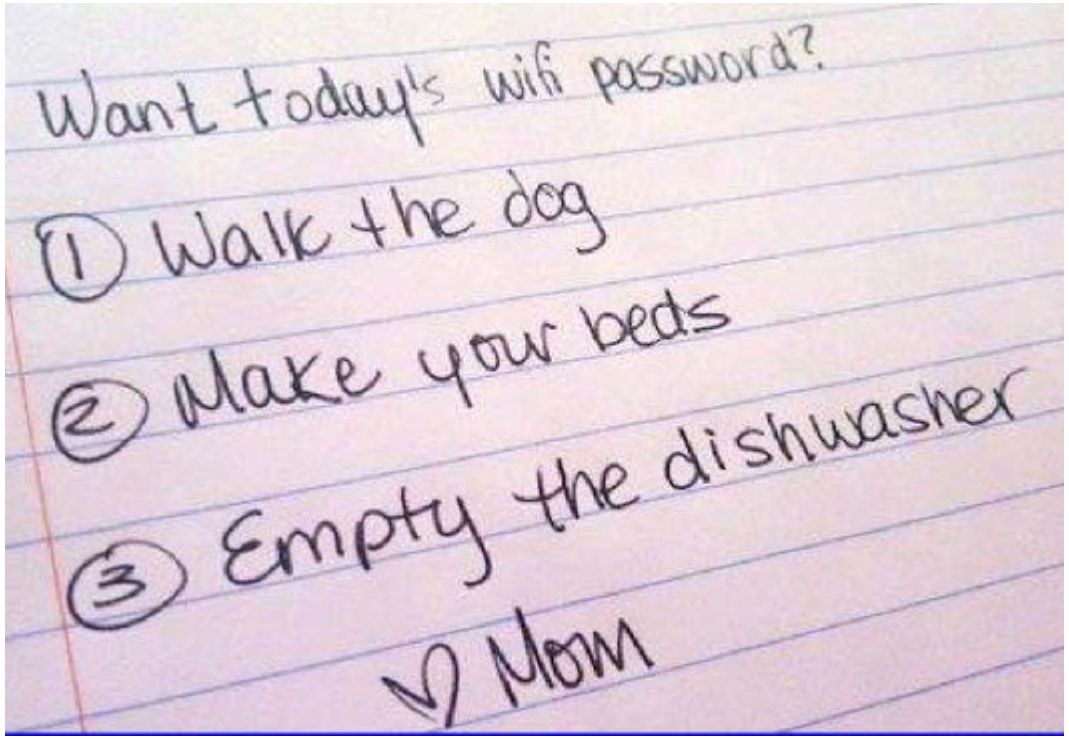
# Troubleshooting Common Wi-Fi Problems

Tom Resman - NetScout

It just has to work!


# What Wi-Fi Complaints Do You Typically Get?

- The Wi-Fi is too slow
- I keep getting disconnected
- I can’t roam
- I can’t connect to the wireless network

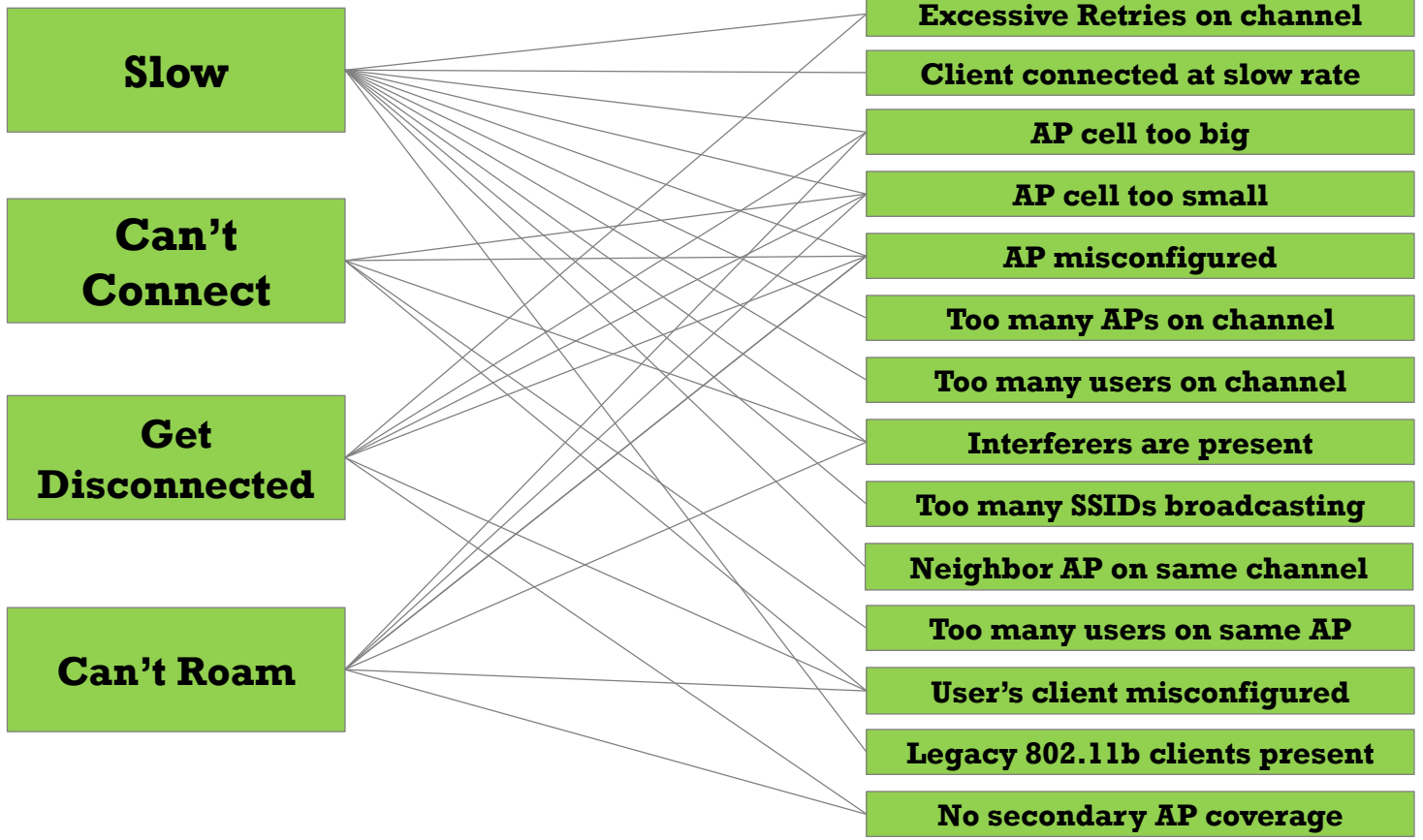


# What are the Causes Behind These Complaints?

- Mis-configuration
  - Access Points
  - Clients
- Coverage
- Capacity
- Co-Channel Interference
  - Your networks
  - Neighbor networks
  - Rogues
- Non Wi-Fi Interference
  - Persistent sources
  - Transient sources
- Security breaches and attacks

# Finding Root Cause is Complex

- Complaints
- Causes



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- Complaints
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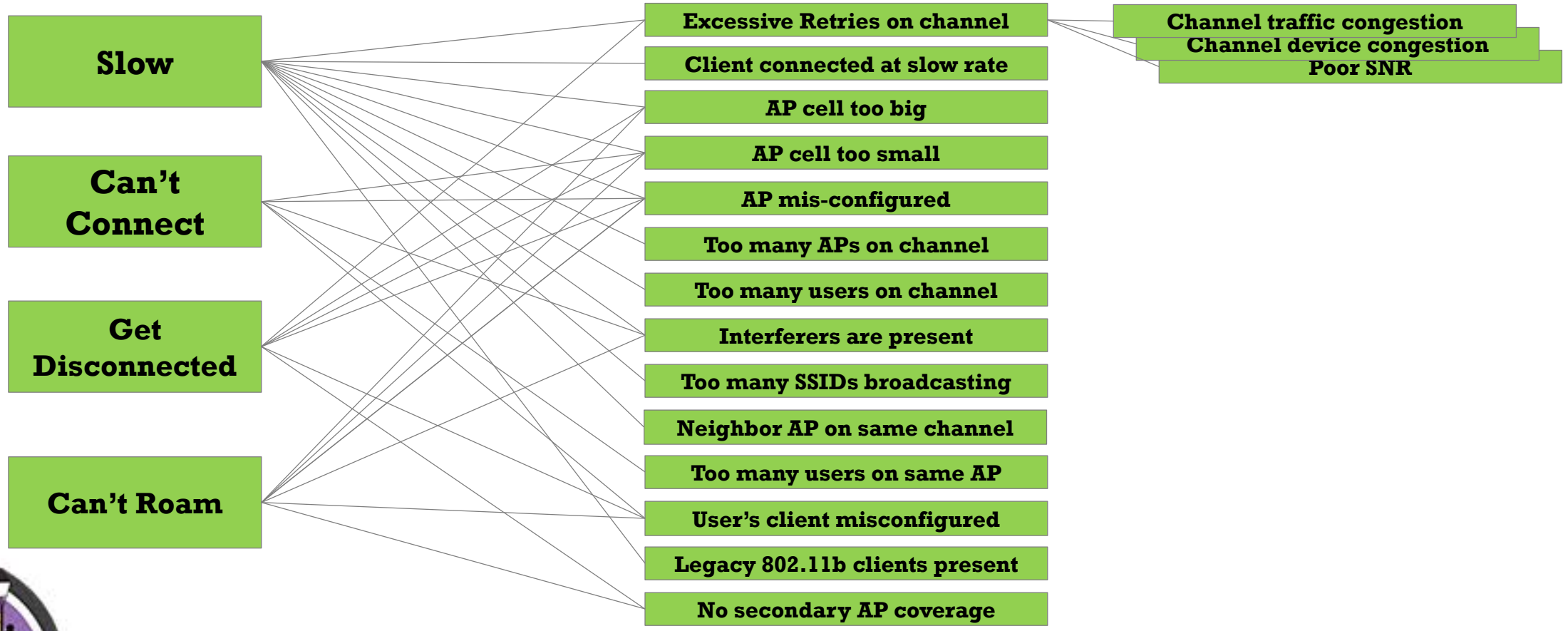
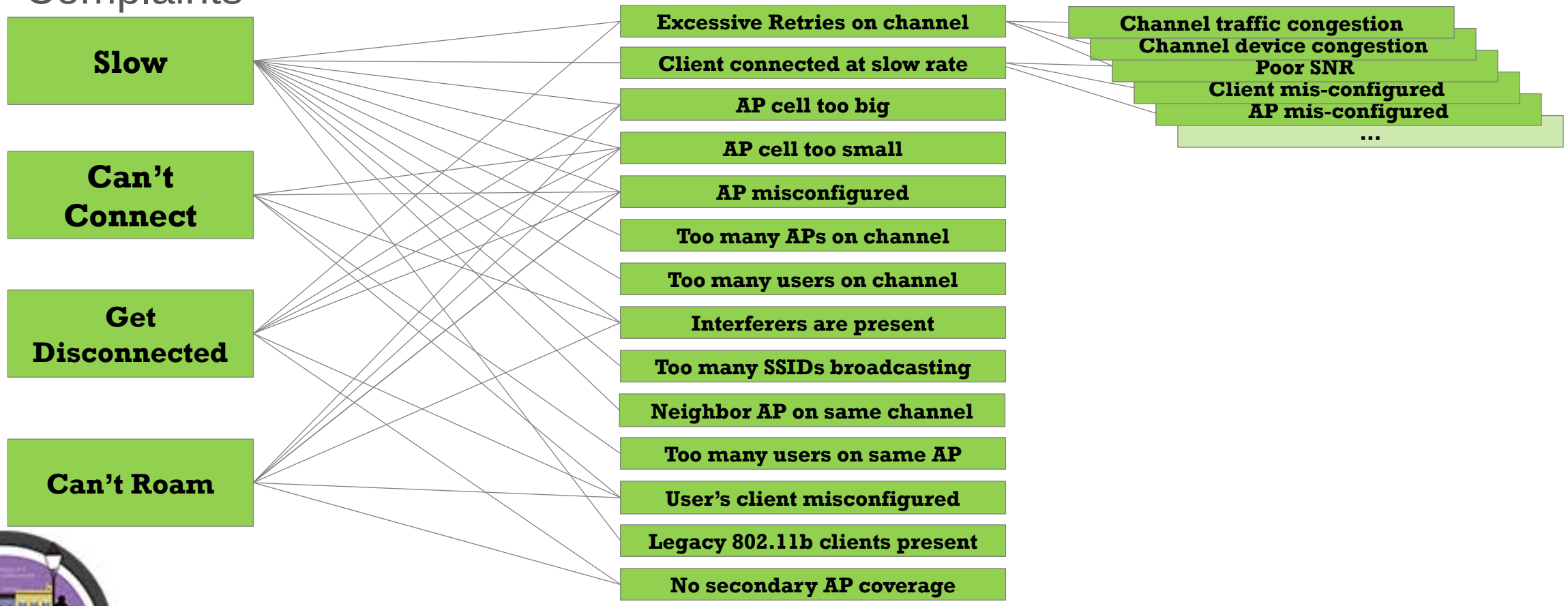


# Finding Root Cause is Complex

- Complaints
- Causes



# Key points

- Wi-Fi is location-dependent. Need portable tools to troubleshoot.
- Wi-Fi uses a time-shared medium… the channel.
- Signal Strength is important, but Signal/Noise Ratio is more-so.
- Critical KPIs include channel airtime utilization, SNR, retry rates.
- Client visibility is priceless.
- Every wireless network uses a wired network. Check for services.
- The right tools for the job makes all the difference.

- **So let’s look at each complaint and how it can be addressed…**

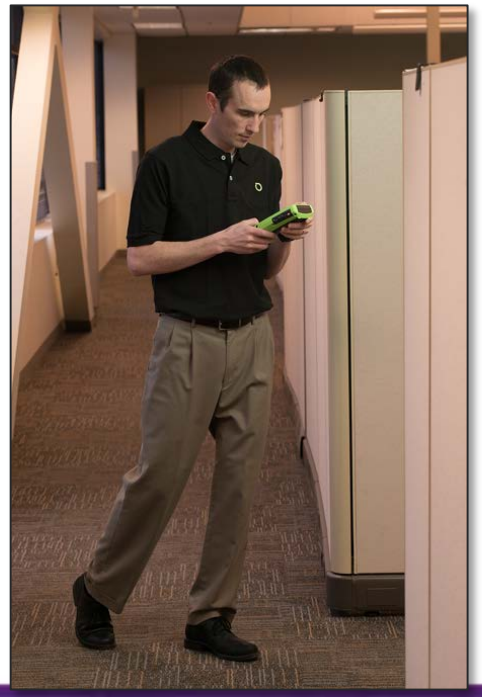
# “The Wi-Fi is too slow”

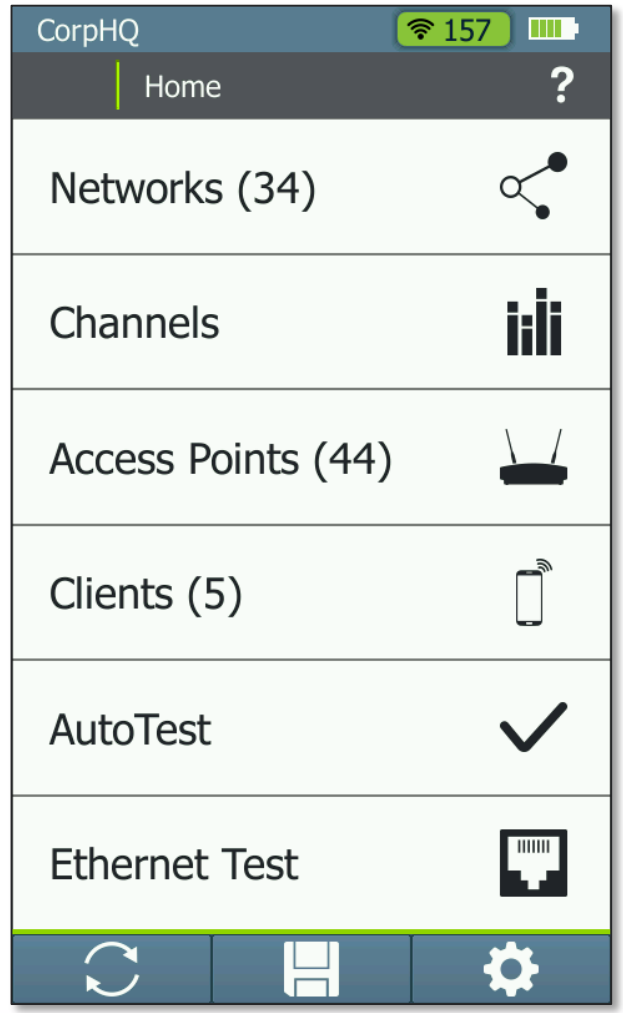
# What To Check For

- How many APs on the channel?
- Airtime utilization of the channel for Wi-Fi devices
  - Are there legacy clients present?
- Airtime utilization of the channel for non Wi-Fi devices
  - Are there any non Wi-Fi interferers on that channel?
- What AP is the customer connected to, and what rates are supported?

# What Dave the IT Tech Did (v1)

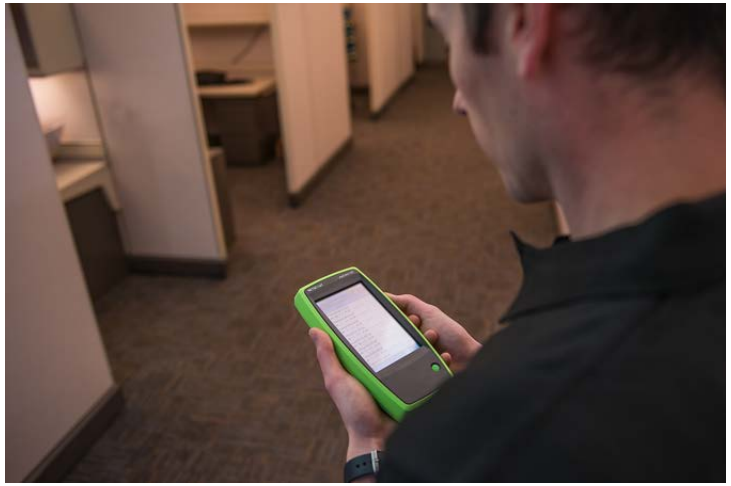
- Grabbed his AirCheck Wi-Fi Tester and went to the location of the user.

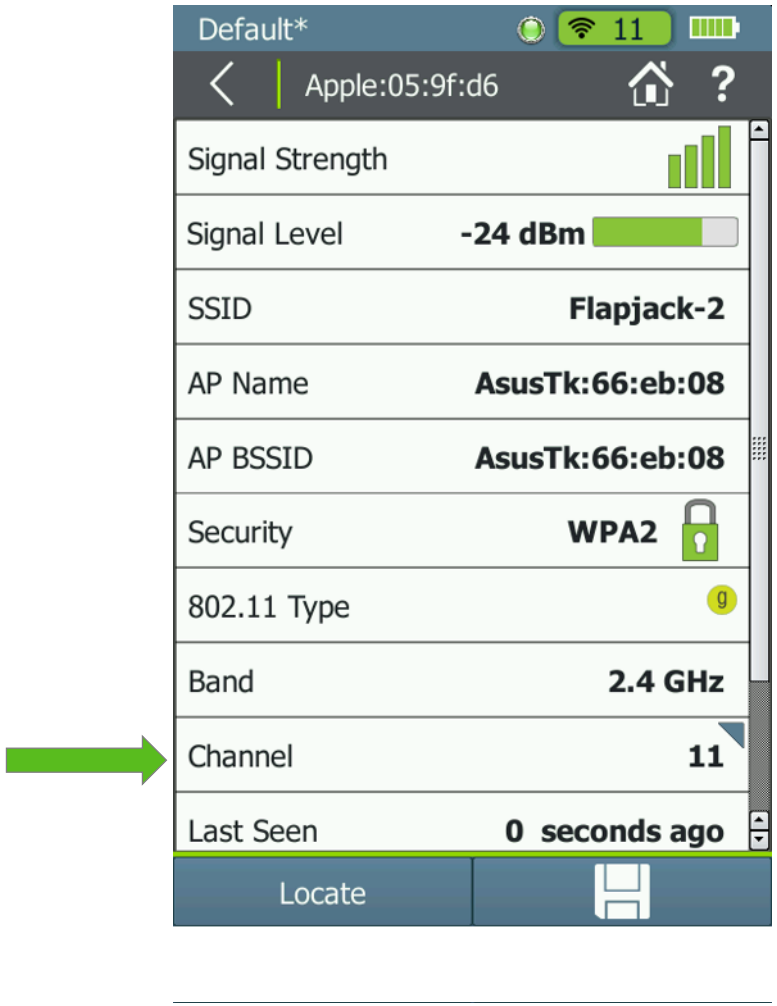




# What Dave the IT Tech Did

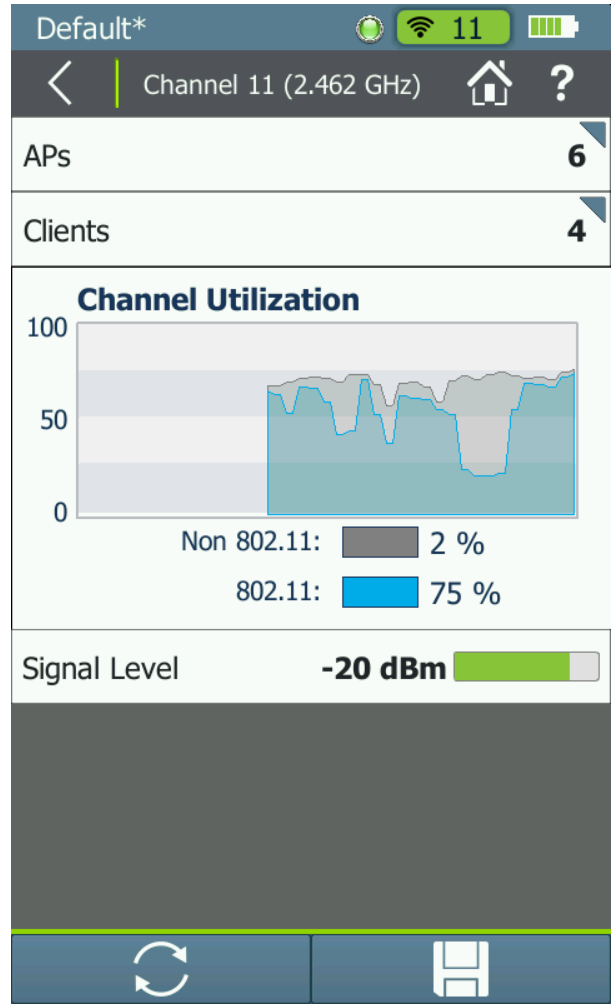
- Found the user's connection on his AirCheck Wi-Fi Tester, and identified its channel.





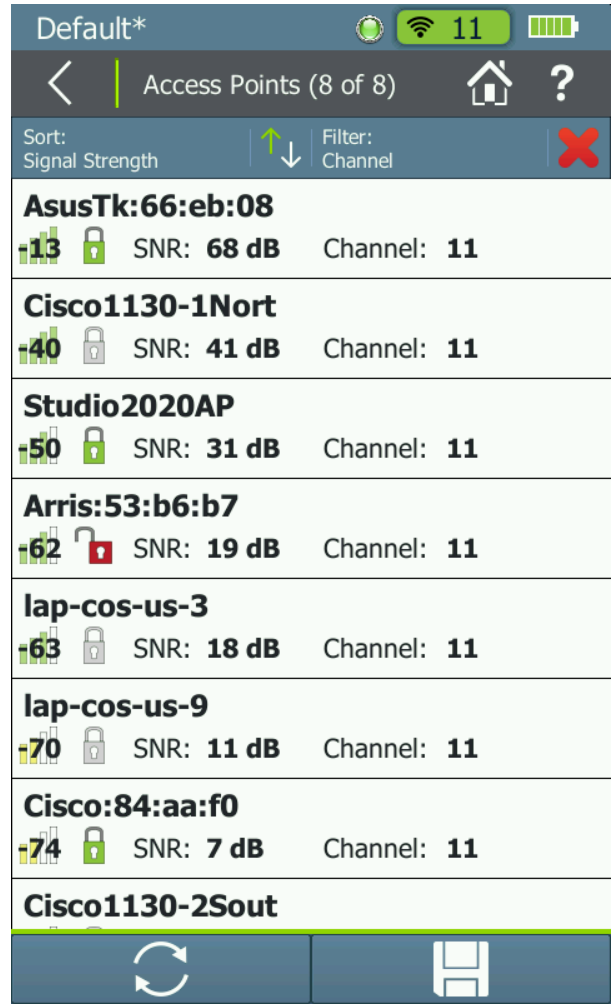
# What Dave the IT Tech Did

- Checked the channel and found too many APs on it.
- Corresponding 802.11 utilization was high.



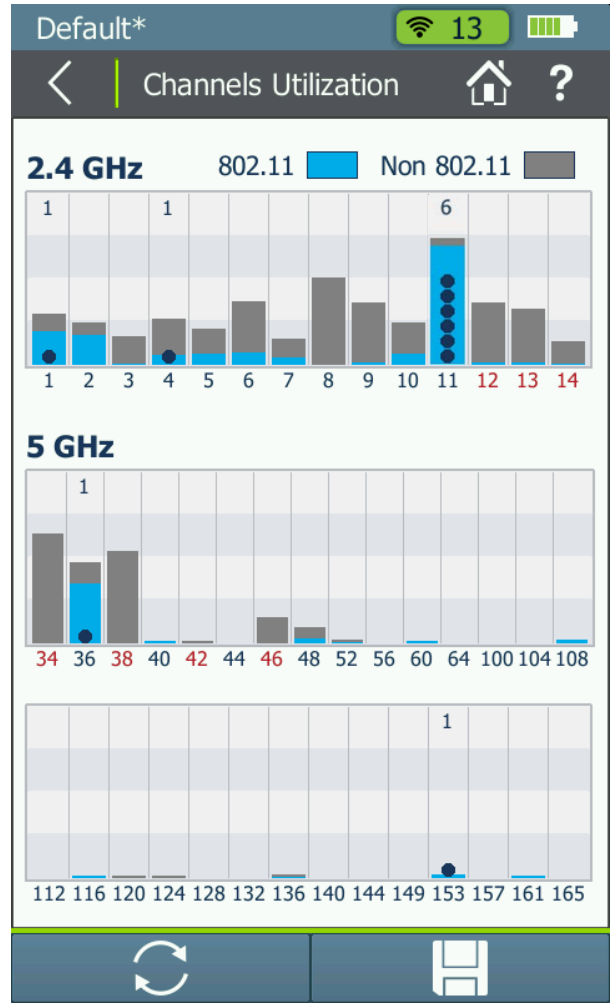
# What Dave the IT Tech Did

- Drilled to the APs on the channel and saw many neighbor network APs.



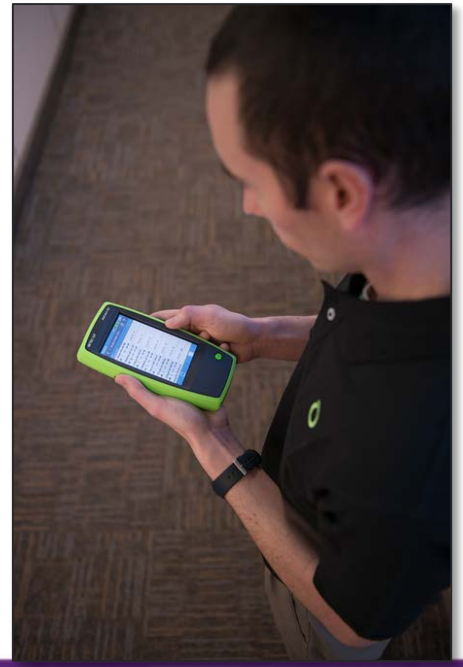
# What Dave the IT Tech Did

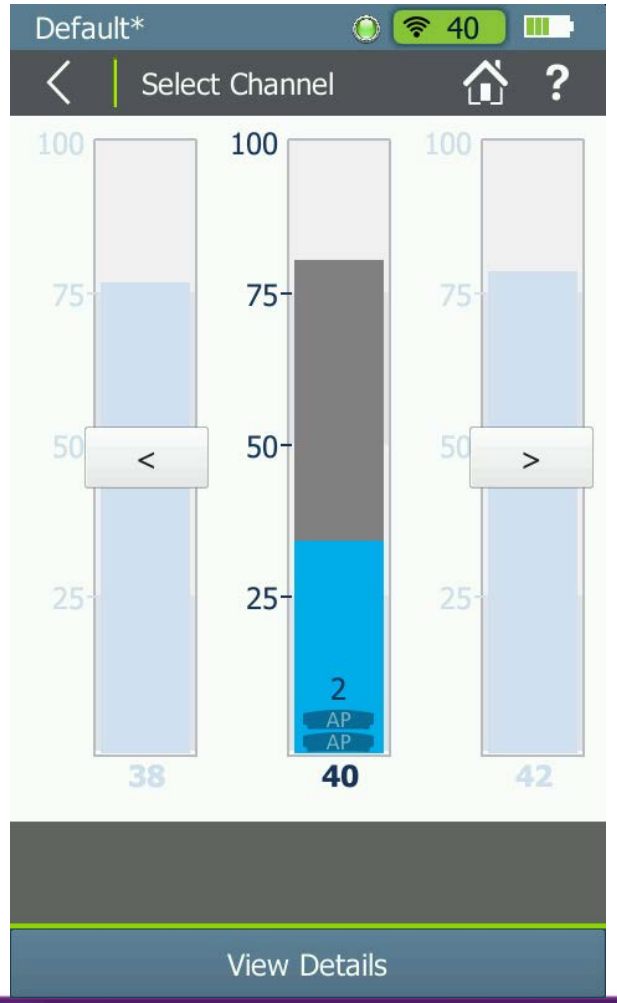
- Viewed other channels and found one much less used.
- Moved the AP to that channel.



# What Dave the IT Tech Did (v2)

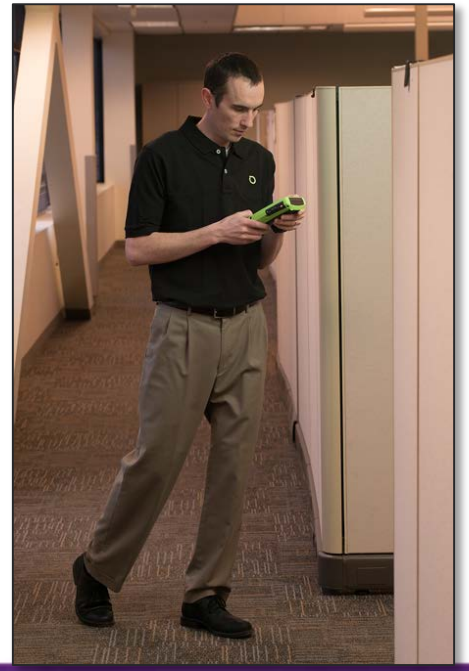
- Checked the channel that the client was on.
- Found 2 APs on the channel; didn't seem too bad

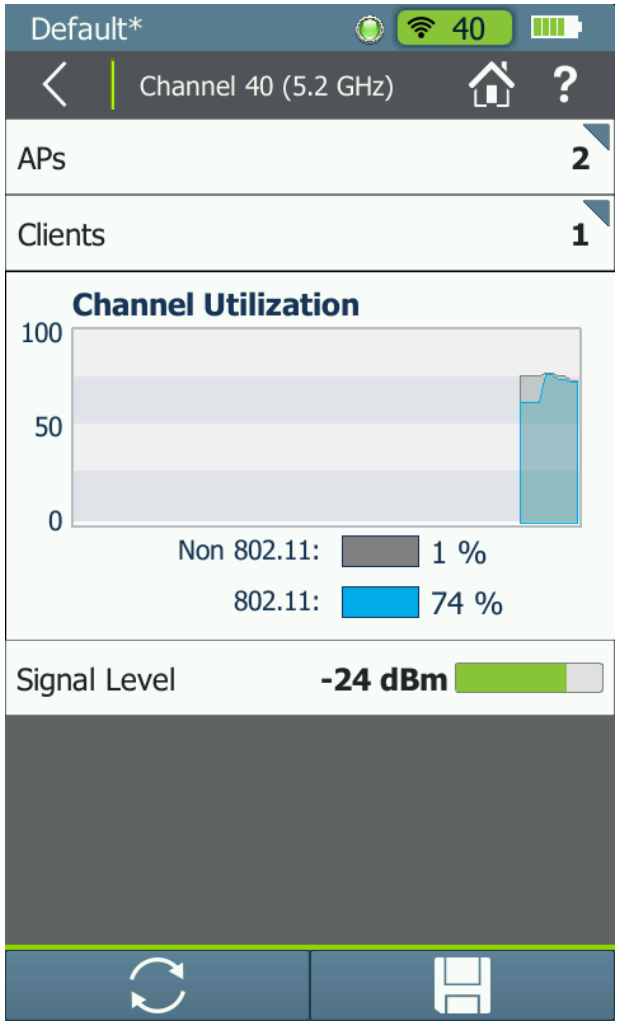




# What Dave the IT Tech Did (v2)

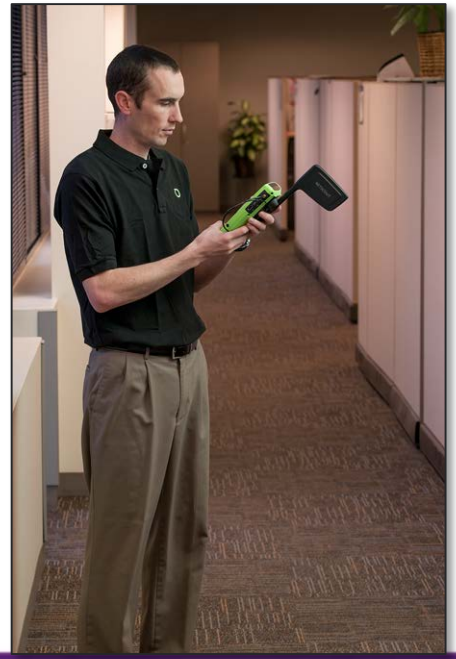
- Checked channel utilization and saw it was very high

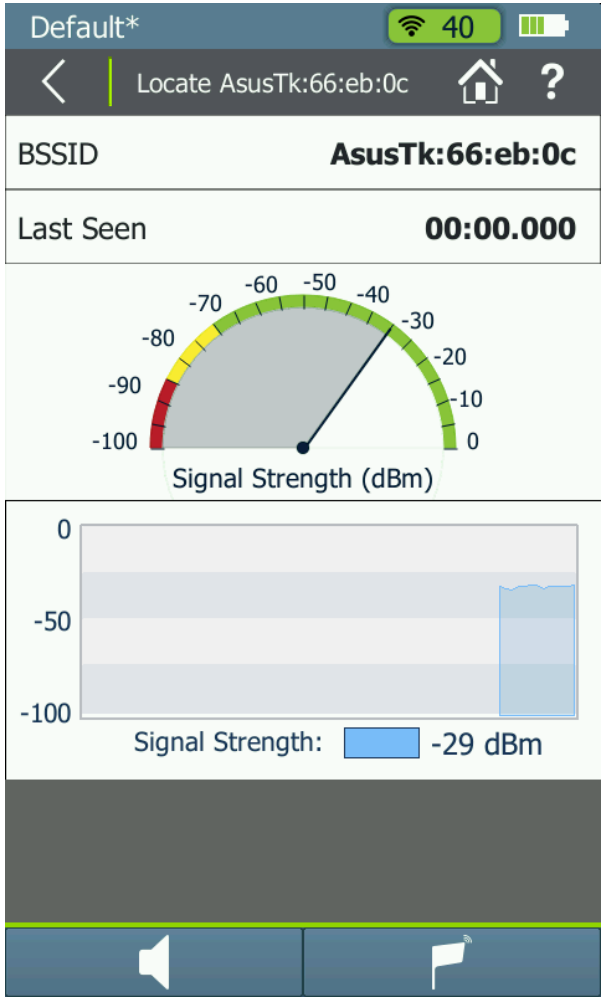




# What Dave the IT Tech Did (v2)

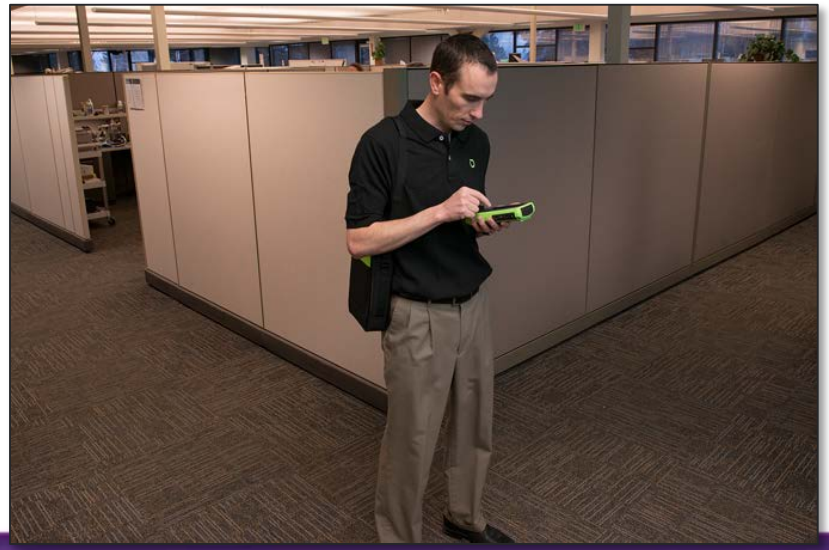
- Checked the APs on the channel and found one was not familiar.
- He located it.





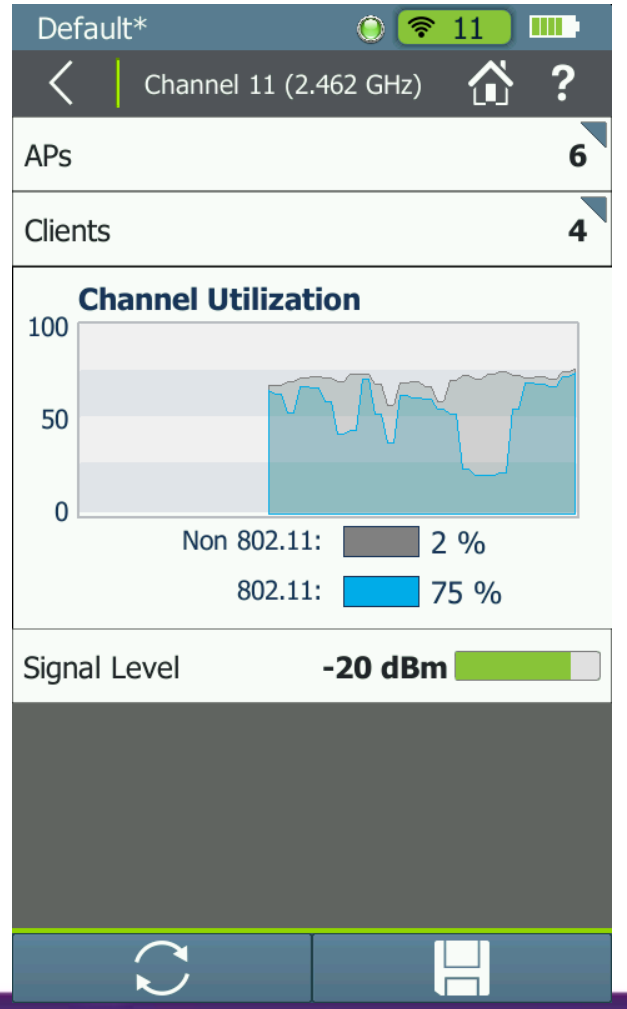
# What Dave the IT Tech Did (v2)

- Found a rogue AP that was transmitting large files. One AP and client caused over-utilization of the channel.
- Removing the AP killed two problems with one swipe - Score!



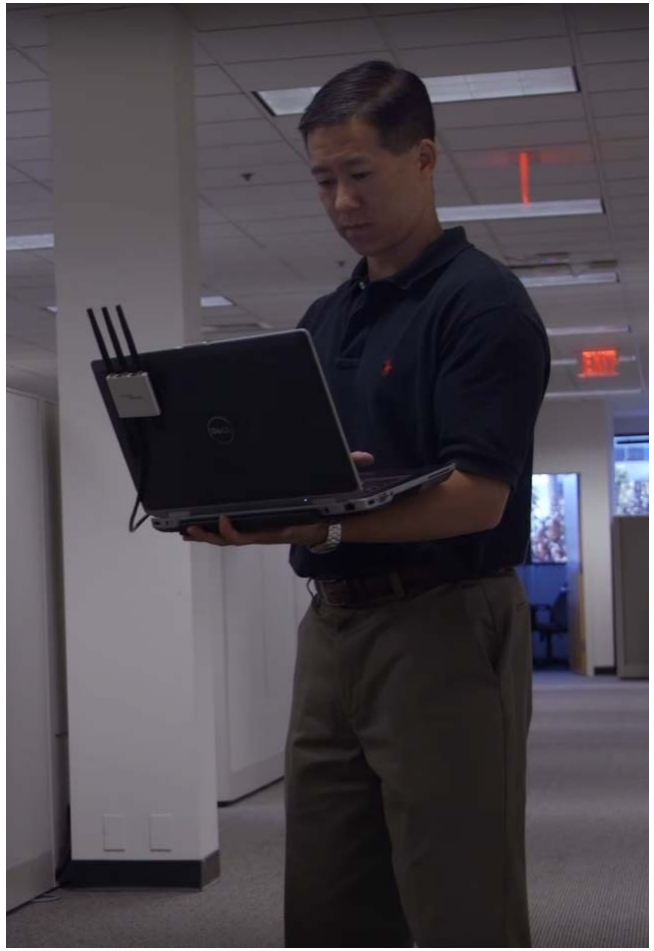
# What Dave the IT Tech Did (v3)

- Checked the channel and found 802.11 utilization was high.
- Could not determine why
- Notified Tom the engineer



# What Ed the engineer did

- Went to location of problem with the AirMagnet WiFi Analyzer PRO
- Scanned the channel



# What Ed the engineer did

- Saw high channel utilization, and most of it was low speed transmissions
- Saw high utilization due to Control Frames, and within that, RTS and CTS frames

# Diagnosis

- Excessive RTS/CTS frames often due to too many clients on a channel (not just an AP; it is the channel that is shared)
- Consider
  - Client load balancing
  - AP transmit power and cell size (clients connecting from too far away)
  - Another AP for capacity (if another channel is available)

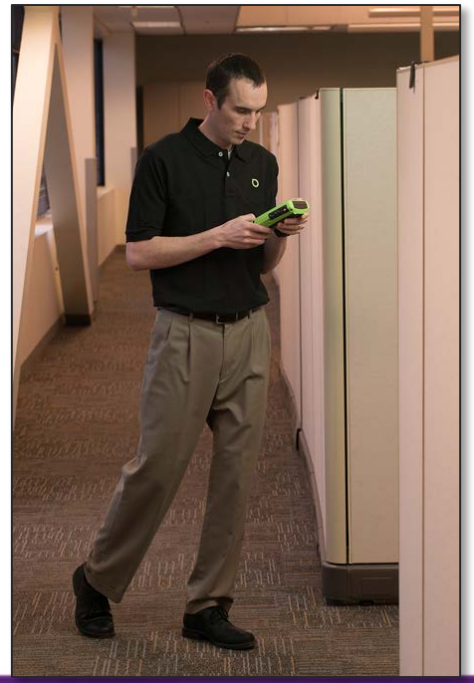
# “I keep getting disconnected”

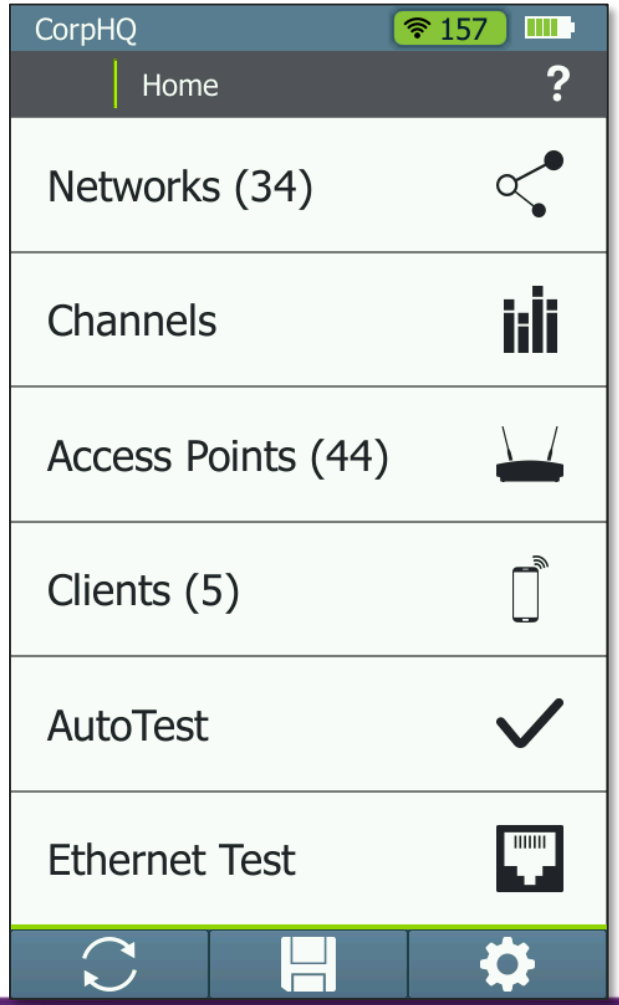
# What To Check For

- Are there interference sources present?
  - Signal levels and duty cycles
- Weak SNR at client location
- Is the client device configured properly?

# What Dave the IT Tech Did

- Grabbed his AirCheck Wi-Fi Tester and went to the location of the user





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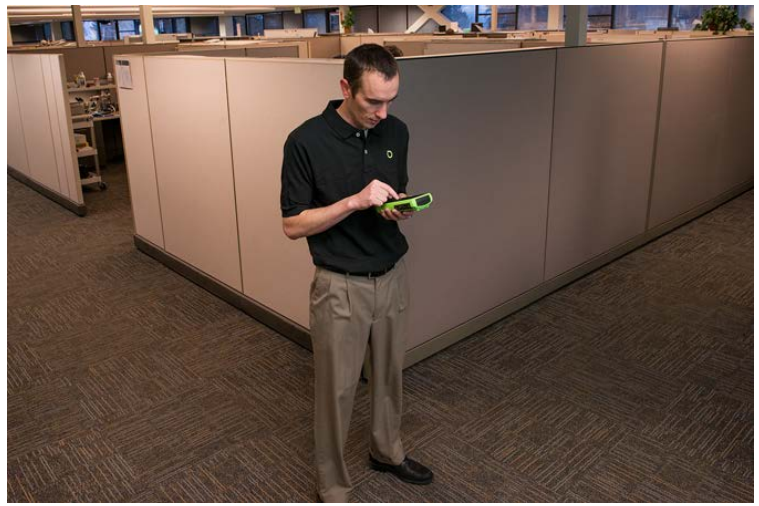
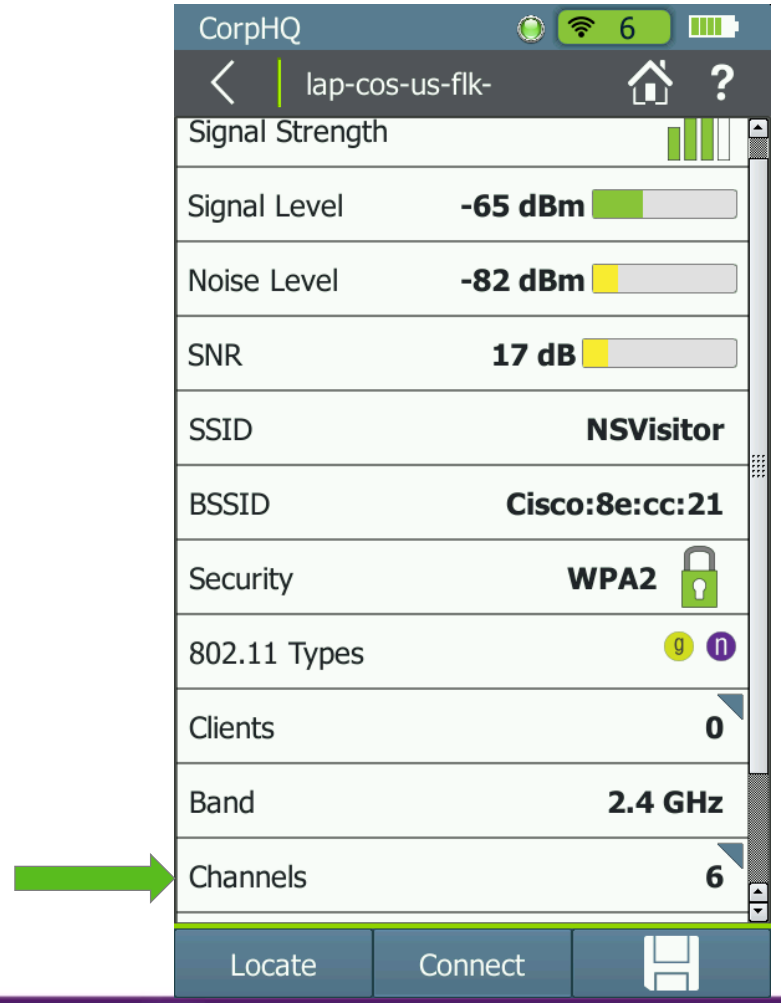
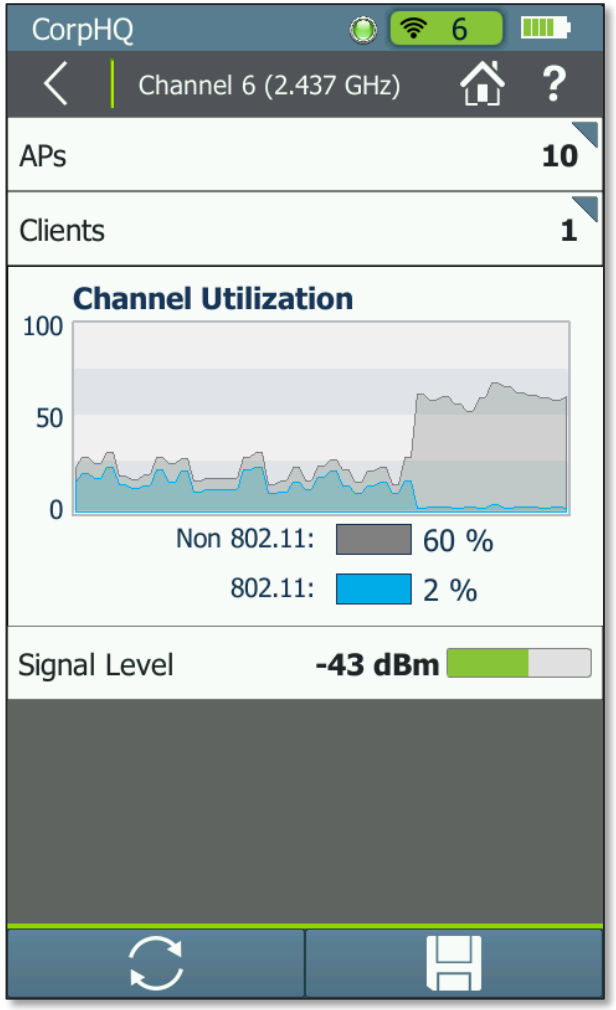
- Found the AP that the user connects to, and identified its channel





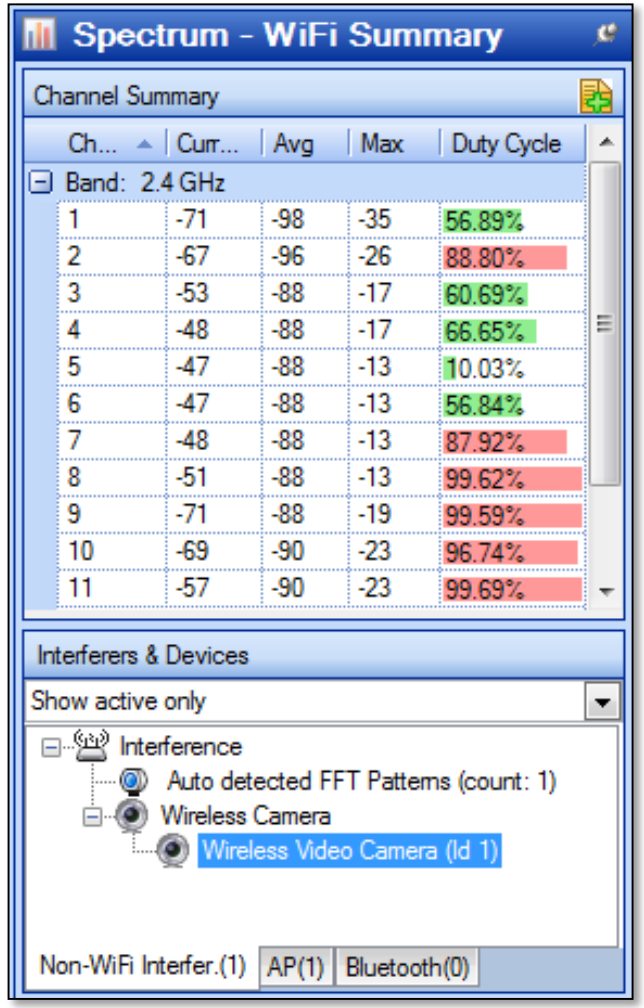
# What Dave the IT Tech did

- Saw non-802.11 Wi-Fi channel utilization was high. Immediately knew there was a interferer issue and notified Tom the engineer



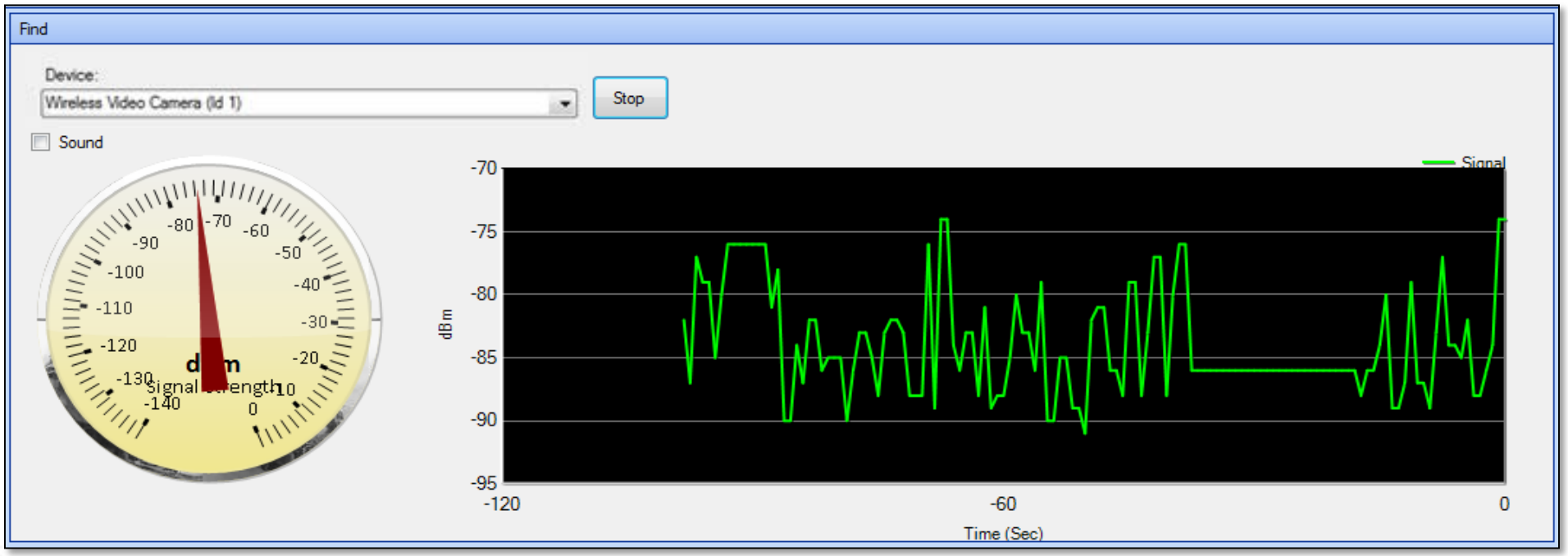
# What Ed the engineer did

- Grabbed his AirMagnet® Spectrum XT™ and identified the interference source
  - Only periodic transmissions
  - But duty cycle = 99% and across all 2.4GHz band



# What Ed the engineer did

- Located the interference source



# What Ed the engineer did

- Depending on the interference source:
  - Removed it
    - For unauthorized or unnecessary devices
  - Changed the Wi-Fi channels around it
    - For embedded devices like microwaves and security cameras
  - Move the AP or increase power to increase SNR
    - For low power devices like sensors

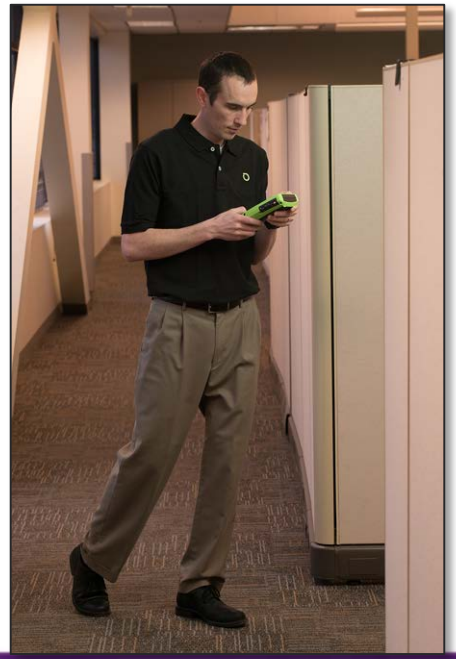
# “I can’t roam”

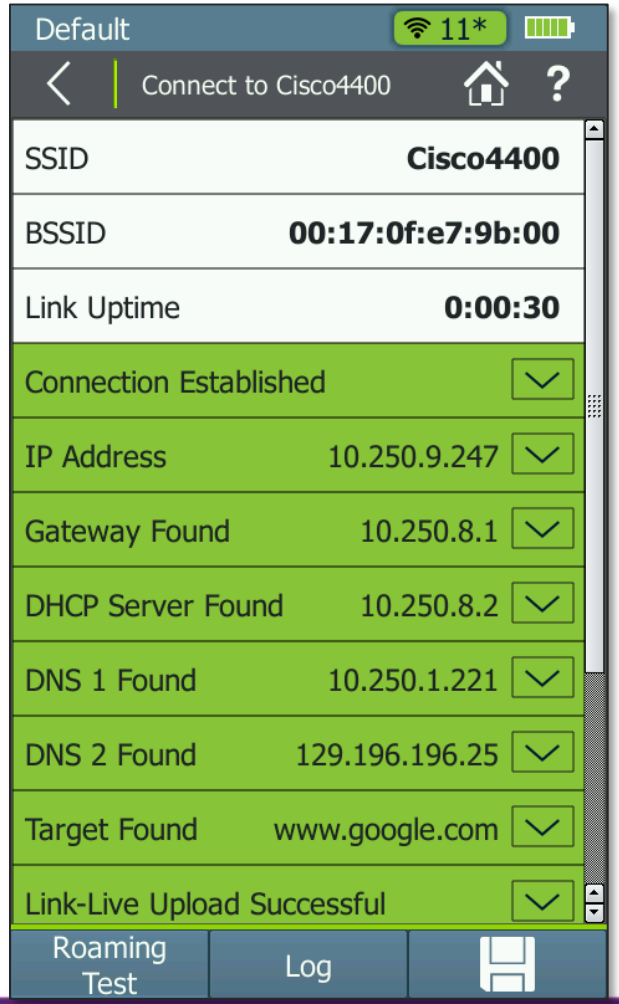
# What To Check For

- Secondary AP coverage
- AP cell sizes too big, Tx power too high
- Client overload on an AP
- AP misconfiguration

# What Dave the IT Tech Did

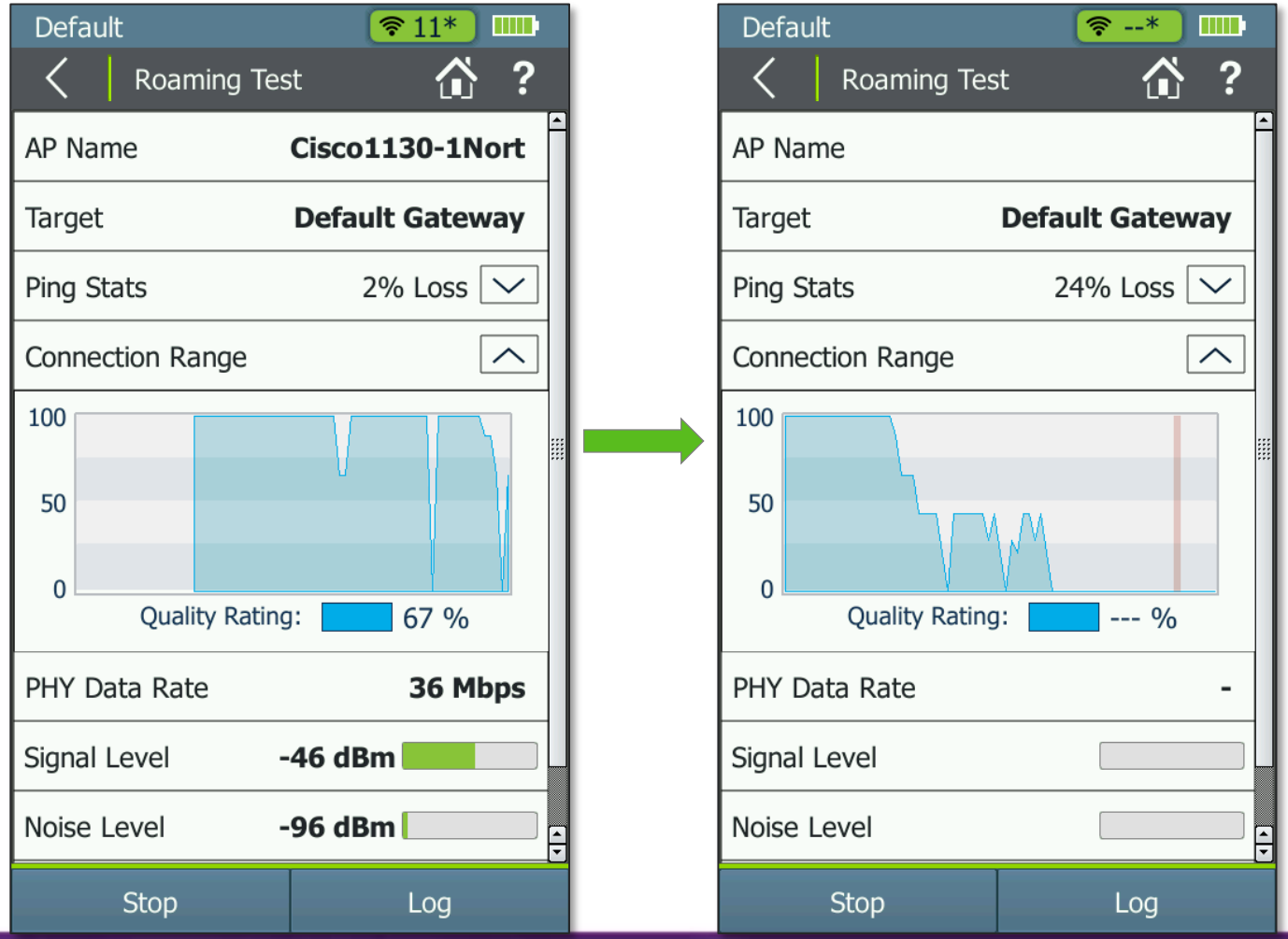
- Grabbed his AirCheck Wi-Fi Tester and successfully connected to the network





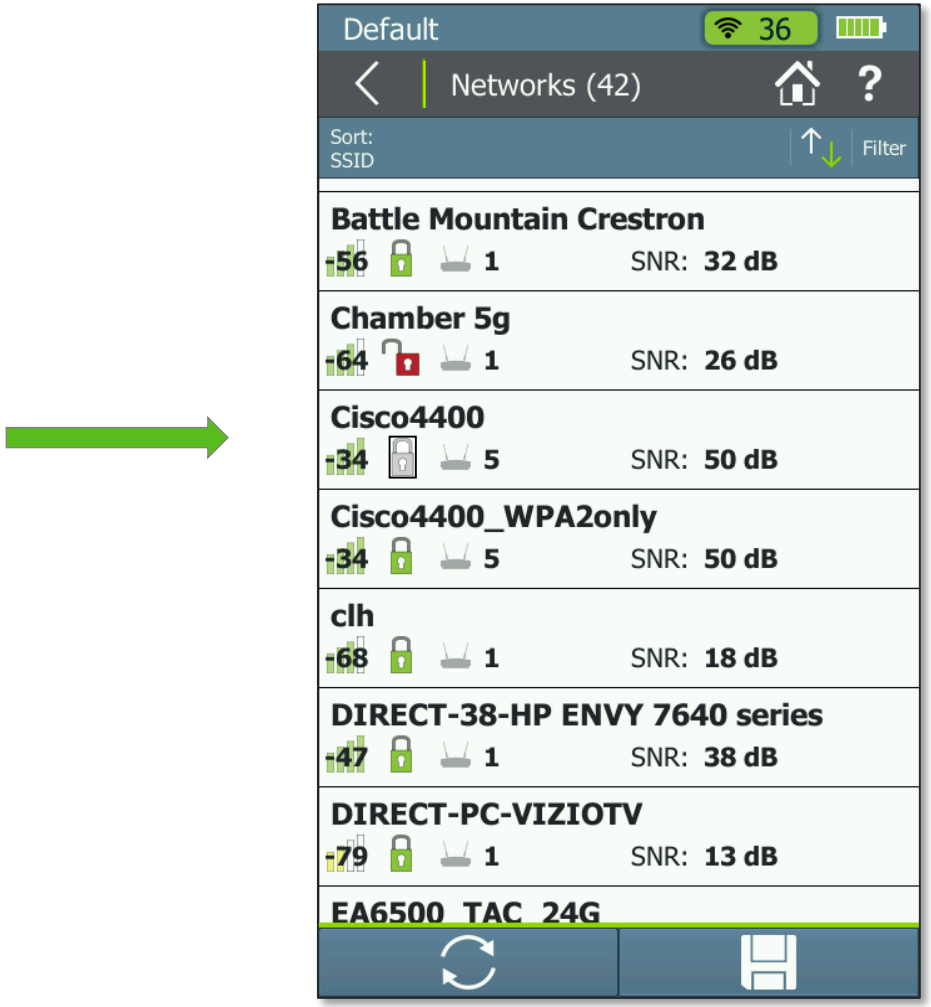
# What Dave the IT Tech Did

- Performed a roaming test. Roaming failed



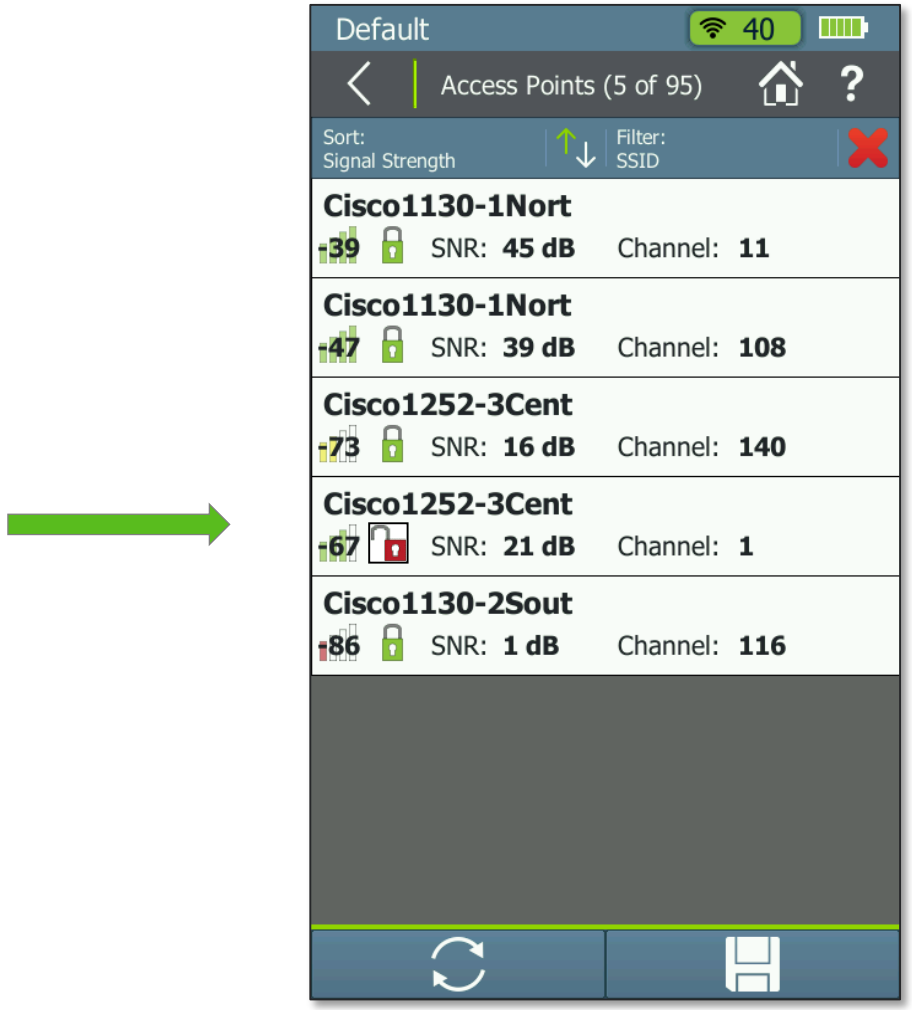
# What Dave the IT Tech Did

- AirCheck Wi-Fi Tester indicated the network had mixed security types. This is a misconfiguration of an access point



# What Dave the IT Tech Did

- Immediately went to the list of APs on the network. Saw the AP he needed to roam to was set for the wrong security type

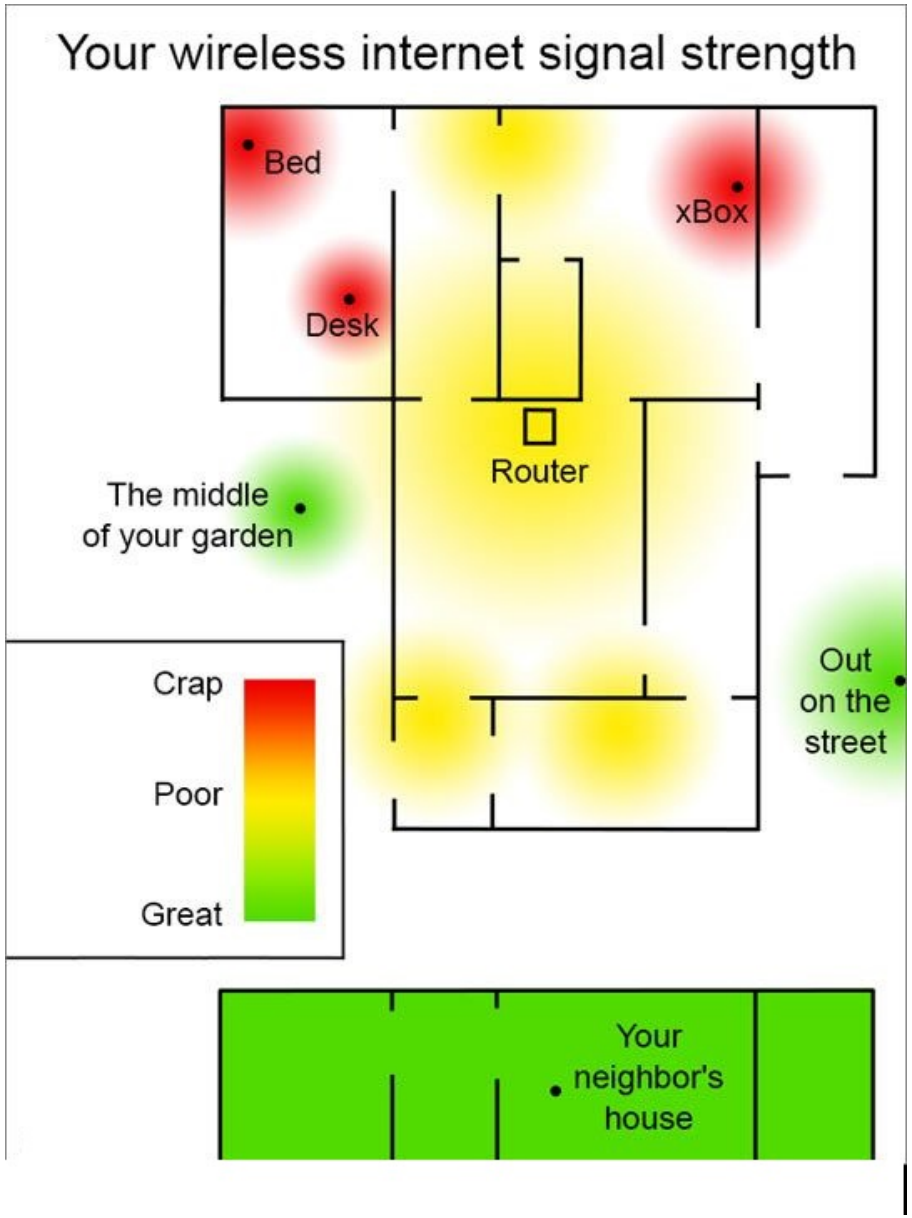


# What Dave the IT Tech Did

- Fixed the AP security configuration issue, and roaming was restored

# “I can’t connect”

- “I can’t connect”

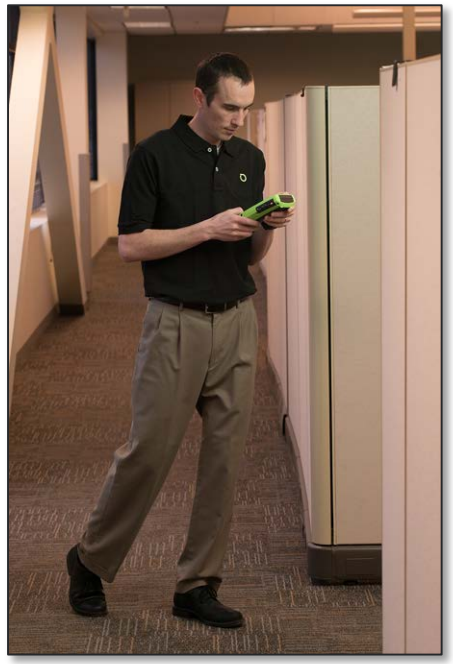


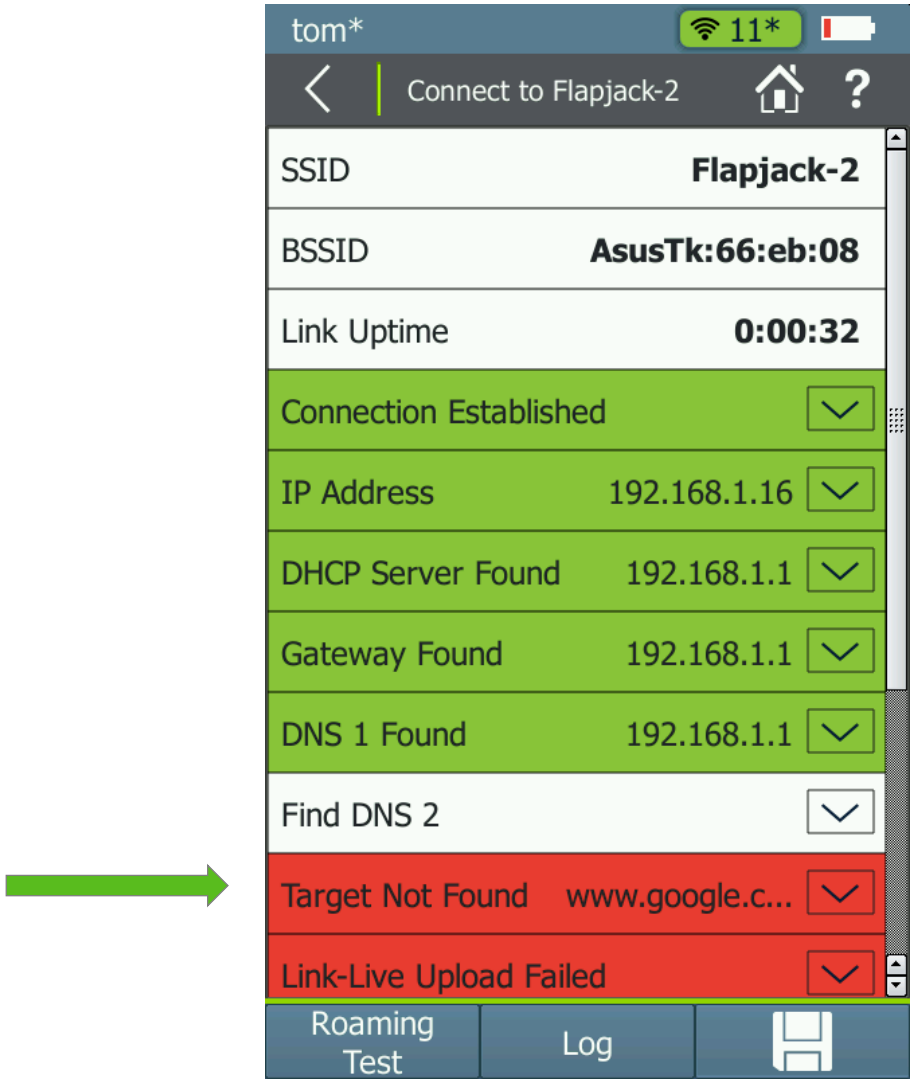
# What To Check For

- Network availability
- Proper signal coverage, and SNR
- Proper access point configuration
- Proper client configuration
- Channel utilization and interference
- Network services availability: DHCP, DNS, gateway route
- Security incidents

# What Dave the IT Tech Did (v1)

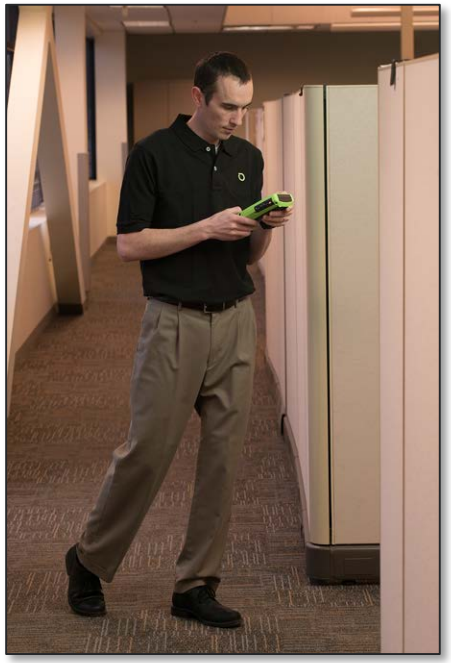
- Grabbed his AirCheck Wi-Fi Tester and tried to connect to the network.

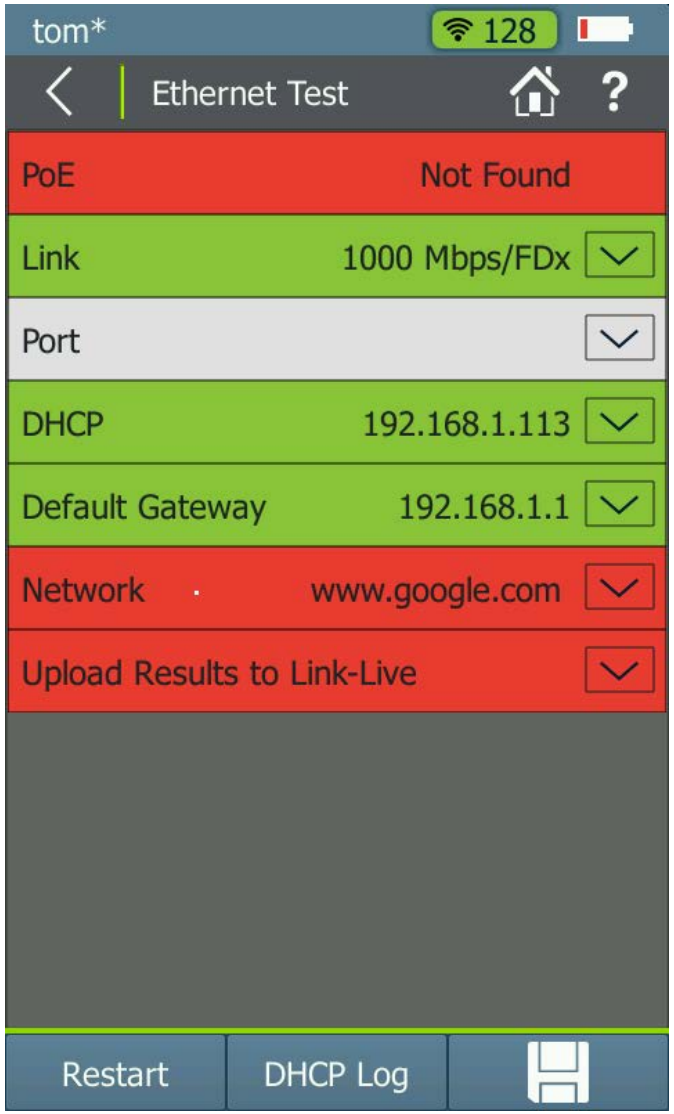




# What Dave the IT Tech Did (v1)

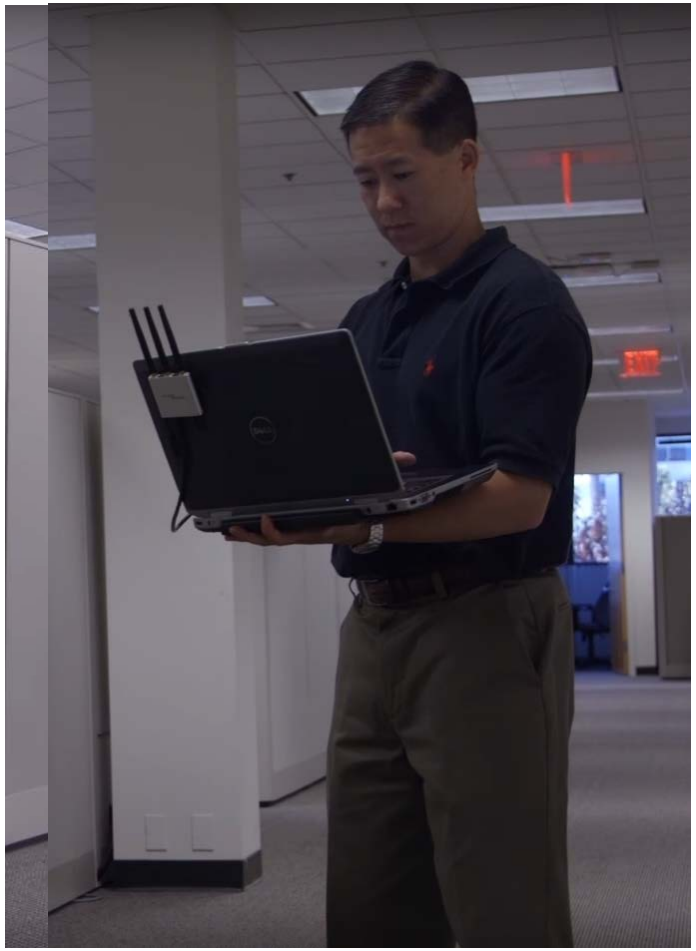
- Checked the Ethernet connection at the AP and saw that he could not get out to the internet.
- Found that it was a misconfigured firewall.





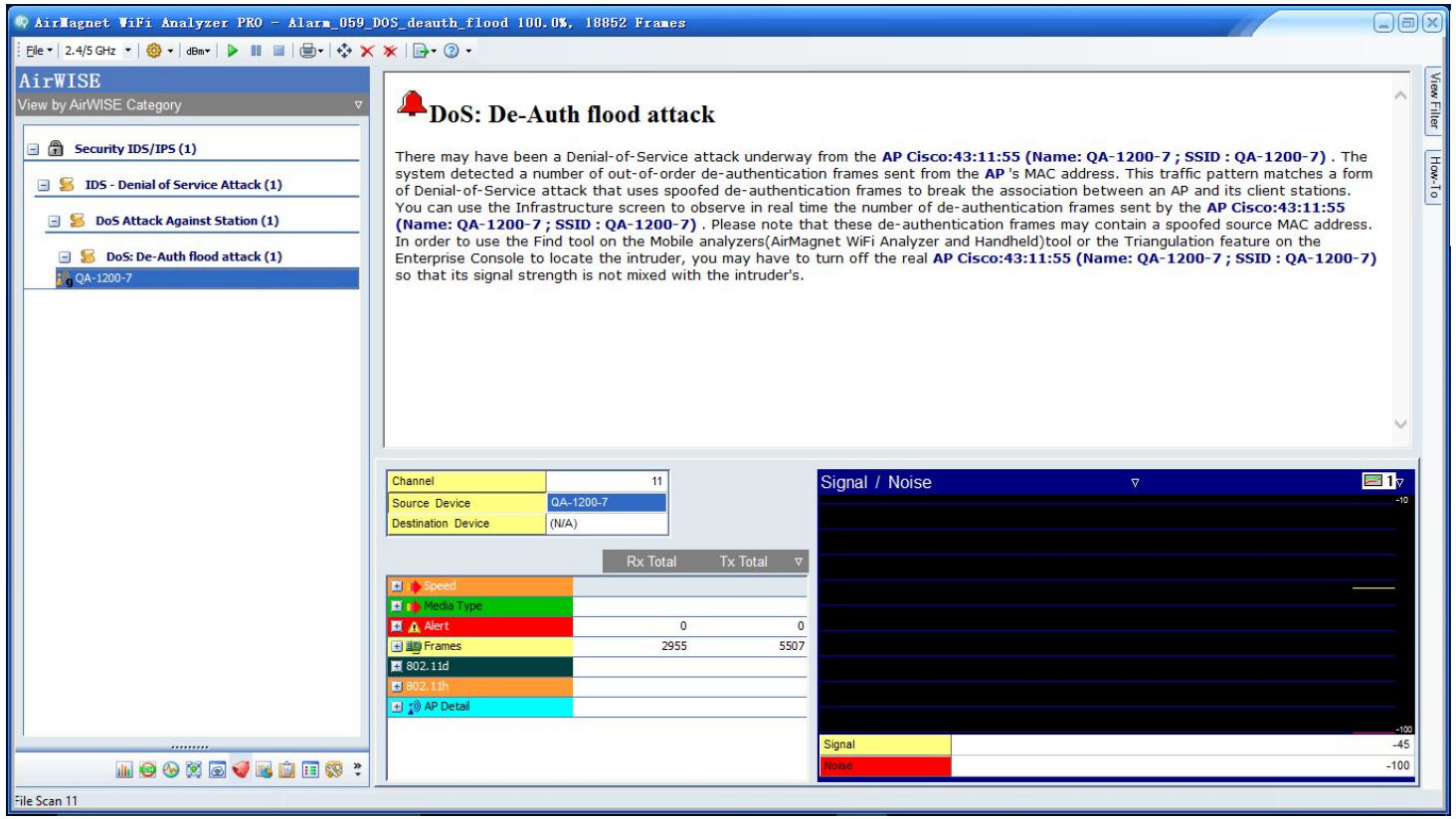
# What Ed the engineer did (v2)

- Grabbed AirMagnet WiFi Analyzer PRO and went to the location of the problem.



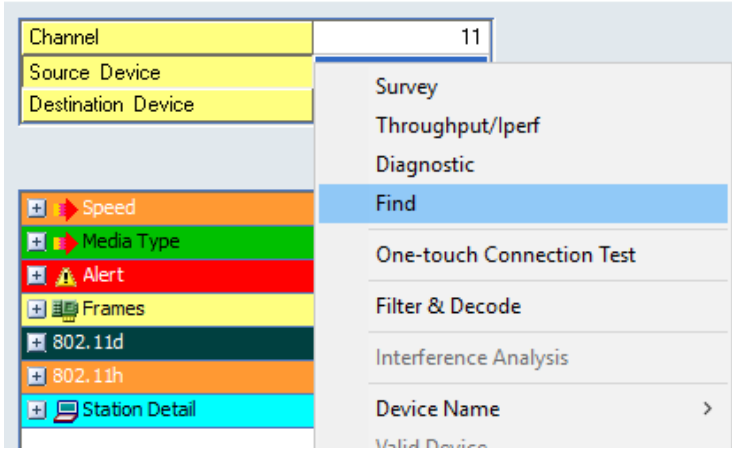
# What Ed the Engineer Did

- Viewed AirWISE® alerts and immediately saw a DoS attack



# What Ed the Engineer Did

- Selected the source and went to the Find screen.
- Located and disabled the device.
- Network connectivity was restored

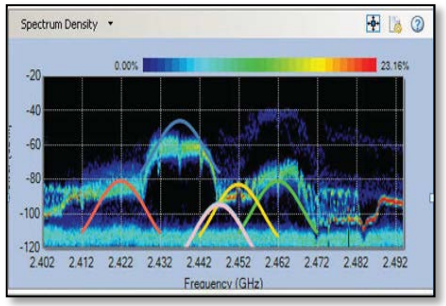



# Wi-Fi Toolset for Troubleshooting

- FOR THE NETWORK TECHNICIAN

AirCheck Wi-Fi Tester G2


- FOR THE NETWORK ENGINEER




AirMagnet Spectrum XT


AirMagnet Wi-Fi Analyzer PRO

# THANK YOU