



Test report No. : 4788854906-US-R2-V0
Page : 1 of 10
Issued date : Mar. 9, 2020
FCC ID : VGY2915

Maximum Permissible Exposure Report

Product : Gigabit Broadband Router

Model Name : Vigor 2915ac, Vigor 2915Fac

FCC ID : VGY2915

Test Regulation : 47 CFR FCC Part 2.1091

Received Date : Feb. 25, 2019

Issued Date : Mar. 09, 2020

Applicant : DrayTek Corp.
No.26 Fu Shing Rd., HuKou County, Hsin-Chu Industrial Park,
Hsin-Chu, Taiwan 303 R.O.C

Issued By : Underwriters Laboratories Taiwan Co., Ltd.
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd.,
Zhudong Township, Hsinchu County, Taiwan



The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report are responsible of the test sample(s) provided by the client only and are not to be used to indicate applicability to other similar products.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Telephone : +886-2-7737-3000
Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0864 / 2.0



Test report No. : 4788854906-US-R2-V0
Page : 2 of 10
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REVISION HISTORY

Original Test Report No.: 4788854906-US-R2-V0

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Table Of Contents

1. Attestation of Test Results.....	4
2. Test Methodology	5
3. Facilities and Accreditation	5
4. Equipment Under Test	6
4.1. Description of EUT.....	6
4.2. Description Of Available Antennas	8
5. Requirement	9
6. Radio Frequency Radiation Exposure Evaluation	10

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Test report No. : 4788854906-US-R2-V0
Page : 4 of 10
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1. Attestation of Test Results

APPLICANT: DrayTek Corp.
No.26 Fu Shing Rd., HuKou County, Hsin-Chu Industrial Park,
Hsin-Chu, Taiwan 303 R.O.C

MANUFACTURER DrayTek Corp.
No.26 Fu Shing Rd., HuKou County, Hsin-Chu Industrial Park,
Hsin-Chu, Taiwan 303 R.O.C

EUT DESCRIPTION: Gigabit Broadband Router

BRAND: DrayTek

MODEL: Vigor2915ac, Vigor2915Fac

SAMPLE STAGE: Production Unit

APPLICABLE STANDARDS	
STANDARD	Test Results
47 CFR FCC PART 2.1091	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Cindy Hsin
Project Handler

Date : Mar. 9, 2020

Approved and Authorized By:

Stanley Wu
Senior Project Engineer

Date : Mar. 9, 2020

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2. Test Methodology

The tests documented in this report were performed in accordance with KDB 447498 D01 General RF Exposure Guidance v06.

3. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398. The full scope of accreditation can be viewed at http://accreditation.taftw.org.tw/taf/public/basic/viewApplyItems.action?unitNo=3398

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4. Equipment Under Test

4.1. Description of EUT

Product Name	Gigabit Broadband Router
Brand Name	DrayTek
Model Name	Vigor2915ac, Vigor2915Fac
Operating Frequency	2.4GHz: 2412MHz ~ 2462MHz 5GHz: 5180MHz ~ 5240MHz 5745MHz ~ 5825MHz
Modulation	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM, 64QAM, 16QAM, QPSK, BPSK
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 5.18 ~ 5.24GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5.745 ~ 5.825GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Normal Voltage	12Vdc from Adapter
Hardware Version	V2915 V0A
Software Version	r79916_beta

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Note:

1. The models difference table as below:

Main Model	Function	
	WAN1	
	RJ45	Fiber
Vigor2915ac	V	-
Vigor2915Fac	-	V

- The above models are market segmented by customer statements. The difference between models is the combination of hardware design and appearance, and there are no changes in RF-related parts.

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	APD	WA-24Q12FG	Input: 100-40Vac, 0.7A, Output: 12Vdc, 2A 1.7meter, non-shielded cable, without ferrite core
RJ-45 Cable	N/A	N/A	Length:3m

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual.

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4.2. Description Of Available Antennas

For 2.4GHz				
Antenna	Brand Name	Model Name	Antenna Type	Antenna Gain(dBi)
Chain(0)	MAG. LAYERS	EDA-1313-25GR2-A9	Dipole	1.95
Chain(1)	MAG. LAYERS	EDA-1313-25GR2-A9	Dipole	1.95
For 5GHz				
Antenna	Brand Name	Model Name	Antenna Type	Antenna Gain(dBi)
Chain(0)	MAG. LAYERS	EDA-1313-25GR2-A9	Dipole	4.12
Chain(1)	MAG. LAYERS	EDA-1313-25GR2-A9	Dipole	4.12

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

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5. Requirement

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30
Note 1: f = frequency in MHz, * means Plane-wave equivalent power density				
Note 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.				

Power Density (S) is calculated by the following formula:

$$S=(P*G)/4\pi R^2$$

where: S = power density (in appropriate units, e.g. mW/ cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

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 (appropriate units, e.g., cm)

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6. Radio Frequency Radiation Exposure Evaluation

CDD Mode

WLAN 2.4GHz

WLAN 2.4GHz						
Evaluation Frequency	Max. Average Power	Directional Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm ²)	(mW/cm ²)
2412 ~ 2462	23.96	4.96	28.92	779.830	0.155	1

WLAN 5GHz

WLAN 5GHz						
Evaluation Frequency	Max. Average Power	Directional Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm ²)	(mW/cm ²)
5180 ~ 5240	27.45	7.13	34.58	2870.781	0.571	1
5745 ~ 5825	25.63	7.13	32.76	1887.991	0.376	1

Beamforming Mode

WLAN 5GHz

WLAN 5GHz						
Evaluation Frequency	Max. Average Power	Directional Gain	Max. EIRP	Max. EIRP	Power density @ 20 cm	Limit
(MHz)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm ²)	(mW/cm ²)
5180 ~ 5240	27.53	7.13	34.66	2924.152	0.582	1
5745 ~ 5825	26.47	7.13	33.60	2290.868	0.456	1

Note:

1. Max. EIRP (dBm) = Max. Average power (dBm) + Antenna Gain (dBi)
2. Max. EIRP (mW) = $10^{(\text{Max. EIRP (dBm)} / 10)}$
3. Power density (mW/cm²) = Max. EIRP (mW) / $[4 \times \pi \times (\text{calculated distance})^2]$, the calculated distance is 20 cm.

Conclusion:

The formula of calculated the MPE is:

$$\text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2} + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz=0.155+0.582=0.737, therefore the maximum calculations of above situations are less than the “1” limit.

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

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