

Rev.01

MPE Report

Applicant : Emplus Technologies, Inc

Product Type : Dual Band AC2600 Access Point

Trade Name : emplus

Model Number : WAP373-C

Test Specification : ANSI / IEEE Std.C95.1-1992 / IEEE Std. 1528-2013

47 CFR § 2.1091

47 CFR § 1.1310

Received Date : May 30, 2019 Test Period : Jun. 15, 2019

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Test Firm MRA : TW0010

designation number

Issue by

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lac-MRA



Taiwan Accreditation Foundation accreditation number: 1330

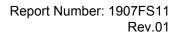
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Revision History

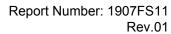
Rev.	Issue Date	Revisions	Revised By
00	Jul. 15, 2019	Initial Issue	Jennifer Liu
01	Aug. 06, 2019	Page 10 Revised Test Results Frequency.	Jennifer Liu





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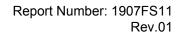
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1. Reference Testing Standards

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.	2005





2. Description of Equipment under Test (EUT)

Applicant	Emplus Ted	chnologies, I	nc			
Αρριισατιτ			igang Rd., Taipei Ci	ty, Taiwan		
Manufacturer		chnologies, I No.209 Nan	nc ıgang Rd., Taipei Ci	ty, Taiwan		
Product Type		AC2600 Acc		•		
Trade Name	emplus					
Model Number	WAP373-C	,				
FCC ID	2AL6XWAF	P373				
			•	Frequency Range (MHz)		
	IEEE 802.1 (64QAM/25		g / 802.11n 2.4 GHz	20 MHz	2412 - 2	462
	IEEE 802.1	1n 2.4 GHz	40 MHz (64QAM/25	6QAM)	2422 - 2	452
	IEEE 802.1	1a U-NII Bar	nd I		5180 - 5	240
Frequency Range	IEEE 802.1	1a U-NII Bar	nd III		5745 - 5	825
			302.11ac 20 MHz U-		5180 - 5	240
			302.11ac 20 MHz U-		5745 - 5	
			302.11ac 40 MHz U-		5190 - 5	
		1n 5 GHz / 8	5755 - 5795			
		1ac 80 MHz 1ac 80 MHz	5210			
		5775				
	Band	Antenna	Model	Туре	Frequency (MHz)	Max. Gain (dBi)
	2.4 GHz	ANT-0	5718A0346300	Metal PIFA Antenr	na 2412-2462	2.86
		ANT-1	5718A0347300	Metal PIFA Antenr	na 2412-2462	3.12
		ANT-2	5718A0348300	Metal PIFA Antenr	na 2412-2462	3.14
		ANT-3	5718A0349300	Metal PIFA Antenr	na 2412-2462	3.29
			G_{ANT}	3.1	1	
			Directional C	9.1	3	
		ANT-0	5718A0350300	Metal PIFA Antenr	5150-5250	4.87
Antenna Information		711110	37 10/1000000	Wetai i ii 717 iii eiii	5725-5850	5.07
		ANT-1	5718A0351300	Metal PIFA Antenr	5150-5250	4.61
		7.1.1.	07 107 1000 1000	Wotal Till Till Till	5725-5850	5.50
		ANT-2	5718A0352300	Metal PIFA Antenr	5150-5250	4.31
	5 GHz	7	07.107.1000=000		5725-5850	5.36
	3 3112	ANT-3	571910252200	Metal PIFA Antenr	5150-5250	4.15
		AINI-9	5718A0353300	Metal FIFA AIITEIII	5725-5850	5.84
			G_{ANT}	5150-5250	4.47	
			CANI	5725-5850	_	
			Directional C	5150-5250	10.49	
			2.700tional C	5725-5850	11.47	



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	IEEE 802.11b / IEEE 802.11g: 4TX (CDD)
Antonno Dolivoni	IEEE 802.11n 2.4GHz 20 MHz / 40 MHz: 4TX (STBC / Beamforming on)
Antenna Delivery	IEEE 802.11a: 4TX (CDD)
	IEEE 802.11ac 20 MHz / 40 MHz / 80 MHz: 4TX (STBC / Beamforming on)
RF Evaluation	0.395 mW/cm ²
Temperature Range	0 ~ +50°C

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR \S 2.1091 / 47 CFR \S 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



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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

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

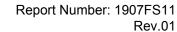
Where

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.

D- I	Date Rate	Frequency	Average Conducted power (dBm)				
Band	(Mbps)	(MHz)	ANT-0	ANT-1	ANT-2	ANT-3 17.91 17.57 18.03 16.44 16.28 16.05 16.17 16.07 14.54 14.34 16.96 13.84 15.71 15.76 15.64 19.81 19.74 19.61 19.74 19.61 17.75 17.61 17.54 18.77 18.64 18.77 18.64 18.71	ANT- 0+1+2+3
		2412.0	17.01	17.75	18.11	17.91	23.73
IEEE 802.11b	1M	2437.0	17.05	17.87	18.15	17.57	23.70
		2462.0	17.45	17.67	18.16	18.03	23.86
		2412.0	15.40	15.84	16.64	16.44	22.13
IEEE 802.11g	6M	2437.0	15.36	15.73	16.38	16.28	21.98
		2462.0	15.10	16.12	15.80	16.05	21.81
1555 000 44 0 4 044 00 144		2412.0	15.33	15.97	16.40	16.17	22.01
IEEE 802.11n 2.4 GHz 20 MHz (256QAM)	26M	2437.0	15.16	15.69	16.16	16.07	21.81
(200QAW)		2462.0	13.75	14.59	14.35	14.54	20.34
1555 000 44 0 4 OU 40 MU		2422.0	13.51	14.02	14.50	14.34	20.13
IEEE 802.11n 2.4 GHz 40 MHz (256QAM)	54M	2437.0	15.89	16.40	16.98	16.96	22.60
(200QAIVI)		2452.0	13.01	13.59	13.71	13.84	19.57
		5180.0	17.00	16.64	16.11	15.63	22.40
	6M	5200.0	17.16	16.71	16.26	15.71	22.51
		5220.0	17.28	16.75	16.18	15.76	22.55
		5240.0	17.29	16.59	16.14	15.64	22.48
IEEE 802.11a		5745.0	19.41	18.79	19.60	19.81	25.44
		5765.0	19.52	18.93	19.63	19.76	25.49
		5785.0	19.60	19.23	19.71	19.74	25.60
		5805.0	19.44	19.41	19.57	19.61	25.53
		5825.0	19.31	19.35	19.40	19.42	25.39
		5180.0	18.97	18.54	18.16	17.69	24.39
		5200.0	18.93	18.41	18.10	17.75	24.34
		5220.0	18.95	18.48	17.98	17.61	24.31
		5240.0	19.06	18.32	17.86	17.54	24.25
IEEE 802.11ac 20 MHz	26M	5745.0	18.22	17.66	18.57	18.77	24.35
		5765.0	18.27	17.80	18.51	18.64	24.34
		5785.0	18.35	18.01	18.48	18.71	24.42
		5805.0	18.18	18.27	18.38	18.55	24.37
		5825.0	18.09	18.39	18.22	18.23	24.25
		5190.0	18.67	18.19	17.75	17.36	24.04
IEEE 802.11ac 40 MHz	54M	5230.0	18.91	18.35	17.67	17.26	24.11
TEEE OUZ. I TAU 40 IVIEZ	IJ 4 IVI	5755.0	17.90	17.30	17.92	18.33	23.90
		5795.0	17.89 1°	17.16	17.97	18.26	23.86
IEEE 802 1120 90 MUz	117 OM	5210.0	14.98	14.49	13.83	13.52	20.26
IEEE 802.11ac 80 MHz	117.2M	5775.0	18.23	17.89	18.26	17.91 17.57 18.03 16.44 16.28 16.05 16.17 16.07 14.54 14.34 16.96 13.84 15.63 15.71 15.76 15.64 19.81 19.76 19.74 19.61 19.42 17.69 17.75 17.61 17.54 18.77 18.64 18.73 17.66 18.23 17.26 18.33 17.26 18.33 18.26	24.25

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



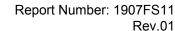
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Beamforming on

Dond	Date Rate	Frequency	Average Conducted power (dBm)				
Band	(Mbps)	(MHz)	ANT-0	ANT-1	ANT-2	ANT-3	ANT- 0+1+2+3
IEEE 000 44 0 4 0 1 00 MIL		2412.0	8.90	9.62	10.05	9.71	15.61
IEEE 802.11n 2.4 GHz 20 MHz (256QAM)	26M	2437.0	8.64	9.25	9.78	9.64	15.37
(200QAW)		2462.0	7.53	8.21	8.25	8.11	14.06
IEEE 000 44 0 4 0 1 40 MII		2422.0	7.04	7.59	8.09	7.95	13.71
IEEE 802.11n 2.4 GHz 40 MHz (256QAM)	54M	2437.0	9.42	10.04	10.62	10.38	16.16
(200QAW)		2452.0	6.58	7.26	7.45	ANT-3 9.71 9.64 8.11 7.95 10.38 7.49 11.04 11.17 10.96 10.88 12.26 12.14 12.13 12.08 11.72 10.79 10.61 11.84 11.70 6.94	13.23
		5180.0	12.46	11.94	11.52	11.04	17.79
	26M	5200.0	12.38	11.88	11.44	11.17	17.76
		5220.0	12.39	11.93	11.28	10.96	17.70
		5240.0	12.47	11.65	11.21	10.88	17.61
IEEE 802.11ac 20 MHz		5745.0	11.69	11.16	11.83	12.26	17.77
		5765.0	11.72	11.31	11.79	12.14	17.77
		5785.0	11.69	11.41	11.78	12.13	17.78
		5805.0	11.43	11.58	11.65	12.08	17.71
		5825.0	11.41	11.77	11.57	11.72	17.64
		5190.0	12.10	11.63	11.11	10.79	17.46
IEEE 802.11ac 40 MHz	54M	5230.0	12.31	11.81	11.02	10.61	17.51
ILLE 002.11ac 40 MITZ	34IVI	5755.0	11.48	10.79	11.24	11.84	17.37
		5795.0	11.28	10.59	11.41	11.70	17.28
IEEE 802.11ac 80 MHz	117.2M	5210.0	8.42	7.97	7.14	6.94	13.68
ILLE 002.11ac ou ivii iz	I I I .∠IVI	5775.0	11.75	11.34	11.62	11.97	17.70

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 Results

Antenna	Band	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (mW)	Power Density [S] (mw/cm²)
	2.4 GHz	2412-2462	1	20	24.36	3.11	2.05	1	559.09	0.111
Wi-Fi Antenna	5 GHz U-NII Band I	5180-5240	1	20	24.89	4.47	2.80	1	862.53	0.172
	5 GHz U-NII Band III	5745-5825	1	20	26.10	5.45	3.51	1	1428.35	0.284
	2.4 GHz	2412-2462	1	20	16.66	9.13	8.18	1	378.98	0.075
Wi-Fi Antenna (Beamforming on)	5 GHz U-NII Band I	5180-5240	1	20	18.29	10.49	11.19	1	755.18	0.150
(======================================	5 GHz U-NII Band III	5745-5825	1	20	18.28	11.47	14.03	1	944.35	0.188

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 to provide MPE results.
- 3. The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).
- 4. The MPE results are evaluated by lowest data rate for WLAN.
- 5. The device operating IEEE 802.11 a/b/g mode is 4TX MIMO / CDD.
- 6. The device operating IEEE 802.11 ac/n mode is 4TX MIMO / STBC.

Simultaneous Transmitting:

Total MPE = 2.4GHz MPE + 5GHz MPE = 0.111 + 0.284 = 0.395 (mw)/cm² < 1 (mw)/cm²

---END---