FCC ID TEST REPORT

for

Air mouse

Model: AM-100

FCC ID: 2AACAAM-100

Prepared for: Syabas Technology HongKong Limited
Unit 316A of the 3rd floor, Enterprise Place, Phase One Hong Kong Science Park Pak ShekKok, Tai Po, New Territories, Hong Kong

Prepared by: Shenzhen TCT Testing Technology Co.,Ltd
1F, Building 1, Yibaolai Industrial Park, Qiaotou Village, Fuyong Town, Baoan District, Shenzhen, Guangdong, China

TEL: +86-0755-27673339
FAX: +86-0755-27673332

Report Number：TCT141103E019
Date of Test： November 07~ November 26, 2014
Date of Report：November 27, 2014

Table of Contents

1.0 General Details

1.1 Test Lab Details

Name :	Shenzhen Tongce Testing Lab
Address:	1F, Leinuo Watch Building, Fuyong Town, Baoan Dist, Shenzhen, China
Telephone:	13410377511
Fax:	--

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

FCC Registration Number: 572331

Shenzhen TCT Testing Technology Co., Ltd., Shenzhen EMC Laboratory: Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

Registration Number: 572331

Industry Canada (IC)

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

Registration Number IC: 10668A-1

1.2 Applicant Details

Applicant:	Syabas Technology HongKong Limited
Address:	Unit 316A of the 3rd floor, Enterprise Place, Phase One Hong Kong Science Park Pak ShekKok, Tai Po, New Territories, Hong Kong
Telephone:	0755-82913735
Fax:	0755-82913735

Manufacturer:	Syabas Technology Shenzhen Limited
Address:	Room 718, 7th Floor,Building 202, Tairan Hi-Tech Garden, Futian District, ShenZhen, China 518040
Telephone:	0755-82913735
Fax:	0755-82913735

1.3 Description of EUT

Product:	Air mouse
Model No.:	AM-100
Additional Model No.:	N.A.
Brand Name:	OpenHour
Rating:	DC 3.7V from Rechargeable lithium battery
Operation Frequency:	2402-2481MHz
Modulation Type:	GFSK
Channel spacing:	1 MHz
Channel number:	75
Antenna Designation:	A PCB antenna, and the maximum antenna gain is 0dBi.

1.4 Statement:

All models above are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement.

1.5 Test Engineer

The sample tested by 

Printed name: Jack Kang

2.0 Test equipments and Associated Equipment used during the test.

2.1 Test Equipments

Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	July 03, 2014	July 02, 2015
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	July 03, 2014	July 02, 2015
Pre-amplifier	Teseq	LAN6900	--	July 02, 2014	July 01, 2015
Pre-amplifier	Agilent	8447D	83153007374	July 02, 2014	July 01, 2015
Pre-amplifier	Agilent	8449B	3008A01738	July 02, 2014	July 01, 2015
Triple-loop antenna	ZHINAN	ZN30900A	--	July 02, 2014	July 01, 2015
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	July 02, 2014	July 01, 2015
Horn Antenna	ETS LINDGREN	3117	--	July 02, 2014	July 01, 2015
Horn Antenna	ETS LINDGREN	3160	--	July 02, 2014	July 01, 2015
Coaxial Cable	TCT	N/A	N/A	July 2, 2014	July 1, 2015
Coaxial Cable	TCT	N/A	N/A	July 2, 2014	July 1, 2015
Coaxial cable	TCT	N/A	N/A	July 2, 2014	July 1, 2015
Coaxial Cable	TCT	N/A	N/A	July 2, 2014	July 1, 2015

2.2 AE used during the test

Equipment type	Manufacturer	Model
N.A.		
N.A.		
N.A.		

3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications

Requirement	CFR 47 Section	Result
Conduction Emission, 0.15MHz to 30MHz	**15.207(a)**	**N.A.**
Radiated Emission Test	**Section 15.209, 15.35 Section 15.249(a)(d)**	**PASS**
Band Edge Test	**15.249(d)**	**PASS**
Occupied Bandwidth	**Section 15.215(c)**	**PASS**
Antenna Requirement	**Section 15.203**	**PASS**

Note: This EUT is power by battery only, the conducted emission is not applicable

3.2 Test Standards

FCC Rules and Regulations Part 15 Subpart C: 2013

4.0 EUT Modification

No modification by Shenzhen TCT Testing Technology Co., Ltd

5.0 Measurement Uncertainty

（95% confidence levels, k=2)

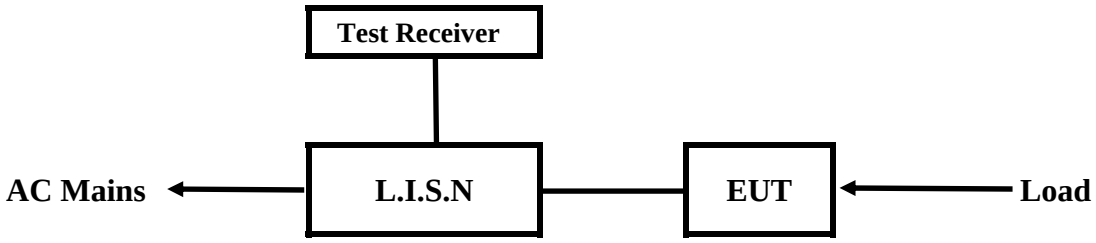
No.	Item	MU
1.	Radio Frequency	$\pm 1\times 10^{-9}$
2.	Temperature	±0.1℃
3.	Humidity	±1.0%
4.	RF power, conducted	±0.34dB
5.	RF power density, conducted	±1.45dB
6.	Spurious emissions, conducted	±3.70dB
7.	All emissions, radiated	±4.50dB

Note: 1) The EUT is a 2.4G RF Air mouse transmitter.

2) Working transmission frequency: 2402-2481MHz, Low channel: 2402MHz, Middle channel: 2441MHz, High channel: 2481MHz

6.0 Power Line Conducted Emission Test

6.1 Schematics of the test



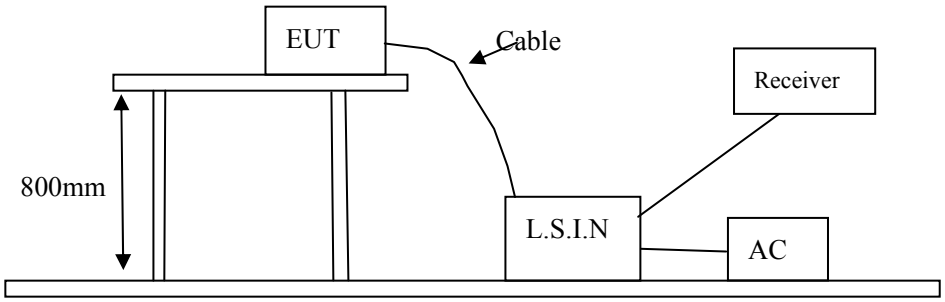
EUT: Equipment Under Test

6.2 Test Method and test Procedure

The EUT was tested according to RSS-Gen Issue 3-2010 The Frequency spectrum From 0.15MHz to 30MHz was investigated.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



6.3 EUT Operating Condition

Operating condition is according to RSS-Gen Issue 3-2010

1) Setup the EUT and simulators as shown on the following

2) Enable AF signal and confirm EUT active to normal condition

6.4 Test Equipment

Please refer to the Section 2

6.5 Conducted Emission Limit

Frequency(MHz)	Class A Limits (dBμV)		Class B Limits (dBμV)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	79.0	66.0	66.0～56.0*	56.0～46.0*
0.50 ～ 5.00	73.0	60.0	56.0	46.0
5.00 ～ 30.00	73.0	60.0	60.0	50.0

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

2）The tighter limit shall apply at the transition frequencies

6.6 Test specification:

Environmental conditions: Temperature: 22° C Humidity: 52% Atmospheric pressure: 103kPa

Frequency range: 0.15 MHz – 30 MHz

The test was carried out in the following operation mode(s):

- --

6.7 Test result

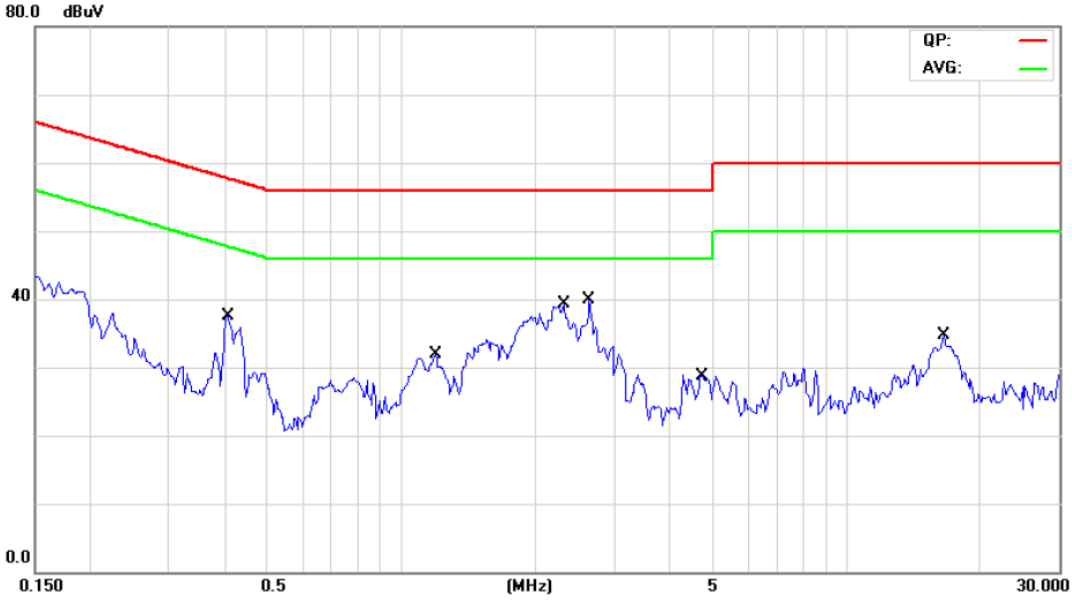
--

The requirements are FULFILLED

Remarks: _____

_____

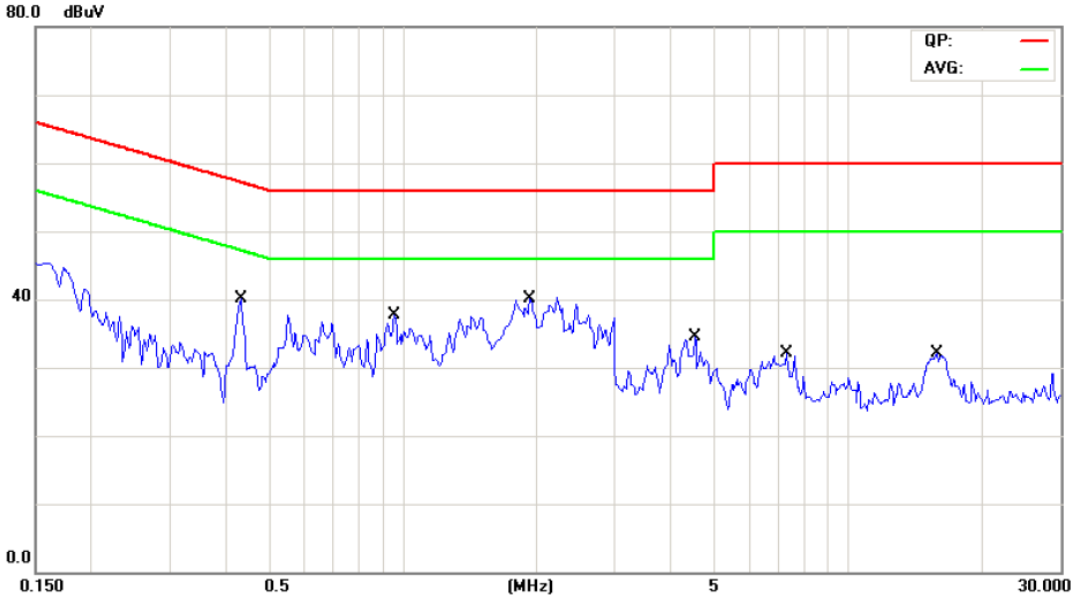
A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)



Site Chamber #1 Phase: L1 Temperature: 23 (C)
Limit: FCC PART15 Conduction(QP) Power: AC 230V/50Hz Humidity: 51 %
EUT: Air mouse
M/N: AM-100
Mode: Operational + Charging
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4078	24.80	11.35	36.15	57.69	-21.54	QP	
2	*	0.4078	23.05	11.35	34.40	47.69	-13.29	AVG	
3		1.1930	16.46	11.27	27.73	56.00	-28.27	QP	
4		1.1930	11.00	11.27	22.27	46.00	-23.73	AVG	
5		2.3102	22.64	11.57	34.21	56.00	-21.79	QP	
6		2.3102	17.52	11.57	29.09	46.00	-16.91	AVG	
7		2.6422	21.69	11.44	33.13	56.00	-22.87	QP	
8		2.6422	13.29	11.44	24.73	46.00	-21.27	AVG	
9		4.7461	12.84	10.70	23.54	56.00	-32.46	QP	
10		4.7461	9.07	10.70	19.77	46.00	-26.23	AVG	
11		16.5117	19.77	11.31	31.08	60.00	-28.92	QP	
12		16.5117	14.80	11.31	26.11	50.00	-23.89	AVG	

B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)



Site Chamber #1 Phase: *N* Temperature: 23 (C)
Limit: FCC PART15 Conduction(QP) Power: AC 230V/50Hz Humidity: 51 %
EUT: Air mouse
M/N: AM-100
Mode: Operational + Charging
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4352	27.45	11.34	38.79	57.15	-18.36	QP	
2	*	0.4352	25.54	11.34	36.88	47.15	-10.27	AVG	
3		0.9625	20.46	11.18	31.64	56.00	-24.36	QP	
4		0.9625	15.52	11.18	26.70	46.00	-19.30	AVG	
5		1.9352	20.98	11.65	32.63	56.00	-23.37	QP	
6		1.9352	16.74	11.65	28.39	46.00	-17.61	AVG	
7		4.5469	11.57	10.79	22.36	56.00	-33.64	QP	
8		4.5469	6.32	10.79	17.11	46.00	-28.89	AVG	
9		7.2734	14.36	10.97	25.33	60.00	-34.67	QP	
10		7.2734	9.12	10.97	20.09	50.00	-29.91	AVG	
11		15.8633	15.62	11.47	27.09	60.00	-32.91	QP	
12		15.8633	11.09	11.47	22.56	50.00	-27.44	AVG	

7.0 Radiated Emission Test

7.1 Test Method and test Procedure:

1) The EUT was tested according to ANSI C63.10 –2009

2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10 –2009.

3) The frequency spectrum from 9 kHz to 25GHz was investigated. All readings from 9kHz to 30MHz are quasi-peak values with a resolution bandwidth of 9 kHz, measured with loop antenna.

All readings from 30MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz, measured with Bi-log antenna.

All readings above 1 GHz are peak values with a resolution bandwidth of 1 MHz, measured with horn antenna.

4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for above 30MHz each frequency .

The antenna high is 1 m to find the maximum emission for each frequency below 30MHz

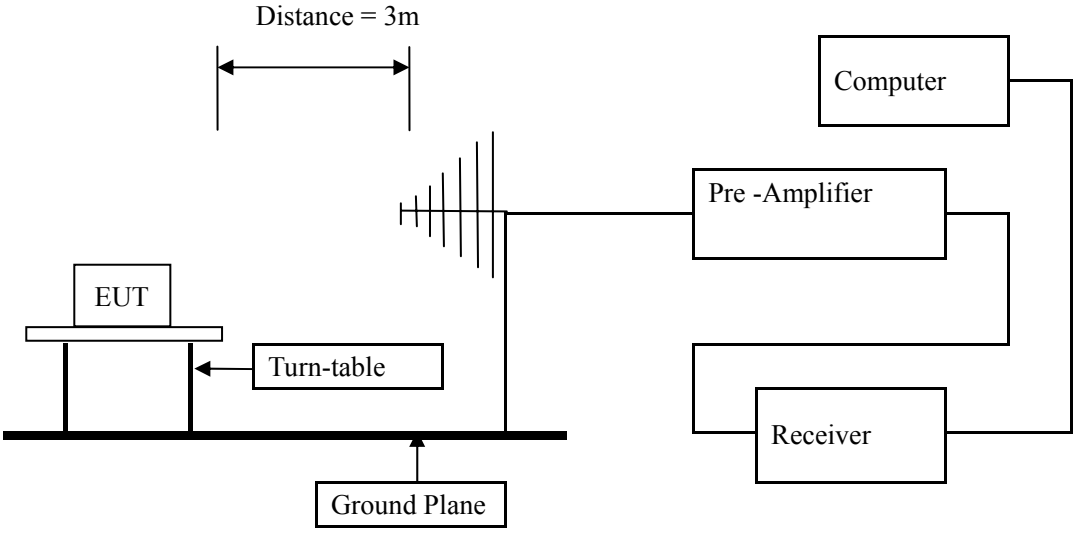
5) Tested distance: 3 meters

6) The antenna polarization: Vertical polarization and Horizontal polarization.

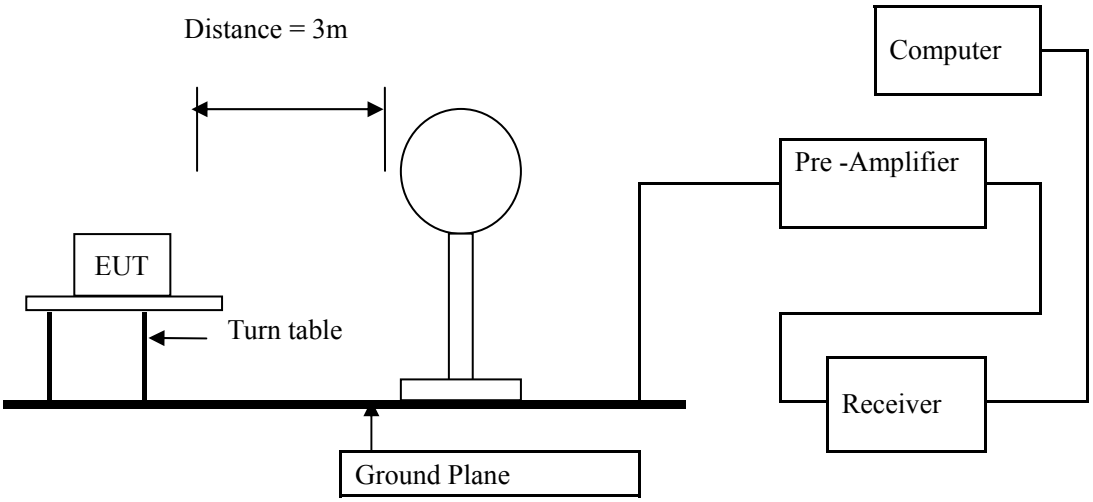
7) Each azimuth of E.U.T will be tested.

7.2 Block diagram of Test setup

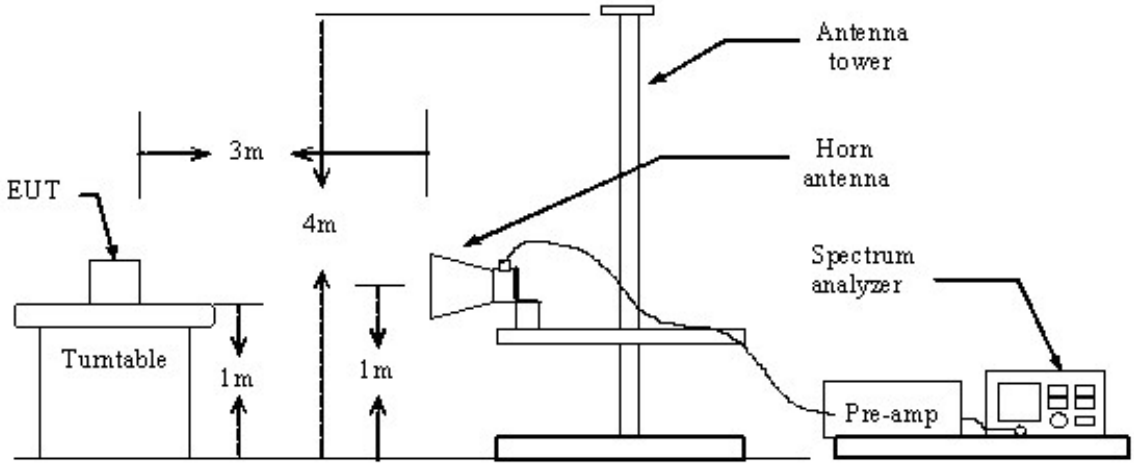
Block diagram of Test setup for frequency 30-1000MHz



Block diagram of Test setup for frequency below 30MHz



Block diagram of Test setup for frequency above 1GHz



7.3 Limit

According to 15.249(a) requirements:

Fundamental Frequency (MHz)	Filed Strength of(mi11ivolts/meter)	
	Fundamental	Harmonics
902-928	50	0.5
2400-2483.5	50	0.5
5725-5875	50	0.5
24000-24250	250	2.5

For this E.U.T

Fundamental Frequency (MHz)	Field Strength of Fundamental (3m)			Field Strength of Harmonics (3m)		
	mV/m	**dBuV/m**		**mV/m**	**dBuV/m**	
2400-2483.5	50	94 (Average)	114 (Peak)	0.5	54 (Average)	74 (Peak)

Note: 1) RF Field Strength (dBuV) = 20 log RF Voltage (uV)

2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3) The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

According to 15.249(d) requirements: 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 § 15.209, whichever is the lesser attenuation.

Frequencies in restricted band are complied to limit

Frequency Range (MHz)	Distance (m)	Field strength (dBμV/m)
0.009-0.490	3	20log 2400/F (kHz) + 80
0.490-1.705	3	20log 24000/F (kHz) + 40
1.705-30	3	20log 30 + 40
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1) RF Voltage (dBuV) = 20 log RF Voltage (uV)

2) In the Above Table, the tighter limit applies at the band edges.

3) Distance refers to the distance in meters between the measuring instrument antenna and the EUT

4)The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

5) If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula Ld1 = Ld2 * (d2/d1)

7.4 Test Equipment

Please refer to the Section 2

7.5 Test specification:

Environmental conditions: Temperature 23° C Humidity: 50% Atmospheric pressure: 103kPa

7.6 Test result

Result: Pass

A Radiated Emission (9 kHz----30 MHz)

Note: 1) Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2) The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Result: Pass

Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
--	--	--
--	--	--
--	--	--
--	--	--

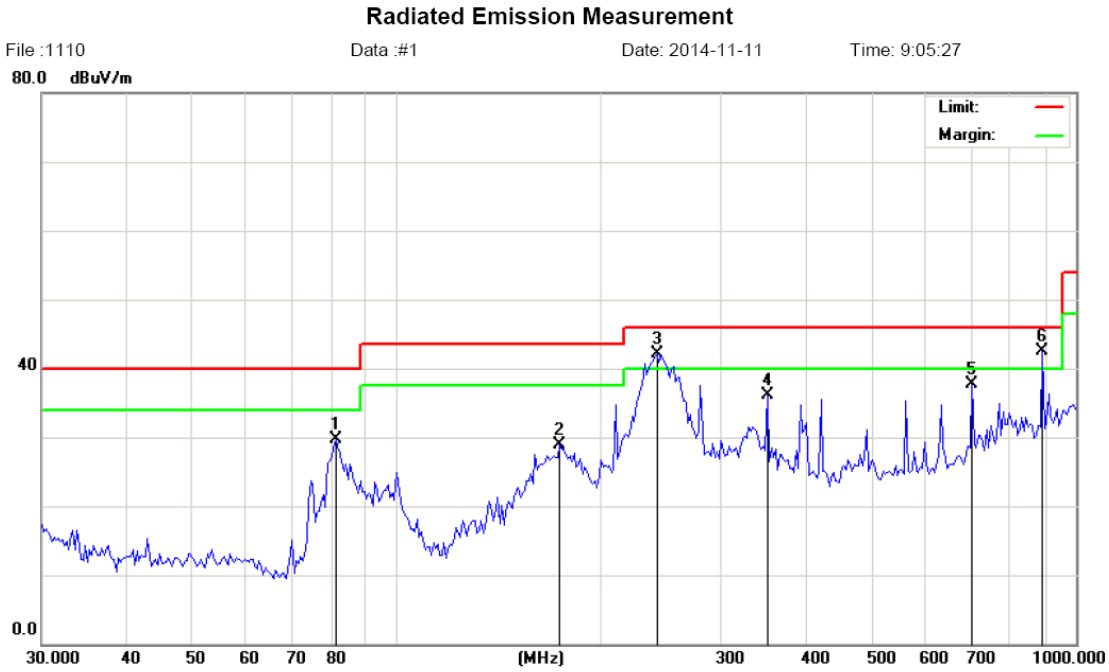
B General Radiated Emissions Data

Radiated Emission (30MHz----1000MHz)

In Horizontal

Please refer to following diagram for individual

Low channel: 2402 MHz



Site

Limit: FCC PART15 3M Radiation

EUT: Air mouse

M/N:

Mode: AM-100

Note:

Polarization: *Horizontal*

Power: AC 110V/60Hz

Distance:

Temperature: 23

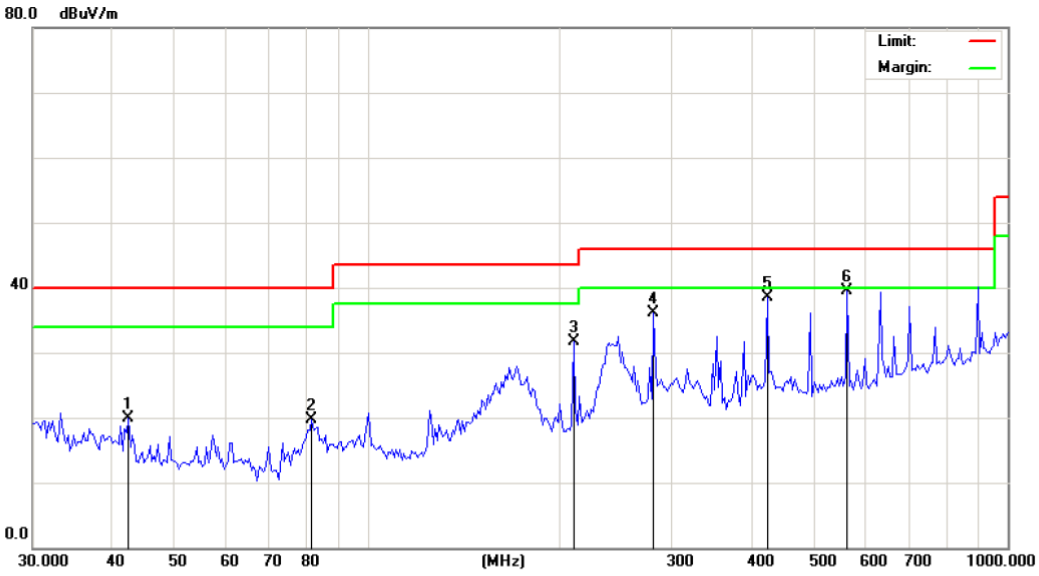
Humidity: 52 %

No.	Mk.	Freq	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	
1		81.3740	45.55	-15.87	29.68	40.00	-10.32	peak		0	
2		173.8146	42.32	-13.50	28.82	43.50	-14.68	peak		0	
3	!	241.8377	52.43	-10.24	42.19	46.00	-3.81	peak		0	
4		350.9722	43.32	-7.20	36.12	46.00	-9.88	peak		0	
5		703.7314	37.46	0.19	37.65	46.00	-8.35	peak		0	
6	*	893.6557	39.87	2.60	42.47	46.00	-3.53	peak		0	

In Vertical

Please refer to following diagram for individual

Low channel: 2402 MHz



Site

Limit: FCC PART15 3M Radiation

EUT: Air mouse

M/N: 1

Mode: AM-100

Note:

Polarization: *Vertical*

Power: AC 110V/60Hz

Distance:

Temperature: 23

Humidity: 52 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		42.3314	32.23	-12.37	19.86	40.00	-20.14	peak		0	
2		81.9477	35.38	-15.69	19.69	40.00	-20.31	peak		0	
3		210.1294	43.04	-11.33	31.71	43.50	-11.79	peak		0	
4		280.2936	44.98	-8.93	36.05	46.00	-9.95	peak		0	
5		421.3287	44.03	-5.50	38.53	46.00	-7.47	peak		0	
6	*	562.0143	41.88	-2.33	39.55	46.00	-6.45	peak		0	

Note: Measurements were conducted in all channels (high, middle, low), and the worst case (low channel) was submitted only.

C Fundamental & Harmonics and Spurious Radiated Emission Data (1000MHz-25000MHz)

Low channel: 2402 MHz				
Frequency (MHz)	**Emission PK/AV (dBuV/m)**	**Horizontal / Vertical**	**Limits PK/AV (dBuV/m)**	**Margin (dB)**
2402	70.68(PK)	H	114/94	23.32
2402	72.45(PK)	V	114/94	21.55
4804	38.62(PK)	H	74/54	15.38
4804	37.65(PK)	V	74/54	16.35
16814	45.23(PK)	H	74/54	8.77
16814	43.21(PK)	V	74/54	10.79

Middle channel: 2441 MHz				
Frequency (MHz)	**Emission PK/AV (dBuV/m)**	**Horizontal / Vertical**	**Limits PK/AV (dBuV/m)**	**Margin (dB)**
2441	69.32(PK)	H	114/94	-24.68
2441	73.54(PK)	V	114/94	-20.46
4882	32.72(PK)	H	74/54	-21.28
4882	38.89(PK)	V	74/54	-15.11
17087	41.32(PK)	H	74/54	-12.68
17087	42.89(PK)	V	74/54	-11.11

High channel: 2481 MHz				
Frequency (MHz)	**Emission PK/AV (dBuV/m)**	**Horizontal/ Vertical**	**Limits PK/AV (dBuV/m)**	**Margin (dB)**
2481	72.25(PK)	H	114/94	21.75
2481	70.34(PK)	V	114/94	23.66
4962	45.12(PK)	H	74/54	8.88
4962	45.35(PK)	V	74/54	8.65
17367	34.35(PK)	H	74/54	19.65
17367	34.71(PK)	V	74/54	19.29

Note: 1) PK= Peak, AV= Average

2) Emission Level = Reading Level + Antenna Factor + Cable Loss.

3) Margin= Limit(AV) – Emission Level

4) If the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

5) The other emission levels are too small, which are not reported. It is deemed to comply with the requirement of the rule.

8. Band Edge

8.1 Band Edge Limit

1) According to 15.249(d) requirements: 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 § 15.209, whichever is the lesser attenuation.

2) For Emissions in Restricted band, the limit is below the general radiated emission limits in 15.209

8.2 Test Equipment

Please refer to the Section 2

8.3 Test Result

Pass

Low channel

Frequency (MHz)	Level@3m (dBμV/m)	Detector	Limit@3m (dBμV/m)	Polarization
2400	27.75	Peak	74.00	H
2400	29.34	Peak	74.00	V

High channel

Frequency (MHz)	Level@3m (dBμV/m)	Detector	Limit@3m (dBμV/m)	Polarization
2483.5	26.34	Peak	74.00	H
2483.5	28.10	Peak	74.00	V

9.0 Occupied Bandwidth

9.1 Test Equipment

Please refer to the Section 2

9.2 Test Specification:

Environmental conditions: Temperature 22° C Humidity: 50% Atmospheric pressure: 103kPa

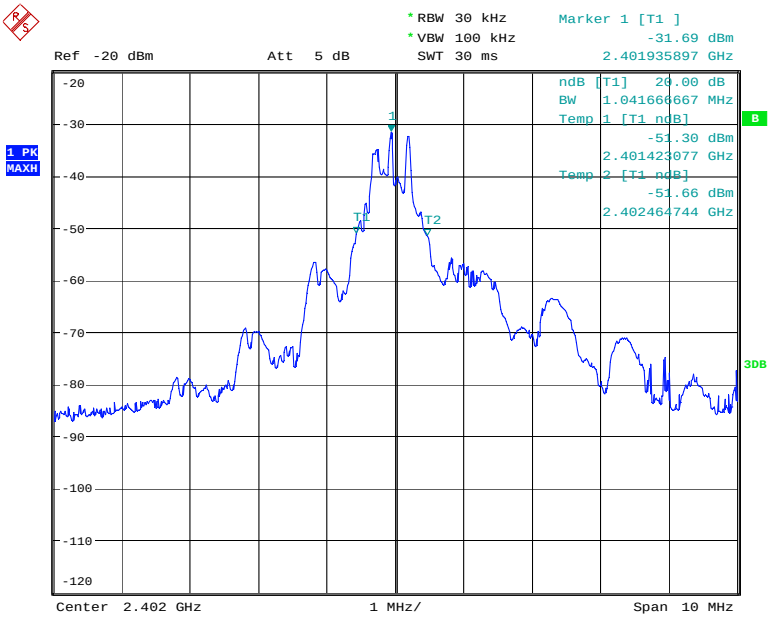
9.3 Limit

According to 15.215(c),20dB Bandwidth should be test

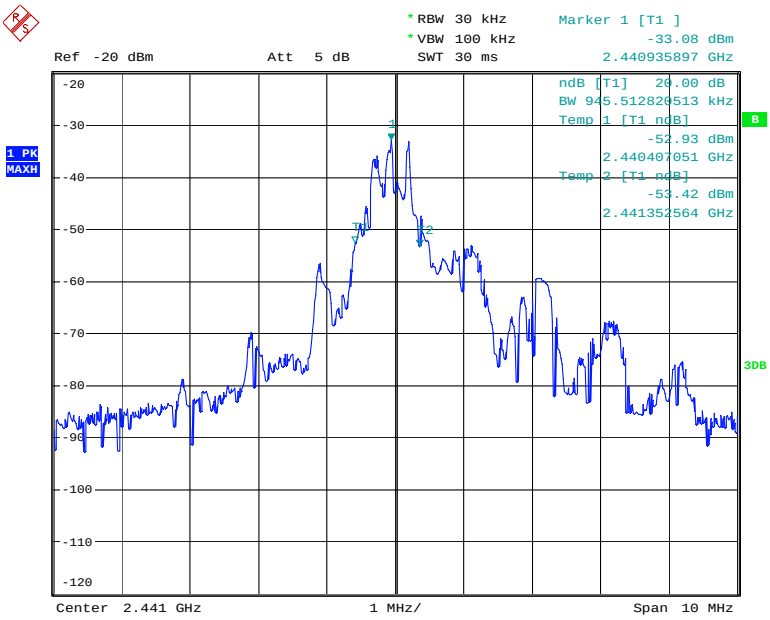
9.4 Test Result:

Channel	20dB Bandwidth (kHz)	Limit (kHz)	Conclusion
Low	1042	--	PASS
Middle	945.5	--	PASS
High	1090	--	PASS

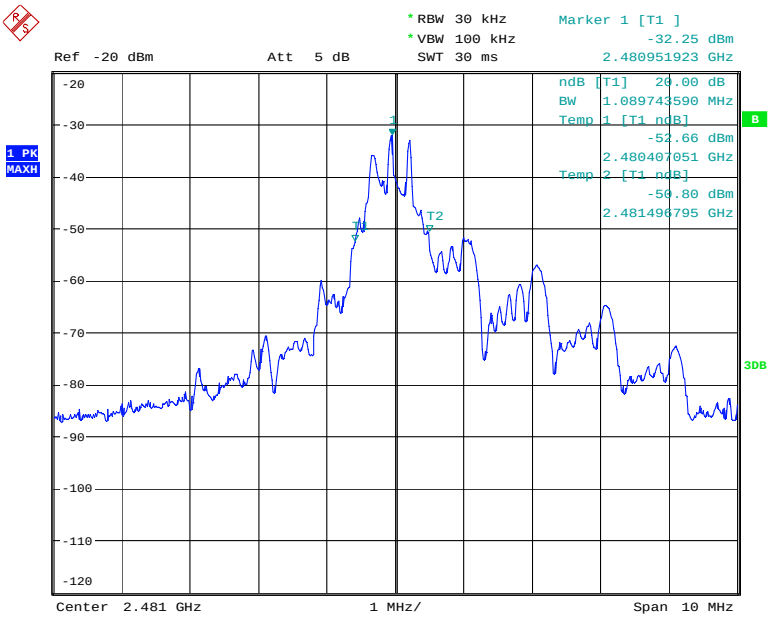
Test Data as follows:



Low CH



Middle CH



High CH

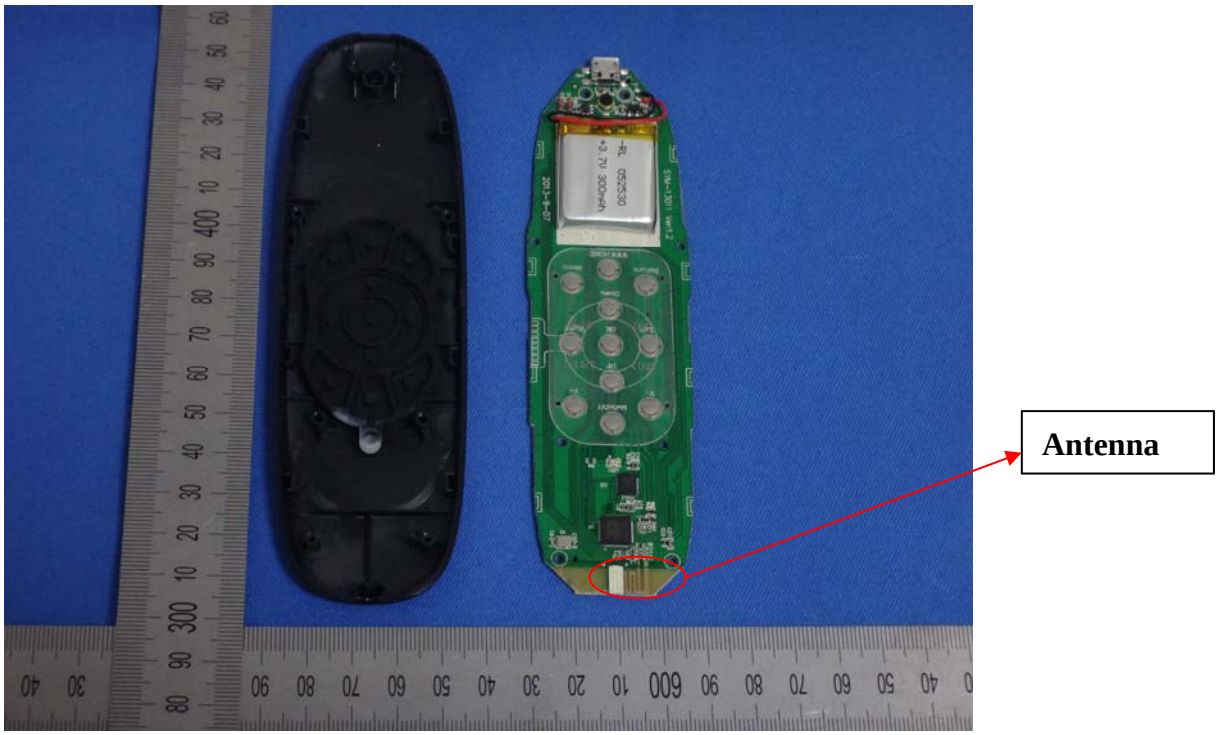
10.0 Antenna Requirement

10.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

10.2 Antenna Specification

According to the manufacturer declared, PCB antennas; the maximum gain of antennas is 0 dBi. and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.



--End of the report--