A Test Lab Techno Corp.

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MPE Report

Test Report No.	：	**1005FS14**
Applicant	：	**DrayTek Corp.**
Manufacturer	：	**DrayTek Corp.**
Product Type	：	**ADSL2+ WLAN Router**
Trade Name	：	**DrayTek**
Model Number	：	**Vigor 2710ne**
Serial Model Number	：	**Vigor 2710e, Vigor 2711ue, Vigor 2712ne, Vigor 2712e, Vigor 2712ue**
FCC ID	：	**VGYV2710NE**
Dates of Test	：	**May 28, 2010**
Test Specification	：	**47 CFR § 2.1091** **47 CFR §1.1310** **ANSI / IEEE Std.C95.1-1999**
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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Sam Chuang **20100531**
Approve Signer

Alex Wu **20100531**
Testing Engineer

Contents

1. Description of Equipment under Test (EUT)

Applicant	DrayTek Corp.
Applicant Address	No. 26, Fu-Shing Rd., HuKou County, Hsin-Chu Industrial Park, Hsin-Chu, Taiwan 303 R.O.C.
Manufacturer	DrayTek Corp.
Manufacturer Address	No. 26, Fu-Shing Rd., HuKou County, Hsin-Chu Industrial Park, Hsin-Chu,T aiwan 303 R.O.C.
Product Type	ADSL2+ WLAN Router
Trade Name	DrayTek
Model Number	Vigor 2710ne
Serial Model Number	Vigor 2710e, Vigor 2711ue, Vigor 2712ne, Vigor 2712e, Vigor 2712ue
Frequency Range	2412 - 2462 MHz (IEEE 802.11b / IEEE 802.11g) 2412 - 2462 MHz (draft 802.11n Standard-20MHz) 2422 - 2452 MHz (draft 802.11n Wide-40MHz)
Transmit Power (mean conducted power)	IEEE 802.11b: 0.065 W / 18.13 dBm IEEE 802.11g: 0.065 W / 18.13 dBm draft 802.11n Standard-20MHz: 0.065 W / 18.11 dBm draft 802.11n Wide-40MHz: 0.028 W / 14.48 dBm
Modulation Technique	IEEE 802.11b:DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g:DSSS(CCK, DQPSK, DBPSK)+ OFDM(QPSK, BPSK, 16-QAM, 64-QAM) draft 802.11n Standard-20MHz channel mode: OFDM(6.5,7.2, 13,14.4, 14.44, 19.5,217,26,28.89,28.9,39.43.3,43.33,52,57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67,104,115.56,117,130 and 144.44 Mbps) draft 802.11n Wide-40MHz channel mode: OFDM(13.5,15,27,30,40.5, 45,54,60,81,90,108,120, 121.5,135,150,162,180,216,240,243,270 and 300 Mbps)
Antenna Specification	2 dBi
Antenna Designation	External Type
Temperature Range	-30 ~ +70°C

The above equipment was tested by Compliance Certification Services Inc. 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

1.1 Series Model List and Difference

Vigor 2710 series model list and difference							
item	Model No.	4port LAN 10/100TX (4xRJ45)	Single LAN 10/100TX (1xRJ45)	WAN ADSL	WLAN 11b/g/n 1T1R	USB HOST	12VDC 1A
1	Vigor 2710ne	V		V	V		V
2	Vigor 2710e	V		V			V
3	Vigor 2711ue	V		V		V	V
4	Vigor 2712ne		V	V	V		V
5	Vigor 2712e		V	V			V
6	Vigor 2712ue		V	V		V	V

The model (DrayTek Vigor 2710ne) have different WLAN antenna for sell. The other circuit designed is the same. The WLAN antenna models list below.

Component Name	Component Model Number	Antenna Specification	Remark
WLAN Antenna (1)	MAG. LAYERS, 450-7000002-00	External Type, Gain: 2dBi	(*)
WLAN Antenna (2)	MAG. LAYERS, 450-9001000-00	External Type, Gain: 2dBi	
WLAN Antenna (3)	MAG. LAYERS, EDA-8709-2G4C1-A31	External Type, Gain: 2dBi	

Remark: (*) The testing used.

1.2 RF Output Power

Band	Data Rate	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Worst Case
IEEE 802.11b	1	2412	20.15	17.72	☐
		2437	20.45	18.13	☐
		2462	20.23	17.88	☐
	11	2412	20.14	17.77	☐
		2437	20.45	**18.13**	■
		2462	20.31	18.01	☐
IEEE 802.11g	6	2412	24.93	17.64	☐
		2437	24.63	17.86	☐
		2462	24.47	**18.13**	■
	54	2412	23.81	14.12	☐
		2437	23.37	14.48	☐
		2462	23.35	14.63	☐
draft 802.11n Standard-20MHz	6.5	2412	24.61	17.91	☐
		2437	24.69	**18.11**	■
		2462	24.43	18.08	☐
	65	2412	23.45	14.36	☐
		2437	22.76	14.57	☐
		2462	23.10	14.70	☐
draft 802.11n Wide-40MHz	13	2422	23.22	14.12	☐
		2437	22.87	**14.48**	■
		2452	22.90	14.43	☐
	130	2422	22.95	14.01	☐
		2437	22.75	14.47	☐
		2452	23.03	14.42	☐

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
Equation from page 18 of OET Bulletin 65, Edition 97-01 $S = \frac{PG}{4\pi R^2}$ 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.

2.1 Test Result

Band	Data Rate	Frequency (MHz)	Limit (mw)	Distance (cm) [R]	Power (dBm) [P]	ANT Gain (dBi) [G]	[P]+ [G] (W) [TP]	Power Density [S]	Min. distance (cm)
IEEE 802.11b	11	2412.0	1.000	20	17.77	2.00	0.095	0.019	20cm
		2437.0	1.000	20	18.13	2.00	0.103	0.021	20cm
		2462.0	1.000	20	18.01	2.00	0.100	0.020	20cm
IEEE 802.11g	6	2412.0	1.000	20	17.64	2.00	0.092	0.018	20cm
		2437.0	1.000	20	17.86	2.00	0.097	0.019	20cm
		2462.0	1.000	20	18.13	2.00	0.103	0.021	20cm
draft 802.11n Standard-20MHz	6.5	2412.0	1.000	20	17.91	2.00	0.098	0.019	20cm
		2437.0	1.000	20	18.11	2.00	0.103	0.020	20cm
		2462.0	1.000	20	18.08	2.00	0.102	0.020	20cm
draft 802.11n Wide-40MHz	13	2422.0	1.000	20	14.12	2.00	0.041	0.008	20cm
		2437.0	1.000	20	14.48	2.00	0.044	0.009	20cm
		2452.0	1.000	20	14.43	2.00	0.044	0.009	20cm