# TEXAS DEPARTMENT OF PUBLIC SAFETY

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July 27, 2015


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Subject: Comments on the FirstNet Draft RFP, Special Notice - D15PS00295


Dear Ms. Callahan,

The Texas Public Safety Broadband Program hereby submits the enclosed documents in response to the request for comment on the FirstNet Draft RFP, Special Notice, D15PS00295. The response focuses upon key issues and is submitted in two separate documents, *"Comments on Rural Definitions,"* and the *"Texas Public Safety Broadband Program Response."*

We greatly appreciate the opportunity to provide input to the draft RFP.


Respectfully Submitted,

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Texas Department of Public Safety
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# FirstNet Draft RFP

## SPECIAL NOTICE D15PS00295

# Texas Public Safety Broadband Program Response

*Submitted by*

## Texas Department of Public Safety

July 2015

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# 1.    Timeline Issues & Questions

In preparation for this response various FirstNet materials and communications[1] were developed into a detailed timeline illustration, used as the basis of the analysis and issues presented here. The following issues arose from this analysis.

- **Timeline and Plan Does Not Fully Account for Contractually-Required "Vendor Blackout" Period –** One of the familiar issues associated with any large project which relies upon the successful execution of a large business contract is what is termed here as a "Vendor Blackout Period." This timeframe occurs upon release of the RFP, continues through to "Vendor Selection" and unless elaborate management occurs, continues until the contract is signed and executed and the vendor can get paid. In reality though, the functional program downtime usually extends substantially beyond the contract award to allow for staffing, planning and creating the vendor's program management office framework to launch, manage and sustain a multi-billion dollar deployment.

- **Timing of Vendor Section Coincident with Release of State Plans** – The timeline developed shows Vendor Selection in the exact same timeframe as the release of the State Plans in "late 2016 or early 2017." Since the recently selected but not contracted "Winning Bidder" cannot yet begin work with FirstNet during the State Plan release timeframe due to the blackout period, it is unclear how a Governor would be able to make an informed Opt-In/Opt-Out decision.

# 2.    Vendor Interaction During State Plan Development

The State of Texas believes it is essential to be included in discussions between FirstNet and the selected vendor to ensure the process captures the unique requirements and needs of the State. The State of Texas believes it is critical that the State be engaged and that its voice is heard by the selected vendor prior to final presentation of the State Plan to the Governor. Additionally it is critical that the State be able to ask specific technical and deployment questions of the vendor to ensure that the State understands all aspects in the function and deployment of the system and its impact on existing and future State operations.

While the FirstNet "Initial Consultation Planning[2]" chart does indicate an iterative State plan process between FirstNet and the State showing "Update Design & Send to State" upon "RFP Results" and "IDR State Outreach/Vetting Process," it is unclear if the vendor will be a part of these consultations.

## 2.1    State Coverage Requirement Inclusion in RFP

The State of Texas believes it is critical that the State Coverage Requirements are included and drive RFP requirements. While the FirstNet "Initial Consultation Planning"[3] chart does indicate that the "State Review/Feedback of Coverage Baseline" will feed the RFP creation, it is not clear if the State's actual coverage requirements will be met by FirstNet's proposed State Plan.

In summary, the State of Texas is concerned that there is no clear opportunity for in-process review of the State Plan with the winning bidder before the plan is presented to the Governor. Because of the complexity of the plan, Texas wants to ensure that all of the State's needs have been considered in the Texas State Plan. Without involvement before delivery of the State Plan, critical misunderstandings,

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[1] *See* Draft RFP, Special Notice, Appendix C-8, Figure 1; TJ Kennedy comments in hearing testimony

[2] *Slide 3 entitled, "Initial Consultation Planning has Begun" presented by TJ Kennedy during his State Consultation and Outreach" presentation*

[3] *Ibid*

missed requirements and questions related to the State Plan will need to be resolved after the Plan is presented, possibly delaying the Texas decision.

# 3.    RF Coverage Topics and Issues

Public Safety Land Mobile Radio 'coverage' from fixed sites is designed for PTT voice service within an area defined by the Public Safety agency's jurisdictional boundaries (city, county, regional, state) and is defined by a quality metric and two percentages. Mobile radio services are nominally delivered at, or above, a predefined quality metric, in 95% of the area defined by the Public Safety agency boundaries, and at 95% of the time the service is requested. The predefined quality metric is measurable across the jurisdictional area of the Public Safety agency and is known to be sufficient to meet the communication needs of the agency.

The coverage definition in the Draft RFP provides quality metrics based on two data rates (one for downlink and one for uplink) and a single coverage percentage that can be easily misconstrued.  Further, the State believes that defining, predicting and measuring acceptable Mission Critical coverage for the NPSBN will be a more difficult challenge than for Land Mobile Radio (LMR). LMR system coverage is characterized for a single application, PTT voice, running at the same fixed data rate for both downlink (DL) and uplink (UL). The NPSBN will be supporting many applications simultaneously (voice, text, location, web browsing, large file downloads, streaming video applications) and at different DL and UL data rates and transmitter modulations that are dependent on the user's device or "User Equipment" (UE), the user's active applications and the user's location within the cell coverage.

## 3.1    768K DL/ 256K UL Data Rates Within Coverage Area

The State has concerns and comments with the data rate performance level and loading percentage as shown in the Statement of Objectives (SOO).

In Appendix C-1 Baseline Coverage Objective Maps, Baseline Coverage Requirements, paragraph 2, third sentence. It states:

> *"Coverage is defined as having a minimum of 768Kbps downlink and 256 Kbps uplink at the cell edge with 50% loading."*

The State believes that the use of a single downlink data rate and single uplink data rate as a coverage quality metric may be insufficient to predict acceptable Mission Critical broadband coverage when voice, text, web browsing, large file downloads, streaming video applications are all concurrently supported in the same coverage area. Coverage quality metrics per application could be needed so that First Responders are aware which types of broadband applications will perform to expectation anywhere in the coverage area. For example, some broadband apps use a low bit rate, meet quality expectations even with high bit error rates but need low delay, or *latency*, across the network. These types of applications should work effectively anywhere in the coverage area. Other applications require a higher bit rate and may or may not be tolerant of high latency but need low bit error rates.  Clearly, a 256Kbps uplink is inadequate for video streaming and other high rate applications. If a single coverage quality metric is used for all applications, that quality metric could have to account for a composite worst case (high data rate, low latency, and low error rate).

Texas questions why the 768Kbps downlink (DL) and 256Kbps uplink (UL) data rates were chosen. These data rates were quoted by the FCC in 2010 as goals for public safety broadband before FirstNet was created. The 256Kbps uplink data rate was first defined for the D-Block in 2006.

FirstNet's Final Operating Configuration (FOC) is 5 years after a contract is awarded to a vendor to start the FirstNet deployment. The FOC date may very well be 2023. Given the rapid growth rate of wireless data usage nationwide, are these 2010-era broadband data rates at the cell edge appropriate data requirements for the NPSBN in the year 2018 or 2023?

The RF power of the User Equipment (UE) should be defined when specifying coverage. UEs with higher transmitter power will allow the user to operate further from the ENodeB site and possibly run at higher uplink data rates.

The form factor of the UE may also influence the coverage design because it can increase or decrease the RF losses between UE and the ENodeB site. Users have a choice of many form factors and carrying positions; smartphone with internal antenna carried in pocket, belt clip or hand held away from body; smartphones and tablets can be used in-vehicle or on-street; an in-vehicle modem typically uses an external roof mounted antenna.

The coverage quality metric will be impacted based on the movement of the UE while in the coverage area, i.e., is coverage metric met while the UE is stationary, moving at 3mph (walking) or moving at 70mph. A single metric measured when stationary would have to account for the worst case moving scenario.

## 3.2     Definition of "Cell Edge"

The term 'cell edge' needs to be clearly defined. Is FirstNet defining the cell-edge as the raw over the air data rates that can be supported at a defined cell radius? Is the data rate at the cell edge identical for all cells in the NPSBN? Will FirstNet adhere to the cell edge user throughput performance metric found in 3GPP?

(3GPP TR 36.913 V12.0.0 (2014-09), 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Requirements for further advancements for Evolved Universal Terrestrial Radio Access (E-UTRA), (LTE-Advanced),(Release 12);

> *8.1.3 Cell edge user throughput, "The cell edge user throughput is defined as the 5% point of CDF of the user throughput normalized with the overall cell bandwidth."*

## 3.3     Challenge to 50% Loading Factor

FirstNet should explain why they use a 50% loading factor rather than the 70% loading factor, throughout the entire network, that appears in FCC documents, year 2010.

PS Docket No. 06-229, DA 10-2342; Paragraph 22, fifth sentence:

> *"Accordingly, we approve ERIC's recommendation that we require Petitioners' systems to provide outdoor coverage at minimum data rates of 256 Kbps uplink (UL) and 768 Kbps downlink (DL), for all types of devices, for a single user at the cell edge. Petitioners' systems must provide the minimum data rates, based on a <u>sector loading of seventy percent, throughout the entire network</u>."*

When a Public Safety Entity is located at the cell edge and is using an application that requires a data rate higher than the specified cell edge rate (768Kbps DL/256Kbps UL), will the NPSBN deliver the faster data rate for the Public Safety Entity's application if un-allocated resources are available? Would these resources be provided to the Public Safety Entity before providing the resources to a secondary user under a covered leasing agreement (CLA)?

## 3.4    Lack of Definition of "50% Coverage" Reliability Requirement

The State has concerns and comments with this data rate performance level and loading percentage as shown in the Statement of Objectives (SOO).

In Appendix C-1 Baseline Coverage Objective Maps, Baseline Coverage Requirements, paragraph 2, fifth sentence. It states:

*"Only those grid blocks that have more than 50% coverage will be considered acceptable."*

The State believes the metric '50% coverage' will need to be further defined. The term '50% coverage' could refer to the area within the grid block where the cell edge data rates, or better, can be provided; or, '50% coverage' could refer to the percentage of time the necessary data rate, based on the application selected by the user, is provided in that grid block.

The '50% coverage' specification might be seen as a coverage reliability issue when compared against the 95% area/95% reliability coverage parameters used for today's Public Safety Land Mobile Radio system and coverage designs. This is yet another different interpretation but it is unclear as to exactly how FirstNet will be managing, measuring and designing to meet this vague specification.

## 3.5    Coverage Capacity, Cell Edge Data Rates

The State has concerns and comments with the coverage data rates per square mile and the Coverage Objective Baseline for Texas shown in the Statement of Objectives (SOO).

From Appendix C-1 Baseline Coverage Objective Maps, Baseline Coverage Requirements, Table 1. Average Downlink Throughput per Square Mile:

|  | Coverage Defined at the following Average Downlink Throughput per Square Mile |
|---|---|
| **RED GRID** | 3.0 Mbps |
| **BLUE GRID** | 0.5 Mbps |
| **GREEN GRID** | 0.1 Mbps |

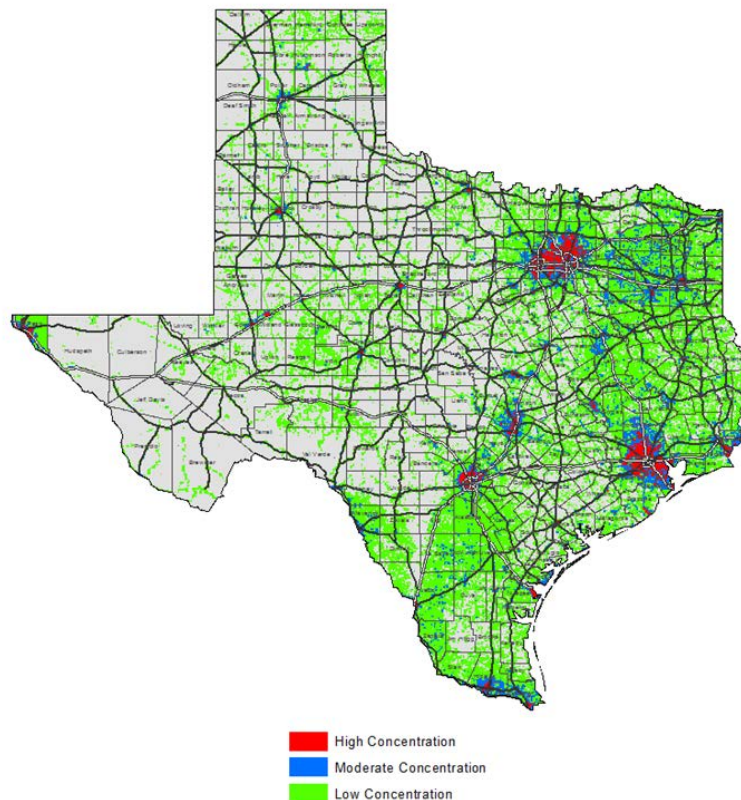In Appendix C-1 - State Coverage – Images, map of the State of Texas



Figure 2. **FirstNet Baseline Coverage Map for Texas** – *The map above provides an initial baseline. Texas has since developed similar views but which consider and expanded and more thorough list of 60 PS Needs factors.*

Texas is concerned that the average downlink data rates are low for a Public Safety broadband system and the green grids especially low. Most concerning is that of the three defined Grid Colors, the 'GREEN GRIDS' account for almost all of the colored grids in the State of Texas.  This infers to the State of Texas that although  FirstNet has defined a healthy portion of the State of Texas with coverage objectives, the data rate for that coverage is low, which is of concern to the State.

Rather than the "average downlink throughput', the State is interested in the 'peak downlink throughput' for emergency situations. What is the ***peak*** downlink throughput in the Green Grids?  Public Safety is known to quickly flood an area with responder personnel if the situation demands it.

Texas is interested to understand how the data rates at the cell edge relate to the average throughput rates for the color grids. The data rates at the cell edge are 768Kbps downlink and 256Kbs uplink while the average downlink throughput in a green grid is 100Kbps. How does Public Safety determine if this is sufficient data capacity and data rate to support future Mission Critical applications in the Green Grids?

While eMBMS and GSCE are included as part of the NPSBN rollout, these group-based technologies are not scheduled for deployment until IOC-3, (24 months into deployment) which means all traffic within the cell must be unicast traffic until IOC-3 is complete.

Texas is interested to understand the user types (for example, urban officer, rural officer, fire fighter, EMS, mayor, code enforcement) and the data use profile for each of those user types that were used to determine the throughput per square mile metrics.

# 4.     Early Builder Infrastructure

As one of the five Early Builders, Harris County, Texas has invested significant grant and public funding in the buildout of its Band 14 network. This network will continue to grow throughout the term of the spectrum management license agreement. While FirstNet declared broadly in its Statement of Objectives that the NPSBN will look to "integrate existing state/local/commercial/federal infrastructure", there is no mention specifically of the Early Builder projects. Texas is concerned that the public investment made by Harris County and the value of the Harris County network will not be given their due consideration in the final design. The final RFP should clearly emphasize to vendors the importance of incorporating existing Early Builder infrastructure into the NPSBN wherever feasible.

# 5.     Cost Sharing with State, Tribal and Local Agencies

Texas has multiple jurisdictions[4] that have demonstrated both the willingness and the financial means to begin buildout of a Band 14 network in their respective areas. While the State recognizes FirstNet's rationale for restricting pre-award buildout to only the five approved Early Builders, the draft RFP makes no mention of leveraging jurisdictions' willingness to fund expanded coverage/capacity in a post-award environment.

Under optimistic assumptions, a FirstNet deployment with anything near ubiquitous coverage is at least seven years away. Even assuming eventual ubiquitous coverage, post-award Band 14 deployment phases may fail to meet the timeline and/or coverage needs of Texas public safety entities. FirstNet has the opportunity to leverage significant local means and enthusiasm to augment and even expedite Band 14 buildout throughout its IOC deployment phases.

Similar to the Cooperative Purchasing Program offered by the U.S. General Services Administration (GSA), FirstNet could provide umbrella contract terms and pricing from its approved vendor(s) that would enable state, local, or tribal agencies to purchase supplemental Band-14 capability, subject to the review and approval of FirstNet. Distributed antenna systems (DAS) for in-building coverage and deployables in particular would be natural candidates for this purchasing model.

The State urges FirstNet to consider multiple cost-sharing mechanisms that leverage the demonstrated willingness of Texas jurisdictions to extract maximum value from the public safety spectrum.

# 6.     General Concerns

The following items remain general concerns which have been articulated and presented in previous filings and are reiterated here because of the importance to the State.

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[4] City of Irving, City of Fort Worth, Harris County and Randall County

- **Substantial Rural Coverage Milestones** – Texas has joined with the Texas Rural SAG in preparing and filing a separate set of comments focusing on FirstNet's proposed definitions of "rural" and "substantial rural milestones."  As shown in that filing, FirstNet's proposed milestones for buildout in rural areas are inadequate and fail to provide the rural deployment envisioned by Congress.  Texas reaffirms those comments here.

- **Business Administration and Integration with State, Tribal, and Local Agencies** – The State has concerns that the level of detail requested in many areas of business administration is insufficient. Although the network and device parameters are extremely important, the business processes are also critical to the success of the network's deployment and operation. In the development of a NPSBN, the complete understanding of components such as methods of finance, contract management, change management, business data management, real estate and facility management is critical. The draft RFP references PMI, GAO, and ITIL, but provides very few specifics in the key areas of how the NPSBN will be administered.

- **Integration with the Nation's PSAPs** – The State will take this opportunity to highlight the importance of FirstNet's plan to promote the integration of the NPSBN with Public Safety Answering Points (PSAP) and Next Gen 911 as noted in PL 112-96.[5]

- **Risks of an Over-Reliance on Spectrum Sharing Strategy** – The mobile data market and spectrum landscape is among the most dynamic in its history, resulting in strategies which remain viable for only short periods of time. The State is concerned that the CLA strategy could be subject to disruption from a variety of powerful industry forces well beyond FirstNet's control, with the likelihood of those disruptions increasing over time. Likewise, the State does not want to see FirstNet locked into a long-term obligation that is not flexible enough to take advantage of the evolving technology landscape.

- **Concerns about Lack of Texas/Mexico Spectrum Coordination Plan** – Although FirstNet cannot directly resolve the 700MHz Texas/Mexico border frequency coordination issue, it would appear that this frequency coordination issue needs resolution, or a plan for resolution, in order for FirstNet to provide a complete State Plan for Texas. The State is concerned that the lack of a frequency plan for this international border will delay a State Plan for Texas and for other States that share this international border.

- **Concerns Regarding Tribal Representation** – The State does not assume the right to speak or determine Opt-Out options for Tribal Nations. Absent specific and clear statutory language to the contrary, it should not be assumed that Congress intended to alter the established governance order under Federal and State laws that provide Tribal entities a degree of sovereign authority over Tribal lands.  That said, Texas is working closely with the three recognized Tribal Nations within our border to ensure their requirements are gathered and included in the state consultation process.

- **Underestimating Public Safety Operational Pressures** – Throughout a somewhat tumultuous history with both private and public data services, Public Safety's unique operational needs put pressure on Public Safety Enterprise data networks.   These are often obscured and result in a tendency to vastly underestimate the loading characteristics on Public Safety data networks. Some of these pressures are presented below.

  - Many "Basic" Public Safety requirements are just the nature of the operations, such as mission critical resilience, evidentiary quality services and logging, encryption and unpredictable peak loading behaviors.

  - Public Safety uploads more data than consumers, who tend to do more downloading. In the 3GPP vernacular, Public Safety uses a much higher proportion of Uplink (UL) traffic

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[5] *See* [6206(b)(2)(C)], Subtitle E – Next Generation 9-1-1 Advancement Act of 2012

which is a bigger problem because 3GPP has roughly half[6] as much bandwidth on the Uplink (upload) side. This particular aspect could have an increasingly[7] important impact on the amount of extra spectrum capacity available—especially in urban areas.

- o Most First Responders require Group-based "one to many" operations, resulting in fundamentally different system loading behaviors. As time goes on and new multicast-based services get deployed and group data operations gain hold, the impact of this operational factor can be expected to dramatically increase.

- **High-Bandwidth Demands of Streaming Video, Wearable Cameras, M2M[8]** – Enhanced Situational Awareness via wearable body cameras and in-vehicle dash-mounted video cameras are a potential game-changer. Although in a formative period, Public Safety users can look forward to increasing functionality, usability and device options fueled by urgency to begin fully leveraging the power of live-streaming, full-motion HD video services.

  - o Due to the high data rates required for HD video and future group video service, it is entirely possible that PS bandwidth consumption could exceed predictions, and more importantly at volumes which negate the value or payback of implementing complex spectrum sharing arrangements and technologies.

These are some of the more vexing issues the State is confident the FirstNet business planners and technologists will be working to resolve. The State would be pleased to assist FirstNet in the acquisition of relevant data in pursuit of solutions.


# 7.   Closing Comments

The State of Texas appreciates the opportunity to provide comments and submits these thoughts and perspectives in the sincere hope that by raising some difficult issues, the larger issues will ultimately be solved and FirstNet can move purposefully forward toward getting viable technologies in the hands of First Responders as soon as possible. The State greatly appreciates your consideration and looks forward to a productive dialog with FirstNet in order to make meaningful progress for the State of Texas in the buildout of this nationwide Public Safety Broadband Network.

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[6] Some devices will have even higher downlink abilities, such as a Category 6 UEs with up to 300 Mbps DL with an UL rate which stays the same at 50Mbps, 3GPP TS 36.306, UE Categories

[7] Aggressive improvements to improve the Downlink bandwidth results in future devices having up to six times more bandwidth more on DL than UL, further exacerbating this issue over time

[8] Machine-to-Machine (M2M), which refers to machines such as cameras or other "non-human users"