

FCC CERTIFICATION RADIO MEASUREMENT TECHNICAL REPORT

On Model Name: Laser Presenter Mouse

Model Number : LPM1

Trademark : **INFINITER[®]**

FCC ID : UMUS751433LPM1

Prepared for Suzhou Optical Maser Technology Inc.

According to FCC Part 15 (2006), Subpart C

Test Report #: SUZ-0610-5808-FCC

Prepared by: *Chris Huang*

Reviewed by: *Harry Zhao*

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Test Report Released by: *Paul J. Chen*

Paul Chen

2006, November 30

Date

Test Location

Tests performed at EMC Compliance Management Group (China) in a Certified ANSI Semi-Anechoic Chamber and Shielded Room performed testing.

Test Site Location:

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86-510-85140037

Registration Number:

399439

Accreditation Bodies

EMC Compliance Management Group is a fully accredited Test Laboratory for ITE, ISM and Telecommunications Products.



In compliance with the site registration requirements of Section 2.948 of the FCC Rules to perform EMI measurements for the general public.



Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code # 200068-0.

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Opinions and Interpretations

This test report relates to the abovementioned equipment under test (EUT). Without the permission of EMC Compliance Management Group Test Lab this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products. The manufacturer has sole responsibility of continued compliance of the device.

Statement of Measurement Uncertainty

The data and results referenced in the document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error. Furthermore, component and process variability of devices similar to that tested may result in additional deviation.

Administrative Data

Test Sample : *Laser Presenter Mouse*

Model Number : *LPM1*

Trade Mark : **INFINITER®**

Date Tested : *2006, October 27 & November 6 & November 29*

Applicant : *Suzhou Optical Maser Technology Inc.
No.5 NEW&HI-TECH. EXPORT PROCESSING
ZONE, SUZHOU CITY, JIANGSU, PRC*

Telephone : *86-512-66724188*

Fax : *86-512-66724288*

Manufacturer : *Suzhou Optical Maser Technology Inc.
No.5 NEW&HI-TECH. EXPORT PROCESSING
ZONE, SUZHOU CITY, JIANGSU, PRC*

EUT Description

Suzhou Optical Maser Technology Inc. Model number LPM1 (referred to as the EUT in this report) is a Laser Presenter Mouse.

The EUT is consisted of a transmitter and a receiver. The transmitter is powered by two AAA batteries and the receiver is powered by USB port of PC. The transmitter is a mouse. When the receiver is plugged in the USB port of PC, and communicated with the transmitter, we can remote control the PC. EUT has four control functions including keyboard, mouse, media player, timer. For detail information, please refer to the user manual.

EUT uses 2.4GHz band frequency, and has 18 channels. When the communication is set, transmitter will choose a channel (pseudo-random number list) to generate signal. Then it will keep working at this channel unless it is reset.

To set EUT to generate signal at specified channel, just press the button as showed in the picture below. Then the EUT will be set into the test mode.

For test mode, it can generate signal in all channels in sequence after a press of the button showed below.



Press this button to enter test mode

Test Summary

The Electromagnetic Compatibility requirements on model LPM1 for this test are stated below. All results listed in this report relate exclusively to this above-mentioned model as the Equipment Under Test. This report confers no approval or endorsement upon any other component, host or subsystem used in the test set-up.

EMC Test Items			
Reference FCC Part 15 (2006), Subpart C			
Specification	Description	Test Results	Remark
FCC Part 15.203	Antenna Requirement	Compliance	Integral Antenna
FCC Part 15.205	Restricted Band of Operation	Compliance	Attachment 1
FCC Part 15.107	Conducted Emission Limits for receiver	N/A	See Note #1
FCC Part 15.209	Radiated Emission Limits	Compliance	Attachment 1
FCC Part 15.249 (a)	Fundamental and Harmonics	Compliance	Attachment 2
FCC Part 15.249 (d)	Band Edge	Compliance	Attachment 3

Note #1: The receiver is operating above 960MHz, so test of receiver is omitted.

Test Mode Justification

The test modes (Lie, Side, Stand) were done for testing.

Note: Lie mode means let EUT put flat, only in this mode the mouse function can be used.

Side mode means let EUT put side;

Stand mode means let EUT stand up.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

EUT Exercise Software

The EUT doesn't use software during test.

Equipment Modification

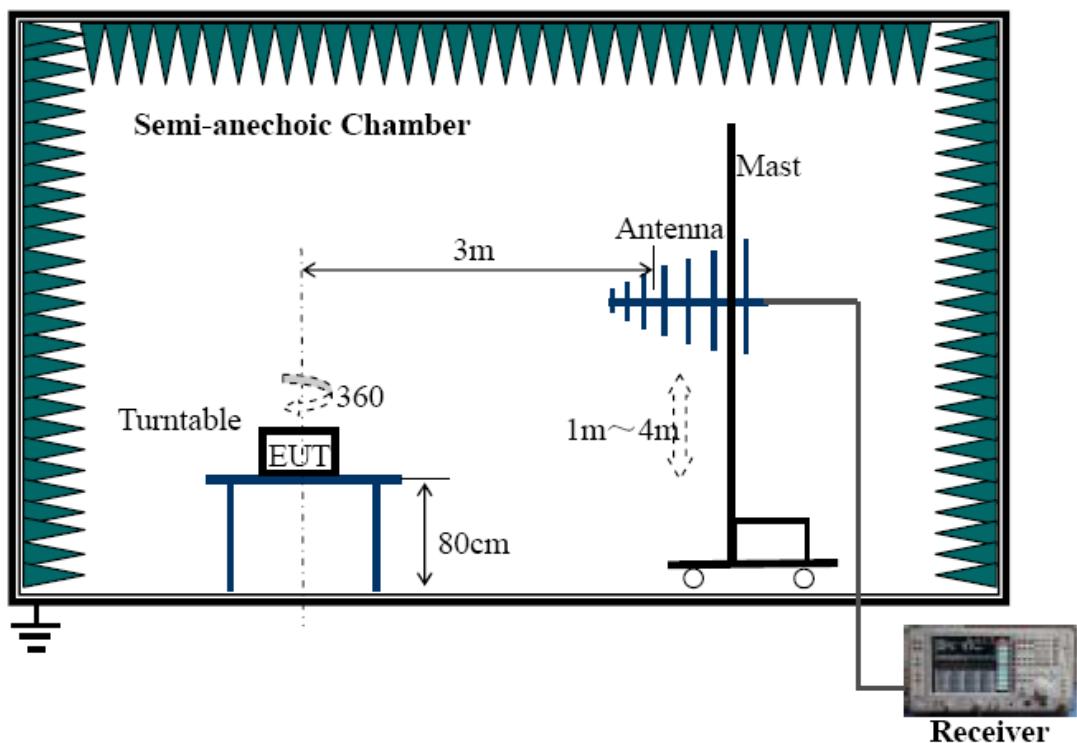
Any modifications installed previous to testing by Suzhou Optical Maser Technology Inc. will be incorporated in each production model sold or leased in United States.

There were no modifications installed by EMC Compliance Management Group (China) test personnel.

Test System Details

EUT				
Model Number:	LPM1			
Trademark:	INFINITER®			
Serial Number:	Engineering Sample			
Input Voltage:	120V~ 60Hz			
Description:	Laser Presenter Mouse			
Manufacturer:	Suzhou Optical Maser Technology Inc.			
Support Equipment				
Description	Model Number	Serial Number	Manufacturer	Power Cable Description (Meters)
PC	OPTIPLEX™ GX60SD	CN21003298	DELL	1.5m Unshielded
MONITOR	M782	CNS1382004	DELL	1.8m Unshielded
KEYBOARD	SK-8110	C4739-60101	DELL	N/A
MOUSE	M-S69	C4737-60001	DELL	N/A
Cable Description				
None				

Configuration of Tested System



EUT Sample Photos of LPM1



Front View



Rear View



Receiver Taken Out



Receiver Front View



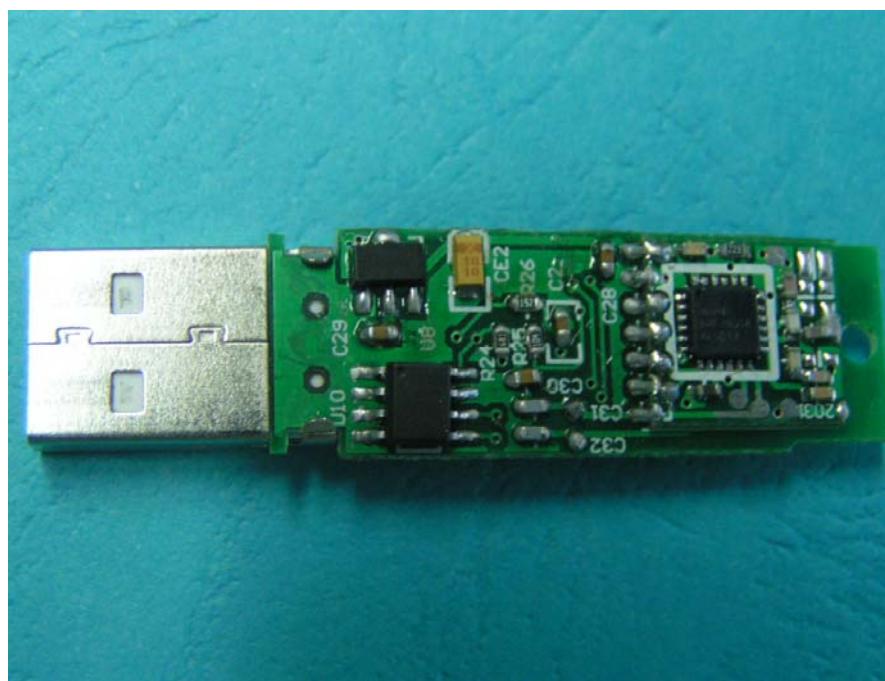
Receiver Rear View



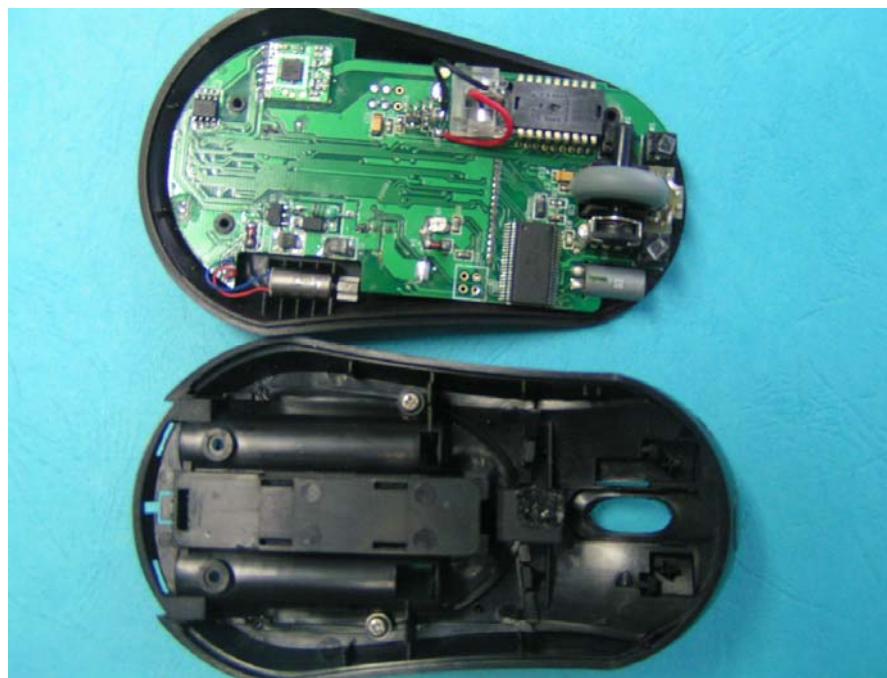
Receiver Uncovered View



Receiver - Main Board Front View



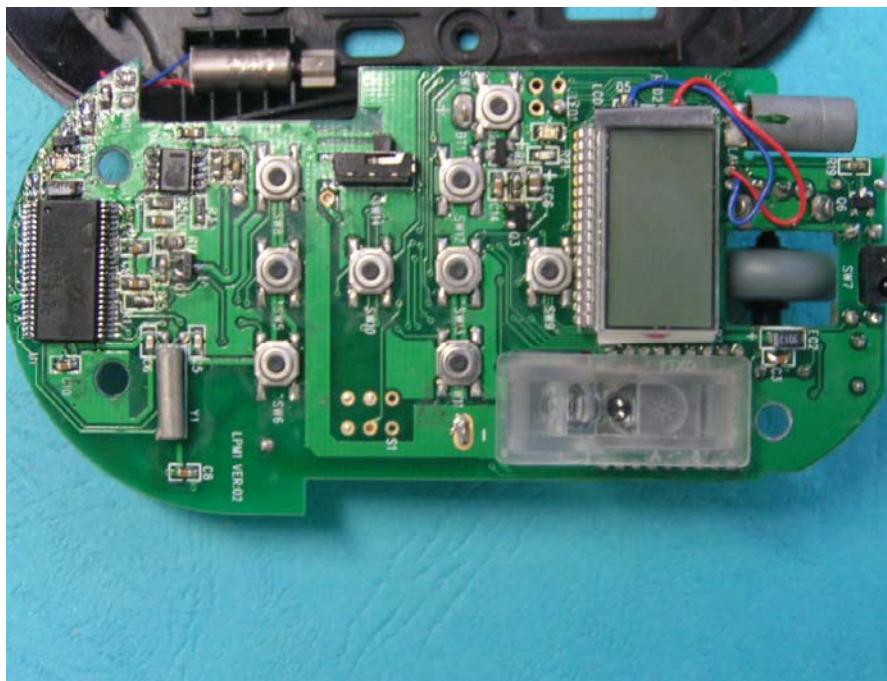
Receiver - Main Board Rear View



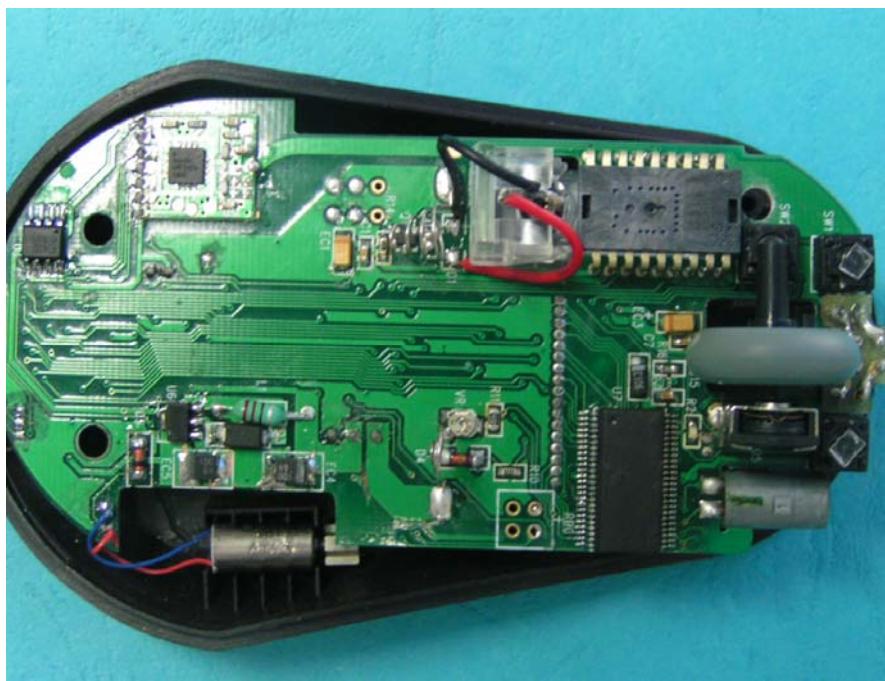
Transmitter - Uncovered View #1



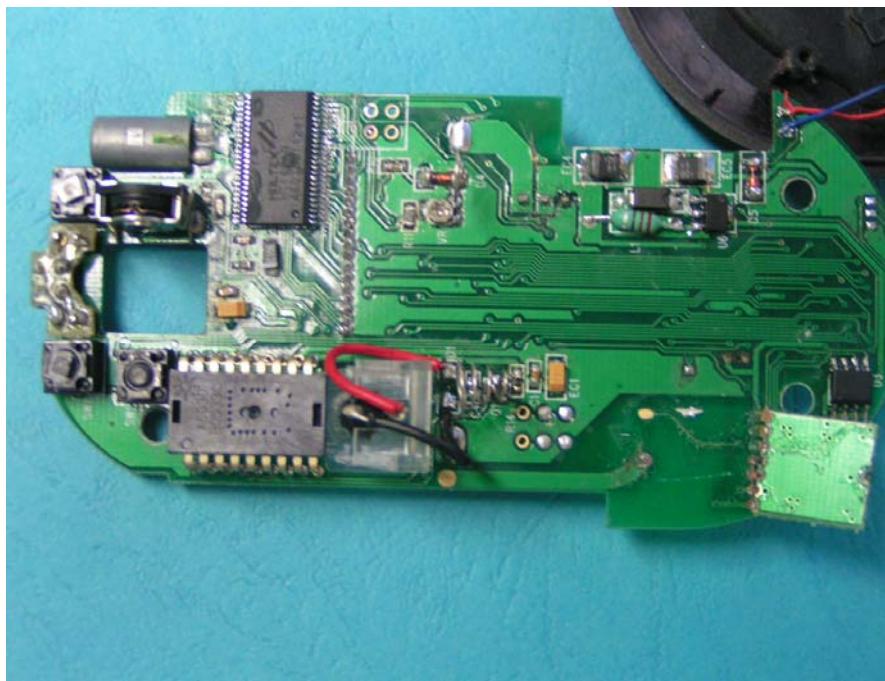
Transmitter - Uncovered View #2



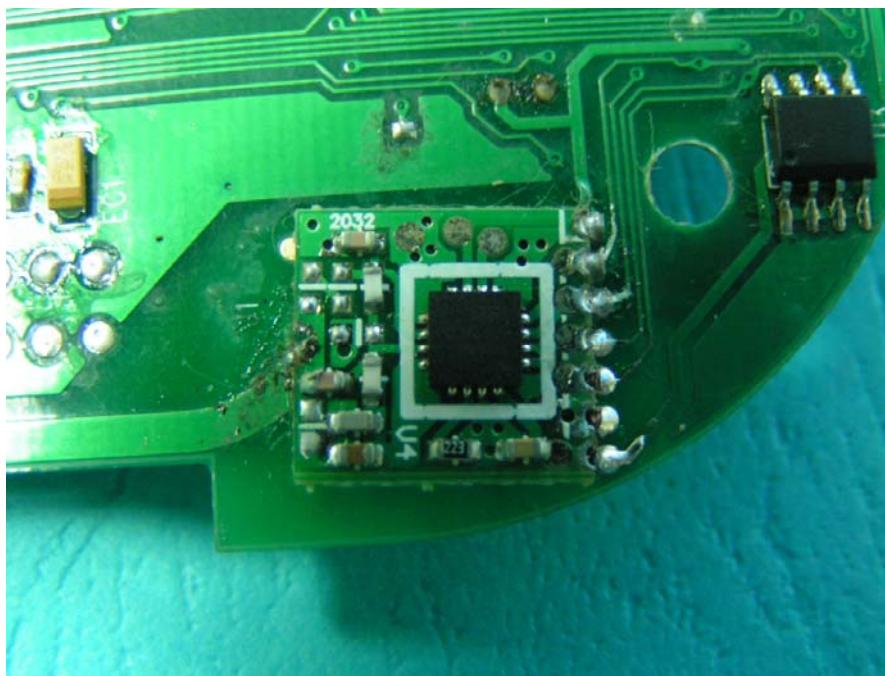
Transmitter - Main Board Front View



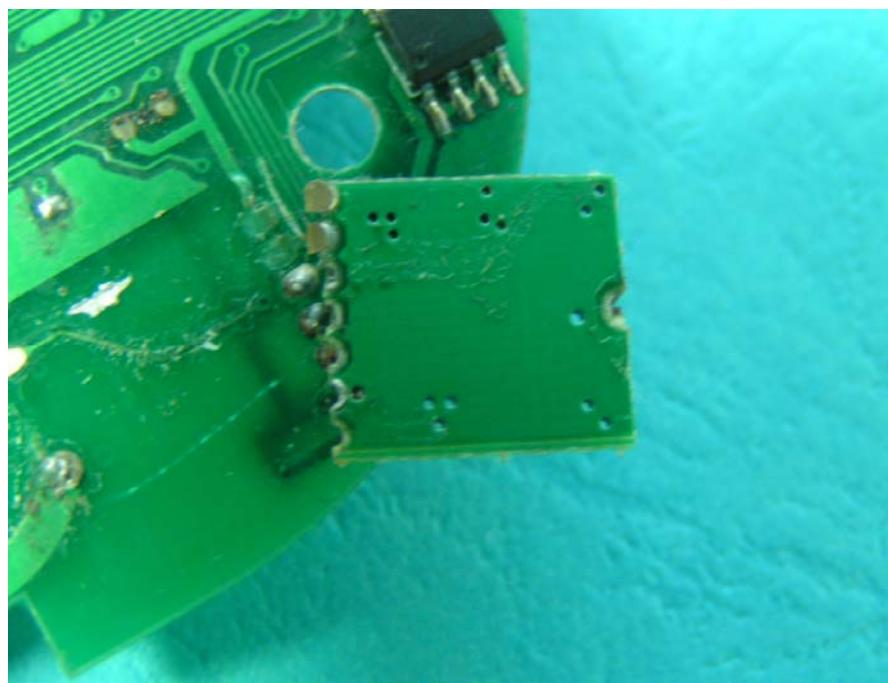
Transmitter - Main Board Rear View



Transmitter - Main Board - RF Board Removed



RF board - Front View



RF board - Rear View

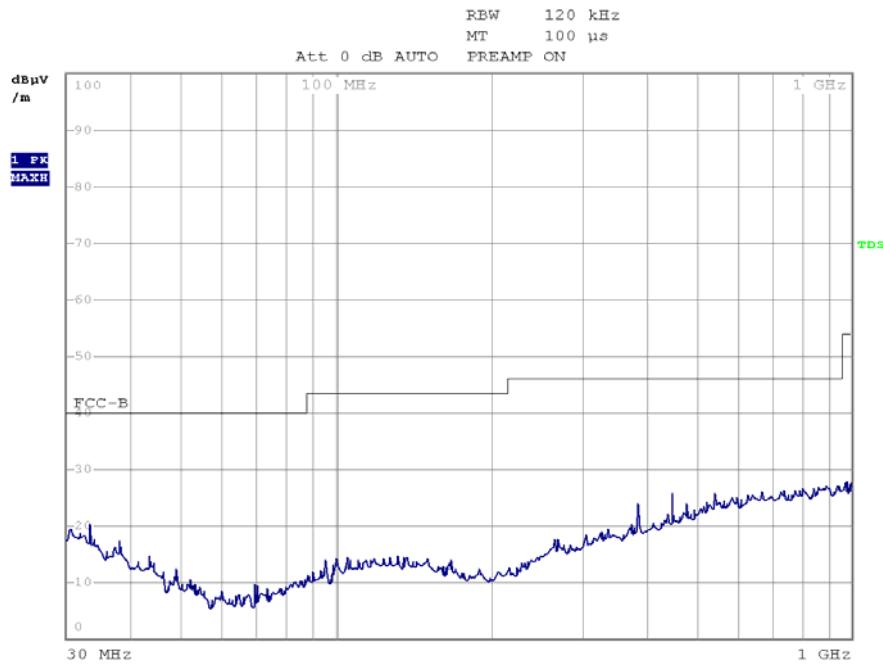
ATTACHMENT 1 - RADIATED EMISSION TEST RESULTS

CLIENT:	Suzhou Optical Maser Technology Inc.	TEST STANDARD:	FCC Part 15.209 FCC Part 15.205
MODEL NUMBER:	LPM1	PRODUCT:	LASER PRESENTER MOUSE
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	No Grounding
TESTED BY:	Shi Xiting	DATE OF TEST:	2006, November 6 & November 29
SETUP METHOD:	ANSI C63.4 : 2003		
TEST PROCEDURE:	<p>a. The EUT was placed on a rotatable table with 0.8 meters above ground.</p> <p>b. The EUT was set 3 meters from the interference-receiving antenna, which was mounted on the top of a variable height antenna tower.</p> <p>c. The antenna was varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna were set to make measurement.</p> <p>d. For each suspected emission the EUT was arranged to its worst case and then change the antenna tower height (from 1m to 4m) and turn table (from 0 degree to 360 degree) to find the maximum reading.</p> <p>e. If the emission level of the EUT in peak mode was 20 dB lower than the specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be tested using the quasi-peak method in about six maximal points and the results will be reported.</p> <p>f. Broadband antenna (Calibrated antenna) was used as receiving antenna below 1000MHz. Horn antenna were used as receiving antenna above 1000MHz.</p> <p>g. The bandwidth is 120 kHz below 1000 MHz, and 1 MHz above 1000 MHz</p> <p>Explanation of the Correction Factor are given as follows:</p> <p>FS= RA + AF + CF - AG</p> <p>Where: FS = Field Strength</p> <p>RA = Receiver Amplitude</p> <p>AF = Antenna Factor</p> <p>CF = Cable Attenuation Factor</p> <p>AG = Amplifier Gain</p>		
TESTED RANGE:	30MHz to 24000MHz for the transmitter		
TEST VOLTAGE:	3V DC for the transmitter and USB 5V for the receiver		

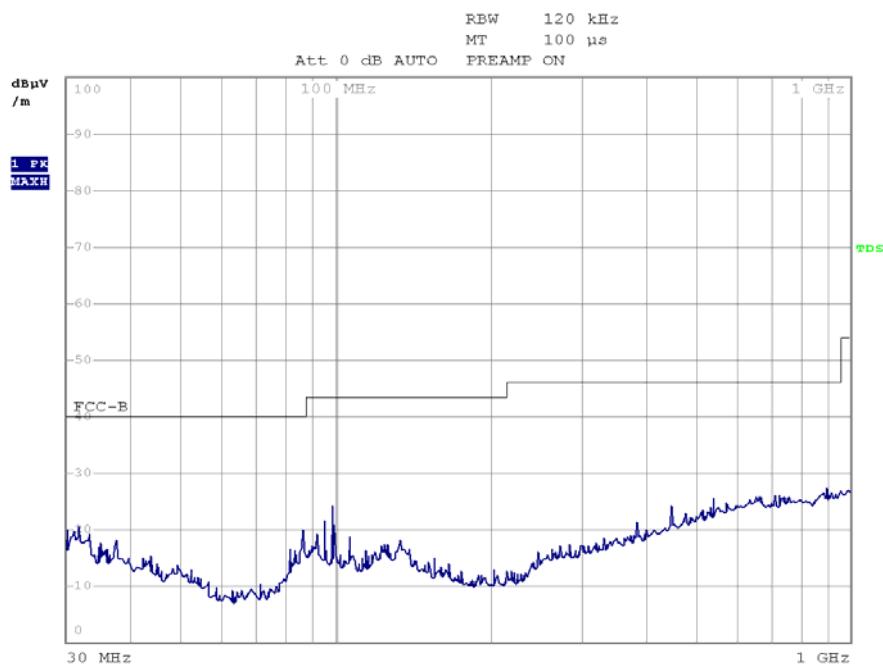
CONTINUE ON THE NEXT PAGE...

TEST STATUS:	For transmitter, keep Tx in normal continuous transmission mode, modulated
RESULTS:	The EUT meets the requirements of field strength test. The test results relate only to the equipment under test provided by client.
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB

Model: Tx of LPM1



**Radiated Emission Plot -Horizontal Polarization
(Peak, Max Hold Mode)**



**Radiated Emission Plot -Vertical Polarization
(Peak, Max Hold Mode)**

Test Results (30MHz~1GHz)

<i>Horizontal</i>								
Signal	Frequency (MHz)	Antenna Factor (dB/m)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	33.1575	15.8	0.3	15.2	40.0	-24.8	25	101
2	381.6125	15.0	1.6	22.1	46.0	-23.9	358	165
3	439.1645	16.0	2.0	24.3	46.0	-21.7	20	142
<i>Vertical</i>								
Signal	Frequency (MHz)	Antenna Factor (dB/m)	Cable Factor (dB)	Corrected QP Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Angle of Turner (degree)	Height of Tower (cm)
1	30.6860	17.7	0.3	16.2	40.0	-23.8	280	100
2	98.1775	10.1	0.7	23.5	43.5	-20.0	267	100
3	674.5380	18.9	2.8	24.4	46.0	-21.6	35	243

Note: All readings are quasi-peak unless stated otherwise, using a QP bandwidth of 120kHz, with a 30 ms sweep time. A video filter was not used.

Test Results (1GHz~24GHz)

<i>Horizontal</i>									
Signal	Frequency (MHz)	Antenna Factor (dB/m)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1216.5	23.4	3.5	28.5	54.0	-25.5	35.1	74.0	-38.9
2	2043.1	25.6	6.4	29.1	54.0	-24.9	36.7	74.0	-37.3
3	10891.5	29.1	8.7	29.4	54.0	-24.6	37.9	74.0	-36.1
<i>Vertical</i>									
Signal	Frequency (MHz)	Antenna Factor (dB/m)	Cable Factor (dB)	Corrected AV Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)	Corrected PK Level dB(uV/m)	3 Meter Limits dB(uV/m)	Margin (dB)
1	1216.5	23.4	3.5	27.4	54.0	-26.6	33.6	74.0	-40.4
2	2043.2	25.6	6.4	29.7	54.0	-24.3	36.0	74.0	-38.0
3	10891.5	29.1	8.7	29.3	54.0	-24.7	38.7	74.0	-35.3

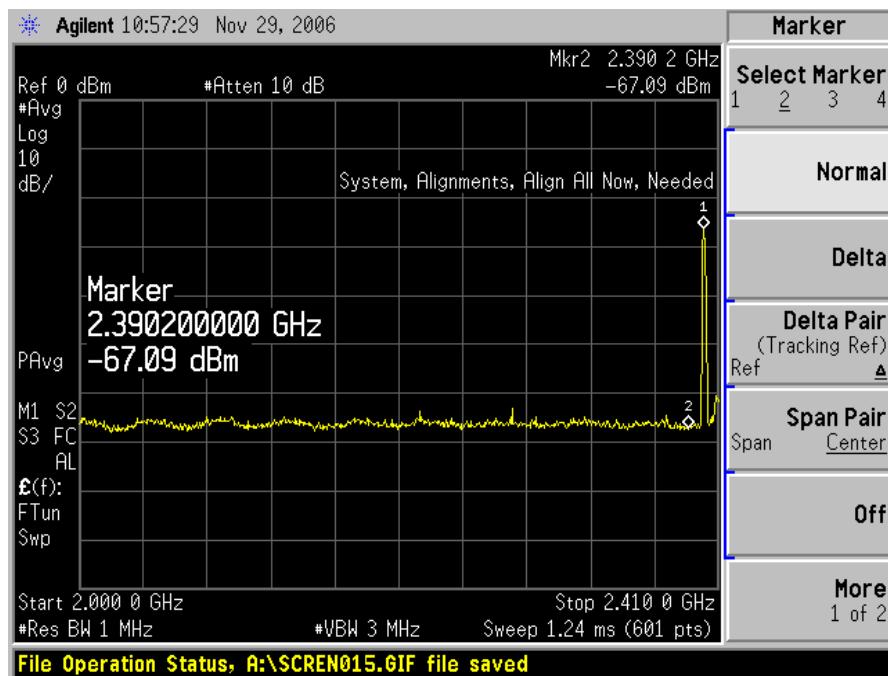
Note: All readings are average and peak unless stated otherwise, using a bandwidth of 1000kHz, with a 30 ms sweep time. A video filter was not used.

Restricted bands:

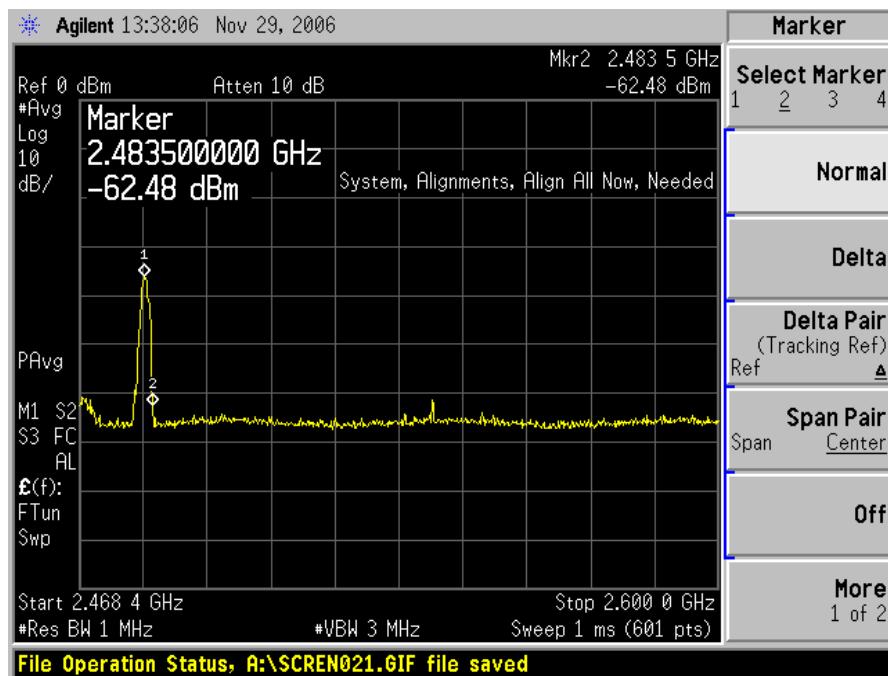
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6



Channel 1



*Channel 18
(Plots with antenna horizontal)*

Antenna Horizontal								
Signal	Frequency (MHz)	PK Reading Level (dBuV)	Antenna Factor (dB/m)	Preamp Gain (dB)	Cable Factor (dB)	Corrected PK Level (dBuV)	Limits PK (dBuV/m)	Margin PK (dB)
1	2390	39.9	27.2	29.6	6.5	44.0	74.0	-30.0
2	2483.5	44.5	27.5	29.5	6.6	49.1	74.0	-24.9
Signal	Frequency (MHz)	AV Reading Level (dBuV)	Antenna Factor (dB/m)	Preamp Gain (dB)	Cable Factor (dB)	Corrected AV Level (dBuV)	Limits AV (dBuV/m)	Margin AV (dB)
1	2390	36.5	27.2	29.6	6.5	40.6	54.0	-13.4
2	2483.5	39.4	27.5	29.5	6.6	44.0	54.0	-10.0
Antenna Vertical								
Signal	Frequency (MHz)	PK Reading Level (dBuV)	Antenna Factor (dB/m)	Preamp Gain (dB)	Cable Factor (dB)	Corrected PK Level (dBuV)	Limits PK (dBuV/m)	Margin PK (dB)
1	2390	38.7	27.2	29.6	6.5	42.8	74.0	-31.2
2	2483.5	42.8	27.5	29.5	6.6	47.4	74.0	-26.6
Signal	Frequency (MHz)	AV Reading Level (dBuV)	Antenna Factor (dB/m)	Preamp Gain (dB)	Cable Factor (dB)	Corrected AV Level (dBuV)	Limits AV (dBuV/m)	Margin AV (dB)
1	2390	35.7	27.2	29.6	6.5	39.8	54.0	-14.2
2	2483.5	37.6	27.5	29.5	6.6	42.2	54.0	-11.8
Note1: The peak readings are using a resolution bandwidth of 1MHz and video bandwidth of 3MHz; the average readings are using a resolution bandwidth of 1MHz and video bandwidth of 10Hz.								

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4440A	US45303119	03/20/06	03/19/07
Preamplifier	HP	8449B	2944A06849	03/20/06	03/19/07
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	513	03/20/06	03/19/07
Bilog Antenna	CHASE	CBL6112	117.0800.20	02/17/06	02/16/07
Anechoic Chamber	LINDGREN	FACT-3	601	01/10/06	01/10/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY:

Shi-xiting

ENGINEER

REVIEWED BY:

Hangzhou

SENIOR ENGINEER

For transmitter of LPM1



Radiated Emissions Test Set-up (Low frequency)



Radiated Emissions Test Set-up (High Frequency)

**ATTACHMENT 2 – FUNDAMENTAL AND HARMONIC FIELD STRENGTH
TEST RESULTS**

CLIENT:	Suzhou Optical Maser Technology Inc.	TEST STANDARD:	FCC Part 15.249 (a)
MODEL NUMBER:	LPM1	PRODUCT:	LASER PRESENTER MOUSE
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	No Grounding
TESTED BY:	Shi Xiting	DATE OF TEST:	2006, November 6
SETUP METHOD:	ANSI C63.4 : 2003		
TEST PROCEDURE:	<p>a. The EUT was placed on a rotatable table with 0.8 meters above ground.</p> <p>b. The EUT was set 3 meters from the interference-receiving antenna, which was mounted on the top of a variable height antenna tower.</p> <p>c. The antenna was varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna were set to make measurement.</p> <p>d. For each suspected emission the EUT was arranged to its worst case and then change the antenna tower height (from 1m to 4m) and turn table (from 0 degree to 360 degree) to find the maximum reading.</p> <p>e. If the emission level of the EUT in peak mode was 20 dB lower than the specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be tested using the quasi-peak method in about six maximal points and the results will be reported.</p> <p>f. Broadband antenna (Calibrated antenna) was used as receiving antenna below 1000MHz. Horn antenna were used as receiving antenna above 1000MHz.</p> <p>g. The bandwidth is 120 kHz below 1000 MHz, and 1 MHz above 1000 MHz</p> <p>Explanation of the Correction Factor are given as follows:</p> <p>FS= RA + AF + CF - AG</p> <p>Where: FS = Field Strength</p> <p>RA = Receiver Amplitude</p> <p>AF = Antenna Factor</p> <p>CF = Cable Attenuation Factor</p> <p>AG = Amplifier Gain</p> <p>FCC 15.249 limit</p> <p>15.249 (a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:</p>		

	Fundamental Frequency	Field Strength of Fundamental (milivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902-928MHz	50	500	
2400-2483.5MHz	50	500	
5725-5875MHz	50	500	
24.0-24.25GHz	250	2500	
TESTED RANGE:	2400MHz to 24000MHz for the transmitter		
TEST VOLTAGE:	3V DC for the transmitter		
TEST STATUS:	Set transmitter to generate signal at low, middle and high channels continually, and set transmitter in lying, side and standing mode		
RESULTS:	The EUT meets the requirements of the fundamental and harmonic field strength. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7} \times$ Center Freq., Amp ± 2.6 dB		

Peak Field Strength=Peak Read Level + Factor - Duty Cycle Correction Factor

Factor = Antenna Factor + Cable Loss - Preamp Factor

Average Field Strength=Peak Field Strength - Duty Cycle Correction Factor

Duty Cycle Correction Factor is calculated by averaging the sum of the pulse train. Correction factor is measured as follows:

Keep the EUT in continuous transmission mode (modulated), and set the spectrum to the fundamental frequency and set the span width to 0 Hz. Then connect a storage oscilloscope to the video output of the spectrum that is used to detect the pulse train. Adjust the oscilloscope settings to observe the pulse train and determine the number and width of the pulses, as well as the period of the train.

$$\text{Duty cycle} = 453.33\mu\text{s} * 48 / 100\text{mS} = 21.76\%$$

So the Duty Cycle Correction Factor = $20 \log 21.76\% = 13.25\text{dB}$

(See the plot in next page)

Duty Cycle Test

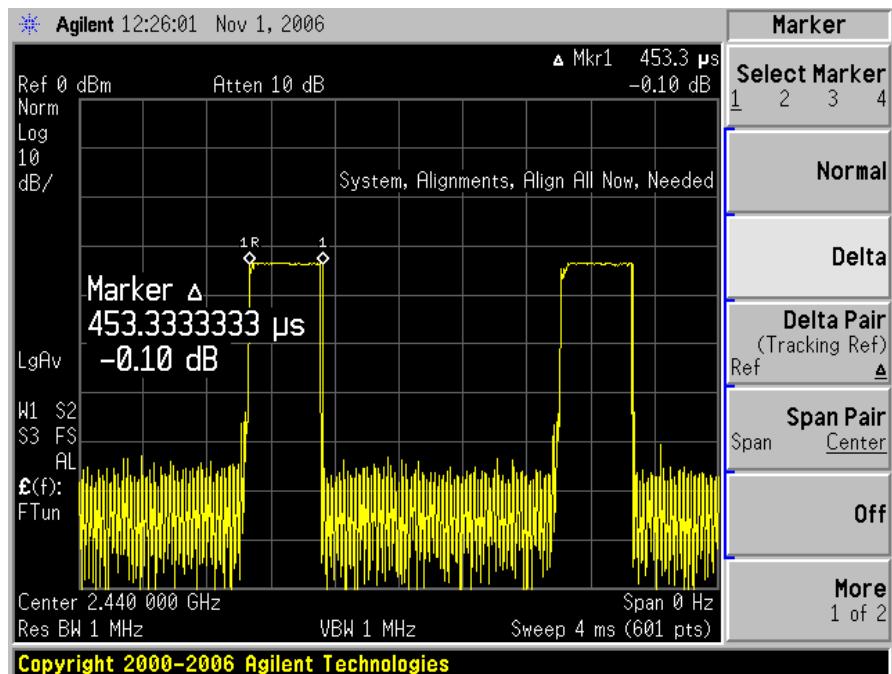


Figure #1- Duration of one signal

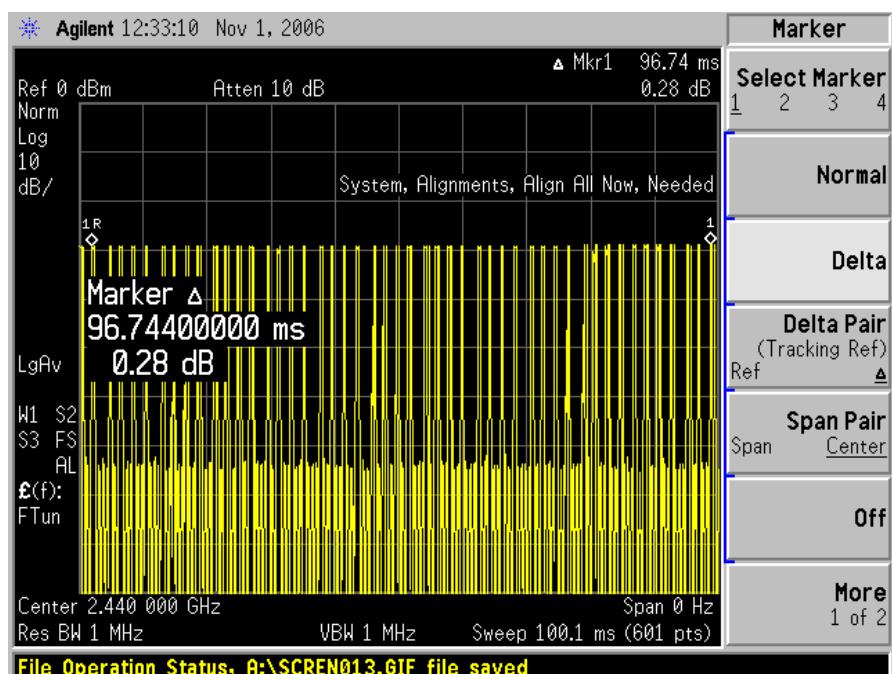


Figure #2 – In 100ms

For transmitter of LPM1
For Channel 1 (2401MHz) (Lie mode)
Test Results (2.4GHz~24GHz)

<i>Horizontal</i>								
Signal	Frequency (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2401	27.3	81.0	114.0	-33.0	68.7	94.0	-25.3
2	4802	31.2	52.6	74.0	-21.4	42.1	54.0	-11.9
3	7203	35.5	49.3	74.0	-24.7	41.5	54.0	-12.5
4	9604	37.8	48.7	74.0	-25.3	40.2	54.0	-13.8
5	12005	38.6	<48	74.0	>26.0	<40	54.0	>14.0
HIGHER HARMONICS		--	<48	74.0	>26.0	<40	54.0	>14.0
<i>Vertical</i>								
Signal	Frequency (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2401	27.3	79.2	114.0	-34.8	66.2	94.0	-27.8
2	4802	31.2	60.3	74.0	-13.7	49.6	54.0	-4.4
3	7203	35.5	49.4	74.0	-24.6	40.8	54.0	-13.2
4	9604	37.8	48.1	74.0	-25.9	39.6	54.0	-14.4
5	12005	38.6	<48	74.0	>26.0	<40	54.0	>14.0
HIGHER HARMONICS		--	<48	74.0	>26.0	<40	54.0	>14.0
Note: All readings are peak and average unless stated otherwise, using a bandwidth of 1MHz, with a 30 ms sweep time. A video filter was not used.								

For transmitter of LPM1
For Channel 8 (2440MHz) (Side mode)
Test Results (2.4GHz~24GHz)

<i>Horizontal</i>								
Signal	Frequency (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2440	27.6	83.5	114.0	-30.5	66.8	94.0	-27.2
2	4881	32.5	53.6	74.0	-20.4	41.6	54.0	-12.4
3	7322	35.8	52.2	74.0	-21.8	41.1	54.0	-12.9
4	9765	38.2	49.4	74.0	-24.6	40.9	54.0	-13.1
5	12210	38.9	<48	74.0	>26.0	<40	54.0	>14.0
HIGHER HARMONICS		--	<48	74.0	>26.0	<40	54.0	>14.0
<i>Vertical</i>								
Signal	Frequency (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2440	27.6	81.9	114.0	-32.1	65.4	94.0	-28.6
2	4881	32.5	58.4	74.0	-15.6	46.4	54.0	-7.6
3	7322	35.8	54.2	74.0	-19.8	43.6	54.0	-10.4
4	9765	38.2	52.7	74.0	-21.3	40.5	54.0	-13.5
5	12210	38.9	<48	74.0	>26.0	<40	54.0	>14.0
HIGHER HARMONICS		--	<48	74.0	>26.0	<40	54.0	>14.0
Note: All readings are peak and average unless stated otherwise, using a bandwidth of 1MHz, with a 30 ms sweep time. A video filter was not used.								

For transmitter of LPM1
For Channel 18 (2482MHz) (Stand mode)
Test Results (2.4GHz~24GHz)

<i>Horizontal</i>								
Signal	Frequency (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2482	28.1	92.3	114.0	-21.7	74.7	94.0	-19.3
2	4964	33.2	54.0	74.0	-20.0	42.3	54.0	-11.7
3	7445	36.0	51.9	74.0	-22.1	40.6	54.0	-13.4
4	9927	38.4	48.8	74.0	-25.2	39.4	54.0	-14.6
5	12409	39.2	<48	74.0	>26.0	<40	54.0	>14.0
HIGHER HARMONICS		--	<48	74.0	>26.0	<40	54.0	>14.0
<i>Vertical</i>								
Signal	Frequency (MHz)	Factor (dB)	Corrected PK Level (dBuV/m)	3 Meter PK Limits (dB uV/m)	Margin (dB)	Corrected AV Level (dBuV/m)	3 Meter AV Limits (dBuV/m)	Margin (dB)
1	2482	28.1	83.9	114.0	-30.1	66.5	94.0	-27.5
2	4964	33.2	57.4	74.0	-16.6	46.1	54.0	-7.9
3	7445	36.0	54.0	74.0	-20.0	42.8	54.0	-11.2
4	9927	38.4	49.7	74.0	-24.3	40.0	54.0	-14.0
5	12409	39.2	<48	74.0	>26.0	<40	54.0	>14.0
HIGHER HARMONICS		--	<48	74.0	>26.0	<40	54.0	>14.0
Note: All readings are peak and average unless stated otherwise, using a bandwidth of 1MHz, with a 30 ms sweep time. A video filter was not used.								

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4440A	US45303119	03/20/06	03/19/07
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	513	03/20/06	03/19/07
Preamplifier	HP	8449B	2944A06849	03/20/06	03/19/07
Bilog Antenna	CHASE	CBL6112	117.0800.20	02/17/06	02/16/07
Anechoic Chamber	LINDGREN	FACT-3	601	01/10/06	01/10/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY:

Shi-xiting

ENGINEER

REVIEWED BY:

Hangzhou

SENIOR ENGINEER

For transmitter of LPM1

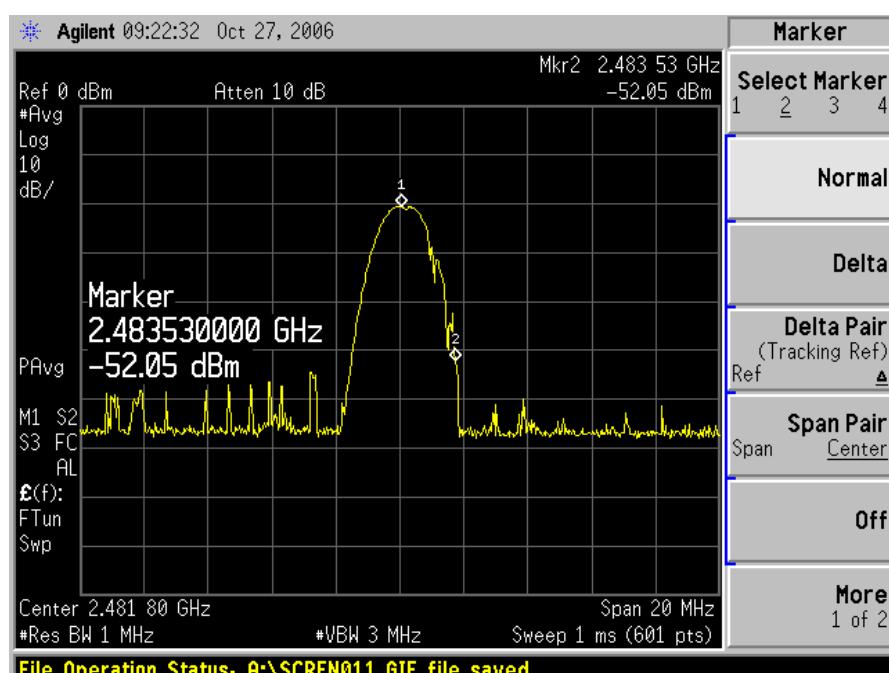
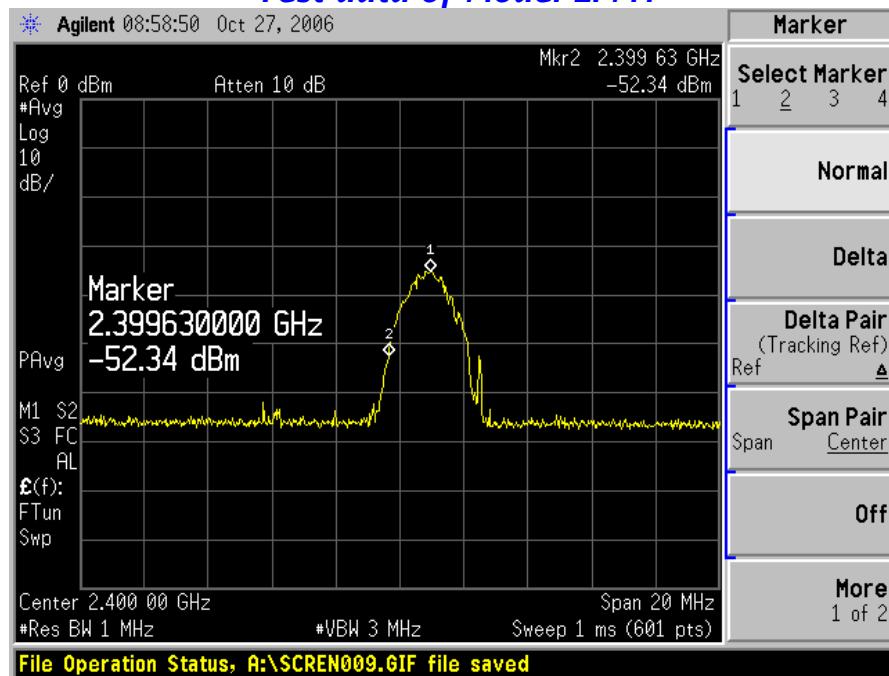


Fundamental & Harmonics Strength Test Set-up Front View

ATTACHMENT 3 – Band Edge Test

CLIENT:	Suzhou Optical Maser Technology Inc.	TEST STANDARD:	FCC Part 15.249 (d)
MODEL NUMBER:	LPM1	PRODUCT:	LASER PRESENTER MOUSE
SERIAL NO.:	Engineering Sample	EUT DESIGNATION:	RF Equipment
TEMPERATURE:	21°C	HUMIDITY:	53%RH
ATM PRESSURE:	101.6 kPa	GROUNDING:	No Grounding
TESTED BY:	Shi Xiting	DATE OF TEST:	2006, October 27
SETUP METHOD:	ANSI C63.4 - 2003		
BANDEdge REQUIREMENT:	FCC 15.249 (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to general radiated emission limits in Section 15.209, which is the lesser attenuation.		
TEST PROCEDURE:	<p>Set the spectrum as follow:</p> <p>Span=wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation.</p> <p>RBW=100kHz; VBW\geqRBW; Sweep=Auto; Detector=Peak; Trace=Maxhold;</p> <p>Allow the trace to stabilize and use the search peak function to set the marker to the peak of the useful emission, then use delta-mark function to mark the maximum emission outside of the band, record the delta level to see if it's more than 50dB. Or see if the emissions outside the operating frequencies can satisfy the limit 15.209.</p>		
TEST VOLTAGE:	3.0V DC for the transmitter		
TEST STATUS:	Channel 1 for low and Channel 18 for high		
RESULTS:	The EUT meets band edge requirement. The test results relate only to the equipment under test provided by client.		
CHANGES OR MODIFICATIONS:	There were no modifications installed by EMC Compliance Management Group (China) test personnel.		
M. UNCERTAINTY:	Freq. $\pm 2 \times 10^{-7}$ x Center Freq., Amp ± 2.6 dB		

Test data of Model LPM1



Band Edge Test Plot with antenna horizontal

Band Edge Test Table

Antenna Horizontal								
Signal	Frequency (MHz)	PK Reading Level (dBuV)	Antenna Factor (dB/m)	Preamp Gain (dB)	Cable Factor (dB)	Corrected PK Level (dBuV)	Limits PK (dBuV/m)	Margin PK (dB)
1	2399.6	54.7	27.2	34.8	6.5	53.6	74.0	-20.4
2	2483.5	54.9	27.5	34.8	6.6	54.2	74.0	-19.8
Signal	Frequency (MHz)	AV Reading Level (dBuV)	Antenna Factor (dB/m)	Preamp Gain (dB)	Cable Factor (dB)	Corrected AV Level (dBuV)	Limits AV (dBuV/m)	Margin AV (dB)
1	2399.6	48.8	27.2	34.8	6.5	47.7	54.0	-6.3
2	2483.5	46.5	27.5	34.8	6.6	45.8	54.0	-8.2
Antenna Vertical								
Signal	Frequency (MHz)	PK Reading Level (dBuV)	Antenna Factor (dB/m)	Preamp Gain (dB)	Cable Factor (dB)	Corrected PK Level (dBuV)	Limits PK (dBuV/m)	Margin PK (dB)
1	2399.8	54.6	27.2	34.8	6.5	53.5	74.0	-20.5
2	2483.5	53.7	27.5	34.8	6.6	53.0	74.0	-21.0
Signal	Frequency (MHz)	AV Reading Level (dBuV)	Antenna Factor (dB/m)	Preamp Gain (dB)	Cable Factor (dB)	Corrected AV Level (dBuV)	Limits AV (dBuV/m)	Margin AV (dB)
1	2399.8	48.6	27.2	34.8	6.5	47.5	54.0	-6.5
2	2483.5	47.9	27.5	34.8	6.6	47.2	54.0	-6.8

Note1: The peak readings are using a resolution bandwidth of 1MHz and video bandwidth of 3MHz; the average readings are using a resolution bandwidth of 1MHz and video bandwidth of 10Hz.

Test Equipment	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4440A	US45303119	03/20/06	03/19/07
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	513	03/20/06	03/19/07
Preamplifier	TDA	TDA-35	3341UD3	04/08/06	04/09/07
Anechoic Chamber	LINDGREN	FACT-3	601	01/10/06	01/10/07
Note: All testing were performed using internationally recognized standards. All test instruments were calibrated.					

SIGNED BY:

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For transmitter of LPM1



Band Edge Test Set-up