

The Growing Need for Solutions Enabled by Licensed Spectrum

Evaluating Utility Uses Cases

Smart Grid Communications

Key Drivers and Use-Cases

Every utility is tasked at some point with looking at its long term Grid Modernization plan, where communications is a key enabler. It is often a balancing act when one considers the key factors that impacts the decisions that need to be made such as:

- How to best bridge the gap between legacy systems and future applications.
- Designing a system that meets coverage, capacity, and security requirements, while providing applications for the breadth of systems including data, voice, mobile and fixed.
- Ensuring reliable connectivity, while implementing a scalable solution that can be cost-justified in the ROI analysis.

This challenge is presented to Utilities today in supporting the communications requirements

essential to the evolving needs of its Smart Grid.

At the surface there are several solutions available for Smart Grid networks: wired, wireless, licensed, unlicensed, carrier or private networks. Each option will have its pros and cons, and its suitability would depend on the needs of each utility.

Reliability is usually the first word that comes to mind when asked about what is most important when designing a communications system. With the hype around the internet of things (IoT), **licensed spectrum** provides the added assurance of maintaining reliability in the exponential growth of connected devices across all industries (not only the Smart Grid which may be considered the true beginning of the new buzz that is termed IoT.)

At the core of a Smart Grid is a field area network (FAN) that

pdvWIRELESS:

Smart Grid Resource and Solution Partner

pdvWIRELESS is the largest holder of 900MHz spectrum in the United States. pdvWIRELESS is committed to providing services to enhance the limited options available for Critical Infrastructure's reliable communications requirements.

Offering excellent propagation characteristics, Utilities can leverage this spectrum as its needs evolves to support voice, data, fixed and mobile applications with a variety of data rate requirements.

A key differentiator between pdvWIRELESS and other spectrum providers is the combination of attractive 900 MHz spectrum and the ability to be a long term partner to the Utility. This means flexibility and adaptability in providing spectrum, business terms, and engineering resources manage network growth and maximize capabilities.

In addition to capabilities of utilizing a variety of equipment options that are compatible in the band, pdvWIRELESS and the Enterprise Wireless Alliance have petitioned the FCC for the realignment of spectrum and creation of Private Enterprise Broadband (PEBB) services. Such services, when approved, will enable a PEBB with priority access for Utility applications.

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can support traffic from three primary sources. These are (1) the backhaul from AMI access points, (2) Supervisory, Control and Data Acquisition (SCADA) traffic, and (3) Distribution Automation (DA) traffic.

The AMI backhaul traffic varies widely. As Distributed Generation, Electric Vehicle chargers, Demand Response, and various other Use Cases are added through the AMI system, the AMI backhaul traffic will grow significantly.

SCADA traffic normally requires modest bandwidth, and historically these systems have often been connected using copper wire. Carriers, however, intend to discontinue support for copper-based services around 2020. Utilities have a strong impetus to make the switch to

wireless, and require spectrum to do so. As with the AMI backhaul, the amount of spectrum required will vary substantially as it is not unusual for other substation traffic, such as video monitoring, to be carried in addition to the routine SCADA traffic.

Distribution Automation (DA) is the most challenging of all. Depending on the size and service area of the Utility, there will be anywhere from a few hundred to many thousands of DA devices. Capacitor banks typically have modest traffic requirements, whereas many reclosers may require high performance RF links.

The requirements will vary substantially both at network implementation and over time as the network evolves. Expansion of Use Cases such as Distributed

Generation and Volt-Var Optimization will drive up the number of devices on the Smart Grid and the need for bandwidth.

One well-established communications need is field work force communications. The line crews and maintenance technical field personnel need reliable communications, and this routinely comes from a land mobile radio (LMR) system. It can be argued that cell phones are ubiquitous. However, as one utility executive has summarized: "the cellular carriers perform the worst when we need them the most". So for mission critical applications, dedicated spectrum is highly desired.

Spectrum Requirements Assessment


Evolving Bandwidth Requirements

To make an assessment of the amount of spectrum required, the key variables are as follows: the specific Use Cases being implemented; the number and locations of towers within the service area; the number and bandwidth of channels in the channel plan; the reuse plan for spreading those channels among the tower sites; and the radio equipment.

900 MHz radios are currently available for Smart Grid applications that can handle LMR and data applications with

channel bandwidths from about 12.5 KHz to 100 KHz, with new standards being proposed to utilize larger bandwidths when available and provide higher data rates.

Utilities and the Smart Grid are growing rapidly. Evolving Use Cases are driving the needs for further bandwidth. These trends can be expected to continue beyond population growth.



Interested in learning more about:

- Licensed spectrum for Utilities
- Equipment compatibility
- Network designs
- ROI with PDV's solutions
- pdvWIRELESS petition for a Private Enterprise Broadband Network?

Contact pdvWIRELESS to speak with someone today:

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