

The T-Band Maze

How T-band licensees can prepare for the forced spectrum change, including potential spectrum and voice network options

By Stu Overby and Joe Ross

DPublic-safety and industrial/business licensees in 11 top metro areas in the United States use the 470 – 512 MHz T-band spectrum, first made available in 1971. Legislation known as Public Law 112-96, enacted Feb. 22, 2012, requires the FCC to start auctioning the spectrum no later than February 2021 and to relocate public safety from the band within two years after the auction concludes. The legislation allows proceeds from the auction of T-band spectrum to be used toward the cost of relocating public-safety systems out of the band.

Jurisdictions in many of those 11 metro areas have built extensive T-band communications networks to meet their operational needs. Also, in many cases, those networks are shared to provide regional interoperability among multiple jurisdictions and first responders. The T-band is a key spectrum resource, and its potential reallocation for FCC auction and commercial use raises many concerns for both public-safety and industrial/business licensees.

Two primary requirements for public safety to exit this band are to identify spectrum to which current T-band licensees would move and to ensure that the costs of moving are completely covered by T-band auction proceeds. Neither of these requirements is specifically addressed in the legislation. The legislation also made no mention of industrial/business licensees in the band that could also be impacted by an auction of the spectrum. As follow-up to the legislation, in April 2012, the FCC imposed a freeze on new T-band licenses or modifications to existing licenses that would expand the spectrum or geographic footprint. As implemented, the freeze impacts both public-safety and industrial/business users. When imposing the freeze, the FCC indicated it would consider waivers of the freeze on a case-by-case basis.

While the FCC has jurisdiction to impose, waive or modify the T-band freeze it has imposed, it cannot “waive” the specific legislative provisions that require reallocation and auction of the spectrum. Therefore, the

primary challenge now is to find viable ways to comply with the legislation or take steps to see if it can be changed. Any relocation, of course, must maintain necessary operational capabilities during and following the relocation. Public-safety operations cannot be compromised, and therefore, if no viable solution exists for relocation from the T-band, the law will need to be changed.

NPSTC Action

The National Public Safety Telecommunications Council (NPSTC) responded in June by establishing a NPSTC T-Band working group. This working group was chartered to study the issue, assess and document the impact of the legislation to public safety, evaluate the viability and cost of potential options, and form recommendations to the NPSTC governing board. Response to the NPSTC call for public safety and industry participation in the T-band working group has been significant; about 60 members volunteered. A liaison was established with the Enterprise Wireless Alliance (EWA), which advocates for industrial/business users, and the Land Mobile Communications Council (LMCC), covering all land mobile users.

Assessing spectrum availability and estimating relocation costs for the T-band markets is a complex task. Spectrum availability is site dependent. NPSTC doesn't intend to do the full frequency coordination by site, engineering design and costing on each T-band system in operation that

T-Band Markets in Use

Los Angeles
San Francisco
Washington/Baltimore
Boston
New York
Chicago
Philadelphia
Dallas
Houston
Miami
Pittsburgh

would ultimately be required in any relocation initiative. However, NPSTC is performing a high-level assessment across these 11 markets of the range of costs involved and the spectrum reality licensees would face in such a relocation initiative.

At the time this article was submitted, the NPSTC T-band working group had delved well into the analysis, but had not yet reached final conclusions or recommendations. The group developed and conducted a Web-based questionnaire of public safety T-band licensees, analyzed T-band license information from the FCC Universal Licensing System (ULS) database, developed a cost analysis model, and analyzed spectrum of alternative land mobile bands by metro market.

The NPSTC questionnaire responses have been analyzed by key topic. For example, NPSTC asked, “Can your agency move off of the T-band to another band?” Of those responding, 47 percent said there is no spectrum available in their area, 18 percent said they have spectrum but no funding, only 2 percent advised they have both spectrum and funding, and 33 percent had not yet studied how they could comply with the legislation. Regarding the FCC freeze, of those public-safety agencies responding to the questionnaire, 44 percent indicated they had planned to make T-band system changes that are now prohibited under the FCC freeze, 11 percent planned changes still allowed under the freeze and 38 percent indicated their system as currently licensed will meet their needs through 2023. The remaining 7 percent of respondents advised they didn’t fall into any of the three categories.

Spectrum Alternatives

A key part of the NPSTC task is spectrum analysis. For example, the map above shows a sample analysis for a single channel in the 800 MHz interleaved spectrum available to public safety. The red circle shows the 50-mile radius around Los Angeles within which T-band base stations are permitted. The green coverage contours denote existing licensed public-safety



Sample of an analysis map for one channel in the 800 MHz interleaved spectrum.

800 MHz stations on the channel under study, and the blue coverage contours are for licensed public-safety 800 MHz band stations on the adjacent channels. The map shows this particular channel in Los Angeles is already in use and unavailable for relocated T-band systems.

This channel-by-channel analysis is under way for all the 800 MHz interleaved public-safety channels in each of the 11 markets. That equates to about 900 maps being developed. Other bands are being analyzed in a variety of ways, related to the environment and FCC rules in those bands, as well as resources available to NPSTC.

NPSTC is also developing an estimate of the overall cost involved in moving the current T-band public-safety systems to alternative bands for each region. The actual cost of a transition out of the T-band requires detailed engineering analysis. Instead, the NPSTC working group is developing a high-level estimate that approximates the cost. An important consideration in the cost is what spectrum and technology solution will be required to vacate the T-band. The working group identified significant risk in relying on presently available broadband technologies to accommodate public safety’s operational requirements currently being met in the T-band. Those operational requirements primarily involve mission-critical voice for which standards in Long Term Evolution (LTE) broadband have not been developed. Further, the coverage of

some regional T-band networks is extensive, and it is not yet clear when broadband would replicate that coverage. As a result, the working group could not forecast the feasibility or cost of a broadband solution at this time. Instead, the group focused on transitioning to other narrowband systems and spectrum allocations.

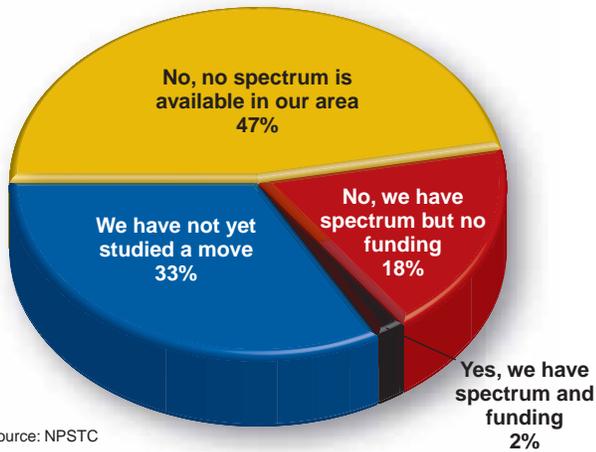
Such a transition is likely to be far more complex than 800 MHz rebanding. For example, many of the current T-band systems are conventional. However, if there is no alternative UHF spectrum, and a move to 700 or 800 MHz bands is defined as a viable solution, systems with more than five channels must be trunked under FCC rules. Furthermore, a migration to these bands impacts the coverage of the system, and more sites may be required to match the current operational capabilities. These factors can have a substantial impact on the work required to migrate out of the band. In 800 MHz rebanding, a substantial portion of the equipment could be reused because it could accommodate the existing and future bands. Multiband subscriber equipment is available, but much of the imbedded base of subscriber equipment in the T-band does not cover 700/800 MHz. Furthermore, infrastructure equipment is primarily single band and would need to be replaced. Therefore, the cost per system to move out of the T-band could be substantial.

Continued interoperability during and after the relocation is also a key requirement, which calls for the working group to develop some informed assumptions on the portion of portables that would need to be multiband and/or the cost of tying together infrastructure in different bands, depending on a jurisdiction’s operational requirements. These are just some of the issues under discussion and deliberation in the NPSTC T-band working group.

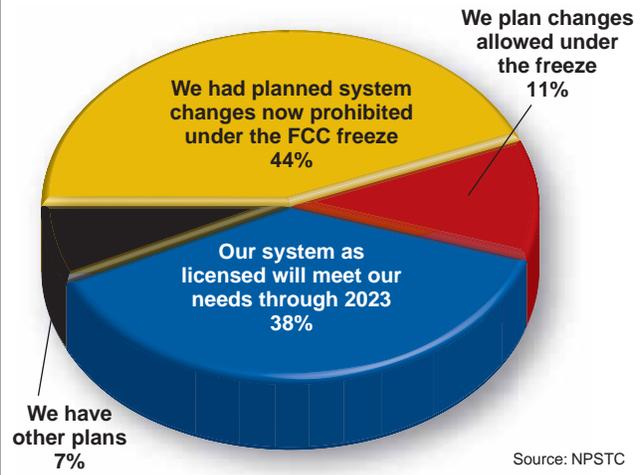
By the time you read this in February, much of the NPSTC analysis is expected to be available. Therefore, check www.npstc.org/TBand.jsp for additional information.

The T-band is a key spectrum resource for public safety, as well as

Can your agency move off T-band to another band?



What are your plans regarding the FCC freeze of the T-band?



industrial/business users, in the 11 top U.S. metropolitan areas. All T-band licensees should develop “situational awareness” on the T-band issues and be poised to participate directly and with respective associations as needed when additional opportunities arise. ■

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