



Produkte
Products

| | | | | | |
|--|--|---|------------------------------------|--|---|
| Prüfbericht - Nr.: 14027878 001 | | | Seite 1 von 11 Page 1 of 11 | | |
| <i>Test Report No.:</i> | | | | | |
| Auftraggeber: <i>Client:</i> | | SHENGYU TOYS FACTORY FENGXIN LAIMEI ROAD, CHENGHAI SHANTOU, GUANGDONG CHINA | | | |
| Gegenstand der Prüfung: <i>Test Item:</i> | | Short Range Device - Low Power Transmitter (27.145MHz) | | | |
| Bezeichnung: <i>Identification:</i> | Please refer to "Models" on page 5 | Serien-Nr.: <i>Serial No.:</i> | Engineering sample | | |
| Wareneingangs-Nr.: <i>Receipt No.:</i> | 00110826044-002 | Eingangsdatum: <i>Date of Receipt:</i> | 23.08.2011 | | |
| Prüfort: <i>Testing Location:</i> | Hong Kong Productivity Council HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong | | | | |
| Prüfgrundlage: <i>Test Specification:</i> | FCC Part 15, Subpart C ANSI C63.4-2003 CISPR 22:1997 | | | | |
| 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: | | |
| 09.09.2011 | Joey Leung Test Engineer |  | 09.09.2011 | Sharon Li Assistant Manager |  |
| Datum <i>Date</i> | Name/Stellung <i>Name/Position</i> | Unterschrift <i>Signature</i> | Datum <i>Date</i> | Name/Stellung <i>Name/Position</i> | Unterschrift <i>Signature</i> |
| Sonstiges / Other Aspects: | | | | | |
| FCC ID: ZX213809674658 | | | | | |
| Abkürzungen: | | P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet | Abbreviations: | | P(ass) = passed F(ail) = failed N/A = not applicable 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

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List of Test and Measurement Instruments

Hong Kong Productivity Council (Registration number: 90656)

| Equipment | Manufacturer | Type | S/N | Due Date |
|--|--------------|--------------------|-------------------|-----------|
| Semi-anechoic Chamber | Frankonia | Nil | Nil | 25-May-12 |
| Test Receiver | R & S | ESU26 | 100050 | 26-May-12 |
| Bi-conical Antenna | R & S | HK116 | 100241 | 05-May-13 |
| Log Periodic Antenna | R & S | HL223 | 841516/020 | 06-May-13 |
| Coaxial cable 50ohm | Rosenberger | RTK081-05S-05S-10m | LA2-001-10M / 001 | 08-Dec-11 |
| Microwave amplifier 0.5-26.5GHz, 25dB gain | HP | 83017A | 3950M00241 | 03-Oct-11 |
| High Pass Filter (cutoff freq. =1000MHz) | Trilithic | 23042 | 9829213 | 30-Oct-11 |
| Horn Antenna | EMCO | 3115 | 9002-3351 | 11-May-13 |
| FSP 30 Spectrum Analyser | R & S | FSP 30 | 100286 | 17-Sep-12 |
| Active Loop Antenna | EMCO | 6502 | 9107-2651 | 19-Apr-12 |

General Product Information

Product Function and Intended Use

The equipment under test (EUT) is a transmitter for a RC toy helicopter operating at 27.145MHz. The EUT has 2 control rods, a switch and a knob. Control rods are used to command the upward, downward, forward, backward, left and right movement; switch is used to select speed mode; knob is used to fine trim the left and right movement of the associated receiver.

The manufacturer declares that the transmitter models listed in below table are identical to model 822. They are all identical in schematics, PCB layouts, components used except the housing.

FCC ID: ZX213809674658

| Models |
|--|
| 812A, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 822A, 823, 824, 825, 825A, 826, 827, 828, 829, 830, 831, 832, 833, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, J374, UJ318 |

Ratings and System Details

| | |
|--------------------|-------------------------------|
| | Transmitter |
| Frequency range | : 27.145MHz |
| Number of channels | : 1 |
| Type of antenna | : External Telescopic Antenna |
| Power supply | : Battery operated 12V |
| Ports | : none |
| Protection Class | : III |

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Independent Operation Modes

The basic operation modes are:

- Transmitting control signal for the RC toy helicopter.

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 12V

Polarization: Vertical

| Detector function | Frequency (MHz) | Measured Field strength at 3m (dBµV/m) | Delta to Limit (dB) |
|-------------------|--------------------|--|------------------------|
| Peak | 27.144 | 79.7 | -20.3 |
| Average | 27.144 | 73.8 | -6.2 |

Polarization: Horizontal

| Detector function | Frequency (MHz) | Measured Field strength at 3m (dBµV/m) | Delta to Limit (dB) |
|-------------------|--------------------|--|------------------------|
| Peak | 27.144 | 46.6 | -53.4 |
| Average | 27.144 | 40.5 | -39.5 |

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 12V
 Measuring Frequency Range : 30-1000MHz

Polarization: Vertical

| Frequency (MHz) | Field strength at 3m (dBuV/m) | Limit at 3m (dBuV/m) | Delta to Limit (dB) |
|-----------------|-------------------------------|----------------------|---------------------|
| 54.288 | 29.5 | 40.0 | -10.5 |
| 190.011 | 13.6 | 43.5 | -29.9 |

Polarization: Horizontal

| Frequency (MHz) | Field strength at 3m (dBuV/m) | Limit at 3m (dBuV/m) | Delta to Limit (dB) |
|-----------------|-------------------------------|----------------------|---------------------|
| No peak found | --- | --- | --- |

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 | $20 \cdot \log(100) = 40.0$ | 3 |
| 88-216 | 150 | $20 \cdot \log(150) = 43.5$ | 3 |
| 216-960 | 200 | $20 \cdot \log(200) = 46.0$ | 3 |
| 960-2500 | 500 | $20 \cdot \log(500) = 54.0$ | 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.

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Bandwidth Measurement

| | | |
|-------------------|---|--------------|
| Port of Testing | : | Antenna port |
| Detector Function | : | Peak |
| Supply Voltage | : | DC 12V |

The field strength of any emissions appearing at the lower edge 26.96 MHz and upper edge 27.28 MHz are 51.75dB and 46.29dB below the carrier respectively.

For test results refer to Appendix 1.