
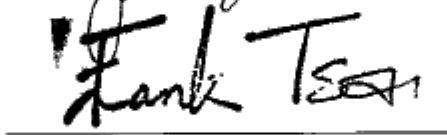


Report No.	C3115529
Specifications	FCC Part 15, Class B
Test Method	ANSI C63.4 1992
Applicant address	16F, No. 150, Chen I Road, 235 Chung Ho City, Taipei Hsien, Taiwan, R.O.C.
Applicant	Chic Technology Corp.
Items tested	Wireless Optical Mouse
Model No.	1440UP (Sample # C31529, Tx)
Results	Compliance (As detailed within this report)
Date	08/16/2001 (month / day / year) (Sample received) 08/27/2001 (month / day / year) (Test)
Prepared by	 Project Engineer
Authorized by	 General Manager (Frank Tsai)
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Modifications	None
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★ **FCC ID: IOW1440UP**

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Chapter 1 Introduction

Description of EUT

EUT : Wireless Optical Mouse
Model No. : 1440UP
FCC ID : IOW1440UP
Frequency Range : 27.045 – 27.095 MHz
Power Type : Powered by two 1.5VDC batteries

This wireless mouse use advancing transmission technology to allow comfortable use. However, occasionally outside sources may cause interference.

Test method

All measurements contained in this report were performed according to the techniques described in Measurement procedure ANSI C63.4 – 1992.

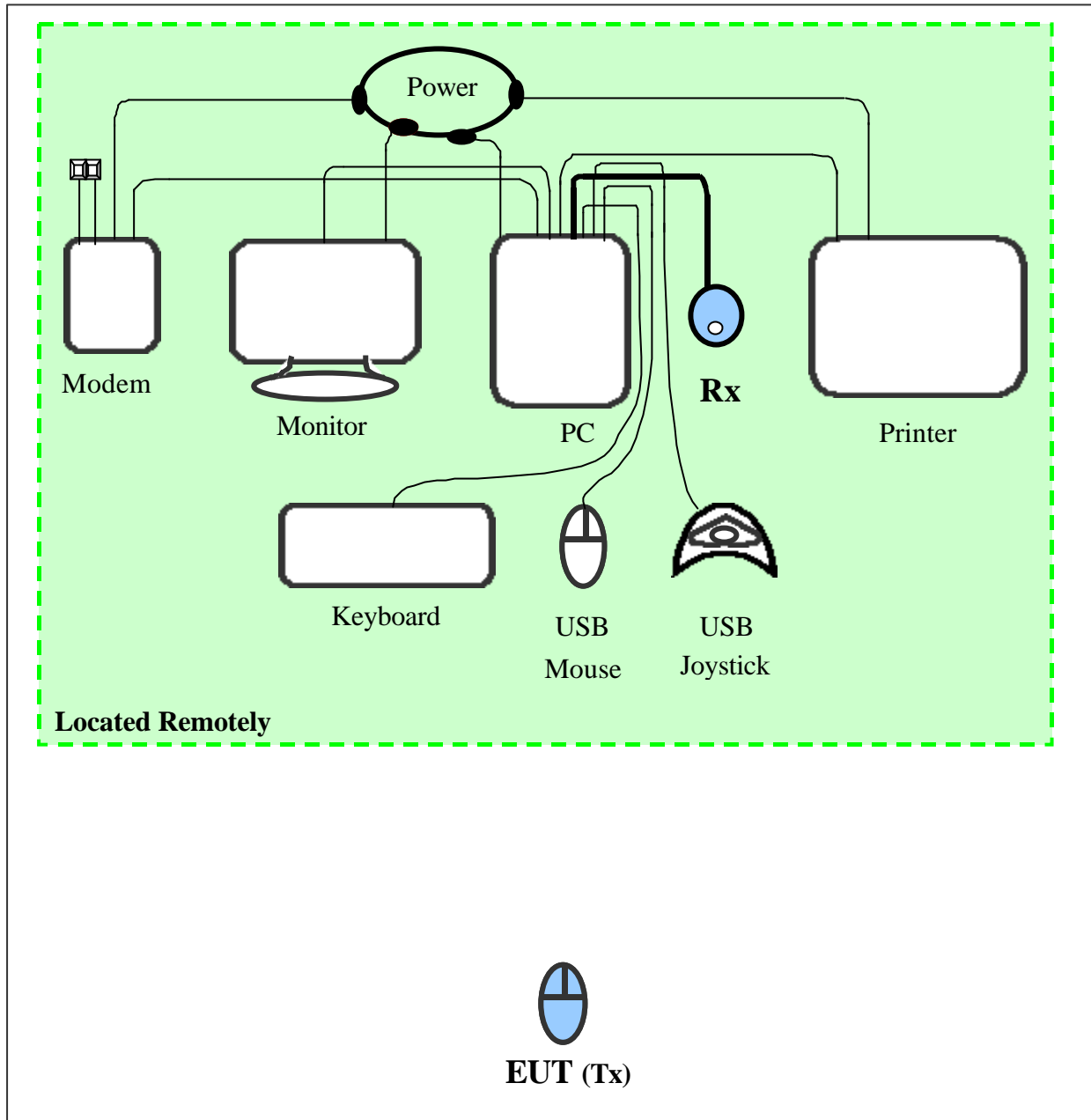
Pretest was found that the emission of operating mode is worse than standby mode. So, The final test is made at the operating mode.

While testing, the EUT set in Ch1 (27.045MHz) and continuously transmitting mode, which transmitted the maximum emission.

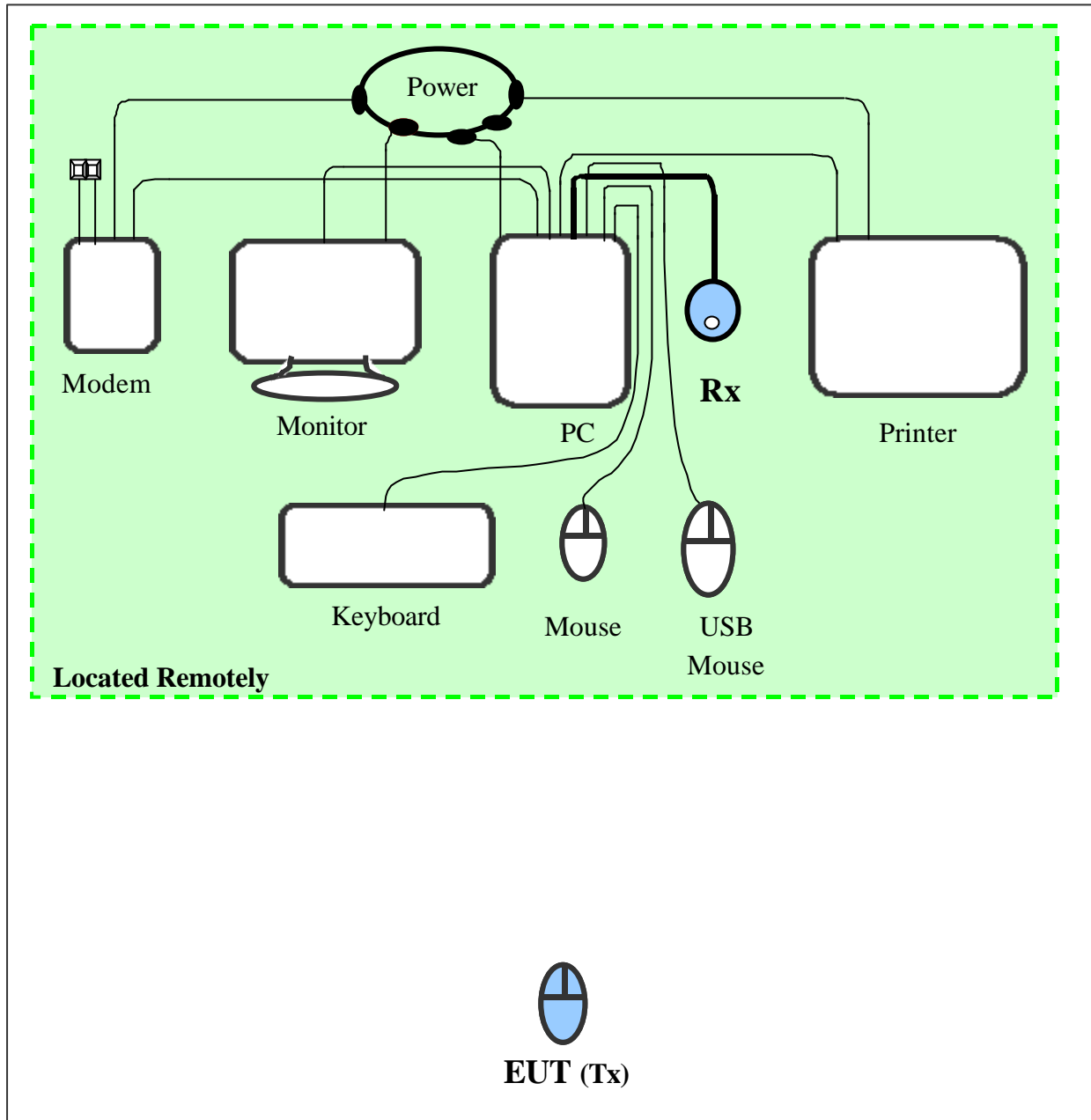
The test placement as the photographs showed is the worst case emission placed. (If the emission is close to the ambient, the resolution BW and view resolution will be reduced and the data will be recorded by detection of maximum hold peak mode.)

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

Configuration of test setup for PS/2 connector



Configuration of test setup for USB connector



Connections of Support Equipment

PC:

- *Serial port --- an external modem
 - *Printer port --- a printer
 - *Monitor port --- a monitor
 - *Keyboard port --- a keyboard
 - *Mouse port --- Receiver (or a mouse)
 - *USB A port --- a USB mouse (or Receiver)
 - *USB B port --- a USB joystick
- (Each port on PC is connected with suitable device)

Rx:

(1)Using PS/2 Port:

- *PS/2 Connector --- via a 145cm long, shielded, no ferrite bead, data cable to the PS/2 of personal computer

(2)Using USB Port:

- *USB Connector --- via a 145cm long, shielded, no ferrite bead, data cable to the USB-A port of personal computer

Connections of EUT

Transmitter:

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

List of Support Equipment

Conducted (Radiated) test:

PC : **HP Brio 85xx 6/350**
Model No. : D6928A
Serial No. : SG91801535
FCC ID : N/A (Doc Approved)
檢磁 : 3872H013
Power type : 100 ~ 230VAC / 50 ~ 60Hz, 5A, Switching
Power cord : Non-shielded, 2.33m long, Plastic, No ferrite core

Monitor : **HP 15' Color Monitor**
Model No. : D2827A
Serial No. : KR91161717
FCC ID : C5F7NFCMC1518X
檢磁 : 3872B039
Power type : 100 ~ 240 VAC / 50 ~ 60 Hz, Switching
Power cord : Shielded, 1.83m long, No ferrite core
Data cable : Shielded, 1.46m long, with two ferrite cores

Keyboard : **HP**
Model No. : SK-2501K
Serial No. : M990308909
FCC ID : GYUR38SK
檢磁 : 3862A621
Power type : By PC
Data cable : Shielded, 1.73m long, with ferrite core

Mouse : **HP**
Model No. : M-S34
Serial No. : LZB90714122
FCC ID : DZL211029
檢磁 : 4862A011
Power type : By PC
Power cord : Non-shielded, 1.88m long, No ferrite core

Printer : **HP**
Model No. : C2184A
Serial No. : SG55T1P1KY
FCC ID : N/A, Doc Approved
Power type : Linear
Power cord : Non-shielded, 1.90m long, No ferrite core
Data cable : Shielded, 1.8m long, No ferrite core

Modem : **ACEEX**
Model No. : XDM41414
Serial No. : 964111217
FCC ID : IFAXDM1414
Power type : Linear
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

USB Mouse : **Logitech**
Model No. : M-BA47
Serial No. : LZE92250027
FCC ID : N/A, Doc Approved
檢磁 : 4872A220
Power type : Powered by PC
Power Cable : Shielded, 1.5m long, Plastic hoods, No ferrite bead

USB Joystick : Padix

Model No. : QF-305U
Serial No. : 8100848
FCC ID : N/A, Doc Approval
Power type : Powered by PC
Power Cable : Shielded, 1.5m long, No ferrite bead data cable

Receiver : Chic Technology Crop.

Model No. : 1440UP
Serial No. : N/A
FCC ID : N/A, Doc Approval
Power type : 120 ~ 230VAC / 50 ~ 60Hz, Switching
Power Cable : Non-shielded, 1.85m long, No ferrite bead

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, which is 80 cm high, is placed 40 cm from the back-wall, which 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 scans from 450KHz to 30MHz. Conducted emission levels are detected at max. peak mode. But if the max. peak mode failed, it will be measured by CISPR's quasi-peak detection mode.

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

<u>Instrument Name</u>	<u>Model No.</u>	<u>Brand</u>	<u>Serial No.</u>	<u>Calibration Date</u>	
				<u>Last time</u>	<u>Next time</u>
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
LISN (EUT)	LISN-01	TRC	9912-03,04	12/09/00	12/09/01
LISN (Support E.)	LISN-01	TRC	9912-05	01/04/01	01/04/02
Switch/Control Unit (< 30MHz)	3488A	HP	N/A	11/20/00	11/20/01
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	11/20/00	11/20/01

The level of confidence of 95%, the uncertainty of measurement of conducted emission is ± 2.4 dB.

Test Result: N/A (Not Applicable)

Chapter 3 Radiated Emission Test

Test Condition and Setup (Harmonic and Spurious Emission)

Pretest: Prior to the final test, the EUT is placed in an anechoic chamber, and scan from 27MHz 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 from the EUT.

Final test: Final radiation measurements is made on a **3 – meter** anechoic chamber.. 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 spectrum is examined from 27 MHz to 1000 MHz measured by HP spectrum.

The whole range Antenna is used to measure frequency from 27 MHz to 1GHz. The final test is used the spectrum analyzer.

Measure more than six top marked frequencies generated from 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

<u>Instrument Name</u>	<u>Model No.</u>	<u>Brand</u>	<u>Serial No.</u>	<u>Calibration Date</u>	
				<u>Last time</u>	<u>Next time</u>
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
Bi-log Antenna	CBL6141A	Schaffner	4206	03/09/01	03/09/02
Switch/Control Unit	3488A	HP	N/A	11/20/00	11/20/01
(> 30MHz)					
Auto Switch Box	ASB-01	TRC	9904-01	11/20/00	11/20/01
(> 30MHz)					
Spectrum Analyzer	8564E	HP	US36433002	08/01/01	08/01/02
Microwave Preamplifier	83051A	HP	3232A00347	08/01/01	08/01/02
Horn Antenna	3115	EMCO	9704 – 5178	08/01/01	08/01/02
Anechoic Chamber (cable calibrated together)				05/20/01	05/20/02

The level of confidence of 95% , the uncertainty of measurement of radiated emission is ± 4.96 dB .

Radiated Test Placement: (Photographs)



Peak Power Measurement of Fundamental Frequency

Test Setup

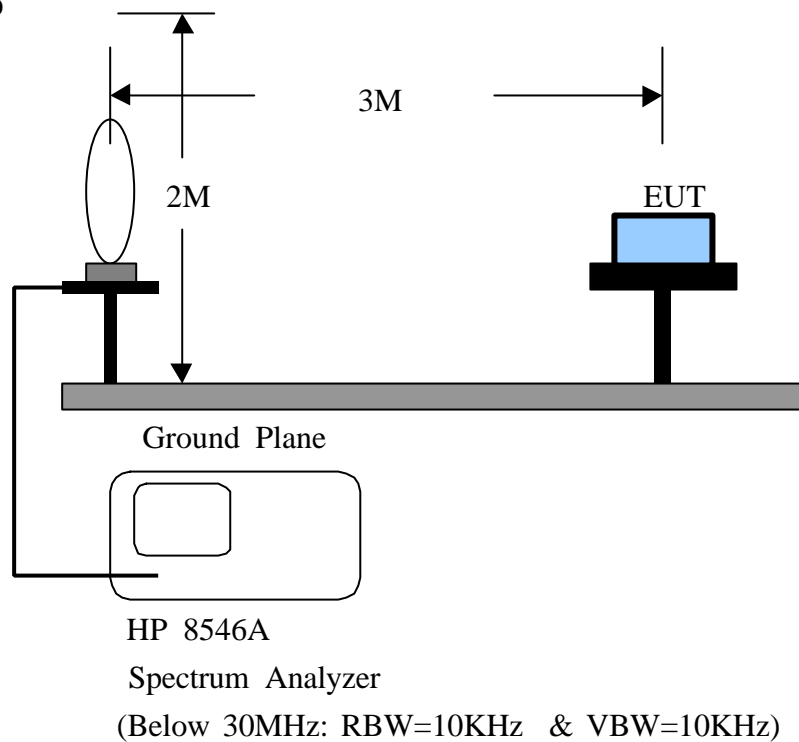


Figure 1

Test Procedure

- Set the Loop ANT. height 1m. ,Vertical ,and rotate the ANT to find the azimuth of the highest emission and record the reading.
- Keep the ANT. azimuth and turn the EUT 360 degree and record the highest emission.
- Raise the ANT to 2 meters and repeat set a and b.
- Change the ANT Horizontal and repeat a to c.
- Record the most highest reading in test report.

List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
Active Loop Antenna	6502	EMCO	2777	07/20/01	07/20/02

Test Result : Pass (Appendix A)

Appendix A

Harmonic and Spurious Emission Test Result: (Horizontal)

Test Conditions:

Testing room : Temperature : 26 ° C Humidity : 73 % RH
 Testing site : Temperature : 31 ° C Humidity : 75 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
54.084	6.41	2.43	9	-13.56	19.97	40.00	-20.03
81.147	14.33	3.91	96	-10.23	24.56	40.00	-15.44
270.481	17.68	1.00	44	-15.51	33.19	46.00	-12.81
297.459	17.39	1.00	112	-16.25	33.64	46.00	-12.36
324.586	13.05	1.00	139	-17.22	30.27	46.00	-15.73
513.916	6.02	2.44	76	-21.16	27.18	46.00	-18.82

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)

Harmonic and Spurious Emission Test Result: (Vertical)

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
54.083	9.91	1.00	125	-13.33	23.24	40.00	-16.76
81.147	12.73	1.00	122	-9.89	22.62	40.00	-17.38
135.244	10.22	1.00	78	-14.02	24.24	43.50	-19.26
270.416	15.71	2.43	126	-15.94	31.65	46.00	-14.35
297.532	14.34	2.43	22	-17.21	31.55	46.00	-14.45
513.918	4.32	1.00	68	-22.15	26.47	46.00	-19.53

Fundamental Emission Test Result: (CH 1)

Frequency: 27.045 MHz					
Antenna Polarity	Reading Amplitude	Correction Factors	Corrected Amplitude	Limit	Margin
	dBμV	dB/m	dBμV/m	dBμV/m	dB
Horizontal	53.44	-13.00	66.44	80	-13.56

Horizontal > Vertical

Correction Factors = Antenna factors + Cable loss - Amplifier

Corrected Amplitude = Reading Amplitude - Correction Factors

Margin = Corrected Amplitude - Limited

Fundamental Emission Test Result: (CH 2)

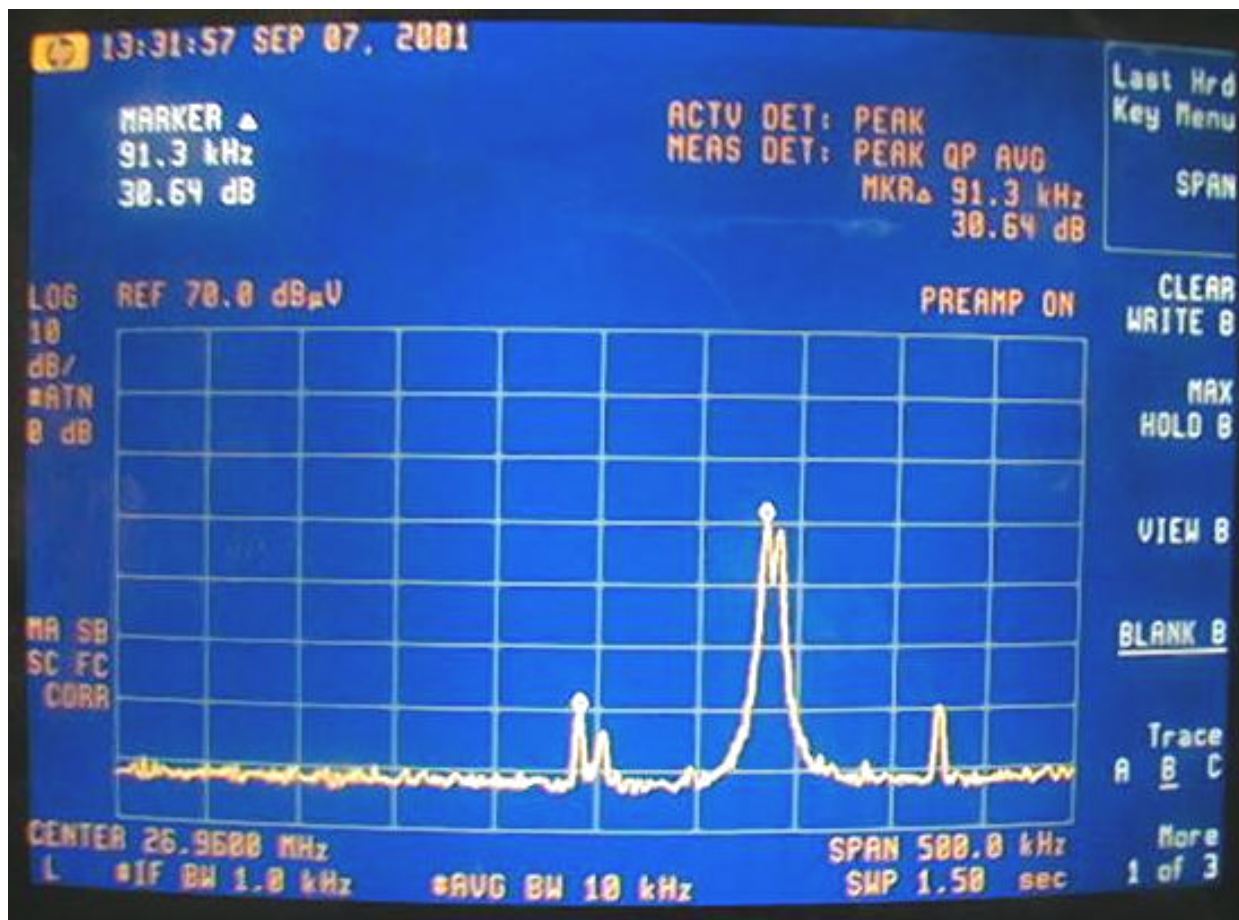
<i>Frequency: 27.095 MHz</i>					
Antenna Polarity	Reading Amplitude	Correction Factors	Corrected Amplitude	Limit	Margin
	dBμV	dB/m	dBμV/m	dBμV/m	dB
Horizontal	54.34	-13.00	67.34	80	-12.66

Horizontal > Vertical

Appendix B

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

Channel 1



Channel 2

