

Prüfbericht - Nr.: 14030416 001			Seite 1 von 8		
<i>Test Report No.:</i>			<i>Page 1 of 8</i>		
Auftraggeber: <i>Client:</i>		geobra Brandstaetter GmbH & Co.KG Brandstaetterstr. 2-10 90513 Zirndorf Germany			
Gegenstand der Prüfung: <i>Test Item:</i>		Short Range Device - Radio Control Toys Transceiver (2.4GHz)			
Bezeichnung: <i>Identification:</i>	30805313	Serien-Nr.: <i>Serial No.:</i>	Engineering sample		
Wareneingangs-Nr.: <i>Receipt No.:</i>	00120515219-001	Eingangsdatum: <i>Date of Receipt:</i>	15.05.2012		
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of test item at delivery:</i>		Test sample(s) is/are not damaged and suitable for testing.			
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 Results:</i>		Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage. The above mentioned product was tested and passed .			
Prüflaboratorium: <i>Testing Laboratory:</i>		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:			
24.09.2012	Joey Leung Test Engineer		24.09.2012	Sharon Li Section 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: N2T30805313			
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			
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>					

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Product information

Manufacturers declarations

	Transceiver
Operating frequency range	2403 - 2475 MHz
Type of modulation	GFSK modulation
Number of channels	16
Type of antenna	Integral
Power level	fix
Connection to public utility power line	No
Nominal voltage	V _{nom} : 9.0 V

Product function and intended use

The equipment under test (EUT) is a radio control toy transceiver operating at 2.4GHz. During pairing, EUT operates as transceiver. After pairing EUT operates as a transmitter only. The EUT is powered by batteries only.

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual
Rating Label

List of Test and Measurement Instruments

Hong Kong Productivity Council (Registration number: 90656)

Radiated Emission

Equipment	Manufacturer	Type	S/N	Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	12-Apr-13
Test Receiver	R & S	ESU40	100190	26-May-13
Bi-conical Antenna	R & S	HK116	100242	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	15-Nov-13
Microwave amplifier 0.5-26.5GHz, 25dB gain	HP	83017A	3950M00241	03-Oct-13
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	28-Oct-13
Horn Antenna	EMCO	3115	9002-3351	11-May-13
Active Loop Antenna	EMCO	6502	9107-2651	19-Apr-13
FSP 30 Spectrum Analyser	R & S	FSP 30	100007	16-Sep-13

Results FCC Part 15 – Subpart C

Subclause 15.207 – Disturbance Voltage on AC Mains	N/A
There is no AC power input or output ports on the EUT.	

Subclause 15.205 – Band edge compliance of radiated emissions	Pass
Test Specification : ANSI C63.4 – 2003 Mode of operation : Tx mode Port of testing : Enclosure Detector : Peak RBW/VBW : 100 kHz / 300 kHz for $f < 1$ GHz 1 MHz / 3 MHz for $f > 1$ GHz Supply voltage : 9.0VDC, 1 x 6F22 size new battery Temperature : 23°C Humidity : 50%	
Requirement : Radiated emissions which fall in the restricted bands, as defined in 15.205 (a), must also comply with the radiated emission limits specified in 15.209(a).	
Results : There is no peak found in the restricted bands. For test protocols refer to Appendix 1, page 4-7.	

Subclause 15.215 (c) – 20 dB Bandwidth		Pass		
Requirement:	The intentional radiators must be designed to ensure that the 20dB bandwidth of the emission, is contained within the frequency band designated in the rule section under which the equipment is operated.			
Test Specification : ANSI C63.4 – 2003 Mode of operation : Tx mode Port of testing : Enclosure RBW/VBW : 100 kHz / 300 kHz for f < 1 GHz 1 MHz / 3 MHz for f > 1 GHz Supply voltage : 9.0VDC, 1 x 6F22 size new battery Temperature : 23°C Humidity : 50%				
Results : For test protocols refer to Appendix 1, page 1-3.				
Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)
2403	2402.600	> 2400	2404.460	< 2483.5
2440	2439.610	> 2400	2441.430	< 2483.5
2475	2474.610	> 2400	2476.400	< 2483.5

Subclause 15.249 (a) – Radiated Emission (Fundamental and Harmonics)		Pass
Test Specification : ANSI C63.4 – 2003 Mode of operation : Tx mode Port of testing : Enclosure RBW/VBW : 100 kHz / 300 kHz for $f < 1$ GHz 1 MHz / 3 MHz for $f > 1$ GHz Supply voltage : 9.0VDC, 1 x 6F22 size new battery Temperature : 23°C Humidity : 50%		
Requirement : The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following limit.		
Results : PASS		
Fundamental Frequency 2403MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2403.221	91.29	114.0 / P
2403.349	38.67	94.0 / A
Fundamental Frequency 2403MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2403.489	88.07	114.0 / P
2403.281	38.38	94.0 / A
Harmonics 2403MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4806.660	58.45	74.0 / P
4806.163	33.35	54.0 / A
7210.140	61.63	74.0 / P
7209.050	36.02	54.0 / A
Harmonics 2403MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4806.821	59.42	74.0 / P
4806.083	33.33	54.0 / A
7209.468	60.57	74.0 / P
7208.971	35.82	54.0 / A
Fundamental Frequency 2440MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2440.208	89.42	114.0 / P
2440.240	38.54	94.0 / A

Fundamental Frequency 2440MHz			Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2440.263	89.79	114.0 / P	2440.263	89.79	114.0 / P
2439.926	38.58	94.0 / A	2439.926	38.58	94.0 / A
Harmonics 2440MHz			Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4880.286	60.93	74.0 / P	4880.286	60.93	74.0 / P
4880.398	33.47	54.0 / A	4880.398	33.47	54.0 / A
7320.647	59.56	74.0 / P	7320.647	59.56	74.0 / P
7320.064	36.13	54.0 / A	7320.064	36.13	54.0 / A
Harmonics 2440MHz			Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4880.208	61.26	74.0 / P	4880.208	61.26	74.0 / P
4879.952	33.51	54.0 / A	4879.952	33.51	54.0 / A
7321.106	64.20	74.0 / P	7321.106	64.20	74.0 / P
7320.032	36.84	54.0 / A	7320.032	36.84	54.0 / A
Fundamental Frequency 2475MHz			Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2474.702	92.35	114.0 / P	2474.702	92.35	114.0 / P
2474.824	41.06	94.0 / A	2474.824	41.06	94.0 / A
Fundamental Frequency 2475MHz			Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2474.712	90.02	114.0 / P	2474.712	90.02	114.0 / P
2474.872	38.77	94.0 / A	2474.872	38.77	94.0 / A
Harmonics 2475MHz			Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4950.465	61.08	74.0 / P	4950.465	61.08	74.0 / P
4949.856	33.78	54.0 / A	4949.856	33.78	54.0 / A
7425.994	61.98	74.0 / P	7425.994	61.98	74.0 / P
7424.968	36.70	54.0 / A	7424.968	36.70	54.0 / A
Harmonics 2475MHz			Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4950.694	61.30	74.0 / P	4950.694	61.30	74.0 / P
4949.652	33.67	54.0 / A	4949.652	33.67	54.0 / A
7423.744	57.63	74.0 / P	7423.744	57.63	74.0 / P
7424.705	36.19	54.0 / A	7424.705	36.19	54.0 / A

Subclause 15.249 (d) – Spurious Radiated Emissions		Pass
Test Specification : ANSI C63.4 - 2003 Mode of operation : Tx mode Port of testing : Enclosure Detector : Peak RBW/VBW : 100 kHz / 300 kHz for $f < 1$ GHz 1 MHz / 3 MHz for $f > 1$ GHz Supply voltage : 9.0VDC, 1 x 6F22 size new battery Temperature : 23°C Humidity : 50%		
Requirement : Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.		
Results : All three transmit frequency modes comply with the field strength within the restricted bands. There is no spurious found below 30MHz.		
Tx frequency 2403MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	---	74.0 / P
No peak found	---	54.0 / A
Tx frequency 2403MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	---	74.0 / P
No peak found	---	54.0 / A
Tx frequency 2440MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	---	74.0 / P
No peak found	---	54.0 / A
Tx frequency 2440MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	---	74.0 / P
No peak found	---	54.0 / A
Tx frequency 2475MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	---	74.0 / P
No peak found	---	54.0 / A
Tx frequency 2475MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	---	74.0 / P
No peak found	---	54.0 / A