

Produkte
Products

Prüfbericht - Nr.: 14033373 001

Test Report No.:

Seite 1 von 9

Page 1 of 9

Auftraggeber: Wellitec Development Ltd.
Client: 37/F., One Midtown
No. 11 Hoi Shing Road
Tsuen Wan
Hong Kong

Gegenstand der Prüfung: 2.4GHz Wireless Optical Mouse in Car Style
Test Item:

Bezeichnung: 95901 **Serien-Nr.:** Engineering sample
Identification: *Serial No.:*

Wareneingangs-Nr.: 00130710044-001 **Eingangsdatum:** 10.07.2013
Receipt No.: *Date of Receipt:*

Zustand des Prüfgegenstandes bei Anlieferung: Test sample(s) is/are not damaged and
Condition of test item at delivery: suitable for testing.

Prüfort: Hong Kong Productivity Council
Testing Location: HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong

Prüfgrundlage: FCC Part 15 Subpart C
Test Specification: ANSI C63.4-2003

Prüfergebnis: Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben
Test Results: genannter Prüfgrundlage.
The above mentioned product was tested and **passed**.

Prüflaboratorium: TÜV Rheinland Hong Kong Ltd.
Testing Laboratory: 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong

geprüft/ tested by:

kontrolliert/ reviewed by:

08.08.2013 Joey Leung
Datum Name/Stellung
Date Name/Position

Unterschrift
Signature

08.08.2013 Sharon Li
Datum Name/Stellung
Date Name/Position

Unterschrift
Signature

Sonstiges: FCCID: 2AAP995901
Other Aspects

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

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

	Page
Cover Page	1
Table of Content	2
Product information.....	3
Manufacturers declarations	3
Product function and intended use	3
Submitted documents.....	3
Remark	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..... N/A.....	5
Subclause 15.205 – Band edge compliance of radiated emissions	Pass..... 5
Subclause 15.215 (c) – 20 dB Bandwidth.....	Pass..... 6
Subclause 15.249 (a) – Radiated Emission (Fundamental and Harmonics).....	Pass..... 6
Subclause 15.249 (d) – Spurious Radiated Emissions.....	Pass..... 8
Appendix 1 – Test Results.....	11 pages
Appendix 2 – Test Setup Photos.....	4 pages
Appendix 3 – Photo documentation.....	6 pages
Appendix 4 – Product documentation.....	7 pages

Product information

Manufacturers declarations

	Transceiver
Operating frequency range	2408 - 2474 MHz
Type of modulation	FSK
Number of channels	34
Channel separation	2 MHz
Type of antenna	PCB antenna
Antenna gain (dBi)	-2
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	No
Nominal voltage	V _{nor} : 1.5V

Product function and intended use

The equipment under test (EUT) is a wireless optical mouse operating at 2.4GHz. It is powered by batteries only.

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User Manual
Label Artwork

Remark

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases.

Special accessories and auxiliary equipment

Additional accessory used for testing

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

- None

List of Test and Measurement Instruments

Hong Kong Productivity Council (Registration number: 90656)

Equipment	Manufacturer	Model No.	S/N	Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	12-Apr-14
Cable	Hubersuhner	SUCOFLEX 104	72799 /6	30-Mar-14
Test Receiver	R & S	ESU40	100190	19-Feb-14
Bi-conical Antenna	R & S	HK116	100241	11-Jun-15
Log Periodic Antenna	R & S	HL223	841516/017	10-Jun-15
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	3123A00437	03-Oct-13
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	28-Oct-13
Horn Antenna	EMCO	3115	9002-3347	11-Jun-15
Active Loop Antenna	EMCO	6502	9107-2651	21-Sep-13
Spectrum Analyzer	Rohde & Schwarz	FSP30	10007/030	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 : 1.5VDC, 1 x 1.5V 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: For test protocols refer to Appendix 1, page 4-7.		
Tx frequency 2408MHz 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 2408MHz 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 2474MHz 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 2474MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	---	74.0 / P
No peak found	---	54.0 / A

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 : 1.5VDC, 1 x 1.5V AA size new battery				
Temperature : 23°C				
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)
2408	2406.864	> 2400	2409.104	< 2483.5
2440	2438.858	> 2400	2441.080	< 2483.5
2474	2472.860	> 2400	2475.116	< 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 : 1.5VDC, 1 x 1.5V 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 2408MHz		Vertical Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
2408.478	92.32	114.0 / P	
2407.997	90.12	94.0 / A	
Fundamental Frequency 2408MHz		Horizontal Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
2408.494	93.28	114.0 / P	
2408.013	90.97	94.0 / A	

Harmonics 2408MHz			Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4816.939	59.49	74.0 / P	4816.090	50.48	54.0 / A
7225.465	63.51	74.0 / P	7225.433	53.58	54.0 / A
Harmonics 2408MHz			Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4817.019	60.39	74.0 / P	4816.090	51.78	54.0 / A
7225.641	58.75	74.0 / P	7225.433	48.40	54.0 / A
Fundamental Frequency 2440MHz			Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2439.583	90.38	114.0 / P	2439.984	88.15	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
2439.452	94.35	114.0 / P	2440.013	91.90	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
4879.022	60.85	74.0 / P	4880.080	52.28	54.0 / A
7321.426	62.46	74.0 / P	7321.410	52.20	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
4880.987	60.99	74.0 / P	4880.074	52.10	54.0 / A
7321.433	59.78	74.0 / P	7321.369	49.42	54.0 / A
Fundamental Frequency 2474MHz			Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2473.494	85.06	114.0 / P	2474.006	82.84	94.0 / A
Fundamental Frequency 2474MHz			Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2473.526	95.40	114.0 / P			

2474.006	93.31	94.0 / A
Harmonics 2474MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4948.974	59.87	74.0 / P
4948.093	50.69	54.0 / A
7423.394	62.56	74.0 / P
7423.410	52.60	54.0 / A
Harmonics 2474MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4948.974	59.15	74.0 / P
4948.077	50.29	54.0 / A
7423.397	55.53	74.0 / P
7423.365	43.76	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 : 1.5VDC, 1 x 1.5V 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 2408MHz 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 2408MHz 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 2474MHz		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 2474MHz		Horizontal Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m	
No peak found	---	74.0 / P	
No peak found	---	54.0 / A	