



TEST REPORT

Report No. : AM0039649(9) Date : 2010-08-18

Application No. : LM011838(0)

Applicant : Jakks Pacific (H.K.) Ltd
12/F, Wharf T&T Centre,
7 Canton Road, Tsim Sha Tsui,
Hong Kong

Sample Description : One(1) submitted sample(s) stated to be RC-XD Video Surveillance Vehicle
of Model No. #28692 and #29431
Radio Frequency : 2410.875MHz ~ 2464.875MHz Transceiver
Rating : 6 x 1.5V AA size batteries
No. of submitted sample : Three (3) piece(s)

Date Received : 2010-07-23.

Test Period : 2010-07-23 to 2010-08-05.

Test Requested : FCC Part 15 Certification.

Test Method : 47 CFR Part 15 (10-1-09 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 and C.

Remark : All two models are the same in circuitry, component and construction.
Therefore, model #28692 was chosen to be the representative of the test
sample.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____


Mr. Wong Lap-pong, Andrew
Assistant Manager
Electrical Division

FCC ID: OTA28692R

Page 1 of 13



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

Table of Contents

1	General Information.....	3
1.1	General Description	3
1.2	Location of the test site.....	4
1.3	List of measuring equipment	5
1.4	Measurement Uncertainty.....	5
2	Description of the radiated emission test.....	6
2.1	Test Procedure	6
2.2	Test Result	6
2.3	Radiated Emission Measurement Data	7
2.3	Radiated Emission Measurement Data (Con't)	8
2.3	Radiated Emission Measurement Data (Con't)	9
3	Description of the Line-conducted Test	10
3.1	Test Procedure	10
3.2	Test Result	10
3.3	Graph and Table of Conducted Emission Measurement Data	10
4	Photograph.....	11
4.1	Photographs of the Test Setup for Radiated Emission and Conducted Emission	11
4.2	Photographs of the External and Internal Configurations of the EUT	11
5	Supplementary document	12
5.1	Band edges	12
5.2	Duty cycle	12
5.3	Transmission time.....	12
6	Appendices	13



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

1 General Information

1.1 General Description

The equipment under test (EUT) is a transceiver for RC-XD Video Surveillance Vehicle. It operates at 2410.875MHz ~ 2464.875MHz and the oscillation of MCU is generated by a crystal. The EUT is powered by 6 x 1.5V AA size batteries. When the EUT receives the radio control signal, it will take the corresponding actions. The EUT also transmits the video signal to the controller.

The antenna is permanently attached in EUT and the radio output power is unable to adjust.

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



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

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,
Fo Tan, Shatin,
New Territories,
Hong Kong.



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date
EMI Test Receiver	R&S	ESCI	100152	23 Dec, 2010
Broadband Antenna	Schaffner	CBL6112B	2692	31 May, 2011
Spectrum Analyzer	R&S	FSP30	100628	26 Apr, 2011
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	10 Jun, 2012
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	07 Jun, 2012
High Pass Filter	Trilithic Inc	6HC3000/18000-3-KK	200720014	07 Jun, 2012

1.4 Measurement Uncertainty

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

Radiated emissions

Frequency	Uncertainty (U_{lab})
30MHz ~ 200MHz (Horizontal)	4.63dB
30MHz ~ 200MHz (Vertical)	4.64dB
200MHz ~ 1000MHz (Horizontal)	4.65dB
200MHz ~ 1000MHz (Vertical)	4.64dB

Conducted emissions

Frequency	Uncertainty (U_{lab})
150kHz ~ 30MHz	3.04dB



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

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.

The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement.

2.2 Test Result

In Transmitter Mode:

Both Average and Peak Detectors data was measured unless otherwise stated.

“#” means emissions appearing within the restricted bands shall follow the requirement of section 15.205.

The frequencies from fundamental up to the tenth harmonics were investigated. The emissions which lower than the radiated ambience were not reported. Thus, those highest emissions were presented in next pages.

It was found that the EUT meets the FCC requirement.

In Receiver Mode:

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.

The frequencies from 30MHz to 1000MHz were investigated, and emissions more than 20dB below limit were not reported. Thus, those highest emissions were presented in next pages.

It was found that the EUT meets the FCC requirement.



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

2.3 Radiated Emission Measurement Data

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	24	°C
Relative humidity:	61	%

Transmitter Mode with Peak Detector:

	Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Average Factor (dB)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
First Channel	2411.693	V	68.9	31.5	-	100.4	114.0	-13.6
	#4823.700	H	60.0	1.5	-	61.5	74.0	-12.5
	7235.014	V	42.0	10.6	-	52.6	74.0	-21.4
	9646.920	H	35.8	13.5	-	49.3	74.0	-24.7
Middle Channel	2438.700	V	69.7	31.5	-	101.2	114.0	-12.8
	#4877.364	H	57.6	1.5	-	59.1	74.0	-14.9
	#7315.702	V	41.9	10.6	-	52.5	74.0	-21.5
	9754.652	H	35.0	13.5	-	48.5	74.0	-25.5
Last Channel	2464.177	V	69.4	31.5	-	100.9	114.0	-13.1
	#4931.331	H	53.9	1.5	-	55.4	74.0	-18.6
	#7397.027	V	40.5	10.6	-	51.1	74.0	-22.9
	9862.702	V	36.4	13.5	-	49.9	74.0	-24.1

Remark: Transducer Factor = Antenna Factor + Cable Loss + Attenuation of HPF - Gain of Pre-Amplifier



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

2.3 Radiated Emission Measurement Data (Con't)

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	24	° C
Relative humidity:	61	%

Transmitter Mode with Average Detector:

	Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Transducer Factor (dB/m)	Average Factor (dB)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
First Channel	2411.693	V	68.9	31.5	-12.7	87.7	94.0	-6.3
	#4823.340	H	41.3	1.5	-	42.8	54.0	-11.2
	7235.014	V	25.6	10.6	-	36.2	54.0	-17.8
	9646.920	H	23.9	13.5	-	37.4	54.0	-16.6
Middle Channel	2438.700	V	69.7	31.5	-12.7	88.5	94.0	-5.5
	#4877.364	H	39.7	1.5	-	41.2	54.0	-12.8
	#7315.702	V	26.1	10.6	-	36.7	54.0	-17.3
	9754.652	H	24.1	13.5	-	37.6	54.0	-16.4
Last Channel	2464.177	V	69.4	31.5	-12.7	88.2	94.0	-5.8
	#4931.331	H	37.0	1.5	-	38.5	54.0	-15.5
	#7397.027	V	25.6	10.6	-	36.2	54.0	-17.8
	9862.702	V	24.4	13.5	-	37.9	54.0	-16.1

Remark: Transducer Factor = Antenna Factor + Cable Loss + Attenuation of HPF - Gain of Pre-Amplifier



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

2.3 Radiated Emission Measurement Data (Con't)

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart B

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	25	° C
Relative humidity:	58	%

Receiver Mode:

	Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
First Channel	215.996	H	30.8	10.5	41.3	43.5	-2.2
	227.991	H	25.6	10.5	36.1	46.0	-9.9
	239.992	H	26.0	10.5	36.5	46.0	-9.5
	263.990	H	20.5	14.3	34.8	46.0	-11.2
	275.990	H	18.9	14.3	33.2	46.0	-12.8
	311.989	H	23.1	15.9	39.0	46.0	-7.0
	383.993	H	19.5	15.9	35.4	46.0	-10.6
Middle Channel	215.998	H	30.6	10.5	41.1	43.5	-2.4
	227.993	H	25.8	10.5	36.3	46.0	-9.7
	239.996	H	26.2	10.5	36.7	46.0	-9.3
	263.992	H	20.7	14.3	35.0	46.0	-11.0
	275.991	H	19.2	14.3	33.5	46.0	-12.5
	311.990	H	23.2	15.9	39.1	46.0	-6.9
	383.995	H	19.9	15.9	35.8	46.0	-10.2
Last Channel	215.996	H	30.6	10.5	41.1	43.5	-2.4
	227.990	H	25.9	10.5	36.4	46.0	-9.6
	239.994	H	26.2	10.5	36.7	46.0	-9.3
	263.991	H	21.0	14.3	35.3	46.0	-10.7
	275.995	H	19.6	14.3	33.9	46.0	-12.1
	311.992	H	23.3	15.9	39.2	46.0	-6.8
	383.995	H	19.8	15.9	35.7	46.0	-10.3



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

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

No measurement is required as the EUT is a battery-operated product.

3.3 Graph and Table of Conducted Emission Measurement Data

Not Applicable



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

4 Photograph

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

For electronic filing, the photos are saved with filename TSup1.jpg to TSup2.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 ExPho2.jpg and InPho1.jpg to InPho8.jpg.



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

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	BlkDia.pdf
Schematic Diagram	Schem.pdf
Users Manual	UserMan.pdf
Operational Description	OpDes.pdf

5.1 Band edges

The plots saved in TestRpt2.pdf show the first and last channels are confined in the specific band. It also shows that the band edges met 15.249(d) requirement at 2.4GHz and 2.4835GHz.

5.2 Duty cycle

The duty cycle is simply the on-time divided by the period:

$$\begin{aligned}\text{The duration of one cycle} &= 0.82\text{ms} \\ \text{Effective period of the cycle} &= 0.19\text{ms} \\ \text{Duty Cycle} &= 0.19\text{ms} / 0.82\text{ms} \\ &= 0.232\end{aligned}$$

Therefore, the average factor is found by $20 \log_{10} 0.232 = -12.7\text{dB}$

5.3 Transmission time

Not Applicable



TEST REPORT

Report No. : AM0039649(9)

Date : 2010-08-18

6 Appendices

A1.	Photos of the set-up of Radiated Emissions	1	page
A2.	Photos of External Configurations	1	page
A3.	Photos of Internal Configurations	4	pages
A4.	ID Label/Location	1	page
A5.	Band Edge Plots	2	pages
A6.	Average Factors	2	pages
A7.	Block Diagram	1	page
A8.	Schematics Diagram	4	pages
A9.	User Manual	1	page
A10.	Operation Description	1	page

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