

RF EXPOSURE REPORT

OF

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

Product Name: Wireless Cable Gateway

Brand Name: Castlenet

Model No.: CBV384Z4

Model Difference: N/A

Report Number: E2/2020/B0038

FCC ID: RK9-CBV384Z4

FCC Rule Part Part 2.1091

Issue Date: Feb. 22, 2021

We hereby certify that:

The above equipment was verified by SGS Taiwan Ltd. The evaluation in this report is in compliance with the above rule(s).
The results of this report relate only to the sample identified in this report.

Approved By: _____

John Teh

John Yeh / Asst. Manager

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Revision History

Report Number	Revision	Description	Issue Date	Remark
E2/2020/B0038	Rev.00	Original.	Feb. 22, 2021	Revised By: Yi-Shan Tsai

Note:

1、Disclaimer

Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

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1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

1.1 General:

Product Name:	Wireless Cable Gateway
Brand Name:	Castlenet
Model No.:	CBV384Z4
Model Difference:	N/A
Hardware Version:	N/A
Software Version:	N/A
Power Supply:	12Vdc from AC/DC Adapter

1.2 Antenna Information:

1.2.1 WLAN 2.4GHz

Antenna Type	Ch0/Ch1/Ch2	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)	Worst Antenna Gain
PCB	Ch0	AnJie	CBV384Z4-AC2800	2412-2462	2.94	V
	Ch1				2.61	
	Ch2				2.93	

Note: Investigation has been done to determine the worst case scenario for the above antennas demonstrated with measurements in this report.

For MIMO mode, higher antenna gains are chosen to ensure higher directional gain is evaluated as below.

Ant. Type	Supplier	Part No.	Freq.(MHz)	Peak Gain (dBi)
PCB	AnJie	CBV384Z4-AC2800	2412-2462	7.6

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1.2.2 WLAN 5GHz

Ant. Type	Ch0/Ch1/Ch2/Ch3	Supplier	Part No.	Freq.(MHz)	Peak Gain (dBi)	Worst Antenna Gain
PCB	Ch0	AnJie	CBV384Z4-AC2800	5150~5250	2.90	V
				5725~5850	2.97	
PCB	Ch1	AnJie	CBV384Z4-AC2800	5150~5250	2.69	
				5725~5850	2.97	
PCB	Ch2	AnJie	CBV384Z4-AC2800	5150~5250	2.93	V
				5725~5850	2.93	
PCB	Ch3	AnJie	CBV384Z4-AC2800	5150~5250	2.67	
				5725~5850	2.83	

Note: Investigation has been done to determine the worst case scenario for the above antennas demonstrated with measurements in this report.

For MIMO mode, higher antenna gains are chosen to ensure higher directional gain is evaluated as below.

Ant. Type	Supplier	Part No.	Freq.(MHz)	Peak Gain (dBi)
PCB	AnJie	CBV384Z4-AC2800	5150~5250	8.82
			5725~5850	8.95

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1.3 Rated Power

1.3.1 WLAN 2.4GHz

Mode	Freq. Range (MHz)	Channels	Modulation Technology	Max Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Worst Case
802.11b/g	2412-2462	11	DSSS & OFDM	25.99	2.94	28.93	V
802.11n_HT20				20.35	7.6	27.95	
802.11 n_HT40				19.93	7.6	27.53	
Modulation type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM					

1.3.2

1.3.3 WLAN 5GHz

802.11	Freq. Range (MHz)	Modulation Technology	Max. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Worst Case
a	5150~5250	OFDM	21.99	8.82	30.81	
	5725~5850		21.92	8.95	30.87	
n HT20 ac VHT20	5150~5250		26.63	8.82	35.45	
	5725~5850		26.69	8.95	35.64	V
n HT40 ac VHT40	5150~5250		26.57	8.82	35.39	
	5725~5850		25.63	8.95	34.58	
ac VHT80	5150~5250		21.06	8.82	29.88	
	5725~5850		20.68	8.95	29.63	

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2 FCC MAXIMUM PERMISSIBLE EXPOSURE (MPE)

2.1 FCC Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
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
1500-15000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equipment power density

Prediction of MPE limit at a given distance

$$S = PG / 4\pi R^2$$

Where: S = Power density

P = Power input to antenna

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

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2.2 Power Density Calculation (Worst Case)

Operation Mode	Evaluation Frequency (MHz)	Operation Distance (cm)	Max. output Power (dBm)	Antenna Gain (dBi)	Max. output Power EIRP (mW)	Power Density (PD) (mW/cm ²)	Limit (mW/cm ²)	Pass / Fail	Power Density / Limit	Collocated MPE
WLAN 2.4G	2412.00	20	25.99	2.94	781.63	0.156	1.000	Pass	0.156	V
WLAN 5G	5825.00	20	26.69	8.95	3664.38	0.729	1.000	Pass	0.729	V

2.3 Collocated Power Density Calculation

FCC Collocated MPE		
Max WLAN 2.4G PD / Limit	Max WLAN 5GHz PD / Limit	Σ (Power Density / Limit) of 2.4G WLAN + 5GHz WLAN
0.156	0.729	0.885

Note:

- Σ (E- Field Strength / Limit): This is a summation of [(E- Field Strength for each transmitter/antenna included in the simultaneous transmission) / (corresponding MPE limit)].
- Considering the collocated transmitters, the aggregated (E- Field Strength /limit) is smaller than 1, and MPE of collocated transmitters is compliant

~ End of Report ~

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