A Test Lab Techno Corp.

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MPE Report

Test Report No.	：	**1005FS13-01**
Applicant	：	**DrayTek Corp.**
Manufacturer	：	**DrayTek Corp.**
Product Type	：	**WiFi Router**
Trade Name	：	**DrayTek**
Model Number	：	**VigorFly200 (Model list see Section 1.1)**
FCC ID	：	**VGYVFLY200**
Dates of Test	：	**May 28 ~ Jun. 11, 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 **20100614**
Approve Signer

Alex Wu **20100614**
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	WiFi Router
Trade Name	DrayTek
Model Number	VigorFly200 (Model list see Section 1.1)
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 (Peak conducted power)	IEEE 802.11b: 0.073 W / 18.64 dBm IEEE 802.11g: 0.183 W / 22.63 dBm draft 802.11n Standard-20MHz: 0.069 W / 18.40 dBm draft 802.11n Wide-40MHz: 0.068 W / 18.33 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

VigorFly200 series model list and difference									
Item	Model No.	LAN (10/100)	WAN (10/100)	USB	1x1 WLAN	2x2 WLAN	PWR jack	Push button	WLAN WPS push button
1	VigorPhone-Z	x1 (PSE)	x1 (PD)	N/A	N/A	N/A	1	1	N/A
2	VigorFly201	x4	x1	host 2.0 x1	1	N/A	1	1	Yes
3	VigorFly200	x4	x1	host 2.0 x1	N/A	1	1	1	Yes
4	VigorFly210	x4	x1	host 2.0 x1	N/A	1	1	1	Yes
5	VigorAP800	x4 (PD x1)	N/A	host 2.0 x1	N/A	1	1	1	Yes

The model (DrayTek VigorFly200) 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	18.62	15.68	☐
		2437	18.44	15.88	☐
		2462	18.39	15.83	☐
	11	2412	**18.64**	16.14	■
		2437	18.61	16.11	☐
		2462	18.45	16.06	☐
IEEE 802.11g	6	2412	21.66	12.08	☐
		2437	22.05	9.45	☐
		2462	**22.63**	12.49	■
	54	2412	21.30	8.88	☐
		2437	22.19	8.99	☐
		2462	21.30	8.88	☐

Band	Data Rate	Frequency (MHz)	Peak Power (dBm)			Average Power (dBm)			Worst Case
			Chan 0	Chan 1	Total	Chan 0	Chan 1	Total	
draft 802.11n Standard-20MHz	6.5M	2412	15.21	15.57	**18.40**	5.20	5.38	8.30	■
		2437	13.81	14.17	17.00	4.70	4.88	7.80	☐
		2462	14.07	14.43	17.26	3.79	3.97	6.89	☐
	13M	2412	14.51	14.87	17.70	4.88	5.06	7.98	☐
		2437	14.25	14.61	17.44	4.55	4.73	7.65	☐
		2462	13.28	13.64	16.47	3.71	3.89	6.81	☐
	19.5M	2412	14.45	14.81	17.64	4.75	4.93	7.85	☐
		2437	14.43	14.79	17.62	4.41	4.59	7.51	☐
		2462	13.15	13.51	16.34	3.49	3.67	6.59	☐
	26M	2412	14.75	15.11	17.94	4.76	4.94	7.86	☐
		2437	14.42	14.78	17.61	4.52	4.70	7.62	☐
		2462	13.45	13.81	16.64	3.51	3.69	6.61	☐
	39M	2412	14.65	14.65	17.66	4.82	5.00	7.92	☐
		2437	14.35	14.35	17.36	4.56	4.74	7.66	☐
		2462	13.11	13.47	16.30	3.50	3.68	6.60	☐
	52M	2412	13.95	14.31	17.14	4.80	4.98	7.90	☐
		2437	13.92	14.28	17.11	4.65	4.83	7.75	☐
		2462	12.68	13.04	15.87	3.56	3.74	6.66	☐
	58.5M	2412	14.91	15.27	18.10	4.71	4.89	7.81	☐
		2437	14.78	15.14	17.97	4.61	4.79	7.71	☐
		2462	13.41	13.77	16.60	3.47	3.65	6.57	☐
	65M	2412	14.69	15.05	17.88	4.77	4.95	7.87	☐
		2437	14.54	14.90	17.73	4.63	4.81	7.73	☐
		2462	13.32	13.68	16.51	3.46	3.64	6.56	☐

Band	Data Rate	Frequency (MHz)	Peak Power (dBm)			Average Power (dBm)			Worst Case
			Chan 0	Chan 1	Total	Chan 0	Chan 1	Total	
draft 802.11n Wide-40MHz	13.5M	2422	14.00	14.36	17.19	4.76	4.94	7.86	☐
		2437	14.76	15.12	17.95	4.52	4.70	7.62	☐
		2452	13.43	13.79	16.62	4.16	4.34	7.26	☐
	27M	2422	14.19	14.55	17.38	4.67	4.85	7.77	☐
		2437	14.01	14.37	17.20	4.48	4.66	7.58	☐
		2452	13.48	13.84	16.67	4.14	4.32	7.24	☐
	40.5M	2422	14.30	14.66	17.49	4.59	4.77	7.69	☐
		2437	13.36	13.72	16.55	4.46	4.64	7.56	☐
		2452	13.34	13.70	16.53	3.92	4.10	7.02	☐
	54M	2422	14.94	15.30	18.13	5.11	5.29	8.21	☐
		2437	14.96	15.32	18.15	4.34	4.32	7.34	☐
		2452	14.30	14.66	17.49	4.31	4.49	7.41	☐
	81M	2422	15.14	15.50	**18.33**	4.66	4.84	7.76	■
		2437	14.87	15.23	18.06	4.41	4.59	7.51	☐
		2452	14.49	14.85	17.68	4.14	4.32	7.24	☐
	108M	2422	14.58	14.94	17.77	4.57	4.75	7.67	☐
		2437	14.38	14.74	17.57	4.36	4.54	7.46	☐
		2452	13.94	14.30	17.13	4.02	4.20	7.12	☐
	121.5M	2422	14.75	15.11	17.94	4.65	4.83	7.75	☐
		2437	14.59	14.95	17.78	4.45	4.63	7.55	☐
		2452	14.32	14.68	17.51	4.13	4.31	7.23	☐
	135M	2422	14.86	15.22	18.05	4.70	4.88	7.80	☐
		2437	14.55	14.91	17.74	4.52	4.70	7.62	☐
		2452	14.00	14.36	17.19	4.00	4.18	7.10	☐

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	Ant. Port	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	1.000	20	18.64	2.00	0.116	0.023	20cm
			2437	1.000	20	18.48	2.00	0.112	0.022	20cm
			2462	1.000	20	18.18	2.00	0.104	0.021	20cm
IEEE 802.11g	-----	6	2412	1.000	20	21.66	2.00	0.232	0.046	20cm
			2437	1.000	20	21.92	2.00	0.247	0.049	20cm
			2462	1.000	20	22.24	2.00	0.265	0.053	20cm
draft 802.11n Standard-20MHz	Chan 0	6.5	2412	1.000	20	15.21	2.00	0.053	0.010	20cm
			2437	1.000	20	13.81	2.00	0.038	0.008	20cm
			2462	1.000	20	14.07	2.00	0.040	0.008	20cm
	Chan 1	6.5	2412	1.000	20	15.57	2.00	0.057	0.011	20cm
			2437	1.000	20	14.17	2.00	0.041	0.008	20cm
			2462	1.000	20	14.43	2.00	0.044	0.009	20cm
	Toatl	6.5	2412	1.000	20	18.40	2.00	0.110	0.022	20cm
			2437	1.000	20	17.00	2.00	0.080	0.016	20cm
			2462	1.000	20	17.26	2.00	0.084	0.017	20cm
draft 802.11n Wide-40MHz	Chan 0	81	2422	1.000	20	15.14	2.00	0.052	0.010	20cm
			2437	1.000	20	14.87	2.00	0.049	0.010	20cm
			2452	1.000	20	14.49	2.00	0.045	0.009	20cm
	Chan 1	81	2422	1.000	20	15.5	2.00	0.056	0.011	20cm
			2437	1.000	20	15.23	2.00	0.053	0.011	20cm
			2452	1.000	20	14.85	2.00	0.048	0.010	20cm
	Toatl	81	2422	1.000	20	18.33	2.00	0.108	0.021	20cm
			2437	1.000	20	18.06	2.00	0.101	0.020	20cm
			2452	1.000	20	17.68	2.00	0.093	0.019	20cm