



Wireless LAN Consortium

802.11abgnac Range vs. Throughput Test Suite v1.1 Report

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March 5, 2015
Report Rev. 1.0

Example Vendor
Member Company
121 Technology Dr.
Durham, NH 03824

Mr. Vendor,

Enclosed are the results from the 802.11abgnac Range vs. Throughput testing performed on the:

SAMPLE DUT 802.11abgnac Access Point

This testing pertains to a set of standard requirements, put forth in the IEEE Std. 802.11-2012 Edition. The tests performed are part of the 802.11abgnac Range vs. Throughput Test Suite, which is available on the UNH-IOL's website:

[802.11abgnac Range vs. Throughput Test Suite v1.1](#)

Issues Observed While Testing

There were no issues observed during the testing process.

As always, we welcome any comments regarding this Test Suite. If you have any questions about the test procedures or results, please contact us via e-mail at wclab@iol.unh.edu or by phone at +1-603-862-2263.

Regards,

A handwritten signature in black ink, appearing to read 'Auderien Monareh', written in a cursive style.

Auderien Monareh

A handwritten signature in blue ink, appearing to read 'Craig Chabot', written in a cursive style.

Craig Chabot

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Table 1 - Result Key - The following table contains possible results and their meanings.

Result	Meaning	Interpretation
PASS	Pass	The Device Under Test (DUT) was observed to exhibit conformant behavior.
PWC	Pass With Comments	The Device Under Test (DUT) was observed to exhibit conformant behavior, however changes were made to the normal test procedure or the behavior observed requires additional comments.
FAIL	Fail	The Device Under Test (DUT) was observed to exhibit non-conformant behavior.
RTC	Refer to Comments	From the observations, a valid pass or fail was not determined. An additional explanation of the situation is included.
Info	Informative	Test is designed for informational purposes only. The results may help ensure the interoperability of the DUT, but are not standards requirements.
Warn	Warning	The DUT was observed to exhibit behavior that is not recommended.
N/A	Not Applicable	This test does not apply to the device type or is not applicable to the testing program selected.
N/S	Not Supported	The Device Under Test (DUT) was not observed to support the necessary functionality required to perform these tests or the requirement is optional and not supported by this device.
N/T	Not Tested	This test was not performed and therefore this is not a complete test report. Please see the comments for additional reasons.
UA	Unavailable	The test was not performed due to limitation of the test tool(s) or interoperable systems, or the test methodology is still under development.

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Table 2 - Setup and Configuration Information

Test System Hardware	
RF Isolated Environment	USC-26 RF/EMI Isolation Chamber 16'x 8' x 8' @ 100dB / Open Air, Quiet Channel
octoScope Hardware	octoBox Multi-Path Emulator with quadAtten™ RF Attenuator Module
Test Station	Netgear R7000 802.11ac Dual Band AP
Ethernet Station (ETH)	Intel(R) Pro/1000 MT Mobile Connection

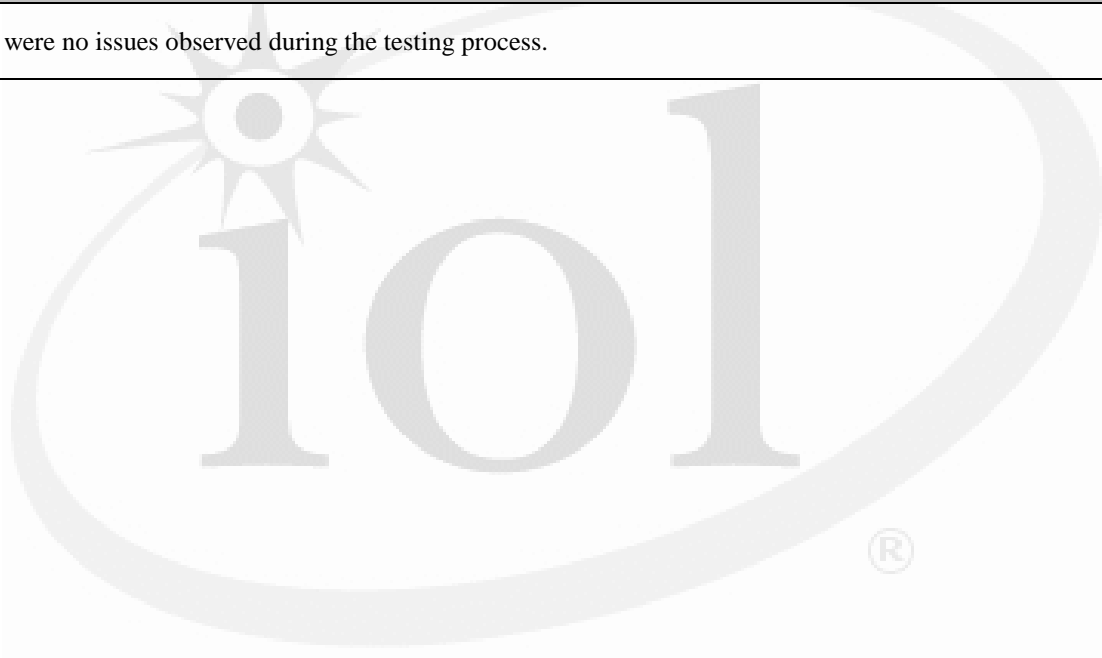
Table 3 – DUT Information

Product	
Manufacturer	Member Company
Model	SAMPLE
Firmware	SAMPLE_FIRMWARE
MAC Address	00:00:00:00:00:00
IOL S/N	IOL-MEMBER-0000000000



GROUP 1: Range vs. Throughput

Test # and Label		
1.1 – Open Air Baseline		
Comments on Test Procedure		
<p><i>Purpose:</i> To test throughput values between the DUT and TS in an open-air environment within a walk-in wireless isolation chamber.</p> <p>This test verifies that all components of the test setup can interoperate, and provides a baseline against which the attenuated testing results gathered in test 1.2 can be compared.</p>		
Test Results		
	1.1.1	1.1.2
Throughput (mbps)	214.993	391.303
Comments		
There were no issues observed during the testing process.		



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Test # and Label					
1.2 – Throughput vs. Range					
Comments on Test Procedure					
<p><i>Purpose:</i> To test throughput values between the DUT and TS connected at varying attenuation levels utilizing the octoBox Multi-Path Emulator and quadAtten Module.</p> <p>This test discovers the DUT’s performance by evaluating its throughput levels while interoperating with the TS at varying simulated distances through the use of attenuation. Testing is performed utilizing octoScope’s OB-MPE which provides the necessary environment to attain consistent and repeatable testing results in addition to emulating a Model B 802.11 channel for MIMO (or spatial streaming) devices.</p>					
Test Results					
1.2.1					
Attenuation (db)	Throughput (mbps)				
	0°	90°	180°	270°	Average
0	143.919	91.657	88.197	86.998	102.693
3	137.684	139.079	89.186	85.938	112.972
6	134.336	136.729	89.934	86.833	111.958
9	88.253	138.225	89.228	84.952	100.165
12	87.635	128.372	88.091	86.126	97.556
15	87.994	89.698	90.507	85.636	88.459
18	84.619	90.377	88.288	88.793	88.019
21	84.679	88.522	86.750	76.739	84.173
24	82.683	86.451	88.029	54.505	77.917
27	70.494	83.818	90.768	51.480	74.140
30	54.168	65.758	88.919	42.224	62.767
33	50.129	45.423	85.541	56.845	59.485
36	49.722	51.499	48.733	49.211	49.791
39	36.102	51.430	40.858	36.862	41.313
42	29.595	43.031	51.697	38.879	40.801
45	16.627	33.702	35.519	29.673	28.880
48	11.979	25.869	19.773	19.245	19.217
51	10.199	19.994	20.975	12.921	16.022
54		14.363	17.245		15.804
57			11.192		11.192
60					

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1.2.2					
Attenuation (dB)	Throughput (mbps)				
	0°	90°	180°	270°	Average
0	401.083	341.584	352.941	281.860	344.367
3	399.250	352.988	351.218	316.917	355.093
6	400.227	352.153	327.737	305.303	346.355
9	400.922	289.943	307.981	307.754	326.650
12	357.131	280.899	280.908	306.349	306.322
15	350.057	280.814	239.747	304.203	293.705
18	348.234	172.263	169.989	241.271	232.939
21	279.608	173.178	125.576	168.827	186.797
24	244.205	136.414	122.084	165.593	167.074
27	168.455	120.337	76.707	119.577	121.269
30	139.284	104.987	71.287	107.853	105.853
33	120.413	75.042	33.937	74.794	76.047
36	116.832	41.751		22.089	60.224
39	78.028			10.992	44.510
42	12.231			11.017	11.624
45	13.685			13.677	13.681
48	10.860				10.860
51	4.675				4.675
54					
57					
60					
Comments					
There were no issues observed during the testing process.					

Chart 1 – Range vs. Throughput in the 2.4GHz Band

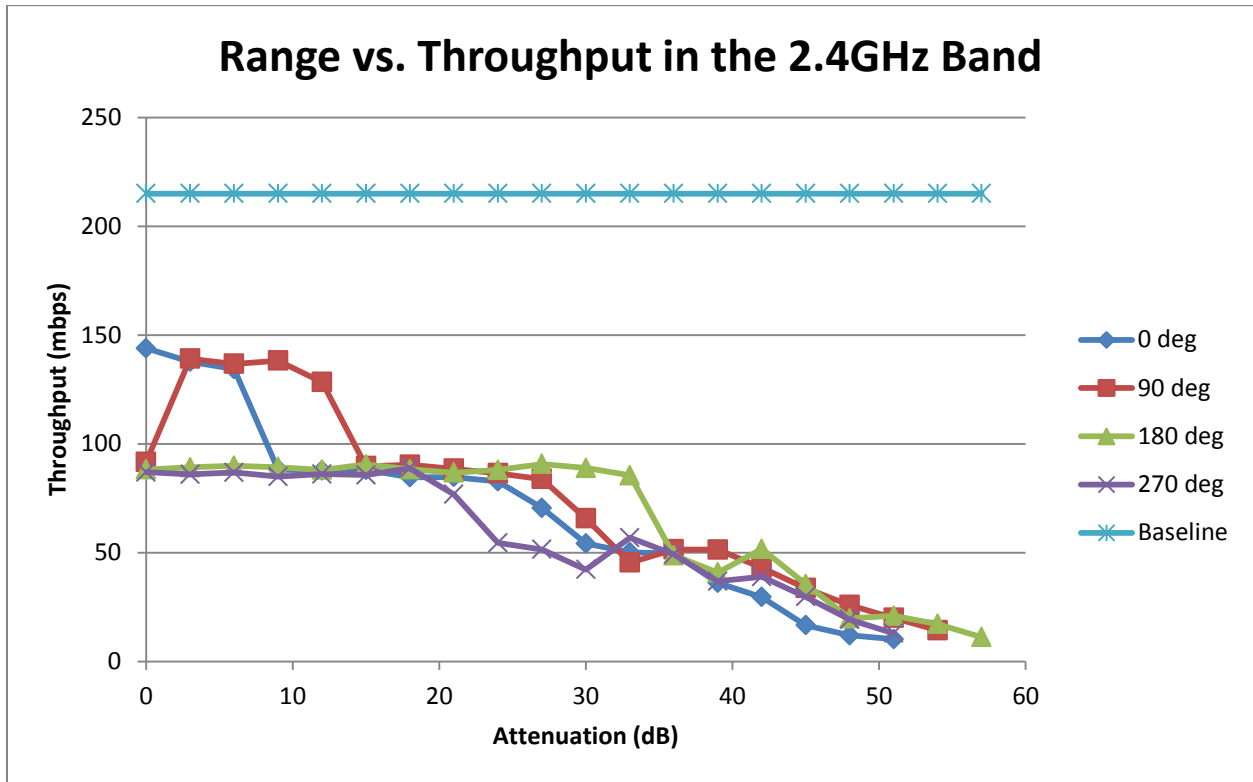


Chart 2 – Average Range vs. Throughput in the 2.4GHz Band

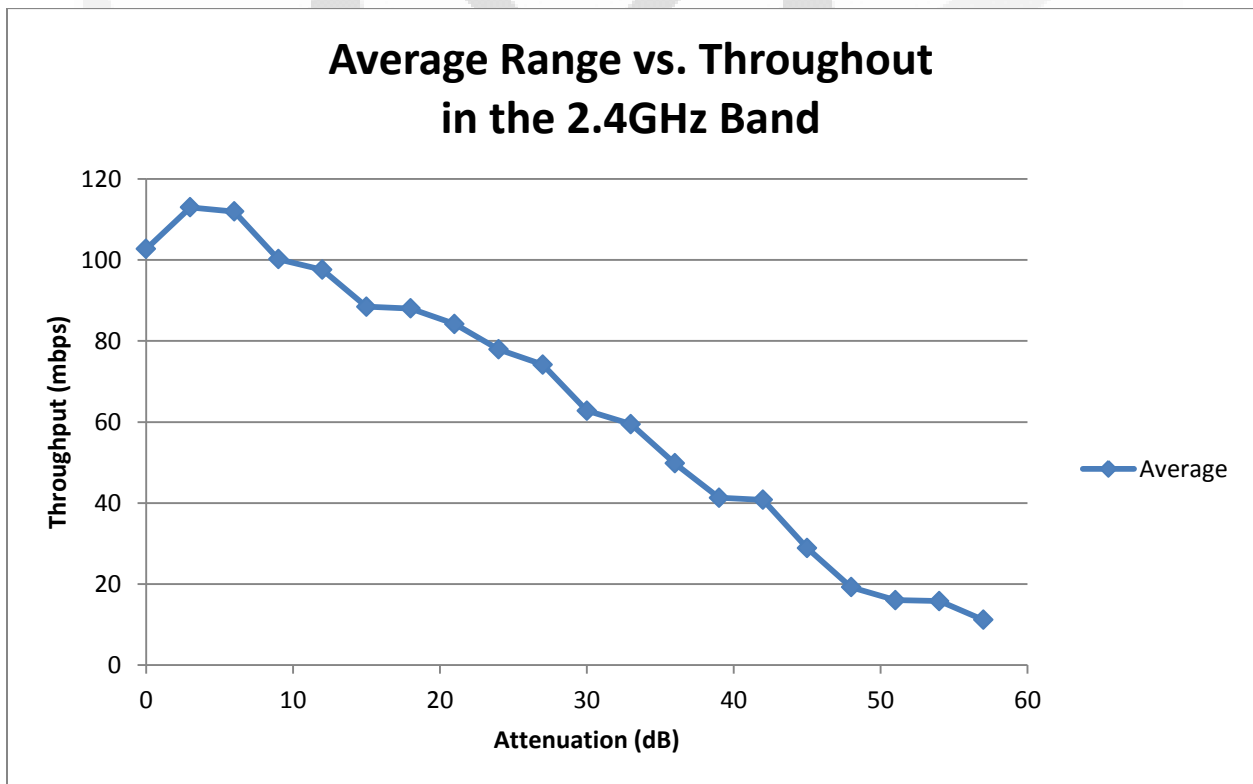


Chart 3 – Range vs. Throughput in the 5GHz Band

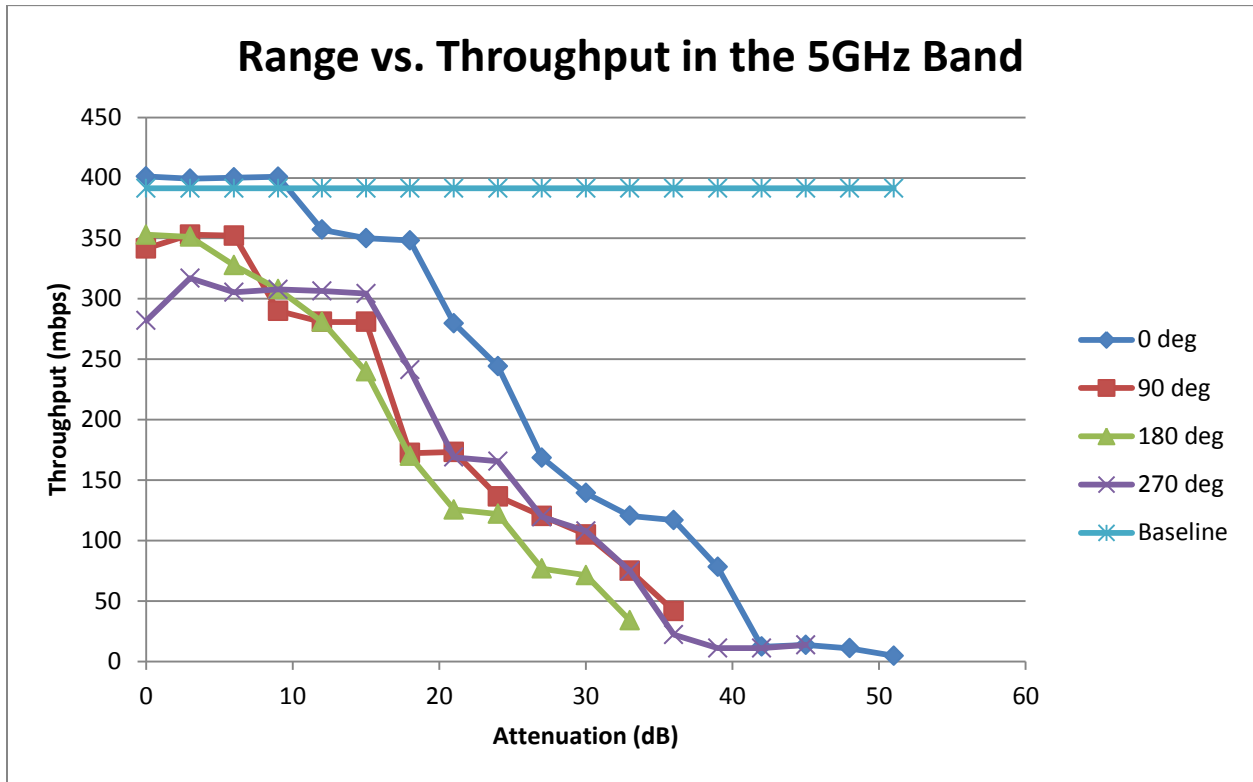


Chart 4 – Average Range vs. Throughput in the 5GHz Band

