



Test Report

Product Name	Wireless Optical Notebook Mouse
Model No.	N332,26-284 [A],26-1424,26-1425
FCC ID.	O62N332

Applicant	Darfon Electronics Corp.
Address	31, Lane 17, Zihciang N. Road, Gueishan, Taoyuan 33347, Taiwan R.O.C.

Date of Receipt	Apr. 17 2009
Issued Date	Apr. 28, 2009
Report No.	094325R-RFUSP03V01
Report Version	V1.0

The Test Results relate only to the samples tested.

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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Test Date: Apr. 28, 2009

Report No.: 094325R-RFUSP03V01



Product Name	Wireless Optical Notebook Mouse
Applicant	Darfon Electronics Corp.
Address	31, Lane 17, Zihciang N. Road, Gueishan, Taoyuan 33347, Taiwan R.O.C.
Manufacturer	Darfon Electronics (Suzhou) Co., Ltd.
Model No.	N332,26-284 [A],26-1424,26-1425
FCC ID.	O62N332
Rated Voltage	Battery 1.5V*2
EUT Working Voltage	Battery 1.5V*2
Trade Name	Gigaware
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2007 ANSI C63.4: 2003 CISPR 22: 2005
Test Result	Complied



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Optical Notebook Mouse
Trade Name	Gigaware
FCC ID.	O62N332
Model No.	N332,26-284 [A],26-1424,26-1425
EUT Working Voltage	Battery 1.5V*2
Frequency Range	27.042MHz
Type of Modulation	FSK Modulation
Type of antenna	Printed on PCB
Number of Channel	1
Channel Control	Auto

Frequency of Each Channel:

Channel	Frequency
Channel 01:	27.042MHz

Note:

1. The EUT is a Wireless Optical Notebook Mouse used in household and office PC system or related application.
2. The EUT is including four models for different marketing requirement.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC CFR Title 47 Part 15 Subpart C Paragraph 15.227.

1.2. Operational Description

The EUT is a Wireless Optical Notebook Mouse used in household and office PC system.

The number of the channels is 1 in 27.042MHz.

The device adapts FSK modulation. The Printed antenna provides diversity function to improve the transmitting function.

Test Mode	Mode 1: Transmitter
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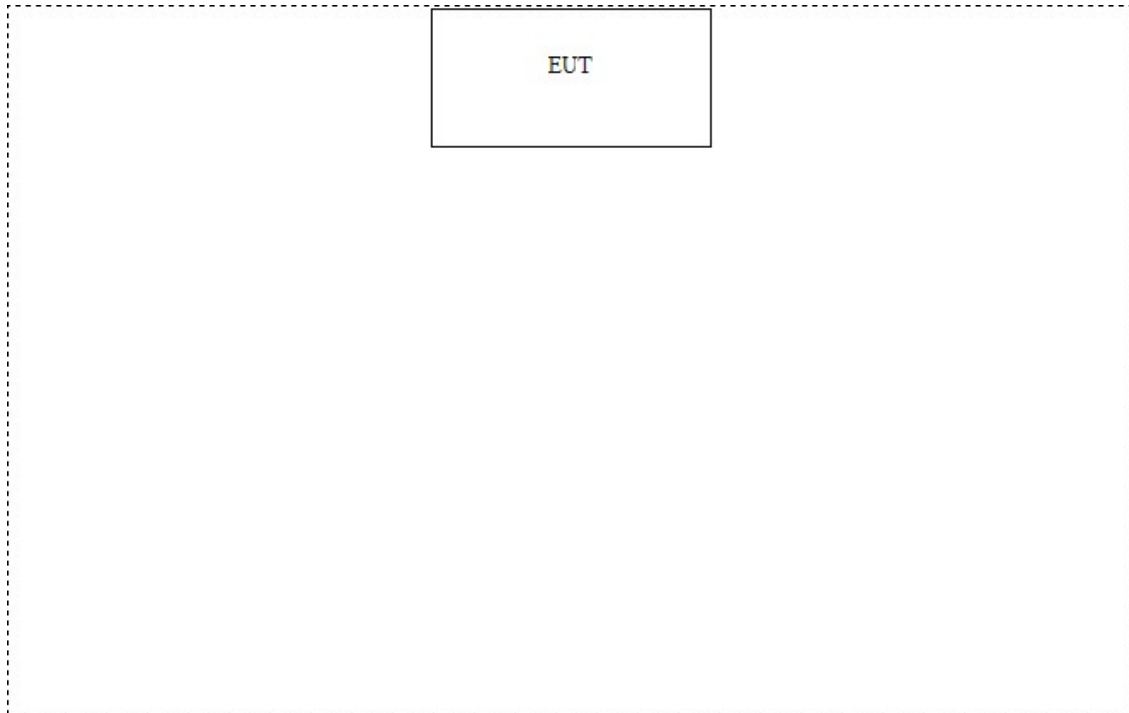
1.3. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
N/A					

Signal Cable Type	Signal cable Description
N/A	

1.4. Configuration of Test System



1.5. EUT Exercise Software

(1)	Setup the EUT as shown in section 1.4.
(2)	Press and hold the left and the middle button.
(3)	Install the batteries.
(4)	Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://tw.quietek.com/modules/myalbum/>
 The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Registration Number: 92195



Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



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FCC Accreditation Number: TW1014



2. Conducted Emission

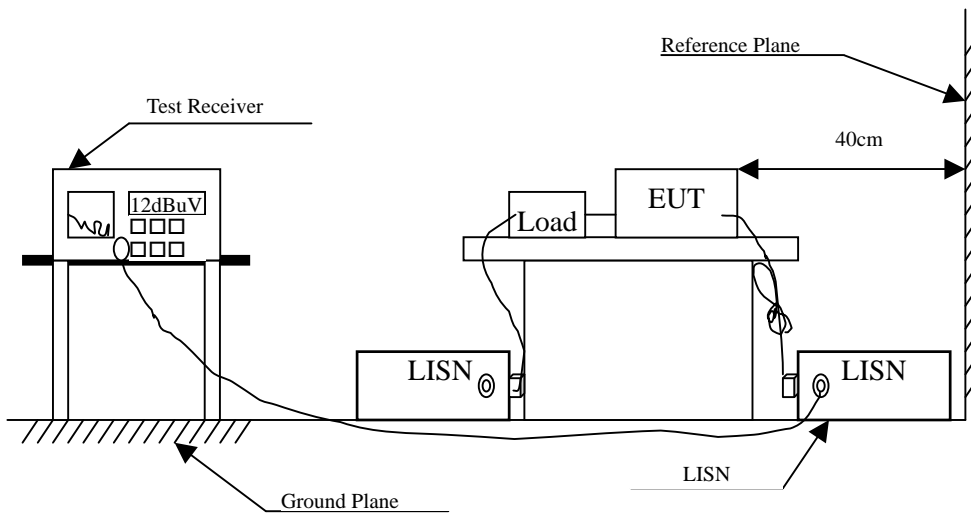
2.1. Test Equipment

The following test equipments are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/838251/001	May, 2008	
2	L.I.S.N.	R & S	ESH3-Z5/836679/0023	May, 2008	EUT
3	L.I.S.N.	R & S	ENV 4200/833209/0023	May, 2008	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2008	
6	No.1 Shielded Room				

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT was setup and tested according to ANSI C63.4, 2003 test procedure.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Data of Conducted Emission

The EUT is powered by batteries Owing to the DC operation. This test item is not performed

3. Radiated Emission

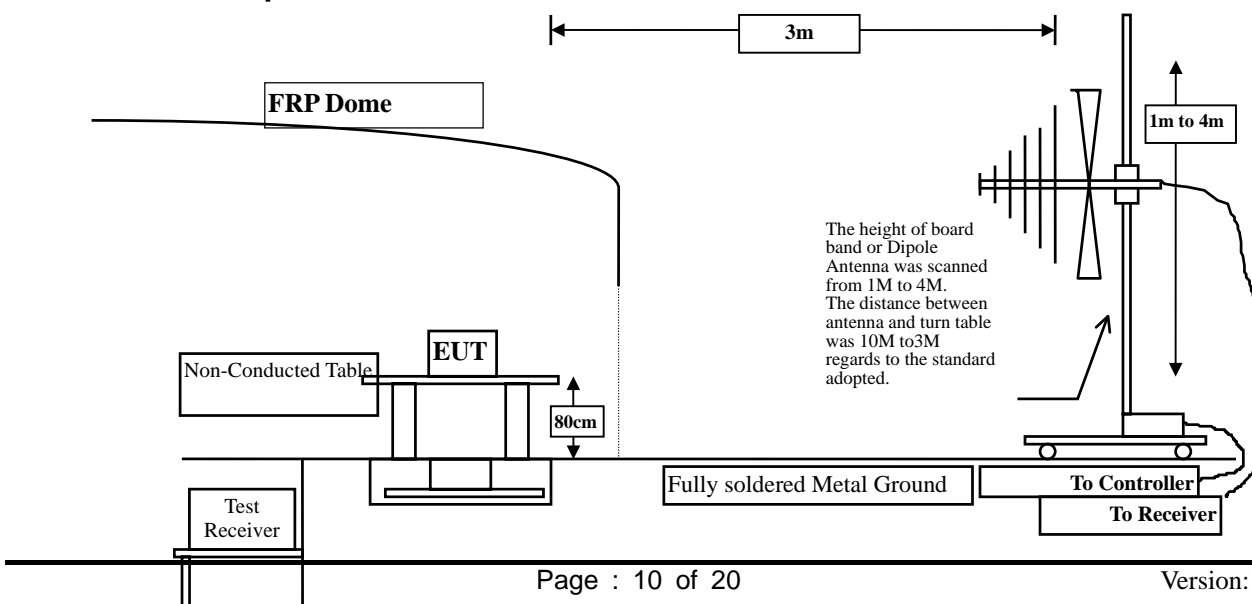
3.1. Test Equipment

The following test equipment are used during the radiated emission test:

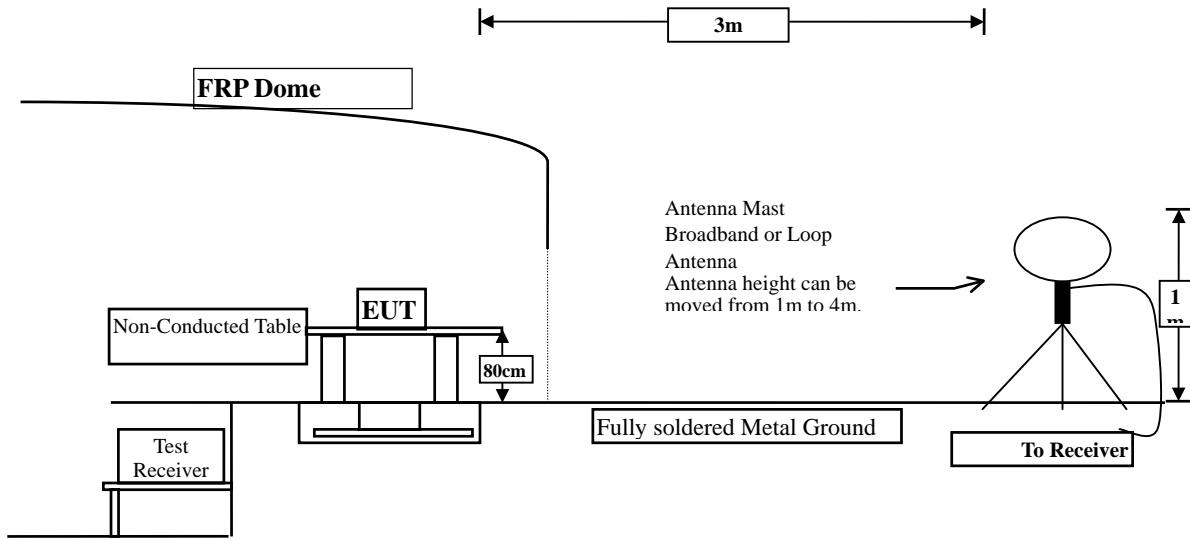
Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
<input type="checkbox"/> Site # 1	Test Receiver	R & S	ESVS 10 / 834468/003	May, 2008
	Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2008
	Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2008
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep., 2008
<input type="checkbox"/> Site # 2	Test Receiver	R & S	ESCS 30 / 836858 / 022	May, 2008
	Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2008
	Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2008
	Bilog Antenna	SCHAFFNER	CBL6112B / 2705	May, 2008
	Horn Antenna	ETS	3115 / 0005-6160	Sep., 2008
	Pre-Amplifier	QTK	QTK-AMP-01/ 0001	May, 2008
<input checked="" type="checkbox"/> Site # 3	Test Receiver	R & S	ESI 26 / 838786/004	May, 2008
	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2008
	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2008
	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2008
	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2008
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2008
	Pre-Amplifier	HP	8449B / 3008A01123	July, 2008

- Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

3.2. Test Setup



Under 30MHz Test Setup



3.3. Limits

➤ FCC Part 15 Subpart C Paragraph 15.227 Limit

FCC Part 15 Subpart C Paragraph 15.227 Limits		
Fundamental Frequency MHz	Field strength of fundamental	
	uV/m	dBuV/m
26.96-27.28	10000	80

Remarks :

1. E field strength (dBuV/m) = 20 log E field strength (uV/m)
2. Peak Limit= Average Limit + 20dB

➤ Frequencies in restricted band are complied to limits on Paragraph 15.209.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks :
1. E field strength (dBuV/m) = 20 log E field strength (uV/m)
 2. In the Above Table, the tighter limit applies at the band edges.

3.4. Test Procedure

The EUT was setup and tested according to ANSI C63.4, 2003.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level.

This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 30MHz to 10th harmonics is checked.

3.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

3.6. Test Data of Radiated Emission

Product : Wireless Optical Notebook Mouse
 Test Item : Fundamental Radiated Emission
 Test Site : No.3 OATS
 Test Voltage : Battery 1.5V*2
 Test Mode : Mode 1: Transmitter (27.042 MHz)

Polarity	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)
Peak Detector							
X	27.042	20.190	25.090	45.280	-34.720	100.000	80.000
Y	27.042	20.190	24.890	45.080	-34.920	100.000	80.000
Z	27.042	20.190	24.220	44.410	-35.590	100.000	80.000

Note:

1. Below 30MHz, the magnetic loop antenna was used.
2. Only fundamental frequency is shown on the test report.
3. For those measured radiated emissions below 30MHz not shown above, mean they are below the limit.
4. Correct factor = Antenna Factor + Cable Loss – Pre-amplifier Gain

Product : Wireless Optical Notebook Mouse
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Voltage : Battery 1.5V*2
 Test Mode : Mode 1: Transmitter

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
53.280	-13.190	43.878	30.688	-9.312	40.000
161.920	-14.862	40.275	25.413	-18.087	43.500
243.400	-8.673	33.132	24.459	-21.541	46.000
270.560	-8.050	33.271	25.221	-20.779	46.000
594.540	3.971	25.175	29.146	-16.854	46.000
842.860	4.580	25.342	29.922	-16.078	46.000
Vertical					
134.760	-7.877	36.371	28.494	-15.006	43.500
161.920	-8.152	43.230	35.078	-8.422	43.500
189.080	-3.974	31.620	27.646	-15.854	43.500
216.240	-2.663	29.677	27.014	-18.986	46.000
823.460	3.552	25.163	28.715	-17.285	46.000
879.720	4.810	25.170	29.980	-16.020	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. "█" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. Correct Factor = Antenna Factor + Cable Loss – Pre-amplifier Gain

4. Band Edge

4.1. Test Equipment

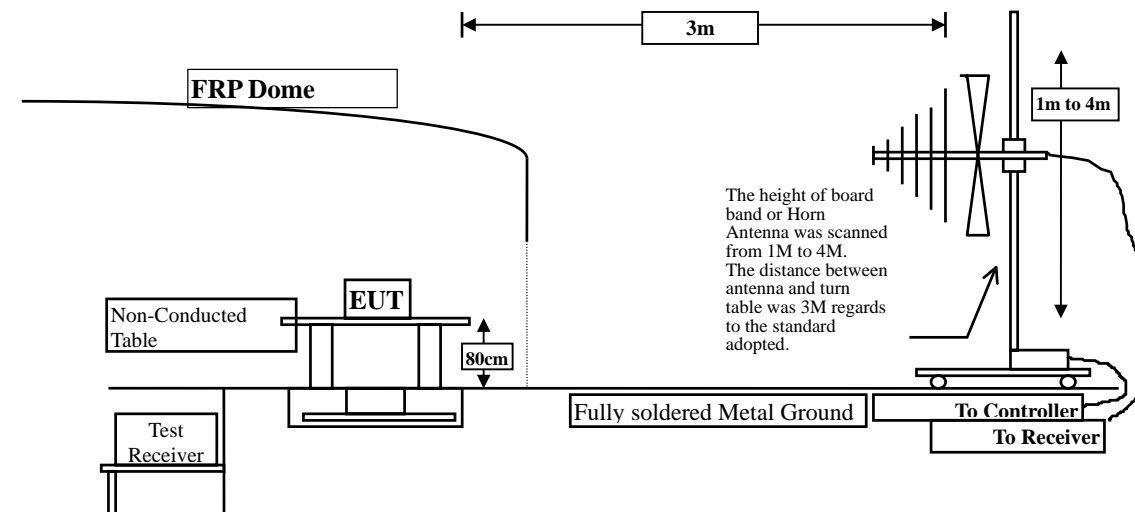
The following test equipment are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
<input type="checkbox"/> Site # 1	Test Receiver	R & S	ESVS 10 / 834468/003	July, 2008
	Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2008
	Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2008
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Nov., 2008
<input type="checkbox"/> Site # 2	Test Receiver	R & S	ESCS 30 / 836858 / 022	Nov., 2008
	Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2008
	Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2008
	Bilog Antenna	SCHAFFNER	CBL6112B / 2705	Oct., 2008
<input checked="" type="checkbox"/> Site # 3	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008
	Spectrum Analyzer	HP	E4407B / US39440758	May, 2008
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2008
	Broadband Antenna	Schwarzbeck	VULB9166/1085	April, 2009
	Horn Antenna	ETS	3115 / 0005-6160	July, 2008
	Loop Antenna	R&S	HFH2-Z2/833799/004	July, 2008
	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2008

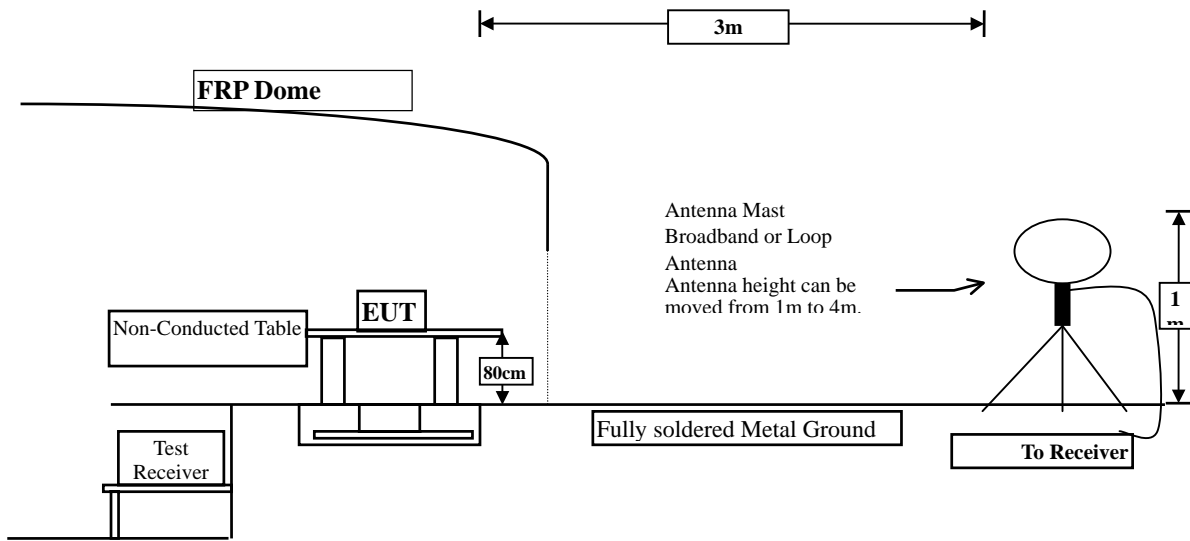
- Note:
1. All equipments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

4.2. Test Setup

RF Radiated Measurement:



Under 30MHz Test Setup



4.3. Limit

Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.4. Test Procedure

The EUT was setup and tested according to ANSI C63.4, 2003.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement.

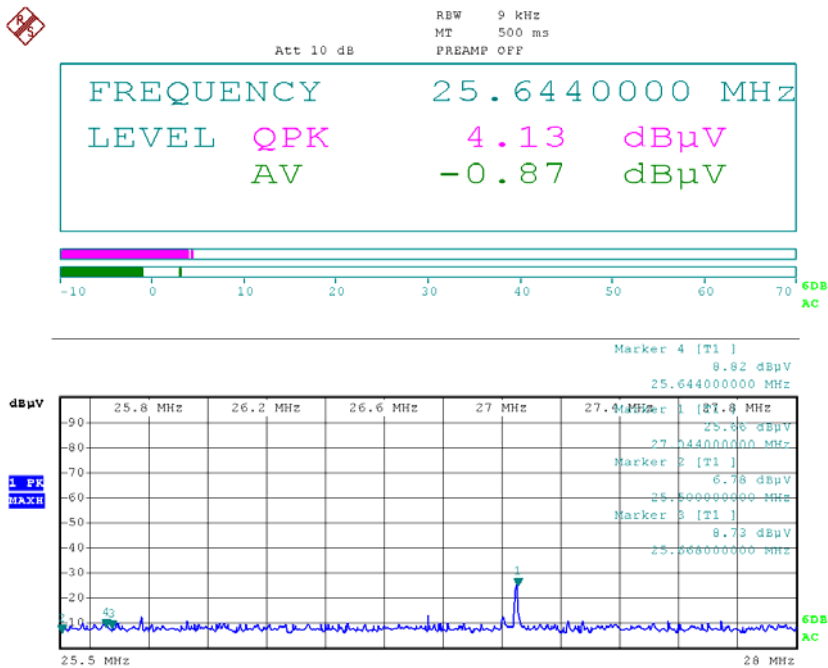
The bandwidth below 30MHz setting on the field strength meter is 9 kHz

4.5. Test Result of Band Edge

Product : Wireless Optical Notebook Mouse
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

RF Radiated Measurement: (Quasi-Peak Detector @3m)

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)
25.644	20.230	4.130	24.360	-45.180	69.540



Date: 22.APR.2009 03:14:06

5. EMI Reduction Method During Compliance Testing

No modification was made during testing.