

**Bandai (HK) Company Limited**

Application  
For  
Certification  
**(FCC ID: PQ3WB21T)**

Computer Peripheral

WO# 0106510  
WN/at  
December 14, 2001

- The test results reported in this report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
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FCC ID : PQ3WB21T

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## **LIST OF EXHIBITS**

### *INTRODUCTION*

<i>EXHIBIT 1:</i>	General Description
<i>EXHIBIT 2:</i>	System Test Configuration
<i>EXHIBIT 3:</i>	Emission Results
<i>EXHIBIT 4:</i>	Equipment Photographs
<i>EXHIBIT 5:</i>	Product Labelling
<i>EXHIBIT 6:</i>	Technical Specifications
<i>EXHIBIT 7:</i>	Instruction Manual

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## MEASUREMENT/TECHNICAL REPORT

**Bandai (HK) Company Limited - MODEL: 70709**  
**FCC ID: PQ3WB21T**

**December 14, 2001**

This report concerns (check one:) Original Grant X Class II Change \_\_\_\_\_

Equipment Type: Computer Peripheral (example: computer, printer, modem, etc.)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes \_\_\_\_\_ No X

If yes, defer until: \_\_\_\_\_  
date

Company Name agrees to notify the Commission by: \_\_\_\_\_  
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes \_\_\_\_\_ No X

If no, assumed Part 15, Subpart B for unintentional radiator

Report prepared by: \_\_\_\_\_

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Intertek Testing Services  
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HONG KONG  
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# INTERTEK TESTING SERVICES

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## Table of Contents

1.0 <b><u>General Description</u></b> .....	2
1.1 Product Description .....	2
1.2 Related Submittal(s) Grants .....	2
1.3 Test Methodology .....	3
1.4 Test Facility .....	3
1.5 Equipment List .....	4
2.0 <b><u>System Test Configuration</u></b> .....	6
2.1 Justification .....	6
2.2 EUT Exercising Software .....	6
2.3 Support Equipment List and Description .....	6
2.4 Equipment Modification .....	7
2.5 specialk Accessories .....	7
3.0 <b><u>Emission Results</u></b> .....	9
3.1 Field Strength Calculation .....	10
3.2 Radiated Emission Configuration Photograph .....	11
3.3 Radiated Emission Data .....	12
4.0 <b><u>Equipment Photographs</u></b> .....	14
5.0 <b><u>Product Labelling</u></b> .....	16
6.0 <b><u>Technical Specifications</u></b> .....	18
7.0 <b><u>Instruction Manual</u></b> .....	20

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### List of attached file

Exhibit type	File Description	filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated1.pdf to radiated2.pdf
External Photo	External Photo	ophoto1.pdf, ophoto2.pdf
Internal Photo	Internal Photo	iphoto1.pdf to iphoto2.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual1.pdf to manual4.pdf

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**EXHIBIT 1**

**GENERAL DESCRIPTION**

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### **1.0 General Description**

#### **1.1 Product Description**

The equipment under test (EUT) is a interface for a computer - Interactive Robot. The EUT is powered by 2 new AA batteries. There is a ON/OFF switch on the EUT. After turning on the power, it can transmit programs from the PC to the robot, and it also sends infrared signals to the robot transmitting the information designed in program.

The brief circuit description is listed as follows :

- IC1 and associated circuit act as Controller.
- Q1 and associated circuit act as IR Transmitter.

#### **1.2 Related Submittal(s) Grants**

This is a single application for certification of a Computer Peripheral.

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### 1.3 Test Methodology

The radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

### 1.4 Test Facility

The open area test site and conducted measurement facility used to collect the emission data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.



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### 1.5 Equipment List

#### Radiated Emissions Tests for FCC Part 15

Equipment	EMI Test Receiver	Antenna Set	
Registration No.	EW-0014	EW-0953	EW-0954
Manufacturer	R&S	EMCO	EMCO
Model No.	ESVS30	3148	3104C
Serial No.	842807/001	9909-1093	9911-4872
Calibration Institute	HKGSCS	ETS	ETS
Calibration Certificate No.	RF010108	12974	13045
Calibration Date	January 16, 2001	June 22, 2001	June 27, 2001
Calibration Due Date	January 16, 2002	June 22, 2002	June 27, 2002
Traceability	HKGSCS	NIST	NIST

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**EXHIBIT 2**

**SYSTEM TEST CONFIGURATION**

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### **2.0     System Test Configuration**

#### **2.1     Justification**

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (1992.)

The EUT was powered by two new AA batteries.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The system was configured for testing in a typical fashion (as a customer would normally use it). The system was tested during data transfer from the weather monitor to the personal computer.

During testing, the peripheral locations were not varied with respect to the main unit.

All interconnecting cables dropped from the rear of the turntable, but none were within 40cm of the ground plane.

The mouse and keyboard cables were arranged in order to maximize emissions.

The arrangement of the cables dangling from the rear of the table was varied to the extent possible to product the maximum emissions.

#### **2.2     EUT Exercising Software**

Robot works (Supplied by Client)

#### **2.3     Special Accessories**

There are no special accessories necessary for compliance of this product.

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### 2.4 Equipment Modification

Any modifications installed previous to testing by Bandai (HK) Company Limited will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services.

### 2.5 Support Equipment List and Description

This product was tested in a standalone configuration.

All the items listed under section 2.0 of this report are

*Confirmed by:*

*Wilbur Ng  
Manager  
Intertek Testing Services  
Agent for Bandai (HK) Company Limited*



\_\_\_\_\_  
Signature

December 14 \_\_\_\_\_  
Date

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**EXHIBIT 3**

**EMISSION RESULTS**

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### 3.0 **Emission Results**

Data is included worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

### 3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

where FS = Field Strength in dB $\mu$ V/m

RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where FS = Field Strength in dB $\mu$ V/m

RR = RA - AG in dB $\mu$ V

LF = CF + AF in dB

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V/m}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$FS = RR + LF$$

$$FS = 23 + 9 = 32 \text{ dB}\mu\text{V/m}$$

$$RR = 23.0 \text{ dB}\mu\text{V}$$

$$LF = 9.0 \text{ dB}$$

$$\text{Level in mV/m} = \text{Common Antilogarithm} [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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### **3.2 Radiated Emission Configuration Photograph**

**Worst Case Radiated Emission**

**37.306 MHz**

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated1.pdf to radiated2.pdf



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### 3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 13.4 dB

#### **TEST PERSONNEL:**



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*Signature*

Anthony K. M. Chan, Compliance Engineer  
*Typed/Printed Name*

December 14, 2001  
*Date*

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Company: Bandai (HK) Company Limited  
Model: 70709

Date of Test: June 11, 2001

Table 1

### Radiated Emissions

Polarity	Frequency (MHz)	Reading (dB $\mu$ V)	Antenna Factor (dB)	Pre- Amp Gain (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	33.302	31.7	10	16	25.7	40	-14.3
V	37.306	32.6	10	16	26.6	40	-13.4
V	41.550	30.8	10	16	24.8	40	-15.2
V	48.553	31.0	11	16	26.0	40	-14.0
V	55.303	30.8	11	16	25.8	40	-14.2
V	67.216	33.2	8	16	25.2	40	-14.8
V	78.336	34.2	6	16	24.2	40	-15.8
H	84.214	31.9	8	16	23.9	40	-16.1

- Notes:
1. Negative sign in the column shows value below limit.
  2. Peak Detector Data unless otherwise stated.
  3. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

Test Engineer: Anthony K. M. Chan

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**EXHIBIT 4**

**EQUIPMENT PHOTOGRAPHS**

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### 4.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename: ophoto1.pdf to ophoto2.pdf and iphoto1.pdf to iphoto2.pdf

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**EXHIBIT 5**

**PRODUCT LABELLING**

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### 5.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and the label location are saved with filename: label.pdf

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**EXHIBIT 6**

**TECHNICAL SPECIFICATIONS**

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### 6.0 **Technical Specifications**

For electronic filing, the block diagram and schematics are saved with filename: block.pdf and circuit.pdf respectively.



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**EXHIBIT 7**

**INSTRUCTION MANUAL**

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### 7.0 **Instruction Manual**

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual1.pdf to manual4.pdf

This manual will be provided to the end-user with each unit sold/leased in the United States.