

Produkte *Products*

Prüfbericht - Nr.: 14039438 001

Test Report No.:

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Auftraggeber: Hobbyengine Model Ltd.
Client: Room 619, 6/F., Peninsula Centre
67 Mody Road, TsimShaTsui East
Kowloon, Hong Kong

Gegenstand der Prüfung: Short Range Device – Low Power Transmitter (49.86MHz)
Test Item:

Bezeichnung: 5F62D72 **Serien-Nr.:** **Engineering sample**
Identification: *Serial No.:*

Wareneingangs-Nr.: A000197217-001 Eingangsdatum: 11.05.2015
Receipt No.: Date of Receipt:

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:* Test sample(s) received is/are sufficient for testing and not damaged.

Prüfourt: Global United Technology Services Co., Ltd.
Testing Location: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China

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

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: 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong

geprüft / *tested by:*

kontrolliert / reviewed by:

20.05.2015 Hugo Wan
Senior Project Manager

20.05.2015 **Sharon Li**
 Department Manager

Datum

Datum

Hugo Wan

Senior Project Manager

Handwritten signature in blue ink.

W.H.

Sonstiges / Other Aspects:

FCC ID: QW70808

Abkürzungen:	P(ass)	= entspricht Prüfgrundlage
	F(ail)	= entspricht nicht Prüfgrundlage
	N/A	= nicht anwendbar
	N/T	= nicht getestet

Abbreviations:	<i>P(ass)</i>	=	<i>passed</i>
	<i>F(ail)</i>	=	<i>failed</i>
	<i>N/A</i>	=	<i>not applicable</i>
	<i>NT</i>	=	<i>not tested</i>

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.

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

Global United Technology Services Co., Ltd. (Registration number: 600491)

Radiated Emission

Equipment	Manufacturer	Type	S/N	Cal. Date	Cal. Due Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)*6.0(H)	--	28 Mar 2015	27 Mar 2017
Control Room	ZhongYu Electron	6.2(L)*2.5(W)*2.4(H)	--	N/A	N/A
ESU EMI Test Receiver	R&S	ESU26	--	27 Jun 2014	27 Jun 2015
Loop Antenna	Zhinan	ZN30900A	--	27 Jun 2014	27 Jun 2015
Bi-log Hybrid Antenna	SCHWARZBECK	VULB9163	--	08 Mar 2015	08 Mar 2016
Double-ridged horn antenna	SCHWARZBECK	9120D	--	08 Mar 2015	08 Mar 2016
Horn Antenna	ETS-LINDGREN	3160-09	--	08 Mar 2015	08 Mar 2016
RF Amplifier	HP	8347A	--	27 Jun 2014	27 Jun 2015
RF Amplifier	HP	8349B	--	27 Jun 2014	27 Jun 2015
EMI Test Software	AUDIX	E3	--	N/A	N/A
Coaxial cable	GTS	N/A	--	27 Jun 2014	27 Jun 2015
Coaxial Cable	GTS	N/A	--	27 Jun 2014	27 Jun 2015
Thermo meter	N/A	N/A	--	27 Jun 2014	27 Jun 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	100007	13 Jan 2015	13 Jan 2017

General Product Information

Product Function and Intended Use

The equipment under test (EUT) is a transmitter for a RC toy car operating at 49.86MHz. The EUT has 2 control rods and 2 buttons to command forward, backward, left and right movement of the associated receiver, and cannon rotation movement.

FCC ID: QW70808

Model	Product description
5F62D72	Radio Control Toy Transmitter

Ratings and System Details

	Transmitter
Frequency range	: 49.86MHz
Number of channels	: 1
Type of antenna	: External Telescopic Antenna
Antenna length	: 48 cm
Power supply	: Battery operated 9.0 V
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
- Bill of materials
- 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 : DC 9.0 V

Polarization: Vertical

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	49.858	72.33	-27.67
Average	49.858	57.03	-22.97

Polarization: Horizontal

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	49.858	53.03	-46.97
Average	49.858	38.03	-41.97

Limit

Subclause 15.235(a)

Frequency within the band	Peak Emission		Average Emission	
	(μ V/m)	dB μ V/m	(μ V/m)	dB μ V/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	:	DC 9.0 V
Measuring Frequency Range	:	30-1000MHz

Polarization: Vertical

Frequency (MHz)	Field strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Delta to Limit (dB)
99.528	32.58	43.5	-10.92
149.486	24.58	43.5	-18.92
199.286	17.03	43.5	-26.47
293.084	24.67	46.0	-21.33
365.539	26.59	46.0	-19.41
454.310	28.83	46.0	-17.17

Polarization: Horizontal

Frequency (MHz)	Field strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Delta to Limit (dB)
99.528	16.37	43.5	-27.13
149.486	9.42	43.5	-34.08
233.349	15.39	46.0	-30.61
*325.596	20.57	46.0	-25.43
365.539	23.02	46.0	-22.98
454.310	28.72	46.0	-17.28

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**

The field strength of any emissions removed by more than 10 kHz from the band edges shall not exceed the general radiated emission limits in §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 (μ V/m)	Field strength (dB μ 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.

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 9.0 V

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 28.29 dB and 27.73 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.