



MPE Report

Applicant : Emplus Technologies, Inc Product Type : Dual Radio Concurrent AP

Trade Name : emplus

Model Number : WAP655-C

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

47 CFR § 2.1091

47 CFR § 1.1310

Received Date : Apr. 02, 2019
Test Period : May 03, 2019
Issue Date : Aug. 06, 2019

Test Firm MRA : TW0010

designation number

Issue by

Approved By : Tested By : Kris Pan (Kris Pan)

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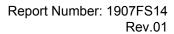




Taiwan Accreditation Foundation accreditation number: 1330

Note:

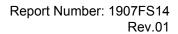
- 1. The test results are valid only for samples provided by customers and under the test conditions described in this report.
- 2. This report shall not be reproduced except in full, without the written approval of A Test Lab Technology Corporation.
- 3. The relevant information is provided by customers in this test report. According to the correctness, appropriateness





Revision History

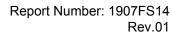
Rev.	Issue Date	Revisions	Revised By
00	Jul. 22, 2019	Initial Issue	Jennifer Liu
01	Aug. 06, 2019	Page 5 Revised Antenna Information. Page 9 Revised Test Results Frequency.	Jennifer Liu





Contents

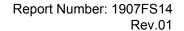
1.	Description of Equipment under Test (EUT)	5
2.	Human Exposure Assessment	6
3.	RF Output Power	7
4.	Test Results	9





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.	2005





2. Description of Equipment under Test (EUT)

	Emplus Te	chnologies, I	nc								
Applicant	Bld B, 10F, No.209 Nangang Rd., Taipei City, Taiwan										
Manufacturer		Emplus Technologies, Inc									
	Bld B, 10F,	Bld B, 10F, No.209 Nangang Rd., Taipei City, Taiwan									
Product Type	Dual Radio Concurrent AP										
Trade Name	emplus										
Model Number		WAP655-C									
FCC ID	2AL6XWAI	2AL6XWAP655 Frequency Range									
		Operate Band									
		1b / 802.11g			2412 - 2462						
			20 MHz (64QAM/25								
			40 MHz (64QAM/25	6QAM)	2422 - 2452						
		1a U-NII Bar			5180 - 5240						
Frequency Range		1a U-NII Bar		AULD II	5745 - 5825						
			302.11ac 20 MHz U-		5180 - 5240						
			302.11ac 20 MHz U- 302.11ac 40 MHz U-		5745 - 5825						
			5190 - 5230 5755 - 5795								
		IEEE 802.11n 5 GHz / 802.11ac 40 MHz U-NII Band III									
		IEEE 802.11ac 80 MHz U-NII Band I IEEE 802.11ac 80 MHz U-NII Band III									
	IEEE 002.	Tac oo wii iz	2 0-IVII Danu III		5775	Max.					
	Band	Antenna	Model	Туре	Frequency (MHz)	Gain (dBi)					
		ANT-0	5718A0382300	Metal PIFA Antenna	2412-2462	3.54					
	2.4 GHz	ANT-1	5718A0382300	Metal PIFA Antenna	2412-2462	3.55					
	2.4 GHZ				3.55						
			Direc		6.56						
Antenna Information		ANTO	F7404000000	Matal DIEA Automa	5150-5250	5.28					
		ANT-0	5718A0382300	Metal PIFA Antenna	5725-5850	4.85					
		ANT-1	5718A0382300	Metal PIFA Antenna	5150-5250	5.70					
	5 GHz	AIII-I	37 T0A0302300	Metal FIFA Afficilia	5725-5850	4.46					
	3 GHZ		C		5150-5250	5.50					
			G _{ANT}	5725-5850	4.66						
			Directional (20in	5150-5250	8.50					
			Directional C	5725-5850	7.67						
	IEEE 802.11b / IEEE 802.11g: 2TX (CDD)										
Antenna Delivery	IEEE 802.11n 2.4GHz 20 MHz / 40 MHz: 2TX (STBC/Beamforming on)										
		IEEE 802.11a: 2TX (CDD) IEEE 802.11ac 20 MHz / 40 MHz / 80 MHz: 2TX (STBC /Beamforming on)									
RF Evaluation		0.315 mW/cm ²									
Temperature Range	-20 ~ +65°										
remperature Kange	-20 ~ +05°	U									

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



Report Number: 1907FS14

Rev.01

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

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

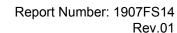
Where

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	Date Rate	Frequency	Average Conducted power (dBm)			
	(Mbps)	(MHz)	ANT-0	ANT-1	ANT-0+1	
		2412.0	21.40	21.17	24.30	
IEEE 802.11b	1M	2437.0	19.85	19.55	22.71	
		2462.0	21.12	20.88	24.01	
		2412.0	17.19	17.31	20.26	
IEEE 802.11g	6M	2437.0	21.71	21.75	24.74	
		2462.0	17.36	17.41	20.40	
		2412.0	16.31	16.41	19.37	
IEEE 802.11n 2.4 GHz 20 MHz (64QAM/256QAM)	13M	2437.0	20.89	20.92	23.92	
(04QAIVI/230QAIVI)		2462.0	16.44	16.52	19.49	
		2422.0	14.67	14.58	17.64	
IEEE 802.11n 2.4 GHz 40 MHz (64QAM/256QAM)	27M	2437.0	16.40	16.57	19.50	
(UHWANI/ZOUWANI)		2452.0	14.81	14.61	17.72	
		5180.0	12.32	12.06	15.20	
		5200.0	12.41	12.08	15.26	
		5220.0	12.44	12.11	15.29	
		5240.0	12.46	12.24	15.36	
IEEE 802.11a	6M	5745.0	20.74	21.08	23.92	
		5765.0	20.71	21.12	23.93	
		5785.0	20.74	21.09	23.93	
		5805.0	20.76	21.05	23.92	
		5825.0	20.73	21.11	23.93	
		5180.0	12.52	12.18	15.36	
		5200.0	12.42	12.07	15.26	
		5220.0	12.45	12.21	15.34	
		5240.0	12.42	12.31	15.38	
IEEE 802.11ac 20 MHz	13M	5745.0	20.71	21.15	23.95	
		5765.0	20.74	21.14	23.95	
		5785.0	20.73	21.19	23.98	
		5805.0	20.81	21.21	24.02	
		5825.0	20.76	21.12	23.95	
		5190.0	12.32	12.05	15.20	
IEEE 000 44 40 MIL	0714	5230.0	12.31	12.10	15.22	
IEEE 802.11ac 40 MHz	27M	5755.0	20.01	20.21	23.12	
		5795.0	19.96	20.23	23.11	
IEEE 000 44 00 MI	50.014	5210.0	12.02	11.92	14.98	
IEEE 802.11ac 80 MHz	58.6M	5775.0	19.75	20.02	22.90	

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



Report Number: 1907FS14

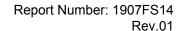
Rev.01

Beamforming on

Band	Date Rate	Frequency	Average Conducted power (dBm)			
	(Mbps)	(MHz)	ANT-0	ANT-1	ANT-0+1	
		2412.0	12.91	13.02	15.98	
IEEE 802.11n 2.4 GHz 20 MHz (64QAM/256QAM)	13M	2437.0	17.54	17.61	20.59	
(0 1 47 1111 200 47 1111)		2462.0	13.06	13.16	16.12	
		2422.0	11.33	11.19	14.27	
IEEE 802.11n 2.4 GHz 40 MHz (64QAM/256QAM)	27M	2437.0	13.02	13.24	16.14	
(0+QAIVI/230QAIVI)		2452.0	11.42	11.18	14.31	
		5180.0	8.99	8.70	11.86	
		5200.0	8.93	8.59	11.77	
	13M	5220.0	8.93	8.75	11.85	
		5240.0	8.95	8.85	11.91	
IEEE 802.11ac 20 MHz		5745.0	17.45	17.75	20.61	
		5765.0	17.44	17.73	20.60	
		5785.0	17.42	17.80	20.62	
		5805.0	17.48	17.81	20.66	
		5825.0	17.45	17.73	20.60	
		5190.0	8.78	8.58	11.69	
	0714	5230.0	8.82	8.62	11.73	
IEEE 802.11ac 40 MHz	27M	5755.0	16.66	16.82	19.75	
		5795.0	16.61	16.83	19.73	
JEEE 000 44 00 MIL	50.014	5210.0	8.48	8.39	11.45	
IEEE 802.11ac 80 MHz	58.6M	5775.0	16.38	16.62	19.51	

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	25.24	3.55	2.26	1	755.34	0.150
Wi-Fi Antenna	5 GHz	5180-5240	1	20	15.88	5.50	3.55	1	137.34	0.027
	3 GHZ	5745-5825	1	20	24.52	4.66	2.92	1	827.7	0.165
	2.4 GHz	2412-2462	1	20	21.09	6.56	4.53	1	581.62	0.116
Wi-Fi Antenna (Beamforming on)	E CIIz	5180-5240	1	20	12.41	8.50	7.08	1	123.34	0.025
,	5 GHz	5745-5825	1	20	21.16	7.67	5.85	1	763.83	0.152

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 2TX CDD.
- 6. The device operating IEEE 802.11 ac/n mode is 2TX MIMO / STBC.

Simultaneous Transmitting:

Total MPE = 2.4GHz MPE + 5GHz MPE = 0.150 + 0.165 = 0.315 (mw)/cm² < 1 (mw)/cm²

---END---