

Issuing Laboratory:

Intertek Testing Services Hong Kong Limited

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TEST REPORT

Report No.: 13090344HKG-001R1

Bandai (HK) Ltd.

Application
For
Certification
(Original Grant)

This report supersedes previous report with report number 13090344HKG-001 dated January 13, 2014.

(FCC ID: PQ337481TG13)

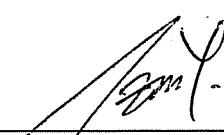
Transceiver

Prepared and Checked by:



Chan Kwan Ho, Alex
Assistant Engineer

Approved by:



Chan Chi Hung, Terry
Supervisor
Date: January 20, 2014

- The test report only allows to be revised within the retention period unless further standard or the requirement was noticed.
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**GENERAL INFORMATION**

Bandai (HK) Ltd.
BRAND NAME: N/A

**MODEL: 37481, 37482, 37483, 37484, 37485, 37486, 37581, 37582, 37583,
37584, 37585, 37586**
FCC ID: PQ337481TG13

Grantee:	Bandai (HK) Ltd.
Grantee Address:	28/F., MG Tower, 133 Hoi Bun Road, Kwun Tong, Kowloon, Hong Kong.
Contact Person:	Riggs Chan
Tel:	852 28660229
Fax:	852 25271971
e-mail:	riggs@bandaisz.com.cn
Manufacturer:	Belfry Enterprises Limited
Manufacturer Address:	Flat A, 19F., Superluck Industrial Centre, 57 Sha Tsui Road, Tsuen Wan, Hong Kong.
Buyer Name:	Bandai
Brand Name:	N/A
Model:	37481 Additional Model: 37482, 37483, 37484, 37485, 37486, 37581, 37582, 37583, 37584, 37585, 37586 Asst. No.: 37480, 37580
Type of EUT:	Transceiver
Description of EUT:	GEM-1 (PINK GEM) (37481, 37581) GEM-2 (PURPLE GEM) (37482, 37582) GEM-3 (BLUE GEM) (37483, 37583) ANIMAL PRINTING-1 (COLORFUL LEOPARD) (37484, 37584) ANIMAL PRINTING-2 (PINK HEART LEOPARD) (37485, 37585) ANIMAL PRINTING-3 (BLUE DALMATIAN) (37486, 37586)
Serial Number:	N/A
FCC ID:	PQ337481TG13
Date of Sample Submitted:	September 09, 2013
Date of Test:	September 09, 2013 to September 25, 2013
Report No.:	13090344HKG-001R1
Report Date:	January 20, 2014
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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**SUMMARY OF TEST RESULT****Bandai (HK) Ltd.****BRAND NAME: N/A****MODEL: 37481, 37482, 37483, 37484, 37485, 37486, 37581, 37582, 37583,****37584, 37585, 37586****FCC ID: PQ337481TG13**

TEST SPECIFICATION	REFERENCE	RESULTS
Transmitter Field Strength	15.209	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2012 Edition

Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a transceiver for a electronic toy operating at 0.125MHz. The EUT is powered by 2 X 1.5V AAA batteries. The EUT is equipped with four buttons. After power on the EUT and press suitable buttons to the "Bump" function, the EUT will transmit or receive RF signal from the corresponding transceiver and thus causing it beeping and exchanging data.

The Model: 37482, 37483, 37484, 37485, 37486, 37581, 37582, 37583, 37584, 37585, 37586 are the same as the Model: 37481 in hardware aspect. The difference in item number and main body color serves as marketing strategy.

Antenna Type : Internal, Integral

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is a single application for certification of a transceiver.

1.3 Test Methodology

Radiated emission measurements was performed according to the procedures in ANSI C63.4 (2009). All radiated measurements were performed in an Open Area Test Site. Preliminary scans were performed in the Open Area Test Site 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 used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been placed on file with the FCC.

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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 (2009).

The device was powered by 2 x 1.5V AAA batteries.

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emission at and above 30 MHz, 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 report in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it transmits the RF signal continuously.

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) Ltd. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services Hong Kong Ltd.

2.5 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

2.6 Support Equipment List and Description

N/A.

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3.0 Emission Results

Data is included of the 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), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

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

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

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

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

AV = Average Factor 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 $\text{dB}\mu\text{V}/\text{m}$

$RR = RA - AG - AV$ in $\text{dB}\mu\text{V}$

$LF = CF + AF$ in dB

Assume a receiver reading of 52.0 $\text{dB}\mu\text{V}$ is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 $\text{dB}\mu\text{V}/\text{m}$. This value in $\text{dB}\mu\text{V}/\text{m}$ was converted to its corresponding level in $\mu\text{V}/\text{m}$.

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

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

$$RR = 18.0 \text{ dB}\mu\text{V}$$

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

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

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

$$AV = 5.0 \text{ dB}$$

$$FS = RR + LF$$

$$FS = 18 + 9 = 27 \text{ dB}\mu\text{V}/\text{m}$$

$$\text{Level in } \mu\text{V}/\text{m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V}/\text{m})/20] = 22.4 \mu\text{V}/\text{m}$$

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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 0.500 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

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.

Judgment: Passed by 33.6 dB

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Applicant: Bandai (HK) Ltd.

Date of Test: September 25, 2013

Model: 37481

Worst-Case Operating Mode: Transmission

Table 1

**Radiated Emissions
Pursuant to FCC Part 15 Section 15.209 Requirement**

Polar-ization	Height (m)	Angle (°)	Frequency (MHz)	Net at 3m (dB μ V/m)	Distance Factor (-dB)	Calculated at 300m (dB μ V/m)	Limit at 300m (dB μ V/m)	Margin (dB)
V	1.0	30	0.125	50.0	80	-30.0	25.7	-55.7
V	1.0	30	0.250	45.1	80	-34.9	19.6	-54.5
V	1.0	30	0.375	36.4	80	-43.6	16.1	-59.7

Polar-ization	Height (m)	Angle (°)	Frequency (MHz)	Net at 3m (dB μ V/m)	Distance Factor (-dB)	Calculated at 30m (dB μ V/m)	Limit at 30m (dB μ V/m)	Margin (dB)
V	1.0	30	0.500	40.0	40	0.0	33.6	-33.6
V	1.0	30	0.625	33.2	40	-6.8	31.7	-38.5
V	1.0	30	0.750	30.3	40	-9.7	30.1	-39.8
V	1.0	50	0.875	31.4	40	-8.6	28.8	-37.4
V	1.0	50	1.000	31.6	40	-8.4	27.6	-36.0
V	1.0	50	1.125	31.8	40	-8.2	26.6	-34.8
V	1.0	50	1.250	31.9	40	-8.1	25.7	-33.8

NOTES: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances 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.
3. Negative sign in the column shows value below limit.
4. Loop antenna is used for the emissions below 30MHz.

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4.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

5.0 Product Labelling

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

6.0 Technical Specifications

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

7.0 Instruction Manual

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

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

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8.0 Miscellaneous Information

The miscellaneous information includes details of the test procedure.

8.1 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

8.2 Calculation of Average Factor

The average factor is not applicable for this device as the transmitted signal is a continuously signal.

8.3 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

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8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.4 (2009).

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

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9.0 Equipment List

Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Active loop H-field Antenna
Registration No.	EW-2500	EW-0954	EW-0191
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI	3104C	6502
Calibration Date	Mar. 22, 2013	Apr. 30, 2013	Jan. 30, 2013
Calibration Due Date	Feb. 28, 2014	Oct. 30, 2014	Jul. 30, 2014

Equipment	Spectrum Analyzer
Registration No.	EW-2188
Manufacturer	AGILENTTECH
Model No.	E4407B
Calibration Date	Nov. 05, 2012
Calibration Due Date	Nov. 05, 2013