



NVLAP LAB CODE 200707-0



FCC PART 15.227

EMI MEASUREMENT AND TEST REPORT

For

MANOVA International Ltd.

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FCC ID: UKWMANOVA-UM-208

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: USB CALCULATOR / U-DRIVE MOUSE
Test Engineer: Hansen Hu	<i>Hansen Hu</i>
Report No.: RSZ06122902	
Test Date: 2007-01-11 to 2007-01-18	
Report Date: 2007-01-19	
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Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratory Corp. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *MANOVA International Ltd.*'s product, model number: UM-208 / 200-RD series or the "EUT" as referred to in this report is a *USB CALCULATOR / U-DRIVE MOUSE*. The EUT is measured approximately 9.9 cm L x 6.0 cm W x 3.0 cm H. rated input voltage: DC 3V battery.

** The test data gathered are from production sample, serial number: 0612035 provided by the manufacturer, we received EUT on 2006-12-29.*

Objective

This Type approval report is prepared on behalf of *MANOVA International Ltd.* 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, 15.209 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. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratory Corp. (Shenzhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratory 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 and Industrial Canada registration test site No.: 5500A. 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 Laboratory 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

Schematics and Block Diagram

Please refer to the Exhibit D.

Equipment Modifications

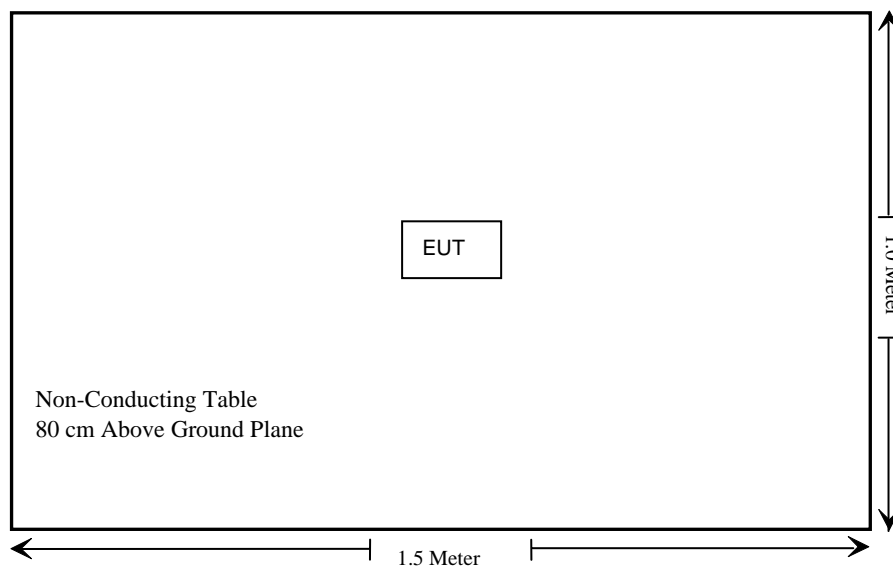
Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

Configuration of Test Setup



EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna requirement	Compliant
§15.205	Restricted Band of operation	Compliant
§15.209	Radiated Emission Limit	Compliant
§15.227(a)	Field Strength	Compliant
§15.227(b)	Out of band emission	Compliant

§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, and please refer to the EUT internal photos.

Result: Compliance.

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

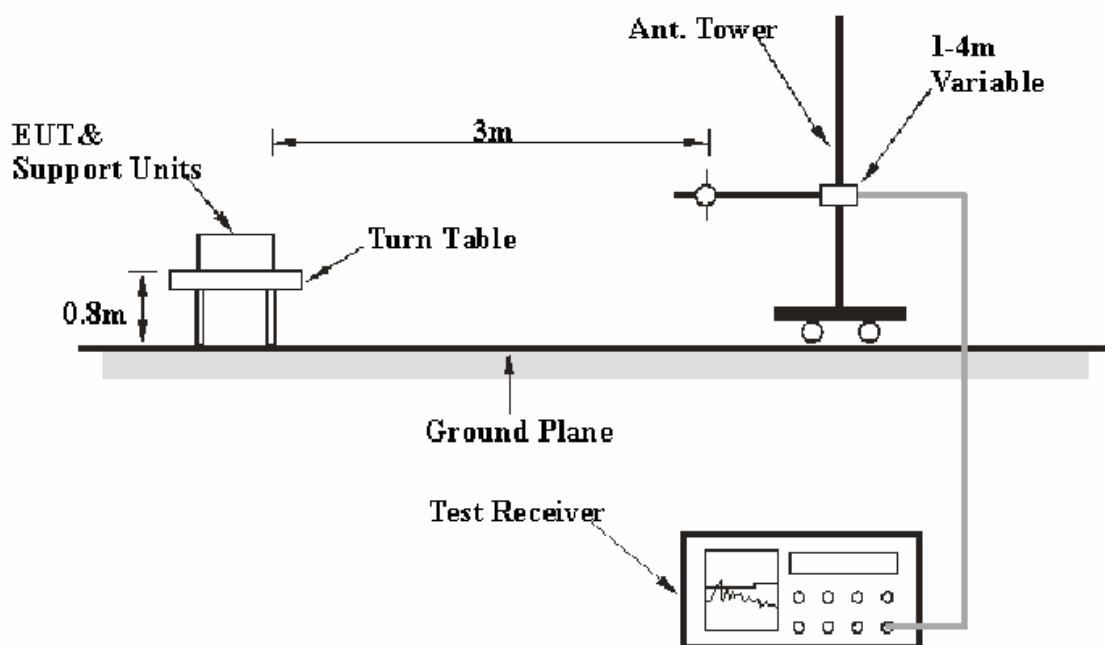
Measurement Uncertainty

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 Laboratory Corp. (Shenzhen) is ± 4.0 dB.

The fundamental data was measured in average and peak detection mode.

EUT Setup



The radiated emission tests were performed in the 3-meter chamber A test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part 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:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
Below 30 MHz	10 kHz	30 kHz
30 – 1000 MHz	100 kHz	300 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2006-11-15	2007-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2006-08-14	2007-08-14
ETS	Passive Loop Antenna	6512	00029604	2006-08-25	2007-08-25

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Amplitude 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:

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

Test Results Summary

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

8.1 dB at 270.45 MHz in the **Horizontal** polarization, 30 MHz-1000MHz

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	1010 mbar

The testing was performed by Hansen Hu on 2007-01-11.

Test mode: Transmitting

30MHz-1000MHz:

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC PART 15.227&15.209		
Frequency (MHz)	Meter Reading (dBμV)	Angle Degree	Height Meter	Polar H/ V	Antenna Factor (dB/m)	Cable Loss (dB)	Amplifier Gain (dB)	Corr. Ampl. (dBμV/m)	Limit dBμV/m	Margin (dB)	Remark
270.45	51.6	210	1.2	h	11.5	2.4	27.6	37.9	46.0	8.1	harmonics
162.270	45.2	45	1.2	v	10.6	1.7	28.2	29.3	43.5	14.2	harmonics
243.405	50.8	90	1.0	h	10.0	2.4	27.8	35.4	46.0	10.6	harmonics
432.67	43.6	160	1.5	v	14.5	3.1	28.5	32.7	46.0	13.3	spurious
135.225	39.9	180	1.2	h	11.7	1.6	28.3	24.9	43.5	18.6	harmonics
54.090	45.2	60	1.0	h	7.1	0.9	28.6	24.6	40.0	15.4	harmonics
216.36	40.3	210	1.5	h	9.4	2.1	27.9	23.9	46.0	22.1	harmonics
189.315	40.0	180	1.2	h	9.8	1.9	28.0	23.7	43.5	19.8	harmonics
81.135	44.0	60	1.2	h	5.7	1.1	28.4	22.4	40.0	17.6	harmonics
162.270	36.7	90	1.0	h	10.6	1.7	28.2	20.8	43.5	22.7	harmonics
108.180	37.5	90	1.2	h	9.8	1.3	28.5	20.1	43.5	23.4	harmonics
54.090	40.3	270	1.0	v	7.1	0.9	28.6	19.7	40.0	20.3	harmonics
135.225	34.7	45	1.2	v	11.7	1.6	28.3	19.7	43.5	23.8	harmonics
81.135	40.1	45	1.2	v	5.7	1.1	28.4	18.5	40.0	21.5	harmonics
189.315	33.9	90	1.1	v	9.8	1.9	28.0	17.6	43.5	25.9	harmonics
216.36	33.0	270	1.1	v	9.4	2.1	27.9	16.6	46.0	29.4	harmonics
108.180	33.7	60	1.0	v	9.8	1.3	28.5	16.3	43.5	27.2	harmonics
270.45	33.4	45	1.3	v	11.5	2.4	27.6	19.7	46.0	26.3	harmonics
243.405	34.7	150	1.4	v	10.0	2.4	27.8	19.3	46.0	26.7	harmonics

Fundamental:

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC PART 15.227		
Frequency (MHz)	Meter Reading (dBμV)	Angle Degree	Height Meter	Dictator AV/PK	Antenna Factor (dB/m)	Cable Loss (dB)	Amplifier Gain (dB)	Corr. Ampl. (dBμV/m)	Limit dBμV/m	Margin (dB)	Remark
27.045	53.47	90	1.0	AV	30.3	0.6	28.8	55.57	80.0	24.43	Fundamental
27.045	54.24	60	1.2	PK	30.3	0.6	28.8	56.34	100.0	43.66	Fundamental

§15.227(b) - Out of Band Emission

Standard Applicable

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in §15.209.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2006-11-15	2007-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
ETS	Passive Loop Antenna	6512	00029604	2006-08-25	2007-08-25

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

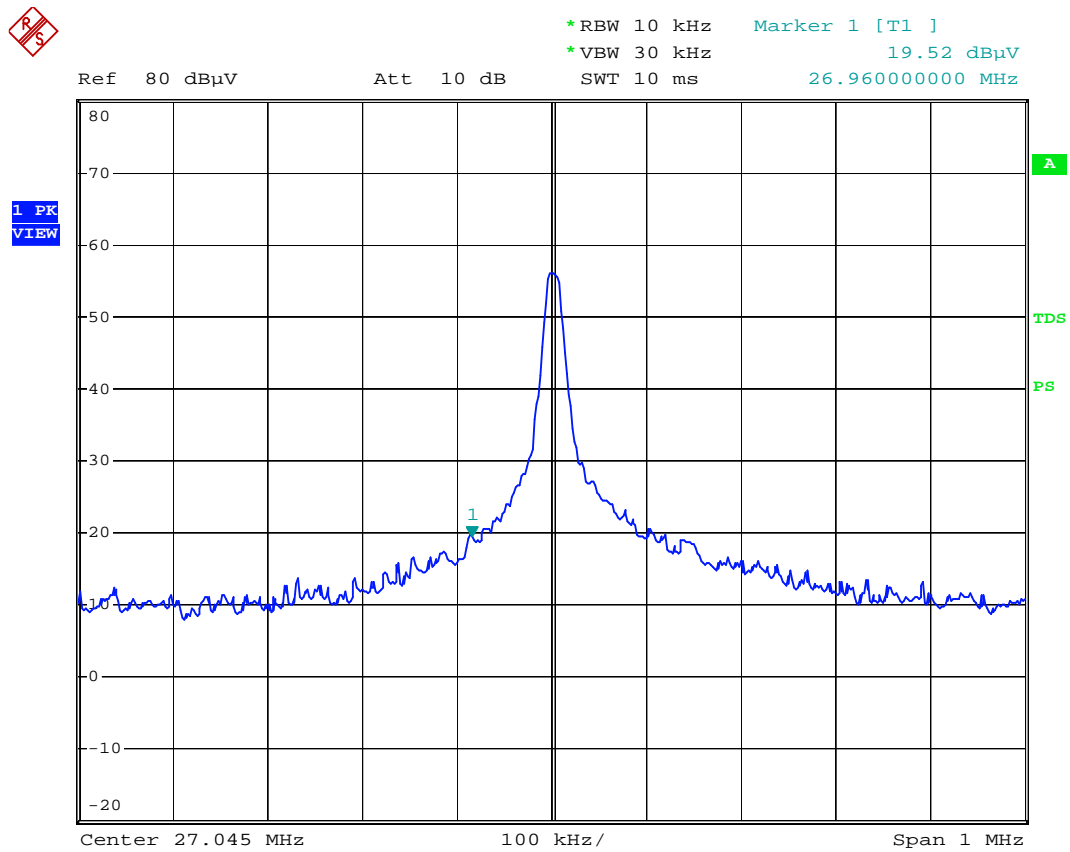
Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	1010 mbar

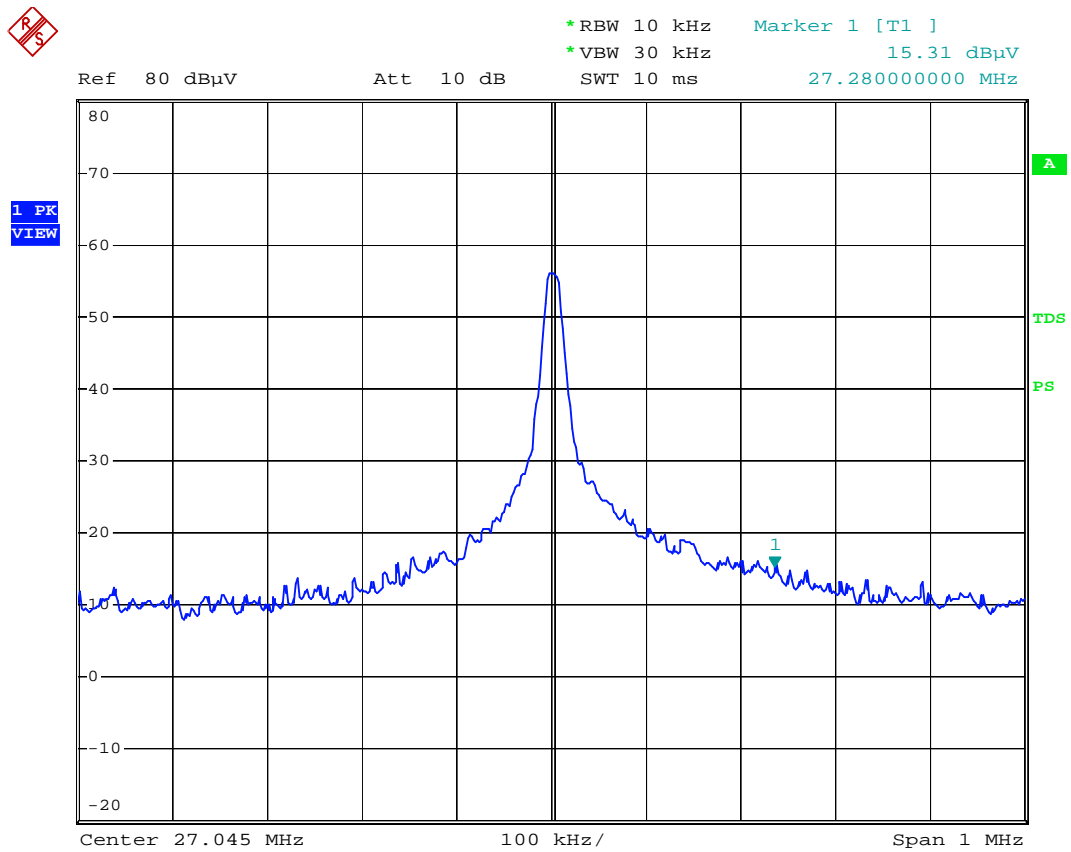
The testing was performed by Hansen Hu on 2007-01-18.

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



out of band

Date: 18.JAN.2007 16:51:44



out of band

Date: 18.JAN.2007 16:52:16