



Test report No. : 4790091528-US-R3-V0
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Issued date : 2022/3/22
FCC ID : RK9-CBV390S5

Maximum Permissible Exposure Report

Product : Wireless Cable Gateway (Wi-Fi 6)
Model Name : CBV390S5-AX5700
Series Model : CBW390S5-AX5700
FCC ID : RK9-CBV390S5
Test Regulation : 47 CFR FCC Part 2.1091
Received Date : 2021/9/23
Test Date : 2021/9/28 ~ 2021/10/21
Issued Date : 2022/3/22
Applicant : CastleNet Technology Inc.
No. 14, Ln. 141, Sec. 3, Beishen Rd., Shenkeng Dist., New
Taipei City 22244, Taiwan (R.O.C.)
Issued By : Underwriters Laboratories Taiwan Co., Ltd.
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd.,
Zhudong Township, Hsinchu County, Taiwan



The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report are responsible of the test sample(s) provided by the client only and are not to be used to indicate applicability to other similar products.

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1. Attestation of Test Results

APPLICANT: CastleNet Technology Inc.
 No. 14, Ln. 141, Sec. 3, Beishen Rd., Shenkeng Dist., New Taipei
 City 22244, Taiwan (R.O.C.)

MANUFACTURER: CastleNet Technology Inc.
 No. 14, Ln. 141, Sec. 3, Beishen Rd., Shenkeng Dist., New Taipei
 City 22244, Taiwan (R.O.C.)

EUT DESCRIPTION: Wireless Cable Gateway (Wi-Fi 6)

BRAND: CastleNet Technology Inc.

MODEL: CBV390S5-AX5700

SERIES MODEL: CBW390S5-AX5700

SAMPLE STAGE: Production Unit

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:

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 Project Handler

Date : 2022/3/22

Approved and Authorized By:

Waternil Guan
 Engineer

Date : 2022/3/22

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2. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with KDB 447498 D01 General RF Exposure Guidance v06.

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.

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4. Equipment Under Test

4.1. Description of EUT

Product Name	Wireless Cable Gateway (Wi-Fi 6)	
Brand Name	CastleNet Technology Inc.	
Model Name	CBV390S5-AX5700	
Series Model	CBW390S5-AX5700	
Operating Frequency	WLAN	2.4GHz: 2412MHz ~ 2462MHz 5GHz: 5180 MHz ~ 5240 MHz, 5260 MHz ~ 5320 MHz, 5500 MHz ~ 5720 MHz, 5745 MHz ~ 5825 MHz
Modulation	WLAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA
Number of Channel	2.4G WLAN 2412 ~ 2462 MHz	11 for 802.11b, 802.11g, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 7 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40)

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Number of Channel	5180 ~ 5240 MHz	4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20)
		2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40)
		1 for 802.11ac (VHT80), 802.11ax (HE80)
	5260 ~ 5320 MHz	4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20)
		2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40)
		1 for 802.11ac (VHT80), 802.11ax (HE80)
		1 for 802.11ac (VHT160), 802.11ax (HE160)
	5500 ~ 5720 MHz	12 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20)
		6 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40)
		3 for 802.11ac (VHT80), 802.11ax (HE80)
		1 for 802.11ac (VHT160), 802.11ax (HE160)
	5745 ~ 5825 MHz	5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20)
2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40)		
1 for 802.11ac (VHT80), 802.11ax (HE80)		
Normal Voltage	12Vdc from adapter	
S/N	3PD5X57000056	
Sample ID	4249937	
Software Version	0001_21131.M.001	

Note:

- The models difference table as below:

Model	Function				
	2.5G port	1G port	USB port	TEL port	ON/OFF switch
CBV390S5-AX5700	v	v	v	v	v
CBW390S5-AX5700	v	v	-	-	-

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2. The EUT provides transmitters and receivers as below:

2.4GHz:

Modulation Mode	Tx,Rx Function
802.11b	3TX,3RX
802.11g	3TX,3RX
802.11n (HT20)	3TX,3RX
802.11n (HT40)	3TX,3RX
802.11ac (VHT20)	3TX,3RX
802.11ac (VHT40)	3TX,3RX
802.11ax (HE20)	3TX,3RX
802.11ax (HE40)	3TX,3RX

5GHz:

Modulation Mode	Tx,Rx Function
802.11a	4TX,4RX
802.11n (HT20)	4TX,4RX
802.11n (HT40)	4TX,4RX
802.11ac (VHT20)	4TX,4RX
802.11ac (VHT40)	4TX,4RX
802.11ac (VHT80)	4TX,4RX
802.11ac (VHT160)	4TX,4RX
802.11ax (HE20)	4TX,4RX
802.11ax (HE40)	4TX,4RX
802.11ax (HE80)	4TX,4RX
802.11ax (HE160)	4TX,4RX

3. The EUT contains following accessory devices:

Product	Brand	Model	Description
AC adapter	MOSO	MSS-V3500WR120-042A0-US	Input: 100-240V 50-60Hz Output: 12.0V 3.5A Length: 1.5m
Lan Cable (Generic)	EKSON	JY01-C066	Length: 1.0m non-shielded cable Color: Gray
Lan Cable (Home+)	EKSON	PF01-C110	Length: 1.0m non-shielded cable Color: Yellow

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

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4.2. Description of Available Antennas

Ant. No.	Transmitter Circuit	Brand Name	Model Name	Ant. Type	Maximum Gain (dBi)
1	Chain (0)	Taiwan Anjie	AJDP1J-C0050	Dipole	2.4GHz: 3.22 5GHz: 4.68
2	Chain (1)	Taiwan Anjie	AJDP1J-R0003	Dipole	2.4GHz: 3.30 5GHz: 4.23
3	Chain (2)	Taiwan Anjie	AJDP1J-W0059	Dipole	2.4GHz: 3.64 5GHz: 5.01
4	Chain (3)	Taiwan Anjie	AJWP1J-B0017	Dipole	5GHz: 5.32

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.

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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/ cm²)

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)

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6. Radio Frequency Radiation Exposure Evaluation

Non-Beamforming mode

WLAN 2.4GHz

Evaluation Frequency (MHz)	Max. Average power (dBm)	Directional Gain (dBi)	Max. EIRP (dBm)	Max. EIRP (mW)	Power density @ 30 cm (mW/cm ²)	Limit (mW/cm ²)
2412 ~ 2462	24.96	8.16	33.12	2051.162	0.18136	1

WLAN 5GHz

Evaluation Frequency (MHz)	Max. Average power (dBm)	Directional Gain (dBi)	Max. EIRP (dBm)	Max. EIRP (mW)	Power density @ 30 cm (mW/cm ²)	Limit (mW/cm ²)
5180 ~ 5240	24.32	10.84	35.16	3280.953	0.29010	1
5260 ~ 5320	19.99	10.84	30.83	1210.598	0.10704	1
5500 ~ 5720	22.24	10.84	33.08	2032.357	0.17970	1
5745 ~ 5825	27.72	10.84	38.56	7177.943	0.63467	1

Beamforming mode

WLAN 2.4GHz

Evaluation Frequency (MHz)	Max. Average power (dBm)	Directional Gain (dBi)	Max. EIRP (dBm)	Max. EIRP (mW)	Power density @ 30 cm (mW/cm ²)	Limit (mW/cm ²)
2412 ~ 2462	18.70	8.16	26.86	485.289	0.04291	1

WLAN 5GHz

Evaluation Frequency (MHz)	Max. Average power (dBm)	Directional Gain (dBi)	Max. EIRP (dBm)	Max. EIRP (mW)	Power density @ 30 cm (mW/cm ²)	Limit (mW/cm ²)
5180 ~ 5240	24.32	10.84	35.16	3280.953	0.29010	1
5260 ~ 5320	18.97	10.84	29.81	957.194	0.08463	1
5500 ~ 5720	19.02	10.84	29.86	968.278	0.08561	1
5745 ~ 5825	25.07	10.84	35.91	3899.420	0.34478	1

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/cm²) = Max. EIRP (mW) / [$4 \times \pi \times (\text{calculated distance})^2$], the calculated distance is 30 cm.

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Conclusion:

The WLAN 2.4GHz and WLAN 5GHz can transmit simultaneously, the formula of calculated the MPE is:

$$\text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2} + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

$$\text{Situation is } (0.18136 / 1) + (0.63467 / 1) = 0.81603$$

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

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