

Produkte
Products

Prüfbericht - Nr.: 14039437 001 <i>Test Report No.:</i>			Seite 1 von 11 <i>Page 1 of 11</i>				
Auftraggeber: <i>Client:</i>			Hobbyengine Model Ltd. Room 619, 6/F, Peninsula Centre 67 Mody Road, TsimShaTsui East Kowloon, Hong Kong				
Gegenstand der Prüfung: Short Range Device – Low Power Transmitter (27.145MHz) <i>Test Item:</i>							
Bezeichnung: <i>Identification:</i>		5F62D72		Serien-Nr.: <i>Serial No.:</i>			
Wareneingangs-Nr.: <i>Receipt No.:</i>		A000182991-004		Eingangsdatum: 08.04.2015 <i>Date of Receipt:</i>			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of test item at delivery:</i>				Test samples received are sufficient for testing and not damaged.			
Prüfört: <i>Testing Location:</i>		Global United Technology Services Co., Ltd. 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China					
Prüfgrundlage: <i>Test Specification:</i>		FCC Part 15, Subpart C ANSI C63.4-2003					
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:				
12.05.2015 Benny Lau Senior Project Manager			12.05.2015 Joey Leung Project Engineer				
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>		
Sonstiges / Other Aspects: FCC ID: QW70800							
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet </td> <td style="width: 50%; vertical-align: top;"> Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested </td> </tr> </table>						Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet	Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested
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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. <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>							

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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

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

Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Cal. Due date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	Mar. 28 2015	Mar. 27 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	June. 27 2014	June. 27 2015
Loop Antenna	Zhinan	ZN30900A	June. 27 2014	June. 27 2015
Bi-log Hybrid Antenna	SCHWARZBECK	VULB9163	Mar. 09 2014	Mar. 08 2016
Double-ridged horn antenna	SCHWARZBECK	9120D	Mar. 09 2014	Mar. 08 2016
Horn Antenna	ETS-LINDGREN	3160-09	Mar. 09 2014	Mar. 08 2016
RF Amplifier	HP	8347A	June. 27 2014	June. 27 2015
RF Amplifier	HP	8349B	June. 27 2014	June. 27 2015
EMI Test Software	AUDIX	E3	N/A	N/A
Coaxial cable	GTS	N/A	June. 27 2014	June. 27 2015
Coaxial Cable	GTS	N/A	June. 27 2014	June. 27 2015
Thermo meter	N/A	N/A	June. 27 2014	June. 27 2015

Bandedge Measurement

Equipment	Manufacturer	Type	Cal. Date	Cal Due Date
Spectrum Analyzer	Rohde& Schwarz	FSP30	Jan. 12 2015	Jan. 12 2017

General Product Information

Product Function and Intended Use

The equipment under test (EUT) is a transmitter for a RC toy car operating at 27.145MHz. The EUT has 2 control rods to command the forward, backward, left and right movement of the associated receiver. And it has 2 buttons to control the movement of the turret and trigger the sound of the receiver.

FCC ID: QW70800

Model	Product description
5F62D72	Remote controller of RC Toy

Ratings and System Details

	Transmitter
Frequency range	: 27.145MHz
Number of channels	: 1
Type of antenna	: Telescopic Antenna
Antenna length	: 48 cm
Power supply	: 1 x 9VDC battery
Ports	: none
Protection Class	: III

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Independent Operation Modes

The basic operation modes are:

- Transmitting control signal for the RC toy Car.

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 materials

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 : 9VDC

Polarization: Vertical

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	27.145	75.0	-25.0
Average	27.145	66.0	-14.0

Polarization: Horizontal

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	27.145	55.0	-45.0
Average	27.145	48.0	-32.0

The measured values in above table are deviated from previous results by more than 3 dB.

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 15.227(b)
 Test Method : ANSI 63.4-2003
 Measurement Location : Semi Anechoic Chamber
 Measurement Distance : 3m
 Detector Function : Quasi Peak
 Measurement BW : 120 kHz
 Supply Voltage : 9VDC
 Measuring Frequency Range : 9kHz – 1000MHz

Polarization: Vertical

Frequency (MHz)	Field strength at 30m (dBuV/m)	Limit at 30m (dBuV/m)	Delta to Limit (dB)
26.960	8.61*	29.5	-20.89
27.280	12.49*	29.5	-17.01
Frequency (MHz)	Field strength at 30m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
30.737	28.40	40.0	-11.60
54.247	26.74	40.0	-13.26
485.284	25.01	46.0	-20.96

Polarization: Horizontal

Frequency (MHz)	Field strength at 30m (dBuV/m)	Limit at 30m (dBuV/m)	Delta to Limit (dB)
26.960	-4.99*	29.5	-34.49
27.280	-2.81*	29.5	-32.31
Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
54.247	15.88	40.0	-24.12
307.143	23.67	46.0	-22.33
372.090	22.53	46.0	-23.47

Remark: (*) Square of an inverse linear distance extrapolation factor (40 dB/decade) is applied to convert the field strength at 3m to 30m.

Limit

Subclause 15.227(b)

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

Limit for Radiated Emission under Section 15.209:

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
1.705-30.0	30	$20 \cdot \log(30) = 29.5$	30
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

Bandwidth Measurement**Subclause 15.215****RESULT:****Pass**

Test Specification : FCC Part 15.215
Port of Testing : Antenna port
Detector Function : Peak
Supply Voltage : 9VDC

The field strength of any emissions at the band edges is at least 33.95dB below the carrier. It meets the requirement of 15.215.

For test results refer to Appendix 1.

Limit**Subclause 15.215**

15.215 (c) - Intentional radiators operating under the alternative provisions to the general emission limits, as contained in 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.