TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14043333 002**		**Seite 1 von 13** *Page 1 of 13*
Auftraggeber: *Client:*	**FENGQI TOY FACTORY CHENGHAI DISTRICT SHANTOU CITY GUANGDONG CHINA**		
Gegenstand der Prüfung: *Test Item:*	**Short Range Device - Low Power Transmitter (49.86MHz)**		
Bezeichnung: *Identification:*	**Please refer to "Models" on page 4**	**Serien-Nr.:** *Serial No.:*	**Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**A000385517-001**	**Eingangsdatum:** *Date of Receipt:*	**29.06.2016**
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	Test sample is not damaged and suitable for testing.		
Prüfort: *Testing Location:*	**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 C63.10-2013**		
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:*		
14.07.2016	Benny Lau Senior Project Manager		14.07.2016	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Sonstiges: Other Aspects	**FCC ID: 2AIU4123456** **This report superseded the report 14043333 001. As per client's request, the applicant's address is changed.**

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

Page

Product information

Manufacturers declarations

	Transmitter
Operating frequency range	49.86 MHz
Type of modulation	ASK
Number of channels	1
Type of antenna	Telescope Antenna
Power level	fix
Connection to public utility power line	No
Nominal voltage	V_{nor}: 3.0Vdc (2 x 1.5V “AA” battery)

Product function and intended use

The equipment under test (EUT) is a transmitter operating at 49.86MHz. And it is powered by 3.0Vdc (2 x 1.5V “AA” battery). The applicant declares that the models below is identical except the model number and packaging.

FCC ID: 2AIU4123456

Models	Product description
MRCC-24-2823,9801,9802,9803,9805,9806,9807,9808, 9809,9810,9811,9812,9813,9814,9815,9816,9817,9818, 9819,9820,9821,9822,9823,9824,9825,9826,9827,9828, 9829,9830,9831,9832,9833,9834,9835,9836,9837,9838, 9839,9840,9841,9842,9843,9844,9845,9846,9847,9848, 9849,9850,9851,9852,9853,9854,9855,9856,9857,9858, 9859,9860,9861,9862,9863,9864,9865,9866,9867,9868, 9869,9870,9871,9872,9873,9874,9875,9876,9877,9878, 9879,9880,9881,9882,9883,9884,9885,9886,9887,9888, 9889,9890,9891,9892,9893,9894,9895,9896,9897,9803A, 9816A	Toy Remote Control

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual
Rating Label

Independent Operation Modes

The basic operation modes are:

- Transmitting mode .

For further information refer to User Manual

Related Submittal(s) Grants

This is a single application for certification of the transmitter. The FCC ID of the corresponding receiver is 2AIU4789.

Remark

The test results in this test report are only relevant to the tested sample and does not involve any assessment in the production

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.

- No testing software is provided by the applicant.

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 of the transmitter part were performed according to the procedures in ANSI C63.10-2013.

For measurement below 1GHz - the equipment under test (EUT) was placed at the middle of the 80 cm height turntable. For measurement above 1GHz - the EUT was placed at the middle of the 1.5 m height turntable and RF absorbing material was placed on ground plane between turntable and 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:

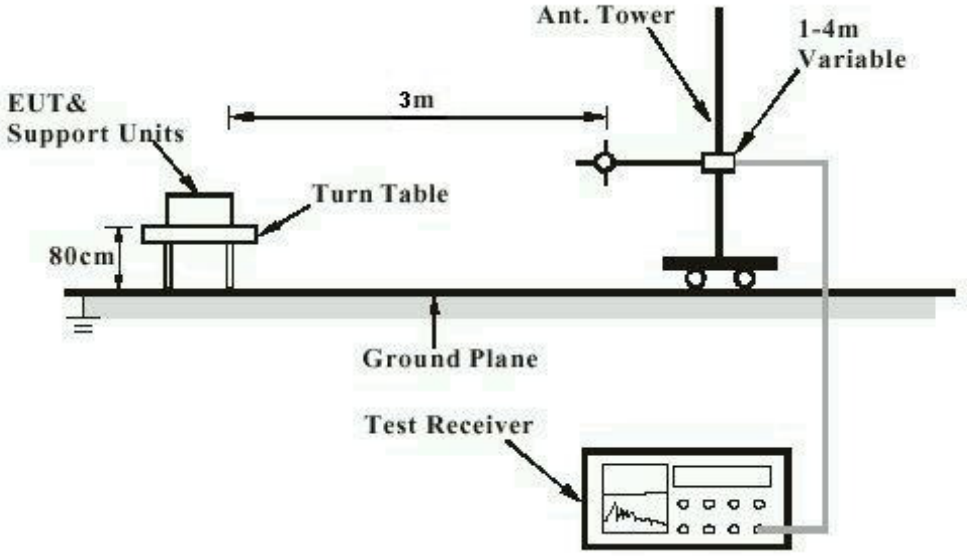
FS = R + AF + CF + FA – PA

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.

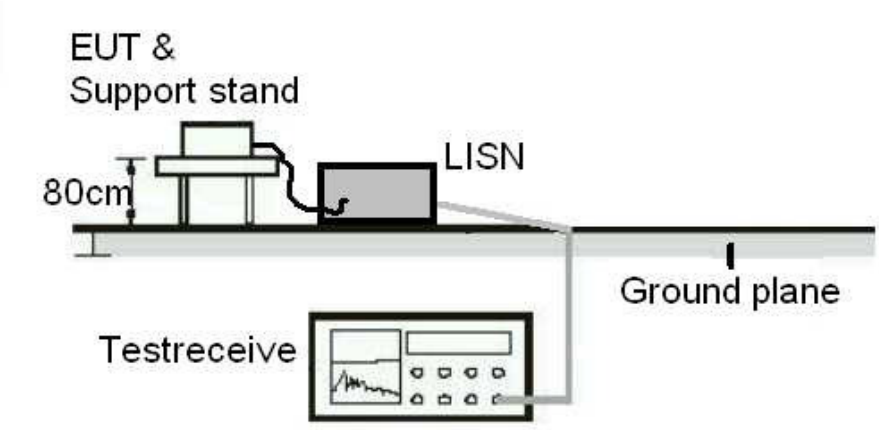
Test Setup Diagram

Diagram of Measurement Configuration for Radiation 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 Equipment Configuration for Mains Conduction Measurement (if applicable)



List of Test and Measurement Instruments

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

Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	July. 03 2015	July. 02 2020
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. 29 2016	June. 28 2017
Loop Antenna	Zhinan	ZN30900A	June. 29 2016	June. 28 2017
BiConiLog Antenna	SCHWARZBECK	VULB9163	June. 29 2016	June. 28 2017
Double-ridged horn antenna	SCHWARZBECK	9120D	June. 29 2016	June. 28 2017
Horn Antenna	ETS-LINDGREN	3160-09	June. 29 2016	June. 28 2017
RF Amplifier	HP	8347A	June. 29 2016	June. 28 2017
RF Amplifier	HP	8349B	June. 29 2016	June. 28 2017
Broadband Preamplifier	SCHWARZBECK	BBV9718	June. 29 2016	June. 28 2017
EMI Test Software	AUDIX	E3	N/A	N/A
Coaxial cable	GTS	N/A	N/A	N/A
Coaxial Cable	GTS	N/A	N/A	N/A
Thermo meter	N/A	N/A	June. 29 2016	June. 28 2017

Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is ±3.43dB.

The estimated combined standard uncertainty for radiated emissions measurements is ±5.10dB (30MHz to 200MHz) and ±5.08dB (200MHz to 1000MHz) and is ±5.10dB (30MHz to 200MHz) and ±5.08dB (above 1GHz).

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of k=2, which for the level of confidence is approximately 95%.

Results FCC Part 15 – Subpart C

FCC 15.203 – Antenna Requirement 1	Pass
FCC Requirement:	No antenna other than that furnished by the responsible party shall be used with the device
Results:	Antenna type: External telescope antenna with unique antenna connector.
Verdict:	Pass

FCC 15.204 – Antenna Requirement 2	Pass
FCC Requirement:	An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.
Results:	Only one integral antenna can be used.
Verdict:	N/A

FCC 15.207 – Conducted Emission on AC Mains	N/A
There is no AC power input or output ports on the EUT.	

FCC 15.235(a) – Radiated Emission (Fundamental) **Pass**

Test Specification : ANSI C63.10-2013
Mode of operation : Tx mode
Port of testing : Enclosure
RBW/VBW : 120 kHz for f < 1 GHz
Supply voltage : 3.0VDC
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 Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
49.858	55.72	100 / PK
49.858	50.53	80 / AV

Fundamental Frequency	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
49.858	44.16	100 / PK
49.858	38.53	80 / AV

FCC 15.235(b) – Out Of Band Radiated Emissions **Pass**

Test Specification : ANSI C63.10-2013
Mode of operation : Tx mode
Port of testing : Enclosure
Detector : Peak
RBW/VBW : 120 kHz for f < 1 GHz
Supply voltage : 3.0VDC
Frequency range : 9kHz to tenth harmonic
Temperature : 23ºC
Humidity : 50%

Requirement: The field strength of any emissions which appear outside the assigned bands shall not exceed the general radiated limits shown in 15.209.

Results: Pass

Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
99.528	29.70	43.5
149.489	15.42	43.5
549.020	29.30	46.0

Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
99.528	22.68	43.5
No peak found	---	---
No peak found	---	---

FCC 15.235(b) – Band-edge Emissions **Pass**

Test Specification : ANSI C63.10-2013
Mode of operation : Tx mode
Port of testing : Enclosure
Detector : Peak
RBW/VBW : 3kHz
Supply voltage : 3.0VDC
Temperature : 23ºC
Humidity : 50%

Requirement: 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. 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.

Results: Pass

Freq MHz	Attenuation -dB	Limit -dB	Level dBuV/m	Limit dBuV/m
49.91	36.32	26	19.40	40.0
49.81	37.03	26	18.69	40.0

FCC 15.215 (c) – 20 dB Bandwidth **Pass**

Test Specification : ANSI C63.10 – 2013
Mode of operation : Tx mode
Port of testing : Enclosure
RBW/VBW : 10kHz
Supply voltage : 3.0VDC
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

Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)
49.86	49.8406	>49.82	49.8808	<49.90