

## TEST REPORT

Report No.: HK09060590-1

**Mattel Brands, A Division of Mattel Asia  
Pacific Sourcing Ltd. / Mattel Direct Import Inc.**

Application  
For  
Certification  
(Original Grant)

**(FCC ID: PIYP2639-09A5T)**

Transmitter

Prepared and Checked by:



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Terry Chan/at  
Lead Engineer

Approved by:



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Senior Supervisor  
Date: July 4, 2009

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### GENERAL INFORMATION

**Mattel Brands, A Division of Mattel Asia  
Pacific Sourcing Ltd. / Mattel Direct Import Inc.  
MODEL: P2639**

**FCC ID: PIYP2639-09A5T**

Grantee:	Mattel Brands, A Division of Mattel Asia Pacific Sourcing Ltd. / Mattel Direct Import Inc.
Grantee Address:	1301 South Tower, World Finance Centre, Harbour City, Tsim Sha Tsui, Kowloon, Hong Kong.
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Supplier:	Wah Sing Toys
Buyer:	N/A
Manufacturer:	N/A
Manufacturer Address:	N/A
Brand Name:	N/A
Model:	P2639
Type of EUT:	Transmitter
Description of EUT:	Mindflex
Serial Number:	N/A
FCC ID:	PIYP2639-09A5T
Date of Sample Submitted:	June 11, 2009
Date of Test:	June 11, 2009 to July 4, 2009
Report No.:	HK09060590-1
Report Date:	July 4, 2009
Environmental Conidtions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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### SUMMARY OF TEST RESULT

**Mattel Brands, A Division of Mattel Asia Pacific Sourcing Ltd. / Mattel  
Direct Import Inc.  
MODEL: P2639**

**FCC ID: PIYP2639-09A5T**

TEST SPECIFICATION	REFERENCE	RESULTS
Maximum Peak Output Power	15.247(b), (c) / RSS-210 A8.4	N/A
Hopping Channel Carrier Frequencies Separation	15.247(e) / RSS-210 A8.1	N/A
20dB Bandwidth of the Hopping Channel	15.247(a) / RSS-210 A8.1	N/A
Number of Hopping Frequencies	15.247(e) / RSS-210 A8.1	N/A
Average Time of Occupancy of Hopping Frequency	15.247(e) / RSS-210 A8.1	N/A
Antenn Conducted Spurious Emissions	15.247(d) / RSS-210 A8.5	N/A
Radiated Spurious Emissions	15.247(d) / RSS-210 A8.5	N/A
RF Exposure Compliance	15.247(i) / RSS-Gen 5.5	N/A
Transmitter Power Line Conducted Emissions	15.207 / RSS-Gen 7.2.2	N/A
Transmitter Field Strength	15.227 / RSS-310 3.8	N/A
Transmitter Field Strength	15.229 / RSS-210 A2.7	N/A
Transmitter Field Strength, Bandwidth and Timing Requirement	15.231(a) / RSS-210 A1.1.1	N/A
Transmitter Field Strength, Bandwidth and Timing Requirement	15.231(e) / RSS-210 A1.1.5	N/A
Transmitter Field Strength and Bandwidth Requirement	15.239 / RSS-210 A2.8	N/A
Transmitter Field Strength and Bandwidth Requirement	15.249 / RSS-210 A2.9	Pass
Transmitter Field Strength and Bandwidth Requirement	15.235 / RSS-310 3.9	N/A

- 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 transmitter for a RC Mindflex headset operating at 2.4GHz. The EUT is powered by 3 x AAA batteries. The EUT has a ON/OFF switch a EEG Electrode and two REF/Gnd Electrode. After switched ON the EUT and put the headset on the head. The headset can be controlled the corresponding Mindflex base unit motor speed by the brainware. The EUT is used single RF channel 2.407GHz and modulation scheme is GFSK. And it only used the transmit function in the headset portion.

Antenna Type : PCB Antenna

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.

The receiver for this transmitter is exempted from the Part 15 technical rules per 15.101(b).

#### 1.3 Test Methodology

Radiated emission measurements was performed according to the procedures in ANSI C63.4 (2003). 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 and conducted measurement facility 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 (2003).

The device was powered from 3 new AAA batteries during test.

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 placed on a turn table, 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.

#### 2.4 Equipment Modification

Any modifications installed previous to testing by Mattel Brands, A Division of Mattel Asia Pacific Sourcing Ltd. / Mattel Direct Import Inc. 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.

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### 2.6 Support Equipment List and Description

N/A.

### 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 $\mu$ 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
- 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 $\mu$ V/m
- RR = RA - AG - AV 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 and average factor of 5 dB are subtracted, giving a field strength of 27 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

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

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

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

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

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

$$FS = RR + LF$$

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

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

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

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

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### 3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission at 2406.702 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 1.2 dB



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Applicant: Mattel Brands, A Division of Mattel Asia  
Pacific Sourcing Ltd. / Mattel Direct Import Inc.

Date of Test: June 17, 2009

Model: P2639

Mode: TX

Sample: 1/2

Table 1

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Average Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	2406.702	96.4	33	29.4	92.8	0	92.8	94.0	-1.2
V	4813.404	44.9	33	34.9	46.8	0	46.8	54.0	-7.2
H	7220.106	41.0	33	37.9	45.9	0	45.9	54.0	-8.1
H	9626.808	39.4	33	40.4	46.8	0	46.8	54.0	-7.2
H	12033.517	40.2	33	40.5	47.7	0	47.7	54.0	-6.3
V	14440.217	40.9	33	40.0	47.9	0	47.9	54.0	-6.1
V	16846.914	43.0	33	37.6	47.6	0	47.6	54.0	-6.4

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. Horn antenna is used for the emission over 1000MHz.

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Applicant: Mattel Brands, A Division of Mattel Asia  
Pacific Sourcing Ltd. / Mattel Direct Import Inc.

Date of Test: June 17, 2009

Model: P2639

Mode: ON Mode (Digital Part)

Sample: 1/2

Table 2

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	36.117	35.8	16	10.0	29.8	40.0	-10.2
V	42.149	36.2	16	10.0	30.2	40.0	-9.8
V	48.139	35.9	16	11.0	30.9	40.0	-9.1
V	54.141	35.2	16	11.0	30.2	40.0	-9.8
V	60.149	35.8	16	10.0	29.8	40.0	-10.2
V	66.150	36.4	16	9.0	29.4	40.0	-10.6

Notes: Negative signs (-) in the margin column signify levels below the limit.

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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 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.

### 8.0 **Miscellaneous Information**

This miscellaneous information includes details of the measured bandwidth.

#### 8.1 **Bandedge Plot**

For electronic filing, the plot shows the fundamental emission are confined in the specified band (902MHz and 928MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard bandwidth is the bandwidth specified by ANSI C63.4 (2003) for frequency being measured.

Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50dB below the level of the fundamental or to the general radiated emissions limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).

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### 8.1 Bandedge Plot (cont'd)

#### Peak Measurement

Bandedge compliance is determined by applying marker-delta method,

$$\begin{aligned}\text{Resultant field strength} &= \text{Fundamental emissions (peak value)} - \text{delta} \\ &= 92.80 \text{ dB}\mu\text{V/m} - 47.81 \text{ dB} \\ &= 44.99 \text{ dB}\mu\text{V/m}\end{aligned}$$

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74 dB $\mu$ V/m (Peak Limit) and 54 dB $\mu$ V/m (Average Limit).

Figure 8.1 Bandedge

### 8.2 Emissions Test Procedures

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

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003.

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 axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

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### 8.2 Emissions Test Procedures (cont'd)

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.

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. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

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 are made as described in ANSI C63.4 - 2003.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted 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, but those measurements taken at a closer distance are so marked.

### 9.0 Confidentiality Request

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: request.pdf.

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### 10.0 Equipment List

#### 1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Log Periodic Antenna	Spectrum Analyzer
Registration No.	EW-0014	EW-0954	EW-0446	EW-2188
Manufacturer	R&S	EMCO	EMCO	AGILENTTECH
Model No.	ESVS30	3104C	3146	E4407B
Calibration Date	1-Jun-2009	Sep. 30, 2008	Oct. 02, 2008	Dec. 18, 2008
Calibration Due Date	1-Jun-2010	Mar. 30, 2010	Apr. 02, 2010	Dec. 18, 2009

Equipment	Double Ridged Guide Antenna
Registration No.	EW-1015
Manufacturer	EMCO
Model No.	3115
Calibration Date	Jul. 28, 2008
Calibration Due Date	Jan. 28, 2010