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TEST REPORT

Report No.: 14060242HKG-001

JAKKS Pacific (HK) Limited

Application
For
Certification
(Original Grant)
(FCC ID: OTA78433)
(IC: 7783A-78433)

Transmitter

Prepared and Checked by:

Approved by:

Wong Kwok Yeung, Kenneth
Lead Engineer

Chan Chi Hung, Terry
Supervisor
Date: July 11, 2014

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GENERAL INFORMATION

Grantee:	JAKKS Pacific (HK) Limited
Grantee Address:	12/F., Wharf T&T Centre, 7 Canton Road, Tsim Sha Tsui, Kowloon, Hong Kong.
Contact Person:	Dick Au
Tel:	2269 7631
Fax:	2366 8247
e-mail:	dicka@jakks.com.hk
Manufacturer:	Root Land Plastic Factory
Manufacturer Address:	Bai Yun Keng Industrial, Danshui Town, Huiyang Zone, Huizhou City, Guangdong, Province China.
Vendor:	Root Land Ltd.
Brand Name:	N/A
Model:	78433
FCC Additional Model:	82642
Asst. No.:	78433, 78433-CAN, 78433-EU, 82642, 82642-CAN, 82642-EU
GL Class No.:	3500.8020.105
Type of EUT:	Transceiver
Description of EUT:	Hero Portal - Power Rangers (Red, Blue, Green, Pink, Yellow, Silver Ranger) (78433) Hero Portal - Power Ranger With Six Figure (Red, Blue, Green, Pink, Yellow, Silver Ranger) (82642)
Serial Number:	N/A
FCC ID / IC:	OTA78433 / 7783A-78433
Date of Sample Submitted:	June 05, 2014
Date of Test:	June 05, 2014 to June 15, 2014
Report No.:	14060242HKG-001
Report Date:	July 11, 2014
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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SUMMARY OF TEST RESULT

TEST SPECIFICATION	REFERENCE	RESULTS
Transmitter Field Strength Frequency Stability	15.225 / RSS-210 A2.6	Pass
Radiated Emission in Restricted Bands	15.205 / RSS-210 2.2	Pass

The equipment under test is found to be complying with the following standards:

FCC Part 15, October 1, 2012 Edition

RSS-210 Issue 8, December 2010

RSS-Gen Issue 3, December 2010

- 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 expected 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 13.56MHz RFID transmitter for a game console unit (RFID toy reader) operating at 13.560MHz which is controlled by a crystal. The EUT is powered by 4 x AA size batteries. This product consists of a controller, a portal (RFID tag reader) and six figures of Power Rangers (passive tags). The EUT has an ON/OFF switch and a RFID tag reader on the portal. It can also connect to the TV monitor for game playing. After switched on the EUT, the TV monitor can show the game mode while the Figure (passive tags) was placed on the portal.

For FCC;

The Model: 82642 is the same as the Model: 78433 in hardware aspect. The models are different in Packaging and the figure combination only.

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 transmitter.

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 and IC.

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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 new 4 x 1.5V 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 rear of unit shall be flushed with the rear of the table.

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.

All relevant operation modes have been tested, and the worst case data is included in this report.

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.

2.4 Measurement Uncertainty

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

2.5 Support Equipment List and Description

LCD TV monitor. (Model: Samsung LS15E33C) EW-2122 (Provided By Intertek)
6pcs figures of Power Rangers (Passive tags)

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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 dB μ V/mRA = Receiver Amplitude (including preamplifier) in dB μ 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 dB μ V/mRR = RA - AG - AV in dB μ V

LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ 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 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

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

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

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

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

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

$$FS = RR + LF$$

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

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

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

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



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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 40.680 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 6.7 dB

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Applicant: JAKKS Pacific (HK) Limited

Date of Test: June 15, 2014

Model: 78433

Worst-Case Operating Mode: Transmitting

Table 1

Radiated Emissions
Pursuant to FCC Part 15.225/ RSS-210 Section A2.6 Requirement

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Distance Factor (-dB)	Calculated at 30m (dBμV/m)	Limit at 30m (dBμV/m)	Margin (dB)
V	13.564	60.3	0	10.8	71.1	40.0	31.1	84.0	-52.9
V	27.120	19.4	0	9.5	28.9	40.0	-11.1	29.5	-40.6

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	40.680	39.3	16	10.0	33.3	40.0	-6.7
V	54.240	34.5	16	11.0	29.5	40.0	-10.5
V	67.800	36.9	16	8.0	28.9	40.0	-11.1
V	81.360	40.5	16	7.0	31.5	40.0	-8.5
V	94.920	40.4	16	11.0	35.4	43.5	-8.1
V	108.480	29.5	16	14.0	27.5	43.5	-16.0
V	122.040	37.2	16	14.0	35.2	43.5	-8.3
V	176.232	32.9	16	19.0	35.9	43.5	-7.6
H	203.400	33.1	16	16.0	33.1	43.5	-10.4

- 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.
 5. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-210 Section 2.2.

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3.4 Frequency Tolerance

Data Table
Frequency tolerance of Transmitter
(Temperature Variation: -20°C to +50°C)

Operating frequency		Model: 13.563904MHz		
Test Voltage (V)	Temperature (°C)	Measured frequency (MHz)	Frequency error (%)	Limit (%)
6.0	+ 50	13.563921	+0.000125	±0.01
	+ 40	13.563863	-0.000302	±0.01
	+ 30	13.563957	+0.000391	±0.01
	+ 20	13.563904	0	±0.01
	+ 10	13.563916	+0.000088	±0.01
	0	13.563942	+0.00028	±0.01
	- 10	13.563962	+0.000428	±0.01
	- 20	13.563952	+0.000354	±0.01

We found that the EUT met the requirement of FCC Part 15 Section 15.225(e)/RSS-210 Section A2.6.

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3.5 Supplementary Data for IC RSS-210 Section A2.6

RSS-210 Section A2.6

Data Table
Frequency Deviation with Voltage Variation

Operating frequency		13.563904MHz		
Test Voltage (V)	Temperature (°C)	Measured frequency (MHz)	Frequency error (%)	Limit (%)
6.0	+20	13.563904	0	±0.01
5.44	+20	13.563892	-0.0000884	±0.01
4.87	+20	13.563908	+0.0000295	±0.01
4.30	+20	13.563956	+0.000383	±0.01

Note:

The battery operating end point is 4.30V, which is declared by the manufacturer.



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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 electronics filing, the FCC ID/IC 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 and Canada.

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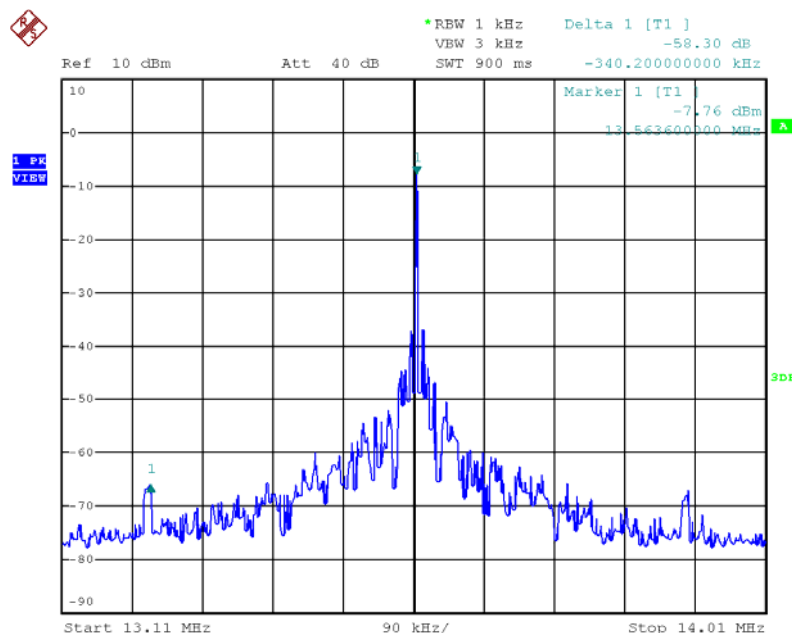


8.0 Miscellaneous Information

The miscellaneous information includes details of the test procedure and measured bandwidth.

8.1 Measured Bandwidth

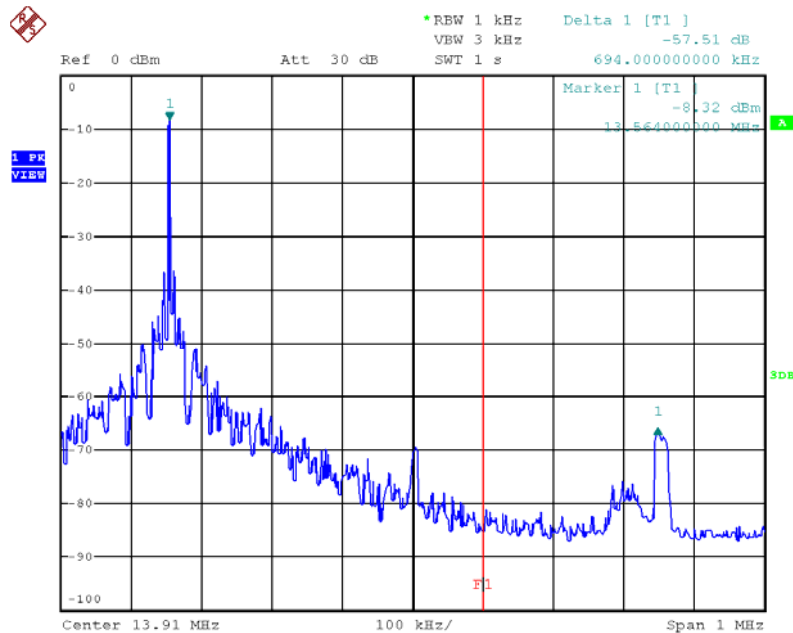
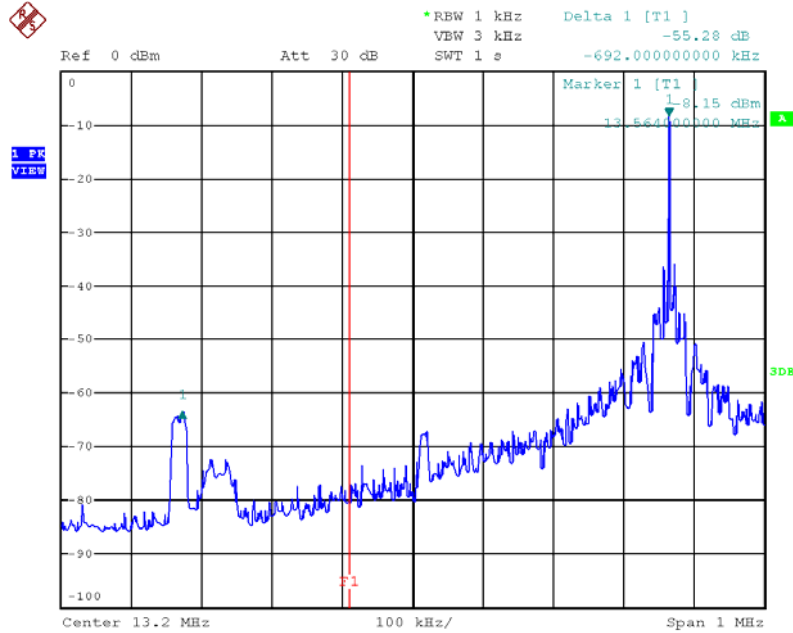
The below plot shows the fundamental emission is confined in the specified band. The emission of the fundamental is 31.1dB μ V/m and it is below the limit of 50.5 dB μ V/m in the range of (13.410-13.553MHz) and (13.567-13.710MHz) and the limit of 40.5 dB μ V/m in the frequency range of (13.110-13.410MHz) and (13.710-14.010MHz). In the frequency range from 13.110-14.010MHz, we cannot find any emission higher than the fundamental emission. Therefore they meet the requirement of Section 15.225(a), (b), (c), & (d).



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8.2 Discussion of Pulse Desensitization

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

8.3 Calculation of Average Factor

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

8.4 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

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Log Periodic Antenna	Biconical Antenna 20MHz to 200MHz
Registration No.	EW-2666	EW-0446	EW-0571
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI7	3146	3104C
Calibration Date	Jun. 20, 2013	Apr. 30, 2013	Nov. 01, 2013
Calibration Due Date	Jun. 20, 2014	Oct. 30, 2014	May 01, 2015

Equipment	Active Loop H-field Antenna	Spectrum Analyzer
Registration No.	EW-0191	EW-2188
Manufacturer	EMCO	AGILENTTECH
Model No.	6502	E4407B
Calibration Date	Jan. 30, 2013	Apr. 16, 2014
Calibration Due Date	Jul. 30, 2014	Apr. 16, 2015

3) Bandedge Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2249
Manufacturer	R&S
Model No.	FSP30
Calibration Date	Oct. 28, 2013
Calibration Due Date	Oct. 28, 2014

END OF TEST REPORT