

FCC RF Exposure Exemption report
for

Wireless Mouse

Model No.: MSH21M-5

FCC ID: YWO-MSH21M-5

of

Applicant: ELECOM CO., LTD.

Address: Fushimimachi 4-1-1, Chuo-ku, Osaka City, Osaka Japan 541-8765

Tested and Prepared

by

Worldwide Testing Services (Taiwan) Co., Ltd.

FCC Registration No.: TW1072, TW1140, TW1146, TW1477, TW0037

Industry Canada filed test laboratory Reg. No.: 20037, 31634



Report No.: W6M22409-23717-EE-2

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
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Registration number: W6M22409-23717-EE-2
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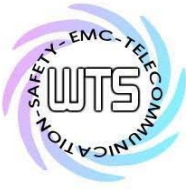
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1 General Information

1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems. The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

Laboratory disclaimer-

1. The test results of this test report relate exclusively to the item tested as specified in 1.5.
2. The test report may only be reproduced or published in full.
3. Reproduction or publication of extracts from the report requires the prior written approval of the Worldwide Testing Services(Taiwan) Co., Ltd.
4. Antenna gain is provided by applicant and laboratory issue relevant data and results.

Tester:

October 21, 2024

Rick Chen

Rick Chen.

Date

WTS-Lab.

Name

Signature

Technical responsibility for area of testing:

October 21, 2024

Kevin Wang

Kevin Wang

Date

WTS

Name

Signature



Worldwide Testing Services(Taiwan) Co., Ltd.

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1.2 Testing laboratory

1.2.1 Location

10m OATS

No.5-1, Lishui, Shuang Sing Village, Wanli Dist.,
New Taipei City 207, Taiwan (R.O.C.)

3 meter semi-anechoic chamber

No. 99, Sec. 1, Balian Rd., Xizhi Dist.,
New Taipei City 221032, Taiwan (R.O.C.)

Worldwide Testing Services (Taiwan) Co., Ltd.
6F., No. 58, Ln. 188, Ruiguang Rd., Neihu Dist.,
Taipei City 114, Taiwan (R.O.C.)
Tel: 886-2-6606-8877

1.2.2 Details of accreditation status

Accredited testing laboratory

FCC filed test laboratory Reg. No.: TW1072, TW1140, TW1146, TW1477, TW0037

Industry Canada filed test laboratory Reg. No.: 20037, 31634

Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd. :

Name: ./.
Accredited no.: ./.
Street: ./.
Town: ./.
Country: ./.

1.3 Application details

Approval holder

Name: ELECOM CO., LTD.
Street: Fushimimachi 4-1-1, Chuo-ku,
City: Osaka City, Osaka
Country: Japan 541-8765

Manufacturer: (if applicable)

Name: ./.
Street: ./.
Town: ./.
Country: ./.



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Test date

Date of receipt of test item: September 11, 2024

Date of test: from September 12, 2024 to October 07, 2024

1.4 General information of Test item

Type of test item: Wireless Mouse

Model no.: MSH21M-5

Multi-listing model no.: MSH21M-3

Brand name: ELECOM

Power supply: Battery 1.5Vd.c.

Type of antenna: PCB antenna

Antenna gain: 2.23 dBi

Technical data

Mode	Channel	Conducted Power (dBm)
2.4G	Ch 1 : 2403 MHz	0.32
	Ch 3 : 2441 MHz	0.78
	Ch 16 : 2480 MHz	0.71
BLE 1M	Ch 0 : 2402 MHz	2.34
	Ch 19 : 2440 MHz	2.23
	Ch 39 : 2480 MHz	1.52

Operation modes: Duplex

Modulation type: GFSK

Sample no.: #01

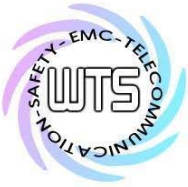
Classification:

Fixed Device	<input type="checkbox"/>
Mobile Device (Human Body distance > 20cm)	<input type="checkbox"/>
Portable Device (Human Body distance < 20cm)	<input checked="" type="checkbox"/>
Modular Radio Device	<input type="checkbox"/>

1.5 Duty cycle and factor

The duty factor is computed as $[10 \log (1 / D)]$, where D is the duty cycle.

Mode	T _{on} (ms)	T _{on} +T _{off} (ms)	Duty cycle (%)	1/T - VBW (kHz)
2.4G	0.16	3.974	4.03%	6.25
BLE 1M	0.313	1.066	29.36%	3.19



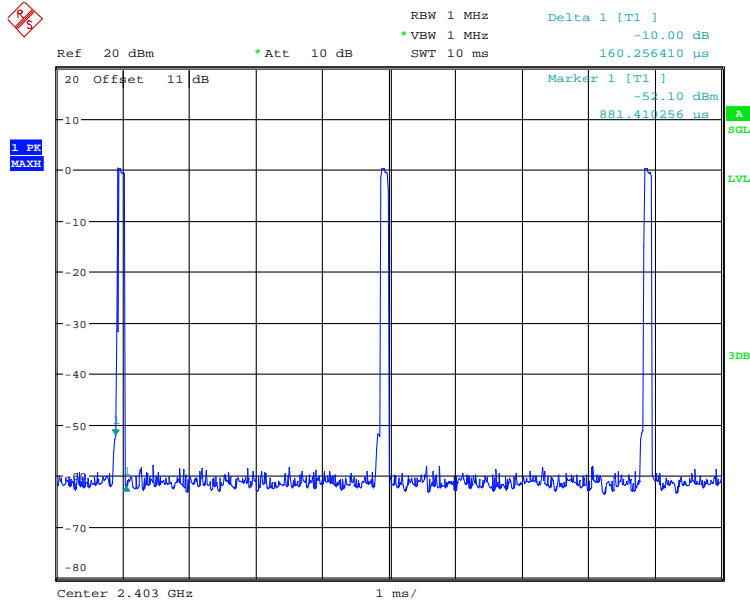
Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M22409-23717-EE-2

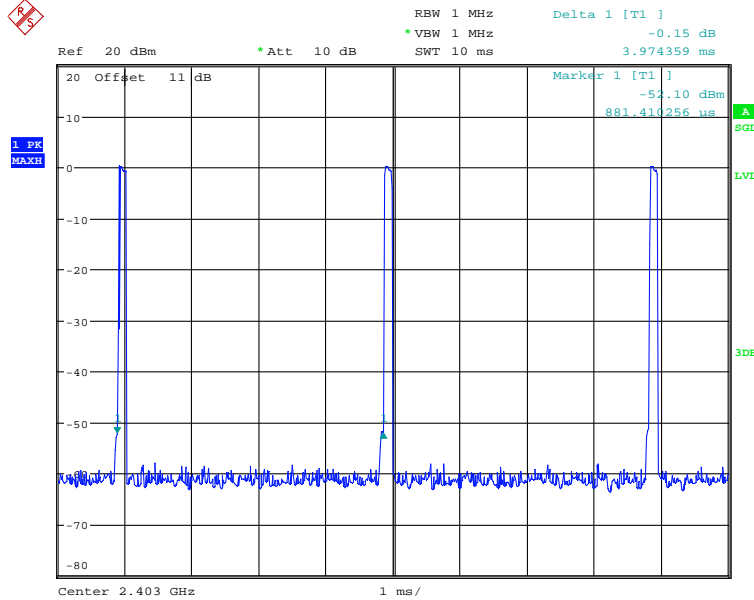
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Duty cycle plot

2.4G



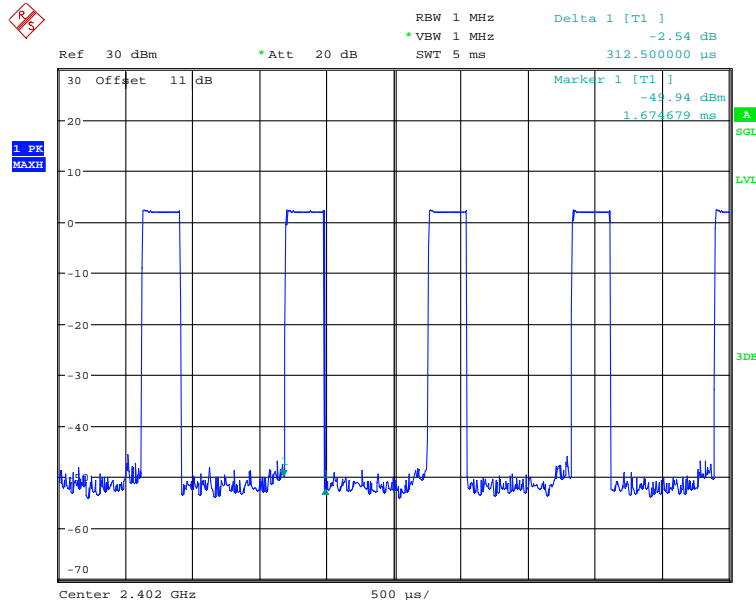
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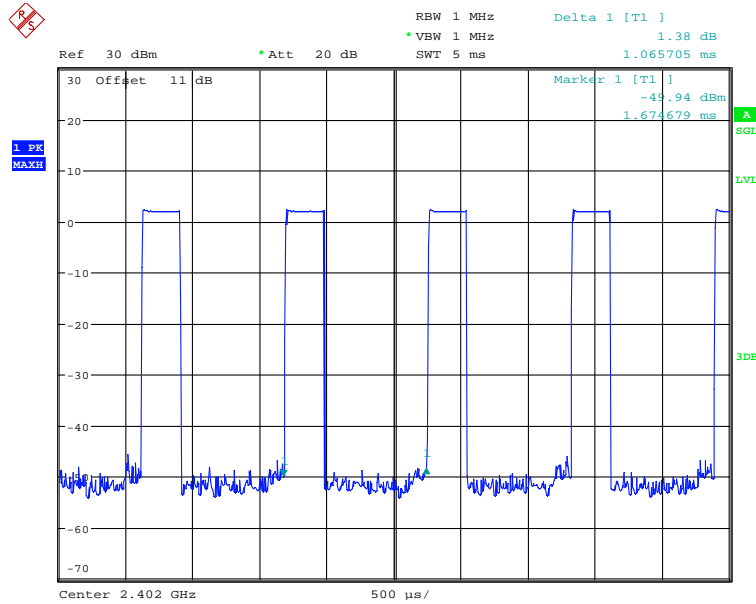
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Registration number: W6M22409-23717-EE-2
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BLE



DUTY
Date: 20.SEP.2024 21:19:20



DUTY
Date: 20.SEP.2024 21:19:38

1.6 Test standards

FCC KDB Publication
447498 D01 General RF Exposure Guidance v06



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2 Test configuration

2.1 Test environment

Relative humidity content: 20 ... 75 %

Air pressure: 86 ... 103 kPa

Extreme conditions parameters: ./.

2.2 Measurement uncertainty

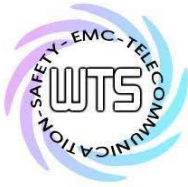
Test item Name	Uncertainty
Estimation Result of Uncertainty of Conducted Output Power Measurement (Peak Output Power (transmitter))	Expanded Uncertainty : 1.64 dB

The decision rule is: Measurement uncertainty is not included in the calculation of test results.

2.3 Test Equipment List

Max Output Power

Code No.	Test equipment	Mode No.	Serial No.	Brand	Cal. Date	Next Cal. Date
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2024/2/16	2025/2/15
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2024/3/7	2025/3/6
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2024/2/16	2025/2/15
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S_Cable 9)	279067	HUBER+SUHNER	2024/2/16	2025/2/15



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3 Equivalent Isotropic Radiated Power (EIRP)

FCC Rule: 15.247

2.4G

EIRP = max. conducted output power + antenna gain

EIRP = 0.78 dBm + 2.23 dBi [antenna gain claimed by manufacturer] = 3.01 dBm = 2.0 mW

BLE

EIRP = max. conducted output power + antenna gain

EIRP = 2.34 dBm + 2.23 dBi [antenna gain claimed by manufacturer] = 4.57 dBm = 2.8642 mW

3.1 Exemption Limits for Routine Evaluation according to FCC KDB Publication

RESULT:

Test standard : FCC KDB Publication
447498 D01 General RF Exposure Guidance v06

3.3.1 Exemption Limits for Routine Evaluation – SAR Evaluation

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table .

Table: SAR evaluation — Exemption limits for routine evaluation based on frequency and separation distance

MHz	5	10	15	20	25	mm
2402	10.09	19.26	29.35	38.52	48.52	SAR Test Exclusion Threshold (mW)

MHz	5	10	15	20	25	mm
2441	10.02	19.05	29.07	38.10	48.10	SAR Test Exclusion Threshold (mW)

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power.

Established separation distance is 5 mm.

Operating frequency band : 2402-2480 MHz

2.4G

Max. output power level at 5 mm separation distance at 2441 MHz according to table is: 10.02 mW

The product is exempt from SAR Evaluation/Testing because the output power of 2.0 mW is below the exemption limit of 10.02 mW

BLE

Max. output power level at 5 mm separation distance at 2402 MHz according to table is: 10.09 mW

The product is exempt from SAR Evaluation/Testing because the output power of 2.8642 mW is below the exemption limit of 10.09 mW.