Report No.	C3115342
FCC ID	PSJMX4350RF-1
Specifications	FCC Part 15, Class B
Test Method	ANSI C63.4 1992
Applicant	Memorex Products, Inc.
Applicant address	10100 Pioneer Blvd., Suite 100 Santa Fe Springs, CA90670, USA
Items tested	Wireless Optical Mouse
Model No.	MX4327RCV, MX4350RF, MX5600RF, MX6000RF, MX4650RF (Sample # C31342)
Frequency Range	26.96MHz to 27.28MHz
Results	**Compliance** (As detailed within this report)
Date	01/29/2003 (month / day / year)(Sample received) 02/27/2003 (month / day / year)(Tested)
Prepared by	Project Engineer
Authorized by	General Manager (Frank Tsai)
Issue date	March 26, 2003 (month / day / year)
Modifications	**None**
Tested by	Training Research Co., Ltd. **(Accredited by NVLAP)**
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Conditions of issue :

- ***This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.***
- ***The test data in this test report are following the procedures in accordance with the terms of accreditation.***
- ***This test report and measurements made by TRC are traceable to the NIST only Conducted and Radiated Method (TRC is accredited by NVLAP, code No.: 200174-0).***
- ***The device has been tested is fully complied with the requirements the Directive FCC Part 15.***

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Chapter 1 Introduction

Description of EUT:

EUT	**:**	Wireless Optical Mouse
Model No.	**:**	MX4327RCV, MX4350RF, MX5600RF, MX6000RF, MX4650RF
Product name	**:**	Wireless Optical Mouse
Frequency Range	**:**	26.96 – 27.28 MHz
Power Type	**:**	Transmitter: Powered by two 1.5VDC AA batteries

*This EUT has two channels (each with 256 IDs):

1. 27.0450 MHz
2. 27.0950 MHz

Test method:

Pretest was found that the emission of operating mode is worse than standby mode. So, The final test is made at the operating mode.

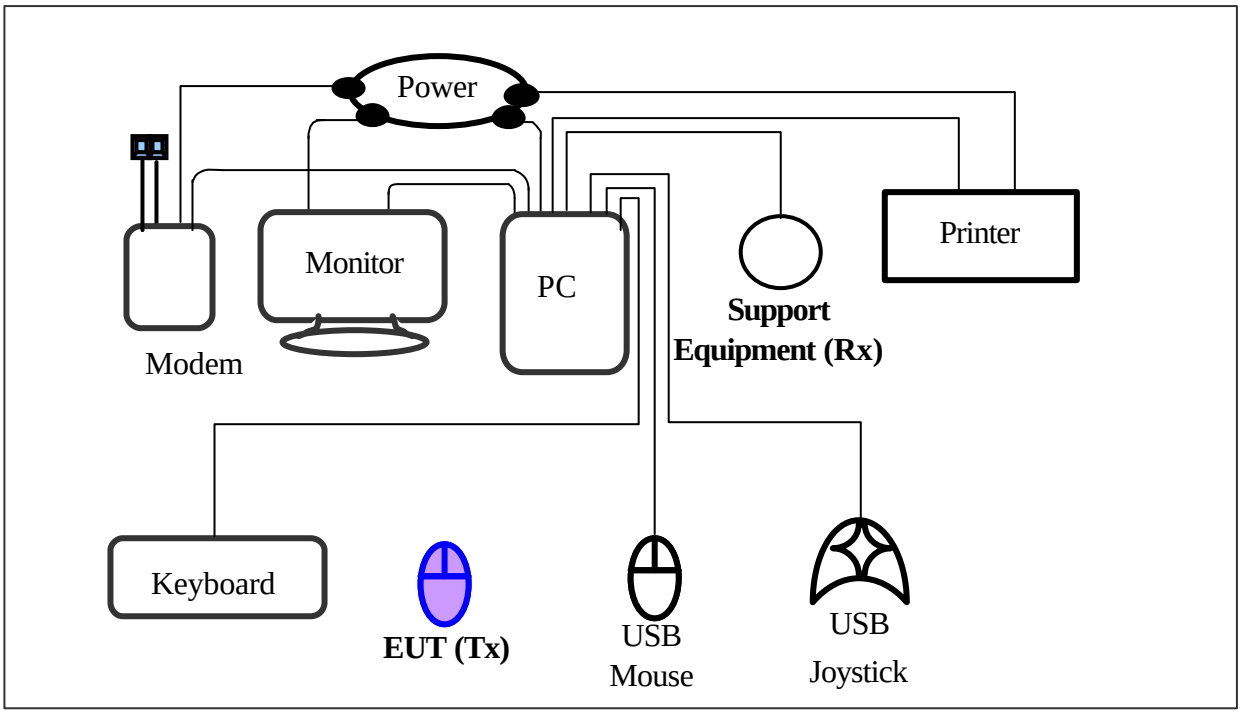
During the measurement, there are two channel and six modes tested: "Channel 1 by PS/2 Interface", "Channel 2 by PS/2 Interface ", "Channel 1 by USB Interface", "Channel 2 by USB Interface" and "Charging" modes. The radiation pretest was found out the testing mode: "Channel 1 by USB Interface" was the worst case and we only recorded worse cases in this report.

While testing, the EUT was made to transmit continuously and adjusted at a position, which transmitted the maximum emission.

The test placement as the photographs showed is the worst emission placed. (If the emission is close to the ambient, the resolution BW and view resolution will be reduced and the data will be recorded by detection of maximum hold peak mode.)

The testing configuration of test setup is showing in the next page.

Configuration of Test Setup (Test mode: PS/2 Interface)



Connections:

PC:

*Serial Port --- via a 110cm shielded RS-232 cable to an external modem.

*Monitor Port --- a monitor with 1.5m length data cable.

*Keyboard port --- a keyboard with 1.5m length data cable.

*Mouse port --- EUT(Rx).

*USB port A --- a USB joystick with 1.8m long, shielded, no ferrite bead data cable.

*USB port B --- a USB mouse with 1.88m long, shielded, no ferrite bead data cable.

(Each port on PC is connected with suitable device)

EUT(Tx):

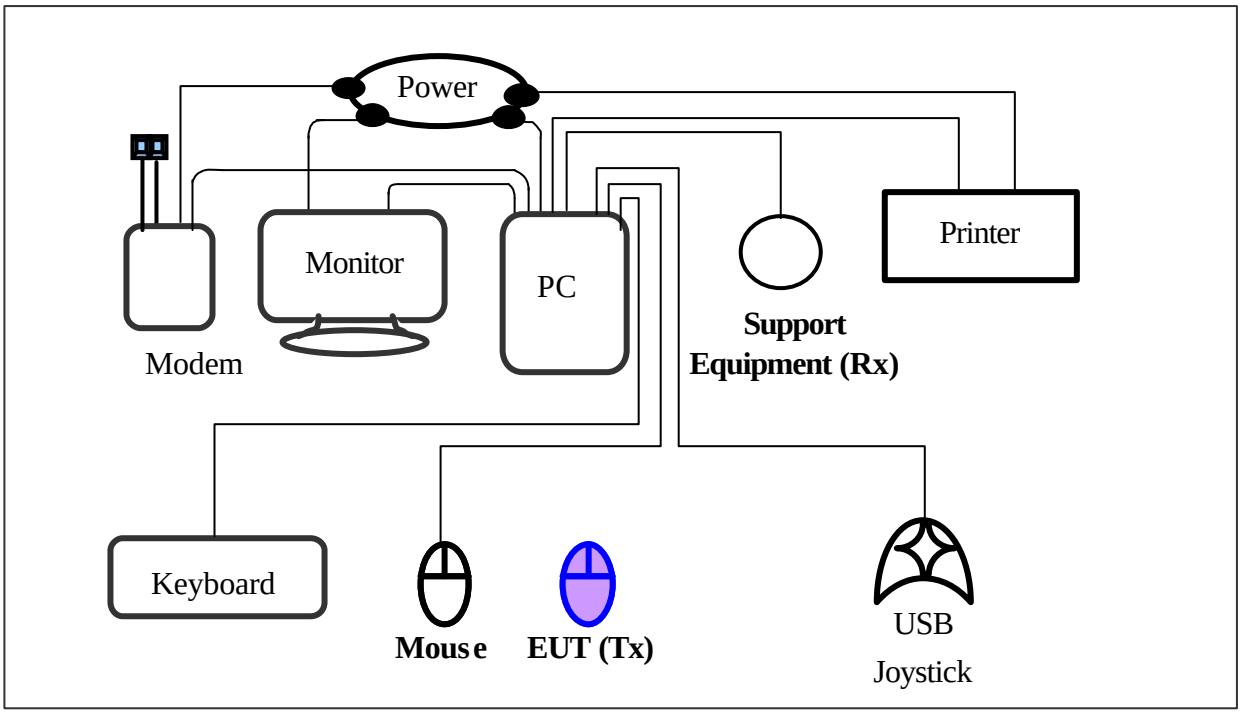
*Put two AA size, 1.5V battery into the battery cell of EUT, powers the subject device.

The EUT does not be connected with any product.

Support Equipment (Rx):

*PS/2 Jack --- via a 142cm length shielded data cable to the Mouse port of PC.

Configuration of Test Setup (Test mode: USB Interface)



Connections:

PC:

*Serial Port --- via a 110cm shielded RS-232 cable to an external modem.

*Monitor Port --- a monitor with 1.5m length data cable.

*Keyboard port --- a keyboard with 1.5m length data cable.

*Mouse port --- a mouse with 1.9m length data cable.

*USB port A --- a USB joystick with 1.8m long, shielded, no ferrite bead data cable.

*USB port B --- EUT(Rx).

(Each port on PC is connected with suitable device)

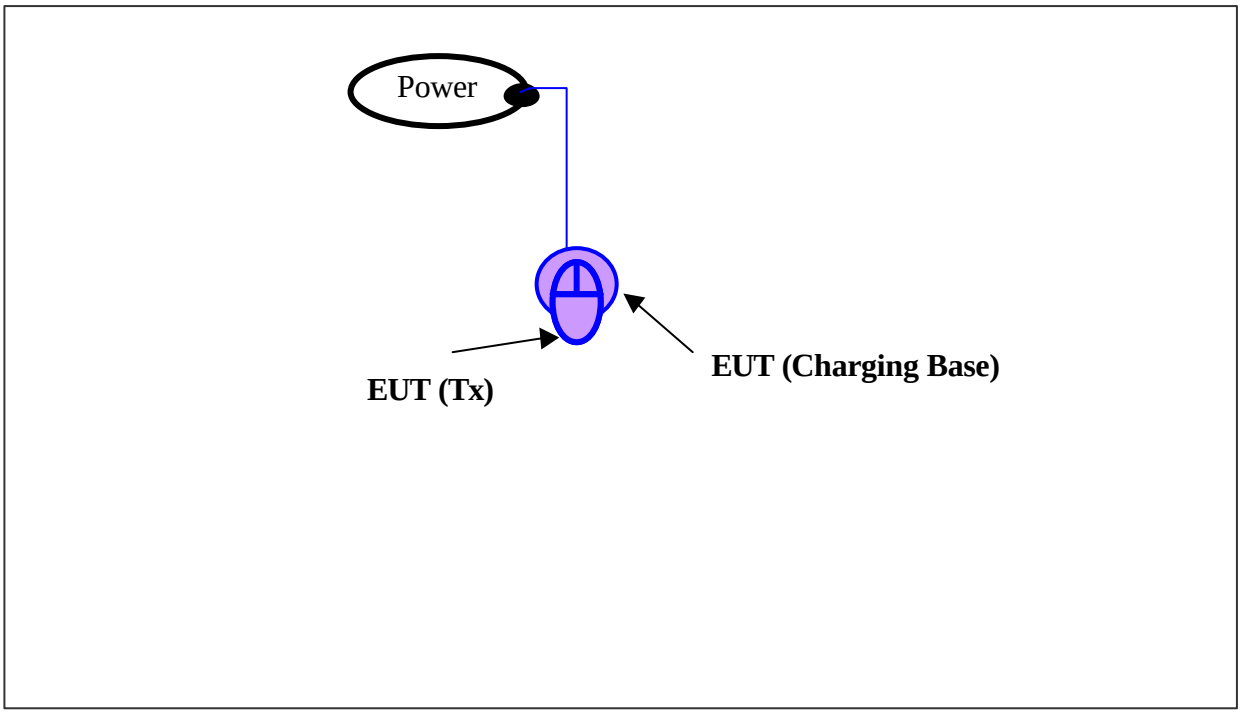
EUT(Tx):

*Put two AA size, 1.5V battery into the battery cell of EUT, powers the subject device.
The EUT does not be connected with any product.

Support Equipment (Rx):

*PS/2 Jack --- via a PS/2 to USB adapter with a 142cm length data cable to the USB port B of PC.

Configuration of Test Setup (Test mode: Charging)



Connections:

EUT(Tx):

*Put two AA size, 1.5V battery into the battery cell of EUT, powers the subject device.
Put the EUT(Tx) on the EUT(Charging Base) to charge.

EUT(Charging Base):

*Power Jack --- via a 1.86m long power cable with a adapter to the power source.

List of Support Equipment

Conducted (Radiated) test:

PC	**:**	**HP Brio 85xx 6/350**
Model No.	:	D6928A
Serial No.	:	SG91801443
FCC ID	:	Doc Approved
Power type	:	100 ~ 230VAC / 50 ~ 60Hz, 5A, Switching
Power cord	:	Non-shielded, 2.33m long, Plastic, No ferrite core
Monitor	**:**	**HP pavilion mx70**
Model No.	:	P1283A
Serial No.	:	THTBR00257
FCC ID	:	DOC Approved
Power type	:	100 ~ 240V AC 15A 50/60Hz
Power cord	:	Shielded, 1.83m long, No ferrite core
Data cable	:	Shielded, 1.46m (1.80m) long, with two ferrite cores (no ferrite core)
Printer	**:**	**HP**
Model No.	:	C2642A
Serial No.	:	SG69A196GV
FCC ID	:	B94C2642X
Power type	:	230 VAC, 50Hz
Power cord	:	Non-shielded, 2m long, no ferrite core
Data cable	:	Shielded, 1.84m long, no ferrite core
Modem	**:**	**ACEEX**
Model No.	:	DM-1414V
FCC ID	:	IFAXDM1414
Power type	:	120VAC, 60Hz/ 9VAC, 1A
Power cord	:	Non-shielded, 1.9m long, no ferrite cord
Data cable	:	RS232, Shielded, 1.2m long, no ferrite core
		RJ11C x 2, 7’ long non-shielded, no ferrite core

Keyboard : Logitech SK-720C
Model No. : Y-SA2
Serial No. : SCC04514357
FCC ID : GYUR49SK
Power type : By PC
Data cable : Shielded, 1.73m long, with ferrite core

USB Joystick : Rockfire
Model No. : QF-337uv
Serial No. : 10600545
FCC ID : CE Approval
Power type : Powered by PC
Power cable : Shielded, 1.8m long, No ferrite bead data cable

USB Mouse : Logitech Wheel Mouse
Model No. : M-BJ-58
Serial No. : LN20901985
FCC ID : Doc Approved
Power type : By PC
Power cord : Non-shielded, 1.88m long, No ferrite core

Mouse : HP
Model No. : M-S34
Serial No. : LZB90714106
FCC ID : DZL211029
Power type : By PC
Power cord : Non-shielded, 1.88m long, No ferrite core

Support Equipment (Rx): Memorex
Model No. : MX4327RCV
Serial No. : N/A
FCC ID : Doc Approved
Power type : By PC
Power cord : Non-shielded, 1.42m length, No ferrite core

Chapter 2 Conducted Emission Test

Test Condition and Setup:

All the equipment is placed and setup according to the ANSI C63.4 – 1992.
The EUT is assembled on a wooden table that is 80 cm high, is placed 40 cm from the back-wall that is a vertical conducting plane. One LISN is for EUT, the other LISN is for support equipment. They are all placed on the conductive ground. The EUT' s LISN connect a line switch box for selecting L1 or L2, then connect to a preamplifier and Spectrum.

The spectrum measured from 150KHz to 30MHz. Conducted emission levels are detected at max. peak mode. But if the max. peak mode failed or over average limit, it will be measured by QP and average detection mode using the Receiver.

While testing, there is the worst-emission plot printed at peak detection mode, and there are more than 6 highest emissions relative to limit recorded. The plot is kept as the original data, not included in test report.

List of test Instrument :

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Receiver	SCR3102	SCHAFFNER	012	03/29/02	03/28/03
LISN (EUT)	3825/2	EMCO	9411-2284	06/17/02	06/16/03
LISN (Support E.)	3825/2	EMCO	9210-2007	05/31/02	05/31/03
Preamplifier	EQ3-006	TRC	- - - - - - - - -	05/15/02	05/15/03
Line switch box	EQ3-007	TRC	- - - - - - - - -	05/15/02	05/15/03

The level of confidence of 95% , the uncertainty of measurement of conducted emission is ± 2.02 dB .

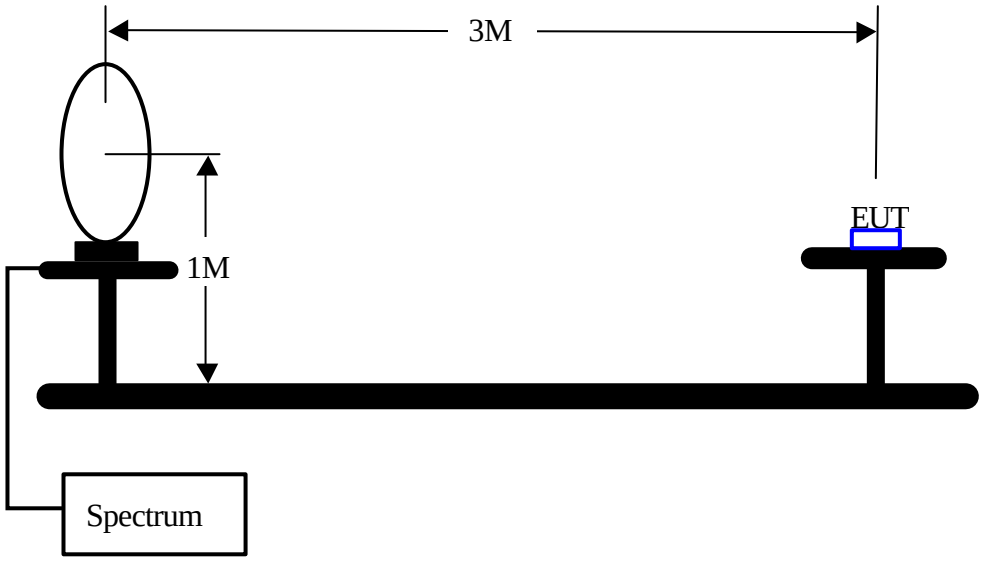
Test Result: Pass (Appendix A)

Conducted Test Placement: (Photographs)(Test mode: Charging)

Chapter 3 Peak Power Measurement (Frequency Band: 26.96 ~ 27.28)

Test Setup:

1. Test Setup:



2. Test Procedure:

a. The EUT was setup in the anechoic chamber as shown above.
b. The loop antenna was located upon its plane vertical, 3-meter distance from the EUT. The center of the loop is 1-meter above the ground plane.
c. In order to find the maximum radiation, the EUT was rotated 360°. The measuring antenna was rotated about its axis at each azimuth about the EUT.

List of test Instrument :

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Receiver	SCR3102	SCHAFFNER	012	03/29/02	03/28/03
Control Box	TWR95-4	TRC	C9001-2	12/01/02	12/01/03
Antenna	6502	EMCO	9206-2777	06/10/02	06/09/03
Open test side (Antenna, Amplify, cable calibrated together)				05/15/02	05/15/03

The level of confidence of 95% , the uncertainty of measurement of radiated emission is ± 3.44 dB .

Test Result : Appendix A

Chapter 4 Radiated Emission Test

Test Condition and Setup:

Pretest : Prior to the final test ,the EUT is placed in an anechoic chamber, and scan from 30MHz to 1GHz. The devices rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit. This is done to ensure the radiation exactly emits form the EUT.

Final test: Final radiation measurement was made on a **3 – meter** open-field test site. The EUT's maximum emission of radiation is placed on a nonconductive table, which is 0.8m height, the top surface is 1.0 x 1.5 meter. All placement is according to ANSI C63.4 - 1992.

The emissions was examined from 30 MHz to 1000 MHz measured by receiver.

The whole range Antenna is used to measure frequency from 30 MHz to 1 GHz. The final test is used the receiver.

Measure more than six top marked frequencies generated form pretest by computer step by step at each frequency. The EUT is rotated 360 degrees, and antenna is raised and lowered from 1 to 4 meters to find the maximum emission levels. The antenna is used with both horizontal and vertical polarization.

Appropriated preamplifier, which is made by TRC is used for improving sensitivity and precautions is taken to avoid overloading. The spectrum analyzer' s 6dB bandwidth is set to 120 KHz, and the EUT is measured at quasi-peak mode.

If the emission is close to the frequency band of ambient, the tester will recheck the data and the corrected data will be written in the test data sheet. If the emission is just within the ambient, the data from shield room will be taken as the final data.

List of test Instrument :

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Receiver	SCR3102	SCHAFFNER	012	03/29/02	03/28/03
Control Box	TWR95-4	TRC	C9001-2	N/A	N/A
Antenna	CBL6141A	SCHAFFNER	4188	11/29/02	11/28/03
Open test side (Antenna, Amplify, cable calibrated together)				05/15/02	05/15/03

The level of confidence of 95% , the uncertainty of measurement of radiated emission is ± 3.44 dB .

Test Result : Pass (Appendix A)

Radiated Test Placement: (Photographs)

Appendix A

Conducted Emission Test Result: (Test mode: Charging)

Testing room : Temperature : 24° C Humidity : 66 % RH

Line 1

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBmV)	*Quasi-Peak (dBmV)*	*Average (dBmV)*	*Quasi-Peak (dBmV)*	*Average (dBmV)*	
473.00	30.98	***.**	***.**	56.77	46.77	-15.79
486.00	30.81	***.**	***.**	56.40	46.40	-15.59
508.00	31.11	***.**	***.**	56.00	46.00	-14.89
518.00	31.32	***.**	***.**	56.00	46.00	-14.68
538.00	31.32	***.**	***.**	56.00	46.00	-14.68
556.00	32.16	***.**	***.**	56.00	46.00	-13.84
582.00	31.33	***.**	***.**	56.00	46.00	-14.67
597.00	31.86	***.**	***.**	56.00	46.00	-14.14
624.00	30.88	***.**	***.**	56.00	46.00	-15.12
645.00	29.90	***.**	***.**	56.00	46.00	-16.10

Line 2

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBmV)	*Quasi-Peak (dBmV)*	*Average (dBmV)*	*Quasi-Peak (dBmV)*	*Average (dBmV)*	
441.00	28.90	***.**	***.**	57.69	47.69	-18.79
480.00	29.59	***.**	***.**	56.57	46.57	-16.99
493.00	28.20	***.**	***.**	56.20	46.20	-18.00
515.00	28.73	***.**	***.**	56.00	46.00	-17.27
530.00	29.10	***.**	***.**	56.00	46.00	-16.90
571.00	28.66	***.**	***.**	56.00	46.00	-17.34
593.00	29.17	***.**	***.**	56.00	46.00	-16.83
608.00	28.61	***.**	***.**	56.00	46.00	-17.39
633.00	27.94	***.**	***.**	56.00	46.00	-18.06
654.00	26.99	***.**	***.**	56.00	46.00	-19.01

*The reading amplitudes are all under limit.

Appendix B

Peak Power Test Result: (Horizontal)(Test mode: Channel 1)

Frequency	Reading Amplitude	Correction Factors	Corrected Amplitude	Limit	Margin
MHz	dBμV/m	dB	dBμV/m	dBμV/m	dB
27.0075	59.63	-8.30	51.33	80.00	-28.67

Radiated Emission Test Result: (Horizontal) (Test mode: Channel 1)

Test Conditions:

Testing site : Temperature : 25 ° C Humidity : 73 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV/m	m	degree	dB	dBμV/m	dBμV/m	dB
54.1975	25.51	2.50	321	-6.25	19.26	40.00	-20.74
81.3000	29.88	2.50	210	-9.88	20.00	40.00	-20.00
135.4870	20.31	2.50	210	-4.40	15.91	43.52	-27.61
162.5380	21.99	3.98	171	-5.60	16.39	43.52	-27.13
189.6813	20.84	1.01	41	-4.62	16.22	43.52	-27.30
216.7376	22.78	1.01	63	-2.65	20.13	46.02	-25.89
270.9806	37.47	1.01	263	-1.11	36.36	46.02	-9.66
325.1750	36.15	1.01	272	0.11	36.26	46.02	-9.76
379.2830	24.74	1.01	87	3.40	28.14	46.02	-17.88
433.5630	24.29	1.01	303	5.27	29.56	46.02	-16.46
***							

Note:

1. Margin = Amplitude – limit, *if margin is minus means under limit.*
2. Corrected Amplitude = Reading Amplitude – Correction Factors
3. Correction factor = Antenna factor + (Cable Loss – Amplitude gain)

(For example : 30MHz correction factor = 15.5 + (–15.26) = 0.24 dB/m)

Peak Power Test Result: (Vertical) (Test mode: Channel 1)

Frequency	Reading Amplitude	Correction Factors	Corrected Amplitude	Limit	Margin
MHz	dBμV/m	dB/m	dBμV	dBμV/m	dB
27.0075	48.94	-8.30	40.64	80.00	-39.36

Radiated Emission Test Result: (Vertical) (Test mode: Channel 1)

Test Conditions:

Testing site : Temperature : 25 ° C Humidity : 73 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV/m	m	degree	dB	dBμV/m	dBμV/m	dB
54.1975	31.56	3.98	94	-6.25	25.31	40.00	-14.69
81.3000	37.89	0.97	308	-9.88	28.01	40.00	-11.99
135.4870	21.63	0.97	241	-4.40	17.23	43.52	-26.29
162.5380	23.37	0.97	62	-5.60	17.77	43.52	-25.75
189.6813	26.07	0.97	288	-4.62	21.45	43.52	-22.07
216.7376	25.47	0.97	178	-2.65	22.82	46.02	-23.20
270.9806	32.83	2.50	165	-1.11	31.72	46.02	-14.30
325.1750	24.08	2.50	178	0.11	24.19	46.02	-21.83
379.2830	16.33	0.97	165	3.40	19.73	46.02	-26.29
433.5630	24.24	3.98	146	5.27	29.51	46.02	-16.51
***							

Note:

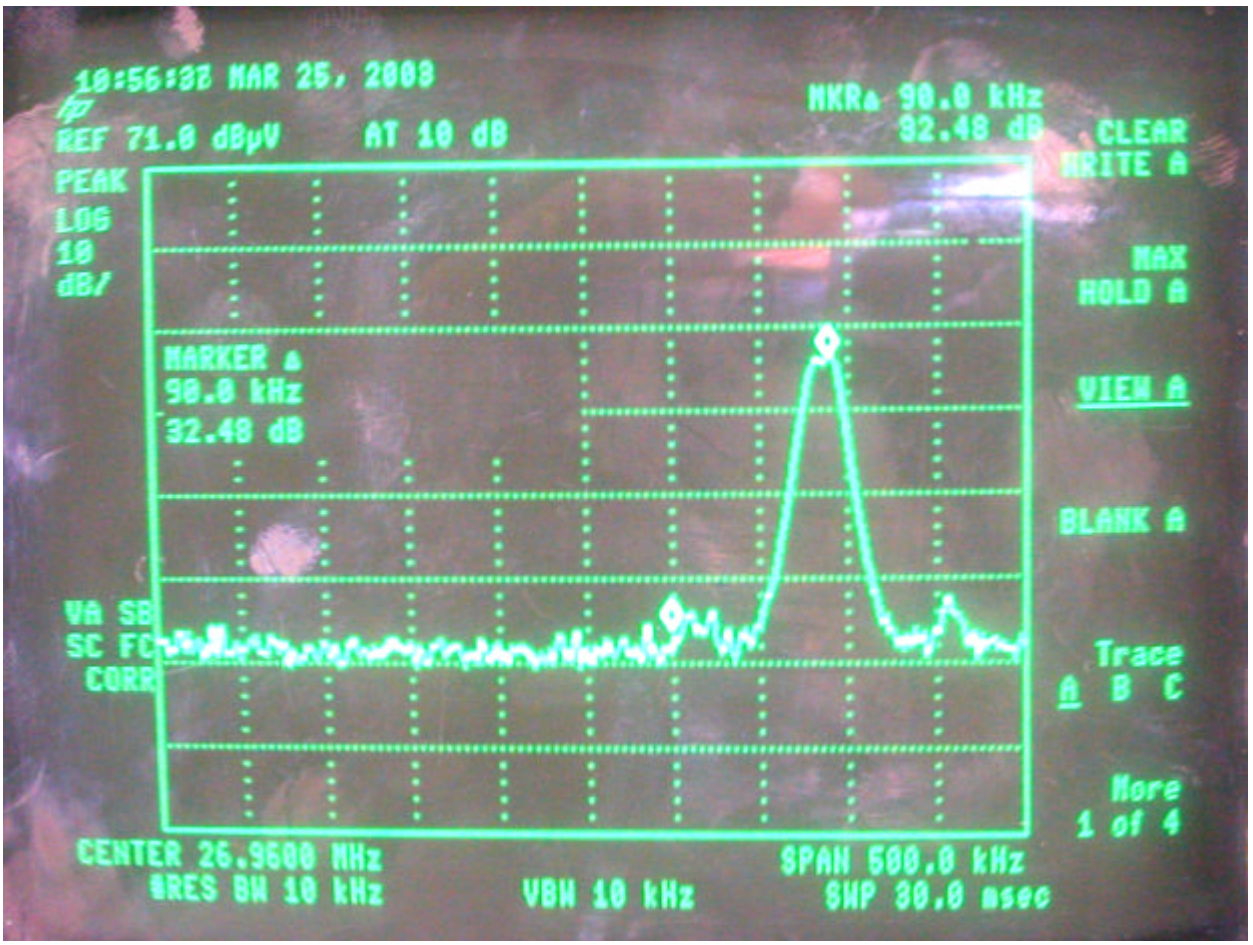
1. Margin = Amplitude – limit, *if margin is minus means under limit.*
2. Corrected Amplitude = Reading Amplitude – Correction Factors
3. Correction factor = Antenna factor + (Cable Loss – Amplitude gain)

(For example : 30MHz correction factor = 15.5 + (–15.26) = 0.24 dB/m)

Appendix C

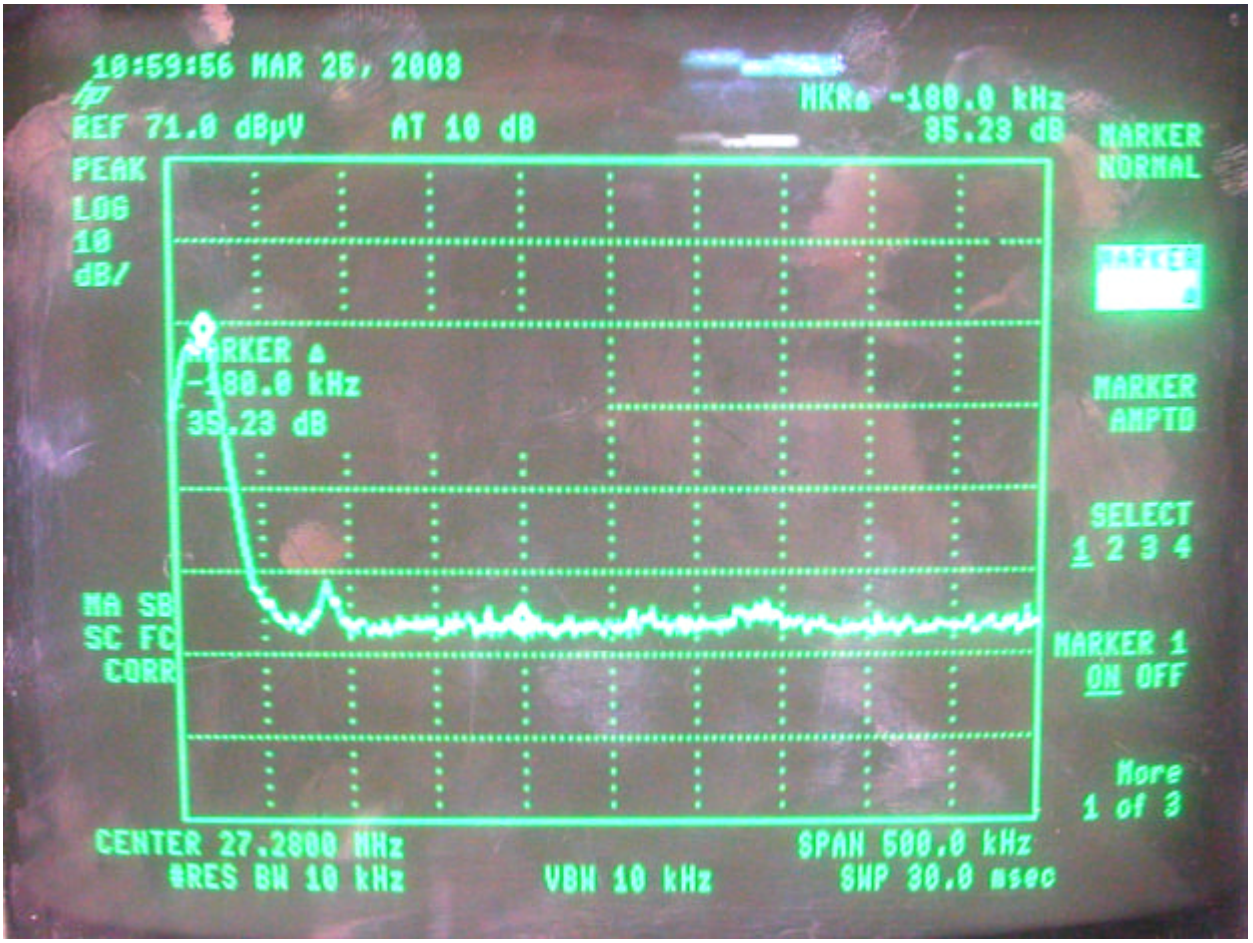
Band Edge of Measurement: (Frequency Band: 26.96 ~ 27.28)

Lower channel



26.96MHz << Class B Limit.

Upper channel:



27.28 MHz >> Class B Limit.