

Defining Terms . . . What is a Cellular Tower?

The federal FirstNet Authority is tasked with the creation of a nationwide broadband network for public safety. The initial 5-year buildout plan includes the promise of new towers to facilitate coverage in areas currently underserved or unserved by commercial providers. With FirstNet prompting discussion of new towers builds, it is helpful to understand the basic features of a cell tower.

The primary function of a cell tower is to ensure proper elevation to antennas that receive and transmit radio-frequency signals from cell phones and other devices. A cell tower supports the electronic communications equipment along with an antenna to support cellular communication in a network. Cell towers are usually placed so that they can cover a wide area. The working range of a cell tower depends on many factors, such as: rated power of the transmitter; frequency of the signal; height of the antenna above its surroundings; the required uplink/downlink data rate of the customer's device; and the reflection or absorption of radio energy by nearby buildings or vegetation.

A microcell provides a small range of coverage for a cellular network in public places such as airports, malls and other crowded places where more people are connected to a single tower or within a single cell. The range of a microcell is a few hundred meters and it is controlled by the tower by changing the voltage value.

Cell phones are designed to be aware of the nearest tower. This is shown to the user in the form of signal strength, which represents the connectivity between the user's location and the nearest tower providing the service.

Source: Technopedia Staff, <https://www.techopedia.com/about>

www.RTS.Vermont.gov

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FirstNet's mission is to deliver a nationwide broadband network dedicated to public safety to help strengthen their emergency communications abilities, making them safer and more effective on the job. As designated by law, FirstNet was to secure a private partner to deploy the Nationwide Public Safety Broadband Network. Following a competitive RFP in 2017, AT&T was awarded the contract to build, operate and maintain the network.

VERMONT SUPPORT TEAM

For questions, or to arrange a presentation for your team:

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VERMONT UPDATE

FirstNet for First Responders

Department of Public Safety

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GAO Releases Report on FirstNet

The U.S. Government Accountability Office in January released a report on the FirstNet Authority that recommended changes to scheduling practices and increased communication with public safety stakeholders. The GAO examined



FirstNet's progress in establishing the Nationwide Public Safety Broadband Network and its efforts to oversee contractor AT&T. The performance audit was from November 2018 to November 2019. The GAO found that while AT&T has met the first coverage milestones in

the contract, the quality and breadth of coverage was not uniform across the states. The GAO report also analyzed contract oversight communication with stakeholders. In approximately 40 interviews with state stakeholders, the GAO reports that numerous stakeholders described dissatisfaction with the level or quality of information they received from FirstNet and AT&T. These officials said that FirstNet had communicated little to no information on AT&T's progress deploying the network in their area or if and how FirstNet was monitoring performance.

The GAO found that FirstNet lacked (1) a reliable master schedule to review; (2) communication with relevant stakeholders regarding contract oversight; and (3) meaningful information on end-users' satisfaction to gauge performance quality. The complete report is available on the GAO website. To read the report, go to <https://www.gao.gov/products/GAO-20-346>.

EDITOR NOTE: In Vermont, DPS works to secure timely updates from FirstNet on network developments. See page 2 of this newsletter for an update.

GAO Surveys State SPOCs - Vermont Response

In May 2019, the GAO sent out a survey to the designated State Single Point of Contact (SPOC) for FirstNet in each state. Terry LaValley, the DPS Director of Radio Technology Services, is Vermont's SPOC. The following is an excerpt of his responses. The complete survey and responses are available on the RTS website at <https://rts.vermont.gov/firstnet-vermont/reports-surveys>.

What sorts of information from FirstNet do you believe the SPOC is entitled to? From AT&T?

The SPOC should be a first point of contact in Vermont for the FirstNet Authority and AT&T representatives. The SPOC should be entitled to all updates on the buildout, including detailed information on site builds, coverage and first responder subscriber numbers.

In what ways, if any, do your expectations for information from AT&T differ from your expectations for other telecommunications carriers? Why?

As conceived by Congress, the FirstNet Authority was given the responsibility of
(GAO Survey continued pg. 2)



Validation work contracted for by DPS aims to assist the FirstNet Authority in ensuring Vermont has the coverage committed to first responders.

- Coverage Validation Work Update

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- GAO Report on FirstNet
- Cell Site Forecast
- Coverage Validation Work

There's more information at www.RTS.Vermont.gov



New Cell Sites Coming On-Air

AT&T FirstNet representatives forecast that seven new cell sites are coming on-air in Vermont within the next three months. The federal contract the FirstNet Authority has with AT&T requires that the company have a nationwide network substantially in place by the close of 2022. This buildout includes new and improved coverage for under-served or unserved areas nationwide—particularly, rural areas. In Vermont, AT&T has committed to constructing 36 new sites. More than half of the new sites are being built at locations where there is currently no cell service. Below is a progress report on the buildout as reported to the Department of Public Safety in December by AT&T:

- One new FirstNet site was brought on-air at the end of 2019. That site is located in Townshend. DPS was advised that a site in Shaftsbury would also be on-air, but it was delayed until spring.
- Five new FirstNet builds are forecast to be on-air by the end of the first quarter of 2020 in Bennington, Moretown, Richford, Winhall and West Bridgewater.
- Six of the 36 new tower sites are located in Essex County and will be built via a partnership with Great North Woods Wireless. Site acquisition and construction of the Essex County sites began in 2019. AT&T forecasts to have these sites active by the end of 2020.
- Five new FirstNet sites were recently activated in New Hampshire, along the Vermont border. Those sites are located in Colebrook, Columbia, North Stratford, Stewartstown and Stratford. Public safety practitioners in Vermont will benefit from improved coverage along the Connecticut River region.

An important part of AT&T's FirstNet buildout plan is to add Band Class 14 to existing towers throughout the country. Band Class 14 represents 20 MHz of highly desirable spectrum in the 700 MHz band that provides good propagation in urban and rural areas and decent penetration into buildings. In the original federal enabling legislation, Band Class 14 was licensed to the FirstNet Authority specifically for the creation of the public safety broadband network. In Vermont, there are now 34 towns that have at least one Band Class 14 enabled location. Adding Band Class 14 to existing towers should increase capacity and coverage for first responders.

As part of the state's opt-in agreement with FirstNet, Vermont will receive two deployable units that will be installed on Department of Public Safety vehicles. The term deployable refers to a communication resource that may be moved or deployed to a specific geographic area of need. The State will own the two units and the units can be deployed as needed. A deployable unit may be as large as a SatCOLT (Satellite Cell on Light Truck) or a smaller unit that may be transported on a trailer or physically carried into a remote area to provide broadband connectivity. Looking forward into 2020, DPS will work with FirstNet/AT&T to determine the type of deployable that will best meet the communication needs of the public safety community in Vermont.

BAND 14 TOWNS
Barre
Barton
Bennington
Brattleboro
Burlington
Colchester
East Burke
East Dover
Essex
Essex Junction
Hardwick
Lyndonville
Manchester Center
Milton
Montpelier
Moretown
Morrisville
Northfield
Norwich
Pownal
Randolph Center
South Burlington
South Royalton
Springfield
St Albans
Townshend
Waterford
West Dover
Westfield
White River Junction
Williamstown
Williston
Windsor
Woodstock



TRENDING

Check out these stories on FirstNet, interoperability and public safety technologies.

GCN

Credentialing private-sector emergency workers

<https://www.gcn.com/Articles/2019/12/02/disaster-recovery-worker-credentials.aspx?p=1>

Identification cards available to government organizations for free can help public-safety officials know what private-sector workers—such as facilities staff, IT workers or safety personnel—are permitted to access affected areas during emergencies.

IWCE Urgent Communications

Group announces successful test of multi-vendor MCPTT call with end-to-end security

<https://urgentcomm.com>. On site enter headline in search field.

Secure voice communications can be delivered using 3GPP's mission-critical-push-to-talk standard across solutions provided by multiple vendors, according to tests recently announced by Bittium, Athonet, Nemergent and the Mission Critical Open Platform (MCOP) project.

(GAO Survey continued pg. 1)

building out the NPSBN in cooperation with the public safety communities in each state. Due to the Congressional mandate and appropriated funding, our expectation for information is much higher than what we would expect from a general telecommunication carrier.

What steps could either FirstNet or AT&T take to improve deployment (coverage and adoption)?

Vermont needs the timely sharing of information regarding coverage and specific adoption numbers as outlined above. Further, the strict confidentiality requirements on such information by the FirstNet Authority and AT&T make it difficult for both administrators and the public safety community to determine whether AT&T is fulfilling the terms of the national contract.

Why do you believe FirstNet or AT&T have not taken these steps to-date?

Vermont has been told that such information will not be shared with us due to provisions in the federal contract between the FirstNet Authority and AT&T.

DEPLOYABLE PERFORMANCE

A test of the AT&T SatCOLT, based in South Burlington, was conducted as part of the DPS Emergency Management statewide recovery exercise in September. The goals of the deployable test were threefold:

- To conduct a Band Class 14 signal test of the FirstNet/AT&T SatCOLT to determine the geographic reach of the signal and the quality of the connection;
- To introduce the push-to-talk application to responders to gauge the ease at which they utilized this function; and
- To evaluate RTS procedures for deployable phone distribution, on-scene instruction, and general performance.

The test scenario was to support the communication needs of a Department of Forest & Parks sawyer team. The Forest & Parks Department contacted the State Emergency Operations Center and requested that a communication resource be provided for them in Bristol, Vermont to enable team members to talk with one another during the operation. The SatCOLT was deployed to provide cellular coverage over Band Class 14. General results indicated excellent signal quality and reach within one mile or less of the deployable. Line of sight and lack of obstructions were more indicative of coverage than distance from the deployable. With a clear path to the SatCOLT signal, some teams reported coverage as far as four miles from the deployable.

Vermont City Marathon

The Vermont City Marathon was held on May 26, 2019 and is one of the largest attended events in the City of Burlington each year. The Burlington Fire Department requested the FirstNet SatCOLT deployable asset to supplement their public safety communications capabilities for the event. A severe weather event caused the start of the race to be postponed by one hour. Racers and attendees were evacuated to safe locations during the delay. Thousands of individuals turned to their smartphones and other devices to communicate their safe status, check weather reports, and coordinate with spectators and loved ones. As a result, some commercial cell networks were overwhelmed and unusable for a period of over 30 minutes.

However, public safety officials were able to communicate with each other despite the network congestion thanks to the service generated by the FirstNet SatCOLT. FirstNet priority and pre-emption, together with the network capacity boost provided by the SatCOLT, allowed responders and organizers to manage the evacuation and resume the race after an hour delay.

Grant Enables Coverage Validation Work

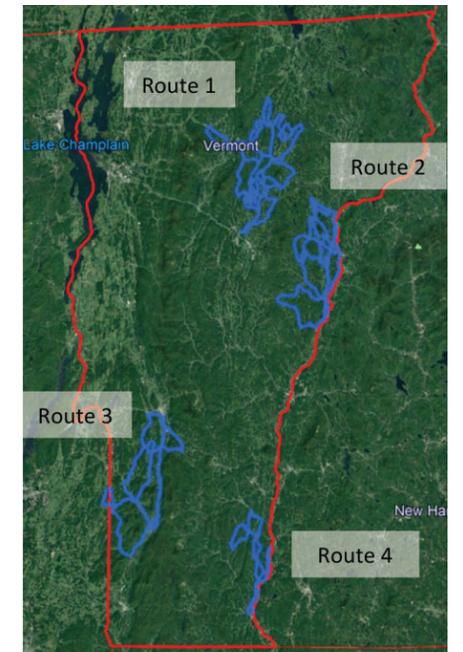
Validation work contracted for by the Department of Public Safety aims to assist the FirstNet Authority in ensuring Vermont has access to the coverage committed to first responders. FirstNet awarded the federal contract to build and manage the Nationwide Public Safety Broadband Network (NPSBN) to AT&T. In 2018, the National Telecommunications and Information Administration (NTIA) awarded grants to states to support planning activities that included identifying and documenting on-going coverage needs and gaps. Vermont DPS received a grant and the NTIA approved a proposal to test for specific coverage concerns in four geographic locations within the state.

The Televate company was selected to conduct the testing. A central focus of the testing was to validate FirstNet coverage predictions against actual measured coverage. Publicly available coverage maps from FirstNet represent that much of Vermont currently has LTE with priority coverage. LTE stands for Long Term Evolution and is a type of 4G technology that delivers some of the fastest speeds for streaming media, downloading data and browsing the web. However, the validation testing identified areas within each testing route that had no cellular service or service that was limited or spotty and pose a concern for the public safety community.

The four locations chosen for testing were based on:

1. First responder coverage concerns;
2. Locations that were in areas not scheduled for new FirstNet tower builds during the initial 5-year buildout period and were marked as having coverage by FirstNet; and
3. The presence of previously identified public safety priority areas within the testing area.

Cellular coverage was determined by measuring signals with calibrated smartphones which automatically collected over 50 unique data elements—including service availability, device location, signal strength, signal quality, cell information, network latency and data speeds. Prior to each drive test, the smartphone was calibrated with field measurement equipment commonly used by the commercial cellular community. Because foliage is capable of blocking cell signals, drive tests were performed before Vermont's deciduous trees shed their leaves. DPS will discuss the results with FirstNet. DPS anticipates doing additional testing within the grant period. If you are a member of the public safety community and have FirstNet coverage concerns, please contact Radio Technology Services at (802) 241-5535 or email the administrative DPS FirstNet program staff at DPS.VTFirstNet@vermont.gov.



The final report and testing procedures are posted on the RTS web site at <https://rts.vermont.gov/firstnet-vermont/reports-surveys>.