

Produkte
Products

Prüfbericht - Nr.: 14029834 001		Seite 1 von 11 Page 1 of 11	
<i>Test Report No.:</i>			
Auftraggeber: <i>Client:</i>	SHANTOU SKYTECH TOYS INDUSTRIAL CO., LTD XINGYE SOUTH ROAD LAIMEI INDUSTRIAL PARK CHENGHAI DISTRICT SHANTOU CITY GUANGDONG CHINA		
Gegenstand der Prüfung: Short Range Device - Low Power Transmitter (27.145MHz) <i>Test Item:</i>			
Bezeichnung: <i>Identification:</i>	Please refer to "Models" on page 5	Serien-Nr.: <i>Serial No.:</i>	Engineering sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	00120524007-002	Eingangsdatum: <i>Date of Receipt:</i>	24.05.2012
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of test item at delivery:</i>		Test samples received are sufficient for testing and not damaged.	
Prüfort: <i>Testing Location:</i>	Shenzhen Emtex Co., Ltd. Bldg. 69, Majialong Industry Zone, Nanshan District, ShenZhen, Guangdong, 518052 P.R. China		
Prüfgrundlage: <i>Test Specification:</i>	FCC Part 15, Subpart C ANSI C63.4-2003 CISPR 22:1997		
Prüfergebnis: <i>Test Result:</i>	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>		
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland Hong Kong Ltd. 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong		
geprüft / tested by:		kontrolliert / reviewed by:	
28.05.2012	Joey Leung Test Engineer	28.05.2012	Sharon Li Section Manager
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Unterschrift <i>Signature</i>
Sonstiges / Other Aspects:			
FCC ID: ZKV07545827998			
Abkürzungen:		Abbreviations:	
P(ass) = entspricht Prüfgrundlage		P(ass) = passed	
F(ail) = entspricht nicht Prüfgrundlage		F(ail) = failed	
N/A = nicht anwendbar		N/A = not applicable	
N/T = nicht getestet		N/T = not tested	
<p>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.</p> <p><i>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.</i></p>			

Test Summary

Radiated Emission of Carrier Frequency

Result: Pass

Spurious Radiated Emissions

Result: Pass

Bandwidth Measurement

Result: Pass

Contents

List of Test and Measurement Instruments.....	4
General Product Information	5
Product Function and Intended Use.....	5
Ratings and System Details.....	5
Independent Operation Modes.....	6
Submitted Documents	6
Related Submittal(s) Grants	6
Test Set-up and Operation Mode.....	7
Principle of Configuration Selection	7
Test Operation and Test Software	7
Special Accessories and Auxiliary Equipment	7
Countermeasures to achieve EMC Compliance.....	7
Test Methodology	8
Radiated Emission.....	8
Field Strength Calculation	8
Test Results	9
Radiated Emission of Carrier Frequency Subclause 15.227(a)	9
Spurious Radiated Emissions Subclause 15.227(b).....	10
Bandwidth Measurement.....	11
Appendix 1 Test Protocol	
Appendix 2 Test Setup	
Appendix 3 EUT External Photo	
Appendix 4 EUT Internal Photo	
Appendix 5 FCCID Label, Block Diagram, Schematics, BOM and User manual	

List of Test and Measurement Instruments

Shenzhen EMTEK Co., Ltd. (Registration number: 709623)

Equipment	Manufacturer	Type	S/N	Due Date
EMI Test Receiver	Rohde & Schwarz	ESU26	LR114196	May 29, 2012
Pre-Amplifier	HP	8447D	2944A07999	May 29, 2012
Bilog Antenna	Schwarzbeck	VULB9163	142	May 29, 2012
Loop Antenna	ARA	PLA-1030/B	1029	May 29, 2012
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	May 29, 2012
Horn Antenna	Schwarzbeck	BBHA 9120	D143	May 29, 2012
Cable	Schwarzbeck	AK9513	ACRX1	May 29, 2012
Cable	Rosenberger	N/A	FP2RX2	May 29, 2012
Cable	Schwarzbeck	AK9513	CRPX1	May 29, 2012
Cable	Schwarzbeck	AK9513	CRRX2	May 29, 2012

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 to command the upward, downward, forward, backward, left and right movement of the associated receiver.

FCC ID: ZKV07545827998

Models	Product description
M1, M2, M6, M60, M61, M62, M63, M65, M66, M67, M68, M69, M70, M71, M72, M73, M75, M76, M77, M78, M79, M80	Radio Control Toy Helicopter

Ratings and System Details

	Transmitter
Frequency range	: 27.145MHz
Number of channels	: 1
Type of antenna	: External Permanent Antenna
Power supply	: Battery operated 6V
Ports	: none
Protection Class	: III

www.tuv.com

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 6V

Polarization: Vertical

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	27.144	50.3	-49.7
Average	27.144	45.3	-34.7

Polarization: Horizontal

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	27.147	66.3	-33.7
Average	27.147	60.3	-19.7

Limit
Subclause 15.227(a)

Frequency within the band	Peak Emission		Average Emission	
	(μ V/m)	dB μ V/m	(μ V/m)	dB μ 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 6V
 Measuring Frequency Range : 30-1000MHz

Polarization: Vertical

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
53.317	21.9	40.0	-18.1
190.112	27.5	43.5	-16.0
353.333	29.8	46.0	-16.3
516.555	30.1	46.0	-15.9
542.981	38.4	46.0	-7.6
570.962	32.4	46.0	-13.7

Polarization: Horizontal

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
462.147	29.8	46.0	-16.2
516.555	30.2	46.0	-15.8
542.981	36.6	46.0	-9.4
570.962	31.9	46.0	-14.1

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 (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
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.

www.tuv.com

Bandwidth Measurement

Port of Testing	:	Antenna port
Detector Function	:	Peak
Supply Voltage	:	DC 6V

The field strength of any emissions appearing at the lower edge 26.96 MHz and upper edge 27.28 MHz are 49.43 dB and 46.13 dB below the carrier respectively.

For test results refer to Appendix 1.