TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14035665 001**	**Seite 1 von 8** *Page 1 of 8*

Auftraggeber: *Client:*	**SYMA MODEL AIRCRAFT INDUSTRIAL CO.,LTD** **NO.2 WEST XINGYE ROAD** **LAIMEI INDUSTRIAL AREA, CHENGHAI** **SHANTOU, GUANGDONG** **CHINA**
Gegenstand der Prüfung: *Test Item:*	**Short Range Device - Radio Control Toy Transmitter (2.4GHz)**
Bezeichnung: *Identification:*	**Please refer to "Models" on page 3**
Serien-Nr.: *Serial No.:*	**Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**A000062214 (001-003)**
Eingangsdatum: *Date of Receipt:*	**15.05.2014**
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	Test samples are not damaged and suitable for testing.
Prüfort: *Testing Location:*	**TÜV Rheinland Hong Kong Ltd.** 8/F, First Group Centre, 14 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong **Global United Technology Services Co., Ltd.** 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China
Prüfgrundlage: *Test Specification:*	**FCC Part 15 Subpart C** **ANSI C63.4-2003**
Prüfergebnis: *Test Results:*	**Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage.** The above mentioned product was tested and **passed**.
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland Hong Kong Ltd.** 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong

geprüft/ *tested by:*

20.05.2014	Joey Leung Project Engineer	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

kontrolliert/ *reviewed by:*

20.05.2014	Sharon Li Section Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges: **FCCID: QV7-GC887552-6**
Other Aspects

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*

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Product information

Manufacturers declarations

	Transmitter
Operating frequency range	2412 - 2464 MHz
Type of modulation	GFSK
Number of channels	16
Type of antenna	Wired Antenna
Power level	fix
Connection to public utility power line	No
Nominal voltage	V_{nor}: 6.0 V

Product function and intended use

The equipment under test (EUT) is a radio control toy transmitter operating at 2.4GHz. It is powered by batteries only.

FCCID: QV7-GC887552-6

Models	Product description
X1, X1C, X2, X2C, X3, X3C, X4, X4C, X5, X5C, X6, X6C, X7, X7C, X8, X8C, X9, X9C, X10, X10C, X11, X11C, X12, X12C, X13, X13C, X14, X14C, X15, X15C, X16, X16C, X17, X17C, X18, X18C, X19, X19C, X20, X20C	Radio Controlled Toy Helicopter

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual
Rating Label

List of Test and Measurement Instruments

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

Equipment	Manufacturer	Type	S/N	Cal. Due date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	---	05 Apr 2015
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	---	N/A
ESU EMI Test Receiver	R&S	ESU26	---	28 Jun 2014
Loop Antenna	Zhinan	ZN30900A	---	28 Jun 2014
Bi-log Hybrid Antenna	SCHWARZBECK	VULB9163	---	08 Mar 2015
Double-ridged horn antenna	SCHWARZBECK	9120D	---	08 Mar 2015
RF Amplifier	HP	8347A	---	28 Jun 2014
RF Amplifier	HP	8349B	---	28 Jun 2014
EMI Test Software	AUDIX	E3	---	N/A
Coaxial cable	GTS	N/A	---	28 Jun 2014
Coaxial Cable	GTS	N/A	---	28 Jun 2014
Thermo meter	N/A	N/A	---	30 Jun 2014

Results FCC Part 15 – Subpart C

Subclause 15.207 – Disturbance Voltage on AC Mains	**N/A**
There is no AC power input or output ports on the EUT.	

Subclause 15.205 – Band edge compliance of radiated emissions	**Pass**
Test Specification : ANSI C63.4 – 2003 Mode of operation : Tx mode Port of testing : Enclosure Detector : Peak RBW/VBW : 100 kHz / 300 kHz for f < 1 GHz 1 MHz / 3 MHz for f > 1 GHz Supply voltage : 6.0VDC, 4 x 1.5V AA size new battery Temperature : 23ºC Humidity : 50%	
Requirement:	Radiated emissions which fall in the restricted bans, as defined in 15.205 (a), must also comply with the radiated emission limits specified in 15.209(a).
Results:	The EUT complies with the radiated emission limits specified in 15.209(a). For test protocols refer to Appendix 1, page 4-7.

Subclause 15.215 (c) – 20 dB Bandwidth	**Pass**
Test Specification : ANSI C63.4 – 2003 Mode of operation : Tx mode Port of testing : Enclosure RBW/VBW : 100 kHz / 300 kHz Supply voltage : 6.0VDC, 4 x 1.5V AA size new battery Temperature : 23ºC Humidity : 50%	
Requirement:	The intentional radiators must be designed to ensure that the 20dB bandwidth of the emission, is contained within the frequency band designated in the rule section under which the equipment is operated.
Results:	For test protocols refer to Appendix 1, page 2-3.

Frequency (MHz)	**20 dB left (MHz)**	**Limit (MHz)**	**20 dB right (MHz)**	**Limit (MHz)**
2412	2411.364	> 2400	2412.672	< 2483.5
2438	2437.340	> 2400	2438.672	< 2483.5
2464	2463.364	> 2400	2464.684	< 2483.5

Subclause 15.249 (a) – Radiated Emission (Fundamental and Harmonics) **Pass**

Test Specification : ANSI C63.4 – 2003
Mode of operation : Tx mode
Port of testing : Enclosure
RBW/VBW : 100 kHz / 300 kHz for f < 1 GHz
1 MHz / 3 MHz for f > 1 GHz
Supply voltage : 6.0VDC, 4 x 1.5V AA size new battery
Temperature : 23ºC
Humidity : 50%

Requirement: The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following limit.

Results: PASS

Fundamental Frequency 2412MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2412.000	75.75	114.0 / P
2412.000	47.16	94.0 / A

Fundamental Frequency 2412MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2412.000	75.74	114.0 / P
2412.000	50.06	94.0 / A

Harmonics 2412MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4824.000	53.49	74.0 / P
4824.000	32.55	54.0 / A
7236.000	48.88	74.0 / P
7236.000	33.74	54.0 / A

Harmonics 2412MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4824.000	51.20	74.0 / P
4824.000	30.51	54.0 / A
7236.000	47.81	74.0 / P
7236.000	34.66	54.0 / A

Fundamental Frequency 2438MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2437.990	74.00	114.0 / P
2437.990	50.35	94.0 / A

Fundamental Frequency 2438MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2437.990	75.72	114.0 / P

2437.990	49.52	94.0 / A
Harmonics 2438MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4876.000	56.03	74.0 / P
4876.000	35.15	54.0 / A
7314.000	47.64	74.0 / P
7314.000	33.89	54.0 / A
Harmonics 2438MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4876.000	57.15	74.0 / P
4876.000	35.24	54.0 / A
7314.000	46.85	74.0 / P
7314.000	33.85	54.0 / A
Fundamental Frequency 2464MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2464.021	75.50	114.0 / P
2464.021	50.97	94.0 / A
Fundamental Frequency 2464MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2464.020	74.63	114.0 / P
2464.020	49.49	94.0 / A
Harmonics 2464MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4928.000	59.56	74.0 / P
4928.000	36.44	54.0 / A
7392.000	49.74	74.0 / P
7392.000	32.84	54.0 / A
Harmonics 2464MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4928.000	58.12	74.0 / P
4928.000	35.83	54.0 / A
7392.000	53.29	74.0 / P
7392.000	31.48	54.0 / A

Subclause 15.249 (d) – Spurious Radiated Emissions	**Pass**

Test Specification : ANSI C63.4 - 2003
Mode of operation : Tx mode
Port of testing : Enclosure
Detector : Peak
RBW/VBW : 100 kHz / 300 kHz for f < 1 GHz
1 MHz / 3 MHz for f > 1 GHz
Supply voltage : 6.0VDC, 4 x 1.5V AA size new battery
Temperature : 23ºC
Humidity : 50%

Requirement: Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Results: All three transmit frequency modes comply with the field strength within the restricted bands. There is no spurious found below 30MHz.

Tx frequency 2412MHz — Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	---	74.0 / P
No peak found	---	54.0 / A

Tx frequency 2412MHz — Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	---	74.0 / P
No peak found	---	54.0 / A

Tx frequency 2438MHz — Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	---	74.0 / P
No peak found	---	54.0 / A

Tx frequency 2438MHz — Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	---	74.0 / P
No peak found	---	54.0 / A

Tx frequency 2464MHz — Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	---	74.0 / P
No peak found	---	54.0 / A

Tx frequency 2464MHz — Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	---	74.0 / P
No peak found	---	54.0 / A