

# ***FCC TEST REPORT***

**FCC ID** : WU9E-DBM01

**Applicant** : E-TECS LIMITED

**Address of Applicant** : Suites 2410-11, 24/F., Shell Tower, Times Square,  
1 Matheson Street Causeway Bay, Hong Kong

**Equipment Under Test (EUT) :**


Product description : Baby Monitor

Model No. : E-DBMPEG4-25

**Standards** : FCC 15 Paragraph 15.247

**Date of Test** : Nov. 17, 2008

**Test Engineer** : Olic huang

**Reviewed By** : 

PERPARED BY:

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### 3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 25GHz)	FCC PART 15: 2003	ANSI C63.4: 2003	N/A	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	PASS

## **4 General Information**

### **4.1 Client Information**

Applicant: E-TECS LIMITED  
Address of Applicant: Suites 2410-11, 24/F., Shell Tower, Times Square,  
1 Matheson Street Causeway Bay, Hong Kong

Manufacturer: SHENZHEN ORIENTAL E-TECS LIMITED  
Address of Manufacturer: 2nd Floor, No.2 Building, Chita Industrial Park, West Longping  
Road, Longgang District, Shenzhen

### **4.2 General Description of E.U.T.**

Product description: Baby Monitor  
Model No.: E-DBMPEG4-25

### **4.3 Details of E.U.T.**

Power Supply: Battery 3.7V,  
Adapter Input AC 100~240V, 50/60Hz  
Output DC 5.0V, 1.5A

### **4.4 Description of Support Units**

The EUT has been tested as an independent unit.

### **4.5 Standards Applicable for Testing**

The customer requested FCC tests for a Baby Monitor. The standards used were FCC 15 Paragraph 15.247, Paragraph 15.205, Paragraph 15.207, Paragraph 15.209, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

#### **4.6 Test Facility**

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

- **FCC – Registration No.: 880581**

Waltek Services(Shenzhen) 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 880581, June 24, 2008.

- **IC – Registration No.: 7760**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration IC7760, July 24, 2008.

#### **4.7 Test Location**

All Emissions tests were performed at:-

1/F, Fukangtai Building, West Baima Rd., Songgang Street, Baoan District, Shenzhen 518105, Guangdong, China.

## 5 Equipment Used during Test

Equipment	Brand Name	Model	Related standards	Cal.Intal Months	Last Cal. Date	Serial No
<b>3m Semi-anechoic chamber</b>						
EMC Analyzer	Agilent	E7405A	ISO9001:2000	12	Jan-08	MY4511494 3
Trilog Broadband Antenne 30-3000 MHz	SCHWARZB ECK MESS- ELEKTROM	VULB9163	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	336
Broad-band Horn Antenna	SCHWARZB ECK MESS- ELEKTROM	BBHA 9120 D	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	667
Broadband Preamplifier	SCHWARZB ECK MESS- ELEKTROM	BBV 9718	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	9718-148
10m Coaxial Cable with N-male Connectors usable	SCHWARZB ECK MESS- ELEKTROM	AK 9515 H	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	-
10m 50 Ohm Coaxial Cable with N- plug, individual length, usable up to 3(5)GHz, Connectors	SCHWARZB ECK MESS- ELEKTROM	AK 9513	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	-
Positioning Controller	C&C LAB	CC-C-IF	ISO9001	12	Jan-08	MF7802108
Color Monitor	SUNSPO	SP-14C	ISO9001	12	Jan-08	-
<b>EMI Shielded Room</b>						
Test Receiver	ROHDE&SC HWARZ	ESPI	ISO9001	12	Jan-08	101155
Two-Line V-Network	ROHDE&SC HWARZ	ENV216	ISO9001 EN/ISO/IEC 17025	12	Jan-08	100115
Absorbing Clamp	ROHDE&SC HWARZ	MDS-21	ISO9001 EN/ISO/IEC 17025	12	Jan-08	100205

10m 50 Ohm Coaxial Cable with N- plug,individual length,usable up to 3(5)GHz, Connectors	SCHWARZB ECK MESS- ELEKTROM	AK 9514	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	-
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## 6 Conducted Emission Test

Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	Nov. 17, 2008
Frequency Range:	150kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

### 6.1 Test Equipment

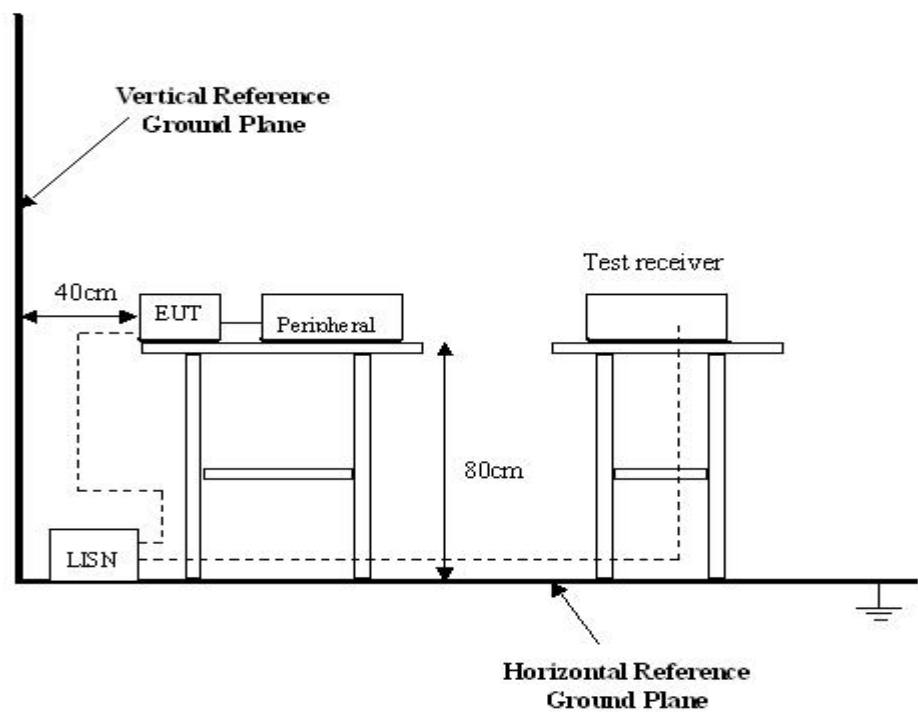
Please refer to Section 5 this report.

### 6.2 Test Procedure

1. The EUT was connected with signal generator and placed on a table.
2. The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.
3. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.3 Conducted Test Setup

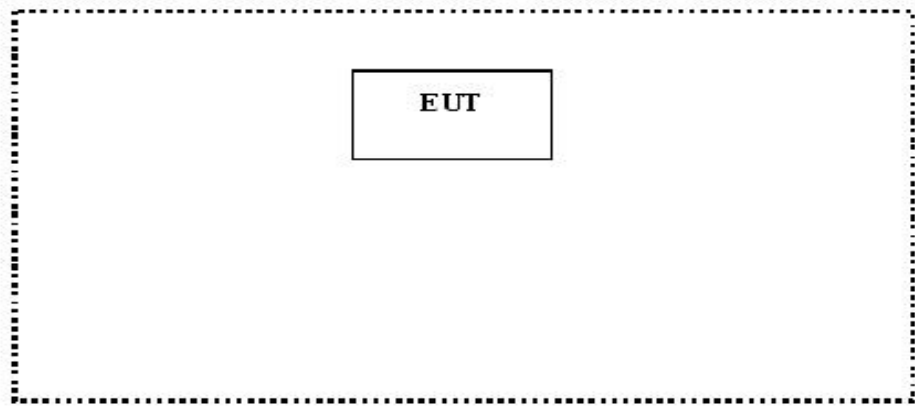
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



6.4 EUT Operating Condition

Operating condition is according to ANSI C63.4:2003.

- A. Setup the EUT and simulators as shown on follow.
- B. Enable RF signal and confirm EUT active.
- C. Modulate output capacity of EUT up to specification.



## **6.5 Conducted Emission Limits**

66-56 dB $\mu$ V between 0.15MHz & 0.5MHz

56 dB $\mu$ V between 0.5MHz & 5MHz

60 dB $\mu$ V between 5MHz & 30MHz

**Note:** In the above limits, the tighter limit applies at the band edges.

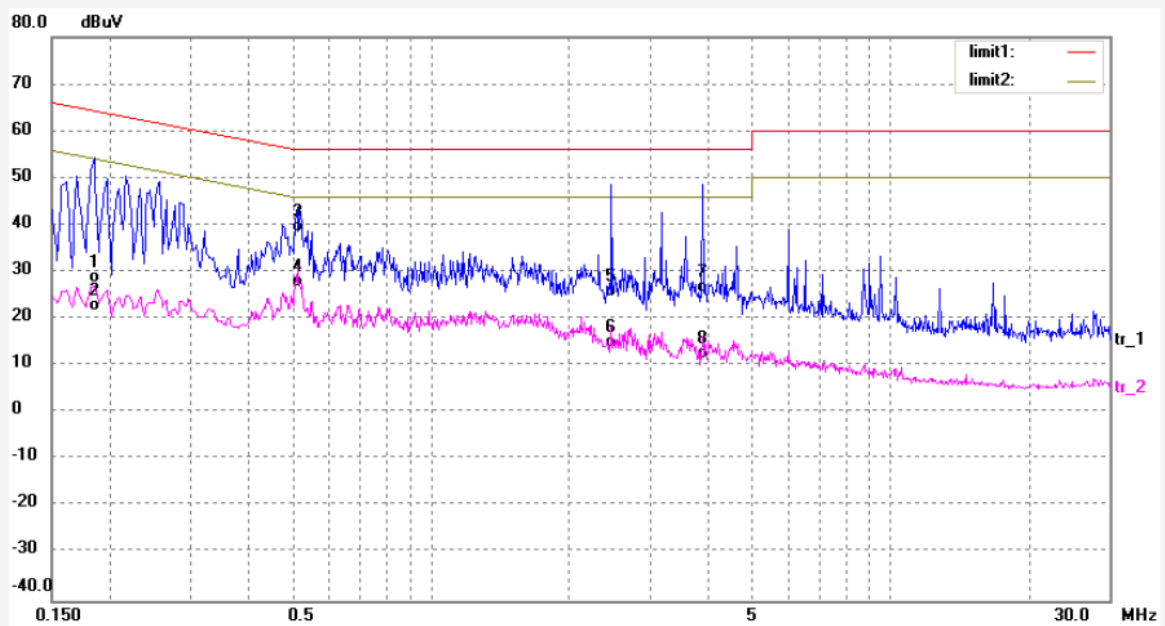
## **6.6 Conducted Emission Test Data**

For more details , lease refer to the test data as below :

Job No.: WT08102746  
 Standard: FCC Part15 CE-Class B\_QP  
 Test item: Conduction Test  
 Temp.( C)/Hum.(%) 25.3 C / 54 %  
 EUT: BABY MONITOR  
 Mode: ON  
 Model: E-DBMPEG4-25

Phase: L1  
 Power Source: AC 120V/60Hz  
 Date: 2008-11-17  
 Time: PM 03:53:20  
 Engineer Signature: Zero

Note: NEW ADAPTER

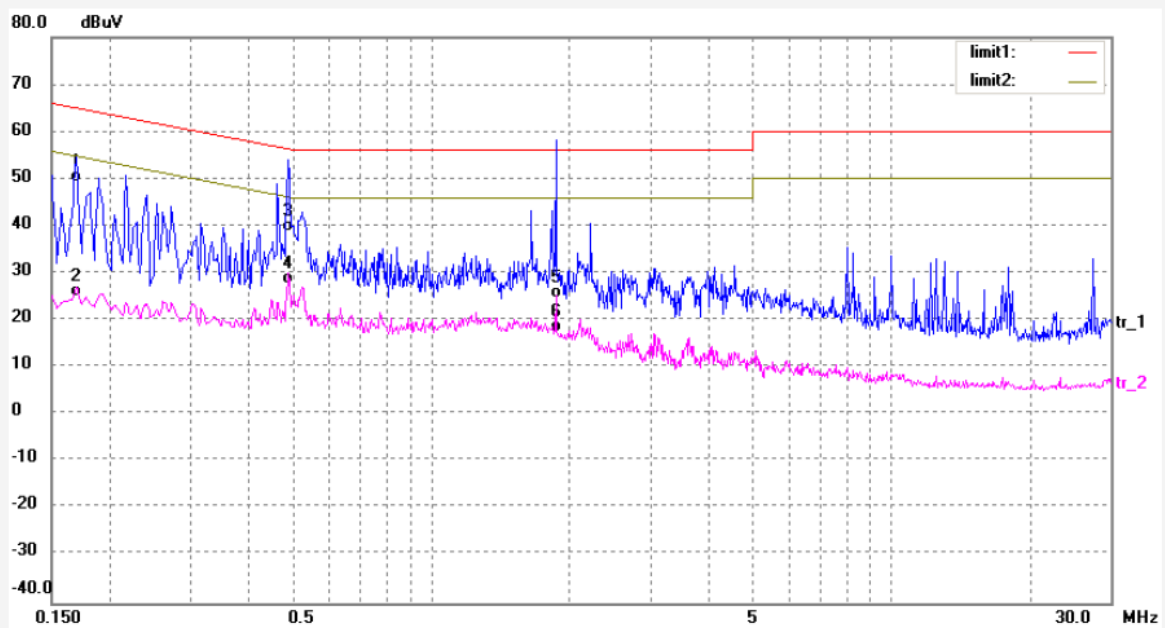


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1860	16.76	10.91	27.67	64.21	-36.54	QP	
2	0.1860	10.89	10.91	21.80	54.21	-32.41	AVG	
3	0.5140	28.70	9.86	38.56	56.00	-17.44	QP	
4	0.5140	16.98	9.86	26.84	46.00	-19.16	AVG	
5	2.4739	15.03	9.72	24.75	56.00	-31.25	QP	
6	2.4739	4.12	9.72	13.84	46.00	-32.16	AVG	
7	3.9060	15.71	9.73	25.44	56.00	-30.56	QP	
8	3.9060	1.71	9.73	11.44	46.00	-34.56	AVG	

Job No.: WT08102746  
 Standard: FCC Part15 CE-Class B\_QP  
 Test item: Conduction Test  
 Temp.( C)/Hum.(%) 25.3 C / 54 %  
 EUT: BABY MONITOR  
 Mode: ON  
 Model: E-DBMPEG4-25

Phase: N  
 Power Source: AC 120V/60Hz  
 Date: 2008-11-17  
 Time: PM 03:56:00  
 Engineer Signature: Zero

Note: NEW ADAPTER



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1700	38.22	11.08	49.30	64.96	-15.66	QP	
2	0.1700	13.75	11.08	24.83	54.96	-30.13	AVG	
3	0.4900	28.72	9.90	38.62	56.17	-17.55	QP	
4	0.4900	17.78	9.90	27.68	46.17	-18.49	AVG	
5	1.8740	14.90	9.72	24.62	56.00	-31.38	QP	
6	1.8740	7.78	9.72	17.50	46.00	-28.50	AVG	

## 7 Radiation Emission Test

Test Requirement:	FCC Part15 Paragraph 15.247
Test Method:	Based on ANSI 63.4:2003
Test Date:	Nov.17, 2008
Frequency Range:	30MHz to 25GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

### 7.1 Test Equipment

Please refer to Section 5 this report.

### 7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on ANSI C63.4:2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at WALTEK SERVICES EMC Lab is +4.0 dB.

### 7.3 Test Procedure

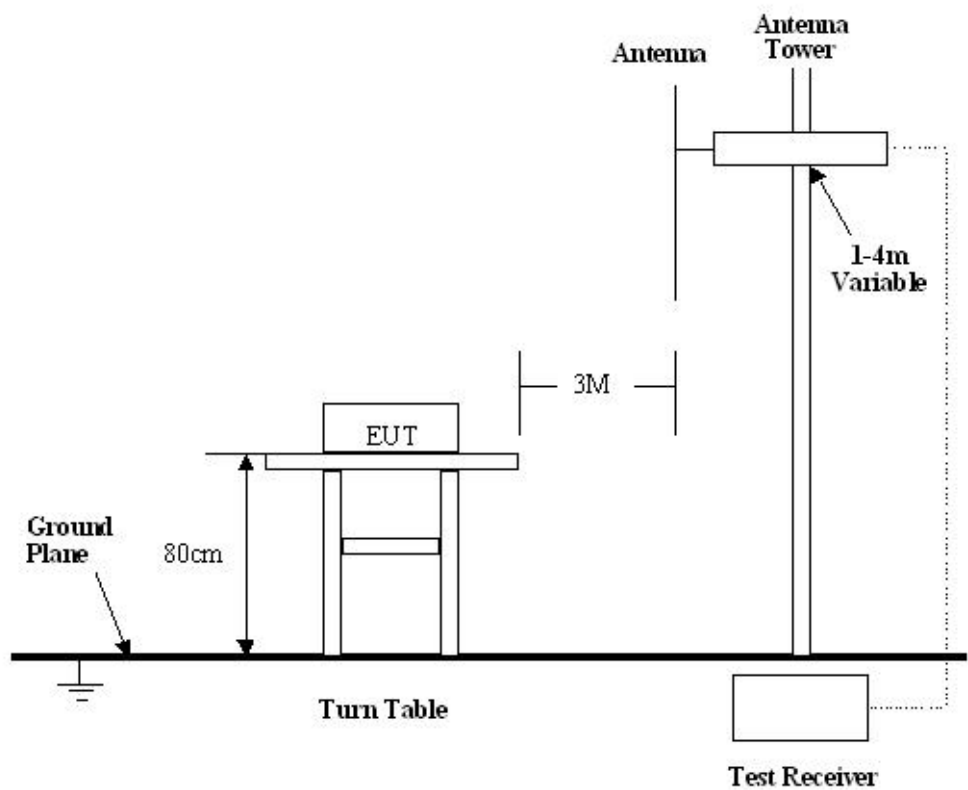
1. New battery were installed in the equipment under test for radiated emissions test.
2. This is a handheld device, The radiation emission should be tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
3. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
4. All data was recorded in the peak and average detection mode.
5. The EUT was under working mode during the final qualification test and the configuration was used to represent the worst case results.

6.The EUT was tested in three(low/middle/high) channel ,and the channel list as below :

Channel List		
Channel	Frequency point	Note
1	2414.250MHz	
2	2417.625MHz	
3	2421.000MHz	
4	2424.375MHz	
5	2427.750MHz	
6	2431.125MHz	
7	2434.500MHz	
8	2437.875MHz	
9	2441.250MHz	
10	2444.625MHz	
11	2448.000MHz	
12	2451.375MHz	
13	2454.750MHz	
14	2458.125MHz	
15	2461.500MHz	

7.4 Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.209 limits and Paragraph 15.247 limits.



7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.247 Rules, the system was tested to 25000 MHz. Below 1GHz

Start Frequency .....	30 MHz
Stop Frequency .....	1000 MHz
Sweep Speed	Auto
IF Bandwidth.....	120 kHz
Video Bandwidth.....	100KHz
Quasi-Peak Adapter Bandwidth .....	120 kHz
Quasi-Peak Adapter Mode.....	Normal
Resolution Bandwidth .....	100KHz



Above 1GHz

Start Frequency .....	1000 MHz
Stop Frequency .....	25000MHz
Sweep Speed	Auto
IF Bandwidth.....	120 kHz
Video Bandwidth .....	1MHz
Quasi-Peak Adapter Bandwidth .....	120 kHz
Quasi-Peak Adapter Mode.....	Normal
Resolution Bandwidth .....	1MHz

7.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

7.7 Summary of Test Results

According to the data in section 7.11, the EUT complied with the FCC Part15 Paragraph 15.247 standards.

## 7.8 EUT Operating Condition

The same as section 6.4 of this report.

Let the EUT work in test mode and test it.

## 7.9 Radiated Emissions Limit on Paragraph 15.209

Frequency(MHZ)	Distance(m)	Field strength(dBuV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note:**
- (1)  $\text{RF Voltage(dBuV)} = 20 \log \text{RF Voltage(uV)}$
  - (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.
  - (4) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
  - (5) Above 1GHz, make a Peak and average measurements for all emissions, Limit for peak is 74dBuV/m, According to Part 15.35(b) and average is 54BuV/m.

### 7.10 Radiated Emissions Test Result

Formula of conversion factors: the field strength at 3m was established by adding  
The meter reading of the spectrum analyzer (which is set to read in units of dBuV/m)  
To the antenna correction factor supplied by the antenna manufacturer. The antenna  
Correction factors are stated in terms of dB. The gain of the pressletor was accounted  
For in the spectrum analyser meter reading.

Example:

Freq(MHz) Meter Reading +ACF=FS

33            20dBuV+10.36dB=30.36dBuV/m @3m

### 7.11 Radiated Emission Data

A. Test Item:                      Radiated Emission Data  
Test Voltage:                      Adapter input 5.0V  
Test Mode:                        TX On  
Temperature:                      24 °C  
Humidity:                         52%RH  
Test Result:                       PASS

Remarks: 30-1000MHz radiation test no significant emissions above the equipment noise floor  
were detected.

And the below is the Fundamental and Harmonic .

Frequency (MHz)	Dete ctor	Antenna Polarizat ion	Emissio n Level (dBuV/ m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntab le Angle (°)
Low frequency							
2414.25	AV	Vertical	92.98		(Fund.)	1.5	100
4848.50	AV	Vertical	40.25	54.00	9.75	1.5	150
7242.75	AV	Vertical	32.14	54.00	17.86	1.8	120
9657.00	AV	Vertical	30.37	54.00	23.63	1.5	90
12071.25	AV	Vertical	30.11	54.00	23.89	1.0	60
14485.50	AV	Vertical	30.39	54.00	23.61	1.5	60
16899.75	AV	Vertical	30.28	54.00	23.72	1.8	100
19314.00	AV	Vertical	30.67	54.00	23.33	1.8	180
21728.25	AV	Vertical	30.59	54.00	23.41	1.5	100

24142.50	AV	Vertical	30.73	54.00	23.27	1.0	45
2414.25	AV	Horizontal	95.12		(Fund.)	1.7	100
4848.50	AV	Horizontal	40.25	54.00	13.75	1.5	120
7242.75	AV	Horizontal	34.02	54.00	19.98	1.5	120
9657.00	AV	Horizontal	32.03	54.00	21.97	1.0	90
12071.25	AV	Horizontal	34.21	54.00	19.79	1.8	45
14485.50	AV	Horizontal	30.36	54.00	23.64	1.0	120
16899.75	AV	Horizontal	30.74	54.00	23.26	1.8	180
19314.00	AV	Horizontal	31.22	54.00	22.78	1.5	90
21728.25	AV	Horizontal	31.53	54.00	22.47	1.5	60
24142.50	AV	Horizontal	32.36	54.00	21.64	1.0	60
2414.25	PK	Vertical	107.56		(Fund.)	1.2	120
4848.50	PK	Vertical	45.36	74.00	29.64	1.2	150
7242.75	PK	Vertical	37.88	74.00	36.12	1.5	100
9657.00	PK	Vertical	37.42	74.00	36.58	1.8	100
12071.25	PK	Vertical	35.63	74.00	38.37	1.0	90
14485.50	PK	Vertical	37.77	74.00	36.23	1.8	90
16899.75	PK	Vertical	35.89	74.00	38.11	1.0	60
19314.00	PK	Vertical	38.67	74.00	35.33	1.8	100
21728.25	PK	Vertical	38.78	74.00	35.22	1.5	120
24142.50	PK	Vertical	34.31	74.00	39.69	1.5	45
2414.25	PK	Horizontal	101.58		(Fund.)	1.20	90
4848.50	PK	Horizontal	42.36	74.00	31.64	1.2	90
7242.75	PK	Horizontal	36.25	74.00	33.75	1.5	100
9657.00	PK	Horizontal	37.33	74.00	36.67	1.0	90
12071.25	PK	Horizontal	33.19	74.00	40.81	1.0	60
14485.50	PK	Horizontal	33.62	74.00	40.38	1.5	60
16899.75	PK	Horizontal	30.73	74.00	43.27	1.8	100
19314.00	PK	Horizontal	33.57	74.00	40.43	1.8	120
21728.25	PK	Horizontal	33.59	74.00	40.41	1.8	180
24142.50	PK	Horizontal	35.88	74.00	38.12	1.0	120
Middle frequency							
2437.875	AV	Vertical	90.69		(Fund.)	1.1	180
4875.750	AV	Vertical	38.25	54.00	15.75	1.2	90

7313.625	AV	Vertical	30.24	54.00	23.76	1.6	60
9751.500	AV	Vertical	30.33	54.00	22.67	1.0	100
12189.375	AV	Vertical	30.87	54.00	22.13	1.8	180
14627.250	AV	Vertical	30.73	54.00	23.27	1.0	120
17065.12	AV	Vertical	30.26	54.00	23.74	1.6	100
19503.00	AV	Vertical	30.17	54.00	23.83	1.6	180
21940.87	AV	Vertical	33.65	54.00	20.35	1.5	90
2437.875	AV	Vertical	31.25	54.00	23.75	1.5	270
2437.875	AV	Horizontal	92.25		(Fund.)	1.2	150
4875.750	AV	Horizontal	35.69	54.00	28.31	1.2	270
7313.625	AV	Horizontal	30.33	54.00	23.67	1.8	90
9751.500	AV	Horizontal	32.52	54.00	21.48	1.0	100
12189.375	AV	Horizontal	31.45	54.00	22.55	1.8	120
14627.250	AV	Horizontal	30.67	54.00	23.33	1.6	90
17065.12	AV	Horizontal	30.24	54.00	23.76	1.5	45
19503.00	AV	Horizontal	31.86	54.00	22.14	1.8	180
21940.87	AV	Horizontal	30.59	54.00	23.41	1.6	120
2437.875	AV	Horizontal	29.03	54.00	27.97	1.2	150
2437.875	PK	Vertical	108.32		(Fund.)	1.2	180
4875.750	PK	Vertical	42.03	74.00	31.97	1.2	90
7313.625	PK	Vertical	38.25	74.00	35.75	1.2	180
9751.500	PK	Vertical	38.94	74.00	35.06	1.6	100
12189.375	PK	Vertical	37.87	74.00	36.13	1.5	120
14627.250	PK	Vertical	38.36	74.00	35.64	1.8	90
17065.12	PK	Vertical	39.47	74.00	34.53	1.0	180
19503.00	PK	Vertical	34.56	74.00	39.44	1.0	150
21940.87	PK	Vertical	40.22	74.00	33.78	1.6	45
2437.875	PK	Vertical	45.61	74.00	28.39	1.8	90
2437.875	PK	Horizontal	101.54		(Fund.)	1.0	120
4875.750	PK	Horizontal	43.56	74.00	30.44	1.8	45
7313.625	PK	Horizontal	41.51	74.00	32.49	1.5	60
9751.500	PK	Horizontal	40.14	74.00	33.86	1.5	90
12189.375	PK	Horizontal	39.36	74.00	34.64	1.6	100
14627.250	PK	Horizontal	38.74	74.00	35.26	1.0	120

17065.12	PK	Horizontal	34.21	74.00	39.79	1.5	90
19503.00	PK	Horizontal	38.86	74.00	35.14	1.5	120
21940.87	PK	Horizontal	40.22	74.00	33.78	1.5	100
2437.875	PK	Horizontal	40.67	74.00		1.6	45
High frequency							
2461.50	AV	Vertical	91.69		(Fund.)	1.0	100
4923.00	AV	Vertical	35.21	54.00	18.79	1.5	135
7384.50	AV	Vertical	32.25	54.00	21.75	1.5	100
9846.00	AV	Vertical	30.26	54.00	23.74	1.6	90
12307.5	AV	Vertical	30.55	54.00	23.45	1.8	45
14769.0	AV	Vertical	30.34	54.00	23.66	1.5	100
17230.5	AV	Vertical	30.62	54.00	23.38	1.6	120
19692.0	AV	Vertical	30.13	54.00	23.87	1.8	90
22153.5	AV	Vertical	30.27	54.00	23.73	1.5	90
24615.0	AV	Vertical	28.25	54.00	25.75	1.5	90
2461.50	AV	Horizontal	89.78		(Fund.)	1.5	150
4923.00	AV	Horizontal	34.56	54.00	19.44	1.2	120
7384.50	AV	Horizontal	30.35	54.00	23.65	1.5	90
9846.00	AV	Horizontal	31.47	54.00	22.53	1.0	60
12307.5	AV	Horizontal	31.89	54.00	22.11	1.6	90
14769.0	AV	Horizontal	32.42	54.00	21.58	1.0	100
17230.5	AV	Horizontal	31.17	54.00	22.83	1.8	120
19692.0	AV	Horizontal	32.55	54.00	21.45	1.5	120
22153.5	AV	Horizontal	32.86	54.00	21.14	1.0	100
24615.0	AV	Horizontal	33.25	54.00	20.75	1.6	60
2461.50	PK	Vertical	105.61		(Fund.)	1.2	90
4923.00	PK	Vertical	43.22	74.00	30.78	1.5	120
7384.50	PK	Vertical	36.83	74.00	37.17	1.5	180
9846.00	PK	Vertical	35.35	74.00	38.65	1.8	90
12307.5	PK	Vertical	35.56	74.00	38.44	1.0	90
14769.0	PK	Vertical	36.20	74.00	37.80	1.5	90
17230.5	PK	Vertical	36.87	74.00	37.13	1.8	45
19692.0	PK	Vertical	36.26	74.00	37.74	1.5	100
22153.5	PK	Vertical	36.73	74.00	37.27	1.5	90

24615.0	PK	Vertical	36.33	74.00	37.67	1.6	60
2461.50	PK	Vertical	104.02		(Fund.)	1.5	90
4923.00	PK	Vertical	43.26	74.00	30.74	1.5	90
7384.50	PK	Vertical	38.64	74.00	35.36	1.5	90
9846.00	PK	Vertical	35.37	74.00	38.63	1.6	90
12307.5	PK	Vertical	35.52	74.00	38.48	1.6	45
14769.0	PK	Vertical	35.26	74.00	38.74	1.5	60
17230.5	PK	Vertical	36.41	74.00	37.59	1.8	100
19692.0	PK	Vertical	39.25	74.00	34.75	1.8	120
22153.5	PK	Vertical	31.10	74.00	42.90	1.0	180
24615.0	PK	Vertical	30.22	74.00	43.78	1.5	90

## 8 Maximum Peak Output Power

Test Requirement:	FCC Part15 Paragraph 15.247
Test Method:	Based on ANSI 63.4:2003
Test Date:	Nov. 17, 2008
Test mode:	Compliance test in the worse case: Tx Lower/Tx Middle/Tx Upper
Requirements:	Regulation 15.247(b) The limit of Maximum Peak Output Power Measurement is 1W(30dBm)

### Test procedure:

The following test procedure as below:

The transmitter output (antenna port) was connected to the spectrum analyzer.EUT and its simulators are placed on a table, let EUT working in test mode,then test it.

The bandwidth of the fundamental frequency was measured with the spectrum analyser using 100kHz RBW and 100kHz VBW.

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

Test Channel	Fundamental Frequency(MHz)	Output Power (mW)	Limit (W)	Power output level
Lower	2414.25	1.72	1	conducted
Middle	2437.875	1.65	1	conducted
Upper	2461.50	1.68	1	conducted



9 Hopping Channel Number

Test Requirement: FCC Part15 C

Test Method: Based on FCC Part15 Paragraph 15.247

Test Date: Nov.17, 2008

Test mode: The EUT work in test mode(Tx) and test it

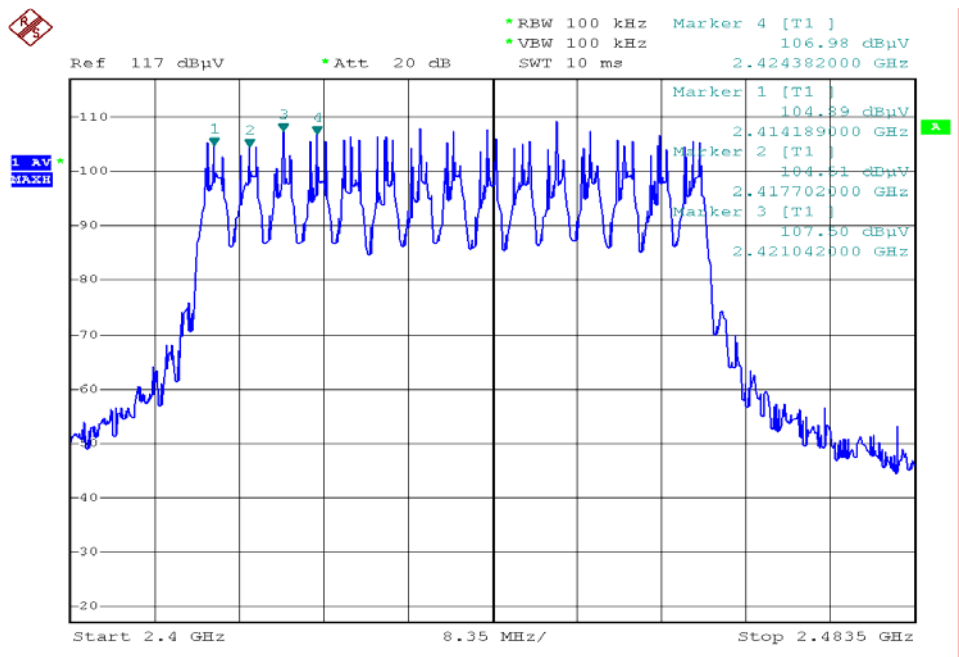
Requirements: Regulation 15.247(b) For frequency hopping systems operating In the 2400-2483.5MHz band employing at least 15 hopping channels.

Test result: The total number of channels would be 15 channels.

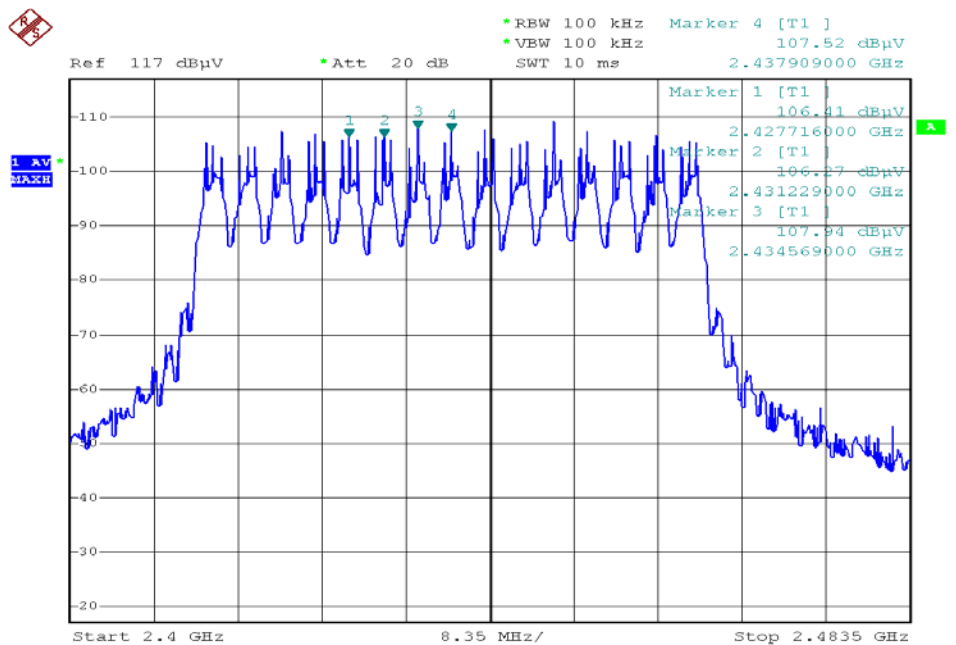
The unit does meet the FCC requirements.

Please refer the graph as below:

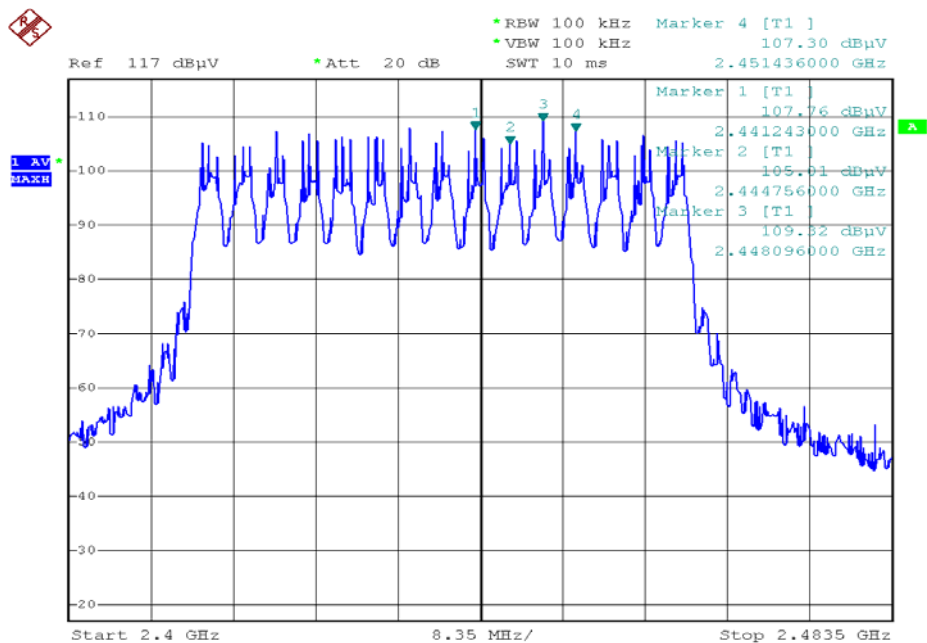
Channel 1 to Channel 4



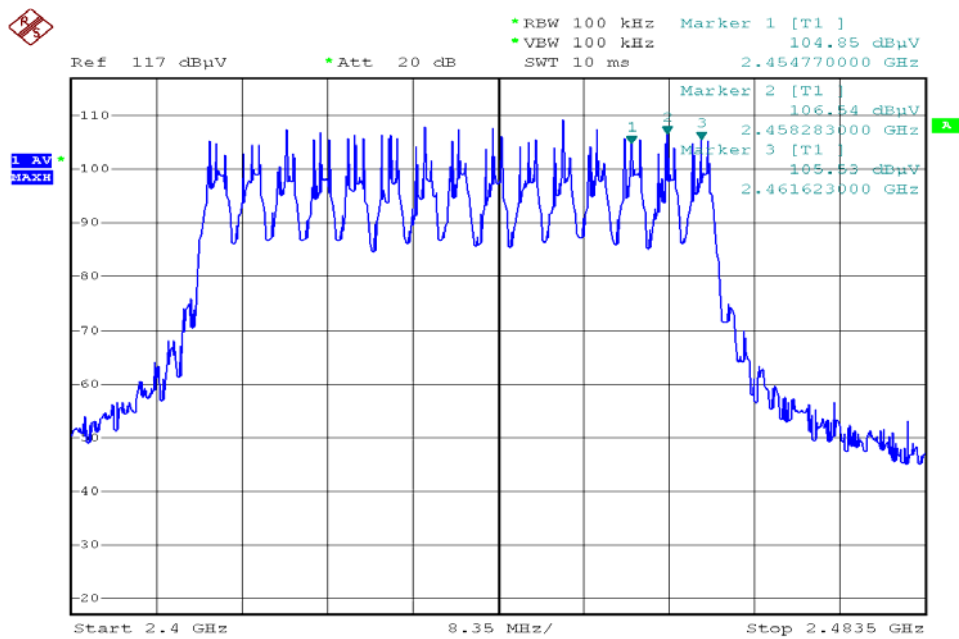
Channel 5 to Channel 8



Channel 9 to Channel 12



Channel 13 to Channel 15



## 10 Frequency Separated

The requirements in this clause are only applicable to equipment using frequency hopping spread spectrum (FHSS) modulation.

### Channel Separated

Definition: A hopping channel is any of the centre frequencies defined within the hopping sequence of a FHSS system.

Limit: Non-adaptive frequency hopping system shall make use of non-overlapping channels separated by the channel bandwidth as measured at 20dB below peak power.

The hopping channels defined within a hopping sequence shall be at least 1MHz apart(channel separation)

Operating Environment:

Temperature: 22.0 °C

Humidity: 55 % RH

Barometric Pressure: 1012 mbar

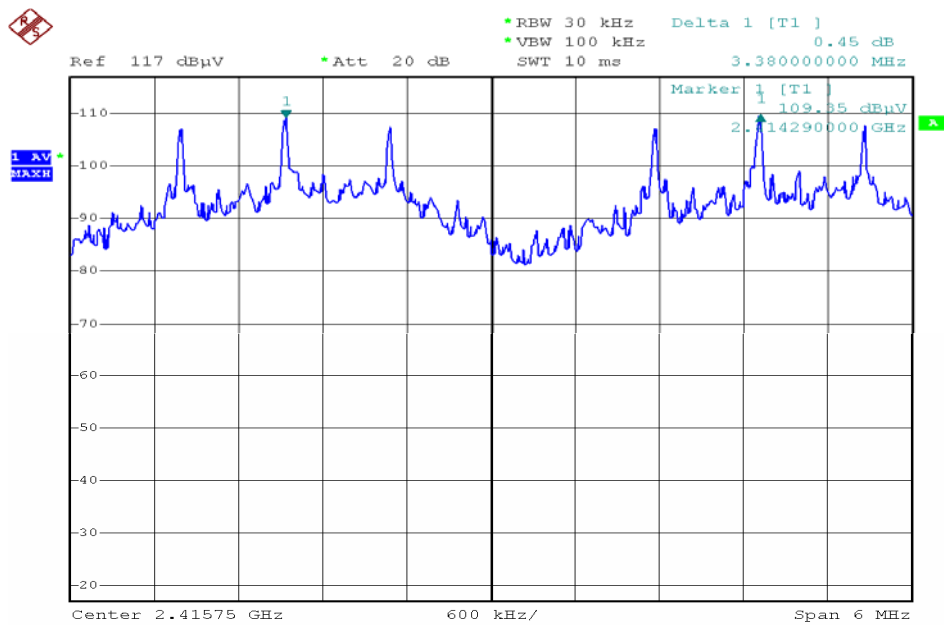
EUT Operation Condition:

The EUT was programmed to be in continuously transmitting mode.

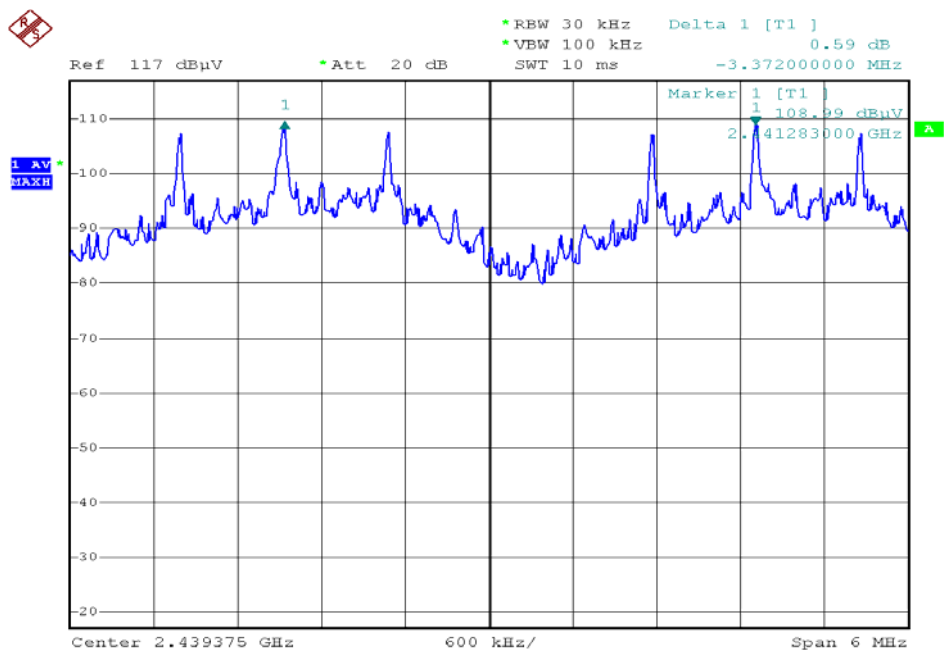
Test Result: PASS

Please refer to the below photos for more details

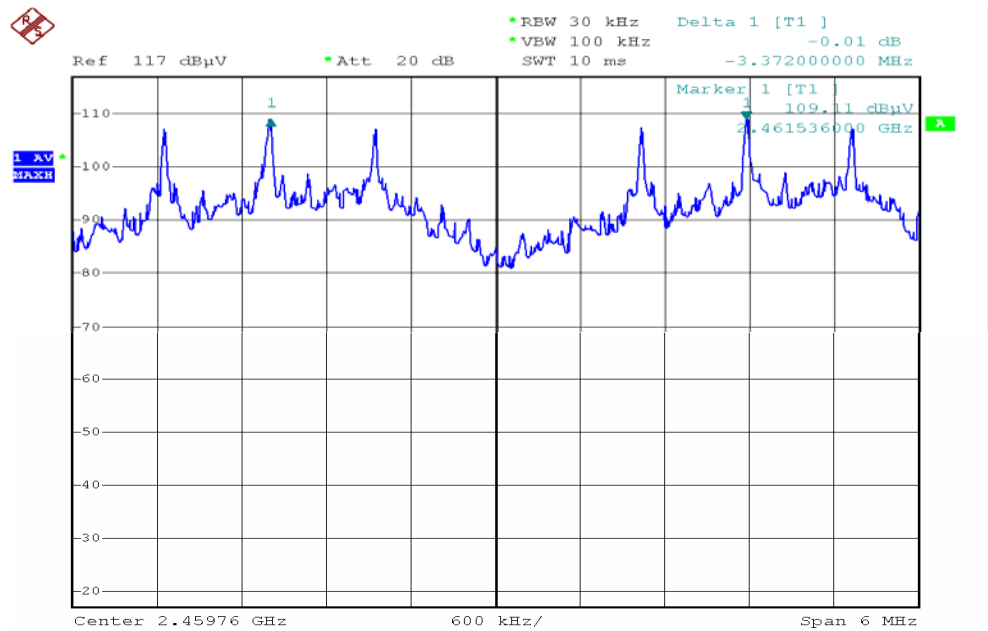
Lower Channel



Middle Channel



Upper Channel



## 11 Dwell time

### 11.1 Definition:

The dwell time is the time spent at a particular frequency during any single hop.

Limit: the maximum dwell time shall be less than 0.4s.

Operating Environment:

Temperature: 22.0 °C

Humidity: 55 % RH

Barometric Pressure: 1012 mbar

EUT Operation Condition:

The EUT was programmed to be in continuously transmitting mode.

### 11.2 Test Procedure

The EUT output antenna port was connected to the spectrum analyzer. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz, and the frequency span to zero span, measure the maximum time duration of one single pulse. So, the Dwell Time can be calculated as follows:

$$T = T_{\text{on-time}} * N_{\text{times}} / 1S * 0.4 * 16 \leq 0.4S.$$

### 11.3 Test Result: PASS

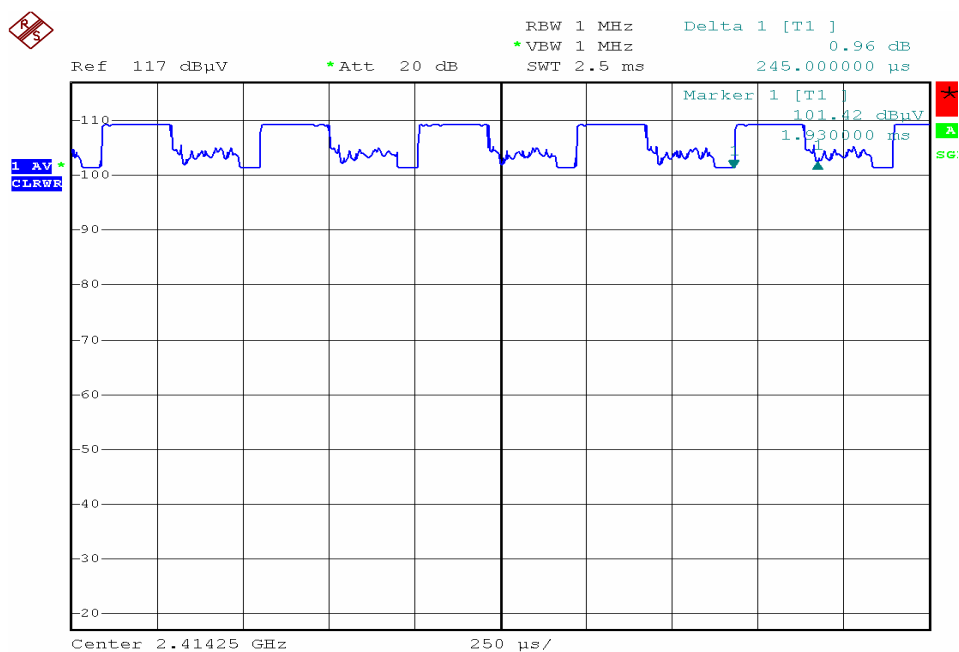
Please refer to the below photos for more details.

Channel Low

Dwell time of each occupation in this channel as follows:  
 $0.000245 \times 18 / 15 \times 0.4 \times 16 = 0.2822 < 0.4S$

Test Result: PASS

The Results are not be greater than 0.4 seconds.



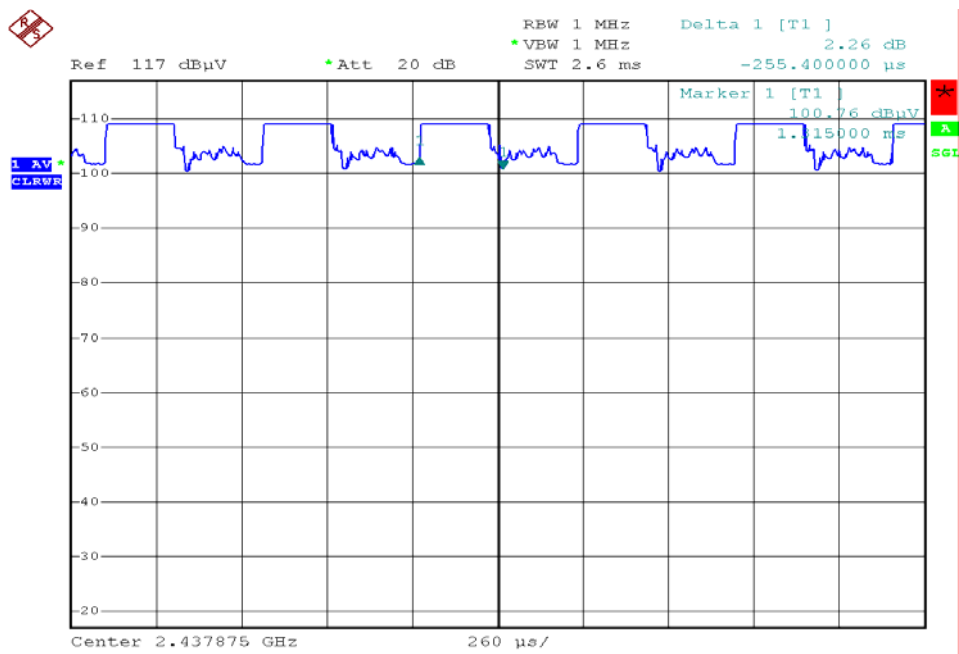


Channel Middle

Dwell time of each occupation in this channel as follows:  
 $0.0002554 \times 18 / 1S \times 0.4 \times 16 = 0.2942 < 0.4S$ .

Test Result: PASS

The Results are not be greater than 0.4 seconds.

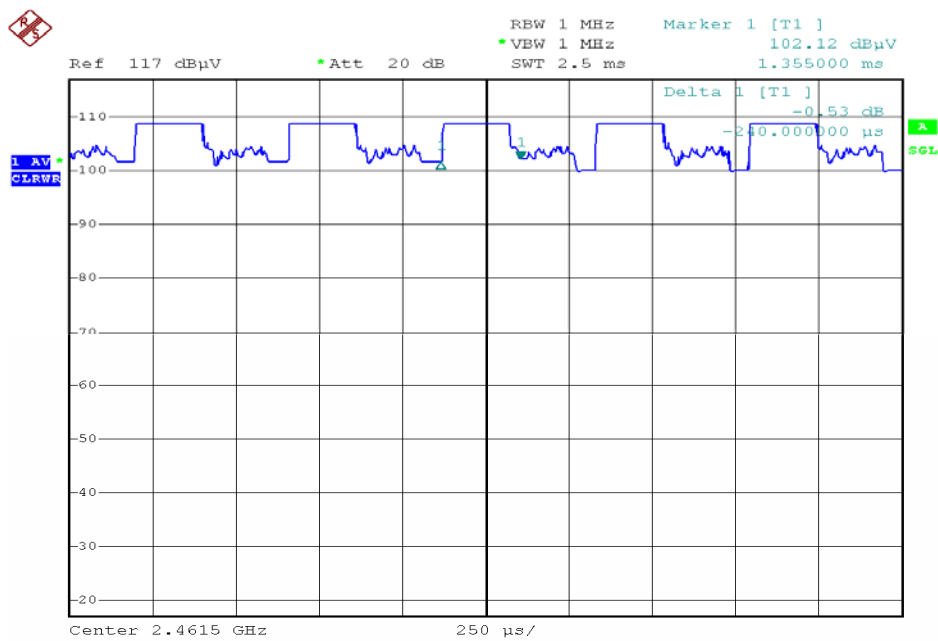


Channel High

Dwell time of each occupation in this channel as follows:  
 $0.00024 \times 18 / 15 \times 0.4 \times 16 = 0.2745 < 0.4S$

Test Result: PASS

The Results are not be greater than 0.4 seconds.



12 20-dB Bandwidth

Test Requirement:	FCC Part15 C
Test Method:	Based on FCC Part15 Paragraph 15.247
Test Date:	Nov. 17 , 2008
Test mode:	The EUT work in test mode(Tx) and test it

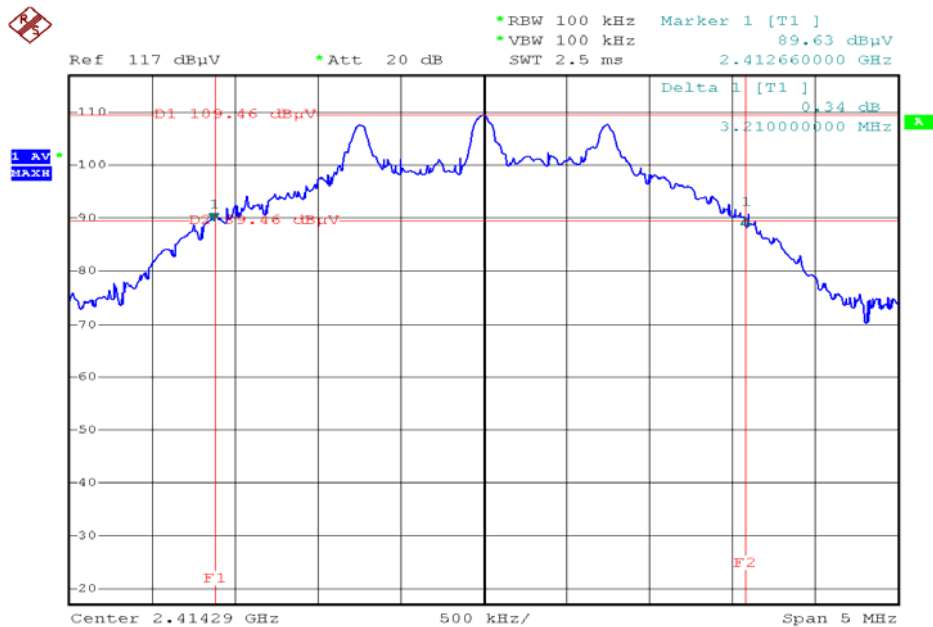
Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 100KHz RBW and 100KHz VBW.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

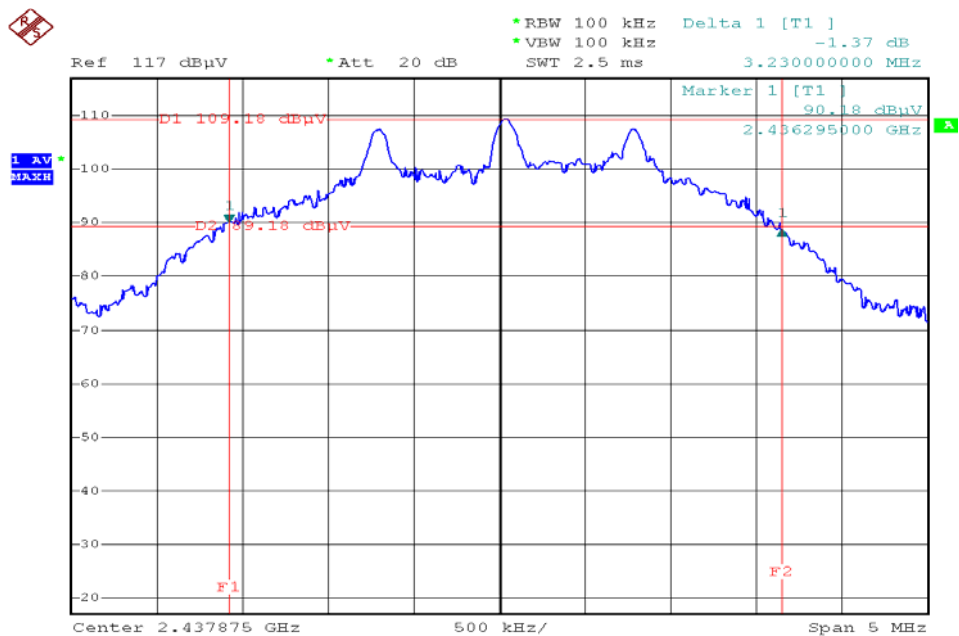
Test Result

Please refer the graph as below:

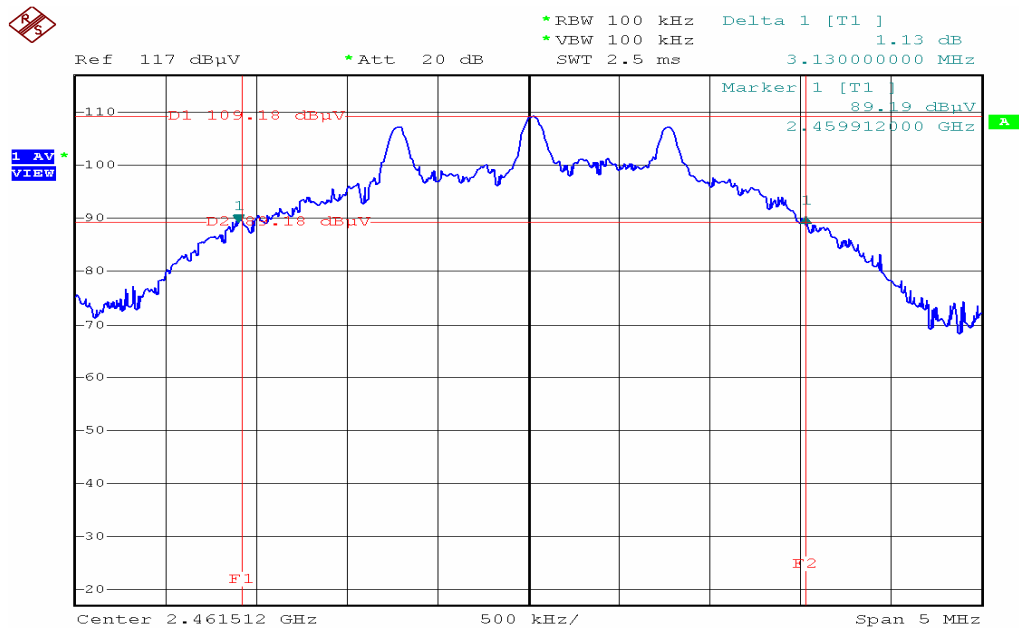
Lower Channel



Middle Channel



Upper Channel



### 13 Radiated spurious emissions into adjacent restricted band

Test Requirement:	FCC Part15 Paragraph 15.205
Test Method:	Based on FCC Part 15 Paragraph 15.247
Test Date:	Nov. 17 , 2008
Requirements:	The EUT work in test mode(Tx) and test it

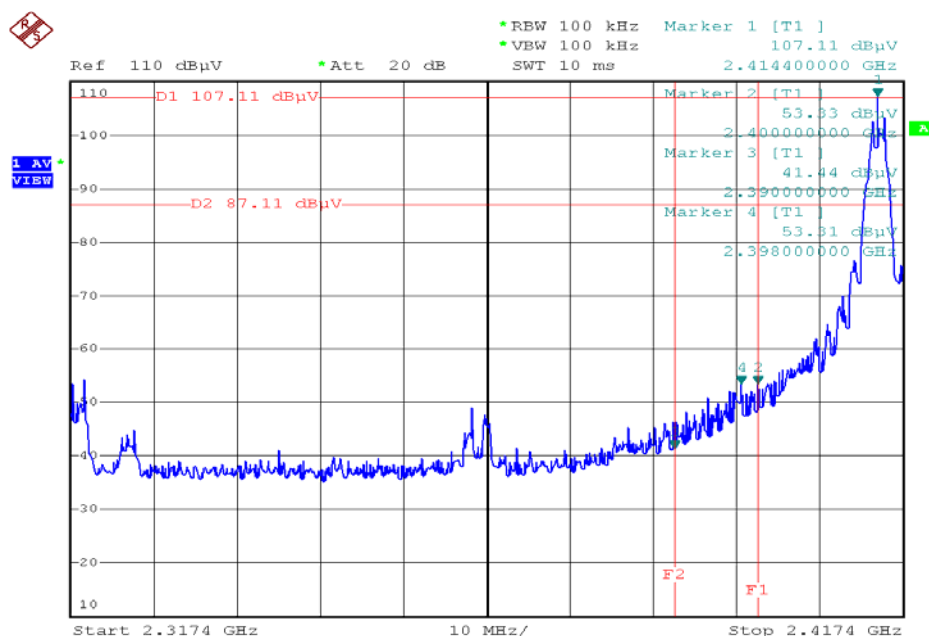
#### Requiments:

emissions that fall in the restricted bands(15.205).Above 1000MHz, compliance with the emissions limits in section 15.209 shall be demonstrated based on the average value of the measured emissions,The provisions in section 15.35apply to these measurements.

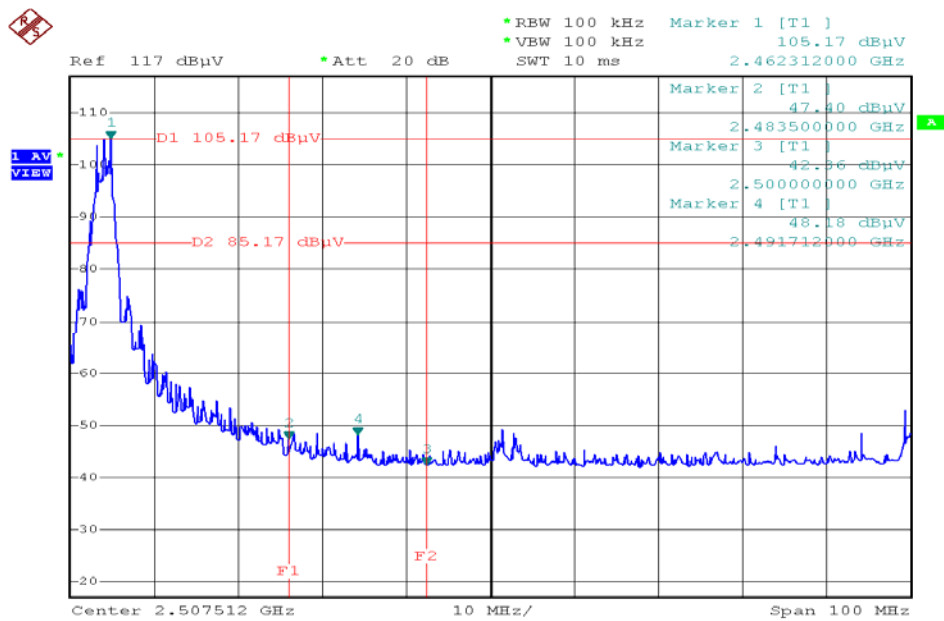
#### Test procedure:

An in band field strength measurement of the fundamental emission using the RBW and detector function required by C63.4-2003 and FCC Rules.The procedure was repeated with an average detector and a plot made.The calculated field strength in the adjacent restricted band is presented below.

#### Lower bandedge/ restricted band (peak value)



Upper bandedge/ restricted band (peak value)



## 14 RF Exposure Test

Test Requirement:	FCC Part 2 Subpart J
Test Method:	Based on FCC Part 15 Paragraph 15.247
Test Date:	Nov.17, 2008
Requirements:	The EUT work in test mode(Tx) and test it

### Requiments:

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

### The procedures / limit

#### (A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

#### (B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

**MPE Calculation Method**

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

**E** = Electric field (V/m)

**P** = Peak RF output power (W)

**G** = EUT Antenna numeric gain (numeric)

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

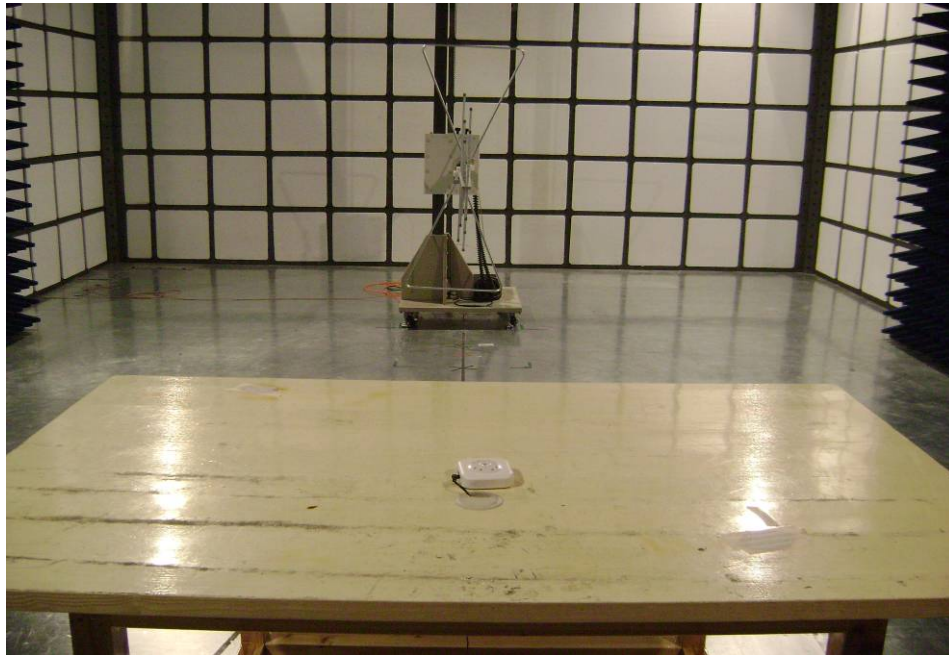
From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
-2.15	0.610	2.35	1.72	0.000209	1	Complies
-2.15	0.610	2.31	1.65	0.000200	1	Complies
-2.15	0.610	2.33	1.68	0.000205	1	Complies

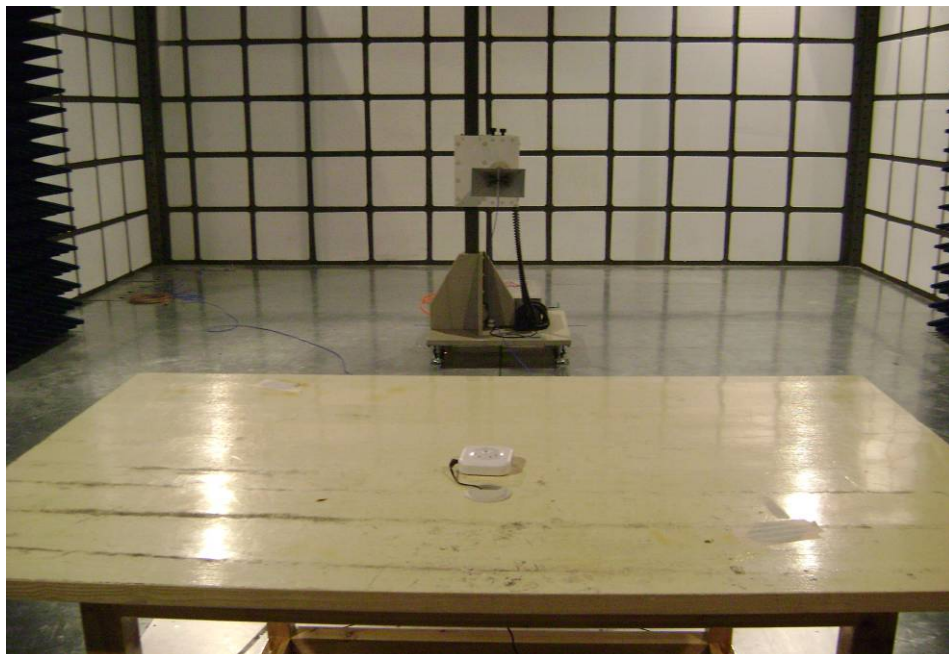


## 15 Photographs of Testing

### Radiation Emission Test View For 30MHz-1000MHz



### Radiation Emission Test View For 1GHz-25GHz



### Conduction Emission Test View



## 16 Photographs - Constructional Details

### 16.1 EUT -Component View



### 16.2 EUT - Front View



### 16.3 EUT - Back View

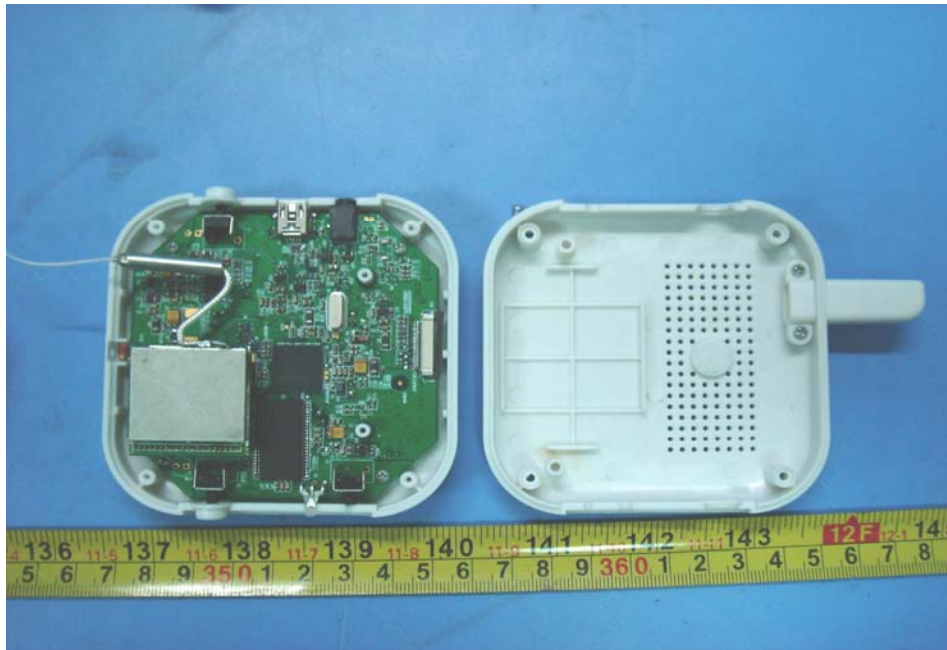


### 16.4 Adapter - Front View

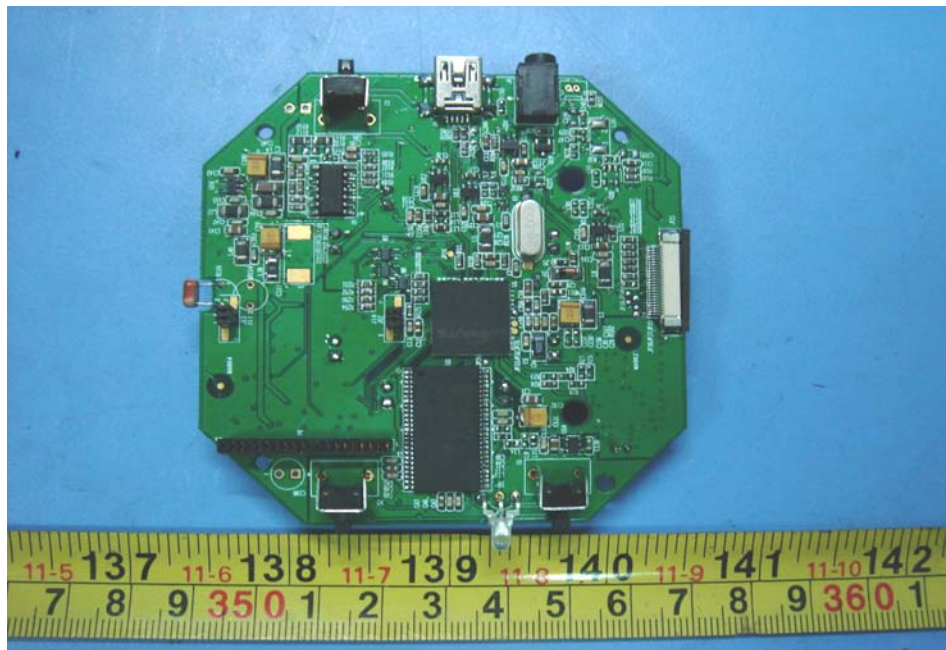




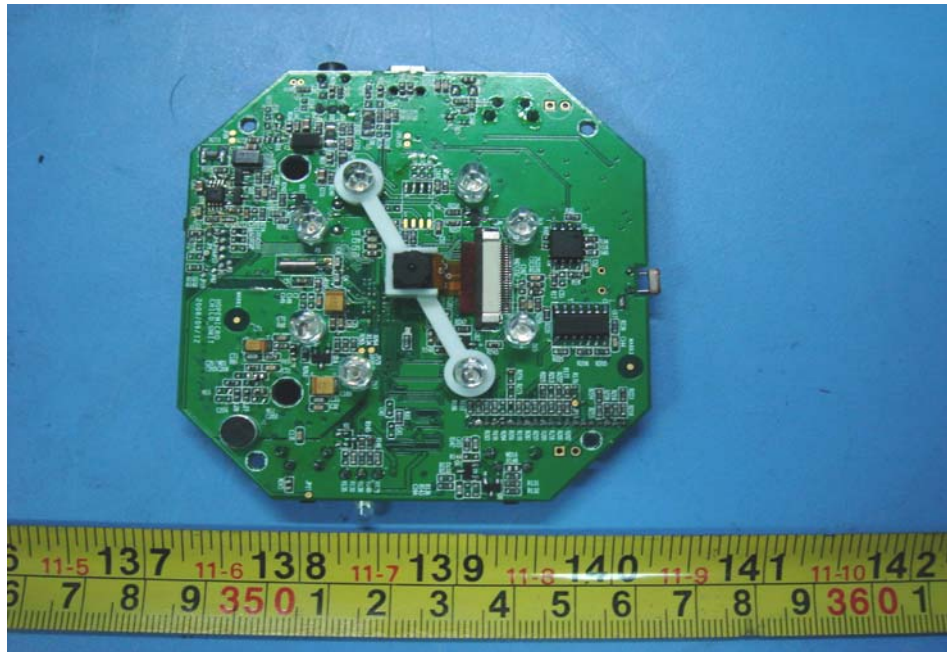
## 16.5 EUT - Open View



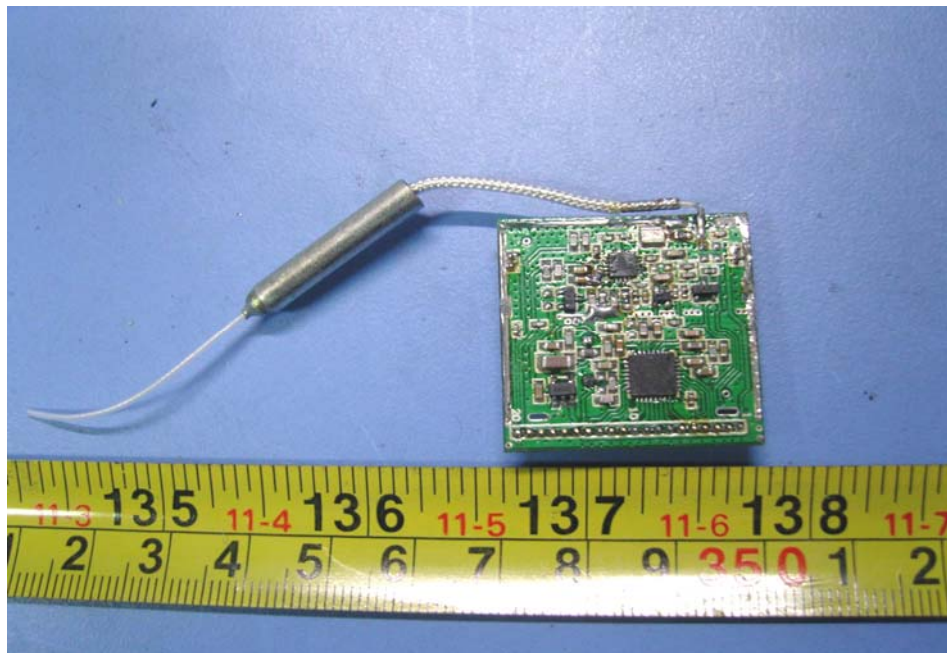
## 16.6 PCB 1 - Front View



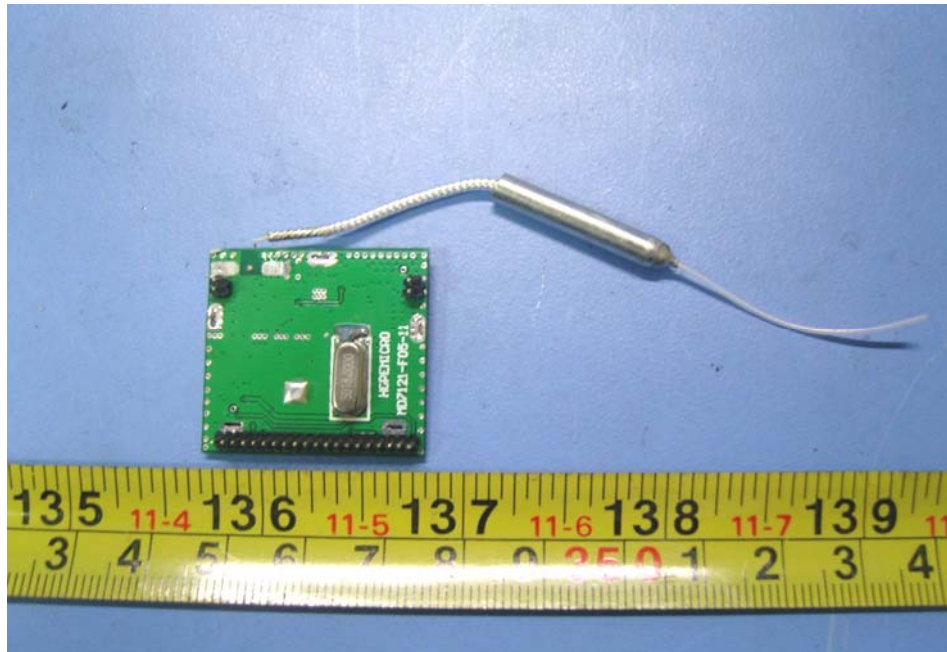
### 16.7 PCB 1 - Back View



### 16.8 PCB 2 - Front View



### 16.9 PCB 2 - Back View

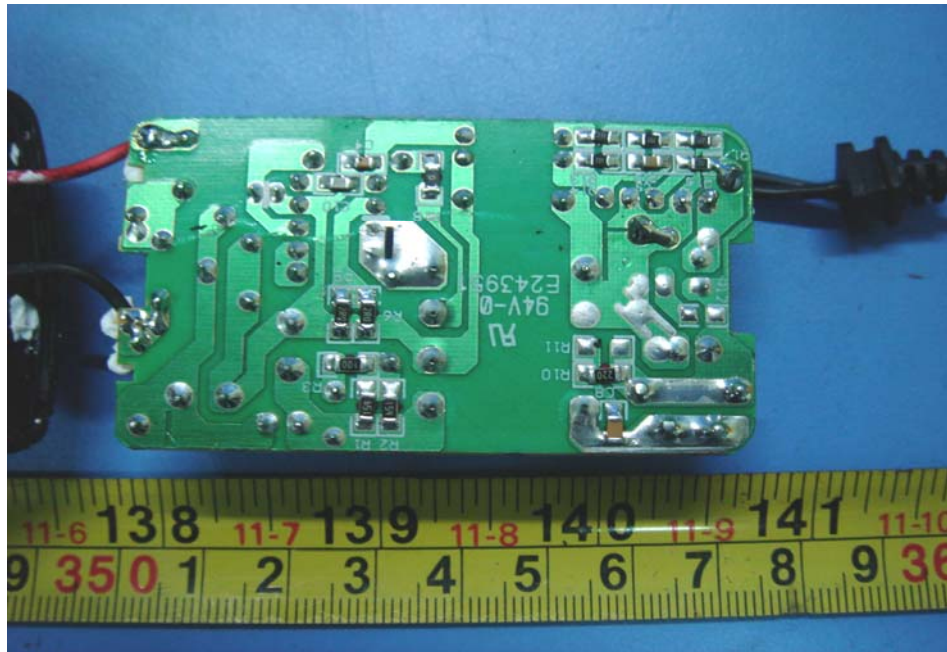


### 16.10 PCB(Adapter) - Front View





### 16.11 PCB(Adapter) - Back View





## 17 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference,and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT  
EUT Bottom View/proposed FCC Mark Location

