SGS-CSTC Standards Technical Services Ltd.

No.198 Kezhu Road, Science Town Economic& Technology
Development District Guangzhou, China 510663Telephone:
Telephone: +86 (0) 20 82155555
Fax: +86 (0) 20 82075059
Email: sgs_internet_operations@sgs.com

FEDERAL COMMUNICATIONS COMMISSION
Registration number: 282399

TEST REPORT

Application No. :	GLEMR060700750RF
Applicant:	National Electronics & Watch co.ltd.
FCC ID:	UH5M04455
Frequency Band	2.410GHz and 2.463GHz
Equipment Under Test (EUT):	
Name:	Cyclo Computer Cadence Sensor Digital Link,M04-455(TX PART)
	Cyclo Computer Speed Sensor Digital Link,M06-091(TX PART)
Model No.:	M04-455,M06-091
Trade mark :	MAVIC
Standards:	FCC PART 15: 2006
	Please refer to section 2 for further details.
Date of Receipt:	August 7 2006
Date of Test:	19 July to 3 August 2006
Date of Issue:	August 11 2006
Test Result :	**PASS ***

In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Jerry Chen
Manager

2 Test Summary

Test	Test Requirement	Stanadard Paragraph	Result
Flied Strength of Fundamental	FCC PART 15 :2006	Section 15.249 (a)	PASS
Flied Strength of Unwanted Emissions	FCC PART 15 :2006	Section 15.249 (a) Section 15.249 (d)	PASS
Occupied Bandwidth	FCC PART 15 :2006	Section 15.249	PASS
Band Edges	FCC PART 15 :2006	Section 15.249 (d)	PASS

Remark:

The two models M04-455, M06-091 are Tx. Only one model was tested as above since their electrical circuit design, layout, components used and internal wiring are identical. Only the sofeware is difference.

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

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

3 Contents

4 General Information

4.1 Client Information

Applicant Name:	National Electronics & Watch co.ltd.
Applicant Address:	15 F.,SHING DAO ING.BLDG.,232 ABERDEEN,HONG KONG

4.2 General Description of E.U.T.

Product Name:	Cyclo Computer Cadence Sensor Digital Link,M04-455(TX PART) Cyclo Computer Speed Sensor Digital Link,M06-091(TX PART)
Model:	M04-455,M06-091
Power Supply:	3.0V DC (1x"CR2032" cell battery)
Power Cord:	N/A
Emission Designation:	F9D

4.3 Description of EUT operation

The EUT was a set of equipment:

The Tx have 2 frequencies between 2.410GHz to 2.463GHz ,A channel 2.410GHz used for broadcast connection information, another B channel between 2.410GHz and 2.463GHz used for transfer data. A channel is a fixed frequency channel. Before the receiver be found, B frequency will hop between lowest channel to highest channel in the assigned frequency band. when the Rx be found, B frequency will fixed in one channel and will not change it any more.

Rx receive the data from Tx and display the relative information about it.

It can support the Tx model include M04-455,M06-091,M04-456,M04-457 simultaneously or relatively.

4.4 Standards Applicable for Testing

The standard used was FCC PART 15, SUBPART C (2006) section 15.249.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory, No.198 Kezhu Road, Science Town Economic& Technology Development District Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

4.6 Other Information Requested by the Customer

None.

4.7 Test Facility

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

- **NVLAP – Lab Code: 200611-0**
  SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0. Effective through December 31, 2006.
- **ACA**
  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.
- **VCCI**
  The 3m Semi-anechoic chamber and Shielded Room (11.5m x 4m x 4m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1599 and C-1706 respectively.
  Date of Registration:June 01, 2005. Valid until February 22, 2008
- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**
  Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.
- **CNAL – LAB Code: L0141**
  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAL/AC01: 2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.
- **FCC – Registration No.: 282399**
  SGS-CSTC Standards Technical Services 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 282399, May 31, 2002. With the above and NVLAP's accreditation, SGS-CSTC is an authorised test laboratory for the DoC process.
- **Industry Canada (IC)**
  The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5169.

5 Test Results

5.1 Test Instruments

No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (dd-mm-yy)	Cal.Duedate (dd-mm-yy)
1	Temperature Chamber	TERCHY	MHG-800RR	0118	05-12-2005	05-12-2006
2	D.C. Power Supply	Instek	PS-3030	9862036	Check when used	
3	DMM	Fluke	73	70681569 or 70671122	12-09-2005	12-09-2006
4	Impact 3m Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	06-03-2006	06-03-2007
5	Biconical Antenna (Rx)	Rohde & Schwarz	HK116	100032	30-01-2006	30-01-2007
6	Biconical Antenna (Tx)	Rohde & Schwarz	HK116	100033	10-05-2006	09-05-2007
7	Log-Perd. Dipole Antenna (Rx)	Rohde & Schwarz	HL223	100039	11-06-2006	10-06-2007
8	Log-Perd. Dipole Antenna (Tx)	Rohde & Schwarz	HL223	100040	10-05-2006	09-05-2007
9	Horn Antenna (Rx)	Rohde & Schwarz	HF906	100095	11-06-2006	10-06-2007
10	Horn Antenna (Tx)	Rohde & Schwarz	HF906	100096	10-06-2006	09-06-2007
11	Bilog Type Antenna	Schaffner Chase	CBL6143	5070	14-01-2006	13-01-2007
12	Bilog Type Antenna	Schaffner Chase	CBL6112B	2966	31-10-2005	31-10-2006
13	0.1-1300 MHz Pre Amplifier	HP	8447D OPT 010	2944A06252	16-01-2006	16-01-2007
14	1-26.5GHz Pre Amplifier	Agilent	8449B	3008A01649	06-03-2006	06-03-2007
15	Antenna Mask (Tx)	HD-GmbH	AS620M	620/408	06-03-2006	06-03-2007
16	Antenna Mask (Rx)	HD-GmbH	MA240	240/619	N/A	N/A
17	Turntable	HD-GmbH	DT430	EMC0509	N/A	N/A
18	Turntable & Antenna Mask Controller	HD-GmbH	HD100	EMC0510	N/A	N/A
19	EMI Test Software	Rohde & Schwarz	ES-K1	EMC0512	N/A	N/A
20	Coaxial cable	Rohde & Schwarz	N/A	EMC0511	N/A	N/A
21	Coaxial cable	Rohde & Schwarz	N/A	EMC0514	04-11-2005	03-11-2006
22	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	04-11-2005	03-11-2006
23	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	05-12-2005	05-12-2006
24	Signal Generator	Rohde & Schwarz	SMR20	100416	05-12-2005	05-12-2006
25	Radio Communication Monitor	Rohde & Schwarz	CMS54	100137	05-12-2005	05-12-2006
26	Power Meter	Rohde & Schwarz	NRVS	825770/074	20-12-2005	20-12-2006

27	Power Sensor	Rohde & Schwarz	NRV-Z5	825802/013	18-07-2005	18-07-2006
28	Dual Directional Coupler	Werlatone Inc.	C1795	6634	18-07-2005	18-07-2006
29	Audio Analyzer	Rohde & Schwarz	UPL	100855	16-08-2005	16-08-2006
30	Digital Oscilloscope	Tektronix	TDS3012	B015508	16-08-2005	16-08-2006
31	Temp. Humidity	Shenzhen Tai Kong	THG-1	EMC0054	04-01-2006	04-01-2007

5.2 E.U.T. Operation

Input voltage: 3.0V DC (1 x 'CR2032' Size Cell Battery)

Operating Environment:

Temperature: 24 °C~26°C

Humidity: 53 % RH~62 % RH

Atmospheric Pressure: 996 ~ 1006 mbar

EUT Operation: Test in transmitting mode:

1. For 1 mode:

channel A: 2.410GHz(lowest channel) , channel B:2.431GHz(middle channel)

2. For 2 mode:

channel A: 2.410GHz(lowest channel), channel B:2.463GHz(highest channel)

5.3 Test Procedure & Measurement Data

5.3.1 Radiated Emissions

5.3.1.1 Test in transmitting mode

Test Requirement: FCC Part15 C Section 15.249(a) & (d)

Test Method: Based on FCC Part15 C Section 15.249 & ANSI C63.4

Test Date: 2 August 2006

Measurement Distance: 3m (Semi-Anechoic Chamber)

Frequency range 30 MHz – 25GHz for transmitting mode.

Test instrumentation resolution bandwidth
120 kHz (30 MHz - 1000 MHz), 1 MHz (1000 M – 25GHz)

Operation: Receive antenna scan height 1 - 4 m, polarization Vertical/ Horizontal

Requirements:

FCC Part 15.249(a)

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m @ 3m)	Field Strength of Harmonics and Spurious Emissions (dBuV/m @ 3m)
902 to 928	94.0	54.0
2400 to 2483.5	94.0	54.0
5725 to 5875	94.0	54.0
24000 to 24250	108.0	68.0

FCC Part 15.249(d)

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

Remark:

The fundamental frequency of the EUT is between 2400 to 2483.5MHz

The limit for average field strength dBuv/m for the fundamental frequency = 94.0 dBμV/m.

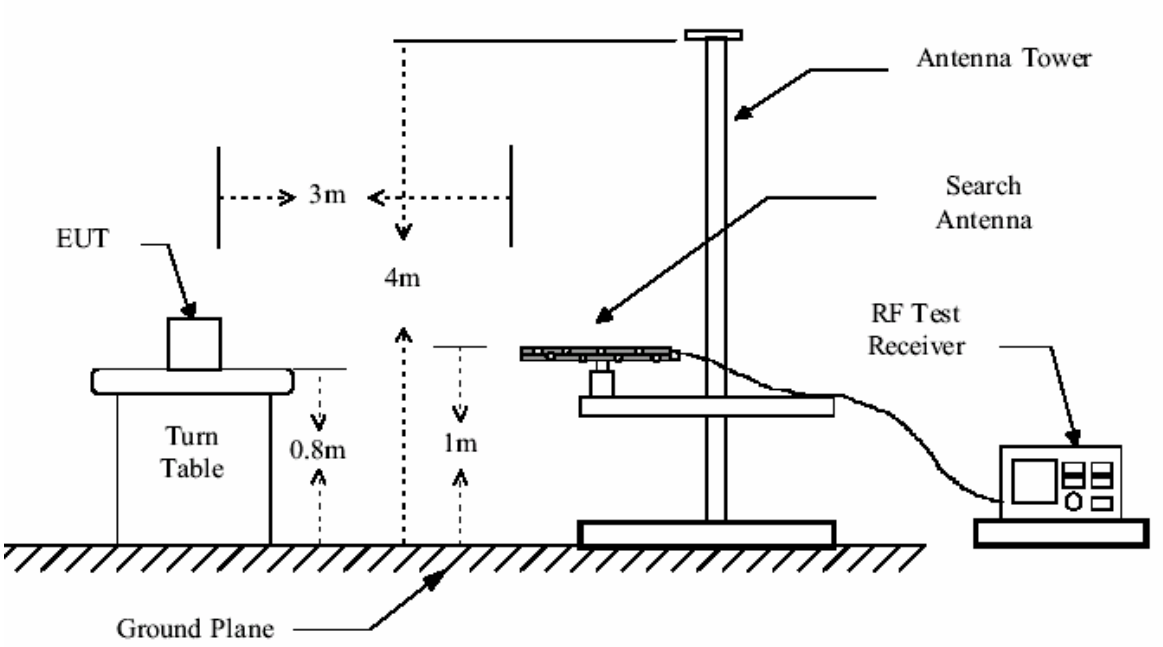
No fundamental is allowed in the restricted bands.

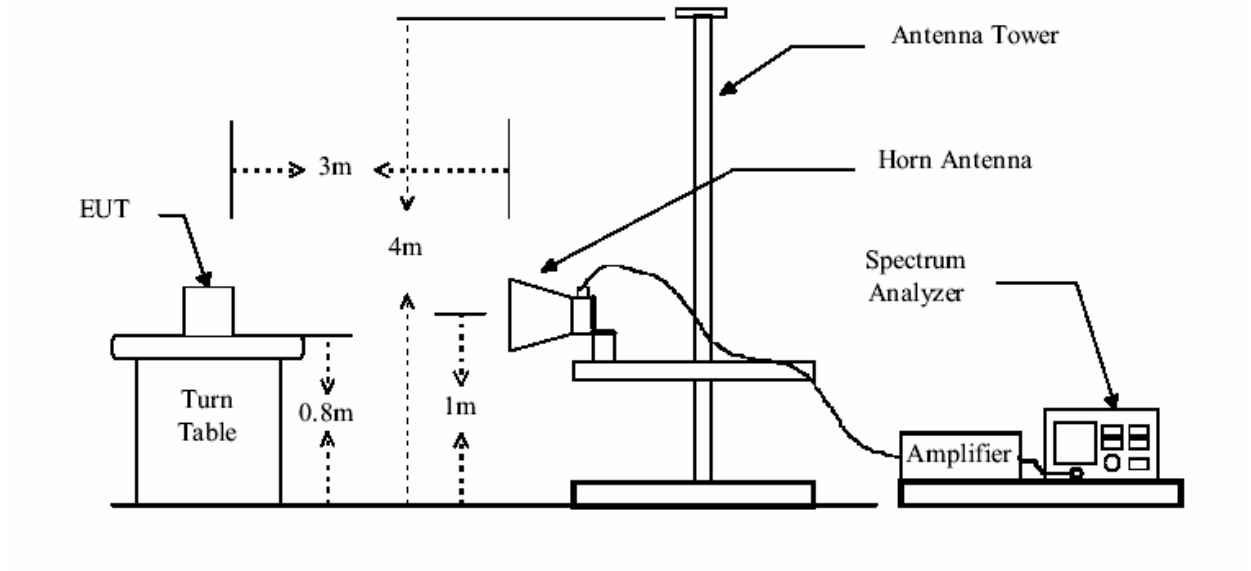
The limit for average field strength dBμV/m for the harmonics = 54.0 dBμV/m.

Spurious in the restricted bands must be less than 44.0 dBuv/m or 54.0 dBμV/m in 15.209. Here is 54.0 dBμV/m according to FCC Part 15.249(d).

Test Procedure: The procedure uesd was ANSI Standard C63.4-2003. The receive was scanned from 30MHz to 25GHz.When an emission was found,the table was roated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

Test Configuration:





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

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Peramlifer Factor

The following test results were performed on the EUT:

For **Mode 1**: (1). Fundamental emission

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2.410	86.7	78.7	114.0	27.3	35.3
2.431	95.6	92.6	114.0	18.4	21.4
Average Measurement					
2.410	46.3	41.2	94.0	47.7	52.8
2.431	58.4	47.1	94.0	35.6	46.9

(2). Harmonics & Spurious Emissions

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2) 4.820	62.8	62.3	74.0	11.2	11.7
3) 4.862	71.9	71.6	74.0	2.1	2.4
4) 7.230	57.4	56.2	74.0	16.6	17.8
5) 7.293	66.1	64.6	74.0	7.9	9.4
Average Measurement					
2) 4.820	34.1	38.3	54.0	19.9	15.7
3) 4.862	37.6	39.4	54.0	16.4	14.6
4) 7.230	42.6	40.1	54.0	11.4	13.9
5) 7.293	49.3	48.6	54.0	4.7	5.4

Remark:

1). According to 15.249 (e) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

2）Sweep from 30MHz to 25GHz, find the max radiated emissions and record it, when the emissions are too weak to be detected, it will not be reported.

TEST RESULTS: The unit does meet the FCC requirements.

The following test results were performed on the EUT:

For **Mode 2**: (1). Fundamental emission

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2.410	87.4	80.9	114.0	26.6	33.1
2.463	98.6	97.6	114.0	15.4	16.4
Average Measurement					
2.410	50.1	54.5	94.0	43.9	39.5
2.463	57.4	56.4	94.0	36.6	37.6

(2). Harmonics & Spurious Emissions

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2) 4.820	63.2	64.1	74.0	10.8	9.9
3) 4.926	72.7	70.8	74.0	1.3	3.2
4) 7.230	55.1	54.2	74.0	18.9	19.8
5) 7.389	64.2	65.9	74.0	9.8	8.1
Average Measurement					
2) 4.820	37.2	35.9	54.0	16.8	18.1
3) 4.926	37.3	36.7	54.0	16.7	17.3
4) 7.230	40.3	42.6	54.0	13.7	11.4
5) 7.389	46.8	43.9	54.0	7.2	10.1

Remark:

1). According to 15.249 (e) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

2）Sweep from 30MHz to 25GHz, find the max radiated emissions and record it, when the emissions are too weak to be detected, it will not be reported.

TEST RESULTS: The unit does meet the FCC requirements.

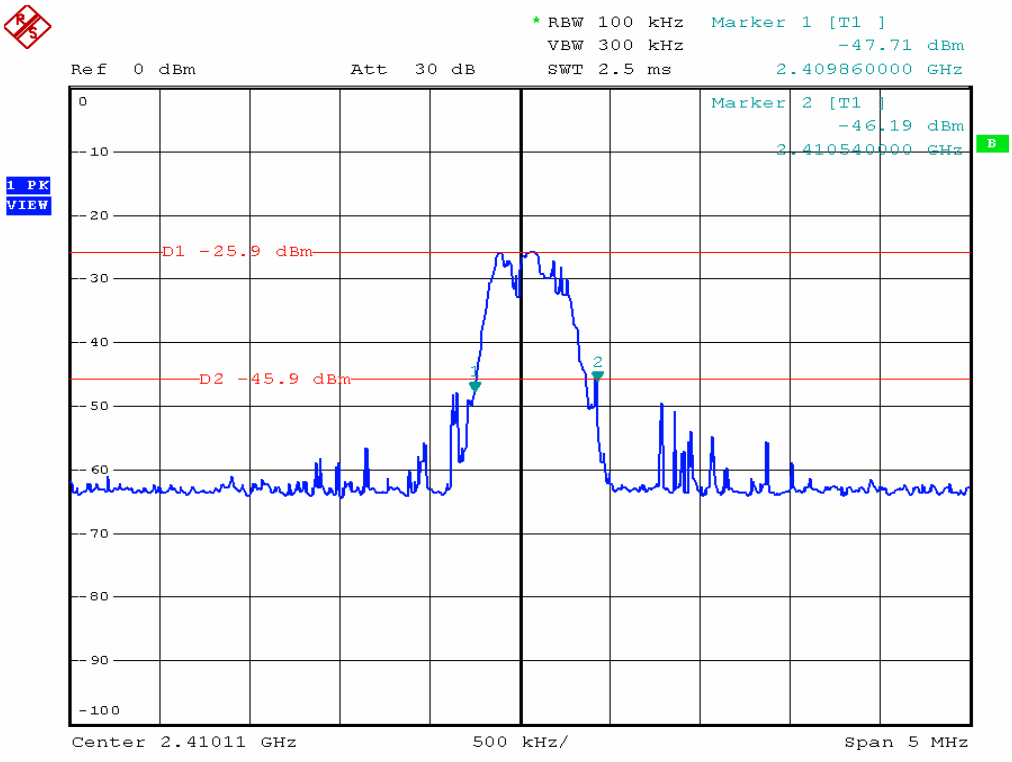
5.3.2 Occupied Bandwidth & Band Edge

Test Requirement:	FCC Part 15 C Section 15.249
Test Method:	ANSI C63.4 and FCC Part 2.1049
	Operation within the band 2.4000 – 2.4835GHz
Test Date:	3 August 2006
Requirements:	15.249 (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.
Method of measurement:	A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken.

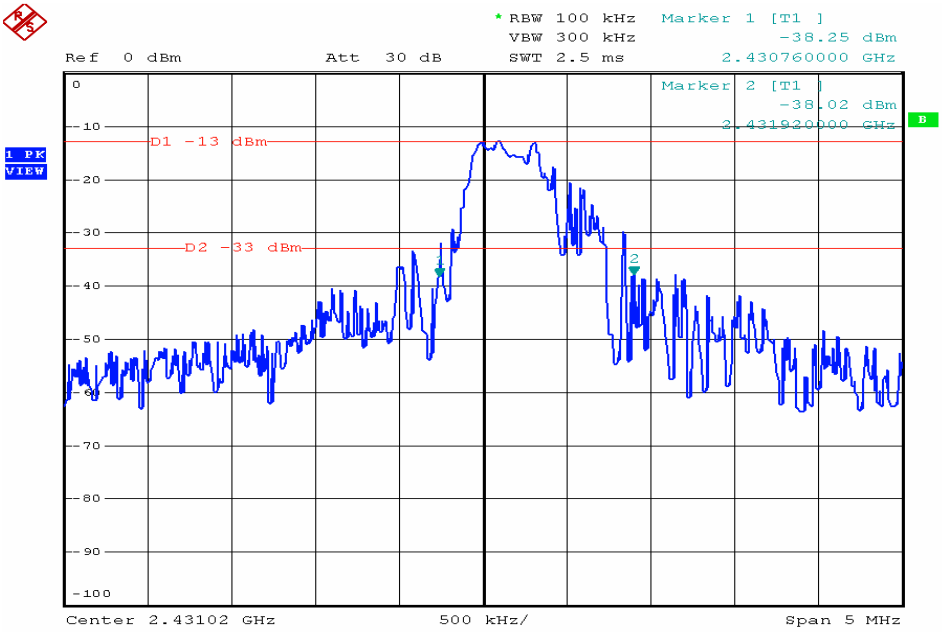
(1). **For Mode 1**:

(i)The occupied bandwidth as below:

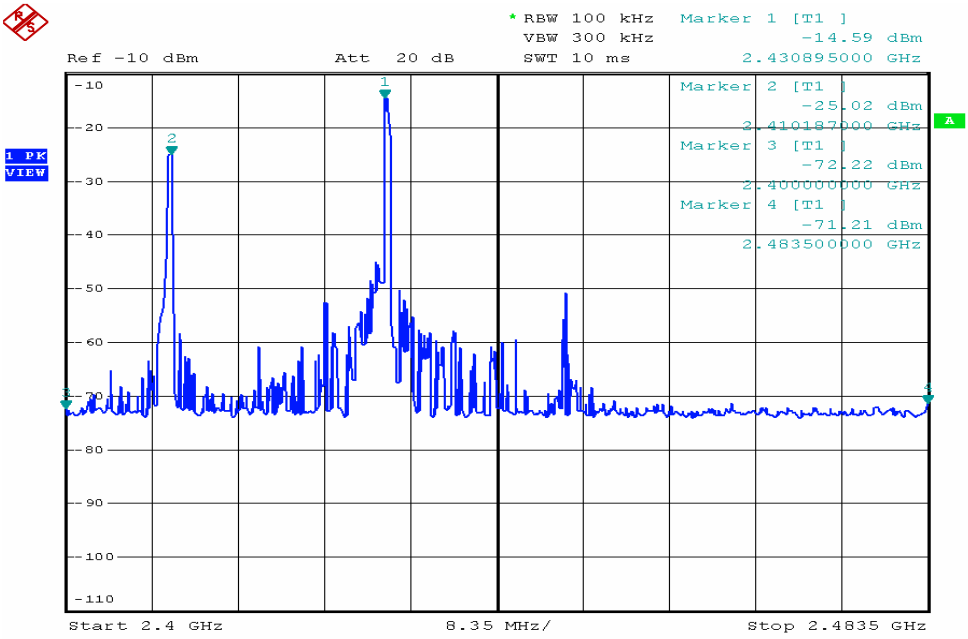
A channel:



B channel:



(ii)Band Edge:



The test result for the Emissions radiated outside of the specified frequency bands , please refer the section 5.3.1 of this report.
The worst case is peak value 71.9dBuV/m at frequency 4.862GHz, it's below the limits 74.0 base Section 15.209 .

For the field strength of Lower Edges:2.4000GHz is 51.7dBuV/m(peak value).

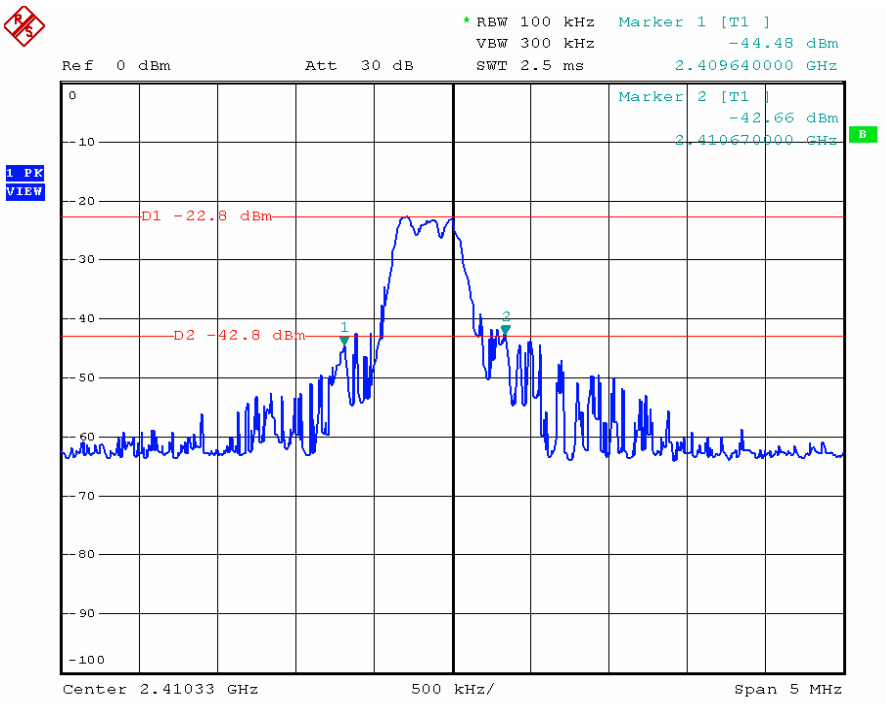
For the field strength of Upper Edges:2.4835GHz is 45.2dBuV/m(peak value).

The results: The unit does meet the FCC requirements.

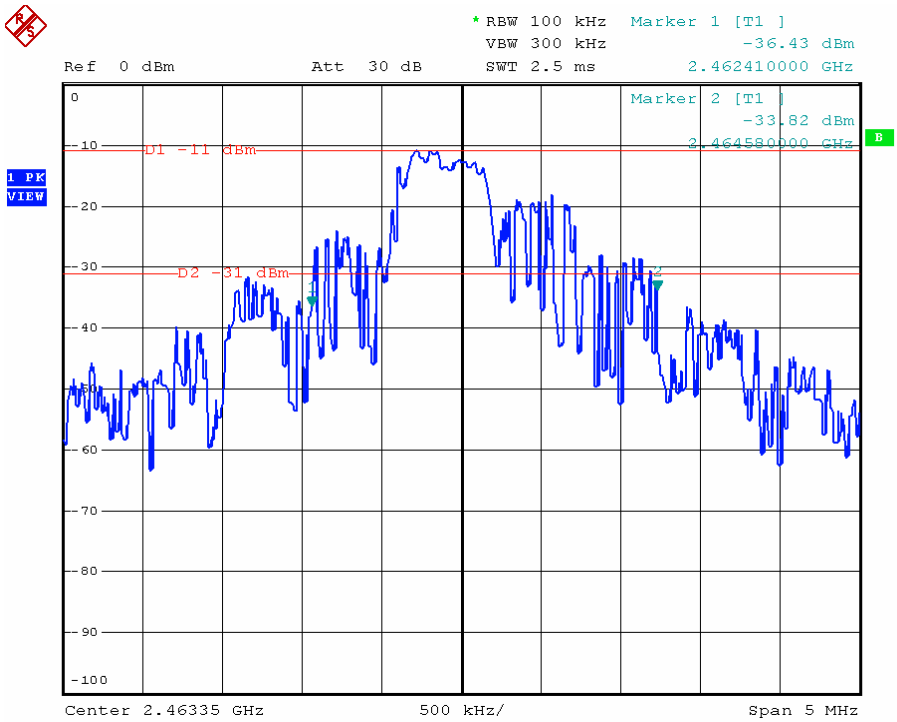
(2) **For Mode 2:**

(i).The occupied bandwidth as below:

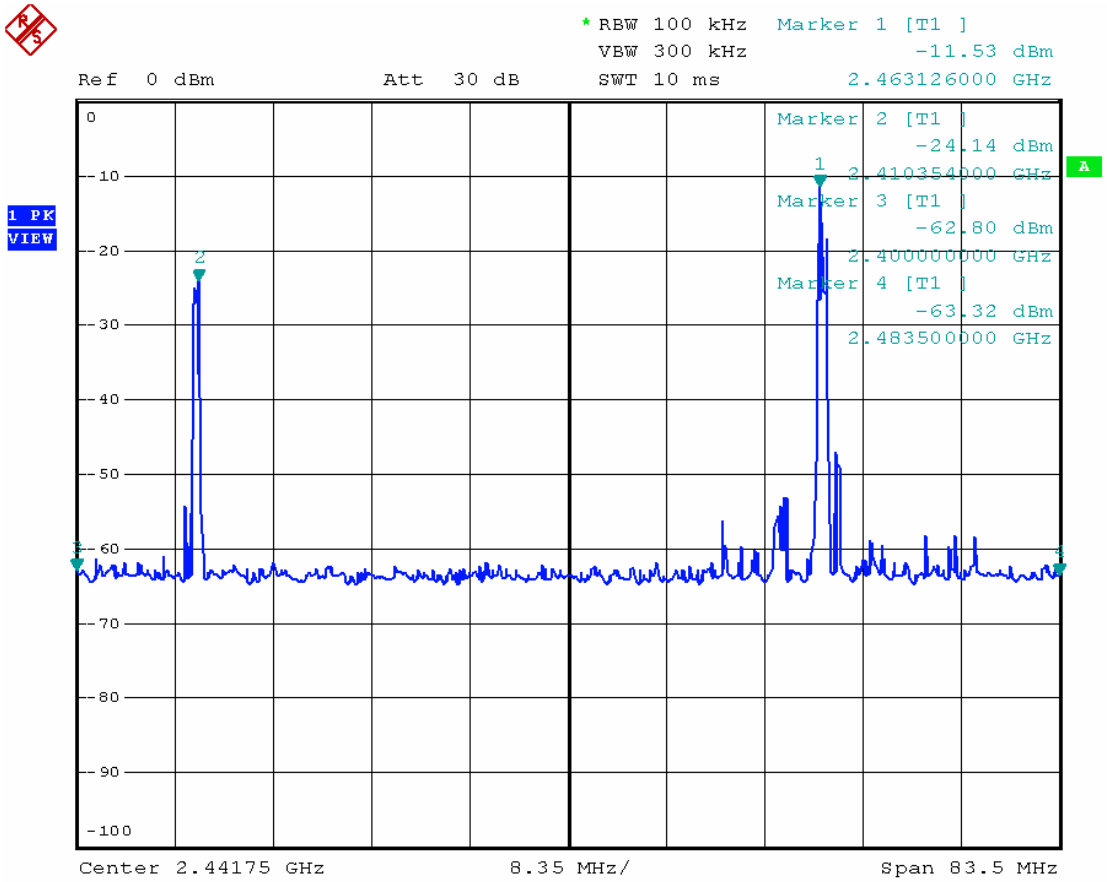
A channel:



B channel:



(ii). Band Edge:



The test result for the Emissions radiated outside of the specified frequency bands , please refer the section 5.3.1 of this report.

The worst case is peak value 72.7dBuV/m at frequency 4.926GHz, it's below the limits 74.0 base Section 15.209.

For the field strength of Lower Edges:2.4000GHz is 55.3dBuV/m(peak value).
For the field strength of Upper Edges:2.4835GHz is 51.9.0dBuV/m(peak value).

The results: The unit does meet the FCC requirements.