RF EXPOSURE REPORT

FCC

APPLICANT

Owl Labs Inc.

MODEL NAME

MTW405

FCC ID

2ALXJ-MTW405

REPORT NUMBER

HA240429-OWL-001-R15

TEST REPORT

Date of Issue
June 5, 2024

Test Site
Hyundai C-Tech, Inc. dba HCT America, Inc.
1726 Ringwood Ave, San Jose, CA 95131, USA

Applicant	Owl Labs Inc.
Applicant Address	33-1/2 Union Square Somerville, MA 02143 U.S.A.
FCC ID	2ALXJ-MTW405
Model Name	MTW405
EUT Type	360-Degree Video Conferencing Platform
FCC Classification	Spread Spectrum Transmitter (DSS) Digital Transmission System (DTS) Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s)	Part 1 (§1.1310 / §1.1307), Part 2 (§2.1091)
Test Procedure	KDB 447498 D01 v06, KDB 447498 D04 v01

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was in accordance with the procedures specified in §2.947. The results in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By	**Reviewed By**
John Park	Yongsoo Park
Test Engineer	Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HA240429-OWL-001-R15	June 5, 2024	Initial Issue

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Hyundai C-Tech, Inc. dba HCT America, Inc., 1726 Ringwood Avenue, San Jose, CA 95131, USA TEL: +1-510-933-8848 FAX: +1-510-933-8849

1. EUT DESCRIPTION

Model	MTW405	
Product Name	Meeting Owl 4+	
Power Supply	20 V d.c. (USB type C - External adaptor)	
RF Specification	WIFI 2.4 GHz : 802.11b/g/ n(HT20, HT40)/ ac(VHT20, VHT40)/ ax(HE20, HE40) WIFI 5 GHz : 802.11a/n(HT20/40)/ ac(VHT20/40/80)/ ax(HE20, HE40, HE80) Bluetooth 5.0 LE (1M / BR / EDR)	
Transmitter Chain	WIFI 2.4 GHz / 5 GHz : 2x2 MIMO (ANT 1 + ANT 2) Bluetooth LE / Bluetooth BR/EDR : SISO (ANT 1)	
Antenna Specification [1)]	ANT1	Antenna Type : PCB Antenna Antenna Model : CU23001-1 Antenna Brand: antenova Peak Gain : 2.9 dBi (2.4 GHz) / 3.8 dBi (5 GHz)
	ANT2	Antenna Type : PCB Antenna Antenna Model : CU23002-1 Antenna Brand: antenova Peak Gain : 2.9 dBi (2.4 GHz) / 3.2 dBi (5 GHz)
Exemption Analysis	☐	1-mW Test Exemptions
	☒	SAR-Based Test Exemptions
	☐	MPE-Based Test Exemptions
Operating Environment	Indoor	
Operating Temperature [2)]	5 °C ~ +30 °C	

Note :

1. Antenna information is based on the document provided.
2. Environmental operating condition is declared by the manufacturer

2. INTRODUCTION

2.1. RF Exposure Exemptions for Single Source

(A) 1-mW Blanket Exemption

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz - 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

(B) SAR-Based Exemption

A more comprehensive exemption, considering a variable power threshold that depends on both the separation distance and power, is provided in § 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz - 6 GHz, with test separation distances between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions. Accordingly, a RF source is considered an RF exempt device if its available maximum time-averaged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are below a specified threshold (P_{th}).

$$P_{th}(mW) = ERP_{20cm}\left(\frac{d}{20}\right)^{x} \quad , where\ d \le 20\ cm$$

$$P_{th}(mW) = ERP_{20cm} \quad , where\ 20\ cm < d \le 40\ cm$$

$$x = -log_{10}\left(\frac{60}{ERP_{20cm}\sqrt{f}}\right)$$

$$ERP_{20cm}(mW) = 2040\,f \quad , where\ 0.3\ GHz \le f(GHz) < 1.5\ GHz$$

$$ERP_{20cm}(mW) = 3060 \quad , where\ 1.5\ GHz \le f(GHz) \le 6\ GHz$$

(C) MPE-Based Exemption

MPE-based exemption is provided in the table 1, § 1.1307(b)(3)(i)(C), for a much wider frequency range, from 300 kHz - 100 GHz. The table 1 applies to any RF source (i.e. single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least λ/2π. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power.

RF Source Frequency f_L (MHz) – f_H (MHz)	Minimum Distance λ/2π (f_L) – λ/2π (f_H)	Threshold ERP (ERP_{th})
0.3 – 1.34	150 m – 35.6 m	1,920 R^2
1.34 – 30	35.6 m – 1.6 m	3,450 R^2 / f^2
30 – 300	1.6 m – 159 mm	3.83 R^2
300 – 1,500	159 mm – 31.8 mm	0.0128 R^2 f
1,500 – 100,000	31.8 mm – 0.5 mm	19.2 R^2

Table 1. § 1.1307(b)(3)(i)(C) – Single RF Source Subject to Routine Environmental Evaluation

2.2. RF Exposure Exemptions for Simultaneous Transmission

(A) 1-mW Blanket Exemption

Per § 1.1307(b)(3)(ii)(A), the 1-mW exemption mat be also applied to simultaneous transmission conditions, within the same host device, according one of the following criteria:

- When maximum available power each individual transmitting antenna within the same time averaging period is ≤ 1 mW, and the nearest parts of the antenna structures of the simultaneously operating transmitters are separated by at least 2 cm.
- When the aggregate maximum available power of all transmitting antennas is ≤ 1 mW in the same time-averaging period.

This exemption cannot be combined with other options (B) or (C).

(B) SAR-Based Exemptions and MPE-Based Exemptions

As described in § 1.1307(b)(3)(ii)(B) and covers the situations where both SAR-based and MPE-based exemption may be considered for test exemption in fixed, mobile, or portable device exposure conditions. For these cases, a device with multiple RF sources transmitting simultaneously will be considered an RF exempt device if the condition of the following formula is satisfied :

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

3. RESULT

3.1. SAR-Based Exemption Calculation

Bluetooth LE				
Frequency (GHz)	2.402 – 2.480	GHz		
Separation Distance (cm)	20	cm		
ERP20cm (mW)	3060.0	mW		
Pth (mW)	3060.0	mW		
Conducted Output Power	16.00	dBm	39.81	mW
Antenna Gain	2.90	dBi	1.95	-
EIRP	18.90	dBm	77.62	mW
ERP (P)	16.75	dBm	47.32	mW
P / Pth Ratio	**0.01546**	at 20 cm separation distance from the body		

Bluetooth (BR / EDR)				
Frequency (GHz)	2.402 – 2.480	GHz		
Separation Distance (cm)	20	cm		
ERP20cm (mW)	3060.0	mW		
Pth (mW)	3060.0	mW		
Conducted Output Power	19.0	dBm	79.43	mW
Antenna Gain	2.90	dBi	1.95	-
EIRP	21.90	dBm	154.88	mW
ERP (P)	19.75	dBm	94.41	mW
P / Pth Ratio	**0.03085**	at 20 cm separation distance from the body		

WIFI 2.4 GHz (Beamforming Mode)				
Frequency (GHz)	2.412 – 2.462	GHz		
Separation Distance (cm)	20	cm		
ERP20cm (mW)	3060.0	mW		
Pth (mW)	3060.0	mW		
Conducted Output Power	20.0	dBm	100.00	mW
Antenna Gain	5.91	dBi	3.90	-
EIRP	25.91	dBm	389.94	mW
ERP (P)	23.76	dBm	237.68	mW
P / Pth Ratio	0.07767	at 20 cm separation distance from the body		

WIFI 5 GHz (Beamforming Mode)				
Frequency (GHz)	5.150 – 5.350 / 5.725 – 5850	GHz		
Separation Distance (cm)	20	cm		
ERP20cm (mW)	3060.0	mW		
Pth (mW)	3060.0	mW		
Conducted Output Power	25.0	dBm	316.23	mW
Antenna Gain	6.52	dBi	4.49	-
EIRP	31.52	dBm	1419.06	mW
ERP (P)	29.37	dBm	864.97	mW
P / Pth Ratio	**0.28267**	at 20 cm separation distance from the body		

Note :
1. Maximum conducted output power including tune-up tolerance

3.2. SUMMARY OF RESULTS

Mode	Frequency Range (GHz)	Threshold (P_{th}) (mW)	ERP (P) (mW)	P / Pth Radio	Simultaneous Ratio
Bluetooth (BR / EDR)	2.402 – 2.480	3060.0	94.41	0.03085	0.39120
WIFI 2.4 GHz	2.412 – 2.462	3060.0	237.68	0.07767	
WIFI 5 GHz	5.150 – 5.350 / 5.725 – 5850	3060.0	864.97	0.28267	

The worst-case transmission is Bluetooth (BR / EDR) + WIFI 2.4 GHz + WIFI5 GHz simultaneous transmission and the EUT meets the RF exposure requirement.

Sample Calculation
Bluetooth (BR / EDR) + WIFI 2.4 GHz + WIFI 5 GHz :
RF Exposure at 20 cm distance = P / P_{th} = 94.41 / 3060.0 + 237.68 / 3060.0 + 864.97 / 3060.0 = **0.39120** < 1.0

END OF TEST REPORT

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