

## Araknis Networks AN-100-AP-I-N WLAN Access Point

### 2.4GHz Rate/Range Performance versus Luxul, Pakedge & Ubiquiti Networks

#### EXECUTIVE SUMMARY

Wireless LANs (WLANs) have become the primary communications infrastructure for many homes and organizations. For smartphones and tablets it is typically the only supported communication method. For instance, MacBook Air is a WLAN-only system that no longer comes equipped with wired Ethernet.

Araknis Networks commissioned Tolly to benchmark the performance of its AN-100-AP-I-N WLAN Access Point (AP) against comparable single-band, 2.4GHz units from Luxul, Pakedge & Ubiquiti Networks at various distances.

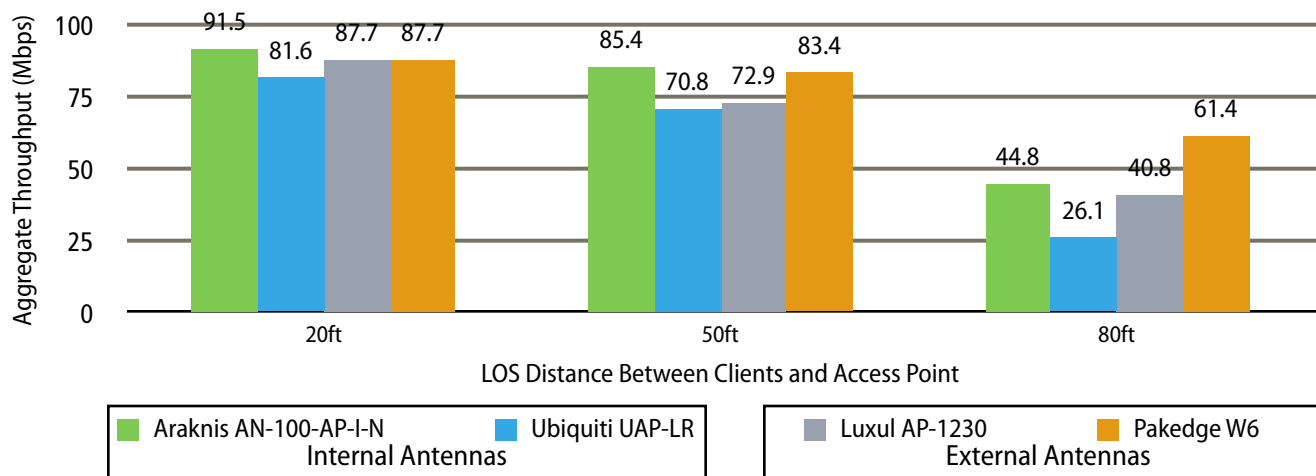
The Araknis Networks AN-100-AP-I-N delivered the highest throughput at 20 and 50 feet from the AP. See Figure 1.

#### THE BOTTOM LINE

The Araknis Networks AN-100-AP-I-N WLAN Access Point delivered:

- 1 Highest throughput at 20 feet
- 2 Highest throughput at 50 feet
- 3 Highest internal antenna throughput at 80 feet

**802.11n 2.4GHz WLAN Access Point Rate/Range 40MHz Channel Performance**  
Three-Client, Bidirectional Throughput  
(as reported by Ixia IxChariot v7.30)



Note: All testing was line of site. All devices used Channel 11 with power set to maximum whenever that option was available. Three runs of 3 minutes each, best used. While Ubiquiti unit status remained "green" and no errors were report, spectrum analysis showed Ubiquiti UAP-LR signal cycle on and off so 1 minute runs were used for that device.

Source: Tolly, October 2014

Figure 1



# Test Results

Testing was conducted at the various distances in a residential environment with no other wireless LAN access point radios enabled with channel 11 chosen to minimize any interaction with signals from WLAN systems in nearby buildings.

Tolly engineers deployed comparable APs and, wherever possible, configured them identically. Two systems implemented their antennas internally and two systems had external antennas. For details of systems under test, see Table 1.

Three clients were used representing the common client types of: notebook computer, tablet and smartphone. Tests used Ixia IxChariot to drive traffic between

the 3 WLAN clients and a single, wired Ethernet client. See Table 3.

## WLAN Bidirectional Performance

All tests measured traffic running simultaneously "downstream" from the wired client to the WLAN clients as well as "upstream" with the reverse flow. Tests were run three times and the best result used. See Figure 1 and Table 2 for all test results.


At 20 feet, the Araknis AN-100-AP-I-N AP delivered the highest throughput of all devices tested at 91.5Mbps irrespective of antenna configuration. The Luxul and Pakedge APs tied for second with 87.7Mbps followed by the Ubiquiti AP at 81.6.

At 50 feet, the Araknis AN-100-AP-I-N AP again delivered the highest throughput of

**Araknis Networks**

**AN-100-AP-I-N WLAN 2.4GHz Access Point**

**Rate/Range Performance**



*Tested October 2014*

all devices tested at 85.4Mbps irrespective of antenna configuration. The Pakedge followed with 83.4Mbps and the Luxul and Ubiquiti APs delivered throughput of 72.9 and 70.8Mbps respectively.

### Single-Band, 2.4GHz WLAN Systems Under Test

Vendor	Model	Description	Version	Configuration Notes	Antenna Location
Araknis Networks	AN-100-AP-I-N	100-series single-band wireless-N Indoor access point	0.9.9.6	Transmit power set to 29 dBm	Internal
Luxul	XAP-1230	High power wireless 300N commercial grade AP	4.0.3 (8/21/14)	No option found to set transmit power	External
Pakedge Device & Software Inc.	W6x	Enterprise-class ultra high power wireless-N AP	Pakedge_v1.7	Transmit power to highest setting of 29 dBm	External
Ubiquiti Networks, Inc.	UniFi AP-LR (UAP-LR)	UniFi enterprise WiFi systems. AP long range.	3.2.1.2601	Transmit power to "high"	Internal

Common configuration: All tests run using 2.4GHz spectrum. Security set to WPA2-PSK. Channel bandwidth 40Mhz, channel 11. Maximum transmit power. Firmware used was newest available as of week of October 13, 2014. The Ubiquiti AP required UniFi v3.2.5 controller for management.

Source: Tolly, October 2014

Table 1



802.11n 2.4GHz WLAN Access Point Rate/Range 40MHz Channel Performance
Three-Client, Bidirectional Average Aggregate Throughput
(as reported by IxChariot v7.30)

Table with 10 columns: AP Under Test, Client Distance from AP (feet) vs Average Throughput (Mbps), and sub-columns for 20, 50, and 80 feet (Downstream, Upstream, Total). Rows include Araknis AN-100-AP-I-N, Luxul XAP-1230, Packedge W6x, and Ubiquiti UAP-LR.

Note: All testing was line of site. All devices used Channel 11 with power set to maximum whenever that option was available. Three runs of 3 minutes each, best used. While Ubiquiti unit status remained "green" and no errors were report, spectrum analysis showed Ubiquiti UAP-LR signal cycle on and off so 1 minute runs were used for that device.

Source: Tolly, October 2014

Table 2

Finally, at 80 feet, the Araknis AN-100-AP-I-N AP delivered the higher throughput of the two APs that used internal antennas delivering 44.8Mbps compared with 26.1Mbps for the Ubiquiti Networks UAP-LR.

Test Setup & Methodology

Objective

The objective of the test was to benchmark the wireless LAN (WLAN) access points

(APs) to determine their throughput at various distances from the test clients.

Systems Under Test

All systems provided access point functionality and were marketed as commercial grade and/or enterprise-class devices. All devices were upgraded to the most current firmware available at time of test. Wherever possible, SUTs were configured with identical settings with respect to bandwidth, channels, transmit power and security. The SUT was connected to a router via a wired Ethernet connection and Gigabit Ethernet switch. The router provided DHCP addressing

services for the test clients and was disconnected from the test network during test runs. For SUT details, please see Table 1.

Traffic Generation Clients

Test traffic was generated using the Ixia IxChariot v7.3 benchmarking system. Three WLAN clients running the IxChariot Endpoint software communicated with a single IxChariot Endpoint that was connected via wired Ethernet connection to the test network via the aforementioned Gigabit Ethernet switch. IxChariot was configured to use the high performance throughput script with two pairs between

### Traffic Generation - IxChariot Client Systems

Connection Type	Device Type	Vendor	Model	Configuration	Wi-Fi module	Quantity
Wired	Desktop	Custom build	N/A	Intel Core i7-3770 3.40GHz, Windows Professional SP1 64-bit	N/A (Ethernet: Realtek PCIe GbE Controller)	1
WLAN	Tablet	Lenovo	ThinkPad 8 (20BN-000US)	Intel Z3770 Quad Core, Microsoft Windows 8.1 32-bit	Foxconn M.2 1216 802.11abgn (Broadcom BCM43241 with PA/LNA) (2x2)	1
WLAN	Laptop	Apple Inc.	MacBook Pro	Intel Core i7 2.66GHz OS X 10.7.5	Airport Extreme - Broadcom BCM 43xx 1.0 (802.11a/b/g/n)	1
WLAN	Smartphone	Samsung Electronics	Galaxy S5	Android v4.4	802.11 a/b/g/n/ac MIMO (2x2)	1

Notes: Each client ran IxChariot Endpoint v7.x or 8.x as appropriate. The wired endpoint also ran the IxChariot Console function v7.30 EA.

Source: Tolly, October 2014

Table 3

each WLAN and the wired endpoint. Reporting mode was batch.

## Environment & Setup

Testing was conducted in a residence with no other WLAN access points enabled. All testing was line of sight (LOS). SUTs were positioned so that the back of the AP was facing toward the clients. Tests were run at the following distances from the AP: 20, 50, and 80 feet.

All systems used Channel 11 with a bandwidth of 40MHz. Wherever possible transmit power was set to the maximum setting.

Three WLAN clients were run simultaneously for the benchmark testing. Clients were situated at the same distance from the AP under test and were situated within roughly a four foot horizontal space at table level. The AP under test was placed


at approximately three feet above the floor. For details of the traffic generation clients, see Table 3.

All testing used the IxChariot High Throughput script. A total of six pairs were used providing bidirectional traffic between each WLAN client and the wired IxChariot endpoint. Run time for each test was three minutes at each test location. Tests were run in batch mode with results reported by endpoints only at the end of each test. In cases where some stations

might time out during the 80 feet run, the IxChariot run time option was changed from batch reporting to interactive reporting to be certain that test results could be gathered from the run. Tests were run at least three times at each distance and the best result for each SUT was used.

### Test Equipment Summary

The Tolly Group gratefully acknowledges the providers of test equipment/software used in this project.

Vendor	Product	Web
ixia	IxChariot v7.30 EA	 <a href="http://www.ixiacom.com">http://www.ixiacom.com</a>



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