**TEST REPORT**

Tolly.

**#215131**

June 2015

**Commissioned by
AirMagnet**

# AirMagnet Spectrum XT

## WLAN Interference Detection & Identification vs. MetaGeek Wi-Spy DBx + Chanalyzer

## EXECUTIVE SUMMARY

With the broad adoption of wireless networks in enterprises and the growth accelerated by the new 802.11ac standard wireless networks are no longer a "nice to have" addition to the enterprise space. When deploying a WLAN environment, IT staff need to confidently rule out any RF interference-generated impact on Wi-Fi network performance and maximize troubleshooting efficiency by using a spectrum analyzer. If not addressed, RF interference will cause the network to underperform, leading to frustrated end users.

AirMagnet commissioned Tolly to benchmark the interference identification and detection of their Spectrum XT and compare it to the MetaGeek Wi-Spy DBx + Chanalyzer. AirMagnet Spectrum XT offers automatic interference identification and greater accuracy of identifying interferers in a single attempt at all distances tested. See Figure 1. In addition, AirMagnet Spectrum XT provides a means to find a device and create a custom signature.

## THE BOTTOM LINE

AirMagnet Spectrum XT provides:

1  Automatic interference identification and classification of devices

2  100% accuracy of identification at all distances tested

3  Simple and intuitive signature adoption with ability to share with others

4  Multi-band support to locate devices quickly



**WLAN Interference Detection & Identification**
**Percentage of Interfering Devices Detected on First Attempt**
**(8 Devices in 2.4GHz Range)**

Notes: LOS is line-of sight or unobstructed view.

Source: Tolly, June 2015

Figure 1
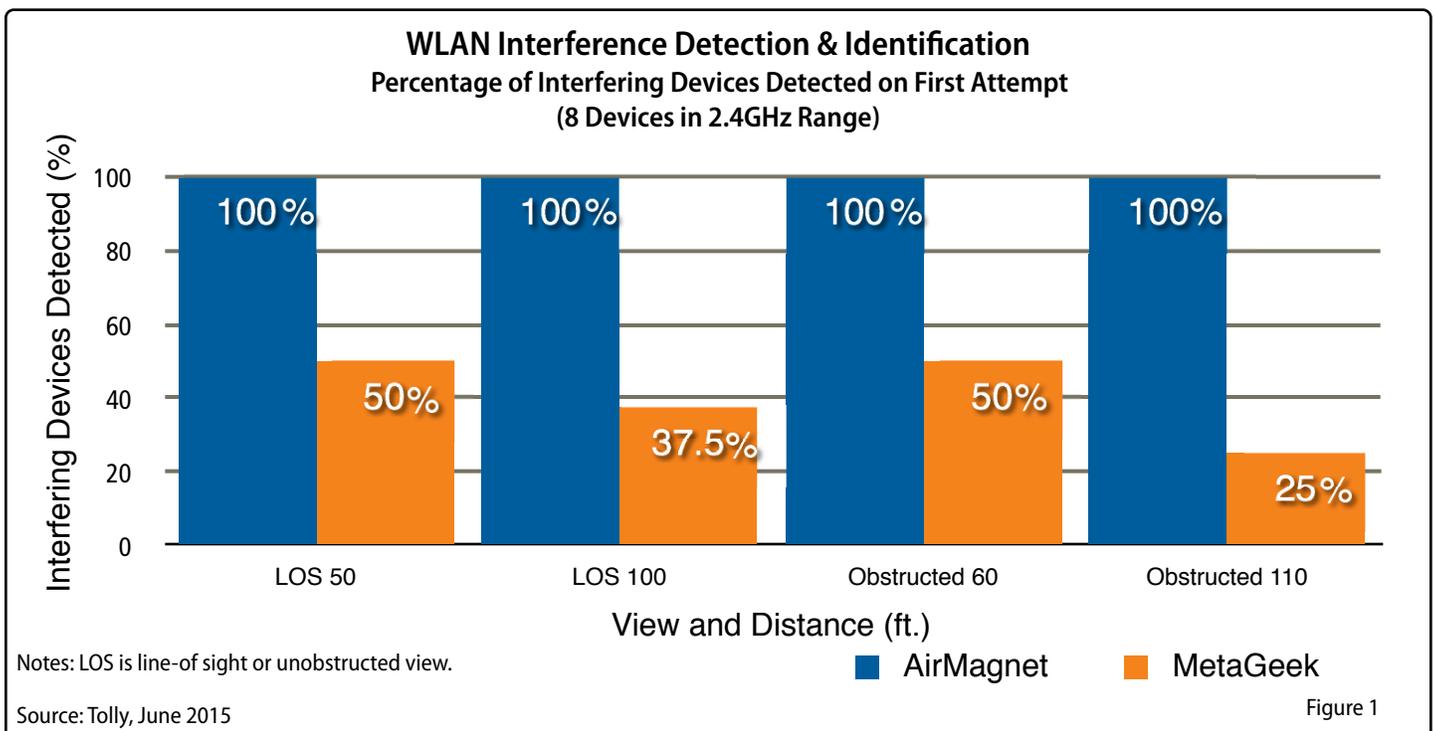
Tests were conducted in an active office environment with obstructions and interference. All identification tests of interfering devices were run at various distances using the same interferers and without the Tolly engineer knowing what device was turned on.

# Test Results

## Interferer Identification

The AirMagnet Spectrum XT offers users the ability to identify the interferers automatically. In contrast, the MetaGeek Wi-Spy DBx + Chanalyzer does not offer automatic interference identification and requires the user to manually review their interface and determine the appropriate classification. This takes the user additional time and increases the chance of user error. See Figure 2.

**Interferer Detection Interface: AirMagnet vs MetaGeek**
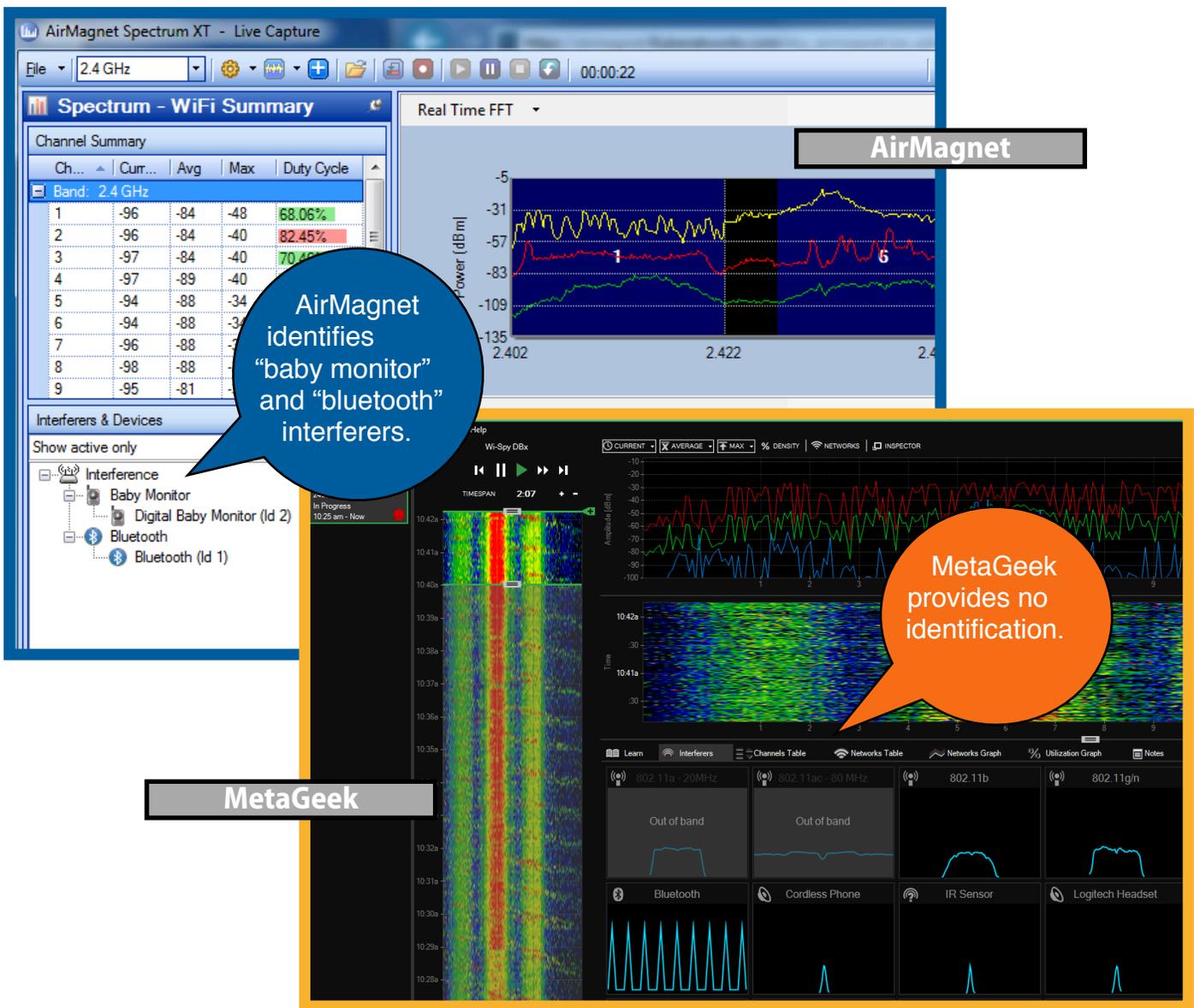


Source: Tolly, June 2015

Figure 2

# Interferer Detection and Identification at Various Distances

As AirMagnet Spectrum XT offers users automatic interferer identification, it correctly identified 100% of the various interferers tested at all distances, which included line of sight and obstructed view. The intuitive interface allowed the Tolly engineer to identify the interferers more rapidly- in some cases in just 5 seconds.

In contrast, with the absence of automatic interferer identification in the new MetaGeek release, the Tolly engineer relied on identifying the interferer manually. This manual approach took the Tolly engineer at least 9X times as long to identify interferers and, in some instances, required multiple attempts at identifying the correct devices. In some cases, the Tolly engineer could not

**AirMagnet Spectrum XT WLAN Interference Detection & Identification**

Tolly Certified

*Tested June 2015*

## WLAN 2.4GHz Interference Detection & Identification Detailed Results
### Detection Status , Time-To-Detection and Number of Attempts at Various Distances Line-of-Sight and Obstructed Views
### (Distances in feet, Detection times in minutes:seconds. Attempts in parenthesis if more than 1)

| Interfering Device (2.4GHz) | AirMagnet Spectrum XT | | | | MetaGeek Wi-Spy DBx + Chanalyzer | | | |
|---|---|---|---|---|---|---|---|---|
| | Line of Sight View (ft) | | Obstructed View (ft) | | Line of Sight View (ft) | | Obstructed View (ft) | |
| | 50 | 100 | 60 | 110 | 50 | 100 | 60 | 110 |
| Cordless Phone FH | :14 | :11 | :15 | :12 | ✘ | 1:46 (2) | :50 | 1:58 (2) |
| Cordless Phone Analog | 11 | :09 | :06 | :08 | 1:00 | :49 (2) | 1:30 | 1:54 (2) |
| Cordless Phone Spread Spectrum | :05 | :10 | :05 | :14 | :48 | :35 | 1:00 | :21 |
| ZigBee Transmitter | :07 | :15 | 2:46 | 1:05 | 1:26 (2) | ✘ | 1:46 (3) | 1:43 (2) |
| Baby Monitor | :12 | :09 | :41 | :07 | 2:54 (2) | 1:51 (3) | 1:46 (3) | 2:50 (4) |
| Wireless Camera | :05 | :07 | :09 | :18 | 1:26 | 1:03 | 1:46 (3) | 1:41 (2) |
| Microwave Oven | :28 | :16 | :05 | :23 | :42 | 1:38 | :40 | ✘ |
| Infrared Motion Sensor | :05 | :14 | :04 | 1:05 | :56 (2) | 1:46 (3) | 1:46 (3) | 1:16 |
| **Percentage Detected on First Attempt** | 100% | 100% | 100% | 100% | 50% | 37.50% | 50% | 25% |

Note: Green represents that interfering device was identified on the first attempt, yellow represents subsequent attempt, red represents that it was not identified within 3 min. When identified, the number after the check mark represents the number of minutes:seconds needed by the system under test to identify the interfering device. Percentage detected shown graphically in Figure 1.

Source: Tolly, June 2015

Table 1

correctly identify the actual interfering device within the 3 minute test window. See Table 1 and Figure 1 for results and Table 4 for details of the interfering devices.

## Custom Signature Creation

The goal of this test was to evaluate the process a user would go through in creating a custom device signature and adding it to the tool. We utilized a Netgear VMB3000 home video device system for the test.

With AirMagnet Spectrum XT the Auto-FFT function automatically defines the wave shape of the interferers. The user can then choose from these wave shapes to create a custom signature. Once created the custom signature is shown in the interferer identification window. See Figure 3.

MetaGeek Wi-Spy DBx + Chanalyzer also offer users the ability to create custom signatures. However, their approach requires the user to manually identify the interferer, select the relevant portion of the spectrum, then create the custom signature. Identifying with the custom signature requires the user to match the signature with the pattern chosen. See their identification and classification in Figure 3.

AirMagnet Spectrum XT also allows multiple users to share custom signatures among them via the import/export feature. Per Tolly's interaction with MetaGeek they advised that the Wi-Spy DBx + Chanalyzer does not offer these feature.

## Locating an Interferer

The final test was a practical evaluation where Tolly engineers attempted to locate five unknown, hidden interferers within a 25 minute test period for all devices.

This test of locating interferers again showed the benefit of AirMagnet Spectrum XT offering automatic interferer identification. Tolly engineers were able to identify and locate each of the five devices hidden. In the case of the MetaGeek Wi-Spy DBx + Chanalyzer, Tolly engineers were able to locate only two of the five devices hidden before the test period expired.

With AirMagnet Spectrum XT users can locate the interferer on the product interface and then double-click on the interferer to begin the "find" process.

The manual approach of the MetaGeek Wi-Spy DBx + Chanalyzer required the Tolly engineers to first define the relevant portion of the spectrum before beginning the "find" process. The selection of the relevant portion of the spectrum required additional time by the Tolly engineer before he could begin the search.

AirMagnet Spectrum XT offers the ability to find interferer devices in both 2.4GHz and 5GHz. Per Tolly interaction with MetaGeek they advised that the Wi-Spy DBx + Chanalyzer device finder only supports 2.4GHz. See Table 2 for results and Table 4 for details of the interfering devices.

# Test Setup & Methodology

## Objective

The objective of the test was to benchmark the wireless LAN (WLAN) interference detection and identification using spectrum analyzer software.

## Use of Unlicensed Bands by Wi-Fi Products

Wi-Fi technology operates on frequencies in the ISM and UNII bands.

These bands are unlicensed, meaning that no specific permission is necessary to operate equipment in these bands so long as the equipment complies with certain regulatory limits (for example transmission power).

At any given time, there could be a number of devices operating in an unlicensed band. These other devices can and often will interfere with Wi-Fi networks that are using the same frequencies, which impacts user throughput and causes unreliable network performance.

Identifying and addressing non-Wi-Fi interference therefor becomes a key factor to keeping a WLAN network running at peak performance.

## Systems Under Test

All devices were upgraded to the most current firmware available at time of test. See Table 3.

## Test Methodology

### Interferer Detection and Identification at Various Distances

A laptop with the spectrum analyzer product was placed on a rolling cart. This allowed for the height and locations to be kept constant across tests as the laptops were moved between locations. Interferers

**Custom Signature Creation for Netgear VMB3000 Video: AirMagnet vs MetaGeek**



Source: Tolly, June 2015                                                                                          Figure 3

**WLAN 2.4GHz "Locate Interferer" Test Results**
**(Checks for all devices located within the 25 minute test window)**

| Interfering Device (2.4GHz) | AirMagnet Spectrum XT | MetaGeek Wi-Spy DBx + Chanalyzer |
|---|---|---|
| Cordless Phone FH | ✔ | ✘ |
| Cordless Phone Spread Spectrum | ✔ | ✔ |
| ZigBee Transmitter | ✔ | ✘ |
| Baby Monitor | ✔ | ✔ |
| Wireless Camera | ✔ | ✘ |

Note: Check represents that interfering device was located, X represents that it was not located within 25 minutes. See Table 4 for details.

Source: Tolly, June 2015                                                                                     Table 2

were kept behind a screen to ensure that the Tolly engineer was not aware of what device was turned on as he attempted to find a match. The tests were conducted at two line of sight distances, which were 50 and 100 feet. The obstructed view test was conducted at 60 and 110 feet. Wrong answers were tallied until the Tolly engineer correctly identified the interferer, or timed out at 3 minutes at which point the correct answer was revealed.

## Custom Signature Creation

To determine the time and steps needed to create a custom signature, Tolly engineers used a Netgear VMB3000 Video Camera with base station.

**WLAN Interference Detection Solutions Under Test**

| Solution | Version | Platform | Wireless Adapter |
|---|---|---|---|
| AirMagnet Spectrum XT (AM/B4070) | 3.6.2 | Dell Latitude E6440 (Intel i7-4610M) running Microsoft Windows 7 SP1 | Intel Centrino Ultimate-N 6300 AGN Driver version: 15.9.2.2 |
| MetaGeek Wi-Spy DBx + Chanalyzer (Diagnose Dual-Band) | 5.8.0.2 | ASUS G750-JZ (Intel i7 4700HQ) running Microsoft Windows 8.1 | Bigfoot Networks KillerN-1202 Notebook Wireless Card |

Source: Tolly, June 2015                                                                                     Table 3

## 2.4GHz WLAN Interferer Details

| Name | Description |
|---|---|
| Cordless Phone FH | Panasonic KX-TG2700 (Frequency hopping) |
| Cordless Phone Analog | GE 27928GE3 |
| Cordless Phone Spread Spectrum | Sony SPP-A2780 (Spread Spectrum) |
| ZigBee Transmitter | Xbee-PRO-PKG |
| Baby Monitor | Summer Infant 02320 |
| Wireless camera | X10 XC18A |
| Microwave Oven | Panasonic NN-SN651B |
| Infrared Motion Sensor | Optex MX-40PI |

Source: Tolly, June 2015

Table 4

## Locating an Interferer

Four (4) interfering devices, which consisted of two cordless phones (frequency hopping and spread spectrum), a baby monitor, and a ZigBee transmitter, were set up in the same area as the previous tests and the user was asked to find the interfering device using the locating portion of each tool. The Tolly engineer was not aware of the location of the devices within the test area. For both products Tolly engineers used a new antenna configuration as recommended by the vendor. For AirMagnet Spectrum XT that is their external flag antenna, for Metageek Wi-Spy DBx +Chanalyzer that's their DeviceFinder antenna, which only can locate 2.4GHz devices. See Table 4 for details of the devices.

## About Tolly

The Tolly Group companies have been delivering world-class IT services for more than 25 years. Tolly is a leading global provider of third-party validation services for vendors of IT products, components and services.

You can reach the company by E-mail at sales@tolly.com, or by telephone at +1 561.391.5610.

Visit Tolly on the Internet at: http://www.tolly.com

## Interaction with Competitors

In accordance with Tolly's Fair Testing Charter, Tolly personnel invited representatives from MetaGeek to participate in the testing. MetaGeek agreed to participate in the evaluation. MetaGeek advised after reviewing the test cases that the new version of their software no longer supports automatic interferer classification. MetaGeek also advised that their device finder only supports 2.4GHz and they do not have a signature template for microwave ovens.

For more information on the Tolly Fair Testing Charter, visit:

http://www.tolly.com/FTC.aspx

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