TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14035192 001**	**Seite 1 von 9** *Page 1 of 9*

Auftraggeber: *Client:*	**HK(SHENZHEN) INDUSTRIES DEVELOPMENT CO.,LTD** **Flat 615, 3/F., Bagua Industries Zone** **Bagua 2nd Road** **Shenzhen** **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.:*	**A000042872 (001-003)**
Eingangsdatum: *Date of Receipt:*	**26.03.2014**
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	Test sample(s) is/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:*

15.04.2014	Joey Leung Project Engineer	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

kontrolliert/ *reviewed by:*

15.04.2014	Hugo Wan Senior Project Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges: **FCCID: 2ABYZTF2835A**
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*

Table of Content

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Product information

Manufacturers declarations

	Transmitter
Operating frequency range	2402 - 2477 MHz
Type of modulation	FSK
Number of channels	20
Type of antenna	Wired Antenna
Power level	fix
Connection to public utility power line	No
Nominal voltage	V_{nor}: 9.0 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: 2ABYZTF2835A

Models	Product description
TF2835A, AMBR-MC4	Radio Controlled Airman

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 : 9.0VDC, 6 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:	There is no peak found in the restricted bands. 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 : 9.0VDC, 6 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)**
2402	2401.736	> 2400	2402.270	< 2483.5
2441	2440.742	> 2400	2441.294	< 2483.5
2477	2476.748	> 2400	2477.222	< 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 : 9.0VDC, 6 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 2402MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2402.030	101.71	114.0 / P
2402.030	87.75	94.0 / A

Fundamental Frequency 2402MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2402.030	98.97	114.0 / P
2402.030	83.39	94.0 / A

Harmonics 2402MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4804.400	53.10	74.0 / P
4804.400	41.81	54.0 / A
7206.120	58.14	74.0 / P
7206.120	44.23	54.0 / A
9608.200	49.78	74.0 / P
9608.200	37.02	54.0 / A

Harmonics 2402MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4804.400	56.67	74.0 / P
4804.400	42.69	54.0 / A
7206.120	56.43	74.0 / P
7206.120	42.92	54.0 / A
9608.200	57.08	74.0 / P
9608.200	42.91	54.0 / A

Fundamental Frequency 2441MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2441.024	99.42	114.0 / P
2441.024	85.05	94.0 / A

Fundamental Frequency 2441MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2441.024	98.31	114.0 / P
2441.024	83.66	94.0 / A
Harmonics 2441MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4882.060	53.65	74.0 / P
4882.060	40.98	54.0 / A
7323.100	56.41	74.0 / P
7323.100	43.19	54.0 / A
9764.000	54.60	74.0 / P
9764.000	41.61	54.0 / A
Harmonics 2441MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4882.060	57.66	74.0 / P
4882.060	44.26	54.0 / A
7323.100	58.37	74.0 / P
7323.100	45.88	54.0 / A
9764.000	55.92	74.0 / P
9764.000	41.69	54.0 / A

Fundamental Frequency 2477MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2476.982	100.13	114.0 / P
2476.982	84.76	94.0 / A
Fundamental Frequency 2477MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2476.982	101.06	114.0 / P
2476.982	85.25	94.0 / A
Harmonics 2477MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4954.300	54.55	74.0 / P
4954.300	40.87	54.0 / A
7431.110	56.83	74.0 / P
7431.110	42.25	54.0 / A
9908.410	58.67	74.0 / P
9908.410	44.50	54.0 / A
Harmonics 2477MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4954.300	59.07	74.0 / P

4954.300	43.63	54.0 / A
7431.110	57.87	74.0 / P
7431.110	43.79	54.0 / A
9908.410	58.12	74.0 / P
9908.410	44.14	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 : 9.0VDC, 6 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 2402MHz 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 2402MHz 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 2441MHz 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 2441MHz 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 2477MHz 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 2477MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	---	74.0 / P
No peak found	---	54.0 / A