


Produkte
Products

Prüfbericht - Nr.: 14026593 001 <i>Test Report No.:</i>		Seite 1 von 12 Page 1 of 12	
Auftraggeber: <i>Client:</i>		Stadlbauer Marketing + Vertrieb GmbH Rennbahn Allee 1 5412 Puch, Salzburg Austria	
Gegenstand der Prüfung: <i>Test Item:</i>		Short Range Device - Low Power Transmitter (40.685MHz)	
Bezeichnung: <i>Identification:</i>	900009	Serien-Nr.: <i>Serial No.:</i>	Engineering sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	00110428062-002 00110610114-001	Eingangsdatum: <i>Date of Receipt:</i>	28.04.2011 10.06.2011
Prüfört: <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:	
18.07.2011	Joey Leung Test Engineer		18.07.2011
			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:			
FCCID: YFA90000940			
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. <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 boat operating at 40.685MHz. The EUT has two control rods for commanding the forward, backward, left and right movement of the associated receiver.

Ratings and System Details

	Transmitter
Frequency range	: 40.685MHz
Number of channels	: 1
Type of antenna	: External telescopic antenna
Power supply	: Battery operated 9VDC, 6F22 size
Ports	: none
Protection Class	: III

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 15.229(a)

RESULT:

Pass

Test Specification : FCC Part 15 Subclause 15.229(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 9.0V, 6F22 size battery

Polarization: Vertical

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	40.682	50.0	-30.0
Average	40.682	49.1	-10.9

Polarization: Horizontal

Detector function	Frequency (MHz)	Measured Field strength at 3m (dB μ V/m)	Delta to Limit (dB)
Peak	40.682	36.1	-43.9
Average	40.682	30.7	-29.3

Limit

Subclause 15.229(a)

Frequency within the band	Peak Emission		Average Emission	
	(μ V/m)	dB μ V/m	(μ V/m)	dB μ V/m
40.66-40.70 MHz	10,000	80.0	1,000	60.0

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 15.229(c)

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 9.0V, 6F22 size battery
 Measuring Frequency Range : 30-1000MHz

Polarization: Vertical

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
81.364	21.2	40.0	-18.8
162.729	27.2	43.5	-16.3
406.823	27.9	46.0	-18.1

Polarization: Horizontal

Frequency (MHz)	Field strength at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Delta to Limit (dB)
366.141	28.3	46.0	-17.7
406.823	31.1	46.0	-14.9

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 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 ($\mu\text{V/m}$)	Field strength (dB $\mu\text{V/m}$)	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.

Frequency Tolerance**Subclause 15.229(d)****RESULT:****Pass**

Test Specification : FCC Part 15 Subpart A – Subclause 15.31
 Detector Function : Peak
 RBW/VBW : 30Hz / 30Hz
 Supply Voltage : DC 9.0V, 6F22 size battery
 Measuring Frequency Range : 30-1000MHz

Temp. (°C)	Fundamental Frequency (MHz)	Peak Frequency (MHz)	Limit	Verdict
-20	40.685	40.68234	Within +/- 0.01%	Pass
-10	40.685	40.68238	Within +/- 0.01%	Pass
0	40.685	40.68232	Within +/- 0.01%	Pass
10	40.685	40.68220	Within +/- 0.01%	Pass
20	40.685	40.68204	Within +/- 0.01%	Pass
30	40.685	40.68192	Within +/- 0.01%	Pass
40	40.685	40.68184	Within +/- 0.01%	Pass
50	40.685	40.68182	Within +/- 0.01%	Pass

Limit**Subclause 15.229(d)**

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

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 40.66MHz and upper edge 40.70MHz are 35.80dB and 23.62dB below the carrier respectively.

For test results refer to Appendix 1.