

<b>Prüfbericht - Nr.:</b> 14006807 001		<b>Seite 1 von 13</b>	
<b>Test Report No.</b>		<b>Page 1 of 13</b>	
<b>Auftraggeber:</b> Applicant		<b>Lucky Plastic Factory Ltd.</b> <b>Suite 907-908, Chinachem Golden Plaza</b> <b>77 Mody Road</b> <b>T.S.T. East, Kowloon</b> <b>Hong Kong</b>	
<b>Gegenstand der Prüfung:</b> Test item		<b>Low Power Transmitter</b>	
<b>Bezeichnung:</b> Identification	<b>Refer to page 6.</b>	<b>Serien-Nr.:</b> Serial No.	<b>Engineering sample</b>
<b>Wareneingangs-Nr.:</b> Receipt No.	<b>040702001</b>	<b>Eingangsdatum:</b> Date of receipt	<b>02.07.2004</b>
<b>Prüfart:</b> Testing location	<b>TÜV Rheinland Hong Kong Ltd.</b> Unit 8, 25 <sup>th</sup> Floor, Skyline Tower, 39 Wang Kwong Road, Kowloon Bay Kowloon, Hong Kong  <b>Hong Kong Productivity Council</b> HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong		
<b>Prüfgrundlage:</b> Test specification	<b>FCC Part 15, Subpart C</b>		
<b>Prüfergebnis:</b> Test Result	<b>Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage.</b> The above mentioned product was tested and <b>passed</b> .		
<b>geprüft / tested by:</b>		<b>kontrolliert / reviewed by:</b>	
26.07.2004	Prudence Poon	26.07.2004	Thomas Berns
<b>Datum</b> Date	<b>Name</b> Name	<b>Unterschrift</b> Signature	<b>Unterschrift</b> Signature
<b>Sonstiges:</b> FCCID: NEX-94102-27 Other Aspects			
<b>Abkürzungen:</b> OK, Pass, P = entspricht Prüfgrundlage Fail, F = entspricht nicht Prüfgrundlage N/A = nicht anwendbar NT = nicht getestet		<b>Abbreviations:</b> OK, Pass, P = passed Fail, F = failed N/A = not applicable NT = not tested	
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicate in extracts. This test report does not entitle to carry any safety mark on this or similar products.			

# Test Summary

## **Radiated Emission of Carrier Frequency**

*Result: Pass*

## **Spurious Radiated Emissions**

*Result: Pass*

## **Bandwidth Measurement**

*Result: Pass*

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## General Remarks

### Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test Results

Appendix 2: Test Setup

Appendix 3: EUT External Photo

Appendix 4: EUT Internal Photo

Appendix 5: FCCID Label, Block Diagram, Schematics and User manual.

**List of Test and Measurement Instruments**

Kind of Equipment	Manufacturer	Type	S/N
Test Receiver	Rohde & Schwarz	ESVS30	842807/009
Biconical Antenna	Rohde & Schwarz	HK116	841489/015
Log.-Periodic Antenna	Rohde & Schwarz	HL223	841516/017
Double Ridge Horn Antenna	EMCO	3115	9002-3351
Double Ridge Horn Antenna	EMCO	3115	9002-3347
Signal Generator	Rohde & Schwarz	SMY 01	844146/024
Signal Generator	Rohde & Schwarz	SMY 01	844146/023
Spectrum Analyzer	Rohde & Schwarz	FSP30	1093.4495K30

## General Product Information

### Product Function and Intended Use

The equipment under test ( EUT ) is a transmitter for a RC toy car operating at 27.145 MHz. The EUT has two control rods for commanding the forward, backward, left and right movement of the associated receiver.

Due to declaration from the manufacturer, it is deemed that that the transmitter of 9412 and 9417 are same in circuit design and PCB layout as the transmitter of 9410, they only differ in the cosmetic design. Hence, all testing was conducted on the representative model: 9410.

FCCID: NEX-94102-27

Model	Product description
<b>9410</b>	<b>Pro Racer Subaru</b>
<b>9412</b>	<b>Pro Racer Citroen</b>

### Circuit Description

IC1 and the associated circuit act as AF-Modulator. Q1 and the associated circuit act as a RF-transmitter. Q2 together with 27.145 MHz crystal oscillator drive the base of Q1, signal from Q2 and the modulation provided by IC1 are then summed into Q1. The matching network at output of Q1 is to limit the harmonic content and provide the proper coupling to antenna output.

### Ratings and System Details

		Transmitter
Frequency range	:	27.145MHz
Number of channels	:	1
Type of antenna	:	Integral antenna
Power supply	:	Battery operated 9V
Ports	:	none
Protection Class	:	III

## **Independent Operation Modes**

The basic operation modes are:

- Remote Control: On and Off

For further information refer to User Manual

## **Submitted Documents**

The submitted documents are listed as follow:

- Circuit diagram
- Block diagram
- User manual
- Label artwork

## **Related Submittal(s) Grants**

This is a single application for certification of the transmitter.

## **Test Set-up and Operation Mode**

### **Principle of Configuration Selection**

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### **Test Operation and Test Software**

Test operation should refer to test methodology.

- There was no special software to exercise the device.

### **Special Accessories and Auxiliary Equipment**

The product has been tested together with the following additional accessories:

- none

### **Countermeasures to achieve EMC Compliance**

The test sample, which has been tested, contained the noise suppression parts as described in the Circuit Diagram or the Technical Construction File. No additional measures were employed to achieve compliance.

## Test Methodology

### Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.4-2001.

The equipment under test (EUT ) was placed at the middle of the 80 cm height turntable, and the turntable is 3 meters far from the measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in section 7.1.1 and 7.1.2 of this test report.

### Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$FS = R + AF + CF + FA - PA$$

Where FS = Field Strength in dBuV/m at 3 meters.

R = Reading of Spectrum Analyzer in dBuV.

AF = Antenna Factor in dB.

CF = Cable Attenuation Factor in dB.

FA = Filter Attenuation Factor in dB.

PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

## Test Results

### Radiated Emission of Carrier Frequency

### Subclause 15.227(a)

**RESULT:**
**Pass**

Test Specification : FCC Part 15 Subclause 15.227(a)  
 Test Method : ANSI 63.4-2001  
 Measurement Location : Semi Anechoic Chamber  
 Measurement Distance : 3m  
 Detector Function : Peak and Average  
 Measurement BW : 100 kHz  
 Supply Voltage : DC 9V

Polarization: Vertical

Detector function	Frequency	Reading	Antenna Factor	Attenuation of cable	Measured Field strength at 3m	Delta to Limit
	(MHz)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	(dB)
Peak	27.145	52.93	18.8	0.37	72.1	-27.90
Average	27.145	51.63	18.8	0.37	70.8	-9.20

Polarization: Horizontal

Detector function	Frequency	Reading	Antenna Factor	Attenuation of cable	Measured Field strength at 3m	Delta to Limit
	(MHz)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	(dB)
Peak	27.145	32.73	18.8	0.37	51.9	-48.10
Average	27.145	31.83	18.8	0.37	51.0	-29.00

For test results refer to Appendix 1, page 1-2

**Limit**
**Subclause 15.227(a)**

Frequency within the band	Peak Emission		Average Emission	
	(microvolt/meter)	dBμV/m	(microvolt/meter)	dBμV/m
26.96-27.28 MHz	100,000	100.0	10,000	80.0

According to section 15.35(b), When average radiated emission measurements are specified, including emission measurement below 1000MHz, there also is limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated.

**Spurious Radiated Emissions****Subclause 15.227(b)****RESULT:****Pass**

Test Specification : FCC Part 15 Subclause 15.209  
 Test Method : ANSI 63.4-2001  
 Measurement Location : Semi Anechoic Chamber  
 Measurement Distance : 3m  
 Detector Function : Quasi Peak  
 Measurement BW : 100 kHz  
 Supply Voltage : DC 9V  
 Measuring Frequency Range : 30-1000MHz

Polarization: Vertical

Frequency	Reading	Antenna Factor	Attenuation of cable	Field strength at 3m	Limit at 3m	Delta to Limit
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
54.289	20.30	11.95	0.55	32.8	40.0	-7.20
81.434	3.89	9.70	0.61	14.2	40.0	-25.80
108.578	0.92	11.60	0.78	13.3	43.5	-30.20
135.723	0.60	13.30	0.90	14.8	43.5	-28.70
162.868	4.28	14.90	0.92	20.1	43.5	-23.40
217.157	1.60	10.40	1.10	13.1	46.0	-32.90
244.301	1.85	11.50	1.15	14.5	46.0	-31.50
271.446	3.60	12.20	1.30	17.1	46.0	-28.90
298.591	3.10	13.00	1.30	17.4	46.0	-28.60
325.735	2.90	13.60	1.40	17.9	46.0	-28.10

Polarization: Horizontal

Frequency	Reading	Antenna Factor	Attenuation of cable	Field strength at 3m	Limit at 3m	Delta to Limit
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
54.289	5.30	11.95	0.55	17.80	40.00	-22.20
81.434	0.69	9.70	0.61	11.00	40.00	-29.00
108.578	0.12	11.60	0.78	12.50	43.50	-31.00
135.723	0.20	13.30	0.90	14.40	43.50	-29.10
162.868	0.28	14.90	0.92	16.10	43.50	-27.40
217.157	5.50	10.40	1.10	17.00	46.00	-29.00
244.301	4.45	11.50	1.15	17.10	46.00	-28.90
271.446	4.00	12.20	1.30	17.50	46.00	-28.50
298.591	3.50	13.00	1.30	17.80	46.00	-28.20
325.735	3.50	13.60	1.40	18.50	46.00	-27.50

**Limit****Subclause 15.209**

Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209.

Limit for Radiated Emission under Section 15.209:

Frequency (MHz)	Field strength (microvolt/meter)	Field strength (dB $\mu$ V/m)	Measurement distance (meters)
30-88	100	$20 \cdot \log(100) = 40.0$	3
88-216	150	$20 \cdot \log(150) = 43.5$	3
216-960	200	$20 \cdot \log(200) = 46.0$	3
960-2500	500	$20 \cdot \log(500) = 54.0$	3

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector and above 1000 MHz are based on the measurements employing an average detector.

## Bandwidth Measurement

## Subclause 15.227(b)

### RESULT:

Pass

Test Specification : FCC Part 15 section 227(b)  
Port of Testing : Antenna port  
Detector Function : Peak  
Supply Voltage : DC 9V

The field strength of any emissions appearing at the lower edge 26.96 MHz and upper edge 27.28 MHz are 65.43 dB and 58.82 dB below the carrier respectively.

For test results refer to Appendix 1.

### Limit

### Subclause 15.227(b)

The field strength of any emission which appears outside of this band shall not exceed the general radiated emission limits in Section 15.209.