FCC TEST REPORT

FCC ID : ZBSWRM-XPN

Applicant : Shenzhen New Element Medical Equipment Technology Development CO.,Ltd
Adress of Applicant : 4F,Building 422,Bagua 4th Road,Futian District,Shenzhen,China

Equipment Under Test (EUT) :

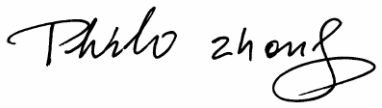
Product description : Remote & Mobile Voiding Diary Monitoring System

Model No. : XYS.WRM-1PN;XYS.WRM-2PN

Standards : FCC 15 Subpart C Paragraph 15.247

Date of Test : Mar.09,2011

Test Engineer **: Olic Huang /Engineer** 

Reviewed By **: Philo Zhong /Manager** 

PERPARED BY:
Waltek Services (Shenzhen) Co., Ltd.
1/F, Fukangtai Building,West Baima Rd.,Songgang Street, Baoan District, Shenzhen
518105,China
Tel: +86-755-27553488
Fax: +86-755-27553868

2 Contents

3 Test Summary

Test Items	Test Requirement	Test Method	Limit / Severity	Result
Maximum peak output power	FCC 15.247	ANSI C63.4: 2003	30dBm	PASS
Restricted Band	FCC 15.247	ANSI C63.4: 2003	Note	PASS
Dwell time	FCC 15.247	ANSI C63.4: 2003	Maximum:0.4 s	PASS
Channel separation	FCC 15.247	ANSI C63.4: 2003	Channel separation at least 1MHz	PASS
Hopping channel No.	FCC 15.247	ANSI C63.4: 2003	Total 79 channels	PASS
20-dB Bandwidth	FCC 15.247	ANSI C63.4: 2003	Note	PASS
RF Exposure Test	FCC 15.247	ANSI C63.4: 2003	Note	PASS
Mains Terminal Disturbance Voltage, 150kHz to 30MHz	FCC 15.247 FCC 15.207	ANSI C63.4: 2003	N/A	N/A
Radiation Emission, 30MHz to 25GHz	FCC 15.247 FCC 15.209	ANSI C63.4: 2003	N/A	PASS

Note : denote that for more details of the EUT , please refer to the relating test items as below .

Remark : the methods of measurement in all the test items were according to the DA 00-705 and FCC 15 Subpart C Paragraph 15.247.

4 General Information

4.1 Client Information

Applicant:	Shenzhen New Element Medical Equipment Technology Development CO.,Ltd.
Address:	4F,Building 422,Bagua 4th Road,Futian District,Shenzhen,China
Manufacturer:	Shenzhen New Element Medical Equipment Technology Development CO.,Ltd.
Address:	4F,Building 422,Bagua 4th Road,Futian District,Shenzhen,China

4.2 General Description of E.U.T.

Product description:	Remote & Mobile Voiding Diary Monitoring System
Model No.:	XYS.WRM-1PN;XYS.WRM-2PN

Remark: two models have the same PCB except the appearance difference.

4.3 Details of E.U.T.

Power Supply:	DC 3.0V
Modulation :	FHSS
Frequency Range:	2402MHz to 2480MHz
Channel Separation :	1MHz

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

The customer requested IC tests for a Remote & Mobile Voiding Diary Monitoring System.The standards used was FCC 15 Subpart C Paragraph 15.247 and FCC 15 Subpart C Paragraph 15.209.

4.6 Test Facility

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

- **IC – Registration No.:7760A**

Waltek Services(Shenzhen) Co., Ltd. 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 IC7760A,Aug. 03,2010.

- **FCC – Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. 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. compliance

4.7 Test Location

All Emissions testswere performed at:-
Waltek Services(Shenzhen) Co., Ltd. at 1/F, Fukangtai Building,West Baima Rd., Songgang Street, Baoan District, Shenzhen518105, China.

5 Equipment Used during Test

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
EMC Analyzer	Agilent/ E7405A	MY45114943	W2008001	9k-26.5GHz	Aug-03-10	Aug-02-11	Wws20081596	±1dB
Trilog Broadband Antenne 30-3000 MHz	SCHWARZBECK MESS-ELEKTROM / VULB9163	336	W2008002	30-3000 MHz	Aug-03-10	Aug-02-11		±1dB
Broad-band Horn Antenna	SCHWARZBECK MESS-ELEKTROM / BBHA 9120D(1201)	667	W2008003	1-18GHz	Aug-03-10	Aug-02-11		f＜10 GHz：±1dB 10GHz＜f＜18 GHz：±1.5dB
Broadband Preamplifier	SCHWARZBECK MESS-ELEKTROM / BBV 9718	9718-148	W2008004	0.5-18GHz	Aug-03-10	Aug-02-11		±1.2dB
10m Coaxial Cable with N-male Connectors usable up to 25GHz,	SCHWARZBECK MESS-ELEKTROM / AK 9515 H	-	-	-	Aug-03-10	Aug-02-11		-
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connector	SCHWARZBECK MESS-ELEKTROM / AK 9513				Aug-03-10	Aug-02-11		
Positioning Controller	C&C LAB/ CC-C-IF				N/A	N/A		
Color Monitor	SUNSPO/ SP-14C				N/A	N/A		
Test Receiver	ROHDE&SCHWARZ/ ESPI	101155	W2005001	9k-3GHz	Aug-03-10	Aug-02-11	Wws20080942	±1dB
EMI Receiver	Beijingkehuan	KH3931		9k-1GHz	Aug-03-10	Aug-02-11		
Two-Line V-Network	ROHDE&SCHWARZ/ ENV216	100115	W2005002	50Ω/50μH	Aug-03-10	Aug-02-11	Wws20080941	±10%

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
Absorbing Clamp	ROHDE&SCHWARZ/ MDS-21	100205	W2005003	impandance50 Ω loss ： 17 dB	Aug-03-10	Aug-02-11	Wws20080943	±1dB
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connectors	SCHWARZBECK MESS-ELEKTROM / AK 9514				Aug-03-10	Aug-02-11		
Digital Power Analyzer	Em Test AG/Switzerland/ DPA 500	V0745103095	W2008012	Power：2000VA Vol-range：0-300V Freq_range：10-80Hz	Aug-03-10	Aug-02-11	Wwd20081185	Voltage distinguish:0.025% Power_freq distinguish:0.02Hz
Power Source	Em Test AG/Switzerland/ ACS 500	V0745103096	W2008013	Vol-range：0-300V Power_freq：10-80Hz				
Electrostatic Discharge Simulator	Em Test AG/Switzerland/DITO	V0745103094	W2008005	Contact discharge：500V-10KV Air diacharge：500V-16.5KV	Aug-03-10	Aug-02-11	Wwc20082400	7.5A current will be changed in V_m=1.5V
RF Generator	TESEQ GmbH/ NSG4070	25781	W2008008	Fraq-range：9K-1GHz RF voltage：-60 dBm-+10dBm	Aug-03-10	Aug-02-11	Wws20081890	Power_freq distinguish0.1Hz RFeletricity distinguish 0.1 B
CDN M-Type	TESEQ GmbH/ CDN M016	25112	W2008009	Voltage correct factor 9.5 dB	Aug-03-10	Aug-02-11	Wwc20082396	150K-80MHz：±1dB 80-230MHz:-2-+3dB
EM-Clamp	TESEQ GmbH/ KEMZ 801	25453	W2008010	Freq_range：0.15-1000 MHz	Aug-03-10	Aug-02-11	Wwc20082397	0.3-400 MHz：±4dB Other freq：±5dB
Attenuator 6dB	TESEQ GmbH/ ATN6050	25365			Aug-03-10	Aug-02-11	Wws20081597	

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
All Modules Generator	SCHAFFNER/6150	34579	W2008006	voltage:200V-4.4KV Pulse current：100A-2.2KA	Aug-03-10	Aug-02-11	Wwc20082401	voltage: ±10% Pulse current：±10%
Capacitive Coupling Clamp	SCHAFFNER/ CDN 8014	25311			Aug-03-10	Aug-02-11	Wwc20082398	-
Signal and Data Line Coupling Network	SCHAFFNER/ CDN 117	25627	W2008011	1.2/50μS	Aug-03-10	Aug-02-11	Wwc20082399	-
AC Power Supply	TONGYUN/ DTDGC-4				Aug-03-10	Aug-02-11	Wws20080944	-
Exposure Level Tester ELT-400	Narda Safety TEST Solutions/2304/03	M-0155	w2008022	Test freq range：1—400kHz	Aug-03-10	Aug-02-11	Wwd20081191	Test uncertainly：1—120kHz:±1.83%, 120 kHz-400 kHz: ±4.06%
Magnetic Field Probe 100cm^2	Narda Safety TEST Solutions/2300/90.10	M-1070	w2008021	Test freq range：1—400kHz				Test uncertainly：1Hz-10Hz: ±16.2%, 10Hz - 120kHz:±2.2%, 120 kHz-400 kHz: ±4.7%
Active Loop Antenna 10kHz-30MHz	Beijing Dazhi / ZN30900A	-	-	10kHz-30MHz	Aug-03-10	Aug-02-11		±1dB

6 Conducted Emission Test

Product Name:	Remote & Mobile Blood Glucose Monitoring and Diabetes Patient Follow-Up System
Test Requirement:	FCC 15 Subpart C Paragraph 15.207
Test Method:	Based on ANSI C63.4: 2003
Test Date:	------
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

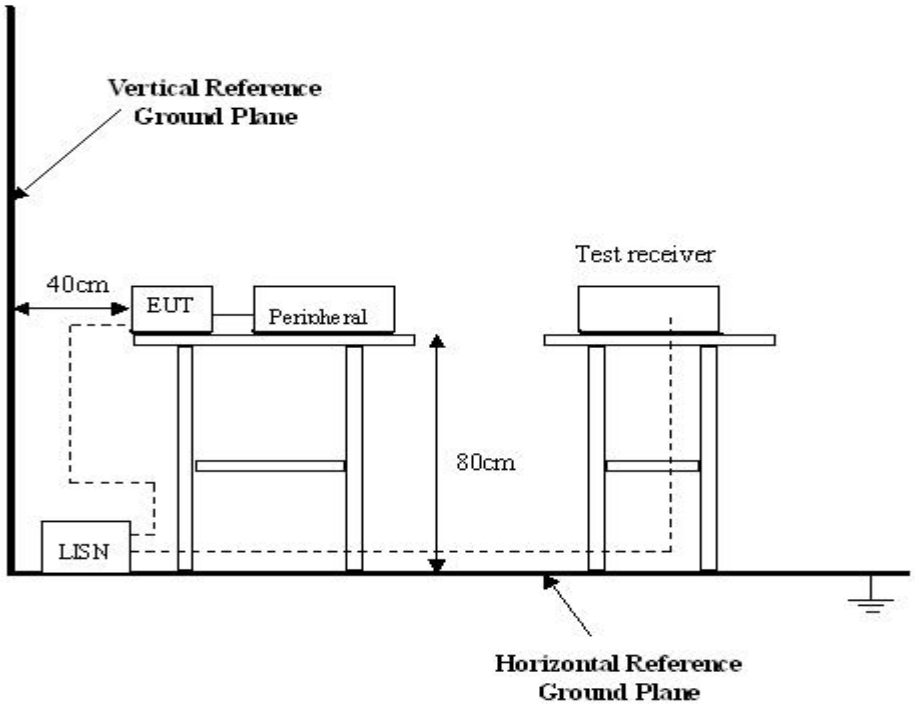
Please refer to Section 5 this report.

6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4: 2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. 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

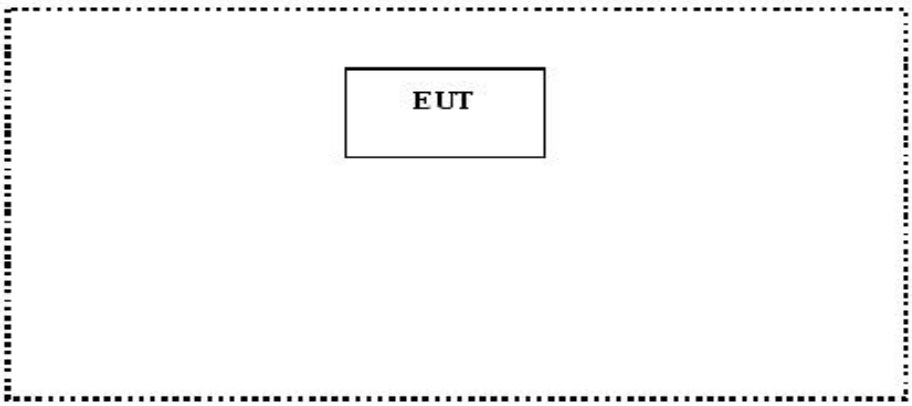
The conducted emission tests were performed using the setup accordance with the ANSI C63.4: 2003, The specification used in this report was the FCC 15 Subpart C Paragraph 15.247 limits.



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 dBμV between 0.15MHz & 0.5MHz
56 dBμV between 0.5MHz & 5MHz
60 dBμV between 5MHz & 30MHz

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

6.6 Conducted Emission Test Data

Own to the EUT operation with battery, the test was not performed.

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7 Radiation Emission Test

Product Name:	Remote & Mobile Blood Glucose Monitoring and Diabetes Patient Follow-Up System
Test Requirement:	FCC 15 Subpart C Paragraph 15.247
Test Method:	Based on ANSI C63.4: 2003
Test Date:	Mar.09,2011
Frequency Range:	30MHz to 25GHz
Measurement Distance:	3m

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.

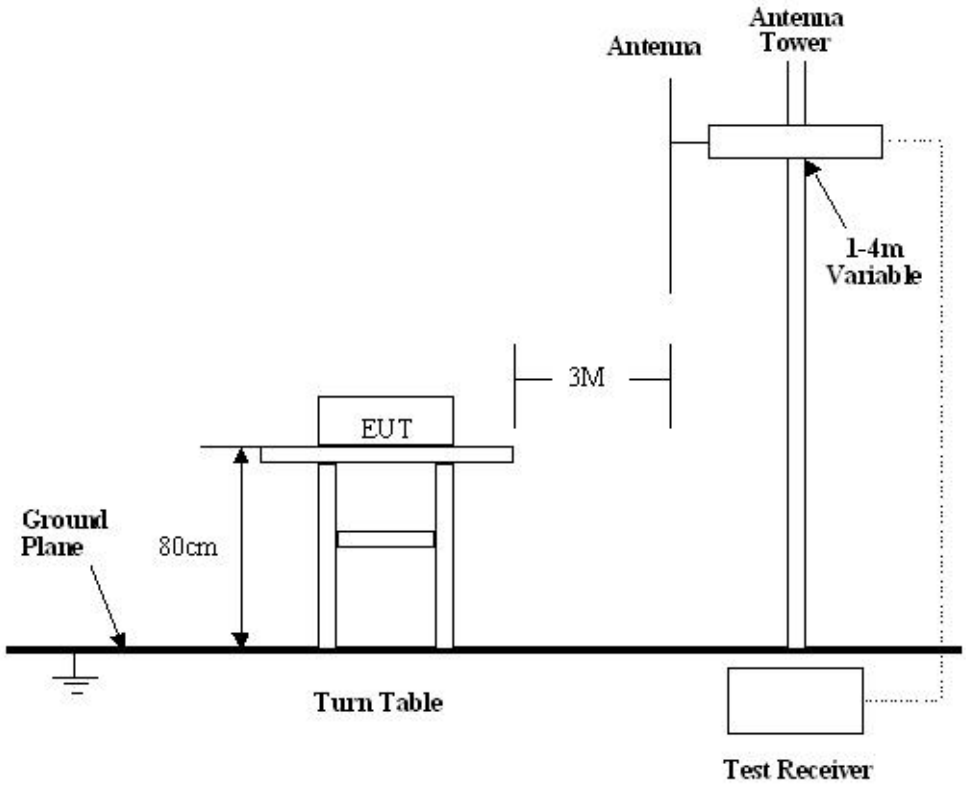
Based on ANSI C63.4: 2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at waltek services is +/-5.03 dB.

7.3 Test Procedure

1. New battery was used in the equipment under test for radiated emissions test.
2. The radiation emission should be tested under 3-axes position(lying,side and stand),After pre-test,It was found that the worse radiation emission was get at the lying position.
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.

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 15 Subpart C Paragraph 15.247 limits.



7.5 Spectrum Analyzer Setup

According to FCC 15 Subpart C 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.....100 kHz
Quasi-Peak Adapter Bandwidth .....120 kHz
Quasi-Peak Adapter Mode.....Normal
Resolution Bandwidth .....100 kHz

Above 1GHz

Start Frequency 1GHz
Stop Frequency 25GHz
Sweep Speed Auto
IF Bandwidth .....120 kHz
Video Bandwidth .....1 MHz
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:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - 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:

Margin = Corr. Ampl. – Class B Limit

7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with FCC 15 Subpart C Paragraph 15.247 and FCC 15 Subpart C Paragraph 15.209 standards.

7.8EUT 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

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) 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.

(4)The emission limit in this paragraph is based on measurement instrumentaion employing an average detector.Measurement using instrumentation with a peak detector function,corresponding to 20dB above the maximum permitted average limit.

(5)Above 1GHz, mark a Peak and average measurements for all emissions,Limit for peak is 74dBuV/m,According to Part15.35(b) and average is 54BuV/m.

7.10 Radiated Emissions Test Result

Formula of conversion factors:the field strength at 3m was egtablished 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 stared 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 Test Condition

A. Test Item:	Radiated Emission Data
Test Voltage:	Input DC 3.0V
Test Mode:	CTX and CRX On
Temperature:	25.5 °C
Humidity:	51%RH
Test Result:	PASS

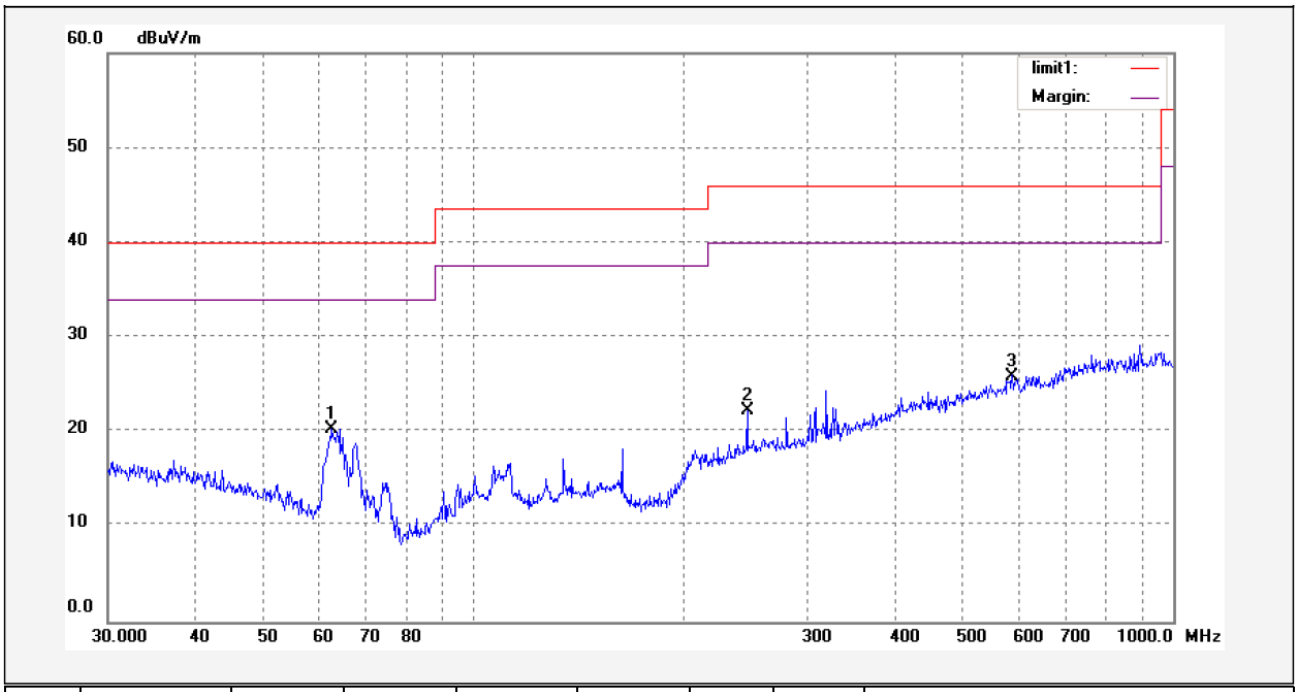
7.12 Radiated Emission Data

7.12.1 Test mode: continuously recevie mode.

Remark: the EUT was pretested at the high,middle and low channel, and the worse case was the low Channel,so the data show was the low channel only.

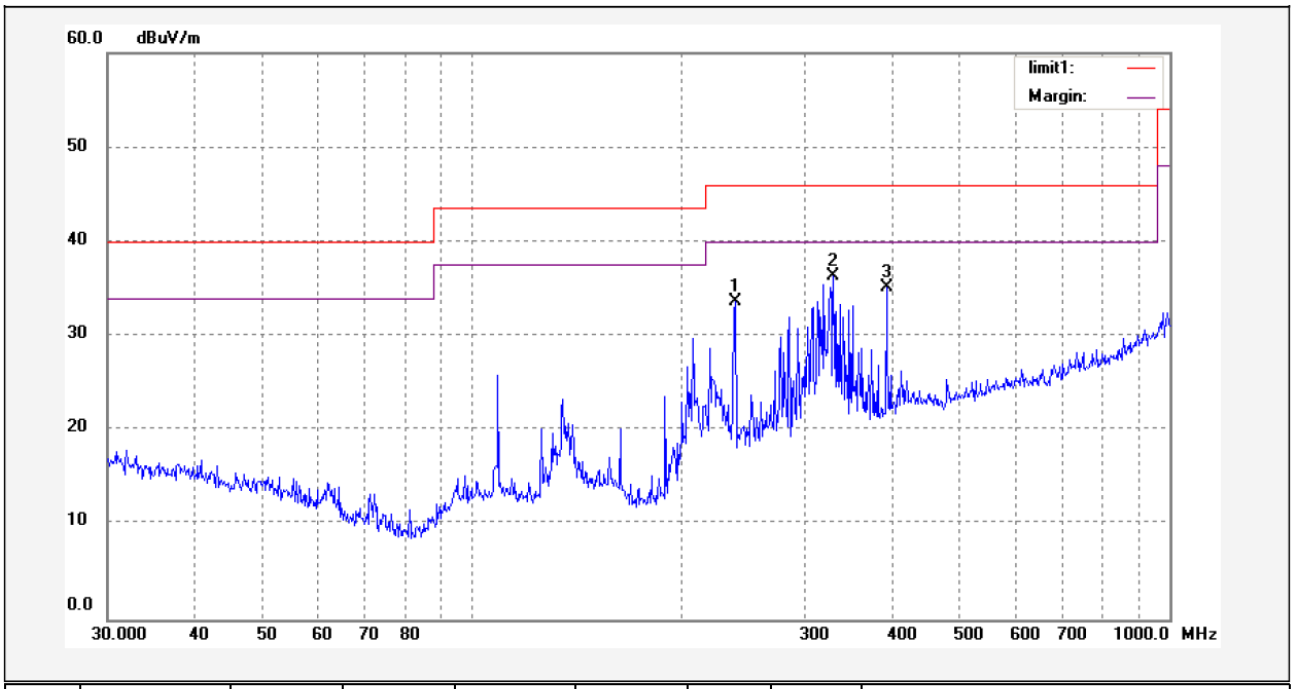
Test frequency : 30-1000MHz radiation test data:

Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	62.7432	9.12	11.22	20.34	40.00	-19.66	peak	
2	246.1238	4.67	17.54	22.21	46.00	-23.79	peak	
3	588.2805	1.82	24.13	25.95	46.00	-20.05	peak	

Horizontal

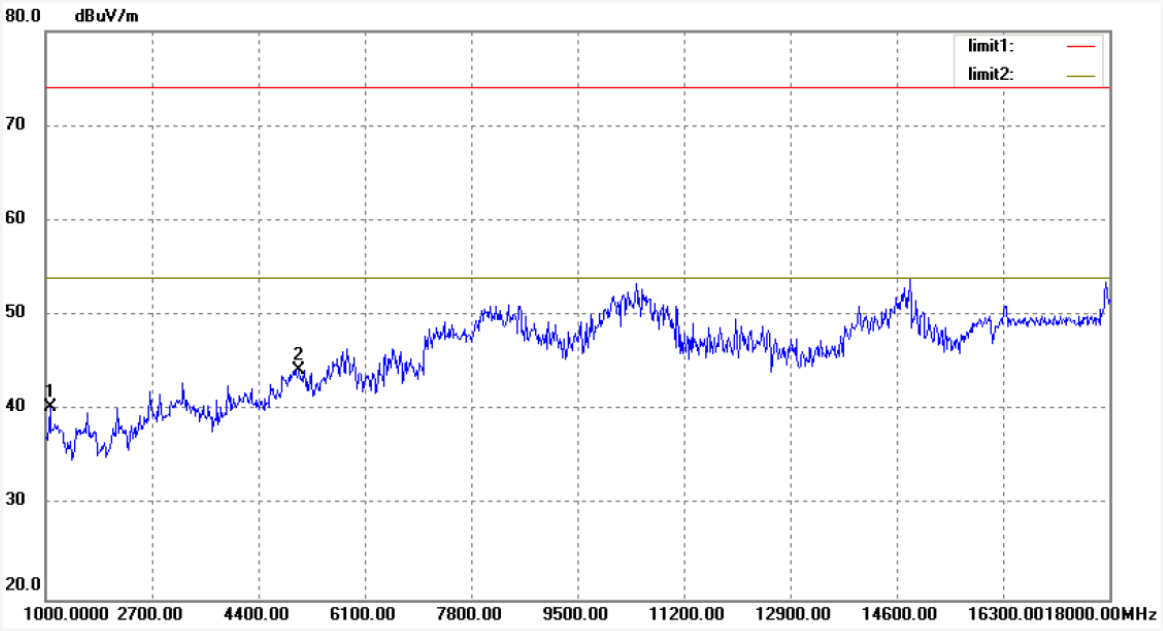


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	238.4626	16.80	16.84	33.64	46.00	-12.36	peak	
2	329.4625	16.89	19.54	36.43	46.00	-9.57	peak	
3	392.7376	14.40	20.82	35.22	46.00	-10.78	peak	

Test frequency: Above 1GHz radiation test data:

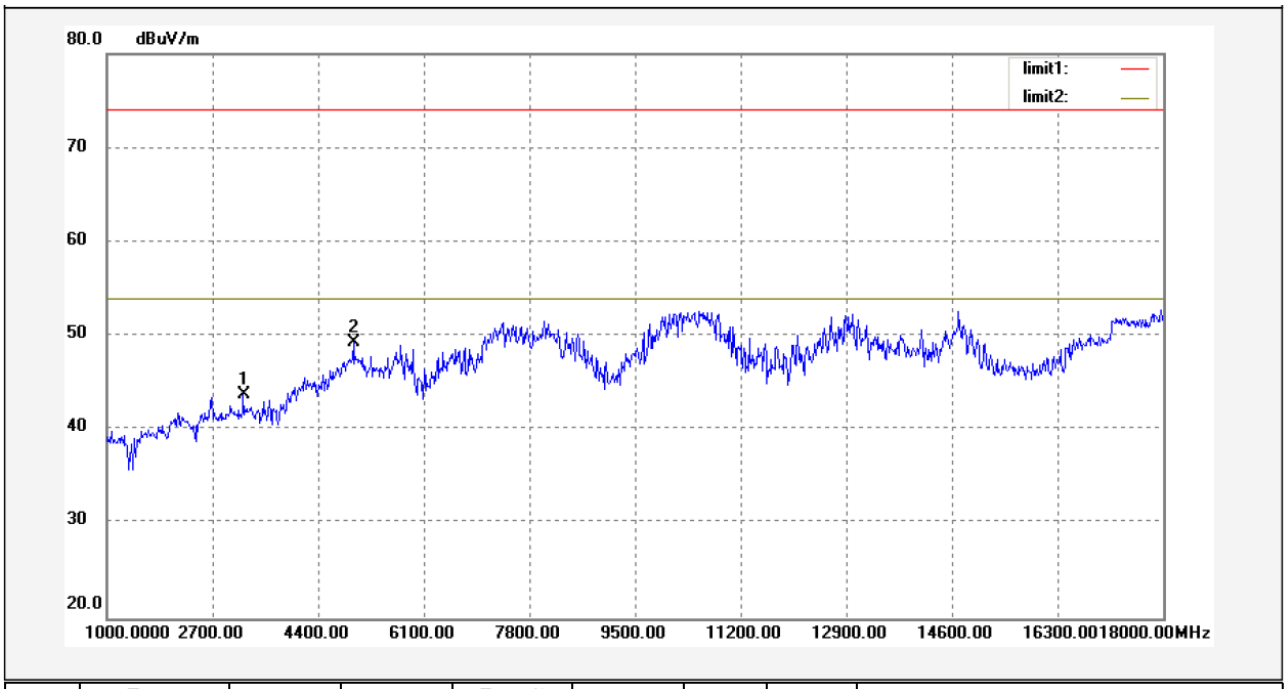
Remark: above 18GHz,the test signal below the noise level,so the data was not perfromed.

Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1068.136	47.04	-6.67	40.37	74.00	-33.63	peak	
2	5054.108	38.85	5.39	44.24	74.00	-29.76	peak	

Horizontal

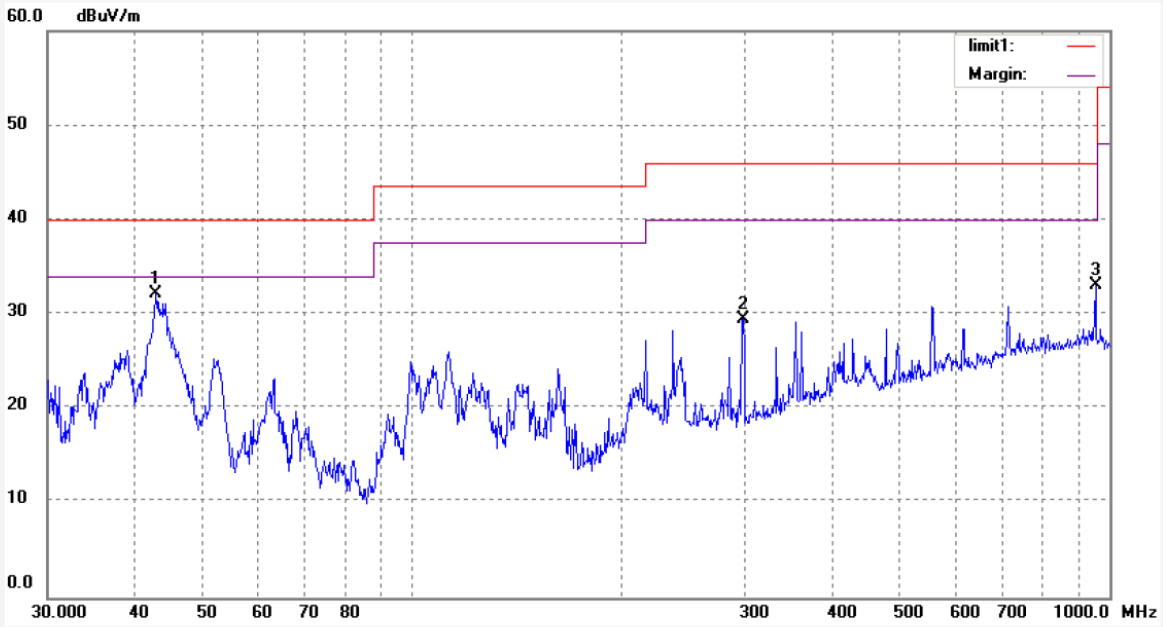


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	3197.395	41.43	2.35	43.78	74.00	-30.22	peak	
2	4968.938	40.54	8.75	49.29	74.00	-24.71	peak	

7.12.2 Test mode: continuously transmit mode.

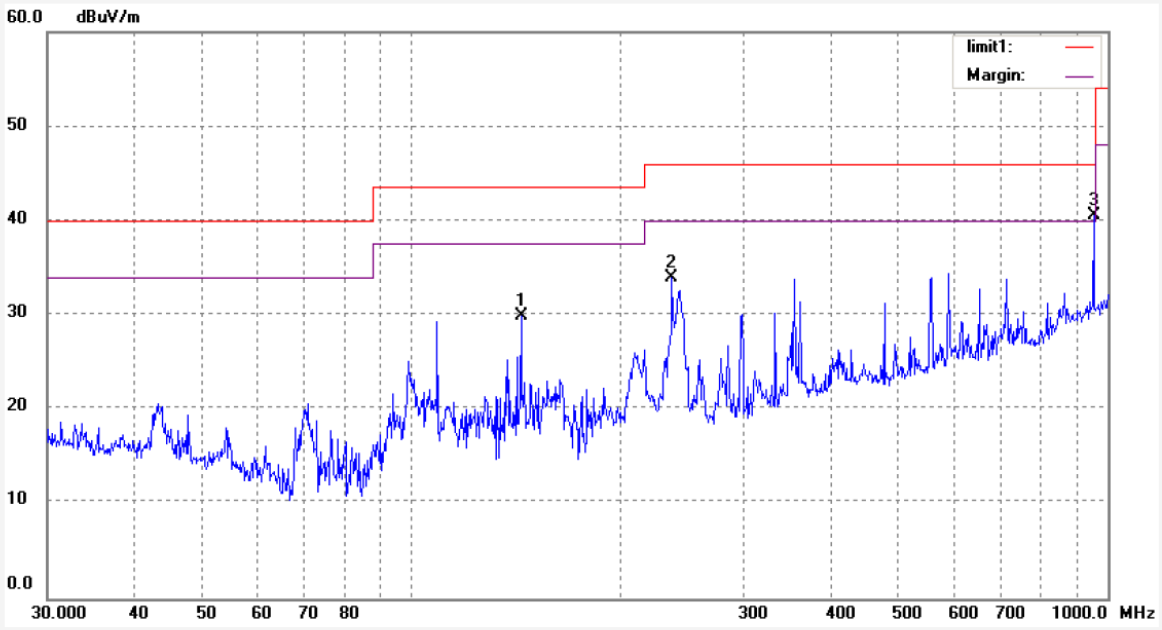
Test frequency :30-1000MHz radiation test data:

Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	42.9305	17.08	15.16	32.24	40.00	-7.76	peak	
2	298.5932	11.09	18.40	29.49	46.00	-16.51	peak	
3	955.3509	6.77	26.24	33.01	46.00	-12.99	peak	

Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	143.7760	16.47	13.44	29.91	43.50	-13.59	peak	
2	236.7928	17.15	16.84	33.99	46.00	-12.01	peak	
3	955.3509	11.80	28.80	40.60	46.00	-5.40	peak	

Test frequency above 1GHz test data record:

And the below is the Fundamental and Harmonic .

Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Low frequency							
2402.00	AV	Vertical	86.68		(Fund.)	1.2	0
4804.00	AV	Vertical	38.00	54.00	16.00	1.2	0
7206.00	AV	Vertical	33.01	54.00	20.99	1.1	60
9608.00	AV	Vertical	31.21	54.00	22.79	1.2	120
12010.00	AV	Vertical	31.12	54.00	22.88	1.0	150
14412.00	AV	Vertical	30.24	54.00	23.76	1.2	90
16814.00	AV	Vertical	30.28	54.00	23.72	1.0	0
19216.00	AV	Vertical	29.99	54.00	24.01	1.0	120
21618.00	AV	Vertical	30.59	54.00	23.41	1.5	100
24020.00	AV	Vertical	29.89	54.00	24.11	1.2	135
2402.00	AV	Horizontal	87.58		(Fund.)	1.4	0
4804.00	AV	Horizontal	40.25	54.00	13.75	1.1	0
7206.00	AV	Horizontal	34.02	54.00	19.98	1.1	60
9608.00	AV	Horizontal	32.03	54.00	21.97	1.0	40
12010.00	AV	Horizontal	34.21	54.00	19.79	1.8	135
14412.00	AV	Horizonta	30.36	54.00	23.64	1.0	60
16814.00	AV	Horizontal	30.74	54.00	23.26	1.1	0
19216.00	AV	Horizontal	31.22	54.00	22.78	1.5	90
21618.00	AV	Horizontal	31.53	54.00	22.47	1.5	60
24020.00	AV	Horizontal	32.75	54.00	21.25	1.0	0
2402.00	PK	Vertical	92.58		(Fund.)	1.2	0
4804.00	PK	Vertical	46.00	74.00	28.00	1.1	10
7206.00	PK	Vertical	38.01	74.00	35.99	1.4	120
9608.00	PK	Vertical	37.42	74.00	36.58	1.1	120
12010.00	PK	Vertical	35.63	74.00	38.37	1.1	180
14412.00	PK	Vertical	36.22	74.00	37.78	1.2	0
16814.00	PK	Vertical	35.89	74.00	38.11	1.0	120
19216.00	PK	Vertical	38.67	74.00	35.33	1.1	0

21618.00	PK	Vertical	38.78	74.00	35.22	1.1	0
24020.00	PK	Vertical	33.02	74.00	40.98	1.2	50
2402.00	PK	Horizontal	93.24		(Fund.)	1.3	0
4804.00	PK	Horizontal	41.26	74.00	32.74	1.2	40
7206.00	PK	Horizontal	36.25	74.00	33.75	1.5	100
9608.00	PK	Horizontal	37.33	74.00	36.67	1.0	90
12010.00	PK	Horizontal	33.19	74.00	40.81	1.0	60
14412.00	PK	Horizontal	33.62	74.00	40.38	1.5	60
16814.00	PK	Horizontal	30.73	74.00	43.27	1.1	110
19216.00	PK	Horizontal	33.57	74.00	40.43	1.1	180
21618.00	PK	Horizontal	34.00	74.00	40.00	1.0	0
24020.00	PK	Horizontal	35.81	74.00	38.19	1.1	20
Middle frequency							
2441.00	AV	Vertical	82.54		(Fund.)	1.1	0
4882.00	AV	Vertical	38.54	54.00	15.46	1.2	90
7323.00	AV	Vertical	33.58	54.00	20.42	1.1	45
9764.00	AV	Vertical	30.33	54.00	22.67	1.0	100
12205.00	AV	Vertical	30.87	54.00	22.13	1.1	180
14646.00	AV	Vertical	31.02	54.00	22.98	1.0	0
17087.00	AV	Vertical	30.26	54.00	23.74	1.6	100
19528.00	AV	Vertical	30.17	54.00	23.83	1.2	0
21969.00	AV	Vertical	33.65	54.00	20.35	1.2	90
24410.00	AV	Vertical	32.02	54.00	21.98	1.0	20
2441.00	AV	Horizontal	85.62		(Fund.)	1.0	0
4882.00	AV	Horizontal	35.69	54.00	28.31	1.1	80
7323.00	AV	Horizontal	30.33	54.00	23.67	1.1	90
9764.00	AV	Horizontal	30.25	54.00	23.75	1.0	100
12205.00	AV	Horizontal	31.45	54.00	22.55	1.1	120
14646.00	AV	Horizontal	30.67	54.00	23.33	1.0	90
17087.00	AV	Horizontal	30.24	54.00	23.76	1.5	45
19528.00	AV	Horizontal	31.86	54.00	22.14	1.1	180
21969.00	AV	Horizontal	30.59	54.00	23.41	1.6	120
24410.00	AV	Horizontal	29.03	54.00	27.97	1.2	150
2441.00	PK	Vertical	92.35		(Fund.)	1.0	0
4882.00	PK	Vertical	41.25	74.00	32.75	1.3	10

7323.00	PK	Vertical	38.25	74.00	35.75	1.2	180
9764.00	PK	Vertical	38.94	74.00	35.06	1.1	100
12205.00	PK	Vertical	37.87	74.00	36.13	1.5	120
14646.00	PK	Vertical	38.36	74.00	35.64	1.2	90
17087.00	PK	Vertical	39.47	74.00	34.53	1.0	180
19528.00	PK	Vertical	34.56	74.00	39.44	1.0	150
21969.00	PK	Vertical	40.22	74.00	33.78	1.6	45
24410.00	PK	Vertical	32.12	74.00	41.88	1.2	45
2441.00	PK	Horizontal	90.85		(Fund.)	1.0	120
4882.00	PK	Horizontal	41.58	74.00	32.42	1.1	25
7323.00	PK	Horizontal	41.51	74.00	32.49	1.5	60
9764.00	PK	Horizontal	40.14	74.00	33.86	1.5	90
12205.00	PK	Horizontal	39.36	74.00	34.64	1.6	100
14646.00	PK	Horizontal	38.74	74.00	35.26	1.0	120
17087.00	PK	Horizontal	35.69	74.00	28.31	1.4	10
19528.00	PK	Horizontal	38.86	74.00	35.14	1.5	120
21969.00	PK	Horizontal	40.22	74.00	33.78	1.5	100
24410.00	PK	Horizontal	35.62	74.00	38.38	1.8	60
High frequency							
2480.00	AV	Vertical	86.74		(Fund.)	1.0	0
4960.00	AV	Vertical	35.78	54.00	18.22	1.2	100
7440.00	AV	Vertical	32.25	54.00	21.75	1.5	100
9920.00	AV	Vertical	30.26	54.00	23.74	1.6	90
12400.00	AV	Vertical	30.55	54.00	23.45	1.8	45
14880.00	AV	Vertical	30.34	54.00	23.66	1.5	100
17360.00	AV	Vertical	30.62	54.00	23.38	1.6	120
19840.00	AV	Vertical	30.13	54.00	23.87	1.2	90
22320.00	AV	Vertical	30.27	54.00	23.73	1.5	90
24800.00	AV	Vertical	28.25	54.00	25.75	1.5	90
2480.00	AV	Horizontal	88.56		(Fund.)	1.0	0
4960.00	AV	Horizontal	35.23	54.00	18.77	1.2	20
7440.00	AV	Horizontal	30.35	54.00	23.65	1.5	90
9920.00	AV	Horizontal	31.47	54.00	22.53	1.0	60
12400.00	AV	Horizontal	31.89	54.00	22.11	1.1	90
14880.00	AV	Horizontal	32.42	54.00	21.58	1.0	100

17360.00	AV	Horizontal	31.17	54.00	22.83	1.2	120
19840.00	AV	Horizontal	32.55	54.00	21.45	1.5	120
22320.00	AV	Horizontal	32.86	54.00	21.14	1.0	100
24800.00	AV	Horizontal	33.25	54.00	20.75	1.6	60
2480.00	PK	Vertical	95.36		(Fund.)	1.0	0
4960.00	PK	Vertical	41.25	74.00	32.75	1.2	0
7440.00	PK	Vertical	36.83	74.00	37.17	1.5	10
9920.00	PK	Vertical	35.35	74.00	38.65	1.1	20
12400.00	PK	Vertical	35.56	74.00	38.44	1.0	58
14880.00	PK	Vertical	36.20	74.00	37.80	1.5	90
17360.00	PK	Vertical	36.87	74.00	37.13	1.8	45
19840.00	PK	Vertical	36.26	74.00	37.74	1.5	100
22320.00	PK	Vertical	36.25	74.00	37.75	1.5	0
24800.00	PK	Vertical	33.69	74.00	40.31	15	50
2480.00	PK	Vertical	93.58		(Fund.)	1.0	90
4960.00	PK	Vertical	40.25	74.00	33.75	1.1	0
7440.00	PK	Vertical	38.64	74.00	35.36	1.5	90
9920.00	PK	Vertical	35.30	74.00	38.70	1.6	50
12400.00	PK	Vertical	35.52	74.00	38.48	1.6	45
14880.00	PK	Vertical	35.26	74.00	38.74	1.5	60
17360.00	PK	Vertical	36.41	74.00	37.59	1.2	10
19840.00	PK	Vertical	39.25	74.00	34.75	1.2	150
22320.00	PK	Vertical	31.11	74.00	42.89	1.0	0
24800.00	PK	Vertical	29.85	74.00	44.15	1.0	0

8 Antenna Requirement.

According to the FCC Part15.203, 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. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a permanent antenna, fulfill the requirement of this section

9 Maximum Peak Output Power

Test Requirement: FCC 15 Subpart C Paragraph 15.247
Test Method: Based on ANSI 63.4:2003
Test Date: Mar.09,2011
Test mode: Compliance test in the worse case: Tx Lower/Tx Middle/Tx Upper
Requirements: Regulation FCC 15 Subpart C Paragraph 15.247 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.

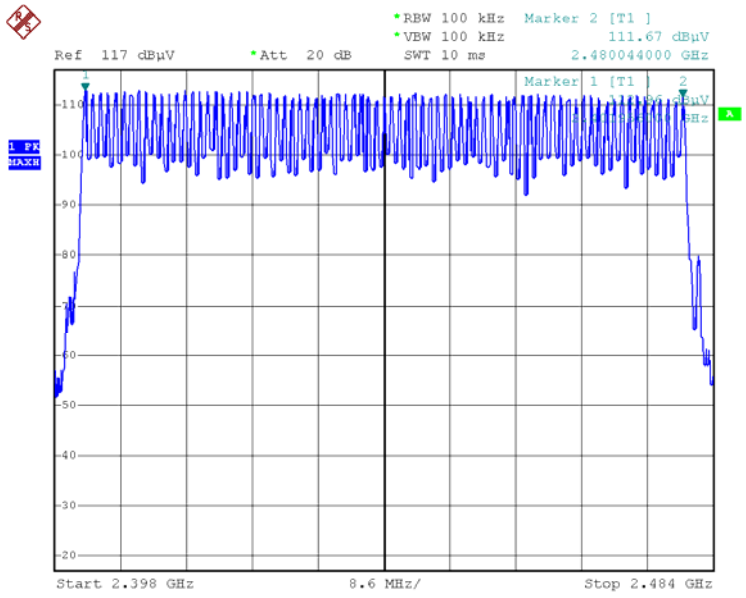
Test Result: The unit does meet the IC requirements.

Test Channel	Fundamental Frequency(MHz)	Output Power (mW)	Limit (W)	Power output level
Lower	2402	4.56	1	conducted
Middle	2441	4.56	1	conducted
Upper	2480	3.29	1	conducted

10 Hopping Channel Number

Test Requirement:	FCC 15 Subpart C Paragraph 15.247
Test Method:	Based on ANSI 63.4:2003
Test Date:	Mar.09,2011
Test mode:	The EUT work in test mode(Tx) and test it
Requirements:	FCC 15 Subpart C Paragraph 15.247. 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 79 channels. The unit does meet the IC requirements.

Please refer the graph as below:



11 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: 25.5°C

Humidity: 51 % RH

Barometric Pressure: 1012 mbar

EUT Operation Condition:

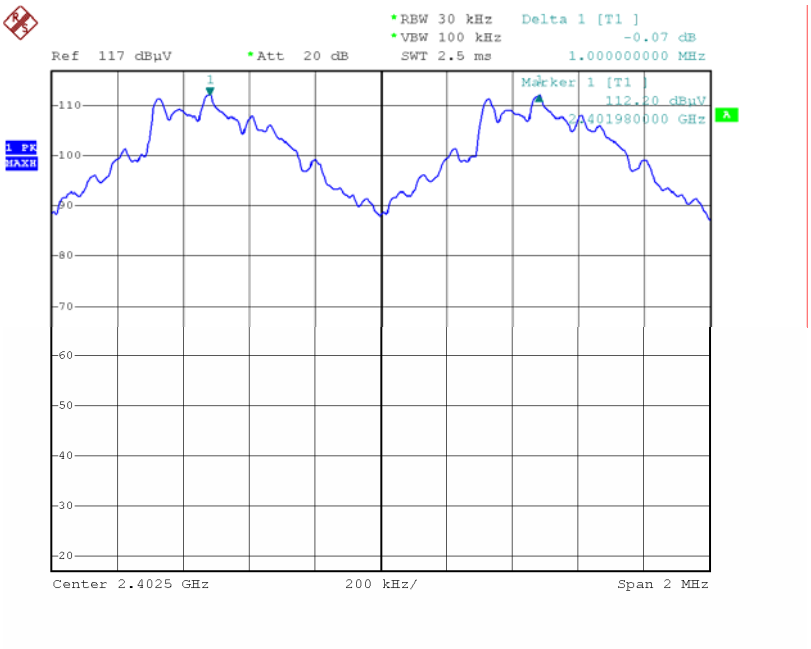
The EUT was programmed to be in continuously transmitting mode.

Test Result: PASS

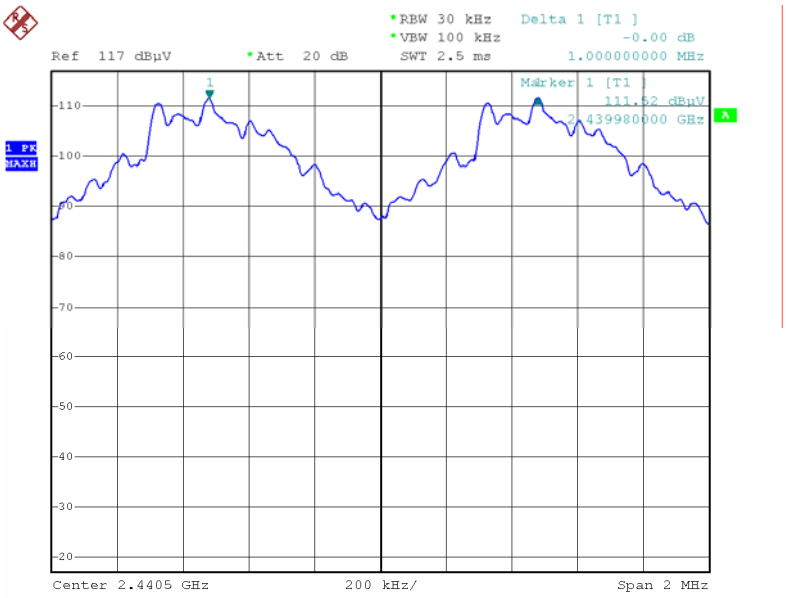
Test Channel	Channel Separation	PASS/FAIL
Lower Channels	1MHz	Pass
Middle Channels	1MHz	Pass
Upper Channels	1MHz	Pass

Please refer to the below photos for more details

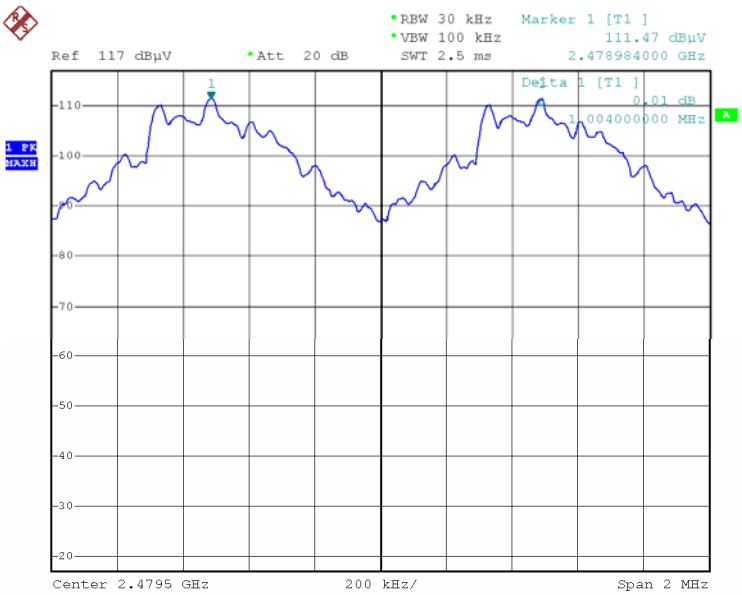
Lower Channel



Middle Channel



Upper Channel



12 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: 25.5°C

Humidity: 51 % 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 0 Hz,measure the maximum time duration of one single pulse.Set the EUT for DH5, DH3 and DH1 packet transmitting.

DH5 Packet permit maximum 1600/ 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots RX, 1 time slot TX).

DH1 Packet permit maximum 1600 / 79 /2 hops per second in each channel (1 time slot RX, 1 time slot TX). So,the Dwell Time can be calculated as follows:

Data Packet	Dwell Time(s)
DH5	1600/79/6*31.6*(MkrDelta)/1000
DH3	1600/79/4*31.6*(MkrDelta)/1000
DH1	1600/79/2*31.6*(MkrDelta)/1000

Note : Mkr Delta is once pulse time .

11.3 Test Result: PASS

Please refer to the below photos for more details.

Lower Channel 2402MHz DH5 test result record

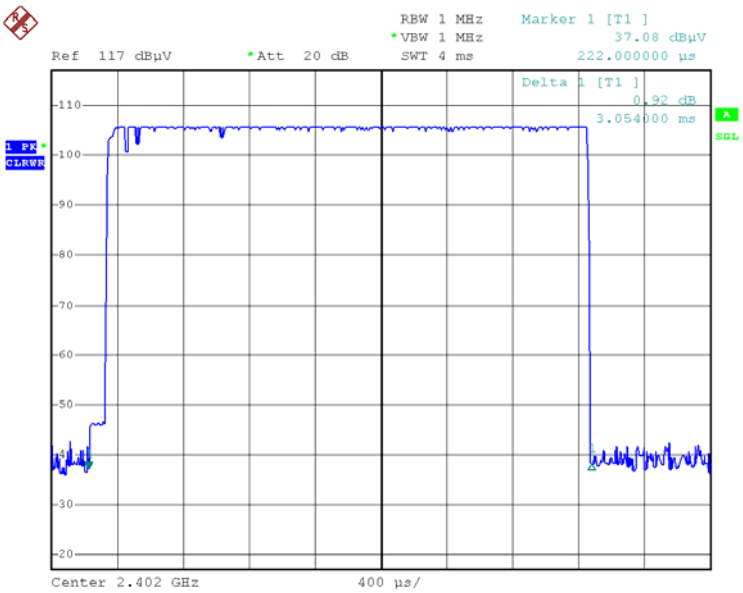
Dwell time of each occupation in this channel as follows:

Data Packet	Frequency	Mkr Delta(ms)	Dwell Time(s)	Limits(s)
DH5	2402 MHz	3.054	0.327	0.400

Test Result: PASS

The Results are not be greater than 0.4 seconds.

Lower Channel 2402 MHz DH5 Test Plots



Lower Channel 2402MHz DH3 test result record

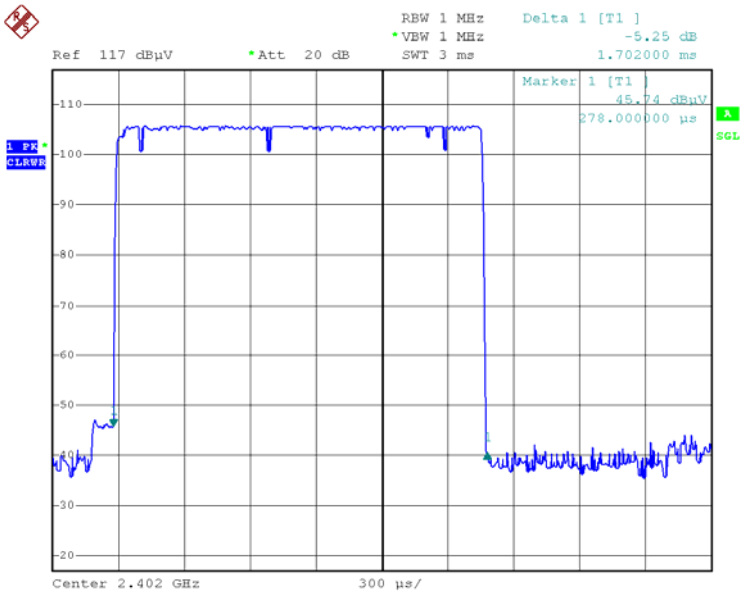
Dwell time of each occupation in this channel as follows:

Data Packet	Frequency	Mkr Delta(ms)	Dwell Time(s)	Limits(s)
DH3	2402 MHz	1.702	0. 272	0.400

Test Result: PASS

The Results are not be greater than 0.4 seconds.

Lower Channel 2402 MHz DH3 Test Plots



Lower Channel 2402MHz DH1 test result record

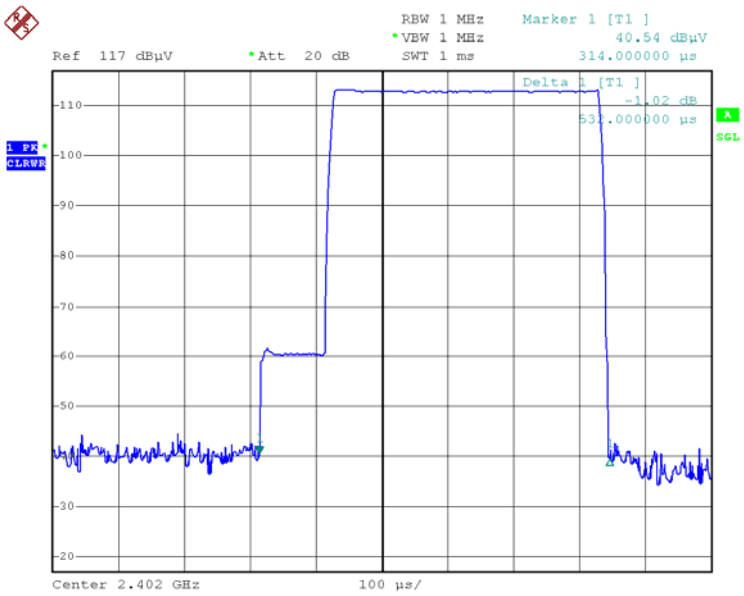
Dwell time of each occupation in this channel as follows:

Data Packet	Frequency	Mkr Delta(ms)	Dwell Time(s)	Limits(s)
DH1	2402 MHz	0.532	0.169	0.400

Test Result: PASS

The Results are not be greater than 0.4 seconds.

Lower Channel 2402 MHz DH1 Test Plots



Middle Channel 2441MHz DH5 test result record

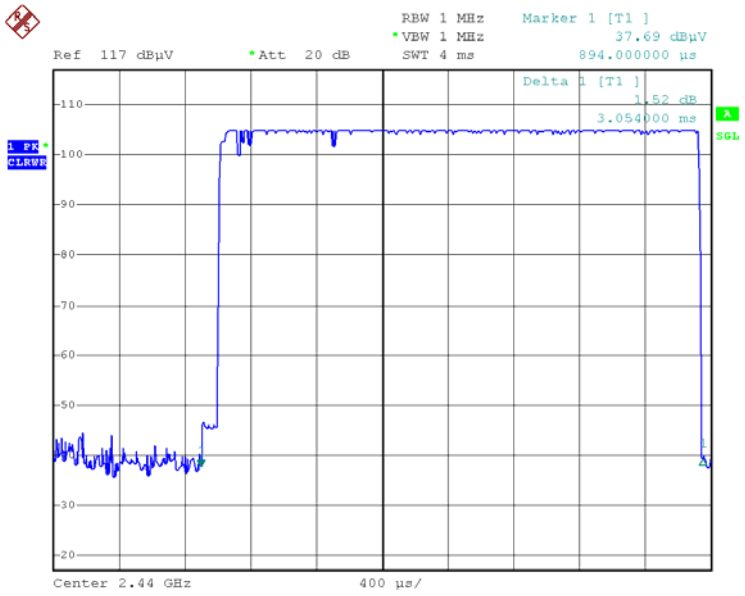
Dwell time of each occupation in this channel as follows:

Data Packet	Frequency	Mkr Delta(ms)	Dwell Time(s)	Limits(s)
DH5	2441 MHz	3.054	0.329	0.400

Test Result: PASS

The Results are not be greater than 0.4 seconds.

Middle Channel 2441 MHz DH5 Test Plots



Middle Channel 2441MHz DH3 test result record

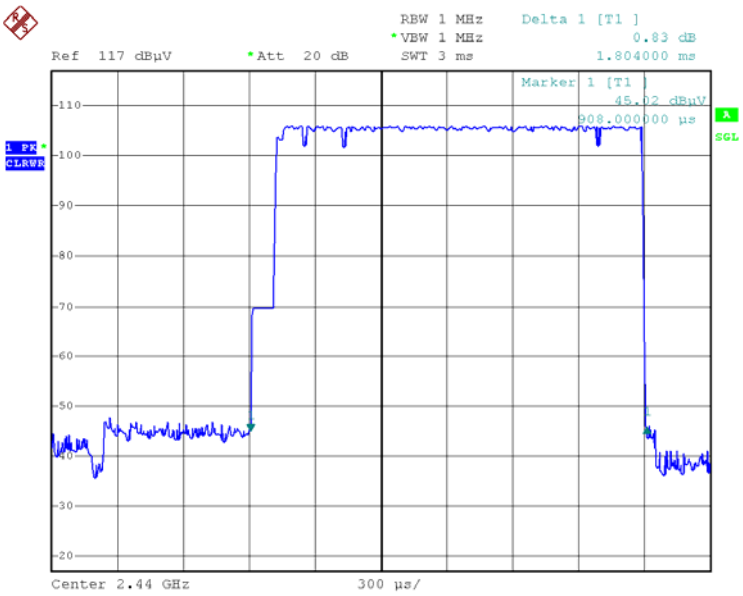
Dwell time of each occupation in this channel as follows:

Data Packet	Frequency	Mkr Delta(ms)	Dwell Time(s)	Limits(s)
DH3	2441 MHz	1.804	0.29	0.400

Test Result: PASS

The Results are not be greater than 0.4 seconds.

Middle Channel 2441 MHz DH3 Test Plots



Middle Channel 2441MHz DH1 test result record

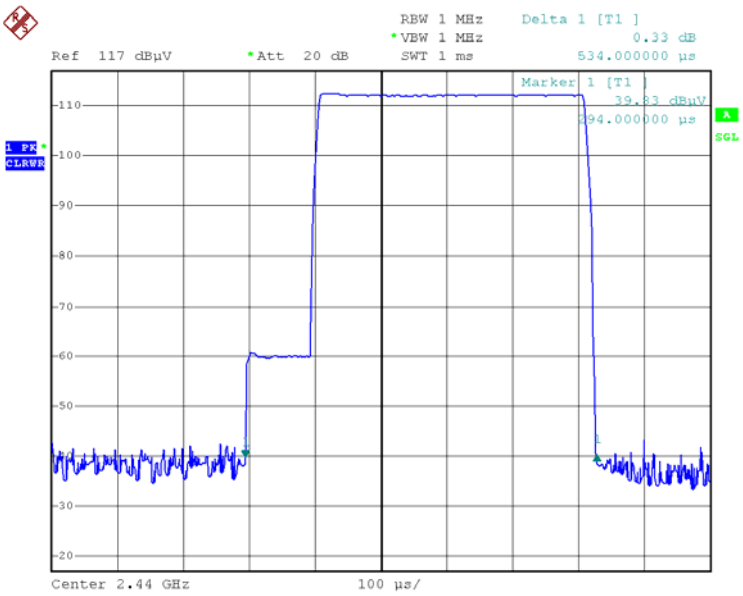
Dwell time of each occupation in this channel as follows:

Data Packet	Frequency	Mkr Delta(ms)	Dwell Time(s)	Limits(s)
DH1	2441 MHz	0.534	0.172	0.400

Test Result: PASS

The Results are not be greater than 0.4 seconds.

Middle Channel 2441 MHz DH1 Test Plots



Upper Channel 2480 MHz DH5 test result record

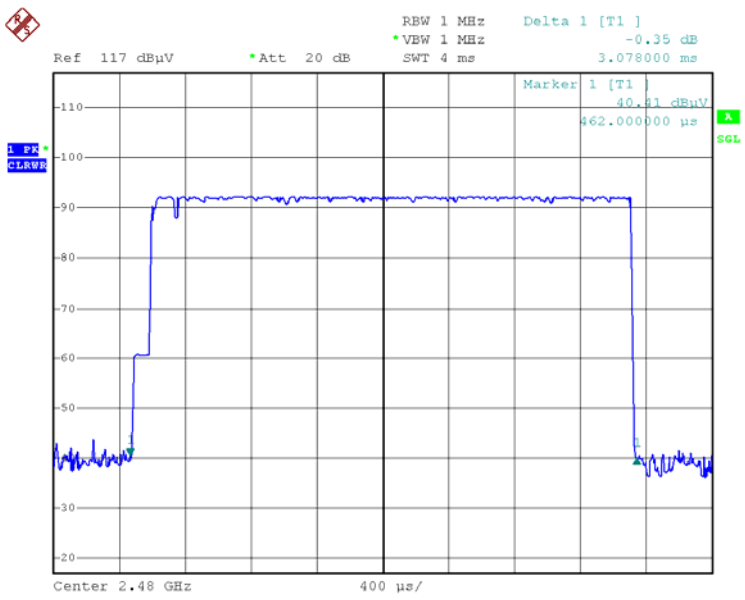
Dwell time of each occupation in this channel as follows:

Data Packet	Frequency	Mkr Delta(ms)	Dwell Time(s)	Limits(s)
DH5	2480 MHz	3.078	0.332	0.400

Test Result: PASS

The Results are not be greater than 0.4 seconds.

Upper Channel 2480 MHz DH5 Test Plots



Upper Channel 2480 MHz DH3 test result record

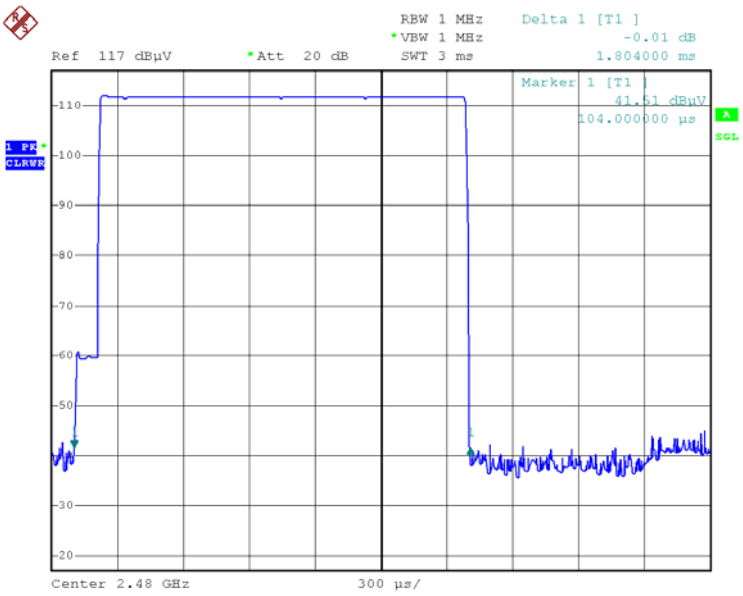
Dwell time of each occupation in this channel as follows:

Data Packet	Frequency	Mkr Delta(ms)	Dwell Time(s)	Limits(s)
DH3	2480 MHz	1.804	0.29	0.400

Test Result: PASS

The Results are not be greater than 0.4 seconds.

Upper Channel 2480 MHz DH3 Test Plots



Upper Channel 2480 MHz DH1 test result record

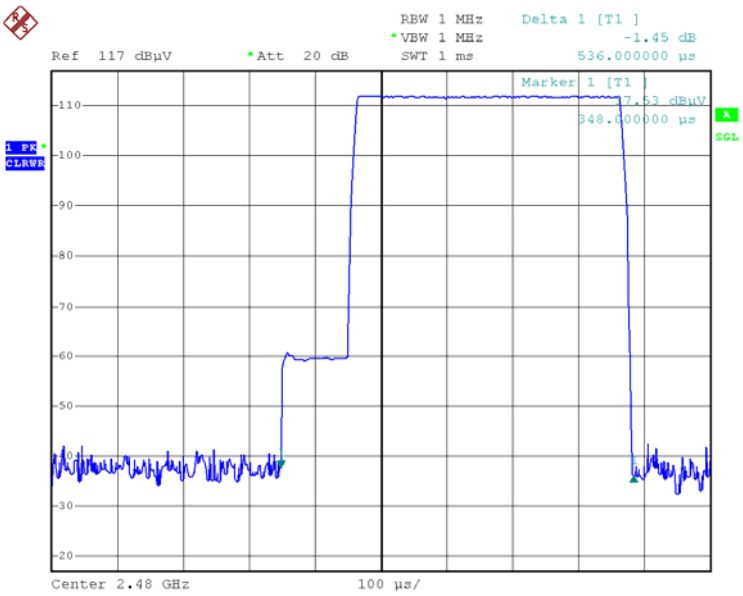
Dwell time of each occupation in this channel as follows:

Data Packet	Frequency	Mkr Delta(ms)	Dwell Time(s)	Limits(s)
DH1	2480 MHz	0.536	0.171	0.400

Test Result: PASS

The Results are not be greater than 0.4 seconds.

Upper Channel 2480 MHz DH1 Test Plots



13 20-dB Bandwidth

Test Requirement:	FCC 15 Subpart C Paragraph 15.247
Test Method:	Based on ANSI 63.4:2003
Test Date:	Mar.09,2011
Test mode:	The EUT work in test mode(Tx) and test it

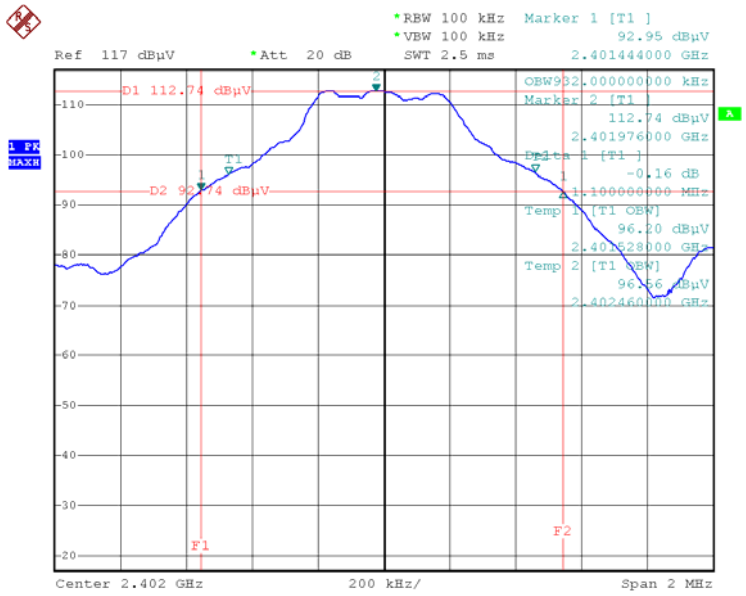
Test Procedure

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.

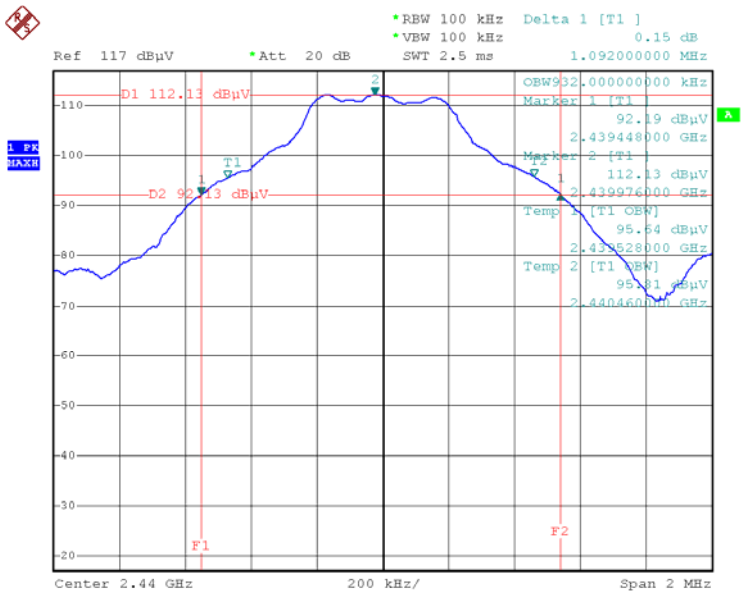
Test Result

Please refer the graph as below:

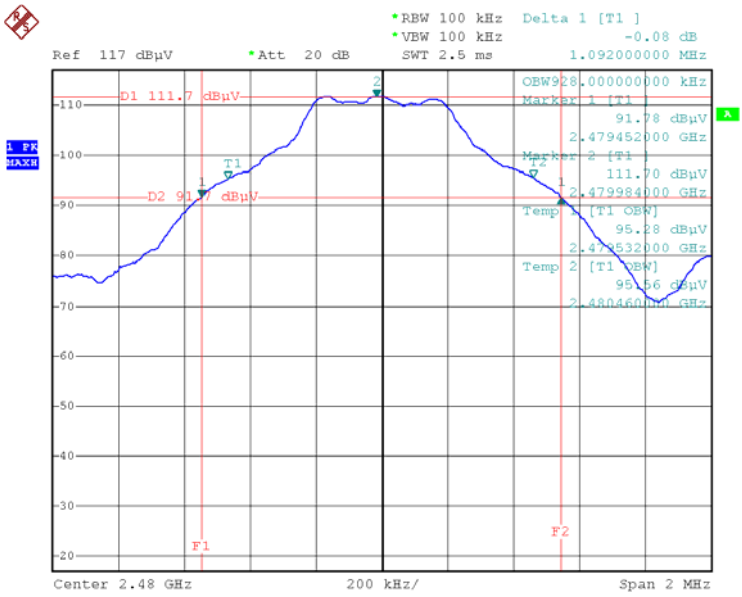
Lower Channel 2402MHz



Middle Channel 2441MHz



Upper Channel 2480MHz



14 Radiated spurious emissions into adjacent restricted band

Test Requirement: FCC 15 Subpart C Paragraph 15.247 and
FCC 15 Subpart C Paragraph 15.209

Test Method: Based on ANSI 63.4:2003

Test Date: Mar.09,2011

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

Requiments:

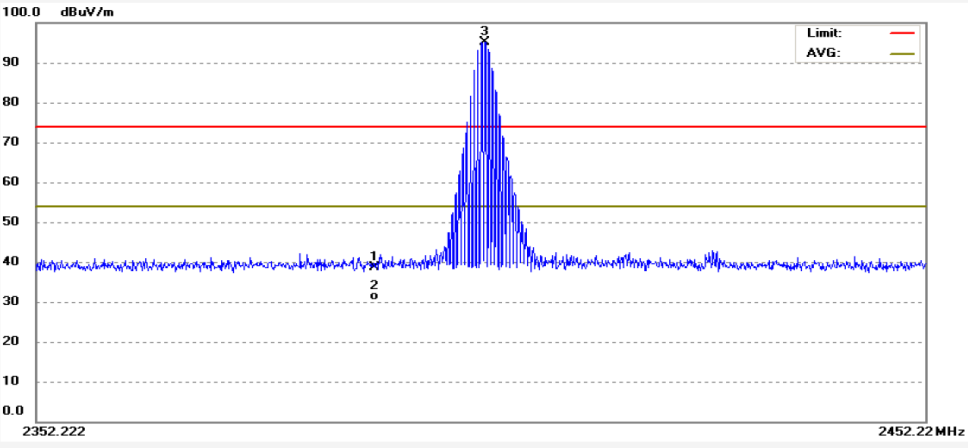
Emissions that fall in the restricted bands of the FCC 15 Subpart C Paragraph 15.247 and FCC 15.205.Above 1000MHz, compliance with the emissions limits in FCC 15 Subpart C Paragraph 15.247 and section of FCC 15.209 shall be demonstrated based on the average value of the measured emissions,The provisions 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 IC 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.

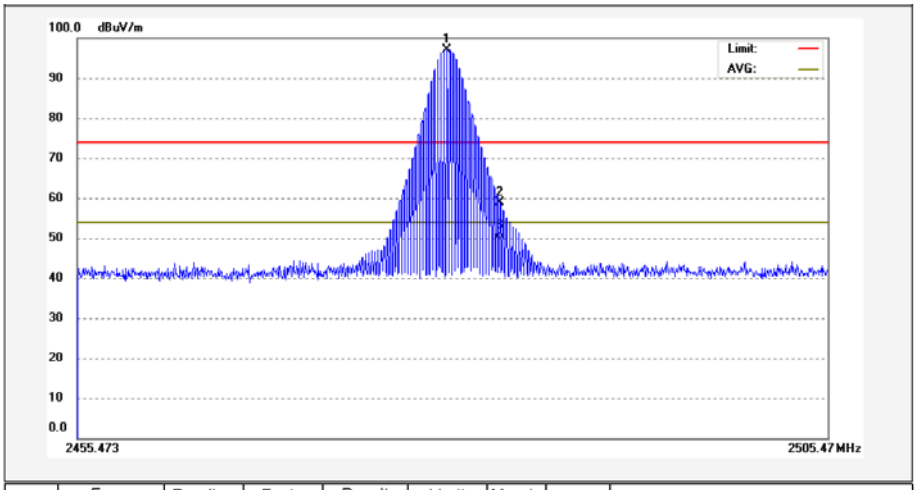
Remark: the worse case was the Horizontal position,so the data show was the Horizontal position only.

Lower bandedge/ restricted band



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2390.000	40.58	-2.01	38.57	74.00	-35.43	peak	
2	2390.000	32.36	-2.01	30.35	54.00	-23.65	AVG	
3	2402.222	97.13	-2.03	95.10	74.00	21.10	peak	

Upper bandedge/ restricted band



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	2479.973	97.24	-0.13	97.11	74.00	23.11	peak	
2	2483.500	58.94	-0.12	58.82	74.00	-15.18	peak	
3	2483.500	49.63	-0.12	49.51	54.00	-4.49	AVG	

15 RF Exposure Test

Test Requirement: FCC Part 2 Subpart J and FCC 15.247
Test Method: Based on ANSI 63.4:2003
Test Date: Mar.09,2011
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^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ 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^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ 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 (V/m) $= \frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) $= \frac{E^2}{377}$

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

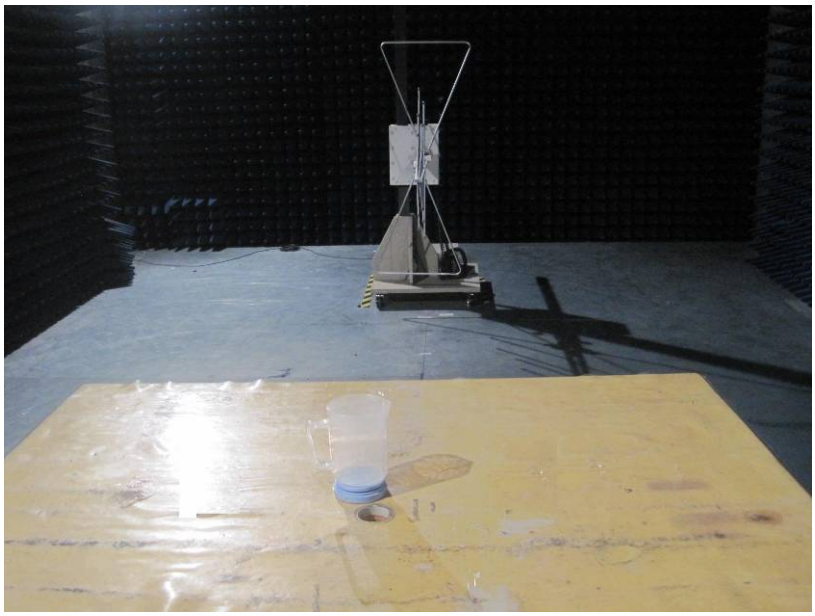
Pd $= \frac{30 \times P \times G}{377 \times d^2}$

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

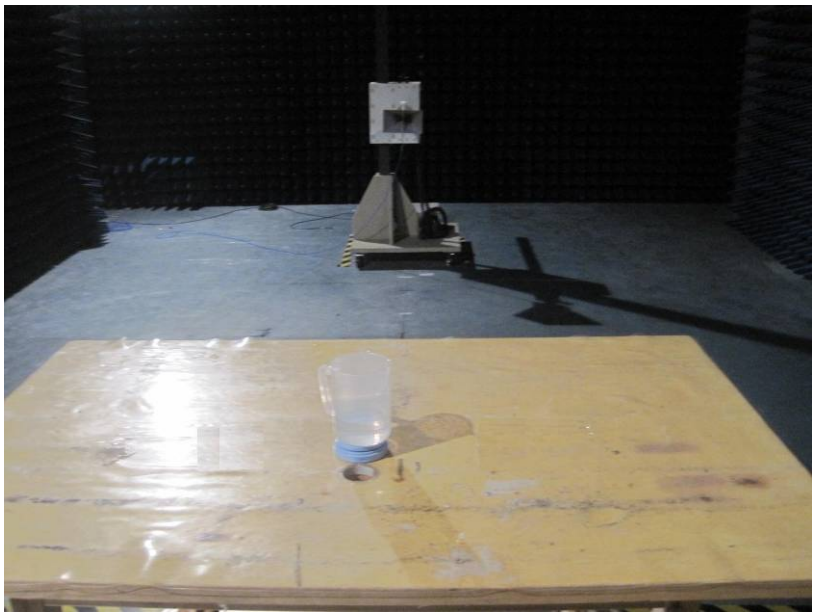
Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm2)	Limit of Power Density (S) (mW/cm2)	Test Result
0	1	4.56	6.59	0.00131	1	Complies
0	1	4.56	6.59	0.00131	1	Complies
0	1	3.29	5.17	0.00103	1	Complies

16 Photographs of Testing

Radiation Emission Test View For 30MHz-1000MHz



Radiation Emission Test View For 1GHz-25GHz

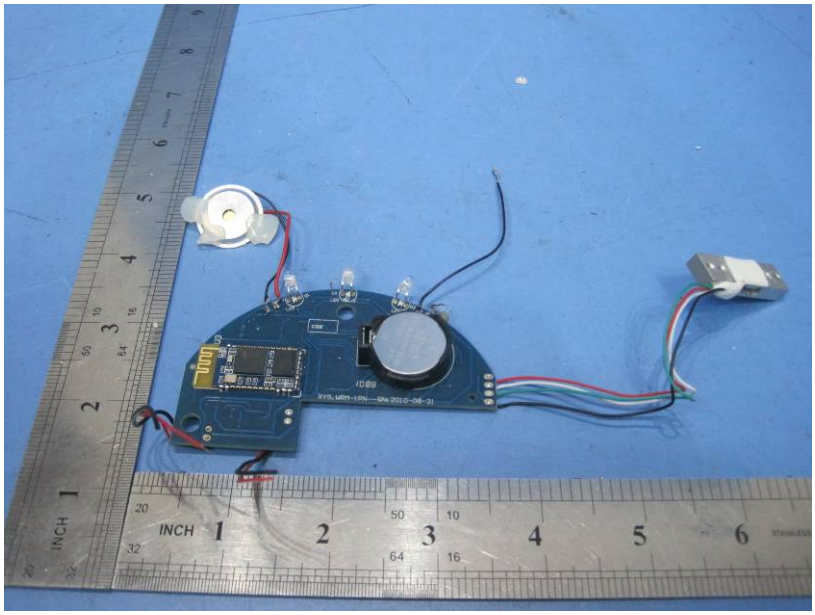


17 Photographs - Constructional Details

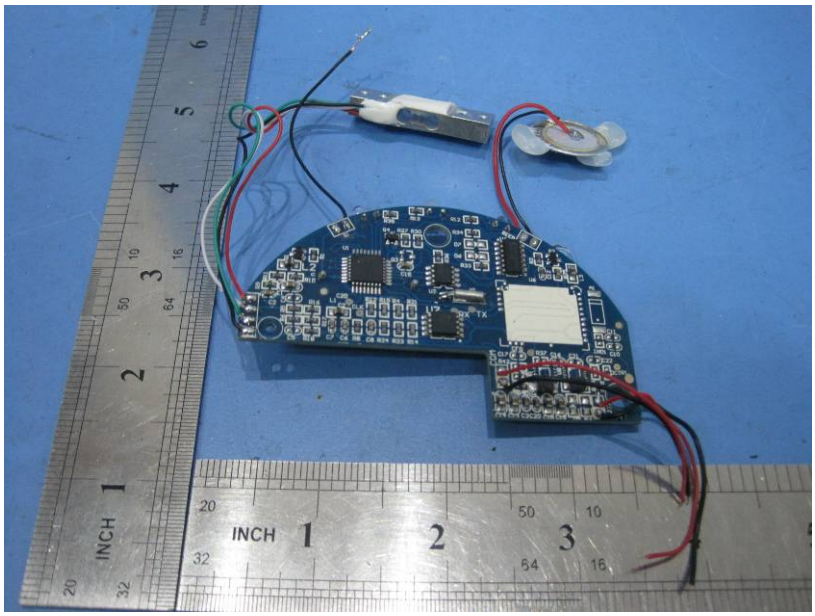
17.1 EUT-Front View

17.2 EUT-Back View

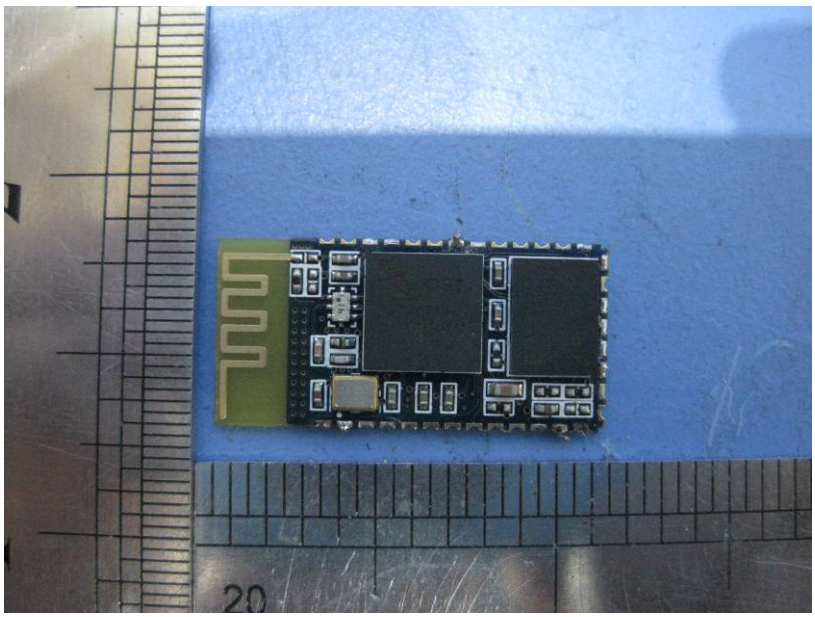
17.3 PCB1-Front View



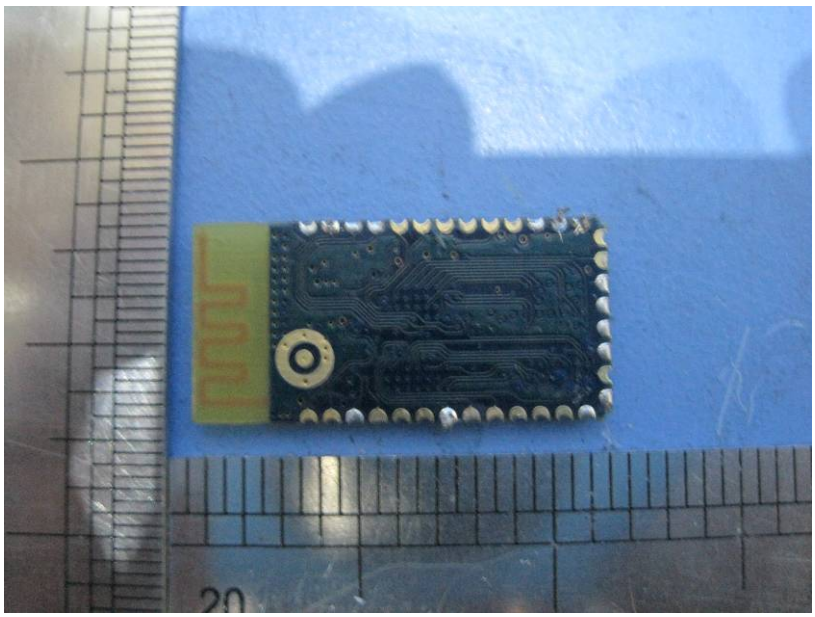
17.4 PCB1-Back View



17.5 PCB2-Front View



17.6 PCB2-Back View



18 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 Label Location