

The SkyPilot Solution

The SkyPilot solution utilizes a Synchronous Mesh Architecture to provide a flexible, high-performance wireless broadband network

- The SkyGateway: carrier-class base station that connects the wireless mesh infrastructure to the Internet.
- SkyExtender TriBand: integrates both 2.4 and 4.9 GHz Wi-Fi access with a 5 GHz backhaul.
- SkyExtender DualBand: integrates 2.4 GHz Wi-Fi access with either 4.9 or 5 GHz backhaul.
- SkyConnector. Low-cost CPE that connects to SkyPilot's synchronous mesh network.

Additional Resources

- Public Safety Application Note
- Wireless Municipal Networks – A Guide for Decision Makers

Available on
<http://www.skypilot.com>

Introduction

In 2003, the U.S. Federal Communications Commission (FCC) finalized the allocation of licensed spectrum in the 4.9 GHz band for exclusive use in public safety applications. Three factors motivated the FCC to take this action:

- the terrorist attack on September 11th 2001;
- the inability of existing licensed narrowband spectrum (e.g. 700 and 800 MHz) to accommodate advanced “multimedia” (data/voice/video) applications; and
- the increased congestion resulting from extensive commercial use of Wi-Fi access and other services in the unlicensed broadband spectrum (2.4 GHz).

The FCC's action, combined with increased funding from the federal and state governments, indicate the significant investment in public safety applications and ultimately for the benefit of many communities. According to *The Yankee Group*, there are over 300 municipalities in the U.S. (as of this writing) already deploying or planning broadband wireless networks. And most of these already have or will ultimately include public safety applications.

With this convergence of spectrum allocation and market demand, SkyPilot Networks provides a unique solution that addresses the need for reliable data and voice communications critical to public safety agencies. SkyPilot supports both the licensed public safety 4.9 GHz and unlicensed public access 2.4 GHz bands to deliver a scalable mesh network that offers extended reach and can easily route around obstacles, providing virtually ubiquitous coverage downtown or beyond city limits. This allows for robust, mission-critical communications such as video surveillance, remote mobility applications, and public access via client devices such as portable computers and communications devices.

This market overview provides an introduction to 4.9 GHz licensing and spectrum allocation as well as funding of public safety initiatives.

Licensing in the 4.9 GHz Spectrum

Although the FCC's allocation is strictly for exclusive use in public safety applications, the FCC is quite lenient in what government agencies are eligible for licensing. Any local (city, town or county), state or federal government entity providing public safety services (e.g., law enforcement, fire protection, emergency medical services, disaster preparedness, etc.) is eligible for a license. Significantly, there is no longer a need for a Regional Plan to be in place before local use of the 4.9 GHz spectrum can begin. Therefore agencies can begin deploying 4.9 GHz network infrastructure immediately.

While businesses in the private sector are not eligible for a license, some are permitted to use the spectrum for public safety purposes. Examples include ambulance services, hospitals, utilities and other private organizations that are regularly (or even only occasionally) involved in providing services related to public safety. The licensee (the government agency holding the license) has full discretion regarding private sector participation.

Aircrafts and designated Cooperative Engagement Capability (CEC) training regions for the U.S. Navy are not eligible for 4.9 GHz allocation. However, it is not uncommon for special concessions to be made for these two exceptions. Aircrafts can provide interference with radio astronomy sites that scan the sky in this frequency range. The FCC is willing to grant special waivers in most locales. One exception is where ground-air communications is desired, especially when the area is remote from a radio telescope. CEC regions are excluded because the U.S. Navy conducts operations in this spectrum.

Public Safety Web Resources

- FCC Universal Licensing System (ULS)
<http://wireless.fcc.gov/uls/>
- Public Safety Wireless Communications
<http://wireless.fcc.gov/publicsafety/>
- Association of Public-Safety Communications Official International
<http://www.apcointl.org>
- Federal Grants
<http://www.grants.gov>
- SAFECOM Program, DHS Science & Technology Directorate's Office for Interoperability and Compatibility
<http://www.safecomprogram.gov>
- FedBizOpps
<http://www.fbo.gov>

The license application process is remarkably simple, and can be handled online via the [FCC's Universal Licensing System \(ULS\)](#). Because the vast majority of public safety agencies already utilize licensed spectrum in other frequency bands, the local agency is probably already a registered user of ULS and familiar with the application process. The application is usually processed within 24 hours, and the license is valid for 10 years.

About the 4.9 GHz Allocation

The FCC divided the 50 MHz allocation (4940-4990 MHz) into 18 channels: Ten at 1 MHz each and eight at 5 MHz each. The 1 MHz channels are expected to be utilized for narrowband communications to support voice and data applications requiring relatively modest throughput. The 5 MHz channels provide sufficient bandwidth for many data and multimedia applications that demand higher levels of throughput. FCC regulations also permit channel aggregation to achieve bandwidths of 10, 15 or 20 MHz, resulting in four, three or two available non-overlapping channels, respectively.

Details of the FCC's allocation are in Part 90 on Private Land Mobile Radio Services in Subpart Y on Regulations Governing Licensing and Use of Spectrum in the 4940-4990 MHz Band. Salient details of the reports, opinions and orders issued by the FCC pertaining to the allocation (as of this writing) can be found in four key documents (FCC 02-47, FCC 03-99, FCC 04-185 and FCC 04-265) available via the federal government's [Electronic Document Management System \(EDOCS\)](#). The most recent version of Part 90 in its entirety can be found via the Electronic Code of Federal Regulations (e-CFR) section on the [GPO Access Website](#) under Title 47 (Telecommunication).

Funding Public Safety Initiatives

Most public safety agencies already allocate budget for communications needs. Most also already "outsource" to a supplier specializing in communications technology (for equipment, deployment and configuration assistance, upgrades and repairs, etc.).

A key difference between the private and public sectors involves the availability of state and federal grant funding for many public safety applications. Most public safety agencies actively seek (and receive) grant funding for a substantial percentage of their operational budgets. The terrorist attack on '9/11' served as the impetus for the U.S. Congress to appropriate billions of dollars for public safety applications, mostly through the Department of Homeland Security (DHS).

Grants involve both good news and bad news. The good news is the availability of substantial funds for major projects. The bad news is the formal bidding process utilized and the length of time involved in the application, award and funding cycles (often more than a year for a needs assessment, proof of concept, bidding process, etc.). These funds are normally targeted for specific types of applications, many of which have a need for intra- and inter-agency communications. Some may even be specifically targeted at communications infrastructure! Information on federal grants can be found at <http://www.grants.gov>. Most states also have similar Websites devoted to grant funding from both state appropriations and the re-granting of federal funds.

Conclusion

Municipalities and public safety agencies have the advantage of a dedicated spectrum for reliable mission-critical communications. In addition, concerns regarding funding public safety initiatives can be alleviated through the many grant opportunities available. As many municipalities and agencies work hand-in-hand on public safety programs, they are recognizing the importance of a network infrastructure that provides multiple services that can benefit the whole community: municipal and public broadband and Wi-Fi access, voice-over-IP (VoIP) and video surveillance.

To address the requirements of these joint municipal and public safety efforts, SkyPilot Networks' offers a scalable, wireless mesh solution that includes the SkyExtender TriBand which provides a 5 GHz wireless mesh backhaul and enables 2.4 GHz and 4.9 GHz Wi-Fi access. Unlike other mesh offerings, the SkyPilot solution can deliver a throughput of up to 20 Mbps in a single, aggregated 20 MHz channel. In locations where the 4.9 GHz spectrum becomes fairly crowded with multi-agency communications over time, up to 5 Mbps of throughput is possible on a single 5 MHz channel, or 10 Mbps on a 10 MHz channel. Multiple agencies can also share a single SkyPilot network using VPNs or VLANs to segment intra-agency traffic securely, with a separate VPN/VLAN designated for interoperable inter-agency communications.

The SkyPilot solution is both feature-rich and field-proven. The superior performance, scalability, security and manageability make choosing a SkyPilot solution a truly safe decision. The versatility of the offering makes SkyPilot a prudent choice over the long-term as the inevitable changes and growth of any community. And finally, the attractive cost-effectiveness of the offering (especially with the need for fewer nodes based on the high-powered directional antenna array) is almost certain to make any qualified proposal.

To learn more about you can benefit from SkyPilot's Synchronous Mesh Network system for public safety applications contact us at sales@skypilot.com.



2055 Laurelwood Road
Santa Clara, CA 95054-2747
408.764.8000
US Toll Free 866 SKYPILOT
sales@skypilot.com

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