Network Setup

Router: Netgear WGR614 54 Mbps / 2.4GHz (v5)

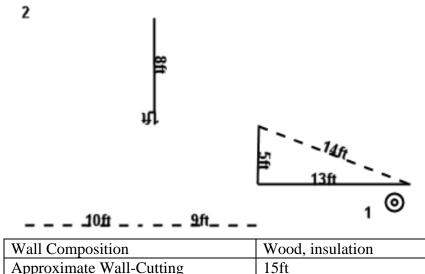
SSID	Nutty Wireless
Region	Canada
Channel	11
Mode	Test Dependent
Wireless AP	ON
Broadcast Name	ON
Security	128bit WEP

Laptop: Dell Inspiron 1150 – Dell Wireless 1450 (a/b/g)

Host Interface	32-bit Mini-F	PCI	
Standards	IEEE 802.11	a/b/g/h (draft)	
Data Rate	802.11a/g	6, 9, 12, 18	, 24, 36, 48, 54 Mbps
	802.11b	1, 2, 5.5, 1	l Mbps
Modulation	802.11a/g	OFDM (6,	9, 12, 18, 24, 36, 48, 54 Mbps)
	802.11b	CCK (5.5,	11 Mbps), DQPSK (2 Mbps), DBPSK (1 Mbps)
Architecture	Infrastructure	e and Ad-hoc	
Frequencies	802.11a	50150 - 5.8	325 GHz
	802.11b/g	2.4 - 2.484	GHz
RF Output	802.11a	21 dBm ma	ax @ antenna connector
	802.11b/g		ax @ antenna connector
Antennae	Hardware div	versity support.	Main and auxiliary antenna connectors; transmit
Connectors	and receive o	n both	
Range	802.11a/h	54 Mbps	30m Open
			10m Indoors
		18 Mbps	100m Open
			50m Indoors
	802.11g	54 Mbps	50m Open
			20m Indoors
		18 Mbps	150m Open
			75m Indoors
	802.11b	11 Mbps	180m Open
		1	60m Indoors
		1 Mbps	570m Open
	0000111	(0.1 D 0.1	125m Indoors
Receive	802.11a/g		54 Mbps; -83dBm @ 18 Mbps
Sensitivity	802.11b		1 Mbps; -92dBm @ 1 Mbps
Power	TX peak	1000mW	
Consumption	RX peak	1200mW	
	Idle	740mW	
	Disabled	20mW	
Security	• •	WEP, CKIP, T	KIP, AES
	WPA (PSK, S	,	
	CCXv2 (CCH	,	2.11:
	1.	gradeable to 80	2.111
	Single Sign C		TLS, PEAP, (TLS, MS-CHAPv2, GTC)
			$1L_{0}, 1LAF, (1L_{0}, M_{0}-CHAFV2, OIC)$
Dolov	Single Sign (nd @ 1% FER: 11Mbps > 250nsec; 5.5 Mbps >
Delay	Multi-paul R	wis delay sprea	u = 170 FER. 11100ps > 2500sec; 5.5 100ps >

Tolerance	300nsec	
Temperatures	Operating	0° - 70° C
	Storage	-40° - 90° C
Humidity	Up to 95%	

Wireless Area



wan Composition	wood, insulation
Approximate Wall-Cutting	15ft
Interference	Cloths, Filing cabinets,
	Computers and other
	electronics (shielded and
	unshielded), Books,
	Kitchen equipment
Total Distance to Router Indoors	Location 1: 1ft
	Location 2: 34.5ft

Notes

Since the laptop wireless isn't true omni directional, the laptop was pointed in the direction of the router to provide maximum signal strength. A 2.4 GHz portable phone is used within the house; however it had no impact on the performance of the wireless tests.

The Netgear WGR614 has been tested by CNet labs to have an average speed of 22 Mbps. Results here are based on my network setup, which are clearly inferior compared to the hardware used at CNet labs. To view their results, visit:

http://reviews.cnet.com/Netgear_WGR614_cable_DSL_wireless_router_54Mbps_2_4GHz/4505-3265_7-21218238-5.html

Tests are conducted on Windows XP Pro SP2. Connections established and maintained by Windows Wireless Zero. Bandwidth Monitor results are based on 30 second network activity. It displays the maximum recorded speed and the amount of instability within the network (represented by a jerky graph).

Tools:

Dell Wireless Tool	Tool provided for use with Dell based wireless
	network cards. Signal strength and Noise level
	reports are as equally accurate as NetStumbler.
Bandwidth Monitor	A tool I programmed to analyze network activity.
	Since I programmed it, I know it's reliable =)

LAN - Wired

🚾 Bandwidth	Monitor				_ 🗆 🗙
File Options	Help				
Default		•			
Current			Average —		
Download:	0.15	MB/s	Download:	0.14	MB/s
Upload:	10.20	MB/s	Upload:	9.11	MB/s
Current Ove Download: Upload:	0.01	MB/s MB/s	Average Ov Download: Upload:	erhead 0.01 0.25	MB/s MB/s
11					

Comments:

LAN test performed to test the performance of the router. Nothing out of the ordinary here.

LAN – Wireless & No Extended Antenna

	1		. r		_
Site Monitor		Diagnost	ics Status	Information	
Wireless Ne	tworks	LINK	Status	Statistics	
Connection					
Status			. Not Associate	d	
Network Name	(SSID)		. Nutty Wireles:	s	
AP's MAC Addr	ess		00:0F:B5:5E:4	44:B0	
Security			. WEP		
Speed			54.0 Mbps		
Channel			. 11		
Client IP Addres	\$\$. 192.168.1.100)	
Network Conne	ection Typ	pe	Infrastructure		
					- []
Signal					
Radio State		Enabled			
Signal:				-36 dBm	
Noise:				-86 dBm	
Noise:				-86 dBm	
Noise:				-86 dBm	
Noise:		Cancel	Apply	-86 dBm	
OK		Cancel	Apply		
OK Bandwidth M		Cancel	Apply		
OK		Cancel	Apply		
OK Bandwidth M		Cancel	Арру		
OK Bandwidth Me Options He Default		Cancel			
OK Bandwidth Mo e Options He Default Current	elp		- Average	Help	
OK Bandwidth Me Options He Default Current Download: 41	elp 1.40	▼ KB/sec	Average	Help	KB/s
OK Bandwidth Me Options He Default Current Download: 41	elp		Average Download: Upload:	Help 41.61 1053.51	
OK Bandwidth Me Options He Default Current Download: 41	elp 1.40 066.24	▼ KB/sec	Average	Help 41.61 1053.51	KB/s
OK Bandwidth Me Options He Default Current Download: 41 Upload: 10 Current Overhe Download: 1,	elp 1.40 066.24	KB/sec KB/sec KB/sec	Average Download: Upload: Average O Download:	Help Help 41.61 1053.51 verhead 1.79	KB/s KB/s KB/s
OK Bandwidth Me Options He Default Current Download: 4: Upload: 10 Current Overhe Download: 1.	elp 1.40 066.24 ead	KB/sec KB/sec	Average Download: Upload: Average O	Help 41.61 1053.51 verhead	KB/si KB/si
OK Bandwidth Me Options He Default Current Download: 4: Upload: 10 Current Overhe Download: 1.	elp 1.40 066.24 ead .80	KB/sec KB/sec KB/sec	Average Download: Upload: Average O Download:	Help Help 41.61 1053.51 verhead 1.79	KB/s KB/s KB/s
OK Bandwidth Me Options He Default Current Download: 4: Upload: 10 Current Overhe Download: 1, Upload: 26	elp 1.40 066.24 ead .80	KB/sec KB/sec KB/sec	Average Download: Upload: Average O Download:	Help Help 41.61 1053.51 verhead 1.79	KB/s KB/s KB/s
OK Bandwidth Me Options He Default Current Download: 4: Upload: 10 Current Overhe Download: 1.	elp 1.40 066.24 ead .80	KB/sec KB/sec KB/sec	Average Download: Upload: Average O Download:	Help Help 41.61 1053.51 verhead 1.79	KB/s KB/s KB/s

Comments:

Very low speeds were recorded. Possibly due to an unknown interference or that my Dell wireless network card is poor quality.

	y	×
Site Monitor Diagno		mation
Wireless Networks	nk Status Si	atistics
Connection		
Status	Not Associated	
Network Name (SSID)	Nutty Wireless	
AP's MAC Address	00:0F:B5:5E:44:B0	
Security	WEP	
Speed	54.0 Mbps	
Channel	11	
Client IP Address	192.168.1.100	
Network Connection Type	Infrastructure	
Signal		
Radio StateEnable	d	
Signal:	.27	dBm
Signal.	-57	
Noise:	-83	dBm
OK Cancel	Analy	Help
Bandwidth Monitor		_ 🗆
e Options Help	7	
	-	
e Options Help	Average	
e Options Help Default Current Download: 41.85 KB/sec	Download: 41.	56 KB/sec
e Options Help Default Current	Download: 41.	
e Options Help Default Current Download: 41.85 KB/sec	Download: 41. Upload: 104	56 KB/sec 14.94 KB/sec
e Options Help Default Current Download: 41.85 Upload: 1022.05 KB/sec Current Overhead	Download: 41. Upload: 10. Average Overhe	56 KB/sec 14.94 KB/sec ad
e Options Help Default Current Download: 41.85 KB/sec Upload: 1022.05 KB/sec	Download: 41. Upload: 104	56 KB/sec 14.94 KB/sec ad KB/sec
e Options Help Default Current Download: 41.85 KB/sec Upload: 1022.05 KB/sec Current Overhead Download: 1.84 KB/sec	Download: 41. Upload: 104 Average Overhe Download: 1.7	56 KB/sec 14.94 KB/sec ad KB/sec
e Options Help Default Current Download: 41.85 KB/sec Upload: 1022.05 KB/sec Current Overhead Download: 1.84 KB/sec Upload: 27.56 KB/sec	Download: 41. Upload: 104 Average Overhe Download: 1.7	56 KB/sec 14.94 KB/sec ad KB/sec
e Options Help Default Current Download: 41.85 KB/sec Upload: 1022.05 KB/sec Current Overhead Download: 1.84 KB/sec Upload: 27.56 KB/sec	Download: 41. Upload: 104 Average Overhe Download: 1.7	56 KB/sec 14.94 KB/sec ad KB/sec
e Options Help Default Current Download: 41.85 KB/sec Upload: 1022.05 KB/sec Current Overhead Download: 1.84 KB/sec Upload: 27.56 KB/sec	Download: 41. Upload: 104 Average Overhe Download: 1.7	56 KB/sec 14.94 KB/sec ad KB/sec
e Options Help Default Current Download: 41.85 Upload: 1022.05 KB/sec Current Overhead Download: 1.84 KB/sec	Download: 41. Upload: 104 Average Overhe Download: 1.7	56 KB/sec 14.94 KB/sec ad 9 KB/sec

Location 1 – Test 2 – Mode g Only:

Comments:

Again, it appears I am limited to 1 MB/sec.

Location 1 – Test 3 – Mode b Only:

Site Monitor				
	Diagnos	tics	Information	
Wireless Network			Statistics	-i,
Connection				
Status		Not Associate	d	
Network Name (SSI	D)	Nutty Wireless	3	
AP's MAC Address		. 00:0F:B5:5E:4	14:B0	
Security		. WEP		
Speed		. 11.0 Mbps		
Channel		11		
Client IP Address		. 192.168.1.100)	
Network Connection	п Туре	. Infrastructure		
Cianal				
- Signal	E a shi sa			
Radio State	Enabled			
Signal:			-35 dBm	
Noise:			-85 dBm	
Noise:			-80 GRW	
	1		1	
ОК	Cancel	Apply	Help	
		Apply	Help	
OK Bandwidth Monito e Options Help		Apply	Help	
Bandwidth Monito		Apply	Help	
Bandwidth Monito		Apply	Help	
Bandwidth Monito e Options Help Default Current		Average	J	
Bandwidth Monito e Options Help Default Current Download: 9,27	or KB/sec	Average Download:	9.37	KB/sec
Bandwidth Monito e Options Help Default Current	or KB/sec	Average	J	
Bandwidth Monito e Options Help Default Current Download: 9,27	or KB/sec	Average Download:	9.37 140.34	KB/sec
Bandwidth Monito e Options Help Default Current Download: 9.27 Upload: 132.23	or KB/sec	Average Download: Upload:	9.37 140.34	KB/sec
Bandwidth Monito e Options Help Default Current Download: 9.27 Upload: 132.23 Current Overhead -	KB/sec	Average Download: Upload: Average Ov	9.37 140.34 /erhead	KB/sec KB/sec

Comments:

This was an unexpected result. The wireless-b network had speeds about 1/5th that of the wireless-g. Since the wireless-g network was operating at wireless-b speeds, I figured wireless-b would have operated just fine. I was wrong.

Location 2 – Test 1 – Mix Mode "g/b":

Site Monitor	Diagnos	tics	Information	
Wireless Networks	Link	Status	Statistics	j,
Connection				
Status		Not Associate	d	
Network Name (SSID).		Nutty Wireles:	3	
AP's MAC Address		. 00:0F:B5:5E:4	44:B0	
Security		. WEP		
Speed		. 36.0 Mbps		
Channel		11		
Client IP Address)	
Network Connection Ty	/pe	. Infrastructure		
Signal				
Radio State	Enabled			
Signal:			-73 dBm	
Noise:			-99 dBm	
OK	Cancel	Apply	Help	
	Cancel	Apply	Help	
Bandwidth Monitor	Cancel	Apply	Help	
Bandwidth Monitor Options Help	Cancel	Apply	Help	
Bandwidth Monitor Options Help	Cancel		Help	
Bandwidth Monitor Options Help Default Current		Average]	
Bandwidth Monitor Default Current Download: 25.02	Cancel		24.98	KB/sec
Bandwidth Monitor Options Help Default Current Download: 25,02 Upload: 519,55	▼ KB/sec	Average Download: Upload:	24.98 536.05	KB/set
Bandwidth Monitor Default Current Download: 25.02 Upload: 519.55 Current Overhead	KB/sec KB/sec	Average Download: Upload: Average Ov	24.98 536.05 rerhead	KB/sec
Bandwidth Monitor Default Current Download: 25.02 Upload: 519.55 Current Overhead Download: 1.08	KB/sec KB/sec KB/sec	Average Download: Upload: Average Ov Download:	24.98 536.05 rerhead	KB/sea KB/sea
Bandwidth Monitor Default Current Download: 25.02 Upload: 519.55 Current Overhead	KB/sec KB/sec	Average Download: Upload: Average Ov	24.98 536.05 rerhead	KB/sec
Bandwidth Monitor Options Help Vefault Current Download: 25.02 Upload: 519.55 Current Overhead Download: 1.08	KB/sec KB/sec KB/sec	Average Download: Upload: Average Ov Download:	24.98 536.05 rerhead	KB/sea KB/sea
Bandwidth Monitor Options Help Oefault Current Download: 25,02 Upload: 519,55 Current Overhead Download: 1,08 Upload: 14,16	KB/sec KB/sec KB/sec	Average Download: Upload: Average Ov Download:	24.98 536.05 rerhead	KB/sea KB/sea
Bandwidth Monitor Default Current Download: 25.02 Upload: 519.55 Current Overhead Download: 1.08	KB/sec KB/sec KB/sec	Average Download: Upload: Average Ov Download:	24.98 536.05 rerhead	KB/sea KB/sea

Comments:

Throughput seems to have decreased by half. Given the level of interference between the laptop and the router, this result (or lower) is expected. The jerkiness in the graph indicates there was a bit of difficulty in communication.

Location 2 – Test 2 – Mode g Only:

Site Monitor	Diagnost		Information		
Wireless Networks	Link	Status	Statistics	4	
Connection				-	
Status		. Not Associate	d		
Network Name (SSID).		. Nutty Wireles:	s		
AP's MAC Address		00:0F:B5:5E:4	14:B0		
Security		. WEP			
Speed					
Channel		. 11			
Client IP Address)		
Network Connection T	уре	. Infrastructure			
Signal				_	
Radio State	Enabled				
riddio otato					
			-		
Signal:			-75 dBm		
Signal:			-75 dBm -97 dBm		
			-		
			-		
	Cancel	Apply	-		
Noise:	Cancel	Apply	-97 dBm		
Noise:	Cancel	Apply	-97 dBm		
Noise: OK Bandwidth Monitor e Options Help	Cancel	Apply	-97 dBm		
Noise:	Cancel	Apply	-97 dBm		
Noise: OK Bandwidth Monitor e Options Help	Cancel	Average —	-97 dBm		
Noise: OK Bandwidth Monitor e Options Help Default Current Download: 20.40	▼ KB/sec	Average Download:	-97 dBm	KB/s	ec
Noise: OK Bandwidth Monitor e Options Help Default Current		Average	-97 dBm		ec
Noise: OK Bandwidth Monitor e Options Help Default Current Download: 20.40	▼ KB/sec	Average Download:	-97 dBm Help 18.75 403.52	KB/s	ec
Noise: OK Bandwidth Monitor e Options Help Default Current Download: 20.40 Upload: 401.41	▼ KB/sec	Average Download: Upload:	-97 dBm Help 18.75 403.52	KB/s	ec
Noise: OK Bandwidth Monitor e Options Help Default Current Download: 20.40 Upload: 401.41 Current Overhead	KB/sec KB/sec	Average Download: Upload: Average Ov	-97 dBm Help 18.75 403.52 /erhead	KB/sr KB/sr	ec ec ec

Comments:

Overall the performance is on par with the previous test. There are major spikes within both tests, suggesting difficulty in the communication.

Location 2 – Test 3 – Mode b Only:

Site Monitor	1			
	Diagr	nostics	Information	
Wireless Netw	orks L	ink Status	Statistics	- į
Connection				_ []
Status		Not Associal	ted	
Network Name (S	SID)	Nutty Wirele	88	
AP's MAC Addres	s	00:0F:B5:5E	:44:B0	
Security		WEP		
Speed		11.0 Mbps		
Channel		11		
Client IP Address.		192.168.1.1	00	
Network Connect	ion Type	Infrastructure	e	
				- 11
- Signal				
Radio State	Enabl	ed		
			-75 dBm	
Signal:				
Signal:			-83 dBm	
			-83 dBm	
Noise:	1	1		
	Cancel	Арріу	-83 dBm	
Noise:	_	Apply		
Noise:	itor	Apply		
Noise: OK Bandwidth Mon e Options Help	itor	<u>Apply</u>		
Noise: OK Bandwidth Mor e Options Help Default	itor	 -		
Noise: OK OK Bandwidth Mon e Options Help Default Current	itor	Average -	Help	
Noise: OK Bandwidth Mon e Options Help Default Current Download: 9.76	i tor	Average Download	Help	KB/sec
Noise: OK Bandwidth Mon e Options Help Default Current	i tor	Average Download	Help	
Noise: OK Bandwidth Mon e Options Help Default Current Download: 9.76	iitor 5 KB/sec 73 KB/sec	Average Download	Help : 9.69 161.45	KB/sec
Noise: OK Bandwidth Mon e Options Help Default Current Download: 9.76 Upload: 175 Current Overhead Download: 0.44	itor 5 KB/sec 73 KB/sec	Average Download Upload: Average C Download	Help Help 9.69 161.45 Dverhead 0.42	KB/sec KB/sec KB/sec
Noise: OK Bandwidth Mon e Options Help	itor	<u>Apply</u>		
Noise: OK Bandwidth Mon e Options Help Default Current Download: 9.76	i tor	Average Download	Help	KB/sec
Noise: OK Bandwidth Mon e Options Help Default Current Download: 9.76 Upload: 175	itor 5 KB/sec .73 KB/sec	Average Download Upload: Average C	Help : 9.69 161.45	KB/sec KB/sec
Noise: OK Bandwidth Mon e Options Help Default Current Download: 9.76 Upload: 175	itor 5 KB/sec 73 KB/sec	Average Download Upload: Average C Download	Help : 9.69 161.45	KB/sec KB/sec

Comments:

Speed appears to be on par with the 3rd test done from location 1. The jerkiness within the network activity clearly suggests there is quite a bit of interference. Unlike the wireless-g network, wireless-b seems to have maintained roughly the same speeds as done from location 1, test 3.

Overall

While my setup is far from optimal, I was still content that the wireless signal managed to penetrate a lot of obstructions. Poor results are either due to a poor router, a poor wireless card, or a lot of interference. Since the results obtained from the point-blank connection was poor, I'm lead to believe either the router or wireless card is of poor quality. There is no other nearby wireless setup operating on that frequency band, and my wireless phone had no impact on performance. Since CNet labs achieved results of about 22 Mbps with their hardware, I'm more likely to conclude that the Dell 1450 wireless card is poor quality. Without enough evidence of performance tests conducted by others on either hardware, it is inconclusive to pinpoint the problem.