

Cognitive's Optimal Wi-Fi Sensing Coverage Recommendations

Proper setup of a Wi-Fi Sensing system is crucial for optimal coverage and customer satisfaction. The initial setup impacts the system's ability to accurately detect motion and perform reliably. Considering the unique features of the deployment environment will allow the end user to maximize coverage and minimize interference effectively.



Wi-Fi Frequency Bands

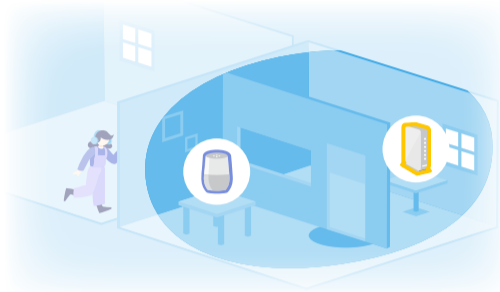
The existing Wi-Fi network's frequency band influences the Wi-Fi Sensing network's signal performance.

2.4 GHz Band: Provides broader coverage and better wall penetration. Ideal for homes with thick or dense construction materials.

5 GHz and 6 GHz Bands: Provides faster speeds but shorter range. Ideal for areas needing high-speed connectivity with fewer obstructions.

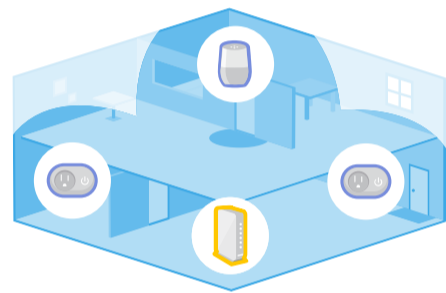
Detection Areas and Zones

When setting up detection areas and zones, strategically position devices to cover high-traffic areas and points of interest. Consider the coverage pattern, which often resembles an ellipsis shape, ensuring that key areas are within the effective sensing range for accurate data collection and motion detection.





Router Placement Position

For optimal Wi-Fi and Wi-Fi Sensing coverage, centrally position routers in areas with dense materials and avoid placement near high-attenuation obstacles like metal ducts. Consider using mesh nodes with deployed WiFi Motion software, such as Wi-Fi extenders, to assist in homes with complex layouts or materials causing signal interference.



Device Selection

Our recommendation is to select fixed devices as motion sensors to ensure accurate data collection, reliable performance, and optimal coverage.

Device Types	Key Features	Examples
 Fixed (Stationary)	<ul style="list-style-type: none"> Stable connection Plugged in Reliable data patterns Consistent sensing environment 	Smart speakers (Amazon Echo or Google Home), Wi-Fi enabled appliances access points, Smart plugs
 Mobile	<ul style="list-style-type: none"> Variable sensing environment Signal strength fluctuations Inconsistent data readings & false positives Battery limitations 	Smartphones, laptops, tablets

Device Location

Where possible, consider the following device placement recommendations:

- Ensure no more than two rooms and two interior walls between APs and devices for optimal connectivity
- Place devices in open areas away from thick walls and large objects that can block signals
- Position Wi-Fi sensing devices off the floor (typically waist to chest height) to improve signal propagation
- Spread devices evenly across rooms and floors to establish multiple links and enhance coverage
- In open-concept homes or larger rooms, use corners and strategic placement to cover larger areas effectively
- Avoid placing devices directly above or below each other on different floors to minimize localization errors.
- Wi-Fi Sensing coverage forms an ellipse shape, requiring strategic device placement to detect motion accurately in areas like doorways or high-traffic zones.

Custom Recommendations

The above suggestions provide a solid foundation for setting up an effective Wi-Fi Sensing system, but each environment and application is unique. For more insights on creating user-friendly setup documentation, contact us at support@cognitivesystems.com