The Verification Experts

Air Expert Series

Why Your Hotspot Matters

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1. Cutting the Cord

It's hard to imagine a world today without mobile devices where communication, business, news and personal lives are all connected. As people connect to the Internet, gone are the days of wired technology. Most devices that we use don't even have an Ethernet LAN port anymore and the only way we communicate, work, or stream video and audio in our local networks is through WiFi.

WiFi-enabled devices connect to the Internet via a WLAN network and a wireless Access Point (AP), or hotspot. Americans today have an average of four WiFi-enabled devices in their homes, and with the Internet of Things just around the corner – anything from the toaster to the water heater – they too will soon be chatting on our networks.

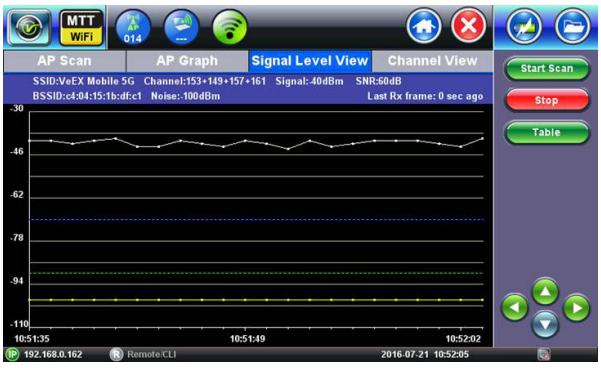
WiFi is the access technology of choice used not only in homes but in businesses and public spaces worldwide. It cannot be treated as a 'convenience' anymore, but as a Service, with all of the customer expectations that it entails. Yet very often this piece is overlooked during the installation process, leading to costly service calls and troubleshooting.

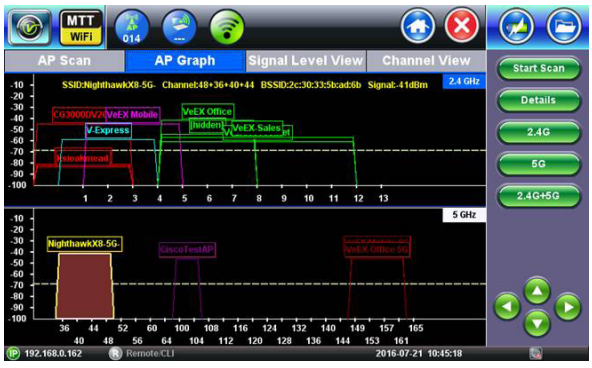
2. Not as Easy as It looks

It is true that WiFi is a very resilient technology that will connect in even the most adverse environments. But many wrongly assume that WiFi is a simple plug and play technology. Simply having a connection does not mean that it will perform optimally or reliably, and satisfy customer expectations. For this reason, a complete home installation plan should proactively survey the environment to ensure Quality of Experience for the user. It should include audits for WiFi coverage, interference, performance and security.

3. Signal Coverage

The basis of a home installation plan is to survey signal coverage, in order to discover dead zones. When the WiFi signal's Radio Frequency waves travel through the air between the Access Point and the client, they will encounter many physical obstacles including walls, dressers and mirrors. These obstacles will degrade the signal's strength and make it harder for the receiver to decode. The amount of degradation depends on the obstacle's nature. For example, a concrete wall attenuates signals more than a drywall. This explains why the signal's quality is not the equivalent in all the rooms or even within the same room. In most cases there will be no control over the environment, but by surveying the signal levels throughout the home, coverage can easily be predicted. In areas of low coverage, you can adjust the Access Point location or eventually add a wireless repeater, where an existing signal from the router is rebroadcasted to create a second network, ultimately improving signal range and coverage.

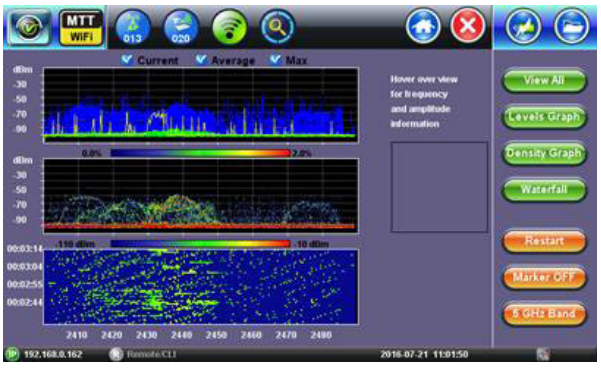


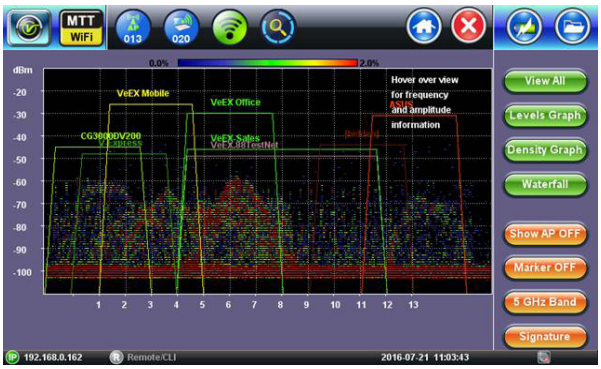


4. Interference from Neighbors and Other Devices

Neighbors often argue about overgrown trees or fence issues, but few would suspect that their neighbor's equipment could be the cause of their poor WiFi performance. Most home users never change the settings on their routers, with most routers defaulting to the same WiFi channel. In reality, a neighbor's Access Point located on the same or an adjacent WiFi channel reduces the available bandwidth. The WiFi RF channel is a shared medium, with each device only transmitting data when there is no other device transmitting, effectively dividing the available bandwidth between the number of devices attempting to transmit simultaneously. This sharing mechanism applies to devices connected to your own AP and to all devices connected to your neighbor's AP, if they are configured on the same or overlapping RF channel (provided that their signal is strong enough).

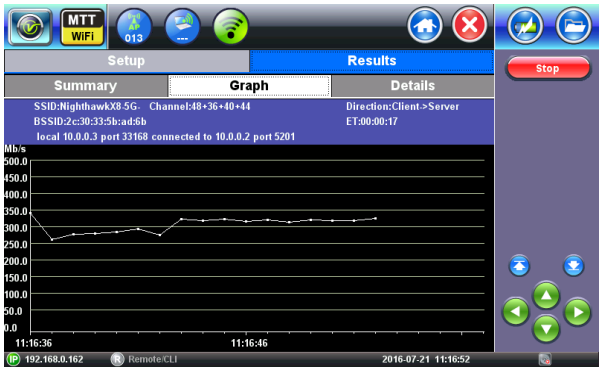
To make matters worse, other non-WiFi equipment, like a microwave oven or a baby monitor, could completely overpower the Access Point's signal and make it unintelligible to the receiver. This is in large part due to the fact that the Federal Communications Commission (FCC) opened up the 2.4 GHz and 5 GHz frequency spectrum for unlicensed use. Unlike AM or FM radio RF bands, where each transmitter is assigned a dedicated frequency, WiFi's frequency bands are available for anyone to use. The 2.4 GHz frequency band is one of the most heavily used, especially popular and crowded. It is used by many common devices including cordless phones, Bluetooth, wireless audio or video cameras. Interference by these competing devices contribute to poor WiFi performance. As a consequence, surveying the home's WiFi environment is an important step for a successful home installation, firstly by discovering the neighboring APs channel allocation, signal strength and utilization, since this can guide optimal AP channel selection. It is also essential to monitor the full RF Spectrum in order to identify sources of non-WiFi interference that could have a destructive effect on the signal.





5. Performance

Access Point vendors advertise incredible data rates, but in practice they can only be achieved in the best of circumstances. The further from the AP and the more obstacles in the way, the lower the speed at which the client device and AP will communicate. In addition, greater interference from WiFi or non-WiFi sources will cause more errors, resulting in more retransmissions. Protection mechanisms are built in the WiFi standards, to revert to the lowest speed when weak signal or errors are detected. The reality is that even with the latest 802.11ac Wave 2 equipment capable of 1.7 Gbps or more, the client might end up connecting at a fraction of that speed. Beyond basic connectivity testing, the customer's Quality of Experience can only be evaluated by real data traffic transmission between the customer's AP and client device and educating the customer about true WiFi performance and shortcomings.



6. Security

Since WiFi data travels over the air, anyone in the vicinity, with simply a computer and the right sniffer software program, can capture and decode data or connect to your home network. WiFi security has to be taken seriously and protection from intrusion and eavesdropping should be implemented. The home installation process should include verification of authentication and encryption and advanced troubleshooting capabilities, including detection and tracking of rogue Access Points and clients.

7. WiFi Air Expert Module

VeEX's WiFi Air Expert Module is the most complete and compact tool for WiFi networks discovery, survey, optimization, performance testing and troubleshooting. With an intuitive guided interface and ease-of-use, the WiFi Air Expert Module is the perfect test tool to ensure successful home WiFi installations.

- Supports detection and connection to 802.11a/b/g/n/ac devices
- Discovers the network and lists Access Points, Clients and Channels in table and graphical format
- AP detailed capabilities discovery including SSID, BSSID, channels, security, supported data rates, signal and noise levels, co-channel and adjacent APs and associated clients
- Survey coverage problems with signal and noise levels tracking
- Analyze Channel usage by utilization and number of APs
- Discover associated and non-associated WiFi Clients present in the network
- Locate rogue APs and clients with directional antenna
- Detect non-WiFi interference sources with built-in Spectrum Analyzer function

Notes

About VeEX®

Located in the heart of Silicon Valley, VeEX develops innovative test and measurement solutions for next-generation communication equipment and networks. Founded in April 2006 by test and measurement industry veterans, VeEX products blend advanced technology and vast technical expertise with the discerning measurement needs of customers.

VeEX products diligently address all stages of network deployment, maintenance, field service turn-up, and service verification features across DSL, Fiber Optics, CATV/DOCSIS, Mobile, Next-Generation Transport Network, Fibre Channel, Synchronous and Carrier Ethernet technologies. VeEX's multinational structure consists of several specialized business units operating in different parts of the world. VeEX has shipped more than 100,000 units since volume production began.

The VeEX team brings simplicity to tomorrow's networks.

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