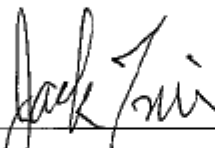



Report No.	C3115661
Specifications	FCC Part 15, Class B
Test Method	ANSI C63.4 1992
Applicant address	16F, No. 150, Chen I Road, 235 Chung Ho City, Taipei Hsien, Taiwan, R.O.C.
Applicant	Chic Technology Corp.
Items tested	Mini Wireless Optical Mouse
Model No.	1450U-P (Sample#C31661, Tx)
Results	Compliance (As detailed within this report)
Date	09/27/2001 (month / day / year) (Sample received) 11/29/2001 (month / day / year) (Test)
Prepared by	 Project Engineer
Authorized by	 General Manager (Frank Tsai)
Issue date	November 30, 2001 (month / day / year)
Modifications	None
Tested by	Training Research Co., Ltd.
Office at	2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan
Chamber at	2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan

Conditions of issue :

- (1) 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.
- (2) This report must not be used by the client to claim product endorsement by NVLAP or any agency of U.S. Government.

★ NVLAP LAB CODE: 200174-0

★ FCC ID: IOW1450U-P

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Chapter 1 Introduction

Description of EUT

EUT	:	Mini Wireless Optical Mouse
Model No.	:	1450U-P
FCC ID	:	IOW1450U-P
Frequency Range	:	26.96 – 27.28 MHz
Operating Frequency	:	27.045 – 27.095 MHz 27.095MHz (channel 1) / 27.045 MHz (channel 2)
Power Type	:	Powered by [1] Computer (USB or PS/2 interface) [2] 2.4V/500mA batteries [3] AC to DC Adaptor, I/P: 120V/60Hz, O/P: 6VDC/200mA

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 (charging and transmitted).

While testing, the EUT set in Ch2 (27.045MHz) and continuously transmitting and charging mode, which transmitted the maximum emission.

During the measurement, there are four modes tested: “single mouse transmitting (power by batteries)” mode, “transmitting and charging (power by adaptor)” mode, “transmitting and charging (power by USB interface of PC)” mode, and “transmitting and charging (power by PS/2 interface of PC)” mode. The pretest was found out that the testing mode: “transmitting and charging (power by adaptor)” was the worst case.

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.)

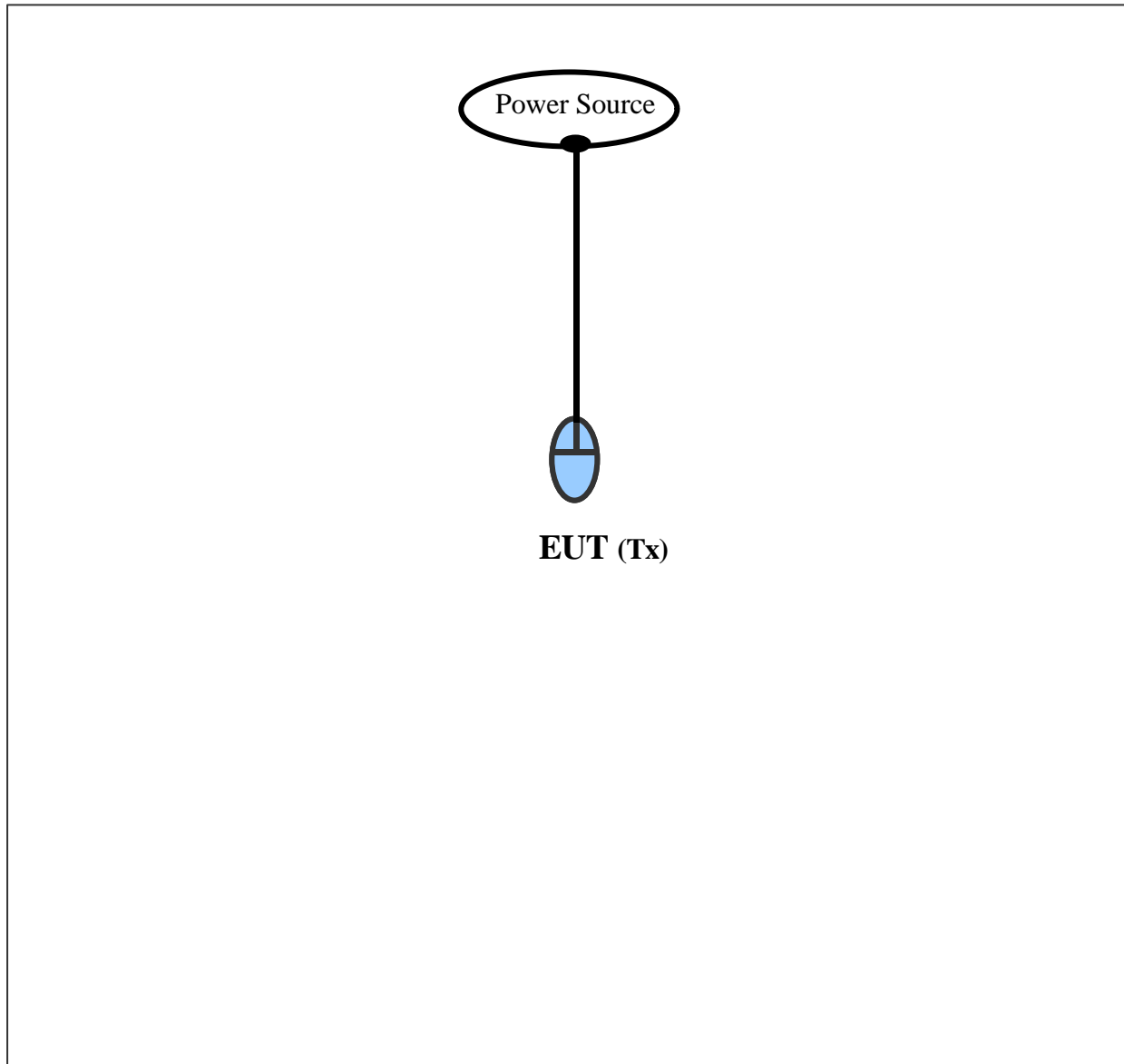
The testing configuration of test setup is showing in the next page.

Configuration of test setup (Power by batteries)

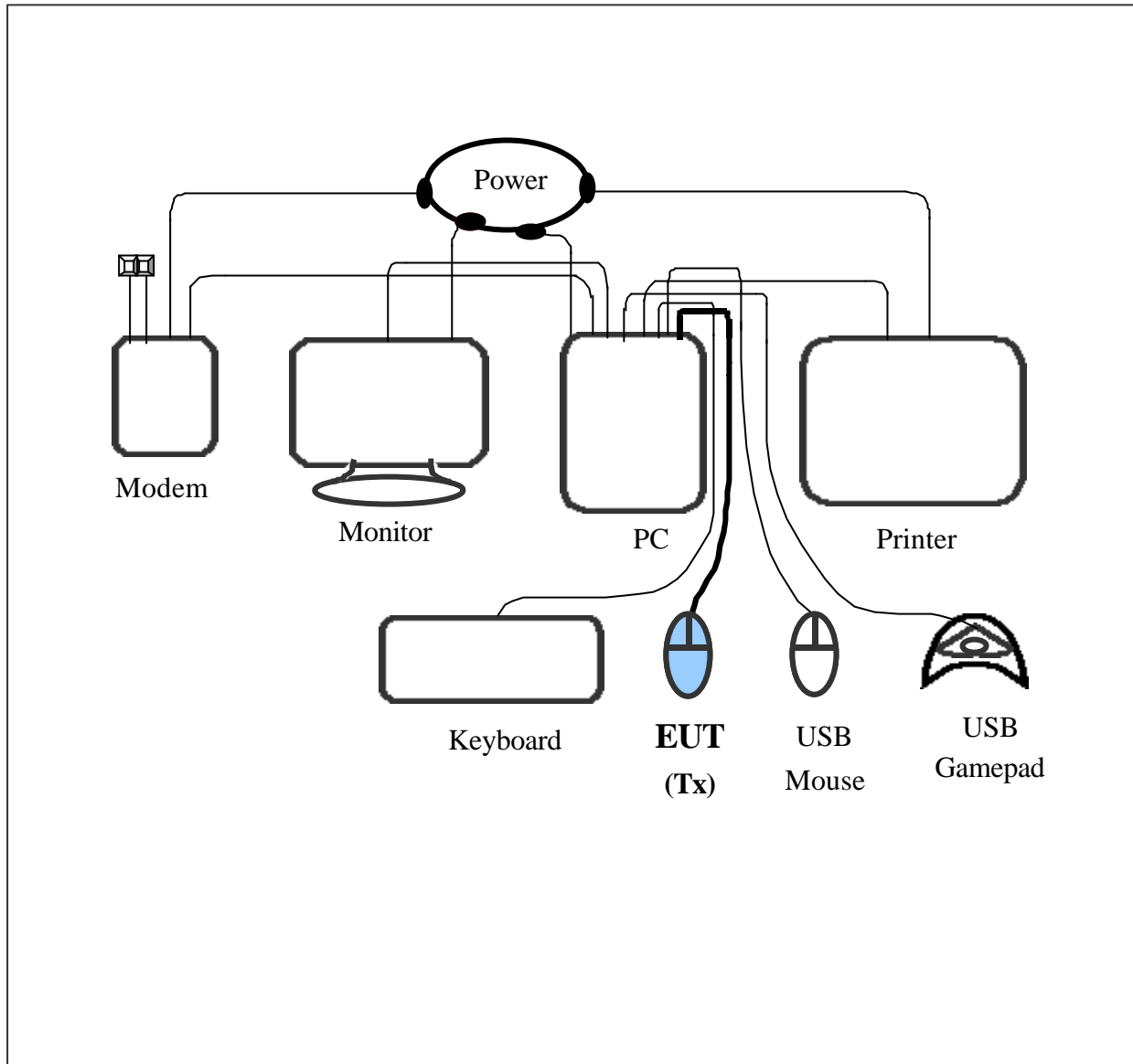


EUT (Tx)

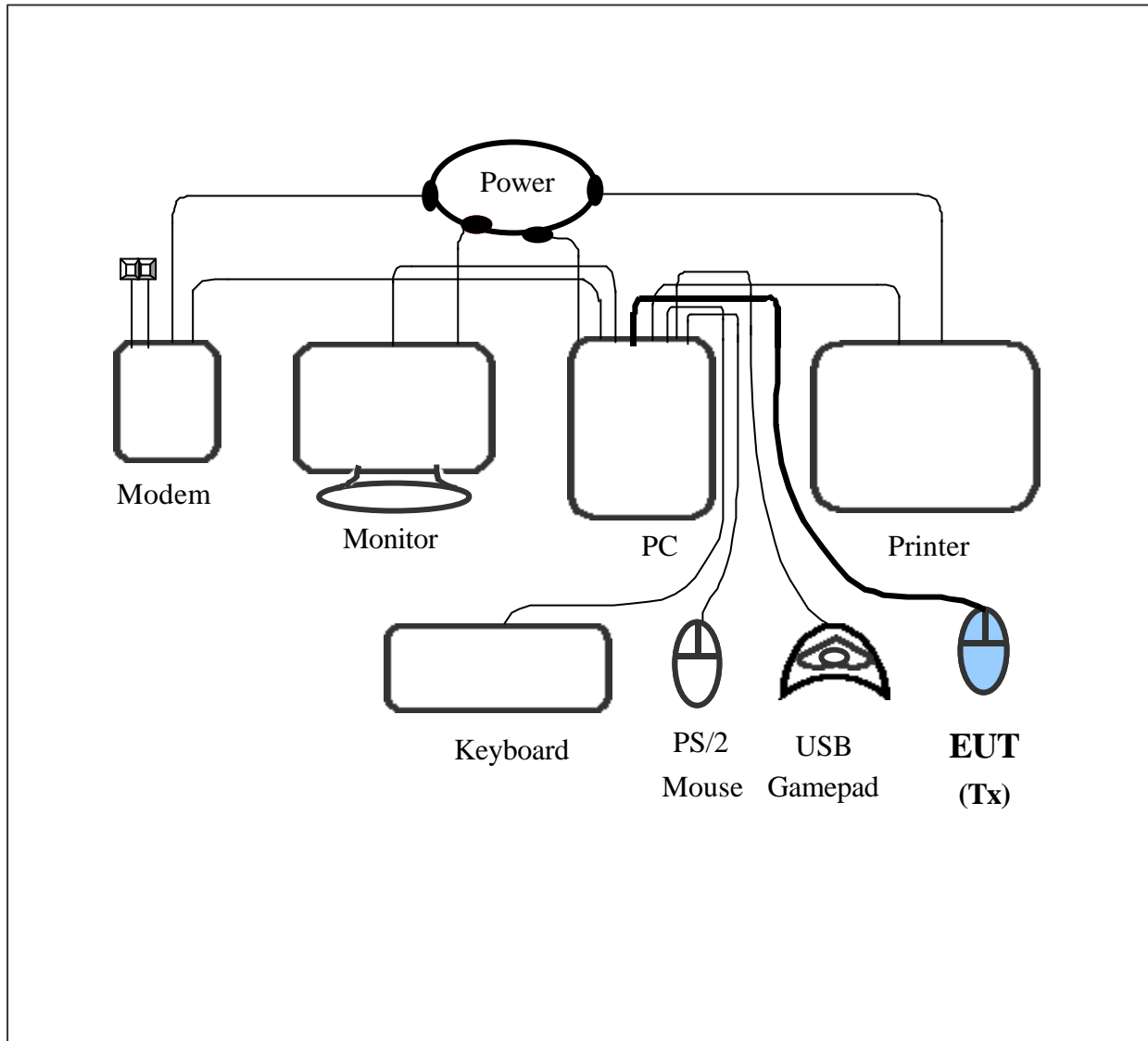
Configuration of test setup (Power by Adaptor)



Configuration of test setup (Power by PS/2 interface of PC)



Configuration of test setup (Power by USB interface of PC)



Connections of Support Equipment

PC:

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

Connections of EUT

Power by Batteries:

- *Put 2.4V/500mA batteries into the battery cell of EUT, powers the subject device. The EUT does not be connected with any product.

Power by Adaptor:

- *Power adaptor
 - M/N: RGD-3506003; I/P: 120V/60Hz; O/P: 6VDC/200mA
- *Power cable of adaptor
 - 187cm long, non-shielded, no ferrite bead

Power by USB interface of PC:

- *Data cable
 - 148cm long, shielded, no ferrite bead

Power by PS/2 interface of PC (via USB to PS/2 adaptor):

- *Data cable
 - 148cm long, shielded, no ferrite bead

List of Support Equipment

PC : HP Brio 85xx 6/350
Model No. : D6928A
Serial No. : SG91801552
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. : KR91379759
FCC ID : C5F7NFCMC1518X
檢磁 : 3872B039
Power type : 110 ~ 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. : MR81008879
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. : LZB90910464
FCC ID : DZL211029
檢磁 : 4862A011
Power type : By PC
Power cord : Non-shielded, 1.88m 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

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

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

GAMEPED : **Logitech**
Model No. : G-YA ARC2
FCC ID : N/A, Doc Approval
Power type : Powered by PC
Power Cable : Shielded, 3m long, No ferrite bead data cable

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	11/20/01	11/20/02
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	11/20/01	11/20/02

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

Test Result: Pass (Appendix A)

Conducted Test Placement: (Photographs, Power by adaptor)



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 27MHz to 1000MHz 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

Instrument Name	Model No.	Brand	Serial No.	<u>Calibration Date</u>	
				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
Bi-log Antenna	CBL6141A	Schaffner	4206	03/09/01	03/09/02
Switch/Control Unit	3488A	HP	N/A	11/20/01	11/20/02
(> 30MHz)					
Auto Switch Box	ASB-01	TRC	9904-01	11/20/01	11/20/02
(> 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 .

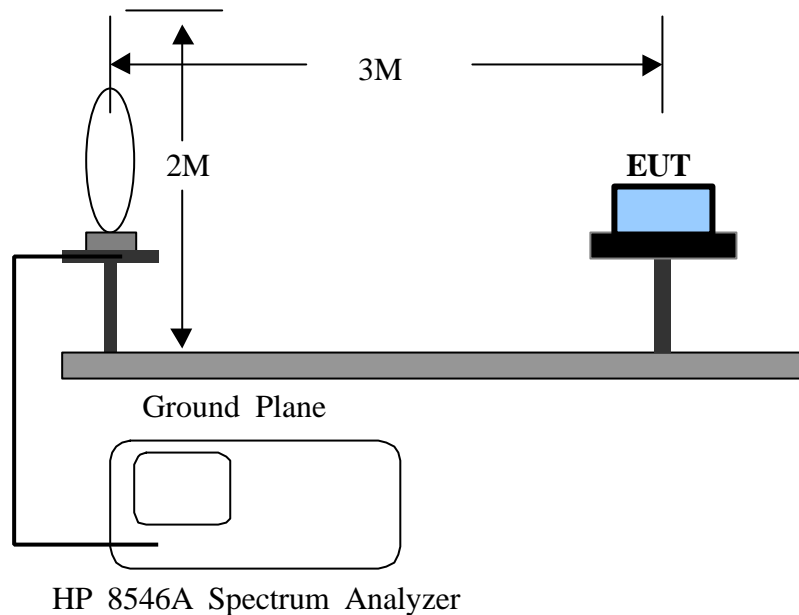
Test Result : Pass (Appendix B)

Radiated Test Placement: (Photographs)



Peak Power Measurement of Fundamental Frequency

Test Setup



(Below 30MHz: RBW=10KHz & VBW=10KHz, Detector mode: Average.)

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 C)

Appendix A

Conducted Emission Test Result

Testing room : Temperature : 24 ° C Humidity : 72 % RH

Line 1

<i>Frequency (kHz)</i>	<i>READING AMPLITUDE</i>			<i>LIMIT</i>		<i>Margin (dB)</i>
	<i>Peak (dBmV)</i>	<i>Quasi-Peak (dBmV)</i>	<i>Average (dBmV)</i>	<i>Quasi-Peak (dBmV)</i>	<i>Average (dBmV)</i>	
624.00	35.41	---	---	48.00	---	-12.59
729.00	37.65	---	---	48.00	---	-10.35
833.00	35.23	---	---	48.00	---	-12.77
1077.00	33.12	---	---	48.00	---	-14.88
1249.00	33.02	---	---	48.00	---	-14.98
24120.00	42.29	---	---	48.00	---	-5.71

Line 2

<i>Frequency (kHz)</i>	<i>READING AMPLITUDE</i>			<i>LIMIT</i>		<i>Margin (dB)</i>
	<i>Peak (dBmV)</i>	<i>Quasi-Peak (dBmV)</i>	<i>Average (dBmV)</i>	<i>Quasi-Peak (dBmV)</i>	<i>Average (dBmV)</i>	
624.00	38.10	---	---	48.00	---	-9.90
729.00	38.11	---	---	48.00	---	-9.89
833.00	34.07	---	---	48.00	---	-13.93
1077.00	33.51	---	---	48.00	---	-14.49
1769.00	34.52	---	---	48.00	---	-13.48
1882.00	34.35	---	---	48.00	---	-13.65
24120.00	44.65	---	---	48.00	---	-3.35

****The reading amplitudes are all under limit.***

Appendix B

Harmonic and Spurious Emission Test Result: (Horizontal)

Test Conditions:

Testing room : Temperature : 26 ° C Humidity : 64 % RH
 Testing site : Temperature : 25 ° C Humidity : 54 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class B Limit	Margin
MHz	dBμV/m	m	degree	dB/m	dBμV/m	dBμV/m	dB
108.170	53.60	4.00	249	-13.66	39.94	43.50	-3.56
135.220	44.60	2.56	259	-11.88	32.72	43.50	-10.78
162.290	47.20	1.00	86	-10.75	36.45	43.50	-7.05
216.350	51.00	1.00	266	-13.43	37.57	46.00	-8.43
243.440	56.60	1.00	52	-11.73	44.87	46.00	-1.13
270.490	55.80	1.00	44	-10.39	45.41	46.00	-0.59
297.530	54.60	1.00	274	-9.05	45.55	46.00	-0.45

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	m	degree	dB/m	dBμV/m	dBμV/m	dB
54.100	46.90	1.00	125	-13.82	33.08	40.00	-6.92
135.270	42.70	1.00	291	-11.87	30.83	43.50	-12.67
162.290	53.80	1.00	164	-10.75	43.05	43.50	-0.45
243.373	56.10	1.00	70	-11.73	44.37	46.00	-1.63
270.490	49.80	1.00	98	-10.39	39.41	46.00	-6.59
297.470	51.50	1.00	206	-9.05	42.45	46.00	-3.55
324.500	40.70	1.00	121	-8.29	32.41	46.00	-13.59

Appendix C

Fundamental Emission Test Result: (CH 1)

<i>Frequency: 27.095 MHz</i>					
Antenna Polarity	Reading Amplitude	Correction Factors	Corrected Amplitude	Limit	Margin
	dBμV/m	dB	dBμV/m	dBμV/m	dB
Horizontal	36.98	-13.00	49.98	80.00	-30.02
Vertical	35.05	-13.00	48.05	80.00	-31.95

Fundamental Emission Test Result: (CH 2)

<i>Frequency: 27.045 MHz</i>					
Antenna Polarity	Reading Amplitude	Correction Factors	Corrected Amplitude	Limit	Margin
	dBμV/m	dB	dBμV/m	dBμV/m	dB
Horizontal	36.66	-13.00	49.66	80.00	-30.34
Vertical	35.69	-13.00	48.69	80.00	-31.31

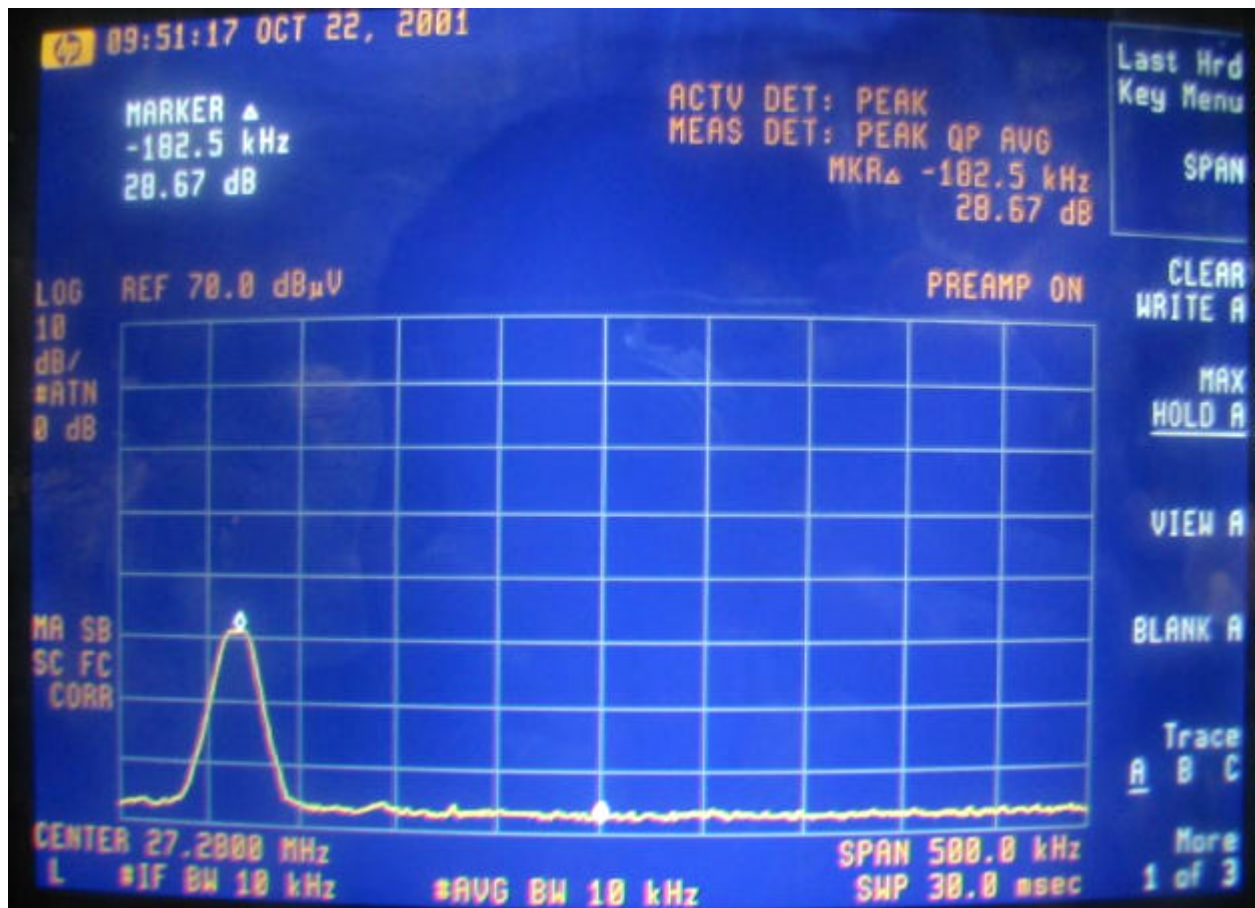
Note:

1. Correction Factors = Antenna factors + Cable loss - Amplifier
2. Corrected Amplitude = Reading Amplitude - Correction Factors
3. Margin = Corrected Amplitude - Limited

Appendix D

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

Channel 1 (27.095MHz)



Channel 2 (27.045MHz)

