Report No.	C3115299
Specifications Test Method	FCC Part 15, Class B ANSI C63.4 1992
Applicant address	10100 Pioneer Blvd., Suite 100 Santa Fe Springs, CA90670, USA
Applicant	Memtek Products, Inc.
Items tested Model No.	Wireless Optical Mouse MX4350RF (Sample # C31299T)
Results Date	**Compliance** (As detailed within this report) 06/18/2001 (month / day / year) (Sample received) 06/20/2001 (month / day / year) (Test)
Prepared by	Project Engineer
Authorized by	General Manager (Frank Tsai)
Issue date	*July 25, 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.***

★ ***FCC ID: PSJMX4350RF***

Contents

Chapter 1 Introduction

Chapter 2 Conducted Emission Test

Chapter 3 Radiated Emission Test

Appendix A :

Appendix B :

Appendix C :

Chapter 1 Introduction

Description of EUT:

EUT	**:**	Wireless Optical Mouse
Model No.	**:**	MX4350RF
FCC ID	**:**	PSJMX4350RF
Frequency Range	**:**	27.03 – 27.10 MHz
Power Type	**:**	Powered by two 1.2VDC 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.

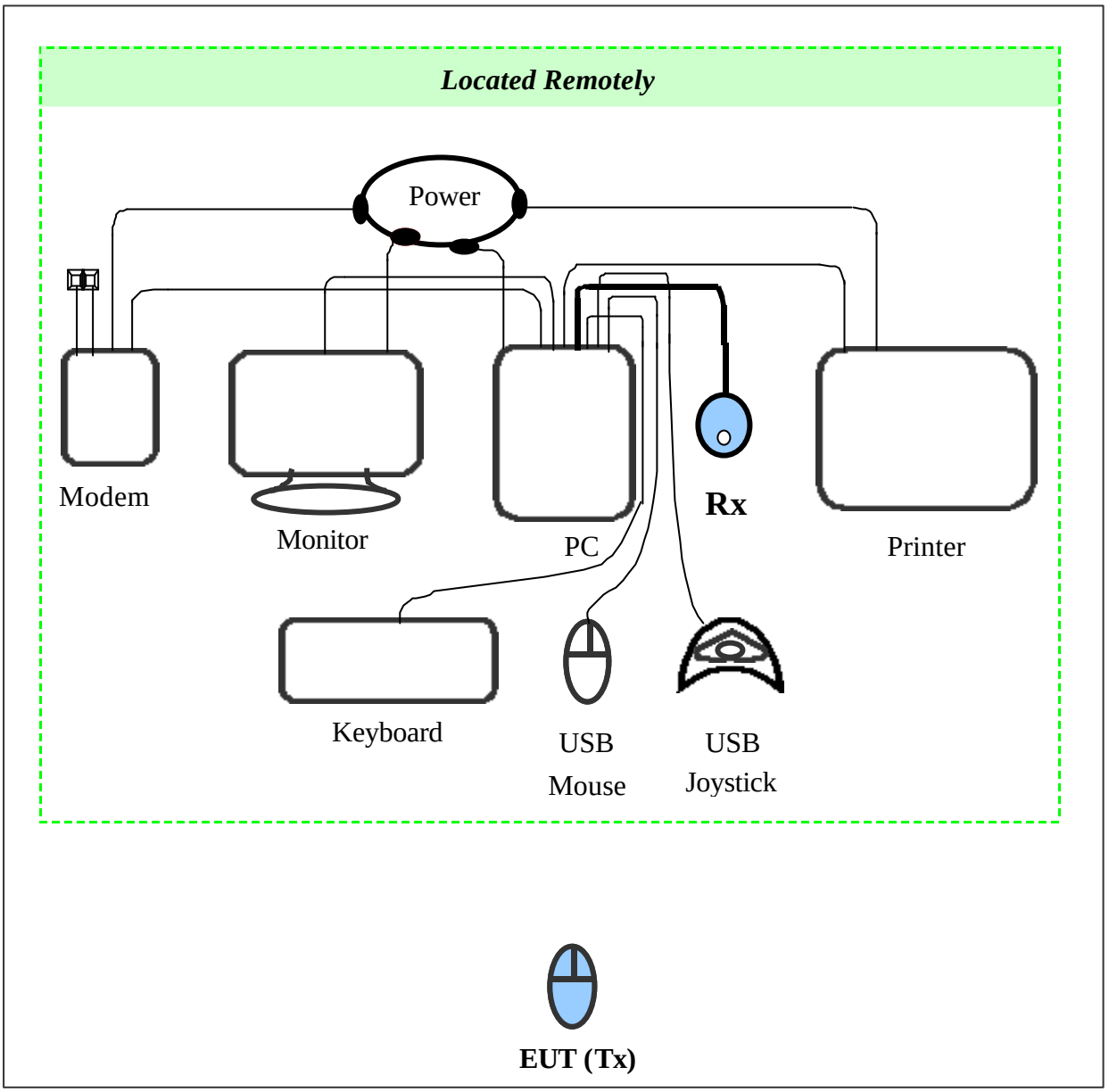
Pretest was found that the emission of operating mode is worse than standby (charging) mode. So, The final test is made at the operating mode.

While testing, the EUT was made to transmit continuously, 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 (Operating mode)

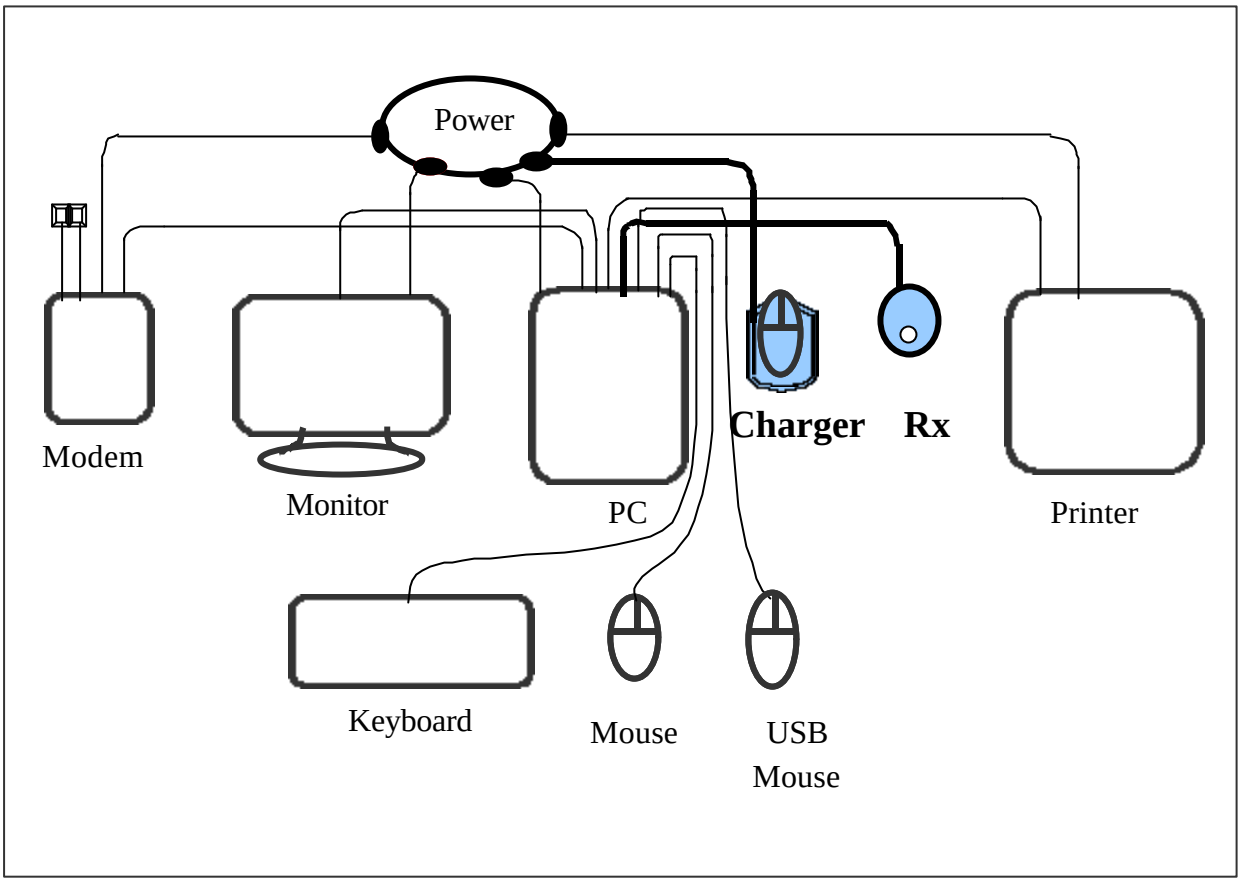


Connections:

EUT:

Put two AAA size, 1.2V batteries into the battery cell of EUT, powers the subject device. The EUT does not be connected with any product.

Configuration of Test Setup (Charging mode)



Connections:

Charger:

*Power Jack --- connected with a power adapter that the power cable is 1.85m long, non-shielded, no ferrite bead

EUT:

*Put two AAA size, 1.2V batteries into the battery cell of EUT.

*Put EUT into the charging slot of receiver

List of Support Equipment

Conducted (Radiated) test:

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.	:	D2832A
Serial No.	:	KR91379759
FCC ID	:	N/A, Doc Approved
檢磁	:	4872A167
Power type	:	100 ~ 240 VAC / 50 ~ 60 Hz, Switching
Power cord	:	Shielded, 1.80m long, No ferrite core
Data cable	:	Shielded, 1.50m long, with two ferrite cores

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

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

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

Receiver	**:**	**Memtek Products, Inc.**
Model No.	:	MX4350RF
Serial No.	:	N/A
FCC ID	:	N/A, Doc Approval
Power type	:	Powered by PC
Data Cable	:	Shielded, 1.45m long, No ferrite bead

Charger	**:**	**Memtek Products, Inc.**
Model No.	:	MX4350RF
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:

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	10/01/00	10/01/01
RF Filter Section	85460A	H P	3448A00217	10/01/00	10/01/01
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: Pass (Appendix A)

Conducted Test Placement: (Photographs, Charging Mode)

Chapter 3 Radiated Emission Test

Test Condition and Setup:

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 form 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 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
EMI Receiver	8546A	H P	3520A00242	10/01/00	10/01/01
RF Filter Section	85460A	H P	3448A00217	10/01/00	10/01/01
Bi-log Antenna	VULB 9160	M.E.	3064	07/13/01	07/13/02
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
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, Operating Mode)

Appendix A

Conducted Emission Test Result: (Charging Mode)

Testing room : Temperature : 23 ° C Humidity : 67 % RH

Line 1

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBmV/m)	*Quasi-Peak (dBmV/m)*	*Average (dBmV/m)*	*Quasi-Peak (dBmV/m)*	*Average (dBmV/m)*	
530.00	32.88	***.**	***.**	48.00	***.**	-15.12
560.00	33.28	***.**	***.**	48.00	***.**	-14.72
590.00	36.69	***.**	***.**	48.00	***.**	-11.31
620.00	29.45	***.**	***.**	48.00	***.**	-18.55
637.00	37.59	***.**	***.**	48.00	***.**	-10.41
663.00	32.98	***.**	***.**	48.00	***.**	-15.02
684.00	32.35	***.**	***.**	48.00	***.**	-15.65
701.00	31.65	***.**	***.**	48.00	***.**	-16.35
739.00	31.75	***.**	***.**	48.00	***.**	-16.25
823.00	30.06	***.**	***.**	48.00	***.**	-17.94

Line 2

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBmV/m)	*Quasi-Peak (dBmV/m)*	*Average (dBmV/m)*	*Quasi-Peak (dBmV/m)*	*Average (dBmV/m)*	
542.00	29.85	***.**	***.**	48.00	***.**	-18.15
560.00	29.50	***.**	***.**	48.00	***.**	-18.50
586.00	35.75	***.**	***.**	48.00	***.**	-12.25
604.00	32.37	***.**	***.**	48.00	***.**	-15.63
624.00	32.24	***.**	***.**	48.00	***.**	-15.76
650.00	33.15	***.**	***.**	48.00	***.**	-14.85
667.00	30.81	***.**	***.**	48.00	***.**	-17.19
697.00	29.75	***.**	***.**	48.00	***.**	-18.25
714.00	30.37	***.**	***.**	48.00	***.**	-17.63
739.00	29.24	***.**	***.**	48.00	***.**	-18.76

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

Appendix B

Radiated Emission Test Result: (Horizontal) (Operating Mode)

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
54.197	16.82	2.42	2	-13.51	30.33	40.00	-9.67
243.884	24.67	1.00	72	-15.28	39.95	46.00	-6.05
270.920	22.01	1.00	4	-15.51	37.52	46.00	-8.48
433.565	22.11	2.42	68	-19.95	42.06	46.00	-3.94
460.664	22.84	2.42	10	-20.71	43.55	46.00	-2.45
921.330	4.97	1.00	28	-27.88	32.85	46.00	-13.15
***							

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)

Radiated Emission Test Result: (Vertical) (Operating Mode)

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
54.186	12.97	1.00	144	-13.29	26.26	40.00	-13.74
243.883	18.92	1.00	154	-15.26	34.18	46.00	-11.82
270.920	12.42	2.43	101	-15.95	28.37	46.00	-17.63
406.470	17.18	2.44	14	-19.56	36.74	46.00	-9.26
460.664	16.30	2.43	88	-21.10	37.40	46.00	-8.60
487.762	11.20	2.44	140	-21.62	32.82	46.00	-13.18
***							

Radiated Emission Test Result:

Frequency: 27.03 MHz (CH 1)					
Antenna Polarity	**Reading Amplitude**	**Correction Factors**	**Corrected Amplitude**	**Limit**	**Margin**
	dBμV	dB/m	dBμV/m	dBμV/m	dB
Horizontal	15.13	-25.23	40.36	80	-39.64

Horizontal > Vertical

Radiated Emission Test Result:

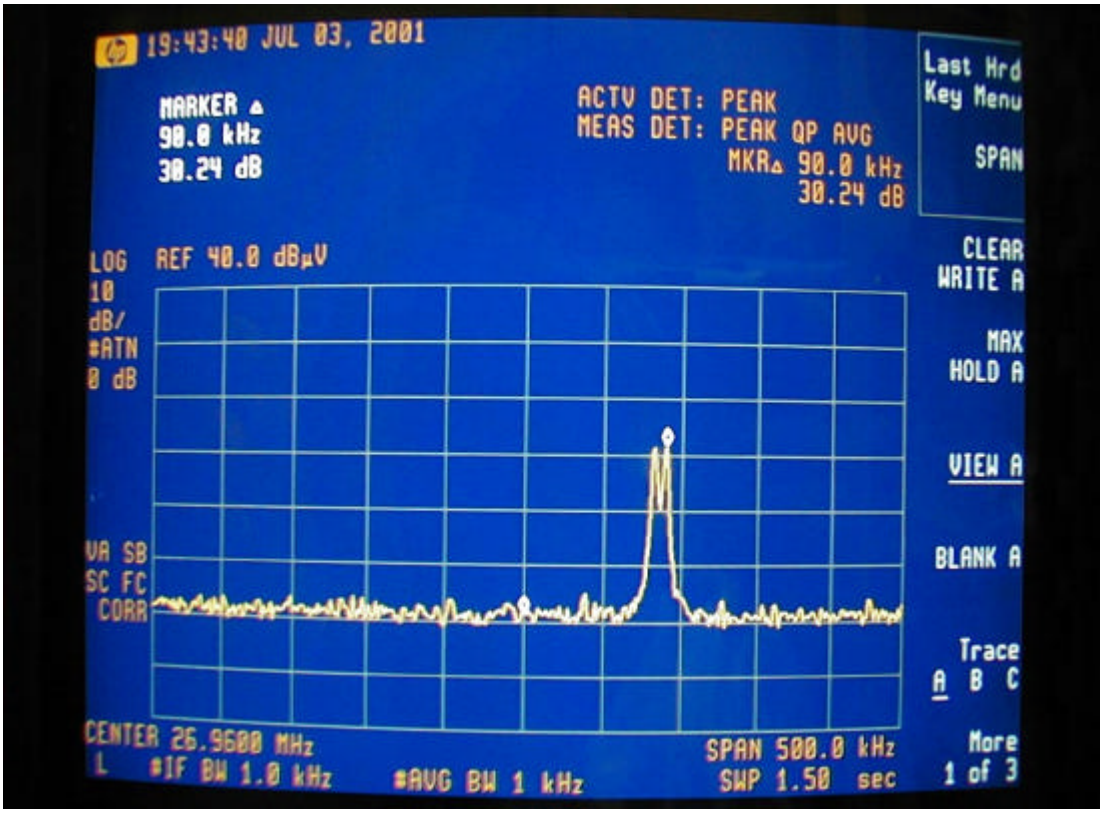
Frequency: 27.10 MHz (CH 2)					
Antenna Polarity	**Reading Amplitude**	**Correction Factors**	**Corrected Amplitude**	**Limit**	**Margin**
	dBμV	dB/m	dBμV/m	dBμV/m	dB
Vertical	15.32	-25.23	40.55	80	-39.45

Horizontal < Vertical

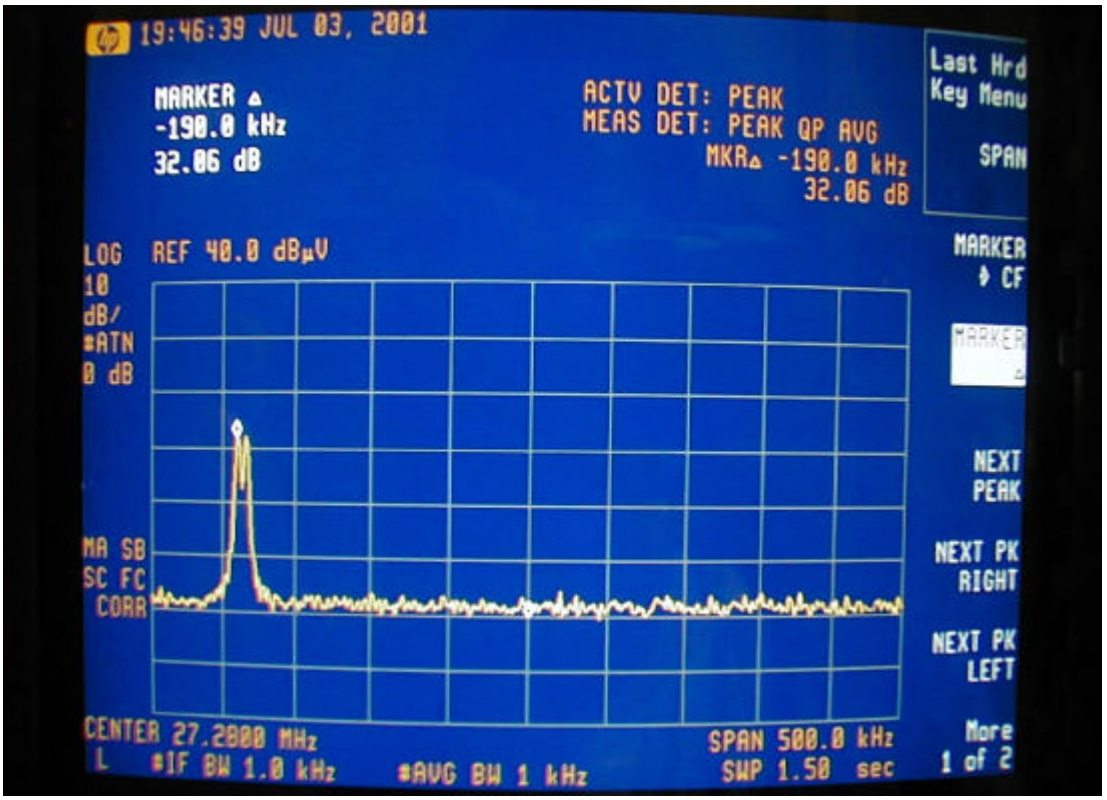
Appendix C

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

Channel 1



Channel 2


19:46:39 JUL 03, 2001
MARKER Δ
-190.0 kHz
32.06 dB
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKRΔ -190.0 kHz
32.06 dB
Last Hrd Key Menu
SPAN
LOG
10
dB/
#ATN
0 dB
REF 40.0 dBµV
MARKER → CF
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
MA SB
SC FC
CORR
CENTER 27.2000 MHz
#IF BW 1.0 kHz
#AVG BW 1 kHz
SPAN 500.0 kHz
SWP 1.50 sec