TEST REPORT

Report No.: HK10080576-1

LEAPFROG ENTERPRISES, INC.

Application
For
Certification
(Original Grant)
(FCC ID: QDX19172)

Transmitter

Prepared and Checked by:

Signed On File
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Date: September 04, 2010

GENERAL INFORMATION

LEAPFROG ENTERPRISES, INC.
MODEL: 19172

FCC ID: QDX19172

Grantee:	LEAPFROG ENTERPRISES, INC.
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Manufacturer:	Sunmart Company Limited
Manufacturer Address:	Guan Yan Road, Guan Yan Nan Hai District, Foshan City, Guang Dong, China
Brand Name:	LEAPFROG
Model:	19172
Additional Model:	81187 and 81188
Type of EUT:	Transmitter
Description of EUT:	Count & Scan Shopper
Serial Number:	N/A
FCC ID:	QDX19172
Date of Sample Submitted:	August 12, 2010
Date of Test:	August 20, 2010
Report No.:	HK10080576-1
Report Date:	September 04, 2010
Environmental Conidtions:	Temperature: +10 to 40°C Humidity: 10 to 90%

SUMMARY OF TEST RESULT

LEAPFROG ENTERPRISES, INC.
MODEL: 19172

FCC ID: QDX19172

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
Antenna 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	15.225 / RSS-210 A2.6	Pass
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	N/A
Transmitter Field Strength and Bandwidth Requirement	15.235 / RSS-310 3.9	N/A
Receiver / Digital Device Radiated Emissions	15.109 / ICES-003	N/A
Digital Device Conducted Emissions	15.107 / ICES-003	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 pervisions 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 transmitter for an inductive toy Count & Scan Shopper (RFID toy reader) operating at 13.560 MHz which is controlled by a crystal. The EUT is powered by 3 x AAA size batteries. This toy consists of a toy Count & Scan Shopper (RFID tag reader) and ten toy food items (passive type powered tags). The EUT has an ON/OFF/ Volume switch, a 3-Way mode switch, free play button and a RFID tag sensor on the face of scanner. Set the 3-Way mode switch to desired game mode. In each game mode, the EUT can scan any food item and it will generate different sound effect and related spoken responses to user.

The Model: 81187 and 81188 are the same as the Model: 19172 in hardware aspect. The difference in model numbers only.

Antenna Type : External, Integral

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

1.2 Related Submittal(s) Grants

The receiver portion for this transceiver 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.

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 by 3 x AAA size 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 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.

2.4 Equipment Modification

Any modifications installed previous to testing by LEAPFROG ENTERPRISES, 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.

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 dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
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 dBµV/m
RR = RA - AG - AV in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV 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 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
AV = 5.0 dB
FS = RR + LF
FS = 18 + 9 = 27 dBµV/m

RR = 18.0 dBµV
LF = 9.0 dB

Level in µV/m = Common Antilogarithm [(27 dBµV/m)/20] = 22.4 µV/m

3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 81.384 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 8.9 dB

Applicant: LEAPFROG ENTERPRISES, INC. Date of Test: August 20, 2010
Model: 19172
Worst-Case Operating Mode: Transmitting

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Distance Factor (-dB)	Calculated at 30m (dBµV/m)	Limit at 30m (dBµV/m)	Margin (dB)
V	13.564	74.2	10.8	0.0	85.0	40.0	45.0	84.0	-39.0
V	27.128	19.6	9.5	0.0	29.1	40.0	-10.9	29.5	-40.4

Table 2

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	40.692	34.9	16	10.0	28.9	40.0	-11.1
V	54.256	34.3	16	11.0	29.3	40.0	-10.7
H	67.820	38.8	16	8.0	30.8	40.0	-9.2
H	81.384	40.1	16	7.0	31.1	40.0	-8.9
H	94.948	37.5	16	11.0	32.5	43.5	-11.0

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 emission below 30MHz.

3.4 Frequency Stability

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

Operating Frequency			13.562512 MHz	
Test Voltage (V)	Temperature (°C)	Measured Frequency (MHz)	Frequency Error (%)	Limit (%)
4.5	+50	13.562289	-0.00164	±0.01
	+40	13.562370	-0.00105	±0.01
	+30	13.562428	-0.00062	±0.01
	+20	13.562512	0	±0.01
	+10	13.562562	+0.00037	±0.01
	0	13.562600	+0.00065	±0.01
	-10	13.562612	+0.00074	±0.01
	-20	13.562598	+0.00063	±0.01

We found that the EUT met the requirement of FCC Part 15 Section 15.225(e).

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

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

8.1 Measured Bandwidth

Within the bands (13.410 – 13.553MHz) and (13.567 – 13.710MHz):

The plot saved in bw.pdf which shows the fundamental emission is confined in the specified band. The emission of the fundamental is 45.0 dBµV/m and it is below the limit of 50.5 dBµV/m in the range of (13.410 – 13.553 MHz) and (13.567 - 13.710 MHz).

Within the bands (13.110 – 13.410MHz) and (13.710 – 14.010MHz):

The plot saved in bw.pdf which shows the fundamental emission is confined in the specified band.

Measurement:

Bandedge compliance is determined by applying marker-delta method, i.e. (Bandedge Plot).

The field strength of fundamental emission is 45dBuV/m at 30m, thus,

The resultant field strength = Fundamental emissions (peak value) – delta from the plot

= 45.0dBuV/m – 49.85dB
= -4.85dBuV/m

The resultant field strength met the requirement of FCC part15.225(c) / IC RSS-210 section A2.6 (c), which does not exceed the limit of 40.5dBuV/m at 30m.

In the frequency range from 13.110 – 14.010 MHz, there are no any emissions higher than the fundamental emission. Thus, it meet the requirement of Section 15.225(b), (c), & (d).

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.

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.

8.2 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 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 **Equipment List**

Radiated Emissions Test

Equipment	EMI Test Receiver	Active H-field Loop Antenna	Log Periodic Antenna	Biconical Antenna
Registration No.	EW-0016	EW-0191	EW-0446	EW-0954
Manufacturer	ROHDESCHWARZ	EMCO	EMCO	EMCO
Model No.	ESVS30	6502	3146	3104C
Calibration Date	Apr 21, 2010	Jun 26, 2008	Apr 26, 2010	Apr 14, 2010
Calibration Due Date	Apr 21, 2011	Dec 26, 2010	Oct 26, 2011	Oct 14, 2011

Equipment	14m Double Shield RF Cable (20MHz - 6GHz)	14m Double Shield RF Cable (9kHz - 6GHz)	Spectrum Analyzer
Registration No.	EW-2528	EW-2375	EW-2188
Manufacturer	RADIALL	RADIALL	AGILENTTECH
Model No.	nm / br5d / sma 14m	n m/br56/bnc m 14m	E4407B
Calibration Date	Feb 18, 2010	Sep 11, 2009	Dec 25, 2009
Calibration Due Date	Feb 23, 2011	Sep 12, 2010	Dec 31, 2010