



Test report No. : 4789400505B-US-R2-V0
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Issued date : Mar. 22, 2021
FCC ID : VGY2865AX

Maximum Permissible Exposure Report

Product : 35b & G.Fast Security Router
Model Name : Vigor2866FVax
Series Model : Refer to Ch.4.1
FCC ID : VGY2865AX
Test Regulation : 47 CFR FCC Part 2.1091
Received Date : Jul. 7, 2020
Issued Date : Mar. 22, 2021
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.

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Doc No: 17-EM-F0864 / 5.0



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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: 35b & G.Fast Security Router

BRAND: DrayTek

MODEL: Vigor2866FVax

SERIES MODEL: Refer to Ch.4.1

SAMPLE STAGE: Engineering sample

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:

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Approved and Authorized By:

Mike Cai Date : Mar. 22, 2021
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2. Test Methodology and Reference Procedures

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	35b & G.Fast Security Router
Brand Name	DrayTek
Model Name	Vigor2866FVax
Series Model	Vigor2865ax, Vigor2865Vax, Vigor2865Fax, Vigor2865FVax, Vigor2866ax, Vigor2866Vax, Vigor2866Fax, Vigor2927ax, Vigor2927Vax, Vigor2927Fax, Vigor2927FVax, Vigor2923ax, Vigor2923Vax, Vigor2923Fax, Vigor2923FVax, Vigor2925ax, Vigor2925Vax, Vigor2925Fax, Vigor2925FVax, Vigor2926_v1ax, Vigor2926_v1Vax, Vigor2926_v1Fax, Vigor2926_v1FVax
S/N	2031449BC0800C8
Operating Frequency	2.4GHz: 2412MHz ~ 2462MHz 5GHz: 5180MHz ~ 5240MHz 5745MHz ~ 5825MHz
Modulation	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20), 802.11ax (HE20): 11 802.11n (HT40), 802.11ax (HE40): 7 5.18 ~ 5.24GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 4 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1 5.745 ~ 5.825GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 5 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1
Normal Voltage	12Vdc from adapter

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Note:

1. The models difference table as below:

Main Model Name	DSL	G. fast	SFP	WWAN	LAN	Wi-Fi 2.4G	Wi-Fi 5G	FXS
Vigor2866FVax	VDSL2/35b	V	V	-	Eth/RJ45x5	V	V	V
Series Model Name	DSL	G. fast	SFP	WWAN	LAN	Wi-Fi 2.4G	Wi-Fi 5G	FXS
Vigor2865ax	VDSL2/35b	-	-	-	Eth/RJ45x6	V	V	-
Vigor2865Vax	VDSL2/35b	-	-	-	Eth/RJ45x6	V	V	V
Vigor2865Fax	VDSL2/35b	-	V	-	Eth/RJ45x5	V	V	-
Vigor2865FVax	VDSL2/35b	-	V	-	Eth/RJ45x5	V	V	V
Vigor2866ax	VDSL2/35b	V	-	-	Eth/RJ45x6	V	V	-
Vigor2866Vax	VDSL2/35b	V	-	-	Eth/RJ45x6	V	V	V
Vigor2866Fax	VDSL2/35b	V	V	-	Eth/RJ45x5	V	V	-
Vigor2927ax	-	-	-	-	Eth/RJ45x6	V	V	-
Vigor2927Vax	-	-	-	-	Eth/RJ45x6	V	V	V
Vigor2927Fax	-	-	V	-	Eth/RJ45x6	V	V	-
Vigor2927FVax	-	-	V	-	Eth/RJ45x6	V	V	V
Vigor2923ax	-	-	-	-	Eth/RJ45x6	V	V	-
Vigor2923Vax	-	-	-	-	Eth/RJ45x6	V	V	V
Vigor2923Fax	-	-	V	-	Eth/RJ45x6	V	V	-
Vigor2923FVax	-	-	V	-	Eth/RJ45x6	V	V	V
Vigor2925ax	-	-	-	-	Eth/RJ45x6	V	V	-
Vigor2925Vax	-	-	-	-	Eth/RJ45x6	V	V	V
Vigor2925Fax	-	-	V	-	Eth/RJ45x6	V	V	-
Vigor2925FVax	-	-	V	-	Eth/RJ45x6	V	V	V
Vigor2926_v1ax	-	-	-	-	Eth/RJ45x6	V	V	-
Vigor2926_v1Vax	-	-	-	-	Eth/RJ45x6	V	V	V
Vigor2926_v1Fax	-	-	V	-	Eth/RJ45x6	V	V	-
Vigor2926_v1FVax	-	-	V	-	Eth/RJ45x6	V	V	V

Note:

The above model are declared by manufacturer for market segmentation that difference between main model and the series model is the combination of hardware design and appearance, there is nothing changed to RF related part that does not affect the RF characteristics.

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2. The EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx,Rx Function
802.11a	2TX,2RX
802.11b	1TX,1RX
802.11g	2TX,2RX
802.11n (HT20)	2TX,2RX
802.11n (HT40)	2TX,2RX
802.11ac (VHT20)	2TX,2RX
802.11ac (VHT40)	2TX,2RX
802.11ac (VHT80)	2TX,2RX
802.11ax (HE20)	2TX,2RX
802.11ax (HE40)	2TX,2RX
802.11ax (HE80)	2TX,2RX

3. The EUT contains following accessory devices

Product	Brand	Model	Description	Remark
AC adapter 1	Channel Well Technology	2ABN036F	Input: 100-240Vac, 1.0A Output:12Vdc, 3A Length: 1.5m	Optional
AC adapter 2	Channel Well Technology	2ABL030F	Input: 100-240Vac, 1.0A Output:12Vdc, 2.5A Length: 1.5m	Optional
AC adapter 3	Channel Well Technology	2ABL024F	Input: 100-240Vac, 0.8A Output:12Vdc, 2A Length: 1.5m	Optional
RJ-45 Cable (Ethernet)	Tung-Li	5U422-20	Length: 3meter, non-shielded cable	-
RJ-11 Cable	N/A	N/A	Length: 1.8meter, non-shielded cable, 6P4C	-

4. 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

Ant. No.	Transmitter Circuit	Brand Name	Model Name	Antenna Type	Maximum Gain (dBi)
1	Chain (0)+(1)	Walsin	RFDPA131300SBLB805	Dipole	2.4GHz: 2.3 5GHz: 3.9
2	Chain (0)+(1)	Walsin	RFDPA131300SBLB806	Dipole	2.4GHz: 2.3 5GHz: 3.9
3	Chain (0)+(1)	Angeei	DPD2430SRW	Dipole	2.4GHz: 2.3 5GHz: 3.5
4	Chain (0)+(1)	Angeei	DPD2430SRB	Dipole	2.4GHz: 2.3 5GHz: 3.5

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

Non-Beamforming 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	20.00	5.31	25.31	339.625	0.068	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	26.95	6.91	33.86	2430.461	0.484	1
5745~5825	28.21	6.91	35.12	3252.725	0.647	1

Beamforming 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	19.43	5.31	24.74	297.852	0.059	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	17.38	6.91	24.29	268.534	0.053	1
5745~5825	25.48	6.91	32.39	1733.804	0.345	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.

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Conclusion:

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz = 0.068 + 0.647 = 0.715, 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.

END OF REPORT

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