TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14027226 001**	**Seite 1 von 12** *Page 1 of 12*
Auftraggeber: *Client:*	**SHANTOU CITY CHENGHAI AREA LONGXIANG TOYS INDUSTRY CO., LTD** **CHENGHUA INDUSTRIAL AREA** **WENGUAN ROAD, CHENGHAI** **SHANTOU, GUANGDONG** **CHINA**	
Gegenstand der Prüfung: *Test Item:*	**Short Range Device - Low Power Transmitter (49.86MHz)**	
Bezeichnung: *Identification:*	**Please see "Models" on page 5 for details**	**Serien-Nr.:** *Serial No.:* **Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**00110627006-001**	**Eingangsdatum:** *Date of Receipt:* **28.06.2011**
Prüfort: *Testing Location:*	**Hong Kong Productivity Council** HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong	
Prüfgrundlage: *Test Specification:*	**FCC Part 15, Subpart C** **ANSI C63.4-2003** **CISPR 22:1997**	
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*	
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland Hong Kong Ltd.** 9th Floor, Emperor International Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong	

geprüft / *tested by:*

18.07.2011	Joey Leung Test Engineer	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

kontrolliert / *reviewed by:*

18.07.2011	Sharon Li Assistant Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges / *Other Aspects:*

FCCID: VKI85877248493

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*

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

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 amplifer 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 car operating at 49.86 MHz. The EUT has six press buttons to command the forward, backward, left and right movement of the associated receiver.

FCCID: VKI85877248493

Models	Product description
9055, 9056, 9029, 9060, 9053, 9038, 9050, 9039, 606, 6005, 511, 512, 513, 515, 516, 518, 30302, 558, 30303, 30305, 30308, 30309, 30310, 30311, 30312, 30313, 8050, 8051, 8053, 80801, 80805, 80807, 80808, 80809, 80810, 80811, 80813, 80815, 80820, 80821, 80823, 9002, 9021, 9023, 9026, 9027, 9028, 9030, 9031, 9032, 9033, 9035, 9036, 9051, 9052, 605, 6006, 6008, 6009, 519, 520, 521, 522, 523, 525, 526, 528, 529, 33009, 33010, 8055, 8056, 8058, 8059, 80822, 80825, 80826, 80827, 80828, 80829, 80830, 80831, 80832, 9037, 9099, 9058, 9059, 9061, 9062, 9063, 9065, 9066, 9068, 9069, 9100, 9079, 9080, 9081, 9082, 9083, 9085, 9086, 9088, 9089, 1002, 1012, 80819	R/C TORNADO TUMBLER

Ratings and System Details

		Transmitter
Frequency range	:	49.86MHz
Number of channels	:	1
Type of antenna	:	External telescopic antenna
Power supply	:	6F22 size battery, 9.0VDC
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

- 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 15.235(a)

RESULT: **Pass**

Test Specification : FCC Part 15 Subclause 15.235(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 : 6F22 size battery, 9.0VDC

Polarization: Vertical

Detector function	Frequency (MHz)	Measured Field strength at 3m (dBµV/m)	Delta to Limit (dB)
Peak	49.860	70.3	-29.7
Average	49.860	66.1	-13.9

Polarization: Horizontal

Detector function	Frequency (MHz)	Measured Field strength at 3m (dBµV/m)	Delta to Limit (dB)
Peak	49.860	51.9	-48.1
Average	49.860	47.7	-32.3

Limit **Subclause 15.235(a)**

Frequency within the band	Peak Emission		Average Emission	
	(µV/m)	dBµV/m	(µV/m)	dBµV/m
49.82-49.90 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 15.235(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	:	6F22 size battery, 9.0VDC
Measuring Frequency Range	:	30-1000MHz

Polarization: Vertical

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
99.720	17.2	43.5	-26.3
149.580	11.8	43.5	-31.7
199.440	24.9	43.5	-18.6
*249.301	27.3	46.0	-18.7
299.161	26.9	46.0	-19.1
349.021	17.9	46.0	-28.1
398.881	20.1	46.0	-25.9
448.741	22.0	46.0	-24.0
498.601	25.7	46.0	-20.3

Polarization: Horizontal

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
99.720	9.0	43.5	-34.5
149.580	14.0	43.5	-29.5
199.440	18.9	43.5	-24.6
*249.300	16.2	46.0	-29.8
299.160	15.8	46.0	-30.2
349.020	16.1	46.0	-29.9
398.880	16.9	46.0	-29.1
448.740	19.1	46.0	-26.9
498.600	20.2	46.0	-25.8

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 other spurious emission found from 30MHz to 1000MHz.

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*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.

Bandwidth Measurement — Subclause 15.235(b)

RESULT: **Pass**

Test Specification	:	FCC Part 15 section 235(b)
Port of Testing	:	Antenna port
Detector Function	:	Peak
Supply Voltage	:	DC 9.0V

The field strength of any emissions appearing between the band edges and up to 10kHz above and below the band edges is at least 26dB below the carrier. At the lower edge 49.81MHz and upper edge 49.91 MHz are 26.54 dB and 27.72 dB below the carrier respectively.

For test results refer to Appendix 1.

Limit **Subclause 15.235(b)**

The field strength of any emissions appearing between the band edges and up to 10KHz above and below the band edges shall be attenuated at least 26dB below the level of the unmodulated carrier or to the general limits in Section 15.209, whichever permits the higher emission levels.