

FCC PART 15.227
EMI MEASUREMENT AND TEST REPORT

For

Eastern Times Technology Co., Ltd

Building 5, PengHua Industry Park, Heping Rd(W), LongHua Town, Shenzhen, China

FCC ID: RNKDS-2128

June 1, 2005

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Transmitter, wireless mouse
Test Engineer: William Chen <i>William Chen</i>	
Report No.: RSZ05052302	
Test Date: May 25, 2005	
Reviewed By: Chris Zeng <i>Chris Zeng</i>	
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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 *Eastern Times Technology Co., Ltd*'s product, model number: DS-2128 or the "EUT" as referred to in this report is a Transmitter of wireless mouse. The EUT is measured approximately 8.0cm L x 5.0cm W x 2.8cm H. rated input voltage: DC 3V battery.

* *The test data gathered are from production sample, serial number: 0504020, provided by the manufacturer.*

Objective

This Type approval report is prepared on behalf of *Eastern Times Technology Co., 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. 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 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 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, BACL 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

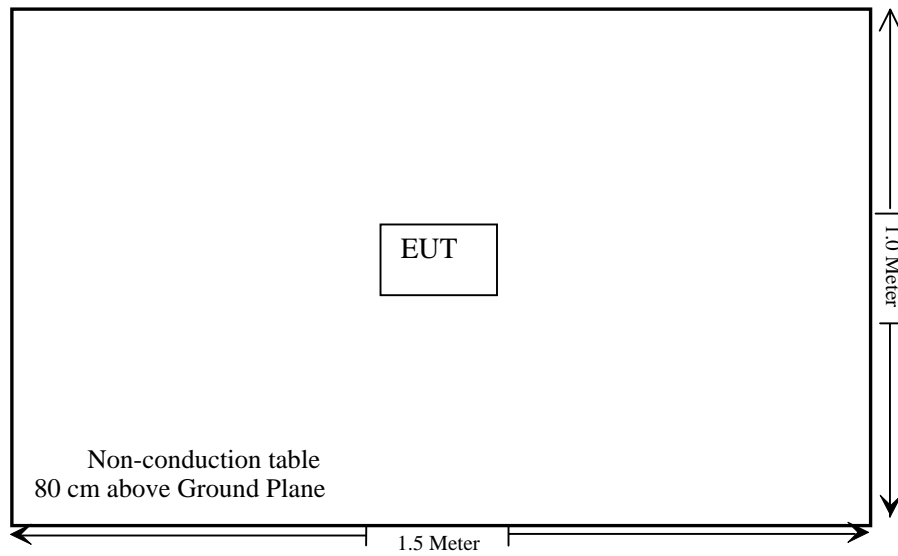
BACL has not done any modification on the EUT.

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.

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 BAEL is ± 4.0 dB.

EUT Setup

The radiated emission tests were performed in the chamber A 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.

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 test receiver was set with the following configurations:

<i>Frequency</i>	<i>RB/W</i>	<i>VB/W</i>	<i>IF B/W</i>
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
Rohde & Schwarz	Test Receiver	ESCI	100035	2004-9-15	2005-9-14
HP	Amplifier	8447E	1937A01046	2004-9-1	2005-8-31
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2005-4-19	2006-4-18

* **Statement of Traceability:** BAEL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions in the described configurations.

According to FCC rules 15.33 (c) and ANSI C63.4-2003 Annex I.4, when average detector function limits are specified for a pulse-modulated transmitter, the average level of emission may be found by measuring the peak level of the emissions and correcting them with the duty cycle as follows:

- 1) Turn on the transmitter, and set it to transmit the pulse train continuously.
- 2) Tune a spectrum analyzer to the transmitter, carrier frequency, and set the spectrum analyzer resolution bandwidth wide enough to encompass all significant spectral components. The video bandwidth should be at least as wide as the resolution bandwidth.
- 3) Set the spectrum analyzer vertical scale (amplitude) to the linear mode and the analyzer frequency scan to 0 Hz.
- 4) Calculate the duty cycle = Tx On / (Tx On + Tx Off) = 86/108 = 0.796
- 5) Multiply the peak-detector field strength (expressed in uV/m) of an emission from a transmitter using pulsed modulation by the duty cycle just measured to determine the average detector field strength of that emission for comparison to the average detector limit.

Please refer to the plots in next page for duty cycle.

Other data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limits), and are distinguished with a “Qp” in the data table.

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:

-9.40 dB at 81.135 MHz in the Horizontal polarization.

Test Data**Environmental Conditions**

Temperature:	22° C
Relative Humidity:	58%
ATM Pressure:	1016mbar

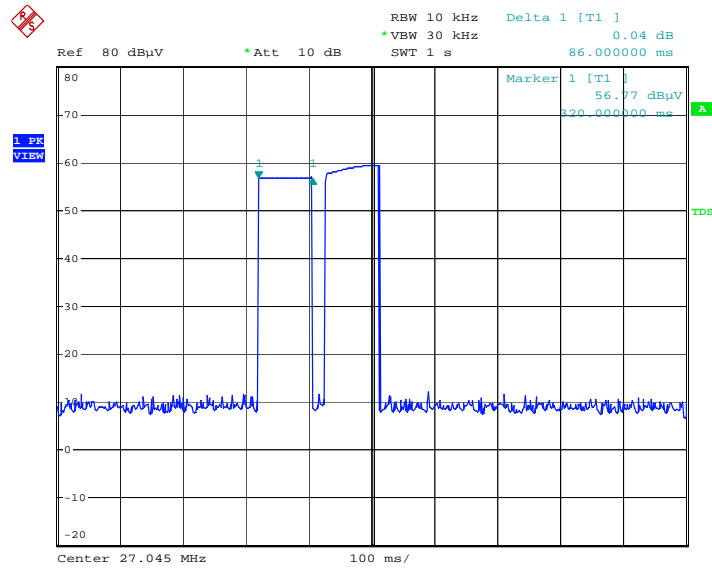
Testing was performed by William Chen on 2005-5-25.

Test Mode: Transmitting

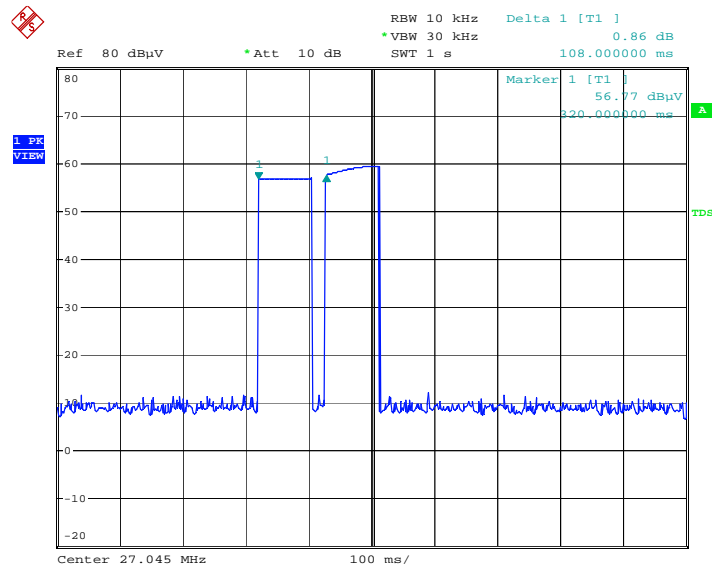
INDICATED		TABLE Angle Degree	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE Corr. Ampl. dB μ V/m	FCC PART 15.227&15.209		
Frequency MHz	Meter Reading dB μ V/m		Height Meter	Polar H/ V	Antenna Loss dB/m	Cable Loss dB	Amplifier Gain dB		Limit dB μ V/m	Margin dB	Remark
81.135	49.83	60	1.2	h	8.6	0.8	28.7	30.60	40.0	-9.40	Harmonics
54.090	50.02	270	1.0	v	8.5	0.7	28.7	30.50	40.0	-9.50	Harmonics
81.135	48.18	45	1.2	v	8.6	0.8	28.7	28.90	40.0	-11.10	Harmonics
135.225	45.22	45	1.2	h	14.5	1.1	28.5	32.30	43.5	-11.20	Harmonics
54.090	47.24	60	1.0	h	8.5	0.7	28.7	27.70	40.0	-12.30	Harmonics
135.225	41.40	180	1.2	v	14.5	1.1	28.5	28.50	43.5	-15.00	Harmonics
108.180	45.05	60	1.0	h	11.0	1.0	28.5	28.60	43.5	-15.00	Harmonics
108.180	44.58	90	1.2	v	11.0	1.0	28.5	28.10	43.5	-15.40	Harmonics
162.270	42.30	45	1.2	h	12.7	1.1	28.3	27.80	43.5	-15.70	Harmonics
162.270	40.32	90	1.0	v	12.7	1.1	28.3	25.80	43.5	-17.70	Harmonics
27.045	56.73	180	1.0	v	24.1	0.6	28.8	52.63	100.0	-47.37	Fund(PK)
27.045	54.16	180	1.0	h	24.1	0.6	28.8	50.06	100.0	-49.94	Fund(PK)
27.045	52.17	AVE=Peak * Duty Cycle=510 μ V/m *79.6% \approx 405.96 μ V/m							80.0	-27.83	Fund(AV)
27.045	54.73	AVE=Peak * Duty Cycle=685 μ V/m *79.6% \approx 545.26 μ V/m							80.0	-25.27	Fund(AV)

Duty Cycle

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



Date: 28.MAY.2005 11:28:33



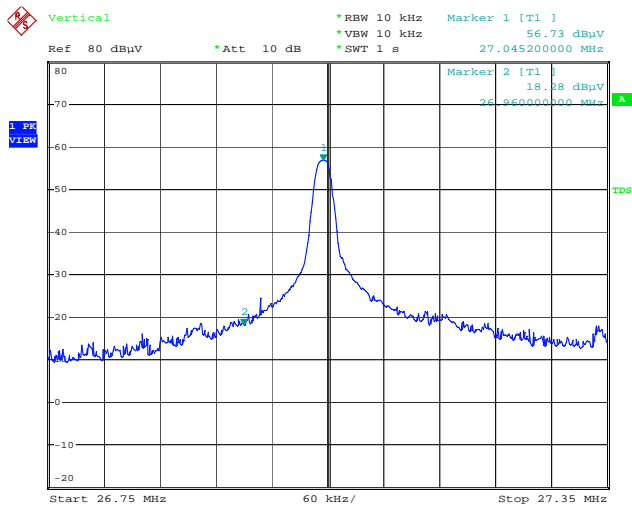
Date: 28.MAY.2005 11:29:50

§15.227(b) - Out of Band Emission

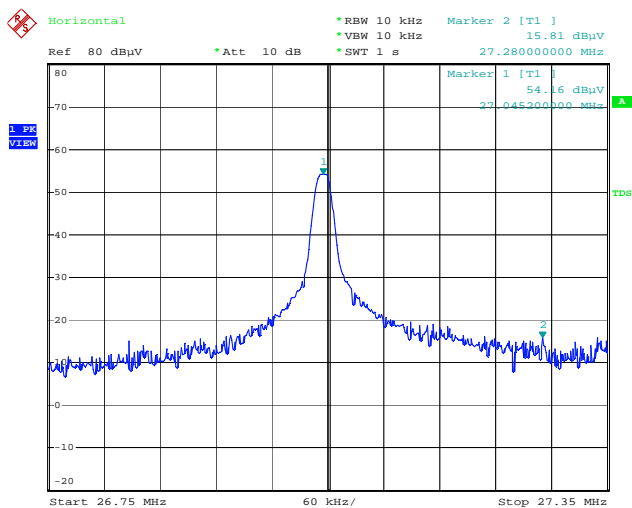
The result has been complied with the 15.227(b), see the following plot:

Frequency MHz	Emission dB μ V/m	Limit dB μ V/m
26.96	18.28	40
27.28	15.81	40

Test Result: Pass



Date: 28.MAY.2005 11:21:42



Date: 28.MAY.2005 11:24:12