

Produkte  
Products

**Prüfbericht - Nr.: 14027878 001**

Test Report No.:

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**Auftraggeber:** SHENGYU TOYS FACTORY  
**Client:** FENGXIN LAIMEI ROAD, CHENGHAI  
 SHANTOU, GUANGDONG  
 CHINA

**Gegenstand der Prüfung:** Short Range Device - Low Power Transmitter (27.145MHz)  
**Test Item:**

**Bezeichnung:** Please refer to "Models" on page 5 **Identifikation:** **Serien-Nr.:** **Engineering sample**  
 Serial No.:

**Wareneingangs-Nr.:** 00110826044-002 **Eingangsdatum:** 23.08.2011  
**Receipt No.:** **Date of Receipt:**

**Prüfstandort:** Hong Kong Productivity Council  
**Testing Location:** HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong

**Prüfgrundlage:** FCC Part 15, Subpart C  
**Test Specification:** ANSI C63.4-2003  
 CISPR 22:1997

**Prüfergebnis:** Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).  
**Test Result:** The test item passed the test specification(s).

**Prüflaboratorium:** TÜV Rheinland Hong Kong Ltd.  
**Testing Laboratory:** 9th Floor, Emperor International Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong

geprüft / tested by:

kontrolliert / reviewed by:

09.09.2011 Joey Leung  
 Test Engineer



09.09.2011

Sharon Li  
 Assistant Manager



Datum Name/Stellung  
 Date Name/Position

Unterschrift  
 Signature

Datum  
 Date

Name/Stellung  
 Name/Position

Unterschrift  
 Signature

**Sonstiges / Other Aspects:**

FCC ID: ZX213809674658

**Abkürzungen:** P(pass) = entspricht Prüfgrundlage  
 F(fail) = entspricht nicht Prüfgrundlage  
 N/A = nicht anwendbar  
 N/T = nicht getestet

**Abbreviations:** P(pass) = passed  
 F(fail) = failed  
 N/A = not applicable  
 N/T = not tested

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.  
 This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

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## Test Summary

### Radiated Emission of Carrier Frequency

*Result: Pass*

### Spurious Radiated Emissions

*Result: Pass*

### Bandwidth Measurement

*Result: Pass*

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## List of Test and Measurement Instruments

### Hong Kong Productivity Council (Registration number: 90656)

Equipment	Manufacturer	Type	S/N	Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	25-May-12
Test Receiver	R & S	ESU26	100050	26-May-12
Bi-conical Antenna	R & S	HK116	100241	05-May-13
Log Periodic Antenna	R & S	HL223	841516/020	06-May-13
Coaxial cable 50ohm	Rosenberger	RTK081-05S-05S-10m	LA2-001-10M / 001	08-Dec-11
Microwave amplifier 0.5-26.5GHz, 25dB gain	HP	83017A	3950M00241	03-Oct-11
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	30-Oct-11
Horn Antenna	EMCO	3115	9002-3351	11-May-13
FSP 30 Spectrum Analyser	R & S	FSP 30	100286	17-Sep-12
Active Loop Antenna	EMCO	6502	9107-2651	19-Apr-12

## General Product Information

### Product Function and Intended Use

The equipment under test (EUT) is a transmitter for a RC toy helicopter operating at 27.145MHz. The EUT has 2 control rods, a switch and a knob. Control rods are used to command the upward, downward, forward, backward, left and right movement; switch is used to select speed mode; knob is used to fine trim the left and right movement of the associated receiver.

The manufacturer declares that the transmitter models listed in below table are identical to model 822. They are all identical in schematics, PCB layouts, components used except the housing.

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Models
812A, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 822A, 823, 824, 825, 825A, 826, 827, 828, 829, 830, 831, 832, 833, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, J374, UJ318

### Ratings and System Details

	Transmitter
Frequency range	: 27.145MHz
Number of channels	: 1
Type of antenna	: External Telescopic Antenna
Power supply	: Battery operated 12V
Ports	: none
Protection Class	: III

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## Independent Operation Modes

The basic operation modes are:

- Transmitting control signal for the RC toy helicopter.

For further information refer to User Manual

## Submitted Documents

The submitted documents are listed as follow:

- Circuit diagram
- Block diagram
- User manual
- Label artwork
- Bill of material

## 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

- none

## Test Methodology

### Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.4-2003.

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 particular parts 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 63.4-2003  
 Measurement Location : Semi Anechoic Chamber  
 Measurement Distance : 3m  
 Detector Function : Peak and Average  
 Measurement BW : 120 kHz  
 Supply Voltage : DC 12V

#### Polarization: Vertical

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB $\mu$ V/m)	Delta to Limit (dB)
Peak	27.144	79.7	-20.3
Average	27.144	73.8	-6.2

#### Polarization: Horizontal

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB $\mu$ V/m)	Delta to Limit (dB)
Peak	27.144	46.6	-53.4
Average	27.144	40.5	-39.5

Limit	Subclause 15.227(a)			
Frequency within the band	Peak Emission		Average Emission	
	( $\mu$ V/m)	dB $\mu$ V/m	( $\mu$ V/m)	dB $\mu$ V/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 in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

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

Test Specification	:	FCC Part 15 Subclause 15.209
Test Method	:	ANSI 63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Measurement Distance	:	3m
Detector Function	:	Quasi Peak
Measurement BW	:	120 kHz
Supply Voltage	:	DC 12V
Measuring Frequency Range	:	30-1000MHz

**Polarization: Vertical**

Frequency (MHz)	Field strength at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Delta to Limit (dB)
54.288	29.5	40.0	-10.5
190.011	13.6	43.5	-29.9

**Polarization: Horizontal**

Frequency (MHz)	Field strength at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Delta to Limit (dB)
No peak found	---	---	---

Remark: (1) '\*' indicates the frequency of the emissions fall into the restricted band as defined in Section 15.205(a). They comply with the radiated emission limits specified in Section 15.209.  
 (2) There is no spurious emission found between lowest oscillating frequency to 30 MHz.

**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 ( $\mu$ V/m)	Field strength (dB $\mu$ V/m)	Measurement distance (m)
30-88	100	20*log(100) = 40.0	3
88-216	150	20*log(150) = 43.5	3
216-960	200	20*log(200) = 46.0	3
960-2500	500	20*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.

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## Bandwidth Measurement

Port of Testing : Antenna port  
Detector Function : Peak  
Supply Voltage : DC 12V

The field strength of any emissions appearing at the lower edge 26.96 MHz and upper edge 27.28 MHz are 51.75dB and 46.29dB below the carrier respectively.

For test results refer to Appendix 1.