

Prüfbericht - Nr.: 14030250 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 Toy Transceiver (2.4GHz)	
Bezeichnung: <i>Identification:</i>	30669392	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:	
25.09.2012	Joey Leung Test Engineer	25.09.2012	Sharon Li Section Manager
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>
			
			
Sonstiges: Other Aspects		FCCID: N2T30669392	
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 _{nor} : 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, 6x1.5V AA size new battery Temperature : 23°C Humidity : 50%	
Requirement : Radiated emissions which fall in the restricted bans, 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, 6x1.5V AA 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	2402.400	> 2400	2404.080	< 2483.5
2440	2439.390	> 2400	2441.050	< 2483.5
2475	2474.400	> 2400	2476.130	< 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, 6x1.5V AA 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
2403.141	95.44	114.0 / P
2402.837	54.50	94.0 / A
Fundamental Frequency 2403MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2403.558	90.40	114.0 / P
2403.157	54.28	94.0 / A
Harmonics 2403MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4806.298	54.80	74.0 / P
4806.186	32.94	54.0 / A
7209.519	62.19	74.0 / P
7209.167	35.82	54.0 / A
Harmonics 2403MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4805.513	53.81	74.0 / P
4806.154	33.03	54.0 / A
7210.625	66.32	74.0 / P
7208.702	36.28	54.0 / A
Fundamental Frequency 2440MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2440.176	95.59	114.0 / P
2439.952	54.64	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
2440.465	90.86	114.0 / P	2440.112	54.41	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
4880.673	54.16	74.0 / P	4879.968	33.06	54.0 / A
4879.968	33.06	54.0 / A	7320.962	63.67	74.0 / P
7320.962	63.67	74.0 / P	7320.272	36.24	54.0 / A
7320.272	36.24	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
4879.663	55.28	74.0 / P	4879.872	33.02	54.0 / A
4879.872	33.02	54.0 / A	7320.978	62.00	74.0 / P
7320.978	62.00	74.0 / P	7320.561	36.18	54.0 / A
7320.561	36.18	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
2475.417	96.07	114.0 / P	2474.712	54.63	94.0 / A
2474.712	54.63	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
2474.311	91.48	114.0 / P	2474.888	54.05	94.0 / A
2474.888	54.05	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
4949.599	55.52	74.0 / P	4950.048	33.23	54.0 / A
4950.048	33.23	54.0 / A	7426.176	64.37	74.0 / P
7426.176	64.37	74.0 / P	7424.686	36.48	54.0 / A
7424.686	36.48	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
4949.503	53.32	74.0 / P	4950.128	33.00	54.0 / A
4950.128	33.00	54.0 / A	7424.423	63.08	74.0 / P
7424.423	63.08	74.0 / P	7425.112	36.30	54.0 / A
7425.112	36.30	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, 6x1.5V AA 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