TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14040804 001**	**Seite 1 von 11** *Page 1 of 11*
Auftraggeber: *Client:*	**Dickie Toys Hong Kong Ltd.** 19/F., Prudential Tower, The Gateway, Harbour City, 21 Canton Road, Tsimshatsui, Kowloon, Hong Kong	
Gegenstand der Prüfung: *Test Item:*	**Short Range Device - Low Power Transmitter (27.145MHz)**	
Bezeichnung: *Identification:*	**20 309 9621**	**Serien-Nr.:** *Serial No.:* **Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**A000227004-001**	**Eingangsdatum:** *Date of Receipt:* **13.07.2015**
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	Test sample is not damaged and suitable for testing.	
Prüfort: *Testing Location:*	**Hong Kong Productivity Council** HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong **TÜV Rheinland Hong Kong Ltd.** 8/F., First Group Centre, 14 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong	
Prüfgrundlage: *Test Specification:*	**FCC Part 15, Subpart C** **ANSI C63.4-2009**	
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*	
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:*		
05.08.2015	Joey Leung Project Engineer		05.08.2015	Benny Lau Senior Project Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges / *Other Aspects:*

FCC ID: NLB27212TX

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*	

Contents

Test Summary

Radiated Emission of Carrier Frequency

Result: Pass

Spurious Radiated Emissions

Result: Pass

Bandwidth Measurement

Result: Pass

List of Test and Measurement Instruments

Hong Kong Productivity Council (Registration number: 90656)

Radiated Emission

Equipment	Manufacturer	Type	S/N	Cal. Interval	Last Cal. Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	1 year	14 Apr 2015
Cable	Hubersuhner	SUCOFLEX 104	72799 /6	2 years	31 Mar 2014
Test Receiver	R & S	ESU26	100050	1 year	12 Feb 2015
Active Loop Antenna	EMCO	6502	9107-2651	2 years	17 May 2014
Bi-conical Antenna	R & S	HK116	100242	2 years	22 Aug 2013
Coaxial cable	Harbour	LL335	N/A	2 years	10 Jun 2014
Microwave amplifer 0.5-26.5GHz, 25dB gain	HP	83017A	3950M00241	2 years	17 Jul 2014
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	2 years	28 Oct 2013

TÜV Rheinland Hong Kong Ltd.

Radio Test

Equipment	Manufacturer	Type	S/N	Cal. Interval	Last Cal. Date
Spectrum Analyzer	R&S	FSP30	100007	2 year	12 Jan 2015

General Product Information

Product Function and Intended Use

The equipment under test (EUT) is a transmitter for a RC toy boat operating at 27.145MHz. The EUT has 2 control rods to command forward, backward, left and right movement of the associated receiver.

FCC ID: NLB27212TX

Models	Product description
20 309 9621	Radio Control Toy Boat

Ratings and System Details

		Transmitter
Frequency range	:	27.145MHz
Number of channels	:	1
Type of antenna	:	Permanent External Antenna
Antenna length	:	28.8 cm
Power supply	:	Battery operated 4.5V
Ports	:	none
Protection Class	:	III

Independent Operation Modes

The basic operation mode is transmitting control signal for the RC toy boat.

For further information refer to User Manual

Submitted Documents

The submitted documents are listed as follow:

- Circuit diagram
- Block diagram
- User manual
- Label artwork
- Bill of material

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 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

Test Methodology

Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.4-2009.

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.

Test Results

Radiated Emission of Carrier Frequency — Subclause 15.227(a)

RESULT: **Pass**

Test Specification	:	FCC Part 15 Subclause 15.227(a)
Test Method	:	ANSI 63.4-2009
Measurement Location	:	Semi Anechoic Chamber
Measurement Distance	:	3m
Detector Function	:	Peak and Average
Measurement BW	:	120 kHz
Supply Voltage	:	DC 4.5V

Polarization: Vertical

Detector function	Frequency (MHz)	Measured Field strength at 3m (dBµV/m)	Delta to Limit (dB)
Peak	27.145	72.0	-28.0
Average	27.145	67.6	-12.4

Polarization: Horizontal

Detector function	Frequency (MHz)	Measured Field strength at 3m (dBµV/m)	Delta to Limit (dB)
Peak	27.145	54.6	-45.4
Average	27.145	50.3	-29.7

Limit **Subclause 15.227(a)**

Frequency within the band	Peak Emission		Average Emission	
	(µV/m)	dBµV/m	(µV/m)	dBµV/m
26.96-27.28 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 15.227(b)

RESULT: **Pass**

Test Specification	:	FCC Part 15 Subclause 15.209
Test Method	:	ANSI 63.4-2009
Measurement Location	:	Semi Anechoic Chamber
Measurement Distance	:	3m
Detector Function	:	Quasi Peak
Measurement BW	:	120 kHz
Supply Voltage	:	DC 4.5V
Measuring Frequency Range	:	30-1000MHz

Polarization: Vertical

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
54.290	23.0	40.0	-17.0

Polarization: Horizontal

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
54.290	11.9	40.0	-28.1

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 spurious emission found between lowest oscillating frequency to 30 MHz.

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.

Bandwidth Measurement

Port of Testing	:	Antenna port
Detector Function	:	Peak
Supply Voltage	:	DC 4.5V

The field strength of any emissions appearing at the lower edge 26.96 MHz and upper edge 27.28 MHz are 48.80 dB and 46.06 dB below the carrier respectively.

For test results refer to Appendix 1.