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ZigBee and WiFi Coexistence

ZigBee and WiFi channels both exist in the 2.4 GHz band, existing in the exact same frequency space. When deploying both WiFi and ZigBee in the same environments, careful planning must be performed to make sure that they don't interfere with each other.

Operating a ZigBee network and a WiFi network on the same frequency will cause them to interfere with each other. Usually, the ZigBee network will take the hit.


Advanced WiFi Lessons

1. WiFi Security (/training/resources/wireless-security-basics.html)
2. Designing a Dual-Band Network (/training/resources/design-dual-band-wifi.html)
3. Legacy Data Rates (/training/resources/access-points-support-legacy.html)
4. Zigbee & WiFi (/training/resources/zigbee-wifi-coexistence.html)
5. Adjacent and Co-Channel Interference (/training/resources/adjacent-channel-congestion.html)
6. WiFi and non-WiFi Interference Examples (/training/resources/WiFi-and-non-WiFi-Interference.html)
7. Man-in-the-Middle Attacks (/training/resources/man-in-the-middle-attack.html)

ZigBee and WiFi Channels

ZigBee and WiFi channel numbers may seem similar, suggesting that they won't overlap. Unfortunately, this is not the case.
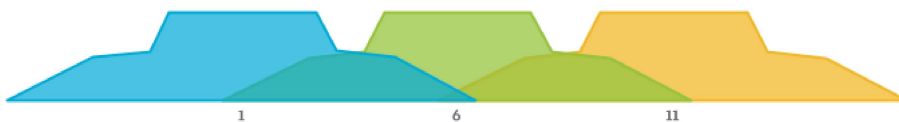

2.4 GHz WiFi Channels
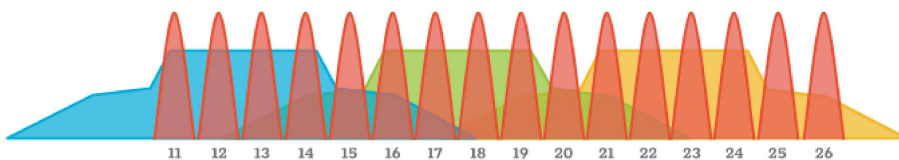
2.4 GHz ZigBee Channels

WiFi's three non-overlapping channels (1, 6, and 11) use the exact same frequencies as ZigBee channels 11-22.

ZigBee channels 25-26 aren't immune either, because they can be caught in WiFi channel 11's sideband lobe (see **Sideband Lobes** below). ZigBee channel 26 is usually relatively unaffected by WiFi, but many ZigBee devices do not support it.
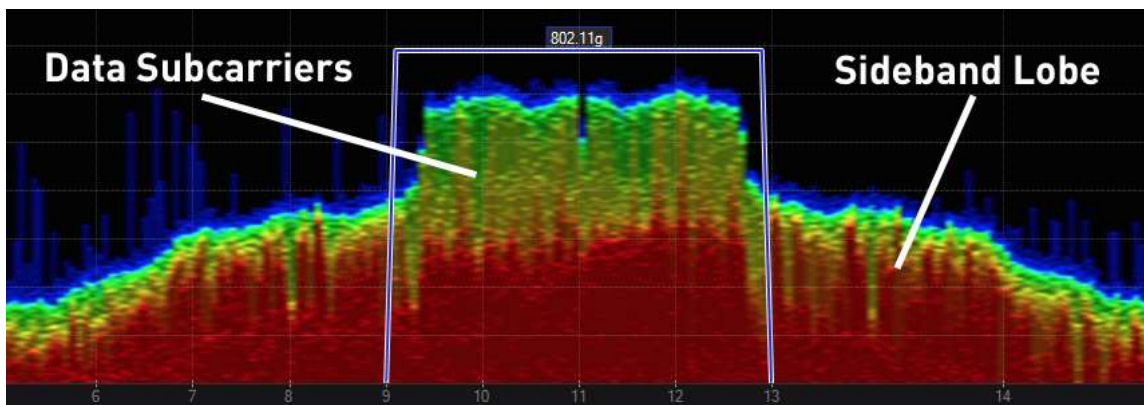
Interference

When a WiFi network is on the same channel as a ZigBee network, the WiFi network will usually interfere with the ZigBee network.
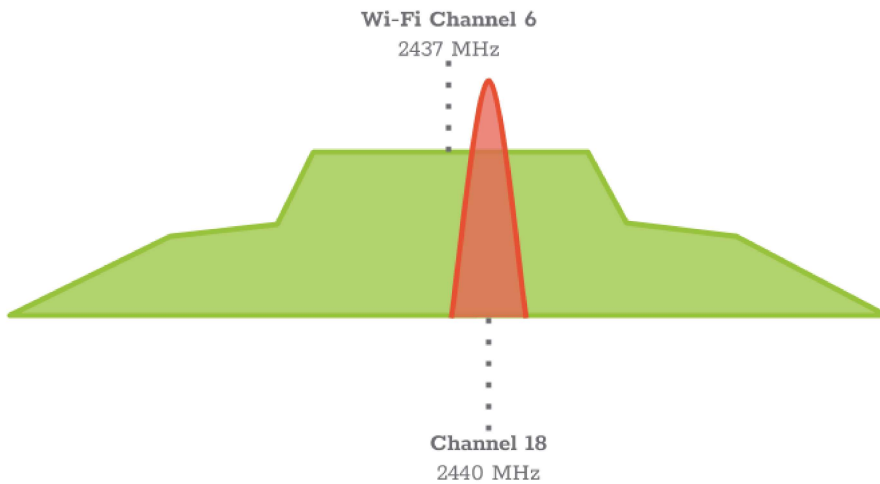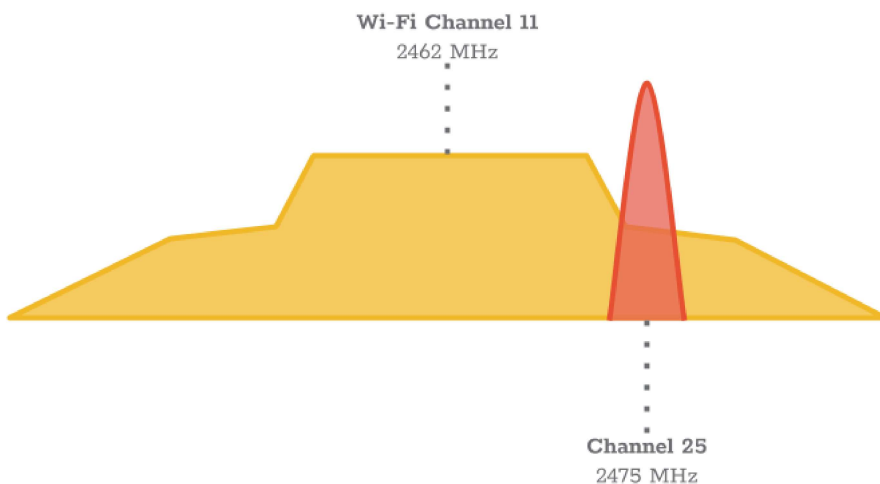

Sideband Interference

An 802.11g/n signature in the spectrum has two components:

1. The 20 MHz "square" section that contains the **data subcarriers**
2. **Sideband** lobes on each side, which are a normal side effect

Sideband lobes might not carry WiFi data, but they are fully capable of drowning out ZigBee transmissions.

Sideband lobes are usually only visible when you are very close to to the device that is actively transmitting (try doing a speed test or streaming an HD video). This is especially evident when your ZigBee access point and WiFi access point are in very close proximity with each other (like in the same comm closet).

Channel Planning

When deploying ZigBee and WiFi networks in the same environment, channel planning for peaceful coexistence is key.

Normally, we get three WiFi channels to work with (utilizing 1, 6, and 11), but to make room for ZigBee, we may have give up channel 11.

When we deploy our AP's around the house, we'll want to keep the same-channel access points as far away from each other as possible to avoid co-channel interference. This essentially creates a two-channel reuse plan, which isn't as efficient as a three-channel reuse plan, but it will work to make space for the ZigBee gear.
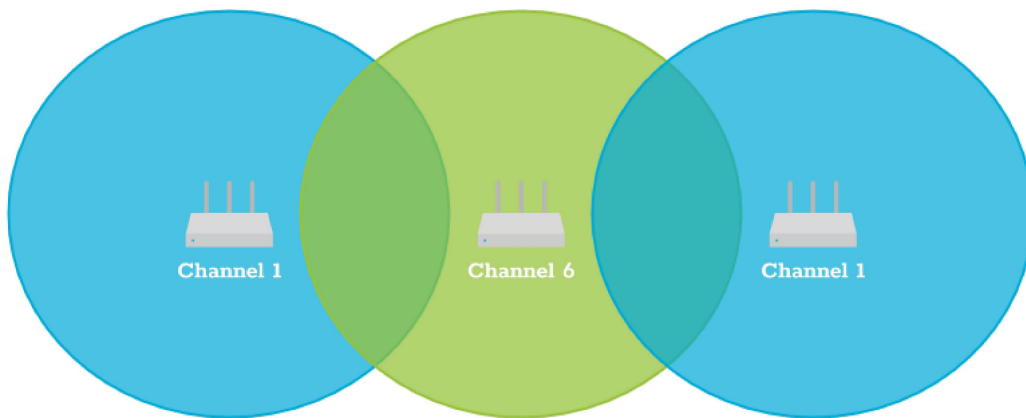
A two-channel reuse plan

This concept can be applied to just about any variation of two channels out of 1, 6, and 11. You could place WiFi gear on channel 1 and 11, or 6 and 11, or any variant, as long as you're making room for the ZigBee gear and placing it on a good channel.

Dealing with Neighbors

Most deployments have neighbors, and they typically run their own wireless networks, which have unpredictable channels.

When you deploy your wireless network, use Chanalyzer + Wi-Spy to:

1. Identify what channels the neighbors are using
2. Choose the best channels for your WiFi network
3. Perform throughput testing on your WiFi network to determine what ZigBee channels they will interfere with
4. Deploy ZigBee networks on channels that don't receive interference from your WiFi, or the neighbors WiFi˜

ZigBee and WiFi Channel Chart

Click here to download (https://support.metageek.com/hc/en-us/article_attachments/115017048148/ZigBee_Channels.pdf) a reference chart for ZigBee and WiFi Channels.

Next Lesson...

Adjacent and Co-Channel Interference (adjacent-channel-congestion.html)

(/products/wi-spy)

See Zigbee and WiFi Signals

Chanalyzer + Wi-Spy allows you to see RF signals from both Zigbee and WiFi

Learn More (/products/wi-spy)

PRODUCTS

Wi-Spy Air (/products/wi-spy-air/)

MetaGeek Complete (/products/complete/)

Chanalyzer + Wi-Spy (/products/wi-spy/)

Eye P.A. (/products/eye-pa/)

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