

# FCC TEST REPORT

**CATEGORY** : Mobile  
**PRODUCT NAME** : Office Connect Wireless 108Mbps 11g PoE Access Point  
**FCC ID.** : P27AP51GA  
**FILING TYPE** : Certification  
**BRAND NAME** : 3COM  
**MODEL NAME** : WL-529

**APPLICANT** : **SerComm Corporation**  
8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan,  
R.O.C.  
**MANUFACTURER** : **SerComm Corporation**  
8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan,  
R.O.C.  
**ISSUED BY** : **SPORTON INTERNATIONAL INC.**  
6F, No. 106, Sec. 1, Hsin Tai Wu Rd., His Chih, Taipei Hsien,  
Taiwan, R.O.C.

## Statements:

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

Certificate or Test Report could not be used by the applicant to claim the product endorsement by CNLA and any agency of U.S. government.

The test equipment used to perform the test is calibrated and traceable to NML/ROC or NIST/USA.



1190  
ILAC MRA



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## HISTORY OF THIS TEST REPORT

Received Date: Mar. 18, 2005

Test Date: Apr. 02, 2005

Original Report Issue Date: Apr. 26, 2005

Report No.: FR531712

☒ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

# CERTIFICATE OF COMPLIANCE

with

## 47 CFR FCC Part 15 Subpart C

**PRODUCT NAME** : Office Connect Wireless 108Mbps 11g PoE Access Point

**BRAND NAME** : 3COM

**MODEL NAME** : WL-529

**APPLICANT** : **SerComm Corporation**

8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan,  
R.O.C.

**MANUFACTURER** : **SerComm Corporation**

8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan,  
R.O.C.

### I **HEREBY** CERTIFY THAT:

The measurements shown in this test report were made in accordance with the procedures given in ANSI C63.4-2003 and all test are performed according to 47 CFR FCC Part 15 Subpart C. Testing was carried out on Apr. 02, 2005 at SPORTON International Inc. LAB.



**Dr. Alan Lane**

Vice General Manager  
Sporton International Inc.

## 1. General Description of Equipment under Test

### 1.1. Applicant

**SerComm Corporation**

8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

### 1.2. Manufacturer

**SerComm Corporation**

8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

### 1.3. Basic Description of Equipment under Test

This product is a Wireless Access Point / Ethernet Bridge with 802.11b/g wireless solution. The technical data has been listed on section " Features of Equipment under Test ". This EUT is able to be powered by POE or adapter.

### 1.4. Features of Equipment under Test

Modulation Type	: Direct Sequence Spread Spectrum (DSSS for 802.11b) Orthogonal Frequency Division Multiplexing (OFDM for 802.11g)
IEEE 802.11g	: BPSK – 6Mbps, 9Mbps QPSK – 12Mbps, 18Mbps 16QAM – 24Mbps, 36Mbps 64QAM – 48Mbps, 54Mbps
IEEE 802.11b	: DBPSK – 1Mbps DQPSK – 2Mbps CCK – 5.5Mbps, 11Mbps
Maximum Data Rate	: 802.11b (11Mbps), 802.11g (54Mbps)
Frequency Range	: 2.4 –2.4835 GHz for 11b/g
Number of Channels	: 11 maximum (for 11b/11g)
Antenna Type	: See section 1.5 for details
Max. Output Power	: 802.11b: 17.80dBm, 802.11g: 15.70dBm
Power Supply	: 48 VDC from POE / 100-240 VAC from Adapter
Chipset Used	: BBP/MAC = Atheros AR5212; Transceiver = Atheros AR2112



## 1.5. Antenna Description

No.	Brand Name	Model Name	Antenna Type	Gain (dBi)
1	3COM	3CWE591	OMNI	6.00
2	3COM	3CWE592	Ceiling	3.00
3	3COM	3CWE596	Panel	18.00
4	3COM	3CWE597	Hallway	4.00
5	3COM	3CWE598	Panel	8.00

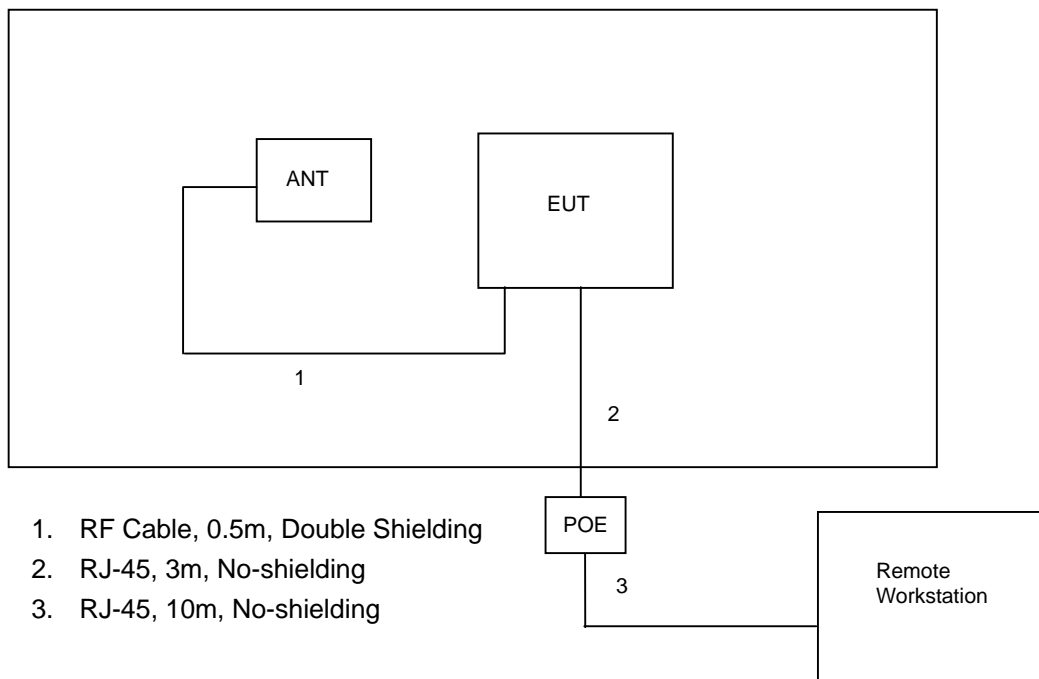
## 1.6. Table for Carrier Frequencies

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	05	2432 MHz	09	2452 MHz
02	2417 MHz	06	2437 MHz	10	2457 MHz
03	2422 MHz	07	2442 MHz	11	2462 MHz
04	2427 MHz	08	2447 MHz	-	-

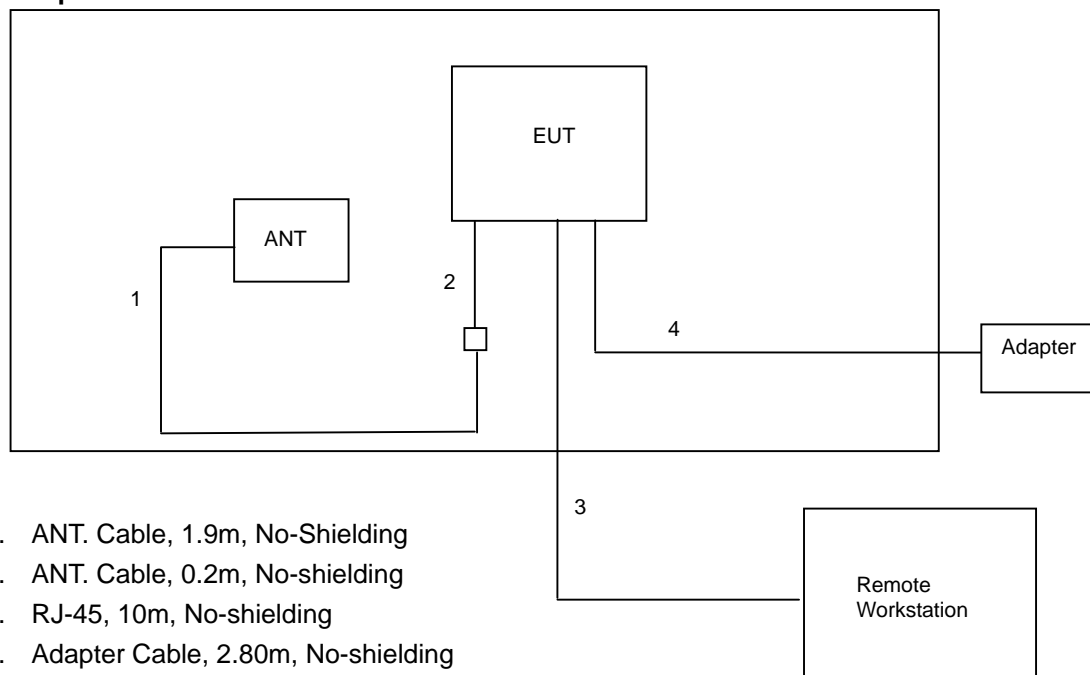
## 2. Test Configuration of the Equipment under Test

### 2.1. Connection Diagram of Test System

#### POE Mode



#### Adapter Mode





## 2.2. The Test Mode Description

1. This test report is class II change for adding 4 types of antennas. Only revised Spurious Radiated Emission was shown in this test report.
2. For DSSS modulation, CCK (11 Mbps) is the worst case on all test items.
3. For OFDM modulation, BPSK (6 Mbps) is the worst case on all test items.
4. According to ANSI C63.4-2003: If frequency range of EUT is more than 10 MHz, we have to test the lowest, middle and highest channels of EUT.
5. Spurious emission below 1GHz is independent of channel selection and modulation types. So only channel 06 with OFDM modulation was tested.
6. Spurious emission below 1GHz was tested on both POE and adapter powered configurations.
7. Antenna Configuration Test Modes:  
Mode 1: ANT.1 (3CWE591)  
Mode 2: ANT.2 (3CWE592)  
Mode 3: ANT.3 (3CWE596)  
Mode 4: ANT.4 (3CWE597)

## 2.3. Description of Test Supporting Units

Support unit	Brand	Model No.	FCC ID	Data cable (m)
Notebook	DELL	D505	DoC	-
Adapter	UL	3C10224-US	-	1.5
POE	3COM	61-0107-000	-	-





### 3. General Information of Test

#### 3.1. Test Facility

**Test Site Location** : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiag, Tao  
Yuan Hsien, Taiwan, R.O.C.  
: TEL 886-3-327-3456  
: FAX 886-3-318-0055  
**Test Site No** : 03CH03-HY / CO04-HY

#### 3.2. Standards for Methods of Measurement

Here is the list of the standards followed in this test report.

**ANSI C63.4-2003**

**47 CFR FCC Part 15 Subpart C**

#### 3.3. Frequency Range Investigated

Radiated emission test: from 30 MHz to 10th carrier harmonic.

#### 3.4. Test Distance

The test distance of radiated emission (30MHz~1GHz) test from antenna to EUT is 3 M.

The test distance of radiated emission (1GHz~10th carrier harmonic) test from antenna to EUT is 3 M.

#### 3.5. Test Software

During testing, Channel & Power Controlling Software: This was provided by the manufacturer and is able to let the test engineer select the operating channel as well as the RF output power. The parameters for channel selection is trying to offer the test engineer the ability to fix the operating channel for testing, both normal data and continuously transmitting modes are allowed, and that for RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

**Power Parameter Table**

Test Software	ART		
	CH 01	CH 06	CH 11
Test Channel	CH 01	CH 06	CH 11
Test Frequency	2412MHz	2437MHz	2462MHz
TX Power of DSSS	20.00	20.00	19.50
TX Power of OFDM	15.50	15.50	15.50



## 4. List of Measurements

### 4.1. Summary of the Test Results

Applied Standard: 47 CFR FCC Part 15 Subpart C			
Paragraph	FCC Section	Description of Test	Result
5.1	15.247(b)(3)	Maximum Peak Conducted Output Power	Pass
5.2	15.247(d)	Band Edges Emission	Pass
5.3	15.247(d)	Spurious Radiated Emission	Pass
5.4	15.203/15.247(b)/(c)	Antenna Requirement	Pass
5.5	FCC 2.1091	Maximum Permissible Exposure	Pass

## 5. Test Result

### 5.1. Test of Maximum Peak Conducted Output Power

#### 5.1.1. Applicable Standard

Section 15.247(b)(3): The maximum peak output power shall not exceed 1 watt (30dBm). Except as shown below, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the above stated values by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

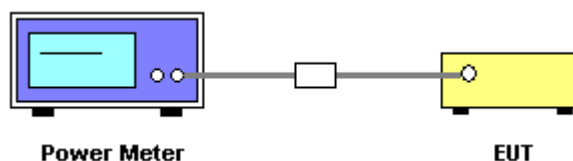
#### 5.1.2. Measuring Instruments

Item 19, 21 of the table are on section 6.

#### 5.1.3. Test Procedures and Test Instruments Setting

1. The transmitter output was connected to the peak power meter through an attenuator.
2. The filter and attenuator have the same peak value instrument parameters.
1. Repeated the 1 for the middle and highest channel of the EUT.

#### 5.1.4. Test Setup Layout



#### 5.1.5. Test Criteria

All test results complied with the requirements of 15.247(b)(3). Measurement Uncertainty is 1.5dB.

## 5.1.6. Test Result of Conducted Power

- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

Modulation Type	Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)
DSSS	01	2412 MHz	17.80	18
DSSS	06	2437 MHz	17.60	18
DSSS	11	2462 MHz	17.60	18
OFDM	01	2412 MHz	15.70	18
OFDM	06	2437 MHz	15.20	18
OFDM	11	2462 MHz	15.60	18



## 5.2. Test of Band Edges Emission

### 5.2.1. Applicable Standard

Section 15.247(d): 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, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

### 5.2.2. Measuring Instruments

Item 6~17 of the table is on section 6 for radiated measurement.

### 5.2.3. Description of Major Test Instruments Setting

- Spectrum Analyzer : R&S FSP40 (Radiated Measurement)
- Attenuation : Auto
- Center Frequency : 2412 MHz / 2462 MHz
- Span Frequency : 100MHz
- RB : 1 MHz for PK value / 1 MHz for AV value
- VB : 1 MHz for PK value / 10 Hz for AV value
- Detector : Peak
- Trace : Max Hold
- Sweep Time : Auto

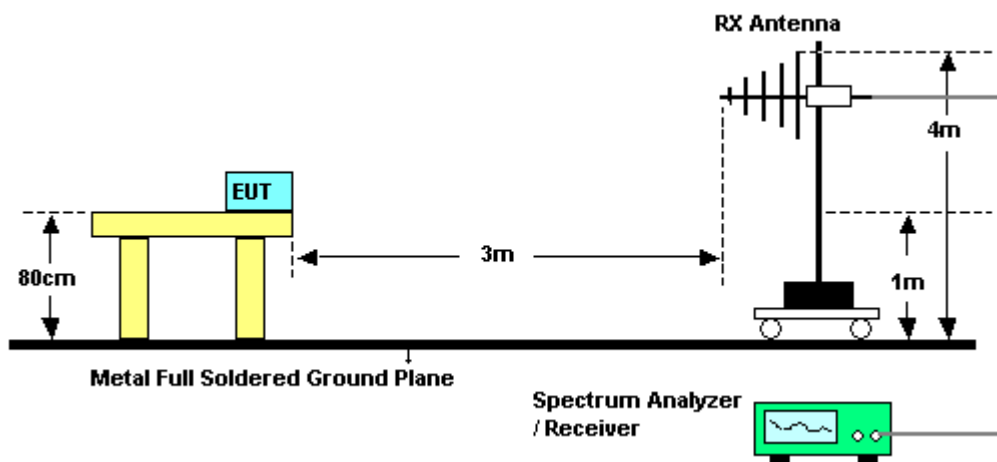
### 5.2.4. Test Procedures and Test Instruments Setting

#### **Radiated Measurement**

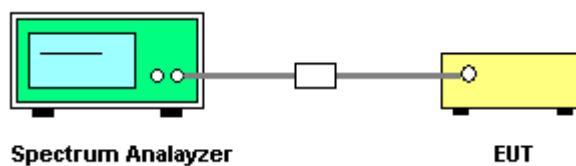
1. Configure the EUT according to ANSI C63.4.
2. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
4. For band edge emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. For band edge emission in restriction bands, use 10Hz VBW and 1MHz RBW for reading under AV and use 1MHz VBW and 1 MHz RBW for reading under PK.

### 5.2.5. Test Setup

#### Radiated Method



#### Conducted Method



### 5.2.6. Test Criteria

All test results complied with the requirements of 15.247(d). Measurement Uncertainty is  $1 \times 10^{-5}$ .

### 5.2.7. Test Result of Radiated Emission

- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

#### Mode 1

Modulation Type	Test Channel	Freq. (MHz)	Level* (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Trace (PK/AV)
DSSS	01	2388.090	69.51	-4.49	74	PK
DSSS	01	2388.090	50.83	-3.17	54	AV
DSSS	11	2483.660	70.76	-5.63	74	PK
DSSS	11	2483.660	48.37	-3.24	54	AV
OFDM	01	2388.660	72.31	-1.69	74	PK
OFDM	01	2388.660	52.22	-1.78	54	AV
OFDM	11	2483.660	72.25	-1.75	74	PK
OFDM	11	2483.660	52.89	-1.11	54	AV

Level\*: The max field strength in the restricted bands.

#### Mode 2

Modulation Type	Test Channel	Freq. (MHz)	Level* (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Trace (PK/AV)
DSSS	01	2389.990	64.03	-9.97	74	PK
DSSS	01	2389.990	47.92	-6.08	54	AV
DSSS	11	2486.890	61.30	-12.70	74	PK
DSSS	11	2486.890	44.90	-9.10	54	AV
OFDM	01	2389.990	71.71	-2.29	74	PK
OFDM	01	2389.990	50.86	-3.14	54	AV
OFDM	11	2483.660	64.22	-9.78	74	PK
OFDM	11	2483.660	47.50	-6.50	54	AV

Level\*: The max field strength in the restricted bands.

**Mode 3**

Modulation Type	Test Channel	Freq. (MHz)	Level* (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Trace (PK/AV)
DSSS	01	2353.700	65.96	-8.04	74	PK
DSSS	01	2353.700	52.34	-1.66	54	AV
DSSS	11	2499.810	64.29	-9.71	74	PK
DSSS	11	2499.810	46.01	-7.99	54	AV
OFDM	01	2348.380	63.89	-10.11	74	PK
OFDM	01	2348.380	52.74	-1.26	54	AV
OFDM	11	2487.460	67.91	-6.09	74	PK
OFDM	11	2487.460	47.97	-6.03	54	AV

Level\*: The max field strength in the restricted bands.

**Mode 4**

Modulation Type	Test Channel	Freq. (MHz)	Level* (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Trace (PK/AV)
DSSS	01	2389.990	67.39	-6.61	74	PK
DSSS	01	2389.990	48.92	-5.08	54	AV
DSSS	11	2486.890	60.96	-13.04	74	PK
DSSS	11	2486.890	44.32	-9.68	54	AV
OFDM	01	2389.990	69.03	-4.97	74	PK
OFDM	01	2389.990	49.87	-4.13	54	AV
OFDM	11	2483.660	60.30	-13.70	74	PK
OFDM	11	2483.660	46.10	-7.90	54	AV

Level\*: The max field strength in the restricted bands.





### 5.3. Test of Spurious Radiated Emission

#### 5.3.1. Applicable Standard

Section 15.247(d): 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, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

#### 5.3.2. Measuring Instruments

Please reference item 1~17 in chapter 6 for the instruments used for testing.

#### 5.3.3. Description of Major Test Instruments Setting

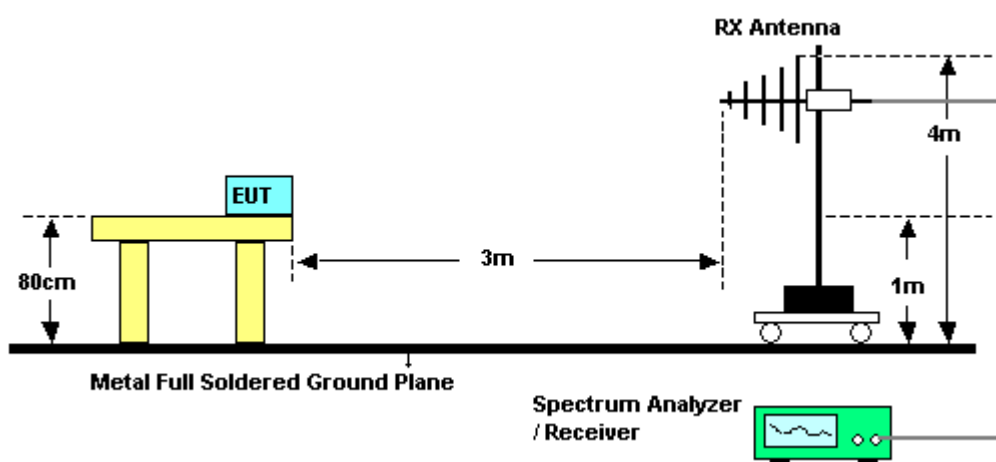
- Spectrum Analyzer : R&S FSP40
  - Attenuation : Auto
  - Start Frequency : 1000 MHz
  - Stop Frequency : 10th carrier harmonic
  - RB / VB : 1 MHz / 1MHz for Peak
  - RB / VB : 1 MHz / 10Hz for Average
- Test Receiver : R&S ESCS 30
  - Attenuation : Auto
  - Start Frequency : 30 MHz
  - Stop Frequency : 1000 MHz
  - RB : 120 KHz for QP or PK

#### 5.3.4. Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT was placed on the top of the turntable 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
4. Power on the EUT and all the supporting units.
5. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
7. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
8. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
9. For emission above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.

10. If the emission level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz and average method for above the 1GHz. the reported.
11. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB higher than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

#### 5.3.5. Test Setup Layout



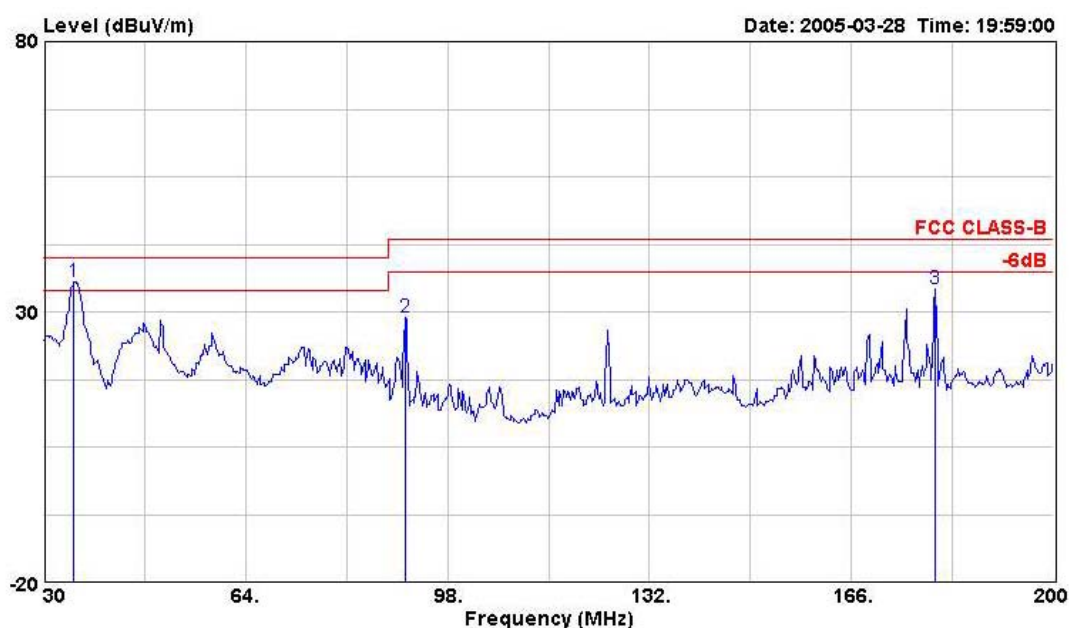
#### 5.3.6. Test Criteria

All test results complied with the requirements of 15.247(d). Measurement Uncertainty is 2.26dB.

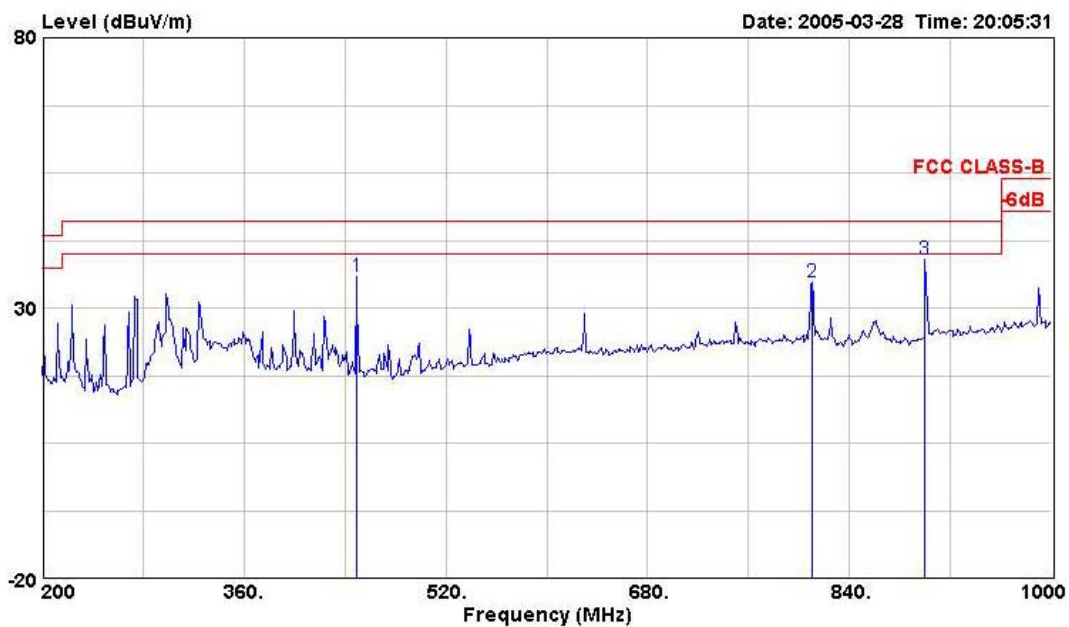
5.3.7. Test Results for CH 06 / 2437 MHz (for emission below 1GHz)

- POE Mode
- Modulation Type: OFDM
- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

**(A) Polarization: Horizontal**

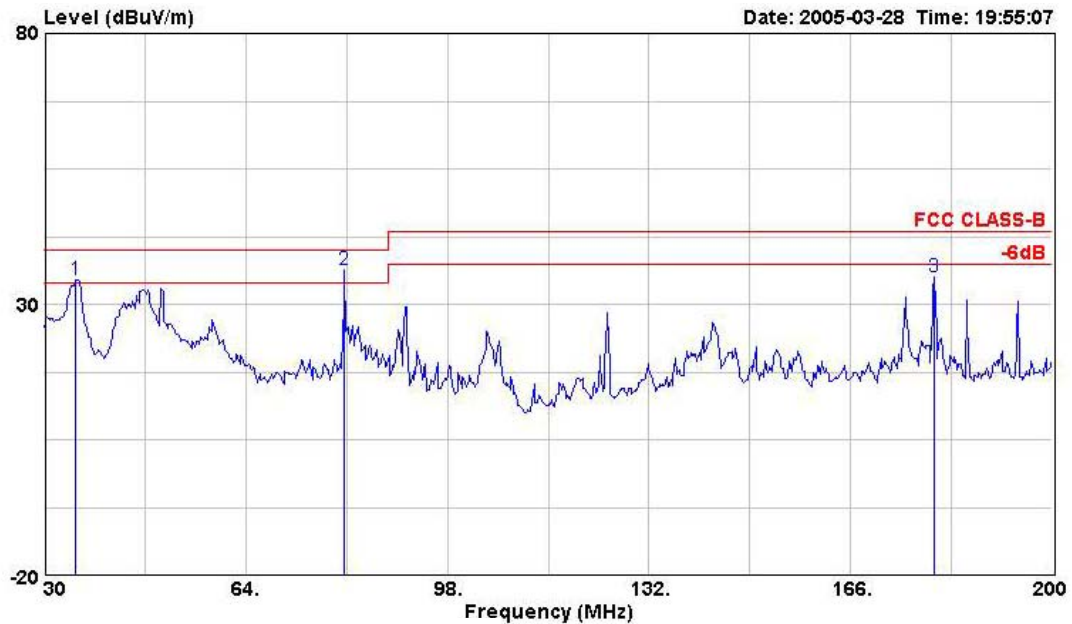


	Freq	Level	Over	Read	Limit	
	MHz	dBuV/m	Limit	Level	Line Factor	Remark
			dB	dBuV	dBuV/m	dB
1	35.100	35.63	-4.37	49.77	40.00	-14.14 Peak
2	90.860	28.94	-14.56	46.70	43.50	-17.76 Peak
3	180.110	34.25	-9.25	45.35	43.50	-11.10 Peak

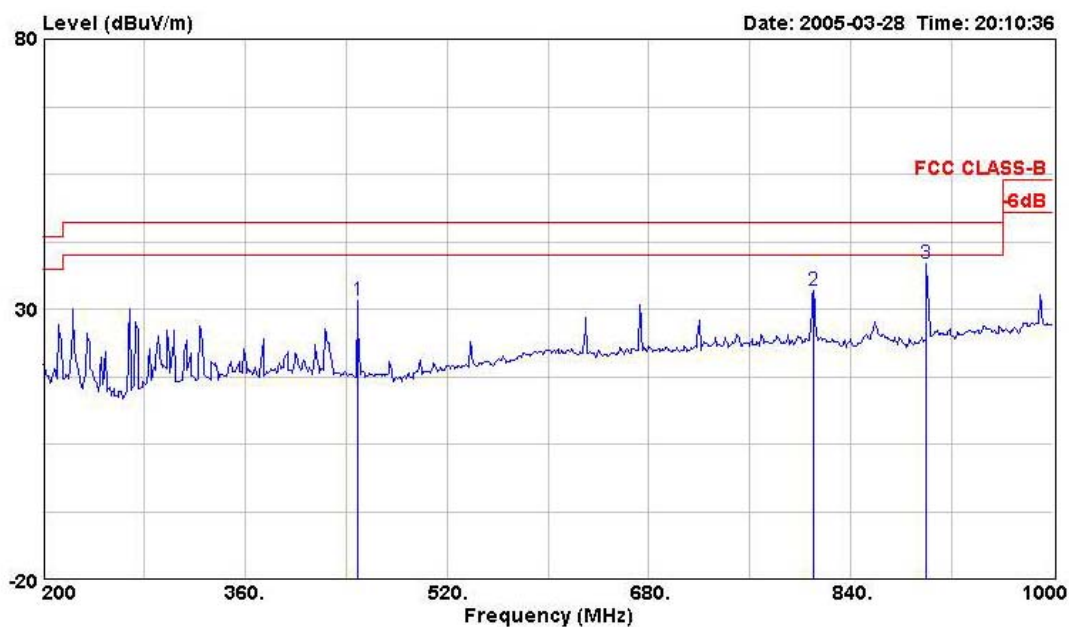


	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	448.800	35.73	-10.27	44.54	46.00	-8.81	Peak
2	810.400	34.86	-11.14	36.67	46.00	-1.81	Peak
3	900.000	38.99	-7.01	39.70	46.00	-0.71	Peak

(B) Polarization: Vertical



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	35.270	34.53	-5.47	48.79	40.00	-14.26	Peak
2	80.660	36.30	-3.70	52.89	40.00	-16.59	Peak
3	180.110	34.98	-8.52	46.08	43.50	-11.10	Peak



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	448.800	31.54	-14.46	40.35	46.00	-8.81	Peak
2	810.400	33.36	-12.64	35.17	46.00	-1.81	Peak
3	900.000	38.33	-7.67	39.04	46.00	-0.71	Peak

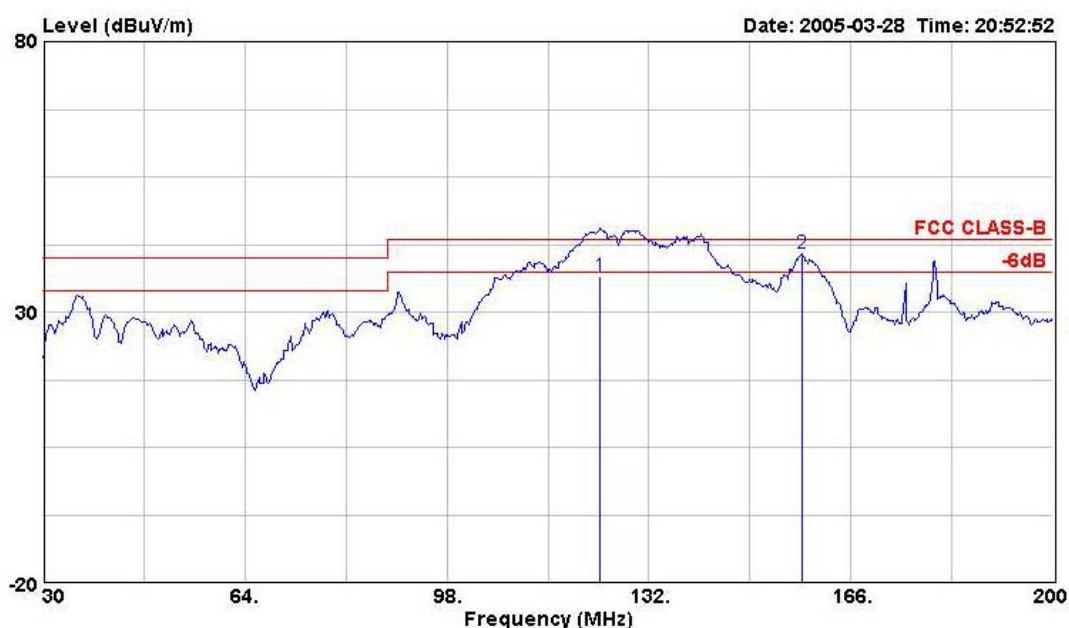
Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

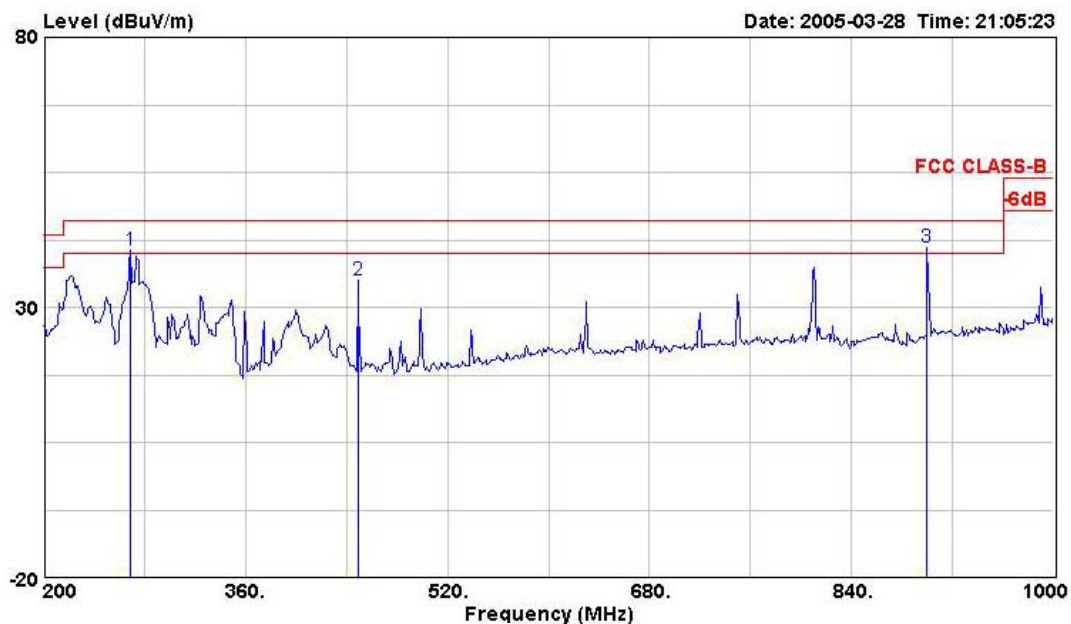
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

- Adapter Mode
- Modulation Type: OFDM
- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

**(A) Polarization: Horizontal**



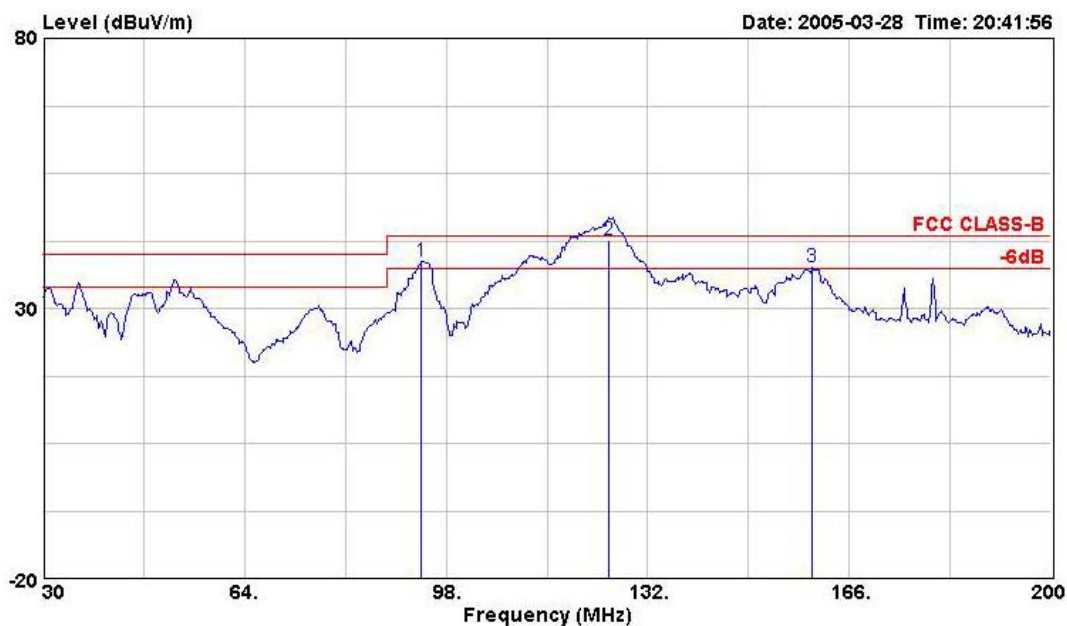
	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	dB	
1	123.670	36.62	-6.88	50.78	43.50	-14.16	1.10	27.38	QP
2 @	157.670	40.78	-2.72	53.84	43.50	-13.06	1.25	26.76	Peak



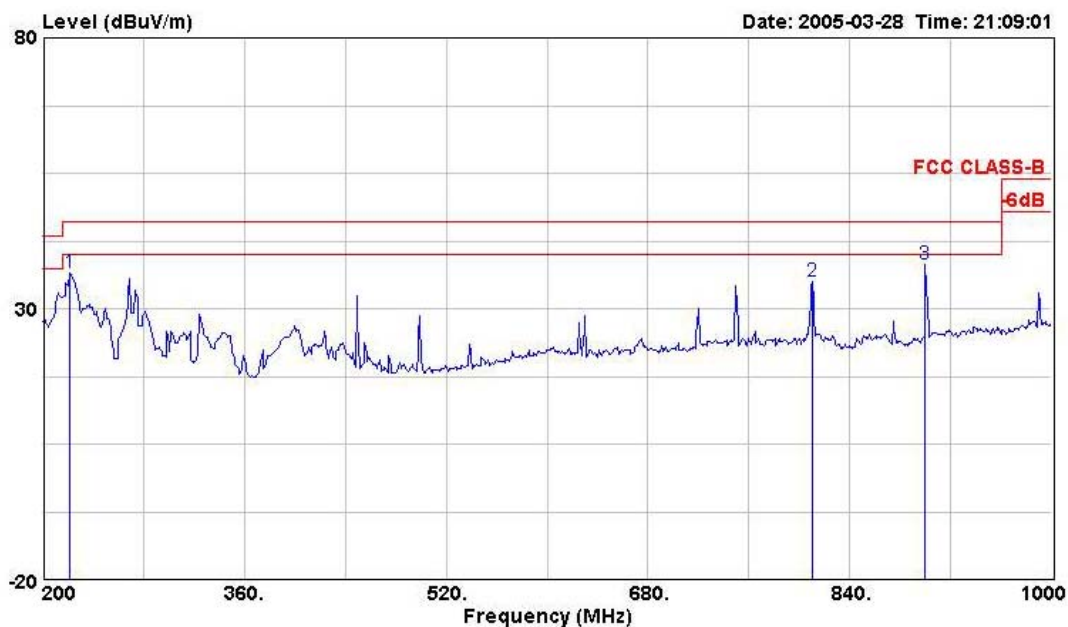
	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	268.800	40.59	-5.41	52.12	46.00	-11.53	Peak
2	448.800	34.93	-11.07	43.74	46.00	-8.81	Peak
3	900.000	40.97	-5.03	41.68	46.00	-0.71	Peak



**(B) Polarization: Vertical**



	Freq	Level	Over Limit	Read Level	Limit	Line Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	93.750	38.61	-4.89	56.48	43.50	-17.87	Peak
2	125.540	42.62	-0.88	56.57	43.50	-13.95	QP
3	159.710	37.56	-5.94	50.39	43.50	-12.83	Peak



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	221.600	36.54	-9.46	46.52	46.00	-9.98	Peak
2	810.400	34.98	-11.02	36.79	46.00	-1.81	Peak
3	900.000	38.26	-7.74	38.97	46.00	-0.71	Peak

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

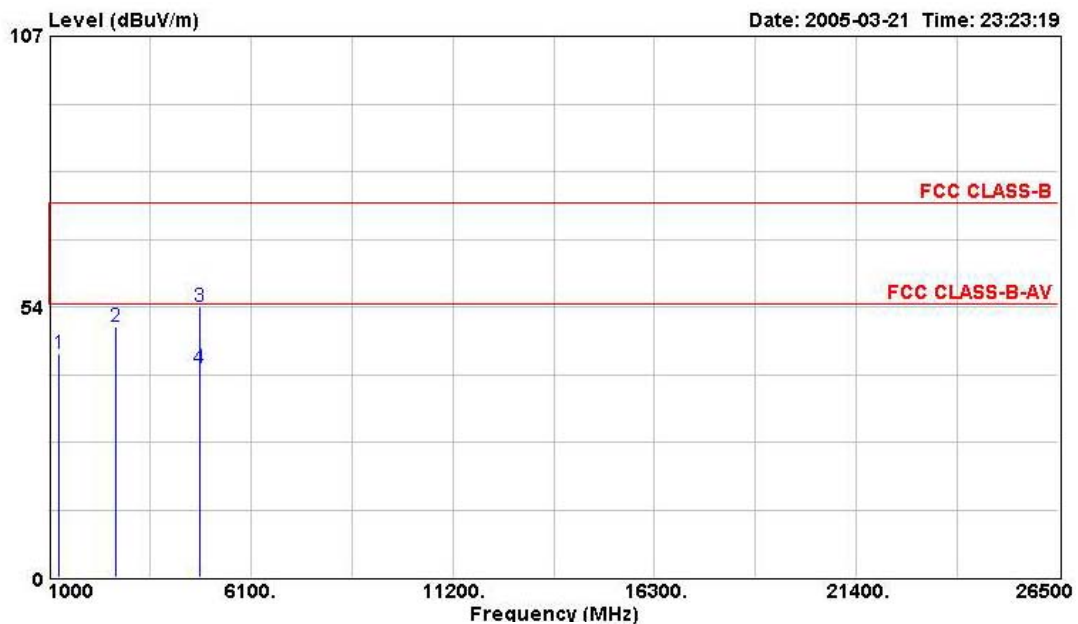
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.3.8. Test Results for CH 01 / 2412 MHz (for emission above 1GHz)

- Modulation Type: DSSS
- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

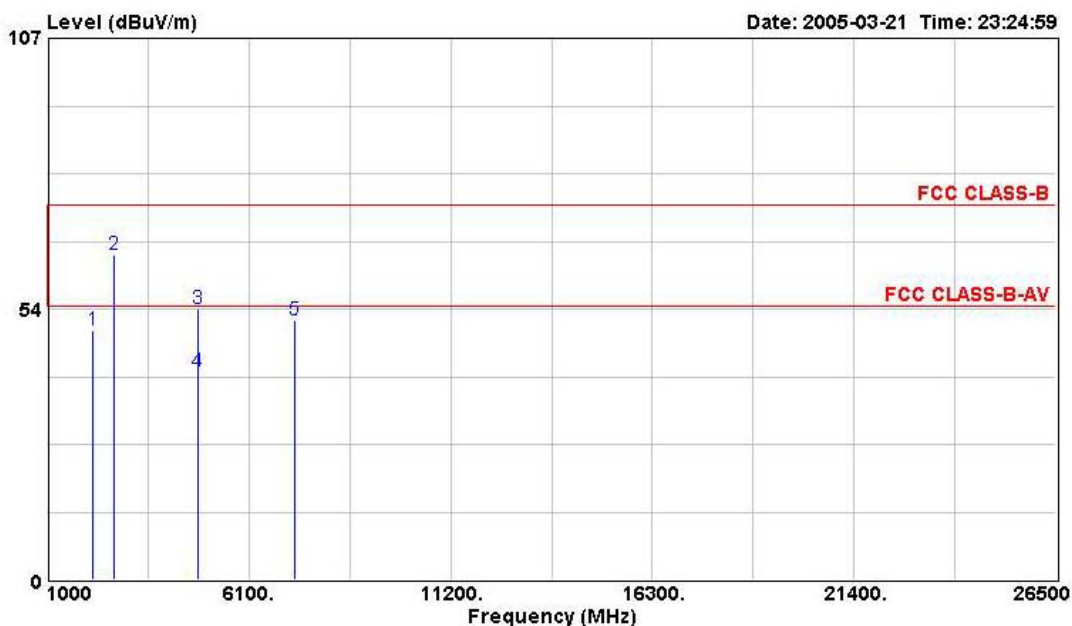
**Mode 1**

**(A) Polarization: Horizontal**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1260.000	44.10	-29.90	57.29	74.00	-13.19	Peak
2	2686.000	49.62	-24.38	58.00	74.00	-8.38	Peak
3	4823.900	53.51	-20.49	57.82	74.00	-4.31	PEAK
4	4823.900	41.51	-12.49	45.82	54.00	-4.31	Average

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	2134.000	49.32	-24.68	59.48	74.00	-10.16	Peak
2	2686.000	64.25	-9.75	72.63	74.00	-8.38	Peak
3	4823.900	53.41	-20.59	57.72	74.00	-4.31	PEAK
4	4823.900	41.02	-12.98	45.33	54.00	-4.31	Average
5	7238.800	51.23	-22.77	51.26	74.00	-0.03	PEAK

**Note:**

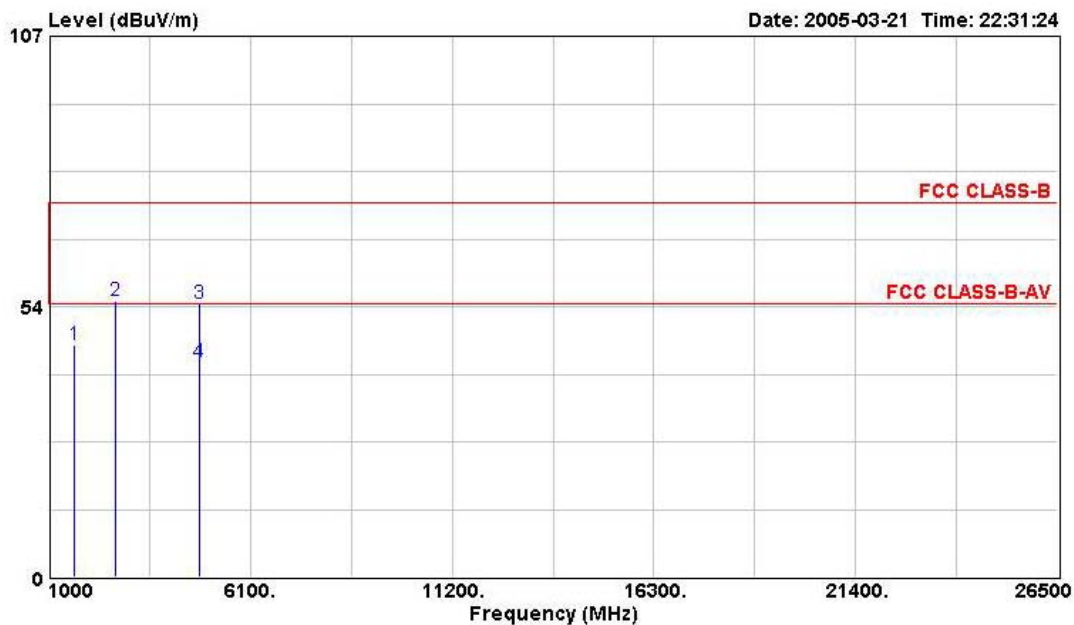
1. Item 2 is on un-restricted band, so the limit is -20dBc for such emission.

2. Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal

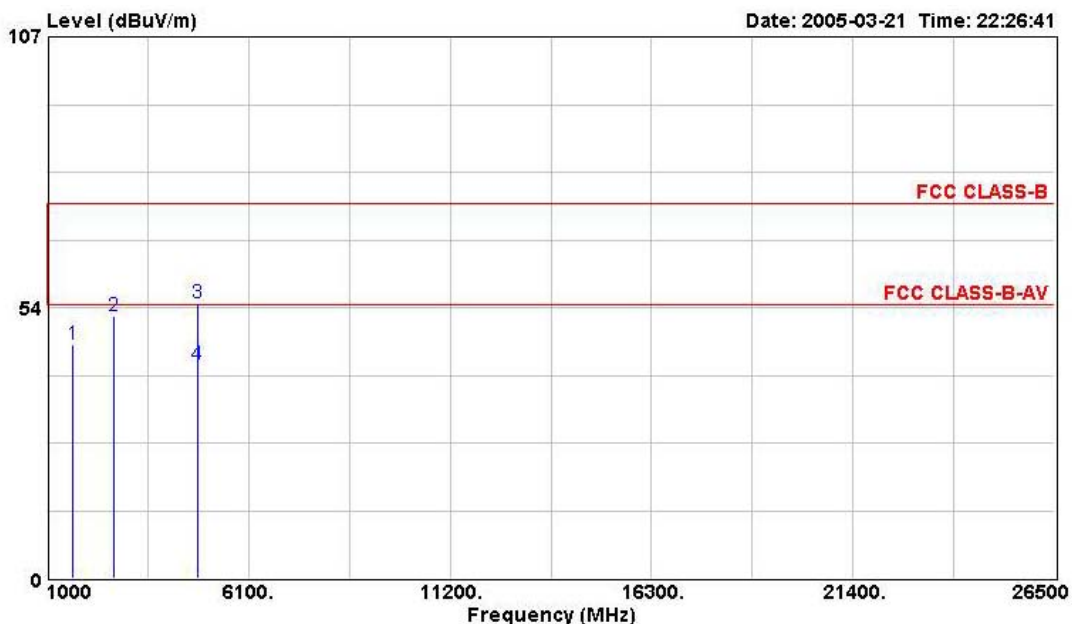


	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	1662.000	45.84	-28.16	57.77	74.00	-11.93	Peak
2 @	2686.000	54.63	-19.37	63.01	74.00	-8.38	Peak
3 @	4823.900	54.09	-19.91	58.40	74.00	-4.31	Peak
4 @	4823.900	42.43	-11.57	46.74	54.00	-4.31	Average

Note:

Item 2 is on un-restricted band, so the limit is -20dBc for such emission.

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1660.000	46.11	-27.89	58.04	74.00	-11.93	Peak
2	2686.000	51.82	-22.18	60.20	74.00	-8.38	Peak
3 @	4823.900	54.35	-19.65	58.66	74.00	-4.31	Peak
4 @	4823.900	42.26	-11.74	46.57	54.00	-4.31	Average

Note:

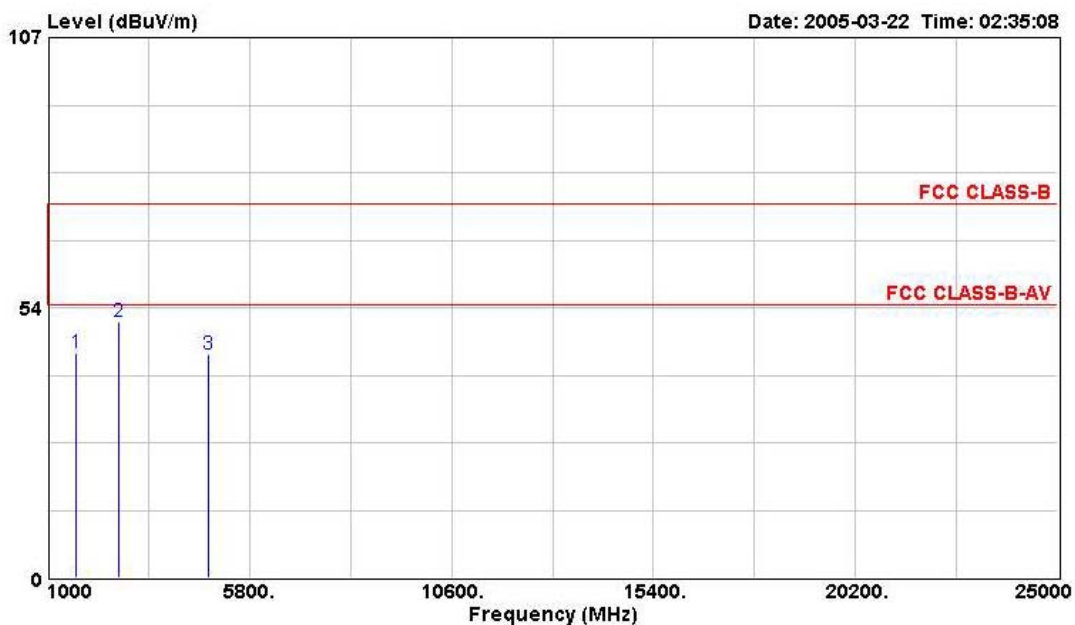
Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level



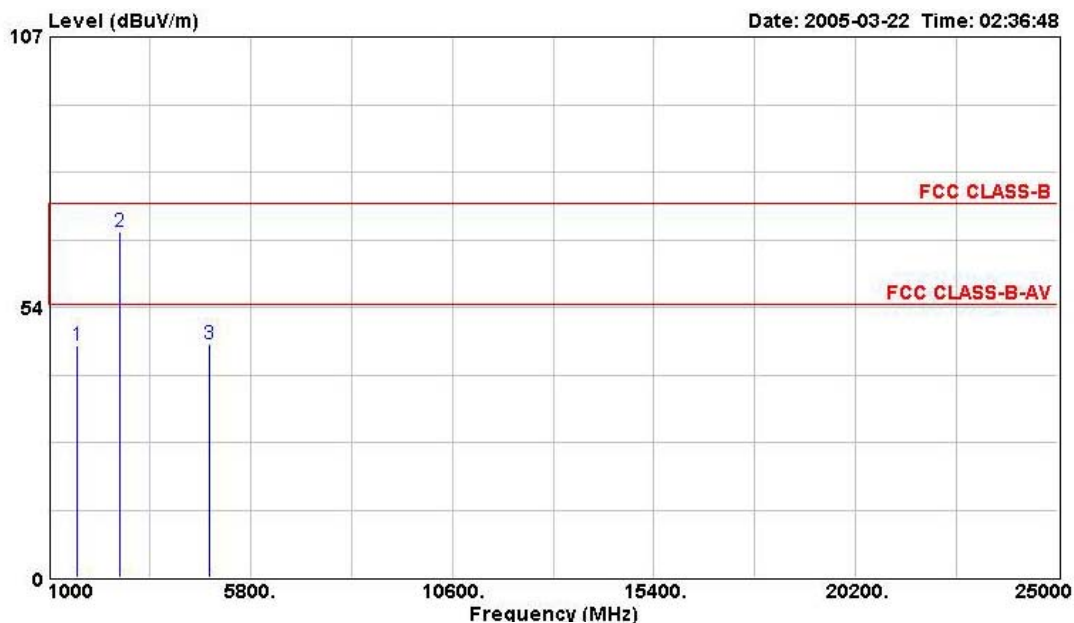
Mode 3

(A) Polarization: Horizontal



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1668.000	44.40	-29.60	56.33	74.00	-11.93	Peak
2	2686.000	50.79	-23.21	59.17	74.00	-8.38	Peak
3	4823.500	44.20	-29.80	48.51	74.00	-4.31	PEAK

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1662.000	45.77	-28.23	57.70	74.00	-11.93	Peak
2	2686.000	68.30	-5.70	76.68	74.00	-8.38	Peak
3	4824.200	46.26	-27.74	50.57	74.00	-4.31	PEAK

**Note:**

- Item 2 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

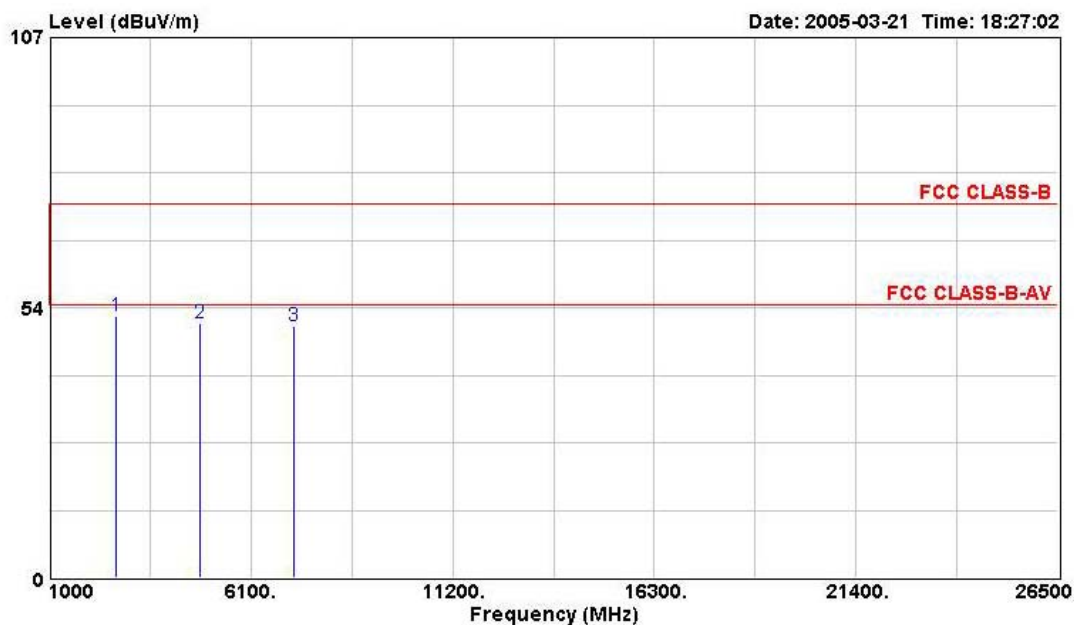
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level





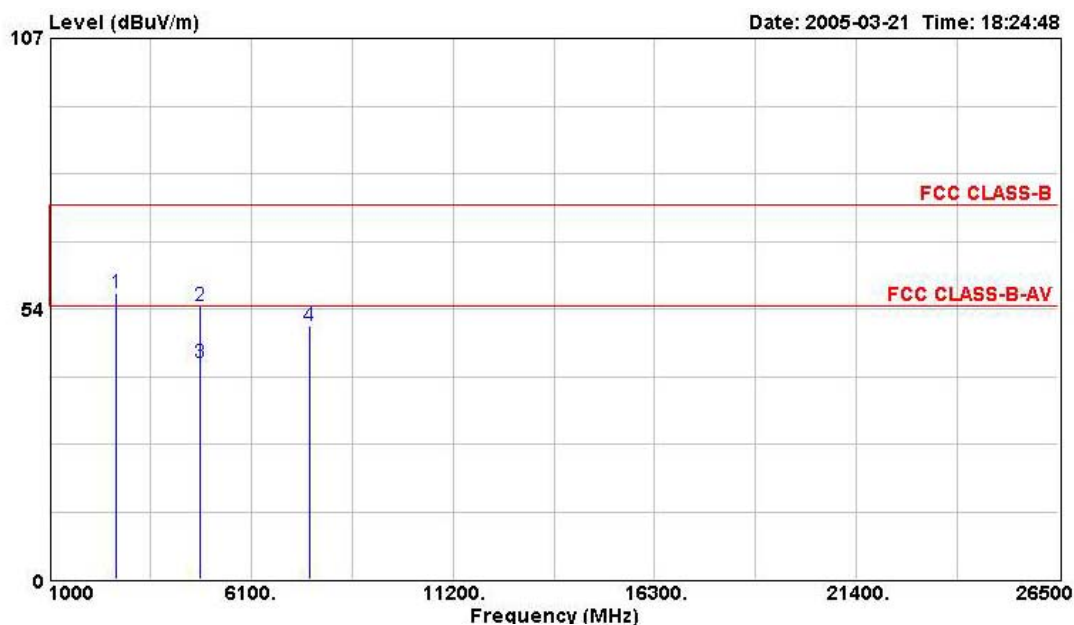
Mode 4

(A) Polarization: Horizontal



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	2686.000	51.88	-22.12	60.26	74.00	-8.38	Peak
2	4824.000	50.39	-23.61	54.70	74.00	-4.31	Peak
3	7180.000	49.97	-24.03	50.18	74.00	-0.21	Peak

**(B) Polarization: Vertical**



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	2686.000	56.62	-17.38	65.00	74.00	-8.38	Peak
2	4824.000	54.07	-19.93	58.38	74.00	-4.31	Peak
3	4824.000	42.71	-11.29	47.02	54.00	-4.31	Average
4	7588.000	50.03	-23.97	48.96	74.00	1.07	Peak

**Note:**

1. Item 1 is on un-restricted band, so the limit is -20dBc for such emission.

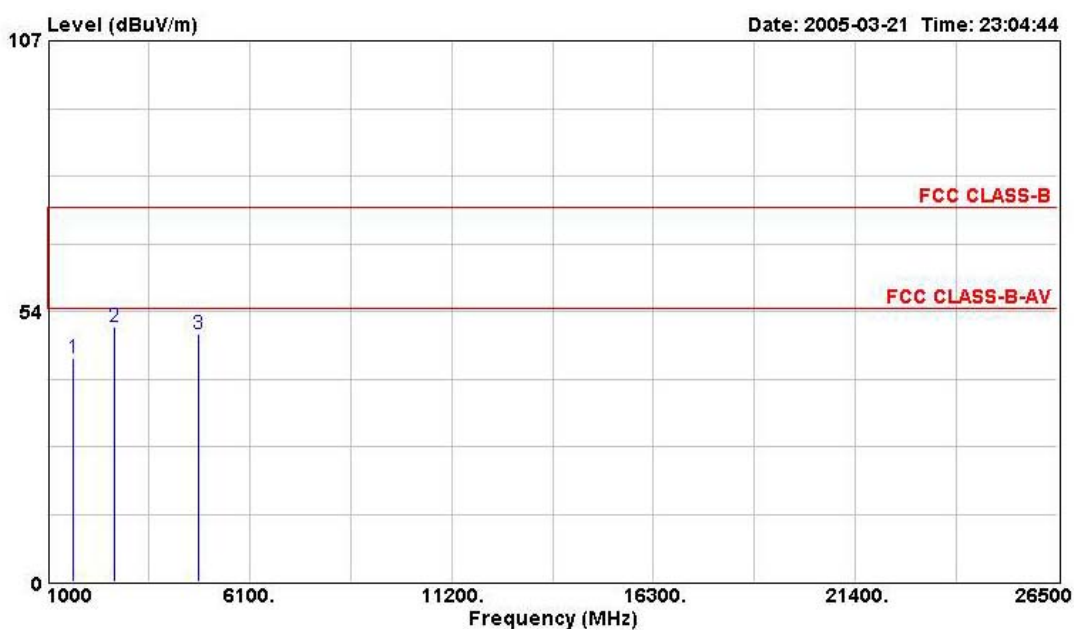
2. Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

- Modulation Type: OFDM
- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

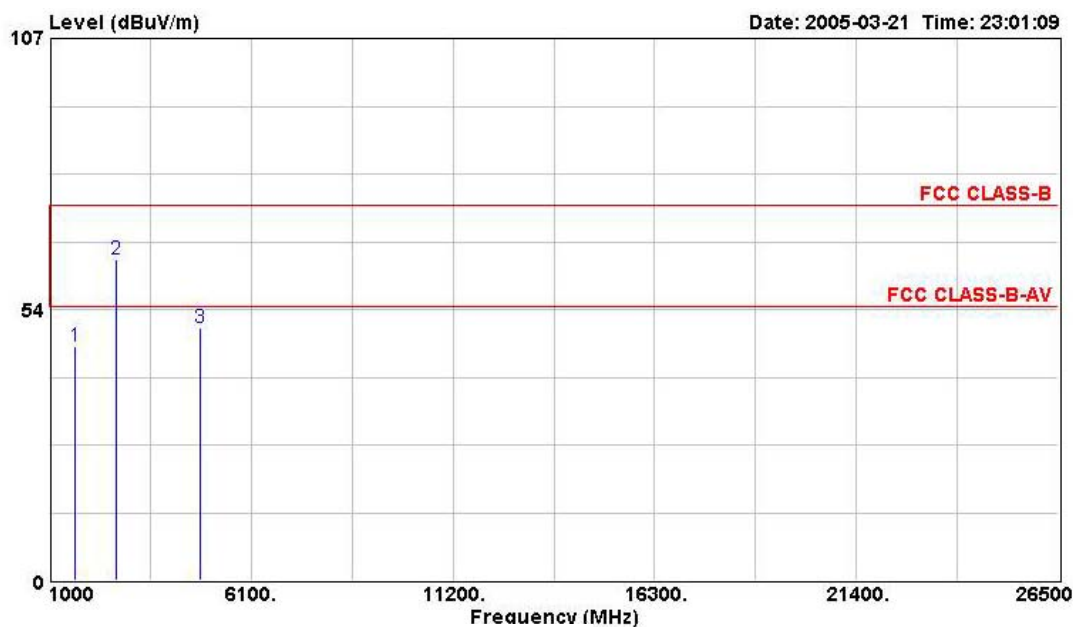
## Mode 1

### (A) Polarization: Horizontal



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	1660.000	44.35	-29.65	56.28	74.00	-11.93	Peak
2	2686.000	50.52	-23.48	58.90	74.00	-8.38	Peak
3	4824.200	48.92	-25.08	53.23	74.00	-4.31	PEAK

(B) Polarization: Vertical



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1662.000	46.20	-27.80	58.13	74.00	-11.93	Peak
2	2686.000	63.48	-10.52	71.86	74.00	-8.38	Peak
3	4818.800	49.75	-24.25	54.06	74.00	-4.31	PEAK

Note:

1. Item 2 is on un-restricted band, so the limit is -20dBc for such emission.

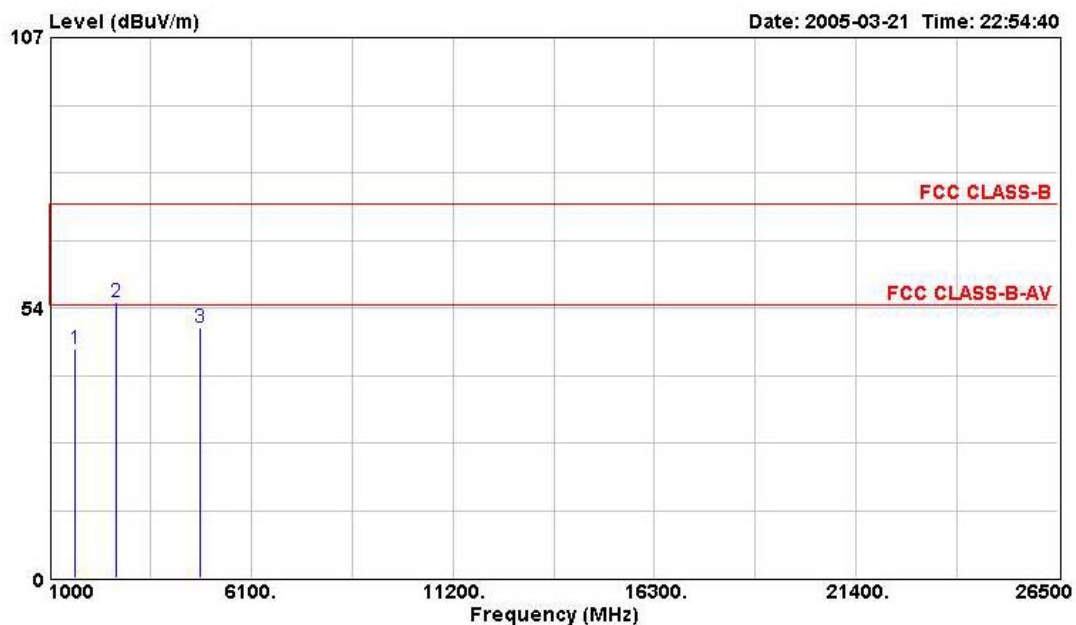
2. Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level



Mode 2

(A) Polarization: Horizontal

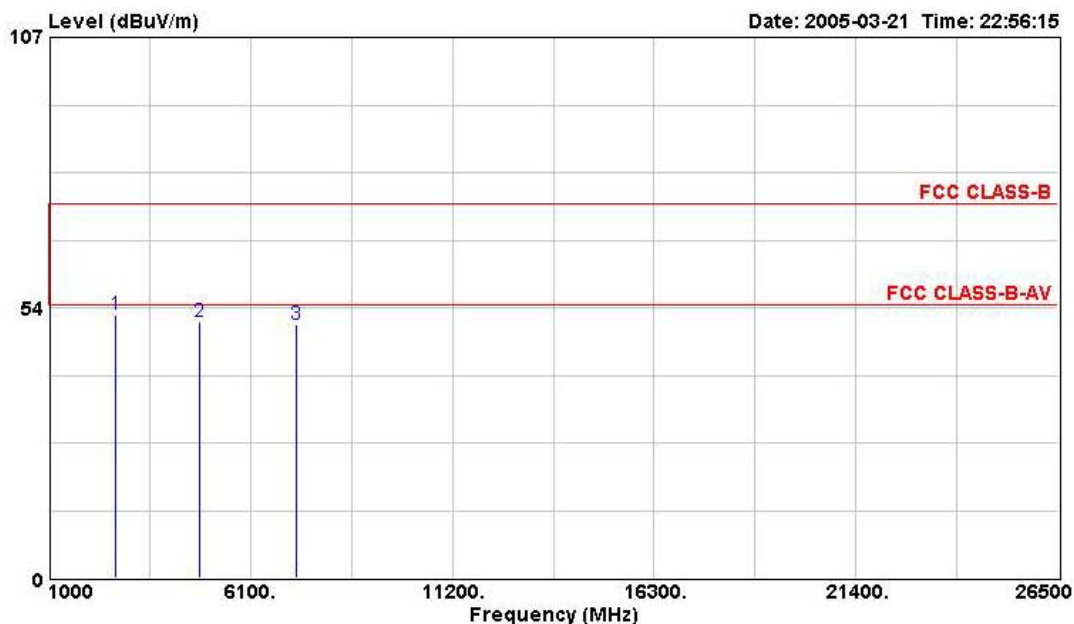


	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	1662.000	45.41	-28.59	57.34	74.00	-11.93	Peak
2	2686.000	54.68	-19.32	63.06	74.00	-8.38	Peak
3	4823.400	49.53	-24.47	53.84	74.00	-4.31	Peak

Note:

Item 2 is on un-restricted band, so the limit is -20dBc for such emission.

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	2686.000	52.06	-21.94	60.44	74.00	-8.38	Peak
2	4823.320	50.83	-23.17	55.14	74.00	-4.31	Peak
3	7239.400	50.26	-23.74	50.29	74.00	-0.03	Peak

Note:

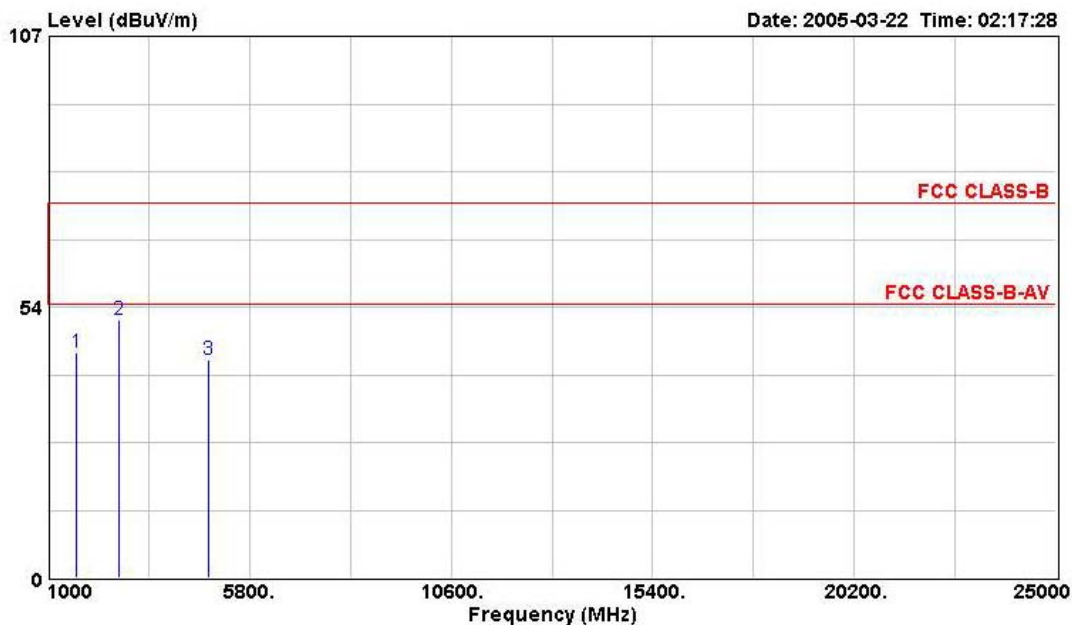
Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level



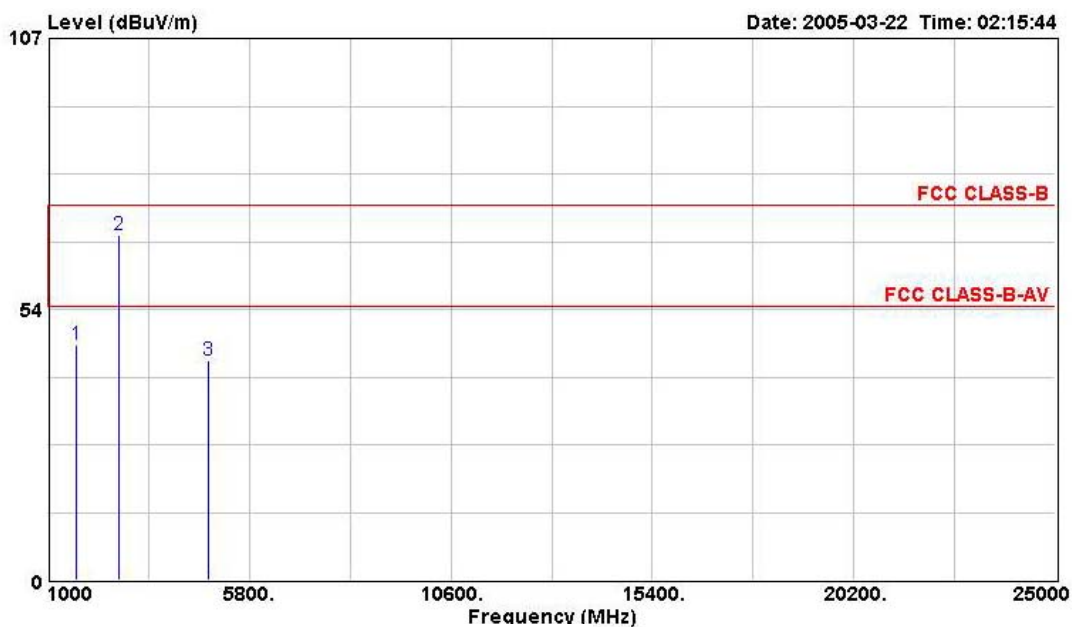
Mode 3

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Read Level	Limit	Line Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	1662.000	44.63	-29.37	56.56	74.00	-11.93	Peak
2	2686.000	51.07	-22.93	59.45	74.00	-8.38	Peak
3	4823.200	43.17	-30.83	47.48	74.00	-4.31	PEAK

(B) Polarization: Vertical



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1660.000	46.58	-27.42	58.51	74.00	-11.93	Peak
2	2686.000	68.23	-5.77	76.61	74.00	-8.38	Peak
3	4824.000	43.49	-30.51	47.80	74.00	-4.31	PEAK

Note:

- Item 2 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

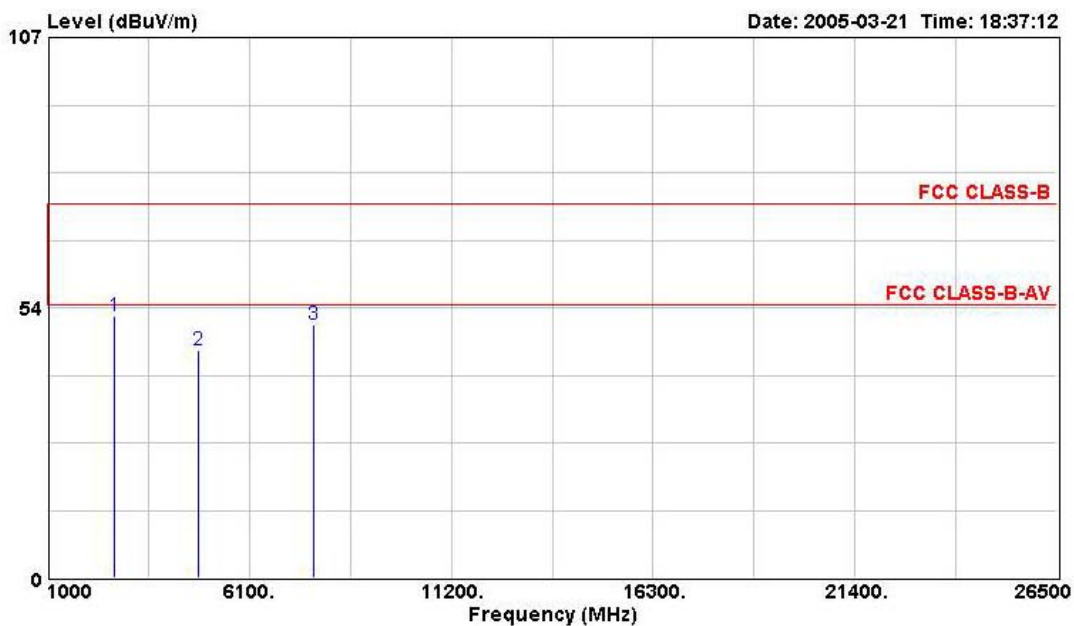
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level





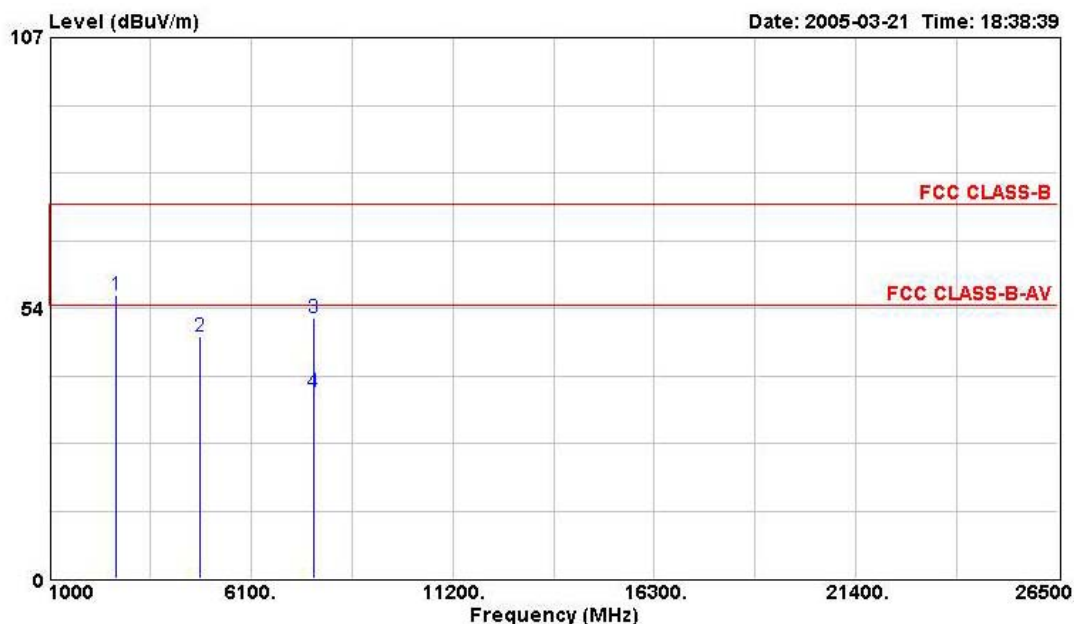
Mode 4

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	2686.000	51.70	-22.30	60.08	74.00	-8.38	Peak
2	4816.000	45.02	-28.98	49.36	74.00	-4.34	Peak
3	7716.000	50.10	-23.90	48.83	74.00	1.27	Peak

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	2686.000	55.96	-18.04	64.34	74.00	-8.38	Peak
2	4816.000	47.84	-26.16	52.18	74.00	-4.34	Peak
3	7680.000	51.50	-22.50	50.28	74.00	1.22	Peak
4	7680.000	36.94	-17.06	35.72	54.00	1.22	Average

**Note:**

1. Item 1 is on un-restricted band, so the limit is -20dBc for such emission.

2. Emission level (dBuV/m) = 20 log Emission level (uV/m)

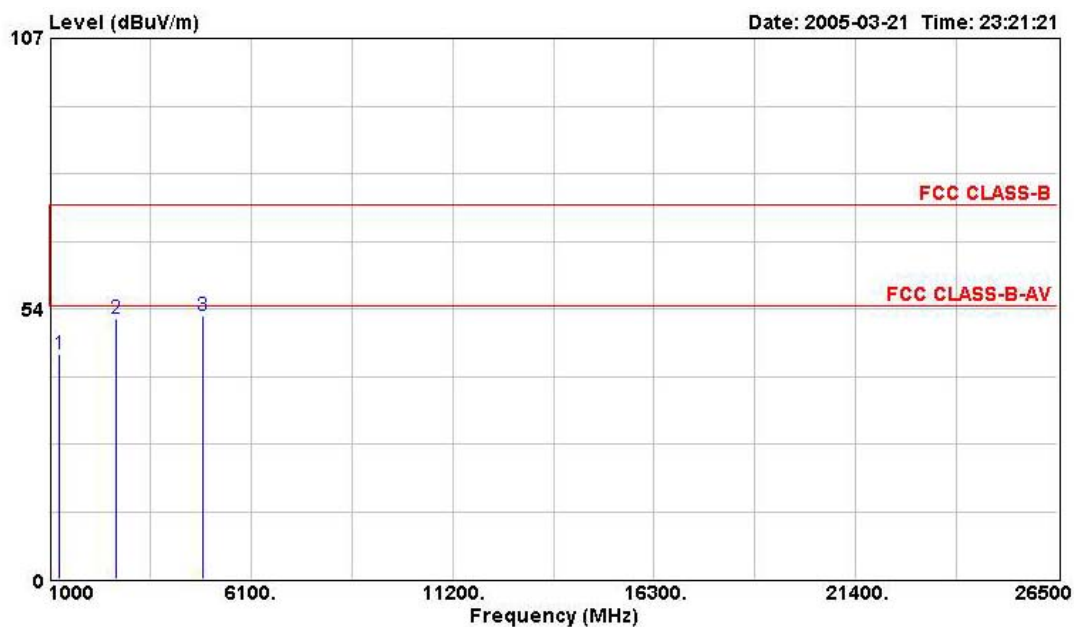
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.3.9. Test Results for CH 06 / 2437 MHz (for emission above 1GHz)

- Modulation Type: DSSS
- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

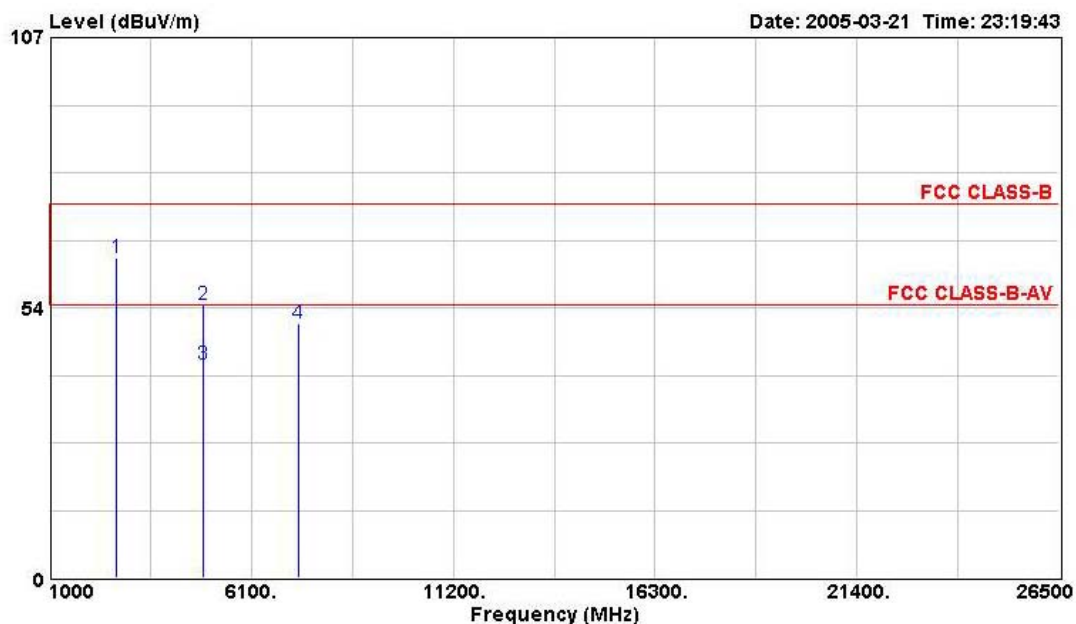
**Mode 1**

**(A) Polarization: Horizontal**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1 Ø	1260.000	44.43	-29.57	57.62	74.00	-13.19	Peak
2 Ø	2686.000	51.62	-22.38	60.00	74.00	-8.38	Peak
3 Ø	4873.900	52.00	-22.00	56.18	74.00	-4.19	PEAK

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBUV/m	Limit	Level	Line	Factor	Remark
	MHz	dBUV/m	dB	dBuV	dBUV/m	dB	
1	2686.000	63.43	-10.57	71.81	74.00	-8.38	Peak
2	4873.900	54.17	-19.83	58.36	74.00	-4.19	PEAK
3	4873.900	42.29	-11.71	46.48	54.00	-4.19	Average
4	7302.900	50.39	-23.61	50.17	74.00	0.23	PEAK

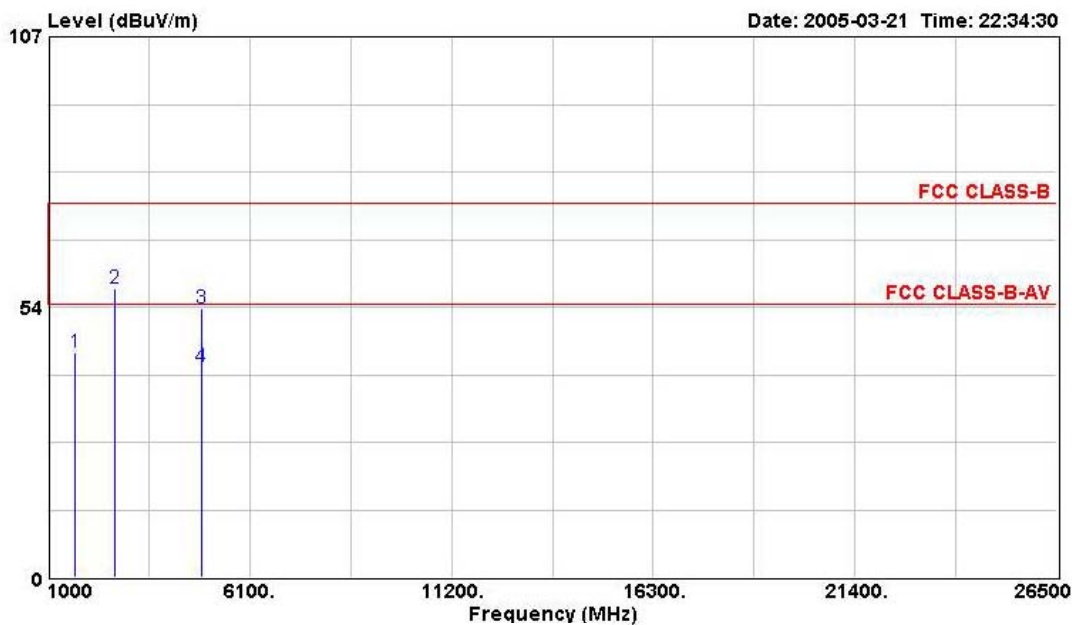
**Note:**

- Item 1 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBUV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal

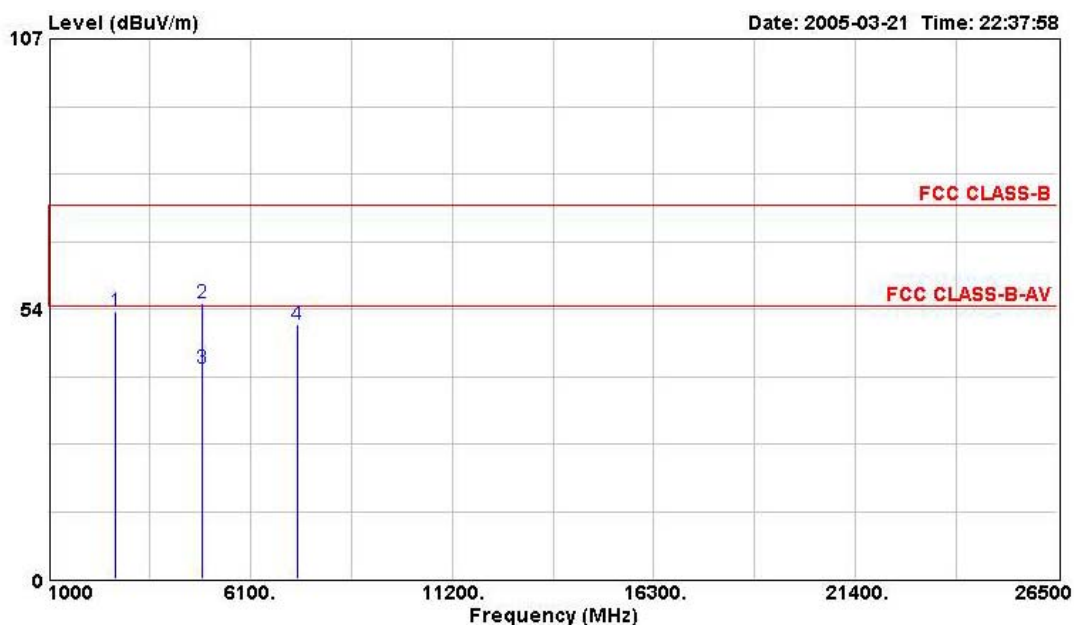


	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1668.000	44.56	-29.44	56.49	74.00	-11.93	Peak
2 0	2686.000	57.30	-16.70	65.68	74.00	-8.38	Peak
3 0	4874.000	53.24	-20.76	57.43	74.00	-4.19	Peak
4 0	4874.000	41.66	-12.34	45.85	54.00	-4.19	Average

Note:

Item 2 is on un-restricted band, so the limit is -20dBc for such emission.

(B) Polarization: Vertical



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	2686.000	52.97	-21.03	61.35	74.00	-8.38	Peak
2	4874.100	54.59	-19.41	58.77	74.00	-4.19	Peak
3	4874.100	41.69	-12.31	45.88	54.00	-4.19	Average
4	7309.000	50.53	-23.47	50.31	74.00	0.23	Peak

Note:

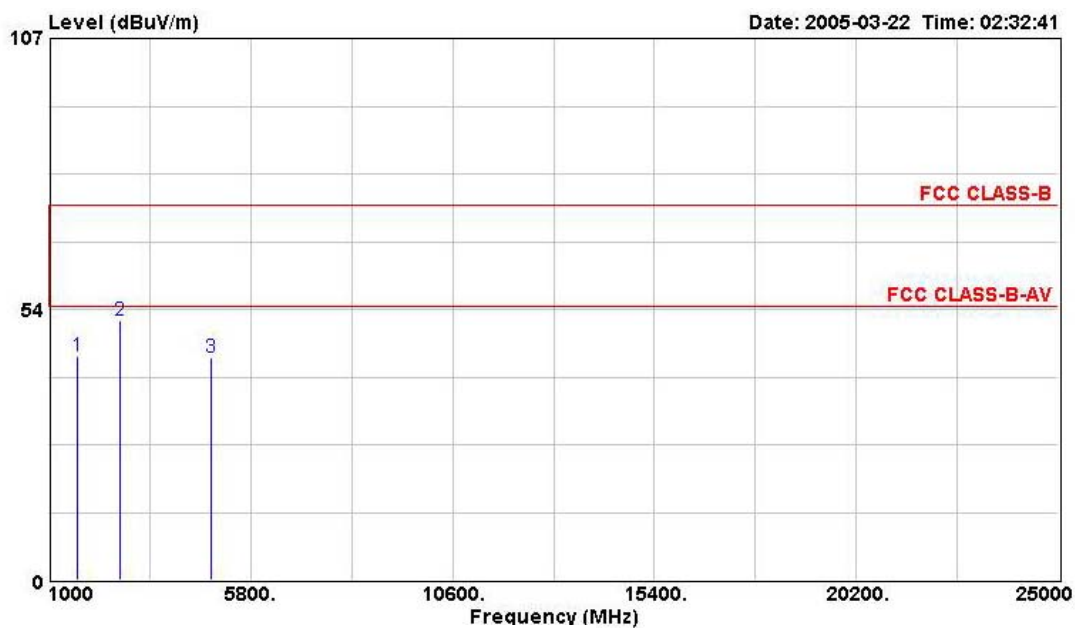
Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level



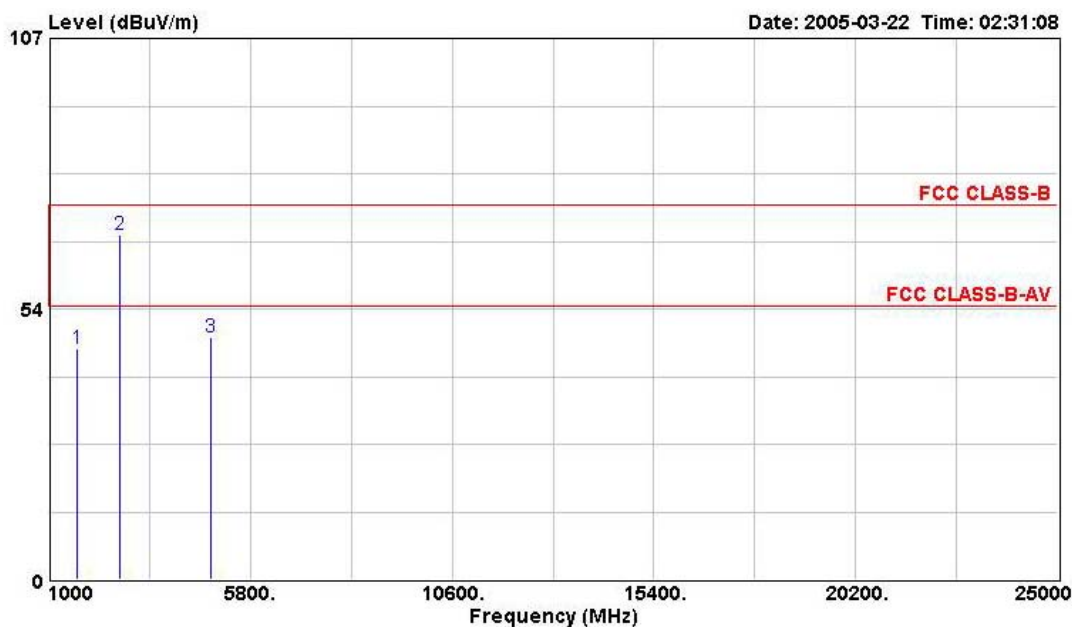
Mode 3

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	1662.000	44.11	-29.89	56.04	74.00	-11.93	Peak
2	2686.000	51.16	-22.84	59.54	74.00	-8.38	Peak
3	4874.000	43.99	-30.01	48.18	74.00	-4.19	PEAK

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1660.000	45.67	-28.33	57.60	74.00	-11.93	Peak
2	2686.000	68.15	-5.85	76.53	74.00	-8.38	Peak
3	4873.700	47.81	-26.19	51.99	74.00	-4.19	PEAK

**Note:**

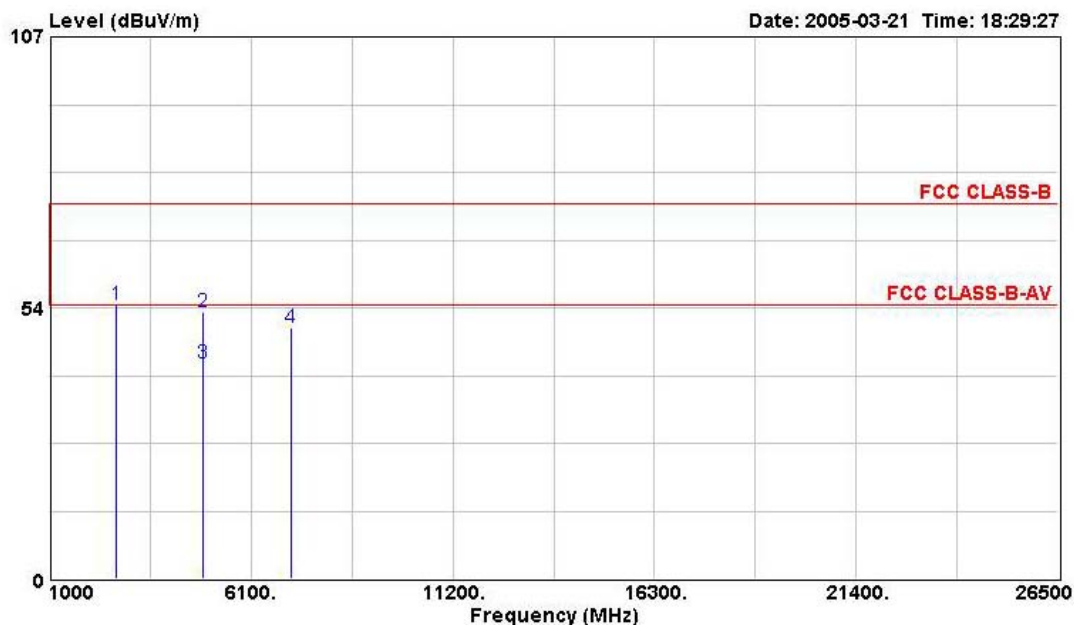
- Item 2 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level



Mode 4

(A) Polarization: Horizontal

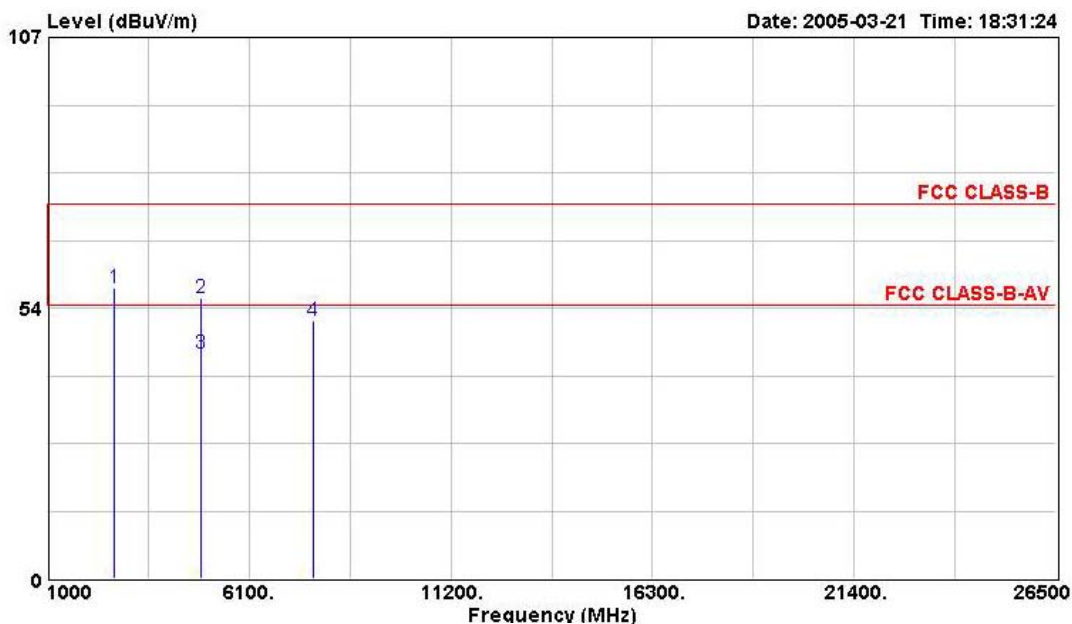


	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	2686.000	54.17	-19.83	62.55	74.00	-8.38	Peak
2	4876.000	52.54	-21.46	56.72	74.00	-4.19	Peak
3	4876.000	42.39	-11.61	46.58	54.00	-4.19	Average
4	7104.000	49.47	-24.53	50.00	74.00	-0.53	Peak

Note:

Item 1 is on un-restricted band, so the limit is -20dBc for such emission.

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	2686.000	57.34	-16.66	65.72	74.00	-8.38	Peak
2	4876.000	55.46	-18.54	59.64	74.00	-4.19	Peak
3	4876.000	44.50	-9.50	48.69	54.00	-4.19	Average
4	7716.000	50.90	-23.10	49.63	74.00	1.27	Peak

**Note:**

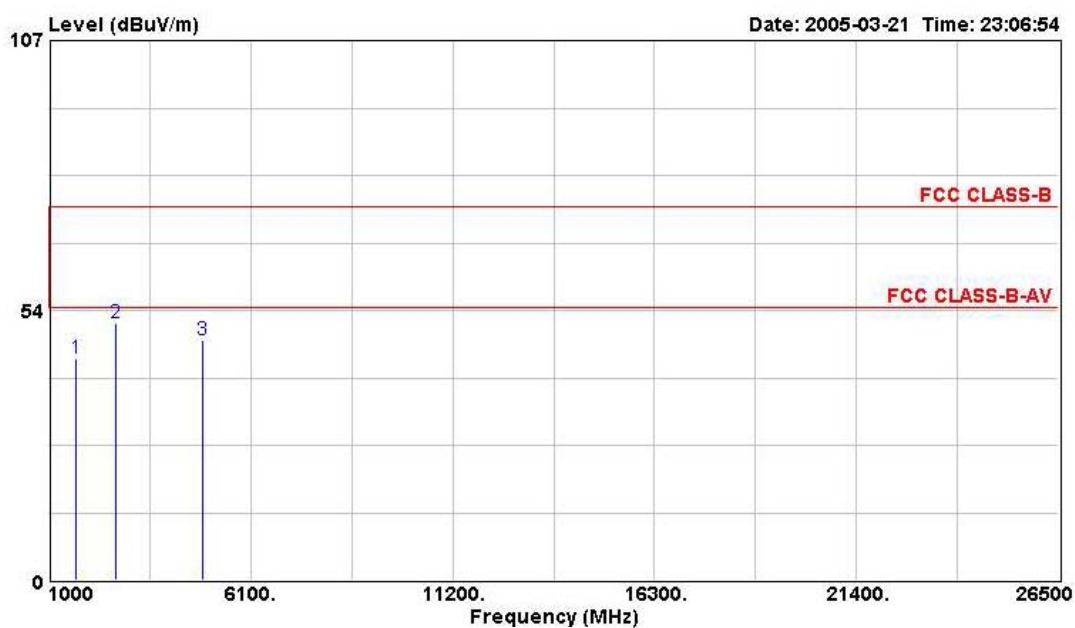
- Item 1 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

- Modulation Type: OFDM
- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

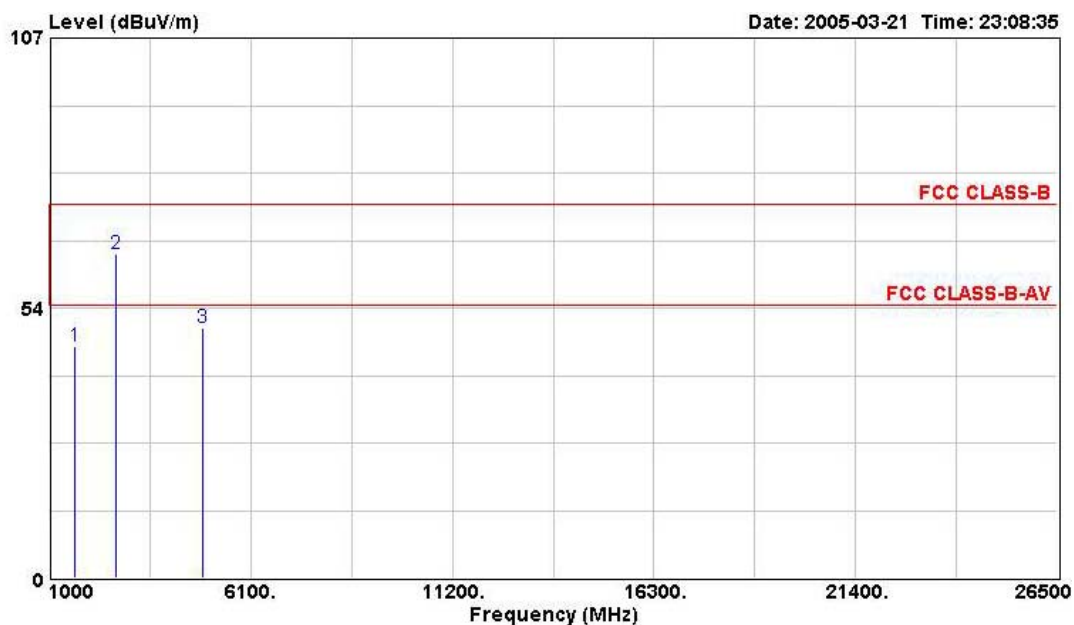
## Mode 1

### (A) Polarization: Horizontal



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1668.000	44.07	-29.93	56.00	74.00	-11.93	Peak
2	2686.000	51.02	-22.98	59.40	74.00	-8.38	Peak
3	4874.800	47.52	-26.48	51.71	74.00	-4.19	PEAK

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	0	1660.000	45.90	-28.10	57.83	74.00	-11.93 Peak
2	0	2686.000	64.12	-9.88	72.50	74.00	-8.38 Peak
3	0	4874.000	49.63	-24.37	53.81	74.00	-4.19 PEAK

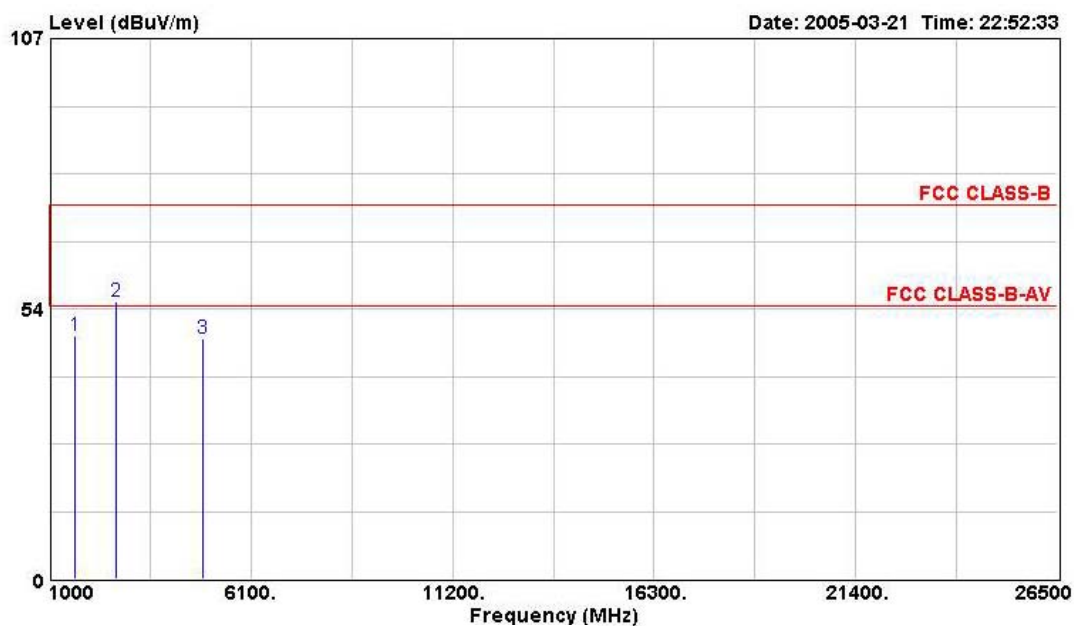
**Note:**

- Item 2 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

**Mode 2**

**(A) Polarization: Horizontal**

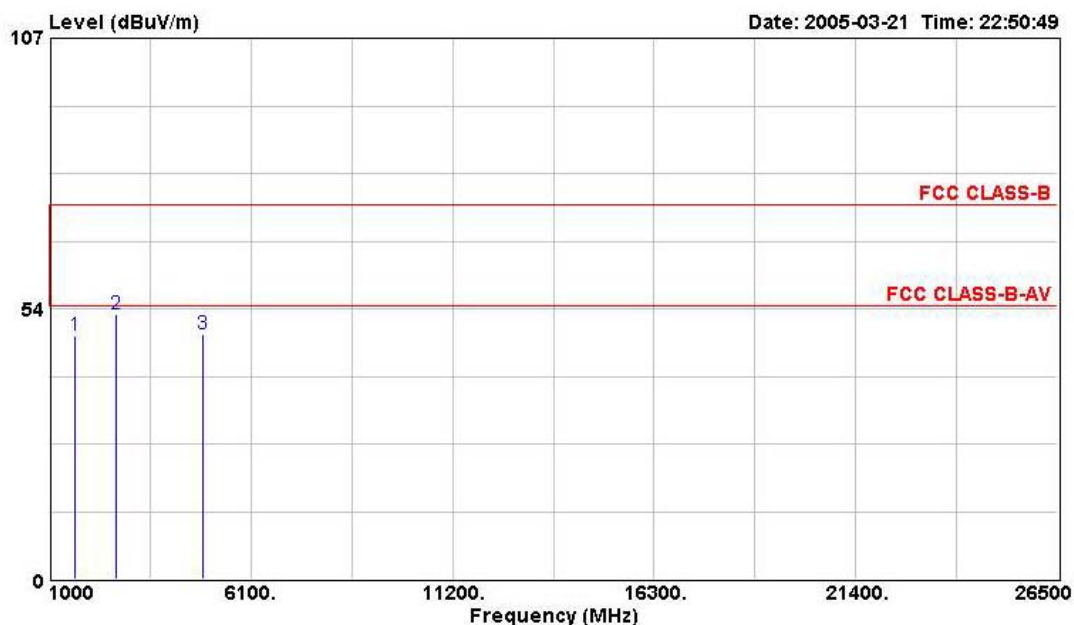


	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	1662.000	48.24	-25.76	60.17	74.00	-11.93	Peak
2	2686.000	54.86	-19.14	63.24	74.00	-8.38	Peak
3	4880.100	47.70	-26.30	51.89	74.00	-4.19	Peak

Note:

Item 2 is on un-restricted band, so the limit is -20dBc for such emission.

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1662.000	48.23	-25.77	60.16	74.00	-11.93	Peak
2	2686.000	52.33	-21.67	60.71	74.00	-8.38	Peak
3	4879.900	48.46	-25.54	52.65	74.00	-4.19	Peak

Note:

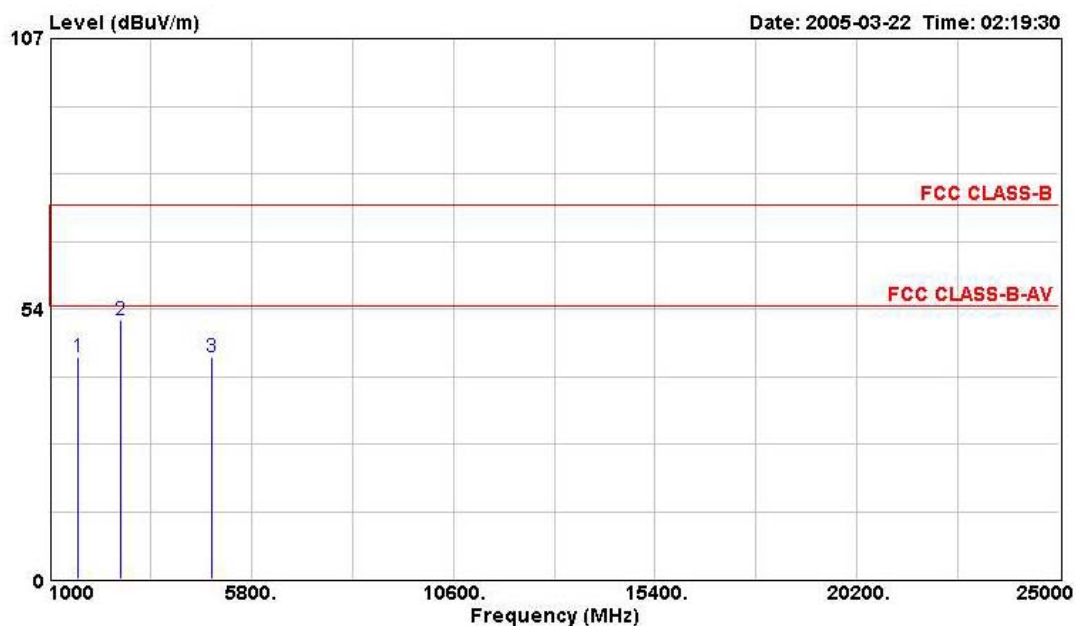
Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level



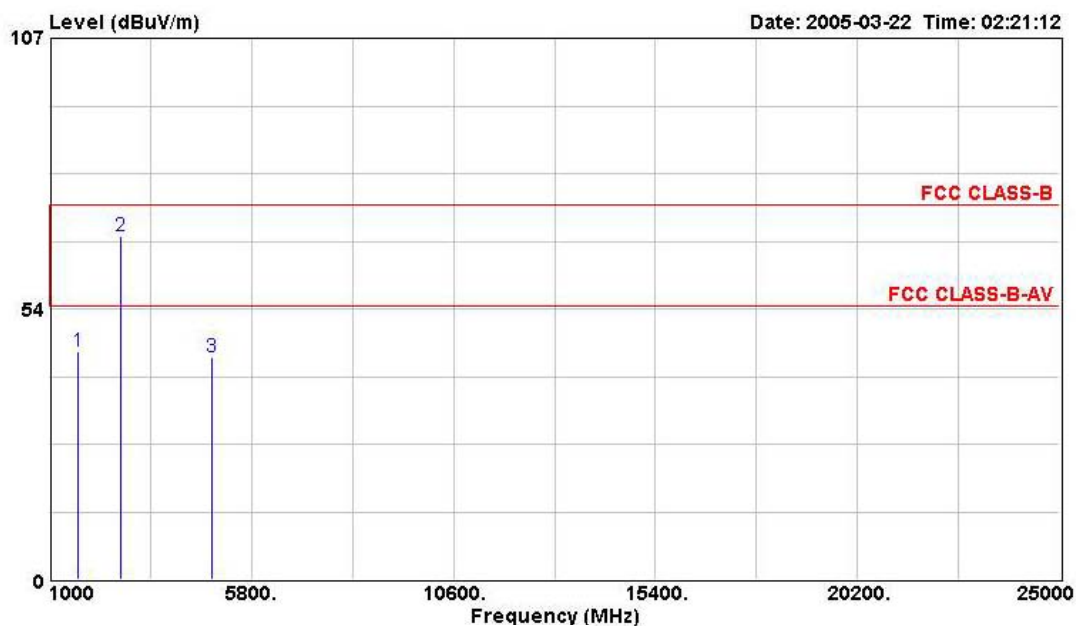
Mode 3

(A) Polarization: Horizontal



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	1662.000	44.03	-29.97	55.96	74.00	-11.93	Peak
2	2686.000	51.33	-22.67	59.71	74.00	-8.38	Peak
3	4873.300	44.05	-29.95	48.23	74.00	-4.19	PEAK

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1662.000	45.08	-28.92	57.01	74.00	-11.93	Peak
2	2686.000	67.89	-6.11	76.27	74.00	-8.38	Peak
3	4874.000	43.96	-30.04	48.14	74.00	-4.19	PEAK

**Note:**

- Item 2 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

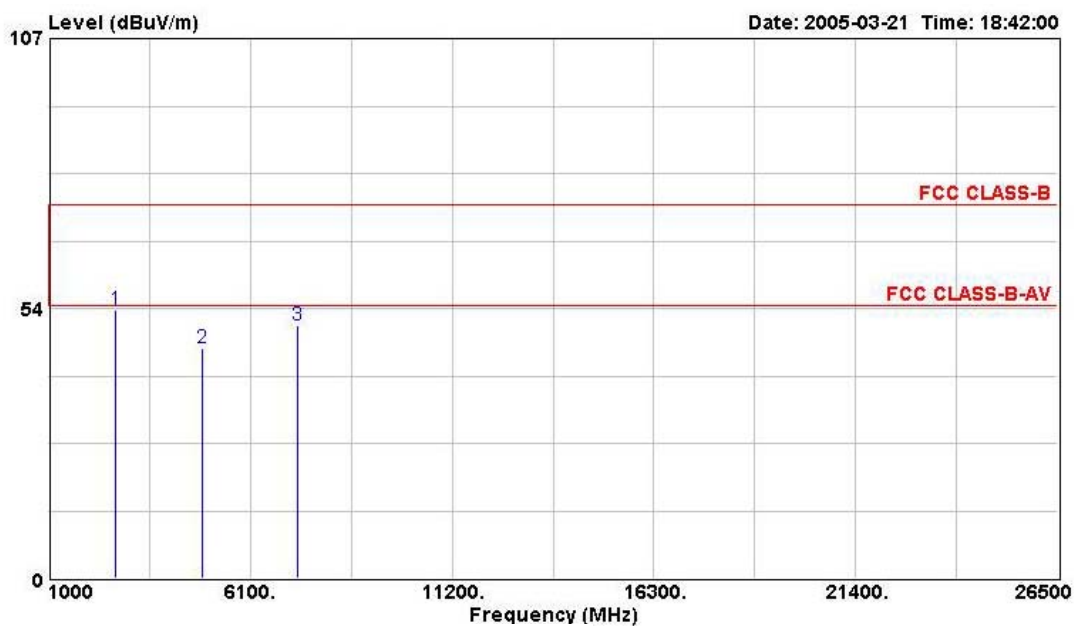
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level





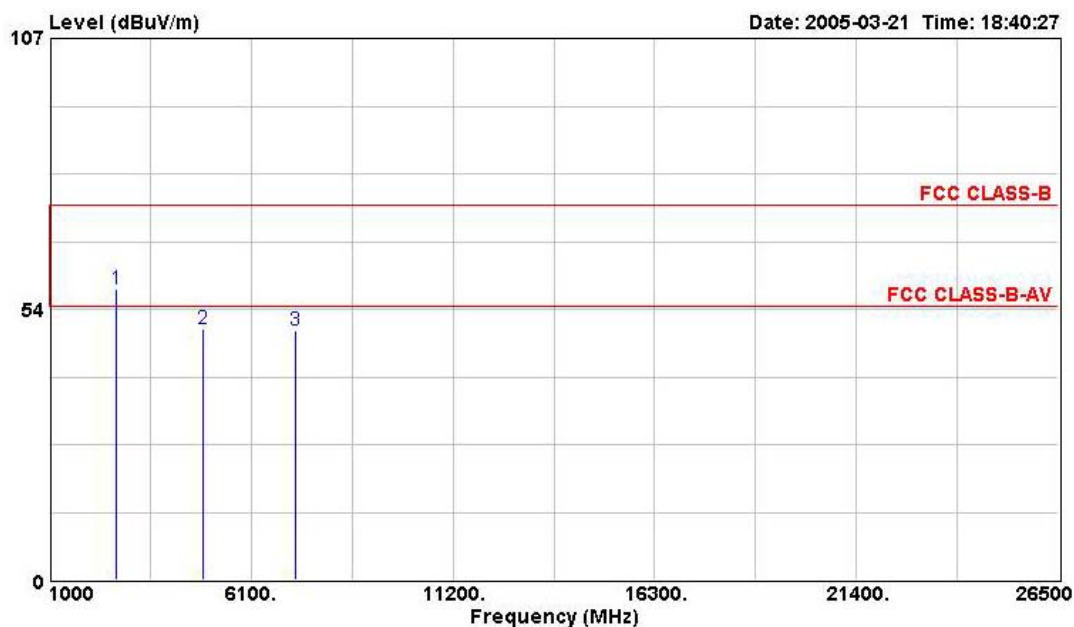
Mode 4

(A) Polarization: Horizontal



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	2686.000	53.35	-20.65	61.73	74.00	-8.38	Peak
2	4876.000	45.75	-28.26	49.93	74.00	-4.19	Peak
3	7300.000	50.06	-23.94	49.84	74.00	0.22	Peak

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	2686.000	57.37	-16.63	65.75	74.00	-8.38	Peak
2	4884.000	49.58	-24.42	53.77	74.00	-4.19	Peak
3	7204.000	49.25	-24.75	49.41	74.00	-0.16	Peak

**Note:**

- Item 1 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

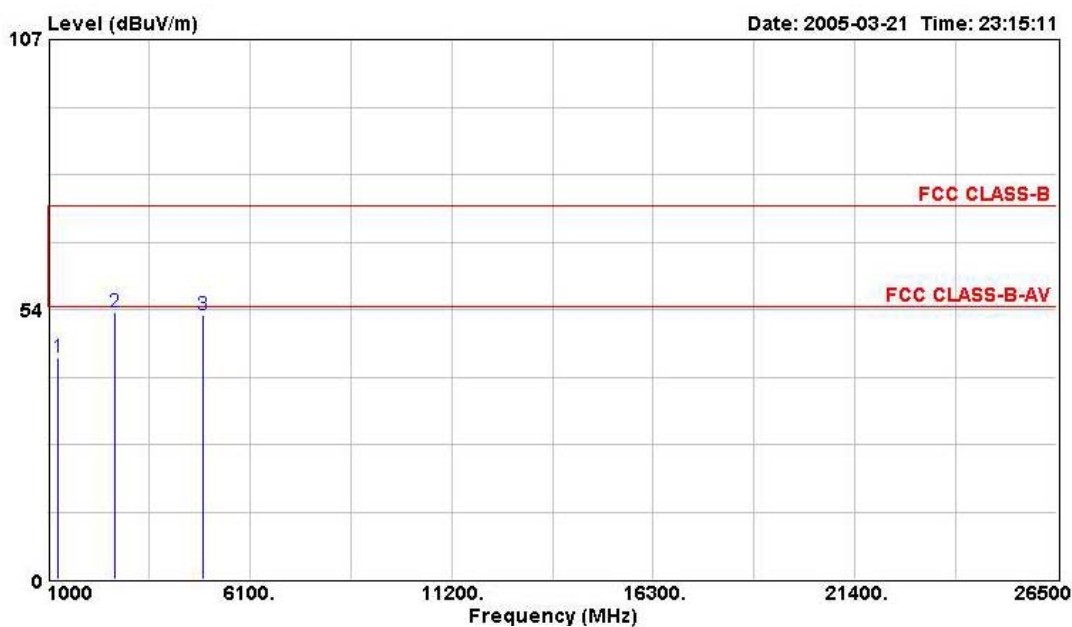
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.3.10. Test Results for CH 11 / 2462 MHz (for emission above 1GHz)

- Modulation Type: DSSS
- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

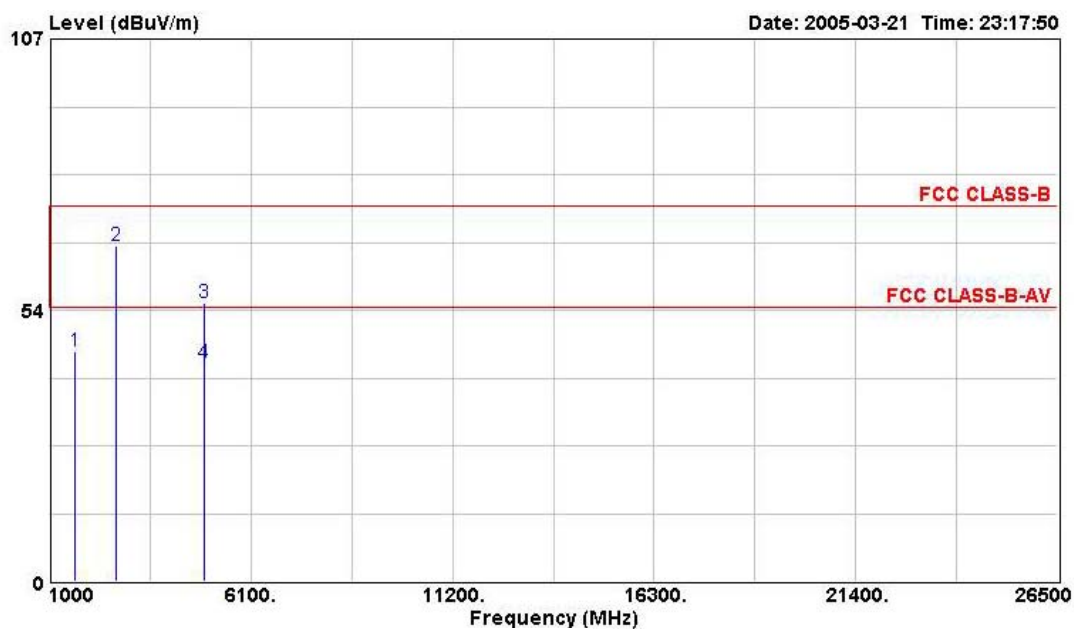
**Mode 1**

**(A) Polarization: Horizontal**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	1260.000	44.03	-29.97	57.22	74.00	-13.19	Peak
2	2686.000	52.88	-21.12	61.26	74.00	-8.38	Peak
3	4924.000	52.52	-21.48	56.60	74.00	-4.08	PEAK

(B) Polarization: Vertical



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1660.000	45.44	-28.56	57.37	74.00	-11.93	Peak
2	2686.000	66.16	-7.84	74.54	74.00	-8.38	Peak
3	4923.800	54.97	-19.03	59.05	74.00	-4.08	PEAK
4	4923.800	42.98	-11.02	47.06	54.00	-4.08	Average

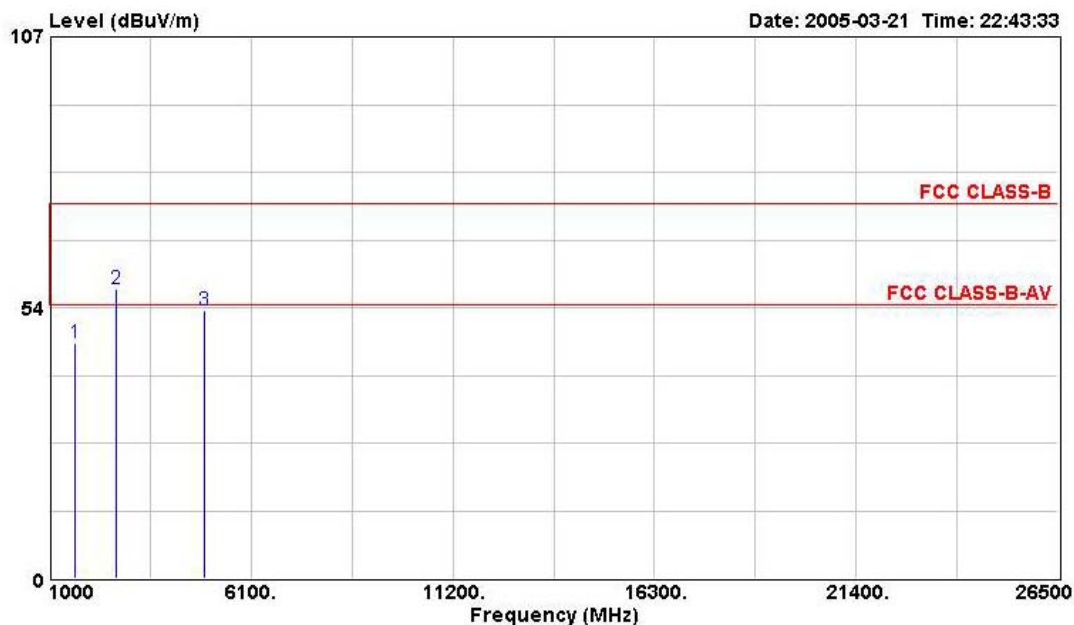
Note:

- Item 2 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1660.000	46.48	-27.52	58.41	74.00	-11.93	Peak
2	2686.000	57.27	-16.73	65.65	74.00	-8.38	Peak
3	4924.100	52.89	-21.11	56.97	74.00	-4.08	Peak

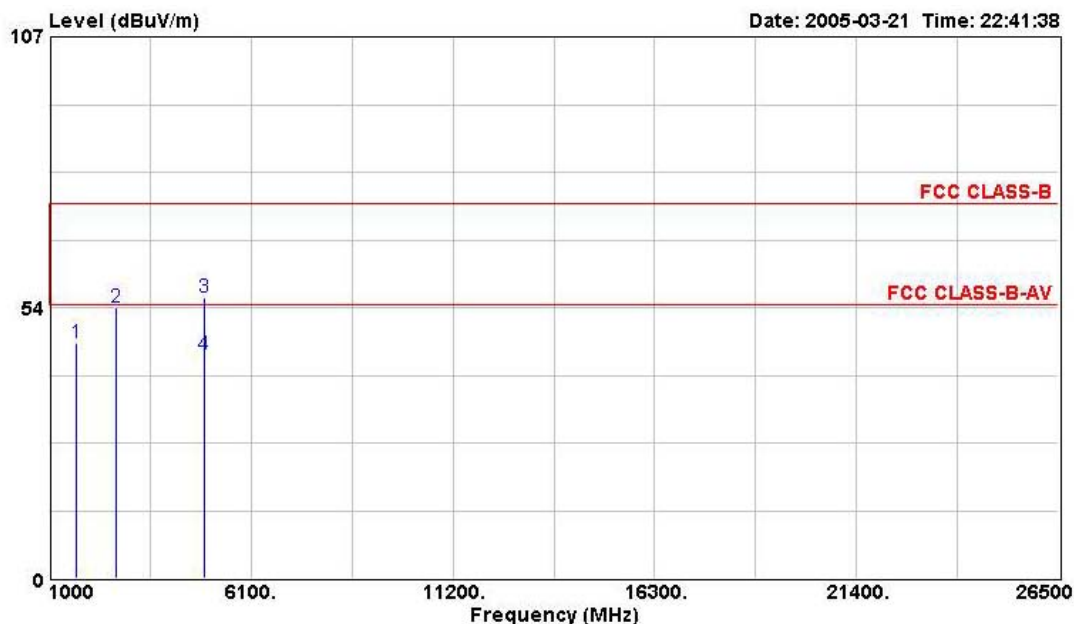
Note:

1. Item 2 is on un-restricted band, so the limit is -20dBc for such emission.

2. Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1668.000	46.43	-27.57	58.36	74.00	-11.93	Peak
2 @	2686.000	53.62	-20.38	62.00	74.00	-8.38	Peak
3 @	4924.000	55.46	-18.54	59.54	74.00	-4.08	Peak
4 @	4924.000	44.09	-9.91	48.17	54.00	-4.08	Average

Note:

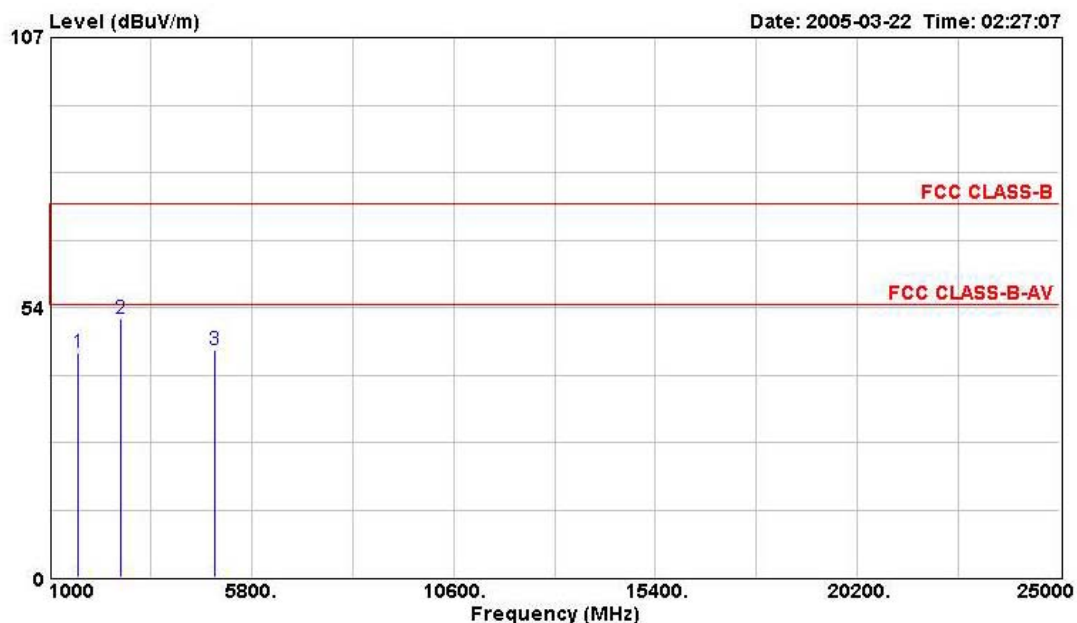
Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level



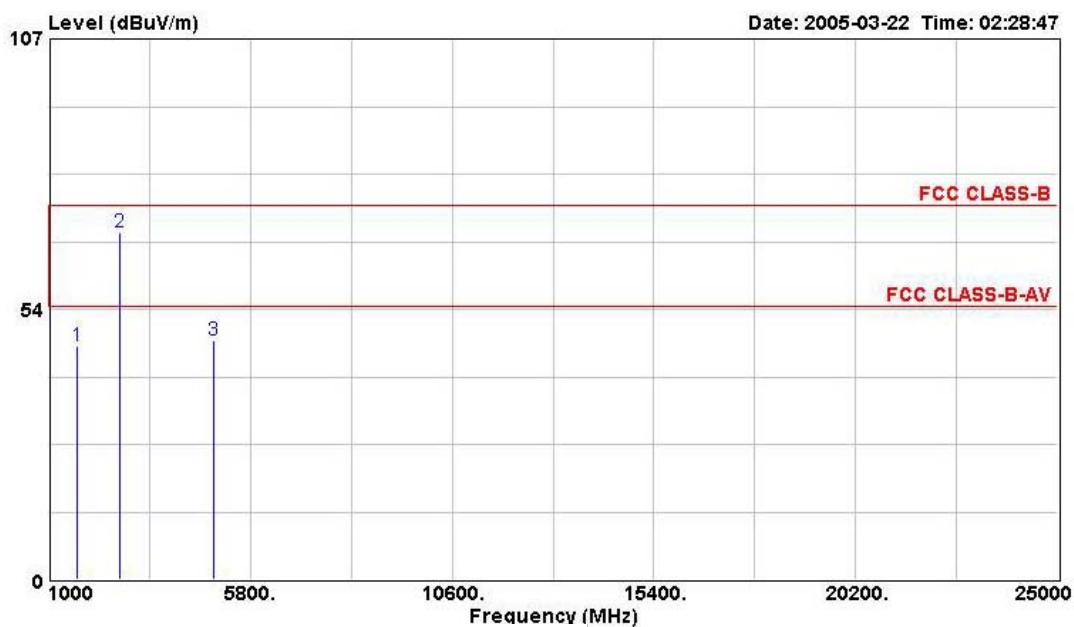
Mode 3

(A) Polarization: Horizontal



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1660.000	44.57	-29.43	56.50	74.00	-11.93	Peak
2	2686.000	51.19	-22.81	59.57	74.00	-8.38	Peak
3	4923.800	45.09	-28.91	49.17	74.00	-4.08	PEAK

(B) Polarization: Vertical



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1660.000	46.08	-27.92	58.01	74.00	-11.93	Peak
2	2686.000	68.59	-5.41	76.97	74.00	-8.38	Peak
3	4923.700	47.27	-26.73	51.35	74.00	-4.08	PEAK

Note:

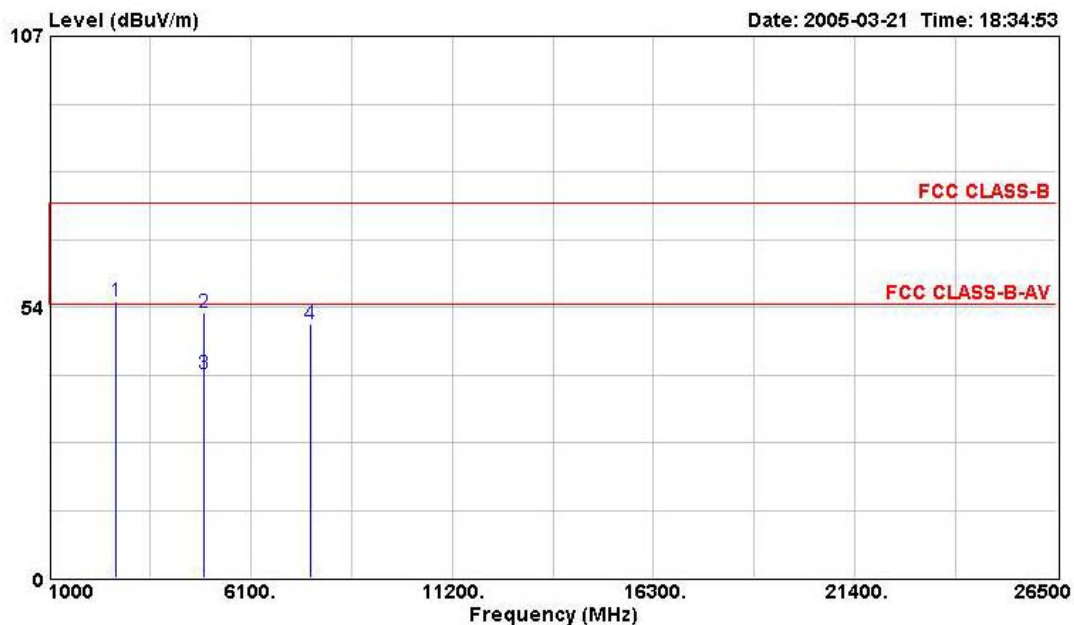
- Item 2 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level



Mode 4

(A) Polarization: Horizontal

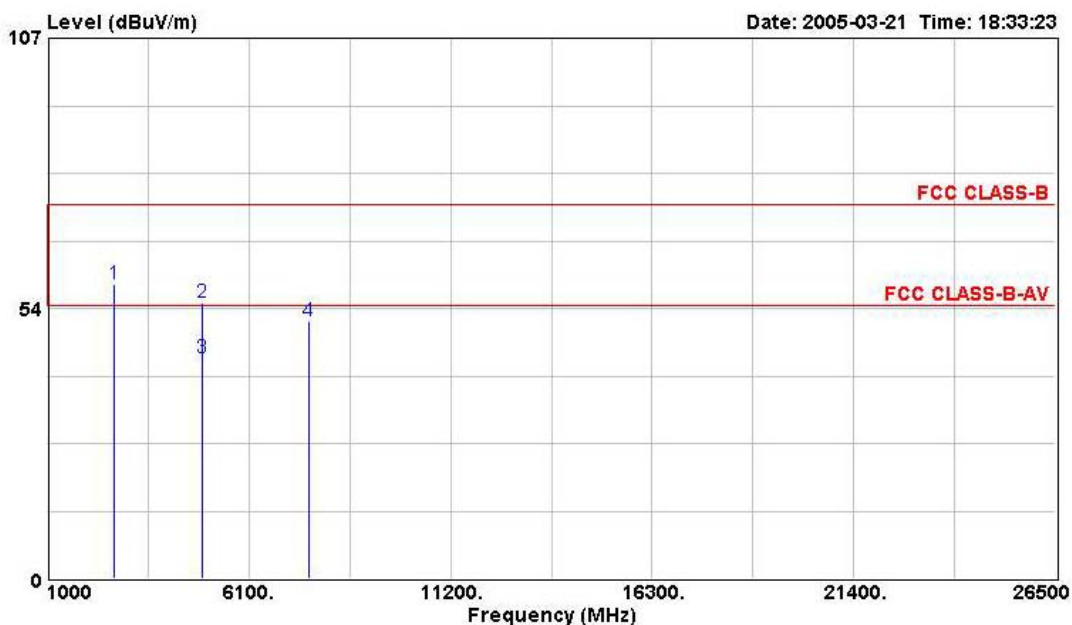


	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	2686.000	54.56	-19.44	62.94	74.00	-8.38	Peak
2	4924.000	52.42	-21.58	56.50	74.00	-4.08	Peak
3	4924.000	40.24	-13.76	44.32	54.00	-4.08	Average
4	7620.000	50.04	-23.96	48.93	74.00	1.11	Peak

Note:

Item 1 is on un-restricted band, so the limit is -20dBc for such emission.

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	2686.000	58.36	-15.64	66.74	74.00	-8.38	Peak
2	4928.000	54.75	-19.25	58.83	74.00	-4.08	Peak
3	4928.000	43.79	-10.21	47.87	54.00	-4.08	Average
4	7612.000	50.87	-23.13	49.75	74.00	1.11	Peak

**Note:**

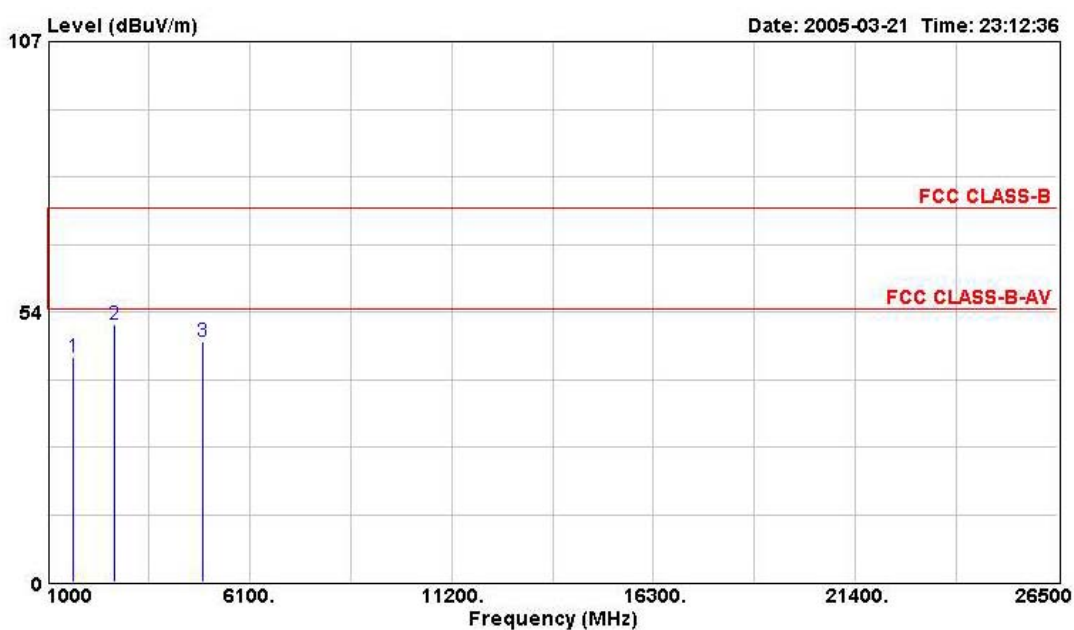
- Item 1 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

- Modulation Type: OFDM
- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

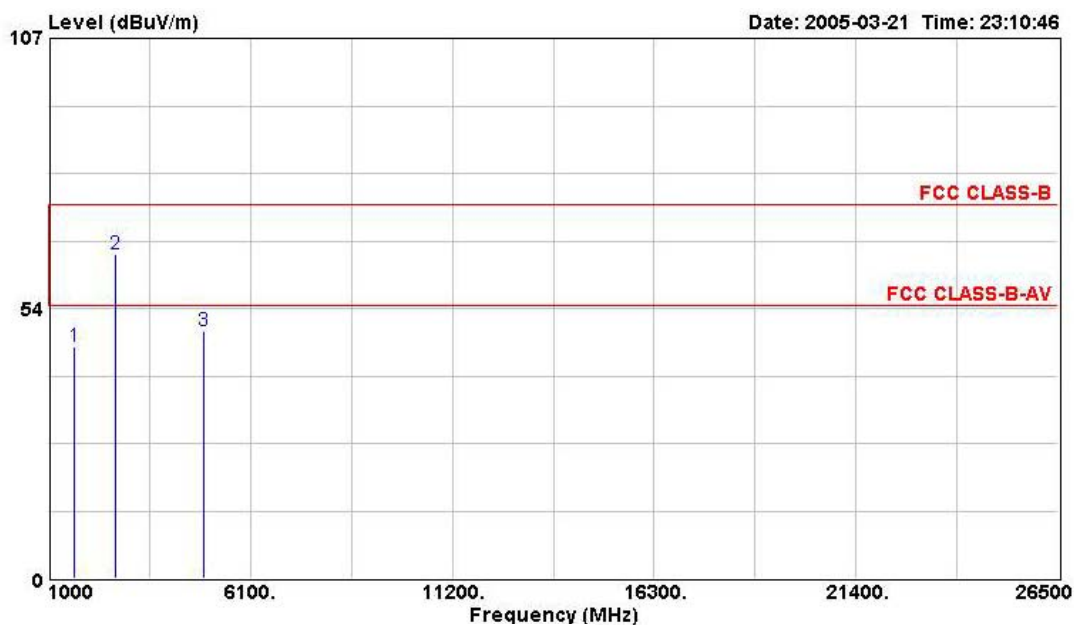
## Mode 1

### (A) Polarization: Horizontal



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	0	1662.000	44.44	-29.56	56.37	74.00	-11.93 Peak
2	0	2686.000	50.93	-23.07	59.31	74.00	-8.38 Peak
3	0	4920.400	47.50	-26.50	51.58	74.00	-4.08 PEAK

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	0	1662.000	45.86	-28.14	57.79	74.00	-11.93 Peak
2	0	2686.000	64.14	-9.86	72.52	74.00	-8.38 Peak
3	0	4917.400	48.97	-25.03	53.08	74.00	-4.11 PEAK

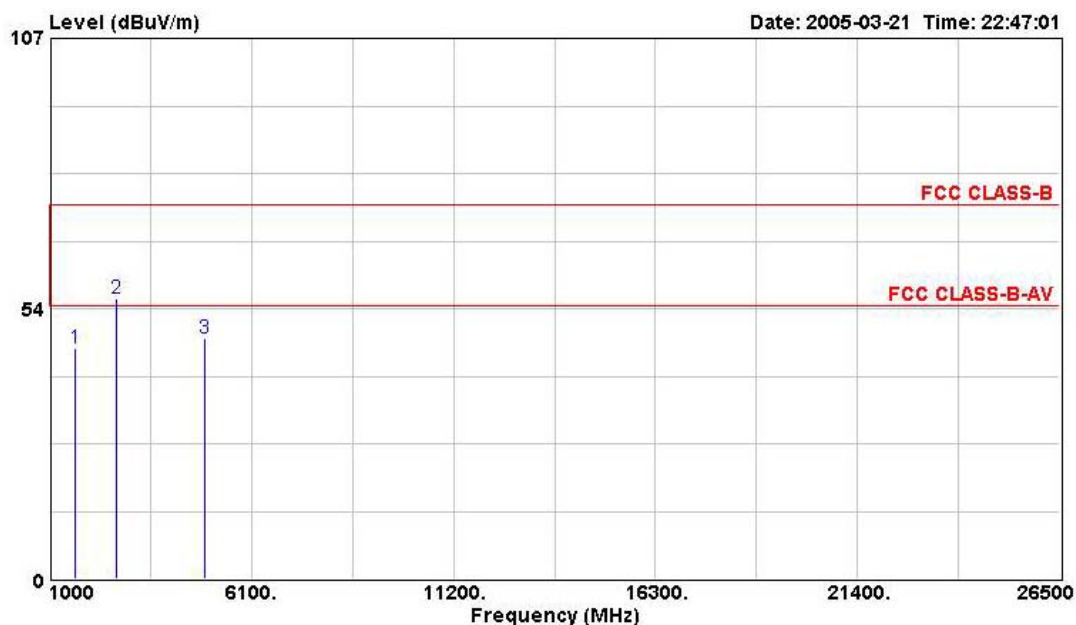
**Note:**

- Item 2 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Mode 2

(A) Polarization: Horizontal



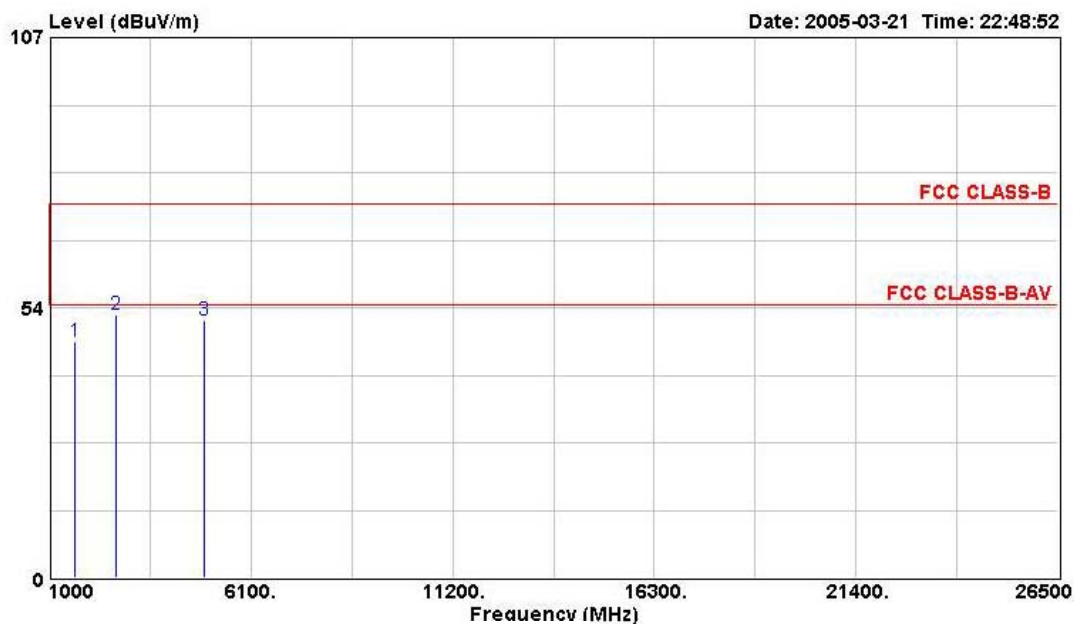
	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1662.000	45.52	-28.48	57.45	74.00	-11.93	Peak
2	2686.000	55.35	-18.65	63.73	74.00	-8.38	Peak
3	4926.800	47.48	-26.52	51.56	74.00	-4.08	Peak

Note:

- Item 2 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

(B) Polarization: Vertical



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1660.000	46.66	-27.34	58.59	74.00	-11.93	Peak
2	2686.000	52.16	-21.84	60.54	74.00	-8.38	Peak
3	4923.700	50.94	-23.06	55.02	74.00	-4.08	Peak

Note:

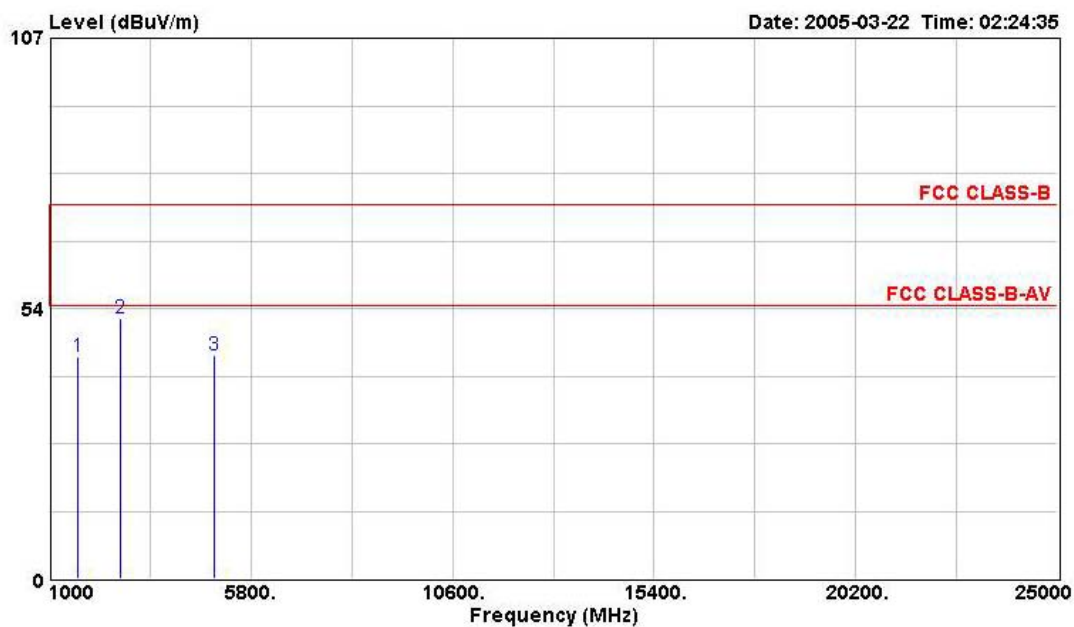
Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level



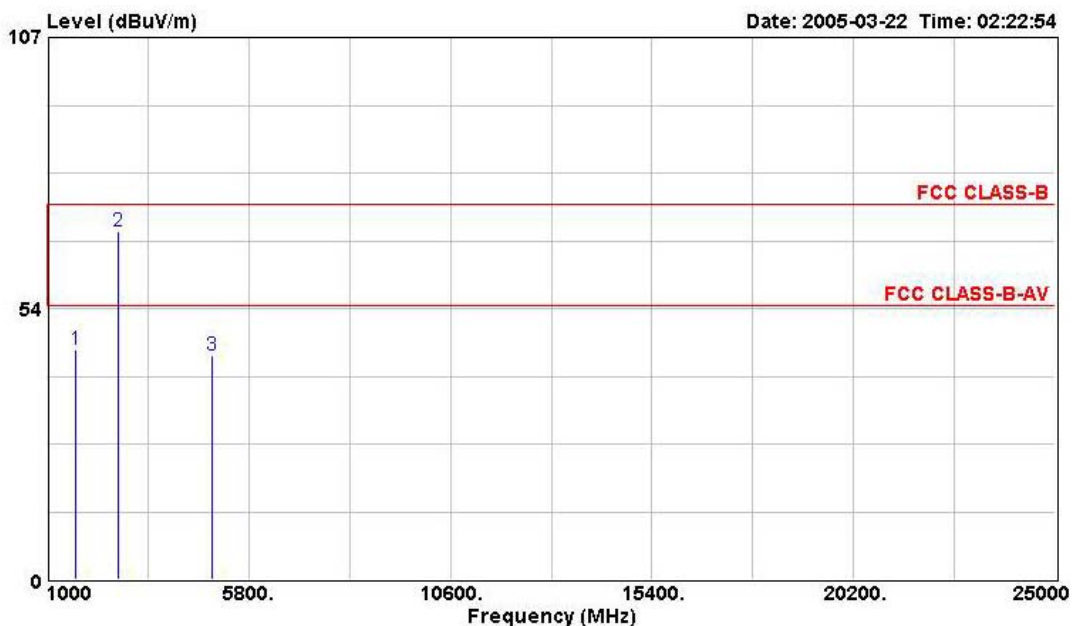
Mode 3

(A) Polarization: Horizontal



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1668.000	43.88	-30.12	55.81	74.00	-11.93	Peak
2	2686.000	51.46	-22.54	59.84	74.00	-8.38	Peak
3	4922.800	44.30	-29.70	48.37	74.00	-4.08	PEAK

(B) Polarization: Vertical



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	1660.000	45.36	-28.64	57.29	74.00	-11.93	Peak
2	2686.000	68.59	-5.41	76.97	74.00	-8.38	Peak
3	4923.800	44.18	-29.82	48.26	74.00	-4.08	PEAK

Note:

- Item 2 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

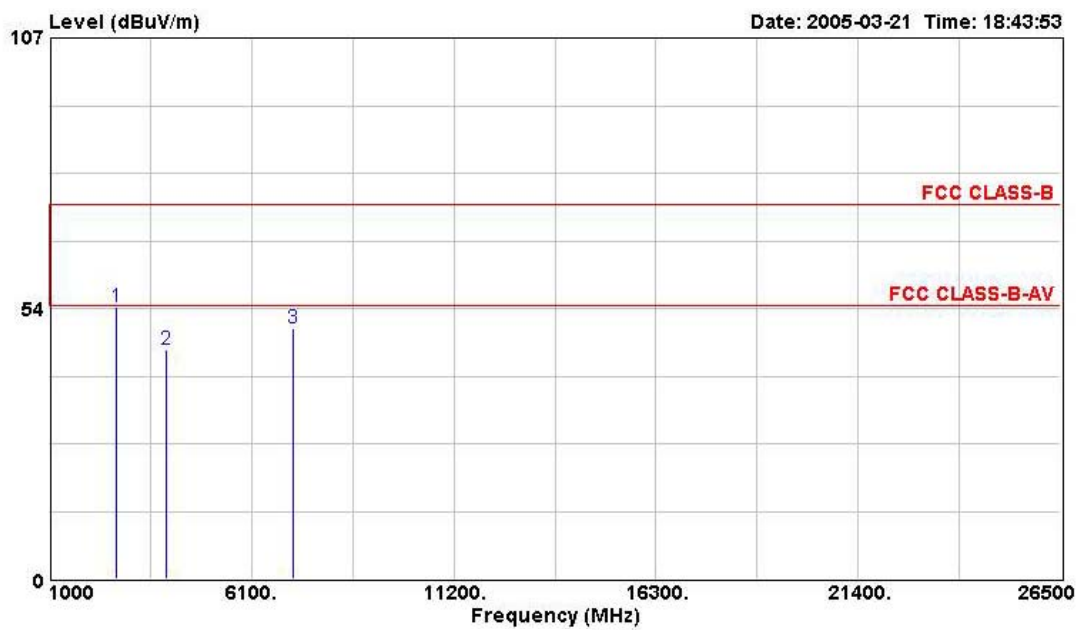
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level





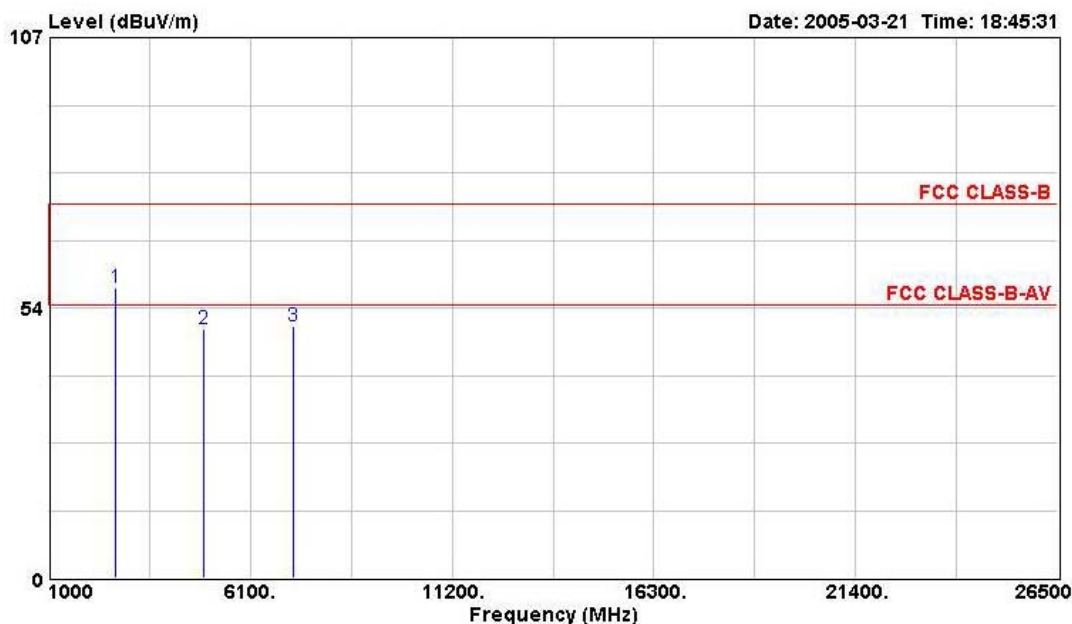
Mode 4

(A) Polarization: Horizontal



	Freq	Level	Over Limit	Read Level	Limit Line	Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	
1	2686.000	53.69	-20.31	62.07	74.00	-8.38	Peak
2	3960.000	45.34	-28.66	49.84	74.00	-4.50	Peak
3	7144.000	49.57	-24.43	49.96	74.00	-0.39	Peak

**(B) Polarization: Vertical**



	Freq	Level	Over	Read	Limit		
	MHz	dBuV/m	Limit	Level	Line	Factor	Remark
			dB	dBuV	dBuV/m	dB	
1	2686.000	57.52	-16.48	65.90	74.00	-8.38	Peak
2	4928.000	49.33	-24.67	53.41	74.00	-4.08	Peak
3	7184.000	49.80	-24.20	50.02	74.00	-0.21	Peak

**Note:**

- Item 1 is on un-restricted band, so the limit is -20dBc for such emission.
- Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level



## **5.4. Antenna Requirements**

### **5.4.1. Standard Applicable**

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Section 15.247(b)/(c):

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

### **5.4.2. Antenna Connected Construction**

There is inverse SMA antenna connector for all antennas.

### **5.4.3. Antenna Gain**

Gain of Antenna 2 and 4 is less than 6dBi. That of Antenna 1 and 3 is more than 6dBi. Therefore peak conducted power limit shall be degraded. Antenna report of manufacturer will have more detail antenna gain or antenna pattern.

### **5.4.4. Test Criteria**

All test results complied with the requirements of 15.203/15.247(b)/(c).

## 5.5. RF Exposure

### 5.5.1. Limit For Maximum Permissible Exposure (MPE)

This product can be classified as mobile device, so the 20cm separation distance warning is required. In this section, the power density at 20cm location is calculated to examine if it is lower than the 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

F = frequency in MHz

\*Plane-wave equivalent power density

### 5.5.2. MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (mW/cm}^2\text{)} = \frac{E^2}{377}$$

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

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

**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=20cm, as well as the gain of the used antenna, the RF power density can be obtained.

### 5.5.3. Calculated Result and Limit

- Modulation Type: DSSS
- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

#### Mode 1

Channel No.	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> )
01	6.00	3.98	17.80	60.26	0.0477	1
06	6.00	3.98	17.60	57.54	0.0456	1
11	6.00	3.98	17.60	57.54	0.0456	1

#### Mode 2

Channel No.	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> )
01	3.00	2.00	17.80	60.26	0.0240	1
06	3.00	2.00	17.60	57.54	0.0229	1
11	3.00	2.00	17.60	57.54	0.0229	1

#### Mode 3

Channel No.	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> )
01	18.00	63.10	17.80	60.26	0.7568	1
06	18.00	63.10	17.60	57.54	0.7227	1
11	18.00	63.10	17.60	57.54	0.7227	1



**Mode 4**

Channel No.	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> )
01	4.00	2.51	17.80	60.26	0.0301	1
06	4.00	2.51	17.60	57.54	0.0287	1
11	4.00	2.51	17.60	57.54	0.0287	1

- Modulation Type: OFDM
- Temperature: 24°C
- Relative Humidity: 53%
- Duty Cycle of the Equipment During the Test: 99%
- Test Engineer: Wayne Hsu

**Mode 1**

Channel No.	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> )
01	6.00	3.98	15.70	37.15	0.0294	1
06	6.00	3.98	15.20	33.11	0.0262	1
11	6.00	3.98	15.60	36.31	0.0288	1

**Mode 2**

Channel No.	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> )
01	3.00	2.00	15.70	37.15	0.0148	1
06	3.00	2.00	15.20	33.11	0.0132	1
11	3.00	2.00	15.60	36.31	0.0145	1

**Mode 3**

Channel No.	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> )
01	18.00	63.10	15.70	37.15	0.4666	1
06	18.00	63.10	15.20	33.11	0.4159	1
11	18.00	63.10	15.60	36.31	0.4560	1

**Mode 4**

Channel No.	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> )
01	4.00	2.51	15.70	37.15	0.0186	1
06	4.00	2.51	15.20	33.11	0.0165	1
11	4.00	2.51	15.60	36.31	0.0181	1



## 6. List of Measuring Equipments Used

Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
1	EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Feb. 19, 2005	Conduction (CO04-HY)
2	LISN	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 15, 2005	Conduction (CO04-HY)
3	LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9kHz – 30MHz	Apr. 09, 2004	Conduction (CO04-HY)
4	EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
5	RF Cable-CON	UTIFLEX	3102-26886-4	CB044	9kHz – 30MHz	Apr. 21, 2004	Conduction (CO04-HY)
6	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2004	Radiation (03CH03-HY)
7	Spectrum Analyzer	R&S	FSP40	100004	9KHZ~4GHz	Aug. 31, 2004	Radiation (03CH03-HY)
8	Amplifier	Schaffner	CPA9231A	18667	9KHz – 2GHz	Jan. 04, 2005	Radiation (03CH03-HY)
9	Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz – 200MHz	Jul. 23, 2004	Radiation (03CH03-HY)
10	Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 23, 2004	Radiation (03CH03-HY)
11	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 02, 2004	Radiation (03CH03-HY)
12	Amplifier	MITEQ	AFS44	879984	1GHz~26.5GHz	Mar. 25, 2005	Radiation (03CH03-HY)
13	Horn Antenna	COMPOWER	AH-118	10092	1GHz – 18GHz	Feb. 18, 2005	Radiation (03CH03-HY)
14	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
15	Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
16	Horn Antenna	Schwarzbeck	BBHA9170	154	15GHz~40GHz	Jun. 09, 2004	Radiation (03CH03-HY)
17	RF Cable-HIGH	SUHNER	SUCOFLES 106	SN30094/6	1GHz~26.5GHz	Mar. 05, 2005	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.

## 7. Company Profile

SPORTON Lab. was established in 1986 with one shielded room: the first private EMI test facility, offering local manufacturers an alternative EMI test facility apart from ERSO. In 1988, one 3M and 10M/3M open area test site were setup and also obtained official accreditation from FCC, VCCI and NEMKO. In 1993, a Safety laboratory was founded and obtained accreditation from UL of USA, CSA of Canada and TUV (Rhineland & PS) of Germany. In 1995, one EMC lab, including EMI and EMS test facilities was setup. In 1997, SPORTON Group has provided financial expense to relocate the headquarter to Orient Scientific Park in Taipei Hsien to offer more comprehensive, more qualified and better service to local suppliers and manufactures. In 1999, Safety Group and Component Group were setup. In 2001, SPORTON has established 3M/10M chamber in Hwa Ya Technology Park.

### 7.1. Certificate of Accreditation


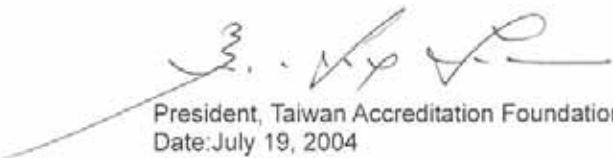
Taiwan	BSMI, CNLA, DGT
USA	FCC, NVLAP, UL
EU	Nemko, TUV
Japan	VCCI
Canada	Industry Canada

### 7.2. Test Location

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 02-2696-2468 FAX : 02-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 03-327-3456 FAX : 03-318-0055
LINKOU	ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 02-2601-1640 FAX : 02-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 02-2631-4739 FAX : 02-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 02-8227-2020 FAX : 02-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2 <sup>nd</sup> Rd., Taipei 114, Taiwan, R.O.C. TEL : 02-2794-8886 FAX : 02-2794-9777

## 8. CNLA Certificate of Accreditation

Test Lab. : Sporton International Inc.  
Accreditation Number : 1190  
Originally Accredited : 2003/12/15  
Effective Period : 2003/12/15~2006/12/14  
Accredited Scope : 47 CFR FCC Part 15 Subpart C (9kHz~40GHz)

	
Taiwan Accreditation Foundation Chinese National Laboratory Accreditation Certificate of Accreditation	
Accreditation Criteria:	ISO 17025
Accreditation Number:	1190
Organization/Laboratory:	EMC & Wireless Communications Laboratory, Sporton International Inc.
Originally Accredited:	December 15, 2003
Effective Period:	December 15, 2003 To December 14, 2006
Accredited Scope:	Electrical Testing Field, 7 items, details shown in the following pages.
Specific Accreditation Program:	Recognition and Approval of Designated Laboratory for Commodities Inspection
 President, Taiwan Accreditation Foundation Date: July 19, 2004	
(This document is invalid unless accompanied by all 4 pages)	
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