Signal-to-Noise Ratio (SNR) and Wireless Signal Strength

Overview

For best performance in a wireless environment, it is key that wireless devices are able to distinguish received signals as legitimate information they should be listening to and ignore any background signals on the spectrum. There is a concept known as the Signal to Noise Ratio or SNR, that ensures the best wireless functionality. The SNR is the difference between the received wireless signal and the noise floor. The noise floor is simply erroneous background transmissions that are emitted from either other devices that are too far away for the signal to be intelligible, or by devices that are inadvertently creating interference on the same frequency.

For example, if a client device’s radio receives a signal at -75 dBm, and the noise floor is -90 dBm, then the effective SNR is 15 dB. This would then reflect as a signal strength of 15 dB for this wireless connection.

The further a received signal is from the noise floor, the better the signal quality. Signals close to the noise floor can be subject to data corruption, which will result in retransmissions between the transmitter and receiver. This will degrade wireless throughput and latency as the retransmitted signals will take up airtime in the wireless environment.
Cisco Meraki Access Points reference the Signal to Noise Ratio as the indication for the quality of the wireless connection. This provides a more accurate depiction of the health of the wireless signals as it takes the RF environment and ambient noise levels into account. For instance, a received signal of -65 dBm can be considered good at a location that has a noise floor of -90 dBm (SNR 25 dB) but not so much at a location with a noise floor of -80 dBm (SNR 15 dB).

Generally, a signal with an SNR value of 20 dB or more is recommended for data networks where as an SNR value of 25 dB or more is recommended for networks that use voice applications. Learn more about Signal-to-Noise Ratio.

**View Client Signal to Noise Ratio**

**View SNR on the Cisco Meraki Dashboard**

All wireless clients connected to a Meraki access point will have their SNR values displayed on dashboard. This information can be viewed by navigating to Network-wide > Clients. Then, select a wireless client to view more details on that particular device's connection. Here you will see additional information in regards to the access point the client is connected to, the wireless channel it is using, and the signal strength (SNR).

**View SNR on connected AP**

To view the SNR directly on a client device, simply open a web browser on that device and navigate to ap.meraki.com or my.meraki.com. This will then display the local status page of the access point that the client device is currently connected to. Here you’ll see various details about this client device's wireless connection, including the signal strength between this client and the AP.
The typical WLAN card on a laptop is not designed to measure the noise floor of its surrounding and special adapters like the Wi-Spy dBx are needed. As explained above, Cisco Meraki access points use SNR to measure the signal strength on a particular client. Using a tool like Metageek inSSIDer or similar tools, one can find the received signal strength on a client and therefore calculate the noise floor at a location by subtracting the SNR value from the received signal value.

For more information relating to wireless and wireless signals, please see the following articles

- Troubleshooting poor wireless performance
- Common sources of wireless interference
- Checking Signal Strength and Throughput on a Cisco Meraki Wireless network