



A Test Lab Techno Corp.

Changan Lab : No. 140-1, Changan Street, Bade District, Taoyuan City 33465, Taiwan (R.O.C)
Tel : 886-3-271-0188 / Fax : 886-3-271-0190



MPE Report

Test Report No.	: 1704FS11-01
Applicant	: Kpnetworks Ltd.
Product Type	: Wireless Lan Access Point
Trade Name	: Kpnetworks
Model Number	: KPWL-0300
Date of Received	: Dec. 01, 2016
Test Period	: Dec. 01 ~ Dec. 12, 2016
Date of Issued	: Apr. 24, 2017
Test Specification	: ANSI / IEEE Std.C95.1-1992 / IEEE Std. 1528-2013 47 CFR § 2.1091 47 CFR § 1.1310
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.
3. The measurement report has to be written approval of A Test Lab Techno Corp. It may only be reproduced or published in full. This report shall not be reproduced except in full, without the written approval of A Test Lab Techno Corp.
4. This document may be altered or revised by A Test Lab Techno. Corp. personnel only, and shall be noted in the revision section of the document.

Approved By

: Bill Hu
(Bill Hu)

Tested By

: Mark Duan
(Mark Duan)



Contents

1.	Description of Equipment under Test (EUT).....	3
2.	Human Exposure Assessment.....	4
3.	RF Output Power	5
4.	Test Results	11



1. Description of Equipment under Test (EUT)

Applicant	Kpnetworks Ltd. 4-5-11-10F Shiba, Minato-ku, Tokyo, 108-0014, Japan			
Manufacturer	Edimax Technology Co., Ltd. No. 3, Wu-Chun 3rd Road., Wuku District, New Taipei City 24891, Taiwan, R.O.C.			
Product Type	Wireless Lan Access Point			
Trade Name	Kpnetworks			
Model Number	KPWL-0300			
FCC ID	2AGR9KPWL0300			
Class II Permissive Change	Add U-NII Band II function by software control.			
Module Used	QUALCOMM_QCA9984 (EW-7955MAC), Master mode only QUALCOMM_QCA9990 (EW-7944MAC), Master mode + Client mode (P to P)			
Frequency Range	Operate Band		Frequency Range (MHz)	
	IEEE 802.11a U-NII Band II-A		5260 – 5320	
	IEEE 802.11a U-NII Band II-C		5500 – 5700	
	IEEE 802.11ac / 802.11n 5GHz 20MHz U-NII Band II-A		5260 – 5320	
	IEEE 802.11ac / 802.11n 5GHz 20MHz U-NII Band II-C		5500 – 5700	
	IEEE 802.11ac / 802.11n 5GHz 40MHz U-NII Band II-A		5270 – 5310	
	IEEE 802.11ac / 802.11n 5GHz 40MHz U-NII Band II-C		5510 – 5670	
	IEEE 802.11ac 80MHz U-NII Band II-A		5290	
	IEEE 802.11ac 80MHz U-NII Band II-C		5530	
Antenna information	Model	Type	Max. Gain (dBi)	Note
	C059-510348-A	External antenna (Reversed-SMA Connector)	2.4GHz: 4.5 5GHz: 6.0	For AP port_4TX
	C059-510347-A	External antenna (Reversed-SMA Connector)	5GHz: 6.0	For P-t-P Port_4TX
	M6060060P1D43602M	External antenna (Reversed-SMA Connector)	2.4GHz: 6.0 5GHz: 6.0	Quad Patct Antenna
	M6060060P23602NB	External antenna (Reversed-SMA Connector)	2.4GHz: 6.0 5GHz: 6.0	MIMO Patct Antenna
	SAA04-22008A	External antenna (Reversed-SMA Connector)	2.4GHz: 4.5 5GHz: 7.0	Omni Directional Antenna
Antenna Delivery	All of operate bands are 4TX/4RX.			
Temperature Range	-20 ~ +50°C			
RF Evaluation	0.757 mW/cm ²			

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
$S = \frac{PG}{4\pi R^2}$ <p>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.</p>



3. RF Output Power

The conducted power turn-up tolerance reference manufacturer specification.

NII Module: QCA9984 (EW-7955MN)							
Band	Data Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)				
			ANT-0	ANT-1	ANT-2	ANT-3	ANT-0+1+2+3
IEEE 802.11a	6	5260.0	9.43	10.81	10.88	9.79	16.29
		5280.0	9.22	11.07	10.83	9.93	16.34
		5300.0	9.30	10.97	10.88	9.85	16.33
		5320.0	8.69	10.13	9.88	8.98	15.48
		5500.0	4.68	7.47	6.21	6.25	12.28
		5520.0	3.81	6.36	5.45	5.28	11.34
		5540.0	3.86	6.58	5.49	5.23	11.42
		5560.0	3.93	6.66	5.42	5.48	11.50
		5580.0	4.09	6.72	5.47	5.41	11.54
		5660.0	4.57	7.05	6.13	5.51	11.93
		5680.0	4.75	7.14	6.30	5.62	12.06
		5700.0	4.43	6.25	5.84	4.85	11.42
	54	5260.0	9.38	10.75	10.84	9.74	16.24
		5280.0	9.20	11.06	10.81	9.90	16.33
		5300.0	9.24	10.96	10.84	9.82	16.29
		5320.0	8.66	10.09	9.84	8.95	15.45
		5500.0	4.63	7.42	6.18	6.21	12.24
		5520.0	3.83	6.33	5.42	5.24	11.31
		5540.0	3.83	6.54	5.47	5.20	11.39
		5560.0	3.90	6.62	5.36	5.44	11.46
		5580.0	4.06	6.66	5.44	5.35	11.49
		5660.0	4.52	7.03	6.10	5.45	11.89
		5680.0	4.72	7.08	6.25	5.56	12.01
		5700.0	4.41	6.20	5.79	4.82	11.39

NII Module: QCA9984 (EW-7955MN)							
Band	Data Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)				
			ANT-0	ANT-1	ANT-2	ANT-3	ANT-0+1+2+3
IEEE 802.11ac 20MHz	26	5260.0	9.13	10.45	10.47	9.41	15.93
		5280.0	8.75	10.44	10.39	9.50	15.85
		5300.0	8.67	10.42	10.29	9.65	15.83
		5320.0	8.69	10.34	9.86	9.42	15.64
		5500.0	4.16	7.13	6.13	6.23	12.06
		5520.0	3.98	7.15	5.54	5.79	11.78
		5540.0	4.02	7.32	5.69	5.92	11.91
		5560.0	4.17	7.24	5.49	5.94	11.87
		5580.0	4.32	7.21	5.68	5.84	11.90
		5660.0	5.12	7.53	6.39	6.04	12.38
		5680.0	5.32	7.30	6.58	6.23	12.44
		5700.0	4.24	6.55	6.33	5.34	11.73
	312	5260.0	9.10	10.42	10.42	9.37	15.89
		5280.0	8.73	10.39	10.33	9.45	15.80
		5300.0	8.66	10.41	10.24	9.60	15.80
		5320.0	8.68	10.29	9.81	9.38	15.60
		5500.0	4.14	7.12	6.08	6.22	12.04
		5520.0	3.94	7.11	5.53	5.77	11.75
		5540.0	4.01	7.31	5.65	5.89	11.89
		5560.0	4.12	7.21	5.47	5.91	11.84
		5580.0	4.28	7.20	5.65	5.78	11.87
		5660.0	5.09	7.50	6.37	5.98	12.34
		5680.0	5.31	7.26	6.55	6.19	12.40
		5700.0	4.22	6.54	6.27	5.28	11.69



NII Module: QCA9984 (EW-7955MN)							
Band	Data Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)				
			ANT-0	ANT-1	ANT-2	ANT-3	ANT-0+1+2+3
IEEE 802.11ac 40MHz	54	5270	9.65	11.22	10.99	10.26	16.59
		5310	9.57	11.19	10.98	10.32	16.58
		5510	5.36	8.24	7.32	7.14	13.15
		5550	5.12	7.72	6.60	7.02	12.74
		5670	6.14	8.31	7.32	7.08	13.30
	720	5270	9.60	11.17	10.96	10.24	16.56
		5310	9.55	11.16	10.94	10.30	16.55
		5510	5.33	8.21	7.30	7.12	13.13
		5550	5.09	7.67	6.56	6.98	12.69
		5670	6.09	8.26	7.27	7.06	13.26
IEEE 802.11ac 80MHz	117.2	5290.0	9.24	10.71	10.90	9.95	16.27
		5530.0	6.64	9.01	8.32	8.06	14.11
	1560	5290.0	9.22	10.68	10.87	9.89	16.23
		5530.0	6.63	8.97	8.28	8.03	14.08

NII Module: QCA9990 (EW-7944MAC), Master mode							
Band	Data Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)				
			ANT-0	ANT-1	ANT-2	ANT-3	ANT-0+1+2+3
IEEE 802.11a	6	5260.0	9.21	10.69	10.12	9.84	16.02
		5280.0	9.19	10.90	10.07	9.79	16.05
		5300.0	9.30	10.85	10.04	9.89	16.08
		5320.0	9.74	10.87	9.95	9.92	16.16
		5500.0	8.81	10.05	9.61	9.75	15.60
		5520.0	8.41	9.32	9.06	9.12	15.01
		5540.0	8.31	9.29	9.20	9.07	15.00
		5560.0	8.30	9.45	9.24	9.15	15.08
		5580.0	8.23	9.48	9.28	9.09	15.07
		5660.0	7.97	9.53	9.40	8.89	15.01
		5680.0	7.99	9.65	9.53	8.87	15.08
		5700.0	8.20	9.72	9.54	9.05	15.19
	54	5260.0	9.08	10.63	10.00	9.79	15.93
		5280.0	9.05	10.81	10.04	9.64	15.95
		5300.0	9.25	10.72	9.89	9.70	15.94
		5320.0	9.69	10.77	9.91	9.73	16.07
		5500.0	8.75	10.03	9.49	9.62	15.52
		5520.0	8.31	9.26	8.91	8.97	14.90
		5540.0	8.21	9.21	9.11	8.88	14.89
		5560.0	8.16	9.35	9.22	9.10	15.00
		5580.0	8.18	9.36	9.16	8.91	14.95
		5660.0	7.79	9.47	9.30	8.76	14.90
		5680.0	7.91	9.61	9.50	8.71	15.01
		5700.0	8.18	9.71	9.47	8.93	15.13

NII Module: QCA9990 (EW-7944MAC), Master mode							
Band	Data Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)				
			ANT-0	ANT-1	ANT-2	ANT-3	ANT-0+1+2+3
IEEE 802.11ac 20MHz	26	5260.0	8.93	10.71	10.12	9.76	15.95
		5280.0	9.07	10.80	10.13	9.73	16.00
		5300.0	9.23	10.83	10.14	9.81	16.06
		5320.0	9.61	10.87	10.01	9.80	16.12
		5500.0	9.03	10.55	10.02	10.16	16.00
		5520.0	8.27	9.64	9.50	9.54	15.29
		5540.0	8.22	9.88	9.49	9.47	15.33
		5560.0	8.25	9.66	9.54	9.55	15.31
		5580.0	8.32	9.61	9.52	9.51	15.29
		5660.0	8.15	9.68	9.66	9.31	15.26
		5680.0	8.25	9.78	9.78	9.30	15.34
		5700.0	7.92	9.21	9.27	8.92	14.88
	312	5260.0	8.79	10.68	10.01	9.51	15.82
		5280.0	8.95	10.76	10.05	9.68	15.93
		5300.0	9.15	10.75	9.97	9.71	15.95
		5320.0	9.39	10.79	9.88	9.57	15.96
		5500.0	8.87	10.43	9.81	9.88	15.80
		5520.0	8.18	9.57	9.35	9.38	15.17
		5540.0	8.18	9.75	9.37	9.25	15.20
		5560.0	8.14	9.52	9.34	9.32	15.13
		5580.0	8.24	9.48	9.44	9.27	15.16
		5660.0	8.03	9.57	9.51	9.14	15.13
		5680.0	8.17	9.69	9.52	9.04	15.16
		5700.0	7.78	9.14	9.07	8.79	14.75

NII Module: QCA9990 (EW-7944MAC), Master mode							
Band	Data Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)				
			ANT-0	ANT-1	ANT-2	ANT-3	ANT-0+1+2+3
IEEE 802.11ac 40MHz	54	5270	10.60	12.20	11.79	11.77	17.65
		5310	10.74	12.40	11.88	11.69	17.74
		5510	10.40	11.78	11.47	11.53	17.35
		5550	9.91	11.31	10.97	11.09	16.87
		5670	8.65	10.17	10.32	9.76	15.79
	720	5270	10.41	12.02	11.75	11.75	17.55
		5310	10.55	12.24	11.71	11.59	17.59
		5510	10.34	11.65	11.37	11.37	17.23
		5550	9.89	11.23	10.88	10.98	16.79
		5670	8.46	10.03	10.22	9.57	15.64
IEEE 802.11ac 80MHz	117.2	5290.0	10.27	11.94	11.25	11.18	17.22
		5530.0	10.79	12.14	11.95	11.73	17.70
	1560	5290.0	10.24	11.81	11.23	11.11	17.15
		5530.0	10.60	12.01	11.81	11.65	17.57



4. Test Results

NII Module: QCA9984 (EW-7955MN)										
Band	Data Rate (Mbps)	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	[P] x [G] with Duty cycle [TP] (mW)	Power Density [S] (mw/cm ²)
IEEE 802.11a CDD	6	5260	1	29	16.4	7	5.01	1	218.69	0.021
		5280	1	29	16.4	7	5.01	1	218.69	0.021
		5300	1	29	16.4	7	5.01	1	218.69	0.021
		5320	1	29	16.4	7	5.01	1	218.69	0.021
		5500	1	29	12.3	7	5.01	1	85.08	0.008
		5520	1	29	12.3	7	5.01	1	85.08	0.008
		5540	1	29	12.3	7	5.01	1	85.08	0.008
		5560	1	29	12.3	7	5.01	1	85.08	0.008
		5580	1	29	12.3	7	5.01	1	85.08	0.008
		5660	1	29	12.3	7	5.01	1	85.08	0.008
		5680	1	29	12.3	7	5.01	1	85.08	0.008
		5700	1	29	12.3	7	5.01	1	85.08	0.008
IEEE 802.11ac 20MHz MIMO	26	5260	1	29	16.1	7	5.01	1	204.1	0.019
		5280	1	29	16.1	7	5.01	1	204.1	0.019
		5300	1	29	16.1	7	5.01	1	204.1	0.019
		5320	1	29	16.1	7	5.01	1	204.1	0.019
		5500	1	29	12.5	7	5.01	1	89.09	0.008
		5520	1	29	12.5	7	5.01	1	89.09	0.008
		5540	1	29	12.5	7	5.01	1	89.09	0.008
		5560	1	29	12.5	7	5.01	1	89.09	0.008
		5580	1	29	12.5	7	5.01	1	89.09	0.008
		5660	1	29	12.5	7	5.01	1	89.09	0.008
		5680	1	29	12.5	7	5.01	1	89.09	0.008
		5700	1	29	12.5	7	5.01	1	89.09	0.008
IEEE 802.11ac 40MHz MIMO	54	5270	1	29	16.7	13.02	20.04	1	937.34	0.089
		5310	1	29	16.7	13.02	20.04	1	937.34	0.089
		5510	1	29	13.4	13.02	20.04	1	438.43	0.041
		5550	1	29	13.4	13.02	20.04	1	438.43	0.041
		5670	1	29	13.4	13.02	20.04	1	438.43	0.041
IEEE 802.11ac 80MHz MIMO	117.2	5290	1	29	16.3	13.02	20.04	1	854.87	0.081
		5530	1	29	14.2	13.02	20.04	1	527.11	0.050

NII Module: QCA9990 (EW-7944MAC), Master mode										
Band	Data Rate (Mbps)	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	[P] x [G] with Duty cycle [TP] (mW)	Power Density [S] (mw/cm ²)
IEEE 802.11a CDD	6	5260	1	29	16.2	7	5.01	1	208.85	0.020
		5280	1	29	16.2	7	5.01	1	208.85	0.020
		5300	1	29	16.2	7	5.01	1	208.85	0.020
		5320	1	29	16.2	7	5.01	1	208.85	0.020
		5500	1	29	15.7	7	5.01	1	186.14	0.018
		5520	1	29	15.7	7	5.01	1	186.14	0.018
		5540	1	29	15.7	7	5.01	1	186.14	0.018
		5560	1	29	15.7	7	5.01	1	186.14	0.018
		5580	1	29	15.7	7	5.01	1	186.14	0.018
		5660	1	29	15.7	7	5.01	1	186.14	0.018
		5680	1	29	15.7	7	5.01	1	186.14	0.018
		5700	1	29	15.7	7	5.01	1	186.14	0.018
IEEE 802.11ac 20MHz MIMO	26	5260	1	29	16.2	7	5.01	1	208.85	0.020
		5280	1	29	16.2	7	5.01	1	208.85	0.020
		5300	1	29	16.2	7	5.01	1	208.85	0.020
		5320	1	29	16.2	7	5.01	1	208.85	0.020
		5500	1	29	16.1	7	5.01	1	204.1	0.019
		5520	1	29	16.1	7	5.01	1	204.1	0.019
		5540	1	29	16.1	7	5.01	1	204.1	0.019
		5560	1	29	16.1	7	5.01	1	204.1	0.019
		5580	1	29	16.1	7	5.01	1	204.1	0.019
		5660	1	29	16.1	7	5.01	1	204.1	0.019
		5680	1	29	16.1	7	5.01	1	204.1	0.019
		5700	1	29	16.1	7	5.01	1	204.1	0.019
IEEE 802.11ac 40MHz MIMO	54	5270	1	29	17.8	13.02	20.04	1	1207.53	0.114
		5310	1	29	17.8	13.02	20.04	1	1207.53	0.114
		5510	1	29	17.4	13.02	20.04	1	1101.28	0.104
		5550	1	29	17.4	13.02	20.04	1	1101.28	0.104
		5670	1	29	17.4	13.02	20.04	1	1101.28	0.104
IEEE 802.11ac 80MHz MIMO	117.2	5290	1	29	17.3	13.02	20.04	1	1076.21	0.102
		5530	1	29	17.8	13.02	20.04	1	1207.53	0.114



- Note:
1. Mobile or fixed location transmitters, minimum separation distance is 29cm, even if calculations indicate MPE distance is less.
 2. The Numeric Gain calculated by $10^{(\text{ant. Gain(dBi)} / 10)}$.
 3. Each band max power which perform MPE of any configurations.
 4. The MPE results are evaluated by lowest data rate for WLAN.
 5. The device operating IEEE 802.11 a mode is 4TX CDD.
 6. The device operating IEEE 802.11 ac mode is 4TX MIMO.

Simultaneous Transmitting:

Simultaneous MPE:

$$\begin{aligned} &2.4\text{GHz MPE} + 5\text{GHz (QCA9984 (EW-7955MAC)) MPE} + 5\text{GHz (QCA9990 (EW-7944MAC)) MPE} \\ &= 0.088 + 0.308 + 0.361 = 0.757 \text{ mw/cm}^2 \end{aligned}$$

Note: The summary result is same as the original data, please refer test report number:1701FS11-01