

Produkte
Products



Prüfbericht - Nr.: 14033054 001		Seite 1 von 9 Page 1 of 9	
<i>Test Report No.:</i>			
Auftraggeber: <i>Client:</i>	Wellitec Development Ltd. 37/F., One Midtown No. 11 Hoi Shing Road Tsuen Wan Hong Kong		
Gegenstand der Prüfung: <i>Test Item:</i>	2.4GHz Wireless Optical Mouse in Car Style		
Bezeichnung: <i>Identification:</i>	95902	Serien-Nr.: <i>Serial No.:</i>	Engineering sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	00130523267-001 00130624233-001	Eingangsdatum: <i>Date of Receipt:</i>	23.05.2013 24.06.2013
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of test item at delivery:</i>	Test sample(s) is/are not damaged and suitable for testing.		
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		
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:	
07.08.2013	Joey Leung Test Engineer	07.08.2013	Sharon Li Section Manager
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>
	 Unterschrift <i>Signature</i>		 Unterschrift <i>Signature</i>
Sonstiges: Other Aspects		FCCID: 2AAP995902	
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>			

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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 4-11.	
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	2406.832	> 2400	2409.152	< 2483.5
2440	2438.912	> 2400	2441.120	< 2483.5
2474	2472.912	> 2400	2473.872	< 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
2407.596	88.16	114.0 / P
2408.077	86.06	94.0 / A
Fundamental Frequency 2408MHz		Horizontal Polarization
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2407.612	96.23	114.0 / P
2408.093	93.81	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
4817.067	56.65	74.0 / P	4817.077	53.79	74.0 / P
4816.747	46.86	54.0 / A	4816.853	43.91	54.0 / A
7225.561	57.27	74.0 / P	7225.571	55.00	74.0 / P
7225.465	46.77	54.0 / A	7225.474	42.36	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
4817.077	53.79	74.0 / P	4816.853	43.91	54.0 / A
4816.853	43.91	54.0 / A	7225.571	55.00	74.0 / P
7225.571	55.00	74.0 / P	7225.474	42.36	54.0 / A
7225.474	42.36	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
2440.465	86.92	114.0 / P	2440.064	84.79	94.0 / A
2440.064	84.79	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
2439.503	94.13	114.0 / P	2440.064	91.87	94.0 / A
2440.064	91.87	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
4879.103	55.46	74.0 / P	4880.785	45.89	54.0 / A
4880.785	45.89	54.0 / A	7321.554	56.93	74.0 / P
7321.554	56.93	74.0 / P	7321.442	46.70	54.0 / A
7321.442	46.70	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
4880.994	54.50	74.0 / P	4880.849	44.21	54.0 / A
4880.849	44.21	54.0 / A	7321.538	55.63	74.0 / P
7321.538	55.63	74.0 / P	7321.410	44.97	54.0 / A
7321.410	44.97	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
2474.519	87.45	114.0 / P	2474.119	85.17	94.0 / A
2474.119	85.17	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
2473.558	94.71	114.0 / P			

2474.038	92.61	94.0 / A
Harmonics 2474MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4948.958	57.06	74.0 / P
4948.782	47.89	54.0 / A
7423.654	56.93	74.0 / P
7423.478	45.91	54.0 / A
Harmonics 2474MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4949.231	54.80	74.0 / P
4948.814	44.75	54.0 / A
7423.478	53.85	74.0 / P
7423.446	42.83	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