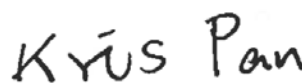


MPE Report

Applicant : Emplus Technologies, Inc
Product Type : Dual Band AC1300 Access Point
Trade Name : emplus, EnGenius
Model Number : WAP551, ECW115
Test Specification : ANSI / IEEE Std.C95.1
47 CFR § 2.1091
47 CFR § 1.1310
Received Date : Aug. 22, 2019
Test Period : Sep. 02 ~ Sep. 04, 2019
Issue Date : Oct. 14, 2019

Issue by

Approved By : 
(Mark Duan)

Tested By : 
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Taiwan Accreditation Foundation accreditation number: 1330
Test Firm MRA designation number: TW0010

Note:

- 1.The test results are valid only for samples provided by customers and under the test conditions described in this report.
- 2.This report shall not be reproduced except in full, without the written approval of A Test Lab Technology Corporation.
- 3.The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.



Revision History

Rev.	Issue Date	Revisions	Revised By
00	Oct. 14, 2019	Initial Issue	Jennifer Liu



Contents

1.	Reference Testing Standards.....	4
2.	Description of Equipment under Test (EUT).....	5
3.	Human Exposure Assessment.....	6
4.	RF Output Power.....	7
5.	Test Result.....	9



1. Reference Testing Standards

Standard	Description	Version
ANSI/IEEE C95.1	American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 KHz to 100 GHz, New York.	1992

2. Description of Equipment under Test (EUT)

Applicant	Emplus Technologies, Inc Bld B, 10F, No.209 Nangang Rd., Taipei City, Taiwan				
Manufacturer	Emplus Technologies, Inc 10F., Building B, No.209, Sec. 1, Nangang Rd., Nangang Dist., Taipei City 115, Taiwan (R.O.C.)				
Product Type	Dual Band AC1300 Access Point				
Trade Name	emplus, EnGenius				
Model Number	WAP551, ECW115				
Difference description of Trade name/model number	Differences are due to selling region. * WAP551 for emplus apply, ECW115 for EnGenius apply.				
FCC ID	2AL6XWAP551				
Frequency Range	Operate Band			Frequency Range (MHz)	
	IEEE 802.11b / 802.11g			2412 – 2462	
	IEEE 802.11n 2.4 GHz 20 MHz (256QAM)			2412 – 2462	
	IEEE 802.11n 2.4 GHz 40 MHz (256QAM)			2422 – 2452	
	IEEE 802.11a U-NII Band I			5180 – 5240	
	IEEE 802.11a U-NII Band III			5745 – 5825	
	IEEE 802.11n 5 GHz / 802.11ac 20 MHz U-NII Band I			5180 – 5240	
	IEEE 802.11n 5 GHz / 802.11ac 20 MHz U-NII Band III			5745 – 5825	
	IEEE 802.11n 5 GHz / 802.11ac 40 MHz U-NII Band I			5190 – 5230	
	IEEE 802.11n 5 GHz / 802.11ac 40 MHz U-NII Band III			5755 – 5795	
	IEEE 802.11ac 80 MHz U-NII Band I			5210	
	IEEE 802.11ac 80 MHz U-NII Band III			5775	
Antenna Information	Model	Type	Antenna	Max. Gain (dBi)	
	5718A0434300	Metal PCB Antenna	ANT-0	2412 – 2472	3.24
			ANT-1	5150 – 5250	4.89
				5755 – 5850	4.37
	5718A0435300	Metal PCB Antenna	ANT-1	2412 – 2472	3.58
			ANT-0	5150 – 5250	4.52
				5755 – 5850	4.56
	Directional Gain			2412 – 2472	6.42
				5150 – 5250	7.72
				5755 – 5850	7.48
Antenna Delivery	IEEE 802.11b / 802.11g: 2TX (CDD) IEEE 802.11n 2.4 GHz 20 MHz / 40 MHz: 2TX (MIMO/Beamforming on) IEEE 802.11a: 2TX (CDD) IEEE 802.11ac 20 MHz / 40 MHz / 80 MHz: 2TX (MIMO/Beamforming on)				
RF Evaluation	0.418 mW/cm ²				
Operate Temp. Range	-0 ~ +40°C				

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 / 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties



3. *Human Exposure Assessment*

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR § 1.1310 titled "Radiofrequency radiation exposure limits", generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as "a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. " This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: "IMPORTANT: To meet the FCC's RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna". Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a "mobile device" as defined in section § 2.1091 paragraph (b).

Exposure evaluation

$$S = \frac{PG}{4\pi R^2}$$

Where

S: power density

P: power input to the 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.

4. RF Output Power

The conducted power turn-up tolerance reference manufacturer specification.

Band	Data Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)		
			ANT-0	ANT-1	ANT-0+1
IEEE 802.11b	1M	2412.0	15.57	15.33	18.46
		2437.0	15.35	15.19	18.28
		2462.0	16.43	16.37	19.41
IEEE 802.11g	6M	2412.0	16.12	16.27	19.21
		2437.0	18.50	18.20	21.36
		2462.0	15.72	15.64	18.69
IEEE 802.11n 2.4 GHz 20 MHz	13M	2412.0	15.57	15.41	18.50
		2437.0	18.58	18.18	21.39
		2462.0	15.52	15.30	18.42
IEEE 802.11n 2.4 GHz 40 MHz	27M	2422.0	15.09	15.17	18.14
		2437.0	15.08	14.93	18.02
		2452.0	15.28	15.03	18.17
IEEE 802.11a	6M	5180.0	20.33	19.90	23.13
		5200.0	20.03	19.83	22.94
		5220.0	19.99	19.87	22.94
		5240.0	19.91	19.56	22.75
		5745.0	19.38	19.24	22.32
		5765.0	19.33	19.24	22.30
		5785.0	19.44	19.26	22.36
		5805.0	19.51	19.43	22.48
		5825.0	19.52	19.45	22.50
IEEE 802.11ac 20 MHz	13M	5180.0	20.45	20.14	23.31
		5200.0	20.19	20.01	23.11
		5220.0	19.91	19.97	22.95
		5240.0	19.85	19.82	22.85
		5745.0	19.22	19.52	22.38
		5765.0	19.25	19.50	22.39
		5785.0	19.27	19.08	22.19
		5805.0	19.38	19.06	22.23
		5825.0	19.49	19.15	22.33
IEEE 802.11ac 40 MHz	27M	5190.0	20.15	20.07	23.12
		5230.0	19.94	20.11	23.04
		5755.0	19.45	19.22	22.35
		5795.0	19.71	19.67	22.70
IEEE 802.11ac 80 MHz	58.6M	5210.0	17.41	17.25	20.34
		5775.0	18.75	18.70	21.74

Note: The relevant measured result has the offset with cable loss already.

Beamforming on

Band	Data Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)		
			ANT-0	ANT-1	ANT-0+1
IEEE 802.11n 2.4 GHz 20 MHz	13M	2412.0	12.21	12.10	15.17
		2437.0	15.32	14.79	18.07
		2462.0	11.87	11.76	14.83
IEEE 802.11n 2.4 GHz 40 MHz	27M	2422.0	11.41	11.52	14.48
		2437.0	11.37	11.30	14.35
		2452.0	11.69	11.33	14.52
IEEE 802.11ac 20 MHz	13M	5180.0	17.13	17.01	20.08
		5200.0	17.04	16.88	19.97
		5220.0	16.81	16.75	19.79
		5240.0	16.80	16.68	19.75
		5745.0	16.01	16.15	19.09
		5765.0	16.13	16.24	19.20
		5785.0	16.06	15.90	18.99
		5805.0	16.08	15.92	19.01
IEEE 802.11ac 40 MHz	27M	5825.0	16.20	16.02	19.12
		5190.0	17.01	16.89	19.96
		5230.0	16.85	16.90	19.89
		5755.0	16.20	16.14	19.18
IEEE 802.11ac 80 MHz	58.6M	5795.0	16.36	16.28	19.33
		5210.0	14.30	14.16	17.24
		5775.0	15.68	15.52	18.61

Note:1. The relevant measured result has the offset with cable loss already.

2. Evaluated high and low data rate, the report record worst case low data rate measurement results.

5. Test Result

Antenna	Band	Frequency (MHz)	Limit (W/m ²)	Distance (m)	Tune-up (dBm)	Gain (dBi)	Numeric Gain	Duty Cycle	Power with Duty cycle (W)	PD (W/m ²)
Wi-Fi Antenna	2.4 GHz	2412-2462	1	20	21.89	6.42	4.39	1	678.37	0.135
	5 GHz	5150-5250	1	20	23.81	7.72	5.92	1	1423.38	0.283
		5725-5850	1	20	23.20	7.48	5.60	1	1170.01	0.233
Wi-Fi Antenna (Beamforming)	2.4 GHz	2412-2462	1	20	18.57	6.42	4.39	1	315.84	0.063
	5 GHz	5150-5250	1	20	20.58	7.72	5.92	1	676.58	0.135
		5725-5850	1	20	19.83	7.48	5.60	1	538.5	0.107

Note:

1. Mobile or fixed location transmitters, minimum separation distance is 20 cm, even if calculations indicate MPE distance is less.
2. We used the maximum power and gain to provide MPE results.
3. The Numeric Gain calculated by $10^{(\text{ant. Gain(dBi)} / 10)}$.
4. The MPE results are evaluated by lowest data rate for WLAN.

Simultaneous Transmitting :

$$\text{Total MPE} = 2.4\text{GHz MPE} + 5\text{GHz MPE} = 0.135 + 0.283 = 0.418 \text{ (mw)/cm}^2 < 1 \text{ (mw)/cm}^2$$

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