

FCC PART 15.227

EMI MEASUREMENT AND TEST REPORT

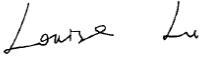
For

Verbatim

1200 West W.T. Harris Blvd. Charlotte, NC 28262, USA

FCC ID: TL4095208

August 26, 2005

| | |
|---|--|
| This Report Concerns: <input checked="" type="checkbox"/> Original Report | Equipment Type: Transmitter, Wireless optical mouse |
| Test Engineer: Louise Lu |  |
| Report No.: RSZ05071501 | |
| Test Date: August 16-25, 2005 | |
| Reviewed By: Chris Zeng |  |
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Note: The test report is specially limited to the above company and this particular sample only.
It may not be duplicated without prior written consent of Bay Area Compliance Lab Corp. (ShenZhen). This report **must not** be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the US Government.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The Verbatim's product, model number: 095208 or the "EUT" as referred to in this report is a transmitter, the product name is Wireless optical mouse. The EUT is measured approximately 11.0cm L x 6.3cm W x 3.3cm H, rated input voltage: DC 3 V battery, can be charging by USB port of PC.

** The test data gathered are from production sample, serial number: 0507028, provided by the manufacturer.*

Objective

This Type approval report is prepared on behalf of *Verbatim* in accordance with Part 2, Subpart J, and Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules, sec 15.203, 15.205, 15.207, 15.209 and sec 15.227.

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Lab Corp. (ShenZhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China.

Test site at Bay Area Compliance Lab Corp. (ShenZhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Lab Corp. (ShenZhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

N/A.

Special Accessories

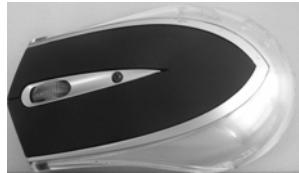
N/A.

Equipment Modifications

Bay Area Compliance Lab Corp. (ShenZhen) has not done any modification on the EUT.

Configuration of Test Setup

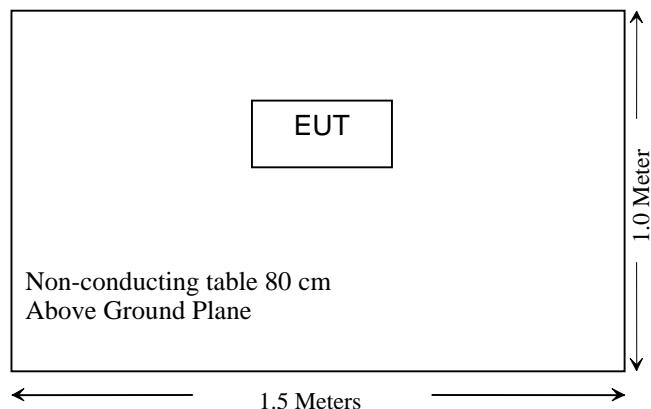
Transmitting Mode:



EUT

Block Diagram of Test Setup

Transmitting Mode:



SUMMARY OF TEST RESULTS

| FCC RULES | DESCRIPTION OF TEST | RESULT |
|------------|------------------------------|------------|
| §15.203 | Antenna requirement | Compliant |
| §15.205 | Restricted Band of operation | Compliant |
| §15.207 | Conducted Emission Test | N/A |
| §15.209 | Radiated Emission Test | Compliant* |
| §15.227(a) | Field Strength | Compliant |
| §15.227(b) | Out of Band Emission | Compliant |

Note: The highest clocks of the EUT was 27.042 MHz.

* Within measurement uncertainty.

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

This product has a permanent antenna, fulfill the requirement of this section.

Test Result: Pass

§15.205, §15.209, §15.227(a) - RADIATED EMISSIONS TEST

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Lab Corp. (ShenZhen) is ± 4.4 dB.

The fundamental data was recorded in average detection mode: set the VBW AVE on, then record the data.

EUT Setup

The radiated emission tests were performed in the chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part 15 Subpart C section 15.227 limits.

EMI Test Receiver Setup

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated from 27 to 1000 MHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

| Frequency | RB/W | VB/W | IF B/W |
|------------------|-------------|-------------|---------------|
| 9 kHz-30 MHz | 10 kHz | 10 kHz | 9 kHz |
| 30 MHz-1 GHz | 100 kHz | 100 kHz | 120 kHz |

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| HP | Amplifier | 8447D | 2994A09795 | 2004-9-1 | 2005-8-31 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100028 | 2004-9-15 | 2005-9-15 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-1 | 2005-4-28 | 2006-4-28 |

*** Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.227&15.209, with the worst margin reading of:

Transmitting Mode: -15.2 dB at 31.730 MHz in the **Vertical** polarization.

Test Data

Environmental Conditions

| | |
|--------------------|----------|
| Temperature: | 27 ° C |
| Relative Humidity: | 53% |
| ATM Pressure: | 1000mbar |

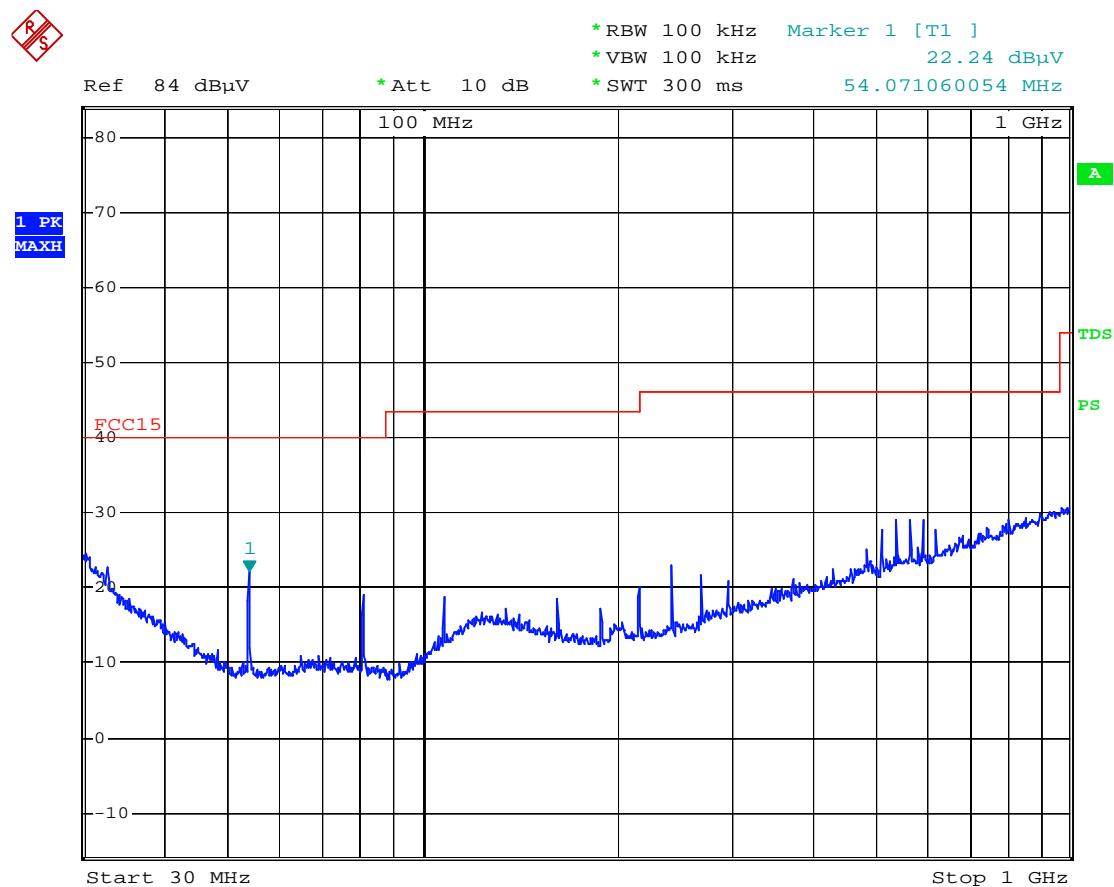
The testing was performed by Louise Lu on 2005-8-25.

Test Mode: Transmitting

| INDICATED | | | TABLE | ANTENNA | | CORRECTION FACTOR | | | CORRECTED AMPLITUDE | FCC PART 15.227&15.209 | |
|---------------|--------------------------|------------------|-------|--------------|--------------|-------------------|-------------------|---------------|---------------------|--------------------------|--------------------|
| Frequency MHz | Meter Reading dB μ V | Detector PK /QP | | Angle Degree | Height Meter | Polar H/V | Antenna Loss dB/m | Cable Loss dB | Amp. Gain dB | Corr. Ampl. dB μ V/m | Limit dB μ V/m |
| 31.730 | 26.3 | PK(spurious) | 45 | 1.0 | V | 24.1 | 1.2 | 26.8 | 24.8 | 40.0 | -15.2 |
| 54.090 | 39.0 | PK(spurious) | 289 | 1.0 | H | 8.5 | 1.5 | 26.8 | 22.2 | 40.0 | -17.8 |
| 81.135 | 35.6 | PK(spurious) | 289 | 1.0 | H | 8.4 | 1.9 | 26.8 | 19.1 | 40.0 | -20.9 |
| 243.405 | 33.9 | PK(spurious) | 180 | 1.2 | H | 12.3 | 2.9 | 26.0 | 23.0 | 46.0 | -23.0 |
| 54.090 | 32.9 | PK(spurious) | 60 | 1.2 | V | 8.5 | 1.5 | 26.8 | 16.1 | 40.0 | -23.9 |
| 81.135 | 32.4 | PK(spurious) | 35 | 3.8 | V | 8.4 | 1.9 | 26.8 | 16.0 | 40.0 | -24.1 |
| 270.450 | 32.0 | PK(spurious) | 45 | 1.0 | H | 12.6 | 3.2 | 26.0 | 21.7 | 46.0 | -24.3 |
| 108.180 | 32.4 | PK(spurious) | 60 | 1.0 | H | 11.0 | 2.0 | 26.6 | 18.8 | 43.5 | -24.7 |
| 216.360 | 32.0 | PK(spurious) | 45 | 1.2 | H | 11.4 | 2.8 | 26.0 | 20.2 | 46.0 | -25.8 |
| 162.270 | 29.0 | PK(spurious) | 90 | 1.2 | V | 12.7 | 2.1 | 26.6 | 17.2 | 43.5 | -26.3 |
| 149.480 | 28.3 | PK(spurious) | 45 | 1.2 | V | 13.4 | 2.0 | 26.6 | 17.1 | 43.5 | -26.4 |
| 122.830 | 26.9 | PK(spurious) | 35 | 3.8 | V | 14.0 | 2.3 | 26.6 | 16.6 | 43.5 | -26.9 |
| 27.045 | 51.1 | AV (fundamental) | 45 | 1.0 | H | 24.1 | 1.2 | 26.8 | 48.6 | 80.0 | -31.4 |
| 27.045 | 51.6 | AV (fundamental) | 45 | 1.2 | V | 24.1 | 1.2 | 26.8 | 47.3 | 80.0 | -32.7 |
| 27.045 | 48.1 | PK (fundamental) | 45 | 1.0 | H | 24.1 | 1.2 | 26.8 | 53.2 | 100.0 | -46.8 |
| 27.045 | 51.8 | PK (fundamental) | 60 | 1.0 | V | 24.1 | 1.2 | 26.8 | 51.9 | 100.0 | -48.1 |

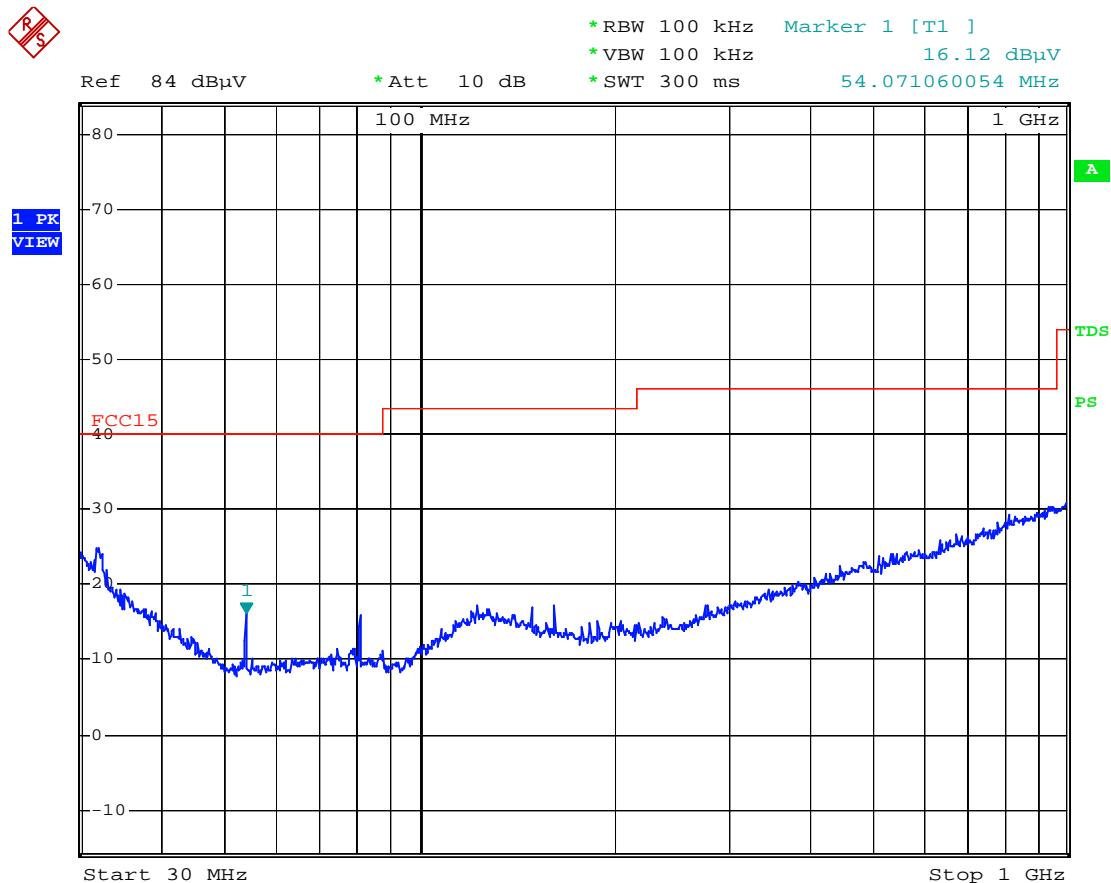
Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.

Test Mode: Transmitting

Verbatim Wireless Optical Mouse M/N:095208 transmitting
(Horizontal)

Date: 24.AUG.2005 16:43:04



Verbatim Wireless Optical Mouse M/N:095208 transmitting
(Vertical)

Date: 24.AUG.2005 16:33:35

§15.227(b) - Out of Band Emission

EMI Test Receiver Setup

The system was investigated from 26.8 MHz to 27.3 MHz.

During the out of band emission test, the EMI test receiver was set with the following configurations:

| Frequency | RB/W | VB/W | SWT |
|-------------------|--------|--------|------|
| 26.8 MHz-27.3 MHz | 10 kHz | 10 kHz | Auto |

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| HP | Amplifier | 8447D | 2994A09795 | 2004-9-1 | 2005-8-31 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100028 | 2004-9-15 | 2005-9-15 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-1 | 2005-4-28 | 2006-4-28 |

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Reading the emission of 26.96 MHz and 27.28 MHz to ensure that the EUT complied with the FCC PART 15.227.

All data was recorded in the Peak detection mode.

Test Data

Environmental Conditions

| | |
|--------------------|----------|
| Temperature: | 27 °C |
| Relative Humidity: | 65% |
| ATM Pressure: | 1000mbar |

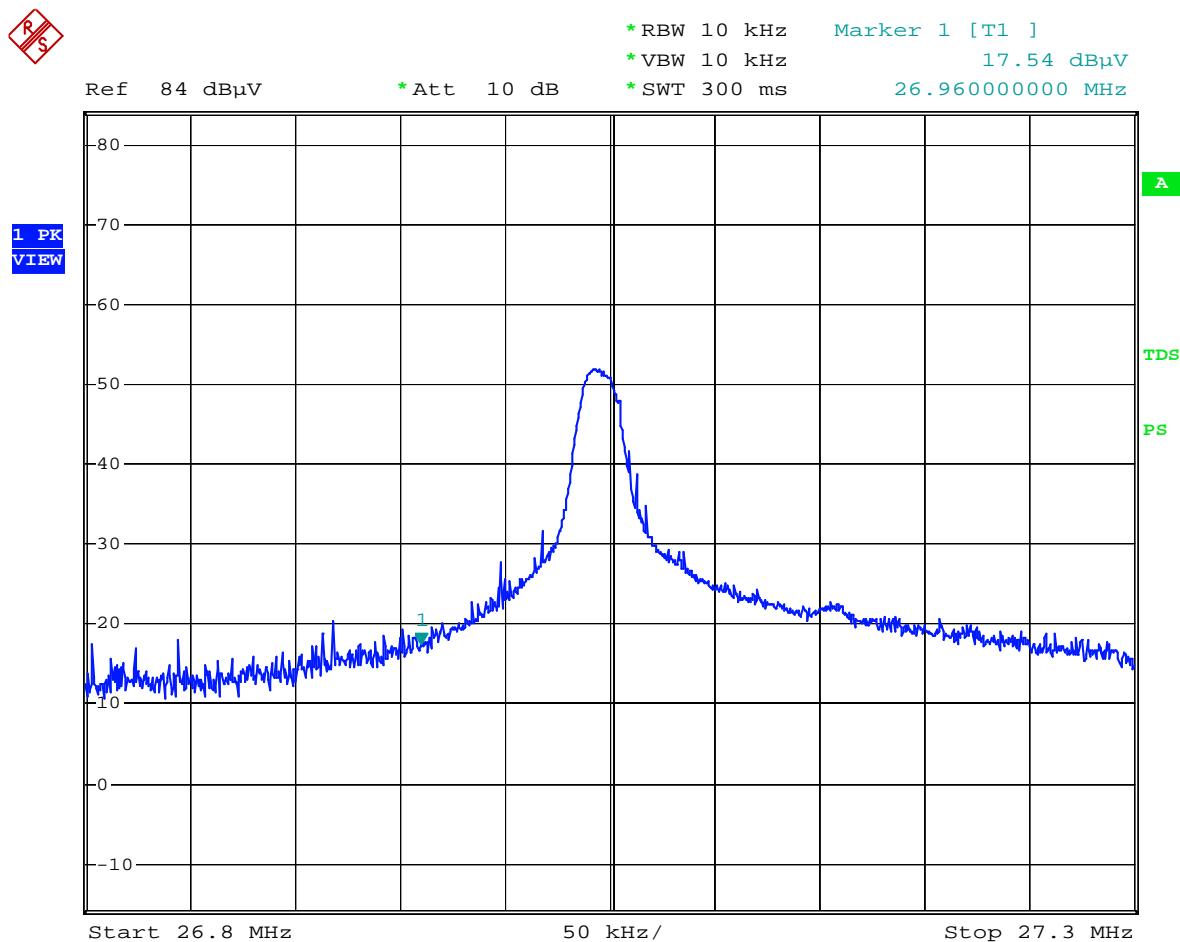
The testing was performed by Louise Lu on 2005-8-25.

Test Mode: Transmitting

The result has been complied with the 15.227(b), see the following plot:

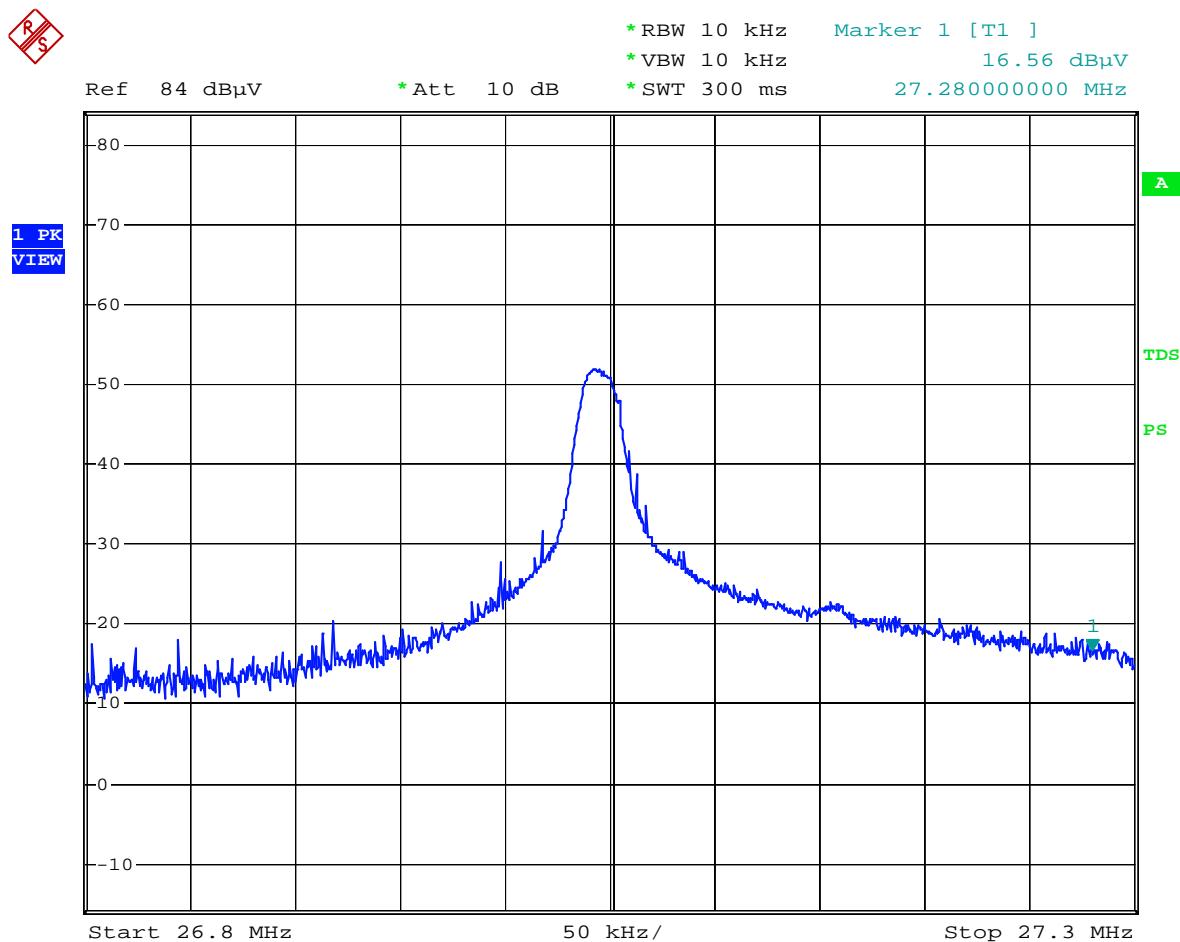
| Frequency MHz | Emission dB μ V | Limit dB μ V/m |
|------------------|------------------------|-----------------------|
| 26.96 | 17.54 | 40 |
| 27.28 | 16.56 | 40 |

Test Result: Pass



Verbatim Wireless Optical Mouse M/N:095208 26.96MHz

Date: 24.AUG.2005 16:18:58



Verbatim Wireless Optical Mouse M/N:095208 27.28MHz

Date: 24.AUG.2005 16:19:39