Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14044191 001**	**Seite 1 von 14** *Page 1 of 14*
Auftraggeber: *Client:*	**RUNLONG TOYS&CRAFT FACTORY LIANHE ROAD 5TH LANE OF NO.1, WAIPU INDUSTRIAL ZONE FENGXIANG STREET, CHENGHAI DISTRICT, SHANTOU CITY GUANGDONG, CHINA**	
Gegenstand der Prüfung: *Test Item:*	**Short Range Device - Radio Control Toy Transmitter (2.4GHz)**	
Bezeichnung: *Identification:*	**Please refer to page 3 for the multiple models**	**Serien-Nr.:** *Serial No.:* **Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**A000379137-001, A000379137-002**	**Eingangsdatum:** *Date of Receipt:* **17.06.2016**
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 **Hong Kong Productivity Council** HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong	
Prüfgrundlage: *Test Specification:*	**FCC Part 15 Subpart C** **ANSI C63.10-2013**	
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:*			**kontrolliert/** *reviewed by:*		
13.07.2016	Hugo Wan Senior Project Manager		13.07.2016	Sharon Li Department Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges: Other Aspects — **FCC ID 2AIOG000000000383**

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	2405 - 2475 MHz
Type of modulation	GFSK
Number of channels	71
Channel separation (MHz)	1
Type of antenna	Wired antenna
Power level	fix
Connection to public utility power line	No
Nominal voltage	V_{nor}: 3.7 V DC (rechargeable battery)

Product function and intended use

The equipment under test (EUT) is a radio control toy transmitter operating at 2.4GHz.The EUT is powered by internal battery only. There is a charging cable with USB connector to charge up the internal battery.

Multiple models

The client declares that the EUT has 100 models as listed in below table. The model 208001-88 was submitted by client as a representative model for testing. The 100 models are all identical to each other in constructions including schematics, PCB layouts and electronic components used except the housing and model number only.

Models	Description
208001-88, 208001-81, 208002-83, 208002-85, 208003-82, 208003-86, 208004, 208005, 208006, 208007, 208008, 208009, 208010, 208011, 208012, 208013, 208014, 208015, 208016, 208017, 208018, 208019, 208020, 208021, 208022, 208023, 208024, FB-101, FB-102, FB-103, R-101, R-102, R-103, R-104, R-105, R-201, R-202, R-203, R-204, R-205, R-301, R-302, R-303, R-304, R-305, R-401, R-402,R-403, R-404, R-405, R-501, R-502,R-503, R-504, R-505, R-601, R-602, R-603, R-604, R-605, R-106, R-107, R-108, R-109, R-110, R-206, R-207, R-208, R-209, R-210, R-306, R-307, R-308, R-309, R-310, R-406, R-407, R-408, R-409, R-410, R-506, R-507, R-508, R-509, R-510, R-606, R-607, R-608, R-609, R-610, RL-1, RL-2, RL-3, RL-4, RL-5, RL-6, RL-7, RL-8, RL-9, RL-10	Voice Intelligent Remote Control Car

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual
Label Artwork
Declaration of equivalence letter

Independent Operation Modes

The basic operation modes are:

- Radio control to the receiver toy.

For further information refer to User Manual

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 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 mode transmitter was provided by client with following arrangement:

1)Fixed channel transmission was set by the specific operation of the EUT.
2)The following channels were tested
Lo: 2405MHz
Mid: 2445MHz
Hi: 2475MHz

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

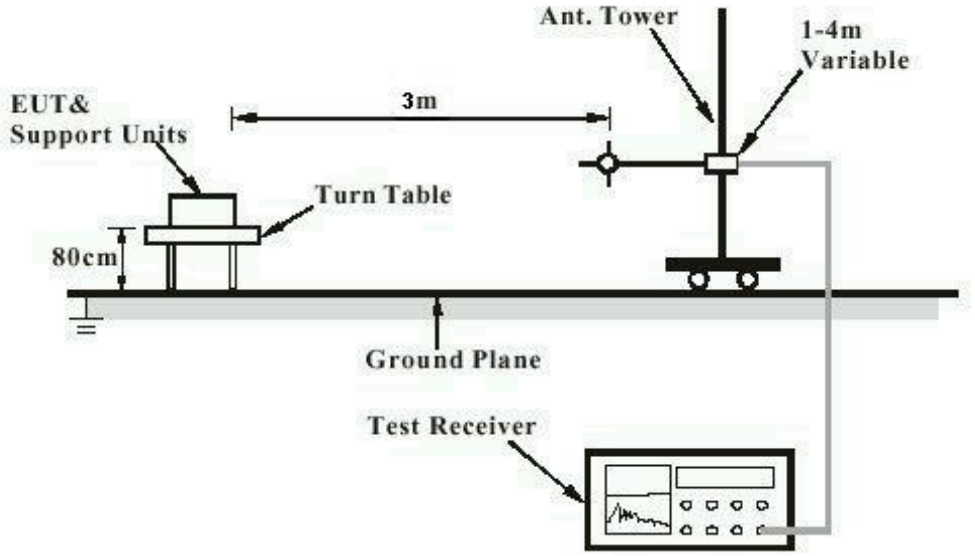
1) USB charging cable
2) AC/DC power adaptor (laboratory reference)
a.Model: A1299
b.Rating Input: 100-240V, 50-60Hz, 0.15A
a.Output: 5V, 1A

Countermeasures to achieve EMC Compliance

- none

Test Setup Diagram

Diagram of Measurement Configuration for Radiated Emission Test



Note: Measurements above 1 GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Configuration for Conducted RF Test

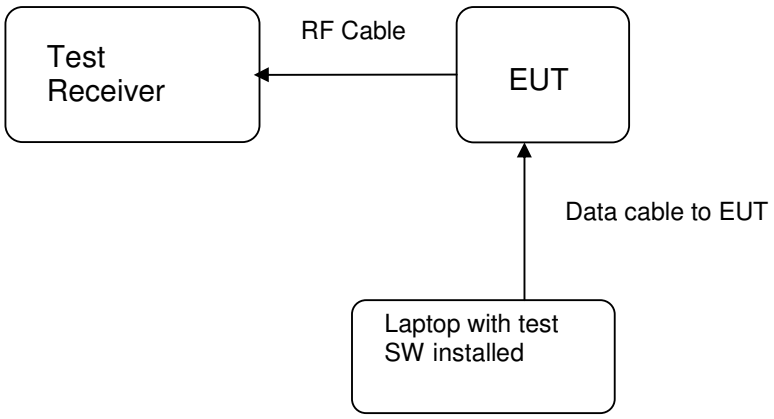
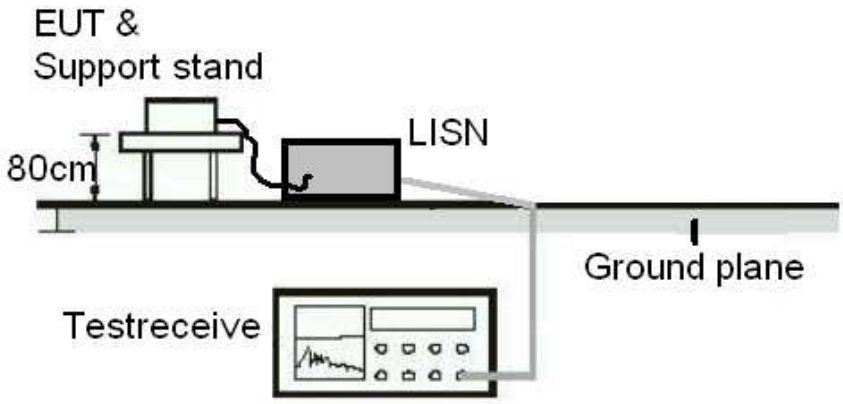


Diagram of Measurement Equipment Configuration for AC Mains Conducted Emission Test (if applicable)



List of Test and Measurement Instruments

Hong Kong Productivity Council (FCC / IC Registration number: 90656 / 4780A-1)

Radiated Emission

Equipment	Manufacturer	Type	S/N	Cal. Date	Cal. Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	25 Apr 2016	25 Apr 2017
Cable	Hubersuhner	SUCOFLEX 104	72799 /6	31 Mar 2016	31 Mar 2018
Test Receiver	R & S	ESU40	100190	07 Dec 2015	07 Dec 2016
Bi-conical Antenna	R & S	HK116	100241	01 Sep 2015	01 Sep 2017
Log Periodic Antenna	R & S	HL223	841516/017	01 Sep 2015	01 Sep 2017
Coaxial cable	Harbour	LL335	N/A	10 Jun 2014	10 Aug 2016
Microwave amplifer 0.5-26.5GHz, 25dB gain	HP	83017A	3950M00241	17 Jul 2014	17 Jul 2016
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	28 Oct 2015	28 Oct 2017
Horn Antenna	EMCO	3115	9002-3347	26 Aug 2015	26 Aug 2017
Active Loop Antenna	EMCO	6502	9107-2651	15 Aug 2015	15 Aug 2016

Conducted Emission on AC Mains Terminals

Equipment	Manufacturer	Type	S/N	Cal. Date	Cal. Due Date
Test Receiver	Rohde & Schwarz	ESR3	101833	22 Oct 2015	22 Oct 2016
LISN	Rohde & Schwarz	ESH3-Z5	100230	22 Oct 2015	22 Oct 2016
EMC32	Rohde & Schwarz	v9.20	N/A	N/A	N/A

TÜV Rheinland Hong Kong Ltd.

Radio Frequency Test

Equipment	Manufacturer	Type	S/N	Cal. Date	Cal. Due Date
Spectrum Analyzer	Rohde & Schwarz	FSP30	100610	19 Jan 2015	19 Jan 2017

Results FCC Part 15 – Subpart C

Subclause 15.203 – Antenna Information		**Pass**
Requirement:	No antenna other than that furnished by the responsible party shall be used with the device	
Results:	Permanent attached antenna	
Verdict:	Pass	

Subclause 15.204 – Antenna Information		**Pass**
Requirement:	Provide information for every antenna proposed for the use with the EUT	
Results:	a) Antenna type: b) Manufacturer and model no: c) Gain with reference to an isotropic radiator:	Wired N/A 0 dBi
Verdict:	Pass	

Subclause 15.207 – Disturbance Voltage on AC Mains **Pass**

Test Port: AC mains input port of the AC/DC adaptor
Applied Voltage: 120VAC
Adaptor Model: Please refer to page 4

Mode of operation: 1) charging with transmitter

Live measurement

Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0,15 – 0,5	0.170	51.3	39.4	66 - 56	56 - 46	Pass
	0.426	45.3	36.3	66 - 56	56 - 46	Pass
> 0,5 - 5	0.756	48.6	42.4	56	46	Pass
> 5 - 30	No peak found	---	---	60	50	Pass

Neutral measurement

Frequency range (MHz)	Frequency (MHz)	Quasi-peak dBµV	Average dBµV	Limit QP (dBµV)	Limit AV (dBµV)	Verdict
0,15 – 0,5	0.170	49.2	33.3	66 - 56	56 - 46	Pass
> 0,5 - 5	0.508	44.6	33.8	56	46	Pass
	0.746	47.1	38.8	56	46	Pass
> 5 - 30	No peak found	---	---	60	50	Pass

Results: The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz does not exceed the limits. For test Results plots refer to Appendix 1, page 4-5.

Subclause 15.215 (c) – 20 dB Bandwidth				**Pass**
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.			
Test Specification : ANSI C63.10 – 2013 Mode of operation : Tx mode Port of testing : Temporary antenna port RBW/VBW : 100 kHz / 300 kHz Supply voltage : 3.7VDC, power supply Temperature : 23ºC Humidity : 50%				
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)**
2405	2404.000	> 2400	2406.740	< 2483.5
2445	2441.780	> 2400	2446.800	< 2483.5
2475	2471.880	> 2400	2476.880	< 2483.5

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

Test Specification : ANSI C63.10 – 2013
Mode of operation : Tx mode
Port of testing : Enclosure
RBW/VBW : 120 kHz / 300 kHz for f < 1 GHz
1 MHz / 3 MHz for f > 1 GHz
Supply voltage : 3.7VDC, internal 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

Fundamental Frequency 2405MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2406.763	85.91	114.0 / P
2405.401	50.24	94.0 / A

Fundamental Frequency 2405MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2405.481	78.24	114.0 / P
2405.240	46.68	94.0 / A

Harmonics 2405MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4809.840	57.23	74.0 / P
4810.272	41.69	54.0 / A

Harmonics 2405MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4810.769	61.96	74.0 / P
4810.048	44.17	54.0 / A

Fundamental Frequency 2445MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2444.647	91.04	114.0 / P
2445.096	51.23	94.0 / A

Fundamental Frequency 2445MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2444.647	87.84	114.0 / P
2445.000	49.92	94.0 / A
Harmonics 2445MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4889.519	63.38	74.0 / P
4890.112	44.67	54.0 / A
Harmonics 2445MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4889.631	64.92	74.0 / P
4889.951	45.35	54.0 / A
Fundamental Frequency 2475MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2475.401	85.87	114.0 / P
2475.080	49.47	94.0 / A
Fundamental Frequency 2475MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2475.962	93.18	114.0 / P
2475.401	52.87	94.0 / A
Harmonics 2475MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4949.663	62.08	74.0 / P
4950.192	44.53	54.0 / A
Harmonics 2475MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4951.827	65.72	74.0 / P
4950.112	46.01	54.0 / A

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

Test Specification : ANSI C63.10 – 2013
Mode of operation : Tx mode
Port of testing : Enclosure
Detector : Peak
RBW/VBW : 120 kHz / 300 kHz for f < 1 GHz
1 MHz / 3 MHz for f > 1 GHz
Supply voltage : 3.7VDC, power supply
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 between 12MHz to 30MHz, of which 12MHz is the lowest oscillating frequency in EUT.

Tx frequency 2405MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2388.317	51.29	74.0 / P
2388.317	33.36	54.0 / A

Tx frequency 2405MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2390.000	46.23	74.0 / P
2390.000	33.08	54.0 / A

Tx frequency 2445MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	--	--

Tx frequency 2445MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	--	--

Tx frequency 2475MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2483.926	49.32	74.0 / P
2483.926	33.08	54.0 / A

Tx frequency 2475MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2483.580	53.59	74.0 / P
2483.580	33.18	54.0 / A

Safety Human Exposure – Radio Frequency Exposure Compliance	Pass
Please refer to Appendix 5 for details.	