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Test Summary

Radiated Emission of Carrier Frequency

Result: Pass

Spurious Radiated Emissions

Result: Pass

20dB Bandwidth Measurement

Result: Pass

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List of Test and Measurement Instruments

Hong Kong Productivity Council (Registration number: 90656)

Kind of Equipment	Manufacturer	Type	S/N	Cal Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	28 May 09
Test Receiver	Rohde & Schwarz	ESU26	100050	06 Aug 09
Biconical Antenna	Rohde & Schwarz	HK116	100242	22 May 10
Log.-Periodic Antenna	Rohde & Schwarz	HL223	841516/020	21 May 10
Horn Antenna	EMCO	3115	9002-3351	27 Feb 10
Coaxial Cable 50ohm	Rosenberger	RTK081-05S-05S-10m	LA2-001-10M / 002	15 May 09
Active Loop Antenna	EMCO	6502	9107-2651	20-Dec-09

General Product Information

Product Function and Intended Use

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

FCCID: XCHBT1030L

Model	Product description
BT-100L series	Cube Platform R/C Truck (AeroCab)

Ratings and System Details

	Transmitter
Frequency range	27.145MHz
Number of channels	1
Type of antenna	External telescopic antenna
Power supply	Battery operated 9V
Ports	none
Protection Class	III

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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.

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 (dB μ V/m)	Delta to Limit (dB)
Peak	27.147	48.5	-51.5
Average	27.147	44.0	-36.0

Polarization: Horizontal

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	27.147	34.3	-65.7
Average	27.147	29.3	-50.7

Limit	Subclause 15.227(a)			
Frequency within the band	Peak Emission		Average Emission	
	(μ V/m)	dB μ V/m	(μ V/m)	dB μ V/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)
54.295	19.9	40.0	-20.1
81.443	16.0	40.0	-24.0
*108.591	15.0	43.5	-28.5
*135.739	14.6	43.5	-28.9
*162.887	16.7	43.5	-26.8
190.034	17.7	43.5	-25.8
217.182	14.4	46.0	-31.6
*244.330	15.3	46.0	-30.7
*271.478	16.3	46.0	-29.7

Polarization: Horizontal

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
54.295	12.5	40.0	-27.5
81.443	10.5	40.0	-29.5
*108.591	9.1	43.5	-34.4
*135.738	9.5	43.5	-34.0
*162.885	11.5	43.5	-32.0
190.033	12.4	43.5	-31.1
217.180	9.3	46.0	-36.7
*244.328	10.3	46.0	-35.7
*271.475	11.1	46.0	-34.9

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.

20dB Bandwidth Measurement**Subclause 15.215(c)****RESULT:****Pass**

Test Specification : FCC Part 15 section 15.215(c)
Port of Testing : Coupling device
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 45.83 dB and 42.65 dB below the carrier respectively.

For test results refer to Appendix 1.

Limit**Subclause 15.215(c)**

The 20dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated.