Public Safety Alliance

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House of Cards

FCC's Capacity White Paper
Built on Assumptions and Conjecture

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National Sheriffs Association | Major Cities Chiefs Association
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Introduction

Three months after the Federal Communications Commission released the National Broadband Plan (NBP), the Public Safety and Homeland Security Bureau finalized *"The Public Safety Nationwide Interoperable Broadband Network: A New Model for Capacity, Performance and Cost"* white paper. The Commission's white paper, which should have been completed before the NBP was released, was requested by public safety and industry leaders five months ago. The paper was developed without meaningful input from the public safety community, and is built on a foundation of assumptions and conjecture.

The cornerstone of the Commission's white paper and the NBP's public safety recommendation is the utilization of 10 megahertz of dedicated 700-MHz band spectrum currently designated by Congress for public safety use. In addition, the Commission believes that public safety must be able to roam on commercial networks with priority access, which supposedly will increase spectrum resources in times of emergency. The Commission's white paper and the NBP recommend the need for 44,000 cell sites based upon three disaster studies that were conducted by the Commission over the last year. Construction of the public safety network would be funded by public funding and commercial auction of the 10MHz of the upper D-Block spectrum.

Unfortunately, the Commission's white paper is built on a weak foundation that is extremely problematic to the public safety community.

1. The Commission makes far too many assumptions and relies on conjecture to develop its misguided policy framework that will put public safety users at risk.

2. The Commission greatly underestimates the current and future capacity needs of public safety when it assumes that 10 MHz of broadband spectrum is adequate for mission-critical high-speed data, high-resolution two-way video conferencing, video monitoring and surveillance at an incident, multi-agency mission-critical IP-based voice communications with push-to-talk services, biometrics, telemedicine, and the thousands of other high-bandwidth applications that will be used by public safety in the near future. While the Commission has acknowledged that consumers will need an additional 500 MHz of spectrum for broadband, in addition to the more than 500 MHz they already have, the Commission assumes that public safety can do it in 10 MHz. In other words, the Commission wrongly assumes that public safety can build a skyscraper on a small piece of land that can only support a single family home.

3. The Commission believes that density of the cell sites makes up for the lack of spectrum capacity and ignores the environmental impact of cell

towers, local and state zoning restrictions, added cost of more backhaul, and the potential for network interference.

4. Public Safety continues to support public – private partnership for broadband deployment. However, the Commission recommends an "incentive based partnership" between public safety and the D Block winner. There is very little information on how this would work leaving public safety skeptical as to how it would be executed and on how it would insure public safety's needs are meet.

Public Safety Alliance (PSA) takes serious exception with the findings of the Commission's white paper and we ask the Commission to take immediate action to develop a more comprehensive, independent study of public safety's capacity needs for mission-critical voice, high-resolution video, high-speed data applications. The study must include public safety practitioners, technicians, and industry experts; it must be able to project the capacity needs of public safety for the next 10 years; it must take into consideration the types of applications that can be used on the network by public safety; and it must provide a solid foundation upon which public safety can build a nationwide broadband network that will meet the needs of our nation's first responders who put their lives on the line every day to protect and serve the public. Anything less is unacceptable.

The PSA fully supports the independent comments of Andrew Seybold, which provides an accurate and critical analysis of the FCC white paper.[1]

The Fallacy of Assumptions

PSA finds that there are many flawed assumptions and conclusions in the white paper, which could lead to the failure to build the public safety broadband network. Below are some of these flawed assumptions and conclusions:

1. "The 10 megahertz of dedicated spectrum allocated to public safety in the 700 MHz band for broadband communications provides more than the required capacity for day-to-day communications."

   The Commission recognizes the importance of the 700 MHz D Block because it shares the same LTE band class as the public safety broadband spectrum, but fails to acknowledge the real advantages to public safety of combining these two blocks of spectrum. Unlike commercial providers, a public safety agency has to meet the

[1] Andrew M. Seybold, "Comments on: FCC White Paper The Public Safety Nationwide Interoperable Broadband Network: A New Model for Capacity, Performance and Cost", FCC Proceeding No. 06-229, filed June 23, 2010.

operational requirements throughout their entire coverage area including at the cell edge where throughput decreases significantly.

Public safety has repeatedly argued that the additional 10 MHz of paired spectrum that would be gained through a D-Block allocation is necessary to ensure reliable operation of the public safety broadband network in the long term. It will be particularly crucial during times of high traffic when additional public safety users from the local area and from agencies coming in from elsewhere all converge at a major incident scene or disaster area.

Since the D-Block spectrum is adjacent to the public safety broadband allocation, it is uniquely positioned to provide the needed additional capacity **throughput for a public safety agency's entire coverage area including the cell edge where throughput decreases significantly**. Any alternative spectrum offered in other bands will be less efficient. Additional components would be required which would increase the cost and reduce performance of broadband devices. Non-adjacent spectrum blocks of the same size as the D Block will not provide as much throughput capacity, since greater efficiency is achieved through spectrum aggregation.

The most significant step that the Commission can take towards ensuring a consistently high level of network performance, reliability, capacity, and coverage across all public safety broadband networks is to recommend that Congress reallocate the Upper 700 MHz D Block to public safety.

2. "…priority access and roaming on the 700 MHz commercial networks is critical to providing adequate capacity in these extreme situations."

   The Commission assumes that commercial networks will be in operation during extreme situations and that there will be sufficient capacity to serve both public safety and consumer traffic. However, it is clear from the experience of public safety agencies around the country that commercial networks are often severely congested during even the most minor situations, including the situation where consumers are using SMS text messages to vote for their American Idol. Priority access to a network that is already congested will not result in meeting the dedicated capacity and transmission speeds needed by public safety users.

3. "The capacity and efficiency of a public safety broadband network will far exceed the expectations…because of the system architecture, density of cell sites, the density of cell sectors per site, network and spectrum management, and the use of new and emerging technologies."

The Commission's plan is built on the assumption that the amount of spectrum does not really matter if enough cell sites can be built producing enough tower density to make do with 10 MHz of existing spectrum. Public safety is concerned that utilizing this approach to solve capacity and interference is not at all a good value. This approach could require up to twice the number of cell sites that would otherwise be required in a regional approach.

The Commission assumes that public safety can make up for the lack of spectrum capacity on the network by adding more cell sites. Unfortunately this simplistic solution, ignores the local, state, and federal regulations such as zoning laws, environmental regulations, and other regulatory hurdles that often impede or stop the build-out of additional cell cites. Additional cell sites will also greatly increase the cost for backhaul, hardening, and ongoing operation and maintenance. Finally, multiple cell sites in a geographic area could lead to dangerous interference and network confusion.

4. The Commission assumes interference and out-of-band-emissions (OOBE) problems are easily solved.

   Public safety will experience interference if the Commission's plan is implemented and there are no attractive solutions. Reducing interference would require deploying up to twice as many cell sites as the public safety approach.

   Current OOBE limits adopted for the public safety broadband system are very inconsistent—they vary dramatically based on whether they were intended to protect the public safety broadband network from the D Block or the public safety narrowband channels from the adjacent commercial 700 MHz blocks.

   The best way to alleviate the OOBE concerns between commercial and public safety entities would be to reallocate the 700 MHz D Block to public safety. Reallocation would eliminate any concerns about interference between the D Block and public safety broadband spectrum.

Misrepresentation of the Facts

"Public safety has a total of 97Mhz of spectrum allocated for use across the RF spectrum with 60MHz of that total available for broadband use. Overall the allocation of spectrum per user for public safety is now 25 times that of commercial providers."

1. Public safety only has 10 MHz of spectrum in the 700 MHz band for mobile broadband. The additional 50 MHz in the 4.9 GHz band does

not penetrate buildings and is not suitable for wide area mobile public safety or commercial mobile broadband services.

2. The Commission allocated 50 MHz in the 4.9 GHz band based on public safety requests for the spectrum to serve "hot spot" types of deployments. This spectrum is suitable for fixed broadband services such as hot spots and point-to-point transmission, but not for jurisdiction-wide coverage.
3. Allocation of spectrum should never be based solely on a per-user calculation. Any credible analysis will also incorporate how the spectrum will be used and how much usage is likely for each user. The per-function use of the spectrum by a public safety user will be, at the very least, 10 times greater than that for the average commercial user. Further, the average application to manage the incident will require much more bandwidth and capacity than merely browsing a web page or texting a friend.

"Priority access and roaming onto commercial bands can provide public safety with far more capacity during periods of greatest need."

1. Many disaster situations have shown that commercial systems get clogged with drastic increase in demand.
2. Priority access (without pre-emption) on a clogged commercial system will not guarantee public safety access to the capacity it will need.
3. There will be considerable delay in the transmission of data on congested commercial networks even if public safety has priority access.

Conclusion

The Commission studied three tragic moderately sized real disasters in its white paper. However, it failed to utilize data from more extensive real world situations like the attacks in New York on 9/11 or from Hurricane Katrina. The public safety community is left to wonder if anything has been learned from these disasters.

Given the concerns cited by the public safety community, the past failure of the D- Block auction, and the uncertain nature of an economically viable nationwide network fully funded by a commercial provider required to share spectrum, we believe the current public/private partnership model funded by an auction is not in the public's best interest.

With only 10 MHz of paired spectrum in the 700 MHz Public Safety Broadband Spectrum, public safety network operators could deploy only one 5 MHz x 5 MHz LTE carrier. However, with a D-Block reallocation, public safety broadband networks will be able to operate over one 10 MHz x 10 MHz LTE carrier, which would provide higher peak data rates and increased overall network throughput. The 10 MHz x 10 MHz LTE system would provide superior network performance, as compared to a 5 MHz x 5 MHz system.

Furthermore, reallocating the D Block would provide a more viable option to retain control over the network in public safety hands. Without such control, there is no assurance that public safety will have the reliability and flexibility needed.

A single wireless public safety broadband network containing the D Block and adjacent public safety 700-MHz broadband spectrum is the only logical choice to satisfy the public safety community's wireless broadband spectrum requirements. Primary public safety access is critical, as demonstrated by the failure of the initial D-Block auction. Public safety cannot be relegated to roaming on commercial networks as just another customer.

Public safety strongly supports the bi-partisan bill introduced by Representatives Peter King and Yvette Clarke, H.R. 5081, and currently co-sponsored by thirty-seven members of the House. We urge Congress to swiftly approve the bill and send it to the President for his signature.