A PUBLIC SAFETY WIRELESS TECHNOLOGY PROGRAM

Washington

FirstNet State Plan

Talking Points

July 20, 2017

DCN: SPOC-OneNet-17-01

This document was prepared by SAIC under contract with OneNet using funds under award 53-10-S13053 from the National Telecommunications and Information Administration (NTIA), U.S. Department of Commerce (DOC). The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the NTIA, DOC, or FirstNet.

Contents

1. Introduction 1
2. Background 1
3. Deployment 2
4. Network 3
5. Coverage 4
6. Devices 6
7. Public Safety Users 7
8. Rate Plans 7
9. Priority and Preemption 8
10. Local Control and ICAM 8
11. Applications and Services 9
12. Governor's Decision 9
13. Weaknesses in the State Plan 10
14. Summary 11

1. Introduction

On June 19, 2017, the First Responder Network Authority (FirstNet) released state plans for the construction and operation of the nationwide public safety broadband network in each of the 56 states, territories, and Washington, D.C. The plans address FirstNet and its partner AT&T's approach to constructing a radio access network (RAN) deployment in each state, including the planned phases of deployment, network policies, services, and capabilities.

The plans were released using a secured web-based portal and made available only to authorized reviewers in each state. States were given 45 days from state plan release to return comments regarding the plans to FirstNet. FirstNet will incorporate received comments and then release an official state plan to each governor who will make the decision whether to opt into the plan for their state. Governors are given 90 days to review the plans.[1]

This document offers "talking points" that highlight the major sections of the FirstNet State Plan for Washington, including areas of strength as well as weaknesses.

2. Background

FirstNet released its request for proposal (RFP) for a Nationwide Public Safety Broadband Network (NPSBN) on January 13, 2016. This **$100 billion** task order contract is notable not only for its size, but its duration – **25 years**; representing a quarter-century commitment to the nation's public safety community.[2] The contract was awarded on March 30, 2017. AT&T won the bid over competitors Rivada Mercury and pdvWireless.

The broad terms of the agreement are that FirstNet will provide payments to AT&T of $6.5 billion over the next five years to support network buildout as well as the 20 MHz of high-value telecommunications spectrum, Public Safety Band 14.

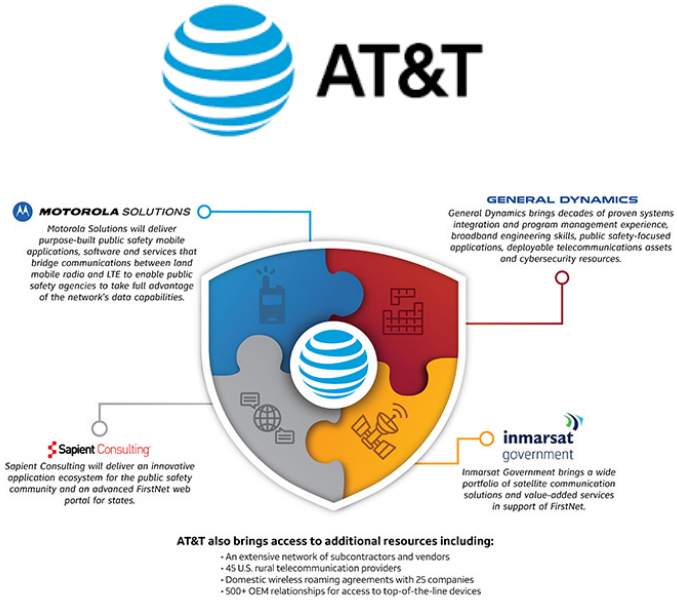

Figure 1: AT&T's FirstNet Team [4]

In exchange, AT&T agrees to spend $40 billion over the life of the contract to build, deploy, operate and maintain the network. This consists of $18 billion in cash payments to FirstNet – more than three times the FirstNet RFP minimum requirement. Of the $18 billion, $2 billion is expected to fund 25 years of

[1] See *Key Considerations for the FirstNet State Plan* for a summary of the FirstNet state plan process: https://youtu.be/2BvLiUJF_2c.

[2] Press release: *AT&T Selected by FirstNet to Build and Manage America's First Nationwide Public Safety Broadband Network Dedicated to First Responders*. Mar 30, 2017. Retrieved from: http://about.att.com/story/firstnet_selects_att_to_build_network_supporting_first_responders.html

FirstNet ongoing operations. The other $16B will go to a FirstNet-directed network investment fund. The remaining $22 billion is for AT&T-directed network improvements.[3]

AT&T's team for FirstNet consists of Motorola Solutions, General Dynamics, Sapient Consulting, and Inmarsat Government. Each team member is responsible for different roles during deployment. See **Figure 1**.[4]

3. Deployment

AT&T intends to offer public safety subscribers within a state priority service on its 4G LTE commercial bands as soon as a state's governor decides to opt into FirstNet. This "all band" strategy is truly an innovation compared to FirstNet's request for only frequency Band 14 deployment spread over five years. This approach:

- Dramatically increases the available bandwidth for public safety well beyond the spectrum provisioned by the Act.
- Significantly lowers device cost by making priority service available on any AT&T LTE device, including those in service by public safety today.
- Speeds deployment by offering priority and preemption service within the year and in parallel with the Band 14 build-out.

Kay Kapoor, President, AT&T Global Public Sector, states:

> "We'll start bringing them on our regular bands and offer them the preemption and all of the capabilities, so that they ride above everyone else. They can do that on our regular networks, while we build the Band 14 network out. Once we build that, then we start to switch them over; but meanwhile, they get the preemption and priority on our regular bands."[5]

As a result, AT&T's near-term deployment schedule on its existing service bands becomes:

- July 2017 – Public safety priority service available in a state upon opt-in
- December 2017 – Preemption available
- December 2017 – Bring your own device (BYOD) available

---

[3] Press release: *AT&T Selected by FirstNet to Build and Manage America's First Nationwide Public Safety Broadband Network Dedicated to First Responders*. Mar 30, 2017. Retrieved from: http://about.att.com/story/firstnet_selects_att_to_build_network_supporting_first_responders.html
Urgent Communications (2017, April 4). FirstNet CEO, AT&T official provide further details about 25-year contract for first-responder network. *Urgent Communications*. Retrieved from: http://urgentcomm.com/public-safety-broadbandfirstnet/firstnet-ceo-att-official-provide-further-details-about-25-year-cont
FirstNet (2017, May 1). *FirstNet and AT&T: The First 30 Days*. Retrieved from: https://www.firstnet.gov/newsroom/blog/firstnet-and-att-first-30-days

[4] Image source: https://www.inmarsatgov.com/customers/contract-vehicles/firstnet/

[5] Urgent Communications (2017, April 4). FirstNet CEO, AT&T official provide further details about 25-year contract for first-responder network. *Urgent Communications*. Retrieved from: http://urgentcomm.com/public-safety-broadbandfirstnet/firstnet-ceo-att-official-provide-further-details-about-25-year-cont

- March 2018 – Multi-level priority within public safety available

4. Network

AT&T has promised public safety 99.99% availability end-to-end for the FirstNet network. This is an unprecedented commitment for a nationwide commercial wireless network contract. A private land mobile network (LMR) may consist of hundreds of sites. In contrast, AT&T is staking this end-to-end availability claim across a nationwide network of 64,000 cell sites with millions of points for potential failure; a notable commitment to public safety.

AT&T's description of its Evolved Packet Core (EPC), or network core, depicts a high degree of redundancy and failover capability, from network pathways and data centers to individual equipment modules within network elements. Also, its security approach reflects comprehensive network and operational security best practices. AT&T's FirstNet Security Operations Center (SOC) uses certified personnel to perform around-the-clock network surveillance, threat assessment, and incident response.

AT&T leverages network management-based techniques for the RAN to increase network resiliency, such as implementing state-of-the-art self-optimizing network (SON) technology.

The Plan is less specific when it comes to detailing site-specific network hardening. AT&T maintains it offers Public Safety Grade service but does not cite conformance with particular requirements or external standards. Although undefined, all "high priority" sites will have on-site electrical generators. Other sites will be supported by over 200 trailer-mounted generators, which will be deployed as needed. All sites will have battery back-up.[6]

[6] AT&T (2017, June 29). *FirstNet Solution Overview*. p.4. Retrieved from: http://www.caloes.ca.gov/PublicSafetyCommunicationsSite/Documents/CA-ATTStateOutreachPresentation.pdf

5. Coverage

By leveraging its commercial network for public safety, at the outset AT&T claims it will cover over 99% of US population and 72% of geography. See **Figure 2**.[7] The darkest blue represents a propagation

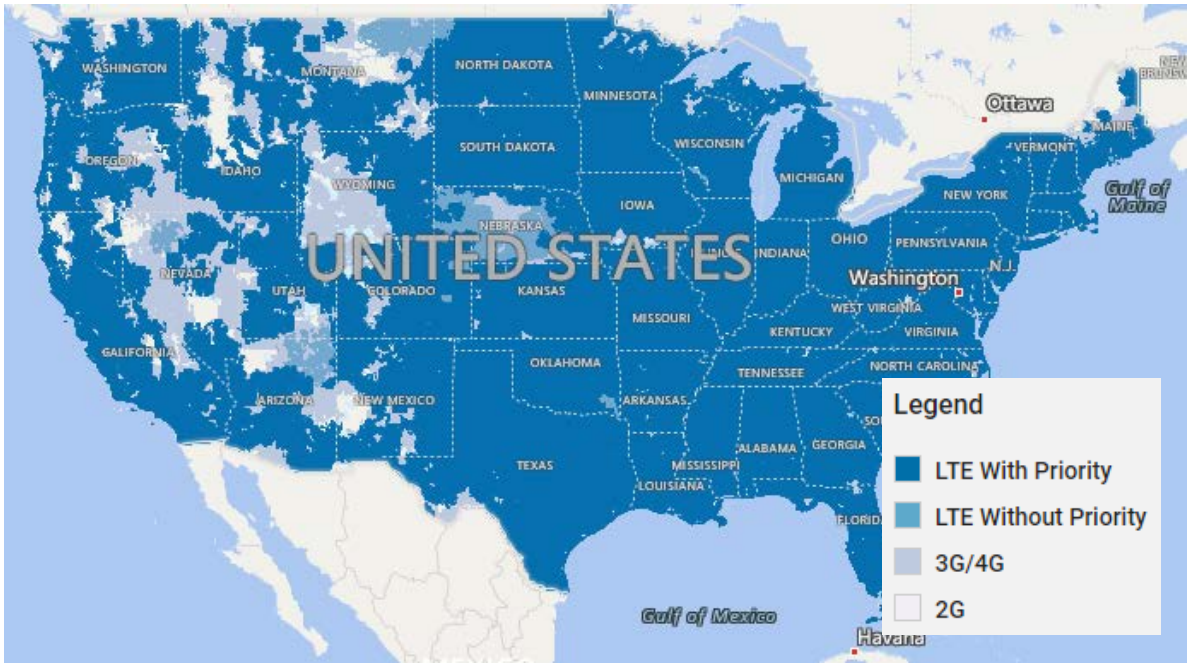

Figure 2: Using its Commercial Coverage, AT&T will Cover over 99% of the US Population and 72% of Geography

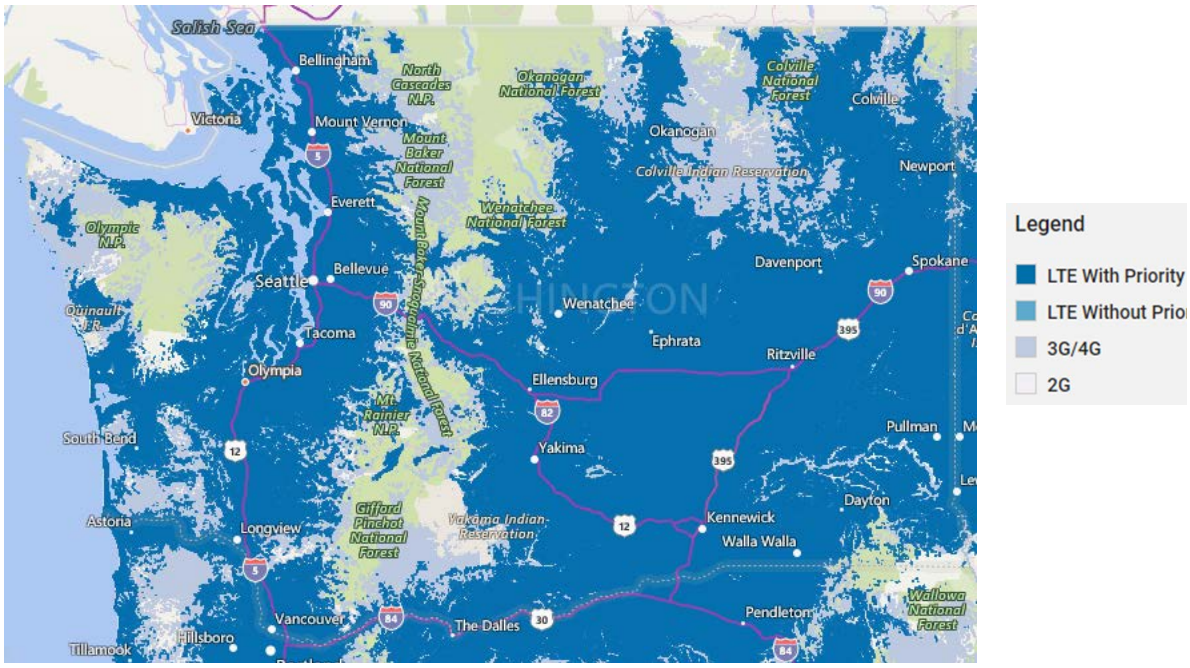

Figure 3: Washington State Proposed FirstNet Coverage – Source: FirstNet.com

[7] (2017, July 15). Retrieved from: www.firstnet.com

estimate of AT&T's 4G LTE coverage. **Figure 3** provides a similar coverage estimate for the State of Washington.[8] Most notable is visibly less coverage in western states when compared to the east. Western states contain more federal lands and less population per area when compared to eastern states, which drives to less commercial wireless build-out per area. Intensifying this contrast, public safety representatives in numerous forums in the western states have noted that the estimated coverage depicted on this FirstNet.com map is "optimistic" at best and that actual coverage is much poorer. Map views on the secured State Plan Portal (SPP) offer higher, 90-meter resolution as well as an indoor setting that generates what most feel are more accurate representations of current coverage.

In addition to the $18 billion returned to FirstNet in the form of payments, AT&T has pledged to invest another $22 billion upgrading its network to benefit public safety. Viewing the SPP maps for each of the successive five years of network build-out, AT&T's apparent strategy is to focus on upgrading existing 2G/3G service to 4G Long Term Evolution (LTE), adding Band 14 to AT&T's spectrum portfolio to increase capacity where most needed, such as in urban areas. This obviously is complementary to their commercial goals. However, since public safety is riding all of AT&T's bands and priority and preemption are only supported on the LTE protocol, public safety benefits as well by the expanding LTE footprint.

In-Building Coverage. To supplement in-building coverage, AT&T touts in the Plan over 6,000 distributed antenna systems as well as offers public safety access to its 40,000 Wi-Fi hotspots.

Rural Service Providers. To expand rural area coverage, AT&T will work with "selected rural telecommunications providers" to provide "seamless handovers" when moving between networks, maintaining priority and preemption if the partner network is capable. Domestic roaming is included at no extra charge for FirstNet customers. Connections to networks using other protocols, such as 2G, 3G, and Wi-Fi will be supported but without LTE priority and preemption capability. Particularly for western states, there appears to be a dearth of contracted rural partners in the Plan, although AT&T claims it is actively working partnerships.

Deployables. In addition to fixed site coverage, the State Plan emphasizes the use of deployables to address coverage for remote incidents, such as wildland fires as well as to augment bandwidth during planned events, such as parades, fairs, concerts, and major sporting events. AT&T has over 120 LTE (non-Band 14) deployables available for general use and has commissioned its partner General Dynamics to build 72 Satellite Cell on Light Trucks (SatCOLTS) dedicated for FirstNet. See **Figure 4**. These will be owned and operated by AT&T and available at no charge to public safety. Deployables are managed by AT&T's Network Disaster Recovery (NDR) Program, which has committed to 14-hour mobilization, nationwide.[9]

Figure 4: AT&T FirstNet SatCOLT [9]

[8] (2017, July 15). Retrieved from: www.firstnet.com
[9] AT&T (2017, June 29). *FirstNet Solution Overview*. pp.18-19. Retrieved from: http://www.caloes.ca.gov/PublicSafetyCommunicationsSite/Documents/CA-ATTStateOutreachPresentation.pdf

6. Devices

An advantage of AT&T's "all band" deployment strategy, AT&T is able to offer public safety a full range of personal user devices from the start, without waiting for manufacturers to integrate Band 14 into

Figure 5: AT&T offers a Full Range of Devices supporting FirstNet

their products. Devices include standard and ruggedized smart phones and tablets as well as wearables. See **Figure 5** for examples.[10] Further, the Plan highlights availability of the public safety-specific devices that first responders need and have been accustomed to using, for example, trunk-mounted modems, ruggedized laptops, and accessories equipped with loud speakers and push-to-talk (PTT) buttons. See

Figure 6: The State Plan Highlights Specialty Devices and Accessories Required by First Responders

[10] AT&T (2017, June 29). *FirstNet Solution Overview*. p. 21. Retrieved from: http://www.caloes.ca.gov/PublicSafetyCommunicationsSite/Documents/CA-ATTStateOutreachPresentation.pdf

Figure 6.[11] AT&T's full device portfolio for FirstNet users will eventually be available at www.firstnet.com.

To prepare for the availability of service using Band 14, AT&T has added Band 14 capability to its requirements for manufacturers responding to its device procurement process. This market pressure applied by AT&T finally puts an end to the uncertainty of whether manufacturers will adopt Band 14 in sufficient volume to reduce prices to public safety.

Bring Your Own Device (BYOD). A final device-related benefit of an all-band service strategy is that AT&T will be able to offer users a bring your own device (BYOD) plan for AT&T compatible equipment quickly. In fact, this service is slated to be available by the end of 2017.[12]

7. Public Safety Users

AT&T has divided public safety FirstNet users into two categories, Primary and Extended Primary users. AT&T makes important distinctions regarding these user classes, with differences ranging from network preemption capabilities to priority service rate plan costs. AT&T's marketing portal, www.firstnet.com defines Primary Users and Extended Primary users as:

> "Law enforcement, the fire service, and emergency medical services personnel will be FirstNet's primary users. Extended primary users are other entities that provide public safety services, including individuals, agencies, organizations, non-profit or for-profit companies who are not primary users, but who may be called upon to support public safety personnel with the mitigation, remediation, overhaul, clean-up, restoration, or other such services that are required during or after emergencies or incidents."

AT&T determines who falls in which category by using North American Industry Classification System (NAICS) codes. For example, Primary users are defined as those falling under the following NAICS codes:

- 621910 (Ambulance Safety Services)
- 922120 (Police Protection)
- 922160 (Fire Protection)[13]

However, these definitions continue to evolve. For example, in response to feedback from public safety, AT&T has recently moved 9-1-1 and emergency managers from Extended Primary into the Primary category.

8. Rate Plans

The State Plan provides an initial look at AT&T's rate plans. As directed by the RFP, both pooled and unlimited plans are available to public safety, including pricing with and without device. Primary and Extended Primary users have separate rate plans.

[11] AT&T (2017, June 29). FirstNet Solution Overview. p. 21. Retrieved from: http://www.caloes.ca.gov/PublicSafetyCommunicationsSite/Documents/CA-ATTStateOutreachPresentation.pdf
[12] AT&T (2017, June 8). FirstNet AT&T State Plans Kickoff Meeting, Dallas, Texas.
[13] AT&T (2017, July 17). *Washington FirstNet Outre*ach. p. 12.

The Plan confirms what FirstNet and AT&T has said in public meetings, that FirstNet devices and services will be made available under existing contracts such via the National Associations of State Procurement Officers (NASPO) and other state and local government contracts. An important point to note is, although FirstNet service will be available upon a governor's opt-in decision, it cannot be used by agencies until it also becomes available via an appropriate purchasing contract.

9. Priority and Preemption

FirstNet priority and preemption service features are unique to public safety. They are established when a new user is activated within the network and operate automatically to assure public safety always has priority over secondary commercial use; to the point of preempting secondary users by moving them to another band or, if necessary, off the network altogether. Service for Primary users includes both priority and preemption. Priority can be purchased separately for Extended Primary users. Extended Primary users are not eligible for the preemption feature.

Once the dedicated public safety network core is implemented, public safety agencies will be able to assign three levels of permanent priority. This will typically take place when a user is first established in the system. A fourth and highest level of priority, Incident Level, is assigned by public safety using the Incident Management Tool (IMT) and is intended for use during an incident. This temporary priority "lift" lasts for 24 hours by default but the interval can be adjusted. This level can also be assigned by an agency to a mutual aid partner or Extended Primary User, such as a utility worker.[14]

In contrast to land mobile radio, FirstNet service provided by a commercial provider decreases public safety's responsibilities in network planning, deployment, and operations. However, AT&T staff have emphasized the ongoing need for states, upon post-governor's decision, to provide governance for prioritization and local control. This is to avoid scenarios such as:

- Having an agency continually maintain an uplifted highest priority rather than using it only temporarily during incidents.
- Assigning everyone in an agency the highest of the three permanent priorities, thereby "gaming" the system.

In sum, AT&T succinctly points out that, when everyone is high priority, no one is.[15]

10. Local Control and ICAM

Agencies will perform local control functions via a Public Safety Home Page. Administrators can:

- Manage users – add user, groups, and assign roles
- Manage services – set permanent priority levels based on roles, add/delete/change service
- Manage applications – push mobile apps to devices, recommend or block apps
- Generate reports – device inventory, upgrade eligibility, and plan summaries
- Monitor network status – live web map, with network, traffic, and weather overlays

[14] AT&T (2017, June 8). FirstNet AT&T State Plans Kickoff Meeting, Dallas, Texas.
[15] Ibid.

Regarding identity, credential, and access management (ICAM), AT&T will offer federated single sign-on, allowing public safety to use their current IDs.

11. Applications and Services

A key objective of any data communications network is to enable end users to retrieve information from a remote data source. For public safety, this includes accessing information from records management and license plate systems to national databases such as the Criminal Justice Information System (CJIS). Just as critical, but more local, is receiving life-saving 9-1-1 and computer aided dispatch (CAD) information from 9-1-1 public safety answering points (PSAPs).

Access to Law Enforcement Systems. Regarding law enforcement system requirements, AT&T says its solution meets secure open standards for federal and state identity, credential, and access management platforms, providing physical and logical separation between security domains, Federal Information Processing Standard (FIPS) 140-2 encryption, and more. The FirstNet security environment meets or exceeds state and National Law Enforcement Telecommunications System (NLETS) Policies, Practices, and Procedures and the Federal Bureau of Investigation (FBI) CJIS Security Policy. However, AT&T notes that agencies themselves must still maintain their NLETS security requirements, including those mandated by FBI CJIS Security Policy.[16]

Public Safety Mobile Apps. The Plan describes at a high level the FirstNet app ecosystem available to public safety subscribers. Major elements of the environment include:

- App Store & Solutions Catalog – making FirstNet-certified apps available for download
- Public Safety Home Page – see Local Control and ICAM section for list of features
- App Developer Program and Console – assistance and process for public safety app developers
- FirstNet websites – Marketing Portal, FirstNet.com, and the State Plan Portal (SPP)[17]

Customer Service. AT&T will staff dedicated customer service representatives for public safety that are separate from those serving other AT&T customers. They will be available 24x7 and knowledgeable of both public safety and the FirstNet service. Although not going into detail, the Plan describes various training aids that will be available to users for devices, such as frequently asked questions (FAQs), online tutorials, and videos.

12. Governor's Decision

The 90-day period for the Governor's review begins when FirstNet notifies the Governor of its completion of the request for proposals (RFP) process for the state, as required by the Act. To positively opt-in, the Governor signs and returns the Opt-In Affirmation provided by FirstNet. Choosing to do nothing defaults to an opt-in stance at the end of the 90 days. The Plan says there will be continued opportunities after a state opts in for public safety to engage with FirstNet and AT&T to communicate

[16] AT&T (2017, June 29). FirstNet Solution Overview. p. 14. Retrieved from: http://www.caloes.ca.gov/PublicSafetyCommunicationsSite/Documents/CA-ATTStateOutreachPresentation.pdf
[17] AT&T (2017, June 29). FirstNet Solution Overview. p. 26. Retrieved from: http://www.caloes.ca.gov/PublicSafetyCommunicationsSite/Documents/CA-ATTStateOutreachPresentation.pdf

additional priorities, as well as evaluate and develop plans that address those priorities. This is consistent with what FirstNet and AT&T have been expressing at recent engagement meetings.

States choosing to build and operate their own RAN face a stiff challenge posed by the process and requirements contained in the Opt-Out Guide on the portal. For example, opt-out states must conform to FirstNet's network policies, a 188-page document containing policies ranging from cybersecurity and network availability to monthly detailed revenue reporting. They serve to tightly couple the state network to the nationwide public safety broadband network (NPSBN), even so far as having FirstNet staff participate in preliminary and critical design reviews and returning comments to the State for design rework if found unacceptable.

13. Weaknesses in the State Plan

AT&T's offer as described in FirstNet's State Plan for Washington is a comprehensive, wide ranging solution, satisfying many data communications needs for public safety. However, the Plan is not without weaknesses. For example, these include the following:

Inaccurate Coverage. Local agencies know the strengths and weaknesses of service provider coverage in their jurisdictions. AT&T's coverage indicated on the maps on ATT.com, Firstnet.com, and the SPP has been found by many public safety stakeholders to be "inaccurate," "misleading" and, on the whole, "optimistic" when compared to actual coverage experienced in the field. Although legitimately referred to as propagation maps and not claiming to depict actual coverage experienced, say, during drive testing, this discrepancy damages AT&T's credibility, affecting agencies' desire to subscribe to FirstNet. This is particularly true in rural areas in the West, where services providers such as Verizon generally have better coverage than AT&T. FirstNet and AT&T would do better to display actual and more conservatively forecasted coverage that can be relied upon by public safety when planning.

Public Safety Grade/Network Hardening. AT&T assures in the Plan that it is committed to providing a Public Safety Grade network. However, the Plan does not define Public Safety Grade and is weak when describing specifics for the physical hardening of individual cell sites and backhaul to the network core. For example, the Plan says the backhaul to the core will be meshed and use redundant virtual connections but doesn't speak to geographically diverse physical paths. The Plan notes that AT&T provides battery back-up for all sites as well as generators for "select high-value" sites. However, it doesn't commit to details; for example, the number of hours of minimum battery power available or the criteria for determining high-value sites, which may be different for public safety than commercial users. In short, the Plan can be improved by AT&T explaining how it meets external accepted network hardening requirements.[18]

Comparable Costs. Under Rate Plans, the State Plan offers what AT&T refers to as "rack rates," available on a national basis. However, in meetings AT&T account managers go out of their way to explain that these aren't the rates agencies will actually pay; rather, to expect highly discounted negotiated rates, dependent on volume and contracting arrangement. This difference between State

[18]An example of an external reference is the Site Hardening specifications called out in the National Public Safety Telecommunications Council's (NPSTC's) Public Safety Grade Final Report. See: http://www.npstc.org/download.jsp?tableId=37&column=217&id=3066&file=Public_Safety_Grade_Report_140522.pdf

Plan "sticker price" and cost "out the door" makes it difficult for agencies to accurately compare FirstNet costs with their current service charges to make prudent buying decisions.

General Lack of Detail. The above are representative of a general lack of specifics in the Plan. Much of the network and service information in the state plan portals is at a high level, offering useful context and strategic direction, but not the more detailed information needed for state and local agency evaluation, planning, and decision making. In fact, many of the AT&T portions had much of a marketing flavor, as if the material was repurposed from AT&T's bid to FirstNet.

14. Summary

The State Plan offered by FirstNet depicts a comprehensive, technically sound, and affordable network service for public safety. Most notable is AT&T's innovative "all band" solution, which delivers to public safety several times the bandwidth originally called out in the Act. Further, its dedicated public safety network core coupled with a Multi-Operator Core Network (MOCN) approach goes a long way to assuring priority service for public safety even when operating in AT&T partner service areas.

Although the Plan commits AT&T to 99.99% end-to-end availability, which is unprecedented for commercial wireless networks, a weakness of the Plan is that it does not go far enough to provide details regarding AT&T's approach to network hardening and redundancy; for example, in areas of powering and earthquake survivability.

However, most importantly, the key hindrance to user adoption will be coverage. Other wireless providers such as Verizon have made it their business to establish service in rural areas not covered by AT&T today. AT&T has acknowledged its shortcomings with regards to wireless coverage in some areas when compared other carriers, saying, "It's incumbent on AT&T to get our coverage on par or better than our competitors. We'll face millions of dollars of fines if we don't."[19] It will need to play serious catch-up in the next 18 to 36 months to garner public safety's business and avoid FirstNet penalties for missing the adoption targets specified in its contract.

[19] AT&T (2017, June 8). FirstNet AT&T State Plans Kickoff Meeting, Dallas, Texas.