TÜVRheinland®

**Produkte**
*Products*

| | | |
|---|---|---|
| **Prüfbericht - Nr.:** *Test Report No.:* | **14036610 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:* | **27207** | **Serien-Nr.:** *Serial No.:* **Engineering sample** |
| **Wareneingangs-Nr.:** *Receipt No.:* | **A000083574-001** | **Eingangsdatum:** *Date of Receipt:* **09.07.2014** |
| **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 | |
| **Prüfgrundlage:** *Test Specification:* | **FCC Part 15, Subpart C** **ANSI 63.4-2003** | |
| **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:* | | |
|---|---|---|---|---|---|
| 25.08.2014 | Joey Leung<br>Project Engineer | | 25.08.2014 | Sharon Li<br>Section Manager | |
| **Datum** *Date* | **Name/Stellung** *Name/Position* | **Unterschrift** *Signature* | **Datum** *Date* | **Name/Stellung** *Name/Position* | **Unterschrift** *Signature* |

**Sonstiges** / *Other Aspects:*

**FCC ID: NLB27207TX**

| *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 (FCC Registration number: 90656)

| Equipment | Manufacturer | Type | S/N | Due Date |
|---|---|---|---|---|
| Semi-anechoic Chamber | Frankonia | Nil | Nil | 14 Apr 2015 |
| Cable | Hubersuhner | SUCOFLEX 104 | 72799 /6 | 31 Mar 2016 |
| Test Receiver | R & S | ESU40 | 100190 | 20 Jun 2015 |
| Bi-conical Antenna | R & S | HK116 | 100241 | 11 Jun 2015 |
| Coaxial cable | Harbour | LL335 | N/A | 10 Jun 2016 |
| Microwave amplifer 0.5-26.5GHz, 25dB gain | HP | 83017A | 3123A00437 | 17 Jul 2016 |
| High Pass Filter (cutoff freq. =1000MHz) | Trilithic | 23042 | 9829213 | 28 Oct 2015 |
| Active Loop Antenna | EMCO | 6502 | 9107-2651 | 11 Jun 2015 |
| FSP 30 Spectrum Analyzer | Rohde & Schwarz | FSP 30 | 100007 | 03 Dec 2014 |

# General Product Information

## Product Function and Intended Use

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

**FCC ID: NLB27207TX**

| Models | Product description |
|---|---|
| 20 111 9408 | Radio Control Toy Car |

## Ratings and System Details

| | | |
|---|---|---|
| | | Transmitter |
| Frequency range | : | 27.145MHz |
| Number of channels | : | 1 |
| Type of antenna | : | Permanent external antenna |
| Power supply | : | Battery operated 9V |
| Ports | : | none |
| Protection Class | : | III |

## Independent Operation Modes

The basic operation modes are:

- Transmitting control signal for the RC toy car.

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 C63.4-2003.

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.

# 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 63.4-2003 |
| Measurement Location | : | Semi Anechoic Chamber |
| Measurement Distance | : | 3m |
| Detector Function | : | Peak and Average |
| Measurement BW | : | 120 kHz |
| Supply Voltage | : | DC 9V |

**Polarization: Vertical**

| Detector function | Frequency (MHz) | Measured Field strength at 3m (dBµV/m) | Delta to Limit (dB) |
|---|---|---|---|
| Peak | 27.145 | 66.4 | -33.6 |
| Average | 27.145 | 61.0 | -19.0 |

**Polarization: Horizontal**

| Detector function | Frequency (MHz) | Measured Field strength at 3m (dBµV/m) | Delta to Limit (dB) |
|---|---|---|---|
| Peak | 27.145 | 52.0 | -48.0 |
| Average | 27.145 | 46.4 | -33.6 |

**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 63.4-2003 |
| Measurement Location | : | Semi Anechoic Chamber |
| Measurement Distance | : | 3m |
| Detector Function | : | Quasi Peak |
| Measurement BW | : | 120 kHz |
| Supply Voltage | : | DC 9V |
| Measuring Frequency Range | : | 30-1000MHz |

**Polarization: Vertical**

| Frequency (MHz) | Field strength at 3m (dBuV/m) | Limit at 3m (dBuV/m) | Delta to Limit (dB) |
|---|---|---|---|
| 54.289 | 17.6 | 40.0 | -22.4 |
| 81.434 | 19.9 | 40.0 | -20.1 |

**Polarization: Horizontal**

| Frequency (MHz) | Field strength at 3m (dBuV/m) | Limit at 3m (dBuV/m) | Delta to Limit (dB) |
|---|---|---|---|
| 54.289 | 13.5 | 40.0 | -26.5 |
| 81.434 | 12.4 | 40.0 | -27.6 |

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 9V |

The field strength of any emissions appearing at the lower edge 26.96 MHz and upper edge 27.28 MHz are 46.82 dB and 45.32 dB below the carrier respectively.

For test results refer to Appendix 1.