



Produkte
 Products

Prüfbericht - Nr.: 14022823 001		Seite 1 von 11	
<i>Test Report No.:</i>		<i>Page 1 of 11</i>	
Auftraggeber: <i>Client:</i>	Apple Toys Development Co. Ltd. Room 515-516, 5/F., Block A Peninsula Centre 67 Mody Road T.S.T. East, Kowloon, Hong Kong		
Gegenstand der Prüfung: <i>Test Item:</i>	Low Power Transmitter (49.86MHz)		
Bezeichnung: <i>Identification:</i>	9023 Please see "Models" on page 5 for details	Serien-Nr.: <i>Serial No.:</i>	Engineering sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	00100304097-001	Eingangsdatum: <i>Date of Receipt:</i>	04.03.2010
Prüfört: <i>Testing Location:</i>	TÜV Rheinland Hong Kong Ltd. 8/F, Niche Centre, 14 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong TÜV Rheinland (Guangdong) Ltd. EMC Laboratory Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650, P.R.China		
Prüfgrundlage: <i>Test Specification:</i>	FCC Part 15, Subpart C		
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. 9th Floor, Emperor International Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong		
geprüft / tested by:		kontrolliert / reviewed by:	
22.03.2010	Mika Chan Project Engineer	22.03.2010	Hugo Wan Project Manager
<i>Datum</i>	<i>Name/Stellung</i>	<i>Datum</i>	<i>Name/Stellung</i>
<i>Date</i>	<i>Name/Position</i>	<i>Date</i>	<i>Name/Position</i>
			
	<i>Unterschrift</i>		<i>Unterschrift</i>
	<i>Signature</i>		<i>Signature</i>
Sonstiges / Other Aspects:			
FCCID: W89-RC-TOYS-49T			
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
<p>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.</p> <p><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></p>			

Test Summary

Radiated Emission of Carrier Frequency

Result: Pass

Spurious Radiated Emissions

Result: Pass

Bandwidth Measurement

Result: Pass

Contents

List of Test and Measurement Instruments.....	4
General Product Information	5
Product Function and Intended Use.....	5
Ratings and System Details.....	5
Independent Operation Modes.....	6
Submitted Documents	6
Related Submittal(s) Grants	6
Test Set-up and Operation Mode.....	7
Principle of Configuration Selection	7
Test Operation and Test Software	7
Special Accessories and Auxiliary Equipment.....	7
Countermeasures to achieve EMC Compliance.....	7
Test Methodology	8
Radiated Emission.....	8
Field Strength Calculation	8
Test Results	9
Radiated Emission of Carrier Frequency Subclause 15.235(a)	9
Spurious Radiated Emissions Subclause 15.235(b).....	10
Bandwidth Measurement Subclause 15.235(b).....	11
Appendix 1: Test Results	
Appendix 2: Test Setup	
Appendix 3: EUT External Photo	
Appendix 4: EUT Internal Photo	
Appendix 5: FCCID Label, Block Diagram, Schematics and User manual.	

List of Test and Measurement Instruments

TÜV Rheinland (Guangdong) Ltd. (Registration number: 833845)

Kind of Equipment	Manufacturer	Type	S/N	Cal Due Date
FSP30 Spectrum Analyzer	Rohde & Schwarz	FSP30	100286	16-Mar-11
EMI Test Receiver	Rohde & Schwarz	ESCI	100216	16-Mar-11
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	209	21-Aug-11
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	210	16-Mar-11
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF 906	100385	24-Aug-11
Band Reject Filter	Micro-Tronics	BRM50702	023	16-Mar-11
Pre-Amplifier	MITEQ	AFS42-00101800-25-S-42	1101599	16-Mar-11
Double-Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF 906	100407	16-Mar-11
Horn Antenna	EMCO	3160-09	21642	26-Jun-14
Pre-Amplifier	MITEQ	AFS33-18002650-30-8P-44	1108282	16-Mar-11
Horn Antenna	EMCO	3160-09	21645	24-Aug-14
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100111	16-Mar-11
Triple-Loop Antenna	Rohde & Schwarz	HM020	100021	16-Mar-11
SAC	Albatross Projects GmbH	N/A	9460000.9	#REF!

General Product Information

Product Function and Intended Use

The equipment under test (EUT) is a transmitter for a RC toy car operating at 49.86 MHz. The EUT has one steering wheel, one speed control trigger for commanding the forward, backward, left and right movement of the associated receiver.

FCCID: W89-RC-TOYS-49T

Models	Product description
606, 607, 608, 608B, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 0188, 0189, 8030, 8031, 8032, 8033, 8034, 8035, 8036, 8037, 8038, 8039, 8040, 8300, 8301, 8302, 8303, 8304, 8305, 8306, 8307, 8308, 8309, 8310, 8311, 8312, 8313, 8314, 8315, 8316, 8317, 8318, 8319, 8320, 8321, 8322, 8323, 8324, 8325, 8326, 8327, 8328, 9008, 9015, 9016, 9023, 9024, 9025, 9026, 9027, 9027N, 9028, 9038, 9048, 9069, 9069T, 9078, 9079, 9080, 9081, 9082, 9083, 9084, 9085, 9119, 9218, 9219, 9220, 9221, 9222, 9222N, 9223, 9224, 9225, 9226, 9227, 9228, 9238, 9338, 9481, 9491, 9501, 2201, 2211, 648G, 3392, 3393, 3881, 604, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 635, 636, 637, 638, 639, 640, 649, 652, 661, 662, 663, 664, 692, 6425, 6410, 6411, 6412, 6413, 6414, 6415, 6416, 6417, 6418, 6419, 6420, 6421, 6422, 6423, 6424, 4000, 4003, 4010, 4016, 4018, 4020, A3043, A3044, A3045, A3046, A3047, A3048, A3049, A3050, A3051, A3052, A3053, A3054, A3055, A3056, A3057, A3058, A3059, A3060	Radio Control Toy Transmitter

Ratings and System Details

	Transmitter
Frequency range	: 49.86MHz
Number of channels	: 1
Type of antenna	: External telescopic antenna
Power supply	: 2 x AA size batteries, 3.0VDC
Ports	: none
Protection Class	: III

www.tuv.com

Independent Operation Modes

The basic operation modes are:

- Remote Control: On and Off

For further information refer to User Manual

Submitted Documents

The submitted documents are listed as follow:

- Circuit diagram
- Block diagram
- User manual
- Label artwork

Related Submittal(s) Grants

This is a single application for certification of the transmitter.

www.tuv.com

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

www.tuv.com

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.

www.tuv.com

Test Results

Radiated Emission of Carrier Frequency

Subclause 15.235(a)

RESULT:

Pass

Test Specification : FCC Part 15 Subclause 15.235(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 : 2 x AA size batteries, DC 3.0V

Polarization: Vertical

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	49.850	76.3	-23.7
Average	49.850	70.7	-9.3

Polarization: Horizontal

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	49.850	62.4	-37.6
Average	49.850	56.7	-23.3

Limit

Subclause 15.235(a)

Frequency within the band	Peak Emission		Average Emission	
	(μ V/m)	dB μ V/m	(μ V/m)	dB μ V/m
49.82-49.90 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 15.235(b)
RESULT:
Pass

Test Specification : FCC Part 15 Subclause 15.209
 Test Method : ANSI 63.4-2003
 Measurement Location : Semi Anechoic Chamber
 Measurement Distance : 3m
 Detector Function : Quasi Peak
 Measurement BW : 120 kHz
 Supply Voltage : 2 x AA size batteries, DC 3.0V
 Measuring Frequency Range : 30-1000MHz

Polarization: Vertical

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
99.700	29.6	43.5	-13.9
299.150	33.0	46.0	-13.0
349.000	31.2	46.0	-14.8
398.900	32.1	46.0	-13.9
448.750	26.4	46.0	-19.6

Polarization: Horizontal

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
199.450	21.7	43.5	-21.8
*249.250	26.3	46.0	-19.7
299.150	32.4	46.0	-13.6
349.000	26.4	46.0	-19.6
398.900	28.0	46.0	-18.0

Remark: (1) '*' indicates the frequency of the emissions fall into the restricted band as defined in Section 15.205(a). They comply with the radiated emission limits specified in Section 15.209.
 (2) There is no other spurious emission found from 30MHz to 1000MHz.

Limit
Subclause 15.209

Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209.

Limit for Radiated Emission under Section 15.209:

Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
30-88	100	20*log(100) = 40.0	3
88-216	150	20*log(150) = 43.5	3
216-960	200	20*log(200) = 46.0	3
960-2500	500	20*log(500) = 54.0	3

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector and above 1000 MHz are based on the measurements employing an average detector.

www.tuv.com

Bandwidth Measurement

Subclause 15.235(b)

RESULT:

Pass

Test Specification : FCC Part 15 section 235(b)
Port of Testing : Antenna port
Detector Function : Peak
Supply Voltage : DC 9V

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. At the lower edge 49.81MHz and upper edge 49.91 MHz are 32.64 dB and 31.59 dB below the carrier respectively.

For test results refer to Appendix 1.

Limit

Subclause 15.235(b)

The field strength of any emissions appearing between the band edges and up to 10KHz above and below the band edges shall be attenuated at least 26dB below the level of the unmodulated carrier or to the general limits in Section 15.209, whichever permits the higher emission levels.