Maximum Permissible Exposure Report

Product	:	Pro 5 Wire-Free Spotlight Camera
Model Name	:	VMC4060P
FCC ID	:	2APLE18300422
Test Regulation	:	47 CFR FCC Part 2.1091
Received Date	:	2022/6/21
Test Date	:	2022/6/24 ~ 2022/6/30
Issued Date	:	2022/8/3
Applicant	:	Arlo Technologies Inc 2200 Faraday Avenue, Suite 150, Carlsbad, CA 92008, USA
Issued By	:	Underwriters Laboratories Taiwan Co., Ltd. Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Testing Laboratory
3398

REVISION HISTORY

Original Test Report No.: 4790420462-US-R4-V0

Rev.	Test report No.	Date	Page revised	Contents
Original	4790420462-US-R4-V0	2022/8/3	-	Initial issue

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1. Attestation of Test Results

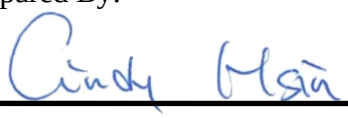
APPLICANT:	Arlo Technologies Inc 2200 Faraday Avenue, Suite 150, Carlsbad, CA 92008, USA
MANUFACTURER:	FUYU PRECISION COMPONENT CO.,LTD. Lot M1 & Lot F, Quang Chau Industrial Park, Van Trung Commune, Viet Yen District, Bac Giang Province, Vietnam
EUT DESCRIPTION:	Pro 5 Wire-Free Spotlight Camera
BRAND:	Arlo
MODEL:	VMC4060P
SAMPLE STAGE:	Engineering Verification Test sample

APPLICABLE STANDARDS	
STANDARD	**Test Results**
47 CFR FCC PART 2.1091	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:



Cindy Hsin Date : 2022/8/3
Project Handler

Approved and Authorized By:

Eric Lee Date : 2022/8/3
Senior Laboratory Engineer

2. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with KDB 447498 D04 Interim General RF Exposure Guidance v01.

3. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.

4. Equipment Under Test

4.1. Description of EUT

Product Name	Pro 5 Wire-Free Spotlight Camera	
Brand Name	Arlo	
Model Name	VMC4060P	
Operating Frequency	Sub-G	904 MHz ~ 926 MHz
	WLAN	**2.4GHz:** 2412MHz ~ 2462MHz **5GHz:** 5180MHz ~ 5240MHz 5260MHz ~ 5320MHz 5500MHz ~ 5720MHz 5745MHz ~ 5825MHz
Modulation	Sub-G	O-QPSK
	WLAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Number of Channel	Sub-G	12
	2.4G WLAN 2412 ~ 2462 MHz	11 for 802.11b, 802.11g, 802.11n (HT20)
	5G WLAN 5180 ~ 5240 MHz	4 for 802.11a, 802.11n (HT20)
	5G WLAN 5260 ~ 5320 MHz	4 for 802.11a, 802.11n (HT20)
	5G WLAN 5500 ~ 5720 MHz	12 for 802.11a, 802.11n (HT20)
	5G WLAN 5745 ~ 5825 MHz	5 for 802.11a, 802.11n (HT20)

Normal Voltage	5Vdc from adapter 3.85Vdc for battery
Sample ID	Conducted Test: 5079774 Radiated Test: 5079774

Note:

1. The EUT provides one completed transmitters and one receivers.

Modulation Mode	Tx,Rx Function
Sub-G	1TX,1RX
802.11a	1TX,1RX
802.11b	1TX,1RX
802.11g	1TX,1RX
802.11n (HT20)	1TX,1RX

2. The EUT contains following accessory devices:

Product	Brand	Model	Description
AC Adapter	PIE	AD2158	Input: 100-240V, 50/60Hz, 0.3A, Output: 5.0V, 2A
AC Adapter	CWT	2AEA010	Input: 100-240V, 50/60Hz, 0.3A, Output: 5.0V, 2A
USB Cable	Nienyi	310-50012-04	Length: 0.9m
Battery	Arlo	A-4a	4800mAh,3.85V, 18.48WH

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual.

4.2. Description of Available Antennas

Ant. No.	Transmitter Circuit	Brand Name	Model Name	Ant. Type	Frequency Band (MHz)	Maximum Gain (dBi)
1	Chain (0)	N/A	N/A	Metal	2400~2500	2.1
					5150~5850	4.5
					900~940	-2.4

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

5. Requirement

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time |E|2, |H|2 or S (minutes)**
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30
Note 1: f = frequency in MHz, * means Plane-wave equivalent power density				
Note 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.				

Power Density (S) is calculated by the following formula:

$S=(P*G)/4\pi R^2$

where: S = power density (in appropriate units, e.g. mW/cm^2)
P = power input to the antenna (in appropriate units, e.g., mW)
G = power gain of the antenna in the direction of interest relative to an isotropic radiator R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

6. General RF Exposure Test Exemption

The corresponding Exclusion Threshold condition, listed below:

1) Blanket Exempt: Following 47 CFR 1.1307(b)(3)(i)(A), the available maximum time-averaged power is no more than 1 mW.

2) SAR Exempt: Following 47 CFR 1.1307(b)(3)(i)(B), the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

3) MPE Exempt: Following 47 CFR 1.1307(b)(3)(i)(C), using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

7. Radio Frequency Radiation Exposure Evaluation

(1) Exposure environment

Sub-G

Evaluation Frequency	Max. Average power	Antenna Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm^2)	(mW/cm^2)
904 ~ 926	18.51	-2.40	16.11	40.832	0.00812	0.60

WLAN 2.4GHz

Evaluation Frequency	Max. Average power	Directional Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm^2)	(mW/cm^2)
2412 ~ 2462	24.60	2.10	26.70	467.735	0.09305	1

WLAN 5GHz

Evaluation Frequency	Max. Average power	Directional Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm^2)	(mW/cm^2)
5180 ~ 5240	21.00	4.50	25.50	354.813	0.07059	1.00
5260 ~ 5320	21.00	4.50	25.50	354.813	0.07059	1.00
5500 ~ 5720	21.00	4.50	25.50	354.813	0.07059	1.00
5745 ~ 5825	21.00	4.50	25.50	354.813	0.07059	1.00

Note:
1. Max. EIRP (dBm) = Max. Average power (dBm) + Antenna Gain (dBi)
2. Max. EIRP (mW) = $10^{(\text{Max. EIRP (dBm)} / 10)}$
3. Power density (mW/cm^2) = Max. EIRP (mW) / [$4 \times \pi \times$ (calculated distance)^2], the calculated distance is 20 cm.

Conclusion:

The Sub-G and WLAN 2.4GHz, Sub-G and WLAN 5GHz can transmit simultaneously, the formula of calculated the MPE is:
CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
CPD = Calculation power density
LPD = Limit of power density

Sub-G + WLAN 2.4GHz
Situation is (0.09305 / 1) +(0.00812 / 0.6) = 0.10658

Sub-G + WLAN 5GHz
Situation is (0.07059 / 1) +(0.00812 / 0.6) = 0.08412

Therefore the maximum calculations of above situations are less than the "1" limit.

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

END OF REPORT