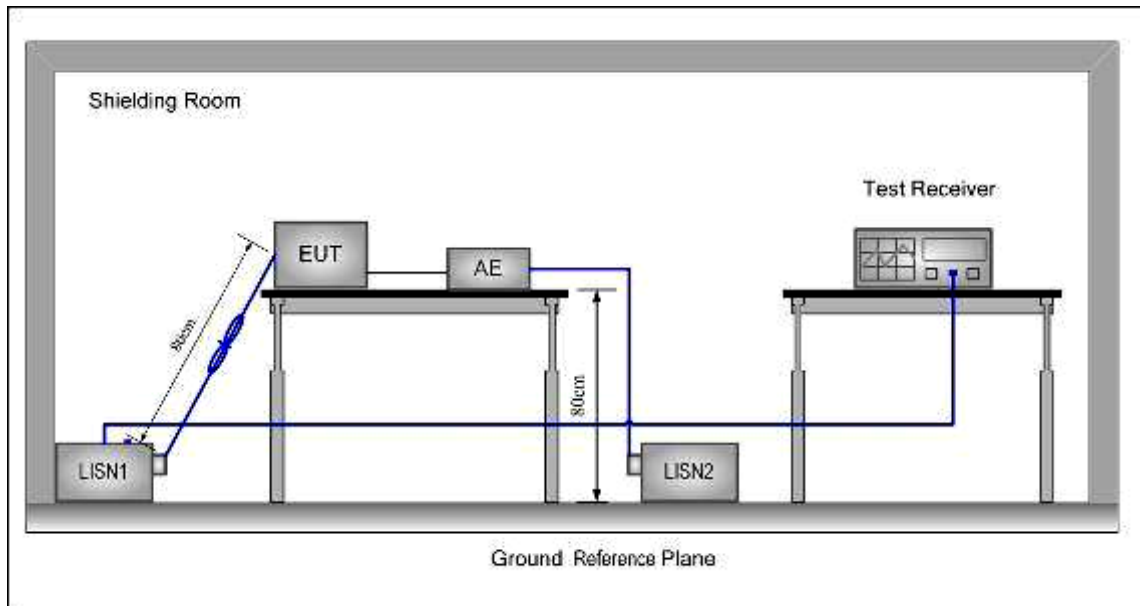
**Limits for conducted disturbance at the mains ports of class B**

Frequency Range (MHz)	Class B Limit dB(μV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
NOTE 1 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

**EUT Operation:** Test in normal operating mode. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

### Test Configuration:



### Test procedure:

1. The mains terminal disturbance voltage test was conducted in a shielded room.
2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a  $50\Omega/50\mu\text{H} + 5\Omega$  linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

### 7.2.3 Measurement Data

Remark: Because the EUT employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Measurements to demonstrate compliance with the conducted limits are not required for devices.

## 8 Photographs

### 8.1 Radiated Emission Test Setup

Below 1G



Above 1G

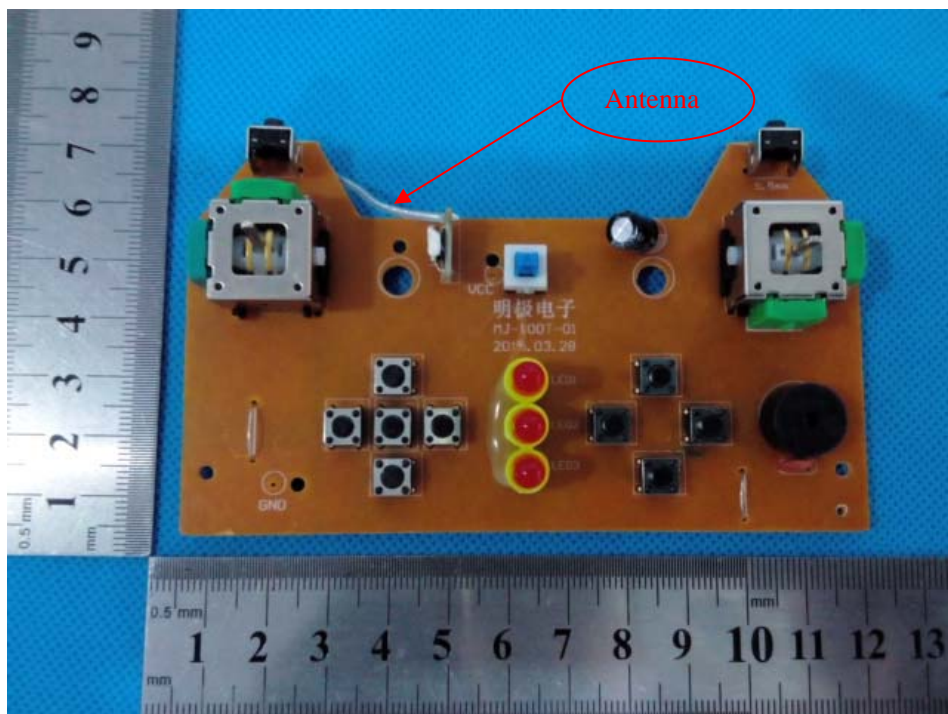


## 8.2 EUT Constructional Details

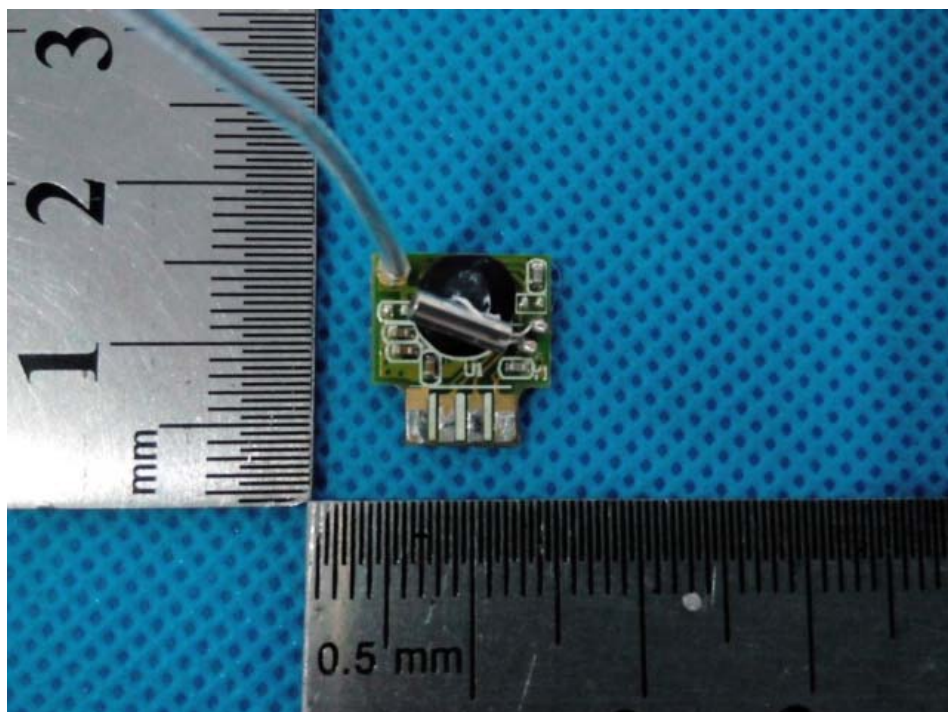
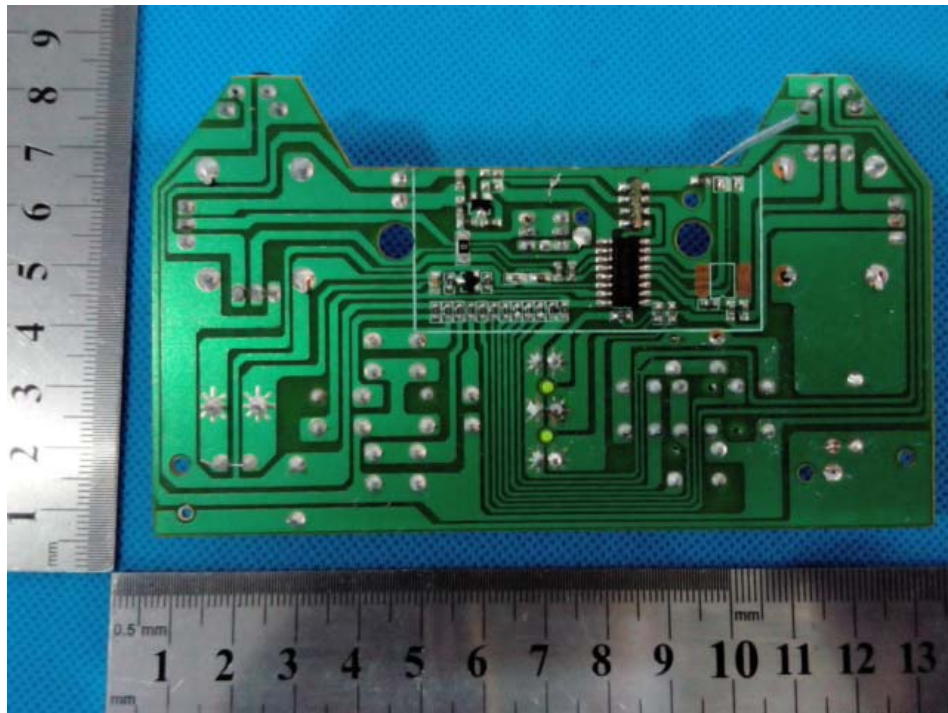


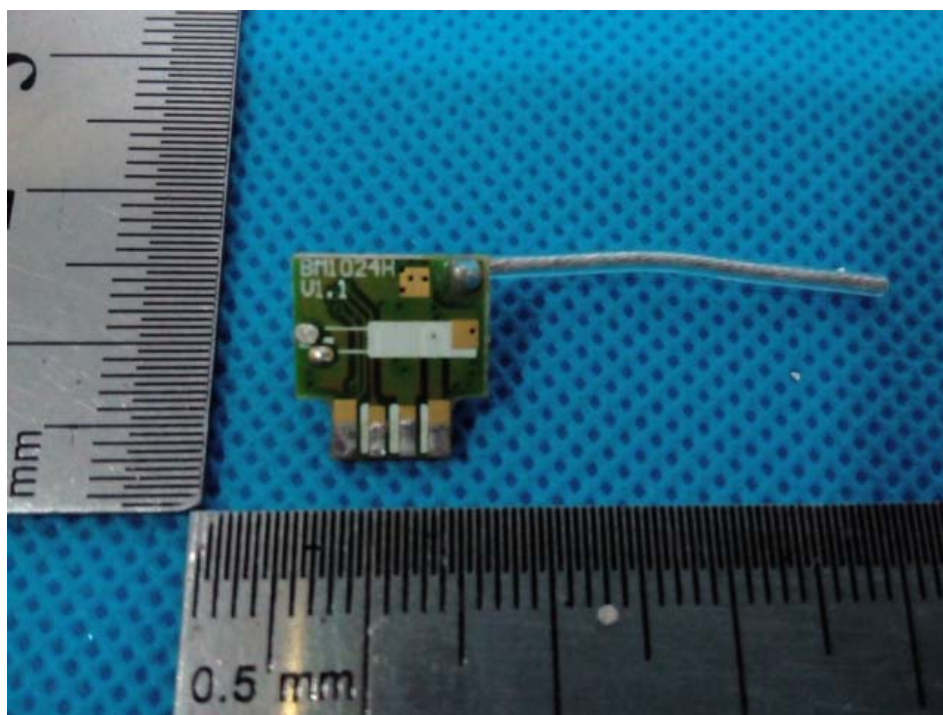












**\*\*End of report\*\***