

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of:)
)
Expanding Flexible Use in Mid-Band) GN Docket No. 17-183
Spectrum Between 3.7 and 24 GHz)
)
)

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

The National Public Safety Telecommunications Council (NPSTC) submits these comments in response to the Notice of Inquiry (NOI) in the above captioned proceeding.¹ The NOI seeks comment on the potential for additional flexible access, especially for wireless broadband licensed and unlicensed operations, in the 3.7 GHz to 24 GHz spectrum. The NOI seeks comment on three specific bands, i.e., 3.7-4.2 GHz; 5.925-6.425 GHz; and 6.425-7.125 GHz.

In these comments, NPSTC focuses on the 5.925-6.425 GHz band which supports microwave links used by public safety and critical infrastructure operations, and addresses the essential requirement to maintain reliability of systems in that band.

The National Public Safety Telecommunications Council

The National Public Safety Telecommunications Council 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

¹ Notice of Inquiry, *Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz*, GN Docket No. 17-183, released August 3, 2017.

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 16 organizations serve on NPSTC's Governing Board:²

- 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 Council of Statewide Interoperability Coordinators
- 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 for Interoperability and Compatibility, and the SAFECOM Program); Department of Commerce (National Telecommunications and Information Administration);

² These comments represent the views of the NPSTC Governing Board member organizations.

Department of the Interior; and the Department of Justice (National Institute of Justice, Communications Technology Program). Also, Public Safety Europe is a liaison member. NPSTC has relationships with associate members: The Canadian Interoperability Technology Interest Group (CITIG) and the Utilities Technology Council (UTC), and affiliate members: The Alliance for Telecommunications Industry Solutions (ATIS), Open Mobile Alliance (OMA), Telecommunications Industry Association (TIA), TETRA Critical Communications Association (TCCA), and Project 25 Technology Interest Group (PTIG).

NPSTC Comments

The Commission seeks comment on additional flexible use in certain bands in the spectrum between 3.7 GHz and 24 GHz. Specifically, the NOI seeks detailed comments on the potential to open the bands 3.7-4.2 GHz; 5.925-6.425 GHz; and 6.425-7.125 GHz bands for consumer unlicensed broadband operations such as WiFi, and for licensed broadband systems that would be deployed by commercial mobile radio service (CMRS) auction winners.

The NPSTC Comments will focus primarily on the 5.925-6.425 GHz (6 GHz) band that supports essential fixed microwave links for public safety and other critical operations. The NOI recognizes that this 6 GHz band already supports heavy fixed microwave usage of this band by these critical services:

The Commission's licensing records reflect that more than 27,000 licenses are issued for point-to-point operations in this band. FS operations support a variety of critical services such as public safety (including backhaul for police and fire vehicle dispatch), coordination of railroad train movements, control of natural gas and oil pipelines, regulation of electric grids, and backhaul for commercial wireless traffic.³

³ NOI at paragraph 25. [Original footnote notation deleted]

Such heavy usage should not be surprising. In the early 1990's the Commission reallocated another critical microwave band in the 1.8 GHz to 2 GHz range for emerging technology services and required public safety and other critical users to relocate from that band. The 5.925-6.425 GHz band now under consideration for "additional flexible use" is the home to which many of the microwave links were relocated, albeit at increased costs over the original 2 GHz links.⁴

The history at the former 2 GHz microwave band does not paint a positive picture of sharing spectrum between public safety and new incumbent commercial operators. In reallocating the 2 GHz band microwave spectrum for emerging technologies in 1992, the Commission initially exempted public safety licensees from involuntarily relocating their fixed microwave networks out of the band and indicated that public safety licenses would maintain a co-primary status with new emerging technology entrants. Negotiating relocation out of the band was encouraged but not required. By late 1994, just two years after the initial allocation decision, the Commission changed the provisions for continued public safety use of the 2 GHz band for essential fixed microwave links, in favor of allowing new PCS licensees into the spectrum. The erosion in protection for public safety is specifically summarized in the Commission's Second Memorandum Opinion and Order in the emerging technology proceeding:

In the First R&O, we exempted licensees of incumbent public safety facilities from involuntary relocation, but encouraged them to relocate on a voluntary basis when the spectrum is needed by an emerging technology provider. At that time we believed that adequate spectrum could be made available for services using emerging technologies through the voluntary relocation of incumbent public safety facilities. In the Third R&O, we maintained the public safety exemption, but clarified the definition of public safety. In the MO&O on our own motion, we concluded that PCS may be precluded or severely limited in some areas unless public safety licensees relocate; that in previous decisions we underestimated the difficulty that PCS will have in sharing spectrum with incumbent public safety

⁴ According to the NOI, the 5.925-6.425 GHz band also supports 1535 earth station licenses in the Fixed Satellite Service.

licensees; and that allowing all public safety facilities to remain in the band indefinitely would defeat our primary goal in this proceeding of providing usable spectrum for the implementation of emerging technologies. Consequently, we decided that it would be in the public interest to subject all incumbent facilities, including those used for public safety, to mandatory relocation if an emerging technology provider requires the spectrum used by the incumbent.⁵

This decision documents that in a previous proceeding involving public safety microwave links similar to those that now exist in the 6 GHz band, the Commission underestimated the difficulty in sharing spectrum and ultimately took steps to force public safety out of the band to benefit new entrants. A similar eventuality in the 6 GHz band would be very detrimental to public safety and the public it serves, as well as to other critical users who supply power, petroleum and transportation services essential to both public safety and the general public.

NPSTC believes that in evaluating any presumed potential for flexible use and spectrum sharing, it is essential first to understand the complexity of public safety microwave networks, as well as the significant risks to the public should interference to microwave links result. As an example, officials from Los Angeles County, California provided NPSTC information about its county-wide microwave network (LANET), supported by multiple microwave bands including the 6 GHz band. LANET consists of thirty-four primary tower sites and an additional fifty-six Fire Department and Sheriff's Department stations which are provided connectivity by these primary sites.

In addition to providing service to the Fire and Sheriff's Departments, LANET also provides transport services to the County Wide Integrated Radio System (CWIRS), a 800 MHz simulcast trunked radio system designed for disaster recovery as well as servicing the County's day-to-day operation for all the other public service agencies such as Department of Public Works, Paramedics radio systems, Department of Social Services, Parks and Recreation, Libraries, District Attorneys,

⁵ Second Memorandum Opinion and Order, ET Docket No. 92-9, released December 2, 1994, at paragraph 3.

Animal Controllers, etc. To accommodate the Los Angeles Regional Interoperable Communications System (LA-RICS), a grant funded multi-year, multimillion-dollar project, additional microwave paths are being added to the LANET.

The LANET microwave system and its supported radio systems provide first responder communications to the entirety of Los Angeles County as well as to the region once the LA-RICS mobile system is fully implemented. The County of Los Angeles is currently holding 120 active radio licenses authorized by the Federal Communications Commission to operate in this band to provide mission-critical services to a population total in excess of 10 Million citizens and visitors.

If the difficulty of spectrum sharing for flexible use or the resultant potential for interference is underestimated, catastrophic results could occur for public safety and the public it serves. NPSTC is also concerned that “spectrum sharing” to provide additional flexible use could eventually translate into “spectrum confiscation” eliminating a resource for public safety, as was done previously in the 2 GHz emerging technology proceeding.⁶

Even if public safety and other critical users are not forced to relocate from the band as occurred at 2 GHz, the underlying concept of flexible use and additional spectrum sharing presumes that new entrants must protect incumbent operations. NPSTC obtained information on the reliability required for public safety microwave links in the 6 GHz band from sample requests for proposals (RFPs) issued by jurisdictions for public safety use. The City of Houston specified a comprehensive set of design parameters in its RFP for a Digital Ring Microwave System used to support its trunked radio system.⁷

⁶ Public safety licensees received some funding assistance for the relocation, however, the spectrum resource was lost.

⁷ Section 5 of the City of Houston RFP.

Two of the RFP requirements that relate directly to system reliability are as follows:

All paths in the system, including rings and spurs, shall be designed for a minimum one-way path reliability of 99.9999% per year using the Vigants model in TIA TSB-10-F. The 10^{-6} BER receiver threshold shall be used as the outage point.

All paths in the system, including spurs and rings, shall have a required long-term, unfaded RBER (residual bit error rate) of $<10^{-11}$.

NPSTC also obtained information from the RFP issued by the County of San Diego for a Network Microwave Replacement to support the Sheriff's Department. Following are excerpts from Section 2 of the RFP:

2.3.6.2 Each microwave link shall be designed to meet or exceed a one way end-to-end annual reliability of 99.9999% (BER = 10^{-6}) at the required capacity.

2.4.3.2 TDM circuits shall meet or exceed the following performance criteria:

- 2.4.3.2.1 Reliability – 99.999%
- 2.4.3.2.2 Bit Error Rate – 10^{-6}
- 2.4.3.2.3 Error Free Seconds – 99.94%
- 2.4.3.2.4 Errored Seconds – 45/day
- 2.4.3.2.5 Severely Errored Seconds – 6/day
- 2.4.3.2.6 Bi-polar violations – 0/day
- 2.4.3.2.7 Transport delays – 5 ms
- 2.4.3.2.8 Frame Slips – 0/day

NPSTC is not clear how the Commission or the wireless industry could guarantee that an unlicensed WiFi device or a licensed CMRS device will not be operated on an upper story of an urban office building that happens to be close to a microwave receive site. As a result, it is not clear that the proponents of spectrum sharing could guarantee “no impact” to the reliability of critical fixed microwave links.

NPSTC has seen no technical study that shows unlicensed actually needs additional spectrum. The Commission points out in the NOI that unlicensed operations in the 5 GHz area already enjoy access to 580 MHz of spectrum. The NOI further indicates that some portions of the existing 580 MHz of unlicensed (UNII) spectrum at 5 GHz is less heavily used. Specifically, the NOI states

“...the most active use appears to have congregated in discrete portions of the bands not subject to dynamic frequency selection...”⁸ This leads to two presumptions: 1) that existing unlicensed bands could support additional operations without the need to encroach on spectrum used for critical public safety and infrastructure operations; and 2) that if the 6 GHz spectrum were opened for additional flexible use with a dynamic frequency selection requirement, it would be less desirable for unlicensed broadband operations.

NPSTC believes there is one additional key issue referenced in the NOI that bears on the potential for additional flexible use in the 5.925-6.425 GHz band. The Commission states “...NTIA has recently concluded that there is no viable solution for U-NII devices to share the 5.35-5.47 GHz band with incumbent Federal systems.” Further research indicates the Assistant Secretary of Commerce for Communications and Information stated the following on this issue:

We also have been examining whether we could meet industry's request for expanded unlicensed access in the 5 GHz band for Wi-Fi and other uses. For the 5350-5475 MHz band, or 5.3 GHz, we had to evaluate whether unlicensed devices could operate without degrading the performance of critical federal radars. Unfortunately, the methodical analysis we conducted in collaboration with federal agencies, the FCC and industry led us to conclude that there is no feasible path forward today to share the 5.3 GHz band. Those who have been following our efforts in this band likely are not surprised by this development as stakeholders on all sides have known for some time that we had high hurdles to overcome.⁹

The NTIA sharing study relates to radar instead of fixed microwave links. However, some additional information on the parameters and assumptions used for proposed unlicensed use that led to this conclusion would be helpful, especially given the FCC has apparently accepted the NTIA conclusion. Some or all of those parameters may very well be relevant to other bands as well.

⁸ NOI at paragraph 30.

⁹ Remarks of Lawrence E. Strickling, Assistant Secretary of Commerce for Communications and Information, The 5G Wireless Future and the Role of the Federal Government, Hudson Institute, Washington, D.C., December 16, 2016.

Conclusion

The NOI points out extensive fixed microwave and fixed satellite use already exists in the 5.925-6.425 GHz band. As detailed in these comments, public safety microwave systems in that 6 GHz band form complex networks with high levels of reliability required, given their role in supporting public safety's protection of the public. The previous reallocation of the 2 GHz microwave bands to emerging technologies funneled additional operations into the 6 GHz band and resulted in increased public safety reliance on the 6 GHz spectrum.

The 2 GHz history does not engender any confidence in spectrum sharing. There, the Commission stated it had underestimated the difficulty of sharing and modified its initial policy of co-primary public safety use to one that required public safety relocation out of the band when requested by new licensed PCS entrants.

If the difficulty of spectrum sharing for flexible use or the resultant potential for interference is underestimated at the 6 GHz band, catastrophic results could occur for public safety and the public it serves, whether new entrants are licensed or unlicensed. NPSTC is concerned that "spectrum sharing" to provide additional flexible use could eventually translate essentially into "spectrum confiscation," eliminating a resource for public safety, as was done previously in the 2 GHz emerging technology proceeding.

Unlicensed operation already enjoys 580 MHz of spectrum in the 5 GHz band and NPSTC is unaware of any credible technical studies that prove additional spectrum is needed. In fact, the NOI notes that existing unlicensed band segments which require dynamic spectrum selection (DFS) have less usage, implying that additional capacity already exists in those existing band segments and that any application of DFS in other bands such as 6 GHz may not provide the unlicensed community with a desired solution.

Ralph A. Haller, Chairman

A handwritten signature in cursive script, appearing to read "Ralph A. Haller", written in black ink.

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