CMA Testing and Certification Laboratories
廠商會檢定中心

TEST REPORT

Report No.	:	AG030174-001	Date :	2006 November 28
Application No.	:	LG223517(9)		
Client	:	iRobot Corporation 63 South Ave Burlington, MA 01803 United States		
Sample Description	:	One(1) submitted sample(s) stated to be iRobot Create of Model No. 4400		
		Rating : AC 100-240V to DC 22V adaptor 12 x 1.5V AA size batteries DC 14.4V NiMH Rechargeable Battery		
		No. of submitted sample : Two(2) set(s) ***		
Date Received	:	2006 November 13		
Test Period	:	2006 November 13 – 2006 November 28		
Test Requested	:	FCC Part 15 Certification.		
Test Method	:	47 CFR Part 15 (10-1-05 Edition) ANSI C63.4 – 2003		
Test Result	:	See attached sheet(s) from page 2 to 13.		
Conclusion	:	The submitted sample was found to comply with requirement of FCC Part 15 Subpart B.		

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____

Danny Chui
Deputy Manager - EL. Division

FCC ID: UFE4400

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TEST REPORT

Report No. : AG030174-001 Date : 2006 November 28

Table of Contents

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TEST REPORT

Report No. : AG030174-001 Date : 2006 November 28

1 General Information

1.1 General Description

The EUT is a Microprocessor based product powered by the DC18V Batteries, DC14.4V Rechargeable Battery and AC120V/ DC22V Adaptor power source. The Main unit is controlled by a Freescale 9S12E128DGV1 microprocessor that utilizes a 6 MHz crystal for timing and control.

The EUT has the following features:

- As a programmable device that is able to accept user commands via a standard TTL serial interface.

- As a mobile robotic device that is capable of executing user commands while reading on-board sensors and controlling wheel motor actuators.

- Serial Interface Module is a non-microprocessor based product powered by DC 5V iRobot Create external power source. The Module is controlled by a TI: MAX232CSE is used for serial PC interface.

- iRobot Command Module is a Microprocessor based product powered by DC 5V iRobot Create external power source. The Module is controlled by an Atmel ATMEGA168-20AU microprocessor that utilizes an 18.432 MHz crystal for timing and control. A USB interface controller FDTI FT232RL is used for serial PC interface.

The brief circuit description is saved with filename: OpDes.pdf

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1.2 Location of the test site

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2003. A shielded room is located at :

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.
EMI Test Receiver	R&S	ESCS30	100001
EMI Test Receiver	R&S	ESCI	100152
Broadband Antenna	Schaffner	CBL6112B	2718
LISN	R&S	ESH3-Z5	100038
LISN	R&S	ESH3-Z5	100010

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TEST REPORT

Report No. : AG030174-001 Date : 2006 November 28

1.4 List of support equipment

1. Intel CPU P4 2.8GHz / 512k cache / 533MHz bus
   Model: 9426A657

2. Intel Mother Board
   Model: Intel Type: D845EPI/D845GVSR

3. Seagate Hard-disk
   Model: ST340014A, 40GB

4. Proview LCD Monitor
   Model: 568

5. Logitech Mouse
   Model: M-S34

6. Hewlett Packard Keyboard
   Model: SK-2502C

7. Hewlett Packard LaserJet 2100TN
   Model: C4172A

8. PenPower Handwriting System
   Model: PP403N

9. RS232 cable 1 meter x 4 pieces
   (330Ω terminated)

10. USB Cable
    (Provided by Applicant)

11. Serial Interface Module (with RS232 Port)
    (Provided by Applicant)

12. iRobot Command Module (with USB Port)
    Model: 3812 (Provided by Applicant)

13. AC 120V 60Hz to DC 22V adaptor
    Model: 10558 (Provided by Applicant)

14. 12 x 1.5V AA size batteries Box
    (Provided by Applicant)

15. DC 14.4V NiMH Rechargeable Battery
    (Provided by Applicant)

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2 Description of the radiated emission test

2.1 Test Procedure

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

2.2 Test Result

All other measurements are well below the limit. Thus, those highest emissions were presented in next page.

The emissions meeting the requirement of section 15.109 are based on measurements employing the CISPR quasi-peak detector below 1000MHz and average detector for frequencies above 1000MHz.

It was found that the EUT meet the FCC requirement.

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2.3 Radiated Emission Measurement Data

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart B

Operation Mode: PC Connection

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV/m)	Antenna and Cable factor (dB)	Field Strength (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
85.388	H	20.9	7.3	28.2	40.0	-11.8
100.004	H	15.0	11.1	26.1	43.5	-17.4
144.182	H	19.0	12.0	31.0	43.5	-12.5
216.346	H	20.3	9.8	30.1	46.0	-15.9
192.094	H	23.8	9.5	33.3	46.0	-12.7
668.345	H	12.6	21.2	33.8	46.0	-12.2
768.215	H	11.4	21.8	33.2	46.0	-12.8

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TEST REPORT

Report No. : AG030174-001 Date : 2006 November 28

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart B

Operation Mode: Stand Alone

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV/m)	Antenna and Cable factor (dB)	Field Strength (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
85.385	H	13.4	7.3	20.7	40.0	-19.3
100.004	H	10.0	11.1	21.1	43.5	-22.4
144.185	H	11.5	12.0	23.5	43.5	-20.0
216.543	H	12.8	9.8	22.6	46.0	-23.4
192.090	H	11.8	9.5	21.3	46.0	-24.7
668.346	H	1.3	21.2	22.5	46.0	-23.5
768.212	H	0.4	20.8	21.4	46.0	-24.6

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3 Description of the Line-conducted Test

3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2003. The EUT was setup as described in the procedures, and both lines were measured.

3.2 Test Result

The PC connected mode has been tested. The EUT connecting with USB and RS232 Cable to measurement. Data was indicated in Appendix. The result showed that the EUT met the FCC requirement.

3.3 Graph and Table of Conducted Emission Measurement Data

For electronic filing, the documents are saved with filename TestRpt2.pdf

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4 Photograph

4.1 Photographs of the Test Setup for Radiated Emission and Conduction Emission

For electronic filing, the photos are saved with filename TSup1.jpg to TSup5.jpg

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename ExPho1.jpg to ExPho4.jpg and InPho1.jpg to InPho8.jpg.

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5 Supplementary document

The following document were submitted by applicant, and for electronic filing, the document are saved with the following filenames:

Document	Filename
ID Label/Location	LabelSmp.jpg
Block Diagram	BlkDia1.pdf - BlkDia2.pdf
Schematic Diagram	Schem1.pdf – Schem2.pdf
Users Manual	UserMan1.pdf – UserMan2.pdf
Operational Description	OpDes.pdf

5.1 Bandwidth

N/A

5.2 Duty cycle

N/A

5.3 Transmission time

N/A

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TEST REPORT

Report No. : AG030174-001 Date : 2006 November 28

6 Appendices

A1	Photos of the set-up of Radiated Emissions	1	page
A2	Photos of the set-up of Conducted Emissions	2	pages
A3	Photos of External Configurations	2	pages
A4	Photos of Internal Configurations	4	pages
A5	ID Label/Location	1	page
A6	Conducted Emission Measurement Data	4	pages
A7	Block Diagram	2	pages
A8	Schematics Diagram	20	pages
A9	User Manual	21	pages
A10	Operation Description	3	pages

***** End of Report *****

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