

Prüfbericht - Nr.: 14033895 001		Seite 1 von 10	
<i>Test Report No.:</i>		<i>Page 1 of 10</i>	
Auftraggeber: <i>Client:</i>		Stadlbauer Marketing + Vertrieb GmbH Rennbahn Allee1 5412 Puch, Salzburg Austria	
Gegenstand der Prüfung: <i>Test Item:</i>		Short Range Device - Radio Control Toy Transmitter (2.4GHz)	
Bezeichnung: <i>Identification:</i>	20010117	Serien-Nr.: <i>Serial No.:</i>	Engineering sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	00130726240-001	Eingangsdatum: <i>Date of Receipt:</i>	26.07.2013
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of test item at delivery:</i>		Test sample(s) is/are not damaged and suitable for testing.	
Prüfart: <i>Testing Location:</i>		Global United Technology Services Co., Ltd. 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China	
Prüfgrundlage: <i>Test Specification:</i>		FCC Part 15 Subpart C ANSI C63.4-2009 CISPR 22:2003	
Prüfresultat: <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:	
12.09.2013	Mika Chan Project Manager	12.09.2013	Hugo Wan Senior Project 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: <i>Other Aspects</i>		FCCID: YFA201210117	
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. <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>			

Table of Content

	Page
Cover Page	1
Table of Content	2
Product information	3
Manufacturers declarations	3
Product function and intended use.....	3
Submitted documents.....	3
Special accessories and auxiliary equipment	3
List of Test and Measurement Instruments	4
Results FCC Part 15 – Subpart C	5
Subclause 15.207 – Disturbance Voltage on AC Mains.....	Pass..... 5
Subclause 15.205 – Restricted Bands Next to The Band Edge	Pass..... 5
Subclause 15.215 (c) – 20 dB Bandwidth.....	Pass..... 6
Subclause 15.249 (a) – Radiated Emission (Fundamental and Harmonics).....	Pass..... 7
Subclause 15.249 (d) – Spurious Radiated Emissions	Pass..... 9
Appendix 1 – Test Results	9 pages
Appendix 2 – Test Setup Photos	3 pages
Appendix 3 – Photo documentation	7 pages
Appendix 4 – Product documentation	13 pages

Product information

Manufacturers declarations

	Transceiver
Operating frequency range	2410 - 2472 MHz
Type of modulation	FHSS modulation (GFSK)
Number of channels	32
Channel Frequency (MHz)	2410, 2412, 2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2432, 2434, 2436, 2438, 2440, 2442, 2444, 2446, 2448, 2450, 2452, 2454, 2456, 2458, 2460, 2462, 2464, 2466, 2468, 2470, 2472
Type of antenna	Integral
Power level	fix
Connection to public utility power line	Yes
Nominal voltage	V _{nom} : 14.8 V

Product function and intended use

The submitted sample is a radio control toy receiver operating at 2.4GHz based on the WIRELESS+ technology.

WIRELESS+ is the latest new cordless racetrack delight for Carrera EVOLUTION. The 2.4 GHz radio technology with frequency-hopping is free of interference and offers a range of up to 15 metres.

Submitted documents

Circuit Diagram
 Block Diagram
 Bill of material
 User manual
 Label Artwork

Special accessories and auxiliary equipment

The product has been tested together with the following additional accessory:

AC/DC Adapter

Brand: Carrera
 Model: STAD-CAMAY-005E
 PRI: 120VAC 60Hz 0.8A
 SEC: 14.8VDC 2x1A 29.6VA

List of Test and Measurement Instruments

Global United Technology Services Co., Ltd. (Registration number: 600491)

Equipment	Manufacturer	Type	S/N	Cal Due Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	--	05 Apr 2015
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	--	N/A
ESU EMI Test Receiver	R&S	ESU26	--	28 Jun 2014
Loop Antenna	Zhinan	ZN30900A	--	28 Jun 2014
Bi-log Hybrid Antenna	SCHWARZBECK	VULB9163	--	17 Mar 2014
Double-ridged horn antenna	SCHWARZBECK	9120D	--	17 Mar 2014
Horn Antenna	ETS-LINDGREN	3160-09	--	17 Mar 2014
RF Amplifier	HP	8347A	--	28 Jun 2014
RF Amplifier	HP	8349B	--	28 Jun 2014
EMI Test Software	AUDIX	E3	--	N/A
Coaxial cable	GTS	N/A	--	28 Jun 2014
Coaxial Cable	GTS	N/A	--	28 Jun 2014
Thermo meter	N/A	N/A	--	30 Jun 2014

Results FCC Part 15 – Subpart C

Subclause 15.207 – Disturbance Voltage on AC Mains						Pass
Test Port: AC mains input port of the adapter Applied Voltage: 120VAC Adaptor Model: Please refer to page 3 Mode of operation: Transmitting and charging the hand throttle.						
Live measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dB μ V	Average dB μ V	Limit QP (dB μ V)	Limit AV (dB μ V)	Verdict
0,15 – 0,5	0.159	53.84	35.38	66 - 56	56 - 46	Pass
	0.218	46.92	29.52	66 - 56	56 - 46	Pass
	0.266	41.43	23.79	66 - 56	56 - 46	Pass
> 0,5 - 5	0.558	36.64	22.04	56	46	Pass
> 5 - 30	19.635	36.03	23.54	60	50	Pass
Neutral measurement						
Frequency range (MHz)	Frequency (MHz)	Quasi-peak dB μ V	Average dB μ V	Limit QP (dB μ V)	Limit AV (dB μ V)	Verdict
0,15 – 0,5	0.156	53.98	34.58	66 - 56	56 - 46	Pass
	0.222	48.12	29.83	66 - 56	56 - 46	Pass
	0.260	43.66	24.16	66 - 56	56 - 46	Pass
> 0,5 - 5	0.549	37.96	23.08	56	46	Pass
> 5 - 30	19.532	41.00	30.84	60	50	Pass
Results:	The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz does not exceed the limits. For test Results plots refer to Appendix 1, page 2-3.					

Subclause 15.205 – Restricted Bands Next to The Band Edge		Pass
Test Specification : ANSI C63.4 – 2003 Mode of operation : Tx mode Port of testing : Enclosure Detector : Peak RBW/VBW : 1 MHz / 3 MHz Supply voltage : 14.8VDC from AC/DC adapter 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 Supply voltage : 14.8VDC from AC/DC adapter Temperature : 23°C Humidity : 50%				
Results : For test protocols refer to Appendix 1, page 8-9.				
Frequency (MHz)	20 dB left (MHz)	Limit (MHz)	20 dB right (MHz)	Limit (MHz)
2410	2409.15	> 2400	2410.90	< 2483.5
2440	2439.23	> 2400	2440.81	< 2483.5
2472	2471.26	> 2400	2472.68	< 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 : 14.8VDC from AC/DC adapter 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 2410MHz		Vertical Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2410.000	90.10	114.0 / P
2410.000	64.55	94.0 / A
Fundamental Frequency 2410MHz		Horizontal Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2410.000	91.23	114.0 / P
2410.000	66.44	94.0 / A
Harmonics 2410MHz		Vertical Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4820.000	48.17	74.0 / P
4820.000	29.78	54.0 / A
7230.000	55.64	74.0 / P
7230.000	36.33	54.0 / A
Harmonics 2410MHz		Horizontal Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4820.000	43.15	74.0 / P
4820.000	29.51	54.0 / A
7230.000	55.27	74.0 / P
7230.000	36.06	54.0 / A
Fundamental Frequency 2440MHz		Vertical Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2440.000	88.56	114.0 / P
2440.000	65.14	94.0 / A
Fundamental Frequency 2440MHz		Horizontal Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m

2440.000	90.93	114.0 / P
2440.000	66.09	94.0 / A
Harmonics 2440MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4880.000	48.39	74.0 / P
4880.000	33.84	54.0 / A
Harmonics 2440MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4880.000	43.16	74.0 / P
4880.000	32.98	54.0 / A
Fundamental Frequency 2472MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2472.000	87.18	114.0 / P
2472.000	62.54	94.0 / A
Fundamental Frequency 2472MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2472.000	90.88	114.0 / P
2472.000	67.72	94.0 / A
Harmonics 2472MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4944.000	50.12	74.0 / P
4944.000	30.68	54.0 / A
Harmonics 2472MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4944.000	43.14	74.0 / P
4944.000	28.98	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 : 14.8VDC from AC/DC adapter 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 2410MHz		Vertical Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
40.702	22.69	40.0 / QP
42.007	22.25	40.0 / QP
67.438	23.89	40.0 / QP
Tx frequency 2410MHz		Horizontal Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
40.417	20.92	40.0 / QP
104.903	20.59	43.5 / QP
248.552	21.47	46.0 / QP
Tx frequency 2440MHz		Vertical Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
40.559	25.43	40.0 / QP
63.092	19.82	40.0 / QP
68.872	20.31	40.0 / QP
96.099	20.40	43.5 / QP
Tx frequency 2440MHz		Horizontal Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
40.417	22.05	40.0 / QP
91.175	20.57	43.5 / QP
256.521	21.51	46.0 / QP
Tx frequency 2472MHz		Vertical Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
34.760	22.74	40.0 / QP
36.381	22.13	40.0 / QP

40.702	22.09	40.0 / QP
59.441	22.95	40.0 / QP
67.913	21.89	40.0 / QP
Tx frequency 2472MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
54.071	21.20	40.0 / QP
95.762	21.80	43.5 / QP
364.260	23.74	46.0 / QP