



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

# FCC TEST REPORT

**CATEGORY** : Portable

**PRODUCT NAME** : Wireless Dual Operation Mouse

**FCC ID.** : F4Z44K3FDM-40NS0

**FILING TYPE** : Certification

**BRAND NAME** : FORWARD

**MODEL NAME** : FDM-40NS0 (TX); FDM-50CD0 (CRADLE)

**APPLICANT** : FORWARD ELECTRONICS CO., LTD.

No.393, Chung Cheng Rd. Sec.1 San-Hsia Town, Taipei  
County Taiwan, 237, R.O.C

**MANUFACTURER** : FORWARD ELECTRONICS CO., LTD.

No.393, Chung Cheng Rd. Sec.1 San-Hsia Town, Taipei  
County Taiwan, 237, R.O.C

**ISSUED BY** : SPORTON INTERNATIONAL INC.

6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi 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 NVLAP and any agency of U.S. government.

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

**NVLAP**<sup>®</sup>

Lab Code: 200079-0

---

***SPORTON International Inc.***

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255



## Table of Contents

<b>HISTORY OF THIS TEST REPORT .....</b>	<b>II</b>
<b>CERTIFICATE OF COMPLIANCE.....</b>	<b>III</b>
<b>1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST.....</b>	<b>1</b>
1.1. Applicant .....	1
1.2. Manufacturer.....	1
1.3. Basic Description of Equipment under Test.....	1
1.4. Features of Equipment under Test .....	1
1.5. Table for Carrier Frequencies .....	1
<b>2. TEST CONFIGURATION OF THE EQUIPMENT UNDER TEST.....</b>	<b>2</b>
2.1. Connection Diagram of Conduction Test System.....	2
2.2. The Test Mode Description.....	2
2.3. Description of Test Supporting Units .....	2
<b>3. GENERAL INFORMATION OF TEST .....</b>	<b>3</b>
3.1. Test Facility.....	3
3.2. Standards for Methods of Measurement.....	3
3.3. DoC Statement .....	3
3.4. Frequency Range Investigated .....	3
3.5. Test Distance .....	3
3.6. Test Software.....	3
<b>4. LIST OF MEASUREMENTS .....</b>	<b>4</b>
4.1. Summary of the Test Results.....	4
<b>5. TEST RESULT .....</b>	<b>5</b>
5.1. Test of Maximum Field Strength of Fundamental.....	5
5.2. 20dB Spectrum Bandwidth Measurement .....	7
5.3. Test of Spurious Radiated Emission.....	10
5.4. Antenna Requirements .....	24
<b>6. LIST OF MEASURING EQUIPMENTS USED.....</b>	<b>25</b>
<b>7. COMPANY PROFILE.....</b>	<b>27</b>
7.1. Certificate of Accreditation .....	27
7.2. Test Location .....	27
<b>8. CERTIFICATE OF NVLAP ACCREDITATION.....</b>	<b>28</b>
<b>APPENDIX A. PHOTOGRAPHS OF EUT .....</b>	<b>A1 ~ A18</b>



**FCC ID: F4Z44K3FDM-40NS0**

Issued on Sep. 27, 2005

Report No.: FR552408

## HISTORY OF THIS TEST REPORT

Received Date: May 24, 2005

Test Date: Aug. 25, 2005

Original Report Issue Date: Sep. 27, 2005

Report No.: FR552408

No additional attachment.

Additional attachment were issued as following record:



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

## CERTIFICATE OF COMPLIANCE

with

### 47 CFR FCC Part 15 Subpart C

**PRODUCT NAME** : Wireless Dual Operation Mouse

**BRAND NAME** : FORWARD

**MODEL NAME** : FDM-40NS0 (TX); FDM-50CD0 (CRADLE)

**APPLICANT** : FORWARD ELECTRONICS CO., LTD.

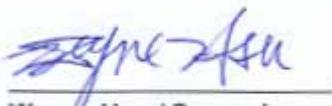
No.393, Chung Cheng Rd. Sec.1 San-Hsia Town, Taipei  
County Taiwan, 237, R.O.C

**MANUFACTURER** : FORWARD ELECTRONICS CO., LTD.

No.393, Chung Cheng Rd. Sec.1 San-Hsia Town, Taipei  
County Taiwan, 237, 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 Aug. 25, 2005 at SPORTON International Inc. LAB.



Wayne Hsu / Supervisor  
Sporton International Inc.



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

## 1. General Description of Equipment under Test

### 1.1. Applicant

**FORWARD ELECTRONICS CO., LTD.**

No.393, Chung Cheng Rd. Sec.1 San-Hsia Town, Taipei County Taiwan, 237, R.O.C

### 1.2. Manufacturer

**FORWARD ELECTRONICS CO., LTD.**

No.393, Chung Cheng Rd. Sec.1 San-Hsia Town, Taipei County Taiwan, 237, R.O.C

### 1.3. Basic Description of Equipment under Test

This product is a wireless mouse and its receiver with GFSK modulation solution. The transmitter is powered by batteries. Please refer to "Features of Equipment under Test."

### 1.4. Features of Equipment under Test

Items	Description
Type of Modulation	GFSK
Number of Channels	8
Frequency Band	2400 MHz ~ 2483.5 MHz
Carrier Frequency	See section 1.5 for details
Antenna Type	Printed Antenna
Testing Duty Cycle	100.00%
Test Power Source	3V from battery
Temperature Range (Operating)	0 ~ 40 °C

### 1.5. Table for Carrier Frequencies

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2414 MHz	04	2430 MHz	07	2462 MHz
02	2420 MHz	05	2452 MHz	08	2470 MHz
03	2424 MHz	06	2456 MHz	-	-



FCC ID: F4Z44K3FDM-40NS0

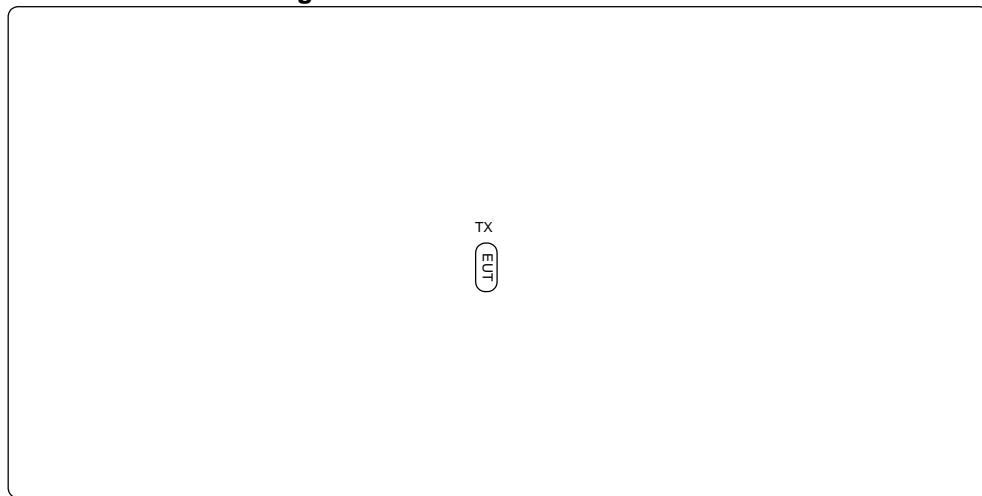
Issued on Sep. 27, 2005

Report No.: FR552408

## 2. Test Configuration of the Equipment under Test

### 2.1. Connection Diagram of Conduction Test System

#### Radiation Emissions Test Configuration



### 2.2. The Test Mode Description

1. For FHSS modulation, GFSK is the worst case on all test items.
2. According to ANSI C63.4-2003, if the frequency range of EUT is more than 10 MHz, then the lowest, middle and highest channels of EUT has to be tested.
3. Spurious emission below 1GHz is independent of channel selection, so only channel 08 with GFSK modulation was tested.

### 2.3. Description of Test Supporting Units

Support unit	Brand	Model No.	FCC ID
Printer	EPSON	LQ-680	DoC
Notebook	COMPAQ	PP2150 1500)	DoC
HDD	TeraSYS	F12-UF	DoC



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

### 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

#### 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. DoC Statement

This EUT is also classified as a device of computer peripheral Class B which DoC has to be followed. It has been verified according to the rule of 47 CFR part 15 Subpart B, and found that all the requirements has been fulfilled.

#### 3.4. Frequency Range Investigated

Radiated emission test: from 9 kHz to 10th carrier harmonic

#### 3.5. Test Distance

The test distance of radiated emission (9kHz ~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.

#### 3.6. Test Software

No special test software was used for the test.



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

## 4. List of Measurements

### 4.1. Summary of the Test Results

Applied Standard: 47 CFR FCC Part 15 Subpart C			
Paragraph	FCC Rule	Description of Test	Result
5.1	15.249(a)	Maximum Field Strength of Fundamental	Pass
-	15.207	AC Power Line Conducted Emission	NA
5.3	15.249(d)	Spurious Radiated Emission	Pass
5.4	15.203	Antenna Requirement	Pass



## 5. Test Result

### 5.1. Test of Maximum Field Strength of Fundamental

#### 5.1.1. Applicable Standard

Section 15.249(a): The field strength of emissions within these bands specified at a distance of 3 meters (measurement instrumentation employing an average detector) shall comply with the following table. The peak field strength of any emission shall not exceed the maximum permitted average limits specified in the table by more than 20 dB under any condition of modulation

Fundamental Frequency (MHz)	Field Strength of Fundamental (millivolts/meter)	Unwanted Emission (microvolts/meter)
2400-2483.5	50	500
5725-5875	50	500

#### 5.1.2. Measuring Instruments

Please refer to section 6 in this report.

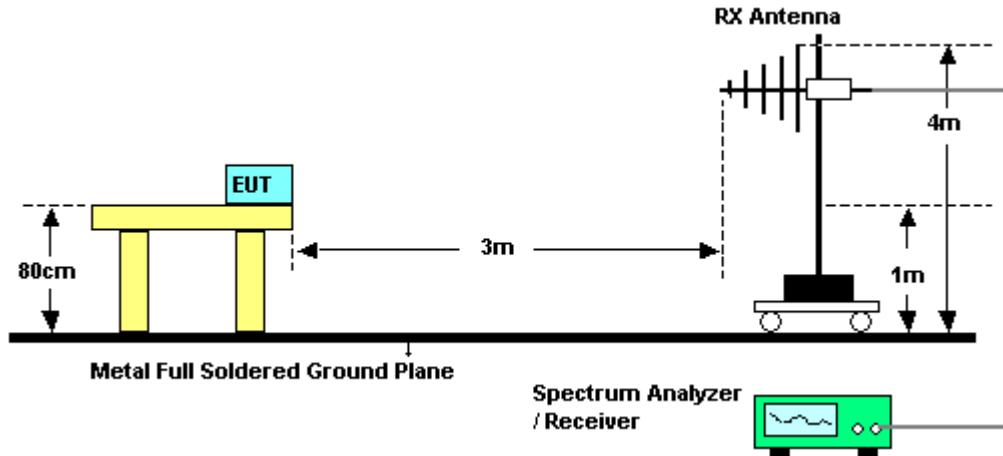
#### 5.1.3. Description of Major Test Instruments Setting

- Spectrum Analyzer : R&S FSP40 (Radiated Measurement)
- Attenuation : Auto
- Center Frequency : Carrier Frequency
- Span Frequency : Suitable for observe
- 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

#### 5.1.4. Test Procedures

1. Configure the EUT according to ANSI C63.4-2003.
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 carrier field strength 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.
5. For carrier field strength emission, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.

### 5.1.5. Test Setup Layout



### 5.1.6. Test Criteria

All test results complied with Section 15.249(a) requirements. Measurement Uncertainty is 2.26dB.

### 5.1.7. Test Result

- Temperature: 25°C
- Relative Humidity: 46%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Ted Chiu

Channel No.	Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Detector
01	2414 MHz	67.89	-26.11	94.00	Average
01	2414 MHz	90.68	-23.32	114.00	Peak
05	2452 MHz	70.28	-23.72	94.00	Average
05	2452 MHz	92.56	-21.44	114.00	Peak
08	2470 MHz	70.57	-23.43	94.00	Average
08	2470 MHz	91.77	-22.23	114.00	Peak

Note:

Correct Factor = Antenna Factor + Cable Loss - Preamp Factor.

Read Level = Level of Receiver or Spectrum.

Level = Read Level + Correct Factor.



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

## 5.2. 20dB Spectrum Bandwidth Measurement

### 5.2.1. Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band (2400~2480 MHz).

### 5.2.2. Measuring Instruments and Setting

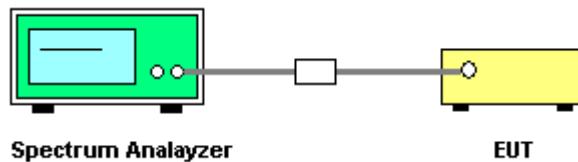
Please refer to section 6 in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

### 5.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

### 5.2.4. Test Setup Layout





FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

### 5.2.5. Test Deviation

There are no deviations with the original standard.

### 5.2.6. EUT Operation during Test

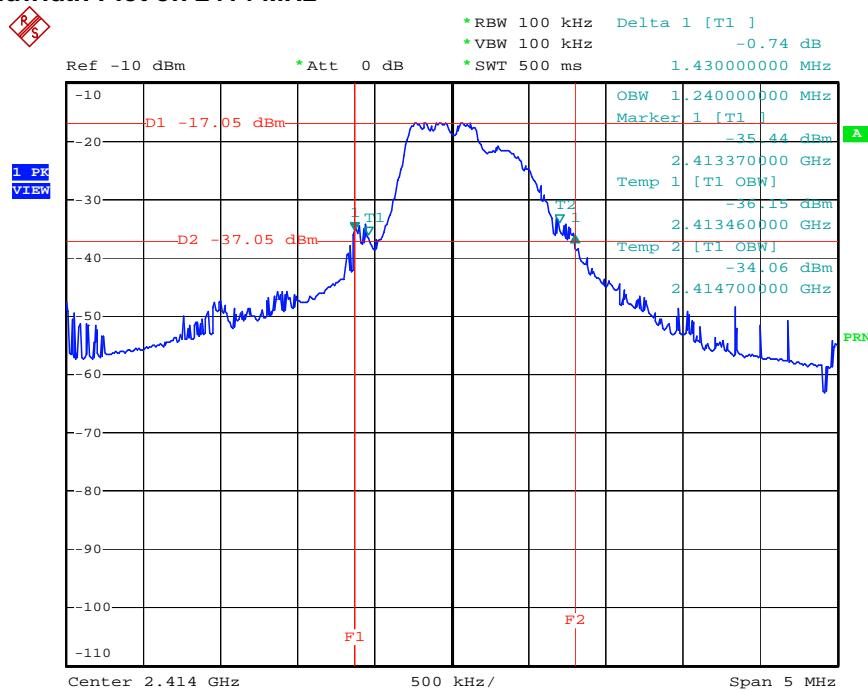
The EUT was programmed to be in continuously transmitting mode.

### 5.2.7. Test Result of 20dB Spectrum Bandwidth

Temperature	20°C	Humidity	70%
Test Engineer	Sam Lee	Configurations	Channel 01/05/08

Frequency	20dB BW (MHz)	99% OBW (MHz)	Frequency range (MHz) $f_L > 2400\text{MHz}$	Frequency range (MHz) $f_H < 2483.5\text{MHz}$	Test Result
2414 MHz	1.43	1.24	2413.37	-	Complies
2452 MHz	1.42	1.33	-	-	Complies
2470 MHz	0.99	0.89	-	2470.50	Complies

### 20 dB/99% Bandwidth Plot on 2414 MHz



Date: 25.AUG.2005 11:01:48

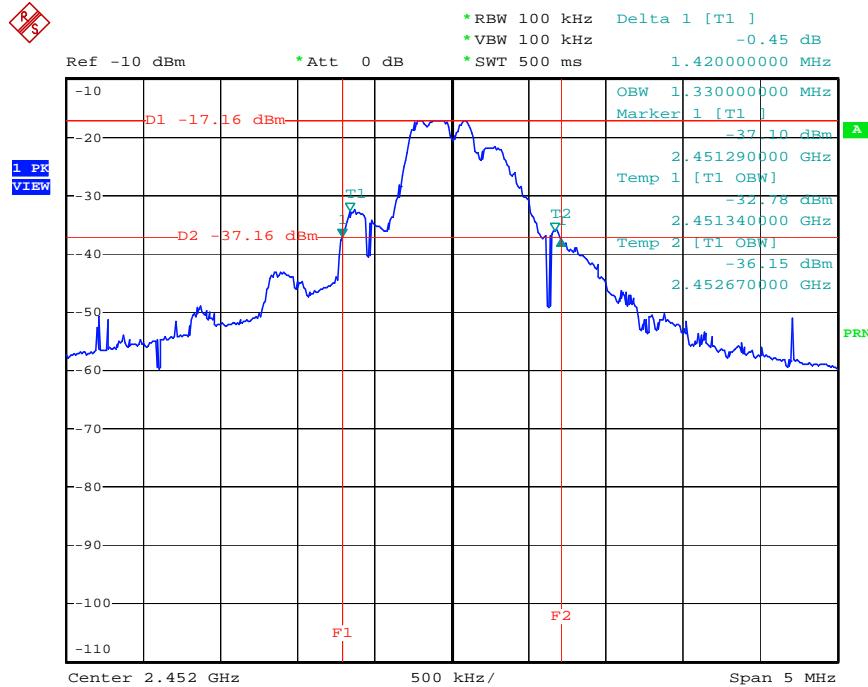


FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

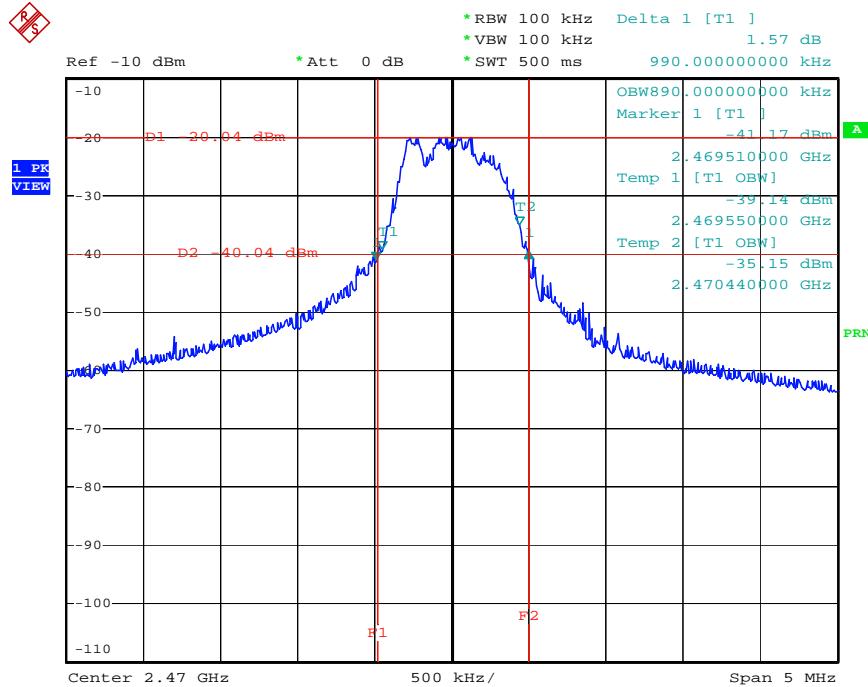
Report No.: FR552408

20 dB/99% Bandwidth Plot on 2452 MHz



Date: 25.AUG.2005 11:04:16

20 dB/99% Bandwidth Plot on 2470 MHz



Date: 25.AUG.2005 11:06:18



### 5.3. Test of Spurious Radiated Emission

#### 5.3.1. Applicable Standard

Section 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.

#### 5.3.2. Measuring Instruments

Please refer to section 6 in this report.

#### 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

##### For radiated emissions below 30MHz

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the receiving antenna was fixed at one meter above ground to find the maximum emissions field strength.
4. Set the test-receiver system to QP Detect Function with specified bandwidth under Maximum Hold Mode.

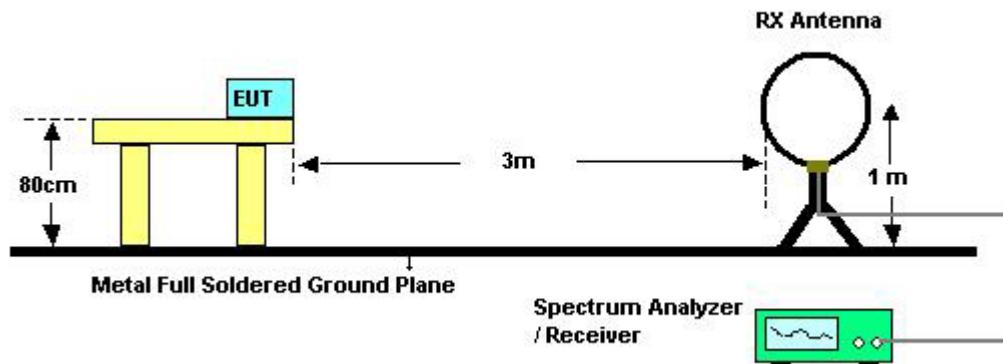
##### For radiated emissions above 30MHz

5. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. 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.
6. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
7. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.

8. For each suspected emissions, 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.
9. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
10. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
11. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
12. If the emissions 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.  
For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions 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

##### For radiated emissions below 30MHz



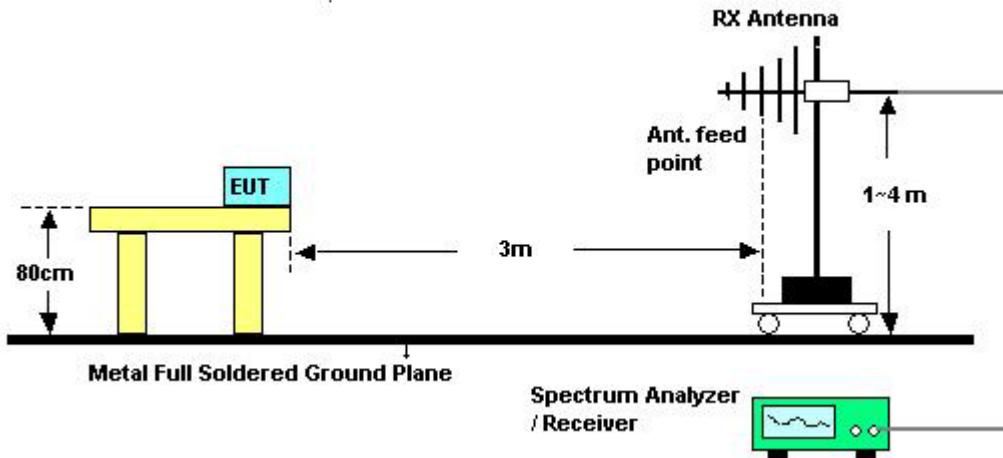


FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

For radiated emissions above 30MHz



#### 5.3.6. Test Criteria

All test results complied with Section 15.249(d) requirements. Measurement Uncertainty is 2.26dB.



FCC ID: F4Z44K3FDM-40NS0

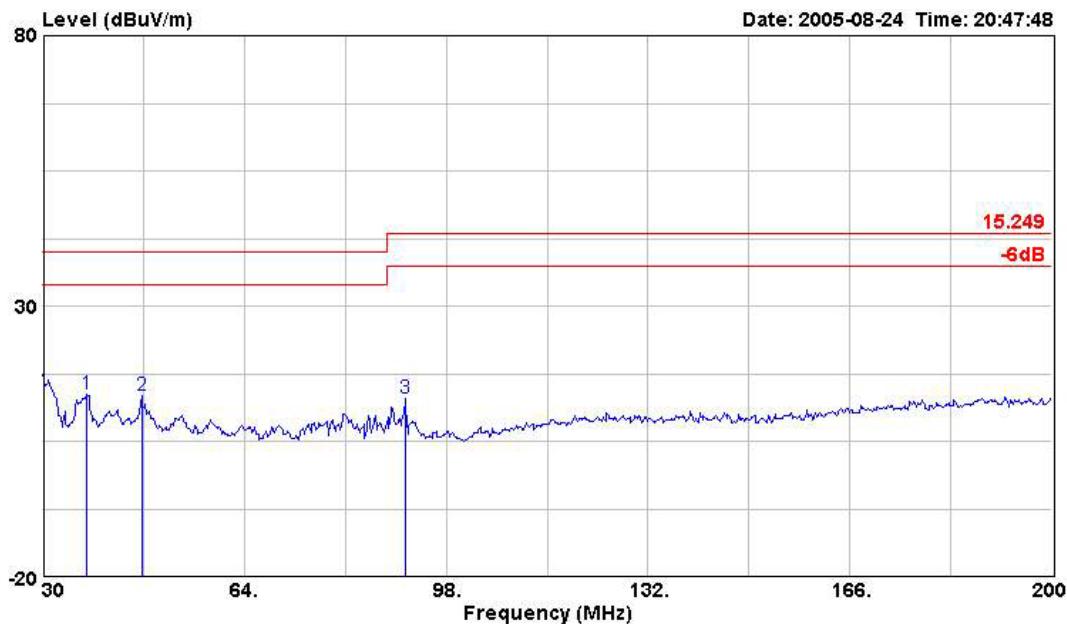
Issued on Sep. 27, 2005

Report No.: FR552408

### 5.3.7. Test Results for CH 08 / 2470 MHz (for emission below 1GHz)

- Temperature: 25°C
- Relative Humidity: 46%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Ted Chou

#### (A) *Polarization: Horizontal*



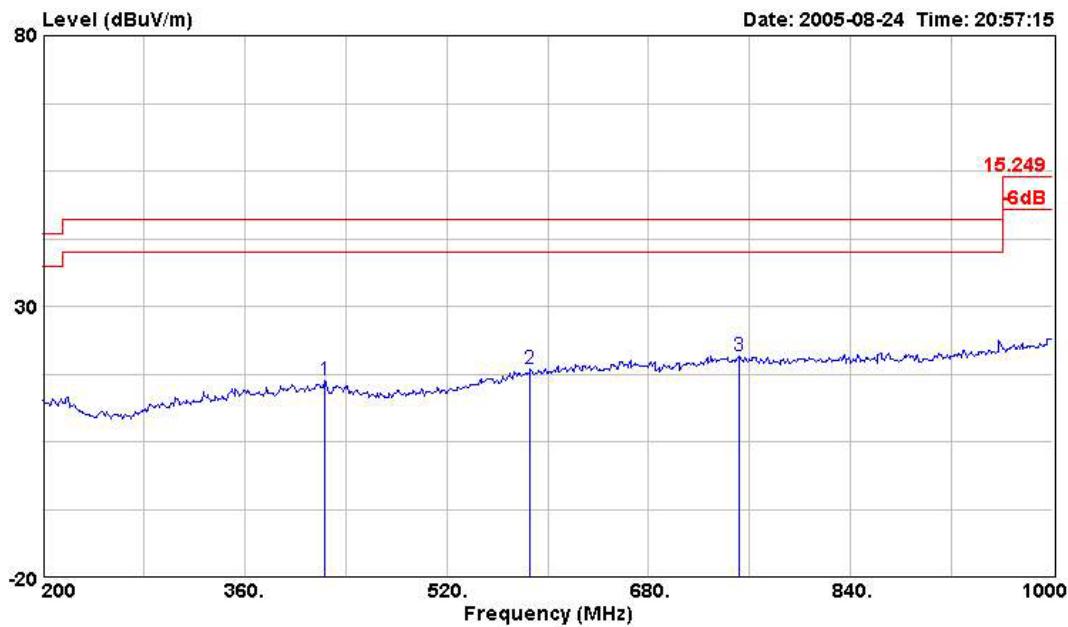
Freq	Level	Over Limit		Read Level	Limit Line	Cable Intenna Preamp			Remark
		MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	
1	37.310	13.59	-26.41	31.25	40.00	0.60	12.21	30.47	Peak
2	46.660	13.37	-26.63	30.88	40.00	0.66	12.06	30.23	Peak
3	91.030	12.89	-30.61	32.92	43.50	0.91	8.55	29.49	Peak



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408



Freq	MHz	Over Limit	Read Level	Limit Line	Cable Antenna Preamp				Remark
					dB	dBuV	dBuV/m	dB	
1	423.200	16.28	-29.72	28.29	46.00	1.96	16.61	30.58	Peak
2	586.400	18.40	-27.60	27.33	46.00	2.36	19.82	31.11	Peak
3	752.000	20.70	-25.30	27.02	46.00	2.79	21.33	30.44	Peak

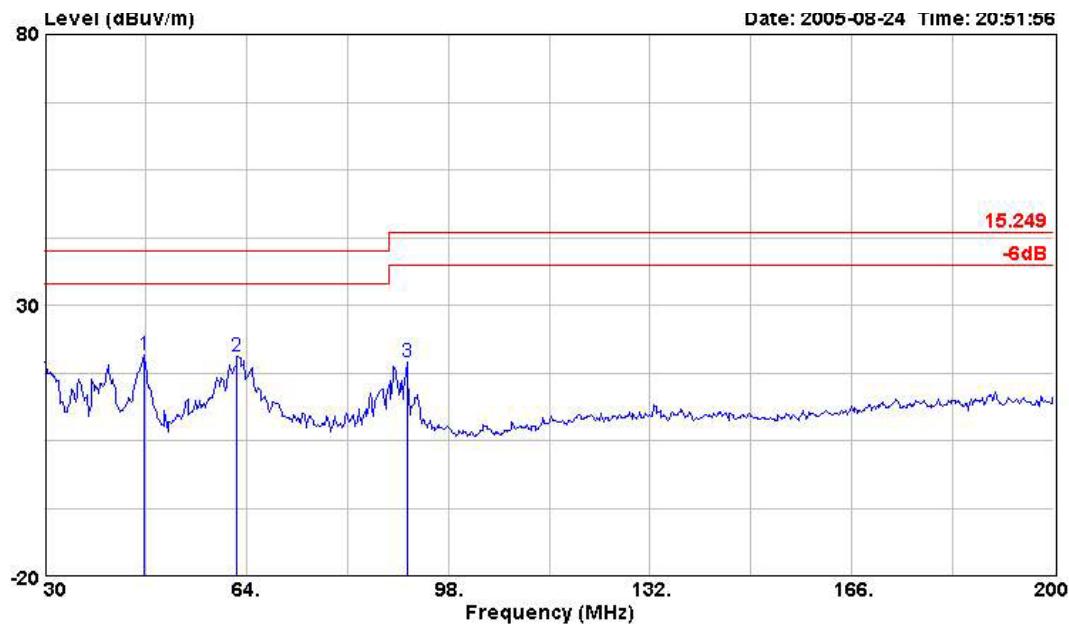


FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

**(B) Polarization: Vertical**



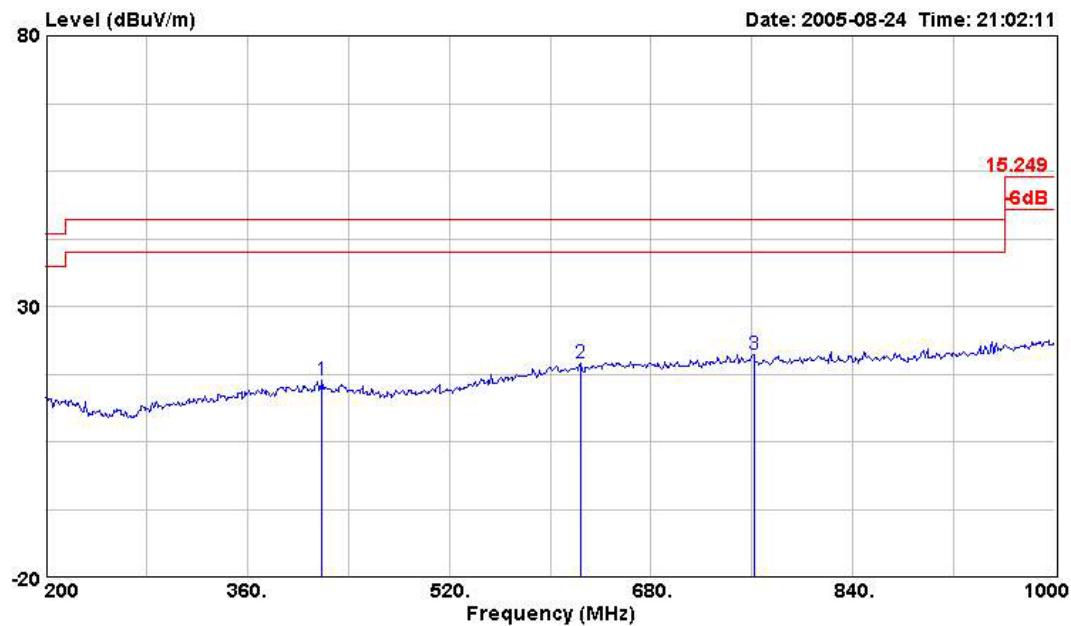
Freq	Level	Over	Read	Limit	Cable	Antenna	Preamp	Remark
		Limit	Level	Line	Loss	Factor	Factor	
MHz	dBUV/m	dB	dBUV	dBUV/m	dB	dB/m	dB	
1	46.660	20.78	-19.22	38.29	40.00	0.66	12.06	30.23 Peak
2	62.470	20.58	-19.42	39.92	40.00	0.78	10.33	30.45 Peak
3	91.030	19.58	-23.92	39.61	43.50	0.91	8.55	29.49 Peak



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408



Freq	Level	Over Limit	Read Level	Limit Line	Cable Antenna Preamp			Remark		
					MHz	dBuV/m	dB	dBuV	dBuV/m	dB
1	419.200	16.30	-29.70	28.31	46.00	1.93	16.64	30.58	30.58	Peak
2	624.000	19.59	-26.41	27.48	46.00	2.44	20.47	30.81	30.81	Peak
3	761.600	21.14	-24.86	27.40	46.00	2.79	21.44	30.49	30.49	Peak

Note:

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

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

Results for the radiated measurement below 30MHz, no emissions found and caused by the EUT.

The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.



FCC ID: F4Z44K3FDM-40NS0

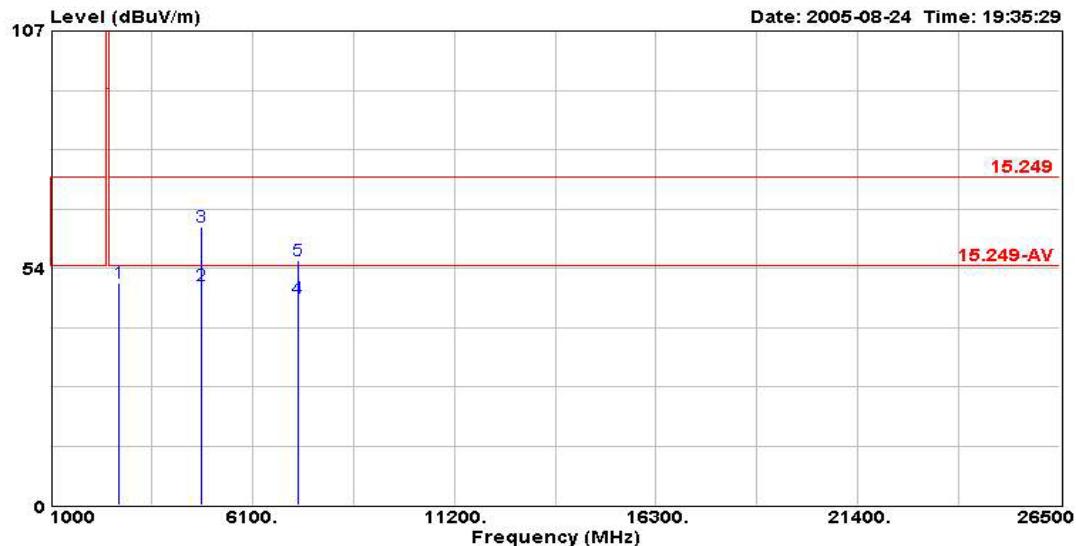
Issued on Sep. 27, 2005

Report No.: FR552408

### 5.3.8. Test Results for CH 01 / 2414 MHz (for emission above 1GHz)

- Temperature: 25°C
- Relative Humidity: 46%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Ted Chou

#### (A) *Polarization: Horizontal*



Freq	Level	Over	Read	Limit	Cable	Antenna	Preamp	Remark
		Limit	Level	Line	Loss	Factor	Factor	
MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB	
1	2712.000	50.05	-23.95	51.85	74.00	2.05	29.14	32.99 PEAK
2	4828.000	49.68	-4.32	46.26	54.00	2.84	33.12	32.54 Average
3	4828.000	62.83	-11.17	59.40	74.00	2.84	33.12	32.54 PEAK
4	7240.000	46.75	-7.25	39.60	54.00	3.62	35.98	32.46 Average
5	7240.000	55.31	-18.69	48.16	74.00	3.62	35.98	32.46 PEAK

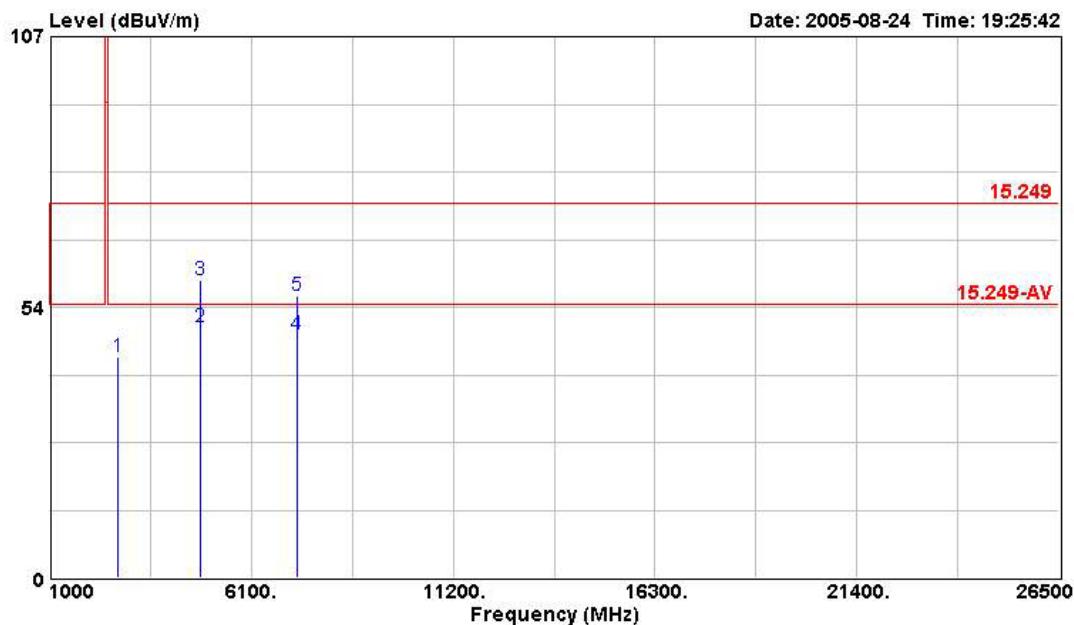


FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

**(B) Polarization: Vertical**



Freq	Level	Over Limit		Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark
		MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB
1	2712.000	43.52	-30.48	45.32	74.00	2.05	29.14	32.99	PEAK
2	4828.000	49.50	-4.50	46.08	54.00	2.84	33.12	32.54	Average
3	4828.000	58.96	-15.04	55.54	74.00	2.84	33.12	32.54	PEAK
4	7240.000	48.23	-5.77	41.08	54.00	3.62	35.98	32.46	Average
5	7240.000	55.89	-18.11	48.74	74.00	3.62	35.98	32.46	PEAK

Note:

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

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



FCC ID: F4Z44K3FDM-40NS0

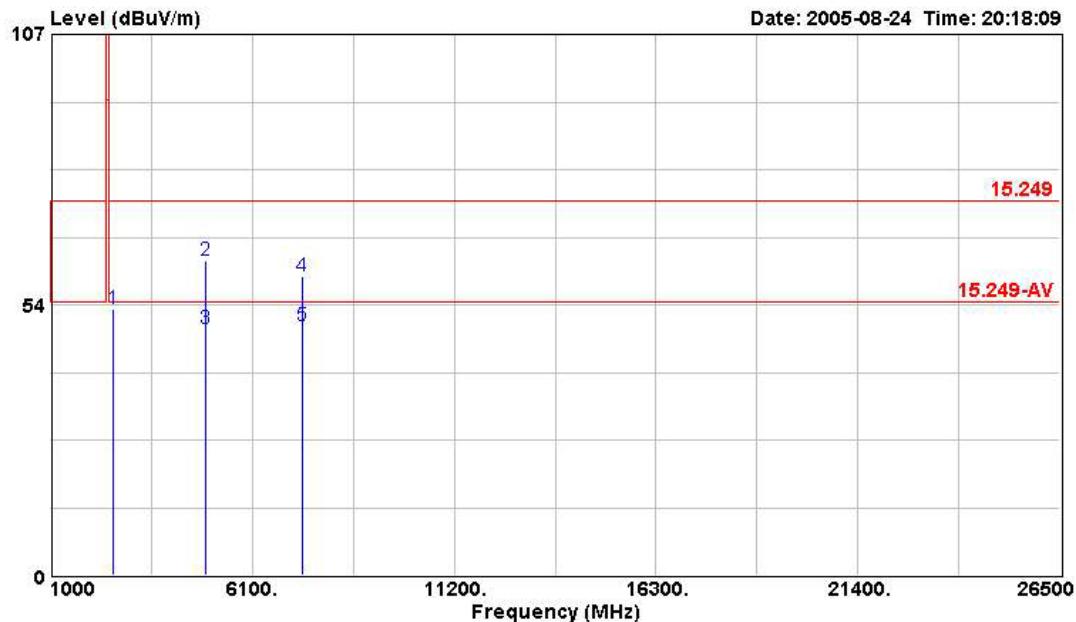
Issued on Sep. 27, 2005

Report No.: FR552408

### 5.3.9. Test Results for CH 05 / 2452 MHz (for emission above 1GHz)

- Temperature: 25°C
- Relative Humidity: 46%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Ted Chou

#### (A) **Polarization: Horizontal**



Freq	Level	Over Limit		Read Level	Limit Line	Cable Antenna Preamp			Remark
		MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	
1	2568.000	52.60	-21.40	55.13	74.00	2.00	28.63	33.15	PEAK
2	4908.000	62.16	-11.84	58.56	74.00	2.89	33.26	32.55	PEAK
3	4908.000	48.78	-5.22	45.18	54.00	2.89	33.26	32.55	Average
4	7356.000	59.22	-14.78	51.95	74.00	3.66	36.27	32.66	PEAK
5	7356.000	49.38	-4.62	42.11	54.00	3.66	36.27	32.66	Average

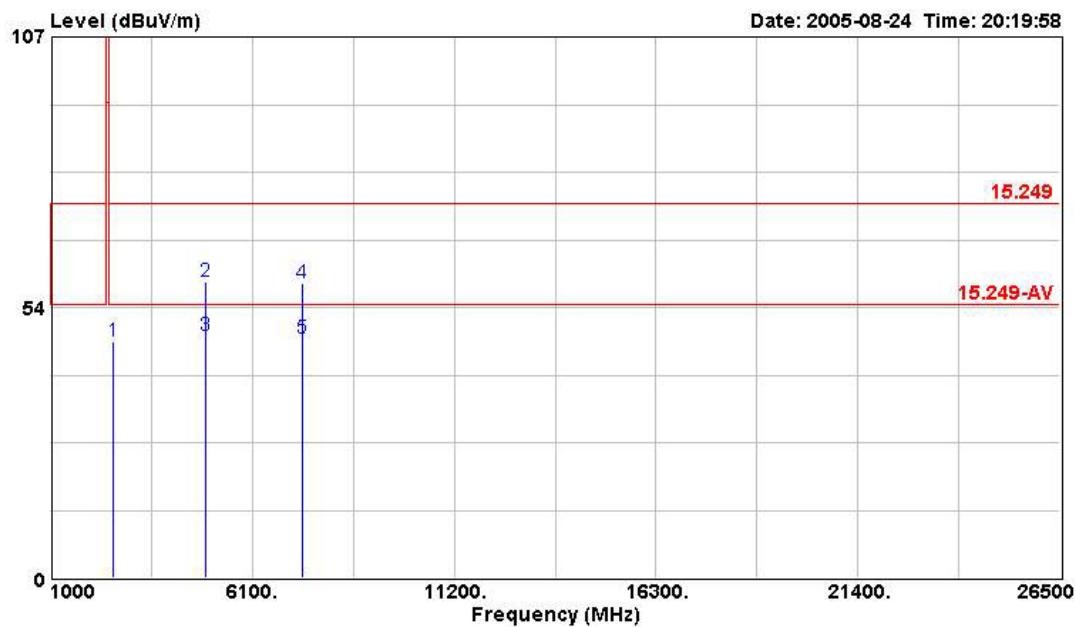


FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

**(B) Polarization: Vertical**



Freq	Level	Over	Read	Limit	Cable	Antenna	Preamp	Remark
		Limit	Level	Line	Loss	Factor	Factor	
MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB	
1	2568.000	46.80	-27.20	49.33	74.00	2.00	28.63	33.15 PEAK
2	4904.000	58.51	-15.49	54.93	74.00	2.87	33.26	32.55 PEAK
3	4904.000	47.88	-6.12	44.30	54.00	2.87	33.26	32.55 Average
4	7356.000	58.30	-15.70	51.03	74.00	3.66	36.27	32.66 PEAK
5	7356.000	47.37	-6.63	40.10	54.00	3.66	36.27	32.66 Average

Note:

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

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



FCC ID: F4Z44K3FDM-40NS0

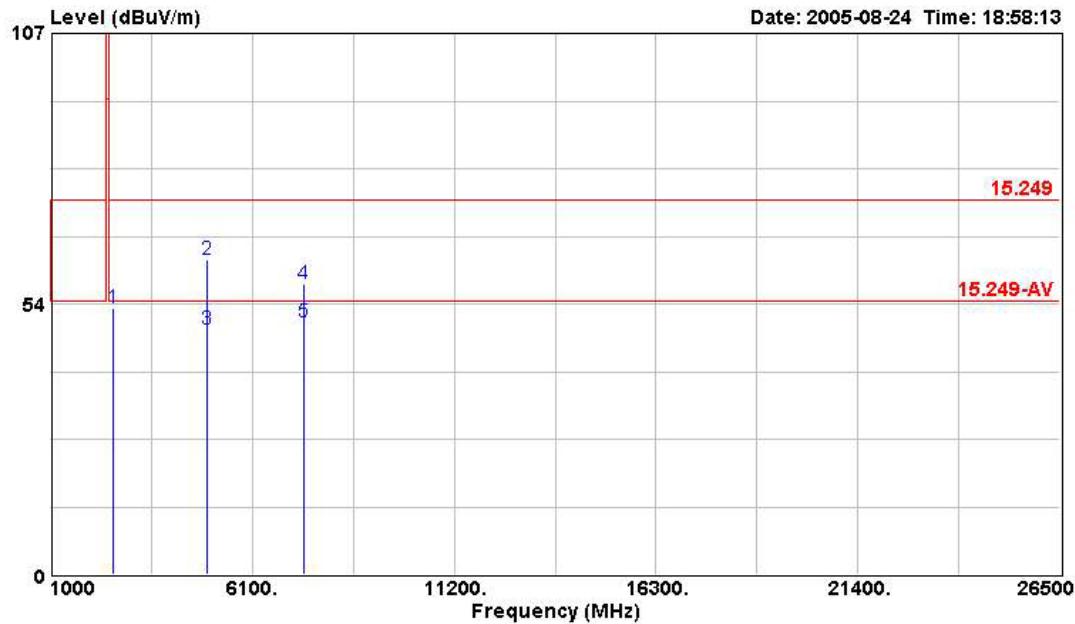
Issued on Sep. 27, 2005

Report No.: FR552408

### 5.3.10. Test Results for CH 08 / 2470 MHz (for emission above 1GHz)

- Temperature: 25°C
- Relative Humidity: 46%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Ted Chou

#### (A) *Polarization: Horizontal*



Freq	Level	Over Limit	Read Level	Limit Line	Cable Antenna Preamp			Remark
					dB	dBuV	dBuV/m	
1	2566.000	52.59	-21.41	55.12	74.00	2.00	28.63	33.15 Peak
2 0	4940.000	62.12	-11.88	58.47	74.00	2.89	33.32	32.56 PEAK
3 0	4940.000	48.37	-5.63	44.72	54.00	2.89	33.32	32.56 Average
4	7408.000	57.55	-16.45	50.25	74.00	3.68	36.39	32.76 PEAK
5 0	7408.000	49.74	-4.26	42.44	54.00	3.68	36.39	32.76 Average

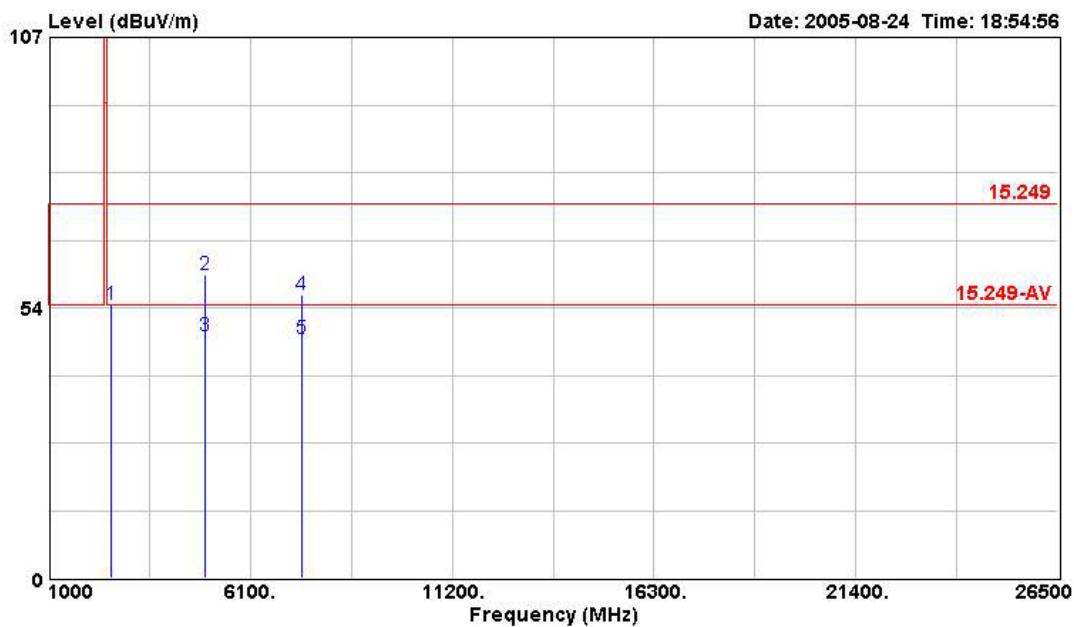


FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

**(B) Polarization: Vertical**



Freq	Level	Over Limit		Read Level	Limit Line	Cable Loss	Antenna Factor	Preamp Factor	Remark
		MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB/m	dB
1	2566.000	53.95	-20.05	56.48	74.00	2.00	28.63	33.15	Peak
2	4944.000	59.90	-14.10	56.25	74.00	2.89	33.32	32.56	PEAK
3	4944.000	47.77	-6.23	44.12	54.00	2.89	33.32	32.56	Average
4	7408.000	55.96	-18.04	48.65	74.00	3.68	36.39	32.76	PEAK
5	7408.000	47.19	-6.81	39.89	54.00	3.68	36.39	32.76	Average

Note:

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

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



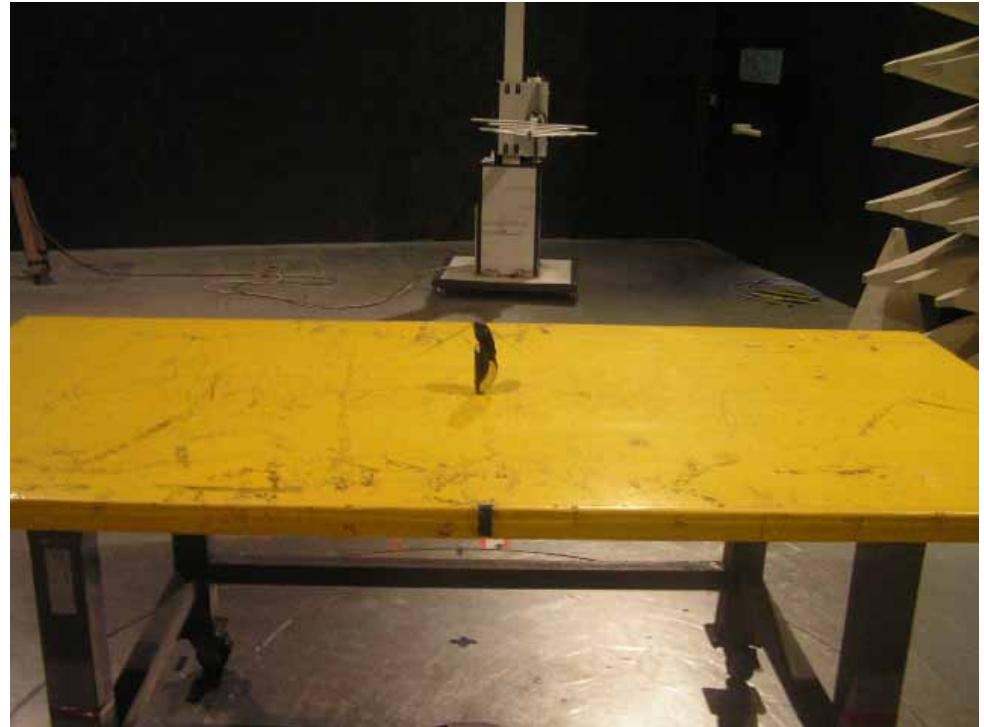
FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

#### 5.3.11. Photographs of Radiated Emission Test Configuration

FRONT VIEW



REAR VIEW





**FCC ID: F4Z44K3FDM-40NS0**

Issued on Sep. 27, 2005

Report No.: FR552408

## 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.

### 5.4.2. Antenna Connected Construction

There is no antenna connector for printed antenna.

### 5.4.3. Test Criteria

All test results complied with the section 15.203 requirements.



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

## 6. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Feb. 16, 2005	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Apr. 20, 2005	Conduction (CO04-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9kHz – 30MHz	May. 05, 2005	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2005	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Jun. 16, 2005	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHZ ~ 40GHz	Aug. 31, 2004	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	CPA9231A	18667	9KHz ~ 2GHz	Jan. 10, 2005	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1GHz ~ 26.5GHz	May 31, 2005	Radiation (03CH03-HY)
Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz ~ 200MHz	Jul. 22, 2005	Radiation (03CH03-HY)
Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz ~ 1GHz	Jul. 22, 2005	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Apr. 22, 2005	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Feb. 22, 2005	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Dec.01, 2004	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	MITEQ	AMF-6F-260400	923364	26.5GHz ~ 40GHz	Jan. 05, 2004*	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9kHz ~ 30MHz	May 24, 2004*	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jun. 09, 2004*	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is two year.



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum analyzer	R&S	FSP40	100004	9KHZ ~ 40GHz	Aug. 31, 2004	Conducted (TH01-HY)
Power meter	R&S	NRVS	100444	DC ~ 40GHz	Jul. 06, 2005	Conducted (TH01-HY)
Power sensor	R&S	NRV-Z55	100049	DC ~ 40GHz	Jul. 06, 2005	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Apr. 28, 2005	Conducted (TH01-HY)
AC power source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Apr. 21, 2005	Conducted (TH01-HY)
DC power source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Nov. 28, 2004	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2004	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Jan. 01, 2005	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Jan. 01, 2005	Conducted (TH01-HY)
Oscilloscope	Tektronix	TDS1012	CO38515	100MHz / 1GS/s	Apr. 15, 2005	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Dec. 31, 2004	Conducted (TH01-HY)
Data Generator	Tektronix	DG2030	063-2920-50	0.1Hz~400MHz	Jun. 02, 2005	Conducted (TH01-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 familial 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



FCC ID: F4Z44K3FDM-40NS0

Issued on Sep. 27, 2005

Report No.: FR552408

## 8. Certificate of NVLAP Accreditation

United States Department of Commerce  
National Institute of Standards and Technology



### Certificate of Accreditation



**SPORTON INTERNATIONAL, INC.**

TAIPEI HSIEN 221  
TAIWAN

is recognized by the National Voluntary Laboratory Accreditation Program  
for satisfactory compliance with criteria set forth in NIST Handbook 150:2001,  
all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994.  
Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:

**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

December 31, 2005

Effective through

For the National Institute of Standards and Technology

NVLAP Lab Code: 200079-0

NVLAP-01C (06-01)