FCC TEST REPORT

For

SANWA ELECTRONIC INSTRUMENT CO., LTD.

2.4G RADIO SYSTEM

Trade Name	:	HOBBY PEOPLE
Model No.	:	AERO-SPORT 5
FCC ID	:	L73ATX90150
Operating Frequency	:	2415-2465 MHz
Number of Channel	:	51CH
Type of antenna	:	Permanent attached
Type of Modulation	:	FHSS
Applicant	:	SANWA ELECTRONIC INSTRUMENT CO., LTD. 1-2-50, YOSHIDA HONMACHI, HIGASHI-OSAKA, OSAKA 578-0982 JAPAN
Regulation	:	***FCC Part 15.247 Subpart C***
Prepared by	:	AOV Testing Technology Co., Ltd AOV Building, Xueyuan Road East, University City, Shenzhen (Tanglang Village, Xili Town, Nanshan District), China
Test Date	:	December 18-23, 2009
Date of Report	:	December 24, 2009

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Description Page

TEST REPORT DECLARATION

Applicant	:	SANWA ELECTRONIC INSTRUMENT CO., LTD.
Manufacturer	:	SHANGHAI MERIT TECHNOLOGY CORP.
EUT Description	:	2.4G RADIO SYSTEM

Test Procedure Used:
FCC Part 15.247 Subpart C

The E. U. T. listed below has been completed RFI testing by Shenzhen AOV Testing Technology Co., Ltd at the test site of Bontek Compliance Testing Laboratory Ltd. And the Interference emissions can pass **FCC CLASS B** limitations.

The test configurations and the facility comply with the radiated and AC line conducted test site criteria in **ANSI C63.4-2003**.

Date of Test: December 18-23, 2009

Prepared by: 

Project Engineer

Reviewer : 

Project Manager

1. GENERAL INFORMATION

1.1 General Information

Applicant : SANWA ELECTRONIC INSTRUMENT CO., LTD.
1-2-50, YOSHIDA HONMACHI, HIGASHI-OSAKA,
OSAKA 578-0982 JAPAN

Manufacturer : SHANGHAI MERIT TECHNOLOGY CORP.
NO. 1058 TAOGAN, RD, SHESHAN TOWN,
SONGJIANG, SHANGHAI, CHINA

1.2 Test Facility

Test Firm : Bontek Compliance Testing Laboratory Ltd.
Certificated by FCC, Registration No.: 338263
Address : FL.1, Building H-3, Hua Qiao Cheng East Industrial Area
Qiaocheng East Road, Nanshan, Shenzhen, P.R.China
Tel : 86-755-86337020
Fax : 86-755-86337028

1.3 Test Instrument Used

No.	Equipment	Manufacturer	Model No.	S/N	Calculator date
1.	EMI Test Receiver	R&S	ESPI	100097	2009-2-22
2.	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2009-2-22
3.	EMI Test Receiver	R&S	ESCI	100687	2009-2-22
4.	EMI Test Receiver	R&S	FSU	BCT-019	2009-2-22
5.	Amplifier	HP	8447D	1937A02492	2009-2-22
6.	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2009-2-22
7.	Horn Antenna	SCHWARZBECK	BBHA9120A	B08000991-0001	2009-2-22
8.	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2009-2-22
9.	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2009-2-22
10.	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2009-2-22
11.	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	D-69250	2009-2-22
12.	Positioning Controller	C&C	CC-C-1F	MF7802113	2009-2-22
13.	Triple-Loop Antenna	EVERFINE	LLA-2	607004	2009-2-22
14.	10dB attenuator	SCHWARZBECK	MTAIMP-136	R65.90.0001#06	2009-2-22

2. MAXIMUM PEAK OUTPUT POWER

2.1. Rules Part No.

15.247(b)

2.2. Limits

The maximum peak output power measurement is 125mW.

2.3. Test Procedure

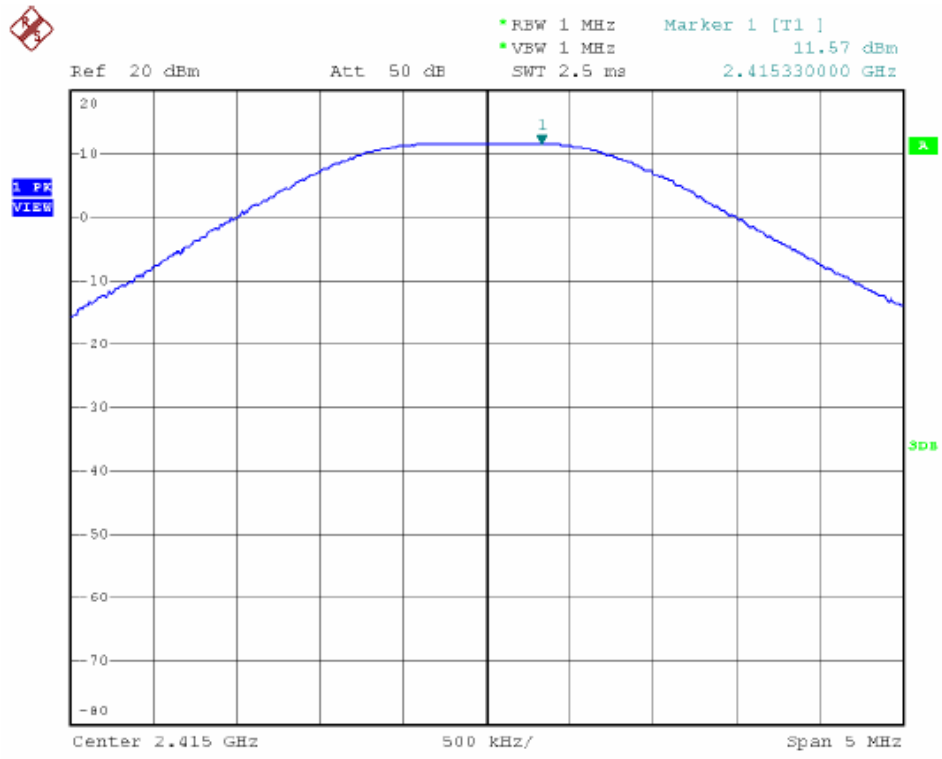
The antenna of the EUT was connected to the RF input cord of power meter with a coaxial cable, power was read directly from the meter and cable loss was added to the reading to obtain power at the EUT antenna terminal. The EUT output power was set to maximum to produce the worse case test result.

2.4. Test Result

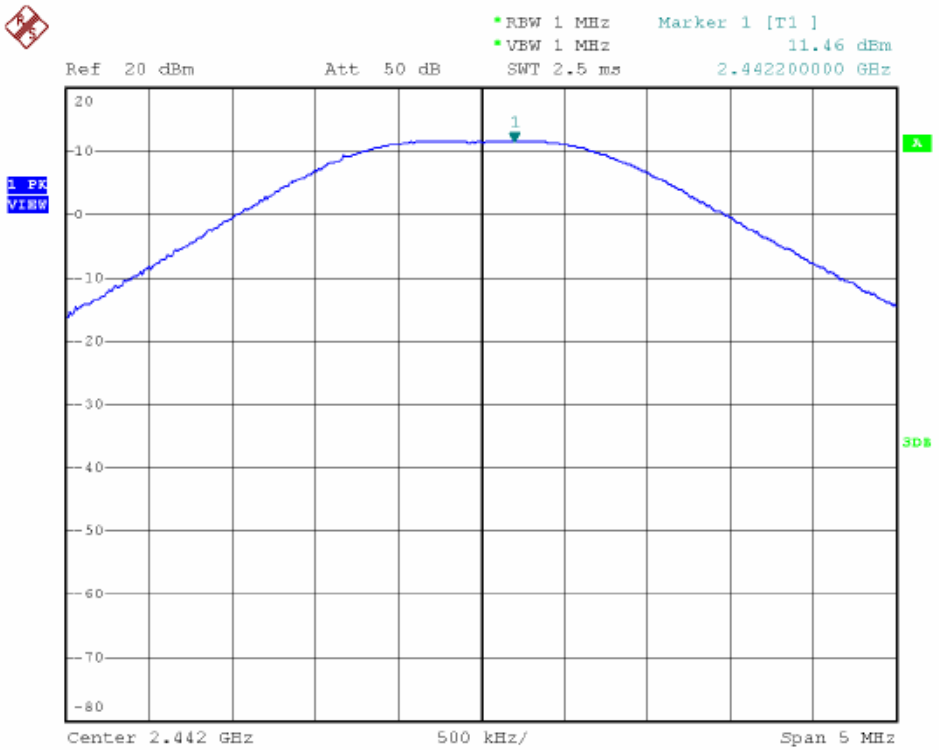
PASS

Channel	Frequency (MHz)	Peak output power (dBm)	Limit (dBm)
Low	2415	11.57	30
Middle	2442	11.46	30
High	2465	11.14	30

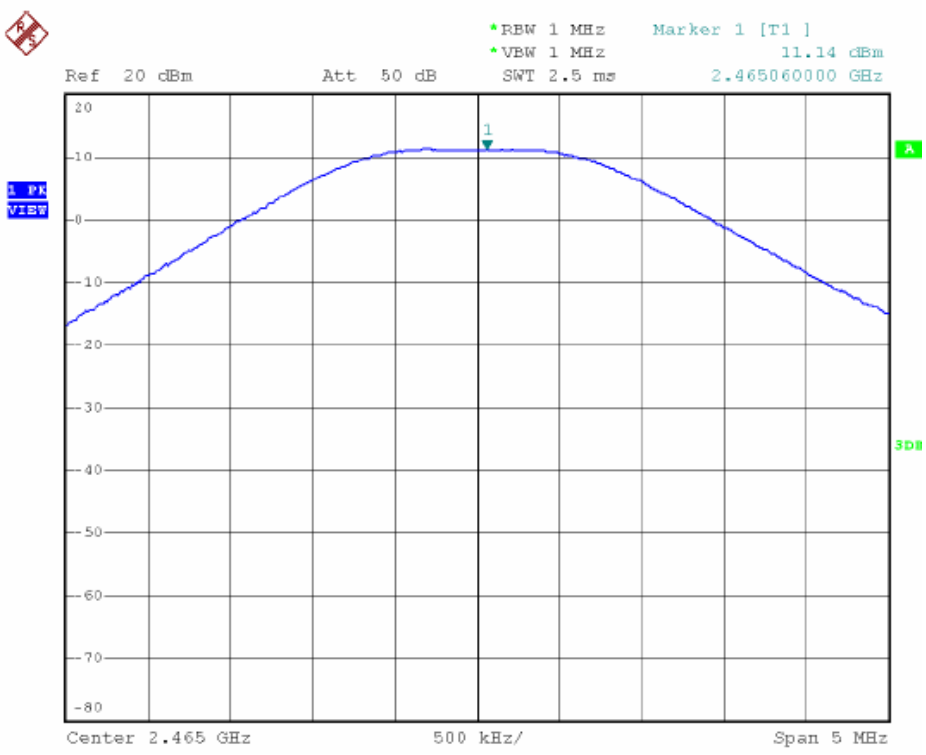
Low Channel: 2415M



Middle Channel: 2442M



High Channel: 2465M



3. HOPPING CHANNEL SEPARATION AND BANDWIDTH

3.1. Test Standard

15.247(a)

3.2. Limits

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater,

3.3. Test Procedure

Record the respond of frequency waveform when the EUT was working by a spectrum analyzer or EMI Receiver.

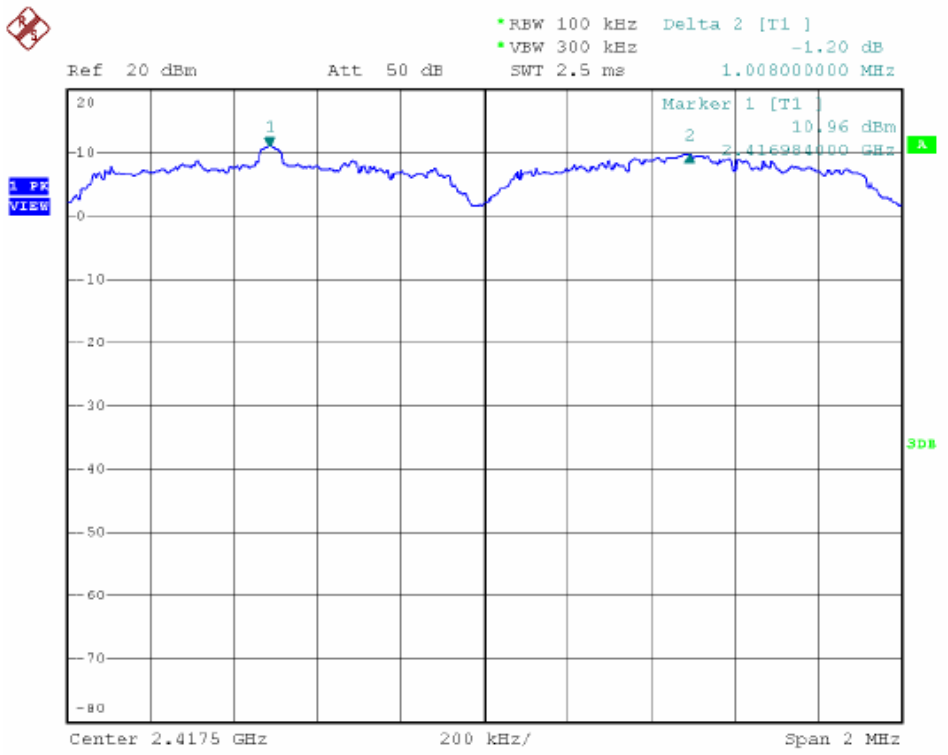
3.4. Test Result

PASS

Channel Separation > 2/3 of 20dB Bangwidth

Detailed information, Please refer to the following page.

Low channel: 2415MHz



4. NUMBER OF HOPPING FREQUENCY

4.1. Test Standard

15.247(b)

4.2. Limits

For frequency hopping systems operating in the 2415-2465 MHz band employing at least 51 non-overlapping hopping channels.

4.3. Test Procedure

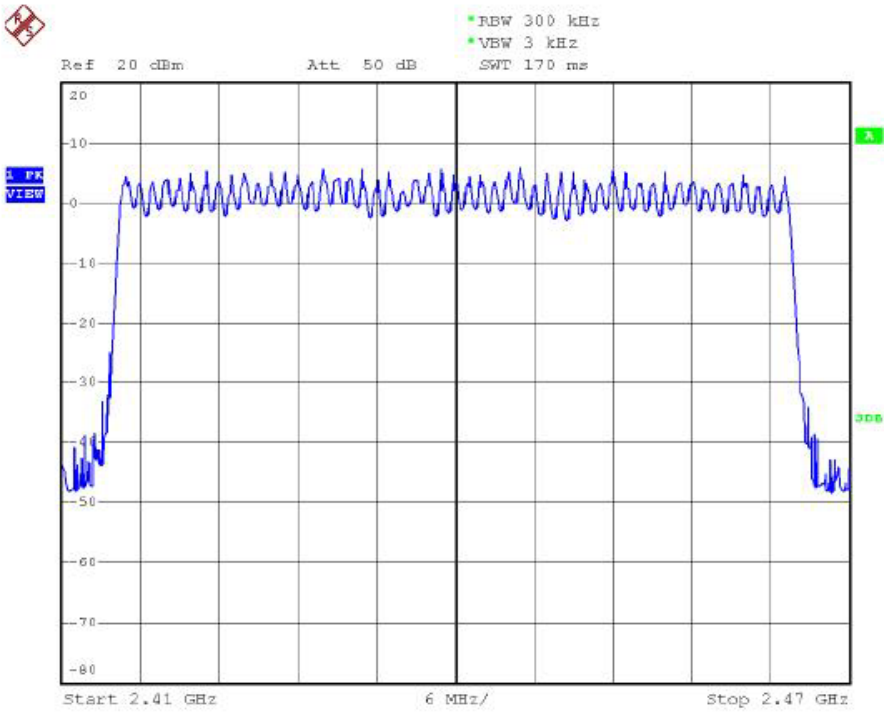
Record the respond of frequency waveform when the EUT was working by a spectrum analyzer or EMI Receiver.

4.4. Test Result

PASS

Hopping Channel is 51.

Detailed information, Please refer to the following page.



5. BAND EDGE

5.1. Rules Part No.

15.247(c)

5.2. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

5.3. Test Procedure

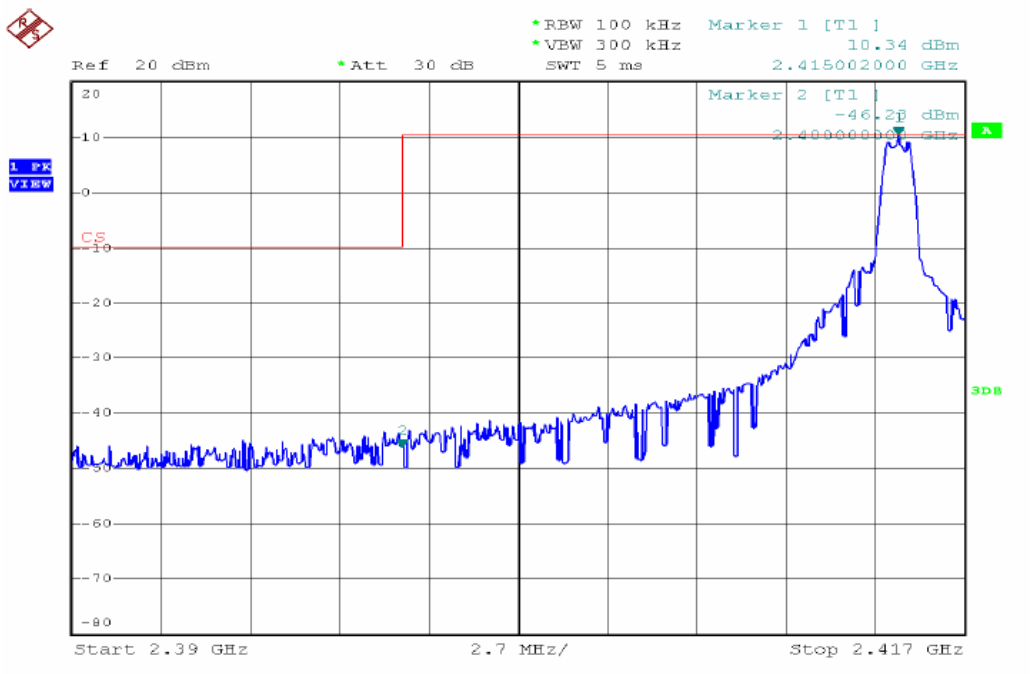
The transmitter output was connected to EMI receiver with a low lose cable, the band edge was measured and recorded.

5.4. Test Result

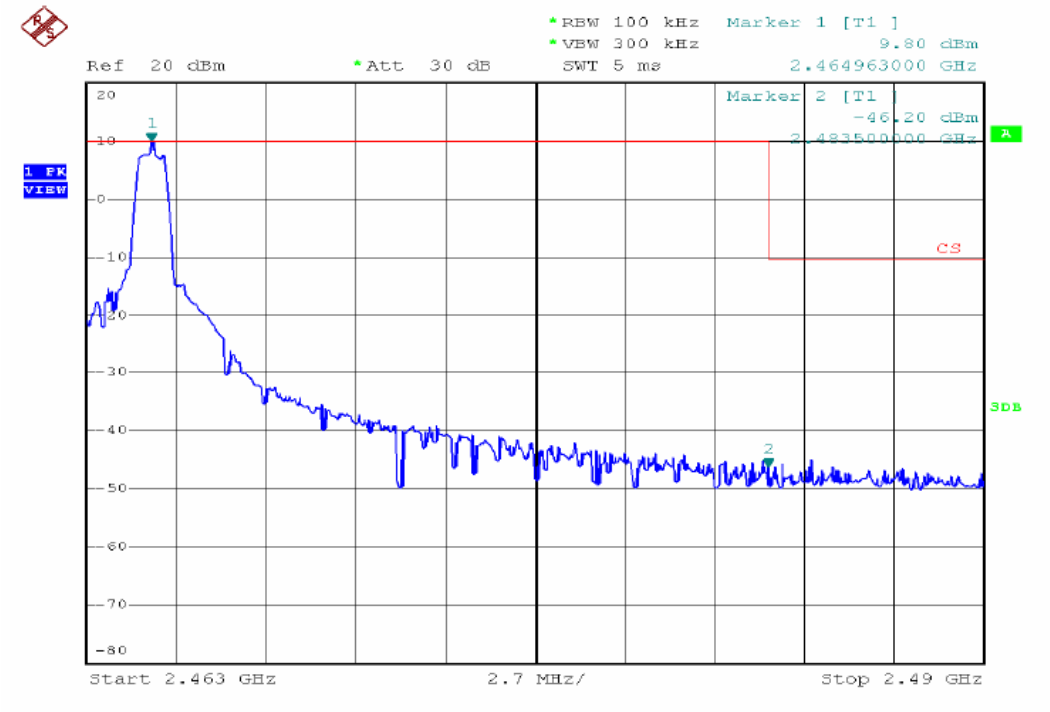
PASS

Detailed information, Please refer to the following page.

Low channel: 2415MHz



High channel: 2465MHz



6. 20DB BANDWIDTH

6.1.Rules Part No.

15.247(b)

6.2.Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

6.3.Test Procedure

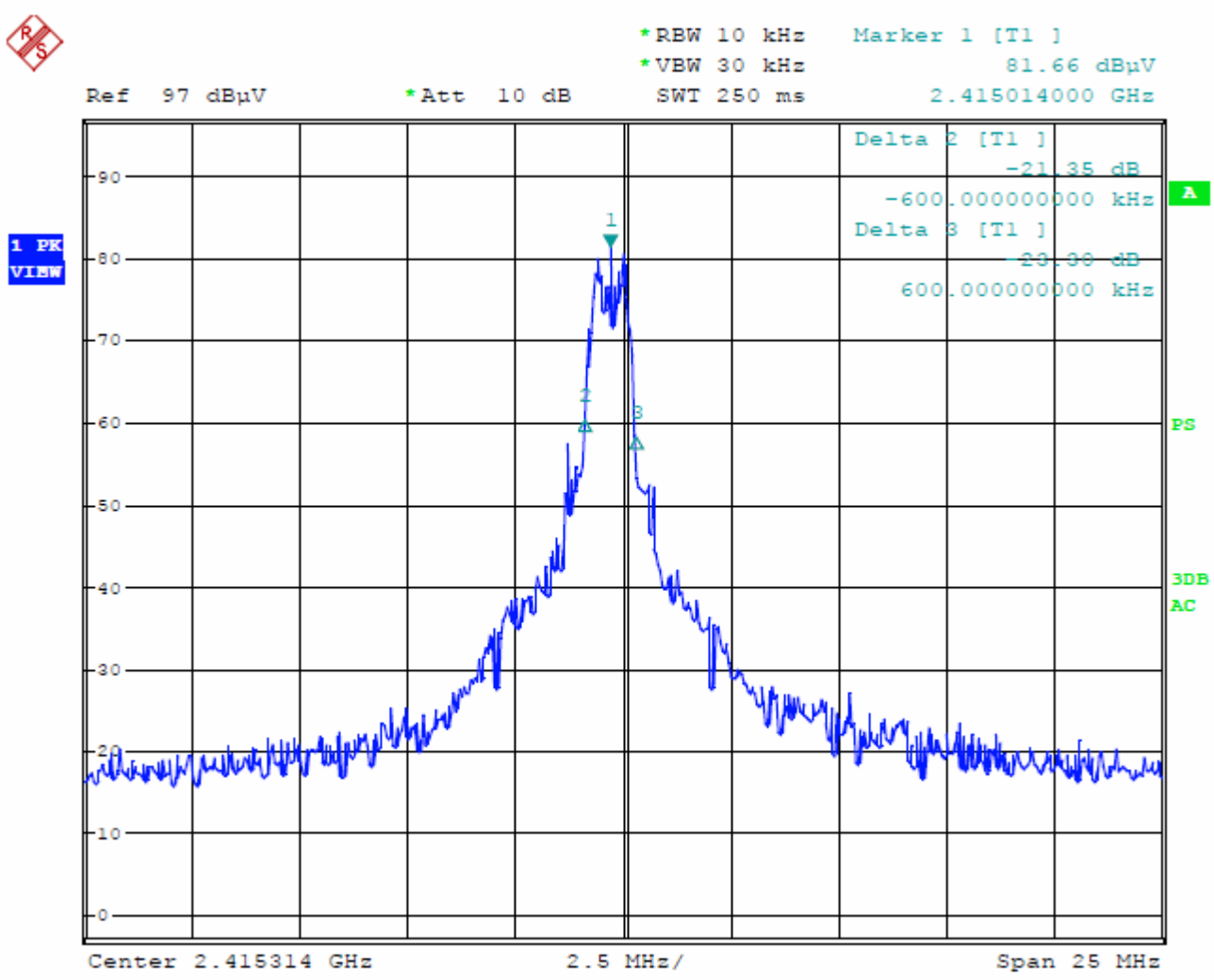
The transmitter output is connected to the spectrum analyzer, The spectrum analyzer Center frequency is set to the transmitter frequency, The RBW is set to 10K Hz and VBW is set 30 KHz

6.4.Test Result

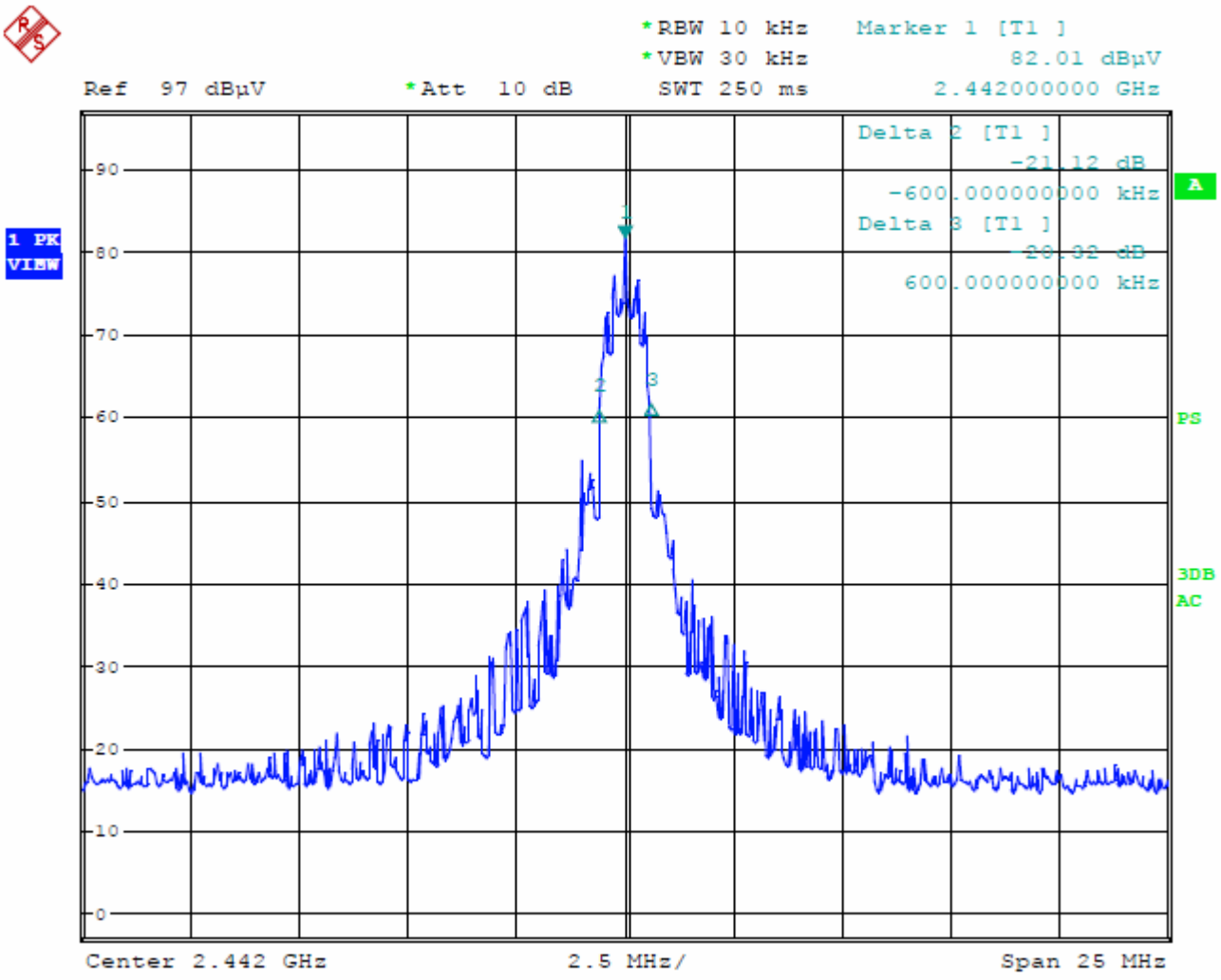
PASS

Detailed information, Please refer to the following page.

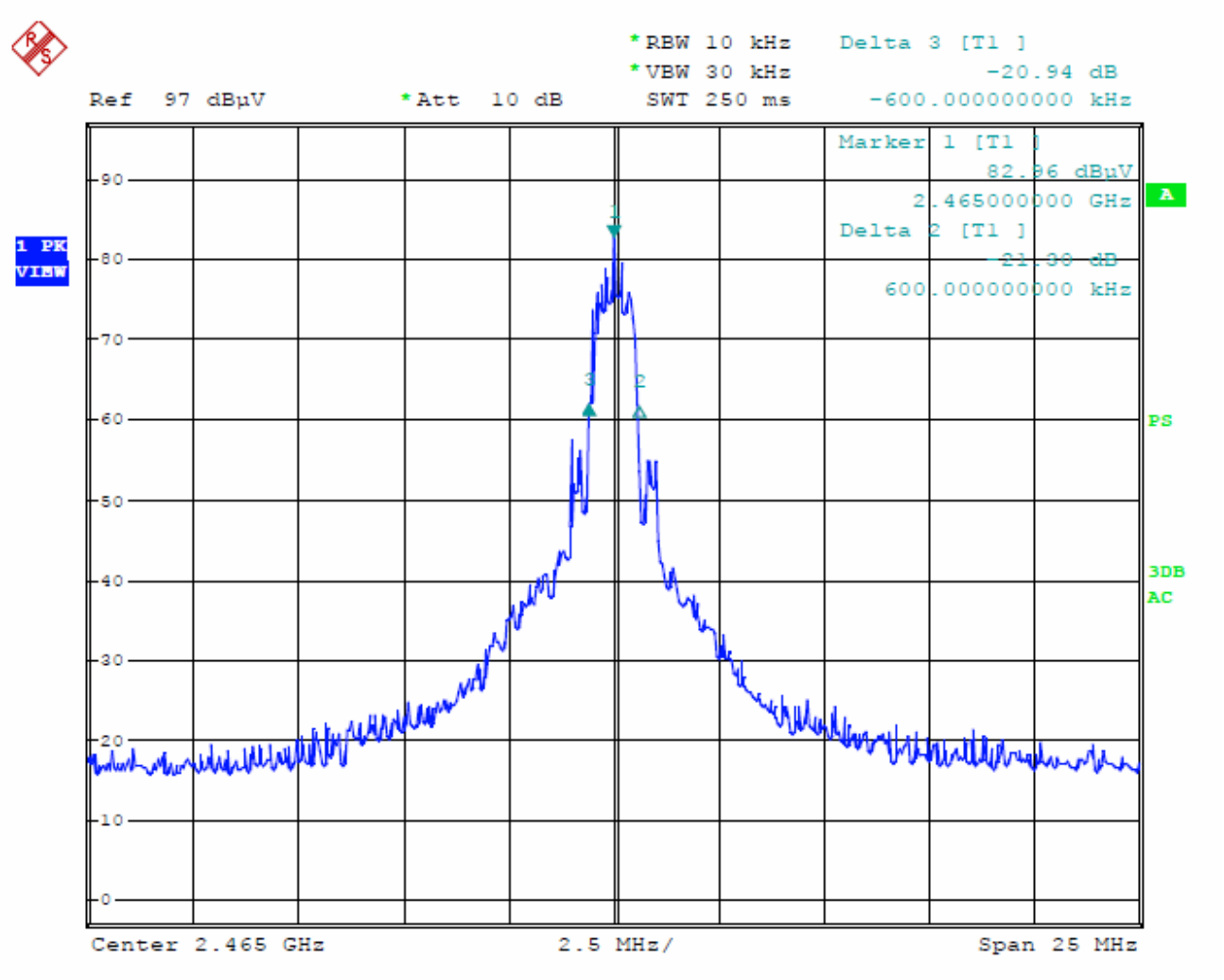
Low Channel: 2415M



Middle Channel: 2442M



High Channel: 2465M



7. DWELL TIME

7.1. Rules Part No.

15.247(a)

7.2. Limits

Per 15.247(a) (1)(iii) At least 15 hopping Frequencies.

7.3. Test Procedure

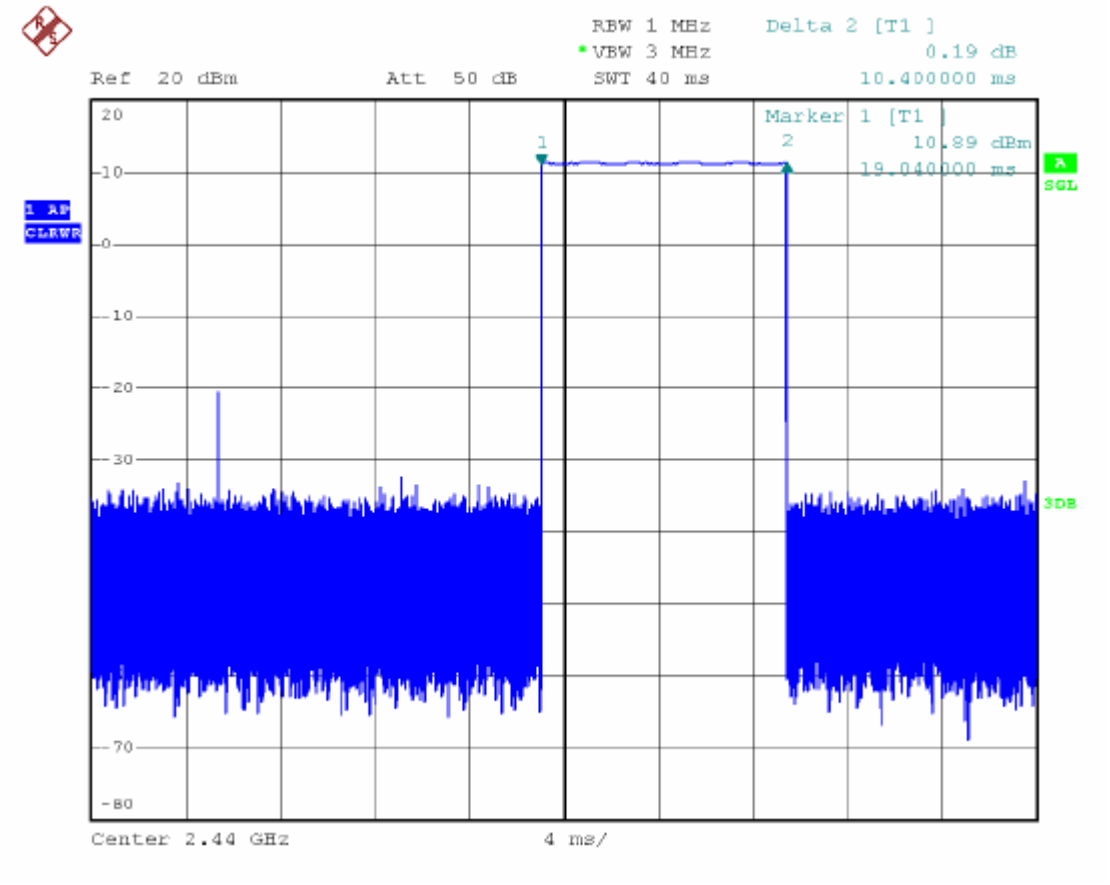
The transmitter output was connected to EMI receiver with a low lose cable, the band edge was measured and recorded.

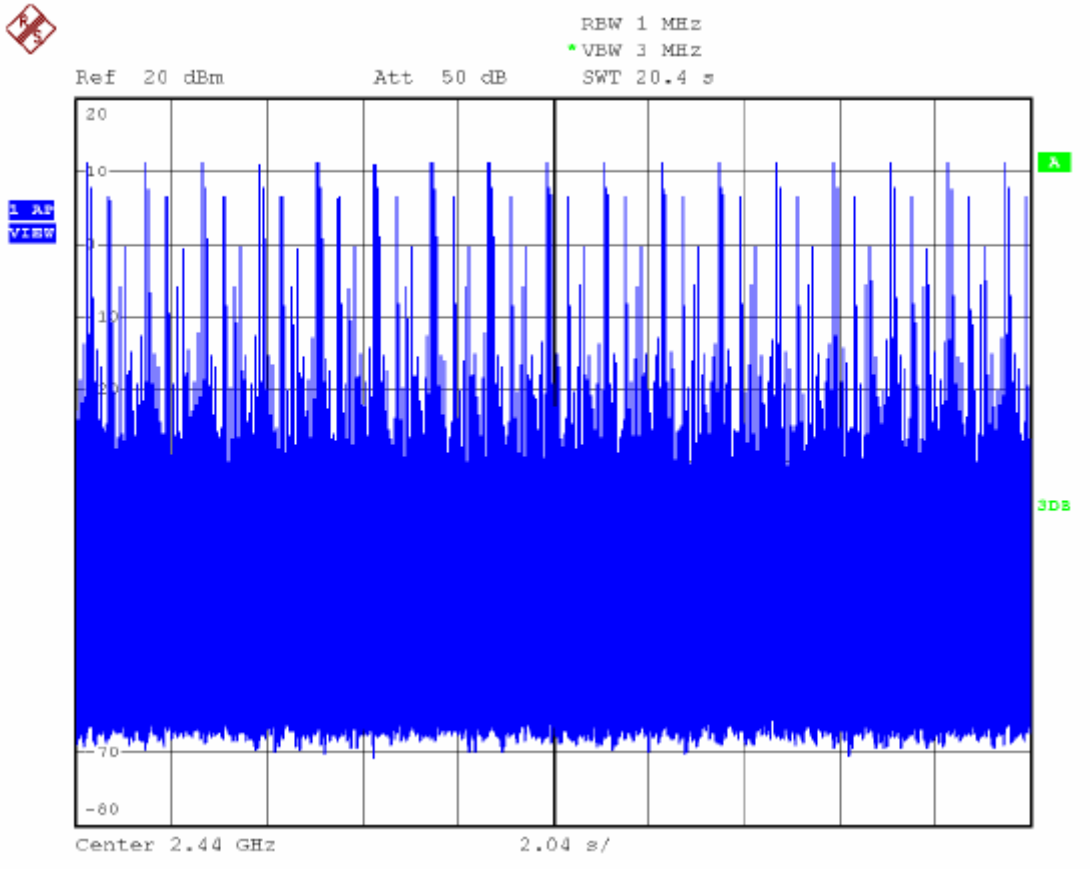
7.4. Test Result

PASS

Dell Time (ms)	Limit (ms)
10.4x34=353.6	<400

Detailed information, Please refer to the following page.


RBW 1 MHz
VBW 3 MHz
SWT 40 ms
Delta 2 [T1]
0.19 dB
10.400000 ms
Ref 20 dBm
Att 50 dB
Marker 1 [T1]
10.89 dBm
19.040000 ms
1 AP
CLRWR
A
SGL
3DB
20
10
0
-10
-20
-30
-70
-80
Center 2.44 GHz
4 ms/


RBW 1 MHz
VBW 3 MHz
SWT 20.4 s
Ref 20 dBm
Att 50 dB
1 AP
VIEW
A
3DB
20
10
-70
-80
Center 2.44 GHz
2.04 s/

8. RADIATION INTERFERENCE

8.1. Rules Part No.

15.209

8.2. Limits

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency of (MHz)	Emission Field Strength (microvolts/meter)
30 - 88	100 (40)
88 - 216	150 (43.5)
216 - 960	200 (46.0)
Above 960	500 (54.0)

8.3. Test Procedure

ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES:

The EUT is placed on a turned table that is 0.8 meter above the ground. The turned table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna that is mounted on the antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (log periodical antenna and horn antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz.

The spectrum was scanned from 30 MHz to 10th harmonic of the fundamental.

8.4. Test Result

PASS

The frequency range from 30MHz to 25GHz is investigated.

Detailed information, Please refer to the following page.

Low Channel: 2415MHz

Horizontal:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
31.940	34.50	30.10	40.0	9.90
55.220	33.70	31.20	40.0	8.80
910.780	36.20	35.60	46.0	10.40
4804.300	38.60	37.10	54.0	(AV)16.90
7205.800	37.40	37.00	54.0	(AV)17.00

Vertical:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
32.040	38.10	33.60	40.0	6.40
55.220	33.10	30.70	40.0	9.30
70.620	35.60	33.30	40.0	6.70
869.800	36.90	36.50	46.0	9.50
4804.300	40.20	38.20	54.0	(AV)15.80
7206.400	38.90	37.40	54.0	(AV)16.60

Middle Channel: 2442MHz

Horizontal:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
31.940	33.60	31.30	40.0	8.70
55.220	31.20	30.50	40.0	9.50
73.820	34.90	33.20	40.0	6.80
898.020	36.10	34.90	46.0	11.10
4882.220	37.60	36.40	54.0	(AV)17.60
7323.320	38.30	37.10	54.0	(AV)16.90

Vertical:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
30.040	39.00	34.20	40.0	5.80
55.220	32.70	30.10	40.0	9.90
73.820	35.70	34.60	40.0	5.40
898.020	36.80	35.70	46.0	10.30
4882.220	39.80	37.00	54.0	(AV)17.00
7324.000	40.30	37.60	54.0	(AV)16.40

High Channel: 2465MHz

Horizontal:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
31.940	35.50	30.50	40.0	9.50
55.220	31.20	29.60	40.0	10.40
73.820	34.20	33.00	40.0	7.00
902.180	39.70	36.60	46.0	9.40
4960.020	37.80	37.10	54.0	(AV)16.90
7440.800	41.60	38.10	54.0	(AV)15.90

Vertical:

Frequency (MHz)	PK (dBuV/m)	Read Level (dBuV/m)	Limit (dBuV/m)	Margin (dBuV/m)
31.940	38.60	35.30	40.0	4.70
55.220	33.20	30.50	40.0	9.50
74.620	35.40	34.50	40.0	5.50
898.020	36.90	35.90	46.0	10.10
4960.020	43.20	39.10	54.00	(AV)14.90
7440.800	39.30	37.20	54.00	(AV)16.80

9. RESTRICTED BANDS OF OPERATION

Section 15.205:
Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
[1]0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
2. 17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
2. 20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 –	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.52525	2655 – 2900	22.01 – 23.12
8.41425 – 8.41475	156.7 – 156.9	3260 – 3267	23.6 – 24.0
12.29 – 12.293	162.0125 – 167.17	3332 – 3339	31.2 – 31.8
12.51975 – 12.52025	167.72 – 173.2	3345.8 – 3358	36.43 – 36.5
12.57675 – 12.57725	240 – 285	3600 – 4400	([2])
13.36 – 13.41	322 – 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

10.ANTENNA REQUIREMENT

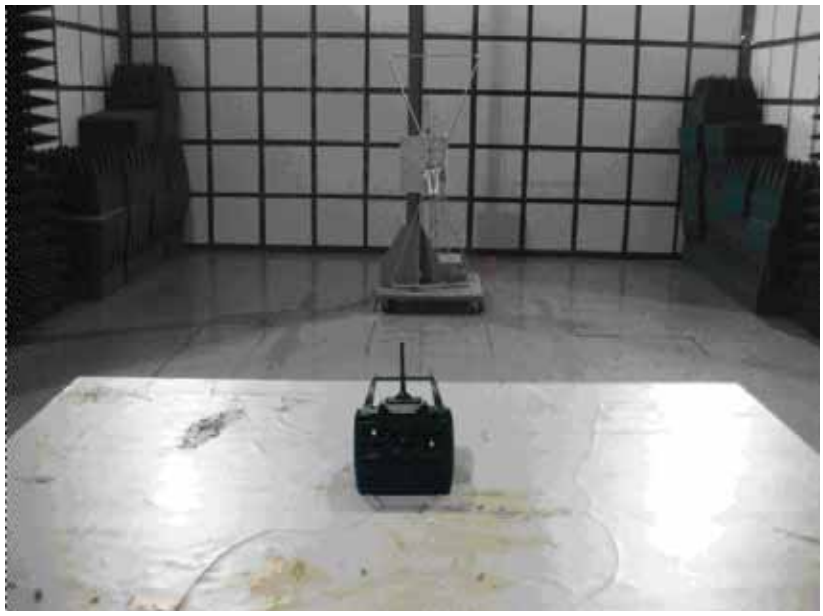
According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna is fixed by enclosure, can not be changed except take apart the product.

11.PHOTOGRAPH OF TEST

Radiated Emission

Below 1G



Above 1G