



A Test Lab Techno Corp.

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MPE Report

Test Report No.	: 1507FS16-02
Applicant	: Ubiquiti Networks, Inc.
Manufacturer	: Ubiquiti Networks, Inc.
Product Type	: Access Point
Trade Name	: UBIQUITI
Model Number	: UAP-AC-LR
Date of Received	: Apr. 20, 2015
Test Period	: May 12 ~ Jun. 20, 2015
Date of Issued	: Aug. 12, 2015
Test Specification	: 47 CFR § 2.1091 47 CFR §1.1310 ANSI / IEEE Std.C95.1-1992
Location of Test Lab.	: Chang-an Lab.

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
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1. Description of Equipment under Test (EUT)

Applicant	Ubiquiti Networks, Inc.		
Applicant Address	2580 Orchard Parkway, San Jose, California, United States, 95131		
Manufacturer	Ubiquiti Networks, Inc.		
Manufacturer Address	2580 Orchard Parkway, San Jose, California, United States, 95131		
Product Type	Access Point		
Trade Name	UBIQUITI		
Model Number	UAP-AC-LR		
FCC ID	SWX-UAPACLR		
Frequency Range	Mode	Frequency Range	
	IEEE 802.11b / IEEE 802.11g	2412 – 2462 MHz	
	IEEE 802.11n (2.4GHz) 20MHz	2412 – 2462 MHz	
	IEEE 802.11n (2.4GHz) 40MHz	2422 – 2452 MHz	
	IEEE 802.11a	5180 – 5240 MHz (Band I) 5745 – 5825 MHz (Band III)	
	IEEE 802.11n (5GHz) 20MHz	5180 – 5240 MHz (Band I) 5745 – 5825 MHz (Band III)	
	IEEE 802.11n (5GHz) 40MHz	5190 – 5230 MHz (Band I) 5755 – 5795 MHz (Band III)	
	IEEE 802.11ac 80MHz	5210 MHz (Band I) 5775 MHz (Band III)	
Transmit Power (conducted power)	IEEE 802.11b :	0.024 W	13.86 dBm
	IEEE 802.11g :	0.015 W	11.81 dBm
	IEEE 802.11n (2.4GHz) 20MHz :	0.015 W	11.61 dBm
	IEEE 802.11n (2.4GHz) 40MHz :	0.010 W	10.08 dBm
	IEEE 802.11a (Band I) :	0.087 W	19.41 dBm
	IEEE 802.11a (Band III) :	0.121 W	20.83 dBm
	IEEE 802.11n (5GHz) 20MHz (Band I) :	0.109 W	20.37 dBm
	IEEE 802.11n (5GHz) 20MHz (Band III) :	0.132 W	21.22 dBm
	IEEE 802.11n (5GHz) 40MHz (Band I) :	0.083 W	19.20 dBm
	IEEE 802.11n (5GHz) 40MHz (Band III) :	0.108 W	20.34 dBm
	IEEE 802.11ac 80MHz (Band I) :	0.074 W	18.70 dBm
	IEEE 802.11ac 80MHz (Band III) :	0.086 W	19.36 dBm
Antenna Specification	2.4GHz: 3 dBi		
	5GHz: 3 dBi		
Antenna Designation	Dual band tri pol antenna		
RF Evaluation	1.93 W/m ²		
Temperature Range	-10 ~ +70°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



2. 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.



3. RF Output Power

Band	Data Rate	CH	Frequency (MHz)	Average Power (dBm)			
				ANT-0	ANT-1	ANT-2	ANT-0+1+2
IEEE 802.11b	1M	1	2412.0	8.84	9.51	8.87	13.86
		6	2437.0	8.61	9.21	8.77	13.64
		11	2462.0	8.71	9.15	8.84	13.68
	2M	6	2437.0	8.59	9.16	8.75	13.61
	5.5M	6	2437.0	8.56	9.11	8.72	13.57
	11M	6	2437.0	8.55	9.08	8.71	13.56
IEEE 802.11g	6M	1	2412.0	6.92	7.29	6.88	11.81
		6	2437.0	6.84	7.24	6.66	11.69
		11	2462.0	6.88	7.17	6.76	11.71
	9M	6	2437.0	6.82	7.22	6.64	11.67
	12M	6	2437.0	6.81	7.19	6.63	11.65
	18M	6	2437.0	6.79	7.18	6.61	11.64
	24M	6	2437.0	6.77	7.15	6.59	11.61
	36M	6	2437.0	6.76	7.12	6.56	11.59
	48M	6	2437.0	6.74	7.10	6.55	11.57
IEEE 802.11n (2.4 GHz) 20MHz	19.5M	1	2412.0	6.43	7.13	6.38	11.43
		6	2437.0	6.49	6.97	6.57	11.45
		11	2462.0	6.54	7.23	6.73	11.61
	39M	6	2437.0	6.47	6.96	6.54	11.43
	58.5M	6	2437.0	6.46	6.94	6.52	11.42
	78M	6	2437.0	6.44	6.93	6.49	11.40
	117M	6	2437.0	6.41	6.91	6.48	11.38
	156M	6	2437.0	6.39	6.87	6.46	11.35
	175.5M	6	2437.0	6.37	6.85	6.43	11.33
	195M	6	2437.0	6.32	6.84	6.42	11.30
IEEE 802.11n (2.4 GHz) 40MHz	40.5M	3	2422.0	4.91	5.73	5.01	10.00
		6	2437.0	5.16	5.66	5.08	10.08
		9	2452.0	4.83	5.69	5.11	10.00
	81M	6	2437.0	4.91	5.41	4.86	9.84
	121.5M	6	2437.0	4.78	5.17	4.53	9.61
	162M	6	2437.0	4.58	4.94	4.31	9.39
	243M	6	2437.0	4.25	4.62	3.99	9.07
	324M	6	2437.0	3.80	4.15	3.79	8.69
	364.5M	6	2437.0	3.77	3.99	3.77	8.62
	405M	6	2437.0	3.75	3.73	3.76	8.52

Band	Data Rate	CH	Frequency (MHz)	Average Conducted power (dBm)		
				ANT-0	ANT-1	ANT-0+1
IEEE 802.11a	6 M	36	5180.0	15.83	16.66	19.28
		40	5200.0	15.88	16.87	19.41
		44	5220.0	15.81	16.77	19.33
		48	5240.0	15.72	16.84	19.33
		149	5745.0	17.19	18.37	20.83
		153	5765.0	16.86	17.76	20.34
		157	5785.0	16.64	17.48	20.09
		161	5805.0	16.48	17.74	20.17
		165	5825.0	16.37	17.32	19.88
	54 M	36	5180.0	15.55	16.64	19.14
		40	5200.0	15.62	16.40	19.04
		44	5220.0	15.53	16.35	18.97
		48	5240.0	15.45	16.48	19.01
		149	5745.0	16.90	17.87	20.42
		153	5765.0	16.58	17.61	20.14
		157	5785.0	16.37	17.37	19.91
		161	5805.0	16.21	17.46	19.89
		165	5825.0	16.08	17.03	19.59
IEEE 802.11a (5GHz) 20MHz	26 M	36	5180.0	16.79	17.86	20.37
		40	5200.0	16.89	17.74	20.35
		44	5220.0	16.74	17.89	20.36
		48	5240.0	16.63	17.53	20.11
		149	5745.0	17.76	18.62	21.22
		153	5765.0	17.65	18.57	21.14
		157	5785.0	17.39	18.62	21.06
		161	5805.0	17.41	18.32	20.90
		165	5825.0	17.43	18.68	21.11
	260 M	36	5180.0	16.68	17.73	20.25
		40	5200.0	16.76	17.43	20.12
		44	5220.0	16.62	17.76	20.24
		48	5240.0	16.51	17.19	19.87
		149	5745.0	17.65	18.16	20.92
		153	5765.0	17.54	18.47	21.04
		157	5785.0	17.28	18.26	20.81
		161	5805.0	17.29	18.11	20.73
		165	5825.0	17.31	18.22	20.80

Band	Data Rate	CH	Frequency (MHz)	Average Conducted power (dBm)		
				ANT-0	ANT-1	ANT-0+1
IEEE 802.11a (5GHz) 40MHz	54 M	38	5190.0	15.54	16.76	19.20
		46	5230.0	15.64	16.56	19.13
		151	5755.0	16.72	17.86	20.34
		159	5795.0	16.22	17.25	19.78
	540 M	38	5190.0	15.06	16.27	18.72
		46	5230.0	15.52	16.29	18.93
		151	5755.0	15.62	17.75	19.82
		159	5795.0	16.09	17.17	19.67
IEEE 802.11ac 80MHz	58.6 M	42	5210.0	15.09	16.21	18.70
		155	5775.0	15.91	16.74	19.36
	780 M	42	5210.0	14.75	16.05	18.46
		155	5775.0	15.61	16.33	19.00



4. Test Result

Band	Data Rate	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G] (dBi)	Duty Cycle	[P] x [G] with Duty cycle [TP] (mW)	Power Density [S] (mw)/cm^2
IEEE 802.11b	1M	2412.0	1	20	15.0	3	2	1	63.25	0.013
		2437.0	1	20	15.0	3	2	1	63.25	0.013
		2462.0	1	20	15.0	3	2	1	63.25	0.013
IEEE 802.11g	6M	2412.0	1	20	13.0	3	2	1	39.91	0.008
		2437.0	1	20	13.0	3	2	1	39.91	0.008
		2462.0	1	20	13.0	3	2	1	39.91	0.008
IEEE 802.11n (2.4GHz) 20MHz	19.5M	2412.0	1	20	13.0	3	2	1	39.91	0.008
		2437.0	1	20	13.0	3	2	1	39.91	0.008
		2462.0	1	20	13.0	3	2	1	39.91	0.008
IEEE 802.11n (2.4GHz) 40MHz	4.05M	2422.0	1	20	11.0	3	2	1	25.18	0.005
		2437.0	1	20	11.0	3	2	1	25.18	0.005
		2452.0	1	20	11.0	3	2	1	25.18	0.005
IEEE 802.11a	6M	5180.0	1	20	21.0	3	2	1	251.79	0.050
		5200.0	1	20	21.0	3	2	1	251.79	0.050
		5220.0	1	20	21.0	3	2	1	251.79	0.050
		5240.0	1	20	21.0	3	2	1	251.79	0.050
		5745.0	1	20	21.0	3	2	1	251.79	0.050
		5765.0	1	20	21.0	3	2	1	251.79	0.050
		5785.0	1	20	21.0	3	2	1	251.79	0.050
		5805.0	1	20	21.0	3	2	1	251.79	0.050
IEEE 802.11n (5GHz) 20MHz	26M	5180.0	1	20	22.0	3	2	1	316.98	0.063
		5200.0	1	20	22.0	3	2	1	316.98	0.063
		5220.0	1	20	22.0	3	2	1	316.98	0.063
		5240.0	1	20	22.0	3	2	1	316.98	0.063
		5745.0	1	20	22.0	3	2	1	316.98	0.063
		5765.0	1	20	22.0	3	2	1	316.98	0.063
		5785.0	1	20	22.0	3	2	1	316.98	0.063
		5805.0	1	20	22.0	3	2	1	316.98	0.063
IEEE 802.11n (5GHz) 40MHz	54M	5190.0	1	20	21.0	3	2	1	251.79	0.050
		5230.0	1	20	21.0	3	2	1	251.79	0.050
		5755.0	1	20	21.0	3	2	1	251.79	0.050
		5795.0	1	20	21.0	3	2	1	251.79	0.050

Note: The Numeric Gain calculated by $10^{(\text{ant. Gain(dBi)} / 10)}$.



Band	Data Rate	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G] (dBi)	Duty Cycle	[P] x [G] with Duty cycle [TP] (mW)	Power Density [S] (mw)/cm^2
IEEE 802.11ac 80MHz	58.6M	5210.0	1	20	20.0	3	2	1	200.00	0.040
		5775.0	1	20	20.0	3	2	1	200.00	0.040

Note: The Numeric Gain calculated by $10^{(\text{ant. Gain(dBi)} / 10)}$.

Simultaneous Transmitting:

Simultaneous MPE = 2.4GHz MPE+5GHz MPE = 0.13+0.063 = 0.193 mw/cm²