

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)	
)	
Service Rules for the 698-746, 747-762 and 777-792 MHz Bands)	WT Docket No. 06-150
)	
Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band)	PS Docket No. 06-229

**COMMENTS OF THE NATIONAL PUBLIC SAFETY
TELECOMMUNICATIONS COUNCIL**

The National Public Safety Telecommunications Council (NPSTC) submits these comments in response to the Commission's *Second Further Notice of Proposed Rulemaking (Second Further Notice)* regarding the 700 MHz D Block, the Public/Private Partnership and the Public Safety Broadband Licensee.¹ NPSTC urges the Commission to remain committed to a nationwide interoperable public safety broadband network through a public private partnership. The Commission should reject proposals that relegate the D Block and Public Safety Broadband Licensee 700 MHz spectrum only to commercial grade design, use and control. With greater clarity and flexibility, NPSTC believes a public/private partnership business plan can provide viable commercial opportunities while meeting public safety-grade requirements. The Commission should maintain the primary role of the Public Safety Broadband Licensee to ensure that state and local public safety agency interests are protected and promoted. Provisions should

¹ In the Matter of the Service Rules for the 698-746, 747-762 and 777-792 MHz Bands and Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band, *Second Further Notice of Proposed Rulemaking*, WT Docket 06-150 and PS Docket No. 06-229, FCC 08-128 (released May 14, 2008).

be made to enable the PSBL to fund and efficiently discharge its duties. To protect the 700 MHz narrowband deployments that have already commenced, the cost cap relating to their relocation should be revised and its schedule extended.

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The National Public Safety Telecommunications Council

The National Public Safety Telecommunications Council (NPSTC) is a federation of public safety organizations whose mission is to improve public safety communications and interoperability through collaborative leadership. NPSTC pursues the role of resource and advocate for public safety organizations in the United States on matters relating to public safety telecommunications. NPSTC has promoted implementation of the Public Safety Wireless Advisory Committee (PSWAC) and the 700 MHz Public Safety National Coordination Committee (NCC) recommendations. NPSTC explores technologies and public policy involving public safety telecommunications, analyzes the ramifications of particular issues and submits comments to governmental bodies with the objective of furthering public safety telecommunications worldwide. NPSTC serves as a standing forum for the exchange of ideas and information for effective public safety telecommunications.

The following 15 organizations participate in NPSTC:

American Association of State Highway and Transportation Officials
American Radio Relay League
Association of Fish and Wildlife Agencies
Association of Public-Safety Communications Officials-International
Forestry Conservation Communications Association
International Association of Chiefs of Police
International Association of Emergency Managers
International Association of Fire Chiefs
International Municipal Signal Association
National Association of State Chief Information Officers
National Association of State Emergency Medical Services Officials
National Association of State Foresters
National Association of State Technology Directors
National Emergency Number Association
National Sheriffs' Association

Several federal agencies are liaison members of NPSTC. These include the Department of Homeland Security (the Federal Emergency Management Agency, the Office of Emergency Communications, the Office of Interoperability and Compatibility, and the SAFECOM Program); Department of Commerce (National Telecommunications and Information Administration); Department of the Interior; and the Department of Justice (National Institute of Justice, CommTech Program). NPSTC also has liaison relationships with associate members, the Telecommunications Industry Association and the Canadian Interoperability Technology Interest Group.

I. Introduction and Executive Summary

The Commission's *Second Further Notice* addresses changes to the rules establishing a public private partnership intended to deploy and operate a nationwide interoperable public safety broadband network in the 700 MHz band. These rules relate to the responsibilities of the Public Safety Broadband Licensee (PSBL), the licensee of 12 MHz in the public safety segment of the 700 MHz band and those of the D Block licensee, who is to be licensed on the adjacent 10

MHz.² These rules were promulgated in the Commission's *Second Report and Order* of these proceedings.³ The *Second Further Notice* results from no D Block winner emerging from the Commission's 700 MHz band auctions.

The *Second Further Notice* asks numerous questions addressing policy and technical issues associated with deploying and operating a public safety broadband network. The winner less D Block auction serves as a predicate to these far reaching questions. The range of options addressed includes abandoning the Commission's objective to establish a nationwide public safety broadband network and include other revisions that would effectively accomplish the same.

The remaining 700 MHz spectrum presents an enormous but fleeting opportunity to provide public safety the broadband communications capability paralleling its increased responsibilities. The advances afforded by modern technology will enhance significantly emergency response and preparedness. The 700 MHz spectrum represents the only option the Commission has defined in which public safety can address wide-area broadband operations. Despite recognition of the importance of this capability by the Commission, Congress, the public safety community and industry, the advanced services associated with a broadband network

² The PSBL license includes 10 MHz for broadband deployment and 2 MHz for guard band.

³ In the Matter of the Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, WT Docket No. 06-150, Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, CC Docket No. 94-102, Section 68.4(a) of the Commission's Rules Governing Hearing Aid-Compatible Telephones, WT Docket No. 01-309, Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services, WT Docket 03-264, Former Nextel Communications, Inc. Upper 700 MHz Guard Band Licenses and Revisions to Part 27 of the Commission's Rules, WT Docket No. 06-169, Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band, PS Docket No. 06-229, Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communications Requirements Through the Year 2010, WT Docket No. 96-86, Declaratory Ruling on Reporting Requirement under Commission's Part 1 Anti-Collusion Rule, WT Docket No. 07-166, *Second Report and Order*, 22 FCC Rcd 15289 (2007) (*Second Report and Order*) recon. pending.

remain only a possibility. To bring tangible improvements to emergency response and preparedness communications, NPSTC's comments are directed to the following core principles which we believe the Commission and Congress must be guided by:

Need for an Interoperable Broadband Network- Meeting the enormous challenges facing public safety means a broadband network of advanced services that is interoperable on a nationwide basis and serves the range of local and state agency requirements. It must ultimately reflect public safety standards to provide the capabilities needed to respond expeditiously to incident specific demands which vary across different areas of the country.

Promote a Competitive D Block Licensee and a Reliable Public Safety Network- The Commission's rules can establish the balance that ensures that the network reflects public safety's unique broadband network requirements while affording the D Block Licensee ability to pursue a viable business plan that provides the resources necessary to build, operate and maintain such a network and compete with other commercial interests.

Ensure Meaningful Public Safety Participation in the Network- It is crucial that the Public Safety Broadband Licensee be broadly representative of public safety, is knowledgeable of public safety operations and standards and has the responsibility, authority and resources needed to protect the variety of public safety agencies' interests on an ongoing basis. This includes interfacing with both the network operator and the public safety users to ensure that the network can and does support the broadband requirements for the wide range of incidents encountered. Any disruption to the basic concept of the PSBL will be detrimental to public safety and the creation of a Nationwide Broadband Network.

Reexamine and Amend the Narrowband Incumbent Relocation Plan- The challenges of relocating agencies that have already deployed narrowband systems has become more defined. An equitable amended plan that supports continued deployment, provides the necessary funding and a reasonable timeline to complete the relocation should be pursued.

II. The Critical Need for a Nationwide Public Safety Communications System

The Commission's decisions establishing a public private partnership to deploy and operate a nationwide public safety broadband communications system responds to a glaring gap in emergency response and preparedness. To the Commission's great credit, its leadership forged a vision that will improve dispatching the right help to the citizen facing emergency and protecting police officers, firefighters, emergency medical technicians and other responding personnel. The Commission recognized the urgent need and real opportunity presented by the 700 MHz band. It structured a public private initiative as the only reasoned course to meet this challenge given the lack of any funding to deploy the system. The resulting policies and rules comprehended the heightened standards that must be implemented into a public private deployment to meet the needs of public safety communications. The Commission's decisions demonstrated a commitment by the federal government to improve emergency readiness and response that will make a historic difference.

The questions posed by the *Second Further Notice* present a much more ambivalent commitment. The lack of a D Block winner has led to questioning not only the objective, but the range of decisions that flow from the commitment. NPSTC urges the Commission to remain dedicated to bringing about a nationwide interoperable public safety broadband network that meets the varied needs across the country. It should not lose sight of the enormous gap between

public safety responsibilities and current communications resources. Public safety will not be well-served by the mere availability of an additional commercial-grade system and the Commission should neither explicitly or implicitly allow the public private initiative to default to that result.

What should guide the Commission's deliberations and decisions is the fundamental challenge facing public safety. Spectrum assignments across multiple bands, inadequate coverage, and especially the lack of advanced data and video services as well as minimal or non-existent funding, choke emergency response and preparedness. The lack of a D Block winner did not alter this challenge. It has, however, afforded opposing interests opportunity to advocate abandoning the path to solving it. NPSTC urges that the Commission's commitment to a public safety broadband network that is interoperable nationwide remain as its core objective.

The Commission should reject the unfounded notion that these goals can be accomplished solely by current or future commercial-grade systems. Public safety requirements, which the Commission's own decisions and proceeding affirm, should not be ignored.⁴ The reality is that if commercial grade systems were the encompassing solutions for public safety that some claim, these proceedings would be unnecessary. Hard experience shows otherwise. In addition, public safety agencies using the network will need the flexibility to deploy interoperable subscriber equipment designed to address their specific needs and not harm the network, as well as application software that supports their needs. The ability to improve emergency response and preparation, to ensure that public safety communications resources are

⁴ *Second Report and Order* at paragraph 31, *Report to Congress on the Study to Assess the Short-Term and Long-Term Needs for Allocations of Additional Portions of the Electromagnetic Spectrum for Federal, State, and Local Emergency Response Providers*, WT Docket No. 05-157 at 13 ¶ 26 (Dec. 16, 2005).

equal to its challenges, is dependent on the Commission's continued commitment to a national public safety broadband network deployed and operated by a public private partnership.

III. Promoting a Competitive Auction and a Capable D Block Licensee

NPSTC's position regarding the clarity of the challenges public safety faces does not diminish the need to provide the D Block licensee a viable opportunity to make a return on its investment. NPSTC understands that a responsible partner, the D Block Licensee, to formulate a business plan and attract investment, must have a level of certainty as it enters the auction process. NPSTC believes that greater clarity with regard to the network's elements should be combined with a flexibility and discretion committed to the partnership. Such an environment is the path to a successful D Block auction and effective deployment and operations that serve both private and public interests.

NPSTC understands the challenge a private entity faces. It must deploy a network capable of assisting public safety in environments where commercial-grade networks are inadequate and at the same time compete for consumer subscribers with other operators whose networks do not reflect such increased standards.

It is this area that NPSTC believes should be the focus of the Commission's deliberations. To attract capable participants to the D Block auction, the network's requirements should be defined but not in such great detail that there is no discretion for the D Block Licensee and PSBL to accommodate and balance competing interests. This discretion is crucial to the deployment of a network capable of continuing to evolve to higher levels of advanced technology.

NPSTC believes that this balance of defined requirements yet discretion is as important as revising any baseline financial commitment or default penalty. A more precise description of

the network's parameters together with the discretion afforded to both partners to make decisions that allow the venture to work is of the highest importance. The balance will not be obtained by the Commission micro-directing the environment through rules and approvals. A regulatory regime that also purports to be an operating structure for the daily delivery of services will not adequately serve either partner. The greater the Commission attempts to micromanage the partnership, the greater the risk that some of the rules adopted will be counterproductive to the deployment and operation of the broadband network. Notably, should that occur, it could take up to 18 months to correct the situation through the rulemaking process.

Several areas will provide greater clarity for potential D Block licensees. Foremost are the technical requirements of the network, which are addressed in Part VII of this comment. Provisions addressing the reserve price and default penalty can provide clarity and incentive to invest in the network. Such are clearly elements prospective D Block auction participants must evaluate. Adjustments in the form of reductions to or removal of the reserve price or default penalty may attract bidders and underscore the federal government's commitment to provide the incentives and structure for the auction's success. This is particularly true since the revenue goals of the Treasury for the 700 MHz auctions have been met. NPSTC, however, notes that the reserve price and penalty provision serve a purpose in helping ensure that D Block participants have the financial, technical and managerial resources to perform licensee responsibilities. This objective should remain.

The cost of the auction is likely to be a fraction of the cost to actually implement and maintain the network. NPSTC urges the Commission to ensure that any significant adjustment to the reserve price and/or the default penalty be replicated by a structure promoting similar commitment and accountability. These concepts include incentives for sound management

decisions. Public Safety cannot afford a one to two year false start in which an auction participant wins the auction because of low costs but does not have the resources needed to build, operate and maintain the network.

NPSTC believes that a balance can emerge that promotes a reliable public safety network and a D Block licensee able to compete in the commercial market. Serving low population centers or areas with unique needs is not foreign to government or the telecommunications industry. The qualities of a public safety network, e.g., diversity, redundancy, coverage and heightened reliability, are valued not solely by emergency services but also by a range of other critical private interests that can contribute to a successful public private partnership. For example, users of the network could include utilities, petro-chemical companies, transportation providers and other users who need greater redundancy and reliability than standard commercial networks typically provide. Intelligent Transportation Systems, which have faced the dilemma of how to obtain cost-effective wide area coverage, might also be prospective subscribers to the network and bring additional funding for deployment along highway corridors.

This potential should be examined in the context of several elements and alternatives that will provide the D Block Licensee and the partnership flexibility. Foremost is that public safety agencies comprehend the balance required to deploy and operate a network. Their experience is based on making realistic and pragmatic decisions evolving around cost. Public safety, through the PSBL, will demonstrate its fidelity to the partnership to make it successful.

More specifically, NPSTC believes that the Commission should explore the following areas and provide flexibility and discretion to the partnership:

Defining Costs -An important element is understanding the costs of public safety grade deployment standards. Given that requirements may vary across jurisdictions in particular

facets of the network, projected network and operational costs should be refined to reflect the particular and not just the general case, with pricing determined accordingly.⁵ Similarly, network deployment and operational costs should be based on whether specific requirements can be phased in over some timeframe negotiated by the PSBL rather than deployed immediately.

Regional Participation- Despite the best efforts of a D block licensee and the PSBL, there are areas of the country over which broadband network coverage is likely to be delayed or possibly will never be deployed for economic reasons. NPSTC recommends that the Commission clarify and, to the extent necessary, modify its rules, to provide additional flexibility for local agency system build out and ownership in these areas, coordinated with and authorized by the PSBL. The current rules are at best unclear and appear to require that any system built out by local public safety agencies be transferred to the nationwide licensee.

The Commission's rules should encourage rather than discourage local build out expeditiously so that data and video applications can be available to public safety, even where it is uneconomic for the D block operator to provide service. The overall goal is to ensure public safety has interoperable access in as much of the country as possible. Such local deployment could be credited toward "build out" of the nationwide network without requiring that ownership of the locally or regionally deployed portions be transferred to the D block operator. Regional projects that the PSBL determines can be integrated into the national network should be allowed. This additional flexibility will protect against the spectrum going unused in these areas.

Build Out Milestones- Emergency services are required by all the public, not just those in population areas that provide an adequate revenue base. Yet if the build-out is set so high that no commercial provider will pursue it, there will be no public safety network absent significant government funding. As the incremental costs of the build out rise substantially beyond 98% population coverage, the Commission should consider adjustments to its present rules. In examining this issue the Commission should encourage the availability of deployable systems in rural areas not normally served

Public Safety Access to the D Block Band- Accommodating public safety's broadband requirements and competing demands for priority and capacity to support the communications needs at incidents within the public safety portion of the 700 MHz band should be entrusted to the PSBL. NPSTC believes that only in extraordinary circumstances will public safety require access to the additional capacity of the commercial D Block. Further, if and when the additional capacity is needed, in most cases it is likely to be required only in a given specified area, not throughout an entire city or county, and certainly not nationwide. NPSTC thinks that an extraordinary circumstance would be invoked only by senior levels of state or local government, after consultation with the PSBL and D Block licensee, and in circumstances the PSBL has

⁵ For example, users in California may need network capabilities as well as devices and application software geared toward fighting wildfires, while those in Florida may need greater focus in response to tropical storms. NPSTC believes that such flexibility, combined with the PSBL's focus and expertise on both nationwide interoperability and local/regional operational requirements, is the best option for public safety to address its requirements in a cost-effective manner.

defined and Commission approves prior to the D Block auction. This clarity should contribute to more precise expectations on the part of D Block auction participants.

That said, any rule by the Commission should support development of an agreement between the D Block Licensee and the PSBL which would allow commercial and public safety interests to use the other's capacity. As part of establishing the parameters by which commercial interests would have secondary access to the public safety segment, the public private partnership would be allowed also to establish circumstances where public safety could obtain additional capacity from the D Block segment if needed for a particular incident. Such flexibility would keep regulatory requirements from promoting inefficient spectrum use while accommodating both the public and commercial requirements to the maximum extent possible, consistent with the spectrum being available.

Auction Incentives- As noted, the auction structure itself can also contribute to promoting the partnership. Reductions in the reserve price or default penalty will provide competitive benefits to the D Block licensee. Most significantly, as the 700 MHz auctions have exceeded revenue objectives, revenues from the D Block should be directed to assisting deployment of the nationwide public safety-grade broadband network.

NPSTC believes that providing greater clarity and flexibility will attract investment to the public private partnership. The D Block licensee and the PSBL, within the parameters set by the Commission, can deploy a platform to deliver broadband services consistent with public safety standards. With discretion committed to the PSBL and the D Block licensee, that platform can also serve a range of commercial interests. The enormous value of 20 MHz in the 700 MHz band should not be understated. In contrast to the now closed auctions, there is no more 700 MHz left. The opportunity to provide public safety advanced services in an environment where private investment will push innovation and efficiency to serve public and private interests remains tangible as ever.

IV. The Objective and Structure of the Public Private Partnership Should Remain Intact

Reflecting its wide ranging inquiries, the *Second Further Notice* addresses areas where D Block responsibility would be eliminated or diminished and the operator would have little responsibility to public safety. Several initiatives intend to assist the D Block licensee. Others

dilute the partnership's responsibilities. The *Second Further Notice* probes the degree broadband is currently available. It asks what entities may use the network and how the Commission can promote use and connectivity to legacy systems. It seeks to survey the extent of public safety access to broadband. It examines in detail the legal and policy issues regarding critical infrastructure entities' access to the network. It invites discussion addressing whether agencies should be mandated to subscribe to the network and whether subscriber equipment for the network should be designed to interoperate with legacy public safety systems in other spectrum bands. Also, the *Second Further Notice* presents the concepts of providing "Most Favored Nation" rates to encourage public safety participants.⁶ Following are NPSTC's recommendations in a number of these key areas.

Public Safety Access to Advanced Services

The record in the 700 MHz proceedings already reflects that public safety has no access to wide area advanced services. The broadband capacity at 700 MHz will meet these needs. Also, while there have been improvements in local and regional interoperable mission critical networks, there is currently no interoperable nationwide network. There is unlikely to be nationwide interoperability except through the opportunity afforded by the 700 MHz band. These facts which resonate throughout public safety and impact the level of service to the public should continue to underlie the Commission's decisions.

Some larger jurisdictions have commenced significant projects to provide emergency response with advanced services. There are also several projects of more limited character, some supported by the federal government. It is reasonable to provide the public private partnership

⁶ Paragraphs 28-38 of the *Second Further Notice* address these issues.

with discretion to integrate such endeavors into the network if the objective of making advanced services available to all public safety agencies is furthered.

Yet, as important as these “early-adopter” initiatives are, none reflect the breadth involved by using the remaining spectrum in the 700 MHz band to provide the range of public safety agencies across the U.S. with advanced service capabilities. Unless there is a clear and accountable effort and the provision of resources to build a nationwide network in the 700 MHz band, the solution envisioned will not happen. Instead, public safety agencies will not have the capabilities to transmit critical data, images and video in the field. A serious and detrimental circumstance is presented- the capabilities of those who endanger the citizens will exceed those of the nation’s public safety personnel, who are charged with protecting the public. This stark reality should reaffirm the objective of attaining a broadband network with interoperability nationwide for first responders, Federal agencies, and other critical personnel.

Mandating Public Safety Participation

The responsibility for promoting public safety participation in the network is that of the PSBL. It is unrealistic to proffer that agencies, which rely on tax revenues, should be mandated to purchase access to the network to ensure the public private partnership a revenue stream. Such a mandate would be a historic departure from the Commission’s role of leaving such choice to the consumer, public or private. In addition, a Federal mandate from the Commission to purchase service would draw serious and well-founded legal objections from state and local governments.

One of the significant and specialized responsibilities of the PSBL is working with the D Block licensee to shape services at prices that attract agency use while fairly contributing to helping fund the cost of the network. This role should be preserved for the PSBL, whose Board

members have significant collective experience in public safety operations across police, fire, emergency medical services, transportation, and encompass representatives from local and state agencies. The Commission should refrain from a role of public safety systems engineer, network manager or operator.

Similarly objectionable is the suggestion that the PSBL spectrum be abandoned to the D Block licensee in areas where there is no public safety agency participation in subscribing to service. Such a step would raise numerous concerns. It would be completely counter to the concept of the public private partnership providing service. An astute operator could gain control of additional spectrum simply by not providing the public safety community with services that would attract agencies as customers on the network. There would be legal ramifications to such a spectrum reallocation, especially in light of the Congressional direction that 24 MHz of the 700 MHz band be allocated for public safety use. It is reasonable to provide the public private partnership discretion to make agreements with state and local agencies or defer deployment for a period of time. Yet the critical responsibility of pursuing and promoting a public safety network much remain intact. Surrendering the public safety spectrum to commercial interests contradicts this core objective

Assuring Most Favored Nation (MFN) rates of a commercial network to small or large agencies provides no meaningful assurance that public safety needs would be met. Instead, it will establish the clear direction that the network will be commercial in character and that public safety will only benefit from arrangements afforded the best commercial customer. The network will be used by agencies if it provides advanced services in the public safety environment at a reasonable cost. MFN would simply avoid the complex challenge of deploying a network that serves both commercial and public safety interests and ignores the need to balance of the equities

involved. The inevitable result is that the network would default to commercial grade service only.

It is this area where the PSBL has a significant responsibility. It must comprehend the cost of deploying and operating the network to the D Block Licensee, taking into account and reduction in reserve price, default penalty and the value of access to the public safety segment. It must pursue participation of all agencies and work with the D Block licensee to obtain such. Concepts such as MFN remove public safety from this important role and should be rejected.

Access by Critical Infrastructure Industries and Federal Agencies

The *Second Further Notice* analyzes the legal issues surrounding critical infrastructure industry use of the network. It suggests removing from the PSBL authority to provide these entities access to the network if defined eligibility requirements are not met. The *Second Further Notice* also suggests that federal agencies, to obtain access to the network, be treated as commercial customers of the network.⁷

NPSTC's position with regard to critical infrastructure entities and federal agency participation is a balance of several interests. The first is that there be adequate capacity for local and state agencies prior to providing access to others, and provisions ensuring that such capacity is maintained. There is also a need to comprehend the roles of these entities in an emergency. There are common situations across the country where restoring critical infrastructure – gas, electric, water, transportation or telecommunications- is at least as important as public safety use. A lack of power and/or connectivity means that many mission critical voice systems are, or soon will be, off the air completely. There are also circumstances that, without the gas, electricity or other service being shut off, response is hindered considerably. Priority-based access needs to

⁷ *Second Further Notice* at paragraph 126.

be flexible and managed real-time, allowing the subscribers who are critical to the operation at hand, whatever and whomever that might be, use of required network resources.

It is promoting interoperability to the broadband network, as well as access by state and local agencies to federal networks, that NPSTC believes will be served by federal agency access. The 700 MHz public safety broadband network should reflect the much envisioned objective of interoperability across all levels of government during an emergency. Access by either federal agencies or critical infrastructure would be directed to emergency circumstances and not general use of the network. It will require ensuring on a continuing basis that state and local agencies have adequate capacity and being able to take appropriate action if such becomes challenged.

NPSTC recommends that the Commission parallel the core concept of its rules contained in section 90.523. That provision recognizes that critical infrastructure entities that are state or local government agencies may be licensed. It would allow access for Non Government Organizations (NGOs) that have the support of the relevant local or state government agency and the PSBL. Federal agency access would be approved by the PSBL, in coordination with the state or local agency. To protect the capacity requirements of local and state agencies from being depleted, access would be conditioned on continuing support from the local agency.

V. The Public Safety Broadband Licensee Must Have the Authority to Promote and Protect Public Safety. The Public Safety Spectrum Trust Corporation License Should be Affirmed

The Commission established the Public Safety Broadband Licensee as the entity responsible for administering the 763-768/793-798 MHz band. The PSST was granted the PSBL license and the public partner responsibilities in negotiating with the D Block licensee. In this role the PSST is to represent public safety agencies. The Commission set the organization structure and criteria of the PSBL based on a not-for-profit model. It conducted an open

proceeding to select the PSBL. On November 19, 2007, the Commission designated the PSST as the PSBL. No funding or funding mechanism was provided the PSST to fulfill its responsibilities.

The *Second Further Notice* presents questions challenging the Commission's decision to establish the PSBL and the authorization granted to the PSST. It asks questions about the possibility of rescinding the PSST's license. At the extreme, it proposes that the D Block licensee be substituted as the entity with the direct relationship with local and state public safety agencies.

These questions essentially abandon the premise that public safety will have an ongoing role in a nationwide broadband network serving its requirements. By following this path, the Commission will reverse its commitment to a "centralized and national approach to maximize public safety access to interoperable broadband spectrum in the 700 MHz band."⁸ Eliminating or eviscerating the PSBL as the *Second Further Notice* suggests leaving public safety without a capable and accountable representative. The PSBL must have adequate resources and independent responsibility to represent public safety in managing the network. This includes negotiating and ensuring compliance with the Network Sharing Agreement (NSA) and incident management requirements, and promoting local and state public safety agency use of the broadband network. This role cannot be fulfilled by the D Block licensee.

The Commission found that the PSST meets the standards it had established for the PSBL, including specific recommendations by state and local agencies and a charter demonstrating its non-profit character. Less than six months later, the *Second Further Notice* proposes to constrict the PSBL from whom it may deal with and how it makes its decisions.

⁸ *Second Further Notice* at paragraph 24, *Second Report and Order* at paragraph 365.

Further, it proposes limits on where the PSBL may obtain resources needed to discharge its duties.

The PSBL is not a mere overseer of the D Block licensee's implementation of the NSA. It is the D Block Licensee's partner in the nationwide broadband network. It must have the discretion, resources and expertise equal to the responsibility accompanying the deployment of a national broadband network. The Commission cannot eliminate public safety participation in managing the network. This would place such authority solely in the hands of the D Block licensee. To weaken the PSBL will weaken public safety's involvement, acceptance and ultimately its participation in the nationwide broadband network.

The *Second Further Notice* ignores several realities. The first is the lack of any financial support for the PSST to carry out its initial responsibilities and the depth of the challenge it faced in adequately preparing to meet its objectives. These responsibilities include influencing the technical parameters of the network, attracting competitors to the D Block auction, negotiating an NSA and implementing the narrowband relocation. These are technically complex and proper results affect the credibility of the entire public private partnership endeavor. The arrangements to meet these responsibilities should be managed not only in the reality of the limited alternatives available, but more importantly in the context of the breadth of one of the largest telecommunications projects ever commenced. The PSBL must have the ability and the resources needed to do its job effectively-- bring broadband service to the public safety community.

References to the Universal Services Fund and the Telecommunications Development as a source of possible support to the PSBL add layers of legal complexity. The revenue base of these funds is already subject to varying constraints and demands, if not controversy. NPSTC

recommends that only if these issues can be resolved and a more definitive view of the level of funding either fund could provide, should these alternatives be pursued. The risks associated with these alternatives appears to outweigh any potential benefit.

If the PSBL is to represent and serve public safety, it must be able to call on a range of advisors, technical, financial, management and legal, particularly those that have experience in the telecommunications markets. This is an enormous undertaking and one reflecting the responsibilities of a license for 10 MHz of valuable spectrum. The experience and expertise in deploying and operating wireless communications networks is a narrow field; NPSTC knows of none emanating from the not for profit sector and few, if any, that have no affiliation with a large holder of current spectrum. The PSBL should have the ability to select its advisors to discharge its duties effectively. To do otherwise would severely handicap the PSBL in representing public safety.

The Commission should recognize that nonprofit entities, both private and government, pursue revenue directed efforts to support their mission. Non profit entities have established and long term relationships with the commercial sector. These include universities, hospitals, museums and religious institutions, all of which assist the government in meeting critical responsibilities. Virtually every association represented on the PSST's Board of Directors has relationships with commercial interests and generates income to support its efforts. These range from training and frequency coordination, to publishing resource and educational materials. The tax laws, enforced by the Internal Revenue Service and its state counterparts, have rigorous standards to protect against abuse in the not-for-profit sector.

The same is true of government entities. Local, state and federal governments operate utilities, airports, seaports, recreational facilities and other entities that generate income to

finance capital and operating expenses. Each must draw on private sector for-profit entities to meet its responsibilities. The PSBL should be provided similarly wide discretion in how it conducts its responsibilities and with whom who it does business.

The *Second Further Notice* proposes to realign the organizational structure of the PSBL⁹ to require unanimous voting and to invoke additional Commission oversight via approval of specific matters. NPSTC urges the Commission to be guided by the premise that the PSBL have operational procedures that enable it to function effectively. The Commission's oversight should be directed to ensure the PSBL's process results in the handling of relevant issues, the opportunity for debate, and the generation of sound and fair decisions. Unanimous rules do the exact opposite. They place in the hands of one or a few the ability to thwart the best ideas and initiatives. They also dilute accountability of leadership and typically result in less action than needed to solve a problem.

The *Second Further Notice* proposal to place in state governments the operating and policy responsibilities now committed to the PSBL lacks any credible indication that it would work. The current environment indicates it will not. While states certainly have expertise in participating in the deployment of regional networks, without a reliable funding source, NPSTC knows of no state government willing to undertake such an endeavor. A national challenge such as a public safety broadband network that requires bridging numerous interests looks to the federal government for guidance and leadership. NPSTC believes the PSBL presents the most credible model to manage the process considering multiple interests and the goal of attaining nationwide interoperability.

⁹ *Second Further Notice* at paragraphs 49-50.

NPSTC urges the Commission to embrace a PSBL that is equal to the role of representing public safety in the nationwide broadband network partnership. It should have the ability to pursue relationships with commercial and other entities that promotes and ensures this core responsibility.

VI. The Narrowband Relocation

In the *Second Report and Order*, the Commission addressed the responsibility to relocate agencies already operating on the 700 MHz band narrowband channels. It established parameters for the PSBL to implement the process. Under the decision, narrowband operations in channels 63 and 68 and the upper 1 megahertz of channels 64 and 69 must be cleared no later than the DTV transition completion in February 2009. It also provided that the D Block licensee would pay for the relocations, but capped the cost reimbursements at \$10 million prior to obtaining an inventory of the equipment to be relocated. NPSTC has examined and documented the various issues impacting this task. There has been significant participation by agencies and manufacturers to move the effort forward.

Several matters have emerged that NPSTC believes the Commission should address. The first is the timing to complete the transition and the effect on agencies already operating on the 700 MHz narrowband channels. With no funding available and the D Block yet to be rescheduled, February 19, 2009 is not a reasonable deadline.

According to certifications and waiver requests submitted to the Commission, approximately 45 agencies operating on the channels were deploying their systems at the time the *Second Report and Order* was released. Several agencies need to continue deployment of

critical systems. Virtually all agencies require actual relocation funds to meet the relocation deadlines.

A number of public safety agencies have submitted waiver requests and/or *Petitions for Reconsideration*. NPSTC believes the Commission needs to bring clarity to the circumstances by understanding that the build out of systems is not a static process and by recognizing that the cost cap the Commission imposed must be adjusted if the circumstances of these systems are to be accommodated. A reasonable time period to complete the relocation, e.g., 9 months after the relocation reimbursement funds are actually available should also be established.

What has also emerged from the NPSTC work is that the \$10 million cost cap is inadequate. Discussions with the affected agencies, service providers and manufacturers indicate that the cap is off several-fold from what is required for full reimbursement and relocation. NPSTC believes that there is a need to obtain cost estimates directly from each affected agency and then to adjust the cap to cover those costs.

Significant analysis has been conducted by NPSTC and equipment providers on means to conserve resources relating to the relocation. This attention has been directed especially to the universe of vehicular repeaters which were not a part of the preliminary estimates. Vehicular repeaters manufactured and deployed under the previous 700 MHz narrowband band plan present a particular relocation challenge from a cost and engineering standpoint. Since there has been no standardized designated channels for vehicular repeater operation, units were designed and built to a particular agency's circumstances and particular channel situation. Relocation requires that a number of units be replaced or that major modifications be made, which will place

a substantial drain on limited relocation resources. Designating specific channels for vehicular repeaters so that the design can be more standardized may reduce costs.

On the assumption, not yet verified, that vehicular repeater relocation costs would be significantly reduced, NPSTC, with participating manufacturers and consultants examined several alternatives with regard to a standardized frequency assignments for vehicular repeaters. Each alternative was examined in the context of ensuring that the vehicular repeaters can coexist with adjacent operations, that cost reductions to the relocation process and public safety sector be meaningful, that flexibility be afforded agencies needing additional channels, that technology selection and a competitive environment not be constricted, and that future uses of the 700 MHz band be preserved. The following recommendations emerged from the analysis:

- Within the guard band established by the *Second Report and Order* (768-769/798-799 MHz) twenty 12.5 KHz channel pairs should be reserved for vehicular repeater operations. The 20 channels would be located at the upper end of the each guard band within the 250 KHz closest to the narrowband segment. Users would coordinate operations with the PSBL.
- Agencies needing additional channels for vehicular repeater operations would be allowed to pursue additional frequencies from the narrowband regional planning or state license channel allotments.
- The Commission's rules at section 90.535, which require digital modulation in the narrowband segment but allow mobile and portable transmitters to have analog capability as a secondary mode in addition to its primary digital mode would apply, as would rules at section 90.941 addressing power levels.

NPSTC is continuing to examine the degree of cost benefits this approach would provide.

In addition to vehicular repeaters, there are thousands of mobiles, portable and base stations deployed under the previous band plan that must be relocated. NPSTC believes the best way to address this issue is to require each agency subject to the relocation requirement to submit a specific cost estimate to the PSBL. Those estimates would be aggregated and a credible revised overall relocation reimbursement estimate for all agencies would then be available.

VII. The Technical Parameters of the Broadband Network

The *Second Further Notice* seeks to describe with greater clarity the responsibilities of the D Block licensee and the standards the network must demonstrate. NPSTC reiterates its position that the network must be capable of assisting public safety in circumstances where commercial networks fail. It is a reasonable premise that some of these requirements be phased in over a period of time to accommodate economic and other circumstances. However, the Commission should not abandon the requirement to meet public safety needs or dilute the PSBL's ability to negotiate credible agreements with the D Block winner.

It was with this objective that NPSTC undertook the study, analysis and discussions that culminated in its Public Safety 700 MHz Broadband Statement of Requirements (700 MHz SoR) for the nationwide broadband network.¹⁰ The 700 MHz SoR was drawn from the range of individuals who operate, service, and manufacture public safety communications systems. It was an open process and included input from public safety practitioners, service providers, potential D Block auction participants, and multiple manufacturers of both public safety and commercial communications equipment.

The 700 MHz SoR and the PSST's Bidder Information Document (BID) presented the parameters of how the network could deliver mission critical requirements. NPSTC urges the Commission to embrace the 700 MHz SoR as the starting point for detailing network requirements. The 700 MHz SoR is attached as Appendix A to become an official part of the record of responses to this *Second Further Notice*.

¹⁰ Public Safety 700 MHz Broadband Statement of Requirements – www.npstc.org.

In addition, NPSTC is providing responses to specific technical questions raised in the *Second Further Notice* and its Appendix.

1. Overall Technical Requirements and Priority Access

In paragraph three of the *Second Further Notice*, the Commission seeks comment on three technical aspects for the broadband network in question. Specifically, comments are requested regarding the overall technical requirements for such a network, rules governing priority access to the network during an emergency and performance requirements.

With regard to the overall technical requirements, NPSTC believes that the 700 MHz SoR released in November of 2007 addresses many if not all of the public safety focused technical requirements for a broadband network. .

It is worth mentioning, however, that the requirements given in the 700 MHz SoR are meant to be considered as negotiable. In fact, in the development of the requirements by public safety, it was understood that public safety was stating candidly what their requirements were with an understanding that in order for a public/private partnership to succeed, many of the details of the requirements would be negotiated as part of the NSA.

This is not to say that public safety has no expectation of meeting these requirements, but rather believes that the requirements could be met over a determined amount of time (i.e. not necessarily all requirements would be met on initial deployment of the network), or through some other negotiated mechanism. One such example is that the PSBL and the D-block auction winner can partner with state and local public safety agencies in an effort to meet desired requirements. In other words, as the 700 MHz broadband network is being deployed in a given metropolitan area, and the local public safety agencies desire more capacity, coverage, reliability, etc., the local public safety agencies can partner with the PSBL and the D-block auction winner

to help achieve these goals through funding, access to existing communications assets, or other partnering opportunities.

More in depth discussions regarding priority during an emergency and performance requirements will be found elsewhere in this response.

2. Interoperability

In paragraph five of the *Second Further Notice*, the Commission states that with the public private partnership it was taking an innovative approach towards addressing a vitally important problem: public safety communications interoperability. NPSTC agrees with this premise, and believes that there are several important factors that contribute directly towards working to address communications interoperability.

First, and most obvious, is that with a nationwide network where the method of accessing the radio network uses a common technology and spectrum, public safety users would have the ability, given proper consideration to authorization of resources, to roam from one jurisdiction to another, seamlessly communicating across the common platform. This is a significant change over today's land mobile radio environment where issues ranging from disjointed spectrum allocation, proprietary or legacy radio systems, or non-overlapping coverage can significantly hamper interoperability efforts.¹¹

Second, with the advent of a nationwide broadband network, emergency responders will gain access to advanced technology and application capabilities. A 2007 NPSTC questionnaire on wireless broadband (circulated to the public safety community, with more than 600 respondents) identified Push-To-Talk (PTT) and Geographic Information System (GIS) among

¹¹ NPSTC notes that over the past several years there have been advances in regional operability and interoperability through the increased deployment of P25 systems.

priority wireless broadband applications. Based on this response, the Department of Homeland Security (DHS) Office for Interoperability and Compatibility (OIC) launched the Radio Over Wireless Broadband (ROW-B) project to field-test the integration of new broadband PTT technology and GIS applications with existing land mobile radio (LMR) systems and standard operating procedures.

This project is one example of a way in which public safety can leverage a nationwide broadband network beyond its initial purpose. Emergency responders commonly use LMRs in portable handheld and mobile vehicle-mounted devices. Connecting PTT technology on broadband mobile devices with LMR will allow interoperability across different—and typically incompatible—types of communications systems, and more notably, demonstrate the feasibility of connecting the 700 MHz nationwide broadband network to public safety’s existing LMR systems for interoperability purposes. We note that such connections are expected to be generally under the control of individual public safety agencies which operate the LMR networks and therefore would not be an added responsibility for the D block auction winner. ROW-B also introduces broadband data applications, including real-time location mapping and location-based group calls. It will test these products for use by multiple emergency response agencies.

3. Types of Users/Timeframe

Paragraph 33 of the *Second Further Notice* requests information regarding what types of public safety users can be expected to use the broadband network in lieu of, or in addition to, their existing networks, and on what timeframe. This is a complex question, as many variables must be considered. For example, the performance requirements of the network will largely determine what kinds of applications/services can be deployed, which will certainly influence what types of users will join the network and when. Additionally, other variables such as

reliability, security, and even the form factor of the devices available will also impact the users' desire for such a network. From this perspective, it is not feasible to respond to this question because accuracy of such a response would be based upon too many assumptions.

However, another perspective does lend itself to worthwhile discussion, namely, what disciplines and what types of agencies can/would use this network. It is NPSTC's belief that all first responder disciplines will find value in a nationwide broadband network. Additionally, it is NPSTC's belief that agencies at all levels of government, i.e., local, state, tribal and Federal, will see benefit in participation. NPSTC also thinks that there would be benefit for secondary responders and organizations, such as public utilities and non government transportation entities, to participate in such a network, garnering not only interoperability with traditional first responders, but also widening the customer base for the system. Many public safety agencies already include such organizations in their statewide communications interoperability plans, and it makes sense that a new nationwide broadband network would reflect an extension of those plans and organizations participating. Clearly, careful consideration must be given to use of the network by non-traditional first responders, but we believe that wider participation cannot only be successful for all involved, but will also contribute to the success of the public/private partnership.

Paragraph 33 of the notice also requests what public safety communications functions are likely to migrate to a new broadband network, and which will remain on existing networks. For ease of reference, two tables from the 700 MHz SoR have been included in this section.

The first table, titled *Application/Service Class Schedule* shows a number of public safety applications that the user community desires for inclusion in the nationwide broadband network. The second table, titled *Application/Service Definition and Data Rates*, gives brief definitions of

each application/service listed and national data rates associated with such applications. Additionally, consideration was given to a timeframe in which these applications could be deployed. Many of these applications/services are already offered on existing commercial broadband networks, and as such, their inclusion in a public/private partnership is expected at the outset, as they will very likely be offered to the commercial users of such a network. Also, some applications may be better suited to using other delivery mechanisms, such as fixed video. While this is an important application for public safety, it might be more feasible to use 4.9 GHz or other transports, freeing up 700 MHz broadband spectrum for more dynamic wide area mobile use.

Lastly, while this list gives many examples of applications/services that public safety desires, it is by no means an exhaustive list. In fact, it is widely expected, and is already occurring, that given access to a resource such as a nationwide broadband network, there will be a staggering amount of innovative applications/services developed for the public safety community.

Table 1 Application/Service Class Schedule

Section 3.2 Requirement #	Application/Service	Quality of Service Class ¹²	Year 1	Year 4	Year 7	Year 10	PSBL/DBL
1	File transfer	5	X	X	X	X	
2	E-Mail	6	X	X	X	X	
3	Web browsing	6	X	X	X	X	
4	Cellular voice	0,2	X	X	X	X	Yes
5	Push to talk voice ¹³	1,2	X	X	X	X	Yes
6	Indoor video	4		X	X	X	
7	Outdoor video	4	X	X	X	X	
8	Location Services ¹⁴	3	X	X	X	X	Yes
9	Database transactions, e.g. RMS	5	X	X	X	X	
10	Messaging	3	X	X	X	X	Yes
11	Operations data	6	X	X	X	X	
12	Dispatch data	5	X	X	X	X	
13	Generic traffic	6	X	X	X	X	
14	Telemetry ¹⁵	3,5	X	X	X	X	
15	VPN traffic	3	X	X	X	X	

¹² This column maps directly to the classes of service defined in Section 3.3 of the PS 700 MHz BB SoR. Note that QoS Service Class does not imply important, but is instead used to set network performance parameters as defined in Section 3.3.

¹³ Typically commercial grade push-to-talk, not intended as a replacement for land mobile radio.

¹⁴ Location and presence information of first responders is highly sensitive data that many agencies feel should be only their control. There MUST be strong controls in place on the data stores such that agencies can control who has access to this information.

¹⁵ QoS Class 3 for real-time sensors such as biometric data, QoS Class 5 for non real-time sensors.

Table 2 Application/Service Definition and Data Rates

Application/Service	Description	Data Rate¹⁶
File transfer	i.e. to download such items as high-resolution images, GIS data, etc.	Greater than 256kb/s
Email		Less than 16kb/s
Web browsing		Greater than 32kb/s
Cellular voice	Analogous to today's cellular system capability.	4-25 kb/s
Push to talk voice	Analogous to commercial offerings, but coupled with group call capability.	4-25 kb/s
Indoor video	Indoor video is video that is transmitted from inside a building, whether it is surveillance or tactical video.	20-384 kb/s ¹⁷
Outdoor video	Outdoor video is video that is transmitted from the street, whether it is surveillance or tactical video.	32-384 kb/s ¹⁸
Location services	This includes location services for personnel as well as vehicles and other objects that public safety tracks.	Less than 16kb/s
Database transactions	This includes both remote databases (data that is not under the agency's direct control), as well as databases that are local.	Less than 32kb/s
Messaging	Instant messaging and SMS type services, both one-way and two-way.	Less than 16kb/s

¹⁶ These figures are per application flow. These data rates will be updated over time as public safety's use of broadband matures.

¹⁷ It has been noted that in order to meet public safety video quality needs, the data rate will likely need to exceed 64kbps.

¹⁸ See FN 17.

Application/Service	Description	Data Rate¹⁶
Operations data	This is a catch all for data that deals with the operations and maintenance of the network, i.e. over the air programming, remote client management, etc.	Less than 32kb/s
Dispatch data	This area primarily covers data as it relates to computer aided dispatching.	Less than 64kb/s
Generic traffic	This is a catch all for traffic that doesn't fall within any of the categories described above, and that generates less than 64kb of data per second.	Less than 64kb/s
Telemetry	Remote measurement and reporting of information for radio devices, vehicles, etc. Also includes sensors data such as passive chemical detection. Additionally, biometric sensors that require better network performance are also included in this application class.	Less than 32kb/s
Virtual Private Networking		Less than 64kb/s

(Notably, while the data rates given in the *Application/Service Definition and Data Rates* table above may seem low comparable to what commercial broadband services supply today, they represent minimum data rates for public safety. For instance, with respect to video, the Public Safety Statement of Requirements published by DHS OIC only recommends 384kbps on systems with no loss, where in a wireless environment; the video data rates required are 768kbps - 1.5mbps.)

It is important to note that, while push to talk voice is included in the list above, it is not intended to act as a replacement for public safety's land mobile radio systems. That said, it is well known that many first responders carry and use cellular services during their day-to-day operations. It is certainly expected that push to talk services on a new nationwide broadband network could replace such use of existing commercial cellular networks, providing an alternative with priority, increased reliability compared to commercial grade networks, etc.

The last question in *Second Further Notice* in paragraph 33 is what factors local jurisdictions will weigh when making decisions regarding the migration of their broadband needs to a new nationwide network. Certainly the cost of such a network will weigh largely on that decision making process. Also, the reliability, security, and available applications/services will also play an important role. In discussions with many practitioners, the importance of cost and reliability feature most prominently as factors in the decision making process.

4. Interoperability Between the Broadband Network and Existing Voice and Data Systems

Paragraph 34 of the *Second Further Notice* requests comments on the extent to which the public safety broadband network will or should be interoperable with existing voice and data networks. NPSTC has performed extensive research on the necessary ability to interoperate existing public safety communication systems with the 700 MHz broadband system. The results of the NPSTC 700 MHz Questionnaire¹⁹ showed that 96% of public safety users were willing to share infrastructure. Additionally the conclusion drawn from these results were that, “Interoperability is key to managing the limited resources for public safety (spectrum & money)”. It allows for seamless roaming and leverages the economies of scale for low cost commercial devices.

The other results of the Questionnaire showed that the top applications by far were Push-To-Talk Voice and Geographic Information Sharing. Voice data accounts for nearly all the communication on public safety radio networks (LMR) and the DHS OIC realized the

¹⁹ www.npstc.org – Denver Meeting June 11-13, 2007 Interoperability – Olbrich – NPSTC 700 MHz Questionnaire Results IO-0061A

importance of this. The DHS OIC has been working on a project called Radio Over Wireless Broadband (ROW-B)²⁰. The high level goals of ROW-B are to do the following:

- Provide PTT on a wireless broadband network – high quality, low latency, over multiple devices
- Integrate location based services via GPS/AGPS – so PTT users are show in real time maps
- Integrate the broadband PTT with existing LMR networks via a standardized Bridging Systems Interface (BSI).

This technology leverages the latest advancements of wireless broadband and allows it to communicate to nearly any LMR network (analog, digital, trunked, conventional). Public safety can now extend the capabilities of their existing networks and truly have interoperability between broadband and LMR. NPSTC encourages the use of the BSI v1.0 as the minimum gateway criteria for broadband and LMR interoperation. As noted in section (2) on Interoperability, such connections are expected to be generally under the control of individual public safety agencies which operate the LMR networks and therefore would not be an added responsibility for the D block auction winner.

The Commission also asks for comments on multimode handsets. There are several limiting factors that determine the availability and viability of such devices, e.g. cost, frequency band, clock speed, manufacturing volume. Most chipset manufacturers are creating multimode chipsets that support the multiple air interface technologies (EVDO, GSM, WCDMA) over multiple frequency ranges. The cost and complexity of these most advanced chipsets usually limit their implementation to only high end handsets. Within the USA, the two prevailing technologies are either based upon 3GPP or 3GPP2 (GSM/WCDMA & CDMA). Agencies across the nation are using these commercial services in addition to other technologies such as

²⁰ More detailed information available at <http://www.safecomprogram.gov/SAFECOM/press/default.htm>.

iDEN. Unless the Commission mandates a technology choice, it is unknown what or how many “modes” a device would need to support or if that is even a good decision if the technology is an outdated one. Additionally there may be requirements for support of satellite or non-terrestrial broadband levied that introduces more of the same cost and complexity issues stated before. It is highly probable that any devices manufactured for the 700 MHz D block will be multimodal and therefore this should be a negotiable item in the NSA.

The use of 10 versus 20 MHz of spectrum has several factors that can affect the throughput. These variables include but are not limited to:

- Technology – e.g. WiMAX, LTE, EVDO, HSPA
- Carrier Bandwidth – 1.25, 1.4, 3, 5, 10 MHz
- Guard Band – Different for each technology and carrier bandwidth
- Single User versus Multiple Users – loaded versus unloaded
- Modulation per technology revision – depending on what technology choice and the given version of technology it can utilize QPSK, 16 QAM, 64 QAM
- Code rate per modulation implemented – different rates for forward error correction (FEC) are possible for multiple technologies
- MIMO implementation

Due to all these variables, the term throughput is often abused and used as a marketing tool to promote a specific technology. The future of fourth generation communications is quickly migrating down the same path towards the implementation of Orthogonal Frequency-Division Multiplexing (OFDM/OFDMA). 3GPP/LTE, 3GPP2/UMB and WiMAX and will all utilize similar downlink modulation schemes and thus the bits/Hz will provide sufficient throughput for public safety. As technology improves and throughput increases, public safety will benefit directly. The entire network and ecosystem for a particular technology should be the considering factor and not purely on the greatest bits/Hz.

One unintended consequence of utilizing a 10 MHz carrier (thus using the entire 20 MHz of spectrum) is when system upgrades happen. As technology changes, the air interface may

change and not be backward compatible with the older technology or the D Block network operator may change technologies for some reason (financial, technical, buyout). For instance T-Mobile recently won a significant amount of 1.7 GHz spectrum in the AWS auction. The main thrust for this was due to the fact that T-Mobile did not have enough room for the 5 MHz bandwidth that 3GPP/WCDMA upgrades require. Nearly all of their subscribers had GSM phones with no WCDMA multi-mode functionality. This caused it to have to pursue new spectrum just to deploy 3G services and keep up with the pace of competition. Newer technologies, “soft” upgrades, backward compatibility and multi-mode handsets can all mitigate this but it is something the Commission should consider when creating new rules.

NPSTC wants public safety to utilize the spectrum in the most efficient manner, consistent with meeting operational requirements. We also realize the network design is a complex mechanism and suggests that the NPSTC 700 MHz SoR v0.6, Section 6.2 System and User Coverage, Capacity and Data Rate be utilized by the Commission as a reference and minimum starting point for required specific data rates. These could then be aggregated into a single or overall sector throughput number.

5. Architectures of Public Safety vs. Commercial Systems

Paragraph 64 of the *Second Further Notice* requests comments on whether any changes to requirements are needed to reflect the practical differences between the architecture of traditional local wireless public safety systems and that of nationwide commercial broadband network systems. NPSTC strongly believes in a common and/or standardized method for the implementation of the broadband network architecture. If local or state municipalities deploy their own networks in the absence of a nationwide framework, interoperability may not occur. Full seamless system interoperation can only be achieved effectively at the physical layer.

Thus, a common air interface and network architecture needs to be utilized. Commercial carriers each utilize multiple infrastructure and subscriber equipment but they all share a common air interface. The D Block winner will likely determine the technology utilized which will recognize the public safety requirements; this should become the minimum standardized network implementation following industry best standards practices. We note that the D Block winner could also attain economies of scale by deploying technologies consistent with those chosen by the licensees of the C block and other 700 MHz blocks who have spectrum configured as FDD like the PSBL and D blocks.

6. Prioritization, Standards and Mission Criticality

Paragraphs 65-67 of the *Second Further Notice* raise a number of questions encompassing prioritization, public safety standards, differentiation between public safety and commercial networks, the relationship between operational and technical requirements and the differences in mission-critical and non mission-critical communications.

The use of priority, quality of service and pre-emption are all very closely linked and not necessarily defined the same by everyone. Sections 6.6 and 6.6.1 of the NPSTC 700 MHz SoR have extensive explanations of the suggested requirements regarding priority, QoS and pre-emption.

Applications such as voice and real-time video have stricter latency and jitter requirements than best effort data such as email or web-browsing. QoS can be used on packet data networks to differentiate this traffic and place commitments on packet delivery. An example of sufficient commitment guarantees would be that voice quality will meet some quality criteria; e.g. Mean Opinion Score (MOS) equal or greater than 3.0. In order to guarantee delivery of data packets to the end user the network must utilize end to end QoS – this includes the radio link all

the way through the IP core.²¹ Each of the primary access technologies (3GPP, 3GPP2, WiMAX) all support priority and QoS within their respective standards but they each have specific mechanisms for this.

To properly manage QoS on the air interface, the network in general should support the management of the following:

- Packet scheduling and/or resource allocation
 - Maximum delay
 - Maximum delay variation
 - Maximum packet loss rate
- Traffic conditioning via admission/congestion control
 - Sufficient minimum bandwidth

Within this framework the network should then support both application and class based QoS. Although similar in that multiple QoS flows must be supported, application type QoS would be pre-defined (user settable presets) for various applications like PTT voice, video streaming and the like. Class based QoS essentially creates user based QoS classes, where users can be assigned different QoS levels.

Within the IP core network the concept of QoS must also be supported. Mechanisms such as IEEE 802.1p, DiffServ, Multiprotocol Label Switching (MPLS) and IP Multimedia System (IMS) all support QoS by different methods. In general the IP core should support some sort of policy decision function (PDF). This would allow for packet classification - class-based traffic separation. It would additionally include some method for separating QoS and/or service classes. The IP core network would then need to be integrated with the RAN to ensure packet delivery.

²¹ See Appendix response section entitled Capacity, Throughput and Quality of Service

If packet data traffic is exiting the IP core network to some destination such as the internet, then the issues become nearly impossible to manage and thus cannot be managed properly without QoS.

Meeting the QoS packet delivery commitment ensures the needed voice quality, even when the network is under heavy load. Without the QoS commitment, larger jitter buffers are required which lead to longer delay, poor sounding voice, poor video quality. This is especially true in a loaded network.

Cellular networks that support QoS work as follows:

- The application requests a QoS reservation for a specific QoS level (bandwidth, delay, delay variation, and packet loss).
- The request is either granted or not (or counter offer).
- When granted, a data session (voice, video...etc) can be established that will have the desired quality metrics.
- The network can revoke a QoS reservation, e.g. due to user leaving a coverage area with the necessary network resources.
- The application must monitor this and act accordingly, e.g. ending the voice session or switching to an alternative network means.

The Commission should note that end-to-end QoS is a very difficult and complicated feature to implement. To date NPSTC does not know of any commercially deployed networks that have enabled end-to-end QoS. However, this type of functionality is something that NPSTC requires eventually in the system to support public safety. QoS is one of the key features of the 700 MHz network that differentiates public safety users from commercial users. The technology standards provide full end-to-end support and therefore are not the limiting factor. By designing a 700 MHz network from the ground up with QoS as a key feature, public safety can be one of the first widespread users to utilize the full capabilities of QoS. In turn it is likely that public safety will not require all the QoS classifications and they could potentially be utilized for commercial user applications.

Regarding operational capabilities for the network, section 4.2 Application/Service Schedule of the NPSTC 700 MHz SoR v0.6 has very detailed information regarding applications and services for public safety. It goes into detail regarding who is responsible for the deployment of the application and the various QoS levels for each application or service. Also please refer to our comments on paragraph 34 of the *Second Further Notice* regarding the DHS OIC ROW-B pilot project and the utilization of VOIP, PTT and GPS.

Besides QoS, the other key feature that should be required on the 700 MHz broadband is the ability to communicate one-to-many. Currently most cellular type mobile networks are unicast in design. This means that a discrete channel or set of codes is assigned for call setup, traffic and teardown for each individual user in the network. Public safety communication systems are typically broadcast type networks with individual channels/talk groups where user communications are broadcast to everyone. Broadcast communications are also beneficial for emergency purposes in notifying both public safety and commercial users for potential threats (e.g. fire, tornado, chemical attack). However, unicast type call setups are not efficient in this manner and other than mobile TV, broadcast capability must be implemented. We note that multicast does provide some benefits in helping operators manage capacity efficiently on the network.

Current “3G” network standards such as 3GPP, 3GPP2 and WiMAX support such broadcast communications. (NOTE: Terms such as multicast and simulcast can be considered synonymous with broadcast.) 3GPP identifies this technology as Multimedia Broadcast Multicast Service (MBMS). 3GPP2 calls this functionality Broadcast Multicast Service (BCMCS). WiMAX uses the term Multicast and Broadcast Services (MBS) for this service and is based off of 3GPP MBMS but it is currently developed to a lesser state than 3GPP or 3GPP2. All of these

technologies allow for data, on the downlink (forward) only, to be delivered to one or more users in one or more cell sectors of a network. Subscriber devices that are programmed to listen to the specific “cyclic prefix/timeslot” can all receive the same data messages simultaneously within a sector or network. The data rates on the broadcast channel can vary according to the network and even support up to 200 kbps, which would be enough to send most data, including high quality video feeds or pictures (mug shot).

However, these features have not been offered or made available on any networks in the USA for a variety of reasons.²² One of the primary decisions for not deploying multicast/broadcast technology is that actual commercial user application(s) do not exist. The largest broadcast cellular feature is mobile TV, which is broadcast via a separate network called MediaFLO.²³

NPSTC supports the notion of incorporating satellite or other non-terrestrial networks in at least one handset. However, there are at least six competing satellite and non-terrestrial technologies that are available or will be shortly.²⁴ These technologies are all proprietary in nature and therefore it would be difficult if not impossible to mandate a specific technology without further research. A potential way to let the market decide this is for the Commission to provide some sort of incentive for the 700 MHz broadband subscriber unit manufacturers and satellite/non-terrestrial to create partnerships.

Currently one of the leading cost factors in operating expenditures (opex) for cellular and wireless providers is backhaul to cell sites. Leased lines such as T1’s can cost anywhere from

²² KDDI in Japan has deployed BCMCS with limited user applications - http://www.kddi.com/english/corporate/news_release/2006/0822/index.html

²³ MediaFLO and MediaFLO USA are Qualcomm developed technologies.

²⁴ Satellite and non-terrestrial vendors noted are: Terrestar, MSV, Inmarsat, Iridium, Globalstar, Space Data

\$300 to well over \$1000 per month. The capacity of a T1 is approximately 1.544 Mbps and current 3G cell sites require anywhere from three to six T1's per site (higher capacity and multiple frequency sites require more and the need will grow linearly with newer 4G technologies). Where public safety 4.9 GHz spectrum is not being used, is not planned for use by licensees in an area as originally envisioned, or where the interests believe it possible for two uses to coexist, portions of the 4.9 GHz band for point to point or point to multipoint microwave backhaul can be deployed in a manner that is mutually agreed by 4.9 GHz licensees in the relevant area.²⁵ At a conservative 1 bit/Hz data rate,²⁶ enough capacity should be available in whole or part for the D block to use for backhaul. NPSTC urges the Commission to provide the PSBL with authority to coordinate the interests of agencies using 4.9 GHz with these backhaul purposes. Where this spectrum is available, it would provide one example of a cost incentive public safety agencies could provide for implementation of the nationwide broadband network.

The 700 MHz commercial network will likely be similar in design and functionality of today's current commercial networks. This type of service will likely meet the needs of non-critical public safety communications. However, the key factors that differentiate the crucial public safety aspects of the network are:

- End-to-end QoS
- Multicast/broadcast capabilities
- Enhanced availability (discussed in this document)
- Enhanced site hardening (discussed in this document)
- Coverage

²⁵ Pending before the Commission is its proceeding addressing several Part 90 provisions of its rules, including NPSTC's position regarding clarifying use the 4.9 GHz band, and which presents a vehicle to address this issue. In the Matter of Amendment of Part 90 of the Commission's Rules, *Notice of Proposed Rulemaking*, WT Docket No. 07-100, FCC 07-85 (May 14, 2007).

²⁶ Estimated Microwave backhaul capacity is around 15-20 Mbps per 20 MHz of spectrum.

These enhancements not only will give public safety the very best possible broadband network but will also create a robust and feature rich commercial network with potentially and significantly enhanced commercial customer features. This will ensure a level of availability and features that currently are not available on commercial networks and help to ensure commercial and public safety subscriber uptake when the network comes on line.

7. Network Robustness and Hardening

Paragraphs 75 and 76 of the *Second Further Notice* pose a number of questions regarding robustness and hardening of the network. Network hardening is a key aspect in creating a robust infrastructure for public safety. NPSTC created separate categories for the cell site and network elements in section 3.3.2 Hardening Requirements of the NPSTC 700 MHz SoR.²⁷ Additional comments are also included in this response in the Appendix response section called Reliability.

Public safety envisions that this network can eventually be used for mission critical situations. As such public safety requires that the broadband communications system harden its network to a level beyond typical commercial systems and in line with today's modern LMR networks. NPSTC recognizes that in order to achieve this goal, there will likely be a phased approach to hardening the sites, as an expectation of hardening every site at the beginning is not economically feasible. Our "requirements" were specifically created as guidelines and are focused on achieving a network that is better than the current commercial networks, with the expectation that the system will move towards mission critical usage over time.

NPSTC fully understands the need to have a hardened network and that it can be a huge cost driver. Therefore the requirements should be negotiable with the D block, phased in over

²⁷ NPSTC SoR version 0.6 sections 3.3.2 Hardening Requirements, 3.3.2.1 Cell Site Hardening Requirements, 3.3.2.2 Other and General Hardening Guidance

time and there should be a process to allow local/state municipalities the ability to “upgrade” the hardening of the sites in coordination with the PSBL and D block winner requirements.

8. Capacity, Throughput and Quality of Service

Paragraph 77 of the *Second Further Notice* request comments on capacity, throughput and quality of service. NPSTC created the 700 MHz SoR as requirements to help aide the Commission and D block bidders in defining the rules for the D block. The requirements are a starting point for the discussion and negotiation for comprehensive system requirements but they are not “final end all” requirements for all of public safety. The 700 MHz SoR addresses many of the concerns by the Commission in the following 700 MHz SoR sections:

- Section 6.1 Coverage Morphologies and Section 6.1.3 Coverage create categories in which RF coverage areas are defined and the coverage required for each of those defined areas
- Section 6.2 System and User Coverage, Capacity and Data Rate addresses the minimum required throughput for the aforementioned coverage areas
- Section 6.4 Capacity - splits up the general capacity requirements of the RAN and IP core networks.
- QoS is also addressed previously within this document²⁸ and in sections 4.3 Quality of Service Classes, 4.4 Network Performance Values for Quality of Service Classes and Section 6.6.4 Quality of Service
- Network monitoring and much more detail can be found in Section 3.3 Access and control, Section 3.3.1 Notification and Informational

9. Power Flux Density

NPSTC has proposed and supported the original power flux density requirements in the order. The PFD requirement should be retained, as it is there to provide an environmental baseline for which systems can be designed in order to manage the coexistence of various types of system. All of the notifications should also be retained without any redefinition (e.g. the 1kW/MHz proposed by Verizon), as these notifications serve as a proactive means to coordinate

²⁸ See Comments for paragraphs 65, 66 and 67

operations such that interference can be avoided before it happens. NPSTC is concerned that going to a 1kW/MHz allowance for coordination could increase the PFD radiated by a C Block Licensee into a public safety receiver by as much as a factor of ten.

10. Determining What Constitutes an Emergency

The comments provided for paragraph 65, 66, and 67 go into great detail about QoS and to other sections throughout the document. To reiterate, technology can now allow QoS and priority services on a per user and per application basis. The networks of tomorrow will have the further ability to control bandwidth allocations on a per sector basis.

NPSTC agrees that there should be governance rules in place (similar to NIMS) for emergency communications. This framework would be dynamic in nature in that priority can be granted very quickly and taken down just as fast. However it is the understanding of NPSTC that public safety will always have priority access to its allocated bandwidth (10 of the 20 MHz).

The term “ruthless pre-emption” is often used by public safety to define when lower priority users are removed from the system and higher priority users are allowed access. Again, technology now can create a “graceful” shedding of commercial bandwidth in lieu of pre-emptive communications as necessary. Pre-emption does not and should not be an “all or nothing” designation. Thresholds for allowed access by commercial customers could be set at pre-determined or possibly dynamic thresholds. This would allow for commercial traffic to still be available but give public safety the priority bandwidth it requires.

It should be noted that AT&T Wireless will complete its 3G nationwide rollout near the end of June, 2008. AT&T currently supports approximately 56 million voice and 3G subscribers nationwide on multiple bands. AT&T is using 3GPP (HSPA – High Speed Packet Access) for its network and it is entirely deployed on a single 5 MHz paired carrier (10 MHz total) in one

band. The level of likely usage of video and data by each subscriber compared to likely public safety usage levels is unknown, as is which portion of the overall 56 million subscribers are 3G network users. However, NPSTC believes the AT&T situation provides a good indication that the needs of the approximately 5 million public safety users is likely to be met on the 5 +5 MHz of spectrum licensed by the PSBL, at least for some number of years. Therefore, NPSTC believes that pre-emption of commercial customers would likely occur only in rare catastrophic cases, especially in the early years of network deployment. Also, public safety will do what it can to preserve capacity resources yet enable public safety users with sufficient priority access for its mission critical needs.

Appendix Comments

NPSTC will address specific issues included in the Appendix to the *Second Further Notice* and provide comments as necessary to those issues deemed important to the Commission. As stated earlier in this comment document, many of the technical requirements can be found in the NPSTC 700 MHz SoR.²⁹ NPSTC's end goal of creating a viable commercial and public safety broadband network should be understood throughout our responses.

A. Subscriber Devices

The *Second Further Notice* states that the network has “two general elements: (a) a Radio Access Network (RAN) and (b) a Core Broadband Network (CBN).³⁰” Although implied as part of the RAN, it is crucial to include requirements for end user/subscriber devices. NPSTC and public safety view the network as an end-to-end solution the will employ not only consumer grade devices (cell phones, smartphone/PDA) but also the potential for specialized devices.

²⁹ NPSTC SoR v0.6

³⁰ See *Second Further Notice* at page 79.

These include but are not limited to MIL-Spec 810x rated devices but specific devices for all the Emergency Support Functions (ESF) like fire, police and EMS.

Public safety should have the choice to deploy specialized devices and applications onto the network in an “open access” type of approach. (So long as the devices and applications meet the minimum technical requirements as determined in the NSA and/or PSBL and provide no harm to the network.) These devices will likely be in low volume due to their specific requirements for operation and are likely to be cost prohibitive for typical consumer use. Other devices such as remote sensors (chemical, fire...etc) or remote tracking should also be allowed on the network as they can provide superior situational awareness and are typically very low bit rate – thus requiring minimal system resources.

B. Engineered Capacity

The PSST currently holds the nationwide license for 5+5 MHz of broadband spectrum located at 763-768 and 793-799 MHz. Together with the adjacent D block which is also 5+5 MHz two contiguous 10 MHz paired blocks of spectrum would be available for the nationwide broadband network. Several different technology choices are available currently and new “4G” technologies are in progress and will be commercially available within 18 months. The simple chart below shows the carrier bandwidths required for each of these technologies require.

IEEE 802.16x – WiMAX ³¹	5 MHz – scalable to 10 MHz
3GPP - Release 6 – HSPA	5 MHz
3GPP – Release 7 – LTE	5 MHz – scalable to 10 MHz
3GPP2 – EVDO Revision A	1.25 MHz
3GPP2 – UMB	1.25 MHz – scalable to 10 MHz

³¹ NOTE: No profile exists for a FDD 700 MHz variant of WiMAX

Implementation of several advanced modulation (16 QAM) and coding (Reed Solomon) techniques are currently being used to increase throughput and capacity. As technology advances, this will allow more users and data per Hz. Additionally, due to the varying bandwidths and how the network is built out – dynamic mechanisms will need to be in place to ensure public safety priority is delivered on a per sector basis.

For instance, if 5 MHz carriers are used for the deployment, the network may have two 5 MHz carriers deployed in high density area's (urban, suburban) and then in low density area's (highways, rural coverage) the network may be built out with only one 5 MHz carrier to conserve costs. If the single 5 MHz carrier is built in the commercial D-Block – then according to the current rules, public safety would not get priority on the network. This unintended circumstance should be eliminated. In the case of emergency situations where public safety requires priority services - NPSTC recommends that dynamic bandwidth allocation schemes be deployed, as determined by negotiations between the PSBL and the D Block winner.

C. Priority and Quality of Service

On page 80 of the Appendix there are several areas of concern raised that NPSTC has regarding Priority, QoS and pre-emption. The Commission can refer to the QoS comments in the above sections Section 6.6 of the NPSTC 700 MHz SoR³² entitled Prioritization, Quality of Service, and Pre-Emption.

D. Availability and Hardening

Section 2.2 of the 700 MHz SoR directly addresses public safety mission critical availability requirements and Section 2.3.2 of the 700MHz SoR directly addresses hardening

³² NPSTC SoR v0.6 – www.npstc.org

requirements. Following the publication of the 700MHz SoR, NPSTC has had many further discussions regarding these two topics in particular, where those discussions have led to new thinking on these topics.

With regard to availability, the original requirements reflected in the 700 MHz SoR required 99.9% availability upon initial deployment of the network, with the intent to reach 99.995% availability over a period of ten years. These requirements were predicated on an understanding of public safety's current availability in their land mobile radio systems. Through many discussions, with both public safety and LMR manufacturers, we have come to the following conclusion: many of public safety's LMR systems are operating at levels of availability that rival today's PSTN, i.e. 99.999%, however, many of these radio systems weren't designed to operate at these levels. In fact, in discussions with several manufacturers, it became clear that many radio systems are designed to operate with 99.9% availability, while in fact operating well beyond this number.³³

Therefore, NPSTC believes that the requirement stated in the 700 MHz SoR reflects an inaccurate understanding of LMR availability at the time. NPSTC further recognizes that the availability requirement is a significant risk factor for a potential bidder in the D-block auction. Unfortunately, these realizations don't mitigate the fact that in order for public safety to find viable use of the network, it must reflect the mission critical nature of their duties. However, in order to make progress on this topic, some assumptions will be made in our proposal:

- Not all public safety agencies will require the same level of availability, where availability in a given jurisdiction should reflect both the agencies' use of the broadband network and current availability expectations based on their LMR systems

³³ It is worth noting that recent procurements are starting to require 99.99% availability or better in portions of an LMR system or in some cases the entire LMR system.

- In order to achieve the levels of availability that public safety ultimately requires, existing public safety communications assets such as tower locations and backhaul locations will need to be leveraged in a coordinated fashion between the agency, the PSBL, and the D-block auction winner. While true broadband operations will require more sites than current narrowband operations, site sharing can help minimize the additional resources needed
- In areas where the build-out of the network won't meet an agency's availability needs, the local public safety entity can participate by providing the incremental funding necessary to ensure the required service level availability

With these assumptions in mind, it is apparent that availability should be a requirement subject to negotiation between the PSBL, the D-block auction winner, and a jurisdiction with needs greater than a nationwide benchmark such as that suggested by PSST in the Bidder's Information Document (99.9%). While we understand that this still places uncertainty on this topic past the auction of the spectrum, a one size fits all approach simply isn't feasible, which is the only mechanism to make this topic moot.

With regarding to hardening, we re-state the relevant requirement and paragraph from the 700MHz SoR:

1. Requirement - Public safety desires and has a need for a nationwide broadband system to be useful for mission critical communications

In order to meet this goal, public safety requires that the broadband communications system harden its network with the same level of robustness as current public safety land mobile radio. The public safety community also recognizes that in order to achieve this goal, there will likely be a phased approach to hardening the sites, as an expectation of hardening every site at the beginning is not economically feasible. Thus, the requirements in this section are focused on achieving a network that is better than the current commercial networks, with the expectation that the system will move towards mission critical usage over time. The D-Block Licensee will be required to negotiate with the PSBL to establish a methodology and timeline for achieving these requirements

We believe that this statement is in line with the prior statement regarding availability, and as the two topics are inter-related, provides further clarity regarding NPSTC's suggestion regarding an approach to these requirements.

E. Real Time Information

NPSTC understands the need for the D block winner to provide adequate and timely information to public safety. As technology advances it will become easier for subscriber information (HSS, HLR, AAA...et al) and system information to be delivered in real time. The Notice requires information be available in real time, such as “Forecast future service needs” This could be a considerable amount of information and may not be required in real time. Section 3.3 and 3.3.1 of the NPSTC 700 MHz SoR provide details on the type of information and access required by public safety. NPSTC believes this should be the superset of parameters for access and administration.

F. Reliability

In addition to the comments NPSTC has provided for paragraphs 73 and 74 in this document the *Second Further Notice Appendix* presents a choice. It suggests that the Commission set the rules regarding system reliability and hardening or allow the D block winner to submit a plan to the PSBL and negotiate an agreement. NPSTC has no preference other than that a minimum set of requirements be created for the entire network.

Section 3.3.2 Hardening, and the subsequent subsections of the NPSTC 700 MHz SoR, were created as guidelines and not strict requirements due to our understanding that this can be and is a huge cost driver in deploying a network. We believe that requirements are not a “one size fits all” but should be tailored to the geographic (hurricane, wild fire and other natural disaster areas) and user (high threat/crime areas) needs.

This minimum set of requirements should include all the network components and best practices stated by the Commission and incorporate as best as possible the 700 MHz SoR

guidelines stated above. The use of emergency deployable cells, cell on wheels, femtocell technology can all supplement the system and are fully supported by NPSTC.

There should be provisions in the NSA that allow local/state municipalities to increase their system hardening and reliability. This would entail local/state municipalities raising their own funds or grant monies, submitting a RFP to the PSBL for the network changes and the PSBL coordinating this with the D block licensee.

G. Capacity, Throughput and Quality of Service

Section IV of the Notice Appendix asks for several comments regarding capacity, throughput and quality of service. The suggestion by the Commission to enforce these network features by requiring the “D Block licensee to anticipate public safety user needs during emergency and disaster situations...”, may be difficult to initially do since this has never been done before on a nationwide scale. To make such an onerous requirement to the D block may be counterproductive.

As stated above, NPSTC has no preference other than that a minimum set of requirements be created for the entire network. It does not matter whether this is the rule of the Commission or negotiated by the D block and PSBL. However, we would note that any necessary changes to the minimum requirements gained through experience are more likely to be accommodated through private negotiations than through a Commission rulemaking process.

Sections 6.4 Capacity, 6.2 Throughput and 6.6.4 Quality of Service of the NPSTC 700 MHz SoR all address the specific issues raised by the Commission.

The notion of 2% blocking rates is a term frequently and historically used in cellular communications. However, this is typically derived from a Poisson distribution of users (Erlang B) based on circuit switched voice technology. This network will be a packet switched

technology and therefore new methodology should be used to identify blocking at the RAN and CBN. Two percent blocking is usually acceptable in most cellular and land switched networks. This can be used for a baseline determination for the number of Erlangs for voice traffic and also the bandwidth needed to support that voice traffic.

Several questions are presented regarding the Commission's stance on Quality of Service. The Commission states that QoS is applied "...after the connection is established" but also goes on to state that QoS can be defined "in the advanced next generation technology standards (e.g., LTE and WiMAX Mobile)." NPSTC thinks this reference should be clarified.

NPSTC adheres to the fact that QoS is end-to-end and thus includes the radio bearer and setup. The QoS connections cannot be guaranteed unless you include the radio link. The wireless standards for HSPA, LTE, WiMAX and CDMA all include provisions for multiple QoS levels at the radio layer that can then be dynamically mapped to QoS on the IP and/or application layer.³⁴

H. Security and Encryption

NPSTC agrees with the Commission in general about Security and Encryption as stated in section V of the Notice Appendix. NPSTC has created an achievable and detailed plan surrounding this in section 5 Security Requirements of the NPSTC 700 MHz SoR. The D block winner and the PSBL need to respond to the requirements of the public safety user. A flexible

³⁴ See Comments addressing the *Second Further Notice* with regard to paragraphs 65, 66 and 67 for more details on QoS.

network, allowing for multiple agency levels of security, basically has three levels of security as follows:

- Open
- Off the shelf – consumer grade security
- Highly security sensitive – mil spec

Addressing all three levels will provide options ranging from open non-encrypted operations to situations such as access to the NCIC2000 database. This latter environment will likely require Federal Information Processing Standard- FIPS140-2- certified modules and user authentication.

I. Operational Control and Use of the Network

Page 88, Operational Control and Use of the Network

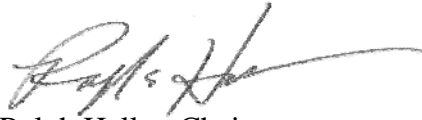
Section 3.3.1 Notification and Informational of the NPSTC 700 MHz SoR and other subsections directly address the issues raised by the Commission on page 88, Section VIII of the *Second Further Notice* Appendix. NPSTC recommends that the Commission carefully craft the rules to allow full negotiation of what information parameters require administrative and informational views.

In statement #2 on page 88, Section VIII of the Notice Appendix, the Commission makes an explicit core infrastructure requirement to support the Internet Multimedia System (IMS). IMS is being slow rolled into several cellular markets and is supported by 3GPP, 3GPP2 and the WiMAX Forum. However, it is unknown if the IMS service delivery platform will meet the needs for public safety users. It also may put an undo financial burden on the D Block winner to support an adjunct IMS system if they do not currently support one. NPSTC suggests that the network management system (NMS) and the application delivery platform used by the PSBL be a negotiable item and no technology specific mandate be made.

VII . Summary and Conclusion

The ability to improve emergency response and preparation, to ensure that public safety communications resources are equal to its enormous challenges, is dependent on the Commission's continued commitment to a national public safety broadband network deployed and operated by a public private partnership. The National Public Safety Telecommunications Council urges the Commission to continue to pursue this objective by maintaining the Public Safety Broadband Licensee's authority as it is licensed to the Public Safety Spectrum Trust. The Commission should provide rules and policies that bring clarity to the D Block Licensee. Abandoning this goal will be a serious detriment to public safety communications and its critical role in the nation's preparedness

Respectfully submitted,



Ralph Haller, Chair
National Public Safety Telecommunications
Council
8191 Southpark Lane, Number 205
Littleton, Colorado 80120-4641
866-807-4755

June 20, 2008

Appendix
NPSTC 700 MHz Broadband Statement of Requirements

(attached as a separate document)