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The Honorable Gregory P. Walden
Chairman, House Subcommittee on Communications & Technology
2125 Rayburn House Office Building
Washington, D.C. 20515-6115

Re: Responses to Questions for the Record from the March 14, 2013 Oversight Hearing of FirstNet and Emergency Communications

Dear Chairman Walden:

I greatly appreciate the opportunity to testify before the Subcommittee on Communications and Technology about FirstNet and to hear the questions from the members and the answers of my fellow witnesses. I am transmitting herewith my responses to the Questions for the Record that were posed to me following the hearing in your letter dated May 2, 2013, and I appreciate the additional four days after your May 16 deadline in which to respond.

Please let me know if I can ever be of assistance on this important topic or any other. Thank you for your hospitality and the consideration of your excellent staff.

Very respectfully,

James Arden Barnett, Jr.
Rear Admiral USN (Ret.)

Attachment

cc: The Honorable Anna Eshoo, Ranking Member
241 Cannon Building
Washington, D.C. 20515

Additional Questions for the Record
James Arden Barnett, Jr.
Rear Admiral USN (Retired)
Partner, Venable LLP, Attorneys at Law

May 20, 2013

The Honorable Greg Walden

1. **Assistant Secretary Strickling, in attempting to justify partial suspension of the BTOP public safety grants, cited the fact that the "network of networks" model contemplated by BTOP may not be compatible with FirstNet's statute. Your testimony seems to disagree. Could you explain how a network of networks model is consistent with a single network architecture?**

Answer:

Assistant Secretary Strickling and I agree that the network must be carefully developed to ensure interoperability. All forces tend to work against interoperability, and it is the responsibility of FirstNet and NTIA to ensure and enforce interoperability in the new network. The Middle Class Tax Relief and Job Creation Act of 2012 (the Act) provides that the nationwide public safety broadband network be based on 'a single, national network architecture'. The Act does not prescribe a single network. Indeed, the Act goes on to describe opt-out procedures that would be inimical to a single network. Consequently, the Act actually contemplates a possible network of networks, but all on a single, national architecture.

Since there is no legislative report, the clear reading of 'single, national network architecture' points to a set of rules and specifications that govern the arrangement, the interconnection between networks, interfaces, interaction, control and interdependence of the parts and elements of a conformant system to ensure interoperability. That single national architecture also should enable and permit roaming on commercial networks.

An analogy may be drawn to commercial networks, especially the larger ones, where smaller networks have been acquired and incorporated into the system. These have become networks of networks but on a single technical architecture for each carrier that ensures interoperability.

FirstNet and NTIA must continue to acquire the technical expertise and a sufficiently staffed workforce who can provide the leadership, governance and oversight of the inevitable network of networks, all on a single architecture, to ensure interoperability.

2. **You state in you testimony that "states that are deciding now to opt-in are taking a risk that FirstNet will be affordable." FirstNet has unilateral authority to set lease fees and per-user core fees for opt-out states. Are states that opt-out taking an even greater risk if FirstNet controls their fiscal fate and the state is on the hook for radio access network buildout?**

Answer:

In both opting in and opting out, the risk arises from what is unknown at this point. An assumption has been implicit in the development of FirstNet that the services it provides will be affordable to the States and public safety users, but no cost models have been released. The Act requires FirstNet to be self-funded and to repay any amounts borrowed from the Treasury against the expected revenues of the spectrum auctions established in the Act.

While FirstNet has the advantage of spectrum that has been supplied without cost for the public good, it is also required to provide service to rural areas, and Chairman Ginn has committed that FirstNet will provide coverage to every part of America and that the network will be hardened. All of these add to the cost of the network and the pressure on FirstNet in its duty to break even.

Accordingly, States need to know what the costs will be, at least in rough order of magnitude, for services offered. FirstNet, supported by NTIA, must embark on a comprehensive cost model and business plan immediately. Since NTIA is a small agency and FirstNet is not currently staffed, this function should be contracted to consultants and experts who do this as a living (of course, with substantial FirstNet input and oversight). A cost model prepared by experts and a business plan agreed upon by FirstNet must be among FirstNet's very top priorities.

The Honorable Joe Barton

1. **You were Chief of the FCC's Public Safety Bureau when the FCC approved waiver petitions from 21 different state and local jurisdictions wishing to begin early deployment of a public safety network in their respective areas, including seven that received federal BTOP awards from NTIA. These projects were subsequently suspended by NTIA over concerns that they might undermine FirstNet's efforts to build a nationwide network. While FirstNet has recently indicated a willingness to allow those projects to proceed, subject to certain conditions, their status is uncertain. What benefits, if any, do you believe would result if these projects were allowed to go forward? And, do you believe that other jurisdictions not awarded BTOP grants should be given equal consideration?**

Answer:

The primary reasons for the FCC's granting of waiver petitions to proceed with early deployment of the public safety broadband network and the cooperation with NTIA to make it possible for those jurisdictions to apply for BTOP grants are all still valid. The risk that early deployments will not be interoperable with the fully developed network is mitigated by close technical oversight and obligations on the part of those jurisdictions (and their contractors) to ensure interoperability. In fact, the FCC's waivers and NTIA's grants were all based on a set of conditions that ensured these networks would be interoperable with the nationwide public safety broadband network.

The risk that early deployers would not be interoperable, *as mitigated and monitored*, is outweighed by the benefits that both the FCC and NTIA originally identified. Early deployments would provide important, even crucial data, to the development of the full network, including understanding how LTE technology can best serve the needs of the public safety community and determining effective methods of interoperability. The early deployments would draw in additional funding for what everyone recognizes will be an underfunded network.

Finally, but just as significantly, the early deployment will aid public safety in those jurisdictions in saving lives and property and dealing with disasters, natural and man-made. FirstNet may take years to design and deploy, and early deployment can provide FirstNet with some early wins and important lessons.

Other jurisdictions should be given consideration as well. FirstNet must acquire the expert staffing and governance, through hiring and consultants, to make sure that early deployers follow its technical guidelines, but there is no technical reason why BTOP grantees should deploy and others which have other funding cannot.

The Honorable Steve Scalise

1. **It is my understanding that it will likely be years before the FirstNet network will be operational. What is the timetable for states like Louisiana that have an urgent need to move forward deploying a broadband network that's fully interoperable with FirstNet for our emergency responders? Do you believe that non-BTOP early deployments should be permitted to go forward provided they are fully interoperable with the future FirstNet network?**

Answer:

FirstNet is the best entity to address timetables for individual jurisdictions, but under the Act, Louisiana may have to wait some time to address the urgent need you describe. The Act sets forth a very deliberate, consultative process. FirstNet may not proceed with the Request for Proposal process until the consultation and the statutory planning process with each of the States and Territories has been completed. It is not clear where Louisiana (or other States and Territories) would come in that process.

However, early deployers could proceed and still be interoperable and provide interconnection with the FirstNet network when it is deployed and reaches full operation capability. Close technical oversight would have to be exercised, and FirstNet the necessary complement of experts and consultants to ensure that any early deployers do not stray from the technical standards for interoperability and interconnection. A multi-billion dollar network which has public safety as its responsibility cannot be adequately run by a handful of people, however dedicated. Sufficient numbers of experts must be hired and consultants brought in to ensure the viability and integrity of the network.

Any States or Territories which wish to deploy early must give enforceable assurances that their systems will be interoperable when FirstNet becomes operational. Early deployment would provide valuable lessons to FirstNet and would draw additional funds into the nationwide public safety broadband network. FirstNet is a national asset, and the investment in that asset provides federal, state and local first responders with a huge advantage in saving lives, preventing injury and protecting property.

The Honorable Cory Gardner

Mr. Barnett, in your testimony, you note that Congress' goal of achieving nationwide interoperability can be achieved with a network of networks approach and that, contrary to Mr. Ginn's testimony, a "national architecture" is not necessary. You observe that Congress's goal can be achieved as long as FirstNet is guided by the principle of national interoperability and local control. Could you expand on the rationale for this, including what you see as the appropriate role for FirstNet at the national level and the decisions that should be deferred to states?

Answer:

Actually, Mr. Ginn's testimony and mine agree that a national technical architecture is necessary, and in fact, such an architecture is mandated by the Act. Interconnection rules will permit BTOP recipients and other early deployers to join FirstNet seamlessly under agreed standard operating procedures. However, a network of networks is still consistent with the concept of a national architecture, and a network of networks is not a reason to stop the BTOP recipients or other early deployers. The primary purpose of FirstNet is to ensure and enforce interoperability and interconnection nationwide as its first priority, since we have several decades of evidence that interoperability will not exist unless it is given the first priority. States and local jurisdictions understandably have competing priorities and responsibilities. FirstNet must deliver interoperable communications services which are integrally a part of the network services and not subject to the vicissitudes of State and local priorities.

However, the network is for public safety at the State and local level, and the States and local governments have statutory responsibilities to their citizens. For that reason, every possible matter that does not support interoperability, operability, security, sustainability and the financial integrity of the network should be deferred to the States and local jurisdictions. Otherwise, FirstNet may find reluctant or even recalcitrant customers and users. Indeed, States and Territories have state constitutional and state statute responsibilities for public safety which may not be ceded or delegated to FirstNet.

FirstNet must establish and enforce technical interoperability, interconnection protocols and at least a baseline of applications that will be usable and used by every jurisdiction that connects to the network. It must prescribe a baseline of standard operating procedures and protocols (since only a small percentage of interoperability is technology; the remainder is human interaction).

FirstNet may want to establish a baseline for resilience and hardening, though a great deal of deference should be given to the States in this regard. Earthquake hardening may be appropriate for California, but would not be as necessary or affordable in non-earthquake prone areas, for example.

States should be given the ability to set services and service levels, to control access and priority and what other applications will be allowed other than the baseline.

The Honorable Mike Doyle

1. **According to the National Broadband Plan wireless backhaul is "critical to the deployment of wireless broadband and other wireless services," particularly "[w]hen fiber is not proximate to a cell site." I understand that the existing wireless backhaul networks face a number of regulatory and technological constraints that limit their potential capacity. These independently-powerable backhaul services are important to undergird FirstNet, the national first responder network.**

   How did public safety and mobile networks perform during natural events, like Hurricane Sandy, and man-made events, like 9/11?

Answer:

I will divide my answer into parts, public safety and then commercial mobile cell service, and I will address both operability (your question on performance) as well as interoperability.

Public safety networks, by and large, remained operational during and after Hurricane Sandy due to the hardening of these networks beyond what is generally commercially viable. During Hurricane Katrina, the entire communications infrastructure was devastated, both public safety and private, so the lesson learned from that disaster is that satellite back up and satellite emergency alert systems should be integrated into any public safety network. During 9/11, some public safety communications facilities were damaged, but mostly public safety communications remained operable. However, several technical and procedural problems were identified after 9/11 regarding the interoperability of public safety communications.

With regard to cell phones, Hurricane Sandy also was devastating to the infrastructure, but power was actually a larger factor than was damage to cell sites. During 9/11, cell sites on and around the Twin Towers were damaged or destroyed, but primarily cell service was impacted by the extremely high usage.

2. **Can public safety networks and mobile networks work without backhaul?**

Answer:

No, public safety networks and mobile networks cannot really work without backhaul. On the scene of an incident, technology does exist to allow public safety officials to set up mobile ad hoc mesh networks that would allow the teams in that area to communicate with each other even if no backhaul to the network is available. However, communications would be limited to that mobile ad hoc mesh network and whatever data and applications it had available until a connection could be established or re-established. In that instance, there would be no connection to the Internet, telephone systems or other networks.

3. **If the FCC ultimately reclaims spectrum in the 24 and 39 GHz range, how long will it take, including the necessary legal proceedings, for a new**

wireless backhaul provider to build-out a backhaul service with the seized spectrum?

Answer:

I do not have the answer to your question.

Thank you for the opportunity to testify and to respond to your questions.