Prüfbericht - Nr.: *Test Report No.:*	**14036457 001**	**Seite 1 von 13** *Page 1 of 13*

Auftraggeber: *Client:*	**Stadlbauer Marketing + Vertrieb GmbH** **Rennbahn Allee1** **5412 Puch, Salzburg** **Austria**
Gegenstand der Prüfung: *Test Item:*	**Short Range Device - Radio Control Toy Transceiver (2.4GHz)**
Bezeichnung: *Identification:*	**900036** **370900036**
Serien-Nr.: *Serial No.:*	**Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**A000084497-001,** **A000161864-002**
Eingangsdatum: *Date of Receipt:*	**11.07.2014,** **02.02.2015**
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	Test sample(s) is/are not damaged and suitable for testing.
Prüfort: *Testing Location:*	**Global United Technology Services Co., Ltd.** 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China
Prüfgrundlage: *Test Specification:*	**FCC Part 15 Subpart C** **ANSI C63.4-2009**
Prüfergebnis: *Test Results:*	**Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage.** The above mentioned product was tested and **passed**.
Prüflaboratorium: *Testing Laboratory:*	**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:*		
18.03.2015	Hugo Wan Senior Project Manager		18.03.2015	Sharon Li Department Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges: **FCC ID YFA900036**
Other Aspects

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.
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.

Table of Content

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Product information

Manufacturers declarations

	Transceiver
Operating frequency range	2405 - 2480 MHz
Type of modulation	GFSK, Frequency Hopping Spread Spectrum
Number of channels	16
Type of antenna	Wired antenna
Power level	fix
Connection to public utility power line	No
Nominal voltage	V_{nor}: 6.0 V DC (4 x AAA size batteries)

Product function and intended use

The equipment under test (EUT) is a radio control toy transmitter operating at 2.4GHz.The EUT is powered by batteries only.

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual
Label Artwork

Independent Operation Modes

The basic operation modes are:

- Radio control to the receiver toy.

For further information refer to User Manual

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 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 mode transmitter was provided by client with following arrangement:

1)Fixed channel transmission was set by the specific operation of the EUT.
2)The following channels were tested
Lo: 2405MHz
Mid: 2440MHz
Hi: 2480MHz

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 C63.4-2009.

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.

List of Test and Measurement Instruments

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

Radiated Emission

Equipment	Manufacturer	Type	S/N	Cal. Date	Cal. Due Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	--	06 Apr 2013	05 Apr 2015
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	--	N/A	N/A
ESU EMI Test Receiver	R&S	ESU26	--	27 Jun 2014	27 Jun 2015
Loop Antenna	Zhinan	ZN30900A	--	27 Jun 2014	27 Jun 2015
Bi-log Hybrid Antenna	SCHWARZBECK	VULB9163	--	09 Mar 2014	08 Mar 2015
Double-ridged horn antenna	SCHWARZBECK	9120D	--	09 Mar 2014	08 Mar 2015
Horn Antenna	ETS-LINDGREN	3160-09	--	09 Mar 2014	08 Mar 2015
RF Amplifier	HP	8347A	--	27 Jun 2014	27 Jun 2015
RF Amplifier	HP	8349B	--	27 Jun 2014	27 Jun 2015
EMI Test Software	AUDIX	E3	--	N/A	N/A
Coaxial cable	GTS	N/A	--	27 Jun 2014	27 Jun 2015
Coaxial Cable	GTS	N/A	--	27 Jun 2014	27 Jun 2015
Thermo meter	N/A	N/A	--	27 Jun 2014	27 Jun 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	100007	13 Jan 2015	13 Jan 2016

Results FCC Part 15 – Subpart C

Subclause 15.203 – Antenna Information	**Pass**
Requirement:	No antenna other than that furnished by the responsible party shall be used with the device
Results:	Permanent attached antenna
Verdict:	Pass

Subclause 15.204 – Antenna Information	**Pass**
Requirement:	Provide information for every antenna proposed for the use with the EUT
Results:	a) Antenna type: Wired b) Manufacturer and model no: N/A c) Gain with reference to an isotropic radiator: 0 dBi
Verdict:	Pass

Subclause 15.207 – Disturbance Voltage on AC Mains	**N/A**
Results:	The EUT does not have AC mains input/output port and hence this test is not applicable.

Subclause 15.205 – Restricted Bands Next to The Band Edge	**Pass**
Test Specification Mode of operation Port of testing Detector RBW/VBW Supply voltage Temperature Humidity	: ANSI C63.4 – 2009 : Tx mode : Enclosure : Peak : 1 MHz / 3 MHz : 6.0VDC, 4x1.5V AAA size new battery : 23ºC : 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	: The emissions found in the restricted bands were below the limit. For details, please refer to Appendix 1.

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 – 2009 Mode of operation : Tx mode Port of testing : Temporary antenna port RBW/VBW : 100 kHz / 300 kHz Supply voltage : 6.0VDC, 4x1.5V AAA size new battery Temperature : 23ºC Humidity : 50%				
Results	: For test protocols refer to Appendix 1, page 2-3.			
Frequency (MHz)	**20 dB left (MHz)**	**Limit (MHz)**	**20 dB right (MHz)**	**Limit (MHz)**
2405	2403.060	> 2400	2407.720	< 2483.5
2440	2438.820	> 2400	2441.480	< 2483.5
2480	2478.840	> 2400	2481.500	< 2483.5

Subclause 15.249 (a) – Radiated Emission (Fundamental and Harmonics) **Pass**

Test Specification : ANSI C63.4 – 2009
Mode of operation : Tx mode
Port of testing : Enclosure
RBW/VBW : 120 kHz / 300 kHz for f < 1 GHz
1 MHz / 3 MHz for f > 1 GHz
Supply voltage : 6.0VDC, 4x1.5V AAA size new battery
Temperature : 23ºC
Humidity : 50%

Requirement : The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following limit.

Results

Fundamental Frequency 2405MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2404.980	91.01	114.0 / P
2404.980	71.74	94.0 / A

Fundamental Frequency 2405MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2404.980	94.22	114.0 / P
2404.980	73.87	94.0 / A

Harmonics 2405MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4809.990	45.17	74.0 / P
4809.990	30.83	54.0 / A
7215.020	53.52	74.0 / P
7215.020	38.11	54.0 / A

Harmonics 2405MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4809.990	57.74	74.0 / P
4809.990	41.08	54.0 / A
7215.020	56.69	74.0 / P
7215.020	39.96	54.0 / A

Fundamental Frequency 2440MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2440.060	92.94	114.0 / P
2440.060	72.38	94.0 / A

Fundamental Frequency 2440MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2440.060	92.77	114.0 / P
2440.060	71.46	94.0 / A
Harmonics 2440MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4879.840	51.39	74.0 / P
4879.840	37.70	54.0 / A
7320.110	63.95	74.0 / P
7320.110	46.67	54.0 / A
Harmonics 2440MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4879.840	54.62	74.0 / P
4879.840	39.81	54.0 / A
7320.110	65.27	74.0 / P
7320.110	48.53	54.0 / A
Fundamental Frequency 2480MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2480.020	89.32	114.0 / P
2480.020	68.79	94.0 / A
Fundamental Frequency 2480MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2480.020	86.21	114.0 / P
2480.020	65.37	94.0 / A
Harmonics 2480MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4960.000	50.23	74.0 / P
4960.000	37.02	54.0 / A
7440.200	60.18	74.0 / P
7440.200	44.07	54.0 / A
Harmonics 2480MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4960.000	49.05	74.0 / P
4960.000	34.95	54.0 / A
7440.200	55.00	74.0 / P
7440.200	42.00	54.0 / A

Subclause 15.249 (d) – Spurious Radiated Emissions	**Pass**

Test Specification : ANSI C63.4 - 2009
Mode of operation : Tx mode
Port of testing : Enclosure
Detector : Peak
RBW/VBW : 120 kHz / 300 kHz for f < 1 GHz
1 MHz / 3 MHz for f > 1 GHz
Supply voltage : 6.0VDC, 4x1.5V AAA size new battery
Temperature : 23ºC
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 between 16MHz to 30MHz, of which 16MHz is the lowest oscillating frequency in EUT.

Tx frequency 2405MHz — Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	--	--

Tx frequency 2405MHz — Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	--	--

Tx frequency 2440MHz — Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	--	--

Tx frequency 2440MHz — Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	--	--

Tx frequency 2480MHz — Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	--	--

Tx frequency 2480MHz — Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
No peak found	--	--

Safety Human Exposure – Radio Frequency Exposure Compliance	Pass
Please refer to Appendix 5 for details.	