



# Visual Spectrum Analysis

with



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# Introduction



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# Housekeeping

## **Questions?**

Feel free to use the Question tool if you have a question or comment that relates to the presentation

## **Audio or Video Problems?**

If you experience audio or video problems, it's not you. It's me. Let me know with the question tool.

# Dual-Band Wi-Fi

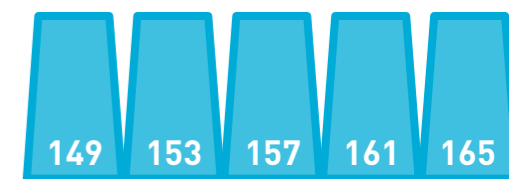
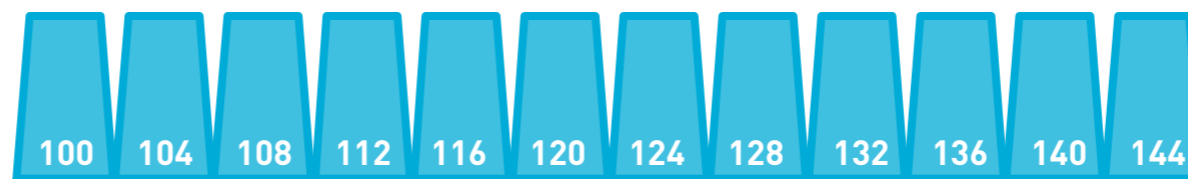
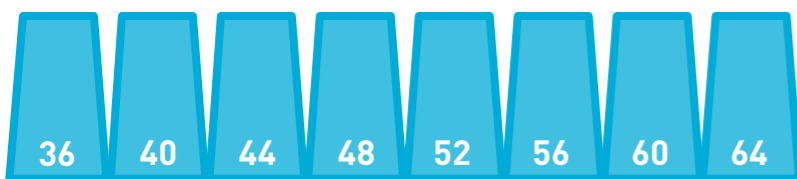
## 2.4 GHz (802.11b/g/n)

- Greater Range (~300 ft)
- Universal Compatibility
- Congested with Wi-Fi
- Plagued by non-Wi-Fi interference
- 3 non-overlapping channels



## 5 GHz (802.11a/n/ac)

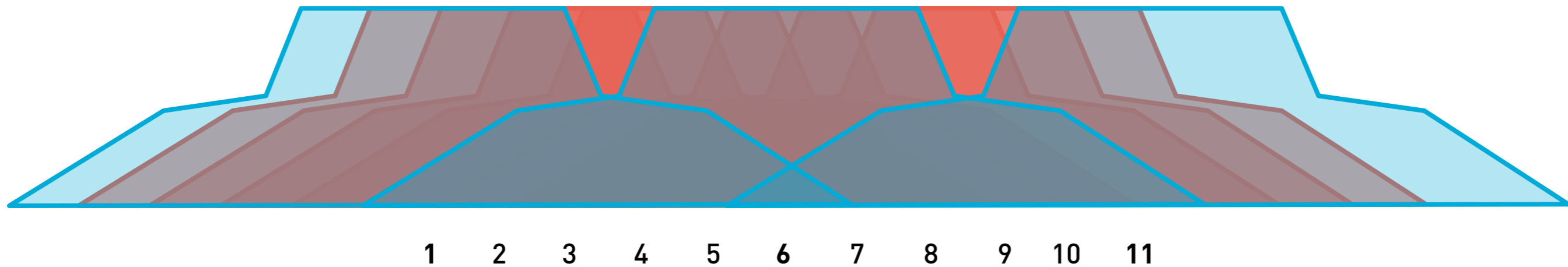
- Lower Indoor Range (~90 ft)
- Limited Compatibility (a/n/ac)
- 24 non-overlapping channels



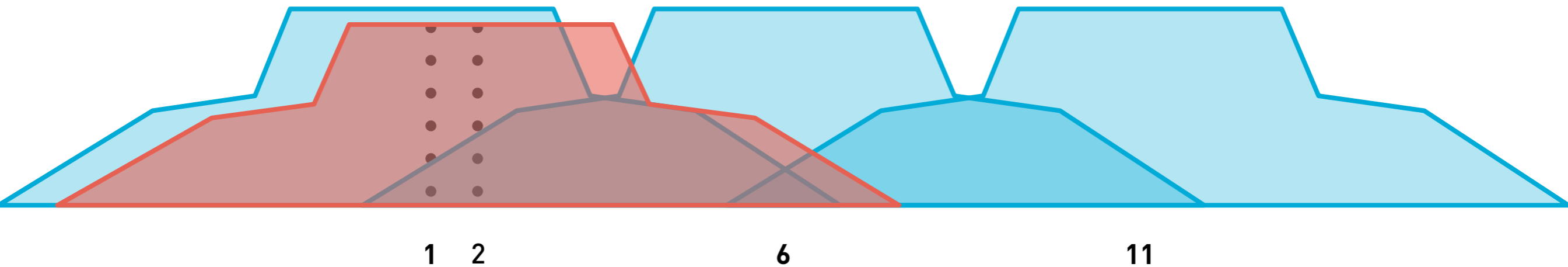


# 2.4 GHz Channels

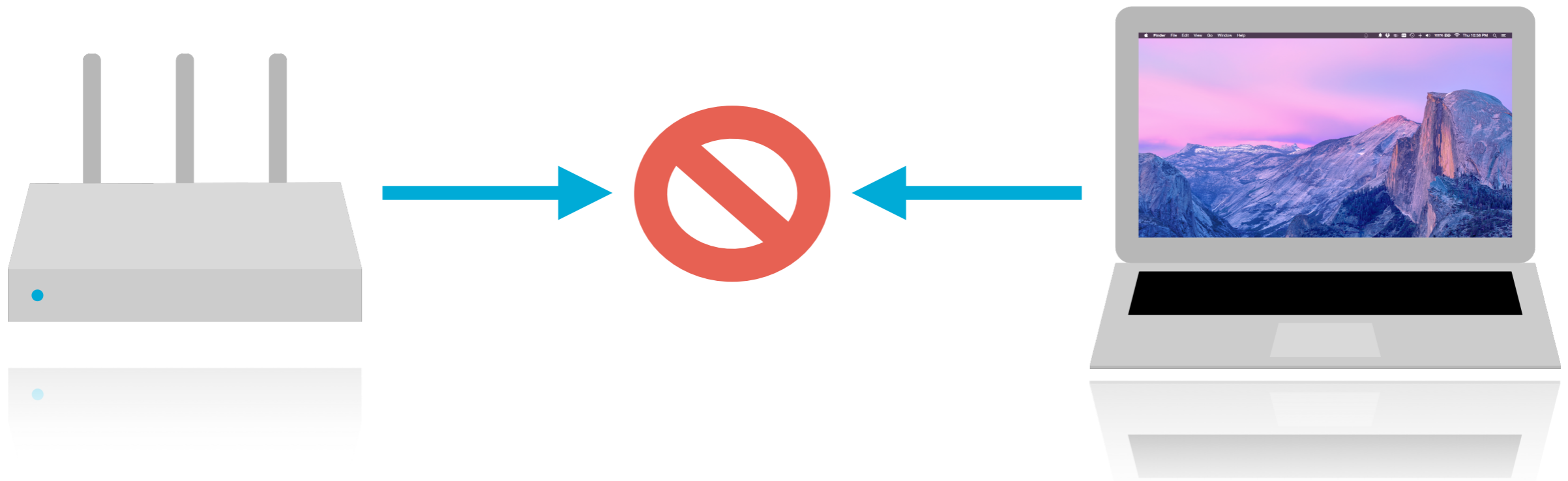
20 MHz Wide



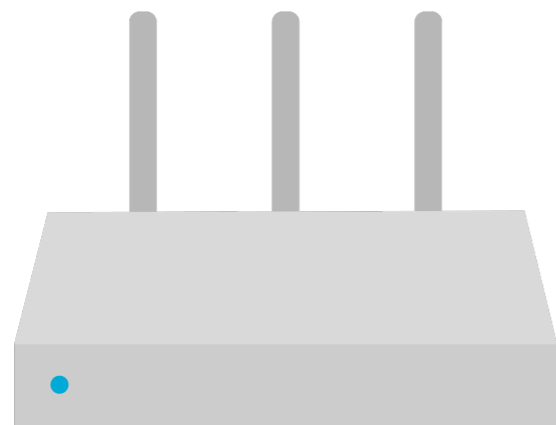
5 MHz Between Centers



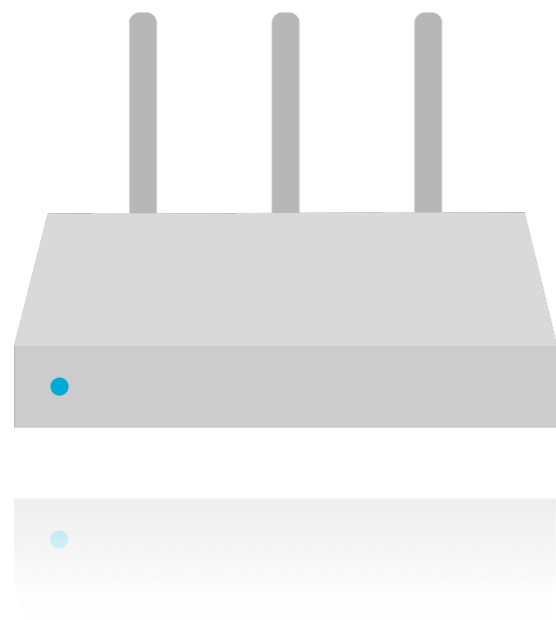
# Half-Duplex



# Half-Duplex



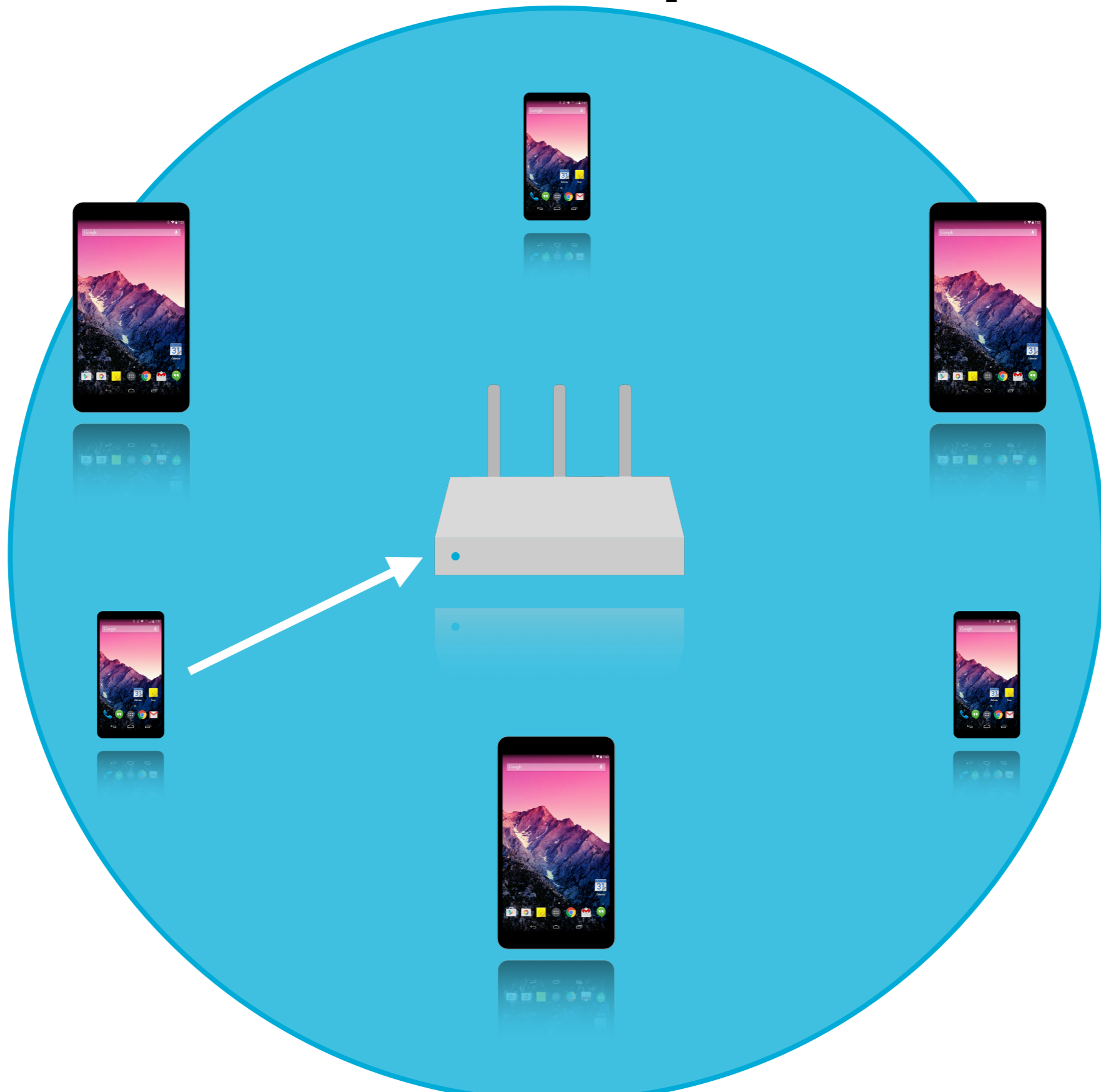
Data



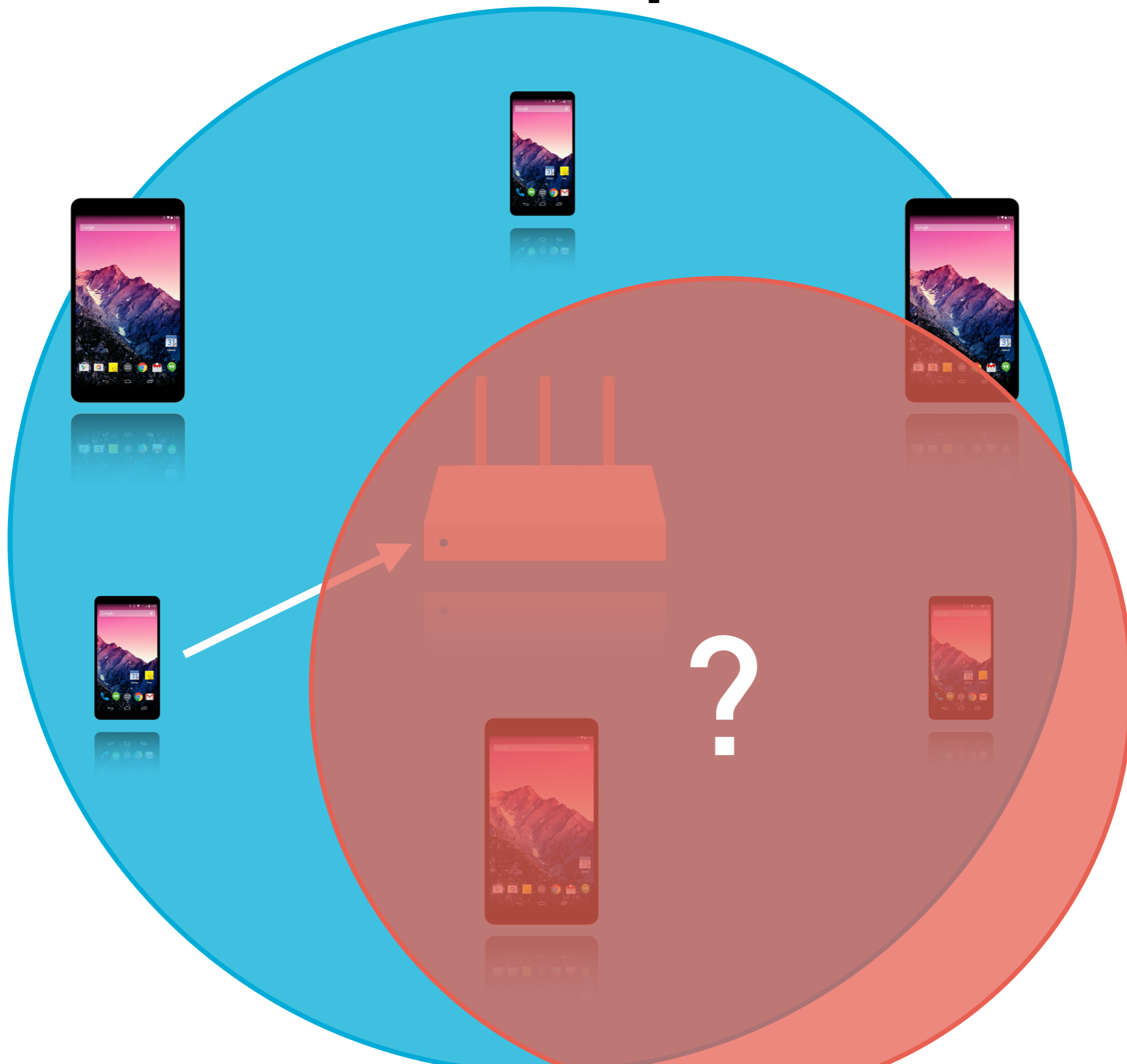
Acknowledgment



# Half-Duplex

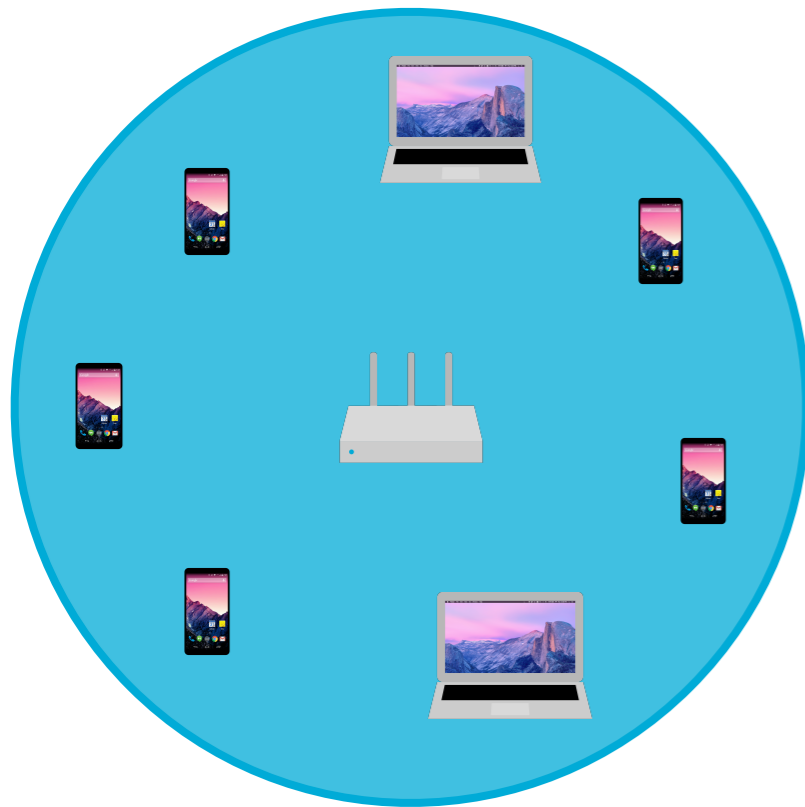


# Half-Duplex



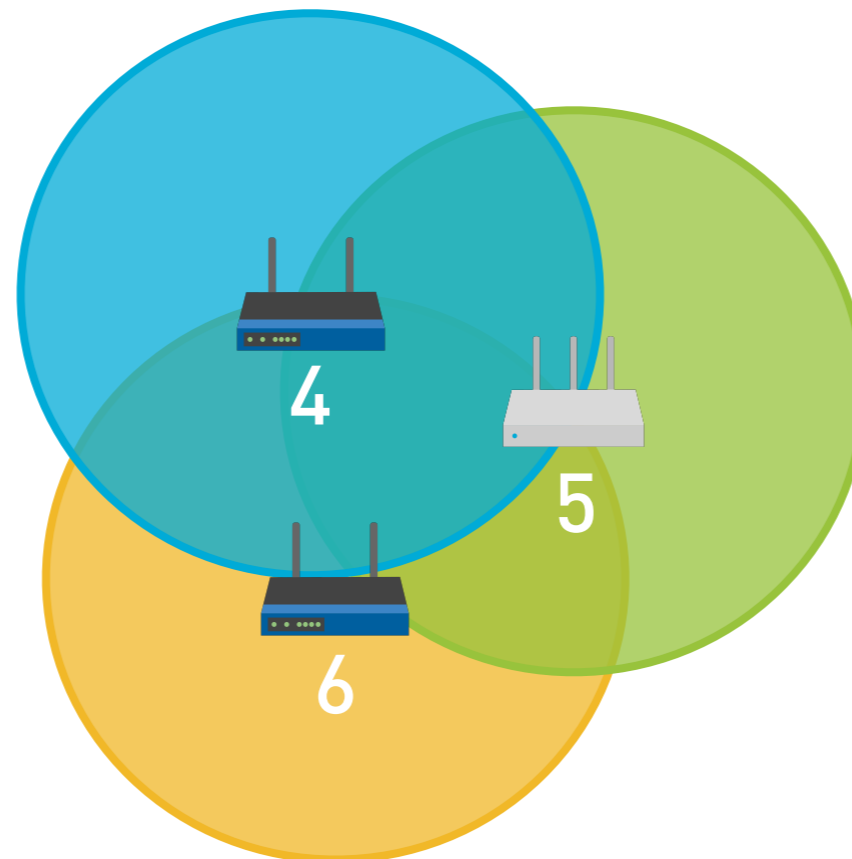
# Types of Interference

## Co-Channel



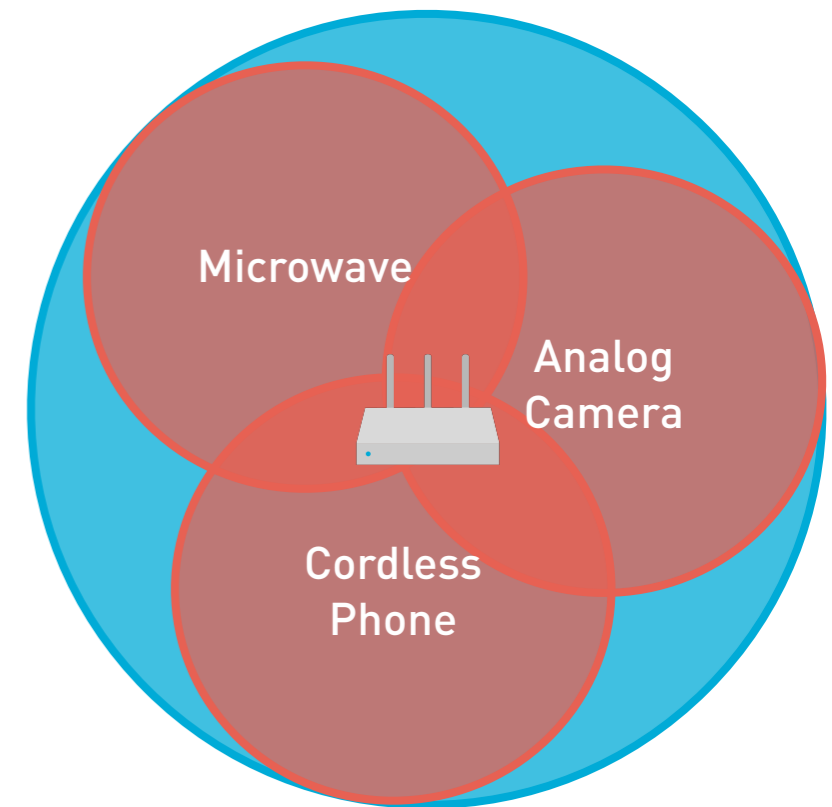
Every client and access point on the same channel competes for time to talk.

## Adjacent-Channel



Every client and access point on overlapping channels talk over each other.

## Non-Wi-Fi



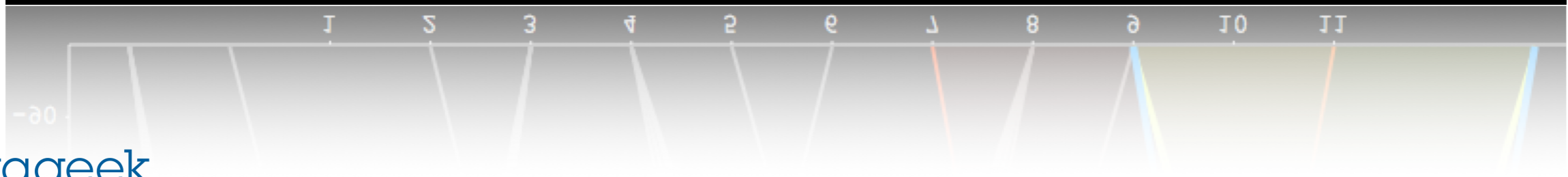
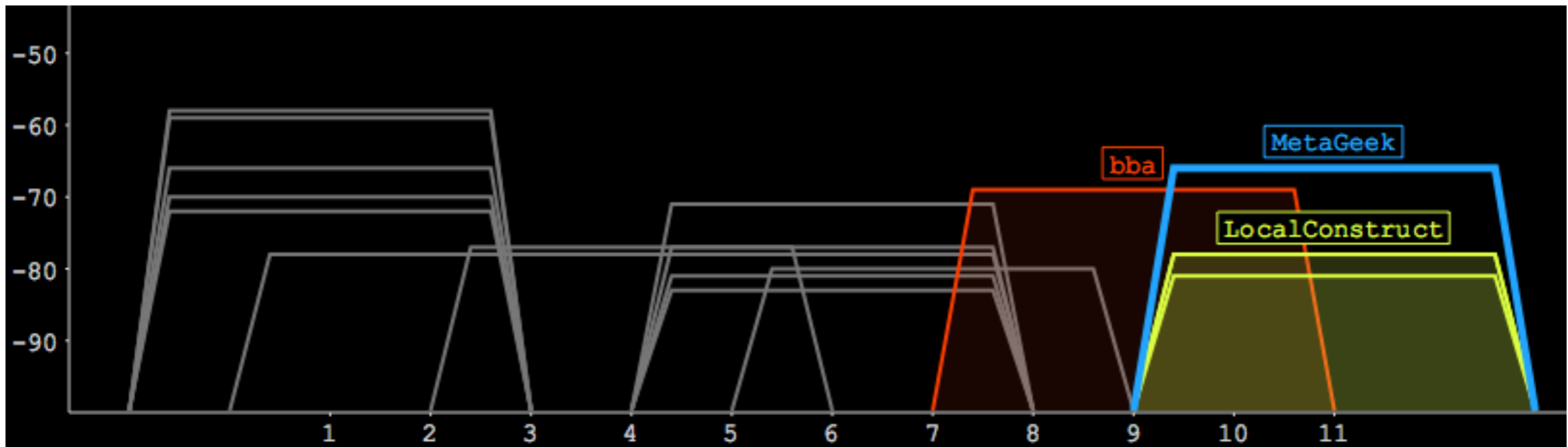
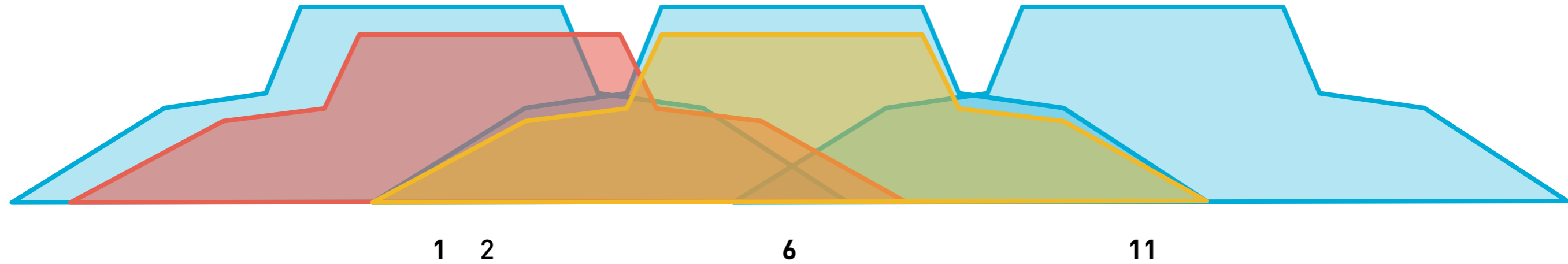
Non-802.11 devices compete for medium access.

# Wi-Fi Scanner

Adjacent Channel  
(Worst)

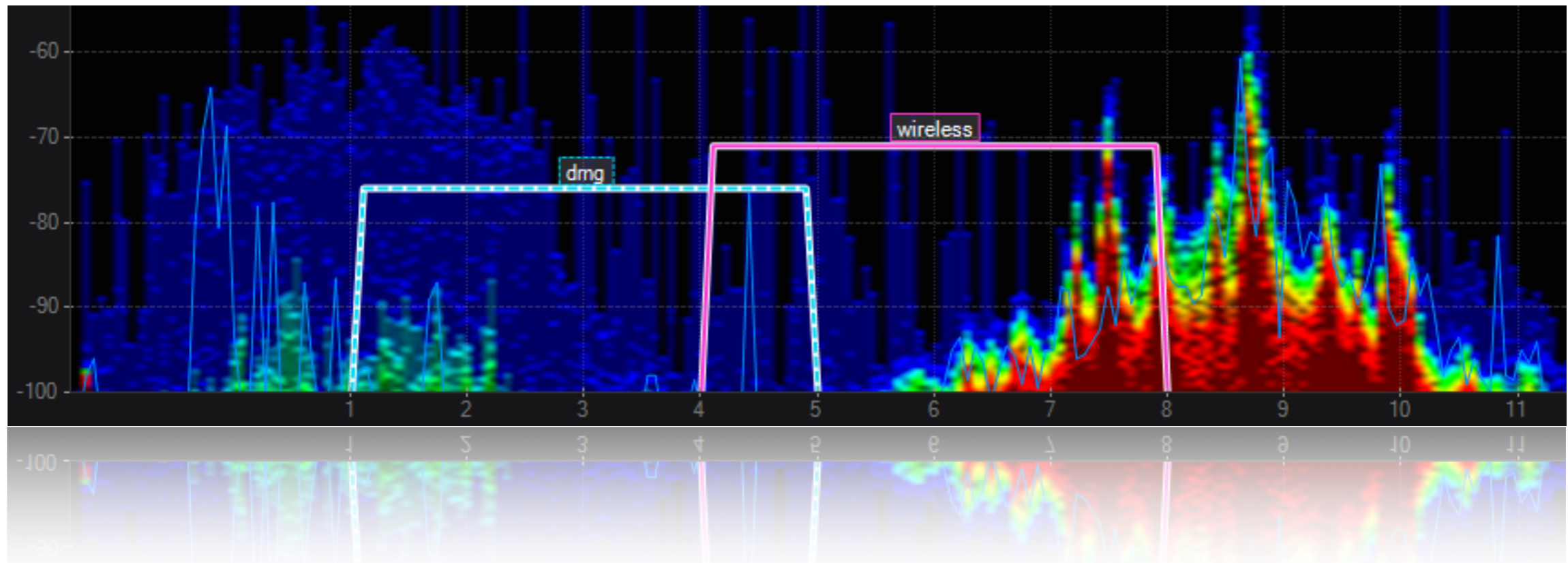
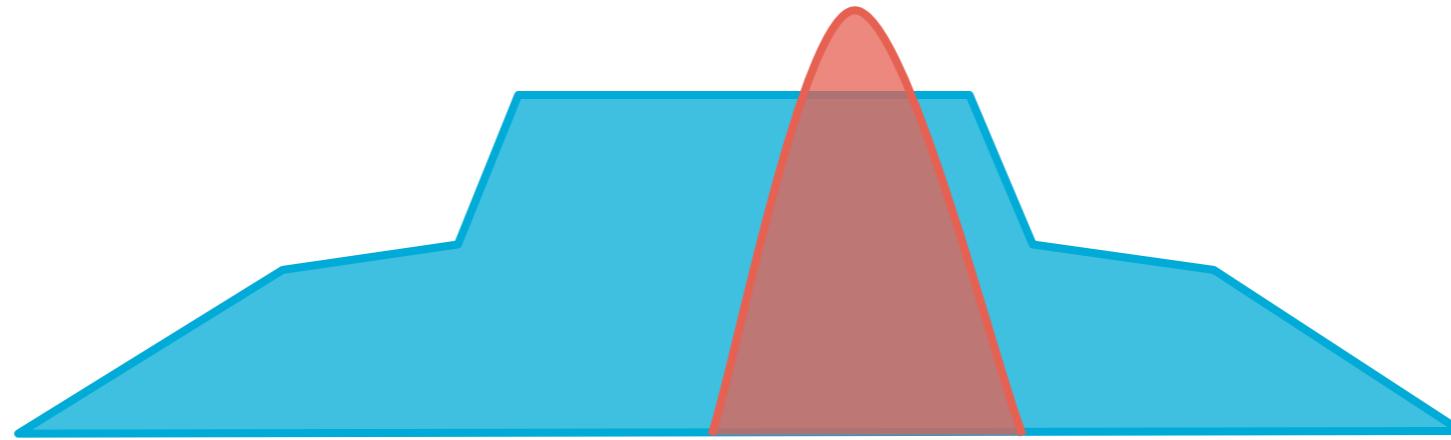
Co-Channel  
(Better)

Open Channel  
(Best)





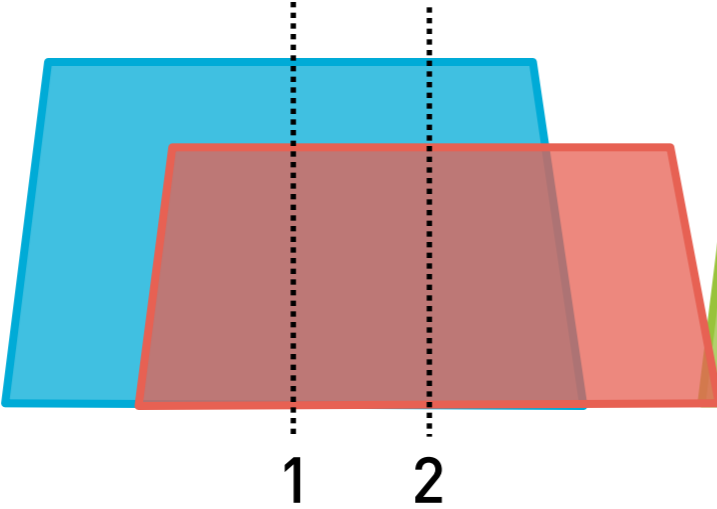
# Spectrum Analyzer



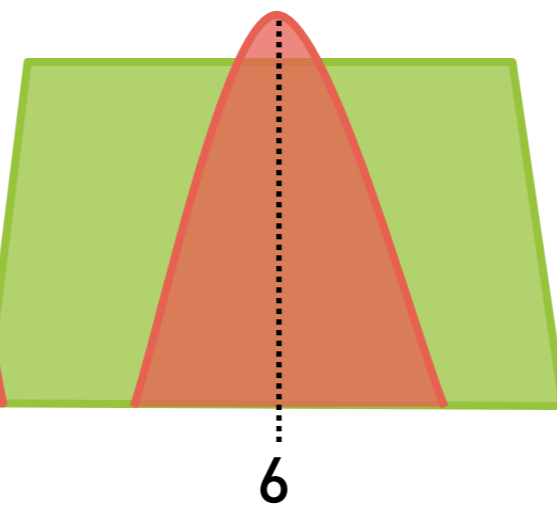


# Different Tools for Different Jobs

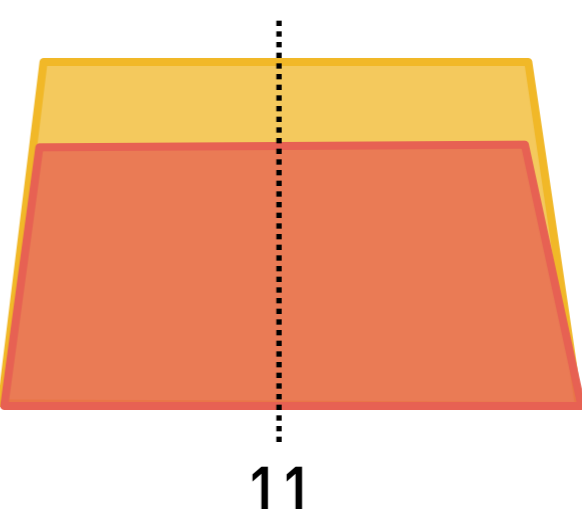
Adjacent-Channel



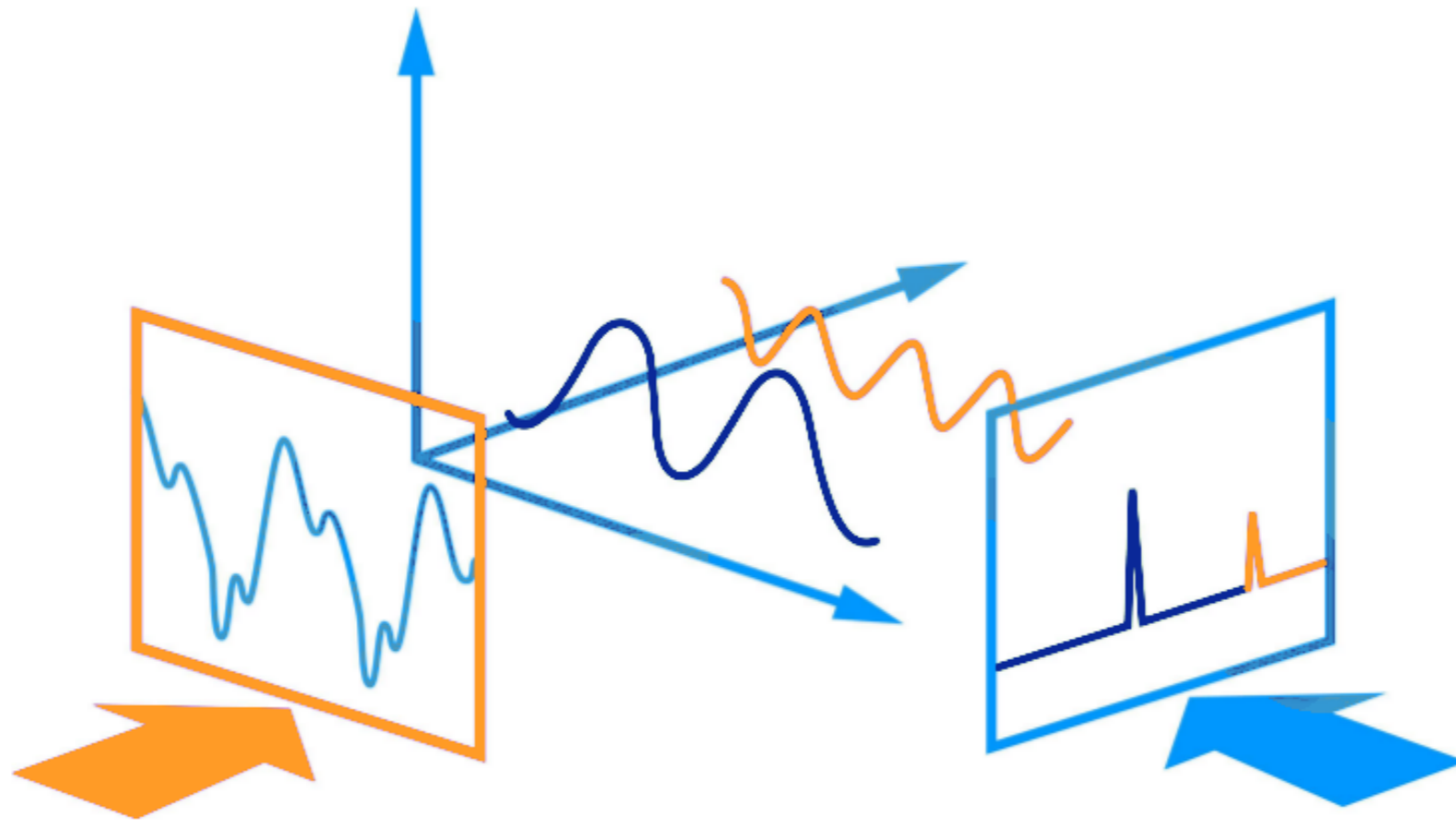
Non-Wi-Fi



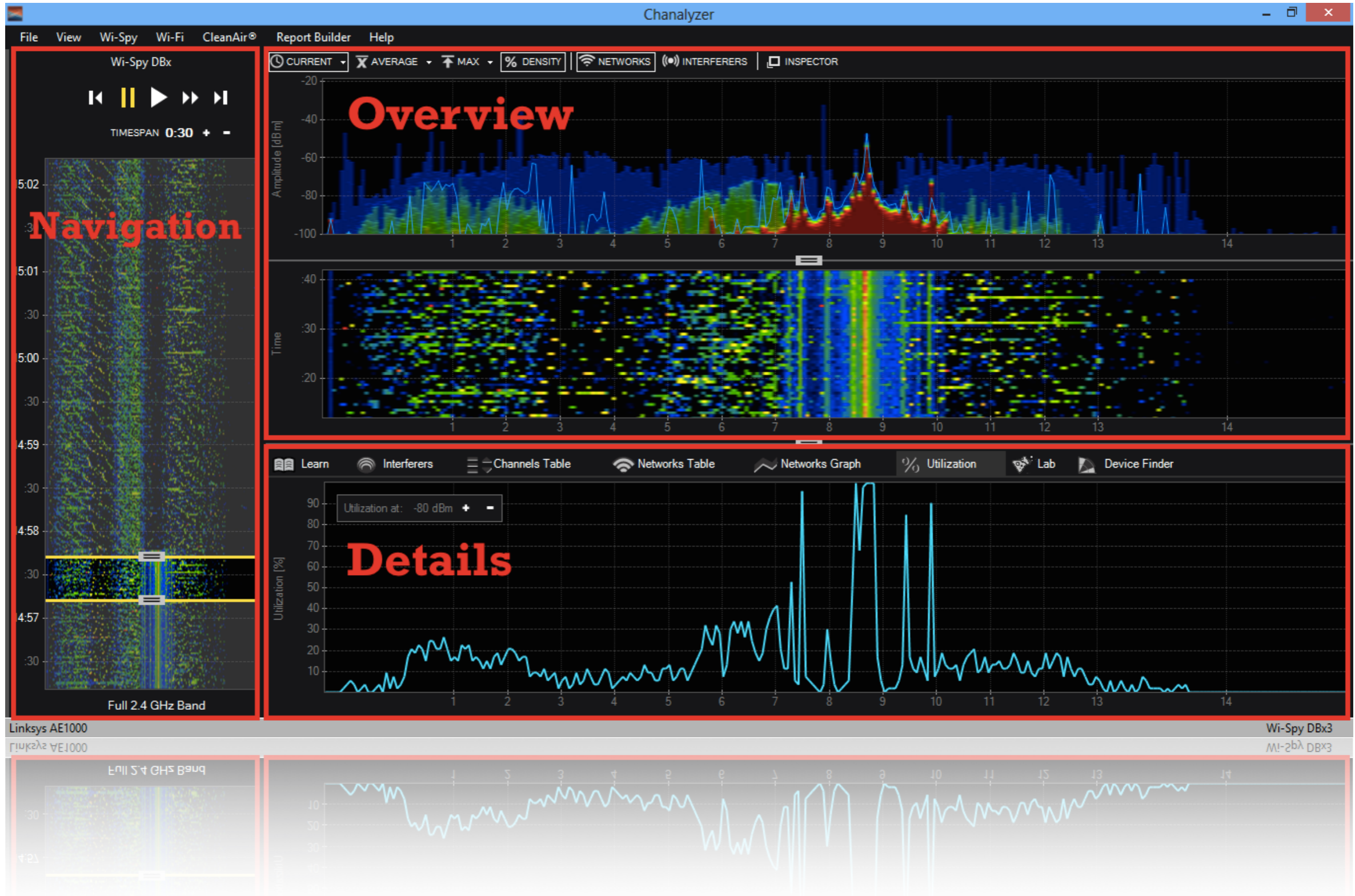
Co-Channel



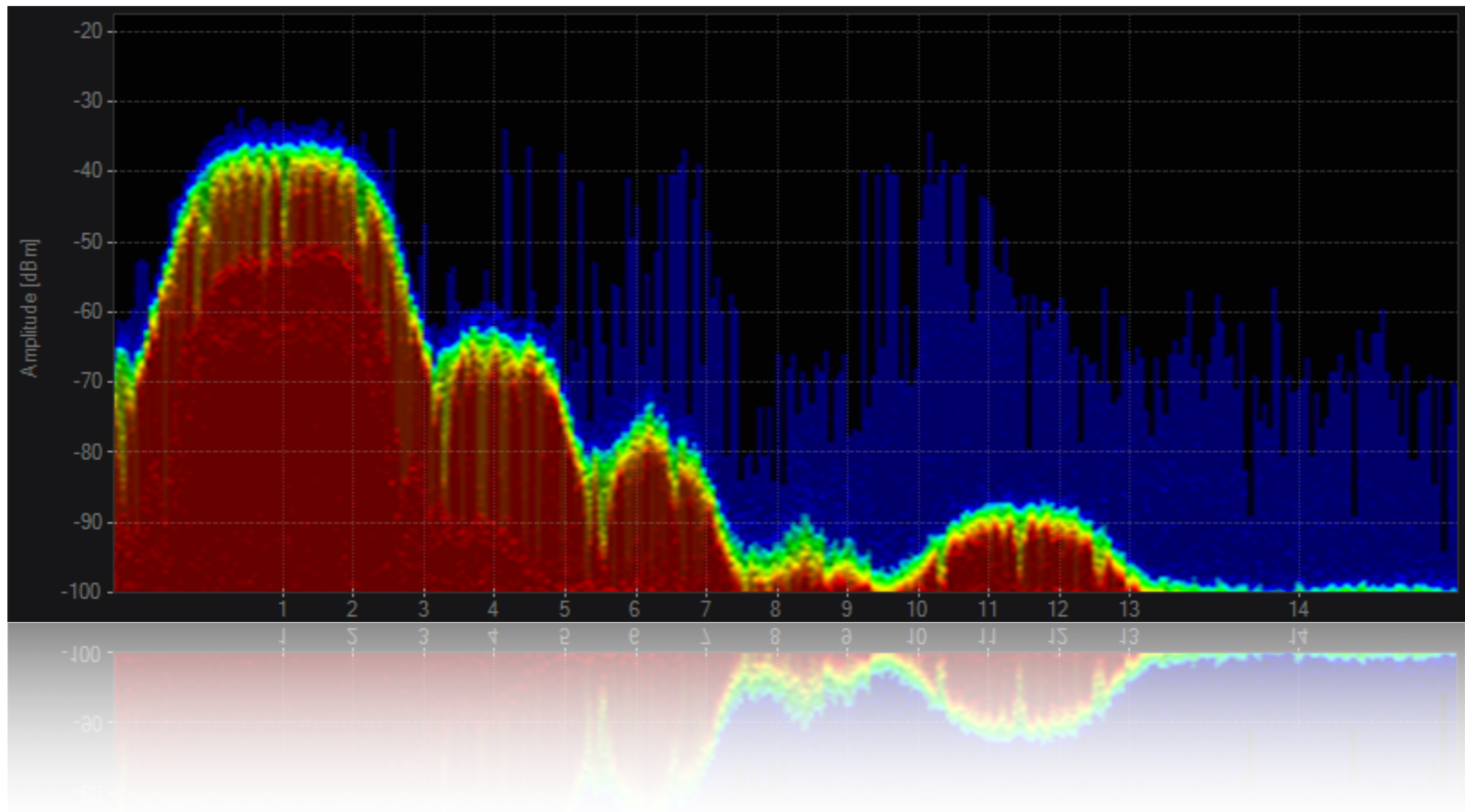
# Time Domain vs Frequency Domain



# Demo

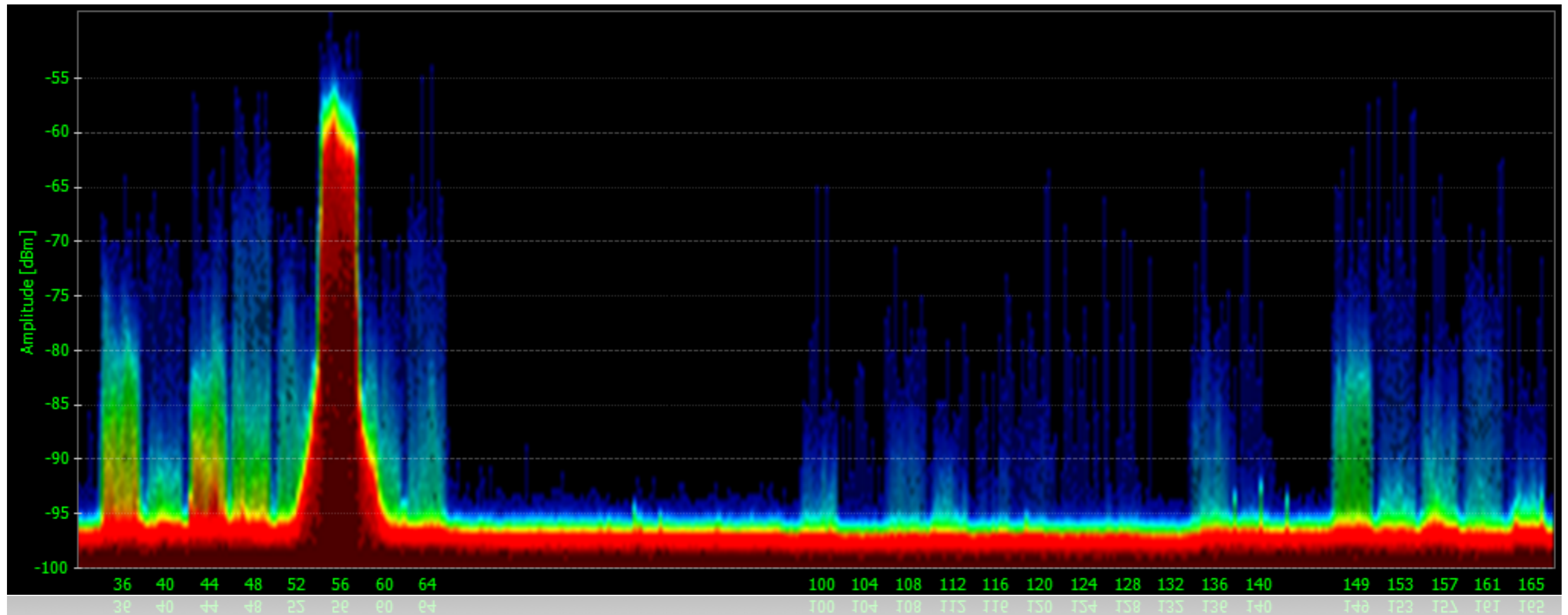


# 802.11b (HR-DSSS)

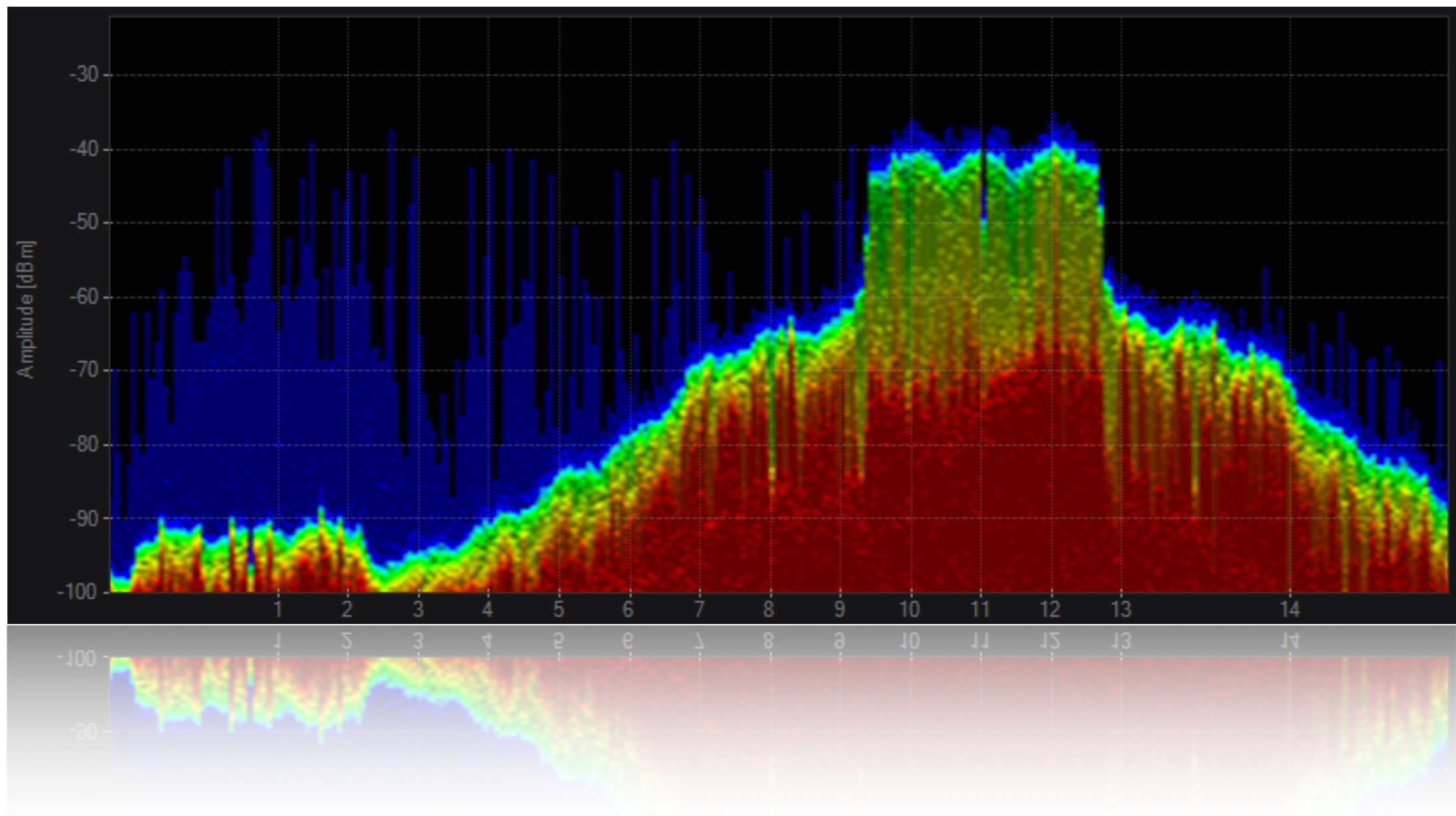




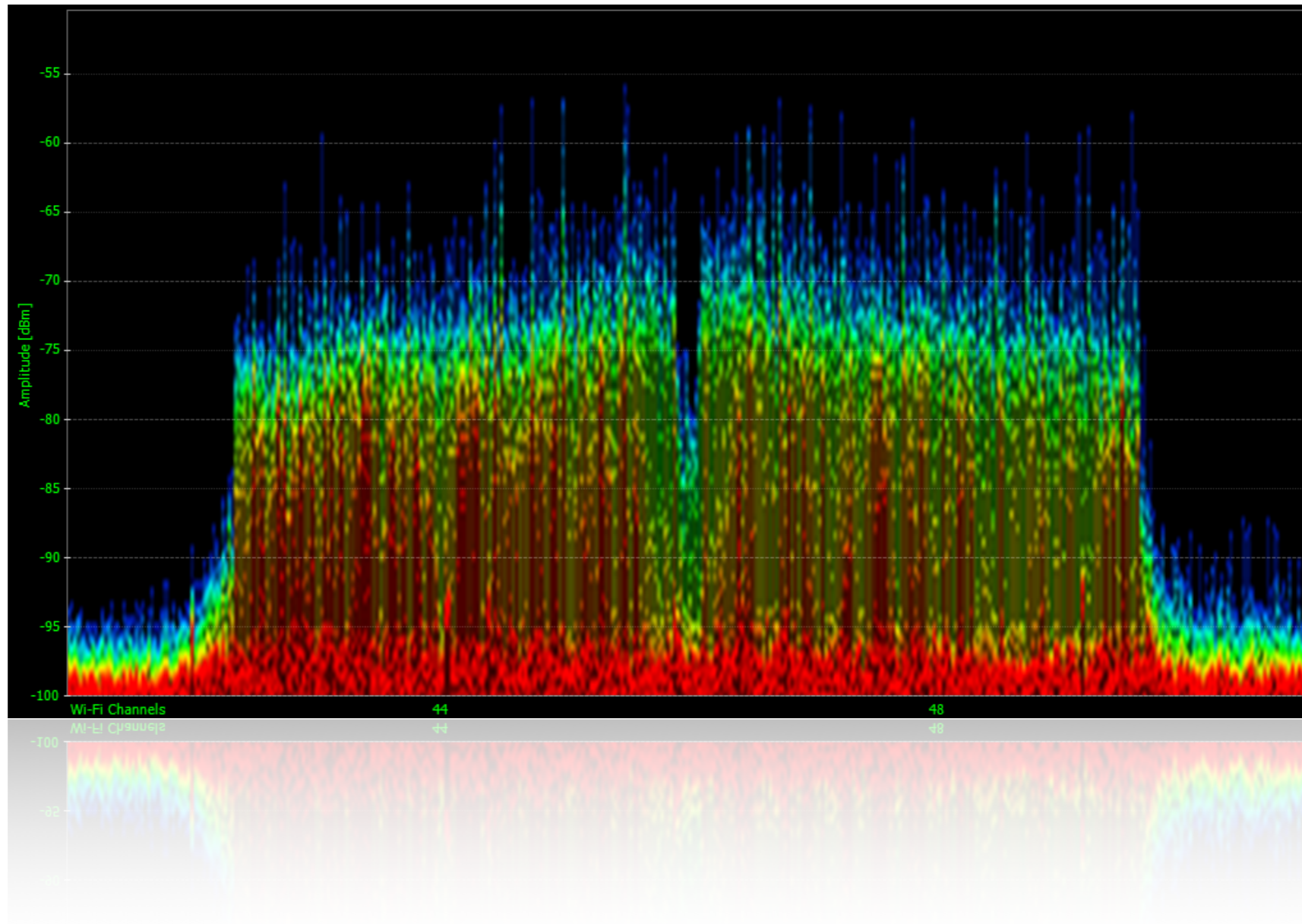
# 802.11a (OFDM)



# 802.11g (ERP-OFDM)

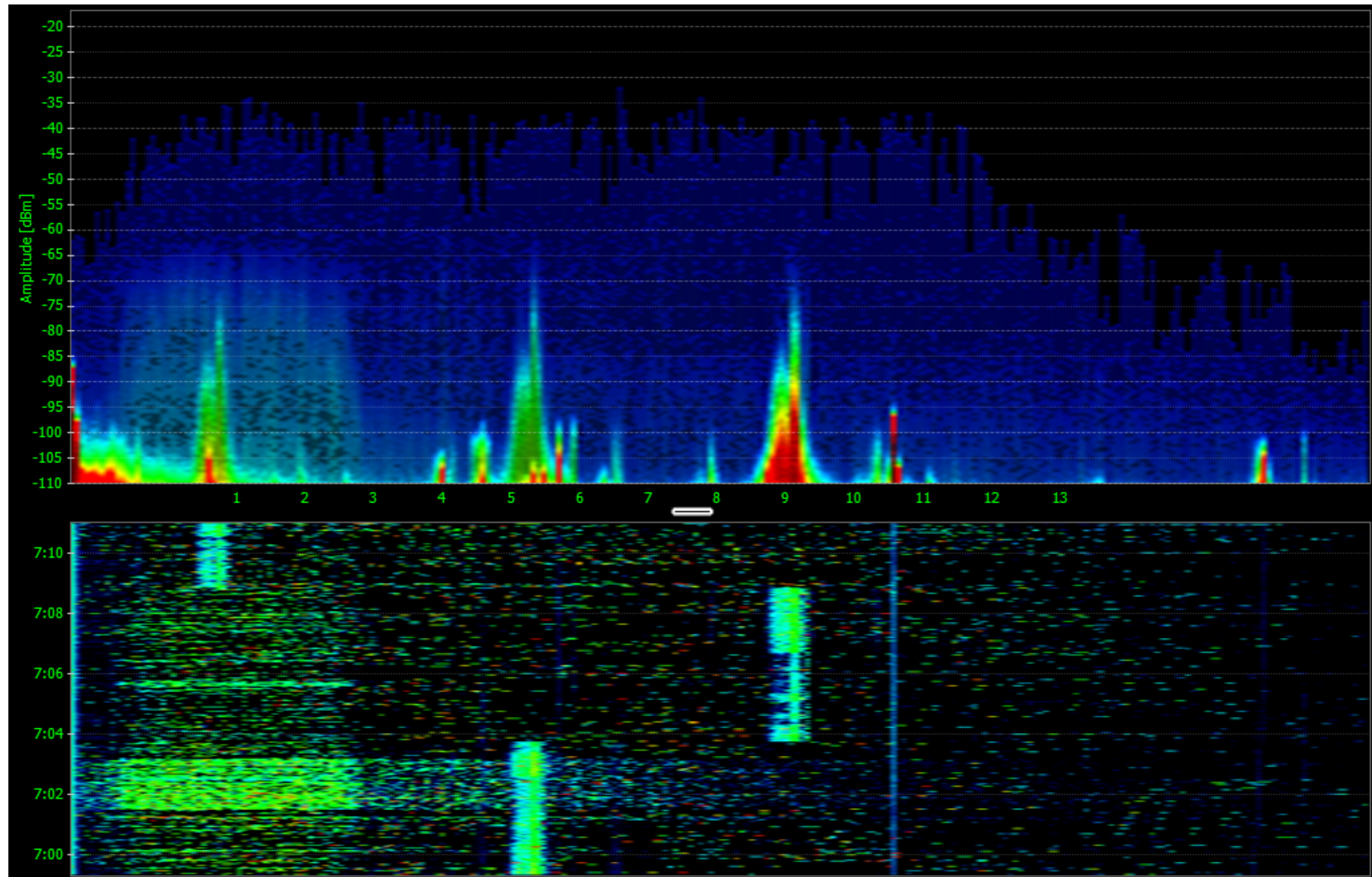


# 40 MHz 802.11n



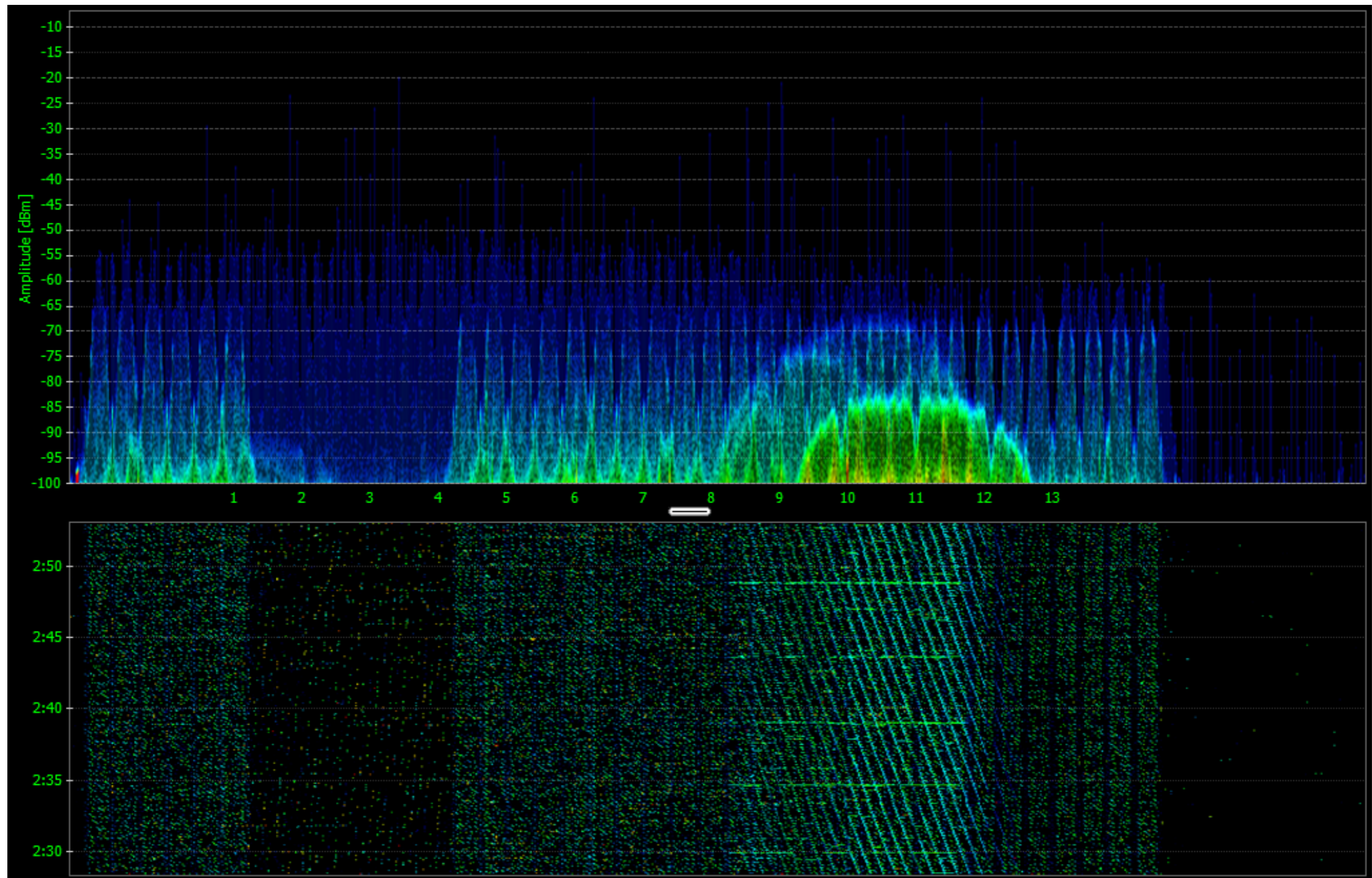


# Baby Monitor (FHSS)



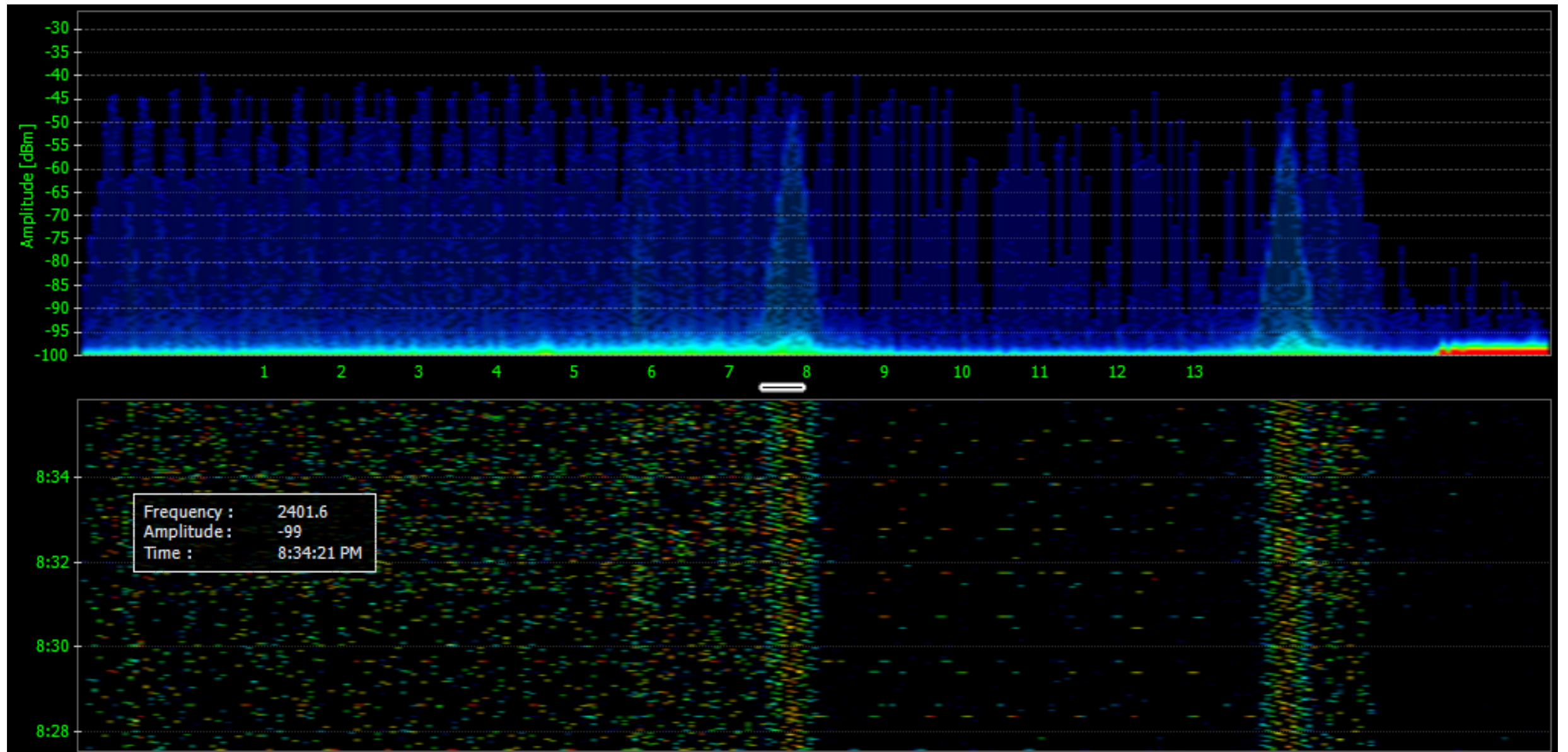


# Bluetooth (Discovery Mode, FHSS)

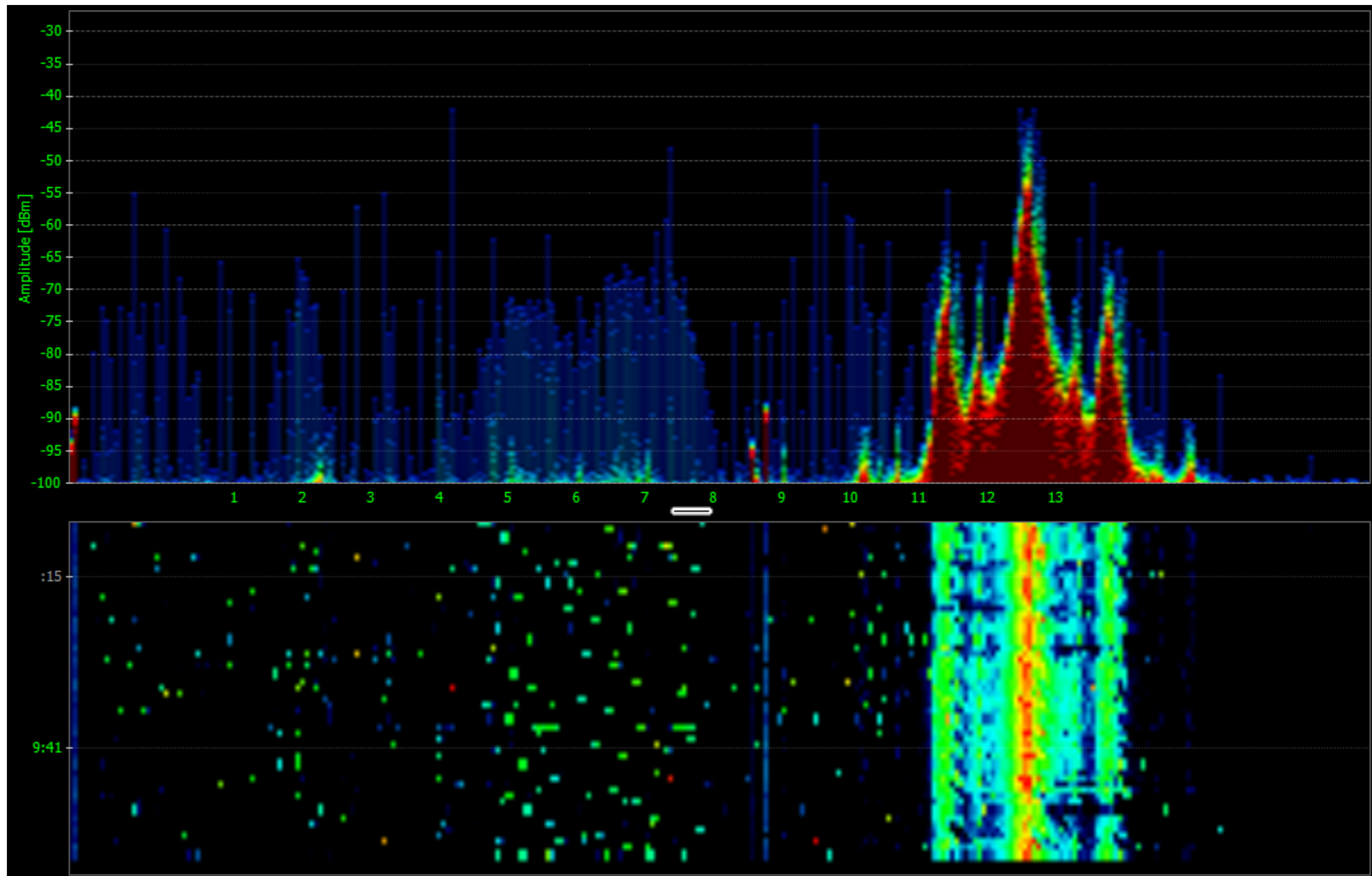




# Xbox 360 Controller (FHSS)

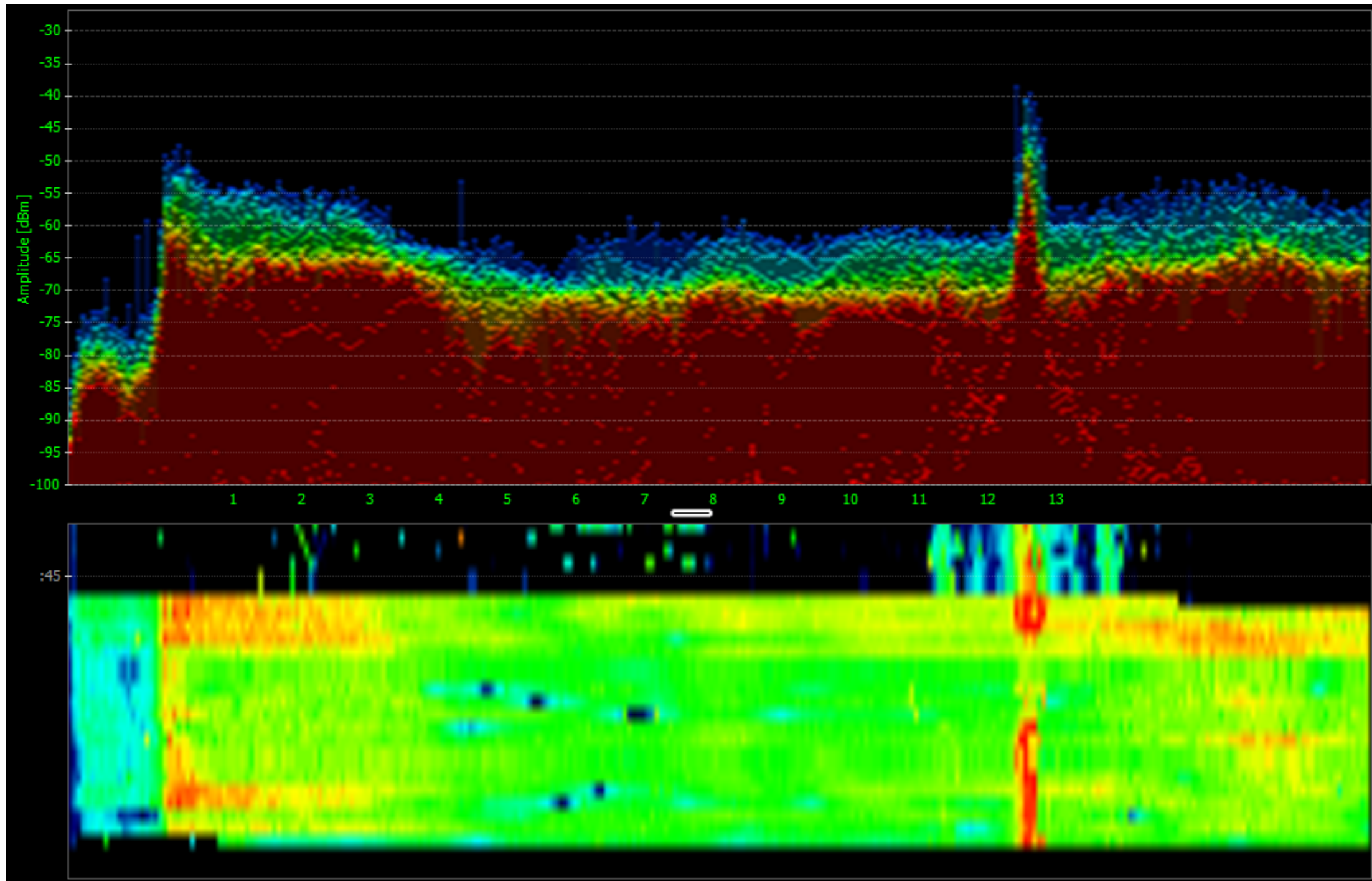


# Analog Video Camera





# Wide Band Jammer








[www.metageek.net/downloads](http://www.metageek.net/downloads)



7-day Trial

# Pricing

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 + 	<b>\$849</b>
CISCO CLEANAIR ACCESSORY	<b>\$150</b>
LAB ACCESSORY	<b>\$150</b>

# Questions?



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**Thanks for Attending!**