



FirstNet Adoption Work Book and Flow Diagram Guide

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FirstNet Adoption Work Book and Flow Diagram Guide

The purpose of this document is to guide prospective FirstNet subscribers through an evaluation and subscription adoption process. This process will focus on major decision points to consider before migrating to FirstNet, the wireless broadband service offered in conjunction with its partner AT&T. The accompanying FirstNet Adoption Flow Chart provides a visual depiction of recommended steps taken to objectively evaluate FirstNet and, when and if appropriate, to move forward with FirstNet service adoption. The color-coded work book section headings below correspond to items in the Flow Chart and provide detailed descriptions of each step. Tables and blank areas that follow the sections can be used to make notes and compile information in a single location for analysis.

Current AT&T Subscriber

If the agency is a current AT&T subscriber and is satisfied with their coverage and capacity, please move forward in the process to *Task 2. Generate User and Device Lists*. If the agency is not a current AT&T subscriber, proceed to *Task 1. Assess Coverage & Capacity*.

Task 1. Assess Coverage & Capacity

An assessment of the coverage and capacity for FirstNet/AT&T services should be performed to determine if it is adequate to meet the needs of the agency. If it is inadequate, consult with the ECN and AT&T to address gaps and determine if the gaps can be satisfactorily addressed by the established buildout plan. If they cannot, then staying with your current wireless provider is an option.

Determine coverage requirements for your operational area by asking your current provider for coverage maps or drive test data. Ask AT&T for the same information and compare the coverage areas. In some cases, independent verification of coverage may be required and applications are available that can be installed onto users' smartphones for data collection and analysis.

Adequate Coverage and Capacity

If the current or planned AT&T coverage and capacity is adequate and meets your agency's needs, please move forward in the process to *Task 2. Generate User and Device Lists*. If it is inadequate, move to *Task 1.a. Identify Gaps and provide to ECN/AT&T*.

Task 1.a. Identify Gaps and provide to ECN/AT&T

ECN is an important partner and resource in the relationship between subscriber agencies and AT&T. If needed, consult with ECN to assist with evaluation of the data and interactions with AT&T. Below are various steps/methods that can be employed to assist in the evaluation of coverage and capacity.

Step One: Evaluate Carrier Maps

- Perform a visual comparison of carriers' marketing maps found on their public websites, and highlight differences between the actual coverage and what is displayed on the marketing maps
- Invite carriers to present and discuss detailed system coverage for your operational area
- Benefits of using this method
 - Easy and inexpensive analysis
- Considerations when using this method
 - Maps are generally optimistic (show few uncovered areas)
 - Maps usually represent outdoor coverage (not indoor/in-vehicle)
 - Provides a good "first pass" of coverage differences

Step Two: Available Real-World Data

- Perform a visual comparison using apps/services that collect real-world signal and performance data for carriers. Examples include:
 - www.opensignal.com
 - www.rootmetrics.com
- Considerations when using this method
 - Manner in which the data is collected by the app/service
 - No data in many rural areas
 - Areas without service, or that may not have been driven, are not identified as such

Step Three: User Experience

- Conduct an informal survey highlighting areas served/unserved by each carrier
- Note: It is important to compare "apples-to-apples" (indoor, in-vehicle, outdoor)
- Benefits of using this method:
 - Simple and inexpensive to collect
- Considerations when using this method
 - Based on a user's memory
 - Difficult to identify specific areas
 - Exposure to multiple carriers unlikely (agencies generally use only one)

Step Four: Network Testing

- Optional step if time and budget allows
- Using off-the-shelf devices, test the carrier networks
 - The way your users will use the network
 - In the locations where they will use it
- Request free devices from the carriers and test coverage and performance
 - Develop a test process and script
 - Document and present findings
- Considerations when using this method
 - Associated expense

- Time commitment

Step Five: AT&T Meeting

- Share findings of your studies with AT&T:
 - Specific buildings/facilities underserved
 - Specific areas underserved
 - Critical/mandatory underserved areas
 - For each area, identify how it is underserved (insufficient data speeds, indoor, in-vehicle, etc.)
- Ask for evidence (drive/other data/other) that backs any carrier claims of sufficiency that do not align with findings of the study
- Ask for a commitment to improve service in these areas
 - Ask for a specific date
 - Ask for method (Distributed Antenna System, cell site, other technical enhancement)
 - If “remedied” via other technology, ask for evidence that the solution will solve the problem
 - Note: Lower frequencies only provide marginal improvements in coverage
 - Ask for Band 14 buildout plan, when and where

Step Six: Final Analysis

- Which carrier covers more critical areas today?
- Which carrier covers more of your operational area overall today?
- Which carrier commits to serving critical and important areas in the future?

Build a table to compare the results. Evaluate each carrier’s ability to meet the criteria for coverage, and assign each a score. An example is depicted below in Table 1.

	Current Carrier Score	AT&T Score
Critical Areas		
Total Operational Area		
LTE Coverage		
Coverage Commitment		
Total Score		

Table 1: Sample Evaluation Table

Capacity is an important consideration and should not be overlooked. Although having a signal is important, if the data rate across that connection is too slow to conduct business, it is not an effective service. Assess coverage and capacity together to be sure of adequate signal strength and throughput to satisfy the needs of your organization. The testing described above considers capacity and the analysis steps include capacity as a component of coverage.

Task 2. Generate User and Device Lists

If coverage and capacity are addressed satisfactorily, or if you are an existing AT&T customer, proceed with generating a list of users and devices, and assigning them the appropriate attributes. This process can be done in different ways, but for this exercise, we will identify the user, their discipline, estimated monthly data usage, whether they are a FirstNet Primary or Extended Primary User, any additional FirstNet features, and contract plan. To expedite this process, we recommend you contact your existing wireless carrier and request a user usage report to help understand your requirements. The below table, Table 2, has been supplied as an example worksheet for the creation of a user list.

Data Usage

This is either an estimate of the user's device monthly data usage (in Gigabytes) or an average based on the usage report you received from your carrier. Be sure and request the average monthly data usage for each subscriber from your carrier, and consider new applications that be support supported over the network. The new applications should be classified based on their respective data throughput requirements and keep in mind that video is a heavy data use application.

FirstNet Primary and Extended Primary User

Users are classified into two categories on the FirstNet network, Primary and Extended Primary. Primary Users comprise frontline first responders (police, fire, emergency medical, emergency management, and 911) and their immediate support. Extended Primary Users are not frontline first responders (transportation, public service, meter readers, ticketing, dog catcher, etc.), but still require access to the FirstNet network. Extended Primary Users are able to access priority and preemption either as required for a specific incident or event, or for an additional monthly fee (AT&T Dynamic Traffic Management¹).

Enhanced Features

FirstNet offers a variety of enhanced features on their network that requires contractual commitments. You should consult with AT&T on the specific offerings but commonly known features include Push-to-Talk (PTT) and AT&T Dynamic Traffic Management (ADTM).

Contract Plan Options

Pooled Plan

- Grouped usage among multiple devices in your account
- Different usage tiers (in Gigabytes)
- Exceeding total limit results in additional charges
- Using less than pooled amount results in paying for unused data
- Can be more cost effective with more limited use

Unlimited Plan

- No usage based charges
- May still be a "threshold" where additional action occurs
- Generally, more effective with heavy users
- Devices in some unlimited plans are included/subsidized

¹ AT&T Dynamic Traffic Management (ADTM): Allows for user network prioritization (<https://www.business.att.com/solutions/Family/mobility-services/data-prioritization/#data-prioritization-public>)

User	Discipline	Data usage/month	Primary/Extended	Enhanced Features	Pooled or Unlimited
Vehicle Modem	Law Enforcement	22 G	Primary		Unlimited
County Sherriff	Law Enforcement	13 G	Primary	PTT	Unlimited
Vehicle Modem	Fire	19 G	Primary		Unlimited
Ambulance Modem	EMS	30 G	Primary		Unlimited
Emergency Manager	EMA	10 G	Primary	PTT	Unlimited
Plow Driver	Public Works	1 G	Extended	PTT	Pooled
Mayor	Government	2 G	Extended	ADTM, PTT	Pooled
Traffic Camera	Public Works	45 G	Extended		Unlimited
Superintendent	School	.5 G	Extended	ADTM, PTT	Pooled

Table 2: Sample User List Worksheet

Existing AT&T/FirstNet Contract Vehicle

If the agency has an existing contract vehicle with AT&T, this is the opportunity to review and update it to include FirstNet services and modify the contract to take advantage of State-negotiated prices, or, negotiate for better pricing. If no AT&T contract is in place, please move forward in the process to *Task 3. Establish AT&T/FirstNet Contract*. Otherwise, go to *Task 4. Determine Cost*.

Task 3. Establish AT&T/FirstNet Contract

If the agency does not have an existing contract with AT&T, then it has the opportunity to utilize the State rates or negotiate rates on its own. The National Association of State Procurement Officials (NASPO) has negotiated rates with AT&T, and those are included below as a reference.

Basic Pricing Considerations

- Number of lines
- Usage: Voice, Text, and Data
- Unlimited vs. Pooled Usage Based (including pooling usage among users)
- Feature Phone, Smartphone (with voice) versus Data Only Devices
- Tethering/Hotspot
- Subsidized Full Cost Device Models vs. Purchased
- Additional Features:
 - Priority (for Extended Primary users)
 - Push-to-talk (PTT)
 - Mobile Device Management (MDM)

Additional Pricing Considerations

- Primary subscribers
 - Primary subscribers include:
 - Law enforcement
 - Fire
 - Emergency Medical Services
 - Emergency Management
 - Public Safety Answering Point/9-1-1
- Extended Primary subscribers
 - Additional feature costs
 - Extended Primary users include all other “public safety” and “public service” agencies not included in the Primary pool
 - Extended Primary users can be “uplifted” during events through the FirstNet Incident Management Tool (even if they have not purchased Priority)
 - Uplifted users for 24-hour timeframe
 - Can be extended multiple 24-hour periods

The National Association of State Procurement Officials (NASPO) released approved pricing for FirstNet on September 1, 2017². The table below, Table 3, summarizes the negotiated pricing plan:

² At the time of publication of this report, the State of Minnesota was still in negotiations with AT&T/FirstNet to finalize the state contract vehicle. Once available, this contract would be shared with jurisdictions for their consideration to support FirstNet service procurement.

Item	2 GB	5GB	50GB	100GB	500GB	1000GB
Pooled Data Plan (Smartphone)	\$28.50	\$41	\$227	\$412	\$1917	\$3682
Additional cost per line (Smartphone)	\$19					
Additional cost per subsidized device (Smartphone)	\$20					
Pooled Date Plan (Data-only Device)	\$21.50	\$34	\$220	\$405	\$1910	\$3650
Additional cost per line (Data-only device)	\$12					
Additional cost per purchased device (Data-only device)	\$10					
Unlimited plan-Smartphone included (with hotspot and tethering)	\$60					
Unlimited plan-Smartphone included	\$50					
Unlimited plan (Data-only device included)	\$40					

Table 3: Summarized Sample NASPO Pricing

Compiling the data in a spreadsheet like the example below will clarify the analysis.

Plan Description	FirstNet via NASPO	FirstNet via State Contract	FirstNet via Local Contract
Smartphone: Unlimited data with tethering and subsidized device	\$60.00	\$	\$
Smartphone: Unlimited data with subsidized device – no tethering	\$50.00	\$	\$
Data Only Device: Unlimited data with tethering and subsidized device	\$40.00	\$	\$
Data Only Device: 2 GB pooled data no device	\$21.50	\$	\$
Data Only Device: 2 GB pooled data with subsidized device	\$31.50	\$	\$
Data Only Device: 5 GB pooled data no device	\$34.00	\$	\$
Data Only Device: 5 GB pooled data with subsidized device	\$44.00	\$	\$

Table 4: Sample Pricing Comparison

Task 4. Determine Cost

Utilizing the contract pricing, user lists, and device and equipment costs, evaluate the total cost to adopt FirstNet.

Align with Device Refresh Schedule

With the introduction of Band 14, new devices will be required to access the new frequencies. While there are a limited number of Band 14 capable devices available today, Band 14 capable devices are not expected to be widely available until 2019. Assuming the agency has a device refresh schedule, aligning the changeover to Band 14 compatible devices will help with a smooth migration to the new network.

If the agency is already using AT&T wireless services, the refresh to Band 14 capable devices can be planned for the time period when Band 14 becomes available in the area. AT&T will offer all the FirstNet network features on all their existing frequencies so there is no need to upgrade devices until Band 14 devices become readily available.

If the agency is migrating from another carrier, new devices will be required for all users. Aligning adoption with the agency's existing device refresh schedule should help with cost control through the process.

Internal Funding Request for Device Refresh Required

Will the agency require a separate internal funding request to obtain new devices? If so, determine the cost for the devices from the user lists generated and carrier information collected above. Some plans include subsidized devices with subscription. Look for unlimited data plans that include device refresh, this will simplify monthly billing and managing devices. Prepare the funding request.

Task 5. Device Refresh Analysis

If new devices are required for adoption of FirstNet services, and if they are not included in the negotiated plan, the devices will have to be purchased separately. Determining the cost of the devices is based on the work already completed above in *Task 3*. The user list and device types can be loaded into a spreadsheet to calculate the number of each type of device required. The cost of each type of device can then be loaded into the spreadsheet and multiplied by the user total for that device. Summing all the device types together will yield the total equipment cost of the refresh.

There may be other factors to consider when changing out devices on this scale.

- SIM cards will need to be issued and installed for the new devices, and old SIM cards disposed of properly to avoid security issues
- Some users may be assigned new phone numbers
- Training may be required for users changing operating systems, or if new applications are implemented
- Administration staff for the changeover

It is not expected that vehicular modems will be subsidized, however, there are many vendors offering Band 14 capable modems today, and if you are in the market for new modems, regardless of your carrier, it is recommended that you purchase Band 14 capable devices. Please keep in mind that

vehicular modems are more expensive than smartphones, required an installation budget, along with a reasonable installation schedule.

Here is a sample table for calculating the cost portion of the analysis:

Device Refresh Analysis Spreadsheet				
User	Smartphone	Featurephone	WiFi Hotspot	Data Only Device
Law Enforcement	50	10	50	100
Fire	50	10	30	100
EMS	26	3	20	20
Emergency Management	2		2	
PSAP	10		5	
Municipal Official	5			
Jail		20	10	30
Animal Control	5			
Public Works	20	5	20	20
Utilities	20			
Total for each device	188	48	137	270
Cost per device	\$600	\$100	\$100	\$50
Total equipment cost	\$112,800	\$4,800	\$13,700	\$13,500
	Total	\$144,800		

Table 5: Sample Cost Calculation Table

Once the calculations are completed, a funding request can be assembled and submitted to management for budget approval.

Request for Funding Approved

If the request for funding is approved, move on to the next step. If the request for funding is not approved, options may still be available to move to FirstNet. Check with your FirstNet and AT&T representatives to explore other opportunities or other subscription plans. There are plans available that include devices, reducing a direct capital expense. If there are no suitable funding options available, return to the *Align with Device Refresh Schedule* step and investigate other options, or wait for the appropriate refresh cycle to engage with FirstNet.

Is it Cost Effective?

If the cost of adopting FirstNet is acceptable, execute the migration plan.³ If the program is not cost effective, the current carrier may be the best solution for the time being. A periodic evaluation of FirstNet is a prudent course of action.

Determine whether added features and benefits are worth the cost

Even if the cost analysis does not show equivalent or better rates than the agency has currently, other factors should be considered, including:

- Interoperability with other agencies
- Value of Quality of Service, Priority and Preemption (QPP)
- Improved Coverage and Capacity with the addition of Band 14
- Local Control of users and priority
- Integration of Identity, Credential, and Access Management (ICAM) into the network operations
- FirstNet Application Store access
- Public Safety Grade Network
- Network Security

After evaluating the current service provider and comparing it to FirstNet, the added features and benefits may make it worthwhile to adopt FirstNet. If not, stay with the current service provider and reassess at a later date.

Other Considerations

The agency's current service provider may support certain networking features that AT&T/FirstNet may not. Some examples include the following.

- If the use of static IP addresses is a requirement, the agency will need to meet with AT&T to determine how a static IP address function will be addressed and determine the impact on the agency.
- Public Safety Grade/Hardening of the network has been discussed by FirstNet and AT&T; each agency considering adoption of the network should evaluate their needs and determine whether they are being met by FirstNet.
- Are all the agency's devices compatible with AT&T's network? If not, are there suitable substitutes available from AT&T?
- Will the agency's applications operate on FirstNet? Are modifications necessary? Who will perform and test the modifications?

³ A migration plan can be a formal or informal action plan focused on migrating or moving users over to the FirstNet services. The migration plan should include an agency-by-agency determination of what applications to load onto the device, and should closely engage the Information Technology department into the device management effort. Device and application management tools should also be assessed.

Task 6. Execute Migration Plan

Each agency will develop its own Migration Plan tailored to its needs. The plan should take into consideration the timeline to execute the migration and align with the agency's device refresh cycles as noted above. Other points to consider include:

- Determine cutover date
 - Plan for any new required equipment or software to be ready before cutover
- Device Migration Preparation
 - Schedule replacement for any incompatible devices (mobile modems, air cards, smartphones) in use
 - Training for IT personnel
 - Device management for cutover
 - Distribution plan for new devices/SIM cards
 - Installation plan for new modems/hotspots
 - Application loading per agency type
 - Training for new devices and applications
 - Temporary augmentation of local help desk for implementation period
- Implement migration plan

Training may be a key factor in the migration from a non-AT&T carrier to FirstNet. If new/different devices are being deployed, training will be essential to familiarize end users on new functions and features. Applications may change and training on those changes will be required as well. The agency may wish to implement new policies and procedures for use of the new devices and network; those need to be prepared in advance of the migration to FirstNet. Policies guiding Bring Your Own Device (BYOD) may be required, or need to be updated. For some agencies, during a change of this magnitude, end users will have many questions and needs; temporarily augmenting the help desk for a few weeks will shorten wait times for assistance and help ensure a smooth migration.

Summary Presentation

FirstNet Adoption Work Book

- Prepared an adoption flow chart and work book (first draft)
- Provides an overview of the steps and actions that could be undertaken to consider and advance FirstNet adoption,
 - Or not to adopt at the time of analysis
- Approach to simplify the analysis and ensure a comprehensive assessment

Broadband Coverage Assessment

- Coverage assessment
 - Critical service areas
 - Gaps in service area
 - Request test devices
 - Document needs and gaps
 - Meet with AT&T to discuss coverage requirements and for them to present their network deployment plans

Broadband Network Capacity Analysis

- Network capacity will be impacted by the types of public safety applications employed
- Also impacted by the underlying wireless technology (3G, 4G, 4G LTE)
- Unlikely to encounter capacity issues day-to-day
 - AT&T offered priority access for Public Safety on all commercial bands, and preemption on all LTE bands
- Request data usage profile for all users from your carrier

Subscriber Documentation

- Document the agency user data
 - Who?
 - What service requirements?
 - How much data?
 - What features?
 - What device types?
- What is budgeted today for broadband cellular services?

Cost Modeling – Contracting Vehicles

- Determine subscription requirements (voice/data/test/hotspots, features, devices, applications, etc.)

- Evaluate FirstNet/AT&T contract vehicles
 - State of Minnesota contract in negotiations
 - National Association of State Procurement Officials (NASPO)
 - Independent contract
- Compare with your incumbent carrier pricing (devices, features, benefits)
- Subscription plans include unlimited (individual) and polled plans (large data buckets for the entire agency)
- What is the most cost effective option? Opportunities to further negotiate the service offering and fees?

The Migration Plan

- If you decide to migrate to FirstNet, a migration plan is required
- What to consider?
 - Device distribution strategy
 - Application loading per device/per discipline
 - Training (devices and applications)
 - Installation plan for modems
 - Redirect vendor access
- Who needs to be involved?